I. Introduction

How much do you know about the air you breathe? Did you know that the air quality you experience can change in just the space from one city block to the next? It’s true!

Background:
The Idaho Department of Environmental Quality (DEQ) has stationary air monitors located in Boise, Meridian, and Nampa. The only two monitors that record PM 2.5 levels are those in Nampa and Meridian. Research has suggested that stationary monitors are not adequate in showing air quality variance across a larger spatial range. Using this information we asked: as the city of Boise, Idaho is growing, how do air quality levels vary throughout a greater spatial scale?

Why does it matter?
Particulates that are under 2.5 microns are small enough to enter your respiratory system, potentially causing health problems such as lung irritation, coughing, and sneezing and intensifying existing medical conditions like asthma and heart disease.

II. Methods

Sampling methods:
In 2017, we began weekly sampling in downtown Boise and along the Boise Greenbelt, hoping to capture air quality conditions during peak usage. We performed weekly sampling along the maps shown below using the MetOne model 831 Aerosol Mass Monitor to record PM 2.5 and the Strava™ running app to record GPS data points. The maps were compiled using ESRI ArcMap™.

III. Results and Conclusions

What are these maps saying?
The Environmental Protection Agency (EPA) sets air standards for PM 2.5 levels at 12.0 μg/m^3. There is consistent variation between sampling locations, though they are within EPA guidelines. Possible influences include: traffic along pedestrian-vehicle intersections, construction, and miscellaneous park activities.

Our findings:
Median values suggest that both sampling locations are below the EPA’s primary standards for PM 2.5 levels. Historically there is no high-resolution air quality data for the Boise area, but as more data is collected we can gain a better understanding of how population growth affects air quality, among other factors.

The data:
PM 2.5 levels are slightly higher in Boise downtown than on the Greenbelt due to vehicle emissions. We also compared mean values between vehicle intersections and pedestrian only areas on the Boise Greenbelt, and found no significant difference between the two.

Conclusion:
Boise’s population has steadily grown about 7% in the last seven years, and continues to grow at an expected rate of over 2% in the next year alone. Boise citizens are beginning to experience some of the pressures larger cities experience, such as denser urban centers and heavier traffic congestion. For local at-risk citizens, information about variations in air quality can be useful to help them determine how air in their neighborhood or commuting path will affect their health. The lack of coverage provided by current stationary air monitors limits the scope of this information. Future research could illuminate air patterns across the Greater Boise Area and provide useful data for public officials looking for options to monitor air quality trends across a greater range.

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