Do Air Quality Alerts Reduce Traffic? An Analysis of Traffic Data from the Salt Lake City Metropolitan Area

Calvin P. Tribby[1], Harvey J. Miller[1], Ying Song[1], Ken R. Smith[2]

[1]Department of Geography
[2]Department of Family and Consumer Studies and Huntsman Cancer Institute

INTRODUCTION

- This research explores the unintended behavioral consequences of the Air Quality Alert notification system in Salt Lake and Davis Counties, Utah.
- We statistically model 10 years of traffic count data in relation to Air Quality Alerts in the Summer (ozone) and Winter (PM 2.5) seasons to assess the spatial relationship between the data at the traffic counter level and the overall trends at the county level.
- For brevity, not all results are displayed. Contact calvin.tribby@geog.utah.edu for complete results.

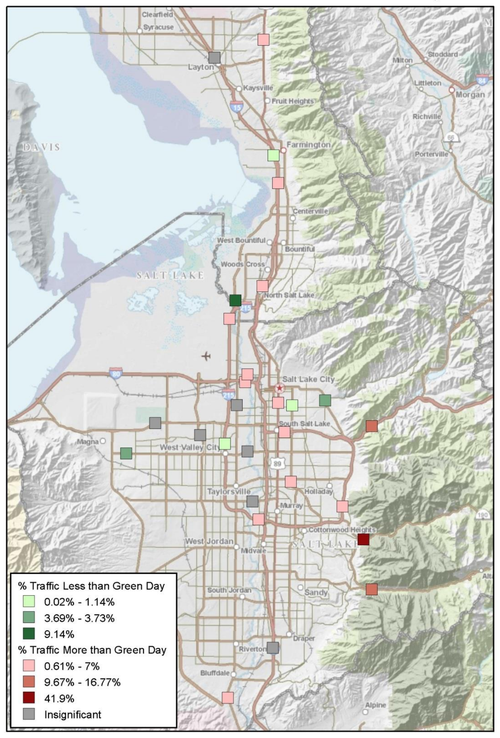
DATA and METHODS

Data Sources:
- Average daily automated traffic counter data from 2001-2011 at 28 locations
- Daily Air Quality Alerts (Red, Yellow, Green)
- Meteorological data in the Salt Lake and Davis counties study area

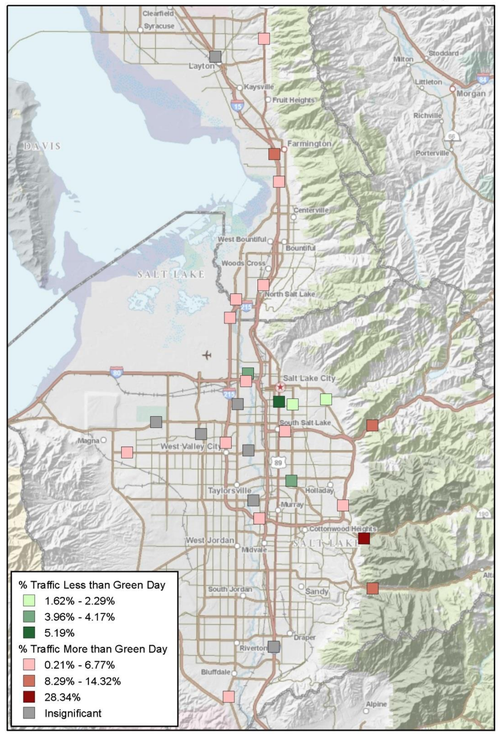
Two Main Methods:
1. Analyzing the spatial patterns of traffic volume among the Air Quality Alert categories with an analysis of variance at the traffic counter level.
2. Creating regression models to statistically analyze the relationship between the traffic volume and Air Quality Alert categories, meteorological factors, and days since last Green (non-alert) Air Day.

SPATIAL RESULTS

Mon. - Thurs. Red Ozone Days



Mon. - Thurs. Yellow Ozone Days



Main Result: In general, an increase in average daily traffic on Yellow Air Alert Days for both the ozone and PM 2.5 alert seasons, compared to Green Air Days, especially on canyon roads to the east. The city center sees some decrease on Red and Yellow Air Alert Days.

REGRESSION RESULTS

	Variables									
	Intercept	Yellow Day	Red Day	Max Temp	Min Temp	Wind Avg	Day Count	DOW 2	DOW 3	DOW 4
Baseline**	51395**	4334.37**	-191.95	65.97	-19.68	-343.47	-	2721.13**	-9245.31**	-20531.00**
Extended**	51274**	3006.18*	-2173.15	74.66	-33.06	-318.59	423.05*	2674.50**	-9287.63**	-20634.00**

Ozone (summer) alert pooled models for average daily traffic count independent variable.

	Variables									
	Intercept	Yellow Day	Red Day	Max Temp	Min Temp	Wind Avg	Day Count	DOW 2	DOW 3	DOW 4
Baseline**	46965**	3722.44**	2552.31*	228.16**	6.83	-125.37	-	2536.69**	-9570.36**	-21476.00**
Extended**	46971**	3151.36**	1787.28	228.81**	10.58	-128.33	176.05	2540.51**	-9567.12**	-21469.00**

PM 2.5 (winter) alert pooled models for average daily traffic count independent variable.
Model and variable significance: *0.05; **0.01;
Notes: Day Count: Days since last Green Day; Reference DOW: Monday - Thursday.; DOW 2: Friday; DOW 3: Saturday DOW 4: Sunday

Main Result: In general, an increase in average daily traffic on Yellow Air Alert Days for both the ozone and PM 2.5 alert seasons, even when controlling for the weather and the number of days since the last Green Day. Red Air Days are generally less significant, especially when accounting for the weather.

RESEARCH HIGHLIGHTS

We find that while Air Quality Alerts have some effectiveness for reducing traffic in the center city, these small reductions are exceeded by larger increases in traffic near the edge of the metropolitan area.

Increases in traffic during Air Quality Alert Days can be explained as discretionary trips by individuals escaping poor air quality by driving.

A policy implication is that soft policies alone, the voluntary suggestion to reduce driving, may not be effective at reducing driving behavior when the public health message, to limit outdoor exposure to pollution, conflicts with its public responsibility implication.

ACKNOWLEDGEMENTS

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