A Spatial Assessment of Environmental Factors and High School Performance

Brian Escobar GIS132 Brown University

INTRODUCTION

Question:
Is there a positive correlation between communities that are environmentally disadvantaged and the performance of students in school?

Why GIS?
With GIS, I am able to visually represent all of the data that I collected, visually analyze it, and come to a better conclusion than if I were to simply look at sheets and sheets of data. This includes data from the LA County as well as from the U.S. Census Bureau.

METHODS

CalEnviroScreen Version 2.0 (11/20/2014)

The Office of Environmental Health Hazard Assessment (OEHHA), on behalf of the California Environmental Protection Agency (CalEPA), provides a screening methodology that allows one to identify neighborhoods that are affected by different environmental risks. Taking all the environmental risks and the score they give each county, I took all the counties whose score percentile range was high (>70%) and isolated those counties (Fig. 1)

Demographic Information

While taking into consideration areas environmentally at risk, a subquestion that had to be addressed was if minorities were the ones located in these disadvantaged communities.

Obtaining the tabular data for people of color by census tract in California from the Census Bureau's American FactFinder (2010), which was later joined to spatial data of all census tracts in California, I isolated all the tracts where people of color (>= 70%) (Fig. 2)

CAHSEE Results

Gathering CAHSEE results for Mathematics and English-Language Arts (ELA) by Program (July 2013) for all grades state report, I compressed the numbers to reflect the total number of students passing both parts of the test per county.

RESULTS

Minority populations in environmentally unsafe areas.

Percentage of Students passing CAHSEE and Environmentally Disadvantaged Areas.

LIMITATIONS

Data Limitations

In my attempt to measure school performance in general, it was difficult deciding what was the best measure to do so.

Obtaining data from standardized tests was difficult to narrow down to the county level. However, once that was figured out, the next challenge was getting an overall score for the test due to the many different subjects (English, Language Arts, Algebra I & II, History, etc.).

The demographics portion of the study is done solely relying on racial data, without regards to economic well-being. The result of the total percentage of students who passed the CAHSEE exam, overlooks whether the students were economically disadvantaged or not, English-learning, under special education, etc.

Conclusions

Taking into consideration the tracts that are considered to be disproportionately burdened by multiple sources of pollution and the tracts with minorities making up more than 70% of the population, there is a visible pattern with both layers. The tracts with minorities line up with tracts that are environmentally unsafe. Many communities with minority groups lie in environmentally unsafe areas. This echoes a lot of the literature in environmental justice that claims many of the harmful pollutants and operations unfairly hurt minority communities.

There is a weak correlation between environmentally unsafe communities and high school performance in the CAHSEE exam (measure here for high school performance). There is an even number of schools that both pass with 70% or higher and lower than 70% in environmentally unsafe communities. Regardless of whether or not the schools are in counties disproportionately burdened with pollution, test results do not vary.

Sources

California Environmental Protection Agency (CalEPA), provides a screening methodology that allows one to identify neighborhoods that are affected by different environmental risks.

The result of the the total percentage of students who passed the CAHSEE exam, overlooks whether the students were economically disadvantaged or not, English-learning, under special education, etc.