

AIR QUALITY AT OAKLAND TECHNICAL HIGH SCHOOL

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INTRODUCTION

In order to determine the Air Quality at Oakland Technical High School, we conducted a series of experiments. The first experiment was to identify physical factors that affect air quality. We determined that the Port of Oakland and a local freeway were the most important factors. Second we used a series of devices and methods to test for particulate matter, wind speed and ozone. By measuring these factors, we were able to infer what pollutants affect the air quality at Oakland Tech. The goal of this study was to find the percentages of particulate matter, and Ozone that contributed to the overall air at Oakland Technical High School.

HYPOTHESIS

If we analyze the air around and in Oakland Technical High School through the use of various tools and comparisons, then we will find that the air quality around Tech will be of poor quality. We believe that particulate matter and ozone levels will be high and conversely oxygen levels will be low due to wind carrying pollution from surrounding areas.

PREDICTION

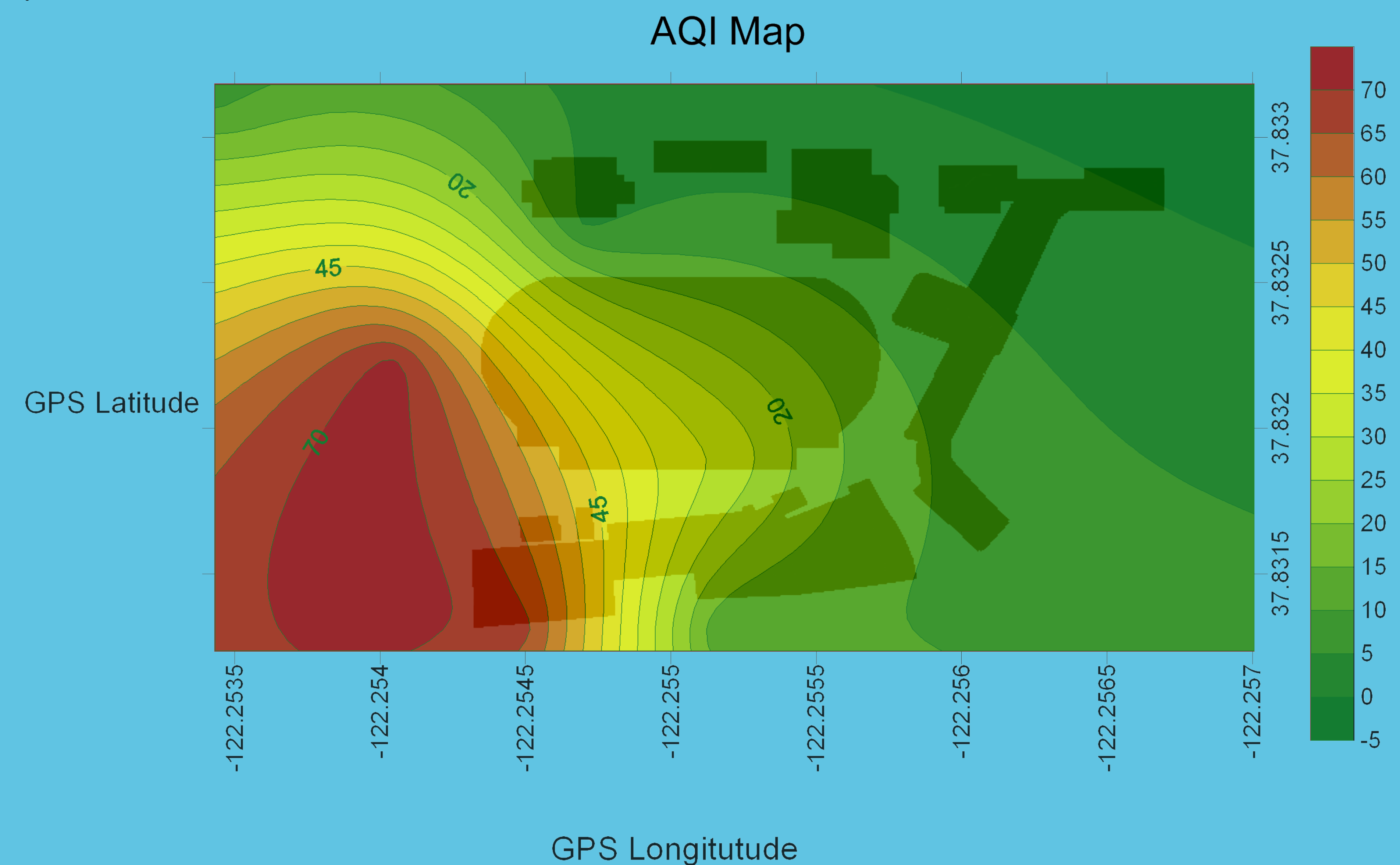
The following predictions are based on the fact that Oakland Technical High School is in urban area. Also, it is not too distant from the heavily industrialized West Oakland. For these reasons we predicted that the overall air quality of Oakland Technical would be negatively affected and thus inferred a number of things based on our assumptions which included the following

We predicted the outdoor quality better than the indoor quality. We assume this because the school is located near a main street. Also, because it is a school zone, each morning and afternoon bring with them cars and buses that cater to students' transportation needs.

Our research showed that the San Francisco Ozone percentage was 15 on the AQI scale and the percentage of Ozone in Los Angeles was 80 on the AQI scale. With these two pieces of data we estimated the Ozone would be low.

METHOD

1. Go to Oakland Technical High School and measure oxygen (O₂), ozone (O₃), fine and coarse particulates, wind speed and wind direction at fifteen sites. Use Xplorer Probe for O₂, a Fluke particulate matter counter for fine and course particulates, wind speed meter for wind speed and wind direction, and an ozone meter for O₃.
2. Create an Air Quality Index (AQI) based on the Index used by the E.P.A.
- 3). Analyze the data based on the Index.
 - Convert raw data into AQI values using the index.
 - Then plug the values into Surfer 7 to create a contour map.
 - Overlay the contour map onto satellite imagery from Google Earth.
 - Determine whether the air quality is good or bad.



RESULTS

The various measurements we took suggest that Tech's air is healthy.

We found that ozone was 15 parts per billion (ppb) at the highest. The site measuring at 15 was significantly higher than the rest of the measurements we found, and the lowest was 1.2 ppb. 15 ppb is very low according to the E.P.A. standard of 64 ppb. The ozone figures are especially low when compared to Los Angeles; the normal amount of ozone in L.A.'s air measures around 80 ppb on the AQI scale, but at Tech the highest value we found was 15 ppb as mentioned above. Los Angeles' ozone more than quadruples that of Oakland's. Even San Francisco's norm is at 15 ppb whereas 15 ppb was the highest value we found at Tech. The fact that all the other sites were below 15 ppb and well below 64 ppb suggests that the ozone level is low. The particulate measurements we found were much higher than their respective averages. For coarse particulates the highest value we found was 29.6 AQI, but that was an outlier as the next value was 15 AQI; the lowest was 1.1 AQI. The annual average in San Francisco was 22.9; therefore, the number of coarse particulates was within a healthy range. The fine particulate measurements we found were significantly lower than San Francisco's annual average. Whereas their annual average was around 43.6 AQI, ours was 23.5 which is nearly half of San Francisco's value. Our lowest was 11 AQI which suggests that the air surrounding Oakland Technical High School is healthy.

CONCLUSIONS

Through our analysis of the various air quality factors, we have concluded that the air quality around Tech is of good quality for an urban setting. Our observations of wind speed and relative air quality suggests that most pollutants are not carried to Tech by the wind from other locations. Since immediate pollution such as surrounding traffic and construction are the only factors contributing to the air quality of Tech, few pollutants enter the air. Although there may be error in our data from incorrectly calibrated devices, we can safely support our conclusion with our data. This data has given us reason to believe that pollutants are dispersed to other areas of Oakland. In order to find where these pollutants are spread, we need to expand the radius of our study by several concentric circles to discover the dirtiest areas of Oakland. This can give us further insight on where the pollutants travel if not to the school. Since our goal is to find sources of negative health effects for students in Oakland, it is important to widen our search area for more conclusive results.