



# +2 Valence Metal Concentrations in Lion Creek Oakland, California

Regina Chagolla, Mollie Dutton-Starbuck, Mesha Shaw, Perla Vasquez, and Ta'lajah Zedd



## Introduction

Lion Creek runs underneath our summer school site, Roots International Academy, and is exposed at a housing complex two blocks west of the school. We became interested in the quality of water in the creek because there are many people and animals that live within the watershed. Our research focused on heavy metal concentrations in Lion Creek. There is an abandoned sulfur mine at the beginning of the creek and we wondered what effect that may have on the quality of the creek's water downstream. The creek begins at the Leona Heights Park in the Oakland hills and flows down through the residential neighborhoods and into the San Francisco Bay estuary at the Martin Luther King Jr. Shoreline. In our study, we chose to focus on testing the levels of lead concentration in the water. We predicted that the quality of water would be lowest at Leona Heights Park, and highest near the estuary because the heavy metals would have settled to the bottom of the creek before the water reached the shoreline.



Two students collecting water samples (left). EBAYS student and staff at Martin Luther King Jr. Shoreline (right).

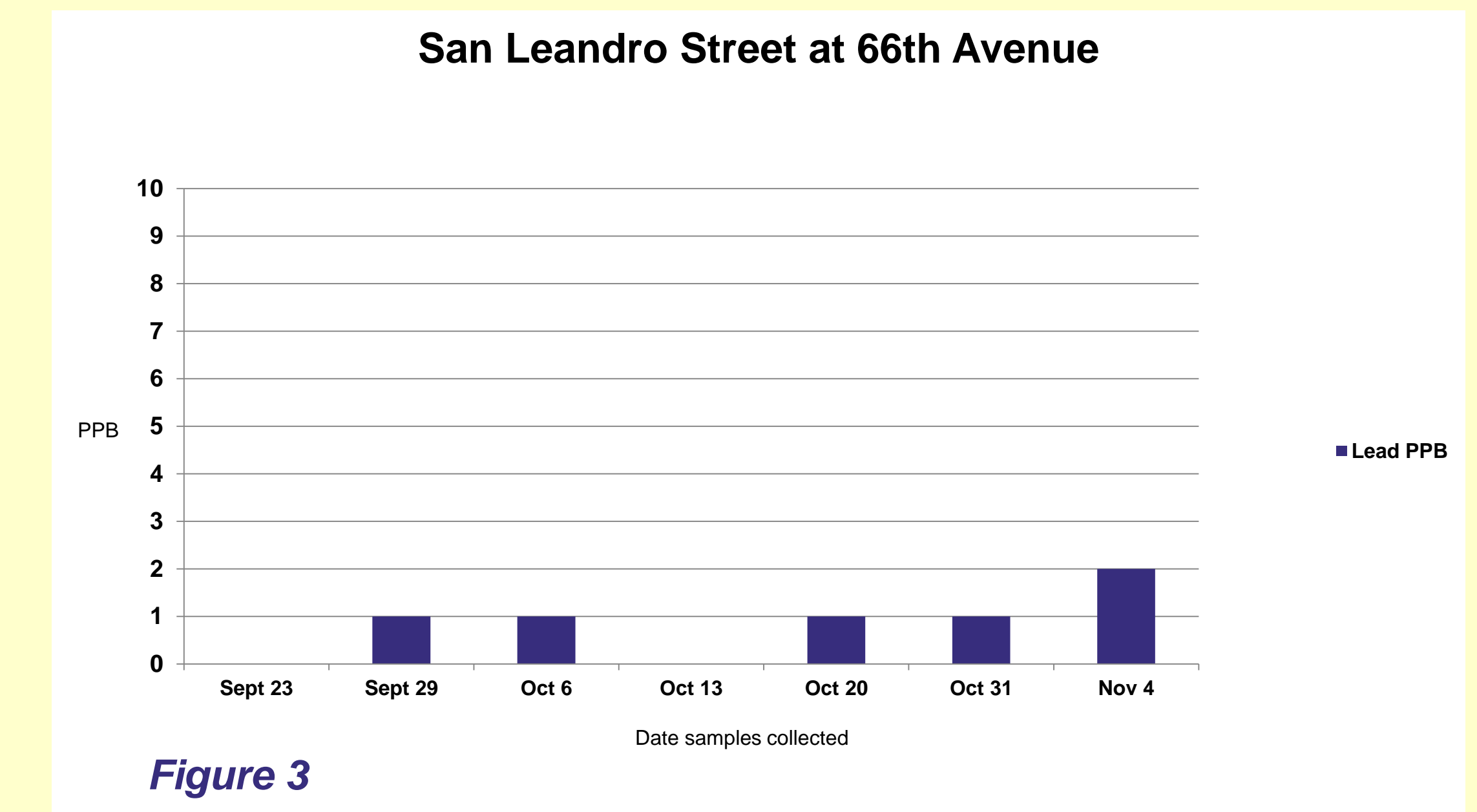


Figure 3

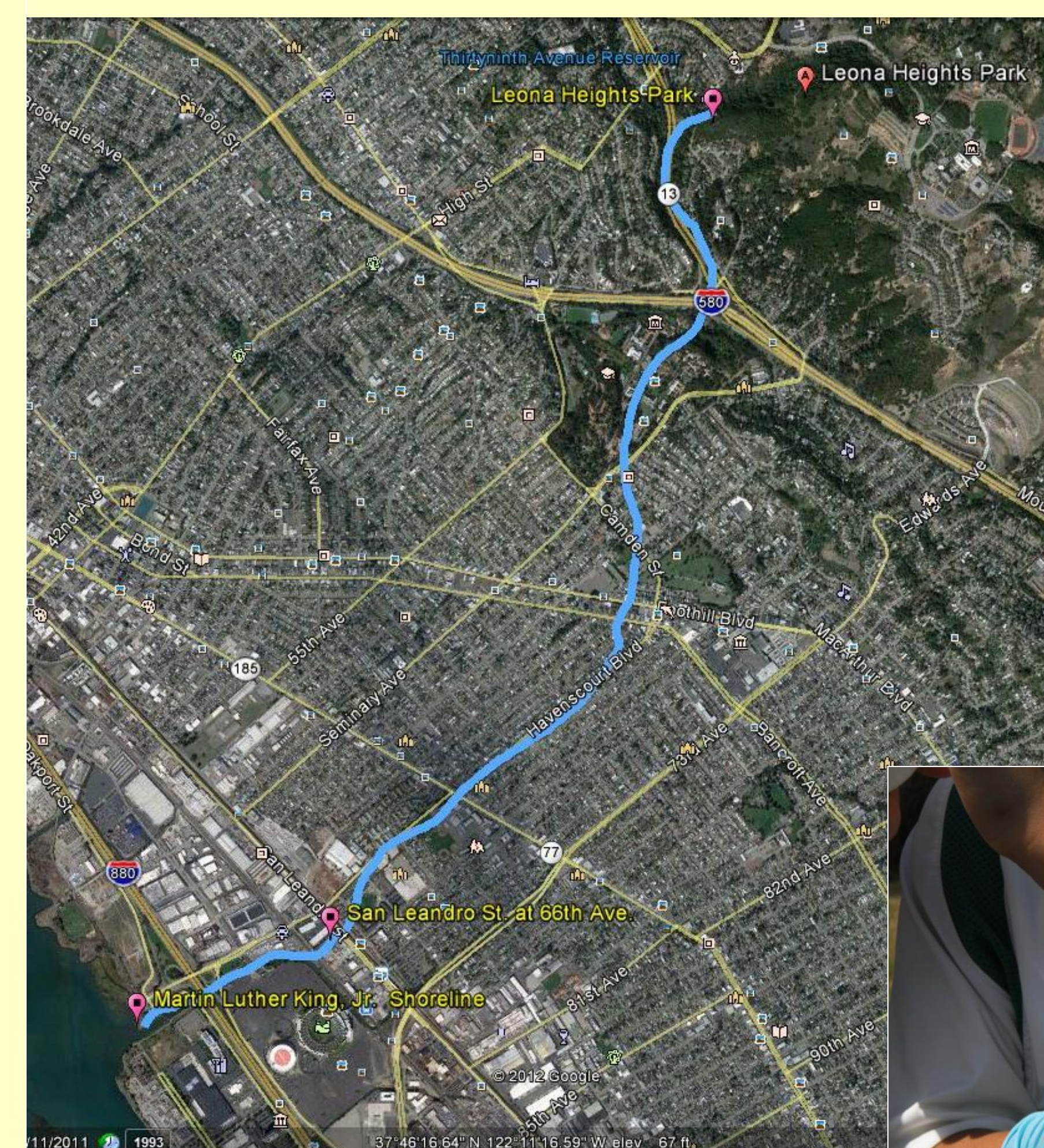


Figure 1: Map of Oakland CA. Blue line represents Lion Creek



Students testing for heavy metals.

## Materials and Methods

First we sampled for heavy metals in the Lion Creek using heavy metal check test strips that change color based on the concentration of heavy metals present in water. We tested water samples from the creek between International Boulevard and San Leandro Street. Based on the test strips, concentrations of heavy metals in this area of the creek ranged between 50 ppb and 100 ppb.

Upon determining these concentrations, we then tested the water specifically for lead concentrations using the Hach LeadTrak procedure from the three locations along Lion Creek. We continued to test at the San Leandro Street site and selected two new testing locations, upstream at Leona Heights Park and downstream at MLK Shoreline. We collected water samples to test levels on the following days: September 23rd and 29th; October 6th, 13th, 20th and 31st; and November 4th.

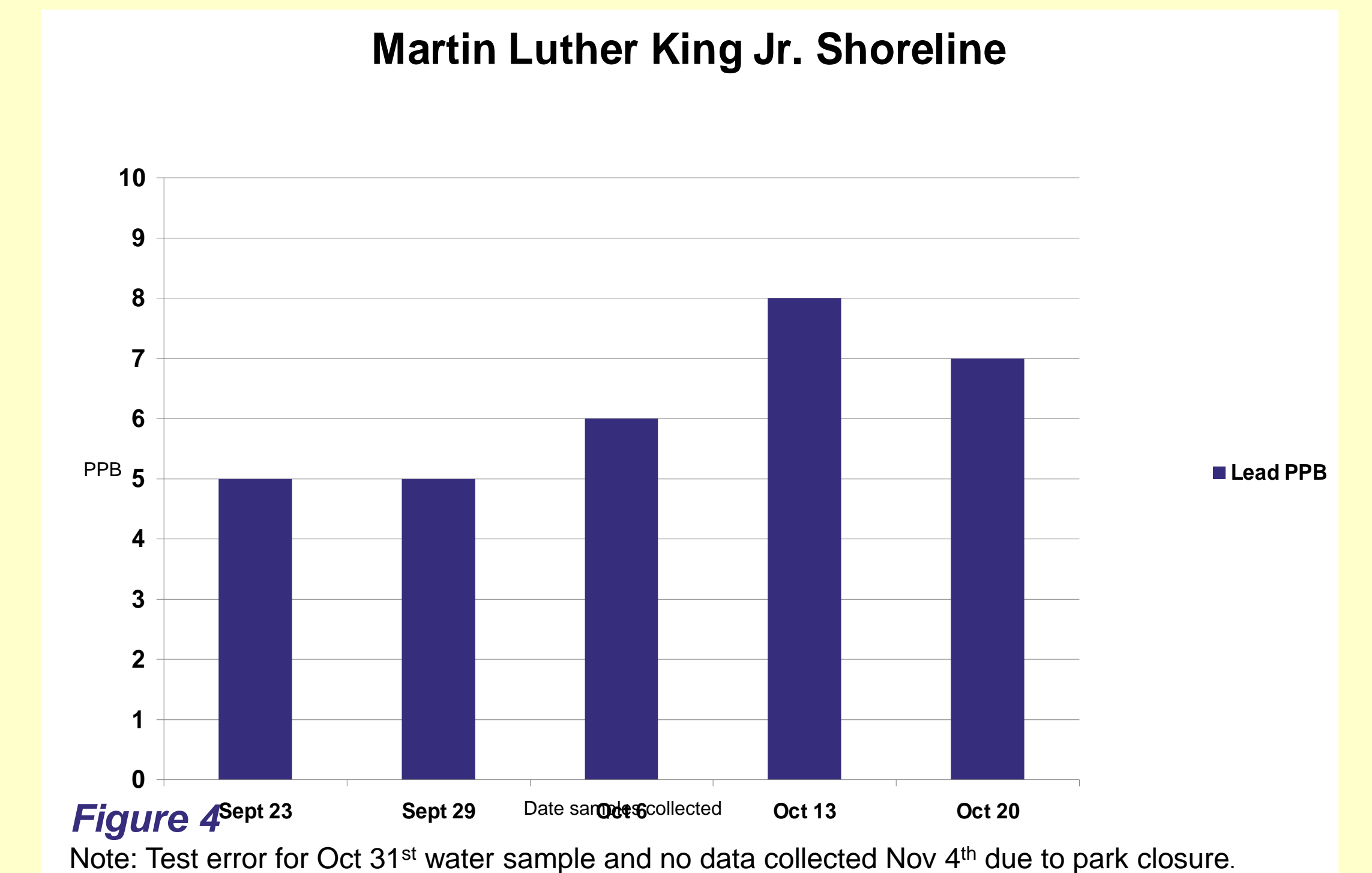


Figure 4

Note: Test error for Oct 31st water sample and no data collected Nov 4th due to park closure.

## Results

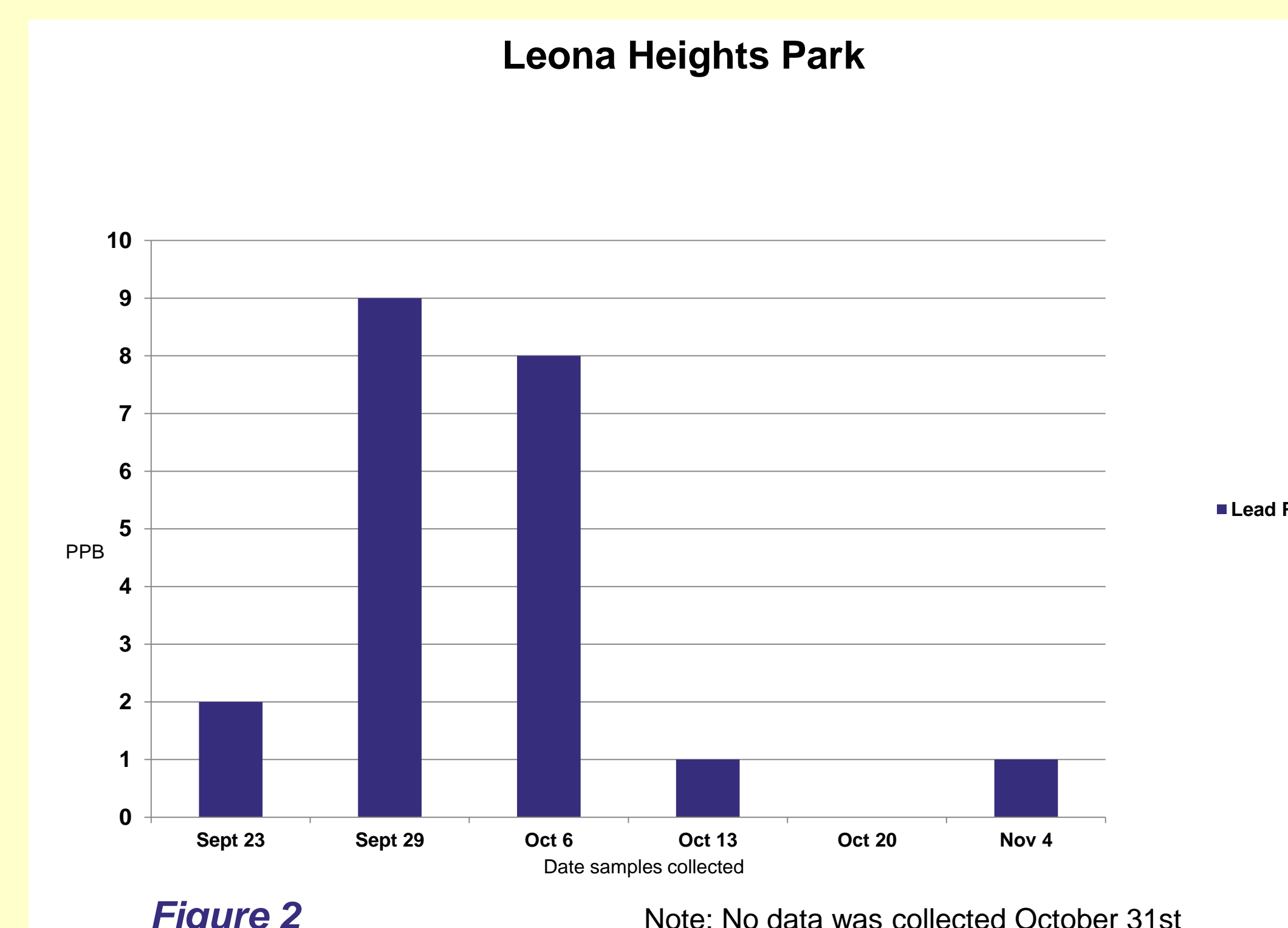


Figure 2

Note: No data was collected October 31st

## Discussion

Using the test strips, we discovered that there are heavy metals present in the waters of Lion Creek. We chose to test exclusively for lead concentrations. The lead concentration at Leona Heights Park is not consistent. We found lead at levels of 2, 9, 8, 1 and 1 ppb (Figure 2). The 9 ppb from Leona Heights Park had the highest lead concentration of any of the samples we collected. San Leandro Street at 66th Avenue had the lowest levels of lead (Figure 3). Martin Luther King Jr. Shoreline has the next highest concentration of lead in the water of Lion Creek (Figure 4). We discovered that although the San Leandro Street and the MLK Shoreline testing sites are only one mile away, the levels of lead found in the creek water at the MLK Shoreline were much higher than the levels found at San Leandro Street. The two different lead levels indicate that whatever is happening at the MLK Shoreline could negatively affect water quality in the watershed. This is important to study because MLK Shoreline is a habitat for living things such as birds and fish, including the California clapper rail which is an endangered species.

## Future Work

We would like to continue testing for lead concentrations and include more sample sites in areas between Leona Heights Park and San Leandro Street to have more complete data. We would also like to test for other heavy metals, such as arsenic and zinc.

## Study Settings

**Leona Heights Park:** Located east of Highway 13, Leona Heights Park is a small city park in a wooded area of Oakland. Lion Creek has its headwaters in this park. At the head of the creek, there is an abandoned sulfur mine where the water is dark orange in color.

**San Leandro Street at 66th Avenue:** Train tracks cross Lion Creek near this intersection. We have noted that many birds are present in this area. There is also an abundance of trash in and around the creek at this location.

**Martin Luther King Jr. Shoreline:** Lion Creek meets the San Francisco Bay at this point. The creek flows under the I-880 freeway just before flowing into the San Francisco Bay. There is an abundance of wildlife, including fish and birds.



Two students testing for lead at the EBAYS laboratory.

## Acknowledgements

We would like to thank the East Bay Academy for Young Scientists and the Aspiranet After-school summer program at Roots International Academy.