Plastic Trash: Following The Trail From Land to Water

Monica Mejia, Ana Rivera

Arise High School Oakland, CA

THE GLOBE PROGRAM
Global Learning and Observations to Benefit the Environment

Abstract (Summary)

• Our research question is: Even though Oakland has a plastic recycling program, will there be microplastics in the bay?

• We wondered about this because we were thinking about plastics and how they are in our daily lives.

• We collected data from our two water samples from different places in the San Francisco Bay.

• The data showed that there are microplastics in the water and trash floating in the water, so we conclude that there are microplastics affecting the water.

Background Information for Research

- We decided to do this research because we wondered if there were any microplastics in the wate of the San Francisco Bay.
- Plastics are found in our daily lives: the computers have plastic, the glasses have plastic, the chairs have plastic. We already knew that around the world a lot of people recycle plastic, from personal experience.
- In our Oakland community we have a plastic recycling program.

Research Question & Hypothesis

• Our research question is: Even though Oakland has a plastic recycling program, will there be microplastics in the bay

• Our claim is there will be microplastics in the bay because we see trash in the streets that doesn't get recycled.

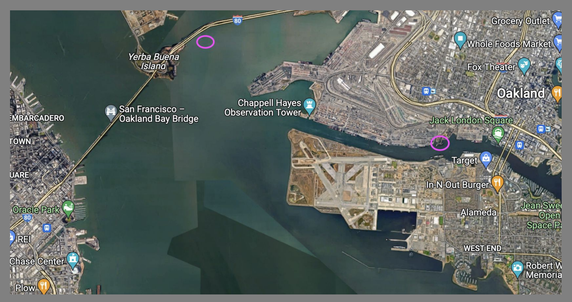
• This topic is important because we want to help our community to reduce the amount of plastic in the bay.

Planning and Carrying out the Investigation

- Our plan for the investigation was to collect data by collecting water samples to see if plastics are present.
- We collected two water samples on October 19, 2022. One sample was in the Oakland estuary (Site 1) and the other was under the Bay bridge (Site 2).
- We chose two different locations one close to shore (Site 1) and the other in the middle of the bay (Site 2) as shown in Figure 1.
- We analyzed water samples for microplastics, e coli, and inorganics using GLOBE protocols.

San Francisco Bay Water Collection Photos

Figure 1: Map of the study site location Oakland, CA October 19, 2022



Data Analysis

Data Relationships and Patterns

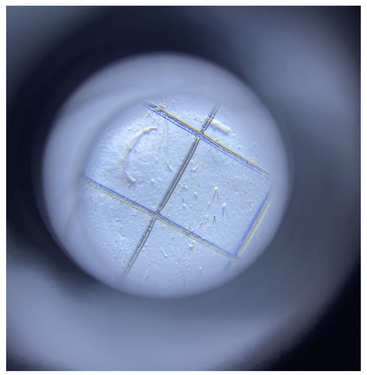
- As shown in our data the water was warmer at Site 1 and there was less dissolved oxygen more E.Coli present at this site.
- Also at this site we saw evidence of plastics on the surface of the water. (See Figure 2).
- Site 2 data did not show any unusual patterns in the water samples except for the presence of microplastics.

Data Visualization

Table 1 Water Analysis
(blue color indicates GLOBE Protocol)

Test	Site 1 - Estuary	Site 2 - Bay Bridge
pH	7.79	7.72
Temperature (c)	21.7	18.5
Dissolved Oxygen (ppm)	6.5-7 ppm	8.0 ppm
Nitrates (ppm)	0.0 ppm	.88 ppm
Alkalinity (ppm)	1.12	7.84
Salinity (ppt or %)	3.56	3.33
E.coli	63 mpv/100mL	10 mpv/100mL
Microplastics	Yes	Yes
Plastics/Trash Observed on Water Surface	Yes	No

Figure 2: **Microplastics from the Microscope**



Data Interpretation

Relating Data to the Research Question

• The data do help answer the research question because we saw microplastics at both sites.

• The data can be used as evidence to support our claim because it shows that some of those un-recycled plastics find their way into the water, both as trash and microplastics.

• One uncertainty we have is that we don't know what other cities have plastic recycling programs or where it came from.

• There might be a potential cause and effect relationship between the presence of people and a less healthy water ecosystem, because we know there are many more people in and around the estuary and there were signs of a less healthy ecosystem in that location.

Conclusion/Next Steps

• How our thinking has changed:
Before we started this class we knew that there was plastic on the surface of the water. Once we got on the boat in the estuary we were able to visualize the plastic floating in the water. Once we saw all the microplastics in the filter paper, we realized that there might be microplastic in every drop of water from the bay.

• Another way to interpret our data could be that we should be concerned about the trash in the streets.

• Future research could include how these plastics affect our health, and if there were more recycling programs would it reduce the amount of plastics in the water.

• One thing we enjoyed about this project was going on the boat and meeting Officer Albino.

References/ Bibliography

- ❑ GLOBE website. www.globe.gov - protocols
- ❑ Oakland Police Department - took us on the trip
- ❑ Water Board provided information on E.Coli