

# Comparing the amount of microplastics in two of Wrangell's harbors

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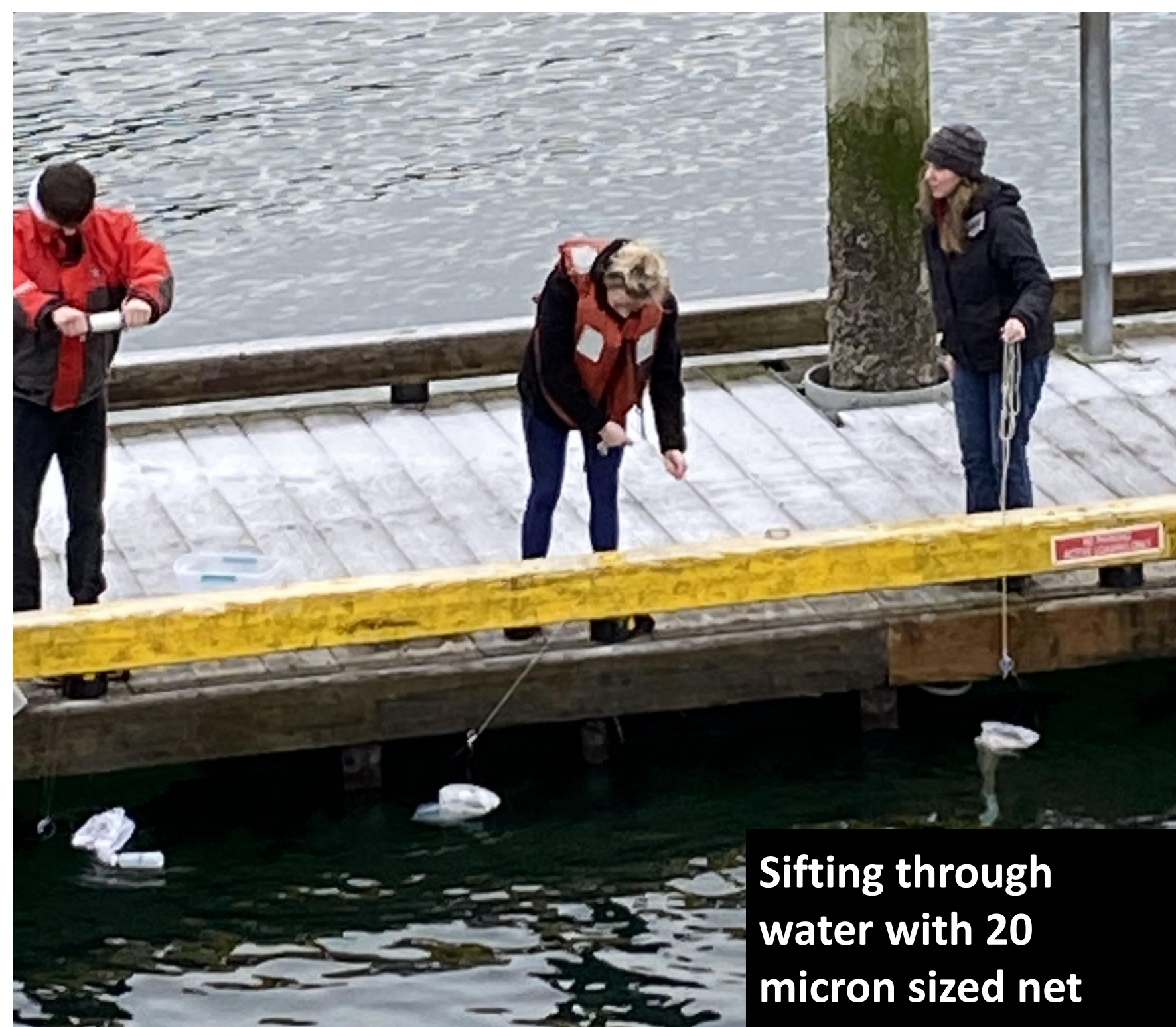
## Introduction

A microplastic is a piece of plastic less than 5 millimeters in size. Since plastic isn't biodegradable, it mechanically breaks apart into smaller and smaller pieces as it is weathered (Gola et al. 2021). Marine microplastics affect marine fish and the marine food chain. The microplastics can have a toxic effect on fish and other aquatic life, including reducing food intake, delaying growth, causing oxidative damage and abnormal behavior (Wright et al. 2013). Microplastics can come from the breakdown of old fishing gear, water treatment plants, canneries, and float houses. Microplastics are too small to get filtered through wastewater treatment plants. In our project, we wanted to find if microplastics are in our environment here in Wrangell.

## Hypothesis

We predict that microplastics will be found around the harbors of Wrangell, Alaska. We predict that there will be more microplastics in Heritage Harbor than Reliance Harbor due to its proximity to the wastewater treatment plant.

## Methods



Sifting through water with 20 micron sized net

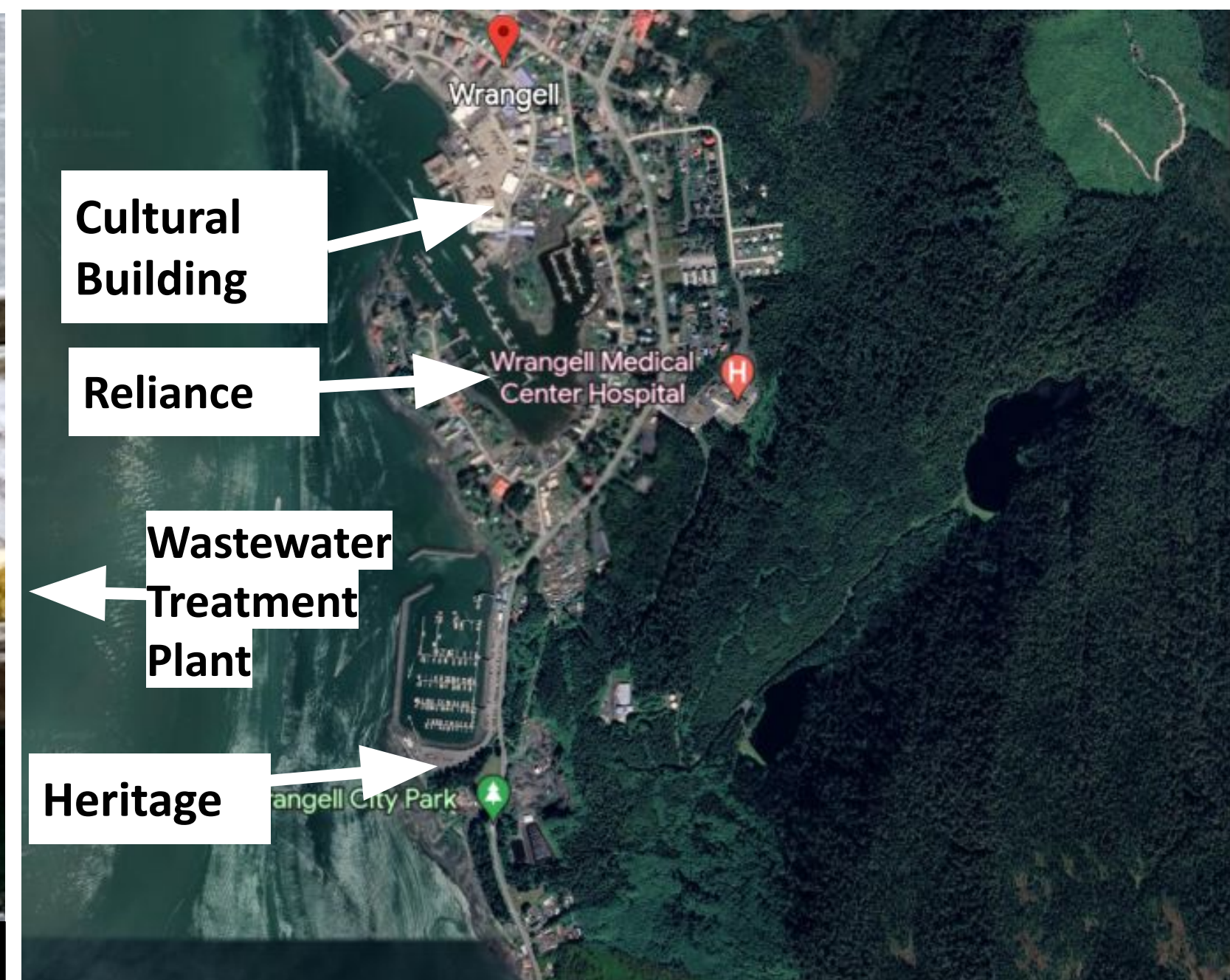
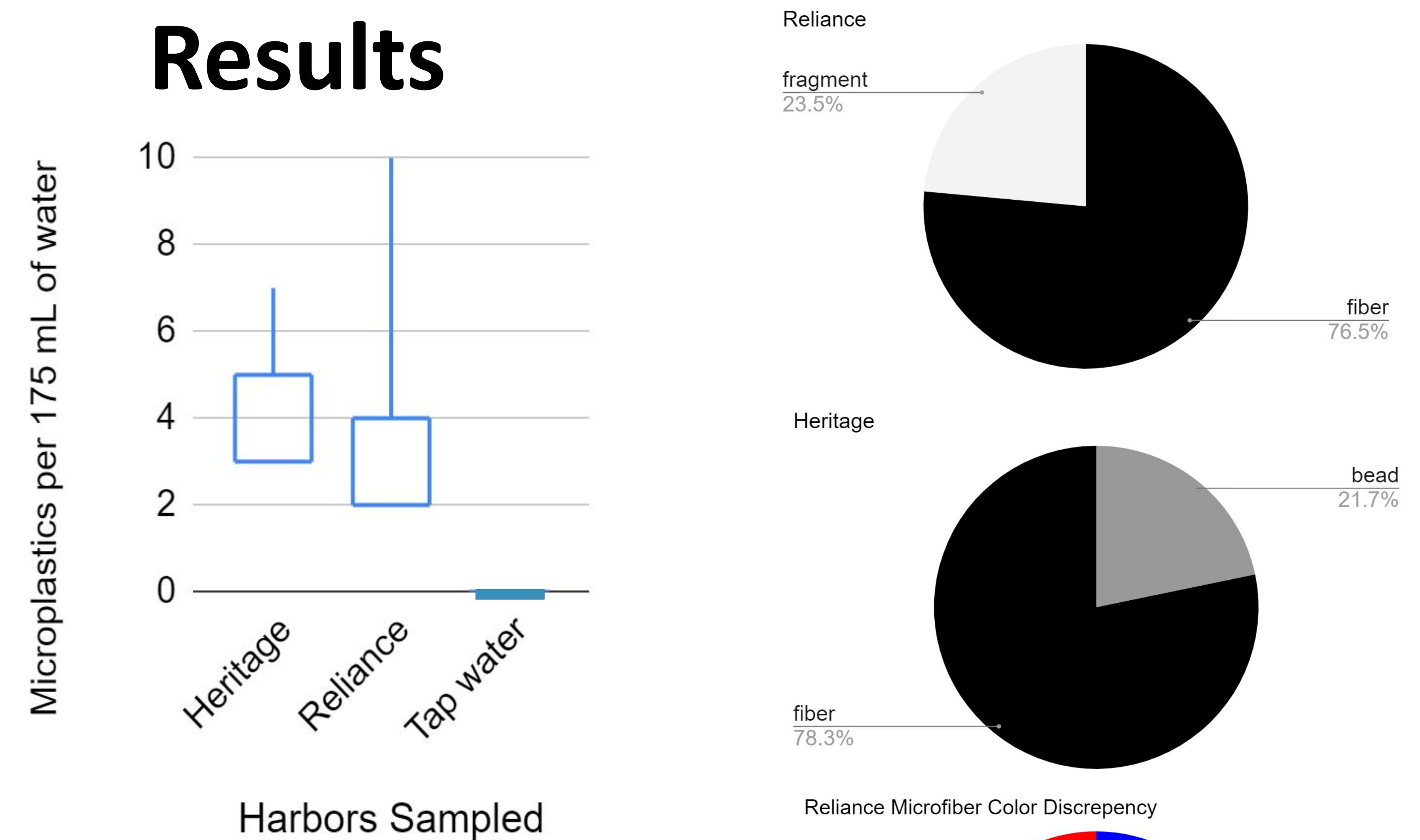


Image of the location of harbors

For this project, we used two different sample locations: Reliance Harbor and Heritage Harbor. A total of 5 samples were collected from each harbor on January 10th. For our collection process, we used a 20 micron sized net, and dragged it through the water for 5 minutes. After collection, the samples were processed at the Wrangell Cooperative Association building. The water samples were vacuum filtered, then the filters were viewed under a microscope, the microplastics were identified and counted. We used a burn test to determine the difference between microplastics and other debris. To create a control, we filtered tap water. No microplastics were found in the tap water.

References  
 Gola, D. (2021, August 9). The impact of microplastics on marine environment: A Review. Environmental Nanotechnology, Monitoring & Management. Retrieved April 19, 2023, from <https://www.sciencedirect.com/science/article/abs/pii/S2215153221001276>  
 US Department of Commerce, N. O. and A. A. (2016, April 13). What are microplastics? NOAA's National Ocean Service. Retrieved April 17, 2023, from <https://oceanservice.noaa.gov/facts/microplastics.html>  
 Wright, S. L. (2013, March 29). The physical impacts of microplastics on marine organisms: A Review. Environmental Pollution. Retrieved April 19, 2023, from <https://www.sciencedirect.com/science/article/abs/pii/S0269749113001140>

## Results



- Heritage harbor had more microplastics on average but Reliance harbor had a larger range of numbers of microplastics
- No microplastics were found in the tap water control
- The majority of the microplastics found were microfibers in both locations. Heritage had beads present while Reliance had fragments.
- Blue and green microplastics were present in both locations
- Heritage samples had more different colors of microplastics

## Discussion

Our hypothesis was supported by our discovery of microplastics in both locations as well as a higher quantity at Heritage. We believe that the difference of microplastic quantity is a result of the location of Wrangell's water treatment facility, which is near Heritage Harbor. Potential sources for microplastics that come from our water treatment facility are microfibers from washing clothes and beads used in shampoo and toothpastes. In future experiments, it would be beneficial to have a more fixed and determined way to count our microplastics. A new question and potential future experiment would be comparing the microplastic quantity at different places within each harbor and how they compare. Another question that was raised was what direct effects on the environment do these microplastics have.



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