

2024 Analysis of Microplastics in Bed sediment of Bellingham Bay



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Introduction

Microplastics originate from the weathering, physical erosion, chemical reduction, and disposal of plastic products and are characterized by their size being 5mm-100nm. For this project we analyzed 12 different sediment samples taken from Bellingham Bay to understand the anthropogenic effect on ecosystems within the bay. This project was an overall assessment of the condition by calculating the concentration of MPs/m² on the seafloor.

QUICK MICROPLASTIC FACTS:

- Microplastics have been found in humans (Bridget, 2024)
- Can be found in the surface water of the ocean and the sediment of the deepest trenches (Tsuchiya et al. 2024)
- Microplastics are classified into five types; Fibers, films, pellets, foam, and fragments. (Ziani et al, 2023).
- Their size is classified as between 100nm and 5mm. (Ziani et al, 2023).
- They bioaccumulate in shellfish and other organisms. (Claessens et al, 2013).

Methods

- Collected by Marine Sediment Monitoring Team from Department of Ecology
- 30 locations in Bellingham Bay
- van Veen grab sampler for collection
- Used density separation and oxidation (Masura et al. 2015)
- Counted in 0.333µm sieve
- Calculation: microplastics/m²
- Control of study: Bellingham Bay
- Variables of study:
 - total amount of MPs
 - type of MP (fiber/film/pellet)
 - size of MP
 - MP color
- Possible errors:
 - multiple people counting, no consistency
 - missing data from lab transfer

Results

- Majority of the microplastics were fibers (92.1%) (fig. 1).
- Coloring for most microplastics were clear (67.7%) or white (13.2%) with a smaller percentage of microplastics with varying colors (fig. 2).
- With an R² less than 0.1 for wet and dry we found no correlation between microplastics and median grain size.

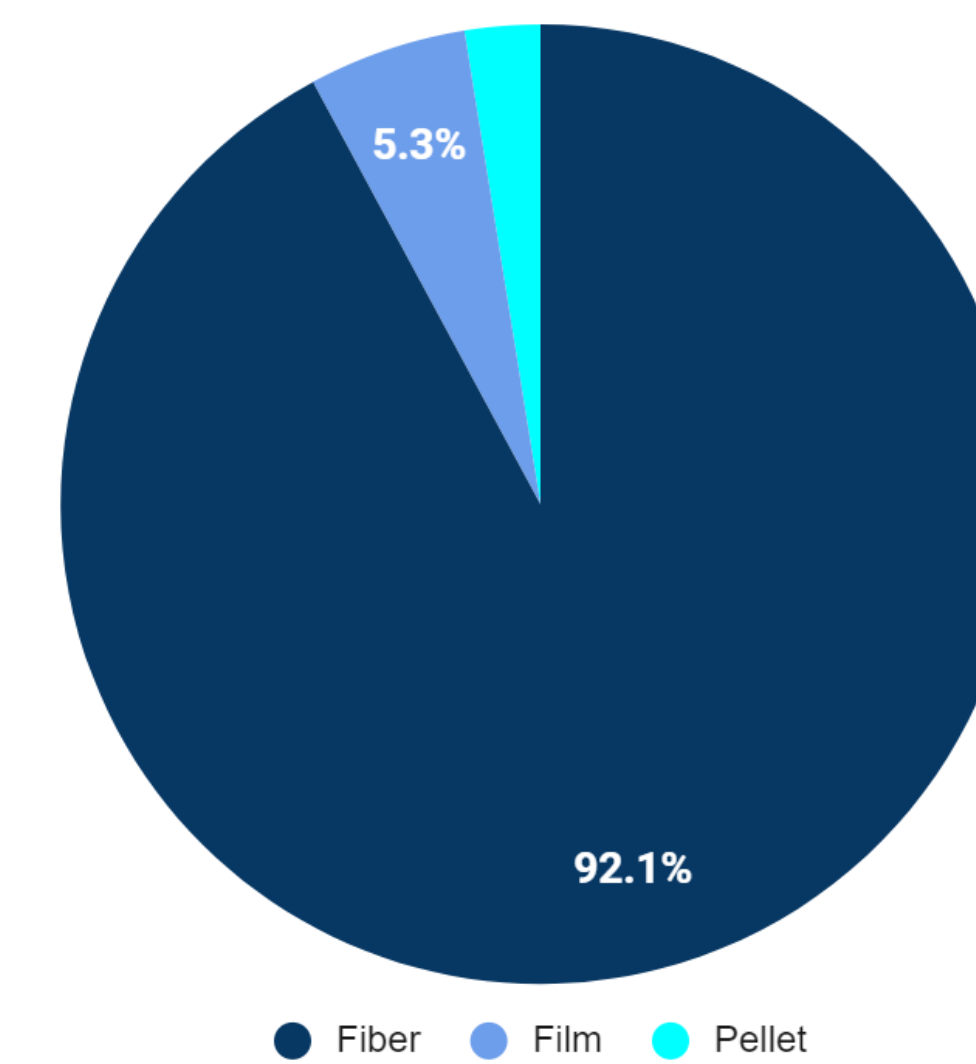


Figure 1. Distribution of microplastics type.

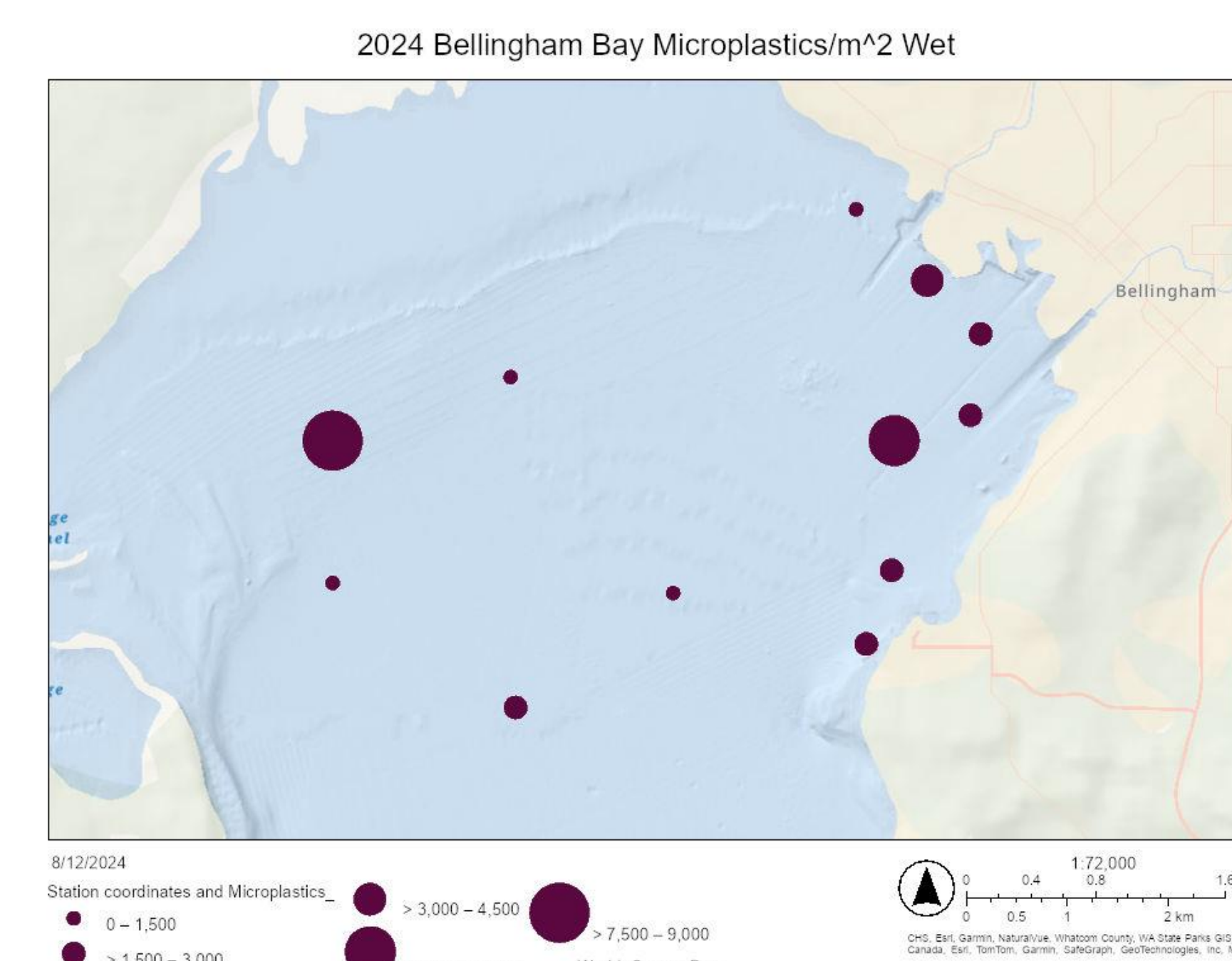


Figure 3. Microplastic abundance count per square meter of wet sediment. Divided into five classes, the groups represents a range of 0-9000 MPs/m².

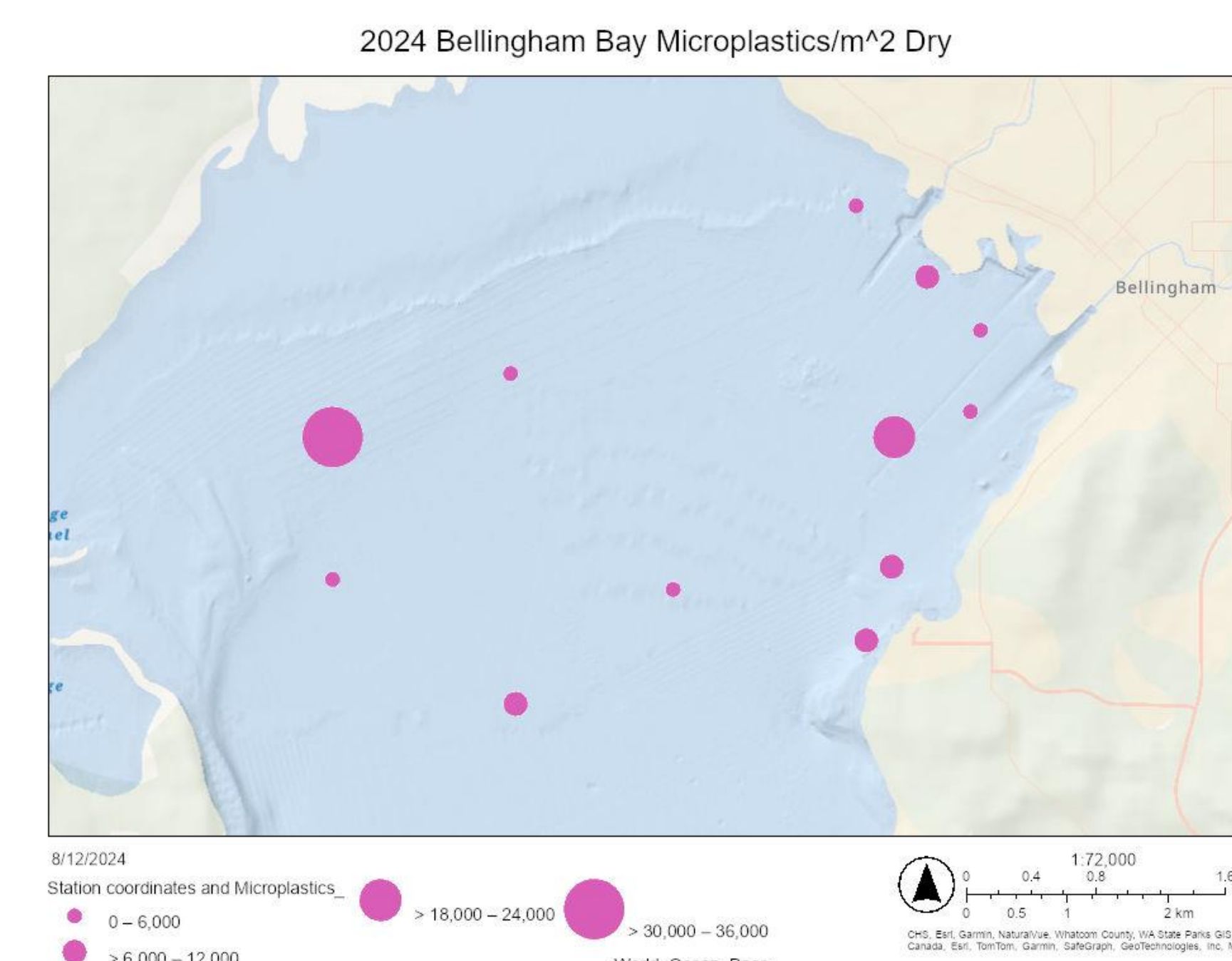


Figure 4. Microplastic abundance count per square meter of dry sediment. Divided into five classes, the groups represent a range of 0-36000 MPs/m².

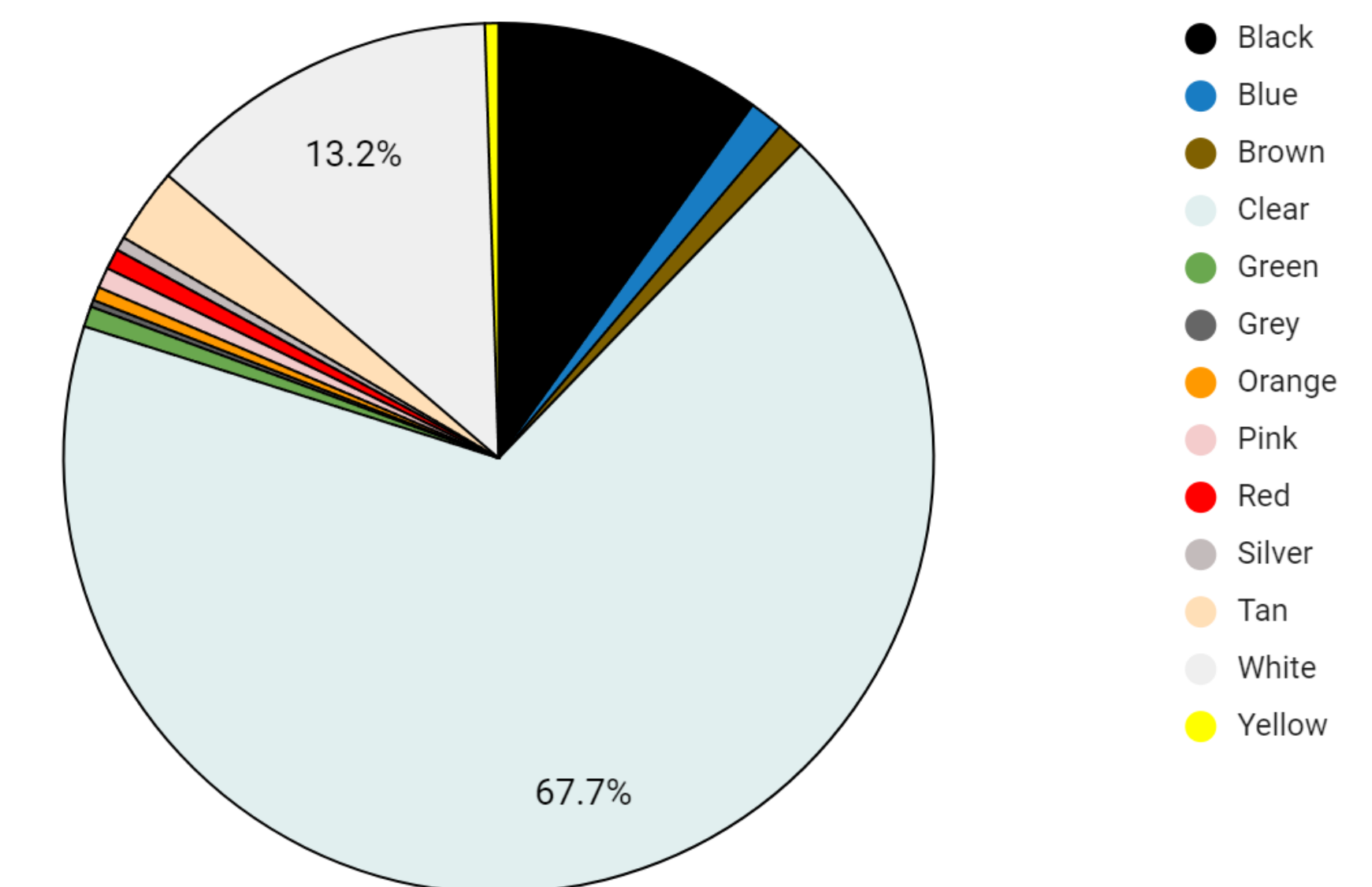


Figure 2. Distribution of microplastics color.

Conclusion

Our findings suggest that the majority of MPs are clear fibers which can be speculated as potentially harmful since MP fibers are able to get in marine life that humans consume. Due to power outages on campus we were unable to analyze all samples collected for the year 2024. Proceeding any future work, we would start by finishing the analysis of the remaining samples.



Figure 5. Microplastics under a microscope showing fibers, pellets, and films (Dunning 2024).

Figure 6. Microplastics under a microscope showing fibers and their relative size (The Young Darwinian 2018).

References:

