2024 Analysis of Microplastics in Bed sediment of Bellingham Bay

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Introduction

Microplastics are a byproduct of the weathering, physical erosion, chemical reduction, and disposal of plastic products which have been incorporated into almost every facet of human consumption. This research aims to capture data of the abundance and locations of microplastics in the bed sediment of Bellingham Bay in Northern Puget Sound. In doing so, we hope to add to the body of work of previous data samples as well as make observations from this data.

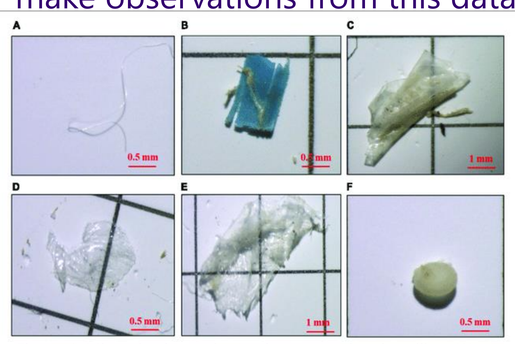

Figure 1. Microplastics under a microscope showing fiber (A), fragment (B,C), film (D,E), and pellet (F).(Jiajia et al. 2021)

Methods

- Sediment collected in June 2024 with a van Veen grab sampler by Marine Sediment Monitoring Team from Department of Ecology
- Collected from 30 locations in Bellingham Bay
- Used density separation and oxidation (Masura et al. 2015)
- Counted in 0.333µm sieve
- Calculation: microplastics/m^2 of Seafloor sediment

Results

- Coloring for most microplastics were clear (67.7%) or white (13.2%) with a smaller percentage of microplastics with varying colors (fig. 3).
- Majority of the microplastics were fibers (92.1%) (fig. 4).
- With an R^2 less than 0.1 for wet and dry we found no correlation between microplastics and median grain size (fig. 5&6).
- Control of study: Bellingham Bay
- Variables of study:
  - total amount of MPs
  - type of MP (fiber/film/pellet)
  - size of MP

QUICK MICROPLASTIC FACTS:

- **Microplastics are classified into five types; Fibers, films, pellets, foam, and fragments. (Ziani et al, 2023).**
- **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)**
- **Their size is classified as between 100nm and 5mm. (Ziani et al, 2023).**
- **They bioaccumulate in shellfish and other organisms. (Claessens et al, 2013).**

References:

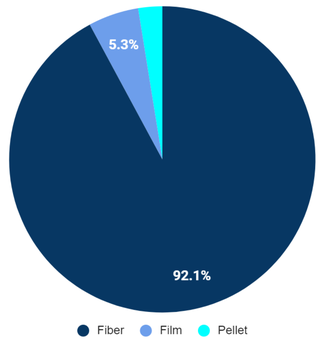

Figure 2. Distribution of microplastics type.

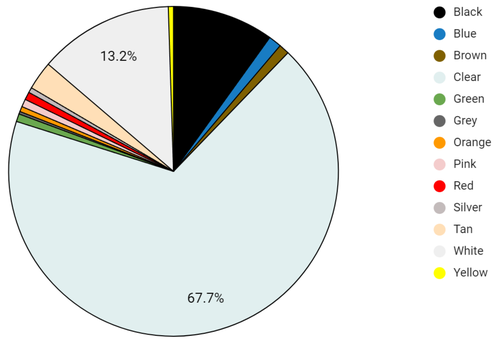

Figure 3. Distribution of microplastics color.

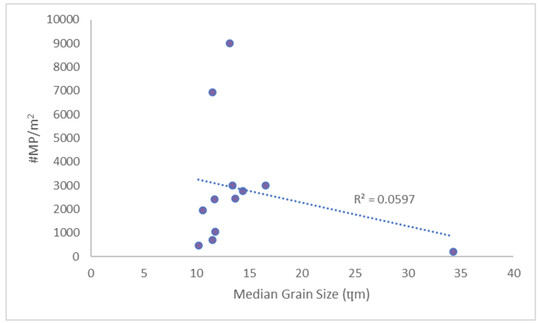

Figure 4. No correlation of Median grain size (ɥm) Wet with MPs/m^2 .

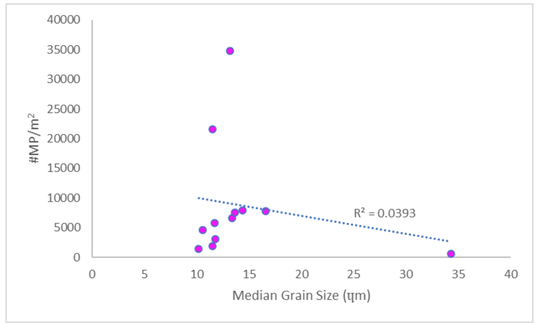

Figure 5. No correlation of Median grain size (ɥm) Dry with MPs/m^2

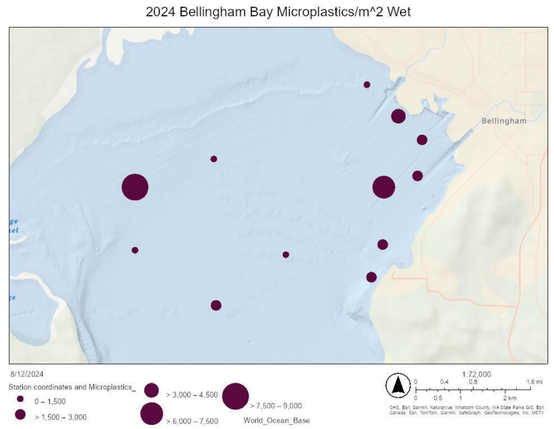

Figure 6. Microplastic abundance count per square meter of wet sediment. Divided into five classes, the groups represents a range of 0-9000 MPs/m^2.

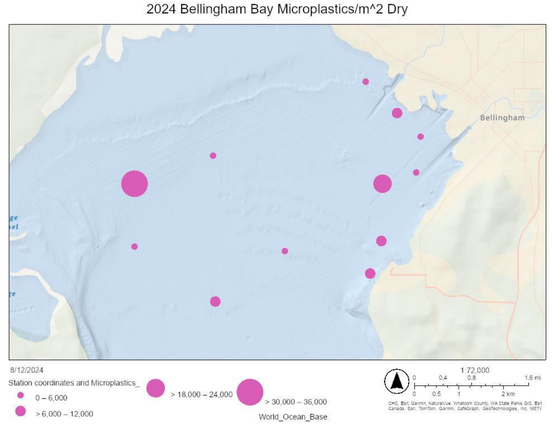

Figure 7. Microplastic abundance count per square meter of dry sediment. Divided into five classes, the groups represent a range of 0-36000 MPs/m^2.

Discussion

Microplastic abundance has no clear pattern with certain stations finding more MPs than others. This can be attributed to the uniform distribution of grain size and water currents. The similar grain size in most of out locations explains why we found no significant relationship with them and the amount of microplastics. Possible sources of error come from multiple different people hand counting the microplastics.