2022 Microplastic Quantification of Puget Sound

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Introduction and Purpose

- The sediments of Puget Sound and the invertebrates that live on and within them, known as the benthos are a vital component of the Puget Sound ecosystem
- Benthos play a key role in these biogeochemical processes, changing sediment properties as they move through, feed, and respire within the sands and muds of Puget Sound.
- Microplastics has the potential to cause harm to bottom-dwelling invertebrates and fish as well other organism part of the food web.
- Below is an image that shows the effects of MPs (microplastics) on Benthos

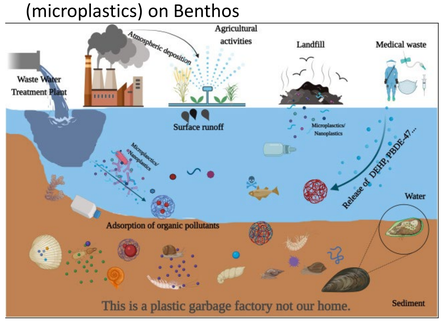

Figure. 1 Effects of Microplastics on Benthos (Gao D. 2022)

- This project looked for microplastics in bed sediments from Puget Sound, Washington.
- The research involved counting the number of microplastics given within a sediment sample.
- The process of microplastic isolation requires density separation of sediment samples using lithium metaphosphate, as well hydrogen peroxide; afterwards, microscopy was used in order to count the number of samples.
- Most common sources of MPs in the ocean come from car tires and synthetic textiles (as shown in the image below).

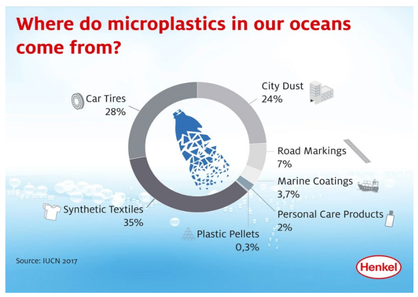

Figure.2 Sources of Microplastic within the ocean (Henkel. 2018)

Research Site

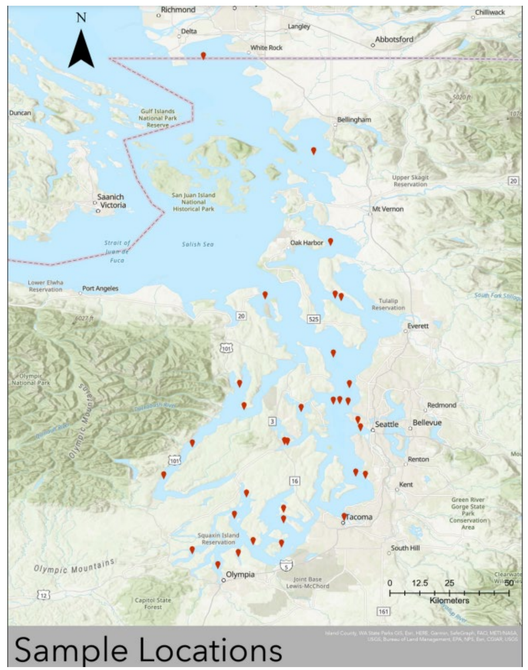

Figure. 3 Map of Sample Locations across the Puget Sound. Credit: Clint

Methods

Wet Peroxide Oxidation (WPO)

- Field sieve samples are dried and weighed
- Wet Peroxide Oxidation, with Fe (II) catalyst
- $Fe(II)/H_2O_2$ oxidizes labile organic matter prior to gravimetric analysis
- Plastics are resistant to WPO
- Samples visually inspected with microplastics removed
- Removed microplastics are gravimetrically analyzed

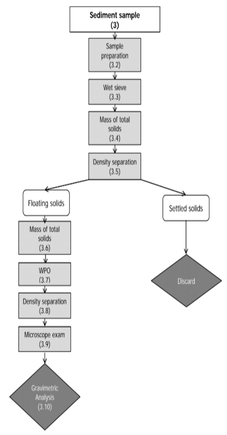

Figure. 4 Flow diagram for the analyses of microplastics in sediments

Methods (continued)

Figure. 5 Density separation of sample.

Figure. 6 Prepared sample ready for microscope examination

Data and Results

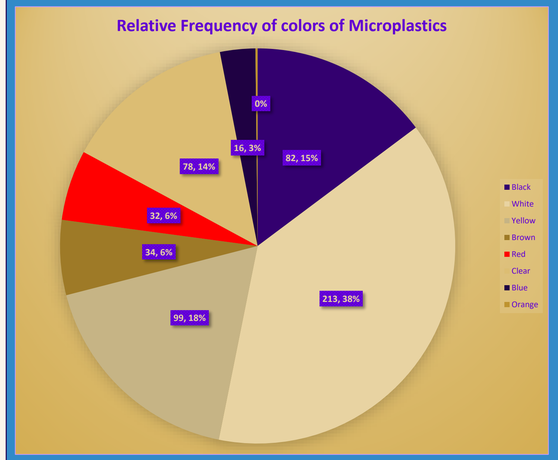

Figure. 7 Data of Microplastic Colors Frequency across all the stations

- 555 microplastics were observed, all samples were fibers
  - 38% of fibers were white
  - 18% of fibers were yellow
  - 15% of fibers were black
- Microplastics were found at every station
- Errors may include small spills and outside contamination during isolation procedures
- 32 stations were sampled.

Conclusion and Future Works

- The data obtained is a small portion of the analysis conducted by the Puget Sound Sediment Monitoring Program.
- Quantification of microplastics and data will be submitted the Marine Water Report supported by the Puget Sound Partnership.
- Hopes to influence future policy makers on importance of microplastics.
- The data from this research can be expanded and used for another research:
  - Concentrations of microplastics
  - Microplastic toxification
  - Sediment pollution
- This data is vital in maintaining the health and quality of the Puget Sound

I hope the data provided in this research can be used by the public to learn the impacts and the amount of microplastics in our current ecosystem. Maintaining the quality of sediment, will provide a better benthos environment for ourselves and future generations to come.

Acknowledgments

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Work Cited

References Here: