2022 King County Quantitative Assessment of Microplastic Contamination in Puget Sound Sediments

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Introduction

> Microplastics are found in almost all lakes, rivers and marine environments

> Secondary microplastics enter marine sediment through degradation of larger plastic pollution from terrestrial sources

> Although the effect of these plastics on organisms is not well understood, they are known to be consumed and travel through all trophic levels

> The King County Sediment Monitoring Team provided 8 samples from the King County region of the Puget Sound to UW Tacoma to analyze for microplastic abundance to create a baseline for future analysis

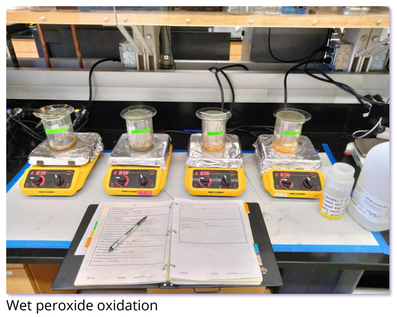
Methods

> Sediment samples were mixed with potassium metaphosphate to disaggregate the fine-sediment particles. The samples were then sieved through a standard 330 µm sieve to remove silt and fine clays

> The first density separation utilized lithium metatungstate (LMT) to float the less dense material to include microplastics. The floating solids were poured through the sieve and the LMT was recovered and filtered

> To reduce the amount of natural organic matter wet peroxide oxidation was used

Solids from LMT separation



Wet peroxide oxidation

Methods (continued)

> 6g of salt per 20mL of remaining solution was added to increase the density. A total of 30g of salt was added

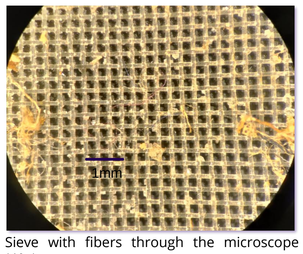
> Samples were transferred to density separation funnels with a rubber tube clipped closed and separated overnight

> High density solids were drained, and the low density solids were transferred to a custom 330 µm sieve. Contents were allowed to dry to then visually isolate microplastics using a dissection microscope. The total weight of the microplastics was then calculated

Wet peroxide oxidation

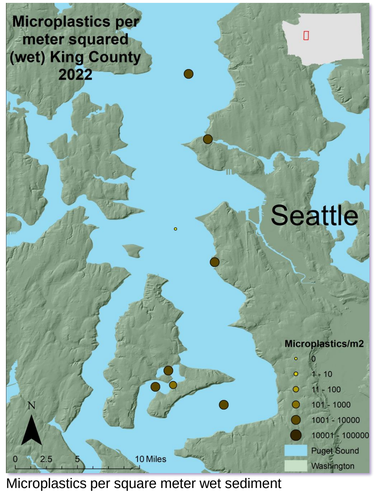
Density separation funnels with solution

Isaiah Levesque analyzing microplastics

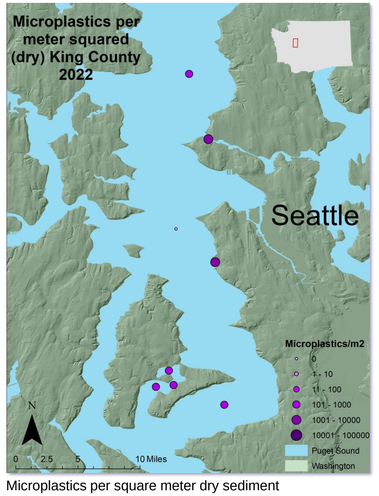


Sieve with fibers through the microscope (40x)

King County sample stations



Microplastics per square meter wet sediment



Microplastics per square meter dry sediment

Results

> 127 microplastics were observed, 100% were fibers

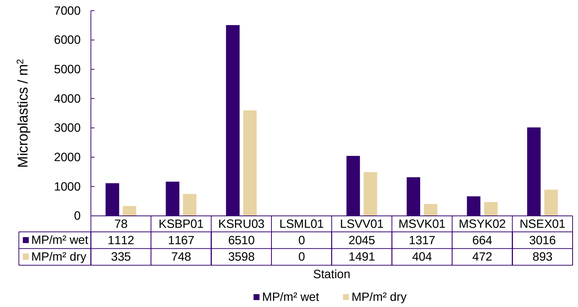
> There were between 0-6510 MP/m² wet sediment

> 51% of fibers were white

> 52% of fibers were between 0-1 mm

> Microplastics were found at every station except for central Central Basin west of West Seattle (LSML01)

> Errors may include small spills and outside contamination during the isolation procedures



	78	KSBP01	KSRU03	LSML01	LSVV01	MSVK01	MSYK02	NSEX01
MP/m² wet	1112	1167	6510	0	2045	1317	664	3016
MP/m² dry	335	748	3598	0	1491	404	472	893

The amount of microplastics per square meter of sediment using dry and wet sediment weight

Relative frequency of colors of microplastics

Relative frequency of size of microplastics (mm)

Conclusion

> Microplastics are a significant source of concern and needs our attention

> Research like this can influence future policy makers on what should be prioritized

> More research is needed to fully assess, address, and tackle the growing issue

Sources

King County

https://tinyurl.com/KCmarine22