

# Quantification of Microplastics from Bed Sediments from Commencement Bay, Puget Sound Washington



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## Introduction

- > Microplastics are a relatively new problem within the environment. They are currently 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 most trophic levels
- > King County Sediment Monitoring Team provided 30 samples from Commencement Bay to UW Tacoma to analyze for microplastic abundance to provide a baseline for future analysis

## Methods

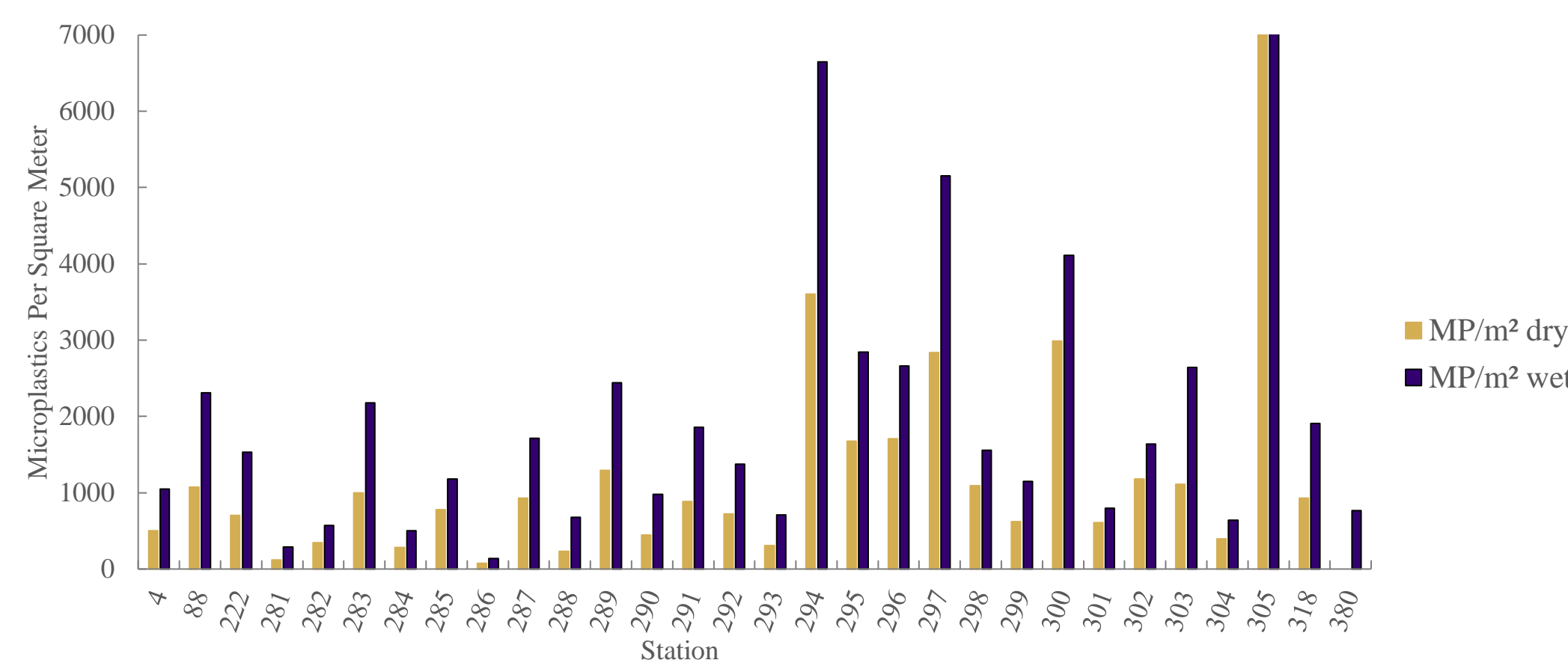
- > Sediment samples were mixed with a solution of potassium metaphosphate to disaggregate sediment particles. The samples were then sieved through a standard 330  $\mu\text{m}$  sieve to remove fine clay and silt particles
- > The first density separation procedure utilized lithium metatungstate (LMT) to float the microplastics. The floating solids were then poured through the sieve and the (LMT) was filtered and recovered
- > To reduce the amount of natural organic matter wet peroxide oxidation was used
- > 6g of salt per 20mL of solution was added to increase the density. A total of 30g of salt was added
- > The samples were transferred to density separation funnels with a rubber tube clipped closed. The samples were allowed to separate overnight
- > The solids were drained, and the floating solids were transferred to a custom 330  $\mu\text{m}$  sieve. The contents were allowed to dry to then visually isolate microplastics using a dissection microscope. The total weight of the microplastics was then calculated



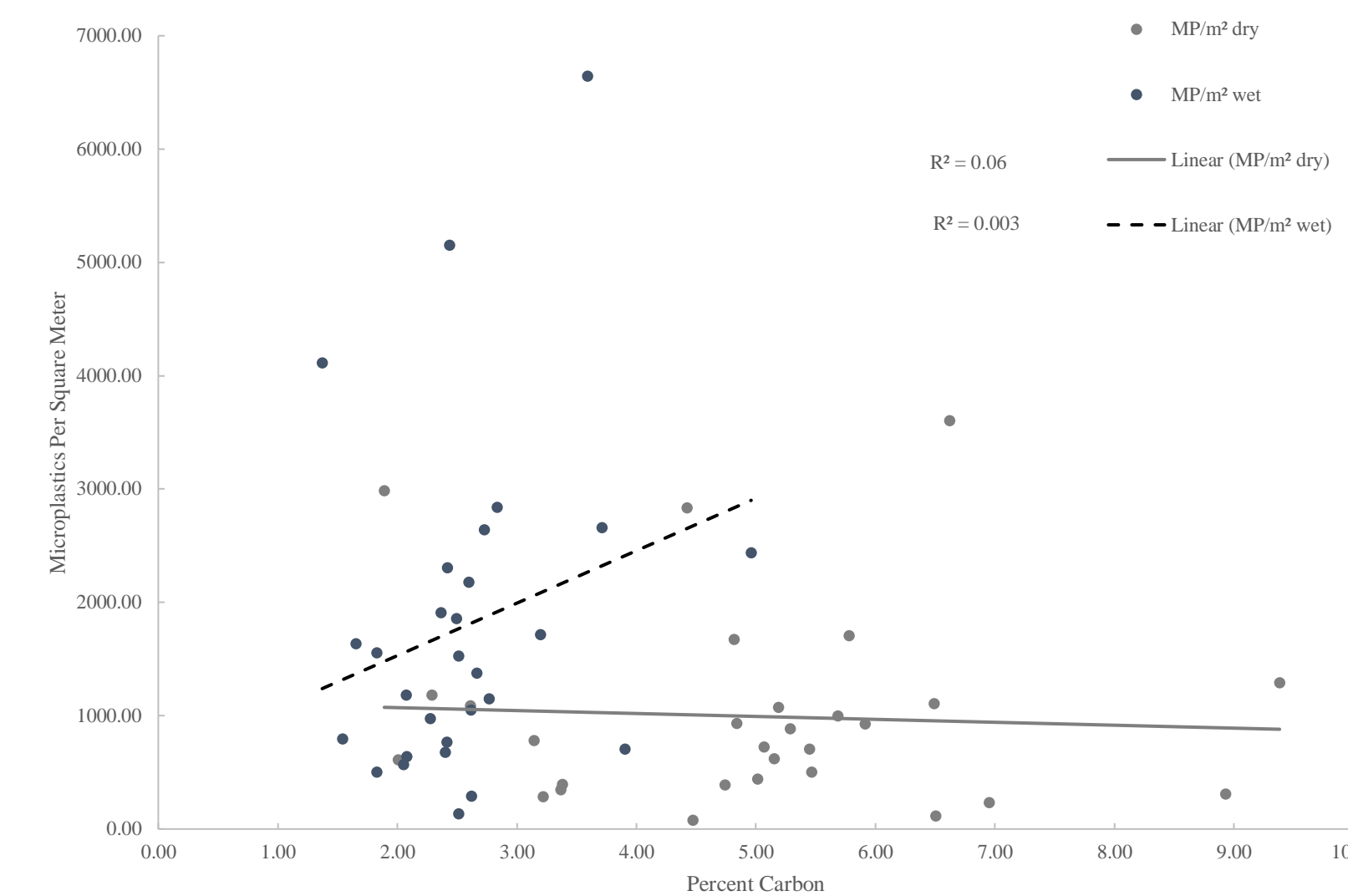
Solids left over after LMT separation and floating solids transferred to the sieve  
Wet peroxide oxidation

## Results

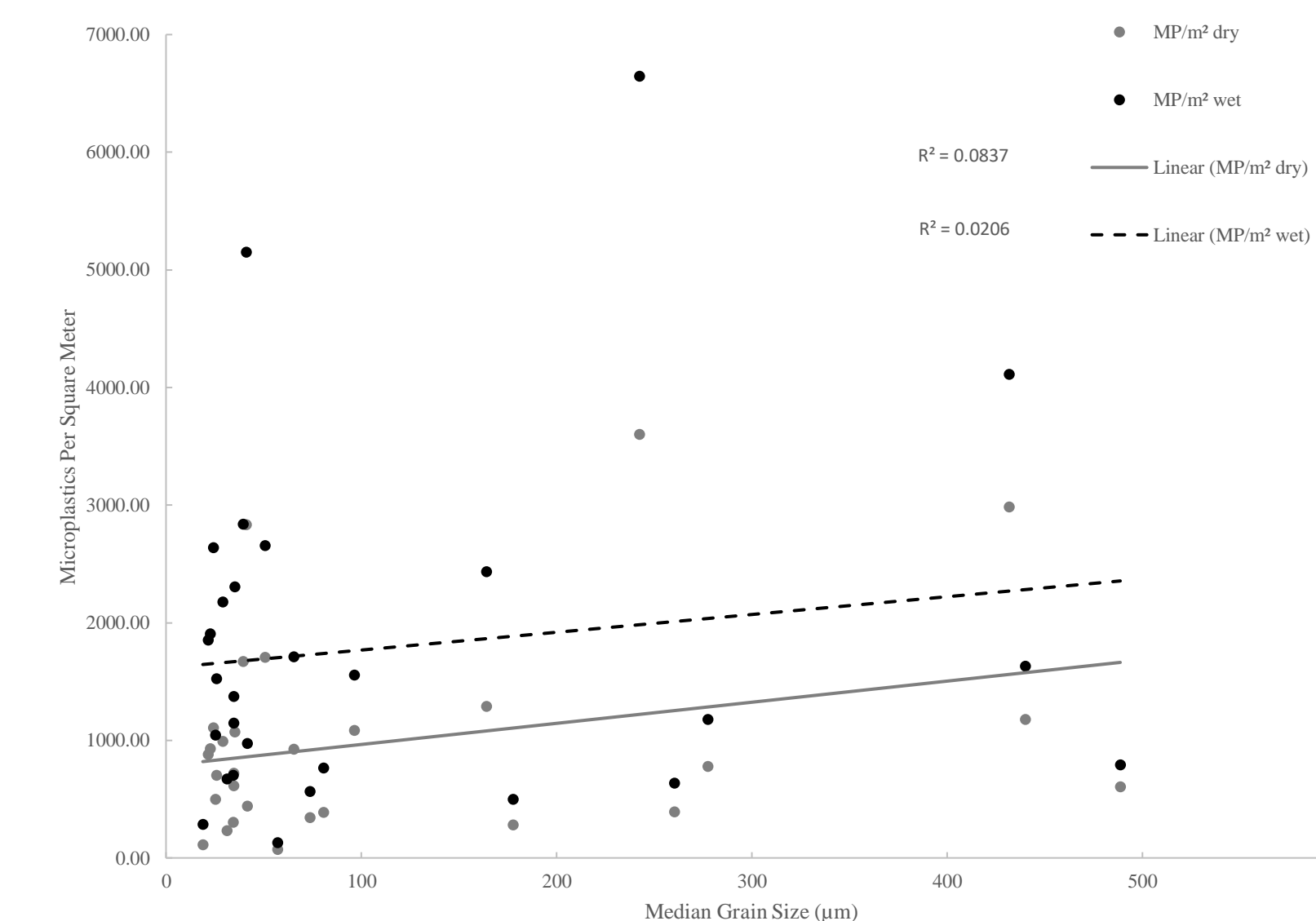
- > Total of 838 microplastics were observed after control and 90.21% were fibers
- > There were between 134-64,556  $\text{MP}/\text{m}^2$  wet weight
- > 36.28% of the total plastics were white
- > 42.6% of the total plastics were between 0-1  $\mu\text{m}$
- > Microplastics were found at every sample station
- > Poor correlation with percent carbon and grain size. Data provided by Irene Forati and Margo Johnson
- > Errors may include small spills and outside contamination during the isolation procedures



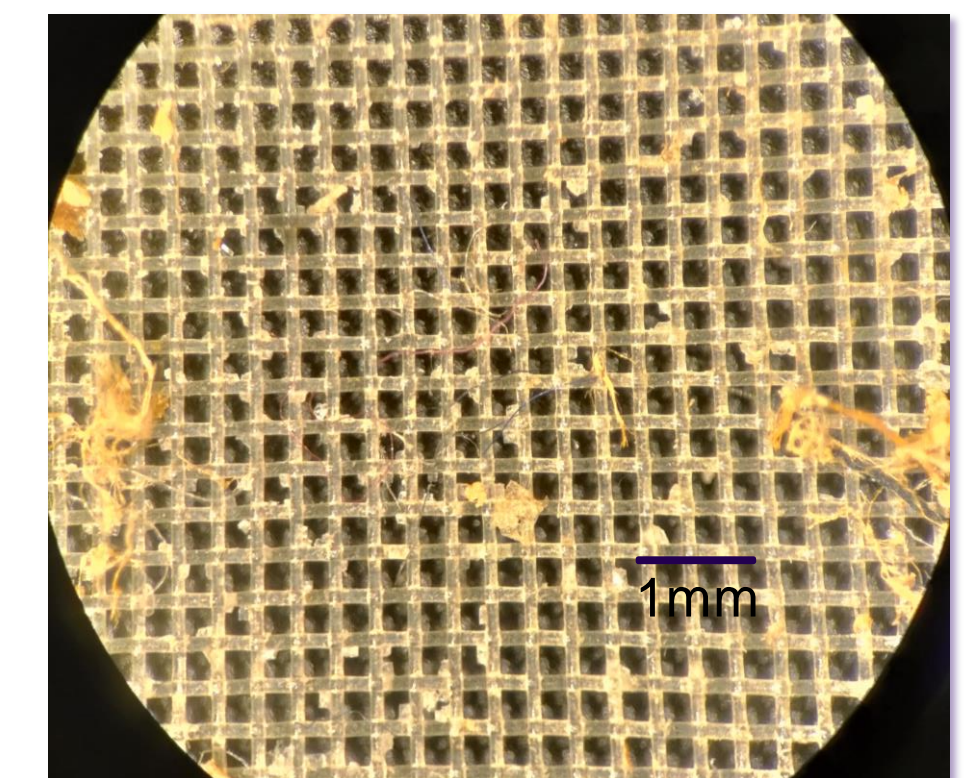
Abundance of microplastics



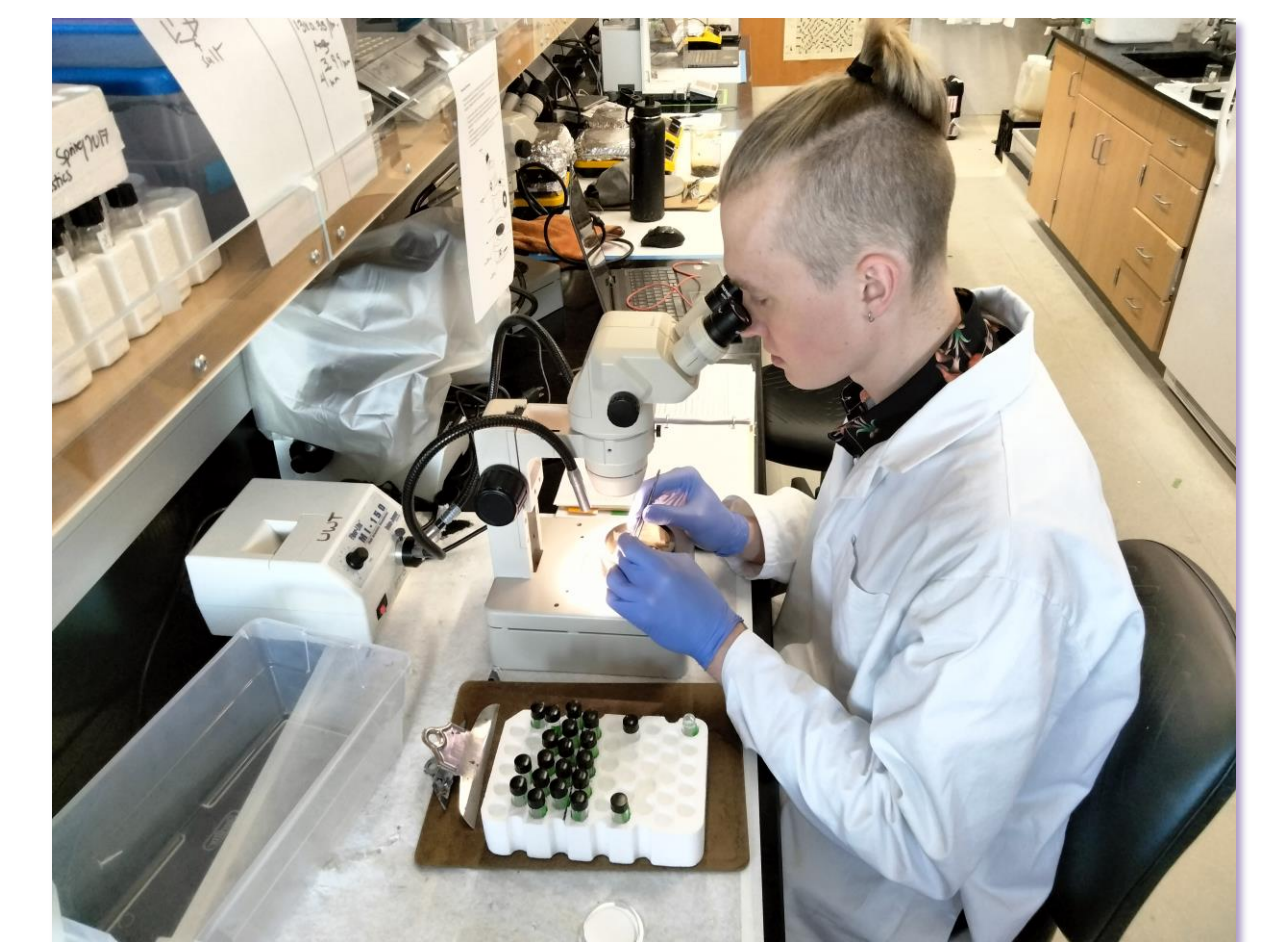
Little to no correlation with percent carbon



Little to no correlation with median grain size



Sieve with fibers through the microscope (40x)



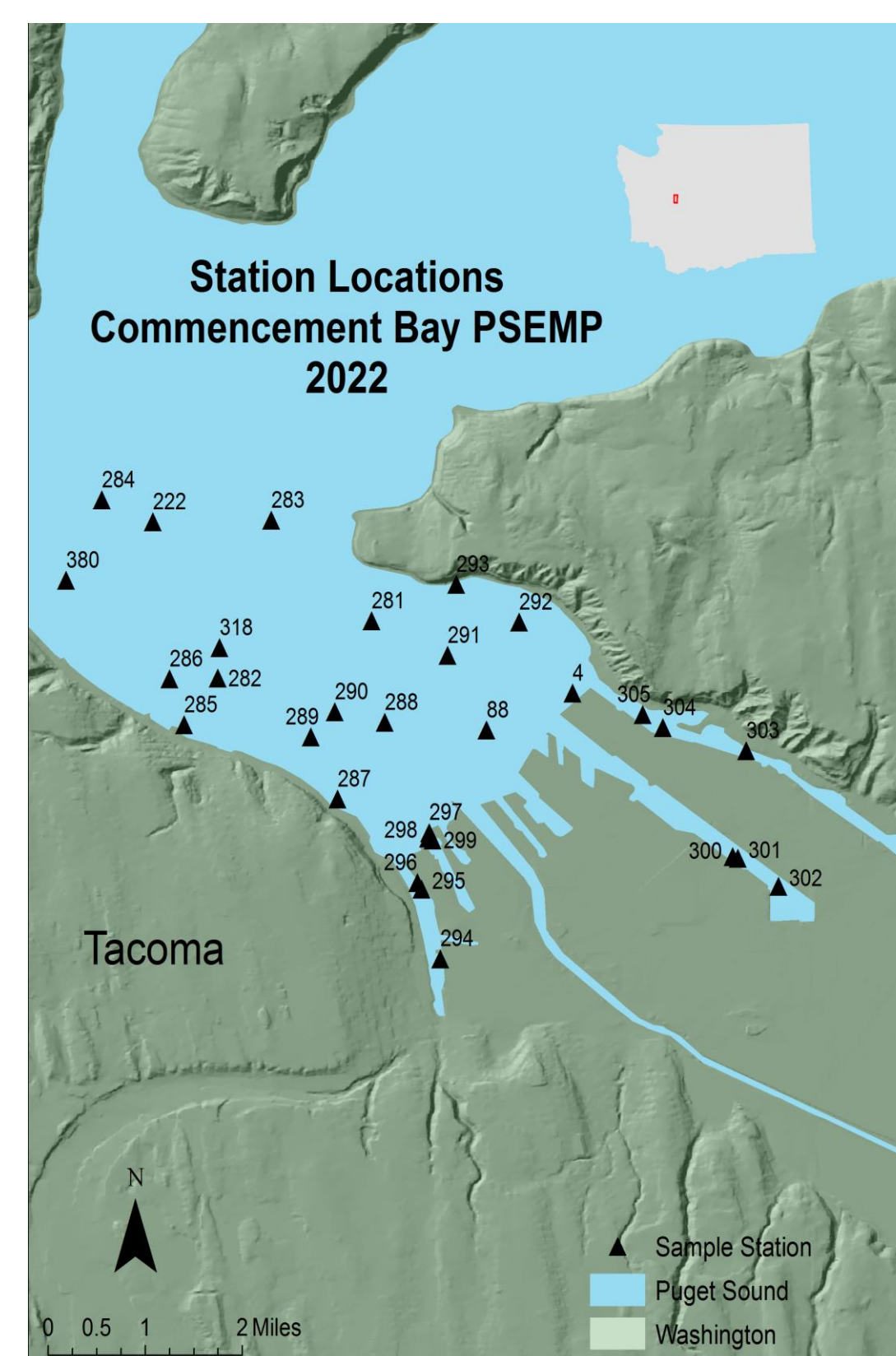
Isaiah Levesque analyzing microplastics

## Discussion

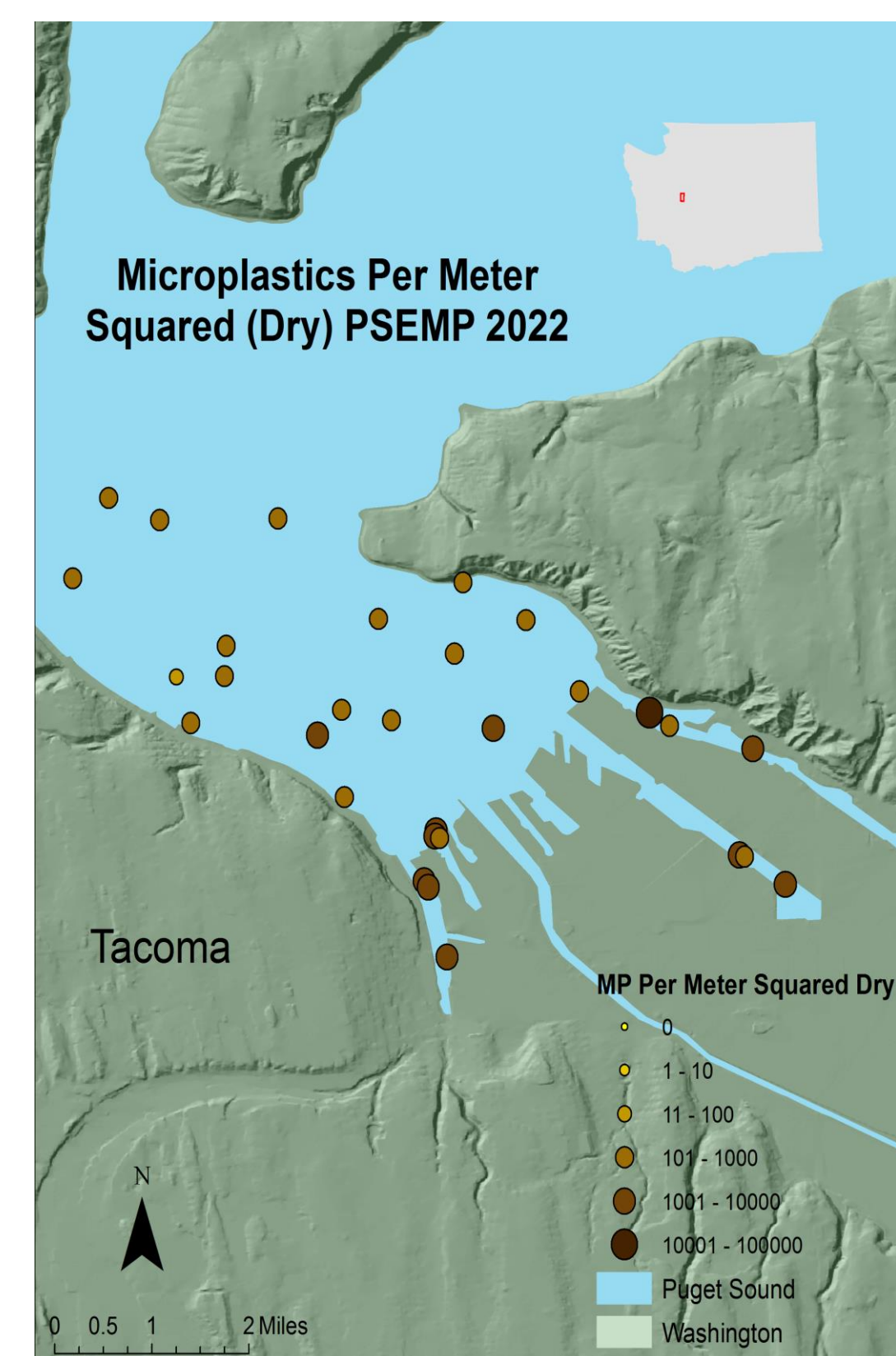
- > Microplastics are ubiquitous throughout commencement bay
- > Higher concentration of microplastics near waterway outlets and near industrial activities as found with prior research
- > Percent carbon and median grain size have little to know correlation with microplastic abundance
- > Mostly synthetic fibers collect in sediment
- > Station 305 showed an unusual amount of microplastics with 64,556  $\text{MP}/\text{m}^2$  wet weight and should be reanalyzed

## Conclusion

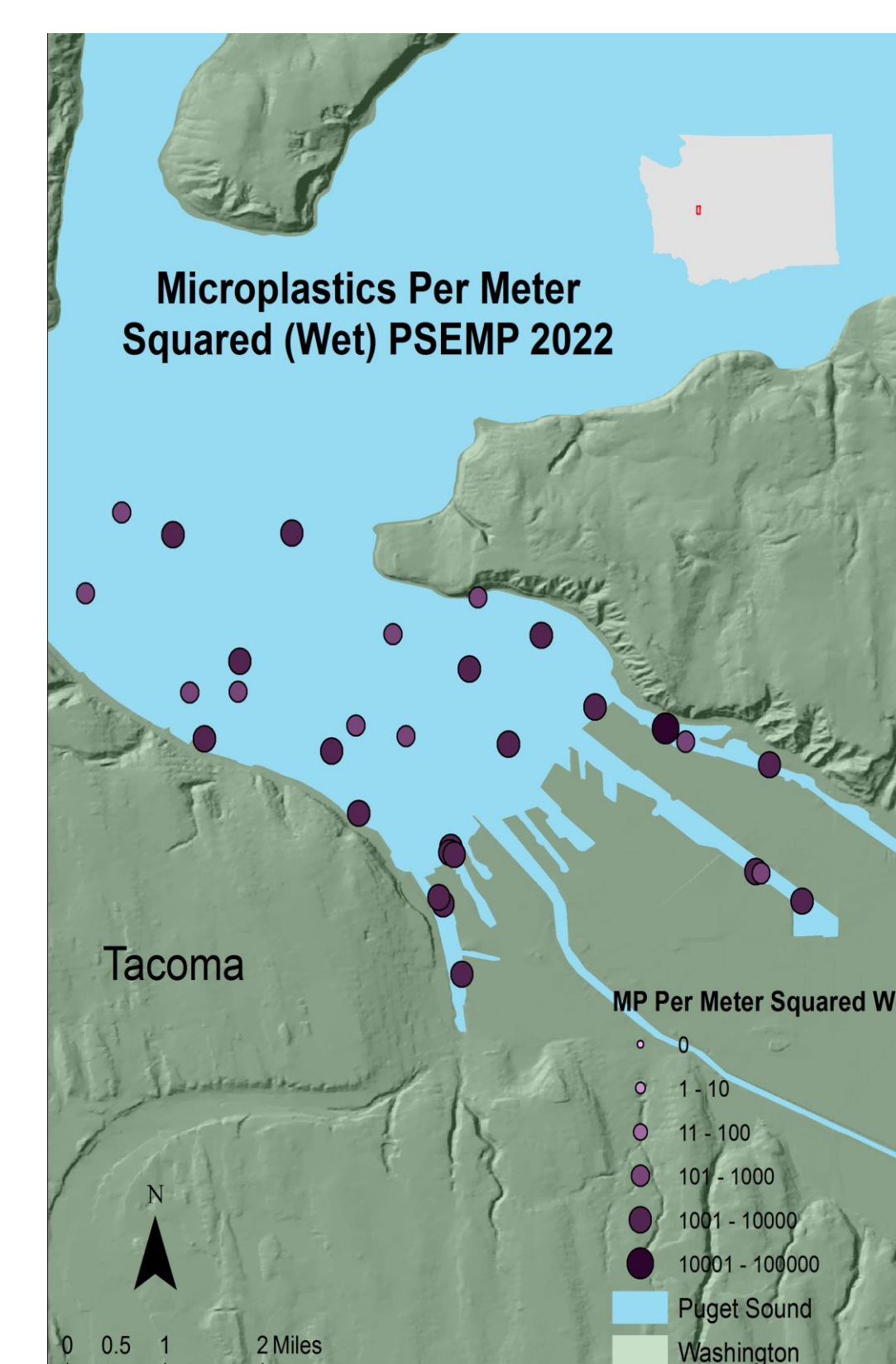
- > Microplastics are a significant source of concern and needs our attention
- > Research like this can influence future policy makers on what should be prioritized
- > More research is needed to fully assess, address, and tackle the growing issue



PSEMP station locations



Microplastics per square meter wet sample weight



Microplastics per square meter dry sample weight

Sources



King County

<https://tinyurl.com/KCmarine22>