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## Exploration of microplastics in the lower Puyallup River watershed

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<https://cedar.wwu.edu/ssec/2018ssec/allsessions/386>

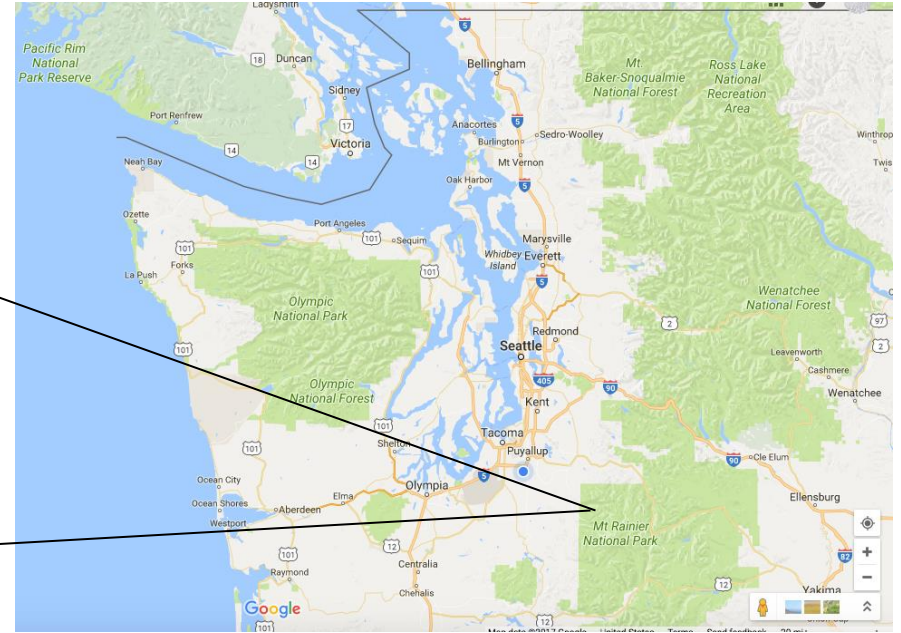
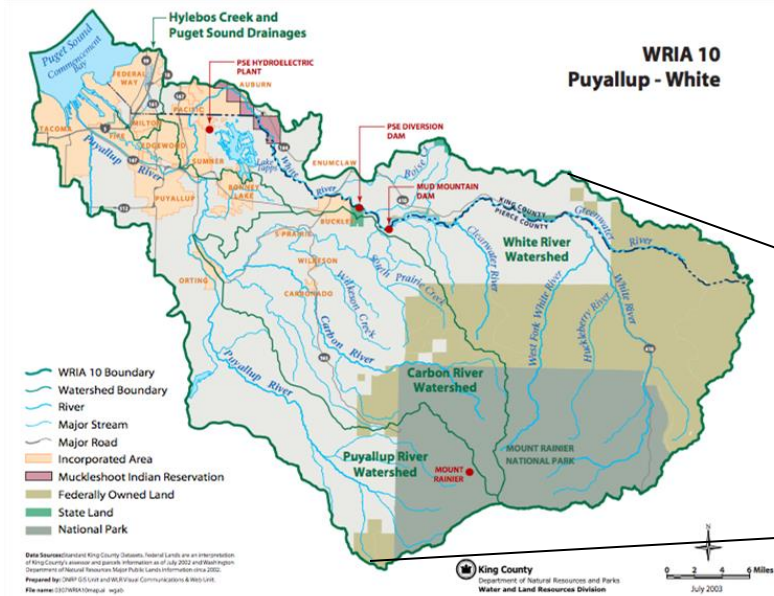
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# **EXPLORATION OF MICROPLASTICS IN THE LOWER PUYALLUP RIVER WATERSHED**

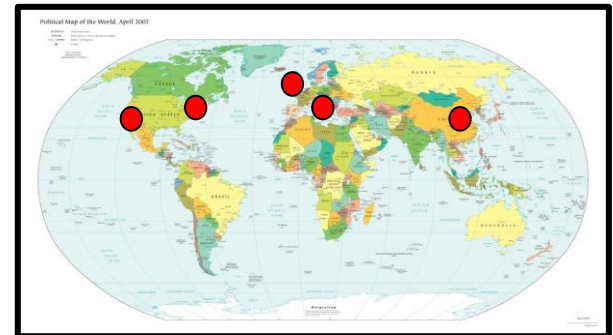
Shannon Black, Jessica  
Kelsey, Mary Eldridge, and  
Julie Masura

# Puyallup River Watershed



# Previous freshwater riverine microplastic

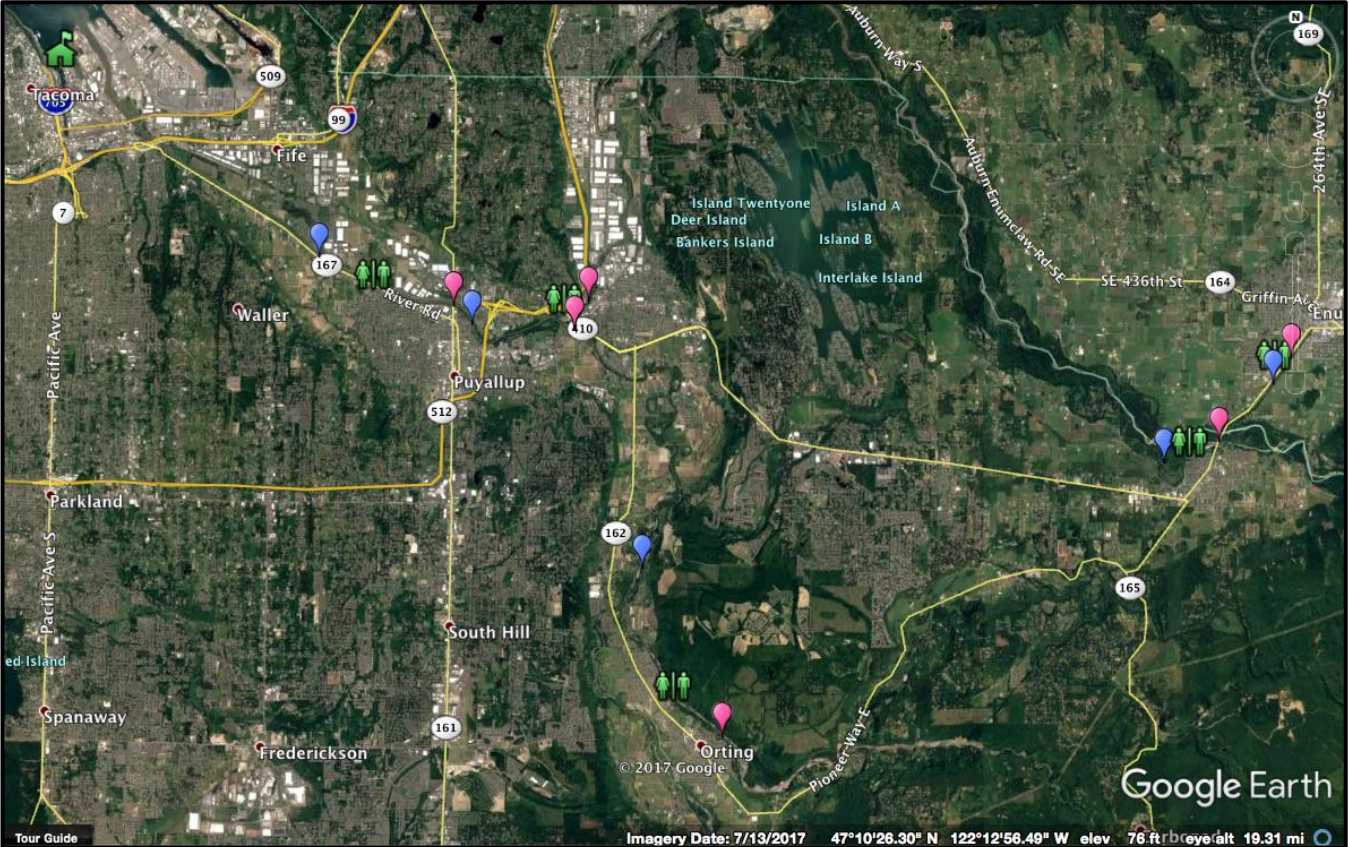
Year	Site	Sampling Method	Identification Method	Units	Reference
2011	Los Angeles River (CA)	Manta net & Hand net	Visual inspection	Particles L <sup>-1</sup>	C.J. Moore, et al.
2011	San Gabriel River (CA)	Manta net & Hand net	Visual inspection	Particles L <sup>-1</sup>	C.J. Moore, et al.
2011	Coyote Creek (CA)	Hand net	Visual inspection	Particles L <sup>-1</sup>	C.J. Moore, et al.
2014	Thames River (UK)	Eel nets	Visual inspection	Number of items sampled	D. Morritt, et al.
2014	Danube River (Germany, Austria etc.)	Stationary driftnets	Density separation and visual inspection	Particles 1000 m <sup>-3</sup>	A. Lechner, et al.
2014	Seine River (France)	Floating booms	Fourier-transform infrared spectroscopy	Mg plastic	J. Gasperi, et al.
2014	4 Estuarine rivers in Chesapeake Bay	Manta trawl	Density separation and visual inspection	g km <sup>-2</sup>	Yonkos, et al.
2015	Seine and Maine River (France)	Manta trawl	Visual inspection	Particles m <sup>-3</sup>	Dris, et al.
2015	Rhine River (Europe)	Manta net	Fourier-transform infrared spectroscopy	Particles 1000 m <sup>-3</sup>	T. Mani, et al.
2014	North Shore Channel (IL)	Neuston net	Visual inspection with electron microscope	Particles m <sup>-3</sup>	McCormick, et al.
2014	Tamar Estuary (Southwest England)	Manta net	Fourier-transform infrared spectroscopy	Number of items sampled	Sadri and Thompson
2015	Three Gorges Dam (China)	Manta trawl	Fourier-transform infrared spectroscopy	10 counts km <sup>-2</sup>	Zhang, et al.



# Hypothesis

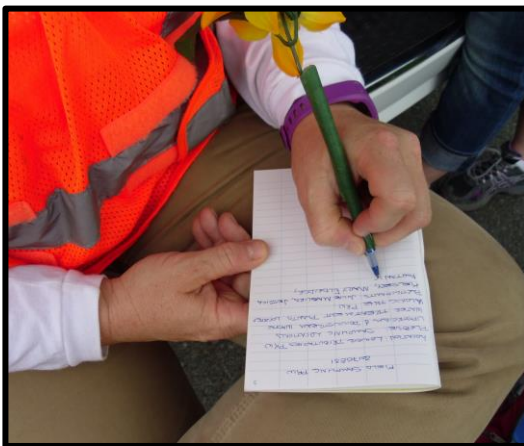
We expect to find a higher concentration of microplastics downstream of the wastewater treatment facilities.

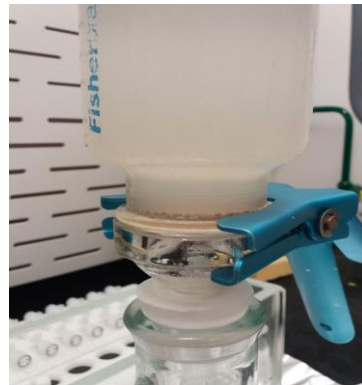
# Sampling Locations



## The Puyallup River Watershed

- Enumclaw
- Buckley
- Orting
- Sumner
- Puyallup





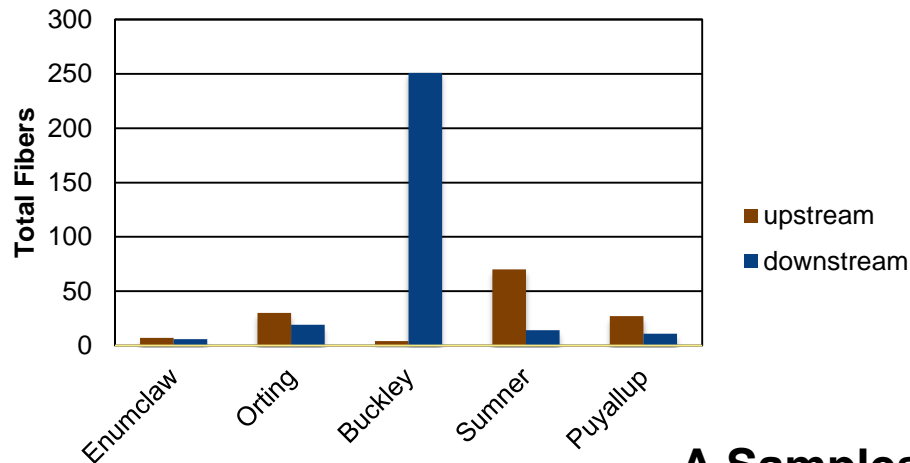
## Laboratory Methods

- Set up treated vacuum flask that was treated with methanol and baked in furnace at 450 degrees for 4 hours
- Set up Passive Collectors
- Inspect and remove any fibers from filter
- Triple Rinse DI Water Bottle and run through filtration to ensure no contamination
- Filter Blank & Samples through Vacuum flask
- Triple Rinse collection cup on vacuum filter between samples
- View filter under microscope at 40x magnification and record and measure fibers
- Archive filters

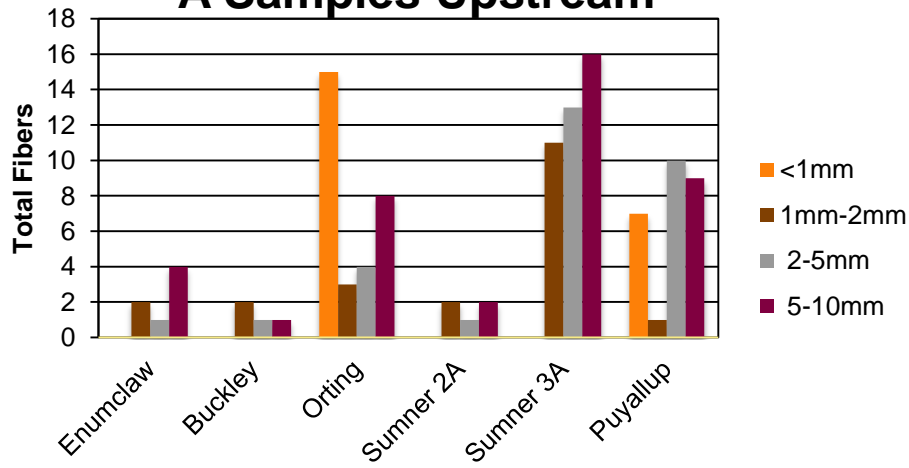


# Results

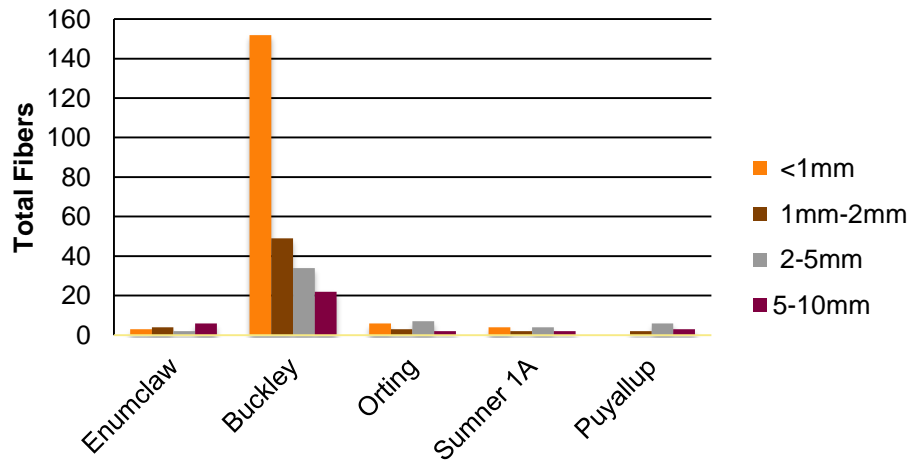
## A Samples Total Fibers



## A Samples Upstream



## A Samples Downstream





# Comparing Results to Literature

Year/ Site	Sampling Method	Identification Method	Results	Reference
2011 Los Angeles River (CA)	Hand net	Visual inspection	$6.06 \times 10^{-3}$ particles/L	C.J. moore, et al.
2011 San Gabriel River (CA)	Hand net	Visual inspection	$4.39 \times 10^{-3}$ particles/L	C.J. moore, et al.
2011 Coyote Creek (CA)	Hand net	Visual inspection	$4.34 \times 10^{-3}$ particles/L	C.J. moore, et al.
2015 Seine and Maine River (France)	Manta trawl	Visual Inspection	0.003 to 0.106 particles/L	Dris, et al.

# In Closing

Microfibers are ubiquitous

