

Method Development for The Extraction of Tire Wear Particles (TWP) from Municipal Stormwater Runoff Sediments

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Tire wear particles (TWPs) form from the breakdown of tires and are one of the most common sources of microplastics. Previous research has shown that TWPs are washed from roadways via stormwater into catchment basins as stormwater sediments. Tires contain the chemical compound 6PPD which is added to increase longevity. However, when tires break down, 6PPD oxidizes to 6PPD-quinone, a chemical that is toxic to Coho Salmon (*Oncorhynchus kisutch*). Considering TWPs prevalence, effects on Coho Salmon, and their contribution to microplastic pollution, TWPs may have serious environmental and economic effects. There is not currently a best method for the extraction and quantification of TWPs in stormwater runoff sediments. To reduce this knowledge gap, this project worked on developing a protocol to efficiently extract and quantify TWPs in stormwater runoff sediment using a density separation technique and then used microscopy to isolate individual TWPs. Four stormwater sediment samples from a storm catchment near Highway 16 below the Narrows Bridge in Tacoma, WA were processed using the technique described above. Of the extracted material 0.1655 grams of TWPs were isolated from 200 grams of stormwater sediment, equating to 0.827 ppt. The results from this preliminary work demonstrate the need for continued monitoring of TWPs from roadway runoff to further understand the scope and rate of this material, known to impact Coho Salmon in this region. This research contributes to larger protocol development for the extraction and quantification of TWPs and will aid in the advancement of protocols for TWP extraction from sediments.