

Microplastics pollution: what can we learn from stormwater pond sediments?

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In urban watersheds, stormwater runoff is a major carrier of microplastics to downstream water bodies, which are collected in stormwater ponds (SWPs). As expected, recent studies have reported high microplastics retention efficiencies in SWPs. However, the variability in the retained microplastic types and sizes among, and within, SWPs remain understudied. The aims of this study are to (1) assess the variability in microplastics types, sizes, and abundances within SWP sediment samples, (2) determine the influence of sediment properties on microplastics accumulation in sediments within and between SWPs, and (3) relate microplastics loads in stormwater runoff to upstream land use. Thus far, we have collected sediment samples from five SWPs with variable catchment land use types (commercial, industrial, and residential) in the City of Kitchener in Ontario. The preliminary results at one of the industrial ponds show that microplastic fragment accumulation rates decreased from 9×10^7 particles $m^{-2} yr^{-1}$ in the inlet forebay to 2×10^7 particles $m^{-2} yr^{-1}$ in the main basin. Moreover, ponds in the industrial catchments exhibited the highest sediment burial and organic carbon accumulation rates, followed by ponds receiving stormwater from residential and commercial areas. Our ongoing research will shed light on the contribution of urban catchments to microplastic pollution and the factors controlling microplastics retention by SWPs.