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Localized influence of dams on river microplastic concentrations

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Dam reservoirs are known sinks for a variety of contaminants including sediments, metals, and PCBs. Are microplastic particles also affected by the presence of dams? This is an important question for better understanding transport patterns of microplastics and estimating global river inputs of microplastics to oceans. We investigated the localized influence of dams by measuring microplastic concentrations above, below, and within the reservoirs of six dams near Ithaca, New York, USA. Samples were processed by wet peroxide oxidation, density separation, and visual counting, followed by Raman spectroscopy validation. We found that within reservoirs, microplastic concentrations were significantly different than concentrations above or below the dams. In sediment samples, reservoir concentrations were higher. In surface water samples, reservoir concentrations were lower. Plastic fibers were the most common particle type, but for sediment samples in reservoirs, higher proportions of less abundant particle types such as plastic fragments were present. These results indicate that, particularly at longer time scales, dam reservoirs are retaining microplastics in the watershed and are important sites for future longitudinal studies focused on river transport of microplastic particles.