

Title: Microplastic distribution in Puerto Rico streams

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Abstract:

Plastics are a major pollutant due to their abundance, ubiquity, and persistence. Studies indicate a pervasive presence of microplastics, which result from the degradation of plastics in the environment. Many studies have focused on microplastic presence in the ocean and its impacts on fauna, such as zooplankton, coral, and fish. It is estimated that 80% of microplastic in the ocean comes from land-based sources, including inputs from rivers. Island communities often struggle to manage solid waste generated by locals and tourists, which can contribute to high concentrations of microplastics in marine environments. While scientists have started to examine contributions from fluvial systems, little research has examined microplastics in island stream and river ecosystems. Since plastic has the potential to adsorb contaminants, the risk to individual organisms and potentially food webs could be high. In this preliminary study, we surveyed eight streams in Puerto Rico across a land-use gradient to determine if microplastic concentration was related to land use. Water samples were collected at upstream and downstream locations in every stream. Nutrient samples were filtered in the field, transported on ice, and then frozen. Microplastic samples were first passed through a 300um sieve, then filtered onto a 25um filter, folded, and stored in aluminum until counted. Salinity across all streams ranged from 0.14 to 14.9 ppt and turbidity ranged from 0.7 to 53.2 FNU, indicating a range of stream conditions. Land use ranged from high urban to agriculture, to forested/protected. Factors that might contribute to the distribution pattern of microplastics will be examined including population density, distance to upstream wastewater treatment facilities, and water quality.