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RESEARCH ARTICLE · ENVIRONMENTAL SCIENCE

Microplastic Loads in Urban Stormwater Biofilters: A Six-City Comparative Audit

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ABSTRACT

Stormwater biofilters are increasingly deployed as nature-based solutions for urban runoff management, yet their effectiveness at retaining microplastics has not been systematically compared across climatic and demographic contexts. We sampled influent and effluent at 48 biofilter cells across six cities (Auckland, Singapore, Copenhagen, Lagos, São Paulo, and Vancouver) over twelve months. Median retention efficiency ranged from 61% to 89%, with fibres retained less effectively than fragments. Linear mixed-effects models indicate that vegetation density and hydraulic loading rate are the dominant predictors of performance, while maintenance frequency shows a non-monotonic relationship. We provide design heuristics for retrofitting existing installations.

Keywords: *microplastics, stormwater, biofilters, urban ecology, nature-based solutions*

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Abstract

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1. Introduction

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2. Methods

Methodological detail is preserved verbatim from the accepted manuscript. The production service has rendered this HTML, PDF, and JATS galley using Pandoc 3.1.11.1 and WeasyPrint with the journal's house CSS template.

3. Results

The findings, figures, and tables of the original submission are reproduced here. Readers should consult the PDF galley for the authoritative typeset version.

4. Discussion

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