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Title

Retrofitting Suburbs: Prioritizing Bmp Implementation to Reduce Phosphorus Runoff

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Abstract

Increasing suburban development has impaired water resources in the Charles River Watershed. Growing populations in the suburban fringes of Boston, Massachusetts have had a significant impact on ecosystems in the region. According to the EPA, one of the primary pollutants in the Charles River is phosphorus (EPA, 2010b). Phosphorus pollution contributes to algal blooms in the Charles that are harmful to ecosystems and toxic to humans (EPA, 2010b).

In order to prevent existing suburban residential areas from contributing additional phosphorus to the Charles River, stormwater best management practices (BMPs) were studied to determine which BMPs effectively contain phosphorus. Infiltration trenches, bio-retention areas, and dry swales were selected and tested in scenarios developed for a neighborhood on Hartford Road in Bellingham, Massachusetts. The scenarios were intended to test a prioritized implementation strategy based on phosphorus loading hotspots and flow accumulation patterns.

This study is intended to provide designers and planners a process through which site design can more effectively fit into broader ecological systems, specifically hydrological systems. The methodology developed in this study provides the ability to identify land cover types that contribute to phosphorus loading while also allowing phosphors loading hotspots to be identified at a scale as fine as 16 x 16 meters. Recognizing land cover types that contribute to phosphorus loading and prioritizing BMP implementation according to phosphorus loading hotspots within those land cover types allows for both economic BMP implementation efficiency and pollutant removal efficiency.

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