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Strengthening Urban Green: Using Green Infrastructure for Biodiversity Improvement in Boston's Highly Fragmented Urban Environments

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Abstract

Increasing recognition of the worlds' expanding population and current global rural-to-urban migration necessitates a better understanding and integration of urban ecological process into the framework for urban design (Sandström, 2006). Incorporating ecological processes such as resilience and dispersal into urban design requires special attention be paid to green infrastructure for the preservation and restoration of biodiversity. In addition, biodiversity improvement promotes related ecosystem services (Opdam et al., 2006) and advocates biodiversity conservation and strengthening as a key part of the development of sustainable urban landscapes.

This research developed a replicable and broadly applicable method for

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determining the ability of green infrastructure to increase abundance of the three target species, and by extension, biodiversity. By applying the urban biodiversity assessment method, green infrastructure can be designed to build neighborhood scale urban ecological networks, specifically designed for the target species in Boston's highly fragmented urban landscapes.

Green infrastructures such as urban parks, riparian corridors, street trees, and unused abandoned land have the ability to serve as important reserves of biodiversity. Using the spatial pattern analysis program FRAGSTATS, the assessment of green infrastructure demonstrates its potential for increasing biodiversity of three target species (Red-tailed Hawk, Song Sparrow, and Variegated Fritillary). The comparative analysis of the existing green infrastructure with the proposed scenarios will determine their potential for species-specific neighborhood scale biodiversity improvement. Additionally, the comparison of the proposed scenarios and their rating helps provide valuable information regarding the spatial configuration of green infrastructure and the effect that it can have on target species.

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