Title

Climate Change Adaptation: A Green Infrastructure Planning Framework for Resilient Urban Regions

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Abstract

The research explores multiple facets of a green infrastructure planning framework for climate change adaptation in urban regions. The research is organized in three distinct, but related parts. The first develops an adaptation implementation model based on triggering conditions rather than time. The approach responds to policy makers' reluctance to engage in adaptation planning due to uncertain future conditions. The model is based on planning and adaptation literature and applied to two case studies. Uncertainty during implementation may be reduced by incremental and flexible policy implementation, disbursing investments as needs arise, monitoring conditions, and organizing adaptation measures along no-regrets to transformational measures. The second part develops the green infrastructure transect as an organizational framework for mainstreaming adaptation planning policies. The framework integrates multi-scalar and context aspects of green infrastructure for vertical and horizontal integration of policy. The framework integrates literature from urban and landscape planning and tested on Boston. Prioritization of adaptation measures depends on location. Results suggest that green infrastructure adaptation policies should respond to configuration of zones. Cross jurisdiction coordination at regional and parcel scales supports mainstreaming. A secondary conclusion suggests that green infrastructure is space intensive and becomes the basis of the empirical study in part three. A spatial assessment method is introduced to formulate opportunities for green infrastructure network implementation within land-uses and across an urban-rural gradient. Spatial data in GIS for Boston is utilized to develop a percent pervious metric allowing the characterization of the study area into six zones of varying perviousness. Opportunities across land uses were assessed then maximum space opportunities were defined based on conservation, intensification, transformation and expansion. The opportunities for transformation of impervious surfaces to vegetal surfaces are highest in the urban center and its surrounding. Intensification of vegetation on pervious surfaces along all land uses is high across the gradient. Conservation of existing forested land is significant for future climate proofing. The concluding section argues for a green infrastructure planning framework for adaptation based on integration into existing infrastructural bodies, regional vision, incremental implementation, ecosystem benefits accounting, and conditions based planning rather than time based.

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