

Energy, Population and the Urban Canopy: An Integrated GIScience Approach Towards Modeling Human-Environmental Interactions

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ABSTRACT This paper examines the interaction between socio-demographic characteristics (electrical energy usage, population density, and percentage of owner occupied dwellings) and the ability of these characteristics to predict urban leaf area index using ordinary least squares regression (OLS). Urban leaf area index was estimated using a combination of field work, remote sensing, and artificial neural networks, and socio-demographic data were obtained from the United States Census 2000. Results show that the independent variables statistically accounted for about 11% of observed variance in urban leaf area, underscoring the impact of socio-demographic characteristics on natural features in urban environments. Further, the study demonstrates that the interaction between built and natural environments can be effectively modeled using proxy data obtained from remote sensing platforms. The paper also shows the efficacy of using interaction terms to model human-environment interactions. Studies like this may be used by urban researchers, planners, government officials, and others to understand the demographic forces that help to shape urban environments.