

Urban Ecological Sustainability: Multi-level Governance of Water, Energy & Carbon in the Northeast Megaregion of the United States

Award Year:

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Associated Program:

[Ecological Wealth & Changing Human Populations](#) [1]

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The emergence of megaregions across the globe is an unplanned experiment in urban growth that often encompasses multiple ecoregions, multiple governance arrangements, and biogeochemical interdependencies. This pursuit will use the Washington, DC-to-Boston urban megaregion as a case study to explore the linkages between urban infrastructure, ecological thresholds, governance strategies, and coupled biogeochemical cycles.

This effort is guided by an overarching question: How do the various models of governance working at multiple scales within the megaregion affect coupled biogeochemical processes and energy fluxes? The products expected from the pair of proposed working sessions are:

1. a review paper on megaregions that includes a theoretical framework, a review of existing and needed data, and a range of cases from the DC-to-Boston megaregion that documents differences in governance across the region relative to water, carbon, and energy budgets; and
2. based on the insights from the review, an NSF Macrosystems Biology proposal to more completely and rigorously explore the coupled biogeochemical systems at the megaregional scale with an explicit focus on the complex interactions between biogeochemistry, land use history, and governance models.

The effort will draw on historical trends and inform future urban sustainability visions in the region. By identifying key stakeholders, vulnerabilities, thresholds, and inequities, it will serve as actionable science that highlights key points for intervention to achieve sustainable outcomes in environmental management of water, energy, and carbon cycles for the region.

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