Resilient Patterns in Urban Ecosystems: Emerging Hypotheses and Implications for Planning

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Urbanizing regions are major determinants of global and continental scale changes in ecosystems through land transformation and modification of biogeochemical processes. However, empirical studies of the underlying processes and mechanisms linking urbanization patterns to ecological resilience are still extremely limited. There is increasing evidence that alternative patterns of urbanization have differential effects on ecosystem function, but the emerging evidence shows that patterns mediate ecosystem response in subtle unexpected ways. Building on initial observations on carbon, nitrogen, and biodiversity, I develop formal hypotheses on key mechanisms linking urban patterns to ecosystem function along gradients of urbanization. I challenge the assumption that one optimal pattern of urbanization is consistently more resilient than another and propose that the diversity of urban patterns may control resilience in urban ecosystems. I discuss scientific challenges and implications for planning.