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Resilient cities: meaning, models, and metaphor for integrating the ecological, socio-economic, and planning realms

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Abstract

Urban designers, ecologists, and social scientists have called for closer links among their disciplines. We examine a promising new tool for promoting this linkage—the metaphor of “cities of resilience.” To put this tool to best use, we indicate how metaphor fits with other conceptual tools in science. We then present the two opposing definitions of resilience from ecology, and give reasons why one is more appropriate for linking with design. Additional specific tools and insights that are emerging from, or being increasingly used in, ecology can further support the linkage with urban design. These include recognizing the role of spatial heterogeneity in both ecological and social functioning of urban areas, the integrating power of watersheds, social and ecological patch dynamics of cities, the utility of spatial mosaic models to capture function, the use of an integrated “human ecosystem” modeling framework, and the consequent

perspective of metropolitan areas as integrated ecological-social systems. Three additional tools are related to the adaptability of people and human institutions. First is the recognition of a "learning loop" in metropolitan ecosystems in which people respond to and affect ecological change, the use of urban design as experiments whose ecological and social outcomes can be measured, and finally the potency of a dialog between professionals and citizens, communities, and institutions, to support both research and design. The metaphor of resilience, and its technical specifications, draw these diverse strands for linking ecology and planning together.



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Keywords

Ecosystem; Ecological resilience; Integration; Paradigm; Urban design; Urban ecology; Urban planning

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Steward T.A. Pickett is a Senior Ecologist at the Institute of Ecosystem Studies. Prior to that, he served on the faculty of Rutgers, the State University of New Jersey. He holds a BS with Honors from the University of Kentucky, and the PhD from the University of Illinois at Urbana Champaign. He is active in the Ecological Society of America, where he has served at Vice President for Science, and in the International

Association for Vegetation Science. His interests include the role of spatial heterogeneity and disturbance in community and ecosystem function, and interdisciplinary approaches to human dominated ecosystems. He is director of the Baltimore Ecosystem Study, Long-term Ecological Research project.

Mary L. Cadenasso is a plant and landscape ecologist at the Institute of Ecosystem Studies in Millbrook, New York. She earned her BS at the University of Santa Clara in California. After working several years in the environmental consulting business, she returned to graduate school and earned a PhD from Rutgers University in Ecology. Her current research focuses on the role of spatial heterogeneity in landscapes and, in particular, the role of boundaries in regulating flows among contrasting patches of land cover. She investigates this phenomenon in metropolitan Baltimore and the savanna landscape of Kruger National Park, South Africa.

Morgan Grove has worked for the US Forest Service's Northeastern Research Station since 1996. He is a Principal Investigator in NSF's Long-term Ecological Research Program's Baltimore Ecosystem Study (co-team leader of the demographic and socioeconomic working group) and a developer of the NED set of decision-support tools for forest and landscape management. His research activities focus on human ecosystem and landscape studies and the development of technology transfer tools. He has a BA in Architecture and Environmental Studies from Yale College, a M.F.S. in Community Forestry from Yale University, and a PhD in Social Ecology from Yale University. Grove received the Chief's Early Career Scientist Award in the Spring of 2001 and the President's Early Career Award for Scientists and Engineers in the Fall of 2001.

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