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Editorial

Actionable urban ecology in China and the world: Integrating ecology and planning for sustainable cities

This special issue is drawn from contributions to an international workshop on *Frontiers in Urban Ecological Research and Planning: Linking Ideas from the East and West*, held from October 25 to 30, 2012, on the campus of the East China Normal University (ECNU) in Shanghai, China. The workshop was organized by the Global Institute for Urban and Regional Sustainability (GIURS) and the Shanghai Key Lab for Urban Ecological Processes and Eco-Restoration (SHUES) at ECNU. It was convened as part of an activity sponsored by the U.S. National Science Foundation Socio-Environmental Synthesis Center (SESYNC) to contribute to the synthesis of understanding, planning, and management of urban ecosystems in China. At the workshop, scholars from around the world aimed to advance the actionability of the science of urban ecology and to increase its relevance to the sustainable planning, design, and management of cities. What is "actionable science"? Palmer (2012) defined it as science that "has the potential to inform decisions (in government, business, and the household), to improve the design or implementation of public policies, or to influence public- or private-sector strategies, planning and behaviors that affect the environment." Thus, ecologists, social scientists, planners and designers joined together to address the actionability of urban ecology, and also to probe their own research for its relevance to improving urbanization in China and elsewhere.

This special issue articulates both social and environmental grounds for seeking more actionable urban ecology in China and the world. It begins with paired papers that comprehensively assess the state-of-the-art of urban ecology. The first, by Jianguo Wu, relates urban ecology to the overarching imperative for sustainable urban systems, presenting an historical synthesis of urban ecology and sustainability concepts as a springboard for concepts that can inform future directions in transdisciplinary science, design and planning. The second, by Wu with Wei-Ning Xiang and Jingzhu Zhao, describes how urban ecology has evolved and is advancing in China. Both papers describe the history of urban ecology in each context, the efficacy of current theories, and conceptual frameworks for studying and planning the ecology of cities and towns in China and the rest of the world. Together, these two review papers articulate the distinct roots and fruitfully grafted branches of different urban ecology traditions in a way that is richly suggestive of further possibilities for intellectual exchange.

The issue continues with three papers that focus on the relationship between human well-being and urban ecology, all from the multi-functional perspective of design and planning. Jennifer Wolch, Jason Byrne and Joshua Newell review literature describing how the distribution and management of urban open spaces affect human health, and discuss the implications for environmental justice in America and China. Joan Nassauer and Julia Raskin consider how the dynamics of highly vacant urban landscapes can respond to the environmental legacies of past land uses while also eliciting the social capital of current residents who seek livable neighborhoods. Jack Ahern, Sarel Cilliers, and Jari Niemela suggest a conceptual framework for design that delivers ecosystem services, even in the face of environmental uncertainty. Employing Ahern's concept of safe-to-fail design, they articulate the value of adaptive planning and design that recognizes urban ecology as instructive but not conclusive for practice, and they emphasize the potential for science to learn from practice as well.

The third section of this issue offers cases that demonstrate how science and practice in the traditionally underrepresented East and South can contribute to the knowledge base and effectiveness of both the fields of urban ecology and sustainability and the practice of urban design and planning. Their examples for building and managing green, healthy cities are relevant globally. Sarel Cilliers, Marie Du Toit, Juanee Cilliers, Francois Retief, and Ernst Drewes emphasize the necessity of shared learning by researchers and stakeholders, using a transdisciplinary approach to build actionable knowledge of urban ecosystems in South Africa. Learning from Singapore, the most densely occupied urban area in the world, Puay Yok Tan and Abdul Rahim Abdul Hamid describe an array of tactics for interjecting ecosystem services into highly-built landscapes. Finally, based on their extensive study of Shenzhen – one of the most rapidly developed metropolises in China since its economic reform in 1978, Peijun Shi and Deyong Yu describe a quantitative methodology for assessing urban environmental resources and services and propose an ecological network-based urban landscape design to improve the sustainability of the city.

This issue concludes with a look forward with different perspectives on how urban ecology can be put into action. Noted urban ecologists, designers, and planners describe key research questions and frontiers for urban ecology, design, and planning. Jari Niemela describes those frontiers from the perspective of his accomplished career in urban ecology; planner Fritz Steiner describes those frontiers from the different perspective of his rich experience in design and planning. Ecologist Ian Douglas draws on his long career of inquiry into urban ecosystems to recall lessons that can help to inform practice and science going forward. Dan Childers, Steward Pickett, Morgan Grove, Laura Ogden, and Anne Whitmer describe another essential means of advancing urban

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ecology as a transdisciplinary science – sharing knowledge across metropolitan areas, and they describe the conceptual basis for forming an international research network to share that knowledge. Finally, Zhifang Wang, Puay Yok Tan, Tao Zhang, and Joan Nassauer draw on their individual experiences in practice and research in China and North America to reflect on how differences in metropolitan governance in China and the US affect the action gap between landscape science and practice in both countries.

Together these papers repeat certain themes: convergence on green infrastructure as an essential part of the solution to ensuring urban ecosystem services and thus human well-being, the need to design for resilience in the face of climate change and other perturbations, and the imperative to address social justice to ensure urban sustainability. They confirm a gap between practice and science – even when the conclusions from that science are widely known and accepted, they point to manifold needs for greater scientific knowledge, and they spell out the need to practice ecological design and planning even when knowledge is uncertain. Finally, they suggest enormous unmet potential for transdisciplinary learning to propel actionable research on urban ecology and sustainability – among disciplines and professions, among scientists, practitioners, and stakeholders, among metropolitan areas, and among nations and states.

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