



# Shifts in urban ecology: From science to social project

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How can urban ecology be better prepared to contribute to a comprehensive understanding of cities? And what do world cities need from urban ecology to move toward desired, more sustainable futures?

Speaking to these questions, all contributions in the Special Section “Shifts in Urban Ecology” frame contemporary urban ecology as an ongoing bridging effort; the scientific field of urban ecology has broadened and diversified by adopting new perspectives and concerns within its scope. From a focus on examining nature in urban landscapes and how it is valued, understood, and stewarded by different social groups, it has expanded to ecologically grounded, systemic explorations, including complex dynamics of social, institutional, cultural, and technological dimensions. This pluralization of the field, sometimes captured by the use of “ecologies” (Nishime and Hester Williams 2018; Rademacher et al. 2019; Pickett et al. 2022), has been facilitated by the engagement with many different disciplines, such as urban studies, sociology, geography, urban policy, and urban planning, as well as infrastructure engineering. This development comes with many conceptual and empirical gains, especially in opening scientific inquiry to multiple knowledges and perspectives with participatory and collaborative research methods. This opening has allowed new questions to emerge, especially about the situatedness, equality, accessibility, and justice of urban ecosystems.

The present and the future of urban ecology, as a field, are shaped in dialogue and collaboration with other disciplines (Childers et al. 2015; McPhearson et al. 2016; Crouzat et al. 2018; Pickett et al. 2021). The expansion of urban ecology has allowed conceptual innovations to emerge, led to the formation of inter-paradigmatic approaches, and opened up for a critical examination of the fundamentals of urban ecology. In this Special Section, we conceptualize the pathways of coevolution and collaboration with other

disciplines as “shifts.” The contributions examine and synthesize our understanding of these shifts in urban ecology relative to the subject of study, the evidence base used, the ways of knowing, and methodological approaches. Through the shifts, we can elucidate the links of the field to important contemporary urban issues, such as justice, climate adaptation, and resilience.

It is becoming clear that to realize the vision of a more engaged urban ecology, vestiges of colonialism, racism, classism, and exclusionary power differentials must be countered (Simone 2017; Schell et al. 2020). We need to examine how the shifts contribute to the evolution of urban ecology into a field that has improved its potential to contribute to positive scenarios within the Anthropocene. The plural views, conceptual innovations, and ways of knowing must be critically interrogated, and unpacked. Theoretical deepening and conceptual innovations in urban ecology are equally important for guiding future research. Indeed, conceptual innovations are required to explore, beyond thin-in-theory justifications for urban research, such as the fact that urbanization is a large, diverse, and continuing collection of global trajectories. While this is true and has great practical significance in and of itself, it is a superficial motivation for transdisciplinary urban research. Such developments should be pursued in a way that can avoid developing new labels that become “ivy concepts” meaning those that are incremental additions that develop around others, but which add no depth (Westman and Castan Broto 2022).

## GUIDING QUESTIONS

Against this backdrop, the Special Section brings together contributions that deepen and broaden the discussion of the

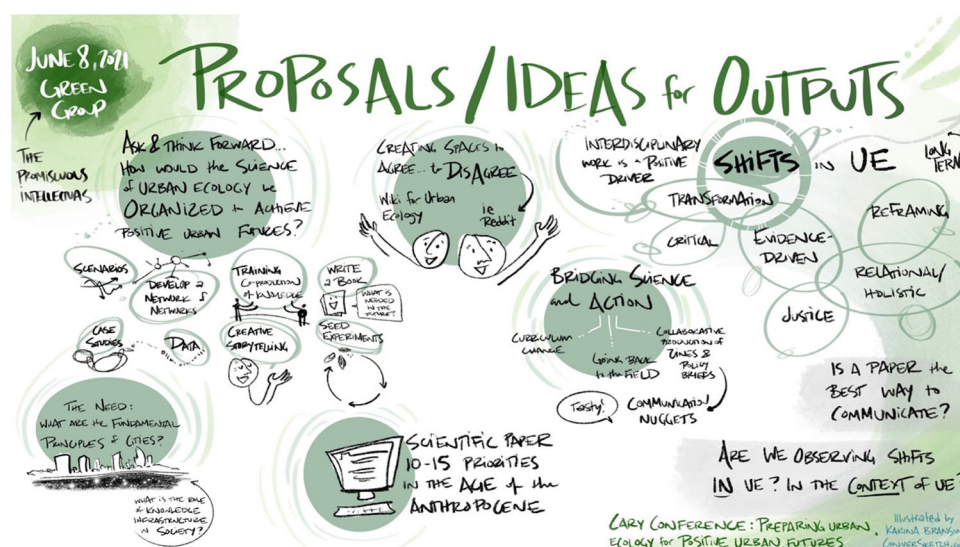
interacting conceptual, methodological, and empirical shifts in urban ecology. More specifically, the contributions will address the following questions:

1. How do *global changes*, such as climate change, urbanization, and social–economic and environmental teleconnections, incite or require conceptual and theoretical shifts in urban ecology?
2. What are the conceptual, theoretical, and ethical shifts that shape the future of urban ecology toward an actionable science?
3. What are *barriers* in the realms of theory, concept, ways of knowing (epistemology), and social values (axiology) that hinder urban ecology from evolving into a reflexive and engaged discipline? That is, what theories, ways of knowing, or ethical values must be examined and applied to advance urban ecology as a transdisciplinary or coproduced pursuit?
4. Given that questions 1 to 3 identify the disciplinary barriers and the global realities, what do the shifts suggest about how to *change the epistemology of urban ecology* to improve its contribution to society and its capacity to produce positive urban futures? What pathways of future actions toward positive urban approaches in the Anthropocene do the shifts open or elucidate?

Answering these guiding research questions is important for increasing the utility of urban ecology. By engaging with communities, policy makers, and planners, urban ecology can help provide a firmer foundation for achieving equitable human wellbeing and improved quality of the urban environment for all residents. The objective of this Special Section is to conceptually identify and explore the

key shifts underway in how urban ecology is evolving and intersecting with other fields of study and practice. By presenting and linking these ongoing shifts, we aim to discover what elements of urban ecology need to be reinvigorated, reconsidered, and repositioned to move to a more just and transformative knowledge paradigm for urban systems in the Anthropocene.

The idea of a Special Section emerged from a dialogue between some thirty participants in an international workshop organized by Cary Institute of Ecosystem Studies in June 2021. The workshop, entitled “Preparing urban ecology to contribute to positive urban futures,” was held online over the course of three weeks, with duplicate sessions to match the variety of time zones of the participants from Japan through the Middle East, Africa, Europe, and western North and South America (Fig. 1). Discussions continued with periodic video calls after the workshop, converging on and critically interrogating six identified shifts. The different discussions were led by a mix of senior and early career researchers from diverse fields of research, nations, and global situations, concluded in 2022 with a recap webinar where different papers were presented as fully developed drafts or advanced outlines. In February and March 2023, we had a series of webinars where we discussed each paper and debated the conceptual innovations and limitations across the shifts. The synthesis paper in this Special Section (Pickett et al. 2024a) distills common themes across all the shifts and proposes a common research agenda for the future of urban ecology as a more transdisciplinary field. The special feature comprises the following papers that respond to the overarching guiding questions:



**Fig. 1** Overview of ideas emerging during the workshop centering on the idea of shifts in urban ecology. Illustrated by Karina Branson of CoverSketch Graphic Facilitation, June 2021. Used with permission

Andersson et al. (2024) point to the need to find ways for positioning, connecting, and synthesizing specific knowledge and diverse evidence. The authors propose a set of five complementary approaches and a simple framework for positioning and expanding individual studies and building cumulative systemic understandings to better match the complex questions contemporary cities pose. The approaches and the framework are meant to help position urban ecology, and other fields of study, as entry points for further advancing interdisciplinary synthesis and open new fields of research.

Grove et al. (2024) present the conceptualization of the ecological justice shift in urban ecology as a coevolution between environmental justice practice and activism and urban ecology. A detailed case study of environmental justice in Baltimore shows how urban ecological research has been affected by a growing understanding of environmental justice. The shift shows how unjust environmental outcomes emerge and are reinforced over time by systemic discrimination and exclusion. In addition, the paper briefly presents four other cases from the Caribbean, Africa, and Asia, to show the global relevance of the shift of urban ecology toward understanding the role of justice. The cases all demonstrate the necessity for continuous engagement with communities in addressing environmental problem solving.

Pickett et al. (2024b) present the relational shift in urban ecology that moves from the reductionistic/reductivism of urban ecology's description of urban landscapes and communities toward a comprehensive understanding of urban landscapes as mosaics of relations between people, nature, place, meanings, and institutions. This shift allows for urban ecology to better engage with and understand how the "social" interacts with the physical, technological, and biological aspects of urban landscapes and sheds light to the place–people relations and transformations over time and across scale. The paper explores how coproduction, global environmental changes, the role of connectivity among urban places and with areas beyond the urban, disaster, and the significance of socioeconomic coping drive the shift.

Frantzeskaki et al. (2024) present the transformative shift in urban ecology. The transformative shift captures the progression from a descriptive science paradigm toward a more applied science paradigm and position as an agent of change for policy and society. Specifically, it showcases the intentionality of the urban ecology research paradigm and narrative to inform ongoing and under-formulation policy programs, especially reconnecting urban with nature and renaturing urban agendas.

We hope that this special feature serves as an invitation to continue invigorating, developing, and opening urban ecology as a discipline, an invitation to continue shifting

and coevolving conceptually, theoretically and empirically. We also envision and invite future scholars and practitioners to join a pluriverse trajectory of urban ecology as one pathway to contribute to new knowledges as well as transformative actions for sustainable and resilient cities of the future.

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