

The Routledge Handbook of Sustainable Cities and Landscapes in The Pacific Rim

Edited by
Yizhao Yang and Anne Taufen

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Chapter 17

Introduction to Section 3

Cities and biodiversity

Jennifer Rae Pierce

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INTRODUCTION TO SECTION 3

Cities and biodiversity

Jennifer Rae Pierce

To achieve the United Nations' Sustainable Development Goal 11 to “make cities inclusive, safe, resilient and sustainable,” we must strategically reframe our relationships with nature and with one another to emphasize interdependencies between us humans and our non-human relatives and redefine what and who can generate biodiverse cities and a more biodiverse planet. As part of this, we argue that we must also address the deeply embedded societal connections between the domination, commodification, and destabilization of nature and parallel actions of oppression of other people, and in particular, the role that cities play in generating and reinforcing these actions. To operationalize these concepts into a call to action, we suggest a framework for cities to address biodiversity at the local, regional, and global scales that maintain equity at its core and provide examples of various aspects of this framework in action by cities in the Pacific Rim.

Context

The link between cities and biodiversity is complex and often misunderstood as purely adversarial. After all, cities are meant to serve the needs of humans, and many of the more radical environmental discourses (Dryzek, 2005), such as Deep Ecology (Naess, 1973), reject anthropocentrism as a primary root of environmental ills, even while sometimes claiming that humans are part of the natural system. This has led to generally negative opinions of cities by traditional conservationists, ranging from tolerance of cities as a necessary but undesirable feature to dislike of cities as a paragon of anthropocentric, nature-destroying landscapes. Herein, we will apply a critical lens to this colonialist misunderstanding of adversity between cities and nature, observing that anthropocentric and ecocentric approaches are not inherently opposed – when biodiversity is destroyed, humans also suffer. As interlinked members of the Earth-community, humans and non-human beings are in relationship, like family members living together in a household. When viewed as an interdependent system, it becomes clear that relationships based upon cooperation and sharing generate abundance and resilience, whereas greed and oppression, particularly when wielded by humans whose technological advancements shield them from nature's checks-and-balances, harm relationships and can threaten the system upon which all beings depend. The oppression of humans and non-humans alike stems from the same root of inequity and broken relations

(Bookchin, 2006). By recognizing and reconciling these relationships, cities *can* become allies for biodiversity – and not just biodiversity found within cities but also in rural and remote lands, and at regional and global scales.

If we are to achieve global conservation goals, we argue that cities *must* be core contributors. This is not only because cities play a direct role in conserving biodiversity within their borders and are often located within biodiversity hotspots (Weller et al., 2019), but also because of their indirect regional influence and impact farther afield. Cities have an outsized influence on global markets and social norms that exceeds the size of their political boundaries manifold (Folke et al., 1997; Rees & Wackernagel, 1996). They are therefore vital actors in transforming these systems to support biodiversity. The chapters in this section will explore how biodiversity conservation efforts in cities differ from standard approaches to biodiversity conservation and how they can support an approach to urban biodiversity that centers equity and addresses the many impacts that cities have on biodiversity at a range of scales.

Biodiversity conservation in an urban context

We begin by recalling the origins of the term “biodiversity” before exploring its particulars in an urban context. Biodiversity was first adopted as a term at a large scale at the Smithsonian’s National Forum on BioDiversity in 1986. In preparation for the forum, biologists deliberately developed the term “biodiversity” to define *what they love about nature* and to protect it by shaping public perceptions and political action in an unprecedented foray by scientists into politics via an explicit normative (i.e. values-based) stance (Takacs, 1996). Since then, attempts to define biodiversity have tended toward more dispassionate measurable definitions such as “variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems” adopted by the Parties to the Convention on Biological Diversity (CBD, 2005, 5). The CBD’s definition has been widely quoted, and was only slightly expanded upon by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) with the addition of “as well as changes in abundance and distribution over time and space within and among species, biological communities and ecosystems” (Diaz et al., 2015, 12). These definitions have not ended the debate on what biodiversity means. The addition of “urban” as a descriptor only adds to the complexity and the potential for disagreement, even among specialists, who, in the absence of an established definition, have had to first come to some shared definition of “urban biodiversity” whenever they gather.

One unsettled issue is the question of conservation value in an urbanized and undeniably anthropocentric landscape that generates novel environmental conditions favoring new ecosystems (Kowarik, 2011; Miller and Bestelmeyer, 2016). Biodiversity conservation has traditionally focused on the preservation of large areas of land that are prioritized based on their “conservation value.” This value is determined by non-anthropocentric factors such as species richness, presence of endangered species, or unique ecological features. The influence of humans in this view is to be minimized and, for the most part, reduced to the role of knowledgeable stewards or leisurely tourists. However, urban landscapes are defined by a concentration of diverse human activities and their corresponding high value to human societies and economies. People in cities cannot limit their activities to those valued by traditional conservationists – to do so would ignore the potential benefits of generating

landscapes that are both a locus of human activity and biodiversity conservation. Therefore, the approach and conceptualization of biodiversity in an urban context challenge the original concept of the role of humans upon which biodiversity conservation activities have traditionally been founded.

Scalar impacts of cities on biodiversity

The relationship between cities and biodiversity is complex; cities can contribute to harmful activities, such as by allowing sprawling development that destroys nearby ecosystems or by contributing to demand for rare earth metals obtained via destructive mining practices. But they can also reduce harms, such as by protecting mountaintops that serve as reservoirs for drinking water or adopting certified sustainably harvested lumber products for buildings. These harms and protections can occur directly or indirectly, reaching even around the globe (Liu et al., 2013), and impacting various landscapes that are hundreds or even thousands of times larger than the city's municipal area (Folke et al., 1997). A city's "bioshed" captures this complex relationship, referring to the wide and varied landscapes that are directly and indirectly either harmed or protected from harm by the city (Pierce, 2014; also see Pierce et al.'s chapter in this section).

We adopt the concept of the bioshed, center it around equity and justice, and further define it by delineating three impact areas and three scales for each city to consider (see Figure 17.1). Centering the bioshed around equity and justice emphasizes the need for transformational systems that actively oppose oppression of both human and non-human

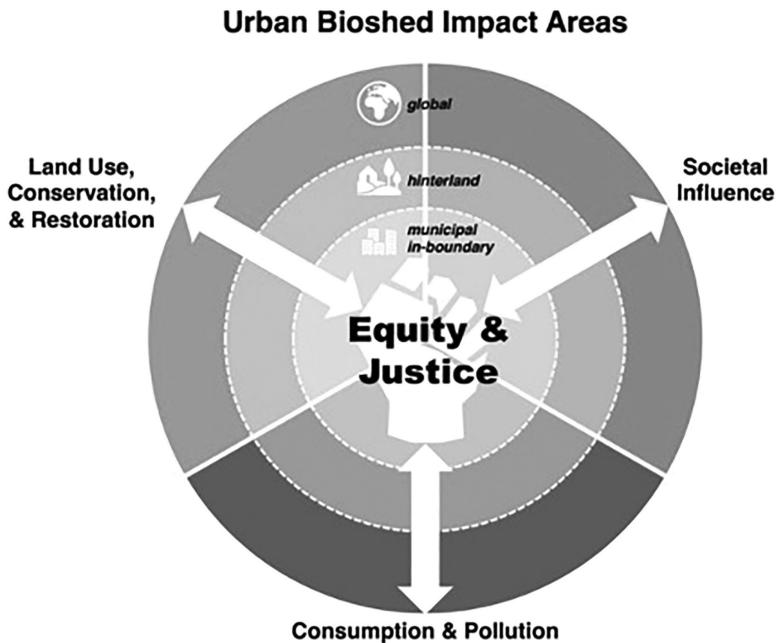


Figure 17.1 Urban bioshed impact areas. This diagram explains the bioshed, centers it around equity and justice, and delineates three scales (global, hinterland or outskirts, and municipal in-boundary) and three impact areas (societal influence, consumption and pollution, and land use conservation and restoration) for each city to consider. The arrows indicate the inter-linkages between each of the impact areas with equity and justice across all three scales

beings, recognizing that these oppressions are rooted in the same self-reinforcing mindsets and power structures of self-prioritization over others, whether the “others” are humans or other forms of life. The three impact areas remind cities of the indirect drivers they can influence, such as market forces, supply chains, and societal norms of consumption. The three scales (in-boundary, hinterland, and global) encourage cities to consider impact areas outside their borders, such as through regional resource flows and cycles (e.g. watersheds, airsheds, and nitrogen) and trade (e.g. industrial activities, resource extraction, and the forces of supply and demand that generate them). The in-boundary scale is defined by the local government’s political boundaries and is therefore the most straightforward politically, but is still problematic in that political boundaries rarely align with ecological or other functional borders. The hinterland scale refers to tributary and nearby territory outside of the local government boundary with a direct economic or other functional link to the city, such as farmlands that deliver products to the city for trade or peri-urban residential areas that depend on jobs or other economic activities within the city (Jones, 1955). The global scale refers to the impacts that a city has in far-flung locations, connected by transportation lines, cultural influence, or other forces of globalization. Now that we have outlined a framework for urban impact on biodiversity, we now turn to the drivers behind these impacts.

Urban drivers of biodiversity loss and social injustice

IPBES recently assessed the latest state of knowledge on biodiversity loss and has concluded that drivers of change in the state of nature are, in order of highest impact, “changes in land and sea use; direct exploitation of organisms; climate change; pollution; and invasion of alien species” (IPBES, 2019, p. 12). IPBES further identifies the underlying causes of these drivers as rooted in “societal values and behaviors that include production and consumption patterns, human population dynamics and trends, trade, technological innovations and local through global governance (*Ibid.*)” These drivers, and, more significantly, the underlying causes of biodiversity loss primarily originate from, or flow through, cities. In particular, societal values and behaviors, consumption patterns, trade, technological innovations, and governance responses are largely generated within cities. Individuals and institutions in cities thus influence the magnitude and direction of ecological and evolutionary changes at local and global scales (Des Roches et al., 2020). These actors are part of complex social-ecological systems, so understanding the impacts of urban areas on biodiversity requires knowledge of how these systems function (Heynen et al., 2006; Liu et al., 2007).

Understanding urban social-ecological systems, in turn, requires critical investigation of power and inequity (Langemeyer and Connolly, 2020; Schell et al., 2020; Smith, 1984). Cities host the extremes of the human condition from the unfathomable wealth of a few to entire communities whose essential needs have not been met, sometimes referred to as “underserved.” These inequities result in human suffering, and are also intimately connected to how humans relate to and benefit from nature. Those with the most power capture the majority of the benefits nature provides through exploitation (often remotely executed) and by implementing generally self-serving conservation initiatives while avoiding the negative impacts of biodiversity loss, which are instead most directly experienced by those with the least power. Despite existing power inequities, local indigenous and community groups have led their own initiatives in cities around the world that integrate justice for both people and nature. These initiatives offer innovative approaches to nature conservation and human

well-being that are connected to place, informed by traditional knowledge, and should inspire and challenge more mainstream approaches (Tengö et al., 2017). Efforts by cities to address biodiversity loss should partner with local groups and must challenge local power imbalances. By taking this approach, cities can seek justice for both humans and non-humans in a way that is sustainable and equitable.

Chapters

Each chapter in this section explores aspects particular to the relationship between cities and biodiversity using examples or applications in the Pacific Rim. Chapters are arranged from larger to smaller scale, and from theoretical to experiential.

In the first chapter, Jennifer Rae Pierce, Melissa Barton, Isaac Brown, Bart Johnson, Ryan Harrigan, Kelsey Jessup, Patrick Mooney, Sohyun Park, Tan Puay Yok, Michael Yun, and Marina Alberti respond to the need for a definition specific to urban biodiversity by offering one for consideration. They then suggest a new operational standard for urban biodiversity that supports the co-realization of human and conservation priorities in urban spaces. Furthermore, they propose a guide for action aiming to support decision-makers seeking to integrate biodiversity into decision-making. They identify four objectives that an urban biodiversity initiative should fulfill and then offer potential leverage points that can help practitioners meet such objectives.

In the second chapter, William Dunbar, Juan Pastor-Ivars, and Evonne Yiu focus on the urban hinterland scale (Jones, 1955) in particular. They describe the landscape approach to biodiversity conservation which considers multi-scalar interactions for managing landscapes using an integrated social-ecological systems approach from local to regional. They then explore in particular the concept of “Satoyama,” a traditional concept in Japan that refers to working hinterlands held in common and that supports built-up human settlements. They explain the vision of the Satoyama Initiative – to create “societies in harmony with nature” and its three-fold approach that integrates traditional practices and ecological values which are applied via co-management. This chapter highlights an important approach that is widely unknown outside of East Asia, but that offers important lessons on building healthy relationships with the regional bioshed.

In the third chapter, Jennie Moore and Meidad Kissinger expand the discussion to the global scale, demonstrating how the ecological footprint, as measured by the consumption levels of people in cities, must be taken into account for cities to meaningfully address biodiversity loss. They discuss the case of Vancouver, Canada to illustrate how a consumption-based ecological footprint can be calculated at the city scale and the implications of such data on decision-making. This discussion necessarily confronts inequities of consumption between individuals and how demand from wealthy people can drive biodiversity loss affected in other places by producers and laborers.

In the fourth chapter, Claudia P. Diaz Carrasco, Maria Lupita Fabregas, and Sabrina Drill provide lessons from the field for engaging urban underserved groups, particularly Latino communities and youth, in environmental conservation derived from their experiences with projects such as Cooperative Extension professionals in California. Their approach integrates economic and cultural concerns with conservation using a theoretical framework developed by Erbstein and Fabionar to provide practical advice for organizations and researchers alike.

In the concluding chapter, Sabrina Drill and Jason Post discuss restoration efforts and the cultures of fishing along the Los Angeles River with a critical eye toward impacts on

vulnerable communities to ask whether river restoration necessarily produces gentrification. They harness their experiences in the field applying an equity lens to urban conservation to achieve effective community engagement and positive impact on urban aquatic ecosystems.

Taken together, the five chapters of the section provide an initial review of urban biodiversity efforts that are centered on equity and/or take into consideration the variety of scales that cities impact can look like. Chapters 2, 3, and 5 focus on a particular scale, while chapters 1 and 4 contain a series of case studies to illustrate their area of focus.

Connections to global goals

Biodiversity is essential to the sustainable development of cities and their surrounding regions because nature provides for all dimensions of human well-being: materially, spiritually, and mentally. The significance of biodiversity for human well-being is recognized in global goals. Sustainable Development Goals 14 (Life on Land) and 15 (Life Underwater) are most directly related to biodiversity loss, and Goal 11 (Sustainable Cities and Communities) is most closely related to urban initiatives, but the impacts of biodiversity loss go beyond those 3 Goals. The continued loss of biodiversity will also undermine 80% of the assessed targets for SDGs that are related to poverty, hunger, health, water, cities, climate, oceans, and land (SDGs 1, 2, 3, 6, 11, 13, 14, and 15) (IPBES, 2019).

Call to action

Increasingly, it is becoming apparent that addressing biodiversity loss in a meaningful way also requires evaluating the lifestyles our society upholds as desirable (IPBES, 2019). We must redefine what it means to live a good life and to have healthy relationships with nature – from what we eat to how we live. This means achieving a more comprehensive understanding of the interconnectedness of our world so that everyday people are aware of who and what makes the things we use, and what happens to those things after we have finished using them (Stern et al., 1997). It means expanding our time horizon to consider how a place was before we arrived and how it will be after we have left.

This expansion of consciousness will require retraining ourselves and re-aligning societal incentives to reinforce the values we choose to uphold. An important step of this retraining is to change how our economists measure success, from GDP, to more direct measures of what society values, such as natural capital, and what our legislators protect from property to more valuable things such as life itself. It will mean establishing vocabulary that expresses the sacredness of our relationship with nature and our role as part of nature.

The field of urban biodiversity is currently in its infancy, lacking a shared vision and framework, standardized terminology, core resources, and even established indicators. Recent efforts such as the work of IPBES, which is the largest effort to date to compile lessons on biodiversity from research on biodiversity applicable to practitioners, and the Urban Biodiversity Hub, which offers the most comprehensive global database of initiatives on the topic of cities and biodiversity freely online, have helped to coalesce the latest developments in this field. This book section seeks to further these contributions by offering a framework for conceptualizing the impact of cities on biodiversity, defining urban biodiversity, and providing examples of how these frameworks have been implemented in the Pacific Rim.

We hope that practitioners and researchers alike will apply the theories offered here in their own cities and further develop them through collaborative implementation in partnership with community groups.

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