

The contribution of wild urban ecosystems to liveable cities

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Abstract

While wildlands are increasingly being transformed into managed ecosystems in rural areas around the world, cities are now also being recognized for their “wilderness” areas. Cities and wilderness have a complex relationship based on constantly changing human-nature interactions and social values. Therefore, understanding the complex nature of the urban-wilderness relationship requires approaches from both the social and natural sciences. This special feature seeks to advance our understanding of this relationship by highlighting the many benefits of wild urban ecosystems for people and biodiversity. From a practical perspective, the special feature examines ways of incorporating urban wilderness into contemporary global urban trends such as green space design, green infrastructure, urban biodiversity conservation and sustainable cities. We conclude that engaging with the wild side of cities is a timely issue, offering unique and rarely exploited opportunities for developing liveable cities and connecting people with nature.

Around the globe, wildlands are increasingly being transformed into managed ecosystems, driven by agriculture, forestry and urbanization (Ellis, 2015). In the face of these transformations, discourses around conserving large wild ecosystems in national parks or other protected areas are prominent in biodiversity conservation. However, cities are now also being recognized for their “wilderness” areas (Kowarik and Körner, 2005). While wilderness has traditionally been viewed as the opposite of civilisation, we now know that wilderness has been shaped by humans for millennia, and the concept is largely a human construct (Cronon, 1995). Cities and wilderness consequently have a complex, but not necessarily exclusive,

relationship based on constantly changing human-nature interactions and social values. Therefore, understanding the complex nature of the urban-wilderness relationship requires approaches from both the social and natural sciences. This special feature seeks to advance our understanding of this relationship by highlighting the many benefits of wild urban ecosystems for people and biodiversity. From a practical perspective, we examine ways to incorporate urban wilderness into other global urban trends such as green space design, green infrastructure, urban biodiversity conservation and sustainable cities (Aronson et al., 2017).

We think that approaching the wild side of cities is a timely issue, offering rarely exploited opportunities for developing liveable cities and linking people with nature. Cities are rapidly expanding to cover more of the world's surface and shape the experience of nature for most of the world's people (McKinney, 2002; Soga and Gaston, 2016). Yet while urbanization deeply transforms natural ecosystems, urban lands can harbour a surprisingly high biological richness that is often richer than in adjacent rural landscapes (McKinney, 2002, Kühn et al. 2004). This richness occurs across a wide variety of mostly novel ecosystems (Gandy, 2013; Kowarik, 2011), ranging from highly managed ecosystems to fully unmanaged wild ecosystems (Threlfall & Kendal, 2017).

Urban forestry is moving to a more holistic approach to planning and managing vegetation in and around cities (Konijnendijk et al., 2006). Developing the urban green infrastructure and associated ecosystem services based on the total range of urban ecosystems is high on the urban forestry agenda (Hegetschweiler et al., 2017). Also, in many areas, there are strong economic incentives for cities to promote urban wilderness areas; increasing green infrastructure is often a much less costly way of reducing problems of flooding, heat island impacts, water pollution and climate change (Birch and Wachter, 2008). Incorporating spontaneous vegetation into green infrastructure could make this even less costly. This is an especially strong economic incentive in the many urban areas of Europe and USA where cities are losing populations, resulting in widespread areas of dereliction or abandonment (Burkholder, 2012).

Wild urban ecosystems are not all the same. They can vary by intent: conserved remnants, restored natural ecosystems, abandoned wastelands and designed landscapes (Kowarik, 2017; Threlfall & Kendal, 2017). They can vary by utility, providing places for recreation, aesthetic enjoyment, interactions with nature, and conservation of rare and threatened species (Zefferman et al., 2017). They can comprise very different types of ecosystems including: forests, woodlands, heathlands, grasslands, or wetlands. Sometimes these ecosystems are deliberately preserved, designed or constructed, but perhaps more often they are accidental (Rupprecht and Byrne, 2014), not the result of optimal planning but the consequence of neglect or serendipity – allowing often unforeseen natural dynamics. In this issue, Kowarik (2017) distinguishes wild ecosystems from others by the prevalence of natural ecosystem processes. Also distinguished are ancient ecosystems that correspond to historic benchmarks which differ from novel ecosystems that do not (e.g. novel urban wastelands). Threlfall & Kendal (2017) further distinguish ecosystems based on human involvement in community assembly, and highlight the temporal and spatial heterogeneity of wild spaces in cities.

Importantly, wild urban ecosystems can provide enormous ecological and social benefits, and these are often intertwined (Jorgensen and Tylecote, 2007; Kowarik, 2011). For example, Zefferman et al. (2017) demonstrate that the Knoxville Urban Wilderness, a large area of relatively undeveloped land in Knoxville, USA, has had a shifting history of land use from resource extraction, through recreation and now preserves hundreds of native plant and animal species, and is reconnecting the citizens of Knoxville to natural ecosystems through citizen science projects. The “urban wilds” of Boston, USA, provide another well documented example (Del Tredici and Rueb, 2017). Kowarik (2017) argues that a variety of social factors including values, preferences and socio-demographics can shape demand for wild urban ecosystems, and that understanding these factors is needed to link demand with supply of urban greenspace through design and planning. Threlfall and Kendal (2017) link the characteristics of wild spaces (e.g. high taxonomic, genetic and structural diversity) to outcomes such as resilience in the provision of ecosystem services, improved provision of habitat and effects on human preference. Riley et al. (2017) show that trees on

abandoned lots can have greater abundance, species diversity and canopy cover than residential lots, which results in greatly increased provision of ecosystem services. Abandoned lots also facilitate natural ecosystem processes such as sapling regeneration of exotic species which is leading to the creation of novel ecosystems (Kowarik, 2017).

Despite these many ecological and social benefits, urban wilderness areas are not universally appreciated and will require thoughtful management if long-term success is to be achieved (Zefferman et al., 2017). For example, green space in cities is distributed inequitably, and deliberate greening interventions can lead to the displacement of disadvantaged and minority communities through increased housing costs (Wolch et al., 2014). However, informal green spaces may provide many of the benefits conferred by managed green spaces without the same risks of displacement. Danford et al. (2017) show that minority groups are using small informal green spaces as well as community-designed spaces, and that vegetation, wherever it is located, is an important predictor of use. Both deliberate and informal green spaces thus provide important opportunities for interacting with nature.

Wild ecosystems can be negatively perceived by the general public. However, the way people perceive natural environments is different based on their values (Kendal et al., 2015), and this is likely to be true for wild urban ecosystems. For example, Brun et al. (2017) show that in two French cities, resident perceptions of wastelands are diverse and influenced by characteristics of the ecosystem (e.g. successional stage) and characteristics of residents (e.g. recreational use, demographics). Mathey et al. (2017) find similar patterns in brownfield sites in Dresden and Leipzig, Germany, and highlight that novel approaches to the design and management of urban green spaces are needed to unlock the potential of these sites.

We conclude that wild urban ecosystems are increasingly important element of sustainable cities around the world. This collection of papers brings together perspectives from three continents to highlight some of the diverse social and ecological benefits that these systems provide. Wild ecosystems are not the same as traditional managed urban green space. They supply different kinds of benefits and different temporal and spatial scales, and demand for them differs from demand for managed green space. They

need to be planned and managed in different ways. Perhaps most importantly, novel and historic wild urban ecosystems offer new opportunities for people to interact with natural systems and processes in our increasingly urbanised world.

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