

Defining greenspace: Multiple uses across multiple disciplines



Lucy Taylor^{a,*}, Dieter F. Hochuli^b

^a School of Life and Environmental Sciences, University of Sydney, Room 410 Heydon–Laurence building (A08) The University of Sydney, NSW 2006, Australia

^b School of Life and Environmental Sciences, University of Sydney, Australia

HIGHLIGHTS

- Most publications reviewed fail to define what is meant by the term greenspace.
- Of those that do provide a definition, six different definition types are identified.
- Two broad interpretations are used: a) greenspace as synonymous with nature; and
- b) greenspace as explicitly urban vegetation.
- Recommend a definition is required that is both qualitative and quantitative.

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ABSTRACT

Greenspace research has been driven by an emerging interest in the impact that biodiversity and ecosystem function has on life in urban areas. Studies from multiple disciplines across the life, physical and social sciences investigate the interactions with or within greenspace, creating a wide range of potentially related, but disparate findings. In order to understand whether these unconnected findings might be integrated, it is important to be able to make comparisons and build meta-analyses. In a review of journal articles about greenspace, we found that less than half of the 125 journal articles reviewed defined what greenspace was in their study; although many articles implied a definition. In those that provided a definition, we identified two overarching interpretations of greenspace using six different definition types. Perhaps arising from how the term has been lexicalized, this suggests that researchers do not have the same understanding of greenspace and limits the ability of researchers to draw meaning from multiple contexts or create syntheses. Rather than suggest a single, prescriptive understanding of greenspace, we propose that researchers construct a definition of greenspace for the context of their research that utilises both qualitative and quantitative aspects.

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1. Introduction

Greenspace is usually, but not always, comprised of vegetation and associated with natural elements. There has been growing interest in greenspace research due to evidence that nature positively impacts human wellbeing (Frumkin, 2013; Taylor & Hochuli, 2015). This research is relevant to a range of disciplines, including the health and medical sciences, urban design and planning, ecology, and a number of social sciences. While single discipline studies are important, greenspace research will not progress without considering the findings of multiple components, such as social and ecological aspects, due to the complexity of how they integrate

(Alberti, 2008). This is particularly relevant in cities, where social and ecological components, including greenspaces, are under pressures associated with urbanization. There are two potential ways to achieve research across multiple elements. First, multidisciplinary investigations consider multiple components. For example, ecology 'in' cities typically involves research from one discipline, such as investigating the diversity and abundance of birds along a rural-urban gradient, but the ecology 'of' cities incorporates multiple disciplines and takes a multi-scale approach (McDonnell, 2012), such as investigating the diversity and abundance of birds in multiple land cover types that represent a rural-urban gradient across an entire city to inform urban planning and management (e.g., Catterall, 2009). Urban ecology has embraced the ecology 'of' cities as a multidisciplinary way to integrate various aspects of the hybrid urban environment. The second way forward for research of multiple components is to make comparative assessments of studies. Comparative studies might include meta-analysis, or syntheses of

* Corresponding author.

E-mail addresses: l.taylor@sydney.edu.au (L. Taylor), dieter.hochuli@sydney.edu.au (D.F. Hochuli).

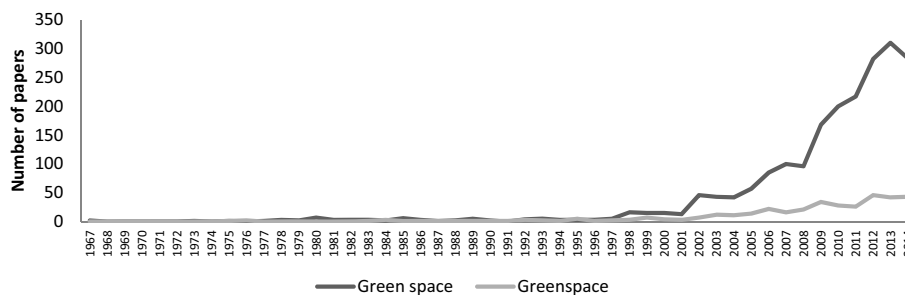


Fig. 1. Publications about greenspace have increased since the turn of the century.

existing studies (McDonnell & Hahs, 2009). In order to understand the variation of greenspace across the world, being able to perform comparative research is important (Niemelä, 2014). In order to be able to compare findings, similar definitions and data are required (McDonnell & Hahs, 2009) (for example, McCrorie, Fenton, & Ellaway, 2014).

Disciplines have different objectives and use different methodologies, and this can result in different meanings (McDonnell, 2012). Without ensuring that common terms are rigorously defined, it is likely that there will be a lack of consensus in how they are used. This has been found to be the case with the term, 'urban' (McIntyre, Knowles-Yáñez, & Hope, 2000). Furthermore, tacit assumptions are often used in lieu of definitions in various disciplines' literature. Providing a clear and considered definition of key terms is critical for researchers, otherwise they risk relying on idiosyncratic personal interpretations of generalized terms (Pickett, Cadenasso, McDonnell, & Burch, 2009). Such individual interpretations might be acceptable for limited or single discipline studies (Pickett et al., 2009), but it is impossible to undertake multidisciplinary research or perform comparative studies without quantified descriptions of key terms (McIntyre et al., 2000). For example, a human-dominated ecosystem might be considered *urban*, but without quantification, the term *urban* lacks qualitative and quantitative detail that detracts from its usefulness, suggesting instead a lack of rigor on the part of the researchers (McIntyre et al., 2000). It is critical to provide a meaningful operational definition in order for the research to progress (Hochuli, Christie, & Lomov, 2009), particularly when multiple aspects are involved. In addition to progressing academic research, policies are at risk of becoming redundant when terms are inadequately defined. If a country or region has a policy of, for example, 7 acres of greenspace per 1000 residents (Ambrey & Fleming, 2014) because the greenspace is intended to improve the lives of residents, then the greenspace may not be fulfilling the desired function if it is degraded or if it comprises artificial elements. So in order to ensure policy decision-making remains relevant, operational definitions must be provided that can be interpreted by all sectors. By meaningful operational definitions, we mean that a term should be qualified and quantified where possible. This is more likely to increase understanding across multiple disciplines and research contexts.

Some of the varying interpretations may be related to how terms develop and become lexicalized. Historically, greenspace has been used as two words, *green* and *space*, where the adjective *green* describes the space. For example, in a paper concerning trees mitigating air pollution, green space is defined as "land covered with some form of vegetation" (Warren, 1973). The author was right to qualify that the vegetation of interest was trees, as otherwise, a 'green space' conforming with the definition provided (i.e., vegetated land) may not be as relevant to the pollution mitigation aspects. Another valid use of the term is "green space biopellant" (Kang, Jang, & Kwon, 2016), however it does not refer to vegetated land. Instead, it refers to an environmentally-friendly

form of space propulsion (Kang et al., 2016). *Greenspace* is a compound that, unlike a noun phrase such as *purple shirt*, has a distinct meaning (Verhoeven & van Huyssteen, 2013), such as *whiteboard*, which is not just a board that is white, but an erasable board that is used with markers for presentations. While compounds, which add words to the lexicon, can be one or two words, one-word compounds are easy to distinguish from noun phrases (Verhoeven & van Huyssteen, 2013). As such, we concentrate on the one-word compound to be explicit about the focus on the modern use of the term, 'greenspace'.

A number of reviews on single aspects of greenspace have been published, including a synthesis of 219 research papers that focus on human-environment interactions in urban greenspace (Kabisch, Qureshi, & Haase, 2015), a review of 25 studies concerning the health benefits of greenspace (Bowler, Buyung-Ali, Knight, & Pullin, 2010), and a review of 50 studies that measure social-ecological values associated with greenspace (Hunter & Luck, 2015). Attempts have been made to define various greenspace features; for example, as unsealed or 'soft' surfaces (Swanwick, Dunnett, & Woolley, 2003). Green infrastructure is a related term used in the literature to refer to a network of greenspace, where the scale is city- or landscape-wide and its function is in relation to urban inhabitants (Tzoulas et al., 2007). Other closely associated terms include: open space, urban vegetation, parks, remnant patches, residential gardens or yards, and road verges or streetscapes. These terms and definitions all assume human interaction or an urban context. These terms are applied at multiple scales (e.g., landscape, city, neighborhood, or parcel), not all include vegetation (for example, open spaces or residential yards may be paved), and the accessibility can vary (for example, streetscapes might be public or, in the case of streets on private property, private). They do not reflect the operational use of greenspace in the recent literature, which also includes literature on agricultural land and other landscapes. As with many other common terms, such as 'urban', the meaning of the term greenspace is often assumed and therefore unclear (McIntyre et al., 2000).

A clear conceptual usage of greenspace is critical to a robust multidisciplinary or comparative study (Cooper, Hedges, & Valentine, 2009). The necessary integration required in order to take the literature about greenspace beyond a collection of individual studies is impossible with the current lack of clarity around the term and how it is used. To continue to research greenspace without adequately defining it potentially undermines the research performed and adds to the challenges of management. Our aims were to investigate how greenspace is used in recent literature, and propose suggestions to enable integration between studies, regardless of the scale, methodology, or disciplinary focus.

2. How greenspace is used in recent literature

In order to determine how researchers use or define greenspace, a search of all ISI Web of Science databases was performed on 17 April 2015, including the core collection, CABI, BioSIS Previews

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