Greenspace Planning:
Problems with Standards, Lessons from Research, and Best Practices

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It is now a truism that 75 percent of people will live in cities by 2050. As we surge towards a global population of 10 billion (Roberts 2011), urban planners, municipal managers, ecologists, health professionals, and ordinary citizens are becoming increasingly alarmed by a growing list of urban environmental problems. These problems include rising pollution, decreasing biodiversity, deteriorating mental and physical health, food and water insecurity, and declining "greenspace" (Blanco et al. 2009). Many cities are now scrambling to protect their greenspaces, and some are retrofitting new types of greenspace. Greenspaces, such as parks, reserves, stream banks, and road verges, confer a range of benefits upon both users and non-users. These benefits include: food provision, flood mitigation, cooling urban temperatures, ameliorating pollution, suppressing dust and noise, sheltering urban wildlife, facilitating active lifestyles, and decreasing stress and anxiety, among many others (Byrne, Sipe, and Searle

2010). Greenspaces may even lower the incidence of some diseases (for instance, heart disease, diabetes, and some cancers) (Francis et al. 2012). Although communities are beginning to appreciate the importance of their greenspaces, in cities across the globe, development pressures still threaten many treasured urban green areas, leading to the question: is greenspace planning a case of too little, too late?

This article reviews how we typically plan for urban greenspace and considers the historical origins of these ideas. It argues that concepts such as greenspace standards have become increasingly inadequate and irrelevant. If our cities are to become more liveable and ecologically viable over longer time frames, what we need are alternative approaches to greenspace provision. The article concisely reviews some of the latest findings from greenspace research and advocates a "needs-based" approach to greenspace provision, calling for more flexible modes

of greenspace delivery. It concludes by looking at some best practices from cities that have pioneered innovative solutions to meeting their greenspace demands, cities that are leading by example.

What is a Greenspace?
To quote Roy et al. (2012) the term "urban greenspace" refers to a broad variety of green areas within cities, including: "all types of parks (from pocket parks to national parks), sporting fields, riparian areas (i.e., river banks), private backyards and gardens, community gardens, street trees, spontaneous vegetation (i.e., not planted), infrastructure easements, communal space around apartment buildings, cemeteries, rock walls, street verges and rail corridors, school grounds, green roofs, stormwater drainage channels, walking and cycling trails, vacant lots, and other spaces that provide opportunities for active and passive recreation, nature conservation, relaxation, socialising, and interacting with plants and animals" (also see Harnik

2010). When we discuss greenspace, we mean more than just manicured parklands, developed playgrounds, or sporting fields; what we are referring to are the interstices, the in-between spaces in our cities, spaces where living things flourish and where people can relax, recuperate, and be revitalised (Gobster and Dickhut 1995).

But how many of such greenspaces are needed in a city? How big should they be? Where should they be located? How will they be accessed, and by whom? How far should people travel to reach them? What facilities should they contain, if any? Are they just for people or will they be shared with wildlife? Are they just for recreation or should they be multifunctional (for example, stormwater management and infrastructure location)? Who will pay for their construction and management costs, and how? Can they contain commercial facilities, and if so, how many and where? How will we know that we are meeting the needs of target populations? These are all vexing questions for greenspace planners. The answers are complex, interrelated and seldom obvious. Planning greenspaces is not easy, but the social and environmental dividends from good planning are worth the time and effort. A look at the "standards" approach to planning for parks, open space, and recreation facilities shows some problems that occur from inadequate planning.

How Do We Plan for Greenspace?

In a cogent and well-written paper, Paul Wilkinson (1985) reviewed the historical origins of standards for park and recreation facilities; it is a paper that is arguably just as relevant now as when it was first published. Wilkinson traced the first standards to the 1890s recreation movement in the United States and United Kingdom. Such standards emerged against a backdrop of rapid urbanisation and deteriorating environmental quality associated with the industrial revolution; they were intended to address concerns about citizen health

and well-being, especially for children (for a more detailed history, see Cranz 1982; Wilkinson 1988; Theobald 1984; and Turner 1992). The popularity of these standards reflects their ease of application and the ability to defend them in appeals courts based on "expert opinion". Wilkinson noted that despite their widespread adoption, such standards have never been empirically validated (although this has begun to change over the past decade, a point we will return to shortly). Wilkinson reported that park standards, such as "no resident should be further than one-quarter miles (400 metres) from a park", are largely aspirational. In reality they are difficult to achieve (also see Harnik and Simms 2004). For example, Wilkinson suggested that if prevailing park standards were applied to New York's Manhattan Island, the area required to serve the island's population would be larger than the island itself (Wilkinson 1985, 196).

Wilkinson reviewed a range of standards in his paper. He noted that there are four types: (i) a size standard (e.g., "1 hectare"); (ii) a ratio standard (e.g., "per 1,000 residents"); (iii) a distance standard (e.g., "within 500 metres of a residence"); and an area measure (e.g., "10 percent of the gross subdividable area"). Until the 1980s, the U.S. National Recreation and Park Association (NRPA) recommended a park or open space standard of 10 acres (or 4 hectares) per 1,000 residents; many Canadian municipalities followed suit. In the United Kingdom, the National Playing Fields Association adopted a standard of 6 acres (or 2.4 hectares) per 1,000 residents in the 1920s, and following the Second World War, a national standard emerged of 4 acres of open space per 1,000 residents, with no resident living more than a half-mile from a park. In Australia a national standard of 7 acres (3 hectares) per 1,000 residents emerged in the 1940s (Veal 2008; Evans and Freestone 2010). From the 1970s though, such standards have received increasing criticism (see Gold 1977).

Wilkinson identified eight weaknesses of a standards approach to greenspace planning. First, standards were originally intended as guidelines but have been rigidly adopted as minimum requirements—making them inflexible. Second, standards are arbitrary—they do not account for demographic, ecological, topographic, or economic variations within a city, and ignore complex citizen behaviours, perceptions, and preferences. For example, standards do not account for the differing needs of children, teenagers, parents, and the elderly. They rarely consider disability, and fail to account for different cultural values. Third, standards also assume uniform rates of participation in social and recreational activities and thus cannot accommodate "peak demand" and may create spaces that are underutilised in "off-peak" times. Fourth, standards have tended to produce monotonous and uninteresting spaces, which people do not find attractive. Fifth, standards only specify a "gross amount" of greenspace. They are silent about how greenspace is distributed within built environments, meaning that some urban areas end up "park poor", creating environmental justice problems (Sister, Wolch, and Wilson 2009). Sixth, standards are insensitive to spatial and temporal variation in urban areas. In other words, they are unresponsive to changes in populations, residential densities, and recreation trends over time. They are also unresponsive to the ways that citizens' needs vary from the street level to the metropolitan scale. Seventh, standards are typically silent about the quality of greenspaces, how they should be managed, and the types of facilities they should contain. Where the latter are specified, they tend to take a "recipe book" approach (e.g., 1 soccer field, 3 tennis courts, 2 benches, 1 drinking fountain, etc.). Moreover, eighth, standards say nothing about the experience of greenspace, such as noise, lighting, security, crowding, and the like.

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What Alternative Approaches Might We Use?

One alternative to a standards approach is a "needs-based" assessment, which considers the socio-demographic and bio-physical characteristics of areas for which greenspace is being planned or where facilities need to be upgraded. A needs-based assessment for greenspace planning requires that greenspace be provided according to the needs of a given population—for example, meeting the needs of local residents, as well as the ecological functions of a city. This approach assumes that the spatial distribution of people and greenspace within a given area is uneven, and that residents will seek to minimise their travel costs (such as time, fuel costs, and money) by using greenspaces that are closer to where they live.

As my colleagues and I have noted elsewhere (Byrne and Sipe 2010), a needs-based approach considers not only the absolute number of people within a given geographic area, but importantly also accounts for their socio-demographic composition, leisure and recreation preferences—and those of various sub-groups within this population—and the type and number of facilities required to serve those needs (also see Tan 2011). These considerations should reflect forecasted socio-demographic changes. Needs-based assessments are necessarily dependent on analysing census data and, where possible, on detailed community surveys, participant observation, behavioural mapping, focus-group research, ethnographic research, and systematic audits of park location and facilities (Mitra 1994; Anderson and Heyne 2000). Such exercises enable planners to better determine the demand for—and rates of participation in—various activities. But a needs-based assessment must also go beyond the needs of existing residents, to forecast those of future residents—a difficult task. This requires a very good understanding of a city's demographic and

lifestyle changes, and of emerging socio-ecological trends (e.g., climate change, oil vulnerability, and food and water scarcity). Park planners of the 1930s, for instance, could not have anticipated the popularity of community gardens in the twenty-first century, but well-designed parks from this period can fortunately be retrofitted for such purposes. Needs-based assessments invariably conclude that greenspaces must be versatile and flexible in their design; they must be capable of sustaining not only present trends but also future activities beyond the capabilities of planners to forecast accurately. New research is helping to inform such approaches.

What Does the Latest Research Tell Us About the Design of, and Access to, Greenspaces?

There has been a remarkable efflorescence of greenspace research over the past decade. Although limited space precludes anything but a cursory examination here, three notable and interrelated topics warrant attention—environmental justice, advances in geographic information science, and improved understandings of park use.

Researchers of environmental justice have demonstrated that low-income populations and ethno-racially marginalised groups are likely to live in the parts of cities that exhibit the worst environmental quality, including limited access to greenspace. Chona Sister and her colleagues, for example, have undertaken research showing that not only is urban greenspace limited within the urban core of many cities in the United States, but it is also poorly maintained, has few facilities, which are often broken, and is heavily congested (Sister, Wolch, and Wilson 2010). Sister devised new methods to measure the accessibility of urban greenspace, using a geographic information system (GIS) (also see Higgs, Fry, and Langford 2012), breaking away from

linear or network measures of greenspace access (Oh and Jeong 2007). Sister and her colleagues found discriminatory planning in the siting and maintenance of greenspace, with implications for the health and well-being of residents, especially for children, who will suffer because they are deprived from contact with various forms of urban nature.

In addition, using a GIS, Golicnik and Ward Thompson (2010) undertook innovative research that combined participant observation, behavioural mapping, and spatial analysis to reveal new patterns of urban greenspace use. For the first time, their research has enabled a definitive evaluation of how the type and location of facilities in greenspaces can significantly impact how these spaces are used. Assessing three parks in the United Kingdom, they demonstrated intricate "environment-behaviour relationships", and found that features such as paths, stairs, and benches, topography, and vegetation all have a measurable effect on people's activities in greenspaces and the length of time they spend on those activities—with implications for health and well-being. Their research will enable advances in assessing the capacity of different types of greenspaces to meet people's needs.

Last, Karin Peschardt and colleagues (Peschardt, Schipperijn, and Stigsdotter 2012) have found that small greenspaces also play an important role in people's lives. Examining over 50 small public urban greenspaces in Copenhagen, Denmark, they found that such spaces are actively used throughout the day, and play important roles in improving neighbourhood conviviality and in fostering residents' rest and recuperation.

1. Jogging trail, Westerpark, Amsterdam.

2. Ecology park, Westerpark, Amsterdam.

3. Cultural facilities, Westerpark, Amsterdam.

4. Wireless facilities, Joan Miró park, Barcelona.

5. Café-cum-bar, Joan Miró park, Barcelona.

6. Dog exercise area, Joan Miró park, Barcelona.

Examples of Best Practice

There are many cities that have begun to take up the challenge of providing alternative forms of urban greenspace—too many to consider here in detail (Byrne and Sipe 2010). But a selection of examples shows what can be done.

Amsterdam, The Netherlands

Westerpark in Amsterdam is an example of a former brownfield site that was converted into a vibrant urban greenspace. After a former gasworks factory was decontaminated, the site was redeveloped as a "culture park". The new park is adjacent to a major rail line, and very close to the heart of the city. The greenspace is accessible by public transport and is surrounded by medium- to high-density apartment buildings. The park contains socio-cultural facilities, such as an art house cinema, an art gallery, cafés and restaurants, a theatre, and an events stage, among other facilities. But park designers also recognised the critical ecological functions of the park, and retrofitted a wetland, riparian areas, and other urban habitat spaces (see Figs. 1 — 3). The integration of flexible spaces within the park underpins its success.

Barcelona, Spain

Barcelona is a very densely populated city; some neighbourhoods have population densities around 50,000 people per square kilometre. Known for its innovative planning, Barcelona features a wide variety of greenspaces, from neighbourhood plazas to very large metropolitan parks. But one park in particular has attracted attention because it features sustainable design principles, such as water-sensitive design, yet encourages a variety of active recreational uses. Named after a famous sculptor, Joan Miró Park was created in 1976 when a municipal abattoir was relocated (Saurí, Parés, and Domene 2009). The park features a provocative sculpture, a plaza, an arbour, areas for sports (for instance, basketball), off-leash dog areas, water features, and importantly has a small café-cum-bar where parents can sit and enjoy a cup of coffee or glass of wine while watching their youngsters play on challenging park equipment (see Figs. 4 — 6). Large areas of the park are also planted with native vegetation.

Hangzhou, China

Marco Polo is reputed to have once called Hangzhou the most beautiful city in the world. If he were alive today he might be tempted to rescind that evaluation. Hangzhou's population has expanded rapidly in recent decades, impacting the city's greenspace assets (Xue 2012). But local officials have begun an ambitious programme of city-wide greening and ecological restoration, focusing on once neglected and forgotten spaces, such as street verges, freeway underpasses, railway corridors, and abandoned canals. The city has created China's first urban ecological wetland park and is becoming a world-leader in retrofitting greenspace (see Figs. 7 — 9). One of the areas where the city still struggles though is finding suitable outdoor play spaces for children and teenagers.

Conclusion

Urban greenspace is becoming critically important as the global population rapidly increases and as global environmental change brings an array of challenges to planning our built environments. Outdated standards are no longer suitable for planning urban greenspaces. Instead of one-size-fits-all prescriptions, what greenspace planners need is ingenuity, creativity, adaptability, and willingness to experiment. Greenspace planners need to draw upon findings from robust research to devise solutions for a range of urban problems. Fortunately, some cities are showing us that parks, reserves, trails, and other green areas are capable of adapting to changing social and ecological conditions in the twenty-first-century city. CG

7. Rail-side vegetable garden, Hangzhou, China.

8. Canal-side park, Hangzhou, China.

9. Freeway greening, Hangzhou, China.

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