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Bringing Nature to Humans: How to Evaluate the Next Generation of Urban Parks and Green Spaces

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With the rise of designer habitats and citizen scientists, ecologists and the general public will play a broader role in evaluating and managing urban parks and green spaces in America. This revised decision making process would benefit from the inclusion of concepts from environmental ethics like ecological citizenship, as well as a re-evaluation of traditional conservation priorities. A reduced emphasis on large protected areas, native biodiversity, static park designs, and hard boundaries between nature and the city would allow for a new generation of ethical urban environments, which can provide a wider array of current benefits while remaining adaptable to the needs and values of future generations.

Keywords

urban ecology, decision making, science policy, ecological citizenship, urban parks, greenspace

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"Either move humans to nature, or bring nature to humans" (Turner et al. 2004).

A PARK BY ANY OTHER NAME

The roles of private urban green spaces and traditional public city parks are being reevaluated as we develop an "Ecology for a Crowded Planet" (Palmer *et al.* 2004). An array of novel design features and goals has emerged, such as biodiversity conservation in an urban context (Fig. 1). Some of the concepts are at odds with historical conservation philosophy and environmental ethics in America, which were based on the preservation of large wilderness areas and emphasized the intrinsic value of nature as a pristine entity. Other traditional conservation priorities—such as eliminating exotic species, maintaining stable historic conditions, and managing for biodiversity as opposed to human utility—will become increasingly untenable in the face of climate change and a growing urban populace. These conflicts need to be reconciled with the modern reality that humans depend on the ecosystem services that nature provides (Sarewitz 2009), and that nature itself is increasingly difficult to define.

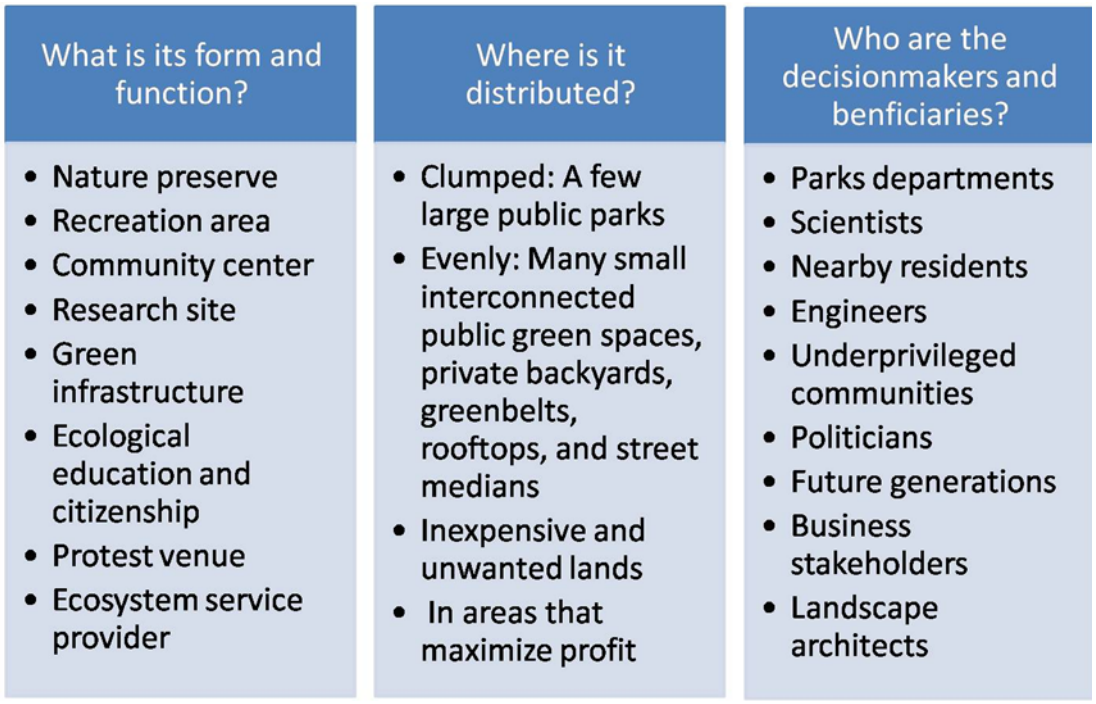

Figure 1. Design elements of urban green space are increasingly diverse, and range from complimentary to mutually exclusive. Many of these novel characteristics stem from a growing cast of stakeholders that have not been traditionally involved in the decision making process of what urban nature should look like, and what ecosystem services it should provide to local communities.

As the forms, functions, users, and stakeholders of urban nature diversify, conflicts can emerge with the historical values embedded in such spaces and the traditional authority of landscape architects and managers (Ackley and Meylan 2010). American parks have been widely viewed as a one-time matter of landscaping and basic engineering, which represented the social trends and aesthetic ideals of its day (Cranz and Boland 2004). As

the needs, values, and desires of the day continue to change, the utility of a park's original design is more likely to decline than increase. Modifying such areas and building new ones will necessitate broader roles for ecologists, as well as increased public knowledge of and participation in an ongoing, pluralistic process of design, management, and use of urban parks and green space.

FORM AND FUNCTION

The biophilia hypothesis suggests people have an innate and universal affinity for nature (Wilson 1984); but what species should be imported or encouraged to live in an urban environment which would otherwise not support them? An ongoing and value laden debate in ecology on exotic species further complicates this issue. While fears of invasives that displace native species and drastically change local ecosystems are valid, most exotic species retain a low profile when introduced, and may increase biodiversity and associated ecosystem services (Davis et al. 2011; Hitchmough 2011). An equally relevant question is what species to exclude. Should urban parks to be made unattractive or hostile to "urban exploiter" species that are already thriving in cities (Rosenzweig 2003)? While introduced species can increase biodiversity on a local scale, the presence of similar sets of species in many cities can reduce biodiversity at regional and global scales, known as biotic homogenization (McKinney 2006).

Exposure to nature has been shown to produce tangible benefits in child development, psychological health, and recovery times of hospital patients (Kahn and Kellert 2002; Rohde and Kendle 1994). While exposure to increasing levels of biodiversity correlates with increasing psychological benefits (Fuller et al. 2007), urbanites may continually redefine baseline biodiversity as what they remember from childhood, making it difficult to appreciate cumulative species losses over multiple generations (Miller 2005). Rather than simply "exposing people to nature", an increased emphasis on ecological literacy and public awareness of how species contribute to ecosystem services in urban parks could help instill a conservation ethic in local urban communities, which may have limited opportunities to interact with natural ecosystems (Dearborn and Kark 2010). The increasing prevalence of community gardens could have a complementary effect in urban green spaces. Because local users continually visit gardens to plant, tend, and harvest, this active engagement is one of the most widespread examples of urban ecological citizenship: an environmental ethics concept akin to civic duty that broadens the interactive community bound by rights and obligations to include nature (Light 2001).

A longstanding tradeoff in both public and private urban green space is whether it should be planted and pruned in an orderly fashion using introduced species, or reflect the surrounding natural areas and be allowed to run wild. Some private urban green spaces, such as LandPaths in California, are managed for a degree of unkemptness and have a small number of minimally developed walking paths. They are also invitation only. To gain access, patrons must volunteer their time in upkeep activities, or visit as part of a guided tour. Instead of a passive relaxation experience, park users are encouraged to engage directly with their surroundings as an act of ecological citizenship.

The development of green infrastructure has allowed for natural areas to serve engineering functions, and to beautify built structures that had not been previously designed with aesthetic considerations. Following hurricane Sandy in 2012, there were conventional proposals to construct seawalls to protect lower Manhattan from future storm surges. However, proposals to construct public parks in the form of salt marshes and oyster beds to accomplish the same ends received national attention (Feuer 2012). These dual roles produce challenges for designers who would not normally work together, and can create potential conflicts among newly conjoined user groups, whose needs and values may not overlap.

Of course, predicting who future users will be, as well as their needs and values, represents an additional challenge. For example, the Occupy Wall Street movement physically occupied Zuccotti Park, one of over 500 privately-owned public open spaces in New York City. These areas are often the result of zoning concessions, such as allowing developers to exceed height restrictions, and are commonly offered in exchange for making a portion of developments available for public use. To eliminate the need for fencing and enforcement, a 24-hour access policy was implemented during Zuccotti's development in1968, which later allowed for a worldwide protest movement to develop in 2011. The park ended up serving multiple functions beyond what its original form was designed for.

DISTRIBUTION

The traditional bigger is better conservation philosophy would suggest that one of the best examples of an urban park is South Mountain in Phoenix, AZ. At 17 km long, and 4 km wide, it is the largest city park in the country. Amazingly it lies within 10 km of Phoenix's geographic center, from which the urban fringe extends 20-40 km. However, most urban parks in Phoenix exist not because of their biological value, but because their steep and rocky terrain makes them prohibitively expensive to build on. Thus despite its size, South Mountain does little to protect the most endangered type of land in Phoenix: flat sections of desert scrub favored by real estate developers.

Local history and geography are important factors in a specific city like Phoenix, but more broadly, the locations of city parks and green spaces are heavily influenced by their size and number. In an urban context, tradeoff known as SLOSS (single large or several small) describes how limited resources can be invested to build a network of protected areas. Historically, conservation in North America has emphasized large wildness parks, and moving forward, a smaller number of larger green areas is commonly advocated as a design goal for the next generation of sustainable city parks (Beatley 2010; Forsyth *et al.* 2005). However, the goals associated with urban green space are less about protecting wilderness, and more about improving access to some form of nature. Due to varied urban land covers, uses, and ownership, the decreased feasibility and increased cost of constructing large city parks may outweigh their advantages.

Larger parks support more species per unit area, and are typically advocated as the best practice for protecting large specialist species (which are often endangered and less

compatible with urbanization) by maximizing the ratio of stable "interior" areas over disturbed "edge" habitat. Alternatively, several small parks can cover a greater diversity of habitat types, distribute risk of disturbances like fire and disease, allow for multiple adaptive management goals (Gunderson and Holling 2001), and cover a larger region overall. This approach facilitates access, and encourages trips to be made by bicycle and foot instead of car. A network of smaller protected areas is generally going to be less expensive and more physically compatible with fragmented urban landscapes (Miller 2006).

A related tradeoff is whether to construct discrete parks designed that separate and protect nature from day to day human activities, or to integrate urban elements into green spaces that cover roof tops, street medians, and backyards. The latter approach magnifies the risks of living in an urban environment for local species, but an important consideration in cities is that biodiversity outside the boundaries of parks and green space represents a major source of natural exposure for urban residents who lack the means or inclination to travel. Park attendance by local residents has been shown to drop considerably when the travel distance exceeds 100 m (Beatley 2010).

DECISION MAKERS AND BENEFICIARIES

Urban planners and landscape architects have traditionally decided what city parks will be in a top-down fashion. As the era of discrete cities and parks gives way to more integrated designer ecosystems, ecologists will increasingly feature in discussions of what a reconciliation of urban and green could look like (Rosenzweig 2003). Conservation initiatives that emphasize the biological potential of disturbed areas will be a challenge to the traditional approach of attempting to maintain historical conditions and restoring altered habitats to their previous ecological baseline. However, more than 80% percent of the world's ice-free land mass is actively used or inhabited by humans (Ellis and Ramankutty 2008; Sanderson *et al.* 2002), climate change is geographically unrestricted, and ecologists have begun to question whether truly wild areas still exist (Kareiva *et al.* 2007). As a result, static ecological baselines are increasingly becoming constructs of human values, and purely restorative projects can be described as natural "museums" with little regard for present or future ecological conditions and human needs (O'Neil *et al.* 2008). An increased emphasis on ethics and sustainability within urban planning and ecology has the potential to produce socially and biologically beneficial green spaces that protect against natural hazards while remaining adaptable to the needs and values of future generations.

Ironically, novel visions of urban parks are often facilitated by environmental crises. In their absence, an alternative is "muddling through" (Lindblom 1959). This incremental approach emphasizes retaining some of what made the previous system work, will allowing for small decisions to be made on the basis of pragmatic comparisons between different policy options, as opposed to potentially irresolvable disputes over deeply entrenched and widely disparate values. While a primary goal of the Ecological Society of America is to provide useful knowledge to decision makers and the general public (Palmer *et al.* 2004), the ensuing question of sufficiency is: to what degree should local

residents and stakeholders participate in visioning, research, and management, and how should their voices be balanced against experts when public opinion is in opposition to scientific consensus? As public scientific literacy grows and ecologists increasingly conduct research in urban areas, both parties will either chose or be forced to exercise their ecological citizenship and become part of the decision making process (Cid and Pouyat 2013). Scientists are often called in the later stages of policy making to assess seemingly contradictory scientific evidence accumulated by opposing parties. Embedding researchers at the outset will minimize uncertainty over the evidence's provenance, and their potential roles as practitioners of basic science, placed-based research designed to answer the question at hand, or advocates for a specific policy (Pouyat *et al.* 2010).

The process of deciding what parks should be amidst a diverse cast of stakeholders is facilitated by integrative concepts like ecosystem services, which allow for a common language, alternative scenario comparisons, and coordination without consensus between multiple parties (Star and Griesemer 1989). However, there is widespread disagreement over which services to count and how to value them. Integrating refined economic valuation tools and public participation could be a way forward (Chiesura 2004). The continual task of re-envisioning desirable forms and functions of individual green spaces and parks could allow for citizens to modify these spaces for future needs, while retaining some historically valued characteristics. A consideration of environmental ethics within urban planning could play an important role in mediating value disputes between competing visions of what urban nature should look like, and what qualifies as sustainable on scales ranging from a green rooftop to a metropolitan area.

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