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Landscape and Urban Planning 75 (2006) 282–299
LANDSCAPE AND URBAN PLANNING
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The Riverside and Berwyn experience: Contrasts in landscape structure, perceptions of the urban landscape, and their effects on people

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Available online 6 July 2005

Abstract

Humans not only structure the landscape through their activities, but their perceptions of nature are affected by the spatial and temporal arrangements (structure) in the landscape. Our understanding of these interactions, however, is limited. We explored the relationship between landscape structure and peoples' perceptions of nature in the Chicago, IL, USA, suburbs of Riverside and Berwyn because they offer contrasting paradigms of an urban landscape. Designed in the 1800s by Frederick Law Olmsted, Riverside has several unique design elements (curvilinear streets, ample setbacks, parkways of variable width with mowed grass and naturalistic groupings of trees) that define the structure and composition of this landscape. The urban forest was the keystone of Olmsted's desire to create a harmonious community characterized by "refined sylvan beauty". In contrast, the adjacent community of Berwyn has right-angled streets with small lots and narrow setbacks for houses. Differences in landscape structure between the two communities produced differences in the diversity, size, and composition of woody vegetation. As measured by patch-size distribution, Riverside had greater diversity in landscape structure than Berwyn, and in turn, Riverside had greater diversity in the composition and size of the woody vegetation compared to Berwyn. Riverside tended toward a "natural" appearance with vegetation, while yards in Berwyn tended to be trimmed and edged. Significant differences between the mean ratings of Riverside and Berwyn respondents were found for six of seven community attribute categories. Riverside participants reported receiving greater benefit from the visual and nature-related features of the urban forest than did Berwyn respondents. Berwyn residents ranked social atmosphere for the community and locomotion (wayfinding) highest among the seven community attribute categories. Despite differences between the two communities, residents valued the green residential environment provided by vegetation. However, the more diverse urban landscape as measured by built structures, woody vegetation, and lot size and shape proved to be more satisfying to the residents of these two communities. The design concepts developed and implemented by Olmsted more than century ago in Riverside are still relevant to city planners striving to develop living environments that are satisfying to urban and suburban residents.
Published by Elsevier B.V.

Keywords: Chicago; Urban landscapes; Trees; Landscape design; Frederick Law Olmsted; Natural capital

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0169-2046/$20.00 Published by Elsevier B.V.
doi:10.1016/j.landurbplan.2005.04.002

1. Introduction

A significant portion of our global landscape is highly designed and managed. Humans dominate these landscapes and the patterns that exist largely reflect their manipulation and intervention (Meyer and Turner, 1994; Andersen et al., 1996). The concept of "nature" depends on the degree to which the intrinsic properties of a landscape result from human activities (Eaton, 1997). Nature as perceived in the context of an urban or suburban landscape will likely be different than that derived in a relatively pristine, unmanaged landscape. In reality, many environments that people consider "natural" exist in highly managed landscapes (Forman, 1995).

A fundamental set of constructs in landscape design and environmental psychology deal with how humans perceive nature, how they affect nature, and in turn, how they are affected by nature (McHarg, 1969; Nassauer, 1995, 1997; Kaplan and Kaplan, 1998). Nearly three-quarters of the American population now lives in metropolitan areas (Martin and Warner, 1997). Cities, with their highly structured landscapes and defining spatial characteristics, are logical places to explore the relationship between people and nature (Holling and Orians, 1971; Martin and Warner, 1997) and the ways in which people experience their environment (Bonaiuto et al., 1999). Trees and other woody vegetation are important contributors to defining the urban environment, to the aesthetic pleasantness, and to a sense of well being in an urban environment (Schroeder, 1991; Henwood and Pidgeon, 2001).

We selected two adjacent communities, Riverside and Berwyn in Illinois, to explore the relationship between people, their environment, and the concept of natural capital in an urban setting. Although natural capital is generally regarded as the benefits provided through ecosystem services, we intend to view natural capital from the perspective of the residents in the two study communities and their perceptions regarding "quality of life" within the communities in which they reside.

Riverside and Berwyn, both suburbs of Chicago, offer contrasting paradigms of an urban landscape. In Riverside (Fig. 1), curved streets, large lots, and ample setbacks create a "harmonious community characterized by refined sylvan beauty" (Frederick Law Olmsted, 1869 Riverside plan). The abundant use of trees in Riverside's design makes the suburb a useful setting for studying the effect of an urban forest ecosystem on a community and its residents. In contrast, the adjacent community of Berwyn has a more traditional design for an urban community in Middle America with right-angled streets, small lots, and narrow setbacks for houses (Fig. 1). Designed with utility and functionality in mind, Berwyn is dominated by roads and houses.

Specifically, the following questions were addressed: Is landscape pattern as measured by its patch structure related to the composition and structure of the woody vegetation (especially trees) on the landscape? Do residents perceive and respond to differences in the composition and structure of urban landscapes? Finally, through comparison with Berwyn, is a mature urban forest ecosystem, as is found in Riverside, more or less preferred psychologically and functionally?

Differences in the organization of the landscape, we hypothesized, will result in differences in the composition and structure of the urban forest between the two communities. For our purposes, the urban forest was considered to be the assemblage of woody vegetation found within the urban landscape matrix. Further, if differences do occur in the composition and structure of the urban forest, do they produce differences in how the residents perceive and respond to their immediate environment? Our objective was to assess empirically the appreciation and effect of the urban environments in Riverside and Berwyn on their residents at the individual and household levels.

2. Study areas

2.1. Riverside

Riverside is a 650 ha planned community of almost 8700 residents along the Des Plaines River west of Chicago. It is nationally and internationally recognized as one of the first planned suburban communities in the United States, designed during the period 1868–1870 by Frederick Law Olmsted, the founder of American landscape architecture, and has associate, Calvert Vaux (Eaton, 1963–1964; Blodgett, 1976). They evoked four central principles in designing Riverside. These were the provision for and perception of open spaces, the preservation and enhancement of natural features, the