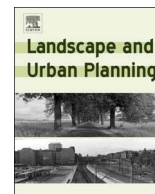




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Research Paper

The social context of U.S. built landscapes

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ABSTRACT

In this paper, we present a quantified, GIS-based analysis of the relationship between urban morphological patterns and racial, ethnic, and household characteristics. We want to understand how the built landscapes of American cities differ in sociological terms—for example, are some more prone to racial concentration or prevalence of particular family types? Since many built landscape types are relatively recent and rapidly growing, this analysis can inform current debates about sprawl and inequality. We examined six diverse U.S. metropolitan regions: Boston, Atlanta, Chicago, Las Vegas, Portland, and Sacramento, joining census block data with built landscape patterns mapped in GIS through aerial imagery analysis. We find that a large portion of our six metropolitan regions consists of patterns that can be characterized as sprawl—patterns that are often manifestations of a desire for separation. This separation has significant equity implications because resources—services, amenities, schools, parks, tax base, etc.—are not evenly distributed. Further, two of our patterns (Rural Sprawl and Upscale Enclave), which are growing rapidly and most often occur on the urban fringe, have the least diverse demographics across all six metro areas. These landscapes are also by far the least dense, leading to a range of negative environmental impacts. Older built landscape types (Urban Grids, Rectangular Block Grids, and Degenerate Grids) are denser and relatively diverse. These have lower rates of occupancy in most urban areas, indicating an opportunity to house additional residents in relatively well-located, well-connected, and diverse central portions of metropolitan regions.

1. Introduction

The rapidly expanding postmodern metropolitan region features a variety of built landscape types—distinctive neighborhood-scale patterns of streets, blocks, buildings, parcel configurations, and balances of gray and green infrastructure. Human populations are not distributed evenly across these built landscapes, but vary in both density and demographic characteristics between them. The physical characteristics of particular landscape types as well as other factors such as job location, transportation options, housing cost, resident self-selection, and racial, ethnic, or economic discrimination determine both density and demographics.

In this paper we seek to understand how the built landscapes of American cities differ in sociological terms, and what this might mean for future efforts to manage sprawl and reduce social inequality. Are some built landscapes more prone to racial concentration or a prevalence of particular family types than others? Are some inhabited primarily by renters who would be at greater risk of displacement than other residents living in owner-dominated landscapes? Do social equity questions exist because of the nature of some built landscape types and

who lives in them, for example arising from the frequent placement of garden apartment landscapes with disadvantaged residents next to freeways, railroad tracks, large commercial corridors, and industrial sites, land uses that might have negative impacts due to noise, traffic, or pollution?

Although there is variation worldwide, certain built landscape forms such as the gridded neighborhood and the organic pre-industrial village have been widely recognized by past generations of urban design theorists (e.g. [Kostof, 1991](#); [Mumford, 1961](#)). Other built landscape types are more recent, enabled by the motor vehicle, twentieth-century development technologies, changing market preferences, and evolving urban design values. For example, suburban tract landscapes with curving streets and cul-de-sacs appeared in North America mainly after World War II, and New Urbanist landscapes with their more connected street patterns and neotraditional housing forms date with a couple of exceptions only to the 1990s.

[Wheeler \(2015\)](#) developed a global typology of 27 built landscape types present in metropolitan regions worldwide in the early twenty-first century. (Not all types occur in all regions.) [Table 1](#) gives a brief description of the patterns. [Fig. 1](#) shows some examples of what these

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Table 1
Built Landscapes of Metropolitan Regions Summary.

Airports	Large-scale landscapes for air travel, usually at edge of metro areas. Early 20th c on.
Allotment Gardens	Contiguous garden plots containing small dwelling structures. Found primarily in Northern Europe and Russia. 18th c. on.
Apartment Blocks	Relatively uniform landscapes of large residential buildings, often slab-like. Rare in North America. Post-WWII.
Campus	Large institutional sites often with formal or picturesque design of spaces. Many eras.
Civic	Large civic buildings and spaces, typically with formal design. Ancient times on.
Commercial Strip	Low-density, linear commercial development along highly trafficked streets. 1920s-on.
Country Roads	Incremental, linear, small-scale development along formerly rural roads. Many eras.
Degenerate Grid	Large-scale residential landscapes with rectilinear street patterns and poor connectivity. Mid-20th c. on.
Garden Apartments	Low-to-mid-rise residential buildings with a strong relationship to exterior green space and site amenities. Late 19th c. on.
Garden Suburb	Detached homes along curvilinear but well-connected streets with extensive greenery. Late 19th c. on.
Heavy Industry	Industrial uses on large parcels; large-footprint buildings, outdoor storage of materials, fuel tanks, and rail access. 19th c. onwards.
Hillside	Irregular winding streets shaped by steep terrain. Many eras.
Incremental/Mixed	Small-scale land subdivision and development, resulting in a non-uniform mix of forms and moderate-to-poor street connectivity.
Land of the Dead	Large areas for burial, often with formal or picturesque design. Many eras.
Long Blocks	Very long, rectilinear, residential blocks (> 1000').
Loops & Lollipops ¹	Large-scale, mass-produced residential landscapes with regular, curvilinear street patterns and poor connectivity. Post-WWII.
Malls & Boxes	Large commercial buildings or a single large enclosed pavilion, usually with ample parking. Post-1950.
New Urbanist	Combines aspects of grid and garden suburb forms. High street connectivity; mixed-use centers. Post-1980.
Organic	Tightly woven street pattern with dense, fine-grained urban development. Many eras.
Quasi-Grid	Rectilinear, well-connected but irregular street patterns created by topography, design, or incremental development. Many eras.
Rectang. Block Grid	A regular, rectangular-block grid form with many potential land uses. In US and Europe typically < 1900.
Rural Sprawl	A semi-rural residential landscape with very large parcels (usually 1–10 acres per dwelling unit). Generally post-1950.
Superblocks	Large master-planned blocks, interior circulation. Building placement more varied than Apartment Blocks. Mid-20th c. on.
Trailer Parks	Mobile homes on small lots with narrow access roads. Exclusive to N. America. Mid-20th c. on.
Upscale Enclave	Affluent, insular residential landscape often with large houses, extensive plantings, and low street connectivity. Antiquity onwards.
Urban Grid	A grid of relatively small, squarish blocks with varied land use often found at the core of many cities. Mid-19th c. or before.
Workplace Boxes	Landscapes of boxy buildings serving industrial or commercial uses. Post-1950.

¹ (Southworth & Owens, 1993).

patterns look like.

Certain patterns exemplify suburban and exurban “sprawl.” Sprawl can be identified by a constellation of factors: poorly connected street patterns, discontinuous development, homogeneous land uses, motor vehicle dependency, and often low density (although sprawl can consist of attached housing, apartments, and even high-rise buildings as well as single-family homes; see Ewing & Hamidi, 2017; Galster et al., 2001). Loops & Lollipops, Rural Sprawl, Upscale Enclaves, Degenerate Grids, Garden Apartments, Garden Suburbs are the core residential landscapes of sprawl, joined by non-residential built landscape types such as Heavy Industry, Airports, Trailer Parks, Land of the Dead, and Commercial Strips. Just three of our patterns—Organic, Urban Grids, and Rectangular Block Grids—can not be classified as sprawl, as these patterns consist of well-connected, contiguous, relatively mixed-use blocks that support pedestrianism. New Urbanist landscapes aim for these urban qualities as well but often have difficulty meeting these objectives. Outlying grids are urban as well (platted as a town centers in previous times), but they are typically remnant nineteenth-century settlements embedded in twentieth or twenty-first century sprawl.

This study represents an initial investigation into correlations between social variables and these built landscapes within six U.S. metropolitan regions for which GIS built landscape mapping is currently available: Boston, Atlanta, Chicago, Las Vegas, Portland OR, and Sacramento. These regions, a convenience sample intended to represent diverse parts of the country, all contain populations of at least 1.5 million with different social histories and demographic characteristics (see Fig. 2). The best correlations would of course come from address-level demographic data, but since this is not available we use the next-best level of the census block (as opposed to the larger block group or census tract). Although data at this scale is more limited, the U.S. census at the block level does provide an initial source of demographic information with which to analyze social dimensions of built landscapes.

Such correlations are of more than academic interest. Urban and regional planners have opportunities to shape future built landscapes both through policies affecting new development at the urban fringe or infill sites, and by promoting more incremental change within existing neighborhoods. We are interested, for example, to know whether

certain current built landscape types hold opportunities for sustainability-improving retrofits, for example if high vacancy rates or small household size indicate opportunities to house more people. We also want to know whether certain built landscape types should be preferred over others for social reasons, for example if they consistently show an ability to accommodate a greater diversity of family types and renters as well as owners. Since limited data is available at the block level, the conclusions we can draw from this analyses are limited as well. But this initial step towards better understanding the social implications of built landscapes in US metropolitan regions may nonetheless yield valuable policy implications related to the challenges of managing sprawl and improving social equity.

2. Background

2.1. The sociospatial patterning of cities

Our empirical investigation seeks to identify associations between built landscapes and the demographic characteristics of residents within early twenty-first century American cities. As background, it is important to briefly summarize the historical trajectory of social and spatial divisions in cities, including the theoretical perspectives that have been proposed to explain them.

Different demographic groups have inhabited separate parts of the city for as long as cities have existed. But it was during the rise of the industrial city in the 19th century that social separation began to take on a more explicit spatial pattern. In the early industrial era this meant new gridded suburban districts outside of more organic central cities in Europe. As production left the home in favor of larger, specialized facilities, exclusively commercial and industrial landscapes emerged. Improving roads and carriages allowed the upper class to take up residence on the periphery, especially in nations such as the United Kingdom with a strong tradition of country estates.

Beginning in the nineteenth century designers began creating garden suburb neighborhoods for the new urban bourgeoisie. As industrial cities grew and created new built landscape forms, demographic groups were increasingly segregated by landscape type. The working class, streaming into cities from the countryside, typically

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