

The Successive Nature of City Parks: Making and Remaking Unequal Access Over Time

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This study examines the historical establishment and shifting residential access to city parks over time. It begins by engaging and extending a theory of urbanization as socioenvironmental succession. It then assembles and analyzes longitudinal data on city park creation and neighborhood change in Houston from 1947 to 2015. Results reveal how socially privileged residents have long enjoyed unequal access to city parks as well as strong influence over where new ones are established. At the same time, growing minority populations have managed to gain more equitable access not by having new parks come to them so much as by moving into neighborhoods where Whites once lived. These dynamics obscure past processes and patterns of inequality while allowing newer, unexpected ones to emerge. We conclude with a discussion of what these findings imply for understanding not just unequal access to city parks but broader processes of urbanization.

Social research on urban parks has grown substantially over recent years and emphasizes several key points. First, these types of spaces are now back in vogue. After decades of degradation and neglect, 9 in 10 Americans agree that parks constitute important local services, and three out of four favor increased public spending on their continued development and upkeep (NRPA 2016). Second, despite this widespread support, a good deal of investment in parks today relies on public-private partnerships. Following a neoliberal turn in urbanization more generally, these partnerships typically leverage significant private and philanthropic investment to develop new, elite greenspaces. Leading examples include New York City's High Line, Chicago's Millennium Park, and Houston's Discovery Green, but similar efforts are evident throughout the country. The reason for this turn, Clark et al. (2002: 499) contend, is that such amenities now define and drive a significant segment of today's urban economy, helping to attract and retain young, educated workforces as well as affluent tourists who contribute billions of dollars each year to city revenues.

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The third point that recent research makes, but less strongly, is that this latest wave of park development has not replaced older park systems. Instead, it has inserted itself in many ways *in front of* that system, which not only still exists but in many cases took more than a century to create. Thus, the real issue when assessing inequalities in access is not just new park development today but shifting inequalities in access to new and existing parks over time, as different populations and efforts to develop such spaces have successively intersected to make and remake cities. These processes matter for understanding not just past dynamics but also contemporary access to city parks, which provide myriad benefits to residents and cities alike. These benefits include increased opportunities for physical activity (McCormack et al. 2010), enhanced psychological well-being (Tinsley, Tinsley, and Croskeys 2002), improved property values (Wu and Dong 2014), and a strengthened sense of community (Jennings et al. 2012). Research also credits city parks with reducing health disparities in obesity and cardiovascular disease associated with low-income and racial minority communities (Jennings et al. 2015), especially when residents of these communities perceive nearby parks to be safe (Echeverria et al. 2014).

The present study brings these successive processes of unequal park formation and access to the fore through a dynamic, longitudinal investigation that begins in the past and then works forward to examine the cumulative development of city parks in relation to shifting neighborhood populations nearby. Such an approach, we think, is useful for several reasons. One is that it digs beneath a stylized notion of the past in order to set it in motion to see how urbanization works successively to transform park access over time. Indeed, iterative change of this sort is one of the enduring insights of urban studies, dating back to classical human ecology of the Chicago School of the 1920s and 1930s. The present study leverages recent efforts to rehabilitate these insights with the aim of showing how local land-use and residential change entwine through time to produce the landscapes we see before us today. In doing so, our approach also provides an analytical framework for moving the successive study of urban parks to other cities, thereby helping to build a foundation for future comparative research.

To demonstrate this approach, we conduct analyses in an understudied city that is currently undergoing a neoliberal boom in new park development: Houston, Texas. Many things make Houston an intriguing as well as informative case. Not only is it the fourth largest city in the country, it is also among the fastest growing and most racially diverse (Emerson et al. 2012). These characteristics result from more than a half-century of significant urbanization that has included the establishment of hundreds of city parks alongside substantial residential churning within the urban core. To study these dynamics, we first go broad to engage and extend a theory of urbanization as a process of socioenvironmental succession. We then go deep to conduct our longitudinal case study. This study begins with the original master plan for Houston and then assembles every available city parks inventory thereafter, from 1947 to the present, and merges them with historical census tract data.

Broadly, results show that wealthier and White residents in Houston have long enjoyed disproportionate access to city parks as well as strong influence over where new ones will be established. At the same time, growing minority populations have gained more equitable access not so much by having new parks come to them as by moving into neighborhoods where Whites once lived and parks still remain. These successive developments have not only worked to hide past inequalities in nearby park access but also produced new, unexpected inequalities for a subpopulation long used to justify investments in city

parks: children. We conclude with a discussion of what these findings mean for understanding not just unequal access to city parks today but longer term processes of urbanization, environmental change, and social inequality.

THE SUCCESSIVE NATURE OF URBANIZATION AND CITY PARKS

If you tour any major U.S. city today, you will likely see a combination of older, neglected public parks and newer, glitzy greenspaces managed by public-private ventures. To understand these developments sociologically, Loughran (2014: 50) argues, “History is key.” By this, he means that we should not contrast today’s neoliberal park development against romanticized notions of public parks past. Rarely, if ever, were those parks the inclusive spaces for democracy and civility that Frederick Law Olmsted famously imagined. To think so is to begin with the wrong analytical frame. It is better, instead, to start with the recognition that city parks have long been planned for and by local gentry, albeit for different purposes at different times and places. To highlight this historical continuity, Loughran reviews past efforts to establish urban parks and then documents elites’ roles in developing New York’s new High Line, an archetypal neoliberal greenspace, replete with corporate partners and artisanal food offerings.

As valuable as this approach is, however, it misses the established system of city parks that took decades to develop and which still lingers, in the shadows of today’s new park developments. To pull this dynamic and very real system to the fore, we must turn back the clock not just to acknowledge past inequalities but to study their actual, iterative unfolding. Only then can we see how shifting urban populations that churn their way through different neighborhoods intersect with public park development to produce the inequalities in access that we see before us today. In such an approach, history is not just key, it is cumulatively in motion.

To build this line of analysis, we begin with a systemic view of city parks. This view does not focus on a given park as an isolated site in need of its own explanation. Rather, it views city parks more collectively and focuses on their ongoing accumulation through successive waves of urbanization characterized by ongoing intersections of local social and environmental change. Recent efforts to recast urbanization in this light are now breathing new life into the Chicago School’s old concept of ecological succession (Elliott and Frickel 2013, 2015; Freudenberg 1985; Rudel 2009). The aim of these efforts is not to depict the growth and change of cities as somehow “natural.” Instead, it is to return to the fundamental point that urbanization at the local level is a cumulative process of ongoing territorial transformation. In this process, land-based change at any point in time — say the establishment of a park during the 1970s — not only reflects prevailing social inequalities at that time but also inscribes them into the local landscape, which is then subject to social change, including residential churning. In this way, yesterday’s social inequalities can create environmental inequalities that then play forward through time to shape future inequalities, sometimes in unintended ways.

Recent efforts to revive this perspective emphasize not only the cumulative nature of these dynamics but how, in their unfolding, they entwine social and environmental systems at the local level. In this vein, Elliott and Frickel (2013, 2015) have advanced a theory of urbanization as socioenvironmental succession that includes three processes of local, ongoing interaction: land-based environmental change that accumulates and

spreads through cities over time; residential churning that brings different groups in and out of relative proximity to these cumulative land-based changes; and municipal governance that both engages and intercedes in both processes, often with limited resources.

To demonstrate their framework, Elliott and Frickel highlight the ongoing accumulation and spread of relict industrial wastes as hazardous facilities and nearby residents churn through urban neighborhoods. Several things, we think, make their approach useful — with modification — for studying the successive nature of urbanization and city parks. First and most broadly, the cumulative transformation of urban lands is not limited to ecological degradation. Just as urbanization has involved the unequal territorial spread of environmental “burdens” such as land-based industrial wastes, it has also involved the unequal territorial spread of environmental “goods” such as land-based city parks, which are intended to improve the nature and quality of urban life. Second, like other forms of local environmental change, the establishment of city parks tends to be slow and cumulative. This is because elected officials rarely have sufficient funds or patronage to develop a full network of city parks all at once, which means that they roll out gradually as parts of an evolving system. And once parks are established within this system, cities are reticent to relinquish them to other uses or owners. The political costs are just too high, with exceptions being particularly informative for understanding where and for whom this is not the case (Westneat 2016).

These characteristics of city parks mean that while their quality and upkeep may wane over time, particularly in marginalized communities (Vaughan et al. 2013), their presence typically remains more territorially stable than residential populations nearby, which are always churning. Sometimes this churning occurs slowly, as when residents hand over housing to children after living most of their lives in the same neighborhood. But typically, it happens more quickly, as when Whites flee an area, opening opportunities for new groups to enter; or when a large renewal project displaces an entire community; or when gentrification brings new, expensive loft apartments. Such residential turnover, in all its forms, remains one of the hallmarks of urbanization at the local level, as does social inequality in where and how it unfolds in relation to other land-use change.

Indeed, this is the essence of urbanization as socioenvironmental succession: the iterative interlocking of social and environmental land-use change over time and space, as each wave unfolds atop the last in ways that obscure what not only came before but often still remains. Elliott and Frickel (2015) highlight how this successive interlocking drives ongoing production and shifting exposure to relict industrial wastes in cities. By contrast, we focus on how it drives cumulative production and shifting proximity to publicly owned city parks — places that have slowly accumulated to form the vast but largely ignored backdrop to today’s neoliberal production of new urban greenspaces.

One advantage of this approach, we think, is that it acknowledges and encourages investigation of well-documented social inequalities in environmental exposure, including exposure to socially produced environmental amenities such as city parks that have long been central to urbanization in the United States (Boone et al. 2009; Sister, Wolch, and Wilson 2010; Wolch, Wilson, and Fehrenbach 2002; Zukin 2010). Yet, at the same time, it also extends beyond a contemporaneous view of such inequalities to consider how they shift and unfold in ways that make longitudinal analyses imperative for developing fuller understanding of underlying processes and future outcomes. Next, we ground this approach in a brief history of city parks and urbanization in the United States before then turning to our case study.

A BRIEF U.S. HISTORY CITY PARKS AND URBANIZATION

City parks have long been developed and used to influence how urbanization unfolds locally in the United States (Evelev 2014). The best known case dates back to the 1840s, when New Yorkers set aside land for what would eventually become one of the largest, most iconic urban spaces in the country — Central Park (Taylor 1999). Thereafter, other northern cities followed New York's lead, coalescing in the "American Park Movement" of the late 19th century (Evelev 2014). Central to this movement was Frederick Law Olmsted, the "father" of landscape architecture and creative force behind Central Park and other parks throughout the country, including Boston's Emerald Necklace and Worcester's Elm Park, widely considered America's first municipal park (Kaliss 2015). For Olmsted and his supporters, such spaces promoted unity and democracy in cities, bringing individuals from different backgrounds together in public spaces designed to be oases of tranquility that countered the stress and (seeming) unnaturalness of urban life.

Yet, despite these pronouncements of community and republican values, most early city parks in fact developed as "pleasure grounds" largely bankrolled and used by wealthy patrons and, once established, typically led to rapid and highly profitable development nearby (Cranz 1982). In this way, the historic planning and financing of such spaces was not a simple product of egalitarian values but instead a complex interplay between local government, real estate stakeholders, and elite landowners (Benac 2015; Byrne and Wolch 2009; Howell 2008; Kaliss 2015). Over time, as cities continued to grow, demands for new parks continued, as did elite efforts to shift their growing costs onto the public. This historical turn meant that park advocates could no longer simply invoke abstract notions of civility and repose. They had to justify public investment in parks more pragmatically and in ways that would foster and maintain wider political support (Howell 2008). In this way, physical recreation, although distant from Olmsted's early vision of city parks, came to play a central role in promoting their ongoing establishment in the early and mid-1900s, thanks in part to reformers like Jane Addams who worked tirelessly to increase nearby access for working-class, immigrant children (Benac 2015; Byrne and Wolch 2009; Cranz 1982).

With these developments, urban park systems continued to grow and became increasingly tied to the social control and political socialization of urban youth (Cavallo 1981). These connections helped to justify public expenditures on new parks, while still allowing planners to use them strategically to redirect traffic, reduce congestion, and increase property values in select areas (Goodman 1979; Howell 2008). As a result, a new type and generation of city parks began to accumulate and extend beyond those initially established, producing a shifting and highly unequal mosaic of differentiated public spaces, much like the cities in which they continued to accrue. Of course, there was regional variation in how this development unfolded, as well as what it meant for less-privileged urban residents.

In the American South, long dependent on agrarian elite and slave labor, urbanization unfolded more slowly as did demand for city parks. This situation began to change after the Civil War, however, encouraging boosters and pro-growth coalitions in the region to look strategically to the North for ideas about how best to design and grow cities. As this happened, it encouraged more deliberate consideration of city parks not on the basis of civility and democracy but as a way to increase land-based profits while also helping to

design and maintain racially segregated public spaces mandated by Jim Crow (Lippard and Gallagher 2011). Locally, this process often began by simply borrowing directly from the park designs and justifications of northern counterparts and inserting them into an explicitly racialized urban landscape (Martin 2012; O'Brien 2012; Weyeneth 2005). Yet, behind these efforts, southern cities remained distinct in how race patterned public park formation and broader forms of spatial interaction in which they were embedded.

Prior to the Civil Rights movement, the context of *de jure* segregation meant that southern cities built and publicly financed city parks mostly for Whites only (O'Brien 2012; Weyeneth 2005). Black communities, by contrast, were left to pool their modest resources to purchase land for their own parks (Steptoe 2016), use a few publicly funded parks of inferior quality (Feagin 1988; Weyeneth 2005), or rely on the occasional philanthropic gift of others. Indeed, the establishment of new parks specifically for Blacks' use during the Jim Crow era was often opposed by White political leaders; and once established, typically languished from lack of funding (O'Brien 2012). Thereafter, once Jim Crow segregation was deemed illegal and new arrivals, particularly from Latin America, began to settle into southern cities, the region's urban landscape began to change, yet again.

By the early 1970s, although *de jure* racial segregation was no longer in effect, *de facto* segregation of increasingly multiethnic populations persisted even as it became more dynamic (Iceland 2004; Sills and Blake 2011). As this occurred, residential churning through existing neighborhoods increased dramatically and in ways reminiscent of processes that first captured the attention of the Chicago School during the 1920s and 1930s. Most prominently, growing Latino populations often entered and shared space near and alongside established Black communities. But over time they also settled into neighborhoods that had historically been predominantly White, following the latter's flight toward the suburbs (Bader and Warkentien 2016; Korver-Glenn and Elliott 2016; Smith and Furuseth 2004, 2006). This residential turnover — in tandem with the cumulative and historically unequal establishment of public parks over time — has reconfigured who has nearby access to these parks today.

HOUSTON: FROM MASTER PLAN ONWARD

To further illuminate and investigate these dynamics, we take a closer look at the City of Houston, a large southern city whose original master plan — with explicit recommendations for public parks — came from Boston landscape consultant Arthur Comey in 1913. Until then, Houston's history was less that of a city than a collection of loosely arranged, predominantly White and Black wards. In this way and despite its now-cosmopolitan character, Houston was a traditional southern town, largely reliant on an agrarian economy that changed little until the first decade of the 20th century, when discovery of oil at nearby Spindletop and decimation of Galveston's port by a major hurricane opened new opportunities for rapid development. Looking to leverage those opportunities, local elites pushed for more deliberate urban planning. This effort included the establishment of city parks that had proven so economically and politically successful in the development of northern cities (Cook and Kaplan 1977) and led to the commissioning of Comey — a disciple of Olmsted and member of the City Beautiful planning movement.

Comey's comprehensive plan recommended that Houston organize its development, including a new park system, along its many bayous, which generally flow west-to-east

toward the Gulf of Mexico. The target ratio was one park-acre for every 110 residents, rather than the ratio of one to 685 that existed at the time. Comey also encouraged a spatially even distribution of new parks be established throughout the city as a way to ensure that residents of all types and classes had walking access. “Of vital importance,” Comey explained, “will be the provision for the play of the smaller children,” which he tried to ensure by advocating for a public park or playground within a half-mile of every residence (Comey 1913: 10). He considered such access to be especially important for “Houston’s laboring population,” who tended to live in substandard, overcrowded housing — “an evil that vitiates health and morality” (p. 68).

Thus, although Houston was coming late to parks and planning relative to other major cities such as New York, Chicago, and San Francisco, it was hiring similar experts to chart a similar reformist course (Cranz 1982). This course included not only the ongoing establishment of smaller parks but also continued development of larger pleasure grounds, which in Houston included Hermann Park and Memorial Park along Brays and Buffalo bayous, respectively. Thereafter, Houston continued to follow trends evident in these other major cities. It formed more and more parks; filled these parks with playgrounds, shelters, and other amenities; merged formerly separate departments of parks and recreation; and embedded this entity within an expanding but still highly entrepreneurial city bureaucracy (Cranz 1982).

Unlike major cities in the North and West, however, Houston had to mesh these developments with Jim Crow laws that protected the status and economic advantages of a growing White population whose social position was threatened by Reconstruction (Steptoe 2016). In this way, early implementation of the local park system encountered a decidedly racialized understanding of the city, which included specific provisions to use parks to *increase* racial segregation by stemming and blocking the perceived problem of racial “scattering” (Feagin 1988: 242). As such, many of Houston’s “White” public parks were established near Black communities whose residents were forbidden from spending time in them. Instead, they were to use a smaller number of “Colored” parks that received far fewer funds for upkeep and improvement relative to White counterparts (Feagin 1988). A notable example was Emancipation Park in the city’s Third Ward, which former slaves originally purchased and used for Juneteenth celebrations before the city acquired and transformed the space into an official, Blacks-only park in 1918.

Another thing that also distinguished Houston from major cities in other regions was its propensity to flood. To address this perennial challenge, in the 1940s and 1950s city officials began to link park planning and development more explicitly to efforts of the Harris County Flood Control District and U.S. Army Corps of Engineers, who teamed to lay more than 2,500 miles of concrete in an effort to repurpose Houston’s bayous into flood mitigation channels (Melosi 2007). This repurposing meant that new city parks were often envisioned and established as much for what they could do to help drain, facilitate, and protect real estate investments as for what they could do to improve the quality of life of nearby residents, especially those of color.

After the Civil Rights Movement and immigration reforms of the 1960s, however, the racial and spatial landscape of Houston began to change dramatically. Not only did Jim Crow laws finally fall, but Whites, as in many cities, began to relocate to the suburbs by the tens of thousands. As they did, Black and Latino populations grew in number and spread throughout established neighborhoods of the urban core (Bader and Warkentien 2016; Korver-Glenn and Elliott 2016). In the process, Houston — a city well-known for

having no official zoning — became even more of the expanding, unplanned frontier it had long seemed to outsiders. New development and redevelopment proceeded with little commitment to historic preservation or municipal services, including the city's park system. And by the 1970s, the establishment of new city parks had slowed, funds and upkeep of those that remained declined, and some parks even dropped from the city roll altogether. This trend was particularly evident during and after the oil bust of the mid-1980s, with little regard or nostalgia for Comey's historic plan (Feagin 1988).

By the 2000s, however, things began to change again, as city leaders joined together to champion a new Bayou Greenways Initiative. Raising more than \$200 million in public and private funds, the goal of this initiative was and remains to reimplement Comey's original vision for Houston's bayous on a grand scale, transforming them from local nuisances and drainage systems into linear greenspaces that tie together a revitalized city park system. Inspiration for this effort continues to come partly from new park development in other major U.S. cities and partly from the successful founding of Discovery Green in 2008 in downtown Houston — a public-private venture that now attracts more than a million visitors annually and is commonly credited with catalyzing more than \$600 million in downtown redevelopment.

Through these successive waves of urbanization, Houston offers a dynamic case in which to study ongoing production and changing residential access to publicly owned city parks. In terms of generalizability and with respect to parks planning, Houston has long paralleled trends found in other major U.S. cities because local leaders deliberately commissioned and pursued such similarity, which ripples forth to this day not only in bold public-private initiatives but also in an accumulated system of smaller, less-celebrated parks that remain under city control. Yet, at the same time, Houston also differs from major cities in other regions. Like its southern counterparts, for much of its history Houston used public parks deliberately to divide rather than integrate residents; to exercise flood as well as social control; and to do both with limited commitment to municipal planning, regulation, and investment. Thus, as a case Houston offers both an example and an exception relative to other major American cities as well as a window onto a changing urban South.

DATA AND METHODS

To conduct a quantitative, longitudinal analysis of these dynamics — specifically Houston's cumulative establishment and shifting residential access to City parks over time — we built a complete inventory of when and where publicly funded City parks have been established in Houston since the mid-20th century. (We now use "City parks," as opposed to "city parks," to distinguish these spaces from other parks that are simply located in the city but not owned and controlled by municipal government.) To construct this inventory, we obtained every official report compiled and released by the City of Houston Parks and Recreation Department (HPARD). Following the original 1913 plan, a total of seven such reports exist, with the most recent posted online. Specific years include 1947, 1956, 1962, 1971, 1988, 2001, and 2015. Using these reports, we recorded the location as well as the first and last years observed for all parks ever listed as part of the system. For earlier years, reports also included information on original purchase price, facilities, and racial restrictions, which we use to further contextualize findings. Note, however, that we do not focus

on park quality, upkeep, or expansion. As important as these factors are, information on these variables is less reliable over time, and we want to introduce as few qualifications into our analysis as possible. In addition and more conceptually, we are primarily interested in the cumulative establishment of City parks within an expanding system of which they are parts, rather than variation in the quality or size of specific sites — which remain important topics for future research.

To examine residential churning and changing park access over time, we merge historical census data on nearby residential populations at the tract level. These tract-level data come from the U.S. Census Bureau's decennial population censuses from 1950 to 2010, which are compiled and made publicly available by the National Historical Geographic Information System (NHGIS). For all census years, we standardize data to constant 1950 tract boundaries, which means that we observe the same, constant spatial units over time for all analyses — an approach consistent with prior research on socioenvironmental succession (Elliott and Frickel 2013, 2015). For this standardization, we utilized a spatial weighting method with visual inspection. This method began by assessing the extent to which a given tract in 1960 or later fell within a 1950-delineated tract. For example, if 100 percent of a 1960-designated tract did, then all residents and housing units are assigned to the respective 1950-delineated tract. If less than 100 percent fell within the 1950-delineated tract, say only 75 percent, then we moved to visual inspection.

This inspection used historic aerial photographs in conjunction with the Geographic Information Systems (GIS) software to assess the extent to which the unaccounted portion of a tract (e.g., as delineated in 1960) contained residential structures, as opposed to open space or commercial facilities. If the portion in question looked to contain no residential structures, then all of the tract's population and housing was assigned to the primary 1950-lineated tract in which the majority of the subsequently delineated tract fell. On the other hand, if the portion in question looked to contain a dozen or more residential structures, then the later tract's population and housing was assigned across respective 1950-lineated tracts proportional to its spatial, or geographic, overlap. So, for the above example, we would allocate 75 percent of the later tract's population and housing to the primary 1950-lineated tract into which it fell; we would allocate the remaining 25 percent of its population and housing to the other tract in which it fell.

In many cases, tract boundaries for the City of Houston have remained relatively stable over time, simplifying standardization in ways that would have been more difficult in rapidly growing suburban areas. In other cases, the 1950-delineated tract split into two or more tracts that could be readily reaggregated to original, 1950 boundaries. However, in some cases, two or more 1950-delineated tracts had to be merged to establish reliable spatial weighting over time. The end result is 95 historically standardized tracts that fall within and comprise the contemporary city limits of Houston. These tracts serve as our primary units of analysis through time.

MEASURES

To measure *nearby access* to City parks, we use the GIS software to count all parks that fall within a given tract plus all parks that fall within a half-mile of its geographic boundary. The half-mile buffer avoids reifying tract boundaries and is consistent with Comey's original recommendation for everyone in Houston — especially children — to reside within

a half-mile of a city park. Thus, even if a tract has no parks but one or more is located within a short distance of its boundary, residents are still considered to have nearby access. In 1947, the year of the first HPARD inventory, values for this variable range from 0 to 7, with a mean of 1.6. By 2015, this variable ranged from 0 to 43, with a mean of 8.1.

For residential demographics, we use U.S. Census data to estimate respective group presence in historically standardized tracts for each year in the official HPARD inventory (e.g., 1947, 1956, 1962, and so on). Central variables of interest include *total number of residents*, which provides insight into the degree to which parks and people (as well as changes therein) collocate over time. For class status, we use *mean household income*, which we adjust to constant 2015 dollars for all years.¹ For *presence of children*, we use the number of residents under 18 years old. And finally, for the presence of different racial and ethnic groups, we take several additional steps.

First, to simplify analyses and ensure robust measurement over time, we narrow our focus to the three largest ethnoracial groups in Houston — ones that have been present the longest and have been most instrumental in shaping and reshaping the city's racialized landscape over the past 70 years. They include non-Hispanic Blacks, Hispanics/Latinos, and non-Hispanic Whites. For simplicity, we refer to them as Blacks, Latinos, and Whites. Although these broad racial categories obscure considerable heterogeneity within them, they have nonetheless operated as powerful forces in the long-term, sociospatial organization of Houston and other major U.S. cities. In statistical models that follow, Whites serve as the omitted reference group to avoid problems of multicollinearity that can produce unreliable estimates.

Note, however, that before 1980 the U.S. Census Bureau did not systematically track Hispanics, a.k.a. Latinos, because what is now known as the Hispanic/Latino category did not exist (Mora 2014; Rodriguez 2000). Thus, we use the following steps to estimate the Latino population prior to 1980. For 1970, we use sample data that the U.S. Census collected about "Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish origin or descent." For 1960, we use the variable "Puerto Rican or Spanish surname" as a proxy for Latinos — a reliable measure that closely approximates the number of Latinos in a given tract (Fiscella and Fremont 2006). Spanish surname data were only collected in five southwestern states, including Texas, for 1960 and 1950. To estimate the number of non-Latino Whites for 1960 and 1970, we subtract the number of Latinos (as measured above) from the number of Whites. This approach is reasonable given the institutional categorization of Latinos as "White" in Houston during that era (San Miguel 2001).

To estimate values of all variables for HPARD-specific years, we employ simple linear interpolation because it introduces the fewest assumptions and because any error can be reasonably assumed to be random. For 1947, we use the same logic to linearly extrapolate observed changes between 1950 and 1960 back three years.

ANALYSES

NEARBY RESIDENTIAL ACCESS IN 1947

We begin our statistical analyses in 1947, the first year with official City parks data in Houston. By that time 56 public parks had been established, yielding a ratio of roughly

TABLE 1. Negative Binomial Regression Model Predicting Number of City Parks Nearby in 1947 (Standard Errors in Parentheses)¹

	Number of City Parks Nearby, 1947		
	Coeff.	S.E.	pValue
Mean household income	0.88	(0.21)	***
Black population	0.08	(0.05)	
Latino population	-0.01	(0.94)	
Youth population	0.02	(0.04)	
Total population	0.32	(0.14)	*
Constant	-11.84	(2.43)	***
Number of historicized tracts	95		

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$; two-tailed test.

¹All variables are log-transformed; thus coefficients are standardized for comparison. The White population is excluded to avoid problems of multicollinearity. The variables for Black and Latino populations should be understood as relative to the reference category (Whites).

one per 7,244 residents. Of those 56 parks, 52 were open to Whites only, with the majority of those purchased with public funds totaling more than \$15 million (in 2015 dollars; authors' tabulation). Of the four parks designated for "Coloreds," only one, Independence Heights Park, had been purchased using public funds, which totaled less than 1 percent of that spent to acquire White parks to that point. The other three "Colored" parks had been privately gifted. As a result, in 1947, there was one "White" park per 7,076 White residents, compared with only one "Colored" park per 32,422 Black residents — a 4.5-fold differential.²

To analyze these inequalities further, we use a negative binomial regression model to predict the number of nearby City parks in 1947 using the tract-level variables described above. In these and subsequent models, all covariates are log-transformed to minimize right-skew and to standardize values for direct, scalar comparison. In this way, a 1-percent increase in X (e.g., average household income in a tract) is interpreted as corresponding to a β -percent change in Y (number of City parks nearby), net of other factors. Moreover, because we include total population in all models, indicators of respective subpopulations (e.g., number of African-Americans) can be interpreted proportionally. For example, if a coefficient is positive, it indicates that it is not just the absolute size of that group that predicts more City parks nearby but also its relative size, or proportion, assuming an average total population.

Results appear in Table 1 and show that in 1947 — before major highways and when public spaces were still racially segregated by law — Houston's City parks skewed strongly toward tracts with more people and affluence. While having more parks near more people is certainly rational from an urban planning perspective, having more parks near families with higher incomes indicates a different operating principle — one of class inequality. Indeed, if we compare the standardized (logged) regression coefficients for the respective covariates in 1947, we find that the influence of household income outweighed that of residential population by more than 2.5 times.

Differences in the size of respective racial groups, by contrast (and relative to Whites), are not statistically significant in Table 1. Yet remember, Houston's neighborhoods and parks were still legally segregated in 1947. Thus, racial parity in nearby access did not

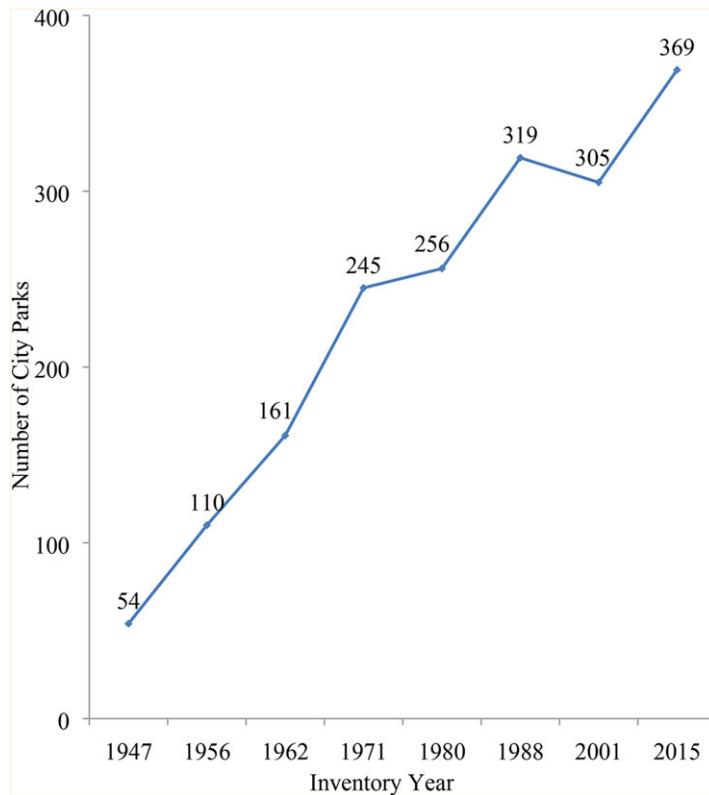


FIG. 1. Number of Houston City Parks by year of official inventory, 1947–2015. [Color figure can be viewed at wileyonlinelibrary.com]

mean racial parity in actual use. In this way, *de jure* racial inequality conjoined with *de facto* class inequality to produce a highly unequal system of City parks in Houston by the mid-20th century, after which the establishment of new parks began to expand quite noticeably, as did the speed and character of local residential churning.

PARK ACCUMULATION AND RESIDENTIAL CHURNING, 1947–2015

As Figure 1 shows, between 1947 and 2015, the number of City parks in Houston increased from 56 to 369, for an average increase of roughly four *new* City parks per year. To assess how this accumulation occurred relative to shifting residential populations nearby, we use a “fixed effects” (FE) version of our negative binomial regression model. This type of model predicts *changes* in the number of nearby City parks over time relative to *changes* in local demographics. In addition to explicitly analyzing temporal change, a benefit of the FE model is that it statistically controls for time-invariant traits of respective tracts, such as geographic size and location, which helps to minimize concerns of omitted variable bias. To estimate this model, all 95 tracts are observed for the full 8 waves of data for an aggregated sample size of 760 tract-years, spanning from 1947 to 2015.

TABLE 2. Panel Fixed-Effects, Negative Binomial Regression Model Predicting Change in Number of City Parks Nearby, 1947–2015 (Standard Errors in Parentheses)¹

	Number of City Parks Nearby, 1947–2015		
	Coeff.	S.E.	pValue
Mean household income	0.17	(0.04)	***
Black population	-0.01	(0.02)	
Latino population	0.19	(0.01)	***
Youth population	-0.09	(0.02)	***
Total population	0.17	(0.04)	***
Constant	13.63	(355.81)	
Number of historicized tracts	95		
Total observations (8 panels)	760		

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$; two-tailed test.

¹All variables are log-transformed; thus coefficients are standardized for comparison.

The White population is excluded to avoid problems of multicollinearity. The variables for Black and Latino populations should be understood as relative to the reference category (Whites).

Results appear in Table 2 and show that after 1947, the establishment of new City parks continued to follow increases in both local population and affluence at roughly the same rate. Specifically, and all else equal, a 1-percent increase in a tract's population corresponded with a 0.17-percent increase in the number of City parks nearby. Similarly, a 1-percent increase in local income also corresponded with a 0.17-percent increase in the number of City parks nearby. To put the latter finding in context, we can use predicted values to compare two hypothetical working-class tracts. In this comparison, each tract started with the same population and mean household income of \$35,000 in 1947, and each had an average number of nearby City parks for that year: two. If, over time, the only thing that varied between the two tracts was that one increased to an average income of \$100,000, while the other stayed at \$35,000, results in Table 2 predict that the gentrifying neighborhood would have approximately 6 nearby parks by 2015, compared with only 2 for the stable working-class neighborhood.

In addition, results in Table 2 reveal a strong, *negative* correlation between nearby park accumulation and growing presence of children over time. Specifically, findings show that for every 1-percent increase in the number of children, there was a corresponding 0.09-percent decline in nearby park access, net of other factors. To put this result in context, consider that the average historically standardized tract in Houston had approximately 1,300 children in 1947. If, over time, one tract stayed at this 1947 average while another declined to just a hundred children (which is still above today's minimum count of 45), the tract with the declining presence of children would be expected to accumulate *more than twice as many* new parks, all else equal.

Finally, Table 2 shows a positive and statistically significant coefficient of 0.19 for Latinos, which might suggest that new parks followed their growth over time, but in fact the reverse occurred. As Whites' numerical presence declined within Houston's city limits and Latinos' presence increased, the latter often moved into areas left behind by White residents, which is where many City parks already existed. In this way, Latinos increased nearby access to parks mostly by moving toward them, not by having new parks come to them. To examine these dynamics further, we examined predictors of where the City relinquished, or ceded, ownership of roughly two dozen parks, which offers insight into

TABLE 3. Panel Fixed-Effects, Negative Binomial Regression Model Predicting City's Relinquishment of City Parks Nearby, 1947–2015 (Standard Errors in Parentheses)¹

	Number of City Parks Relinquished by City, 1947–2015		
	Coeff.	S.E.	p-Value
Mean household income	-0.42	(0.17)	*
Black population	0.17	(0.05)	***
Latino population	0.33	(0.05)	***
Youth population	-0.19	(0.07)	**
Total population	-0.10	(0.10)	
Constant	1.69	(1.62)	
Number of historicized tracts	95		
Total observations (8 panels)	760		

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$; two-tailed test.

¹All variables are log-transformed; thus coefficients are standardized for comparison. The White population is excluded to avoid problems of multicollinearity. The variables for Black and Latino populations should be understood as relative to the reference category (Whites).

where its commitment to public parks has tended to be weakest. For this analysis, we use the same fixed-effects regression model reported in Table 2, but we change the dependent variable to the number of nearby parks that were *dropped* from the City's control during 1947–2015, regardless of reason.

Results appear in Table 3 and reveal several noteworthy trends. First, the City of Houston has been most likely to relinquish control over parks in areas characterized by *growing* Black and Latino populations, as well as in areas where average household incomes have not kept pace with city-wide increases over time. Specifically, findings indicate that for every 1-percent increase in average income there has been a 0.42-percent *decrease* in the number of relinquished parks nearby. By contrast, for every 1-percent increase in a neighborhood's Black population, there has been a corresponding 0.17-percent *increase* in the number of relinquished parks nearby; and, for every 1-percent increase in the local Latino population, there has also been a 0.33-percent *increase*. Thus, working-class neighborhoods with growing minority populations have been the most likely to lose City parks over time.

UNEQUAL ACCESS TODAY

Finally, we examine variation in access to nearby City parks today, 70 years after the first, official HPARD inventory. Here we use data just for 2015. Results appear in Table 4 and offer several insights. First and most notably, household income is *not* statistically significant at the 0.05-level, even though this variable strongly predicted park access in 1947 and subsequent increases in park access during 1947–2015. How can this be? How can findings in Table 1 show that in 1947 richer tracts tended to have more parks, then Table 2 show that through time increases in income tend to bring more parks, only to end with a situation today in which Table 3 shows that a neighborhood's income no longer significantly predicts access to nearby parks?

The answer brings us back to an important difference between social and environmental dimensions of urban land-based change. Namely, environmental change tends to

TABLE 4. Fixed-Effects, Negative Binomial Regression Model Predicting Number of City Parks Nearby in 2015
(Standard Errors in Parentheses)¹

	Number of City Parks Nearby, 2015		
	Coeff.	S.E.	pValue
Mean household income	0.23	(0.30)	
Black population	0.18	(0.08)	*
Latino population	0.13	(0.16)	
Youth population	-0.48	(0.16)	**
Total population	0.33	(0.31)	
Constant	-1.97	(2.83)	
Number of historicized tracts	95		

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$; two-tailed test.

¹All variables are log-transformed; thus coefficients are standardized for comparison. The White population is excluded to avoid problems of multicollinearity. The variables for Black and Latino populations should be understood as relative to the reference category (Whites).

accumulate, or successively increase, because it lingers as part of the built environment. By comparison, social change often occurs faster and thus is more fleeting. A particular neighborhood, for example, may attract new City parks at a given historical moment; but, if that neighborhood's residential composition eventually turns over, those parks still tend to remain. This point is not to imply that social processes such as residential segregation do not also accumulate or feedback to influence the distribution of environmental goods, including parks and tree cover (Jesdale et al. 2013). Instead, it is to illuminate how class inequalities in the establishment of City parks can become hidden with time. It also helps to explain how areas with growing minority populations tend to secure more equitable access to parks — not by attracting new parks, but by moving toward older, established ones, which according to local Houston surveys have subsequently declined in quality and upkeep (Smiley et al. 2016).

Against this backdrop, Table 4 also shows that the strongest statistical predictor of access to nearby City parks today is the relative *absence* of children. Specifically, results indicate that for every 1-percent increase in the presence of children in a neighborhood, there is a corresponding 0.48-percent *reduction* in the number of City parks nearby. This is one of the larger standardized effects in our study. In supplemental analyses, we reexamined it using the proportion, rather than number, of children in respective tracts. Results again revealed a similarly strong statistical effect. So, regardless of measurement strategy, areas with more children now have markedly fewer City parks nearby — a clear reversal of historical justifications for expanded investment in such amenities.

CONCLUSION

The present study set out to make several contributions to existing research on urbanization and parks. First, we wanted to draw attention to the fact that publicly owned city parks did not disappear with the latest neoliberal turn in public-private development of new urban greenspaces. Instead, they slipped to the background in ways that parallel declines in their physical and financial upkeep in many U.S. cities. Second, in bringing these types of parks back to the fore, we wanted to establish the utility of conceptualizing them

not as isolated sites but as parts of socioenvironmental systems that, like the cities they help to constitute, develop *successively* over time. Third and finally, we wanted to demonstrate how this approach can help advance empirical understanding of how inequalities in publicly produced environmental goods so vivid in the present have much older roots that continue to twist and turn. At each stage in this process, social inequalities of the past entwine with those of the present to produce lasting land-based changes that accumulate into the future, in conjunction with ongoing residential churning.

To demonstrate these contributions, we conducted a case study of Houston — a major, understudied U.S. city that recently embarked on a \$220 million public-private venture to help actualize parts of a master plan commissioned more than a century ago. Findings show that by the time the City assembled its first official parks inventory in 1947, there was already strong bias towards more privileged areas. Overlaying quantifiable class inequalities was a system of racial oppression that ensured that although Black populations had equal spatial access to nearby parks, they were legally excluded from using more than 90 percent of them. Findings also show that as the City lifted Jim Crow laws and established hundreds of new parks, increasing incomes remained a strong predictor of where this new development would occur. As these dynamics unfolded, the growth and churning of local minority populations eventually brought them into proximity to existing parks, while similar processes brought children farther away.

The result, today, is an urban landscape in which City parks have become both more numerous and less accessible to areas with high concentrations of young residents — a once-important motivator for public investment in urban parks, including Houston's own original master plan. While our data do not allow us to provide a definitive explanation for this trend and current inequality, it is consistent with more general attempts by city boosters across the country to remake existing parks and surrounding spaces for tourists and the new creative class. Both of these groups tend to be childless (at least while they are town) and attracted to historic urban neighborhoods being gentrified just outside the central business district. These are areas where many older parks were established and, in Houston, never included high-rise public housing complexes that historically concentrated Black residents, poverty, and children. So the patterns we find now would seem less a result of that type of development and subsequent demolition than from ongoing business and residential churning as usual.

Overall, these findings are important because they help to show how current events are but the latest iteration of ongoing, successive socioenvironmental changes. They also show how these changes can, over time, conjoin to obscure social inequalities they help to create. The new, it seems, is not so new after all, and the past lives on, sometimes in unexpected ways. In Houston, one of these ways includes not only declining access to City parks in areas with large and increasing numbers of children; it also includes more equitable access among lower-income and minority areas historically neglected by new park development. How did this situation come to pass?

The short answer is that it did *not* happen because of contemporary planning and politics, regardless of how benevolent or inequitable these may be. Our study shows that, instead, current conditions stem from processes of City park accumulation and neighborhood change decades in the unfolding. This is the power of taking a longer, more processual view of urbanization: It allows us to see how urban inequalities are produced and slowly hidden as social and environmental changes iteratively intersect. The implication for environmental justice scholars is that what they currently see in cities is not always

a good indicator of the processes that produced them. The implication for urban planners and policymakers is that their efforts today are not responsible for current inequities in public park access. That's the good news. The more difficult news is that if they and others wish to ameliorate existing inequalities, they will need to take a longer, broader view of the processes involved as well as what they leave behind.

As with any study, however, this one has limitations. The most fundamental, perhaps, is that we focused on just one city. Future research would benefit from similar analyses conducted elsewhere to determine which patterns and processes are most generalizable across cities and which are more locally idiosyncratic. Another important limitation is that we focused only on nearby park access, not park quality or size. We did so because information on these other variables is less reliable over time, and we wanted to invoke the fewest assumptions and qualifications in our analyses. Yet, park quality is clearly an important issue, now more than ever, as is the concentration of resources in large, historically commissioned pleasure grounds. Finally, it would be useful to extend our historical analyses to include not just City parks under the direct control of municipal governments but also new public-private greenspaces maintained and operated by local nonprofit organizations. Key from our perspective would be to assess if the location and development of these spaces parallel and thus reinforce patterns and processes uncovered in the present study, or if they reflect deliberate efforts to address and counter them. We look forward to future work in these directions.

Notes

¹As an indicator of an area's class status, we also considered homeownership rates. However, this measure is highly collinear with average household income from 1947 to 2001, which introduces statistical problems when both variables are included in the same panel model. Because average income is a more reliable indicator of class status and because it is the stronger, more consistent of the two predictors of nearby park access, we use it rather than rate of homeownership as our proxy for socioeconomic status.

²These population statistics come from Harris County as a whole, which is now nearly coterminous with the City of Houston boundaries. In 1947, it overstates the number of residents in the City limits, as drawn at that time.

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