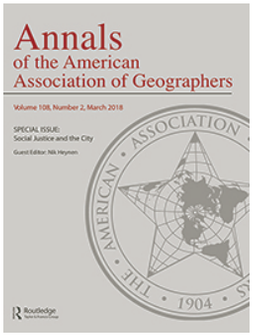

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The Legacy Effect: Understanding How Segregation and Environmental Injustice Unfold over Time in Baltimore

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Legacies of social and environmental injustices can leave an imprint on the present and constrain transitions for more sustainable futures. In this article, we ask this question: What is the relationship of environmental inequality and histories of segregation? The answer for Baltimore is complex, where past practices of de jure and de facto segregation have created social and environmental legacies that persist on the landscape today. To answer this question, we examine the interactions among past and current environmental injustices in Baltimore from the late 1880s to the present using nearly twenty years of social and environmental justice research from the Baltimore Ecosystem Study (BES), a long-term social–ecological research project. Our research demonstrates that patterns and procedures in the city's early history of formal and informal segregation, followed by "redlining" in the 1930s, have left indelible patterns of social and environmental inequalities. These patterns are manifest in the distribution of environmental disamenities such as polluting industries, urban heat islands, and vulnerability to flooding, and they are also evident in the distribution of environmental amenities such as parks and trees. Further, our work shows how these legacies are complicated by changing perceptions of what counts as an environmental disamenity and amenity. Ultimately, we argue that the interactions among historical patterns, processes, and procedures over the long term are crucial for understanding environmental injustices of the past and present and for constructing sustainable cities for the future. *Key Words: Baltimore, distributive justice, environmental justice, procedural justice, segregation.*

社会与环境不正义的遗产, 能够在当下留下深刻的印记, 并对转变成为更具可持续性的未来产生限制。我们于本文中质问此一问题: 环境不公与隔离历史之间的关系为何？对巴尔的摩而言, 答案相当复杂, 因其过往法律上与实际的隔离, 已创造了今日在地景上续存的社会及环境遗产。为了回答此一问题, 我们运用巴尔的摩生态系统研究 (BES) 这个长期的社会生态研究计画近乎二十年的社会与环境不公研究, 检视自 1880 年代晚期至今, 巴尔的摩的过往与当下环境不公之间的互动。我们的研究显示, 该城市早期正式与非正式的隔离历史模式与过程, 伴随着 1930 年代"拒绝贷款区"的划设, 已遗留了难以磨灭的社会与环境不公模式。这些模式, 在诸如污染工业、城市热岛和面对洪灾的脆弱性等不友善环境的分佈上十分显着, 且同时在诸如公园与植栽等友善环境的分佈上相当明显。再者, 我们的研究显示, 这些遗产如何受到有关何谓环境不友善与环境友善的认知改变而复杂化。我们最终主张, 长期的历史模式、过程与程序, 对于理解过往与当下的环境不正义以及打造未来可持续发展的城市而言至关重要。 *关键词： 巴尔的摩, 分配正义, 环境正义, 程序正义, 隔离。*

Los legados de las injusticias sociales y ambientales pueden trasmitir una huella al presente y obstaculizar las transiciones a futuros más sustentables. En este artículo formulamos esta pregunta: ¿Cuál es la relación entre la desigualdad ambiental y las historias de la segregación? Para Baltimore, la respuesta es compleja, donde las prácticas pasadas de la segregación de jure y de facto han generado legados que persisten en el paisaje actual. Para responder esta pregunta, examinamos las interacciones entre las injusticias ambientales pasadas y presentes de Baltimore desde los años 1880 hasta la actualidad, utilizando cerca de veinte años de investigación sobre justicia ambiental y social del Estudio del Ecosistema de Baltimore (BES), un proyecto de investigación

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socio-ecológica a largo plazo. Nuestra investigación demuestra que los patrones y procedimientos en la historia temprana de segregación formal e informal de la ciudad, seguida por la "discriminación" de los años 1930, han dejado patrones indelebles de desigualdades sociales y ambientales. Estos patrones se manifiestan en la distribución de incomodidades ambientales como industrias contaminantes, islotes urbanos de calor y vulnerabilidad a las inundaciones, las cuales también son evidentes en la distribución de atractivos ambientales, tales como parques y arbolado. Adicionalmente, nuestro trabajo muestra cómo estos legados se complican por las percepciones cambiantes sobre lo que cuenta como una incomodidad ambiental o un atractivo. Por último, argüimos que las interacciones entre los patrones, procesos y procedimientos históricos a plazo largo son cruciales para entender las injusticias ambientales del pasado y del presente y para construir ciudades sostenibles para el futuro. *Palabras clave: Baltimore, justicia distributiva, justicia ambiental, justicia procedimental, segregación.*

In this article, we argue that Baltimore's history of racial and economic segregation has produced patterns of environmental disamenities and amenities that sometimes counter expectations about the sociospatial characteristics of environmental justice (EJ). EJ emerged in the United States in the 1980s as a social movement and field of scholarship in response to the disproportionate exposure of people of color to environmental hazards (Boone 2010). Classic EJ theory has repeatedly demonstrated the correlations among race, class, and the distribution of environmental hazards and benefits (United Church of Christ 1987; Bullard 1990; Colten and Skinner 1996). White privilege has sociospatial characteristics as well, as Pulido (2015) theorized, resulting in landscapes where communities of color are disproportionately exposed to environmental hazards and white neighborhoods are insulated from those risks.

Counter to classic expectations, Baltimore reveals exceptions: Whites live closer to polluting industries and African Americans have greater access to parks, for instance. Twenty years of EJ research in Baltimore suggests that the city's history of de jure and de facto segregation, followed by "redlining" in the 1930s, has left legacies that account for the sociospatial distribution of environmental amenities and disamenities in the city today. Attention to these legacies helps us understand the complex temporal dynamics of urban EJ, complexities sometimes missing from ahistorical analyses.

Baltimore's racial and economic segregation mirrors the history of other cities in the United States.[1] After the Civil War, Baltimore at the ward level exhibited a mixture of small, affordable houses and grander homes for managers and entrepreneurs, members of different classes, and whites and African Americans living among each other (Duneier 2016). After Reconstruction, with the hardening of racial discrimination and the arrival of new immigrant groups, Baltimore's social mosaic became less diverse at the ward level, with households of similar class and identical race most frequently together. At the same time, new legal and procedural mechanisms furthered ward-level patterns of segregation and social differentiation in Baltimore. As we describe here, these mechanisms included the first, and short-lived, municipal segregation ordinance in the United States; subsequent deed covenants; and the discriminatory activities of neighborhood improvement associations to compensate for the ordinance's invalidation. Sociospatial practices of exclusion, often at the ward level, produced a fundamentally heterogeneous city.

Our EJ research examines historic and current patterns and processes of social injustice by focusing on interactions among distributive and procedural justice and disamenities and amenities over time. Further, we situate our EJ research in the larger context of research on the city's environmental heterogeneity over the long term, a focus of the Baltimore Ecosystem Study (BES) Long-Term Ecological Research project established in 1997. The ecology of Baltimore is highly differentiated. Situated on the Fall Line, Baltimore straddles the hilly Piedmont with its deep stream valleys and the sandy coastal plain with its estuarine edge. The city is dissected by three major streams. The heterogeneity of geology, native vegetation, and drainage are fundamental features of the region. BES has revealed the spatial patterns of soil contamination by heavy metals; the pollution of different stream reaches by road deicers, pharmaceuticals, and personal care products; and nitrate from leaky city sewers and suburban septic systems. It has documented the effects of restoration on streams, the impacts of storm water retention basins, and the impacts of green infrastructure. These heterogeneities provide an unusually rich understanding of the ecological dimensions of environmental inequity, which subsequently affect EJ. At the same time, our research on EJ is important to understanding the dynamics of the Baltimore region as a social–ecological system over the long term.

Our research in Baltimore incorporates insights from EJ scholarship (e.g., Shrader-Frechette 2002),

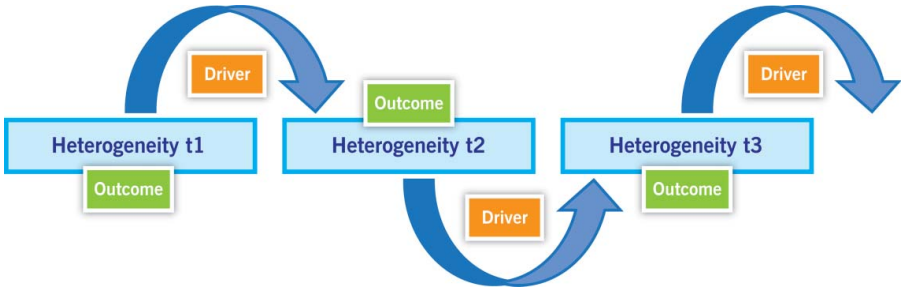

Figure 1. Dynamic heterogeneity is a framework that investigates how a given socioecological state is composed of both drivers and outcomes of heterogeneity. Although considering heterogeneity to be both drivers and outcomes might seem circular, this representation explains why that is not the case. Causation has a temporal dimension that separates the status of the socioecological state as outcomes and drivers and acknowledges the role of social, economic, and ecological phenomenon as both a cause and consequence. Thus, drivers responding to pattern at t_1 produce a new spatial pattern at t_2 and a subsequent driver responding to the spatial pattern at t_2 produces a new pattern for t_3. (Color figure available online.)

urban political ecology (Swyngedouw and Heynen 2003; Heynen et al. 2006; Heynen 2014), and ecosystem ecology (Cadenasso, Pickett, and Grove 2006; Pickett et al. 2011). It is operationalized through the analytic framework of dynamic heterogeneity (*sensu* Pickett et al. 2016). The dynamic heterogeneity framework posits that a pattern of spatial heterogeneity at a given point in time can be affected by social and environmental events, interventions, and actions, resulting in a new pattern of heterogeneity (Figure 1). Further, spatial heterogeneity and social–environmental events can cascade through time, generating social and environmental legacies and lags that could shape future outcomes. Because EJ is about spatial heterogeneity or distributive justice and outcomes on one hand and drivers of procedural justice on the other hand, dynamic heterogeneity can help frame the interactions of these two components of EJ in terms of spatial and temporal explanations of EJ over time (Figure 2).

A critical feature of the dynamic heterogeneity framework is that it can be used as an analytical tool to unpack long-term interactions among distributive justice, which involves patterns of disamenities and amenities, and procedural justice by de jure and de facto allocation of disamenities and amenities. Examples of disamenities include polluting industries, urban heat islands, and vulnerability to flooding, and examples of amenities include such features as parks and trees. Unpacking and disentangling these long-term interactions can reveal, for instance, the complex relationships among patterns of amenities and procedures of disamenities and, conversely, patterns of disamenities and procedures of amenities (Figure 2). Further, by investigating the dynamics among patterns and procedures, we can uncover social and environmental legacies and changing perceptions that might be associated with both distributive and procedural justice.

Our research in Baltimore emphasizes the need to examine EJ as more than a snapshot of correlations at one point in time. We understand the heterogeneity of urban landscapes as the legacy and result of uneven

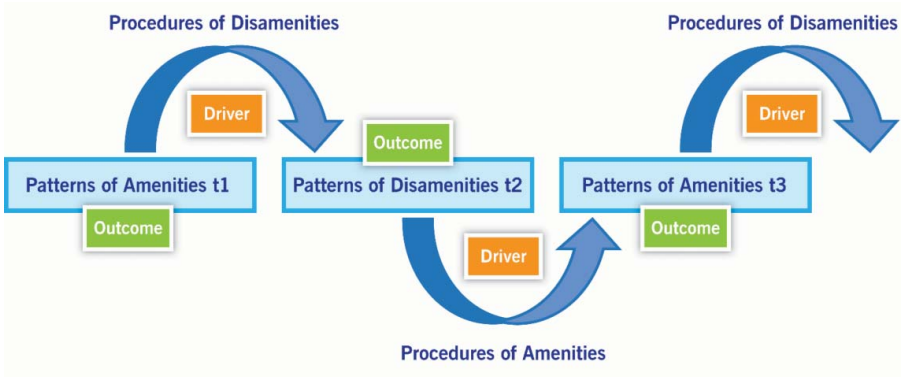

Figure 2. The dynamic heterogeneity framework can be used to explore interactions among distributive and procedural justice and amenities and disamenities. For example, patterns of amenities at t_1 could affect the allocation of disamenities that produce patterns of disamenities at t_2. Subsequently, patterns at t_2 could affect the allocation of amenities for patterns of amenities at t_3. (Color figure available online.)

development and social injustices. Geographers and other urban theorists have built on Marxist political economy to examine how capital accumulation in cities produces patterns of racialized segregation and the uneven distribution of social and environmental amenities. In general, urban political economic theory suggests that land use in cities is driven by the maximum accumulation of capital (Harvey 1978, 1987) or "highest and best use" (Blomley 2004, 4). For example, Smith (1987) argued that patterns of uneven development are the instantiation of a capitalist logic, where patterns of uneven investment enable gentrification to transform poor neighborhoods and displace residents (Smith 1987; Heynen et al. 2006). Baltimore's long history of state-sponsored neglect and decades of segregation have created neighborhoods seemingly abandoned by capitalist investment, requiring attention to the legacies of uneven development to understand contemporary processes and patterns of environmental inequality. The term *dynamic* in dynamic heterogeneity invokes changes, metastability, feedbacks, path dependencies, and legacies manifest in the past, present, and potential futures. Procedural justice, the de jure and de facto allocation of disamenities and amenities, can be significant instrumentally to the dynamics of urban ecological systems.

The Political Economy of Segregation in Baltimore

Baltimore is located on the Chesapeake Bay. It was once the second leading port of entry for immigrants to the United States and a major manufacturing center. In the late 1800s, Baltimore, like most industrial cities, faced many social–environmental challenges. Private sanitation services dumped household and industrial sewage into the harbor, compounding the problems caused by ship discharge. More than 20,000 cesspits drained illegally into the Jones' Falls, one of the three major streams in the city. As the city rapidly industrialized and expanded in the late nineteenth century, elected and civic leaders began to recognize that its modest system of parks and squares did not meet the needs of its residents and that those amenities were not equally distributed (Korth and Buckley 2006).

A sequence of three planning paradigms responded to Baltimore's environmental inequalities and hazards: Progressivist reconstruction after the fire of 1904, urban renewal in the 1950s to 1970s, and urban sustainability since the 2000s. Baltimore's devastating 1904 fire, which destroyed seventy city blocks of the downtown area (140 acres), enabled a progressive approach to redevelopment (Euchner 1991). Over the next decade, the city would employ comprehensive approaches to water supply and sewers (Boone 2003), roads (Buckley, Boone, and Grove 2017), a park system (Crooks 1968; Korth and Buckley 2006), city arboriculture (Boone et al. 2009), and zoning (Lord and Norquist 2010). Urban renewal, beginning with the Federal Housing Act of 1949, funded slum removal and neighborhood revitalization, new home construction, and the development of open space and landscaping. More recently, the sustainability period was ushered in by the adoption of a forward-looking sustainability plan in 2009, targeting six areas of concern: cleanliness, pollution prevention, resource conservation, greening, environmental education, and green economy. During each planning period, concerns for development, environmental health, and equality have been central, although shifting political and economic realities have challenged implementation, including declines in manufacturing, industrialization, population, and rail transportation since 1950.

Baltimore persistently constrained black families to dense and relatively expensive housing through deed restrictions, covenants, and municipal ordinances (Power 1983; Olson 1997). After the Civil War, African Americans lived throughout the city. By the early twentieth century, however, block-by-block segregation began to give way to sizable hemmed-in ghettos in East Baltimore, West Baltimore, and South Baltimore (Power 1983). In May 1911, following hostilities after a black lawyer moved into a white neighborhood, Baltimore enacted the first municipal segregation ordinance in the United States, which was authored by progressives who agreed that "blacks should be quarantined in isolated slums in order to reduce the incidents of civil disturbance, to prevent the spread of communicable disease into the nearby white neighborhoods, and to protect property values among the white majority" (Power 1983, 301).

In 1917, the ordinance fell after a decision by the U.S. Supreme Court. In response to the Supreme Court's decision, the mayor set out to replace the de jure segregation with de facto segregation, "enforced by a conspiracy in restraint of rental or sale" of housing to blacks on blocks that had been set out as white neighborhoods (Power 1983, 318). The plan was to use white property associations, the real estate board, the health department, and the city building inspector to ensure that African Americans left the neighborhoods where they were in the minority and did not enter those

neighborhoods that were already white. Over time, the conspiracy grew and formalized, with white neighborhood associations adopting racial segregation as a top priority and neighborhood protection associations passing restrictive covenants that prohibited the rental or sale of properties to blacks. Such deed restrictions imposed by property owners persisted well into the 1970s, even after the Fair Housing Act of 1964. By 1925, seventeen neighborhood improvement associations had held meetings to discuss various perceived threats to their neighborhoods and coordinated their efforts across neighborhoods to share information and enforce restrictive practices (Buckley and Boone 2011).

During this same period, banks and the federal government began to use race in a way that isolated black residents in certain neighborhoods. In 1937, the Federal Home Owners' Loan Corporation (HOLC) was charged with refinancing homes in danger of foreclosure. The HOLC assigned a security grade to each neighborhood based on the perceived risk of default, using criteria that included occupation of residents, annual income, predominant nationality, percentage of "negro families," percentage of families on relief, and "threat of infiltration of foreign born, negro or lower grade population" (Grove et al. 2015, 138–39). The neighborhoods deemed at highest risk were labeled hazardous and mapped in red—hence the term *redlining*[2] (Figure 3). The effect of these various policies, programs, laws, and practices has been to segregate African Americans into areas of West and East Baltimore and some sections of South Baltimore, institutionalizing a racially based legacy of disinvestment characterized by overcrowding, poor housing quality, encroachment of industrial uses, and noise from nearby businesses.

Unexpected Outcomes, Legacies, and Changing Perceptions

Here we exemplify how Baltimore's contemporary social–environmental landscape is the result of changing patterns of racial and economic segregation. At different periods in Baltimore's history, practices of social exclusion coproduced patterns of environmental inequality and racism, such as environmentally related zoning variances. Yet there is sometimes a lag between the

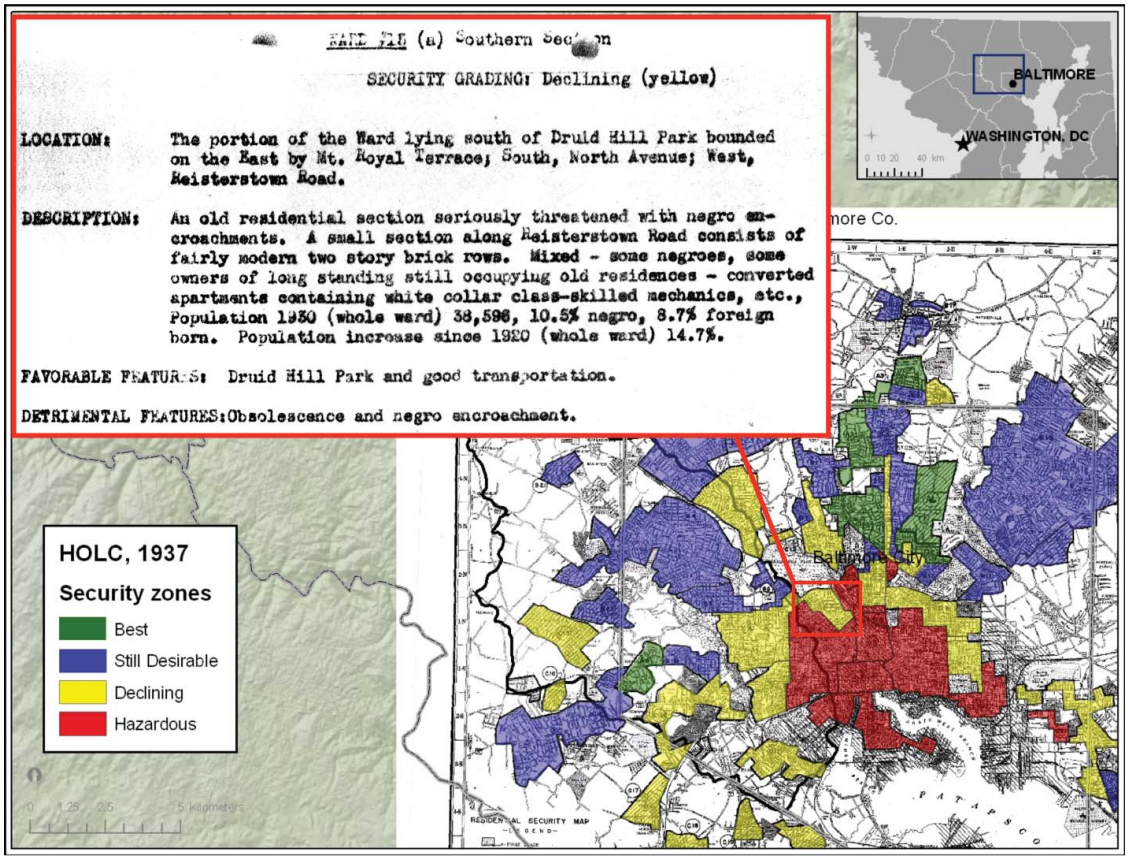

Figure 3. Baltimore City, 1937 Home Owners' Loan Corporation map (Grove et al. 2015). The first sentence of the description states, "An old residential section seriously threatened with negro encroachment." HOLC = Home Owners' Loan Corporation. (Color figure available online.)

temporal dynamics of social and environmental change, resulting in contemporary sociospatial distributions of environmental benefits and hazards in Baltimore that do not always conform to classic EJ explanations. Further complicating the contemporary landscape are changing perceptions of what counts as an environmental amenity. Thus, EJ research in Baltimore illustrates the importance of a historical approach to understanding the city's dynamic heterogeneity. History reveals how legacies of past practices of segregation account for contemporary sociospatial distributions of environmental hazards and benefits.

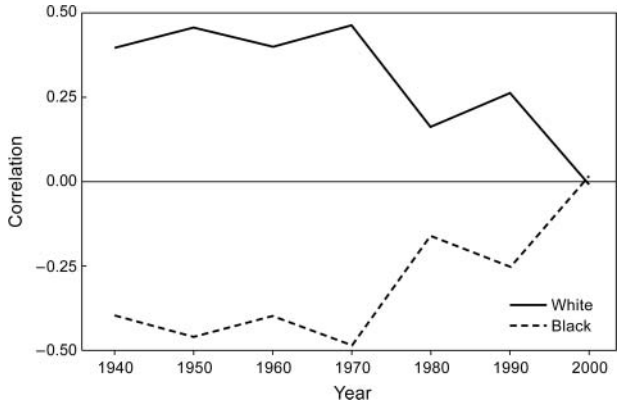

Figure 4. Correlation between race and distance to disamenities (adapted from Lord and Norquist 2010).

Distributive Justice and Disamenities

Our analyses of EJ in Baltimore have generated both expected and unexpected patterns. Several expected patterns of disamenities emerge: Nonconforming, environmentally related zoning variances were disproportionately approved for African American neighborhoods and disapproved for white neighborhoods between 1930 and 1970 (Lord and Norquist 2010; Figure 4). The concentration of vacant lots and abandoned buildings and the absence of trees in neighborhoods reflect the HOLC's redlining (Grove et al. 2015; Figure 5). The absence of trees produces collateral social and environmental disamenities, including higher levels of crime (Troy, Grove, and O'Neil-Dunne 2012; Troy, Nunery, and Grove

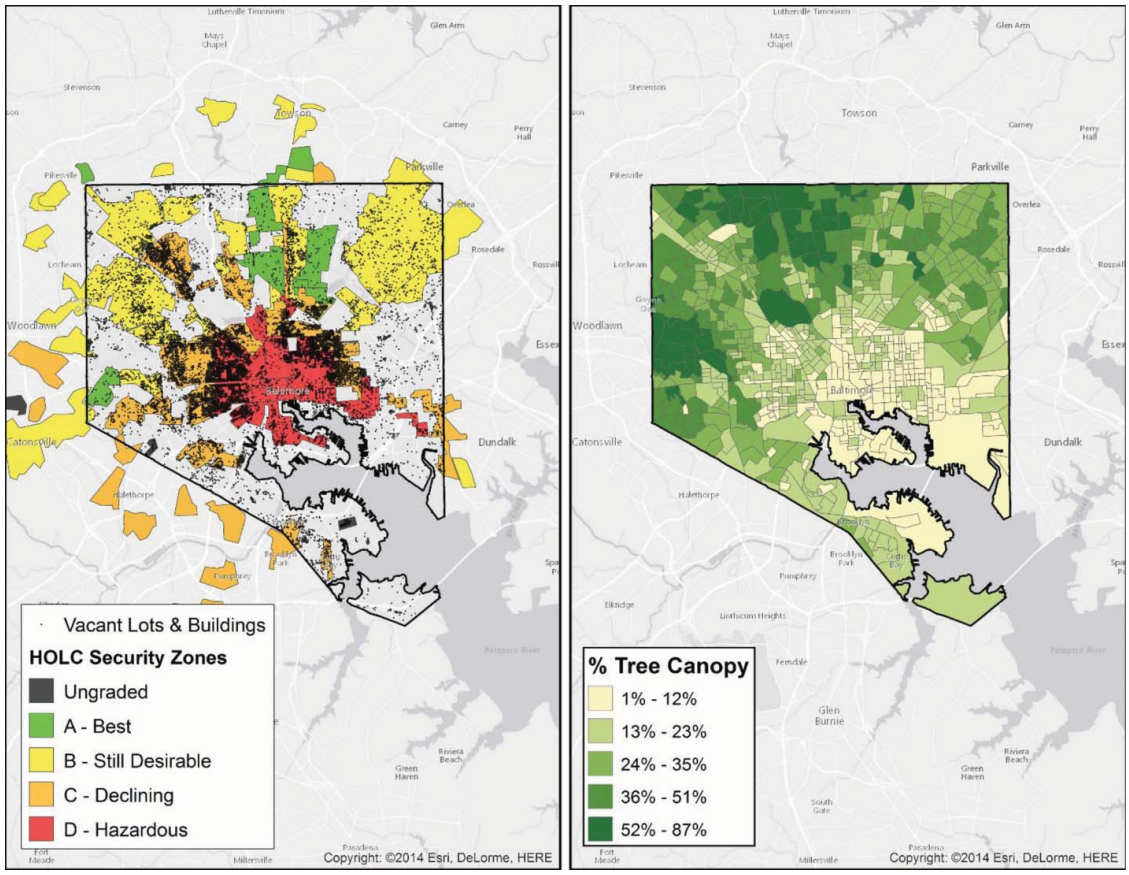

Figure 5. Neighborhoods classified as "hazardous" or "declining" in 1938 have the highest concentration of vacant lots and buildings in 2012 and the lowest percentages of canopy cover (Grove et al. 2015). (Color figure available online.)

2016) and higher temperatures and vulnerability to heat waves (Huang et al. 2011; Huang and Cadenasso 2016).

The unexpected patterns of EJ in Baltimore are understandable through the legacies of racial and economic segregation. The current pattern of Toxic Release Inventory (TRI) sites, representing industrial land uses and pollution, is predominantly associated with majority-white neighborhoods, contrary to the usual pattern of association with minority communities (Figures 6 and 7). The amenity of living close to the factories where they worked was reserved mainly for whites. Although some blacks could secure the lowest paid factory jobs, they had to travel long distances to work. Thus, housing near factories later came to be identified as neighborhoods with TRI sites (Boone 2002).

Distributive Justice and Amenities

It is not only disamenities that are of concern for EJ. Indeed, access to amenities, including access to parks and tree canopy cover, is also a concern. Once again, we find unexpected results that are understandable through the lens of Baltimore's history of racial and economic segregation. Today, African American neighborhoods enjoy greater access to parks within walking distance than white neighborhoods, although whites generally have access to more acres (Boone et al. 2009). The amenity of proximity to parks was not justly achieved, as African Americans were historically excluded from participating in recreational activities even when they lived close to a

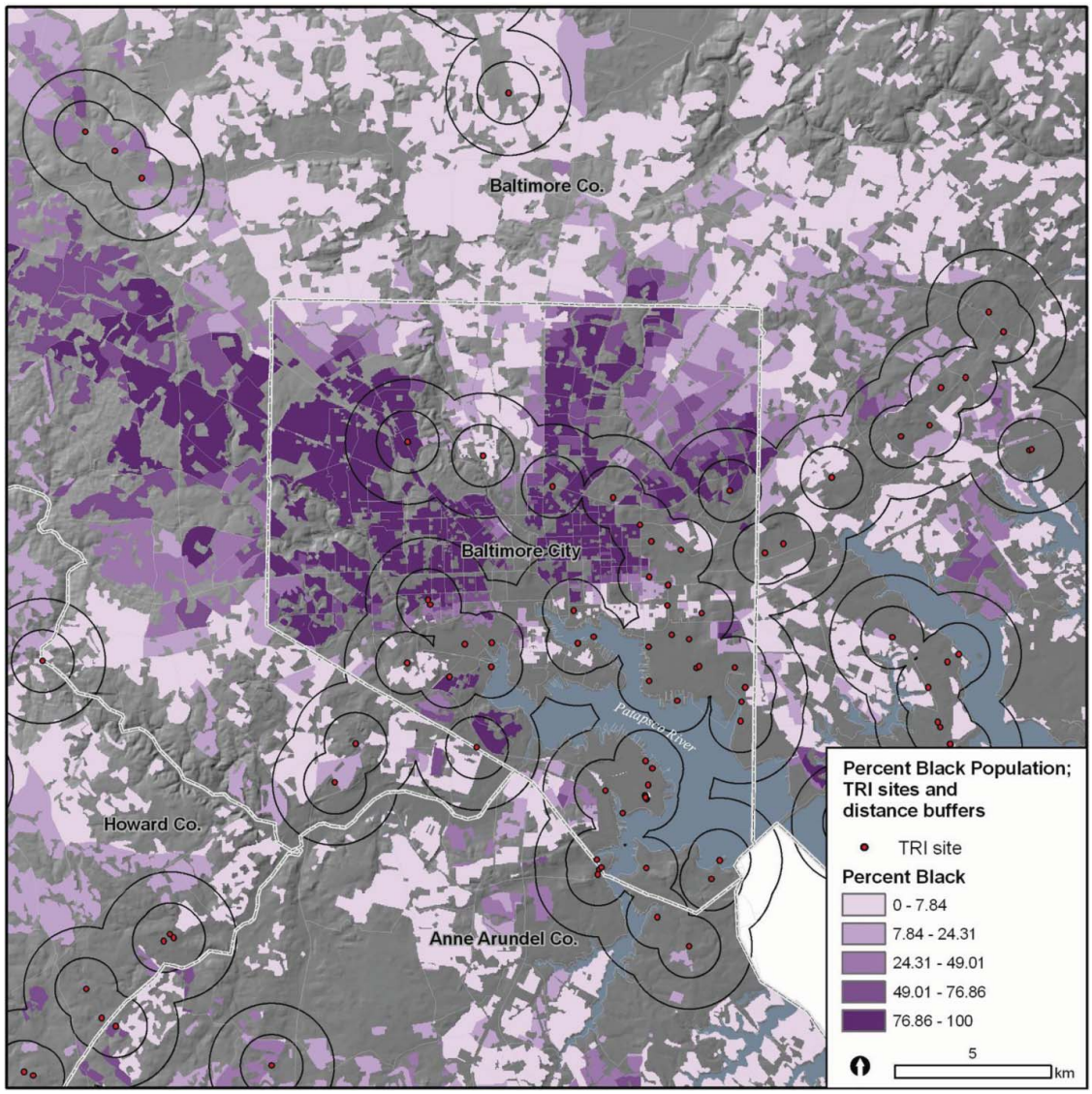

Figure 6. Percentage black population and 1- and 2-km distance buffers from TRI sites for Baltimore City and surrounding areas (Boone 2002). TRI = Toxic Release Inventory. (Color figure available online.)

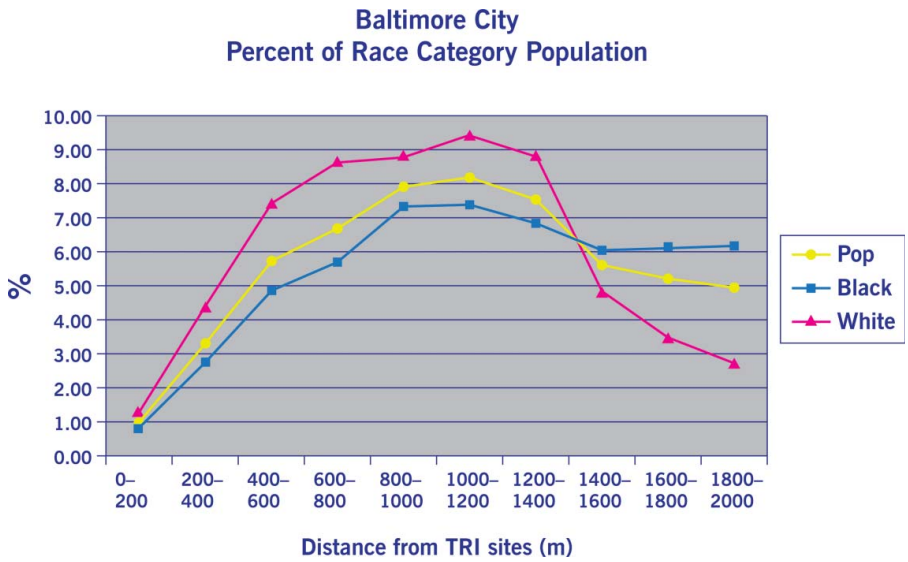

Figure 7. Percentage of race category populations by distance zones from TRI sites, Baltimore City (Boone 2002). TRI = Toxic Release Inventory. (Color figure available online.)

neighborhood park. Only after large numbers of whites migrated to the suburbs, often prompted by white real estate agents engaged in block busting, was the African American population able to disperse and gain access to all of the city's parks and recreational facilities, including golf courses and swimming pools (Wells, Buckley, and Boone 2008). Thus, the current distribution of parks is more associated with the legacies of white privilege and an "inherited landscape" (Boone et al. 2009).

The legacies of white privilege and inherited landscapes are also present in the current distribution of urban tree canopy. Urban tree canopy is positively associated with the percentage of African Americans currently living in a neighborhood (Grove et al. 2006; Troy et al. 2007; Boone et al. 2010). This is attributable in part to the legacy of the white neighborhood improvement associations that worked to establish the city's forestry division and to plant trees in their neighborhoods (Buckley and Boone 2011). Just as African Americans inherited greater access to parks, they also inherited greater tree canopy cover as they dispersed into new neighborhoods.

Procedural Justice and Disamenities

Patterns of disamenities are the stock in trade of EJ research, but it is critical to examine the mechanisms by which the distribution of environmental inequities come to exist. Lord and Norquist (2010) studied how racial biases in the decisions about nonconforming zoning variances associated with environmental disamenities varied between 1940 and 2000. For each decade from 1940 to 1990, race and the distance to disamenities were correlated: The higher the percentage of African American residents, the closer to disamenities, and the higher the percentage of white residents, the farther away the disamenities. Beginning in 1970, however, the correlation between race and proximity to disamenities began to weaken, and in 2000 there was no correlation, coinciding with the period during which the city became predominantly African American and the zoning variance approval process was reformed (Figure 4).

Several procedural factors produced this bias, causing a disproportionate number of zoning variances to be approved for redlined neighborhoods (Lord and Norquist 2010). First, the legacy of prior neighborhood conditions such as obsolescence of housing stock, encroachment of industrial uses, or noise from businesses, which had already been concentrated in redlined neighborhoods, provided a rationale for zoning variance approvals. Second, businesses purposefully sought to locate their nonconforming operations in African American neighborhoods because they thought those neighborhoods were poor, poorly organized, and unlikely to resist. When African American neighborhoods did resist, the neighborhoods had a high rate of success. Where African American neighborhoods could afford a lawyer, the zoning board disallowed the variance in a majority of cases (Lord and Norquist 2010). This suggests that lack of economic

and legal resources in African American neighborhoods often put them at a disadvantage.

Procedural Justice and Amenities

Our research has examined a variety of processes affecting the allocation of amenities, including segregated parks and park uses, biases in park acquisition, and tree planting programs since the early 1900s. A major social movement in Baltimore, and many other cities in the United States, was African Americans' resistance to exclusionary practices that prohibited them from using the city's golf courses, pools, tennis courts, and beaches.

Baltimore began to construct municipal golf courses in the 1920s, all of which were "white only." In 1934, Baltimore's Board of Public Park Commissioners (BPPC) allowed African Americans to golf at Carroll Park—a poorly designed and maintained course with only nine holes—after the Monumental Golf Club of Baltimore, an African American organization, challenged the "white only" policy. In part, BPPC made this change because they did not believe that an increased African American presence in the predominantly industrial area would have negative impacts on nearby white neighborhoods. The surrounding neighborhoods strenuously objected, though, and the BPPC was forced to rescind its decision. Soon after, a compromise was reached by splitting course privileges and providing whites exclusive rights on Tuesdays, Thursdays, and Saturdays and second and fourth Sundays. Two years later, African Americans were granted unrestricted access to the course but remained barred from the other municipal courses (Wells et al. 2008).

The Monumental Golf Club eventually sued the city for access to the other courses, claiming that Carroll Park did not meet the "separate but equal" standard established by the U.S. Supreme Court because of the course's inferior qualities. A subtext to the lawsuit was to go after the segregationists' wallets, assuming that they would rather grant African Americans access to the city's other golf courses than spend money to upgrade Carroll Park (Olson 1997). With persistence and threats of lawsuits, the BPPC finally granted full access to all of the municipal golf courses, regardless of race or ethnicity. Again, white neighborhood associations petitioned the BPPC, arguing that white neighborhoods needed to be protected from African American "invasion" and the detriment to property values surrounding the newly desegregated courses (Wells et al. 2008). Eventually, the BPPC relaxed its rules against mixed play among the races on its golf courses, baseball diamonds, tennis courts, and other athletic fields (Gibson and Yoes 2004).

During this period, the Baltimore Board of Public Recreation concluded that the city had inadequate acreage in parks, especially for children's playgrounds (Figure 8), and that the "colored community is lacking in areas and facilities quite out of proportion to the ratio of its numbers to the total population" (Pangburn and Allen 1941, ix). The Board had also received a large financial gift from a private donor for public park acquisition. Whereas many advocated for the purchase of small playgrounds in East Baltimore, others sought a large park in West Baltimore. Theodore Marburg, Chairman of the Municipal Arts Society, contacted his old friend Frederick Law Olmsted, Jr. for advice.

Although previous reports in 1904 and 1926 made it clear that Olmsted wished to provide the city with "a roughly equitable distribution" of parks and recreation facilities "for all its citizens" (Korth and Buckley 2006, 2), Olmsted replied to Marbury that although playgrounds in East Baltimore were needed, such an expenditure would be risky given the condition and instability of the neighborhoods. The city heeded Olmsted's advice and made the first of several purchases of large tracts of stream valley lands in West Baltimore in 1941 (Korth and Buckley 2006). Once again, the legacy of preexisting conditions of deteriorated neighborhoods justified the procedural decision not to invest in amenities.

Urban tree cover is typically seen as an environmental benefit. During the Progressive era, neighborhood associations lobbied for tree planting and maintenance (Buckley 2010; Buckley and Boone 2011). This process continued during the urban renewal programs in the 1950s and 1960s. For instance, the Bolton Hill neighborhood—which had declined due to block busting—advocated for tree planting investments based on its preexisting conditions and former prominence as one of the wealthiest neighborhoods in Baltimore (Merse, Buckley, and Boone 2009). At the same time that Bolton Hill was planting trees, other neighborhood associations were actively discouraging tree planting programs. When tree planting started in predominantly white neighborhoods in East Baltimore, the City's Forestry Division discovered that many residents did not perceive trees as an amenity and opposed tree planting in their neighborhoods (Buckley 2010).

Figure 8. Baltimore Mayor Thomas D'Alesandro at the groundbreaking ceremony for Cloverdale Playground, 13 July 1949. Separate facilities for African Americans were often enforced through de jure and de facto segregation. University of Baltimore, Langsdale Library, Special Collections, Thomas D'Alesandro, Jr. Collection, Series IV-C, Box 4. (Reproduced courtesy of the University of Baltimore.)

Some predominantly African American neighborhoods in East Baltimore remain virtually treeless despite the best efforts of city foresters since the City's urban renewal programs. Starting in the 1960s, large numbers of African Americans migrated to this section of East Baltimore and inherited this landscape devoid of trees. This demographic shift did not signal a change in attitude toward urban trees, however. As the city has implemented its sustainability plan, Battaglia et al. (2014) found that although residents are not opposed to more trees, they question the ability of the city to manage its existing street trees and voice concern about significant negative costs of these "so-called amenities," including gentrification. They argue that the city has more important disamenities that it should solve before it embarks on a tree planting campaign. Similar results are found in the city's tree giveaway programs, where addresses of Baltimore participants in free tree giveaway programs were most likely to be from the most affluent neighborhoods with the highest rates of canopy cover. In contrast, less affluent neighborhoods with much lower rates of canopy cover were much less likely to participate in these free programs (Locke and Grove 2016). Although the issues affecting participation can be complex, these experiences indicate that perceptions of disamenities and amenities might vary over time and among different social groups.

Conclusion

We have recognized EJ as a normative stance and scholarly pursuit. As a normative stance, EJ is fundamental to sustainability and transitions for the future. What might we learn from the past to achieve current and future sustainability goals? Sustainability is in essence a set of desired outcomes and associated with future patterns of distributive justice. Sustainability policies and planning, however, might also look at the current distribution of outcomes associated with sustainability goals and how past social and environmental procedures, processes, and legacies have produced the current distribution. Without these types of understandings, the rationale and ability to achieve future sustainability outcomes might be severely limited.

For more than 100 years, policymakers and planners have called for the equitable distribution of environmental benefits in the City of Baltimore. We propose that more attention also needs to be paid to transitions:

how the equitable distribution of sustainability outcome goals is produced. Transitions are associated with procedural justice, which includes fairness in the application of environmental and other laws; development and maintenance of fair institutions; fairness in decision making; and recognition, enfranchisement, and removal of barriers to participation by marginalized groups as stakeholders in decisions (Boone 2008, 2010; Schlosberg 2009; Boone and Klinsky 2016). This might be summarized in terms of principles: (1) expand and enable partnerships (who participates), (2) empower people and foster participation (how people participate), and (3) enable good governance (the even application of laws). More basically, to paraphrase Inez Robb, a local activist and member of the Baltimore Sustainability Commission, "we need to change from the City doing things *to* the people, from the City doing things *for* the people, to the City doing things *with* the people" (Robb 2016). Understanding the barriers and missed opportunities in procedural justice in the past could help build practices and institutions for just procedures for the present and future.

The long-term view and attention to each of the components in our analytical framework of dynamic heterogeneity (Figure 2) makes manifest the potential for dynamic interactions among distributive and procedural justice and among disamenities and amenities, including legacies of racial biases and changing perceptions. Understanding these dynamics requires both social and environmental explanations. We do not witness a social system acting on a passive environmental system. An inclusive perspective of both social and biophysical sciences is required. Promising new avenues for EJ scholarship could build on theories, data, and methods from other fields and approaches, including land use law, industrial and housing location theory, land economics, hazards and vulnerability, political ecology, public health, and environmental sciences. In particular, EJ scholarship could benefit from putting more "environment," meaning an understanding of ecological processes, into EJ (Pickett, Boone, and Cadenasso 2007; Boone 2008). Knowledge about how ecosystems are structured and function—the spread of diseases or flows of water contaminants—would allow EJ researchers to tap into rich bodies of knowledge that could lead to improved understanding of the processes of environmental inequality. EJ collaborations with biological and physical scientists might also create opportunities to work with new and underexplored data sets in EJ research, such as soil surveys for lead or atmospheric dynamics for air pollution models. Conversely, knowledge about EJ theories, data, and methods could be crucial to a general understanding of patterns and processes of urban social–ecological systems over the long term.

Although our analytical framework can be useful for capturing dynamic interactions and social and environmental chains of explanation of the past and present (Figure 9), we propose that it could also be used to advance EJ as a forward-looking, actionable science that is concerned with producing just, sustainable, and resilient futures (Childers et al. 2015). The need for such an endeavor is not unique to Baltimore. Although the history of racial segregation and redlining is ubiquitous in many postindustrial cities, so is the desire to create more sustainable urban futures for all.

Finally, we propose that there is a need to systematically consider the long-term role and legacies of segregation of people and place to understand EJ for the past, present, and future. Patterns, processes,

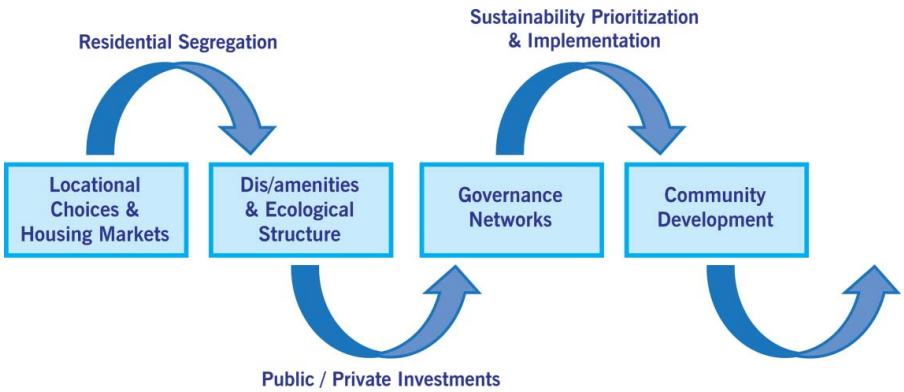

Figure 9. Patterns and processes of distributive and procedural justice contributing to historical and contemporary environmental injustices viewed through the dynamic heterogeneity framework. (Color figure available online.)

and systems of racial segregation have produced social and environmental places of environmental injustice that are different in type and not degree. Current urban ecological research often implicitly assumes "landscapes of choice," with households choosing where to live and how to manage their lands, unconstrained by biases of race, ethnicity, or religion. We propose, however, that there is also the need to understand and address the ecology of people and place where choice is not, or was not, present. We might call this an *ecology of segregation*. Understanding its people, place, legacies, and long-term dynamics might be crucial to achieving more sustainable and resilient cities.

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Notes

1. We note that other scholars have examined segregation in Baltimore and its relationships to public health (Roberts 2009; Markowitz and Rosner 2013), recreation (Wiltse 2007), policing (Alexander 2012), and government at federal and local levels as public actors in segregation (Rothstein 2017). These phenomena are critical to a systematic study of segregation and environmental justice.
2. For an assembly of HOLC maps for the United States, see Nelson et al. (n.d.).

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