Scientific Research Publishing

Current Urban Studies, 2024, 12, 267-281
https://www.scirp.org/journal/cus
ISSN Online: 2328-4919
ISSN Print: 2328-4900

Measuring and Improving Environmental Justice in the Urban Outdoors

Matthew Bingham[1], Jason Kinnell[1], Darrick Hamilton[2]

[1]Veritas Economics, Cary, North Carolina, USA
[2]Institute on Race, Power, and Political Economy, The New School, Manhattan, USA
Email: matthew.bingham@veritaseconomics.com

How to cite this paper: Bingham, M., Kinnell, J., & Hamilton, D. (2024). Measuring and Improving Environmental Justice in the Urban Outdoors. *Current Urban Studies, 12,* 267-281.
https://doi.org/10.4236/cus.2024.122013

Received: May 17, 2024
Accepted: June 25, 2024
Published: June 28, 2024

Abstract

This manuscript presents a comprehensive and flexible approach for quantitatively evaluating environmental justice in the provision of spatially distributed public goods. The approach is used to assess baseline spatial aspects of environmental justice in Hudson County, New Jersey and how it changes with the creation of a new park. The analysis quantitatively evaluates changes in environmental justice fusing a statistically estimated recreation preference function to a neighborhood-level, spatially-distributed population and set of parks. The reliance on a preference function estimated from behavioral data, application of preferences to quantify satisfaction, and explicit quantitative connection between the local population and recreation opportunities represent a significant improvement over the ad hoc and rule-of-thumb approaches that are currently common practice for evaluating environmental justice. Given the recognized importance of measuring outcome improvements, it is expected that the widespread application of this approach will ultimately lead to a general improvement in environmental justice.

Keywords

Environmental Justice, Urban, Outdoors, Recreation, Discrete Choice

1. Introduction

Outdoor recreation connects us with nature and each other, improves our physical and mental health, and supports community attractiveness and vitality. Given the importance of outdoor recreation to public wellbeing, and that parks are typically publicly funded, it is important that urban park systems are equitable. However, despite recent efforts, racial, ethnic, and income disadvantaged groups often have access to fewer parks of lower quality (Dai, 2011; Estabrooks et al., 2003; Harris et al., 2015; Nesbitt et al., 2019).

Efforts aiming to correct these imbalances confront a set of challenges. Funding is a clear obstacle. However, as described in Pellow's (2000) Environmental Inequality Formation perspective, environmental inequalities can emerge from more complex processes. Less obvious impediments include the dominance of advantaged groups in community engagements and difficulties in understanding the preferences of disadvantaged communities (Bullard, 1993). As described in the McGahey et al. (2023) evaluation of six municipality's racial equity impact assessments "societies measure what we value and value what we measure." Under this principle, both nonfinancial challenges can be addressed by the availability of a quantitative measurement technique that can consistently value the social welfare associated with a set of spatially distributed recreation opportunities across socioeconomic and demographic groupings.

This manuscript describes and implements an approach for spatially quantifying the value of urban recreation opportunities. The underlying valuation approach employs the economic concept of utility. Utility functions have mathematical properties which allow for an ordered ranking of value.[1] Other things equal, a larger park with more facilities delivers more value, and utility allows us to measure how much more value. In this manuscript, we employ the term value except when explicitly discussing mathematical functions where it is more conventional to use the term utility.

In the context of urban parks, other aspects are typically not equal because of location effects that lead to differential site access costs. This effect means that proximity to better sites leads to higher value and vice versa. The approach described here accounts for this consideration using the travel cost methodology. This technique considers the negative effect of travel distance along with other site attributes in estimating site value. In this framework, the total value of a set of urban parks differs across neighborhoods because the neighborhoods are different distances from the parks. This means that location aspects of environmental justice can be evaluated by neighborhood level value comparisons. Because socioeconomic and demographic makeup varies spatially, these location effects can also be evaluated over broader regions across income and race categories.

To demonstrate the approach, it is applied to Hudson County, New Jersey. Baseline utility is assessed for each of the 3121 populated census blocks in Hudson County, New Jersey. Environmental justice is assessed spatially. The spatial evaluation maps utility by block for the county and describes the distribution of per-trip value across blocks.

Following this baseline assessment, a counterfactual change case is evaluated. This counterfactual quantifies the value change and discusses the environmental justice implications of the new East Newark Riverfront Park. This park was de-

[1]The properties of a utility function include monotonicity, diminishing marginal utility, transitivity, completeness, continuity, and independence from irrelevant alternatives.

veloped as an offset for damages identified under Natural Resource Damage Assessment (NRDA) requirements (NOAA, 2024). The park is expected to improve environmental justice conditions in East Newark, New Jersey, which has limited access to public parks and green space (NJDEP, 2020). The environmental justice implications of this new park are evaluated by conducting comparisons of counterfactual value with the baseline value by census block as well as demographic categories.

Although this example is an important application, there are additional uses. Integrating spatial, socioeconomic, and demographic value calculations into urban outdoor recreation planning is the application that would likely have the most beneficial impact on disadvantaged communities. It is also useful for supporting private efforts, such as charitable activities where donors are interested in enhancing environmental justice. In addition, the National Environmental Policy Act (NEPA) requires evaluations of environmental justice for various "with project" conditions, and Executive Order 14096 charges each Federal agency to make achieving environmental justice part of its mission (NEPA, 2024). This includes projects as broad ranging as offshore wind development under the Bureau of Energy Management (BOEM) to remediation and restoration decisions under the United States Environmental Protection Agency (USEPA), the Department of the Interior's Fish and Wildlife Service, and the National Oceanic and Atmospheric Administration (NOAA). The baseline and counterfactual comparisons presented in this manuscript are consistent with NEPA's alternatives analysis requirement (USACE, 2016) and USEPA's *Guidelines for Preparing Economic Analysis* (USEPA, 2016a) *and Technical Guidance for Assessing Environmental Justice in Regulatory Analysis* (USEPA, 2016b). Moreover, the baseline and counterfactual comparisons represent an improvement over current approaches to measure changes in environmental justice.

The method described and applied here has numerous advantages over qualitative and ad hoc approaches. These advantages arise from the spatial connection of parks and neighborhoods using a recreation preference function, and the reliance on scientific survey research to develop the recreation preference function. The spatial representation relates all neighborhoods to all parks through the roads and sidewalks that connect them. When combined with a recreation preference function, this allows estimating value on a continuous scale at the neighborhood level. Doing so supports quantitative comparisons of outcomes across neighborhoods and groups, which is a major improvement over existing approaches. Whereas a rule of thumb may interpret a neighborhood having walking access to a park as an indicator of equity, the approach described here can identify value by neighborhood. This allows assessing environmental justice by, for example, quantitatively comparing the value of a park system to two neighborhoods, one with easy access to a single small park and the other with easy access to two larger and better equipped parks.

The other major advantage arises from the nature of the recreation preference function. In recreation planning, community preferences are often elicited through convenience surveys and community engagement. Without discounting the usefulness of these activities, it is recognized that they tend to overrepresent the interests of active citizens who are often members of more advantaged communities. In such cases, well-meaning outreach activities can slow and potentially subvert environmental justice aims.

The approach employed here uses a preference function that was estimated from scientifically collected survey data. Data from scientifically conducted surveys can be used to estimate preferences of different groups and to weight them by the geographic and demographic prevalence of those groups. This allows a spatial and demographic specific understanding of preferences, which can be weighted to local populations and circumvent the over reliance on preferences of already advantaged groups that hold more power in urban park decision-making.

2. Methods

In economic valuation it is common to transfer information from one study context to another. This practice is called benefits transfer and is described comprehensively in Johnston et al. (2015). Benefits transfers can be either value transfers or functional transfers. The approach applied here is a type of functional transfer in which an existing survey based statistical model is connected to the spatially and demographically explicit information available from the U.S. Census. This allows assessing baseline environmental justice and changes to environmental justice that accompany the development of a new park.

2.1. Statistical Model of Recreation Preferences

The statistical model of recreation preferences is estimated from survey data that characterizes outdoor recreation trips taken by a sample of recreators from five counties in New Jersey and is described in Kinnell et al. (2006). The survey data are from 358 recreators located in Bergen, Essex, Hudson, Passaic, and Union County, New Jersey who recorded 1499 outdoor recreation trips to 181 sites. For the statistical model, the data are augmented with site characteristics and distances from each of the 358 recreators to all 181 sites.

The data was collected using a telephone survey and a mail survey. The telephone survey began in May 2000. It asked the respondents questions regarding their outdoor recreation preferences, past visitation from the beginning of the year through the date of the screener and expected visitation through the end of the year. The screener served as a recruitment tool for mail survey participants and collected information for developing survey weights. Of 6312 telephone numbers for residential households, 4525 individuals were available to be interviewed and 2139 completed the screener. Of these approximately 76% (1629) indicated that they visit parks in New Jersey and 651 (39%) participated in the mail portion of the survey.

The mail portion of the survey collected information on the screened participants' June and July 2000 outdoor recreation trips. Of the 651 respondents who returned a mail questionnaire, 358 (56%) took trips in June and/or July and provided data on 1499 trips to 181 sites throughout New Jersey. The mail surveys collected actual trip data on outdoor recreation trips, including location visited, distance traveled, duration of the trip, and activities engaged in.

The underlying model used to estimate the recreational preference function is the conditional logit model. This model, introduced by Daniel McFadden in 1974, is used to explain the choices individuals make among a finite set of alternatives, based on the characteristics of the options and the individuals. Outdoor recreation applications are inherently spatial in that they must consider the travel costs of accessing recreation sites. These have been applied in a variety of contexts including recreational fishing (Bingham et al., 2011), beach visitation (Lew & Larsen, 2008), forest recreation (Agimass et al., 2017), and urban park visits as described in Kinnell et al. (2006) which is the model that is enhanced to evaluate environmental justice in this current application.

In the outdoor recreation context, the model estimates the probability of a survey respondent visiting each site based on the characteristics of the sites and distances from their home to each site. The utility index of site j for respondent i is expressed in Equation (1).

$$U_j^i = V_j^i + \varepsilon_j^i = X_j \beta + \varepsilon_j^i \quad (1)$$

In this expression, X is the matrix of data that represents sites and travel distances, and the vector β is a set of estimated coefficients. The error term represents unobserved factors and averages to zero. The dependent data are represented as [0 or 1] and grouped by choice occasions with a (1) for the site visited on a choice occasion and (0) for sites that weren't visited. The statistical model estimates coefficients for travel costs and park attributes that are consistent with the conditional logit mathematical structure in Equation (2) and best predict (i.e., maximizes the likelihood of observing) the trip data. As seen in Equation (2), the probability of visiting any site arises from the utility of that site divided by the total utility of all sites.

$$P_{ij} = \frac{\exp\left(V_j^i\right)}{\sum_{j=1}^{J} \exp\left(V_j^i\right)} \quad (2)$$

This process results in estimated coefficients (β) for distance and park attributes. Coefficients transferred from that model and descriptions are included in Table 1.

2.2. Baseline Environmental Justice

The term environmental justice was popularized when, in 1982, Warren County, the poorest county in North Carolina, was selected by the state as the location for a PCB landfill. Subsequent protests did not stop the landfill but did draw attention to the connections between poverty, race, and environmental conditions

Table 1. Statistical estimates of site attribute coefficients from Kinnell et al. (2006).

Variable	Variable Description	Coefficients
Recreator-Related Variables		
One-way distance	One-way distance traveled from recreator's home ZIP Code to recreation site	−0.11***
Site-Related Variables		
Acres	Recreation area acres	0.01***
Trails	Indicates trails present at site	0.99***
Trail miles	Trail mileage available at the site	0.02***
Picnic area	Indicates picnic area present at site	0.74***
Sports facilities	Indicates sports facilities (i.e., fields, basketball/tennis courts, etc.) present at site	0.43***
Swimming	Indicates swimming facilities available at site	0.14**
Boat launch	Indicates boat launch present at site	−0.04
Waterbody	Indicates waterbody (i.e., lake, river) present at site	0.83***
Bathrooms	Indicates bathroom facilities available at site	0.12
Playground	Indicates playground present at site	0.26**

*Significant at the 10% level; **Significant at the 5% level; ***Significant at the 1% level.

(Newkirk II, 2016). Quantitative relationships between race and proximity to toxic waste were demonstrated several years later (Commission for Racial Justice, 1987), and in 1992 the United States Environmental Protection Agency established the Office of Environmental Justice which intended to address environmental issues that affect poor and minority communities.

In recent characterizations, environmental justice refers to the fair treatment and meaningful involvement of all people, inclusive of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies (USEPA, 2024). It advocates for the fair distribution of environmental benefits and burdens across all communities and emphasizes the meaningful participation of all stakeholders in decision-making processes. Environmental justice also seeks to ensure that all members of society, "have equitable access to a healthy, sustainable, and resilient environment in which to live, play, work, learn, grow, worship, and engage in cultural and subsistence practices." (USEPA, 2024)

This effort adopts the perspective that in the provision of public goods, when one group is at a disadvantage, causing a relative improvement for the disadvantaged group is an improvement in fairness. Given the linkage between fair treatment and environmental justice, it follows that improvements in fairness result in improvements in environmental justice.

Measuring the value of spatially distributed public goods requires spatially explicit measures of value. Although site choice survey data and an estimated model, such as that of Section 2, can characterize the satisfaction of the surveyed individuals, this information generally cannot be directly used to evaluate value spatially. Although the data are suitable for estimating a preference function, they are not spatially representative because many neighborhoods and parks do not appear in the data used to estimate the statistical model.

For example, the data employed to estimate the preference function used here is from a sample of 358 recreators who recorded 1499 outdoor recreation trips to 181 sites. As seen in **Table 1**, this number of trips is sufficient for estimating a preference function with many significant coefficients. However, the 358 recreators are drawn from a population of 3.3 million people who live in thousands of different neighborhoods, and the 181 parks represent a small portion of more than 1000 parks in the study area.[2]

This shortcoming is addressed by conducting a geospatial fusion that connects the estimated preference function to the entire region of interest. Doing so requires collecting location and characteristic data for parks that could be visited by people who live in the modeled region. Although sites and their characteristics are sometimes available in inventories created by recreation professionals, this is not usually the case. Moreover, any area will contain multiple jurisdictions such as state, county, and local.

In addition to park information, the approach requires recreator origin and population information. Census designations are ideal for this. The smallest geographic areas defined by the United States Census Bureau are blocks. The primary reason for using blocks is that they allow the best spatial resolution. This is particularly important for urban parks where small scale distance is a critical feature of utility. Census block data carries the latitude and longitude of the centroid of the block. With this, and park latitude and longitude, travel distances are calculated from all origins to all parks.[3]

Census blocks vary in size and shape, but are designed to be relatively uniform in population size. Census blocks are delineated based on a variety of factors, including population density, physical features such as roads and bodies of water, and administrative boundaries. Although census blocks do not specifically represent neighborhoods, they often contain groups with similar preferences. Certain information, such as detailed income breakdowns, are not available at this level. However, it is possible to transfer information from higher levels down to census blocks.

Having park and distance information, it is possible to calculate the value of parks with and without consideration of their location. This assessment focuses on Hudson County, New Jersey. Considering county and local parks there are a total of 214 sites in the county. With notation for surveyed sites (j) changed to reflect all parks (p), the summed product of the site characteristics and coeffi-

[2]The sample of recreators was drawn from the population of Bergen, Essex, Hudson, Passaic, and Union Counties in New Jersey (Kinnell et al., 2006).

[3]For this application, PCMiler was used to calculate distances.

cients yields the utility for each site (U_p) independent of its location and can be calculated as in Equation (3).

$$U_p = \exp\left(V_p\right) \tag{3}$$

The results for each modeled park are depicted in Figure 1. In this figure, the size of the circle indicates its quality based on the site-related attributes of Table 1. For example, the largest circle represents Lincoln Park in Jersey City, which has 273 acres, 6.8 miles of trails, sports facilities, a waterbody, bathrooms, and playgrounds. There are many low value parks, indicated by little circles. These are typically small acreage open spaces without any facilities or water.

Parks provide value based on both their quality and location. Given the quality of parks and locations of recreators, the disutility of distance for each block and park is added to get the distance adjusted utility for each block. Replacing the i with b to represent the shift from surveyed individuals to blocks, and summing over all parks returns a single number representing the utility of all parks for each block.

$$\sum_{p=1}^{P} \exp\left(V_p^b\right) \tag{4}$$

Figure 2 depicts the relative per-trip value for census blocks in Hudson County. The value is made relative by dividing the results of Equation (4) by the maximum of Equation (4). In Figure 2, the darkest blocks receive the highest per-trip value from park visits. Lighter shading indicates less relative value. As this figure indicates, value is highest in the center of the county. Values are scaled by dividing by the highest value so that the highest value block receives one hundred percent value. The lowest value block receives approximately 13 percent of the per-trip value received by the block with the highest value.

2.3. Environmental Justice from East Newark Riverfront Park

Under Executive Order (EO) 14008, federal agencies are required to consider actions to address disproportionately high and adverse health, environmental, climate, and other cumulative impacts on disadvantaged communities. These agencies include federal trustees who are parties to National Resource Damage (NRD) claims.[4] Under the Comprehensive Environmental Response, Compensation, and Liability Act, 42 *U.S.C.* § 9601, et seq., responsible parties are required to restore offset losses. EO 14008 requires that environmental justice should be considered when conducting settling and crediting activities for Natural Resource Damage Assessments (NRDA).

A 2020 New Jersey Department of Environmental Protection (NJDEP) report that evaluates Environmental Justice communities identifies 3,154 Census block groups with at least 35 percent of households classified as low income, or at least 40 percent minority, or at least 40 percent having limited English proficiency. East Newark is noted as having 100 percent of its population meeting the low

[4]NRD claims arise from environmental damages.

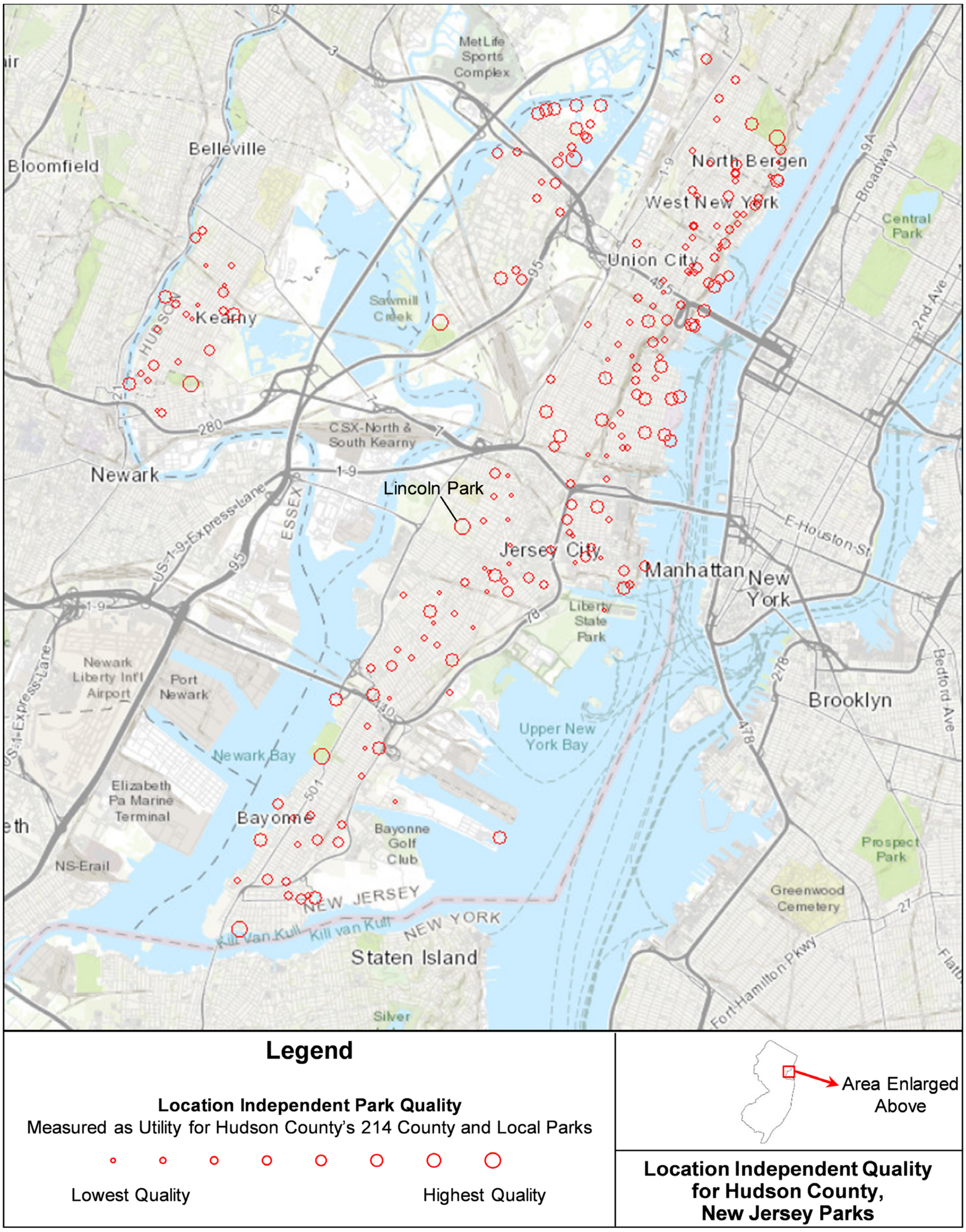

Figure 1. Location independent park quality.

income criteria and 100 percent of its population meeting the minority criteria, resulting in New Jersey designating East Newark as an Environmental Justice Community (NJDEP, 2020).[5]

In July of 2022, the U.S. Department of Justice finalized an agreement with the

[5]Table 1, Page 30 (NJDEP, 2020).

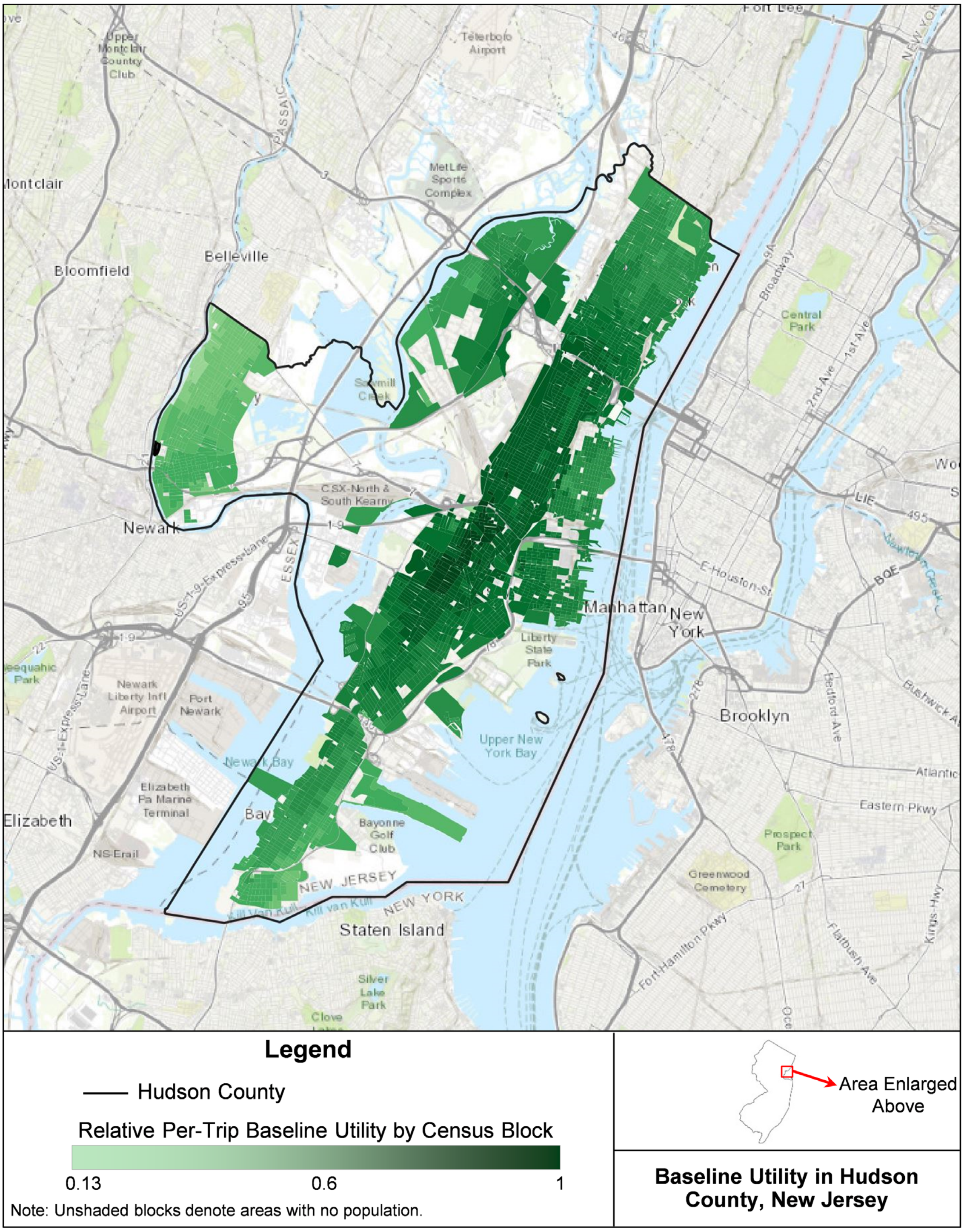

Figure 2. Relative per-trip baseline utility by census block.

BASF Corporation (BASF) to settle part of the damages from the Diamond Alkali Superfund Site and the Berry's Creek Study Area (NOAA, 2024). The agreement includes the creation of a five-acre park along the shoreline of the Passaic River in East Newark. East Newark Riverfront Park will include walking paths, forested areas, pollinator gardens, a wetland, and green spaces for recreation.

The project announcement notes that New Jersey has designated East Newark as an Environmental Justice Community. It also states that East Newark has very limited access to public parks and open greenspace options, has insufficient tree canopy and areas where the public can walk or bike, and that correcting such disparities is the goal of environmental justice. An additional notable feature of this project is that it is being developed before remediation is complete (Federal Register, 2022). Although accelerating restoration activities in this manner has recognized advantages, these benefits have historically been challenging to realize (Goldsmith, 2023; Stahl et al., 2023).

The environmental justice implications of East Newark Riverfront Park can be evaluated by conducting counterfactual simulations with the park added to the set of parks from which recreators choose. This is accomplished by adding East Newark Riverfront Park to the model, identifying its appropriate geographic location, and specifying its attributes: five acres, a quarter mile of trails, a picnic area, sport facilities, a waterbody, bathrooms, and a playground.

Environmental justice can be evaluated spatially through the block level value changes.[6] These are depicted in **Figure 3**. Comparing **Figure 2** and **Figure 3** indicates the degree to which previously disadvantaged areas are being improved by the addition of East Newark Riverfront Park. As seen in **Figure 2**, the area near the new park historically has urban park-related value that is among the lowest in Hudson County. **Figure 3** shows that the Census blocks near the park have the highest value improvements. The value changes presented in **Figure 3** are percentage improvements relative to baseline and range from about one percent (lightest yellow) to six percent (darkest brown). Comparing **Figure 2** and **Figure 3** indicates that areas that previously had low value are seeing it improved.

Direct evaluation of location effects in East Newark is possible by comparing value in baseline to counterfactual value. To evaluate value change by demographics, the per-trip value by block is multiplied by demographic membership by block and then divided by the sum of total per-trip value for blocks in East Newark, resulting in the percent of the total value change in East Newark by demographic group. **Table 2** summarizes these results by the US Census' demographic groups.

3. Conclusion

Certain communities have historically been more subject to the negative impacts of environmental degradation and less likely to receive the benefits of environmental improvements (Banzhaf, 2012). These communities are often lower income and composed of historically disadvantaged demographic groups. Environmental justice, which seeks more equitable outcomes, is an important moral

[6]Changes here are evaluated at the census block level which has many advantages over ZIP Code level analysis. The term ZIP Code is commonly used in place of location, and we believe that is the case with Executive Order 14008.

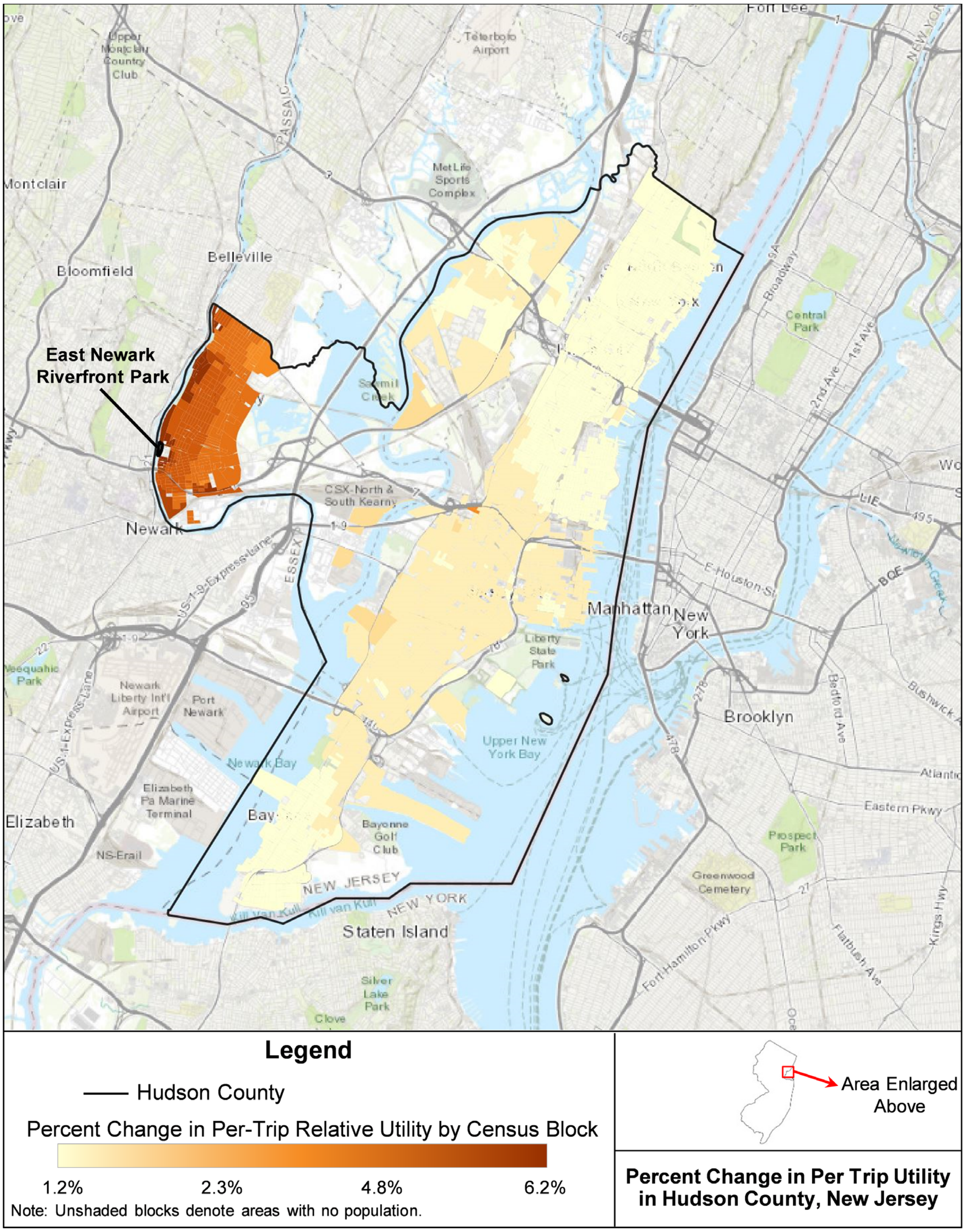

Figure 3. Percentage change in per-trip utility.

and policy objective. The availability of objective, transparent, and sophisticated methods for quantifying environmental justice is important for improving the situation (Perry & Hamilton, 2021).

Outdoor recreation opportunities are critical for urban community wellbeing and a relative lack of them in disadvantaged communities is an important

Table 2. Percent of total value change by group.

Demographic Group	Percent
American Indian and Alaska Native	0
Asian	9.96
African American	2.12
Hispanic or Latino	62.33
Native Hawaiian and Other Pacific Islander	0
White	19.70

environmental justice concern. However, the ability to improve the environmental justice of urban parks is limited by a lack of high quality techniques for measuring and comparing the quality of urban recreation opportunities for different neighborhoods. This manuscript describes and applies a spatially explicit, utility consistent approach for calculating the per-trip value of park opportunities at the census block level.

Although the technique that is described and implemented here is already an important improvement over extant qualitative and ad hoc approaches, many additional extensions are available. Potential expansions include considering population sizes and trip frequencies rather than focusing on per-trip measures, including efficiency considerations such as those evaluated in Kinnell et al. (2006), and developing more detailed preference functions.

Considering the latter, this manuscript employed a single recreation preference function that does not consider the mode of travel or varying preferences. Modeling mode of travel would allow considering the implications of walkability and mass transit for utility. An interacted preference function would allow a deeper understanding of preferences by group.

Although the data underlying this effort arose from survey subjects' recorded behaviors, it is sometimes advantageous to elicit behaviors under hypothetical conditions. This is typically less expensive, and it also allows for evaluating park features that do not already occur in the geographic area being evaluated. Using this technique, it is possible to calculate preferences for specific market segments and park attributes, allowing much finer distinctions that could recognize, for example, the preferences of different market segments for different activities.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

Agimass, F., Lundhede, T., Panduro, T. E., & Jacobsen, J. B. (2017). The Choice of Forest Site for Recreation: A Revealed Preference Analysis Using Spatial Data. *Ecosystem Services, 31,* 445-454. https://doi.org/10.1016/j.ecoser.2017.11.016

Banzhaf, S. (2012). *The Political Economy of Environmental Justice.* Stanford University Press.

Bingham, M. F., Li, Z., Mathews, K. E., Spagnardi, C. M., Whaley, J. S., Veale, S. G. et al. (2011). An Application of Behavioral Modeling to Characterize Urban Angling Decisions and Values. *North American Journal of Fisheries Management, 31,* 257-268. https://doi.org/10.1080/02755947.2011.571483

Bullard, R. D. (1993). *Confronting Environmental Racism: Voices from the Grassroots.* South End Press.

Commission for Racial Justice, United Church of Christ (1987). *Toxic Wastes and Race in the United States: A National Report on the Racial and Socio-Economic Characteristics of Communities with Hazardous Waste Sites.*

Dai, D. (2011) Racial/ethnic and Socioeconomic Disparities in Urban Green Space Accessibility: Where to Intervene? *Landscape and Urban Planning, 102,* 234-244. https://doi.org/10.1016/j.landurbplan.2011.05.002

Estabrooks, P. A., Lee, R. E., & Gyurcsik, N. C. (2003). Resources for Physical Activity Participation: Does Availability and Accessibility Differ by Neighborhood Socioeconomic Status? *Annals of Behavioral Medicine, 25,* 100-104. https://doi.org/10.1207/s15324796abm2502_05

Federal Register (2022). *Notice of Proposed Interim Settlement and Crediting Agreement Under Comprehensive Environmental Response, Compensation, and Liability Act.* https://www.federalregister.gov/documents/2022/06/07/2022-12154/notice-of-proposed-interim-settlement-and-crediting-agreement-under-comprehensive-environmental

Goldsmith, B. J. (2023). *New Ways to Look at PFAS and Climate Issues: Innovative Best Practice Frameworks for Lawyers and Other Practitioners.* American Bar Association.

Harris, C. D., Paul, P., Zhang, X., & Fulton, J. E. (2015). Park Access among School-Age Youth in the United States. *Journal of Physical Activity and Health, 12,* S94-S101. https://doi.org/10.1123/jpah.2015-0119

Johnston, R. J., Rolfe, J., Rosenberger, R. S., & Brouwer, R. (2015). *Benefit Transfer of Environmental and Resource Values: A Guide for Researchers and Practitioners.* Springer

Kinnell, J. C., Bingham, M. F., Mohamed, A. F., Desvousges, W. H., Kiler, T. B., Hastings, E. K. et al. (2006). Estimating Site Choice Decisions for Urban Recreators. *Land Economics, 82,* 257-272. https://doi.org/10.3368/le.82.2.257

Lew, D. K., & Larson, D. M. (2008). Valuing a Beach Day with a Repeated Nested Logit Model of Participation, Site Choice, and Stochastic Time Value. *Marine Resource Economics, 23,* 233-252. https://doi.org/10.1086/mre.23.3.42629616

McGahey, R., de Souza Briggs, X., Treuhaft, S., & Sherman, J. (2023). *Measuring What Matters for Racial Progress: Local and State Innovation in Racial Equity Impact Assessment.* https://racepowerpolicy.org/measuring-what-matters/

National Environmental Policy Act (NEPA) (2024). *Environmental Justice.* https://ceq.doe.gov/nepa-practice/justice.html

National Oceanic and Atmospheric Administration (NOAA) (2024). *New East Newark Riverfront Park Restoration Project.* https://darrp.noaa.gov/EastNewarkRiverfrontPark

Nesbitt, L., Meitner, M. J., Girling, C., & Sheppard, S. R. J. (2019). Urban Green Equity on the Ground: Practice-Based Models of Urban Green Equity in Three Multicultural Cities. *Urban Forestry & Urban Greening, 44,* Article ID: 126433. https://doi.org/10.1016/j.ufug.2019.126433

New Jersey Department of Environmental Protection (NJDEP) (2020). *Furthering the Promise: A Guidance Document for Furthering Environmental Justice.*

Newkirk II, V. R. (2016). *Fighting Environmental Racism in North Carolina.* The New Yorker.

Pellow, D. N. (2000). Environmental Inequality Formation. *American Behavioral Scientist, 43,* 581-601. https://doi.org/10.1177/0002764200043004004

Perry, A., & Hamilton, D. (2021). *Just as We Score Policies' Budget Impact, We Should Score for Racial Equity as Well.* Brookings.

Stahl, R. G., Martin, J., Tomasi, T., & Goldsmith, B. J. (2023). If Coordination of Remediation and Restoration under CERCLA Is Such a Good Idea, Why Is It Not Practiced More Widely? *Journal of Environmental Management, 340,* Article ID: 117964. https://doi.org/10.1016/j.jenvman.2023.117964

United States Army Corps of Engineers (USACE) (2016). *Alternatives Analysis Framework. Portland District.* https://www.nws.usace.army.mil/Portals/27/docs/regulatory/Forms/Alternative%20Analysis%20Framework%20NWS%20(4-18-16).pdf?ver=2016-06-07-111159-147

United States Environmental Protection Agency (USEPA) (2024). *Environmental Justice.* https://www.epa.gov/environmentaljustice

United States Environmental Protection Agency (USEPA) (2016a). *Guidelines for Preparing Economic Analyses*. https://www.epa.gov/environmental-economics/guidelines-preparing-economic-analyses#new

United States Environmental Protection Agency (USEPA) (2016b). *Technical Guidance for Assessing Environmental Justice in Regulatory Analysis*.