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Case Study

City of Atlanta Parks and Recreation Equity Data Tool: A Decision-Making Tool for Prioritizing Parks, Recreation Centers, and Neighborhoods with the Greatest Need

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In the United States today, zip code is the single greatest predictor of life expectancy. Neighborhood disparities contribute to babies being born just miles apart within the City of Atlanta with life expectancy differences of up to a 23-years (Arias et. al, 2018). Life expectancy is contingent on a wide variety of physical, social and behavioral factors. One of the most important behavior determinants of health is physical activity. Physical activity can reduce risk of coronary heart disease, hypertension, colon cancer, diabetes, and obesity (Warburton et al., 2006). Researchers have shown that moderate to severe obesity may reduce life-expectancy by three to 10 years (Prospective Studies Collaboration et al., 2009). However, behaviors are modifiable by physical factors, such as when people have increased access to parks and greenspaces, they are more likely to walk and engage in physical activity, thereby reducing their risk for obesity and other associated health outcomes (Centers for Disease Control and Prevention, 2021). Atlanta's Department of Parks and Recreation (DPR) Commissioner, John Dargle, Jr., recognized this reality and made improvements to citywide health equity a central piece of DPR's 10-year comprehensive master plan, *ActivateATL: Recreation and Parks for All*. *ActivateATL* is aimed at increasing access to exceptional recreational programming, fostering community connections to nature through parks and trails, and ultimately, improving the health, happiness, and resilience of all Atlantans, in all neighborhoods. To identify these inequities, monitor and evaluate progress, the Atlanta DPR Department partnered with Bloomberg Associates to develop a first-of-its-kind parks and recreation equity data tool.

The data tool is designed to measure health equity across Atlanta by each individual park and recreation center, census tract, and maintenance district. A total of 375 parks and 19 recreation centers are included in the data tool. The objectives of the tool are to (a) prioritize parks, recreation centers, and the surrounding neighborhoods with the greatest need for park investment and capital improvement in the DPR 10-year comprehensive master plan, *ActivateATL*, (b) track improvements in park and recreation conditions, community perceptions of Atlanta parks, life expectancy, and neighborhood determinants of health, and (c) link parks and recreation and the health benefits they offer to citywide equity and life expectancy, with the longer-term goal of helping to decrease disparities among Atlanta neighborhoods.

Atlanta's DPR, in collaboration with other city agencies, nonprofit partners, and the general public, can use this data-driven tool to make evidence-based decisions that improve Atlanta's extensive parks and recreation system in the areas that need it most, therefore improving health equity and outcomes over time.

Background

The Atlanta metropolitan area is home to over 10 million people with more than 500,000 residents living within the city limits themselves (U.S. Census Bureau, 2019). Atlanta is demographically diverse, comprising of Black (50%), White (38%), and Hispanic (8%) racial and ethnic groups (U.S. Census Bureau, 2019). Though one of the largest metropolitan cities in the southern United States, Atlanta is known for its unique and expansive urban greenspace.

Atlanta's defining natural feature is its forest, renowned for the expansive tree canopy and the verdant wilderness that inhabits it. Atlanta has been known as the "City in the Forest" for more than 80 years and was named the 'most livable' city, per GeoTab's 2019 report, "Urban Footprint: The Allocation of Space in U.S. Cities", due to Atlanta boasting more greenspace per resident than any other major U.S. city —with 17.8 square miles of greenspace, each Atlanta resident could theoretically use their own 1,023 square feet slice of parks, forests, and other greenery within the city limits (Keenan, 2019). With nearly 48% of the total land area covered in tree canopy, Atlanta has the largest urban tree canopy of any significant U.S. city and one of the largest across the entire United States (Keenan, 2019).

However, despite Atlanta being known for its green assets, there are still many disparities in the quality of greenspaces and non-motorized access to public park spaces. Many of these disparities can be traced back to neighborhood, zip code or geography. For example, dozens of neighborhoods lack a park or recreation center within a 10-minute walk, regardless of Atlanta's Parks and Recreation system including over 400 greenspaces and 27 recreation centers spread across the city, including the flagship Frederick Law Olmsted designed Piedmont Park, the Beltline and the new Westside Quarry Park, among others. Moreover, many neighborhoods do not have safe pedestrian routes connecting public parks, forcing residents to drive, which pits healthy physical activity opportunities against the risk of road accidents and injury.

After evaluating a wide variety of neighborhood determinants of health across the city, it was clear that access to greenspace was not the sole health equity issue. Neighborhoods across Atlanta differ widely in determinants of health and related health outcomes, including overall life expectancy. For example, physical inactivity ranges from 10% to 46% and obesity prevalence ranges from 16% to 44% across Atlanta neighborhoods, (Department of Population Health, NYU Langone Health, 2021).

Methodology

The creation of the parks and recreation equity data tool began with a scan of parks' equity plans from other peer cities across the United States. The plans evaluated included those from Miami-Dade, Boston, New York City, Seattle, East Los Angeles, Pittsburgh, Denver, Raleigh, and Minneapolis. Reviewing each of these plans was essential to better understanding which methodologies were most often employed and to evaluate trends in the types of data typically included in park plans, to help guide our decision-making for developing the park and recreation equity data tool methodology. We also conducted a literature review and consulted with six different parks and health experts from the Centers for Disease Control and Prevention (CDC), Georgia Institute of Technology, and Emory University in Atlanta, Georgia to validate our methodology and to gather additional insights about what data would be

most useful for linking parks and recreation to health equity. In each consultation, we asked the subject-matter experts to review our methodology and selected indicators. We then asked for feedback regarding the indicators that were most critical to measure in order to determine citywide parks and health equity based on their evidence-based opinions, and their rationale. These consultations were conducted individually through online video conferencing for the duration of one hour each. We also solicited feedback in identifying additional indicators that were not presented in the initial list and talked through data collection strategies and challenges that may limit our measurements.

The data tool included six different categories of scored information: park conditions and funding, recreation center conditions and funding, level of service, community need, maintenance funding, and community perspectives. Each category was comprised of many different composite indicators and data. For a full list of composite indicators, see Table 1 below.

The indicators were made of various pieces of data, each stemming from different sources. Data sources included DPR-collected data, American Community Survey data, Georgia Electronic Accident Reporting System (GEARS), and other publicly available data, as seen in Table 1.

Table 1. A Breakdown of Data included in the Methodology

Park Conditions and Funding Score	**Data Included**	**Geographic Level**	**Data Source**	**Temporal Year**
Access and Visibility	ADA Compliance	Park Level	DPR	2020
	Visibility from a Distance	Park Level	DPR	2020
Comfort and Image	Cleanliness/overall quality of maintenance (Exterior Site)	Park Level	DPR	2020
	Protection from bad weather	Park Level	DPR	2020
	Condition and Effectiveness of any Equipment or Operating Systems	Park Level	DPR	2020
Park Programming and Activities	Mix of uses/ things to do	Park Level	DPR	2020
	Ability of facility to effectively support current organized programming	Park Level	DPR	2020
Environmental Sustainability	Stormwater Management	Park Level	DPR	2020
Linkages and Location	Multi-modal Capacity	Park Level	DPR	2020
Park Funding	Public capital improvement funding	Park Level	DPR	2015-2020
	Private capital improvement and maintenance funding	Park Level	Private/ philanthropic donors	2015-2020
Recreation Conditions and Funding Score	**Data Included**	**Geographic Level**	**DataSource**	**Temporal Year**
Recreation Conditions	Aesthetics	Rec Level	DPR	2020
	Clarity of Entry	Rec Level	DPR	2020

	Interior Finishes	Rec Level	DPR	2020
	Functioning Dimensions	Rec Level	DPR	2020
	Building Structure	Rec Level	DPR	2020
Recreation Funding	Public capital improvement funding	Rec Level	DPR	2015-2020
	Private capital improvement and maintenance funding	Rec Level	DPR	2015-2020
Level of Service Score	**Data Included**	**Geographic Level**	**Data Source**	**Temporal Year**
Access Level of Service	Census tract area	Census tract	American Community Survey	2014-2018 5-Year ACS
	Area of geographic access	Census tract	ActivateATL Analysis	2020
	Percentage of greenspace access	Census tract	ActivateATL Analysis	2020
Acreage Level of Service	Census tract area	Census tract	American Community Survey	2014-2018 5-Year ACS
	Greenspace area	Census tract	DPR, Atlanta Regional Commission, Dekalb County	2020
	Percent greenspace	Census tract	ActivateATL Analysis	2020
	Population	Census tract	American Community Survey	2018
Community Need Score	**Data Included**	**Geographic Level**	**DataSource**	**Temporal Year**
Concentration of Vulnerable Age Groups	Adults age 65 and older	Census tract	American Community Survey	2018
	Children age 5 and younger	Census tract	American Community Survey	2018
Racial and Ethnic Diversity	Racial and ethnic diversity	Census tract	American Community Survey	2020
Income and Educational Disparities	High school completion	Census tract	American Community Survey	2018

	School enrollment	Census tract	American Community Survey	2018
	Income inequality	Census tract	American Community Survey	2018
Vulnerable Housing Conditions	Housing values	Census tract	American Community Survey	2018
	Housing unaffordability	Census tract	American Community Survey	2018
	Gross rent above $1,500	Census tract	American Community Survey	2018
	Household income under $25,000	Census tract	American Community Survey	2018
Violent Crime/Safety Incidents	Violent crime	Data points	Atlanta Police Department	2020
Transportation Environments	Vehicle only involved accidents	Data points	Georgia Electronic Accident Reporting System (GEARS)	2020
	Bicycle involved accidents	Data points	Georgia Electronic Accident Reporting System (GEARS)	2020
	Pedestrian involved accidents	Data points	Georgia Electronic Accident Reporting System (GEARS)	2020
Environmental Health	Lead exposure	Census tract	American Community Survey	2018
	Particulate matter exposure	Census tract	Community Multiscale Air Quality model, US Environmental Protection Agency	2016
Street Connectivity	Walk Score	Neighborhood	Redfin Real Estate in Atlanta	2013
	Bike Score	Neighborhood	Redfin Real Estate in Atlanta	2013
	Transit Score	Neighborhood	Redfin Real Estate in Atlanta	2013
	Concentration of sidewalks (near parks and rec centers)	Data points	Atlanta City Planning	2020

Food Environment	Farmer's market	Data points	USDA	2019
	Grocery retail locations	Data points	Nielsen TDLinx	2016
	Low USDA food access	Data points	USDA	2015
Life Expectancy	Life expectancy	Census tract	National Center for Health Statistics	2018
Maintenance Level Score	**Data Included**	**Geographic Level**	**DataSource**	**Temporal Year**
Maintenance Funding	Public maintenance funding	Maintenance district	DPR	2015-2020
Community Perceptions	Park and recreation needs	Maintenance district	DPR	2020
	Reasons discouraging use of parks	Maintenance district	DPR	2020
	Quality of parks and recreation activities and events	Maintenance district	DPR	2020
	Physical condition of parks and recreation	Maintenance district	DPR	2020
	Greatest park concerns	Maintenance district	DPR	2020

Scoring System

One of the outputs of this methodology is that we were able to evaluate parks, recreation centers, and their surrounding neighborhoods by scoring them based on relative need, as compared to the rest of the City of Atlanta. In order to develop the scoring system, all of the raw data used in the tool was normalized. Each of the pieces of data were normalized to fit a scale between one and five (one indicating the lowest exposure or vulnerability, five indicating the highest exposure or vulnerability) then weighted depending on the scoring category the data resided in. A normalization formula was used in Microsoft Excel to normalize the raw data to fit the scoring system. The full breakdown of scores can be seen in Table 2.

After all data was normalized, scores for each category were added together and assigned to their specific park or recreation center. For a park or recreation center, scores could range from 1 (lowest need) to 300 (highest need).

Each scoring category was weighted differently depending on what DPR staff identified as most critical for improving park access, use, and life expectancy. To assign the level of scores for service, community need, community perspective and maintenance funding to specific parks and recreation centers, table joins and spatial joins were conducted using the online version of ArcGIS. The table join function combined data between two datasets that included one or more of the exact pieces of data, whereas a spatial join could combine data based on location. Therefore, the park or recreation center is assigned an individual park or recreation center level score and scores within larger geographic contexts such as census tract and maintenance district levels. For parks that fall across multiple census tracts, the parks were included in the census tract scores where their centroid was located. Life expectancy was calculated using the U.S. Small-area Life Expectancy Estimates Project (USALEEP) data, which looked at individual census tracts.

Table 2. Park and Rec Need Scores

Park Need Score		
Total Score	300 pts (1 indicating lowest need, 300 indicating greatest need)	
Breakdown of Scores		
Park Conditions and Funding Score	100 pts	50 pts: Park conditions 50 pts: Funding
Level of Service Score	100 pts	50 pts: Access level of service 50 pts: Acreage level of service
Community Need Score	50 pts	5 pts: Concentration of vulnerable age groups 5 pts: Racial and ethnic diversity 5 pts: Income and educational disparities 5 pts: Vulnerable housing conditions 5 pts: Level of public safety 5 pts: Transportation environments 5 pts: Environmental health 5 pts: Street connectivity 5 pts: Food environment 5 pts: Life expectancy
Community Perspectives Score	25	5 pts: Park and recreation needs 5 pts: Reasons discouraging use of parks 5 pts: Quality of parks and recreation activities and events 5 pts: Physical condition of parks and recreation 5 pts: Greatest park concerns
Maintenance Funding Score	25	5 pts: Maintenance costs * All scores were multiplied by 5
Recreation Center Need Score		
Total Score	300 pts (1 indicating lowest need, 300 indicating greatest need)	
Breakdown of Scores		
Rec Conditions and Funding Score	100 pts	50 pts: Rec conditions 50 pts: Funding
Level of Service Score	100 pts	50 pts: Access level of service 50 pts: Acreage level of service
Community Need Score	50 pts	5 pts: Concentration of vulnerable age groups 5 pts: Racial and ethnic diversity 5 pts: Income and educational disparities 5 pts: Vulnerable housing conditions 5 pts: Level of public safety 5 pts: Transportation environments 5 pts: Environmental health 5 pts: Street connectivity 5 pts: Food environment 5 pts: Life expectancy

Community Perspectives Score	25	5 pts: Park and recreation needs 5 pts: Reasons discouraging use of parks 5 pts: Quality of parks and recreation activities and events 5 pts: Physical condition of parks and recreation 5 pts: Greatest park concerns
Maintenance Funding Score	25	5 pts: Maintenance costs * All scores were multiplied by 5

Mapping the Scores

The maps in the data tool were produced using data from these datasets which were downloaded as CSV files into Microsoft Excel,. To visualize the data on different geographic levels, layers for the Atlanta census tract boundaries, park and recreation centers, and maintenance districts were uploaded onto ArcGIS Online, the online mapping software used to analyze and visualize all data and scores in this methodology.

Atlanta Parks Map and Atlanta Recreation Center Map

The Atlanta Parks map shows a total 'need' score for each of the evaluated parks across Atlanta. The map also shows the scores for all five of the scoring categories (park conditions and funding, community need, level of service, community perspectives, and maintenance funding).

Community Need Map

The Community Need map scores our operationalized definition of community need for each Atlanta census tract. Community need was evaluated by adding the scores of 10 composite indicators that were used to measure a number of neighborhood social and environmental determinants of health. It also includes life expectancy as a measure of comparison for overall community health equity.

Level of Service Map

The Level of Service map shows level of service scores for each of Atlanta's census tracts. Level of service was scored by evaluating access to greenspace and greenspace acreage by census tract.

Health Map

The Health map includes life expectancy data from the National Center for Health Statistics and data for 12 health outcomes and 4 health behaviors from the CDC 500 cities tool which is comprised of BRRFS data from 2017.

Community Perceptions Map

This map illustrates a representative sample of Atlantans' perspectives of their parks and recreation system by maintenance district. Atlantans' perspectives were evaluated through a statistically valid survey disseminated to Atlanta residents in 2020 where questions regarding their use and perceptions of the park and recreation system were evaluated. Five illustrative questions from the survey were included in the community perception scores.

Maintenance Funding Map

The Maintenance Funding map shows differences in public maintenance funding from 2015 to 2020 by maintenance district.

Developing the Tool

The parks and recreation equity data tool was comprised of seven maps (Atlanta parks map, Atlanta recreation centers map, level of service map, community need map, community perspectives map, maintenance funding map, and health map), in which six of the maps stemmed from the six scoring categories in Table 1. The data included in the health map were not used in the scoring methodology, but it was included as a tool to compare differences in health outcomes in relation to parks and recreation locations and to track and measure long-term progress over time. The health map included 15 health outcomes and behaviors and is utilized to evaluate differences in health across Atlanta neighborhoods and to also make connections between how the indicators in each of the scoring categories might contribute to health trends and disparities across the city.

Findings & Conclusion

This scoring and mapping methodology was designed to meet the needs of Atlanta's Parks and Recreation Department to facilitate data collection and decision making about investing in parks and recreation centers to improve health outcomes and health equity citywide. The broad approach can be replicated in any context by utilizing a similar set of indicators and adjusting the weighting accordingly. The mapping looked at a wide variety of physical and social determinants of health by census tract and compared them to parks and recreation condition and health outcomes, including life expectancy.

Total need scores across Atlanta ranged from a low need of 90 (Piedmont Park) to a high need of 242 (Coventry Station Park). As hypothesized, many of the higher need scores across all categories were found in historically marginalized neighborhoods, clustered mostly in the southeast and southwest of the city. However, there were several surprises as wealthier neighborhoods such as Buckhead showed a diverse range of needs and disparities throughout, and scores did not always fall into the lowest

need tercile or consistently show the best health outcomes. Greenspace acreage and level of service in some of the most privileged parts of Buckhead showed a need in the middle or upper tercile compared to the rest of the city in several census tracts. Higher life expectancy largely correlated with lower need scores, however, reflecting the complex range of neighborhood factors influencing overall health, wellbeing and lifespan.

As a result of the parks and recreation equity data tool, DPR is now able to more equitably make data-driven decisions about which parks and recreation centers to prioritize for funding and investments in their 10-year comprehensive master plan. Additionally, we have trained DPR staff on using the data tool to explicitly consider the environmental and social determinants of health and the disparities across the neighborhoods surrounding parks and recreation centers throughout the City of Atlanta, with a goal of targeting improvements in those upstream factors with specific strategies and interagency partnerships. They will use the tool to track their master plan implementation progress, to measure and evaluate access to greenspace and the ways that park and recreation actions and investment can improve citywide equity.

We hosted data tool trainings for many nonprofit partner parks groups, grassroots organizations, the mayor's office and several other City of Atlanta agencies. The Equity and Inclusion Office, the Director of Sustainability, the Department of City Planning, Watershed, Public Works and Transportation have all been supportive collaborators throughout the process and many of them intend to add data and utilize the data tool themselves to pinpoint the areas with the greatest need for health promoting actions through their agency programs.

Over time, we hope that this helps the city move closer to their goal of identifying historic inequities, decreasing place-based disparities and eventually, bringing greater health equity to Atlantans, regardless of race, background, age or zip code.

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Author Contributions

Conceptualization, D.S. and G.S.; Methodology D.S. and G.S.; Investigation D.S. and G.S.; Writing – Original Draft, D.S., Writing – Review & Editing, G.S.

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Appendix

Figure 1

ATL Rec Center Need Scores

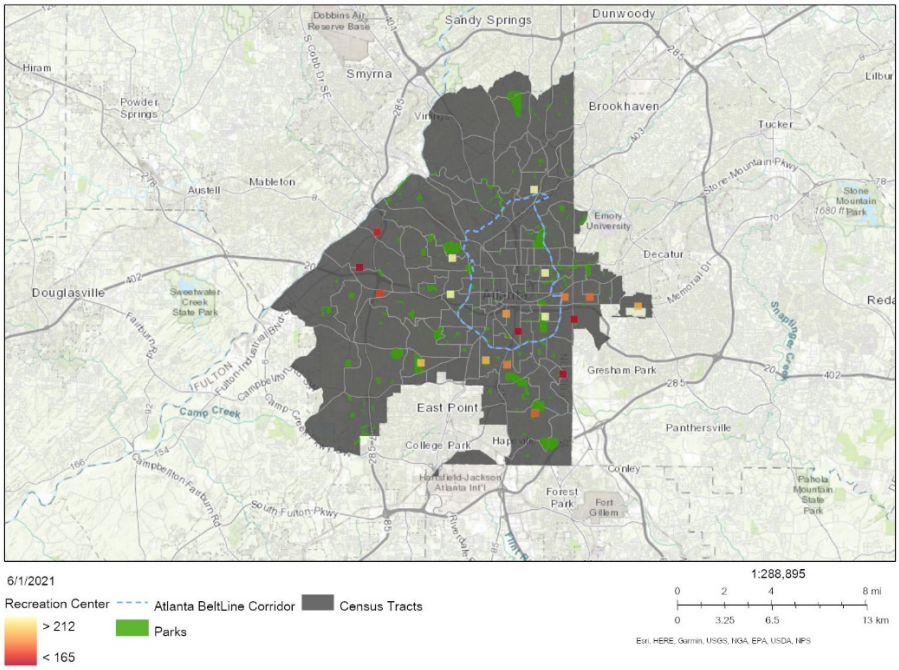

Figure 2

Community Perceptions by Maintenance District

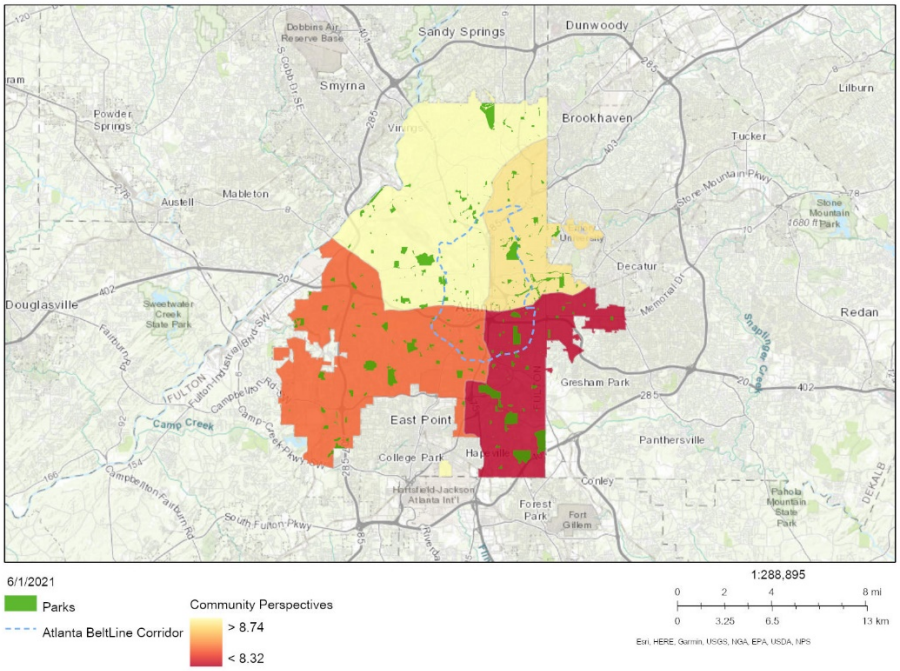

Figure 3

Level of Service Need Score

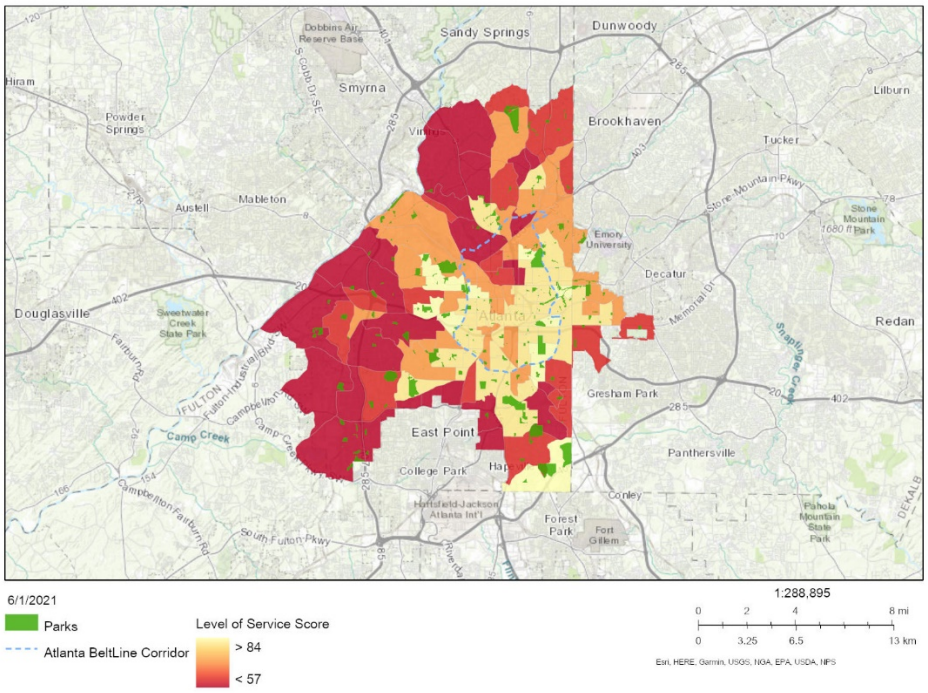

Figure 4

Maintenance Funding by Maintenance District

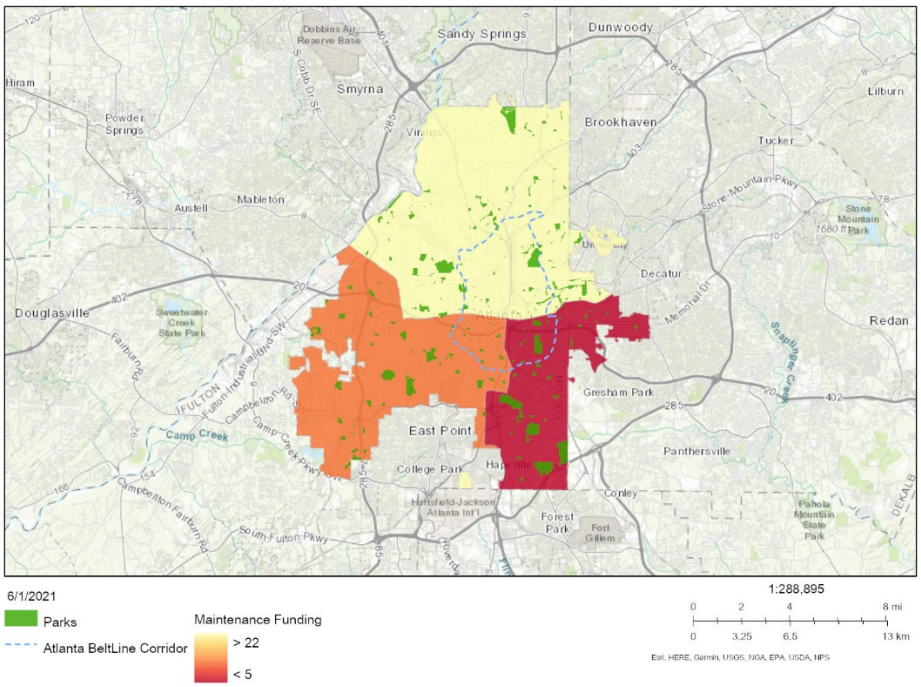

Figure 5

Life Expectancy and Health Map by Census Tract

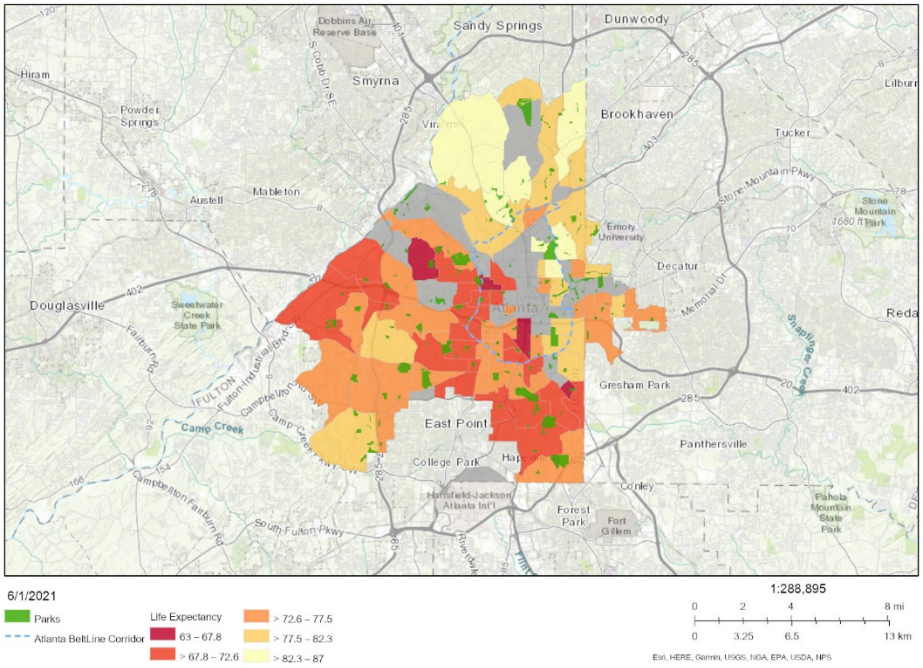

Figure 6

City of Atlanta Parks and Recreation Equity Data Tool Test Results