Mapping Environmental Privilege: An Analysis of Parks in Austin, TX

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Executive Summary

In this exploratory project, I map the spatial distribution of environmental inequalities in Austin, Texas, with a particular focus on public parks in the city. Drawing on the sociological concept of “environmental privilege,” which describes the role of racial and class privileges in access to green spaces and natural resources, this project analyzes the quality of park spaces as they relate to social inequalities in Austin. I place particular emphasis on the difference in quality of park spaces East and West of Interstate Highway 35 (I-35), which historically has served as a dividing line between black and white residents, as well as between low- and high-income households. Using public parks as a proxy for access to green space and environmental amenities in residential areas, my analysis calls attention to correlations between environmental quality and social demographics in Austin. The project seeks to identify environmentally “privileged” areas of the city by gauging the quality of select parks in Austin, and noting the demographic characteristics of each park’s service area.

While the historically underserved East Austin does not actually have less park space than West Austin, I argue that the environmental quality of some of these park spaces may be substantially lower than those in more affluent white neighborhoods West of I-35, both in terms of potential contaminants and in the balance between the natural and the built environment. My comparative analysis of the quality of park spaces in Austin draws on an assessment of the suitability of existing parks based on proximity to industrial land use, hazardous materials (hazmat) sites, and busy streets, as well as firsthand observation I conducted in four parks -- two East of I-35 (“East Austin”), and two West of I-35 (“West Austin”). These analyses show that clusters of parks East of I-35 are considered “unsuitable” according to my criteria (outlined in the “Methodology” section of this report), and that more natural elements are preserved and incorporated into design in parks West of I-35.

The focus on mapping “environmental privilege” (and lack thereof) is an exploratory application of a “mixed methods” approach to environmental justice research. Using GIS as a tool for data discovery and for mapping impressions on people’s surrounding environment, it links quantitative and qualitative methods to visualize demographic and environmental correlations.
Introduction

Research on environmental inequality, often conducted within an “environmental justice” framework, has established that minority and low-income neighborhoods typically bear a disproportionate brunt of contamination stemming from industrial activity. Sometimes referred to as “fenceline communities” or even “sacrifice zones,” the focus on these neighborhoods has drawn attention to the “negative externalities” of contamination. Recent sociological literature on environmental inequality conceptualizes the idea of environmental privilege as a flipside of sorts of traditional environmental justice scholarship. Lisa Park and David Pellow define environmental privilege as the result of “the exercise of economic, political, and cultural power that some groups enjoy, which enables them exclusive access to coveted environmental amenities...which are protected from the kinds of ecological harm that other groups are forced to contend with every day.” Park and Pellow argue that this reflection of social privilege in access to environmental amenities should be analyzed as a source of environmental injustices, one that is often obscured due to its “more structural, less conscious, and deeply historicized” roots in the exercise of white privilege.

Parks, as protected green spaces in urban environments, are fitting empirical sites for analyses of environmental privilege. Urban parks can have a significantly positive impact on nearby residents, since they provide space for physical activity, social interaction, relaxation, and ecological preservation. In a recent “environmental justice inquiry” into park space in Baltimore, Boone et al. note that analyses of park space should not only focus on distribution of park space, common in parks literature, but on elements such as aesthetics, barriers to access, local perceptions of park value, and “deeper historical understandings of urban and institutional dynamics” in park management. Other studies note that environmental amenities such as wooded areas, hiking trails, and greenbelts may hold certain appeal for white residents and more elitist tastes. My project draws on these perspectives to identify qualitative differences between parks in areas of different demographic makeup and with different levels of “parks need” and to consider how researchers might gauge local impressions of public spaces as a measure of parks quality and local relevance.

Austin’s history of residential segregation between areas East and West of I-35, disproportionate siting of industrial land parcels in East Austin, and notoriety for

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1 Steve Lerner, Sacrifice Zones: The Front Lines of Toxic Chemical Exposure in the United States (Cambridge, MA: The MIT Press, 2010)
incorporation of environmental initiatives in city planning make it an appropriate case for an analysis of urban park space within an environmental justice framework. Environmentalist initiatives such as the Save Our Springs Alliance (advocating the preservation of Barton Springs, a natural spring-fed pool downtown), incorporation of the natural landscape into bike trails and greenbelts, and historic local landmarks such as the Treaty Oak in West Central Austin represent (to some) sites for the construction of an anti-establishment “environmental meaning”6 of Austin and of “creative resistance” to urban development.7 There is little discussion, however, of what social groups are leading or benefiting from these initiatives, nor of other environmental issues that point explicitly to ongoing inequalities in exposure to environmental hazards.8

While this project does not aim to deconstruct dominant environmental discourse in Austin, it does analyze environmental amenities – specifically, parks designed for residents living within a 2-mile radius – from an environmental justice angle. My focus on local city parks as a marker of “environmental privilege” offers an alternative environmental justice consideration, in addition to the common focus on disproportionate amounts of hazardous waste and industrial land in areas East of (what is now) I-35, which was also designated for the city’s minority populations in the 1928 City Plan and 1931 zoning laws.9 My comparative evaluation of park space East and West of I-35 also calls attention to the role that environmental preservation of the latter region has played in the promotion of environmental degradation in East Austin. Quality of actual park space in either side of the city likely reflects an ongoing prioritization of protecting “environmentally sensitive and recreationally revered” areas, which are located almost exclusively West of I-35.10 Walsh points out that the dominant environmentalist movements in Austin, which in other places are hailed as part of an anti-growth “meaning” of Austin11 or as a manifestation of “creative resistance” to growth,12 implicitly focus on threats to green spaces in West Austin, which has historically been reserved exclusively for white and affluent residents.13

This project does not assign blame or malicious intent to environmental activists, parks advocates, or planners in Austin; rather, it is meant to provide a critical evaluation of differences between actual park spaces in East and West Austin. In addition to an environmental suitability analysis of parks citywide, the project evaluates my impression of the environmental amenities in four parks – Pease, Givens, Perry, and Rosewood — with an environmental justice perspective that takes into account historical patterns of segregation and unequal resource allocation East and West of I-35.

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6 William Scott Swearingen, Jr, Environmental City: People, Place, Politics, and the Meaning of Modern Austin (Austin, TX: University of Texas Press, 2010).
8 For a detailed discussion of the history of environmental politics in Austin, see: Elizabeth Walsh, East Austin Environmental Justice History (Austin, TX: University of Texas at Austin, 2007). Available at: http://soa.utexas.edu/eajhp/
9 Walsh, 7.
10 Walsh, 9.
11 Swearingen, Environmental City.
12 Long, Weird City.
13 Walsh, 10.
Hypothesis

Given the disconnect between dominant environmental activism and environmental justice concerns, and the historically-prescribed concentration of industrial land use in East Austin, I hypothesize that park spaces in East and West Austin will differ in terms of quality. Preliminary mapping of park space in all of Austin did not show a substantial difference in the amount of park space between East and West Austin; however, I hypothesize that the quality of available amenities and maintenance will be lower in East Austin parks. Given that protection of the environment and of green space is usually reserved for affluent, predominantly white neighborhoods West of I-35, I also posit that park spaces in West Austin will likely be better maintained and contain more natural elements such as more wooded areas, natural creeks, and seclusion from surrounding streets and neighborhoods.
Research Questions

Given the known racial segregation and unequal environmental hazard siting between East and West Austin, this project seeks to answer the following:

- Is there a qualitative difference in park space East and West of Interstate 35, both in terms of ecological quality (i.e. distance from industrial lands and hazardous materials sites) and environmental amenities?
- What amount and kinds of parks are available in areas with an identified high need for park space? What is the balance between natural and built elements in these parks?
- How might park quality relate to historical patterns of segregation in the city?
Methodology

Data Collection

To carry out this study, I collected demographic, land use, transportation, toxic release, and firsthand observational data. My approach was to identify suitable and unsuitable parks (based on criteria outlined below), visit select parks to gauge my impression of their environmental amenities and green space, and to juxtapose the suitability and observational data with demographic characteristics of parks’ surrounding neighborhoods.

I was most interested in analyzing demographic data in relation to local land use, and I decided that Census data at the block level would most adequately reflect demographic variation in the city. I downloaded 2010 Census block data from the American Community Survey, paying particular attention to statistics that could serve as a proxy for social vulnerability (see “Analysis” section below).

In order to make any judgments on the potential environmental and safety barriers to park usage, I needed to determine where parks are located and how land is used in their surrounding areas. To this end, I downloaded shapefiles for city streets, City of Austin Parks, and 2010 Land Use from the City of Austin GIS database. I categorized this data so that I could identify: a) parks that are presumably designed for the most proximate residents (see “Analysis” section below); b) land usage that could be hazardous for park users while at parks or en route to and from parks; and c) distance of selected parks from busy streets and highways.

In addition to identifying land used for industrial, manufacturing, mining, or landfill purposes (from the 2010 Land Use shapefile), I identified specific hazardous materials sites near parks to further evaluate their environmental quality. To plot hazardous materials (“hazmat”) sites, I downloaded point data from the Environmental Protection Agency’s Toxics Release Inventory (TRI), which is a fairly comprehensive database of registered sites that use, process, store, or toxic compounds, or which are currently identified as Superfund or brownfield sites. It should be noted that mapped hazmat sites do not necessarily represent equal threats (some process waste, some export their waste, some are closed, etc.), but I included all sites to account for potential danger, due to the uncertain nature of the actual extent and gravity of exposure to certain chemicals, and the sometimes problematic reporting of release of toxic materials.14

I collected firsthand observational data in two district parks, with service areas of a 2-mile radius – Pease (West Austin) and Givens (East Austin) – and two neighborhood parks, with service areas of a 1-mile radius – Perry (West Austin) and Rosewood (East Austin). I brought blank maps of each park with me on my visits to the park to record picnic areas, wooded areas, fencing, concrete/pavement, trash cans and dumpsters, sports

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courts/pools, and other noteworthy environmental features such as incorporation of natural landscapes, plants, and features that encourage interaction with the natural environment (such as educational plaques and tags). I also took photos that I thought best captured my impressions of the parks. A blank version of my field notes guidelines is included in Appendix C.

Analysis

- **Demographics:**
  I used statistics on educational attainment (number of residents with a BA), median household income, number of residents under the age of 18, and number of white residents to map privilege, vulnerability, and parks need (see “Determination of Park Need” below). I categorized each factor into quantiles to allow for better comparison and reflection of variation in each respective category, and to construct the parks need score based on income, educational attainment, and children in each Census block. I normalized racial, educational, and age data to reflect the percentage of the total population of each Census block who are white, have a BA, and are under the age of 18.

- **Determination of Park Need:**
  Drawing from the Kirwan Institute’s idea of social “opportunity mapping”15 and from Boone et al’s assessment of “parks need” in Baltimore, MD,16 I created my own version of a “parks need score” to determine which areas of the city are most socially vulnerable and would most benefit from usable park space – in this case, those areas with lower incomes, lower educational attainment, and higher percentages of children. I assigned each Census block a score of 1-5 for each of the following categories: median income, educational attainment (measured as percentage of total residents with a Bachelor’s degree), and percentage of residents under the age of 18. I assigned scores on a scale of one to five for each of these categories based on quantiles, with higher scores reflecting higher “vulnerability” and/or potential benefit from park space (ie, the highest quantile for median income was assigned a “5”, after I reversed the order of the scale so that the lowest median income per Census block would fall at the higher end of the spectrum). I then added the scores for the three individual categories into one composite score. In this case, Census blocks with the highest scores (14 and 15) represent highest vulnerability and need, meaning lowest median incomes, lowest educational attainment, and highest numbers of resident children. The parks need scale starts at “3” because no Census block was assigned a “0” for any of the three categories.

- **Park Selection:**
  Given that I am interested in the relationship between social privilege (and vulnerabilities) and available park space, I only included parks with a service area of two miles or less in my spatial analyses. These parks, which the City of Austin categorizes as “district,” “neighborhood,” “school,” and “pocket” parks, presumably attract users from surrounding neighborhoods, and are designed for the service of the most proximate residents. I excluded parks with a “citywide” service area – metropolitan parks, nature

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16 Boone et al., "Parks and People: An Environmental," 775.
preserves, greenbelts, and special parks – because their users are most likely more heterogeneous due to the fact that these parks are ostensibly designed to serve more geographically diverse areas of the city. I selected parks for firsthand observation based on contrasting demographic characteristics within service areas East and West of I-35 (% white residents and parks need scores), and on my ability to access them in limited time frames (parks had to be in Central Austin).

- **Suitability of Parks:**
  I conducted a suitability analysis to define the environmental quality of park space in Austin. I considered three main factors when conducting this analysis: proximity to sites listed in the TRI, proximity to potentially hazardous land, and proximity to major highways. My measures for suitability are admittedly quite restrictive, but given the amount of time and resources available for this project, I decided to use a liberal definition of “hazardous” factors to distinguish suitable from unsuitable parks. Parks that are considered “suitable” in this study are: a) at least 200 feet from road with speed limits over 40 miles per hour (to account for pedestrian safety en route to parks, safety near park perimeters, air quality, and noise pollution); b) do not have a registered toxic release site within walking distance (1/4 mile, to account for users’ health and safety while en route to or at parks); and c) are not within walking distance from industrial, manufacturing, mining, or landfill sites.

- **Environmental Impressions:**
  After reviewing my notes from visits to Pease, Givens, Perry, and Rosewood parks, I decided to symbolize the following in order to give map readers an idea of the overall balance between built and natural elements, as well as where activities are designed to take place: sports courts and fields (“Sports”), densely-wooded areas (“Wooded”), paved areas (“Pavement”), waste management (“trash cans” and “Dumpsters”), fenced-in areas (“Fenced-in”), picnic areas, playscapes, recreation centers, and park areas that were deemed “unsuitable” in my suitability analysis, if any.
Findings

Maps of my analyses are presented in the following order:

1. **Income, Youth, Education, and White Residents by Census Block**
   -- This map highlights spatial inequalities in each of these demographic categories.

2. **Austin Parks Need Score by Census Block**
   -- Highlights the unequal distribution of “parks need” between East and West Austin.

3. **All City of Austin Parks and Areas of Highest Need**
   -- Shows the distribution of all park space in Austin (including metropolitan parks not in my subsequent suitability analysis) for context, as well as areas with highest parks need score (from second map).

4. **Suitable and Unsuitable Parks**
   -- Shows results of the suitability analysis, according to the three criteria outlined in the Methodology section.

5. **Parks with Hazmat Sites Within Walking Distance**
   -- Shows parks which have a hazmat site within walking distance (1320-foot buffer) of their boundaries to capture differences between East and West Austin.

6. **Parks Selected for Observation**
   -- Shows the location of the four parks I selected for observational analysis, their service areas, and their surrounding parks need score for context of my analysis.

7. **Pease District Park Service Area**
   -- Shows the parks need score for the 2-mile service area of Pease District Park, as well as the percentage of the population that is white (in quantiles, per Census block) in the area.

8. **Environmental Impression of Pease District Park**
   -- Maps my observations according to criteria outlined in Methodology section

9. **Givens District Park Service Area**
   -- Shows the parks need score for the 2-mile service area of Givens District Park, as well as the percentage of the population that is white (in quantiles, per Census block) in the area.

10. **Environmental Impression of Givens District Park**
    -- Maps my observations according to criteria outlined in Methodology section
11. Perry Neighborhood Park Service Area
-- Shows the parks need score for the 1-mile service area of Perry Neighborhood Park
Park, as well as the percentage of the population that is white (in quantiles, per Census
block) in the area.

12. Environmental Impression of Perry Neighborhood Park
-- Maps my observations according to criteria outlined in Methodology section

13. Rosewood Neighborhood Park Service Area
-- Shows the parks need score for the 1-mile service area of Rosewood Neighborhood
Park, as well as the percentage of the population that is white (in quantiles, per Census
block) in the area.

14. Environmental Impression of Rosewood Neighborhood Park
-- Maps my observations according to criteria outlined in Methodology section
Mapping Environmental Privilege: An Analysis of Parks in Austin, TX
Income, Education, Youth, and White Residents by Census Block

Map 1: Household Income
Map 2: Educational Attainment
Map 3: Youth Residents
Map 4: White Residents

Created by: Emily Spangenberg, December 12, 2012
Coordinate System: NAD 1983 StatePlane Texas Central
Projection: Lambert Conformal Conic
Datum: North American 1983
Sources: US Census (2010), City of Austin GIS Database, CAPCOG
Mapping Environmental Privilege: An Analysis of Parks in Austin, TX
Austin Parks Need Score by Census Block

Notes: 1. Map excludes parks with citywide service areas.
2. Parks Need Score is a composite score of 3 demographic categories: median household income, educational attainment (% residents with BA), and % of residents under 18 per Census block.

Created by: Emily Spangenberg, December 12, 2012
Coordinate System: NAD 1983 StatePlane Texas Central
Sources: US Census Bureau (2010), City of Austin GIS Dataset, CAPCOG
Mapping Environmental Privilege: An Analysis of Parks in Austin, TX
All City of Austin Parks and Areas of Highest Need

Notes: 1. Map includes parks with citywide (metropolitan), 2-mile, 1-mile, and .25-mile service areas.
2. Parks Need Score on scale of 3 (low) to 15 (high)

Created by: Emily Spangenberg, December 12, 2012
Coordinate System: NAD 1983 StatePlane Texas Central
Sources: US Census Bureau (2010), City of Austin GIS Dataset, CAPCOG
Mapping Environmental Privilege: An Analysis of Parks in Austin, TX
Suitable and Unsuitable Parks

Notes: 1. Map excludes parks with citywide service areas.
2. Suitable parks do not have industrial land or hazardous materials sites within walking distance (1320 ft), and are at least 200 ft from roads with speed limits over 40 mph.

Created by: Emily Spangenberg, December 12, 2012
Coordinate System: NAD 1983 StatePlane Texas Central
Projection: Lambert Conformal Conic
Datum: North American 1983
Sources: US Census Bureau (2010), City of Austin GIS Dataset, EPA TRI
Mapping Environmental Privilege: An Analysis of Parks in Austin, TX

Parks with Hazmat Sites Within Walking Distance

Notes: 1. Map excludes parks with citywide (metropolitan) service areas.
2. “Walking distance” = 1320 feet (1/4 mile) radius.
3. Hazmat sites are sites registered in the EPA’s Toxics Release Inventory.

Created by: Emily Spangenberg, December 12, 2012
Coordinate System: NAD 1983 StatePlane Texas Central
Sources: US Census Bureau (2010), City of Austin GIS Dataset, EPA TRI
Mapping Environmental Privilege: An Analysis of Parks in Austin, TX

Parks Selected for Observation

Notes:
1. Map excludes parks with citywide service areas.
2. Parks Need Score is a composite score of 3 demographic categories: median household income, educational attainment (% residents with BA), and % of residents under 18 per Census block.

Created by Emily Spangenberg, December 12, 2012
Mapping Environmental Privilege: An Analysis of Parks in Austin, TX

Givens District Park: Parks Need and White Population per Census Block

Map 1: Parks Need Assessment
Map 2: Percent White Residents

Notes: 1. District parks' service area = 2-mile radius
2. "Parks Need Score" out of scale from 3-15 (3=lowest need)

Parks Need Score
- 5-7
- 8-10
- 11-13
- 14-15

% White
- 18-36
- 37-46
- 47-57
- 58-64
- 65-89

Created by: Emily Spangenberg, December 12, 2012
Coordinate System: NAD 1983 StatePlane Texas Central
Projection: Lambert Conformal Conic
Datum: North American 1983
Sources: US Census Bureau (2010), City of Austin GIS Dataset
Mapping Environmental Privilege: An Analysis of Parks in Austin, TX

Environmental Impression of Givens District Park

Notes: 1) Point data plotted manually. 2) Drawings not to scale.

Created by: Emily Spangenberg, December 12, 2012

Mapping Environmental Privilege: An Analysis of Parks in Austin, TX

Perry Neighborhood Park: Parks Need and White Population per Census Block

Map 1: Parks Need Assessment

Map 2: Percent White Residents

Notes:
1. Neighborhood parks' service area = 1-mile radius
2. "Parks Need Score" out of scale from 3-15 (3=lowest need).

Parks Need Score
- 3-4
- 5-7

% White
- 58-90
- 91-94
- 95-96
- 97-98
- 99-100

Location in Austin

Created by: Emily Spangenberg, December 12, 2012
Sources: US Census Bureau (2010), City of Austin GIS Dataset
Mapping Environmental Privilege: An Analysis of Parks in Austin, TX

Map 1: Parks Need Assessment

Map 2: Percent White Residents

Location in Austin

Parks Need Score

Notes:
1. Neighborhood parks service area = 1-mile
2. Park Need Score: out of scale from 0-15 (15=lowest need)

Service Area

Roadway

0.25 0.5 1 Miles
Mapping Environmental Privilege: An Analysis of Parks in Austin, TX

Environmental Impression of Rosewood Neighborhood Park

Notes: 1) Point data plotted manually. 2) Drawings not to scale. 
Created by: Emily Spangenberg, December 12, 2012
Coordinate System: NAD 1983 StatePlane Texas Central 
Projection: Lambert Conformal Conic Datum: North American 1983 Sources: US Census Bureau (2010), City of Austin GIS Dataset, EPA TRI.
Photo by author.
Analysis and Discussion of Findings

Distribution of Parks and Parks Need
My reference map of all park spaces in Austin shows no clearly-discernible pattern in the distribution of all park spaces East and West of I-35 (257 parks in total), with the exception of several large parks (which have metropolitan service areas and were excluded from my suitability analysis) which are located on the extreme Western edge of the city limits.

Parks need scores throughout the city largely reflect dominant demographic patterns in the town, with highest “need” scores (Census blocks with the highest percentage of residents under the age of 18, lowest median household incomes, and lowest percentages of educational attainment) concentrated almost exclusively East of I-35 (see “Parks Need Scores” map). More specific spatial statistics could be run to calculate the average distances to and sizes of parks in areas with the highest need, since it is not clearly-discernible from my map (see “All City of Austin Parks” map) whether or not these areas are actually underserved. The scope of this project, however, is to determine if there is a qualitative difference in park spaces in areas with contrasting levels of need (part of the selection process in my decisions on which parks to observe). Also notable is the fact that the city’s non-white population (see “Income, Education, Youth, and White” map) largely coincides with the areas with the highest parks need scores.

Parks Suitability Analysis
My initial analysis of parks suitability (“Suitable and Unsuitable Parks”) shows clusters of unsuitable park spaces in Central Austin. It is difficult to discern whether there are more or less actual numbers of parks deemed unsuitable between East and West Austin, though it does appear that parks selected in East Austin are a bit larger and more clustered in East Central Austin (the area historically designated for industrial activities).

Since my suitability analysis is based on admittedly broad criteria (road with speed limits over 40 mph, industrial/manufacturing/resource extraction land and hazmat sites within walking distance), I decided to parse out part of the criteria and map parks which have hazmat sites – potentially the biggest threat to parks in terms of proximate contamination – within walking distance. This map (“Parks with Hazmat Sites Within Walking Distance”) shows a clear clustering of parks just East of I-35, coincident with historical zoning of this area as industrial.

Parks Need and Coincidence with Percentages of White Population
The maps of each of my selected parks’ service areas show a rough correlation between high parks need scores and lower percentages of the white population per Census block, suggesting that the most socially “vulnerable” tracts are located in areas where less white residents live. I selected Pease, Givens, Perry, and Rosewood parks based on their location in the map of the city’s parks need scores, intentionally zooming in on parks whose service areas contained contrasting parks scores and racial demographics. Identification of these parks and the social vulnerability or privilege of their service areas was the basis for their selection for observational fieldwork, and for conclusions on the relationship between demographic and environmental inequality.
Field Observations of Select District and Neighborhood Parks

Overall, my original hypothesis that there would be a qualitative difference between park spaces East and West of I-35 held. My comparison of four parks of similar classifications (2 district, 2 neighborhood) and sizes shows that parks in areas with higher overall parks need scores in their service areas in East Austin incorporated less elements of the natural environment — in fact, in one case (Givens Park), the most densely-wooded area was actually fenced off inaccessible to park users. Where pavement, wire fencing, and presence of dumpsters dominated East Austin parks, West Austin parks were built into and around natural features such as Shoal Creek and small bluffs. Densely-wooded areas were more accessible to park users, as both had mulch and/or paved trails running through them. More detailed descriptions of each of the observed parks follow:

1. Pease District Park – West Central Austin – Mostly Suitable (According to suitability analysis), Moderately low parks need scores

I visited Pease Park at mid-day on a Saturday. It was fairly crowded (likely because it was Thanksgiving weekend), with around 40-50 people using an area of the park with playscapes and reserved picnic areas. Many people also passed through the park on the Shoal Creek trail on foot or on bike, and individuals and small groups were scattered throughout the North end of the park. Nobody was in the area of the park shown as “unsuitable” on the map at the time of my visit. With the exception of the “unsuitable” strip of land, most of the park is fairly quiet and secluded from activities going on around it. I did not hear or see many houses, cars, or pedestrians outside of the park’s borders. Amenities such as picnic areas and playscapes are concentrated in the South end of the park, but seem adequately spread out throughout the park to encourage use in all areas. Innocuous trashcans are spread throughout the park, and I did not notice any litter inside the park (except some near North Lamar).

My overall impression of the park was that it was well-maintained and had been built around and into the natural environment. Shoal Creek served as the guide for a running and bike trail that runs through the park, as well as a natural “barrier” between most of the park and the area near busy North Lamar Boulevard (which was deemed “unsuitable” in my spatial analysis, likely for its proximity to North Lamar). Though there are some wide empty areas (most notably near North Lamar), much of the park is fairly densely wooded, and mulched trails run through the woods on the Western edge of the park (not shown in this map). Several of the trees in wooded areas are tagged with strips of aluminum with numbers stamped into them, likely part of a tree identification program.

The map presented here highlights the most densely-wooded areas, and shows that the natural environment dominates the built environment in this park. Small amounts of concrete and fencing make the park more environmentally appealing, and, with its well-maintained trails, it lends itself to recreation that inherently involves more active interaction with the outdoors (such as hiking, running, etc.).

2. Givens District Park – East Central Austin – Entirely “Unsuitable, Moderately high parks need scores

I visited Givens Park at mid-day on a Sunday. In total, I saw around 20-30 people, though many were passing through the park on the paved road that runs down the
middle. The highest concentration of people that I saw during my time in the park was in a parking lot – about 10 men were sitting near their cars and talking together. The park is fairly open to the surrounding neighborhood – trees line the Northeast corner of the park, but otherwise the park’s edges run up to the sidewalks of bordering streets. There is a wooded area on the Western edge of the park, but it is largely fenced off, and it is unclear whether it is a developed part of the park (the map I had downloaded from the Internet prior to my visit did not include it within its borders, but the City of Austin’s GIS data does).

My overall impression of the park was that it was quite different from Pease Park, which I had visited the day before. It is mostly open and has relatively little tree cover, and has many built/concrete elements meant for parking or playing sports such as tennis or basketball. Two large baseball diamonds (which double as soccer fields) occupy large portions of the grounds, but they are fenced in, making it difficult to walk from one edge of the park to another. The park seems geared toward usage for team sports, and has a large swimming pool (closed during my visit in November) in the Northwest corner. Picnic areas are located in the few accessible sections of the park that are shaded by tall trees. The presence of three large dumpsters in a central parking lot gave the impression that the park is not well-maintained, since several large objects (broken chairs, tires, a broken television) were lying nearby.

The map presented here shows the dominance of pavement and fenced-in areas of Givens Park, as well as the lack of trees in central areas. The dominance of built elements make the park perhaps most suited to team sports and swimming, as much of the park is made up of sports courts, fields, and a concrete pool.

3. Perry Neighborhood Park – West Austin – Entirely “Suitable”, Low parks need scores

I visited Perry Park at mid-day on a Saturday. I saw about 15 people total – all families with at least one young child. Most users were on the park’s two playscapes, a couple were playing in a tennis court on the Eastern edge, and 3 were running laps inside a baseball diamond built into bluffs in the center of the park. The park is quite secluded from neighboring streets – wooded areas and bluffs enclose most of the park, and the rest borders an elementary school. The wooded area has some mulched trails running through it, and one section displays plaques by six different native tree species explaining what they are. The park is fairly quiet inside, due to the fact that woods serve as a natural barrier for most of it.

My overall impression of the park was that it is similar to Pease Park in the types, quality, and amount of “natural” environmental amenities available to users. The park feels like a natural sanctuary, since it is fairly quiet, has maintained, accessible wooded areas, and is largely set inside bluffs. The entrance to the park bears four plaques – one for each year in the 1960s that the park’s playground was named Austin’s “superior” playground. My map shows the densely-wooded boundaries of much of the park, and the ample open space it provides in the central areas. The park feels family-oriented and, like Pease Park, lends itself to active exploration of the natural environment.

4. Rosewood Neighborhood Park - East Central Austin – Mostly Suitable, Moderately high parks need scores
Rosewood Park, of similar size and classification to Perry Park, is quite different in terms of the natural amenities and balance between natural and built elements that it contains. Like Givens Park, Rosewood is fairly open, flat, and has large fenced-in fields. I visited Rosewood Park on a Sunday morning, and saw three men sitting alone at picnic tables, one woman walking her dog through the park, and one man stretching near a fenced-in field. The park’s most densely-wooded area lies inside a section of the park that my suitability analysis deemed “unsuitable”, likely for its proximity to Pleasant Valley Boulevard, a fairly busy street. The park’s playscape is also located in this “unsuitable” area, with the busy elevated street nearby. It looks as though there have been efforts to grow more trees in the park, as several small, younger-looking plants populate an area in the Northeast of the park labeled as an arboretum.

My overall impression of the park is similar to that of Givens Park – there is a lot of pavement, open (yet fenced-in) spaces, wires overhead, and tree coverage is, for the most part, not located in inviting sections of the park. A concrete ditch runs along most of the Western edge of the park, and, though there is a bridge over one section, the ditch mostly divides the park and makes it impossible to cross the park completely. There are, however, three recreation centers located in the park, which signal an active engagement with the local community (though it was hard to tell during my Sunday visit). There are also several sports areas – a tennis court, swimming pool, baseball diamond, and soccer field – which lend them to team sports. The park also contains two large dumpsters, and the concrete ditch running down the Western edge of the park had trash, tires, and a dead opossum inside.

My map shows this dominance of treeless spaces and fenced-in areas, as well as the presence of several paved areas, dumpsters, and amenities located in areas marked “unsuitable” through my analyses.

Possible Errors and Caveats:

- Suitability Analysis: I did not categorize or rank hazmat sites in the TRI data due to time and information limitations, and thus the sites which are most potentially threatening are considered equally with sites that do not work with the same kinds or volumes of chemicals. TRI data also does not account for the frequency by which toxic materials are used/released at their sites,\(^{17}\) thus making it difficult to gauge the actual threat of the sites listed here. Additionally, the grid of streets near the Capitol were classified as having speed limits over 40 mph in the city data (which is not true), leading me to suspect that my suitability analysis likely includes streets that do not fit my selection criteria.

- My conclusions and observations are not meant to be generalizable; it is important to note that I collected data in four of over 200 parks in the City of Austin, that I intentionally selected parks that I would be able to access without a car from Central Austin, and that had contrasting demographic and parks need scores for basis of comparison.

- This study’s focus on the division between East and West Austin overlooks new spatial divisions of social inequality such as neighborhoods in Northwest Austin and East Central Austin.

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Conclusions and Ramifications

The maps and observations presented here show that parks in areas with high “parks need scores” and low percentages of white residents may have access to parks with less environmental amenities. Available facilities contribute to an overall dominance of built elements such as pavement and wire fencing, and less elements of the natural environment are incorporated into the parks’ designs. With the possible exception of amount of parks deemed “unsuitable” in East Austin vs. West Austin with my suitability analysis, most of my original hypotheses held. Surprisingly, my initial suitability analysis did not show a clearly discernible difference in actual amount of suitable vs unsuitable parks between East and West Austin. When I created a map of parks with perhaps the most “threatening” criterion – hazmat sites – within walking distance, however, there was a clearer clustering of parks in East Central Austin. Future research on this topic could include a spatial statistics evaluation of amount and distances between suitable parks and areas with high parks need to better address the environmental quality of local available park spaces in these areas.

The qualitative differences I outline in the findings section of this paper offer an application of the concept of environmental privilege to environmental justice issues in Austin. The presence of garbage and dead animals in the parks I evaluated in East Austin, juxtaposed with the dominant incorporation of natural elements into park design in West Austin shows a noticeable difference in the preservation of the environment East and West of I-35. The cases I present offer evidence of the historically unequal protection of environment in Austin, which parallels other social inequalities. Parks such as Perry, which has been named Austin’s “superior playground” and is designed around existing bluffs and wooded areas, may be located in predominantly white areas which otherwise have low social vulnerability scores, suggesting a manifestation of environmental privilege. While this inequality is partially a question of personal preference on aesthetic appeal of natural environments, the fact that certain communities have pristine, well-maintained parks within reach, while others’ available public spaces may be poorly maintained and made up primarily of concrete and contain physical barriers such as fencing highlights unequal access to the benefits parks can provide.

The practical implications of this study point to considerations that planners and policymakers should make when deciding where and how to focus funding and development decisions in park spaces, and calls attention to the kinds of maintenance issues that certain neighborhoods disproportionately face in public spaces. Since parks contain potential benefits for individuals and communities alike in terms of health and social cohesion, the city of Austin should prioritize environmental stewardship and planning in East Austin as a means of redressing historical neglect.

This exploratory study also provides an example of how “mixed methods” can be employed in environmental justice research. Using GIS applications as a method of “data discovery” can lay the groundwork for where to site ethnographic studies on
environmental issues\textsuperscript{18}, it can also be used to map people’s perceptions and actual usages of public spaces. This on-the-ground approach can help fill gaps in official, top-down, or statistical knowledge, highlighting priorities for the improvement of public spaces in underserved neighborhoods.

References


Walsh, Elizabeth. *East Austin Environmental Justice History*. Austin, TX: University of Texas at Austin, 2007.

**Geospatial Data:**


APPENDIX
Appendix A: Data Sources (full citations provided in “References” section)

US Census Bureau, American Community Survey 2010
Downloaded from: www.socialexplorer.com

City of Austin GIS Data Sets
  ■ City of Austin Parks
  ■ Land Use 2010
  ■ Street Centerlines

Capital Area Council of Governments Geospatial Data
  ■ Austin City Limits
  ■ Census 2010 Boundary Files
  ■ Major/Minor Arterials

US Environmental Protection Agency, EPA Geospatial Data Access Project
Toxics Release Inventory Data
www.epa.gov/enviro/geo_data.html
  ■ Point data on sites registered with the EPA’s Toxics Release Inventory program
Appendix B: Data Preparation and Map Creation

I. Steps to Prepare Data and Elements Common to Many Maps (including inset maps)
   1. Download data from respective sources
   2. Check metadata, define and project downloaded files to NAD 1983 StatePlane Texas Central
   3. Clip CAPCOG “city limits” file to Austin, Travis County to create an “Austin city limits” shapefile
   4. Clip “city of Austin parks” shapefile to Austin city limits, save as layer
   5. Clip “streets” shapefile to Austin city limits, save as layer
   6. Create layer for streets within Austin city limits with speed limits over 40 mph (using “Select by Attribute” in the “streets” shapefile Attribute Table)
   7. Clip “hazardous materials” layer to Austin city limits, save as layer
   8. Create “Major Highways” layer
   9. Create layer file for I-35 (select from streets file)
   10. Create layer file with Census 2010 Boundaries (spatial join for American Community Survey Data to Census Boundaries file, clip to city limits)
   11. Create shapefile for each of the four parks selected for field observation

II. Maps on Distribution of City Parks and Identification of Parks for Analysis
   1. Create map showing all parks in Austin city limits, major highways, Colorado River (areawater). Add all data to one layout in ArcMap.
   2. Create second map showing parks selected for suitability analysis by searching the “city of austin parks” attribute table for parks with a service area of two miles or less (district, neighborhood, school, pocket). Create new layer for these parks, to be used in subsequent maps.

III. Parks Suitability Analysis
   1. Create ArcMap document including parks with service area of two miles or less, the Austin city limits, point data on hazardous materials sites, 2010 City of Austin land use, and streets with speed limits over 40 mph.
   2. Create a “hazardous land” layer using the “select by attribute” tool on the 2010 City of Austin land use file, select “Miscellaneous Industrial”, “Manufacturing,” “Landfill”, and “Mining/Resource Extraction” parcels. Export selected parcels as one layer (“hazland”).
   3. Create a 200-foot buffer around the streets over 40 mph and a 1320-foot buffer around hazardous materials sites and “hazland sites”.
   4. Dissolve buffered features, create one “unsuitable” shapefile using union tool
   5. Use erase tool to identify “suitable” parks
   6. Use erase tool to identify “unsuitable” parks by overlaying “suitable” parks with all parks, then erasing “unsuitable” parks

IV. City Demographic Maps
   1. Open Census boundary file, clipped to city limits and spatially joined to ACS data
2. Symbolize to show the percentage of white residents per Census block (“White” normalized to “Total Population” of each block), categorized in quantiles; median household income for each Census block categorized in quantiles; percentage of residents with a BA (“EducBA” normalized to “Total Population”), categorized in quantiles; percentage of residents under 18 (“Under18” normalized to “Total Population”), categorized in quantiles. Save each as a layer to preserve symbology.

V. Parks Need Score Maps
1. Add Census boundary file and city limits file to ArcMap document.
2. Import symbology from demographic maps, assign scores to values according to quantiles in each category using “Select by Attribute” in Attribute Table. For educational data and income data: 1 = 5th quantile, 2 = 4th quantile, 3 = 3rd quantile, 4 = 2nd quantile, and 5 = 1st quantile (so that a higher score represents a higher risk). For data on youth, assign numerical score to match the quantile number (so that more children = greater parks need). Add all three scores together so that each Census block has a composite score.
3. Delete composite scores of 0, 1, and 2, which likely represent data entry error or missing data.
4. In symbology, group scores of 3-4 and 14-15 together to represent the extremes in the parks need score spectrum. All other numerical values grouped in groups of three composite scores (5-7, 8-10, etc.)

VI. Selected Parks’ Service Area Maps
1. Create ArcMap document with 2 data frames containing the Austin city limits file and the shapefile for park being analyzed.
2. Create buffer for each parks’ respective service areas (10560 ft for district parks, 5280 feet for neighborhood parks.)
3. Add parks need score map to one frame, white population to other frame.
4. Clip the demographic data to the buffer file, make buffer file transparent. Leave original demographic file partially transparent in background, erase census block boundaries, add street centerline file. Label some streets for orientation.

VII. Environmental Impression Maps
1. Create ArcMap document for each of the four parks selected for observation (Pease District Park, Givens District Park, Perry Neighborhood Park, Rosewood Neighborhood Park). Add shapefile for each park (and “unsuitable parks” file, if applicable, to identify ) , streets, and hazardous materials point data (if applicable).
2. Zoom map to level that fits entire park shape, but allows room for photos.
3. Add four photos, cropped to 1.5 in. by 1.5 in., that best represent my overall impressions of environmental quality and amenities. Add callout boxes to label photos and show approximately where on the map they were taken.
4. Create point shapefiles to represent picnic areas, playscapes, heavily wooded areas, waste receptacles (categorized by “normal” trashcans and large dumpsters), plaques (categorized by “donor/memorial” plaques and “historical” markers), sports courts or complexes, and recreational buildings. Use ArcCatalog to create
a new shapefile for these points, then edit attribute table of this file to include points. Use edited attribute table to symbolize points accordingly.
5. Use “draw” tool to draw polygons to represent large areas of concrete and rectangles to represent fenced-in areas.
C. Appendix C: Criteria for Evaluating Selected Parks (form used on site visits)

Date and time of visit:
Approximate number of users:
Which areas of the park are people using? Which are they not using?

Are picnic areas available? If so, where are they?

Are sports courts/pools/fields available? If so, where are they?

Does the park contain any historical markers, educational materials, or other culturally-relevant structures?

Does the park have any wooded areas? If so, where are they? Are they accessible? Do they include maintained trails or other means of access?

Are there fences inside the park grounds? If so, where, and how do they affect access to amenities?

How is waste collected and maintained? Are trash cans and/or recycling cans available?

If the park contains “unsuitable” areas (from suitability analysis), where are they, and what do they look like?

Overall impression of landscape: