Park Location and Amenities in Austin, Texas

Joanne Crompton
School of Public Affairs, The University of Texas at Austin

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CRP 386
Executive Summary

This paper examines the spatial characteristics of park location and park amenities in regard to average household income, ethnicity and crime rate. Its larger purpose is to address the question of neighborhood park availability to Austin residents in terms of social justice – are parks available to all residents?

I hypothesized that park locations and amenities are not equally distributed across the City of Austin with respect to the location of non-Anglo populations, low-income populations, and areas which experience high rates of crime. Specifically, I felt there were more parks with the most amenities in Central and West Austin, in other predominantly Anglo areas, and in areas which experience lower levels of criminal activity.

I began by mapping the City of Austin and its parks. Park types were identified, Austin Parks and Recreation Department service area standard was compared to a national service area standard, and then park service area and park amenities were spatially analyzed to determine if they were correlated to or influenced by household income, ethnicity and crime rates.

The results support the hypothesis: Park locations and amenities are not equally distributed across the City of Austin. While the Austin Parks and Recreation Department has more equally distributed the number of amenities to parks in non-Anglo areas and higher crime rate areas, the number of parks in these areas is low. More parks need to be constructed in these areas.
Introduction

Parks improve our quality of life. The purpose of the Parks and Recreation Department of Austin, Texas, is “to provide, protect and preserve a park system that promotes recreational, cultural and outdoor experiences for the community.” In total, the Austin Parks and Recreation Department (APRD) oversees more than 16,682 acres of land containing 206 parks, 12 preserves, and 26 greenbelts. For some time, APRD has been considered by other cities as a nationally leader in park systems.

On December 11, 2008, a press release from the Parks and Recreation Department announced that Austin had become the only major city in Texas, and one of 73 cities nationwide to earn national certification from the Commission for Accreditation of Parks and Recreation Agencies (CAPRA). To be accredited, cities must meet 36 fundamental standards and over 85 percent of other standards (See Appendix).\(^1\) CAPRA categorizes each of the standards into 10 sections: Agency Authority, Role and Responsibility; Planning; Organization and Administration; Human Resources; Finance; Program and Services Management; Facility and Land Use Management; Security and Public Safety; Risk Management; and, Evaluation and Research. Within each section are detailed sub-sections which were first evaluated by the City of Austin and then by individuals on the CAPRA accreditation team. Austin met the fundamental standards and obtained 97% of the remaining standards.\(^2\)

APRD has now turned its focus on three standards in which it needs to improve in order to meet 100% of the remaining standards. These standards are: 2.4 – Comprehensive Planning, 7.6.2 – Building Security Plans, and, 10.4 – Employee Education. Within the 2.4 sub-standard of Comprehensive Planning are the Recreation Programming Plan and the Resource Management and Land Use Planning. The Recreation Programming Plan consists of community studies, community inventories, needs indexes, and various types of programs. The Resource Management and Land Use Planning includes feasibility studies, a master site plan, a resource management plan, competent planning personnel, citizen involvement and phased development.

The role of the Comprehensive Planning Standard 2.4 is to use the above methods to determine where parks should be located to best meet residents’ needs. It is a mechanism to ensure that Austin promotes social justice, or the equal allocation of benefits, such as basic human rights and equal opportunity, regardless of background, throughout society. While research into negative externalities such as toxic releases has become a more common social justice issue, there is a relative lack of conclusive evidence regarding the distribution of positive externalities, such as parks and recreation opportunities.\(^3\) The Community Planning standard addresses this social justice issue.

Literature Review

General Benefits of Parks

*The Benefits of Local Recreation and Park Services* was a nationwide study that investigated the benefits of local parks.\(^4\) It compiled a list of the benefits of local recreation and parks services as perceived by users and non-users of local parks. Users reported they benefited from parks in the following ways: 42 percent from personal use, 38 percent from social use, 12 percent from facility/activity use, 6 percent from environmental benefits and 2 percent from economic benefits. Surprisingly, 71 percent of non-users said they received some benefit from parks as they keep kids off the streets by giving them a place to go, increase community awareness, make residents feel good, and provides opportunities for exercise.
Exposure to and Use of Parks Makes People Healthier

Strong evidence shows that when people have access to parks, they exercise more. In a study published by the Centers for Disease Control (CDC), creation of or enhanced access to places for physical activity led to a 25.6 percent increase in the percentage of people exercising three or more days per week. A group of studies reviewed in the American Journal of Preventive Medicine found that access to a place to exercise results in a 5.1 percent median increase in aerobic capacity.

Despite the importance of exercise that has repeatedly been found to increase health and reduce the risk of a wide range of diseases, only 25 percent of American adults engage in the recommended levels of physical activity while 29 percent engage in no leisure-time physical activity. The problem extends to children: only 27 percent of students in grades 9 through 12 engage in moderate-to-intensive physical activity. Americans have produced an epidemic of obesity. The CDC found that “Americans can substantially improve their health and quality of life by including moderate amounts of physical activity in their daily lives,” and called for the creation of more parks and playgrounds to help fight this epidemic.

Beyond the recreational opportunities offered by parks, a growing body of research shows that contact with the natural world improves physical and psychological health. One study reviewed the recoveries of surgical patients in a Pennsylvania hospital. The rooms of some patients overlooked a stand of trees, while others faced a brown brick wall. A review of ten years of medical records showed that patients with tree views had shorter hospitalizations, less need for painkillers, and fewer negative comments in the nurses’ notes, compared with patients with brick-wall views.

Household Income and Parks

The availability of parks is an important quality-of-life factor influence individuals choosing a place to live. In a 2001 survey conducted for the National Association of Realtors by Public Opinion Strategies, 50 percent of respondents said they would be willing to pay 10 percent more for a house located near a park or other protected open space. In the same survey, 57 percent of respondents said that if they were in the market to buy a new home, they would be more likely to select one neighborhood over another if it was close to parks and open space. This trend appears to hold true regardless of income. A University of Southern California study found that the positive relationship between park proximity and property value in neighborhoods where the residents are mostly immigrants and poor. The study found that an 11 percent increase in the amount of green space within a radius of 200 to 500 feet from a house leads to an approximate increase of 1.5 percent in the expected sales price of the house, or an additional $3,440 in the median price.

However, low income neighborhoods are generally short of park space. The poor have historically been forced to live on the wrong side of the tracks in industrialized areas that have few public amenities. Low income individuals are significantly less likely to than high-income individuals to engage in regular physical activity that is crucial to good health for this reason. Adults with incomes below the poverty level are three times as likely as high-income adults to never be physically active.
Ethnicity and Parks

Neighborhoods populated by minorities and recent immigrants are generally park poor. Minorities have historically been forced to live in areas with few parks. From a social justice standpoint, there is a strong need to redress this imbalance, as inequitable distribution of park space harms the residents of these communities and may generate large health care costs. Lacking places for recreation, minorities are significantly less likely than whites to engage in the regular physical activity that is crucial to good health. Among non-Hispanic white adults in the United States, 34.9 percent engage in regular leisure-time physical activity, compared with only 25.4 percent of non-Hispanic black adults and 22.7 percent of Hispanic adults.

Crime Rates and Parks

Research supports the widely held belief that community involvement in neighborhood parks is correlated with lower levels of crime. The Project on Human Development in Chicago Neighborhoods studied the impact of “collective efficacy,” or “cohesion among neighborhood residents combined with shared expectations for informal social control of public space.” The study found that “in neighborhoods where collective efficacy was strong, rates of violence were low, regardless of socio-demographic composition.” Crime reduction has also been strongly linked to public parks which keep at-risk youth off the streets, give them a safe environment to interact with their peers, and provide them with engaging activities that keep them out of trouble.

Anecdotal information gleaned from Kansas City police reports suggests a few parks are so overrun with undesirable activities that legitimate park users choose not to use them. These parks cease to function as recreational areas and function instead as criminal marketplaces. In order for a criminal market to thrive, high levels of deprivation and the presence of disorder must exist in the neighborhood. Understanding the basic constructs of criminal markets and the impacts of deprivation and physical disorder aids in understanding the role parks appear to play in a community.

A Park Case Study for the City of Austin

Austin is currently undergoing dramatic social and demographic changes. In 2005, 39 percent of Central Texan fourth graders, 41 percent of sixth graders, and in 2007, 61 percent of adults were either overweight or obese. Residents are experiencing more health problems than ever before. Maps of median family income from the 2000 Census show an increasingly larger income gap between affluent and less-affluent areas. The center of wealth in Austin has slowly migrated into the hills west of the city from the city center. Austin is also experiencing rapid ethnic changes. In 2005, Austin became a majority-minority city – meaning that no ethnic or demographic group exists as a majority of the city’s population. The city’s Anglo share of total population dropped below 50 percent and will stay there for the foreseeable future. In regard to criminal activity, in 2006, Austin experienced above average criminal activity, specifically in the incidence of rapes, burglaries and theft. As Austin is undergoing substantial social and demographic shifts, the city must continue to provide parks and park services to its residents.
Problem Statement

Do Austin residents have equal access to parks?
This spatial analysis will determine if a relationship between park location and amenities are correlated with income, ethnicity, and crime rates found in census tracts within the city limits of Austin.

Hypothesis: Park locations and amenities are not equally distributed across the City of Austin with respect to the location of non-Anglo populations, low-income populations, and areas which experience high rates of crime. Specifically, I believe there are more diverse parks with the most amenities in Central and West Austin, and in areas where there is low criminal activity.

Central Questions

Question 1: Does Austin have enough neighborhood/school and district parks according to NRPA standards?

Question 2: Is there a spatial correlation between neighboring park location and income, ethnicity and crime rate?

Question 3: Is there a spatial correlation between park location and income, ethnicity and crime rate?

Methodology

Data Acquisition

I created a template of the base map that each from which each subsequent map was constructed. Basic map information such as major roads, rivers and lakes and city limit boundaries were downloaded from the City of Austin ftp website. I found a City of Austin folder within the GIS Data File on My Computer for the School of Architecture which contained shapefiles of Austin parks that characterized parks by size, type, amenity, as well as many other characteristics. These databases formed the basic building blocks of my maps.

I then added datasets to subsequent maps as necessary. I added average household income in 1999 dollars from the 2000 Census on the Social Explorer website, shapefiles for Travis County census tracts (polygons) and a database of demographic information for Texas from the Geography Network. The attribute table for Travis County census tracts and the database of demographic data were joined in each instance the information was used. 2007 crime data by census tract was obtained from the Austin Police Department website.

I used the Long Range Plan for Land and Facilities for the Austin Parks and Recreation Department to define park types and standards. I found CAPRA certification requirements and process from the National Parks and Recreation Association (NRPA) website, and compared APRD to NRPA standards for neighborhood and district parks (Table 1).
Table 1. APRD and NRPA Park Standard Comparison

<table>
<thead>
<tr>
<th>Park Type</th>
<th>APRD</th>
<th>NRPA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Size</td>
<td>Service Area</td>
</tr>
<tr>
<td>Neighborhood Parks</td>
<td>3-30 Acres</td>
<td>Within 1 mile</td>
</tr>
<tr>
<td>District Parks</td>
<td>30 – 300 Acres</td>
<td>Within 2 miles</td>
</tr>
</tbody>
</table>

Level of Analysis – Census Tracts

While census block data provides finer resolution, census tracts change less over time, and as we are in approaching 2009, may illustrate a more accurate overall trend between social and demographic factors and park type and amenities. This level of analysis also encourages comparison to previous or future years for which such detailed information might be problematic.

Units of Analysis – Neighborhood, School and District Parks

I combined the 10 different park types (Table 2) officially defined by ARPD into 5 categories (Table 3). I then used neighborhood, school and district parks to analyze park location and distribution of amenities throughout Austin.

Table 2. APRD Park Definitions

<table>
<thead>
<tr>
<th>Park Type</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neighborhood</td>
<td>82</td>
</tr>
<tr>
<td>School</td>
<td>23</td>
</tr>
<tr>
<td>District</td>
<td>11</td>
</tr>
<tr>
<td>Metropolitan</td>
<td>19</td>
</tr>
<tr>
<td>Nature</td>
<td>12</td>
</tr>
<tr>
<td>Senior</td>
<td>3</td>
</tr>
<tr>
<td>Tennis</td>
<td>4</td>
</tr>
<tr>
<td>Golf</td>
<td>6</td>
</tr>
<tr>
<td>Greenway/Greenbelt</td>
<td>31</td>
</tr>
<tr>
<td>Special</td>
<td>29</td>
</tr>
<tr>
<td>TOTAL</td>
<td>220</td>
</tr>
</tbody>
</table>

Table 3. Analysis Park Definitions

<table>
<thead>
<tr>
<th>Park Type</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neighborhood/School</td>
<td>105</td>
</tr>
<tr>
<td>District</td>
<td>11</td>
</tr>
<tr>
<td>Metropolitan</td>
<td>19</td>
</tr>
<tr>
<td>Greenway/Greenbelt/Nature</td>
<td>43</td>
</tr>
<tr>
<td>Special/Golf/Senior/Tennis</td>
<td>42</td>
</tr>
<tr>
<td>TOTAL</td>
<td>220</td>
</tr>
</tbody>
</table>

Assumptions

I assumed that lower income, minority populations, and areas that experience high crime rates are less likely to drive to a park due to social and financial restrictions. Therefore, this analysis uses parks that are within walking or biking distances of one’s home.
Parks Included in Analysis

Neighborhood and School Parks: Neighborhood parks traditionally have been the backbone of Austin’s park system. They typically provide basic recreational opportunities close to home; ideally, all citizens have easy access to a neighborhood park within one mile of their residences. In most cases, they are close enough to residents to allow access by foot or bicycle. Traditional facilities, such as playground, basketball and tennis courts, open play areas and picnic tables are usually provided. School parks are usually located on elementary school properties in which the City of Austin has limited ownership. Their function, service area and access characteristics are the same as neighborhood parks although they are typically smaller in size. PARD places greater emphasis on recreational facilities at schools that target the student population rather than the larger neighborhood population.25

District Parks: District parks are larger than neighborhood parks and are more highly developed to serve the needs of neighborhoods within their two-mile service areas. Typically, they provide the basic recreational opportunities found in neighborhood parks, plus major indoor and outdoor facilities such as sport courts and playfields, group or reservation picnic facilities, swimming pools or nature trails.26

Parks Excluded from Analysis

Metropolitan parks: Metro parks serve the entire city, and therefore require transportation which lessens the likelihood that lower-income populations will travel to the park. They are generally located along waterways and according to this spatial research, appear to be located in wealthier, predominantly Anglo areas which experience lower crime rates. Also, in some cases, metropolitan parks are tourist attractions or sites of special events that draw visitors from other parts of the country. Public transit may serve the parks, but the majority of users arrive by personal or group vehicle.27

Greenbelts/Greenways/Nature Parks: Greenbelts are linear parks that usually follow rivers, creeks and scenic ravines and serve as transportation links to various areas in the city. Greenways serve as a wildlife corridor, an area for flood control and possible corridor for utilities. Both often link with other types of parks; both are excluded from the analysis because they are not located in high density population areas, but are located on the outskirts of the city limits. I could not find a definition for Nature Parks.28

Special Parks: Serve a specific function or protect a special feature. Examples include nature preserves, museums, boat landings, gold courses, urban squares, scenic viewpoints and gardens. This classification serves as a designation for parks and facilities which are clearly not one of the other types, and for this reason the function, size, service area, access and facility characteristics vary considerably. Due to the special nature of these parks, the service area is often city-wide.29 I included senior centers, tennis courts and golf courses into this category because there are only 11 senior centers, 3 tennis courts and 6 golf courses.30
Analysis Tools
The overarching methodology of this spatial analysis is to compare demographic characteristics to park characteristics in each census tract. I used various methods to do this.

- **Clipping**
  Reshaping dots, lines or polygons.
  Ex: I used the city limits layer to clip the roads, lakes and waterways and parks to the shape of Austin’s city limits.

- **Joining**
  Using shared characteristics to join together two tables.
  Ex: Joining the 2000 Census Tracts for Travis County to the Demographic Census Data for the state of Texas using the shared field of STFID.

- **Data Streamlining**
  Ensuring that data in attribute tables were accurate.
  Ex: Census tracts from different sources did not necessarily contain the same number of tracts. Data from APD omitted some tracts that were present in the Demographic Census Data for Texas and added other tracts which were not present. This meant that I spent lots of time figuring out why tract information did not accurately line up when different data sources were joined.

- **Georeferencing**
  Aligning non-digital maps to GIS projected maps so that spatial analysis could be conducted. Ex: Using maps from Ryan Robertson, the City Demographer to compare minority populations to park locations.

- **Editor - Modify Polygon Shape**
  Adding or deleting vectors which create the shape of the dot, line or polygon.
  Ex: I modified the shape of the Austin city limits polygon to eliminate an elongated section that protruded south of the city that did not contain any parks to ensure that legend and other compensatory map information would have adequate space.

- **Editor – Extend/Trim Features**
  Increasing or decreasing feature length
  Ex: After clipping the roads layer to the city limits layer and selecting desired roads, some roads were too short – they did not touch the edge of the city limits. I extended these roads to give the maps a more finished appearance.

- **Editor – Attribute Table**
  Re-classify or add data to the attribute table to adjust map illustrations
  Ex: Edit the number of each type of amenity to the number one so that each type of amenity would be represented just once in the total summation of amenities for each park.

- **Adding Fields**
  Create new columns in attribute table
  Ex: Addition of fields such as violent, non-violent and total crime rates

- **Field Calculator**
  Calculates mathematical functions
  Ex: Used field calculator to sum park attributes and total crime rate.

- **Buffering**
Buffers spatially represent park service areas for both neighborhood/school and district parks. A series of concentric rings were placed at regularly spaced intervals around the point. Calculations are performed on the proximity or distance of events to the selected site.
Ex: Create 1 mile radius around parks to demonstrate service area of neighborhood parks in Austin

- **Select by Attributes to Create New Data Layer**
  Select features by including desired features or excluding undesired features. Export Data to create new data layer in Table of Contents
  Ex: Road selection

- **Individual Labels**
  Use data view to choose verbiage and symbol for map characteristics
  Ex: Creation of Interstate 35 label

- **Layer Properties – General**
  The general tab sets basic functions for map characteristics
  Ex: I set roads and buffer zones to transparency levels between 10 and 50.

- **Layer Properties – Symbology**
  Select the type of symbology, number of classes, type of data breakdown, color scheme and label format.
  Ex: I used four classes of natural breaks and a color scheme that would complement previous maps.

- **Layer Properties – Symbology - Normalizing Data**
  Using a column in the attribute table to mathematically alter another column in the attribute table.
  Ex: Displaying the percentage of non-Anglo populations by using the minority population column divided by the total population column. This created a percentage that showed the distribution of minority populations.

**Findings**
The principle findings are the attached series of maps on the following pages.
Comparison of Park Standards
Neighborhood Parks

Sources: City of Austin, National Parks and Recreation Ass.
Projection: NAD 1983 StatePlane Central Texas FIPS 4203

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Comparison of Park Standards
District Parks

Sources: City of Austin, National Parks and Recreation Ass.
Projection: NAD 1983 StatePlane Central Texas FIPS 4203
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Comparison of Park Standards
Neighborhood and District Parks

Sources: City of Austin, National Parks and Recreation Ass.
Projection: NAD 1983 StatePlane Central Texas FIPS 4203

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Income
Austin, Texas

Income
$0.00 - $24,297.00
$24,297.01 - $52,606.00
$52,606.01 - $88,005.00
$88,005.01 - $276,611.00

Sources: City of Austin, National Parks and Recreation Ass., Geography Network, Socil Explorer
Projection: NAD 1983 StatePlane Central Texas FIPS 4203

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Crime Rate
Austin, Texas

Violent Crime
- 0 - 20
- 21 - 55
- 56 - 99
- 100 - 198

Non-Violent Crime
- 0 - 137
- 138 - 339
- 340 - 657
- 658 - 1995

Sources: City of Austin, Geography Network, Austin Police Department
Projection: NAD 1983 StatePlane Central Texas FIPS 4203

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Income
Neighborhood Parks

Sources: City of Austin, Geography Network, Socio Explorer
Projection: NAD 1983 StatePlane Central Texas FIPS 4203
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Ethnicity

Neighborhood Parks

Sources: City of Austin, Geography Network, Social Explorer
Projection: NAD 1983 StatePlane Central Texas FIPS 4203

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December 15, 2008
Income
Park Amenities

Amenity Types
- 0 - 2
- 3 - 5
- 6 - 8
- 9 - 13

Income
- $0.00 - $24,297.00
- $24,297.01 - $52,606.00
- $52,606.01 - $88,005.00
- $88,005.01 - $276,611.00

Sources: City of Austin, Geography Network, Socil Explorer
Projection: NAD 1983 StatePlane Central Texas FIPS 4203
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December 15, 2008
Ethnicity
Park Amenities

Sources: City of Austin, Geography Network, Social Explorer
Projection: NAD 1983 StatePlane Central Texas FIPS 4203
Joanne Crompton
December 15, 2008
Analysis

Map 1: Park Types
Parks appear to be well-distributed throughout Austin, with a notable absence of parks near the edge of the city limits. Neighborhood School Parks are distributed throughout the City but are more concentrated between 35 and MoPac (Texas Highway 1). Although there are far fewer District Parks, they are larger and are also well distributed throughout Austin. Metropolitan Parks are located in central and south Austin, many Greenbelts/Greenways are located near the outskirts of the city limits, and Special Parks concentrated in the city core.

Park Standard Comparisons

Map 2: Comparison of Park Standards – Neighborhood Parks
Neighborhood Park standards for APRD have dramatically different service distances than the standards proposed by NRPA. At a glance, it is evident that Austin’s in-house evaluation of its neighborhood parks is that they are sufficient in number and provide access to the large majority of residents. Excluded from neighborhood access according to APRD is the southeast corner and several areas located at the southern city limit boundary and in a section located in the central northwest. When compared to NRPA standards, however, it is evident that Austin does not have enough parks to adequately provide recreation and leisure opportunity to residents. By NRPA standards, park service areas are concentrated in the urban core. Residents south of Slaughter Lane, northeast and southeast of 35, and east of 360 do not have access to many neighborhood parks.

Map 3: Comparison of Park Standards – District Parks
The same trend holds true for District Parks. Service areas designated by APRD show that most residents have district parks, while service areas designated by NRPA show that most residents do not have access to district parks.

Map 4: Comparison of Park Standards – Neighborhood and District Parks
APRD standards for both parks illustrate that the large majority of residents have access to either a neighborhood or district park. NRPA standards for both parks illustrates that most residents do not have access to a park within 1 mile.

Social and Demographic Factors

Map 5: Income
The wealthiest residents tend to live west of Texas Highway 1 in west Austin. Residents with an average household income of between $52,606.01 and $88,005.00 either live just east of the most wealthy residents, just north or south of Parmer Lane, or just north or south of Slaughter Lane. Also in this income category are residents that live north of 290 en route to Houston. Residents earning between $24,297.01 and $52,606.00 tend to live in east of Texas Highway 1. The poorest Austin residents are located in pockets just north of the University of Texas campus, in Far West, just south of the river between I-35 and 183, and between 183 and 290 in the south. In general, there is an east-west divide, consistent with the conceptual delineation between predominantly African American and Hispanic east Austin and the rest of the city.

Map 6 and 7: Ethnicity and Crime Rate
Both ethnicity and crime rate shows some form of east-west differential. Most ethnicities, such as African Americans and Hispanics, live east of I-35, which is also where the most incidences of violent crimes are committed. Nonviolent crime is less contained – it is located west of State Highway 1 in the wealthier, predominantly Anglo areas. In general, however, the crime rate is higher in east Austin than it is in the west.

Map 8: Park Amenities
District parks have more amenities than neighborhood parks.

Maps 9-11: Income, Ethnicity and Crime Rate – Neighborhood Parks
The service areas for neighborhood parks, according to NRPA standards, when analyzed in regard to income, ethnicity and crime rate demonstrate have similar patterns. Most parks are located in the urban core – there is a noticeable lack of parkland in areas which have high non-Anglo populations and areas which experience higher crime rates. Wealth does not appear to be a determining factor for park location, perhaps because of the relatively recent shift of the wealthy into western Austin from the urban core.

Maps 12-14: Income, Ethnicity and Crime Rate – Park Amenities
The parks with the most number of amenities are district parks and some neighborhood parks in areas with lower income, more non-Anglos and higher crime rates. While it is more difficult to create new parks in areas lack parkland, it seems as though there has been a conscious effort to provide more facilities in areas which are economically and socially repressed.

Conclusions
Central Questions

**Question 1:** Does Austin have enough neighborhood/school and district parks according to NRPA standards? No.

Maps 2 through 4 demonstrate the service area of neighborhood and district park service area is below that of the standards required by the National Parks and Recreation Association. Through this analysis, it is apparent why APRD did not meet standard 2.4 - there are not enough neighborhood parks in areas that have high non-Anglo populations and experience higher crime rates. More parks need to be developed in these areas.

**Question 2:** Is there a spatial correlation between neighborhood park location and income, ethnicity and crime rate? Yes.

Areas which have higher non-Anglo populations and areas which experience higher crime rates have fewer neighborhood parks. Interestingly, however, wealth does not appear to be a determining factor for park location. This may reflect the recent social and demographic changes which have been occurring in Austin – namely that the wealthy are moving west of Texas Highway 1 towards un-built areas of Austin that have naturally occurring open spaces – which may deter the city from building more parks in that area. Non-Anglo populations are located in areas of Austin that have been developed, have high crime rates and might not have space for a park. This might mean that the land in east Austin is too expensive for the city to purchase, or the city fears that parks in areas of high criminal activity may act as a conduit for more criminal activity instead of ameliorating it.
Question 3: Is there a spatial correlation between park amenities and income, ethnicity and crime rate? Yes.

It appears that APRD has consciously placed more amenities in areas with high non-Anglos populations that experience high crime rates. This could be because parkland is too expensive and that by perhaps building more amenities, more people will be enticed to walk/bike a little farther to get to the park.

Overall, parks seem to be more densely located in the urban core. From these maps, it seems as though APRD has going through phases of development. The first parks may have been built in the urban core, followed by another development phase that concentrated in building parks in north and south of the core. It seems now that that the next phase of park development should concentrate on construction in east Austin and on the outskirts of the city limits. Provided that parks have scheduled community events, they should lower the crime rate, increase property value of homes, and improve the health of residents living in east Austin. Based on park literature, more parks located in non-Anglo areas and areas which experience higher crime rates will increase the level of exercise of local residents, decrease the crime rate and increase property value.

Additional Maps
- Population Density – Show the number of residents in each census tract.
- Suitability Analysis – Combine census tracts for income, ethnicity and crime rates to determine most and least desirable areas for parks.
- Crime Data – Use addresses where crimes were committed to make comparisons between park location and criminal activity.
- Travis County parks – Where are they located in relation to city parks?
- Google Earth – Determine potential locations for new parks.
Appendix
Map Template

Data Sources:

Feature: Austin City Limits
Producer: City of Austin

Feature: Roads
Producer: City of Austin
Procedure: downloaded “cenart.zip” dataset from FTP server: ftp://coageoid01.ci.austin.tx.us/GIS-Data/Regional/coa_gis.html, “City of Austin GIS Data Sets”, Transportation, Major/Minor Arterials – select feature, choose the major roads that frame Austin (Mopac, I35, 290 (both), 183), erase zip file
Projection: NAD 1983 State Plane Central Texas FIPS 4203

Feature: Water
Producer: City of Austin
Projection: none

Feature: Parks
Producer: City of Austin
Procedure: gis-data on ‘arch-moore’ folder in my computer on School of Architecture computer, opened GIS data folder, opened City of Austin folder, selected parks.
Projection: NAD 1983 State Plane Central Texas FIPS 4203

Analysis:

- Download datasets into data folder
- Looked up and recorded Metadata in ArcCatalog
- Projected water shapefile to State Plane Coordinate System FIPS 4203
- Imported shapefiles into ArcMap: Austin City Limits, Roads, Water
- Used Austin City Limits to clip the roads layer
- Used the ‘select by attributes’ feature in the attribute table to select desired roads and waterways to include in map. Exported selected data to create new layers and added them to table of contents.
- Used editor to cut polygon features, extend/trim features, and modify features of the roads, waterways and city limits
- Made water lapis lazuli blue, made roads 2.0 width in black, made Austin city limits hollow and outlined in black (width 1.0), and lightly shaded the background in 10% gray.
- Labeled major roads individually with the label tool
- Deleted parks outside of city limits – Reicher Ranch (Special Park) and Southland Oaks (Neighborhood Park) and saved exported data as a layer
- Created reference map
Designated areas for the map title, sources, projection, legend, scale bar, north arrow, author and date go on each map

Map 1: Parks Types
Additional Data Sources: no
Analysis:
- Edit columns in attribute table to reduce number of park types from 10 to 5.
  - Categorized Golf, Tennis and Senior into Special Parks category
  - Combined Nature Parks with Green Parks
  - Combined Neighborhood Parks with School Parks
- Set symbology to a different color based on park type so that parks would show up better on map
- Created legend

Maps 2 – 4: Comparison of Austin Parks and Recreation Standards to the National Parks and Recreation Association Standards
Additional Data Sources:
  Feature: NRPA Park Standards
  Producer: National Parks and Recreation Association
  Procedure: Recorded standards for neighborhood, community, district and special parks in regard to their type, size and service area
  Projection: none

Feature: Austin Park Standards
Producer: City of Austin Parks and Recreation Department
Procedure: I called Victor Ovalle, Information Manager for Austin Parks and Recreations, who on December 11, 2008, released a press announcement regarding Austin’s CAPRA certification. He put me in touch with Robert Sopronyi who was the lead investigator for Austin during the CAPRA certification process. Sopronyi sent me the 10 categories of CAPRA requirements and loaned me the Long Range Plan for Land and Facilities for the Austin Parks and Recreation Department from 1998 but still applied to the definitions Austin currently applies to park types, sized and service area.
Projection: none

Map 2: Comparison of Park Standards – Neighborhood and School Parks
Analysis:
Edit Attribute Table
- Edited ‘school’ parks in attribute table so that they became ‘neighborhood’ parks
- Sorted by park type in attribute table to select neighborhood parks, created new data layer and saved it to the table of contents
- Removed parks outside of city limits
Buffer
- Used neighborhood parks as the input feature, set buffered distance to 1 mile in accordance to APRD standards, set dissolve type to ‘all’
- Used neighborhood parks as the input feature, set buffered distance to .25 miles in accordance to NRPA standards, set dissolve type to ‘all’
• Used two data frames to compare the two standards
• Selected colors that would contrast with subsequent maps

**Map 3: Comparison of Park Standards – District Parks**

**Analysis:**

**Buffer**
- Used district parks as the input feature, set buffered distance to 2 miles in accordance to APRD standards, set dissolve type to ‘all’
- Used district parks as the input feature, set buffered distance to 1 mile in accordance to NRPA standards, set dissolve type to ‘all’
- Used two data frames to compare the two standards
- Selected colors that would contrast with subsequent maps

**Map 4: Comparison of Park Standards – Neighborhood, School and District Parks**

**Analysis:**
- Imported buffers from previous two maps for both neighborhood/school and district parks.
- Used two dataframes to illustrate difference in standards between APRD and NRPA

**Map 5: Income**

**Additional Data Sources:**

**Feature:** 2000 Census Tracts for Travis County (polygons)

**Producer:** Geography Network

**Procedure:**
- www.geographynetwork.com, click on Census TIGER/2000, click on TIGER/Line Files, Redistricting Census 2000, click on Preview and Download under Free Download, select Texas and click Submit Selection, select Travis County and click Submit Selection, select Census Tracts 2000 and proceed to download file into personal data file. Unzip and delete unzipped file.
- **Projection:** Projection: State Plane Coordinate System FIPS 4203

**Feature:** Demographic Census Data for Texas (database)

**Producer:** Geography Network

**Procedure:**
- www.geographynetwork.com, click on Census TIGER/2000, click on TIGER/Line Files, Redistricting Census 2000, click on Preview and Download under Free Download, select Texas and click Submit Selection. Under Select by Layer, choose Census Tract Demographics (SF1) and click Submit Selection. Place a check mark next to ALL COUNTIES and proceed to download file into personal data file. Unzip and delete unzipped file.
- **Projection:** none

**Feature:** Income

**Producer:** Social Explorer

**Procedure:**
- www.socialexplorer.com, ran a demographic report for all tracts in Travis County from 2000 Census data, that searched specifically for average household income in 1999 dollars, downloaded data to CSV before adding data to attribute table in ArcMap.
Projection: none

Analysis:
- Joined 2000 Census Tracts for Travis County shapefile with Demographic Census Data for Texas using STFID.
- Downloaded average household income in 1999 dollars from Social Explorer Report into Excel file
- Created new field in attribute table of demographic data on the 2000 Census Tracts for Travis County.
- Inserted income data from Excel file into 2000 Census Tracts Census data.
- Discovered that the census tract numerical identification systems were different for Social Explorer and the Census. The 2000 Census did not have tracts 17.62, 17.64, 17.66, 17.67, 17.68 or 18.53 in the attribute table.
- Created 5 rows for the missing census tracts and input income data
- Used ‘symbology’ to classify income initially into 5 classes. I then combined the labels for the two most wealthy classes into essentially $88,005.01 and higher.

Map 6: Ethnicity

Additional Data Sources:
- Feature: 2000 Census Tracts for Travis County (polygons)
  Producer: Geography Network
  Procedure: www.geographynetwork.com, click on Census TIGER/2000, click on TIGER/Line Files, Redistricting Census 2000, click on Preview and Download under Free Download, select Texas and click Submit Selection, select Travis County and click Submit Selection, select Census Tracts 2000 and proceed to download file into personal data file. Unzip and delete unzipped file.
  Projection: Projection: State Plane Coordinate System FIPS 4203

- Feature: Demographic Census Data for Texas (database)
  Producer: Geography Network
  Procedure: www.geographynetwork.com, click on Census TIGER/2000, click on TIGER/Line Files, Redistricting Census 2000, click on Preview and Download under Free Download, select Texas and click Submit Selection. Under Select by Layer, choose Census Tract Demographics (SF1) and click Submit Selection. Place a check mark next to ALL COUNTIES and proceed to download file into personal data file. Unzip and delete unzipped file.
  Projection: none

Analysis:
- Joined 2000 Census Tracts for Travis County shapefile with Demographic Census Data for Texas using STFID.
- Added a column in the attribute column – Minority – which summed each ethnicity except Anglo.
• Created 4 data frames – African American, Hispanic, Anglo and Minority, each which was normalized by the total 2000 population during symbolization. Each ethnicity was set to display in 4 classes using the natural breaks categorization method.

Map 7: Crime Rate
Additional Data Sources:
Feature: Crime Rates by Census Tract
Producer: Austin Police Department
Procedure: saved crime rates by census tract from http://malford.ci.austin.tx.us/police/censustract/census/CENSUS_2007.pdf. Repeatedly called/emailed with police department to determine if they had data in excel or other ‘friendly’ format. Unfortunately, they keep their data in a software program that was incompatible with any software programs that I could find.
Projection: none

Analysis:
• Joined 2000 Census Tracts for Travis County shapefile with Demographic Census Data for Texas using STFID.
• Created three new column fields in the 2000 Census Tract for Travis County – nonviolent, violent, and total crime.
• I calculated the nonviolent, violent and total crime for each census tract, and entered the final sums into the attribute table
• Created 3 data frames to show the variation between violent and nonviolent crimes in regard to census tracts.
• Used four classes categorized by natural breaks to illustrate the crime rates

Map 8: Park Amenities
Analysis:
Edit
Used editor to alter attribute table - if a park had five picnic tables and two playgrounds, I re-classified it as 1 picnic table and 1 playground to illustrate the diversity of amenities, not the overall amount of amenities. Summed the total number of amenities for each park by using the field calculator

Included Amenities:
Baseball fields, softball fields, football fields, soccer fields, multipurpose fields, basketball court, volleyball court, tennis court, golf course, golf disc course, playground, picnic table, picnic shelter, bar-b-que pit, restroom, swimming pool, camping facilities.

Excluded Amenities:
hiking/biking trails, parking area, fishing pier, arts center, theater, botanical gardens, boat ramp, recreational center

Layer Properties
Symbology – I set the symbology to show that each type of park is a different color
Maps 9-11: Income, Ethnicity and Crime Rate – Neighborhood Parks

Additional Data Sources:
- **Feature:** NRPA Park Standards
- **Producer:** National Parks and Recreation Association
- **Procedure:** Recorded standards for neighborhood, community, district and special parks in regard to their type, size and service area
- **Projection:** none

Analysis:
- Used previous income, ethnic and crime rate templates
- Created .25 buffer around neighborhood parks on each map

Maps 12-14: Income, Ethnicity and Crime Rate – Amenities

Additional Data Sources:
- **Feature:** Parks
- **Producer:** City of Austin
- **Procedure:** gis-data on ‘arch-moore’ folder in my computer on School of Architecture computer, opened GIS data folder, opened City of Austin folder, selected parks.
- **Projection:** NAD 1983 State Plane Central Texas FIPS 4203

Analysis:
- Used previous income, ethnic and crime rate templates
- Used symbology, 4 classes natural breaks to show distribution of amenities
References

17. “Regular leisure-time physical activity” is defined as engaging in light to moderate leisure-time physical activity for at least 30 minutes five or more times per week, or engaging in vigorous leisure-time physical activity for at least 20 minutes three or more times per week. Centers for Disease Control and Prevention (CDC), “Early Release of Selected Estimates Based on Data from the 2002 National Health Interview Survey” (Atlanta: CDC, National Center for Health Statistics, June, 2003), http://www.cdc.gov/nchs/data/nhis/earlyrelease/200306_07.pdf.


