

Determining the Best Places to Live in Washington DC: Based on Population Density and Proximity to a Subway Station and Tennis Court

Introduction

Washington DC is the nation's capital and home to over 650,000 residents who live in diverse and eclectic neighborhoods. Residents represent a wide range of ages, races, ethnicities, annual incomes, and education levels. Some areas of Washington DC are resource poor, while other areas are resource rich. In the latter, residents have access to community recreational spaces, public transportation, and other resources that promote health and well-being.

Thinking about a possible move to Washington DC, I would want to live in a location nearby a tennis court and subway station. Such a location would support my efforts to meet national recommendations for weekly physical activity and give me easy access to public transportation to traverse the city. Additionally, I would want to live in a densely populated area so that I can live in a popular part of the city.



Objective

To figure out where in Washington DC are areas that are population dense and also near a tennis court and subway station in order to find a place to live.

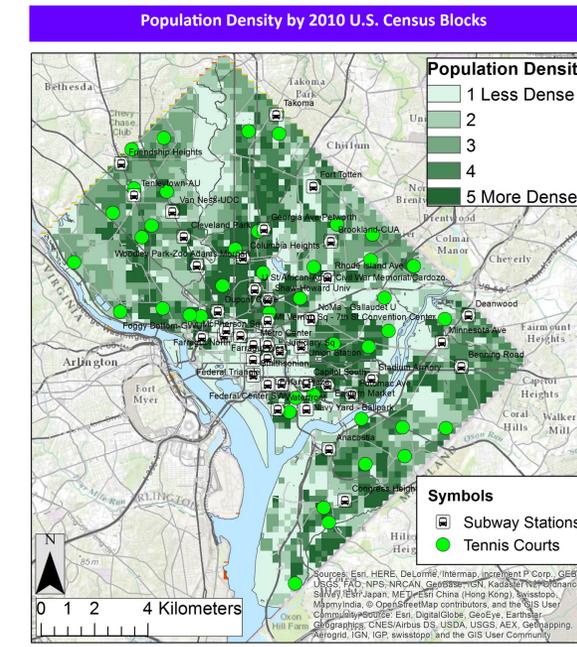
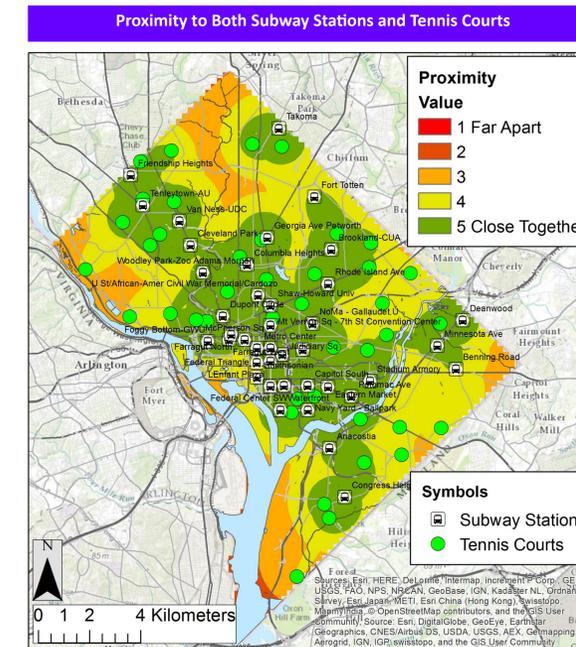
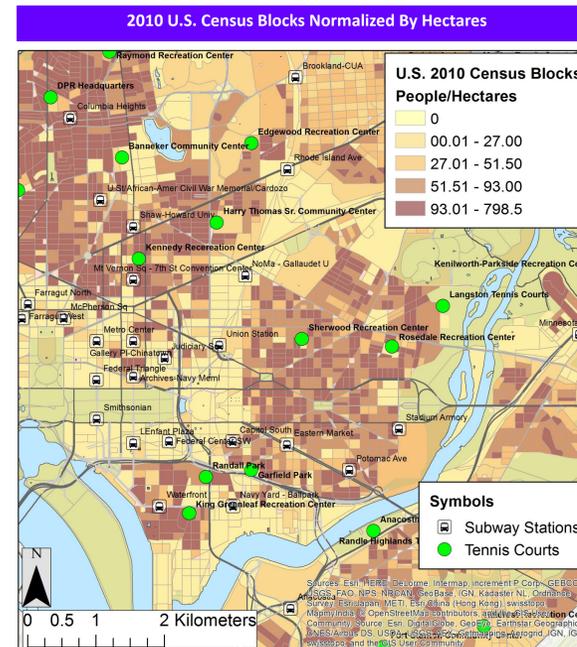
Methodology

To map areas in Washington DC that are best suited for me to live, I analyzed data on locations of tennis courts and subway stations, 2010 U.S. Census Blocks, and included roads, water bodies, and national parks areas on my map. I began by clipping base-map and topography layers to limit to the Washington DC and slightly surrounding area. Using 2010 U.S. Census Block data, I calculated population density by normalizing by hectares.

Then I created a model that calculated radial distances from subway stations to tennis courts. Since the distances included areas outside of Washington DC where subway stations and tennis court locations were not being measured, I created a mask in order to account for locations in Washington DC only. I reclassified the results into quintiles with 1 representing areas that are not close to tennis courts and subway stations and 5 representing areas that are close to both.

I created a second model that calculated population density in Washington DC using 2010 U.S. Census Block data by projecting the census onto a MD state plane 1900 projection. I added a field to the census block projected to calculate the population density in meters squared and converted the census block density field from a polygon to a raster. Finally, I reclassified the results into quintiles with 1 representing less population dense census blocks and 5 representing more population dense census blocks.

Finally, I combined scores to create a composite value of proximity from subway stations to tennis courts plus population density. The combined scores ranged from 2 to 10. A score of 2 indicated locations not nearby a tennis court or subway station and less densely populated. A score of 10 indicated locations nearby both a tennis court and subway station and more densely populated. I reclassified the scores into four groups numerically indicating the best fit for me to live based on proximity and density.



Results

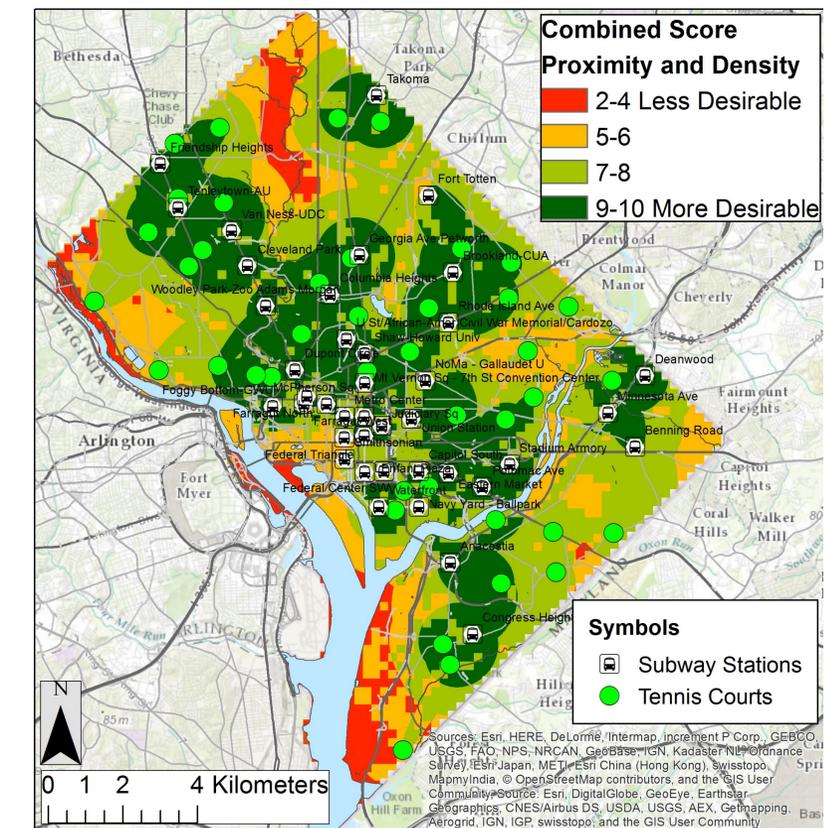
The final map indicates many places that would be a good fit for me to live and many places I might want to avoid living given my criteria. The highest concentration of best places for me to live are in central Washington DC in neighborhoods such as Dupont Circle, Woodley Park, and Capitol Hill. The places I would generally want to avoid living are on the outskirts of DC in the southern and northern areas of the city.

Limitations

There are several limitations to my map:

- The radial distances that measure proximity do not take into account the sidewalks and streets used to get from a subway station to a tennis court. Instead, it measures proximity "as the crow flies", which is not an accurate measurement for walking.
- My final map likely underestimates the best places to live. The spatial mechanism is selecting census blocks containing a population density, but it is not granular enough to distinguish a singular neighboring census block with a different population density from the ones surrounding it. My assumption is that living in a census block with many other people would be great, but based on my map, I would miss opportunities to live across the street from a densely populated block.
- My final map does not take into account other real life factors that determine where I would want to live such as housing cost, size of home, school district quality, proximity to my job, neighborhood safety, etc. It also does not ascertain whether the recommended areas are residential versus commercial, park land, or something else that makes them unlivable.

Places to Live in Washington DC Based on Proximity to Tennis Courts and Subway Stations and Population Density



Projected Coordinate System: NAD 1983 StatePlane Maryland FIPS 1900

Data Sources: Fundamentals of GIS; Term Project; Tennis Court Sites, District of Columbia Department of Parks and Recreation data, created as part of the DC Geographic Information System (DC GIS) for the D.C. Office of the Chief Technology Officer (OCTO) and participating D.C. government agencies; <http://data.dc.gov/>; accessed Dec 5, 2015; American Community Survey 5-Year Estimates for District of Columbia, 2007-2011, TIGER/Line with Selected Demographic and Economic Data; accessed Dec 5, 2015 || Kaczynski AT, Besenyi GM, Stanis SA, et al. (2014). Are park proximity and park features related to park use and park-based physical activity among adults? Variations by multiple socio-demographic characteristics. *Int J Behav Nutr Phys Act.* 11:146

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