

Documenting Greenspaces in Philadelphia

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Abstract

Studies have shown that having access to green space areas are important to overall well-being and can reduce health inequalities. We documented and mapped existing greenspaces in the Olde Kensington neighborhood of Central Philadelphia near Temple University. With the gentrification and recent development boom in this area of Philadelphia, there have been many greenspaces that have been destroyed and built upon to make room for new residences.. By utilizing Google Earth and recent satellite imagery, we digitized greenspaces within the study area parcel by parcel and applied their existing parcel and address data. We also included whether the greenspaces were on commercial, resident, or vacant lots, as there is a significant amount of vacant lots in the neighborhood. In August of 2019, we visited the study site in Philadelphia to conduct field work by ground truthing our results and observing if any greenspaces had been added or lost from the date of our satellite imagery. Using ArcMAP, Google Earth, and Adobe Illustrator, we created a map with the current existing greenspaces found from our research as well as the amount of schools, community centers, and churches within the study area. We found 531 greenspaces in our study area, totaling 16.98 acres, or 7.9% of the total study area. The average area per greenspace was 0.032 acres, while the largest greenspace had an area of 1.33 acres. This study represents the first phase of a long-term research project in Philadelphia, by documenting the current greenspaces in this rapidly changing neighborhood, residents and policymakers can work to ensure that they are preserved as new development occurs. Future research will examine how changes in greenspaces over time relate to shifting neighborhood demographics. The methodology developed for this study can be replicated in other locations to study rapid urban socioecological change.

Literature Review

While there have been numerous studies examining the distribution and benefits of formal urban greenspace (i.e. parks, urban forests, etc.), less attention has been paid to informal greenspace (IGS) in cities (Rupprecht and Byrne; Rupprecht, Byrne, Garden, et al.). Following Rupprecht and Byrne (2014), we conceptualize IGS as non-remnant, spontaneous urban vegetation, excluding parks, gardens, ornamental plantings, and agricultural areas from consideration as IGS. That said, the level of management, land use, site history, form, scale, and neighborhood context all vary between IGSs (Rupprecht and Byrne). IGS consists of everything from vacant lots to street right of ways to vegetation growing in cracks and holes in the urban fabric.

Like formal greenspaces, IGS can provide both environmental and social benefits to cities. A recent systematic review of the potential for IGS to increase biodiversity in cities found that ecologists reported a high number of species across different IGS types and taxa, more even than some rural areas, lawns, and forests (Rupprecht, Byrne, Garden, et al.). In terms of social benefits, another recent systematic review found that many researchers had documented the recreational value of IGS and its ability to provide residents with connections to nature (Rupprecht, Byrne, Ueda, et al.). IGS can also provide for a greater diversity of uses and users than formal parks, which often limit the types of activities allowed within them and the hours during which they can take place (Campo).

Study Area

Like many other North American cities, Philadelphia is seeking solutions to vacancy and sustainability challenges. Although it has bounced back faster than many other U.S. urban centers, poverty and economic inequality persist in the urban core and broader region, with Philadelphia having the fourth highest Gini coefficient (a standard measure of economic inequality) among major U.S. cities.

Driven by deindustrialization, racial unrest, and other social and economic factors, the loss of many business and middle-class residents in the second half of the Twentieth century eroded the city's tax base and left tens of thousands of parcels vacant. While the city's population grew in 2010 for the first time since 1950, the legacy of decades of decline has left the city with high concentrations of poverty, vacant land, and rampant inequality across the metropolitan area.

The South Kensington and Old Kensington neighborhoods were historically a mix of residential and manufacturing uses, including furniture manufacturers, breweries, and the Stetson Hat Factory, which employed 5,400 workers at its peak in 1915 (Snyder). Bounded on the West by 5th Street, on the North by Berks Street, to the East by Front Street, and to the South by Girard Avenue, our study area is approximately one third of a square mile. Like much of Philadelphia outside of Center City, the area is still struggling with high levels of vacancy and concentrated poverty.

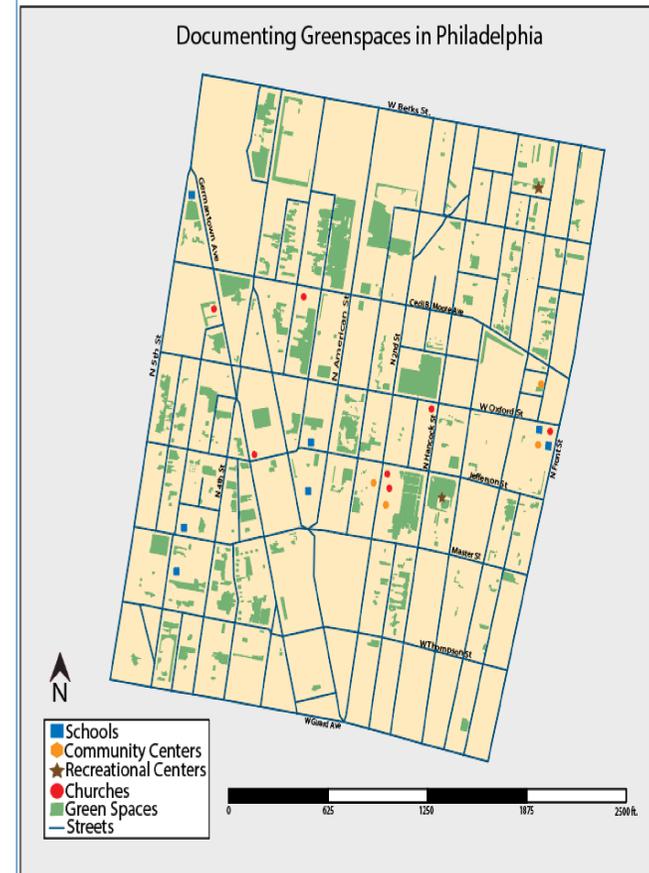
However, the area has recently seen a return of development, both residential and commercial, growing in population from 6,831 in 2010 to 7,852 in 2016 (a 15% increase) (U. S. Census Bureau 2010; U.S. Census Bureau 2016). Similarly, the percent of vacant land has decreased in the same time period. Finally, the median household income increased by over \$6,000 (a 17.5% increase) between 2010 and 2016 (U. S. Census Bureau 2010; U.S. Census Bureau 2016). These increases in population and median household income are much larger than those happening citywide, with Philadelphia seeing a 2.2% increase in population and an 8.9% increase in median household income between 2010 and 2016 (U. S. Census Bureau 2010; U.S. Census Bureau 2016). Like many areas with incipient or ongoing gentrification, the neighborhood is now home to a cluster of artist spaces and initiatives including those that have relocated from elsewhere due to being priced out (Saffron).

Methods

To construct a census of greenspaces, we worked parcel by parcel through each block in the study area, using Google Earth Pro's Add Polygon tool to digitize each greenspace we found. Street View imagery was to validate findings from aerial imagery, which was examined at a flat plane and an eye altitude of 700-850 feet. We also categorized the greenspaces based upon landuse (vacant, residential, industrial, commercial, park, religious, educational, social services, and other), vacancy status (based upon lack of structures rather than residency), and whether they were formal or informal greenspaces (based upon evidence of maintenance). To ensure accuracy between digitizers, we performed an inter-rater reliability evaluation by having each digitizer independently digitize thirty randomly sampled blocks and comparing the results. This analysis differs from previous investigations of IGS in urban areas by conducting a complete census of a neighborhood, rather than using a sampling scheme to estimate IGS for an q city (Rupprecht and Byrne).

To validate the digitizing results, we confirmed each remotely sensed urban greenspace in the field. In August of 2019, in two teams of two, we walked each block of the study area to complete our urban greenspace census of the neighborhood. For each block, the field auditors had a printout of the aerial imagery that included any of the greenspace polygons identified via Google Earth. In the field, auditors confirmed greenspaces, noted those that had been lost, and marked any changes in their spatial extents. We also confirmed the land use type and vacancy status for each greenspace in the field.

Results



We found 531 greenspaces in our study area in 2016, totaling 16.98 acres, or 7.9% of the total study area. The average area per greenspace was 0.032 acres, while the largest greenspace had an area of 1.33 acres. The vast majority were IGS (490, or 92.3%), as was the vast majority of greenspace area (14.18 acres, or 83.5%). However, while the largest greenspace was IGS, the average size of formal greenspaces (0.069 acres) in the neighborhood was over twice that of IGS (0.029 acres).

	N	Area (Acres)	Avg Area (Acres)	Max Area (Acres)
Total	531	16.98	0.032	1.33
Formal	41	2.8	0.069	0.55
Informal	490	14.18	0.029	1.33

Conclusions

While we think of cities as concrete jungles, almost eight percent of our study area was composed of greenspaces, the vast majority (83.5%) of which consisted of informal, unplanned greenspace. Given the many ecological and social benefits that this greenspace provides to residents, we are concerned that much of it will be lost as the neighborhood redevelops and land becomes more valuable. Philadelphia should explore strategies for revitalizing neighborhoods that retain both current greenspace and long-term residents. Redevelopment strategies should account for the social, cultural, ecological, and economic activities already occurring, with an emphasis on maintaining housing affordability and environmental amenities in each neighborhood.

While this research focuses upon the City of Philadelphia, the results speak to concerns around the loss of urban greenspace and environmental gentrification in cities across the world. The challenges Philadelphia faces in redeveloping neighborhoods without losing formal and informal greenspaces and/or displacing current residents are similar to those faced in other shrinking cities. Future research will explore urban socioecological change in more cities to develop a comparative approach that can generate best practices for redevelopment without displacement or the loss of greenspace. Future research will also include temporal analyses of greenspace in our South Kensington study area to see how greenspace availability and neighborhood demographics are changing over time as the neighborhood redevelops.

References

- Campo, Daniel. *The Accidental Playground: Brooklyn Waterfront Narratives of the Undesigned and Unplanned*. New York: Fordham University Press, 2013.
- Rupprecht, Christoph D.D., Jason A. Byrne, Jenni G. Garden, et al. "Informal Urban Green Space: A Trilingual Systematic Review of Its Role for Biodiversity and Trends in the Literature." *Urban Forestry and Urban Greening* 14.4 (2015): 883–908.
- Rupprecht, Christoph D.D., Jason A. Byrne, Hirofumi Ueda, et al. "'It's Real, Not Fake like a Park': Residents' Perception and Use of Informal Urban Green-Space in Brisbane, Australia and Sapporo, Japan." *Landscape and Urban Planning* 143 (2015): 205–218.
- Rupprecht, Christoph D.D., and Jason A. Byrne. "Informal Urban Green-Space: Comparison of Quantity and Characteristics in Brisbane, Australia and Sapporo, Japan." *PLoS ONE* 9.6 (2014).
- . "Informal Urban Greenspace: A Typology and Trilingual Systematic Review of Its Role for Urban Residents and Trends in the Literature." *Urban Forestry and Urban Greening* 13.4 (2014): 597–611.
- Saffron, Inga. "With Clay Studio's Move to North American Street, a New Creative Cluster Emerges in South Kensington." *The Philadelphia Inquirer* Jan. 2020.
- Snyder, Jeffrey B. *Stetson Hats and the John B. Stetson Hat Company 1865-1970*. Atglen, PA: Schiffer Publishing, 1997.
- U.S. Census Bureau. "American FactFinder." 2016.
- United States Census Bureau. "The United States Census." 2010.

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