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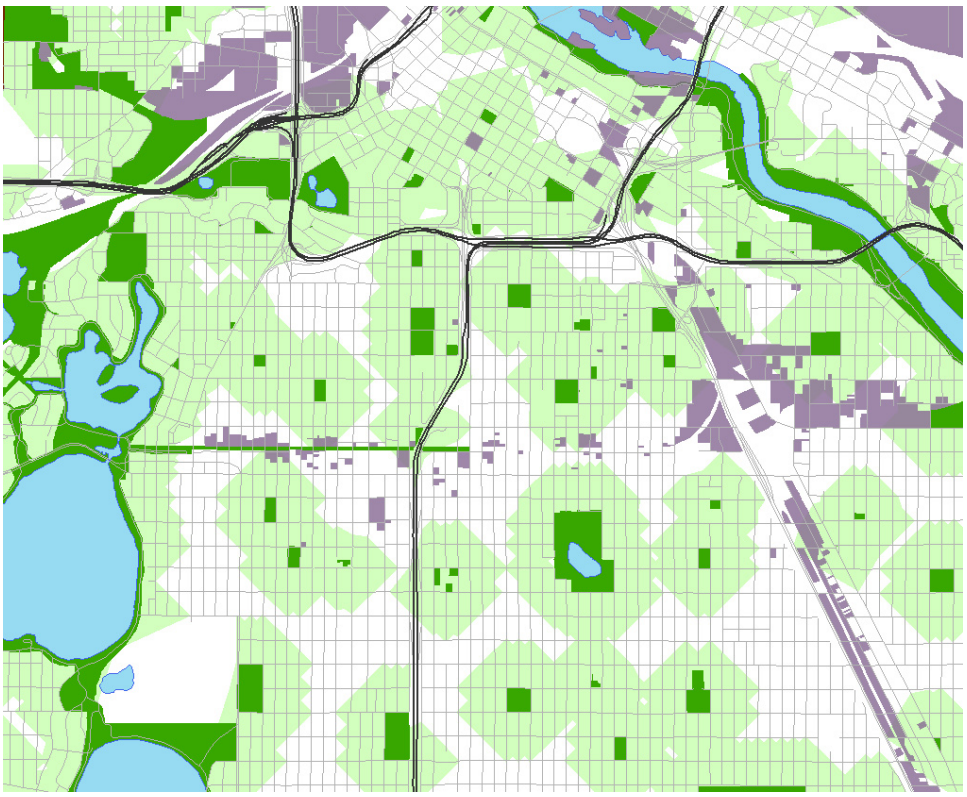
Mapping Park Buffers: The Minnesota Method



Joel Koepp, Research Fellow
Ann Forsyth, Director
Jason Zimmerman, Research Fellow

Second Revised Edition

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Revised Edition

Joel Koepp, Research Fellow
Ann Forsyth, Director
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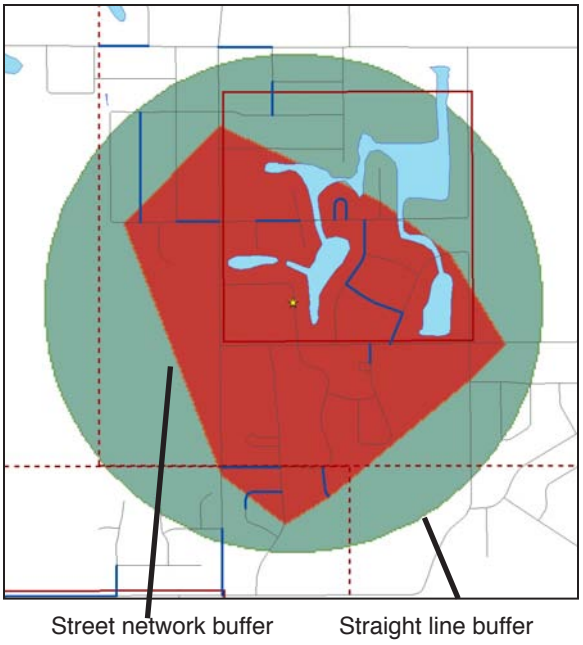
Overview

The Minnesota park buffering method illustrates access to open space for disadvantaged populations. Rather than using the simpler technique of determining straight line buffers around parks, the Metropolitan Design Center developed a method of identifying access along a street network, which deals with physical and human barriers to park access in a more realistic way. This technical paper describes the basic method and a refinement of that method, which was developed after better data became available that allowed green space to be identified more precisely. The second method also represents a refinement of the buffering approach.



This technical paper accompanies the Access to Parks and Low Mobility map series created by the Metropolitan Design Center at the University of Minnesota for the Trust for Public Land in June 2005. These refined a series of maps created in August 2004, referred to as Map Series One.

The purpose of the map series was to identify residents of the Twin Cities who are potentially less well-served with parks. The focus was on parks useful to seniors and children.

Parks and Park Buffering: Method One

The parks used for buffering in Map Series One were from the Metropolitan Council's generalized land use layer. Many pocket parks, community gardens, and schools that function as parks were excluded.

Street distance buffers were created for areas within 0.25 miles of the park. Technically, after trying different options to do this in GIS, we found every road center line that came within a 30 foot buffer around the parks (and in this data set park boundaries are typically drawn up to the road center line)—allowing for some error in the computer data and assuming that even it is accurate, that if someone comes so close to the park on a road, he or she can gain access. The Design Center created a point where

the buffer met each road. We then used the ArcView Network Analyst extension to draw all possible 0.25 mile street routes away from these park "access" points. There may be trails and pedestrian paths that give access for others--for this broad assessment we could not include them.

Parks and Park Buffering: Method Two

Parks

The parks used for buffering were from the Metropolitan Council's 2000 generalized land use layer, the 2005 City of Minneapolis parks layer, and the 2004 City of Saint Paul parks layer. The maps in Series Two focused on Minneapolis and Saint Paul only.

In addition to the parks layers, green spaces around public schools were digitized by hand and considered functionally as parks in the analysis. School buildings and paved surfaces were excluded. Schools were identified from the Metropolitan Council's points of interest layer. Using high resolution color orthophotos from Ramsey County and the City of Minneapolis, the Metropolitan Design Center hand-drew ball fields, play areas, and other usable green spaces around schools and saved the information as a separate data layer. For about a dozen schools in Minneapolis where aerial imagery was unavailable, a research assistant did site visits and drew in the green spaces on parcel maps, using a GPS to mark the corners of each green space. Schools in the two cities are open to the public.

In addition to the parks in the two cities, parks within a two mile buffer around each city were included in the analysis to account for access to nearby parks not shown on the maps. While these maps were as complete as possible, they may not have included some new parks. There may also be pedestrian-only access to parks in some areas, but this was not noted in the data.

These maps include open green areas. Park buildings are included where they are located in these open green areas.

Context and Excluded Areas

Additionally, land zoned industrial from the Metropolitan Council land use layer is indicated in a transparent purple layer. This enables the viewer to distinguish between neighborhoods and industrial areas, which do not present the same park access concerns.

Several types of open space were excluded from the analysis:

- Private golf courses, which are typically fenced off
- College and university campuses, including athletic fields
- Open space on church properties, which is generally too small to be usable
- Minneapolis and Saint Paul parkways, which act more as visual amenities than usable space
- Trails (e.g., the Gateway Trail in Saint Paul)
- The Midtown Greenway in Minneapolis, which is below grade and not very accessible
- 35 traffic triangles that were much too small to be usable open space. These were examined using aerial photos to check that they included mainly small patches of lawn without benches or other signs of potential use.

These features were removed by editing the parks layers in ArcGIS, splitting polygons where necessary, and removing the parkway and trail features.

Buffering

Street distance buffers were created for areas within 0.25 miles of the park. The Design Center found every road center line that came within a 15 meter buffer around the parks. This slightly wider buffer than Method One allowed greater accuracy in finding access points. It is possible for a park to have no buffer on one or more sides if there is no street access.

Low Mobility

The red and orange areas on these maps indicate areas where many people with low mobility live. The analysis used 2000 US Census data at the block group level, which is smaller than a census tract. St. Paul has 258 blocks groups and Minneapolis has 397 block groups. To enhance readability, we have not highlighted the block group boundaries on these summary maps, but they are available for further analysis.

Low mobility is estimated based on four characteristics: school age children (ages 5-14), individuals over age 65, individuals in poverty, and those in households without cars. Low mobility is calculated in two ways:

- based on the percentage of the total population in a block group and
- based on the density of these population groups.

The reason for this blended analysis is described further in a memo related to a similar study: http://www.designcenter.umn.edu/reference_ctr/publications/designbriefs/pdfs/tpl.pdf

Areas of block groups with high concentrations of these groups--either measured as a percentage/proportion of the population or in terms of population density--are shown in red (indicator for four and above). Areas of block groups with moderately high concentrations of these groups are shown in orange (indicator of one and above). White areas do not have a higher than average population or density of people with low mobility, as defined above.

Maps: Combining Census and Park Access Data

Two maps were made for both Minneapolis and Saint Paul. One map of each city shows the red and orange low mobility block groups, the park and open space features, industrial and airport land, and the street network. This map is meant to highlight areas of need and their spatial relationship to parks. The other map is identical but also shows the 0.25 mile street distance buffers around the parks. These buffers cover the shading of low mobility block groups and highlight the areas outside the buffers that may not be well-served by parks.

Notes

The maps are displayed in the NAD83 UTM Zone 15 coordinate system.

References

Metropolitan Council. 2000. *Generalized Land Use 2000 for the Twin Cities Metropolitan Area*. MetroGIS: http://www.datafinder.org/metadata/landuse_2000.htm.

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Metropolitan Council, et al. 2005. *Counties and Cities & Townships, Twin Cities Metropolitan Area*. MetroGIS: http://www.datafinder.org/metadata/county_ctu.htm.

Metropolitan Design Center
1 Rapson Hall
89 Church Street
Minneapolis, MN 55455
612.625.9000
www.designcenter.umn.edu