



Portland Parks

A GIS Analysis of Geodemographics, Distribution, and Service

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GIS 2
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Poverty and Green Space

- Hypothesis: Areas with greater poverty have less accessible green space (acreage).
- Studies in Los Angeles indicated a strong correlation between poverty, minority populations, and green space (Wolch et. al, 2002).
- National Park Standards (National Recreation and Parks Association, 2000): 4 acres per 1000 residents minimum; 6-10 acres of park space is ideal.
- Question: How does Portland compare in a similar analysis?

The Process

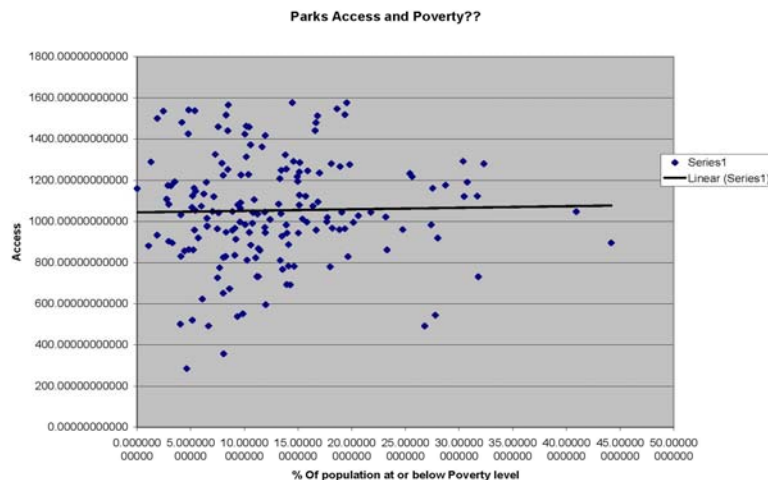
- Acquire GIS data from Metro's RLIS
 - UGB, Parks, Census Tracts, County Line, Vacant Lots
- Determine extent of study: Chose census tracts for Multnomah County within the Urban Growth Boundary as study area (minimizes data, processing, and time)
- Gather census data: www.census.gov
- Number crunching...

Mapping Poverty and Parks

- Using the Census definition of "Poverty" (as in under the poverty income level), I assigned a percentage of poverty per population in each census tract of the study area.
- Eliminate "parks" and "open space" that are listed as private, golf courses, swimming pools, cemeteries.
- Calculate the total area of park space in each census tract.
- Define a characteristic of "accessibility": $\frac{1}{4}$ mile Euclidian Distance from parks; walkable distance

Mapping Poverty and Parks, pt. 2

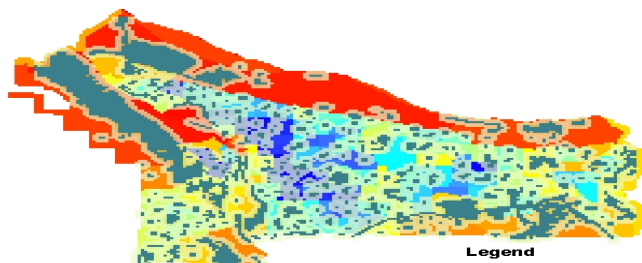
- Raster Calculator: convert to “accessibility” with highest value being outside of the ¼ mile buffer.
- Zonal Statistics as Table: Summarize value of accessibility per pixel and calculate the mean for each census tract.
- Join to the census tract table with geodemographics.



Mapping Population and Park Acreage Service

- Assume that population is homogenous throughout Portland
- Assign a raster cell size of 150x150 feet (about 10 to 12 households based on a 2000 sq.ft house)
- Zonal statistics summarize population per pixel
- Dasymetric mapping could reveal a more realistic distribution of population

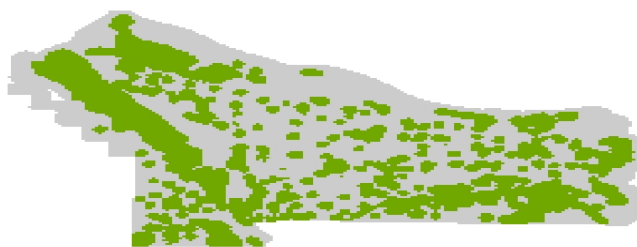
Overlay of Population Density and Park Density in Portland

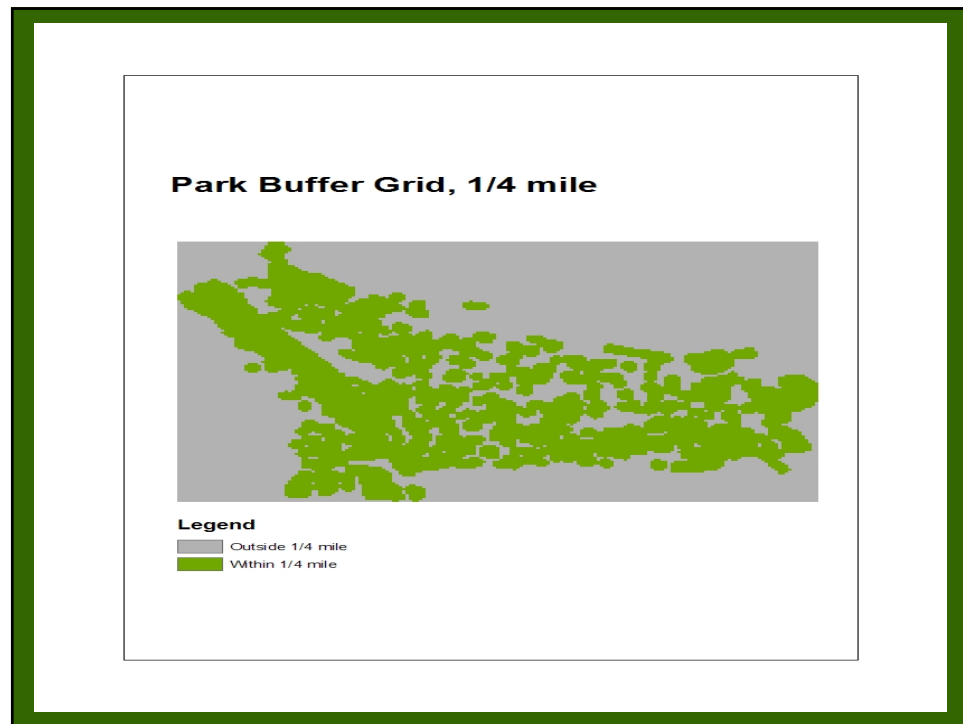


Raster Calculator

- $([\text{parkdensity}] * 150 * 150 / 43559.66) / ([\text{population per pixel}] / 1000)$
- This calculation provides a visual “mask” of serviceable park areas
- At least 4 acres per 1000 people

Underserved Park Areas



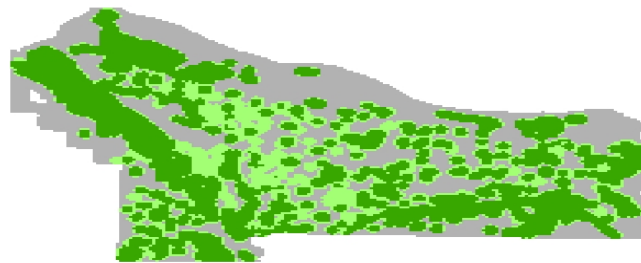


Raster Addition

Less than 1/4 mile	7
More than 1/4 mile	3
More than 4 acres	0
Less than 4 acres	5

	<1/4 miles	>1/4 miles
>4 acres	7	3
<4 acres	12	8

Raster Addition of Parameters



Legend

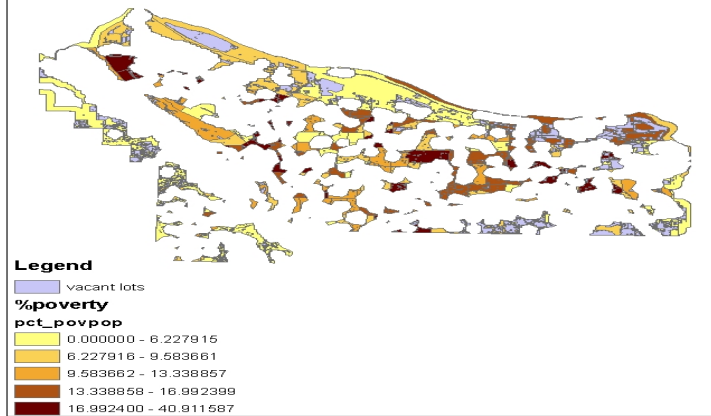
- Within 1/4 mi and at least 4 ac.
- Outside of parameters
- Within 1/4 mi, less than 4 ac.

Percentage of land for Parks

Value	Percentage
7	43.5
8	36.2
12	20.3

~63.8 percent of Portland (within Multnomah County and the Urban Growth Boundary) is within ¼ mile of a park, and 43.5% provides at least 4 acres per 1000 residents.

Vacant Properties, & % Poverty within the raster value 8



The trouble with population density

- Population density is very high throughout census tracts surrounding downtown, inner southeast, and southwest Portland
- Presence of Regional parks like Forest Park, Washington Park, and Mt. Tabor offset population and accessibility measures

MAUP

- The results of this study could change based on search radius of population per pixel. This study used $\frac{1}{4}$ mile radius, same as the park buffer, and showed little difference in population and distance.
- Using a $\frac{1}{2}$ mile search radius for the Focal Stats function would alter results.

Conclusions & Next Steps

- Portland is well planned in terms of park space.
- How do we negotiate densely populated areas with little park space?
- What are the options for creating Greenways, Ecological Corridors between parks for connecting and facilitating species diversity?
- Possible creation of a model to simulate this process for other cities to replicate for parks planning purposes.