Using Multi-Criteria Evaluation to Select Suitable Sites for Depaving

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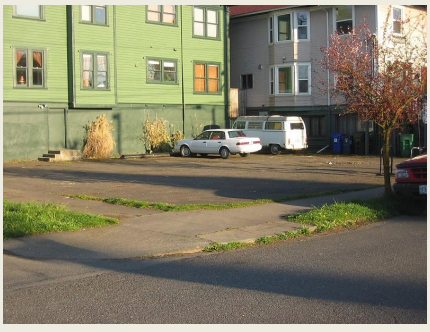
Our goal was to select a suitable site for the organization Depave to remove pavement

Before:



Underutilized parking lot
@ N Williams Ave and NE Fargo St

After:

Fargo Forest Garden
@ N Williams Ave and NE Fargo St

Why are permeable surfaces important?

- Impermeable surfaces do not allow water to flow through them to reach the soil.
  - Ex: concrete, asphalt, compacted gravel
- Permeable surfaces DO allow water to flow through. When the water reaches the soil, the soil acts as a filter, and takes out impurities before the rainwater reaches our rivers.
  - Ex: bare soil, grassy lawns, water gardens and bioswales
- Drainage through impermeable surfaces also helps prevent flooding and combined sewer overflow.

Datasets Used

- Metro 2007 Landsat Satellite Imagery Land Cover Classification raster
- 2000 Census SF3P87 poverty table
- RLIS
  - Parks
  - Census block groups
  - Portland neighborhoods
  - Portland city boundary

Methodology

- Converted text files to excel spreadsheets, added to ARCMap as tables
- Select by location- neighborhoods, census blocks, and parks that are within the city boundary
- Intersect tool (Analysis Tools)- area of each block group that is park
- Table join- parks and census block groups
  - New field, field calculator- [Sum-AREA]/[POP00]
  - Gave area of parks per person in each block group
  - Similar process for poverty levels per block group

Methodology Continued

- Analysis layers converted to raster based on Landsat (1m) resolution
- Four reclass maps were created, one for each variable, using Reclassify tool in Spatial Analyst
- The reclass categories were suitable (1) and unsuitable (0)
- These layers were then used in a weighted overlay to create a map of suitable areas for depaving

Why we chose what we did

Soil categorization - chose the two classes that needed irrigation least, these soils best support plant growth and water uptake

Poverty – one standard deviation above mean (~22 – 62%)
Source: Community development expert

Land Cover- only looked at impervious surfaces

Parks- block groups with park density below 20 acres/ 1000 people was chosen
Source: Portland Parks and Recreation 2020 Vision

Justification of Weights

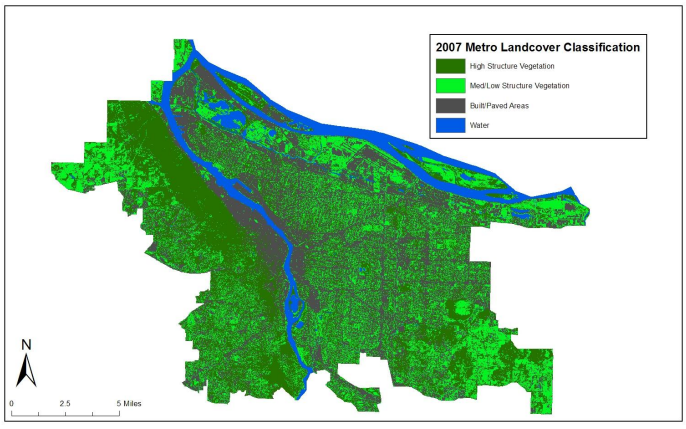
- We followed the interests of Depave for our weighting system:

- 34%) Poverty – Low socioeconomic equity
- 20%)Parks - Green space present
- 22%)Soils - Need for irrigation
- 24%)Land Cover – Impermeable surfaces

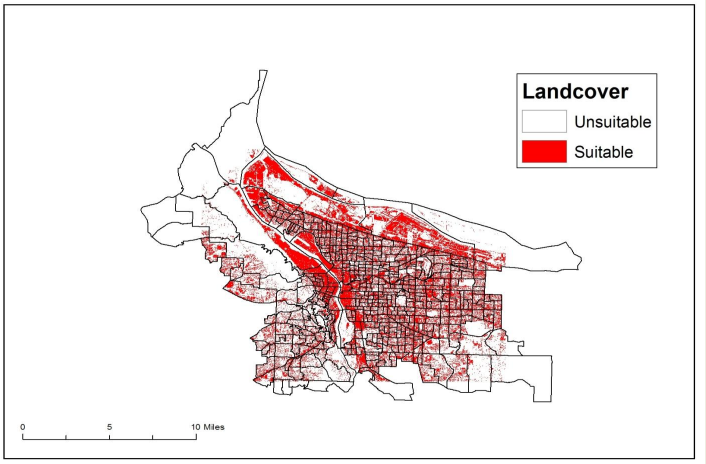
Justification of Weights continued

Depave Site Planners' Ranks							
Poverty Density	2	3	1	1	1		
Park Density	4	4	3	2	2		
Surface Impermeability	3	2	2	3	3		
SubsurfacePermeability/Health	1	1	4	4	4		
Depave Site Planners' Values						**Layer Total**	**Weight**
Poverty Density	3	2	4	4	4	17	0.34
Park Density	1	1	2	3	3	10	0.2
Surface Impermeability	2	3	3	2	2	12	0.24
SubsurfacePermeability/Health	4	4	1	1	1	11	0.22
						Values Total	
						50	

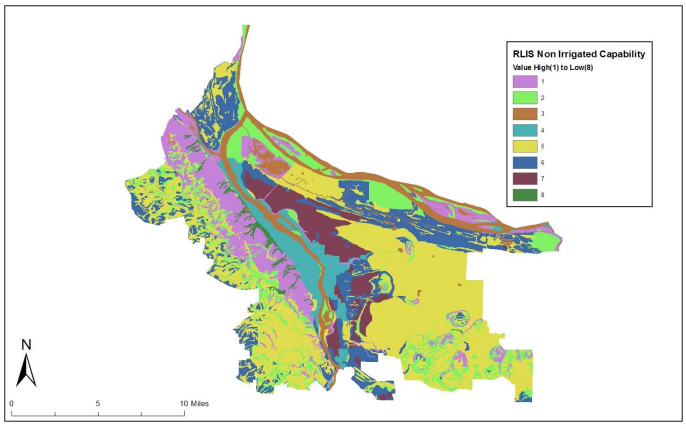
Original Land Cover Classification



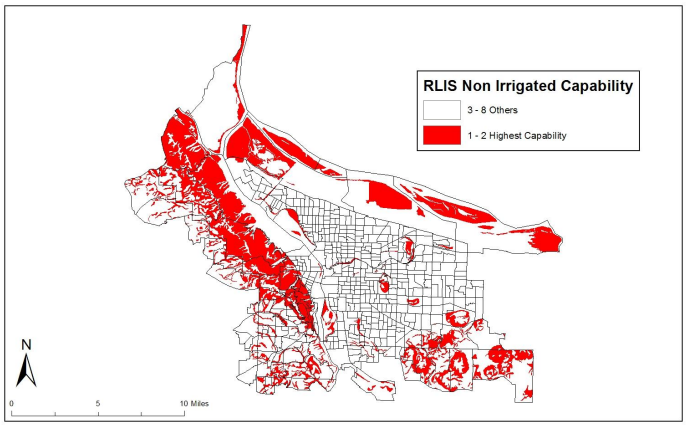
Impervious Surfaces Selected



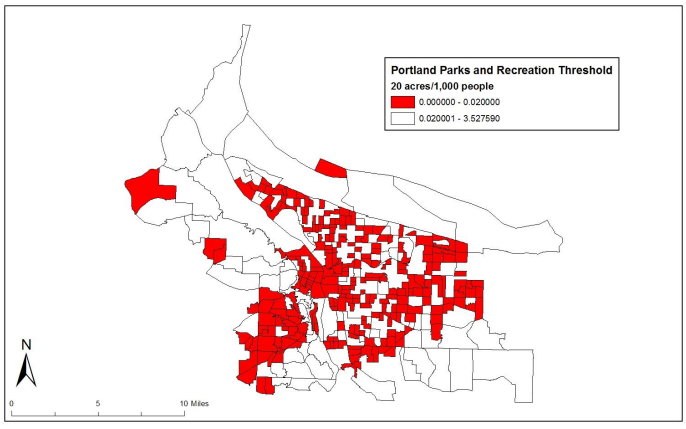
Original Soil Map



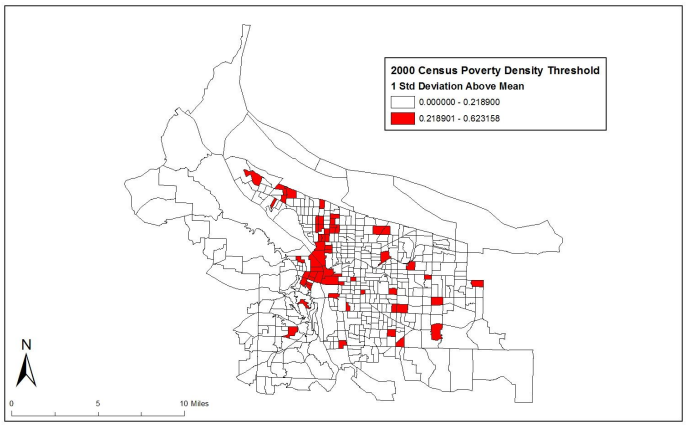
Selected 2 Soil Types that Need Least Irrigation



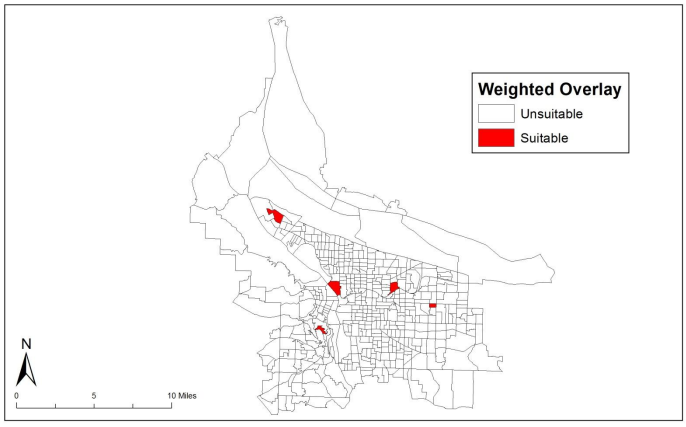
Selected Block Groups with less than 20 acres per 1000 people



Poverty Level Selected Block Groups with One Standard Deviation Above the Mean

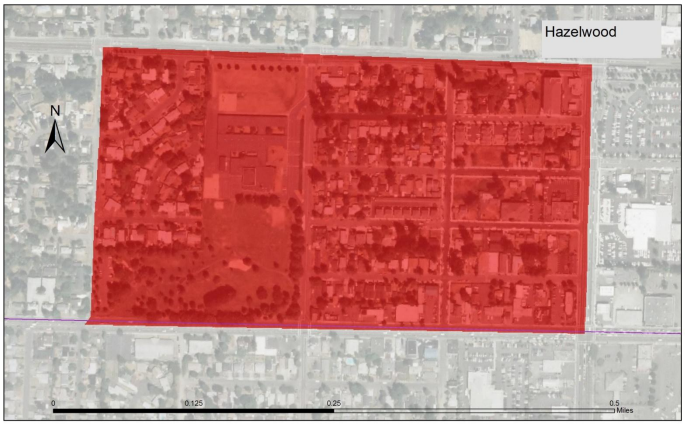


Weighted Overlay Map

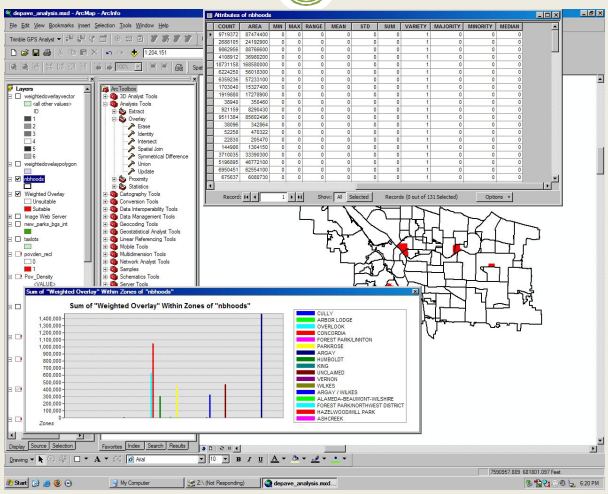


Neighborhoods that Overlap Selected Block Groups

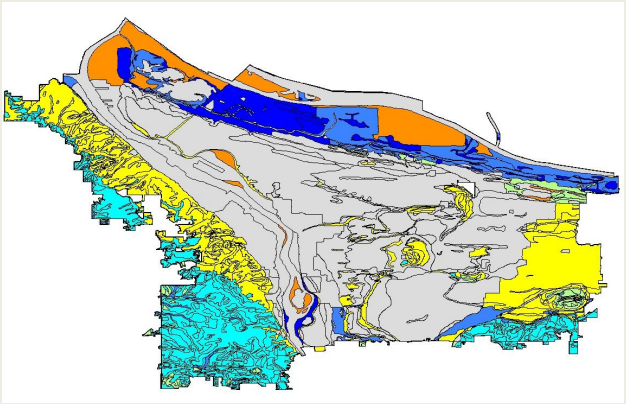
Further Work



Zonal Statistics



Challenges & Limitations



We looked at multiple soil data sets before finding suitable data

Questions?

depave