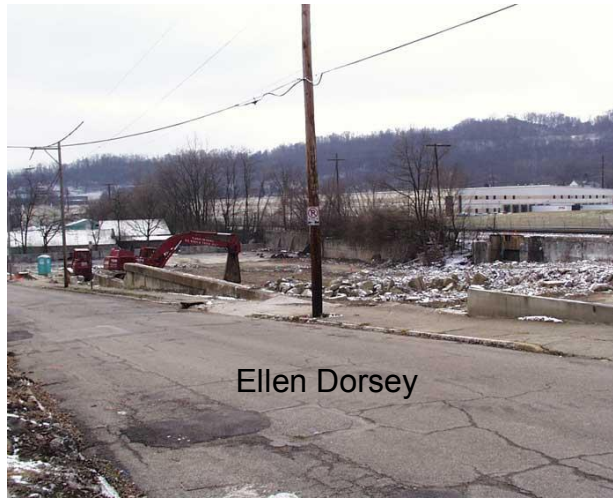Brownfield Prioritization Model: Considering Environmental Factors, Environmental Justice and Infill Potential
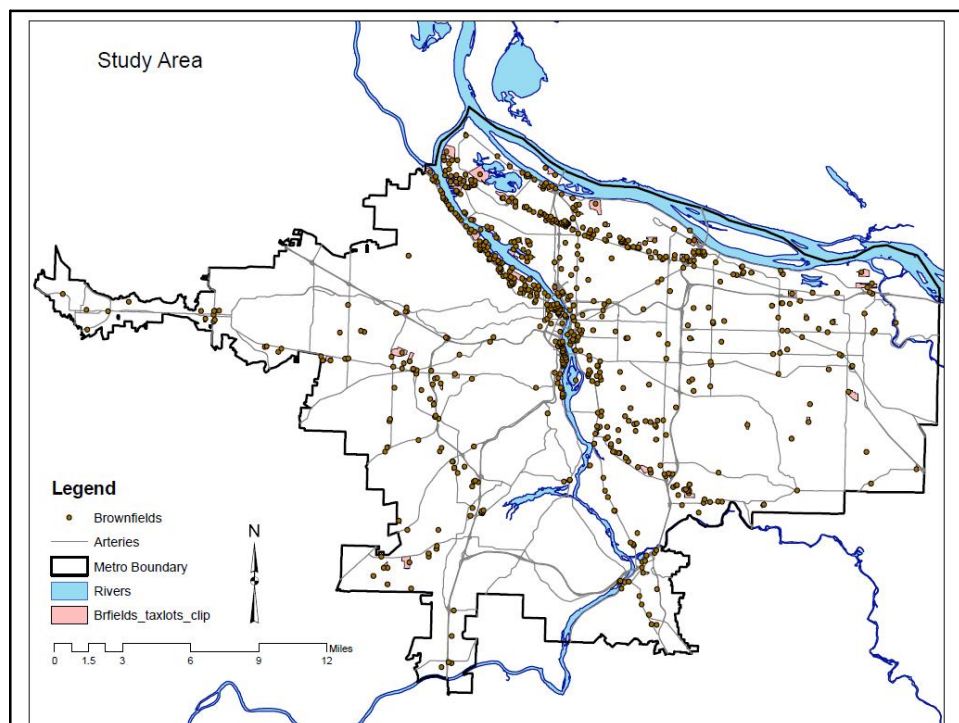
Ellen Dorsey

What is a Brownfield?

- Properties that are contaminated by low concentrations of hazardous waste or pollution

- Redevelopment of property is costly, mainly due to clean-up costs.

- Infill (redevelopment) potential in under-utilized land resources

- Brownfield sites located in impoverished or minority neighborhoods are usually not desired by developers

Benefits of Redevelopment

- Improve environmental quality
- Community restoration and green space
- Infill vs. Sprawl
- Economic growth
- Mitigation of impacts urban disinvestment

Multi-criteria Analysis

–Environmental Justice Criteria
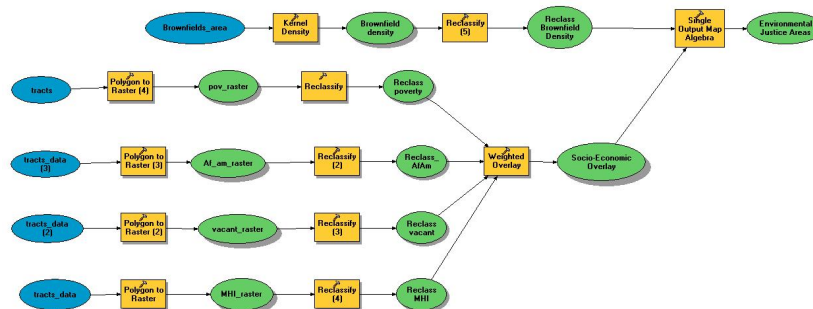
–Environmental Factors

–Redevelopment Potential

Brownfield Data:

Oregon DEQ Database: GIS Mapping and Applications. Facility
    Profiler. Retrieved from
    http://www.deq.state.or.us/news/databases.htm.

Environmental Justice

DATASETS (U.S. Census)
- % African-American
- % below Median Household Income
  (Portland)
- % living in Poverty
- % Vacant Property

Environmental Justice
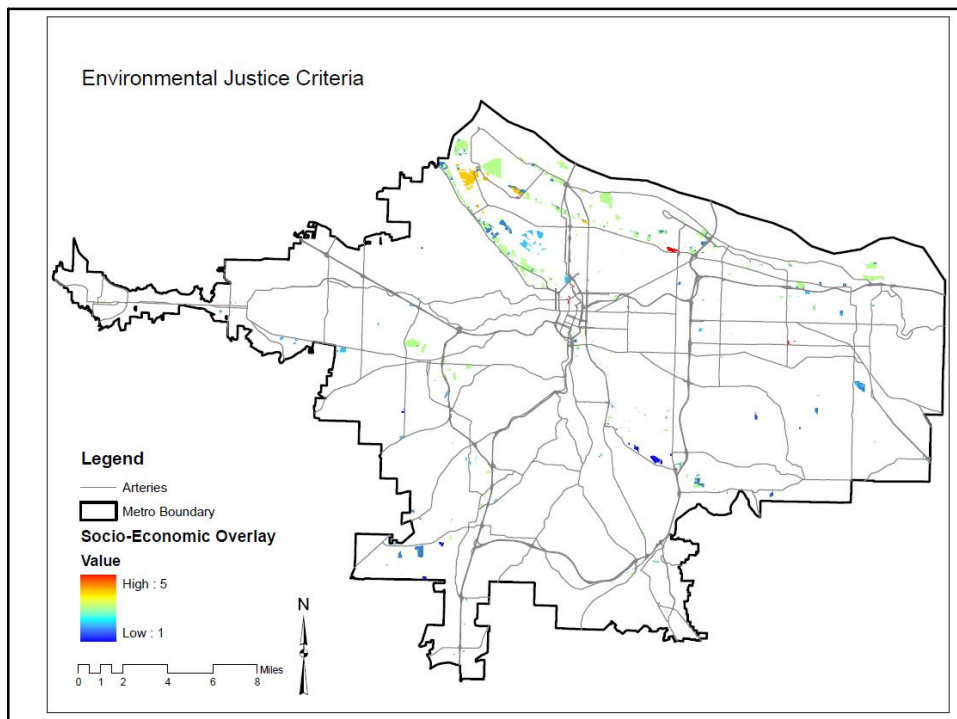
1. Classification
   (Quantile Breaks)

2. Vector to Raster
3. Reclass (1-5)
4. Weighted Overlay

Ranking: 1 to 5
1 (lowest quantile rank)
5 (highest quantile rank)

Weights
% Af. Am   20%
% Vacant   20%
% below MHI   30%
% Poverty   30%

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
6 (Constant)	-0.336	0.136		-2.5	0.014
% Af Am	0.012	0.005	0.131	2.3	0.024
% vacant	0.033	0.014	0.127	2.3	0.024
% Below MHI	0.01	0.005	0.198	2.1	0.033
% Poverty	0.008	0.003	0.207	2.3	0.021

Environmental Justice Criteria

Legend
Arteries
Metro Boundary
Socio-Economic Overlay
Value
High : 5
Low : 1
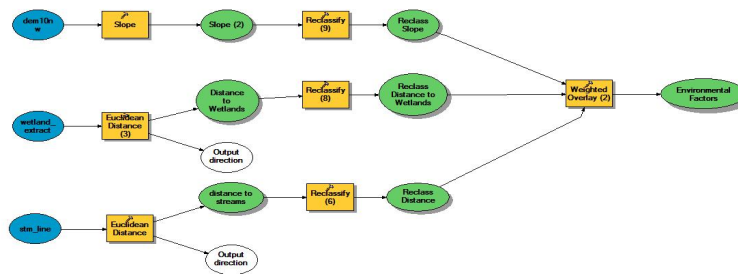N
Miles
0 1 2   4   6   8
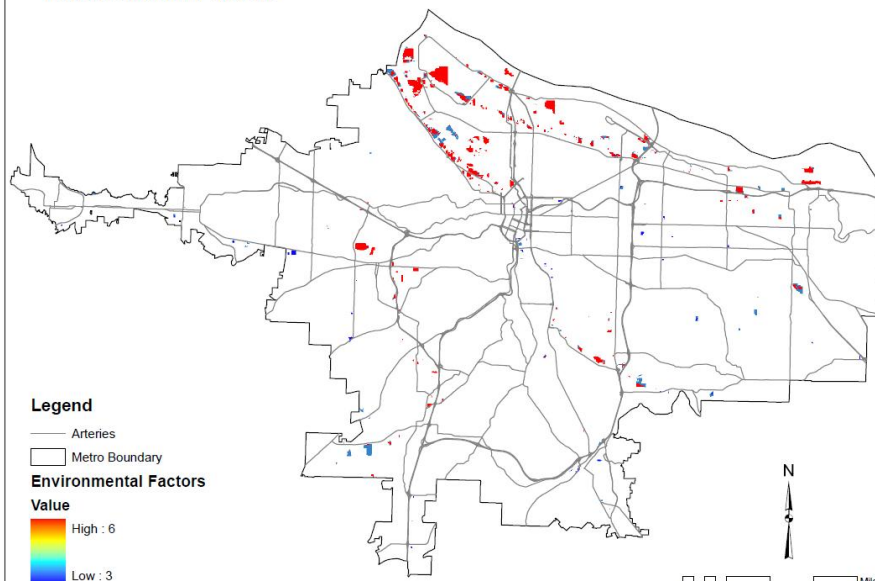
Environmental Factors

Datasets
- Distance to Wetlands
- Distance to Streams
- Slope

Process
- Euclidean Distance
- Reclassify
- Weighted Overlay

- Equal Weights
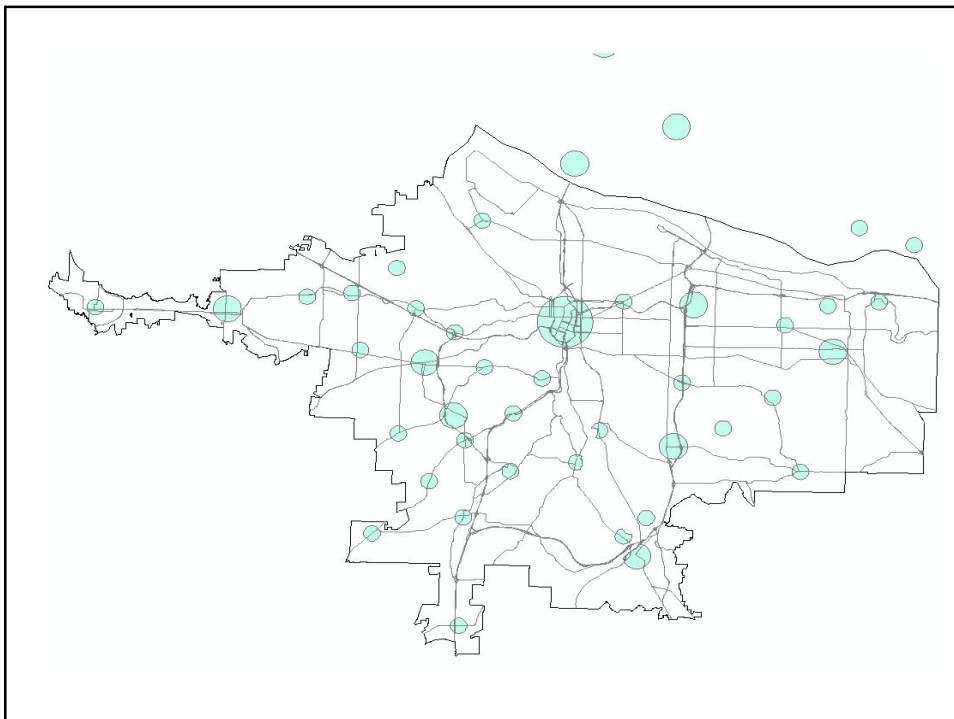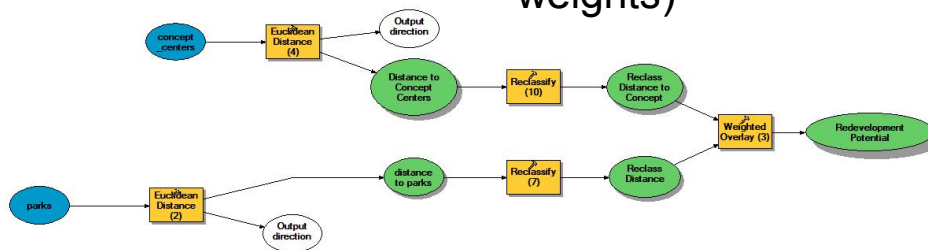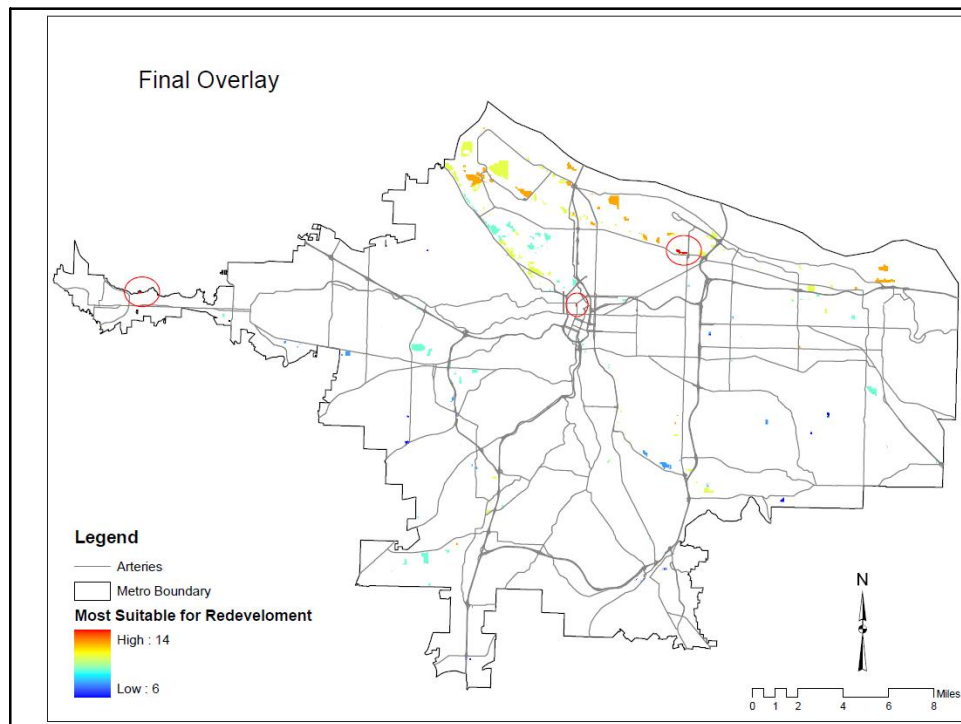- Restricted slopes 25% or higher in overlay

Environmental Factors

Legend
Arteries
Metro Boundary
Environmental Factors
Value
High : 6
Low : 3

N

0 1 2   4   6   8 Miles

Redevelopment Potential

Datasets
- Distance to concept centers
- Distance to Parks

Process
- Euclidean Distance
- Reclassify
- Overlay (equal weights)

Redevelopment Potential

Final Overlay

Legend
— Arteries
☐ Metro Boundary
Most Suitable for Redevelopment
High : 14
Low : 6

Limitations

- Brownfield Data: Facilities not necessarily abandoned and could still be operating

- Census Data: 2000

- Weights should consider public opinion and priorities