The Urban Canopy, Environmental Justice and Social Equity

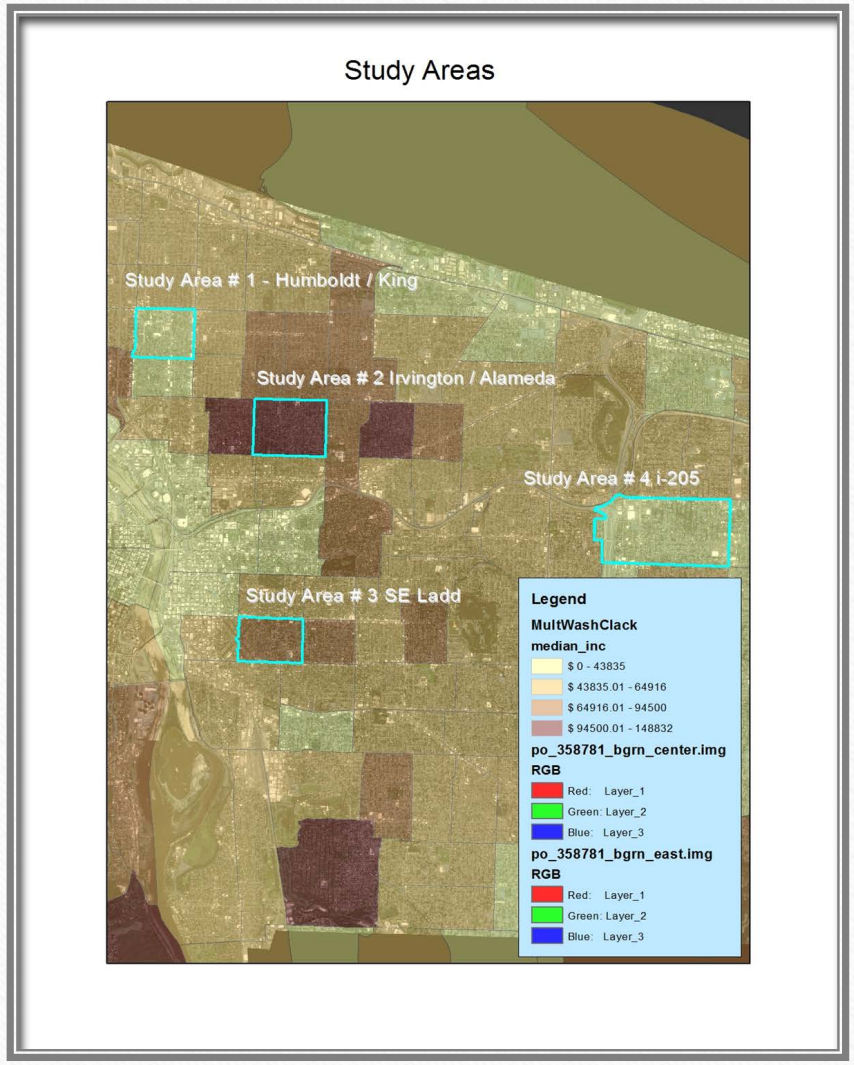
Presentation by: Teryl Neal

Data Sets Utilized

- Geoeye satellite data (2009)
- Lidar DEM/DSM (2007)
- Tree Canopy
- Census Data
  - Multwashclack.lyr (2010)

Abstract:

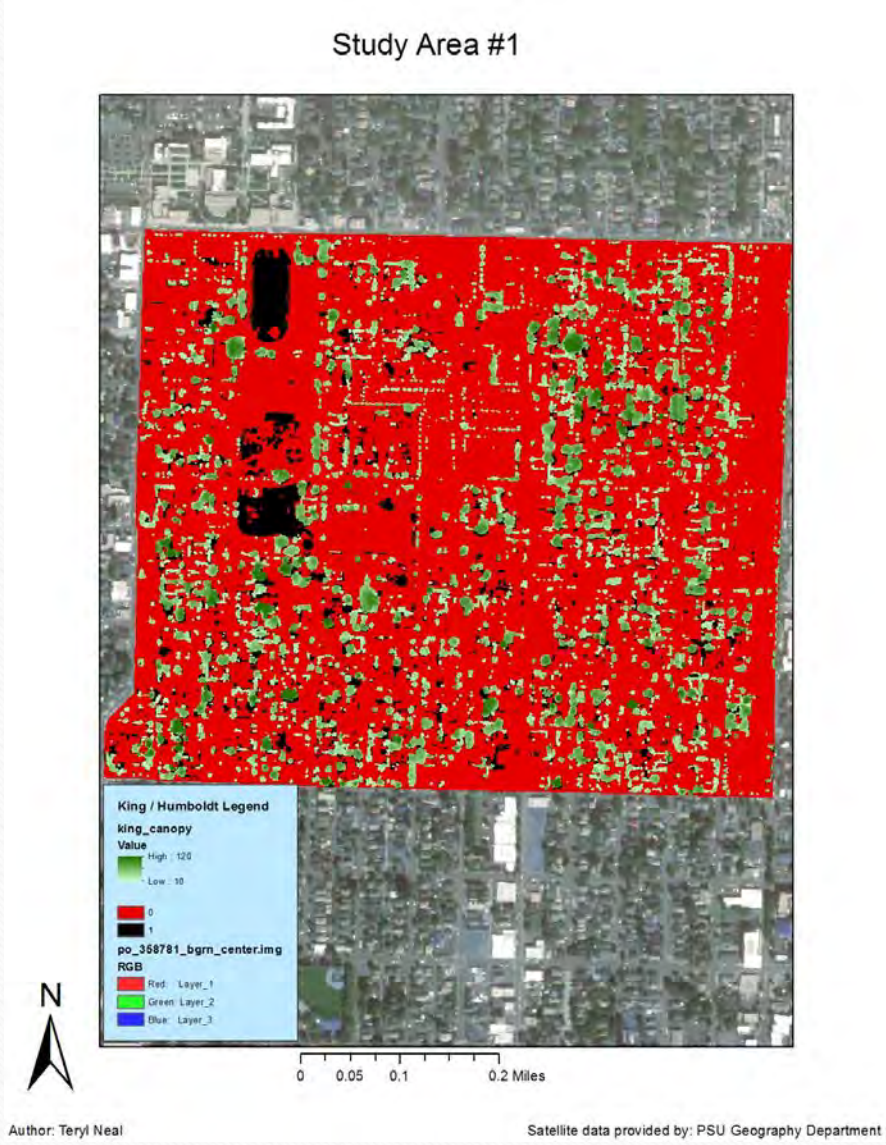
Urban forestation and public spaces have become a bell cow for advanced public planning in recent years. With the challenges of adapting life to a changing landscape and climate hanging as burdens of public policy Green space and street trees along with ease of commute and efficient public transportation projects have been noted as being able to boost the appeal and livability of cities, and the city of Portland is growing at a near historic rate due to these factors. There is a multitude of benefits associated with street trees, the urban canopy, and green spaces in general. Whether the advantages be cleaner air, a higher abundance of natural beauty to ease mental health issues, or increased property values. However, the social benefits are not being recognized at the same scale across all socioeconomic tiers. Is the spatial distribution of the urban canopy in Portland Oregon actually affecting neighborhoods in an equitable manner or a starkly uneven fashion? Without setting out to extrapolate causation or delving into the contentious history of minorities in America or Portland specifically this project seeks to prove how the environmental benefits of urban forestation are disproportionately affecting those within the city boundaries based on social class and racial demographics using Lidar, satellite data and NDVI analysis.



Study Area #1 – King Humboldt area

Study Area	Area	% Minority Population	Median Income
Study #1 Humboldt/King	10,263,353.18 sq ft	48%	31336

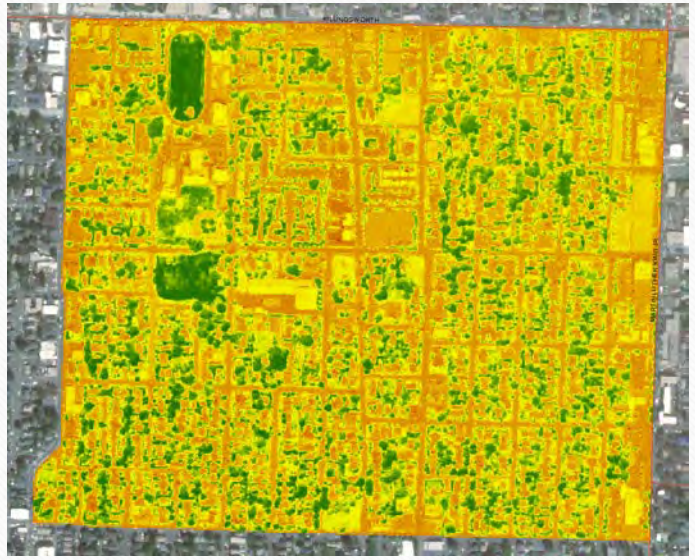
- Total Population: 3335
- Highest minority population of study areas selected
- Lowest income area
- How does vegetation / Canopy correlate?



Study Area #1

Study Area	Area	# of Canopy Pixels >15ft	Canopy % >15ft	# of Canopy Pixels >50 ft	Canopy % > 50 ft	NDVI % > 0.3
Study #1 Humboldt/King	10,263,353.18 sq ft	205,603	18.03%	38,106	3.3%	17.2%

NDVI

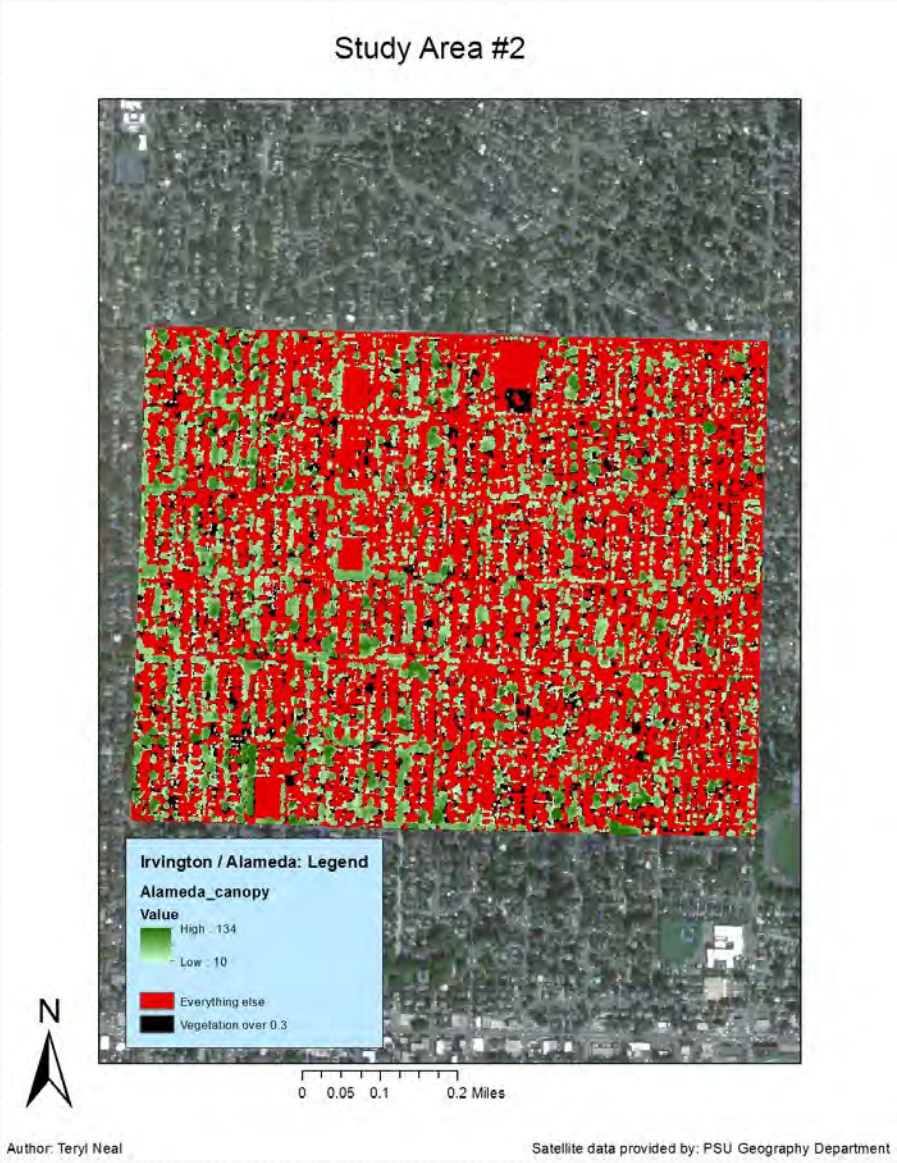


Tree Canopy >15ft

Study Area #2 – Irvington / Alameda

Study Area	Area	% Minority Population	Median Income
Study #2 Lloyd Community Associations	14,405,448.7 sq ft	11.6%	121964

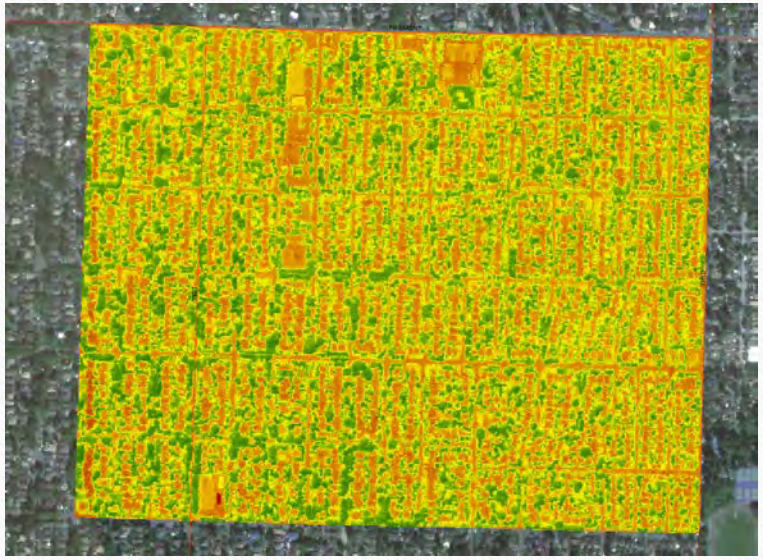
- Total Population: 4573
- Relatively low minority population
- How does vegetation/green space/canopy correlate?



Study Area #2

Study Area	Area	# of Canopy Pixels >15ft	Canopy % >15ft	# of Canopy Pixels >50 ft	Canopy % > 50 ft	NDVI % > 0.3
Study #2 Lloyd Community Associations	14,405,448.7 sq ft	485,089	30.3%	127,832	7.98%	41.2%

NDVI

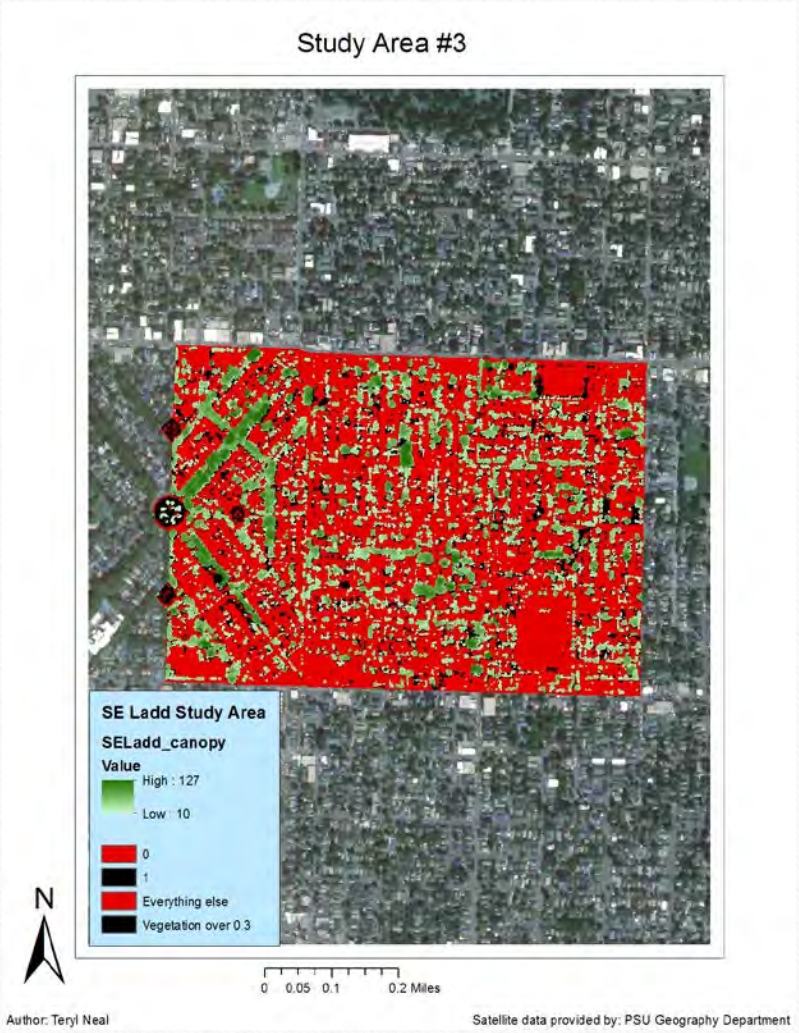


Tree Canopy >15ft

Study Area #3 – SE Ladds Addition

Study Area	Area	% Minority Population	Median Income
Study #3 SE Ladd	10,054,144.87 sq ft	12.8	68510

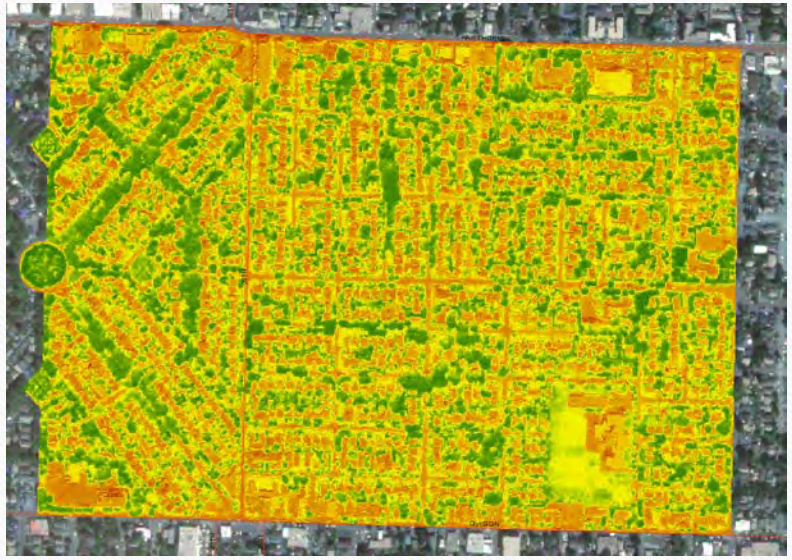
- Total population: 3232
- Quite average in all demographic and spatial statistics



Study Area #3

Study Area	Area	# of Canopy Pixels >15ft	Canopy % >15ft	# of Canopy Pixels >50 ft	Canopy % > 50 ft	NDVI % > 0.3
Study #3 SE Ladd	10,054,144.87 sq ft	293,228	26.2%	79,046	7.1%	39.2%

NDVI



Tree Canopy >15ft

Study Area #4 – i-205

Study Area	Area	% Minority Population	Median Income
Study # 4 i205	30,311,737.6 sq ft	39.2	46146

- Total population: 7108
- High minority population

Study Area #3

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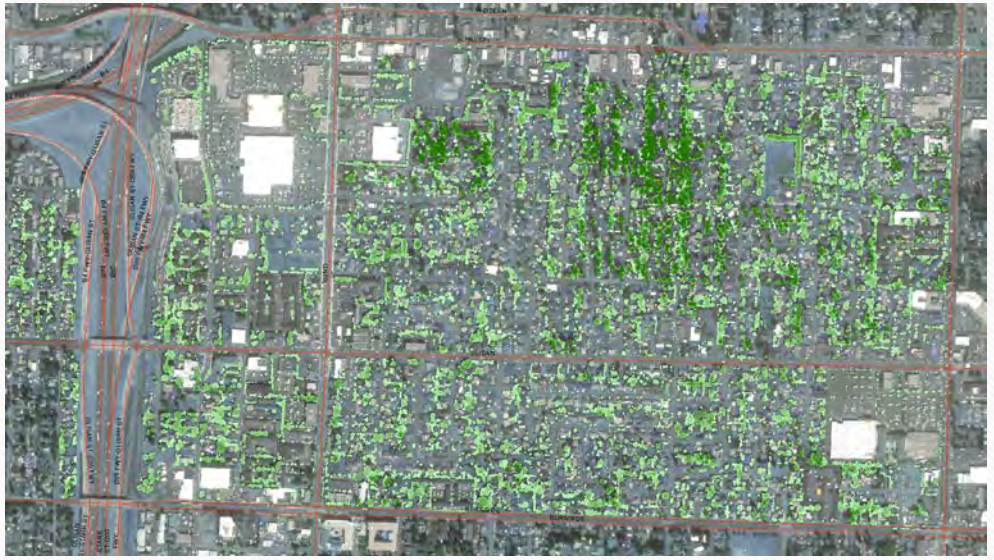
Satellite data provided by: PSU Geography Department

Study Area #4

Study Area	Area	# of Canopy Pixels >15ft	Canopy % >15ft	# of Canopy Pixels >50 ft	Canopy % > 50 ft	NDVI % > 0.3
Study # 4 i205	30,311,737.6 sq ft	535,811	15.9%	180,732	5.4%	11%

NDVI

Tree Canopy >15ft



Full Analysis:

Study Area	Area	# of Canopy Pixels >15ft	Canopy % >15ft	# of Canopy Pixels >50 ft	Canopy % > 50 ft	NDVI % > 0.3
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Study #2 Lloyd Community Associations	14,405,448.7 sq ft	485,089	30.3%	127832	7.98%	41.2
Study #3 SE Ladd	10,054,144.87 sq ft	293,228	26.2%	79046	7.1%	39.2
Study # 4 i205	30,311,737.6 sq ft	535811	15.9%	180732	5.4%	11

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Analysis continued / Conclusion:

Study Area	Area	Canopy % >15ft	Canopy % > 50 ft	Income	Pop Density	NDVI	Total Rank Score
Study #1 Humboldt/King	10,263,353.18 sq ft	3	4	4	4	3	18
Study #2 Lloyd Community Associations	14,405,448.7 sq ft	1	2	1	3	1	8
Study #3 SE Ladd	10,054,144.87 sq ft	2	3	2	2	2	11
Study # 4 i205	30,311,737.6 sq ft	4	1	3	1	4	13

- Negative correlation between Minority percentage/Income & Canopy coverage/amount of green space.

Work Cited

- Datasets provided by: PSU Geography Department (I:drive)
- Additional readings:

  - Heynen, Nik, et al. "The Political Ecology of Uneven Urban Green Space." *Urban Affairs Review*, vol. 42, no. 1, 2006, pp. 3–25., doi:10.1177/1078087406290729.
  - Landry, Shawn M, and Jayajit Chakraborty. "Street Trees and Equity: Evaluating the Spatial Distribution of an Urban Amenity." *Environment and Planning A*, vol. 41, no. 11, 2009, pp. 2651–2670., doi:10.1068/a41236.
  - Nowak, David J., et al. "Measuring and Analyzing Urban Tree Cover." *Landscape and Urban Planning*, vol. 36, no. 1, 1996, pp. 49–57., doi:10.1016/s0169-2046(96)00324-6.