Portland Air Toxics Solutions
Environmental Justice Analysis

NACAA Fall Membership Meeting
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Portland Air Toxics Solutions

A geographic approach to understanding and reducing air toxics

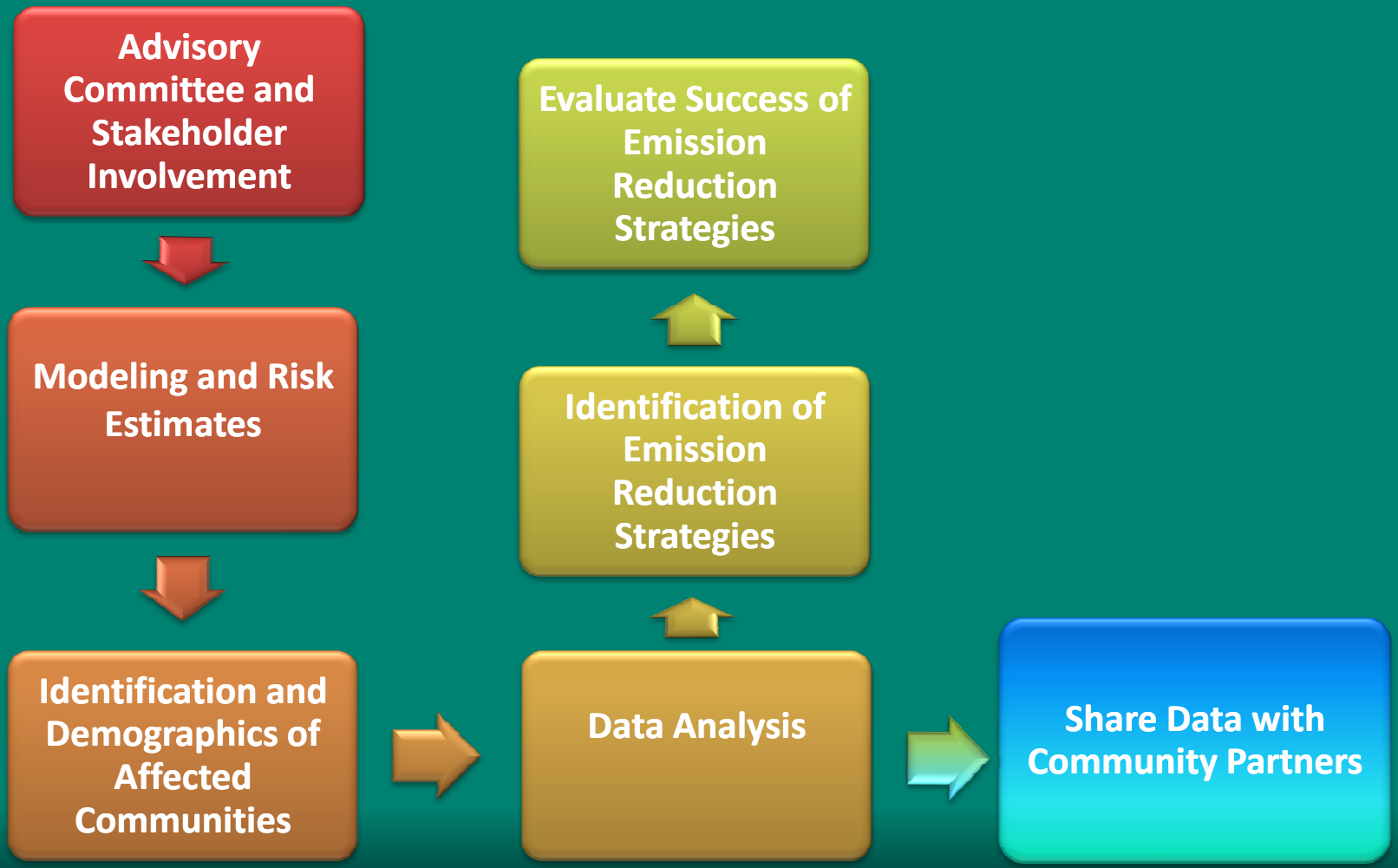
Five priority categories for reduction:

- Residential wood burning
- Cars and trucks
- Heavy duty vehicles
- Construction equipment
- Industrial metals facilities

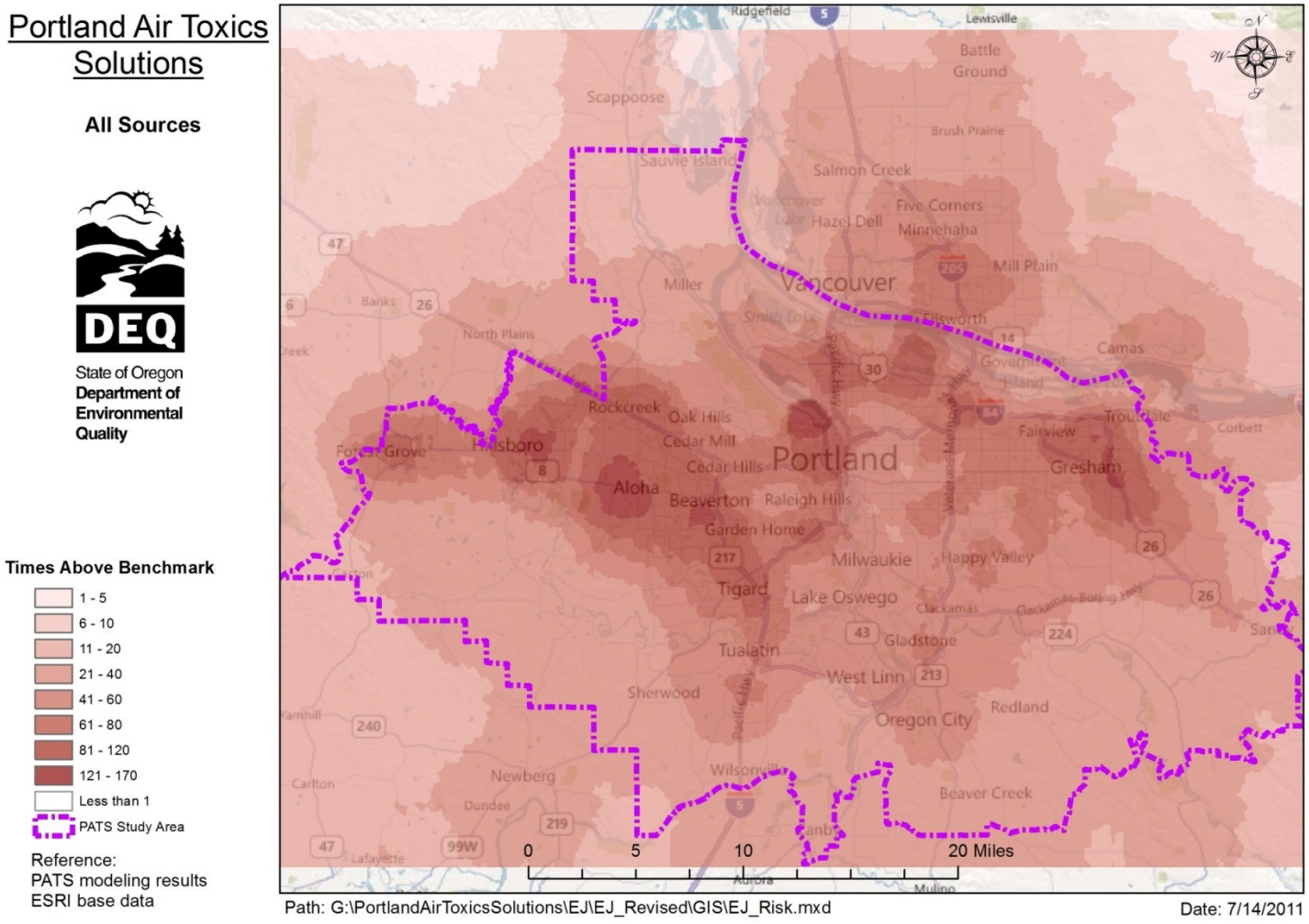
Portland Air Toxics Solutions
2017 Modeled Pollutant Estimates

Pollutant	Top Source	Impact Area
More than 10 times over benchmark		
1,3 butadiene	Cars and trucks	Region wide/neighborhood
Benzene	Cars and trucks	Region wide/neighborhood
Diesel Particulate	Non road engines, cars and trucks	Region wide/neighborhood
15 PAH	Residential wood burning	Region wide
Naphthalene	Residential wood burning	Region wide/neighborhood
Cadmium	Industry	Neighborhood
Formaldehyde	Chemical formation in atmosphere	Region wide
Acrolein	Chemical formation in atmosphere	Region wide/neighborhood
Between 1 and 10 times over benchmark		
Arsenic	Cars and trucks	Region wide/neighborhood
Manganese	Industry	Neighborhood
Nickel	Industry	Neighborhood
Chromium VI	Cars and trucks	Region wide/neighborhood
Dichlorobenzene	Solvents and pesticides	Region wide/neighborhood
Acetaldehyde	Chemical formation in atmosphere	Region wide

Portland Air Toxics Solutions - Development of EJ Analysis



Portland Air Toxics Solutions EJ Analysis – Risk Characterization



Portland Air Toxics Solutions EJ Analysis
Identification of Minority Communities

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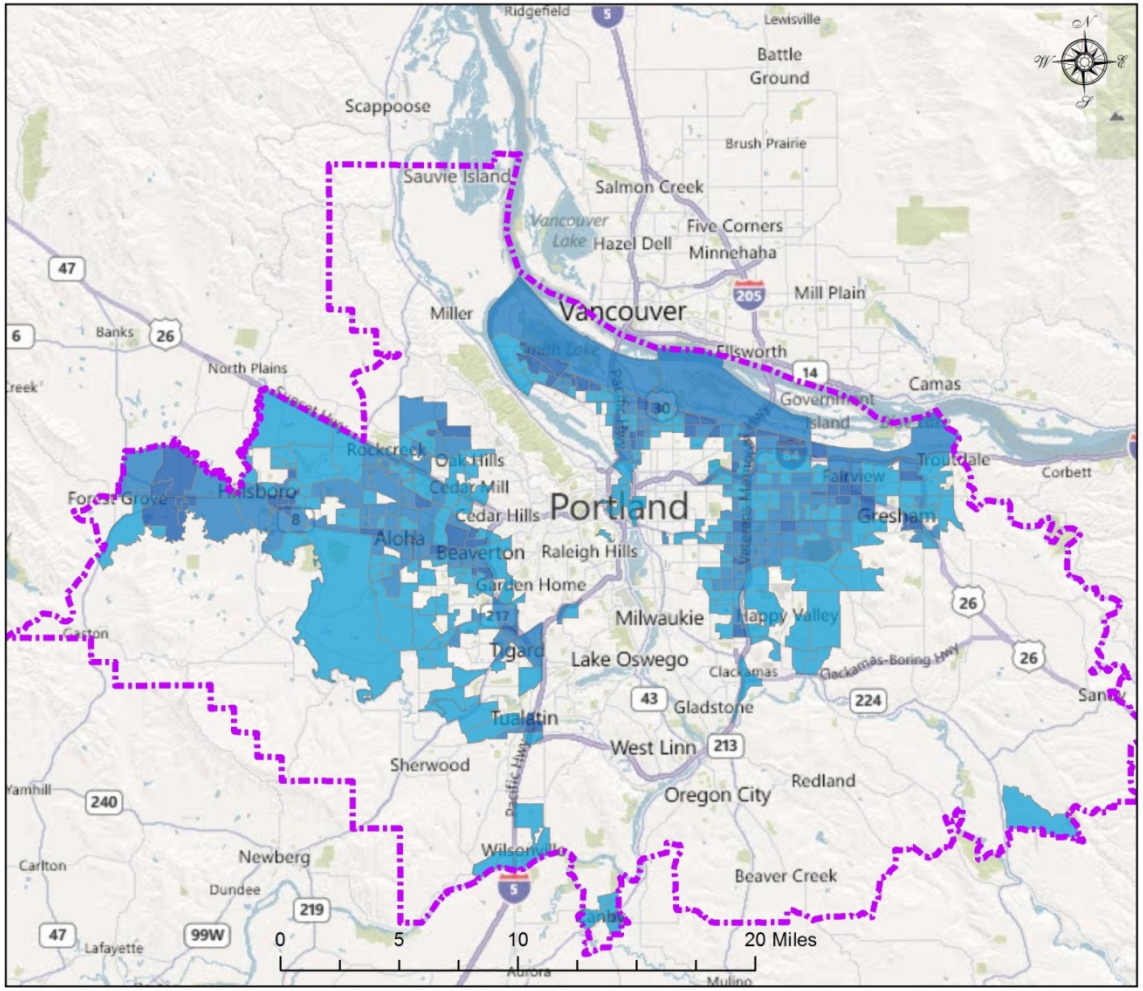
Note: Average minority population per block group in the PATS study area is 25%. Block groups with above the average minority population are shaded.

2010 Census
% minority by block group

- 4 - 15
- 16 - 24
- 25 - 35
- 36 - 49
- 50 - 87
- PATS Study Area

Reference:
Census 2010 and
American Community Survey
ESRI base data



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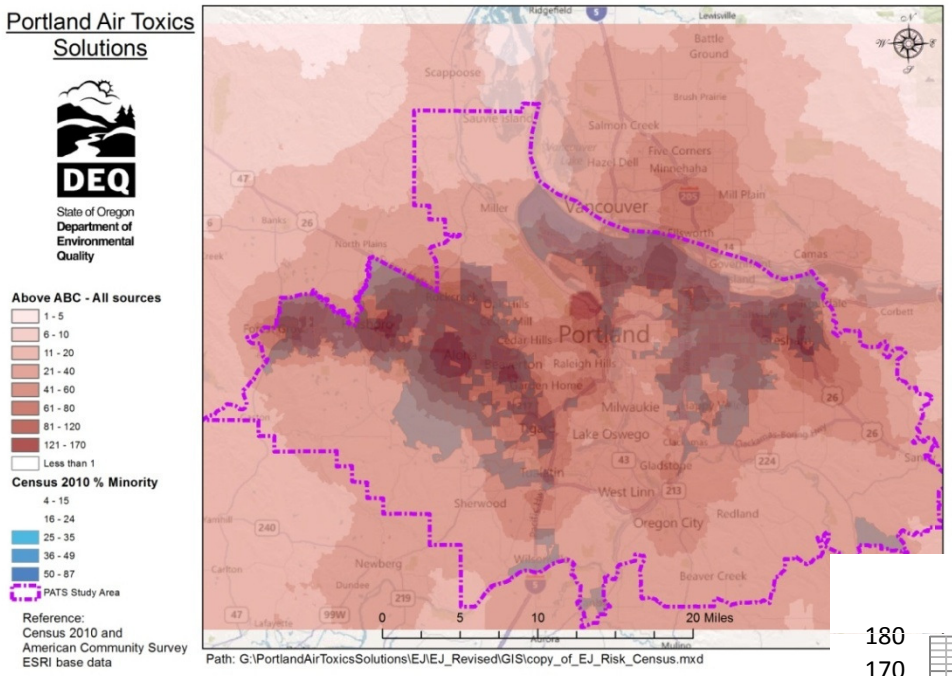
Date: 7/14/2011

Portland Air Toxics Solutions EJ Analysis – Map Overlay and Cumulative Distribution

All Sources

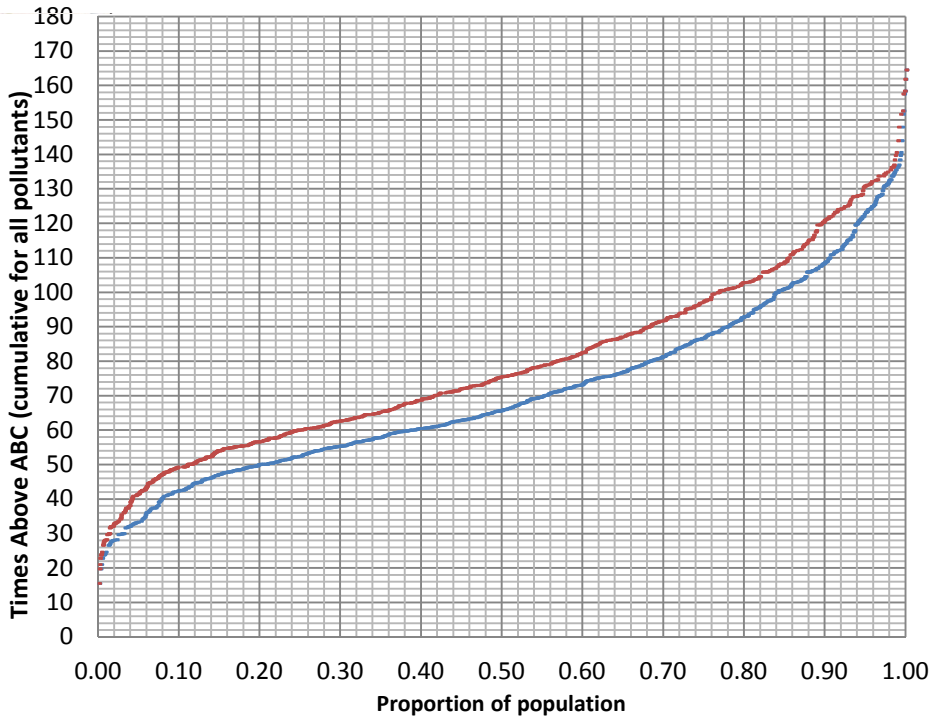


Map:

Red: Risk from all modeled source categories
Blue: block groups with over 25% minority

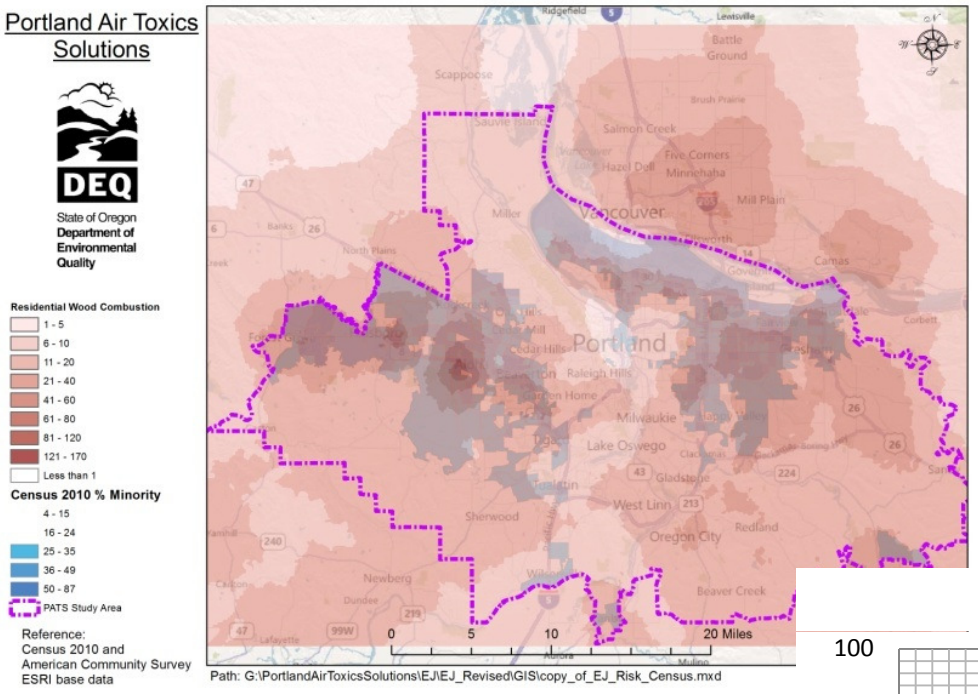
Graph:

Cumulative distribution function: All Sources
Blue: white population
Red: non-white population



Portland Air Toxics Solutions EJ Analysis – Map Overlay and Cumulative Distribution

Residential Wood Combustion

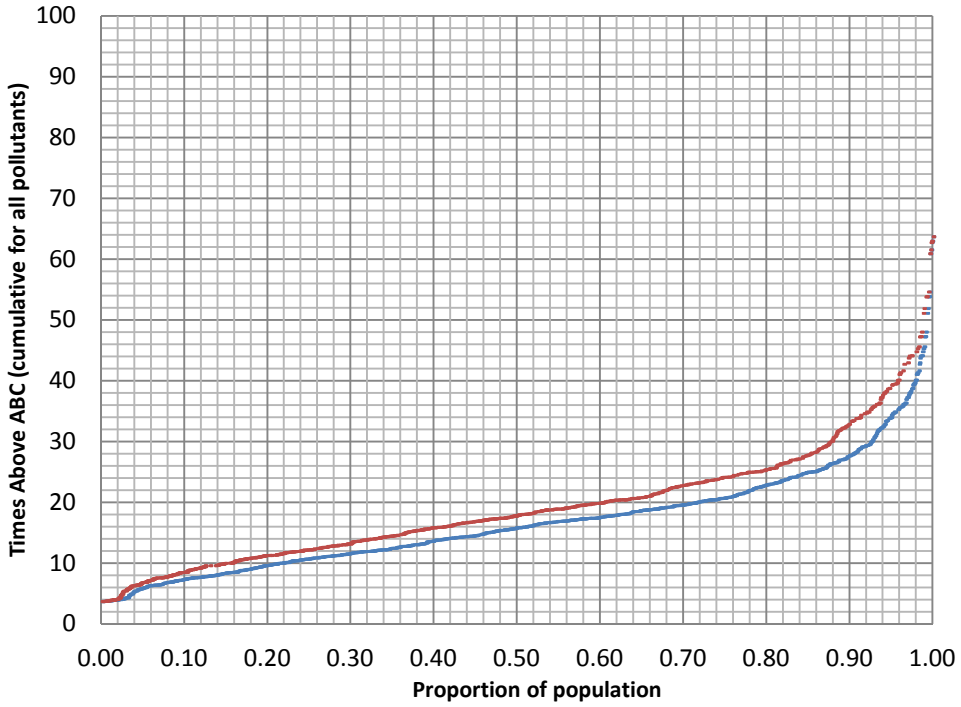


Map:

Red: Risk from residential wood combustion
Blue: block groups with over 25% minority

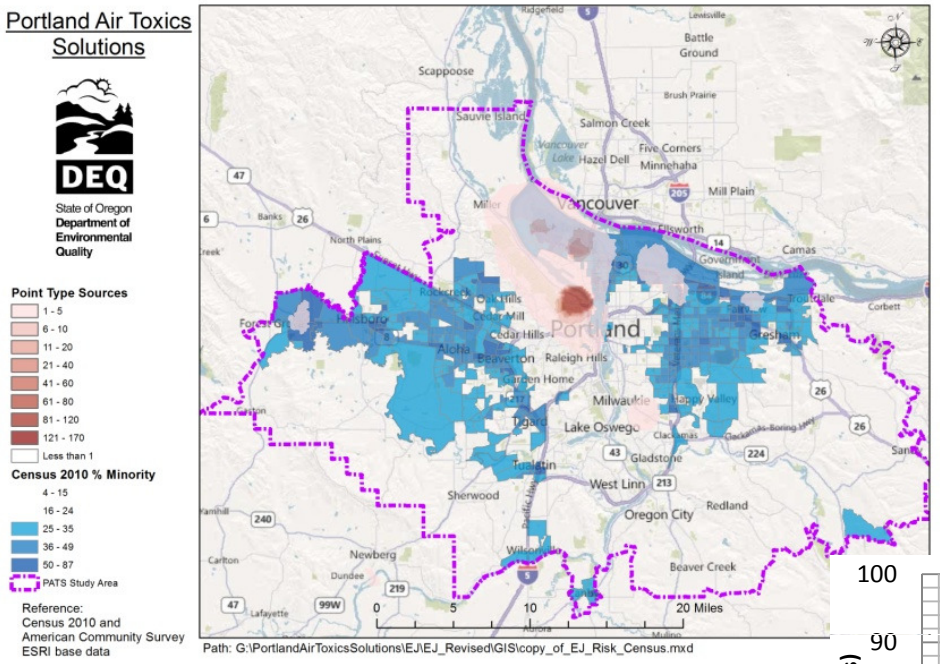
Graph:

Cumulative distribution function:
Residential Wood Combustion
Blue: white population
Red: non-white population



Portland Air Toxics Solutions EJ Analysis – Map Overlay and Cumulative Distribution

Point Sources



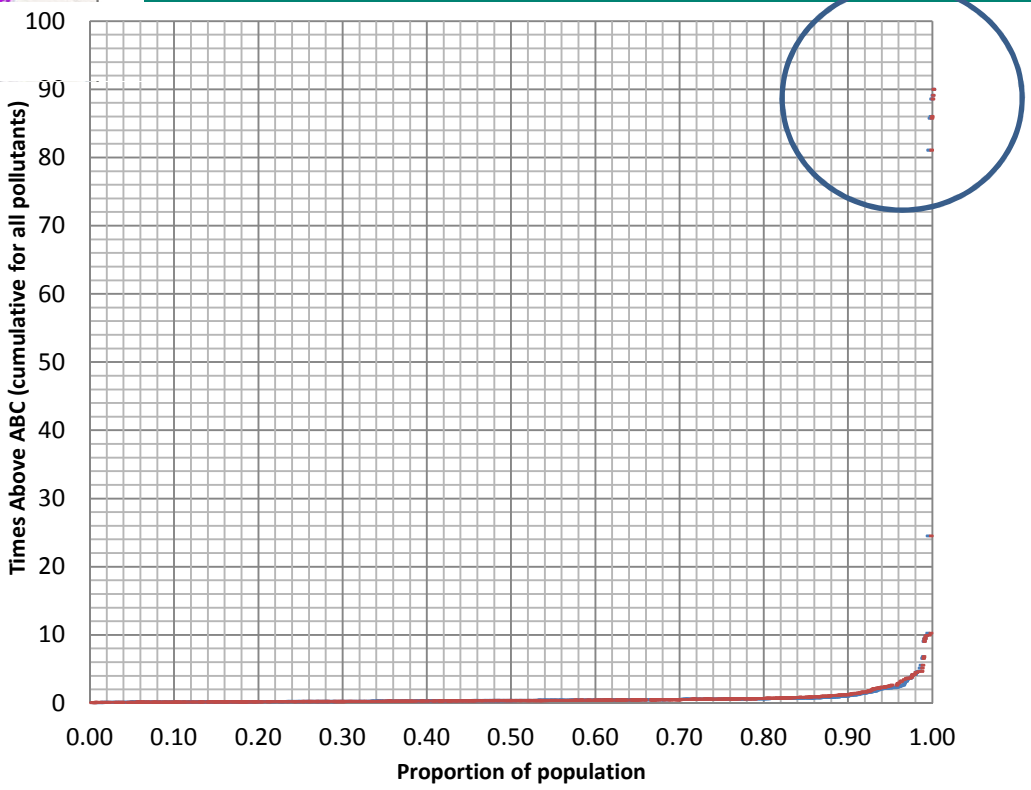
Map:

Red: Risk from point sources
Blue: block groups with over 25% minority

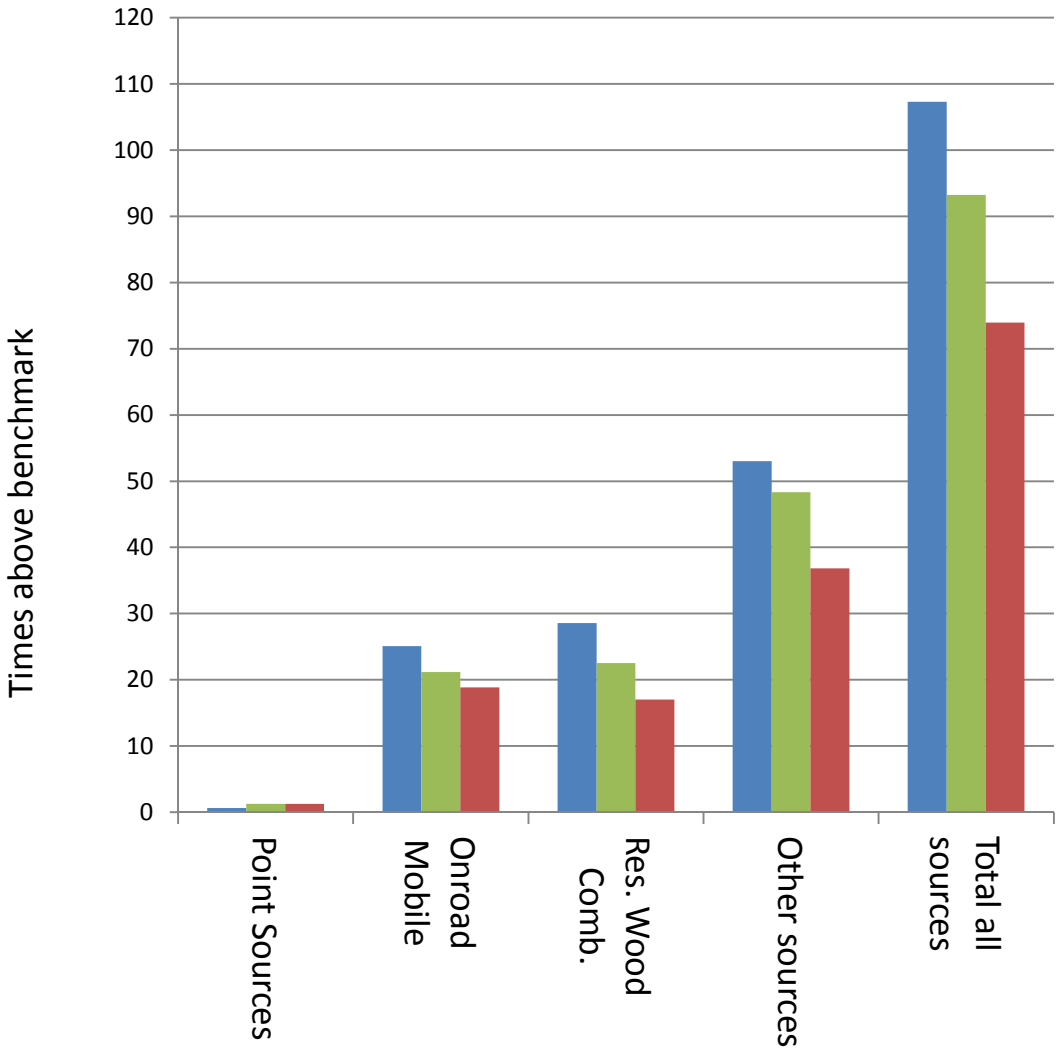
High risk from point sources

Graph:

Cumulative distribution function: Point Sources
Blue: white population
Red: non-white population



Portland Air Toxics Solutions EJ Analysis – Comparing Minority Population to Source Impacts



- 10 block groups with the highest minority population (average 71% minority). Population 20,015.
- 50 block groups with the highest minority population (average 59% minority). Population 96,935.
- All block groups (average 25% minority). Population 1, 556, 116.

Portland Air Toxics Solutions EJ Analysis
Identifying Low Income Population

American Community Survey 2005 -2009
Population below poverty

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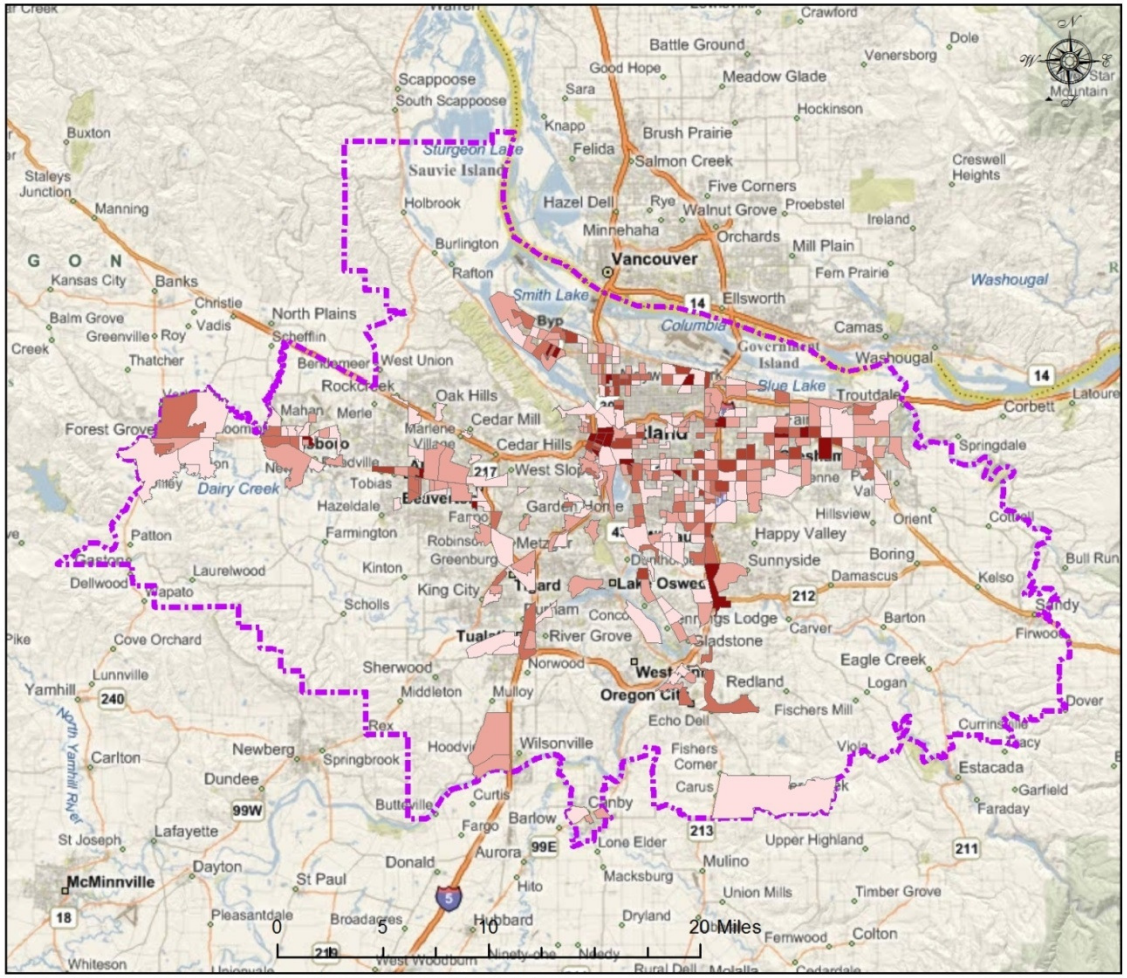
Fraction of population below poverty limit by block group

- 0.13 - 0.19
- 0.20 - 0.25
- 0.26 - 0.33
- 0.34 - 0.43
- 0.44 - 0.60

Note:
Block groups shown have above average (avg = .13) fraction of population below poverty limit.



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Date: 6/28/2011

Portland Air Toxics Solutions EJ Analysis
Summary of Multivariate Regression Analysis

Disproportionate impact from all sources:

Higher → Lower

Disproportionate impact by source category: Higher → Lower

Hispanic/Latino	Asian	African American/Black	Below Poverty
Residential Wood Burning	Cars and Trucks	Commercial Solvent and Fuel Use	Cars and Trucks
Construction and Non Road Engines	Construction and Non Road Engines	Construction and Non Road Engines	Commercial Solvent and Fuel Use
On-Road Mobile	Residential Wood Burning		Permitted Industrial Facilities
Commercial Solvent and Fuel Use	Commercial Solvent and Fuel Use		

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EJ Focused Emission Reduction Strategies

Hispanic/Latino	Asian	African American/Black	Below Poverty
Residential Wood Burning	Cars and Trucks	Commercial Solvent and Fuel Use	Cars and Trucks
15-PAH	Benzene Diesel Particulate 1,3 Butadiene	Naphthalene Benzene Formaldehyde	Benzene Diesel Particulate 1,3 Butadiene

Potential Use of Community EJ Analysis in Permitting
Community: Awareness of local risk drivers, better opportunity to participate
Facility: Awareness of local risk drivers and potentially affected populations
DEQ: Provide meaningful opportunity for involvement, inform about risk issues

Portland Air Toxics Solutions
EJ Analysis

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