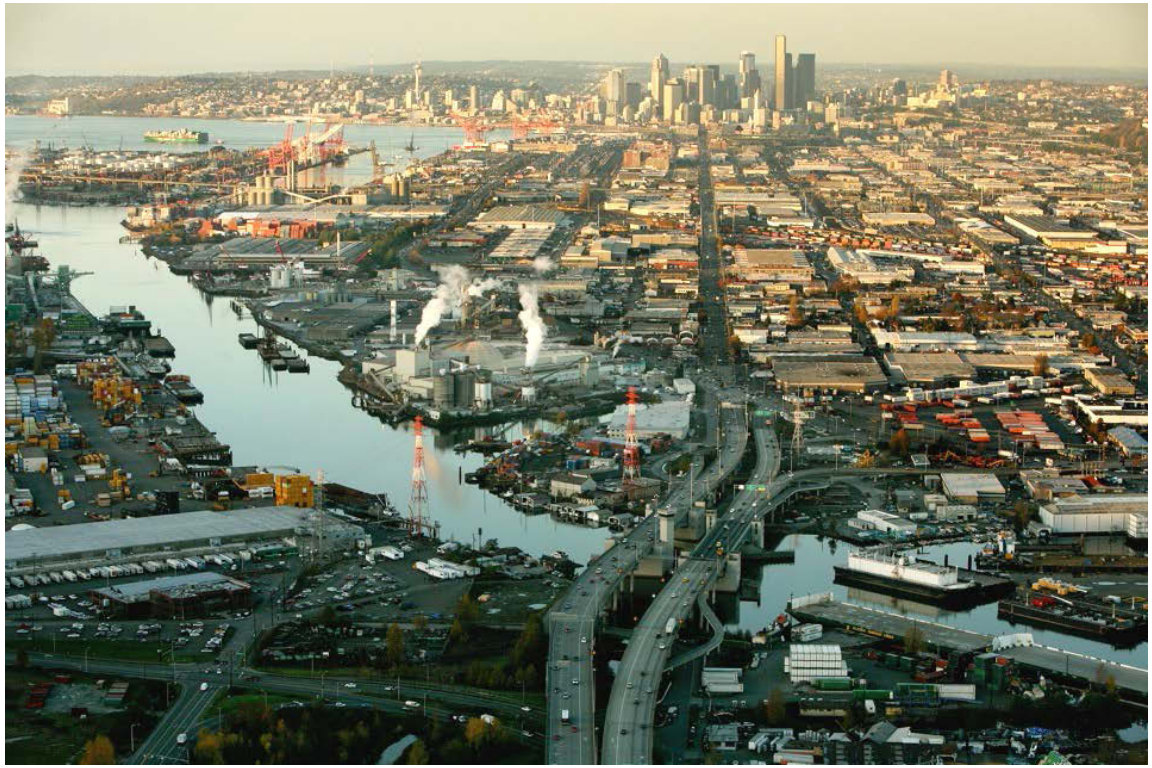
Duwamish Valley Cumulative Health Impacts Analysis: Seattle, Washington



Linn Gould, MS, MPH
Just Health Action

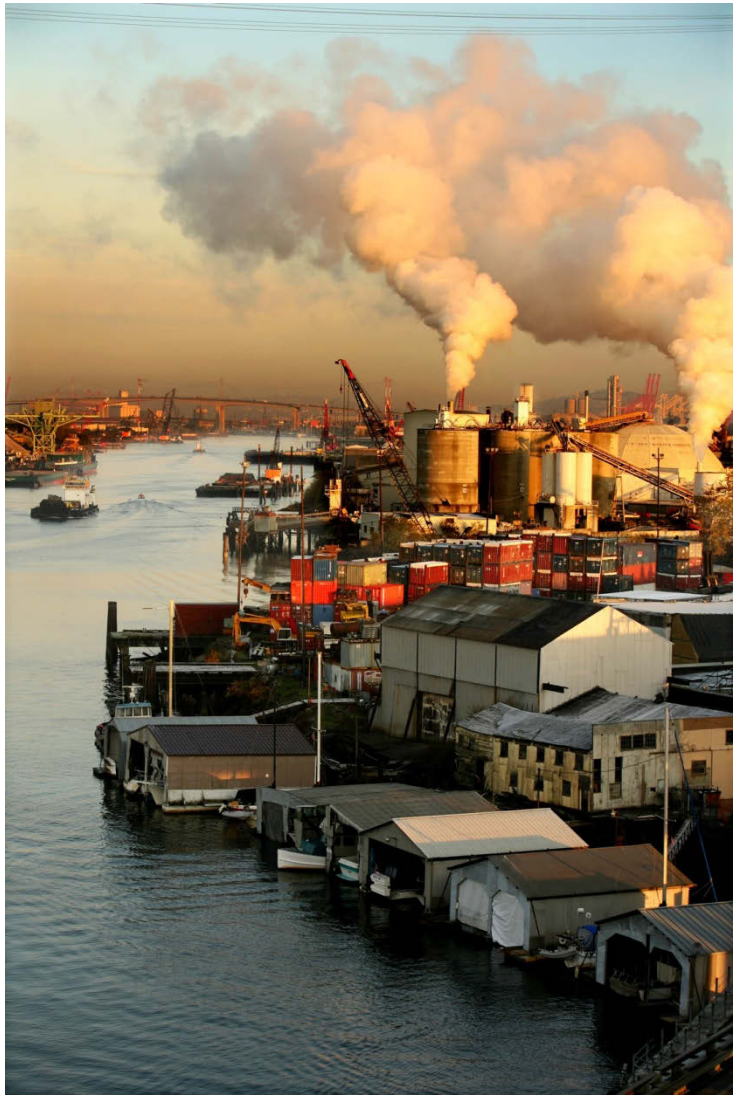
TRI Conference
May 7, 2014

DUWAMISH RIVER CLEANUP COALITION

Technical Advisory Group

JustHealthAction

Today



- What is JHA?
- Where is the Duwamish Valley?
- Cumulative impacts
- Method
- Results and limitations
- How used?

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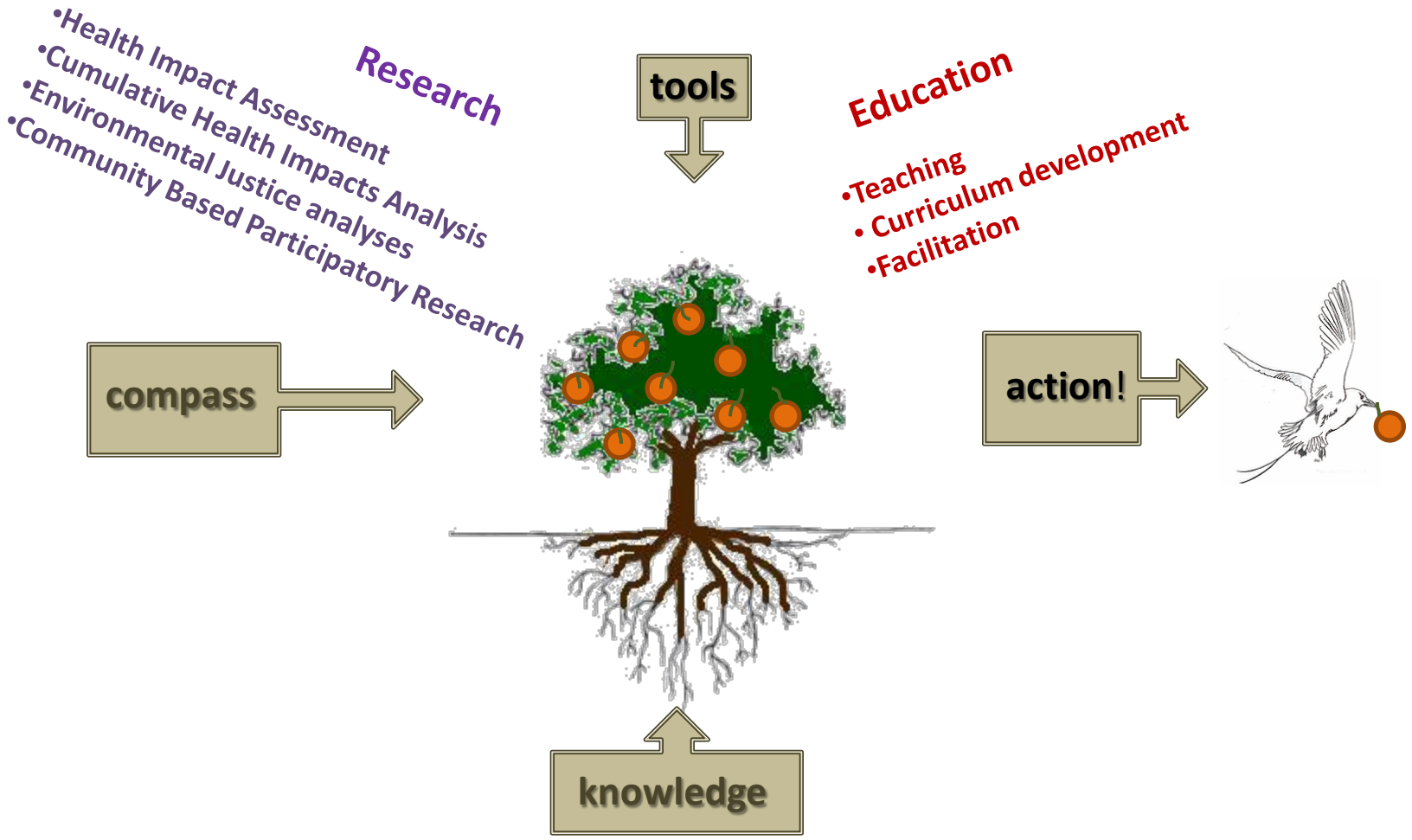
JHA: working towards health equity



Mogford, Gould, & DeVoght, (2010), Health Promotion International

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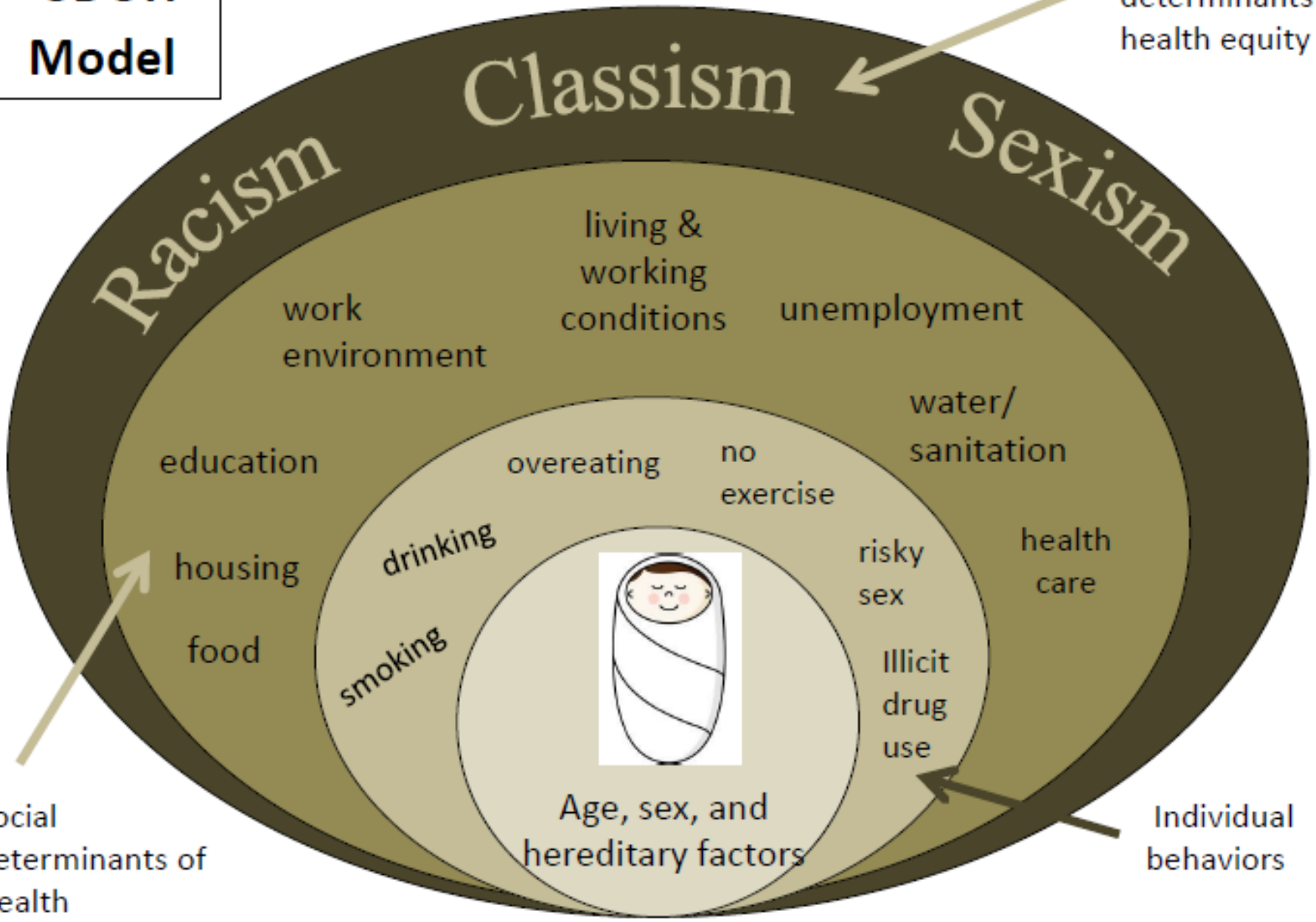
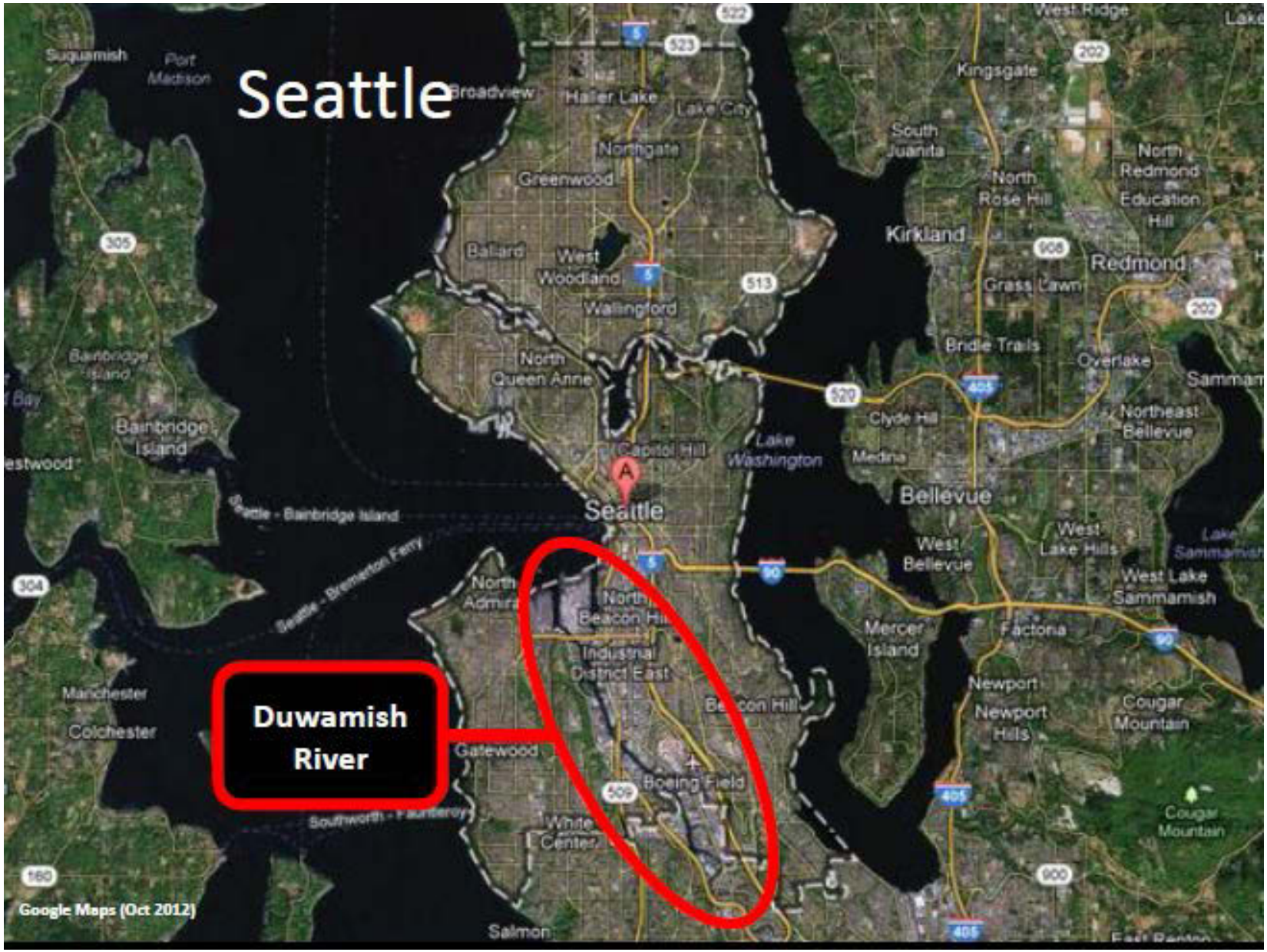
SDOH Model



Adapted from Dahlgren & Whitehead(1991) and Jones et al (2009)



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Duwamish Valley contamination –

soils, air, ground water, Duwamish River Superfund site

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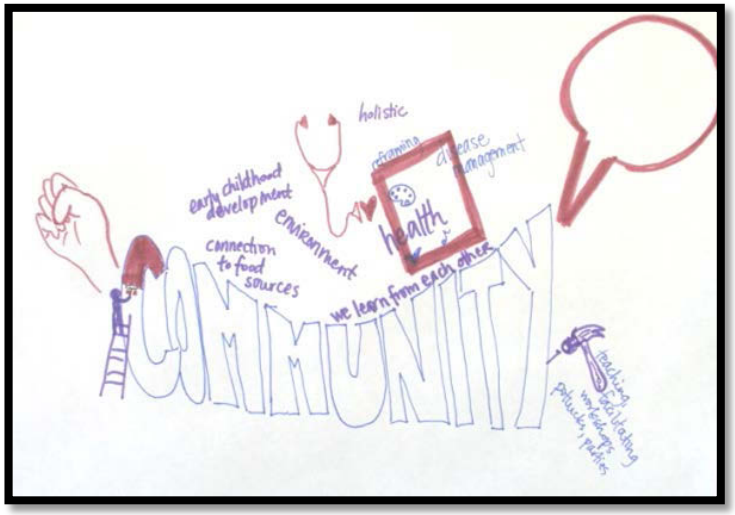
Assets too!



SP Community Center

SEA MAR
Community Health Centers
Clinica de la Comunidad

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Duwamish Valley Disparities

Indicator	Duwamish Valley	King County
Life expectancy*	79.4	81.3
% below poverty**	17.6%	9.7%
Foreign born**	31.9%	19%
No high school degree**	20.2%	8.2%
Uninsured*	20%	13%
Lung cancer*	52.3 per 100,000	41.4 per 100,000
Homicide*	10.5 per 100,000	3.4 per 100,000
Asthma hospitalization*	240.4 per 100,00	143.4 per 100,000
Assault*	70.9 per 100,00	31 per 100,00
Low birth weight*	6.0%	4.9%
No leisure time physical activity*	24%	15%

Source: Public Health Seattle & King County.
* p=.05; **p=.10

Cumulative Effects - Imagine

+

+

+

+

+++++

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OR

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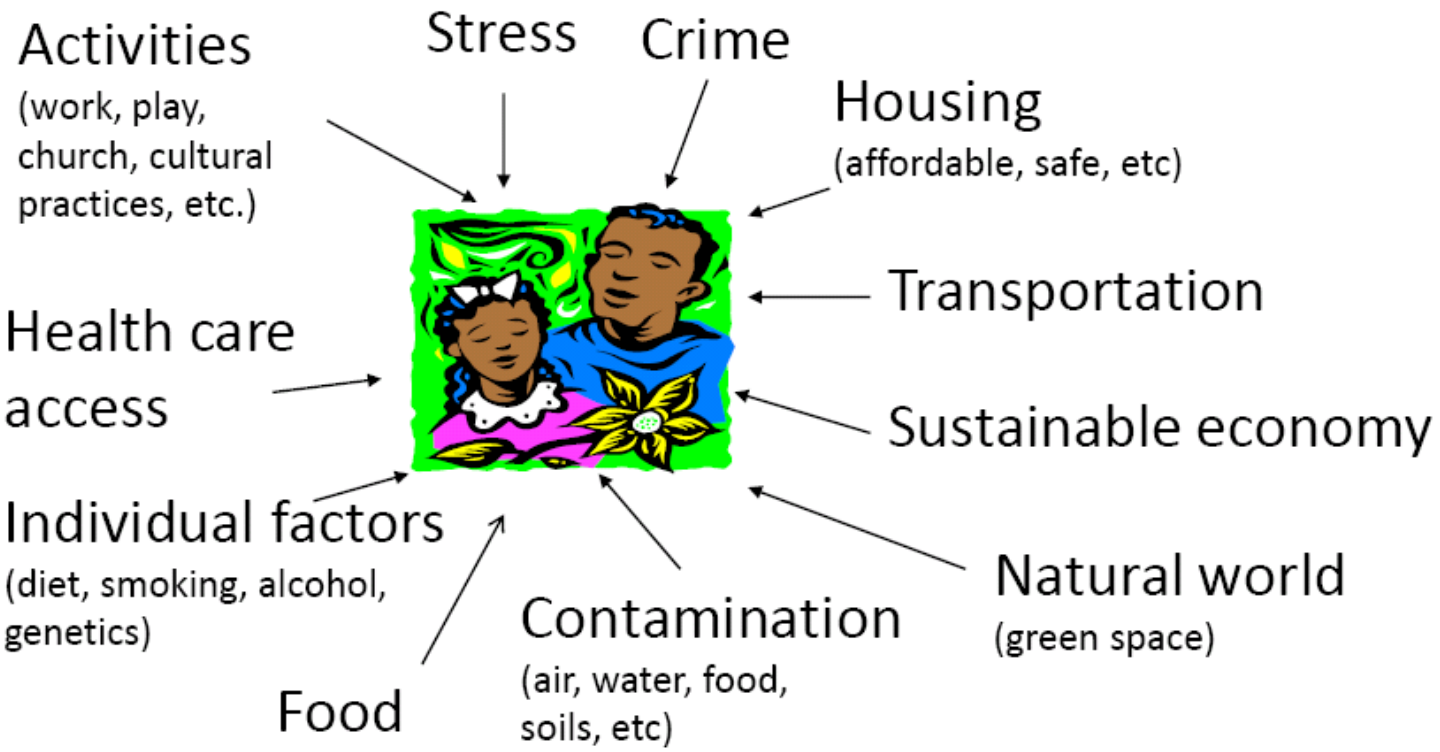
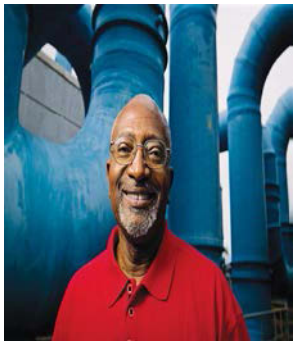
ENVIRONMENTAL JUSTICE





"The environment is everything: where we live, work, play, go to school, as well as the physical and natural world. And so we can't separate the physical environment from the cultural environment."

(Robert Bullard, 1999)

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What does the “community” want?

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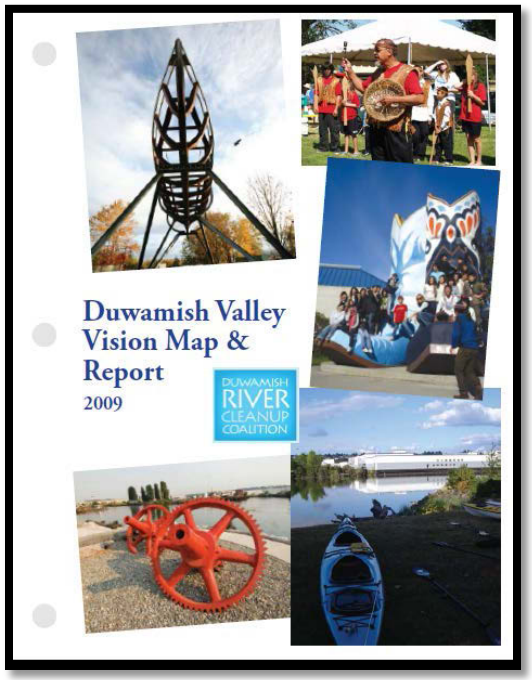
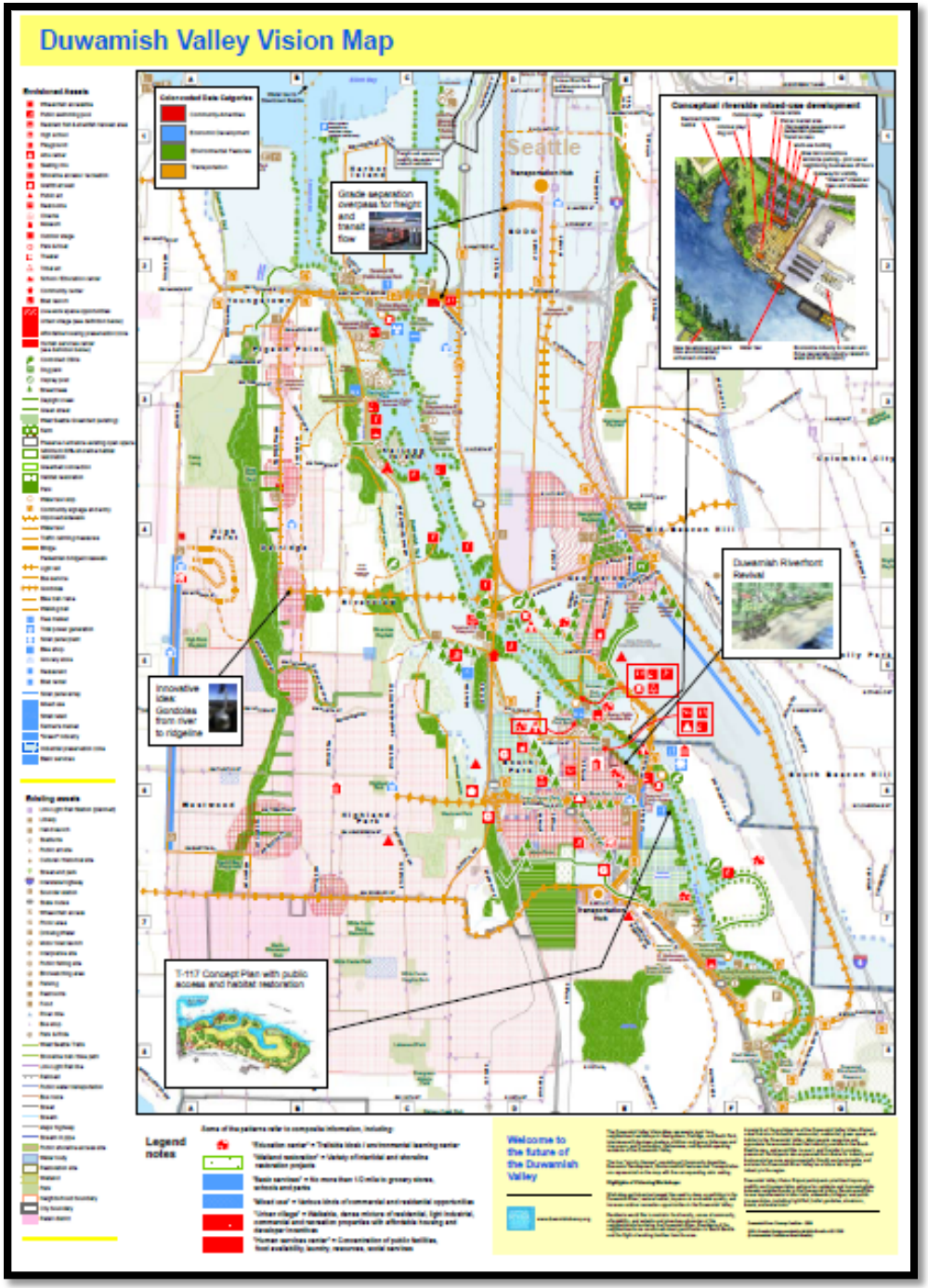
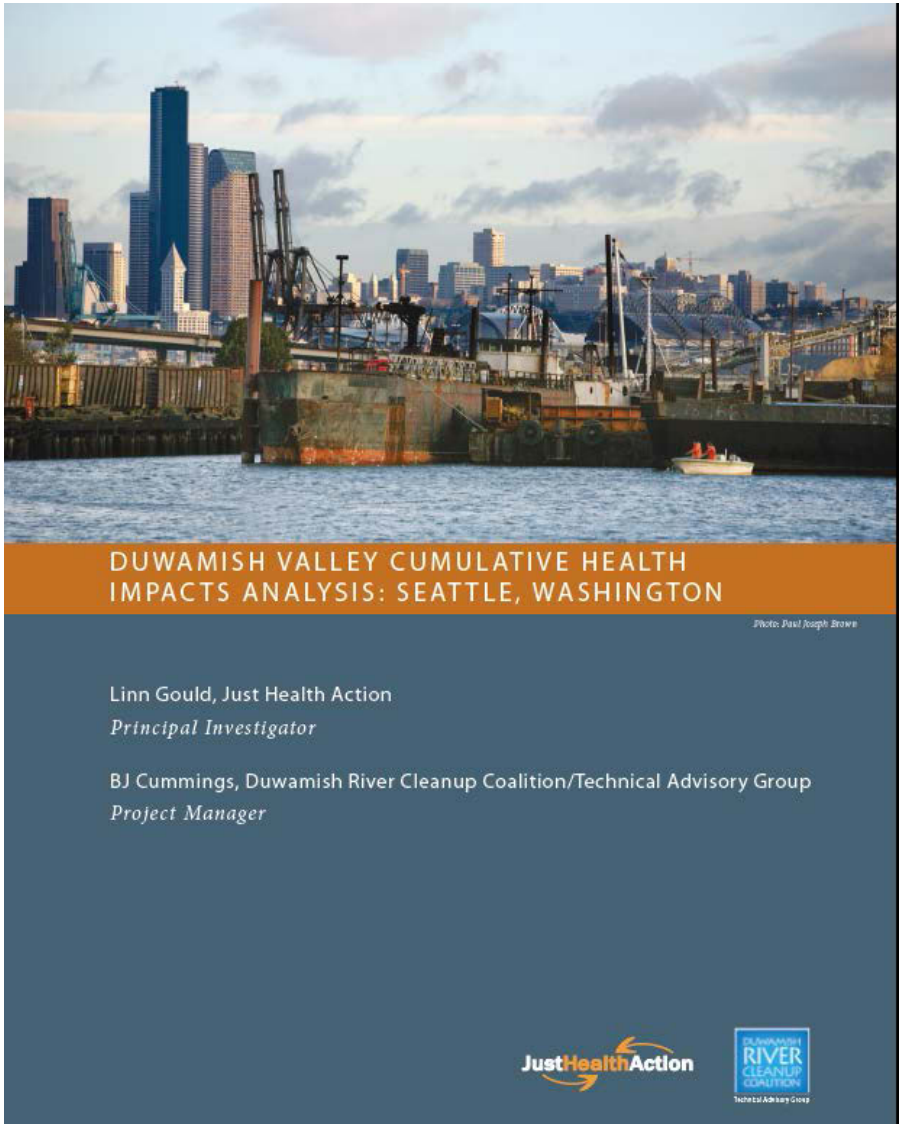
VISIONING the Duwamish Valley

Health as main outcome





EPA Environmental Justice Research Grant



1. Inform EPA's Duwamish River Superfund Site Cleanup decisions
2. Develop risk reduction strategies for communities impacted by site
3. Improve health outcomes in the affected community
4. Inform action by regional public and private agencies

DUWAMISH RIVER CLEANUP COALITION

Technical Advisory Group

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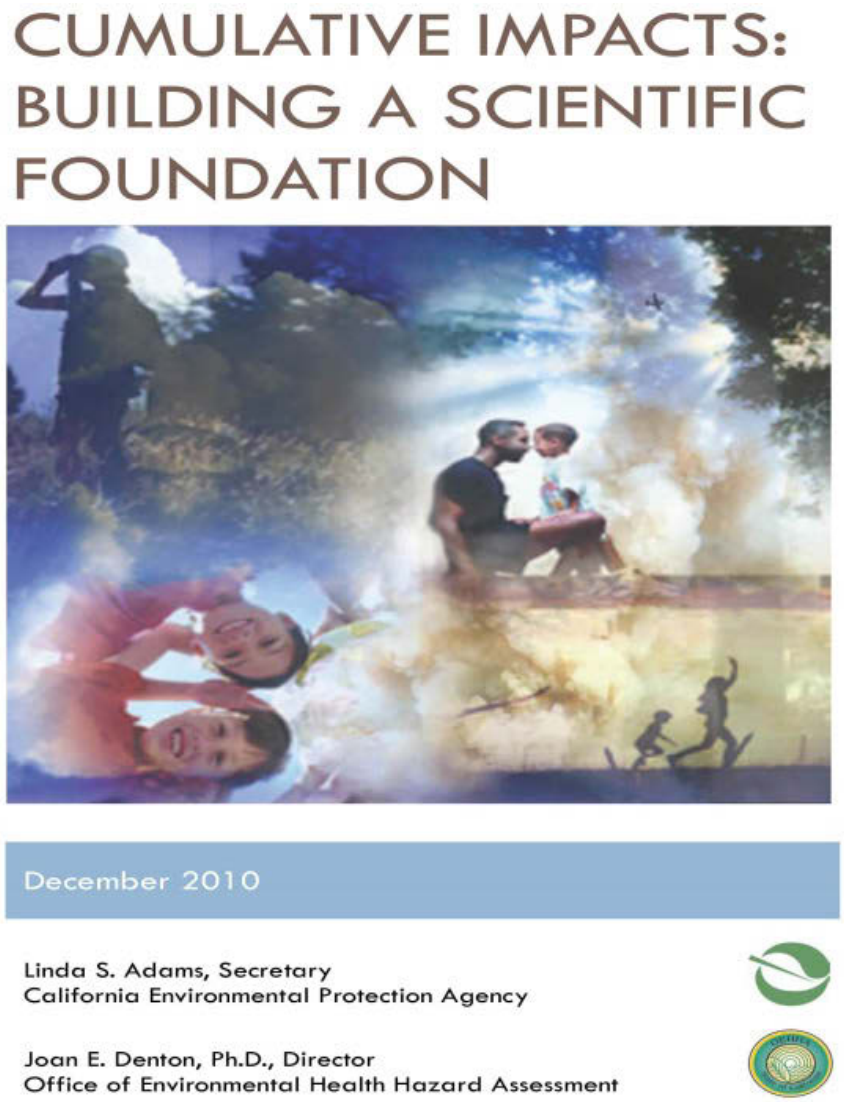
Methodology – CAL/EPA and OEHHA



DEFINITION:

Any exposures, public health or environmental effects from the combined emission and discharges in a geographic area, including environmental pollution from all sources, whether a single or multi-media, routinely, accidentally, or otherwise released

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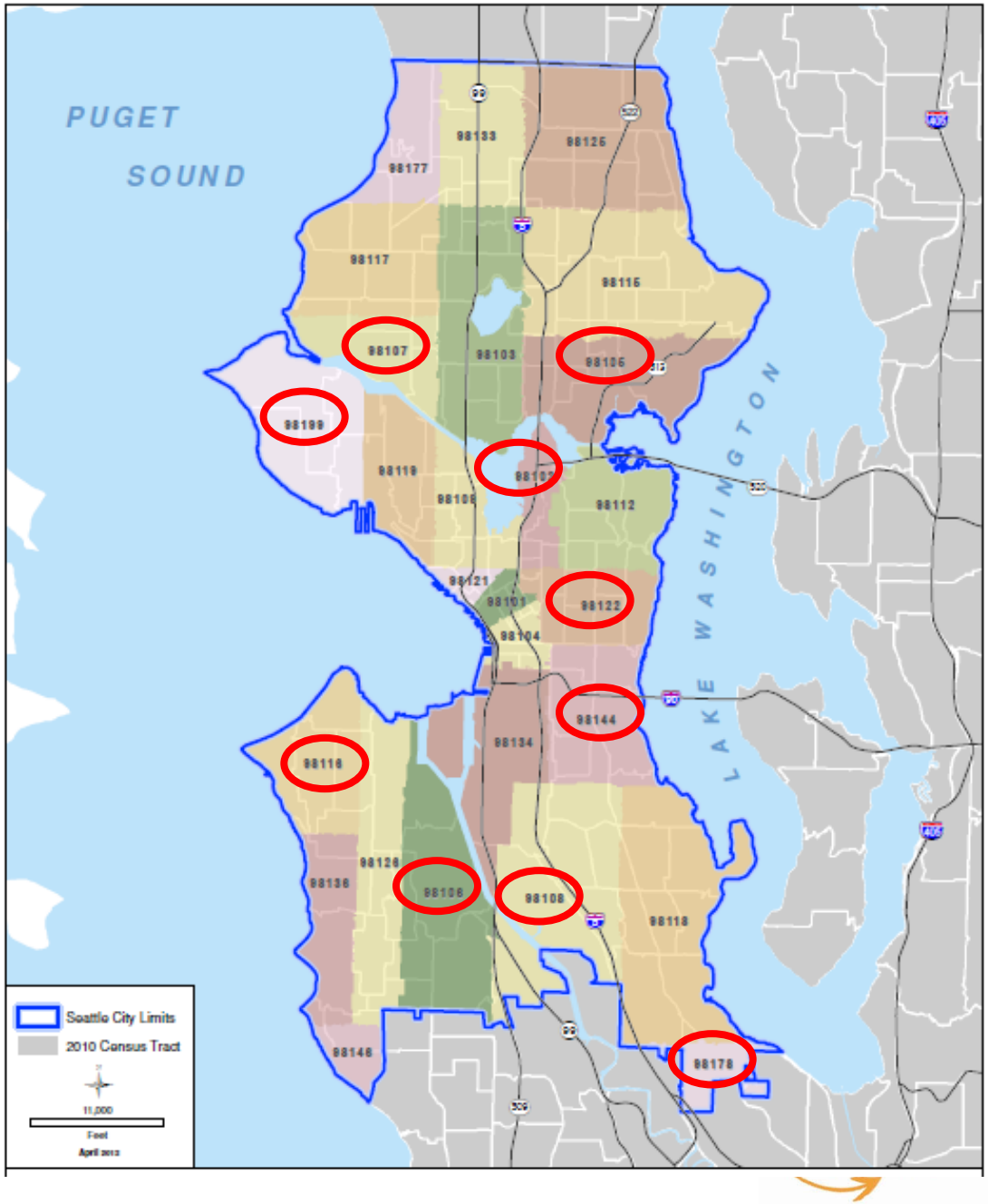
Seattle CHIA

Geographic unit of analysis – 10 ZIPs

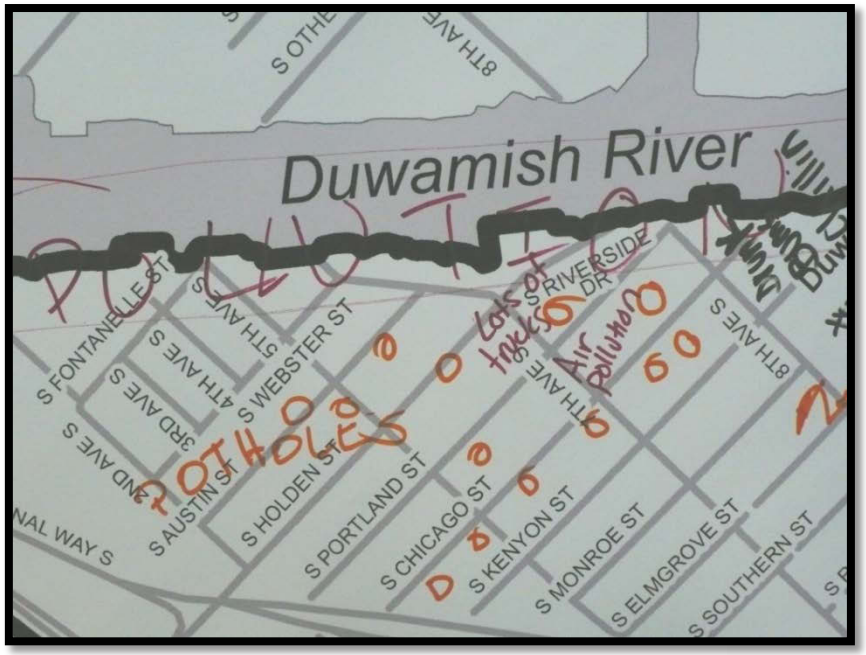
Ranges of:

- Income
- Minority
- Pollution

- CBPR



Community Based Participatory Research



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CBPR:
Health Mapping

Where is our neighborhood healthy?

Where is our neighborhood unhealthy?

Research on 24 Indicators in 5 categories

Component	Definition
Socioeconomic factors	Community characteristics that result in increased vulnerability to pollutants
Sensitive populations	Populations with traits that may magnify the effects of pollutant exposures
Environmental exposures	Contact with pollution
Environmental effects	Adverse built environment conditions
Public health effects	Disease and other heath conditions

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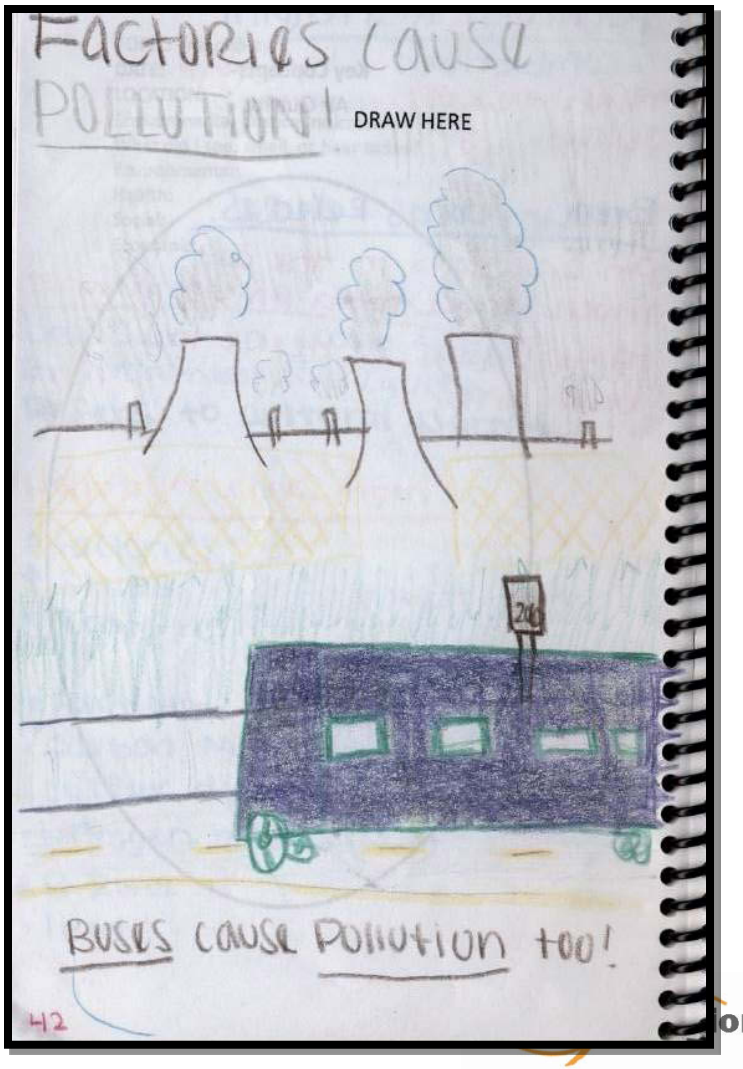
Information sources

- The community!
- U.S. Census
- Public Health Seattle King County
- King County Department of Natural Resources
- Environmental Protection Agency TRI and C-FERST
- WA State Department of Ecology data base



CHIA: Range of scores for each component

Component	Range of Possible Scores	Map Color
Socioeconomic factors	1-3	BROWN
Sensitive populations factors	1-3	GREEN
Environmental exposures factors	1-10	BLUE
Environmental effects factors	1-5	PURPLE
Public Health effects factors	1-5	PINK
Cumulative Impact Score	6-120	ORANGE

Source: Cal/ EPA Cumulative Impacts: Building a Scientific Foundation

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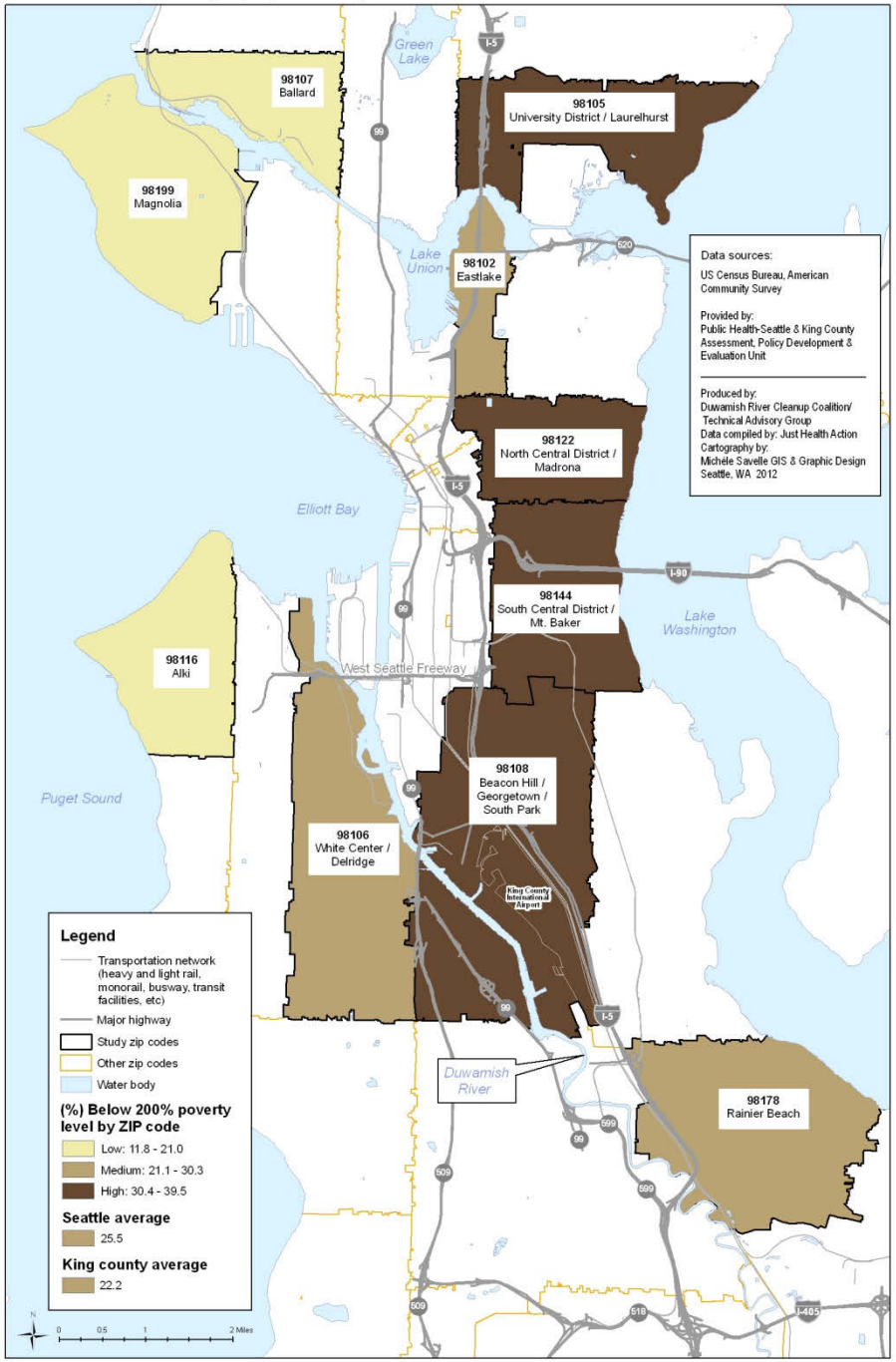
Socioeconomic factor component (rank 1-3):
Percent Below 200% Poverty Level by ZIP code

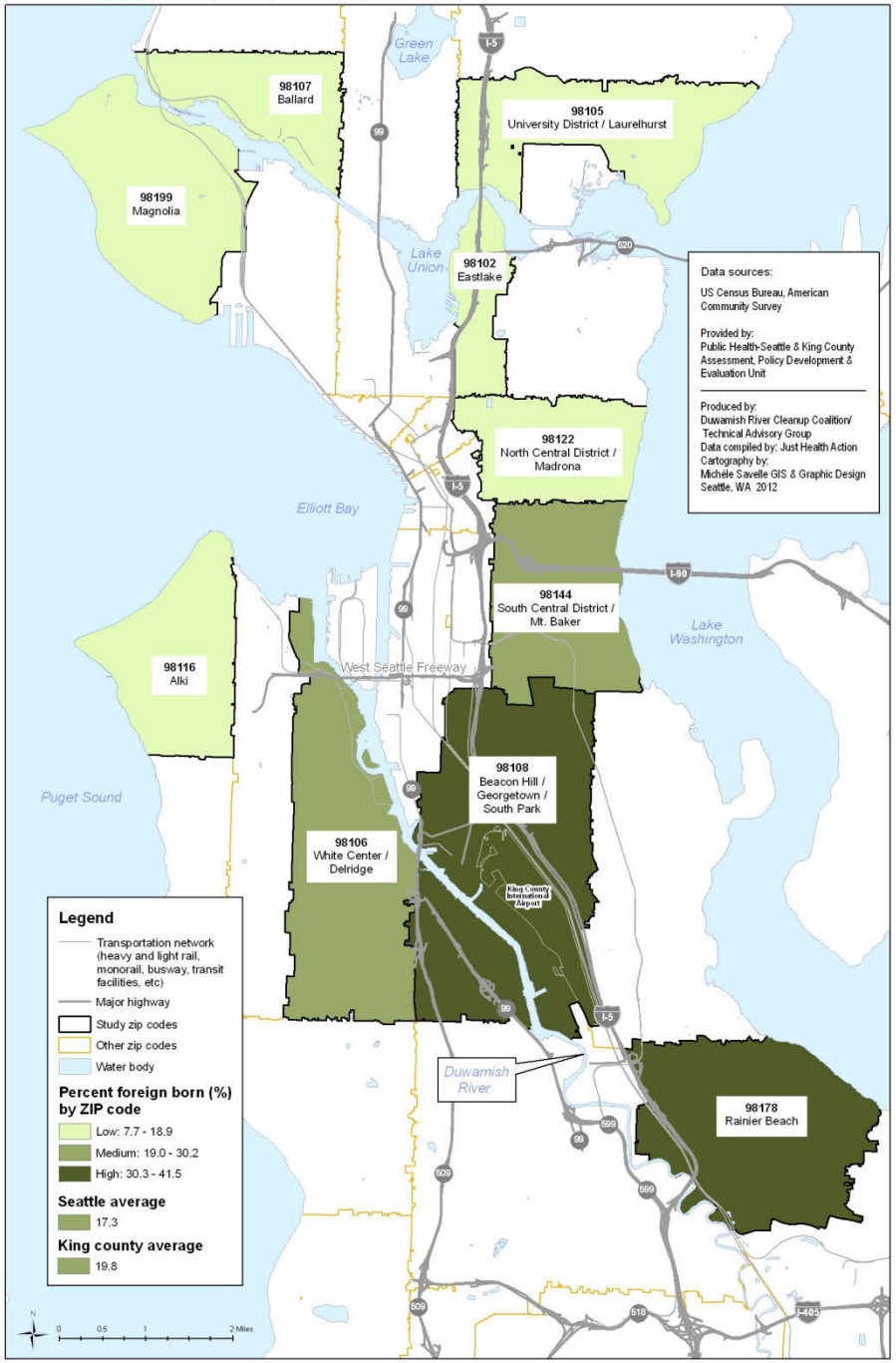
Figure 3. Percent Below 200% Poverty Level, by ZIP Code
Seattle, Washington, 5-year Average 2006-2010



Sensitive populations component (rank 1-3):

Percent Foreign Born
by
ZIP code

Figure 7. Percent Foreign-Born by ZIP Code
Seattle, Washington, 5-year Average 2006-2010



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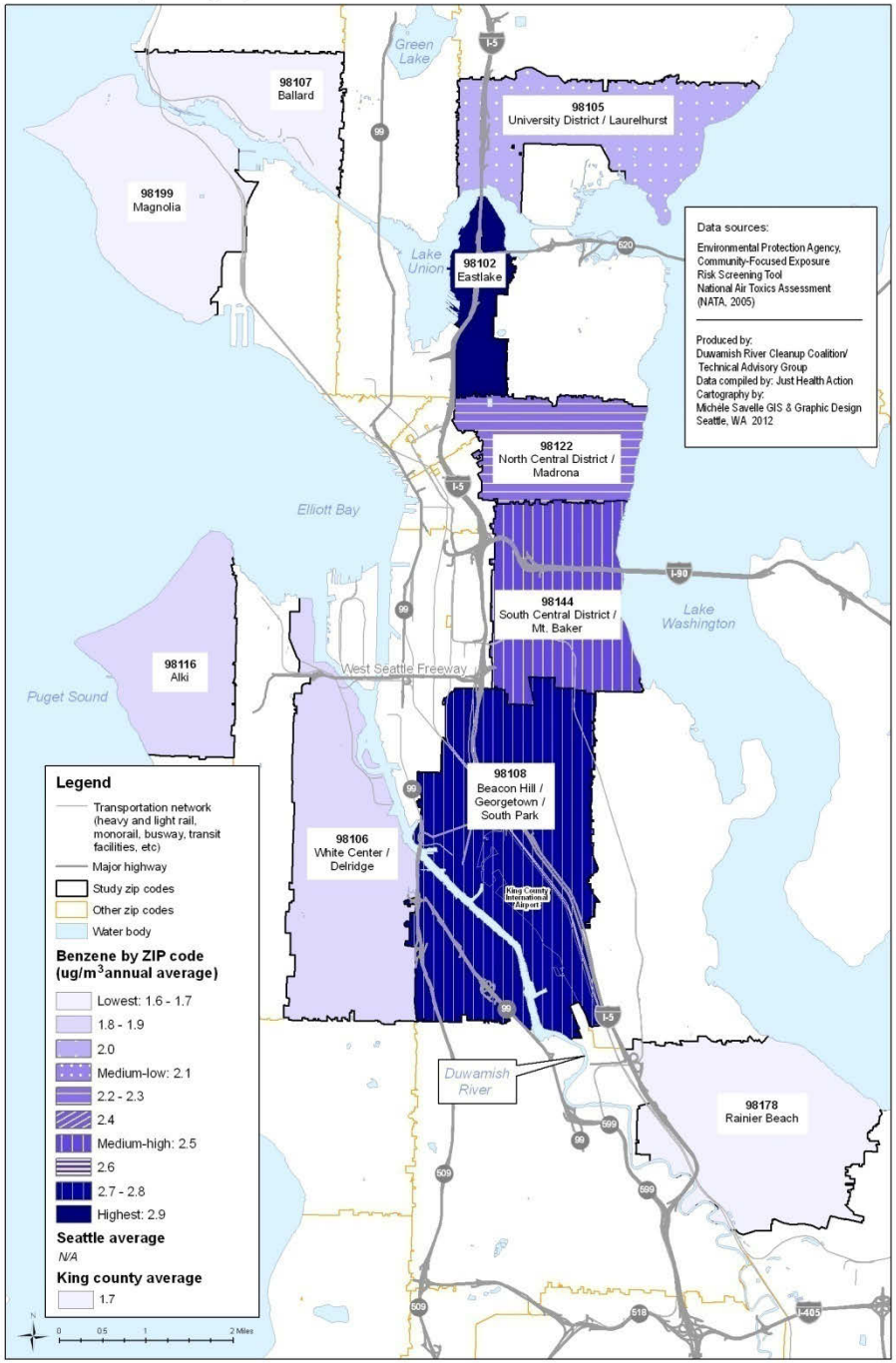
EPA C-FERST

Environmental exposures component (Rank 1-10):

Annual Average Benzene in human breathing zone (ug/m^3), by ZIP code

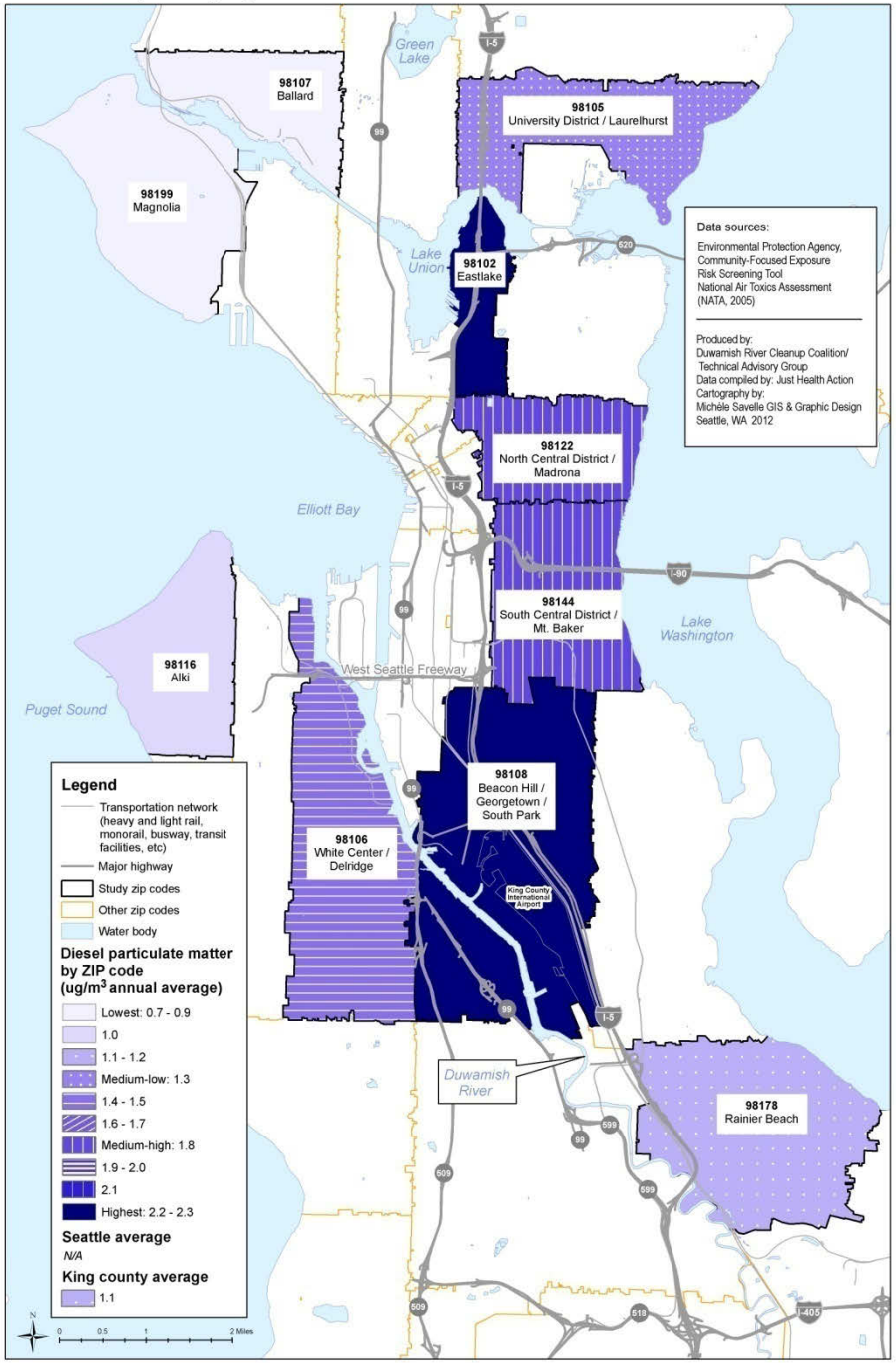
Figure 9. Annual Average Benzene in Human Breathing Zone (ug/m^3), by ZIP Code
Seattle, Washington, 2005



EPA C-FERST Environmental exposures component (Rank 1-10):

Annual Average Diesel Particulate Matter in human breathing zone (ug/m^3), by ZIP code

Figure 8. Annual Average Diesel Particulate Matter in Human Breathing Zone (ug/m^3), by ZIP Code Seattle, Washington, 2005

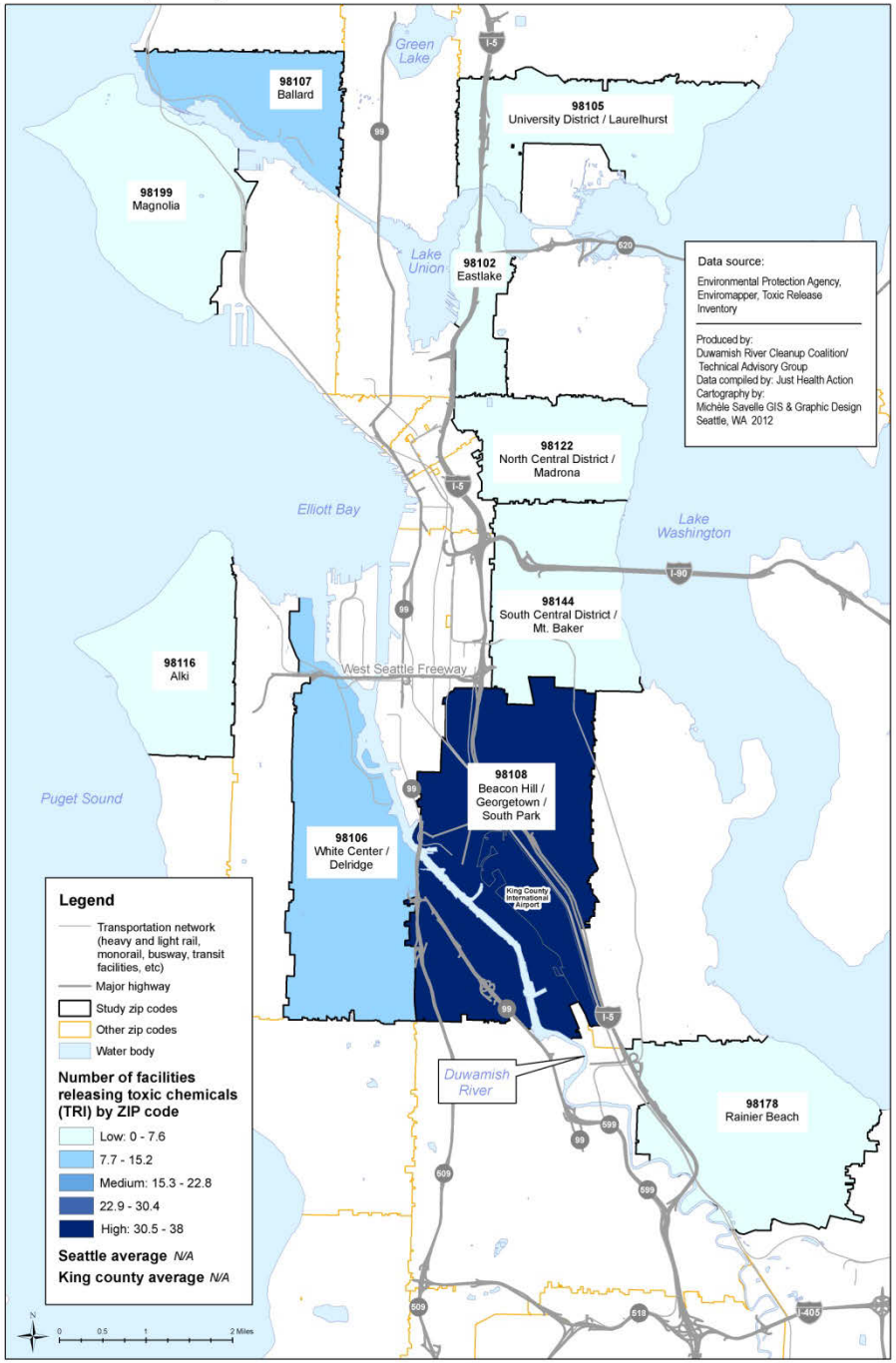


EPA TRI Data

Environmental effects component (Rank 1-5):

Number of Toxic Release Inventory Sites, by ZIP code

Figure 13. Number of Toxic Release Inventory Sites, by ZIP Code
Seattle, Washington



Action

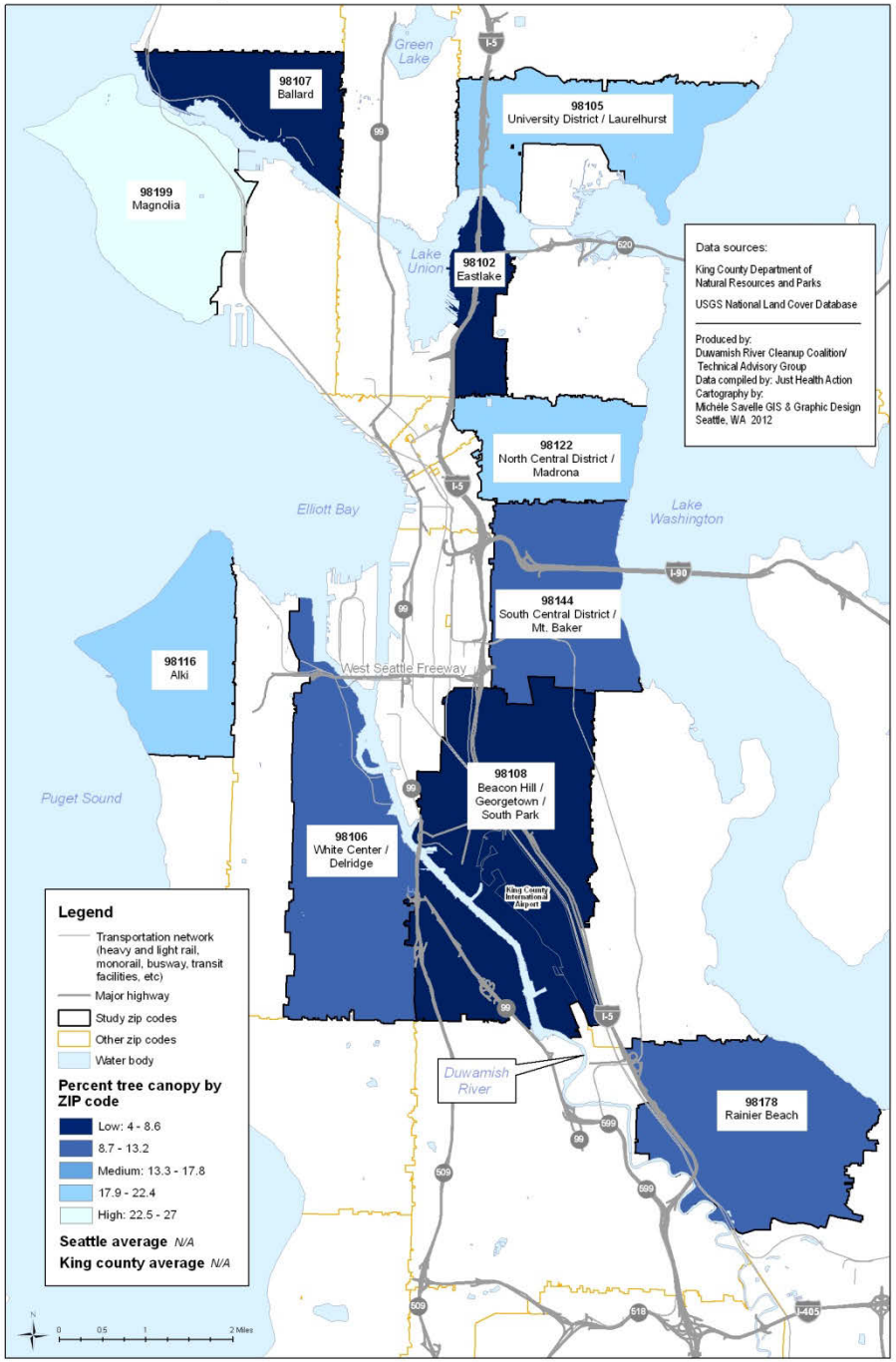
Environment factors component (Rank 1-5):

Percent Tree Canopy

by

ZIP code

Figure 11. Percent Tree Canopy, by ZIP Code
Seattle, Washington

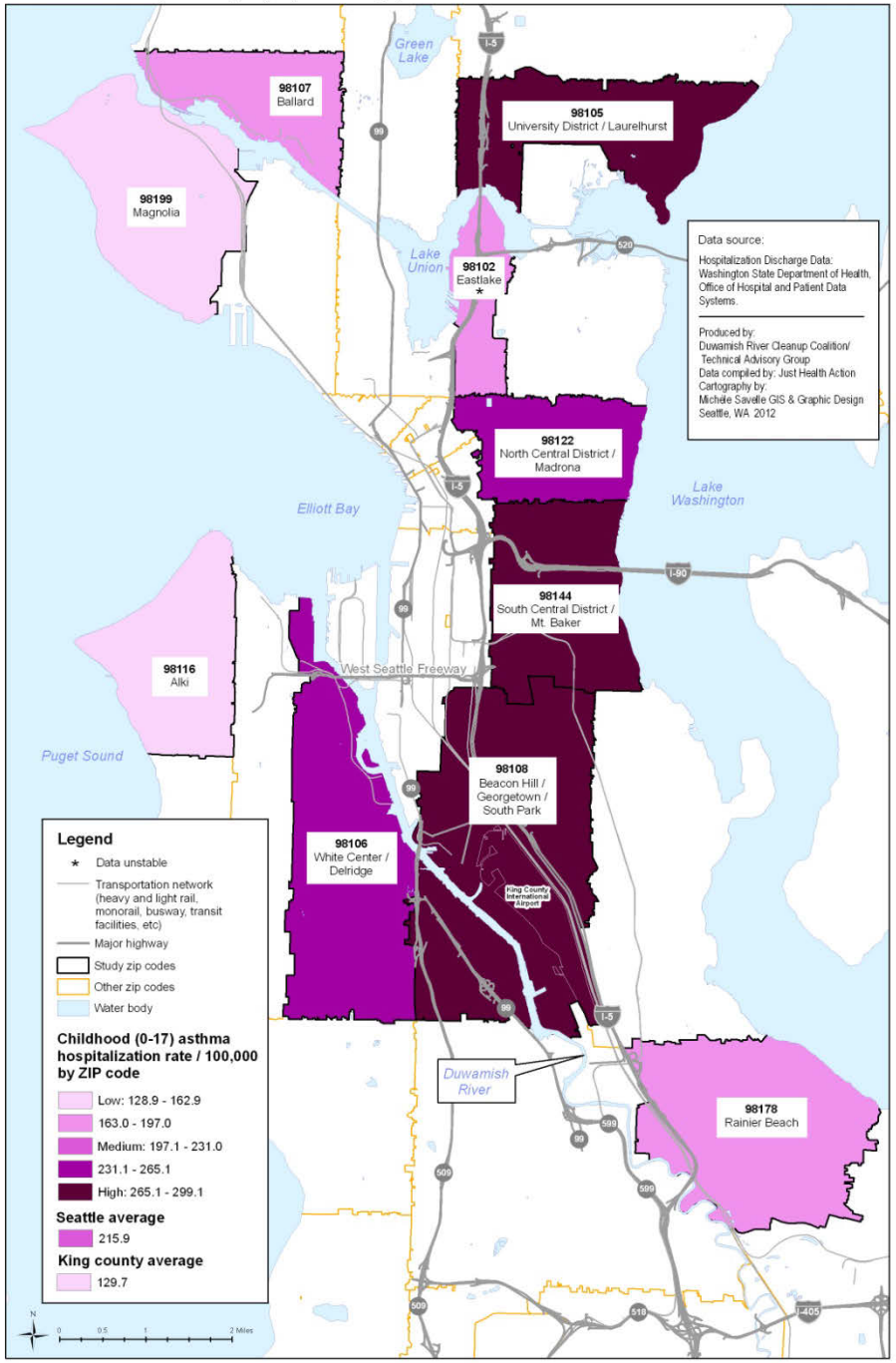


Action

Public health factors component (Rank 1-5):

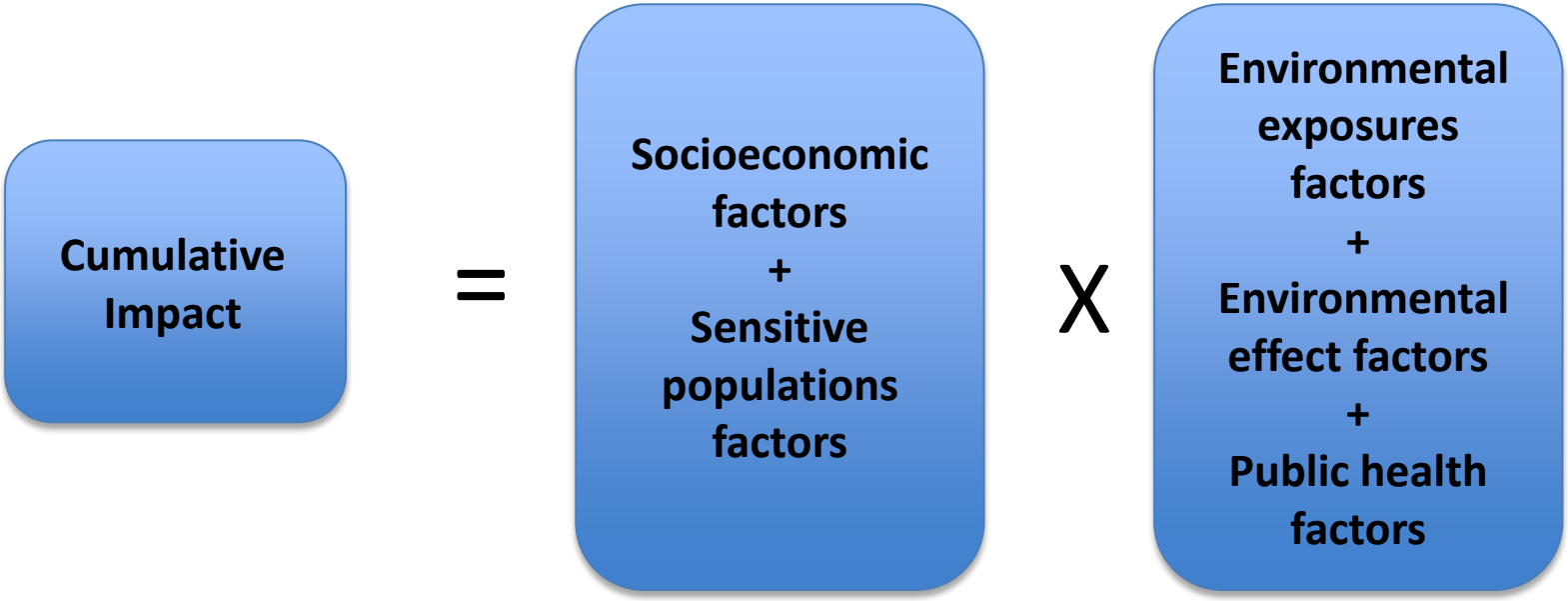
Childhood asthma hospitalization rate per 100,000 by ZIP code

Figure A8. Childhood (0-17) Asthma Hospitalization Rate per 100,000, by ZIP Code
Seattle, Washington, 5-year average, 2006-2010



Cumulative Health Impacts Formula:

Input 3 indicators from each component



Source: Cal/ EPA Cumulative Impacts: Building a Scientific Foundation, 2010

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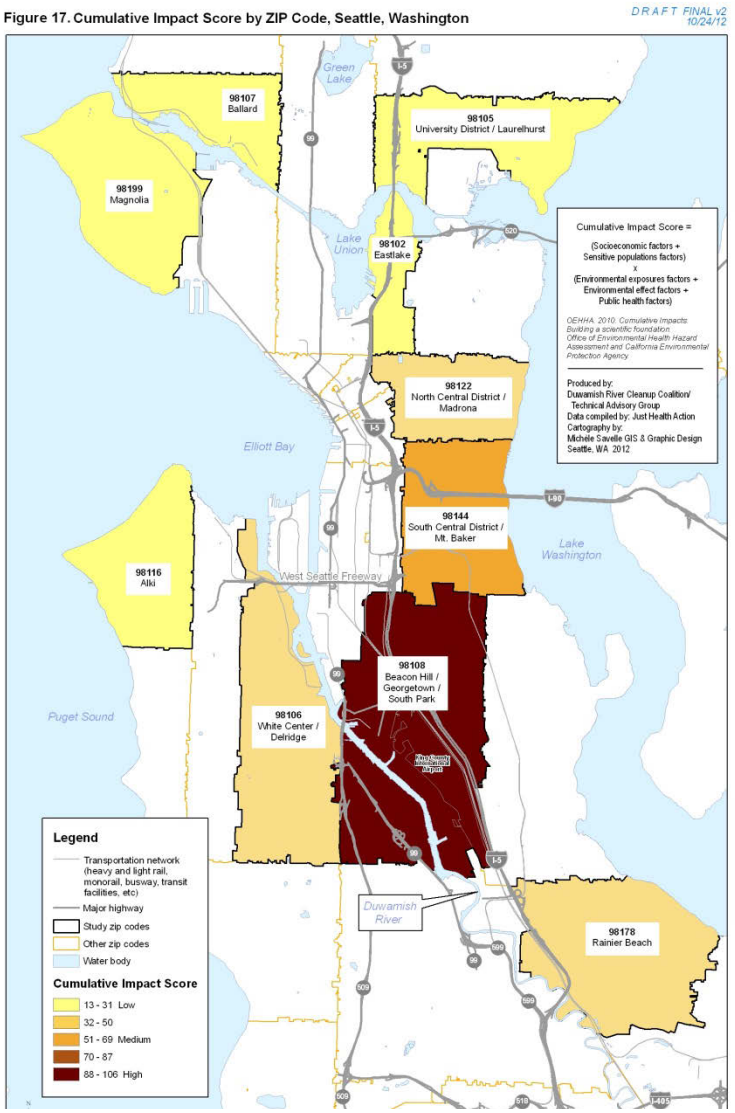
Seattle Cumulative Impact Analysis Results



Component	98108 Beacon Hill Georgetown South Park	98144 South Central District Mt Baker	98178 Rainier Beach	98106 White Center Delridge	98122 North Central District Madrona	98102 Eastlake	98107 Ballard	98105 University District Laurelhurst	98116 Alki	98199 Magnolia
CUMULATIVE IMPACT SCORE	106	66	50	46	43	30	28	21	19	13

Georgetown/South Park disparities

Indicator	Georgetown /South Park Census tracts 109 and 112	Laurelhurst Census tracts 4100 and 4200	Seattle	King County
Life expectancy at birth (years)	73.3*	86.4*	81.5	81.5
Heart disease death rate per 100,000	202.9#	89.6*	138.4	137.8

Source: Public Health Seattle & King County
*p=0.05 from both KC and Seattle average
#p= 0.05 for KC average only

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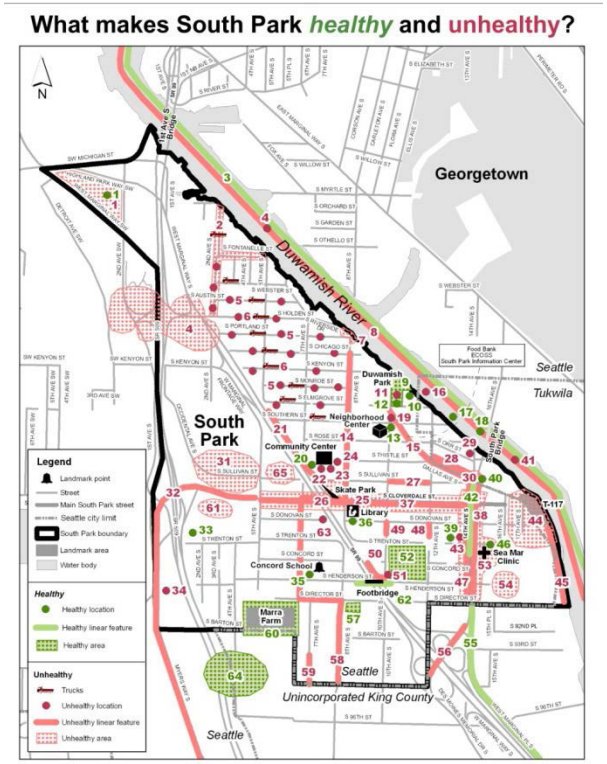
Community Prioritization Workshops



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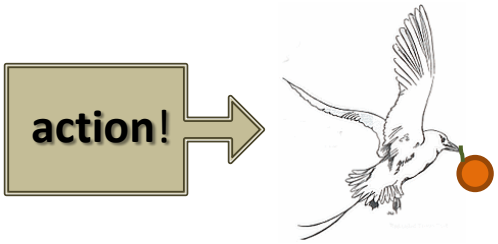
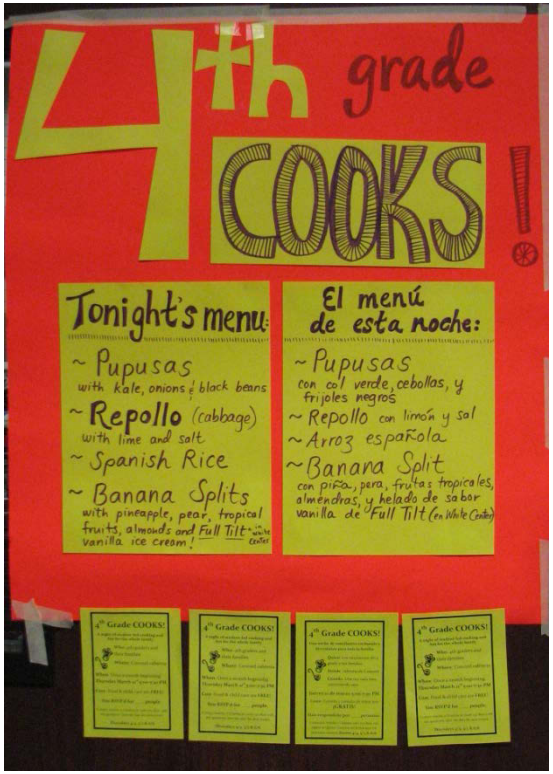
Community Action Grants





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Pollution control: Duwamish Valley Cisterns and Rain Gardens

Influencing Decision-Making

- Evidence base when giving neighborhood “toxic tours”
- Advocating for more resources to improve neighborhood conditions
- Citation when requesting funding for grants
- Informs community outreach efforts
- Helps identify mitigation measures for site cleanups and construction activities
- Information dissemination
- King County and Seattle Equity and Social Initiatives
- Seattle Mayor sets aside $250,000 *Duwamish River Opportunity Fund* to develop health interventions and mitigation for local residents

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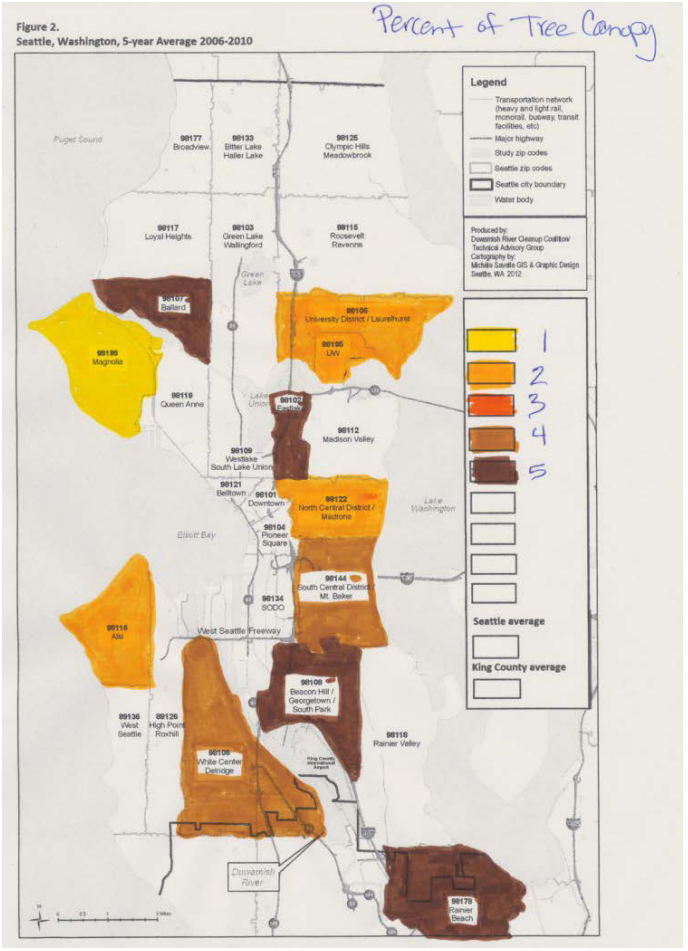
Education – CHIA lesson plans being developed and taught

How does ZIP code determine your health?

1. What makes an individual, school, neighborhood healthy and how do you measure it (indicators)?
2. What parts of Seattle have good/bad indicators? (color in the ZIPs by indicator)
3. How would you add it up? (use the formula
4. Is this fair? (Equity vs equality and EJ)
5. Why is GT/SP different from 98108?
6. Action – what should we do?



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QUESTIONS?

Where to get Duwamish Valley Cumulative Health Impacts Analysis (CHIA)?

- The full appendices, and poster can be found at: www.justhealthaction.org/resources/jha-publications
- Our CHIA and associated Environmental Justice curriculum should be available for free online by early 2015.

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Thank You!

Contact:

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www.justhealthaction.org

(206) 324-0297

JustHealthAction

ACKNOWLEDGEMENTS

- Paulina Lopez – Community expert
- BJ Cummings – Co-author

DUWAMISH RIVER CLEANUP COALITION

Technical Advisory Group

Center for ecogenetics & Environmental Health

Public Health
Seattle & King County

SCHOOL OF PUBLIC HEALTH
UNIVERSITY of WASHINGTON

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Possible extras

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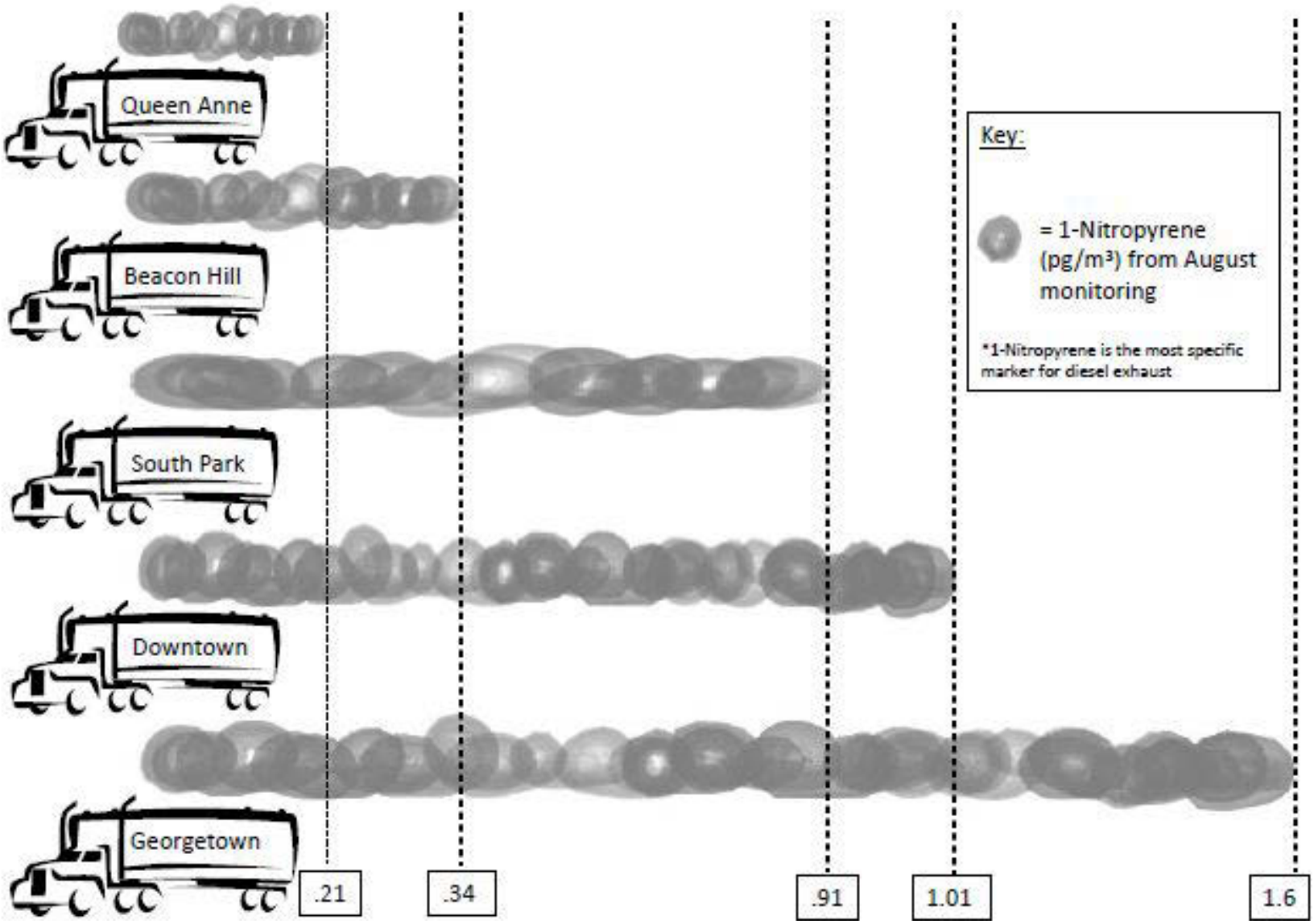
Diesel Exhaust by Neighborhood



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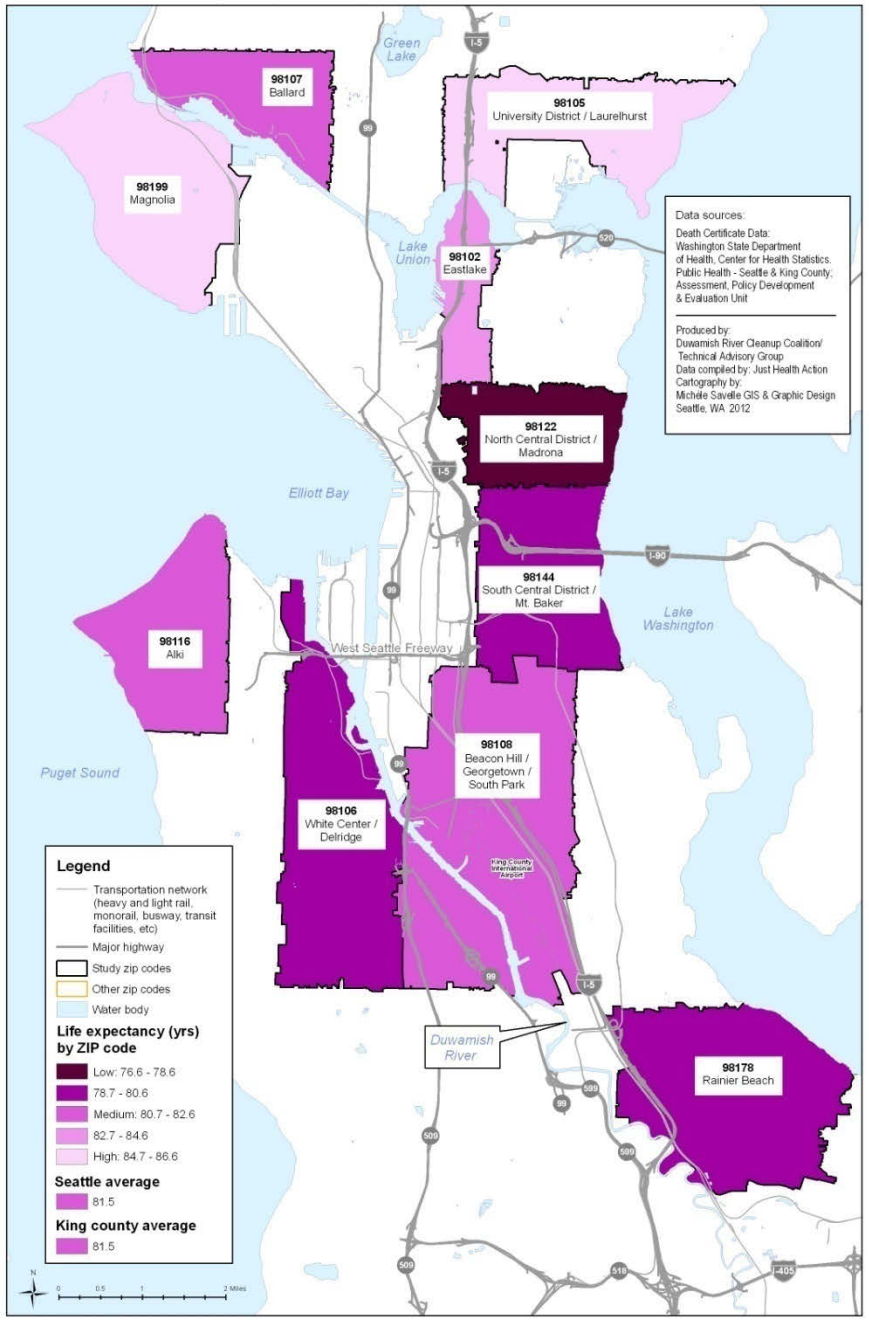
Public health factors component (Rank 1-5):

Life Expectancy at birth by ZIP code, 5 year average (2005-2009)

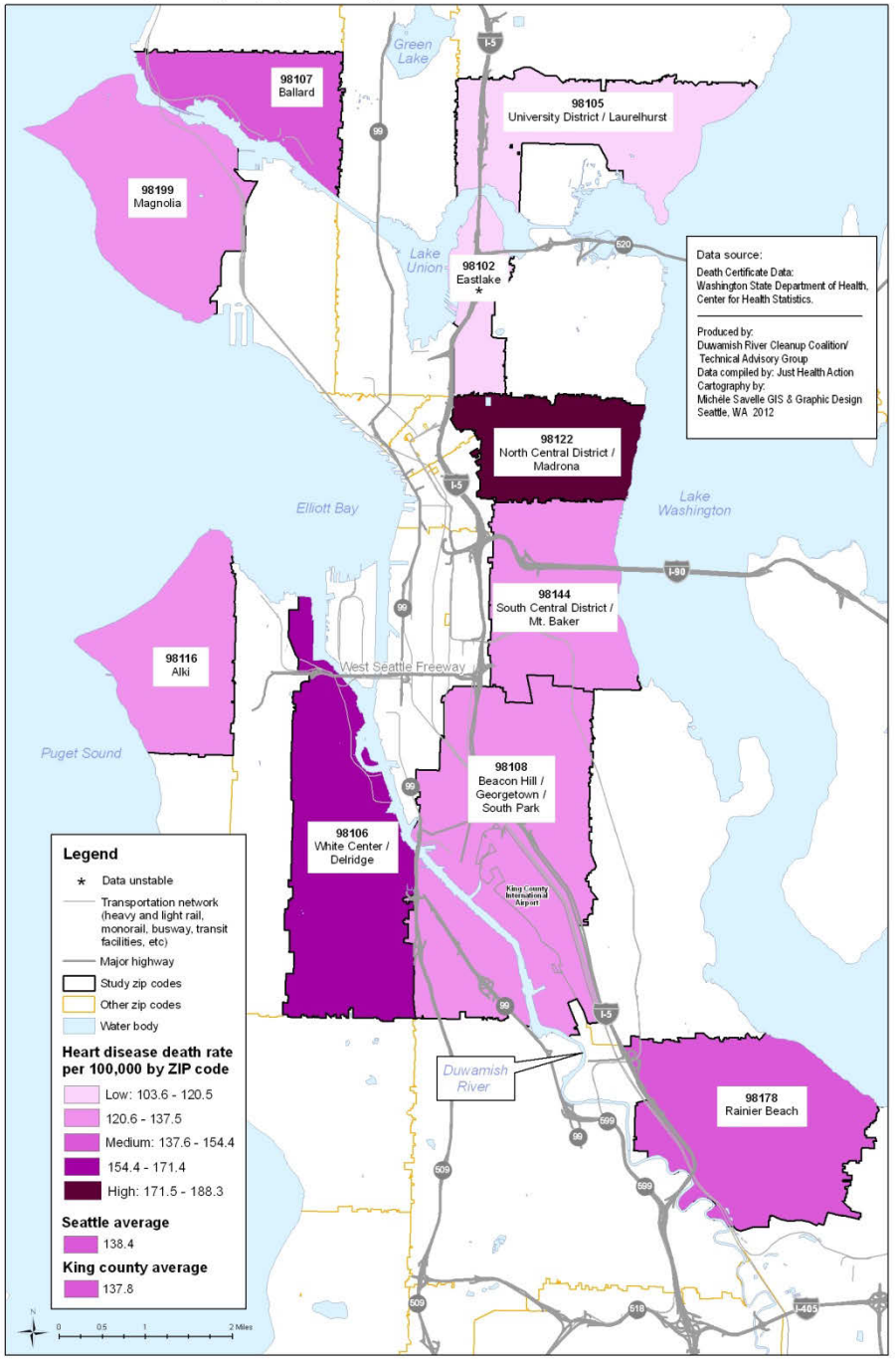
Figure A3. Life Expectancy at Birth in Years, by ZIP Code
Seattle, Washington, 5 year average, 2005-2009



Public health factors component (Rank 1-5):

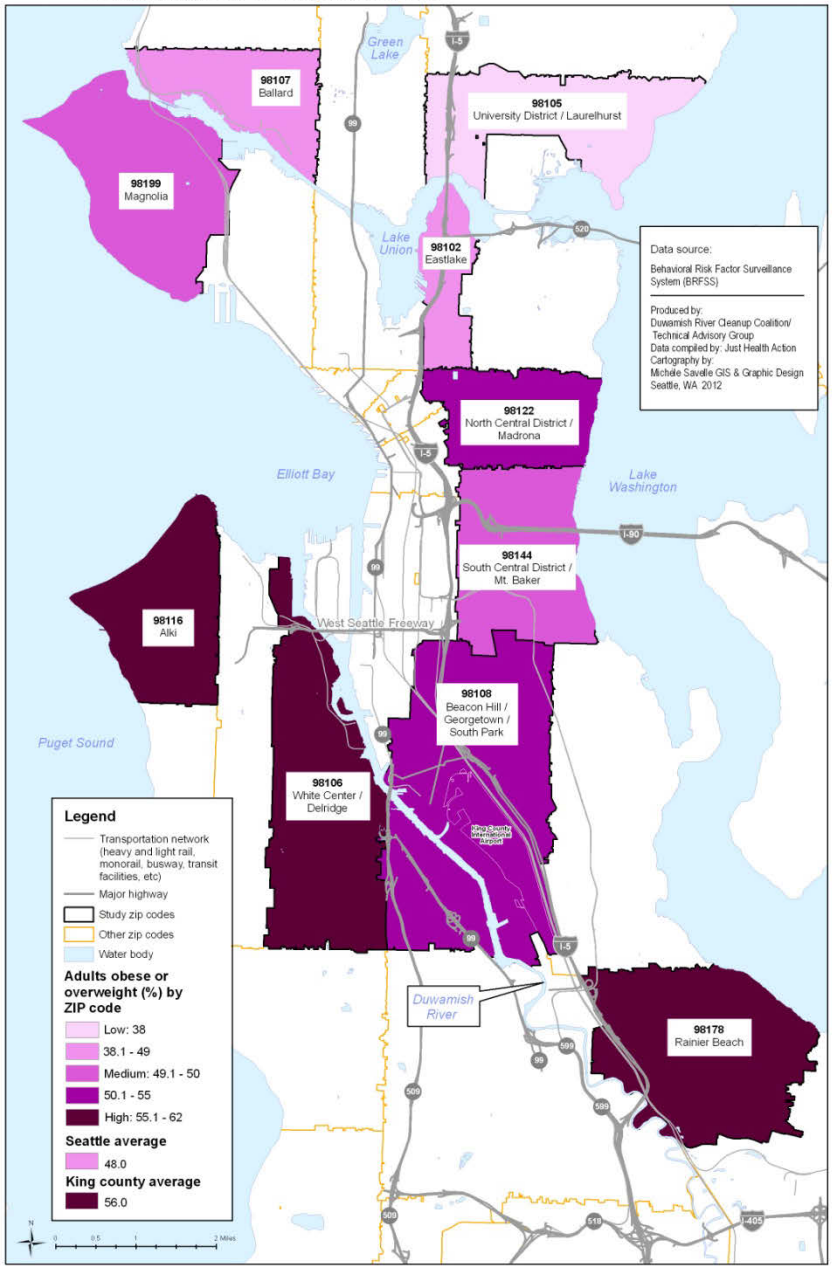
Heart Disease death Rate per 100,000 by ZIP code

Figure 14. Heart Disease Death rate per 100,000, by ZIP Code
Seattle, Washington, 5-year average, 2006-2010



Percent adults overweight or obese, by ZIP code, 5 year average

Figure A4. Percent Adults Overweight or Obese by ZIP Code
Seattle, Washington, 5-year Average 2007-2011



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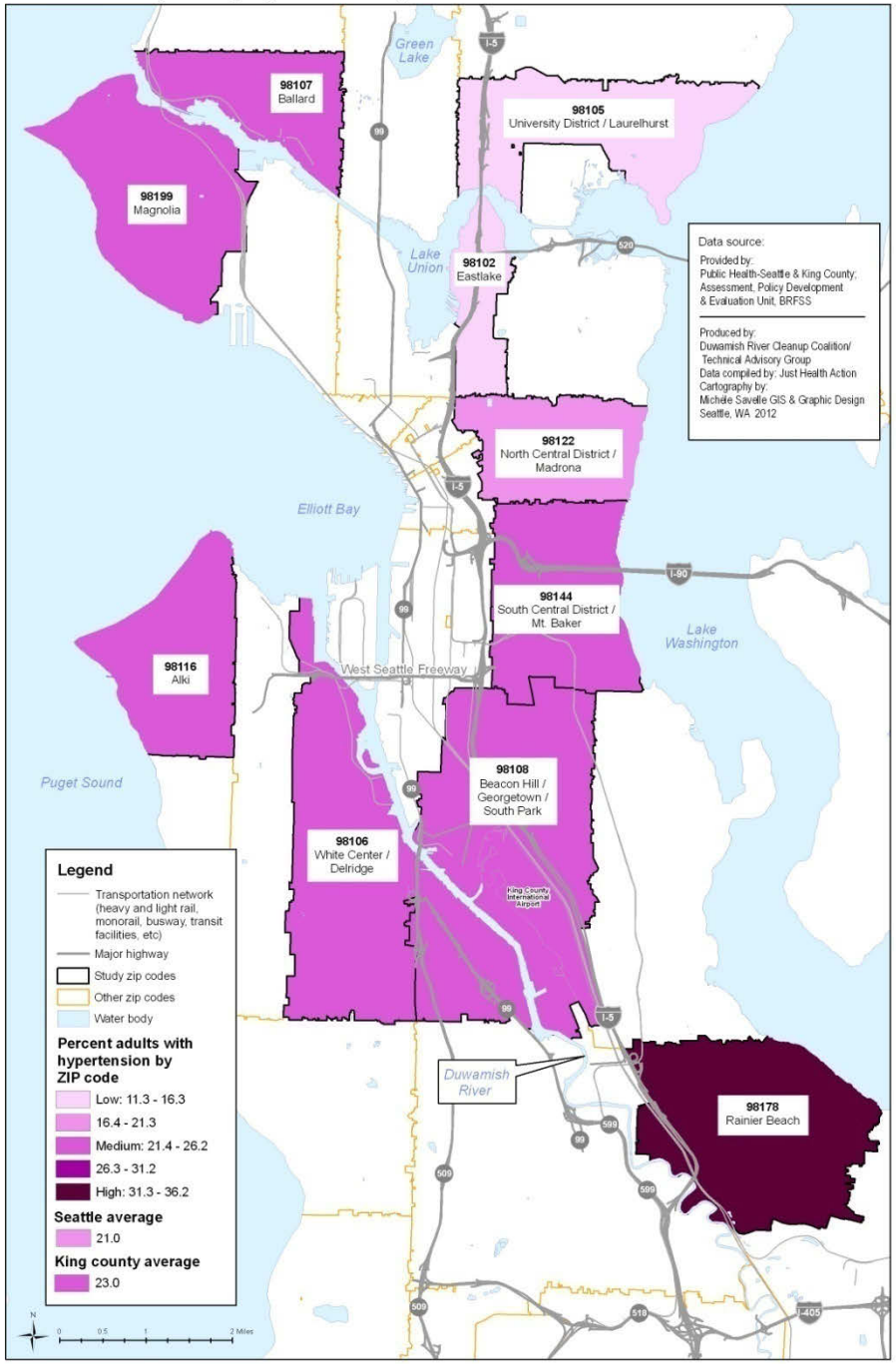
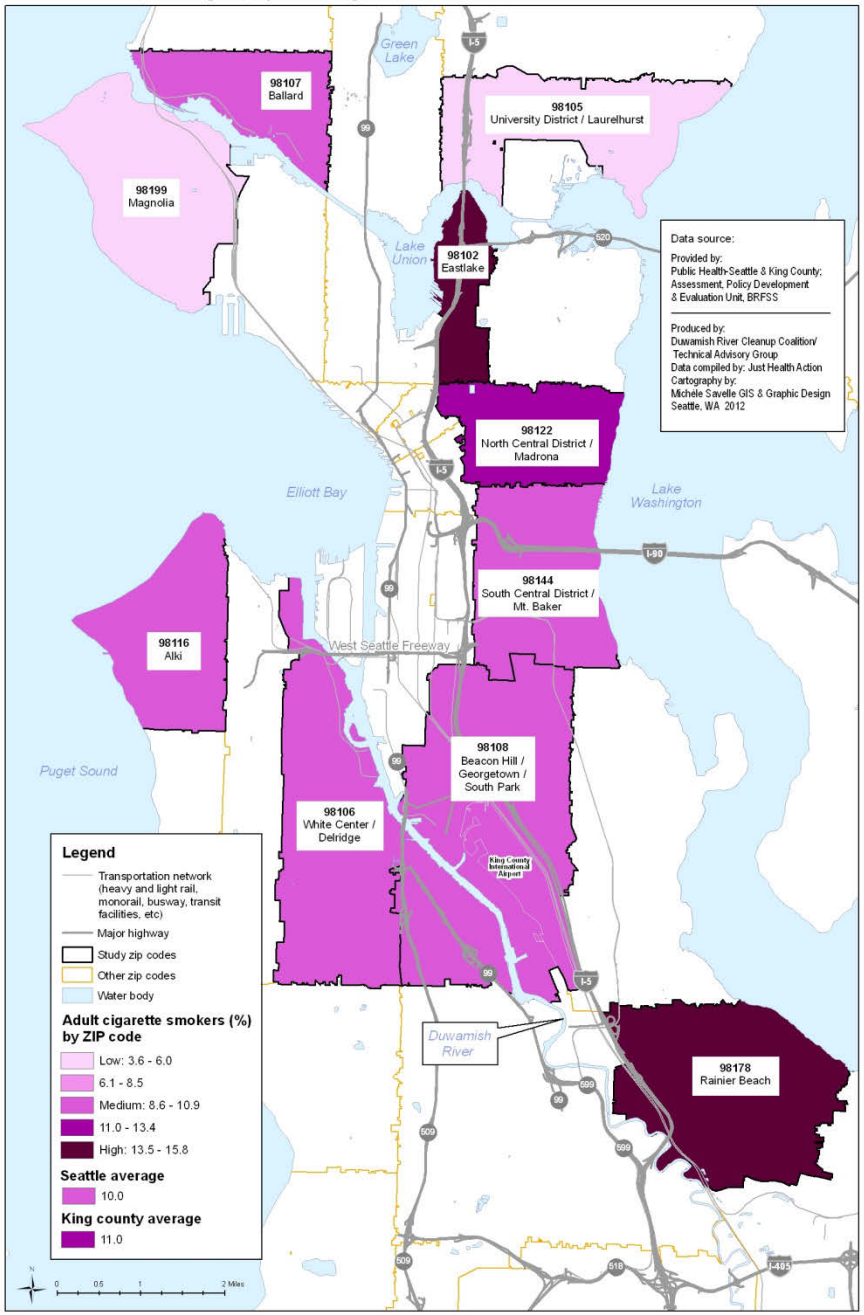
Percent adults with Hypertension, by ZIP code

Figure A7. Percent Adults with Hypertension, by ZIP Code
Seattle, Washington, 2003-2011 odd years



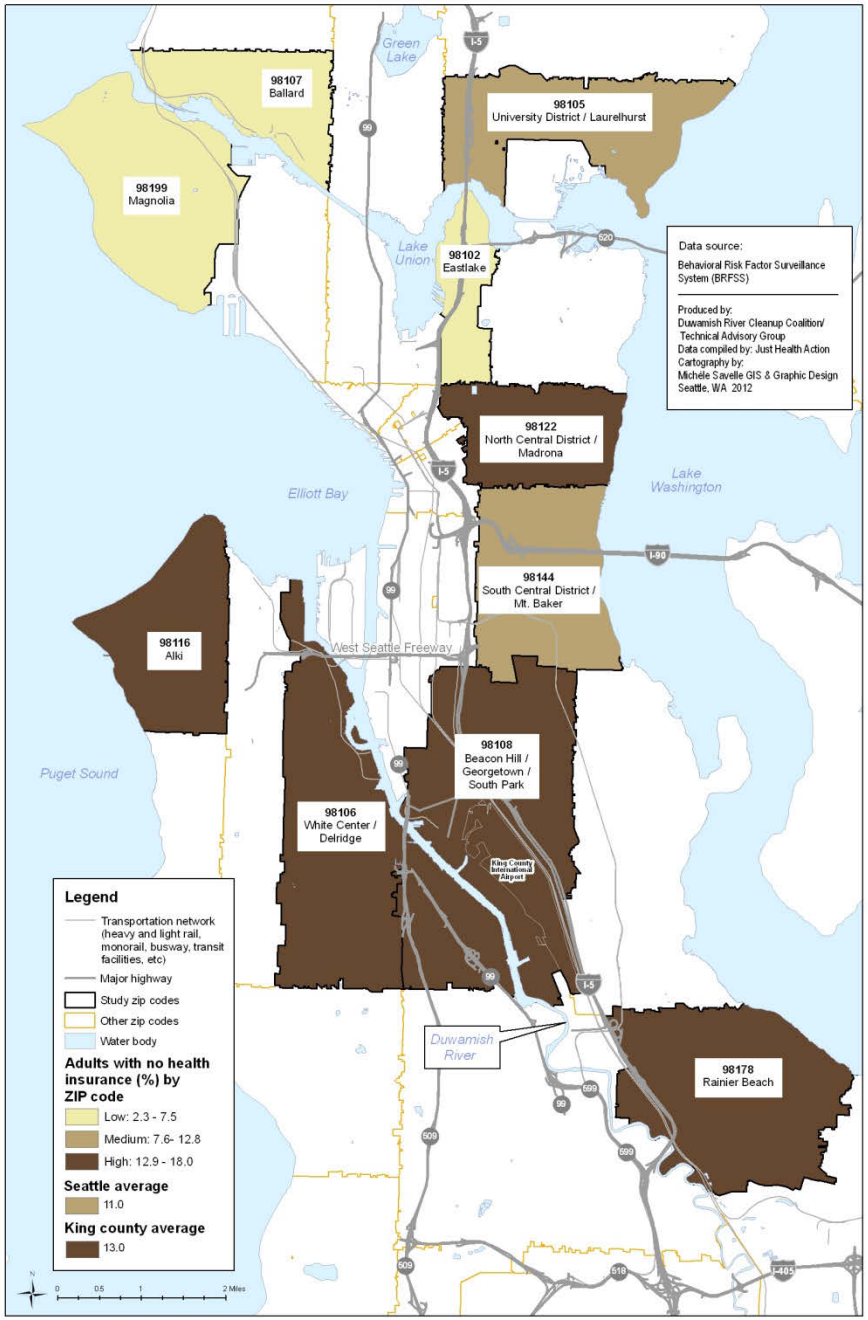
Percent adult cigarette smokers

Figure 15. Percent Adult Cigarette Smokers, by ZIP Code
Seattle, Washington, 5-year Average 2007-2011



Percent adults no health insurance

Figure A1. Percent Adults (18-64 years) With No Health Insurance, by ZIP Code
Seattle, Washington, 5-year Average 2007-2011



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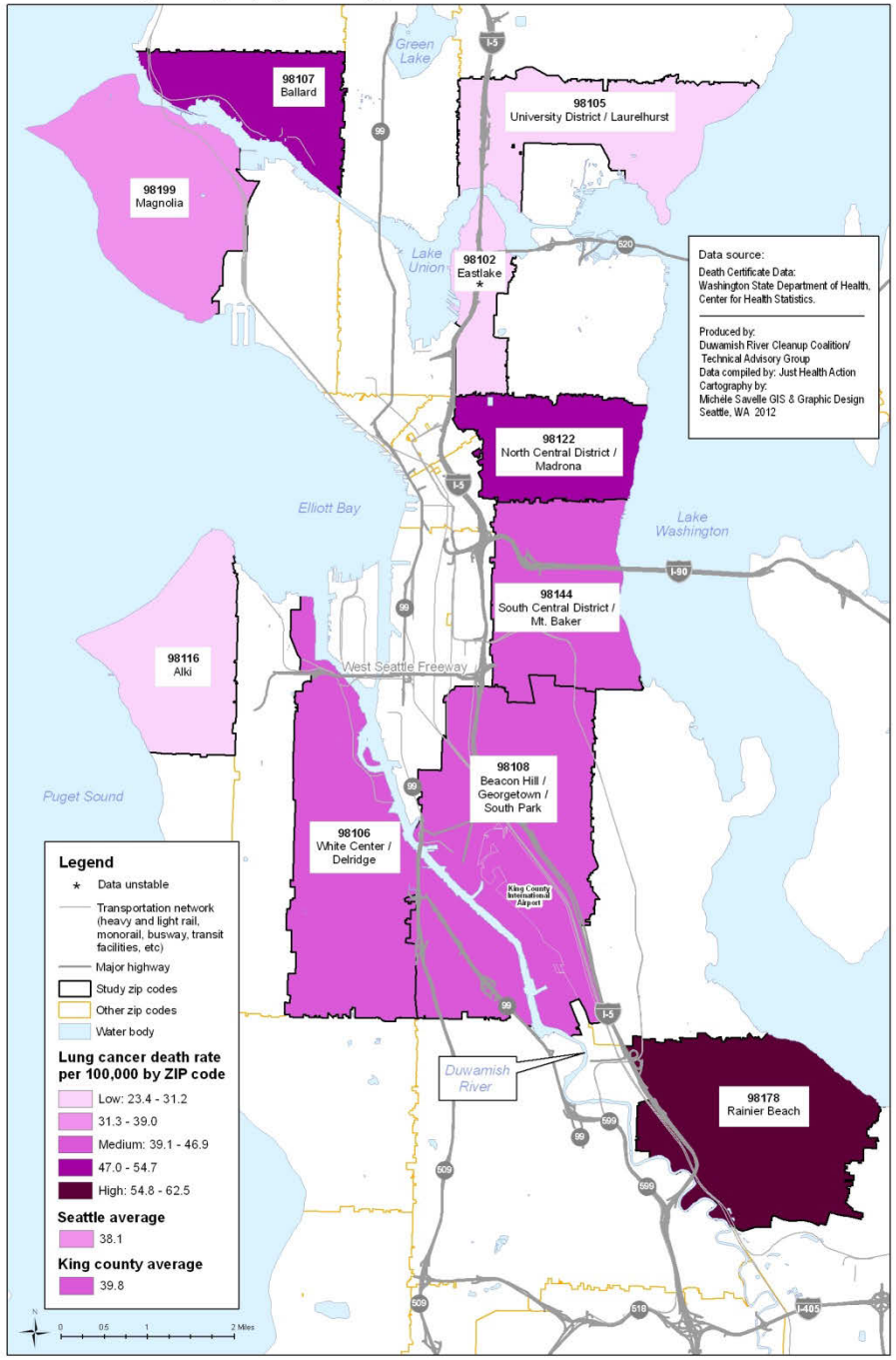
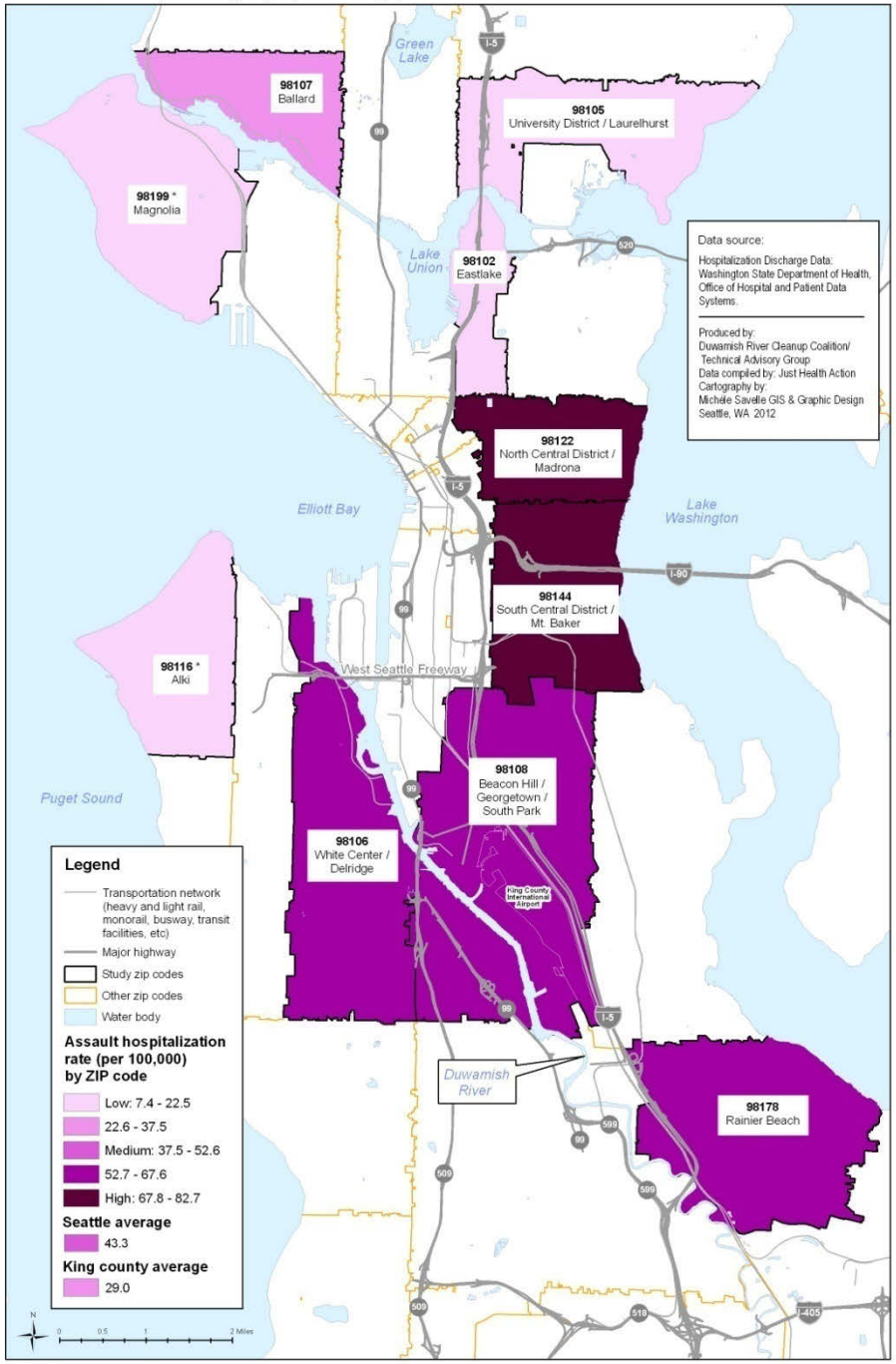
Lung cancer death rate

Figure 16. Lung Cancer Death Rate Per 100,000, by ZIP Code
Seattle, Washington, 5-year average, 2006-2010



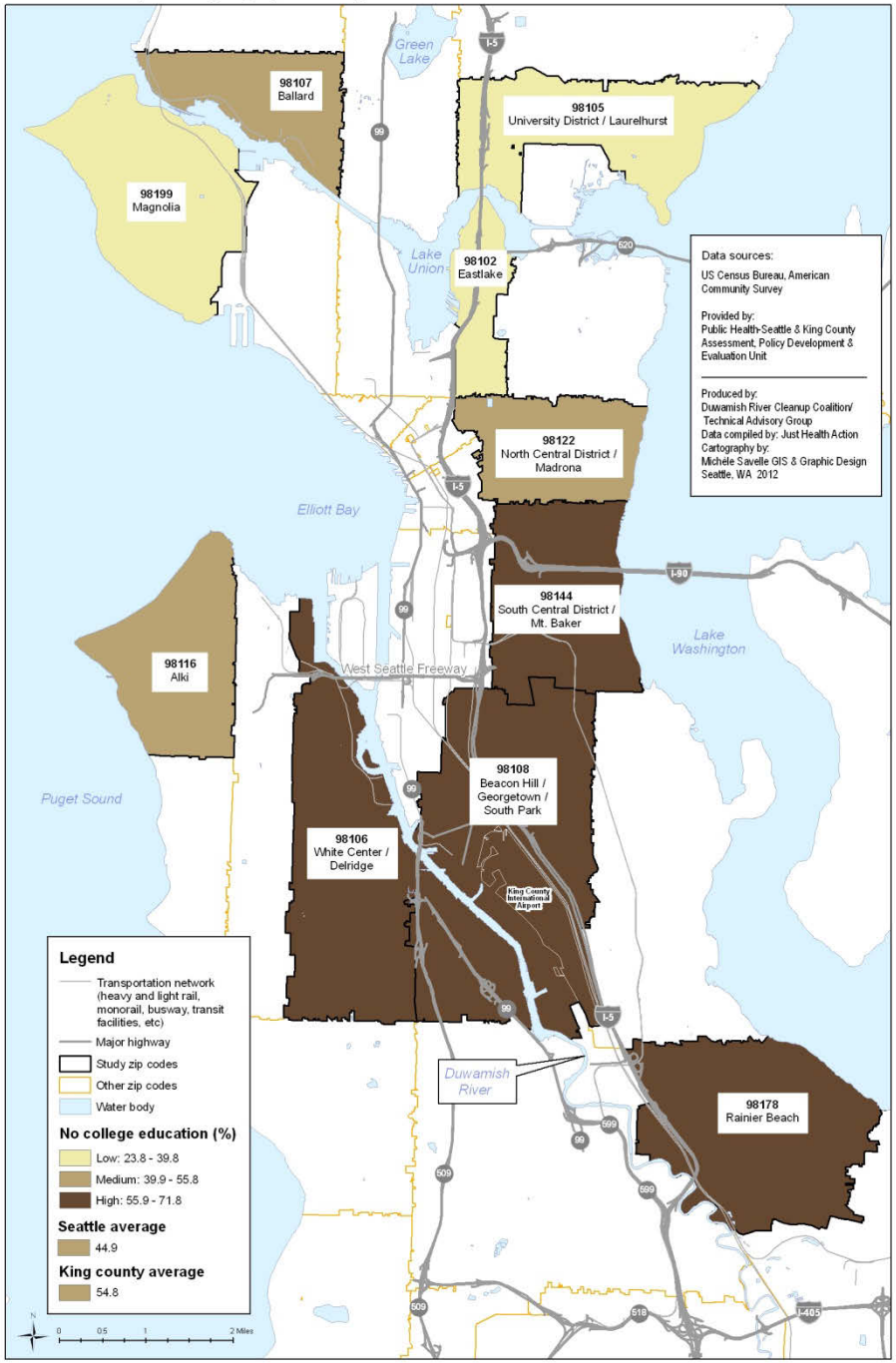
Assault hospitalization rate per 100,000, by ZIP code

Figure A9. Assault Hospitalization Rate Per 100,000, by ZIP Code
Seattle, Washington, 5-year average, 2006-2010



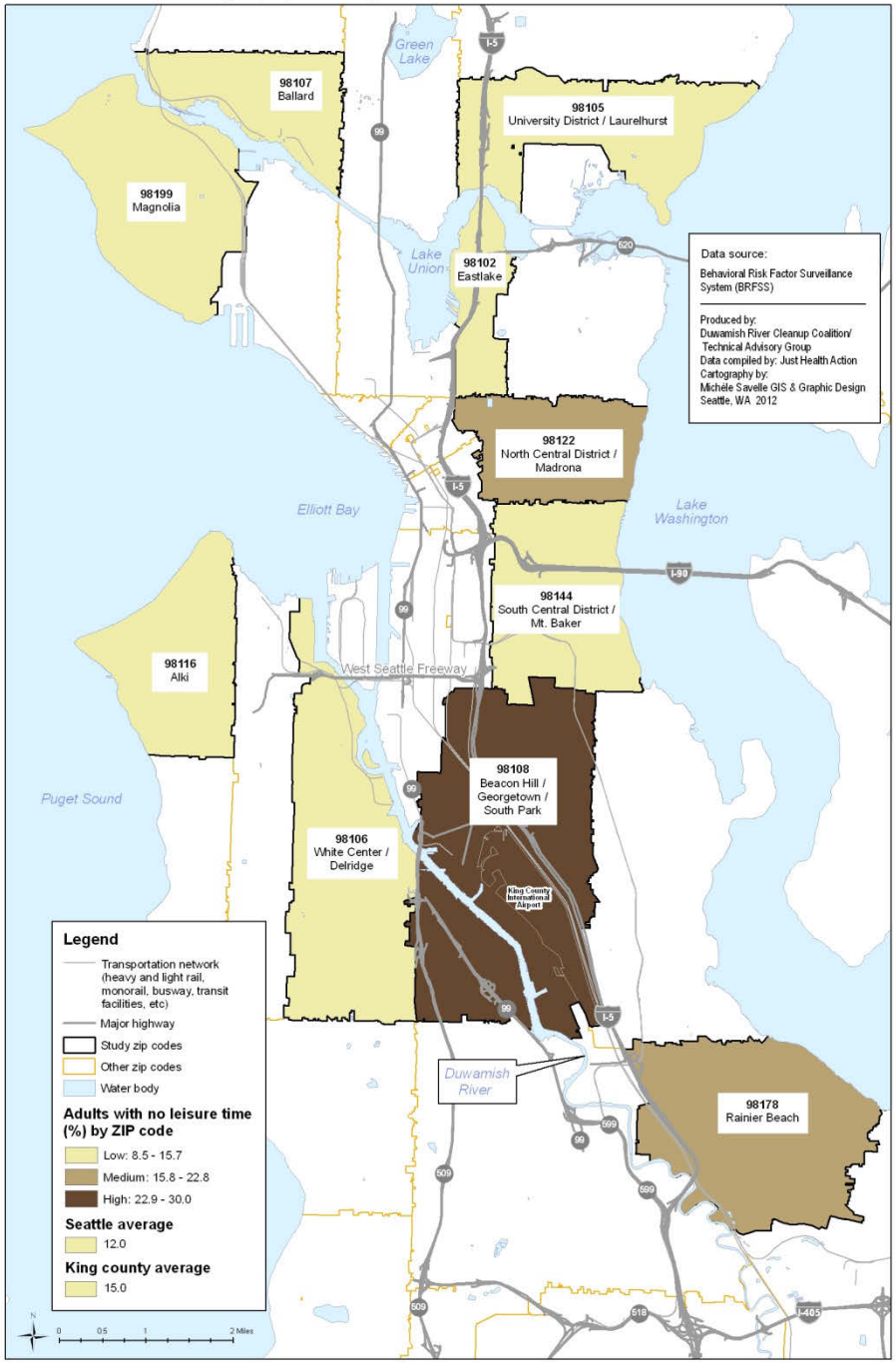
Percent adults 25 and older without a college degree, by ZIP code

Figure 2. Percent Adults 25 and older Without a College Degree, by ZIP Code
Seattle, Washington, 5-year Average 2006-2010



Percent adults with no leisure time physical activity, by ZIP code

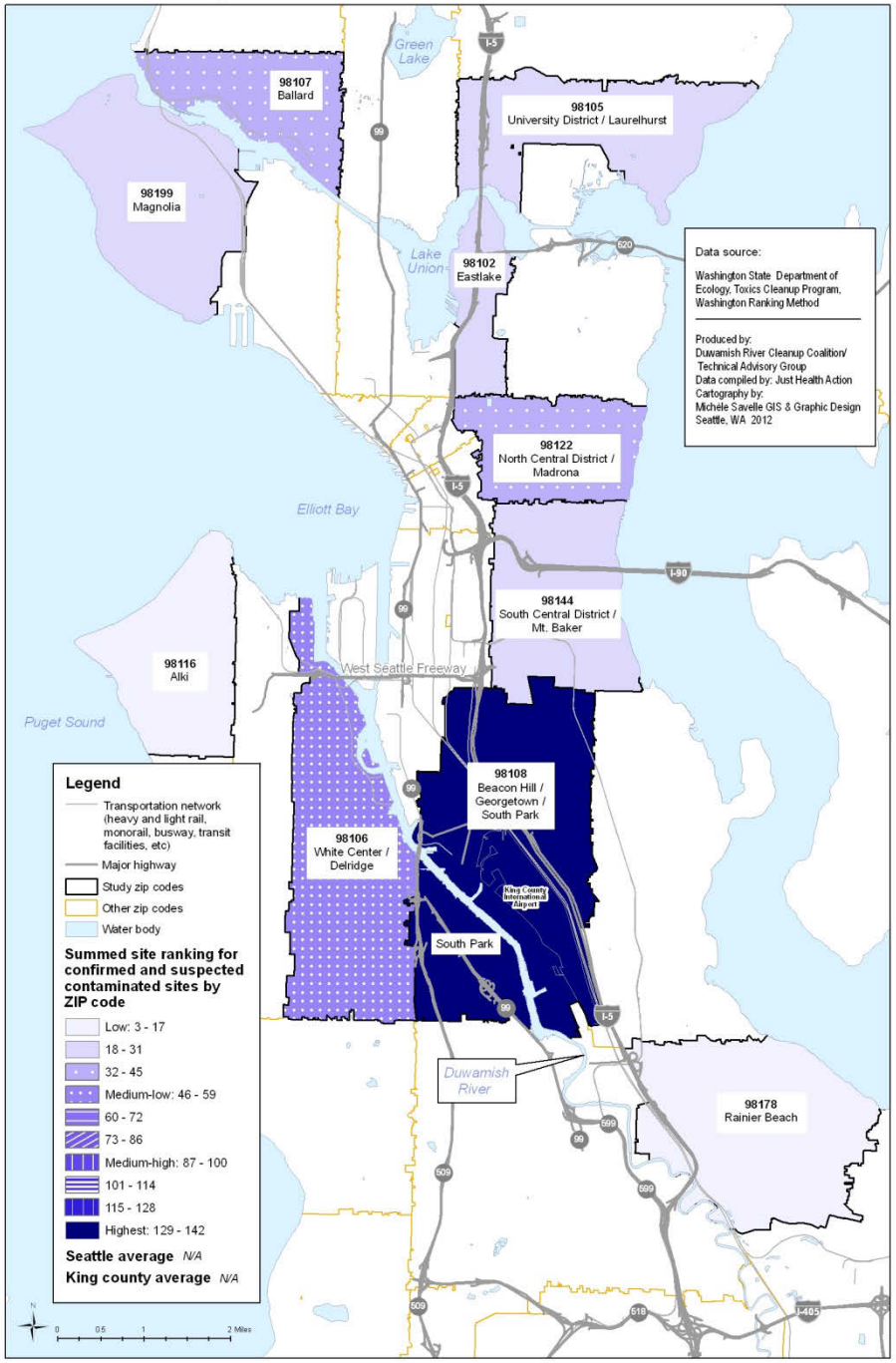
Figure A2. Percent Adults With No Leisure Time Physical Activity, by ZIP Code
Seattle, Washington, 5-year Average 2007-2011



Environmental exposures component (Rank 1-10):

Summed Site Ranking for confirmed and suspected sites by ZIP code

Figure 10. Summed Site Ranking for Confirmed and Suspected Contaminated Sites, by ZIP Code
Seattle, Washington



Action

JustHealthAction

Duwamish River Then & Now

Light blue
river before 1909

Dark blue
current waterway

Health Advisories

Do not eat any crab or resident fish from the Duwamish River

Limit consumption of Puget Sound/Duwamish Chinook to one meal per week

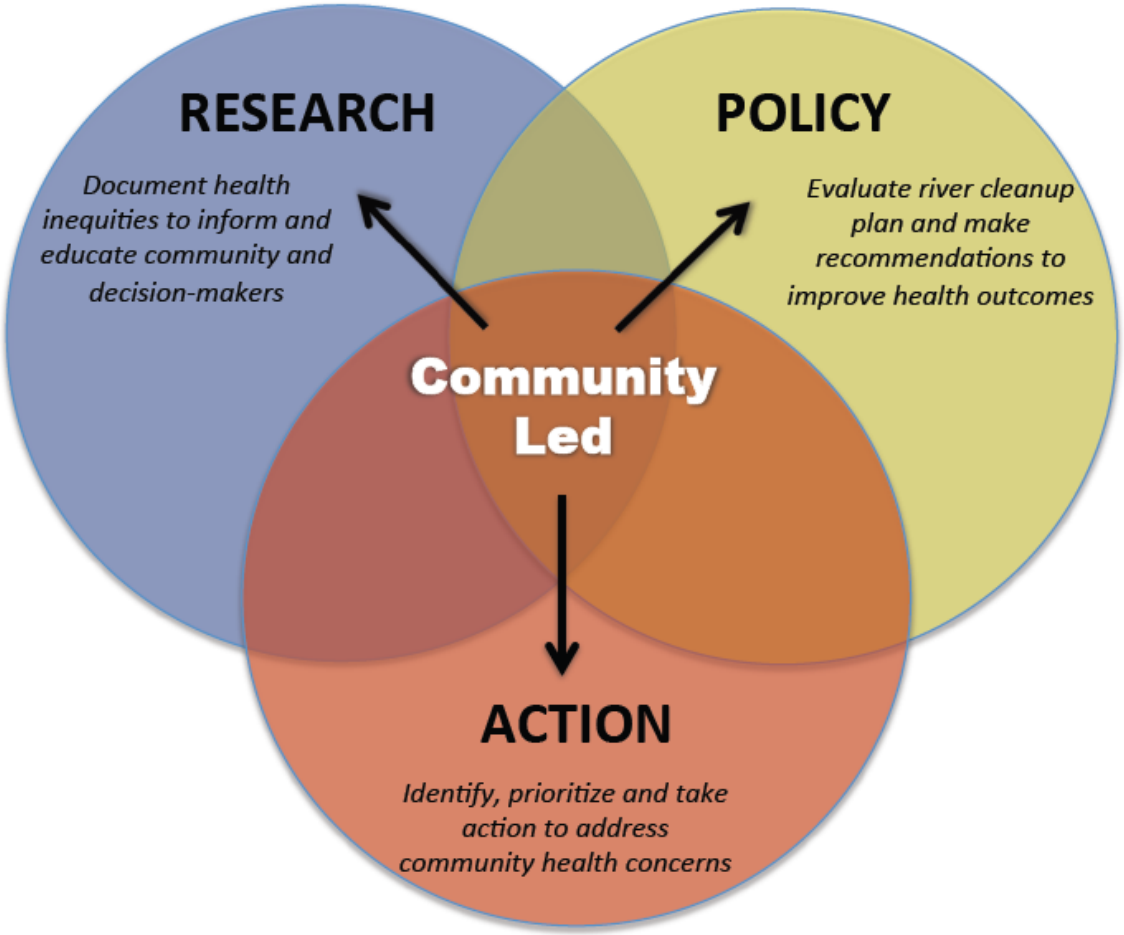
Do not swim near a sewer/stormwater outfall within 3 days of rain

credit: Ashley Ahearn, KUOW

Duwamish Valley Healthy Communities Project

Improving environmental and human health through
• community-based research • promoting protective and equitable policies • taking action!

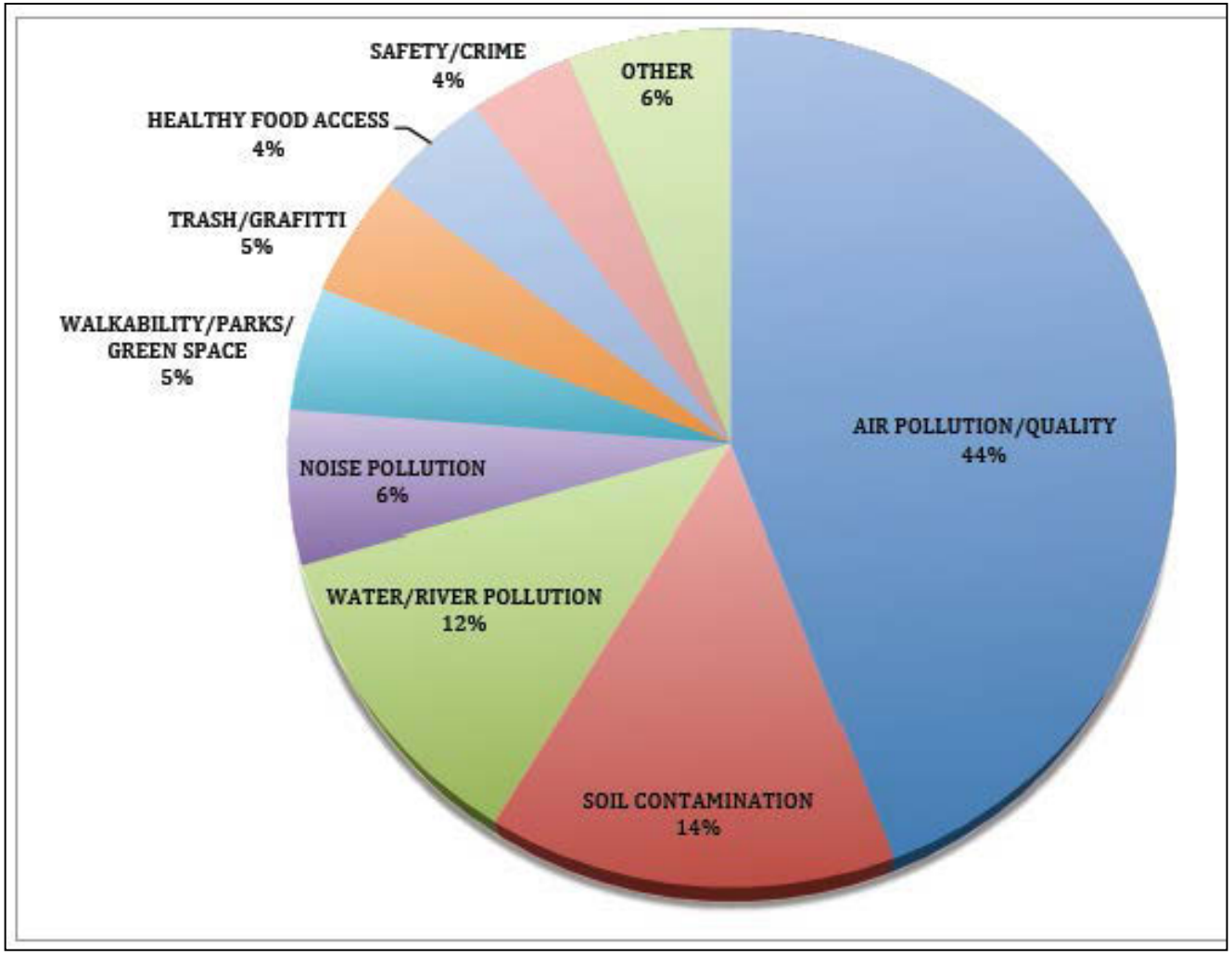
Cumulative Health Impacts Analysis (CHIA, EPA EJ)



Duwamish Cleanup Health Impact Assessment (HIA, Pew/RWJF)

Community Action for Renewed Environment (CARE, EPA)

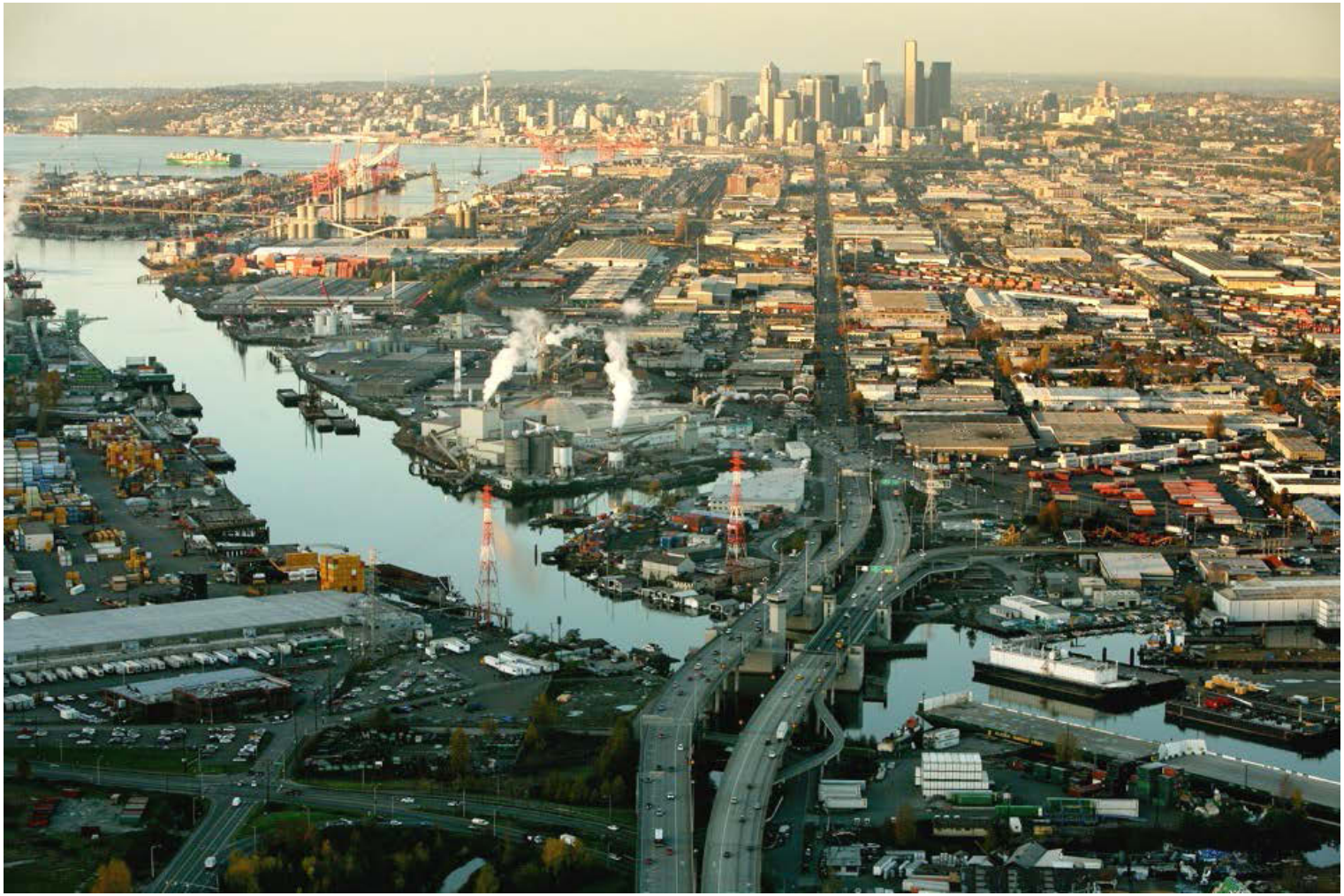
EPA CARE grant:
What are community health issues?



JustHealthAction

Anna Schulman, Antioch University, 2012

Seattle industrial corridor



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