The scalar politics of environmental injustice: obscured constructions of air pollution in Seattle, Washington

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Abstract

Unequal exposure to urban air pollution in North American cities continues to challenge even leaders in sustainability like Seattle. In 1994, the city developed the first US comprehensive plan for sustainability but after two decades, progress on air quality remains uneven. Some neighborhood residents endure nearly double the rates of childhood asthma hospitalizations in the city and disproportionate air pollution exposures. In the first part of our paper, we set the case of Seattle's environmental justice politics within critical geography's literature on scalar politics and the growing field of Community-Based Participatory Research. In the second part of our paper, we examine how these air pollution problems are obscured by the scalar constructions of Seattle's riskscape through the institutionalized practices of regional air quality monitoring and reporting. Using data from the regional air monitoring network, we document the substantial interurban variability in Particulate Matter (PM) pollution levels among the region's 12 stationary monitors, data from mobile pollution sensors, and other air toxics studies. In the paper's third part, we consider the perils and opportunities provided by a community-based, and participatory monitoring response to the existing institutional arrangements regulating air quality in Seattle and beyond. We demonstrate how understanding air quality through the lens of scalar politics can complement conventional environmental justice analysis and contribute to the transformation of institutional practices from one way science communication to a more just, culturally sensitive and multilingual dialogue.

Keywords: environmental injustice, equity, environmental racism, community engagement, outreach, air pollution, political geography, framing

Contents

Two Emerald Cities

Seattle Washington is recognized as one of the world's leaders in planning for urban sustainability sometimes represented by the "Emerald City" nickname. In the nation's first comprehensive plan aiming explicitly for sustainability (Beatley 2012; Seattle City Council 1994), Seattle aimed at three goals: environmental stewardship, social equity and economic opportunity. By many accounts, the city has been a sustainability leader launching the first US sustainability indicators program (AtKisson 1996; Karlenzig 2008) and is often touted as a model of existing practices that can lead to planning for sustainability (Krueger and Agyeman 2005). Most recently, Seattle was recognized by the Sustainability Tools for Assessing & Rating (STAR) Communities programs as being the nation's most sustainable city (Shaver 2014).

However, a growing number of studies raise critical questions about Seattle's sustainability reputation especially on the social equity dimension. Researchers evaluated the city's 1994 plan with 30 others and only ranked Seattle in the middle of sustainable development planning efforts (Berke and Conroy 2000). Another scholar observed that "the downside of (Seattle's) greener urbanism may have been its tendency to reinforce a trend toward a more fractured landscape in a city that would become increasingly out of reach to working and middle-class families" (Sanders 2010, 214). More recent studies found that Seattle's "pollution riskscape and urban development burdens were skewed toward the city's most socially vulnerable residents" (Abel and White 2011, 252) and was producing a "gentrified sustainability" (Abel and White 2015).

Likewise, Dierwechter (2014) observed that the city's planning should be called "smart segregation" instead of smart growth while Dooling (2009) used Seattle's history of public green space development to illuminate the losers in a process of ecological gentrification. Another scholar documented how uneven ecological degradation and urban inequity have always been a centerpiece of Seattle's environmental history (Klingle 2008). Such contradictory accounts led us to examine the evolving narratives of Seattle's environmental politics of peril and opportunity and address key questions derived from the theme of the 2016 meetings of the Western Political Science Association (WPSA 2015).

How does a sustainability framework construct and reconstruct the politics of urban air pollution? How are some environmental problems constructed as threats and others obscured? How can political actors respond creatively to counter those constructions obscuring environmental injustices? In the next part of our paper, we set the case of Seattle's environmental justice politics within critical geography's literature on scalar politics and the growing field of Community-Based Participatory Research. This sets the stage for the unique politics of peril and opportunity we examine in the Seattle case study. Second, we examine scalar politics unfold in Seattle's air quality management. Specifically, we explore how Seattle's air pollution problems are obscured by the scalar constructions of the city's riskscape through the institutionalized practices of regional air quality monitoring and reporting. This leads to the question of how communities can respond and reframe air pollution narratives to support community-based action on environmental injustice. In our paper's third part, we respond to this question by describing the lessons learned from community-based actions along Seattle's Duwamish River and Superfund site.

Seeing environmental injustice's scalar politics

Researchers in critical human geography have begun to employ "a politics of scale" to analyze the social construction and manipulation of geographies as part of "social strategies to combat and defend control over limited resources and/or a struggle for empowerment" (Swyngedouw and Heynen 2003, 913). Instead of seeing scales and scalar relationships as an objective fact to be described, they are seen as a political project (Smith 1993, 1996, 2004). Or as Thrift (1994) asserted, regions are not bound but constructed. "Regions, their boundaries, symbols and institutions are hence not results of autonomous and evolutionary processes but expressions of a perpetual struggle over the meaning associated with space, representation, democracy and welfare" (Paasi 2002, 805). Scale is no longer seen as fixed and external to social processes (Sheppard and McMaster 2008).

This critical geography tradition about the social construction of the environment or nature and scale can be traced to the seminal works of Lefebvre (1991), Harvey (1982) and Smith (1984). The latter in particular initiated a critical study of "social nature" where "the major analytical issue . . . becomes the question of how nature is (re)produced, and who controls this process of (re)production in particular times and places" (Whatmore and Boucher 1993, 167). A literature on the political economy of scale has blossomed from these roots (Brenner 1998, 2000, 2001; Marston 2000; Swyngedouw 1997). It also has developed an influential place in environmental politics. One scholar for instance describes how the "politics of the earth" is a function of the existence of incompatible discourses or "shared ways of looking at the world" (Dryzek 2013). Thus, environmental justice conflicts arise from the communicative dissonance among stakeholders' assumptions, judgments, and contentions over the causes and remedies for inequities. Likewise, Williams and Matheny (1998) described how hazardous waste policy is prone to gridlock because public officials, business interests, and environmentalists all speak from discourses incomprehensible to one another.

Others focus on "framing theory" to explain how environmental conflict is a function of perceptual differences towards the dispute, the possible solutions, and the identification of those responsible (Lewicki, Gray, and Elliot 2003). Moreover, conflicting frames are a main cause of the perpetuation of environmental disputes according to one group of scholars. In other words: "Frame conflicts occur not only because different interpretive communities focus cognitively and rationally on different elements of a policy issue, but because they value different elements differently (Yanow 2000, 11). Consequently, several recent contributions in political science call for the addition of narrative analysis to the methods of policy analysis (Clemons and McBeth 2009; Jones, Shanahan, and McBeth 2014; Weible and Schlager 2014; Lejano, Ingram, Ingram 2013). For example, "environmental inequality might be interpreted as 'just how things normally are', as the outcome of how the market economy works, or as the result of systematic discrimination and injustice" observed Walker (2012, 4).

Contesting the Scalar Politics: Community-Based Participatory Research (CBPR)

Community-Based Participatory Research (CBPR) can be traced to several new currents in environmental policy and politics. These included the democratization of risk assessment (Fiorino 1989, 1990; Laird 1993; Stern and Fineberg 1996), participatory and decentralized environmental decision making (Abel and Stephan 2000; Knopman, Susman, & Landy 1999; Rivkin 2001; Shutkin 2000; Sirianni & Friedland 2001) and "popular epidemiology" (Brown 1987; Brown and Mikkelson 1990). CBPR is a more collaborative action-oriented approach to inquiry (Hacker 2013; Israel 2000; Israel, Schulz, Parker, and Becker, 1998) and responds to the "need

for environmental justice scholarship to actively work at its connections to activism and its engagement with those at the sharp end of injustice, however it is understood, and to bring theory to bear in meaningful ways into praxis and diverse forms of public engagement" (Hollifield, Porter, and Walker 2009, 608).

The Environmental Protection Agency (EPA) has started to highlight the role of CBPR practices in meeting their requirements under Executive Order 12898 to provide minority and low-income communities access to public information and public participation. In 2010, the EPA) convened researchers and nongovernmental organizations to host a symposium focused on "Strengthening Environmental Justice Research and Decision Making" (Nweke et al., 2011). A key product from this meeting was the dissemination of a new conceptual model for participation within a CBPR framework (Freudenberg, Pastor, and Israel, 2011). We are formal partners in just such a CBPR project sponsored by the EPA and titled "Duwamish Community Action for Clean Air."

Emerald City Glasses and Obscured River Communities

'But isn't everything here green?' asked Dorothy. No more than in any other city,' replied Oz. . . my people have worn green glasses on their eyes so long that most of them think it really is an Emerald City" (Baum 1900,187-188).

Every day, the US EPA's AirNow.gov website displays a forecast of an Air Quality Index for US cities with a color coded system of six shades representing an increasing level of concern: (1) green indicating good air quality conditions; (2) yellow depicting moderate conditions; (3) orange representing unhealthy conditions for sensitive groups; (4) red indicating adverse conditions for everyone, and serious effects for sensitive groups; (5) purple for very unhealthy conditions that triggers a health alert; and (6) maroon for hazardous conditions and an emergency health warning (EPA 2014b). The majority of Seattle's AQI shades are green and the result of averaging five days of air pollution levels monitored across the Metropolitan Statistical Area (MSA) from a network of 12 monitoring sites. For example, the sequence of the maps on the top of Figure 1 show varying air pollution readings that generate a moderate health concern in some areas of the region on the left (March 18), all green and healthy in the middle (February 25), and one of the more variable days on the right. In the latter, while most of the region reached levels of moderate concern, some areas reached air pollution concerns that are unhealthy for sensitive groups (orange) but unhealthy for all groups (red). Moreover, in the bottom parts of figure 1, most of the monitors show a yellow reading while the region report is green.

From this vantage, the City of Seattle is often awash in a color of green, as its residents breathe fresh and clean air. However, community voices are raising concerns that the AQI is not representative of the air quality that they are experiencing on the ground. One South Seattle resident described her regular rage when the daily weather forecast is reported as healthy and green. "I want to smack officials when they tell me the air is healthy in Seattle. Its f*#*#*@&g insulting" (South Park resident: September 24, 2016). Such stories rarely are associated with Seattle. Instead, this Emerald City is well-known for its music scene, coffee, a growing hi-tech center, and quality of life. Seattle has been called the smartest city in the US (Cohen 2013), one of the top ten cities where the American dream is still alive (Nisen 2013), the most-liked US city (Kang 2013), and one of America's ten greenest cities (Kearns 2015). However, Seattle's river is the epicenter for this city's dirty little secret.
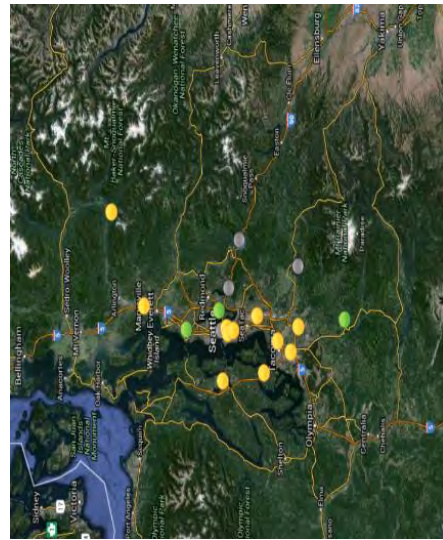
Figure 1: Air Quality Monitoring Map (US EPA 2016b) Accessed March 20, 2016.
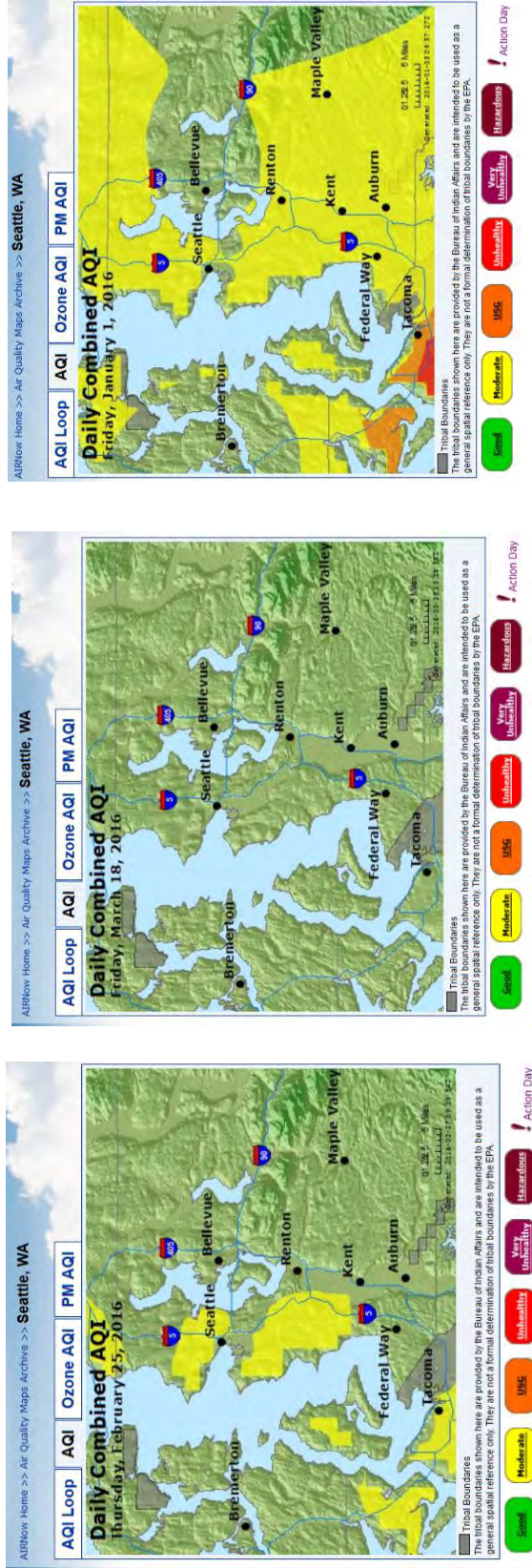
AQI for March 18, Feb. 25, and Jan. 1, 2016.

PSCAA Monitors and Readings for March 20, 2016.

PSACAA Air Quality "Landing Page" for Mar. 17-18, 2016.

In 2001, the EPA designated a five mile stretch of the Duwamish River a Superfund site flowing through Seattle's Port and into Elliott Bay (EPA 2001). Sometimes referred to as uncontrolled hazardous waste locations, the cleanup of these toxic dumps became the focus of federal environmental policy in 1980 when Congress enacted the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

The Duwamish earned its place on Superfund's National Priorities List (NPL) because of a century of heavy industrial use near the river resulted in sediments contaminated with arsenic, dioxins, polychlorinated biphenyls (PCBs), and more than a dozen other toxic and hazardous wastes (US EPA 2015a, 2015b). The Superfund stretch is also bordered by the neighborhoods of Georgetown and South Park whose residents are over sixty-percent nonwhite and sixteen percent of families earning less than the poverty level (American Community Survey 2014)

The Georgetown and South Park neighborhoods are located opposite to each other along the Duwamish River and once were Seattle's farming hinterland (See Figure 2). Yet, over time, the residential communities that thrive here have been affected by a series of decisions that have seen this part of the City transformed into the intermodal transportation and manufacturing hub for the City, a sea of grey surrounded by the green hills characteristic of Seattle.

Eighty five percent of Seattle's industrial lands are located within the Duwamish Manufacturing and Industrial District (Port of Seattle 2013) and over 7,000 people live in the immediately adjacent neighborhoods (City-Data.com 2016) which include the "fenceline" communities of South Park and Georgetown (See Figures 3 and 4). In 2014, the EPA funded the "Duwamish Community Action for Clean Air Project" to address this community's air pollution burdens. This partnership funded by the EPA involves the Duwamish River Cleanup Coalition (DRCC), Just Health Action (JHA), the Washington Chapter of the American Lung Association (ALA), the Puget Sound Clean Air Agency (PSCAA), Western Washington University's (WWU) Huxley College of the Environment's Peninsulas Program, and the Georgetown and South Park Neighborhood Associations.

Figure 2: Study Area, Seattle and surrounding King County
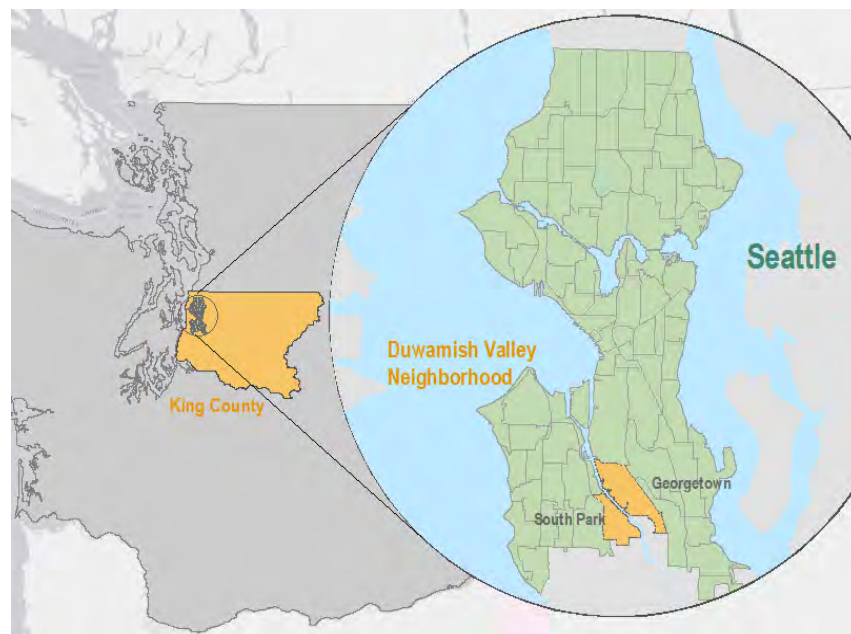
In our second year of the Duwamish Community Action for Clean Air project, partnering organizations have been trying to reframe the conversation away from the AQI, to a discussion that is more nuanced and reflective of lived experiences. By examining air quality monitoring trends at individual monitoring stations, information from air quality modeling tools developed by the EPA to bridge the gap between pollution source and exposure and health outcomes, and data depicting variable health outcomes in the region, this CBPR praxis begun to reveal the other air quality story in Seattle.

Seeing the Variability in Regional Air Monitoring

The CBPR research group first focused its attention on understanding the existing air pollution data sources, including information from the region's Air Quality Index (AQI), a dominant air quality metric produced by the EPA. The AQI is a simplified index, established by EPA for reporting daily air quality and is calculated based upon five of the six criteria air pollutants regulated under the Clean Air Act, including ground - level ozone, particulate matter (PM), carbon monoxide, sulfur dioxide and nitrogen dioxide. The index is divided into six categories that are used to describe the health impacts of local air quality conditions, from good to hazardous. An AQI value of 100 generally corresponds to the national air quality standard for the pollutant, which is the level EPA has set to protect public health. AQI values below 100 are generally thought of as satisfactory (PSCAA 2014).

Days in the past year with AQI values in the good range are commonly incorporated into sustainability indicators in order to assess air quality conditions (EPA 2015b). In the most recent assessment, Seattle and its host of King County were reported to achieve good air quality levels 70% of the time, or approximately 255 days out of 365 (PSCAA 2014). As noted by PSCAA, "Good" AQI days continued to dominate the region's air quality in 2013.

Yet, a closer look at AQI values for individual monitoring stations reveals a very different pattern. The breakpoint for $PM_{2.5}$ to be considered in the "good" air quality range extends up to 12 micrograms per cubic meter over a 24-hour period. In 2013, the South Park station exceeded this breakpoint over 23 percent of the time, while the Duwamish Valley station exceeded this breakpoint 38 percent of the time (see Figure 5). In contrast, the station on Beacon Hill, which had the lowest overall particulate matter daily levels for the region in 2013, exceeded this breakpoint only 7 percent of the time. So, while good AQI days continue to dominate the region, neighborhoods within this region experienced significant variability in their share of good days.

A pattern of interurban variability is revealed when looking closer at the air quality monitoring station data. They are operated by Puget Sound Clean Air Agency (PSCAA) and the Washington State Department of Ecology, who work together to monitor air quality for the Clean Air Act's six criteria pollutants and air toxics: 1. Carbon monoxide (CO); 2. Lead (Pb); 3. Nitrogen dioxides (NO_x); 4. Ozone (O_3); 5. Particulates ($PM_{2.5}$, PM_{10}); and 6. Sulfur dioxides (SO_2). Since the mid-nineties, Seattle has met the National Ambient Air Quality Standards (NAAQs) for these six criteria air pollutants (EPA 2016a). Regional studies also report good air quality levels for Seattle and improving conditions (EPA 2014a, ECY and EPA 2014).

Monitoring stations are located in a variety of geographic locations in King County, sited according to EPA criteria to ensure "a consistent and representative picture of air quality" in the region (PSCAA 2014, p. 3).

Figure 3: Aerial View of Georgetown and South Park Neighborhoods in Duwamish Valley.
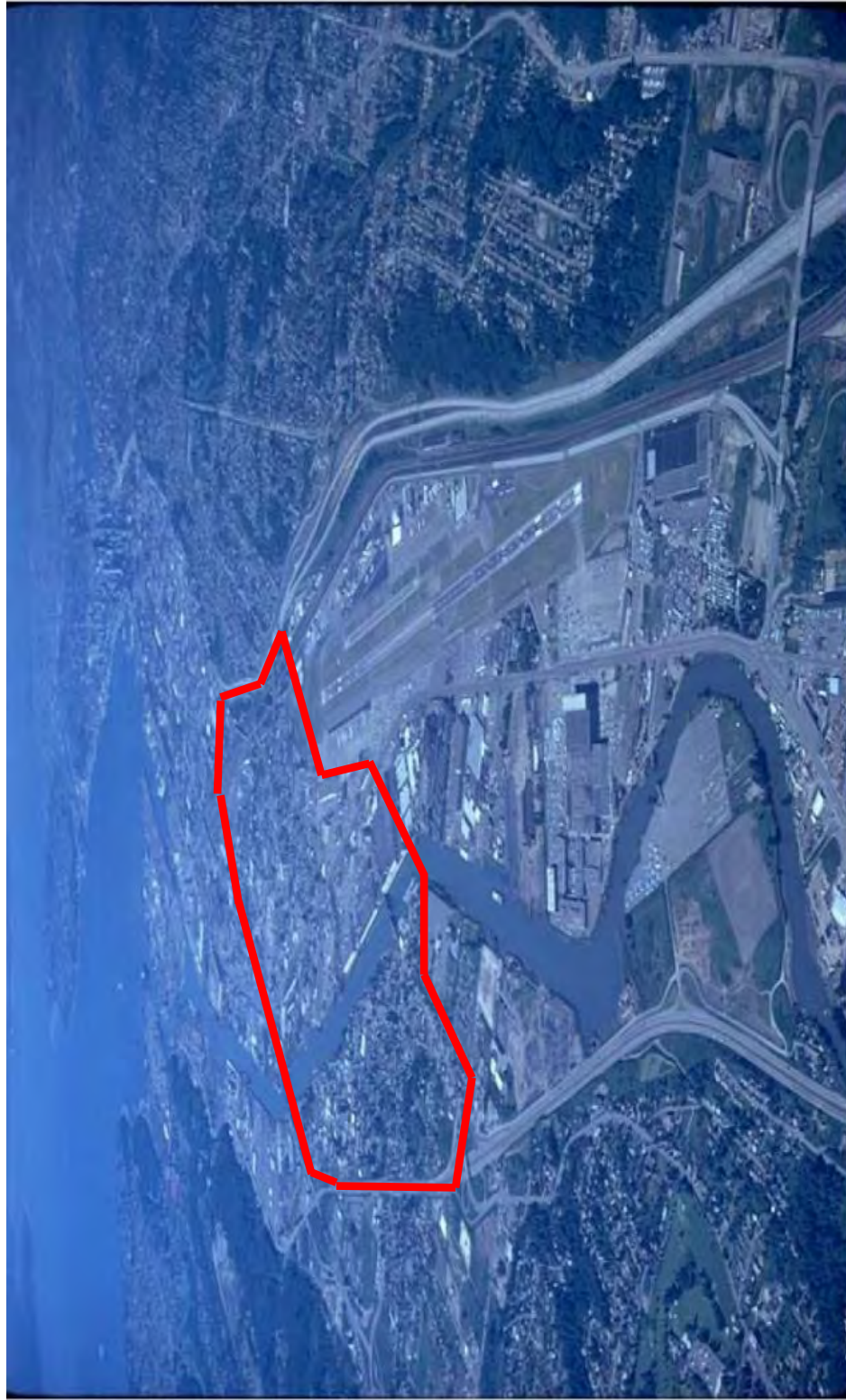
Figure 4. Georgetown and South Park Neighborhoods in Duwamish Valley.
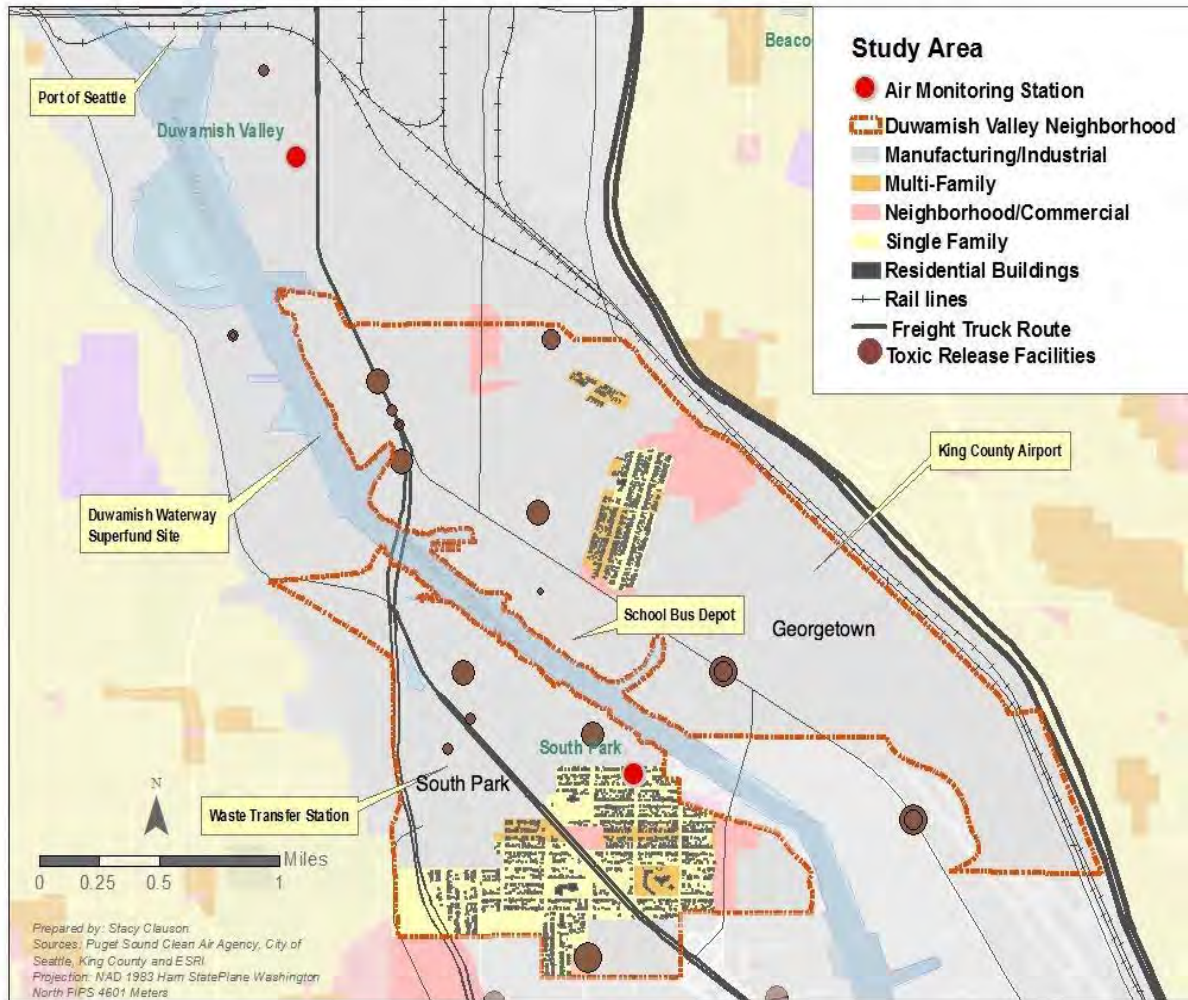
Based upon findings from a 2010 air toxics monitoring study completed by PSCAA showing that diesel particulate matter contributed the most to health risk (PSCAA and UW 2010), our group concentrated on gathering information on particulate matter (PM) monitoring, including measurement of the total mass of fine particulate matter (PM2.5), the carbon fraction of the particulate matter (black carbon (BC)), and visual range, which measures how much fine particles in the air reduce visibility.

Particulate matter was also of specific concern because this pollutant is most likely to be present in Washington above levels known to impact health and is therefore more extensively monitored than other pollutants (Washington State Department of Health 2014). We computed the regional average emissions, and compared this information with the emissions reported for each monitoring station within King County to understand the degree of interurban air quality variability that exists in the region. The results of this comparison show that while King County conforms with NAAQS, there is significant interurban variability in the monitored air quality conditions across the County. PM2.5 is measured under the NAAQS in two ways: a daily concentration (98th percentile), and an annual average concentration.

Figure 5: PM$_{2.5}$ Air Quality Break-points.

These standards are based on a 3-year average, so each value is a sum of three consecutive years. The daily standard is higher, to account for more acute, short-term exposure. PSCAA also maintains monitors that can help provide information on the sources of particulate matter pollution, such as black carbon; these are deployed at limited monitoring sites with high particulate matter concentrations (PSCAA 2014).

Figure 6 depicts the monitoring station results over a 13-year period extending from 2001 to 2013. The two monitoring stations located in the Duwamish Valley have consistently higher values for all three measurements of particulate matter: daily (acute), annual (long-term) and black carbon (a key source of health-impacts from particulate matter) than the monitored values for both the greater Seattle area and King County region. While monitored pollution levels were on an overall downward trend since 2001, there is a discernable increase in 2013.

In addition, the regional air quality agency has adopted a health-based goal of 25 g/m^3 for a daily average, more protective than the current federal standard of 35 g/m^3. This level is consistent with the American Lung Association's goal and the EPA Clean Air Science Advisory Committee's recommended lower range for the EPA's 2006 ambient air quality standard revision (PSCAA 2014). The Duwamish Valley and South Park stations exceeded this standard on a regular basis.

Modeling the Air Toxics Riskscape

The community next focused its attention on understanding the sources of pollution and how these individual pollutant sources combine to produce variable exposure risks. Industrial sources were a key concern and, as a result, we plotted the location of Toxic Release Facilities (TRI[1]) located in King County, based upon all facilities that self-reported emissions to the EPA in 2013.

We then incorporated the relative risk of emissions from TRI facilities by including risk scores from the Risk Screening Environmental Indicators (RSEI) modeling tool developed by EPA, which incorporates information from multiple chemical releases from the TRI into a comparative risk characterization of different pollution sources.

The RSEI software begins with facilities reporting to TRI who are required to report annually the toxic chemicals they release and the amounts. These release volumes are input into a steady-state Gaussian plume model that then simulates downwind pollutant concentrations from a stack or fugitive air source. Finally, a surrogate inhalation dose is estimated for neighboring census populations. An indicator value is then produced that can be used to rank relative impacts by geography, industry, and facility (Schmidt 2003). Table 1 below depicts the 10 facilities with the highest 1-year risk scores in the King County region over a 5-year period from 2006 to 2011. The highest scores during this period were all located directly within the South Park or Georgetown neighborhoods, or on industrial lands in the Duwamish Valley bordering these neighborhoods (see Figure 7).

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[1] TRI facilities include all industrial firms that are required by the EPA to voluntarily report the release of any toxic chemical into the environment if (1) it is in the following industrial sectors—manufacturing, metal mining, coal mining, electrical utilities, hazardous waste treatment and disposal facilities, chemical plants, petroleum plants and terminals, solvent recovery services, and federal facilities; (2) has 10 or more full-time employees; and (3) manufactures or processes more than 25,000 pounds or otherwise uses more than 10,000 pounds of any listed chemical during the calendar year.

Figure 6: Comparison of Particulate Matter Monitored Values, King County, 2001 – 2013 with data provided by the Puget Sound Clean Air Agency (PSCAA).
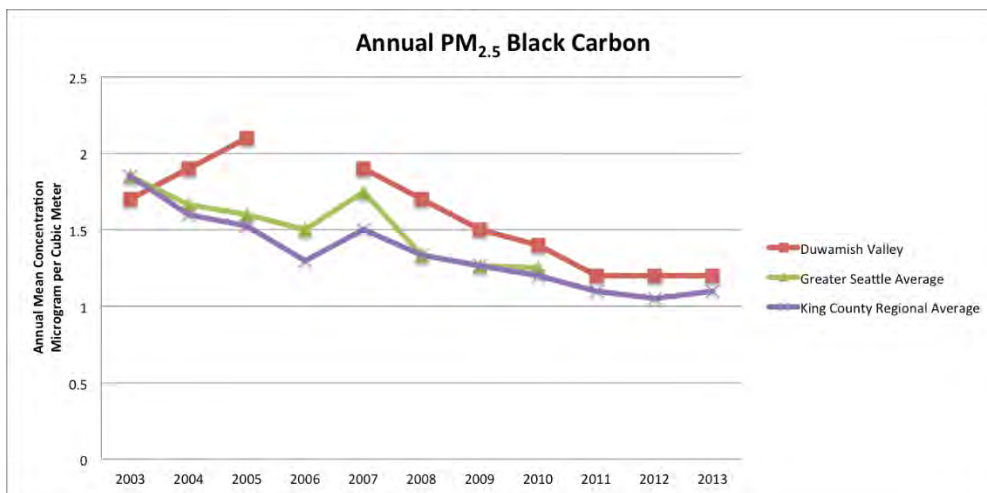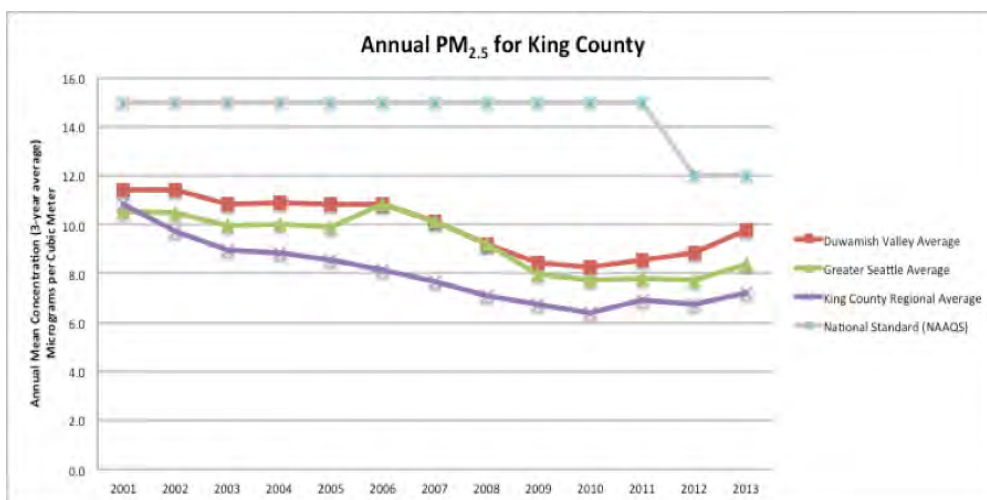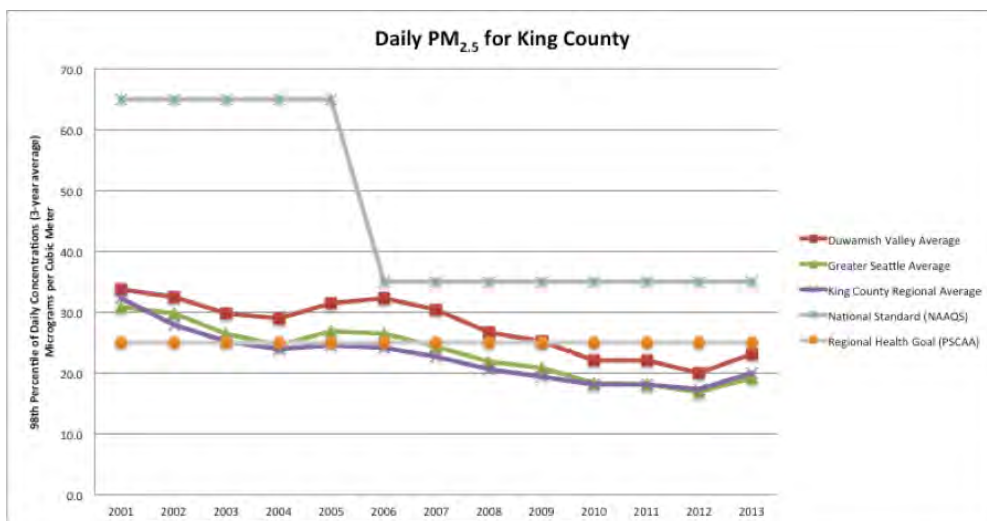
Table 1: King County's 10 Highest Toxic Release Inventory (TRI) Facility Air Pollution Risk Scores from 2006-2011 (Data: Toxic Release Inventory)

Facility	Relative Risk Score	Year
Saint-Gobain Containers Inc	3,389,378	2011
Alaska Copper Works	1,650,321	2011
Alaska Copper Works	1,626,519	2009
Alaska Copper Works	1,614,865	2008
Alaska Copper Works	1,603,089	2007
Jorgenson Forge Corp	1,343,422	2008
Jorgenson Forge Corp	1,334,729	2007
Sound Propeller Services	1,137,649	2007
Jorgenson Forge Corp	1,009,598	2011
Jorgenson Forge Corp	628,666	2010

Figure 7: TRIs with Highest Risk Scores - King County 2006 - 2011
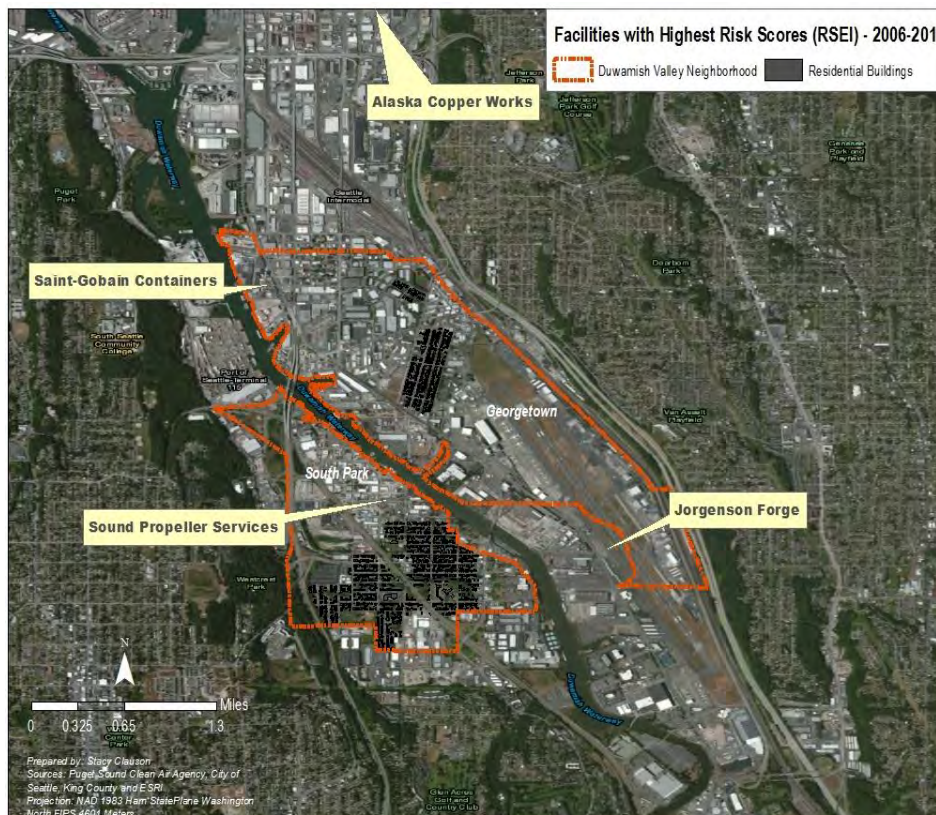
We also incorporated modeled information from the National-Scale Air Toxic Assessments (NATA), which is a screening tool developed by EPA with the intent of measuring health risks associated with inhalation of hazardous air pollutants from multiple emission sources. The EPA developed NATA to help people understand the potential health risks from breathing air toxics. NATA uses a combination of emissions reporting and monitoring data plus modeling to estimate health risks and prioritize pollutants and emission sources. The EPA released the most current NATA in 2011, based on 2005 data. The 2011 NATA identified 3,100 regions (census tracts) nationally with cancer risks greater than 100 - in - a - million. This means that across the lifespans of one million people, 100 would develop cancer from breathing air toxics. Thirteen of those regions are in King County (PSCAA 2011).

Figure 8: Comparison of National Scale Air Toxics Assessment Data (based on 2005 data)
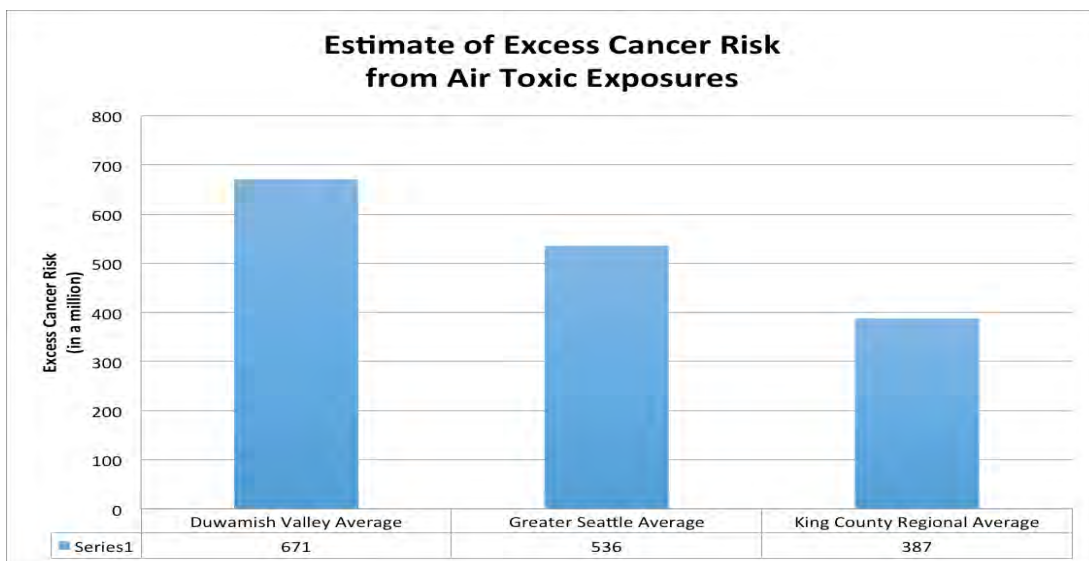
Since this assessment did not include cancer risk attributable to diesel exhaust, PSCAA and the Washington State Department of Ecology revised NATA and included diesel particulate matter in the cancer risk estimates, using California EPA toxicity for diesel particulate matter (PSCAA 2011) to modify the risk characterization. Including diesel particulate matter raised the lifetime cancer risk, in some areas from 100 to over 1,000 additional cancers per million people (Washington State Department of Health 2014). We computed the regional average risk score, and compared this information with the risk scores reported for Census Tracts located within the Duwamish Valley and the greater Seattle area to understand the skewed riskscape that exists in the region. Figure 8 shows the results of this comparison. The Duwamish Valley neighborhoods of South Park and Georgetown have the highest risk, in relative comparison to Seattle or King County. In two Census Tracts in the Duwamish Valley (one located in South Park and Georgetown, respectively) excess cancer risk was estimated to be over 1,000 - in - a - million.

To further understand the variability of this riskscape compared to the region, we also used the EPA's Risk Screening Environmental Indicators - Geographic Microdata (RSEI-GM) data from 2014. The RSEI-GM provides disaggregated toxicity exposure estimates over an 810-square meter grid. The cells were clipped to the Central Puget Sound region and the toxicity concentration for all chemicals were aggregated to the cell-level, resulting in an exposure estimate for each 810-square meter cell.

Figure 9: RSEI-GM Toxic Concentration - Central Puget Sound, 2014
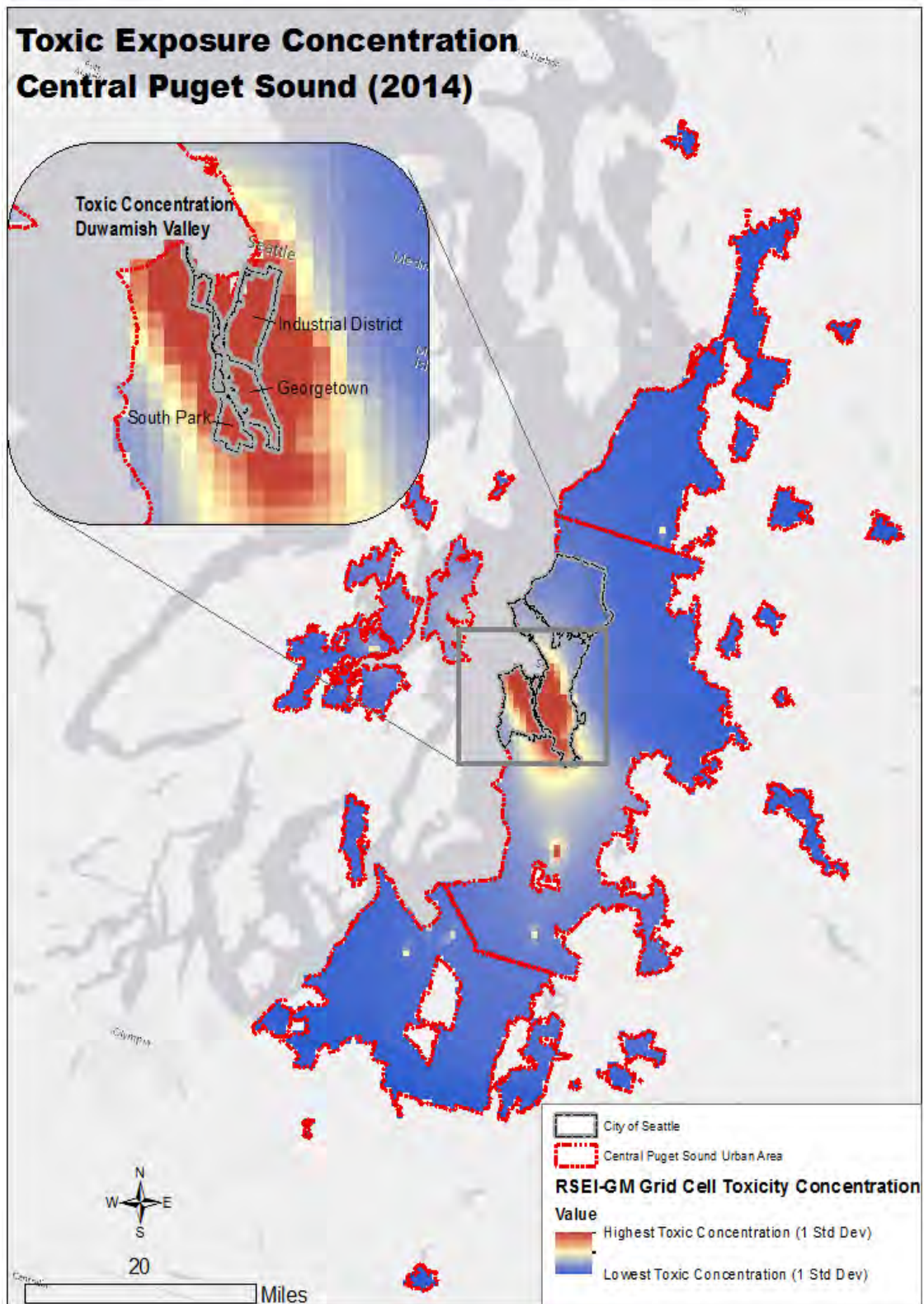
Figure 9 above shows the relative concentration in exposure that occurs in the vicinity of the Duwamish Valley. The areas shown in red are at least one standard deviation above the mean exposure estimate. Conversely, blue areas are at least one standard deviation below the mean exposure estimate. The figure clearly shows a hotspot that corresponds with the Duwamish Valley industrial core.

Skewed Health Outcomes

Another environmental justice challenge involves linking pollution with actual exposures and health outcomes. The models described above are often criticized because they only model approximate pollution, they are based upon TRI data that is compiled from a voluntary reporting process, and they are built upon a large number of assumptions (Chakraborty et al., 2011). In addition, the prominent models are based on a traditional risk-assessment framework that focus on chemical by chemical analyses. Cumulative risk or exposure assessment instead puts the community at the center of the analysis while considering multiple hazards (Corburn 2003; EPA 2003; Fox, Groopman, Burke 2002).

Thus, the community has also focused on gathering data to better understand health outcomes. We compiled King County Health Department public health data showing the rate of asthma hospitalizations over a 10-year period from 2001 to 2010, as reported by Zip Codes. We compared the hospitalization rates to identify the geographic areas with the highest rate of hospitalization. Figure 10 below shows a comparison of the hospital rates in the region, showing a higher relative hospitalization rate in the Duwamish Valley.

Figure 10: Average Asthma Hospitalization Rates (per million persons) - King County, 2001 - 2010 (Data: King County Health Department)
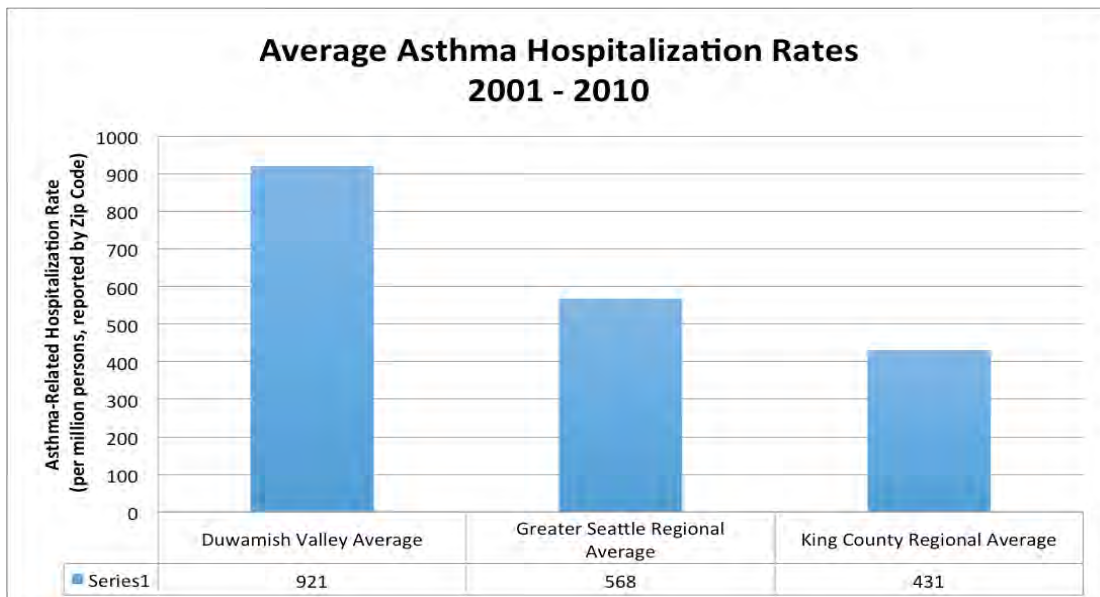
All three strands of the data sources presented here (monitoring, modeling, and health) point to significant concentration of risk in the Duwamish Valley, yet actions to more fully investigate and mitigate these issues remain situated in an outmoded air quality assessment system. The perceived inaction on the part of air quality regulators thus far is prompting many communities to

seek solutions of their own. The Duwamish Valley community was well positioned to do this because of their history of reclaiming and reframing the environmental injustices of South Seattle and challenging the city's scalar political constructions.

A River Community Rises (2001 – 2010)

The Duwamish River Cleanup Coalition (DRCC) was launched in 2001 with a $60,000 public participation grant from Washington State's Department of Ecology and a Technical Assistance Grants (TAG) from the EPA (EPA and WADOE 2002). When Congress reauthorized Superfund in 1986, the amendments expanded the opportunities for public involvement. The first mechanism involved administrative support for a Community Advisory Group (CAG). EPA's Technical Assistance Grants (TAGs) are a second effort to increase community involvement. TAGs are awarded to eligible community groups to hire their own, independent Technical Advisor and have been associated with higher cleanup levels (Daley 2007). Community groups near Superfund sites are eligible to receive up to $50,000 to get technical assistance with understanding and influencing EPA's remediation decisions. The Duwamish communities rose in response to the perils of the uncontrolled toxic wastes of a Superfund site.

Northernmost portion of the Duwamish River and downtown Seattle in the background.

Photo: Paul Joseph Brown

At the time of the designation, six toxic contaminants in the sediment were identified as Chemicals of Concern (COCs): PCBs, arsenic, carcinogenic Polycyclic Aromatic Hydrocarbons (PAHs), 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD), tributyltin (TBT), and mercury. The seafood consumption risk assessment scenarios generated the highest cancer risks (3 in 1,000 excess cancer cases) for tribal members who traditionally fish in the Duwamish (LDWG 2003). In 2008, the Washington State Department of Health (DOH 2008) issued a DO NOT EAT health advisory for all seafood expect salmon and against swimming near any Combined Sewer Overflows (CSOs) within three days of a rainfall. Uncontrolled CSOs are an ongoing source of pollution to the river, along with direct industrial discharges and urban and industrial stormwater from the

surrounding areas. An additional concern is for neighborhood children, who frequently play on the beach and street ends and wade or swim in the river, even after rainstorms.

The residents of Seattle's Duwamish Valley are predominantly underserved communities with multiple environmental justice concerns and susceptible or vulnerable populations. According to Health Impact Assessment undertaken by the University of Washington School of Public Health (Daniell et al. 2013, 5), residents of South Park and Georgetown (zip code 98108) are 42% foreign-born, 40% Latino, and more than 70% non-white minorities, including Asian, Pacific Islander, Hispanic, African-American, and Native American. Median household income is approximately 40% below the Seattle average, 32% percent of residents live below 200% of the poverty level, and 78% of children enrolled at the local elementary school qualify for reduced-price lunch. Moreover, according to a Cumulative Health Impacts Analysis (CHIA), Georgetown and South Park also have a significantly higher percentage of vulnerable populations such elderly residents (>65) and children (<5) than the city average (Gould and Cummings 2013).

The CHIA also reported that pollution exposures in 98108 (e.g., diesel particulates, toxic waste sites) and outcomes for many health indicators (e.g. childhood asthma) are significantly worse than elsewhere in the city. Of ten representative zip codes citywide, the Duwamish Valley's 98108 ranks highest for overall cumulative impacts. At the census tract level, the riverfront neighborhoods of South Park and Georgetown show even greater disparities, including an eight year shorter life expectancy than the Seattle average, and a full 13 years shorter than other affluent and predominantly Caucasian neighborhoods in Seattle (Gould and Cummings 2013).

In addition to residents, three Tribes use the river for fishing and/or cultural ceremonies, and low-income, immigrant and homeless families from throughout King County harvest seafood from the river for subsistence, and to maintain cultural and community traditions. Over 20 native languages are spoken throughout the valley (Gould and Cummings 2013). Further, due to industrial development, public access to the river is highly restricted. For all these reasons, attaining environmental justice is one of the driving forces shaping advocacy for the river's cleanup and much more.

Reframing Environmental Racism and Health Inequity

Since its inception, CERCLA has undergone many changes, mainly geared towards decreasing the authority of the federal government in dictating cleanup alternatives, limiting them to an oversight role. Local agencies (state, county, and city) take more responsibility for the everyday management of the cleanup instead. The case of the Duwamish River cleanup is no different: the Lower Duwamish Waterway Group (LDWG), a public-private entity made up of the four potentially responsible parties or PRPs (those responsible for the historical and ongoing pollution), was formed in 2000 with the objective of negotiating terms that were more favorable to them and avoid being subject to Superfund law but they did not succeed (Purcell 2008). This triggered the emergence of a complex governance regime: EPA and Washington State department of Ecology (Ecology) are both overseeing the cleanup process while the LDWG is actually carrying it out.

A detailed review by one human geographer explored the scalar politics of the Duwamish River Superfund cleanup. By using institutional features of a federal cleanup process, Purcell describes how the Duwamish River Cleanup Coalition (DRCC) counters the coalition of parties identified by the EPA as responsible for the pollution: the Boeing Company, the City of Seattle,

King County, and the Port of Seattle. Called the Lower Duwamish Waterway Group (LDWG), the narrative politics starts with the strategic use of different names. "The lower Duwamish was straightened years ago to accommodate the Port and the industrial uses, and . . . referred to as a 'waterway.' A waterway . . . is functional for an industrial economy. A river . . . is . . . more explicitly ecological" (Purcell 2008, 145). The construction of the Duwamish waterway frame is challenged by an ongoing reconstruction of the waterscape as a river by the DRCC. He would add: "...it is largely true that Superfund law calls for public participation, but that participation is intended to be contained and manageable." He continues: "However… there is room to maneuver here… if [CAGs] are insistent, active, and imaginative" (Purcell 2008 141).

The superfund arena allowed DRCC to turn peril into opportunity by giving them the chance to bend, if not break, many of the rules of engagement, lifting the voice of those most affected by the historical and ongoing pollution on the river. It also allowed for something that no one was expecting: the chance for the affected communities to fight the environmental racism and health inequities that had been perpetuated for well over a century.

Terminal 117: Shifting the Narrative to a People-Centered Approach

For example, a local journalist (Ith 2004) reported this scene along the banks of the Duwamish River: "a thick, hardened flow of oily asphalt still oozes to the river like lava from a Hawaiian volcano" where the Malarkey Asphalt company used to treat the river like a dump for its toxic and hazardous wastes. Yet, four years earlier, the EPA announced that the former asphalt site cleanup was complete (EPA 2000). Now owned by the Port of Seattle, this location epitomizing an uncontrolled hazardous waste site had concentrations of polychlorinated biphenyls (PCBs) up to 4,000 parts per million (EPA and WADOE 2006). Relabeled Terminal 117 and zoned commercial one street across from the South Park neighborhood, a second phase of the site cleanup by the EPA and the Port aimed for PCB levels allowable for industrial site cleanup levels 10 parts per million (ppm) at the surface and 25 ppm below two feet. But with the TAG-funded staff at DRCC and neighborhood residents fought for more cleanup and 1 ppm of PCBs, the cleanup standard for residential areas (McClure 2006).

One month later, Commissioners for the Port voted to amend the cleanup plan to achieve 1 ppm (Scott 2006). This victory was featured in the Public Broadcasting Services (PBS) documentary (Smith and Young 2009) while the DRCC was lauded in half a book chapter by a critical urban geographer. Marc Purcell (2008) described how the DRCC countered the parties identified by the EPA as responsible for the pollution: the Boeing Company, the City of Seattle, King County, and the Port of Seattle. Called the Lower Duwamish Waterway Group (LDWG). These interests tried in vain to characterize the Superfund cleanup site as an industrial zone. For example, a Boeing official stated that "So I think people need to understand is that there are going to be certain uses of the Duwamish River that aren't going to be possible in the future. . . I don't think people are going to be able to subsistence fish . . . I think we have to set reasonable expectations for clean-up in industrial areas" (Tochko quoted in Smith and Young 2009). But because of the DRCC and the South Park community in 2006, Terminal 117's remediation will be clean enough to repurpose and rezone for a park and public river access as depicted in Figure 11 (EPA 2016).
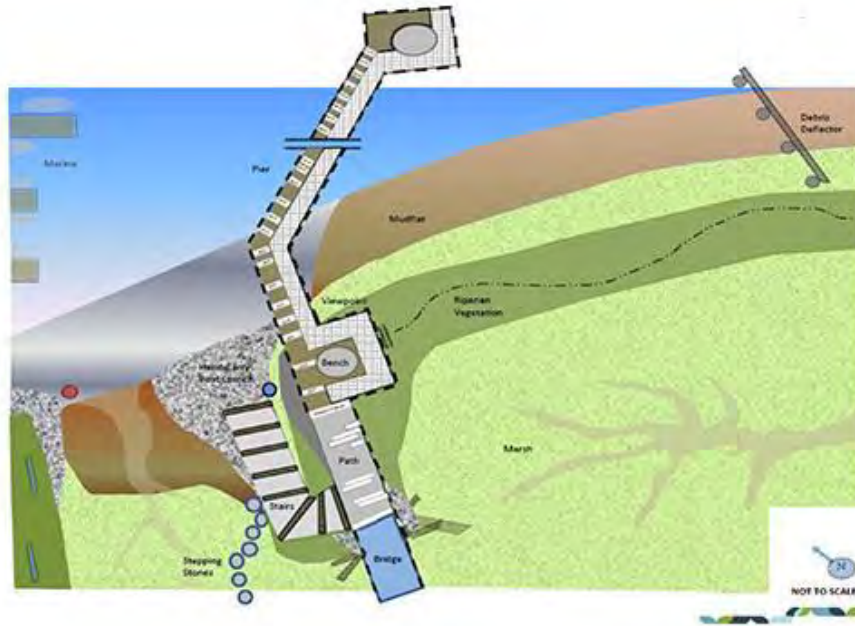
Figure 11: Sketch of a portion of the public access site and salmon habitat restoration site to be built at the old Malarkey Asphalt Company site.

A Journey from Community Outreach to Meaningful Community Engagement

DRCC was founded in 2001 by ten non-profit organizations representing community, environmental, social justice, health, tribal and small business stakeholders affected by the pollution of and cleanup plans for south Seattle's Duwamish River. DRCC simultaneously serves as the EPA's Community Advisory Group (CAG) for this site and Technical Advisory Group (TAG) to the community. With the mission to ensure a Duwamish River cleanup that is accepted by and benefits the community and protects fish, wildlife, and human health, DRCC provides critical independent technical oversight of the Superfund cleanup planning process; community engagement and education to diverse stakeholders; and advocacy for a thorough, holistic cleanup of the Duwamish River (DRCC 2016a).

DRCC believes the only way to achieve this is by having the community at the decision-making table at all times so they guide the river cleanup. For this reason, they look at building the capacity, leadership, and power of the local communities through everything they do. Everything the coalition does is guided by the affected communities: they cater to the needs, values, concerns, and diverse cultures of the communities they work with and for. Throughout the years, this has forced them and state and federal agencies to do things in unconventional ways – which has yielded unprecedented, positive results (Rodriguez 2015).

The journey the coalition has traveled to get to the place where they are at in terms of meaningfully engaging these affected communities has not been short nor easy. DRCC started doing outreach (literally reaching out) and informing community members about the river, its cleanup plans, and inviting them to get involved. The coalition translated and distributed brochures in five different languages at churches, food banks, community events, etc. and provided simultaneous interpretation at their events and meetings. Mark Purcell put it really well in his book: "...any consensus, even within the counter public, must exclude some and include others, and it will favor some inside the group over others... the DRCC have so far been

unsuccessful in creating meaningful opportunities to include the voices of the [English as a Second Language] ESL population in their deliberations."

Purcell was correct, it was not until the coalition hosted events and meetings at the local elementary school and asked their Aztec dance group to open these when the first five Spanish-speaking community members attended one of their events. Things started to change after that, and they started to change for the good. The coalition then realized they were not taking the right approach: they were trying to sell their idea of cleaning up "invisible" contaminants to community members that were working 16 hours/day and worried about more urgent, immediate needs. After that, DRCC decided they needed to make structural changes to their approach, stumbled upon meaningful community engagement, and started building an ongoing, permanent relationship for the purpose of applying a collective river cleanup vision that would reflect the values, concerns, and cultures of those most affected by the historical and ongoing pollution in the Duwamish River.

Reclaiming: From Peril to Opportunity in the Superfund Arena and Beyond (2011 - 2014)

In 2011, after hearing from a diverse array of community members, DRCC decided to expand their work beyond the Superfund arena and pursued working on community health. First, the coalition was awarded a small grant ($20,000) for conducting a Cumulative Health Impact Assessment (CHIA) and multilingual educational forums for the communities in the Duwamish River Valley (EPA 2011). A second 2011 award of $100,000 came from the EPA's Community Action for a Renewed Environment (CARE) to fund a consensus-based identification and prioritization of community health risks and mitigations (not related to the Superfund site). Third, DRCC received $60,000 in 2013 from the Urban Waters program to help establish a community-based health equity and revitalization taskforce to develop recommendations for the Superfund cleanup plan and other community priorities.

Example of DRCC's brochure translated into five languages.
Photo: DRCC/TAG

Taskforce priorities include creating greenspace and public river access, food security, at-risk youth programming, neighborhood beautification, tree planting, green infrastructure implementation, air quality, local business vitality and economic development, healthy living practices, training and hiring local residents for cleanup jobs, providing healthy alternatives to contaminated fish, and protecting residents from gentrification and displacement (EPA 2015d). In the meantime, DRCC kept functioning as the CAG and TAG for the Superfund site with an intense time period in early in 2013 when, after 12 years in the making, EPA finally released their Proposed Cleanup Plan. Moreover, the EPA conducted the first-ever Environmental Justice Analysis of a Superfund for the Duwamish River case. This time, though, DRCC lifted even more disproportionately marginalized voices within an already marginalized community.

Hearing from Those Most Affected: Multilingual Community Surveys

Through a CARE grant, DRCC worked with community members to identify and prioritize actions to improve environmental and community health in the Duwamish Valley, specifically beyond the Superfund realm. This was not completely unchartered territory for DRCC (the coalition published the Duwamish Valley Vision Plan and Map in 2009) but a lot of work needed to be done to involve those who had not been meaningfully engaged in the coalition's work before. Even though more than 20 languages are spoken in the valley, the coalition prioritized three main communities: Hispanic, Vietnamese, and homeless (in 2011 there was a homeless encampment in the outskirts of the South Park neighborhood known as "Nickelsville").

The reasons for engaging these communities were various, including: 1) DRCC finally had bilingual capacity to engage the largest minority group in the valley after hiring a recent immigrant from Latin America as their new Program Manager and recruiting a native Spanish-speaking volunteer who was a resident of South Park; 2) they started collaborating with an active community leader and respected elder from the Vietnamese community (second largest minority group) who agreed to work for DRCC as a contractor; and 3) one of DRCC's staff members had good connections with Nickelsville residents who were camping next to the river and many were fishing on the river for subsistence.

A DRCC intern from Antioch University, with input from DRCC staff and community members designed a five-question survey that included the following questions: 1. What makes you healthy?; 2. What makes your community healthy?; 3. Do you live and/or work in the Duwamish Valley?; 4. If you work in the Duwamish Valley, what do you do?; and 5. What, if any, health concerns do you have about where you live and/or work?

DRCC's staff, Antioch University, and a cohort of youth from the Wilderness Inter-City Leadership and Development (WILD) program (with multilingual capacity) surveyed community members at community events and meetings, local food banks, and through door-knocking. The survey reached 185 community members (see Figure 12). However, community members were quick to express concern and frustration because "they had already taken the survey". It was not until then when the coalition learned there was another community group actively surveying community members about diesel pollution. DRCC had to take a new and inventive approach in their community engagement and input-collection strategy.
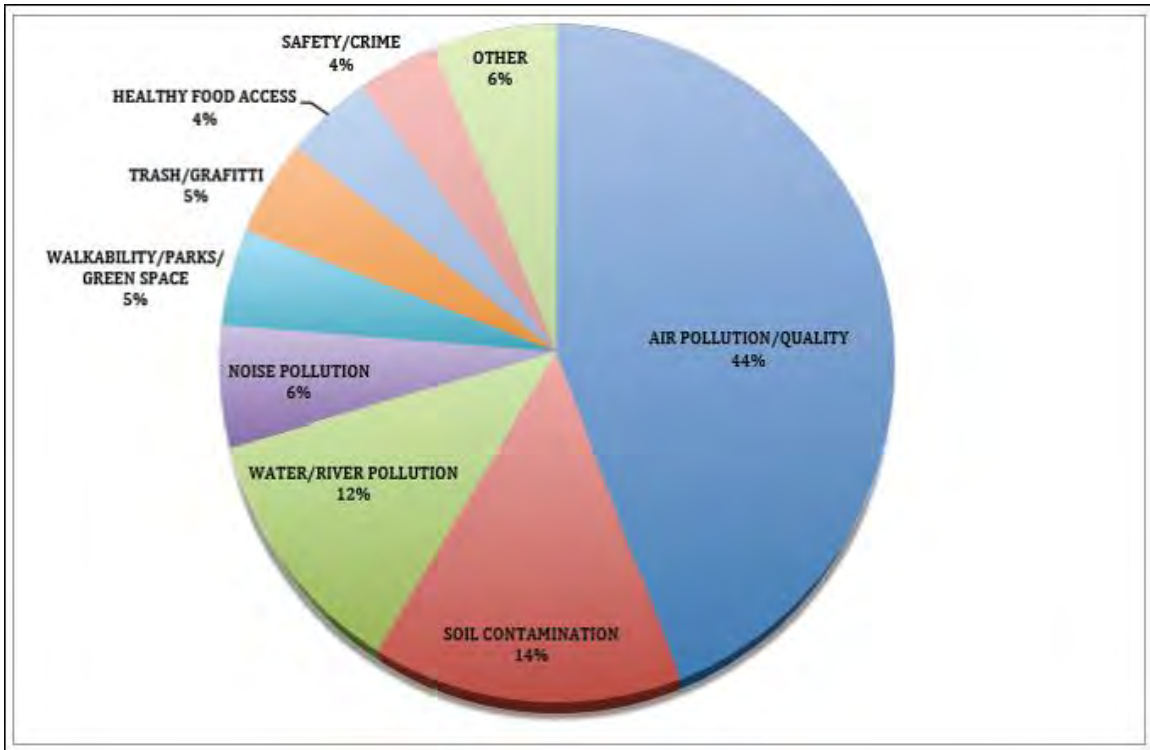
Figure 12: Results for community members responses to a survey administered by DRCC; question: What is the things you are most worried about in your community? n=185

And By Popular Demand, We Present You With: Community-Asset and Health Threats Mapping

Due to community concerns, confusion, and obvious frustration, DRCC implemented a new strategy. The coalition hired Paulina López, a Spanish-speaking volunteer and resident of South Park who that had been helping DRCC reach the Hispanic community in the Duwamish Valley, to design a new community engagement strategy. Ms. López designed a community asset and health threats mapping exercise - this not only allowed the coalition to collect the information they needed but also identify the locations of where actions were needed.

The exercise consisted of asking community members to write and/or draw and locate on two different printed maps (approximately 3'x4' each) what made their neighborhood "healthy" and "unhealthy" (see Figure 13). The reaction from community members was astounding: they felt "listened to" as they noticed the change in strategy due to their comments and supported this effort in big numbers. A compilation of the results for each neighborhood can be seen in Figure 14 and Figure 15.
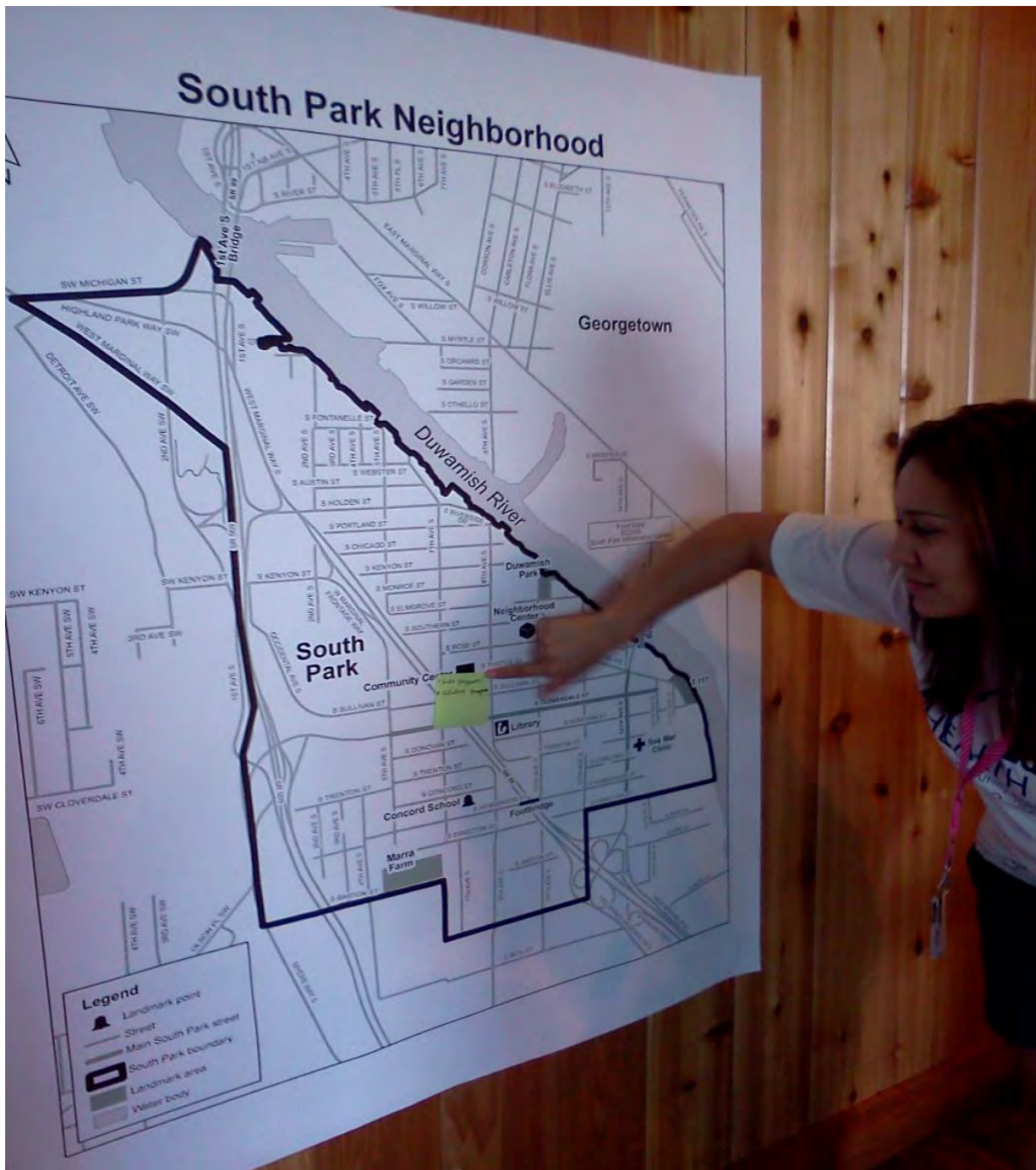
Figure 13. Community member participating in the community assets and health threats mapping exercise.

Photo: Paulina Lopez

What makes Georgetown *healthy* and **unhealthy**?

SEATTLE

Georgetown

Georgetown Playfield

Airport Way Business District

All City Coffee

Hat 'n' Boots

Oxbow Park

Ruby Chow Park

Carleton Grocery

South Seattle C C

Coliman Restaurant

Boeing Field 34

Duwamish River

South Park

Gateway Park

1st Ave S Bridge

South Park Bridge

Boeing Plant 2

Legend

12 Reference number
Landmark point
Street
Landmark area
Georgetown border
Park
Water body

Healthy
Fish
Bikes
Trees
Boating
Healthy location
Healthy street feature
Healthy area

Unhealthy
Airplanes
Trucks
Unhealthy location
Unhealthy street feature
Unhealthy area

Key to numbered sites

3 SANCA circus school
5 Spray park
6 Georgetown playfield / soccer!
7 Old Cold Storage building
8 Georgetown business district
10 Volleyball and tetherball
12 Harbor Freight Tours
14 Food Bank
17 Trees
19 Trees and gardens
20 Good open space

22 P-patch and garden
23 Carleton Grocery
24 Chickens
27 Green space: geese live here, dogs play
28 Telephone Museum
29 Trees
30 Coliman Restaurant
32 Bike lane
33 Sense of community
38 Love living by the river!
40 Boeing public access site
41 Trees

42 Gateway Park
43 SBC Mini Mart
44 Bike lanes in Georgetown!
45 Shared community meals
46 Trees
47 Rain gardens

1 Need sidewalk
2 Big empty lot: blight
4 Bridge area needs clean-up
13 Too much traffic
15 Need safe pedestrian access

16 Panhandling
18 Toxic materials
25 Diesel exhaust
26 Need sidewalk
31 Prostitution and crime
34 Airport noise and pollution
35 Need an exit sign for Georgetown on I-5
36 Too much truck traffic
37 Polluted river
39 Not enough access to the river
40 Air pollution in the residential areas

This map represents a compilation generated by 115 Georgetown residents in mapping exercises conducted at numerous venues from May to August, 2012.

Figure 14: Summary of results for community-asset and health-threat mapping exercises in the Georgetown neighborhood. n=115.

What makes South Park *healthy* and **unhealthy**?

Georgetown

Duwamish River

South Park

Seattle
Tukwila

Duwamish Park

Neighborhood Center

Community Center

Skate Park

Library

Concord School

Footbridge

Marra Farm

Sea Mar Clinic

South Park Bridge

Food Bank
ECOSS
South Park Information Center

T-117

Seattle

Unincorporated King County

Seattle

Legend

- Landmark point
- Street
- Main South Park street
- Seattle city limit
- South Park boundary
- Landmark area
- Water body

Healthy
- Healthy location
- Healthy linear feature
- Healthy area

Unhealthy
- Trucks
- Unhealthy location
- Unhealthy linear feature
- Unhealthy area

Key to numbered sites

1 Nickelsville; nice people, sense of community
3 I love the river!
9 Park is nice green space
10 Good views of the river
12 Dog walkers are friendly people
13 Engaged neighbors, civic support
17 Wildlife in the river
18 New bridge will be great for business!
20 Good meeting place, sports/coaching, events
33 Bartending college
35 School convenient to walk to
36 Reading, programs, good place for kids to go
39 Love the apartments and taco truck here!
40 Drug dealing is gone!
42 Good restaurants on 14th Ave

46 Good to have a clinic in South Park!
52 Senior center-nice place to walk
55 Trail
60 Everyone loves Marra Farm! Needs exercise space.
62 Good bridge
64 Sense of community in all of South Park!

1 Nickelsville: access, electricity, sanitation, pests
2 + 56 Unpaved streets no sidewalks
4 Air pollution in South Park
5 Giant potholes in the residential streets
6 Trucks on residential streets
7 Dirty park
8 Contamination in the river
11 Rats, litter, drugs, drinking in the park
14 Needs bus shelters and street lights

15 + 58 Speeding; signs needed for kids
16 Garbage in the river
19 Drug use on bench
21 Noise - need a sound barrier!
22 Dog poop on the grounds
23, 47 + 51 Graffiti
24 + 28 Not enough lights
25 Graffiti in Skate Park and along Cloverdale
26 Abandoned cars
27 Dark: trees block street lights
29 Vacant building - blight
30 Public drunkenness and loitering
31 Need alley lighting + bus shelters in South Park!
32 No safe way to walk to White Center
34 No signs for South Park on highway
37 Dangerous speeding on Cloverdale - need signs!

38 No healthy stores
41 Need more river recreation opportunities
43 History of drugs and prostitution;
   worry about them returning with new bridge
44 T-117 and related contamination
45 Need more river access
48 + 49 Stairs need repair
50 Scary, filthy, overgrown trail needs repair
53 Not enough parking
54 Not enough police in South Park!
57 Water yard construction
59 Littering and smoking
61 Too much garbage everywhere!
63 Dope house
65 Homeless living in bus shelters in SP

This map represents a compilation generated by 235 South Park residents in mapping exercises conducted in three languages at numerous venues from May to August, 2012.

Figure 15: Summary of results for community-asset and health-threat mapping exercises in the South Park neighborhood. n=235

Making Space at the Table and Sharing the Spotlight with the Unusual Suspects
The Duwamish Valley Healthy Communities Initiative, of which the two previous efforts were part of, was being implemented while the coalition was still simultaneously serving as the CAG and TAG for the Duwamish River Superfund cleanup process. And it was in early 2013, after 12 years in the making, when EPA decided to release their Proposed Cleanup Plan (details on how, how much, and when to clean up the river) for public comment. This was an incredibly important and exciting time: not only had the communities been waiting for over a decade to hear what EPA was planning for their river but, due to the work done through the initiative, the coalition was excited to bring the "unusual suspects" to the table for the first time. The coalition, in partnership with community members, designed one of the most ambitious and aggressive community engagement plans in the nation, convinced EPA to extend their regular 30-day public comment period to 105 days, and implemented an unconventional plan that resulted in more than 3,300 people participating in public comment-related activities and more than 2,300 public comments in 10 different languages.

In the words of Purcell (2008, 148): "In other contexts, in Superfund and beyond, such public meetings are typically impoverished: the decision-makers show a slick, well-thought-out presentation of their plans and ask the public to comment. An unorganized public made up of a variety of people interested in the issue for different reasons attempts a response… The Duwamish case is different… Speaker after speaker comes to the microphone to reiterate the DRCC's argument, an argument they helped to shape." The regular way of doing business has worked well in getting Caucasian community members involved but, as discussed earlier in this paper, recent non-English speaking immigrants and refugees have unique challenges. The coalition was forced to come up with a strategy that would work for those who would normally not speak up to government and demand their rights, needs, and wants.

Multilingual Public Meeting and Community Workshop. For example, the DRCC's Program Manager posed the following strategy to EPA and Ecology community involvement coordinators. "How about allowing community members present about the plan to their neighbors and peers in the own language?" Driven by a desire to build the community's capacity, leadership, and power, everyone went to work. The coalition's responsibilities included: 1) recruit 10 community members (four English-, four Spanish-, one Vietnamese, and one Somali-speaker) to present the plan at a public meeting; 2) explain the Proposed Cleanup Plan to these community presenters; 3) partner with the presenters and develop the visual materials to be used at the meeting once approved by EPA and Ecology; and 4) recruit meeting attendees (see Figure 16).

The evening of May 9, 2013 the gym of the local elementary school was full with more than 250 attendees that had been recruited by DRCC's staff but, most importantly, by the local experts (presenters), and the *abuelas* (grandmothers) that had been hired to cook the homemade dinner to be served that night. Presentations were simultaneously happening in three languages (no Somali community members attended) while representatives of EPA, Ecology, LDWG, and DRCC were floating around in case community members had questions the local experts couldn't answer. Changing the format was worth it: more than 90% of attendees gave meaningful community input that night, something that had not happened in the previous 12 years.

Let YOUR voice be heard!
(for the good of our children, our neighborhood, our community and our river)

MAY 9, 6:00 PM
CONCORD INTERNATIONAL SCHOOL
(723 S Concord St, Seattle WA)

Learn about the cleanup plan for the Duwamish River and how the proposed alternative will affect you and your family.

Interactive & Multilingual - (English, Spanish, Vietnamese & Somali)
Food • Art • Child Care • FREE tickets to the Seattle Aquarium!
(Co-hosted by Concord International School and DRCC/TAG)

To RSVP, please cut and send this piece of paper by Tuesday, May 7 with the total number of family members we should expect.

¡Exprese SU opinión!
(por el bien de nuestros niños, nuestra familia, nuestra comunidad y nuestro río)

9 de mayo , 6:00 PM
CONCORD INTERNATIONAL SCHOOL
(723 S Concord St., Seattle, WA)

Aprenda sobre el plan de limpieza del Río Duwamish y como la alternativa propuesta le afecta a ud. y a su familia.

Interactiva y multilingüe – (inglés, español, vietnamita y somalí)
Comida • Arte • Cuidado de niños • boletos para el Acuario de Seattle GRATIS!
(Patrocinada por Concord International School y DRCC/TAG)

Para hacer su reservación recorte y envíe este pedazo de papel a más tardar el Martes 7 de mayo indicando el número total de miembros de familia que le acompañarán.

Ngày 9 tháng 5, 2013
Trường Tiểu học Concord
(723 S Concord St, Seattle, WA)

Tìm hiểu về Chương trình Dọn sạch sông Duwamish và kế hoạch được đề nghị sẽ gây ảnh hưởng nào cho Bạn và Gia đình của Bạn.

Phục vụ Thực phẩm-Nghệ thuật-Săn sóc trẻ em Vé miễn phí tham quan Hồ cá Seattle!

Vui lòng trả lời bằng cách gởi về mẫu giấy này trước ngày 7 tháng 5 với tổng số số người trong Gia đình mà chúng tôi mong muốn.

Tariiq meey 9, 6:00 PM
DUGSIGA CONCORD INTERNATIONAL
(Adarays ku waa: 723 S Concord St., Seattle, WA)

Baro waxa yaabaha ku saab san nadafada Wabiga Duwamish iyo sida uu u saa meeyo qoyskaga. Waxa Joogi doona qof afka somaliga ku turjumidoona.

Waxa diyar ah Cunto, Mel ciyaal ka la gu hayo wax sawirid. Iyo tikid bilaash ah!

Fadlan Jar RSVP ka ku na diri waraq daan malinta Taladadaa mey 7 dhaman inta qoska ka kooban yahay Waa in aan aqbal naa.

Figure 16: Flier (front - English) designed to invite community members to the Multilingual Public Meeting and Community Workshop to discuss EPA's Proposed Cleanup Plan for the Duwamish River (back - Spanish, Vietnamese, and Somali).

Non-English Language Formal Public Hearing. Building on the success of the community workshops, DRCC then turned its efforts to 'upending' the traditional format for public hearings by holding multi-lingual forums for the Duwamish River valley residents. While there was initial resistance from state and federal agency officials, a gentle "we will host a meeting 100% in Spanish with or without you" resulted in EPA hosting one of the first-ever formal and multi-lingual public hearings in the nation. This included testimony from the community's independent technical advisor translated by the coalition's Program Manager, a native Spanish speaker and recent immigrant. The hearing also was purposefully hosted a week after the Multilingual Public Meeting and Community Workshop to take advantage of the momentum and pride built therein. The strategy worked: 151 community members showed up compared to the 25 Spanish-speaking community members EPA hoped to engage.

The Duwamish River in 3-D. On the other side of the river, a different strategy was needed. The Georgetown neighborhood is not as ethnically diverse and instead has a thriving artist community and well organized residents representing a growing business district. The coalition partnered with the Georgetown Arts and Cultural Center (GACC), a local group of activists/artists that are vocal about many of the issues that affect the neighborhood.

GACC recruited volunteers to build a 50-foot model of the Duwamish River in an indoor beach volleyball court and designed a visual way to explain the four actions EPA proposed for the cleanup of the Duwamish River: 1) dredging; 2) capping; 3) enhanced natural recovery; and 4) monitored natural recovery, each of which had its own station at the model. To additional stations were included: institutional controls and pollution source control (see Figure 19 and Figure 20 for images of the model). Each of these stations was manned by a community member that explained what each of these terms meant and what was "good" and "bad" about it. This "Hawaiian party" (which included Hawaiian shirts, shorts, flip flops, and a delicious Hawaiian dinner graciously catered by one of the local restaurants) was attended by 129 community members, many of which gave public comment at the "public comment corner."

Effecting Change

The unprecedented engagement and "rising" of this river community whose members represent far-ranging cultural, social, and environmental interests did not go unnoticed and has influenced how decision-makers engage with them. A few of the recent achievements in regards to Superfund and beyond include:

- The creation of the Duwamish River Opportunity Fund in late 2013. Due to many years of community advocacy, the City of Seattle has clearly realized that "Superfund cleanup and pollution source control are not enough to achieve quality of life people desire. The City is committed to addressing community concerns about affordable housing, displacement, jobs, economic development, and healthy food." (City of Seattle 2013)

A photograph of "The Duwamsh River in 3-D", a 50-foot model of the Duwamish River and EPA's Proposed Cleanup Plan for the Duwamish River.

Photo: Alberto J. Rodriguez

Another perspective of "The Duwamish River in 3-D", a 50-foot model of the Duwamish River and EPA's Proposed Cleanup Plan for the Duwamish River.

Photo: Alberto J. Rodriguez

- The City has allocated a total of $750,000 ($250,000/year since 2014) for community projects that address community-identified priorities.

- A more comprehensive, health-protective final cleanup plan (Record of Decision) for the Duwamish River in late 2014. Even though several of the potentially responsible parties lobbied against a more aggressive final cleanup plan (McClure 2014), EPA increased the amount of dredging by 20%; many other opportunities to improve the cleanup plan were included in the final plan as well.

- This City of Seattle and King County Council's explicitly stated support in 2015 for the Lower Duwamish Waterway cleanup and the health of the neighboring communities with passage of Resolution 31567 and Motion 14368 respectively. Both pieces of legislation call for better coordination of projects and services that serve and protect the health or resident, tribal, and fishing communities in the Duwamish River Valley, leverage funds to improve overall community health that would build on the City's existing Duwamish River Opportunity Fund, and the use of racial equity and social justice toolkits in decision-making processes.

The Next Chapter: Breaking Silos and Challenging Paradigms with Community Action on Air Quality (2014-2016)

The community's experiences with the Duwamish River Superfund site served as not only a key opportunity to reframe and reclaim cleanup action in a manner that was more responsive to community's interests, but also to build the tools, capacity and sense of efficacy needed for the community to react to other on-going environmental injustices contributing to poor health outcomes. DRCC has responded by initiating a new official program: the Community Health program. This program consists of two projects: 1) Healthy River / Healthy Communities; and 2) Duwamish Community Action for Clean Air. The former aims to implement recommendations crafted by affected community members (residents, tribes, workers, and subsistence fishermen) to improve their health and that of their communities. The latter, which we focused on this paper, was initiated due to the overwhelming community interest in air pollution.

In addition to taking action on a community-identified priority, a recent study (Colton et al., 2015) linked air pollution to the Duwamish River through air deposition. Community members identified the following three main goals for the Clean Air project: 1. compile existing information on the sources of diesel and other air pollution in the Duwamish Valley; 2. identify and fill data gaps with new monitoring and mapping efforts; and 3. take action to reduce exposure to air pollutants and the frequency and severity of asthma among local residents. Since 2014, a consortium of public agencies, academia, non-profit organizations, and community groups have been working together to achieve these goals. We discuss a few actions that have been taken to achieve goals #2 and #3 in the next sections.

Healthy Home Assessments and High-Efficiency Indoor Air Filters

Residents in the Duwamish Valley are constantly exposed to pollution sources from industries, automobiles, trucks, and other sources. These conditions increase the likelihood of residents developing asthma (Gould and Cummings 2013). Data has shown that children in

South Park and Georgetown were most frequently hospitalized due to asthma conditions. In order to act on this quickly, DRCC and the American Lung Association (ALA) developed collaborative "healthy home assessments" to work with families to identify health hazards in people's homes and develop a low- or no-cost plan to improve indoor air quality. These assessments are being offered in English, Spanish, Vietnamese, and Somali. Participating families receive a green cleaning kit and a doormat free of charge. Families with members suffering from asthma also receive an additional kit that includes a dust mite resistant pillowcase and mattress cover. Lastly, DRCC and ALA devised a way to build high-efficiency air filters (MERV 13) allowing every family participating in the healthy home assessment to receive one filter and replacement supplies to last for a year.

Additional Air Monitors

There are two regional air quality monitors located in the Duwamish Valley. Community members have complained about how these are too far from the neighborhoods and are skeptical on how much their readings reflect air quality in places where people spend most of their time. For years the community has asked for more localized air monitors. This happened for a brief amount of time when the University of Washington and Puget Sound Sage conducted a diesel exposure study (Schulte et. al. 2013).

Through the Clean Air, the Puget Sound Clean Air Agency (PSCAA) will monitor the efficiency of air filters being distributed through the project. To do this, PSCAA will place a monitor outside and inside participating families' homes to measure total small and large particles and diesel pollution for a week. In addition, DRCC, Western Washington University, and Just Health Action (JHA) are currently seeking funding to do more air quality monitoring in the neighborhoods.

Piloting an Air Pollution Exposure Reduction Project: Green Screens

One of the most important aspects of the Clean Air project is to implement projects to reduce local residents' exposure to polluted outdoor air. To do this, JHA and a representative of Sea Mar Public Health Clinics (Sea Mar) did a literature review on effective projects that had been implemented across the nation to improve air quality and/or reduce people's exposure to air pollution. When the literature review was completed, Linn Gould with JHA analyzed the information and chose the three most promising options to work in the Duwamish Valley; these three options were presented to English-, Spanish-, and Vietnamese-speaking community members during a series of multilingual community workshops in late 2015.

Community members identified "green screens" as the most viable option due to its benefits improving air quality but also for all the additional benefits: stormwater management, decreasing the urban heat island effect, shading, security, and graffiti control (Greenscreen 2016). A green screen is a type of vegetated wall or façade that is free standing structure; its metal frame structure supports the growth of native and fast growing vines. DRCC and JHA will work with community members to identify the locations for these to be built in the fall of 2016.

Discussion

The results of our air pollution analysis match findings from many other studies. In the 2012 study, researchers used monitoring data from the 20 stations to create air quality prediction

models. The models generated from the data highlighted road and rail proximity, industrial activity, and truck emissions as key factors in determining interurban air quality conditions within Seattle. "The existence of a gradient of diesel exhaust suggests that, particularly in stagnant periods, the health and environmental impacts of diesel traffic are not evenly distributed. These results reflect that residents in high intensity development areas near major roads and truck corridors likely face disproportionate impacts of diesel traffic and higher exposure to diesel exhaust" (Schulte et al 2013, p. 65).

Other air quality risk studies conducted within the region also consistently show higher risk levels in the Duwamish Valley as compared to other neighborhoods. For instance, a longitudinal air toxics monitoring program in Seattle found higher inhalation cancer risks from data collected at two South Seattle sites compared with four other locations across the city (Wu et al. 2011). In another recent study, these neighborhoods were part of a cluster of Census Block Groups (CBGs) that were home to 13 of the city's 22 Toxics Release Inventory (TRI) reporting facilities in 2009 accounting for 84 percent of the city's simulated point-source air toxics exposure risks (Abel and White 2015). Likewise, a 2008-2009 study sampling over 100 different air toxics across four sites in both Seattle and the industrial port of Tacoma to the South found that the potential cancer risks from diesel emissions were the highest at the monitoring site just north of the Georgetown and South Park neighborhoods (PSCAA 2010).

The community action for clean air investigation into air quality assessment has revealed several challenges: 1. air quality variability is masked by emphasis on regional conditions; 2. modeling data is limited by several factors, including problems with underlying data and modeling methods; and 3. health outcomes can be difficult to link to specific air pollution sources. Moreover, as one national policy analyst observed, the current monitoring network for National Ambient Air Quality Standards (NAAQS) has been found to be inadequate. It "was not designed to measure the kinds of exposure that current research identifies as a cause of concern. . . EPA and the states will need to devote resources in the next few years to expanding and refocusing the monitoring networks in order to identify areas where air quality does not meet new standards" (McCarthy 2011,19).

A growing body of research on pollution microgeographies has also found significant variation in air pollution and exposures in numerous cities (Kaur, Nieuwenhuijsen, Colvile 2005; Knibbs, Cole-Hunter, Morawska 2011; Pattinson, Longley, Kingham 2014). Yet, the system that has been established is based on a sparse network of stationary measurement stations that are very expensive to establish and monitor, and are not readily adaptable to capture interurban heterogeneity and identify pollution hotspots (Kumar et al 2015). For instance, one national report noted: "...urban-based field studies have demonstrated high pollutant levels in the near-source /roadway environment, where a majority of the North American population lives and the chemical environment is dynamic and poorly understood. These scale issues, at opposite ends of the spatial spectrum, challenge the current assessment framework that emphasizes regional air quality management." (NSTC 2013, 11).

Praxis for Environmental Justice

The Duwamish Community Action for Clean Air Partnership exemplifies a series of strategies responding to calls for an environmental justice praxis engaged "with those at the sharp end of injustice" (Hollifield, Porter, and Waker 2009, 608). Moreover, the Duwamish River Cleanup Coalition leading the charge has been active, imaginative, and insistent. However, the same could not be said for one of sustainability's leading cities.

In a 2014 planning forum, the city's Deputy Mayor stated that civic inclusion has got to be a part of Seattle's community fabric going forward if Seattle is going to be a successful community five and 10 years from now (Joncas 2014). The Deputy Mayor's words highlight the need for meaningful involvement of all residents in the long-term planning processes that will shape the urban form of Seattle for years to come. In order for these words to have meaning there is a strong need for more deliberative politics and democracy, based upon engagement strategies that are truly participatory in their approach and execution. Researchers noted recently concluded that "until Seattle's leaders recognize the connections between gentrification, zoning, affordable housing, and skewed air pollution exposures; the city's economic stratification and environmental injustice will continue to tarnish the Emerald City's brand of sustainability" (Abel, White, and Clauson 2015, 15743).

The tenacity and perseverance of the Duwamish Valley community in reframing and reclaiming their riverfront community has charted a potential new course towards more effective engagement - one that is re-oriented to ensure that Seattle's rising tide 'lifts all boats'. Residents in the Duwamish Valley have persisted through a long struggle, advocating for more attention and investment to be directed to their community. This struggle started with the listing of the Duwamish 'waterway' as a Superfund site, one of the most polluted places in the nation. Through the community's organizing efforts and emergence of new engagement activities designed to represent the far-ranging cultural, social, and environmental interests present in the community, decision-makers have begun to change the manner in which they engage with this community.

Yet, community members who hoped that these changes would provide a catalyst for deeper shifts in institutional practices, bringing about a more just relationship, may be disappointed. Our research suggests that there is more work to be done to bring about a truly Sustainable Seattle especially in the light of public investment decisions across this growing city. For instance, in Purcell's (2008) examination of the transformation of the South Lake Union (SLU) neighborhood in Seattle, public investments are also skewed in the Emerald City. Just north of downtown, SLU historically was a mixture of light manufacturing, warehouse, marine services, and the relatively low-income Cascade neighborhood. A neoliberal narrative of reviving the regional economy on the one hand supported a massive redevelopment project and public infrastructure investment ($420 million) to create an urban biotechnology cluster. The city ". . . is spending funds *here* rather than in other parts of the city with similar needs. . . because its spending is driven by the desire to foster economic development, not to meet the needs of inhabitants" (Purcell 2008, 117). Meanwhile, less than one-million dollars have been committed to the Duwamish River Opportunity Fund and the city expects community groups and community members to tackle "affordable housing, displacement, jobs, economic development, enhancing the human and natural habitat in local neighborhoods and healthy food with this amount." (City of Seattle 2015).

Looking Towards a Sustainable Seattle

Our research illuminates that two emerald cities have emerged along fractures in equitable development, economic growth, and the focus of this paper, an uneven air pollution riskscape. While much attention has been focused on the Duwamish River, due to its listing as a Superfund site, less attention has been paid to air pollution and the interactions between atmospheric deposition and water quality. Further, the focus on regional air quality has diluted the discussion of pollution hotspots or the uneven pollution riskscape that occurs within the region. As a result, much like the Superfund engagement, the Duwamish Valley community has had to undertake a

new reframing and reclaiming process in order to highlight the intersectionality of pollution sources that is impacting their community in very different ways than is experienced by other neighborhoods within Seattle and the region.

A more Sustainable Seattle will need to respond more substantively to the Duwamish Valley community's engagement efforts, internalizing the concept of meaningful community engagement and why it is important to engage those who are commonly left out. Beyond that, a Sustainable Seattle will need to recognize the spatial variation in air pollution and health outcomes that exist and the underlying processes that have historically and continue to drive these patterns of difference. The narrative of the Emerald City still needs to be rewritten and the curtain pulled back to reveal the contrasts and differences that exist in access to opportunity and environmental conditions across the different local scales within the City. These challenges are especially evident in our research on the city's scalar politics and the community's efforts to reframe the story about air quality and take action to clean the air.

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