



# Green Solutions to Air Pollution

Building a green wall in a neighborhood with  
environmental justice concerns

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Cities Alive, November 3<sup>rd</sup>, 2016

# Today's presentation:

- ▶ Introduction to the Duwamish Valley in Seattle, where I live
- ▶ What is a community with environmental justice issues?
- ▶ Introduction to the Cumulative Health Impact Analysis (CHIA)
- ▶ The importance of community based participatory processes in low income, minority communities
- ▶ Green infrastructure as a community decision
- ▶ The community based approach for prioritizing build location
- ▶ Involving local green infrastructure job training programs
- ▶ Building the project - complications and set backs, support and successes
- ▶ Plant choices, community involvement in planting, and media day
- ▶ Tips for working in Environmental Justice communities





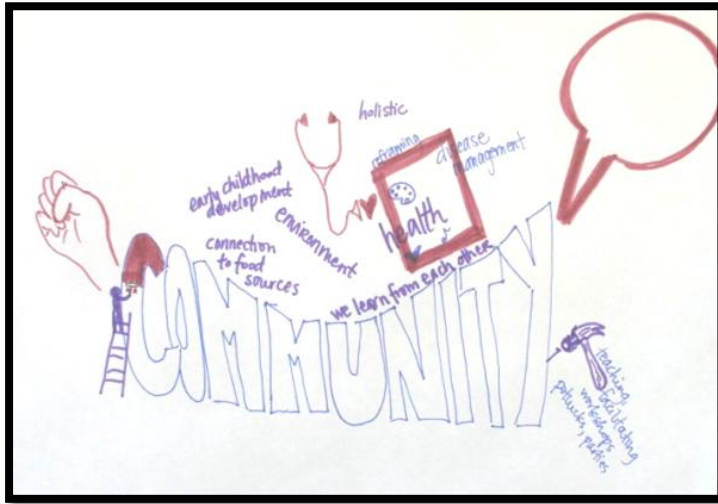


# Duwamish Valley contamination - soils, air, ground water, Duwamish River Superfund site





# Assets too!



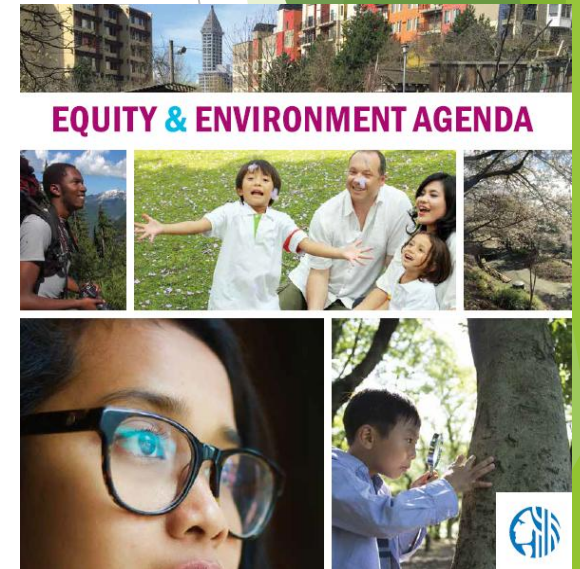
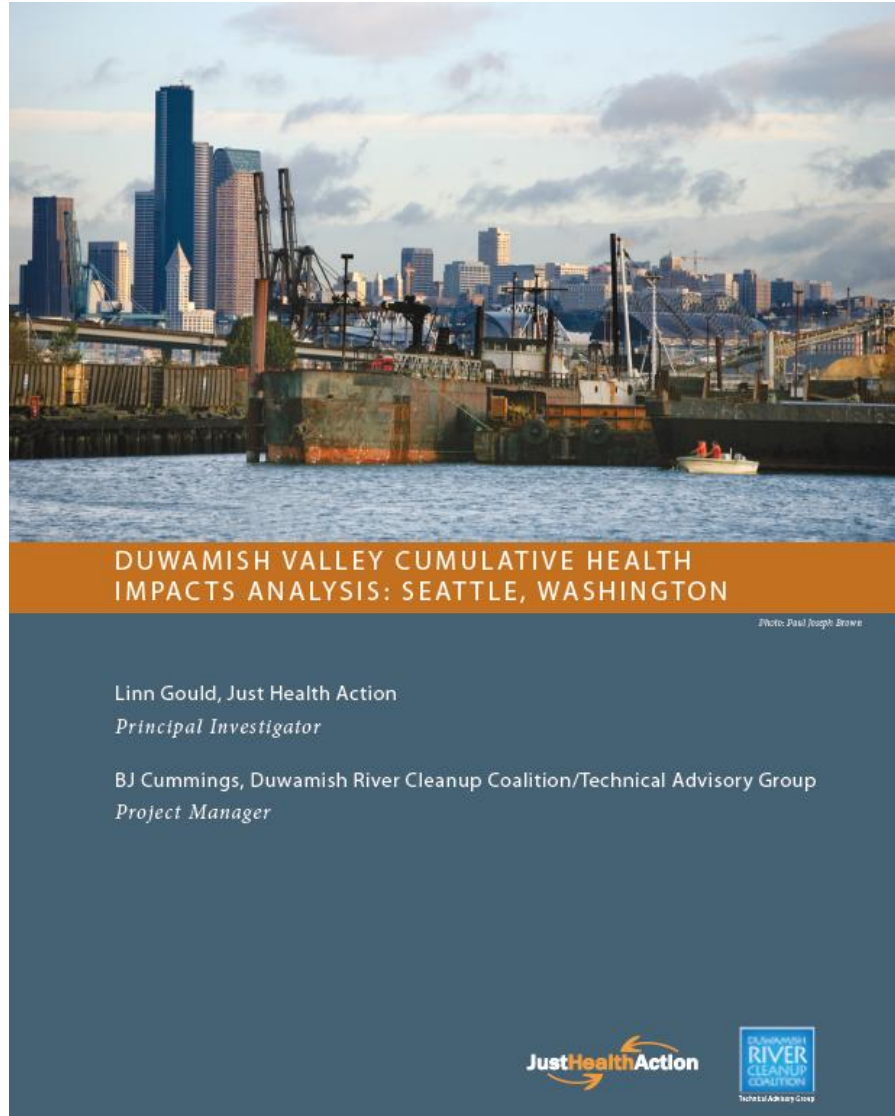
SP Community Center



# EPA Environmental Justice Research Grant



1. DV as an EJ community always anecdotal.
2. We set to prove it to make decision makers *listen*.
3. Used City and County equity initiatives and ordinances to force

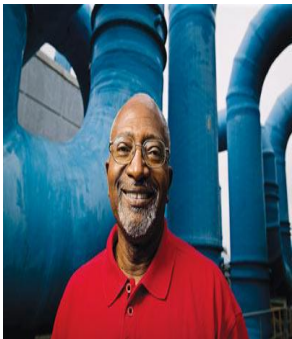
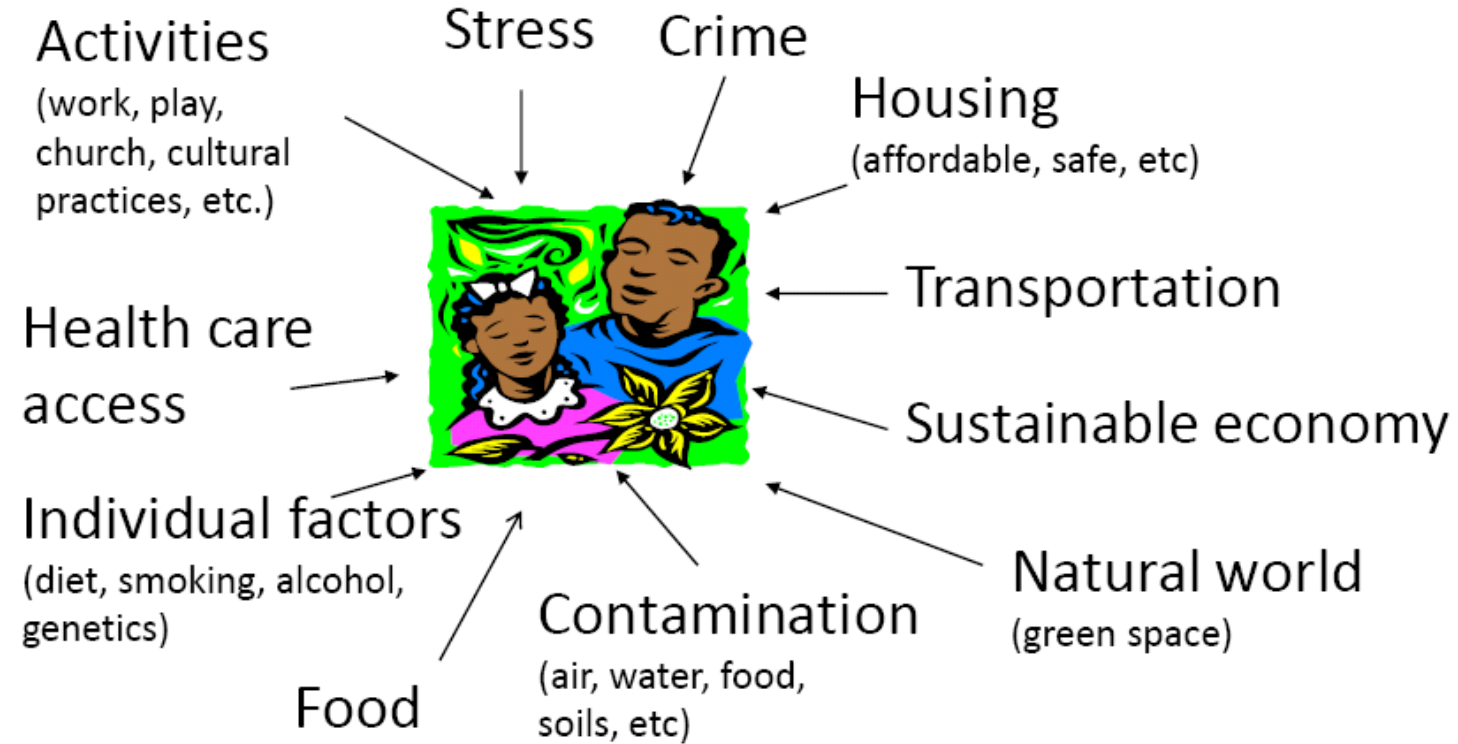


Technical Advisory Group



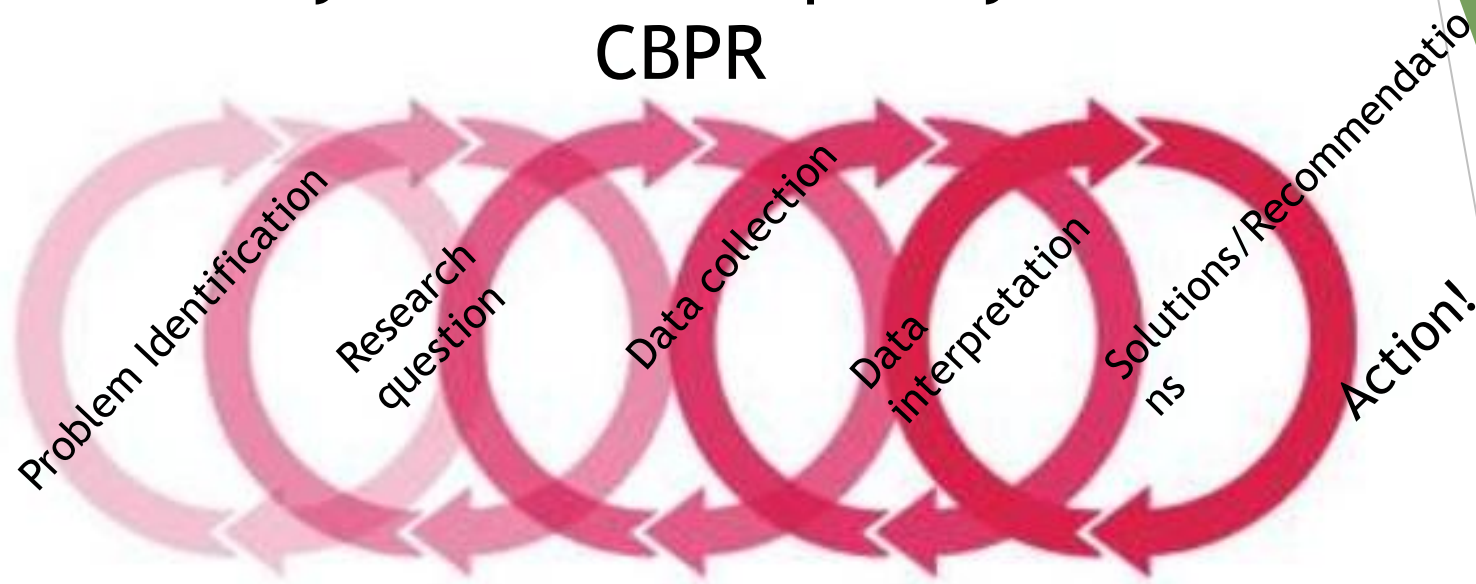


# ENVIRONMENTAL JUSTICE



***“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)

# Community Based Participatory Research - CBPR



**CBPR involves a cyclical  
and iterative process.**

*A collaborative approach to research that equitably involves all partners in the research process and recognizes the unique strengths that each brings.*



# 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 health conditions

# Cumulative Effects - Imagine



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OR



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

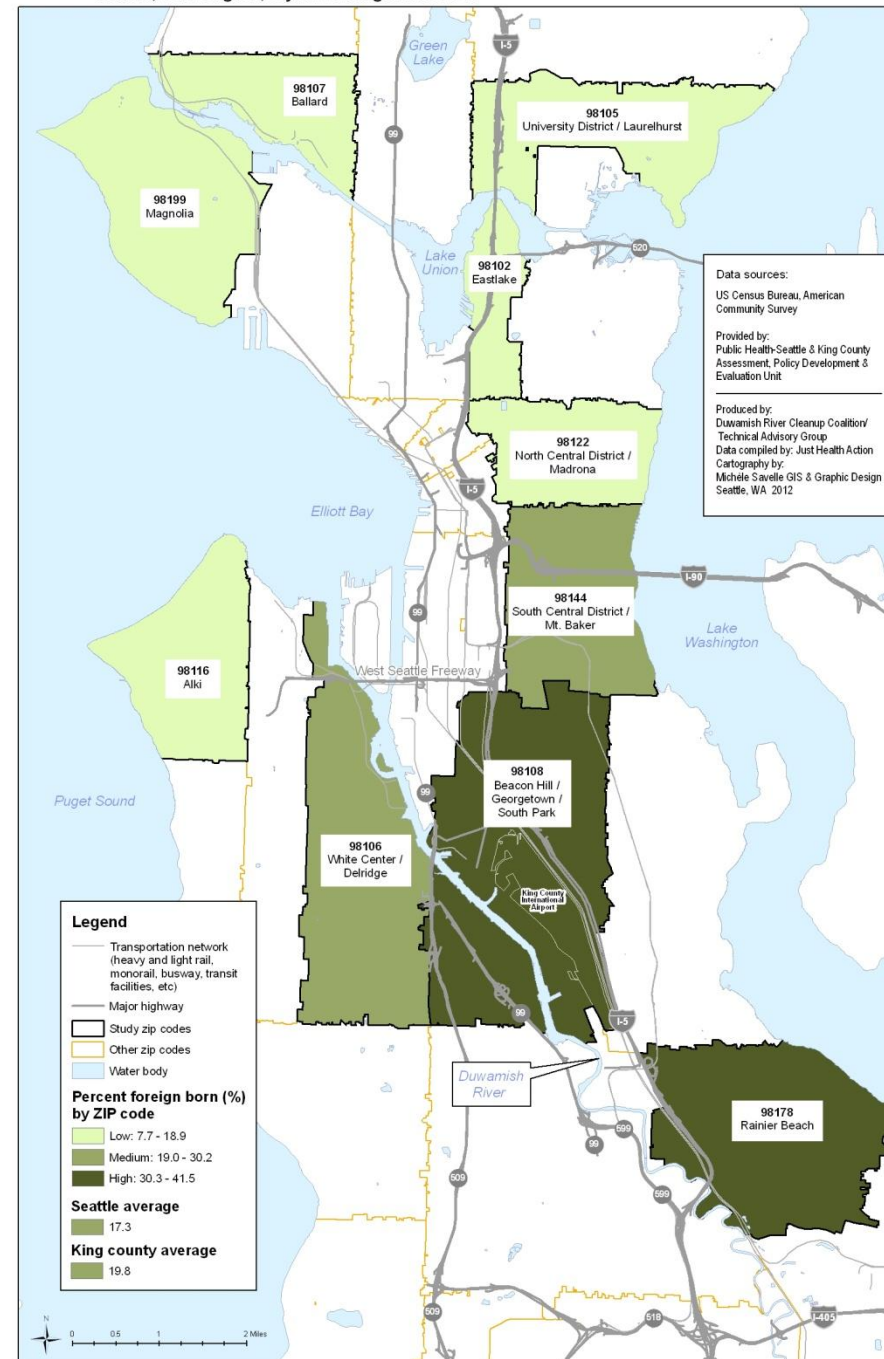
Figure 3. Percent Below 200% Poverty Level, by ZIP Code  
Seattle, Washington, 5-year Average 2006-2010





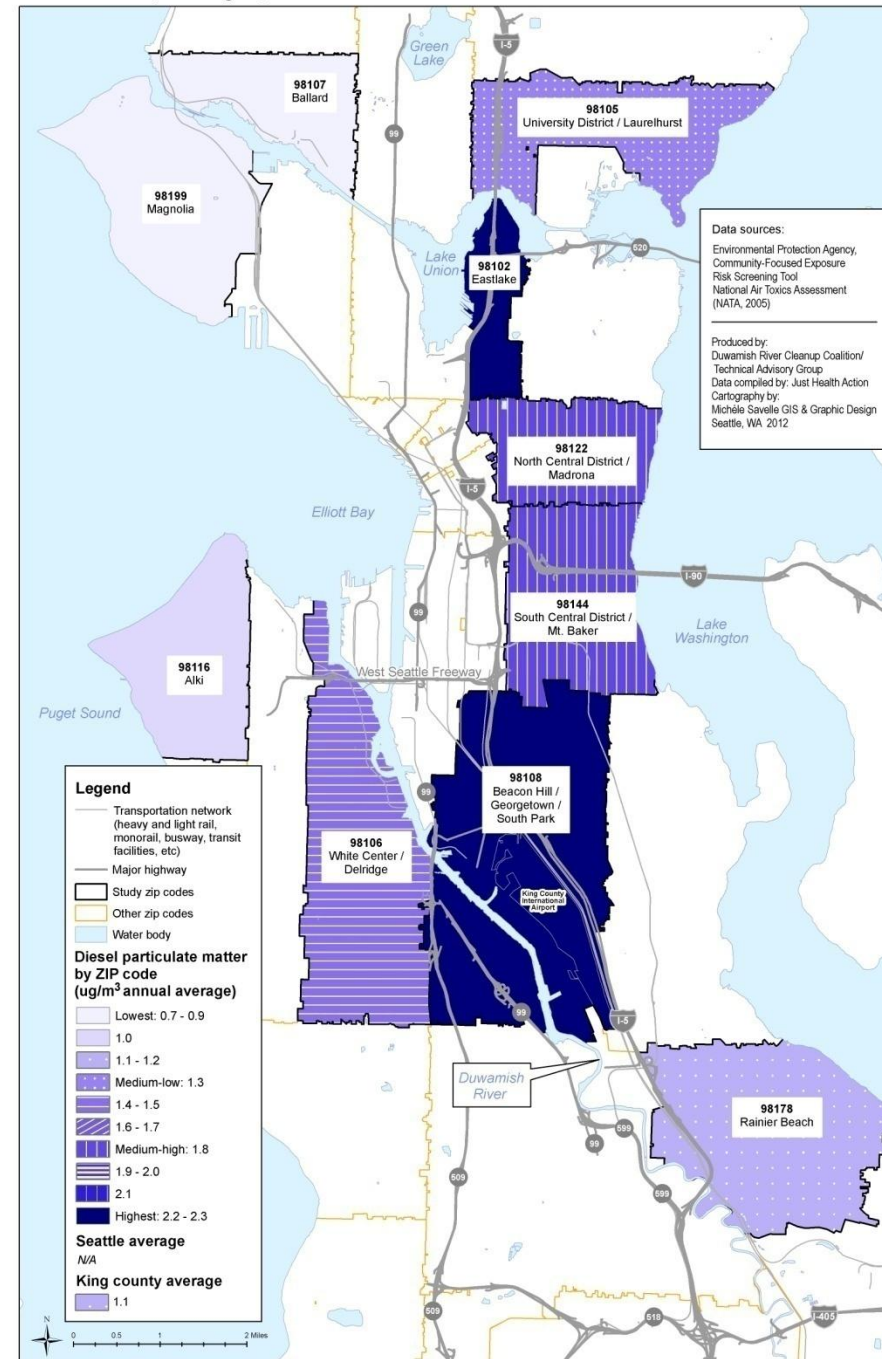
Figure 7. Percent Foreign-Born by ZIP Code  
Seattle, Washington, 5-year Average 2006-2010

# Sensitive populations component (rank 1-3): Percent Foreign Born by ZIP code



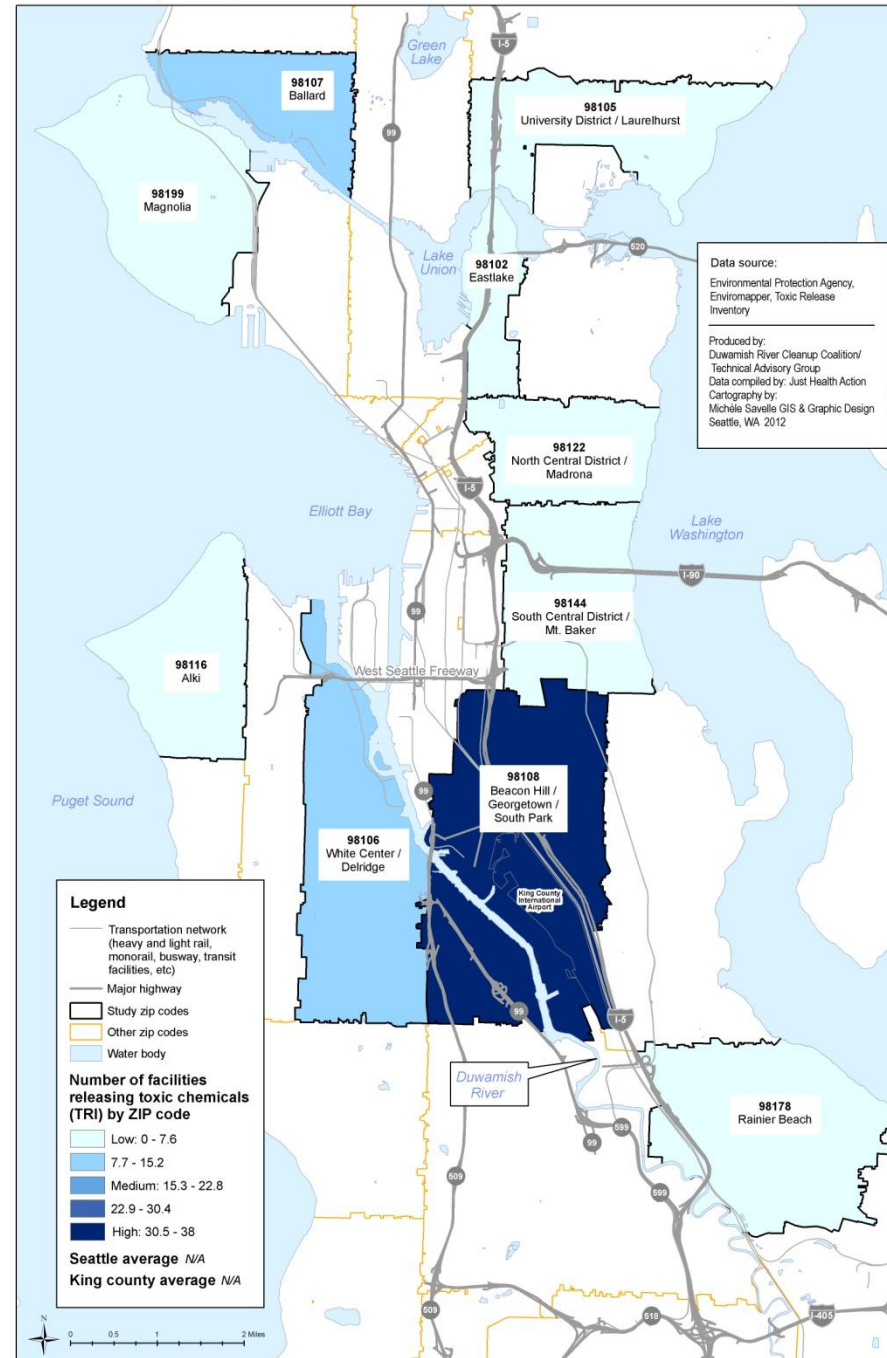
EPA C-FERST  
Environmental  
exposures  
component  
(Rank 1-10):  
Annual Average  
Diesel  
Particulate  
Matter in human  
breathing zone  
( $\mu\text{g}/\text{m}^3$ ), by ZIP  
code

Figure 8. Annual Average Diesel Particulate Matter in Human Breathing Zone ( $\mu\text{g}/\text{m}^3$ ), by ZIP Code  
Seattle, Washington, 2005



# EPA TRI Data Environmental effects component (Rank 1-5): Number of Toxic Release Inventory Sites, by ZIP code

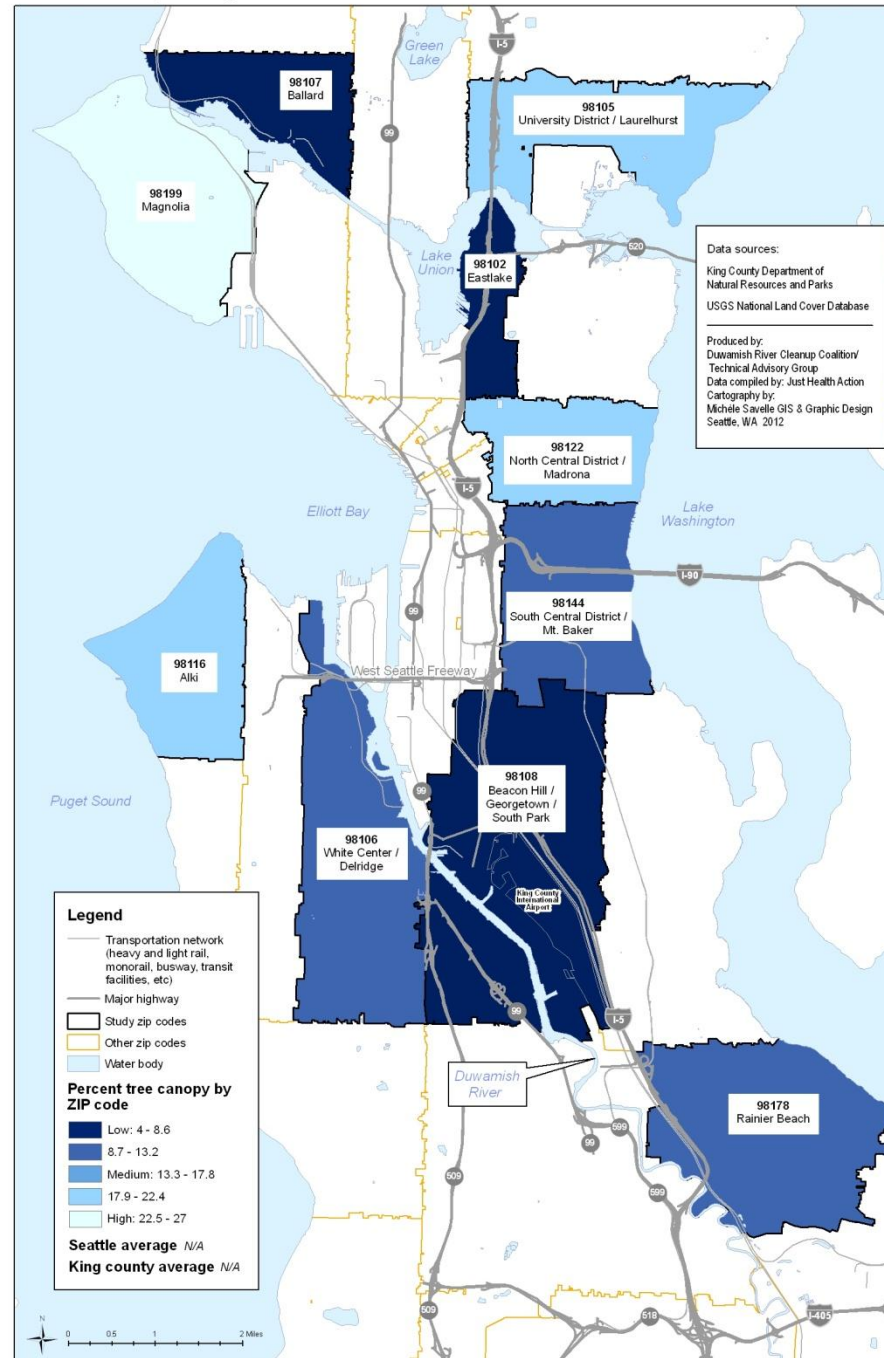
Figure 13. Number of Toxic Release Inventory Sites, by ZIP Code  
Seattle, Washington





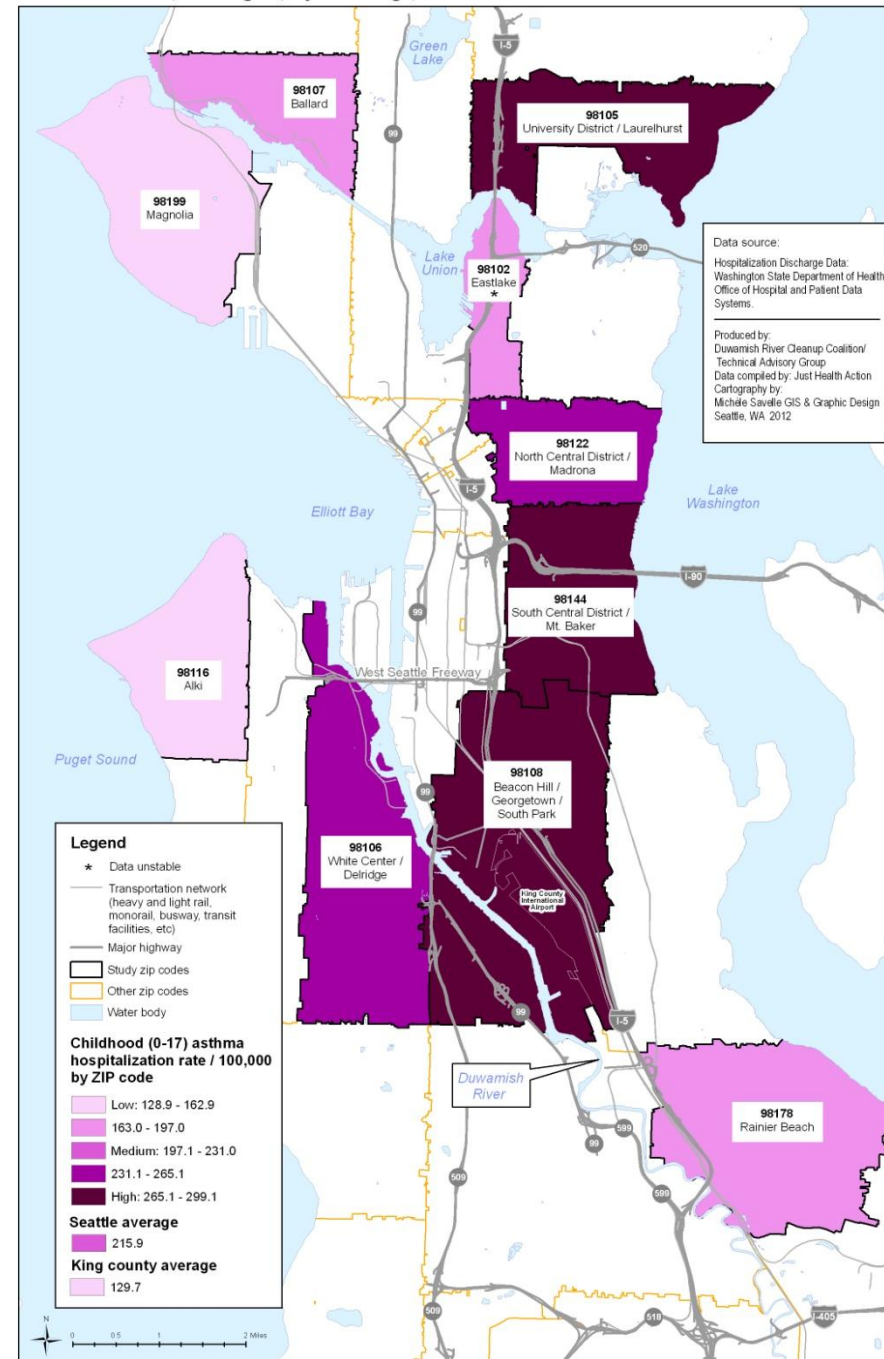
# Environment factors component (Rank 1-5): Percent Tree Canopy by ZIP code

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

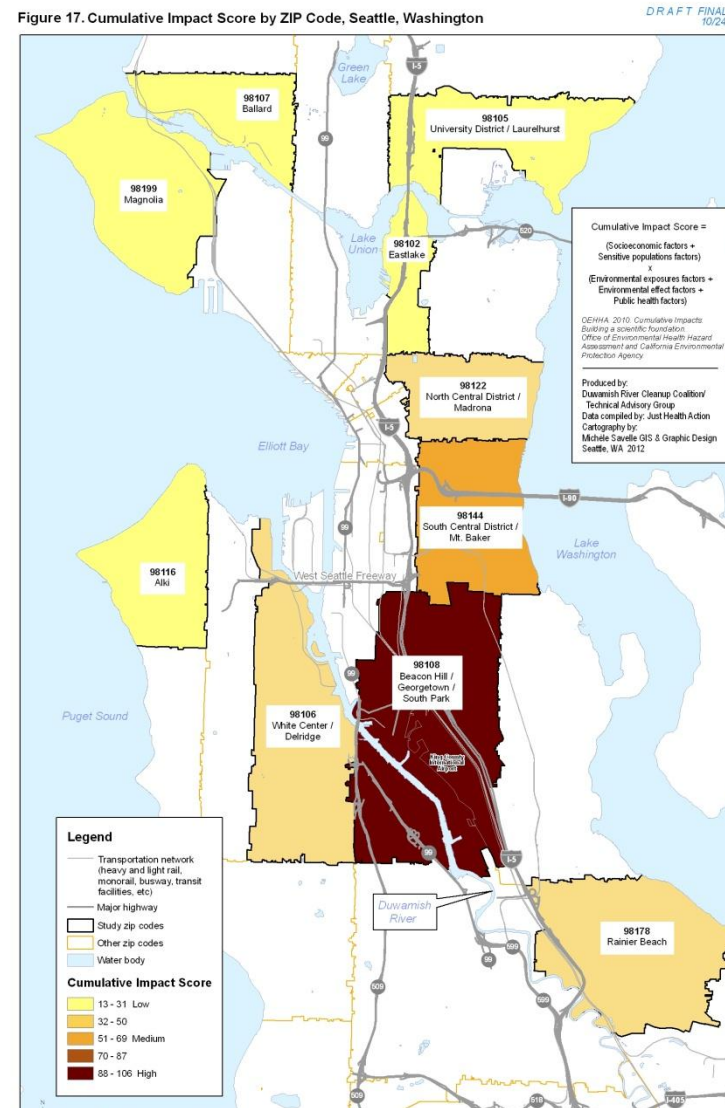


# Public health factors component (Rank 1-5): Childhood asthma hospitalization rate per 100,000 by ZIP code

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



# 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



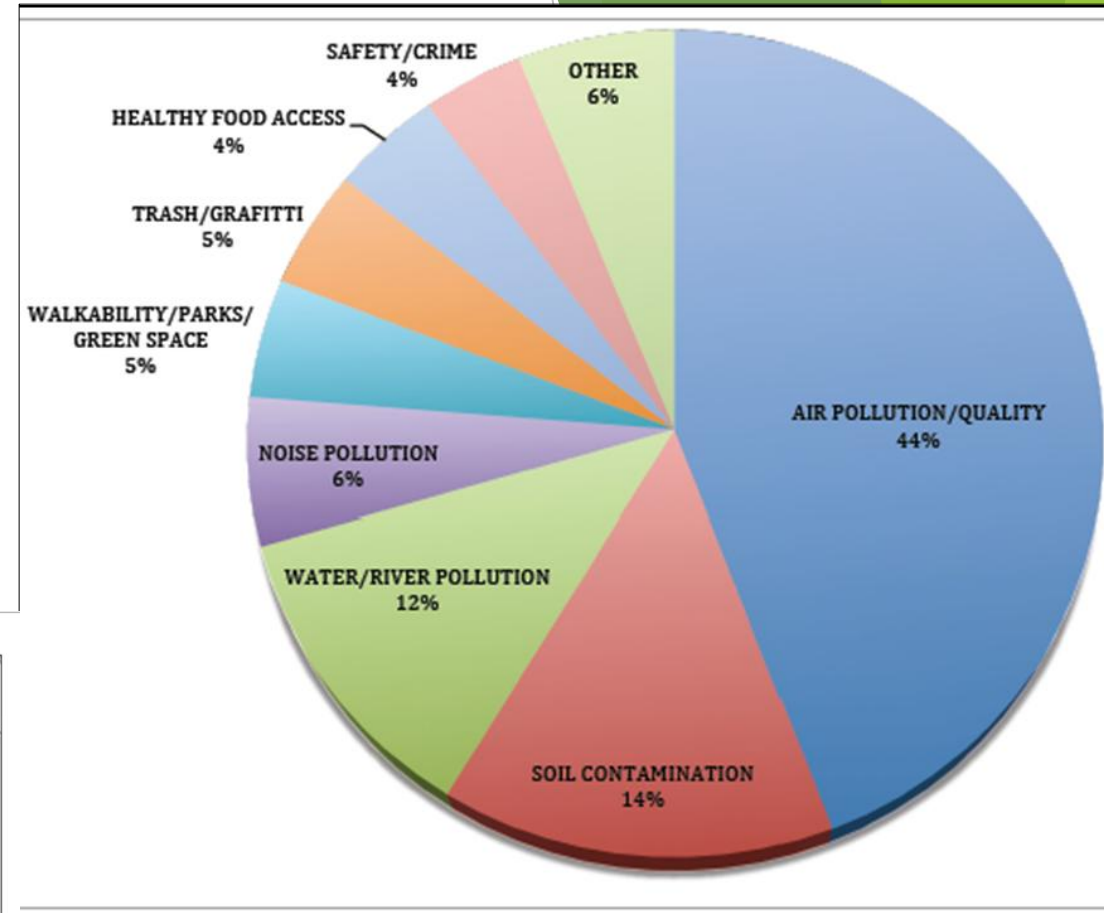
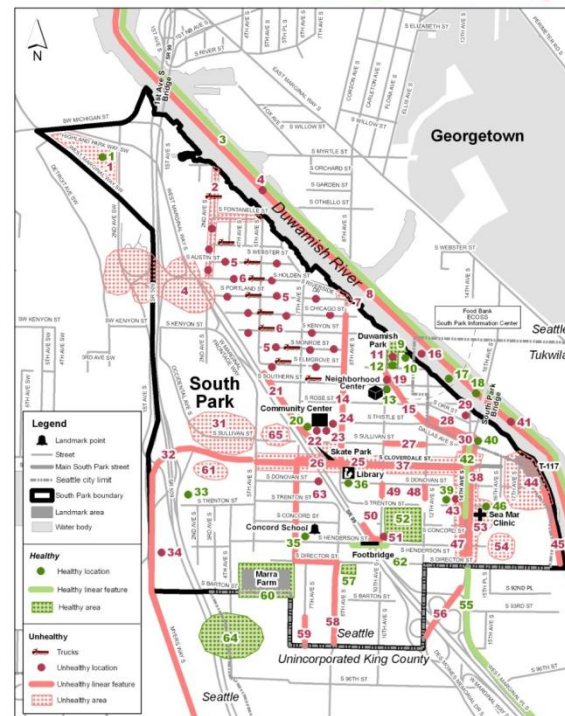
# Georgetown/South Park disparities

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				

# Community Prioritization Workshops



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





# DRCC Environmental Justice Collaborative Problem Solving Grant - “Clean Air”

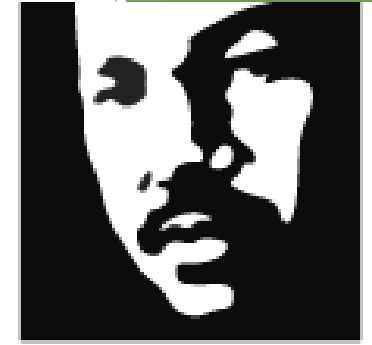


Technical Advisory Group



# Green Solutions to Air Pollution (GSAP) Grant Tasks

1. Literature review: What are some actions that other communities have done to reduce air pollution?
2. Determine which actions appeal to GT and SP
3. Find two sites (one in GT and one in SP) where we can pilot (community helps pick site).
4. Hold design workshops in SP and GT on chosen action (DIRT corps, DRCC youth corps, others)
5. Design and implement two pilot projects.



**King County**



# The First Step - Literature Review

The three most effective options for mitigating air pollution:

## 1. Tree Planting



## 2. Strategic Coordination/Advocacy



## 3. Living Walls Green Facades Green Screens

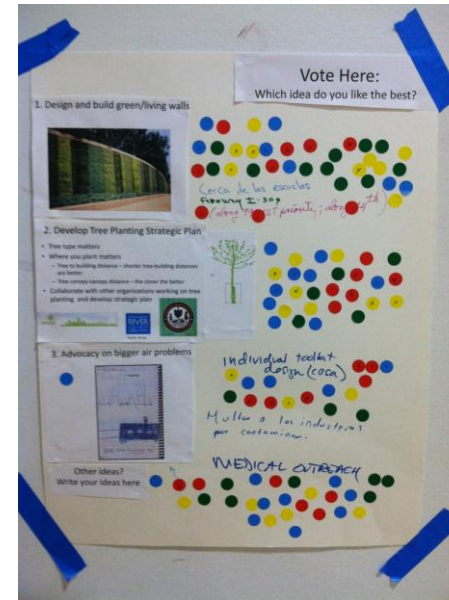
# Community Workshops: Opportunity for Information Exchange

We highlighted all the pollution and the effects it was having on their health including...

- ❖ High asthma rates
- ❖ High lung disease rates
- ❖ 13 year shorter life span than other places in Seattle

They told us:

- ❖ Green walls are the favorite
- ❖ Medical outreach for asthma also important
- ❖ Indoor plants would be cool too
- ❖ They want to learn how to build their own green walls





# Green Screens

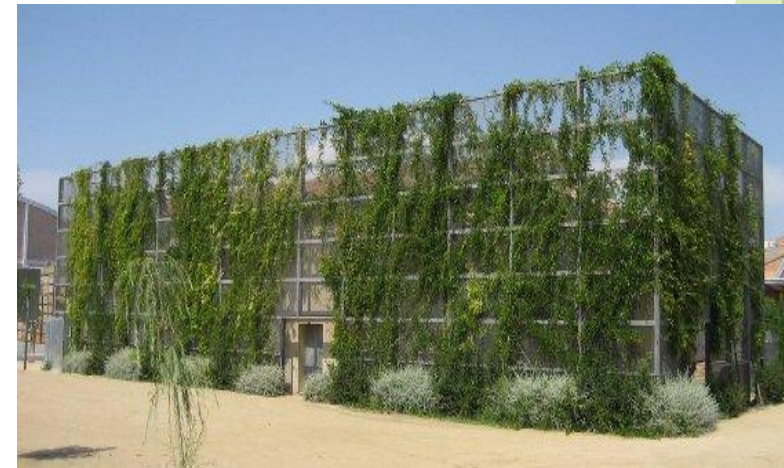
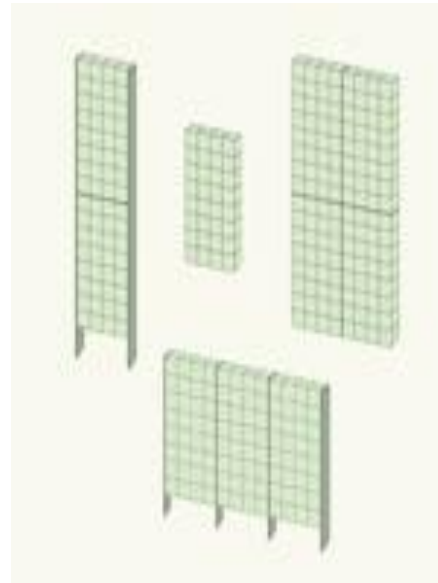
A green wall without a building



greenscreen®



- ✓ Leaves absorb air pollution
- ✓ Can be put anywhere
- ✓ Creates a wall of green
- ✓ Can go where trees can't
- ✓ Doesn't require a building
- ✓ Aesthetically pleasing





# Back to the Community for Locations Hey Duwamish - Green Screen

## HEY DUWAMISH!

ABOUTBACKGROUNDGET INVOLVEDGREEN SCREEN

SEE ALL REPORTS

ESPAÑOL / TIẾNG VIỆTSIGN IN

Hello residents of Georgetown and South Park,

Just Health Action (JHA), a non-profit Seattle-based organization received a grant from King County Waste Water Treatment Division to build an actionable project in the neighborhood to mitigate air pollution. This action-oriented project is called Green Solutions to Air Pollution and will leverage the existing resources and work achieved through the Duwamish Community Action for Clean Air project coordinated by Duwamish River Cleanup Coalition (DRCC). We will be partnering with the DRCC and Urban Systems Design's program "Duwamish Infrastructure Restoration Training" (DIRT Corps) to implement the project.

After talking to a few residents at community workshops this fall about different types of actionable projects that could reduce air pollution in the neighborhoods, we heard you say that installing a "green screen" was the most exciting option (a detailed description of what a green screen is below). We now need your feedback about where you would like this green screen to go. Though we have spoken to some residents already, we want to make sure we hear as many voices as possible before deciding on the final locations (one location per neighborhood). More information about the details of the project are listed below the instructions.

**To add your green screen location nomination to the map:**

- Hit the orange button that says 'Add a report to the map'
- Move the red pin to mark your exact desired location (by dragging and zooming the map)
- Select *Green Screen Vote* under the dropdown menu where it says 'type of report.'

ADD A REPORT TO THE MAP!

Type of report  
Observation

**REPORT TYPES:**

Observations

Ideas

Questions

Complaints

Green Screen Vote

**MAP LAYERS:**

☒ Community action

☒ Areas of concern

☐ Future cleanup plan

☐ Land use data

☐ Buildings

☐ Land coverage data

☐ Original river path

**ACTIVITY STREAM**

Someone created a Green Wall nomination named Anywhere on Ellis

Someone created a Green Wall nomination named Recology / Cleanscapes

Someone created a Green Wall nomination named Markey Machinery

Someone created a Green Wall nomination named South Seattle College - E. Marginal Way side

Someone created a Green Wall nomination named Telephone museum

Dagmar created a Green Wall nomination named Green

Powered by [Shareabouts](#), a project of [OpenPlans](#)



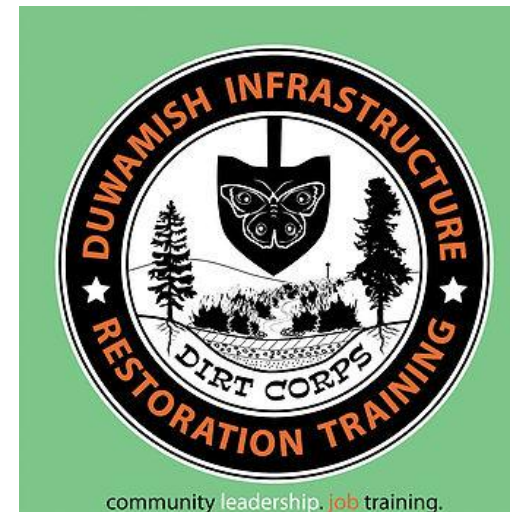
# Community green jobs



Duwamish Valley Youth Corps with King 5's anchor woman Joyce Taylor



Technical Advisory  
Group





# Workshops and Training



## Agenda

- All things greenwall
- Installation requirements
- Opportunities for simple attachments
- Horticultural aspects for success
- Long term maintenance



A screenshot of the greenscreen® website homepage. The header features the greenscreen® logo on the left and a navigation menu with links: Company, Products, Projects, Users, Resources, Installation, Plants, News, and a search icon. Below the header is a large banner image showing three different green wall installations: a dense green wall, a green wall on a building facade, and a green wall on a fence. Overlaid on the banner is the text "Learn About Green Facades" with left and right arrow icons. Below the banner is a paragraph of text: "greenscreen® is a three-dimensional modular trellis system providing you with endless combinations for creating green facades, freestanding elements, shapes and fencing. greenscreen® can transform space or define it... act as a wall, change a facade or create an environment."



# CDL Recycle Becomes the Project Site

- Construction materials recycling company
- Not the most polished exterior
- Dust from their operations regularly blows into the neighborhood



# Designing the Screen: A challenge

- ▶ A Georgetown community member (me) designed the screen
- ▶ The site was covered by ecoblocks
- ▶ Measurements could not be accurate
- ▶ The engineer got on board after the screen was designed
- ▶ We did not have direct access to the engineer
- ▶ Materials ordered before permit (and hence design) was complete
- ▶ Changes in design had to accommodate materials





# Starting the Build!





# Stop for challenge: Permitting process

- ▶ We started the permit application process in April 2016
- ▶ The City of Seattle sent the permit back to us multiple times
- ▶ Unhappy with calculations, footings
- ▶ Footings expanded from 56" deep augured holes, to 4'x4'x36" blocks
- ▶ Didn't understand purpose or community based aspect
- ▶ CDL helped us with the process and paid for it (\$28,000 for labor)
- ▶ Possible mistake since CDL has their own permit issues
- ▶ Permit finally came through in September 2016, 6 months later.
- ▶ Not an accessible process in any way - HUGE equity issue



# Stop for Challenge: CDL and the Community

- ▶ CDL gets shut down for L&I violations
- ▶ CDL concerned about screen height reduction
- ▶ Due to shut down, site prep takes much longer than anticipated
- ▶ Once the site is cleared, more challenges revealed





# Resuming the build

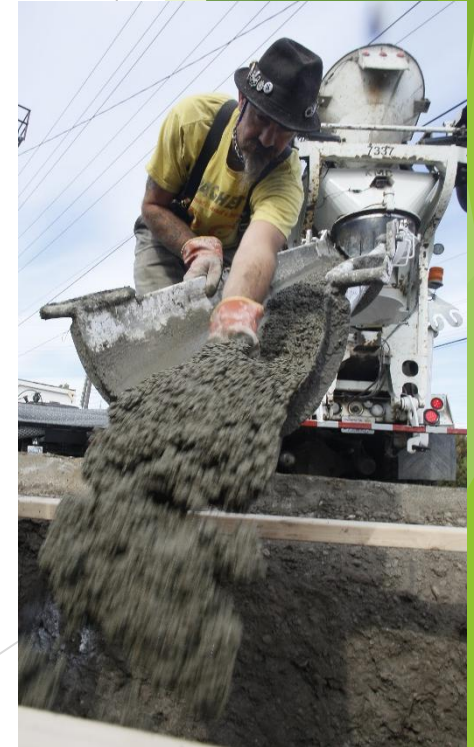
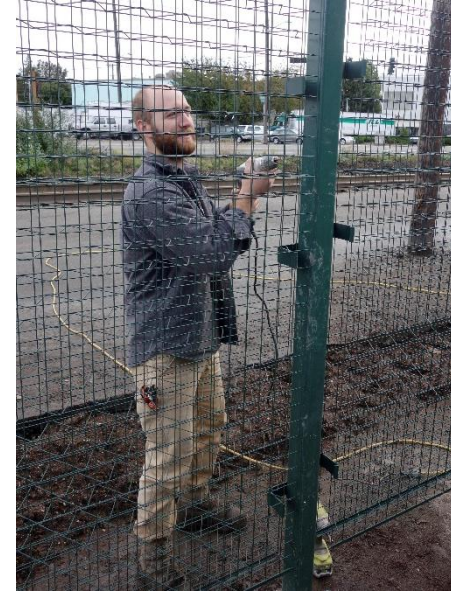
- ▶ Delays cause challenge for job training programs participation
- ▶ New construction manager - former community member
- ▶ Must rely more on CDL and construction equipment
- ▶ Accommodating new footing requirements means a lot more materials
- ▶ Increased budget by \$25K





# Building it ourselves

- ▶ Education and job opportunities for community members
- ▶ Positioned to do this again ourselves rather than hire outside contractor





# Build Challenges

- Needed more concrete and soil than anticipated due to inaccuracy of excavation
- One section of excavated dirt was full of trash



Drainage issues at site



Had to depave more to accommodate large footings



Large footings leave little room for planting





# Planting Plan



*Clematis armandii*  
Snowdrift Clematis



*Clematis jackmanii*  
Plus multiple other  
varieties of  
deciduous clematis



*Parthenocissus quinquefolia*  
Virginia Creeper



*Humulus lupulus*  
Common Hops



*Lonicera henryi*  
Henry's Honeysuckle



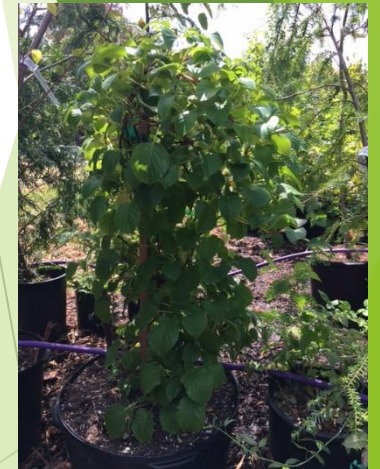
*Lonicera ciliosa*  
Orange  
Honeysuckle



*Lonicera hispidula*  
Pink Honeysuckle



*Hydrangea anomal*  
Climbing Hydrangea





# Community Planting Day

- ▶ Invited the community to plant with us
- ▶ Invited the media to bring attention to the issues
- ▶ Got over 40 volunteers day of and planted in just a few hours
- ▶ Combined with Duwamish Alive!, an existing community volunteer event





# The final product:

- ▶ 126' long x 13' tall
- ▶ 60+ vines planted
- ▶ Total budget: \$93,000
- ▶ 13 project partners/groups





# Next Steps:

- ▶ Install irrigation system in the spring
- ▶ Maintenance done by DIRT Corps and DVYC for next 3 years
- ▶ Monitor air pollution captured by green wall
- ▶ Monitor soil for nutrients and PH balance
- ▶ DVYC and KC WTD collaborating to make interpretative signage for site
- ▶ Teach residents to build residential green walls inside and outside
- ▶ Build smaller artful demonstration project in South Park at the library
- ▶ We have already been approached by Boeing and Cedar Grove





# Community Reactions to the Project

- ▶ Community was very happy that the project got built within one year of the idea being brought to them
- ▶ Appreciated that their concerns, ideas, and needs were considered
- ▶ Appreciated that we checked in with them repeatedly, continued iterative process throughout
- ▶ Thanked me for providing regular updates on our progress
- ▶ The more our actions reflected that we were listening to them, the more input they gave
- ▶ They want more screens built in several other places around the neighborhood
- ▶ Residents want to learn how to create green walls on their own properties



# Lessons learned

- ▶ Building a smaller green wall at South Park Library
- ▶ Make sure you can work closely with the engineer to discuss design changes and find creative solutions
- ▶ Don't order materials until design and permit are approved
- ▶ We will need a completely different footing design for all large screens moving forward
- ▶ Community appreciation and environmental benefits makes the project worth doing despite any and all challenges





# What should you know to work in EJ Communities?

1. Ask the community what they want
2. Do not assume you know what is best for them
3. Know that EJ communities are often fighting on many fronts
4. See what other battles the community is fighting and how you can join them in those other battles
5. EJ residents often have many problems competing for their attention
6. Outreach must be done in multiple ways and languages
7. Listen to what the community is saying directly and indirectly
8. Be precise and brief with your requests (respect people's time and attention)
9. Partner with one or more community members and pay them or hire them to participate in the project with you
10. Pay attention to the cultures of the community you are working within



# Thanks to our funders and supporters!!!



The Georgetown Community!!!  
-GCC Board of Directors and more



King County Wastewater Treatment Division  
-Jo Sullivan and many more



Hannah Kett



CDL Recycle  
-Paul Jerome and Brian Thompson Sr.



James Sable and Cathy Roberts



U.S. Environmental Protection Agency



Devon Zeller





# More thanks...



DIRT Corps

-Cari Simson, Roseann Barnhill,  
the whole crew

## *SS Landscaping Services*

Kyle Sidor



Duwamish Valley Youth Corps

-Paulina Lopez, Carmen Martinez,  
ALL the amazing youth



Ethan Newstrum  
Union Carpenter



Jacob Caggiano



SEATTLE OFFICE OF  
**Sustainability & Environment**




# Media Coverage for More Info

LIVE VIDEO  
WATCH: Claims WSU disproportionately disciplines minority...  
1 of 2

King 5 NEWS

Dan Cassuto, KING  
12 days ago

f t in



Giant plant wall to filter Duwamish River pollution

SEATTLE -- The industrial neighborhood along the Duwamish River in south Seattle is about to get a brand new splash of green.

[www.king5.com](http://www.king5.com)

Search: "green wall"



Within a year or two, this wall will be covered in vines.  
Photos by Sara Bernard.

## Largest Green Wall in Seattle Takes Shape in Georgetown

A community-led air quality project is "one of many first steps" to fight industrial pollution.

SARA BERNARD / Tue Oct 25th, 2016 10:30am /

NEWS & COMMENT



<http://www.seattleweekly.com/news/largest-green-wall-in-seattle-takes-shape-in-georgetown/>



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