BEYOND TOXICS

CENTRO LATINOAMERICANO

ENVIRONMENTAL JUSTICE IN WEST EUGENE:

FAMILIES, HEALTH AND AIR POLLUTION

Grant Report for the US EPA
Environmental Justice Small Grant Program

2011-2012

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The project was undertaken by Beyond Toxics and Centro LatinoAmericano. The Environmental Justice in West Eugene: Families, Health and Air Pollution project involves lower-income and Latino residents in environmental health research and community action related to the Clean Air Act Section 103(b)(3).

The purpose of the project is to recognize the distinctive environmental health vulnerabilities of lower-income and Latino residents in West Eugene, and carry out activities to promote empowerment and actions to meet their environmental health needs.

West Eugene, Lane County, Oregon

Beyond Toxics is a statewide organization working for all Oregonians to expose root causes of toxic pollution and help communities find solutions that protect human and environmental health.

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Introduction

What is Environmental Justice?

Environmental justice is ensuring equal human health and environmental protection for everyone – with special consideration for communities that are disproportionately burdened by environmental pollution and who are economically and socially distressed. According to the Environmental Protection Agency, "minority and/or low-income communities frequently may be exposed disproportionately to environmental harms and risks." President Clinton issued the 1994 Presidential Executive Order to address environmental justice in minority and lower-income communities. The order calls for active government and community commitment to create opportunities to participate meaningfully in the development, implementation and enforcement of environmental laws, regulations and policies.

Understanding environmental risk in an environmental justice community

The purpose of this report is to increase our understanding of environmental risk in an environmental justice community - one defined by the State of Oregon's Environmental Justice Task Force as "...minority and low-income communities, tribal communities, and other communities traditionally underrepresented in public processes" and experiencing disproportionate exposure to environmental and health impacts. This is a challenging process because it requires that we look at non-traditional indicators of public health. Traditional risk assessment approaches that look at permit-by-permit, chemical-by-chemical or on-the-job exposures alone are not well suited to community-scale health impacts. Risk assessment analyses look for the highest tolerable rate or incidence of a disease based on hazard indexes, cancer slopes and other modeling methodologies. These calculations are based on a "cost-benefit analysis" model. Traditional risk assessment may study cancer exposure but not study diseases known to be related to environmental factors such as asthma, obesity or learning disabilities.

A community-based health study may use different sets of indicators and recommend solutions that improve health outcomes and institute programs for healthier lifestyles. Ideally, this alternative method of studying community health may take into account cumulative and chronic exposures to multiple chemicals, heightened sensitivities of some groups such as children and the elderly, or people with limited access to health care. Other community characteristics known to affect vulnerability to pollution will be considered, such as socio-economic factors, geography, community land use patterns, education, and cultural differences.

Do we have environmental justice communities here in Eugene?

The research conducted by Beyond Toxics and Cento LatinoAmericano shows that West Eugene is an environmental justice community. When compared to other Eugene neighborhoods, residents in West Eugene have:

1) Disproportionate exposure to air toxics;

2) Higher percentage of poverty/low-income;

3) Higher percentage of minority residents;

4) Unacceptably high rates of self-reported childhood asthma, often an indicator of an environmental justice community and

5) Less access to educational materials and public decision-making processes.

Alison Guzman, Projects and Outreach Manager for Beyond Toxics, speaks at Lark Park, first stop of the April 2012 EJ Toxics Bus Tour in West Eugene. The tour helped prove to many that, in fact, we do have an environmental justice community.

How can environmental justice be achieved?

The process of identifying environmental justice characteristics gives local, regional and state governments, businesses, schools and community groups opportunities to involve residents in lasting solutions to public health issues. This approach must look at community level indicators, particularly cumulative exposures and uniquely vulnerable groups. The residents of West Eugene whose lives are affected by air pollution must have a seat at the table. West Eugene neighborhoods have already developed strong community leaders and a community vision. Next steps must involve multi-stakeholder processes, consensus building and an alternative dispute resolution process – all under the arch of environmental justice. Reducing the incidence of children's asthma is a top priority. Together, we must recognize the undue environmental health burdens some communities face and prioritize children's health and well-being as a jointly-held obligation.

Partner Organizations: Beyond Toxics and Centro LatinoAmericano

The 2011-2012 EPA Environmental Justice Small Grants award supports the joint work of two non-profit organizations to carry out ***The Environmental Justice in West Eugene: Families, Health and Air Pollution*** project. Since 2009 and over the course of this project, Beyond Toxics and Centro LatinoAmericano (Centro) have built a mutually respectful and engaged partnership to identify and address environmental justice issues. For over a decade, Beyond Toxics has taken a leading role to systematically challenge the root causes of toxic pollution in Oregon, to advance environmental justice and to provide direct-action to improve environmental health in communities. Established nearly thirty years ago, Centro LatinoAmericano is dedicated to the empowerment of the Latino community of Lane County by offering social services, access to community resources, and advocating for fair treatment. Its work provides assistance to lower-income and Latino individuals in West Eugene facing challenges in environmental health, including cultural and language barriers and limited access to socio-economic resources.

Together, these two organizations have undertaken the ***Environmental Justice in West Eugene: Families, Health and Air Pollution*** project to address the distinctive environmental health vulnerabilities of lower-income and Latino residents in West Eugene, and carry out activities to promote empowerment and actions to meet their environmental health needs. The two organizations have plans to maintain a collaboration indefinitely into the future.

Beyond Toxics and Centro LatinoAmericano have established a fair and equitable working relationship, examples include:

- Share staffing hours for the project coordinator, Alison Guzman;
- Share staffing hours and office space for part-time project staff;
- Co-sponsor community events;
- Share grant funding and other financial resources;
- Print materials in both Spanish and English;
- Meet regularly to discuss the project, the work plan and the outcomes;
- Coordinate our individual strengths in community organizing and contacts;
- Mutually support our various community and institutional relationships;
- Meet jointly with elected officials, other NGOs, state agencies and commissions.

Lisa Arkin (left), Beyond Toxics Executive Director, and Marcela Mendoza (right), Centro LatinoAmericano Executive Director, give a presentation to West Eugene community members in November 2010.

Project Summary

According to an environmental justice neighborhood canvass conducted in 2010 by Beyond Toxics and Centro, LatinoAmericano residents of West Eugene believe they are disproportionately exposed to contaminated air pollution from nearby energy generation, chemical processing, manufacturing and wood products industries, traffic, and idling trains.[1] Examples of top chemicals emitted from industrial point sources include toluene, naptha solvents, ammonia, acetone, ethylbenzene, sodium hydroxide and methanol. Pollutants also include the five criteria air pollutants: particle pollution (often referred to as particulate matter), ground-level ozone, carbon monoxide, sulfur oxides, and nitrogen oxides. Heavy metals, such as lead and chromium, are also emitted into the air. The US Environmental Protection Agency (EPA) and the US Centers for Disease Control (CDC) confirm that these chemicals can pollute local air and are associated with a variety of health risks such as asthma, cardiovascular disease and cancer. The impact of industrial chemicals on community health is borne out in the results of our 2010 environmental health survey: over 60% of the residents who participated in the West Eugene survey reported significant concern about asthma and cardiovascular disease, as well as increased incidence of allergies, headaches and fatigue. Despite community efforts to raise awareness about these problems, very few solutions have been suggested by industries, local government and agencies. Since the involvement of Beyond Toxics and Centro LatinoAmericano, progress has been made to identify specific problems, gather data, take action and recommend concrete steps to address the community's concerns around environmental health risks.

The current project specifically addresses the finding that people in West Eugene, particularly fence-line communities, Latino and lower-income households, are more likely to suffer from asthma. Statistical analysis also conducted by Beyond Toxics and Centro LatinoAmericano supports this finding and further demonstrates the need to understand and solve environmental health impacts in the community. An important aspect of the project was to address the concern that Latino residents and lower-income residents are especially vulnerable since they have limited access to information and resources due to income level, lack of health care, language barriers, poor media access, social isolation and underlying xenophobic attitudes in Oregon.

Community forums, such as this one, organized by Beyond Toxics and Centro LatinoAmericano at Eugene's Petersen Barn Community Center, helped West Eugene neighbors get to know each other and organize around issues of mutual interest.

Project Objectives, Process and Outcomes

Objectives

The Environmental Justice in West Eugene: Families, Health and Air Pollution project involves lower-income and Latino residents in environmental health research and community action related to the Clean Air Act Section 103(b)(3). The purpose of the project is to recognize the distinctive environmental health vulnerabilities of lower-income and Latino residents in West Eugene, and carry out activities to promote empowerment and actions to meet their environmental health needs. An important objective of the project is to gather information about students' respiratory disease in collaboration with the Bethel School District, and cross-reference this information with air emissions data from industrial point source pollution to determine relationships between air toxics and health in an environmental justice community. A second objective of the project was to support opportunities for community participation in environmental justice advocacy.

Our objective corresponds to the larger EPA strategy to understand and reduce uncertainty by linking health and environmental outcomes, as well as to characterize aggregate and cumulative risks to protect people exposed to multiple environmental stressors.

1. West Eugene Industrial Corridor Environmental Health Project 2010-2011

Project Objectives, Process and Outcomes, ***cont.***

Overall Project Objectives

- To provide the community with data, guidance and direction for efforts to incorporate their voices in decision-making processes regarding air quality and environmental health.
- To develop new pathways in which families, communities, and the city can achieve specific, objective pollution prevention and community health benefits within a reasonable time frame.
- To gain an initial assessment of self-reported childhood asthma in West Eugene neighborhoods and assess potential relationships between health and disproportionate exposure to industrial air pollutants.
- To build leadership and avenues for community action in Latino and lower-income communities.

Process: From Principles to Action

Based on EPA's general principles, Beyond Toxics and Centro LatinoAmericano were able to identify many overarching community concerns in environmental health and industrial pollution and strategize to address these concerns using concrete, community-based activities.

1. **Using data to identify and overcome obstacles to prevention**: Communities cannot take action without data and information. In lower-income and bilingual communities, lack of access to information is a major obstacle to prevention. In addition, data is often obscure, highly technical or "segmented" in that it only gives a narrow perspective on the environmental health conditions. We sought to overcome these obstacles by making data accessible, explaining data using graphs and maps, and describing relationships between data sets so that the larger picture of how environmental justice plays out in a community is apparent. In order to accomplish this, we plotted childhood asthma, pollution sources, census and socio-economic data for West Eugene using GIS mapping software. We also identified specific industrial air toxic data sets that are housed in the US EPA Toxics Release Inventory, federal EPA Toxics RelAir Permits, state air permitting files and the Eugene Toxics Right-to-Know Program (a local toxics reporting system) to document data gaps and data relationships. Finally we determined how the voices of environmental justice communities can be incorporated into data collection, research dissemination and environmental health planning. In the wake of the community's growing environmental justice consciousness, Beyond Toxics and Centro LatinoAmericano responded to the need for better information on the environmental performance of local regulatory agencies and industrial facilities, identified data gaps and identified the barriers that prevent environmental justice communities' concerns from being heard.

2. **Expanding public participation:** Beyond Toxics and Centro LatinoAmericano worked with agencies, neighborhoods, Latino groups, churches, schools and the University of Oregon to develop community engagement strategies. We applied a number of different formats to foster environmental health education and empowerment in the community, including group workshops, small group trainings, community forums and focus groups. These activities also served to expand environmental justice awareness in city and agency decisions. Our work to expand public participation culminated in an Environmental Justice Toxics Bus Tour, held on April 13, 2012. This event brought eighty people from outside the West Eugene area together with twenty representatives from the impacted community to take a three-hour tour, hear directly from residents and participate in a community forum led by a respected environmental justice leader from a Latino community in Southern California.

3. **Embedding an Environmental Justice Perspective in Government Policy:** Through organizing the Environmental Justice Toxics Tour, this project promoted the establishment and expansion of environmental justice programs. For example, the City of Eugene Human Rights Commission and organizations from the University of Oregon were co-sponsors of the Toxics Tour; the Mayor of Eugene, city counselors and a county commissioner attended the Toxics Tour; and the Oregon Environmental Justice Task Force, the City of Eugene Sustainability Commission and City of Eugene Urban Planning Department sent staff members on the Toxics Tour. Staff members from various state and federal agencies attended. This heightened level of communication between agencies and communities is a step toward ensuring that environmental justice will become embedded in policy-making decisions.

General Project Activities Timeline

October – Nov. 2011	Relationship Building with communities, Bethel School District, businesses, neighborhood associations, churches, schools, healthcare centers and community organizations, etc.
December 2011	Gather self-reported school enrollment data from the Bethel School District
January 2012 – March 2012	Research point source pollution, population data, self-reported asthma data, environmental health impacts, and schools. Data analysis. Input data in GIS mapping software. Run statistical analysis. Focus on data analysis and data gathering was fundamental to identifying location of point source pollution and its effect on community health. Conduct extensive outreach in the community and share our information to the public. Outreach to Latino households specifically.
April 2012	West Eugene Environmental Justice Toxics Tour and Guest Residency The Environmental Justice Toxics Tour took place on 4/13/2012. Over 100 people registered for the event and 80 people participated. Key attendees included: City of Eugene, Bethel School District, US EPA Region 10, Lane Regional Air Protection Agency, Department of Environmental Quality, Department of Agriculture, Comite Civico, Pineros y Campesinos Unidos en el Northwest, Madres para la Salud, Lane County Public Health, Eugene's Sustainability Commission and Human Rights Commission. Two buses traveled on a pre-planned route that visited 7 spots to illustrate disproportionate exposures to air toxics in this impacted community. The Toxics Tour culminated in a catered lunch and community forum for participants and additional community members. Preceding the Toxics Tour, we hosted Luis Olmedo, Executive Director of Comite Civico, as key guest speaker for a 3-day environmental justice residency at the University of Oregon. Mr. Olmedo spoke in classes to over 300 students. Beyond Toxics and the University of Oregon Coalition Against Environmental Racism also hosted the evening panel, "Voices of Environmental Justice" with guest speakers Luis Olmedo, Caleen Sisk and Ben Duncan.
April - June 2012	Environmental Justice Toxics Tour Follow-up and Future Recommendations. Held nearly a dozen individual meetings with civic leaders, elected officials and NGO partners.
July – August 2012	Green cleaning and asthma-care workshops and community relationship building To address the lack of information resources, Centro LatinoAmericano and Beyond Toxics provided community members with bilingual asthma care information (English and Spanish) supplied by the Oregon Health Authority and the U.S. Environmental Protection Agency. During the bilingual asthma workshops, residents were able to ask questions and/or discuss concerns and make comments. We disseminated information via radio and printed bilingual media. Centro LatinoAmericano and Beyond Toxics made an effort to do outreach to individuals on a one-on-one basis to gauge their concerns, and answer specific environmental health related questions; sometimes this entailed making home visits.
August – Sept. 2012	Results dissemination to various local and state-wide groups and organizations; Building of new coalitions, including collaborating partners Lane Livability Coalition, Oregon State University, and Lane Coalition for Healthy Active Youth.

Outcomes

• **Engagement of Universities:** Local institutions of higher education, such as the University of Oregon (UO), Oregon State University (OSU) and Lane Community College, contributed to the GIS mapping, socio-economic, community health, and air quality data analysis. In addition, students and faculty from OSU and UofO co-sponsored a number of events, lectures and panels, and have expressed interest in continuing with the research and contributing to the data.

• **Changes in "Envision Eugene" (city boundary expansion and land use planning) proposal**: The City's Urban Planning Division withdrew a recommendation to pursue a land use zoning proposal, which would have located new parks, schools, and homes in very close proximity to major industrial polluters. The proposal, had it been adopted, could have compounded the existing environmental justice issues.

• **Environmental health and equity:** The City of Eugene Human Rights Commission and Sustainability Commission are participating in discussions to ensure that the City's Triple-Bottom-Line Assessment Tool will better incorporate environmental justice concerns into city planning and management.

• **Environmental justice training:** Local and regional agencies and groups are in full support of hosting a Workshop on Environmental Justice Training for city staff, followed by discussions on practical implementations into city policy. The Oregon Environmental Justice Task Force has expressed a willingness to play a role in providing these trainings.

• **Collaborate with local government:** Eugene's Mayor, Kitty Piercy, has expressed support for an Environmental Justice Training with city staff. She has also expressed interest in an ongoing discussion with the community members and regulatory agencies regarding an Alternative Dispute Resolution.

• **Alternative Dispute Resolution:** The Community Action Coalition (CAC) that was formed in 2010-2011 as a West Eugene project has grown and transitioned to a group keen on finding solutions. The CAC is currently discussing the possibility of having an alternative dispute resolution with major polluters aimed at bringing all stakeholders to the table.

• **Continued health research and relationship building:** OSU and Lane County Public Health have provided support for data collection and analysis and are interested in future collaboration with Beyond Toxics and Centro LatinoAmericano in their research.

• **Clean-Up of Toxic Hazardous Waste:** During the Environmental Justice Toxics Bus Tour, Beyond Toxics pointed out a year-round pond (the Maxwell Pond) polluted by discarded creosote rail road ties. One bus tour participant, a water quality attorney, was alarmed at what he saw and filed a complaint with the Oregon Department of Environmental Quality.

It turned out that the situation constituted an illegal hazardous waste dumping problem on Union Pacific Railroad property. Union Pacific stepped forward to work with the DEQ and assessed the problem. Union Pacific cleaned up hundreds of dumped railroad ties from in and around Maxwell Pond. (See photograph in Appendix 3). Clean-up was verified by a letter from Union Pacific to the DEQ in January 2013.

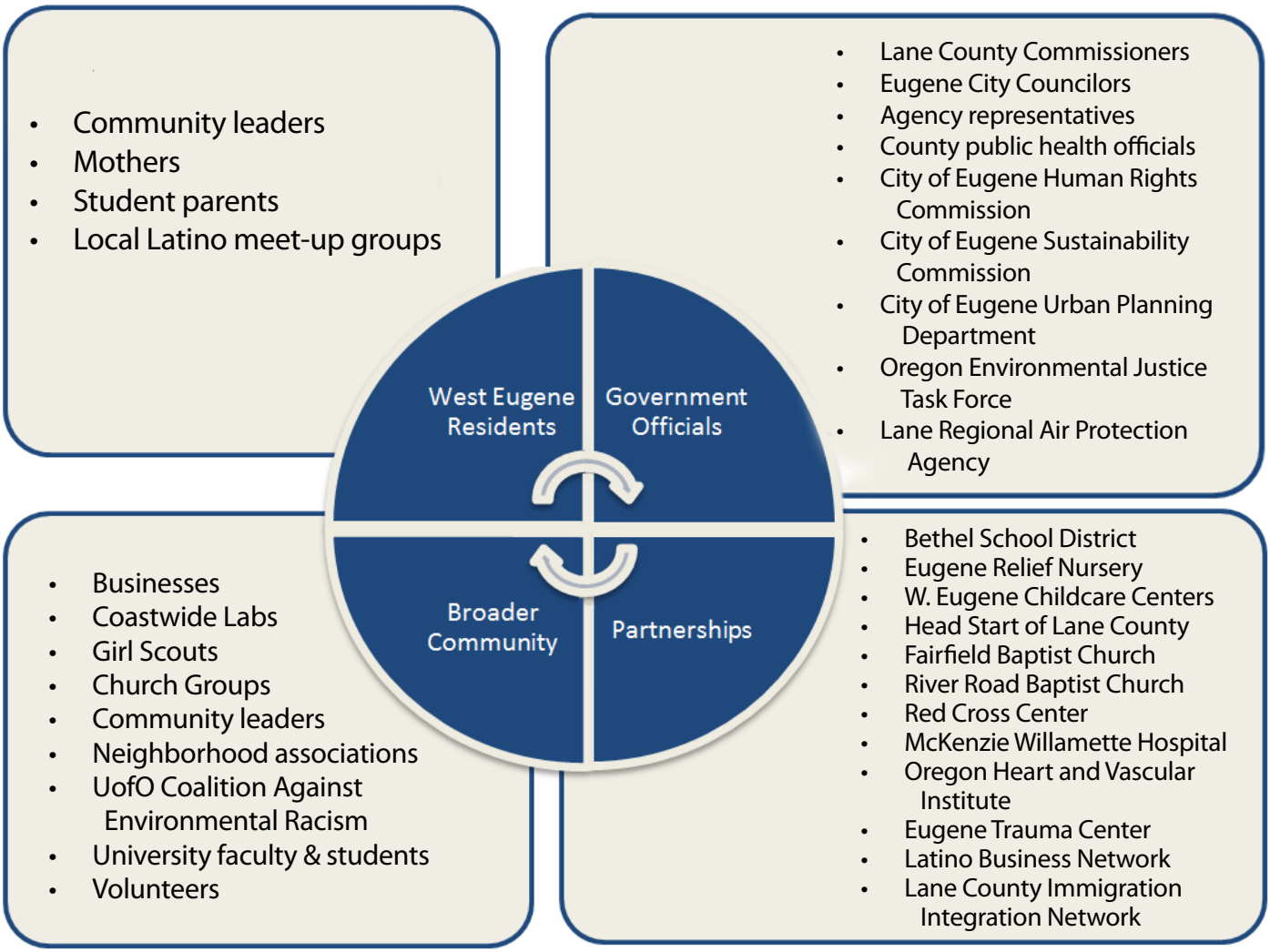
• **Latino Families served by offering Asthma Care and Green Cleaning Workshops:** Hundreds of Latino families benefited from the frequent asthma care and green cleaning workshops offered during this project. Beyond Toxics and Centro developed the bilingual curriculum. Business partner, Coastwide Laboratories, also contributed to the curriculum, provided speakers and designed and donated 250 Green Cleaning Kits for free distribution to lower-income and Latino families. Attendees who completed two-workshops (four hours of class time) were awarded a Green Cleaning Certificate. The certificate was designed to serve as verification of their attendance and mastery of the material; attendees felt this could help describe job skills for use in future employment.

Community Data

Demographics of the participants

The participants of the project consisted of lower-income and Latino residents in the West Eugene Industrial Corridor. From the perspective of building community awareness and empowerment, the project focused mainly on families living near the Industrial Corridor, who experience disproportionate exposure to nearby air emissions from industrial facilities. Many of these families live in lower-income housing, including rental apartments and mobile homes. Some families have limited access to the internet and other outlets for environmental health information in Spanish. As a consequence of outreach activities and community relationship building, Beyond Toxics and Centro LatinoAmericano established new relationships and developed a group of involved project participants from within the community. Equally important, we gathered project supporters, including community leaders, organizations, media and local community activists who collaborated in the environmental health aspect of the project. For example, beginning in 2011, Madres Para La Salud was formed to provide space for a group of Latina women in West Eugene to talk about their environmental health concerns. West Eugene residents were the main participants, since they were the biggest stakeholders in the environmental justice project. This outreach focused on community leaders, mothers, students, and church groups. We placed significant emphasis on arranging household visits, local community networking, workshops, *Madres para la Salud* focus groups and community meetings.

Figure 1: Participants



Demographics of the participants, *cont.*

We also reached out to churches, especially where Latino families gathered. These are settings where residents are able to discuss and address their environmental health concerns as well as determine potential activities and solutions to lessen negative health impacts and invest in a healthier future for their families.

Lane County Commissioners, Eugene City Councilors, agency representatives and local county health officials were curious about the project and provided input on how best they could support the environmental justice aspect of the project. Examples of such inputs included potential partnerships for asthma education, air quality monitoring and community activities. This expressed interest was essential for the Environmental Justice Toxics Tour conducted in April 2012.

Shortly after analyzing the canvassing results and presenting to the local community, Beyond Toxics and Centro began outreach to the third group: statewide organizations. An important element for the project was to ensure that the results and concerns were efficiently communicated to other state decision makers and support groups. We wanted to ensure their awareness of the environmental justice project and all of the community issues associated with it. Outreach to and inclusion of this target audience proved to be extremely useful for the overall support of the project due to the amount of knowledge, information, contacts, and networking exchanged in these meetings. Other Oregon NGOs view our project as a model for projects they might initiate in their own local communities. Beyond Toxics and Centro plan to maintain relationships with these organizations to provide updates on the project and environmental health improvements.

Finally, the fourth group, local support, was a target audience established as a result of the project's natural momentum. Many students from the local universities discovered the mission of the project and were keen to support the team. As a result, they helped in research and outreach. University of Oregon faculty members invited project staff to speak to classes and seminars (including the Environmental Studies, Sociology, and Planning, Public Policy and Management departments). Many community activists, also interested in contributing to the project due to the environmental justice focus, became active participants and organizers and joined Beyond Toxics and Centro LatinoAmericano to assist with the presentations to local agencies and organizations. Garnering local support in this way became essential in our community outreach to the local residents. In addition, due to local support, the City of Eugene has been able to incorporate changes in urban planning and policy agendas through the lens of environmental justice.

Characteristics of the Impacted Community and Health Factors

Our data for this collaborative project confirmed that the West Eugene Industrial Corridor is an environmental justice community underscored by the neighborhoods' exposure to environmental health hazards, socio-economic status and limited capacity to participate in decision-making processes. Disproportionate impacts are important to measure, as underscored by a study published in 2002 by Landrigan in Environmental Health Perspectives, which concluded that as much as 35% of asthma attacks can be attributed to outdoor environmental pollutants. We documented the following environmental justice characteristics:

1. Residents in the West Eugene Industrial Corridor are more likely to be lower-income (<$13,500) and/or Latino than in any other area of the City of Eugene. (Source: Eugene/Springfield Consolidated Plan 2005)

a. Since 2000, the Latino population increased 56% in Eugene (U.S. Census 2010). 12,200 Latinos lived in Eugene in 2010, many more than anticipated in population growth estimates. [3]

b. The proportion of Latino students in the Bethel School District's elementary schools ranges from 12% to 35%, and averages 16.6% across the district (Oregon Department of Education, 2010-2011 Student by Ethnicity Report).

c. Fairfield Elementary School, the school closest to center of the industrial corridor, served as a case study. Fairfield School has 35% Latino students, the highest percentage in the entire district because it serves as a bilingual education center. It also has the highest asthma rate for an elementary school; and it is closest to the highest number of industrial polluters. (For Bethel School District boundary map see Appendix 2.)

3. West Eugene Industrial Corridor Environmental Health Project 2010-2011

Characteristics of the Impacted Community and Health Factors, *cont.*

2. **Latino families experience cultural and linguistic barriers to civic participation, environmental health information and public health services.**

a. Latino residents typically feel unsafe when presented with an opportunity to go to a public hearing or engage with public officials and agencies. During this project, staff witnessed disrespectful treatment and bias by a few public officials and members of the public, but it was enough to discourage civic participation.

b. Latina mothers report lacking access to health information. They expressed the need for information about how to make a healthier home environment for their children, especially children with asthma and chemical sensitivities. These mothers also report their concern that mothers and fathers are more likely to be hired for jobs that require them to use toxic chemicals.

c. Latino families lack information about community resources such as recycling, dealing with hazardous waste, and how to file an air pollution complaint.

d. A majority of Latino families are interested in getting more information about ways to improve environmental health.

3. **The West Eugene Industrial Corridor residents are overburdened by industrial air pollutants.**

a. Over ninety-nine percent of all Eugene's air toxics are emitted in West Eugene.

b. Forty percent of the people surveyed believe that local air quality impacts their health. In fact, residents have filed thousands of air quality complaints with the local air protection agency over the past decade.

c. Residents tend to experience intensified chemical smells and increased physiological responses (burning eyes, allergies, headaches, breathing difficulty, etc.) on hot summer days and on winter air stagnation days.

Table 1A:
Minority Enrollment in the Bethel School District in West Eugene, 2010-2011

Attending School	Total Students	Male	Female	Hispanic	White, non-Hispanic	Black, non-Hispanic	American Indian/ Alaskan Native, non-Hispanic	Asian, non-Hispanic	Pacific Islander, non-Hispanic	Multiethnic, non-Hispanic
Cascade Middle School	379	176	203	81	248	9	12	8	2	19
Clear Lake Elementary School	295	158	137	37	234	6	2	5	4	7
Danebo Elementary School	338	170	168	84	214	10	5	7	0	18
Fairfield Elementary School	306	142	164	109	175	2	8	2	2	8
Irving Elementary School	377	186	191	25	286	6	8	5	2	45
Kalapuya High School	111	69	42	17	80	5	5	3	0	1
Malabon Elementary School	357	168	189	32	271	15	12	6	6	15
Meadow View School	762	423	339	72	612	13	8	22	3	32
Prairie Mountain School	691	360	331	157	444	16	9	27	8	30
Shasta Middle School	501	256	245	72	369	10	9	13	3	25
Willamette High School	1548	768	780	255	1131	34	44	35	12	37
TOTALS	5665	2876	2789	941	4064	126	122	133	42	237

Source: Bethel School District

Table 1B:
Percent Latino Enrollment in the Bethel School District 2010-2011

Source:
Oregon Department of Education

Latino Students in West Eugene - 2011

School	Hispanic Students (%)
Fairfield Elementary	35.0%
Irving Elementary	6%
Danebo Elementary	24.8%
Malabon Elementary	9%
Meadowview	9%
Prairie Mountain	22.7%
Cascade Middle	21.3%
Willamette High School	16.5%
Clear Lake Elementary	12.5%
Shasta Middle	14.3%
Kalapuya High School	15.3%

Characteristics of the Impacted Community and Health Factors, *cont.*

3. ***continued***

d. Many of the point sources of industrial pollution are located at close proximity to each other along the industrial corridor and therefore air pollutants tend to accumulate within the surrounding neighborhoods. In other words, residents are exposed to overlapping and cumulative air pollution zones. The impacts of synergistic air pollution exposures have not been previously studied in Lane County. By mapping toxic emissions using GIS software, this project demonstrated that chemical exposure is geographically concentrated, cumulative and likely to be synergistic for residents in the West Eugene Industrial Corridor. Many of these chemicals are known to have health impacts; some of which affect similar organs in the body and similar systems (respiratory, reproductive, etc.). According to the U.S. Centers for Disease Control, industrial pollution sources emit toxic chemicals that increase risks to reproductive health, neurological development, and respiratory health and are possible carcinogens. Thus, health problems associated with these chemicals are potentially exacerbated by cumulative, chronic and overlapping exposures.

4. The West Eugene Industrial Corridor residents may have higher than average self-reported asthma rates.

a. West Eugene residents are concerned about the rate of children's asthma. Parents have also reported concern about childhood allergies, nose bleeds and chemical sensitivity. More research needs to be undertaken to further understand childhood asthma trends in West Eugene.

b. The Bethel School District provided self-reported asthma data that suggest that the asthma rate could be as high as nearly 20% at middle and high schools, and as high as 14% at some elementary schools. On average for all schools (K-12), the asthma rate of the student population is approximately 14%. (Asthma data is self-reported on the District's school registration form.)

c. Statistical analysis of our data shows a correlation between asthma, socio-economic status and proximity to industrial pollution. We recommend additional data collection to further explore this correlation.

5. Schools in West Eugene are disproportionately located near major sources of industrial polluters.

a. Five schools are within 2 miles of nine or more industrial sources of air toxics. (See Table 2)

b. The Eugene School District has far fewer schools within a mile of an industrial air pollution source. We suggest future research that uses GIS mapping to compare the two school districts, proximity to industrial sources, minority enrollment and respiratory disease.

c. The project focused on Fairfield Elementary School as a case study site. Fairfield has an enrollment of 280 students. The school is surrounded by at least 14 industries within a two mile radius and 11 within a one mile radius. Fairfield School also has the highest enrollment of Latino children (it serves as a bilingual education center) and the highest self-reported asthma rate for an elementary school.

6. Green cleaning workshops proved to be an effective way of disseminating information regarding environmental health.

a. Latino residents were particularly interested in green cleaning alternatives. The workshops involved both men and women.

b. The workshops attracted partnerships from businesses.

c. Having the ability to control indoor air pollution is celebrated as a solution and positive, self-empowering action which protects the health of the families while minimizing its impact on the environment.

d. Workshops emphasized the environmental and financial benefits of green cleaning.

e. Spanish language workshops that were personalized to the attendees encouraged group discussion on both indoor and outdoor environmental health issues.

Table 2:
Percent Latino Enrollment and Proximity to Industrial Sources

Bethel Schools located near industrial sources

School	Number of Industries in a 2 Mile Radius	Percent Latino Enrollment
Fairfield Elementary	14	35%
Willamette High School	13	16.5%
Cascade Middle School	11	21.3%
Malabon Elementary	10	9%
Kalapuya High School	9	15.3%
Danebo Elementary School	9	24.8%

Green cleaning workshop at Eugene's Relief Nursery

Findings Addressing Environmental Justice

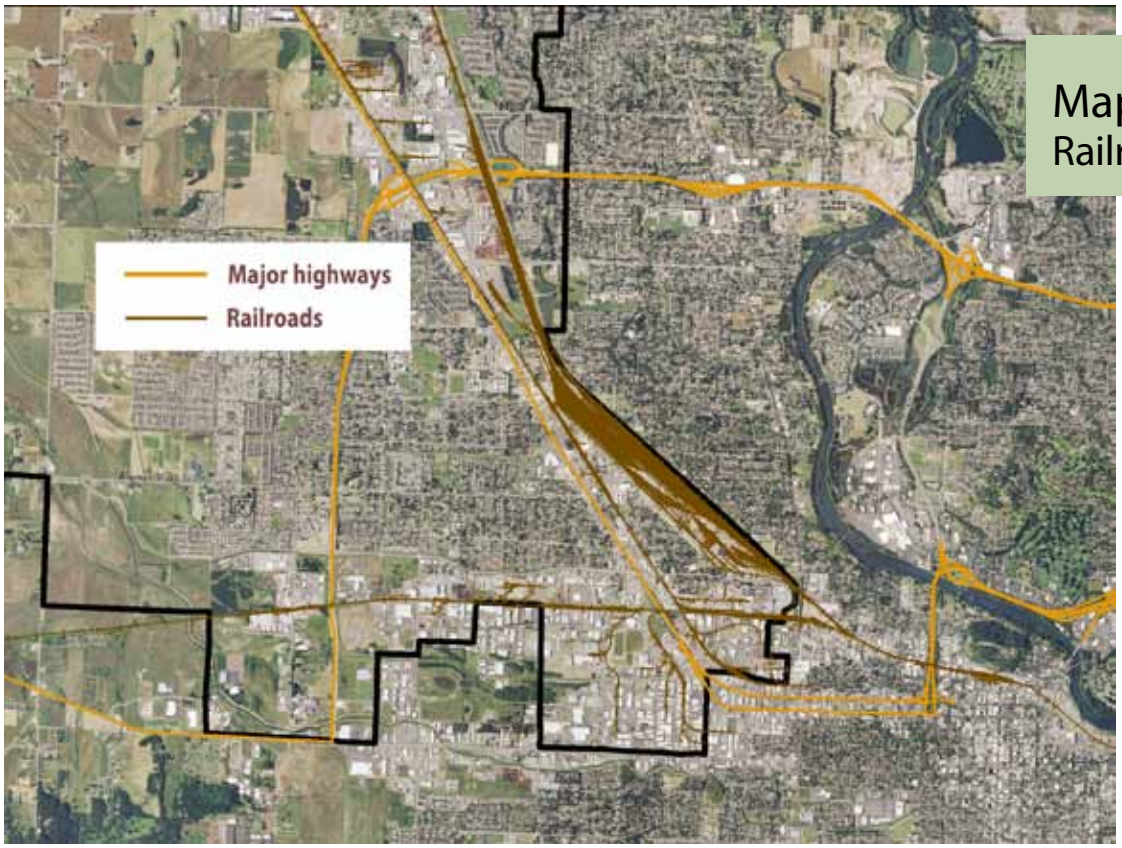
Correlation between self-reported asthma, socio-economic status, cultural affiliation and proximity to industrial pollution: Using GIS Mapping

One objective of the project was to answer the question: Is there a correlation between self-reported asthma, socio-economic status, cultural identity and proximity to sources of air pollution? According to data gathered from school asthma reports, indicators of poverty and our GIS mapping data, there does appear to be a statistically significant correlation between these factors. The data is explained and illustrated in the following sections.

Railroads and Highways in Eugene

Environmental justice communities are surrounded by major highways and industries. A growing body of research is showing that exposure to automobile emissions along highway corridors has significant health impacts. Exposure to highway pollution over time is associated with lung function deficits in children, particularly among children sensitized to common allergens. Exposure to benzene and diesel particulate can lead to cancer. Much of the traffic consists of polluting tractor-trailer trucks traveling through the neighborhoods.

Trainsong residents have had a history of disproportionate cumulative exposure to train idling, groundwater pollution, and diesel particulates due to their proximity to the Union Pacific Rail Yard. Studies in 2009 conducted by the Department of Health Services (renamed the Oregon Health Authority) showed that more residents have cancer than is considered normal by federal guidelines. (Source: ATSDR Public Health Assessment for the Union Pacific Railyard, 10/29/2007)



Map 1: Railroads in Eugene

West Eugene Project Area (outlined in black) showing major highways (orange lines) and rail road corridors (brown lines).

Railroads and Highways in Eugene, *cont.*

The rail yard is located near where children live, learn, and play — homes, schools, day care centers, and parks. Children are known to be especially sensitive receptors to environmental toxics. Diesel particulate emissions have been linked to lung cancer and other health effects. The people who live in the Trainsong neighborhood have struggled with health burdens for decades and have asked rail companies to reduce the emissions from train idling to levels that would protect public health.

Because the area was so polluted, state agencies recommended that residents not drink water from their wells and many wells were decomissioned.

Industrial Air Emissions

Our industrial activity indicators were identified by first locating facilities in these databses: EPA Toxics Release Inventory (TRI), City of Eugene Toxics Right-to-Know reporting program (TRTK) and Lane Regional Air Protection Agency (LRAPA). The resulting data points were then imported into GIS mapping software.

These three databases generate reports on annual industrial pollution emissions. Importantly, each database uses different criteria to collect data and different reporting systems to disseminate data.[2] The analysis included in our report is a unique approach to gather and compare data sets. Gathering and comparing three official data sets gave us a comprehensive understanding of the full impact of industrial air emissions in West Eugene. (see Table 3)

Disproportionate Exposure to Air Toxics

Most of the chemicals released from these major industrial sources are detrimental to health and environment. The people who live in these communities are forced to adapt to a toxic environment and therefore suffer a significant reduction in quality of life. According to the Eugene TRK reporting program, 99% of the air toxic emissions in the city limits are located in West Eugene. (see Table 4 - next page)

Table 3: Fifteen Industries in the 97402 Zip Code and Toxic Reporting Programs that Track their Emissions

Industry	Address zip code 97402	TRI	NPR*	Eugene Right to Know	Enviromapper	LRAPA
A&k Development Co	410 Chambers St			X		X
A. M. Todd Botanicals	4091 W 11th Ave			X		
Bulk Handling Systems Ross Corporati	460 N Danebo Ave	X	X	X	X	X
Cascade Plating & machine	3790 Cross Street	X		X	X	X
Datalogic Scanning Inc	959 Terry St			X		X
Echo Spring Dairy	1750 W 8th Ave			X		
Emerald Forest Products	118 Hwy 99 N			X	X	X
Empire Pacific Industries	830 Wilson St			X		
Flakeboard America LTD	50 N Danebo Ave	X	X	X		X
Forrest Paint Co.	1011 McKinley St	X	X	X	X	X
Georgia Pacific Chemicals	2665 Hwy 99 N	X	X			X
Gheen Irrigation Works	1248 Willagillespie Rd	X	X	X	X	X
JH Baxter & Company	85 N Baxter Rd	X	X	X	X	X
Murphy Plywood Co	2350 Prairie Rd	X	X			X
Seneca Sawmill Company	90201 Hwy 99 N					X
States Industries	20545 Enid Rd		X		X	X

[2] EPA TRI collects air toxics data that is self-reported by the industrial polluter. Eugene RTK collects data from the industrial polluter by requiring industries to mass balance their chemical inputs and emission outputs; there are 4 inputs and 11 output categories. On December 31 of each year, the inputs and outputs must balance. LRAPA gathers emission data on the five Criteria Air Pollutants, Hazardous Air Pollutants (HAP) and Volatile Organic Compounds (VOC) using emission formulas associated with types of equipment used by the manufacturer (e.g., boilers, scrubbers) and self-reporting by the industry. LRAPA also makes on-site visits to oversee pollution equipment testing.

Table 4: Disparity between industrial air toxics emitted in West Eugene compared to all other areas of Eugene

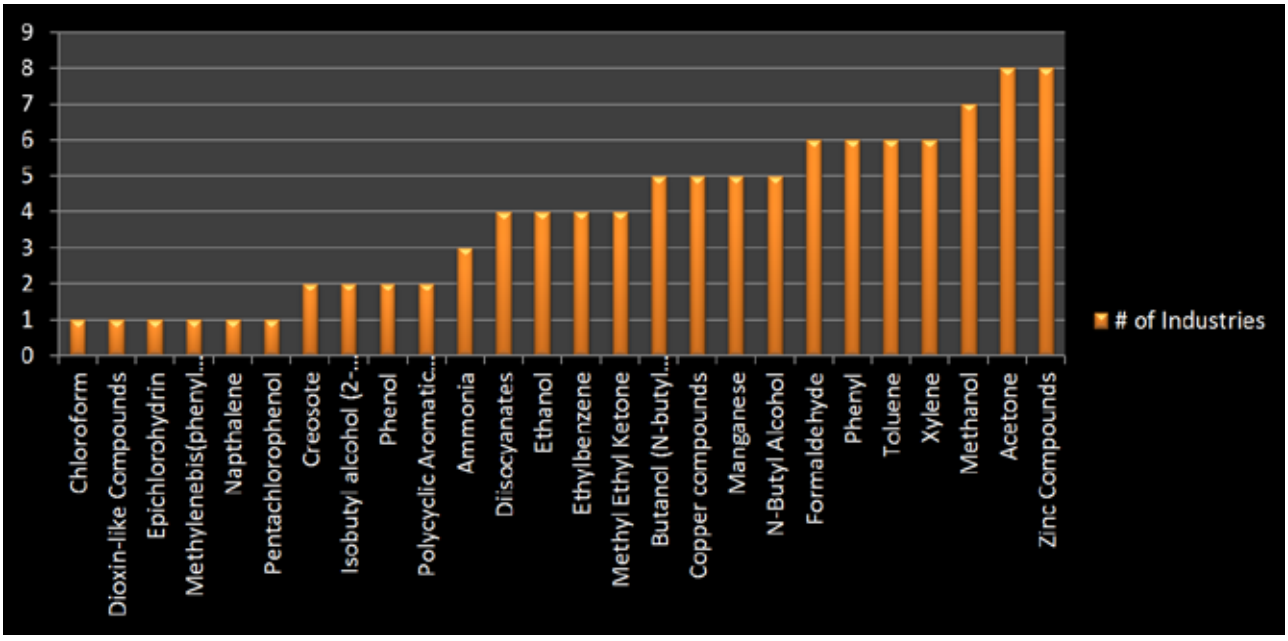
The project resulted in the finding that the majority of schools in West Eugene are located in close proximity (within 2 miles) from industrial sites identified by the Eugene Toxics Right-to-Know reporting program as the source of 99% of air toxics in Eugene.

Year	West Eugene Toxics Data in Zip Code 97402	% of total emissions	Eugene Toxics Data in all other Zip Codes*	% of total emissions
2005	Annual: 1,008,500 lbs./year Daily Average: 3,000 lbs./day	99.9	Annual: 770 lbs. /year Daily Average: 2 lbs./day	0.1
2008	Annual: 494,000 lbs./year Daily Average: 396 lbs./day	100	Annual: 0 lbs. /year	0
2011	Annual: 412,757 lbs./year Daily: 1131 lbs./day	99.9	Annual: 229 lbs./year Daily Average: 0.6 lbs./day	0.1

Source: The Eugene Toxics Right to Know database provides information on emissions per industry, per chemical or in the aggregate. Percentages in Table 3 (above) show that West Eugene receives 99% of all air toxic emissions. City of Eugene Toxics Data are submitted by industries to the Office of the Fire Marshall who then compiles and publishes the data on the Toxics Right to Know website: http://www.eugene-or.gov/portal/server.pt?space=CommunityPage&control=SetCommunity&CommunityID=715&PageID=1868

Figure 2: Top 3 Chemicals by Number of Industry Emitters

Figure 2 provides information about which air toxics are most frequently released into the air. (Table 5 lists the health impacts associated with each chemical.)



Source: Eugene Toxics Right to Know Report (2010-2011)
***Data only reflects top three chemicals most frequently reported.**

J.H. Baxter
is a chemical and wood treatment facility that makes creosote-infused telephone poles and railroad ties. Noxious fumes have prompted thousands of neighborhood complaints.

Latest EPA Toxics Release Inventory (TRI) reports annual releases of over 37,000 pounds of air toxics, primarily ammonia and creosote.

Nearest school: Fairfield Elementary (.6 miles)

Table 5:
Health Effects associated with the top chemicals emitted by industries

The industries listed in Table 5 (next 2 pages) are issued air pollution discharge permits by regulatory agencies. These permits give legal permission for each industry to release pollutants into the community's air. Each industry is allowed to pollute the air until they reach the upper ceiling of a generic, annual site emission limit. The emission limits are assigned independently of each polluter, regardless of the pollution level of any nearby industries. In other words, regulation does not limit the cumulative impacts of multiple polluters in a confined geographic area. The following maps display air toxics data, health data, and the overlapping and additive patterns of regulated air toxics sources with one mile of the elementary school with the highest incidence of self-reported asthma.

The purposes of examining the data are:

1. To better understand the potential for cumulative air toxics exposures in a neighborhood.
2. To characterize what "disproportionate exposures" means for an environmental justice community.
3. To expose a shortcoming of traditional regulatory and risk assessment paradigms by looking at data through a health and justice lens.

Table 5:
Health Effects associated with the top chemicals emitted by industries

Top Chemicals in West Eugene	Potential Health Effects from Chronic Exposure	Industries (Approx. 2 miles from Fairfield Elementary)
Acetone [1]	Exposure can cause dizziness and sleepiness. Dryness, irritation, and inflammation of the skin can also occur.	Bulk Handling Co., Inc., Western Pneumatics, Inc., Weyerhaeuser (Veneer Technologies), Whittier Wood Products Company
Ammonia [2]	Repeated exposure may lead to chronic irritation of the respiratory tract. Cough, asthma, lung fibrosis, chronic eye and skin irritation, and breathing difficulty on exertion are symptoms of repeated exposures. Headache and drowsiness also have been reported.	JH Baxters Incorporated, Murphy Plywood, Willamette Industries
Creosote [3]	Probable carcinogen in humans; some evidence that it causes skin cancer; contains many of the same compounds present in other polycyclic aromatic hydrocarbon (PAH) mixtures known to be human carcinogens. Creosote is a neurotoxicant. Breathing creosote vapors may cause a burning in the mouth/throat and stomach pain. Long-term exposure to creosote and creosote-charged smoke can cause difficulty in breathing & asthma.	JH Baxters Incorporated
Formaldehyde [3]	Respiratory symptoms and eye, nose, and throat irritation. Epidemiological studies have shown formaldehyde exposure to be significantly associated with cancer at sites in the respiratory tract in workers and in the general population.	Emerald Forest Products Incorporated, Murphy Plywood, Seneca Sawmill, Willamette Industries
Manganese [4]	Primary effects are on the nervous system. Chronic exposure may result in manganism which typically begins with feelings of weakness and lethargy and progresses to other symptoms such as gait disturbances, clumsiness, tremors, speech disturbances, a mask-like facial expression, and psychological disturbances.	Cascade Plating & Machine, Western Pneumatics Incorporated

Table 5: Health Effects associated with the top chemicals emitted by industries, *cont.*

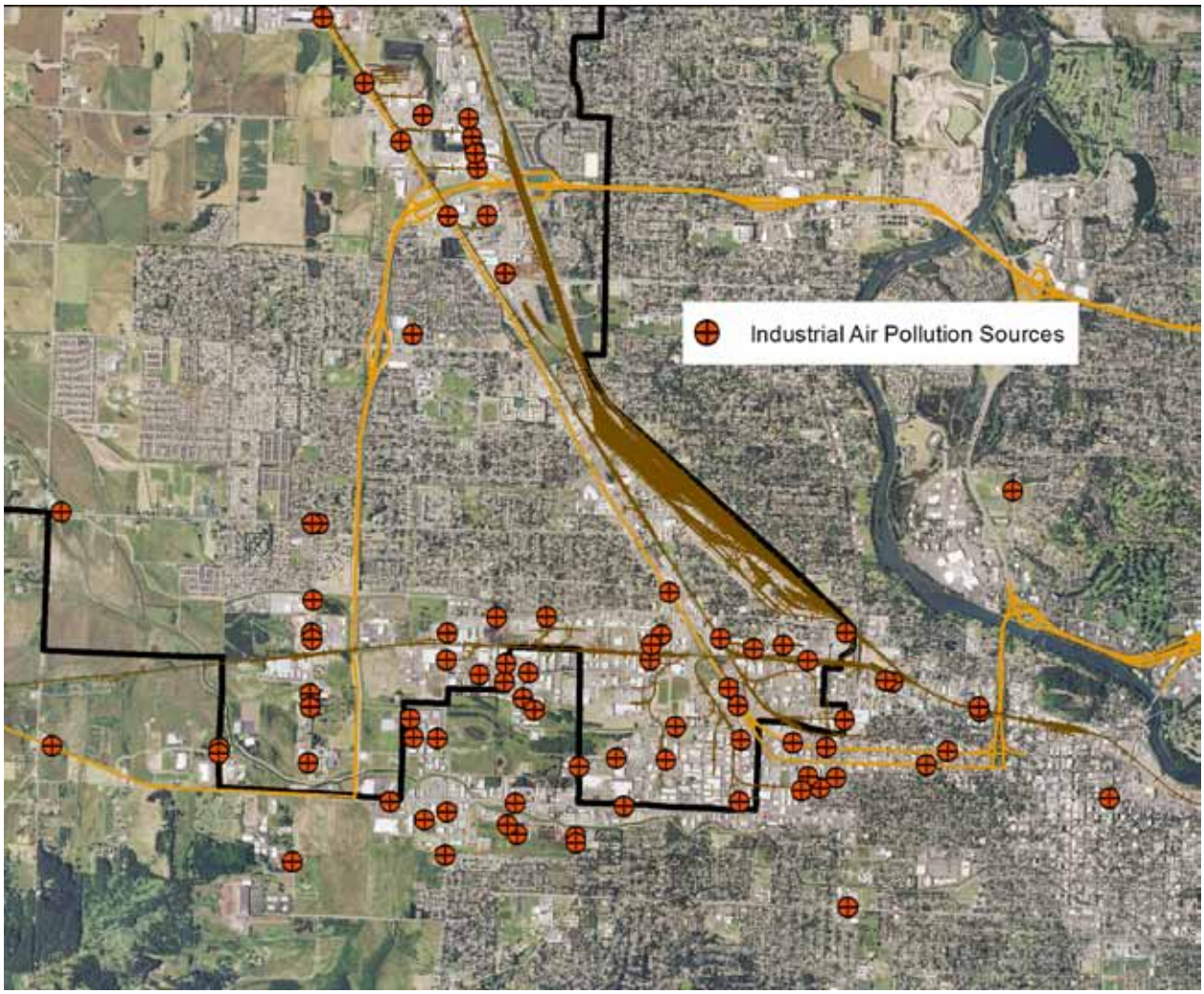
Methanol [5]	Chronic inhalation or oral exposure to methanol may result in headache, dizziness, giddiness, insomnia, nausea, gastric disturbances, blurred vision) in humans. Exposure to a mixture of methanol and other solvents has been associated with central nervous system birth defects in humans.	Emerald Forest Products Incorporated, Newood Products of Oregon, Weyerhaeuser (Veneer Technologies), Murphy Plywood, Willamette Industries
Naphthalene [6]	Symptoms include irritation of the nose and eyes; headache, confusion, excitement, or malaise (vague feeling of discomfort); nausea, vomiting, or abdominal pain; dermatitis. Classified naphthalene as a Group 2B: possibly carcinogenic to humans (IARC, 2002)	J.H. Baxters, Newood Display Fixtures
Phenol [7]	Anorexia, progressive weight loss, diarrhea, vertigo, salivation, and a dark coloration of the urine have been reported in chronically exposed humans. Gastrointestinal irritation and blood and liver effects have also been reported.	Weyerhaeuser (Veneer Technologies)
Toluene [8]	Chronic inhalation exposure of humans to toluene causes irritation of the upper respiratory tract and eyes, sore throat, dizziness, headache, and difficulty with sleep. Impairment of the Central Nervous System.	Bulk Handling Co., Inc.
Xylene [9]	Chronic exposure of humans to mixed xylenes, as seen in occupational settings, has resulted primarily in neurological effects, such as headache, dizziness, fatigue, tremors, incoordination, anxiety, impaired short-term memory, and inability to concentrate. Labored breathing, impaired pulmonary function, increased heart palpitation, severe chest pain, abnormal EKG, and possible effects on the kidneys have also been reported.	Bulk Handling Co., Inc., Western Pneumatics Incorporated

Data Sources: California Environmental Protection Agency, U.S. Environmental Protection Agency, Agency for Toxic Substances and Disease Registry (ATSDR), International Agency for Research on Cancer (IARC)

1) Acetone: http://www.axiall.com/pdf/Acetone%202013.pdf
2) Ammonia: http://health.utah.gov/meth/docs/PDFs/AmmoniaToxComprehensive.pdf
3) Creosote & Formaldehyde: http://oehha.ca.gov/air/hot_spots/pdf/May2005Hotspots.pdf
4) Manganese: http://www.epa.gov/ttn/atw/hlthef/manganes.html
5) Methanol: http://oehha.ca.gov/air/chronic_rels/pdf/67561.pdf
6) Naphthalene: http://oehha.ca.gov/air/toxic_contaminants/pdf_zip/NAPHTHALENEdraft.pdf and http://www.epa.gov/ttn/atw/hlthef/naphthal.html
7) Phenol: http://www.epa.gov/ttn/atw/hlthef/phenol.html
8) Toluene: http://www.epa.gov/ttn/atw/hlthef/toluene.html
9) Xylene: http://www.epa.gov/ttn/atw/hlthef/xylenes.html

Map 2:
Major Sources of Industrial Air Emissions

Locations of West Eugene Point Sources of Industrial Air Toxics. Source: EPA TRI



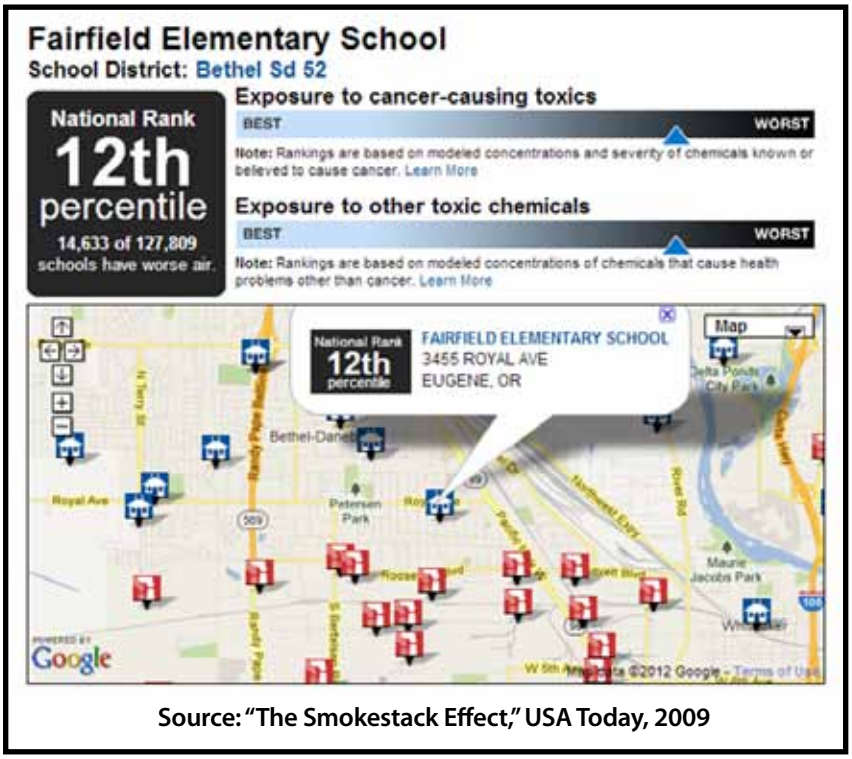
Schools and Point Source Pollution

We calculated the number of industries that emit air toxics within a one mile and two mile radius of schools in West Eugene. Following that, we researched health impacts of the top five chemicals to better understand potential impacts to the health of nearby schools and neighborhoods. For each of these variables we looked at the pattern of overlapping emissions within the one and two-mile radius of selected schools. We determined that cumulative exposures to these chemicals are concentrated in some areas in West Eugene more than in others.

The data that Beyond Toxics and Centro LatinoAmericano collected correlates with a recent series of articles in USA Today that highlighted potential air pollution problems near schools across the nation. Some schools in the Bethel School District ranked below the 20th percentile. For example, Fairfield Elementary School was ranked in the 12th percentile of schools in the US that have poor air quality. (See Figure 3 - right)

Viewing the data through GIS mapping software illustrates a pattern that industries and pollution are distributed "inequitably" according to race, ethnicity, and income. Our GIS data shows that people living in poverty tend to live at close proximity to industries and air toxics. One could invert this correlation and suggest that communities with higher incomes and less diversity live further away from pollution and air toxic sources than communities with lower incomes and higher minority rates. Our data also shows that the higher the percentage of Hispanics in Eugene, the higher the concentration of air toxic sources such as trains, highways, and industries.

Figure 3:
National Air Quality Ranking for Schools



Source: "The Smokestack Effect," USA Today, 2009

<u>Student Asthma</u>

Student asthma data is collected by the Bethel School District. This health information is supplied by the parents or the student on school enrollment forms and tabulated by the Bethel School District nurse. The data shared with the public is anonymous; only the name of the school, student age, gender and race/culture was made available for the purpose of this EPA grant on environmental health.

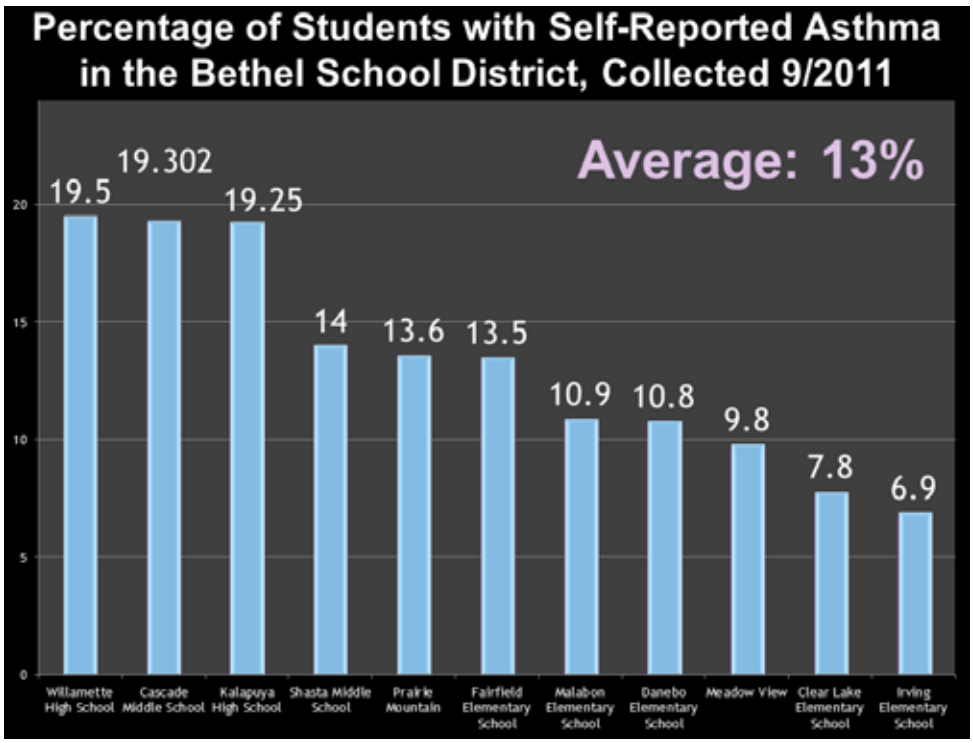
Average self-reported asthma rates:

High Schools: 19%
Middle Schools: 17%
Elementary School: 10%
K-8 Schools: 12%

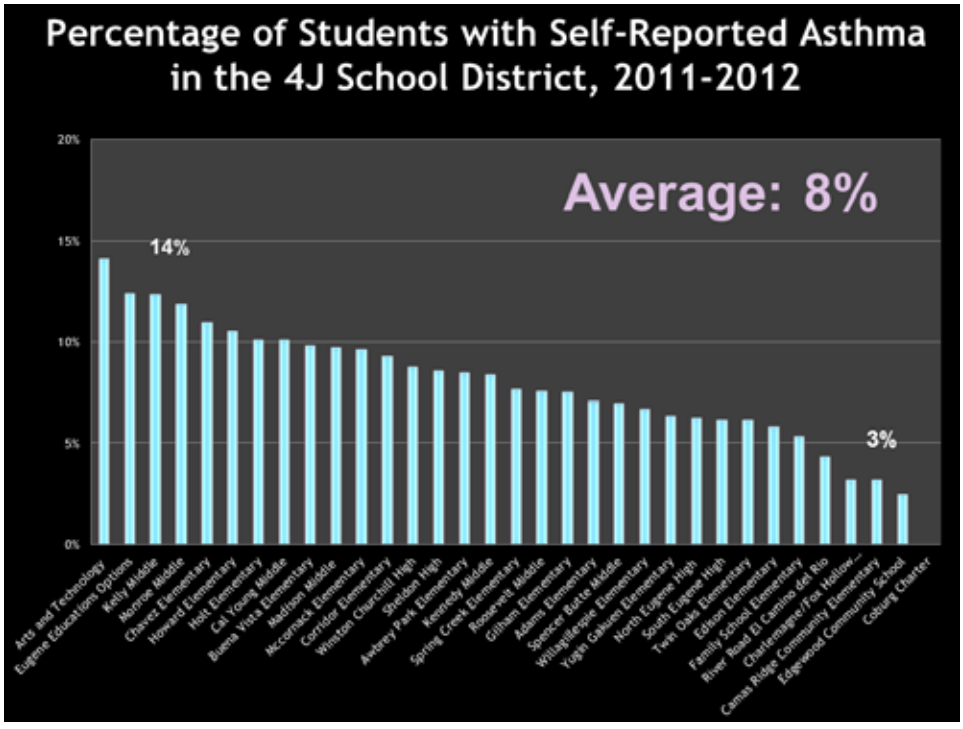
National Asthma Rate: 10% for children under the age of 18 (US CDC, 2010)

Figure 4a and 4b: Percentage of Students with Self-reported Asthma per school in Bethel and Eugene School District – (as reported on school enrollment forms)

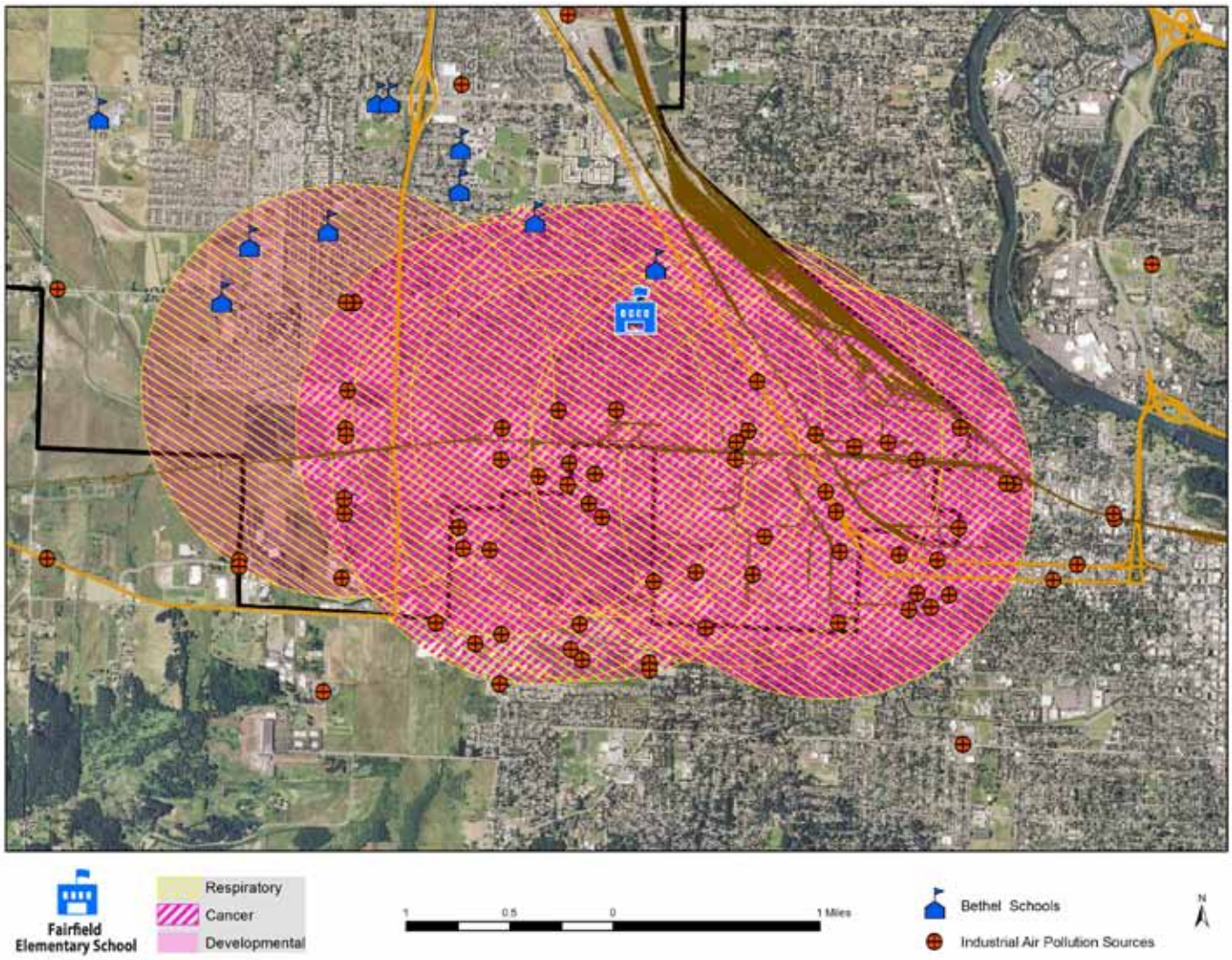
The Bethel School District collected self-reported asthma data from students and their parents on enrollment forms collected in the fall of school year 2011. The average asthma rate for the district is 13%, where the highest reported asthma rate is 19.5% and the lowest is 6.9%. The Eugene School District also collected self-reported asthma data from students and their parents for the school year 2011-2012. An initial analysis of this data shows that the average asthma rate for students in the Eugene School District is 8%, where the highest reported asthma rate is 14% and the lowest is 3%. Figures 4a and 4b show the comparison of asthma data for the two adjacent school districts. Beyond Toxics plans additional data analysis as this project progresses.



Source: Bethel School District



Map 2: Overlapping daily exposure to toxicants emitted by industries within one mile of Fairfield Elementary School



Mapped are 1) respiratory irritants 2) carcinogens and 3) neurotoxins. The darker the hatching, the more concentrated is the exposure. School location represented by the blue symbols. (See Figure 7 for chemical details)

Statistical Analysis - Relationships between socio-economic, self-reported student asthma and pollution data

Socio-economic, disease, and school location data was viewed through a statistical analysis performed out by Eric Coker, and volunteer for Beyond Toxics and Ph.D. candidate at Oregon State University in the School of Public Health. Table 6 below is the result from a linear regression analysis, testing the strength of the relationship between percent of students on the free and reduced school lunch program to the percent of students with self-reported asthma in a school. Figure 5 below portrays this relationship graphically. According to the multiple linear regression model (adjusted for school type), for every one percent increase in lunch school program prevalence there is an increase of 0.115% in the prevalence of asthma (p-value = 0.076; R-squared = 0.7322). For instance, if there is a 10% increase in the prevalence of school lunch programs, there is an increase of 1.15% in the prevalence of asthma among the student population. The note "Adjusted for School Type" basically means, within this statistical model, that the schools are of a different type (i.e. High School versus Middle School versus Elementary School). The equation for this model is: y = mx + b = 0.115(x) + b, where m is the slope of the line, x is the prevalence (i.e. 0.10) and b is the y-intercept.

Table 6: Linear Regression of Percent of Students on Lunch Program with Percent of Students with Asthma

Regression Model (n = 11)	Regression Coefficient	Std. Err.	95% CI	p-value	R-squared
Adjusted for School Type*	0.115	0.057	(-0.152; 0.2461)	0.076	0.7322
Crude Estimate	0.137	0.092	(-0.07; 0.345)	0.17	0.1982

***School Types are (a) K-8, (b) Middle School, (c) High School**

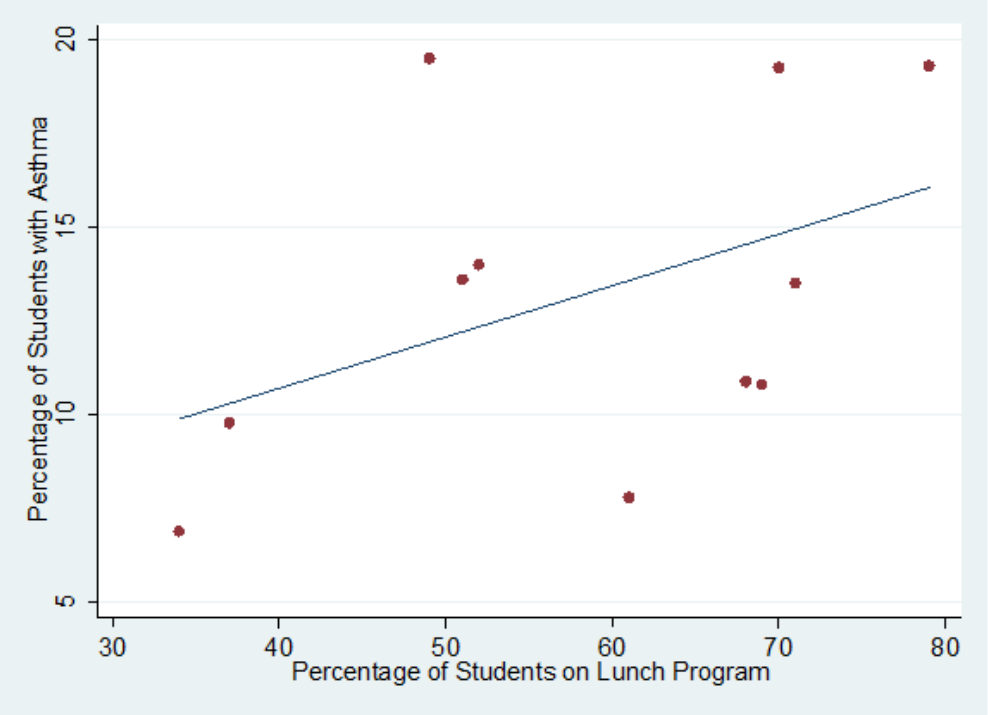


Figure 5: Relationship between Lunch Program and Percent of All Students with Self-reported Asthma

Figure 6:
Comparing Elementary School by Self-reported Asthma Prevalence and School Lunch Program Prevalence

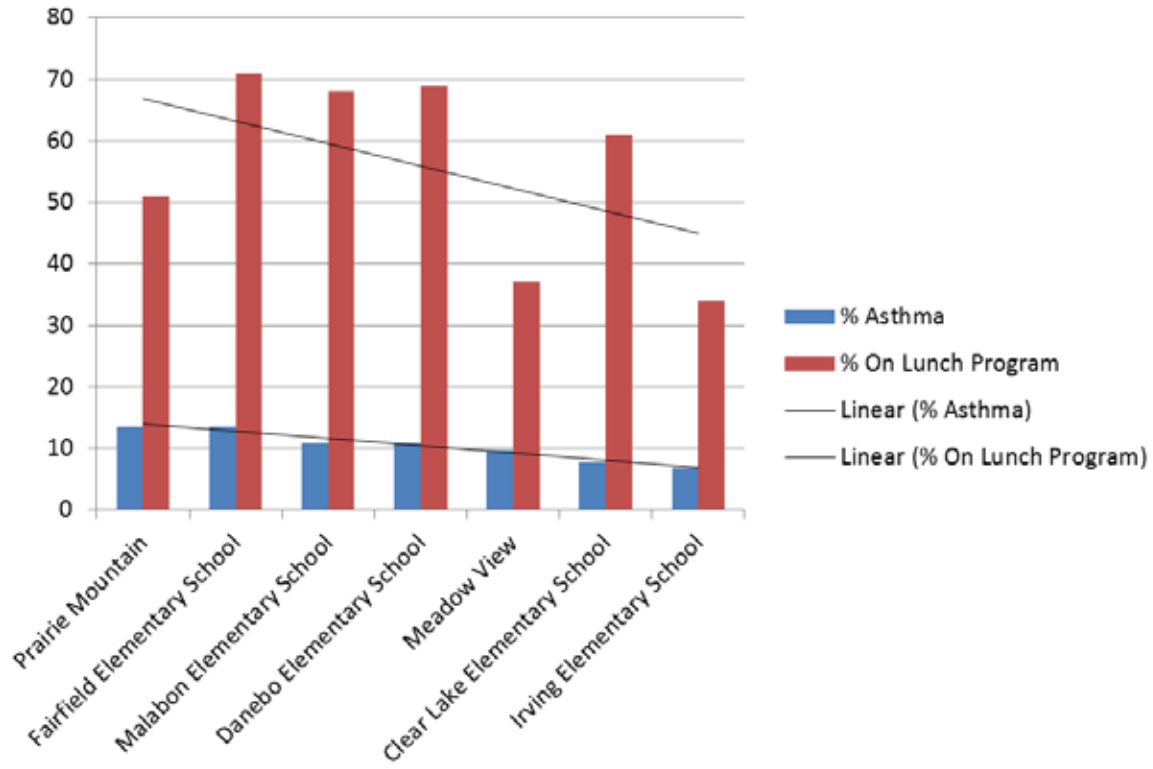


Table 7 (interprets Figure 6 above) reflects the school with the highest prevalence of school lunch programs compared to the school with the lowest school lunch program. Table 7 reflects a classic epidemiologic method that compares the prevalence of self-reported asthma between Fairfield Elementary School students and Irving Elementary School students. Our results indicate that the odds of a student having asthma at Fairfield are higher compared to Irving students' odds. According to the logistic regression analysis the Odds Ratio (OR) of a Fairfield student having asthma is 2.07 (1.28 – 3.38, 0.003) compared to an Irving student. This means Fairfield students have a 107% increased odds of having asthma compared to Irving students. There is 95% chance that the risk of asthma is between 28% and 238% higher for Fairfield students, and the best estimate is 107% (or an Odds Ratio of 2.07).

Fairfield students are 107% more likely to have asthma compared to Irving students, and this increased likelihood is statistically significant. This would indicate that lower socioeconomic status increases a student's risk of having asthma, which is consistent with the scientific literature. The scientific literature tells us that children from lower-income families have a higher likelihood of having asthma compared to children from wealthier families, regardless of race or ethnicity.

Table 7: Risk of Asthma: Fairfield Elem. Compared to Irving Elem.

Odds Ratio	95% CI	p-value
2.07	1.28 – 3.38	0.003

Figure 7:
Among All Schools: Industry Sites with Self-reported Asthma Prevalence

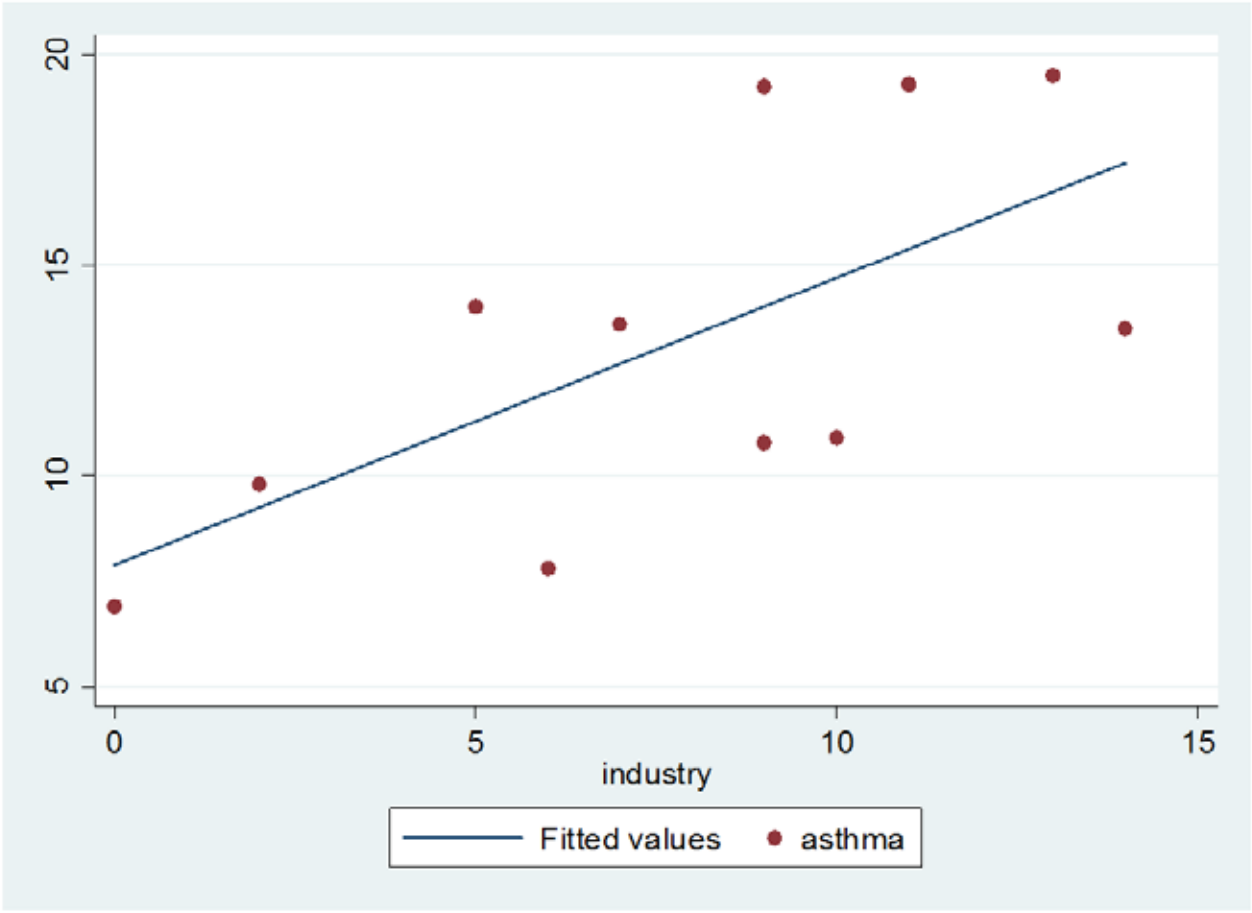


Table 8: Linear Regression of Asthma Prevalence with Number of Industrial Sites within 2 Miles

Regression Model (n = 11)	Regression Coefficient	Std. Err.	95% CI	p-value	R-squared
Adjusted for School Type*	0.415	0.151	(0.067- 0.763)	0.025	0.8547

***School Types are (a) K-8, (b) Middle School, (c) High School**

According to Figure 8 below, we can see that socioeconomic status may be associated with the proximity to industrial sites. Indeed, a linear regression depicted in Table 9 below confirms this association. There is a statistically significant positive association between the prevalence of school lunch programs and proximity to industrial sites. As the prevalence of students on school lunch programs increases by one percent the number of industrial sites within 2 miles increases by approximately 3. This relationship remains, even when adjusting for the type of school. The example shown here is for elementary schools.

Figure 8:
Relationship between Lunch Program and Elementary School Proximity to Industry

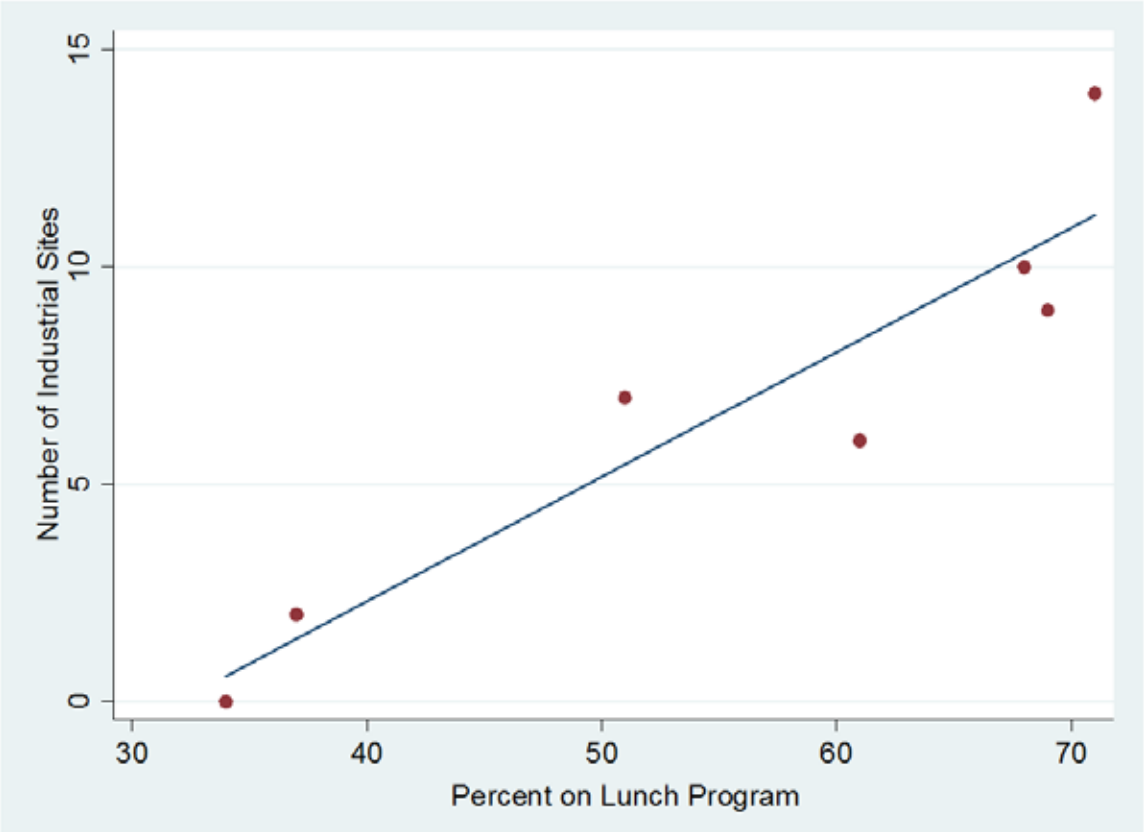


Table 9: Linear Regression of Number of Industrial Sites within 2 Miles with Percent of Students on Lunch Program

Regression Model	Regression Coefficient	Std. Err.	95% CI	p-value	R-squared
Among All Schools -- Adjusted for School Type* (n = 11)	3.31	1.14	(0.66 – 5.95)	0.020	0.60
Among Elementary Schools (n = 7)	3.00	0.54	(1.61 – 4.39)	0.003	0.86

***School Types are (a) K-8, (b) Middle School, (c) High School**

Overview of Findings

Our findings indicate that lower socio-economic status increases a student's risk of having asthma, which is consistent with the scientific literature. Secondly, we found that, as the number of industrial air pollution sites increases so does self-reported asthma prevalence. Our data reflects that there is a statistically significant positive association between the number of industrial sites near schools and the prevalence of self-reported asthma among students. For each additional industrial site within two miles of a school, the prevalence of asthma among the students will increase by 0.415%. For example, Fairfield Elementary School is situated within two miles of 14 major industrial polluters, which is predicted to increase the prevalence of childhood asthma by 5.81%. Regardless of the grade level of the school a student attends, the proximity to industrial sites partially determines the asthma prevalence. Socio-economic status and proximity to industrial sites are likely affecting students' lung health, independently of one another. Simply put, as the number of industrial sites within two miles increases, we observed an increase in the asthma prevalence, even after adjusting for the grade level of the school.

The findings appear to hold true when comparing the self-reported asthma data provided by the Bethel and Eugene school districts. The average asthma rate for students in Bethel School District in West Eugene is 13%, compared to an average asthma rate of 8% in other parts of Eugene. In other words, at an initial level of analysis, the asthma rate for students in the Bethel School District is 63% higher than in the Eugene School Distict.

The following summarizes the key findings from the GIS analysis and the data exported from air toxics databases:

- 99% of industrial air toxics are emitted in West Eugene. Most of these pollutants increase the risk of asthma, cancer and neurological symptoms.
- Low socioeconomic status appears to increase risk of asthma, which is consistent with the environmental justice literature.
- Higher numbers of industrial sites within two miles of a school appears to increase the risk of asthma for students, consistent with air pollution literature.
- Low socio-economic status appears to correlate with the number of industrial sites within two miles of a school, which is also consistent with the environmental justice literature.
- Multiple industrial sites emit complex and possibly synergistic air toxics that accumulate in a single neighborhood. However, considering low-level chronic exposure to multiple additive chemicals with known health effects is not a regulatory criterion. Nor does the regulatory process collect and evaluate air toxics data for the purpose of understanding and reducing health impacts to vulnerable communities.
- Each of these conclusions, taken together, provides a picture of the typical Environmental Justice community: low income leads to increased health risks, proximity to industrial sites is associated with low income, and proximity to industrial sites increases the risks of health impacts.
- West Eugene students are 62% more likely to have asthma as self-reported to school districts.

Lisa Arkin, Beyond Toxics Executive Director, attends one of the many asthma care workshops organized by both Beyond Toxics and Centro LatinoAmericano in West Eugene.

Additional Observations about Environmental Justice in Our Community

Beyond Toxics and Centro LatinoAmericano found that environmental health risks are a notable concern in West Eugene communities. These communities are facing disproportionate exposure to toxics and chemicals from nearby industrial sources, have limited access to the decision-making process around their family's health, are likely to be of lower-income or Spanish-speaking households, and consequently less likely to have health care or health insurance.

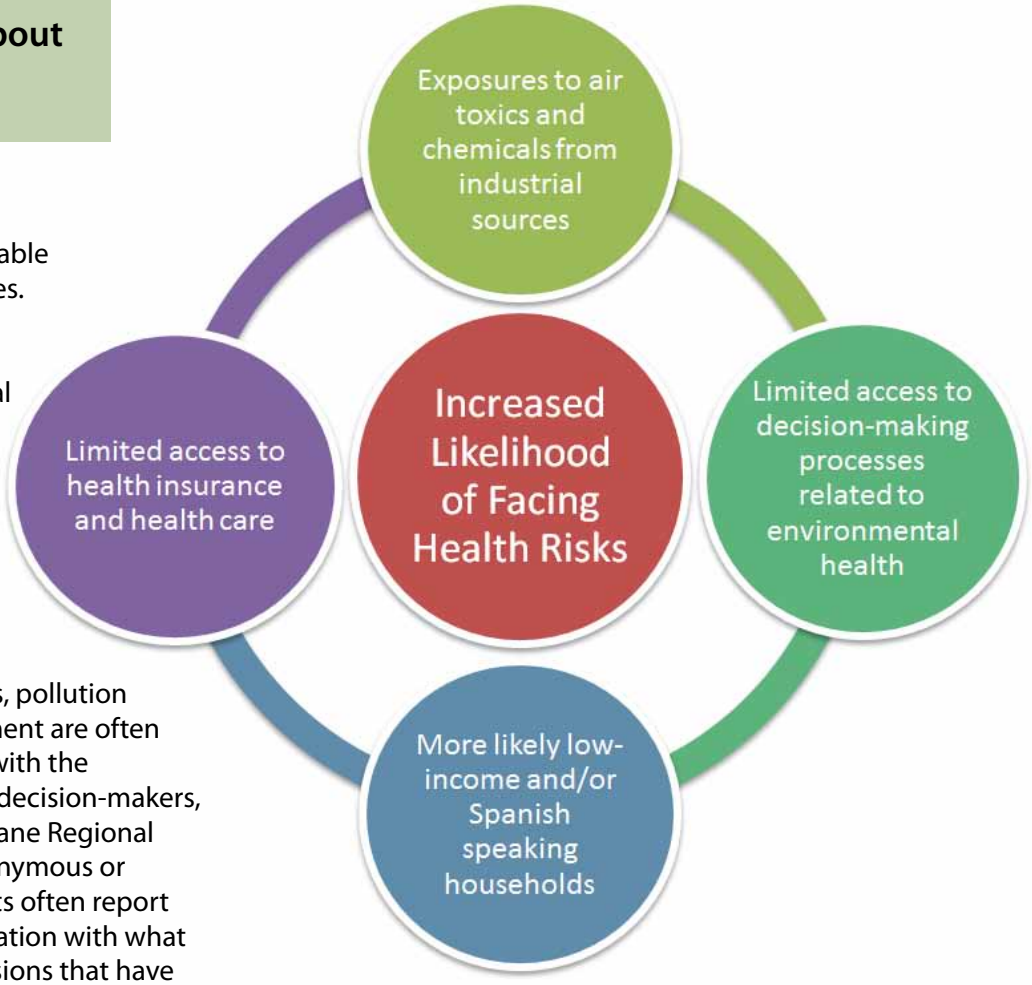


Figure 9:
Characteristics of an Environmental Justice Community and Environmental Health Risks

Decisions about safe pollution levels, pollution mitigation, and economic development are often made with little or no consultation with the impacted community. Government decision-makers, or regulatory agencies such as the Lane Regional Air Protection Agency are often anonymous or detached authority figures. Residents often report feelings of powerlessness and frustration with what appears to be arbitrary agency decisions that have significant impacts on their health.

Compared to middle or upper class neighborhoods, these residents are less likely to have the time and the technical background to understand air pollution permits and comply with the very prescriptive rules of giving testimony at public hearings.

Most likely, one parent is working a day job and the other is working a night job, which leaves little time for a family representative to attend a public hearing. Unlike their wealthier neighbors, residents in an environmental justice neighborhood cannot hire a lawyer to represent their interests in a public hearing process. If they attend a public hearing for an air pollution permit in order to speak about their family's experience with the effects of air pollution, they are told by the regulating agency that their testimony doesn't pertain to the parameters of the permitting process.

If they take the time to call Lane Regional Air Protection Agency to voice an air pollution complaint, they are told that they must first identify the source of the toxic exposure, or their complaint won't be investigated. This is a difficult requirement for many reasons. Residents are not likely experts in toxicology, chemistry, meteorology or industrial permits. Technical and cultural language barriers are obstacles to community participation. For these reasons, Beyond Toxics and Centro continue to demand an Alternative Dispute Resolution process to address disproportionate toxic emissions, with equal participation from agencies, industries, government, public health officials, NGOs and impacted residents.

Additional Observations about Environmental Justice in Our Community, *cont.*

In the process of addressing disproportionate air toxics exposure in West Eugene, we found other environmental justice problems surfaced. We believe that when one environmental justice problem exists, it is likely that other pressing community concerns are present.

We found that:

- West Eugene is considered to be a food desert (poor access to food);
- West Eugene has a higher obesity rate than other areas of Eugene;
- There are no city-sponsored community gardens west of the Trainson or Bethel neighborhoods.
- There are no County (free) health care centers in West Eugene;
- West Eugene residents are less likely to have backyard gardens (food security);
- Access to public transportation is lacking (which is related to additional traffic congestion);
- Bike lanes are few;
- There is less vegetation throughout West Eugene;
- Bethel and Trainsong neighborhoods have many brownfield sites (former commercial or industrial sites that are polluted and can't be safely developed until a clean-up occurs).

Asthma Education in an Environmental Justice Community

"*I'd love to have more information about alternative cleaning products (especially disinfectants and air fresheners) because I use these products in the house, in my car, and when I'm doing laundry.*" ~ Latina mother, Green cleaning workshop participant, 2012

"*I'm a member of the school board, and I wasn't aware of the asthma data until now.*"
~ Attendee of an Asthma Care Workshop, 2012

In addition to data collection, Beyond Toxics and Centro LatinoAmericano also initiated bilingual asthma education to address the environmental health concerns of lower-income Latino families in West Eugene. The project was based on our findings indicating lack of access to information on asthma care resources for Spanish speakers. To address this, Beyond Toxics and Centro LatinoAmericano provided Latino community members with bilingual information (English and Spanish). We dispersed this information in the community through educational workshops and presentations at church groups, organizations, and childcare centers, as well as Latino community settings. During the asthma education workshops, attendees were able to ask questions, make comments, and/or discuss concerns. We also reached out to Latino individuals, one-on-one, to address individual concerns and answer specific environmental health-related questions.

Parents who committed to attending a minimum of four hours of training in asthma care and green (non-toxic) cleaning received a Green Cleaning Certificate of Completion. The goal of distributing the certificate was to enhance job qualifications and support efforts to put this knowledge to use.

This project demonstrated that involving Latino mothers as prominent participants in the major project activities was important to building lasting trust in the community, which helped gain more interest and support from the Latino community.

The interest expressed by the participants increased empowerment in the community, and as a result, more Latino families are aware of environmental health risk exposures, are willing to speak out to bring public attention to these problems, and are more likely to work with friends and neighbors to take steps to address pressing concerns.

Evaluation of Environmental Justice Goals

Beyond Toxics and Centro LatinoAmericano shaped this environmental justice project upon the following principles:

- To learn from community members, and to recognize that their own solutions and inputs are of great value;
- To ensure that experiences are shared and that problems are analyzed from different perspectives;
- To involve all groups in the community

Beyond Toxics and Centro LatinoAmericano addressed the following goals and outcomes:

1) Goal: Provide an analysis and characterization of combined risk to health and environment from multiple air pollution sources or stressors.

***Rationale*:** Prior to the beginning of the project, there was very little evidence that supported the community's concerns that there are disproportionate exposures to air toxics in Eugene.

***Results*:** The project resulted in a series of maps, charts and other resources that help draw relationships between locations of industries, location of schools, demographics, income, and health risks. Using GIS mapping and statistical analysis, the community is now better able to identify proximity to point sources of pollution and correlational relationships to nearby schools, parks, and homes.

2) Goal: Support locally focused community partnerships and build understanding that can help mitigate local pollution and its impacts.

***Rationale*:** Because of social and geographic isolation, Latino and lower income families have not had opportunities to take leadership roles in their local community. In addition, their complaints about poor air quality and health impacts have not been given credibility. Building strength through effective community partnerships will help remedy this reality.

***Results*:** Self-reported asthma data information, was collected from the Bethel School District. The data formed an important centerpiece around which community partnerships formed to provide education, reduce asthma triggers and mobilize diverse participation in community conversations about health and local pollution. In addition, partnerships with other institutions, universities, and neighborhood associations helped the team to better analyze the data and formulate conclusions.

3) Goal: Provide parents in lower-income and Latino neighborhoods information to help them respond to toxic exposure pathways in both indoor and outdoor air to reduce health risks for their children.

***Rationale*:** Families in the impacted neighborhoods are less likely to have internet access, media access, health care access and are less likely to be able to take advantage of traditional forms of public outreach due to labor patterns, language barriers, transportation barriers and cultural barriers.

***Results*:** Beyond Toxics and Centro offered over 20 workshops on asthma care and improving indoor air quality, served over 300 attendees, worked with 10 new community leaders, distributed 145 Green Cleaning kits and hundreds of bilingual handouts, etc. We distributed many dozens of Spanish-language refrigerator magnets explaining how to submit an air pollution complaint to the appropriate agency. Workshops and community meetings helped Beyond Toxics and Centro identify key gaps in respiratory health information. Leaders were identified and focus groups were formed in order to help disseminate various environmental health resources related to indoor and outdoor air quality.

Benefits Gained From Program

Benefits gained from the program can be categorized in the following themes:

a) Environmental Stewardship,
b) Community Building and Empowerment,
c) Environmental Equity,
d) Environmental Education, and
e) Planning and Decision-making.

A. Environmental Stewardship:

Community-based activities such as the Environmental Justice Toxics Bus Tour served as a way to prioritize the remedy of environmental health inequities in future decision making plans, as well as advanced environmental stewardship in the local context.

For example, many areas in West Eugene are heavily contaminated by industrial emissions but rarely assessed. Attempts to clean up areas have been very limited, if at all. The Toxics Tour resulted in a successful demand to clean up a nearby pond heavily contaminated by creosote tar and other chemicals related to wood preservation as a result of illegal dumping of railroad ties. The Union Pacific Railroad took responsibility for the contamination and the clean up. (See Appendix 2)

B. Community Building and Empowerment:

We carried out activities designed to contribute to leadership development in low-income and Latino neighborhoods, and raise awareness about disparities in public health access for local agencies and governments so that future funds can be allocated to equal access. As suggested by our outreach activities, particular focus was placed on ensuring that the community's voices were heard. As a result, confidence and awareness increased amongst community leaders. For example, the Community Action Group, which began in 2011 as a result of canvassing results, is pursuing the idea of an Alternative Dispute Resolution.

Student groups from local universities have gained knowledge and insight into environmental justice topics and are actively becoming involved with Beyond Toxics and Centro LatinoAmericano on a regular basis. Finally, the project's analysis of environmental health risks enabled the community to raise the issue of environmental justice when the city had to make the decision on whether coal transport through Eugene should be supported. The issue of environmental justice and air pollution exposures played a role in the City Council's vote to reject coal train transport through Eugene and to call for a comprehensive health impact statement.

C. Environmental Equity:

We provided education, career development and decision-making opportunities within the impacted community, as well as raise awareness in the larger community about environmental equity.

Outreach activities to form long-standing relationships with the community fostered the feeling of empowerment. Advocacy activities also included bringing Luis Olmedo, Executive Director of the California enviornmental justice organization Comite Civico del Valle, for a 3-day guest residency at the University of Oregon (cosponsored with the UO Coalition Against Environmental Racism). Olmedo provided University of Oregon students and the general community a unique opportunity to learn about environmental justice. We also invited Caleen Fisk (Spiritual Leader of the Winnemem-Wintu Tribe) and Benjamin Duncan, chair of the Oregon Environmental Justice Task Force, along with Louis Olmedo to present an evening panel, "What is Environmental Justice," free and open to the public, which took place at the University of Oregon Jacqua Center.

Benefits Gained From Program, *cont.*

D. Environmental Education:

The community has identified key areas where further resources are needed. These include bio-monitoring and the setting up air monitoring devices in fence line communities. Currently, the Community Action Group is taking leadership in this direction.

E. Planning and Decision-Making:

As a result of community outreach, exposures, conferences and meetings, the project brought forth key issues that needed to be addressed by the City Planning department and other agency staff. In fact, in October 2012, West Eugene was recognized as an Environmental Justice community by the Mayor of Eugene. As a result, the decision to develop parks, schools, and low-income housing near major industrial sources of pollution was reconsidered. In addition, the City of Eugene, Health Department, Planning Department, Human Rights Commission and Sustainability Commission may host Environmental Justice trainings for the near future.

Areas for Further Research and Action

As part of our initiative to find correlation between environmental justice communities and its proximity to major sources of toxic pollution, Beyond Toxics and Centro LatinoAmericano identified the following areas where continued research and action is suggested:

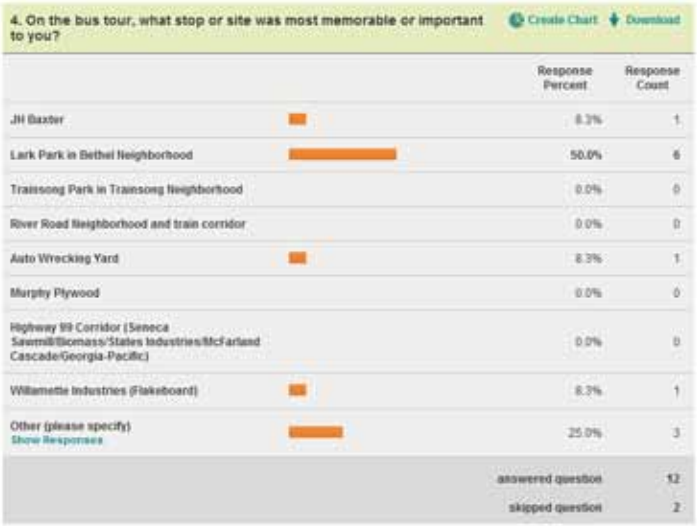
- Additional data on race or ethnicity needs to be collected, which could present even more compelling evidence;
- A deeper analysis is needed, which will likely strengthen the demonstration of the interaction between low income and proximity to industrial sites and the effect on lung health for students;
- Data collected from other school districts could provide a comparative analysis;
- Community-based air data samples of outdoor air near selected schools;
- Community-based cancer survey;
- Detailed children's asthma data collection and analysis;
- An analysis of air toxics of particular concern;
- Environmental Justice training for public officials and government staff;
- Evaluation of actions needed to reduce levels of pollutants of concern;
- Continue leadership development and community organizing;
- Develop a citywide strategy for integrating environmental justice into city planning and policies;
- Ensure that our environmental justice projects are part of the region's broader social inclusion plan;
- Continue to engage the community and participate in Neighborhood Association meetings, faith-based organizations, and Latino events and groups;
- Continue using the GIS mapping tool to identify local demographics, environmental justice issues and proximity to air toxic sources.;
- Assist local government in developing a plan to encourage the community to participate in decisions related to environmental health and equity.

Toxic Tour Survey Results

After the tour, participants were encouraged to answer survey questions through Survey Monkey. According to the survey, most participants were students, community members, and community leaders and representatives. Over 90% responded that the Toxics Tour experience was highly valuable. As indicated in the figures below, many participants found speaking with the neighborhood residents in the Lark Park Bethel Neighborhood to be the most memorable. Lark Park is located across the street from JH Baxter, a site the participants believed needed alternative solutions.

Figures 10: Toxic Tour Survey Results

Figure 10a: Memorable Sites

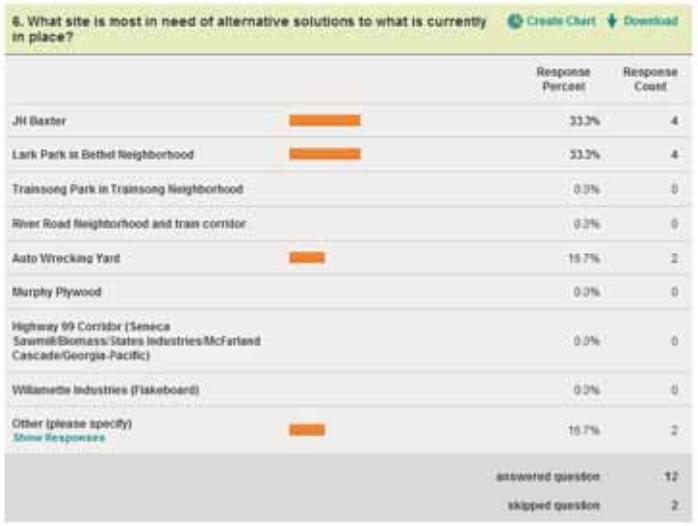


4. On the bus tour, what stop or site was most memorable or important to you?

Create Chart | Download

	Response Percent	Response Count
JH Baxter	8.3%	1
Lark Park in Bethel Neighborhood	50.0%	6
Trainsong Park in Trainsong Neighborhood	0.0%	0
River Road Neighborhood and train corridor	0.0%	0
Auto Wrecking Yard	8.3%	1
Murphy Plywood	0.0%	0
Highway 99 Corridor (Seneca Sawmill/Biomass/States Industries/McFarland Cascade/Georgia-Pacific)	0.0%	0
Willamette Industries (Flakeboard)	8.3%	1
Other (please specify) Show Responses	25.0%	3
answered question		12
skipped question		2

Figure 10b: Most in Need of Alternative Solutions



6. What site is most in need of alternative solutions to what is currently in place?

Create Chart | Download

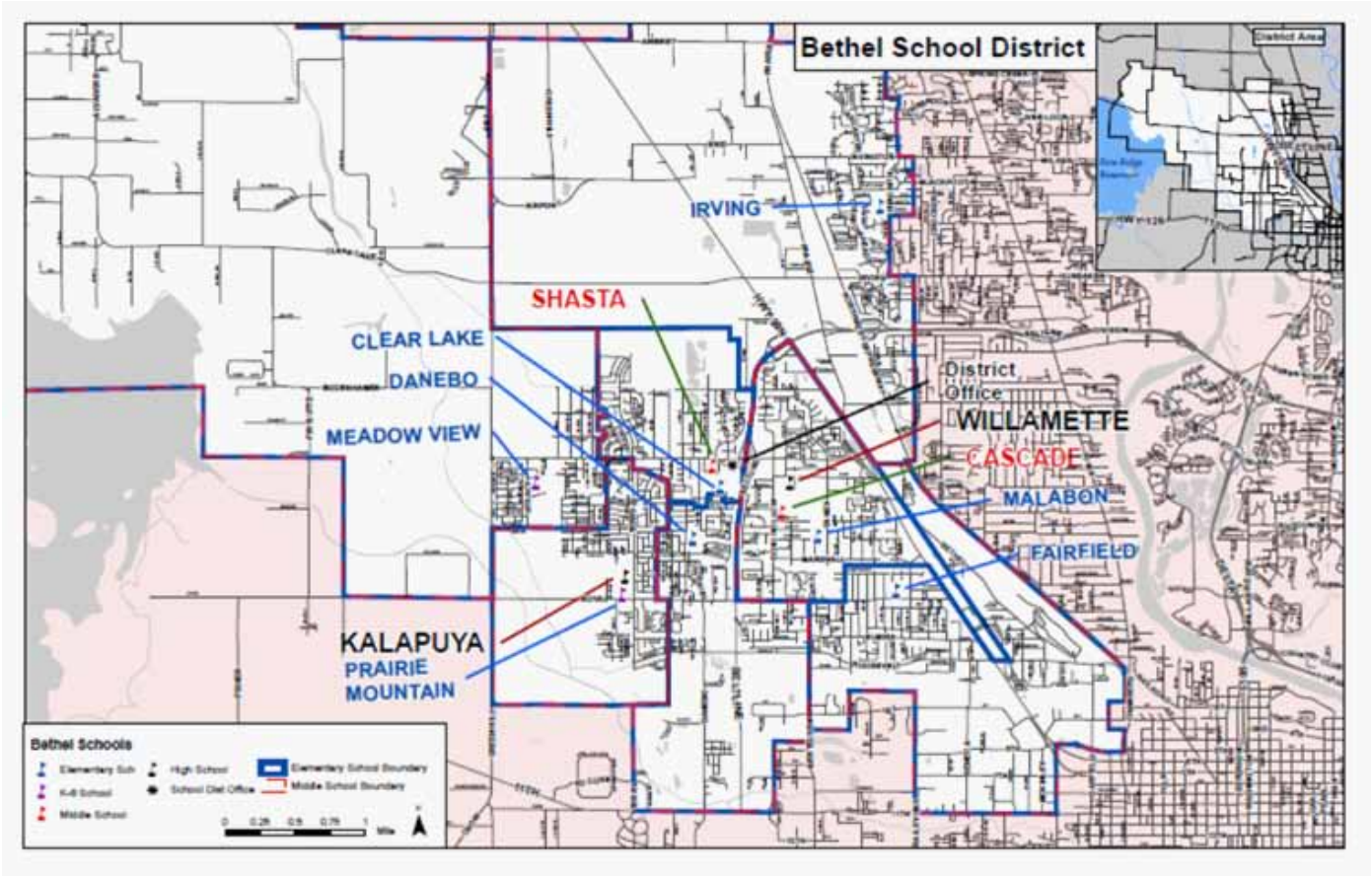
	Response Percent	Response Count
JH Baxter	33.3%	4
Lark Park in Bethel Neighborhood	33.3%	4
Trainsong Park in Trainsong Neighborhood	0.0%	0
River Road Neighborhood and train corridor	0.0%	0
Auto Wrecking Yard	16.7%	2
Murphy Plywood	0.0%	0
Highway 99 Corridor (Seneca Sawmill/Biomass/States Industries/McFarland Cascade/Georgia-Pacific)	0.0%	0
Willamette Industries (Flakeboard)	0.0%	0
Other (please specify) Show Responses	16.7%	2
answered question		12
skipped question		2

Participants had the opportunity to share their experiences after the tour. Among the many positive comments we received, the examples listed below are among the best:

- *"The park across from Baxter was scary, depressing and poignant. It made me realize that one friend's 15 year-old son died of a rare leukemia (7 blocks away) and another's daughter died at 16 of asthma (3 blocks away)."*
- *"Hearing from the women who live in that neighborhood was really powerful and experiencing the difference between their view and mine."*
- *"The health concerns of people who actually live in this neighborhood and the other neighborhoods we visited are compelling. I found that their willingness to share their stories exemplified best the reasons for conducting this bus tour and the reasons that air quality standards must be enforced and improved."*
- *"I had been very interested to find out more about what all the smells were in the neighborhood, so getting to SEE them, plus read the info about what is coming out, was invaluable. Now I really know that we need to get some action on these sites!"*
- *"The residents' stories were powerful and grounded the statements about pollution from company facilities."*
- *"Hearing from residents of the Bethel Neighborhood was moving and informative while also making environmental injustice more relatable."*

Appendix 1

Bethel School District Boundary Map



Appendix 2

Creosote Rail Ties clean-up in a West Eugene pond/wetlands

These old logs were removed from the Maxwell pond that was featured on the Environmental Justice Bus Tour. This pond is used for subsistence fishing. Union Pacific agreed to clean up the hazardous waste dumping and undertook the clean-up in summer 2012. (See pictures below)

Maxwell Pond Pre-Clean Up

Appendix 2, *cont.*

Creosote Logs pulled from Maxwell Pond during Hazardous Waste Clean Up (photo above and next page)

Appendix 2, *cont.*