

## Understanding Environmental Risk Awareness Levels in West Oakland

**Junn Masongsong**

**Abstract** Low income communities and communities of color carry a disproportionate amount of environmental risk. In this study, environmental risk is defined as the “likelihood, or probability, of injury, disease, or death resulting from exposure to a potential environmental hazard” (European Environmental Agency 2000). There is a void, however in the understanding of the level of awareness of environmental risks in these communities. West Oakland, California is a community that is both characterized by low incomes and people of color. This community also is exposed to a disproportionate amount of environmental risks. The Port of Oakland, located in West Oakland, is a source of some of these environmental risks. Maritime development projects are responsible for an increase in traffic on the roads, noise in the community, and air pollution from increases in diesel truck use. This study analyzes the level of awareness of West Oakland residents to these environmental risks. An investigation of data gathered through a telephone survey of West Oakland residents tested for associations between age, ethnic/cultural backgrounds, income, and information sources, with awareness levels of environmental risk. As a result, it was discovered that age and income did factor into determining a resident’s level of awareness while their ethnic/cultural background and information source did not.

## **Introduction**

Some communities carry a disproportionate amount of environmental risk in comparison to other communities (Setterberg and Shavelson 1993). As a result, addressing this inequity in the distribution of environmental risks has become a national issue due to the environmental justice movement (Rechtschaffen and Gauna 2002). By one definition,

Environmental justice is achieved when everyone, regardless of race, culture, or income, enjoys the same degree of protection from environmental and health hazards and equal access to the decision-making process to have a healthy environment in which to live, learn, and work (EPA 2003).

The environmental risk experienced by low income communities and communities of color is an issue that the government as well as nongovernmental organizations (NGOs) are trying to address. Since the government alone is not addressing many environmental justice issues, communities that are affected have taken action to address the disparities in environmental risk in their communities (Newell 2001). The inequality among communities regarding environmental risk has resulted in an environmental justice movement that “began to address disparities borne by the poor as well as people of color, acknowledging the substantial overlap between the two demographic categories” (Rechtschaffen & Gauna 2002).

During the Clinton administration, an executive order on environmental justice reflected the desire of the president and perhaps the nation to establish equality among all communities with respect to environmental risks. The executive order called for every federal agency to address the possible consequences of their actions to minorities and low-income populations (Clinton 1994). The environmental justice movement began in the 1980s as an after thought of environmental racism but has evolved into the complex concept that it is today (Rechtschaffen & Gauna 2002). Initially, the movement focused on finding specific sources to blame for the inequity in environmental risk (Preston et al. 2000). The problem with this approach was that it focused on the siting of polluting sources while paying little attention to the lack of environmental risk awareness in the community (Preston et al. 2000).

Understanding what the community perceives as a risk to them and whether or not that perceived risk is valid is vital to an understanding of environmental justice (McIntyre 2002). Gaining knowledge of what a community perceives as an environmental risk can provide vital insight into their level of awareness of that risk. If they feel that are not at risk from an environmental hazard, then their level of awareness about that hazard will not be very high. The

difference between perceived risk and actual risk is important because simply not seeing a risk does not mean that they will not be harmed by it (Arcury et al. 2002). Achieving equity among communities with respect to environmental risk can be gained through raising awareness levels. Since education is such an important factor in increasing awareness levels of risk in a community (Preston et al. 2000) providing appropriate information in a form that best suits the population is imperative (Arcury et al. 2002 and Claudio et al. 1998).

A case study of West Oakland, California analyzing whether the residents are receiving appropriate information in the best form concerning their environmental risks was conducted. In order to assess the relevance of the information that this community receives, a test of their awareness of environmental risk from maritime development projects at the Port of Oakland occurred. This assessment of awareness levels was conducted through a telephone survey of West Oakland residents. The survey also determined the effectiveness of the information sources from which the residents received their data. The data that this case study provides can be used to change current environmental health education practices to better suit the West Oakland community. Communities experiencing similar issues can conduct a similar experiment in order to assess the levels of environmental risk awareness and the effectiveness of information sources in their community.

## **Methods**

**Study Site** A case study focused on West Oakland residents was conducted where the levels of environmental risk awareness with respect to the Port of Oakland maritime development projects was measured. West Oakland consists of about 20,000 people who are mostly African American, Latino American and Asian American (Census 2000). For the purposes of this study I have defined West Oakland in terms of zip codes so as to provide a framework for gaining telephone number prefixes. I have defined West Oakland as being the following zip codes: 94612, 94607, 94626, and 94625 (Valley Yellow Pages 2001).

**Data Collection** I used a survey that consists of three parts (Appendix I). The first part of the survey measured the environmental risk awareness of the respondent. This first part is broken up into three sections. Each section is more specific than the last. The first section addresses the Port of Oakland. The second addresses the maritime development projects at the Port of Oakland. The third addresses the risks associated with the maritime development

projects. The first question in each section determines if the respondent will continue to the next question. For example, the first question asks whether or not the respondent has heard of the Port of Oakland. If the answer is “no” then there is no need to continue with the other sections and so the survey jumps to the second part of the survey. The second part of the survey determines the respondent’s information sources, their public health concerns, and the best form future information sources should take. The third part of the survey determines relevant demographic information such as cultural/ethnic background, age, and household income.

In order to administer this survey, calls were made to households in West Oakland. The process of developing these telephone numbers was similar to another survey that was conducted by the Oakland city auditor’s office (Crawford and Smith 2000). In that survey, telephone prefixes were coupled with four random digits to produce a telephone number. In this case study, the same tactics will be utilized. First, a list of West Oakland telephone prefixes was gathered from Melissa Data Corporation, which provides data on contact information. This company provides a list of Oakland telephone prefixes which can be sorted through by cross-referencing them through Melissa Data Corporation’s database with West Oakland zip codes. By doing this, I was able to determine the telephone prefixes for West Oakland. After finding the telephone prefixes I listed and numbered each prefix with its own unique number. I then generated a random list of these numbers through Microsoft Excel’s random number generator. Next, I generated the other four random numbers to complete the telephone number. I did this using the same program and generated a list of random numbers ranging from 0000 – 9999.

**Statistical Techniques** With the data that was collected in this study, chi square tests were conducted. The chi square tests allowed me to determine if there were any associations between ethnic/cultural background, age, household income, information sources and awareness levels of environmental risk. The tests determined associations between ethnic/cultural background, age, and household income with current information sources. The tests also determined associations between ethnic/cultural background, age, and household income with awareness levels of environmental risk. The association between current information sources and the awareness levels of environmental risk was also determined through chi square tests.

## Results

The total number of surveys completed in this case study was 122 (n = 122). The demographics of the respondents are illustrated below in Figures 1.

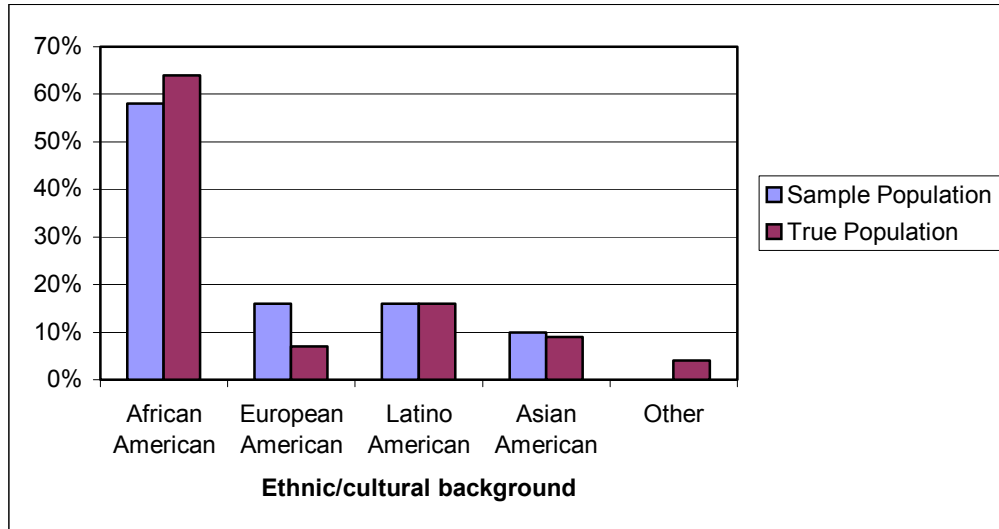


Figure 1: Sample Population and West Oakland Population (Redrawn from Census 2000)

There are some differences between the sample population and the true population of West Oakland. The largest difference occurs with the population of European Americans. In the sample population European Americans comprise 16% of the total population instead of 7% in the true population. The next largest difference occurs with Asian Americans where in the sample population they comprise 10% of the total population but in the true population only comprise 9%. In the African American sample population they comprise 58% of the total population rather than 64% as in the true population. The Latino American sample population was equal to the true population. The 4% taken up by the population group labeled “other” did not appear in the sample population because there were no respondents who fit that category.

It was important in this study to find out where the residents received their information about the Port of Oakland’s maritime development projects were from. It was also important to find out where these residents wished their information should come from in the future. Figures 2 and 3 illustrate the distributions.

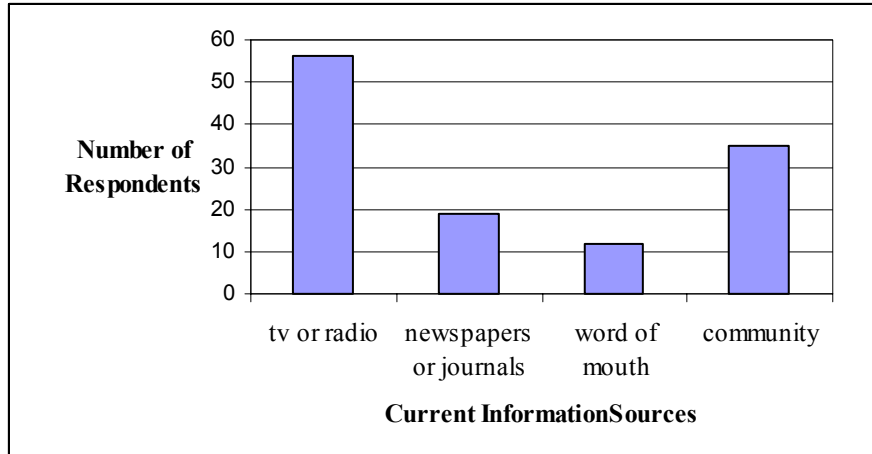


Figure 2: Current information sources for respondents about the Port of Oakland’s maritime development projects

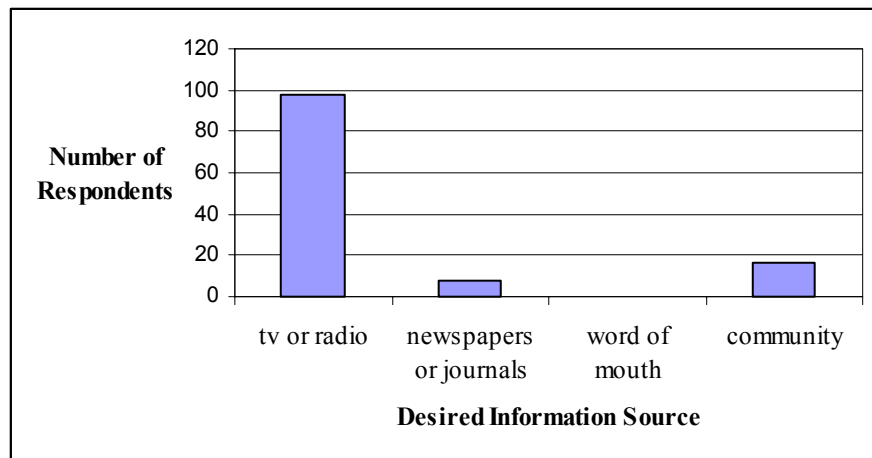


Figure 3: Desired information sources for respondents about the Port of Oakland’s maritime development projects

Chi square tests were conducted on the responses given in the surveys. The table below illustrates which relationships were analyzed, their respective p values, and whether or not the results were significant. The null hypotheses in all tests were that there was no relationship between the independent and dependent variables.

<b>Relationship (dependent vs independent variable)</b>	<b>p value</b>	<b>Statistical Significance</b>
Ethnic/cultural Background vs Awareness Level	0.291	Not significant
Age vs Awareness Level	0.030	Significant
Household Income Level vs Awareness Level	<0.001	Significant
Current Information Source vs Awareness Level	0.083	Not significant

Table 1: Chi square tests

In the scoring of levels of awareness with respect to environmental risk posed by the maritime development projects, one correct answer was weighed according to the amount of awareness questions in that particular section. For example, section one of the survey asks three questions (labeled 2a, 2b, and 2c) regarding facts about the Port of Oakland (Appendix I). Since this section has three questions, each question is worth a third of a point, totaling one point for the section. The second section has only two questions and therefore each question is worth half a point and so on.

The results showed that there was no relationship found between ethnic/cultural background and awareness levels. However, one's age and income did have a relationship with their level of awareness. Where residents get their information also did not have a relationship with their awareness level. No specific ethnic/cultural background scored higher or lower than another group in awareness levels. The age group that was the most aware compared to the other groups were 18-25 years old while the group 36-45 years old had the least amount of awareness. In income the group who made the lowest amount of money (below \$20,000) had the highest levels of awareness while the group that made over \$45,000 had the lowest levels of awareness.

## **Discussion**

The sample population in this study was somewhat representative of the true population of West Oakland. There were no large differences in the populations except for the higher emergence of the European American population in the study. Other than the slight overrepresentation of some populations, the sample survey remained relatively representative of the true population.

From the data gathered, it can be seen that most of the sample population reported getting their information from television or radio. The desired form that future information should take is television or radio. Since most of the population do receive their information about the maritime development projects from television and radio it would be assumed that focusing on

those forms of media would increase awareness levels of environmental risk about the Port of Oakland. However, from the chi square test that was conducted between current information sources and environmental risk awareness levels it can be seen that there is no detectable relationship between these two variables. Since there is no evidence of a relationship between the two, an analysis of which information source yielded the highest awareness levels is irrelevant. This means that no matter where a resident gets their information, the information has the same chance to be correct (as well as wrong) as any other source. An increase in the amount of information provided from any source would increase the awareness levels of the community (Preston et al. 2000).

Ethnic/cultural background also did not show a relationship with awareness levels. However, age and household income levels did. The age group that had the highest percentage of low awareness (score of  $<2$ ) were 36-45 years. Perhaps this is a result of this age group worrying more about mortgages, rent, work, children or other parts of their lives that requires a considerable amount of attention. However, the age group that had the highest percentage of high awareness (score of  $\geq 2.5$ ) were 18-25 years. Perhaps this is a result of the environmental movement already being in place as this age group was in school. As a result this group may understand the environmental risks associated with their community more than their parents.

With the relationship between household income and awareness level, the group with the highest percentage of high awareness made below \$20,000. This may be explained with the fact that most young people (18-25 years old) do not make very much, especially if they are still furthering their education. The group with the highest percentage of low awareness belonged to the group that made over \$45,000. This may be explained as either they do not care whether they are affected by environmental hazards or they live in an area of West Oakland that may not be affected much by the maritime development projects. Those who do not make a lot of money may live in an area where they can see the environmental risks that they are exposed to. They would be able to see the diesel trucks driving down their streets and see the pollution that is caused. The residents in the higher income bracket, however, may not see these risks as often because they may live in an area where the trucks do not drive down. As a result they do not know that they are being exposed to an environmental hazard.

The limitations of this study are the relatively small sample size with respect to the some 20,000 people who live in West Oakland (Census 2000). Along with a larger sample size, a



better form of sampling is needed. The coupling of West Oakland prefixes and four random digits resulted in many disconnected, nonexistent, business, and multi-line household telephone numbers. This lowered the chance of reaching a potential respondent as well as time to complete more surveys. Also, since there are people in West Oakland who do not speak English or do not speak it well enough to complete a survey this removed some potential respondents from the sample. The actual sample, although ethnically representative may not be representative of age and income in West Oakland. I was unable to locate statistics for age and income in purely West Oakland and so was not able to compare my sample with the true population.

I recommend a future study that analyzes the role of education in determining the level of awareness in West Oakland. It may be seen that education may play a bigger role in determining someone's level of awareness to environmental risk.

### **Acknowledgements**

I would like to thank Manish, John and Matt for all their help and firm nudges to get me through this project. I would also like to thank Karen Biestman for her guidance in finding a project and the Citizens for West Oakland Revitalization for all their information and interest.

## References

- Arcury TA, Quandt SA, and Russel GB. 2002. Pesticide Safety Among Farm Workers Perceived Risk and Perceived Control as Factors Reflecting Environmental Justice. *Environmental Health Perspectives*, 110: 230-233 Suppl. 2. US Dept. Health Human Services Public Health Service, Res. Triangle Park.
- Bernard, HR. 1994. *Research Methods in Anthropology* 2<sup>nd</sup> Edition. Sage Publications. Thousand Oaks, California.
- Claudio L, Torres T, Sanjuro, et al. 1998. Environmental Health Education – A Tool for Achieving Environmental Equity and Protecting Children. *Environmental Health Perspectives*, 106:849-855 Suppl. 3. US Dept. Health Human Services Public Health Service, Res. Triangle Park.
- Clinton W. 1994. Presidential Executive Order on Environmental Justice (EO No. 12898). Office of the Secretary, The White House. Washington DC.
- Crawford V and Smith R. 2000. City Auditor's Report on the Auditor's Citizen Survey of the Community Policing Awareness and Related Issues. Office of the City Auditor. Oakland, California.  
Online: <http://www.oaklandauditor.com/reports/communitypolicesurvey.pdf>  
Accessed: October 15, 2002.
- Environmental Protection Agency. 2003. Environmental Justice. Environmental Protection Agency. Washington DC.  
Online: <http://www.epa.gov/compliance/environmentaljustice/>  
Accessed: February 15, 2003.
- European Environmental Agency. 2002. General Environmental Multilingual Thesaurus. European Environmental Agency.  
Online: [http://glossary.eea.eu.int/EEAGlossary/E/environmental\\_risk](http://glossary.eea.eu.int/EEAGlossary/E/environmental_risk)  
Accessed: April 5, 2003.
- McIntyre J. 2002. Critical System Praxis for Social and Environmental Justice: A Case Study of Management, Governance, and Policy. *Systematic Practice and Action Research*, 15(1): 3-35. Kluwer Academic/Plenum Publishers. New York, New York.
- Melissa Data Corporation. 2002. Oakland, California Telephone Prefixes and Zip Codes. Melissa Data Corporation.  
Online: <http://www.melissadata.com/>  
Accessed: January 20, 2003.
- Newell P. 2001. Access to Environmental Justice? Litigation Against TNCs in the South. *IDS Bulletin-Institute of Development Studies*, 32(1): 83. Institute of Development Studies, Bighton.

Preston BL, Warren RC, and Stewart P. 2000. Factors Affecting Environmental Awareness Among Head Start Families in Mississippi. *American Journal of Preventative Medicine*, 19(3): 174-179. Elsevier Science. New York, New York.

Rechtschaffen C and Gauna E. 2002. *Environmental Justice Law, Policy and Regulation*. Carolina Academic Press, Durham, North Carolina.

Setterburg and Shavelson. 1993. *Toxic Nation*. John Wiley and Sons. New York, New York.

US Census Bureau. 2000. *Census 2000*. US Census Bureau. Washington DC.

Online: <http://www.census.gov/>

Accessed: October 20, 2002.

Valley Yellow Pages. 2001. *Oakland, Alameda, Berkeley, Emeryville, and San Leandro*. Valley Yellow Pages. Fresno, California.

## Appendix I

Hello, I am an undergraduate doing research at UC Berkeley for my senior project. I am studying the awareness levels of environmental risk in West Oakland. I will ask a series of short questions and it will only take a couple of minutes to complete. All the information you provide will remain confidential and your identity will remain anonymous. By taking part in this research you will help in providing information that may be used in the future to better accommodate the needs of West Oakland and its levels of environmental health education.

### I. AWARENESS OF THE PORT OF OAKLAND

1. Have you heard of the Port of Oakland?  
 Yes  
 No (IF “NO” GO TO QUESTION IV-2)

**Of the following uses of the Port of Oakland, please state whether they are “true” or “false”**

- 2a. community fishing programs  
 True  
 False
- 2b. international center for shipbuilding  
 True  
 False
- 2c. international cargo transportation and distribution  
 True  
 False

### II. AWARENESS OF MARITIME PROJECTS

1. Are there any maritime development projects in progress or currently being planned by the Port of Oakland?  
 Yes  
 No (IF “NO” GO TO QUESTION IV-1a)

**Of the following developments at the Port of Oakland, please state whether they are “true” or “false”**

- 2a. expansion to include the Oakland Army Base.  
 True  
 False
- 2b. deepening of the shipping channels between Alameda and Oakland so that larger ships can have access to Port of Oakland facilities.  
 True  
 False

### III. AWARENESS OF RISK

1. Are there any environmental and public health risks associated with the maritime projects at the Port of Oakland?

- Yes
- No (IF “NO” GO TO QUESTION IV-1a)

**Of the following health risks that may result from maritime development projects at the Port of Oakland please state whether or not they are “true” or false”**

2a. Diesel truck traffic will likely increase

- True
- False

2b. Noise levels will likely increase

- True
- False

2c. Air pollution levels will likely increase

- True
- False

### IV. INFORMATION

**Of the following information sources, please indicate with a “yes” or a “no” whether or not your household learns about changes at the Port of Oakland from that source**

1a. tv or radio

- yes
- no

1b. newspapers or journals

- yes
- no

1c. word of mouth such as from family or friends

- yes
- no

1d. your community such as meetings, fliers, or posters

- yes
- no

2. Which of the following environmental and public health risks is your household most concerned with?

- traffic
- noise
- air pollution

3. Is the best way to inform your household about the Port of Oakland through:

- tv or radio

- newspapers or journals
- word of mouth such as family or friends
- your community such as meetings, fliers, or posters

<b>V. MISCELLANEOUS</b>
-------------------------

1. Please indicate your cultural/ethnic background

- African American
- European American
- Latino American
- Asian American

2. Please indicate your age level

- 18-25 years old
- 26-35 years old
- 36-45 years old
- over 45 years old

3. Please indicate your yearly household income

- below \$20,000
- \$20,000-\$35,000
- \$35,000-\$45,000
- above \$45,000

I'd like to thank you for taking the time to take part in my research. If you have any questions you may contact my advisor at (510)643-4551.