EPA/600/R-11/120 | October 17, 2011 | www.epa.gov/ord

United States
Environmental Protection
Agency

Application of Tools and Databases to Community-Level Assessments of Exposure, Health and the Environment with Case Study Examples

Office of Research and Development
National Exposure Research Laboratory

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Developed by the U.S. Environmental Protection Agency
Office of Research and Development (ORD)

National Exposure Research Laboratory (NERL)

CONTRIBUTORS:

Timothy M. Barzyk (EPA/ORD/NERL)

Brandi White (EPA/ORD/Student Services)

Lars Perlmutt (EPA/ORD/Student Services)

Margaret Millard (EPA/Region 5/OECA)

Marilou Martin (EPA/Region 5/OECA)

Francene Harris (EPA/Region 5/OECA)

Phuong Nguyen (EPA/Region 5/ARD)

Kathy Memmos (EPA/Region 5/OECA)

Fred Jenkins (EPA/OCSPP)

Davyda Hammond (EPA/ORD/NERL)

Alan Walts (EPA/Region 5/OECA)

Andrew Geller (EPA/ORD/NERL)

Valerie Zartarian (EPA/ORD/NERL)

Brad Schultz (EPA/ORD/NERL)

PRIMARY CONTACT

Timothy M. Barzyk
National Exposure Research Laboratory (NERL)
109 T.W. Alexander Dr.
Durham, NC 27711-0001

Acknowledgements

The authors would like to thank the following people for their informative feedback and support: Anna Ciesielski, Nancy Tian, the members of the EPA Communities and Cumulative Risk Research Program, U.S. EPA Regions 5 and 6, and the communities of Westlawn, Altgeld Gardens, Port Arthur and the 30th Street Corridor.

Table of Contents

Executive Summary

The purpose of this report is to assess the application of tools to community-level assessments of exposure, health and the environment. Various tools and datasets provided different types of information, such as on health effects, chemical types and volumes, facility locations and demographics, and different formats, such as maps, graphs and tables. Each community case study has a documented environmental or public health concern. This report focuses primarily on the identification of potential issues of concern and the collection of information for them (and the tools and datasets available for these tasks); in contrast, it does not focus on risk ranking or prioritization, which falls more into the category of a formal risk assessment.

For each case study, we followed assessment steps outlined in one of two documents intended for community assessments, either the *Community Action for a Renewed Environment (CARE) Roadmap or the Toolkit for Assessing Potential Allegations of Environmental Injustice (hereafter, the EJ Toolkit)*. Tools and datasets were identified that could provide information for each step, which was then compiled and evaluated with respect to its suitability for addressing the assessment step.

Results draw from national and local sources of publicly available information. In most cases, a certain level of technical aptitude is necessary to access the tools, compile and analyze information. This report provides examples of which tools and information can be used within the context of environmental or public health assessment, and how the information can be displayed and interpreted. Potential users may be interested in currently available information that could provide insight into environmental or health conditions prior to a more rigorous assessment that may include measurements or other types of in-field research. In this respect, users may include community-based organizations, academic researchers, local governments working with communities, or federal agencies developing local-scale applications.

The report is divided into four sections and ten appendices. The first section provides an introduction to available tools, and an overview of health and environmental assessments as related to the community case studies. The second section describes the application of the *CARE Roadmap* to one community. The third section describes the application of the *EJ Toolkit* to three communities. The fourth section provides suggestions on the use of these tools to collect, organize and display health and environmental information. The appendices provide detailed and comprehensive examples of information related to environmental, health, social and economic data collected for the case study communities.

This report provides a screening-level approach to collecting, organizing and interpreting available information. In this respect, information in this report could provide a basis for a more quantitative assessment that leverages expert guidance to better understand and interpret causal relationships between chemical concentrations, health effects, and exposure.

This research resulted from a collaborative partnership between scientists and personnel from the EPA Office of Research and Development, Office of Chemical Safety and Pollution Prevention, Region 5, and community stakeholders.

1.0 Introduction

A number of tools have been developed that provide information and guidance to assist communities, researchers, government officials, academics and others with performing assessments of environmental and public health conditions for a defined population or location representing a community. While the definition of community may include several considerations, in the context of this research a community is a subset of individuals living in a contiguous location that share common traits or goals with respect to environmental and public health issues.
Tools and information were applied to the steps outlined in two guidance documents related to environmental and health assessments for communities. One was the *Community Action for a Renewed Environment (CARE) Roadmap and the other was the Toolkit for Assessing Potential Allegations of Environmental Injustice (hereafter the EJ Toolkit)*.

This report details the process and method of using tools to collect information. It does not focus on aspects of ranking environmental issues. Instead, it is intended as a resource to demonstrate which and how environmental and health data could be accessed and displayed for use in community-based environmental and health assessments. In this respect, the report is written primarily for organizers, researchers or local officials working towards community-based assessments with the intention of gathering and presenting information in order to make informed decisions regarding issue prioritization and resource allocation.

A common theme in both of the guidance documents is that of assessing cumulative impacts. Assessing cumulative impacts at the local level with local participation and knowledge is known as a community-based cumulative risk assessment (CBCRA), for which this report provides screening-level information. A CBCRA provides a population-based approach for identifying environmental, social, and economic conditions that could potentially impact the health of a community. CBCRAs can include a number of considerations, such as the potential for combined effects from chemical mixtures and the exacerbation of health effects due to socioeconomic factors. The culmination of these factors can be described as cumulative impacts.

The Interagency Working Group (IWG) on Environmental Justice of the California Environmental Protection Agency is currently working to develop a method to screen for cumulative impacts. The Group defines cumulative impacts as follows:[1]

> Cumulative impacts means exposures, public health or environmental effects from the combined emissions and discharges, in a geographic area, including environmental pollution from all sources, whether single or multi-media, routinely, accidentally, or otherwise released. Impacts will take into account sensitive populations and socio-economic factors, where applicable and to the extent data are available.

The National Research Council proposes defining cumulative impact assessments as:[2]

> Considering a wider array of end points, including effects on historical resources, quality of life, community structure and cultural practices, some of which may not lend themselves to quantification

Documents developed by the EPA concerning cumulative assessments provide an abbreviated definition. The *Framework for Cumulative Risk Assessment (2003)* and *Concepts, Methods and Data Sources for Cumulative Health Risk Assessment of Multiple Chemicals, Exposures and Effects: A Resource Document (2008)* defines cumulative risks as the combined risks from exposures to multiple chemicals or stressors.[3] The documents emphasize providing information on stressors in both the physical and social environment.

For years, communities overburdened by environmental stressors have acknowledged that their community faces multiple challenges from both the physical and social environment. Examining cumulative impacts in CBCRAs can help achieve environmental justice (EJ) by considering a variety of stressors to provide a comprehensive description of a community's physical and social conditions. Environmental justice incorporates an understanding of vulnerability and fairness. The EPA defines EJ as:[4]

> The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no population, due to policy or economic disempowerment, is forced to bear a disproportionate share of the negative human health or environmental impacts of pollution or environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local and tribal programs and policies.

Working for environmental justice is one of the seven priorities declared by EPA Administrator Lisa P. Jackson for the Agency.[5] Providing communities with the tools to conduct

[1] For more information on the Interagency Group, go to: http://www.calepa ca.gov/EnvJustice/Strategy/Development.htm.

[2] The NRC's Science and Decision: Advancing Risk Assessment is available at: http://dels.nas.edu/Report/Science-Decisions-Advancing-Risk-Assessment/12209.

[3] For access to these documents and more information on CBCRA, go to: http://www.epa.gov/ncer/cbra/about.html.

[4] For more information on EJ, visit: http://www.epa.gov/oecaerth/environmentaljustice/.

[5] To read Administrator Jackson's seven priorities for the EPA, go to: http://blog.epa.gov/administrator/2010/01/12/seven-priorities-for-epas-future/.

CBCRAs is one way to work towards environmental justice and include communities in the environmental decision making process.

EPA tools that provide information from publicly available sources, such as national databases of industrial emissions, that could be used to inform the CBCRA process, were summarized by scientists at the Office of Research and Development's (ORD's) National Exposure Research Laboratory (NERL).[6] NERL scientists have incorporated the databases into a web-based tool, the Community-Focused Exposure and Risk Screening Tool (C-FERST).[7] C-FERST helps communities identify and prioritize environmental health issues by using the latest innovations in estimating human exposure to toxic chemicals in the physical environment. The tool also helps communities make informed decisions to improve environmental health and achieve environmental justice.[8]

Results presented in this report draw from C-FERST and publicly available sources to inform the steps of the *CARE Roadmap* and the *EJ Toolkit* within a cumulative risk framework, the former for one community, and the latter for three communities. Much of section 2 of the report draws from C-FERST. Section 2 was conducted in the early stages of C-FERST development; thus, some of the figures were generated outside C-FERST, but can be generated in the current and/or future versions of the tool. The other case studies provide important material to inform C-FERST development and future community applications.

[6] Timothy M. Barzyk, Kathryn C. Conlon, Teresa Chahine, Davyda M. Hammond, Valerie G. Zartarian, and Brad D. Schultz. Tools available to communities for conducting cumulative exposure and risk assessments. Journal of Exposure Analysis and Environmental Epidemiology 9 (2009):1-14.

[7] V .G. Zartarian, B.D. Schultz, T.M. Barzyk, M. Smuts, D.M. Hammond, A.M. Geller. The EPA's Community-Focused Exposure and Risk Screening Tool (C-FERST) and its potential use for Environmental Justice efforts. Accepted for publication by the American Journal of Public Health.

[8] Detailed information on C-FERST can be found at: http://www.epa.gov/heasd/c-ferst/

This report does not include risk ranking and prioritization steps or recommendations for specific actions within the community case studies. Instead, it focuses on identifying issues and collecting data and information. Procedures for drawing specific conclusions or recommendations about committing resources to risk mitigation actions are often determined by the community itself, such as the individuals involved and resources available.

The data presented in this report are a product of a collaborative partnership with scientists and personnel from NERL, the Office of Chemical Safety and Pollution Prevention (OCSPP), and EPA Region 5. Project Officers from the CARE program presented this data to community groups and members to supplement information for their community assessments.

The report is divided into four sections and ten appendices. In the second section of the report, the *CARE Roadmap* is applied to a community case study. References to C-FERST are made to assist users in collecting similar information for community case studies. The third section applies the *EJ Toolkit* to three communities. The fourth section provides a summary and conclusions for community-based stakeholders and groups. The appendices provide detailed information on environmental, health, social, and economic data collected for the case study communities to demonstrate examples of how this information can be collected and displayed.

Much of the information provided in this report could be used as a screening-level approach to environmental and health assessments. However, it is possible to conduct a more quantitative assessment based on chemical concentrations, exposure and health effects; however, this is typically a fairly complicated procedure, typically conducted by professionals familiar with the risk assessment process in more detail. It is possible that this type of report could provide a basis to launch a more rigorous assessment, which would then supplement the screening-level assessment with quantitative results.

2.0
Community Action for a Renewed Environment (CARE) Roadmap

Developed by EPA's Community Action for a Renewed Environment (CARE) program, the *CARE Roadmap* provides guidance to communities addressing environmental health concerns. The CARE program assists communities in addressing multiple sources of toxic pollutants in their environment. The program also helps communities by awarding partnership funds to tackle environmental risks. Funding is available to support communities establishing partnerships, identifying problems, and finding solutions (Level 1 grants). To support the implementation of solutions and to promote sustainability, Level 2 grants are available.[9]

2.1 Overview

2.1.1 Introduction to the CARE Roadmap

The *CARE Roadmap* outlines a ten-step process for communities to learn about environmental health issues, mobilize community partners to reduce impacts and risks, and build long-term capacity within the community. It presents a method to identify, prioritize, and address environmental health risks that draws perspectives from the *Framework for Cumulative Risk Assessment*[10] and recommendations from the National Environmental Justice Advisory Council (NEJAC) in *Ensuring Risk Reduction in Communities with Multiple Stressors: Environmental Justice and Cumulative Risks/Impacts.*[11] The *CARE Roadmap* does not specify comparisons between the community and reference areas such as the city or state; however, Appendices E,F, G, and H provide data on Milwaukee County and the State of Wisconsin for another case study.

The ten steps of the *Roadmap* are:

1. Build a partnership
2. Identify community concerns
3. Identify community vulnerabilities
4. Identify community assets
5. Identify concerns for immediate action
6. Collect and organize information
7. Rank risks and impacts
8. Identify potential solutions
9. Set priorities for action and begin work
10. Evaluate results and become self-sustaining

[9] For more information on the CARE grant program, go to http://www.epa.gov/care/index.htm.

[10] The *Framework for Cumulative Risk Assessment* is available at: http://www.epa.gov/raf/publications/framework-cra.htm.

[11] For all NEJAC reports containing advice and recommendations to the EPA, go to http://www.epa.gov/environmentaljustice/nejac/recommendations.html

The online tool developed by the National Exposure Research Lab (NERL), C-FERST, is intended to assist communities with the challenge of identifying and prioritizing environmental health issues.[12] It contains a number of sources that can be used to complete the steps of the *CARE Roadmap*. Results presented here represent an exercise where relevant information was downloaded and placed under the appropriate Roadmap step for a CARE community in Milwaukee, Wisconsin (WI). In many cases, summary statistics or graphics were produced from raw datasets.

2.1.2 Case Study Description: Westlawn, Milwaukee, WI

The Westlawn Community is located in the northwest corner of Milwaukee, WI. In 2008, the Westlawn Partnership for a Healthier Environment received a Level I CARE grant with the Institute for Urban Health Partnerships of the University of Wisconsin-Milwaukee as the lead partner. The partnership includes community residents, community-based organizations, schools, and local, state, and federal agencies. The environmental issues initially identified by the partnership were poor water quality, toxic releases, exposures to lead and copper in drinking water, pharmaceutical waste, sewer overload, and asthma.

2.2 Step 1: Build a Partnership

Build a collaborative partnership that is able to identify environmental risks and impacts, build consensus on priorities, and mobilize all the resources necessary to achieve community goals.

[12] V.G. Zartarian, B.D. Schultz, T.M. Barzyk, M. Smuts, D.M. Hammond, A.M. Geller. The EPA's Community-Focused Exposure and Risk Screening Tool (C-FERST) and its potential use for Environmental Justice efforts. Accepted for publication by the *American Journal of Public Health.*

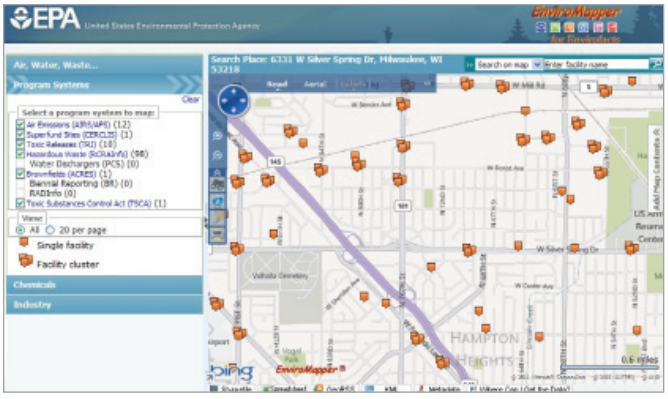


Figure 2-1. Map of Westlawn, Milwaukee, WI (EnviroMapper)

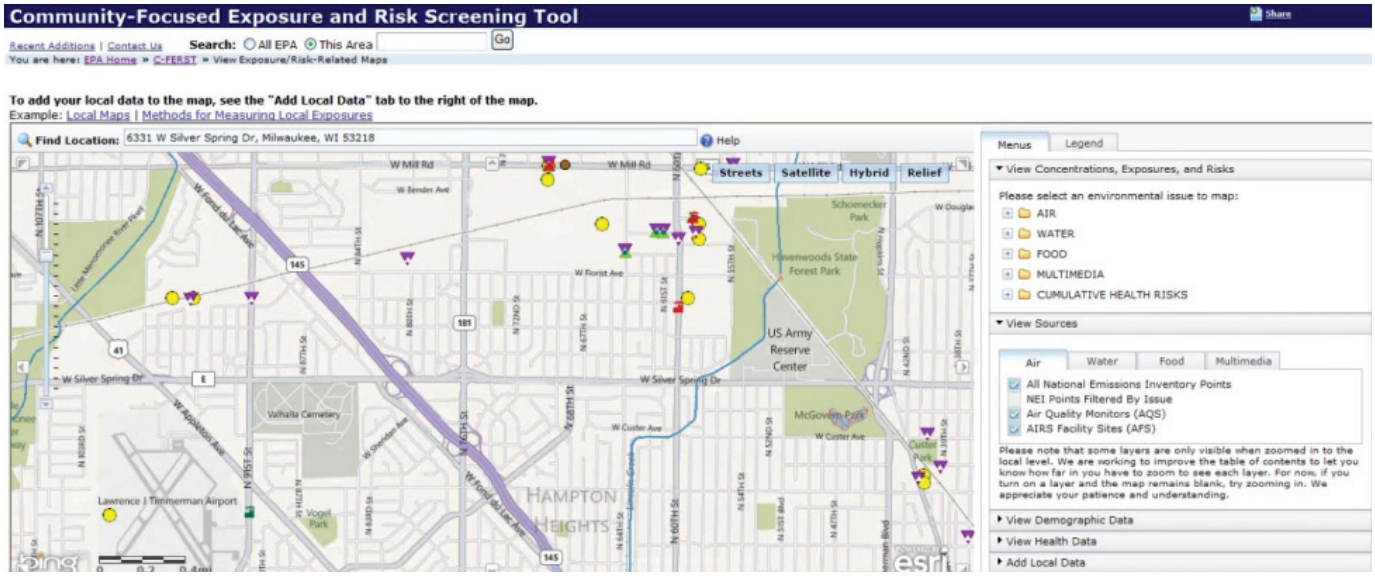


Figure 2-2. Location of Facilities, Westlawn (C-FERST)

The first step of the *CARE Roadmap* involves building a collaborative partnership representing a broad range of interests that is able to identify environmental risks, build consensus, and mobilize the resources necessary to achieve community goals.

This includes:

- ✓ Including a broad cross-section of community partners
- ✓ Clarifying roles and expectations of partners
- ✓ Laying out clear plans for involving partners
- ✓ Providing the support partners need to participate
- ✓ Planning for ongoing partner recruitment
- ✓ Finding creative ways to fund the process
- ✓ Building a philosophy of self-sustainability

2.2.1 Community Profile

According to the 2000 U.S. Census, there were 13,950 residents in the Westlawn Community. More than half the residents were African-American (66%) and over one third were under 15 years of age (34%). In addition, more than half of the residents lived below the federal poverty line (FPL) in 1999 (59%).[13] In C-FERST's maps, the user can obtain 2000 Census data at the census tract level by entering a zip code or city.

2.2.2 Funding Opportunities

Funding opportunities promote the maintenance and sustainability of a partnership, and address potential roadblocks related to available resources. In C-FERST, the *consider/identify environmental issues for your community* option links to grant opportunities. Some funding options include federal grants focused on community and public health activities.[14]

2.2.3 Community Description

Identifying sources of pollution and risks can help identify potential partners and stakeholders. Mapping features within C-FERST can plot results from the 2002 National-Scale Air Toxics Assessment (NATA), such as cumulative cancer risk estimates and risk estimates for specific pollutants.[15] C-FERST also offers the ability to plot facilities and areas associated with air, water, food and multimedia concerns, including facilities that report to the National Emission Inventory (NEI),[16] the Toxic Release Inventory (TRI),[17] and the Air Facility System (AFS) (see Figure 2-2).[18] The option to add demographic and housing characteristics at the census tract level as a map layer is also available.

Within C-FERST one generates maps by selecting the *visualizing exposure/risk-related maps* option and typing a location (an address, zip code, city, or county). To view the estimated cumulative cancer risk from NATA, click on air, open the cumulative cancer risk folder, and click on estimated cancer risk. To overlay the location of facilities from NEI for air, go to view sources and click on "All National Emissions Inventory Points."

Maps with estimated cancer risks from NATA for zip code 53218, which includes the Westlawn Community, can be found in Appendix B. Based on the risk estimates, Westlawn has the greatest cumulative cancer risk, which is 54 out of one million equally exposed people, while the rest of the area has a risk of 25-50 per one-million people exposed.

C-FERST maps can also display non-cancer respiratory risk estimates as a result of exposure to diesel particulate matter (PM). The hazard quotient for zip code 53218 ranges from 0.10 to 0.12, indicating that the risk at the upper bound is approximately in the 60th percentile. Hazard maps

[13] Census data is available at: factfinder2.census.gov.

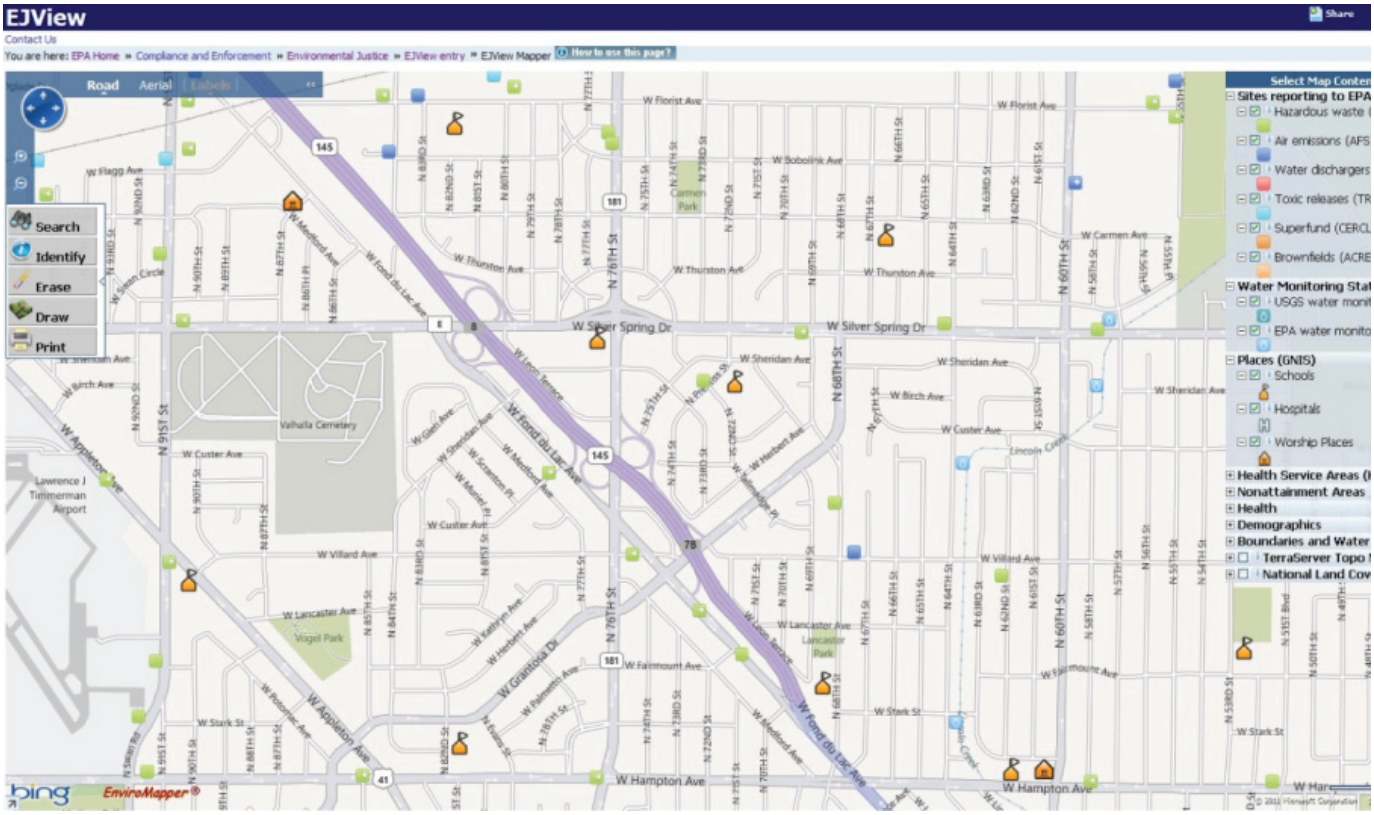
[14] For additional information on funding opportunities, go to http://www.epa.gov/CARE/collaboration.htm.

[15] Assessment results from the 2002 NATA are available at http://www.epa.gov/ttn/atw/nata2002/tables.html.

[16] Access to NEI data is available at: http://www.epa.gov/air/emissions/where.htm.

[17] TRI data is available at: http://www.epa.gov/triexplorer/.

[18] AFS data is available on Envirofacts at http://www.epa.gov/enviro/facts/afs/index.html.



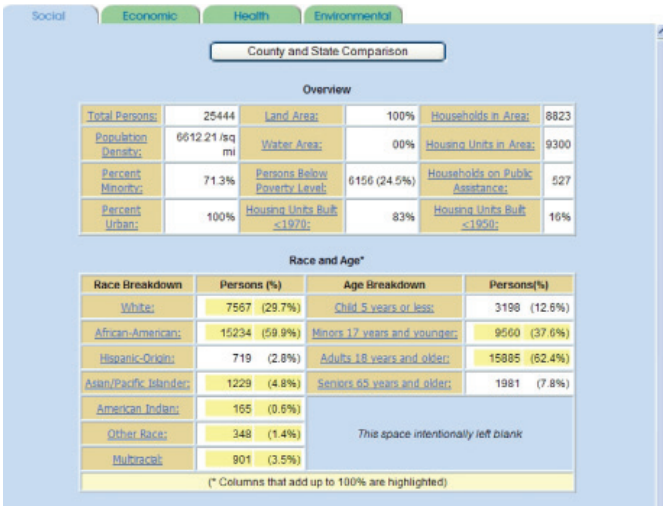


Figure 2-3. Geographic Area and portion of EJ Report, Westlawn (EJView)

The location of facilities can also be viewed in EPA's Environmental Justice Viewer (EJView).[19] Environmental, health, social, and economic statistics are obtained by defining a geographic area and generating a report (see Figure 2-3). EJView is accessible through C-FERST under *access other community tools.*

Detailed social, economic, and housing data is available for download at multiple geographic levels, e.g. block, block group, and census tract, from the 2000 Census.[20] Data for Westlawn was collected at the block group level (see Table 2-1).

There was an approximate equal gender distribution of Westlawn residents (55% are female) in the 2000 Census. Most of the residents were non-white (75%) and more than half of the population lived in housing built between 1940 and 1959 (62%).

2.2.4 Community Partners

The context of the CBCRA will help identify interested partners from diverse backgrounds, including community-based organizations, local and state agencies, healthcare and childcare providers, community members, and local businesses. For example, the following groups are partners in the Westlawn Partnership for a Healthier Environment:

- Westlawn Residents
- Growing Power
- Fight Asthma Milwaukee
- Havenwoods Economic Development Corporation
- Silver Spring Neighborhood Center
- City of Milwaukee
- Milwaukee Public Schools
- Milwaukee Health Department
- University of Wisconsin – Milwaukee
- Wisconsin Department of Health
- EPA Region 5

A user can upload local information on C-FERST's maps, such as the location of community partners, as well as overlay social and economic information.

[19] EJView is available at: http://www.epa.gov/environmentaljustice/mapping.html.

[20] Data from the 2000 US Census was downloaded for Summary File 3 at the block group level available at: http://factfinder.census.gov/jsp/saff/SAFFInfo.jsp?_lang=en&_sse=on&_content=sp4_decennial_sf3.html&_title=Summary+File+3+(SF+3)

SOCIAL	
Total population	13,950
Gender	
Male	44.8%
Female	55.2%
Race/Ethnicity	
Black, alone	64.5%
White, alone	25.4%
Asian, alone	3.9%
Two or more races	4.0%
Hispanic/Latino	2.4%
Age Groups	
Under 5 years	10.8%
5-9 years	11.2%
10-14 years	12.1%
15-17 years	6.0%
65 years and over	6.6%
Education 25 yrs or older	
High school graduate	38.8%
Bachelor's degree or higher	6.2%

ECONOMIC	
Median household income, 1999	$29,379.00
Per capital income, 1999	$12,577.00
Income below poverty level, 1999	59.0%
Households with public assistance, 1999	6.8%

HOUSING		
Tenure		
Owner-occupied		46.2%
Renter-occupied		53.8%
Year housing unit built		
	1939 or earlier	7.0%
	1940 to 1959	62.4%
	1960 to 1969	16.8%
	1970 to 1979	8.5%
	1980 to March 2000	5.3%
	1939 or earlier	7.0%

Table 2 1. Socioeconomic Characteristics, Westlawn (2000 U.S. Census)

Community Partner	Roles & Expectations	Plan for Involving Members	Support Required to Participate	Plan for Ongoing Recruitment	Philosophy of Self-Sustainability
University of Wisconsin	Lead administrator	…	…	…	…
Fight Asthma Milwaukee	Provide Westlawn residents with asthma information	…	…	…	…
Milwaukee Health Department	Provide data on health-related concerns	…	…	…	…

Table 2 2. Partnership Considerations (*CARE Roadmap*)

2.2.5 Organization

The *CARE Roadmap* offers recommendations for engaging and retaining partners when establishing a partnership. The table below can be used as a template to document and display partnership accountability standards as they apply to each partner.

2.3 Step 2: Identify Community Concerns

Identify the environmental, health, and related social and economic concerns of the community.

The second step of the *CARE Roadmap* entails identifying community concerns. Community concerns were identified by reviewing meeting minutes from the CARE partnership meetings and through discussions with the EPA CARE project officer from Region 5.[21] C-FERST can be used to gather additional information for these concerns or other concerns the community might have missed.

2.3.1 Disease Incidence

Information on disease incidence is available from the Centers for Disease Control and Prevention's (CDC's) National Environmental Public Health Tracking Network (NEPHTN)[22] and local health departments. EPA provides both air quality monitor data and air quality model data (via EPA's Hierarchical Bayesian [Statistical] Model) to CDC

[21] Meeting minutes were retrieved from the Westlawn Partnership CARE website, available at: http://westlawncare.community.officelive.com/default.aspx.

[22] Information from the CDC's National Environmental Public Health Tracking Network is available at: http://ephtracking.cdc.gov/showHome.action.

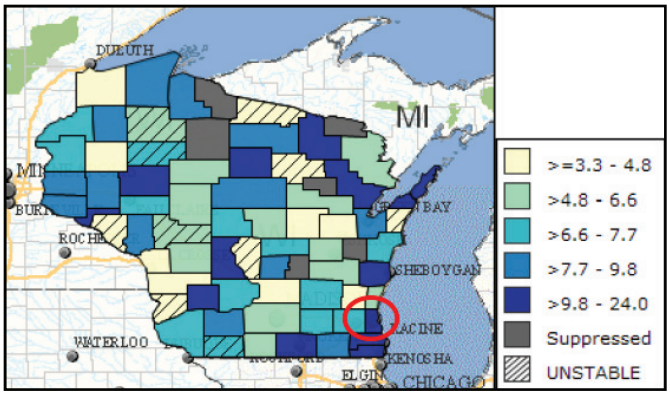


Figure 2 4. Asthma Hospitalization Rate for Wisconsin, 2004 (NEPHTN)

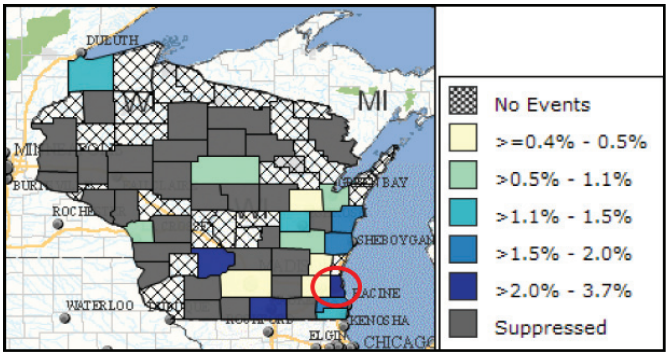


Figure 2 5. Elevated Childhood Blood Lead Levels for Wisconsin, 2004 (NEPHTP)

for the NEPHTN under a collaborative research program begun in 2007. The CDC then determines the incidence of cardiovascular and respiratory disease in different communities. A link to NEPHTN is available through C-FERST under access other community tools. Data was collected on asthma and childhood lead poisoning from the NEPHTN based on concerns identified by the Westlawn CARE Partnership.

2.3.1.1 Asthma

Asthma information from the NEPHTN, such as hospitalizations for asthma, is available at the state and county level. Figure 2-4 indicates that in 2004 Milwaukee County had one of the highest age-adjusted hospitalization rates in Wisconsin (19.4 per 10,000 residents; circled in red in the southeast corner of Wisconsin).

2.3.1.2 Childhood lead poisoning

Childhood lead poisoning data is also available at the state and county level from NEPHTN. Figure 2-5 indicates that in 2004, compared to all the counties in Wisconsin, Milwaukee County had the highest percent of children born in the same year and tested before age 3 with confirmed elevated blood lead levels (3.7%).

2.3.2 Sources of Pollution

In reviewing environmental health questionnaire results from the Westlawn Partnership, environmental concerns of residents were identified (see Figure 2-6)[23].

Twenty-five residents participated in the survey with most respondents identifying indoor and outdoor air quality as a source of concern for health effects.

A number of pollution sources exist within and around the community, including multiple NEI facilities (see Figure 2-7) and two Superfund sites. Contaminants occur in a variety of media. In air fugitive stack emissions, such as xylene, are released from Hentzen Coating in 2008. Pollutants in water may occur as a result of discharges into streams or water bodies, like chromium ompounds released from Capital Returns in 1999

In addition, mobile sources are a source of pollution causing concern for residents of Westlawn, especially those with respiratory illnesses such as asthma. Exposure to mobile sources can be measured by examining traffic count or annual average daily traffic (AADT). Maps showing AADT for Westlawn are available from Wisconsin's Department of Transportation (DOT) (see Figure 2-8).[24] In 2007, several roadways with an AADT over 20,000 intersected the community and Routes 41 and 45 are within 3 miles.

2.3.3 Economic and Social Conditions

Previously stated in Step 1 of the *CARE Roadmap*, economic and social data is available in EJView by defining a geographic area and generating a report. EJView is accessible through C-FERST under access other community tools. These data are also available in the C-FERST maps and community data table. Detailed data are available to download from the 2000 Census.[25] Economic and social data for the Westlawn Community are presented in Appendix C.

2.3.4 Routes of Exposure

To identify routes of exposure for specific environmental concerns in C-FERST, the *access factsheets for issues of concern* option will provide information on specific toxic substances, including concentration and exposure information. For instance, lead is a concern for the Westlawn CARE Partnership. Information on potential sources of lead poisoning is generated in C-FERST through the factsheet with mapping features and links to concentration and exposure information.

[23] Survey data were retrieved from the Westlawn Partnership CARE website, available at: http://westlawncare.community.officelive.com/default.aspx.

[24] To download AADT maps for Wisconsin, go to: http://www.dot.wisconsin.gov/travel/counts/index.htm.

[25] Economic and social data is available from the 2000 U.S. Census, available at: factfinder2.census.gov.

2.3.5 Environmental Issues

The user can get information on environmental issues categorized by type, media and pathway in C-FERST by going to *learn about environmental issues, and then to consider/identify environmental issues for your community.*

Figure 2-9 is a snapshot of the environmental issues available in C-FERST. This information is useful in identifying an environmental issue, giving health endpoints of concern, as well as chemicals of concern associated with an issue.

2.3.6 Chemical Effects

In addition to providing information on routes of exposure, *factsheets for issues of concern* in C-FERST provide hazard information for several toxic substances. The following is a list of specific toxic substances that the current C-FERST version provides information on:

- 1,3 Butadiene
- Acetaldehyde
- Acrolein
- Arsenic
- Asbestos
- Benzene
- Chromium
- Diesel Exhaust
- Environmental Tobacco Smoke
- Fine Particulates (PM 2.5) Formaldehyde
- Lead
- Mercury
- Mold
- Naphthalene
- Ozone
- Polychlorinated biphenyls (PCBs)
- Polycyclic aromatic hydrocarbons (PAHs)
- Radon
- Residential Pesticides

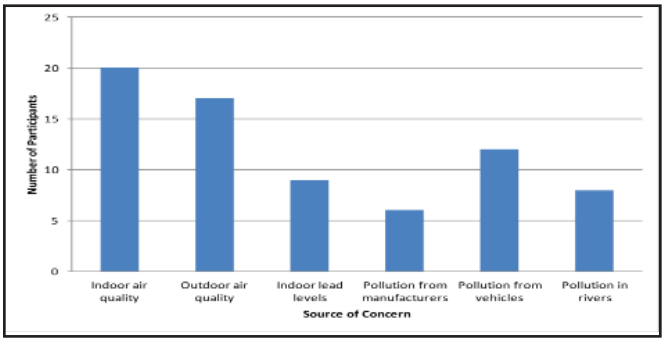


Figure 2 6. Environmental Sources of Concern of the Westlawn Community

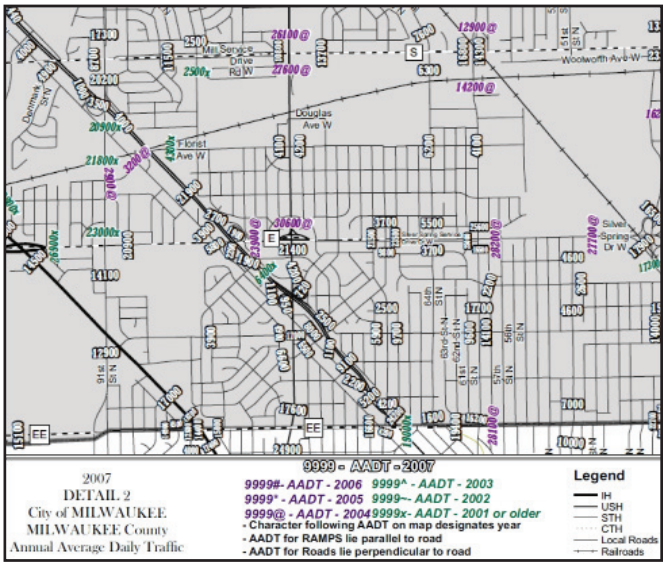


Figure 2 8. Traffic Counts - Westlawn, 2007 (WI DOT)

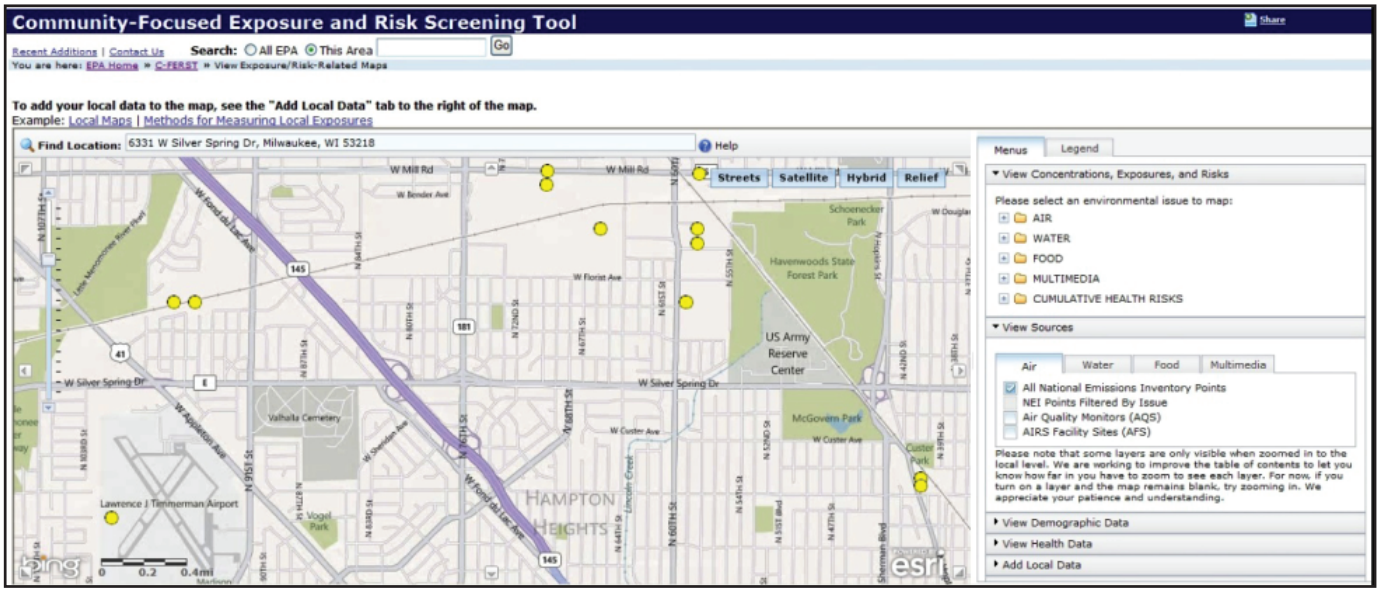


Figure 2 7. Westlawn's Proximity to NEI Facilities(C-FERST)

Environmental issues categorized by resource (partial table)							
Environmental Issues	OEJ Grantee Directory[1]	CARE Program Directory[2]	EPA 1987 Report[3]	EPA 1990 Report[4]	EPA 1993 Report[5]	2002 NATA[6]	2007 RSEI[7]
Accidental Releases — Oil Spills			26 of 26		X		
Accidental Releases — Toxics			25 of 26		X		
Air Quality	X	X				X	X
Air Quality — Mobile Source/Near Road Pollution	X	X				X	
Air Quality — Point Source Emissions	X	X				X	X
Ambient Air Pollutants				X		X	X
Arsenic in Soil		X					X
Asbestos						X	X
Asthma	X	X				X	
Autobody Shops/Recyclers	X	X					

[1] Environmental Justice Collaborative Problem-Solving Model. EPA-300-R-06-002. June 2008.

[2] 2005-2009 CARE Projects. Draft, Sept 2009.

[3] EPA. "Unfinished Business…" - Ranked from 1(most concern) to 26 (least concern)

[4] "Reducing risk…" Report of the Science Advisory Board to EPA Administrator.

[5] EPA. "Guidebook to comparing risks…." September 1993. 230-B-93-003.

[6] 2002 NATA

[7] Risk-Screening Environmental Indicators Model (RSEI)

Environmental issues categorized by type, media and pathway (partial table)												
Environmental Issues	Affected or Influencing Media						Exposure Pathways				Health Endpoint(s) of Concern	Chemical(s) of Concern
Sources of Exposure	AIR	INDR	SOIL	WATR	FOOD	OTH	IH	IG	DT	DR		
Airport	•		•				•				hearing loss, asthma	VOCs PM
Air Quality	•						•				asthma, COPD, heart disease	PM, O3
Air Quality — Mobile Source/ Near Road Pollution	•						•				asthma, respiratory disorder	diesel exhaust, PM,HAPs
Air Quality — Point Source Emissions	•						•				asthma, respiratory disorder	metals, SVOCs, VOCs
Autobody Shops/ Recyclers	•		•	•			•				asthma, neurological disorder	VOCs, metals
Brownfields			•	•				•		•	cancer	metals, PCBs
Contminanted Land			•	•	•			•		•	cancer	metals
Contaminated Sludge			•							•	cancer, immune disorders	PCBs, plutonium, etc.
Drinking Water				•	•			•	•	•	cancer, liver/kidney disorder	pathogens, metals
Fish Consumption					•				•		neurological impairment	mercury
Ground-water Contamination				•				•	•	•	cancer, liver/kidney disorder	nirates, metals
Hazardous Waste/ Pharmaceuticals			•	•						•	cancer	medications, acids, mercury

Figure 2-9. Environmental Issues (C-FERST)

Source: Davyda M. Hammond et al. Community environmental issues: A summary and analysis of local and federal government perspectives. Draft.

Demographics	Pollution Sources	Existing Health Problems and Conditions
Overview: Total persons: 13,950 Population density: 7004.07/sq mi Occupied households: 4,737 **Age Groups** Under 5 years: 11% Under 15 years: 34% 65 years and older: 7% **Race/Ethnicity:** African-American: 65% White: 25% Asian/Pacific Islander: 4% Hispanic/Latino: 2%	Emissions of chemicals into the air and water from a large number of facilities in the area. Two superfund sites within close proximity to the community Multiple sites reporting toxic releases Several Brownfield properties Near roadway exposure to Highway 145	Pharmaceutical waste Sewer overload Asthma
Unique Exposure Pathways	**Social/Cultural Conditions**	**Social Capital**
Air: Air fugitive stack emissions from facilities, such as xylene released from Hentzen Coating, Inc. in 2008 **Water:** Discharges to receiving streams or water bodies; i.e. Chromium Compounds released from Capital Returns in 1999	Low economic conditions Living below federal poverty line: 59%	**Substandard housing:** Housing Built < 1970: 86% **Lack of economic capital:** Households receiving public assistance: 7% Renter-occupied units: 54%

Table 2 3. Potential Cumulative Risks and Impacts, Westlawn *(CARE Roadmap)*

2.3.7 Community Environmental Health

After identifying community concerns, it is important to understand the scope of issues affecting the community's health. Using a template from the *CARE Roadmap,* Table 2-3 outlines potential cumulative risks and impacts for the Westlawn Community. Demographic and social capital information was obtained from EJView. Information on pollution sources and unique exposure pathways is from EnviroMapper.[26] Information on a community's environmental health is also available in C-FERST's exposure and risk-related maps.

2.4 Step 3: Identify Community Vulnerabilities

Identify community vulnerabilities that may increase risks from environmental stressors.

The next step in the *CARE Roadmap* is to identify vulnerabilities that may increase risks from stressors. The community may be vulnerable if it is more likely to be adversely affected by poorer environmental conditions (physical and social) than the general population.

	Westlawn (Zip code: 53218)	Milwaukee County
Total number of births	848	15,368
Number of low birth weight births	109	1,375
Low birth weight (less than 2,500 grams)	12.85%	8.95%
Number of infant deaths (less than 28 days)	8	145
Neonatal mortality rate per 1,000 live births (<365 days)	9.43	9.44

Table 2 4. Birth Outcomes, 2008 (WISH)

[26] EnviroMapper is available at: http://www.epa.gov/emefdata/em4ef.home.

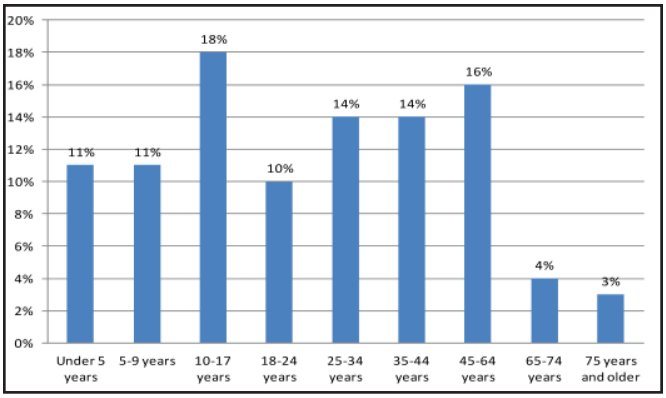


Figure 2 10. Age Groups, Westlawn (2000 U.S. Census)

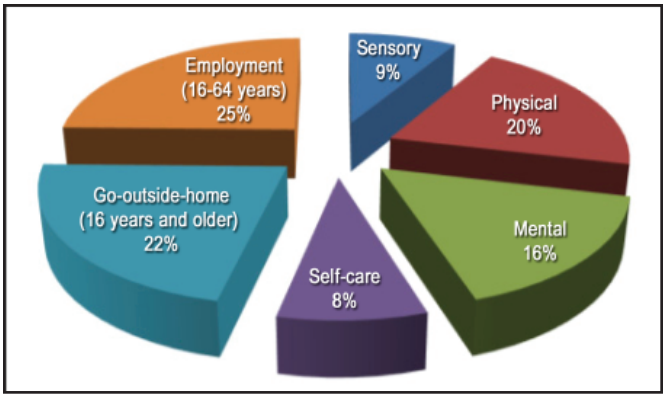


Figure 2-11. Type of Disability, Westlawn (2000 U.S. Census)

According to a NEJAC report on cumulative risks, vulnerability acknowledges that exposures to environmental hazards for certain subpopulations, such as socially and economically disadvantaged groups, may worsen health outcomes.[27] Vulnerability consists of three concepts:

- Susceptibility and sensitivity
- Exposure conditions
- Preparedness/Ability to recover

2.4.1 Susceptibility and Sensitivity

According to the NEJAC report, susceptible and sensitive subpopulations are defined as follows:

> A subpopulation may be susceptible or sensitive to a stressor if it faces an increased likelihood of sustaining an adverse effect due to a life state (e.g., pregnant, young, old), an impaired immune system, or a pre-existing condition, such as asthma. A subpopulation could have been previously sensitized to a compound, or have prior disease or damage. In some cases, susceptibility also could arise because of genetic polymorphisms, which are genetic differences in a portion of a population.

Therefore, identifying susceptible and sensitive populations includes obtaining information on age groups and preexisting health conditions.

2.4.1.1 Age groups

Infants, children, people with pre-existing health conditions and the elderly are sensitive subpopulations. As described in the NEJAC report, for example, young children are more susceptible to the impacts of lead poisoning and elderly residents could be more vulnerable to extreme temperatures. In C-FERST, maps can overlay demographic data from the 2000 Census identifying persons under 6 years old, 18 years old, and over 64 years old. Demographic data on age groups is also available to download in the community data table. For more detailed information, the *consider/identify environmental issues for you community* option links to the Census. Figure 2-10 shows the distribution of age groups in the Westlawn Community from the 2000 Census. Almost one quarter of the residents were under 10 years of age (22%) and 7% were over the age of 64.

For information on birth outcomes, *the consider/identify environmental issues for you community* option links to the CDC's NEPHTN. Detailed information on birth outcomes is available at Wisconsin Department of Health Services' interactive website, WISH (Wisconsin Interactive Statistics on Health) (see Table 2-4).[28]

In 2008, almost 13% of infants in Westlawn's zip code (53218) were considered low birth weight babies (less than 2,500 grams), compared to less than 10% of infants in Milwaukee County. The infant mortality rate for Westlawn was 9.43 per 1,000 live births, slightly lower than the county's rate of 9.44.

2.4.1.2 Pre-existing health conditions

The 2000 Census provides data on non-institutionalized persons aged 5 years and older with a disability. The *consider social issues* option in C-FERST links to Census data. Data are available at multiple geographic levels, such as block, block group, and census tract.

At the block group level, over one third of residents had a disability in Westlawn (34%); Figure 2-11 below indicates the employment and mobility status and the type of disability for residents living with a disability.

2.4.2 Exposure Conditions

Several factors can increase a population's exposure to pollution. Such factors include residential and occupational conditions, such as proximity to pollution sources, employment in high-risk jobs, and multiple routes of exposure to one chemical.

[27] NEJAC's Ensuring Risk Reduction in Communities with Multiple Stressors: Environmental Justice and Cumulative Risks/Impacts, December 2004 report, is available at: http://www.epa.gov/oecaerth/environmentaljustice/nejac/recommendations.html.

[28] Local data is available from WISH at: http://www.dhs.wisconsin.gov/wish/.

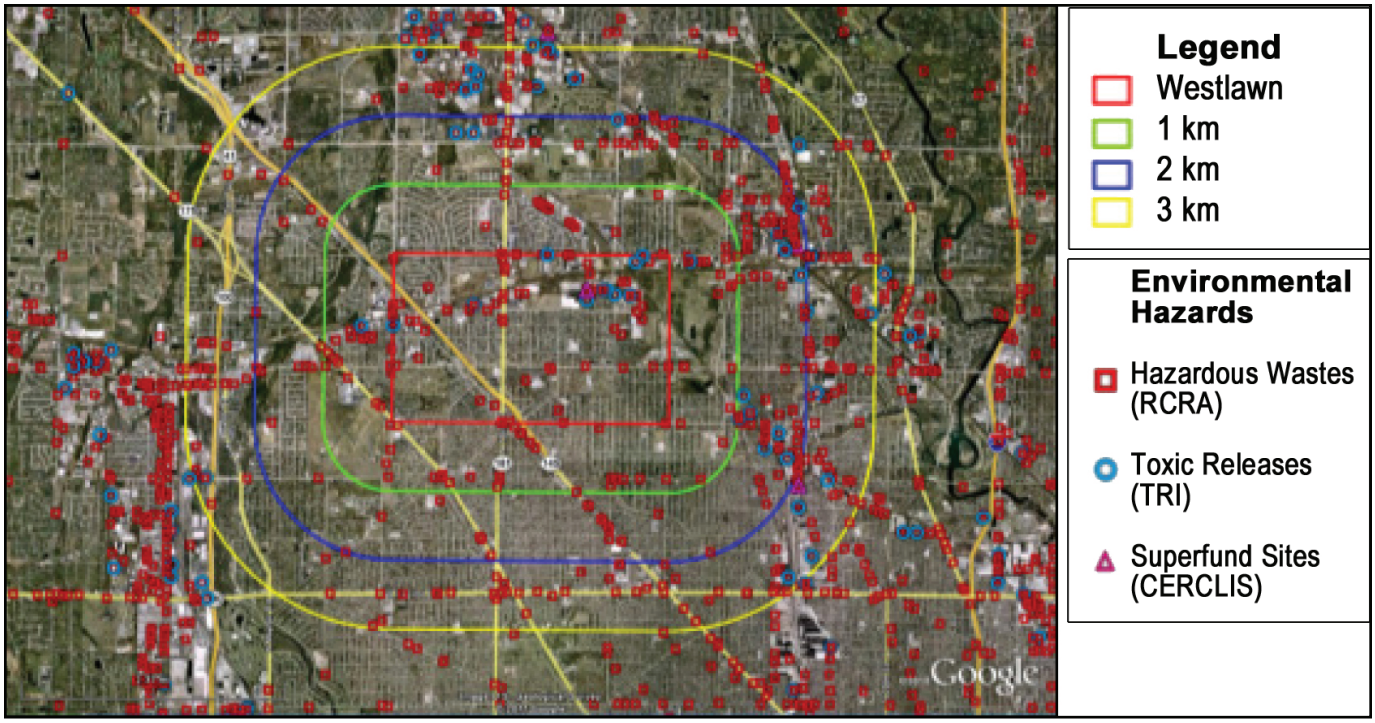


Figure 2 12. Facilities within 3 km, Westlawn (EnviroMapper and Google Earth)

Rank	Chemical	Media	Risk-related Score
1	Chromium and chromium compounds	Fugitive Air	933.08
2	Chromium and chromium compounds	Stack Air	591.59
3	1.2.4-Trimethylbenzene	Stack Air	164.80
4	1.2.4-Trimethylbenzene	Fugitive Air	135.90
5	Glycol ethers	Stack Air	127.01
6	Glycol ethers	Fugitive Air	105.46
7	Copper and copper compounds	Fugitive Air	77.90
8	Xylene (mixed isomers)	Stack Air	43.54
9	Xylene (mixed isomers)	Fugitive Air	36.02
10	n-Butyl alcohol	Stack Air	6.08
11	Zinc and zinc compounds	Fugitive Air	5.16
12	n-Butyl alcohol	Fugitive Air	5.05
13	Methyl isobutyl ketone	Stack Air	1.37
14	Zinc and zinc compounds	Stack Air	1.29
15	Methyl isobutyl ketone	Fugitive Air	1.12
16	Ethylbenzene	Stack Air	0.78
17	Ethylbenzene	Fugitive Air	0.62
18	Toluene	Stack Air	0.35
19	Toluene	Fugitive Air	0.28
20	Methyl ethyl ketone	Stack Air	0.14
21	Methyl ethyl ketone	Fugitive Air	0.11

Table 2 5. Top Chemicals by Media, 1996-2002 (RSEI)

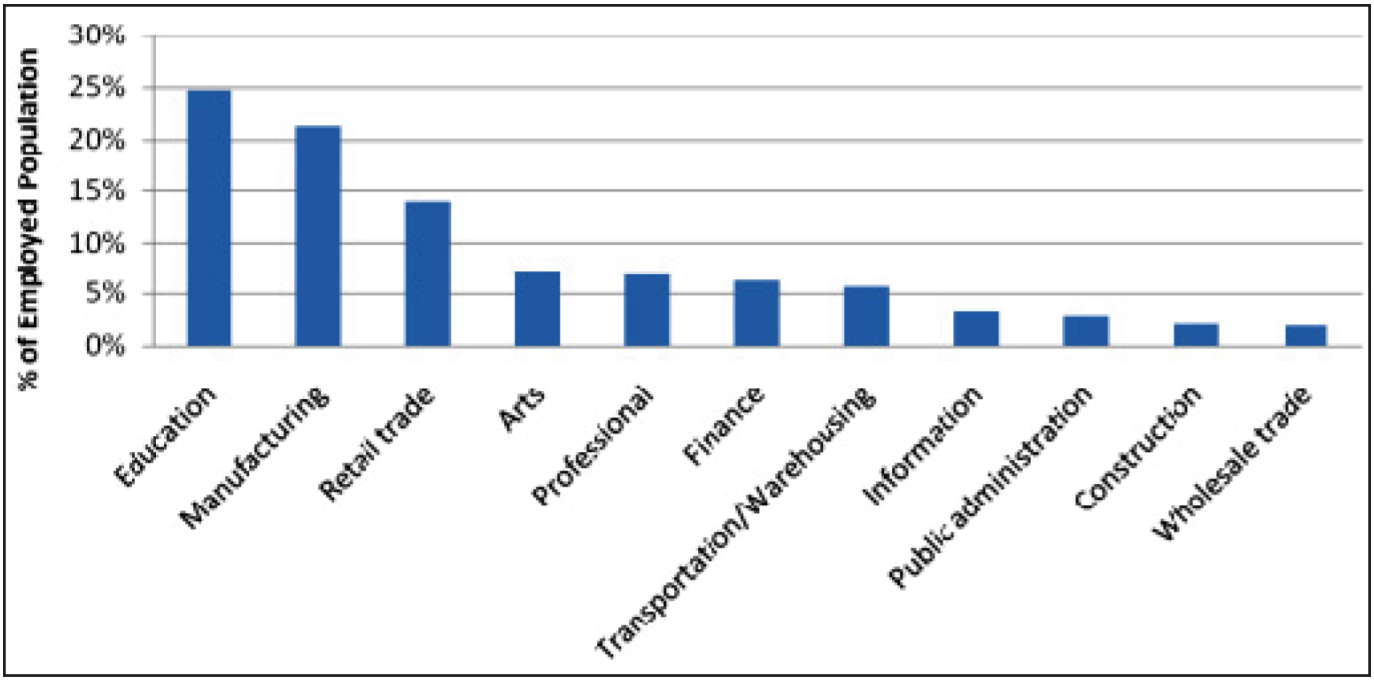


Figure 2 13. Industry of Employment, Westlawn (2000 U.S. Census)

2.4.2.1 Proximity to pollution sources

In C-FERST, the location of facilities can be plotted for a geographic area; however, the current version does not allow the user to define an area and draw buffer zones to determine proximity. In Figure 2-12, the location of facilities was downloaded from EnviroMapper and uploaded into Google Earth.[29] Several facilities are located within 3 kilometers (km) of Westlawn, including toxic release, hazardous waste sites, and Superfund sites.

2.4.2.2 Employment in high-risk jobs

According to the Bureau of Labor Statistics (BLS), high-risk employment industries include: agriculture forestry; fishing and hunting; mining; construction; manufacturing; and transportation and warehousing.[30] The *consider social and economic issues* option in C-FERST links to Census data which provides employment information. According to the 2000 Census, Westlawn residents worked in the manufacturing (21%) or educational industries (25%) (see Figure 2-13).

2.4.2.3 Multiple routes of exposure

There are sources of emissions of one chemical that can lead to higher levels of pollution than the general population. The EPA's Risk-Screening Environmental Indicators (RSEI) can provide the relative contribution of chemical-medium combinations for communities. RSEI is accessible in C-FERST through *additional tools for communities*. Table 2-5 shows the risk-related score for the top chemicals released by media for Westlawn's zip code (53218). Data was downloaded from RSEI Version 2.2.0.[31]

Chromium and chromium compound air releases had the highest risk-related score for Westlawn's zip code from 1996 to 2002.

2.4.3 Preparedness and Ability to Recover

Several conditions, such as poor housing conditions and employment status, can make it difficult for a community to recover from environmental stressors compared to the general population. Currently, users can overlay information on housing conditions (i.e. percent housing units built before 1950) in C-FERST's maps. For additional information on housing conditions and employment status, going to *consider social and economic issues* in C-FERST will link the user to the U.S. Census American FactFinder. The information was downloaded from the FactFinder.

2.4.3.1 Housing conditions

Based on the 2000 Census, 20% of housing units were built before 1950 in the Westlawn Community, which can increase the probability of lead poisoning (see Figure 2-14).[32]

2.4.3.2 Employment status

According to the 2000 Census, 11% of Westlawn residents were unemployed, compared to 6% in Milwaukee and 5% in Milwaukee County.

2.4.4 Social Vulnerability

Social vulnerability characteristics are based on NEJAC recommendations for the Environmental Justice Strategic Enforcement Tool (EJSEAT), an environmental justice screening method developed by the EPA Office of Enforcement and Compliance Assurance (OECA).[33] NEJAC

[29] EnviroMapper is available at: http://www.epa.gov/emefdata/em4ef.home; Google Earth can be downloaded at: http://www.google.com/earth/index.html.
[30] Information from BLS, available at: http://www.bls.gov/home.htm.
[31] RSEI is available for download at: http://www.epa.gov/oppt/rsei/.
[32] See the CDC's *Screening Young Children for Lead Poisoning*, available at: http://www.cdc.gov/nceh/lead/publications/screening.htm.
[33] The NEJAC report, "Nationally Consistent Environmental Justice Screening Approaches – May 2010," is available at: http://www.epa.gov/compliance/ej/resources/publications/nejac/ej-screening-approaches-rpt-2010.pdf.

recommended the tool incorporate a social vulnerability category to identify communities experiencing disproportionate environmental and public health burdens.

The table below shows the social vulnerability indicators suggested by NEJAC for Westlawn, which include demographic, economic, and health-related data from the 2000 Census and the state health department.[34] This information is also available in C-FERST Community Data Table in the *prioritize your community's issues* option.

Demographic	
Non-white population	74.6%
Under 5 years old	10.8%
Linguistically isolated households	1.9%
Female-headed household with children under 18 years	29.4%
Economic	
Per capital income, 1999	$12,577
Unemployed (16 years and older)	59.0%
Income below poverty level, 1999	24.6%
No High School diploma (25 years and older)	30.8%
Home ownership	46.2%
Health	
Infant mortality rate	9.4
Low birth weight	12.9%

Table 2 6. Westlawn Social Vulnerability Characteristics

[34] Local data is available from WISH at: http://www.dhs.wisconsin.gov/wish/.

Community Assets CARE Partner	Overall Partnership	Partner 1	Partner 2
Special Skills	…	…	…
Detailed Knowledge	…	…	…
Ability and Networks	…	…	…
Culture	…	…	…
Longevity	…	…	…
Neighborhood Associations	…	…	…
Religious Institutions	…	…	…

Table 2 7. Template to Identify Community Assets (CARE Roadmap)

Stressor	Immediate concern	Actions for risk reduction	Resources required	Timeline for completion	Success metric
Lead	…	…	…	…	…
Pesticides	…	…	…	…	…
Hazardous household waste	…	…	…	…	…

Table 2-8. Template for Immediate Concerns

Facility Name	CO	NO_x	VOC	SO_2	$PM_{2.5}$	PM_{10}	Total CAPs Emissions
Hentzen Coatings Inc.	0.4237	0.5053	12.6882	0.0030	0.1477	0.3397	13.9598
Kubin-Nicholson Corp.			18.9084				18.9084
Fredman Bag Co.	0.2779	0.3320	23.6327	0.0020	0.0116	0.0116	24.2562
Pechiney Plastic Packing Inc.	0.5010	0.6136	15.2550	0.0036	0.0089	0.0089	16.3821
Nohl Electrical Products Corp.	0.0756	0.0904	2.4113	0.0005	0.0032	0.0032	2.5810

CO: Carbon monoxide

NOx: Nitrogen oxides

VOC: Volatile organic compound

SO2: Sulfur dioxide

PM: Particulate matter

Note: The six pollutants from the National Ambient Air Quality Standard (NAAQS) include O_3 (ozone) and Pb (lead) in addition to CO, NO_2, SO_2, and PM. VOCs can react with NOx and CO in the presence of sunlight to form ozone (O_3), a constituent of photochemical smog.

Table 2-9. CAPs for Westlawn, 2002 (AirData)

2.5 Step 4: Identify Community Assets

Develop a list of community assets in order to build on the existing strengths of the community.

The next step is to create a list of assets to build on existing community strengths. Community assets include (*CARE Roadmap*, page 10):

- Special skills and capacities of community members
- Detailed knowledge of all aspects of community
- Ability and networks to communicate with community members
- Culture
- Longevity
- Neighborhood associations
- Religious institutions
- Business and industry
- Civic and community leaders
- Political abilities
- Community building resources
- Human resources
- Outreach networks and skills
- Historical information

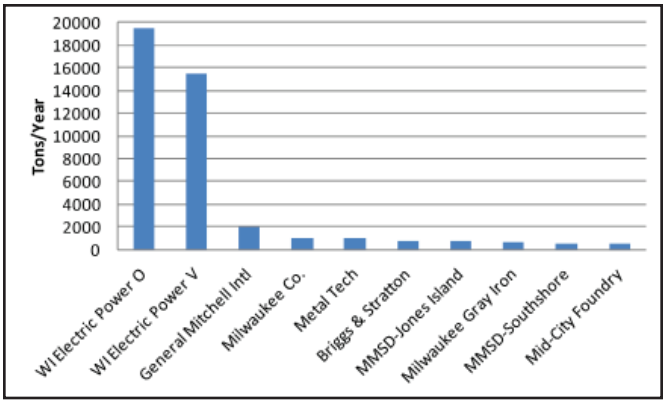


Figure 2-15. CAPs Emissions by Facility, 2005 (NEI)

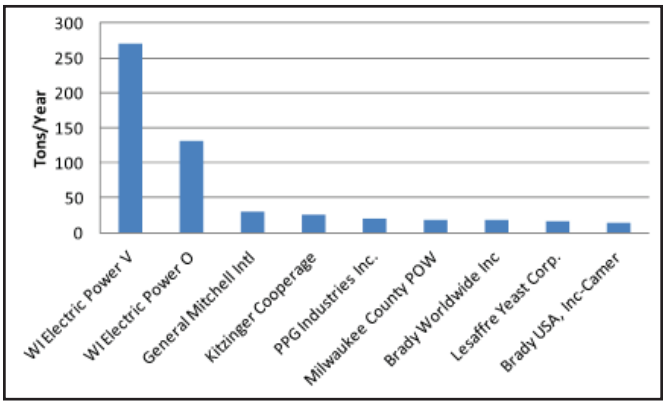


Figure 2-16. HAPs Emission by Facility, 2005 (NEI)

Chemical Concentration Rank	Census Tract 12	Census Tract 13	Census Tract 18	Census Tract 19
1	Toluene	Toluene	Toluene	Toluene
2	Formaldehyde	Formaldehyde	Formaldehyde	Formaldehyde
3	Xylenes (mixed isomers)	Acetaldehyde	Acetaldehyde	Acetaldehyde
4	Acetaldehyde	Xylenes (mixed isomers)	Xylenes (mixed isomers)	Xylenes (mixed isomers)
5	Benzene (including from gasoline)	Benzene (including from gasoline)	Benzene (including from gasoline)	Benzene (including from gasoline)
6	1,1,1-trichloroethane	Methyl chloride (chloromethane)	Methyl chloride (chloromethane)	Methyl chloride (chloromethane)
7	Methyl chloride (chloromethane)	Diesel engine emissions	Diesel engine emissions	Diesel engine emissions
8	Diesel engine emissions	1,1,1-trichloroethane	2,2,4-trimethylpentane	1,1,1-trichloroethane
9	Methanol		1,1,1-trichloroethane	
10	Methyl isobutyl ketone (hexone)	Methanol	Methanol	2,2,4-trimethylpentane

Table 2-10. Modeled Ambient Concentrations by Census Tract, Westlawn, 2002 (NATA)

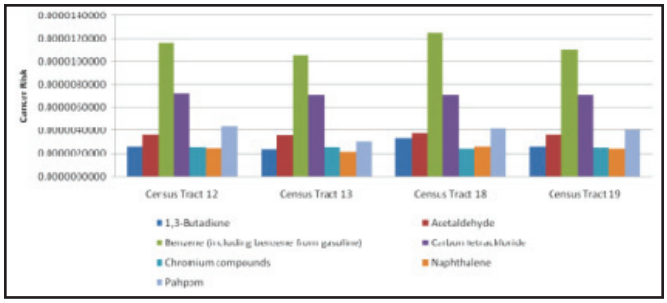


Figure 2-17. Estimated Cancer Risk, Westlawn, 2002 (NATA)

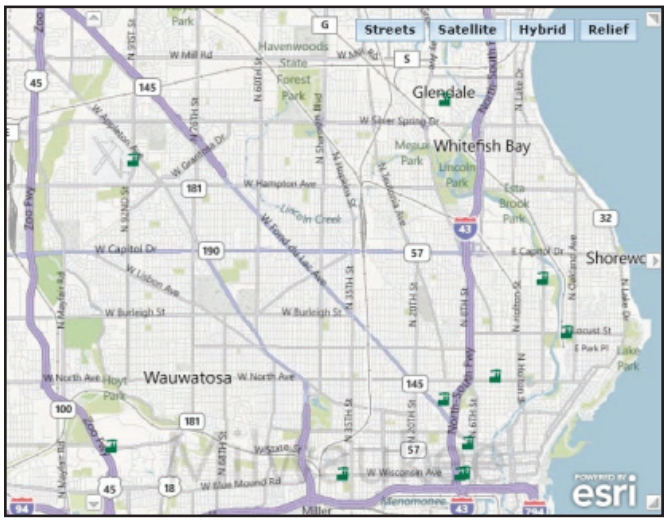


Figure 2-18. AQS Monitor Locations, Milwaukee County (C-FERST)

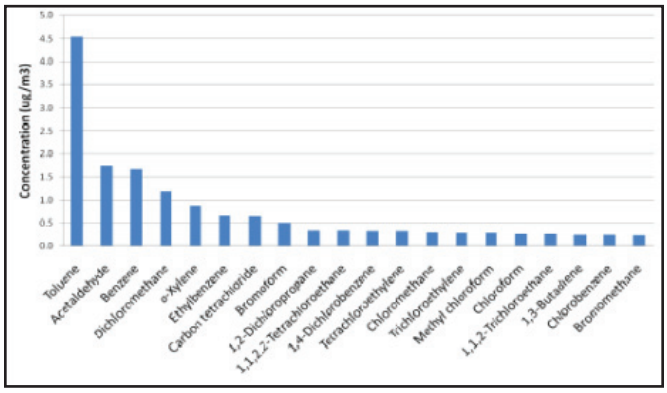


Figure 2-19. Annual Average Concentration of HAPs, Health Center Monitor, 2002 (AQS Data Mart)

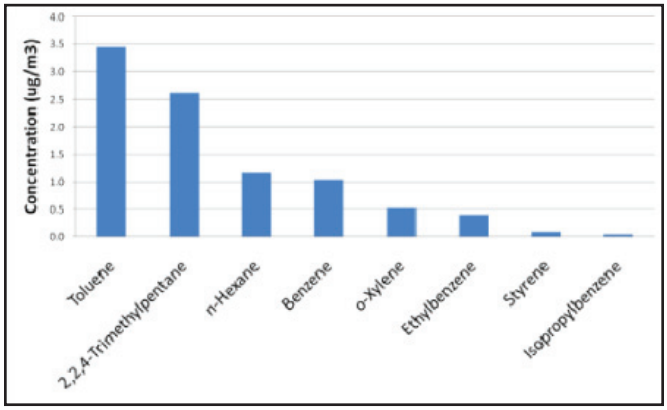


Figure 2-20. Annual Average Concentration of HAPs, WDNR Monitor, 2002 (AQS Data Mart)

Table 2-7 is an illustration of a way to identify community assets. In C-FERST, other examples of community assets can be identified by viewing CARE community profiles in the *consider/identify environmental issues for your community* option.

2.6 Step 5: Identify Concerns for Immediate Action

Identify and begin to address immediate concerns and vulnerabilities.

Step five involves identifying any concerns and vulnerabilities that need immediate attention. The partnership should agree on the high priority items and develop actions for risk reduction. A template such as the one in Table 2-8 can be used to identify high priority items and actions for risk reduction.

In C-FERST, the user can *explore potential solutions* for selected environmental issues of concern, such as lead, and view *promising practices for solutions implemented by communities.*

2.7 Step 6: Collect and Organize Information

Collect and summarize information on environmental health concerns (or stressors), taking into account the factors that may make the community more vulnerable.

Step six encompasses gathering and summarizing information on health concerns or stressors. Vulnerable populations identified in Step 3 of the Roadmap will be taken into account.

In C-FERST, a user can plot pollution sources in the exposure and risk-related maps for facilities reporting to NEI. In AirData, one can identify facilities in a specific zip code and determine the amount of Criteria Air Pollutants (CAPs) released from each NEI facility (see Table 2-9).[35] Thus, a project officer or community member could look at this information and see if a disproportionate amount of emissions comes from one facility. In 2002, the Fredman Bag Company emitted the most CAPs: 24.25 tons per year.

At the county-level, NEI shows that the top two facilities releasing CAPs were coal-fired power plants operated by Wisconsin Electric Power in 2005 (see Figure 2-15).[36] Of the top 10 CAP emitters, releases from Wisconsin Electric comprised 83% of emissions.

As with CAP emissions, Wisconsin Electric Power plants were also the top two emitters of Hazardous Air Pollutants (HAPs) in 2005 (see Figure 2-16).[35] Of the top 10 HAP emitters, emissions from Wisconsin electric comprised 69% of emissions

In NATA, one can generate a chemical list at the census tract level.[37] Westlawn covers four census tracts: census tracts 12, 13, 18 and 19. The top ten modeled ambient chemical concentrations from NATA for each Westlawn census tract were similar in 2002 (see Table 2-10). Toluene and formaldehyde had the highest modeled concentrations in each tract. NATA is accessible in C-FERST through the *additional tools for communities* option.

[35] AirData is available at: *http://www.epa.gov/air/data/.*
[36] Data is from NEI 2005, available at: http://www.epa.gov/ttnchie1/net/2005inventory.html.
[37] NATA 2002 data is available at: http://www.epa.gov/ttn/atw/nata2002.

C-FERST | Community Data Table | Export to Excel

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Data Metrics	Your Community Milwaukee WI	National Average	Standard [1]	Data Info/Notes [1]
Sources of Stress Placed on the Community (Vulnerability Indicators)				
Proximity/density of regulated facilities (under development)				
Traffic Density (under development)				
# current and past permit exceedances by regulated facilities (under development)				
# or extent of non-point sources of pollution (under development)				
% domestic well water use (under development)				
Environmental Concentration Estimates (µg/m³)				
Outdoor Air - Acetaldehyde	2.2	1.9		
Outdoor Air - Acrolein[2]	0.07	0.05		
Outdoor Air - Arsenic	0.0009	0.0006		
Outdoor Air - Benzene	2.02	1.06		
Outdoor Air - Butadiene	0.1	0.07		
Outdoor Air - Chromium	0.003	0.0009		
Outdoor Air - Diesel PM	2.03	0.9		
Outdoor Air - Formaldehyde	2.4	2.09		
Outdoor Air - Lead	0.009	0.002	1.5 µg/m³ (Quarterly Avg)	
Outdoor Air - Naphthalene	0.2	0.07		
Outdoor Air - PAH	0.02	0.02		
Outdoor Air - Fine Particulates (PM2.5) (under development)				
Outdoor Air - Ozone (under development)			0.075ppm (2008 std) 0.08ppm (1997 std)	
Outdoor Air - Near-Roadway (EPA Research Underway)				
Indoor Air - Radon (EPA Research Underway)				
Indoor Air - ETS (EPA Research Underway)				
Drinking Water - Arsenic (EPA Research Underway)				
Food - Methyl Mercury in Fish Consumption (EPA Research Underway)				
Human Exposure Estimates (µg/m³)				
Outdoor Air - Acetaldehyde	1.8	1.5		
Outdoor Air - Acrolein[2]	0.05	0.03		

Figure 2-21: Community Data Table, partial (C-FERST)

Concern	Level and type of risk	Extent of impact	Information used and Data Gaps
Asthma	Respiratory: Affects airways that carry oxygen in and out of lungs	High impact on children: Age-adjusted hospitalization rate (per 10,000 resident), 2008 Milwaukee County: 17.6 Wisconsin: 9.2	Data limited to county level
Lead	Neurological/ Developmental: Brain, liver, and kidney damage; slowed development; learning or behavior problems	Year housing units built: Before 1970*: 86% *prior to lead paint regulations Elevated childhood blood lead levels, 2004: Milwaukee County: 3.65% Wisconsin: 1.57%	Year housing built at block group level; Blood lead levels limited to county level
Mercury	Neurological/ Cardiovascular/ Immunological: High levels may harm brain, heart, kidneys, lungs, and immune system	Estimated neurological risk Westlawn: 0.001876	Based on census tract level modeling data
Sewer overflow	Poor water quality: Contaminated drinking water Property damage: Destructive to public and private property; bad for recreation and tourism	High impact on water quality: More than 400,000 people affected (>100 deaths) when cryptosporidium parvum, a microscopic parasite, entered Milwaukee's public water supply; Untreated wastewater leaks may have discharged the parasite into the primary drinking water source	Historical data
Pharmaceutical Waste	Risks uncertain	May be ecological harm when certain drugs present	More research needed

Table 2-11. Summary of Environmental and Health Concerns (CARE Roadmap)

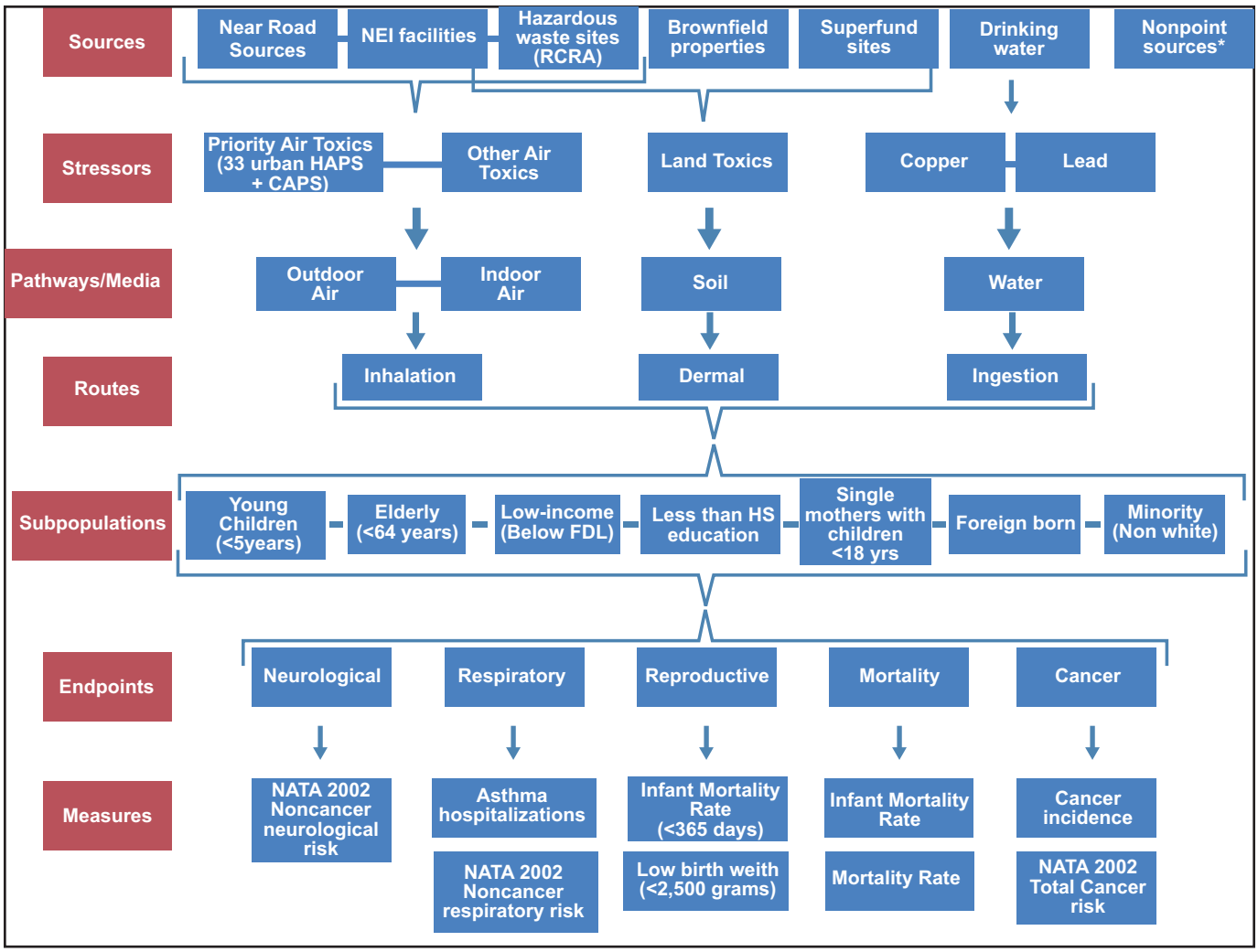


Figure 2-22. Conceptual Model, Westlawn

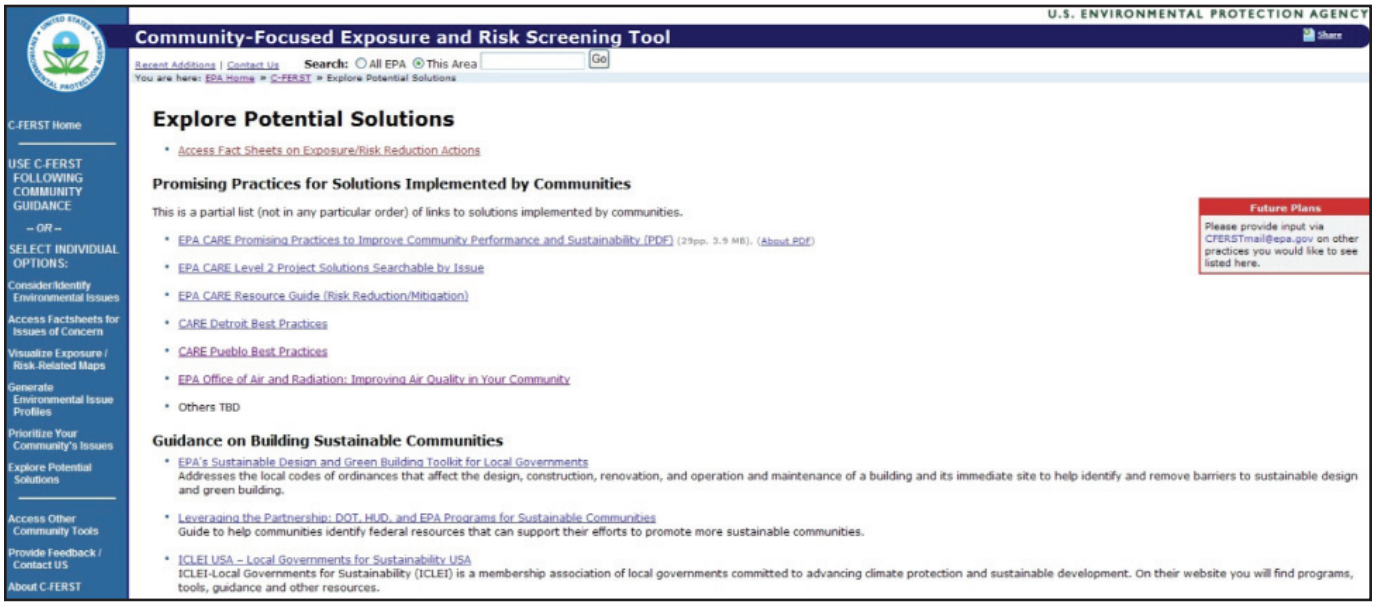


Figure 2-23: Potential Solutions (C-FERST)

The estimated cancer risk from exposure to air toxics is also modeled at the census tract level in NATA (see Figure 2-17). The greatest risk at each census tract were from benzene (0.00001-0.000012), followed by carbon tetrachloride (0.000007) in 2002.

Based on Air Quality System (AQS) data, two monitors within Milwaukee County measure HAPs, the Health Center Monitor and the Wisconsin Department of Natural Resources (WDNR) Service Headquarters Monitor.[38] CAPs are measured in seven locations, including the two monitors that measure HAPs. In C-FERST, the location of AQS monitors can be plotted in the exposure and risk-related maps. The monitor locations were uploaded into Google Earth in Figure 2-18.

The annual average concentrations of HAPs measured by the Health Center Monitor indicate that toluene, acetaldehyde, benzene, and dichloromethane had the greatest ambient concentrations in 2002 (see Figure 2-19).

Toluene and 2,4,4-trimethylpentane had the highest ambient concentrations of HAPs measured for the WDNR Monitor (see Figure 2-20).

2.8 Step 7: Rank Risks and Impacts

Rank risks and impacts to identify the community's concerns.

The next step is to rank the risks and impacts affecting the community's health. Ranking of the risks and impacts are based on what is important to the health and quality of life for the community and environment. In initial stages, the focus should be on ranking the risks and impacts, instead of identifying potential solutions.

When ranking risks/impacts, the severity of the risk/impact must be considered. Community vulnerabilities identified in Step 3, the number of people exposed, the extent of the environment affected, and cumulative effects should also be considered when ranking risks/impacts.

Several risk ranking methods exist outside of a rigorous toxicologically-based approach. One method is to create a scale, numerical (e.g., 1 to 10) or categorical (e.g., high or low), to rank risks/impacts. There are guidance documents available to help communities during the ranking process. *PACE EH: Protocol for Assessing Community Excellence in Environmental Health*[39] and *Air Toxics Risk Assessment Reference Library, Volume 3: Community Scale Assessment*[40] provide quantitative methods to assist with ranking risks/impacts and priority setting.

In C-FERST, users can prioritize their community's issues by creating a community data table to help rank risks/impacts by state, county, and zip code as seen in Figure 2-21.

[38] Data is from AirData, available at: http://www.epa.gov/air/data/.
[39] *PACE-EH* is available at: http://www.naccho.org/pubs/product1.cfm?Product_ID=60.
[40] *PACE-EH* is available at: http://www.naccho.org/pubs/product1.cfm?Product_ID=60.

ENVIRONMENTAL HEALTH ISSUE:				
Evaluate the following criteria within the community as they relate to the environmental health issue.				
	High	Medium	Low	Comments
Political support to address the issue				
Public demand/ acceptability				
Preventability (through personal- and community-based action)				
Effectiveness of available interventions				

Table 2-12. Priority Setting Template (PACE EH, page 57)

When limited information exists for stressors of concern, available information and best judgment should be used to estimate the potential risks and impacts. In addition, the partnership must determine if more information or analyses is needed to estimate the potential harm of stressors. To help summarize concerns and identify data gaps, the *CARE Roadmap* provides a template for partnerships to use. Table 2-11 summarizes environmental and health concerns for the Westlawn Community.

Another way to summarize information for risk ranking is to create a conceptual model. The conceptual model will identify potential sources, environmental stressors, and exposure pathways and routes (see Figure 2-22). The model should also include vulnerable subpopulations and endpoints with quantifiable measures, such as rates or percentages.

2.9 Step 8: Identify Potential Solutions

Identify and analyze options for reducing priority concerns and vulnerabilities and for filling information gaps.

Identifying potential solutions is the next step in the *CARE Roadmap*.

To do this, consider:

- ✓ Exploring risk reduction options for each concern
- ✓ Identifying community assets and resources
- ✓ Compiling information into an informative format
- ✓ Balancing time and effort of collecting information with time and effort available for risk-reduction actions
- ✓ Considering entities outside of the partnership

In C-FERST, the user can select *the explore potential solutions* option for several environmental issues (see Figure 2-23).

2.10 Step 9: Set Priorities for Action

Decide on an action plan to address concerns, fill information gaps, and mobilize the community and its partners to carry out the plan.

The next step is to decide on a plan to address community concerns and to fill information gaps. Mobilizing the community and its partners to carry out the plan is the ultimate goal. The partnership must determine which concerns to tackle first and develop action plans. A short-term action plan can be developed to address immediate concerns identified in Step 7 (Risk Ranking). Developing a long-term plan to address concerns that may need additional information will also help with priority setting. Factors to consider for setting priorities include:

- Risk ranking (revisit step 7)
- Ability to affect outcomes
- Available resources
- Community values
- Community capacity to tackle an issue

The short-term action plan should allow for measurable, short-term accomplishments to build community support and capacity to address issues. During this step, priorities may range from gathering more information, to confirming risks, to building consensus. A priority may also focus on risk reduction. In C-FERST, the user can explore guidance developed by other groups for priority setting in the *consider/identify environmental issues for your community* option.

PACE EH provides a template to help with priority setting for individual concerns and to determine the feasibility to tackling the issue (See Table 2-12).[41] After completing the template, the partnership can prioritize the community's issues and develop action plans.

Several databases can also be used to help with priority setting. This includes the Risk-Screening Environmental Indicators (RSEI) and the National-Scale Air Toxics Assessment (NATA).[42]

[41] *PACE-EH* is available at: http://www.naccho.org/pubs/product1.cfm?Product_ID=60.

[42] RSEI is available at: http://www.epa.gov/oppt/rsei/. NATA is available at: http://www.epa.gov/ttn/atw/natamain/.

2.11 Step 10: Evaluate Results

Evaluate the results of community action, analyze new information, and restart the process as needed to reestablish priorities, develop new plans for action, and collect information. Consider sources for financial and human capital to restart the Roadmap process and make your partnership self-sustaining.

The final step in the *CARE Roadmap* is to evaluate the results of the partnership's actions and analyze new information. If necessary, the partnership may need to restart the Roadmap to reestablish priorities and develop new plans for action. Additional information may need to be collected depending on the identification of new concerns. The partnership may need to consider sources for financial and human capital to restart the Roadmap process and to make the partnership self-sustaining.

In C-FERST, viewing guidance developed by other groups in the *consider/identify environmental issues for your community option* may be useful when evaluating results.

A checklist to assist partnerships during this step includes:

- ✓ Considering human and financial resources for continuing assessment and action
- ✓ Integrating the *CARE Roadmap* steps into ongoing projects
- ✓ Identifying additional planning and resources
- ✓ Utilizing organization and capacity of community partnership to apply for partnership- and capacity-building grants
- ✓ Retaining enhanced skills, capacity and knowledge within community

3.0
Environmental Justice (EJ) Toolkit

3.1 Overview

3.1.1 Introduction to the EJ Toolkit

The *Toolkit for Assessing Potential Allegations of Environmental Injustice*, referred to as the *EJ Toolkit*, provides a systematic approach to examine potential cases of environmental injustice.[43] The *EJ Toolkit* uses several EJ indicators to understand community conditions, specifically community vulnerabilities, to evaluate EJ concerns. Results presented in this section draw from publicly available sources. C-FERST was not used to download information because at the time of data collection, the information was not available. It is noted when information is currently available in C-FERST .

The Toolkit has four phases (see Figure 3-1):

1. Problem formulation
2. Data collection
3. Assessment of the potential for adverse environmental and human health impacts
4. Assessment of the potential for disproportionately high and adverse impacts

The four phases are incorporated within a two tiered approach: the first tier, a screening-level assessment, and the second tier, a refined assessment. The first tier recommends a qualitative assessment of available information to determine whether a more refined, quantitative assessment is needed. For the purpose of this report, the focus is on presenting and analyzing publicly available quantitative information from national and local sources for the first tier. This report only presents information from the first three phases and provides suggestions for the fourth phase.

[43] For access to the EJ Toolkit, go to http://www.epa.gov/environmentaljustice/resources/policy/ej-toolkit.pdf.

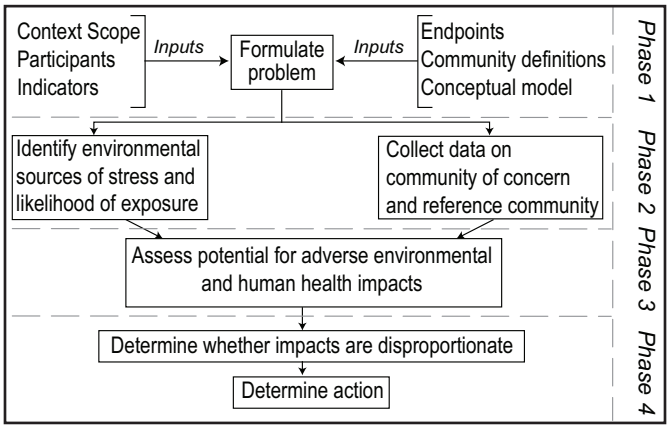


Figure 3-1. Phases of the EJ Toolkit

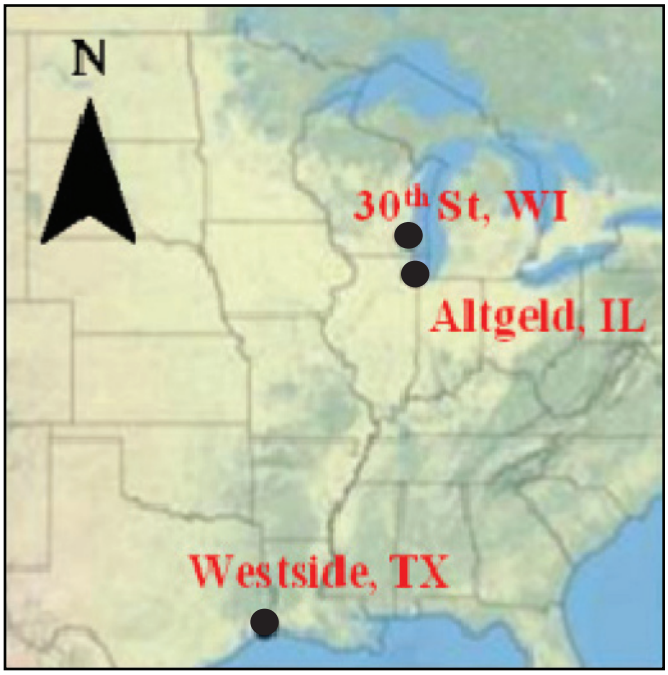


Figure 3-2. Location of Case Study Communities (ArcGIS)

3.1.2 Case Study Descriptions

Case study communities were chosen by researchers in ORD and EPA Region 5 based on available data, community needs, and environmental injustice concerns. Two EJ Showcase communities were chosen: the 30th Street Corridor in Milwaukee, Wisconsin (WI) and the Westside Community of Port Arthur, Texas (TX). Altgeld Gardens and Philip Murray Homes, in Chicago, Illinois (IL) was selected as the third case study community as previous environmental health research had been conducted there by a researcher on the team.

3.1.2.1 30th Street Corridor, Milwaukee, WI

The 30th Street Industrial Corridor is a 5.5 km^2 [square kilometers (km^2) or 2.15 square miles] area with a history of industrial development. At least ten major industrial facilities were located in the community throughout the history of its development. Some operators remain, but there are several underused industrial sites. The Corridor is designated as one of ten EJ Showcase Communities by the EPA to receive funding and technical assistance during its redevelopment.[44] The Corridor has also received funding for Brownfields redevelopment.

[44] For more information on the EPA's EJ Showcase Communities, go to: http://www.epa.gov/compliance/environmentaljustice/grants/ej-showcase.html.

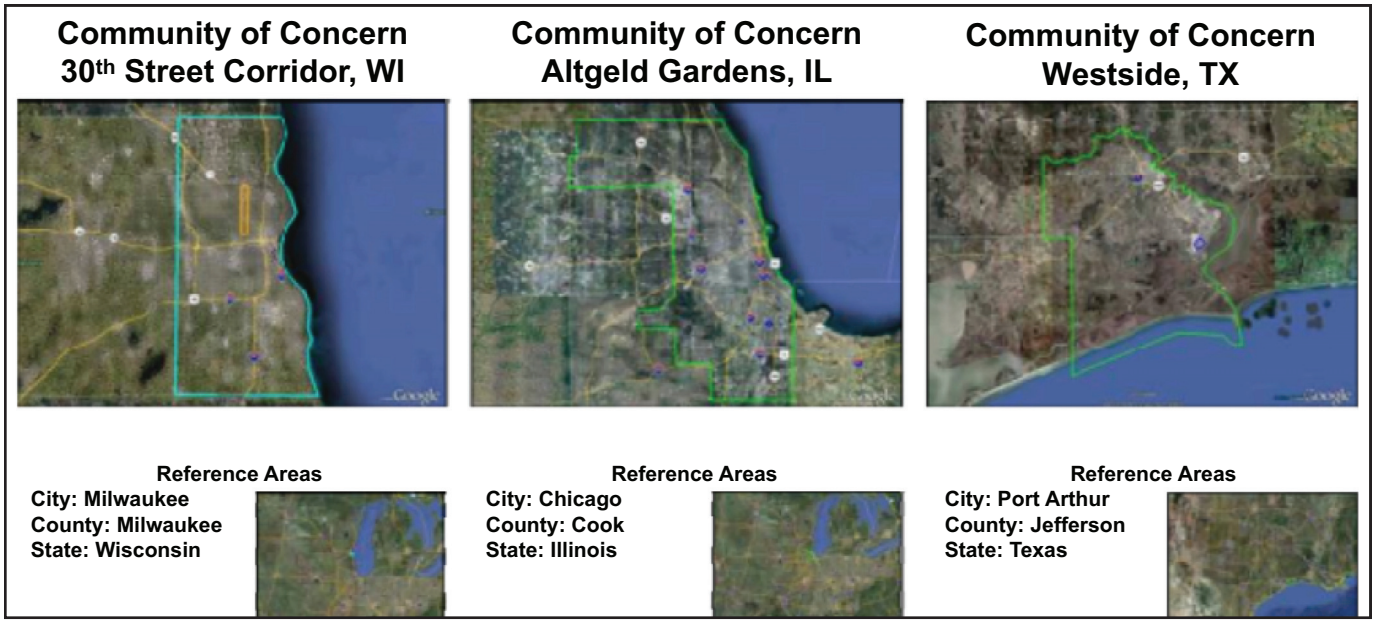


Figure 3-3. Reference Areas (Google Earth)

3.1.2.2 Altgeld Gardens and Philip Murray Homes, Chicago, Illinois IL

Altgeld Gardens and Philip Murray Homes (referred to as Altgeld Gardens) is a public housing development located in the Calumet, IL industrial region. The community is surrounded by heavy manufacturing facilities, and closed and active landfills. With nearly 1,200 units in a 0.6 km^2 (0.25 square miles) area, it is the largest public housing development of the Chicago Housing Authority.

3.1.2.3 Westside Community, Port Arthur, Texas TX

The Westside Community is another EJ Showcase Community. Westside is approximately 4.9 km^2 (1.9 square miles). It is located in a heavily industrialized area with refineries and chemical plants bordering the community. It is also a major port town, which includes the potential of air emissions and adverse health impacts associated with the goods movement.

3.2 Phase 1: Problem Formulation

3.2.1 Assessment Level

The first phase of the *EJ Toolkit* is to determine the level of the EJ assessment. This report will provide information appropriate for a screening-level assessment.

The aims of these EJ assessments for the three case study communities were:

To conduct a study of environmental inequity using the *EJ Toolkit*

- To incorporate a systematic approach to determine environmental inequity into C-FERST
- To provide useful information to Regions 5 and 6 of the EPA
- To advance the field of environmental justice and environmental health disparities

3.2.2 Context and Scope

Next, the context and scope must be determined. The scope of these assessments included determining cases of environmental inequity for specific communities associated with:

- Proximity to industrial facilities
- Exposures to non-point sources (e.g. roadways, railways)
- Cumulative exposures
- Environmental amenities (e.g. public transportation, health care facilities), and
- Exposures that would exacerbate health conditions (e.g. asthma)

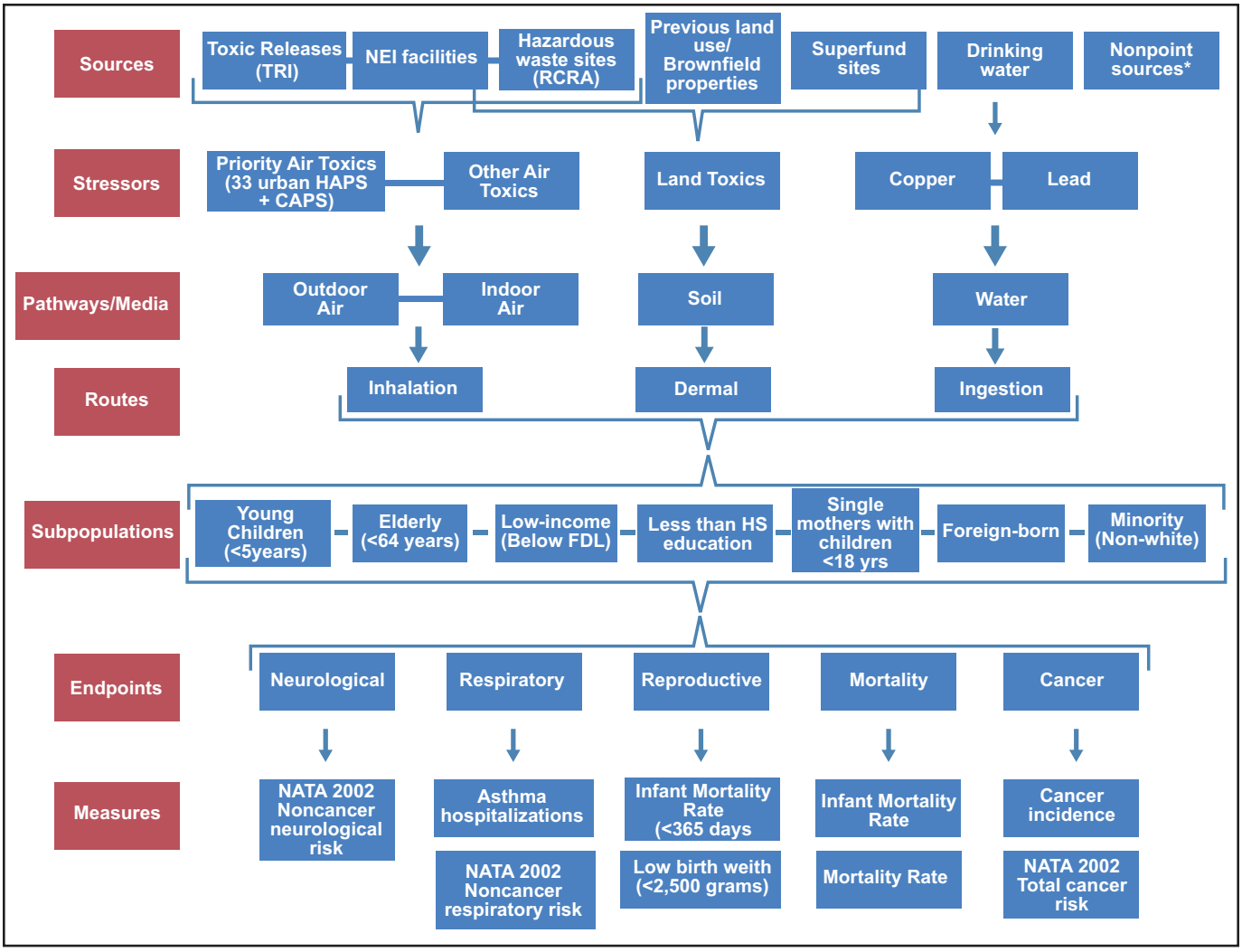


Figure 3-4. Conceptual Model

3.2.3 Stakeholders

Stakeholders included regional and program offices, and the communities of interest. EPA Region 5 was directly involved in monthly meetings to clarify research questions and to identify community needs. The Exposure Modeling Research Branch (EMRB) and Environmental Characterization and Apportionment Branch (ECAB) of ORD's National Exposure Research Laboratory (NERL) coordinated the research aspects, in addition to the Cumulative/ Communities' Program in ORD. The EJ Coordinator of OCSPP (Office of Chemical Safety and Pollution Prevention) also attended meetings and provided valuable input.

3.2.4 Reference Areas

To determine if a community is disproportionately impacted, the *EJ Toolkit* recommends identifying reference areas to compare environmental and health conditions. The reference areas used for this report were the communities' associated city, county, and state (see Figure 3-3). C-FERST provides the option to generate a table comparing quantitative data across communities, such as reference communities

3.2.5 Assessment Endpoints

Assessment endpoints are the measures of the effects of chemical and nonchemical stressors.[45] Non chemical stressors include noise pollution and socioeconomic factors. The endpoints will be used to examine the potential of disparate impact on environmental conditions, human health, and social and economic welfare.

3.2.6 Conceptual Model

A conceptual model helps to visualize sources, stressors, exposure pathways and routes, sensitive populations, assessment endpoints, and possible endpoint measures. A model was developed for this assessment (see Figure 3-4) to assist in identifying applicable measures for the EJ indicators in the second phase and potential sources of pollution based on community concerns.

3.2.7 Analysis Plan

The analysis plan developed for the assessments included determining the EJ indicators to use for the data collection phase (Phase 2). A contractor conducted a literature review to determine the best variables for each indicator based on

[45] US Environmental Protection Agency. Framework for Cumulative Risk Assessment. (2003). Available at: http://www.epa.gov/raf/publications/pdfs/frmwrk_cum_risk_assmnt.pdf.

reliable data sources and those recommended by the *EJ Toolkit*. Data were then collected for each community of concern and its reference areas. Information was downloaded from the 2000 U.S. Census, local, state, and national health departments, and EPA databases. Stakeholders provided feedback on data sources, specific variables, and the data collected.

3.3 Phase 2: Data Collection

The EJ indicators listed in the Toolkit are categorized into four broad areas:

- Environmental
- Health
- Social
- Economic

The indicators meet as many of the following selection criteria as possible: policy relevance, analytical soundness, and measurability. The *EJ Toolkit* includes suggested publicly available data sources for each indicator variable. Appendix D lists the publicly available web-based tools used for data collection.

3.3.1 Environmental Indicators

Environmental indicators included information from several EPA databases, such as My Environment, AirData, Envirofacts, and NEI. Additional data was obtained from the National Oceanic and Atmospheric Administration's (NOAA's) National Climatic Data Center and the CDC's State Lead Surveillance Data. Information is listed under the following subheadings: sources, potential exposures, environmental conditions, and vulnerabilities. In C-FERST, information on sources, potential exposures, and environmental conditions are available in the exposure and risk-related maps. Community vulnerabilities can be identified in the community data table under the *prioritize your community's issues* option. The following is a summary of the data collected for each variable; detailed information is available in Appendix E.

3.3.1.1 Sources

There are several ways to determine the sources of environmental stressors in a community. The *EJ Toolkit* suggests calculating the community's proximity to regulated facilities and determining the extent of non-point sources of pollution, such as proximity to highways. The Standard Industrial Classification (SIC) code, a three- or four-digit code, can be used to determine the facility's industry. Environmental stressors also include sources of noise pollution, including noise from nearby roadways, airports, manufacturing operations, and trains. Regulated facilities may not be the only source of potential pollution in a community; therefore, it is useful to research historical land uses that could or could have affected the community.

30th Street Corridor, Milwaukee

In 2005, there were 10 facilities reporting to NEI within the boundaries of the community and 54 reporting within 3 km. Iron and steel foundries were the most common industry (SIC code: 332). In 2009, the most recent available data for TRI, 53 facilities reported toxic releases within 3 km of the community. Non-point sources for the Corridor include bus route stops, railways, roadways, and previous land use. All of the sources are potential noise and pollution sources.

Altgeld Gardens, Chicago

While there were no facilities reporting to NEI in 2005 within the community, 51 facilities reported to NEI that were located within 3 km. Refuse systems, that is waste treatment plants and landfills, were the most prevalent facilities operating within 3 km (SIC code: 4953). Twenty-seven (27) facilities reported to TRI in 2009 that were within 3 km and four Superfund sites reporting to CERCLIS (Comprehensive Environmental Response, Compensation, and Liability Information System). Non-point sources for Altgeld Gardens include bus stops, railways, and roadways. Illegal dumping and land contamination are also major environmental concerns. For an estimated 20 years, a yard storing decommissioned electrical transformers leaked polychlorinated biphenyls (PCBs), contaminating the soil in the community. In 1999, residents received $10.5 million and local officials cleaned up the area.[46] All of the sources are potential noise and pollution sources.

Westside, Port Arthur

One facility located within the community reported to NEI in 2005 and 17 were listed in the inventory within 3 km. Petroleum refining facilities were the most common within 3 km (SIC code: 2911). Fifteen sites reported to TRI in 2009 that were within 3 km. Non-point sources for the Westside include railways and activities related to petrochemical refineries and the movement of goods. On January 23, 2010 at a port in Port Arthur, there was a collision between two barges and a tank ship loaded with crude oil. The estimate of spilled oil was 450,000 gallons.[47] All of the sources are potential noise or pollution sources.

3.3.1.2 Potential exposure

Residents of all the case study communities can be exposed to environmental hazards at home, school, and work. Housing units built before 1950 increase the risk of childhood lead poisoning.[48] Biomarkers, such as childhood blood lead levels, can be used to determine potential exposures to chemical stressors. For exposure to occupational hazards, information from the BLS is useful.[49] For instance, those employed in industries with the highest incidence rates of nonfatal occupational illnesses (e.g. respiratory conditions, skin diseases, and hearing loss) include the manufacturing and mining industry. High-risk industries of employment include: agriculture forestry; fishing and hunting; mining; construction; manufacturing; and transportation and warehousing. This information is available to download from the 2000 Census at the block group level.

[46] Nonpoint sources were based on focus groups conducted with residents and community leaders in March, 2009 regarding environmental hazards.
[47] For more information on the spill, go to: http://cgvi.uscg.mil/media/main.php?g2_itemId=761823.
[48] See the CDC's *Screening Young Children for Lead Poisoning*, available at: http://www.cdc.gov/nceh/lead/publications/screening.htm.
[49] Information from the BLS is available at: http://www.bls.gov/home.htm.

30th Street Corridor, Milwaukee
Based on the 2000 Census, more than half (58%) of the housing units were built before 1950. A report from the CDC's Agency for Toxic Substances and Disease Registry (ATSDR) found elevated childhood blood lead levels compared to the reference areas in 2005 (data for the reference areas is from the state health department and CDC).[50] In addition, about 27% of residents worked in the construction, manufacturing, or transportation and warehousing industry in 2000.

Altgeld Gardens, Chicago
Over half (60%) of the housing units were built before 1950. Most primary school children attend school in the community. Most high schools students take public transportation to a school about 3 miles outside the community. Information from the state health department indicates childhood blood lead levels were also elevated in the community compared to the county and state in 2005. In addition, about 23% of residents worked in the manufacturing, or transportation and warehousing industry in 2000.

Westside, Port Arthur
Almost a third (28%) of the housing units were built before 1950. In addition, there are three schools located within the community. Data on childhood lead poisoning was not available at the community or city level. However, based on CDC data, the prevalence of children with elevated blood lead levels was higher at the county level than the state level in 2005. In addition, almost a third of residents (29%) worked in the mining, construction, manufacturing, or transportation and warehousing industry in 2000.

3.3.1.3 Environmental conditions
Several data sources can be used to determine the quality of a community's environment, which includes air, water, and land quality. One can download data on HAP estimated concentrations from NATA to examine air quality. Information on the quality of water is from the EPA's Safe Drinking Water Information System (SDWIS) and local drinking water reports. Only data on land quality was available for Altgeld Gardens from ATSDR's Public Health Assessments and Health Consultation in 1999.

30th Street Corridor, Milwaukee
For air quality, the top three estimated HAP concentrations in the Corridor in 2002 were toluene, formaldehyde, and xylenes (mixed isomers). Milwaukee Water Works provides drinking water to the community and most of the city. Standards for water quality are based on federal and state regulations. The 2009 Safe Drinking Water Report did not indicate any contaminants exceeding the MCL (Maximum Contaminant Level).[51] The median value for lead was 5.3 µg/L (microgram per liter or parts per billion) (highest level allowed: 15 µg/L) and 0.056 mg/L (milligram per liter or parts per million) for copper (highest level allowed: 1.3 mg/L). In 1993, Milwaukee had a Cryptosporidium outbreak caused by a contaminated water treatment plant (Howard Avenue Water Purification Plant) that serves the city. Cryptosporidium is a parasite that is transmitted through drinking water, as well as recreational water activities, and causes Cryptosporidiosis, a diarrheal disease.[52] It is estimated that one quarter of the residents became ill because of the outbreak; over 60 deaths were attributed to the outbreak.[53]

Altgeld Gardens, Chicago
The top three estimated HAP concentrations in the community were chlorobenzilate, chloroacetic acid, and chloroform. For drinking water, Chicago Water Department serves almost 3 million people, including Altgeld Gardens. The 2009 Annual Consumer Confidence Report did not indicate any contaminants exceeding the MCL.[54] The highest levels measured for lead and copper respectively (90th percentile) were 6.07 ppb (parts per billion) and 0.0323 ppm (parts per million). The action level for lead is 15 ppb and 1.3 ppm for copper. In 1999, the Illinois Department of Public Health collected ten surface soil samples in the community from grassy areas near housing units, schools, and a clinic. The state found elevated levels of dichlorodiphenyltrichloroethane (DDT) (31.4 ppm), dichlorodiphenyldichloroethane (DDD) (5.8 ppm), and dichlorodiphenyldichloroethylene (DDE) (31.6 ppm), all pesticides or its byproduct.[55]

Westside, Port Arthur
The top three estimated HAP concentrations in the Westside Community were benzene, including benzene from gasoline, hexane, and diesel engine emissions. The City of Port Arthur provides drinking water to the community and serves almost 60,000 residents. The 2009 Water Quality Report did not indicate any contaminants exceeding the MCL.[56] The highest levels measured for lead and copper respectively (90th percentile) were 2.2 ppb and 0.136 ppm.

3.3.1.4 Vulnerability
Information on the community's physical environment is important to determine potential vulnerabilities that could impact air, water, or land quality. Information on the climate, geomorphic features, and the presence of ecologically sensitive areas, e.g. wetlands and rivers, is important to incorporate into assessments to understand how it influences the communities' health. Data on storm events and the location of flood zones were collected from NOAA's Storm Events Database[57] and FEMA (Federal Emergency Management Agency).[58]

[50] Data from the report on the Corridor includes two additional zip codes. The report is available at: http://www.atsdr.cdc.gov/sites/brownfields/docs/30THStreetCorridorReportAUG2008.pdf.

[51] Information on the quality of drinking water from Milwaukee Water Works is available at: http://city.milwaukee.gov/water.

[52] For more information on Cryptosporidiosis, go to: http://www.cdc.gov/parasites/crypto/.

[53] For more information, go to: http://www.cdc.gov/ncidod/EID/vol9no4/02-0417.htm.

[54] Information on water quality for community water systems in Illinois is available at: http://www.epa.state.il.us/water/drinking-water-watch/.

[55] For access to the report, go to: http://www.atsdr.cdc.gov/HAC/pha/PHA.asp?docid=513&pg=0.

[56] Information on water quality for the City of Port Arthur is available at: http://www.portarthur.net/.

[57] NOAA's database is available at: http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storms.

[58] FEMA's flood zone information is at: http://www.fema.gov/plan/prevent/floodplain/nfipkeywords/flood_zones.shtm.

30th Street Corridor, Milwaukee
The Corridor is susceptible to tornadoes, thunderstorm winds, temperature extremes, and floods based on data from NOAA. In addition, part of the community is in a flood zone.

Altgeld Gardens, Chicago
The community is susceptible to tornadoes, thunderstorm winds, and temperature extremes. The community is located in Lake Calumet's wetland area and the Little Calumet River runs along the southern border.

Westside, Port Arthur
The community is susceptible to hurricanes and tropical storms, tornadoes, thunderstorm winds, and floods. The city is on the western bank of Sabine Lake.

3.3.2 Health Indicators
Health statistics provide an overview of a community's health. For this report, variables on infant mortality and low birth weight were available from local health departments, and the remaining indicators on sensitive populations were housed in national databases. Disease incidence data was also available from local health agencies. Information is provided under the following subheadings: existing conditions, impacts from environmental stressors, and sensitive populations. In C-FERST, information on existing health conditions, potential impacts from environmental stressors, and sensitive populations is available in the community data table. The exposure and risk maps can identify sensitive populations. Data collected for the health indicators is available in Appendix F.

3.3.2.1 Existing conditions
Information on existing health conditions can identify potential vulnerable subpopulations or impacts from previous exposures to environmental stressors. Infant health data provides information on the most vulnerable subpopulations – pregnant women and newborn infants. Infant health data collected for this report was primarily available from local health departments. Examining mortality data, such as deaths due to cancer and respiratory illnesses, is useful to determine if a community is exposed to increased levels of environmental hazards. In general, mortality and disease data were not available at the community level.

30th Street Corridor, Milwaukee
In 2000 and 2001, the Corridor had the highest infant mortality rate compared to its reference areas. For every 1,000 live births, the infant mortality rate for the Corridor was 12.9, compared to 11.5 for the city, 10.1 for the county, and 6.9 for the state. The percentage of low birth weight was also higher in the Corridor compared to its reference areas. In 2000, 12.2% of infants were born low birth weight (less than 2,500 grams or five pounds), compared to 10.2% for the city, 9.1% for the county, and 6.5% for the state.

Altgeld Gardens, Chicago
In 2000, the community had the highest infant mortality rate compared to its reference areas. For every 1,000 live births, the infant mortality rate for Altgeld was 33.7, compared to 10.5 for the city, 9.6 for the county, and 8.3 for the state. The percentage of low birth weight was also higher in the community compared to its reference areas. In 2000, 16.3% of infants were born low birth weight (less than 2,500 grams or 5 pounds), compared to 9.7% for the city, 8.9% for the county, and 8.0% for the state.

Westside, Port Arthur
Data at the community level was not available for the Westside, but it was available for Port Arthur. In 2006, Port Arthur had a higher infant mortality rate (6.4) compared to the state (6.2), but it was lower than the county rate (7.6). Low birth weight data was not available for the community or city. For the county, 10.0% of infants were born low birth weight and 8.5% of infants were born low birth weight for the state.

3.3.2.2 Health impacts from environmental stressors
Health information that may indicate exposures to environmental stressors also identifies possible vulnerable and sensitive subpopulations. Data on different types of cancer, diseases attributable to pathogens, and cardiovascular and respiratory infections is presented in this report. Data was generally limited to county and state data, and available from local databases.

30th Street Corridor, Milwaukee
Cancer mortality data was not available for the community or city; however, Milwaukee County did have a higher death rate (per 100,000 people) for all cancers than the state of Wisconsin from 2002 to 2006. The highest death rate for the county was for cancer of the trachea, bronchus, and lung (54.3 per 100,000); slightly higher than the state's rate (50.1 per 100,000). Cancer of the trachea, bronchus, and lung has a strong link to chemical agents associated with environmental and occupational exposures.[59] The Cryptosporidium outbreak in 1993 caused over 60 deaths.[60] For respiratory infections, the community had the highest asthma hospitalization discharges for children less than 5 years of age compared to its reference areas in 2004.

Altgeld Gardens, Chicago
Cancer incidence data was available for the community (zip code), county and state. For the community, the highest incidence of cancer was prostate cancer from 2002-2006. In 2003, there were nine reported cases of food borne outbreaks in the City of Chicago and 186 reported cases of Cryptosporidiosis. Emergency department hospitalizations were highest for acute myocardial infarctions and asthma for the community, city, county, and state.

[59] For a summary of environmental and occupational links with cancer, see the 2008-2009 report on Reducing Environmental Cancer Risk, available at: http://deainfo.nci.nih.gov/advisory/pcp/annualReports/pcp08-09rpt/PCP_Report_08-09_508.pdf

[60] For more information, go to: http://www.cdc.gov/ncidod/EID/vol9no4/02-0417.htm.

Westside, Port Arthur
Cancer mortality data was not available for the community or city. The age-adjusted death rate for all cancers (per 100,000 people) for Jefferson County (206.3) was higher than the state's rate (192.6) in 2007. The highest type of cancer incidence for the county was of the trachea, lung, and bronchus. Information on diseases attributable to pathogens was limited to the county and state. There were nine deaths due to Salmonella infections in Texas from 2000 to 2002, but none in the county. The age-adjusted death rate for cardiovascular diseases was higher in the county (321.9) than the state (270.3) in 2006.

3.3.2.3 Sensitive populations
Identifying sensitive populations in a community is important because environmental stressors may pose a greater risk to subpopulations with inherent health sensitivities. Specific age groups, such as children and the elderly, are considered a sensitive subset of the population. While characterizing a community by age group is included as a social indicator in the *EJ Toolkit*, it is reported in this report as a health indicator because children (5 years of age and younger) and older individuals (65 years and older) may be more sensitive to chemical contaminants than the general population. Identifying those with disabilities (e.g. physical, mental, or employment disabilities) from the 2000 Census can also identify sensitive subpopulations.[61] Information on individual behavior, such as alcohol and tobacco use, can also make individuals more susceptible to environmental hazards. The CDC's BRFSS (Behavioral Risk Factor Surveillance System) provides information on alcohol and tobacco use for Metropolitan Statistical Areas (MSAs), some counties, and states.

30th Street Corridor, Milwaukee
According to the 2000 Census, the Corridor had a higher percentage of children under 5 years of age (10%) and a lower percentage of adults over 65 years than the reference areas (6%), i.e. city, county, and state levels. The population 5 years and older with a disability was the highest in the Corridor compared to the reference areas. Of those with a disability, almost a quarter had a physical disability (22%) and an employment disability (21% of residents 18 to 64 years of age). In 2002, almost 20% of adults in Milwaukee's MSA surveyed for the BRFSS reported binge drinking, that is having five or more drinks on one occasion, compared to 22% for the state. Almost a quarter of adults were current smokers in Milwaukee's MSA (23.7%), similar to the state's percentage (25.7%).

Altgeld Gardens, Chicago
Altgeld had a higher percentage of children under 5 years of age (13%) and a lower percentage of residents 65 years and older (3%) than the reference areas in 2000. The community had the highest percentage of residents with a disability in comparison to the reference areas, with the highest disability being those with an employment disability (30%). Adults reporting binge drinking in 2002 on the BRFSS were similar for Chicago, Cook County, and Illinois (17%, 17%, and 18% respectively). More adults reported being current smokers in Chicago than the other reference areas (23%).

Westside, Port Arthur
The percentage of children under 5 years of age in the Westside Community was similar to the reference areas (7%). The community had a higher percentage of elderly residents (19% of residents 65 years and older) than its reference areas. The community also had the highest percentage of those with a disability compared to the reference areas. Of the residents with a disability, over a quarter had a physical disability (27%). Data from the BRFSS was only available for the state of the reference areas. Almost 18% of adults reported binge drinking in 2002 and 23% were current smokers in Texas.

3.3.3 Social Indicators
Research has shown that some communities are disproportionately exposed to environmental hazards based on social characteristics, such as demographics and political power. Executive Order 12898 requires federal agencies to identify communities based on social characteristics. The order calls upon federal agencies to achieve environmental justice by identifying and addressing their programs, policies and activities that create disproportionately high adverse health and environmental conditions in low-income and minority populations.[62]

Social indicators presented in this report were available through the 2000 Census Summary Files 1 and 3 at the block group level. In C-FERST, demographic data are available in the community data tables and maps. Information on community amenities and political power is available through the *consider/identify environmental issues for your community* option for social and economic issues. Detailed data collected for the social indicators are available in Appendix G.

3.3.3.1 Demographic
Demographic variables presented in this report are from the 2000 Census and include: race/ethnicity,[63] age, gender, place of birth, linguistic isolation,[64] educational attainment,[65] and family structure.[66]

[61] According to the 2000 US Census, people 5 years old and over are considered to have a disability if they have one or more of the following: (a) blindness, deafness, or a severe vision or hearing impairment; (b) a substantial limitation in the ability to perform basic physical activities; (c) difficulty learning, remembering, or concentrating; or (d) difficulty dressing, bathing, or getting around inside the home. People 16 years old and over are considered to have a disability if they have difficulty going outside the home alone to shop or visit a doctor's office, and people 16-64 years old are considered to have a disability if they have difficulty working at a job or business.

[62] To access Executive Order 12898, go to: http://www.epa.gov/fedreg/eo/eo12898.htm.

[63] Race (American Indian and Alaska Native, Asian, Black or African American, Native Hawaiian and Other Pacific Islander, and White) and ethnicity (Hispanic or Latino) is categorized as white and non-white (minority). Non-white includes anyone who did not self-identify as White on the 2000 Census.

[64] Linguistic isolation is defined as a household in which all members of the household 14 years old and over have some difficulty speaking English.

[65] Educational attainment is the highest degree or level of school completed.

[66] Family structure focuses on the head of the household, specifically, single-parent, female households where no husband is present.

30th Street Corridor, Milwaukee
According to the 2000 Census, most residents of the Corridor were non-white (94%) and African-American (80%). The average median age was 23 years and 54% of residents were female. Almost all of the residents were born in the U.S. (94%) and few households were linguistically isolated (3%). Compared to the reference areas (city, county, and state values), more residents 25 years and older in the Corridor do not have a high school diploma (29%). One-fourth of the households were single-female households with children under 18 years of age (25%).

Altgeld Gardens, Chicago
Almost all of the residents were African-American (99%) in 2000. The median average age was 19 years and 58% of residents were female. Almost all of the residents were born in the U.S. (99%) and very few households were linguistically isolated (0.3%). More than a quarter of the residents did not have a high school diploma (31%), a higher percentage compared to the reference areas. Almost half of the households were single-female households with children (49%).

Westside, Port Arthur
Most of the residents were non-white (97%) and African-American (94%). The average median age was 38 years and 54% of residents were female. Most residents were born in the U.S. (98%) and few households were linguistically isolated (2%). Compared to the reference areas, a higher percentage of residents in the community did not have a high school diploma (19%). Less than a quarter of the households were single-female households with children (20%), higher than the reference areas.

3.3.3.2 Vulnerability to exposure
Some communities may be vulnerable to environmental hazards because of limited access to amenities, such as public transportation and health care facilities. Limited access to public transportation can prevent residents from accessing essential amenities, including health care facilities and healthy, affordable food, all of which impacts a community's quality of life. Google Earth provides a transportation layer that locates railways, subways, and bus stops. The 2000 Census provides information on households' accessibility to a vehicle. In addition, the Health Resources and Services Administration (HRSA) of the U.S. Department of Health and Human Services (HHS) identifies Health Professional Shortage Areas (HPSAs), which means the area has a shortage of primary medical care, dental or mental health providers. All of these indicators demonstrate a community's vulnerability to environmental exposures due to limited access to amenities.

30th Street Corridor, Milwaukee
According to Google Earth, Milwaukee County Transit bus stops are located throughout the community. The 2000 Census indicates that almost half of the housing units in the community do not have access to a vehicle (43%). The community is also located in a HPSA for primary care.

Altgeld Gardens, Chicago
There are several bus stops operated by the Chicago Transit Authority in the community. More than half of households do not have access to a vehicle (67%). The community has also been identified as a HPSA for primary care.

Westside, Port Arthur
Port Arthur Transit System offers bus services and special paratransit door-to-door services for the elderly and disabled. Most housing units in the community have access to a vehicle (75%). The area is also a primary care HPSA.

3.3.3.3 Community participation
Often, socially disadvantaged communities, i.e. low-income and/or minority communities, do not have access to information on their environment and are not able to meaningfully participate in the decision making process. To measure a community's ability to meaningfully participate in the decision making process, two researchers created a community power score.[67] The score uses data from the 2000 Census at the block group level. The measure is the sum of the standardized score for median household income and the percentage of the population that is White. According to the method, the scores in the bottom 10% are the least empowered communities.

30th Street Corridor, Milwaukee
Community power scores for block groups in the Corridor were in the bottom quartile for scores in Milwaukee County, with almost 70% of the block groups being in the bottom 10% of all scores in the county

Altgeld Gardens, Chicago
Community power scores for block groups in Altgeld Gardens were in the bottom quartile for scores in Cook County, with all of the block groups being in the bottom 10% of all scores in the county.

Westside, Port Arthur
Community power scores for block groups on the Westside of Port Arthur were in the bottom quartile for scores in Jefferson County, with 7 out of 11 of the block groups being in the bottom 10% of all scores in the county.

3.3.4 Economic Indicators
Executive Order 12898 requires federal agencies to also examine economic conditions in communities to prevent instances of environmental injustice. The order specifically identifies low-income communities as being potentially vulnerable to disproportionate exposures to environmental stressors. The *EJ Toolkit* defines low-income communities as households where the median income is below the federal poverty line. Economic indicators included in this report are employment status, income level, housing tenure, industry of employment, and the presence of Brownfield properties.

[67] Eric J. Krieg and Daniel R. Faber. Not so black and white: Environmental justice and cumulative impact assessments. Environmental Impact Assessment Review 24 (2004): 667–694.

All economic data was downloaded from the 2000 Census. In C-FERST, this information is available in the community data tables and maps. Additional information can be found under the *consider/identify environmental issues for your community* option for social and economic issues. Data collected for the Economic Indicators is available in Appendix H.

3.3.4.1 Unemployment

The unemployment rate indicates the economic opportunities available in a community. In addition, the rate demonstrates if community members are able to meet basic needs, such as purchasing healthy foods.

30th Street Corridor, Milwaukee
Compared to the reference areas, i.e. city, county, and state, the Corridor had a higher percentage of unemployed residents 16 years and older (11%) in 2000.

Altgeld Gardens, Chicago
Almost 20% of residents were unemployed, compared to 6% for the city, 5% for the county and state.

Westside, Port Arthur
The percentage of unemployed residents for the Westside Community was over half the city level (18% vs. 7%), and almost four times the county and state level (5% and 4% respectively).

3.3.4.2 Income (1999)

Information on income also indicates whether community members are able to meet basic needs. Information on median household income,[68] families receiving public assistance,[69] and families living below the federal poverty line are provided for the case study communities and associated reference areas. All information is from the 2000 Census.

30th Street Corridor, Milwaukee
According to the Census, the median household income for the Corridor was below the median income for the city of Milwaukee ($20,000 and $32,216, respectively) in 1999. More families received public assistance income compared to the reference areas (10%). The percent of families living in poverty was also higher than the city (40% vs. 17%) and higher than the county and state values (12% and 6%).

Altgeld Gardens, Chicago
Altgeld had the lowest median household income than the median values for the city, county, and state in 1999 ($11,933; $38,625; $45,922; and $46,590 respectively). More than a quarter of families received public assistance income (36%). Almost three quarters of the families lived in poverty in 1999, also higher than its reference areas (71%).

Westside, Port Arthur
The median household income for the Westside Community was below the median income for its reference areas ($16,170; $26,455 for the city; $34,706 for the county; and $45,861 for the state). More families received public assistance than the reference areas (7%). The percentage of families living in poverty was also higher than the reference areas (40%).

3.3.4.3 Housing tenure

The percent of homeowners in a community is important because it may indicate how invested community members are in the decision making process regarding environmental hazards. The 2000 Census provides information on the number of occupied housing units and the housing tenure of the occupants, i.e. owner or renter occupied units.

30th Street Corridor, Milwaukee
Based on the Census, most housing units in the community were occupied (86%); however, there were more occupied housing units in the city and county. More than half of the housing units were renter occupied (67%), higher than the reference areas.

Altgeld Gardens, Chicago
Most housing units in Altgeld Gardens were occupied (87%) in 2000. While Altgeld Gardens is a public housing development, according to the 2000 Census almost 90% were renter occupied, higher than all the reference area values.

Westside, Port Arthur
Most housing units in the community were occupied (81%) in 2000; however, compared to the reference areas, Westside had more unoccupied units. More than half of the housing units in the community were owner occupied (63%), which was similar to values for the reference areas.

3.3.4.4 Occupation

The dominant occupation of residents in a community is also an economic indicator. Information for employment in white collar[70] and blue collar[71] jobs is available from the 2000 Census.

30th Street Corridor, Milwaukee
In 2000 , most residents in the Corridor were employed in blue-collar jobs (32%), compared to 27% for the city, 25% for the county, and 29% in the state. Only 18% were employed in white collar jobs, compared to 28% for the city and 32% for the county.

[68] Median household income includes the income of the householder and all other individuals 15 years old and over in the household, whether they are related to the householder or not.

[69] Families receiving public assistance income includes general assistance and temporary assistance to needy families.

[70] White collar jobs are defined as employment in management, professional and related occupations (two subcategories: management, business and financial operations; and professional and related occupations).

[71] Blue collar jobs are defined as employment in two occupational categories: (1) construction, extraction, and maintenance; and (2) production, transportation and material moving.

Altgeld Gardens, Chicago
The percentage of residents with blue collar jobs in the community was similar for the city, county and state percentages (21%, 23%, 22%, and 24% respectively); however, fewer residents had a white collar job compared to the reference areas (10%, 34%, 35%, and 44% respectively).

Westside, Port Arthur
Almost one-third of residents had a blue collar job (29%) in the community, compared to 31% for Port Arthur. Fewer residents in the community had a white collar job (16%), compared to 21% for the city, 29% for the county, and 33% in the state

3.3.4.5 Brownfield properties
The presence of Brownfield properties indicates increased economic development and urban revitalization. Brownfield properties also indicate greater job opportunities for residents.

30th Street Corridor, Milwaukee
The Corridor has almost half of the city's Brownfield properties within 3 km of the community.

Altgeld Gardens, Chicago
There is one Brownfield property located within 3 km of Altgeld Gardens.

Westside, Port Arthur
All of Port Arthur's Brownfield properties are within 3 km of the Westside Community.

3.4 Phase 3: Assessment of Potential Adverse Impacts
Phase 3 of the *EJ Toolkit* examines if there is potential for adverse environmental and human health effects or impacts. This assessment focuses on adverse human health effects by using information from RSEI.[72] RSEI is a screening tool developed by the EPA that provides data on chemical releases from TRI. The model is useful to obtain total-mass-release data, in addition to a toxicity-weighted stressor score. Table 3-1 shows how the scores are calculated in RSEI. The information presented in this report is from version 2.2.0; however, version 2.3.0 was released in June 2010.

There are limitations to using RSEI. The model only provides data for facilities reporting to TRI and does not consider ecological effects. In addition, the model does not evaluate all toxic chemicals or pathways, nor does it consider area sources or mobile sources.

3.4.1 Total Mass-Release Analysis
The following is a summary of information downloaded from RSEI for 1996 to 2002 for the case study communities and the associated reference areas. The data is from TRI. Information is organized by an overall assessment, the media of emission (e.g., stake air releases, transfer releases, and landfill releases), the chemicals released, and the top industries and facilities releasing chemicals. Similar data can also be obtained from NEI. Detailed information is available in Appendix I.

[72] RSEI is available at: http://www.epa.gov/oppt/rsei/.

Risk Indicator	Method
Risk-related results	Surrogate Dose x Toxicity Weight x Population
Hazard-based results	Pounds x Toxicity Weight
Pounds-based results	TRI Pounds

Table 3-1. Risk Indicator Calculation (RSEI)

3.4.1.1 30th Street Corridor, Milwaukee

Overall
- Milwaukee County ranked the highest in TRI pounds released and made up 20% of Wisconsin's releases.
- All zip codes covering the Corridor accounted for 11% of releases in Milwaukee County and 13% in the City of Milwaukee.
- Zip code 53210 accounted for 40% of releases covering the Corridor's four zip codes.

Media
- Stack air releases made up most emissions for Wisconsin (17%).
- Stack air releases accounted for 10% of TRI emissions in Milwaukee County.
- Publicly Owned Treatment Works (POTW) transfer releases accounted for 10% emissions in Milwaukee and 11% of for zip codes covering the Corridor.

Chemical
- Copper was the top chemical emitted for Wisconsin (12%).
- The top chemical for TRI releases was lead for Milwaukee County (23%) and Milwaukee (31%).
- Copper was the top chemical emitted for the Corridor (37%).

Industry
- The top industry in Wisconsin emitting releases was Industrial Organic Chemicals (SIC Code: 286) (8%).
- Miscellaneous Electrical Machinery (SIC Code: 369) accounted for 21% of Milwaukee County and 29% of Milwaukee's industry emissions.
- Cutlery and General Hardware (SIC Code: 342) accounted for 54% of TRI emissions for 30th St. Corridor.

Facility
- Stora Pulp Mill (Wood County) released 7% of total TRI emissions for Wisconsin.
- C&D Technologies (Zip code: 53212) emitted 20% of total TRI emissions for Milwaukee County and 27% for Milwaukee.
- Master Lock (Zip code: 53210) emitted 41% of total TRI releases for the Corridor.

3.4.1.2 Altgeld Gardens, Chicago

Overall

- Cook County ranked the highest in TRI pounds released in Illinois (25% of total releases).
- Zip code 60131 accounted for 10% of releases in Cook County and 60827 (Altgeld Gardens) made up 3% of total emissions.
- Altgeld accounted for less than 1% of Chicago's total emissions.

Note: A portion of zip code 60827 is not within Chicago's city boundaries, thus the entire area is not included in the city's total

Media

- Stack air releases made up most emissions for Illinois (19%).
- Stack air releases accounted for 8% of emissions in Cook County.
- Offsite Recycling (metal recovery) made up 29% of TRI emissions for Chicago.
- Offsite Landfill releases accounted for 80% emissions in Altgeld.

Chemical

- Zinc was the top chemical emitted for Illinois (17%).
- The top chemical for TRI releases was copper for Cook County (21%).
- Zinc was the top chemical emitted for Chicago (29%) and Altgeld (60%).

Industry

- Blast Furnace/Basic Steel Products (SIC Code: 331) (12%) was the top industry in Illinois emitting releases.
- Sanitary Services (SIC Code: 495) made up 13% of Cook County and Secondary Nonferrous Metals (SIC Code: 334) topped Chicago's emissions (28%).
- Blast Furnace/Basic Steel Products made up 83% of emissions for Altgeld.

Facility

- Peoria Disposal (Peoria County) released 5% of total Illinois emissions.
- Safety-Kleen Systems (Zip code: 60419) emitted 8% of otal emissions for Cook County.
- H. Kramer & County (Zip code: 60608) released 16% of total emissions for Chicago.
- Mittal Steel emitted 83% of total releases for Altgeld Gardens.

3.4.1.3 Westside, Port Arthur

Overall

- Harris County ranked the highest in TRI releases in Texas (31% of total); Jefferson County released 7% of the state's emissions.
- Zip code 77705 accounted for most of releases in Jefferson County (36%) and the Westside of Port Arthur (Zip code: 77640) made up 26% of releases in the county.
- The Westside accounted for 74% of emissions for Port Arthur.

Media

- Offsite Energy Recovery releases made up most emissions for Texas (17%).
- Underground Injections (Class 1) accounted for 22% of releases in Jefferson County.
- Offsite Recycling (Solvents/Organics Recovery) made up 51% of TRI emissions for Port Arthur and 69% for the Westside.

Chemical

- Nitrate compounds were the top chemicals emitted for Texas (7%).
- The top chemicals for TRI releases were also nitrate compounds for Jefferson County (12%).
- Naphthalene was the top chemical emitted for Port Arthur (30%) and the Westside (41%).

Industry

- The top industry in Texas emitting releases was Industrial Organic Chemicals (SIC Code: 286) (39%).
- Industrial Organic Chemicals also accounted for 71%, 80%, and 86% of Jefferson County, Port Arthur, and the Westside's score respectively.

Facility

- Celanese Clear Lake Plan (Harris Co) released 3% of total emissions for Texas.
- DuPont Beaumont Plant (Zip code: 77705) emitted 29% of total emissions for Jefferson County.
- Chevron Phillips Chemical in the Westside released 64% of total emissions for Port Arthur and 86% for the Westside.

3.4.2 Total Toxicity-Weighted Analysis

Risk-related score data is weighted and can be used for comparative purposes only within RSEI. Detailed information on the results is available in Appendix J.

3.4.2.1 30th Street Corridor, Milwaukee

Overall

- Kenosha County had the highest risk-related score in WI (32% of state score), followed by Milwaukee County (21%).
- All zip codes covering the Corridor accounted for 28% of the risk-related scores in Milwaukee County and 38% in the City of Milwaukee.
- Zip code 53208 accounted for 54% of the total risk-related score for the Corridor's zip codes.

Media

- Fugitive air releases accounted for 39% of risk-related impact emissions for Wisconsin.
- Fugitive air releases accounted for 65% of the risk-related scores in Milwaukee County and 61% in Milwaukee.
- Fugitive air releases made up 64% of the risk-related score for the Corridor.

Chemical

- Manganese accounted for 32% of the risk-related score for Wisconsin.
- Manganese also accounted for 60% of the risk-related scores for Milwaukee County, 56% for Milwaukee, and 57% for the Corridor.

Industry

- The industry with the highest risk-related score in Wisconsin was Electric Services (SIC Code: 491) (33% of state score).
- Iron and Steel Foundries (SIC Code: 332) accounted for 44% of Milwaukee County and 46% of Milwaukee's scores.
- Industrial Machinery Equipment (SIC Code: 356) accounted for 37% of the score for the Corridor.

Facility

- Pleasant Prairie (Kenosha County) made up 32% of the risk-related score for Wisconsin.
- Maynard Steel Casting (Zip code: 53215) made up 14% of the scores for Milwaukee County and 20% for Milwaukee.
- Rexnord Industries (Zip code: 53208) accounted for 37% of the score for 30th St. Corridor.

3.4.2.2 Altgeld Gardens, Chicago

Overall

- Cook County had the highest risk-related score in Illinois (50% of state score).
- Zip code 60804 made up 27% of Cook County's risk score and Altgeld Gardens made up 8%
- Zip code 60614 accounted for 28% of the score for Chicago and Altgeld made up 2%.

Note: A portion of zip code 60827 is not within Chicago's city boundaries, thus the entire area is not included in the city's total

Media

- Fugitive air releases accounted for 49% of risk-related score for Illinois.
- Fugitive air releases accounted for 50% of the risk-related scores in Cook County, 54% in Chicago, and 70% in Altgeld.

Chemical

- Manganese accounted for 39% of the risk-related score for Illinois.
- Manganese also accounted for 51% of the risk-related scores for Cook County, 28% for Chicago, and 70% for Altgeld.

Industry

- Iron/Steel Foundries (SIC Code: 332) were 23% of Illinois's score.
- Iron/Steel Foundries accounted for 36% of Cook County's score.
- Coating, Engraving, and Allied Services (SIC Code: 347) made up 25% of Chicago's score.
- Blast Furnace/Basic Steel Products (SIC Code: 331) accounted for 85% of the score for Altgeld.

Facility

- Chicago Castings (Cook County) accounted for 11% of the risk score for Illinois and 22% for Cook County.
- A. Finkl & Sons (Zip code:60614) made up 20% of the score for Chicago and Hickman Williams & Co. in Altgeld made up 2%.
- Mittal Steel accounted for 80% of the score for Altgeld Gardens and Hickman Williams & Co made up10%.

3.4.2.3 Westside, Port Arthur

Overall

- Harris County (38%) and Jefferson County (30%) had the highest risk-related scores in Texas.
- Zip code 77643 made up 88% of Jefferson County's risk score and the Westside made up less than 1% (Zip code: 77640).
- Zip code 77643 accounted for 98% of the score for Port Arthur and the Westside made up about 1%.

Media

- Direct water releases accounted for 35% of risk-related score for Texas and 88% for Jefferson County.
- Direct water releases also made up 98% of the risk-related score in Port Arthur.
- Stack air releases accounted for 79% of the risk-related score for the Westside.

Chemical

- PCBs accounted for 25% of the risk-related score for Texas, 82% for Jefferson County, and 92% for Port Arthur.
- Sulfuric acid made up 61% of the risk-related scores for the Westside.

Industry

- Sanitary Services (SIC Code: 495) were 27% of the state's risk score and 88% of Jefferson County's score.
- Sanitary Services also made up 98% of Port Arthur's score.
- Petroleum Refining (SIC Code: 291) accounted for 86% of the score for the Westside.

Facility

- Veolia Technical Solutions (Jefferson County) made up 27% of the risk-related score for Texas, 88% for Jefferson County, and 98% for Port Arthur.
- Motiva Enterprises on the Westside accounted for 0.3% of the risk score for Jefferson County and 49% for the Westside.

3.5 Phase 4: Assessment of Potential Disproportionate Cumulative Impacts

The final phase of the *EJ Toolkit* determines if a community is experiencing disproportionate cumulative impacts. Disproportionately high impacts are defined in the toolkit as adverse effects that (page 71):

1. are predominately borne by any segment of the population, including a minority population and/or a low-income population; or
2. will be suffered by a minority population and/or low-income population and are appreciably more severe or greater in magnitude than the adverse effect or impact that will be suffered by a non-minority population and/or non-low-income population

The reference areas are used to determine disproportionality. For a screening-level assessment, the toolkit recommends using a more qualitative based analysis to determine disproportionate impacts and using a quantitative analysis for a refined assessment. While this report focuses on screening-level assessments for the case study communities, this section will provide options to quantitatively assess disproportionate cumulative impacts.

Quantifying disproportionate cumulative impacts is challenging and there is currently no agreement on how to measure cumulative impacts.[73] Several methods have been suggested

[73] Ken Sexton and Stephen H. Linder. The role of cumulative risk assessment in decisions about environmental justice. International Journal of Environmental Research and Public Health 7 (2010): 4037-4049.

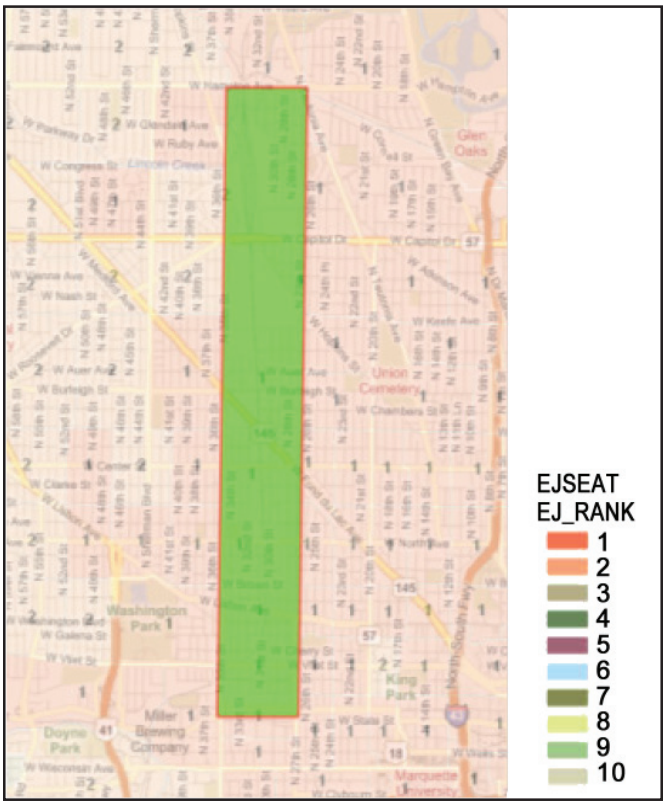


Figure 3-5. EJSEAT Score, 30th Street Corridor

Region 5 EJ Assist Analysis	
Map	
Area of digitized polygon	2.29 sq.mi
Eco	
Within Great Lakes Area of concern?	No
Within a NWI Wetland?	No
Demog	
Within 1 miles of Census Tracts designated as a high-priority aria of potential environmental justice concern?	Yes
Within Tribal land?	No
Facility	
Within .25 miles of RCRA 2020 facility?	Yes
Within 1 mile of a Nuclear Power Plant	No
Within 1 mile of a Electric Power Plant	No

by EPA and the environmental justice research community. Methods to examine cumulative or disproportionate impacts have included calculating proximity to regulated facilities,[74] estimating cancer risks,[75] and creating a score compiled from environmental stressors and socioeconomic factors.[76]

This report does not specifically determine if one of the case study communities is disproportionately exposed to cumulative impacts, but rather provides examples for project officers and communities conducting an EJ assessment. Different methods developed by EPA and the research community are presented for the three case studies. These methods are for demonstration purposes only and not for interpretation. This report does not endorse any one method over another.

There are several different ways to examine disproportionate impacts. The NEJAC report on cumulative risks outlines primary methods for analyzing cumulative effects, and identifies strengths and weaknesses of each method.[77] An index can be created that incorporates several different indicators, or information can be examined qualitatively by displaying it on a map or Geographic Information System (GIS). Trends can be analyzed over a period in time and compared to reference areas. Modeling can also be used to estimate environmental conditions resulting from stressors.

3.5.1 Indices

An index integrates multiple indicators into one composite score. Data sources for the indicators should be reliable and available for all reference areas. The index should also be easy to calculate and interpret for all audiences. According to the NEJAC report, this method can provide a comprehensive overview of conditions, in addition to addressing multiple indicators, such as environmental, health, social, and/or health conditions. However, an index may not link environmental information to adverse health impacts, or it may not incorporate time or geographic information into the composite score.

[74] Robert D. Bullard, Paul Mohai, Robin Saha, and Beverly Wright. *Toxic Waste and Race at Twenty 1987–2007*: *Grassroots Struggles to Dismantle Environmental Racism in the US*, Cleveland, Ohio: United Church of Christ, 2007.

[75] Rachel Morello-Frosch and Bill M. Jesdale. Separate and unequal: Residential segregation and estimated cancer risks associated with ambient air toxics in US metropolitan areas. *Environmental Health Perspective* 114 2006): 386-393.

[76] E. J. Krieg and D. R. Faber. Not so black and white: Environmental justice and cumulative impact assessments. *Environmental Impact Assessment Review* 24 (2004): 667-694.

[77] NEJAC's *Ensuring Risk Reduction in Communities with Multiple Stressors: Environmental Justice and Cumulative Risks/Impacts*, December 2004 report, is available at: http://www.epa.gov/oecaerth/environmentaljustice/nejac/recommendations.html.

Illinois	10,588,994	
Cook County	5,323,861	
Chicago	1,787,959	
Rank	Top Zip Codes for Cook County (% of County score)	
1	60804	1,581,143 (26.7%)
2	60160	732,190 (13.8%)
3	60614	495,607 (9.3%)
4	60827 (Altgeld Gardens)	435,808 (8.2%)
5	60501	269,373 (5.1%)
6	60608	240,662 (4.5%)
7	60623	193,484 (3.6%)
8	60644	179,084 (3.4%)
9	60617	128,480 (2.4%)
10	60107	81,273 (1.5%)

Table 3-2. RSEI Score, Altgeld Gardens (1996-2002)

Several cumulative index methods are currently in development by EPA, university scientists and state agencies. Indices that could be used to assess disproportionate cumulative impacts and that are not included in this report include:

- Cumulative Risk Index Analysis – Region 6, EPA
  - » Web address: http://www.epa.gov/ospinter/presentations/cumrisk/carney.pdf
- Social Vulnerability Index (SVI) – Region 9, EPA
  - » Web address: http://www.epa.gov/region9/enforcement/results/10/highlights.html
- Cumulative Impacts: Building a Scientific Foundation – California Environmental Protection Agency
  - » Web address: http://oehha.ca.gov/ej/pdf/CIReport123110.pdf
- Cumulative Impacts Screening Method – University of Southern California, Occidental College, and University of California, Berkeley
  - » Web address: http://college.usc.edu/pere/projects/cumulative_impacts.cfm
- Social Vulnerability Index for Environmental Hazards (SoVI) – Hazards and Vulnerability Research Institute, University of South Carolina
  - » Web address: http://webra.cas.sc.edu/hvri/products/sovi.aspx

Type of Hazardous Facility or Site	SIC Code	Points for Rating Severity	Source
EPA Superfund National Priority List (NPL) Site	n/a	25	National Priorities List
EPA Superfund site (not on NPL)	n/a	5	EPA Superfund
State-regulated abandoned contaminated waste site	n/a	5	Local databases
Large power plant (top 5 polluter based on pounds released)	491, 493 [4911, 4931, 4939]	25	My Environment, Emissions Inventories
Small power plant	491, 493 [4911, 4931, 4939]	10	My Environment, Emissions Inventories
Proposed power plant	n/a	5	Local databases
TRI facility	n/a	5	TRI Explorer
Commercial hazardous waste treatment, storage, and disposal facility	495 [4953, 4959]	5	My Environment, Emissions Inventories
Municipal solid waste landfill (nonhazardous waste)	495 [4953]	5	My Environment, Emissions Inventories
Municipal incinerator (nonhazardous waste)	495 [4953]	20	My Environment, Emissions Inventories
Large sewage treatment plant or sludge management facility	495 [4952]	5	My Environment, Emissions Inventories
Trash transfer station (hazardous and nonhazardous waste)	n/a	5	My Environment, Emissions Inventories
Waste tire pile	n/a	5	Local databases

Table 3-3. Environmental Hazard Point System

This section focuses on three additional index methods: (1) Environmental Justice Strategic; Enforcement Assessment Tool (EJSEAT); (2) RSEI; and (3) the Cumulative Environmental Justice Impact Assessment. RSEI is accessible through C-FERST under the *additional tools for communities* option. Each method is applied to one case study community and is for demonstration purposes. Again, this report does not endorse any one method over another.

3.5.1.1 Environmental Justice Strategic Enforcement Assessment Tool (EJSEAT) for 30th Street Corridor, WI

EPA's environmental justice screening tool, EJAssist, provides a cumulative community assessment by examining demographic, environmental, health, and compliance information at the census tract level. The tool calculates an index comprised of 18 indicators and combined into a component score for each census tract, called the EJSEAT score.[78] Census tracts are ranked according to the decile it falls in within a state. The score ranges from one to ten, with a score of one indicating a value at the highest decile (top 1-10%) and a census tract with potential EJ concerns.

The EJSEAT score is displayed over a map within the EJAssist application. EJAssist allows users to define a geographic area and generate a report. The method can be applied at a national level and uses publicly available databases; however, the score can only be compared to scores within one state and in one year.

Application: 30th Street Corridor, Milwaukee, WI

When EJSEAT is applied to the Corridor, the EJAssist analysis indicates the community is within one mile of census tracts "designated as a high-priority area of potential environmental justice concern" (see Figure 3-5). The map generated in EJAssist shows the EJSEAT scores for all the census tracts in the Corridor as ranking in the highest decile in the state. The EJSEAT scores indicate this is a community of potential EJ concern.

3.5.1.2 Risk-Screening Environmental Indicators (RSEI) for Altgeld Gardens, IL

RSEI is a screening tool by the EPA that provides information on toxic releases from TRI. The model provides a risk-related score (RSEI score) that multiplies surrogate dose, the toxicity of a chemical release, and the potential exposed population. The tool calculates risk-related scores for specific facilities, industry groups, zip codes, cities, tribal lands, counties, states, or EPA regions. Information can also be organized in several ways, including pathway of exposure or chemical data. Version 2.2.0 of RSEI reports on TRI releases from 1996-2006.[79]

RSEI results do not evaluate individual risk. The RSEI score can be used for comparative purposes only within RSEI; however, it only provides information for facilities reporting to TRI and does not incorporate area sources, mobile sources, acute toxicity or ecological effects. In addition, RSEI does not assess all toxic chemicals or pathways, such as food ingestion, dermal, or indirect contact.

[78] For detailed information on how the score is calculated, go to: http://www.epa-otis.gov/otis/ej/.

[79] Version 2.3.0 is now available for download and reports on releases from 1996-2007 at: http://www.epa.gov/oppt/rsei/.

Application: Altgeld Gardens, Chicago, IL
Of all the zip codes in Cook County, the RSEI score for Altgeld's zip code ranked fourth (see Table 3-2). The score accounted for almost one-tenth of the total RSEI score for the county.

3.5.1.3 Cumulative Environmental Justice Impact Assessment for Westside, TX

The Cumulative Environmental Justice Impact Assessment was developed by Krieg and Faber, and has been applied to several communities. [80]-[81] Krieg and Faber rate regulated and unregulated sites on a hazard point scale, called the Environmental Hazard Point System. The system can be modified to include hazardous sites not listed (see Table 3-3). Points for the sites are added for each geographic area (e.g. census block group or census tract) and divided by the total area to obtain an environmental hazard density score. Next, geographic areas are assigned a score based on the quartile it falls in and can be classified as "extensively burdened," "moderately burdened," or "least burdened."

While the score is relatively simple to calculate, the method of rating the severity of hazardous facilities or sites is not clear. In addition, the score only focuses on sources within the geographic area of concern. Therefore, a hazard may be located in an adjacent area and pose a threat to the community of concern; however, it is not included in the calculation. Displaying the environmental hazard density scores for a larger geographic area on a map can help identify surrounding hazards.

Application: Westside, TX
Environmental hazard density scores were calculated for the census tracts in Jefferson County (see Table 3-4). Based on information from EnviroMapper in 2009, two Superfund NPL sites and three TRI facilities, including one petroleum refinery, were located in the census tracts covering the Westside Community. The total environmental hazard point score was 65 points.

Once the environmental hazard density scores were calculated, two census tracts scored in the top quartile for density scores in the county and classified extensively burdened (top 10%). This information was displayed on a map in ArcGIS with population data from the 2000 Census in Figure 3-6. According to the Cumulative EJ Impact Assessment, the Westside Community is surrounded by extensively and moderately burdened tracts in a populated area.

Type of Hazardous Facility or Site	Total Sites	Total Points for Severity
EPA Superfund NPL site	2	50
EPA Superfund site (not on NPL)	0	0
TRI facility	3	15
Petroleum Refineries	1	
	TOTAL	65

Table 3-4. Environmental Hazard Points, Westside Census Tracts

3.5.2 Overlay Mapping and Geographic Information Systems (GIS)

Overlay mapping and GIS (Geographic Information Systems) can be used to identify communities environmentally overburdened by mapping regulated facilities and socioeconomic characteristics.[82] The ability to define a geographic area is useful to generate specific reports on a community of concern. According to the NEJAC report on cumulative risks, this method can provide a visual presentation of environmental, health, social, and economic information that is useful when communicating with community members. On the other hand, this approach is limited to a specific location and may not address indirect impacts of environmental stressors.

Several overlay mapping and GIS methods are available or in development by EPA and state agencies. GIS applications that could be used to assess disproportionate cumulative impacts and that are not included in this report include:

- NEPAssist – EPA
  - » Web address: http://www.epa.gov/region02/spmm/pdf/NEPAssist_Factsheet.pdf
- Census Tract Ranking Tool for Environmental Justice (CenRank) – EPA
  In development
- Potential Environmental Justice Areas (PEJAs) – New York Department of Environmental Conservation
  - » Web address: http://www.dec.ny.gov/public/899.html

Several cumulative index methods mentioned in the previous section also display their scores using GIS and they include:

- Cumulative Risk Index Analysis – EPA Region 6
  - » Web address: http://www.epa.gov/ospinter/presentations/cumrisk/carney.pdf
- Cumulative Impacts Screening Method – University of Southern California, Occidental College, and University of California, Berkeley
  - » Web address: http://college.usc.edu/pere/projects/cumulative_impacts.cfm
- Social Vulnerability Index for Environmental Hazards (SoVI) – Hazards and Vulnerability Research Institute, University of South Carolina
  - » Web address: http://webra.cas.sc.edu/hvri/products/sovi.aspx

[80] E. J. Krieg and D. R. Faber. Not so black and white: Environmental justice and cumulative impact assessments. *Environmental Impact Assessment Review* 24 (2004): 667-694.

[81] Diane Sicotte. Some more polluted than others: Unequal cumulative industrial hazard burdens in the Philadelphia MSA, USA. *Local Environment* 15 (2010): 761-774.

[82] Juliana Maantay. Mapping environmental injustices: Pitfalls and potential of Geographic Information Systems in assessing environmental health and equity. *Environmental Health Perspectives* 110 supp 2 (2002): 161-171.

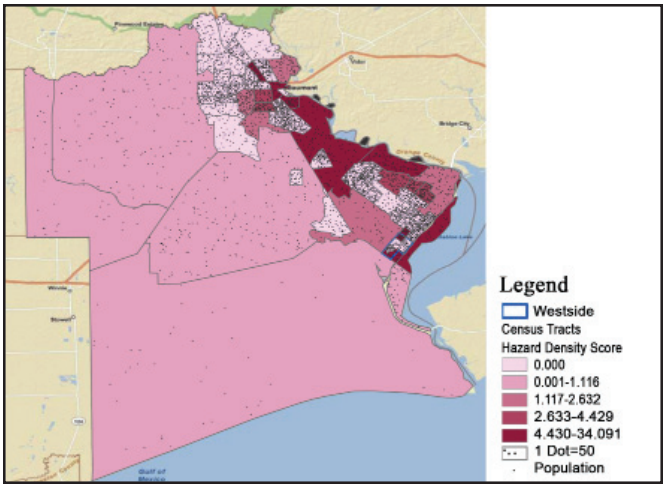


Figure 3-6. Environmental Hazard Density Scores, Jefferson County (ArcGIS)

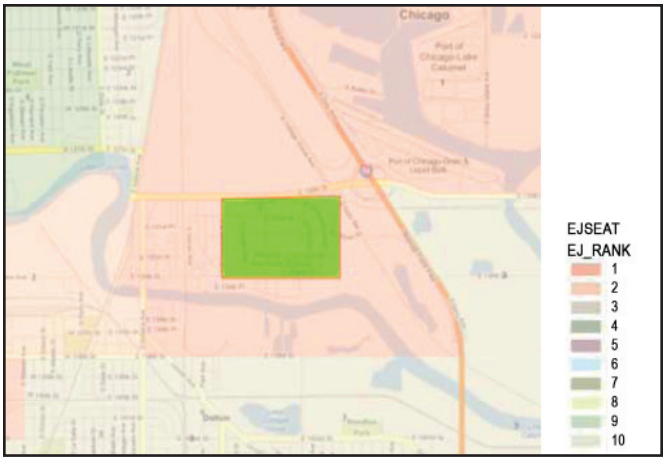


Figure 3-7. EJAssist, Altgeld Gardens

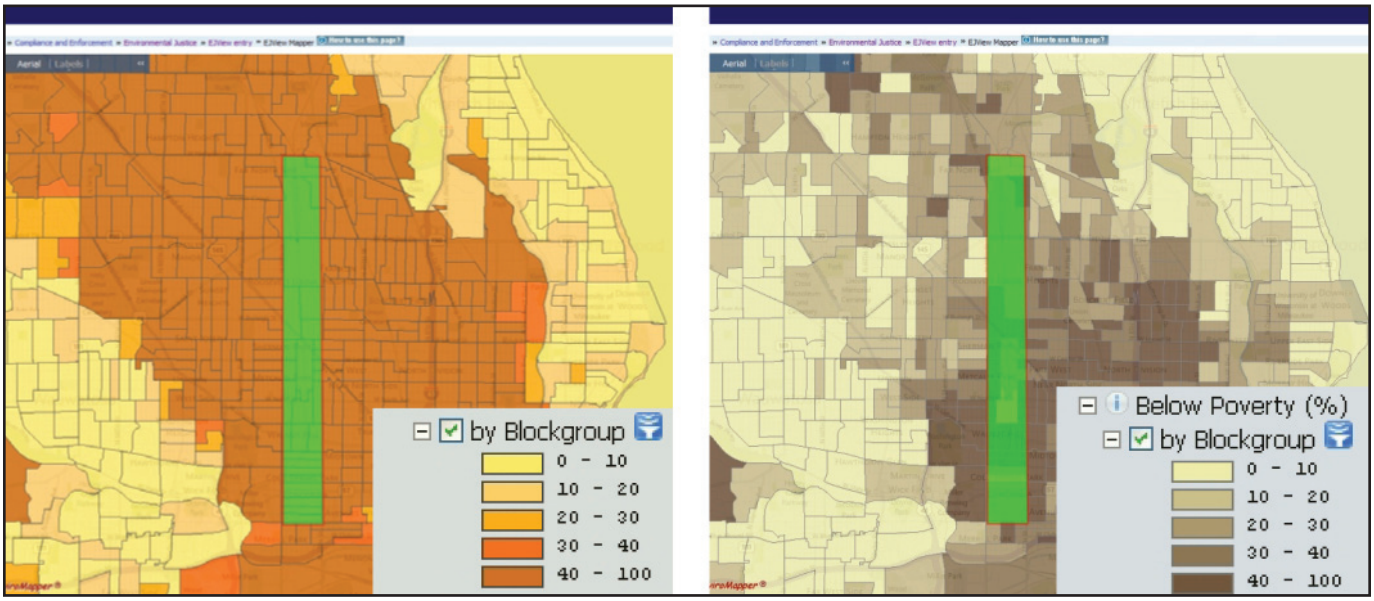


Figure 3-8. EJView, 30th Street Corridor (Minority and Below poverty)

This section focuses on two GIS tools, EJAssist and EJView, which map regulated facilities and provide the option to overlay U.S. Census data. Regulated facilities and Census data can also be overlaid in C-FERST's exposure and risk-related maps. Each method is applied to one case study community and is for demonstration purposes. Again, this report does not endorse any one method over another.

3.5.2.1 EJAssist for Altgeld Gardens, IL

This EJ screening tool developed by OECA provides an assessment of demographic, environmental, health, and compliance information at the census tract level. The tool calculates the EJSEAT score and identifies census tracts with potential EJ concerns.[83] The score is displayed over a map within the EJAssist application and the user is able to identify adjacent tracts with potential EJ concerns. The user is also able to define the geographic area of concern.

Application: Altgeld Gardens, Chicago, IL

When EJAssist is applied to Altgeld Gardens, the map displays the EJSEAT score for the census tract it lies and classifies it as an area of potential EJ concern (a score of one indicates a value at the top 1-10% for the state) (see Figure 3-7).

3.5.2.2 EJView for 30th Street Corridor, WI

EJView is a GIS tool that provides environmental, health, social, and economic information.[84] The tool maps regulated facilities for several EPA programs, including CERCLIS, AFS, and TRI facilities. In addition, it identifies where potential sensitive populations may be present, such as schools and hospitals. The user is also able to define a geographic area and generate an EJ report with specific indicator information.

[83] For detailed information on how the EJSEAT score is calculated, go to: http://www.epa-otis.gov/otis/ej/.

[84] EJView is available at: http://epamap14.epa.gov/ejmap/entry.html.

Application: 30th Street Corridor, Milwaukee, WI
When EJView is applied to the Corridor, the user is able to define the geographic area of interest and display indicator information. Regulated facilities were plotted for the area for several EPA programs, such as AFS, TRI, and CERCLIS. Nonattainment areas for 8-hour ozone were also added as an overlay. Nonattainment areas are areas with air quality that violates the National Ambient Air Quality Standards as defined in the Clean Air Act.[85] Schools, hospitals, and worship places were also added as an overlay on the map.

Two maps were generated for the Corridor with social information from the 2000 Census at the block group level, percent minority and percent living below poverty, in Figure 3-8. According to the map, the Corridor has several EPA regulated facilities in and around its boundaries, in addition to schools. The area is a nonattainment area for 8-hour ozone. The area in and around the community is 40-100% minority with 40-100% of residents living below the poverty line.

3.5.3 Trends Analysis
Trends analyses examine indicators over a period of time and provide information on historical environmental, health, social, and economic information. According to the NEJAC report on cumulative risks, this method incorporates the accumulation or worsening of specific indicators over time. Determining a baseline for the analysis also helps assess changes over time. Depending on the period of time analyzed, this method can be time consuming.

Trends analysis can be conducted independently for environmental, health, social, and economic indicators. Possible databases that can be accessed for a trends analysis, but are not included in this section, are outlined below:

- AirData [National Emissions Inventory (NEI)] – EPA
  Indicator: Environment
  Years available: 1999, 2002, 2005, 2008
  - » Web address: http://www.epa.gov/air/data/
- Chronic Disease Indicators – CDC
  Indicators: Health
  Years available: Multiple years
  - » Web address: http://apps.nccd.cdc.gov/cdi/default.aspx
- American FactFinder – US Census
  Indicators: Social and Economic
  Years available: Multiple years
  - » Web address: www.factfinder.census.gov/

This section focuses on two databases that can be used for a trends analysis: RSEI and TRI. Both databases are available in C-FERST under the *additional tools for communities* option. These databases provide environmental information by accessing data on toxic releases. Again, each method is applied to a case study community and is for demonstration purposes. This report does not endorse any one method over another.

[85] For more information on National Ambient Air Quality Standards, go to: http://www.epa.gov/air/criteria.html.

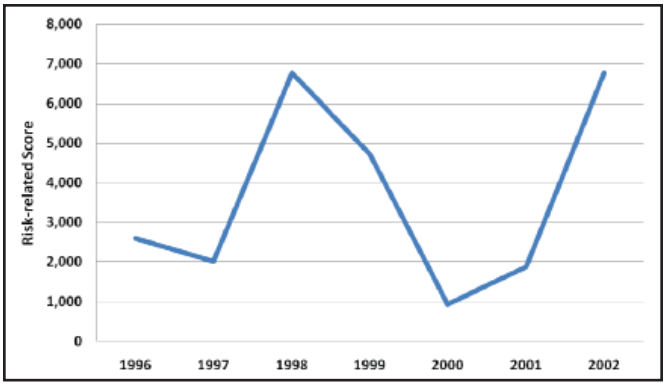


Figure 3-9. RSEI Score, Westside (1996-2002)

3.5.3.1 Risk-Screening Environmental Indicators (RSEI) for Westside, TX
RSEI is a screening tool developed by the EPA that provides a toxicity-weighted score for chemical releases from TRI. The risk-related score, or RSEI score, is calculated in the model by multiplying surrogate dose by the toxicity of a chemical release and the potentially exposed population. Information for this report is from version 2.2.0.[86]

Application: Westside, Port Arthur, TX
Information was downloaded by zip code for the Westside Community (Zip code: 77640). The RSEI scores and TRI releases are displayed in a line graph and table for 1996 to 2002 (see Figure 3-9 and Table 3-5). Information from RSEI shows a slight decline in toxicity-weighted releases from 1996 to 1997, mirrored by the decrease in actual chemical releases in pounds. There was a sharp increase in the RSEI score from 1997 to 1998; however, there was not such an increase in the pounds released. From 1998 to 2000, the RSEI score declined; however, the total pounds released increased from 1999 to 2000. The RSEI score increased again from 2000 to 2002, with a sharp increase in the risk-related score and total pounds released from 2001 to 2002.

A further trends analysis of environmental information from RSEI could organize the data by specific facility releases or chemical releases to explain reductions or increases in the RSEI score.

3.5.3.2 Toxic Release Inventory (TRI) for 30th Street Corridor, WI
TRI provides data on chemical releases and waste management activities for facilities regulated by the EPA. Facilities are required to report their emissions annually for specific chemicals and chemical categories (currently 593 chemicals and 30 categories). TRI data is accessible through several tools, including TRI Explorer, TRI.NET, and Envirofacts. In C-FERST, TRI data is accessible under the access other community tools option and the exposure and risk-related maps. Users are able to download data by facility, zip code, city, county, state, or EPA Region.[87]

[86] Version 2.3.0 is now available for download at: http://www.epa.gov/oppt/rsei/.
[87] For more information on TRI and access to data, go to: http://www.epa.gov/tri/index.htm.

Year	1996	1997	1998	1999	2000	2001	2002
Number of Facilities	9	9	9	8	7	8	7
Pounds Released	4,799,580	3,830,282	7,414,730	3,290,889	14,808,480	17,815,422	33,679,150
RSE Score	2,590	2,015	6,768	4,731	930	1,871	6,767

Table 3-5. RSEI Score and Pounds Released, Westside (1996-2002)

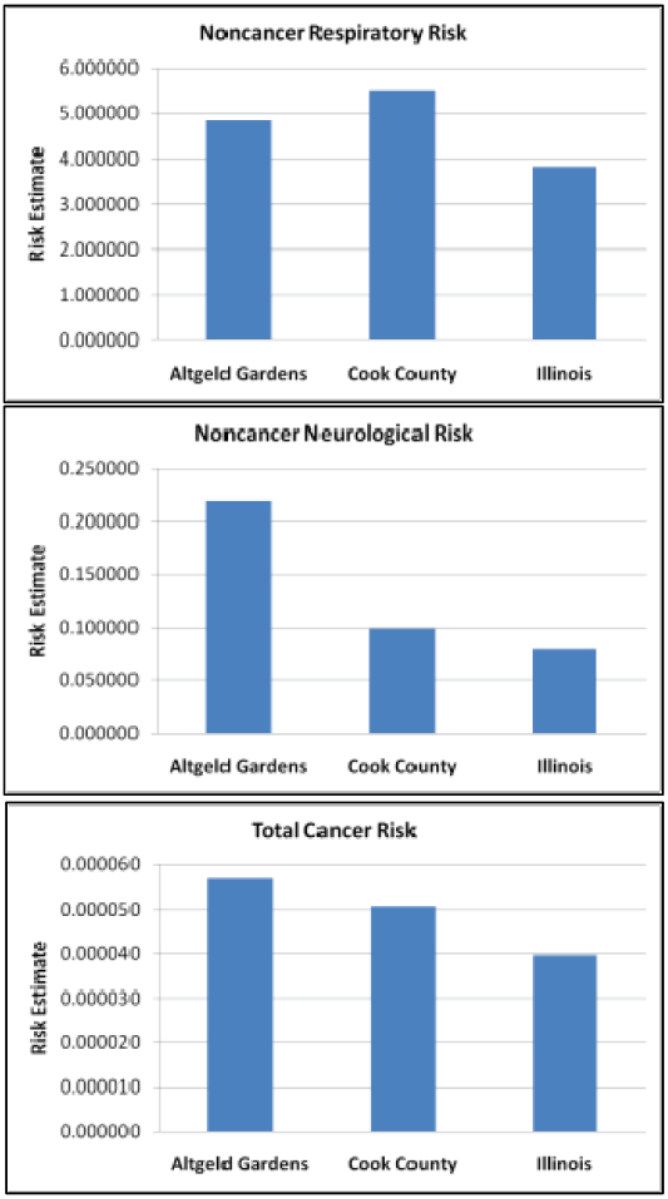


Figure 3-11. NATA Estimated Risks, Altgeld Gardens (2002)

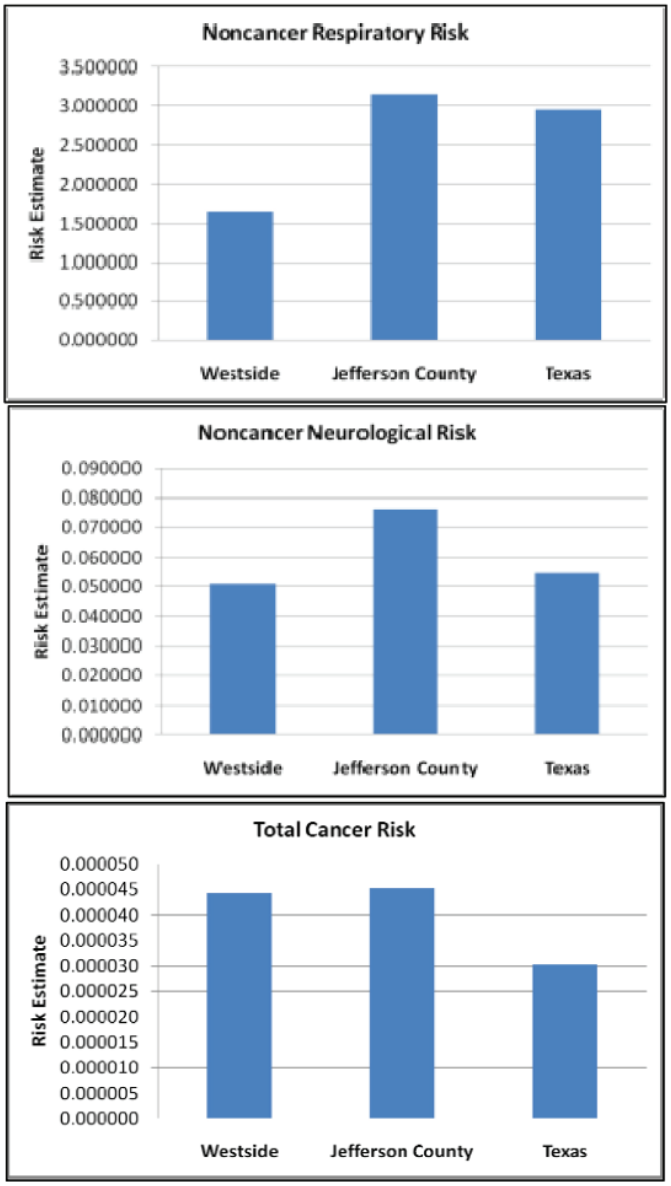


Figure 3-12. NATA Estimated Risks, Westside (2002)

There are several limitations to using TRI data. First, the data does not include information on actual chemical exposures, nor does it assess the toxicity of the chemicals released. Facilities are also not required to report all chemical releases that could impact communities. In addition, facilities self-report their releases to TRI, which may be underreported if they are not monitoring their emissions.

Application: 30th Street Corridor, Milwaukee, WI
Releases from TRI in pounds are shown in the line graph and table for the four zip codes covering the Corridor (see Figure 3-10 and Table 3-6). Overall, there was an increase in chemical releases for all the zip codes. Zip code 53216 had the highest pounds released every year from 1996 to 2002. There was a slight decrease in releases from 1997 to 1998; however, the overall trend of releases increases from 1998 to 2002.

3.5.4 Modeling

Modeling can provide detailed information on the relative impacts of environmental stressors. Modeling can link exposure to health impacts and calculate cumulative risks; however, most require large datasets and can be time consuming. The EPA has developed several complex models that can be used to assess disproportionate impacts for a more refined EJ assessment at the community-level. Data from these models are not included in this report, but include:

- Air Pollutants Exposure Model (APEX) – EPA
  - » Web address: http://www.epa.gov/ttn/fera/human_apex.html
- Hazardous Air Pollutant Exposure Model (HAPEM) – EPA
  - » Web address: http://www.epa.gov/ttn/fera/human_hapem.html
- Human Exposure Model (HEM) – EPA
  - » Web address: http://www.epa.gov/ttn/fera/human_hem.html
- SHEDS-Multimedia – EPA
  - » Web address: http://www.epa.gov/heasd/products sheds_multimedia/sheds_mm.html

While many models are developed for researchers and are difficult to interpret, there are databases based on models that non-technical users can apply to community case studies. The National-Scale Air Toxics Assessment (NATA) is a database derived from NEI data and models that include the Assessment System for Population Exposure Nationwide (ASPEN), the Human Exposure Model-3 (HEM-3) and the Community Multiscale Air Quality Monitoring System (CMAQ). NATA provides estimates on chemical concentrations and exposures, in addition to calculating cumulative cancer risk estimates and risk estimates for specific pollutants.[88] 2005 NATA evaluated 177 of the 187 air toxics, plus diesel PM, at the census tract level. NATA risk estimates can provide information on environmental health disparities and identify communities with potential concerns.[89]

[88] Information on NATA is available at http://www.epa.gov/ttn/atw/natamain/index.html.

[89] Benjamin J. Apelberg, Timothy J. Buckley, and Ronald H. White. Socioeconomic and racial disparities in cancer risk from air toxics in Maryland. *Environmental Health Perspective* 113 (2005): 693-699.

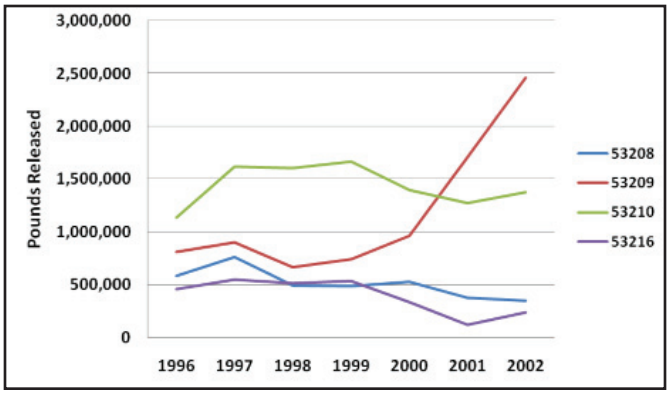


Figure 3-10. TRI Emissions, 30th Street Corridor (1996-2002)

There are limitations to using information from NATA. NATA does not provide information on all chemical exposures and some chemical concentration information may be underestimated. In addition, there is some uncertainty for the risk estimates calculated in the database.

In C-FERST, models developed by EPA are available under the additional tools for communities option. This section provides risk estimates from NATA for two case study communities and their associated reference areas (county and state).

3.5.4.1 National-Scale Air Toxics Assessment (NATA) for Altgeld Gardens, IL and Westside, TX

Application: Altgeld Gardens, Chicago, IL

NATA risk estimates for 2002 are displayed in Figure 3-11 for Altgeld Gardens (Census tract: 5401), Cook County, and Illinois. The county had a higher noncancer respiratory risk estimate than the community and state. The noncancer neurological risk for the community was over twice that of the county and state. The total cancer risk was slightly higher for Altgeld than the reference areas.

Application: Westside, Port Arthur, TX

NATA risk estimates for 2002 are also displayed in Figure 3-12 for the Westside Community (Census tracts: 53, 59, 61, 62), Jefferson County, and Texas. The county had a higher noncancer respiratory risk than the community and state; the community had the lowest risk. The noncancer neurological risk for the county was higher than the community and state estimates. The total cancer risk for the Westside and county were similar, and higher than the state estimate.

Year	30th Street Corridor Zip Codes			
	53208	53209	53210	53216
1996	586,347	468,303	1,131,358	458,333
1997	764,759	462,478	1,612,873	548,598
1998	491,895	334,089	1,598,530	512,767
1999	485,674	400,092	1,663,815	538,034
2000	531,683	674,222	1,393,849	334,505
2001	375,287	962,292	1,270,351	119,336
2002	347,571	1,744,995	1,376,222	239,477

Table 3-6. TRI Emissions by Zip Code, 30th Street Corridor (1996-2002)

4.0
Summary and Conclusions

4.1 Summary

The purpose of this report is to assess the application of tools to community-level assessments of exposure, health and the environment. Various tools and datasets provided different types of information, such as on health effects, chemical types and volumes, facility locations and demographics, and different formats, such as maps, graphs and tables. Each community case study has a documented environmental or public health concern. This report focuses primarily on the identification of potential issues of concern and the collection of information for them (and the tools and datasets available for these tasks); in contrast, it does not focus on risk ranking or prioritization, which falls more into the category of a formal risk assessment.

All tools and datasets in this report are publicly available, either through national or local sources. The information provides a screening-level approach to conduct community-based cumulative risk assessments (CBCRAs) by compiling information on multiple sources, stressors and health effects and with considerations for non-chemical stressors and population vulnerabilities.

In general, a certain level of technical aptitude is required to use the tools and to download and analyze the various data types. Information for CBCRAs is available; however, it is typically located in a number of different sources and formats. Challenges include locating appropriate data sources, downloading and organizing information, and visualization and interpretation, either through maps, graphs, tables or other formats. This report provides context for which and how tools and datasets could be accessed and analyzed to inform steps of environmental and health-related assessments. Tools that organize and compile various sources of information, such as C-FERST, provide a central resource and facilitate CBCRA research and implementation.

4.2 Conclusions

A number of conclusions can be drawn from this research, including (1) useful methods do exist; (2) appropriate data are available in many cases; (3) there is a need to decide up front on the important question(s) to be addressed/evaluated; (4) focus should be on analyzing data to derive scientific findings not on selecting data and methods to justify a preconceived notion.

Useful tools, methods and data sources do exist to inform environmental and health-related assessments at the community level. While challenges remain in gathering and analyzing the information, appropriate data are available in many cases. This information can aid with decision-making processes for human and financial resource allocation, or determining next steps for a more rigorous assessment.

There is a need up front to determine the important questions that are going to be addressed or evaluated in order to focus the scope of the data gathering and analysis. This will also determine which tools are most relevant, and provide a context for presenting the information. Conversely, a broad compilation of data and information without context may prove to be counter-productive in an assessment because the breadth of information may make it difficult to focus on a particular issue or set of issues. However, although questions and goals may be formulated initially, the data acquisition process should focus on analyzing data that will derive scientific findings (and stakeholders should be prepared if results are not consistent with what they were expecting), and not on selecting data and methods that justify a preconceived notion in isolation of alternative possibilities.

Community knowledge and participation is another important point to consider. Local residents often have knowledge of potential stressors that are not available through publicly available datasets, such as illegal dumping or previous land contamination.

Nonchemical stressors, such as noise pollution and odor, can also affect a community's overall quality of life. A recent report from the World Health Organization (WHO) found that noise pollution is associated with adverse cardiovascular effects, including high blood pressure and heart attacks.[90] Thus, it is essential to engage community members in the CBCRA process to identify nonchemical stressors that outside parties would not be able to identify if they did not reside in the community.

Several national databases exist that provide information on environmental, health, social and economic conditions at a geographic scale relevant for community assessments. However, most health information is not available at the community level. For that reason, it is important to use state, county, or city databases to obtain community-level data. For example, for the Westlawn Community and 30th Street Corridor in Milwaukee, the Wisconsin Interactive Statistics on Health (WISH) provided health data for zip codes, as well as cities and codes, allowing for a more accurate description of the community's health status. The Illinois Project for Local Assessment of Needs (IPLAN) also provided community-level health statistics for Altgeld Gardens.

This report provides examples of which tools and information can be used within the context of environmental or public health assessment, and how the information can be displayed and interpreted. Potential users may be interested in currently available information that could provide insight into environmental or health conditions prior to a more rigorous assessment that may include measurements or other types of in-field research. In this respect, users may include community-based organizations, academic researchers, local governments working with communities, or federal agencies developing local-scale applications.

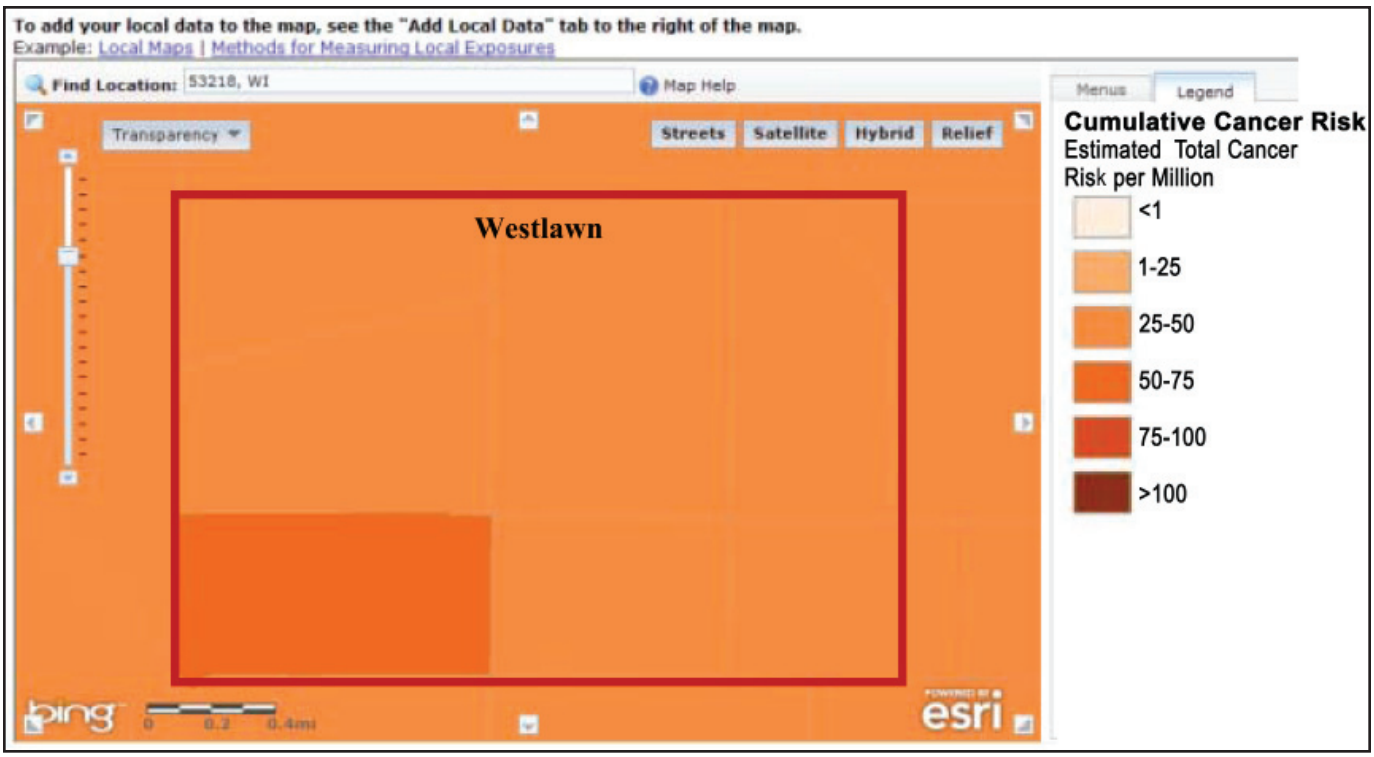
[90] The 2011 WHO report on noise pollution is available at: http://www.euro.who.int/en/what-we-publish/abstracts/burden-of-disease-from-environmental-noise.-quantification-of-healthy-life-years-lost-in-europe

Appendixes

Appendix A
Acronyms

ATSDR	Agency for Toxic Substances and Disease Registry
ARD	Air and Radiation Division
AFS	Air Facility System
AQS	Air Quality System
AADT	Annual average daily traffic
BRFSS	Behavioral Risk Factor Surveillance System
BLS	Bureau of Labor Statistics
CDC	Centers for Disease Control and Prevention
CARE	Community Action for a Renewed Environment
CBCRA	Community-based cumulative risk assessment
C-FERST	Community-Focused Exposure and Risk Screening Tool
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CAPs	Criteria Air Pollutants
DOT	Department of Transportation
DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane
EJ	Environmental Justice
ECAB	Environmental Characterization and Apportionment Branch
EJSEAT	Environmental Justice Strategic Enforcement Tool
EJView	Environmental Justice Viewer
EMRB	Exposure Modeling Research Branch
FEMA	Federal Emergency Management Agency
FPL	Federal Poverty Line
GIS	Geographic Information Systems
HAPs	Hazardous Air Pollutants
HPSA	Health Professional Shortage Area
HRSA	Health Resources and Services Administration
km	kilometer
MCL	Maximum Contaminant Level
MSA	Metropolitan Statistical Area
µg/L	microgram per liter or parts per billion
µg/m3	micrograms per cubic meter
mg/L	milligram per liter or parts per million
NEI	National Emission Inventory
NEJAC	National Environmental Justice Advisory Council
NEPHTN	National Environmental Public Health Tracking Network
NERL	National Exposure Research Laboratory
NOAA	National Oceanic and Atmospheric Administration
NPL	National Priority List
NRC	National Research Council
NATA	National-Scale Air Toxics Assessment
OCSPP	Office of Chemical Safety and Pollution Prevention
OECA	Office of Enforcement and Compliance Assurance
ORD	Office of Research and Development
PM	Particulate Matter
ppb	parts per billion
ppm	parts per million
pCi/L	picocuries per liter
PCBs	Polychlorinated biphenyls
PAHs	Polycyclic aromatic hydrocarbons
PACE EH	Protocol for Assessing Community Excellence in Environmental Health
POTW	Publicly Owned Treatment Works
RSEI	Risk-Screening Environmental Indicators
SDWIS	Safe Drinking Water Information System
S/O	Solvents/Organic
SIC	Standard Industrial Classification
TRI	Toxic Release Inventory
EPA	US Environmental Protection Agency
WDNR	Wisconsin Department of Natural Resources
WISH	Wisconsin Interactive Statistics on Health
WHO	World Health Organization

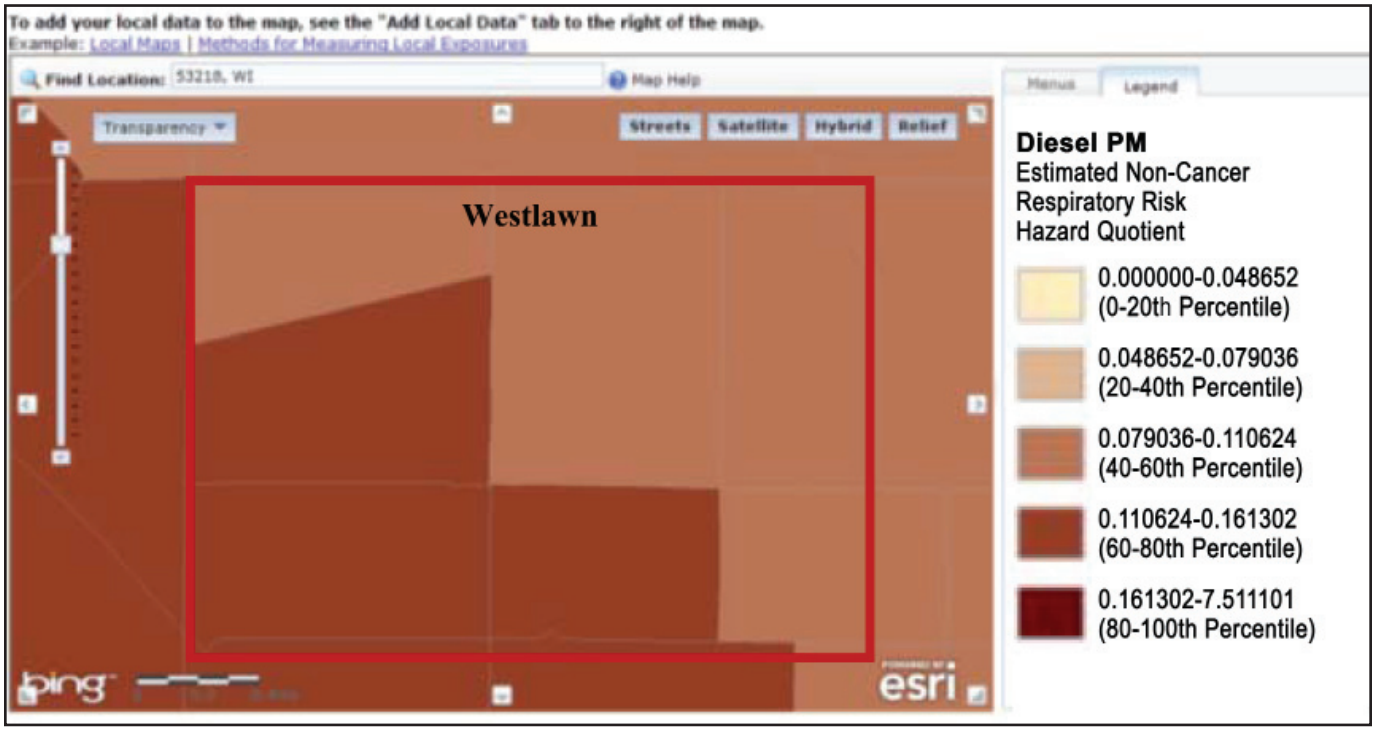
Appendix B
C-FERST Exposure and Risk Maps
National-Scale Air Toxics Assessment (NATA), 2002



Cumulative Estimated Cancer Risk, Zip Code: 53218

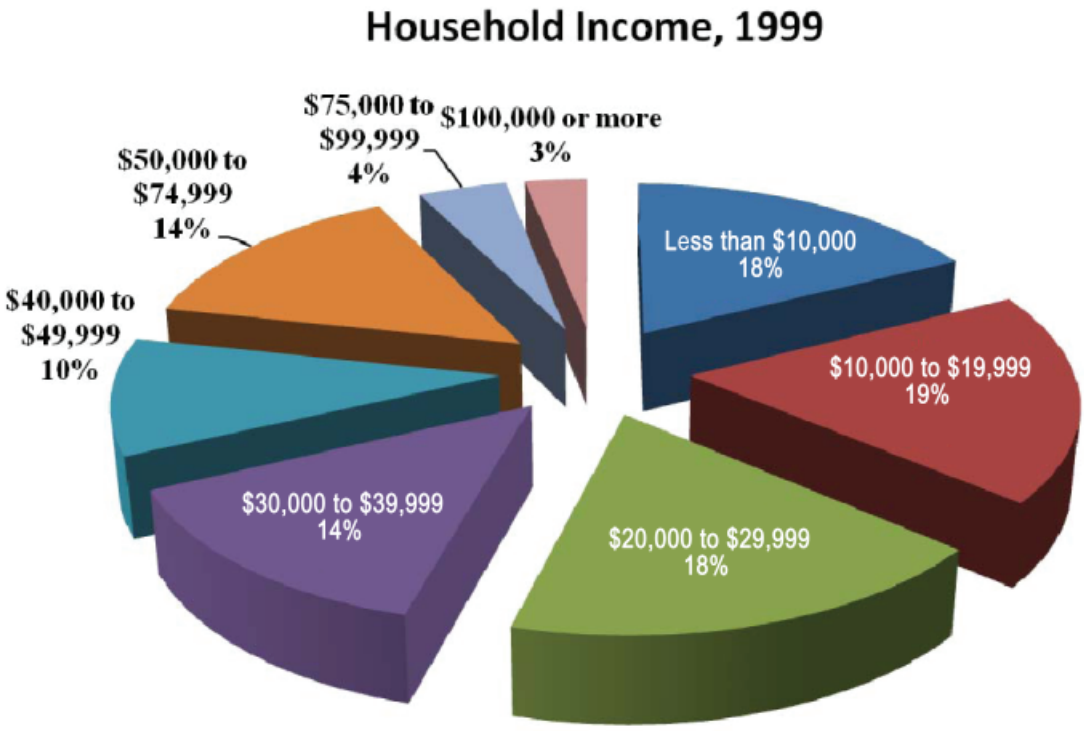
Estimated Non-Cancer Respiratory Risk, Zip Code: 53218

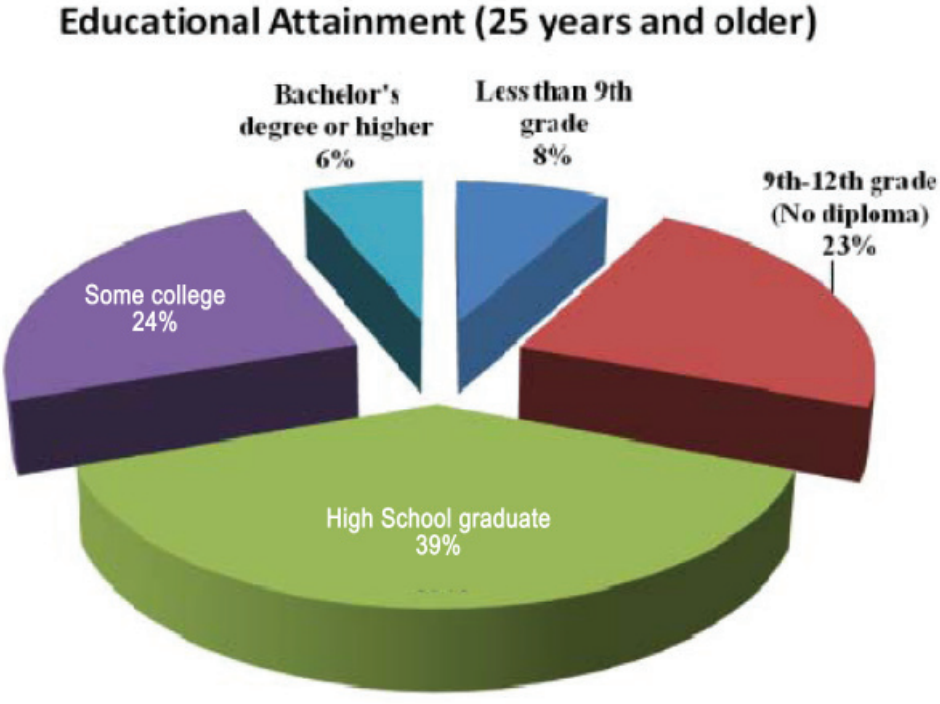
Benzene – Estimated Exposure Concentration, Zip Code: 53218



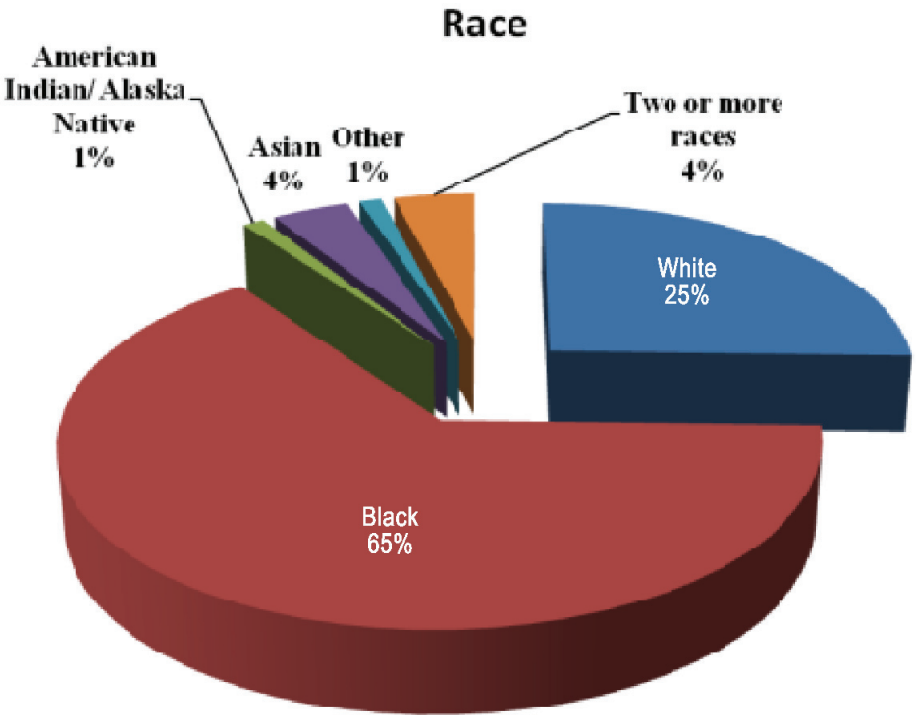
Diesel PM – Estimated Non-Cancer Respiratory Risk, Zip Code: 53218

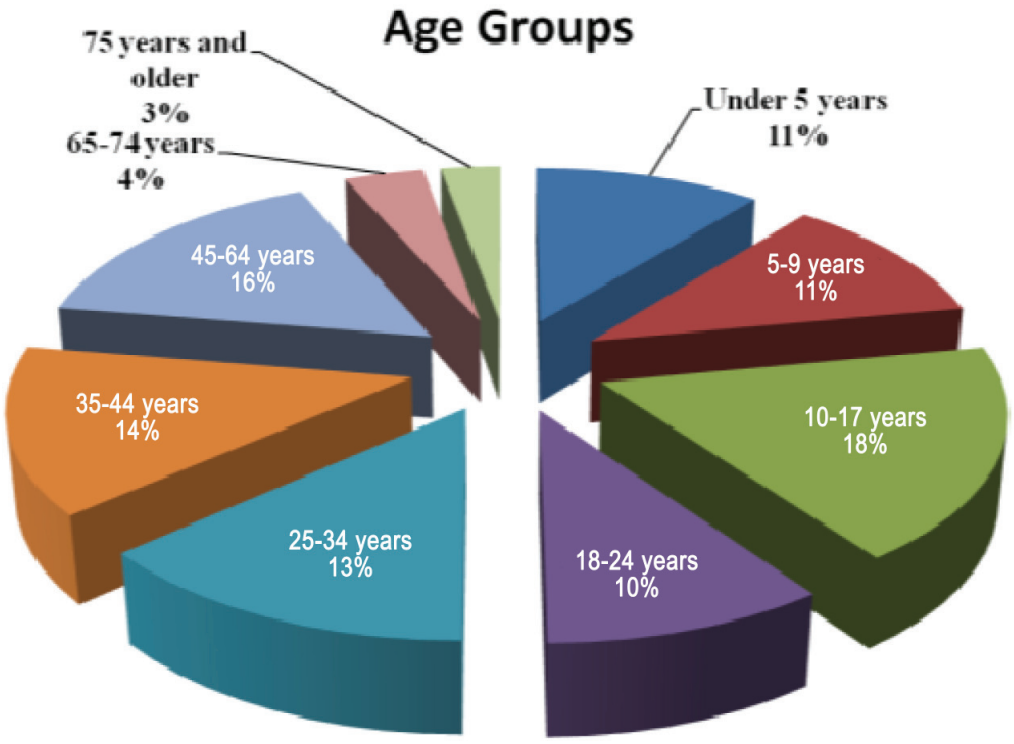
Appendix C
Westlawn Socioeconomic Data





Economic Information (2000 US Census)





Social Information (2000 US Census)

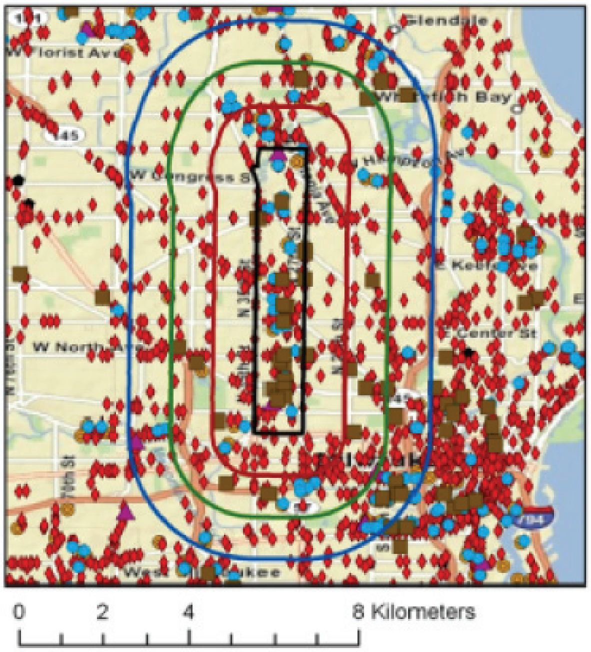
Appendix D
Publicly Available Web-Based Sources, EJ Toolkit

INDICATOR	DATABASE	WEB ADDRESS	TYPE OF DATA
Environmental	Envirofacts (EPA)	http://www.epa.gov/enviro/	Sources
	EnviroMapper (EPA)	http://www.epa.gov/emefdata/em4ef.home	
	Flood Mapping (FEMA)	http://www.fema.gov/hazard/map/flood.shtm	
	My Environment (EPA)	http://www.epa.gov/myenvironment/	
	NEI (EPA)	http://www.epa.gov/air/emissions/	
	Toxic Release Inventory Explorer (EPA)	http://www.epa.gov/triexplorer/	
	Illinois – Getting Around: Average daily traffic counts	http://www.gettingaroundillinois.com/	
	Brownfield / Land Reuse Initiative (ATSDR)	http://www.atsdr.cdc.gov/sites/brownfields/docs/30THStreetCorridorReportAUG2008.pdf	Potential exposure
	Decennial Census (U.S. Census)	http://www.factfinder.census.gov/home/saff/main.html?_lang=en	
	State Lead Surveillance Data (CDC)	http://www.cdc.gov/nceh/lead/data/state.htm	
	Illinois – Department of Health Statistics	http://www.idph.state.il.us/	
	Public Health Assessments & Health Consultations (ATSDR)	http://www.atsdr.cdc.gov/hac/pha/index.asp	Environmental conditions
	Safe Drinking Water Information System (EPA)	http://www.epa.gov/enviro/facts/sdwis/index.html	
	Illinois EPA – Drinking Water Watch: Chicago	http://www.epa.state.il.us/water/drinking-water-watch/	
	Texas – Water Quality Report: Port Arthur	http://www.portarthur.net/	
	Wisconsin – Water Quality Report: Milwaukee	http://city.milwaukee.gov/home	
	National Climatic Data Center (NOAA)	http://www.ncdc.noaa.gov/oa/ncdc.html	Vulnerability

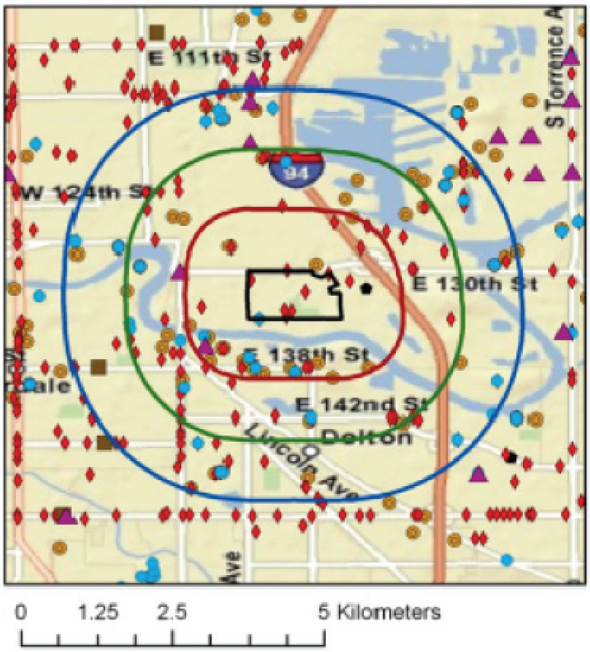
INDICATOR	DATABASE	WEB ADDRESS	TYPE OF DATA
Health	Behavioral Risk Factor Surveillance System (CDC)	http://www.cdc.gov/brfss/	Sensitive populations
	Decennial Census (US Census)	www.factfinder.census.gov/	
	Illinois – Department of Health Statistics	http://www.idph.state.il.us/	Existing conditions; Health impacts from environmental stressors
	Illinois – Illinois Project for Local Assessment of Needs (IPLAN)	http://app.idph.state.il.us/	
	Texas – Department of State Health Services	www.dshs.state.tx.us/chs/	
	Wisconsin Interactive Statistics on Health (WISH)	www.dhfs.state.wi.us/wish/	
Social	Decennial Census (US Census)	www.factfinder.census.gov/	Demographic; Community participation
	Google Earth	www.google.com/earth/	
	Health Resources and Services Administration (HRSA)	http://www.hrsa.gov/	Vulnerability to exposure
Economic	Decennial Census (US Census)	www.factfinder.census.gov/	Unemployment; Income; Housing tenure; Industry of employment
	EnviroMapper (EPA)	http://www.epa.gov/emefdata/em4ef.home	Brownfield properties
Mapping	Google Earth	www.google.com/earth/	
	Census 2000 TIGER/Line Data	www.esri.com/data/download/census2000-tigerline/index.html	
	National Geospatial Program – National Map Viewer (US Geological Survey)	http://viewer.nationalmap.gov/viewer/	
Adverse Effects	Risk Screening Environmental Indicators Model (RSEI) (EPA)	www.epa.gov/oppt/rsei/	

Appendix E
Environmental Indicators, EJ Toolkit

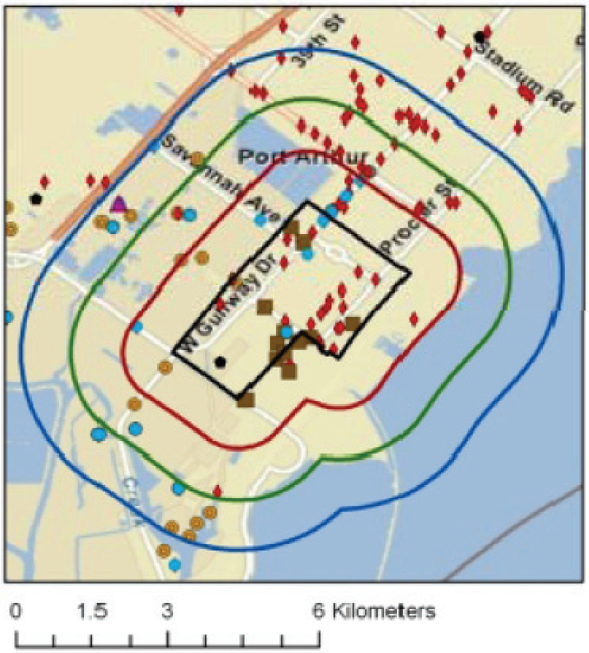
30th Street Corridor, Milwaukee, WI

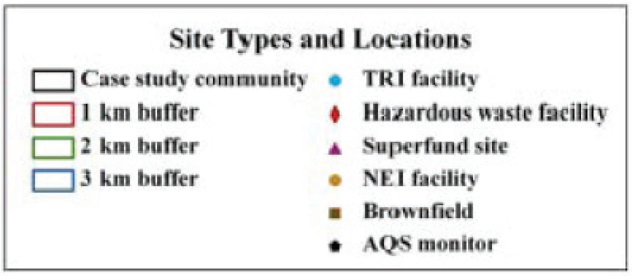


Altged Gardens, Chicago, IL



Westside, Port Arthur, TX





Sources

Proximity to Regulated Facilities (EnviroMapper and ArcGIS)

Number of Regulated Facilities (My Environment, EnviroMapper, and AirData)

Site	30th Street Corridor				Milwaukee	Milwaukee County	Wisconsin
	Within boundary	1 km	2 km	3km			
NEI, 2005	10	18	32	54	201	306	2,609
TRI , 2009	14	19	31	53	86	128	881
Hazardous waste, 2009	97	251	421	680			
Superfund, 2009	3	3	4	6	15	24	174
Brownfield properties, 2009	21	27	39	47	96	114	299
AQS monitor	0	0	0	0	19	20	90

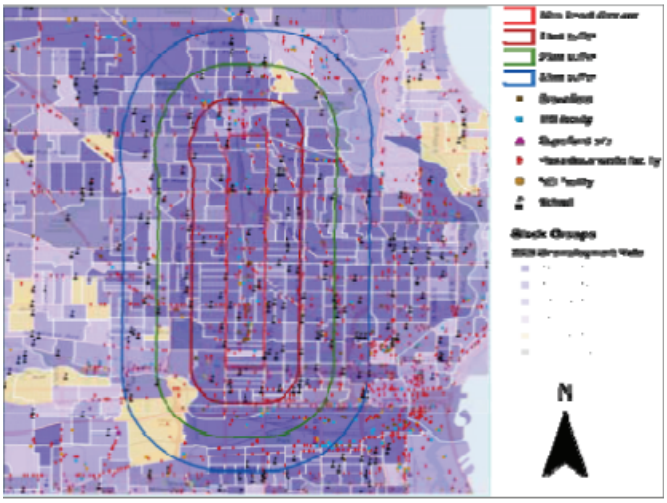
Site	Altgeld Gardens				Chicago	Cook County	Illinois
	Within boundary	1 km	2 km	3km			
NEI, 2005	0	15	30	51	741	1,939	7,390
TRI , 2009	1	5	12	27	109	361	1,079
Hazardous waste, 2009	7	24	67	123			
Superfund, 2009	0	1	2	4	103	158	481
Brownfield properties, 2009	0	0	0	1	31	88	328
AQS monitor	0	1	1	1	24	59	147

Site	Westside				Port Arthur	Jefferson County	Texas
	Within boundary	1 km	2 km	3km			
NEI, 2005	1	5	9	17	37	130	3,644
TRI , 2009	3	8	10	15	16	54	1,515
Hazardous waste, 2009	21	35	52	72			
Superfund, 2009	0	0	0	1	4	9	545
Brownfield properties, 2009	8	13	13	13	13	15	370
AQS monitor	1	1	1	1	10	18	257

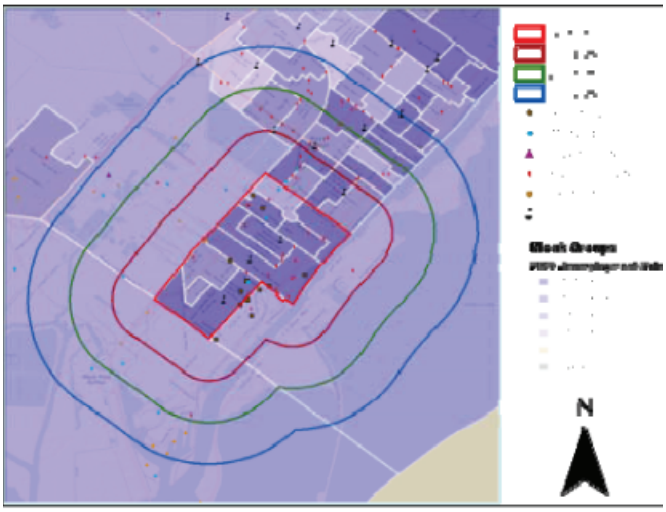
POTENTIAL EXPOSURE

Exposures at home and school (EnviroMapper, AirData, and ArcGIS)

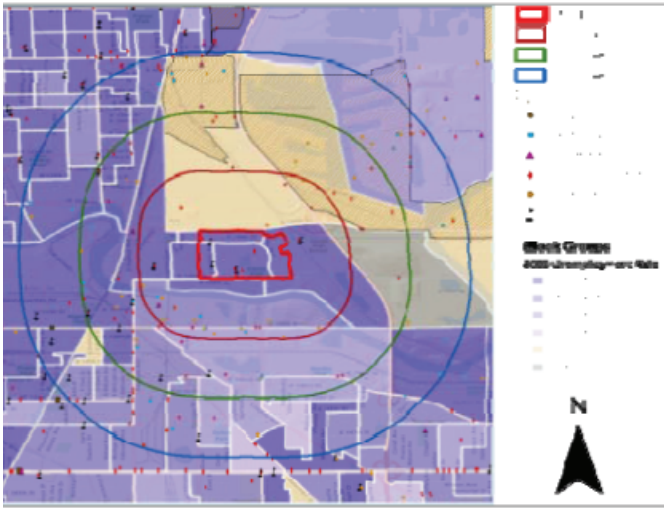
30th Street Corridor, WI



Westside, TX



Altgeld Gardens, IL



Housing Characteristics–Year housing unit built (2000 US Census)

Variable	30th St Corridor	Milwaukee	Milwaukee County	Wisconsin
Total housing units	7,903	249,215	400,093	2,321,144
Occupied housing units (%)	6,816 (86.2)	232,188 (93.2)	377,729 (94.4)	2,084,544 (89.4)
Year housing unit built, Percent				
Built 1980 to Present	4.5	6.7	11.7	27.6
Built 1950 to 1979	37.2	46.6	47.3	41.4
Built Before 1950	58.5	46.7	40.9	31.1

Variable	Altgeld Gardens	Chicago	Cook County	Illinois
Total housing units	2,232	1,152,871	2,096,121	4,885,615
Occupied housing units (%)	1,938 (86.8)	1,061,928 (92.1)	1,974,181 (94.2)	4,591,779 (94.0)
Year housing unit built, Percent				
Built 1980 to Present	0.9	8.5	13.7	22.1
Built 1950 to 1979	38.7	39.2	48.1	46.0
Built Before 1950	60.4	52.3	38.2	31.8

Variable	Westside	Port Arthur	Jefferson County	Texas
Total housing units	4,223	24,713	102,080	8,157,575
Occupied housing units (%)	3,402 (80.6)	21,839 (88.4)	92,880 (91.1)	7,393,354 (90.6)
Year housing unit built, Percent				
Built 1980 to Present	4.0	16.5	22.7	43.3
Built 1950 to 1979	56.4	55.5	57.6	45.9
Built Before 1950	39.6	28.0	19.7	10.8

Biomarkers of exposure–Childhood blood lead levels (ATSDR, State health department, and CDC)

Children <6 years with Elevated Blood Lead Levels, 2005	30th Street Corridor*	Milwaukee	Milwaukee County	Wisconsin
Prevalence	15.7 % ≥ 10µg/L	7.7 % ≥ 10 µg/dL	5.7 % ≥ 10 µg/dL	2.7 % ≥ 10 µg/dL

*Note: Blood lead data is from the ATSDR report on 30th Street Corridor which includes two additional zip codes and 32 census tracts

Children <6 years with Elevated Blood Lead Levels, 2005	Altgeld Gardens	Chicago	Cook County	Illinois
Results ≥ 10mcg/dL, Percent	All Chicago zip codes considered high risk for pediatric blood lead poisoning	4.4	3.8	3.0
Results ≥ 15mcg/dL, Percent		1.4	1.2	1.0

Children <6 years with Elevated Blood Lead Levels, 2005	Westside	Port Arthur	Jefferson County	Texas
Percent prevalence (≥ 10 µg/dL)			1.3	0.7

High-risk industries of employment (2000 US Census)

Variable	30th St Corridor	Milwaukee	Milwaukee County	Wisconsin
Employed civilian population ≥16 yrs	5,751	256,244	436,878	2,734,925
Persons 16 years and older high-risk industries of employment, Percent				
Agriculture forestry; Fishing and hunting; Mining	0.4	0.4	0.3	2.8
Construction	2.1	3.7	4.0	5.9
Manufacturing	19.6	18.5	18.5	22.2
Transportation and warehousing	5.2	4.4	4.5	3.7

Variable	Altgeld Gardens	Chicago	Cook County	Illinois
Employed civilian population ≥16 yrs	1,209	1,220,040	2,421,287	5,833,185
Persons 16 years and older high-risk industries of employment, Percent				
Agriculture forestry; Fishing and hunting; Mining	0.0	0.1	0.1	1.2
Construction	0.0	4.4	4.9	5.7
Manufacturing	11.1	13.1	14.1	16.0
Transportation and warehousing	12.1	6.2	6.2	5.2

Variable	Westside	Port Arthur	Jefferson County	Texas
Employed civilian population ≥16 yrs	2,312	19,790	99,640	9,234,372
Persons 16 years and older high-risk industries of employment, Percent				
Agriculture forestry; Fishing and hunting; Mining	1.4	2.9	1.6	2.7
Construction	8.1	9.5	8.2	8.1
Manufacturing	10.6	13.1	13.8	11.8
Transportation and warehousing	2.7	4.7	4.4	4.8

ENVIRONMENTAL CONDITIONS
Air Quality–Hazardous Air Pollutants (HAP) (NATA 2002)

HAP Concentration (µg/m3)	30th St Corridor	Milwaukee	Milwaukee County	Wisconsin
Toluene	4.596		4.456 (1)	2.576 (1)
Formaldehyde	2.115		2.118 (2)	1.327 (2)
Xylenes (mixed isomers)	2.095		2.022 (3)	1.145 (4)
Acetaldehyde	1.973		1.920 (4)	1.133 (6)
Benzene (including from gas)	1.694		1.745 (5)	1.137 (5)
1,1,1-Trichloroethane	1.335		1.109 (8)	0.660 (8)
Methyl Chloride	1.207		1.202 (6)	1.191 (3)
Diesel Engine Emissions	1.169		1.163 (7)	0.772 (7)
Methanol	1.068		0.892 (10)	0.476 (11)
2,2,4-Trimethylpentane	0.952		0.994 (9)	0.554 (10)

HAP Concentration (µg/m3)	Altgeld Gardens	Chicago	Cook County	Illinois
Chlorobenzilate	2.930		9.0E-09 (120)	4.0E-09 (139)
Chloroacetic Acid	2.646		9.2E-07 (104)	4.2-E07(119)
Chloroform	2.178		0.139 (23)	0.108 (22)
Chlorobenzene	1.848		0.096 (27)	0.056 (28)
Coke Oven Emissions	1.797		0.003 (50)	0.003 (50)
Chloroprene	1.203		9.2E-06 (94)	7.1E-06 (98)
Chromium Compounds	1.200		0.002 (53)	0.001 (55)
Cobalt Compounds	0.907		2.4E-05 (90)	1.9E-05 (91)
Ethylene Dichloride (1,2-dichloroethane)	0.662		0.004 (45)	0.004 (43)
Ethylene Glycol	0.635		0.590 (14)	0.366 (15)

HAP Concentration (µg/m3)	Westside	Port Arthur	Jefferson County	Texas
Benzene (including from gas)	2.072		2.208 (4)	1.224 (4)
Hexane	2.046		5.018 (1)	0.611 (10)
Diesel Engine Emissions	1.623		4.299 (2)	1.102 (7)
Formaldehyde	1.556		2.064 (5)	1.640 (2)
Toluene	1.542		2.369 (3)	2.305 (1)
Methyl Chloride	1.204		1.206 (7)	1.209 (5)
Acetaldehyde	1.167		1.538 (6)	1.368 (3)
Xylenes (mixed isomers)	0.796		1.132 (8)	1.124 (6)
Carbon Tetrachloride	0.622		0.635 (9)	0.612 (9)
Methanol	0.299		0.461 (11)	0.357 (13)

Note: Pollutants of concern are the top ten total concentrations for the community of concern. For the reference areas, the pollutant rank is in parenthesis.

Water Quality (Local water reports)

30th Street Corridor, WI
Milwaukee Water Works (System ID: WI2410100), 2009 Safe Drinking Water Report

Contaminant (Unit)	Median Value	Highest Detected	MCL	Potential Source(s)
Trihalomethanes (µg/L)	3.6	10.4	80	By-product of disinfection
Copper (mg/L)	0.056		1.3	Corrosion of plumbing systems
Lead (µg/L)	5.3		15	Corrosion of plumbing systems

Altgeld Gardens, IL
Chicago Water Department (System ID: IL0316000), 2009 Consumer Confidence Report

Contaminant (Unit)	Highest Detected	Range	MCL	Potential Source(s)
Trihalomethanes (ppb)	20	11.1-22.7	80	By-product chlorination
Copper (ppm)*	0.032		1.3	Natural erosion; Leaching; Corrosion of plumbing systems
Lead*	6.07		0	Corrosion of plumbing systems; Natural erosion

Westside, TX
City of Port Arthur (System ID: TX1230009), 2009 Water Quality Report

Contaminant (Unit)	Amount Detected	Range	MCL	Potential Source(s)
Chloramines (ppm)	3.0	1.2-3.5	4.0	Water additive used to control microbes
Trihalomethanes (ppb)	25.7	*15.8- 32.6*	80	By-product disinfection
Copper Samples (ppm)*	0.136		1.3	Corrosion of plumbing systems; Natural erosion; Leaching
Lead Samples (ppb)*	2.2		0	Corrosion of plumbing systems; Natural erosion

*Note: Value is the 90th percentile

Land Quality (ATSDR)

Altgeld Gardens, IL Soil Sampling, 1999

Contaminant	Maximum level detected
Polycyclic aromatic hydrocarbons (PAHs)	Normal range in urban area
Dichlorodiphenyltrichloroethane (DDT)	Elevated (31.4 ppm)
Dichlorodiphenyldichloroethane (DDD)	Elevated (5.8 ppm)
Dichlorodiphenyldichloroethylene (DDE)	Elevated (31.6 ppm)

VULNERABILITY

Hazard Frequency (NOAA's Storm Event Database)

Hazard event	30th St Corridor (within 4 km)	Milwaukee	Milwaukee County	Wisconsin
Tornado	3.3		25.0	1438.3
Flood			43.3	961.7
Thunderstorm winds			90.0	
Hail			11.7	
Drought			3.3	10.0
Snow and ice			1.7	25.0
Temperature extremes			33.3	70.0
Wild and forest fire			1.7	16.7
Lightning			38.3	

Hazard event	Altgeld Gardens (within 4 km)	Chicago	Cook County	Illinois
Tornado	0	3.3	56.7	2075.0
Flood			36.7	903.3
Thunderstorm winds			131.7	
Hail			8.3	
Drought			0.0	6.7
Snow and ice			6.7	
Temperature extremes			161.7	253.3
Wild and forest fire			1.7	3.3
Lightning			50.0	

Hazard event	Westside (within 4 km)	Port Arthur	Jefferson County	Texas
Tornado			15.0	120.0
Flood			96.7	6541.7
Thunderstorm winds	11.7	10.0	73.3	4795.0
Hail		13.3	95.0	
Drought			0.0	
Snow and ice			0.0	153.3
Temperature extremes			1.7	328.3
Wild and forest fire			3.3	205.0
Lightning			0.0	195.0

Note: Hazard frequency = number of events / years in record

Appendix F
Health Indicators, EJ Toolkit

EXISTING CONDITIONS

Infant Mortality Rate (IMR) (<365 days) (Local health departments)

Infant Mortality, 2000-2001	30th St Corridor	Milwaukee	Milwaukee County	Wisconsin
Live Births	5,440	22,351	29,573	138,301
Infant Deaths	70	256	299	948
IMR per 1,000 live births	12.9	11.5	10.1	6.9

Infant Mortality, 2000	Altgeld Gardens	Chicago	Cook County	Illinois
Live Births	178	50,885	85,503	185,003
Infant Deaths	6	532	819	1,528
IMR per 1,000 live births	33.7	10.5	9.6	8.3

Infant Mortality, 2006	Westside	Port Arthur	Jefferson County	Texas
Live Births		932	3,556	399,309
Infant Deaths		6	27	2,476
IMR per 1,000 live births		6.4	7.6	6.2

Low Birth Weight (LBW) Rate (<2,500 Grams) (Local health departments)

Year: 2000	30th St Corridor	Milwaukee	Milwaukee County	Wisconsin
Total Number of births	2,762	11,153	14,846	69,289
Number LBW births	338	1,135	1,350	4,526
LBW, Percent	12.2	10.2	9.1	6.5

Year: 2000	Altgeld Gardens	Chicago	Cook County	Illinois
Total Number of births	178	50,885	85,503	185,003
Number LBW births	29	4,957	7,644	14,747
LBW, Percent	16.3	9.7	8.9	8.0

Year: 2006	Westside	Port Arthur	Jefferson County	Texas
Total Number of births			3,556	399,309
Number LBW births			356	33,749
LBW, Percent			10.0	8.5

IMPACTS FROM ENVIRONMENTAL STRESSORS

Cancer (Local health departments)

Cancer group, 2002-2006 Death rate per 100,000 population	30th St Corridor	Milwaukee	Milwaukee County	Wisconsin
All cancers			209.51	201.34
Stomach			4.60	3.39
Colon, Rectum, Anus			18.38	18.45
Liver and Intrahepatic bile ducts			6.16	5.04
Pancreas			12.83	11.77
Trachea, Bronchus, Lung			54.29	50.97
Breast			14.23	13.99
Ovary			5.18	5.48
Prostate			10.33	11.48
Nervous System			4.53	4.79

Cancer group, 2002-2006 Incidence (Count)	Altgeld Gardens	Chicago	Cook County	Illinois
All cancers	573		122,749	305,990
Colorectal (Colon & Rectum)	69		14,330	35,298
Lung & Bronchus	90		17,558	44,898
Breast – invasive	78		17,257	42,610
Breast – in situ	10		4,099	10,052
Cervix	5		1,363	2,943
Prostate	100		17,368	42,773
Nervous System	9		1,483	4,035
Leukemias & Lymphomas	32		8,686	22,395
All other cancers	127		32,591	79,961

Cancer group, 2007 Rate per 100,000 estimated population	Westside	Port Arthur	Jefferson County	Texas
Total cancers			540	33,437
Age-adjusted death rate (all cancers) per 100,000 people			206.3	192.6
Stomach			7	830
Colon, Rectum, Anus			52	3,294
Pancreas			32	1,771
Trachea, Lung & Bronchus			164	9,386
Breast			31	2,497
Prostate			32	1,755
Leukemias & Lymphomas			34	6,331

Diseases Attributable to Pathogens (Local health departments)

Age-adjusted mortality rate, 2000-2002 (Deaths per 100,000 population)	30th St Corridor	Milwaukee	Milwaukee County	Wisconsin
All causes			920.93	793.38
Salmonella Infections				0.08
Unspecified Infections and Parasitic Diseases			2.67	1.79
Viral Hepatitis			0.94	0.64
Certain Other Intestinal Infections			0.73	

Reported cases, 2003	Altgeld Gardens	Chicago	Cook County	Illinois
Reported food borne outbreak		9	31	62
Pertussis			186	323
Cryptosporidiosis				102

Cause of Death – Cases reported, 2000-2003	Westside	Port Arthur	Jefferson County	State of Texas
Salmonella Infections			0	9
Shigellosis & Amebiasis			0	1
Arthropod-Borne Viral Encephalitis			1	8
Viral Hepatitis (Age-adjusted rate per 100,000)			28 (3.7)	1,279 (2.2)

Cardiovascular and respiratory infections (ATSDR and Local health departments)

	30th St Corridor	Milwaukee	Milwaukee County	Wisconsin
Asthma hospitalization discharges per 10,000 children <5 years, 2004*	78	55	20.06	9.83
Age-Adjusted Mortality Rate, 2000-2002 (deaths per 100,000 population)				
Diseases of heart			256.30	224.18
Chronic lower respiratory diseases			46.10	40.61
Acute bronchitis and bronchiolitis			0.27	0.11

*Note: Asthma data for the 30th St Corridor and Milwaukee are from the ATSDR report on the Corridor; County and state data are the age-adjusted rates

Emergency Department Hospitalizations, 2000-2002*	Altgeld Gardens	Chicago	Cook County	Illinois
Asthma	677	22,406	31,481	45,343
Acute bronchitis	266	4,380	7,131	14,775
Acute myocardial infarction	632	12,078	25,874	56,594
Pulmonary heart disease	118	2,572	5,029	10,092
Other upper respiratory infections	125	2,047	3,346	6,318

*Note: Data for Atlgeld is for the 3-digit zip code tabulation

Mortality, 2006	Westside	Port Arthur	Jefferson County	Texas
Cardiovascular disease			827	50,892
Age-adjusted rate			321.9	270.3
Heart disease			634	38,487
Age-adjusted rate			246.9	203.6
Stroke			156	9,332
Age-adjusted rate			60.7	50.2
Chronic lower respiratory diseases			97	7,599
Age-adjusted rate			38.0	40.9

SENSITIVE POPULATIONS

Age Group – Children/Elderly (2000 US Census)

Variable	30th St Corridor	Milwaukee	Milwaukee County	Wisconsin
Total population	17,423	596,974	940,164	5,363,675
% Under 5 years	10.3	8.0	7.1	6.4
% under 18 years	41.7	28.6	26.4	25.5
% 65-74 years	3.8	5.5	6.4	6.6
% 75 years and older	2.1	5.4	6.6	6.5

Variable	Altgeld Gardens	Chicago	Cook County	Illinois
Total population	5,780	2,896,016	5,376,741	12,419,293
% Under 5 years	13.0	7.5	7.2	7.1
% under 18 years	51.5	26.2	26.0	26.1
% 65-74 years	1.9	5.5	6.1	6.2
% 75 years and older	1.1	4.8	5.6	5.9

Variable	Westside	Port Arthur	Jefferson County	Texas
Total population	8,402	57,755	252,051	20,851,820
% Under 5 years	7.1	7.8	6.7	7.8
% under 18 years	26.8	28.7	25.9	28.2
% 65-74 years	10.0	7.7	7.1	5.5
% 75 years and older	9.2	7.8	6.5	4.5

Health Impairments – Disability status (2000 US Census)

Variable	30th St Corridor	Milwaukee	Milwaukee County	Wisconsin
Total population 5 years and older with any disability (%)	9,470 (49.2)	120,800 (22.0)	169,939 (19.5)	790,917 (15.7)
Sensory, %	6.2			
Physical, %	21.6			
Mental, %	18.6			
Self-care, %	8.8			
Go-outside-home disability (16 years and older)<, %	23.8			

Variable	Altgeld Gardens	Chicago	Cook County	Illinois
Total population 5 years and older with any disability (%)	2,633 (43.0)	604,676 (22.6)	973,558 (19.5)	1,999,717 (17.3)
Sensory, %	6.3			
Physical, %	18.8			
Mental, %	14.0			
Self-care, %	9.6			
Go-outside-home disability (16 years and older)<, %	21.5			

Variable	Westside	Port Arthur	Jefferson County	Texas
Total population 5 years and older with any disability (%)	4,628 (59.3)	23,822 (43.0)	48,472 (20.6)	3,605,542 (18.7)
Sensory, %	10.3			
Physical, %	27.0			
Mental, %	12.8			
Self-care, %	9.4			
Go-outside-home disability (16 years and older)<, %	21.0			

Individual Behavior – Tobacco use/Alcohol use (CDC)

Variable, Percent	30th St Corridor	Milwaukee	Milwaukee County	Wisconsin
Obesity		18.8	19.9	21.6
Binge drinking (≥5 drinks on one occasion)		20.8	23.0	24.9
Current smoker		23.7	25.7	23.3

Variable, Percent	Altgeld Gardens	Chicago MSA	Cook County	Illinois
Obesity		21.2	20.4	21.9
Binge drinking (≥5 drinks on one occasion)		16.8	16.5	17.8
Current smoker		23.2	21.4	22.8

Variable, Percent	Westside	Port Arthur	Jefferson County	Texas
Obesity				25.5
Binge drinking (≥5 drinks on one occasion)				17.8
Current smoker				22.9

*Note: MSA estimate are geographically larger than county-level estimates

Appendix G
Social Indicators, EJ Toolkit

DEMOGRAPHIC

Race/Ethnicity (2000 US Census)

Variable, Percent	30th St Corridor	Milwaukee	Milwaukee County	Wisconsin
White	6.1	50.0	65.6	88.9
Black	79.7	37.3	24.6	5.7
Asian	9.4	2.9	2.6	1.7
Other	4.8	9.8	7.2	3.7
Total minority (non-white)	**93.9**	**50.0**	**34.4**	**11.1**
Hispanic/Latino (of any race)	3.3	12.0	8.8	3.6

Variable, Percent	Altgeld Gardens	Chicago	Cook County	Illinois
White	0.3	42.0	56.3	73.5
Black	98.7	36.8	26.1	15.1
Asian	0.1	4.3	4.8	3.4
Other	0.9	16.9	12.8	8.0
Total minority (non-white)	**99.7**	**58.0**	**43.7**	**26.5**
Hispanic/Latino (of any race)	0.3	26.0	19.9	12.3

Variable, Percent	Westside	Port Arthur	Jefferson County	Texas
White	3.4	39.0	57.2	71.0
Black	93.6	43.7	33.7	11.5
Asian	0	5.9	2.9	2.7
Other	3.0	11.4	6.2	14.8
Total minority (non-white)	**96.6**	**61**	**42.8**	**29**
Hispanic/Latino (of any race)	3.2	17.5	10.5	32.0

Age Groups (2000 US Census)

Variable	30th St Corridor	Milwaukee	Milwaukee County	Wisconsin
% under 5 years	**10.3**	**8.0**	**7.1**	**6.4**
% 5-9 years	12.5	8.5	7.6	7.1
% 10-14 years	12.3	7.8	7.4	7.5
% 15-17 years	6.6	4.4	4.3	4.5
% under 18 years	**41.7**	**28.6**	**26.4**	**25.5**
% 18-44 years	37.1	42.4	40.7	39.2
% 45-64 years	15.3	18.1	20.0	22.2
% 65-74 years	**3.8**	**5.5**	**6.4**	**6.6**
% 75 years and older	**2.1**	**5.4**	**6.6**	**6.5**

Variable	Altgeld Gardens	Chicago	Cook County	Illinois
% under 5 years	**13.0**	**7.5**	**7.2**	**7.1**
% 5-9 years	17.5	7.7	7.6	7.5
% 10-14 years	14.2	6.9	7.1	7.3
% 15-17 years	6.9	4.0	4.1	4.3
% under 18 years	**51.5**	**26.2**	**26.0**	**26.1**
% 18-44 years	36.6	44.6	41.6	40.3
% 45-64 years	8.9	18.9	20.7	21.5
% 65-74 years	**1.9**	**5.5**	**6.1**	**6.2**
% 75 years and older	**1.1**	**4.8**	**5.6**	**5.9**

Variable	Westside	Port Arthur	Jefferson County	State of Texas
% under 5 years	**7.1**	**7.8**	**6.7**	**7.8**
% 5-9 years	7.5	8.1	7.2	7.9
% 10-14 years	7.1	7.9	7.3	7.8
% 15-17 years	5.2	4.8	4.7	4.7
% under 18 years	**26.8**	**28.7**	**25.9**	**28.2**
% 18-44 years	32.4	35.9	39.4	41.6
% 45-64 years	21.7	19.9	21.1	20.2
% 65-74 years	**10.0**	**7.7**	**7.1**	**5.5**
% 75 years and older	**9.2**	**7.8**	**6.5**	**4.5**

Place of Birth – Foreign born (2000 US Census)

Variable	30th St Corridor	Milwaukee	Milwaukee County	Wisconsin
Native, %	94.4	92.3	93.2	96.4
Born in WI, %	54.4	65.2	69.4	73.4
Foreign born, %	5.6	7.7	6.8	3.6
Naturalized citizen, %	1.9	2.4	2.5	1.4
Not a citizen, %	3.7	5.3	4.2	2.2

Variable	Altgeld Gardens	Chicago	Cook County	Illinois
Native, %	99.8	78.3	80.2	87.7
Born in IL, %	85.3	57.7	61.6	67.1
Foreign born, %	0.2	21.7	19.8	12.3
Naturalized citizen, %	0.1	7.7	7.8	4.9
Not a citizen, %	0.1	14.0	12.0	7.5

Variable	Westside	Port Arthur	Jefferson County	Texas
Native, %	97.8	87.6	93.8	86.1
Born in TX, %	68.6	64.4	71.1	62.2
Foreign born, %	2.2	12.4	6.2	13.9
Naturalized citizen, %	0.6	4.0	2.3	4.4
Not a citizen, %	1.6	8.4	3.9	9.5

Language Spoken at Home–Linguistic isolation (2000 US Census)

Variable, Percent households	30th St Corridor	Milwaukee	Milwaukee County	Wisconsin
Only English spoken	87.2	83.2	85.4	90.5
Linguistically isolated	3.0	4.0	3.0	1.4

Variable, Percent households	Altgeld Gardens	Chicago	Cook County	Illinois
Only English spoken	95.6	65.9	69.8	80.3
Linguistically isolated	0.3	10.2	8.2	4.7

Variable, Percent households	Westside	Port Arthur	Jefferson County	Texas
Only English spoken	92.6	77.9	85.1	68.6
Linguistically isolated	1.5	6.7	2.8	7.2

Educational Attainment–Literacy (2000 US Census)

Variable	30th St Corridor	Milwaukee	Milwaukee County	Wisconsin
Population 25 years and older	10,392	353,305	594,387	3,475,878
Grades completed, Percent				
Less than 9th grade	12.2	7.7	5.9	5.4
9th-12th grade, no diploma	28.6	17.4	13.8	9.6
High school graduate (includes equivalency)	29.3	30.2	29.4	34.6
Some college, no degree	19.0	20.7	21.1	20.6
Associate degree	4.5	5.7	6.1	7.5
Bachelor's degree or more	6.5	18.3	23.6	22.4

Variable	Altgeld Gardens	Chicago	Cook County	Illinois
Population 25 years and older	2,773	1,815,896	3,454,738	7,973,671
Grades completed, Percent				
Less than 9th grade	6.8	12.4	9.6	7.5
9th-12th grade, no diploma	30.9	15.8	12.7	11.1
High school graduate (includes equivalency)	31.9	23.0	24.2	27.7
Some college, no degree	23.2	18.7	20.3	21.6
Associate degree	5.2	4.6	5.2	6.1
Bachelor's degree or more	2.1	25.5	28.0	26.0

Variable	Westside	Port Arthur	Jefferson County	Texas
Population 25 years and older	5.326	35,576	161,261	12,790,893
Grades completed, Percent				
Less than 9th grade	17.5	14.4	7.9	11.5
9th-12th grade, no diploma	19.2	15.9	13.6	12.9
High school graduate (includes equivalency)	34.6	34.7	33.1	24.8
Some college, no degree	19.9	21.4	23.8	22.4
Associate degree	4.0	4.3	5.3	5.2
Bachelor's degree or more	4.9	9.4	16.3	23.2

Family Structure–Single-mother households (2000 US Census)

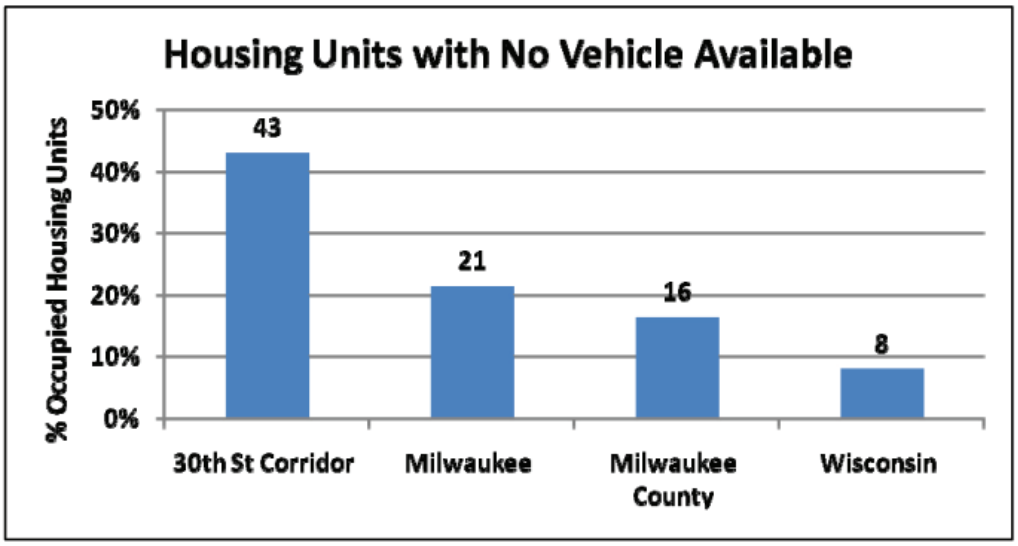
Variable	30th St Corridor	Milwaukee	Milwaukee County	Wisconsin
Total households	6,750	232,312	377,983	2,086,304
Single-mother with own children under 18 years, %	25.3	13.8	10.2	5.9
Single-father with own children under 18 years, %	3.6	2.3	2.0	2.0
Married-couple with own children under 18 years, %	12.2	15.2	17.8	24.4

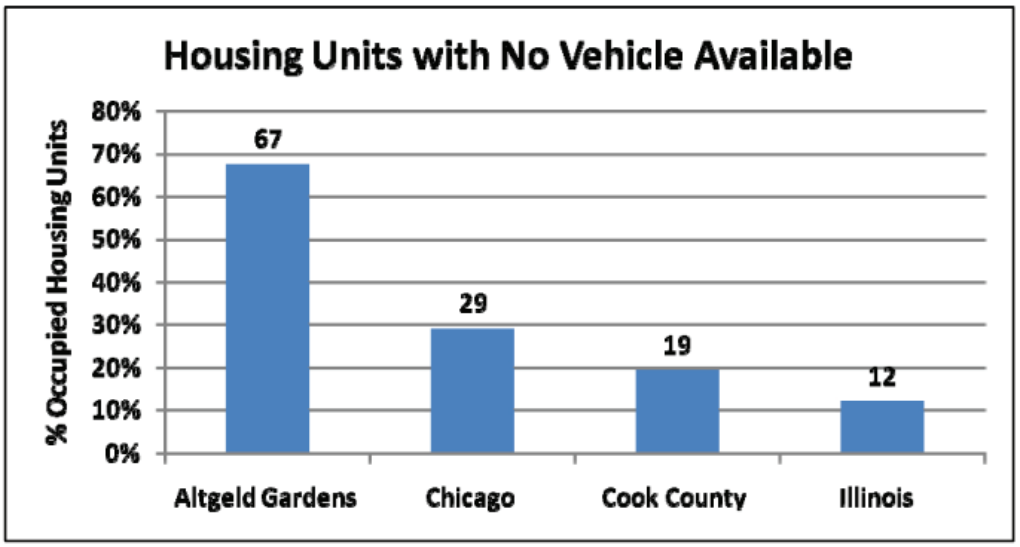
Variable	Altgeld Gardens	Chicago	Cook County	Illinois
Total households	1,936	1,061,964	1,974,408	4,592,740
Single-mother with own children under 18 years, %	48.7	9.8	7.8	6.7
Single-father with own children under 18 years, %	3.7	2.0	1.8	1.9
Married-couple with own children under 18 years, %	6.8	17.8	21.9	25.1

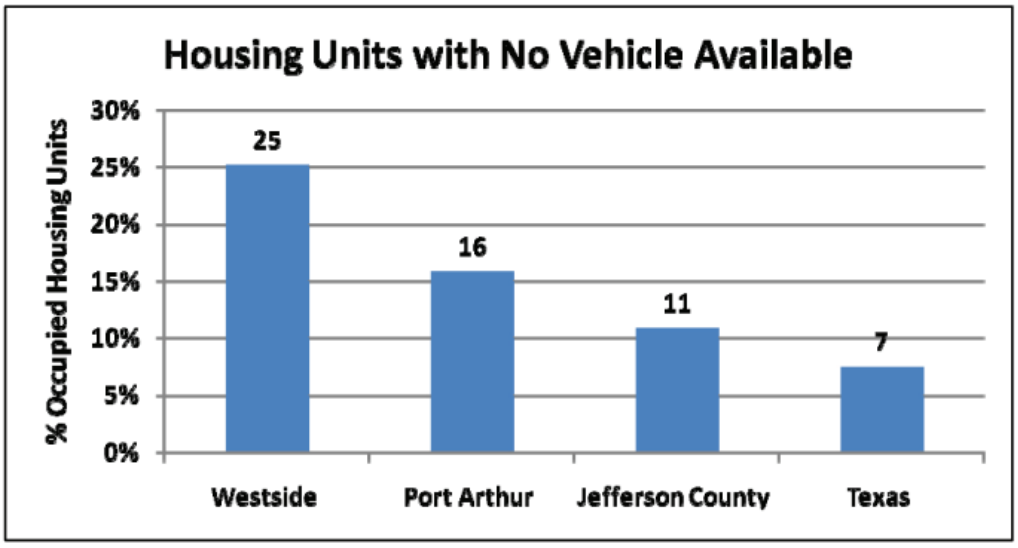
Variable	Westside	Port Arthur	Jefferson County	Texas
Total households	3,467	21,869	92,993	7,397,294
Single-mother with own children under 18 years, %	18.8	11.9	9.7	7.4
Single-father with own children under 18 years, %	1.4	2.1	1.9	2.1
Married-couple with own children under 18 years, %	7.0	19.6	22.0	28.0

VULNERABILITY TO EXPOSURE

Access to Public Transportation (2000 US Census)



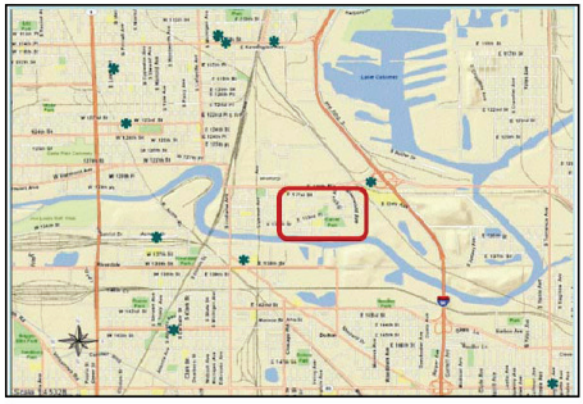




Access to Health Care Facilities (Local health departments and ArcGIS)

Health Insurance Coverage	Uninsured all year	Insured part of year
30th St Corridor		
Milwaukee 1	5%	8%
Milwaukee County 2	7%	7%
Wisconsin 1	4%	5%

Health Insurance Coverage 2002	No health plan	Without health plan > 1 year
Altgeld Gardens		
Chicago	23%	42%
Cook County	18%	
Illinois	14%	50%



Health Insurance Coverage 2002	No. Acute Care Hospitals	No. Nursing Homes
Westside		
Port Arthur		
Jefferson County	8	14
Texas	470	1,143

COMMUNITY PARTICIPATION

Community Power (2000 US Census) ADD KRIEG AND FABER REF

Milwaukee County	Number of Block groups	Minimum	Maximum	Mean	Standard Deviation
Median household income, 1999	880	$0	$200,001	$39,345.82	$19,190.093
Percent of population that is White	880	0.0	100.0	63.240	35.4014
Milwaukee County – Community power	**880**	**-3.41**	**9.22**	**0.000**	**1.77964**
30th Street Corridor – Community power	**26**	**-3.26**	**-1.68**	**-2.611**	**0.39722**

Cook County	Number of Block groups	Minimum	Maximum	Mean	Standard Deviation
Median household income, 1999	4,185	$2,499	$200,001	$48,766.53	$24,624.504
Percent of population that is White	4,185	0.0	100.0	53.756	35.9897
Cook County – Community power	**4,185**	**-3.37**	**7.43**	**0.000**	**1.76457**
Altgeld Gardens – Community power	**4**	**-3.12**	**-2.62**	**-2.968**	**0.2374**

Jefferson County	Number of Block groups	Minimum	Maximum	Mean	Standard Deviation
Median household income, 1999	217	$0	$89,731	$34,341.86	$16,033.263
Percent of population that is White	217	0.0	100.0	53.366	35.1015
Jefferson County – Community power	**217**	**-3.08**	**4.13**	**0.000**	**1.84573**
Westside – Community power	**11**	**-3.05**	**-2.05**	**-2.522**	**0.31344**

Appendix H
Economic Indicators, EJ Toolkit

Unemployment (2000 US Census)

Variable	30th St Corridor	Milwaukee	Milwaukee County	Wisconsin
Population 16 years and over	13,675	442,845	718,569	4,157,030
Total in labor force	7,205	283,052	469,688	2,872,104
Employment status for persons in labor force, Percent				
Armed Forces	0.0	0.1	0.1	0.1
Employed civilians	42.1	57.9	60.8	65.8
Unemployed civilians	10.6	6.0	4.5	3.2

Variable	Altgeld Gardens	Chicago	Cook County	Illinois
Population 16 years and over	3,782	2,215,574	4,129,256	9,530,946
Total in labor force	1,933	1,358,054	2,620,175	6,230,617
Employment status for persons in labor force, Percent				
Armed Forces	0.0	0.0	0.0	0.2
Employed civilians	32.0	55.1	58.6	61.2
Unemployed civilians	19.0	6.2	4.8	3.9

Variable	Westside	Port Arthur	Jefferson County	Texas
Population 16 years and over	6,493	43,268	194,853	15,617,373
Total in labor force	2,823	22,857	108,633	9,937,150
Employment status for persons in labor force, Percent				
Armed Forces	0.2	0.1	0.1	0.7
Employed civilians	81.9	45.7	51.1	59.1
Unemployed civilians	17.9	7.0	4.5	3.8

Income (2000 US Census)

Variable	30th St Corridor	Milwaukee	Milwaukee County	Wisconsin
Poverty status, 1999 (population for whom poverty status is determined)				
Families	4,532	23,687	26,454	78,188
Below poverty, %	40.1	17.4	11.7	5.6
Households, 1999				
Total households	6,750	232,312	377,983	2,086,304
Median income	$20,000	$32,216	$38,100	$43,791
Per capital income	$9,267	$16,181	$19,939	$21,271
Public assistance income, %	10.1	4.6	3.2	1.7

Variable	Altgeld Gardens	Chicago	Cook County	Illinois
Poverty status, 1999 (population for whom poverty status is determined)				
Families	1,104	105,752	135,038	244,303
Below poverty, %	71.2	16.6	10.6	24.1
Households, 1999				
Total households	1,936	1,061,964	1,974,408	4,592,740
Median income	$11,933	$38,625	$45,922	$46,590
Per capital income	$6,682	$20,175	$23,227	$23,104
Public assistance income, %	35.9	6.9	4.7	3.3

Variable	Westside	Port Arthur	Jefferson County	Texas
Poverty status, 1999 (population for whom poverty status is determined)				
Families	2,189	3,396	9,378	632,676
Below poverty, %	39.7	22.9	14.6	12.0
Households, 1999				
Total households	3,476	21,869	92,993	7,397,294
Median income	$16,170	$26,455	$34,706	$45,861
Per capital income	$9,970	$14,183	$17,571	$19,617
Public assistance income, %	7.3	5.9	4.2	3.2

Housing Tenure (2000 US Census)

Variable	30th St Corridor	Milwaukee	Milwaukee County	Wisconsin
Total housing units	7,903	249,215	400,093	2,321,144
Occupied housing units (%)	6,816 (86.2)	232,188 (93.2)	377,729 (94.4)	2,084,544 (89.4)
Owner occupied, %	32.8	45.3	52.6	68.4
Renter occupied, %	67.2	54.7	47.4	31.6

Variable	Altgeld Gardens	Chicago	Cook County	Illinois
Total housing units	2,232	1,152,871	2,096,121	4,885,615
Occupied housing units (%)	1,938 (86.8)	1,061,928 (92.1)	1,974,181 (94.2)	4,591,779 (94.0)
Owner occupied, %	11.4	43.8	57.9	67.3
Renter occupied, %	88.6	56.2	42.1	32.7

Variable	Westside	Port Arthur	Jefferson County	Texas
Total housing units	4,223	24,713	102,080	8,157,575
Occupied housing units (%)	3,402 (80.6)	21,839 (88.4)	92,880 (91.1)	7,393,354 (90.6)
Owner occupied, %	62.8	62.2	66.0	63.8
Renter occupied, %	37.2	37.8	34.0	36.2

Industry of Employment (2000 US Census)

Variable	30th St Corridor	Milwaukee	Milwaukee County	Wisconsin
Employed civilian population ≥16 yrs	5,751	256,244	436,878	2,734,925
Persons 16 years and older employed in "White collar" occupations, Percent				
Management, business and financial operations	6.4	9.5	11.7	12.8
Professional and related	11.3	18.5	20.6	18.5
Persons 16 years and older employed in "Blue collar" occupations, Percent				
Construction, extraction, and maintenance	3.7	6.0	6.4	8.7
Production, transportation and material moving	27.9	21.1	18.4	19.8

Variable	Altgeld Gardens	Chicago	Cook County	Illinois
Employed civilian population ≥16 yrs	1,209	1,220,040	2,421,287	5,833,185
Persons 16 years and older employed in "White collar" occupations, Percent				
Management, business and financial operations	2.2	13.3	14.4	14.2
Professional and related	7.4	20.2	20.8	20.0
Persons 16 years and older employed in "Blue collar" occupations, Percent				
Construction, extraction, and maintenance	0.7	6.6	7.1	8.2
Production, transportation and material moving	20.4	16.2	15.1	15.7

Variable	Westside	Port Arthur	Jefferson County	Texas
Employed civilian population ≥16 yrs	2,312	19,790	99,640	9,234,372
Persons 16 years and older employed in "White collar" occupations, Percent				
Management, business and financial operations	3.6	6.1	9.3	13.6
Professional and related	12.2	14.7	19.5	19.8
Persons 16 years and older employed in "Blue collar" occupations, Percent				
Construction, extraction, and maintenance	10.5	12.2	11.4	10.9
Production, transportation and material moving	18.7	18.8	14.9	13.2

Brownfield Properties (EnviroMapper)

Total Brownfields	30th St Corridor	Milwaukee	Milwaukee County	Wisconsin
Within geographic area	21	96	114	299
Within 1 km	27			
Within 2 km	39			
Within 3 km	47			

Total Brownfields	Altgeld Gardens	Chicago	Cook County	Illinois
Within geographic area	0	31	88	328
Within 1 km	0			
Within 2 km	0			
Within 3 km	1			

Total Brownfields	Westside	Port Arthur	Jefferson County	Texas
Within geographic area	8	13	15	370
Within 1 km	13			
Within 2 km	13			
Within 3 km	13			

Appendix I
Total Mass-Release Results, 1996-2002 (RSEI, Version 2.2.0)

OVERALL

State of Wisconsin - Total Pounds Released
(% of total state releases)

WISCONSIN	1,055,837,310 (100)	
Rank	**County**	
1	Milwaukee*	217,257,679 (21)
2	Wood	96,786,382 (9)
3	Dane	84,541,113 (8)
4	Waukesha	42,360,801 (4)
5	Racine	39,196,668 (4)
6	Sheboygan	37,094,953 (4)
7	Ozaukee	36,169,800 (3)
8	Manitowoc	35,166,905 (3)
9	Brown	31,919,890 (3)
10	Eau Claire	30,597,878 (3)

City of Milwaukee - Total Pounds Released
(% of total city releases)

MILWAUKEE	159,349,427 (100)	
Rank	**Zip code**	
1	53212	47,416,379 (30)
2	53204	25,843,850 (16)
3	53218	16,900,182 (11)
4	53210*	10,046,998 (6)
5	53223	8,987,714 (6)
6	53215	7,489,631 (5)
7	53214	6,916,160 (4)
8	53207	6,302,895 (4)
9	53233	5,704,104 (4)
10	53209*	5,046,472 (3)

Milwaukee County - Total Pounds Released
(% of total county releases)

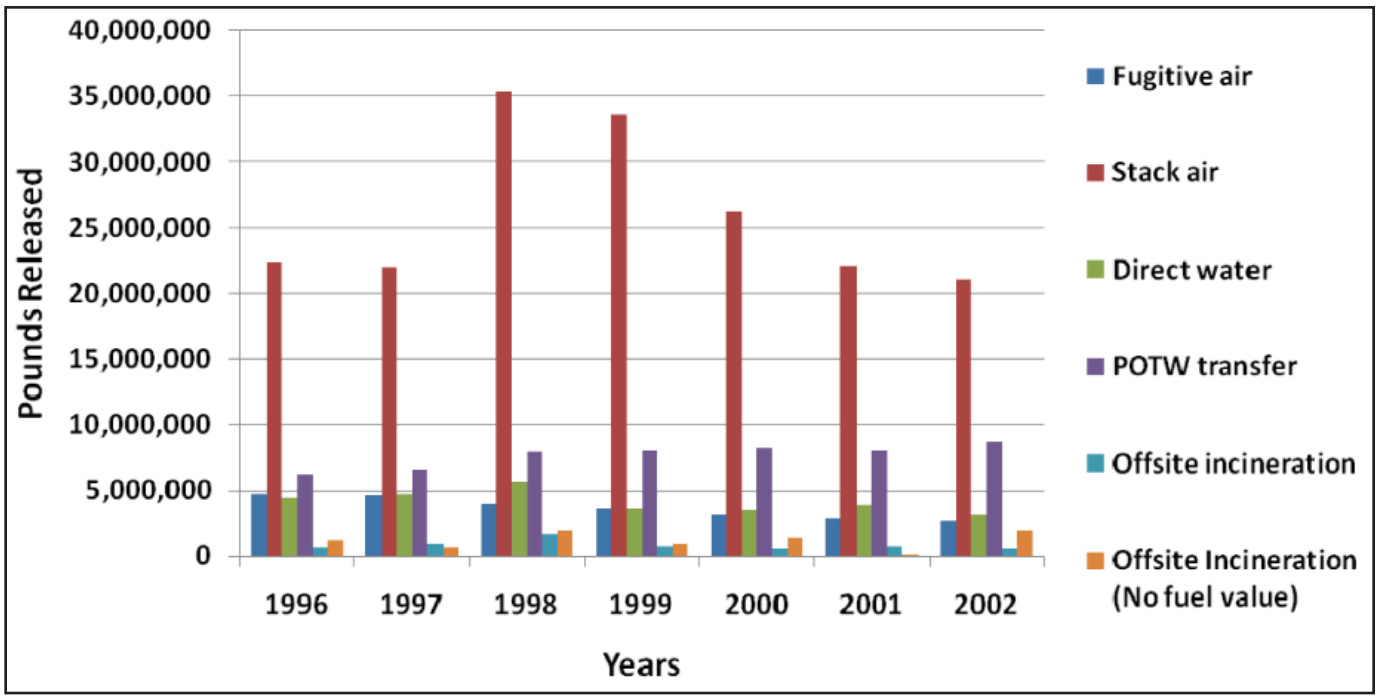
MILWAUKEE COUNTY	217,257,679 (100)	
Rank	**Zip code**	
1	53212	47,416,379 (22)
2	53154	34,770,898 (16)
3	53204	25,843,850 (12)
4	53218	16,900,182 (8)
5	53214	10,232,310 (5)
6	53210*	10,046,998 (5)
7	53223	8,987,714 (4)
8	53209*	8,232,516 (4)
9	53215	7,489,631 (4)
10	53207	6,302,895 (3)

30th Street Corridor - Total Pounds Released

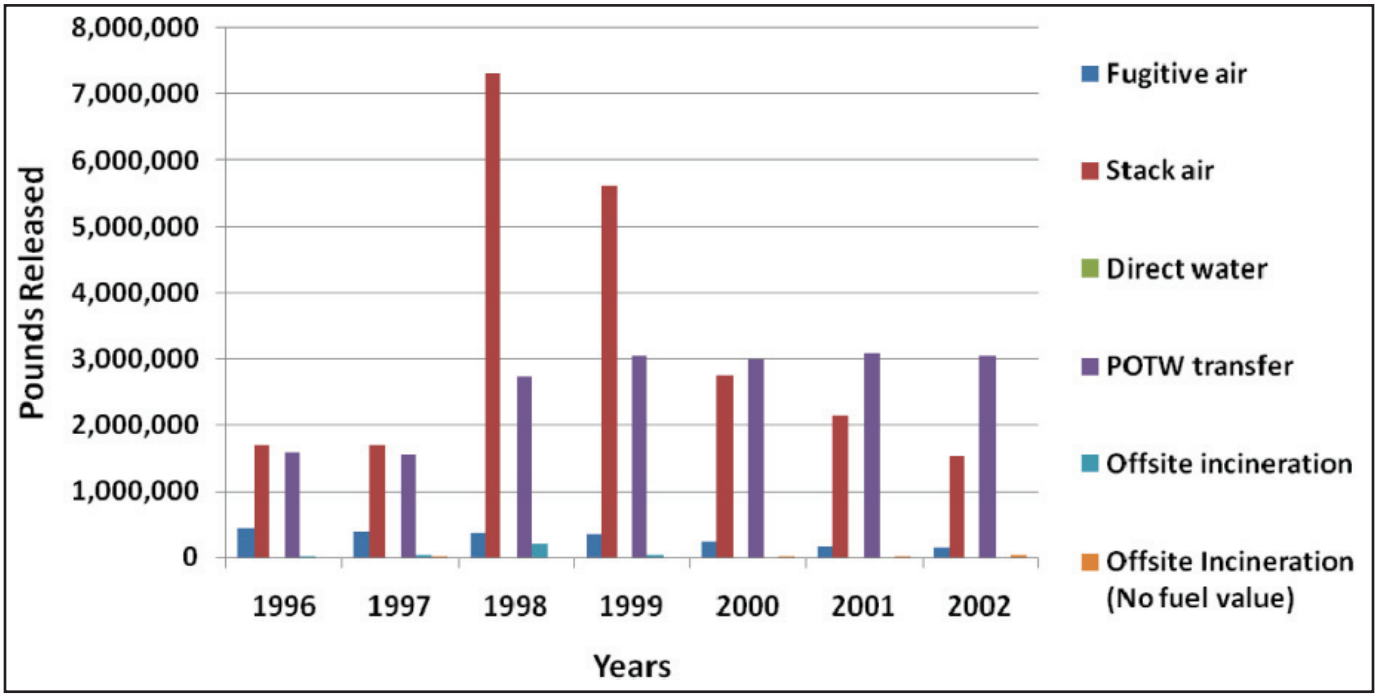
MILWAUKEE	159,349,427
Zip Code	
53208	3,583,216
53209	8,232,516
53210	10,046,998
53216	2,751,049

MEDIA

State of Wisconsin

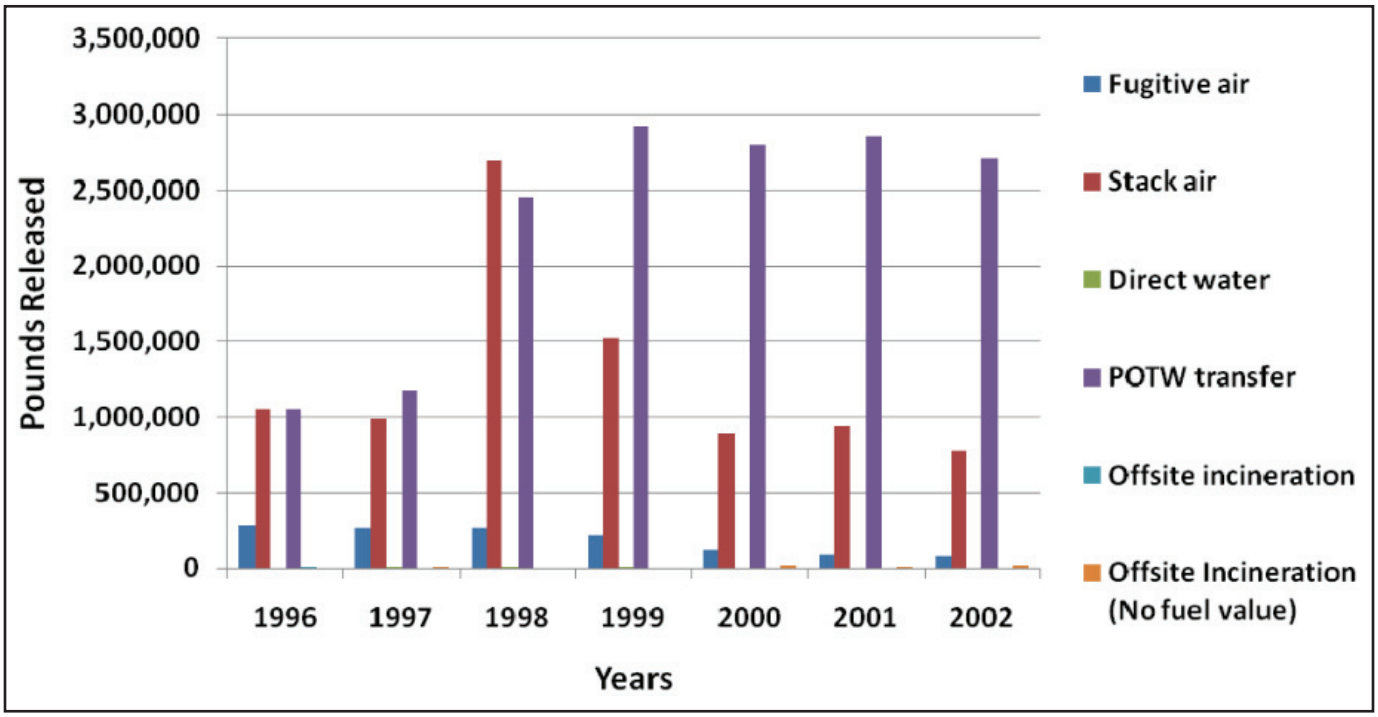


Milwaukee County



MEDIA (continued)

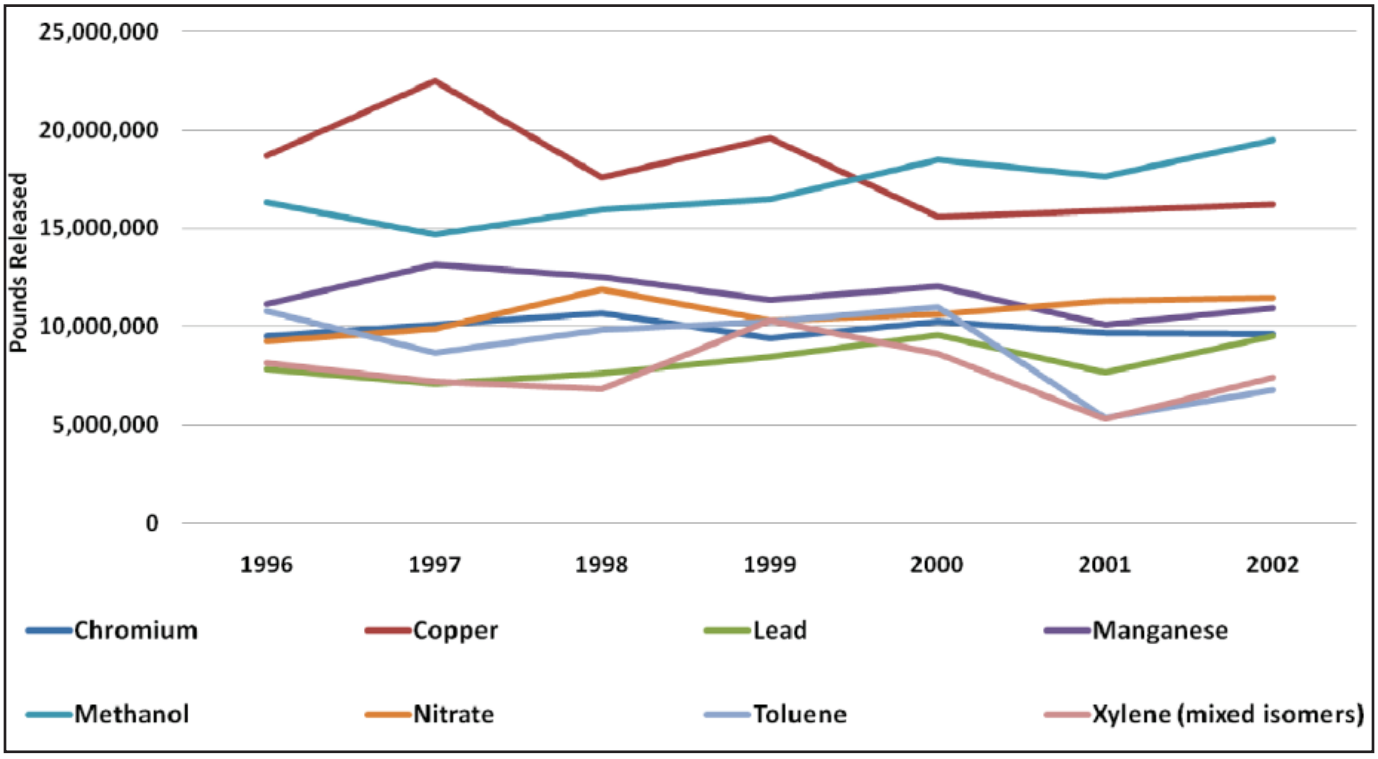
City of Milwaukee



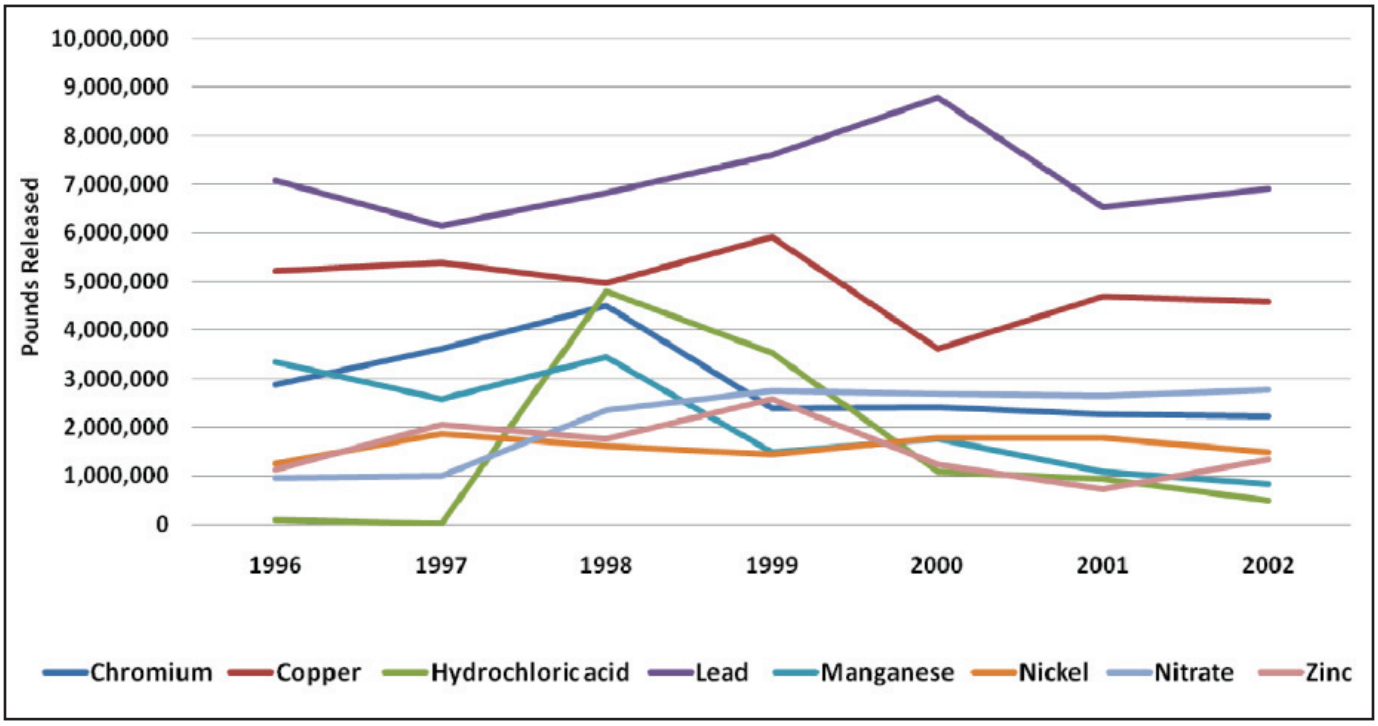
30th Street Corridor

CHEMICAL

State of Wisconsin

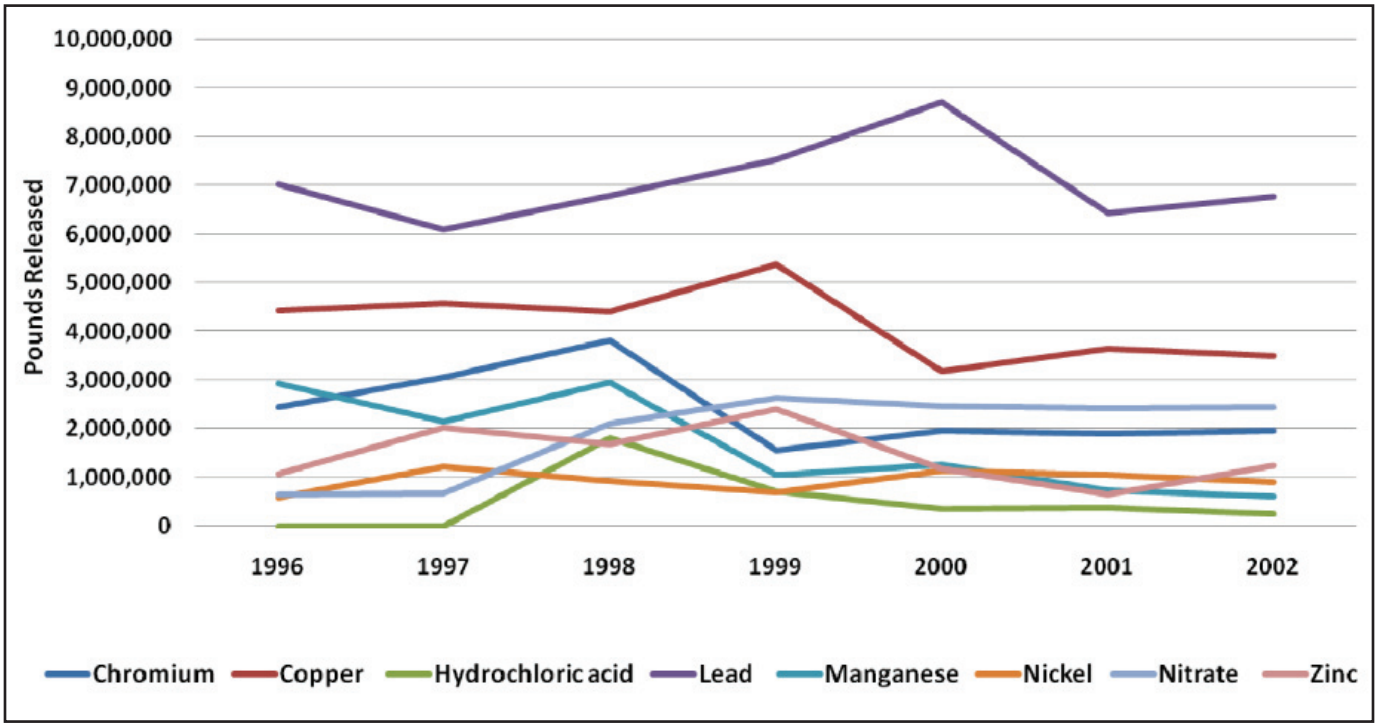


Milwaukee County

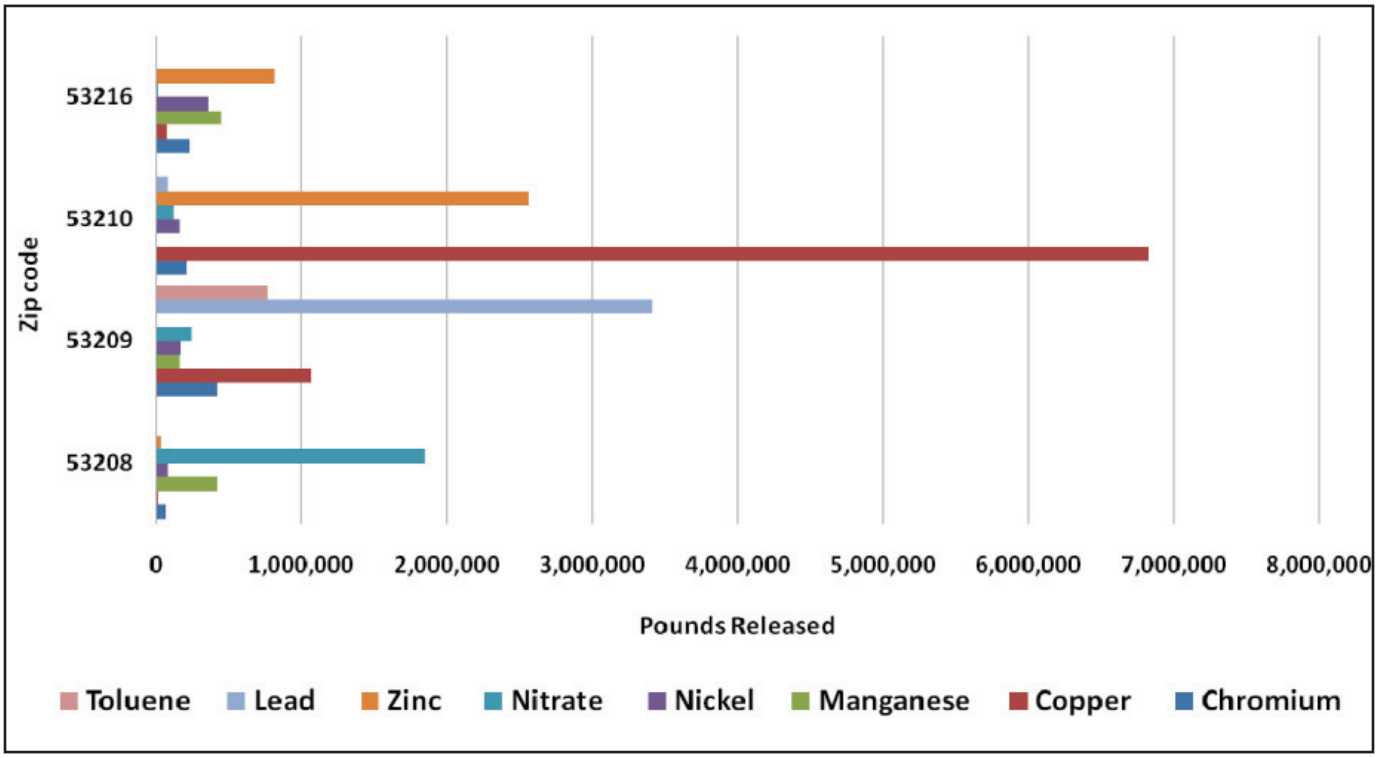


CHEMICAL (continued)

City of Milwaukee

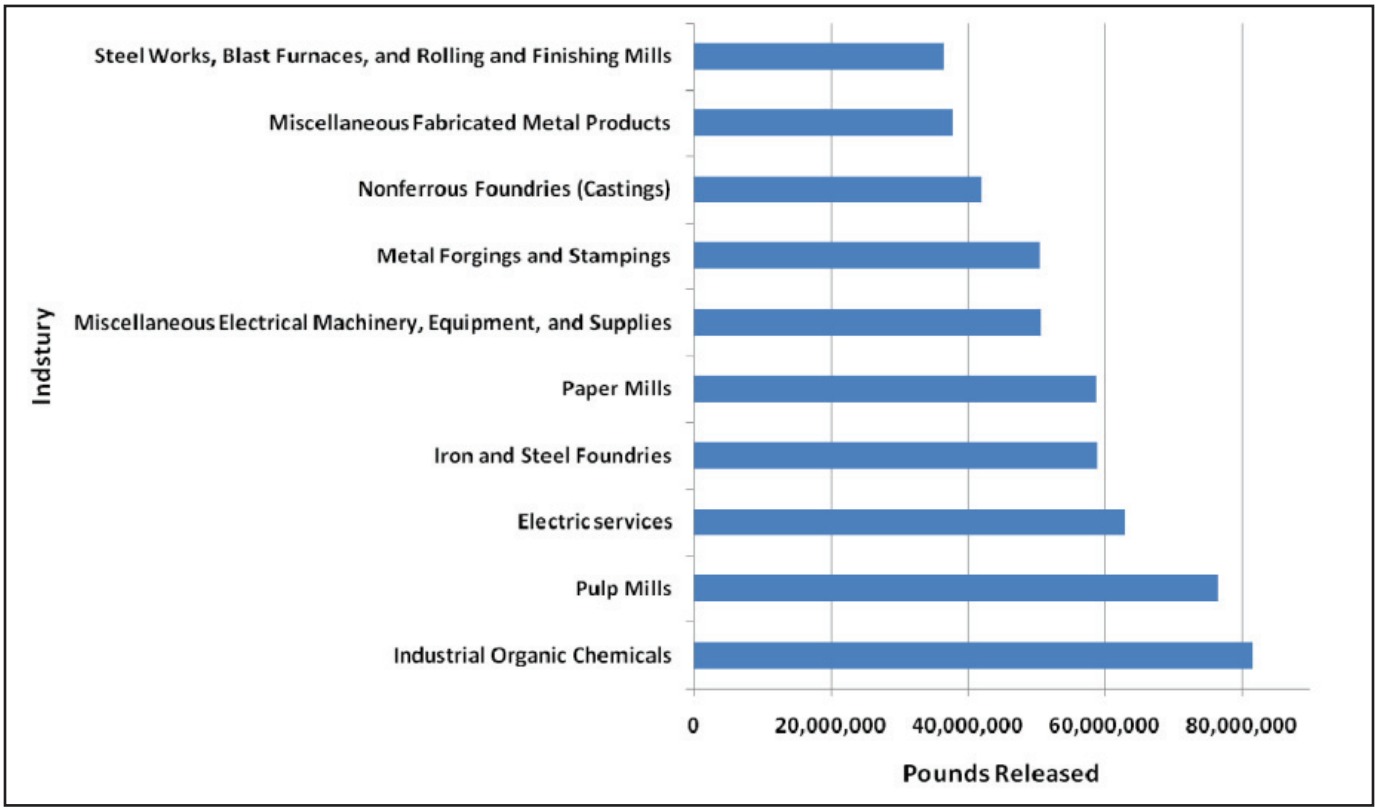


30th Street Corridor

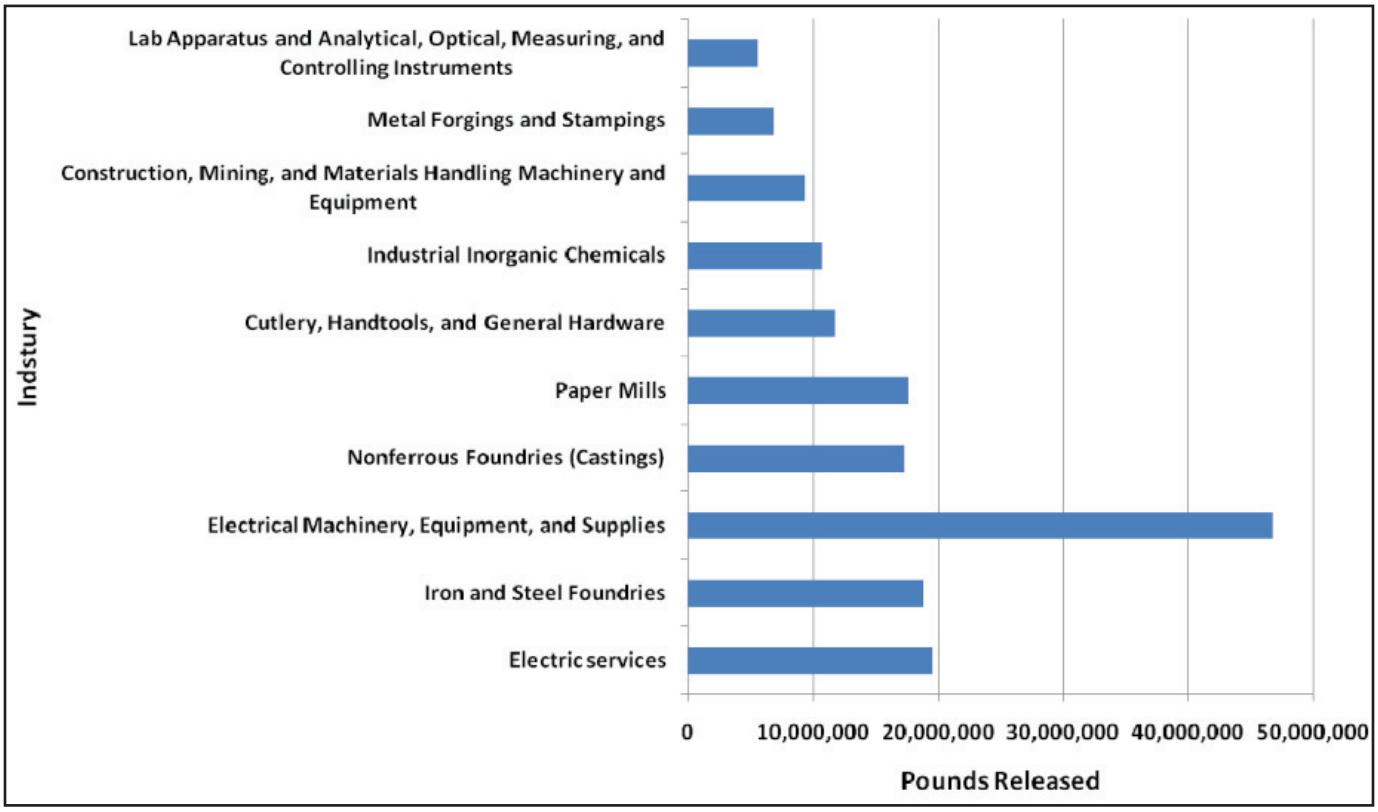


INDUSTRY

State of Wisconsin



Milwaukee County



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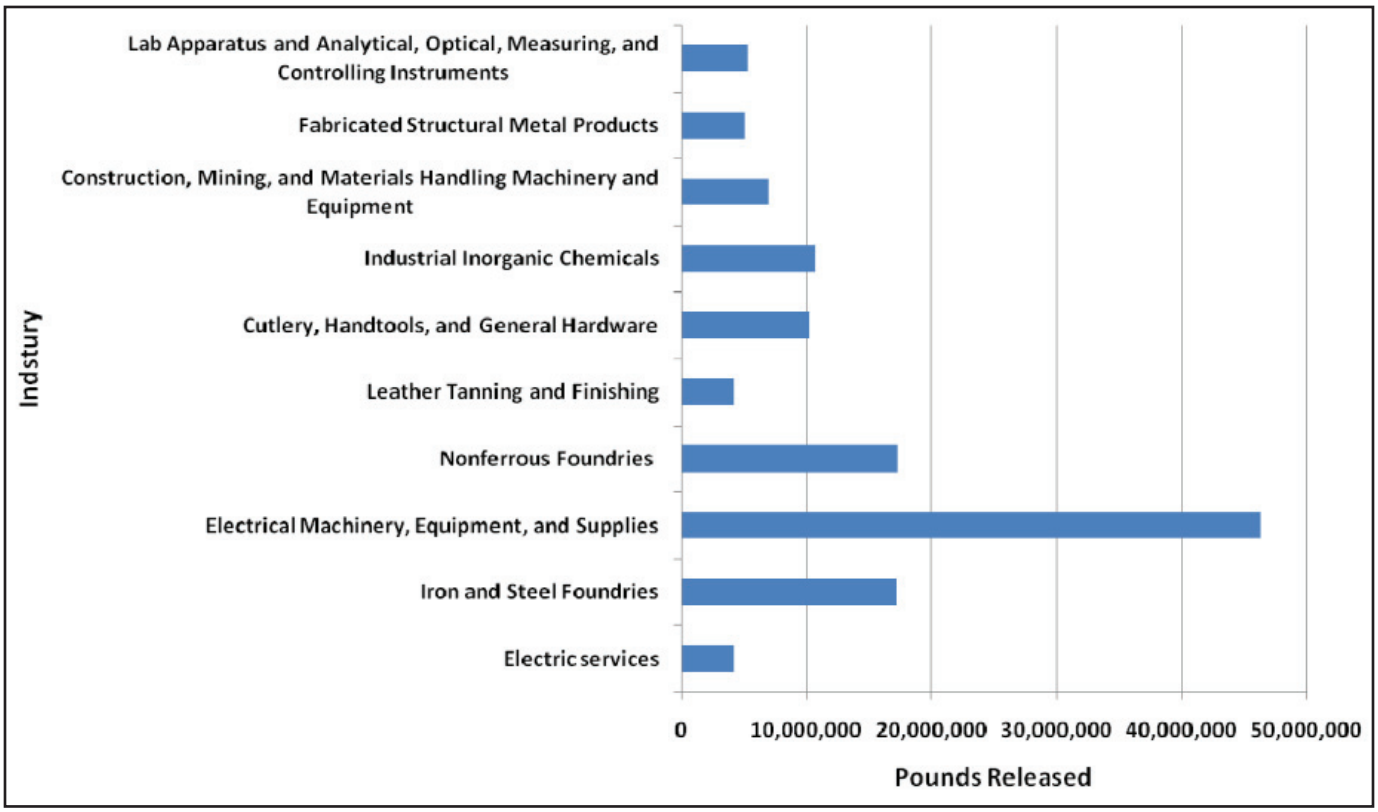
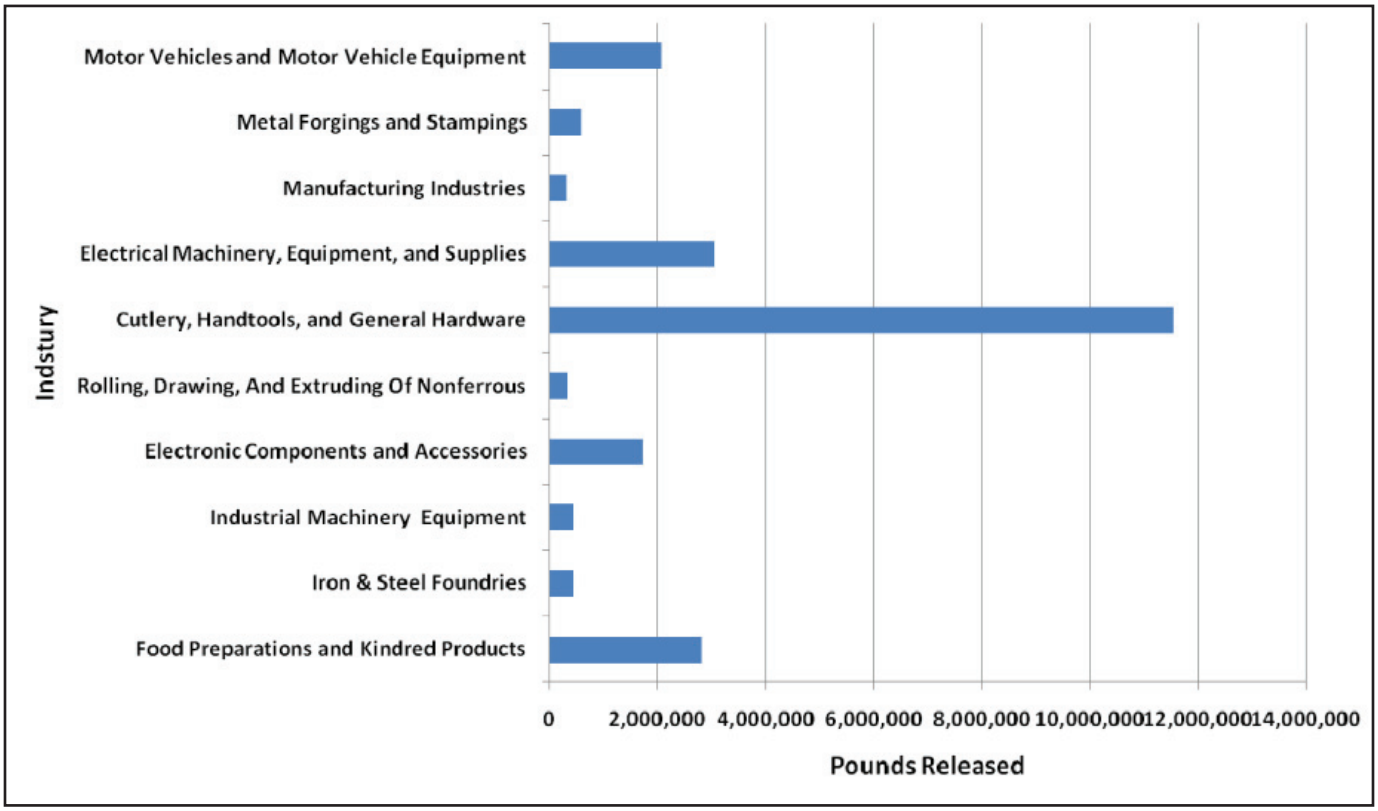
City of Milwaukee



30th Street Corridor



FACILITY

State of Wisconsin - Total Pounds Released
(% of total state releases)

WISCONSIN		1,055,837,310 (100)
Rank	**Facility (County)**	
1	Stora Enso Pulp Mill (Wood)	70,501,173 (7)
2	Hydrite Chemical Co. (Dane)	64,216,932 (6)
3	C&D Tech. Power Div* (Milwaukee)	43,304,354 (4)
4	WRR Env'tal Services(Eau Claire)	27,233,771 (3)
5	Brenntag Great Lakes (Waukesha)	23,673,569 (2)
6	Parker Hannifin Corp. (Burnett)	21,649,789 (2)
7	Regal Ware (Washington)	18,735,154 (2)
8	Charter Steel (Ozaukee)	18,446,037 (2)
9	PPG Industries Inc.* (Milwaukee)	17,512,629 (2)
10	ThyssenKrupp Plant (Waupaca)	17,445,610 (2)

City of Milwaukee - Total Pounds Released
(% of total city releases)

MILWAUKEE		159,349,427 (100)
Rank	**Facility (Zip code)**	
1	C&D Technologies Power Division-Keefe (53212)	43,304,354 (27)
2	Starline Manufacturing Co. Inc. (53218)	12,969,782 (8)
3	Wayne Pigment Corp. (53204)	10,615,697 (7)
4	Master Lock Co (53210)*	10,045,599 (6)
5	Grede Foundries Inc Milwaukee Alloy Foundry (53204)	7,527,578 (5)
6	Badger Meter Inc. (53223)	5,366,714 (3)
7	P&H Mining Equipment Inc National Ave (53214)	5,330,586 (3)
8	Maynard Steel Casting Co (53215)	4,554,420 (3)
9	Valley Power Plant (53233)	4,197,277 (3)
10	Stroh Die Casting Co Inc (53222)	4,109,090 (3)

Milwaukee County - Total Pounds Released
(% of total county releases)

MILWAUKEE COUNTY		217,257,679 (100)
Rank	**Facility (Zip code)**	
1	C&D Tech. Power Div (53212)	43,304,354 (20)
2	PPG Industries Inc. (53154)	17,512,629 (8)
3	Oak Creek Power Plant (53154)	14,343,917 (7)
4	Starline Manufacturing (53218)	12,969,782 (6)
5	Wayne Pigment (53204)	10,615,697 (5)
6	Master Lock Co.* (53210)	10,045,599 (5)
7	Grede Foundries Inc (53204)	7,527,578 (3)
8	Badger Meter (53223)	5,366,714 (2)
9	P&H Mining Equipment (53214)	5,330,586 (2)
10	Ladish Co. Inc. (53110)	4,594,268 (2)

30th Street Corridor - Total Pounds Released

30th STREE CORRIDOR	24,613,779
Facility (Zip code)	
Master Lock Co (53210)	10,045,599
Johnson Controls Inc (53209)	3,055,136
Lesaffre Yeast Corp (53208)	2,828,069
Tower Automotive Products (53216)	2,064,199
Brady Worldwide Inc. (53209)	1,732,171
Strattec Security Corp (53209)	1,428,128
Citation Corp. (53216)	607,229
Rexnord Industries (53208)	456,792
Stainless Foundry & Engineering (53209)	448,633
Vulcan Lead Inc (53209)	348,204

OVERALL

State of Illinois - Total Pounds Released
(% of total state releases)

ILLINOIS	2,180,597,569 (100)	
Rank	**County**	
1	Cook*	550,303,655 (25)
2	Peoria	196,483,935 (9)
3	Madison	183,696,416 (8)
4	Macon	119,645,742 (6)
5	Lake	95,142,996 (4)
6	Kane	82,683,675 (4)
7	Will	80,337,704 (4)
8	Whiteside	68,051,113 (3)
9	Kankakee	65,876,705 (3)
10	Winnebago	63,638,487 (3)

City of Chicago - Total Pounds Released
(% of total city releases)

CHICAGO	153,405,702 (100)	
Rank	**Zip code**	
1	60608	26,861,652 (18)
2	60617	20,159,977 (13)
3	60628	19,124,906 (13)
4	60609	18,488,508 (12)
5	60633	11,815,457 (8)
6	60626	10,151,394 (7)
7	60623	7,298,178 (5)
8	60632	7,238,175 (5)
9	60639	5,189,748 (3)
10	60616	4,152,481 (3)

Cook County - Total Pounds Released
(% of total cook releases)

COOK COUNTY	550,303,655 (100)	
Rank	**Zip code**	
1	60131	55,081,659 (10)
2	60419	42,850,950 (8)
3	60804	41,644,342 (8)
4	60608	26,861,652 (5)
5	60007	26,212,232 (5)
6	60501	24,833,378 (5)
7	60411	21,662,879 (4)
8	60617	20,159,977 (4)
9	60462	19,862,343 (4)
10	60827*	19,442,998 (4)

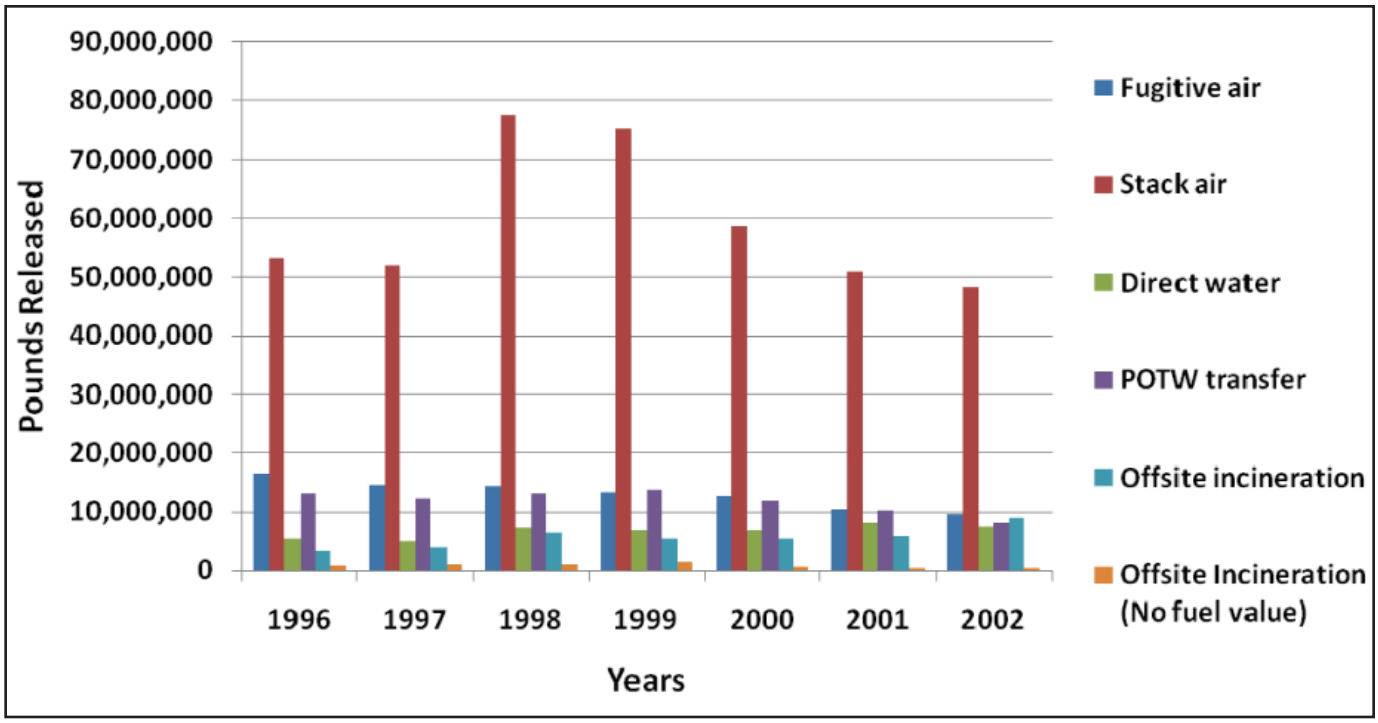
Altgeld Gardens - Total Pounds Released

COOK COUNTY	550,303,655
60827	**19,442,998**

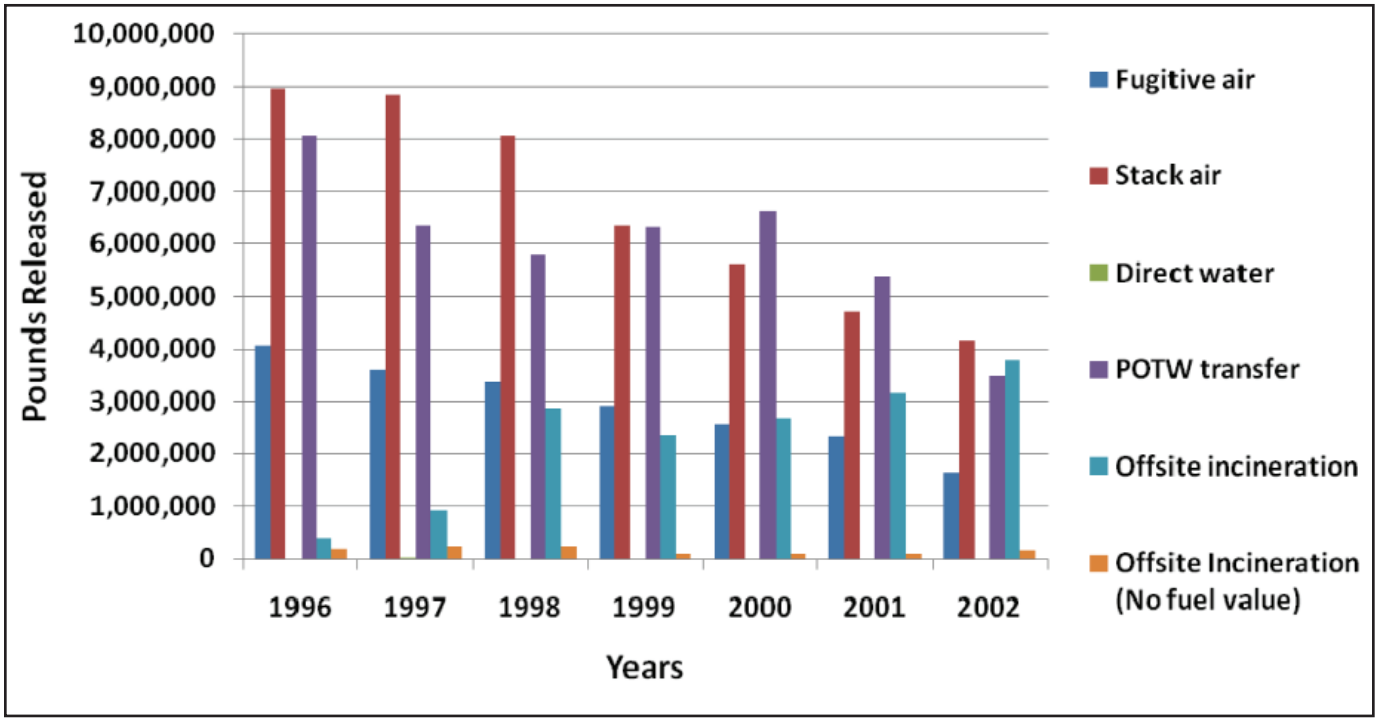
*Note: A portion of zip code 60827 (Altgeld Gardens) is not within Chicago's city boundaries, thus the entire area is not included in the city's total pounds released.

MEDIA

State of Illinois

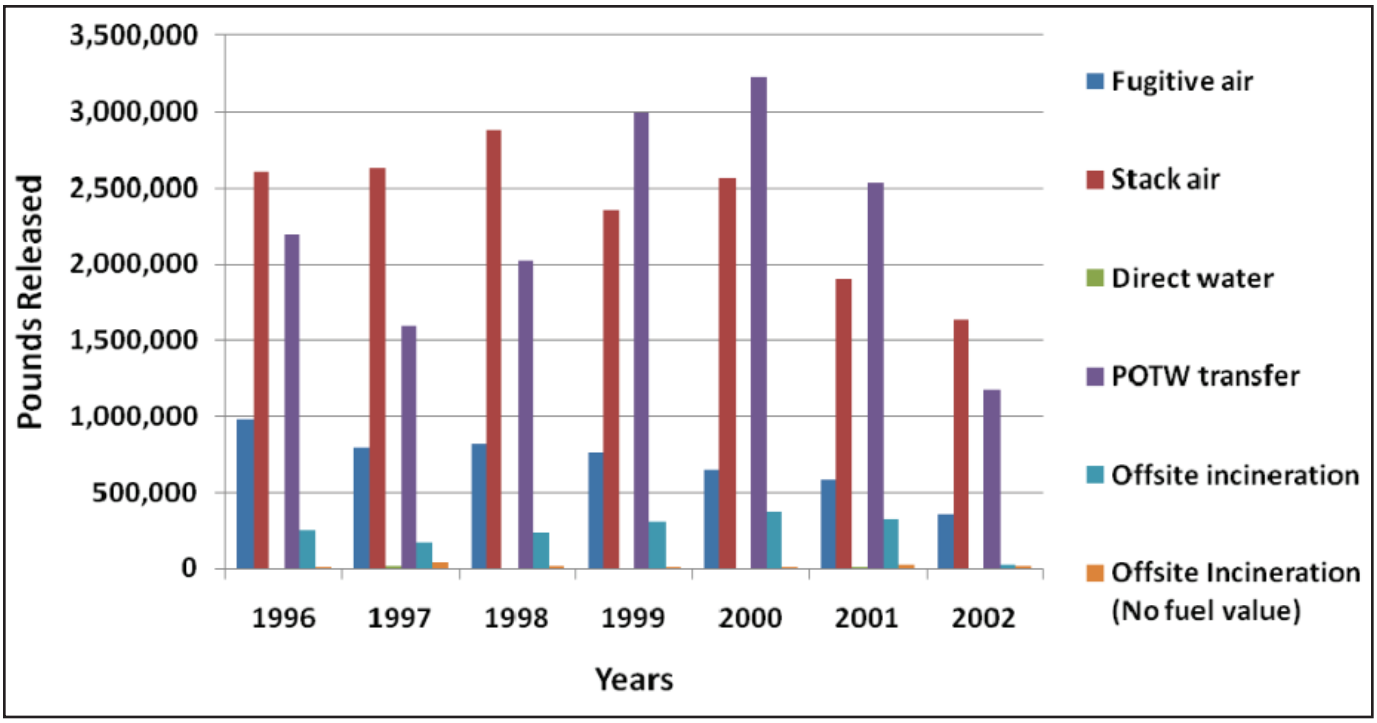


Cook County

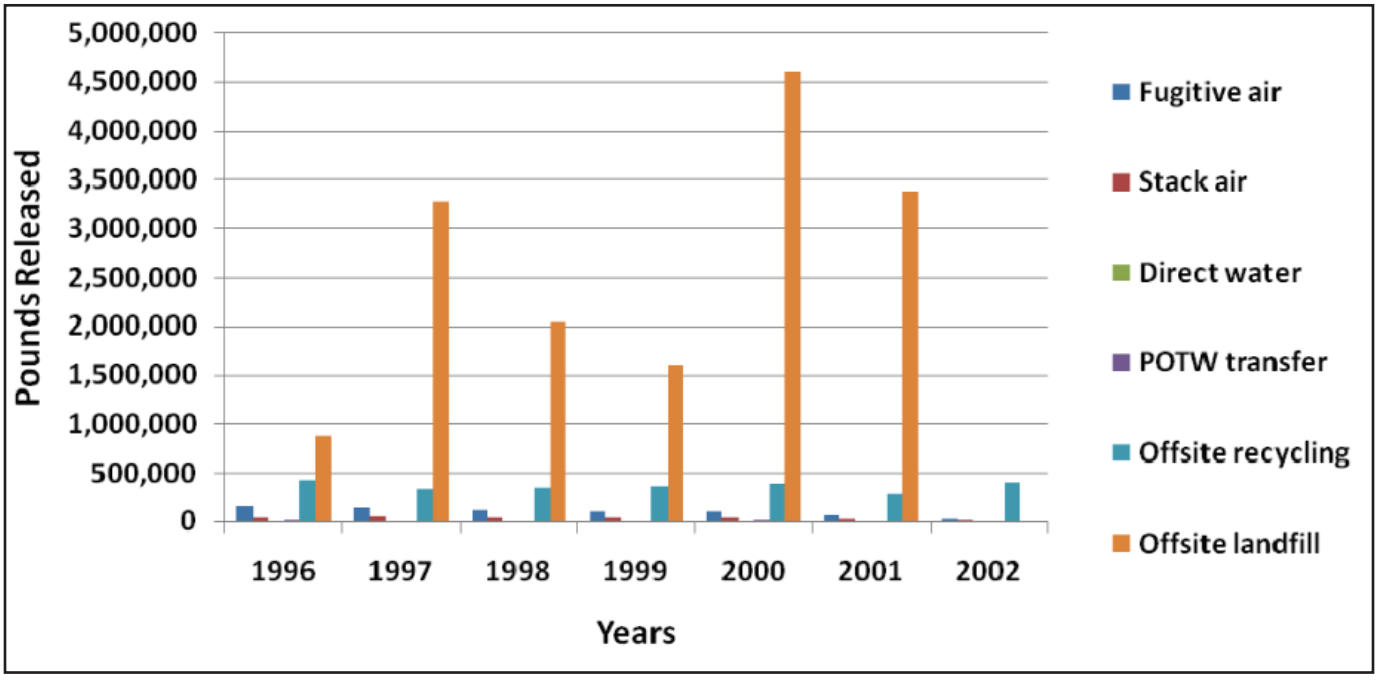


MEDIA (continued)

City of Chicago

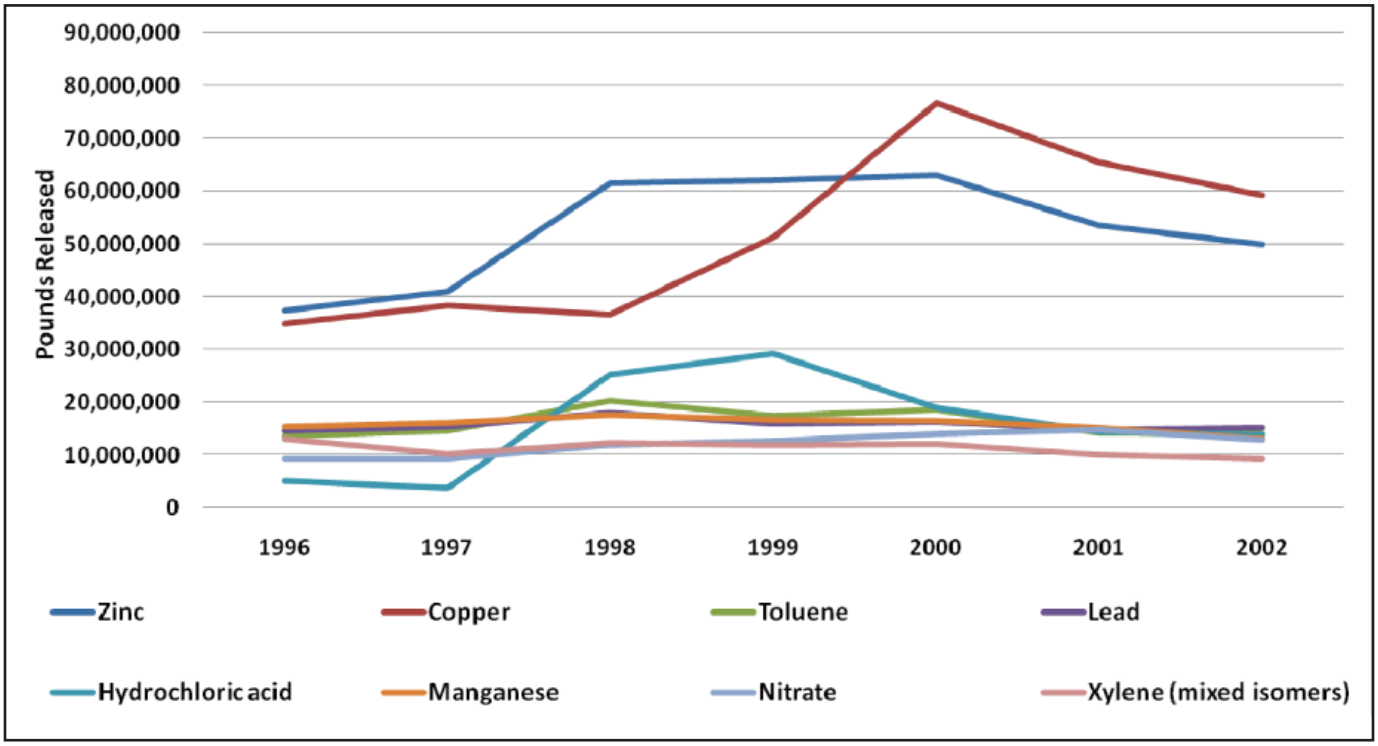


Altgeld Gardens

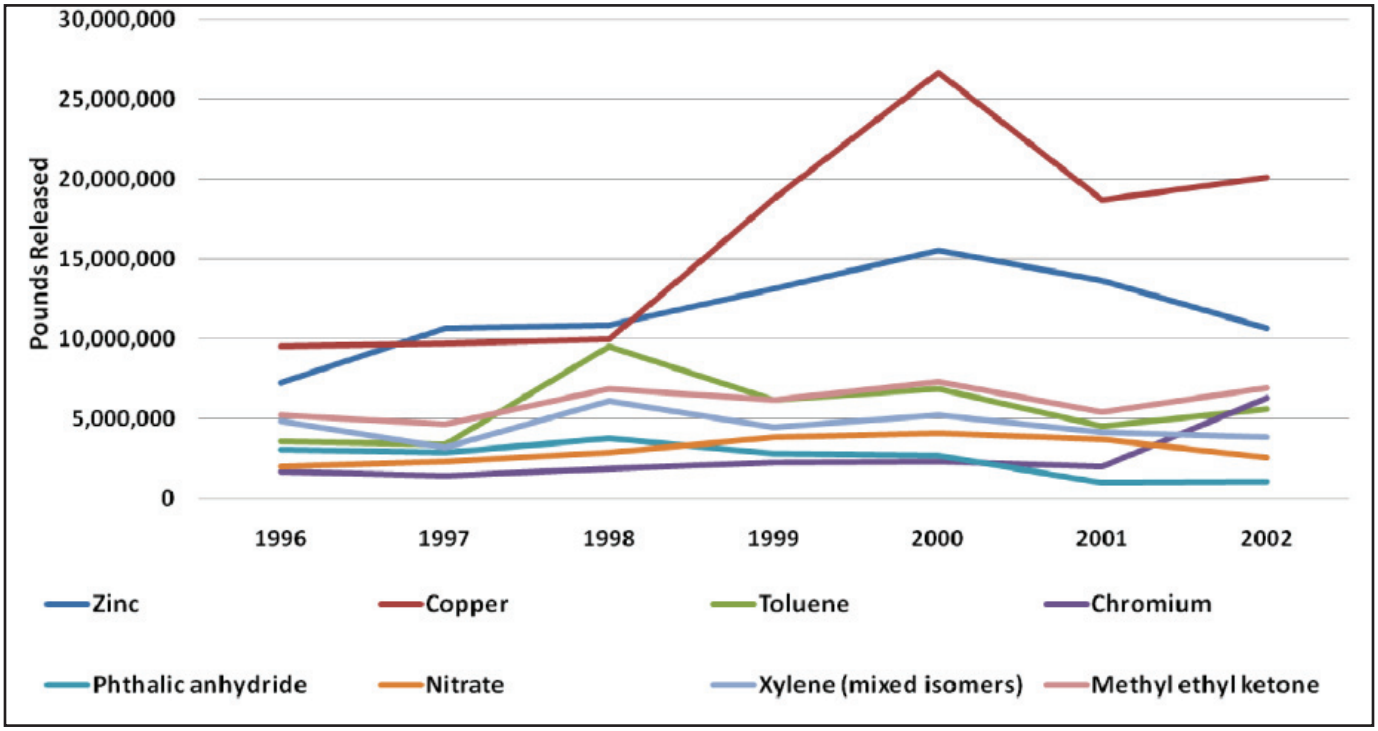


CHEMICAL

State of Illinois

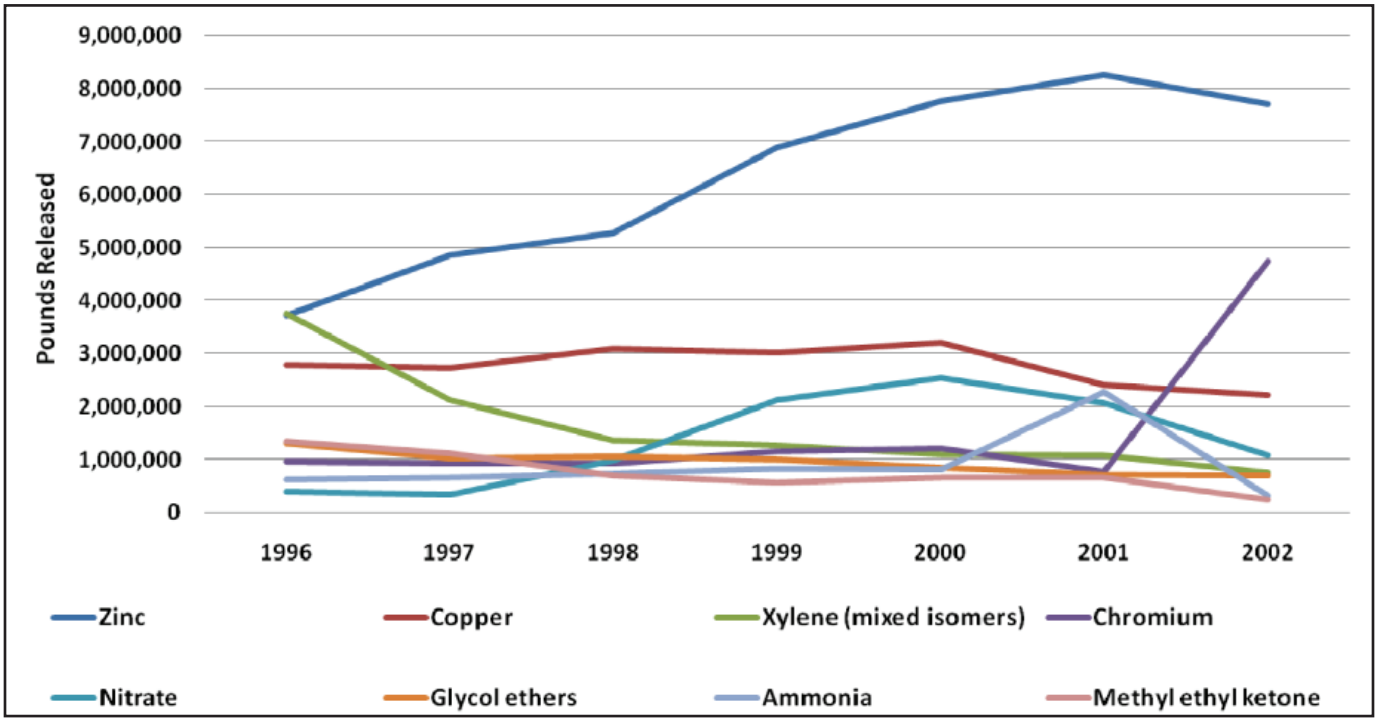


Cook County

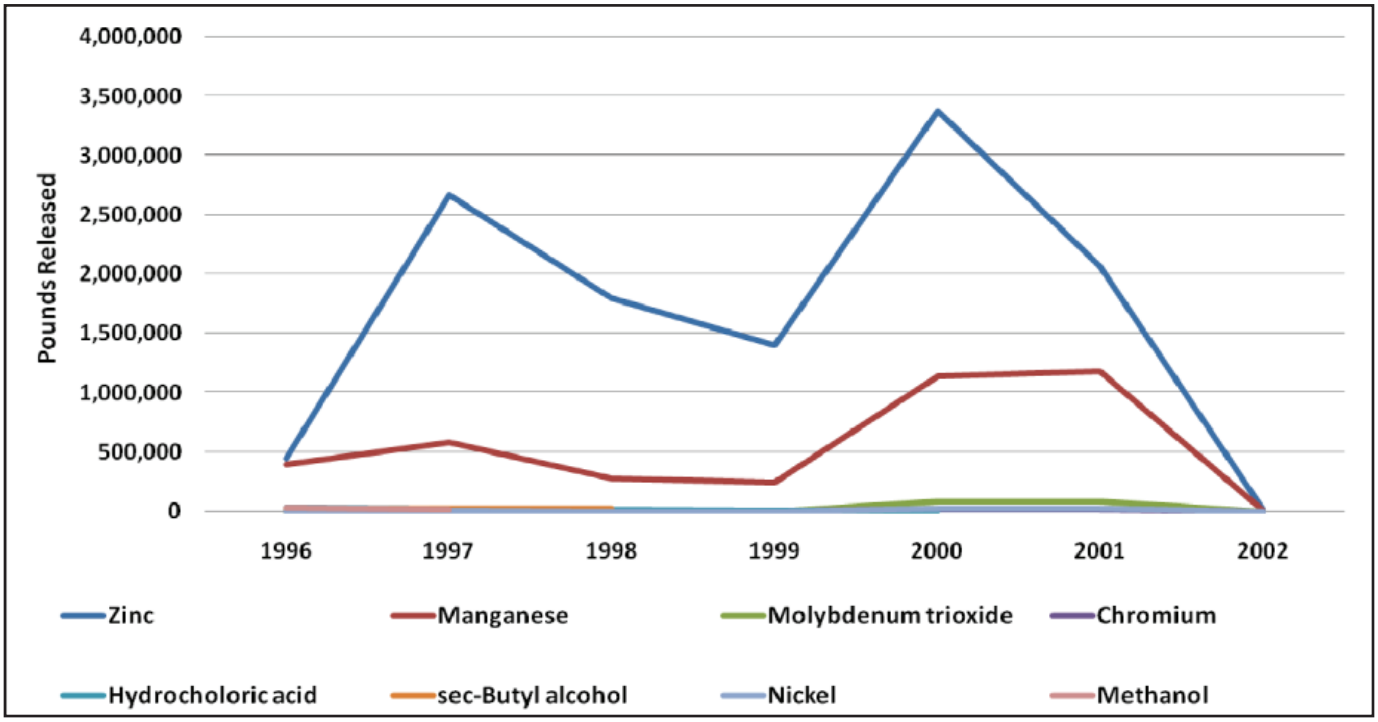


CHEMICAL (continued)

City of Chicago

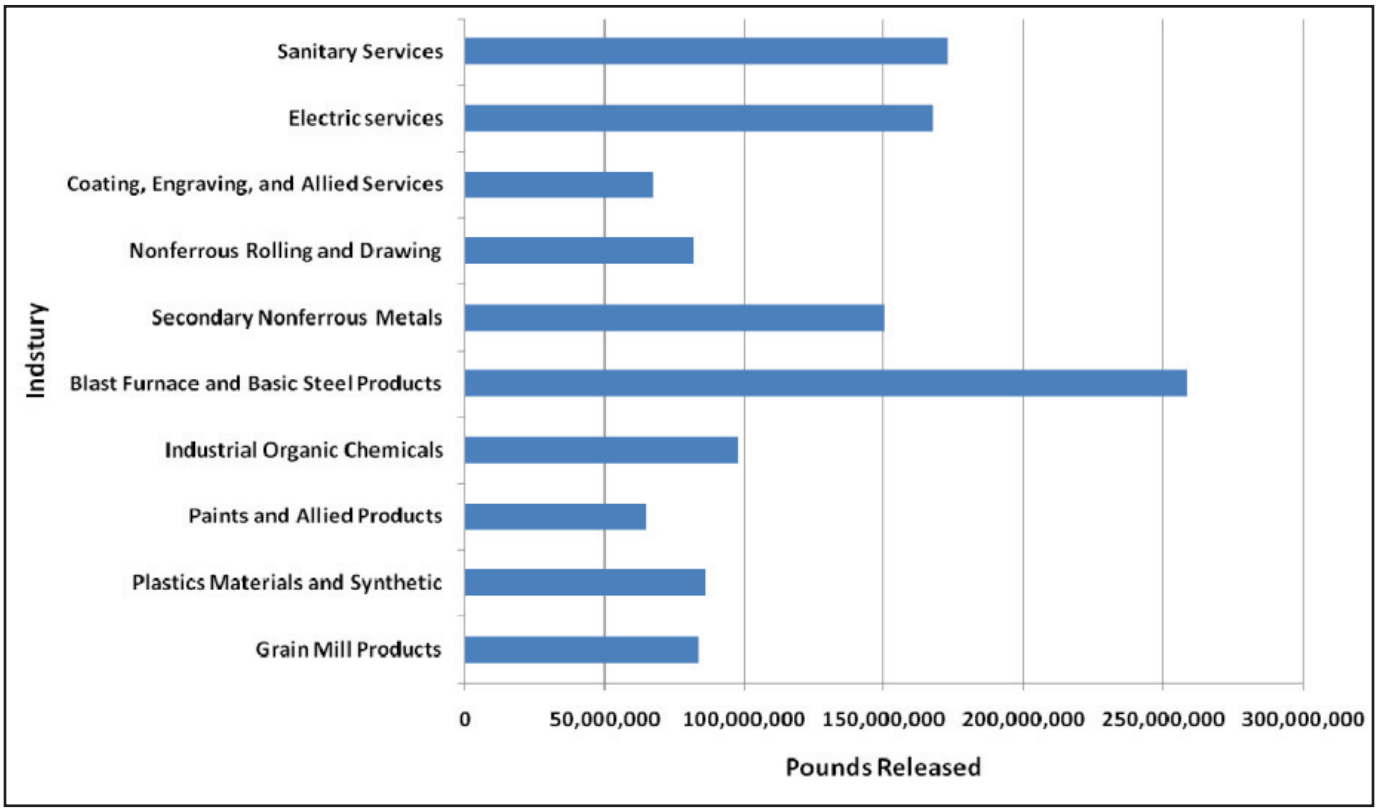


Altgeld Gardens

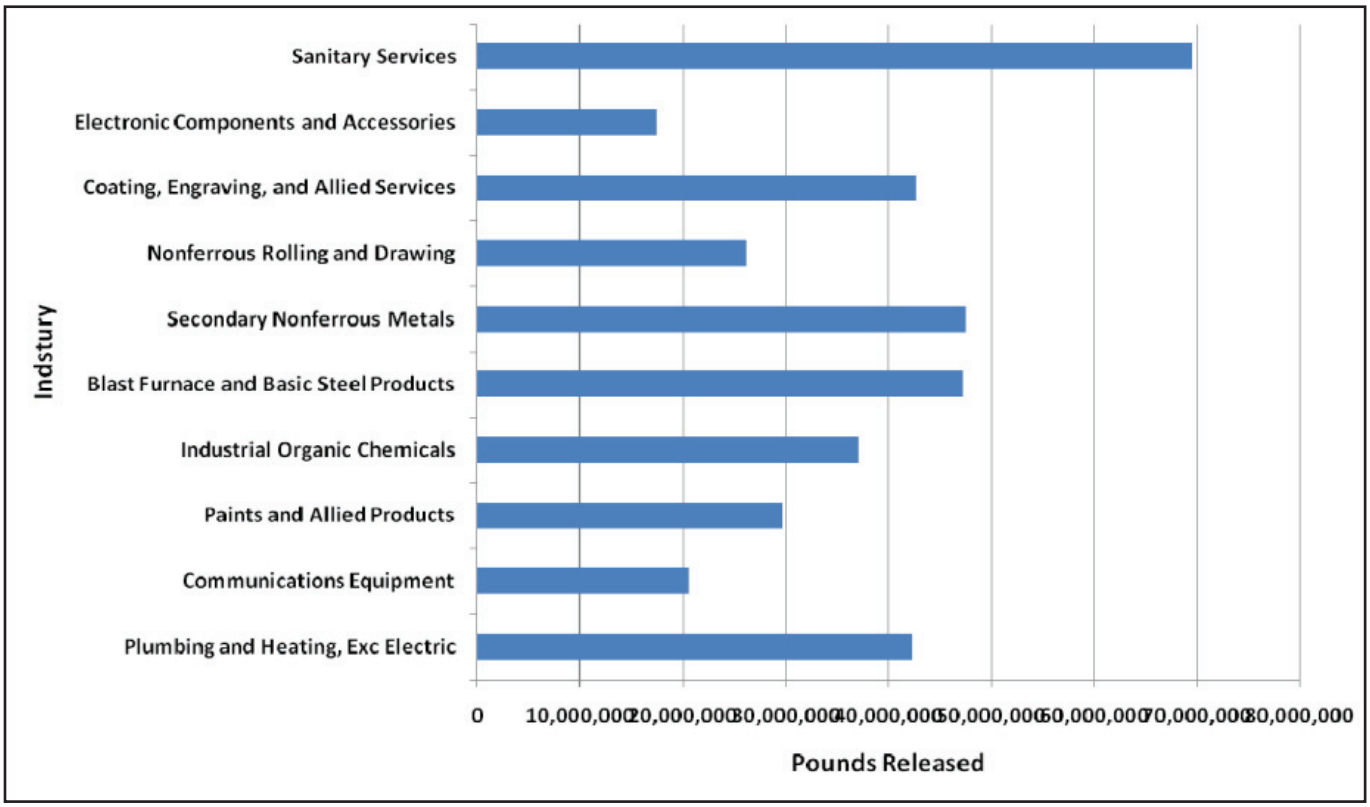


INDUSTRY

State of Illinois

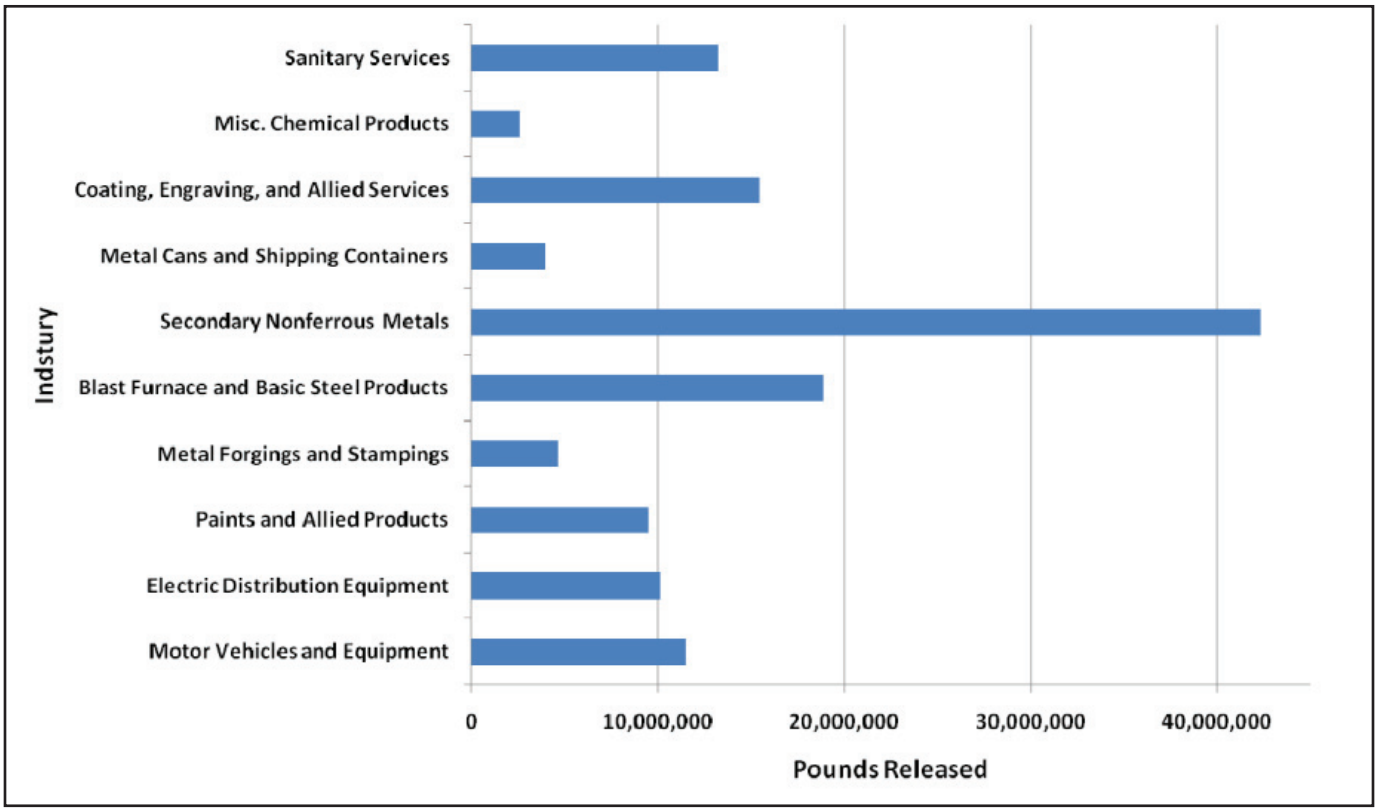


Cook County

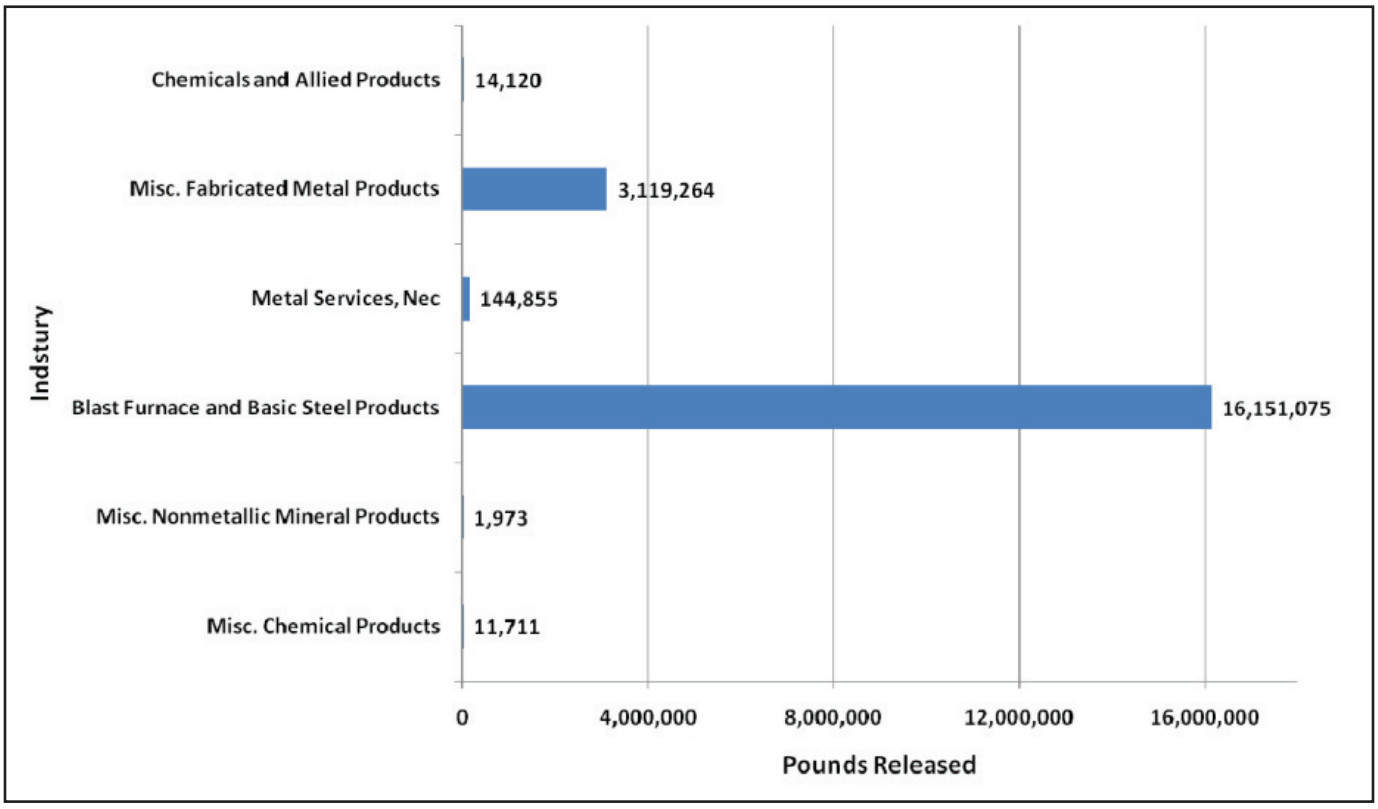


INDUSTRY (continued)

City of Chicago



Altgeld Gardens



FACILITY

State of Illinois -Total Pounds Released
(% of total state releases)

ILLINOIS		2,180,597,569 (100)
Rank	**Facility (County)**	
1	Peoria Disposal Co #1 (Peoria)	99,429,133 (5)
2	ADM (Macon)	76,113,382 (4)
3	Olin Corp Zone 17 Facility (Madison)	74,865,241 (3)
4	Northwestern Steel & Wire Co (Whiteside)	62,109,058 (3)
5	Keystone Steel & Wire Co (Peoria)	50,724,641 (2)
6	Abbott Laboratories - North Chicago Facility (Lake)	45,518,088 (2)
7	Safety-Kleen Systems Inc. (Cook)*	44,194,753 (2)
8	U.S. Steel Granite City Works (Madison)	41,926,047 (2)
9	Sloan Valve Co (Cook)*	41,462,887 (2)
10	Nucor Steel Kankakee Inc. (Kankakee)	34,138,560 (2)

City of Chicago - Total Pounds Released
(% of total city releases))

CHICAGO		153,405,702 (100)
Rank	**Facility (Zip code)**	
1	H. Kramer & Co. (60608)	24,966,395 (16)
2	Clean Harbors Services Inc. (60617)	13,247,823 (9)
3	Imperial Zinc Corp (60628)	11,994,863 (8)
4	Wheatland Tube Co Chicago Div (60609)	11,617,499 (8)
5	Ford Motor Co Chicago Assembly (60633)	11,027,872 (7)
6	S&C Electric Co (60626)	10,151,394 (7)
7	Sherwin-Williams Co (60628)	4,877,868 (3)
8	LTV Steel Company (60617)	4,284,386 (3)
9	Able Electropolishing Co Inc (60623)	3,774,007 (3)
10	Silgan Closures Llc #35 (60639)	3,387,289 (2)

Cook County -Total Pounds Released
(% of total county releases)

COOK COUNTY		550,303,655 (100)
Rank	**Facility (Zip code)**	
1	Safety-Kleen Systems Inc. (60419)	44,194,753 (8)
2	Sloan Valve Co (60131)	41,462,887 (8)
3	H. Kramer & Co. (60608)	24,966,395 (5)
4	Andrew Corp (60462)	19,861,619 (4)
5	Koppers Inc (60804)	19,543,548 (4)
6	Chicago Extruded Metals Co (60804)	18,660,819 (3)
7	Mittal Steel USA - Riverdale Inc. (60827)*	16,151,075 (3)
8	Corn Products Argo Plant (60501)	13,670,557 (3)
9	NB Coatings Inc (60438)	13,284,880 (2)
10	Clean Harbors Services Inc. (60617)	13,247,823 (2)

Altgeld Gardens -Total Pounds Released

ALTGELD GARDENS	19,442,998
Facility	
Mittal Steel USA - Riverdale Inc.	16,151,075
ACME Packaging Riverdale Facility	3,119,264
Riverdale Plating & Heat Tre Ating Inc.	144,855
Airgas Specialty Products Riverdale Il	14,120
Hickman Williams & Co	8,000
Riverdale Industries Llc Riverdale Facility	3,711
Harsco Co Multiserv Plant 27	1,973

OVERALL

State of Texas -Total Pounds Released
(% of total state releases)

TEXAS	4,515,104,877 (100)	
Rank	**County**	
1	Harris	1,394,076,260 (31)
2	Brazoria	352,848,657 (8)
3	Jefferson*	324,084,674 (7)
4	Victoria	244,736,536 (5)
5	Galveston	191,053,803 (4)
6	Calhoun	188,770,963 (4)
7	Dallas	168,853,649 (4)
8	Nueces	117,481,795 (3)
9	Orange	112,043,835 (3)
10	Ellis	101,831,824 (2)

City of Port Arthur -Total Pounds Released
(% of total city releases)

JEFFERSON COUNTY	324,084,674 (100)	
Rank	**Zip code**	
1	77640*	85,638,533 (74)
2	77641*	18,750,920 (16)
3	77642	6,495,436 (6)
4	77643*	4,180,948 (4)

Jefferson County -Total Pounds Released
(% of total county releases)

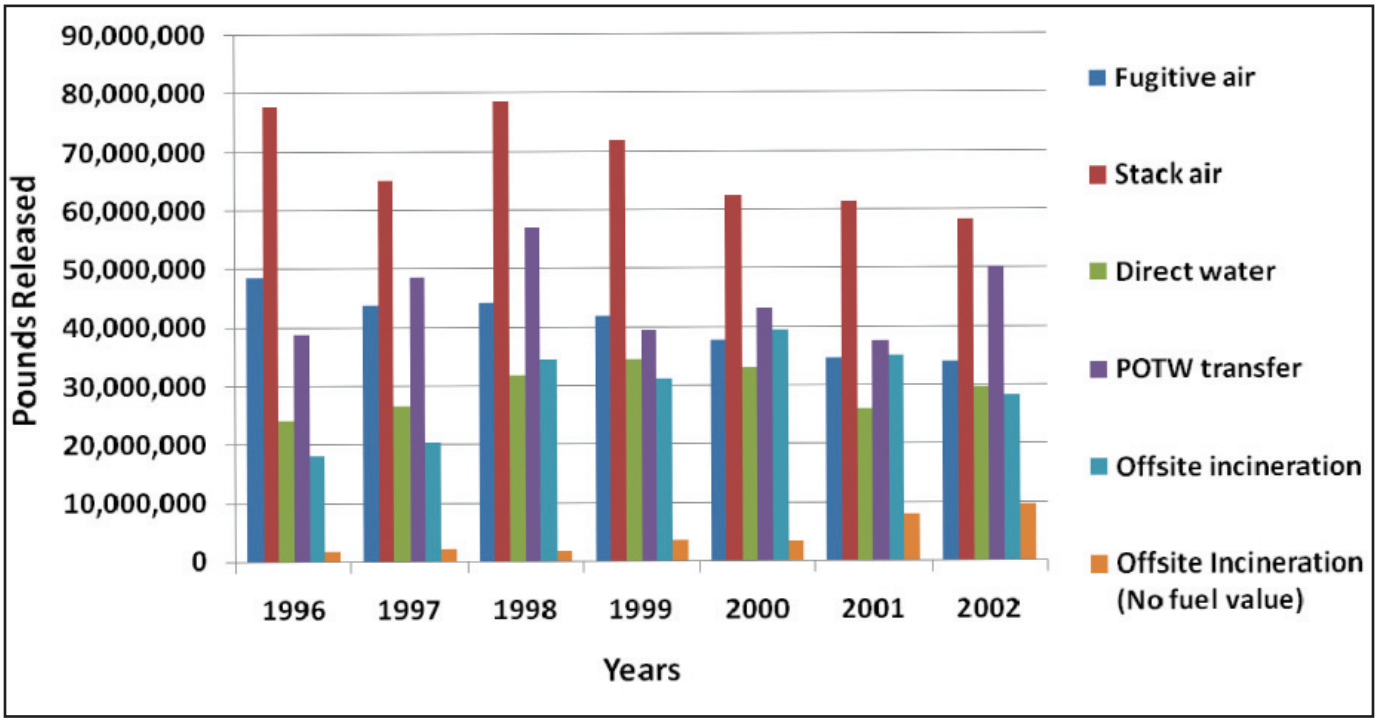
JEFFERSON COUNTY	324,084,674 (100)	
Rank	**Zip code**	
1	77705	117,354,939 (36)
2	77640*	85,638,533 (26)
3	77701	36,232,629 (11)
4	77651	31,072,455 (10)
5	77641*	18,750,920 (6)
6	77665	13,166,185 (4)
7	77713	8,255,432 (3)
8	77642	6,495,436 (2)
9	77643*	4,180,948 (1)
10	77627	1,989,368 (1)

Westside -Total Pounds Released

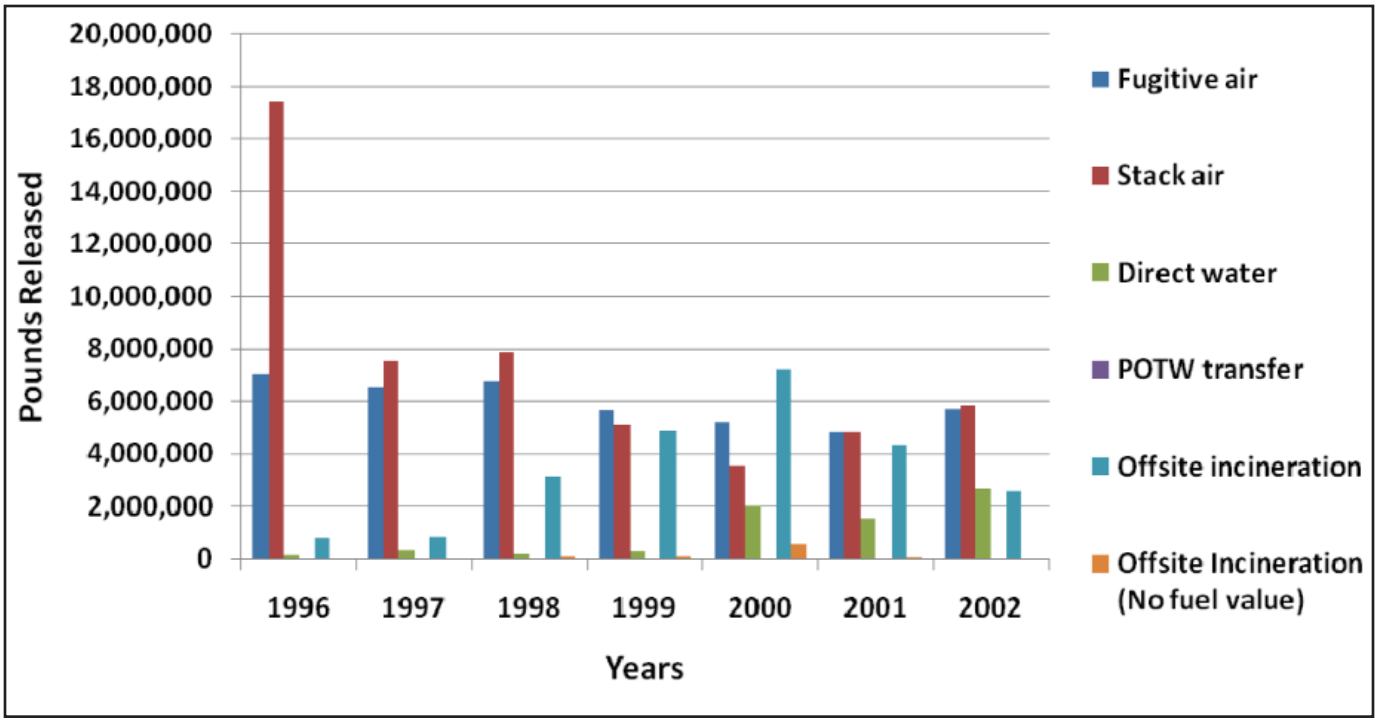
JEFFERSON COUNTY	324,084,674 (100)
77640*	85,638,533

MEDIA

State of Texas

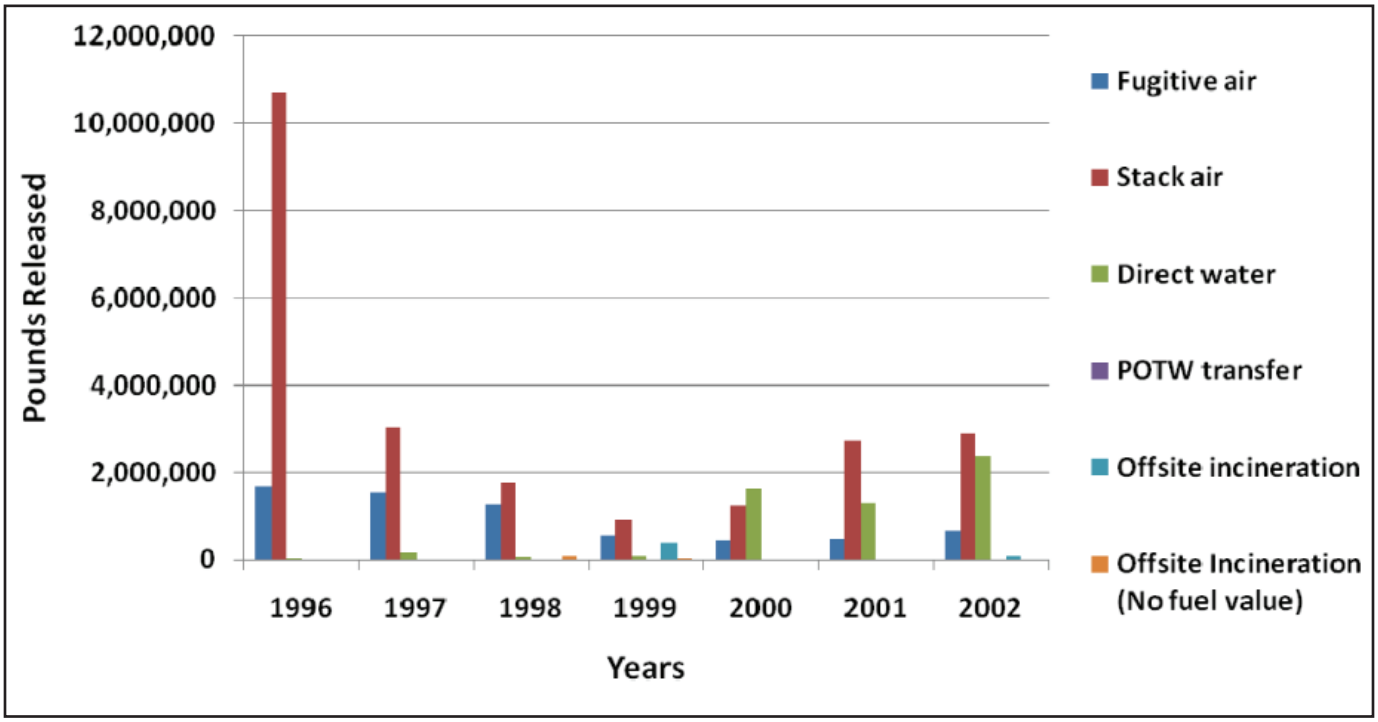


Jefferson County

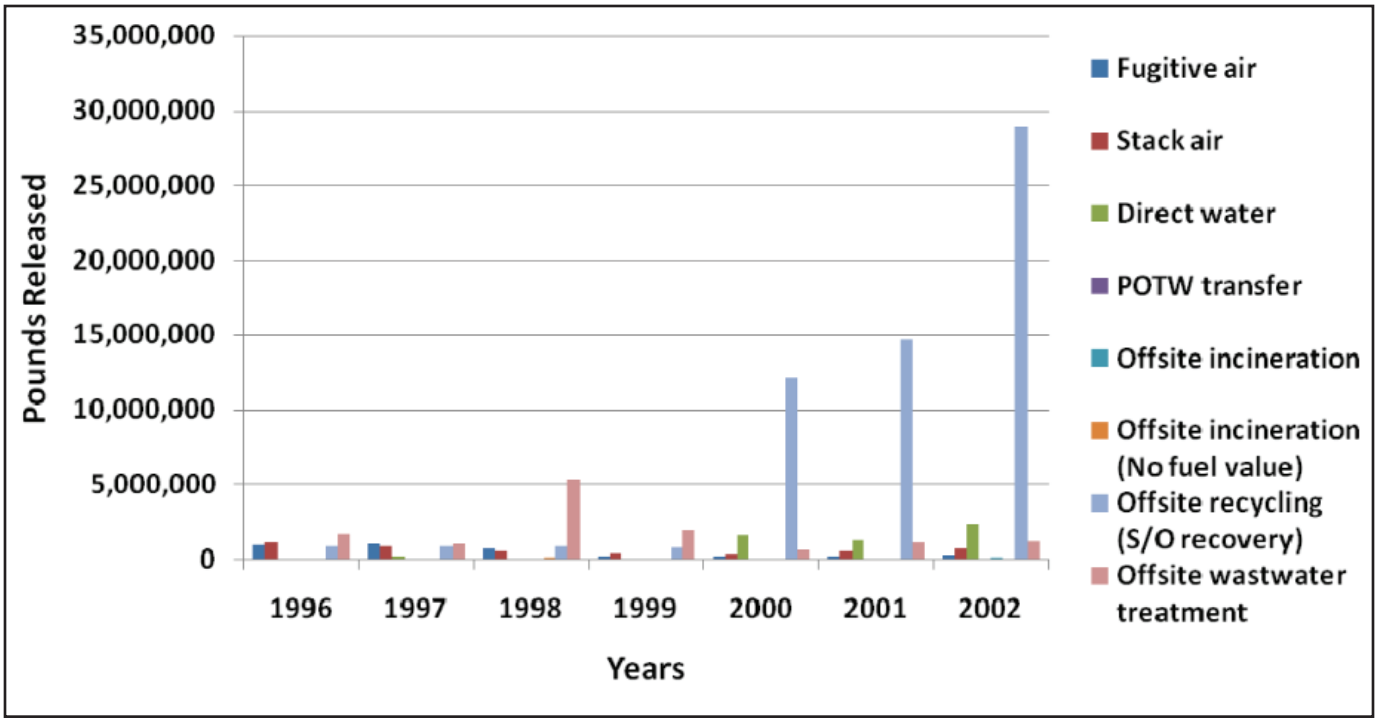


MEDIA (continued)

City of Port Arthur

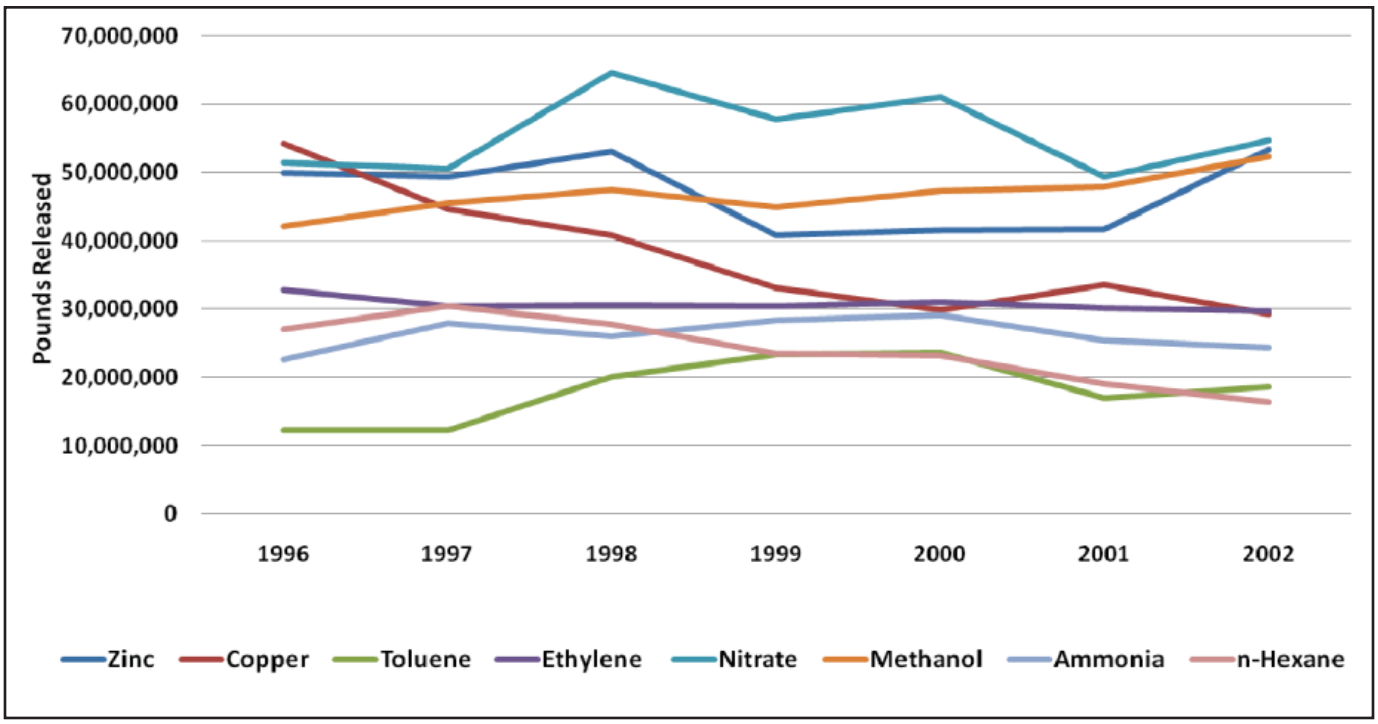


Westside

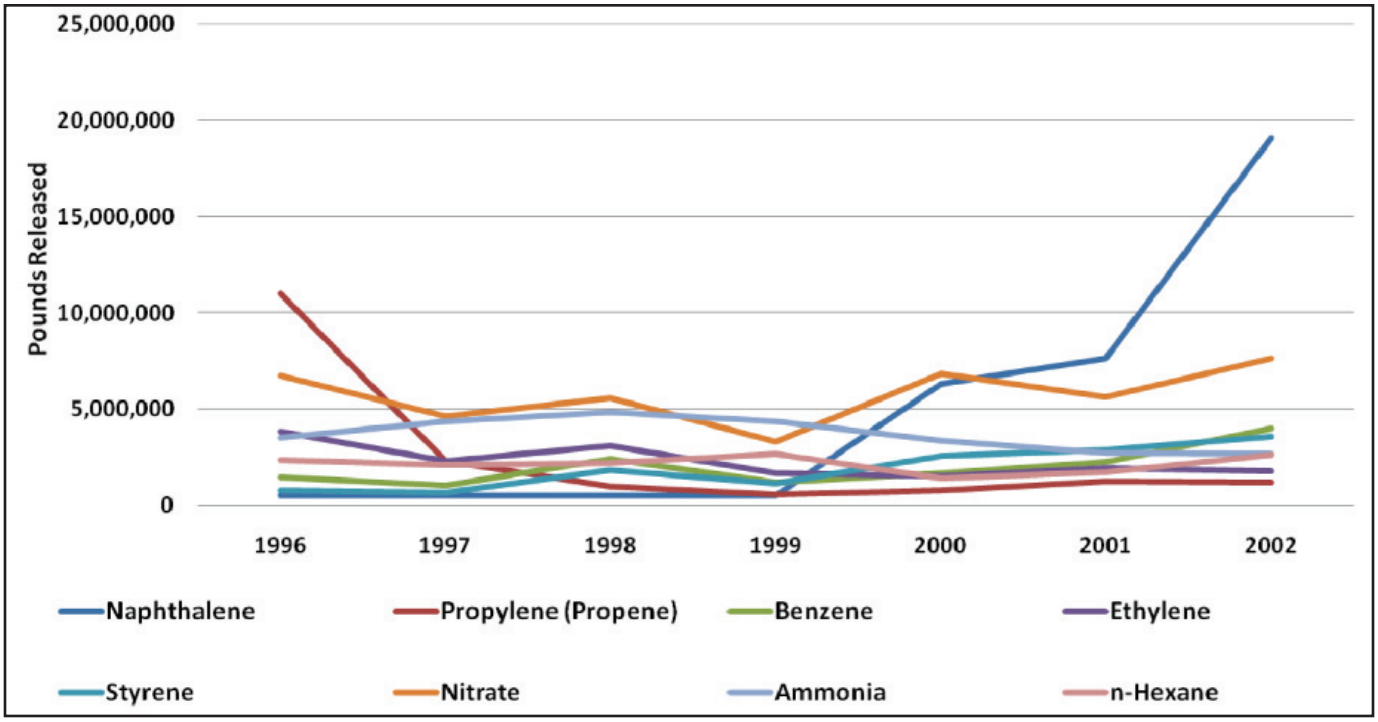


CHEMICAL

State of Texas

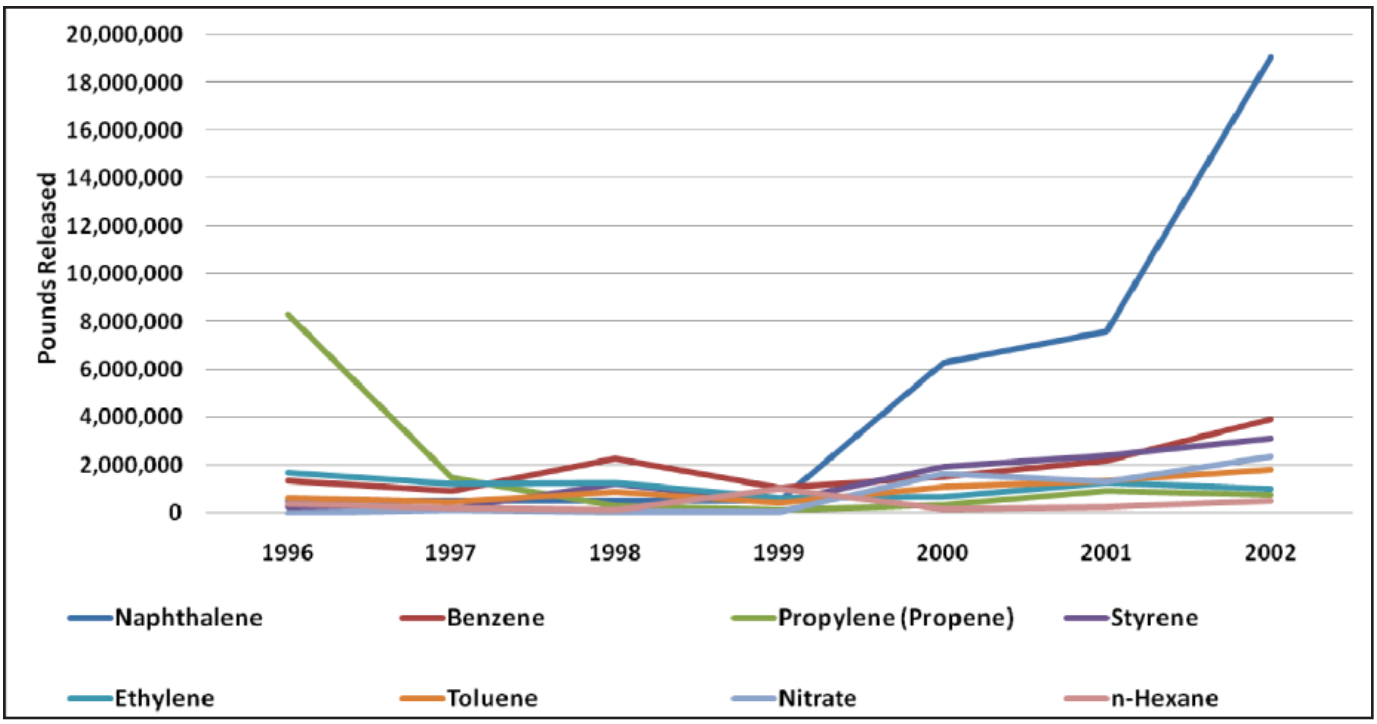


Jefferson County

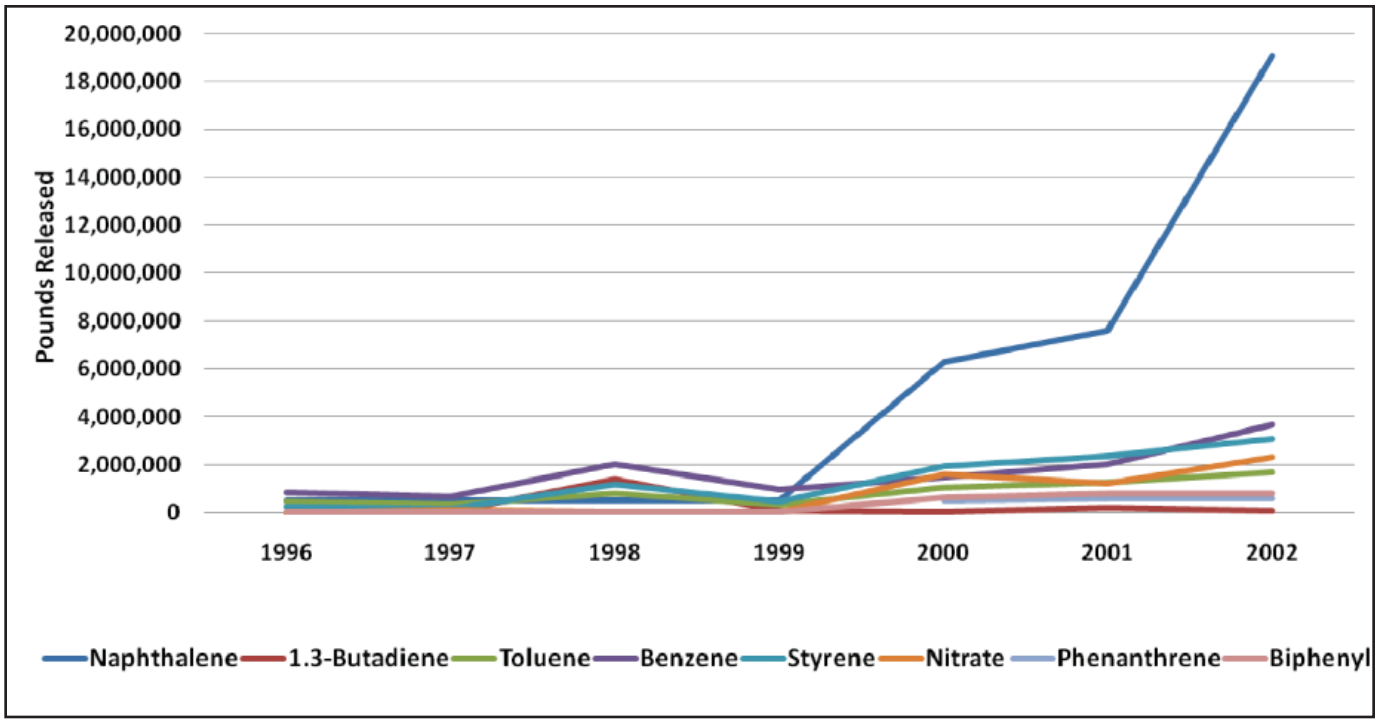


CHEMICAL (continued)

City of Port Arthur

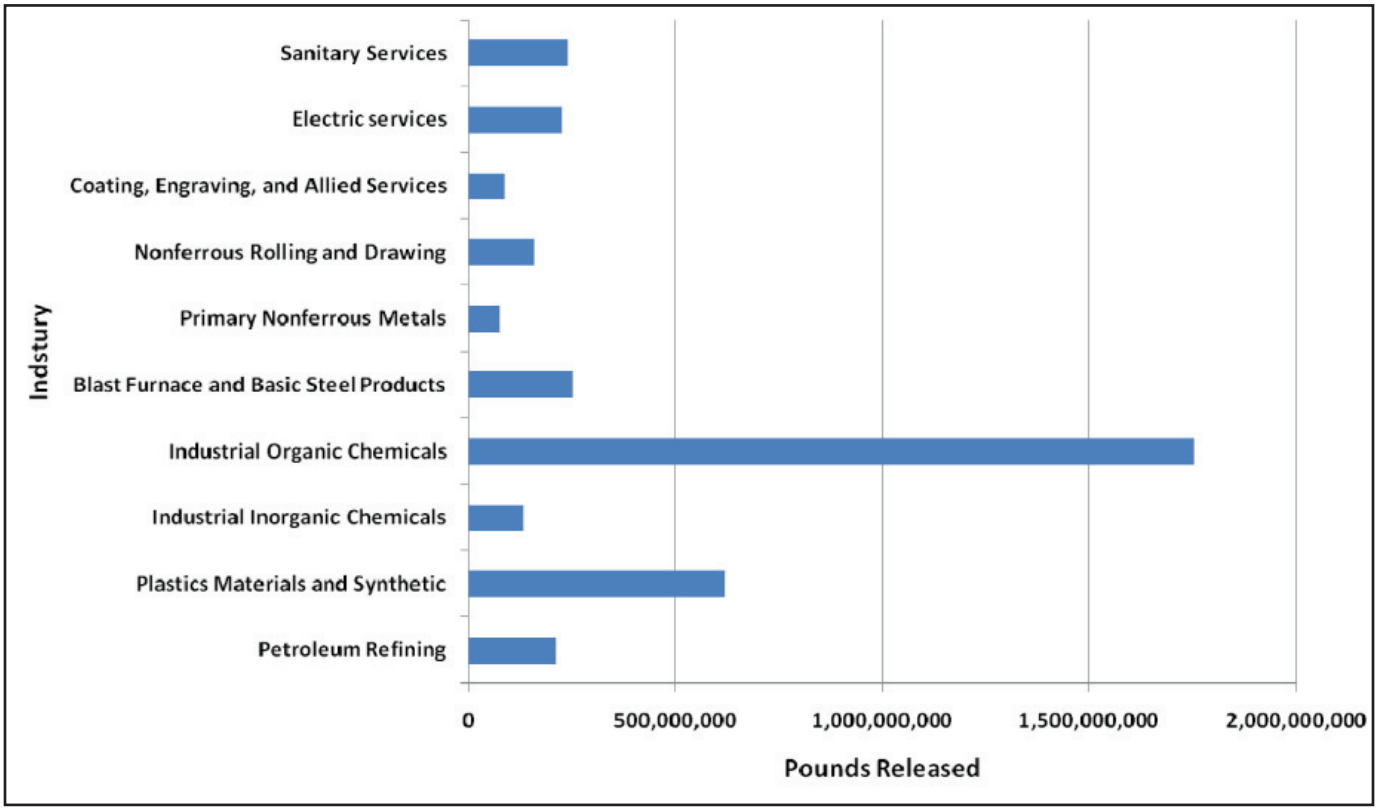


Westside

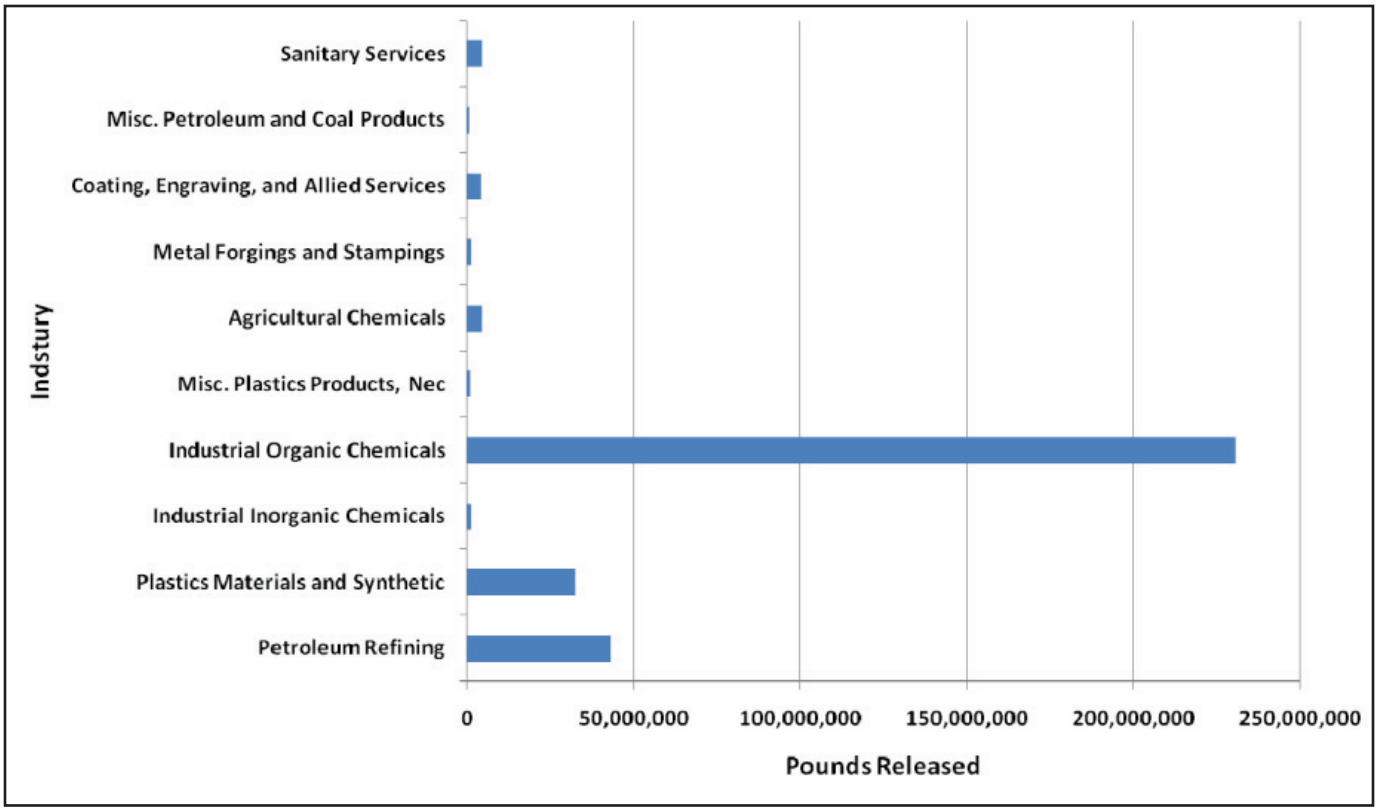


INDUSTRY

State of Texas

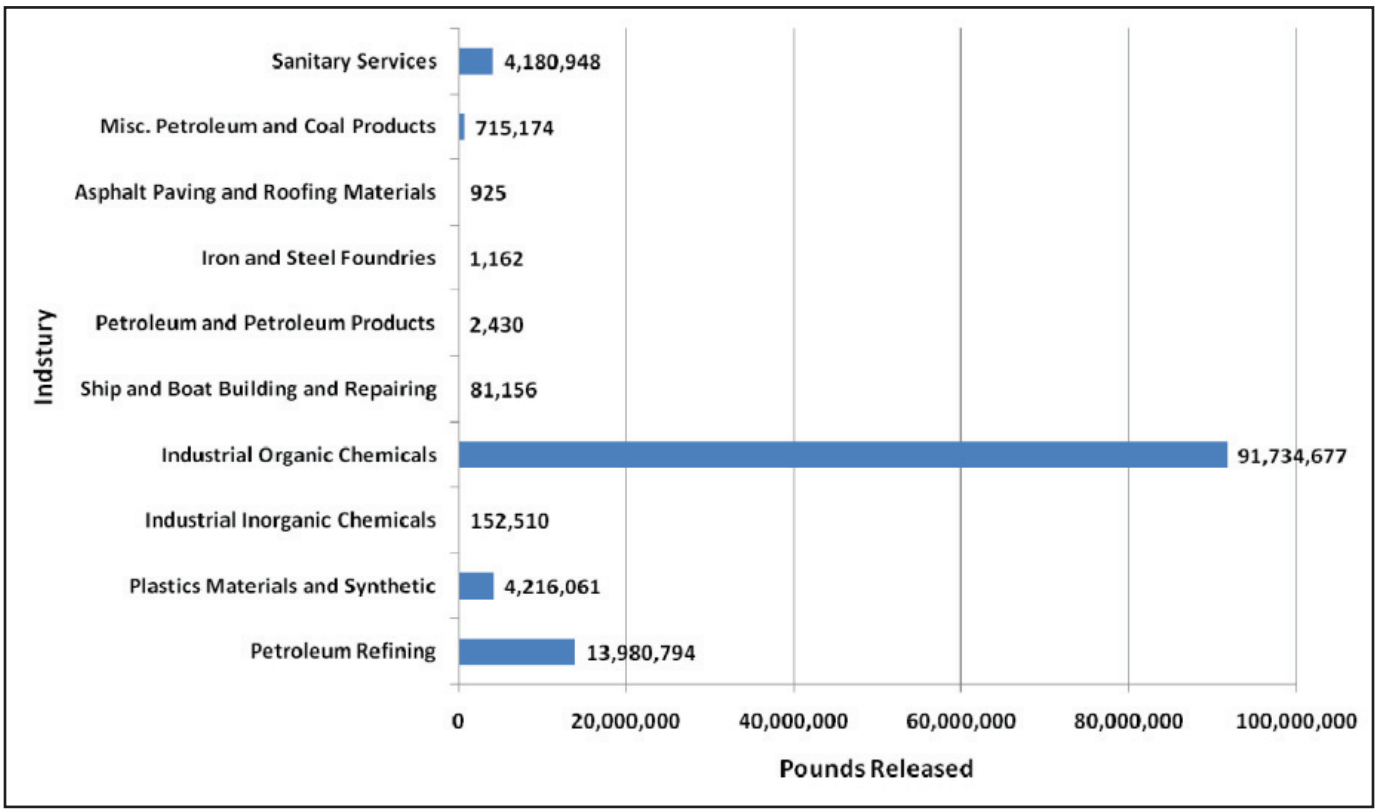


Jefferson County

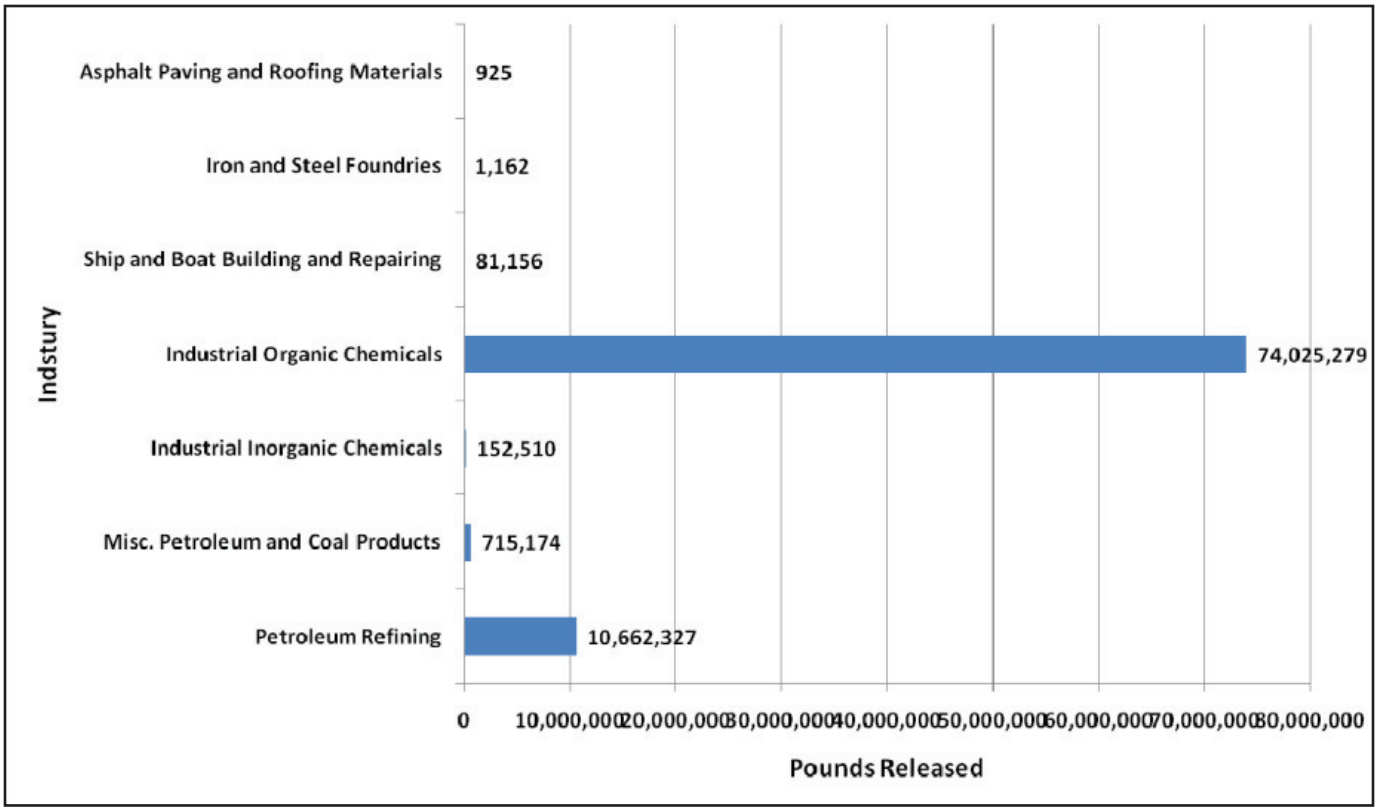


INDUSTRY (continued)

City of Port Arthur



Westside



FACILITY

State of Texas -Total Pounds Released
(% of total state releases)

TEXAS		4,515,104,877 (100)
Rank	**Facility (County)**	
1	Celanese Ltd. Clear Lake Plan T (Harris)	144,534,826 (3)
2	Basf Corp (Brazoria)	136,795,937 (3)
3	Dupont Victoria Plant (Victoria)	133,561,464 (3)
4	Air Products L. P. (Harris)	125,298,186 (3)
5	Equistar Chemicals (Victoria)	110,856,032 (3)
6	Ineos USA Llc Green Lake Plant (Calhoun)	100,938,575 (2)
7	Dupont Beaumont Plant (Jefferson)*	93,158,297 (2)
8	Lyondell Chemical Co Bayport Facility (Harris)	84,639,030 (2)
9	Chaparral Steel Midlothian Lp (Ellis)	82,264,430 (2)
10	Bayer Materialscience Baytown (Chambers)	77,434,530 (2)

City of Port Arthur -Total Pounds Released
(% of total city releases)

PORT ARTHUR		115,065,837 (100)
Rank	**Facility (Zip code)**	
1	Chevron Phillips Chemical Co (77640)*	73,803,710 (64)
2	Huntsman Petrochemical Corp Pabc (77641)	14,238,103 (12)
3	Motiva Enterprises Llc (77640)*	8,112,688 (7)
4	Equistar Chemicals L.P. Port Arthur Plant (77641)	4,216,061 (4)
5	Veolia Technical Solutions Port Arthur Facility (77643)	4,180,948 (4)
6	Total Petrochemicals - Port Arthur Refinery (77642)	3,318,467 (3)
7	Nafta Region Olefins Complex (77642)	3,176,969 (3)
8	Premcor Refining Group Inc Port Arthur (77640)*	2,364,803 (2)
9	Chevron Port Arthur Distribution Center (77640)*	714,924 (1)
10	KMCO. Port Arthur Inc. Dba Kmtex (77641)	294,325 (0.3)

Jefferson County -Total Pounds Released
(% of total county releases)

JEFFERSON COUNTY		324,084,674 (10)
Rank	**Facility (Zip code)**	
1	Dupont Beaumont Plant (77705)	93,158,297 (29)
2	Chevron Phillips Chemical Co (77640)*	73,803,710 (23)
3	ExxonMobil Oil Corp (77701)	28,033,342 (9)
4	Huntsman Corp - Po/Mtbe Plant (77651)	15,270,731 (5)
5	Huntsman Petrochemical Corp Pabc (77641)	14,238,103 (4)
6	Merisol USA Llc (77665)	13,166,185 (4)
7	Goodyear Tire & Rubber Co (77705)	11,767,924 (4)
8	Huntsman Corp O&O Facility (77651)	9,987,662 (3)
9	Motiva Enterprises Llc (77640)*	8,112,688 (3)
10	Mobil Chemical Beaumont Polyethylene Plant (77713)	7,756,728 (2)

Westside -Total Pounds Released

WESTSIDE		85,638,533
Rank	**Facility**	
1	Chevron Phillips Chemical Co	73,803,710
2	Motiva Enterprises Llc	8,112,688
3	Premcor Refining Group Inc Port Arthur	2,364,803
4	Chevron Port Arthur Distribution Center	714,924
5	Afton Chemical Additives Corp	221,569
6	Motiva Enterprises Llc Port Arthur Terminal	184,836
7	Air Products L. P.	152,510
8	Tdi-Halter Inc. Dock Yard	81,156
9	Standard Alloys & Manufacturing Co	1,162
10	U.S. Intec Inc.	925

Appendix J
Total Toxicity-Weighted Results, 1996-2002 (RSEI, Version 2.2.0)

OVERALL

State of Wisconsin - Risk-related Score
(% of state score)

WISCONSIN	3,922,208 (100)	
Rank	County	
1	Kenosha	1,259,148 (32)
2	Milwaukee*	827,280 (21)
3	Dane	459,887 (12)
4	Brown	358,230 (9)
5	Waukesha	188,014 (5)
6	Wood	148,530 (4)
7	Outgamie	116,648 (3)
8	Marathon	81,999 (2)
9	Waupaca	77,844 (2)
10	Ozaukee	57,766 (1)

City of Milwaukee - Risk-related Score
(% of city score)

MILWAUKEE	611,573 (100)	
Rank	County	
1	53208*	126,181 (21)
2	53215	122,171 (20)
3	53204	101,423 (17)
4	53209*	75,415 (12)
5	53212	41,699 (7)
6	53216*	24,333 (4)
7	53202	17,096 (3)
8	53214	16,675 (3)
9	53207	13,434 (2)
10	53213	13,309 (2)

Milwaukee County - Risk-related Score
(% of county score)

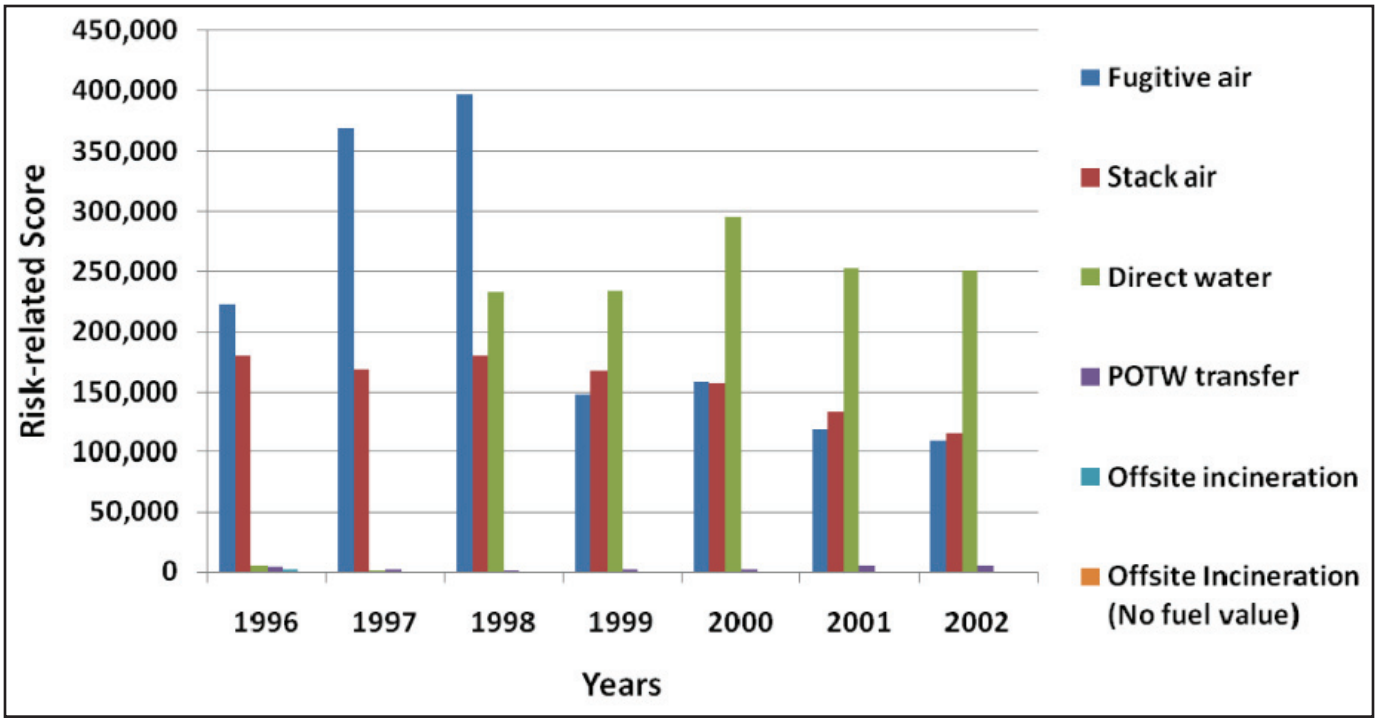
MILWAUKEE COUNTY	827,280 (100)	
Rank	County	
1	53208*	126,181 (15)
2	53215	122,171 (15)
3	53204	101,423 (12)
4	53172	86,652 (11)
5	53213	86,486 (11)
6	53209*	75,875 (9))
7	53212	41,699 (5)
8	53214	38,480 (5)
9	53216*	24,333 (3)
10	53154	17,429 (2)

30th Street Corridor - Risk-related Score

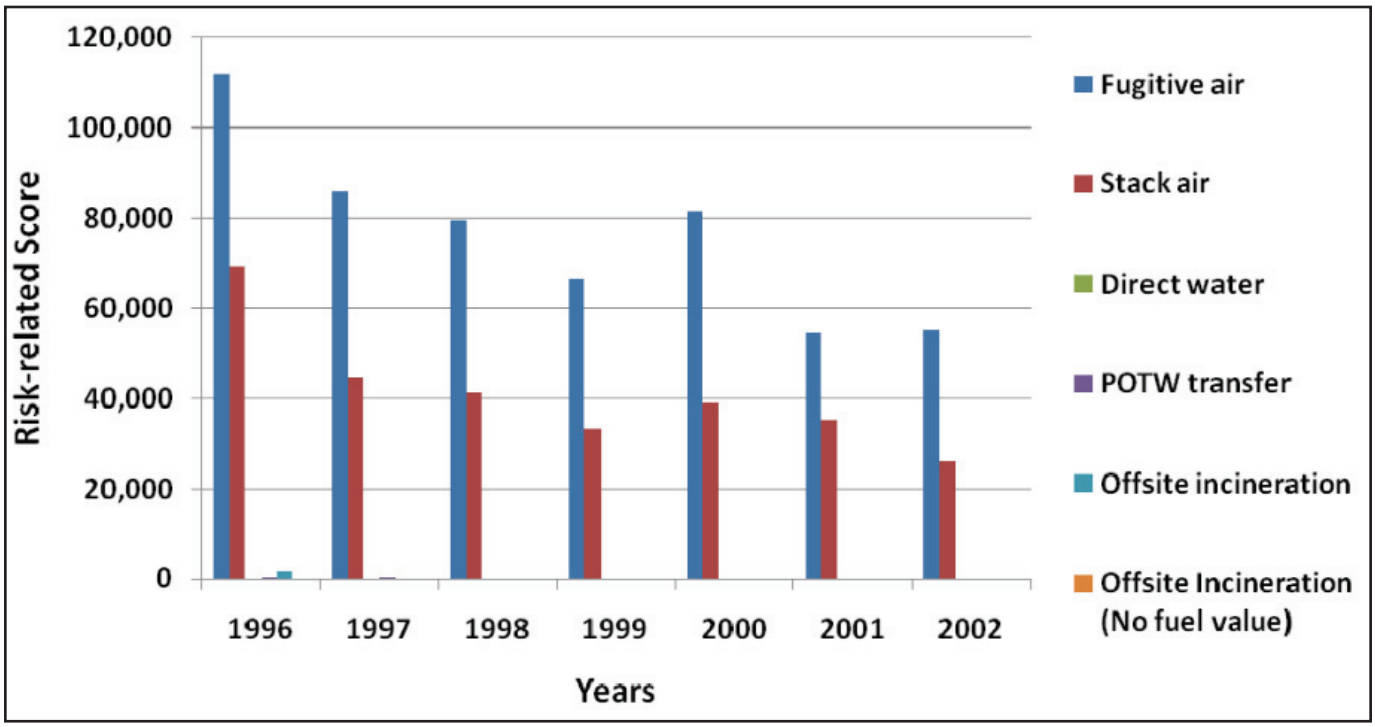
MILWAUKEE	611,573
Zip Code	
53208	126,181
53209	75,875
53210	8,101
53216	24,333

MEDIA

State of Wisconsin

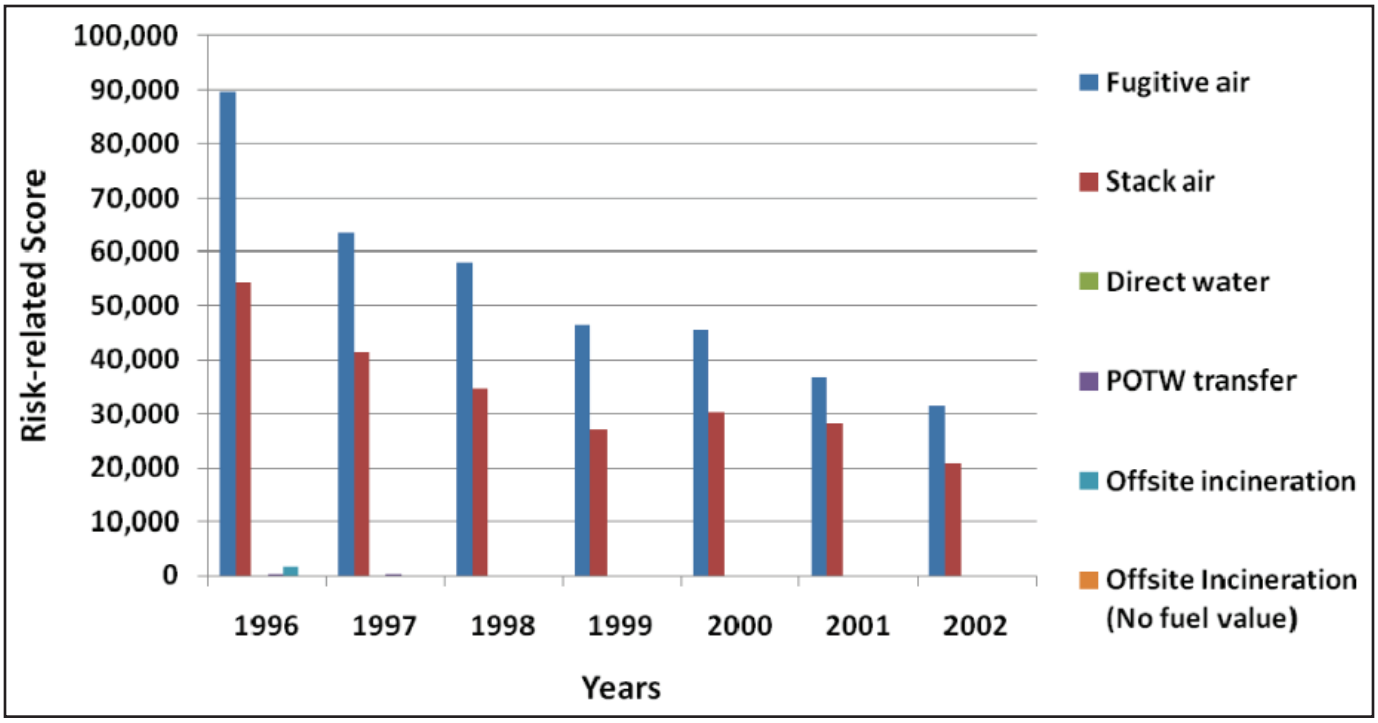


Milwaukee County



MEDIA (continued)

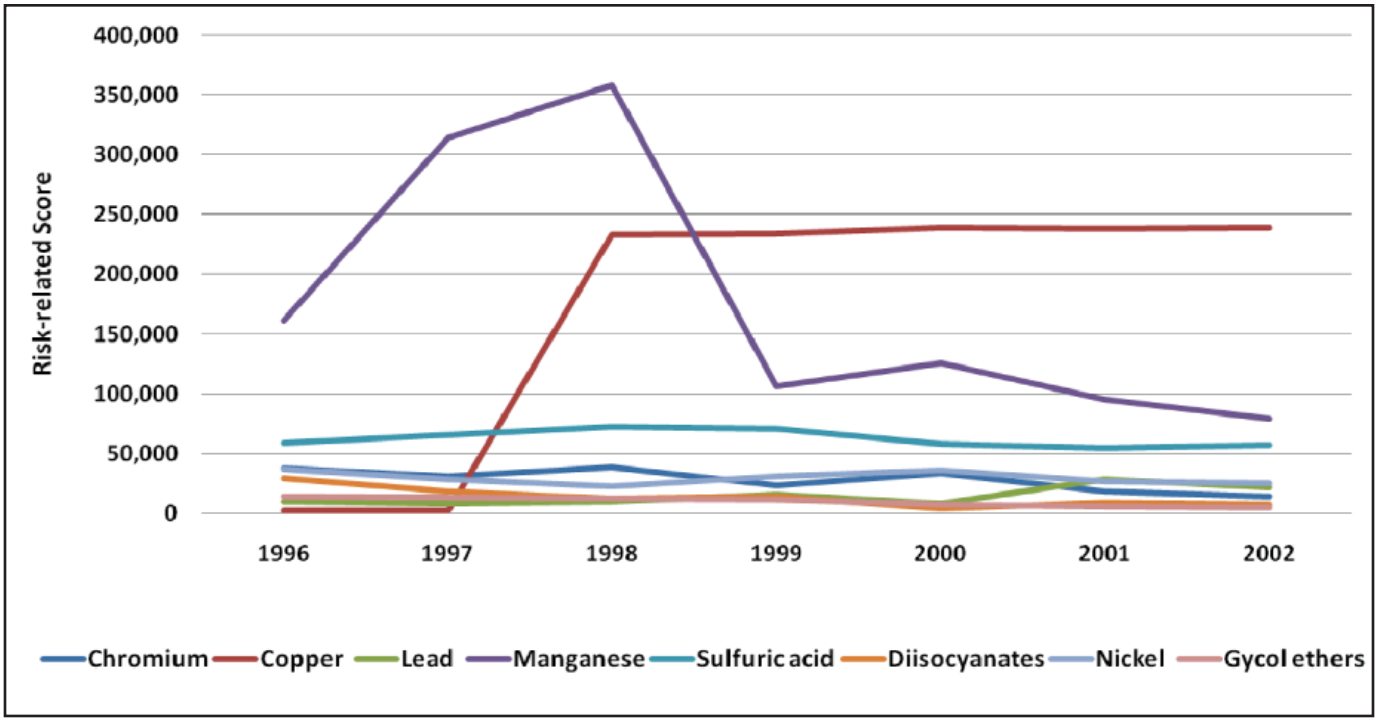
City of Milwaukee



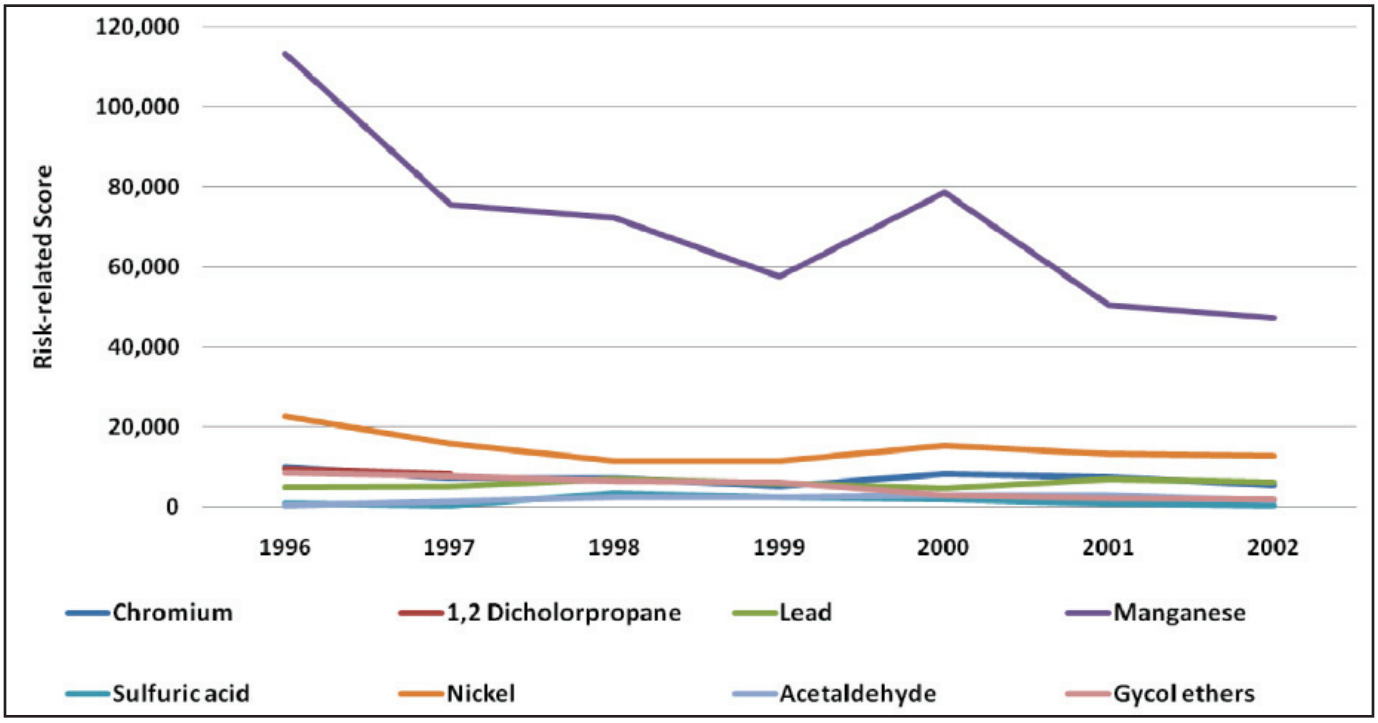
30th Street Corridor

CHEMICAL

State of Wisconsin

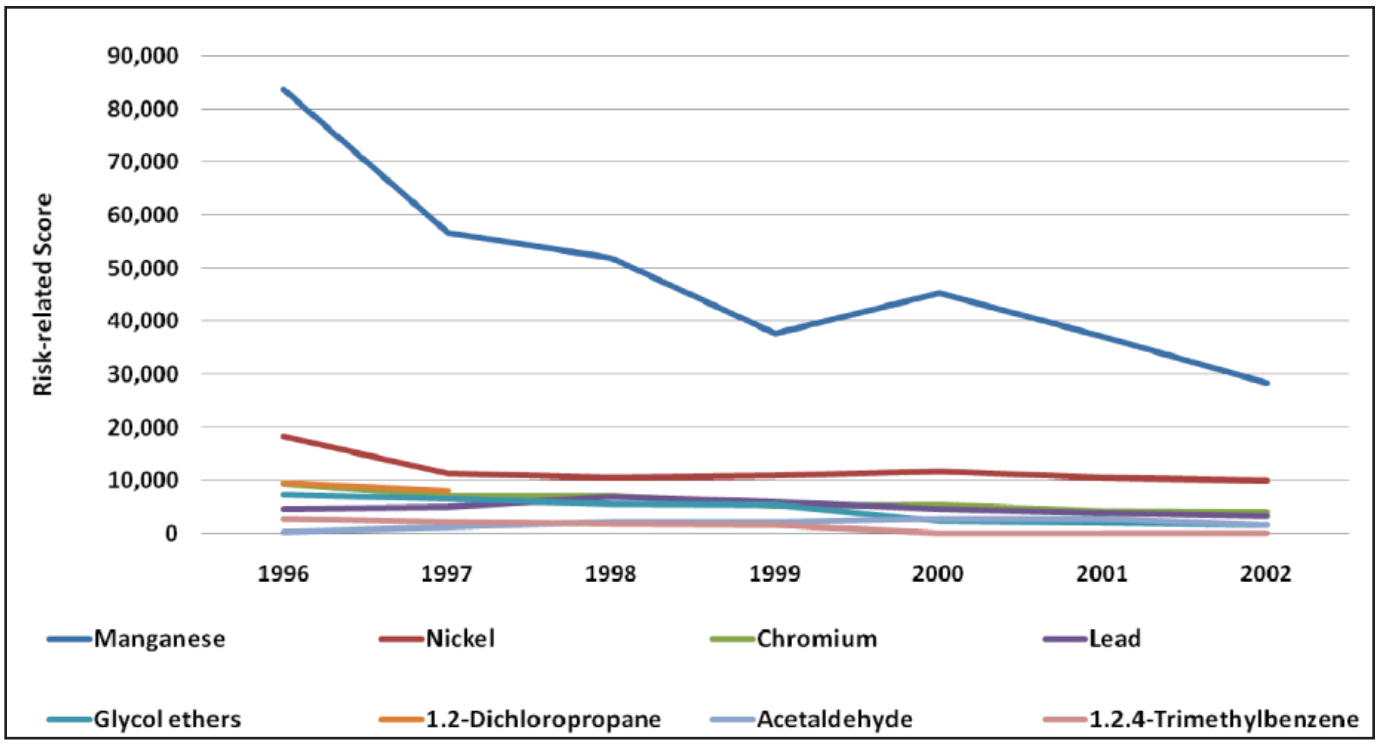


Milwaukee County

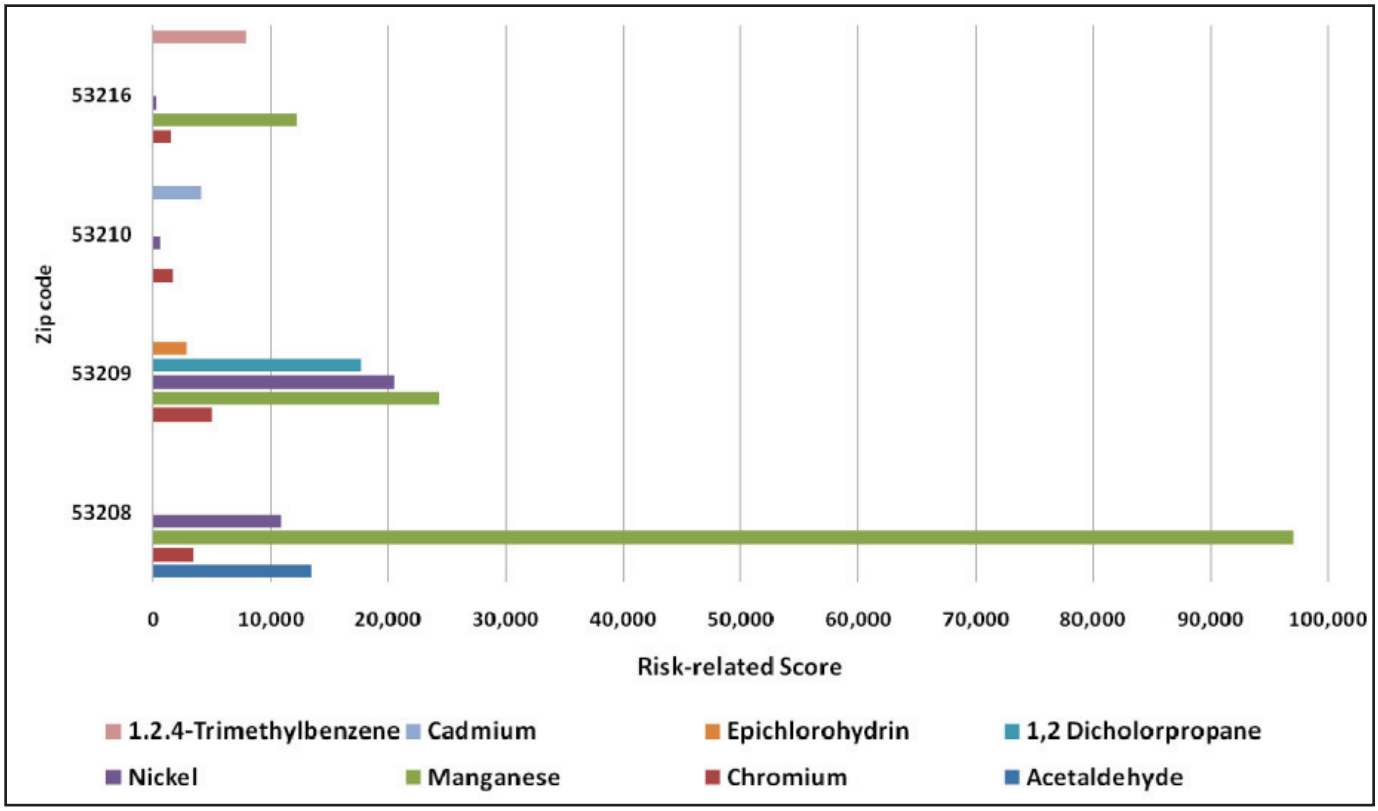


CHEMICAL (continued)

City of Milwaukee

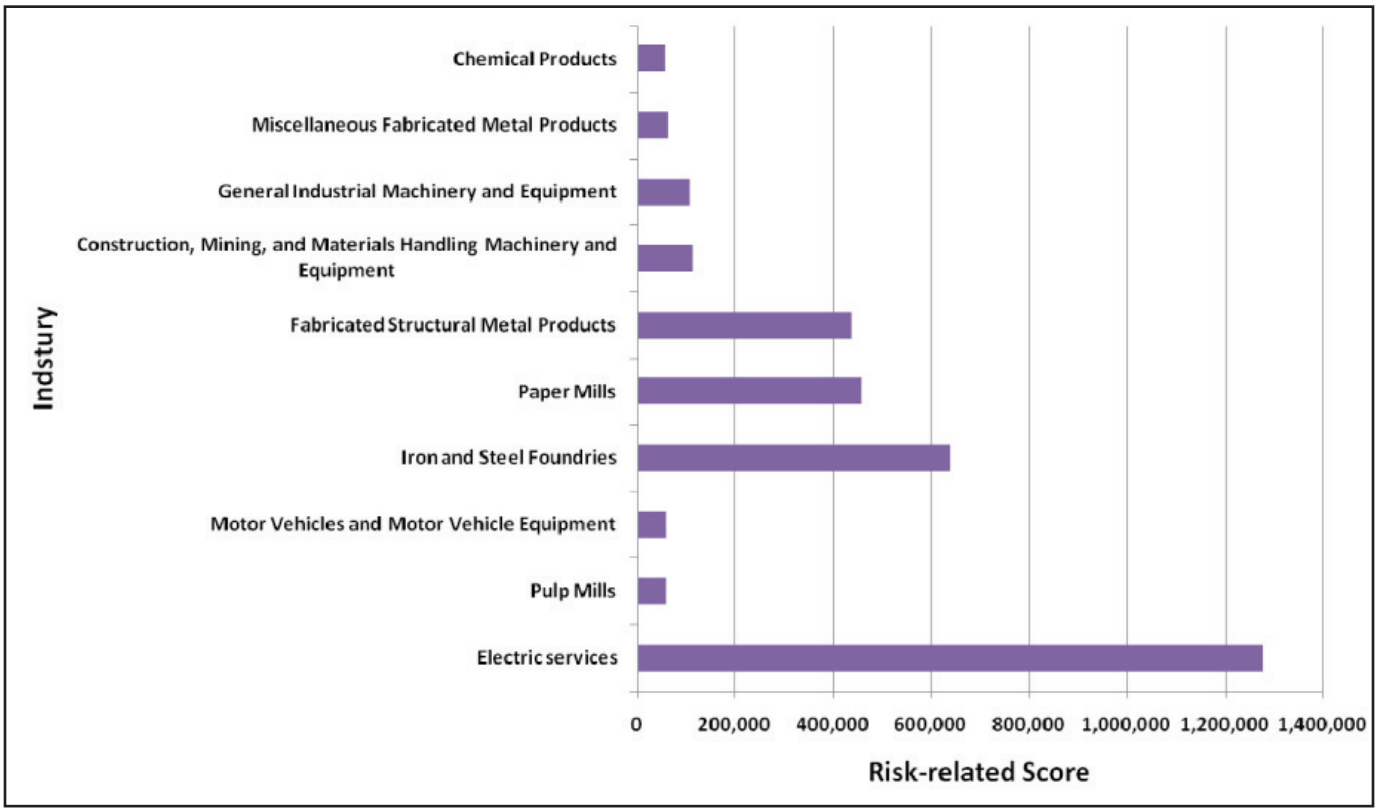


30th Street Corridor

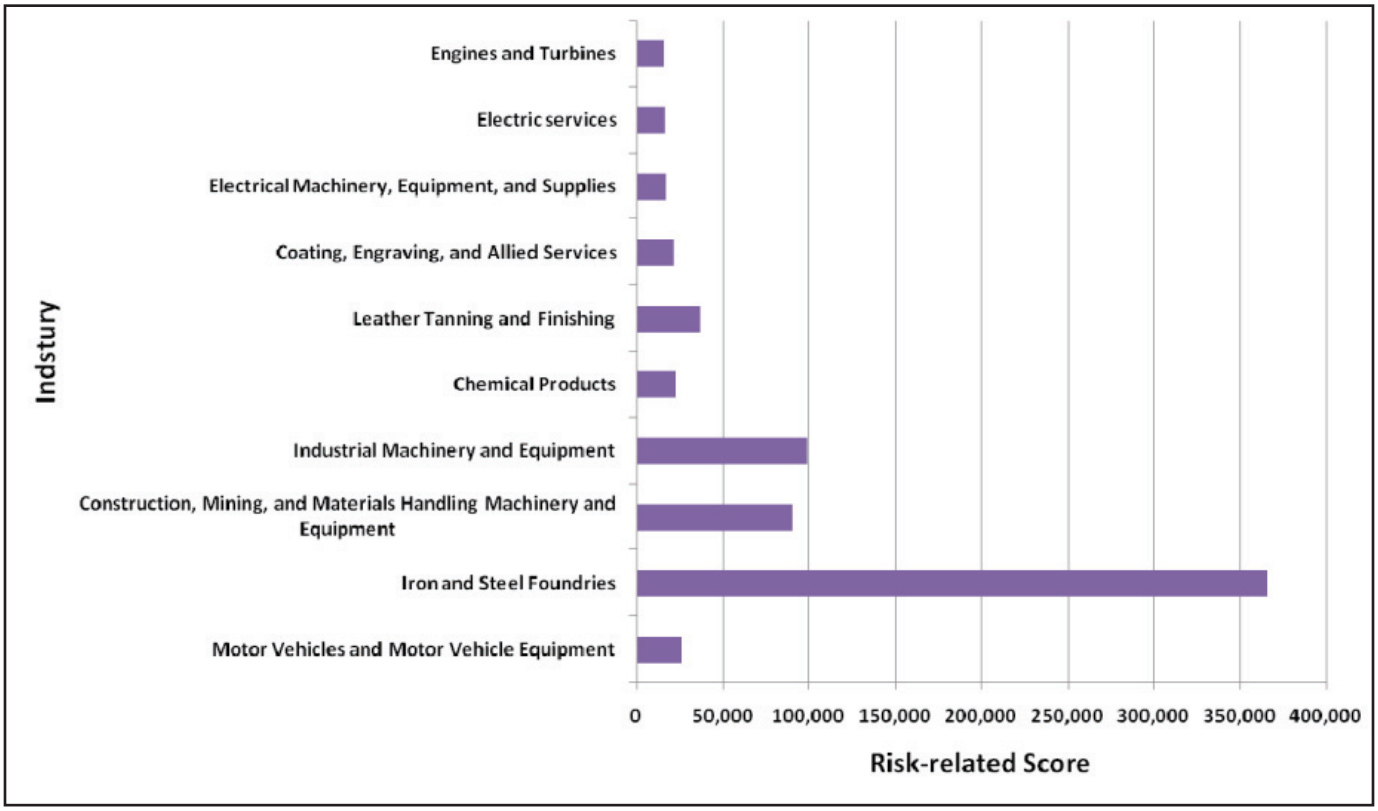


INDUSTRY

State of Wisconsin

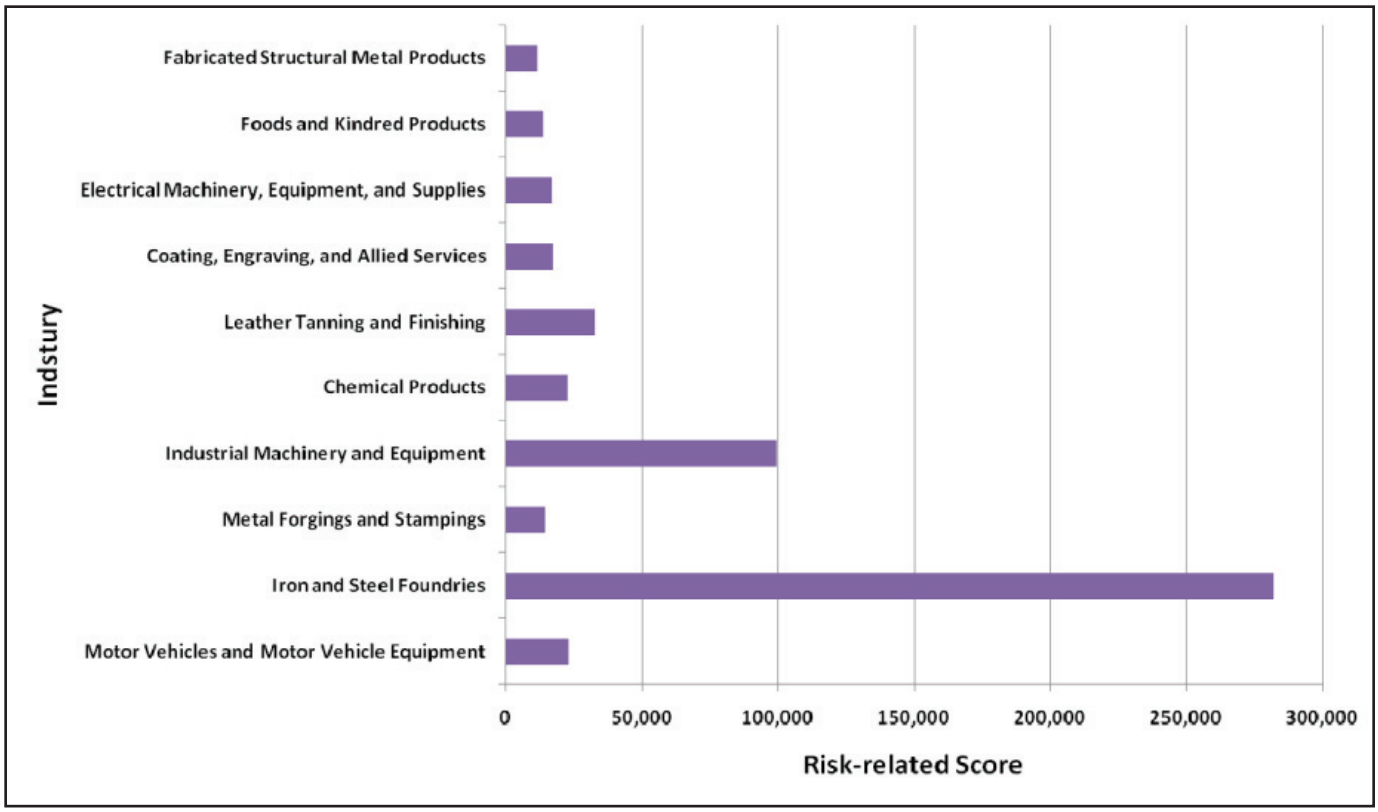


Milwaukee County

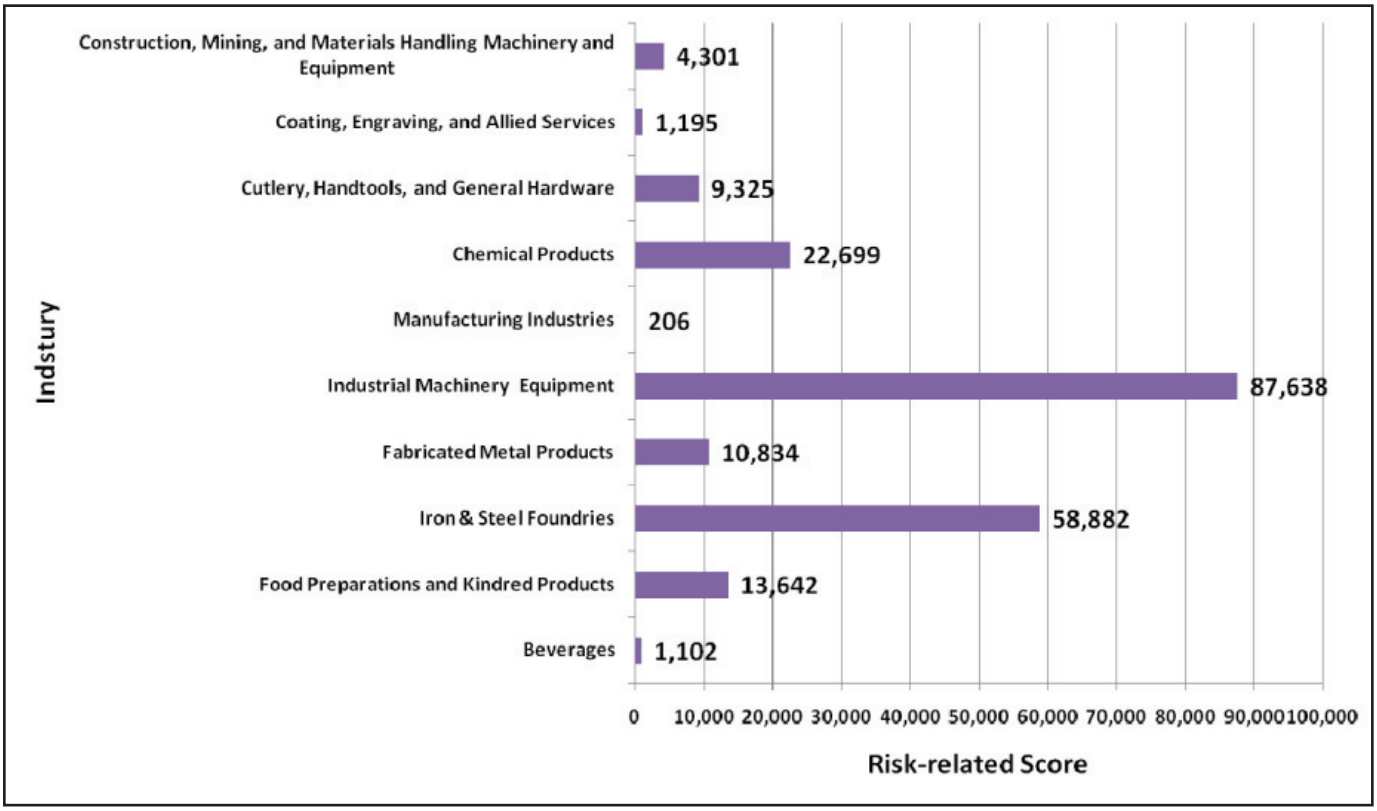


INDUSTRY (continued)

City of Milwaukee



30th Street Corridor



FACILITY

State of Wisconsin - Risk-related Score
(% of state score)

WISCONSIN		3,922,208 (100)
Rank	**Facility (County)**	
1	Pleasant Prairie Power Plant (Kenosha)	1,251,299 (32)
2	Zalk Josephs Fabricators Llc (Dane)	397,198 (10)
3	Georgia-Pacific Consumer Products (Brown)	310,110 (8)
4	Maynard Steel Casting Co (Milwaukee)*	120,275 (3)
5	Rexnord Industries – Canal (Milwaukee)*	87,638 (2)
6	Bucyrus International Inc. (Milwaukee)*	83,307 (2)
7	Grede Foundries Inc. Liberty Foundry (Milwaukee)*	73,178 (2)
8	Domtar A.W. Corp Nekoosa Mill (Wood)	64,394 (2)
9	Waukesha Foundry Inc (Waukesha)	63,203 (2)
10	Thyssenkrupp Waupaca Plant 1 (Waupaca)	54,911 (1)

City of Milwaukee - Risk-related Score
(% of city score)

MILWAUKEE		611,573 (100)
Rank	**Facility (Zip code)**	
1	Maynard Steel Casting Co (53215)	120,275 (20)
2	Rexnord Industries Llc - Bcg Group - Canal (53208)*	87,638 (14)
3	Stainless Foundry & Engineering Inc (53209)*	45,917 (8)
4	Mid-City Foundry (53204)	37,024 (6)
5	Grede Foundries Inc Milwaukee Alloy Foundry (53204)	36,613 (6)
6	Tower Automotive Products Co Inc. (53216)*	23,259 (4)
7	Hercules Inc (53209)*	22,696 (4)
8	C&D Technologies Power Division-Keefe (53212)	17,215 (3)
9	Pfister & Vogel Leather (53202)	16,929 (3)
10	Lesaffre Yeast Corp (53208)*	13,642 (2)

Milwaukee County - Risk-related Score
(% of county score)

MILWAUKEE COUNTY		827,280 (100)
Rank	**Facility (Zip code)**	
1	Maynard Steel Casting Co (53215)	120,275 (15)
2	Rexnord Industries Llc - Bcg Group – Canal (53208)*	87,638 (11)
3	Bucyrus International Inc. (53172)	83,307 (10)
4	Grede Foundries Inc. Liberty Foundry (53213)	73,178 (9)
5	Stainless Foundry & Engineering Inc (53209)*	45,917 (6)
6	Mid-City Foundry (53204)	37,024 (5)
7	Grede Foundries Inc Milwaukee Alloy Foundry (53204)	36,613 (4)
8	Tower Automotive Products Co Inc. (53216)*	23,259 (3)
9	Hercules Inc (53209)*	22,696 (3)
10	C&D Technologies Power Division-Keefe (53212)	17,215 (2)

30th Street Corridor - Risk-related Score

30th STREE CORRIDOR	234,490
Facility (Zip code)	
Rexnord Industries (53208)	87,638
Stainless Foundry & Engineering (53209)	45,917
Tower Automotive Products (53216)	23,259
Hercules (53209)	22,696
Lesaffre Yeast Corp (53208)	13,642
Badger Alloys (53208)	12,965
Steeltech Mfg. Inc. (53208)	10,834
Master Lock Co (53210)	8,101
SPX Dock Prods. (53209)	4,301
Hydro-Platers. Inc. (53209)	1,195

OVERALL

State of Illinois - Risk-related Score
(% of state score)

ILLINOIS		10,588,994 (100)
Rank	County	
1	Cook*	5,323,861 (50)
2	Adams	723,863 (7)
3	Madison	689,310 (7)
4	Peoria	675,687 (6)
5	Will	492,889 (5)
6	Macon	414,759 (4)
7	Lake	384,614 (4)
8	Winnebago	338,985 (3)
9	St Clair	328,957 (3)
10	Whiteside	311,355 (3)

Cook County - Risk-related Score
(% of county score)

CHICAGO		1,787,959 (100)
Rank	Zip code	
1	60614	495,607 (28)
2	60608	240,662 (14)
3	60623	193,484 (11)
4	60644	179,084 (10)
5	60617	128,480 (7)
6	60641	68,154 (4)
7	60639	67,459 (4)
8	60609	59,103 (3)
9	60607	40,161 (2)
10	60827*	39,769 (2)

City of Chicago - Risk-related Score
(% of city score)

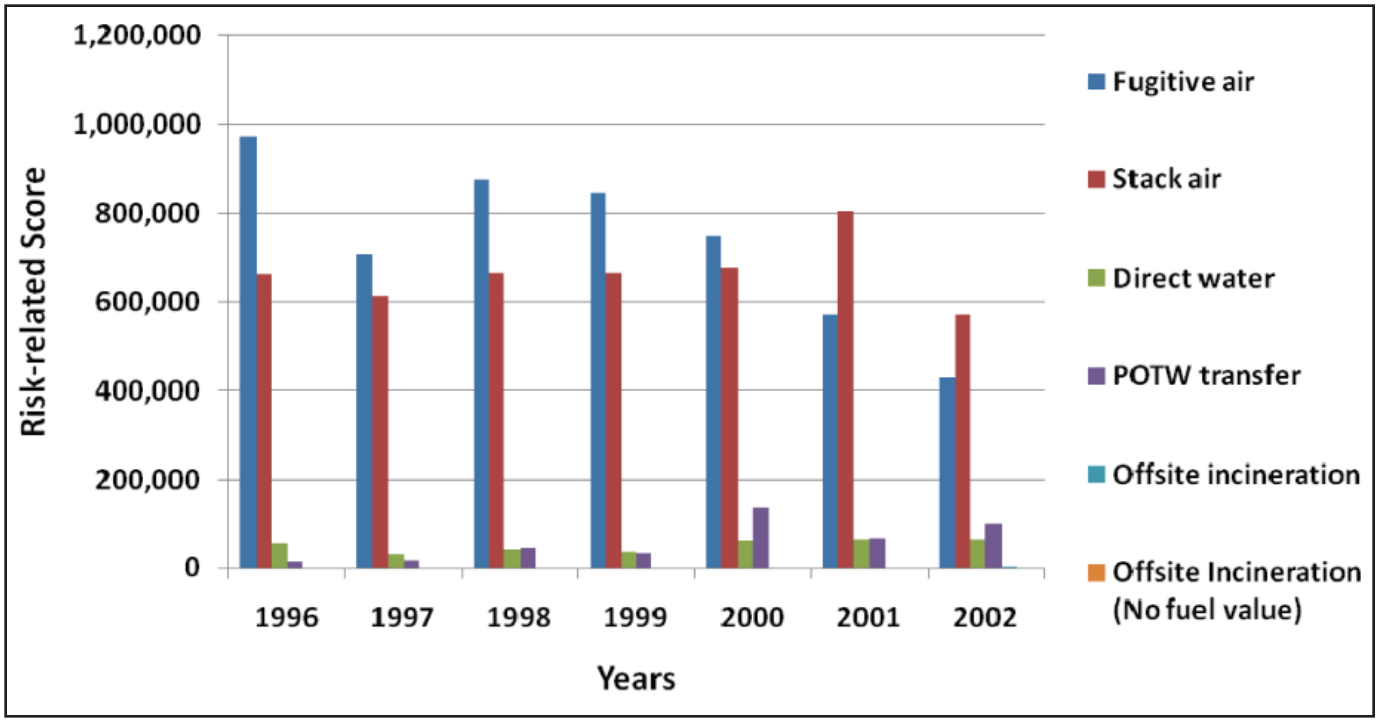
COOK COUNTY		5,323,861 (100)
Rank	Zip code	
1	60804	1,581,143 (27)
2	60160	732,190 (14)
3	60614	495,607 (9)
4	60827*	435,808 (8)
5	60501	269,373 (5)
6	60608	240,662 (5)
7	60623	193,484 (4)
8	60644	179,084 (3)
9	60617	128,480 (2)
10	60107	81,273 (2)

Altgeld Gardens - Risk-related Score

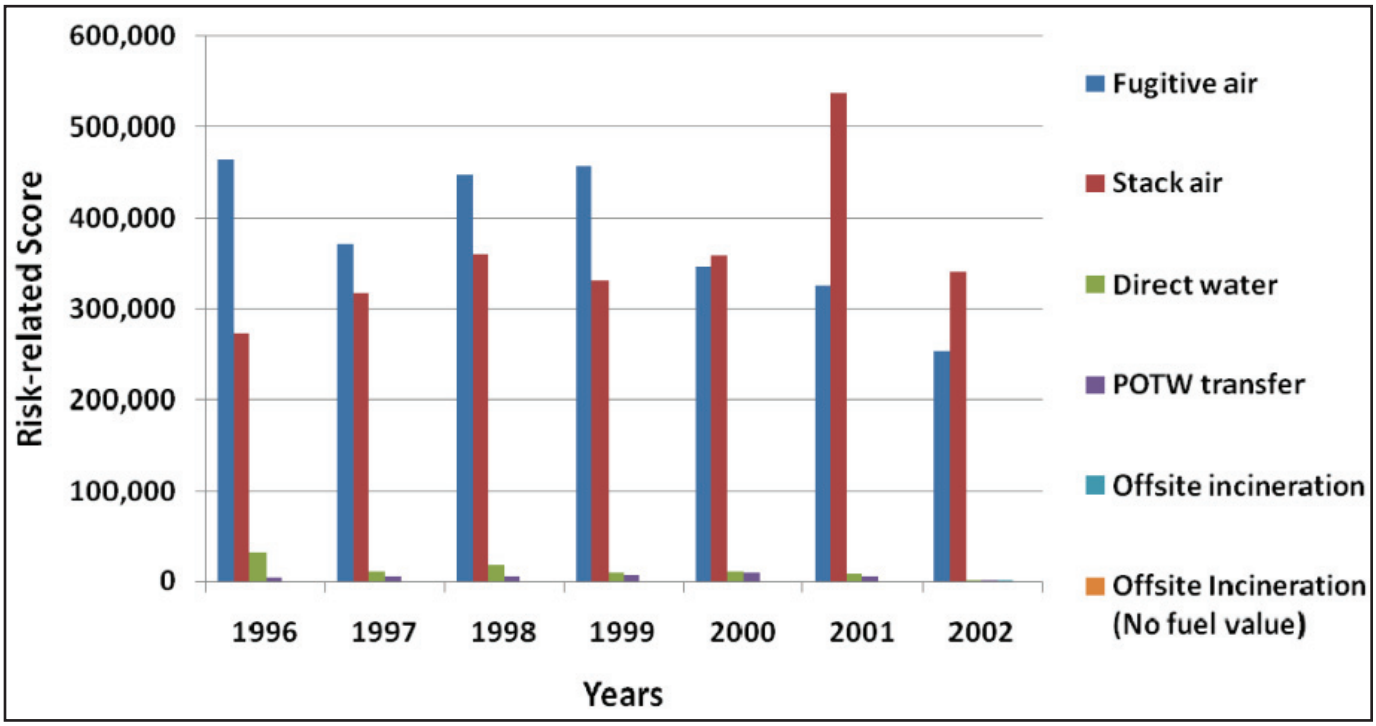
COOK COUNTY	5,323,861
60827	435,808

MEDIA

State of Illinois

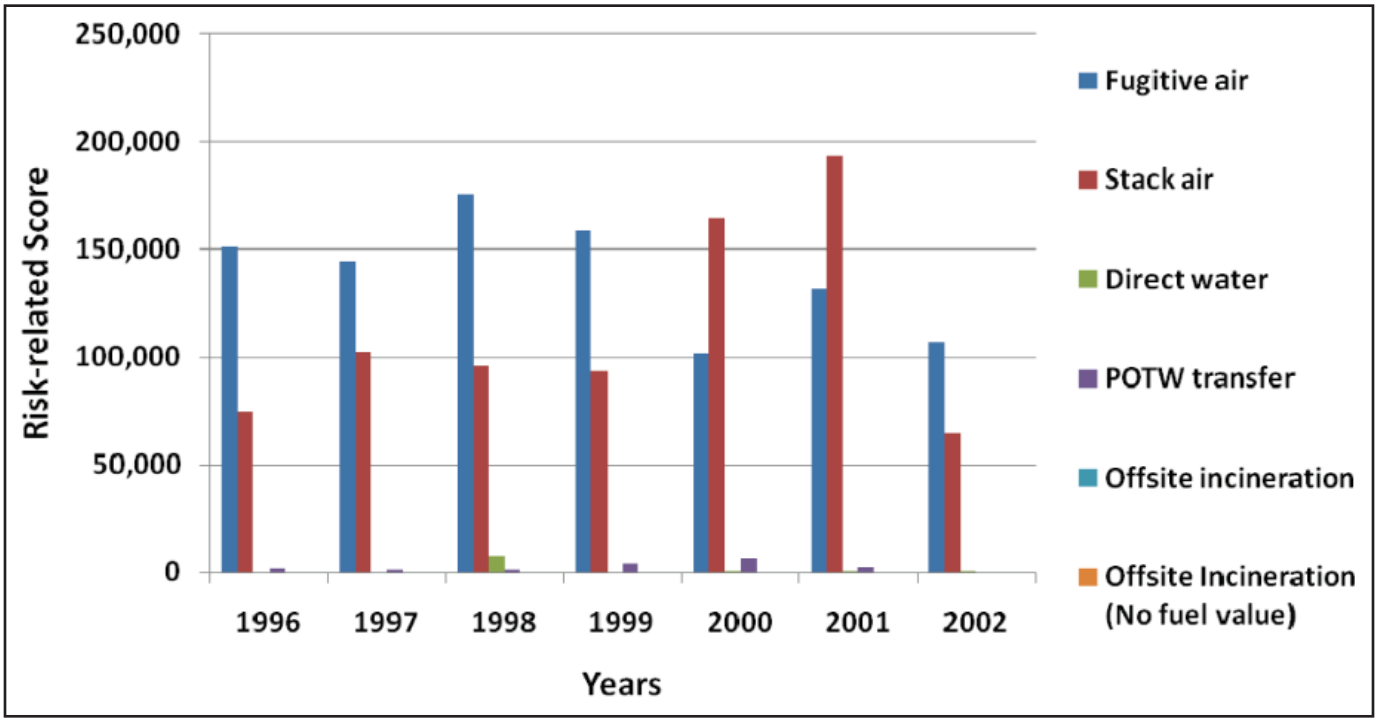


Cook County

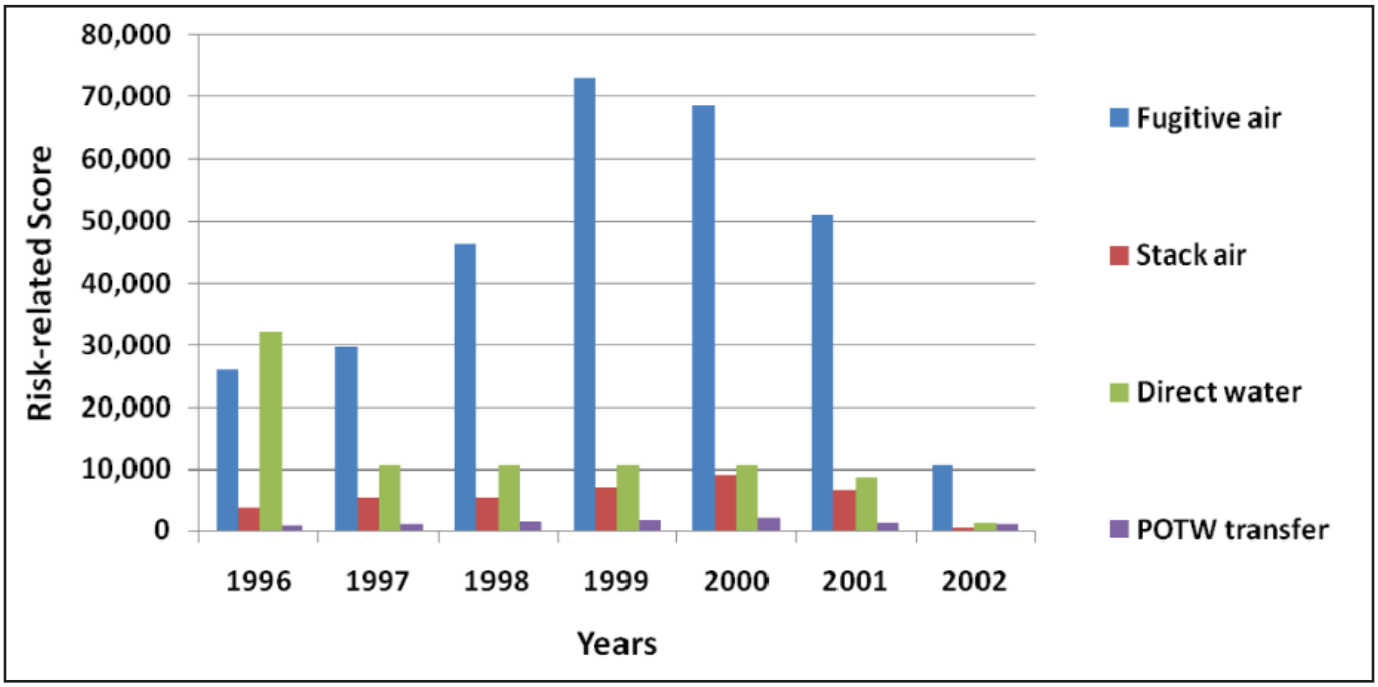


MEDIA (continued)

City of Chicago

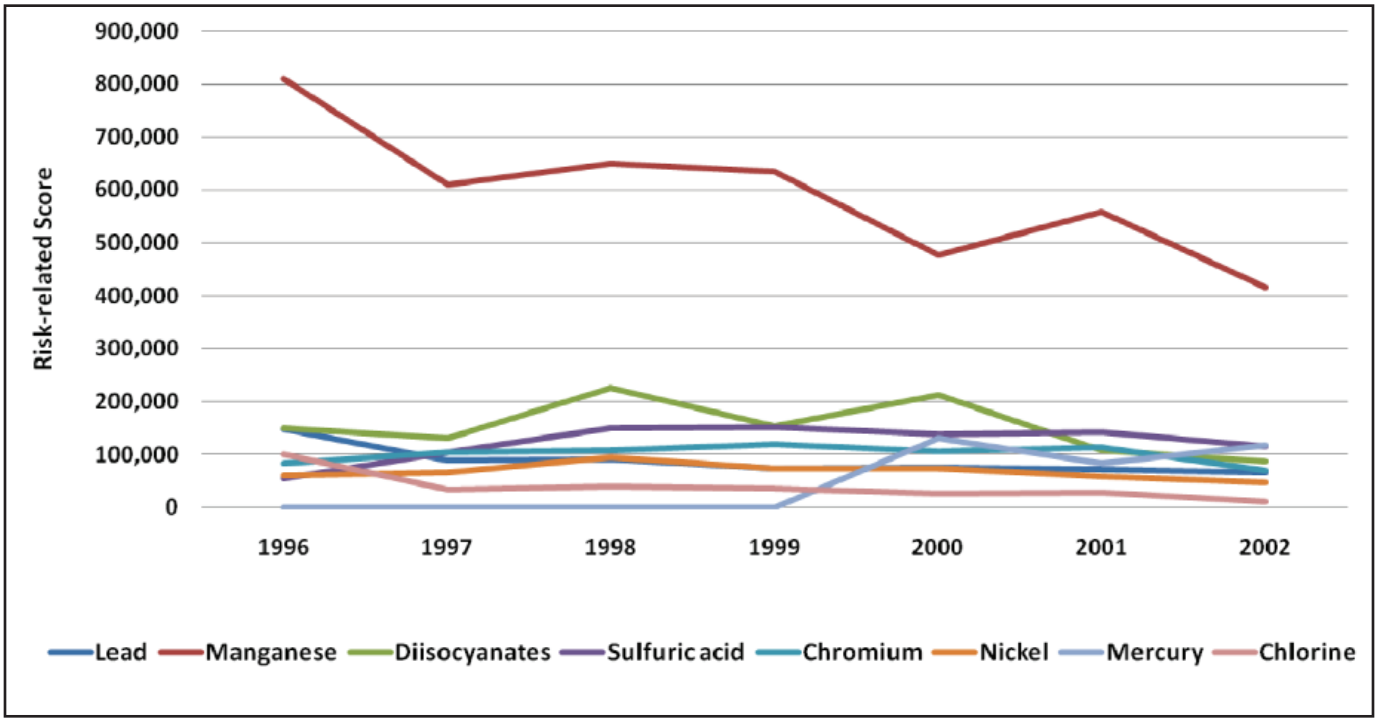


Altgeld Gardens

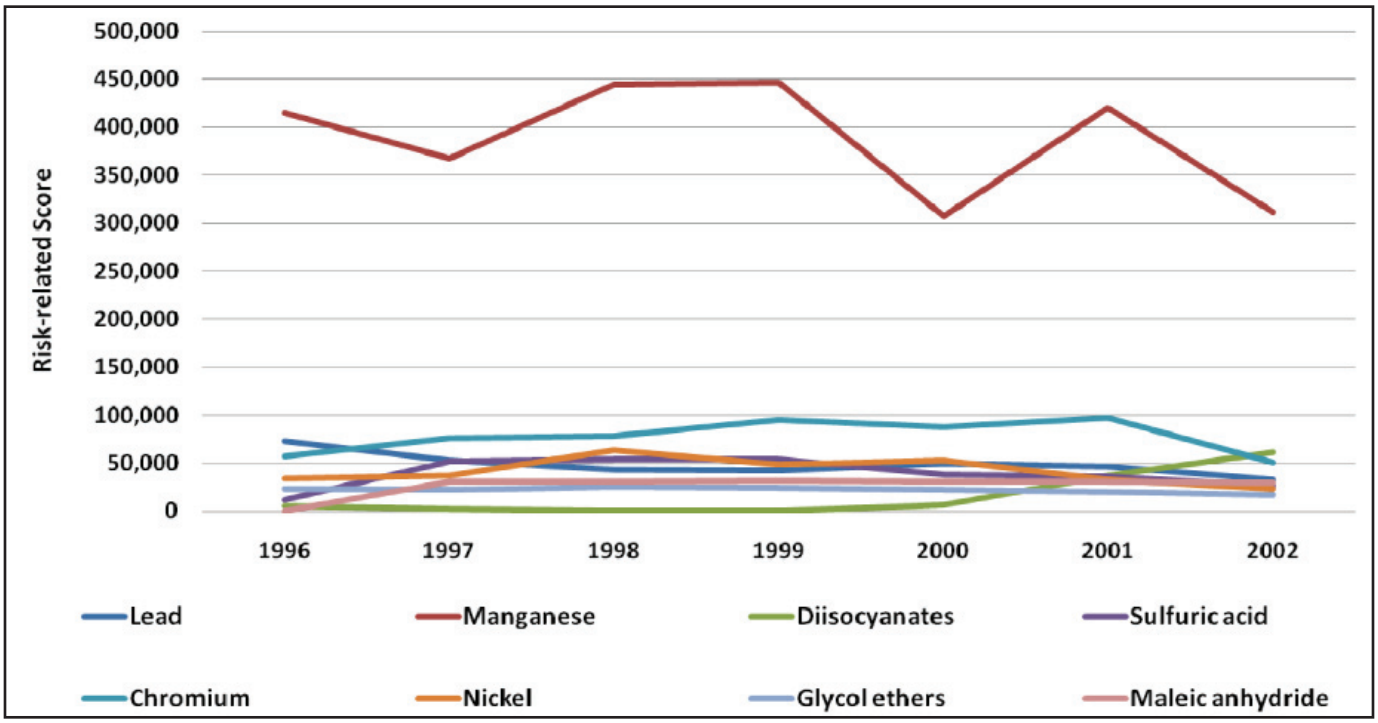


CHEMICAL

State of Illinois

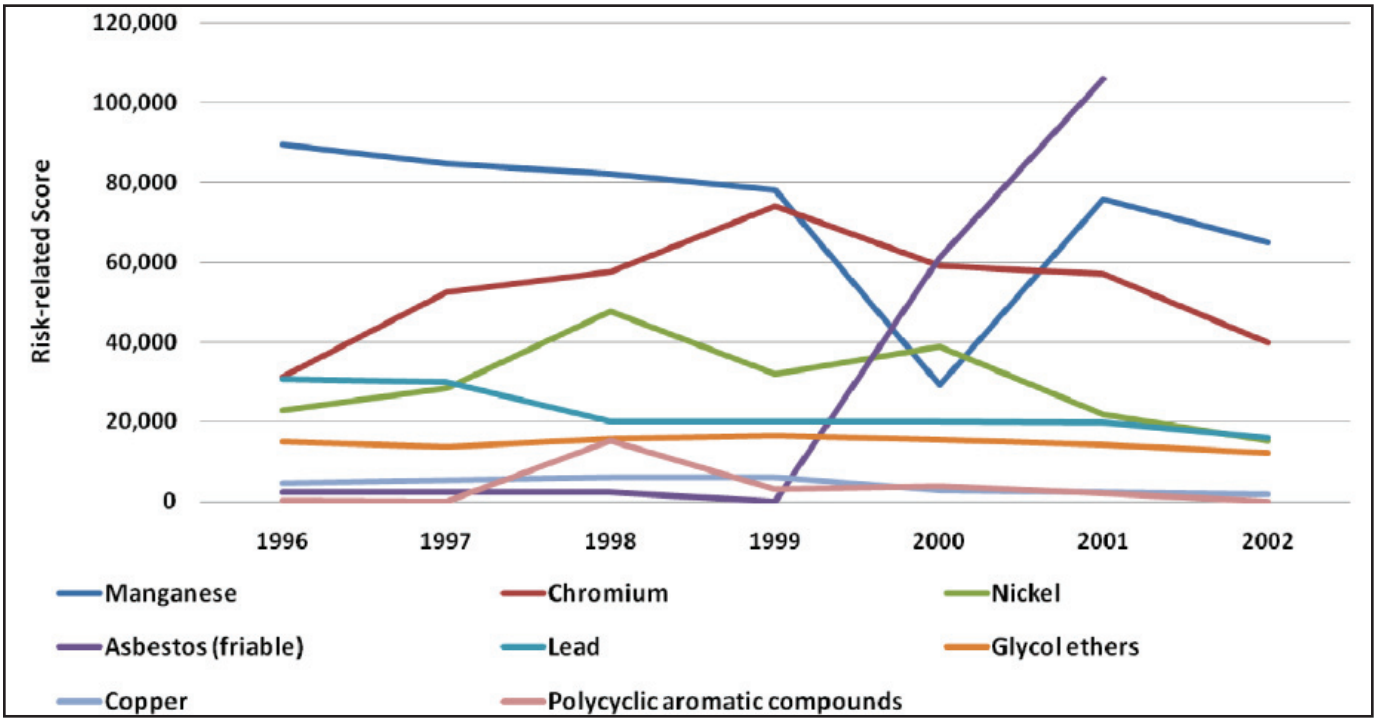


Cook County

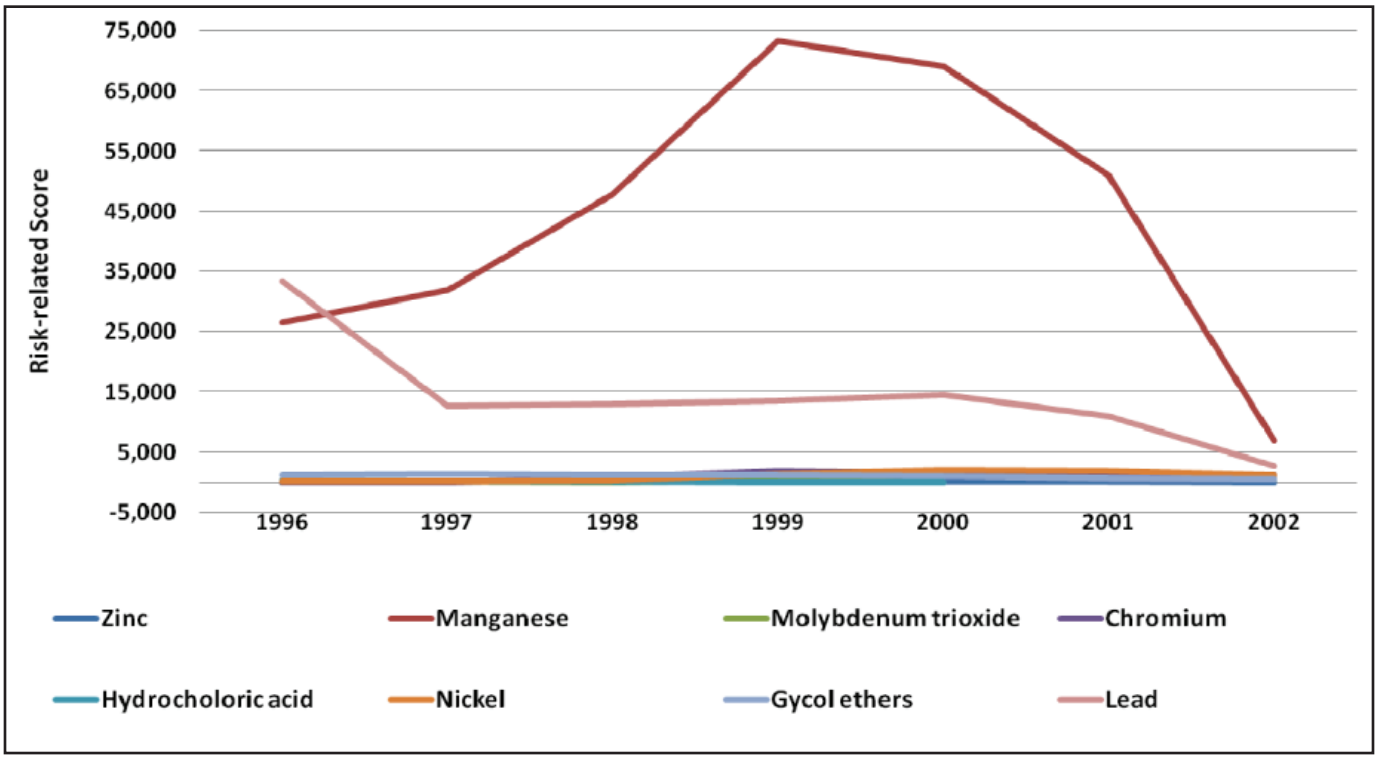


CHEMICAL (continued)

City of Chicago

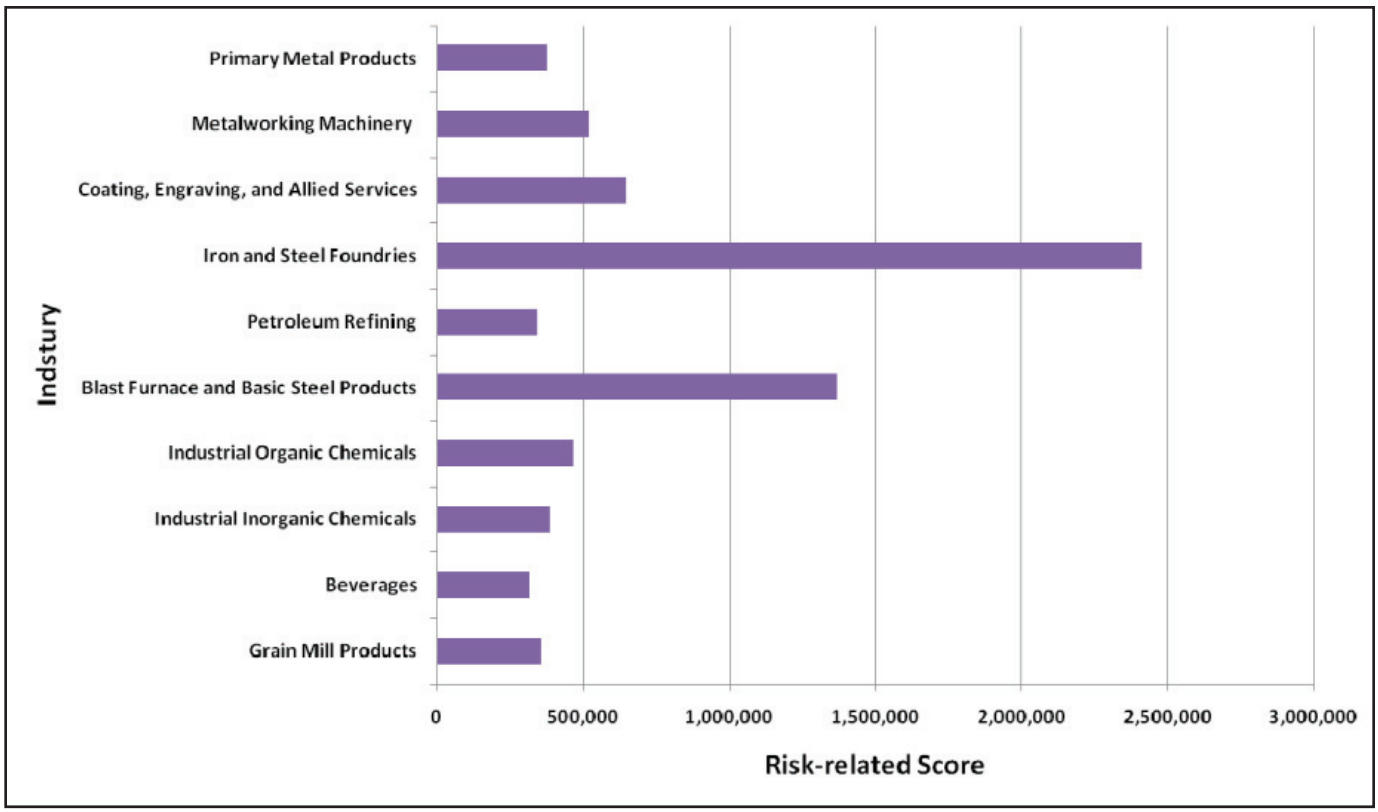


Altgeld Gardens

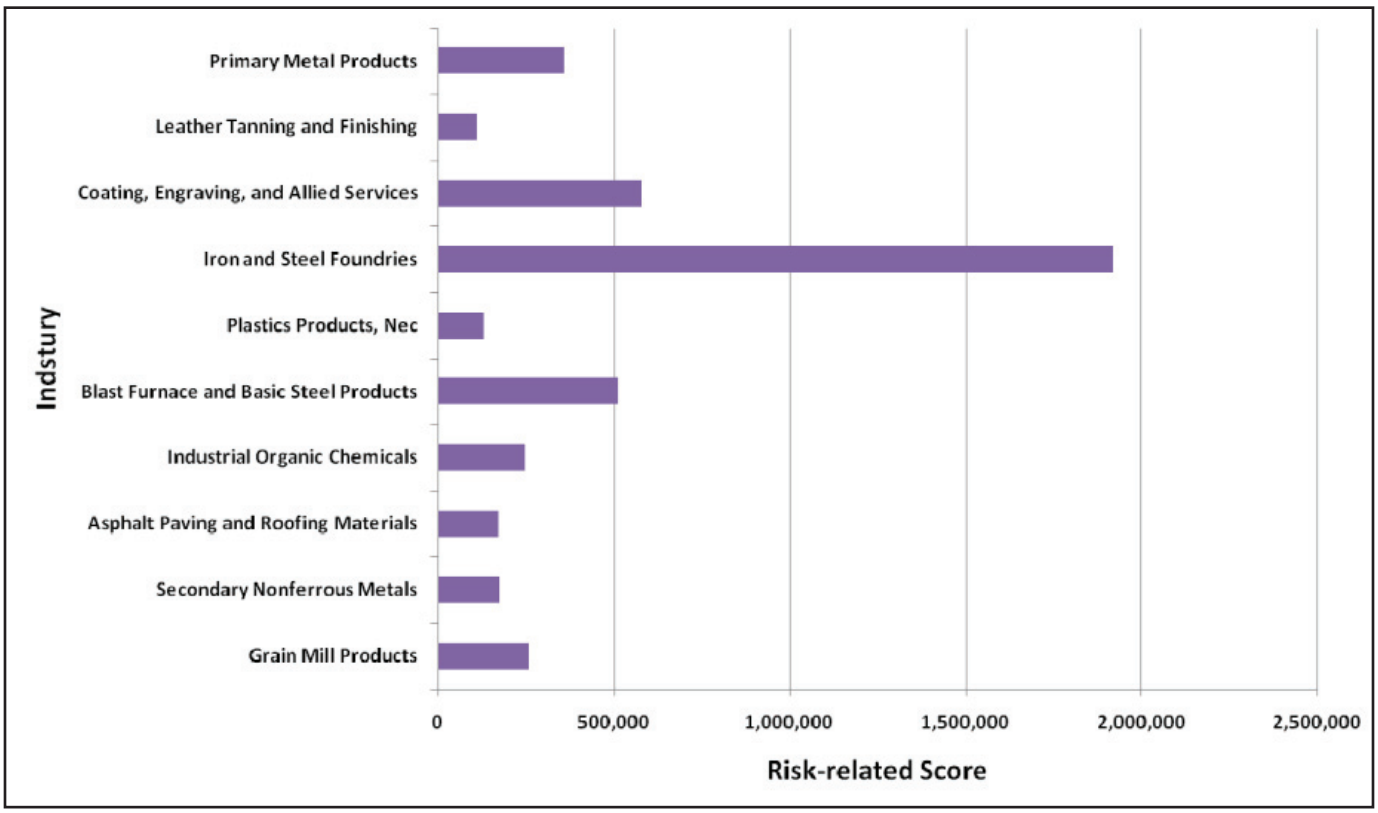


INDUSTRY

State of Illinois

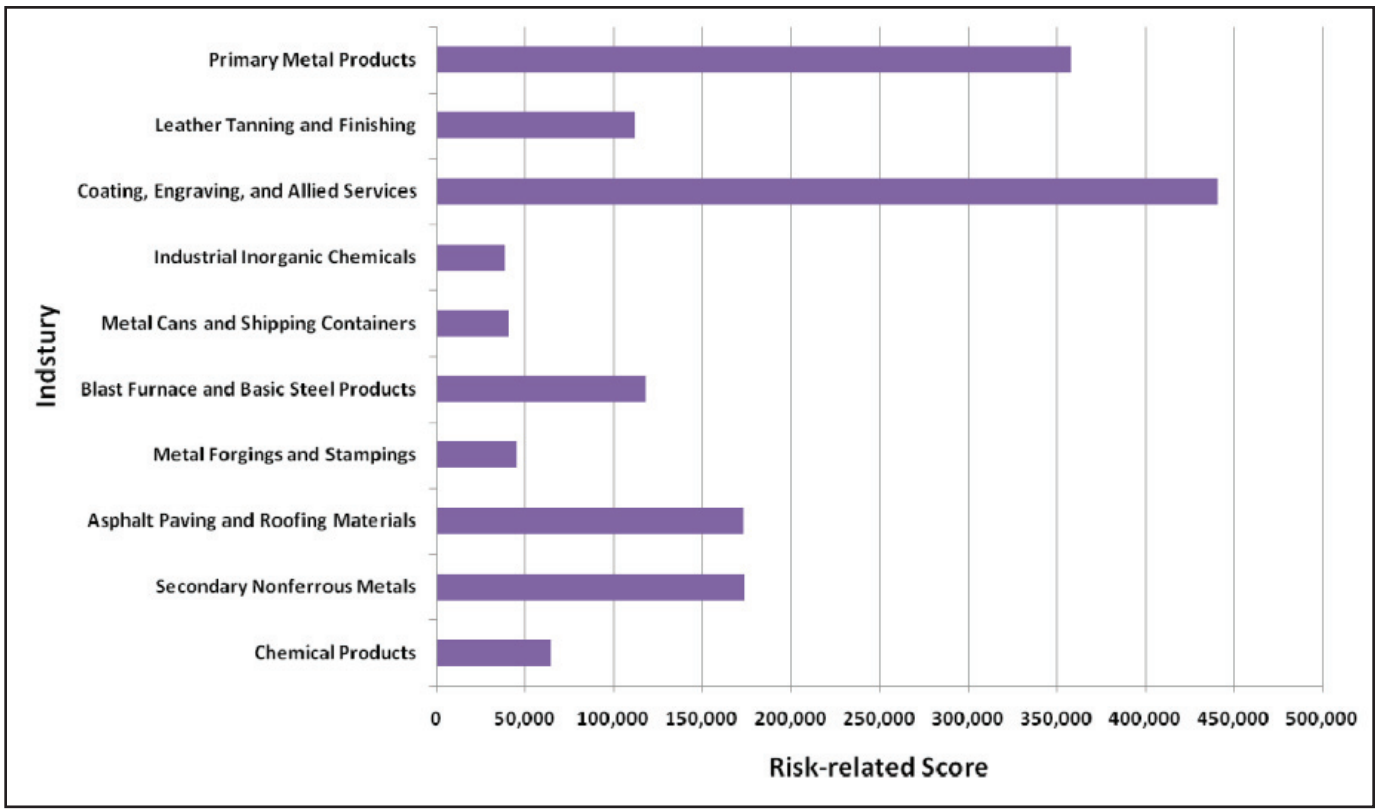


Cook County

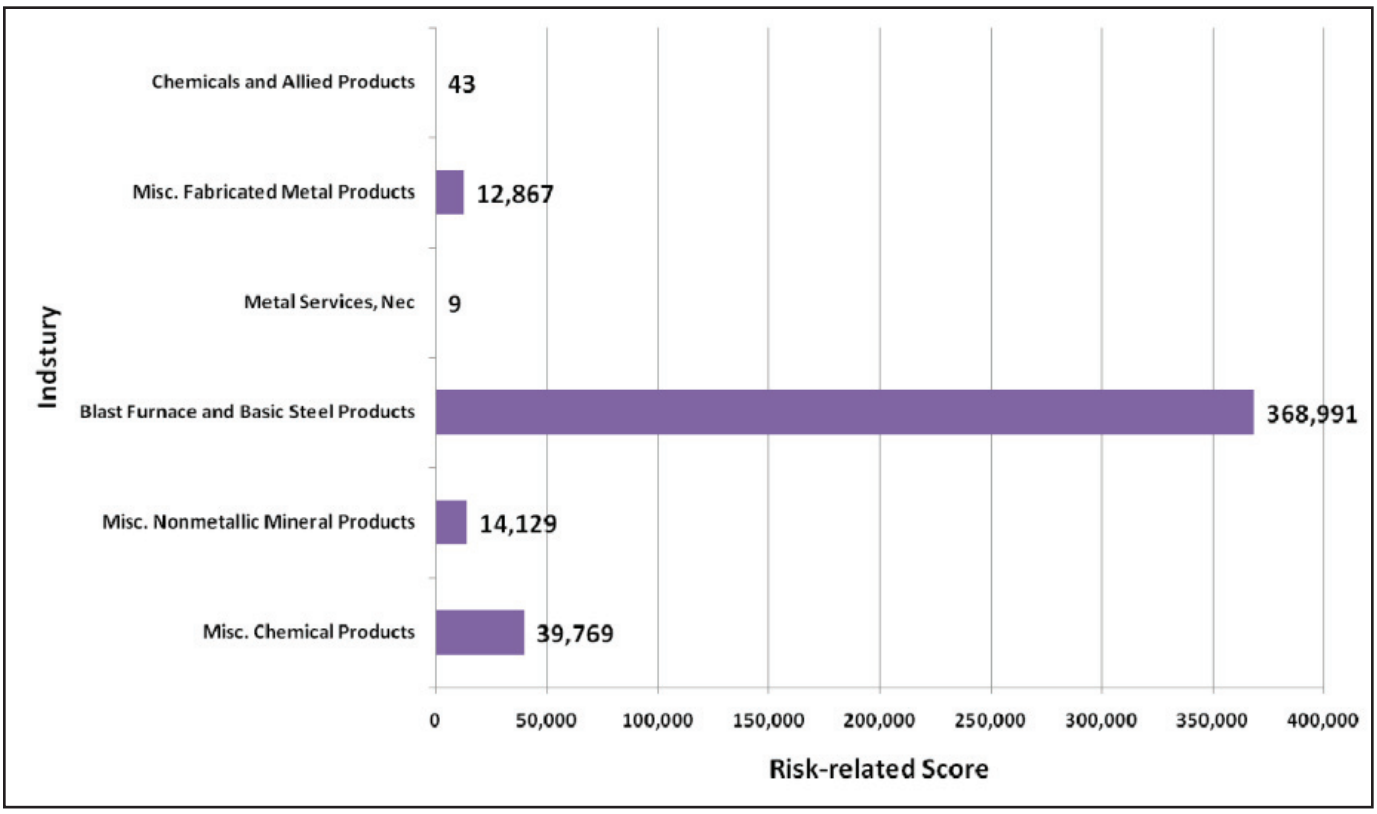


INDUSTRY (continued)

City of Chicago



Altgeld Gardens



FACILITY

State of Illinois - Risk-related Score
(% of state score)

ILLINOIS		10,588,994 (100)
Rank	**Facility (County)**	
1	Chicago Castings Co (Cook)*	1,190,358 (11.2)
2	National Castings Inc. (Cook)*	724,996 (6.8)
3	Midwest Patterns Inc. (Adams)	514,969 (4.9)
4	ADM (Peoria)	397,241 (3.8)
5	Mittal Steel USA - Riverdale Inc. (Cook)*	368,991 (3.5)
6	A. Finkl & Sons Co. (Cook)*	358,052 (3.4)
7	Northwestern Steel & Wire Co (Whiteside)	306,365 (2.9)
8	Corn Products Argo Plant (Cook)*	261,037 (2.5)
9	Keystone Steel & Wire Co (Peoria)	259,322 (2.4)
10	Koppers Inc (Cook)*	239,757 (2.3)

City of Chicago - Risk-related Score
(% of city score)

CHICAGO		1,787,959 (100)
Rank	**Facility (Zip code)**	
1	A. Finkl & Sons Co. (60614)	358,052 (20)
2	GAC Kansas-Chicago-Springville Inc (60644)	166,676 (9)
3	H. Kramer & Co. (60608)	149,884 (8)
4	Empire Hard Chrome Inc. (60623)	125,744 (7)
5	Horween Leather Co (60614)	103,799 (6)
6	Acme Steel Co. Furnace Plant (60617)	72,472 (4)
7	Amber Plating Works Inc (60641)	67,866 (4)
8	Empire Hard Chrome Inc. (60608)	67,283 (4)
9	Silgan Closures Llc #35 (60639)	41,403 (2)
10	Hickman Williams & Co (60827)*	39,769 (2)

Cook County - Risk-related Score
(% of county score)

COOK COUNTY		5,323,861 (100)
Rank	**Facility (Zip code)**	
1	Chicago Castings Co (60804)	1,190,358 (22)
2	National Castings Inc. (60160)	724,996 (14)
3	Mittal Steel USA - Riverdale Inc. (60827)*	368,991 (7)
4	A. Finkl & Sons Co.	358,052 (7)
5	Corn Products Argo Plant (60501)	261,037 (5)
6	Koppers Inc (60804)	239,757 (5)
7	GAC Kansas – Chicago – Springville Inc (60644)	166,676 (3)
8	H. Kramer & Co. (60608)	149,884 (3)
9	Empire Hard Chrome Inc (60623)	193,027 (2)
10	Horween Leather Co (60614)	103,799 (2)

Altgeld Gardens - Risk-related Score

ALTGELD GARDENS	435,808
Facility	
Mittal Steel USA - Riverdale Inc.	368,991
Hickman Williams & Co	39,769
Harsco Co Multiserv Plant 27	14,129
ACME Packaging Riverdale Facility	12,867
Airgas Specialty Products Riverdale Il	43
Riverdale Plating & Heat Tre Ating Inc.	9
Riverdale Industries Llc Riverdale Facility	0

OVERALL

State of Texas - Risk-related Score
(% of state score)

TEXAS		15,436,918 (100)
Rank		**County**
1	Harris	5,916,593 (38)
2	Jefferson*	4,691,666 (30)
3	Dallas	953,873 (6)
4	El Paso	846,922 (6)
5	Brazoria	410,309 (3)
6	Galveston	393,145 (3)
7	Nueces	350,429 (2)
8	Ellis	318,533 (2)
9	Tarrant	168,522 (1)
10	Gregg	110,214 (1)

City of Port Arthur - Risk-related Score
(% of city score)

PORT ARTHUR		4,206,648 (100)
Rank		**Zip code**
1	77643*	4,125,182 (98)
2	77641*	45,995 (1)
3	77640*	25,672 (1)
4	77642	9,799 (0.2)

Jefferson County - Risk-related Score
(% of county score)

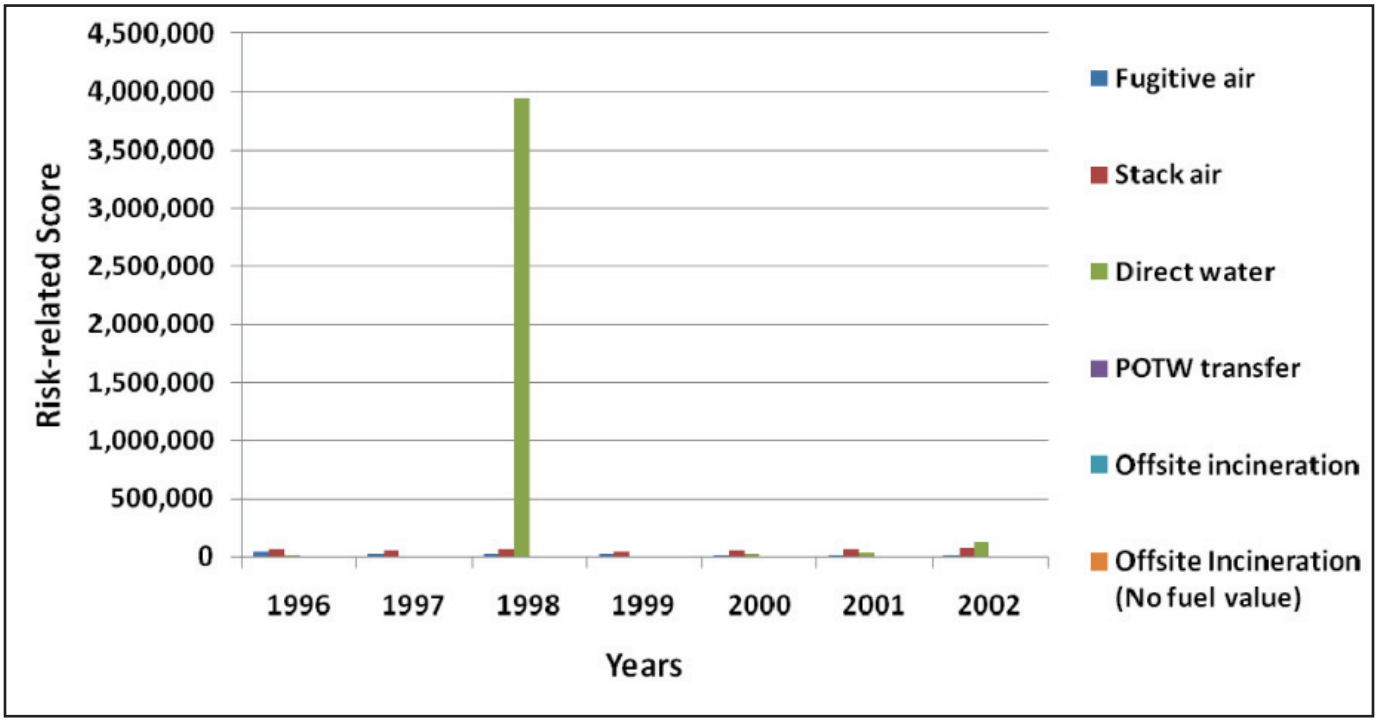
JEFFERSON COUNTY		4,691,666 (100)
Rank		**Zip code**
1	77643*	4,125,182 (88)
2	77651	392,456 (8)
3	77701	48,956 (1)
4	77641*	45,995 (1)
5	77705	40,397 (1)
6	77640*	25,672 (1)
7	77642	9,799 (0.2)
8	77627	2,656 (0.1)
9	77713	471 (0.01)
10	77619	67 (0.001)

Westside - Risk-related Score

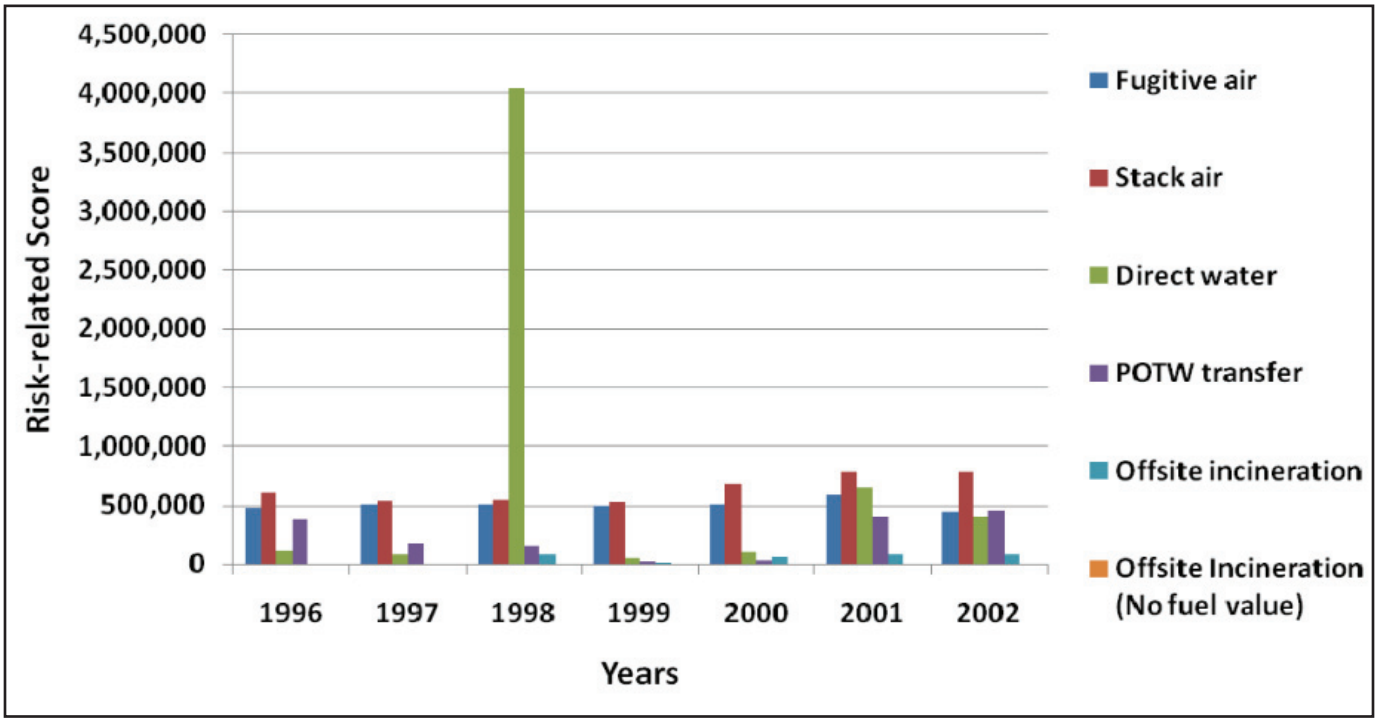
JEFFERSON COUNTY	4,691,666
Zip Code	
77640	25,672

MEDIA

State of Texas

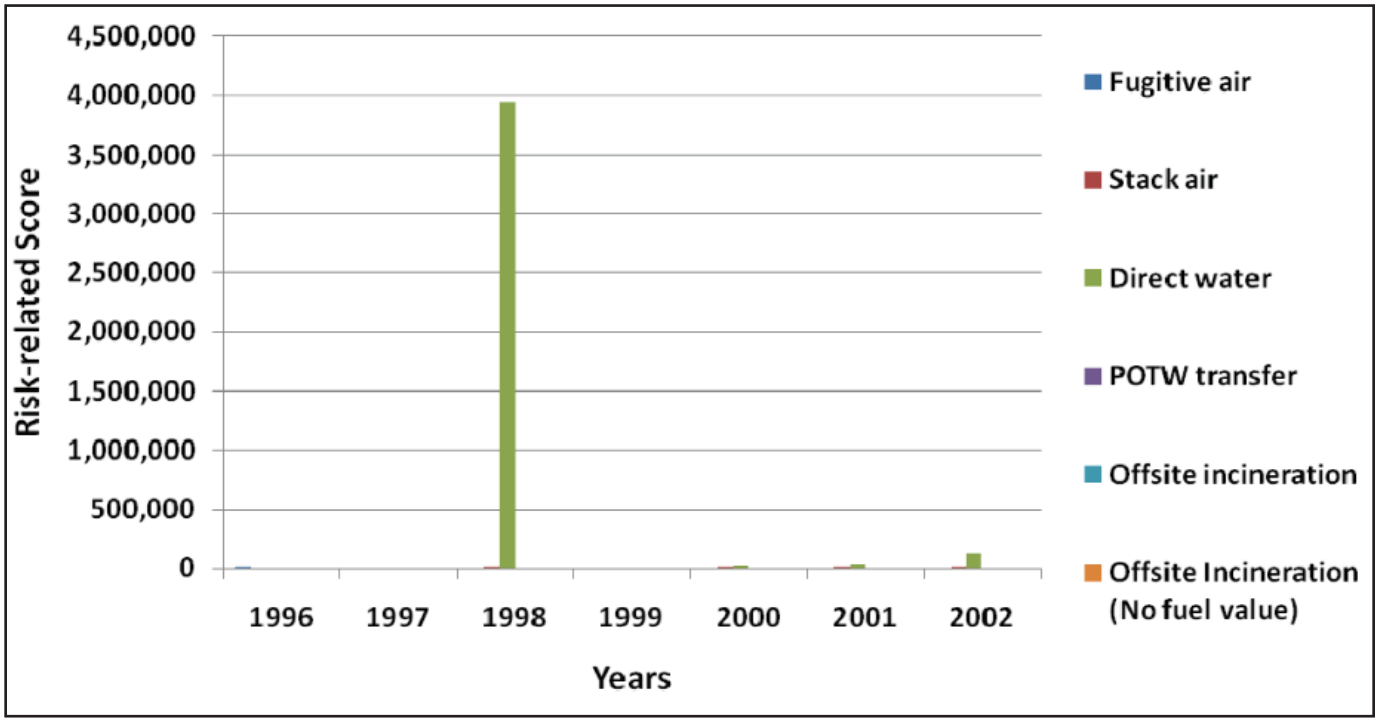


Jefferson County

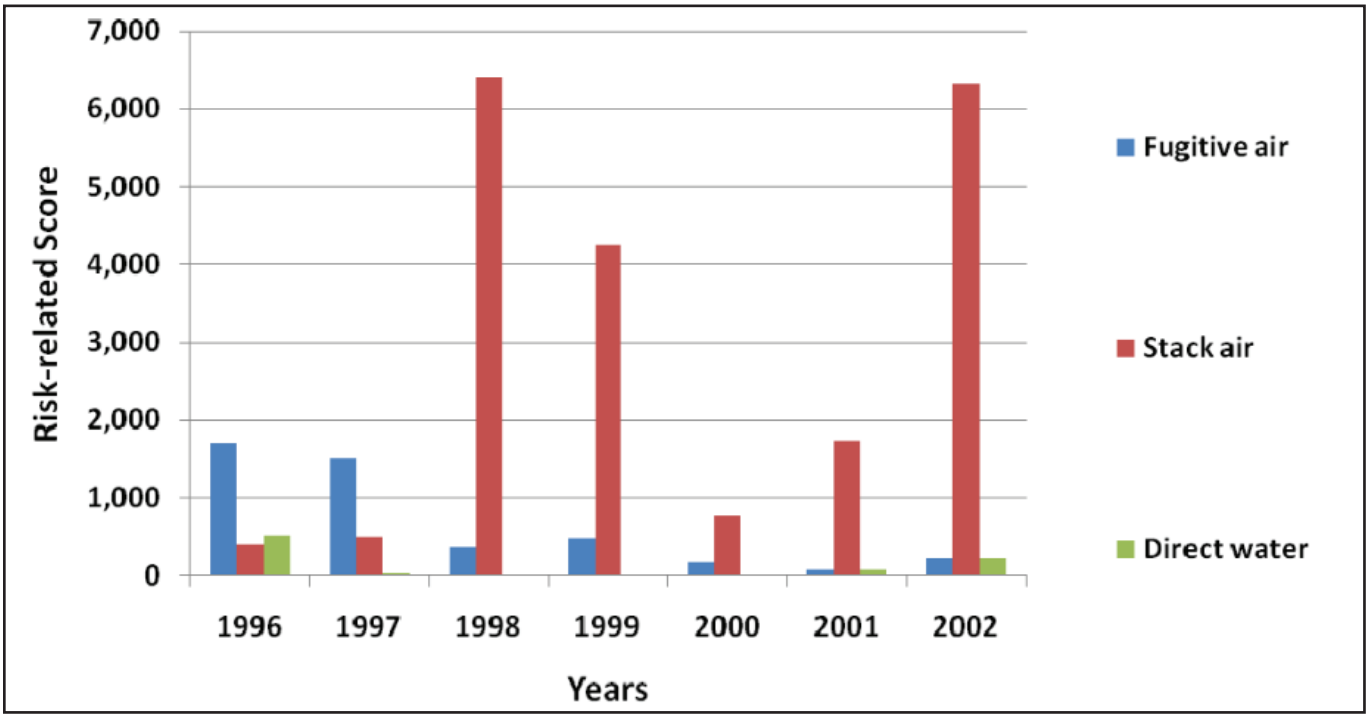


MEDIA (continued)

City of Port Arthur

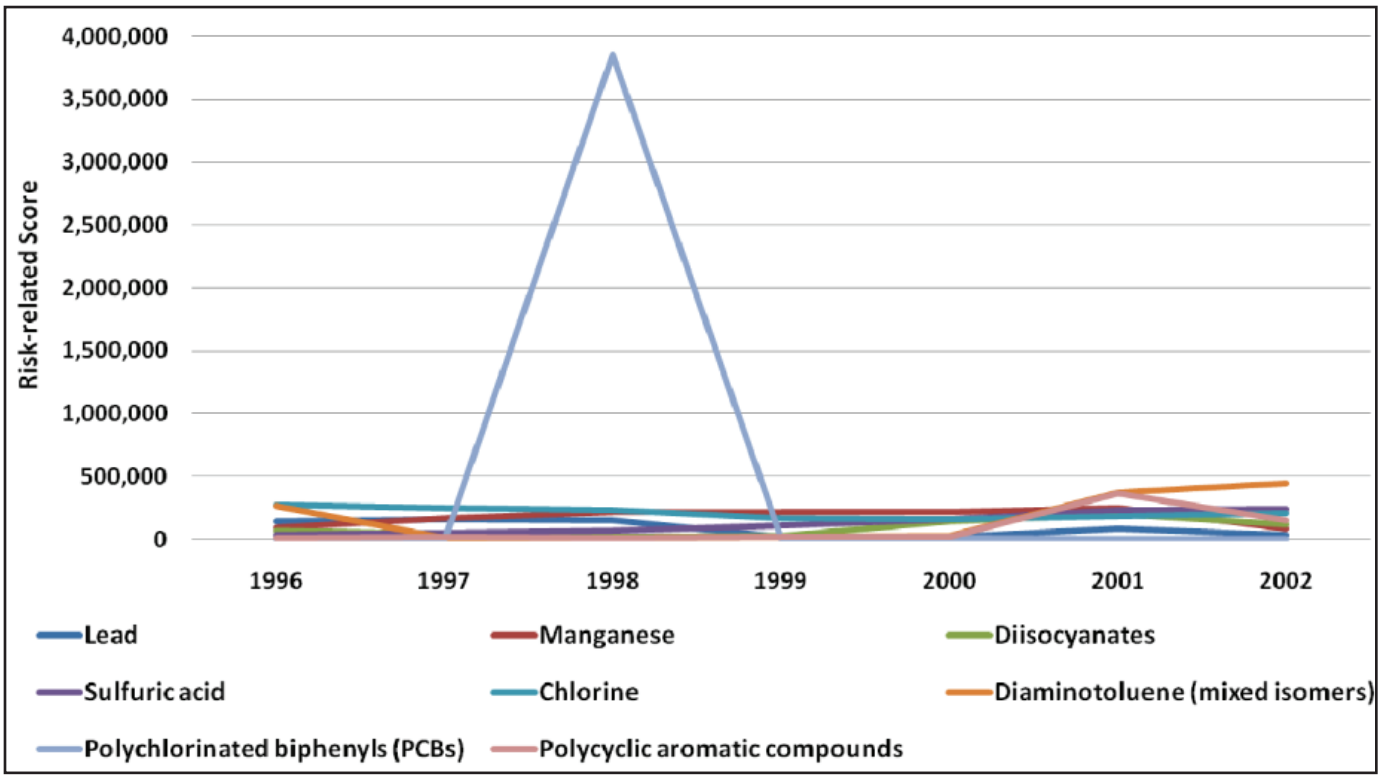


Westside

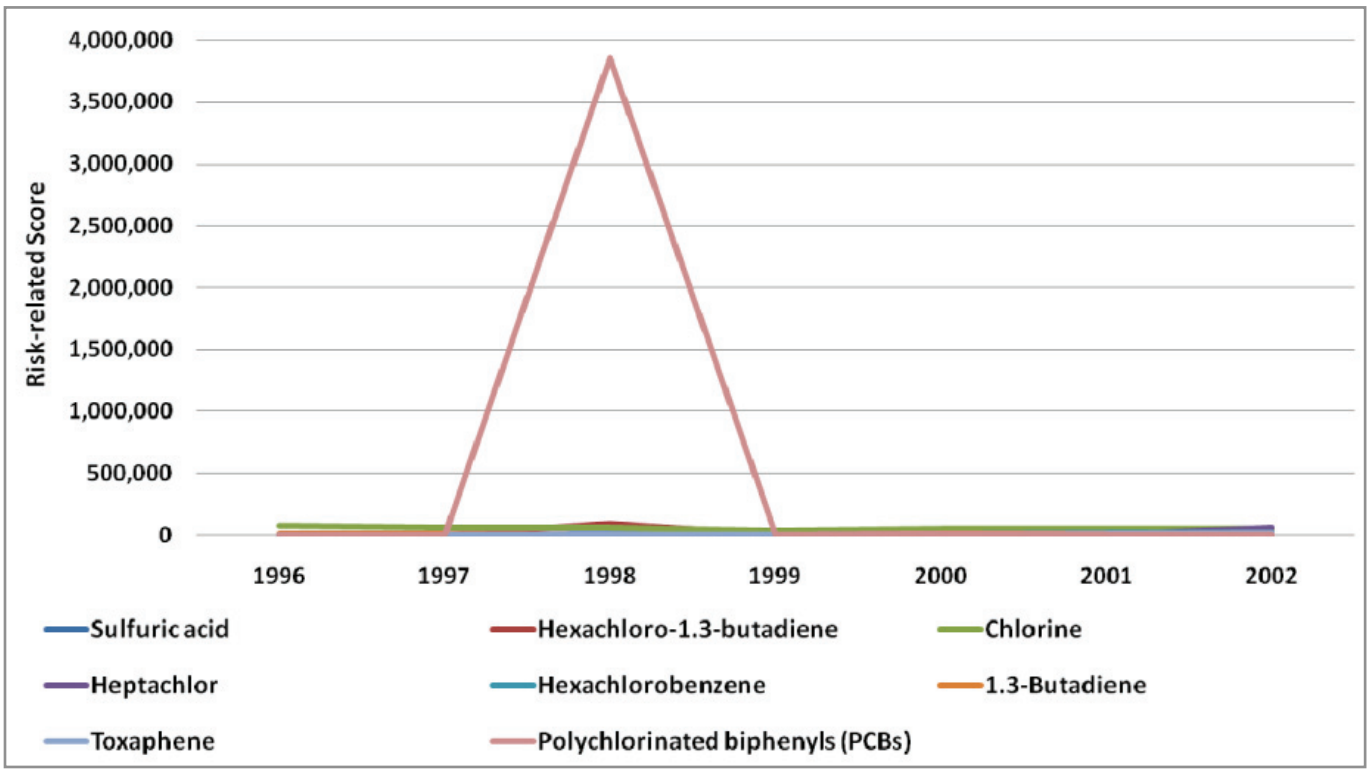


CHEMICAL

State of Texas

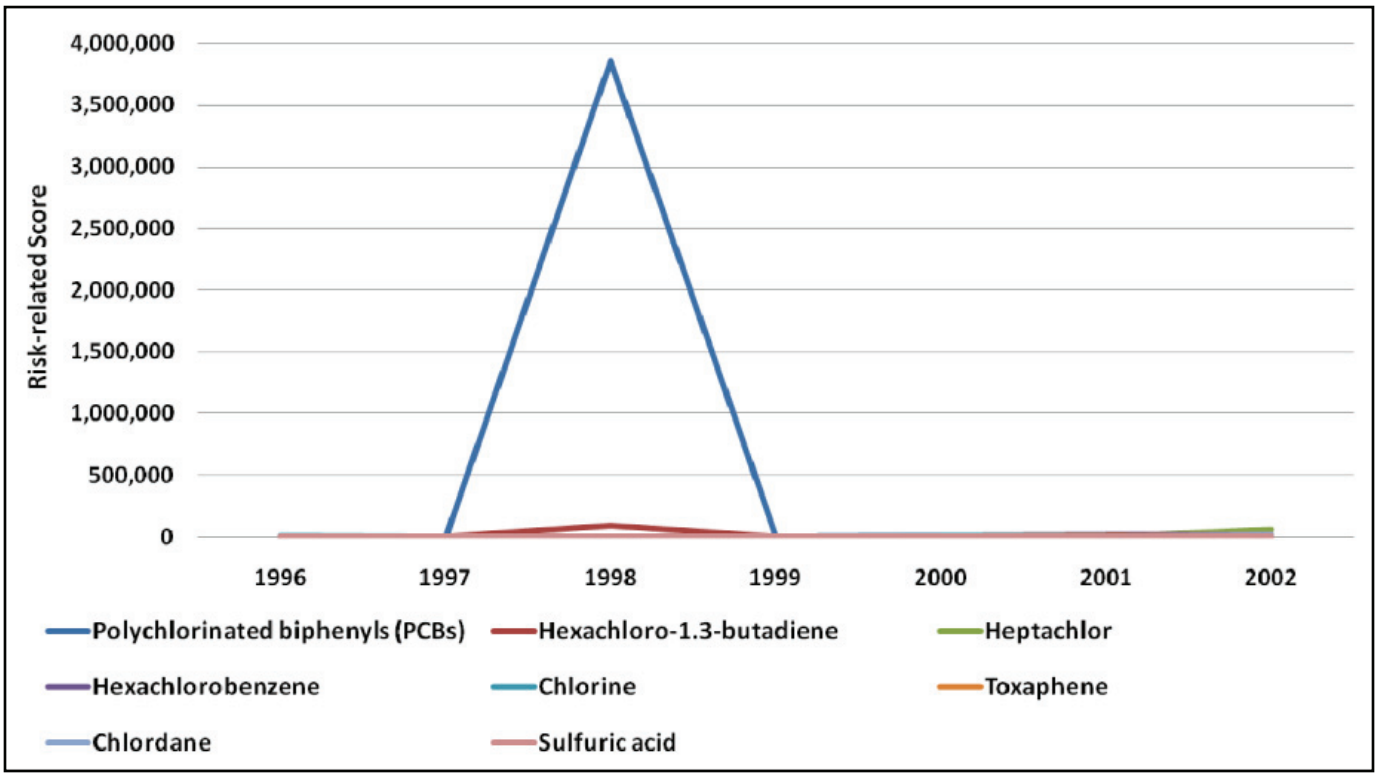


Jefferson County

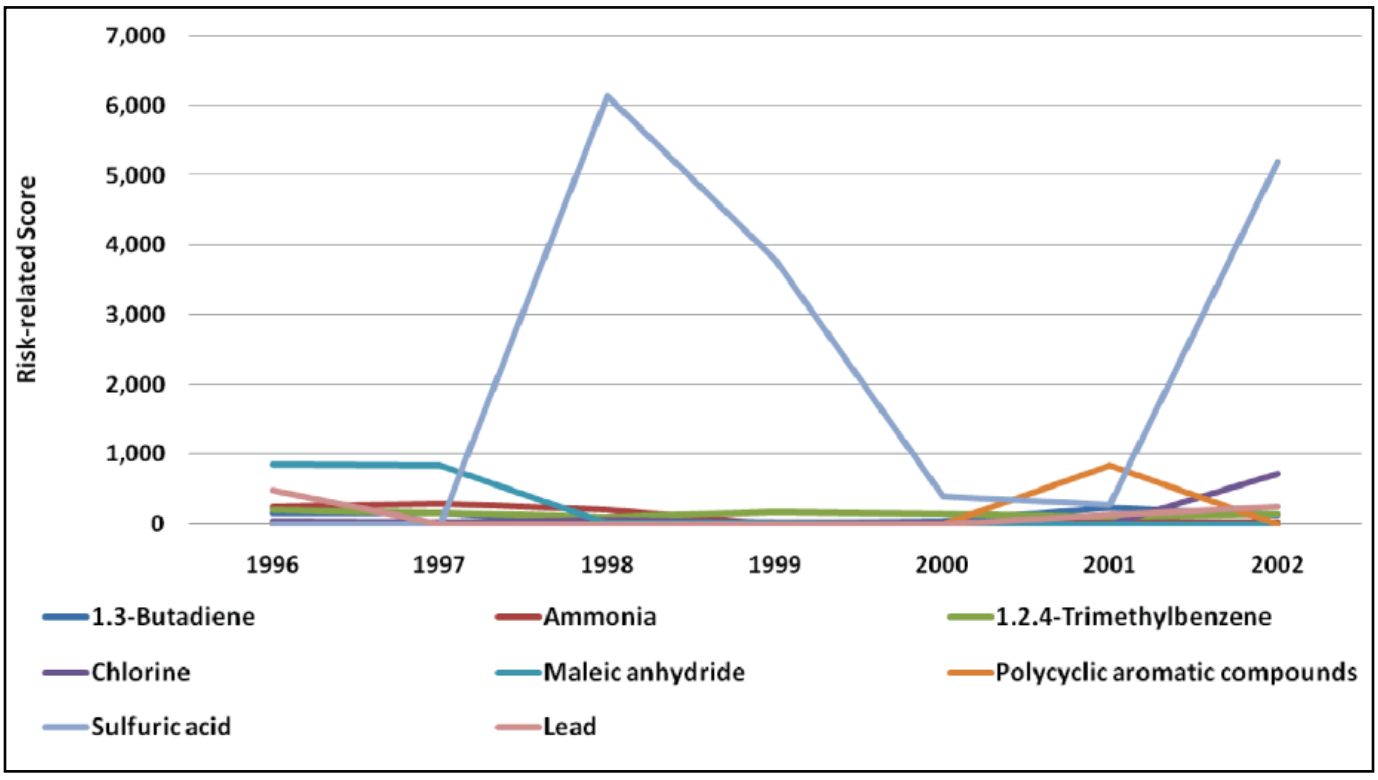


CHEMICAL (continued)

City of Port Arthur

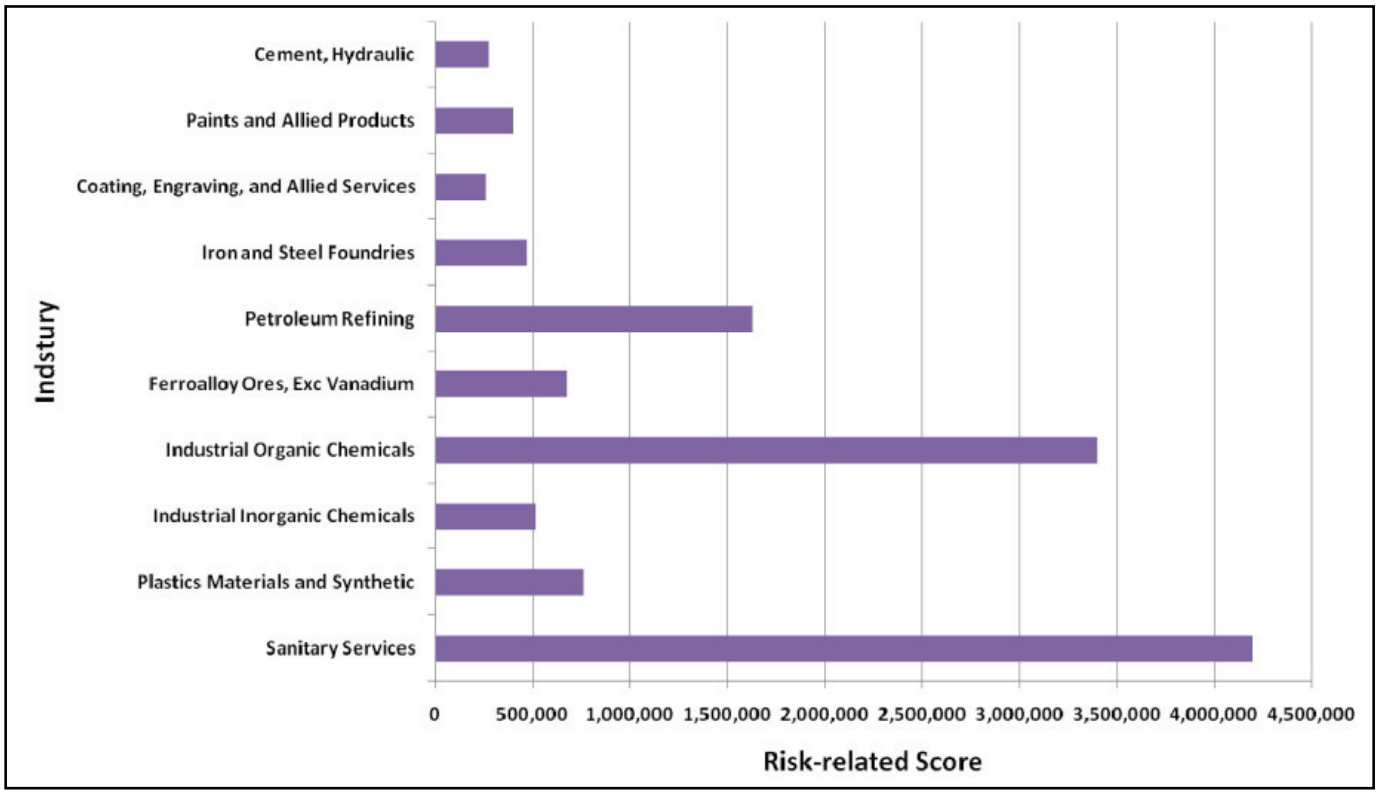


Westside

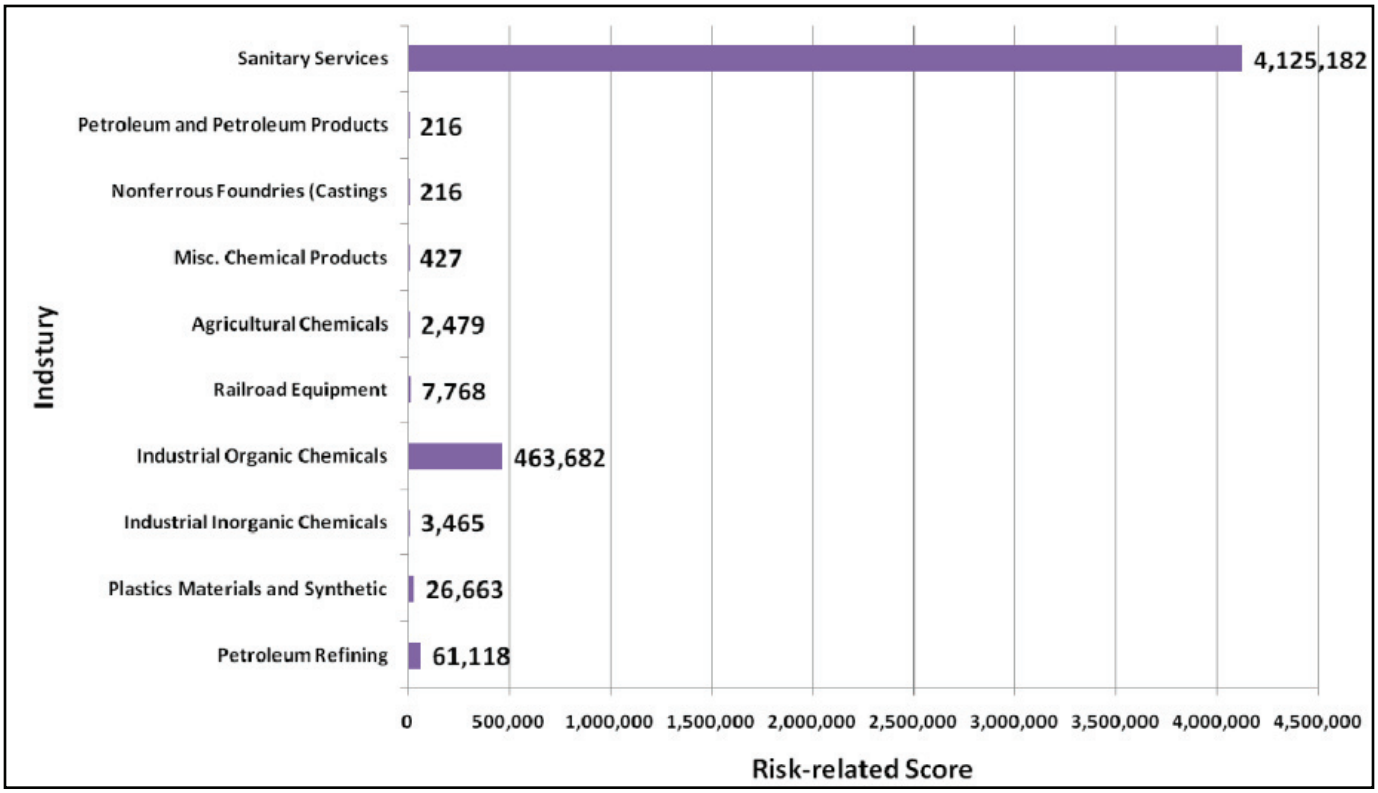


INDUSTRY

State of Texas

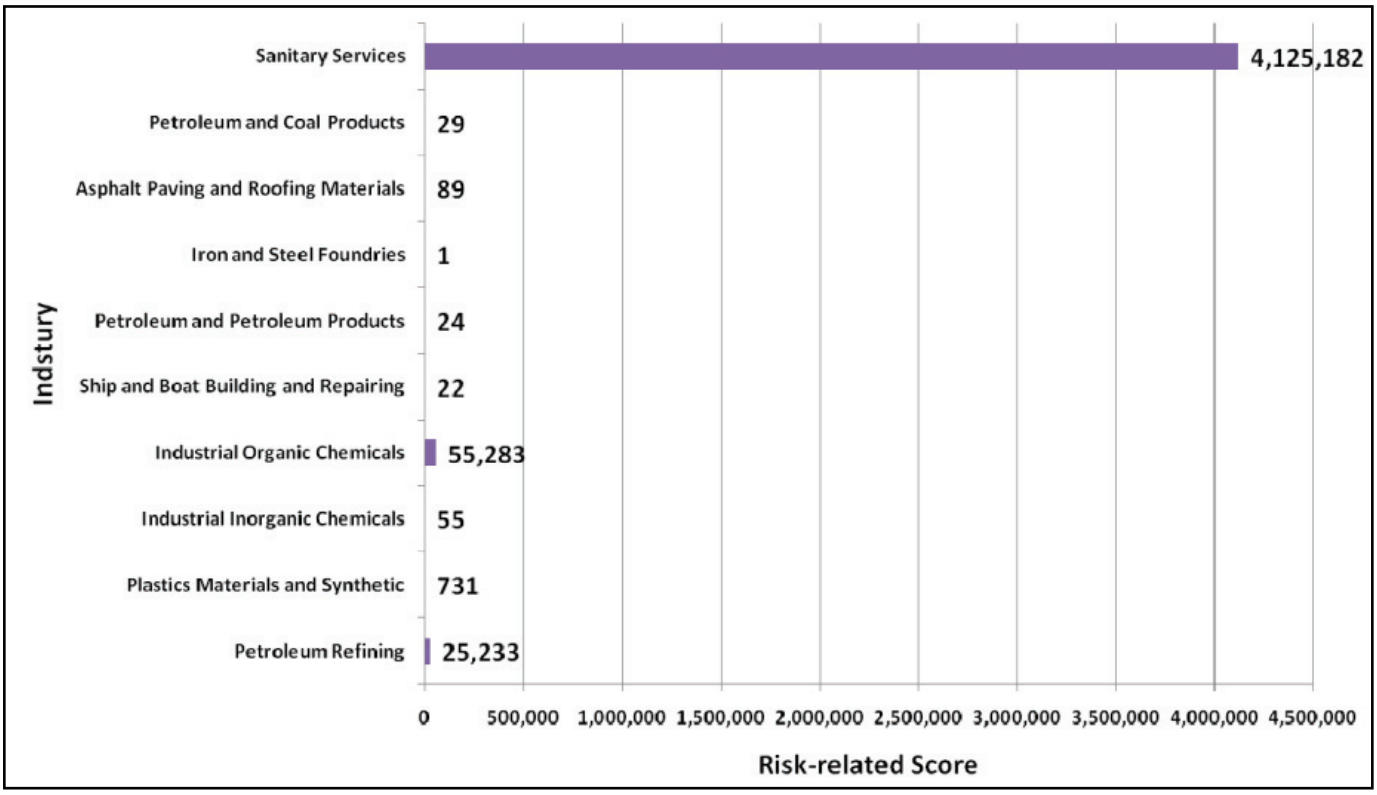


Jefferson County

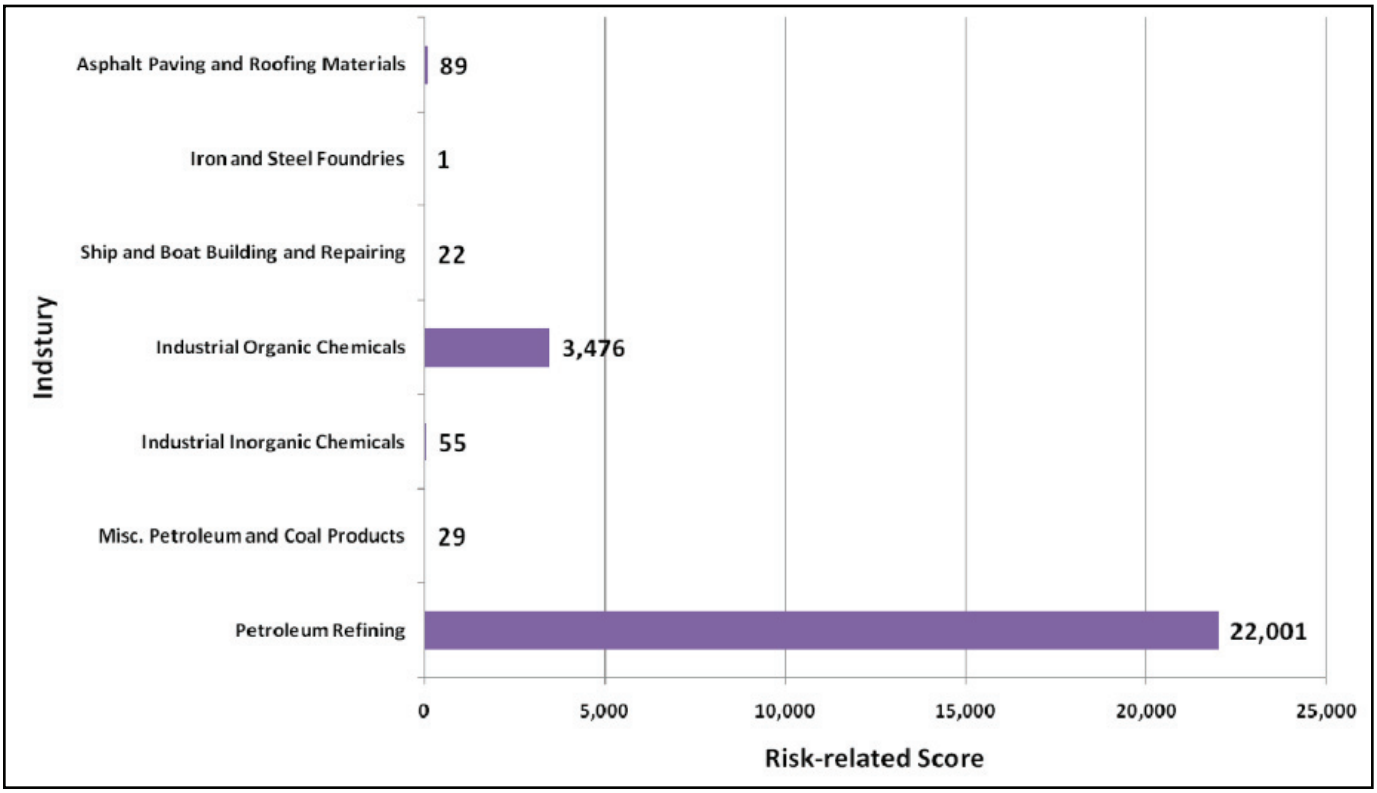


INDUSTRY (continued)

City of Port Arthur



Westside



FACILITY

State of Texas - Risk-related Score (% of state score)

TEXAS		15,436,918 (100)
Rank	**Facility (County)**	
1	Veolia Technical Solutions Port Arthur (Jefferson)*	4,125,182 (27)
2	Air Products L. P. (Harris)	1,173,529 (8)
3	American Minerals Inc (El Paso)	677,802 (4)
4	Shell Oil Co Deer Park Refining (Harris)	455,080 (3)
5	Engineered Polymer Solutions Inc. (Dallas)	386,575 (3)
6	Quality Electric Steel Castings (Harris)	311,144 (2)
7	Huntsman Corp O&O Facility (Jefferson)*	309,421 (2)
8	Flint Hills Resources LP - West Plant (Nueces)	303,708 (2)
9	Dow Chemical Co Freeport Facility (Brazoria)	297,298 (2)
10	GB Biosciences Corp (Harris)	230,837 (2)

City of Port Arthur - Risk-related Score (% of city score)

PORT ARTHUR		4,206,648 (100))
Rank	**Facility (Zip code)**	
1	Veolia Technical Solutions Port Arthur (77643)	4,125,182 (98)
2	Huntsman Petrochemical Corp Pabc (77641)	45,197 (1)
3	Motiva Enterprises LLC (77640)*	12,705 (0.3)
4	Premcor Refining Group Inc Port Arthur (77640)*	8,665 (0.2)
5	NAFTA Region Olefins Complex (77642)	6,567 (0.1)
6	Total Petrochemicals - Port Arthur Refinery (77642)	3,232 (0.1)
7	Afton Chemical Additives Corp (77640)*	2,079 (0.1)
8	Chevron Phillips Chemical Co (77640)*	1,397 (0.03)
9	Equistar Chemicals L.P. Port Arthur Plant (77641)	731 (0.02)
10	Motiva Enterprises Port Arthur Terminal (77640)*	630 (0.01)

Jefferson County - Risk-related Score (% of county score)

JEFFERSON COUNTY		4,691,666 (100)
Rank	**Facility (Zip code)**	
1	Veolia Technical Solutions Port Arthur (77643)	4,125,182 (88)
2	Huntsman Corp O&O Facility (77651)	309,421 (7)
3	Huntsman Corp - PO/MTBE Plant (77651)	70,665 (2)
4	Huntsman Petrochemical Corp Pabc (77641)	45,197 (1)
5	ExxonMobil Oil Corp (77701)	23,748 (1)
6	DuPont Beaumont Plant (77705)	21,972 (1)
7	Motiva Enterprises LLC (77640)*	12,705 (0.3)
8	LNVA - North Regional Treatment Plant (77701)	12,119 (0.3)
9	Ameripol Synpol Corp. (77651)	11,390 (0.2)
10	Goodyear Tire & Rubber Co (77705)	8,692 (0.2)

Westside - Risk-related Score

WESTSIDE		25,672
Rank	**Facility (Zip code)**	
1	Motiva Enterprises LLC	12,705
2	Premcor Refining Group Inc Port Arthur	8,665
3	Afton Chemical Additives Corp	2,079
4	Chevron Phillips Chemical Co	1,397
5	Motiva Enterprises LLC Port Arthur Terminal	630
6	U.S. Intec Inc.	89
7	Air Products L. P.	55
8	TDI-Halter Inc. Dock Yard	22
9	Great Lakes Carbon LLC Port Arthur Plant	16
10	Chevron Port Arthur Distribution Center	13

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