Chapter 4
A Current Appraisal of Toxic Wastes and Race in the United States – 2007[*]

As shown in the previous chapter, distance-based methods reveal racial and socioeconomic disparities in the location of the nation's commercial hazardous waste facilities that are much greater than previously reported. Compared to approaches used in prior research, these new methods are more reliable and accurate because they count persons living within the same proximity to each hazardous waste facility as part of the impacted population. To aid in the comparison with prior studies, the previous chapter used 1990 census data and applied distance-based methods to a current database of commercial hazardous waste facilities.

This chapter employs the same methods and database of facilities as the previous chapter, but utilizes 2000 census data to assess the current extent of racial and socioeconomic disparities for the nation as a whole. Disparities also are examined by region and state, and separate analyses are conducted for metropolitan areas, where most hazardous waste facilities are located. Using the most recent census data, this current appraisal will answer the following questions:

1. *What is the current extent of racial and socioeconomic disparities in the location of the nation's commercial hazardous waste facilities?*

2. *Did disparities increase during the 1990s?*

3. *Are disparities greater for host neighborhoods with clustered facilities?*

4. *How are racial and socioeconomic disparities distributed in different regions of the country?*

5. *How important is race in predicting facility location in comparison to socioeconomic status and other non-racial factors?*

To answer the first question, we will examine percentages of people of color as a whole and specific racial and ethnic groups living in neighborhoods and communities with commercial hazardous waste facilities. The neighborhood socioeconomic characteristics will be similarly compared to areas without facilities using indicators such as poverty rates, incomes and housing values.

Toxic Wastes and Race Revisited, the 1994 update of the original United Church of Christ (UCC) report, *Toxic Wastes and Race in the United States,* showed that racial and socioeconomic disparities associated with the location of the nation's hazardous waste facilities increased from 1980 to 1993 (Commission for Racial Justice, 1987; Goldman and Fitton, 1994).[1] The second question above asks whether this trend continued throughout the 1990s.

Both of the previous UCC reports found that people of color were concentrated in the most environmentally hazardous communities as measured by the number of commercial hazardous waste facilities and amounts of hazardous wastes handled. To answer the third question, a similar analysis is conducted in this current update, which examines neighborhoods where multiple facilities are clustered.

The fourth question examines the extent to which racial and socioeconomic disparities are confined to particular regions of the country and if disparities are substantially greater in certain regions compared to

---

[*] The principle author of this chapter is Dr. Robin Saha, Assistant Professor, Department of Environmental Studies and School of Public and Community Health Sciences, University of Montana, Missoula, MT.

others. Following the example of the previous UCC reports, this chapter examines racial and socioeconomic disparities for states and metropolitan areas. This allows us to detect environmental justice "hot spots," i.e., areas with high concentrations of hazardous wastes and large racial or socioeconomic disparities.

The final question asks whether the racial characteristics of neighborhoods independently predict the location of the nation's commercial hazardous waste facilities, separate from poverty levels and other socioeconomic characteristics. The preponderance of environmental inequality studies have found that race is an independent predictor of the location of polluting industrial facilities (Mohai and Bryant, 1992; Ringquist, 2005). Indeed, the 1987 UCC report was the first study to find race to be an independent predictor of the location of the nation's commercial hazardous waste facilities. It also found race to be a much stronger predictor than socioeconomic status. Sorting out whether racial factors are associated with facility location regardless of socioeconomic status can be accomplished with multivariate statistical tests. It can thereby be determined if the significance of race noted in *Toxic Wastes and Race in the United States* persists 20 years later.

Hazardous Waste Management in the United States

In 2001, industry generated more than 41 million tons of hazardous wastes in the United States (U.S. EPA, 2003). Some of these wastes are shipped out of state and even out of the country. Because of their toxicity, hazardous wastes are regulated by the U.S. Environmental Protection Agency (EPA) and state environmental agencies. Under the Resource Conservation and Recovery Act of 1976 (RCRA), hazardous wastes must be managed by specially designed facilities referred to as treatment, storage and disposal facilities. Companies operating such facilities must obtain permits from state and sometimes federal environmental agencies and conform to local land use regulations.

As the recent explosion of stored hazardous wastes in Danvers, Massachusetts, illustrates, even when operated according to accepted specifications, hazardous waste facilities can adversely impact nearby residents (Daley 2006).[2] The city of East Palo Alto is home to another poorly operated facility, Romic Environmental Technologies (Jayadev, 2007). Institutional discrimination in the form of lax governmental enforcement has contributed to numerous problems with chemical leaks, accidents and explosions at the plant. Indeed, hazardous wastes are well-known to pose serious risks to health, property and quality of life.[3] Because of these ordinary and extraordinary risks, public opposition to siting of these facilities is nearly universal, particularly regarding high-profile facilities such as incinerators and landfills. As a result, new facility sitings have tended to follow the path of least political resistance (Bullard and Wright, 1987; Saha and Mohai, 2005). Although in recent decades communities of color have begun to mount their own resistance, their limited scientific, technical and legal resources have historically made such communities vulnerable to facility sitings (Bullard, 1983, 1990; Taylor, 1998).

Data and Analysis

As indicated in Chapter 3, several databases were used to identify currently operating commercial hazardous waste facilities in the U.S.: EPA's Biennial Report System (BRS); EPA's Resource Conservation and Recovery Information System (RCRIS); and the Environmental Services Directory (ESD), a private industry listing (U.S. EPA, 2001a, 2001b; U.S. Census Bureau, 1993; Environmental Information Ltd., 2001/2002). The EPA's Envirofacts Data Warehouse also was used to cross-reference information and obtain the most recent data for facilities, for example, if a facility recently received a new operating permit and therefore was not included in the aforementioned databases (U.S. EPA, 2001/2002). A facility was included if it met all the following criteria: (1) it was a private, non-governmental business, (2) designated in 1999 as a hazardous waste Treatment, Storage and Disposal Facility (TSDF) under the Resource Conservation and Recovery Act (RCRA) and (3) operated as a commercial facility in 1999, i.e., received off-site wastes from another entity for pay. Geographic Information Systems (GIS) were used to precisely map facility locations. The current operating status and locations were verified by contacting the companies or in some case regulatory agencies (see the Methods Appendix for more details about the procedures used to identify and locate the nation's currently operating facilities).

In all, 413 facilities were identified. These represented all the commercial hazardous waste facilities operating in the U.S. in 1999. By using 2000 Census data, collected by the U.S. Census Bureau in 1999, it was possible to determine the racial and socioeconomic characteristics of neighborhoods containing these facilities that corresponded to *the same time the facilities were known to be in operation* (Rhodes, 2002).

The *areal apportionment method* (see Chapter 3) was used to estimate the racial and socioeconomic characteristics of circular host neighborhoods of 1, 3 and 5 kilometer radius around the 413 facilities. Because the results were very consistent regardless of the radius, only findings pertaining to the 3-kilometer radius are reported below to streamline the presentation. This radius, approximately 1.8 miles, corresponds to the distance within which empirical studies have noted adverse health, property value and quality of life impacts associated with hazardous waste sites, including hazardous waste facilities (see Methods Appendix).

This radius is in line with those used in other environmental justice studies employing distance-based methods (see Mohai and Saha, 2006, 2007). The circumscribed area is also about the size of the heavily polluted Greenpoint/Williamsburg neighborhood in Brooklyn (Corburn, 2005). The City of Vernon, located near heavily polluted areas of East Los Angeles, is also similar in size. Vernon has several commercial hazardous waste facilities and numerous polluting industrial facilities (see Pulido, Sidawi, and Vos, 1996).

Unless otherwise indicated, findings reported are aggregate values for all host neighborhoods (i.e., neighborhoods within 3 kilometers of a facility), not averages of each host neighborhood and the census tracts comprising them. This means that populations were summed for all neighborhoods to compute people of color percentages. For example, to compute people of color percentages for all host neighborhoods, the total number of people of color within 3 kilometers of any hazardous waste facility was divided by the total population within the same circular host neighborhoods. Similar procedures were used to compute poverty rates, mean households incomes and mean property values. The resulting values represent the overall racial and socioeconomic characteristics of the defined impacted areas (see Methods Appendix).

Assessing Racial and Socioeconomic Disparities

To assess racial and socioeconomic disparities, the characteristics of the neighborhoods of 3-kilometer radius containing a commercial hazardous waste facility ("host neighborhoods") are compared to the characteristics of areas that lie beyond 3 kilometers ("non-host areas"). For the national-level analysis, non-host areas include all areas in the U.S. that lie beyond 3 kilometers of a facility. Likewise, for the state-level analysis, non-host areas in each state include all areas that lie beyond 3 kilometers of a facility (additional information is provided below regarding the metropolitan area analyses).

If people of color percentages are higher in host neighborhoods than in the non-host comparison areas, then a racial disparity is therefore said to exist. Likewise, socioeconomic disparities exist if poverty rates are higher, or mean household incomes and housing values are lower, in host neighborhoods than in the non-host areas. These disparities are consistent with an environmental justice claim.

Disparities in percentages of specific people of color groups were examined, including percentages of African Americans, Hispanics or Latinos, Asians/Pacific Islanders and American Indians/Alaskan Natives.[4] It should be noted that the U.S. Census Bureau defines Hispanic as an ethnic, not a racial category. Hispanics can belong to any of the recognized races, including the white category. Race, in fact, is a socially constructed notion (Jacobson, 1998). Hispanics, or Latinos as they generally self-identify, suffer from similar forms of racial and institutional discrimination as other people of color (Cole and Foster, 2002). Thus, for convenience, Hispanic or Latino disparities also will be referred to as racial disparities.

Two approaches are used to assess the magnitude of racial and socioeconomic disparities: (1) differences in values (percentages of people of color, poverty rates, mean household income, mean housing values, etc.) between host neighborhoods and non-host areas; and (2) ratios of host

51

neighborhood values to non-host area values. For example, if Hispanic or Latino percentages were 30% and 10%, respectively, then differences would be 30% minus 10%, or 20%, and the ratio would be 30% divided by 10%, or 3.

Tests also were done to determine if these disparities were statistically significant (i.e., were not likely to be merely the result of random chance) and to assess the importance of race in predicting facility locations. A statistically significant disparity is defined as one where there is less than a 5% chance (1 in 20) that the disparity is due to random chance as determined by t-tests and logistic regressions (see Methods Appendix).

Findings

More than nine million people (9,222,000) are estimated to live within 3 kilometers (1.8 miles) of the nation's 413 commercial hazardous waste facilities. This represents 3.3% of the U.S. population (281,422,000). More than 5.1 million people of color, including 2.5 million Hispanics or Latinos, 1.8 million African Americans, 616,000 Asians/Pacific Islanders and 62,000 Native Americans, live in neighborhoods with one or more commercial hazardous waste facility.

Host neighborhoods are densely populated, with more than 870 persons per square kilometer (2,300 per mi^2), compared to 30 persons per square kilometer (77 per mi^2) in non-host areas. Not surprisingly, 343 facilities (83%) are located in metropolitan areas.

Additional findings presented below begin with a look at racial and socioeconomic disparities for the nation as a whole, an assessment of changes from 1990 to 2000 and an analysis of disparities in neighborhoods with clustered facilities (i.e., host neighborhoods where the facilities are so close together that the 3-kilometer areas around them overlap; see Figure 3.1E). These findings are followed by similar analyses for the 10 EPA regions, states and metropolitan areas. This chapter concludes with an analysis of the importance of race in predicting facility locations.

National Disparities

Table 4.1 compares the racial and socioeconomic characteristics of the 3-kilometer circular host neighborhoods of the nation's 413 commercial hazardous waste facilities to the same characteristics of non-host areas. Data from the 1990 and 2000 Census are shown. For 2000, host neighborhoods with commercial hazardous waste facilities are 56% people of color whereas non-host areas are 30% people of color.[5] In other words, percentages of people of color as a whole are 1.9 times greater in host neighborhoods than in non-host areas. Similarly, percentages of African Americans, Hispanics and Asians/Pacific Islanders in host neighborhoods are 1.7, 2.3 and 1.8 times greater in host neighborhoods than non-host areas (20% vs. 12%, 27% vs. 12%, and 6.7% vs. 3.6%, respectively). However, percentages of American Indians/Alaskan Natives (hereafter referred to as Native Americans) in host neighborhoods and non-host areas are very small and roughly equal (0.7% vs. 0.9%).

Table 4.1 also reveals significant socioeconomic disparities. Poverty rates in the host neighborhoods are 1.5 times greater than those in non-host areas (18% vs. 12%), and mean annual household incomes in host neighborhoods are 15% lower ($48,234 vs. $56,912). Mean owner-occupied housing values are also disproportionately low in neighborhoods with hazardous waste facilities. These data reveal depressed economic conditions in host neighborhoods of the nation's hazardous waste facilities.

Education and employment disparities also can be noted in Table 4.1. The percentage of persons 25 years and over with a four-year college degree are much lower in host neighborhoods than in non-host areas (18% vs. 25%, respectively). Similar disparities exist for the percentage of persons employed in professional "white collar" occupations, while percentages employed in "blue collar" occupations are disproportionately high in host neighborhoods.

The above racial and socioeconomic disparities are statistically significant at the 0.001 level, which means that there is less than a 0.1% (1 in 1000) chance that the differences are merely the result of random chance.

Changes During the 1990s

Table 4.1 shows that racial and socioeconomic disparities also existed in 1990 (also see Chapter 3). The 1990 and 2000 data allow us to consider whether disparities increased in magnitude during the 1990s. People of color percentages in host neighborhoods increased from 46% to 56%, whereas percentages in non-host areas increased from 23% to 30%. Thus, the overall difference in people of color percentages between host neighborhoods and non-host areas increased from 23% to 26% during the 1990s. However, the ratio of the percentages between host neighborhoods and non-host areas decreased slightly from 1.97 to 1.86. Similar trends can be noted for racial subgroups and with respect to poverty, income and housing value indicators of neighborhood socioeconomic status. The education and employment measures show no change during the 1990s.[6]

Table 4.1 – Racial and Socioeconomic Disparities between Host Neighborhoods and Non-Host Areas for the Nation's 413 Commercial Hazardous Waste Facilities (1990 and 2000 Census)

	2000				**1990**			
	Host	Non-Host	Diff.	Ratio	Host	Non-Host	Diff.	Ratio
Population								
Total Pop. (1000s)	9,222	272,200	-262,979	0.03	8,673	240,037	-231,364	0.04
Population Density	870	29.7	840	29.0	820	25.1	790	27.3
Race/Ethnicity								
% People of Color	55.9%	30.0%	25.9%	1.86	46.2%	23.4%	22.8%	1.97
% African American	20.0%	11.9%	8.0%	1.67	20.4%	11.7%	8.7%	1.74
% Hispanic or Latino	27.0%	12.0%	15.0%	2.25	20.7%	8.4%	12.3%	2.47
% Asian/Pac. Is.	6.7%	3.6%	3.0%	1.83	5.3%	2.8%	2.5%	1.88
% Native American	0.7%	0.9%	-0.2%	0.77	0.6%	0.8%	-0.3%	0.68
Socioeconomics								
Poverty Rate	18.3%	12.2%	6.1%	1.50	18.5%	12.9%	5.6%	1.43
Mean Household Income	$48,234	$56,912	-$8,678	0.85	$33,115	$38,639	-$5,524	0.86
Mean Owner-Occpd. Housing Value	$135,510	$159,536	-$24,025	0.85	$101,774	$111,954	-$10,180	0.91
% with 4-Year College Degree	18.5%	24.6%	-6.1%	0.75	15.4%	20.5%	-5.1%	0.75
% Professional "White Collar" Occp.	28.0%	33.8%	-5.8%	0.83	21.8%	26.6%	-4.8%	0.82
% Employed in "Blue Collar" Occupations	27.7%	24.0%	3.7%	1.15	30.0%	26.1%	3.9%	1.15

NOTES: Data computed using *areal apportionment method* (see Ch. 3). Differences and ratios are between host neighborhood and non-host area values. Differences may not precisely correspond to other values due to rounding off. Population density is in persons per square kilometer (rounded off). Mean housing values pertain to owner-occupied housing units. Percent employed in "white collar" and "blue collar" occupations are not directly comparable between 1990 and 2000, because of changes in Census Bureau definitions (see Methods Appendix).

People of color now comprise a majority of the population living near the nation's commercial hazardous waste facilities

Overall, Table 4.1 shows that the magnitude of racial and socioeconomic disparities did not change appreciably between 1990 and 2000. It is notable, however, that during the 1990s the percentages of people of color increased in the United States such that people of color now comprise a majority of the population living near the nation's commercial hazardous waste facilities.

Neighborhoods with Clustered Facilities

Figure 4.1 shows that people of color percentages in neighborhoods with clustered facilities (i.e., multiple facilities), non-clustered facilities (i.e., a single facility) and no facility.[7] Neighborhoods with clustered facilities have higher percentages of people of color than those with non-clustered facilities (69% vs. 51%). Likewise, neighborhoods with clustered facilities have disproportionately high poverty rates. These differences are statistically significant at a 0.001 level.

In addition, percentages of African Americans and Hispanics in the neighborhoods with clustered facilities are significantly higher than neighborhoods with non-clustered facilities (29% vs. 16% and 33% vs. 25%, respectively). Although Asians/Pacific Islanders are disproportionately located in all host neighborhoods (see Table 4.1), they are found in lower percentages in the neighborhoods with clustered facilities than in non-clustered facility neighborhoods (4.3% vs. 7.8%).

Figure 4.1 – People of Color Percentages in Neighborhoods with Clustered Facilities, Non-Clustered Facilities and No Facility

54
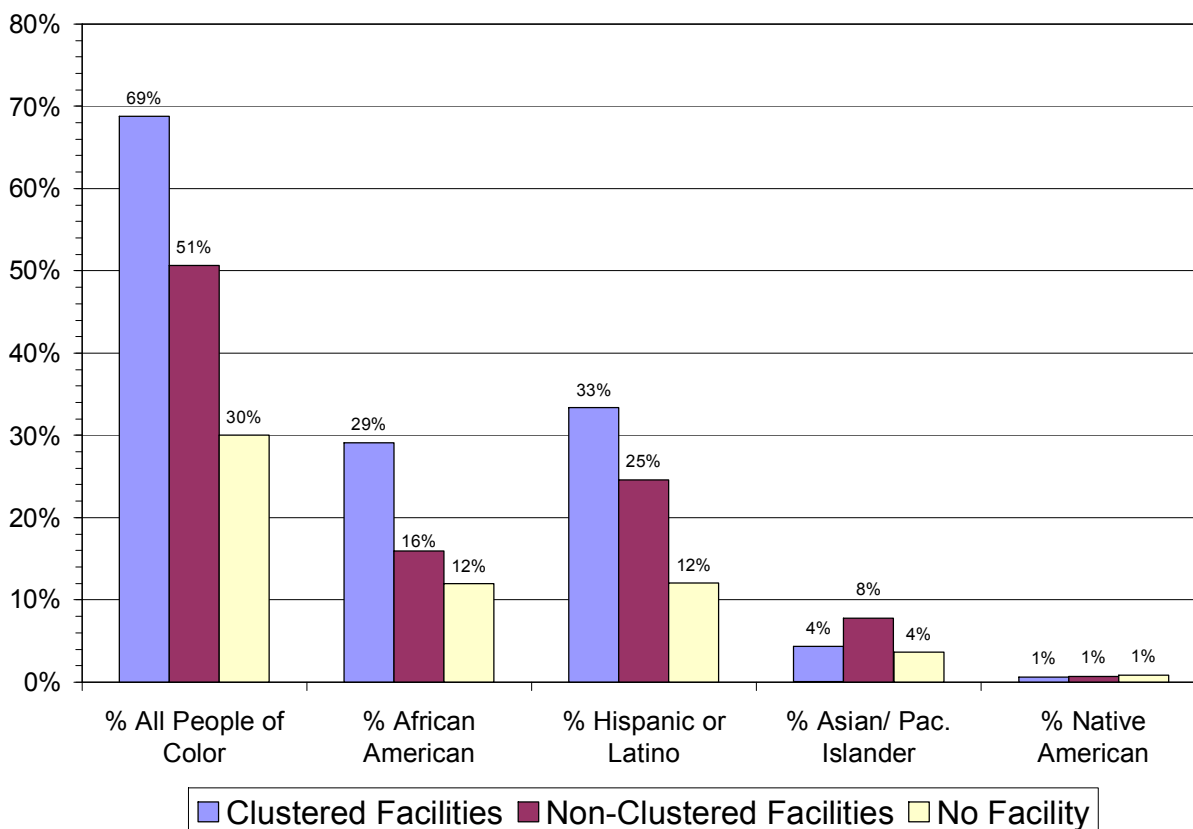
Native American percentages are very small and nearly equal (0.7%) in clustered and non-clustered facility host neighborhoods (see Figure 4.1). While there may be individual cases with striking disparities in Native American percentages, they would be masked in this national level study. A definitive analysis of environmental injustices facing Native Americans is beyond the scope of this study. Environmental injustices in Indian Country have been well-documented, and Native Americans have been an important group in the struggle for environmental justice.[8] Indeed, 13 facilities analyzed in this study are located on Indian reservations, including a controversial facility on the Gila River Indian Community reservation in Arizona (Jayadev, 2007). However, because of their small numbers relative to the other groups in this particular analysis, they are not included in subsequent tables.

Poverty rates in the neighborhoods with clustered facilities are high compared to non-clustered facility neighborhoods: 22% vs. 17%. Mean household incomes are 10% lower in neighborhoods with clustered facilities ($44,600 vs. $49,600), and mean housing values are 14% lower ($121,200 vs. $141,000). These data are shown in Appendix 4.1.

All racial and socioeconomic disparities between neighborhoods with clustered and non-clustered facility host neighborhoods are statistically significant at the 0.01 level. Although measuring the concentration of hazardous waste activity in a slightly different way, these findings are similar to those of the previous UCC reports, which found that zip code areas with higher levels of hazardous waste activity also had relatively higher percentages of people of color and higher poverty rates.[9] People of color and the poor thus continue to be particularly vulnerable to the various negative impacts of hazardous waste facilities. Moreover, the present findings show that this is the case for African Americans, Hispanics and Asians/Pacific Islanders.

EPA Regional Disparities

Racial and socioeconomic disparities were assessed for all 10 EPA regions, each comprising between 2 and 8 contiguous states (see Figure 4.2). Table 4.2 shows that regions with the greatest number of facilities include: Region 5, Great Lakes states (85 or 21%); Region 4, the southeast (67 or 16%); Region 6, south central states (61 or 15%); and Region 9, the West (55 or 13%). The fewest facilities are found in: Region 1, the Northeast (23 or 6%); Region 8, the mountain west (15 or 4%); and Region 10, the Pacific Northwest (8 or 2%).

Figure 4.2 – EPA Regions
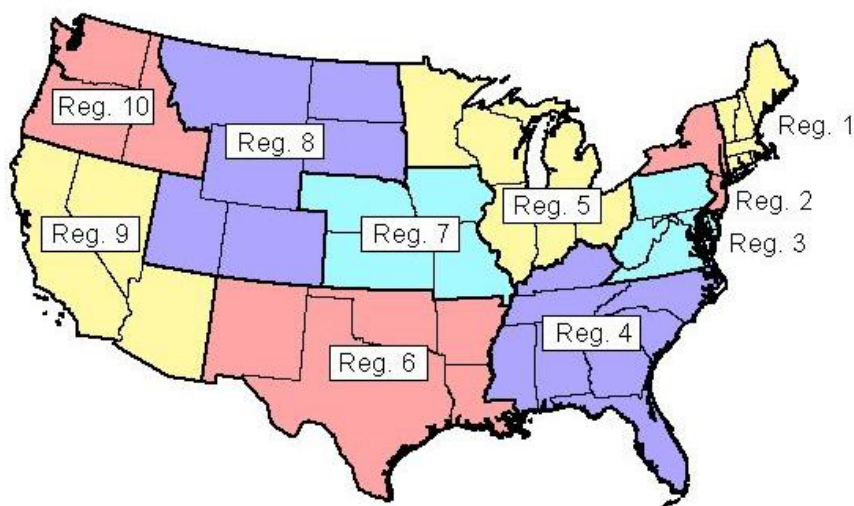
NOTES: Region 2 includes New York and New Jersey only. Region 3 includes Maryland, Pennsylvania, Virginia, West Virginia and Washington D.C. Region 10 also includes Alaska and Hawaii (not shown).

55

EPA regional offices provide direct oversight of state environmental programs, which in turn monitor and enforce the operation of existing hazardous waste facilities and issue permits for the siting of new ones. This EPA regional analysis allows us to see how geographically widespread the racial and socioeconomic disparities noted above are. We also can identify regions with pervasive and severe racial disparities, regions where regulatory intervention may be needed to ensure environmental justice.

Table 4.2 shows that racial disparities for people of color as a whole exist in 9 out of 10 EPA regions (all except Region 3). These disparities are statistically significant at the 0.001 level. Disparities in people of color percentages between host neighborhoods and non-host areas are greatest in: Region 1 (36% vs. 15%), Region 4 (54% vs. 30%), Region 5 (53% vs. 19%), Region 6 (63% vs. 42%) and Region 9 (80% vs. 49%).[10]

Table 4.2 – People of Color Percentages for Host Neighborhoods and Non-Host Areas by EPA Region

	Number of Facilities	Host Neighborhoods	Non-Host Areas	Difference	Ratio
U.S. Total	413	55.9%	30.0%	25.9%	1.86
Region 1	23	36.3%	15.0%	21.3%	2.43
Region 2	32	51.5%	36.0%	15.6%	1.43
Region 3	35	23.2%	24.5%	-1.33%	0.95
Region 4	67	54.3%	30.4%	23.8%	1.78
Region 5	85	52.6%	18.8%	33.8%	2.80
Region 6	61	62.7%	41.8%	20.9%	1.50
Region 7	32	29.1%	13.4%	15.7%	2.17
Region 8	15	31.2%	18.2%	13.0%	1.72
Region 9	55	80.5%	49.4%	31.1%	1.63
Region 10	8	38.9%	19.1%	19.9%	2.04

NOTES: Data computed using 2000 Census data and *areal apportionment method* (see Ch. 3). Differences may not precisely correspond to other values due to rounding off.

Seven EPA regions have statistically significant disparities in African American percentages, seven EPA regions also have statistically significant disparities in Hispanic or Latino percentages, and six EPA regions have statistically significant disparities in percentages of Asians/Pacific Islanders. Table 4.3 shows the descriptive statistics for these racial and ethnic groups for each EPA region.

Geographically widespread socioeconomic disparities also can be noted (see Table 4.4). For example, nine EPA regions have disproportionately high poverty rates and disproportionately low mean household incomes and housing values. Differences in poverty rates between host neighborhoods and non-host areas are greatest for Region 1 (16% vs. 8.7%), Region 2 (19% vs. 12%), Region 5 (19% vs. 9.6%), Region 7 (15% and 10%), Region 8 (15% and 10%) and Region 9 (21% vs. 13%). Socioeconomic disparities are statistically significant in 9 of the 10 EPA regions, all but Region 9.

Disproportionately high percentages of people of color are found in 7 of the 9 regions with neighborhoods with clustered facilities (see Appendix 4.2). Differences between clustered and non-clustered facility host neighborhoods are greatest in Region 5 (62% and 46%), Region 7 (59% vs.25%), Region 8 (55% vs..

Table 4.3 – Racial Disparities between Host Neighborhoods and Non-Host Areas by EPA Region

EPA Region	Percent African American				Percent Hispanic or Latino/a				Percent Asian/Pacific Islander			
	Host	Non-Host	Diff.	Ratio	Host	Non-Host	Diff.	Ratio	Host	Non-Host	Diff.	Ratio
Region 1	9.6%	4.8%	4.8%	2.00	19.5%	5.5%	13.9%	3.52	4.9%	2.6%	2.4%	1.91
Region 2	16.0%	15.0%	1.0%	1.07	23.3%	14.0%	9.3%	1.66	9.7%	5.4%	4.3%	1.81
Region 3	15.1%	16.6%	-1.5%	0.91	4.7%	3.7%	1.0%	1.26	2.0%	2.7%	-0.7%	0.75
Region 4	37.0%	20.4%	16.6%	1.82	13.7%	7.2%	6.5%	1.91	2.2%	1.4%	0.8%	1.59
Region 5	35.8%	10.1%	25.7%	3.55	11.3%	5.0%	6.3%	2.27	3.2%	2.0%	1.2%	1.59
Region 6	20.4%	13.5%	6.9%	1.51	37.9%	23.1%	14.7%	1.64	2.5%	2.1%	0.4%	1.17
Region 7	16.1%	6.7%	9.4%	2.40	8.9%	3.6%	5.3%	2.50	1.7%	1.3%	0.4%	1.30
Region 8	1.9%	2.0%	-0.1%	0.95	22.9%	10.5%	12.4%	2.19	3.1%	1.7%	1.4%	1.80
Region 9	11.8%	5.6%	6.2%	2.10	54.1%	28.7%	25.3%	1.88	12.3%	10.8%	1.5%	1.14
Region 10	6.6%	2.3%	4.2%	2.84	10.1%	7.5%	2.6%	1.35	17.1%	4.2%	12.9%	4.07

NOTES: Differences and ratios are between host neighborhood and non-host areas. Differences may not precisely correspond to other values due to rounding off.

Table 4.4 – Socioeconomic Disparities between Host Neighborhoods and Non-Host Areas by EPA Region

EPA Region	Poverty Rates				Mean Household Income				Mean Housing Value			
	Host	Non-Host	Diff.	Ratio	Host	Non-Host	Diff.	Ratio	Host	Non-Host	Diff.	Ratio
Region 1	15.7%	8.7%	7.0%	1.80	$48,368	$65,296	-$16,928	0.74	$143,840	$202,102	-$58,261	0.71
Region 2	19.4%	12.3%	7.1%	1.57	$50,793	$66,137	-$15,344	0.77	$171,083	$202,579	-$31,496	0.84
Region 3	12.6%	10.7%	1.9%	1.18	$47,493	$57,479	-$9,986	0.83	$97,971	$139,278	-$41,307	0.70
Region 4	15.7%	13.7%	2.0%	1.15	$45,811	$50,931	-$5,120	0.90	$97,673	$118,962	-$21,288	0.82
Region 5	19.4%	9.6%	9.7%	2.01	$44,933	$56,955	-$12,022	0.79	$103,812	$137,470	-$33,658	0.76
Region 6	18.8%	16.0%	2.8%	1.18	$45,072	$50,616	-$5,545	0.89	$83,602	$101,518	-$17,916	0.82
Region 7	15.0%	10.4%	4.7%	1.45	$44,084	$50,308	-$6,224	0.88	$84,028	$106,808	-$22,780	0.79
Region 8	14.8%	10.3%	4.4%	1.43	$40,801	$55,413	-$14,612	0.74	$105,286	$163,390	-$58,104	0.64
Region 9	20.7%	13.5%	7.2%	1.54	$52,947	$64,146	-$11,199	0.83	$218,576	$246,673	-$28,096	0.89
Region 10	10.9%	11.0%	-0.1%	0.99	$55,599	$55,889	-$290	0.99	$180,716	$179,522	$1,193	1.01

NOTES: Differences and ratios are between host neighborhood and non-host areas. Differences may not precisely correspond to other values due to rounding off.

26%) and Region 9 (89% vs. 75%). Regions 1, 3 and 4 also have large disparities between clustered and non-clustered facility neighborhoods

For Hispanics, African Americans and Asians/Pacific Islanders, statistically significant disparities exist in the majority or vast majority of EPA regions.

In sum, racial disparities in the location of the nation's commercial hazardous waste facilities exist in all EPA regions. For Hispanics, African Americans and Asians/Pacific Islanders, statistically significant disparities exist in the majority or vast majority of EPA regions. Moreover, the pattern of people of color being especially concentrated in areas where facilities are clustered is also geographically widespread throughout the country.

State Disparities

Given the widespread geographic distribution of racial and socioeconomic disparities associated with the location of hazardous waste facilities among EPA regions, one could expect such disparities to be distributed widely among states as well. EPA regional offices and their environmental justice programs provide guidance to and oversight of state environmental programs (such as RCRA, Clean Air Act and Clean Water Act). States also are beginning to develop environmental justice and enhanced enforcement programs of their own to reduce risks to environmentally overburdened communities (Targ, 2005). Thus, it is helpful to identify states where racial and socioeconomic disparities are the greatest. It is in these states where more stringent regulatory action may be warranted.

Alaska, Delaware, Hawaii, New Hampshire, Montana, Wyoming and the District of Columbia did not have licensed and operating commercial hazardous waste facilities in 1999. Forty of the remaining 44 states with facilities have disproportionately high percentages of people of color in circular host neighborhoods. The average of these 40 states' percentage of people in color in host neighborhoods is about two times greater than the average of non-host areas for those states (44% vs. 23%).[11] Host neighborhoods in 19 states are majority people of color.

Figure 4.3 shows states with the 10 largest differences in people of color percentages between host neighborhoods and non-host areas. These states are shown in order (left-to-right) by the largest percentages of people of color living in the host neighborhoods. For both California and Nevada, these percentages are about 80%. For three additional states, people of color make up a two-thirds or more majority in these neighborhoods. In descending order of by the size of the differences between host and non-host areas, these states are: Michigan (66% vs. 19%), Nevada (79% vs. 33%), Kentucky (51% vs. 10%), Illinois (68% vs. 31%), Alabama (66% vs. 31%), Tennessee (54% vs. 20%), Washington (53% vs. 20%), Kansas (47% vs. 16%), Arkansas (52% vs. 21%) and California (81% vs. 51%). Differences in these percentages range from a high of 47% for Michigan to 30% for California.

Numerous other states have large disparities in people of color percentages. Many of these have majority people of color host neighborhoods, including Arizona, Florida, Georgia, Louisiana, New Jersey, New York, North Carolina and Texas (see Appendix 4.3). People of color disparities are statistically significant for 32 states, including all the aforementioned states.

Host neighborhoods in an overwhelming majority of the 44 states with commercial hazardous waste facilities have disproportionately high percentages of Hispanics (35 states), African Americans (38 states) and Asians/Pacific Islanders (27 states). Among these states, the average disparity between host neighborhoods and non-host areas is 17% vs. 9.0% for Hispanics, 24% vs. 11% for African Americans and 4.5% vs. 2.2% for Asians/Pacific Islanders.[12] Additional highlights regarding these racial disparities include the following findings:

- Host neighborhoods in Arizona, California and Nevada are majority Hispanic or Latino. Other states with very large disparities in Hispanic or Latino percentages include Colorado,

Connecticut, Florida, Illinois, Kansas and Utah (see Appendix 4.4 for a compete listing). Differences in these percentages between host neighborhoods and non-host areas range from a high of 32% for Nevada to 13% for Kansas.

- Host neighborhoods in Alabama and Michigan are majority African American. Other states with very large disparities in African American percentages: Arkansas, Illinois, Kentucky, Nevada, North Carolina, Ohio, Tennessee and Wisconsin. Differences in percentages between host neighborhoods and non-host areas range from 46% (Michigan) to 19% (Nevada). Twenty-eight other states have African American disparities (see Appendix 4.5).

- The state of Washington has the largest disparity in the percentage of Asians/Pacific Islanders (26% vs. 5.6%). Other states with Asian/Pacific Islander disparities: California, Massachusetts, Minnesota, New York, Oregon, Rhode Island and Utah (see Appendix 4.6).

Figure 4.3 – States with the 10 Largest Differences in People of Color Percentages between Host Neighborhoods and Non-Host Areas
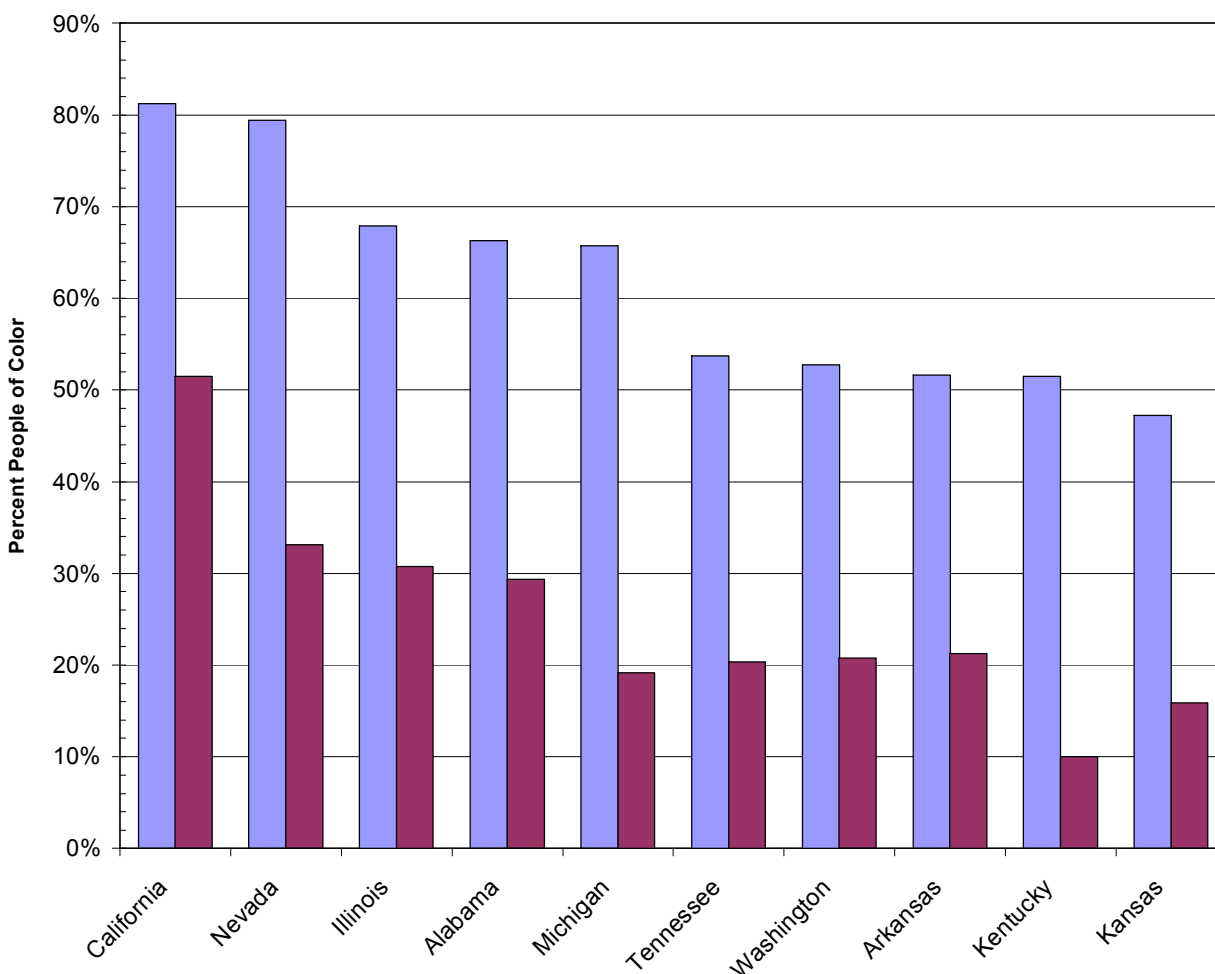
Thirty-five states have socioeconomic disparities as indicated by poverty rates. For these states, the average poverty rate in host neighborhoods is 18% compared to 12% in non-host areas. States with very large poverty rate disparities include Arizona, Connecticut, Michigan, Minnesota, Nevada and Ohio. In these states, poverty rates in host neighborhoods are more than two times greater than those in non-host

areas (see Appendix 4.7). Poverty rate disparities are statistically significant for a majority of states with commercial hazardous waste facilities (23 out of 44).

This analysis shows that statistically significant racial and socioeconomic disparities in the location of commercial hazardous waste facilities are very prevalent among the states and thus throughout the country. This reinforces the findings for the EPA regions and should allow more focused and effective attention to be devoted to regional environmental injustices. This might include additional research, since few published environmental justice studies have been conducted for many of these states where environmental justice claims could be made on the basis of these findings.

> *Racial disparities are more prevalent and extensive than socioeconomic disparities, suggesting that race has more to do with the current distribution of the nation's hazardous waste facilities than poverty.*

This analysis of the states also shows that racial disparities are more prevalent and extensive than socioeconomic disparities, suggesting that race has more to do with the current distribution of the nation's hazardous waste facilities than poverty. The question of the relative importance of race and socioeconomic status is systematically examined below.

Metropolitan Area Disparities

The state-wide disparities may in part reflect the fact that most commercial hazardous waste facilities are located in large cities where people of color are generally found in relatively high percentages. Various scholars have suggested examining host neighborhoods in metropolitan areas by themselves to avoid possible confounding effects of counting rural areas, which have relatively low percentages of people of color, among the non-host areas (see e.g., Anderton et al., 1994; Mohai, 1995). Such a comparison is more conservative in that the likelihood of finding disparities is reduced.

Metropolitan Areas (MAs) are prescribed by the Office of Budget and Management (OMB) to gather statistics and allocate resources to various federal programs. They are not political jurisdictions like incorporated towns, cities and counties. A single metropolitan area may encompass several counties and cities, which in turn may be located in adjoining states.

In 2000, 149 of the nation's 331 metropolitan areas (45%) contained 343 of the nation's 413 commercial hazardous waste facilities (87%). More than 9 million people reside in host neighborhoods of facilities located in metropolitan areas. This represents 98% of the total population living in host neighborhoods of all 413 facilities.

Table 4.5 compares the racial and socioeconomic characteristics of the metropolitan host neighborhoods to the characteristics of non-host areas. In this comparison, non-host areas include areas in all 331 U.S. MAs that lie beyond the 3-kilometer circular host neighborhoods. See the Methods Appendix note 9 for further details.

In metropolitan areas, people of color percentages in host neighborhoods are significantly greater than those in non-host areas (57% vs. 33%). Likewise, the nation's metropolitan areas show disparities in percentages of African Americans, Hispanics and Asians/Pacific Islanders, 20% vs. 13%, 27% vs. 14% and 6.8% vs. 4.4%, respectively. Table 4.5 also shows socioeconomic disparities between host neighborhoods and non-host areas, for example, in poverty rates (18% vs. 12%). Mean household incomes and housing values in host neighborhoods are about 20% lower than those in non-host areas ($48,400 vs. $60,000 and $136,900 vs. $173,700, respectively). These racial and socioeconomic disparities are statistically significant at the 0.001 level.

One hundred and five of the 149 MAs with facilities (70%) have host neighborhoods with disproportionately high percentages of people of color, and 46 of these MAs (31%) have majority people of color host neighborhoods. These MAs are widely distributed across the country. Metropolitan areas

with large disparities in Hispanic or Latino percentages are also located in all regions, whereas MAs with large disparities in African American percentages are located primarily in the South and Midwest.

Table 4.5 – Racial and Socioeconomic Disparities between Host Neighborhoods and Non-Host Areas of Commercial Hazardous Waste Facilities in Metropolitan Areas

	Host Neighborhoods	Non-Host Areas	Difference	Ratio
Population				
Total Population (1000s)	9,035	216,920	-207,885	0.04
Population Density	1,040	120	920	8.67
Race/Ethnicity				
% People of Color	56.6%	33.1%	23.5%	1.71
% African American	20.1%	12.8%	7.3%	1.57
% Hispanic or Latino/a	27.4%	13.7%	13.8%	2.01
% Asian/Pacific Islander	6.8%	4.4%	2.4%	1.56
Socioeconomics				
Poverty Rate	18.3%	11.6%	6.8%	1.59
Mean Household Income	$48,391	$60,438	-$12,048	0.80
Mean Housing Value	$136,880	$173,738	-$36,858	0.79

NOTES: Differences and ratios are between host neighborhood and non-host area percentages. Differences may not precisely match other values due to rounding off. Population density is persons per square kilometer (rounded off). Mean housing values pertain to owner-occupied housing units.

Table 4.6 – The 10 Metropolitan Areas with the Largest Number of People of Color Living in Hazardous Waste Facility Neighborhoods

Metropolitan Area	Number of Facilities / Host Neighborhoods	People of Color in Host Neighborhoods	People of Color per Host Neighborhood	% People of Color in Host Neighborhoods
Los Angeles	17	1,115,412	65,612	90.9%
New York	3	451,746	150,582	61.0%
Detroit	12	315,975	26,331	69.3%
Chicago	9	294,437	32,715	71.6%
Oakland	6	219,978	36,663	76.0%
Orange County (CA)	3	176,368	58,789	69.8%
Houston	10	165,729	16,573	78.6%
Newark	4	143,540	35,885	66.8%
San Jose	2	132,720	66,360	77.1%
Minneapolis--St. Paul	9	101,455	11,273	35.3%
TOTAL	75	3,117,360		

NOTE: See Appendix 4.8 for a listing of 80 selected metropolitan areas.

Appendix 4.8 has listings of people of color percentages for 80 selected metropolitan areas. Thirteen metropolitan areas have large disparities (host-non-host area differences of 3% or more) in Asian/Pacific Islander percentages. These also are distributed throughout the country (see Appendix 4.9, which lists 25 selected metropolitan areas).

Table 4.6 above shows the 10 metropolitan areas with the largest number of people of color living in neighborhoods with hazardous waste facilities. Host neighborhoods in these 10 metropolitan areas have a total of 3.12 million people of color, which represents 60% of the total population of people of color in all host neighborhoods in the country (5.16 million). Six metropolitan areas account for half of all people of color living in close proximity to all of the nation's commercial hazardous waste facilities (Los Angeles, New York, Detroit, Chicago, Oakland and Orange County, CA). Los Angeles alone accounts for 21% of the people of color in host neighborhoods nationally.

In sum, there is no doubt that significant racial disparities exist within the nation's metropolitan areas, which contain 4 out of every 5 commercial hazardous waste facilities. Racial disparities exist in a large majority of metropolitan areas that have facilities (105 out of 141), and these metropolitan areas are widely distributed throughout the country. The magnitude of these disparities is often quite substantial. Moreover, these disparities are not confined to a single racial group but can be found among African Americans, Hispanics and Asians/Pacific Islanders. The significant disparities found when separately examining the nation's metropolitan areas as a whole, as well as individual metropolitan areas, demonstrate the robustness of the findings and underscore those of the EPA regional and state analyses.

The Race Factor

Toxic Wastes and Race in the United States found race to be more important than socioeconomic status in predicting the location of the nation's commercial hazardous waste facilities. Thus, it is appropriate to ask whether racial disparities reported above in the current distribution of hazardous wastes are a function of neighborhood socioeconomic characteristics. Because race is often highly correlated with socioeconomic status, it is difficult to tell if race plays an independent role in accounting for facility locations without conducting statistical tests (i.e., multivariate analyses) to isolate the effect of race alone.

To determine the independent effect of race, socioeconomic factors believed to be associated with race must be statistically controlled. A number of income, occupation, employment and education variables were selected to serve as indicators of neighborhood socioeconomic characteristics (see Methods Appendix).

Table 4.7 shows the results of the multivariate analysis with the race and socioeconomic variables separately grouped. All race variables (percentages of Hispanics, African Americans and Asians/Pacific Islanders) are highly significant independent predictors of the facility locations (at the 0.000 level). The positive coefficient (B) indicates that the higher the people of color percentages, the more likely a census tract is to be within 3 kilometers of a commercial hazardous waste facility. Among the indicators of socioeconomic status, mean income and percent employed in blue collar occupations are significant predictors (at the 0.000 level). These variables are therefore independently associated with hazardous waste facility locations. Mean housing value is statistically significant, but in an unexpected direction (i.e., it has a positive coefficient).

Some socioeconomic variables are not statistically significant. For example, the percentage employed in management and professional (i.e., white collar) occupations is not a significant predictor. Likewise, the percentage of persons with a college degree does not quite achieve the threshold needed to be considered statistically significant, though it is trending that way. It also has a positive coefficient, which is in the unexpected direction.

> *The results show that race continues to be a significant and robust predictor of commercial hazardous waste facility locations when socioeconomic and other non-racial factors are taken into account.*

The results show that race continues to be a significant and robust predictor of commercial hazardous waste facility locations when socioeconomic and other non-racial factors are taken into account. A separate analysis of metropolitan areas alone produces similar results (see Appendix 4.10).

Table 4.7 – Multivariate Analysis Comparing Independent Effect of Race on Facility Location (Logistic Regression)

	Coefficient (B)	Est. Odds Ratio (Exp(B))	Significance Level
Race/Ethnicity			
% Hispanic or Latino	2.222	9.226	**0.000**
% African American	1.752	5.768	**0.000**
% Asian/Pacific Islander	3.583	35.964	**0.000**
Socioeconomic Status Indicators			
Mean Household Income ($1000s)	-0.011	0.989	**0.000**
Mean Housing Value ($1000s)	0.001	1.001	**0.002**
% with 4-Year College Degree	0.769	2.158	0.058
% Employed in Professional "White Collar" Occupations	-0.695	0.499	0.167
% Employed in "Blue Collar" Occupations	2.427	11.321	**0.000**
Constant	-4.453	0.012	**0.000**
-2 Log Likelihood	16977.135		
Model X^2 (df=8)	1683.086		**0.000**

NOTES: Analysis uses 2000 Census tract data and *50% areal containment method* with a 3-kilometer circular radius (see Ch. 3). See Methods Appendix for definitions of "white collar" and "blue collar" occupations.

Conclusions

Twenty years after the release of *Toxic Wastes and Race in the United States,* significant racial and socioeconomic disparities persist in the distribution of the nation's commercial hazardous waste facilities. Although the current assessment uses newer methods to ensure that only nearby populations are counted, the conclusions are very much the same as they were in 1987. People of color and persons of low socioeconomic status are still disproportionately impacted and are particularly concentrated in neighborhoods and communities with the greatest number of facilities. Indeed, a watershed moment has occurred in the last decade. People of color now comprise a majority in neighborhoods with commercial hazardous waste facilities, and much larger (over two-thirds) majorities can be found in neighborhoods with clustered facilities.

This current appraisal also reveals that racial disparities are also widespread throughout the country – whether one examines EPA regions, states or metropolitan areas, where the lion's share of facilities is located. Moreover, race continues to be a stronger predictor of facility locations than other factors often considered to be associated with race.

Significant racial and socioeconomic disparities exist today despite the considerable societal attention to the problem noted in previous chapters. These findings raise serious questions about the ability of current policies and institutions to adequately protect people of color and the poor from toxic threats.

Significant racial and socioeconomic disparities exist today despite the considerable societal attention to the problem noted in previous chapters These findings raise serious questions about the ability of current policies and institutions to adequately protect people of color and the poor from toxic threats.

In 1994, in their introduction to *Toxic Wastes and Race Revisited,* John Rosenthall of the NAACP and Charles Lee of the UCC Commission for Racial Justice remarked about "the continuing need for vigilance and action to ensure people of color are no longer disproportionately exposed to health and environmental risks" (Goldman and Fitton, 1994: 1). These words are still relevant over a decade later. It remains clear that much more concerted attention is needed to address these persistent disproportionate environmental burdens on this twentieth anniversary of *Toxic Wastes and Race in the United States*.

Endnotes

[1] The 1993 findings used estimates based on 1990 Census data.

[2] The explosion in Danvers destroyed or damaged 70 houses and businesses.

[3] Studies of the impacts of hazardous waste facilities are too numerous to list here. For examples, see Methods Appendix.

[4] For a description of the construction of these variables and Census data sources, see Methods Appendix.

[5] Note that 147 of the 413 host neighborhoods (36%) have a majority of people of color (see Appendix 4.3).

[6] To streamline the presentation, education and employment variables are omitted from subsequent tables, except for the table showing the results of the multivariate analysis, which examines the role of race and various indicators of socioeconomic status in accounting for the location of hazardous waste in the U.S. Poverty rates, mean household income and mean housing values are nevertheless shown in the following analyses of clustered facilities, states, EPA regions and metropolitan areas.

[7] A total of 49 clustered facility neighborhoods (42 with two facilities, five with three facilities, one with four facilities and one with six facilities) and 304 non-clustered facility neighborhoods were delineated. Thus, clustered facility neighborhoods and non-clustered facility neighborhoods contain 109 and 304 facilities, respectively. Most analyses reported, however, involve the combined clustered and non-cluster facility neighborhoods. See Figures 3.1E and 3.1F for an illustration of neighborhoods with clustered facilities.

[8] For accounts of the indigenous environmental movement, see Clark (2002), LaDuke (1995) and Weaver (1995). For studies of abandoned hazardous wastes and other toxic threats, such as nuclear, military and mining wastes impacting Native Americans, Alaskan Natives and Native Hawaiians, see, e.g., Blackford, 2004; Grinde and Johansen, 1995; and Hooks and Smith, 2004.

[9] Similar analyses also were conducted of 3 kilometer host neighborhoods of hazardous waste landfills and incinerators compared to host neighborhoods of all other commercial hazardous waste facilities. For this comparison, facilities were classified according to their Standard Industrial Codes (SIC) and North American Industry Classification System (NAIC), hierarchical coding systems that classify all economic activity in various industry sectors. These codes were obtained from Envirofacts. Thus, people of color percentages were examined for host neighborhoods of 120 commercial hazardous waste facilities with an SIC code of 4953 ("Refuse Systems") and NAIC code of 592211 ("Hazardous Waste Treatment and Disposal"). The results very closely parallel those presented and therefore are not reported, but may be requested from the author.

[10] In Region 5, 28 of 85 (33%) of host neighborhoods are majority people of color (i.e., people of color percentages are greater than 50%). The number of majority people of color host neighborhoods in Regions 1, 4, 6 and 9, respectively: 3 of 23 (13%), 28 of 65 (43%), 28 of 61 (46%) and 43 of 55 (73%).

[11] States without racial disparities include North Dakota, Nebraska, New Mexico and Idaho.

[12] Disparities in Hispanic percentages are statistically significant for 21 states. Disparities in African American and Asian/Pacific Islander percentages are statistically significant for 25 and 11 states, respectively.

References

Anderton, Douglas L., Anderson, Andy B., Oakes, John Michael, & Fraser, Michael R. (1994). Environmental equity: The demographics of dumping. *Demography, 31*(2), 229-248.

Baibergenova, Akerke, Kudyakov, Rustam, Zdeb, Michael, & Carpenter, David O. (2003). Low birth weight and residential proximity to PCB-contaminated waste sites. *Environmental Health Perspectives, 111*(10), 1352-1357.

Been, Vicki (1995). Analyzing evidence of environmental justice. *Journal of Land Use & Law, 11*(1), 1-36.

Been, Vicki, & Gupta, Francis (1997). Coming to the nuisance or going to the barrios? A longitudinal analysis of environmental justice claims. *Ecology Law Quarterly, 24*(1), 1-56.

Blackford, Mansel G. (2004). Environmental justice, native rights, tourism, and opposition to military control: The case of Kaho'olawe. *Journal of American History, 91*(2), 544-571.

Bullard, Robert D. (1983). Solid waste sites and the black Houston community. *Sociological Inquiry, 53*, 273-288.

Bullard, Robert D. (1990). *Dumping in Dixie: Race, class and environmental quality*. Boulder, CO: Westview Press.

Bullard, Robert D. (Ed.) (1993). *Confronting environmental racism: Voices from the grassroots*. Boston: South End Press.

Bullard, Robert D., & Wright, Beverly Hendrix (1987). Blacks and the environment. *Humboldt Journal of Social Relations, 14*(1/2), 165-184.

Clark, Brett (2002). The indigenous environmental movement in the United States. *Organization & Environment, 15*(4), 410-442.

Cole, Luke W., & Foster, Sheila R. (2001). *From the ground up: Environmental racism and the rise of the environmental justice movement*. New York: New York University Press.

Commission for Racial Justice (1987). *Toxic wastes and race in the United States: A national report on the racial and socioeconomic characteristics of communities with hazardous waste sites*. New York: United Church of Christ.

Corburn, Jason (2005). *Street science: Community knowledge and environmental health justice*. Cambridge, MA: MIT Press.

Daley, Beth (2006). Oversight gap cited on waste at Danvers site. *Boston Globe* (Nov. 29). Retrieved from http://www.boston.com/news/local/articles/2006/11/29/oversight_gap_cited_on_waste_at_danvers_site/.

Davidson, Pamela, & Anderton, Douglas L. (2000). The demographics of dumping II: Survey of the distribution of hazardous materials handlers. *Demography, 37*(4), 461-466.

Dolk, H., Vrijeid, M., Armstrong, B., Abramsky, L., Bianchi, F., Game, E., Nelen, V., Robert, E., Scott, J.E.S., Stone, D., & Tenconi, R. (1998). Risk of congenital anomalies near hazardous waste landfill sites in Europe: The EUROHAZCON study. *The Lancet, 352*, 423-427.

Edelstein, Michael R. (2004). *Contaminated communities: Coping with residential toxic exposure* (2d ed.). Cambridge, MA: Westview Press.

Elliot, S., Taylor, S.M., Walter, S., Stieb, D., Frank, J., & Eyles, J. (1993). Modeling psychological effects of exposure to solid waste facilities. *Social Science and Medicine, 37*(6), 805-812.

Environmental Information Ltd. (2001/2002). *Environmental services directory*. (Online paid subscription service and database). Edina, MN: Environmental Information Ltd. (Available at http://www.envirobiz.com/newSearch/EnvSerDir.asp).

Environmental Systems Research Institute (2000). *StreetMap USA*. Redlands, CA: ESRI Inc.

Fielder, H.M.P., Poon-King, C.M., Palmer, S.R., Moss, N., & Coleman, G. (2000). Assessment of impact on health of residents living near the Nant-y-Gwyddon landfill site: Retrospective analysis. *British Medical Journal, 320*, 19-22.

Gerschwind, Sandra A., Stolwijk, Jan, Bracken Michael, Fitzgerald, Edward, Stark, Alice, Olsen, Carolyn, & Melius, James (1992). Risk of congenital malformations associated with proximity to hazardous waste sites. *American Journal of Epidemiology, 135*, 1197-1207.

GeoLytics Inc. (1998). *Census CD+Maps Version 3.0*. New Brunswick, NJ: GeoLytics Inc.

GeoLytics Inc. (2000). *StreetCD 99*. New Brunswick, NJ: GeoLytics Inc.

GeoLytics Inc. (2002). *Census 2000*. New Brunswick, NJ: GeoLytics Inc.

Goldman, Benjamin A., & Fitton, Laura (1994). *Toxic wastes and race revisited: An update of the 1987 report on the racial and socioeconomic characteristics of communities with hazardous waste sites*. Washington, D.C.: Center for Policy Alternatives.

Grinde, Donald A., & Johansen, Bruce E. (1995). *Ecocide of Native America: Environmental destruction of Indian lands and peoples*. Santa Fe, NM: Clear Light.

Hooks, Gregory, & Smith, Chad (2004). The treadmill of destruction: National sacrifice areas and Native Americans. *American Sociological Review, 69*, 558-575.

Jacobson, Matthew Frye (1998). *Whiteness of different color: European immigrants and the alchemy of race*. Cambridge, MA: Harvard University Press.

Jayadev, Raj (2007). Silicon Valley's dirty secret. *Metro Silicon Valley* (Jan. 3-9). Retrieved from http://www.metroactive.com/metro/01.03.07/environmental-racism-0701.html.

LaDuke, Winona (1999). *All our relations: Native struggles for land and life*. Cambridge, MA: South End Press.

Mohai, Paul (1995). The demographics of dumping revisited: Examining the impact of alternate methodologies in environmental justice research. *Virginia Environmental Law Journal, 14*, 615-653.

Mohai, Paul, & Bryant, Bunyan (1992). Environmental racism: Reviewing the evidence. In Bunyan Bryant & Paul Mohai (Eds.), *Race and the incidence of environmental hazards: A time for discourse* (163-176). Boulder, CO: Westview Press.

Mohai, Paul, & Saha, Robin (2006). Reassessing racial and socioeconomic disparities on environmental justice research. *Demography, 43*(2), 383-389.

Mohai, Paul, & Saha, Robin (2007). Racial inequality in the distribution of hazardous waste: A national-level reassessment. *Social Problems*. Forthcoming.

Nelson, Arthur C., Genereux, Michelle, & Genereux, John (1992). Price effects and landfills on house values. *Land Economics, 68*(4), 359-365.

Oakes, John Michael, Anderton, Douglas L., & Anderson, Andy B. (1996). A longitudinal analysis of environmental equity in communities with hazardous waste facilities. *Social Science Research, 23*, 125-148.

Pastor, Manual, Sadd, Jim, & Morello-Frosch, Rachel (2004). Waiting to inhale: The demographics of toxic air releases in 21st century California. *Social Science Quarterly, 85*(2), 420-440.

Pulido, Laura, Sidawi, Steve, & Vos, Robert O. (1996). An archaeology of environmental racism in Los Angeles. *Urban Geography, 17*(5), 419-439.

Ringquist, Evan J. (2005). Assessing evidence of environmental inequalities: A meta-analysis. *Journal of Policy Analysis and Management, 24*(2), 223-247.

Rhodes, Edwardo L. (2002). The challenge of environmental justice measurement and assessment. *Policy and Management Review, 2*(1), 86-110.

Saha, Robin, & Mohai, Paul (2005). Historical context and hazardous waste facility siting: Understand temporal trends in Michigan. *Social Problems, 52*(4), 618-648.

Targ, Nicholas (2005). The states' comprehensive approach to environmental justice. In David Naguib Pellow and Robert J. Brulle (Eds.), *Power, justice and the environment: A critical appraisal of the environmental justice movement* (171-184). Cambridge, MA: The MIT Press.

Taylor, Dorceta E. (1998). Mobilizing for environmental justice in communities of color: An emerging profile of people of color environmental groups. In Jennifer Aley, William R. Burch, Beth Canover and Donald Field (Eds.), *Ecosystem management: Adaptive strategies for natural resource organizations in the 21st century* (32-67). Philadelphia: Taylor & Francis.

U.S. Bureau of the Census (1993). LandView III (RCRIS and other computer files on CD-ROM). Washington, D.C.: U.S. EPA and U.S. Department of Commerce, Bureau of the Census.

U.S. Bureau of the Census (2002). *2000 Census of population and housing, Technical documentation summary file 3*. Washington, D.C.: U.S. Department of Commerce, Economic Statistics Administration. Available at http://www.census.gov/prod/cen2000/doc/sf3.pdf.

U.S. Environmental Protection Agency (1992). *Hazard ranking system guidance manual*. Washington, D.C.: Office of Solid Waste and Emergency Response.

U.S. Environmental Protection Agency (2001a). *National biennial reporting system*. Washington, D.C.: Office of Solid Waste and Emergency Response. Available at ftp://ftp.epa.gov/rcrainfodata/brfiles/.

U.S. Environmental Protection Agency (2001b). *Biennial report module introduction*. Washington, D.C.: Office of Solid Waste and Emergency Response. Available at http://www.epa.gov/epaoswer/hazwaste/data/brs99/brshelp.pdf.

U.S. Environmental Protection Agency (2001c). *National analysis: The national biennial RCRA hazardous waste report (based on 1999 data)*. Washington, D.C.: Office of Solid Waste and Emergency Response, EPA-530-R-01-009. Available at http://www.epa.gov/epaoswer/hazwaste/data/brs99/99_n_a.pdf.

U.S. Environmental Protection Agency (2001d). *List of large quantity generators: The national biennial RCRA hazardous waste report (based on 1999 data)*. Washington, D.C.: Office of Solid Waste and Emergency Response, EPA-530-R-01-013. Available at http://www.epa.gov/epaoswer/hazwaste/data/brs99/99_lqg.pdf.

U.S. Environmental Protection Agency (2001/2002). *Envirofacts data warehouse*. (Data accessed online through technical user platform from approximately March 2001 to June 2002.) See http://www.epa.gov/enviro/html/technical.html.

U.S. Environmental Protection Agency (2003). *National biennial RCRA hazardous waste report: Based on 2001 data*. Washington, D.C.: Office of Solid Waste and Emergency Response, EPA 530-R-03-007. Available at http://www.epa.gov/epaoswer/hazwaste/data/biennialreport/index.htm.

Vrijheid, M., Dolk, H., Armstrong, B., Boschi, G., Busby, A., Jorgensen, T., & Pointer, P. (2002). Hazard potential ranking of hazardous waste landfill sites and risk of congenital anomalies. *Journal of Occupational and Environmental Medicine, 59*, 768-776.

Weaver, Jace (1995). *Defending mother Earth: American Indian perspectives on environmental justice*. Maryknoll, NJ: Orbis Books.

Wessex Inc. (1994). *1990 census of population and housing*. Summary Tape Files 1A and 3A. Washington, D.C.: U.S. Bureau of the Census (producer). Winnetka, IL: Wessex Inc. (distributor).

Methods Appendix

This appendix supplements the Data and Analysis section of this chapter by providing additional technical information regarding the data sources and analytic methods used in this chapter.

Procedures for Identifying Commercial Hazardous Waste Facilities

Data from the U.S. EPA's Biennial Reporting System (BRS) for the 1999 reporting year was used to develop an initial list of 517 commercial hazardous waste facilities, i.e., that accept off-site wastes for pay (U.S. EPA, 2001a, 2002b). The Environmental Service Directory (ESD) was used to identify facilities that might have been omitted from the BRS, due to poor reporting to EPA by state agencies or the companies themselves (Environmental Information Ltd. 2001/2002). This yielded an additional 38 facilities. Governmental facilities, such as those operated by the Departments of Defense and Energy, were removed. A total of 499 facilities resulted from these procedures.

Using contact information from the BRS, EPA's Resource Conservation and Recovery Information System (RCRIS) and EPA's Envirofacts Data Warehouse, attempts were made to contact each facility by phone to verify its current operating status and determine that it indeed accepted hazardous wastes as a commercial enterprise under Subtitle C of Resource Conservation and Recovery Act (RCRA) or associated state statute (U.S. Bureau of the Census, 1993; U.S. EPA, 2001a; U.S.EPA, 2001/2002).[1] Calls were made between October 2001 and August 2002. Contacts typically included the facility owner/operator and, in some cases, the parent company. If initial phone contact was not able to provide information needed, members of the research team requested to speak with other company personnel. Facility address information for precisely mapping facility locations also was obtained through these contacts, since address information in the environmental databases sometimes pertained to a business or corporate office rather the facility itself. For a small number of facilities that could not be contacted, for example, those that had gone out of business since 1999, regulatory agencies were contacted. On the basis of these contacts, facilities that were not operating or handling hazardous wastes in 1999 were excluded from the list. In the end, 413 commercial hazardous waste facilities were identified.[2]

Mapping Facility Locations

Facility locations were initially mapped digitally (geocoded), using facility address information and ArcView GIS Version 3.2 (GIS software), StreetMap USA (geoding software) and TIGER/Line® Files (street files) (ESRI, 2000; GeoLytics, 2000). Because not all facilities could be geocoded, due to having address information that did not match the digital street files, facility locations were obtained through phone calls with the facility owners/operators. Phone calls also were used to verify the location of facilities that did geocode. Facility contacts were asked to give driving directions to the facility from a given intersection. In some cases, where these contacts could not provide the information, locations were verified by EPA and state agencies. For a small number of facilities without contacts or with streets or other digitally mapped landmarks that did not provide adequate guidance for verifying locations, other procedures were used. In these instances, facility contacts provided site maps or areal photographs that also showed nearby streets or other landmarks. These site maps were used to "place" facilities at point locations using GIS. Thus, the location of all facilities was verified through the facility contacts. The final mapped locations are shown in the cover of this report.

One limitation of the digital mapping and verification process was that site visits were not made. Although the actual locations may differ slightly from those mapped, it is believed that any discrepancies are very minimal in relation to the size of the host neighborhoods examined. Chapter 3 illustrated the stability of the demographic data at various distances around the facility (also see Mohai and Saha, 2007). Thus, any slight locational inaccuracies that may exist are not believed to have appreciably affected the estimated racial and socioeconomic characteristics of the surrounding host neighborhoods within 3 kilometers of the facilities. The other limitation is that a point location was used for a given facility rather than the physical footprint. This could result in an underestimation of the potentially affected population living in close proximity to the site.

Variable Construction

Variables used in the study were constructed from 1990 and 2000 Census data (Wessex, 1996; GeoLytics, 2000). Table 4A below shows the data files (STF1 and STF3 for 1990, and SF3 for 2000),[3] Census tables and categories therein used to construct each variable.

Table 4A – 1990 and 2000 Census Tables and Categories Used to Construct Racial/Ethnic and Socioeconomic Variables

Variable	1990 Census (SF3 unless indicated)	2000 Census (SF3)
Total Pop. (1000s)	Table P1: Total Persons	Table P1: Total Persons
% People of Color	Table P12: Hispanic Origin by Race, Category 1 (not Hispanic origin – white); Table P1: Total Persons	Table P7: Hispanic or Latino by Race, Categories 1 (total population) and 3 (not Hispanic or Latino, white alone)
% African American	Table P8: Race, Category 2 (Black); Table P1: Total Persons	Table P6: Race, Categories 1 (Total persons) and 3 (Black or African American alone)
% Hispanic or Latino	Table P10: Persons of Hispanic Origin; Table P1: Total Persons	Table P7: Hispanic or Latino by Race, Categories 1 and 10
% Asian/Pacific Islander[4]	Table P8: Race, Category 4 (Asian or Pacific Islander); Table P1: Total Persons	Table P6: Race, Categories 1, 5 and 6 (Total persons; Asian alone; and Native Hawaiian and other Pacific Islander alone)
% Native American	Table P8: Race, Category 3 (American Indian, Eskimo, or Aleut); Table P1: Total Persons	Table P6: Race, Categories 1 and 4 (Total persons; and American Indian and Alaskan Native alone)
Poverty Rate[5]	Table P119: Poverty Status in 1989 by Race and Age, Categories 36-70 (and 1-70)	Table P87: Poverty Status in 1999 by Age, Categories 1 and 2
Mean Household. Income	Table P81: Aggregate Household Income in 1989, Categories 1 and 2; Table P5: Households	Table P54: Aggregate Household Income in 1999 (Dollars), Category 1; Table P52: Household Income in 1999, Category 1
Mean Owner Occupied Housing Value	Table H24: Aggregate Value (specified owner occupied housing units); Table H25: Race of Householder, Categories 1-5 (STF1)	Table H81: Aggregate Value (Dollars) for Specified Owner-Occupied Housing Units by Mortgage Status; Category 1; Table H80: Mortgage Status, Category 1
% with 4-Year College Degree	Table P57: Educational Attainment (Persons 25 years and over), Categories 6 and 7 (and 1-7)	Table P37: Sex by Educational Attainment for the Population 25 Years and Over, Categories 1, 15-18, and 32-35
% Professional "White Collar" Occupations[6]	Table P78: Occupation, Categories 1 and 2 (and 1-13)	Table P50: Sex by Occupation for the Employed Civilian Population 16 Years and Over, Categories 1, 3, and 50
% Employed in "Blue Collar" Occupations[7]	Table P78: Occupation, Categories 10-13 (and 1-13)	Table P50: Sex by Occupation for the Employed Civilian Population 16 Years and Over, Categories 1, 35, 41, 82, and 88

In 1990, the Census Bureau defined five racial categories (White; Black; American Indian, Eskimo or Aleut; Asian or Pacific Islander; and Other Race). In 2000, seven categories were defined (White alone; Black or African American alone; American Indian and Alaska Native alone; Asian alone; Native Hawaiian and Other Pacific Islander alone; Some other race alone; and Two or more races). Nevertheless, all variables used in this study, with the exception of percent employed in "white collar" and "blue collar"

69

occupations can be compared reliably between 1990 and 2000 (see below and notes 4, 6 and 7).

Because the Census Bureau defines Hispanic or Latino as an ethnic rather than as a racial category, Hispanics or Latinos may belong to any race (i.e., racial category) defined for 1990 and 2000. Thus, because some Hispanics and Latinos self-identify as "White" in responding to the race question on the Census questionnaire, one cannot simply count persons belonging to non-white race categories to count all people of color, since one would omit white Hispanics or Latinos who self-identified as White. Therefore, to compute the people of color population, the non-Hispanic White (i.e., non-Latino White) population was simply subtracted from the total population for both 1990 and 2000.[8]

Circular Buffer Radius

The application of distance-based methods to analyze racial and socioeconomic characteristics of hazardous waste facility neighborhoods involved the use of circular buffers of 3 kilometer radii (approximately 1.8 miles) centered at each facility. For clustered facility neighborhoods (see Chapter 3 and Figures 3.1E and 3.1F), the overlaps between the buffers were dissolved. A 3-kilometer radius was chosen because it falls within the radius that numerous studies have noted adverse health and property value impacts. See, e.g., Baibergenova et al. (2003); Dolk et al. (1998); Fielder et al. (2000); Gerschwind et al. (1992); Nelson, Genereux, and Genereux (1992); and Vrijheid et al. (2002). Perceptions of risk, and thus quality of life impacts, also vary with distance from waste sites (Edelstein, 2004; Elliot et al., 1993).

Similarly, the Superfund Hazard Ranking System defines affected populations to be those who live within a four-mile radius (6.4 km.) of sites having groundwater contamination and/or airborne contamination within a one-mile (1.6 km.) radius of sites having soil contamination only, and within 15 miles downstream of where contaminants enter surface water (U.S. EPA, 1992). It should be noted that for Superfund sites hazardous wastes already have been released into the environment. Though commercial hazardous waste facilities pose risks of environmental contamination, for example, through accidents and spills (Daley, 2006; Jayadev, 2007), they are designed to prevent dangerous environmental releases. They may nevertheless end up on the Superfund list of contaminated sites.

Procedures for Assessing Racial and Socioeconomic Disparities

The *areal apportionment method* (see Chapter 3) was used to estimate the racial and socioeconomic characteristics within 3 kilometers of the 413 commercial hazardous waste facilities, i.e., clustered and non-clustered host neighborhoods combined. Resulting values represent the total population (non-sample) characteristics of the combined host neighborhoods and are not averages of smaller units such as zip code areas or census tracts. The analysis of neighborhoods with clustered and non-clustered facilities (see above) was conducted for the nation as a whole and for EPA regions, again using the *areal apportionment method*. Separate tabulations of clustered and non-clustered facilities combined were prepared for EPA regions and states. Racial and socioeconomic disparities also were assessed for the metropolitan area facilities. In this national-level analysis, non-host areas were defined as all areas in any of the nation's 331 metropolitan areas that lie beyond 3 kilometers of a commercial hazardous waste facility.[9]

Statistical Tests

Bivariate statistical tests (independent samples T-tests) were conducted to determine if differences in racial and socioeconomic characteristics between host neighborhoods and non-host areas are statistically significant. Multivariate analyses (logistic regressions) were similarly used to determine if race continues to be a strong predictor of facility locations independent of neighborhood socioeconomic characteristics. Because individual units of analysis were required to make statistical comparisons, the *50% areal containment method* was used for these tests because it employs complete geographic units, 2000 Census tracts in this case (see Chapter 3 for a description of the *50% areal containment method*). For T-tests, tracts were coded as *1s* or *0s* depending on whether 50% of the tract area was within 3 kilometers of one or more commercial hazardous waste facility (see Figure 3.1C), and mean values for the two sets of tracts were compared. Separate tests were conducted for all census tracts in the entire U.S. and for all metropolitan area tracts.[10] Significance levels are reported for these comparisons, e.g., (p<0.001), but to

streamline the presentation, group statistics (e.g., differences in means) are not reported.

T-tests also were conducted for each of the 10 EPA regions and for each of the 44 states with a commercial hazardous waste facility. The number of regions and states with significant racial and socioeconomic disparities are reported. Although statistical significance is defined as $p<0.05$, 90% of the statistically significant differences in people of color percentages for EPA regions were significant at $p<0.001$, and 70% of the statistically significant differences for states were significant at $p<0.001$. The detailed results may be requested from the author (see Table 4.2–4.4. and Appendices 4.2–4.7 for the total population statistics of host neighborhoods and non-host areas for EPA Regions and states).

The same coding of tracts was used for the multivariate (logistic regression) analysis, whereby the dependent variable took a value of 1 for host neighborhood tracts (i.e., tracts within 3 kilometers of a facility) and a value of 0 for non-host area tracts. The analysis was repeated twice, once using all census tracts in the United States and again using metropolitan area tracts only (see Table 4.7 and Appendix 4.10. In selecting income, occupation, employment and education variables to serve as indicators of neighborhood socioeconomic characteristics, it was necessary to avoid including variables that are too highly correlated, a condition known as multicollinearity. For example, because people of color percentages are highly correlated with African American and Latino percentages, including these variables together could confound the statistical tests. To reduce problems of multicollinearity, the same variables were selected as were used in "Reassessing Racial and Socioeconomic Disparities in Environmental Justice Research," a recent paper published in *Demography* (Mohai and Saha, 2006).

Methods Appendix Notes

[1] The Envirofacts Data Warehouse contains environmental data from a variety of sources and includes databases we also consulted directly. EPA and state regulatory agencies regularly update information to Envirofacts. For example, Envirofacts contains Resource Conservation and Recovery Act Information (RCRAInfo), which is an updated version of RCRIS. Technical user permission was obtained from EPA to access the most current and complete Envirofacts data.

[2] The original 1987 UCC report (CRJ, 1987) and the 1994 update (Goldman and Fitton, 1994) used universes of 415 and 530 facilities, respectively. In their national studies, Been (1995) and Been and Gupta (1997) used a universe of 608 facilities, whereas Anderton et al. (1994) and Oakes, Anderton, and Anderson (1996) had universes of 454 and 476 facilities, respectively. Because Mohai and Saha replicated Been and Gupta's studies using the same universe of 608 facilities but applying distance-based methods (see Mohai and Saha, 2006, 2007), it was possible to determine that 298 facilities used in Professor Been's studies were among the 413 facilities used in this study. Four additional facilities included in a longer list of 623 facilities provided by Professor Been and not used in her studies, however, also were among our new universe of 413 facilities. See Saha and Mohai (2005) for a recent review of the prior studies of commercial hazardous waste facilities.

[3] The designations STF and SF refer to Summary Tape File (1990) and Summary File (2000), respectively, and the numerical designations (1 and 3) refer to different statistical sampling methods used.

[4] The percent Asian/Pacific Islander variable was constructed for 2000 using the Asian alone and Native Hawaiian and Other Pacific Islander alone categories (see Table 4A). The inclusion of the latter category, which was not in Table P8 in 1990, is not believed to affect the comparability of the variable from 1990 to 2000, because of the very small number of Native Hawaiians and other Pacific Islanders (0.13% for U.S.) and the likelihood that many were counted within the Asian or Pacific Islander category in 1990.

[5] The poverty level is set by the Office of Management and Budget (OMB) and is periodically adjusted for inflation and other factors.

[6] For 1990, the variable defined as "professional white collar" included employed persons 16 years old and over belonging to either of the following two categories (out of 13 occupational categories): (1) executive, administrative and managerial and (2) professional specialty occupation. For the 2000 Census, persons employed in professional white collar occupations included persons 16 years old and over belonging to the following single category: management, professional and related occupations. This category, however, includes two subcategories (management, business and financial operations; and professional and related occupations). The change in occupational categories from the 1990 to 2000 Census resulted from major revisions to the 2000 Standard Occupation Classification (SOC) Manual and hamper the comparability between 1990 and 2000 (see U.S. Bureau of Census 2002: B23-26).

[7] For the 1990 Census, we defined "blue collar" occupations as those that included the followed four occupational categories: (1) precision, production, craft and repair; (2) machine operators, assemblers, inspectors; (3)

transportation and material moving operators and (4) handlers, equipment cleaners, helpers and laborers. For 2000, "blue collar" was defined as belonging to either of following two occupational categories: (1) construction, extraction, and maintenance; and (2) production, transportation and material moving. These changes in categories hamper the comparability of 1990 and 2000 occupation data (see U.S. Bureau of Census, 2002: B23-26).

[8] Thus, for 2000, people of color included white Hispanics or Latinos, and persons belonging to all six non-white alone race categories, including persons of two or more races (i.e., multiracial persons). The 2000 Census reported 7.3 million multiracial persons in the United States, or 2.6% of the population. In 1990, the numbers of multiracial persons may have been smaller, but they were not tabulated; multiracial persons had to identify with one race. It is nevertheless likely that many self-identified in one of the four non-white race categories, such as "Other Race." Although some may have been counted among the white population in 1990, their relatively small numbers in 1990 and the likelihood that many identified as non-white, suggests that the percentage of people of color, though necessarily defined in a slightly different manner in 1990 and 2000, can nevertheless be reliably compared.

[9] The rationale for including all metropolitan areas in the comparison was that many metropolitan areas without facilities nevertheless generate hazardous wastes that are either handled on-site or shipped to other metropolitan areas or rural areas with commercial hazardous waste facilities. This was determined through a cursory examination of the 20,000 Large Quantity Generators listed in the BRS (U.S. EPA, 2001a, 2001d). If metropolitan areas that are generating hazardous waste and enjoying associated economic benefits of jobs and taxes are exporting their waste to other metropolitan areas, then it would be appropriate to include those other hazardous-waste generating areas in the comparison. Although this assumption was not conclusively verified, it was found to be reasonable. See, e.g., Davidson and Anderton (2000) for evidence of the wide geographic distribution of hazardous waste generators. Also see Mohai (1995) for a discussion of considerations in selecting an appropriate comparison population.

[10] T-tests were also conducted to compare tracts comprising clustered host neighborhoods to those comprising non-clustered host neighborhoods.

Appendix 4.1 – Racial and Socioeconomic Characteristics for Clustered and Non-Clustered Facility Host Neighborhoods

	Clustered	Non-Clustered	Difference	Ratio
Race/Ethnicity				
% People of Color	68.8%	50.6%	18.2%	1.36
% African American	29.1%	15.9%	13.2%	1.83
% Hispanic or Latino	33.4%	24.6%	8.8%	1.36
% Asian/Pacific Islander	4.3%	7.8%	-3.5%	0.55
% Native American	0.7%	0.7%	0.0%	0.94
Socioeconomics				
Poverty Rate	21.6%	16.8%	4.8%	1.29
Mean Household Income	$44,587	$49,614	-$5,027	0.90
Mean Housing Value	$121,203	$140,992	-$19,789	0.86

NOTES: Differences and ratios are between values for host neighborhood with clustered and non-clustered facilities. Differences may not precisely correspond to other values due to rounding off. Mean housing values pertain to owner-occupied housing units.

Appendix 4.2 – People of Color Percentages for Clustered and Non-Clustered Facility Host Neighborhoods by EPA Region

EPA Region	Clustered	Non-Clustered	Difference	Ratio
Region 1	39.6%	35.5%	4.2%	1.12
Region 2	52.6%	51.3%	1.3%	1.03
Region 3	32.0%	23.1%	8.9%	1.38
Region 4	63.3%	52.7%	10.7%	1.20
Region 5	62.3%	45.7%	16.6%	1.36
Region 6	61.8%	63.0%	-1.2%	0.98
Region 7	58.6%	25.4%	33.2%	2.31
Region 8	54.7%	26.0%	28.7%	2.10
Region 9	88.9%	74.8%	14.1%	1.19
Region 10	N/A	38.9%	N/A	N/A

NOTE: Differences may not precisely correspond to other values due to rounding off.

Appendix 4.3 – People of Color Percentages by EPA Region and State[1]

EPA Region/State	Sites[2]	Majority People of Color Sites[3]	Host Neighborhoods	Non-Host Areas	Difference[4]	Ratio
Region 1						
Connecticut	4	1	49.0%	21.3%	27.7%	2.30
Maine	2	0	7.8%	3.4%	4.4%	2.31
Massachusetts	12	1	33.5%	17.2%	16.3%	1.95
Rhode island	3	1	39.6%	14.6%	25.0%	2.71
Vermont	2	0	4.4%	3.9%	0.5%	1.13
Region 2						
New Jersey	14	3	54.8%	33.0%	21.9%	1.66
New York	18	2	50.3%	37.3%	13.0%	1.35
Region 3						
Maryland	3	1	44.8%	37.8%	7.0%	1.19
Pennsylvania	23	0	16.5%	15.9%	0.6%	1.04
Virginia	9	0	36.1%	29.8%	6.3%	1.21
West Virginia	2	0	10.2%	5.4%	4.8%	1.89
Region 4						
Alabama	8	3	66.3%	29.3%	36.9%	2.26
Florida	13	5	52.7%	34.3%	18.4%	1.54
Georgia	12	7	55.6%	37.0%	18.6%	1.50
Kentucky	9	1	51.5%	10.0%	41.5%	5.14
Mississippi	3	2	50.6%	39.1%	11.5%	1.29
North Carolina	10	4	55.9%	29.4%	26.5%	1.90
South Carolina	4	3	43.9%	33.8%	10.2%	1.30
Tennessee	6	3	53.8%	20.4%	33.4%	2.64
Region 5						
Illinois	16	10	67.9%	30.8%	37.1%	2.21
Indiana	16	4	41.2%	13.1%	28.1%	3.14
Michigan	19	8	65.7%	19.2%	46.5%	3.43
Minnesota	10	2	34.4%	10.3%	24.1%	3.33
Ohio	21	4	39.0%	15.3%	23.7%	2.55
Wisconsin	3	0	35.6%	12.4%	23.2%	2.87
Region 6						
Arkansas	5	2	51.6%	21.3%	30.4%	2.43
Louisiana	12	5	52.7%	37.3%	15.4%	1.41
New Mexico	3	1	52.5%	55.4%	-2.9%	0.95
Oklahoma	8	0	28.1%	25.9%	2.2%	1.09
Texas	33	20	66.4%	47.1%	19.4%	1.41
Region 7						
Iowa	3	0	21.0%	7.0%	13.9%	2.98
Kansas	9	3	47.2%	15.9%	31.3%	2.97
Missouri	15	2	28.3%	15.9%	12.4%	1.78
Nebraska	5	0	11.2%	12.7%	-1.4%	0.89
Region 8						
Colorado	5	1	41.0%	25.2%	15.8%	1.63
North Dakota	3	0	7.5%	8.2%	-0.7%	0.91
South Dakota	1	0	13.7%	11.9%	1.8%	1.15
Utah	6	4	36.5%	14.1%	22.4%	2.58
Region 9						
Arizona	7	4	64.3%	35.7%	28.6%	1.80
California	45	38	81.2%	51.5%	29.7%	1.58
Nevada	3	1	79.4%	33.1%	46.3%	2.40
Region 10						
Idaho	2	0	7.9%	12.0%	-4.1%	0.66
Oregon	3	0	25.7%	16.3%	9.4%	1.57
Washington	3	1	52.8%	20.7%	32.0%	2.54
U.S. Total	**413**	**147**	**55.9%**	**30.0%**	**25.9%**	**1.86**

[1] Alaska (Reg. 10), Hawaii (Reg. 9), Delaware & New Hampshire (Reg. 1), Montana & Wyoming (Reg. 8) have no commercial hazardous waste facilities.
[2] Number of commercial hazardous waste facilities.
[3] Number of host neighborhoods with majority people of color, i.e., greater than 50%.
[4] Differences may not precisely correspond to other values due to rounding off.

Appendix 4.4 – Hispanic/Latino Percentages by EPA Region and State

EPA Region/State	Host Neighborhoods	Non-Host Areas	Difference[1]	Ratio
Region 1	**19.5%**	**5.5%**	**13.9%**	**3.52**
Connecticut	25.8%	8.6%	17.2%	3.00
Maine	1.7%	0.7%	1.0%	2.42
Massachusetts	19.0%	5.9%	13.1%	3.21
Rhode island	19.6%	6.9%	12.8%	2.86
Vermont	1.2%	0.9%	0.3%	1.37
Region 2	**23.3%**	**14.0%**	**9.3%**	**1.66**
New Jersey	23.8%	12.8%	11.0%	1.87
New York	23.1%	14.6%	8.5%	1.58
Region 3	**4.7%**	**3.7%**	**1.0%**	**1.26**
Maryland	2.5%	4.3%	-1.9%	0.57
Pennsylvania	5.8%	3.1%	2.7%	1.88
Virginia	2.3%	4.6%	-2.3%	0.50
West Virginia	1.1%	0.6%	0.5%	1.74
Region 4	**13.7%**	**7.2%**	**6.5%**	**1.91**
Alabama	1.2%	1.6%	-0.4%	0.74
Florida	33.6%	16.5%	17.0%	2.03
Georgia	8.5%	5.2%	3.3%	1.64
Kentucky	0.9%	1.4%	-0.5%	0.61
Mississippi	1.7%	1.3%	0.4%	1.27
North Carolina	6.6%	4.6%	2.0%	1.43
South Carolina	1.4%	2.3%	-0.9%	0.60
Tennessee	6.2%	2.0%	4.1%	3.02
Region 5	**11.3%**	**5.0%**	**6.3%**	**2.27**
Illinois	25.8%	11.8%	14.0%	2.19
Indiana	15.4%	3.0%	12.4%	5.12
Michigan	3.5%	3.2%	0.3%	1.09
Minnesota	6.9%	2.6%	4.3%	2.64
Ohio	5.2%	1.8%	3.4%	2.90
Wisconsin	2.4%	3.6%	-1.2%	0.68
Region 6	**37.9%**	**23.1%**	**14.7%**	**1.64**
Arkansas	2.0%	3.2%	-1.2%	0.62
Louisiana	6.4%	2.4%	4.0%	2.71
New Mexico	42.3%	42.1%	0.2%	1.00
Oklahoma	5.0%	5.2%	-0.1%	0.98
Texas	43.1%	31.7%	11.4%	1.36
Region 7	**8.9%**	**3.6%**	**5.3%**	**2.50**
Iowa	4.1%	2.8%	1.4%	1.49
Kansas	19.8%	6.5%	13.4%	3.06
Missouri	4.4%	2.0%	2.4%	2.18
Nebraska	7.9%	5.4%	2.5%	1.47
Region 8	**22.9%**	**10.5%**	**12.4%**	**2.19**
Colorado	35.0%	16.7%	18.3%	2.10
North Dakota	1.2%	1.2%	0.1%	1.06
South Dakota	3.8%	1.3%	2.5%	2.85
Utah	23.2%	8.6%	14.6%	2.69
Region 9	**54.1%**	**28.7%**	**25.3%**	**1.88**
Arizona	50.9%	24.8%	26.1%	2.06
California	54.3%	30.8%	23.5%	1.76
Nevada	50.3%	18.5%	31.8%	2.72
Region 10	**10.1%**	**7.5%**	**2.6%**	**1.35**
Idaho	3.9%	7.9%	-3.9%	0.50
Oregon	12.7%	7.9%	4.7%	1.60
Washington	8.1%	7.5%	0.7%	1.09

[1] Differences may not precisely correspond to other values due to rounding off.

Appendix 4.5 – African American Percentages by EPA Region and State

EPA Region/State	Host Neighborhoods	Non-Host Areas	Difference[1]	Ratio
Region 1	**9.6%**	**4.8%**	**4.8%**	**2.00**
Connecticut	20.5%	8.4%	12.1%	2.44
Maine	1.9%	0.4%	1.4%	4.21
Massachusetts	5.7%	5.3%	0.4%	1.08
Rhode island	11.0%	3.2%	7.8%	3.41
Vermont	0.4%	0.5%	-0.1%	0.87
Region 2	**16.0%**	**15.0%**	**1.0%**	**1.07**
New Jersey	23.8%	12.9%	10.9%	1.85
New York	13.1%	15.9%	-2.8%	0.83
Region 3	**15.1%**	**16.6%**	**-1.5%**	**0.91**
Maryland	37.3%	27.5%	9.8%	1.35
Pennsylvania	7.8%	9.9%	-2.2%	0.78
Virginia	30.8%	19.5%	11.3%	1.58
West Virginia	6.3%	3.0%	3.2%	2.06
Region 4	**37.0%**	**20.4%**	**16.6%**	**1.82**
Alabama	64.0%	25.6%	38.4%	2.50
Florida	16.5%	14.4%	2.1%	1.14
Georgia	41.8%	28.3%	13.4%	1.47
Kentucky	48.7%	6.6%	42.1%	7.39
Mississippi	47.5%	36.2%	11.3%	1.31
North Carolina	44.2%	21.2%	23.0%	2.09
South Carolina	41.3%	29.4%	11.9%	1.40
Tennessee	43.6%	16.0%	27.6%	2.72
Region 5	**35.8%**	**10.1%**	**25.7%**	**3.55**
Illinois	38.0%	14.1%	23.9%	2.69
Indiana	23.2%	7.7%	15.5%	3.00
Michigan	57.5%	11.9%	45.6%	4.84
Minnesota	12.8%	2.8%	10.0%	4.57
Ohio	30.7%	10.7%	19.9%	2.86
Wisconsin	29.0%	5.4%	23.6%	5.39
Region 6	**20.4%**	**13.5%**	**6.9%**	**1.51**
Arkansas	47.7%	15.4%	32.2%	3.09
Louisiana	44.2%	32.2%	12.0%	1.37
New Mexico	2.3%	1.8%	0.5%	1.28
Oklahoma	10.6%	7.5%	3.1%	1.42
Texas	19.2%	11.2%	8.0%	1.71
Region 7	**16.1%**	**6.7%**	**9.4%**	**2.40**
Iowa	13.6%	1.8%	11.7%	7.39
Kansas	21.2%	5.1%	16.1%	4.17
Missouri	20.0%	10.9%	9.2%	1.84
Nebraska	0.8%	4.1%	-3.2%	0.21
Region 8	**1.9%**	**2.0%**	**-0.1%**	**0.95**
Colorado	1.5%	3.8%	-2.3%	0.40
North Dakota	1.2%	0.5%	0.7%	2.34
South Dakota	3.8%	0.5%	3.2%	6.98
Utah	2.8%	0.7%	2.1%	4.10
Region 9	**11.8%**	**5.6%**	**6.2%**	**2.10**
Arizona	7.9%	2.9%	5.0%	2.72
California	11.6%	6.2%	5.4%	1.87
Nevada	24.8%	5.9%	18.8%	4.18
Region 10	**6.6%**	**2.3%**	**4.2%**	**2.84**
Idaho	0.8%	0.4%	0.4%	2.04
Oregon	1.3%	1.6%	-0.2%	0.86
Washington	11.6%	3.0%	8.6%	3.82

[1] Differences may not precisely correspond to other values due to rounding off.

Appendix 4.6 – Asian/Pacific Islander Percentages by EPA Region and State

EPA Region/State	Host Neighborhoods	Non-Host Areas	Difference[1]	Ratio
Region 1	**4.9%**	**2.6%**	**2.4%**	**1.91**
Connecticut	1.3%	2.5%	-1.2%	0.51
Maine	1.9%	0.6%	1.2%	2.92
Massachusetts	6.6%	3.6%	3.0%	1.83
Rhode island	5.6%	1.8%	3.8%	3.14
Vermont	1.0%	0.8%	0.2%	1.28
Region 2	**9.7%**	**5.4%**	**4.3%**	**1.81**
New Jersey	2.2%	5.0%	-2.8%	0.44
New York	1.3%	1.1%	0.2%	1.19
Region 3	**2.0%**	**2.7%**	**-0.7%**	**0.75**
Maryland	3.1%	4.0%	-0.9%	0.76
Pennsylvania	1.8%	1.8%	0.0%	0.99
Virginia	1.4%	3.7%	-2.3%	0.38
West Virginia	1.1%	0.5%	0.6%	2.06
Region 4	**2.2%**	**1.4%**	**0.8%**	**1.59**
Alabama	0.2%	0.7%	-0.5%	0.31
Florida	1.8%	1.7%	0.1%	1.03
Georgia	4.0%	2.1%	1.9%	1.89
Kentucky	0.4%	0.8%	-0.4%	0.49
Mississippi	0.7%	0.6%	0.0%	1.03
North Carolina	11.4%	5.2%	6.2%	2.19
South Carolina	0.2%	0.9%	-0.7%	0.25
Tennessee	1.9%	1.0%	1.0%	1.99
Region 5	**3.2%**	**2.0%**	**1.2%**	**1.59**
Illinois	3.1%	3.5%	-0.4%	0.89
Indiana	0.8%	1.0%	-0.2%	0.79
Michigan	1.6%	1.8%	-0.2%	0.90
Minnesota	10.2%	2.4%	7.8%	4.27
Ohio	1.2%	1.2%	0.0%	1.00
Wisconsin	2.1%	1.6%	0.5%	1.32
Region 6	**2.5%**	**2.1%**	**0.4%**	**1.17**
Arkansas	0.2%	0.8%	-0.6%	0.21
Louisiana	1.1%	1.3%	-0.2%	0.88
New Mexico	5.1%	5.8%	-0.6%	0.89
Oklahoma	0.6%	1.4%	-0.8%	0.45
Texas	2.9%	2.7%	0.2%	1.06
Region 7	**1.7%**	**1.3%**	**0.4%**	**1.30**
Iowa	1.4%	1.2%	0.1%	1.11
Kansas	2.5%	1.7%	0.8%	1.46
Missouri	1.5%	1.1%	0.4%	1.33
Nebraska	3.0%	1.4%	1.6%	2.14
Region 8	**3.1%**	**1.7%**	**1.4%**	**1.80**
Colorado	2.1%	2.3%	-0.2%	0.92
North Dakota	1.3%	0.5%	0.8%	2.57
South Dakota	1.3%	0.6%	0.6%	2.00
Utah	6.8%	2.2%	4.6%	3.11
Region 9	**12.3%**	**10.8%**	**1.5%**	**1.14**
Arizona	2.6%	1.9%	0.7%	1.36
California	13.1%	11.1%	2.0%	1.18
Nevada	1.2%	1.3%	-0.1%	0.93
Region 10	**17.1%**	**4.2%**	**12.9%**	**4.07**
Idaho	1.3%	1.0%	0.3%	1.30
Oregon	8.1%	3.0%	5.0%	2.66
Washington	26.3%	5.6%	20.7%	4.72

[1] Differences may not precisely correspond to other values due to rounding off.

Appendix 4.7 – Poverty Rates by EPA Region and State

EPA Region/State	Host Neighborhoods	Non-Host Areas	Difference[1]	Ratio
Region 1	**15.7%**	**8.7%**	**7.0%**	**1.80**
Connecticut	16.0%	7.5%	8.6%	2.15
Maine	14.4%	10.8%	3.6%	1.33
Massachusetts	14.6%	9.0%	5.6%	1.63
Rhode island	19.7%	10.8%	8.9%	1.83
Vermont	8.5%	9.5%	-1.0%	0.90
Region 2	**19.4%**	**12.3%**	**7.1%**	**1.57**
New Jersey	15.6%	8.2%	7.5%	1.92
New York	20.8%	14.2%	6.5%	1.46
Region 3	**12.6%**	**10.7%**	**1.9%**	**1.18**
Maryland	15.6%	8.3%	7.2%	1.87
Pennsylvania	11.2%	11.0%	0.2%	1.02
Virginia	11.4%	9.6%	1.8%	1.19
West Virginia	23.3%	17.8%	5.5%	1.31
Region 4	**15.7%**	**13.7%**	**2.0%**	**1.15**
Alabama	22.9%	16.0%	6.8%	1.43
Florida	13.9%	12.5%	1.4%	1.11
Georgia	12.5%	13.0%	-0.5%	0.96
Kentucky	23.3%	15.7%	7.6%	1.48
Mississippi	17.5%	20.0%	-2.5%	0.88
North Carolina	17.2%	12.2%	5.1%	1.41
South Carolina	14.0%	14.1%	-0.2%	0.99
Tennessee	14.8%	13.5%	1.3%	1.10
Region 5	**19.4%**	**9.6%**	**9.7%**	**2.01**
Illinois	18.6%	10.4%	8.2%	1.79
Indiana	16.3%	9.2%	7.0%	1.76
Michigan	22.8%	9.9%	12.9%	2.30
Minnesota	16.1%	7.4%	8.7%	2.17
Ohio	21.6%	10.2%	11.4%	2.11
Wisconsin	10.0%	8.7%	1.3%	1.15
Region 6	**18.8%**	**16.0%**	**2.8%**	**1.18**
Arkansas	25.2%	15.8%	9.4%	1.60
Louisiana	21.3%	19.6%	1.7%	1.09
New Mexico	14.8%	18.5%	-3.7%	0.80
Oklahoma	19.8%	14.7%	5.1%	1.35
Texas	18.7%	15.3%	3.5%	1.23
Region 7	**15.0%**	**10.4%**	**4.7%**	**1.45**
Iowa	14.1%	9.0%	5.0%	1.56
Kansas	18.5%	9.6%	8.9%	1.93
Missouri	16.3%	11.6%	4.7%	1.40
Nebraska	7.6%	9.8%	-2.2%	0.77
Region 8	**14.8%**	**10.3%**	**4.4%**	**1.43**
Colorado	15.1%	9.1%	6.0%	1.66
North Dakota	13.2%	11.8%	1.4%	1.12
South Dakota	13.0%	13.2%	-0.1%	0.99
Utah	15.7%	9.2%	6.5%	1.70
Region 9	**20.7%**	**13.5%**	**7.2%**	**1.54**
Arizona	28.3%	13.7%	14.7%	2.07
California	20.2%	13.8%	6.4%	1.46
Nevada	28.1%	9.8%	18.3%	2.87
Region 10	**10.9%**	**11.0%**	**-0.1%**	**0.99**
Idaho	5.7%	11.8%	-6.0%	0.49
Oregon	9.6%	11.6%	-2.1%	0.82
Washington	12.4%	10.6%	1.8%	1.17

[1] Differences may not precisely correspond to other values due to rounding off.

Appendix 4.8 – People of Color Percentages in Host Neighborhoods ("Host") and Non-Host Areas for 80 Selected Metropolitan Areas[1]

Metropolitan Area	Sites[2]	Percent People of Color			Percent African American			Percent Hispanic or Latino		
		Host	Non-Host	Diff.[3]	Host	Non-Host	Diff.[3]	Host	Non-Host	Diff.[3]
Albuquerque, NM	2	53.0	52.2	0.8	2.4	2.4	0.0	43.7	41.4	2.3
Atlanta, GA	4	64.6	39.6	24.9	49.4	28.4	21.1	7.4	6.5	0.9
Augusta--Aiken, GA--SC	1	58.2	38.5	19.6	54.6	33.0	21.7	1.9	2.4	-0.6
Baltimore, MD	3	44.2	33.2	11.0	37.1	26.8	10.3	2.2	2.0	0.2
Baton Rouge, LA	3	89.6	34.7	54.9	87.8	30.2	57.6	0.8	1.8	-1.0
Beaumont--Port Arthur, TX	3	57.5	34.9	22.5	48.1	23.6	24.5	6.5	8.1	-1.6
Binghamton, NY	1	17.9	7.3	10.6	9.3	2.1	7.2	3.9	1.6	2.3
Birmingham, AL	2	74.4	31.9	42.4	72.0	28.3	43.7	1.3	1.8	-0.5
Bridgeport, CT	1	64.4	22.1	42.3	30.9	8.3	22.6	30.5	9.4	21.1
Canton--Massillon, OH	1	38.1	8.5	29.6	33.1	5.6	27.5	1.5	0.8	0.7
Champaign--Urbana, IL	1	48.3	19.6	28.8	29.8	9.2	20.6	4.4	2.6	1.9
Charleston--North Charleston, SC	1	48.2	35.9	12.3	45.9	30.5	15.5	0.5	2.4	-1.9
Charlotte--Gastonia--Rock Hill, NC--SC	4	74.9	26.5	48.4	65.0	18.3	46.8	5.9	5.0	0.9
Chicago, IL	9	71.6	40.5	31.1	38.6	17.7	20.9	29.1	16.5	12.6
Cincinnati, OH--KY--IN	3	54.9	14.2	40.7	48.5	10.8	37.6	1.5	1.0	0.5
Cleveland--Lorain--Elyria, OH	6	34.4	24.0	10.4	22.8	18.1	4.7	9.1	3.0	6.1
Columbia, MO	1	30.7	13.2	17.4	22.3	6.5	15.8	2.3	1.8	0.5
Corpus Christi, TX	4	64.3	60.4	3.9	5.5	3.8	1.8	55.9	54.4	1.5
Dallas, TX	8	55.1	43.2	11.9	13.4	15.0	-1.6	35.8	22.4	13.4
Dayton--Springfield, OH	3	37.8	17.6	20.1	34.2	13.4	20.7	1.0	1.1	-0.2
Denver, CO	3	43.4	29.3	14.1	1.7	5.5	-3.8	36.0	18.4	17.7
Detroit, MI	12	69.3	25.8	43.5	60.8	18.5	42.4	3.6	2.8	0.8
Fort Wayne, IN	1	30.3	12.9	17.4	23.3	7.1	16.1	4.3	3.3	1.1
Fort Worth--Arlington, TX	2	49.6	33.8	15.8	10.8	11.0	-0.2	31.5	17.7	13.8
Fresno, CA	2	78.4	58.9	19.6	2.4	5.1	-2.6	69.5	43.3	26.2
Gary, IN	3	68.0	28.1	39.9	28.0	18.7	9.3	38.7	7.3	31.4
Greensboro--Winston-Salem--High Point, NC	2	41.6	27.2	14.4	25.8	19.9	5.9	8.0	4.9	3.1
Houston, TX	10	78.6	52.7	25.9	25.8	17.0	8.8	49.9	28.8	21.0
Jackson, MS	1	93.1	46.3	46.8	91.8	44.0	47.8	0.8	0.9	-0.2
Jersey City, NJ	1	66.4	64.7	1.7	19.2	13.1	6.1	25.1	40.4	-15.3
Kansas City, MO--KS	6	45.0	20.5	24.5	29.3	11.7	17.5	11.2	4.9	6.3
Las Vegas, NV--AZ	2	80.2	34.8	45.4	25.1	7.1	18.0	50.8	19.0	31.8

Appendix 4.8 (cont.)

Metropolitan Area	Sites[2]	Percent People of Color			Percent African American			Percent Hispanic or Latino		
		Host	Non-Host	Diff.[3]	Host	Non-Host	Diff.[3]	Host	Non-Host	Diff.[3]
Lawrence, MA--NH	1	57.9	7.4	50.5	3.8	0.8	3.0	52.1	3.4	48.7
Little Rock--North Little Rock, AR	2	43.8	26.3	17.5	37.8	21.7	16.2	3.2	2.1	1.1
Longview--Marshall, TX	1	70.9	26.6	44.3	49.5	18.4	31.1	20.0	6.5	13.5
Los Angeles--Long Beach, CA	17	90.9	65.8	25.0	13.2	9.1	4.1	66.8	41.3	25.6
Louisville, KY--IN	3	51.6	15.7	35.9	48.9	11.4	37.5	0.7	1.6	-0.9
Lowell, MA--NH	1	40.8	7.8	33.0	4.3	0.9	3.3	15.2	2.1	13.0
Memphis, TN--AR--MS	4	57.2	47.8	9.4	54.3	42.8	11.5	1.6	2.3	-0.7
Miami, FL	1	91.9	79.0	12.9	2.3	20.6	-18.2	90.2	56.4	33.8
Middlesex--Somerset--Hunterdon, NJ	3	41.8	30.9	10.9	10.3	7.6	2.7	18.8	10.5	8.3
Milwaukee--Waukesha, WI	2	38.8	25.1	13.7	31.9	15.0	16.9	2.5	6.4	-3.9
Minneapolis--St. Paul, MN--WI	9	35.3	13.1	22.2	13.2	4.3	8.9	7.1	2.9	4.1
Nashville, TN	2	41.8	21.3	20.5	25.5	15.3	10.2	10.4	3.0	7.4
Nassau--Suffolk, NY	3	49.1	22.5	26.6	27.1	7.6	19.5	18.6	9.9	8.7
New Haven--Meriden, CT	1	43.2	26.1	17.1	9.6	13.2	-3.6	31.6	8.5	23.1
New Orleans, LA	2	53.5	45.1	8.4	38.2	37.4	0.9	13.0	4.2	8.8
New York, NY	3	61.0	60.4	0.6	12.9	25.4	-12.5	29.6	24.7	4.9
Newark, NJ	4	66.8	38.1	28.7	33.1	20.8	12.3	30.1	11.3	18.8
Oakland, CA	6	76.0	49.2	26.7	20.9	11.4	9.5	28.4	17.1	11.3
Orange County, CA	3	69.8	46.8	23.0	1.6	1.6	0.0	53.7	28.6	25.2
Orlando, FL	2	49.0	34.7	14.3	17.9	13.7	4.3	24.9	16.4	8.5
Phoenix--Mesa, AZ	5	63.7	33.5	30.2	8.3	3.5	4.8	50.3	24.5	25.8
Pittsfield, MA	1	11.1	4.0	7.1	4.8	1.4	3.4	2.5	1.3	1.2
Providence--Fall River--Warwick, RI--MA	3	39.6	13.5	26.1	11.0	2.8	8.2	19.6	6.3	13.4
Pueblo, CO	1	63.1	39.7	23.4	1.6	1.7	-0.1	59.0	35.2	23.7
Riverside--San Bernardino, CA	4	70.5	52.4	18.2	12.9	7.5	5.4	49.0	37.5	11.5
Sacramento, CA	1	41.9	35.7	6.1	7.0	7.5	-0.5	15.3	14.4	0.9
Saginaw--Bay City--Midland, MI	1	68.7	17.0	51.7	61.1	9.6	51.4	6.8	4.8	2.0
Salt Lake City--Ogden, UT	3	36.6	16.4	20.2	2.8	0.9	1.8	23.2	10.3	12.9
San Antonio, TX	2	72.7	60.4	12.2	33.4	5.9	27.5	35.8	51.6	-15.8
San Francisco, CA	2	55.6	48.6	7.0	10.6	5.0	5.6	29.5	16.2	13.2
San Jose, CA	2	77.1	53.6	23.5	3.1	2.6	0.5	42.6	21.9	20.7
Savannah, GA	1	50.1	39.6	10.5	42.2	34.7	7.4	6.5	1.9	4.6

80

Appendix 4.8 (cont.)

Metropolitan Area	Sites[2]	Percent People of Color			Percent African American			Percent Hispanic or Latino		
		Host	Non-Host	Diff.[3]	Host	Non-Host	Diff.[3]	Host	Non-Host	Diff.[3]
Seattle--Bellevue--Everett, WA	2	58.1	23.0	35.2	12.7	4.1	8.6	8.8	5.1	3.7
South Bend, IN	3	48.5	12.5	35.9	31.5	6.5	25.0	13.6	2.6	11.0
Springfield, MA	1	44.9	21.3	23.7	24.4	5.6	18.8	17.6	12.4	5.2
St. Louis, MO--IL	4	32.5	22.4	10.1	28.9	18.0	10.9	1.5	1.5	0.0
Stockton--Lodi, CA	1	58.3	52.4	6.0	6.9	6.5	0.4	35.1	30.1	5.0
Sumter, SC	1	80.3	47.4	32.9	78.9	43.5	35.5	0.7	1.7	-0.9
Tallahassee, FL	1	76.9	39.2	37.7	68.6	32.4	36.2	2.3	3.9	-1.6
Tampa--St. Petersburg--Clearwater, FL	2	52.6	23.7	28.9	32.3	9.9	22.4	18.1	10.3	7.9
Toledo, OH	2	42.1	18.2	23.9	29.9	11.4	18.5	9.8	4.0	5.9
Tucson, AZ	1	70.0	38.1	31.8	6.7	2.8	3.9	58.8	28.9	29.8
Vallejo--Fairfield--Napa, CA	2	59.1	45.4	13.7	15.2	11.1	4.1	10.3	19.6	-9.3
Waterbury, CT	1	47.8	17.3	30.4	20.7	5.3	15.4	24.2	8.6	15.6
Waterloo--Cedar Falls, IA	1	25.8	8.3	17.5	19.0	4.4	14.7	4.0	1.2	2.8
Wichita Falls, TX	1	35.5	24.7	10.8	18.7	8.5	10.2	9.7	11.8	-2.1
Wichita, KS	3	50.7	17.5	33.1	24.0	5.8	18.2	20.0	5.8	14.2
York, PA	2	19.3	7.5	11.8	7.7	3.2	4.5	7.5	2.6	4.9

[1] Includes metropolitan areas with predominantly people of color host neighborhoods (i.e., greater than 50%) or with greater than 5% difference in the percentage people of color between host neighborhoods and non-host areas.

[2] Number of commercial hazardous waste facilities.

[3] Difference between host neighborhood and non-host area percentages. Differences may not precisely correspond to other values due to rounding off.

Appendix 4.9 – Asian/Pacific Islander Percentages for 25 Selected Metropolitan Areas[1]

Metropolitan Area	Sites[2]	Host	Non-Host	Diff.[3]	Ratio
Atlanta, GA	4	6.2%	3.2%	3.0%	1.92
Boston, MA--NH	5	5.1%	4.9%	0.1%	1.03
Champaign--Urbana, IL	1	11.3%	6.0%	5.4%	1.90
Fort Worth--Arlington, TX	2	4.7%	3.1%	1.6%	1.51
Greensboro--Winston-Salem--High Point, NC	2	4.6%	1.2%	3.4%	3.82
Jersey City, NJ	1	18.0%	9.1%	8.9%	1.98
Los Angeles--Long Beach, CA	17	9.6%	12.6%	-2.9%	0.77
Lowell, MA--NH	1	17.6%	3.6%	14.1%	4.93
Middlesex--Somerset--Hunterdon, NJ	3	11.3%	11.3%	-0.03%	1.00
Minneapolis--St. Paul, MN--WI	9	10.53%	3.4%	7.1%	3.11
New York, NY	3	15.6%	8.6%	7.0%	1.81
Oakland, CA	6	22.1%	16.4%	5.7%	1.34
Orange County, CA	3	12.4%	14.0%	-1.6%	0.89
Portland--Vancouver, OR--WA	2	8.1%	4.7%	3.3%	1.70
Providence--Fall River--Warwick, RI--MA	3	5.6%	1.8%	3.8%	3.07
Riverside--San Bernardino, CA	4	5.4%	4.4%	1.1%	1.25
Sacramento, CA	1	13.3%	9.3%	4.0%	1.43
Salt Lake City--Ogden, UT	3	6.8%	2.9%	3.9%	2.36
San Francisco, CA	2	12.4%	23.9%	-11.5%	0.52
San Jose, CA	2	28.2%	25.6%	2.6%	1.10
Seattle--Bellevue--Everett, WA	2	29.8%	9.3%	20.5%	3.21
Stockton--Lodi, CA	1	11.5%	11.9%	-0.4%	0.97
Tacoma, WA	1	9.1%	5.6%	3.5%	1.63
Tallahassee, FL	1	4.4%	1.7%	2.7%	2.61
Vallejo--Fairfield--Napa, CA	2	28.8%	10.0%	18.8%	2.88

[1] Includes metropolitan areas with host neighborhoods with Asian/Pacific Islander percentages greater than 5% or differences of greater than 3% between Asian/Pacific Islander percentages in host neighborhoods and non-host areas.

[2] Number of commercial hazardous waste facilities.

[3] Difference between host neighborhood and non-host area percentages. Differences may not precisely correspond to other values due to rounding off.

**Appendix 4.10 – Multivariate Analysis Comparing Independent Effect of Race on
Location of Facilities in Metropolitan Areas
(Logistic Regression)**

	Coefficient (B)	Est. Odds Ratio (Exp(B))	Significance Level
Race/Ethnicity			
% Hispanic or Latino	1.303	3.681	**0.000**
% African American	1.560	4.760	**0.000**
% Asian/Pacific Islander	3.200	24.528	**0.000**
Socioeconomic Status Indicators			
Mean Household Income ($1000s)	-0.017	0.983	**0.000**
Mean Housing Value ($1000s)	0.001	1.001	**0.003**
% with 4-Year College Degree	-0.263	0.769	0.529
% Employed in Professional "White Collar" Occupations	1.215	3.372	**0.019**
% Employed in "Blue Collar" Occupations	3.973	53.153	**0.000**
Constant	-4.431	0.012	**0.000**
-2 Log Likelihood	15886.571		
Model X^2 (df=8)	1513.317		**0.000**

NOTES: Analysis uses 2000 Census tract data and *50% areal containment method* with a 3 kilometer circular radius (see Ch. 3). Professional "White Collar" includes management, professional and related occupations. "Blue Collar" includes construction, extraction, maintenance, production, transportation and material moving occupations.