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## Demographic Studies Reveal a Pattern of Environmental Injustice

*Race and the Incidence  
of Environmental Hazards*

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Fifteen studies that evaluate the social distribution of pollution are compared, yielding demographic evidence that environmental hazards are distributed on the basis of race, and to a lesser extent poverty—a phenomenon dubbed by this and earlier studies “environmental racism.” In five of the eight studies that assessed the relative importance of race and income, race was found to be a more significant factor than income in determining exposure to environmental hazard. This finding is echoed by the University of Michigan's 1990 Detroit Area Study, which correlates race and income with the distribution of hazardous waste sites in Detroit to find that a minority resident is about four times more likely than a white citizen to live within a mile of a waste site. The race factor is found not only to be independent of income but a stronger predictor of exposure to pollution—an inequity that requires “proactive government policies . . . to address this issue.”

The United Church of Christ's (1987) report on the distribution of hazardous waste sites in this country has been very influential in raising public awareness about the disproportionate burden of pollution on minorities. This study is important because of its national scope and because of its strong and unequivocal findings regarding the distribution of com-

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mercial hazardous waste facilities. It found that the proportion of residents who are minorities in communities that have a commercial hazardous waste facility is about double the proportion of minorities in communities without such facilities. Where two or more such facilities are located, the proportion of residents who are minorities is more than triple. This study further demonstrated that race is the single best predictor of where commercial hazardous waste facilities are located, even when other socioeconomic characteristics of communities, such as average household income and average value of homes, are taken into account.

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*Minority communities are at a disadvantage not only in terms of availability of resources but also because of underrepresentation on governing bodies.*

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The United Church of Christ report concluded that it is “virtually impossible” that the nation's commercial hazardous waste facilities are distributed disproportionately in minority communities merely by chance, and that underlying factors related to race, therefore, in all likelihood play a role in the location of these facilities. Among others these factors include: 1) the availability of cheap land, often located in minority communities and neighborhoods (Asch and Seneca, 1978; Bullard and Wright, 1987; United Church of Christ, 1987); 2) the lack of local opposition to the facility, often resulting from minorities' lack of organization and political resources as well as their need for jobs (Bullard and Wright, 1987; United Church of Christ, 1987); and 3) the lack of mobility of minorities resulting from poverty and housing discrimination that traps them in neighborhoods where hazardous waste facilities are located (Bullard and Wright, 1987; United Church of Christ, 1987). The United Church of Christ report noted that these mechanisms and resulting inequitable outcomes represent institutionalized forms of racism. When the report was released, Dr. Benjamin F. Chavis, Jr., termed the racial biases in the location of commercial hazardous waste facilities as “environmental racism” (Lee, 1992).

The striking findings and the scope of the United Church of Christ study suggest that environmental racism is not confined to hazardous waste alone. A major objective of our investigation was, therefore, to document the existence of other studies which have used systematic data to examine the social distribution of pollution and to determine whether the evidence from these studies, taken together, demonstrates a consistent pattern of environmental racism.

A question that is often raised is whether the racial bias in the distribution of environmental hazards is simply a function of poverty (see, for example, Weisskopf, 1992). That is, rather than race per se, is it not poverty that affects the distribution of environmental hazards? And are not minorities disproportionately impacted simply because they are disproportionately poor? Classical economic theory would predict that poverty plays a role (see Asch and Seneca, 1978, and Freeman, 1972). Because of limited income and wealth, poor people do not have the financial means to buy out of polluted neighborhoods and into environmentally more desirable ones. Also, land values tend to be cheaper in poor neighborhoods and are thus attractive to polluting industry that seek to

reduce the costs of doing business (United Church of Christ, 1987). However, housing discrimination further restricts the mobility of minorities (Denton and Massey, 1988; Feagin and Feagin, 1978).<sup>2</sup> Also, because noxious sites are unwanted (the "NIMBY" syndrome) and because industries tend to take the path of least resistance, communities with little political clout are often targeted for such facilities (Bullard and Wright, 1987). These communities tend to be where residents are unaware of the policy decisions affecting them and are unorganized and lack resources for taking political action; such resources include time, money, contacts, knowledge of the political system, and others (Bullard, 1990; Mohai, 1985, 1990). Minority communities are at a disadvantage not only in terms of availability of resources but also because of underrepresentation on governing bodies when location decisions are made (Bullard, 1983). Underrepresentation translates into limited access to policy makers and lack of advocates for minority interests.

Taken together, these factors suggest that race has an additional impact on the distribution of environmental hazards, independent of income. A second major objective of our study, therefore, was to assess the relative influence of income and race on the distribution of pollution. We did so by examining the results of those empirical studies which have analyzed the distribution of environmental hazards by both income and race. To our knowledge, this is the first time such a review and assessment has been undertaken. We also provide new evidence from a multivariate analysis of the distribution of commercial hazardous waste facilities in the Detroit metropolitan area.

### Environmental racism: Evidence from existing studies

Table 1 contains a summary of 15 studies which provide systematic information about the social distribution of environmental hazards. In assessing the distribution of these hazards by income, the typical approach has been to correlate the average or median household or family income of the community (usually approximated by U.S. Census tracts or zip code areas) with the degree of exposure to the hazard. In assessing the distribution of environmental hazards by race, the minority percentage of the community has been typically employed. For example, after matching the location of air quality monitoring sites with U.S. Census tracts, Asch and Seneca (1978) correlated the median family incomes and minority percentages of the Census tracts with the mean annual air pollution levels of the tracts. Likewise, the United Church of Christ (1987) matched the location of commercial hazardous waste facilities with zip code areas, and correlated the mean household income, minority percentage, and other characteristics of these areas with the presence of one or more commercial hazardous waste facilities.

A number of interesting and important facts emerge from an examination of Table 1. First, an inspection of the publication dates of these studies reveals that information about environmental inequity has been available for some time. Rather than being a recent discovery, documentation of environmental injustices stretches back two decades, almost to Earth Day [1970]—an event viewed by many as a major turning point in public awareness about environmental issues (Davies and Davies, 1975; Fessler, 1990). Evidently, it has taken some time for public awareness to catch up to the issues of environmental injustice.

**Table 1. Studies Providing Systematic Empirical Evidence Regarding the Burden of Environmental Hazards by Income and Race**

Study	Hazard	Focus of Study	Distribution Inequitable by Income?	Distribution Inequitable by Race?	Income or Race More Important?
CEQ (1971)	Air Poll.	Urban Area	Yes	NA*	NA
Freeman (1972)	Air Poll.	Urban Areas	Yes	Yes	Race
Harrison (1975)	Air Poll.	Urban Areas	Yes	NA	NA
	Air Poll.	Nation	No	NA	NA
Kruvant (1975)	Air Poll.	Urban Area	Yes	Yes	Income
Zupan (1975)	Air Poll.	Urban Area	Yes	NA	NA
Burch (1976)	Air Poll.	Urban Area	Yes	No	Income
Berry et al. (1977)	Air Poll.	Urban Areas	Yes	Yes	NA
	Solid Waste	Urban Areas	Yes	Yes	NA
	Noise	Urban Areas	Yes	Yes	NA
	Pesticide				
	Poisoning	Urban Areas	Yes	Yes	NA
	Rat Bite Risk	Urban Areas	Yes	Yes	NA
Handy (1977)	Air Poll.	Urban Area	Yes	NA	NA
Asch & Seneca (1978)	Air Poll.	Urban Areas	Yes	Yes	Income
Gianessi et al. (1979)	Air Poll.	Nation	No	Yes	Race
Bullard (1983)	Solid Waste	Urban Area	NA	Yes	NA
U.S. GAO (1983)	Haz. Waste	Southern Region	Yes	Yes	NA
United Church of Christ (1987)	Haz. Waste	Nation	Yes	Yes	Race
Gelobter (1987; 1992)	Air Poll.	Urban Areas	Yes	Yes	Race
	Air Poll.	Nation	No	Yes	Race
West et al. (1992)	Toxic Fish Consumption	State	No	Yes	Race

\* NA = not applicable.

It is also interesting to note that most of the studies that have been conducted in this period have focused on the distribution of air pollution. Clearly, systematic studies of the social distribution of other types of environmental hazards, such as water pollution, pesticide exposure, asbestos exposure, and other hazards are needed. Also worth noting is that these studies vary considerably in terms of their scope—i.e., some studies have focused on single urban areas, such as Washington, DC, or Houston, others have focused on a collection of urban areas, while still others have been national in scope. This observation is important in that it reveals that the pattern of findings is not simply an artifact of the samples used. Regardless of the scope of the analyses, the findings point to a consistent pattern.

It is clear from examining the results in Table 1 that, regardless of the

environmental hazard and regardless of the scope of the study, in nearly every case the distribution of pollution has been found to be inequitable by income. And with only one exception, the distribution of pollution has been found to be inequitable by race. Where the distribution of pollution has been analyzed by both income and race (and where it was possible to weigh the relative importance of each), in most cases race has been found to be more strongly related to the incidence of pollution.

The United Church of Christ (1987), Freeman (1972), Gelobter (1987, 1992), Gianessi, Peskin, and Wolff (1979), and West, Fly, Larkin, and Marans (1992) all found that race was more strongly related than class to the distribution of the environmental hazard under investigation. As mentioned previously, from a multivariate statistical analysis of nationwide data, the United Church of Christ found that the percentage of minority residents within a community (defined by zip code areas) was the single best predictor of where commercial hazardous waste facilities are located in the country—more so than other socioeconomic variables such as mean household income and mean value of owner-occupied homes.

Using an air pollution exposure index, Freeman (1972) found that low-income groups in three urban areas (Kansas City, St. Louis, and Washington, DC) were more greatly exposed to total suspended particulates and sulfates than upper-income groups. However, racial differences were found to be even more pronounced as minorities in each of the cities were found to be exposed to higher levels of both pollutants than the lowest income group examined (the "under \$3,000" group).

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*If you . . . are a minority resident, your chance of living within a mile of a hazardous waste facility is about four times greater than if you are white.*

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Likewise using pollution exposure indices (one for total suspended particulates and another for combined concentrations of total suspended particulates, sulfates, sulfur dioxide, nitrogen oxides, ozone, and carbon monoxide), Gelobter (1987, 1992) found similar results. However, unlike Freeman's study Gelobter's was national in scope. He conducted his analyses in two parts, one focused on the U.S. as a whole, incorporating both rural and urban areas, and a second focused on just urban areas. He found that over a 15-year period (from 1970 to 1984) minorities were consistently exposed to significantly more air pollution than whites. This finding was the same whether the analysis was focused on just the urban areas or on the country as a whole. Inequities in the distribution of air pollution by income were less clear. At the national level, exposure to total suspended particulates was found to be somewhat greater for upper income groups than for lower income groups (a probable result of the fact that both income and pollution tend to be simultaneously higher in urban areas than in rural ones). Within urban areas, however, exposure was found to be greater for those in the lower income categories, although differences by income categories tended to be small. When exposure to combined concentrations of air pollutants was examined, similar patterns were found, although this time lower income groups were found to be more greatly exposed at both national and urban levels of analyses. Nevertheless, as in Freeman's study, racial biases in exposure to pollution

tended to be more stark; as in the earlier study, in all cases minorities were found to be more greatly exposed to pollution than the lowest income group examined ("under \$3,000").

Gianessi, Peskin, and Wolff's (1979) study is the only other to have attempted a national level analysis of the distribution of air pollution by income and race. However, unlike Gelobter's study, rather than measuring exposure to physical concentrations of air pollution directly, they estimated dollar damage suffered from exposure to air pollution. Also, their estimates were based on EPA data taken for a single time period. Nevertheless, their results are very similar to Gelobter's. Like Gelobter, they found that air pollution damage is distributed progressively (i.e., upper rather than lower income groups suffer more damage) when the analysis is conducted at the national level (as before, this outcome is the probable result of incomes and pollution tending to be simultaneously higher in the more urbanized rather than rural areas of the country). However, when racial differences were examined, the inequities were found to be clear and striking: minorities were much more likely to suffer greater damage from air pollution than whites at all income levels.

Finally, West, Fly, Larkin, and Marans (1992) found from a state-wide survey of licensed fishermen in Michigan that on average minority fishermen and their families are likely to consume more fish (21.7 grams/person/day) than white fishermen and their families (17.9 grams/person/day). The purpose of their study was to assess the potential risk to these groups of ingesting toxic fish. Michigan's Rule 1057, which is designed to regulate the amount of discharge of toxic chemicals into state waters, is based on the assumption that the average consumption of fish in the state is 6.5 grams/person/day (West et al., 1992). Although minority fishermen and their families were found to consume more fish than white fishermen and their families, clearly both groups appear to be at risk based on this standard. Interestingly, West et al. did not find a significant relationship between income and the amount of fish consumed in either their bivariate analysis of income with consumption nor in their multivariate analysis where the simultaneous relationship of income and race with consumption was examined.

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*Current environmental policies have allowed for separate societies differing in the quality of their respective environments.*

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Only in 3 of the 8 studies where it was possible to weigh the relative importance of both race and income was income found to be more strongly related to the distribution of environmental hazards. In one of these studies, Kravant (1975) superimposed Census tract data in the Washington, DC, area with air pollution zones. Using this method, he found that there tended to be a tighter fit between areas of high air pollution and high concentrations of the poor than there were between areas of high air pollution concentrations and blacks. Using a similar technique, Burch (1976) found that while there was a significant relationship between areas of high air pollution and high concentrations of the poor in the New Haven, CT, area, there was no significant relationship between concentrations of air pollution and blacks. Finally, Asch and

Seneca (1978) found that the correlations of the "nonwhite" percentages of Census tracts in Chicago, Cleveland, and Nashville with the mean annual levels of various air pollutants tended to be weaker than the correlations of the median family incomes of the Census tracts with pollutant levels; using cities within 23 states (rather than Census tracts within the 3 cities mentioned above) as the units of analysis, Asch and Seneca obtained similar results.

Although 2 additional studies found the distribution of environmental hazards to be inequitable by both income and race, it was not possible to assess conclusively which, if either, variable was more strongly related because of the methodological approaches employed in these studies. These include Berry et al.'s study (1977) of the distribution of air pollution, pesticide poisoning, noise, solid waste, and rat bite risks in 13 of the nation's major urban areas, and the U.S. General Accounting Office's study (1983) of the distribution of four major hazardous waste landfills located in the South.

In summary, review of the 15 studies which have examined the distribution of environmental hazards by income and race indicates both a class and racial bias. Furthermore, that the racial bias is not simply a function of poverty alone also appears to be born out by the data. All but one of the 11 studies which have examined the distribution of environmental hazards by race have found a significant bias. In addition, in 5 of the 8 studies where it was possible to assess the relative importance of race with income, racial biases have been found to be more significant. Noteworthy also is the fact that all 3 studies which have been national in scope and which have provided both income and race information have found race to be more importantly related to the distribution of environmental hazards than income. Taken together, these findings thus appear to support the assertion of those who have argued that race has an additional effect on the distribution of environmental hazards that is independent of class.

### Environmental racism: evidence from the Detroit Area Study

In order to provide greater clarity to the issue of environmental equity, we provide additional evidence from an analysis of the distribution of commercial hazardous waste facilities in the Detroit area. In so doing, special attention is given to the effects of race. A detailed multivariate statistical analysis is conducted in order to determine whether race has a relationship with the location of commercial hazardous waste facilities that is independent of income. The multivariate analysis is also used to weigh the relative strength of the relationship of race and income with the distribution of sites. There are only 2 other studies which have applied multivariate statistical techniques to assess the relative effects of race and income on exposure to environmental hazards: the United Church of Christ (1987) and West et al. (1992) studies. Both found race not only to have an independent relationship with the hazard but also found it to be more strongly related to the hazard than income.

Data used for this study are taken from the University of Michigan's 1990 Detroit Area Study (Mohai and Bryant, 1989). Information was obtained from face-to-face interviews of residents 18 years or older in Macomb, Oakland, and Wayne Counties, Michigan (the 3 counties sur-

rounding the city of Detroit). Respondents were identified from households which were selected with equal probability using a stratified two-stage area probability sampling design. Because of the objectives of the study, an additional oversample was drawn of households within 1.5 miles of an existing or proposed commercial hazardous waste treatment or storage facility. Information about the location of the facilities in the Detroit area was obtained from the Michigan Department of Natural Resources. These included 14 existing facilities and 2 proposed.<sup>3</sup>

L. Kish (1949) selection tables were used to randomly select one respondent from the eligible persons in each of the households in the base (households not within 1.5 miles of a facility) and supplemental studies. Five hundred four and 289 interviews, respectively, in the two samples were conducted resulting in an overall study response rate of 69 percent.

For all analyses, cases were weighted by the number of eligible persons in the household. In those analyses where the oversample and base samples were pooled, cases were additionally weighted by a household sampling weight which compensates for the unequal probability of selection between the two samples.

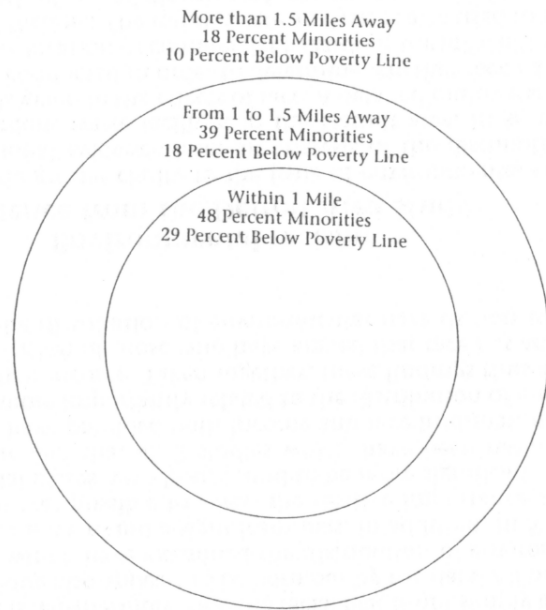
Information about race and household income was obtained for all 793 respondents. The unweighted numbers of whites, blacks, and other nonwhites in the sample were 575, 180, and 38, respectively. For purposes of the analyses the 218 blacks and other nonwhites were combined into the category "minority."

The precise locations of the commercial hazardous waste facilities and the 289 respondents in the oversample were mapped. The distances between these respondents and one of the 16 facilities was measured to the nearest 0.1 mile.

Although our main objective was to assess racial biases in the distribution of commercial hazardous waste facilities within the 3 counties surrounding the city of Detroit, from a cursory analysis we observed a rather striking racial bias in the distribution of these facilities at the state level as well. Although there are 21 commercial hazardous waste facilities in the state of Michigan, 16 (76 percent) of them are located in the 3-county area. And of these 16, half (the 2 facilities that are proposed are included here) are located in the city of Detroit, proper. This is significant as U.S. Census Bureau data for the state of Michigan and demographic data collected from our Detroit area study indicate that the minority percentages for the state, 3-county area, and city are 16 percent, 21 percent, and 76 percent, respectively. Thus, commercial hazardous waste facilities in the state are clearly located disproportionately where minorities are most heavily concentrated.

Our next step was to conduct a detailed analysis of the distribution of commercial hazardous waste facilities within the 3-county metropolitan area, giving special attention to the relative effects of income and race. Using the demographic and socioeconomic information from the 504 residents in our base sample (those in the Detroit area who live more than 1.5 miles away from a commercial hazardous waste facility), we computed the percent who are minority residents as well as the percent who are living below the poverty line.<sup>4</sup> We did likewise with the oversample of 289 residents living within 1.5 miles of a facility. However, we further divided this latter sample into those living strictly within 1 mile of and those living between 1 mile and 1.5 miles from a facility.

**Figure 1. Percent of Detroit Area Residents Living Near a Commercial Hazardous Waste Facility Who Are Members of a Minority Group or Who Live Below the Poverty Line**



The diagram in Figure 1 indicates the percent of minorities and the percent of people living below the poverty line within fixed distances of a commercial hazardous waste facility. The percentages indicate a clear bias. Of those people living more than 1.5 miles from a commercial hazardous waste facility only 18 percent are minority residents. Of those people living within 1.5 miles but more than 1 mile away, 39 percent are minority. And of those residents living within 1 mile from the center of a facility, 48 percent are minority. A similar pattern exists when the percentage of people living below the poverty line are examined (see Figure 1). Chi-square tests indicate that these patterns are statistically significant at the .0000 level (see Table 2).

Analysis of our data indicates that only about 4 percent of the total population in the three-county area lives within 1 mile of a commercial hazardous waste facility. Broken down by racial groups, 3 percent of all whites and 11 percent of all minorities live within a mile of such a facility. Although these are small proportions for both groups, the biases are nevertheless clear. As the ratio of the two percentages indicate, if you are living in the 3-county area of Detroit and are a minority resident, your chance of living within a mile of a hazardous waste facility is about four times greater than if you are white.

We wanted to determine whether the above results were a function

**Table 2. Percent of Detroit Area Residents Living Within Fixed Distances of a Commercial Hazardous Waste Facility Who Are Members of a Minority Group or Living Below the Poverty Line**

All Three-County Area Residents		Above Poverty Line	Below Poverty Line	
	White	Minority		
> 1.5 miles away	82	18	90	10
1-1.5 miles away	61	39	82	18
< 1 mile away	52	48	71	29
		Chi-square = 26.6328 d.f. = 2 P = 0.0000	Chi-square = 56.6610 d.f. = 2 P = 0.0000	
City of Detroit Residents		Above Poverty Line	Below Poverty Line	
	White	Minority		
> 1.5 miles away	25	76	66	34
1-1.5 miles away	21	79	85	15
< 1 mile away	20	80	48	52
		Chi-square = 0.4651 d.f. = 2 P = 0.7925	Chi-square = 11.3457 d.f. = 2 P = 0.0034	
Suburban Residents		Above Poverty Line	Below Poverty Line	
	White	Minority		
> 1.5 miles away	93	7	95	5
1-1.5 miles away	88	12	80	20
< 1 mile away	82	18	89	11
		Chi-square = 7.3690 d.f. = 2 P = 0.0251	Chi-square = 16.8079 d.f. = 2 P = 0.0002	

of the disproportionate number of hazardous waste facilities in the city of Detroit (the city contains 50 percent of the 16 commercial hazardous waste facilities in the 3-county area but only about 20 percent of its population), or whether the same patterns exist both inside and outside the city. Thus, we repeated the above analysis: 1) once for the city of Detroit alone and 2) again for the suburban area (i.e., the 3-county area outside Detroit). The percentages in Table 2 indicate that the biases persist whether the city or the suburban area is examined by itself, although in the case of the City of Detroit the differences do not attain statistical significance. Although the suburban area contains very few minorities (the percentages of minority residents for Macomb, Oakland, and suburban Wayne Counties are 7 percent, 9 percent, and 5 percent, respectively, and

8 percent as a whole), it is there where the racial biases in the distribution of facilities are most pronounced (Table 2). Although generally the hazardous waste facilities are also disproportionately located in areas with high concentrations of people living below the poverty line, patterns are less clear when suburban areas and the city of Detroit are examined separately. In both the city and the suburban areas, the proportion of people who live below the poverty line is higher among people residing within a mile of a commercial hazardous waste facility than it is among those residing more than 1.5 miles away. However, in Detroit, the smallest concentrations of people living below the poverty line are in the neighborhoods that are between 1 and 1.5 miles from a facility; in the suburbs, neighborhoods that are between 1 and 1.5 miles from a facility have the highest concentrations (Table 2).

A major objective of our study was to examine the relative strength of the relationship of race and income on the distribution of commercial hazardous waste facilities in the Detroit area. In order to accomplish this objective, we used multiple linear regression analysis. We tested to see whether race (coded as 1=white and 0=minority) and income (measured in dollars) each had an independent relationship with the distance of residents to a commercial hazardous waste facility. And if so, which had the stronger relationship. We conducted the analysis in two ways. In the first analysis, the dependent variable used to measure distance to a site was an ordinal number which indicated the general proximity of the respondent to the site. Here, 1=within 1 mile, 2=between 1 mile and 1.5 miles, and 3=more than 1.5 miles away. In this analysis, all 793 respondents were included (and appropriately weighted to correct for the varying probability of selection into the study). In the second analysis, the precise distance of the respondent to the center of a facility (measured to the nearest 0.1 mile) was used as the dependent variable. In this latter analysis, only data from the 289 respondents in the oversample were used since precise distances to the commercial hazardous waste facilities were measured only for this group. Either approach yields similar results. The relationship between race and the location of commercial hazardous waste facilities in the Detroit area is independent of income in each of the analyses. And, important to the thesis of this paper, it is race which is the best predictor. In fact, in the second analysis, the relationship between the location of sites and income is no longer statistically significant.

### Conclusions

Review of 15 existing studies plus results of our Detroit area study provide clear and unequivocal evidence that income and racial biases in the distribution of environmental hazards exist. Our findings also appear to support the claims of those who have argued that race is more importantly related to the distribution of these hazards than income. Ultimately, knowing which is more important may be less relevant, however, than understanding the conditions associated with race and class that appear to consistently, if not inevitably, lead to inequitable exposure to environmental hazards and in understanding how these conditions can be addressed and how inequities in the distribution of environmental quality can be remedied.

Currently, there are no public policies in place which require moni-

makers have little knowledge about what the equity consequences are of the programs designed to control pollution in this country. Are some groups receiving fewer environmental and health remedies than others from existing programs? Have the risks to some actually increased as a result? If the social, economic, and political disadvantages faced by the poor and minorities that lead to environmental inequities are unlikely to be compensated any time soon, then it is clear that proactive government policies will be needed to address this issue. In the future, inequities in the distribution of environmental hazards will need to be monitored; existing policies and programs adjusted; and new programs designed in which enhancing environmental equity is a criterion for adoption.

A quarter of a century ago, the Kerner Commission (United States Government, 1968) warned that: "To continue present policies is to make permanent the division of our country into two societies: one largely Negro and poor, located in the central cities, the other predominantly white and affluent, located in the suburbs and in outlying areas." At the time that that warning was made, the EPA had not yet been created nor the nation's major environmental legislation yet passed. The terms "environmental racism" and "environmental justice" were unheard of. Results of our study and those of others indicate current environmental policies have allowed for separate societies differing in the quality of their respective environments. To know that these inequities exist but to do nothing about them is to perpetuate separate societies and will continue to leave the poor, blacks, and other minorities vulnerable to current and future environmental policy decisions.

### Notes

1. One has to ask why minorities are disproportionately poor in the first place, however. Obviously, the answer is related to job and educational discrimination which contributes to the low pay and hence poor living conditions of minorities. Thus, the factor of race ultimately cannot be avoided.
2. That housing discrimination is no insignificant influence on mobility was demonstrated in an ambitious national study by Denton and Massey (1988). Using U.S. Census Bureau data, they found that the degree of segregation found in black communities was not appreciably reduced by controlling for the income, education, and occupational status levels of the communities. This finding led Denton and Massey to conclude that race rather than income was the limiting factor on the mobility of blacks. "Clearly, black segregation in U.S. metropolitan areas cannot easily be attributed to socioeconomic differences from whites" (p. 805).
3. The survey population for this special supplemental study includes all households who live within a 1.5 mile radial zone of the 16 designated commercial hazardous waste facilities (14 existing and 2 proposed). From this survey population a two-stage equal probability sample of households was selected. The distribution of sampled households in the 16 zones which comprise the survey population is proportional to the total number of households which reside in each zone. Zones surrounding commercial hazardous waste facilities which have low population densities are expected to have smaller numbers of sampled households than zones with higher household densities. Although all households in the survey population had an equal chance of selection for the study, densi-

ficiently low that no sample observations were in fact selected. However, as inference from the sample is to the entire population of people living in all 16 zones, the sample selected is representative of the entire population of residents living within 1.5 miles of these 16 commercial hazardous waste facility zones.

4. The U.S. Census Bureau definition was used here.

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