

The Evidence of Environmental Injustice **Clifford Rechtschaffen**

A central building block of the environmental justice movement is empirical evidence about the unequal distribution of environmental benefits and burdens. Such evidence has played a key role in galvanizing public attention to the issue of environmental justice and helped inform what the appropriate legal responses should be. Conversely, those who challenge the existence of environmental discrimination and the breadth of environmental justice claims have questioned how solid the evidence of environmental inequities is and whether seeming disparities are better explained by other demographic factors.

On one level, one could argue that empirical evidence of environmental disparities merely supports what most people understand intuitively: that factories, junkyards, and landfills tend to be located in poor communities and communities of color, and not in affluent, white neighborhoods. Indeed, as environmental justice expert Charles Lee has written, there long has been widespread anecdotal evidence of disparities, including the alarming rates of lead poisoning among minority children, the high rates of pesticide-related illness among farm workers, a predominantly Latino work force, the high rates of Native Americans who mined uranium ore and suffer lung cancer, the growing rates of childhood asthma in inner-city areas, and the proximity of communities of color to hazardous waste sites and polluting facilities in areas throughout the country.¹ Over the past ten to fifteen years, however, academics and others have more systematically evaluated the distribution of environmental harms (and more recently, benefits).

How strong is the evidence of environmental injustice? Does it support the arguments for reforming environmental law raised by environmental justice activists? Does it substantiate claims of environmental discrimination, or are seeming disparities better explained by other demographic factors? This article attempts to provide a brief overview of the state of empirical research about the distribution of environmental harms, and to a lesser extent, environmental benefits. It is decidedly *not* comprehensive; there are literally dozens if not hundreds of studies that have been completed, and it is beyond the scope of this short article to comprehensively catalogue all of them.² (Indeed, there are well over 300 law review articles and over 120 books

¹Charles Lee, *Environmental Justice: Creating a Vision For Achieving Healthy and Sustainable Communities* 8-9 (1996) (unpublished manuscript).

²An annotated bibliography of studies about racial and income disparities in environmental harms can be found in LUKE COLE & SHEILA FOSTER, *FROM THE GROUND UP: ENVIRONMENTAL RACISM AND THE RISE OF THE ENVIRONMENTAL JUSTICE MOVEMENT* (2000). Three surveys of the empirical literature are Paul Mohai & Bunyan Bryant, *Environmental Racism: Reviewing the Evidence*, in RACE AND THE INCIDENCE OF ENVIRONMENTAL HAZARDS: A TIME FOR DISCOURSE 163 (Bunyan Bryant & Paul Mohai eds., 1992); BENJAMIN GOLDMAN, *NOT JUST PROSPERITY: ACHIEVING SUSTAINABILITY WITH ENVIRONMENTAL JUSTICE* (1994); and Andrew Szasz & Michael Meuser, *Environmental Inequalities: Literature Review and Proposals for New Directions in Research and Theory*, 45 *CURRENT SOC.* 99 (July 1997).

that have been written about environmental justice.) Rather, this article attempts to highlight some of the broad conclusions of the research and some of its implications for environmental law.

The article begins with some of the most well publicized research, that concerning the location of hazardous waste facilities. Numerous studies document that these facilities are concentrated in communities of color and low-income communities, although there are some that reach contrary results. In part, the conflict in the evidence results from differences in the methodological design of the various studies. The article then examines studies evaluating the distribution of air pollutants, air toxics, facilities that report under the Toxic Release Inventory (TRI) program, occupational environmental hazards, and other environmental harms. The article concludes with a short discussion of research about the disparate distribution of environmental benefits, including parks, transportation funding, and enforcement activity.

Hazardous Waste Facilities

One of the seminal events in the environmental justice movement occurred in 1982, when the siting of a polychlorinated biphenyl (PCB) landfill in predominately African- American Warren County, North Carolina sparked nonviolent demonstrations resulting in over 500 arrests. Against a well-publicized charge that the community was targeted for siting because the residents were predominantly African-American, the General Accounting Office (GAO) undertook an investigation in the southern region (EPA Region IV) and found that three of the four major offsite hazardous waste facilities were in fact located in predominantly African-American communities, even though African-Americans comprised only about one-fifth of the region's population.³

In 1987, the United Church of Christ's Commission for Racial Justice (CRJ) released an influential national study that documented a significant relationship between the location of commercial hazardous waste facilities (Treatment, Storage and Disposal Facilities, or TSDFs) and uncontrolled toxic waste sites, and race. The study was based on a comparison of such facilities and demographics in zip codes throughout the country. The CRJ study found that although socio-economic status appeared to play an important role in the location of TSDFs, race was even more significant, even after controlling for urbanization and regional differences. The report also found that three out of every five Black and Hispanic-Americans, and approximately half of all Asian/Pacific Islanders and American Indians lived in communities with uncontrolled toxic waste sites.⁴ In 1994, researchers updated the CRJ study (using 1990 census data as opposed to 1980 data) and confirmed that zip codes hosting one facility had more than twice the percentage of minorities as zip codes with no facilities. The study also found that the

³U.S. GEN. ACCOUNTING OFFICE, SITING OF HAZARDOUS WASTE LANDFILLS AND THEIR CORRELATION WITH RACIAL AND ECONOMIC STATUS OF SURROUNDING COMMUNITIES, GAO/RCED 83-168 (1983).

⁴COMMISSION FOR RACIAL JUSTICE, UNITED CHURCH OF CHRIST, TOXIC WASTES AND RACE IN THE UNITED STATES: A NATIONAL REPORT ON RACIAL AND SOCIO-ECONOMIC CHARACTERISTICS OF COMMUNITIES WITH HAZARDOUS WASTE SITES (1987).

concentration of people of color living in zip codes with commercial hazardous waste facilities actually increased between 1980 and 1993.⁵

Also in 1994, researchers at the Social and Demographic Research Institute (SADRI) of the University of Massachusetts released a study at odds with the conclusions of the CRJ report. The SADRI report found that based on 1980 census data, there was no statistically significant difference in the percentages of the population that were African-American or Hispanic, or living below the poverty line, in census tracts hosting commercial hazardous waste facilities as opposed to non-host tracts.⁶ By contrast, levels of manufacturing employment and the industrial character of areas were important factors in determining the location of TSDFs. (The same research team reported similar results based on their study of 1990 census tract data, although in the latter study they also found that significantly higher percentages of low-income families and families receiving public assistance lived in tracts where TSDFs are located.⁷) Differences between the CRJ and SADRI studies appear to stem from several differences in the methodological designs of the studies: (1) the SADRI study did not use the entire U.S. as its comparison group, but only metropolitan areas with commercial waste sites, on the highly questionable theory that areas without currently operating waste facilities (i.e. some cities and rural areas) are not feasible for TSDFs;⁸ (2), the SADRI study did not examine disparities for all

⁵BENJAMIN GOLDMAN, & LAURA FITTON, TOXICS WASTES AND RACE REVISITED: AN UPDATE OF THE 1987 REPORT ON THE RACIAL AND SOCIOECONOMIC CHARACTERISTICS OF COMMUNITIES WITH HAZARDOUS WASTE SITES (1994).

⁶Douglas Anderton, et. al., *Environmental Equity: The Demographics of Dumping* 31 DEMOGRAPHY 229 (May 1994).

⁷Andy B. Anderson, et. al., *Environmental Equity: Evaluating TSDF Siting Over the Past Two Decades*, 25 WASTE AGE 83, 84 (July 1994).

⁸Professor Paul Mohai criticizes this approach, arguing that being rural (or a metropolitan area without an existing waste site) does not necessarily disqualify an area from being considered for waste siting, and noting that the largest commercial hazardous waste landfill in the country, with 23% of the nation's hazardous waste landfill capacity, is located in the rural (predominantly African-American) community of Emelle, Alabama. The effect of using the narrower control group is to increase significantly the percent of people of color in the control areas, which reduces the likelihood of finding racial disparities. Mohai argues:

In effect, the UCC [CRJ] study addresses the question of where hazardous waste facilities are most likely to be located, regardless of whether these areas are urban or rural. The UMass [SADRI] study, on the other hand, addresses the question of where within metropolitan areas currently containing a facility such facilities are likely to be located. Unlike the UCC study, the UMass study treats as unimportant the fact that metropolitan

people of color as a group, but rather only separately for blacks and Hispanics, which leaves out eleven percent of the people of color population in the U.S; and (3) the SADRI study used census tracts rather than zip codes as its geographic unit of analysis. When the SADRI researchers combined census tracts to create geographically larger local areas, they also found racial disparities.

Another nationwide study, conducted by Professor Vicki Been and Francis Gupta, of 544 communities that in 1994 hosted active TSDFs, found that the percentage of Latinos had a significant impact on the likelihood of hosting a TSDF (as did the percentage of local industrial employees), but that the percentage of African-American residents, and the percentage of residents in poverty, did not.⁹ A number of local and regional studies, including some in California, also have found disparities based on race and income in the location of hazardous waste facilities. For example, a study of TSDFs in Los Angeles County concluded that race and ethnicity (both for African-Americans and Latinos) were significantly correlated with TSDF location (as were industrial land use and the proximity of a manufacturing labor force).¹⁰

Interestingly, both the Been and Gupta study and the study of TSDFs in Los Angeles County found that the very poorest neighborhoods appear to repel, rather than attract, hazardous facilities, and that working class or lower middle class neighborhoods bear a disproportionate share of TSDFs facilities. The Los Angeles County study, for example, found that rising income has a positive, then negative effect on the probability of TSDF location. The authors conclude that “some areas are too poor to have any economic activity, even a TSDF, while others are wealthy enough to resist TSDFs being sited nearby. In short, the most “at-risk” and impacted

areas currently hosting hazardous waste facilities are places with simultaneously high concentrations of people of color.

Paul Mohai, *The Demographics of Dumping Revisited: Examining the Impact of Alternate Methodologies in Environmental Justice Research*, 14 Va. Env'tl. L.J. 615, 648 (1995).

⁹Vicki Been & Francis Gupta, *Coming to the Nuisance or Going to the Barrios? A Longitudinal Analysis of Environmental Justice Claims*, 24 ECOL. L.Q. 1 (1997).

¹⁰J. Tom Boer, et. al., *Is There Environmental Racism? The Demographics of Hazardous Waste in Los Angeles County*, 78 SOC. SCI. Q. 793 (1997); see also, Mohai & Bryant, *Environmental Racism: Reviewing the Evidence*, supra note 2 (finding that race and income were significant predictors of the location of commercial hazardous waste facilities in Detroit area); NATIONAL ACADEMY OF PUBLIC ADMINISTRATION, *MODELS FOR CHANGE: EFFORTS BY FOUR STATES TO ADDRESS ENVIRONMENTAL JUSTICE* 54 (June 2002) (study by the Florida Environmental and Equity Justice Commission of close to 600 environmental hazardous facilities (large quantity hazardous generators, Superfund National Priority List (NPL) sites, solid waste sites, TSDFs, TRI facilities, and others) in 15 counties found that communities within two miles of the facilities were disproportionately minority and low income).

communities are working class, heavily minority neighborhoods located near industrial activity.”¹¹

Other studies have examined other types of hazardous waste facilities. For example, a recent analysis of facilities that generate hazardous waste found that disproportionate numbers of minority and low-income residents lived near the nation’s very biggest “Large Quantity Generators” (LQGs) (those that generate at least 1,000 kilograms per month) but that these generators were few in number, and that overall, there was no pattern of LQGs being located in minority areas. These facilities, however, are somewhat more likely to be concentrated in low-income communities.¹²

Finally, the evidence suggests that sites listed on EPA’s National Priority List (NPL) under Superfund are more likely to be located in predominantly nonwhite areas, but not in areas that are less wealthy.¹³ As two researchers note, however, NPL sites do not represent a random sample of all hazardous waste sites: “Indeed, one could argue that inclusion on the list – which is a precondition to federal cleanup support – is itself a function of political influence or greater wealth on the part of a particular community.”¹⁴

Intentional Siting vs. “Market Dynamics” or “Minority Move-in”

One of the most provocative arguments in environmental justice scholarship is that the prevalence of hazardous waste facilities and other Local Unwanted Land Uses (LULUs) in low-income communities and communities of color results from market-driven changes that occur in

¹¹Boer, et. al., *supra* note 10, at 795.

¹²Mark Atlas, *Few and Far Between? An Environmental Equity Analysis of the Geographic Distribution of Hazardous Waste Generation*, 83 SOC. SCI. Q. 365 (2002). A 1995 study by the General Accounting Office found that persons of color and low-income residents were not disproportionately located in a one-mile radius surrounding most solid waste (nonhazardous) municipal landfills. U.S. GEN. ACCOUNTING OFFICE, HAZARDOUS AND NONHAZARDOUS WASTE: DEMOGRAPHICS OF PEOPLE LIVING NEAR WASTE FACILITIES GAO/RCED-95-84 3(1995).

¹³See, e.g., John A. Hird, *Environmental Policy and Equity: The Case of Superfund*, 12 J. POL’Y ANALYSIS & MGMT. 323 (1993).

¹⁴John A. Hird & Michael Reese, *The Distribution of Environmental Quality: An Empirical Analysis*, 79 SOC. SCI. Q. 693, 697 (1998). Professor Rae Zimmerman’s findings based on a review of 814 Superfund sites are mixed but somewhat supportive of Hird’s. Using a simple unweighted analysis (which counts each community the same even though one community might have a population of 1000 and another a population of 10,000), she concluded that the percentages of blacks & Hispanics in Superfund communities were lower than in the nation as a whole. When weighted averages were used to take into account the communities’ population level, blacks & Hispanics were more prevalent than they are in the nation. She found no significant differences in poverty rates, however. Rae Zimmerman, *Social Equity and Environmental Risk*, 13 RISK ANALYSIS 649 (1993).

neighborhoods after an unwanted land use is located there. This thesis has been prominently developed by Professor Vicki Been, among others. Been suggested the possibility that communities in which hazardous waste facilities are sited might not be disproportionately minority or poor at the time the sites were selected, but might become poorer and home to a greater percentage of people of color in subsequent years following the sitings. Been pointed to a number of factors that could trigger such demographic shifts: “poverty, housing discrimination, and the location of jobs, transportation, and other public services may have led the poor and racial minorities to ‘come to the nuisance’ – to move to neighborhoods that host LULUs – because those neighborhoods offered the cheapest available housing.”¹⁵ Likewise, the siting of a LULU may decrease the value of a neighborhood’s property and the perceived quality of life in a neighborhood, causing those who can afford to and are able to move to do so. Been labeled these factors “market dynamics,” although as she herself noted, widespread racial discrimination in housing that limits the mobility of minority groups is a key ingredient in post-siting demographic changes.

Which set of forces is responsible for the disproportionate distribution of environmental harms is of more than academic interest. If the siting process itself is primarily responsible, communities may have viable claims, at least with respect to people of color, of discrimination under the Equal Protection Clause of the Constitution or Title VI of the Civil Rights Act (the former claims require a showing of intentional discrimination, while Title VI claims can be based on proof of discriminatory effect.) Likewise, problems with the siting process might lead to revisions of zoning, permitting and other decision making procedures to make them fairer. On the other hand, if the disproportionate distribution of LULUs results from market forces, then the remedies in theory would have to be much more fundamental – addressing unfairness in the operation of our market economy. (Some commentators argue that even “fixing” siting schemes to result in more equitable distributions would not work, since market dynamics will eventually cause the inequities to return.) Other, less sweeping remedies might include the need for tougher laws against “ethnic steering” in real estate sales/rentals, or ensuring access to data about neighborhood health risks so that persons who chose to move into neighborhoods with polluting facilities are acting on the basis of complete information.

Based on the research to date, there is little empirical support for the market dynamics theory. In her own nationwide study of 544 TSDFs (discussed above), Been and Gupta found that neighborhoods surrounding TSDFs did not become poorer or more heavily minority after TSDFs were sited there.¹⁶ Another nationwide study similarly found that having a TSDF facility sited in a community did not lead to significant increases in the percentage of African-American or Hispanic residents living there. Rather, demographic shifts in these communities are better explained by general population trends.¹⁷ Another study of high-capacity TSDFs in Los Angeles County likewise concluded that siting of TSDFs did not encourage minority move-in.

¹⁵Vicki Been, *Locally Undesirable Land Uses in Minority Neighborhoods: Disproportionate Siting or Market Dynamics?*, 103 YALE L.J. 1383, 1385 (1994).

¹⁶Been & Gupta, *supra* note 9.

¹⁷John Michael Oakes, et. al., *A Longitudinal Analysis of Environmental Equity in Communities with Hazardous Waste Facilities*, 25 SOC. SCI. RES. 125, 147 (1996).

Interestingly, that study also found that whether an area was undergoing ethnic transition also was a significant predictor of siting. The authors posit that “such ethnic transitions may weaken the usual social bonds constituted by race and make an area more susceptible to siting.”¹⁸ Another regional study, however, found that neighborhoods in St. Louis, Missouri, became poorer and more heavily minority following the siting of TSDFs landfills and incinerators.¹⁹

Other Environmental Harms

There is a substantial body of research documenting that low-income communities and communities of color also are disproportionately exposed to a wide range of other environmental harms. Some of the studies analyze distributions dating back to the early 1970’s. For example, in 1992, Professors Paul Mohai and Bunyan Bryant published a review of fifteen studies that had examined the distribution of various environmental hazards, many focusing on air pollution. With only a few exceptions, the studies had found pollution to be inequitably distributed by income, and that with only one exception, the studies had found pollution to be inequitably distributed by race. Where the distribution of pollution was analyzed by both income and race (and where it was possible to weigh the relative importance of each), in most cases race was found to be more strongly related to the incidence of pollution.²⁰ The studies reviewed by Mohai and Bryant were of varying scope, some limited to a single urban area, others national in scope. In 1994, Benjamin Goldman reviewed 64 empirical studies examining a wide range of environmental hazards, and reported that all but one found disparities by either race or income. When race and income were compared for significance, race proved more important in three-quarters of the tests (22 out of 30 studies).²¹

Based on its own review of the literature, in 1992, EPA concluded that racial minority and low income populations experience higher than average exposures to certain air pollutants, hazardous waste facilities (and by implication, hazardous waste), contaminated fish, and agricultural pesticides. EPA further concluded, however, that there was insufficient data to determine whether these populations also suffer disparate health effects. The one exception was

¹⁸Manuel Pastor, et. al., *Which Came First? Toxic Facilities, Minority Move-In, and Environmental Justice*, 23 J. URB. AFF. 1 (2001).

¹⁹Thomas Lambert & Christopher Boerner, *Environmental Inequity: Economic Causes, Economic Solutions*, 14 YALE J. ON REG. 195, 203-212 (1997).

²⁰ Mohai and Bryant, *supra* note 2. In assessing the distribution of these hazards by income, the typical approach of these studies was 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 was typically employed.

²¹BENJAMIN GOLDMAN, *NOT JUST PROSPERITY: ACHIEVING SUSTAINABILITY WITH ENVIRONMENTAL JUSTICE* (1994).

childhood lead poisoning.²² Indeed, there is unambiguous evidence that childhood lead poisoning – widely recognized as the most serious environmental health hazard facing young children – disproportionately affects low-income children and children of color. While blood lead levels of children have been dropping nationwide, children from poor families are eight times more likely to be poisoned than those from higher income families, and African-American children are five times more likely to be poisoned than white children.²³

Since the EPA review in 1992, numerous additional studies have been carried out. In one of the most comprehensive, Professors John Hird and Michael Reese examined the relationship between demographic characteristics and the distribution of twenty-nine indicators of environmental quality throughout the nation, including industrial air emissions, industrial water discharges, water quality, air quality, and proximity to hazardous wastes. The authors found a clear and strong relationship between race and environmental quality – nonwhites and Hispanic populations experienced disproportionately high pollution levels – while the results for income were mixed. They also found that levels of pollution were positively related to levels of manufacturing activity, population density, and unemployment, and inversely related to political mobilization (i.e. the higher levels of potential political mobilization, the lower the levels of pollution). Hird and Reese conclude:

The results of this study suggest that environmental quality is unevenly distributed, that nonwhites and Hispanics are significantly affected by that uneven distribution, and that this uneven distribution is a national rather than a regional phenomenon. Pollutants tend to be distributed in a way that disproportionately affects people of color, even across different model specifications, different pollutants, and when many other confounding characteristics are taken into account. This conclusion is all the more powerful because plausible alternative political and economic explanations are here modeled explicitly (e.g., the influences of income, urban locations, manufacturing activity).²⁴

In another national study, Professor Evan Ringquist examined factors accounting for three elements of environmental risk: the distribution of Toxic Release Inventory (TRI) facilities, the density of TRI facilities (i.e. where are TRI facilities clustered), and the concentration of TRI pollutants (where is the total weight of TRI pollutants the greatest). [The Toxic Release Inventory requires certain industrial facilities to annually report their releases of approximately 654 toxic chemicals.] Ringquist found that there are racial biases in all three elements he examined. Even when controlling for other factors, African-American and Hispanic residential areas are more likely to be exposed to higher levels of these environmental risks. With respect to class characteristics, the results were less consistent: the probability that a residential area hosts a TRI facility was negatively associated with income (i.e. the higher household income, the lower

²²ENVIRONMENTAL PROTECTION AGENCY, ENVIRONMENTAL EQUITY: REDUCING RISK FOR ALL COMMUNITIES, VOL. 2: SUPPORTING DOCUMENT 7-15 (June 1992).

²³46 MORBIDITY AND MORTALITY WKLY. REP. 141 (1997).

²⁴John A. Hird & Michael Reese, *The Distribution of Environmental Quality: An Empirical Analysis*, 79 SOC. SCI. Q. 693, 711 (1998).

the likelihood that a facility was located there), but it was also negatively associated with poverty rates and the percentage of adults without a high school diploma. In other words, and consistent with studies in the hazardous waste facility context, “while TRI facilities are not prevalent in wealthy areas, neither are they disproportionately present in ‘underclass’ neighborhoods. This suggests that these facilities, perhaps predictably, are located in working class residential areas.”²⁵ Another study generated for each zip code in the U.S. an air toxics exposure index, based on the volume of TRI emissions, their relative toxicity, and the distance of exposed persons from emission sources. The study found that communities with higher proportions of African-Americans face greater exposures to air toxics, even after controlling for a variety of economic and political variables, as do communities with lower educational attainment, high poverty levels, and higher levels of renter occupied housing.²⁶

Scholars James Lester, David Allen and Kelly Hill recently conducted a comprehensive review of the empirical evidence about environmental injustice. They conclude that studies conducted before 1992 generally determine that race (whether or not controlling for class) is linked with higher rates of exposure to environmental hazards for a variety of geographic areas and a variety of harms. They find that research carried out after 1992, which tends to be more sophisticated and control for additional demographic and political factors, likewise demonstrates that race and class are significant predictors of where environmental harms are located, although other factors also can be significant predictors.²⁷

Lester and his colleagues then conducted their own detailed study of the distribution of a range of environmental harms at different levels of analysis: the state, county, and city level. (The harms evaluated include air pollution (two measures), hazardous waste, solid waste, toxic waste, water pollution (two measures) releases of Toxic Release Inventory chemicals, and releases of lead.) Their analysis shows a strong link between the percent population that is African American and the extent of environmental harms, and a significant, if less pronounced, link between the percent population that is Hispanic and environmental harms.²⁸ Social class, as measured by income and education, is a less significant predictor than race of where hazards are

²⁵Evan J. Ringquist, *Equity and the Distribution of Environmental Risk: The Case of TRI Facilities*, 78 SOC. SCI. Q. 811, 818 (1997). Another national study reported results similar to the Ringquist study, namely that there are racial biases in the distribution of TRI facilities but that the income results are less clear cut. See Susan A. Perlin, et. al., *Distribution of Industrial Air Emissions by Income and Race in the United States: An Approach Using the Toxic Release Inventory*, 29 ENVTL. SCI. TECH. 69 (1995).

²⁶Nancy Brooks & Rajiv Sethi, *The Distribution of Pollution: Community Characteristics and Exposure to Air Toxics*, 32 J. ENV'T ECON. & MGMT. 233, 243-246 (1997).

²⁷JAMES P. LESTER, DAVID W. ALLEN & KELLY M. HILL, ENVIRONMENTAL INJUSTICE IN THE UNITED STATES 13-14 (2000).

²⁸With respect to Hispanics, they found no link between environmental hazards and percent Hispanic population at the city level, but they did find links at the county level, which were especially strong in poorer, western counties with low fiscal capacity. At the state level, they found racial disparities (for Hispanics) with respect to approximately half of the environmental harms studied. *Id.* at 152-155.

located.²⁹ By contrast, the researchers found that higher levels of political mobilization did not lead to lower levels of environmental harms.³⁰

The findings of this study, particularly the strong relationship between race and especially with regard to African Americans, are noteworthy because of the breadth of the environmental harms studied and the different geographic units of analysis used (as well as the different time periods studied), and because of the authors' initial skepticism about the claims of environmental injustice.³¹

A series of recent studies focusing on air toxics and other air pollutants in southern California (Los Angeles and surrounding counties) also document racial disparities in exposure to environmental risk, similar to the national pattern described above. The studies have been conducted by a collaboration of academics, including Professors James Sadd, Manuel Pastor, and Rachel Morello-Frosch, and community leaders.³²

In one study, which looked at TRI air releases, including pounds of emissions and their relative toxicity, the researchers found that the percentage of minority (but particularly Latino) residents was positively linked with the likelihood of living near a TRI facility, including a facility with a release that poses a greater health hazard.³³ The authors also found that industrial land use (i.e. the percentage of an area devoted to residential vs. industrial use), percentage of residents employed in manufacturing, and population density, all matter to TRI location. Additionally, and as reported in other research, they found that with respect to TRI location, income takes on an inverted "U-shaped pattern" in which the poorest and richest tracts experience the least likelihood of hosting a TRI.

In another study, the authors looked at the cumulative cancer risks faced by residents in the South Coast Air Basin from exposure to air toxic emissions [the 148 hazardous air pollutants (HAPs) listed under the 1990 Clean Air Act Amendments].³⁴ The authors calculated population risk indices (PRIs) for each racial and ethnic group. Their results, shown in the table below, indicate that estimated cancer risks for people of color are higher than for Anglos and exceed the average PRI for all groups in the region, with Latinos experiencing the highest risk levels.

²⁹They found that lower levels of social class were linked with the presence of greater environmental hazards in approximately 35-50% of the scenarios examined. *Id.* at 151-152.

³⁰*Id.* at 149-151.

³¹*Id.*, at xv.

³²Rachel Morello-Frosch, et. al., *Environmental Justice and Regional Inequality in Southern California: Implications for Future Research*, 110 ENVTL. HEALTH PERSP. 149 (2002).

³³James Sadd, et. al., "Every Breath You Take....": *The Demographics of Toxic Air Releases in Southern California*, 13 ECON. DEV. Q. 107 (1999).

³⁴Rachel Morello-Frosch, et. al., *Environmental Justice and Southern California's Riskscape: The Distribution of Air Toxics Exposures and Health Risks Among Diverse Communities*, 36 URB. AFF. REV. 551 (2001).

Average Personal Risk Index (Excess Lifetime Cancer Risk)
by Race/Ethnicity for the South Coast Air Basin

Racial/Ethnic Group	PRI for Estimated Individual Lifetime Cancer Risk
African-American	63/100,000
Latino	65/100,000
Asian American	63/100,000
Anglos	49/100,000
People of Color	64/100,000
Average Across all Groups	57/100,000

These results held true after controlling for household income as well as for well-known causes of pollution such as population density, income, land use, and a proxy for political power and assets (home ownership).

In a later study, the researchers evaluated the demographic distribution of TSDF facilities, TRI facilities, and cancer risks and respiratory hazards associated with exposure to air toxics, among public schoolchildren in the Los Angeles Unified School District. They concluded that the census tracts in which public schools are located are more likely to contain TRI and TSDF facilities than tracts without schools, but that the health risks associated with air toxic exposures were actually slightly lower in the tracts containing schools. When they compared the demographics of students attending schools, they found that minority students, particularly Latinos, are more likely to attend schools near TSDF and TRI facilities, and face higher health risks from air toxic exposures than white students. These findings held true even after controlling for other socioeconomic and land use variables.³⁵

Most recently, the research team attempted to analyze whether the higher risks faced by minority schoolchildren in Los Angeles contributes to poorer academic performance. Their preliminary results are noteworthy: they found that environmental risks (as measured by proximity to TRI facilities and respiratory risk levels associated with cumulative air toxic exposures) were associated with diminished school level academic performance (as measured by a school's performance on the Stanford 9 achievement test), even after controlling for factors such as percent of students on free lunches, teacher quality, percent of English learners, and other explanatory variables. For example, they concluded that significantly reducing the respiratory risks faced by schoolchildren would yield an estimated academic performance boost of over ten percent.³⁶ While the authors caution that important caveats apply to their findings (the results are

³⁵Manuel Pastor, et. al., *Who's Minding the Kids? Pollution, Public Schools and Environmental Justice in Los Angeles?* 83 SOC. SCI. Q. 263 (2002).

³⁶Manuel Pastor, et. al., *Reading, Writing and Toxics: Children's Health, Academic Performance, and Environmental Justice in Los Angeles* (2002) (copy on file with author). They found this improvement would result if a school's air quality improved from the highest to the

limited to Los Angeles, academic performance may not be accurately reflected by performance on the Stanford 9 achievement test, and others), the results suggest potential far-reaching impacts resulting from inequitable environmental burdens.

Another area in which risks apparently are distributed inequitably by race, ethnicity, and income but that has received less research attention is workplace exposure to environmental hazards. One notable example is farm worker exposure to pesticides; ninety percent of the approximately two million hired farm workers in the United States are people of color.³⁷ The U.S. is the largest single user of pesticides in the world; EPA estimates that each year U.S. farmers use about 1.2 billion pounds of pesticides. The World Resources Institute has estimated that as many as 313,000 farm workers in the United States may suffer from pesticide-related illnesses each year. Another source estimates that 800 to 1,000 farm workers die each year as a direct consequence of pesticide exposure.³⁸ Outside the farm worker context, several studies show that workers of color and low-wage workers are more likely than the rest of the population to work in jobs with higher exposures to toxic chemicals and other hazardous conditions, and that they experience greater risks of occupational disease and injury.³⁹ Dr. George Friedman-Jiménez notes that occupational diseases caused by exposure to toxic substances or hazardous conditions in the workplace are widespread: “The best available evidence indicates that 350,000 workers develop new onset occupational diseases and 50,000-70,000 active, disabled, or retired workers die of occupational diseases each year in the United States.”⁴⁰

Methodological Concerns and Critiques

Some of the research documenting disproportionate environmental hazards has been challenged on various methodological grounds. For example, as noted above, the choice of the

lowest respiratory risk category. They also determined that about 1/10th of the roughly 20% mean difference between white and African-American academic performance can be attributed to differences in the mean air pollution levels experienced by these respective groups at their schools.

³⁷The majority are Chicanos, followed by Puerto Ricans, Caribbean blacks, and African-Americans. Yvette Perfecto & Baltimore Velásquez, *Farm Workers: Among the Least Protected*, 18 EPA J. 13 (March/April 1992).

³⁸*Id.* EPA estimated in 1999 that there were 10,000 to 20,000 incidents of physician-diagnosed pesticide illnesses and injuries per year in farm work, but acknowledges that this is a serious underestimate. U. S. GEN. ACCOUNTING OFFICE, PESTICIDES, IMPROVEMENTS NEEDED TO ENSURE THE SAFETY OF FARM WORKERS AND THEIR CHILDREN, GAO/RCED-00-40, 12 (2000). The GAO concluded that comprehensive information on the occurrence of acute and chronic health effects for farm workers due to pesticide exposure does not exist. *Id.* at 4.

³⁹Some of these studies are discussed in George Friedman-Jiménez, M.D., *Achieving Environmental Justice: The Role of Occupational Health*, 21 FORDHAM URB. L.J. 604, 610-613 (1994).

⁴⁰*Id.* at 606.

appropriate geographic unit of analysis – zip codes, counties, census tracts, census blocks, or other units, such as an area that approximates the geographic impacts from a facility – can significantly affect the outcome of siting studies. Many of the more recent studies use census tracts, but these too have limitations: they are not consistent in size and shape; LULUs may be located anywhere within them, and could affect neighboring units as much, if not more, than the host unit.⁴¹

Critics have challenged the research on other grounds. Some argue that early studies were inconclusive because they failed to clarify the independent effects of race, income, population density, and other demographic factors. The more recent studies, however, generally control for such variables.

Critics also contend that some of the studies only have evaluated proximity to polluting facilities, and that this does not equate with actual exposure or elevated risk levels in host communities.⁴² Some argue that health risk levels may vary based on how well a facility is run, or how effectively its pollution control equipment is operating; others more broadly allege that environmental and health risks from industrial activities generally are not significant and are greatly exaggerated.⁴³ One counter to this argument is that, even if it were true that proximity does not translate into risk, there are numerous other impacts from a facility, apart from health risks, that can be quite damaging to a neighborhood. These include noise, odor, risk of accidents, truck traffic, neighborhood disruption, aesthetics, stigma, diminution in property value, increased anxiety and fear of illness, and so forth. (One interesting study of black and white families in an industrial Louisiana corridor found that black households are more concerned about industrial pollution than are white households, and that anxiety about pollution translates into the perception that the quality of life in communities is deteriorating. The authors concluded: “[B]lack households who are exposed to industrial hazards suffer in two ways. Compared to white households they are more exposed to health hazards, and their heightened concerns translate into a lower quality of community life.”⁴⁴) Notably, moreover, as discussed above,

⁴¹ Mohai, *The Demographics of Dumping Revisited*, *supra* note 8, at 649-650. For a detailed recent evaluation of which units of analysis are most appropriate to use, see Michael Aquino, et. al., *Units of Analysis and the Environmental Justice Hypothesis: The Case of Industrial Hog Farms*, 83 SOC. SCI. Q. 298 (2002). The authors propose a methodology for determining “community,” which they argue is the most desirable unit of analysis.

⁴² See, e.g., Christopher Berner & Thomas Lambert, *Environmental Injustice*, THE PUBLIC INTEREST 61, 67 (Winter 1995); William M. Bowen, *Comments on “Every Breath You Take...”: The Demographics of Toxic Air Releases in Southern California*, 13 ECON. DEV. Q. 124, (1999).

⁴³ See CHRISTOPHER FOREMAN, *THE PROMISE AND PERIL OF ENVIRONMENTAL JUSTICE* (1998).

⁴⁴ Raymond Burby & Denise Strong, *Coping with Chemicals: Blacks, Whites, Planners and Industrial Pollution*, 63 AM. PLAN. ASS’N J. 469 (1997).

some of the more recent studies explicitly attempt to determine the distribution of exposure levels and health risks.

Finally, critics have argued that the environmental justice scholarship is not reliable because the results can vary based on the scale on which studies are conducted – national, state, regional, or local level. In part, such variations may reflect differences in decision making dynamics and demographic forces at various governmental levels. Some researchers, such as Professor Sadd and his colleagues, argue that a regional focus in environmental justice research is most appropriate “because industrial clusters, transportation planning, and economic development decisions are often regionally rooted.”⁴⁵ However, the choice of scale can also be a function of what hypothesis researchers are testing. If, for example, a study’s purpose is to examine whether facilities permitted by a state agency, such as power plants, are inequitably distributed, the relevant study area will be the state, the area of the agency’s jurisdiction; if it is to evaluate whether the siting practices of a local body are discriminatory, the relevant area will be the local agency’s jurisdiction.

In response to these and other methodological critiques, the quality of environmental justice research has noticeably improved over the past decade, and likely will continue to do so in the future. As it has improved, the research continues to demonstrate that significant disparities in environmental harms exist.

Disparities in Environmental Benefits

Although far less systematically than with respect to environmental hazards, researchers have begun to assess the inequitable distribution of environmental goods or amenities. Some of the areas studied include parks and open space, transportation spending, and enforcement. Focusing on these additional significant issues will paint a more complete picture of the relative benefits and burdens that flow from our environmental laws.

For example, one review of New York City found that communities of color have the lowest percentages of tree canopy in the city (the author of the study also noted that these communities have some of the highest rates of asthma morbidity and mortality in the nation, and that studies demonstrate that trees promote environmental health by removing soot and dust particles from the air). The same study concluded that New York City has the lowest open space standards for its citizens of any metropolitan area in the country – only 2.5 acres of open space per 1000 residents – and that two thirds of the community planning districts (primarily communities of color) do not meet that standard.⁴⁶

⁴⁵Morello-Frosch, *supra* note 32, at 150.

⁴⁶Samara F. Swanston, *Environmental Justice: Mobilizing for the 21st Century: Environmental Justice and Environmental Quality Benefits: The Oldest, Most Pernicious Struggle and Hope for Burdened Communities*, 23 VT. L. REV. 545 (1999).

Attorney Robert Garcia reports marked disparities in access to parks and recreation in Los Angeles, which he notes has fewer acres of parks per 1,000 residents than any major city in the country. He points out that:

In the inner city where low income communities of color live, there are .3 acres of parks per thousand residents, compared to 1.7 acres in disproportionately white and relatively wealthy parts of Los Angeles. The paucity of park land is matched by the lack of recreational facilities. Within a five mile radius of [a] planned Baldwin Hills state park, for example, in the historical heart of African-American Los Angeles, there is one picnic table for every 10,000 people, one playground for 23,000 children, one soccer field for 30,000 people and one basketball court for 36,000 people. These figures do not take into account the privatization of public space. More affluent white communities have back yards and swimming pools and basketball hoops over the garage and access to country clubs and private beaches that low income communities of color do not have. The children in these neighborhoods lack adequate access to cars or to a decent transit system to reach parks in other neighborhoods.⁴⁷

Researchers also have begun focusing on disparities in the distribution of transportation benefits. As Professor Robert Bullard and two co-authors recently explained:

[T]ransportation remains a civil-rights and quality-of-life issue. All communities are still not created equal. Indeed, some communities accrue benefits from transportation development projects, while others bear a disproportionate burden in paying the costs. Generally, benefits are more widely dispersed among the many travelers who use new roads, while costs or burdens are more localized. Having a seven-lane freeway next door, for instance, is not a benefit to someone who does not own a car.⁴⁸

One, interesting, if somewhat anecdotal example, of unequal transportation funding can be found in how the Los Angeles Metropolitan Transportation Administration (MTA) allocated its resources – disproportionately to riders of Metrolink, MTA’s commuter rail line, where 28 percent of the riders are minorities, as compared to MTA’s bus and rail lines, where 80 percent of the riders are minorities. Robert Garcia, who represented the community groups that sued the MTA under Title VI of the Civil Rights Act (an action that led to a favorable settlement for the plaintiffs), notes some of the funding disparities uncovered by the lawsuit:

* Subsidy disparities. While 94 percent of MTA’s riders rode buses, MTA customarily spent 70 percent of its budget on rail. Data in 1992 revealed a \$ 1.17 subsidy per boarding for an MTA bus rider. The subsidy for a Metrolink commuter rail rider was

⁴⁷Robert Garcia, *Building Community: Lessons From The Urban Parks Movement in Los Angeles* (copy on file with author).

⁴⁸Robert Bullard, Glenn Johnson, & Angel Torres, *The Routes of American Apartheid*, 15 F. FOR APPLIED RESOURCES & PUB. POL’Y 66, 66 (Sept. 22, 2000).

18 times higher, however, or \$ 21.02. For a suburban light-rail streetcar passenger, the subsidy was more than nine times higher, or \$11.34; and for a subway passenger, it was two-and-a-half times higher, or \$ 2.92.

* Security disparities. While MTA spent only three cents for the security of each bus passenger in fiscal year 1993, it spent 43 times as much, or \$ 1.29, for the security of each passenger on the Metrolink commuter rail and the light rail, and 19 times as much, or 57 cents, for each passenger on the subway.

* Crowding disparities. MTA customarily tolerated overcrowding levels of 140 percent of capacity on its buses. In contrast, there was no overcrowding for riders on Metrolink and MTA-operated rail lines. Metrolink was designed to have three passengers for every four seats so that passengers could ride comfortably and use the empty seat for their briefcases or laptop computers.⁴⁹

Other, anecdotal evidence supports claims of disparate environmental benefits. For example, officials with the California Department of Transportation (CalTrans) recently reported that they had been planning to build sound walls to mitigate noise impacts from a planned freeway running through middle class communities, where they had received complaints from residents. In Spanish-speaking communities, with the same noise levels from freeways, but where residents had not complained, they were not building the sound walls. (The agency eventually decided to build sound walls in all the communities).⁵⁰

Another area that researchers have begun to examine is environmental enforcement. Enforcement is clearly a type of environmental benefit or amenity because effective enforcement preserves the integrity of the environment, which in turn improves the quality of life for the surrounding community. Indeed, enforcement is arguably even more important in communities that host a disproportionate share of polluting facilities, since these communities will

⁴⁹Robert Garcia, *Mean Streets*, 15 F. FOR APPLIED RESOURCES & PUB. POL'Y 75, 77 (Sept. 22, 2000).

⁵⁰Sandra Salazar-Thompson, Environmental Justice Project Director, California Office of Planning & Research, "Giving Meaning to Environmental Justice: I Know it When I See it," California State Bar Section Education Institute (Jan. 18, 2003) (quoting Greg King, Chief, Cultural & Community Studies, Division of Environmental Analysis, California Dept' of Transportation)

disproportionately experience the impacts of noncompliance with environmental standards. Considerable evidence shows that rates of noncompliance among regulated entities are substantial, probably in the range of 20 to 40 percent.⁵¹

In 1992, the National Law Journal (NLJ) published a report analyzing whether EPA's enforcement of environmental laws was discriminatory.⁵² The report reviewed all civil judicial enforcement cases resolved by EPA from 1985 to 1991 (with minor exceptions). It also looked at EPA responses to abandoned toxic waste sites under the Superfund program, specifically examining all sites listed on EPA's National Priority List (NPL) from 1980 to 1992 (again with minor exceptions).⁵³ The study found that penalties for violations of federal environmental laws were 46% lower in minority communities than white communities (\$153, 067 vs. \$105, 028).⁵⁴ It found, however, that a community's income level was not a reliable predictor of the size of penalties.

The study also found racial disparities in EPA's response to contaminated waste sites. In particular, it found that abandoned hazardous waste sites in minority areas take 20 percent longer to be placed on the national priority action list than those in white areas (5.6 years from the date of discovery until its listing on the NPL vs. 4.7 years). The report found that by the time cleanup commenced, this gap had narrowed and minority sites were only 4% behind white sites (10.4

⁵¹David Spence, *The Shadow of the Rational Polluter: Rethinking the Role of Rational Actor Models in Environmental Law*, 89 CALIF. L. REV. 917, 966-967 (2001).

⁵²See Marianne Lavelle & Marcia Coyle, *Unequal Protection; The Racial Divide in Environmental Law*, NAT'L L.J., Sept. 21, 1992, at S1 to S12.

⁵³The study classified zip codes around the facilities or waste sites into four quartiles, ranging from those with the highest white population and highest income to those with the lowest white population and income. It then compared the quartile with the highest white population (which it termed the "white community") with the quartile with the lowest population (referred to as the "minority community") and the quartile with the highest median income ("high-income") with the lowest median income ("low-income").

⁵⁴Specifically, average penalties imposed under the Resource Conservation & Recovery Act were 500% lower; under the Clean Water Act, 28% lower, the Clean Air Act, 8% lower, the Safe Drinking Water Act, 15% lower, and in multi-media actions involving enforcement of several statutes, 306% lower.

years vs. 9.9 years), although in half of the EPA regions this difference was 12% to 42%. The study also found that EPA chose less protective cleanup remedies at minority sites, opting for “containment,” (the capping or walling off of a waste site) 7 % more frequently than permanent treatment methods that reduce or eliminate the volume or toxicity of hazardous substances. (EPA is required by section 121(a) of CERCA to give preference to such permanent remedies.) At white sites, the EPA ordered treatment 22 % more often than containment.

The National Law Journal study has been criticized on a number of methodological grounds. Critics have argued that the study’s use of quartiles to divide cases into white and minority areas resulted in areas being classified as “minority” even though they were not in fact predominantly minority; that the disparities reported were not statistically significant, and that the NLJ failed to control for other variables that might affect penalties. Two subsequent studies of the cases reviewed by the NLJ have questioned its conclusions. Professor Evan Ringquist found that the results varied depending on how one grouped the historical data. He first confirmed the study’s findings that penalties from 1985-1991 were higher in white areas, but also found that penalties were higher in poor communities. Ringquist also examined civil judicial enforcement actions filed by EPA dating back to 1974, and concluded that from 1974 to 1985, penalties were higher in minority and poor communities, and that during the entire period from 1974 to 1991, there was little difference in average fines between white and minority areas (and that penalties were higher in poor areas).⁵⁵ Professor Mark Atlas also reevaluated the cases analyzed by NLJ using some different methodologies, and found no disparities in low income or minority communities.⁵⁶

As summarized by Professor Robert Kuehn, there also have been a number of additional studies examining bias in EPA’s responses under Superfund, with mixed results:

⁵⁵Evan J. Ringquist, *A Question of Justice: Equity in Environmental Litigation, 1974-1991*, 60 J. POL. 1148, 1162 (1998).

⁵⁶Mark Atlas, *Rush to Judgment: An Empirical Analysis of Environmental Equity in U.S. Environmental Protection Agency Enforcement Actions*, 35 LAW & SOC. REV. 633 (2001). Specifically, Atlas used geographic concentric rings around facility locations as the units of analysis, rather than facility zip codes. He also made changes based on what he determined were mistakes in EPA’s original enforcement database. Atlas found that the income level of an area had no meaningful effect on penalties, and that while a community’s race affected penalties, it was in the opposite direction of what the NLJ found, i.e. penalties *increased* as the proportion of minorities in an area increased.

Professors [James] Hamilton and [Kip] Viscusi [concluded] that EPA Superfund cleanups were less stringent for sites in communities with a higher percentage of minorities, finding that while there was not much difference in the pace of cleanup, regulators did treat sites differently in terms of the cleanup remedies selected and the cost expended per cancer case averted based on the racial characteristics of the community exposed. Other published studies of EPA's enforcement of the Superfund program have found that: eligible rural poor sites were placed on the Superfund NPL at half the rate of sites in other areas, but they were receiving the same level of EPA attention for site inspections and emergency removal actions; the higher the percentage of black population around a Superfund site, the less likely it is that EPA has yet issued a record of decision; the pace of cleanup depended not on socioeconomic factors but mostly on the site's potential hazard; and neither the level of contamination deemed to require cleanup nor the level of permanence in the remedies chosen by EPA was related to the racial composition or median income of the communities surrounding Superfund wood preservation sites.⁵⁷

If documented more generally, the apparent disparity in the distribution of environmental amenities raises some noteworthy issues. For one, it casts some additional doubt on the "market dynamics" theory discussed earlier. According to this theory, industrial facilities seek to locate in low-income neighborhoods because of economically rational factors such as the costs of land, favorable transportation infrastructure (such as nearby railroads), and a good local labor pool, not because the residents are low income or minority and have lack the political resources to resist the siting. There are, however, few if any apparent economic justifications for providing more amenities in wealthier communities. In fact, according to the market dynamics theory, the opposite would occur: since land for open space is cheaper in poorer communities, one would expect municipalities to site parks, recreational facilities, and other environmental amenities in lower income neighborhoods.

In addition, past experience suggests that courts are more likely to remedy the disparate distribution of environmental benefits than environmental harms – simply because the inequity in the former case is much easier to redress than in the latter situation (i.e. it is much easier to pay for the construction of additional parks or flood protection services in a community of color than to undo an unfair siting scheme). For example, while to date the courts have been uniformly unreceptive to discriminatory siting claims based on violations of the Equal Protection Clause of the Constitution (which requires a showing a discriminatory intent),⁵⁸ in another line of cases,

⁵⁷Robert Kuehn, *A Taxonomy of Environmental Justice*, 30 ENVTL. L. REP. 10,681, 10,695 (2000).

⁵⁸*See, e.g.,* Bean v. Southwest Management Corp., 482 F.Supp. 673 (S.D. Tex. 1979), *aff'd w/out opinion*, 780 F.2d 1038 (5th Cir. 1986).

courts have been willing to infer discriminatory motive and find equal protection violations based on the disparate provision of municipal services such as water hookups, street paving, and storm-sewer capacity to minority residents.⁵⁹

Conclusion

Although certainly not unmixed, the clear weight of the evidence supports claims that environmental harms, and to a lesser extent, environmental benefits, are inequitably distributed in society. Indeed, in 1999, the Institute of Medicine's Committee on Environmental Justice reviewed the available scientific literature and concluded "that there are identifiable communities of concern that experience a certain type of double jeopardy in the sense that they (1) experience higher levels of exposure to environmental stressors in terms of both frequency and magnitude and (2) are less able to deal with these hazards as a result of limited knowledge of exposures and disenfranchisement from the political process. Moreover, factors directly related to their socioeconomic status, such as poor nutrition and stress, can make people in these communities more susceptible to the adverse health effects of these environmental hazards and less able to manage them by obtaining adequate health care..."⁶⁰ This view of the evidence is not uniformly shared; critics such as Christopher Foreman maintain that "even a reasonably generous reading of the foundational empirical research alleging environmental inequity along racial lines must leave room for profound skepticism regarding the reported results."⁶¹ Because so much is at stake in how this dispute is resolved, the debate about the evidence of environmental justice is likely to continue. In the meantime, however, policymakers have appropriately concluded that there is sufficient documentation that disparities exist, and have begun grappling with the

⁵⁹*See, e.g., Dowdell v. City of Apopka*, 698 F.2d 1181 (11th Cir. 1983). Very recently, a federal district court allowed equal protection claims based on the provision of municipal services to go forward. The plaintiffs in the case, residents of an African-American community in Dallas, have alleged that the City of Dallas discriminated in the provision of five categories of municipal services, including flood protection, zoning, protection from industrial nuisances, landfill practices, and streets and drainage. *Miller v. City of Dallas* 2002 WL 230834 (N.D. Tex.).

⁶⁰COMMITTEE ON ENVIRONMENTAL JUSTICE, INSTITUTE OF MEDICINE, TOWARD ENVIRONMENTAL JUSTICE RESEARCH, EDUCATION, AND HEALTH POLICY NEEDS 6 (1999).

⁶¹CHRISTOPHER FOREMAN, *THE PROMISE AND PERIL OF ENVIRONMENTAL JUSTICE* 27 (1998). Professor William Bowen has a similarly skeptical view; he writes that "to my mind... the big picture emerging from the current studies is one of mixed and inconclusive empirical evidence." Bowen, *supra* note 42, at 129.

challenging questions of how to incorporate environmental justice principles into their policies, programs, and regulations.

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