Environmental Justice

A slightly revised version of this article, with no citations, will appear as an entry in the Elsevier *Encyclopedia of Resource, Energy, and Environmental Economics*

H. Spencer Banzhaf
Georgia State University

November 2011

I. Introduction

The topic of environmental justice encompasses questions about the distribution of environmental quality across different populations, as well as the fairness of the policy-making process resulting in that distribution. Generally speaking, it can be divided into two contexts. The first, more traditional, context pertains to within-country comparisons—indeed, often intra-city comparisons—of where the poor and/or minorities live in relation to local pollutants like disposed hazardous wastes and emissions of air pollution. The second pertains to international comparisons, especially between nations in the north and south. Though receiving less attention traditionally, this context for environmental justice if increasingly important, as we wrestle with the ethics of climate change and the inequities in its impacts, its damages, and the costs of any abatement (e.g. Adger 2001, Miranda et al. 2011). Despite the importance of the international context in its own right, this article addresses only the former case, and considers especially the case of the United States, where most work on the subject has been conducted.

The beginnings of all timelines are arbitrary, but 1982 is a reasonable year to mark the birth of the environmental justice movement in the US. In that year, residents of Warren County, NC protested the construction of a hazardous waste landfill in their predominantly African-American Community (Bullard 1994). Minority communities' sense that such hazardous facili-

ties are to be found disproportionately in their communities was soon confirmed by landmark research studies by Bullard (1983), the US GAO (1983), and the United Church of Christ (1987). Since that seminal work on the topic, research has continued to confirm that poor and minority households do tend to live in more polluted neighborhoods. This correlation appears to be quite robust to the statistical methods employed and to the type of pollution considered, including hazardous waste facilities, landfills, large air polluters, and the concentration of air pollutants.[1] The one exception to this trend is the sensitivity some have documented to the spatial scale of analysis. Anderton et al. (1994), Baden, Noonan, and Turaga (2007), Cutter, Holm, and Clark (1996), Gamper-Rabindran and Timmins (2011), and Mohai and Saha (2006) all report sensitivity to spatial scale. The most recent of these studies find important correlations between pollution and demographics at the smallest spatial scales best representing distance to environmental hazards. At this point, the correlation appears to be a fact to be explained rather than one to be further tested.

This finding of a disproportionate environmental burden borne by the poor and people of color prompted President Clinton to issue Executive Order 12898 in 1994. Still in force, the order requires nondiscrimination in federal environmental programs and focuses federal resources, such as US Environmental Protection Agency's (EPA's) brownfield program, on low-income and minority communities. Under President Obama, the White House and EPA have

[1] On the location of landfills and hazardous waste facilities, see US GAO (1983), United Church of Christ (1987, 2007) for the classic studies and, for more recent work, Baden and Coursey (2002), Been (1997), Boer et al. (1997), Depro, Timmins, and O'Neil (2011), Gamper-Rabindran and Timmins (2011), and Goldman and Fitton (1994). On the presence of large polluters, see Banzhaf et al. (2011), Ringquist (1997), Sadd et al. (1999) and Wolverton (2009, 2011). On the emissions of air pollutants, see Arora and Cason (1999), Brooks and Sethi (1997), Kriesel et al. (1996), and Ringquist (1997). And on estimated air pollution concentrations, see Ash and Fetter (2004), Depro and Timmins (2011), Morello-Frosch and Jesdale (2004), and Morello-Frosch et al. (2001). Bullard (1994) is the classic book-length introduction. For more recent reviews and discussion of this literature, see Banzhaf (2011a), Bowen (2002), Cole and Foster (2001), Noonan (2008), and Ringquist (2003, 2005).

launched a number of initiatives to incorporate environmental justice considerations into "the fabric" of its regulatory activities (US EPA 2010, 2011a).

In addition to such top-down initiatives, environmental justice findings have fed grass-roots activist movements. For example, local stakeholders have sought more involvement in permitting polluting facilities and in making other environmental plans. They also have filed lawsuits against governments for discriminatory environmental enforcement and against polluters for environmental nuisances. In one prominent case in 2004, local activists forced California's South Coast Air Quality Management District to settle a suit over the geographic distribution of trades under its air pollution trading program.[2]

II. Hypotheses for Environmental Justice Correlations

Given the stylized fact of a spatial correlation between pollution and demographics, the logical question is why this correlation arises. In an influential article, Hamilton (1995) identified three broad categories of explanations for environmental justice correlations: pure discrimination, economic efficiency, and political action. Reorganizing some of these and adding another, I will consider five broad explanations for the observed correlations, none of which are mutually exclusive.

The first explanation is pure discrimination. The notion here, as articulated by Becker (1957), is that firms make production choices, including pollution emissions, based partly on their differential preferences for the welfare of different groups. If firms put a greater weight on the welfare of whites, they may systematically steer pollution into minority communities. Many economists who know only a little of the environmental justice literature have the mistaken impression that this model is what most activists and scholars have in mind, at least implicitly.

[2] See Lazarus (2000), Binder et al. (2001), and the United Church of Christ (2007) on the tangible successes of the environmental justice movement.

Given evidence from multiple regressions, in which race is no longer correlated with pollution after controlling for various economic and political factors, many then conclude the question of environmental justice as closed. In fact, leading scholars in the environmental justice literature have a much more nuanced view of the socio-economic processes governing the correlation, such as those discussed below (e.g. Bullard 1994, Foster 1998, Pulido 2000).

Similarly focused on firms' behavior, the second explanation is that firms locate their pollution-generating facilities on the basis of economic factors that maximize their profits rather than on the basis of demographics per se. But these factors, in turn, are correlated with demographics. Examples might be access to inexpensive land, to transportation networks, or to other firms in their supply chain. Another example might be access to low-wage labor, which are poorer virtually by definition. Wolverton (2009, 2011) explores such factors in a choice-based model of polluting firms' locational decisions and finds substantial evidence for this hypothesis.

A third explanation, known as "coming to the nuisance," essentially reverses the causality. Regardless of the reason pollution occurs in an area, local residents will find it undesirable. Accordingly, demand for real estate in the area will fall, and consequently so too will real estate values. The poor, being unwilling (or unable) to pay the higher housing costs required to obtain a clean environment, are the most likely to remain, or even to move in. This explanation follows the logic of Tiebout (1956), in which households "sort" into areas by their willingness to pay for public amenities. It was introduced into the environmental justice literature by Hamilton (1995) and by Vicki Been in a series of influential papers (1993, 1994, 1997). More recently, Banzhaf, Sidon, and Walsh (2011) have developed this explanation in a more formal theoretical model. This approach continues to receive the most attention from economists interested in environmen-

tal justice questions, so it will be given the most attention in this entry.

The weight of the empirical evidence suggests such sorting by households is an important factor explaining the observed correlations, but the empirical studies have not been unanimous on this point. One body of evidence is the large number of hedonic studies that find housing prices are lower near undesirable land uses and other forms of pollutions (for reviews, see Banzhaf and McCormick 2011, Boyle and Kiel 2001, Kiel and Williams 2007). Many of these studies also find that property values only decline after discovery of the hazard, or rebound after cleanup (e.g. Dale et al. 1999, Gayer et al. 2000, Kohlhase 1991, McCluskey and Rausser 2003a, Michaels and Smith 1990). On the other hand, Messer et al. (2006) did not find any price rebound after cleanup of superfund sites, suggesting these sites may be permanently stigmatized. Additionally, Greenstone and Gallagher (2008) recently have argued that many of these studies may suffer from unobserved variable bias. Examining some of the nation's most contaminated sites targeted for cleanup by the US superfund program, they adopt a strategy that accounts for unobserved time-invariant factors and compares neighborhoods around cleaned up superfund sites only to similarly polluted neighborhoods that did not receiving funds for cleanup. Doing so, they find no evidence of any effects of cleanup on property values. However, upon re-examining these data, Gamper-Rabindran, Mastromonaco, and Timmins (2011) do find effects at more local levels. As these results suggest, much of this literature must be interpreted with caution. Vigdor (2011) points out that many environmental justice communities have high vacancy rates, so, because of this slack supply, property values may not rebound after cleanup even if demand for real estate does. Noonan (2011) adds that cleanup projects often involve "reuse" of the land in ways that add to the stock of housing, which may offset the demand effect on prices through a supply effect.

A second body of evidence looks directly at the demographic responses following siting of polluting facilities or cleanup.[3] Banzhaf and Walsh (2008) and Kahn (2000) find evidence of "scale effects," in which population density increases in an area following local environmental improvements, as more households move in. However, even in contexts where environmental justice correlations are clearly present in a cross-section, the evidence for *changes* in the composition of demographic groups (average income, the percent minority, etc.) following siting of polluting facilities or cleanup is decidedly mixed. Evidence in support of such composition effects can be found in Baden and Coursey (2002), Banzhaf and Walsh (2008), Depro, Timmins, and O'Neil (2011), Gamper-Rabindran and Timmins (2011), Lambert and Boerner (1997), and Wolverton (2011). Evidence against can be found in Been (1997), Cameron, Crawford, and McConnaha (2011); Cameron and McConnaha (2006), Greenstone and Gallagher (2008), and Pastor, Sadd, and Hipp (2001).

While these studies all provide valuable raw facts, they again must be carefully interpreted. Recent theoretical models have recognized at least three reasons why empirical studies may fail to identify the phenomenon of "coming to the nuisance," even where it is actually occurring. Banzhaf, Sidon, and Walsh (2011) emphasize that demographic effects must be interpreted in the context of general equilibrium. They note that even if a neighborhood becomes richer after a cleanup of nearby toxic facilities, it is likely because of in-migration of marginal households from richer communities. Consequently, both the "treated" community and the supposed "control" community may become richer, making it harder to identify relative changes in income across space. They also show that, even if whites are richer than minorities on average, the ratio of whites to minorities over the relevant income range is in general indeterminate, so there are no

[3] Noonan, Krupka, and Baden (2007) combine these two literatures, considering real estate and demographic effects jointly.

clear predictions on *changes* in racial composition from *changes* in public goods, even in the extreme case where segregation is completely driven by sorting on those public goods.

Second, there may be some hysteresis in community characteristics (Cameron and McConnaha 2006, McCluskey and Rausser 2003b). Consider a poor, minority community that is dirtier than a nearby middle-class community. The residents of their respective communities will over the years build up social systems that fit their respective needs and wants. Removing the pollution removes the initial impetus the groups sorted into those communities in which they are found, but given the mobility costs and other neighborhood amenities that have formed, the neighborhood's character may not change as rapidly as simple static models would predict. In fact, Banzhaf and Walsh (2010) and Banzhaf, Sidon, Walsh (2011) show that when households choose a community based on its racial composition as well as its public goods and housing prices, counter-intuitive patterns may well occur in general equilibrium, with communities becoming less white after a cleanup, again even when such sorting is solely responsible for whites living in the cleaner community.

Finally, Depro, Timmins, and O'Neil (2011) have recently pointed out that observed changes in group populations do not reveal patterns in individuals' behavior. They construct an example illustrating that, even when minorities differentially come to a nuisance, it does not logically follow that the *percentage* of residents who are minorities will increase more in the polluted community than in a control group. They offer a simple solution for empirical work: rather than focus on community aggregates, track the migratory adjustments of individual households. Crowder and Downey (2010) take a similar approach. Together, these two studies provide what well may be the most convincing evidence to date that minorities are more likely than whites to "come to the nuisance" (and less likely to flee).

If such Tiebout sorting, or coming to the nuisance, is an important factor in explaining the observed correlations, it would have important policy implications. At a minimum, it would imply that many policies designed to reverse environmental justice correlations may inevitably be ineffective, as households can always move in patterns that would recreate the correlation. At most, such policies may make poor households worse off through a process of "environmental gentrification." By the logic of this socioeconomic process, poor households sort into the community because their priority is affordable housing, which allows them to save money for other necessities, so their willingness to pay for the environment is relatively low. In contrast, wealthier gentrifiers bid up housing prices to their own, higher, willingness to pay, harming the poorer incumbents who must now pay higher rents (see e.g. Sieg et al. 2004). Consequently, if the dynamic of Tiebout sorting plays an important role in explaining observed environmental justice correlations, it would appear to push back the locus of injustice from an environmental question to a more general question about the distribution of wealth.

The fourth explanation for the observed correlation is that it is the result of Coasian bargaining (Coase 1960). Under this scenario, polluting facilities locate in those communities that are willing to accept the smallest compensation in return for allowing the facility to be sited nearby (Hamilton 1995). There is some modest evidence of such dynamics taking place, as in the pattern of host fees collected by neighborhoods near landfills (Jenkins, Maguire, and Morgan 2004). Like the previous explanation of sorting by households in response to a given pattern of pollution, the standard Coasian model of bargaining between polluting firms and communities is a market-like process which—with the critical proviso of starting from the existing distribution of income—leads to an efficient allocation of pollution. Environmental inequity, from this perspective, is a matter of the inequity in the distribution of income. However, another perspec-

tive might be that some groups face greater transactions costs than others in collective action and negotiating with firms. For example, Hamilton (1993, 1995), found that communities with lower voter turnout were more likely to see local firms expand their processing of hazardous wastes (see also Brooks and Sethi 1997 and Arora and Cason 1999). This itself might be considered another source of inequity, one that can be addressed through capacity-building activities of community groups and non-profits.

A fifth and final interpretation focuses attention not so much on firms as on government and its failure to enforce environmental standards and regulations equitably. Perhaps governments are more likely to deny a permit for a new polluting facility, or more likely to enforce regulations at existing facilities, in areas with higher levels of political support for the current administration. Alternatively, perhaps government enforcement agencies find it easier to react to complaints from local citizens. But as with the "squeaky wheel that gets the grease," those agencies would be more likely to respond to better organized, better connected, and otherwise more politically powerful citizens (see McCubbins and Schwartz 1984, Hamilton and Viscusi 1999). If environmental justice communities lack political organization and connections, this dynamic would give rise to the observed environmental justice correlations. While plausible, this last explanation has found little empirical support. In one recent study, Shadbegian and Gray (2011) found little evidence of discrimination in government enforcement activities.

Again, none of these explanations excludes any of the others. Moreover, some of them may reinforce one another in various ways. As suggested in the previous paragraph, if minority communities have weaker political power, governments may give them less consideration in enforcement. Anticipating weaker enforcement, firms might thus be attracted to such communities. Additionally, pure discrimination in real estate markets may reinforce income differences in

steering minorities toward polluted areas (Bullard 1994).

III. From Positive to Normative: Incorporating Environmental Justice Considerations into Policy-Making.

If there is an environmental injustice, a natural question is how to remedy it. The answers of various scholars and policy makers have turned on how one interprets the injustice (Adler 2008, Foster 1998, Pulido 2000). The US EPA defines environmental justice as

> the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. EPA has this goal for all communities and persons across this Nation. It will be achieved when everyone enjoys the same degree of protection from environmental and health hazards and equal access to the decision-making process to have a healthy environment in which to live, learn, and work. (US EPA 2011b)

This interpretation classifies environmental justice as a matter of procedural justice, in which EPA's rule-making and enforcement processes must be fair and open to the participation of all. Other interpretations primarily classify environmental justice as a matter of distributive justice, in which the primary concern is the outcome, specifically the distribution of environmental quality or, more broadly, its contribution to the distribution of overall welfare (e.g. Adler 2008).

From either perspective, one proposal is for environmental justice to play a larger role in environmental rulemaking, in particular in regulatory impact analyses and benefit-cost analyses. From the standpoint of procedural justice, these analyses are an important procedure which, without discrimination, should reflect the interests of, provide information relevant to, and allow public comment from all groups. From the standpoint of distributive justice, these analyses are

an important planning tool that influences the distribution of environmental quality and welfare. Perhaps for these reasons, the US EPA is currently reforming its regulatory impact analyses to give a larger role for environmental justice considerations (US EPA 2011a).

There is in fact a long precedent for incorporating distributional effects into benefit-cost analysis. Indeed many economists and other analysts have advocated such a move for over 50 years, and continue to do so.[4] The United Kingdom incorporates distributional considerations in its analyses (HM Treasury 2003) and, in the US, the Office of Management and Budget has long allowed them to be, though they seldom are in practice (US OMB 1992). Most recently, President Obama's Executive Order 13563, issued January 18, 2011, requires that the benefit-cost principle include "distributive impacts and equity."

If the distributional effects of environmental policies are to be incorporated into regulatory impact analyses and benefit-cost analyses, a fundamental issue is to identify that entity whose distribution is said to matter. Some argue that environmental justice is inherently about the distribution of environmental quality, and that focusing on this one outcome is the most pragmatic course (e.g. Maguire and Sheriff 2011). Others have suggested that if the ultimate goal of distributive justice is the distribution of welfare, equalizing the level of environmental quality may be an inefficient way to go about achieving it. Instead, they would focus directly on the distribution of net benefits provided by an environmental policy (e.g. Banzhaf 2011b). This entails understanding the distribution of costs as well as benefits, including direct costs like taxes and fees and even indirect costs such as the gentrification effects discussed above (see Fullerton 2011 for a review of such effects).

Extending the latter argument, Banzhaf (2011b) suggests that identifying the distribution

[4] On the earlier history, see Banzhaf (2009). For more recent examples, see Adler (2008), Arrow et al. (1996), Graham (2008), Harrington, Heinzerling, and Morgenstern (2009), Johansson-Stenman (2000, 2005).

of net benefits requires using group-specific values for environmental improvements. He constructs an example in which imposing uniform willingness-to-pay values for environmental improvements results in one policy being selected by a benefit-cost test, even when every group prefers the other policy. In that example, this reversal in the decision rule happens because the policy imposes costs on each group that surpasses its actual values for the benefits it receives. He argues that the seeming inequity in allowing heterogeneity in values is really from ignoring the distribution of benefits, not from the heterogeneity in values per se. Returning to the theme of procedural justice, the implication is that respecting groups' own values is an important aspect of environmental justice.

A final question is how to incorporate the distribution of net benefits into benefit-cost analysis. Perhaps the most ambitious proposal is to weight individuals' or groups' net benefits, and sum those weighted values (e.g. Adler 2008, Johansson-Stenman 2000, 2005). For example, one common approach is to parameterize a utility function of the form $v(y) = \frac{1}{1-\rho} y^{1-\rho}$, where y is income and ρ is a parameter. Then the marginal utility of money is $y^{-\rho}$, which would serve as the weight for somebody with income y. This approach has the same advantages as monetizing other kinds of effects (such as environmental improvements) in benefit-cost analysis. It reduces all benefits—including equity—into common units. Moreover, given the weights selected, it provides a clear decision criterion for selecting a policy.

However, others have argued that most weights based on social welfare functions result in unreasonably severe penalties on the benefits of richer households (Harberger 1978). For example, if $\rho = 2$ in the above utility function (a common rule of thumb), then these weights imply society should trade \$100 to a household with \$100,000 for \$1 to a household with \$10,000, even if the other \$99 is lost in the transfer. Harberger (1978) argues that, because more

efficient transfers surely are available, such benefit weights provide misleading criteria for decision-making.

A second criticism of using distributional weights in benefit-cost analysis is that it arrogates too much authority to the analyst. That is, distributional weights are to be revealed by social decisions, not used as inputs into decision making. From this perspective, the greatest strength of distributional weights (collapsing everything into a scalar-valued function) is its greatest weakness, because it masks the distributional effects of interest. An alternative, less ambitious, approach is simply to provide distributional information along with conventional net-benefit measures. One way to do this may be by using summary measures such as the Gini Index or Atkinson Index (Atkinson 1970). Such measures may be used to summarize the distribution of net benefits, or health effects and other impacts (see e.g. Levy et al. 2009, Post, Belova, and Huang 2011). As with distributional weights, these summary measures may trade transparency for concision (Maguire and Sheriff 2011). Perhaps the most transparent approach is simply to provide net-benefit measures by salient groups. For example, Shadbegian, Gray, and Morgan (2006) apply this approach to a benefit-cost analysis of the Clean Air Act.

Incorporating environmental justice considerations—like any distributional considerations—into policy making is not without controversy. Questions about how best to do it ultimately depend on views about the role of government in society, the place of the expert in informing government, and the underlying socioeconomic mechanisms driving the observed correlations.

References

Adger, W. Neil. 2001. Scales of Governance and Environmental Justice for Adaptation and Mitigation of Climate Change. *Journal of International Development* 13: 921-31.

Adler, Matthew D. 2008. "Risk Equity: A New Proposal." *Harvard Environmental Law Review* 32: 1-48.

Anderton, Douglas L., Andy B. Anderson, John Michael Oakes, and Michel R. Fraser. 1994. "Environmental Equity: The Demographics of Dumping." *Demography* 31(2): 229-48.

Arora, Seema, and Timothy N. Cason. 1999. "Do Community Characteristics Influence Environmental Outcomes? Evidence from the Toxics Release Inventory." *Southern Economic Journal* 65: 691-716.

Arrow, Kenneth J., Maureen L. Cropper, George C. Eads, Robert W. Hahn, Lester B. Lave, Roger G. Noll, Paul R. Portney, Milton Russell, Richard Schmalensee, V. Kerry Smith, and Robert N. Stavins. 1996. "Is there a Role for Benefit-Cost Analysis in Environmental, Health, and Safety Regulations?" *Science* 272: 221-2.

Ash, Michael, and T. Robert Fetter. 2004. "Who Lives on the Wrong Side of the Environmental Tracks? Evidence from the EPA's Risk-Screening Environmental Indicators Model." *Social Sciences Quarterly* 85: 441-62.

Atkinson, Anthony B. 1970. "On the Measurement of Inequality." *Journal of Economic Theory* 2: 244-63.

Baden, Brett M., and Don L. Coursey. 2002. "The Locality of Waste Sites within the City of Chicago: A Demographic, Social, and Economic Analysis." *Resource and Energy Economics* 24: 53-93.

Baden, Brett M., Douglas S. Noonan, and Rama Mohana Turaga. 2007. "Scales of Justice: Is There a Geographic Bias in Environmental Equity Analysis?" *Journal of Environmental Planning and Management* 50: 163-185.

Banzhaf, H. Spencer. 2009. "Objective or Multi-objective? Two Historically Competing Visions for Benefit-Cost Analysis." *Land Economics* 85: 1-23.

Banzhaf, H. Spencer, ed. 2011a. *The Political Economy of Environmental Justice*. Stanford, CA: Stanford University Press, forthcoming.

Banzhaf, H. Spencer. 2011b. "Regulatory Impact Analyses of Environmental Justice Effects." *Journal of Land Use and Environmental Law*, forthcoming.

Banzhaf, H. Spencer, and Eleanor McCormick. 2011. "Moving Beyond Cleanup: Identifying the Crucibles of Environmental Gentrification." In Banzhaf (2011a).

Banzhaf, H. Spencer, Joshua Sidon, and Randall P. Walsh. 2011. "Segregation and Tiebout Sorting: Investigating the Link." In Banzhaf (2011a).

Banzhaf, H. Spencer, and Randall P. Walsh. 2008. "Do People Vote with their Feet? An Empirical Test of Tiebout's Mechanism." *American Economic Review* 98: 843-63.

Banzhaf, H. Spencer, and Randall P. Walsh. 2010. "Segregation and Tiebout Sorting: Investigating the Link between Investments in Public Goods and Neighborhood Tipping." NBER Working Paper No. 16057.

Becker, Gary S. 1957. *The Economics of Discrimination*. Chicago: University of Chicago Press.

Becker, Gary S. 1983. "A Theory of Competition among Pressure Groups for Political Influence." *Quarterly Journal of Economics* 98: 371-400.

Been, Vicki. 1993. "What's Fairness Got to Do with It? Environmental Justice and the Siting of Locally Undesirable Land uses." *Cornell Law Review* 78: 1001-85.

Been, Vicki. 1994. "Locally Undesirable Land Uses in Minority Neighborhoods: Disproportionate Siting or Market Dynamics?" *Yale Law Journal* 103: 1383-1422.

Been, Vicki. 1997. "Coming to the Nuisance or Going to the Barrios? A Longitudinal Analysis of Environmental Justice Claims." With Francis Gupta. *Ecology Law Quarterly* 34: 3-56.

Binder, Denis, Colin Crawford, Eileen Gauna, M. Casey Jarman, Alice Kaswan, Bradford C. Mank, Catherine A. O'Neill, Clifford Rechtschaffen, and Robert R.M. Verchick. 2001. "A Survey of Federal Agency Response to President Clinton's Executive Order No. 12898 on Environmental Justice." *Environmental Law Reporter* 31: 11133-50.

Boer, J. Tom, Manuel Pastor, Jr., James L. Sadd, and Lori D. Snyder. 1997. "Is there environmental racism? The demographics of hazardous waste in Los Angeles County." *Social Science Quarterly* 78: 793-810.

Boyle, Melissa A., and Katherine A. Kiel. 2001. "A Survey of House Price Hedonic Studies of the Impact of Environmental Externalities." *Journal of Real Estate Literature* 9(2): 117-44.

Bowen, William. 2002. "An Analytical Review of Environmental Justice Research: What Do We really Know?" *Environmental Management* 29: 3-15.

Brooks, Nancy, and Rajiv Sethi. 1997. "The Distribution of Pollution: Community Characteristics and Exposure to Air Toxics." *Journal of Environmental Economics and Management* 32: 233-250.

Bullard, Robert D. 1983. "Solid Waste Sites and the Black Houston Community." *Sociological Inquiry* 53: 273-88.

Bullard, Robert D. 1994. *Dumping in Dixie: Race, Class, and Environmental Quality*, 2nd ed. Boulder, CO: Westview Press.

Cameron, Trudy Ann, Graham D. Crawford, and Ian T. McConnaha. 2011. "Superfund Taint and Neighborhood Change: Ethnicity, Age Distributions, and Household Structure." In Banzhaf (2011a).

Cameron, Trudy Ann, and Ian T. McConnaha. 2006. "Evidence of Environmental Migration." *Land Economics* 82: 273-290.

Coase, Ronald H. 1960. "The Problem of Social Cost." *Journal of Law and Economics* 3: 1-44.

Cole, Luke W., and Sheila R. Foster. 2001. *From the Ground Up: Environmental Racism and the Rise of the Environmental Justice Movement*. New York: New York University Press.

Crowder, Kyle, and Liam Downey. 2010. "Inter-Neighborhood Migration, Race, and Environmental Hazards: Modeling Micro-Level Processes of Environmental Inequality." *American Journal of Sociology* 115: 1110-49.

Cutter, Susan L., Danika Holm, and Lloyd Clark. 1996. "The Role of Geographic Scale in Monitoring Environmental Justice." *Risk Analysis* 16: 517-26.

Dale, Larry, James C. Murdoch, Mark A. Thayer, and Paul A. Waddell. 1999. "Do Property Values Rebound from Environmental Stigmas?" *Land Economics* 75: 311-26.

Depro, Brooks, and Christopher Timmins. 2011. Residential Mobility and Ozone Exposure: Challenges for Environmental Justice Policy. In Banzhaf (2011a).

Depro, Brooks, Christopher Timmins, and Maggie O'Neil. 2011. Meeting Urban Housing Needs: Do People Really Come to the Nuisance? Mimeo.

Foster, Sheila. 1998. "Justice from the Ground up: Distributive Inequities, Grassroots Resistance, and the Transformative Politics of the Environmental Justice Movement." *California Law Review* 86: 775-841.

Fullerton, Don. 2011. "Six Distributional Effects of Environmental Policy." *Risk Analysis* 31: 923-9.

Gamper-Rabindran, Shanti, Ralph Mastromonaco, and Christopher Timmins. 2011. "Valuing the Benefits of Superfund Site Remediation." NBER Working Paper 16655.

Gamper-Rabindran, Shanti, and Christopher Timmins. 2011. "Hazardous Waste Cleanup, Neighborhood Gentrification, and Environmental Justice: Evidence from Restricted Access Census Block Data." *American Economic Review papers and proceedings* 101: 620-24.

Gayer, Ted, James T. Hamilton, and W. Kip Viscusi. 2000. "Private Values of Risk Tradeoffs at Superfund Sites." *Review of Economics and Statistics* 82: 439-51.

Graham, John D. "Saving Lives through Administrative Law and Economics." University of Pennsylvania Law Review 157: 101-245.

Greenstone, Michael, and Justin Gallagher. 2008. "Does Hazardous Waste Matter? Evidence from the Housing Market and the Superfund Program." *Quarterly Journal of Economics* 123: 951-1003.

Goldman, Benjamin A., and Laura Fitton. 1994. *Toxic Wastes and Race Revisited*. Washington, DC: Center for Policy Alternatives.

Hamilton, James T. 1993. "Politics and Social Costs: Estimating the Impact of Collective Action on Hazardous Waste Facilities." *Rand Journal of Economics* 24: 101-125.

Hamilton, James T. 1995. "Testing for Environmental Racism: Prejudice, Profits, Political Power?" *Journal of Policy Analysis and Management* 14: 107-32.

Hamilton, James T., and W. Kip Viscusi. 1999. *Calculating Risks: The Spatial and Political Dimensions of Hazardous Waste Policy*. MIT Press.

Harberger, Arnold C. 1978. "On the Use of Distributional Weights in Social Cost-Benefit Analysis." *Journal of Political Economy* 86: S87-S120.

Harrington, Winston, Lisa Heinzerling, and Richard D. Morgenstern. 2009. *Reforming Regulatory Impact Analysis.* Washington, DC: Resources for the Future.

H.M. Treasury. 2003. *The Green Book: Appraisal and Evaluation in Central Government*. http://www.hm-treasury.gov.uk/d/green_book_complete.pdf

Jenkins, Robin R., Kelly B. Maguire, and Cynthia L. Morgan. 2004. "Host Community Compensation and Municipal Solid Waste Landfills." *Land Economics* 80: 513-28.

Johansson-Stenman, Olof. 2000. On the Value of Life in Rich and Poor Countries and Distributional Weights Beyond Utilitarianism. *Environmental and Resource Economics* 17: 299-310.

Johansson-Stenman, Olof. 2005. "Distributional Weights in Cost-Benefit Analysis—Should We Forget about Them?" *Land Economics* 81: 337-52.

Kahn, Matthew E. 2000. "Smog Reduction's Impact on California County Growth." *Journal of Regional Science* 40: 565-582.

Kiel, Katherine A., and Michael Williams. 2007. "The Impact of Superfund Sites on Local Property Values: Are all Sites the same?" *Journal of Urban Economics* 61: 170-92.

Kohlhase, Janet E. 1991. "The Impact of Toxic Waste Sites on Housing Values." *Journal of Urban Economics* 30: 1-26.

Kriesel, Warren, Terence J. Centner, and Andrew G. Keller. 1996. "Neighborhood Exposure to Toxic Releases: Are there Racial Inequities?" *Growth and Change* 27: 479-99.

Lambert, Thomas, and Christopher Boerner. 1997. "Environmental Inequity: Economic Causes, Economic Solutions." *Yale Journal on Regulation* 14: 195-234.

Lazarus, Richard J. 2000. "'Environmental Racism! That's What it is.'" *University of Illinois Law Review* 2000: 255-74.

Levy, Jonathan I., Susan L. Greco, Steven J. Melly, and Neha Mukhi. 2009. "Evaluating Efficiency-Equality Tradeoffs for Mobile Source Control Strategies in an Urban Area." *Risk Analysis* 29: 34-47.

Maguire, Kelly B., and Glenn Sheriff. 2011. "Quantifying the Distribution of Environmental Outcomes for Regulatory Environmental Justice Analysis." NCEE Working paper 2011-02.

McCluskey, Jill J., and Gordon Rausser. 2003a. "Hazardous Waste Sites and Housing Appreciation Rates." *Journal of Environmental Economics and Management* 45: 166-76.

McCluskey, Jill J., and Gordon Rausser. 2003b. "Stigmatized Asset Value: Is it Temporary or Long-term?" *Review of Economics and Statistics* 85: 276–85.

McCubbins, Matthew D., and Thomas Schwartz. 1984. "Congressional Oversight Overlooked: Police Patrols versus Fire Alarms." *American Journal of Political Science* 28: 165-79.

Messer, Kent D., William D. Schulze, Katherine F. Hackett, Trudy A. Cameron, and Gary H. McClelland. 2006. "Can Stigma Explain Large Property Value Losses? The Psychology and Economics of Superfund." *Environmental and Resource Economics* 33: 299-324.

Michaels, R. Gregory, and V. Kerry Smith. 1990. "Market Segmentation and Valuing Amenities with Hedonic Models: The Case of Hazardous Waste Sites." *Journal of Urban Economics* 28: 223-42.

Miranda, Marie Lynn, Douglas A. Hastings, Joseph E. Aldy, and William H. Schlesinger. 2011. "The Environmental Justice Dimensions of Climate Change." *Environmental Justice* 4: 17-25.

Mohai, Paul, and Robin Saha. 2006. "Reassessing Racial and Socioeconomic Disparities in Environmental Justice Research." *Demography* 43: 383-99.

Morello-Frosch, Rachel, and Bill M. Jesdale. 2006. "Separate and Unequal: Residential Segregation and Estimated Cancer Risks Associated with Ambient Air Toxics in US Metropolitan Areas." *Environmental Health Perspectives* 114: 386-93.

Morello-Frosch, Rachel, Manuel Pastor, and James Sadd. 2001. "Environmental Justice and Southern California's 'Riskscape': The Distribution of Air Toxics Exposures and Health Risks among Diverse Communities." *Urban Affairs Review* 36: 551-578.

Noonan, Douglas S. 2008. "Evidence of Environmental Justice: A Critical Perspective on the Practice of EJ Research and Lessons for Policy Design." *Social Science Quarterly* 89: 1154-74.

Noonan, Douglas S. 2011. "Amenities Tomorrow: A Greenbelt Project's Impacts over Space, Time." In Banzhaf (2011a).

Noonan, Douglas S., Douglas J. Krupka, and Brett M. Baden. 2007. "Neighborhood Dynamics and Price Effects of Superfund Site Clean-Up." *Journal of Regional Science* 47: 665-92.

Pulido, Laura. 2000. "Rethinking Environmental Racism: White Privilege and Urban Development in Southern California." *Annals of the Association of American Geographers* 90: 12-40.

Pastor, Manuel, Jim Sadd, and John Hipp. 2001. "Which came first? Toxic facilities, minority move-in, and environmental justice." *Journal of Urban Affairs* 23: 1-21.

Post, Ellen S., Anna Belova, and Jin Huang. 2011. "Distributional Benefit Analysis of a National Air Quality Rule." *International Journal of Environmental Research and Public Health* 8: 1872-92.

Ringquist, Evan. 1997. "Equity and Distribution of Environmental Risk: The Case of TRI Facilities." *Social Science Quarterly* 78: 811-829.

Ringquist, Evan J. 2003. "Environmental Justice: Normative Concerns, Empirical Evidence, and Government Action." In *Environmental Policy: New Directions for the Twenty-First Century*, ed. by Norman J. Vig and Michael E. Kraft. Washington, DC: CQ Press.

Ringquist, Evan J. 2005. "Assessing Evidence of Environmental Inequities: A Meta-Analysis." *Journal of Policy Analysis and Management* 24: 223-247.

Sadd, James L., Manuel Pastor, J. Thomas Boer, and Lori D. Snyder. 1999. "'Every Breath You Take…:' The Demographics of Toxic Air Releases in Southern California." *Economic Development Quarterly* 13(2): 107-123.

Shadbegian, Ronald J., and Wayne B. Gray. 2011. "Spatial Patterns in Regulatory Enforcement: Local Tests of Environmental Justice." In Banzhaf (2011a).

Shadbegian, Ronald J., Wayne Gray, and Cynthia Morgan. 2006. "Benefits and Costs from Sulfur Dioxide Trading: A Distributional Analysis." In *Acid in the Environment: Lessons Learned and Future Prospects*, ed. by Gerald R. Visgilio and Diana M. Whitelaw. New York: Springer.

Sieg, Holger, V. Kerry Smith, H. Spencer Banzhaf, and Randy Walsh. 2004. "Estimating the General Equilibrium Benefits of Large Changes in Spatially Delineated Public Goods." *International Economic Review* 45(4): 1047–77.

Tiebout, Charles. 1956. "A Pure Theory of Local Expenditures." *Journal of Political Economy* 64: 416-24.

United Church of Christ. 1987. *Toxic Wastes and Race in the United States*. Report of the Commission for Racial Justice. http://www.ucc.org/about-us/archives/pdfs/toxwrace87.pdf

United Church of Christ. 2007. *Toxic Wastes and Race at Twenty*: 1987-2007. http://www.ucc.org/assets/pdfs/toxic20.pdf

United States General Accounting Office (US GAO). 1983. *Siting of Hazardous Waste Landfills and their Correlation with Racial and Economic Status of Surrounding Communities*. http://archive.gao.gov/d48t13/121648.pdf.

United States Environmental Protection Agency (US EPA). 2010. *EPA's Action Development Process: Interim Guidance on Considering Environmental Justice during the Development of an Action*. http://www.epa.gov/compliance/ej/resources/policy/considering-ej-in-rulemaking-guide-07-2010.pdf

United States Environmental Protection Agency (US EPA). 2011a. *Plan EJ 2014*. http://www.epa.gov/environmentaljustice/resources/policy/plan-ej-2014/plan-ej-2011-09.pdf

United States Environmental Protection Agency (US EPA). 2011b. http://www.epa.gov/environmentaljustice/

United States Office of Management and Budget (US OMB). 1992. Budget Circular A-94, revised. http://www.whitehouse.gov/omb/circulars_a094/

Vigdor, Jacob. 2011. "Does Environmental Remediation Benefit the Poor?" In Banzhaf (2011a).

Wolverton, Ann. 2009. "Effects of Socio-Economic and Input-Related Factors on Polluting Plants' Location Decisions." *BE Journal of Economic Analysis & Policy.* Vol. 9.

Wolverton, Ann. 2011. "The Role of Demographic and Cost-Related Factors in Determining where Plants Locate – A Tale of Two Texas Cities." In Banzhaf (2011a).