
Moving toward Sustainability: Integrating Social Practice and Material Process

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We ground this chapter on the assumption that the tradition of identifying human society and the natural environment as mutually exclusive is the most fundamental conceptual challenge facing both the environmental and social justice movements.¹ Human society cannot achieve environmental sustainability without understanding the relationship between material processes and sociopolitical practices and then applying that understanding in the policy arena. Such an understanding, let alone its application, is impossible when nature itself divides human communities through environmental injustice. Environmental injustice blocks attempts toward environmental sustainability by rendering the materiality of nature a wedge between social elites and the disenfranchised. Sustainability and social equity can only develop when humans begin to understand nature as a fundamental material for crafting what Aldo Leopold described as an expanding community of ethical responsibility, rather than a socioeconomic wedge.² As we will illustrate, the concept of sustainable development offers potential for environmental movements and environmental justice movements to work together in an alliance toward common goals.³ Achieving this potential, however, requires “movement fusion,” or thoughtful integration of physical processes typically stressed by environmental movements with social practices stressed by environmental justice movements.⁴

Both unsustainable development and environmental injustice are chronically acute on borders between comparatively affluent and poor nations (for example, United States/Mexico, Costa Rica/Nicaragua, South Korea/North Korea), where long-time residents and mushrooming

immigrant populations are prone to differential treatment, differential access to political systems, and differential conceptions of justice. This context has growing implications in a globalizing world where communication, transportation, and associated technologies facilitate existence of borderlands between countries without physical contiguity (for example, Singapore/Indonesia) by altering the trajectories of permeability between nations. Further, communities must share common-pool resources that influence environmental quality.⁵ Because such resources and their impacts often travel great distances, this condition does not necessarily mandate physical adjacency of communities.

In this chapter we explore the potential nexus of environmental justice and environmentalism in the context of borderland development using a mixed-method case study among border residents of Cameron and Hidalgo counties, Texas (United States). In this region immigration is driving development initiatives, which, in turn, shape environmental justice and environmental conditions. This region is familiar with explosive population growth, transnational disputes over common-pool natural resources, and environmental degradation. For decades, it has faced a divide between those who would implement Garrett Hardin's lifeboat ethics by keeping out, or at least isolating poor immigrants, and those who are struggling to build a more inclusive and sustainable community.⁶

As a critical case study of environmental justice and environmentalism on the southern border of the United States, this chapter begins to identify possibilities and constraints for fostering sustainable community development. The first step is to identify subjectivities of local people and how those subjectivities articulate with material processes such as degradation of air and water quality. This chapter, therefore, uses an emic perspective to elicit environmental issues crucial to local residents and imposes an etic bioscience perspective to examine their articulation with material processes. We use space (that is, the relationship between households and both perceived and scientifically verified environmental problems) to link these social practices and material processes. Although we are aware of the political and economic barriers to justice described earlier in this volume, our focus is on the logics behind the life choices made by those assumed to be the victims of environmental injustice.

First we discuss potential points of convergence between sustainability and the environmental justice movement within a liberal-democratic context. Second, we describe the methods used for data collection and analysis. Third, we share results of our analysis, using spatial relationships to demonstrate connections between social practices and material processes. Finally, we discuss what these border residents taught us about the promises and problems involved in drawing from both the environmental justice movement and environmental movement to develop sustainable communities in borderlands and beyond.

Sustainable Development: Panacea or Pandora's Box

No concept associated with environmental protection has enjoyed more widespread public legitimacy than sustainable development, something conservation biologists have long advocated in an attempt to encourage careful use of natural resources.⁷ During the last decade of the twentieth century, virtually everyone supported it. With the publication of *Our Common Future*, the idea was internalized into the popular lexicon. An explosion in publications using the term soon followed.⁸ The concept became a centerpiece for global development policy following the 1992 United Nations Conference on Environment and Development in Rio de Janeiro and the 2002 World Summit on Sustainable Development in Johannesburg.⁹ This social shift was legitimized by science and capitalized on the residual uncertainty inherent to the World Commission's definition of development as that meeting "the needs of the present without compromising the ability of future generations to meet their own needs."¹⁰

The definition's greatest strength and weakness is that, although communities embracing sustainable development must subscribe to a direct link between sustainability and development, as well as intergenerational and international equity, those communities also create their own terms of implementation, including operational definitions.¹¹ For example, some advocates for indigenous groups use sustainable development to argue that, because such groups have always used their natural resources, they should not be denied access to them by those who would protect

wilderness, whereas others use the same concept to argue that such groups should not be denied the right to protect natural resources from those who would spur economic development.¹² Julian Agyeman, Robert Bullard, and Bob Evans have suggested a modified definition of sustainable development that includes the clause "in a just and equitable manner," but this definition has yet to attain popular currency among sustainable development proponents.¹³

The conflicting values and beliefs associated with the confusing array of perspectives toward sustainable development should surprise no one. Given a definition that "allows proponents to simultaneously endorse both environmental protection and economic development, governments, private industry, natural resource agencies, conflict resolution professionals, and many environmental advocacy groups wholeheartedly embraced sustainable development."¹⁴ Multiple meanings evolved as sustainability advocates rooted the concept in their personal moral sentiments without making the values and politics associated with those sentiments explicit.¹⁵ Powerful business interests joined in the attempt to co-opt the meaning and use of the term.¹⁶ For example, business interests have colonized sustainable development for use in marketing campaigns designed to convince the public that purchasing certain high-end brands of building materials, food, toiletries, and other products will eliminate environmental problems associated with the consumer society epitomized by the United States.¹⁷

Many advocates of sustainable development discarded the concept when they discovered sustainable development was "code for perpetual growth... force-fed to the world community by the global corporate-political-media network."¹⁸ Deep ecologists eventually rejected the World Commission's definition for its implicit anthropocentrism, and many environmental ethicists rejected sustainable development in favor of "ecosystem sustainability."¹⁹ When the competing views of sustainable development and its failure to meet the expectations of its advocates became apparent, "it fell from grace among ecologists nearly as rapidly as it had become popular."²⁰ Critical evaluation of sustainable development as a conceptual framework for environmental management can be summed up in the claim that, at best, it is an unproven concept and, at worst, it has failed to slow the inexorable degradation of

environments needed to preserve environmental health for humans and other species.

What Is Environmental Justice and Who Gets to Decide?

Connections between sustainable development and environmental justice have only recently begun to develop.²¹ Our review of the environmental justice movement, particularly as it applies to sustainability within democratic political contexts, suggests the need to clarify what environmental justice is and who participates in shaping it. Even tentative answers to these issues would contribute to our ability to evaluate the degree to which environmental justice is achieved in specific situations and how it contributes to sustainability.

Critics of the environmental justice movement claim it has no basis in scientific fact, but rather is a mask for efforts of minorities and other disenfranchised groups to gain political power.²² They note that, although poor and minority communities often are located in or near environmentally degraded areas, few if any studies have demonstrated a causal relationship between decisions to locate a polluting facility and either the income or ethnicity of local residents.²³ In other words, it is difficult to document a phase of decision process during which managers explicitly state, "Let's dispose of our toxic waste in this neighborhood because it is inhabited by minority and/or poor people."

Claims that the environmental justice movement is grounded in political goals, rather than scientific fact, ironically reveal the epistemological fragility of the critics' argument. The Environmental Protection Agency's (EPA) definition of environmental justice mandates "fair treatment" and "meaningful involvement" of all potentially impacted groups.²⁴ If minorities and those from lower income brackets must struggle to gain political power in the environmental decision-making arena, they probably find their current involvement insufficiently meaningful. Moreover, the EPA version of environmental justice defines "fair" as equal (that is, no group receives a disproportionate share of negative environmental consequences). Data from numerous studies demonstrate that different socioeconomic groups bear differential shares of negative environmental impacts.

Agyeman, Bullard, and Evans note equal treatment is necessary but insufficient for environmental justice, adding that "access to the decision-making and policy-making processes" also is required.²⁵ Even institutional access is insufficient within liberal democratic contexts where both equality and liberty are valued.²⁶ If, as Agyeman argues, democracy is critical to the development of sustainable communities, both equality and liberty must be taken into account.²⁷ But protection of individual liberty maintains differences in decisions that influence exposure to environmental hazards and the ability to act on those decisions. For example, I may prefer to live far from a toxic waste dump, yet my income may be insufficient for me to obtain housing anywhere other than near the dump. Although it may be physically possible for me to take a second job that augments my income sufficiently to enable purchase of a home far from the dump, I may choose not to do so. For example, two participants in the study we describe below chose to live in homes without indoor plumbing or adequate outdoor drainage yet they purchased flat screen televisions so large they had to be placed at an angle to fit into the living rooms. Still others chose to exchange air conditioning, indoor plumbing, and/or electric lights for the pleasures of country living. These respondents said it was unhealthy to be crowded into the towns, and they liked sharing the native brush with wildlife.

Michael Walzer's categorization scheme of free exchange, need, and desert is a widely used approach to distribution that is directly relevant to environmental justice.²⁸ For instance, if all people received an equal level of environmental quality for a given investment of time or money, free exchange justice would exist. This version of environmental justice might preclude disparities rooted in ethnicity, but not income. It would be "just" for all poor humans to live in pressboard shacks, with open sewers, in the shadow of landfills filled with toxic waste from plants producing luxuries for wealthier humans. In contrast, environmental justice rooted in the need version of justice would mandate expending exceptional efforts for those living in degraded environments. Wealthy communities would be expected to provide the revenue needed to supply indoor plumbing with hot and cold running water for their poor neighbors. The third option, rooted in the merit system, might require residents to earn the right to protection from exposure to toxic waste

(regardless of who benefits from that waste) by contributing a predetermined amount of money and/or time to, for example, the local sheriff's reelection campaign. We learned that all these options have been implemented in our study area to some degree, with varying results. Although it should be clear that none of these versions of justice is adequate in all circumstances or cultures, and each version has different implications for environmental justice, they provide a useful starting point in the attempt to move beyond mandated equality in the distribution of harm.

Although critics have failed to trivialize the material significance of the environmental justice movement, they unwittingly have pointed out an inordinate focus on the results of environmental injustice as compared to the physical processes and social practices that create it. Environmental justice studies have tended to focus on the spatial relationship between pollution sources and disenfranchised people.²⁹ Some studies are beginning to identify the everyday cultural politics leading to environmental injustices, but few delve into the practices that exclude disenfranchised voices from the environmental decision-making process itself.³⁰ Another need is the exploration of appropriate responses to current injustices.³¹ Agyeman, Bullard, and Evans note the paucity of research addressing potential solutions, which suggests it may stem from the relative ease of reactive, as opposed to proactive behavior.³² Further, to have political weight, those solutions must integrate social practice with physical process.³³ This requires us to grapple with differences among those who focus on conceptualizing justice, as well as differences between those who focus on achieving social justice and those who focus on preserving biodiversity.

To address environmental degradation associated with environmental injustice, we must explore the sociopolitical practices of those living in degraded environments, understand how different sociocultural groups define environmental justice, and discover how the material that constitutes bodies and habitats interacts with these political practices. People who live along borders regularly make development choices others also eventually must make. The Spanish translation for "the border" is "*la frontera*," a term whose ordinary language significance best captures this phenomenon. Those who live in *la frontera* between relatively affluent and poor nations are the vanguard of global justice and sustainabil-

ity. They face the reality of environmental degradation on a daily basis and have much to teach the rest of us about issues that currently stymie efforts to create sustainable communities. This study among those living in the United States, yet along the far southeastern border between the United States and Mexico, explores how minorities and the poor are excluded from environmental decision-making processes and invites them to share their interpretations of environmental justice and sustainable development.

Research Methods

We capitalized on the benefits of methodological heterodoxy by combining a personally administered survey with open- and closed-ended questions, conducting informant-directed interviews, living within the social situation, and taking field notes.³⁴ We collected all data in a spatially explicit fashion. This approach allowed us to use the advantages of grounded theory to identify previously unimagined reasons for public participation and conceptions of environmental justice among border residents. We promoted design validity by utilizing prolonged on-site engagement, peer debriefing, triangulation, and member checking.³⁵ Time in the field enabled us to develop an intimate knowledge of the people, region, and context.³⁶ Practical constraints limited the time we were able to spend living on the border, and we relied on advisors who grew up in the Lower Rio Grande Valley to provide additional contextual insight. We used peer debriefing to address potential biases of "native" researchers and identify biases in interviewing approaches. We achieved triangulation by combining individual interview notes, field notes taken while living within the social situation, and summaries of historical accounts. Our member checking took two forms: including clarification questions in the interview and asking those who became informants to critique conclusions from past and current analyses of the situation.

Survey Preparation, Administration, and Evaluation

Survey questions asked (1) for perspectives toward environmental justice, pollution, and environmental issues in general; (2) whether respon-

dents had participated in any public process to address an environmental problem; and (3) basic demographic information, including household size, education, political affiliation, ethnicity, and income. We employed bilingual translators to conduct a forward (English to Spanish) and backward (Spanish to English) translation process to improve comparability between English and Spanish surveys.³⁷ We employed one translator whose first language was English and another whose first language was Spanish. The Spanish-first translator was native to the region of Texas along the U.S.-Mexico border. Each translator worked individually first and then consulted with other translators and the authors to resolve discrepancies.

To achieve our objectives, we studied a population of rural residents of the U.S.-Mexican border. Although we had arranged to obtain a sampling frame for the survey from county tax roles, we soon discovered that, regardless of whether they were legal residents, many people we sought lived off the grid. We therefore designed a sampling approach that avoided potential errors associated with traditional sampling frames. Rather than questioning a random sample of county taxpayers, we questioned a purposive sample of residents along the Military Highway (the southern-most transportation corridor along the U.S. border), between Hidalgo/McAllen and Brownsville, Texas. This gave us access to Texas residents living along approximately fifty-two miles of the farthest southeastern border between the United States and Mexico. We included all homes that fronted directly on the highway, as well as subdivisions, or *colonias*, connected to the highway. The term *colonia* simply means neighborhood for Spanish speakers in this region, but the Texas Secretary of State defines *colonia* as "a residential area along the Texas-Mexico border that may lack some of the most basic living necessities, such as potable water and sewer systems, electricity, paved roads, and safe and sanitary housing."³⁸ With one exception, neighborhoods in our study area were *colonias* by either definition.

Within this framework, we attempted to administer a survey to the person who answered the door of every fifth dwelling while moving northeast to southwest along the border. When no one was home we noted the address and returned daily until the interview was completed.

If the person answering the door chose to defer to another member of the household—usually someone with more education—we did not remonstrate. When the person claimed to be too busy, we asked whether we could leave the survey with them and pick it up later. Although we introduced ourselves first in English, we also noted the availability of Spanish translations of the survey. Because only one of the authors was comfortable conversing in Spanish, when potential respondents preferred to use a Spanish version, we had to ask them to wait a few minutes until that author was available. No one responded to this situation by refusing to let us return. Some respondents asked us to read the survey questions, explaining that, although they spoke Spanish, they were not comfortable reading it. They usually nodded encouragingly whenever we stumbled and helpfully corrected pronunciation as needed. Most respondents seemed to enjoy the role of teacher. In some households, a second resident invited the English-only researchers to sit down and engage in a conversation conducted from mixed fragments of English and Spanish. We stumbled upon one wealthy neighborhood, built around an elaborately landscaped *resaca* (an oxbow lake or abandoned river meander). Our response rate was slightly lower in this neighborhood and people were less likely to invite us back for further conversation.

All spatial analyses were conducted in ArcView 3.2 (Environmental Systems Research Institute, Redlands, California). We used landmarks (for example, canals, levies, forests) and road intersections as references to mark the general locations of interview households on a paper map (scale 1:16,800). We then used individual homestead attributes (for example, lawn shape, roof type, house shape, topography, driveway shape and type) to identify and enter the location of each house on a digital aerial photograph. Because image resolution was sufficiently fine to locate the actual interview households, spatial precision of interview household locations was better than ten meters. All descriptive and inferential statistics were calculated using Statistica 6.1 (StatSoft, Tulsa, Oklahoma, United States). We used either *t* tests or one-way analysis of variance (ANOVA) to determine whether differences in response variables of interest occurred by categories (.05 level of significance). If ANOVA was significant, we used Duncan's range test to evaluate differences among means (.05 level of significance).

Informant-Directed Interviews

We followed Peterson's approach to conducting informant-directed interviews.³⁹ We gave informants every opportunity to discuss any aspect of environmental quality and development but never required them to do so. This process allowed informants to lead the discussion and talk about issues they found important, thereby reducing the constraints that accompany highly structured interview protocols, as well as increasing the amount of information we gained. Informants were drawn primarily from survey respondents, with some supplementation from additional individuals involved in human health, environmental preservation, and development issues.

After respondents had completed the survey, we encouraged them to become informants, talking further about the survey questions, concerns the experience of filling out the survey had prompted, or anything else about the relationship between environmental quality and sustainability. We encouraged all informants, as well as other residents of their households, to participate in informal conversations with us. Thus, survey administration evolved into conversations, or informant-directed interviews, as residents began to accept researcher questions as the result of curiosity and a desire for understanding. The role of informants who preferred to speak Spanish evolved smoothly from language tutor to cultural tutor. Some who chose to take the survey in Spanish switched to English for the less-structured conversations because they no longer felt threatened by the interview context. We did not use a tape recorder during interviews that evolved from survey responses. We took notes as unobtrusively as possible and then filled in details, as well as added comments regarding affect, immediately following the interviews. We used a tape recorder during interviews with individuals who had not responded to the survey. We spent postsurvey time conversing with most of our survey respondents. Although we produced field notes from all conversations, we did not consider them interviews unless the conversation lasted at least twenty minutes after the survey was completed. Depending on the informants' needs and desires, most interviews lasted between twenty and sixty minutes. Within these parameters, we engaged in informant-directed interviews with sixty survey respondents as well as additional informants drawn from the health professions, biological sciences, and environmental management.

As the conversations evolved, our informants became increasingly willing to explain their perspectives and statements. We gained significant understanding of what it meant to live on *la frontera* as they guided the interviews into issues we may not have considered, as well as clarified previously vague concepts and verified or refuted our interpretations of events. Outside of the formal survey procedure, residents told stories, drew family members and friends into the conversation, and often contradicted statements they had made when answering the survey. In the case of apparent contradictions, we asked them for further clarification but did not change any survey responses. Detailed field notes of all interviews enhanced our reflexivity by enabling us to make frequent comparisons between statements informants made in various settings and our own experiences living in the area. Within this chapter, we use first-name pseudonyms for all informants, and we use interview number parenthetically to identify informants.

Living On-Site

Living on the border was critical to our ability to design an appropriate sampling frame. We arranged to live in a camp-trailer at the Santa Ana National Wildlife Refuge from mid-May through mid-August 2005. Established in 1943 for the protection of migratory birds, the 2,000-acre refuge is home to nearly 400 different species of birds and myriad other wildlife, including the indigo snake, malachite butterfly, and the endangered ocelot.⁴⁰ Both people and wildlife traversing the U.S./Mexico border use the area extensively. Refuge personnel informed us that they stopped providing trail maps for visitors because immigrants and smugglers were using them to navigate the dense thorn-scrub vegetation. Now humans passing through the refuge face the same navigational challenges as wildlife. The refuge is bounded on the north by the Military Highway and on the south by the Rio Grande River and Tamaulipas, Mexico. As mentioned earlier, we had intended to use a random sample drawn from county tax roles for our survey. The wisdom of that plan was called into question as soon as we arrived. We discovered immediately that society was divided into legal and illegal residents and that both often bypassed common identifying markers. As we got our bearings, we learned that multiple households often lived in several buildings but on one property

owned by a family patriarch or matriarch. Utilities were occasionally shared by means of electric cords run from one home to another, and some either used an outdoor privy or borrowed the neighbors' facilities. We also learned that the largest *colonias* were developing along Military Highway. We revised our sampling frame to take advantage of this transportation corridor, sampling from a population that lived on the border of a wildlife corridor, on the border between urban and rural, and within sight of the border between Mexico and the United States.

Results

Our survey compliance rate was 92.8% (402 of 432). Our sample was slightly more Hispanic and more female than the populations of Cameron and Hidalgo counties: 57.6% of respondents were female (51.5%, 2000 census), and 94.2% were Hispanic (86.3%, 2000 census). The average age of respondents was 42 years (SD = 16.4 years). Median annual household income fell between \$15,000 and \$24,999. The most frequent annual household income category was less than \$15,000 (42.6%), and 87.2% reported annual household incomes less than \$50,000. Average household size was 4.4 (SD = 1.9). Most respondents had either not completed high school (40.0%) or had completed their education at the high school level (31.1%, includes GED). Only 9.6% of respondents had received a junior college or university education. The most common sources of income for our respondents were service (16.6%), retired (12.1%), retail sales (9.3%), hourly physical labor (8.6%), public schools (8.6%), construction (7.2%), disability (6.9%), health care (5.5%), and self-employed (5.5%).

When respondents were asked about their political affiliation, the most common response was that they did not vote (43.5%), while 34.8, 13.8, and 7.4% reported being Democrats, Independents, and Republicans, respectively. We had not designated the phrase "do not vote" as an option on the paper survey but added it to our analysis because it was the most common response. Within our study area, being a Democrat was an act of cultural acquiescence more than a political action. For example, when members of the Gonzalez family appeared confused by the "what is your political affiliation" question, Pablo

explained why the question was not relevant for his family saying, "[W]e live on the river; we sure as hell ain't Republican" (137). Several times, eavesdropping family members informed older respondents that they were Democrats when they expressed the same confusion over the political affiliation question.

The high incidence of respondents who viewed not voting as their political affiliation probably related to the noncitizen status of some respondents, but most who felt compelled to explain their answers expressed disillusionment with government. For example, "I don't even want to vote because the parties just fight. They don't do anything for the community. The politicians don't do anything for the community, they just do it for themselves" (47); "It's the nature of people to do what's in their own best interest instead of the public" (203); "I won't vote because they do what they want anyway" (385); and, most commonly, "Poor people don't believe in that" (100). Disillusionment with local government was probably fueled by personal experience. After making the shift from respondent to informant, Ricardo told us, "I work at the county jail and he [the county sheriff] would have us all over at his house for a barbeque and then try to get us to vote for him" (321). The sheriff in question and several deputies were implicated in crimes ranging from running drugs and guns to sexual misconduct with inmates. This sheriff was being held in jail during our field study because other local law enforcement officers were afraid he would run to Mexico where he had a second family. Another informant said, "[O]ff the record, . . . the sheriff was working with the mafia to sell drugs and guns and when he went before the judge the judge said 'we're only human' but when I went in for a DWI they said, '[Y]ou messed up and you're going to pay,' and they told me not to say anything or you'll get more time. I'm not going to say anything about the sheriff though because he's got friends in law, but he's got more friends in the mafia, and if they find out they will come and burn my house" (104).

Social Perceptions of the Environment and Justice

Environmental Problems The vast majority of our respondents (82.4%) thought there were important environmental problems along *la frontera* and identified a diverse array of examples. Although no single problem

was implicated by the majority of respondents, illegal dumping, water pollution, problems with drainage and mosquitoes, and various air pollution issues were cited most commonly (34.7, 15.3, 10.5, and 10.5% of respondents, respectively). When asked to rank acceptability of exposure to pollution on a scale of 1 to 9, with 1 representing a completely unacceptable risk and 9 the most acceptable risk, the average score was 5.7 (SD = 2.3). Female respondents found pollution exposure levels less acceptable than did male respondents ($t = 2.14$; $p = .033$). Those who had graduated with associate's, bachelor's, or graduate/professional degrees found pollution exposure less acceptable than other respondents ($t = 2.36$; $p = .019$). Political affiliation also was related to the acceptability of pollution exposure ($F = 3.07$; $p = .028$), with Independents finding pollution exposure levels less acceptable than Republicans and those who reported they did not vote. Democrats could not be distinguished statistically from Republicans, Independents, or those who did not vote. The acceptability of pollution exposure levels was not related statistically to ethnicity, source of income, or household income ($p = .121 - .333$).

Illegal dumping was a pervasive problem throughout our study area. The Texas Natural Resource Conservation Commission suggested in 1997 that the more than 20,000 illegal dumping sites on the Texas/Mexico border would require more than \$20 million to clean up.⁴¹ The estimate of sites and cost has undoubtedly increased since that time. This problem plagued the most rural areas of our study site because surveillance was minimal there. One informant, who was employed by the U.S. Department of Transportation, expressed the problem in these words: "People dump old tires, furniture, mattresses in the ditches that are supposed to be for drainage. . . . [W]hen it rains the trash clogs the ditches and you get drainage problems, and people complain and say, '[O]h now my house is flooding.' Well you filled up the drainage ditches" (176). We saw evidence to corroborate the claims of informants who often directed us to the local "dump," which was a street, dried pond, or canal used for garbage disposal. A young woman described how a class from a local university changed her perspective: "[W]e need to be careful about disposal of our wastes and recycling." She regretted losing a local *resaca* because of the combined actions of her extended family and the Hidalgo County Water Control and Improvement District: "[T]he government

dammed up the lake and after it dried out we [neighborhood] used it for our garbage" (27). Many residents attempted to solve the trash problem by burning their garbage. Unfortunately, this practice simply converted one problem (trash) into another (air pollution). In fact, fire and smoke associated with trash burning was identified by 5.5 percent of our respondents as the most important environmental problem in the area.

When we asked respondents to describe water pollution, they typically referred to tap water. With rare exceptions, such as the disabled military veteran who said, "[S]ometimes bad water comes out, sometimes its yellowish, I drink it because I got used to bad water in the military" (100), even those making less than \$2,000 a year purchased bottled water for drinking. They said, "We have to get bottled water because tap water feels weird and has a smell" (295), "we don't drink it anyway because they say its *venenoso* [poisonous]" (326), and "I would rather be thirsty when it [bottled water] runs out than drink it from the tap" (142). One informant warned us, "[W]ater around here, no one drinks the water. It smells and tastes okay. You can take a bath with it, but if you drink it, give it about one half hour and it turns your stomach. You can ask anyone around here. Nobody drinks the water" (164). Residents were sure their neighbors knew the dangers of drinking tap water saying, "[B]etween here and Laredo nobody drinks the water. Everybody drinks bottled water" (254). Although few people considered drinking tap water an option, they were concerned about their clothing and pets, because "we get dirt out of the faucet and there is an oily film on top of the water" (48), "the water . . . stinks your clothes. You can't even wash with it" (343), and "some people give it to dogs and cats and it can make them sick" (157).

Residents saw poor drainage and mosquito infestations as different manifestations of the same problem. Drainage problems had two causes: trash and inadequate infrastructure. Some trash items (for example, washers, tires, sheet metal, propane tanks) led to mosquito problems by holding water, while others (such as sofas, mattresses, bags) led to mosquito problems by clogging drains and drainage ditches. While pointing to an adjacent yard full of old tires, automobiles, and appliances, Anita explained, "[T]he problem is trash in lots, makes mosquitoes, it's bad for kids" (47). In a nearby *colonia*, Andres described what happened when the drains clogged: "The drainage ditch behind my house gets trash and standing water, mosquitoes. It turns green color" (50).

Even without trash clogging drains and holding water, residents of *colonias* in our study area faced serious drainage problems. Many were built on land that was unsuitable for other purposes because of poor soils and inadequate drainage. According to John, "the farmer who owned the land [where the *colonia* was built] was supposed to put in drainage and fill to bring it up to code, but he didn't really do it, and so the water stays and there are mosquitoes" (357). John did, however, gratefully acknowledge that the county sometimes brought pumps to drain the *colonia* after heavy rains. Bluetown, a *colonia* developed in the 1960s, had received its first drainage system two years prior to our study, but the system held standing water. One resident we met walking down the street told us, "[T]hey didn't use any kind of machine, they just eyeballed it, and you see how well that worked!" (field notes). An informant from the neighborhood explained why some homes were separated from the street by a ditch: "They just started putting street drains in and made people on the street pay for the materials like the concrete pipes. If you didn't pay you didn't get a drain, and they left a ditch in front of your house" (87).

Overspray from crop dusters and smoke from burning sugarcane were considered serious problems by 7.1 percent and 4.2 percent of respondents, respectively. Several people suggested agrochemicals were a necessary evil because people needed food, so Anna was more upset that, once people became sick from chemicals, they had no medical care: "People get sick from asthma and breathing problems from the spraying of fields. They go to get [medical] help and its not there" (163). Several respondents considered sugarcane a bigger problem than trash burning. This feeling, however, may have resulted from frustration at watching hundreds of acres of cane burn while they were fined for burning trash in a barrel. Javier expressed this concern, saying, "The county cops come to our door as soon as we burn a little trash, but the cane farmers can burn that entire field and its fine. It should be fair. Tell us something, should tell them too. Have it straight" (61).

Although only 3.7 percent of our respondents identified *maquiladoras* as an important environmental issue, the *maquiladoras* evoked strong and bitter emotions in some informants. Lando (figure 7.2, point 4) shared the gristly details of his friend's experience working in one: "He dipped

electrical boards into some kind of resin you know, and had his hands get mutilated so he couldn't work. . . . He lost much of his vision from that chemical . . . they gave him gloves but it ran in still. . . . It was an American company, and they give him a little money because he can't work anymore, but they don't have to give you much in Mexico" (29). Juan, a disabled oil rig worker broke down in frustration and anger while telling us about his eight-year-old grandson, who "has lung cancer, and they had to move him to San Antonio to get help. They have a lot of *maquiladoras* in Mexico and they don't give a fuck! All that shit blows over here and maybe that hurt him when the wind was blowing. It came out in the paper two or three years ago about the wind. The plants in Reynosa and Matamoros—and it might hit you when [pause] maybe five or ten years. [pause] I hope I don't get sick" (366). Juan (figure 7.2, point 9) was directly downwind from the *maquiladoras* in Matamoros (figure 7.1).

Political Engagement in Environmental Issues Only 10.0 percent ($n = 40$) of our respondents had ever participated in political processes designed to address environmental problems. Most saw such engagement as futile. Marcos described his reasons for not participating.

I worked in John Deere and Barge factories for about 20 years and they didn't give a damn. They just threw it in the bay. The Coast Guard caught them and gave them a \$100,000 fine and they tried to blame me. They ordered me to throw it in the water. I was working in one of those big tanks. I don't know if you have seen those tanks, but they have a big door on the bottom. They told me to open that manhole, and they paid me so I did it, and all the oil drained into the water. They tried to say I didn't know what I was doing and I messed up, but I said I'd tell them the truth, so they were like, "No, no, no, we'll pay." That all went in the Brownsville Channel. Then I had to move, and went to the Mississippi to work for John Deere. They threw all their stuff into the Mississippi and everything. There were other tractor factories on the other side. When I went fishing, all the fish I caught smelled like oil. They can break the law, but I can't because I'm no good. I'm a poor man. They will pay money and say shut up. That's the way of life man. (171)

Of the 10 percent of our respondents who did participate in environmental politics, the most common modes were contacting governmental agency personnel to obtain information or make a complaint ($n = 16$; 43.2%), voting for or against a political candidate based on her or his position on the environment ($n = 14$; 37.8%), attending a public meeting

or hearing about environment issues ($n = 12$; 32.4%), and contributing either time or money to conservation groups ($n = 6$; 16.2%). The most common approach, contacting an agency to make a complaint, involved creative use of a phone tree: "We call the county and they say it's not easy because they have too many places to spray mosquitoes. Our neighbors, we all get together and call. I call my neighbor and they call their neighbor and we all call on one day. That's what it takes to get them to come" (345).

Hispanic respondents were more likely than whites to have participated in environmental politics ($t = 3.02$; $p = .003$). Education also was related to whether respondents participated in environmental politics ($F = 3.72$; $p = .001$), with those who graduated from a four-year college or university more likely to participate than those who had not graduated from high school, high school graduates, and those with associate's degrees. Respondents with graduate or professional degrees also were more likely to participate than high school graduates. Put another way, those who had obtained associate's, bachelor's, or graduate/professional degrees, collectively, were much more likely to participate in environmental politics than those without the benefit of either a college or university education ($t = -3.48$; $p < .001$). Similarly, household income was related to whether respondents participated in environmental politics ($F = 3.12$; $p = .005$). Those reporting annual household incomes between \$75,000 and \$99,999 (2.7% of respondents) were more likely to participate in environmental politics than those whose incomes ranged from less than \$15,000 to \$49,999 (87.2%). Respondents living in households earning at least \$100,000 annually (2.9% of respondents) also were more likely to participate in environmental politics than those reporting incomes of less than \$15,000 to \$24,999, or \$35,000 to \$49,999 (72.6%). Whether respondents participated in environmental politics was not related statistically to gender, source of income, or political affiliation ($p = .126 - .329$).

Linking the Material and Social

Environmental Problems Although there was a prominent spatial pattern in concern about illegal dumping, it was not related to a material aspect of dumping location or its impact on the environment. Rather, the

distribution of concern about illegal dumping was related to political boundaries. Only 17.5 percent of Hidalgo County respondents saw illegal dumping as a problem, as compared to 36.8 percent of Cameron County respondents. No public trash service in rural areas existed in Cameron or Hidalgo counties prior to our study. Private companies offered service. However, because most residents lived on incomes far below the poverty level, a monthly \$20 trash service was relatively low on their list of priorities. Cameron County began a mandatory rural trash service during the last two weeks of our study. On July 28, 2005, Red River Service Corporation (the rural trash service contract bid winner) began unloading trash bins at our respondents' homes. A brochure taped to the bin notified residents of the mandatory service, described billing (it was included in their water bill), and provided service information. Only 23.5 percent of respondents interviewed after trash bin delivery began ($n = 98$) were aware of the mandatory trash service before cans were dropped off at their homes. Many residents in our study area discovered other county residents considered illegal dumping a serious problem only after the trash bins arrived, but they did not change their views on environmental problems. Only 33.9 percent considered dumping a serious problem after the cans arrived as compared to 34.9 percent prior to their arrival.

As with illegal dumping, the spatial distribution of water pollution and concern about water pollution (15.3%) were mediated more by sociopolitical than material factors. The Military Highway Water Supply Corporation provided water to most households in our study area, so large wells and water treatment facilities filtered both the water and the relationship between point source water pollution and pollution of water at individual households. Although residents did not tie water pollution to point sources in the environment, they did tie it to the Rio Grande River. John told us, "[T]he water in the river is no good. It used to be good and people used to fish in it" (324). According to Ted, "[T]he other side, they throw shit in the river. When I was a kid you could drink out of it [made hand scooping water to mouth gesture], but now there are Pampers floating by" (374). One common theme was that water treatment was inadequate to clean the river. Joanne explained that "the water in the river is kinda green. They say they clean it and shit, but I know a

guy at the water place, and he says, '[H]ey I urinate in a cup and I don't care how many tests you give to it, its still going to be urine.' We used to have wells that went down real deep, but they came to us and said that water is poison and we need to get city water. Now they just use big wells from the farmers. We're still in the same boat" (121). Sal was "worried about air and water because they burn everything and dump shit in the water and don't care in Mexico and you can't stop it from coming here" (137). Mercedes claimed, "You can't filtrate it enough. The river is dead; it foams. How can you filtrate that?" (209).

There was a clear spatial link between perceived environmental threats from agriculture (11.3 percent of informants), including overspray from crop dusters and smoke from sugarcane burning, and point sources of agricultural pollution. Of the respondents concerned about agricultural pollution, 88.0 percent lived directly adjacent to an agricultural field that was currently being farmed (51.5 percent of all respondents did). Twenty-seven respondents (7.1 percent) objected to overspray of agricultural chemicals, primarily from crop dusters. From this group, 88.9 percent lived directly adjacent to an actively farmed field. This immediate adjacency is critical because when a crop duster attempts to spray to the edge of a field, overspray only hits houses directly adjacent to the field and those a mere fifty meters inside a *colonia* are spared. Respondents cited damage to yard plants as evidence that defoliant were occasionally missing their intended targets: "[W]e have a crop duster right there and sometimes he throws chemicals to kill the cotton and sometimes he spills on us and we know it because all our neighbors' trees were killed. A lot of people went to complain to him but he doesn't give a darn. A lot of children play in the street and it can fall on their head and become a serious problem" (100). Another informant living adjacent to a cotton field said, "[T]he public is the one that will be hurt if they use too much and throw it around. The public should be like 'hey, you endangered this kid's life with that'" (333).

Concern about sugarcane burning also was spatially related to the environmental problem. Of the fifteen respondents listing cane burning as an environmental problem, thirteen lived adjacent to an actively farmed field, eleven lived adjacent to a field planted in sugarcane when the interview took place, and three lived in homes completely surrounded by sugarcane

fields. One person living adjacent to a sugarcane field warned that the smoke was “deathly ill to some people. It doesn’t seem fair that no one does anything” (18). Another described the burning, saying, “[T]hose little things they plant and burn [sugarcane], yah, little black things falling from the sky. You can see it coming in the sky” (305). Because these people lived next to cane fields, the long range effects (smoke, particulate matter, and ash) were less important to them than the local (that is, the edge of the field) effects. Our informants expressed far more concern about the grisly scene unfolding in the fields than about the resulting air quality. One afternoon we approached several men sitting on the porch of an old wooden shack bordering a cane field, and fighting off the heat with a cooler of beer. One tough-looking man with calloused hands and skin creased from scars and the sun grew so angry and indignant his eyes welled up with tears when describing a burn: “They burn half the creatures. . . . They get pissed off when I say it, but like they say, the truth hurts better than a lie. They need to stop the burning of sugarcane and killing the creatures. I would like to do something about all the animals I see burned. I would like you to come here when they burn and see . . . [what] I seen burned; they come burning out of the fields. Sometimes they are burning when they come out. And you see them burned lying by the edge. Sometimes they run out of the fire and run right back in” (91). A wealthier resident of the Progreso Lakes community was so distraught by the scene that he bought a small lot and left it wooded as a hiding place for animals fleeing the burns (18). This sentiment was shared by one sugarcane farmer we interviewed. He hated to see the “raccoons, possums, and rabbits lying burned in the ditches” but was most upset by the panicked and burned coyotes that “would run out of the fire and then run right back in” (106).

Concern about air pollution (from trash burning and factories) was spatially related to point sources, but respondents generally did not know or mention the source. Prevailing winds from the southeast characterize the Lower Rio Grande Valley, so the Brownsville/Matamoros region is the only urban area upwind of any portion of our study area.⁴² Every respondent who was alarmed about air pollution lived within the area that was downwind of the urban region 90 percent of the time, and 87 percent lived within the much narrower area that was downwind of the urban region 60 percent of the time (figure 7.1). Respondents con-



Figure 7.1. Area downwind of Brownsville (checkered polygon) and Matamoros (striped polygon) 60% of the time and 90% of the time. Black stars represent informants concerned with air pollution, black triangles represent informants concerned with smoke from trash burning, and white circles represent all other informants interviewed.

cerned about trash burning ($n = 17$) also were clustered closer to the urban area than those disturbed about air pollution in general. Trash burning was more prevalent in the fringe near urban areas, where burning bans were enforced, and larger particulate matter no doubt fell out more quickly in these areas because they were closer to where trash burning occurred (figure 7.1).

Only 14 (3.7 percent) of our respondents mentioned *maquiladoras* as environmental problems. Two of these individuals lived in Los Indios, the only *colonia* in our study site with an active *maquiladora* (figure 7.2, points 4 and 5). One of them (figure 7.2, point 5) charged that, “[W]hen the Free Trade Bridge was built, the *maquiladora* came and dumped crap from toilets, or something, and it killed all the fish and birds in that pond. We used to fish there, but now there’s nothing there” (137). Another respondent had recently moved from Reynosa, where several *maquiladoras* operate, to a rural farming area across the river from those *maquiladoras* (figure 7.2, points 1–3). While the remaining respondents were more isolated from *maquiladoras* spatially, they were socially tied through tragic losses or employment (figure 7.2, points 6–14).

Environmental Justice Perceptions of justice in the distribution of environmental problems were different from perceptions of the problems’

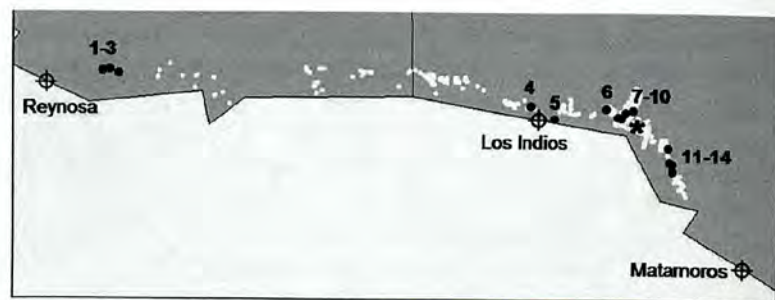


Figure 7.2. Study area with maquiladoras (target), people expressing concern about them (numbered black points), Alejandra (asterisk), and all other informants interviewed (white circles).

existence. Most of our respondents lived below the poverty level in substandard housing, used water from a river carrying agricultural, human, industrial, and nuclear wastes, and breathed smoke-laden air—and knew it. Yet they saw other people as the victims of environmental injustice. Although most identified serious environmental problems (82.4%), only 37.7 percent ($n = 149$) felt any group of people was exposed to more environmental pollution than another. Whether respondents thought one group of people was exposed to more environmental pollution than other groups was not related statistically to any of our demographic variables ($p = .151-.926$). Of respondents who maintained that some people were exposed to more pollution than others, virtually all found the situation unjust (89.5%). Respondents who found this fair (9.8%) typically explained that people chose to live in polluted environments for economic or other reasons: “People in big cities are exposed to more [pollution], but that’s the life they choose to live” (201). Perceived fairness was not related statistically to any of our demographic variables ($p = .094-.923$).

Concern over agrochemical exposure was the only case where a spatial link between pollution and environmental justice emerged. Nine of the eleven respondents who thought people living adjacent to farm fields suffered environmental injustice lived adjacent to farm fields. One crop duster we interviewed corroborated the concerns of these respondents.

He was standing on the top of a rickety step ladder tinkering with engine parts of the plane he had just crashed in an adjacent field while we conducted the interview, and we were occasionally interrupted when he dropped his wrench and one of us retrieved it from the ground. He used his most recent crash (one of eight he had survived) to describe the risk associated with living near farm fields:

Well, the other crop dusters would be mad for me telling you this, and wouldn’t want to go on record, but the applicators and people living by the fields definitely have higher exposure to chemicals, so the potential is there for harm. But there would have to be an occurrence for a problem. It’s like having a loaded gun in the house. We still use methyl-parathion, which is quite deadly. It has the potential of causing death. Usually I get a little too much, but not this year. If this engine went out on me in the north end of that field instead of the south end, I’d have landed in that *colonia* (pointing with his wrench) with a load of poison. The wind is always out of the southwest and that *colonia* is on the north end of the field. We are careful and try to spray early in the morning when the wind is low—and we go in before and tell them to stay inside, and we’ve never had a complaint—but to consider the risk factor, they are more at risk than people in downtown Harlingen. (155)

Respondents who thought environmental injustice was a problem identified the poor ($n = 23$; 16.9%) and people living in cities ($n = 22$; 16.2%) as the groups most often experiencing environmental injustice. None of our respondents lived in cities, but most would be classified by an outsider as poor. The respondents, however, were referring to others as the “poor” in the context of environmental justice. Eva, a woman whose household of three survives on an annual household income of considerably less than \$15,000, told us, “[P]oor people get pollution. Those people would like to live more clean, but they don’t have the money to live better” (294). The poor people to whom she referred were not her own family. Alan differentiated between himself and the poor that suffer environmental injustice: “We’re poor people, but those poor people live like chickens, like animals” (403). Another respondent ironically referred to the mandatory rural trash service as environmental injustice, saying, “[S]ome people here don’t work and it’s hard for them. They would use that \$18 to buy food or milk for the baby” (317). Concern for the other also was illustrated by respondents who thought that children ($n = 12$; 8.8%) and people in *colonias* ($n = 11$; 8.1%) suffered the brunt of environmental injustice. Although most of our respondents lived in *colonias*, only three of the

twelve who considered *colonia* residents victims of environmental injustice lived in a *colonia*. Further, two of the three respondents living in *colonias* were referring specifically to residents of Cameron Park, an urban *colonia* in Brownsville. Alejandra (247) exemplified the tendency to see environmental injustice as the plight of others when she expressed gratitude that she had been able to move from her previous home of Buttonwillow, California, where a close friend had given birth to a child with a neural tube defect. "We used to live just five miles from a factory with chemical wastes and a lot of kids were being born without brains. They said it was the burning of chemicals," she told us. "Of course the people didn't win. They even had people picketing and stuff."

Learning from the People of *la Frontera*

Our results paint a dire picture for sustainability on *la frontera*. The poor, uneducated, and patriarchal communities we surveyed lacked virtually all characteristics typically considered critical to effective identification and remediation of environmental problems. Women and people with higher education levels were more likely to identify the existence of a problem, but education levels were low and these women lacked formalized power. Further, informants with higher education and income were more likely to become politically engaged in addressing a problem, but were spatially or economically, or both, (for example, bottled water, health care) distanced from environmental problems. We saw the lands and people of *la frontera* locked into a positive feedback loop of degradation catalyzed by infusion of the global society's discards. In this sacrifice zone, the earth could not protect or provide for its inhabitants, and the humans drawn to them for economic and social reasons lacked resources to protect or provide for the earth.

Our results support Haraway's argument that "socio-techno-bio bodies" shape our world.⁴³ Social (happiness, economics, health, power), technical (water filtration, crop dusters, factories), and material (human bodies, nonhuman animal bodies, ash, chemicals) dimensions were linked in what our respondents perceived as environmental problems. The likelihood that people would identify a specific environmental issue, and act on that identification, was directly linked to its material presence

as it affected their own bodies. For example, based on predictor variables, such as household income and education, whites should have been more likely to have participated in environmental politics. Hispanics, however, were significantly more likely to have done so, probably because those who self-identified as white lived far (or upwind or upstream) from the primary sources of air and water pollution.

Our respondents supported much of the discourse of the environmental justice movement by demonstrating awareness of the existence of environmental pollution, the location of the pollution, and its potential threat. Yet they challenged that discourse by adamantly refusing to designate themselves as victims of injustice. For our informants, human health was the central issue, not race, ethnicity, civil rights, or distributive justice. Most did not describe the socio-techno-material configurations shaping their lives as unjust. The few who identified injustice, described a generic "other" as the victim. Can one cry environmental injustice when the "victims" do not self-describe as such? We propose that sustainability demands an affirmative answer to this question. By repudiating certain bodies, and the spaces they inhabit, society has positioned nature as a wedge between social elites and the disenfranchised. The resulting hostilities preclude any opportunity to build sustainable communities.

Although it remains vital to respect the presence of individual choice in the lives of these people, we do not assume they make decisions in a social vacuum, or that they can easily escape environmental degradation. The poor and otherwise disenfranchised flock to *la frontera*, where they can survive on as little as \$200 a month. One reason our response rate was so high is that the disabled, the elderly, and the unemployed are home much of the time. The homebound elderly woman who persisted in believing we were county healthcare workers coming to check on her (despite our repeated protestations to the contrary) was notable for her similarity to other respondents rather than her distinctiveness. For these people, escape is nearly impossible. As Alejandra (247) told us, one of the reasons she left her home in Buttonwillow was to escape the horrors of toxic chemicals and brainless babies. Yet, unbeknownst to her, social ties and economic circumstances drew her to another sacrifice zone. Her friend's baby was born and buried in Buttonwillow in 1992, just after a

spike in neural tube birth defects in Cameron County, Texas. Both the Buttonwillow and the Cameron County cases drew national attention from human health professionals and the public.⁴⁴ Official reports vaguely blamed the outbreaks on individual lifestyle choices such as diet, bemoaned the lack of sufficient data, and found no evidence that the birth defects were related to exposure to industrial wastes such as xylene and toluene.⁴⁵ Alejandra currently lives directly downwind from the *maquiladoras* in Matamoros and downstream from those in Reynosa (figures 7.1 and 7.2).

Alejandra and other residents of *la frontera* measure the concentrations of environmental pollution with their bodies. An openly just society can promote sustainability by bridging the gap between the material needs of human bodies (as well as those of other animals, rivers, ecosystems, and so forth) and social practices developed and displayed through culture, economics, law, and politics. We can design and inhabit democratic societies in which people have defensible rights. Similarly, we can design and inhabit societies that are simultaneously just and sustainable. Agyeman suggests the *Just Sustainability Paradigm* as a unifying construct for this effort.⁴⁶ Discovery and implementation of sustainable communities, however, requires a far more inclusive discourse than we have thus far invented. Advocates for environmental sustainability can help by discovering how to re-present Earth's voices in language that resonates with human residents of *la frontera*. Environmental justice advocates can help by grappling directly with sociopolitical structures that place humans at odds with other species and by re-presenting spatial scales that currently encourage the material and social to speak past each other.

Notes

1. Leopold (1949); World Commission on Environment and Development (1987); Busch (1996); Agyeman, Bullard, and Evans (2003); Latour (2004).
2. Leopold (1949).
3. Peterson (1997).
4. Agyeman (2005, p. 8).
5. Ostrom (1990).
6. Hardin (1968, 1993); Peterson (1997).

7. Leopold (1949); Allen and Hoekstra (1993).
8. World Commission (1987); Aguirre (2002).
9. Agyeman et al. (2003).
10. World Commission (1987); Peterson, Peterson, and Peterson (2005).
11. Peterson (1997).
12. Nabhan (1995); Amnesty International and Sierra Club (2000).
13. Agyeman et al. (2003, p. 5).
14. Peterson and Franks (2005).
15. Lélé and Norgaard (1996).
16. Aguirre (2002); Peterson et al. (2005).
17. Stauber (1994); Woollard and Ostry (2000).
18. Willers (1994, p. 1146).
19. Jacob (1994); Callicott and Mumford (1997).
20. Peterson et al. (2005, p. 264).
21. Waterman (2002); Agyeman et al. (2003).
22. Bowen and Wells (2002).
23. General Accounting Office (1983); Commission for Racial Justice (1987); Bryant and Mohai (1992); Mennis (2002).
24. U.S. Environmental Protection Agency (2005).
25. Agyeman et al. (2003, p. 3).
26. Mouffe (2000).
27. Agyeman (2005, p. 77).
28. Walzer (1983); Dobson (1993).
29. General Accounting Office (1983); Commission for Racial Justice (1987); Bryant and Mohai (1992); Mennis (2002).
30. Maantay (2002); Pezzullo (2003a).
31. Pezzullo (2003b).
32. Agyeman et al. (2003, p. 3).
33. Latour (2004).
34. Newman and Benz (1998); Tashakoré and Teddlie (1998); Strauss and Corbin (1997).
35. Newman and Benz (1998).
36. Creswell (2003).
37. Marín and Marín (1991).
38. Texas Secretary of State (2005); Texas Water Development Board (2005).
39. Peterson (1997).

40. U.S. Fish and Wildlife Service (2005).
41. Texas Natural Resource Conservation Commission (1997, 2005).
42. Texas Department of Environmental Quality (2005).
43. Harroway (1997).
44. Peterson (1997); Cole and Foster (2001).
45. Texas Department of Health (1992); California Birth Defects Monitoring Program (1993).
46. Agyeman (2005).

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