Chapter 12
Dissertation I: Human–Environment Interactions

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This proposalfocuses on human–environment interactions and the notion of environmental justice. The proposal develops a qualitative GIS methodology to investigate the relationship between place attachment and environmental activism in two study areas. By examining the political ecology of environmental hazards, the dissertation proposal nicely positions the research within an existing literature as well as makes explicit (conceptual and methodological) linkages to the field of GIScience and even sociology. Like Lewis' thesis proposal, the dissertation uses mixed methods to unlock and interpret the everyday realities of urban environmental risk in two demographically distinct Indianapolis neighborhoods.

12.1 Statement of Purpose

The purpose of this investigation is to examine the development of social movements (or lack thereof) in response to environmental hazards and why responses have varied between two different communities of Indianapolis, Indiana. The field of environmental justice offers many examples of investigators exploring the spatial correlation between environmental hazards (disamenities) and particular socioeconomic/demographic characteristics of a community, with 'community' representing anywhere from a census block group to the zip code or even county level. Such research has revealed many examples of disproportionate environmental risk being endured by particular disadvantaged or marginalized races, ethnicities or income groups (Pulido 2000; Buzzelli et al. 2003). While these analyses provide insight regarding the spatial distribution of disamenities and the proportions of population groups which may be impacted by them, questions of environmental justice activism must be investigated further. Some research has provided examples of residents reacting to the location and harmful practices of particular facilities (Chambers 2007; Checker 2008). The existing literature lacks comparative analysis of environmentally damaged communities and why one community becomes socially active while the

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other does not. Rather, the literature has examined the comparative levels of 'success' achieved between two already socially active environmental justice communities. This investigation contributes toward the environmental justice and urban political ecology literature by examining not only factors which may play a role in the varying degree of activism between communities, but also how place attachment, social capital, race, and the type of contaminated medium (i.e. the 'non-human') intersect with concerns of citizens regarding disamenities. A political–ecological approach to these communities individually and as parts of the larger urban development of Indianapolis, Indiana, will illuminate the political, social, and economic (i.e. capital) factors which have acted as forces to shape both the physical and human landscapes.

The two study areas selected for this research sit within Indianapolis, Indiana. The first area is Martindale-Brightwood, located on the near east side of Indianapolis and bounded by 16th and 30th streets, Keystone and Massachusetts avenues, and the Norfolk Southern Railroad (Monon) tracks. This area has a population of approximately 10,000 residents and is predominantly African-American. In 2004, a church organization in the neighborhood paid for an environmental site assessment to be conducted as part of an application for a loan to be used for planned church renovations. The environmental site assessment revealed historical practices in the area that indicated a potential for site contamination. As a result of this initial assessment, further investigations were conducted revealing high levels of lead (Pb) in the soil on the site, as well as in surface soil on approximately 250 residential properties in the area. Many of these properties were subsequently remediated, however some were not remediated. The lead contamination propelled some in the community to form an organization (Martindale-Brightwood Environmental Justice Coalition) to learn more about their neighborhood and push the U.S. EPA to expand its cleanup efforts. The other community proposed for this study is West Indianapolis, a highly industrialized area with heavy traffic bounded by Holt Road, Raymond Avenue, the White River, and Interstate 70. This area is comprised predominantly of Caucasian residents and a total population of approximately 11,000. The area has a history of industrial operations surrounding residential areas. While this area has been the subject of some sampling and extensive news reporting, no persistent environmental activism has or citizen organization has emerged. Because of the difference in citizen response between the two proposed study areas, this investigation may offer insight into the various drivers and forces which allow for or prevent citizen involvement in environmental justice activism.

The methodology will consist of both quantitative and qualitative analyses. Geotechnologies will be used in this investigation to visualize the potential environmental risks surrounding the neighborhoods. Qualitative data will be compiled via surveys provided to local residents and in-depth interviews with residents and local government officials. The surveys will ask residents about their perceptions of various sites in their neighborhood, as well as what factors play a role in moving citizens to act as part of an environmental justice organization and factors that act as barriers to participation. In sum the specific questions to be addressed by this investigation are captured in the following research objectives:

(1) Analyze the spatial distribution of environmental disamenities within the two study neighborhoods.
(2) Trace the ecological, economic, political, and social forces which have collaboratively produced the damaging environmental histories of both neighborhoods.
(3) Interrogate the respective roles of non-human factors, place attachment, race, and social capital in producing different interpretations and understandings of the local landscape within the two selected neighborhoods.
(4) Evaluate the role of non-human factors, place attachment, race, social capital, and state interaction in producing varying levels and types of environmental activism.

12.2 Literature Review

Among the general public environmental justice is often interpreted as ensuring that no segment of the population be subjected to a disproportionate amount of exposure, or even perceived exposure, to environmental hazards. Public concern over environmental justice arose in response to two high profile cases involving allegations by African-Americans in two communities that they were being subjected to a disproportionate risk of exposure to environmental disamenities (Bullard 1990; United Church of Christ 1987; U.S. GAO 1983). The unveiling of serious environmental contamination events such as Love Canal near Buffalo, NY ran concurrent with an increase in broader environmental awareness during the 1970s. Along with the growing public concern a growth in academic research on environmental injustices ensued (Lee 1992; Mohai and Bryant 1992; Anderton et al. 1994; Pulido 2000; Pastor et al. 2001). While the methods used to assess the spatial distribution of environmental hazards have been debated, the vast majority of studies demonstrate that minority and/or low-income populations are more often exposed to a disproportionately higher number of environmental disamenities.

12.2.1 Spatial Distribution

The area of analysis (and associated findings) within environmental justice literature has varied widely with much of the research focusing on a city-wide analysis (Mohai and Bryant 1992; Buzzelli et al. 2003; Pulido 2000). Some research has modeled environmental risk at the county, state, and even national level (Bullard 1990; Margai 2001; Pastor et al. 2001). Early environmental justice research analyzed the question of disproportionate risk by focusing on a larger area, such as the ZIP code (United Church of Christ 1987). This assessment of environmental hazards across Indianapolis will use census tracts as they are the smallest areas at which various government-produced environmental records information can be obtained.

More recently, researchers have tried to get beneath the surface of environmental justice issues to consider both the roles of economic, political and social institutions in shaping the unequal distribution of environmental hazards in particular places, and how local residents and political organizations perceive and respond to those hazards. Much of this research falls within the urban political ecology literature; however, other literatures on environmental activism and social movements are also relevant. The background literature for this dissertation focuses on three important themes. The first theme involves interrogating the macro-scale political and economic forces that shape the uneven distribution of environmental disamenities. The second theme emphasizes micro-scale processes: how people's perceptions of and responses to environmental hazards are influenced by social capital and place attachment. The third theme involves understanding how 'non-human' or ecological actors contribute toward people's perceptions and responses via a deeply interconnected process of collaboration with human forces (economic, political, social). I intend to draw these literatures closer together in order to more deeply interrogate how environmental disamenities come to be distributed unevenly, how residents perceive and respond to these disamenities, and how perceptions, social capital, place attachment, race, and the contaminated medium interact to either produce or deter environmental activism within two communities.

12.2.2 Political Ecology of Environmental Disamenities

Urban political ecology calls for historical analysis as a means to excavate the political, social, and economic (i.e. capital) forces that have collectively shaped the current uneven urban environment. Such an accounting can also reveal the interactions between residents of the areas and the physical landscape (Gandy 2003).

In *An Unnatural Metropolis* Colten (2006) walks the reader through the historic and ongoing struggle of humans to more effectively manipulate 'nature' in order to suit the needs and wants of New Orleans and its residents. Environmental disamenities were continually thrust upon the population unevenly as industries left a trail of pollution on the landscape and as the state acted to protect wealthy interests. This underlying trend of environmental inequities is revealed in different ways, from public works services initially not offered to all of the population, to the unjust results of historical processes more recently. Colten (2006) illustrated the way in which the relationship between humans and 'nature' is never static, but is a dynamic process that produces multiple uneven landscapes.

12.2.3 Social Movements

In reviewing major social movements in U.S. history, Piven and Cloward (1978) provide arguments as to why these movements succeeded and/or failed. In order to

approach an investigation of a social or protest movement, a clear definition of what constitutes such a movement must be in place. Piven and Cloward define a 'protest movement' as 'a transformation both of consciousness and of behavior…The change in consciousness has at least three distinct aspects' (id, 4). First, 'the system' loses legitimacy among the people. Second, people who once complacently accepted their fate begin to recognize their rights and demand change. Third, people who believed they could do nothing begin to think they can in fact effect some change (id, 5). Piven and Cloward go on to argue that the change in people's behavior evolves from first becoming defiant to ultimately acting collectively. It is the act of collective defiance that Piven and Cloward emphasize as being the key factor in their definition of a protest movement (id, 6).

Movements are often absorbed into the state apparatus where they are 'tamed' (Piven and Cloward). Such co-optation may be relevant in understanding the evolution of environmental activism in Martindale-Brightwood. Chaotic, defiant protests are much more effective for political response than a more formalized/organized activism (Piven and Cloward). The research proposed here will include an interrogation of the environmental justice movement (or lack thereof) within the two communities in an attempt to determine the 'legitimacy' of the movement as perceived by residents. While Piven and Cloward argue that the formalization of a protest movement leads to its demise, McAdam (1999) argues that such is not always the case.

In his discussion of the development of black insurgency during the twentieth century, McAdam (1999) dissects each of the major models used in examining social movements, specifically calling attention to two major faults of the classical model, those being the belief that a social movement is a reaction by a psychologically unstable citizen to a sudden 'strain' and that everybody shares equal access to the 'system' (McAdam 1999). In response, McAdam advocates a political process model which conceives of social movements as continuous and dynamic, enduring structural changes and being shaped by long-running social processes (such as urbanization or industrialization) in which the actors are recognized as being rational, motivated individuals with political leverage. McAdam sees this model as more appropriately fitting the development of black insurgency in the U.S. because it developed through historical interactions with social and spatial controls on race and the forms in which political and economic forces reconfigured race to serve the needs of the elite.

The social movements literature situates community activism in relation to broader class, race and ethnic divisions. It views such movements as framed by the uneven distribution of political and economic power and capitalist imperatives. These insights are highly relevant for my research. However, the social movements literature pays scant attention to the more localized dimensions of community response that are tied to people's experiences of their local communities, their perceptions of environmental risks and their access to social networks and institutions. These dimensions vary, even within economically and socially disadvantaged communities, resulting in varying levels and types of environmental response. The next sections review the literatures on how people's experiences and perceptions of environmental risks influence the development (or lack thereof) of environmental activism.

12.2.4 Environmental Activism

Gandy (2003) illustrates well how so often it is concerns of residents regarding their health and that of their children which provide the impetus for social activism. Such environmental justice movements often have deeper goals than preventing one facility being sited near a community. As Gandy illustrated, the goals of the New York City-based environmental movements were to acquire a greater ability to dictate how their 'space' or 'community' is used, or in other terms, how their physical landscape will be shaped.

When attempting to identify determinants of environmental activism Wakefield et al. (2006) offered an analytical framework consisting of composition, context, and collective ingredients. Composition refers to the individual demographics within a community, such as level of education, age, income, etc. that correlate to different levels of environmental activism. Context refers to the local ecological or environmental characteristics, such as the visibility, duration, and intensity of pollution (Wakefield et al. 2006). I propose to expand upon this role of context as a determinant of environmental action by examining how differences in the form of pollution itself (soil vs. air) may produce different responses and levels of environmental activism. The term collective is used by Wakefield et al. (2006) to describe the social networks of support existing within a community, which have been shown to be important to the potential development of local civic action (id).

Despite many residents perceiving risks from air pollution in their neighborhoods or communities, very few people choose to become active (Wakefield et al. 2001; Elliot et al. 1999). Wakefield et al. (2006) constructed the composition, context, and collective framework to join together disparate literatures (environmental health justice and political ecology) in order to deepen investigations of environmental activism. In addressing why so few residents (who are concerned about air pollution) take environmental action, Wakefield et al. (2001) argue that individual perceptions and experiences are key. Individuals often feel as if they (1) lack sufficient scientific knowledge to assess something as complex as air pollution, (2) have other priorities to deal with in life, and (3) don't know how to go about contacting anyone in order to complain.

Residents' concerns and perceptions derived from their experiences of their life spaces or something akin to 'activity spaces' (Buzzelli et al. 2005). The context includes not only the observed pollution, which calls to mind the strong role of the senses (odor in Elliot et al. 1999), but also the observed health outcomes. As Wakefield et al. (2006) argued the context is one of the strongest predictors of environmental action. Therefore, the senses can play a significant role in prompting response. Context can also include consideration of how the characteristics of an existing site and the presence of state/federal officials contributed toward citizens' health concerns and activism (Stephan 2005).

The literature provides accounts of where environmental justice activism took place and why residents became active (Kurtz 2005; Stephan 2005), however the literature lacks a robust examination of the comparative forces (including ecological)

at play between those areas where activism did take hold and those where it did not. Here the intent is to compare two different communities in the hopes of revealing what factors may have contributed toward the different responses to environmental injustices.

12.2.5 Place Attachment

Place attachment refers to a bond one develops with a particular locale or an emotional investment in an area (Wakefield et al. 2001). Place attachment has sent mixed signals throughout the environmental justice and activism literature (Wakefield et al. 2001; Brown et al. 2003). When residents give poor valuations of their neighborhood then they most likely exhibit low place attachment, however, poor valuations of a neighborhood from 'outsiders' may not at all be indicative of low place attachment. In fact, high levels of place attachment are often seen in areas classified as 'devastated' by outsiders. Wakefield et al. (2001) finds that friendships are also important (2001). Because of these various emotional attachments to an area, residents often choose to stay in communities that can be classified as environmentally damaged, in essence a tradeoff whereby residents accept the pollution in exchange for certain benefits such as affordable homes and friends (Elliot et al. 1999; Wakefield et al. 2001).

The impact of place attachment on different responses to disamenities depends on interactions of place attachment, social capital, and characteristics of the environment or context (Wakefield et al. 2006). Wakefield and Elliot (2000), in assessing the role of risk perceptions and stress associated with a landfill siting process, concluded that place attachment did play a role in residents' stress but not necessarily in action-taking. While environmental activism literature has presented variability in the role of place attachment in prompting environmental activism, this investigation positions place attachment as one of multiple forces critical in the production of locally-based environmental activism.

12.2.6 Social Capital

Social capital is important in communities facing environmental negatives (Wakefield et al. 2006). Social capital, the networks of connections and support that people possess and build can strongly influence residents' decisions to become activist even when place attachment is not strong (Wakefield et al. 2001). Wacquant (2008) addressed the potential decline in social capital among residents of the 'hyperghetto' as people develop poor valuations of their neighbors via a social-Darwinist view which labels them as failures. This view prevents residents from recognizing common concerns and offering support to the larger community.

12.2.7 Race

Research examining differences in environmental activism by ethnicity and race has produced conflicting results (Williams and Florez 2002; Mohai 2003; Stephan 2005). Williams and Florez (2002) attempted to examine a previously underexplored area of environmental justice in assessing how Mexican Americans perceive issues of 'risk, inequity, trust, and participation in civic activities' in Tucson, Arizona, a city with a history of environmental racism (303). The authors conclude that ethnicity does indeed play a strong role in influencing participation in such activities as environmental justice. Mexican Americans perceive greater inequalities in their communities and perceive a stronger association between environmental negatives and health risks than Whites in Tucson.

Mohai (2003) presents evidence refuting the previously longstanding notion that because of other priorities, such as income and daily needs, African American citizens are not concerned about environmental issues. Mohai deconstructed this notion using data indicating that more African Americans than Caucasians believe that quality of life in the U.S. is seriously threatened by environmental issues (id, 15). The difference can be explained via the greater exposure of African Americans to environmental disamenities (Mohai 2003).

The neoliberal political governance within the city of Indianapolis has produced a dramatically uneven form of development which has most negatively affected low-income African Americans (Wilson 2007). This uneven development is rooted in the goal of local growth machines to isolate and foster particular communities as 'warehouses of contaminants' (id, 30). These communities are not only isolated as neighborhoods of both 'contaminated bodies' (African-Americans) and contaminants (i.e. environmental hazards), but they can become targeted neighborhoods with which city officials and other 'outsiders' intervene in an effort to inject capital into neighborhoods ripe for redevelopment and gentrification (Hulse 2001). Municipal authorities offer up various 'neo-liberal forms of intervention' such as Community Development Corporations (CDCs), which are tied up in the belief that market mechanisms can improve a community (id, 39). Potential activism within these low-income African American communities can be muted through co-optation by the city's neo-liberal CDCs.

12.2.8 The Environment Speaks: Agency of the Non-human

In addition to place attachment, social capital, and race, non-human actors (e.g. contaminated soil vs. air) are important in shaping responses to environmental injustice. Urban political ecology offers a useful framework for examining the interactions between humans and non-humans (Heynen and Kaika 2006; Desfor and Keil 2004; Heynen et al. 2007). Environmental justice as a political project offers the notion that decades of political, cultural, and economic forces create many 'metropolitan

natures' (Gandy 2005), with the various natures distributed across an urban space via the underlying power structure (Véron 2006). A form of nature devoid of noxious land uses but filled with trees and/or 'clean' air is constructed in wealthier, white areas while another form made up of disamenities and disinvestment takes shape in another part of the city. What lower-income and minority communities experience then is a nature that acts by invading the human body via contaminant transport and deposition, making its way into the lungs and pores or even minds (via perceptions) of residents to affect their health and their response to the nonhuman.

Non-human 'actors' reveal themselves and act upon us and the physical environment on a continuous basis, altering all parties, including themselves, along the way (Franklin 2006). Franklin (2006) illustrates how gum trees, despite appearing passive can dictate not only the human practices and responses but also the very form of the material environment produced. In this way, gum trees and humans both 'act' and in doing so they 'are constitutive of each other' (id). Through an analysis of the political-economic context, Robbins (2007) revealed how lawns and the larger economies and ecologies they operate within exert pressure and anxiety upon humans (Robbins 2007). For example, Robbins (2007) illustrated the way that lawns 'speak' to homeowners by way of their changes in appearance (turning brown) and this influences homeowners to fertilize and mow their lawns in order to maintain an appearance both of their lawn and themselves.

Urban political ecology literature provides examples of attempts by researchers to use the notion offered by Swyngedouw et al. (2002) that environmental and social changes co-determine each other, and as such, the classic dichotomy is dismantled to form this ever-shifting, amorphous mass made up of the social, ecological, political, economic, human, and non-human. The political, economic, social, and ecological processes acting on and through us have created a socio-ecological environment that has deeply intertwined humans and non-humans (Heynen et al. 2007) in the production of multiple symbolic and material 'natures' that are continuously in flux. The unjust environments that we encounter today in our urban formations provide ample evidence of the continuous interactions between humans, nonhumans, and the transformation/production of local environments.

In a similar fashion as Franklin (2006) and Robbins (2007) have approached trees and lawns, respectively, soil and air (Véron 2006) as non-human entities can and do influence. Robbins (2007) spoke of the role of the soil on a lawn and the way in which the biological and chemical characteristics of soils combined with the effects of various human actions such as earth-moving, chemical application, and planting regimes causing continuous shifts in the soil's form which in turn, reshape the form of the various industries, economies, and humans acting upon it in the first place (Robbins 2007).

12.2.9 Non-human Agency and Local Knowledge

In addition to the literature which has explicitly discussed the agency of nonhumans, more recent scholarly endeavors provide numerous examples of how nonhuman agency might intersect with local knowledge. Local knowledge is 'an organized body of thought based on immediacy of experience' (Corburn 2003). It is information that reflects the daily life experiences of people and the insights this regular interaction with their physical and social environments imparts upon them. Non-human agency, while not discussed as such in the literature here, can nevertheless be seen.

Scammell et al. (2009) added to the local knowledge and environmental health justice literature by offering what has been termed 'tangible evidence' as that crucial personal information derived from daily experiences that is dismissed by traditional risk assessment. Scammell et al. (2009) found that many project participants had a difficult time accepting the findings of risk assessments when they contradicted the experiences or 'local knowledge' of the residents. The nonhumans, or in this case air pollution, interacted with residents on a regular basis and produced negative responses and perceptions of health, thereby contradicting the results of the risk assessment. Researchers should pay attention to the contextual differences, or in this case, the combination of human and non-human actors, the 'built environment' as well as the various nonhuman actors such as particulate matter, odor, smoke, etc. (Scammell et al. 2009).

Related to the role of context in such investigations and how local knowledge can add 'contextual meaning' to environmental health justice issues, Lambert et al. (2006) provided an illustration where local knowledge complimented 'expert' knowledge. Physical measurements in Sydney, Nova Scotia revealed elevated levels of various metals and petroleum aromatic hydrocarbons (PAHs) in surface soil. In response to a decision only to remediate a limited area, residents sought further assessment by gathering residents' observations and experiences of this contamination in a wider area. Combining local knowledge with physical measurements showed that many more people were affected by nonhuman actors (particulate matter, smoke, odor, wind) than a traditional risk assessment would reveal.

12.3 Summary and Contributions

This research adopts an urban political ecology framework in understanding varying levels and types of environmental activism in two Indianapolis neighborhoods. The current landscape of environmental hazards is excavated to reveal the historical political, economic (explicitly the role of capital), social, and ecological factors that shape/re-shape the uneven urban environment. Urban political ecology brings to environmental justice/activism research a needed accounting of the interplay between the human (political, economic, social) and nonhuman (ecological, contaminated media). This research situates environmental activism in relation to forces at both

the macro and micro scales. The macro-scale forces will be the political, social, and economic (capital) forces that have produced the environmental histories and environmentally unjust status of the two study areas. The micro-scale forces will be the individual residents' and neighborhood organizations' perceptions of and responses to local environmental hazards, how their responses are influenced by social capital and place attachment, and how the particular medium (soil vs. air) contaminated impacts their perceptions of and responses to those hazards.

In addition to these macro and micro forces, for the community in which activism is stronger (Martindale-Brightwood), this investigation also will examine the development of the local environmental justice coalition, MBEJC. This proposal does not begin with a starting presumption that the 'activism' seen in Martindale-Brightwood is 'real' grassroots activism. However, this investigation will seek a deeper understanding of the activism to date and whether it is 'bottom-up' or 'top-down' and what role local institutions play in shaping the form of action/inaction seen in both Martindale-Brightwood and West Indianapolis. This analysis will be framed by the social movements literature to determine how that coalition formed, its primary actors, the role of race and capital, as well as the potential for co-optation by the city/state. In summary, this research draws from all of these literatures in order to more deeply interrogate how environmental disamenities come to be distributed unevenly in Indianapolis, how residents perceive and respond to these disamenities, and how perceptions, social capital, place attachment, race, and the contaminated medium (nonhuman) interact to either produce or deter environmental activism within two communities, and what that activism comes to look like.

This research makes a contribution by interrogating via comparative analysis between two neighborhoods (one socially activist and the other not) how the potential form of environmental injustice, including the medium contaminated (soil or air), initiates or encourages activism. I ask whether the specific type of environmental contamination might play a role in prompting (or inhibiting) activism. Most often in environmental health investigations when residents speak of their first 'encounter' with pollution, it predominately takes place via their sense of smell or perhaps even a 'taste' in the air, i.e. 'sensory experience' (Scammell, et al 2009; Wakefield et al. 2006; Wakefield and Elliot 2000). In this way, this research will contribute by demonstrating the importance of considering ecology in urban environmental justice issues. Perhaps the regularity with which residents encounter a foul odor (poor air quality) acts to normalize the injustice, whereas a sudden event (soil contamination) triggers immediate health concerns. The perception of air as a complex entity difficult to capture or trace may produce a sense of hopelessness among residents regarding the likelihood of political efficacy. The role of non-human actors (contaminated air and soil) will be examined in relation to residents' perceptions of health risks as well as social and economic factors that may produce activist residents/communities. In doing so, this research will expand upon the concern with nonhuman actors in urban political ecology while enriching the environmental justice literature.

This research also responds to the call in urban political ecology for a greater role of capital in environmental justice studies through an examination of the historical, ecological, economic, political, and social forces that have shaped the discursive and

material landscapes (i.e. natures) of the two Indianapolis communities. In addition, this investigation will assess residents' perceptions of these landscapes and how those perceptions, combined with place attachment, race, social capital, and contaminated media, and local government produce two markedly different responses from the study areas. This will also contribute to the broader environmental justice literature by echoing more recent arguments for a greater place for perceptions with regards to questions of environmental injustice, moving beyond the often stagnant division between distributive and procedural forms of equity. Here both will be considered as both neighborhoods suffer from the burden of inequitable distribution of disamenities relative to the rest of Indianapolis.

Finally, as a methodological contribution, this project will offer a unique qualitative GIS component to depict and visualize differences in residents' environmental perceptions and experiences between the two communities (Knigge and Cope 2006; Pavlovskaya 2006). Qualitative GIS enables 'grounded visualization', in which local ethnographic research findings regarding the views, perceptions, and attitudes of local residents are considered, taking into account 'people's subjective experiences of everyday life' (Knigge and Cope 2006, p. 2025). Built upon Kwan's notion of 'body-mapping' (Kwan 2002), the qualitative GIS will reveal geographic variation in residents' physical encounters (sight, smell, touch, etc.) with disamenities and their recorded perceptions of those encounters. In this way, perceptions of disamenities and the form of encountering those disamenities may vary spatially and temporally on a daily basis.

12.3.1 Hypotheses

In sum the specific objectives of the investigation are captured in the following proposed hypotheses:

(1) The spatial distribution of environmental disamenities is disproportionately dense within the two aforementioned communities as compared to the greater metropolitan Indianapolis area.
(2) The two study areas share similar extensive and damaging environmental histories.
(3) Differences in environmental activism are associated with differences in place attachment, social capital and the medium contaminated.
(4) Local social institutions and the activities of local business interests and governmental agencies are important in shaping differences in environmental activism.
(5) A qualitative GIS produced via the 'body mapping' of residents in each community will reveal a difference between the two study communities in terms of residents' perceptions and experiences of disamenities.

12.4 Data and Methodology

Quantitative and qualitative methods will be used in this investigation. The use of GIS as well as interviews to explore the proposed questions provides a suitable framework for a mixed methodology. Environmental activism, with its distributional and procedural equity branches, is well-suited to both quantitative and qualitative analyses.

12.4.1 Study Areas

Both study areas share a long history of environmental contamination and are the home of numerous hazardous sites. Both are low-income areas however Martindale-Brightwood's population is predominately African American and West Indianapolis is predominately Caucasian. Martindale-Brightwood has some collective environmental activism while West Indianapolis has none.

12.4.2 Quantitative Analysis: GIS and Environmental Justice

An initial GIS-based assessment will be performed for both study areas in order to visualize the environmental disamenities in and around the study areas. GIS will be used not only to visualize the distribution of disamenities but to gather and statistically analyze the quantitative properties of the disamenities including frequency and levels of toxic releases. This will provide quantitative data describing the presence and levels of disamenities in the two study communities in comparison to Indianapolis as a whole.

12.4.3 Environmental Disamenities

Since the 1970s when much of U.S. environmental policy was developed and institutionalized, the United States Environmental Protection Agency (U.S. EPA) has required reporting of information from facilities/sites handling or processing particular wastes or emissions. The Toxics Release Inventory (TRI) contains data for each reporting facility on the levels and types of hazardous chemicals released. Information on regulatory compliance and the release and storage of hazardous materials provides both the public and academe with a database for investigating environmental quality and questions of environmental injustice. The Indiana Department of Environmental Management (IDEM) holds such data for all of Indiana, including

the City of Indianapolis. The proximity of a disproportionate number of such facilities to particular communities is interpreted by many researchers as an indication of environmental risk (i.e. injustice).

Maps showing the locations and types of environmental disamenities in the two communities will be constructed in ArcGIS. In order to most effectively compare communities of Indianapolis, a limited number/type of disamenities will be selected for assessment. This will include the use of variables which have been historically utilized in environmental justice distributional research (Anderton et al. 1994; Atlas 2002; Buzzelli et al. 2003). The variables proposed for use are the following: Brownfields, Large Quantity Generators of Industrial Waste, U.S. EPA Toxics Release Inventory (TRI), Treatment, Storage, and Disposal Facilities (TSDF), and Superfund sites.

12.4.4 Qualitative Analyses: Historical Assessment of Study Areas

The social, political, and economic forces that have shaped and altered the political economies of the two communities will be assessed via analysis of local government policies and socioeconomic demographics. Data on past hazardous facilities will be collected from Sanborn maps. In addition, articles from local newspapers and magazines will be analyzed to capture the occurrence of contamination 'events' and residents' reactions to these 'events'. This work will be directed at compiling and historicizing the development of the two communities in question. Archival information will provide insights as to how and when the two areas underwent periods of growth. The aforementioned data will include historical aerial photographs, Sanborn maps, and an inventory of businesses in both communities.

12.4.5 Perceptions of Risks and Health Outcomes

Qualitative methods (surveys and interviews) will be utilized to assess how residents perceive various facilities/sites in their neighborhood. A survey will be conducted of approximately 40 residents of each community. The survey will attempt to gather individual measurements of residents' perceptions to determine the potential contextual factors that may be contributing toward the different responses to environmental disamenities among the two communities. Residents will be asked for their perceptions of disamenities, including particular facilities/sites, and whether they associate such disamenities with actual or potential health risks. Questions will also attempt to determine the potential influence (if any) of the particular form of contamination (soil

or air) in producing different perceptions. The survey will also attempt to measure residents' place attachment and social capital with regards to the neighborhood.

12.4.6 Drivers of Activism

This study seeks to understand what factors play a role in moving citizens to act as part of an environmental justice organization. Questions asked during in-depth interviews with residents and local officials from each study area will determine what forces work to convince residents to act collectively in response to environmental disamenities and also forces that discourage environmental activism. Forces of interest include: social capital, place attachment, political efficacy, residents' perceptions of health concerns, race, and perceptions of the medium contaminated. Data gathered from the interviews will be coded for textual analysis using a qualitative data analytical software package.

12.4.7 Qualitative Geographic Information Systems

A qualitative GIS is a GIS that incorporates such qualitative information as photographs, attitudes, perceptions, videos and oral histories (McLafferty 2002). GIS will be used to produce this visualization based on residents' perceptions and observations during their daily pathways. They will rate facilities and places in their community according to a scale (unknown, no concern, little concern, significant concern, danger). Participants will also be provided with a blank map, illustrating only streets and street names, and they will be asked to mark/draw areas of environmental concern, whether those be operating facilities, abandoned facilities, or vacant areas in which dumping/polluting occurs. I also propose to ask participants to identify areas where regulatory involvement is strong, weak, or absent. The daily environmental experiences of residents will be recorded in order to visualize perceptions of and interactions with disamenities. This may reveal differences among residents of the two communities, their frequency of physical encounters with disamenities, the types of disamenities most often encountered and the medium, as well as the ways in which residents perceive these sites and come to imagine their daily landscapes. Residents will be asked to record their daily routes and interactions with disamenities including encounters with sites, odors, smoke, liquids and the like. Each resident (4–5 per community) will be given a camera and notepad and asked to document their daily interactions with disamenities.

12.5 Expected Results

12.5.1 Non-human Factors

In this study, I hypothesize that a key nonhuman factor is the particular form of environmental contamination. In West Indianapolis, air pollution predominates, so residents are (and have historically been) faced with the smell of the various contaminants released to the local atmosphere. Hazardous air pollution is well-documented in that part of the city. On the other hand, residents in Martindale-Brightwood have predominately encountered pollution as something they are told is present in their yards or soil. The nonhuman actors in this community can include the presence of Pb in/on residential lawns. It is this difference in the nature and medium of contamination and how that may affect residents' perceptions and activism that this research will address. This study hypothesizes that this route of exposure to a resident does trigger different responses and processes than when a resident is informed of pollution via manifested health issues or observation of government officials assessing/remediating a site.

12.5.2 Perceptions, Place, Race, and Social Capital

This study is also expected to reveal that differences in environmental activism between the two communities relate to the strength and nature of social capital and place attachment, in people's relations with local government and industries, and in their efforts to blunt local activism. These are likely to vary socially with race, ethnicity, and age and in relation to particular economic and historical circumstances. These processes play out differently in each community resulting in varying types and degrees of response to local environmental disamenities. Initial fieldwork in the study areas indicates that some residents associate disamenities in their neighborhoods with past or existing health outcomes. While residents in both communities associate environmental risks and personal health, it becomes critical to understand why different responses emerge via activism or acquiescence.

12.6 Implications

Environmental injustice and activism research can offer information critical to the development of more effective policy within urban environments. The research proposed here will provide much-needed 'local knowledge' that may challenge traditional 'professional' environmental assessment methodologies. This research will also illuminate the role (if any) of social capital and/or place attachment that

can contribute toward a re-visiting of existing and longstanding urban redevelopment approaches. In addition, policy will be well-served by findings which provide insight as to if/how the particular form of contamination (medium-soil, air, water) may foster different resident responses and actions.

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Reflection

This proposal synthesizes a vast and diverse collection of literature across multiple fields to identify a gap in the existing literature (place attachment) to understand perceptions of environmental risk, activism, and complex (but inherently fuzzy) concepts such as social capital. The methods section is especially clear and well defined. In the case of more qualitative proposals, the methods section is critical to a

successful proposal. In this case, definitions of qualitative GIS and local knowledge are positioned within well defined boundaries to avoid the excessive "fuzzy-ness" that sometimes accompanies qualitative research. Additionally, this research and the methods are also grounded in empirically observed environmental data.