The Environmental Justice Implications of New York State's and New York City's Brownfield Policies

By

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Abstract

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This dissertation assesses the environmental justice implications of New York State and New York City laws designed to encourage the cleanup and remediation of contaminated and vacant properties, also known as brownfields. To do so, the dissertation asks three questions. First, do brownfield policies promote the cleanup and redevelopment of contaminated sites in areas with predominantly poor and minority residents? Second, when brownfield development does occur in these neighborhoods, does it improve environmental conditions? And third, to what extent do brownfield policies offer residents, business owners, and others living, working, and playing near brownfield sites a voice in the remediation and development process? To answer these questions the dissertation uses a two-step, multi-scalar, and mixed-method approach. In the first step, the dissertation uses methods of randomization to describe the characteristics of populations and properties near sites enrolled in New York State's brownfield program at the scale of the city. In the second step, the dissertation investigates the impact of brownfield development in three case study neighborhoods –the Gowanus and East New York neighborhoods in Brooklyn and Melrose Commons in the Bronx. Through these analyses, the dissertation concludes that the environmental justice implications of New York State's and New York City's brownfield policies are uneven. While state and city policies may encourage development in areas with

higher property values and a higher proportion of white and wealthy residents, for the most part, they have little impact in areas with predominantly poor and non-white residents. When brownfield development does occur in these neighborhoods, it tends to exacerbate existing environmental injustices. Although the clean-up and development of contaminated sites may protect human and ecological health within the site's boundaries, it often exacerbates environmental problems in the surrounding areas. City and state brownfield policies further exacerbates environmental injustices by providing few opportunities for nearby resident and business to influence remedial methods or future land uses. There are, however, exceptions to these findings. In neighborhoods with a history of community, comprehensive, and area-wide planning, brownfield policies are much closer to fulfilling the policies' stated ambition.

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Introduction

The Gowanus Whole Foods Groundbreaking (Source: The Gowanus Lounge)

On September 6, 2006, New York State and New York City elected officials stood shoulder to shoulder with representatives of city agencies and executives from the Whole Foods Corporation. Shovels in hand, the politicians, bureaucrats, and corporate executives broke ground on what would be the gourmet grocer's first store in the borough of Brooklyn. The visible conditions on the surrounding property, however, hardly invoked images of fresh and organic produce. Throughout the weed strewn lot were piles of trash, concrete and debris interspersed with pools of standing water. Even more troubling was what guests could not see. For nearly 100 years the site had been used for an array of industrial purposes including a coal yard, a junkyard, and an automobile repair shop. Along with neighboring industrial firms, these businesses had left often dangerous amounts of arsenic, lead, mercury, and other toxic chemicals

in the site's soil, groundwater, and surface water (New York State Department of Environmental Conservation 2011).

In New York City, sites like the future Whole Foods property are a common occurrence. Across the city there are an estimated 7,600 acres of brownfields (slightly less than 10% of the city's developable space). Although definitions vary, brownfields are generally thought of as vacant lots with either known or suspected contamination in the groundwater, surface water or soil where the level of contamination is high enough to pose a health risk but not so severe as to merit inclusion in federal or state programs designed to address the most dangerous sites. Recently, both New York City and New York State lawmakers have created policies designed to encourage the development of these properties. The most prominent of the state and city brownfield initiatives is the New York State Brownfield Cleanup Program (BCP), which promotes development by offering property owners incentives to bring his or her site into compliance with statewide standards (NYS DEC 2004). In addition to the BCP, the Brownfield Opportunity Area (BOA) program provides community groups grants to identify and assess environmental conditions at brownfield sites in their neighborhoods (NYS DEC 2006). New York City has also been active in creating incentives for brownfield development. In 2008 the City created the office of Environmental Remediation which oversees brownfield development in the city, and in 2009 the City passed the New York City Brownfield Redevelopment Act (NYCBRA) which, among other things, created the city's own incentive based brownfield redevelopment program (Associated Press 2008).

New York State and New York City are not alone in their commitment to brownfield development. Since Illinois and Minnesota enacted the first incentive based brownfield programs in the late 1980s, nearly every state has followed suit (Bartsch and Deane 2002). At the federal level, in 2002 Congress unanimously passed the Small Business Liability Relief and Brownfields Revitalization Act which changes the legal landscape of brownfield development and creates several new grant-based programs (US Congress 2002). In addition to these initiatives several municipalities have launched brownfield programs of their own (Heberle and Wernstedt 2006).

Although these brownfield policies differ, they are all designed to address three overlapping goals. First, these initiatives promote economic growth by intensifying land use, creating jobs, and increasing tax revenue. Second, state, city, and federal brownfield programs advance environmental objectives by either remediating or containing toxic substances such as heavy metals, petroleum byproducts, benzene, lead, or arsenic that can contaminate nearby residents' air, water, or soil. Third, because brownfields tend to cluster in environmentally compromised areas with predominantly poor, black and Hispanic residents, brownfield development advances equity or environmental justice.

Urban Sustainability Policy

In simultaneously pursuing these three goals, brownfield policies are emblematic of a broader adoption of the ideals of environmental sustainability at the urban scale. The United Nations (1987) defines sustainable development as that which "meets the needs of the present without

compromising the ability of future generations to meet their own needs." For many sustainability is consistent with "ecological modernization" or the belief that it is possible for governments to promote economic growth while simultaneously protecting the environment (Hajer 1995, Harvey 1996). Although national governments and global organizations have led the drive for sustainability, city and municipal governments have also taken up the cause. In the United States the most visible manifestation of urban sustainability is the ideal of "Smart Growth" which emphasizes higher population densities and construction of housing around transportation hubs.

The local embrace of sustainable development represents a significant shift in urban environmental policy. In the past, cities could either protect the environment or promote growth, but they could not do both at the same time. During the period of early industrialization, for instance, cities sought to curb the excesses of industrial production by imposing nuisance laws and using zoning to segregate the most noxious land uses. While these laws may have made the city a healthier place to live, they also limited growth by placing restrictions on where manufacturers could locate their businesses and what sorts of things they could do. In the first half of the 20th century, the urban environmental movements sought to carve out "garden cities" and parks that were free from industry's noises, smells, and waste. Like earlier urban environmental policies, policy makers and activists designed these initiatives to protect the environment and make the city a more livable place by limiting growth. During the Fordist period following World War II, the balance between economic growth and environmental protection changed once again. In order to compete for jobs, capital, and companies in an

increasingly global economy, many cities either rolled-back or chose not to enforce existing regulations.

In contrast to these past approaches, proponents of local sustainability claim that in post-industrial cities, economic growth and environmental protection are no longer antagonistic but are now dialectically intertwined. At the heart of their claims is the belief that in order to grow economically, cities must position themselves at the forefront of the knowledge and service economy by attracting a highly trained *creative class* of workers. One way to do this is to offer residents and businesses the sort of lifestyle amenities they covet including a clean environment and access to environmental goods like open space, parks, and recreation (Florida 2002, Florida et al. 2000). As environmental protection promotes economic growth so too can economic growth support environmental protection. Constructing "green" energy efficient buildings, for instance, can reduce energy consumption and green-house gas emissions. Advocates of "Smart Growth" similarly argue that building mixed use and pedestrian friendly communities around public transportation hubs can reduce dependency on automobiles and increase public transportation use. In the current era of urban environmental policy, then, the historic tensions between economic growth and environmental protection disappear as the two goals become inseparably bound (While, Jonas and Gibbs 2004, Portney 2003).

More recently policy makers have expanded on urban sustainability's promise by arguing that in addition to economic growth and environmental protection, urban sustainability initiatives can promote equity or environmental justice. As a large number of empirical studies document, poor, black and Hispanic residents are often exposed to greater environmental risks than their

wealthy and white peers (United Church of Christ 1987, US GAO 1983, Bowen and Wells 2002, Liu 2001). According to urban sustainability advocates, new environmental policies will necessarily ameliorate many of these environmental injustices because improving urban environmental conditions everywhere will disproportionately benefit conditions in the most environmentally compromised neighborhoods. Like brownfield initiatives, then, this new wave of urban environmental policies promises to simultaneously promote economic growth, environmental protection, and equity, what Campbell (1996) famously referred to as "the 3 Es of urban sustainability".

Purpose / Objective

The purpose of this dissertation is to examine urban sustainability policy's potential for achieving the last of these three goals by assessing the environmental justice implications of state and city brownfield policies in New York City. I do this by asking three questions:

1. At the scale of the city, do New York State and New York City's brownfield policies decrease the disparity in environmental conditions between areas where white and wealthy residents live and areas where residents are predominantly poor and not white?

2. When brownfield development does occur in areas with predominantly poor and non-white residents, does it improve neighborhood-wide environmental conditions?

3. To what extent do these policies offer residents, business owners, and others living, working, and playing near brownfield sites a voice in the remediation and development process?

Answering these questions gives insight into the potentials and limitations for urban environmental policies to address environmental injustices at the same time that they promote economic growth and environmental protection.

Contributions

By drawing a connection between environmental justice and urban sustainability policy, this dissertation contributes to research on urban environmental policy, brownfields, and environmental justice policy analysis.

Urban Environmental Policy

Within the academic literature, there has been a great deal of skepticism about local sustainability's claims. Agyeman and co-authors (Agyeman, Bullard and Evans 2002, Agyeman and Evans 2003), for instance, argue that true sustainability demands environmental justice. Realizing "Just Sustainabilities", however, requires cities to radically alter their approach to urban growth and development. In his oft-cited piece on the subject, Campbell (1996) claims that urban sustainability's true value is in highlighting the consequences of planning decisions as the tensions between the three goals are too significant to overcome. Those like Marcuse (1998)

are even more critical, arguing that discourses of urban sustainability are nothing more than a ruse designed to promote unfettered growth while obscuring its uneven benefits.

To date, however, the claims of simultaneously promoting economic growth, environmental protection, and environmental justice remain untested. In general, the empirical literature on urban sustainability initiatives can be divided into two groups. First is research that documents best practices for aligning economic growth, environmental protection, and equity. Usually structured as a series of case studies, these investigations offer cities a sustainability blueprint by documenting urban sustainability "success stories" (Mazmanian 1999, Wheeler and Beatley 2009). Second are critical accounts that expose inherent tensions that arise as policy makers align economic and environmental goals (Brand 2007, Lake 2000, Krueger and Gibbs 2008, Gibbs and Krueger 2005, Gibbs 2002, Gibbs, Jonas and While 2002, While et al. 2004, Desfor and Keil 2006). In many cases, authors of these studies argue that city governments mobilize sustainable development discourses to rally support for unfettered growth in an era of heightened intra-urban competition. Neither the best practices nor critical literature, however, ask how these policies may be either ameliorating or exacerbating existing environmental injustices within the city.

In many ways New York City presents an ideal case study to ask such questions. With its publication of its sustainability plan – PlaNYC - in 2007, New York City and its mayor, Michael Bloomberg, have become internationally recognized leaders in the urban sustainability movement. Although PlaNYC only mentions environmental justice once, issues of equity play a prominent role in its text. In part, the inclusion of equity concerns reflects environmental justice

activists' success in either thwarting or delaying the city's construction of power plants, waste incinerators, and other growth enabling projects in areas already saturated by facilities and facing public health problems resulting from them (Sze 2007). Faced with such strong and vocal opposition the city needed to find another way to expand. Whatever the motivation, New York City's enactment of urban sustainability at least rhetorically attempts to balance urban sustainability's three objectives. While the impacts of New York's brownfield policies may not apply to other places, they do provide insight into tensions that may arise between urban sustainability's three part promise of environmental protection, economic growth, and equity.

Brownfield literature

Although brownfield policies have garnered support across the political spectrum, the brownfield literature is divided on whether city, state, and federal brownfield policies actually promote environmental justice. On the one hand, proponents of brownfield policies argue that reducing the costs and risks of brownfield development will make it profitable for property owners to develop and clean up vacant and contaminated properties in neighborhoods with predominantly poor and non-white residents and hazardous environmental conditions. On the other hand, critics of these policies argue that because of their spatial orientation these policies exacerbate rather than ameliorate existing environmental injustices.

In general, brownfield policies can be divided between site-specific and area-wide approaches. Site-specific approaches reduce the risks and costs of brownfield development by addressing conditions within the site's boundaries like protecting property owners from future lawsuits,

clarifying (and in some cases reducing) clean-up standards, or providing tax breaks and other financial incentives. In contrast to site specific policies, area-wide approaches attempt to spur brownfield growth by fixing infrastructure, increasing open space, reducing crime and otherwise improving conditions in the property's surrounding areas (Van Hook 2000, Van Hook, Shaw and Kloo 2004, Meyer 1998, Meyer, Williams and Yount 1995). Even though surveys of brownfield developers indicate that area-wide conditions often pose a greater obstacle to brownfield development than on-site conditions alone (Council for Urban Economic Development 1999, Jackson 2001, United States Conference of Mayors 2006, Alberini et al. 2004, Reddy, Adams and Richardson 1999) , almost every state and city, including New York State and New York City, follow the former, or site-specific, approach.

According to critics, addressing conditions within the site's boundaries while neglecting neighborhood-wide concerns can exacerbate existing environmental injustices in at least three ways. First, while policies may promote development in areas with higher property values, they are unlikely to have a significant environmental impact in areas with multiple environmental stressors and predominantly poor and non-white residents (Leigh 2000, Meyer 1998, Wernstedt 2005, Frickel and Elliott 2008). Second, even if these policies do promote the cleanup of contaminated sites, there is no guarantee that they will actually improve neighborhood-wide environmental conditions (Heberle and Wernstedt 2006, Eisen 1996, McCarthy 2002). Third, these policies provide few opportunities for nearby residents, business owners, and other stakeholders to meaningfully participate in cleanup or redevelopment decisions (Byrne 1999, Eisen 1996, Eisen 2007, Davies 1999).

To date, however, there has been little literature testing any of these three assertions. Instead, the empirical literature that does exist focuses on site specific metrics like the number of housing units built, the number of jobs created, or the number of sites enrolled in or state or city programs (Winson-Geidman, Simons and Pendergrass 2004, De Sousa 2005, Page and Berger 2005). The few studies that do exist examining brownfield policies' environmental justice implications compare outcomes across municipalities or rely on data from community groups that have benefited from the programs (Gardner 2001, Davies 1999) .

Environmental Justice Policy Analysis

By analyzing state and city brownfield policies' environmental justice implications, this research contributes to a rich body of literature examining the way that environmental policies can contribute to differences in social groups' exposure to environmental risks and access to environmental benefits. In the past, researchers have examined environmental justice issues in relation to a wide range of government actions including zoning and land use planning (Maantay 2002b, Arnold 1998, Rabin 1989, NAPA 2003), energy policy (Sze 2007), food policy (Williams 2005, Gottlieb 2001), solid waste policy (Debbané and Keil 2004, Pastor, Sadd and Hipp 2001, Lake and Disch 1992, Pellow 2002), transportation policy (Bullard and Johnson 1997, Feitelson 2002, Lin et al. 2002), permit trading (Chinn 1999, Corburn 2001, Tietenberg 1995, Solomon 1999), and environmental policy enforcement (Lavelle and Coyle 1992, Viscusi and Hamilton 1999, Hird 1994, Holifield 2004). In addition, many local, state, and government agencies have also offered methods of environmental justice policy analysis as part of their policies designed to address the issue (New York State Department of Environmental Conservation 2003, US

Environmental Protection Agency 1998, US Environmental Protection Agency 2000a, US Environmental Protection Agency 2000b).

While this research is important in demonstrating how environmental policies may exacerbate existing environmental injustices it is also subject to four critiques. First, the methods that analysts use to assess quantitative results are not robust. Findings may therefore vary significantly depending on decisions analysts make. Second, most analysts focus solely on a singular spatial scale and often overlook the ways that policies may displace environmental problems across scales. Third, most analysts focus solely on policies' distributional outcomes but play little attention to procedural concerns like who participates in the policy making process which can affect who benefits, who stays. Fourth, prevailing methods of environmental justice policy analysis make the assumption that what constitutes environmental justice is universal and intransient. Increasingly, however, scholars argue that the meaning of environmental justice varies depending on its contexts.

In the following I employ a mixed methods and multi-scalar approach to environmental justice policy analysis designed to respond to these criticisms. At the scale of the city I describe the characteristics of populations and properties in areas surrounding sites enrolled in the BCP by analyzing census data and property assessment data using methods of randomization. To examine these issues at the neighborhood scale, I conduct case studies in two Brooklyn neighborhoods, Gowanus and East New York, and one neighborhood in the Bronx, Melrose Commons. In each case study I use a combination of environmental reports, newspaper

accounts, government documents, and blogs, listservs and other sources of micro-local news to describe individual project's impacts on surrounding areas.

Key Terms

Brownfields

Despite (or perhaps because of) the widespread adoption of brownfields policies, the term evades easy definition. The US EPA (2011) defines a brownfield as an "abandoned, idled, or under used industrial and commercial facilities/sites where expansion or redevelopment is complicated by real or perceived environmental contamination." In the Small Business Liability and Relief and Brownfields Redevelopment Act, however, Congress (2002) removes references to the site's present use and states that "The term 'brownfield site' means real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant." In addition to these two definitions, Yount (2003) identified at least 11 others in state statutes. Within the brownfields debate, it appears that there are as many meanings for the term as there are interested parties (Alker et al. 2000).

When I use the term brownfield I am referring to any property with known, or suspected, toxins or contaminants, where the level of contamination poses a health risk but is not so severe that it is regulated under state or federal superfund laws. In the US, the most significant policy affecting contaminated land is the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund). Congress passed CERCLA in 1980, and has amended it many times since, most notably in the Superfund Amendment and Reauthorization Act (SARA)

of 1984. When Congress passed the law, its main function was to clean up a relatively small number of the country's most severely contaminated properties (Abrams 1997). Because site clean-up is a time and labor intensive process, the US EPA can only pursue remediation at a small number of properties at a time. The sites that the federal government remediates under CERCLA are listed in the National Priority List (NPL). As of January 2008, there are 1,245 active sites on the NPL with about 10 more added each year (Pope and Rauber 2004, US EPA 2008). Around the time that the federal government passed CERCLA almost every state created a set of parallel policies. Like the corresponding federal legislation, state laws only target the most heavily polluted properties. In New York State, for example, there are only 1,268 sites enrolled in the State's Inactive Hazardous Waste Disposal Site Remedial Program (NYS DEC 2011). There are, however, hundreds of thousands of properties that federal or state programs do not address even though there is known contamination on the site, or the site's past uses indicate the presence of contamination in excess of federal or state standards (Simons 1998, USCM 2000). In many cases these sites are either partially or wholly vacant or employed for marginal uses like storage or parking. I refer to these properties as brownfields.

Operationalizing the above definition has proven difficult. In part, the challenge in identifying brownfield properties comes from a lack of available information about sites' environmental conditions. Until recently, environmental assessments were not a routine aspect of the property procurement process. When property owners do determine on-site conditions, these data are usually not in the public record. In the absence of thorough environmental knowledge, researchers often use a history of industrial use as an indicator that contaminants will be present

(Frickel and Elliott 2008, Leigh and Coff 2000, Litt and Burke 2002). In cities like New York, however, a history of leaded gas use has left traces of lead in all properties making nearly every site – residential and industrial alike – a potential brownfield.

Even if conditions are known, there remains disagreement about what constitutes a contaminant. Critics of the BCP, for example, argue that the policy places New York City sites at a disadvantage because it does not consider the presence of historic fill as sufficient for the owner to enroll the property in the program (New Partners for Community Revitalization 2007a, The City of New York 2008). Further complicating brownfield identification is determining vacancy, abandonment, or underuse as many sites that are technically vacant may be used for parking, storage, or other low-intensity uses (Yount 2003, Been, Madar and McDonnell 2009). Sites may also be used for community gardens, performance, or recreation (Campo 2002). Researchers have proposed a number of proxies and research methods to overcome these issues (Colten 1990, Frickel and Elliott 2008, Leigh and Coff 2000, Litt and Burke 2002, Simons 1998). Following guidelines established by the New York City Department of Environmental Remediation (2011), I identify any site zoned for manufacturing where there was no use or structure during the last assessment by the NYC Department of Finance as a brownfield. In addition to these sites, I also include any site that is enrolled in a New York City or New York State brownfield program in my brownfield inventory.

Environmental Justice

Like the meaning of "brownfield," the meaning of "environmental justice" is contested. Initially, activists and researchers used the term to describe the inequitable distribution of environmental risks and benefits where poor people and racial and ethnic minorities suffer greater exposure to environmental risks and less access to environmental benefits than their white and wealthy peers (Holifield 2001, Cutter and Solecki 1996). Along with these *distributional* concerns, activists and scholars also refer to *procedural* injustices where marginalized populations lack influence or are otherwise excluded from the environmental decision-making process. While some privilege one dimension over the other (Lake 1996, Hunold and Young 1998, Walker 2006), most definitions simultaneously invoke procedural and distributional notions of justice. The US EPA (2011b) for example, states that:

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

In addition to competing notions of justice, the definition of environmental justice also varies depending on what the speaker means by the word "environment". What counts as an environmental problem is never self-evident but is a point of contestation and political struggle (Braun and Wainwright 2001, Harvey 1996, Castree 2002). Many environmental justice activists, for example, counter the notion of the environment as de-populated and distant spaces

promoted by mainstream environmental organizations by arguing that the environment is where "we live, work, and play" (Bullard 1994). Within environmental justice activism what constitutes an environmental problem extends well beyond US environmental policy's traditional emphasis on concentration of particles in the air, water, or soil, but also includes social issues such as crime, education, housing, and access to health care (Schlosberg 1999, Harvey 1996, Taylor 2000, Pulido 1996, Bullard and Johnson 2000). Benford (2005) illustrates the movement's breadth by identifying over 50 different issues on the websites of environmental justice groups. The multiplicity of meanings for the term was also evident in 1994 when then President Clinton issued Executive Order 12898 which required, amongst other things, that all federal agencies formulate an environmental justice strategy. The resultant documents touched on such disparate concerns as "lead-based paint in inner-city public housing projects," "migrant farm worker camps," and "ensuring that minority and low-income populations benefit proportionately from transportation projects" (Holifield 2001: 85). Because one definition can never adequately capture these diverse sites, struggles, and conflicts, scholars favor an embrace of the term's multiple meanings (Kurtz 2003, Schlosberg 2007, Debbané and Keil 2004, Walker 2006, Holifield 2001, Low and Gleeson 1998).

An overly expansive definition of "environmental justice", however, may also undermine activist ambitions. Environmental justice's malleability opens the door for political actors, including academics, to mobilize the term in support of contradictory political projects and ideological objectives, many of which may contradict activists' original intentions (Harvey 1996, Pellow and Brulle 2005). Further, if environmental justice activists continue to stretch the meaning of the

term “to explain every problem at the intersection of development and social inequality … surely their movement will lose its explanatory (and mobilizing) power” (Pellow and Brulle 2005: 16, see also Getches and Pellow 2005, Brulle 2005). With these issues in mind I limit inquiry to narrowly defined environmental issues of solid waste management and contamination in the air, soil, or water.

Outline

The dissertation is divided into two parts. The first part provides background and reviews the current literature. In the second chapter, I examine the issue of sustainable development and its application at the urban scale. I then explore the elision of economic growth, environmental protection, and equity in New York City’s approach to environmental policy. In the third chapter, I introduce brownfields and brownfield policy with an emphasis on New York State and New York City initiatives. Following what I call the Brownfield Paradox, I argue that although conditions in surrounding neighborhoods often pose a greater barrier to brownfield development than on-site conditions alone, almost all brownfield programs, including those in New York State, address the latter while ignoring the former. I argue that at least in New York City, one explanation for this Brownfield Paradox may be the spatiality of the city’s growth policy. In the fourth chapter, I examine prevailing methods of environmental justice policy analysis and propose a multi-scalar multi-method alternative.

The second part of the dissertation presents empirical results. The fifth chapter shows the results of the city-wide quantitative analysis, while chapters seven, eight, and nine contain the case studies in the Gowanus and East New York neighborhoods of Brooklyn and Melrose Commons in the Bronx. In the final chapter, I present conclusions about brownfield policies, in specific, and urban sustainability initiatives, in general, as well as policy recommendations.

Chapter 1: Urban Sustainable Development

Over the last 15 years sustainable development has emerged as the most dominant discourse influencing environmental policy. As Campbell (1996:301) argues "in the battle of big public ideas, sustainability has won: the task of the coming years is simply to work out the details." In this chapter I introduce the concept of sustainable development, particularly its US variant – Smart Growth. Building on While, Jonas, and Gibbs' (2004) notion of *sustainability fix*, I argue that one reason behind Smart Growth's popularity is that, at least in rhetoric, it enables city managers to simultaneously promote growth while protecting the environment. In addition to claims that Smart Growth and Sustainable Development yield both economic and environmental benefits, several authors argue that it also should address environmental justice issues. To date, however, most empirical research on Urban Sustainability focuses on the policies' ecological dimensions while ignoring its social justice and equity implications. This oversight is particularly problematic as cities like New York increasingly argue that growth oriented policies can be effective tools for improving environmental conditions, particularly in neighborhoods with predominantly poor and non-white residents.

In the second part of this chapter, I turn my attention towards PlaNYC, New York City's widely acclaimed sustainability initiative. While closely following Smart Growth's promotion of economic development and environmental protection through market-based policies, voluntary measures, and financial incentives, PlaNYC distinguishes itself from other Smart Growth programs through its attempts to address environmental justice issues.

Sustainable Development

Mazmanian and Kraft (1999) divide US environmental policy into three epochs. The *command and control* period lasted from 1970 until the 1990s. During this time the federal government protected the environment by setting statutory limits on the amount and type of waste a firm could produce and how they could dispose of it. The government enforced these regulations through the threat of fines or legal action. Starting in the 1980s, command and control policies were supplemented and often eclipsed by *market-based strategies*. Arguing that existing laws were difficult to enforce and ineffective, policymakers increasingly emphasized economic efficiency as measured through rigid cost-benefit analysis. The result was a series of market-based and voluntary measures designed to internalize pollution costs and provide fiscal incentives for polluters' to change their behaviors. Starting around 2000, environmental policy shifted from command and control and market based strategies towards *sustainable development*. Despite its clear importance, this phase of policy eludes easy characterization.

The most frequently cited definition of sustainable development comes from the World Commission on Economic Development (United Nations 1987) that states "sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs." Sustainable development is often associated with notions of ecological modernization, or the belief that economic expansion and ecological protection need not conflict, and in many cases, may actually be mutually beneficial (Harvey 1996, Hajer 1995). How to achieve this balance, however, remains an open question. While proponents of strong sustainability advocate that resources must not be consumed faster than they can be

renewed, supporters of weak sustainability accept that certain resources can be depleted so long as others can serve as adequate substitutes (Krueger and Agyeman 2005). Weak sustainability and strong sustainability are just two of the multitude of sustainability discourses in circulation as political actors use the term to support wide-ranging and often divergent practices (Gibbs and Krueger 2007). The absence of clear definition has led Gunder (2006: 211) to lament that "sustainability is a fuzzy concept that everyone purports to understand intuitively but somehow finds it difficult to operationalize into concrete terms" (as cited in Saha 2009: 18).

Despite this confusion, proponents of sustainability often promote local-scale and urban policies as a crucial means of achieving long-term objectives – whatever those objectives may be. Advocates of local scale intervention argue that cities are the largest consumers of world resources while they also produce the most waste. As a rising share of the world's population lives in urban areas, influencing city's relationship with nature becomes a key site for addressing global environmental goals. In addition, proponents of urban sustainability claim that local governments are often "closer" to their constituents and thus have a greater chance of both influencing their behaviors and reflecting their wants and needs but are less susceptible to influence from lobbies and other corporate influence (John and Mlay 1999, Shutkin 2000, Siriani and Friedland 1997). Finally, local policy making process is viewed as more amenable to change than often cumbersome processes of federal policy-making. The heightened emphasis on local sustainability measures was codified during the United Nations Conference on Environment and Development held in Rio de Janeiro on June 14, 1992. In the resulting document – Agenda 21 – the authors emphasized the need for local authorities to "enter into a

dialogue with its citizens, local organizations and private enterprises to … provide strategy and process for attaining sustainability within the local sphere" (as cited in Lake 2000: 71).

To some extent, the calls for local sustainability initiatives have been met with a positive response. Following a trend of increasing urban areas' autonomy and policy responsibilities (Brenner 1997, Peck and Tickell 2002), several countries have devolved environmental policy-making to the local scale (Gibbs, Jonas, and While 2002). A 2002 study by the International Council for Local Environmental Initiatives (ICLEI) found that 6,416 local authorities in 113 countries have made either a formal commitment to or are in the process of implementing Local Agenda 21 (LA21) initiatives. The embrace of urban sustainability, however, has been highly uneven. While LA21 policies are common in Europe and to a lesser extent Asia, there has not been a similar trend in the US. For example, the ICLEI study identified 425 LA21 programs in the UK, 106 in Belgium, and 172 in South Korea but only 21 LA21 initiatives in the United States. Further, those cities that did embrace LA21 tended to cluster in the West, had wealthier residents, and were not amongst the first-order, or most influential, in the country (Lake 2000).

The reluctance of US cities to embrace LA21, however, did not signal a wholesale rejection of the goal of urban sustainability. Instead, following discourses of Smart Growth, US cities often sought to achieve a subset of sustainability goals by employing a few specific methods. In general, the main function of Smart Growth policies is to influence land use decisions by promoting high-density development around public transportation nodes while preserving open-spaces on urban peripheries (Krueger and Gibbs 2008, Krueger and Agyeman 2005, Gearin 2004, Pollard 2000). In contrast to previous "command and control" measures, Smart Growth

policies control sprawl through the use of incentives, voluntary compliance and market based strategies (Krueger and Gibbs 2008, Gearin 2004, Pollard 2000). Although Smart Growth is often touted as a dramatic shift in US urban policy, Gearin (2004) argues that most Smart Growth strategies have been in existence for some time. Further, Smart Growth trends do not upend prevailing market trends but are consistent with global capital's spatial shift away from the urban fringe and towards the central city (Porter 1995, Smith 1996, Zukin 1982). Accordingly, the Smart Growth "revolution" signals more of a rhetorical than substantive policy change. Whether or not Smart Growth represents a radical departure from past policy efforts, it has been widely adopted in the US (Krueger and Gibbs 2008). For instance, a 2000 report from the American Planning Association (APA 2000) indicates that over 70% of the 533 state and local ballot initiatives focused on Smart Growth passed (Tregoning, Agyeman and Shenot 2002: 344).

The Sustainability Fix

The bulk of empirical research on local sustainability, in general, and Smart Growth, in specific, are normative accounts. Taking the form of case-studies, this body of scholarship collectively documents the best design and planning practices for localities hoping to achieve sustainable outcomes (Mazmanian 1999, Wheeler and Beatley 2009). One common critique of this writing is its localism or its failure to situate sustainability discourses in the context of processes operating at and between a broad range of spatial scales (Braun 2005, Desfor and Keil 2006). By contrast a growing body of literature argues that cities enact discourses of sustainable development in order to secure their position vis-à-vis other locales in the global competition for

jobs, capital, and resources (Desfor and Keil 2006, Keil and Graham 1998, Gibbs 2002, Gibbs and Krueger 2007, Jonas and Gibbs 2003, Krueger and Gibbs 2008, While et al. 2004, Raco 2005).

This synergy between environmental protection and urban growth signals a reverse of past relationships between the two goals. As Keil and Graham (1998) argue each era of urbanization brings with it a new relationship between the urban economy and nature. During the period of early industrialization (spanning the mid 19th to the early 20th century), the city beautiful movement, the sanitary movement, and progressive era reformers and grassroots activists worked with legislators and city bureaucracies to create public health departments, public nuisance laws, and zoning ordinances (Melosi 2000a, Colten 1990). These initiatives had a contradictory relationship with growth. On the one hand, by curbing the environmentally deleterious impacts of unchecked industrial expansion they helped attract and retain the urban bourgeoisie by making the city a more pleasant place to live (Scobey 2003). On the other hand, the laws raised the cost of doing business for the city's oil refineries, manufactured gas plants, and many of the other noxious industries causing them to decamp to emergent industrial suburbs where city governments did not closely regulate their operations (Hurley 1994).

In the Fordist era, tensions between economic growth and environmental protection increased. Thanks in part to the advent of containerization and other transportation innovations as well as lower tariffs, industrial firms were no longer tethered to the urban locales. While some firms relocated to the suburbs or other cities within the United States, many moved production overseas. In order to grow and remain competitive, cities had to attract these increasingly mobile

firms by offering them lower taxes, fewer regulations, and other cost saving measures. Enhanced intra-urban competition soon devolved into a race to the bottom, as cities either rolled-back or chose not to enforce environmental laws (While et al. 2004).

In the Post-Fordist, city the relationship between economic growth and environmental protection has changed once again. As the basis for urban economic growth shifts from manufacturing and industrial production to knowledge industries like finance, insurance, and real estate, it has become accepted knowledge amongst urban development professionals that cities' future growth is contingent on attracting graphic designers, computer programmers, and other highly trained professionals that became the heart of a new urban bourgeoise. In order to lure this creative class of workers, cities placed a new emphasis on the production of lifestyle amenities like downtown shopping and cultural districts. The environment figures prominently in these plans:

> In the new economy, environmental quality has become important not simply as an end in itself, but as a prerequisite for attracting talent … Regions have begun to see the environment as a source of economic competitiveness, quality-of-life, and talent attraction. Leading regions have undertaken efforts to reduce sprawl and move to Smart Growth, promote environmental sustainability, clean-up and reuse older industrial sites, encourage firms to adopt environmental management systems, and preserve natural assets for recreation and improved quality-of-life (Florida et al. 2000: 17).

The link between environmental protection and economic growth, however, is rife with contradictions. Just as environmental amenities are a prerequisite for growth, growth itself has a negative impact on the environment. Growth is often associated with mounting sprawl, traffic congestion, and a dramatic reduction in open space. Further, with increased demand on waste removal, power generation, and sewage treatment, growth places severe strains on an area's

existing services and utilities and often necessitates the construction of new environmentally deleterious facilities. Not surprisingly, in the wake of rapid expansion, environmentalists often clash with developers, local officials, elites, boosters, and other interests that collectively make-up urban growth machines (Logan and Molotch 1987). By degrading environmental conditions, short-term growth may have the contradictory effect of undermining a region's long-term competitive position. As Prytherch (2002: 773) notes in his study of Tuscon "marketers may construct nature as a 'condition' of production of growth, but sprawl devours the landscape upon which their sales pitch is premised" (as cited in Gibbs and Krueger 2007: 101).

Smart Growth and urban sustainability strategies hold forth the promise of mitigating the tensions inherent in cities' new embrace of environmental objectives. By balancing the competing demands of growth promotion while protecting and preserving the environmental conditions that are prerequisites for future expansion, urban environment policies strive to achieve what While, Jonas, and Gibbs (2004: 551) refer to as a *sustainability fix*:

> The historically contingent notion of a `sustainability fix' is intended to capture some of the governance dilemmas, compromises and opportunities created by the current era of state restructuring and ecological modernization. Although nature and its production has always been a necessary precondition for capital accumulation, sustainable development is itself interpreted as part of the search for a spatio-institutional fix to safeguard growth trajectories in the wake of industrial capitalism's long downturn, the global `ecological crisis' and the rise of popular environmentalism.

The authors argue that while sustainability fixes do not necessarily preclude the possibility for addressing many pressing environmental concerns, they dramatically limit the types of issues urban governments can target and the range of tools they can use to address them. In this way,

the notion of a sustainability fix shares much in common with Molotch's (1993) argument that while cities may respond in place specific ways, the demand for growth invariably favors certain policy solutions while marginalizing others.

Case studies of sustainability fixes throughout the United States indicate that when economic and environmental interests conflict the former often prevails at the expense of the latter. Brand (2007: 617), for example, argues that by emphasizing individual contributions rather than state actions, urban environmental policies operate "on the levels of strategic interests and everyday social practices to facilitate … the legitimation of neoliberal city governments." Lake (2000) similarly argues that a desire for competitiveness in the global economy often eclipse any local government ambition to positively impact global ecological sustainability. Further, when cities do positively address local environmental conditions they often do so by exporting environmental disamenities and wastes to other locales. Using the example of Massachusetts, Kreuger and Gibbs (2008: 1272) argue that by rejecting state-based regulatory tools and relying solely on market-based tools, incentives, and voluntary measures, "Smart Growth's goals may be in contradiction with its mechansisms for delivering them." In short, urban sustainability policies may yield positive environmental outcomes but they will only do so when those objectives do not conflict with overriding economic concerns.

One reason that cities may find balancing economic and environmental objectives difficult are the mechanisms they employ to achieve those goals. As argued earlier, urban sustainability policies in the US eschew "command and control" policies in favor of voluntary measures, incentives, and market mechanisms. This change entails a major shift in stakeholder relations.

Under a command and control policy, the state determines the environmental goals and imposes fines, legal actions, or other penalties for non-compliance. Under a voluntary measure, however, the state must negotiate with polluters to assess what incentives the state must offer to modify polluters' behavior. If the cumulative value of these incentives do not match or exceed polluters' cost of compliance, the polluter will elect not to participate and the policy will be deemed a failure (Alberini and Segerson 2002). Voluntary policies thus offer polluters de-facto veto power in the policy process. Given this dynamic it is hardly surprising that Maxwell and Lyon (1999: 18) argue that US voluntary policies "reduce the power of the EPA in its relationship with the industries it regulates." Smart Growth policies similarly formalize the influence of growth interests in the environmental policy process.

The role of equity

Particularly in the context of planning, there has been an effort to extend the meaning of sustainability to include issues of social justice. In his influential piece on the topic, Campbell (1996) argues that along with environmental and economic goals, the concept of sustainable development also includes concerns for equity. Campbell illustrates the relationship between these three goals by presenting a triangular diagram with environmental protection, economic development, and equity at the vertices (figure 1.1). Each point within the triangle captures the relative weight of each objective in planners' practice with sustainability existing in the middle. Achieving sustainable solutions however is beset by tensions that arise between each set of objectives. In the diagram these conflicts are represented by the triangle's edges. The property conflict arises as developers clash with social justice advocates over appropriate land uses. The

resource conflict captures the discord between environmentalists and proponents of economic growth. Finally, the development conflict refers to potential inconsistencies between environmental and social justice goals. As the planner can never fully resolve these contradictions, sustainability lies beyond his or her reach. The value of sustainability as a discourse is therefore not in its ability to direct long term planning but in its capacity to inspire deliberation by making conflicts between each of the three Es explicit.

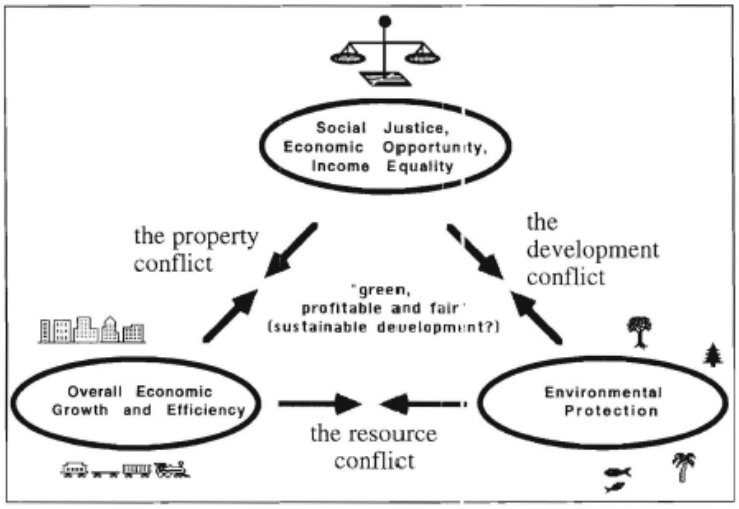

Figure 1.1 Sustainabilities three Es: envrionment,economy, and equity (Campbell 1996: 298)

Through their concept of *just sustainabilites*, Agyeman and Evans (2003) similarly inject equity and social justice concerns into sustainable development discourses. Contradicting Campbell's assertion that three elements of sustainability – equity, environment, and economy – are incompatible, Evans and Agyeman identify five key areas where environmental justice and sustainability intersect: land use planning, solid waste management, toxic chemical use, residential energy use, and transportation planning. They acknowledge, however, that balancing

the two concerns is the exception rather than the rule. While city governments may try to embrace sustainability or ameliorate existing environmental injustices, they rarely attack both problems at the same time. One reason that cities may be reluctant to address equity issues is that in order to do so they would need to question the goals of economic development and instigate "a paradigm shift away from our present market-driven, resource-intensive development" policies (Agyeman and Evans 2003: 39). Until these dramatic changes are made, achieving *just sustainabilities* may be beyond most cities' reach.

Marcuse (1998) is even more suspicious of urban sustainability initiatives. According to Marcuse, policy makers deploy sustainability discourses to mask conflicts inherent in the creation and enforcement of urban policy:

> It [sustainability] suggests all humanity has a similar interest in 'sustainable housing' or 'sustainable urban development'; that if we all simply recognized our common interests everything would be fine, we could end poverty, exploitation, segregation, inadequate housing, congestion, ugliness, abandonment and homelessness. Yet, in these areas, the idea of universal acceptance of meaningful goals is a chimera. Housing and urban development are conflict-laden arenas: what benefits one hurts another (Marcuse 1998: 104-105).

Because it promises universal benefits and obscures political tensions, Marcuse argues, a focus on sustainability results in less attention to issues of redistribution and equity (see also Gunder 2006). It's not clear, however, whether Marcuse's critique reflects politicians' current use of sustainability or stems from a more fundamental and deeply rooted relationships between economic growth, environmental protection, and equity.

Not all analysts, however, draw such dire conclusions. For example, Gibbs, Jonas, and While (2002: 125) claim that changes in local environmental governance open "new state spaces" which offer the potential for interests to counter dominant development practices. Desfor and Keil (2006) similarly argue that the rise of local-scale environmental governance has been accompanied by an increase in "subaltern environmental groups" including environmental justice activists. Kreuger and Agyeman (2005) also contest the assumption that sustainable development has had little impact on practices of urban planning by arguing that what constitutes "real and actual sustainabilities" often exist in health care, planning, and other domains of urban governance usually considered outside the domain of what is traditional sustainability policy. Collectively these works indicate that while urban sustainable development often reflects the interests of dominant political and economic interests, the rapid rise and embrace of sustainability and Smart Growth also presents the opportunity for historically marginalized populations to transform urban policy.

To date, however, there is almost no empirical evidence to support either claim. Saha (2009) divides the empirical research on urban sustainability into three categories: the emergence of sustainable development as a planning paradigm, case studies of sustainability innovators, and metrics for measuring local government adherence to sustainability principles. In each of the three cases, Saha argues, authors emphasize the ecological and environmental dimensions of urban sustainability while neglecting social equity concerns.

Where authors have examined the distributions of sustainability strategies, they have found that they often yield inequitable benefits. In a study of 25 English cities, Burton (2000: 1987) found

that poor and politically marginalized groups experienced "less domestic living space; lack of affordable housing; increased crime levels; and [surprisingly] lower levels of walking and cycling" in cities where urban sustainability initiatives that minimized sprawl by promoting higher densities in downtown areas. Gunder (2006: 216) argues that while Toronto's sustainability policies may have benefitted the city's wealthy creative class, they did little to benefit the city's working-poor who were forced to live in areas with "high-density environments of poor build quality, amenity, and service" and have little access to the city's new environmental amenities. New York City's approach to sustainability, however, differs substantially from these other contexts. If Toronto and Great Britain marginalize equity in the name of providing universally beneficial sustainability initiatives, New York City makes achieving environmental justice an explicit goal.

Sustainable Development in New York City

Where other world cities like London or Los Angeles issued sustainability plans in the 1990s, New York City did not seriously address environmental issues until after the election of mayor Michael Bloomberg in 2003. Since that time New York has reversed its position and has emerged as a widely recognized world leader in urban sustainable development. The City is now routinely at the top of the list of sustainable US cities (SustainLane 2008), and the mayor regularly appears with and garners praise from environmentally minded celebrities and politicians like the singers Bono and Bette Middler and former Vice President and Nobel Laureate Al Gore (Navarro 2009). In 2010, New York cemented its position as world urban sustainability leader when Bloomberg traveled to Copenhagen to represent New York City at the

global climate talks (Chen 2009). Perhaps the most significant action the Bloomberg administration took to establishing its sustainability credentials was the publication of its sustainability plan, *PlaNYC 2030*, which ICLEI (2010) described as "a breakthrough in sustainability planning," and "the gold standard for big-city sustainability plans".

PlaNYC starts by noting that since the 1970s the city's population has grown by nearly one million people. The plan then claims that barring major changes in immigration law or quality of life, this trend will continue with an additional 200,000 residents by 2010 and 1,000,000 by 2030. The plan is unabashedly pro-growth, arguing that by creating new jobs, expanding the tax base, and revitalizing distressed areas, this expansion will benefit all city residents. But in order to continue on this trajectory the city must do two things. First, it must update a decaying infrastructure and second it must protect the environment.

To achieve these goals PlaNYC identifes 127 initiatives divided between 10 policy areas (table 1.1). Consistent with Smart Growth's aversion to "command and control" policy instruments, most of the plan's recommendations rely upon voluntary measures, financial incentives, and market-based mechanisms. For example, to reduce traffic in lower Manhattan the plan argues that the city should create a disincentive for drivers to enter the area by charging them a fee. Similarly, the plan advocates for creating an incentive for the construction of middle class housing by allowing developers to violate a site's zoning designation if they designate a percentage of affordable units. Another feature PlaNYC shares with Smart Growth is an emphasis on efficiency. For example, the plan argues that the city can increase the supply of

energy without constructing new facilities if landlords and utility owners make their buildings more efficient.

PlaNYC's 10 Policy Areas

1. Housing
2. Open Space
3. Brownfields
4. Water Quality
5. Water Network
6. Congestion
7. Transportation Infrastructure
8. Energy
9. Air Quality
10. Climate Change

Figure 1.2 PlaNYC's 10 Policy Areas (Bloomberg 2008)

As is true of almost all New York City policies, in order for the city to enact the plan it had to garner the support of the city's growth machine. Logan and Molotch (1987) present growth machines as amalgams of interest that share an interest in growth promotion and real estate development. Although New York City's growth interests have always wielded tremendous influence, their political power has increased substantially since the financial crises of the 1970s. At that time, the decline of the city's manufacturing sector coupled with the roll-back of federal

programs and the out-migration of many wealthy and middle class city dwellers to the suburbs created significant shortfalls in the city budget. The city aggressively promoted real estate development in the hopes that increased property tax revenues and luring professionals and tourists to the city would ultimately fill its budgetary gaps. This meant enlisting the support of the small, medium, and large developers, brokers, landlords, construction unions, and civic groups. New York's growth machine, however, is not limited to locally bound actors but also includes the Real Estate Investment Trusts (REITs), multi-national developers, corporations, and retailers that control an increasing share of the city's property (Angotti 2008a). Although not always acting in perfect accord, members of the city's growth machine have used their combined political influence to promote policies that offer them generous subsidies while opposing laws that limit what, where, and how they build.

If New York City's approach to addressing environmental and economic objectives is typical of Smart Growth, its emphasis on equity is not. The plan makes few explicit references to "environmental justice" mentioning the term just once in its 158 pages. Nonetheless, the plan makes its commitment to the principles of environmental justice clear by claiming that "We have taken as a basic value that … a healthy environment is not a luxury good, but a fundamental right essential to creating a city that is fair, healthy, and sustainable" (The City of New York 2008: 10). Accordingly many of the plan's proposed measures explicitly aim to improve environmental quality in communities with poor, black, and Hispanic residents. For example, the plan prioritizes creating parks and planting trees in neighborhoods that have the highest concentrations of residents who suffer from obesity and respiratory illness. The plan's

commitment to environmental justice principles is also emphasized in the process of its creation. According to the authors the plan was the product a three month public outreach process. Similarly members from a number of stakeholder groups, including environmental justice activists, sat on the commission that wrote the report (although it is not clear how much influence they had) (New York City Environmental Justice Alliance 2011). Although the plan does not address environmental justice activists' most pressing concerns, like solid waste or truck traffic, they do represent at least an incipient effort on the part of the Bloomberg administration to reach out to the city's environmental justice community. As part of that effort, the administration has added former environmental justice activists to the staff of city agencies (New York City 2006).

The Bloomberg administration's tentative embrace of environmental justice may reflect its commitment to growth promotion more than its desire to improve the living conditions of the city's poor, black, and Hispanic residents. In the past, the city accommodated growth through the construction of new, often environmentally deleterious, facilities. Overwhelmingly the city located these projects in neighborhoods with predominantly poor, black, and Hispanic residents. For example, in 2000 new power plants were proposed for the South Bronx, Staten Island, Astoria in Queens, and Williamsburg and Sunset Park in Brooklyn. The world's largest sewage treatment plants were built in Williamsburg, Brooklyn, and Harlem. In 2001 the city also closed its largest landfill – Fresh Kills in Staten Island – re-routing its garbage through waste transfer stations in Greenpoint, Brooklyn and the South Bronx.

In response to all of these projects neighborhood residents raised cries of environmental justice, opposing the construction of new facilities in demonstrations, public hearings, and legal proceedings. In some instances the public uproar derailed a project. In others it caused substantial delays. In either case, environmental justice activism dampened growth by significantly increasing the time and cost of constructing new facilities (Sze 2007). Environmental justice activists also coalesced in opposition to other growth related issues. Many of the opponents to gentrification, for instance, expressed their concerns using the language of environmental justice (Angotti 2008a). By directly reaching out to the environmental justice community and emphasizing environmental concerns, the Bloomberg administration forged a crucial alliance with a group of citizens with a history of disrupting the city's growth initiatives.

Critics argue, however, that despite PlaNYC's claims of promoting equity and environmental justice, its policies may have the opposite effect. Much of the criticism about the plan revolves around its creation. Angotti (2008b) argues that the city designed the hundreds of public meetings, stakeholder forums, and focus group sessions to introduce the plan but not to elicit meaningful input. Instead, the plan's content came from private consultants – first former City Planning Commissioner Alex Garvin, then the firm McKinsey and Co – under contract with the city's Economic Development Corporation (EDC). The administration has further marginalized public input by exempting the plan from provisions in the city charter that mandate input and approval from the city's community boards. Given its origins, it is not surprising that the plan remains focused on development oriented issues. The plan dedicates exhaustive effort addressing energy efficiency, transportation efficiency, and global climate change (Angotti

2010). Although all three of these issues are important, none touches upon key equity concerns. Where the plan does address equity issues like access to public space or increasing the number of trees, it does so in a cursory fashion, while other equity concerns, like gentrification, are not discussed at all (Finn 2008). Taken together these absences indicate that despite the accolades, within PlaNYC the Bloomberg administration's commitment to environmental protection and equity take a back seat to its vigorous promotion of economic growth.

Conclusion

Sustainable development and its US variant, Smart Growth, offer city managers the possibility of growing the economy while protecting the environment. Scholarship on urban sustainability has also placed an emphasis on the need for urban sustainability strategies to embrace equity and environmental justice goals. Rather than balancing these concerns, in most cases local sustainability policies prioritize economic growth over environmental protection while almost never touching upon equity concerns. The literature on Smart Growth and Sustainable Development reflects these biases as there is almost no empirical research examining the environmental justice implications of Smart Growth and Sustainable Development policies. New York City's main sustainability initiative, plaNYC, promises to succeed where others have failed. In addition to expanding the economy and protecting the environment, the plan also hopes to promote environmental justice. As I argue in the next chapter, one key area that touches upon all three goals is the issue of brownfield development.

Chapter 2: New York State and New York City Brownfield Policies

Over the past 30 years, nearly every state, with the exception of North Dakota and South Dakota, and many municipalities have enacted brownfield policy of some sort (Bartsch and Deane 2002). Although late to the game, both New York City and New York State have followed suit with the State passing both the Brownfield Cleanup Program (BCP) and the Brownfield Opportunity Areas Program (BOA) in 2004 and the City launching several smaller initiatives following the publication of PlaNYC in 2007. Following the Smart Growth formula, policy makers argue that by promoting growth these initiatives yield environmental benefits. Further, because brownfields tend to cluster in areas with a high percentage of poor racial and ethnic minorities, brownfield development will also reverse environmental inequities. In this chapter I argue that the opposite may be true. Rather than addressing the problem, state and city brownfield policies may exacerbate existing environmental injustices at both the metropolitan and neighborhood scales.

Brownfields

The United States Environmental Protection Agency (US EPA 2009) defines a brownfield site as “a site, or portion thereof, that has actual or perceived contamination and an active potential for redevelopment or reuse." According to the USEPA (US EPA 2008) there are between 500,000 and 1,000,000 brownfields nationwide. Although frequently treated as a problem specific to the formerly industrialized cities of the US Midwest and Northeast, brownfields are

found in urban, suburban, and rural communities throughout the country. From large-scale manufacturing to gas stations, dry cleaners, military installations, extractive industry, and out-of-business big box retailers, brownfields include diverse past uses (Alberini et al. 2004). Despite this variability, brownfields are prevalent in urban areas (Mank 2000). In New York City, for example, there are an estimated 7,600 acres of brownfields accounting for slightly less than 10% of all developable land (The City of New York 2008).

Brownfields have always existed in a legal gray area. Historically, laws addressing on-site contamination have targeted the nation's most polluted sites. Passed by Congress in 1980, the most well known of these laws is the Comprehensive Environmental Reclamation Cleanup and Liability Act (CERCLA). Under CERCLA, the federal government identifies those sites that pose an immediate health danger and places them on a National Priority List (NPL). Today, there are 1,288 sites on the NPL (US EPA 2011a). Once a site is listed on the NPL, the federal government can commence a clean up of the property. To assure that the government does not foot the bill for these remedial efforts, the law enables the government to sue past property owners for current cleanup costs whether the past property owner knew about the contamination, caused the contamination in the first place, or their actions were legal at the time (Bartsch, Collaton and Pepper 1996, Geltman 2000, Meyer et al. 1995). CERCLA's liability provisions are not reserved for government agencies but extend to private property owners as well. In addition to the federal law, many state statutes - also known as "baby superfunds" - include similar liability provisions (Abrams 1997). In New York State the Inactive Hazardous Waste Disposal Site Remedial Program serves this purpose.

The idea behind superfund laws was that environmental liability laws would be a cost efficient way for property owners to clean their sites. In New York City, site cleanup guidelines are set by the City Environmental Quality Review (CEQR). These targets, in turn, mimic state level standards as listed in the State Environmental Quality Review Act (SEQRA) as well as various Technical and Administrative Guidances (TAGM) (NYC OEC 2011, NYS DEC 2011). As there is no way, however, for either state or city regulators to assure that these standards are met on each of the city's nearly one million tax lots, the city and the state need to provide property owners with incentives for compliance. The hope was that state and federal superfund environmental liability laws would fill this gap, as the risk of a future lawsuit would motivate property owners to clean their sites.

Many critics argue that the presence of environmental liability laws had the reverse impact. Rather than leading property owners to clean their sites, CERCLA's and state equivalents' liability provisions made many contaminated and potentially contaminated properties pariah investments (Collaton and Bartsch 1996, Deyle and Bretschneider 1995, Gardner 2001, Geltman 2000, Heberle and Wernstedt 2006, Keenan 2005, Meyer et al. 1995, Mueller 2005, Opper 2005, Stann and Airst 1999, Urban Institute et al. 1997). According to this critique, banks and other lenders, who could be held liable under the initial law, would not provide loans for potentially contaminated properties for fear that they would be party to a future lawsuits. Owners of potentially contaminated property, including city governments, would also be hesitant to sell for fear that they would have to foot the bill for an expensive cleanup. Future buyers were wary for

the same reason. Caught between unwilling purchasers, hesitant sellers, and uncooperative financiers, many of these properties lay dormant with their on-site contaminants unaddressed.

Development of these properties has become a priority for local, state, and federal government agencies for several reasons. On the most basic level, because they are unused, brownfields represent an opportunity cost in lost tax revenue and job creation for cash strapped municipalities (Bartsch et al. 1996, De Sousa 2005). At the same time, brownfield development has become a key tenet in smart growth strategies that aim to halt sprawl and new construction on previously undeveloped tracts, or greenfields, along the urban periphery (Geller 2003, Greenberg et al. 2001a, Opper 2005). At the more local level, brownfield cleanup and redevelopment can yield public health benefits by either remediating or containing toxic substances such as heavy metals, petroleum biproducts, benzene, lead, or arsenic that can contaminate nearby residents' air, water, or soil (Greenberg, Lee and Powers 1998, Litt and Burke 2002). Finally, because brownfields tend to cluster in areas with high poverty and unemployment rates, it is argued that "revitalization would particularly benefit low-income and minority residents who have suffered the consequences of living near blighted buildings and contaminated land" (Collaton and Bartsch 1996: 18).

Brownfield Policies

Driven by these potential benefits, Illinois and Minnesota passed the laws to promote brownfield development in the late 1980s. Since that time nearly every state has followed suit (Bartsch and Deane 2002). While these policies constitute a "grab bag of federal, state, and local incentives"

(Hersch and Wernstedt 2003: 1), Van Hook (2000) divides brownfield policies between first and second-tier approaches.

Although they differ between states, first-tier approaches generally follow a similar formula. Rather than mandating compliance through the threat of fines or other legal actions, enrollment in state brownfield programs is voluntary (Alberini and Segerson 2002, Eisen 1996, Mank 2000). Accordingly, these policies are frequently referred to as Voluntary Compliance Programs (VCPs). The process starts when a developer approaches the state. After an initial site assessment, state regulators determine whether or not it is necessary to remediate. State regulators will then compare the study results with publicly available state-wide tables that specify the concentration of chemicals posing a nominal health risk in the soil or groundwater (Mank 2000, Mills 2006, Newell and Connor 1996). If the site is not in compliance with these statewide targets, state regulators work with the property owner to establish clean-up targets and appropriate remedial methods.

Clean-up targets and methods will often differ depending on the site's future use (Mank 2000, Eisen 1996, Wernstedt, Hersh and Probst 1999). The clean-up targets for residential properties, for example, may be more stringent than those for industrial or commercial sites. The state may also allow the property owner to leave contaminants in place. Following one of the most common practices in brownfield development, the developer will remove the top eight feet of soil, replace it with clean fill and then cover the surface with a parking lot, building foundation, or other concrete slab. Another technique brownfield developers use is to remove the top eight feet of contaminated soil, lay down a textile lining, and then add clean fill. In order to assure that

future property owners are aware of the presence of contaminants, the use of these engineering controls is often coupled with the issuance of institutional controls such as deed restrictions. With proper maintenance these engineering controls can protect human and ecological health within the site's bounds by limiting exposure to contamination in the soil, groundwater, or surface water (Eisen 1996, Mills 2006, Newell and Connor 1996).

Because brownfield policies are voluntary, states must offer property owners incentives for compliance. In general, states design these incentives to offset three types of costs associated with developing contaminated property. First, although they vary depending on the type of contaminants, the scope of contamination, and the site's geological and hydrological characteristics, site cleanup and assessment costs can be substantial (Bartsch et al. 1996, Greenberg et al. 2001a). Many VCPs offset these costs by providing property owners grants and financial rewards once the property is in compliance with state environmental standards. Second, state and federal Superfund laws implement a "polluter pays" principal where both the state and current property owners can sue past property owners for all or part of current cleanup costs, regardless of whether the past property owner caused the contamination or it was legal at the time (Alberini et al. 2005, Bartsch et al. 1996, Collaton and Bartsch 1996, Geltman 2000, Meyer et al. 1995). In most cases, once a property owner cleans up a site through a VCP, the state will protect her from potentially expensive litigation and settlements, by exempting her from state, and in some cases federal, liability laws. Third, because state environmental agencies only have enough resources to investigate and oversee the cleanup of a relatively small number of sites at any given time, development of contaminated properties can suffer from long

administrative delays (McCarthy 2002). Many VCPs will reduce this bureaucratic overhead by guaranteeing response times and fast-tracking sites enrolled in the program.

While the vast majority of US brownfield policies adhere to this first-tier approach, there are a few isolated examples of states and localities implementing a second tier of brownfield policies. In contrast to first tier policy's targeting of individual properties and property owners, second-tier policies take an area-wide approach (Van Hook 2000). Through these policies, a locality usually defines the borders of areas that are affected by multiple brownfields and then develops a plan to coordinate development of these properties. These plans may reflect a wide range of objectives. Some brownfield plans, for example, may strive to make areas more marketable to prospective property owners by improving infrastructure, sewage treatment, schools, open space, or coordinating various incentives (Wolf 1998, Van Hook 2000, Wernstedt 2005). Alternatively, area-wide brownfield plans may seek to curb individual projects' negative externalities by coordinating land uses and increasing public participation (Eisen 1996, Meyer 1998, NEJAC 1996). While area-wide approaches are fairly common in Europe, they have not been widely embraced in the US (Meyer et al. 1995, Meyer 1998). In the rare instances that states and localities implement second-tier, or area-wide, policy, they usually do so in conjunction with first-tier, or site-specific, approaches. As is true in New York, the former often overshadow the latter.

New York State and New York City Brownfield Policies

Both New York State and New York City have been active in creating legislation to encourage the purchase and redevelopment of brownfield properties. In New York State these efforts include the Brownfield Cleanup Program (BCP) and the Brownfield Opportunities Area Program (BOA). Following the publication of PlaNYC, New York City has promoted brownfield development through the creation of the Office of Environmental Remediation (OER), the creation of the Local Brownfield Cleanup Program (LBCP), and several other smaller initiatives. Consistent with first tier approaches, all of these efforts focus on issues at the site, while generally ignoring the conditions around the site.

New York State Brownfield Cleanup Program

New York's first forays into brownfield policy started in 1994 with the state's Voluntary Compliance Program (NYS VCP). The NYS VCP was administered by the State's Department of Environmental Conservation (DEC) in conjunction with the New York State Department of Health (DOH). Excepting those sites already subject to state or environmental enforcement, sites listed on either the US EPA's National Priority List (NPL), or the State's list of Inactive Hazardous Waste Disposal Sites, all sites with known or suspected contamination were eligible to apply for the program. Consistent with first-tier approaches, DEC established clean-up standards based on the site's future use, and in exchange for compliance with these standards volunteers were rewarded with a "no further action" letter that protects them from future state, but not federal, actions (NYS DEC 2002). From the program's inception in 1994 until they

stopped accepting applicants in 2003, there were 440 properties accepted in the program statewide with 108 of these in New York City (NYS DEC 2008). Although moderately successful, the New York State Department of Environmental Conservation (NYS DEC) enforced the NYS VCP under administrative guidance and was not authorized in statute or regulation. As such, the liability waivers were not recognized by the State's Attorney General or any other state agency aside from NYS DEC (DiNapoli 2008).

In 2003, the state legislature formalized the brownfield program through the passage of the 2003 Brownfield/Superfund Law, which included provisions for the BCP. At the time there were great hopes for the law. Then Governor, George Pataki proclaimed that the "law is the greatest piece of economic and environmental legislation in decades" (NYS DEC 2004: 4) and that it would "be one of the most protective cleanup programs in the country" (CHEJ2007: 5). The Governor was not alone his praises for the new brownfield law. Representatives from the Natural Resource Defense Council (NRDC), the New York League of Conservation Voters, and the Citizens Campaign for the Environment all called the law a "significant victory" (Environmental New Service 2003). By 2008, however, the law was subject to criticism from across the political spectrum.

The criticisms fall into three general categories. First, the law's financial incentives were too generous. Under the BCP, property owners are eligible for tax credits from 10% to 22% of the costs associated with site preparation (i.e. testing for program application), groundwater remediation, and development. In addition to the above redevelopment credits, the property owner is also eligible for credits for 25% to 100% of the site's property taxes. Finally, the

property owner is eligible for tax credits in the amount of $30,000 or 50% of the costs of environmental insurance (DiNapoli 2008, CHEJ 2007, NYS DEC 2004).

Together these credits, created a huge liability for the state of New York. In a 2008 report State Comptroller Thomas DiNapoli, who was an adamant supporter of the law as a state assemblyman (Environmental New Service 2003), estimated that overall the state would incur a tax liability of $3.1 billion dollars, an average of $15.4 million per site, for all sites enrolled in the program (DiNapoli 2008). Almost 90% of these funds were designated for projects in either New York City or Long Island. According to DiNapoli (2008: 11), it is not clear that these lucrative incentives had any impact on development in many economically disadvantaged communities:

> The experience of Program constituents indicates that financial incentives are not the most important deciding factor in the success of a brownfields project. Local economic factors may play a more significant role. For example, one site cleaned up under the BCP has yet to be sold, despite the fact that the potential purchaser would be eligible for redevelopment tax credits. This reflects the fact that it may be difficult to develop economically viable projects, regardless of the incentives depending on the state of the local economy.

The second criticism of the BCP revolves around the application process. The 2008 DiNapoli report compared the number of programs in the BCP with enrollment in VCPs in neighboring states. Next to the 30,000 and 23,000 participants in Massachusetts's and New Jersey's programs, the 200 participants in New York State's program appear paltry. In part the lower enrollments can be attributed to tax incentives. Because each project in the program was accumulating such substantial tax incentives, the BCP could only afford to admit a small number

of participants. A second reason for the low enrollment, however, was the stringent eligibility criteria which excludes sites on historic land fill or that have contamination from surrounding sources (Bloomberg 2008, Center for Health Environment and Justice et al. 2007). Further, because each application demands thorough testing and evaluation, the upfront costs of applying to the program are so prohibitive as to exclude all but the largest projects (Bloomberg 2008).

The third criticism of the BCP had to do with the cleanup standards. Projects in the BCP could be cleaned to one of four set of standards, depending on the site's future use. In the first three of these standards, the state determines cleanup targets by referencing a state-wide table that lists safe concentrations of different toxins based on the site's future use (NYS DEC 2004). In many cases, however, the state's clean-up targets allow significantly higher concentrations of toxins than either previous laws or the laws in other states.

The majority of sites in the program, however, do not even comply with these lax standards. Instead, most properties in the BCP program comply with track 4 standards, which are the least stringent. Under track 4, the State only requires property owners to clean-up a site to the levels on neighboring sites, also known as background levels (Center for Health Environment and Justice et al. 2007). Because most properties are located in areas with high levels of pollution, background levels often exceed even the relaxed standards specified in state tables. Further, the state only requires that the property owner clean up a site based on the use of the building's first floor. This means that a property owner of a primarily residential building with a supermarket, or some other commercial first floor use, need only clean up the site to comply with commercial standards. The state does increase the incentives available to property owners that remediate

sites to track 1, or the more stringent standards, but the difference is not that substantial and the overwhelming majority of sites are only cleaned up to comply with the less stringent, or class 4, cleanup targets (Center for Health Environment and Justice et al. 2007).

In the Summer of 2008 the New York State legislature amended the BCP. The amended law importantly caps many of the tax credits, creating the potential to spread existing resources to multiple sites, but fails to address either the lax cleanup standards, restrictive admission guidelines, or failure to address the neighborhood scale factors that are often the most significant barrier to brownfield investment (Associated Press 2008). To add further insult to the existing law, in September 2008, the Federal Bureau of Investigation (FBI) revealed that Anthony Seminerio, a state representative from Queens, had accepted $25,000 from an undercover police officer posing as a brownfield developer. Among other things, in exchange for the payment, Seminerio introduced the undercover police officer to four Assembly members involved in brownfield development and the state's brownfield policy (Brown 2008b, Weiser and Hakim 2008). Although Seminero's offense does not indict the BCP as corrupt, it does indicate the potential for developers to leverage political connections in hopes of gaining favorable treatment under the program.

Despite these many setbacks, there were 65 BCP sites in New York City during the program's first four years from its creation in 2004. In some cases there are multiple sites for the same project. The Silvercup project in western Queens, for example, is divided into four different BCP sites, each of which is administered separately. Altogether the 65 sites in New York City are divided between 51 projects (NYS DEC 2008). Figure 2.1 shows the spatial distribution of

these projects in the city. In general, the projects cluster in four areas: the South Bronx, western Manhattan, the Gowanus, and Long Island City.

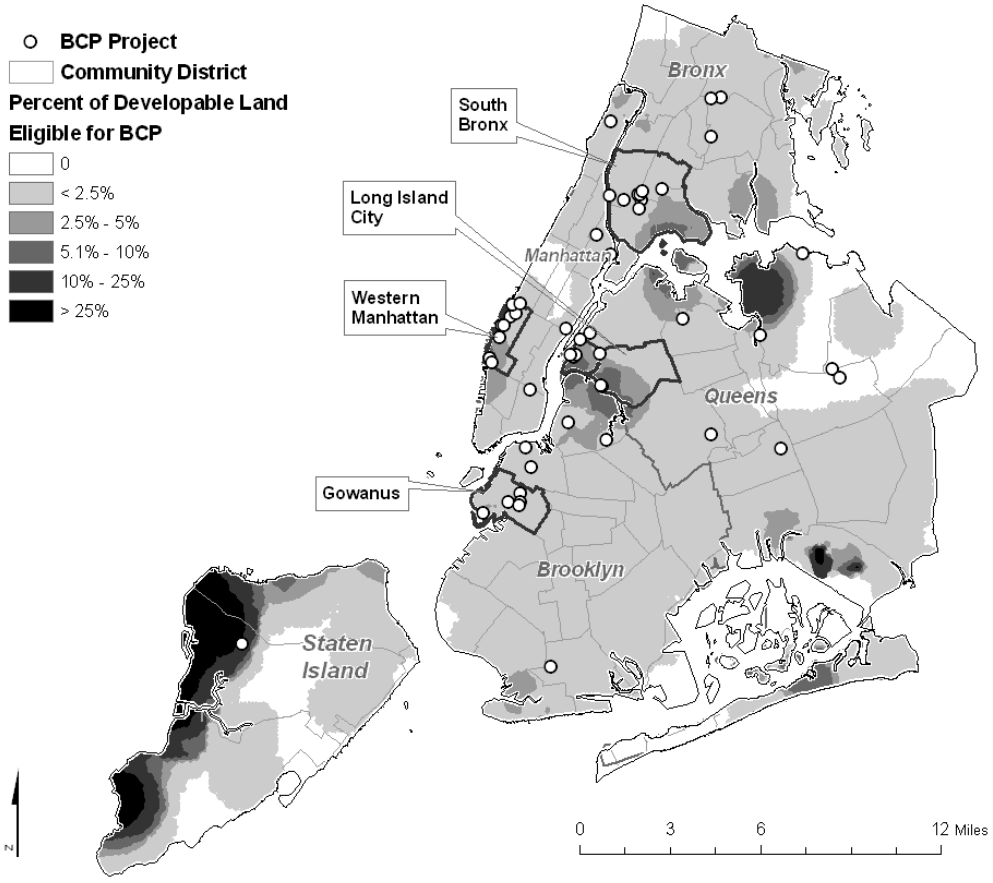

Figure 2.1 BCP Projects in New York City, 2004 – 2008

New York State Brownfield Opportunity Area Program

The New York State Legislature created The New York State Brownfield Opportunity Area (BOA) Program as part of the same legislation that created the BCP in 2004. The two programs were designed to be complementary - while the BCP dealt with conditions on the site, the BOA

program fostered a more comprehensive area-wide approach. According to the not-for-profit group, New Partners for Community Revitalization (NPCR 2007b:2):

> At its heart, the BOA program is about creating value. It recognizes that a brownfield program that is based on a "one-parcel-at-a-time" strategy will not result in the revitalization of distressed areas and will frequently invite dirty or stigmatizing uses such as garbage transfer stations. Instead, the BOA approach can reverse the cycle of disinvestment and decay – not by cleaning up one parcel at a time, but by creating a plan for an entire area, including housing, shops, small manufacturing, public amenities, and infrastructure improvements: street lights, trees, parks, sidewalks and roadways. These are the things that together define functional communities and livable neighborhoods that allow current residents to remain and also attract new residents.

The BOA program provides two mechanisms to accomplish this goal. First, the program provides funding for community planning initiatives. Community groups can use this money to fund studies to identify brownfields within a geographically bounded brownfield opportunity area, develop a community-wide brownfield plan for that area, and conduct marketing and feasibility studies for developing those properties. Second, the BOA program includes tools to realize this vision by offering incentives, like greater access to funding and other state resources, for projects that are consistent with these plans. Under the BOA program, the state may also provide funding to assess the extent of contamination for sites identified in the community plan (NYS DOS 2006, NPCR 2007b).

The BOA program, however, has had minimum impact. Compared with the BCP, funding for the BOA is sparse. According to the NYS DOS website, the state has committed to approximately $7.4 million to fund 51 grants, 10 of which are in New York City (NYS DOS 2009). Statewide, the largest BOA grant provides funding for a $600,000 study in South

Buffalo. While these funds are certainly helpful, the total commitments are less than half the $15 million benefits awarded to the average single site enrolled in the BCP program. Even these small totals have been difficult to come by. Until the law was amended in the summer of 2008, the state did not fund any of the grants it had accepted into the program (NPCR 2007b). Equally problematic is that there are no means to enforce any of the plans or guidances developed through the BOA process. While the BCP does increase potential benefits for projects located in BOA areas and potentially increase a community's capacity to address brownfields issues, there are no requirements that these projects are consistent with the community's plan. In the best case scenario, after conducting a series of investigations and producing several reports, a community might be eligible to recoup some of the costs for investigating the environmental conditions at a small handful of sites.

New York City's Brownfield Policies

Prior to the publication of PlaNYC 2030, brownfield development was not a priority for New York City government. More recently, however, this has changed as the Bloomberg Administration commits significant human, political, and financial capital to promote its brownfield initiatives. In addition to the usual reasons for brownfield programs – protection of human and ecological health, reduced sprawl, and increased tax revenues – the city, as argued in PlaNYC, also promotes brownfield development as a way to create room for the city's projected growth: "One thing is clear: if we are to accommodate our need for housing, jobs, and open space, the challenge of cleaning up our brownfields cannot be ignored." Though the report is

unequivocal in the need for brownfield development, it is highly disparaging of the state's proposals to promote it.

PlaNYC's critique of the state's brownfield policy rests upon four basic arguments. First, that the current state programs, particularly the BCP, require property owners to thoroughly test sites before enrolling in the program. These tests take too long and require too much expenditure prior to development. Second, the BCP excludes many brownfields by not accepting sites with contaminants like urban fill that are common in NYC. Third, because the BCP covers development and remediation costs, a few large projects consume the bulk of the funding that the state would otherwise distribute among many smaller projects. Fourth, by not funding BOA or enforcing the resultant community plans, the state does not adequately assure that brownfield development is consistent with community needs.

Since PlaNYCs publication the city has taken several steps to correct these problems. Mayor Bloomberg and other elected officials have aggressively lobbied for changes in the funding and requirements in the BCP and for the state to release funds for the BOA program. In addition, the City has consolidated management of its various brownfield laws and programs under the newly created the Office of Environmental Remediation (OER) (Brown 2008a). OER serves as a one-stop-shop for brownfield development, coordinating actions between city agencies, developers, and environmental engineers. Consistent with the Bloomberg administration's approach to environmental justice, OER has aggressively promoted brownfield development in the city's poor, black, and Hispanic communities by offering seminars, public hearings, and other outreach events, as well as through the creation of several smaller initiatives including the New York

Brownfield Incentive Grant Program (NYC BIG)(Rules of the City of New York 2008). Perhaps OER's most ambitious project will be to oversee the city's own voluntary compliance program – the Local Brownfield Cleanup Program (LBCP). Like VCPs elsewhere, the LBCP will offer property owners incentives for compliance with state and city environmental statutes. These incentives could include additional city tax breaks, liability relief (although the city has not coordinated these efforts with either state or federal regulators), and Green Property Certification (The City of New York 2010).

The City and State's brownfield programs contrast in several important ways. While the state's policies generally favor larger projects in areas with stronger real estate markets, city policies target smaller projects in poor areas. Further, the city's initiatives place a much stronger emphasis on the role of community based organizations and developers. In other ways, however, state and city policies have much in common. By challenging the BCP's incentives and admission requirements while retaining support for its fundamental structure, the City criticizes the type of properties enrolled in the program but not its site-specific focus. Further, both the city's advocacy of the BOA program and its own small grant program lends financial support to the creation of area-wide plans but do not increase their capacity to enforce them. This is not to minimize the real differences between the city and state's approach to brownfield development or to question the city's commitment to promoting brownfield development in many poorer communities rather to argue that although the city often invokes discourses of area-wide development, like the state, it does little to support these claims. Instead both the city and state continue to promote brownfield development by addressing issues within the property's bounds.

There is increasing evidence, however, that the site-specific issues that city and state policies address have far less influence on developer's decisions than conditions in the surrounding areas.

The Brownfield Paradox

While the city and state continue to attack the costs and risks associated with developing contaminated sites, for many brownfield developers area-wide issues pose a much greater impediment to brownfield development than site-specific issues alone. In a survey conducted by the United States Conference of Mayors (2006), over 40% of the respondents identify market conditions as one of the most significant barriers that cities face in redeveloping brownfield properties. Similarly, a recent study of 36 private development firms identified neighborhood factors such as site location and access to a skilled labor force as more important in making development decisions than environmental liabilities (as cited in Alberini et al. 2004). Although the costs and uncertainties associated with developing contaminated sites clearly impact investors' decisions (VanLandingham and Meyer 2002, Greenberg et al. 2001a, Alberini et al. 2005), in most cases, strong market conditions will mitigate these deterrents, while weak market conditions will exacerbate them (Jackson 2005b). In short, as Alberini et al (2004:9) argue, "basic real estate fundamentals often pose more significant obstacles to redevelopment of any previously used urban land than does contamination."

Area-wide issues become even more important as once substantial site-specific costs decrease. As brownfield development becomes more common, remedial technologies continue to improve (Reddy et al. 1999, Mulligan, Yong and Gibbs 2001). For example, the Council for Urban

Economic Development (1999) profiled 107 development projects, both failed and successful, and found that clean-up costs averaged only 8% of total development costs. Liability issues are also not as imposing as they once were. Through the passage of the 2002 Small Business Liability Relief and Brownfield Development Act in conjunction with several court decisions, it is now clear that the US government has no intention of prosecuting cases on smaller less contaminated sites (Abrams 1997, Keenan 2005, McMorrow 2004). Further, legal decisions exempt property owners from liability claims provided they executed "all reasonable inquiries" at the time of purchase. In the past, however, "all reasonable inquiries" has been poorly defined, and these clauses have been difficult to enforce. Recent rulings at both the state and federal level, however, clarify acceptable practices and solidify property owners' defense against future liability claims.

A *brownfield paradox* thus arises: despite the strong influence of neighborhood level factors on the redevelopment of contaminated properties, as is true in New York State and New York City, the vast majority of brownfield policies do little to address them. Instead, these policies aim to offset development costs related to on-site contamination by offering property owners financial incentives, liability relief, and faster turnaround times. The property-by-property approach employed in the US stands in stark contrast with Europe where brownfield development is often part of a much more comprehensive land use strategy. Under these area-wide policies, clean-up standards and the future use of the property are determined by the conditions and uses of the surrounding site. Further, rather than offsetting site-specific development costs, European policies tend to encourage brownfield development by increasing open-space, improving

infrastructure, and otherwise improving the areas around the site (Meyer et al. 1995, Meyer 1998).

Explaining the Brownfield Paradox

There are two explanations for the lack of area-wide policy in the US. First, Meyer et al (1995) argue that the difference is largely cultural. Countries like Germany, Italy, and the Netherlands, who have all implemented comprehensive area-wide strategies; however, in both the US and the UK, there is a far greater emphasis on individualism and market processes coupled with a rejection of corporatist solutions and government intervention. Second, Meyer and Reaves (1998) claim that the difference in policy reflects different spatial dynamics. As compared to the United States, European countries tend to have far higher population densities, a lack of open space, and limited amounts of readily available land that can be developed. As such, European countries have a greater need to preserve green space by developing formerly used sites. In New York City, at least, a third possible explanation for the emphasis on site-specific, rather than area-wide policies, may relate to the real estate lobby's aversion to comprehensive planning.

In order to address area-wide issues, the state and the city would have to enforce a plan that coordinates land uses, transportation, and infrastructure with other services like police, fire, and schools. In Oregon, for example, a prospective project must provide "a substantial public benefit" to be accepted into the state's brownfield program. In order to assess this benefit the state consults with "affected land use planning jurisdictions and considers reasonably anticipated future land uses at the facility and surrounding properties … to determine whether the

purchaser's proposed use is consistent with land use plans for the area" (Oregon Department of Envrionemtnal Quality 1997 as cited in Meyer 1998: 6). New Jersey's Brownfield Development Area (NJBDA) program similarly coordinates the development of several brownfield sites. The program starts when a steering committee, comprised of representatives from local stakeholder groups, submits an application identifying a brownfield cluster. While not identifying specific projects, the application must "articulate a meaningful and realistic vision for where the community would like to be at the end of the [development] process." Once accepted into the program, a case manager works with the steering committee, property owners, and state and local agencies to make that vision a reality (Van Hook et al. 2004).

In New York City pro-growth interests have historically opposed this sort of comprehensive planning. The opposition to comprehensive planning is in part driven by developers' desire for flexibility. Because it specifies what a developer can build and where, a comprehensive plan may inhibit a developer's capacity to convert a site to its profit-maximizing, or "highest and best" use. In addition to restricting a developer's options, comprehensive planning can also add another layer of regulation to an already complex development process, resulting in increased delays and turnaround time. Finally, in order for any comprehensive plan to gain legitimacy it must reflect the input of a wide-range of interests including community groups, homeless advocates, and other populations traditionally left out of land-use decisions (Berg 2007).

Given these constraints, it is not surprising that the City's growth machine has undermined any attempt the City has made to develop or implement a master plan. In the one instance where a plan was authored, the real estate lobby used its political influence to assure that it was not

ratified. Although rejected at the scale of the city, comprehensive planning has garnered more support when targeting specific neighborhoods (Angotti 2008a). For example, in 1989 the City charter was amended to make it easier for neighborhood groups to create comprehensive neighborhood plans. Since that time, residents, business owners, and other stakeholders have contributed to create over 12 of these 197a plans (NYC DCP 2011) . In most cases, however, the city elects not to enforce them and the plans have little impact (Angotti 2008a, Berg 2007).

In the absence of any comprehensive planning at either the neighborhood or city scales, the city relies upon zoning laws to coordinate land uses. First implemented in 1916, the City re-wrote the zoning ordinance in 1961 and amended it several times since. The zoning ordinance divides the City into zoning districts. As of 2009, there are 3,219 zoning districts in the city that range in size from a 1,550 sq ft district in Bayside, Queens to a 5.5 sq mile district in central Brooklyn (NYC DCP 2009). Each of these districts is categorized into one of three basic types - residential, commercial, or manufacturing – which specify the height, bulk, and density (among other factors) for each structure as specified in the City's multi-volume and complex zoning code (Berg 2007). While it can never be a substitute for comprehensive planning, the city can theoretically use the zoning code to coordinate land uses. Even these rather unambitious goals, however, appear beyond the city's reach.

More often than not the city's zoning ordinance reflects rather than constrains developers' ambitions. Because DOB will only investigate zoning code violations if someone files a complaint, the City has a great deal of flexibility about where and how it enforces land-use regulations. For example, in the 1970s, developers were increasingly seeking to build housing in

the SoHo neighborhood in lower Manhattan even though the area was zoned for manufacturing use. Rather than re-zoning the entire neighborhood or enforcing existing zoning codes, the City and the DOB looked the other way and allowed owners to convert their properties to more profitable residential uses (Berg 2007, Johnson 1996, Zukin 1982). DOB's reluctance to enforce zoning codes in SoHo is consistent with the way that the City's planning agencies and commissions defer to the market. As former City Planning Commission chairman Richard Schaffer states "Whenever you have a disjunction between what zoning allows and what the market pressures dictate, you have a lot of creativity … Sometimes my legal staff knew enough not to talk to me about it so I wouldn't know" (Johnson 1996). When a site's zoning designation clearly conflicts with a developer's intended use of the property, zoning variances are not difficult to obtain.

The real estate lobby's strong aversion to comprehensive planning carries with it several negative consequences without district or city-wide planning. Wolf-Powers (2005), for example, argues that lack of planning led to the decline of the city's manufacturing sector by enabling land use change in the city's industrial districts. Examining development practices in the late 1980s, Fainstein (1991) claims that the absence of comprehensive planning resulted in a "postmodern vista of checkerboard development, unmatching, architecture, uncontrolled congestion, and sharp juxtaposition of the rich and poor." Angotti (2008a) similarly contends that the absence of a comprehensive plan may adversely impact residents' quality of life and undermine long-term growth. In the case of brownfield development, one other consequence may be to exacerbate existing environmental injustices.

Brownfields and Environmental Justice

In many ways, site-specific policies have been very successful. Between 1996 and 2006 nearly 50,000 sites have enrolled in state brownfield programs with a total investment of over $700 billion (Paull 2008). Once a "pariah" investment, brownfield redevelopment is now a $3 billion cottage industry of developers, financiers, lawyers, and architects (Mueller 2005). While still not routine, brownfield redevelopment is now a much less labor and time intensive process than it was 30 years ago (Heberle and Wernstedt 2006). As critics argue, however, these successes are highly uneven. Rather than benefitting poor racial and ethnic minorities, through their site-specific focus, these policies exacerbate existing environmental injustices at both the regional and neighborhood scales.

At the regional scale, site-specific policies may lead to the redevelopment and remediation of some contaminated sites but not others. While the combination of liability protection, tax credits, and faster turnaround times may spur brownfield development in areas with higher property values where area-wide conditions tend not to be a concern, site-specific strategies are less likely to produce results in neighborhoods with lower property values where crime, infrastructure, housing, access to transportation and schools are often a problem. Because a neighborhood's property values tend to correlate with the income, race, and ethnicity of its residents, site-specifc policies may encourage brownfield development and remediation in areas with wealthy and white residents while having little impact in the places where poor people, blacks, and Hispanics live (Frickel and Elliott 2008, Davies 1999, Leigh 2000).

Site-specific policies may also exacerbate environmental injustices at the regional scale by creating two sets of environmental laws. As mentioned earlier, in site-specific policies, regulators determine clean-up standards based on a site's future use. These future uses and clean-up standards, however, may differ substantially between areas with higher property values and more affluent residents and areas with lower property values and less affluent residents. In areas with higher property values, owners are likely to use their sites for more capital intensive projects like housing or the construction of office space. These projects often require the most stringent cleanups. By contrast, in areas with lower property values landholders are likely to use brownfields for industrial purposes, big-box stores, or warehousing. As these projects require the least stringent cleanups, two sets of standards emerge: one for areas with higher land values where the residents tend to be white and affluent and a less stringent set of standards for areas with lower land values where the residents tend to be poor racial and ethnic minorities (Mank 2000, Holifield 2001, Eisen 1996).

Even if brownfield policies do facilitate investment in poor, black, or Hispanic communities, there is no guarantee that those developments will benefit the surrounding areas. One way site-specific policies can exacerbate environmental injustices at the scale of the neighborhood is by encouraging brownfield conversion to uses that are incommensurate with surrounding properties and land uses (McCarthy 2002, Heberle and Wernstedt 2006, Van Hook 2000). New projects, for example, may increase property values, contribute to on-going gentrification of an area, and ultimately lead to the displacement of nearby residents (Essoka 2003, NEJAC 1996). Gentrification, however, is just one of many possible negative externalities brownfield projects

can produce. Many projects convert formerly industrial sites for residential use. By increasing the number of people living in the neighborhood these projects may place a strain on existing services like post offices, libraries, health care, or public transportation. Further, although brownfield development may protect environmental and ecological health on the site, by the increase in truck traffic, emissions, or noise, new projects may also exacerbate environmental concerns in surrounding areas (Heberle and Wernstedt 2006).

Many commentators argue that one way to better assure that brownfield development benefits the surrounding community is by providing the nearby residents a voice in the project's design (Ellerbusch 2006, Davies 1999, Byrne 1999). Accordingly many brownfield laws incorporate some form of public participation measure. As Eisen (1996: 107) notes, however, public participation can validate but not significantly alter future projects:

> When a community first becomes involved in a brownfield redevelopment project, three critical decisions will already have been made: the decision to develop the site, the proposed use of the site, and the proposed cleanup standard.

For example, in New York State the BCP mandates several measures to include the public, including a publicly accessible document repository and public hearings, yet does not require the property owner, the state, or the municipality to respond to any concerns that citizens may raise in this process (NYS DEC 2004).

Empirical Research on the Environmental Justice Impacts of State and Local Brownfield Policies

Despite the clear theoretical case that site-specific policies exacerbate environmental justice claims, there is little empirical evidence to support these claims. Although there is a great deal of research on brownfields in general, due to their recent implementation, there is not a great deal of empirical research on state brownfield policies. Several studies, for example, measure the impact of contamination on property development outside the scope of specific policies (Litt and Burke 2002, Frickel and Elliott 2008, Jackson 2005b, Longo and Alberini 2006, Simons and Sementelli 1997, Page and Rabinowitz 1993). Some of this research focuses on environmental justice. Davies (1999), for instance, surveys community groups directly impacted by three brownfield projects in Michigan and finds that those groups that were most directly involved in the decision making process were most satisfied with the outcome. Essoka (2003) tests the relationship between brownfield development and gentrification by assessing the social and demographic characteristics of populations living in areas surrounding sites enrolled in the US EPA's Brownfield Pilot Program both before and after property development. He identifies significant changes and concludes that the projects are part of a broader gentrification process.

The research that does exist on state and local policies can be divided into two groups. First are case studies that document brownfield development successes at individual properties with the intent of identifying best practices for brownfield development (Bartsch et al. 1996, Pepper 1997, Page and Rabinowitz 1994). Second are systematic studies documenting the size, and past, present, and future uses of properties enrolled in Cook County, Illinois (Winson-Geidman et al.

2004), New York State (Page and Berger 2005), and Milwaukee, Wisconsin (De Sousa 2005). In either case, and like the policies themselves, most of the existing empirical research on state policies emphasizes site characteristics while playing down area-wide concerns (Heberle and Wernstedt 2006, Meyer 1998, Eisen 2007).

In one study that does examine the area-wide impacts of state brownfield policies, Gardener (2001) compares brownfield development in four distressed New Jersey cities under the State's Brownfield and Contaminated Site Remediation Act (BCSRA). She finds that while the program "has a positive impact on commercial and economic development projects in large sites in well-located towns," it has had a "negligible impact on neighborhood revitalization in poor cities" (Gardner, 2001:4). She argues that these uneven effects are, in large part, due to the differences in capacity between cities. Because wealthier cities have the human resources to market their brownfield sites and shepherd developers through the program, they are in a better position to encourage development.

Conclusion

Over the last 6 years, New York State and New York City have promoted brownfield development through the passage of the BCP and BOA, the formation of the OER, the creation of the LBCP, and several other smaller initiatives. Consistent with the promises of Smart Growth, these policies use incentives, voluntary enrollment, and market-mechanisms to promote development with environmental benefits. In addition to this focus on economics and the environment, state and city brownfield policies also promise to address equity. In this chapter, I

have argued that the spatial orientation of the state and city policy's undermines this three-part goal. Although area-wide concerns may present the most significant barrier to brownfield development, the city's real estate lobby has long resisted any initiative that addresses them for fear that the policies would limit what, where, and how developers build. As a consequence the city and state have pursued strategies designed to promote brownfield development by offering property owners liability protection, tax credits, and faster turnaround times. Critics argue that rather than addressing environmental justice issues, this site-specific approach may have little impact on the environmental conditions in the neighborhoods where poor ethnic and racial minorities live and, in some cases, worsen them.

Testing this hypothesis, however, is complicated by methodological concerns. Many of the methods that policy makers and scholars use to test for environmental justice are inconsistent with the way that academics and activists define and measure the problem. In the next chapter I propose a method of environmental justice policy analysis that addresses these inconsistencies.

Chapter 3: Methods

In the two preceding chapters I argue that there is a clear need to examine the environmental justice implications of urban sustainability initiatives, in general, and brownfield policies, in particular. Yet what it means to evaluate a policy through the lens of environmental justice is not altogether evident. This gap is in part filled by a wealth of academic studies examining the distributive impacts of public policies. Government agencies have also developed methods for assessing a policy's environmental justice implications in order to comply with federal, state, and local laws. Government and academic methods of environmental justice policy analysis, however, are susceptible to both methodological and theoretical critique.

In this chapter, I address shortcomings in these methods by proposing a mixed methods approach to environmental justice policy analysis of brownfield policies. Following a multi-level design, the proposed method examines environmental justice issues at a range of spatial scales. At the urban scale, I use quantitative methods to ask whether New York State's Brownfield Cleanup Program (BCP) combats environmental injustice by promoting development of contaminated properties in areas with predominantly non-white and poor residents. At the neighborhood scale, I use a case study methodology to examine whether brownfield development improves environmental conditions in areas around redeveloped sites.

Environmental Justice

Environmental injustices occur when racial and ethnic minorities and the poor suffer from greater exposure to environmental risks, less access to environmental amenities, and less

influence in the environmental decision making process than their white, affluent, and politically connected contemporaries. Although scholars trace the environmental justice movement back to protests against the siting of toxic waste dumps in the 1980s (Cole and Foster 2001, Bullard and Johnson 2000, Foreman 1998), concerns about environmental conditions in poor and working class neighborhoods extend back to the19th century. In the Condition of the Working Class in England, for example, Engels laments that in London "the harmful influence of an abnormal atmosphere in the working-people's quarters, where, as we have seen, everything combines to poison the air" (Engels and McLellan 1993). At the turn of the century Jane Adams, Alice Hamilton, Ellen Swallow, and other urban reformers targeted similar conditions in US cities by promoting enforcement of health, sanitation, and housing codes. The language of race and class was also present throughout the early modern environmental movement. Activists mobilizing around the discovery of toxic wastes in Love Canal, NY, for example, in part solicited support by invoking the class identities of the affected population (Harvey 1996). The landmark case, Been vs Southwestern Management Corp, similarly mobilized the language of racial discrimination (Melosi 2000a).

What differentiates the current environmental justice movement from these past activisms is its scope. In the past, protests against environmental conditions in poor and minority communities have often been disjointed and disconnected. By identifying a common connection between these localized conflicts, environmental justice activists sought to unify disparate struggles and combat the issue at broader geographic scales. The first efforts to create a national movement to combat environmental injustice occurred in 1983 when protestors challenged the citing of a PCB

plant in Warren County, North Carolina (Bullard and Johnson 2000, Bullard et al. 2007, Cole and Foster 2001). Since that time, literally thousands of protests have erupted as residents challenge the construction and expansion of facilities that degrade the air they breathe, the water they drink, and the soil in which they grow their crops (Cole and Foster 2001). In 1991 many of these groups met in Washington, DC for the First National People of Color Environmental Leadership Summit. One outcome of that meeting was the publication of the "Principles of Environmental Justice," which outlines a range of issues and problems that connect often diverse and diffuse struggles (First National People of Color Environmental Leadership Summit 1991). By 2000 the People of Color Environmental Groups Directory included listings for over 400 groups in 45 states, the District of Columbia, and Puerto Rico (Bullard 2000).

Along with the convergence of grassroots interests, the environmental justice movement has been supported by academic research that has provided empirical evidence to support activist's circumstantial and place-specific claims. In 1984 the Government Accounting Office issued a report entitled *Siting of Hazardous Landfills and Their Correlation With Racial and Economic Status of Surrounding Communities* (US GAO1983). In that study, the GAO found that three out of the four off-site hazardous waste landfills in EPA Region 4 were in communities where residents where predominantly black and poor. In 1987 the United Church of Christ issued their groundbreaking report *Toxic Wastes and Race in the United States* which similarly argued that areas with predominantly black and poor residents hosted more than their fair share of waste facilities (United Church of Christ 1987). Over the next 20 years, researchers have published literally hundreds of studies conducted in multiple locations and scales and using a range of

environmental hazards and amenities that test the hypothesis that racial minorities, ethnic minorities, the poor, and other politically and socially marginalized suffer greater exposure to environmental hazards and less access to environmental amenities than do white, affluent, and politically connected contemporaries (Bowen 2001).

In addition to these outcome studies are process studies that attempt to identify the factors and forces that lead to inequitable outcomes. At first these studies focused on whether environmental hazards preceded the migration of poor and minority residents into these neighborhoods, or if poor and minority residents were drawn to areas where hazardous facilities already existed (Been 1994, Been and Gupta 1997, Yandle and Burton 1996). Later research expanded the question, examining such diverse forces as the dynamics of capital accumulation (Lake 1996, Harvey 1996), racism (Kurtz 2009, Pulido 1996, Pulido 2000), and globalization (Pellow 2007, Faber and Mccarthy 2003). Still others examined the role of public policies including zoning and land use planning (Maantay 2002b, Arnold 1998, Rabin 1989, NAPA 2003), energy policy (Sze 2007), food policy (Williams 2005, Gottlieb 2001), solid waste policy (Debbané and Keil 2004, Pastor et al. 2001, Lake and Disch 1992, Pellow 2002), transportation policy (Bullard and Johnson 1997, Feitelson 2002, Lin et al. 2002), permit trading (Chinn 1999, Corburn 2001, Tietenberg 1995, Solomon 1999), and environmental policy enforcement (Lavelle and Coyle 1992, Viscusi and Hamilton 1999, Hird 1994, Holifield 2004).

At the same time as scholars were examining the role of government policies in environmental injustice formation, federal, state, and local governments issued directives designed to assure that their actions did not have disproportionately negative impacts on poor and minority groups.

Perhaps the most well known government action was Executive Order 12,898 issued in 1994 by then President Clinton (Bass 1998, Abraham 1997, Foreman 1998, Bullard and Johnson 2000). Amongst other things, the order specified that all executive branch agencies "make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories" (Clinton 1994).

At the state and municipal level, government agencies have implemented similar initiatives. A 2003 report published by the American Bar Association identifies environmental justice initiatives in over 30 states (Bonnoris 2004). In New York State, the Department of Environmental Conservation (DEC) considers environmental justice concerns in environmental permitting decisions (NYS DEC 2003). There are also many environmental justice initiatives at the municipal level. New York City's Fair Share law, for instance, requires the city to consider the existing distribution of city facilities when siting a new one, with an eye towards assuring that no community is host to more than its fair share of hazards (Giulliani 1998). Despite this flurry of research and policy initiatives, the methods used in this research can be subject to both methodological and theoretical critique.

Environmental Justice Policy Analysis

Studies that analyze policies' role in creating environmental injustices generally follow a two-step process. First, they characterize the exposed or "at-risk" population. The two most

common methods analysts use to identify at-risk populations are *containment* and *proximity*. Under a *containment* method, all residents of a county, zip code, census tract, county, or some other geographic aggregation that contains a hazard are considered at risk. Under a *proximity* method anyone who lives within a fixed distance of a hazard is considered at risk.

Most analysts execute *proximity* analyses by first creating a series of circles (or buffers) with a radius equal to the at-risk distance and centered on the hazard and then identifying census tracts, census block groups, or some other geographic aggregate that either intersect with or are contained by the buffers. In some instances buffers may assume a non-circular shape to characterize any anisotropic effects. Chakraborty and Armstrong (1997), for example, uses plume analysis to capture the effects of wind speed and direction on the dispersion of toxic emissions. In other instances, authors approximate exposure by giving those populations closest to the hazard the greatest weight (Cutter, Hodgson and Dow 2001) .

One of the challenges with proximity analyses is that most socio-economic data that analysts use are published by block, block-group, tract, or some other coarse geographic aggregate. In all likelihood there will be some geographic aggregates that intersect with the buffer so that part of the aggregate unit is within the specified distance of the hazard but part is farther away. When this happens, analysts have several options for determining the at-risk population. They may, for example consider all those populations living in geographic aggregates that intersect with buffer (figure 3.1a), all those that have a geographic centroid within the buffer (figure 3.1b), or all those that are contained by the buffer as at-risk (figure 3.1c). Another option is to consider all of the population living within aggregates that fall entirely within the buffer as at-risk, but only

consider part of the population of aggregates that intersect with, but are not contained by, the buffer as at-risk (Mennis 2002, Maantay, Maroko and Herrmann 2007). Methods of areal interpolation (Flowerdew and Green 1992, Goodchild, Anselin and Deichmann 1993), for instance, would determine the at-risk population by multiplying the aggregate's total population by the proportion of the aggregate's area that is within the specified distance to the hazard.

(a) *(b)* *(c)*

Figure 3.1Methods for determining at-risk population including polygon intersection (a), centroid containment (b), or polygon containment (c).

Once the analyst identifies the at-risk population, the second step in the analytic process is to compare characteristics of that population with some baseline population. In some cases this may be a simple comparison. Maantay (2002a), for instance, compares the percentage of non-white and poor residents in areas re-zoned for industrial use to citywide averages. Harner et al (2002) similarly advocate for creating odds ratios. Others rely on statistical methods like Cramers V (Yandle and Burton 1996), multiple regression (Mohai and Bryant 1992), t-tests (Cutter, Holm and Clark 1996), and analysis of variance (Bowen et al. 1995).

Critiques of Environmental Justice Policy Analysis

Methodological Critique of Disproportionate Impact Research

The methodological critiques of prevailing practice of environmental justice policy analysis all revolve around the issue of accuracy. Within these critiques analysts can better capture a policy's disproportionate impacts by more accurately identifying at-risk populations while using more robust methods to compare the characteristics of those that are at-risk against the characteristics of the baseline population.

In general, scholars consider *proximity* to be a much better method for identifying an at-risk population than *containment*. The most significant problem with the containment method is that aggregate borders rarely reflect impacted populations. For example, the US Post Office defines Zip Codes to optimize mail delivery. Similarly, the Census Bureau defines census tracts to facilitate data collection. Although some scholars argue that certain aggregations are preferable (Cutter et al. 1996, Maantay 2002a, Mennis 2002), there is no reason to believe that one aggregate is better than any other. How, for example, do you justify using zip codes instead of counties, census tracts, or any other geographic aggregation?

Because of this arbitrariness, the choice of aggregates can have a substantial impact on outcomes. For instance, Cutter et al (1996) found that in South Carolina, whites were more likely to live closer to environmental hazards when they used counties as the unit of analyses but found no correlations when using census tracts or census block groups. Glickman and Hersh (1995) similarly found that blacks were more likely to live near toxic spills in Pittsburgh when

they conducted analyses for the city as a whole but not when using census tracts or block groups. A third concern with the containment method is that populations that live directly across from census tract or county borders may not be considered at risk while those living much further away are (Maantay 2002a, Liu 2001).

Proximity analysis also faces significant drawbacks. As is true with containment, methodological choices can have a significant impact on findings, yet there is no clear reason to favor one method over any of the others. For instance, findings may vary substantially depending on whether analysts identify at-risk populations using polygon intersection, centroid containment, or polygon containment methods (figs 1a-1c), yet there is no clear reason for choosing one and not the others. Some scholars argue that areal interpolation provides a more accurate measure (Bowen et al. 1995), but others point out that because population is often unevenly distributed within census tracts, areal interpolation is no better or worse than the other options (Maantay et al. 2007).

The choice of buffer size or at-risk distance is equally fraught with uncertainty. For example, Shepperd et al (1999) compared the characteristics of populations living within 100, 500, and 1,000 yards of toxic facilities in Minneapolis, MN. While switching from 100 to 500 yard buffers had little impact on results, when the authors conducted analysis using 1,000 yard buffers there were significant differences which suggests disproportionate impacts. In addition to the size of the buffer, the shape can also impact results. For example, in their study of Houston, Sui and Giardino (1995) found significant differences in results when they use circular buffers and 45 degree sectoral patterns to determine impacted populations.

Critics have also expressed concern about the means of comparison. Although statistical methods are preferable to comparisons, many of these methods rely on assumptions in the underlying data like normality or independence. In most cases the data do not comply with these assumptions (Bowen and Wells 2002, Bowen 2001). Most data for example, violate the assumption of independence because the data exhibit spatial autocorrelation whereby observations that are closer in space are more alike than observations at greater distance (Bowen 2001, Fotheringham and S. 1991, Tobler 1970). The relationship between the spatial distribution of risk and the residential patterns of racial, ethnic, and income groups may also be spatially non-stationary, or may change across the study area (Fotheringham, Brunsdon and Charlton 2002, Brunsdon, Fotheringham and Charlton 1998). For example, Mennis (2005) examined the characteristics of populations living near air toxic release facilities in New Jersey and found that results varied significantly across the state.

Place Specificity

The methods of environmental justice policy analysis described above make the assumption that an environmental feature's impacts are the same regardless of its location or spatial context. Yet, many critics argue that dichotomous measures of presence or absence tell us little about how environmental features affect peoples' day-to-day lives. For them, environmental injustices do not manifest in abstracted patterns of points, lines, and polygons but arise in complex, place-specific interactions between individuals, land uses, and their surrounding environments in at least three ways.

First, an environmental feature's impact is dependent on the affected population. Risk assessors make a distinction between *exposure* and *vulnerability*. While *exposure* captures the quantity of chemicals that a body absorbs, *vulnerability* describes how the body processes those toxins. Often times *vulnerability* will differ depending on a subject's genetic make-up, lifestyle, and countless other compounding factors. Accordingly, two people exposed to the same environmental triggers may experience radically different health outcomes. Researchers argue, for instance, that African Americans' biological and genetic makeup lead to elevated incidence of diseases like hypertension, chronic liver disease, chronic respiratory disease, and sickle-cell anemia (Sexton 1997). Similarly, there is a direct relationship between adverse health outcomes and limited access to quality healthcare, stress, and other lifestyle factors. Researchers point to these as the primary reason that the incidence of liver disease, asthma, hypertension, and all cancers are higher for African-American males than for any other population group in the US (Corburn 2002, Adler 2005, Fischer 2000, Kuehn 1996). As such, the exact same facility may pose a very different set of risks if, for instance, nearby residents are poor and African American than it would if nearby residents are wealthy and white.

Second, an environmental feature's impact is dependent on its location vis-à-vis other environmental features and land uses. It is not uncommon for chemicals from two or more sources to combine in the water, air, or soil. In some cases the cumulative toxicity of these mixtures may be equal to the sum of their individual toxicities. For example, if toxin A, with a toxicity score of five, combines with toxin B, with a toxicity score of three, the resulting mixture may have a toxicity score of eight. Environmental scientists refer to this as *chemical additivity*.

By contrast, *chemical synergism* occurs when the mixture's toxicity is greater than the sum of its individual components. Using the above example, a synergistic effect may occur if a mixture of toxin A and toxin B has a toxicity score of 12. Due to *chemical synergism*, an isolated smelting plant may be less toxic than one located next to a waste transfer station, gas station, or any other environmental hazard. Despite the prevalence of chemical synergism, scientists know little about the health impacts of chemical combinations and even less about their real world incidence (Corburn 2002, US EPA 1989, Johnson and DeRosa 1995).

Third, an environmental feature's impact is dependent on place-specific social, cultural, and economic relations. Even if analysts could somehow overcome the above technical issues, they may still not be able to capture a hazard's varied impacts across space. Take, for example, a highway. In some communities, a highway is an environmental hazard that leads to increased noise and traffic while significantly degrading air quality. In other communities, a highway can be seen as a vital tributary connecting otherwise isolated residents to centers of employment (Bullard and Johnson 1997) . Walker (2009:31) similarly documents ambiguities around the issue of parks and green space:

> Greenspace is not an entirely uncontested and unproblematic 'good thing' that contributes equally to wellbeing for all; rather there can be important cultural, gender and other differences in how particular forms of greenspace are viewed and the functions and services that these perform. It is also well recognised that there are many factors that can act as barriers to the access and use of greenspace for people in different social groups and contexts, such as fear of crime and of others, physical barriers to mobility, and conflicts between different uses and users. It follows that how the meaning and impact of greenspaces on wellbeing shift across the city and over time may be *just* as significant as the geography of greenspace availability.

Building from these criticisms, many scholars argue against a universalized notion of environmental justice. Debanne and Keil (2004), for example, compare environmental justice movements in Canada, South Africa, and the United States and conclude that in each the term's meaning derives from its geographic context. Walker (2006) similarly claim that North American definitions do not apply to environmental conflicts in Europe, Asia, or other parts of the world. Instead, these and other scholars advocate for analyses that are sensitive to place-specific geographic relations. By analyzing environmental justice impacts across large areas using quantitative techniques, prevailing methods of environmental justice policy analysis fail to capture these place-specific and spatial varied meanings and implications.

Participation

A second theoretical critique of the prevailing methods of environmental justice analysis is that it only addresses issues of distribution of environmental risks while ignoring issues of participation. Throughout its history, the environmental justice movement has advocated not only for the redistribution of environmental risks but also for marginalized populations to have

more control over the environmental conditions where they live, work, and learn. The principles of environmental justice, for instance, include demands that "public policy be based on mutual respect and justice for all peoples, … the right to participate as equal partners at every level of the decision-making including needs assessment, planning, implementation, enforcement and evaluation," and "the fundamental right to political, economic, and environmental self-determination for all people" (First National People of Color Environmental Leadership Summit 1991). Indeed the need to "speak for ourselves" links disparate environmental justice claims (Di Chiro 1998, Bullard 1996, Holifield 2001, Schlosberg 2007).

The movement's emphasis on participation is reflected in environmental justice laws and initiatives. The federal government, for example, defines environmental justice as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies." Through the National Environmental Justice Advisory Council (NEJAC) the EPA has published "A Model Plan for Public Participation," (EPA 2000) as well as several other advisory documents for increasing participation in the permitting process (EPA 2003, EPA et al. 1998). These have resulted in substantive changes in agency operations, including increased public access to environmental information, the publication of material in multiple languages, and the creation of grants enabling communities to hire independent environmental consultants.

Despite these efforts, critics argue that environmental laws still provide insufficient opportunities for public participation. Lake (1996), for instance, claims that agency initiatives reflect a

truncated notion of procedural justice. Rather than merely providing communities with the tools to redistribute risks, Lake asserts that a truly just solution would enable marginalized populations to influence the processes that produce the environmental risks in the first place. Holifield (2004) similarly argues that rather than fundamentally empowering marginalized communities, the EPA community outreach programs simply buy communities support through the promise of grants and other financial incentives.

Scale

The issue of scale has become a primary concern for environmental justice researchers. Along with geographic aggregation, those seeking to measure environmental injustices argue that results will change depending on study area boundaries. While the same tests for environmental justice may find disproportionate impacts across the nation or state, these results may not hold when the study is limited to areas within municipal or county boundaries (Sui 1999, Bowen et al. 1995). The reverse is also true as local findings do not translate to broader geographic areas.

Referencing critical theories of scale production, others argue that environmental justice activists, along with state and private sector actors exploit these inconsistencies by emphasizing the spatial scale that best supports their political goals. For example, in her study of the siting of a PVC production facility in St James Parish, Louisiana, Kurtz (2003) finds that environmental justice activists, representatives of the Shintech Corporation (the owner of the facility), and the State of Louisiana alternately represented the facilities' potential impacts at the county, state, or national level to bolster their claims of the projects' harm or benefit. Towers (2000) argues that

environmental justice activists deploy a similar politics of scale politics when they contested the siting of an electricity transmission line in Monroe, West Virginia.

Scale may intercede in policy analysis in other ways. One recurring issue in environmental policy analysis is that even though a policy may address a problem at one level, it may also displace it across spatial scales. For example, as New York City grew, it exported its wastes further afield. While municipal waste was deposited and stored near the source of production in the 19th century, this waste was relocated to landfills and dumps at greater distances as the city continued to expand (Tarr 1996, Melosi 2000b). The example of New York is not unique. Urban Transition Theory (Marcotullio and McGranahan 2007, McGranahan et al. 2001, Marcotullio 2005), for instance, posits that as cities grow environmental risks transition from household level risks like lack of access to water, poor sanitation, or use of solid fuel (like coal or biomass) to community, citywide, or regional risks like air and water pollution. With continued development community and citywide environmental problems are then displaced to risks like global climate change that occur at global scales.

These issues of scalar displacement have been a particular concern for those studying Smart Growth and other urban sustainability strategies. Lake (1996), for instance, examines Agenda 21 initiatives in the United States and concludes that

> Under the cloak of sustainability, a few municipal governments have adopted programs that simultaneously improve local environmental quality, support economic development through the attraction of clean jobs and industry, and export environmental disamenities beyond their borders. For these communities, the high level of environmental amenity that contributes to economic viability does not depend on changes in the production of environmental problems but rather on their spatial redistribution.

Haughton and Hunter (1994) are similarly suspicious of local sustainability efforts arguing that what may appear sustainable or unsustainable at the local scale may not be at a global scale (Braun 2005). Haughton (1998: 236) extends these arguments by claiming that polluters can exploit legal, political, and jurisdictional borders:

> Too often, external impacts that affect areas outside the particular jurisdictional domain of the host polluter can be ignored if the polluter feels no responsibility for the recipient area and is beyond formal systems of legal sanction, such as liability to pay compensation. In a variant of the old saw "out of sight, out of mind" activities are effectively encouraged when they degrade distant areas, creating uncompensated costs passed on to someone or somewhere else. The further afield they are, the more administratively and politically separate their legal system, the easier it is to perpetrate such transfers of costs.

It is therefore essential that local scale initiatives "ensure that political or jurisdictional boundaries are not used to shield individuals, companies, and governments from the negative impacts of their activities."

Given environmental justice's complex scalar politics and policies' propensity to displace environmental problems across spatial scales, it is imperative that analysts do not resign themselves to investigating a policy's environmental justice implications at the neighborhood,

metropolitan, regional, or national scale alone. Rather analysts should pursue a multi-level design, simultaneously investigating impacts at and between a range of spatial scales.

A Mixed-Methods Approach

In the following I propose a mixed-method approach to environmental justice policy analysis. In general, mixed-methods research combines quantitative and qualitative strategies in a single study. Also referred to as synthesis, multimethod, multimethodology, and synthesis, most sources trace mixed-method research back to Campbell and Fiske's introduction of a "multimethodology matrix" in their 1959 study of the validity of psychological traits (Creswell 2003). Since that time, researchers across the social sciences have used mixed methods to study topics as diverse as criminology, linguistics, and business. Within the past ten years mixed-methods research has become particularly popular among geographers seeking to transcend a deep and often rancorous disciplinary divide between qualitative and quantitative researchers (Kwan 2004, Pavlovskaya 2004). With a few notable exceptions (Elwood 2006), environmental justice researchers have not embraced mixed methods, instead favoring either qualitative or quantitative approaches.

Although scholars using mixed methods all combine qualitative and quantitative research, they do so in very different ways. In many cases, research will follow a clear sequence. For example, researchers may use quantitative analysis to first identify cases and later explore those cases using qualitative techniques. Similarly, researchers may use qualitative research to elaborate or explain outliers or strange results in quantitative studies (Creswell 2003, Tashakkori and Teddlie

2003). In other cases, researchers will conduct quantitative and qualitative research at the same time. Under a process of *triangulation,* for instance, researchers will compare the results of quantitative and qualitative research in hopes that the two approaches combined will present a more complete understanding than each one alone (Jick 1979). Similarly, researchers may use qualitative and quantitative methods to analyze different components of the research process. Under a multilevel design, for example, each method may be used to analyze different groups or levels (Tashakkori and Teddlie 2003). A researcher using a multilevel design might use quantitative methods to study a phenomena at the level of a school or school-district while using qualitative methods to examine the phenomena within individual classrooms.

I use this multi-level approach to examine the environmental justice implications of New York's brownfield policies. In this project there will be two levels of analysis – equity analysis and cases studies. In the equity analysis component, I use quantitative methods to test whether New York's brownfield policies promote development and cleanup of contaminated properties in poor and minority communities across the city. I conduct the analysis by first preparing the data, second analyzing the data using proximity methods, and third testing for the results with methods of randomization. In the case study component, I use qualitative methods to determine whether brownfield development improves environmental conditions in three neighborhoods with a high proportion of poor and non-white residents –Gowanus and East New York in Brooklyn, and Melrose Commons in the Bronx. I present the details of each component below.

Equity Analysis

The purpose of the equity analysis is to determine whether the state's Brownfield Cleanup Program encourages development and clean up of brownfields in areas with predominantly poor and minority residents. I do so by describing the characteristics of populations in areas surrounding sites enrolled in the New York State Brownfield Cleanup Program through a three step process: data preparation, analysis, and significance testing.

To analyze the populations and land values for areas around each BCP project, I prepare three different data sets. First, I identify the geographic centroid of each property enrolled in the state's BCP. The process is complicated by the fact that many projects span two or more tax lots and in some cases multiple city blocks. To identify which tax lots are associated with which projects, I rely on data engineering reports and project descriptions found in the DEC's Environmental Site Remediation Database (NYS DEC 2008), the Address to Tax Lot Converter from the New York City Department of City Planning (NYC DOCP 2008), and tax lots maps. I then merge all of these tax lots for each project to calculate the project's geographic centroid.

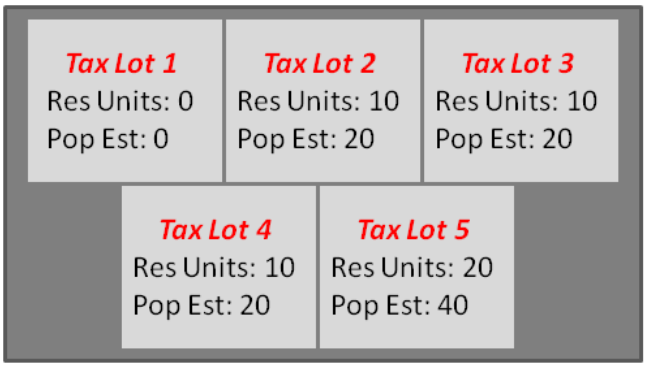

Figure 3.2 CEDS Example

Second, I disaggregate social and demographic data from the 2000 census using a method of Cadastral-based Expert Daysmetric System (CEDS) (Maantay et al. 2007). CEDS geographically distributes population data from the 2000 decennial census to individual tax lots based on either the tax lot's residential units or the tax lot's residential area. Figure 3.2 demonstrates how CEDS works in a hypothetical census block group. In that block group, fifty residential units are distributed between five tax lots - one without any residential units, three with ten residential units each, and one with twenty residential units. If the block group has a population of one hundred, CEDS makes the assumption that no one lives in the tax lot without any residential units, twenty people live in each of the three tax lots with ten residential unit, and forty people live in the tax lot with twenty residential units.

In some cases, tax lots' residential area provides a better estimate of a tax lot's population than the number of residential units. To determine whether residential area or residential units is more accurate, the analyst first uses both proxies to disaggregate census tract data to the tax lot level. These lot level estimates are then re-aggregated to the block group level. The analyst then

assigns each block group the proxy that best estimates the block group's observed population. One of the main advantages of disaggregating the data is that it better captures the spatial distribution of population. Figure 3.3, for example, shows CEDS population estimates and block group boundaries on Manhattan's Upper West Side. The uneven spatial distribution of the population reflects each block group's mix of large and small residential buildings. These fine-scale population estimates helps avoids ambiguities that may arise when part of the census tract is within a buffer distance of the project centroid and part is further away.

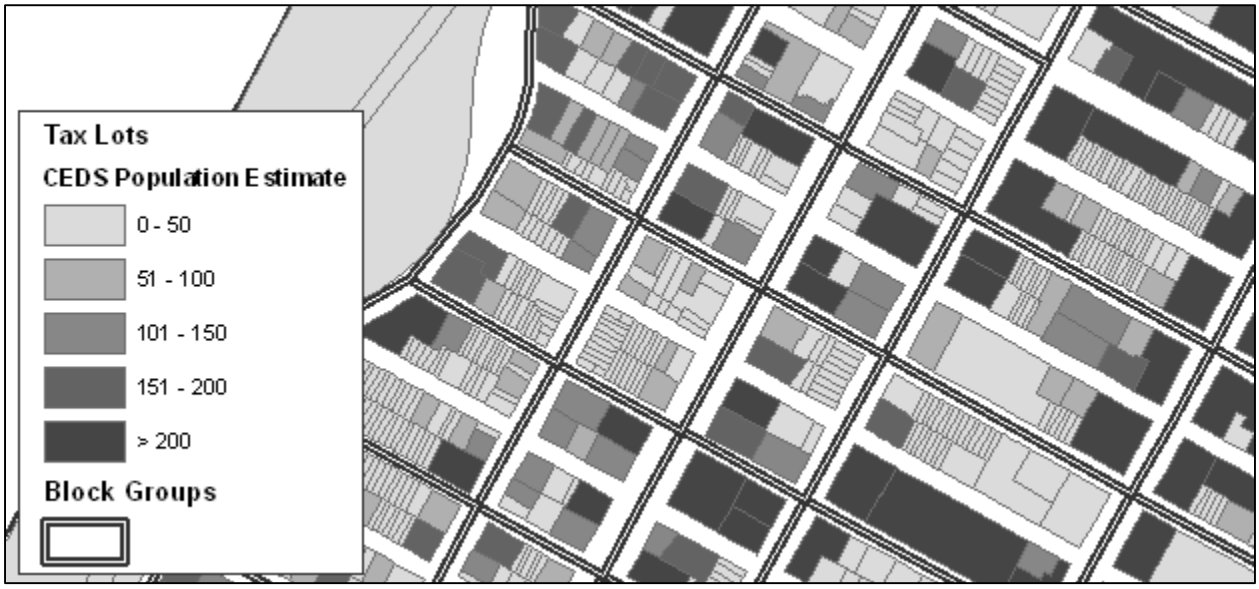

Figure 3.3 CEDS population estimates and block group boundaries on Manhattan's Upper West Side

The third data set is an inventory of likely brownfield properties in New York City. Because full environmental assessments are not readily available for most properties it is difficult to identify brownfield sites (Colten 1990, Frickel and Elliott 2008, Leigh and Coff 2000, Litt and Burke

2002, Simons 1998). Further complicating the construction of a brownfield inventory is the issue of vacancy. In many cases, determining vacancy status can be difficult if the property owner employs the site for storage, parking, or some other marginal or seasonal use. Assessing vacancy can also be complicated if there is a decaying structures with little value or potential for use (Been et al. 2009). To address these issues, I follow methods established by the New York City Office of Environmental Rememiation (2010). Using property assessment data published by the New York City Department of City Planning (New York City Department of Planning 2003), I identify those lots that are zoned for either manufacturing or commercial use where assessed building value is less than 5% of the property's total assessed value as potential brownfields.

Using these data, I conduct proximity analysis to identify which of the city's 850,510 tax lots have their geographic centroid within half a mile, half a mile to one mile, and one to two miles of each of the fifty–eight projects enrolled in the BCP. For each of these distances, I then calculate the average proportion of residents who are black, the average proportion of residents who are Hispanic, the average proportion of residents who are white, the average household income, the average rent (the total aggregate rent divided by the total number of renter-occupied housing units), and the average house value (the total aggregate household value divided by the number of owner-occupied housing units). Based on 2003 lot level data by the New York City Department of City Planning (New York City Department of Planning 2003), I also calculate the averaged assessed land value at each of the distances. I then average these values across all fifty-

eight projects at each distance (eq 1). Because I use data sources from before the VCP began, land values and population characteristics do not reflect the program's effects.

$$var_{d1,d2} = \frac{\sum_{i=1}^{n_{bg}} \sum_{j=1}^{n_{lot}} h(bg_i, lot_j, d1, d2) * var_j}{51} \quad (1)$$

Where:

$var_{d1, d2}$ is the variable of interest at distances greater than d1 and less than d2

n_{bg} is the number of block groups

n_{lot} is the number of tax lots

h(bg, tl, d1, d2) is an indicator function that equals 1 if the distance between block group *bg* and tax lot *tl* is greater than d1 and less than d2, and otherwise equal to 0

var_j is the variable of interest for tax lot *j*

In order to test the significance of the above values I use a randomization strategy. Randomization is a forty year old method, where an observed statistic is compared with the same statistic computed for a large (usually 999) number of random realizations (Besag and Diggle 1977, Getis and Ord 1992, Sheppard et al. 1999, McMaster, Leitner and Sheppard 1997). If a large number (approximately 95%) of the randomly generated values are either greater than or less than the observed value, that the observed statistic is significantly greater than or less than what might be observed by chance. In this project, for example, after calculating average population and land value indices for the fifty-eight BCP projects, I randomly select fifty-eight new sites and recalculate the same value again. After repeating the random selection and recalculate 998 more times, I count the number of randomly generated values that are greater

than the observed value and divide by 1000. The resulting number is the likelihood that the observed statistic is significantly higher or lower than would be expected by chance.

There are several advantages that a randomization strategy has over linear regression and other modeling techniques. First, unlike other modeling techniques, there are no assumptions about the data's distribution or independence when using randomization. Second, randomization strategies maintain and exploit the spatial structure of the underlying data. Third, by changing the universe of sites I use to generate each realization, I can test for different hypotheses. For example, in this project I test whether or not the observed characteristics of properties and people around BCP projects are significantly high and low for the city in general by randomly selecting from all properties in the city. I can also test, however, whether or not the values are high or low for those sites that are most likely eligible for the BCP by randomly selecting from only those sites in the brownfield inventory described above. In order to characterize spatial non-stationarity in the characteristics of populations and properties near BCP projects, I calculate each value for projects in the south Bronx, western Manhattan, Gowanus, and Long Island City.

Case Studies

To assess the area-wide impacts of state and city brownfield policies I will conduct case studies in three New York neighborhoods: Gowanus and East New York in Brooklyn and Melrose Commons in the Bronx. I will select these three case studies by first identifying those neighborhoods where brownfields cluster and there is a high percentage of poor and non-white residents. After the preliminary research on the future use of brownfield sites in these

neighborhoods, I will identify those with significant brownfield development. Beyond these similarities, I also seek to identify neighborhoods where brownfield development is contributing to disparate processes of land use change. In Gowanus, developers are converting brownfields into luxury housing and retail spaces to attract younger and wealthier residents. In East New York, brownfields are becoming central to the expanding industrial economy while community groups in Melrose Commons are building affordable housing in former brownfield sites.

In each case study I will explore the neighborhood-wide impacts of brownfield development, and the processes of land use change of which they are a part, using archival data. Table 1 shows the proposed data sources. Data for population will come primarily from the decennial census (both current and past). To describe processes of land use change I will use property data (including assessed land values, land uses, ownership, and transaction histories) from the New York City Department of Finance. Fire Insurance Maps published by the Sandborne Corporation provide historic lot-by-lot land use data. Newspapers including *The New York Times*, *The Daily News*, *Crains Busineess Daily*, *The Brooklyn Eagle*, and *City Limits* provide helpful descriptions of individual projects as well as broader neighborhood transitions.

In order to assess individual brownfield projects' environmental impacts I will rely on a combination of environmental impact statements and engineering reports. For projects enrolled in the BCP, these documents are readily available through the publicly accessible document repositories. In many cases the brownfield development occurs on land the city formerly owned. In these cases the city is required to conduct an environmental review. These reviews are available through requests made under New York State's Freedom of Information Law (FOIL).

In other cases, however, property owners have not collected environmental data and if they have it is not publicly available. In these instances, I make inferences about the site's environmental conditions based on its past use.

In addition to these more traditional sources of information are sources of hyperlocal news. Although difficult to define, hyperlocal news is generally thought of as electronic media "devoted to the stories and minutiae of a particular neighborhood, ZIP code or interest group within a certain geographic area" (Shaw 2007). Hyperlocal news can often fill in the gaps left by mainstream media by reporting on small scale events like public hearings or community board meetings, as well as on-going evolution of the neighborhood's built environment. It is not uncommon, for example, for hyperlocal news sources to report on the store openings, plans for a new building, or zoning changes that comprise day-to-day life within a neighborhood (Caine Miller and Stone 2009). Although some question hyperlocal media's accuracy, others have found them to be a useful source of local news (Shaker 2009).

Additional sources of hyperlocal news are citywide real estate blogs. Targeting the real estate professionals and the real estate obsessed, these blogs provide detailed accounts of specific projects as well as a broader overview of geographic and sectoral shifts within the real estate industry. Real estate blogs are much closer to traditional journalistic models with a staff of full-time reporters and a clear corporate structure. Although many of these blogs such as the Real Deal or Curbed exist purely in their online form, others, like Crains, provide an online presence for newspapers and print journalism.

Both hyperlocal news and real estate blogs blur the distinction between reporters and news users (Glaser 2004). In some cases, users may contribute by writing comments. In others, users are the source of content by providing unedited contributions. Perhaps the most dramatic example of this are community listservs with content solely comprised of resident submissions on traffic patterns, parenting advice, used furniture for sale, or musings on any number of topics that impact the minutiae of neighborhood life. While it may be difficult to gauge the accuracy of these often anonymous contributions, they do represent residents' often raw and unedited response to processes of neighborhood change (Zukin 2010).

I analyze these data in a four step process. First I combine quantitative analysis of property records and historical census data with archival newspaper reporting and other secondary sources to establish the area's history and past land uses. Second, I examine environmental impact statements to determine which contaminants are present in the neighborhood's brownfield sites and the methods property owners use to remove or contain them. Third, I categorize blog posts, blog comments, and listserv contributions to identify environmental concerns in the surrounding area. Fourth, I combine the above analyses to determine the connection between brownfield development, land use, and the neighborhood's changing environment.

Description	Source	Access
Population		
Data from the 2000 decennial census	The Bureau of the Census	Public
Historical census data	National Historic GIS	Public
Property		
Tax Assessment Data	NYC Dept of Finance	Fee Based/ Public
Property Sales Data	NYC Dept of Finance	Public
Sandborne Maps	NYPL Map Division	Public
Environment		
Environmental Impact Statements		
- urban renewal plans	NYC DEC	FOIL
- city owned property	NYC Economic Development Corporation (DEC)	FOIL
- sites enrolled in BCP	BCP Repository	Public
Engineering Reports	DEC Contaminated site database	Public
Historical		
Newspapers	NYT, NY Post, NY Observer	Public
Citywide real estate blogs	The RealDeal, Brownstoner,	Public
Neighborhood blogs	Gowanus Lounge, Brownstoner, Boogiedowner	Public

Figure 3.4 Data sources for analysis

Conclusions

In this chapter I have argued that prevailing methods of environmental justice policy analysis can be subject to both methodological and theoretical critiques. In order to address these limitations, I propose a mixed-methods approach to assessing the environmental justice implications of New York City and State's brownfield policies. The approach consists of two components: an equity analysis and neighborhood case studies. In the equity analysis I use quantitative methods to determine whether the BCP encourages the cleanup and redevelopment of sites in neighborhoods with predominantly poor and non-white residents. In the case studies I use archival data and qualitative methods to ask whether these projects actually benefit environmental conditions in areas surrounding the redeveloped site.

Chapter 4: Citywide Results

As I argue in chapter 2, New York State and New York City policies promote brownfield cleanup by reducing the costs and risks associated with contaminated property development. While this approach deals primarily with issues within the site's boundaries, surveys of brownfield developers indicate that area-wide concerns, like crime, infrastructure, and access to transportation, pose a greater obstacle to brownfield development than on-site contamination alone. By failing to address these issues, state and city brownfield policies may promote brownfield development in areas with higher property values and predominantly wealthy and white residents; however these policies are less likely to have an impact in areas with lower property values and predominantly poor and non-white residents where area-wide issues are more pressing. As site-specific brownfield policies channel resources into areas with wealthy and white residents, they may exacerbate existing environmental inequities. Although several critics have made this claim, to date there is little empirical evidence to support it (Eisen 2007).

In this chapter I test whether the State's brownfield policy promotes brownfield cleanup and redevelopment in areas with predominantly poor and marginalized populations. I do so by describing the characteristics of properties and populations in areas surrounding sites enrolled in New York State's Brownfield Cleanup Program (BCP). In the first section of this chapter I describe the spatial distribution of the city's brownfield properties and sites enrolled in the BCP. In section two, I first examine these results in comparison to all properties within the city and then re-examine those same results relative to the city's brownfield properties. In section three, I

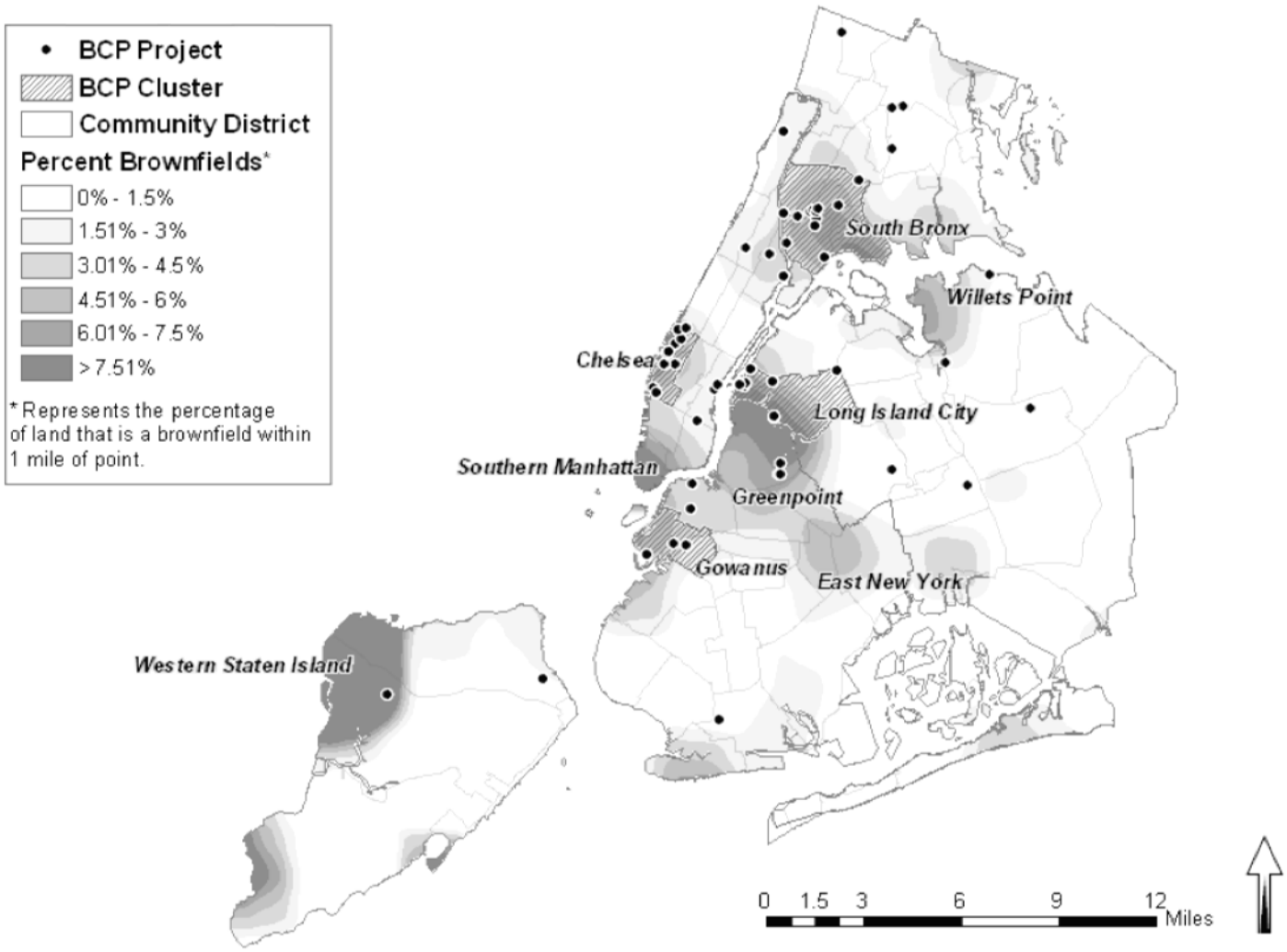

Figure 4.1 Brownfield Locations in New York City

test for spatial non-stationarity by comparing the results between four areas where brownfields tend to cluster.

New York City's Brownfields

Figure 4.1 shows a map of the distribution of New York City's brownfield properties. Overall there are roughly 6,200 acres of brownfields in the city accounting for about 5% of space that can be developed. In general, brownfields tend to cluster on coastal and formerly industrial areas like Willets Points in Queens, the South Bronx, Greeenpoint and Long Island City on the border separating Brooklyn and Queens, western Staten Island, and southern Manhattan. There are also a few isolated pockets in in-land industrial areas like East New York and Gowanus neighborhoods, both in Brooklyn.

Table 4.1 shows the distribution of brownfields by borough. Brooklyn is home to roughly 42% of all brownfield properties with the remaining sites distributed across the other four boroughs. When area is taken into consideration, Staten Island eclipses the other four boroughs accounting for over half of the city's brownfield acreage. This is largely due to the many large brownfield sites in and around Fresh Kills landfill on Staten Island's western edge, which is now closed but was once the destination for the city's waste.

	Sites Enrolled in BCP		**Brownfield Area**		**Brownfield Lots**	
	Count	*Percent*	*Area (acres)*	*Percent*	*Count*	*Percent*
Brooklyn	9	16%	895	14%	6,466	42%
Bronx	16	28%	518	8%	2,377	15%
Manhattan	17	30%	285	5%	1,629	10%
Queens	13	23%	1,239	20%	3,170	20%
Staten Island	2	4%	3,274	53%	1,921	12%
Total	***57***	***100%***	***6,210***	***100%***	***15,563***	***100%***

Table 4.1 Sites enrolled in BCP, brownfield area, and brownfield count by borough

One of the recurring assumptions in brownfield literature is that brownfields tend to cluster in areas with low property values (Bartsch et al. 1996, Capuano 2003, Eisen 1996, Greenberg et al. 2000, Lange and McNeil 2004). In the case of New York City, however, this may not always be the case. Table 2 shows the percentage of land that is a brownfield and assessed land value for the 10 (out of 59) New York City community districts with the highest proportion of brownfield land.

Community District			Brownfields		Assessed Land Value	
Name	**Borough**	**BCP Projects**	**Brownfield Area**	**Rank**	**$ / sq ft**	**Rank**
Rockaway/Broad Channel	Queens	14	44.5%	1	4.23	40
Woodside/Sunnyside	Queens	2	13.2%	2	7.08	19
Mott Haven/Melrose	Bronx	1	12.0%	3	4.00	42
South Crown Heights/Prospect	Brooklyn	9	11.9%	4	5.13	29
East Flatbush	Brooklyn	17	10.0%	5	4.61	35
Queens Village	Queens	13	9.5%	6	3.04	49
Clinton/Chelsea	Manhattan	4	8.3%	7	89.94	7
Ozone Park/Woodhaven	Queens	9	7.5%	8	4.25	39
Williamsbridge/Baychester	Bronx	12	7.4%	9	2.87	53
Financial District	Manhattan	1	6.8%	10	139.94	4

Table 4.2 Assessed land values for the 10 (out of 59) community districts with the highest density of brownfield properties.

Table 4.2 shows no clear relationship between brownfields and land value. On the one hand, there are a number of neighborhoods that uphold the assumption that brownfields cluster in areas with lower property values. For example, 44.5% of the developable acreage in Rockaway/Broad Channel is a brownfield (the highest percentage in the city) while only 19 out of the city's 59 community districts have assessed land values lower than the neighborhood's $4.23 per square foot. In places like Williamsbridge/Baychester and Mott Haven/ Melrose in the Bronx, as well as Queens Village in Queens there is a similarly high percentage of brownfields and low assessed land values. On the other hand, there are also areas where the expected relationship

between brownfield density and property values does not hold. For example, Clinton/Chelsea in Manhattan which has the seventh highest density of brownfield land in the city and also has the seventh highest assessed property values. In the Financial District in Manhattan there is similarly a high percentage of brownfields and high assessed land values.

Given the ambiguous relationship between the density of brownfields and property values, policy makers' assumption that encouraging brownfield development alone will promote environmental justice becomes suspect. Brownfield laws may actually exacerbate environmental inequities if they only lead to the development of those properties in areas with higher property values and predominantly wealthy and white residents. In order to assess the environmental justice implications of a brownfield policy, it is therefore essential not only to ask whether the policy promotes brownfield development, in general, but also to investigate the characteristics of areas surrounding sites that are enrolled in the program.

New York City Sites Enrolled in the BCP

According to the New York State Department of Environmental Conservation (DEC 2011) there are 81 sites enrolled in the five boroughs of New York City. This number, however, is misleading. In many cases, a property owner may enroll multiple sites into the program even though they are all part of the same project. For example, there are five separate sites enrolled in the program affiliated with the Silvercup project (a movie and television production space in Long Island City, Queens). Similarly, the Flushing Industrial Park (also in Queens) includes

four separate sites. Once these redundancies are removed there are 58 unique New York City projects enrolled in the BCP (figure 4.1).

Overall these projects' locations do not match the spatial distribution of the city's brownfield properties. As shown in table 1, there are many fewer projects enrolled in the BCP on Staten Island, and, to a lesser extent, Brooklyn compared to both the brownfield land area and number of brownfields sites. Even though Staten Island is home to 12% of the city's brownfield properties and over 50% of brownfield land area, there are only two sites enrolled in the BCP in the borough (4% of all BCP sites). Similarly, although 42% of the city's brownfield lots and 14% of the total brownfield area are in Brooklyn, there are only 9 BCP sites (16% of all BCP sites) in the borough. Conversely, there is a disparately high number of projects in both Manhattan and the Bronx. Manhattan, where nearly one third of all BCP projects are located, is home to only 10% of the city's brownfield lots and 5% of the brownfield land area.

BCP projects also tend to cluster within specific areas within each borough. As shown in fig 4.1, BCP projects tend to cluster in four areas: the south Bronx, Chelsea in Manhattan, Gowanus in Brooklyn, and Long Island City in Queens. Collectively, 35 out of the 57 projects (63%) located in these four clusters with 21 in Chelsea and the South Bronx.

	NYC	1/2 Mile		1/2 Mile - 1 Mile		1 Mile - 2 Miles	
		Obs	Sig[2]	Obs	Sig[2]	Obs	Sig[2]
Race and Ethnicity							
Black[1]	24.5%	20.5%	16%	19.3%	6%	18.8%	1%
White[1]	35.0%	34.0%	4%	36.1%	19%	38.0%	55%
Hispanic	27.0%	34.8%	100%	33.4%	100%	31.5%	100%
Asian[1]	9.7%	7.4%	3%	7.9%	3%	8.2%	2%
Other[1]	3.8%	3.2%	4%	3.1%	1%	3.4%	1%
Income							
Avg HHD Inc ($)	58.5	52.8	11%	57.2	87%	61.6	100%
Fam Below $20K	29.0%	33.6%	100%	33.4%	100%	30.6%	100%
Fam Below $50K	60.6%	64.9%	100%	63.8%	100%	61.8%	95%
Land Value							
Avg Rent ($)	782	757	18%	781	86%	824	100%
Avg House Value (x $1,000)	280	261	83%	292	100%	314	100%
Assessed Prop Value ($ / sq ft)	24.86	79.03	100%	108.10	100%	111.65	100%
Assessed Land Value ($/ sq ft)	10.00	30.80	100%	47.79	100%	50.13	100%

[1] Not Hispanic

[2] Based on simulations using all lots in New York City. Significance is percentage less than observed.

Table 4.3Race and Ethnicity of Populations in areas around sites enrolled in BCP

Characteristics of Populations and Properties compared with all New City Properties

Table 4.3 shows the race, ethnicity, income, and land value indicators for populations and properties in areas surrounding New York City sites enrolled in the BCP. The US Bureau of the Census distinguishes between race (black, white, Asian) and ethnicity (Hispanic). The same person, for example, may be both black and Hispanic, white and Hispanic, or Asian and Hispanic. Table 3 first divides Hispanics and non-Hispanics and then separates non-Hispanics into blacks, whites, Asians, and others (including those who identify with two or more races).

The first column of table 4.3 (NYC) shows the value for all of New York City. For example, 24.5% of New York City's population is non-Hispanic black (hereafter black). Similarly, based on tax assessment data, the average house value in New York City is $280,000. The second, fourth, and sixth columns show the same statistic within one half mile, one half mile to one mile, and one mile to two miles of sites enrolled in the BCP. Following the above examples, blacks account for 20.5%, 19.3%, and 18.8% of the population living within each of those distances while the average house value in those areas are $261,000, $292,000, and $314,000.

Based on these values it appears that blacks are underrepresented in areas closest to BCP projects and house values are much lower than the city in general. It is difficult to know, however, whether these differences are significant or if they are due to chance. To answer that question I randomly select 58 tax lots in the city and calculate the race, ethnicity, household incomes, house values, property values and so on for those living within one half mile, between one half mile and one mile, and between one and two miles from BCP sites. After that I again randomly select

58 tax lots and perform the same calculations. After randomly selecting 58 tax lots and calculating these values 997 more times, I can identify the percentage of randomly generated values that are less than the observed values. These percentages are shown in columns three, five, and seven. For example, within one half mile of BCP sites the observed percentage of black residents is greater than the percentage of black residents in 160 (16%) of the randomly generated simulations, and the observed house values is greater than the house value in 830 (83%) of the randomly generated simulations. When the observed values are greater than 95% of the simulations or are less than 5% of the simulations, I argue that they are significantly higher or lower than we would expect by chance.

As is evident from the table there are substantial differences between areas closest to the sites and those that are farther. The percentage of white residents living within one half mile of the site, for example, is well below the city wide average but increases substantially in adjacent areas. The percentage of black residents, well below the city-wide average within one half-mile of the sites, decreases substantially from one half mile to a mile from the site and then again from one mile to two miles from the sites. The percentage of Hispanic residents similarly decreases with distance from the sites but is well above the citywide average at all three intervals.

When considering significance, these values become even more dramatic. The percentage of white residents living within one half mile of the site is significantly low with 96% of the

simulations generating values greater than observed[1]. From one half mile to one mile from the sites, and again from one to two miles from this site, however, these values are no longer significant as only 19% and 55% of the simulations generated a lower percentage. The percentage of black residents, towards the bottom end of the distribution within one half mile of the sites, becomes significantly low at greater distances with 99% of the simulations having a value greater than observed between one mile and two miles from the site. By contrast the observed percentage of Hispanic residents was significantly high with an observed value greater than all simulations at all three distances.

For average household income, there is a similar difference in areas closer to the site and those that are farther. Within one half mile of sites enrolled in the BCP, households had an average income of $52,800 per year, well below the city-wide average of $58,500. From one half mile to one mile from BCP sites, average household incomes increase dramatically to $57,200, a value higher than all but 13% of the simulations. From one to two miles from BCP sites, average household incomes again increase to $61, 600 which is greater than all simulations.

[1] Interestingly the percentage of white residents within one half mile of the site is very close to the city wide mean, but is less than 91% of the simulations. This is most likely because New York City's non-white residents tend to cluster in a few segregated neighborhoods.

At all distances, the percentages of families with household incomes less than $20,000 a year and less than $50,000 a year are very high. Within a half mile of BCP sites 33.6% of families have an income below $20,000 per year while 64.9% of families have an income below $50,000 per year. Both indicators are significantly high and well above the percentages citywide. At further distances these percentages decrease but remain significantly high. At one mile to two miles from the site, 30.6% and 61.8% of families have incomes less than $20,000 and $50,000 a year and are respectively greater than values in 100% and 95% of the simulations. These findings appear to contradict the trend for average family income. While the high percentages of families with average household incomes less than $20,000 per year and less than $50,000 per year should put downward pressure on area-wide averages, as mentioned above, average family incomes at this distance are significantly high.

The contradictions in income indicators may arise for several reasons. First, the areas one to two miles from the site may be mixed income areas with a combination of very wealthy and very poor families. This would be consistent with Essoka's (2003) finding that brownfield development is often associated with gentrification. A second explanation is that some sites are one to two miles from areas with very wealthy residents and other sites are one to two miles from areas with very poor residents. In aggregate these two extremes cancel each other out. These two explanations are not mutually exclusive. Regardless, all three income indicators show that the family incomes increase substantially with distance from sites.

Like income characteristics, land value characteristics indicate a difference between areas closest to the site and those that are farther. Average rent, for instance, is well below the city-wide

average within one half mile of the sites, but climbs substantially with distance so that between one mile and two miles away from the site the observed average rent is greater than the average rent in all simulated values. Both house value and land values similarly increase in areas slightly farther away from the site although they are significantly high at all distances. Assessed land value, for instance, climbs from roughly 3 times the citywide average within one half mile of the site to nearly 5 times the citywide average between one and two miles.

Characteristics of Populations and Properties compared with Brownfield properties

When compared to the city in general, areas immediately surrounding properties enrolled in the BCP have higher property values, a higher percentage of Hispanic residents, slightly lower rents, and slightly lower household incomes. Further away, the percentage of white residents, household incomes, land values, rents, and house values all increase substantially while the percentage of black and Hispanic residents decline. The question then arises, as to whether these findings are attributable to the spatial distribution of brownfields. Otherwise stated, is there a significant difference between characteristics of populations and properties in areas surrounding brownfield sites enrolled in the BCP and the characteristics of populations and properties in areas surrounding brownfield sites that are not enrolled in the BCP?

To answer these questions, I again generate 999 random simulations. In contrast to table 4.3, where simulations drew from all properties within the city, the significance values in table 4.4 are based on random simulations that draw only from brownfield sites. The first, fourth, and seventh column in table 4.4 reflects the average population and property values in areas

surrounding all of the city's brownfields. For instance, although 24.5% of the city's residents are black (table 4.3), 33.9%, 32.9%, and 31.8% of the residents living within one half mile, from one half-mile to one mile and one mile to two miles from brownfield sites are black (table 4.4). The second, fifth, and eighth columns show the average values in areas surrounding sites enrolled in the BCP. For instance, 20.5%, 19.3%, and 18.8% of the residents living within one half mile, one half mile to two miles, and one to two miles from sites enrolled in the BCP are black.

As indicated in table 4.4, there is a clear systematic bias in the location of sites that property owners are enrolling in the BCP. For instance, relative to the city's brownfields, BCP projects are much less likely to be located in areas with a high percentage of black residents. Although 33.9% of all residents living within one half mile of brownfield sites citywide are black, only 20.5% of the residents living within one half mile of BCP sites are black. There are similar disparities from one half mile to a mile and again from one mile to two miles from the site. At all three distances the values are significantly low, as none of the 999 simulations produced lower values.

	1/2 Mile			1/2 Mile - 1 Mile			1 Mile - 2 Miles		
	NYC[2]	Obs	Sig[3]	NYC[2]	Obs	Sig[3]	NYC[2]	Obs[3]	Sig
Race and Ethnicity									
Black[1]	33.9%	20.5%	0%	32.9%	19.3%	0.0%	31.8%	18.8%	0.0%
White[1]	22.9%	34.0%	100%	25.9%	36.1%	100%	29.1%	38.0%	100%
Hispanic	33.4%	34.8%	68%	30.7%	33.4%	85%	28.8%	31.5%	90%
Asian[1]	6.1%	7.4%	84%	6.7%	6.7%	83%	6.6%	8.2%	96%
Other[1]	3.4%	3.2%	25%	3.6%	3.6%	5%	3.6%	3.4%	24%
Income									
Avg HHD Inc (x $1,000)	43.6	52.8	100%	46.8	57.2	100.0%	50.6	61.6	100.0%
Fam Below $20K	38.6%	33.6%	0%	36.3%	33.4%	4%	33.5%	30.6%	1%
Fam Below $50K	70.7%	64.9%	0%	68.6%	63.8%	1%	66.0%	61.8%	1%
Land Value									
Avg Rent ($)	662	757	100%	682.5	781	100%	715	824	100.0%
Avg House Value (x $1,000)	240.4	261.4	94%	252.3	292.1	100%	271.0	313.6	100.0%
Assessed Property Value ($ / sq ft)	47.04	79.03	94%	45.20	108.10	100%	42.56	111.65	100%
Assessed Land Value ($ / sq ft)	18.13	30.80	92%	17.54	47.79	100%	17.21	50.13	100%

[1] Not Hispanic

[2] Based on brownfield properties

[3] Simulations created using only brownfield properties. Significance is the percentage of observations less than observed.

Table 4.4 Characteristics of populations and properties in areas surrounding sites enrolled in BCP as compared to NYC brownfield properties.

Conversely, there does not appear to be a systematic bias in the site enrolled in the BCP in relation to Hispanics. In general brownfields tend to locate in areas with a high percentage of Hispanic residents. Within one half mile, one half mile to one mile, and one mile to two miles from brownfield sites 33.4%, 30.7%, and 28.8% of residents are Hispanic. At each distance the percentage of Hispanics is well above the percentage citywide (27%). While the percentage of Hispanic residents surrounding BCP sites is slightly higher (34.8%, 33.4%, and 31.5%), it is likely that these differences are due to chance as these values are only greater than 68%, 85%, and 90% of simulations drawn from brownfield properties.

Just as the percentage of Hispanic and black residents are slightly above or well below their respective means, when controlling for the spatial distribution of brownfields the percentage of white residents is very high. In general brownfield properties tend not to cluster in areas with a high percentage of white residents. At all three distances the percentage of white residents surrounding brownfield properties is substantially lower than the percentage of white residents citywide (22.9%, 25.9%, and 29.1% compared with 35% citywide). In areas surrounding sites enrolled in the BCP, however, these disparities disappear. Within one half mile of sites enrolled in the BCP 34% of the residents are white – only slightly below the percentage citywide. From one half mile to one mile and again from one mile to two miles from BCP sites, 36.1% and 38% of residents are white – both greater than the percentage citywide. At all three distances these values are greater than the values in all 999 simulations and are therefore very significant.

Relative to the cities brownfield properties, sites enrolled in the BCP also tend to come from areas where nearby residents have very high incomes. At all three distances the average

household income is at least ten times higher than the mean value for all brownfields. Again, these observed values are greater than all of the simulations and are therefore very significant. Just as the average household incomes are significantly high, the percentage of families with incomes below $20,000 per year and the percentage of families with incomes below $50,000 per year are both significantly low. At all three distances, both observed values are well below the mean for all brownfield properties and less than either 100% or 99% of all simulations.

The property values in areas surrounding sites enrolled in the BCP exhibit a similar bias. The average rent and household values is significantly high at all three distances as is the assessed land value from one half mile to one mile and one mile to two miles from the sites. The only property indicator that is not significantly high is the assessed property values within one half mile of the property. Interestingly, this value is significantly high when compared with all properties in the city (table 4.3). This indicates that counter to expectations, brownfields tend to cluster in areas with very high property values.

Variability

The above values are only averages and may be obscuring substantial variability. High average land values, for instance, may result from a handful of sites in areas with very high land values while the majority of sites are in areas that are either close to or slightly below the citywide mean. To examine how these relationships vary across space, I recalculated these values in the four areas where brownfield projects tend to cluster: the South Bronx, Chelsea, Gowanus, and Long Island City. The results are presented in table 4.5.

As is shown in table 4.5 there is substantial variability between clusters. At one extreme is the South Bronx where 97% of the residents are either black or Hispanic and only 3% are Asian, White, or some other race. Average household incomes in the South Bronx are very low as are rents, house prices, and property values. By contrast, nearly 60% of the residents living within one half mile of BCP projects in Chelsea are white while only 30% are either black or Hispanic. Household incomes, house values, rents, and property values in Chelsea are well above the city average and are two to three times higher than they are in the South Bronx. The difference between the two areas is particularly notable in relation to assessed land value which is nearly 18 times higher in Chelsea than it is in the South Bronx.

	NYC	Chelsea	Gowanus	LIC	So Bronx
Race and Ethnicity					
Black	24%	9%	22%	10%	41%
White	35%	58%	37%	40%	1%
Hispanic	27%	21%	34%	34%	56%
Asian	10%	8%	3%	12%	1%
Other	4%	3%	4%	4%	2%
Income					
Avg HHD Inc ($)	58,514	80,347	52,844	50,005	29,600
Fam Below $20K	29%	23%	35%	25%	52%
Fam Below $50K	61%	51%	65%	61%	85%
Land Value					
Avg Rent ($)	782	1,097	706	735	468
Avg House Value ($)	280,052	410,757	345,472	250,059	130,301
Assessed Property Value ($ / sq ft)	24.86	204.46	12.78	22.22	30.38
Assessed Land Value ($ / sq ft)	10.00	86.78	5.62	8.48	4.74

Table 4.5 Characteristics of properties and populations within one half mile of sites in four different areas

Between these two extremes are the neighborhoods of Gowanus and Long Island City. With the exception of the percentage of black residents in Long Island City and the percentage Asians in

the Gowanus, within one half mile of BCP sites in both neighborhoods the racial distribution in both neighborhoods is roughly equivalent to the city in general. Average household incomes are well below the city-wide average while the number of families living below $20,000 per year is above the city-wide average in Gowanus and below the city-wide average in Long Island City. Rents, property values, and land values in both neighborhoods are below the city-wide average.

Overall, it is clear that sites enrolled in the BCP are located in widely varied geographic settings. In Chelsea residents living near BCP sites are much more likely to be wealth and white, while in the South Bronx they are more likely to be Black or Hispanic and poor. Land Values surrounding sites in the two neighborhoods show an even more dramatic disparity. In terms of population and property characteristics Long Island City and Gowanus are between these two extremes.

Conclusion

In this chapter I test whether the BCP encourages development and remediation of contaminated properties in areas with low-property values and predominantly poor and non-white residents. Compared with the city in general, the program at least partially fulfills these goals by encouraging development in areas with a very high percentage of Hispanic residents, slightly lower household incomes and a very high percentage of families making less than $20,000 or $50,000 per year. Although rents in these areas are very low, property values and house values are very high. The characteristics of these areas change pretty dramatically, however, in adjacent

areas where the percentage of white residents increases dramatically as do household incomes, rents, house and property values.

The propensity of the BCP to address issues of environmental justice, however, is most likely a product of the spatial distribution of the city's brownfields. When controlling for the location of brownfield properties it becomes clear that the properties enrolled in the BCP are those brownfields that are located in the neighborhoods with the highest percentage of white residents, lowest percentage of black residents, highest household incomes, rents, house and property values. While the BCP may address issues of environmental justice, it is encouraging development of brownfields in communities where area-wide issues, like crime, infrastructure, or access to transportation, are least likely to be pressing concerns. At the same time, the program is generally having little to no impact in some of the city's neighborhoods with the highest concentrations of poverty, non-white residents, and low property values. By directing environmental resources towards the city's most attractive property markets, the program may actually be widening the gap between environmental conditions in neighborhoods with wealthy and white residents and neighborhoods where residents are poor and either black or Hispanic; thus, the BCP may be exacerbating existing inequity concerns.

These results, however, obscure significant variability. Although the BCP may on average have little impact in areas with poor and non-white residents, that does not mean that there is no brownfield development in these areas. Rather, there are several BCP projects in areas like the South Bronx and Gowanus. The question then emerges whether or not development and remediation of contaminated sites in these areas actually benefits neighborhood-wide

environmental conditions. In the next three chapters I explore that question through case studies in three neighborhoods: Gowanus, East New York, and Melrose Commons.

Chapter 5: Upscaling the Gowanus

Situated between the Brooklyn neighborhoods of Carroll Gardens, Park Slope, and Boerum Hill the defining feature of the Gowanus area is a one and a half mile canal that gives the neighborhood its name (figure 5.1). Today, after nearly 150 years of sewage overflows, illegal dumping, and toxic industries, the canal and surrounding properties comprise one of the most polluted neighborhoods in New York City. Starting in the late 1980s the City began a clean-up of the canal mandated by the federal Clean Water Act of 1972. At first, the City's efforts emphasized cleaning the Canal's water and sediment. Under the Bloomberg Administration, however, the City pursued a different strategy. In addition to plans to clean the Canal, the City promoted development of many of the area's large, formerly industrialized and heavily contaminated properties. The city argued that the construction of each new mega-housing project and suburban style store would improve the neighborhood's environmental conditions, ultimately making it safer for its mix of black, Hispanic, and white residents.

In many ways Gowanus is typical of a gentrifying brownfield community. In the Gowanus the city used state brownfield programs to subsidize the conversion of the large and formerly industrial sites into commercial and residential structures, arguing that these projects not only yielded economic but also environmental gains. According to several neighborhood groups, however, the proposed clean-ups not only have done little to improve the neighborhood's condition but may have actually made things worse. In the following, I use postings and comments on neighborhood blogs in addition to newspaper articles and government documents

to describe these groups' critique in the context of three projects – the Public Place site, the Whole Foods site, and the Toll Brothers development. I argue that even if these projects protect human and ecological health within each site's boundaries – an assertion that neighborhood residents were profoundly skeptical of – the projects would exacerbate environmental issues like air pollution, flooding, and water pollution in the surrounding areas.

Background

From Marshland to Contamination

In the early 19th century, the waterway that is now the Gowanus Canal was a creek and the surrounding area, marshlands. Starting in the 1840s, the creek was widened and dredged, and its walls solidified to form the canal. At the same time the surrounding marshland was converted to developable property through fill (Plunz and Culligan 2007, Brownstoner 2007, Brownstoner 2008, Gowanus Lounge 2007d).

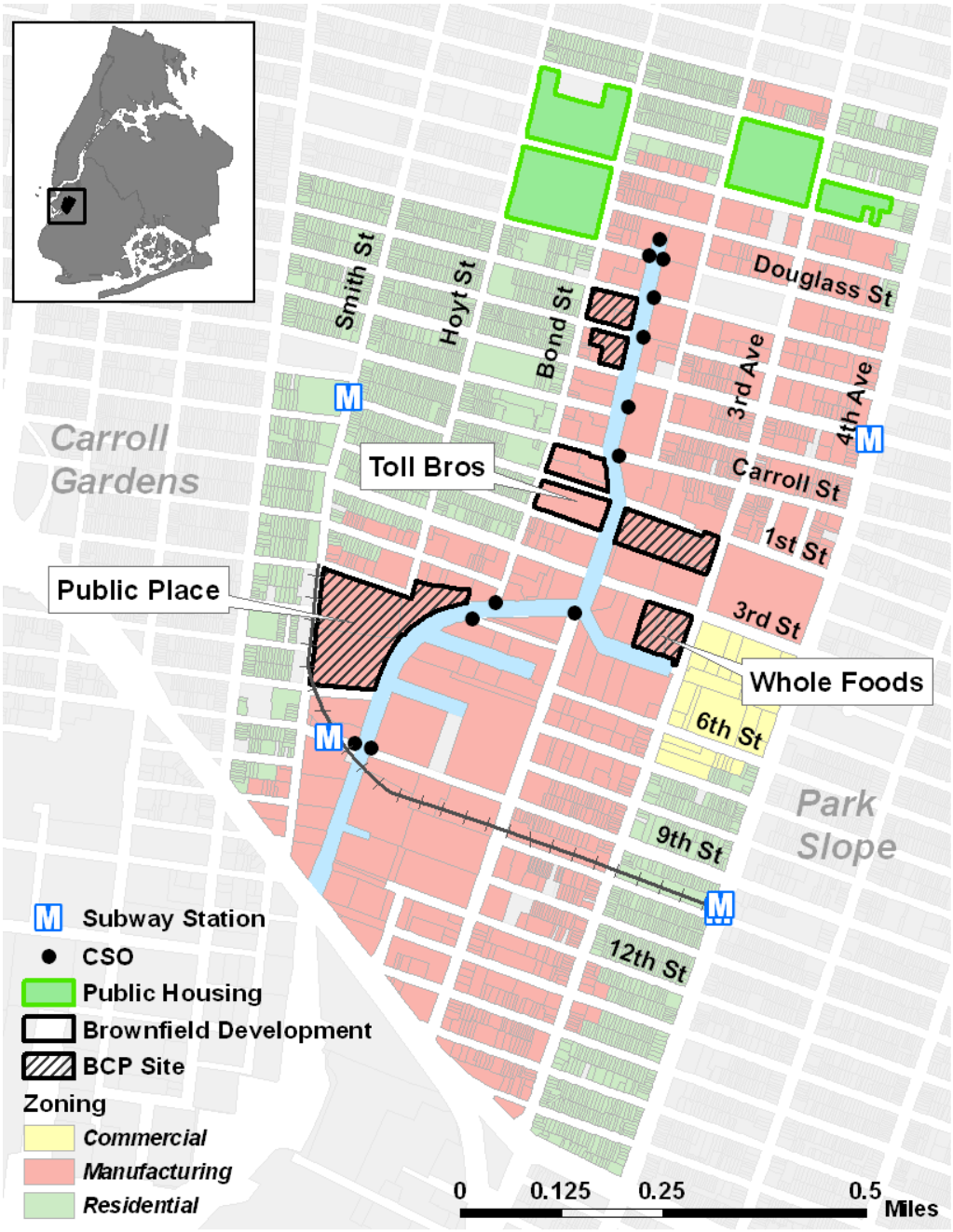

Figure 5.1 Gowanus overview map

Throughout much of its early history the Gowanus area flourished. By the turn of the century the Canal's waters were packed with barges carrying sandstone from New Jersey, lumber from the

Hudson Valley, and coal and food from Western New York via the Erie Canal (Reis 2000). Lined with fuel and coal depots, warehouses, and heavy manufacturing, the Canal's banks were similarly abuzz with activity. By 1922 over 2,000,000 tons of freight were transported through the Gowanus, making it the single most active waterway in the nation. At only 1,250,000 tons, the Erie Canal was a distant second (NYT 1922). For some of these goods, the Gowanus was just a stop-over until they travelled to other markets, but many were consumed in the rapidly expanding neighborhoods to the Canal's north, east, and west. The connection between the Canal and the rest of brownstone Brooklyn was evident after the financial crash of 1929 when a "slump in building operations" led to a precipitous decline in Canal shipping (NYT 1930).

Yet just as the canal became the conduit for transporting materials supporting the area's growth, so too did it become the receptacle for the surrounding neighborhood's wastes. To accommodate its growth, in the 1860s the city of Brooklyn instituted what would become the nation's first municipal sewage system. Lying at the borough's low-point, the Canal became an ideal downhill outlet for the city's increasing waste stream. With fourteen combined sewage overflow (CSOs) points along its banks (figure 5.1), today, the Canal remains the borough's sewer, as is readily evidenced by the odors during heavy rains. Human waste, however, was just one of the many contaminants polluting the Canal's waters. Throughout its history, either through direct dumping or by way of groundwater, improperly disposed of toxic wastes from the area's gas manufacturing plants, fuel depots, and manufacturers found their way into the canal.

While the deluge of waste and toxins would cause problems regardless of the circumstances, the original design of the Gowanus compounded the issue. Rather than spending slightly more

money to assure that the Gowanus' waters circulated, nineteenth century designers initially hoped that the tides would empty the canal, replacing its noxious contents with fresh water from the New York harbor (Reis 2000). The tidal flushing plan never lived up to its promise, and the mixture of sewage overflows and industrial waste was left to fester in place. In 1911, city officials attempted to correct some of these problems by constructing a flushing tunnel that pumped water from the canal's Douglas Street terminus underground to the Buttermilk channel separating Brooklyn from Gouvernor's island. Although a moderate success, in the mid 1960s the city ceased operating the tunnel due to mechanical failure (GCCDC 2006, McFadden 2007, Reis 2000).

This combination of topography, neglect, and incompetence has left the Canal as one of the most polluted waterways in the country. In 2003, the New York City Department of Environmental Protection (DEP) classified the Gowanus as unsafe for fishing, swimming, and secondary contact – a distinction shared by only Newtown Creek and Kill Van Kull. US Army Corps of Engineers (2006) have found significantly unsafe levels of at least 10 contaminants including volatile organic compounds (VOCs), cyanide, asbestos, lead, pesticides, PCBs, and mercury . Tests by New York City College of Technology faculty and students also revealed that the Gowanus is home to many human diseases such as typhoid, cholera, gonorrhea and the flu (McLaughlin 2007, Reis 2000). Perhaps the most problematic contaminants, however, are coal tars left from the area's gas manufacturing plants. While most contaminants are measured in parts per million (ppm) and some are measured in parts per billion (ppb), coal tar in the Gowanus is measured in parts per hundred with levels exceeding 4.5% (Holt 2009).

Throughout the end of the 20th century the City began to address the Canal's woeful state. In 1987 the City opened the Red Hook Water Pollution Control Plant to divert wastes from the Canal, although the CSOs still remain. The following year, the City dredged 2,000 tons of contaminated sediment from the Canal floor. In 1999, after laying dormant for nearly 30 years, the pumping station was re-opened (DEP 1999, Plunz and Culligan 2007, Reis 2000, The Gowanus Dredgers Canoe Club).

The Bloomberg Administration

Under the administration of Michael Bloomberg, plans to clean the Gowanus have accelerated substantially. While the Bloomberg Administration continues to maintain the flushing tunnel and dredge the Canal's floor (The City of New York 2009), it has shifted its attention away from the Canal itself towards developing the surrounding upland areas. In 2008, the Department of City Planning furthered these goals through its publication of the Gowanus Corridor Plan. While the Plan preserves existing spaces for manufacturing and heavy industry (figure 5.2, subareas C and E) in the area's northern and southern regions, it rezones 25 blocks along the canals shore from manufacturing to mixed use (figure 5.2, subareas A and B) (NYC DCP 2007, MAS 2009). Although manufacturing firms can still legally exist within these areas, they must now compete with, and in most cases are outbid by, residential and commercial uses (MAS 2009).

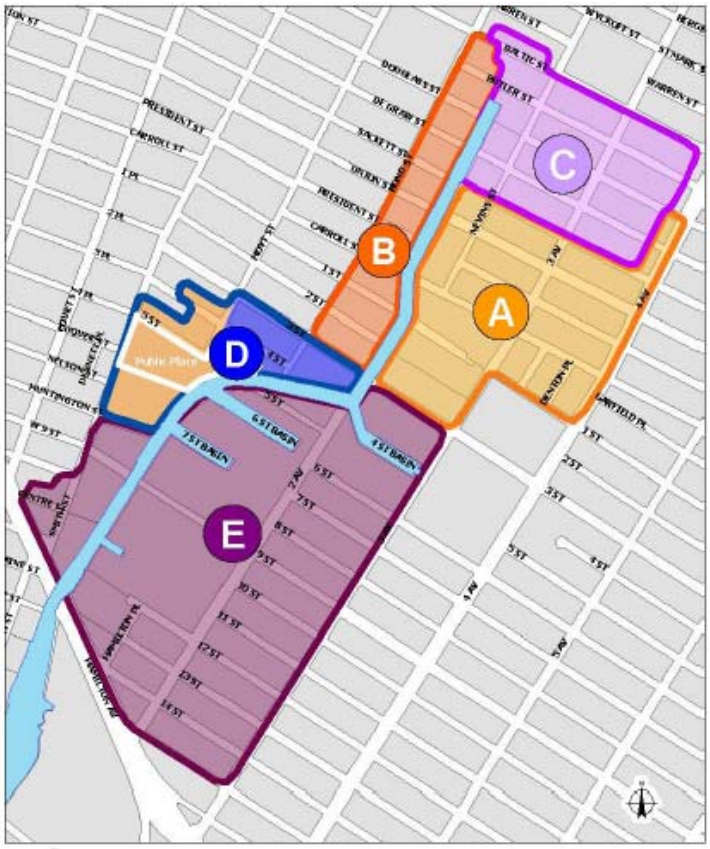

Figure 5.2 New York City Department of Planning Proposed Land Use Plan for the Gowanus Corridor (NYC DCP 2007).

While the Gowanus Corridor plan may ameliorate certain environmental concerns, it fails to address others. On the surface, the plan appears to follow an area-wide approach to city planning. According to the Department of City Planning, the Plan, which was created following "a series of outreach meetings," provides "a set of guiding principles that provides standards for formulating and evaluating proposals for future land use changes" and was "shaped by … an understanding of the entire corridor " (NYC DCP 2007). In practice, however, the plan limits discussion to site-specific concerns like establishing appropriate building heights and bulk, access to public space, or inclusion of low-income housing units and does not attempt to tackle

more pressing area-wide issues like contamination in the Canal, flooding, and CSOs. According to area residents, the City's failure to address these problems indicates that the City's intent in issuing the Gowanus Corridor Plan was not so much to improve neighborhood-wide environmental conditions as to promote development and advance demographic and social changes that had been underfoot for a decade (Gowanus Lounge 2007b).

Population and Politics

Over the course of the 20th century, population in the Gowanus decreased from just under 50,000 people in 1910 to approximately 20,000 in 1990 (see figure 5.3). At the same time, the area's black and Hispanic populations increased dramatically. By 1990 these two groups accounted for 20% and 37% of the area's resident's respectively. From 1990 to 2000, however, there was a modest reversal of these two trends. During this period, and for the first time in nearly 100 years, the area's total population showed a small gain driven largely by an increase in white residents (US Bureau of the Census 1990, US Bureau of the Census 2000). Today, the area around the Canal includes a mix of races and ethnicities. While residents of the Gowanus Homes just north of the Canal's in-land terminous are primarily black, those living in the industrial areas to the Canal's East are overwhelmingly Hispanic. Wealthier and white residents are occupying the new large apartment buildings being constructed along fourth avenue slightly further east and the lofts and single family homes in Carroll Gardens to the Canal's west.

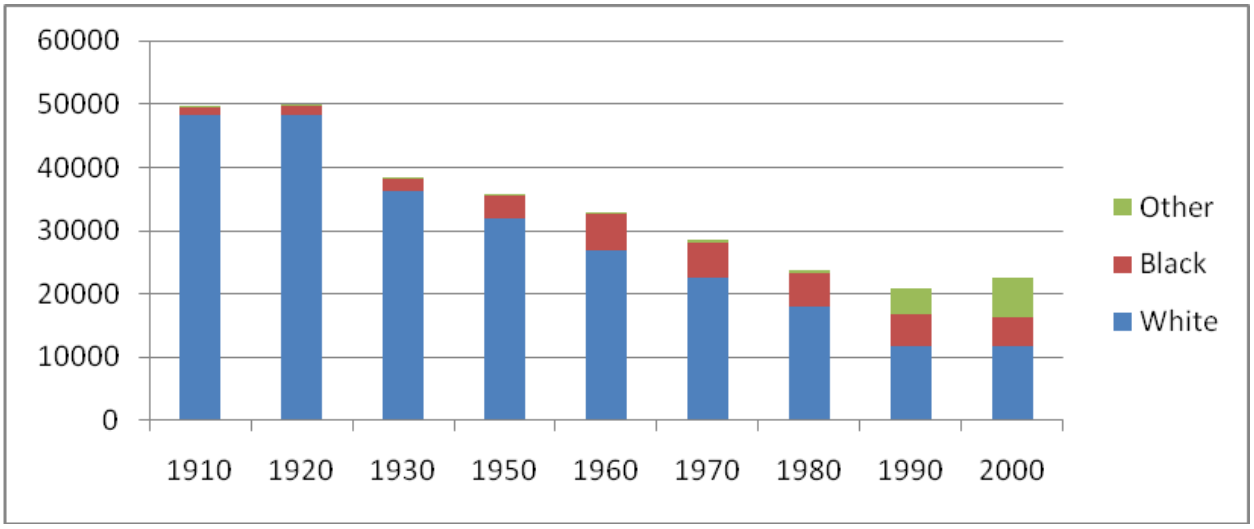

Figure 5.3 The race of the population living in the Gowanus, 1910 - 2000. Compiled from data retrieved from the National Historical Geographic Information System (Minnesota Population Center 2004).

Particularly in Carroll Gardens, new residents worked with long-time home-owners to infuse new energy into the neighborhood's political life. Rather than following one dominant group, neighborhood political activism centers on a constellation of small groups, many representing individual blocks. Frequently, these organizations will create alliances in response to specific issues. For example, in response to the City's plans to develop the Public Place site (see below), nine neighborhood groups came together to form the Public Place Alliance (Whitman 2005). Similarly, the Carroll Gardens Neighborhood Association, Carroll Gardens Coalition for Respectful Development (CG CORD), the Union-Sackett Block Association, Friends of Bond, Friends and Residents of Greater Gowanus (FROGG), and the Baltic Warren Neighbors Group joined together to form the South Brooklyn Neighborhood Alliance (SOBRA) (The Gowanus Lounge 2008). Most of these organizations, however, come from the predominantly white areas

to the east of the Canal bordering on Carroll Gardens while the predominantly black and Hispanic areas to the North and West of the Canal remain underrepresented.

In addition to meetings and other traditional organizing techniques, these groups rely on blogs and social media both as a forum for interaction as well as a means to publicize their opinions about changes in the neighborhood. There are five frequently updated blogs documenting the politics of development in the Canal – *The Gowanus Lounge*, *Pardon Me for Asking*, *Found in Brooklyn*, and the *FOB* and *CORD* blogs. The area also figures prominently in south Brooklyn blogs like *Brownstoner*, and citywide real estate blogs such as *Curbed* and *the Real Deal*. Many groups use these media to publicize their position on a particular issue either by maintaining the blog themselves, being in direct contact with those that maintain the blog, or commenting on various blog posts. In the following sections I use these media to document the community response to development on three brownfield sites – the Public Place Site, the Whole Foods site, and the Toll Brothers Project. As many of the neighborhood's black and Hispanic residents as well as the pro-development community groups and workers do not use these media, these data fail to capture their opinions and point of view. These blogs do, however, capture the evolution of discourses of many smaller groups and residents, particularly those located in the Carroll Gardens area to the west of the canal.

Brownfields

Brownfield development plays a pivotal role in the Gowanus Corridor plan. The plan, however, does not so much curb as respond to already emergent real estate pressure. Even prior to the

plan's introduction there were three area projects along the Canal's banks enrolled in the State's Brownfield Cleanup program: the Public Place Site, the Whole Foods Site, and the Toll Brother Site.

The Public Place Site

Public Place is a nearly six acre site that hugs the Gowanus Canal, at the base of Sixth Street. The site is bound by an above ground subway trellis on two sides and the Gowanus on the third. From 1860 to 1960, Public Place was the site of one of three manufactured gas plants in the Gowanus area. Coal gasification is a particularly toxic process, where coal is transformed into gas. By-products from the production process include coal-tars, sludges, lampblack, light oils, spent oxide and other hydrocarbon products (Plunz and Culligan 2007). While some of these substances became inputs into other industrial processes, many were left on-site causing long-term contamination in the groundwater and soil.

Since the closure of the oil to gas manufacturing plant, proposed uses for the site include a mini-mall, a department of sanitation vehicle repair yard, and senior housing (Klein 1987, CPD 6 1974, Biasci and Verderame 2002, Hammerman 1993) . In 1975, Keyspan (which would later become National Gas) designated it for public purposes including baseball fields and a sports stadium (CPD 6 1974, Cohen 2007b, Holt 2007). As described by an artist who used the site as an open air gallery in 1982 (Clueck 1982), illegal dumping was common:

> "trucks would come at night almost every night and dump barrels of toxic waste with all kinds liquids, turned over and opened up. We had a deal with Sanitation to pick up the trash on the sidewalk and they often would not take the stuff but call some kind of chemical specialists" (Pardon Me For Asking 2007).

The history of the site's toxic uses has left their mark in the form of severe on-site contamination. Table 5.1 shows observed and safe concentrations of benzene, toluene, ethylbenzene, and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAH), and Heavy Metals in the site's groundwater. These contaminants can be found deep in the subsurface with at least two active coal tar seeps into the Gowanus Canal extending to depths of 150 feet. In addition the contaminants are highly mobile. According to a report from the New York State Department of Environmental Contamination, under "extreme low tide conditions" these seeps "can cover a several hundred-foot reach of the canal with slicks and sheens" (DEC 2009). Authors of a study conducted by Columbia University School of Architecture drew the similarly dire conclusions that if the toxic hot spots on the property were not remediated they would eventually contaminate large areas of the Gowanus watershed (Plunz and Culligan 2007).

Contaminant	**Safe Level (ppb)**	**Observed (ppb)**
BTEX	5	540 - 2600
PAH	0.2	0 - 500
Heavy Metals	0.2	60 - 73,300

Table 5.1 Observed and safe concentrations of contaminants at the Public Place Site. (Plunz and Culligan 2007)

In 2007, the city issued a call for proposals to develop the site and ultimately selected the Hudson Company's Gowanus Green proposal for a mixed use project. Plans for Gowanus Green include 774 apartments, 38,000 square feet of retail and 100,000 square of open space (Gowanus Lounge 4/16/2008). Rather than doing a full remediation, National Grid, the party responsible for remediation, will conduct a typical "excavate, haul, and cap" clean-up by excavating eight feet of soil from selected locations on the property, replace it with clean soil, and pave over the entire site. To stop contaminants from seeping into the Canal, the property owners will build a subsurface containing wall. Wells will be used to remove existing contaminants (GEI Consultants 2007), and deed restrictions will limit the future use of the property. These remedial strategies have been approved by the state, and because the property is enrolled in the Brownfield Cleanup Program (BCP), the owners will be eligible for substantial tax abatements.

The Whole Foods Site

The high-end supermarket chain, Whole Foods, targeted a site on the corner of 3rd Ave and 3rd St for their first Brooklyn outlet. In many ways the location made a great deal of sense. Borough President Marty Markowitz lauded "the newest waterfront addition" for "knitting together the neighborhoods of Park Slope, Boerum Hill, Carroll Gardens, and Red Hook" (Gowanus Lounge 2006c). Whole Foods projected that this favorable location would attract a great deal of foot and automobile traffic – roughly 1,500 thousand car trips and 2,500 transactions per day (Gowanus Lounge 2007i).

The benefits of building along the Gowanus, however, were in part off set by the property's environmental conditions. The site was formerly home to numerous industrial operations including coal yards, an ice company, lumberyards, a petroleum oil company, a building materials company, a trucking company, a freight depot, and an automobile junkyard and automobile repair shop. Not surprisingly these past uses had left severe contamination usually associated with petroleum products including BTEX compounds such as benzene, toluene, ethylbenzen, and xylenes (Gowanus Lounge 2007f). The property also suffered from contamination coming from neighboring properties. Because the site was built on a former wetland, the groundwater, which was relatively close to the surface, carried a number of contaminants from spills and activities in the site's vicinity (Gowanus Lounge 2006a). For instance, *The Brooklyn Paper* identified a Benzene plume on the property that had most likely migrated from a nearby parking lot and fuel station owned by Verizon (Cohen 2006a).

As is true for other properties enrolled in the BCP– the store was going to follow a standard "excavate and haul" approach (Gowanus Lounge 2007d). In addition, Whole Foods was going to remake the bulkheads along the Fourth Street basin of the Canal and convert the existing decaying wood structures into publicly accessible space. Initially development went smoothly. Work on the site began in early 2005 with plans that the store would open in 2006 (Hack 2006a). By March 2006, representatives from Whole Foods proclaimed that the environmental clean-up was "75 to 80 percent complete," remediation would be complete by fall, and construction would start before the end of the year (Hack 2006b). In May of that year, with help from the city, the company acquired two adjacent lots occupied by a concrete recycling and building supply businesses (Gowanus Lounge 2006b). In October, when remediation was supposed to be complete, the company announced changes to their initial project. The new plan increased the complex's size 60% from 42,000 square feet to 68,000 square feet and increased room for parking 140% from 177 to 430 spaces spread across a 3-story parking garage and surface lot (Gowanus Lounge 2006d, Cohen 2006b). To get around zoning designations that limited the project to one-story buildings and 10,000 feet of commercial space, the company decided to develop more than 80% of the store below street level (Gowanus Lounge 2007d).

All of the optimism around the project, however, obscured significant issues. From the start the site faced major environmental problems. As early as March of 2006, blogs had labeled a large pool of green murky water in the middle of the site "Lake Gowanus" (see figure 5.4). By April 2007 development on the site appeared to be stalled. According to the Gowanus Lounge (2007a), "no work has gone on there [on the site] for months, and the piles of contaminated soil

covered by tarps have not moved." A month later, and six months after Whole Foods estimated that remediation would be complete, the company still did not have the necessary permits or approval for the building (Gowanus Lounge 2007j), and in November the Gowanus Lounge declared that the site had been in a "semi-abandoned state" for more than a year" (Gowanus Lounge 2007k). By August of the next year with no meaningful progress, many permits outstanding, and the company languishing in a financial slump, completion of the project appeared unlikely.

Figure 5.4 Lake Gowanus (Gowanus Lounge 2006b)

The Toll Brothers Site

Starting in 2004 there were hints that Toll Brothers, the international housing developer headquartered in suburban Philadelphia, was targeting the shores of the Gowanus for their next major housing development. Although the Toll Brothers are best known for their suburban developments, New York City figured prominently in their newly emergent urban strategy with major projects either completed or in the works in Long Island City in Queens, Union Square in Manhattan, Murray Hill in Manhattan, and two projects in the Williamsburg neighborhood in Brooklyn (Ryley 2008a).

In February 2008, the Toll Brothers announced their plans for a project between Carroll St and 2nd Place along the Gowanus Canal. The proposed project was to include a mixture of twelve floor apartment buildings along the Canal with smaller four story townhouses along First Place, Second Place, and Carroll St. Altogether, there are 577 units planned for the complex with 130 that are affordable to those earning less than 80% of the area's annual median family income. In addition to the residential space, the first floor of the project would be set aside for commercial and "community" uses, including a boathouse for the Gowanus Dredgers Canoe Club (figure 5.5). Buffering the site from the Canal would be a public esplanade. To protect from flooding, the Toll Brothers planned to build the site on a hill, so that all residential units would be above the 100 year flood plain (as cited in Gowanus Lounge 2008d).

Figure 5.5 Rendering of the proposed Toll Brothers Gowanus Canal project (Gowanus Lounge 2008d)

According to initial documents, the site did not face severe environmental contamination problems. In testimony to the City's Zoning and Franchising Committee, an environmental consultant hired by the Toll Brother's stated that:

> These properties are no different than other properties that Toll Brothers has developed in the New York City area. They are classic urban fill, they have some hot spots. … We did apply to the brownfields [the state's Bronwfield Cleanup Program] for one of the lots on the Gowanus and we were rejected because it wasn't dirty enough (video of Toll Brothers consultant Mimi Raybordesky on Pardon Me For Asking 2009c).

According to the consultant, the environmental conditions on the site were aided by a layer of hard clay located between five and seventeen feet below grade which acts as an "aquatard restricting downward migration of the contaminants." Toll Brothers's Vice President of Development David Von Spreckelsen similarly dismissed claims that the project's location on the Canal would cause a problem: "Let's be clear: sediments at the bottom of the canal pose no threat to human health unless humans come in contact with those sediments on a very regular basis" (Von Spreckelsen 2009). Even the odors, did not appear to be a concern, with Von Spreckelsen arguing that he "not once smelled anything coming from the canal" and that there is "no stench at all" (Ryley 2008a).

The environmental reports, however, tell a somewhat different story. In the consultant's Phase II Investigation Report, there are mentions of elevated concentrations of pesticides, metals, mercury, lead, and arsenic in the groundwater and soil (as cited in comments on Pardon Me For Asking 2009c). Further research by Community Board 6 revealed that the site was once the home of a paint company, several oil companies, and warehouses that likely would have left significant amounts of asbestos, lead, and other heavy metals in the groundwater and soil (CB6 as cited in Gowanus Lounge 2008i). It also appears that the reason the project was not enrolled in the state brownfield program was not because of light contamination, as the environmental

consultant testified, but because the Toll Brother's never actually owned the site in the first place. Rather, than buying the site outright, the Toll Brother's purchased an option to buy the site pursuant to a rezoning of the lots from manufacturing to mixed-use. According to the Brooklyn Paper, this put the Toll Brothers in a "catch-22": "Toll Brothers won't buy the site … until the city rezones the land for residential use. But the state can't approve a taxpayer-subsidized cleanup until the developer buys the site" (Cohen 2007a).

Demolition activities commenced even before the Toll Brothers announced their plans for the site. In January of 2007 the Gowanus Lounge (2007g) reported that demolition crews tore down a warehouse on the proposed Toll Brothers site, and that the demolition "happened so quickly that if you blinked, you might have missed the transition phase from building to pile of rubble" (Gowanus Lounge 2007e).

Environmental Impacts

Much of the concern of surrounding residents related to the viability of excavate, haul, and cap strategies. While these remedies purportedly protect human and ecological health on the site by minimizing the potential for exposure, many residents clearly believed that there were residual health risks. In relation to the Public Place project, for instance, the Gowanus Lounge reported that "an earlier meeting had resulted in a hostile reaction from some residents concerned about, among other things, the safety of putting community housing on such a polluted site" (Gowanus Lounge 2007h). In April 2008, *Pardon Me For Asking* similarly proclaimed "Bravo to Betty Stolz of the South Brooklyn Local Development Corporation who argues … 'Why stick people

someplace that can kill them. I wouldn't want my mother living there" (Pardon Me For Asking 2008). This position was later repeated by New York State Senator Velmanette Montgomery when she states that she "cannot in good conscience support development on contaminated land" (Pardon Me For Asking 2009e). Particularly within the Gowanus Lounge, there was a sustained fear that excavate, haul, and cap remedies are untested and would not be effective in the long-term, leading one commenter to describe the clean-up as a "quick band-aid" allowing poor people and seniors to "occupy potentially harmful residences" (Gowanus Lounge 2008b).

As development progressed, however, blog posts and comments shifted from concern about the effectiveness of remedies on site to how these remedial actions would impact environmental conditions in the surrounding areas. Three types of externalities arose in the blogs posts and comments: construction debris, flooding, and combined sewage overflows (CSOs). In each, distrust of regulatory agencies and developers and a lack of participation in the remedial process increased residents' fears.

Construction Debris

Although the term "brownfield" may conjure images of weed strewn lots and abandoned buildings, brownfield redevelopment may sometimes include the displacement of active industrial business that does not represent a site's "highest and best use." Redevelopment of the Public Place Site, for example, included the demolition of a neighboring clothing warehouse that provided uniforms to workers across the City (Ryley 2008b). To make way for the company's expansion, the Whole Foods Corporation razed a concrete recycling company and building

supply business (Curbed 2006). The Toll Brothers Project similarly displaced a neighboring wholesale dry cleaning business and a fiber optic cable manufacturer (Found In Brooklyn 2007b). These instances were far from unique. According to the Municipal Arts Society of New York (2009), roughly 40% of land-use in the area rezoned under the City's Gowanus Corridor Plan was occupied by industrial and manufacturing businesses not including transport and utility uses or parking. Displacing these firms not only constituted a significant loss in industrial employment, losing 540 industrial jobs lost in the re-zoned areas alone, but also an environmental hazard.

Remediating contaminated properties inherently poses environmental risks to the surrounding area. Almost all remedies require the property owner to transport contaminated fill or disturb toxic soil. Environmental risks may also arise when property owners raze existing structures. Particularly in the case of industrial sites, building demolition can produce fugitive dust containing lead, asbestos, and other toxic substances. The area-wide environmental impacts of demolishing industrial buildings were particularly evident in relation to the tearing down of the warehouse on the Public Place Site. In the *Gowanus Lounge* one resident stated that residents on nearby streets were "breathing in the dust there every day that is being stirred up"(Gowanus Lounge 2008a). In a comment on another story, an anonymous commentor responded to accusations of NIMBYism (not in my backyard):

> NIMBYs? Do you live in the neighborhood? Are your windows constantly covered with white dust from the concrete factories? Do you smell the stench from the canal? Those of us with children are concerned about heavy metals and other contaminants getting into the air in high concentrations - to [sic] toxic conditions directly below the surface are well documented - and if I lived next to or down wind of this site, I'd be very concerned (Gowanus Lounge 2008h).

During the warehouse demolition, one nearby resident who is also a member of the local Community Board, similarly states:

> As a nearby resident with a small child I feel at risk! What is going on here? ... It is of extreme concern that this work is being conducted adjacent to a children's park in open air with no protection and no community awareness (Gowanus Lounge 2008e).

The last commenter's emphasis on the lack of "community awareness" points to the way that the developer's failure to communicate remedial methods or progress amplified neighbors concerns and suspicions. In part, National Grid, the party in charge of the Public Place cleanup, has assuaged many of these concerns by maintaining a website that documents the company's plans for cleanup and being otherwise responsive to resident concerns. In other projects, however, the relationship between the developer and nearby residents has taken on a much more adversarial tenor.

Flooding

One of the most pressing concerns in the Gowanus is the issue of flooding. As one would expect of marshland, the areas around the canal sit just above sea-level and serve as the floor of a

valley separating Cobble Hill and Carroll Gardens to the west and Park Slope to the east (Plunz and Culligan 2007). These low-lying areas frequently flood, complicating development and creating health risks. An 1872 article in the *New York Times* argued that in the Gowanus area to "dig for a cellar was impossible without having the excavation fill with water almost as rapidly as the men could dig" (NYT 1872). Particularly in the summer months the article attributes outbreaks of "fever," "ague," and small-pox to these wet conditions. Although the construction of the canal in the late 1860s reduced these risks by draining the area, throughout its history the basements and streets around the Gowanus flood on a regular basis. Today, at intersections like the one at Sacket Street and the Canal (figure 5.6), heavy rains can bring puddles four feet deep (McFadden 2007) and flood local basements.

Figure 5.6 Flooding in the Gowanus (Gowanus Lounge 2007c)

By altering the area's hydrology, new projects threatened to exacerbate flooding concerns. For instance, to avert flooding the Toll Brothers planned to build their project on a hill elevated above the flood plain. While this solution would protect residents on that site, it would worsen flooding conditions in the surrounding area. According to one blogger, if the Toll Brothers build their project as planned "Bond Street will then become a valley between the raised ground on 1st, 2nd and Carroll Streets and the proposed raised ground along the canal" (Found In Brooklyn 2008a). The commenter's concern was that during heavy rains water would flow off the Toll Brothers site and into the canal, nearby basements, and intersections (Gowanus Lounge 2008f, Gowanus Lounge 2008g, Friends of Bond 2008).

Blog posts and comments indicate that residents were also nervous about flooding from the Whole Foods project. Soil on the Whole Food site served as a sponge absorbing the heavily contaminated groundwater running underneath adjacent uphill properties. When Whole Foods expanded their original design and placed much of the project below street grade, however, they effectively created a barrier wall diverting groundwater flow. Because the Gowanus area is located within a FEMA 100 year flood plain, residents were concerned that during heavy rains the re-routed groundwater would exacerbate existing flood risks in the surrounding neighborhood (Mirabella 2007, Brownstoner 2008, Gowanus Lounge 2007d). As one commenter argues:

> The whole structure (at least 95% of it) is a legal cellar–BURIED below the ground, BURIED BELOW THE WATER SURFACE! And all this to play tricks with zoning law! If this was good development, then the developer would do the right thing by this environment and not burry [sic] such a large chunk of nonsense in the ground here! If this was good development, then the developer would at least TRY to make a decent piece of architecture, one that addresses the landscape on which it will co-exist. This community deserves better than what is being proposed here especially since the public is paying for a good portion of it under the brownfield cleanup program (Gowanus Lounge 2008c).

Aside from the criticizing the site's design, the above comment also highlights the way that perceptions of area-wide risks are intertwined with the relationship between the developer, regulators, and the surrounding community. The commenter mentions the word "buried" twice, both times adding emphasis by writing it in all capital letters. While the reference to "burying" clearly refers to the company's decision to skirt zoning laws by building underground, it also captures neighbors' complaints about the project's lack of transparency. In several posts, comments, and letters to the New York State DEC, for instance, Friends and Residents of the Greater Gowanus (FROGG) argues that the Whole Foods Corporation had not put forth a public participation plan, as recommended under the BCP, and that public document repositories were inaccessible (Pardon Me For Asking 2009a). In another instance, the group complained that they could not submit a comment in response to the Whole Foods' application for a wetland permit.

CSOs

One of the fundamental challenges with converting industrial land for residential use is that it can significantly increase the number of residents in areas without providing enough infrastructure to support their needs. According to estimates, brownfield development could add

as many as 2,000 to 3,000 new housing units to the Gowanus. This mass influx of residents would place a major stress on the area's already overtaxed infrastructure. Prior to development the Gowanus area had neither a post office nor a grocery store. Making matters worse, the area was "losing basic services everyday" (Found In Brooklyn 2007a), including a local firehouse that was the victim of budget cuts and a hospital that was cutting back services (Pardon Me For Asking 2009b). The Gowanus's main subway line, the F Line, was similarly overtaxed with waits for morning and evening service, in the words of one commentator, that were "ridiculous" (Gowanus Lounge 2009). In addition, the schoolyard of the local elementary school was already filled with temporary trailers to accommodate overenrollment (Pardon Me For Asking 2009d).

Increased pressure on infrastructure could also have environmental consequences. In addition to school, transport, and other basic needs, new residents also would put increased stress on a sewage system that was already running over capacity. When measured on a project-by-project basis, as the city does, these increases were not that dramatic, but as FROGG notes on a comment in the blog Found In Brooklyn, when assessed for all projects taken together the impact can be substantial:

> What is most appalling is that this project is being consideration separate from all other projects in the works; project that also hope to dump their toilets into the same sewer line. Public Place site may get upwards of 1400 new toilets, the Bayside site could have 1000 new toilets, and who knows how many more could go between these sites. (FROGG comment on Found In Brooklyn 2008b).

Absent a more comprehensive plan to deal with Brooklyn's sewage and waste handling, during heavy rains, wastes from all of these new toilets would flow through the canal's fourteen CSOs

and further pollute the Gowanus' already toxic waters. Theoretically, the city could have addressed these area-wide concerns when it created the Gowanus Corridor plans. As FROGG argues on the Gowanus Lounge, however, at public discussions of the proposed area-wide re-zoning, the City would not broach environmental issues: "The community was busy talking about whether housing should be allowed anywhere along the water's edge while the department of City Planning was trying to ge us to talk about how high housing should be at the waters edge and how much parking should be included" (Gowanus Lounge 2007b). The city's failure to broach these topics again suggests a development process where regulatory agencies, developers, and environmental professionals are insulated from nearby residents' concerns.

Discussion and Conclusions

The community's response as expressed through blog posts and comments indicates that the city's site-by-site approach to brownfield development exacerbated environmental injustices in the Gowanus in at least two ways. First, city and state policies create distributional injustices. Each individual project may have lead to the protection of human and ecological health within site boundaries, an assertion that bloggers and commentors were skeptical of. However, by increasing construction debris and CSOs and exacerbating flooding conditions, the projects would have collectively increased nearby residents' exposure to environmental risks. The Second are procedural injustices. With the partial exception of the Public Place site, brownfield development in the Gowanus was insulated from public oversight and input. When creating the Gowanus Corridor Plan, the City failed to address residents' most pressing environmental issues. With each individual project, residents were similarly left out of the decision-making process and

city and state representatives and developers routinely ignored their concerns. This lack of transparency and communication amplified residents' fears while creating an antagonistic relationship between many residents and the developers, regulators, and environmental professionals who were overseeing remedial actions. A more comprehensive and area wide approach would have clearly gone a long way to mitigating both forms of injustice. Not only would an area-wide approach create a venue where area-residents could articulate their concerns and be appraised of on-going actions, it would also have significantly increased the range of possible options for addressing concerns like air quality, flooding, and CSOs.

The contrasts between area wide and site specific approaches to brownfield development became explicit in April, 2009, when the US Environmental Protection Agency (EPA) proposed to place the Gowanus Canal on the National Priority List (NPL), making it eligible for a federally supervised clean-up under the Superfund program. For many community groups, the NPL listing carried the promise of a comprehensive, area-wide clean-up and the end of the city's piecemeal approach. In response, the City, developers (particularly the Toll Brothers), and some community development groups, argued that designating the area a Superfund site would deter private investment and undermine all progress the city had made in cleaning the Canal and the surrounding areas.

In 2010, the EPA officially designated the canal a Superfund Site. It is not altogether clear whether the federal actions will live up to residents' expectations. The federal government has only agreed to clean up the canal while the upland areas (including the brownfield sites) remain under the jurisdiction of the state. While the EPA may intervene if remedial strategies jeopardize

their clean-up efforts, the state and city will continue their site-by-site approach to brownfield development. The Superfund designation, however, does make this approach less tenable as plans for both the Toll Brothers and Whole Foods sites have either been permanently shelved or are on hiatus.

There are, however, several limitations to these findings. First and foremost are the challenges of using blogs as a primary data source. While blog entries certainly represent the viewpoints of its authors, one must be cautious in attributing those opinions to the broader community. In part, this concern is addressed by the ways that individual blogs reference one another as well as publish the work of multiple community groups. Much more problematic is the way that this media excludes certain voices. In the Gowanus, this is particularly evident by what appears to be a lack of participation from the area's black and Hispanic residents. The above arguments thus represent the viewpoint of one segment of a diverse and divided community rather than the community in total. It does not, however, undermine the basic finding that a politically active segment of that community advanced a spatiality of brownfield development wholly at odds with that of the City.

Chapter 6: East New York's Industrial Brownfields

If Gowanus is one of the most thoroughly documented neighborhoods in the city, East New York sits at the other end of that spectrum. Located near Brooklyn's borders with Queens and Nassau County, East New York is one of the City's poorest neighborhoods. Until recently if media outlets mentioned East New York or neighboring Brownsville or Gravesend, it was to demonstrate urban decay. In the 1960s and 1970s, East New York became synonymous with urban blight as its white working class residents fled to suburban Long Island. In the 1980s, the neighborhood became ground zero for New York City's crack epidemic and set the still standing record for most murders in one year. In the late 1990s and throughout the first decade of the new millennium, however, media reports started to tell a different story. Instead of death and hopelessness, blogs and newspapers described a community where property values were rising and the streets were becoming safe.

East New York is still one of the poorest neighborhoods in the city, but the area has undergone a dramatic transformation with the construction of new housing, improving environmental conditions and dramatic declines in crime. This change in outlook was particularly evident in East New York's northwestern industrial quadrant. Although technically vacant, many of the parcels in this area historically housed the pillars of the neighborhood's thriving illegal economy. Starting in the mid 1990s, a new wave of small and large scale manufacturers replaced the drug dealers and sex workers. Along with land speculators and developers, these new industrial and tenants bought and sold the neighborhood's brownfields at some of the highest rates in the city.

East New York is thus emblematic of a different type of brownfield community than the Gowanus. Rather than a rapidly gentrifying area where formerly industrial sites are being converted into residential and commercial use, new occupants of East New York brownfields are small scale manufacturing and industrial firms. In contrast to the Gowanus, the state and city's new brownfield programs have almost no impact in these areas. Of all the new projects in East New York none are enrolled in the BCP or in any of the newer city initiatives. Instead, in industrial areas like East New York, the city and state promote brownfield development through a privatized Industrial Business District and other industrial retention policies. Although these programs do not prioritize site clean-up the way that other state and city policies do, new occupants appear to execute at least nominal remedies.

In this chapter I combine newspaper accounts, blog postings, land use and property transaction data, and satellite imagery analysis, to argue that while the methods of promoting brownfield development in the two types of neighborhood differ the results are very similar. While brownfield development in East New York may have lead to the protection of human and ecological health within the site's boundaries, by increasing automotive and diesel emissions it also exacerbated environmental problems in the surrounding neighborhood.

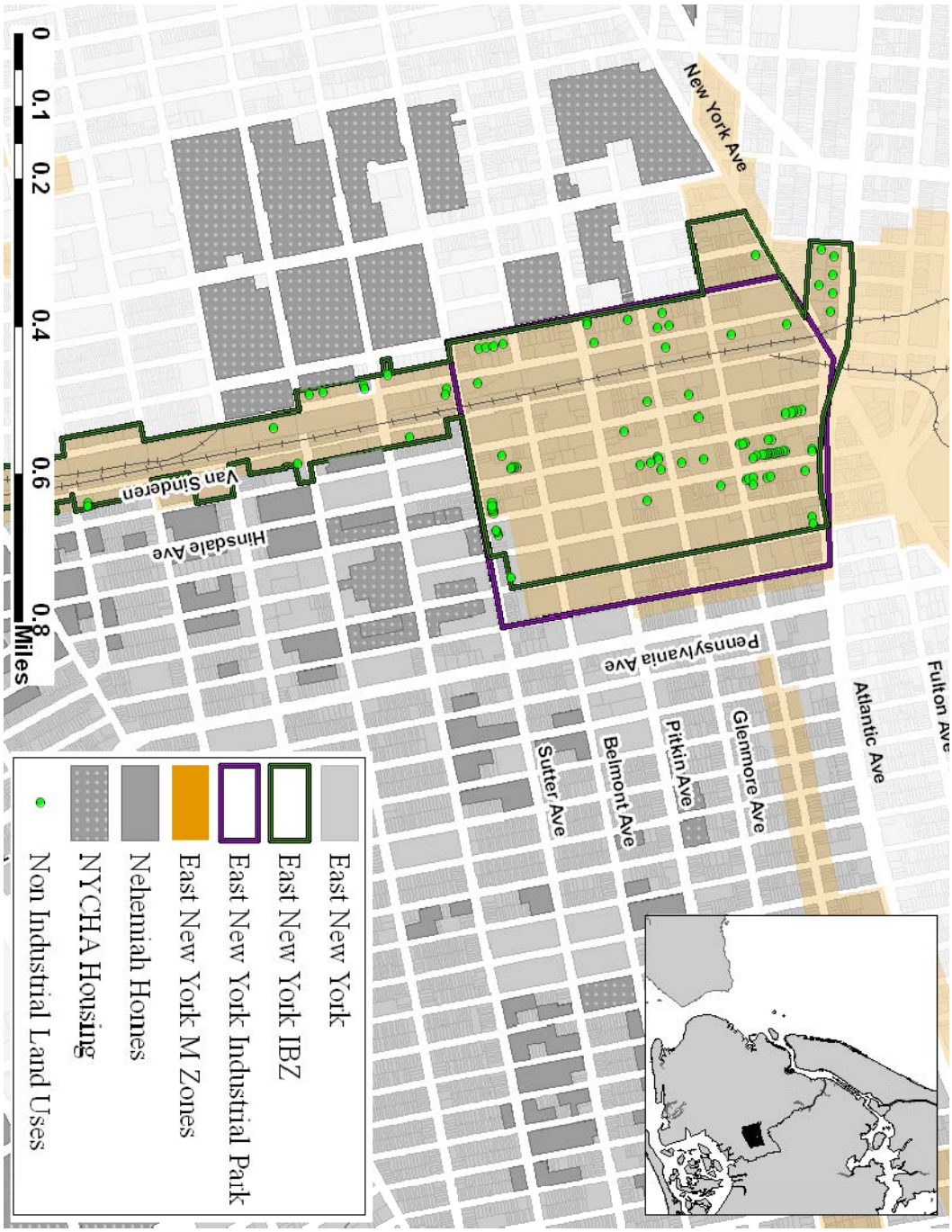

Figure 6.1 East New York overview map

Background

East New York is near Brooklyn's borders with Queens and Long Island in the borough's northeast corner (figure 6.1). The area's first European settlers were Dutch farmers who arrived in the mid-17th century. In 1835, Colonel John Pitkin consolidated 135 acres to form what he hoped would be a cosmopolitan center to rival Manhattan. At the end of the century, electric trolley's transported the eastern European Jews, Polish, Italian, and Russian residents between their original point of entry on Manhattan's Lower East Side and their new homes in East New York. By the great depression, the neighborhood was a bustling satellite community, with thriving commercial strips and small-scale manufacturing firms.

By midcentury, urban renewal coupled with changes in the City's population had dramatic impact on the neighborhood. In the postwar period, southern blacks and Puerto Ricans immigrated to New York City in unprecedented numbers. When they arrived, they tended to cluster in a handful of neighborhoods like Manhattan's Upper West Side, a geographic pattern that was reinforced by practices in the real estate and banking industry. Under the banner of urban renewal, the city leveled existing structures, built new housing and civic facilities, and ultimately made many of these "slums" more attractive to wealthier, white residents. As a new gentry moved in, rents went up, and black and Puerto Rican residents were forced to find new homes. For many this meant a move to East New York (Thabit 2003).

It's hard to imagine how quickly East New York changed. In 1960 first and second generation European immigrants comprised nearly 85% of the area's residents. By 1966 the neighborhood

was nearly 80% black and Puerto Rican (Thabit 2003: 7). As the racial composition of the neighborhood transformed, so did its landscape. Over the course of the 1960s the neighborhood's already aging housing stock underwent an accelerated rate of decline. By the end of the decade, many of residential buildings were no longer inhabitable and lay vacant. In 1971 a police report estimated that there were 1,000 vacant buildings in the area (Rogin 1971), double the number in 1967 (Thabit 2003: 173-4). On some blocks nearly one third of the buildings were either destroyed or uninhabitable (Thabit 2003: 171).

There were many causes for the dramatic decline of the neighborhood's housing. In some cases, buildings were owned by absentee landlords who could get away with charging high-rents without maintaining their properties. In other cases, banks would be unable or unwilling to sell foreclosed properties and when they did, the buyer was often a speculator that warehoused the site in hopes of future profits. Public policies and corruption were also major contributing factors to the neighborhood's decline. In one scandal, unscrupulous lenders colluded with assessors, government bureaucrats, and credit agency employees to secure Federal Housing Administration (FHA) insured loans for amounts in excess of the property's market. When the homeowner inevitably failed to keep up with payments the lender would foreclose on the property. Because the FHA would not settle insurance claims for a building that was still occupied, the lender would evict all remaining tenants and board the building. As the lender recouped his investment the FHA was left with a vacant and dilapidated property and the tenants were left homeless (Fried 1974, Thabit 2003, Wolf-Powers 2008, Gottlieb 1986).

The increase in vacancies had dramatic environmental repercussions. As the number of vacancies grew, illegal dumping and accumulation of garbage became an epidemic. Garbage collection was already a problem, but as crime rates increased sanitation workers avoided the neighborhood and collection became even less frequent. By 1971, an article in *The New York Times* described a blighted community:

> The vacant houses in East New York … are now burned-out, vandalized, shattered, filled with old shoes, smashed furniture, forgotten dogs and a sour eluvium of neglect and despair … Windows and doors are sealed with tin or cinderblocks or left open and broken. Scores of buildings have had the tin coverings or the metal gates which usually guard empty stores ripped away and the interiors ransacked, gutted and heaped with rank debris. (Rogin 1971)

The connection between vacancies and environmental conditions was explicit in a 1973 court case where several neighborhood groups from across Brooklyn (including groups from East New York) successfully sued the FHA. The group argued that by promoting the improper sealing of vacant buildings, encouraging vandalism, and ultimately destabilizing conditions for families in the area, the FHA's "delivered vacant" policy violated the National Environmental Policy Act (NEPA) (Wolf-Powers 2008, Thabit 2003).

In hopes of stemming the tide of vacancies, the city used its power of eminent domain to take ownership of the uninhabitable properties and then level them to make way for new development. In one of the most ambitious projects, the city attempted to demolish blocks of single and multi-family homes, some of which were still occupied, to build an educational complex. When the project never materialized, all that was left was a patch of city-owned empty

land (Lichtenstein 1974). In another project, the City evicted nearly 1,200 families and combined several smaller tracts it acquired through eminent domain to create an industrial park in the neighborhood's northwestern quadrant (Thabit 2003: 146, Shipler 1972, Kihss 1975). The goal of the project was to lure land intensive industries from the suburbs by offering them large, contiguous, and affordable tracts of land. In the end, however, there was little demand for the properties and many remained vacant. Even when the city found a tenant there was no guarantee of long-term occupancy because the city leased, rather than sold, the plots (Shipler 1972, Kihss 1975). Once again, the city became the owner of the neighborhood's vacant lots.

Another strategy the city used to address the problem of vacancy was tax foreclosure. During the 1970s, the City shortened to one year the time an owner could miss paying property taxes after which the City would take title of the property. The hope was that aggressive intervention in the early stages of tax delinquency would preserve the housing stock by stemming the tide of abandonment and decay. Under the policy the city's property roles swelled. By 1986, the city owned 53,000 occupied and 30,000 vacant units across all five boroughs making it, in the words of one editorial, "the biggest slumlord in the state" (Allred 2000, Mueller 1999). In East New York, tax foreclosures transferred ownership of the bulk of the neighborhood's 4,500 vacant buildings to the city (Thabit 2003: 207).

In the end, neither eminent domain nor tax foreclosure successfully addressed the neighborhood's problems. Through the next two decades the neighborhood's conditions only worsened. In 1987 there were only 1,200 people working in sixty-six factories in the area, a two-

thirds reduction in employment over a ten year period (Roberts 1987). The loss of jobs left the area desperately poor. By 1990, one in four of the area's households had an income of less than $10,000 per year, and over half the adult residents did not have a high-school diploma (Simon and Buntin 1999: 6). Fueled by a raging crack epidemic, the neighborhood became one of the most crime-ridden areas in the city. In one year in the mid-1980s, there were more than 400 burglaries of forty-three businesses (Roberts 1987), and in 1993 the 75th precinct (which includes East New York) had the dubious distinction of having 129 murders which remains the city-wide record for most murders in one year (Simon and Buntin 1999: 1). Crime became so pervasive that police officer's labeled the western areas of the neighborhood as the "dead-zone."

From the"Dead Zone" to "Bamboo Floors"

Starting in the mid 1990s things started to change in the neighborhood. For the first time in decades, crime decreased, and new housing was built. Vacant land played an important role in this transition. By the late 1980s, there was such an abundance of vacant land in the neighborhood that horses grazed freely (Roberts 1987). Throughout the 1990s, however, the amount of vacant land decreased by 25% and it had become a scarce commodity (Hevesi 2001). One cause for the dramatic decline in vacant space was the city's aggressive sale of properties that it had earlier acquired through eminent domain and tax foreclosure.

In general, the city used two methods to dispose of city-owned land. First, the city auctioned its properties to the highest bidder. While these auctions provided the city with much needed revenue, and in some cases provided affordable housing, it also attracted speculators who would

drive up the value of the property beyond what a poor or middle class family could afford (deCourcy Hinds 1987). In many cases, speculators would not build on these lots but let them sit idle in the hopes of profiting in the future. The extent of speculator *warehousing* was documented in a report from the community group Association of Community Organizations for Reform Now (ACORN) which found that two out of three properties that the city auctioned between 1996 and 2003 in ten neighborhoods with predominantly poor, black and Puerto Rican residents were still vacant (Cooper 2003).

The second approach the city took to transfer publicly owned properties into private hands was to deed the property to a community group at little or no cost. In East New York the most prominent amongst these efforts was the city's collaboration with a consortium of churches – the East Brooklyn Congregations (EBC). The city worked with EBC in a number of ways including a project where the city replaced missing street signs on corners identified by EBC volunteers (Hevesi 2001). EBC also worked with the city to build new affordable housing on vacant city-owned lots (Thabit 2003). In the early 1980s the scale of these efforts increased dramatically. At that time, EBC worked with the mayor's office to construct approximately 2,500 single family homes (figure 6.2). Naming the project after the biblical prophet sent to rebuild Jerusalem, the Nehemiah Homes were pre-fabricated single-family homes, constructed in the Brooklyn Navy Yard, and assembled on vacant lots (Thabit 2003, DePalma 1987). Along with projects by the East New York Urban Youth Corp. and ACORN, the Nehemiah Homes began to transform the face of the neighborhood.

Figure 6.2 The Nehemiah Homes in East New York (Source: Author)

Housing was not the only use for city-owned vacant land. Throughout the 1990s, residents constructed community gardens and small-scale urban farms on the area's vacant lots (Celock 2007). At first, these community farms existed with only the implicit consent of City Hall. Following confrontations over community gardens in gentrifying neighborhoods, like Manhattan's East Village, however, conflicts over the gardens intensified. On one side were community gardeners seeking a legally binding ownership claim on the plots. On the other side was the city who sought to sell the properties to developers for housing construction (Staeheli, Mitchell and Gibson 2002, Zukin 2010). In 2002, Mayor Bloomberg partially assuaged these tensions by assuring that the bulk of the gardens would remain under the control of the city

agencies or by transferring ownership to private foundations (Zukin 2010). Today, the product of these labors are available at local farmers' markets and a neighborhood food coop (Monahan and Belenkaya 2008).

As new housing was built and crime rates declined, the neighborhood became appealing to global capital investors. In 2006 the Arker and Domain company bought the affordable housing complex Spring Creek Gardens for $18.3 million, with plans to invest an additional $50 million in renovations (The Real Deal 2006). In 2009, Hudson Development received financing for a 176 unit building nearby. Global capital also flowed to the neighborhood in the form of mortgage lending (Kelly 2009). With credit easily available, home prices skyrocketed, and East New York was increasingly appearing in the posts of real estate blogs like curbed.com or the Real Deal. By 2008 *the New York Daily News* proclaimed "Welcome to Brooklyn's East New York, where working-class families can find apartments loaded with granite countertops, bamboo floors, French door closets, and Crate and Barrel sinks for prices ranging from $110,500 studios to $350,000 three-bedrooms" (Sheftell 2008) . *The Real Deal* similarly gushed about detached single family houses selling for $600,000 (Warshawer 2007).

These developments, however, did not benefit neighborhood residents equally. Like Virginia Daniels who hoped to sell her 4 bedroom brick house for $400,000 (Hevesi 2001), many longtime homeowners viewed the housing boom as an opportunity to reap previously unthinkable profits. For renters, however, the change was much more problematic. For example, RY Management, Inc evicted over half of the residents (many receiving rent subsidies)

from Linden Plaza following a $52 million renovation (The Real Deal 2009). Also, many of the gains proved elusive. As was true in other predominantly minority communities, non-traditional lenders offering high rate mortgages drove much of the real estate growth. With over leveraged homeowners defaulting on these subprime loans, housing prices tumbled. In 2008, T*he Real Deal* reported that prices in the East Brooklyn housing market (including the neighborhoods of Bedford Stuyvesant, Crown Heights, and East New York) decreased by over 20% in less than a year (Polsky 2008).

Brownfield Development

Just as East New York residential projects were appearing more frequently in posts and articles, the city's blogs and real estate press were also taking an interest in the neighborhood's industrial properties. "Affordable space is growing scarce even in East New York" proclaimed a 2000 article in *Crain's New York* – a business oriented daily. The article continues to recount increases in property values more commonly associated with gentrifying neighborhoods in Manhattan or other parts of Brooklyn: "a one-story building, which rented for $3 to $4 per square foot five years ago, now commands $5 to $6 per square foot. On the sales side, one-story industrial buildings that sold for between $20 and $35 per square foot five years ago now snare $55 per square foot" (Trager 2000). In 2000, an article in *Real Estate Weekly* celebrated the neighborhoods "excellent accessibility" and "large and diverse labor pool" (Real Estate Weekly 2000).

Property appraisal and property sales data confirm these positive assessments. From 1989 to 2000, the square footage of vacant land decreased 54%, outpacing Brooklyn's and New York City's respective 12.4% and 23.5% declines (MAS 2001). Vacant and industrial property, which is notoriously illiquid, transacted at a dizzying rate with 109 of the 237 (46%) lots in East New York that were vacant and zoned for manufacturing in 2003 changing ownership at least once by 2009. By comparison, I randomly selected 237 New York City lots that were vacant and zoned for manufacturing in 2003 999 times. In each iteration I counted the number of lots that were sold by 2009. In only one instance was the transaction rate greater than the number observed in East New York. This indicates that the transaction rates for vacant manufacturing land in East New York are significantly higher than the city in general, and that those differences are most likely not due to chance.

None of this boom, however, can be attributed to city and state voluntary compliance or BOA programs. There are no programs enrolled in the State Brownfield Cleanup Program or its predecessor, the Voluntary Cleanup Program. While East New York is an officially designated Brownfield Opportunity Area, the BOA committee is just now identifying potential targets for redevelopment. Instead, there are four major reasons for the boom in neighborhood brownfield development. First, even though the City's industrial base continues to contract, the supply of industrial land is decreasing faster than demand. Unable to pay the escalating rents in formerly industrial but now increasingly residential neighborhoods like Greenpoint, Williamsburg, and Gowanus in Brooklyn, Long Island City in Queens and the South Bronx, manufacturing and

industrial firms turned to neighborhoods like East New York where fairly priced industrial properties were readily available. Second, during this period there was a general economic upswing. Although, this did not reverberate throughout the city's industrial economy, firms associated with expanding sectors, like the construction industry, thrived.

The third cause of East New York's wave of brownfield development was nearly twenty years of industrial retention policies. In the mid-1980s, for example, East New York was designated as one of the city's two industrial business improvement districts (BID). Businesses within the BID's boundaries pay a fee to the East New York Local Development Corporation (ENYLDC). In exchange the ENYLDC provides important services like security, cleaning garbage from vacant lots, and maintaining infrastructure. In addition, the ENYLDC serves as the ombudsman and helps local businesses take advantage of state and city programs designed to spur industrial development. ENYLDC also manages the state Empire Zone program which provides businesses within the zone's borders with tax credits for each employee hired. Businesses within the East New York BID can also save costs by participating in an area wide program that shared energy costs. More recently, the Bloomberg administration designated East New York as one of the city's seventeen Industrial Business Zones. Under the program, businesses locating within an IBZ are offered additional tax breaks and incentives. Further, the Bloomberg administration has committed to preserving industrial zoning within IBZs, reducing the likelihood that area businesses would have to compete with residential rents.

The fourth reason for East New York's property boom is that the city owns many of the neighborhood's brownfields. As of 2003, 45% of the lots and 37% of the total area that was vacant and zoned for manufacturing was city owned. In the ensuing years the city aggressively transferred ownership to companies seeking to expand or to firms moving into the area. By 2009, the city had cut its holdings in half. Disposition of city-owned properties remains an arcane and confusing process. Currently, the Economic Development Corporation (EDC), a publicly-owned not-for-profit corporation, is brokering the sales. EDC sells publicly owned land through a request for proposal (RFP) process. While the accepted bid must match market prices, as determined by an independent auditor, EDC may take additional factors into consideration. For example, in a recent RFP for the sale of three lots in East New York, EDC identifies the number of new jobs and the use of energy-efficient structures as two factors they will use in determining who can buy the land.

The rapid growth of East New York's brownfield market was fundamentally different than the change in other industrial, and formerly industrial, areas. In neighborhoods like West Chelsea, Gowanus, or Greenpoint, gentrification and increased property values led developers to convert brownfields into high-rise apartment buildings and big-box superstores. In East New York, however, property owners continue to employ brownfields for industrial uses. While neighborhood property values are certainly increasing, in East New York the primary driver of brownfield development is industrial retention policies that made the neighborhood attractive to industrial firms. Further, as the seller in so many transactions, the city has the power to control

the future use of the property in ways it could not if the sale was between private parties. As a result, in East New York, the number of industrial firms has increased while they were decreasing citywide.

On the surface, the concentration of industrial firms in a neighborhood with primarily poor and minority residents may appear to be a form of environmental injustice. Maantay (2002b), for example, argues that the city perpetuated environmental injustices because it was more likely to re-zone lots from residential to industrial use in communities with a high percentage of poor and minority residents, while it was more likely to re-zone lots in communities with a higher percentage of wealthy and white residents from manufacturing to residential uses. Like many others studying the issue of environmental justice (Oakes, Anderton and Anderson 1996, Been 1994, Talih and Fricker 2002), Maantay does not differentiate between industrial land uses. While some industrial firms emit potentially harmful toxins into the air or water, others do not. In order to assess the environmental justice implications of brownfields development in East New York, it is essential to understand what types of companies have moved to the area and how they use the land.

Neighborhood Impacts

Brownfield redevelopment is almost universally hailed as an environmental boon – with the assumption that the new owner must clean the site in order to develop. It is not clear, however, that the redevelopment of East New York's brownfields has yielded substantial environmental benefits. Because the majority of property sales in the neighborhood did not involve land use

change, they occurred “as of right.” Under an “as of right sale,” there is no requirement for environmental review or assessment, and the new property owner may develop the site as he or she pleases, provided that new development does not violate existing zoning laws. Even though the city does not require it, property owners may still conduct an environmental assessment or remediation. In some cases, the property owner may do this as a protection against future environmental liability claims. In other cases, a financial institution may require a property owner to execute these actions to qualify for a loan. Because there is no public record of these actions, it is hard to know if contaminants were found, at what concentrations, and how the property owner responded. Interviews with personnel at the City’s Office of Environmental Remediation indicate that when requires that a lender voluntarily remediates his or her property, they often use concrete caps and other engineering controls. The success of these remedies is entirely dependent on long-term monitoring and it is not clear that lenders have either the personnel or the will to pursue meaningful oversight.

The environmental requirements differ when the city is the seller. State law requires that upon acquiring or rezoning a property the city goes through the Universal Land Use Review Process (ULURP) that requires both an environmental assessment. If the environmental assessment finds a “significant environmental impact” to be likely or possible, the city can then require a full environmental impact statement along with a public comment period. Almost all city owned industrial properties in East New York went through the requisite processes in 1987, when the city designated the area as an urban renewal area. As the lead agency in charge of the

disposition process, the City Economic Development Corporation (EDC) may also require purchasers of city owned property to go through an environmental review process, even if there is no change in zoning or land use. Because they can specify criteria other than price, such as new jobs created or energy efficiency, EDC can also require environmental cleanups as a factor in the RFP process. In interviews, EDC employees stated that EDC requires that all properties be in compliance with statewide standards and that the agency will conduct ongoing investigations to assure the soundness of those remedies. Documents retrieved from EDC through a Freedom of Information Law (FOIL) request, however, tell a very different story.

Although inconsistent, documentation of environmental conditions is available from the EDC under the state's Freedom of Information Law (FOIL). Based on information I obtained through FOIL requests for documents relating to the sale of seven city-owned properties[2], it appears that in no case did EDC require perspective purchasers to execute any environmental remedies even when the concentration of chemicals in the soil exceeded values in statewide tables or the much less stringent background values. Although EDC often conducts a phase II environmental site assessment (ESA) for city-owned properties prior to disposition, ESAs were only available at four of the seven requested transactions. In three of those four cases, the ESA revealed the presence of semi-volatile organic compounds (SVOCs) and metals - including arsenic,

[2] All sales involved more than one lot

beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, and zinc – well above state standards. At a fifth site, where a complete phase II ESA was not available, an environmental investigation examining for the presence of leaking underground storage tanks revealed that one of the lots "was entirely covered by metallic debris and abandoned vehicles," indicating the probable presence of metals in the soil. In none of these five cases did the city require the property owner to conduct a thorough environmental review of the property or to remove existing contaminants. Instead, for all seven projects, including the four where there were known contaminants, the city waved the requirement that property owners conduct an environmental review, claiming that the proposed projects are not more noxious than present uses and will therefore not have negative environmental impacts.

Even though the city did not mandate the new owner to execute an environmental remedy, it appears that some of the new owners may have put one in place. Five of the applicants included projected business costs as part of their RFP applications. As all five projects were financed without a bank loan or mortgage, it is unlikely that a financial institution required that the property owner bring the site into compliance with statewide standards. Nonetheless, in three of the cases, it appears that the property owner did execute an environmental remedy of some sort. These three cases included a line-item for "site preparation costs." Consistent with the expected costs of environmental remediation, the site preparation costs at those two sites were between 5% and 10% of total development costs (Wernstedt et al. 2004). Most likely these remedies involved removing debris, replacing contaminated soil with clean fill, and then covering the

surface with either a parking lot or building foundation. As I discuss below, even if the new owner did protect human health at the individual site, it is likely that the new business exacerbated area-wide environmental problems.

Transportation Related Industries

From 2003 to 2009, East New York's industrial economy experienced a significant shift away from manufacturing and construction and towards transportation-related land uses. A comparison of 2003 assessment data from the New York City Department of Finance with the same data set in 2009 reveals the extent of that change. In both years, factories and industrial buildings comprised the largest use of land zoned for manufacturing. During this period, however, the square footage of factories and industrial buildings decreased 17%. At the same time there was an 11% increase in the land area of garages and gasoline stations and a 48% increase in the land area of warehouses. The growth of transportation-related industries from 2003 to 2009 is a continuation of a trend that started in the 1990s, with the land area of lots dedicated for auto-related uses doubling between 1989 and 2000 (MAS 2001).

Analysis of employment data tells a similar story of expanding transportation industry and contracting manufacturing firms. The US Bureau of Labor Statistics (US BLS) tabulates the number of employees, companies, and wages by industry in the Quarterly Census of Employment and Wages (QCEW). The data for the QCEW comes from unemployment insurance as collected by state agencies and is normally aggregated at the state level. In order to assess changes in East New York's workforce, I obtained zip code level data from the Center for

Urban Research (CUR) who acquired the data from the New York State Department of Labor (NYS DOL). The results are shown in table 6.1. In general, industrial companies fall under one of three categories: construction, manufacturing, and transportation and warehousing. Between 2000 and 2006, the first two of these three categories – construction and manufacturing - experienced dramatic declines in employment with the number of employees in construction dropping from 1,197 in 2000 to 545 in 2006 (a 54% decline) and the number of employees in manufacturing dropping from 2,779 in 2000 to 1,883 in 2006 (a 32% decline). In the manufacturing sector, the food manufacturing, apparel manufacturing, and furniture manufacturing subsectors lost approximately 200 jobs each and accounted for nearly 70% of the job losses. Even employment in fabricated metal product manufacturing, which was featured in much of the city's promotional material, declined by nearly 127 jobs in the six year period.

As the neighborhood's manufacturing and construction industries contracted, the transportation and warehousing industry experienced dramatic growth. In 2000 there were 2,280 people employed in this sector. By 2006 that number had increased 55% to 3,533. Almost all of this increase was likely due to the expansion of existing firms, as there were only four more companies in 2006 than there were in 2000. Nearly all of the employees in this sector were in the "transit and ground passenger transportation" subsector which the BLS (2009) describes as including "urban transit systems; chartered bus, school bus, and interurban bus transportation; and taxis" (BLS 2009).

	Construction	Manufacturing	Transportation and Warehousing
2000	1,197	2,779	2,280
2001	1,298	2,607	2,310
2002	1,332	2,393	2,557
2003	1,380	2,209	3,154
2004	1,406	2,306	3,319
2005	1,198	2,079	3,404
2006	545	1,883	3,533

Table 6.1 Employment by Sector in East New York (BLS 2009)

In street level surveys of the area, the abundance of transportation-related industries was evident. Not only were parking lots of school buses, charter vans, and health related transport visible, but vehicles often spilled out of the lots taking up both sides of the street. The high density of transportation-related industries was also evident in satellite images of the area. When seen from above, transportation land uses have an unmistakable pattern. Unlike parking lots at a shopping center or for a business where cars may be unevenly spaced, buses and vans parked in lots owned by transportation oriented firms are closely parked to each other in an efficient and orderly manner. These patterns are omnipresent in a 2010 satellite image from Google Earth (figure 6.3).

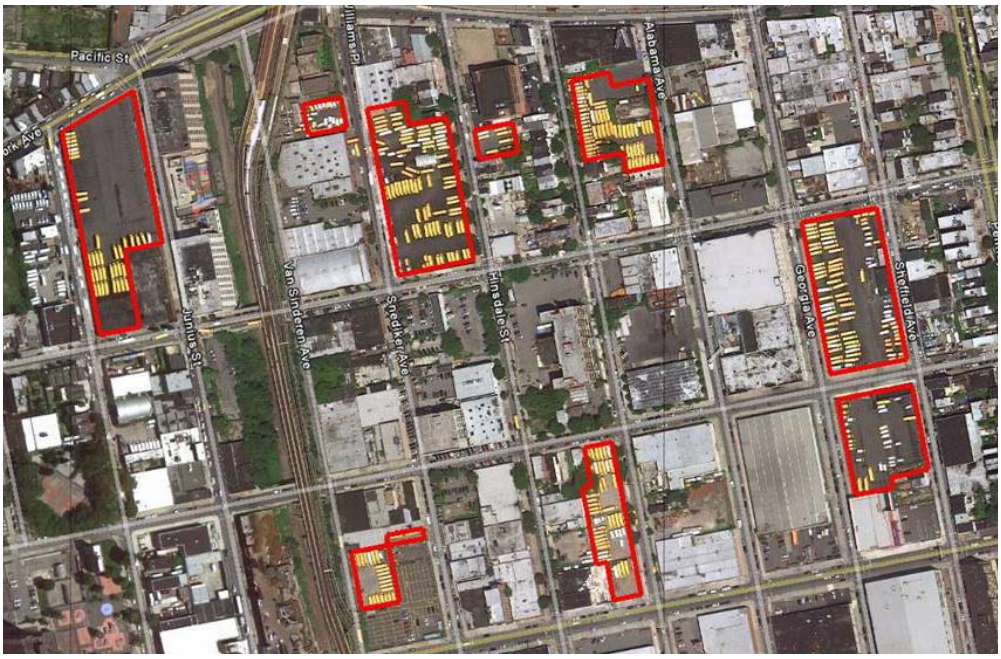

Figure 6.3 Aerial Image of East New York's Industrial Area with school bus parking lots highlighted (Google 2010)

Brownfield development played an important role in East New York's shift towards transportation related industry. Although brownfields transactions were common from 2003 to 2009, it did not always result in immediate changes to the landscape, as slightly less than half of the land area remained vacant. The high rate of vacancy may reflect the presence of speculators who were *warehousing* vacant land in hopes of continually increased prices. The high rate of vacancy may also reflect the long time it takes to develop many of these parcels. More striking than the vacancies is the increasing role of transportation-related industries in East New York's industrial economy. Nearly one-third of the land area that was vacant and zoned for

manufacturing in 2003 was used for warehouses, garages, or gasoline stations in 2009[3]. Between 2003 and 2009, property owners were much more likely to convert vacant land to garages, gas stations, and warehouses than to land with one or more structures. There were 224 lots that were zoned for manufacturing but changed building class by 2009. 125 of those 224 lots were vacant in 2003 and 99 had at least one structure. While 72 of the 125 (58%) lots that were vacant in 2003 became a gas station or a garage in 2009, only 9 of the 99 (9%) lots that had a structure in 2003 underwent a similar conversion (table 6.2).

Many of these industries grew by acquiring land from the city. Nearly one third of the brownfield land that was converted for transportation related uses between 2003 and 2009 was originally city owned. The experience of the Consolidated Bus Company exemplifies the city's promotion of East New York's transportation-related economy. Also known as Boro Transit, Inc, Consolidated's primary business comes through contracts with the New York City Department of Education to provide school bus transportation. Since the company was founded in 1988 it has continually expanded. Today, consolidated owns nearly seven acres of property in

[3] These findings may be an artifact of the data. Assessors must use their judgment in determining how a property is being used and what might appear to be a parking lot one day could seem vacant the next. If this were the case we could also expect the reverse. Yet, only one lot that was listed as a garage or gas station in 2003 was designated as vacant land in 2009. This indicates that the findings are not likely due to assessors' judgment.

East New York, has revenues between $7 and $8 million, and employs over 300 people (Manta 2011). Over 40% of the property the company owns was acquired from the city, including major purchases in 1993 and 2001. Smaller companies have also benefited from city land sales. For example, in 2009, Saradi, Inc – an auto repair shop – purchased four lots from the City's Industrial Development Agency to park school buses and other vehicles either before or after repair.

2009 Bldg Class	**Not Vacant in 2003**	**Vacant in 2003**
Factories And Industrial Buildings	20	6
Garages And Gasoline Stations	9	72
Miscellaneous	4	31
Store Buildings (Taxpayers Included)	9	4
Vacant Land	10	0
Warehouses	32	12
Residential	8	0
Institutional	7	0
Total	*99*	*125*

Table 6.2 2009 Building Type for Lots that were vacant and zoned for manufacturing in 2003.

The proliferation of vans and school buses in the neighborhood can have a dramatic impact on area residents' health. Several studies have documented the relationship between emissions from diesel vehicles – like school buses – and the incidence of respiratory diseases, particularly asthma (Leikauf 2002, Corburn, Osleeb and Porter 2005, Kaiser 2005, Lin et al. 2002, Studnicka

et al. 1997, van Vliet et al. 1997) . In part, the city can rationalize the high concentration of school buses by arguing that because the lots are in an industrial area with lower population densities, there is a lower likelihood of human exposure. This argument, however, obscures the diverse range of land uses within East New York's industrial zones. According to data from the New York City Department of Finance over 14% of the lots in East New York's industrial areas are used for non-industrial purposes including homeless shelters, health dispenseries, housing, and schools. East New York industrial areas are also adjacent to high density residential areas including NYCHA housing developments and several homes developed under the Nehemiah program (figure 6.1). This also says nothing of the routine exposure of those working in the area. The block of Williams Ave between Atlantic Ave and Liberty Ave illustrates the complexity of area land uses where a metal working shop sits next to a tidy single family homes, a YMCA community center, and an elementary school. Across the street is a school bus yard, a vacant lot and a mini-storage facility.

Conclusions

Over the last decade, development of East New York's brownfields has occurred at a dizzying rate. With no properties in the area enrolled in the BCP or the city VCP, City and State brownfield policies are not the cause of this uptick in sales activity. Rather, it is a combination of a citywide reduction in the supply of vacant land, a large number of city-owned properties, and the city's industrial retention policies that is the cause of East New York's recent industrial

property boom. Although the city and state's approach to brownfield development in East New York differs significantly from their tact in Gowanus, the results were much the same.

As was true in Gowanus, brownfield development in East New York exacerbates environmental injustices in at least two ways. First, there is increasing evidence that many of these projects do not yield substantial environmental improvements. Overwhelmingly, the new businesses moving to the area were school bus, limousine, ambulette, and other transport intensive companies. While it does appear that these firms may have conducted at least rudimentary environmental cleanups, the dramatic increase in diesel and automotive emissions undoubtedly diminished air quality in the surrounding areas. These emissions significantly increased health risks for the congregants, clients, and students at the churches, homeless shelters, and schools, as well as the adjacent high-density housing projects.

Second, there is no evidence that East New York's residents, who are predominantly poor blacks and Hispanics, had a say in the neighborhood's change. Because there was no change in zoning designation, all of the brownfield development in East New York occurred "as of right," meaning that business owners did not require new permits or approvals when moving into the area. It is not altogether clear, however, that even if given the opportunity there would be significant participation in the area. The East New York Industrial Business Improvement Corporation - perhaps the neighborhood's most active civic organization – had substantial trouble finding enough volunteers to start the BOA process, while churches and tenant

organizations did not know what brownfields are nor did they express interest in participating in the properties' redevelopment.

In and of itself the preservation of industrial space is not problematic. The city needs industry, and manufacturing firms are an essential source of employment for the city's dwindling middle class. Yet, the presence of industry need not come at the expense of neighborhood health. Recently there has been an emphasis on the creation of a so-called "green" economy where businesses produce environmentally sustainable goods using environmentally sustainable technologies. The increase in gas, stations, garages, auto-related industries, and truck traffic hardly fit that model.

Chapter 7: Melrose Commons' Area-Wide Approach

Melrose Commons is 35 block area located near the geographic center of the South Bronx roughly a half-mile east of Yankee Stadium. Throughout the second half of the twentieth century, like the South Bronx in general, Melrose Commons underwent a dramatic process of disinvestment. Between 1960 and 1990 the neighborhood lost half of its residents and housing units. At the height of that transition, landlords and property owners turned to arson as a last ditch effort to recoup any income from their otherwise devalued properties. By the end of the period, brownfields, which were non-existent before the decline began, became a pressing problem. On some blocks half of the lots were vacant. Starting in the early and mid 1990s, however, the neighborhood's fortune began to change. Community developers working with not-for-profits and private developers constructed new single and multi-family homes on once weed-strewn and vacant properties. State and city policies contributed to this change with four of these projects developed under the BCP.

In some ways Melrose Commons is similar to the Gowanus and other neighborhoods where state and city brownfield programs are used to subsidize residential development. Unlike in Gowanus, however, in Melrose Commons the new projects were not part of a process of displacement but offered affordable and safe housing to the neighborhood's low-income residents. Melrose Commons is also different from Gowanus and East New York in another important way. While the city and state followed a site-by-site approach in both the Gowanus and East New York, because Melrose Commons is designated as an urban renewal area (URA)

brownfield development is constrained by an urban renewal plan (URP) authored by planners and community residents in the early 1990s. In many ways the Melrose Commons URP is emblematic of an area-wide approach to development. Aside from zoning designations, the plan offers a comprehensive vision for the neighborhood's future. The URP also creates the opportunity for significant participation as it is the product of ongoing deliberation between community residents, planners, and city officials. The question then arises does this area-wide approach lead to a more environmentally just brownfield development?

To answer this question I use records, government documents, newspaper accounts and list serve archives to examine the environmental impacts of four brownfield projects in Melrose Commons. Even though it was guided by an area-wide plan, brownfield development still displaced environmental problems from the site to the surrounding areas. In this case, Melrose Commons' brownfield projects depleted the neighborhood's already insufficient open space resources by displacing community gardens even as it protected human and ecological health within site boundaries. What differentiated these outcomes from East New York and Gowanus, however, was that Melrose Commons' history of community planning created the opportunity for residents, developers, and other stakeholders to deliberate on the changes and identify alternative solutions. As was true in East New York and Gowanus, in Melrose Commons brownfield development still involved an environmental tradeoff – addressing on-site contamination while depleting the supply of open space – in this case, however, community residents had a say in how those tradeoffs were made.

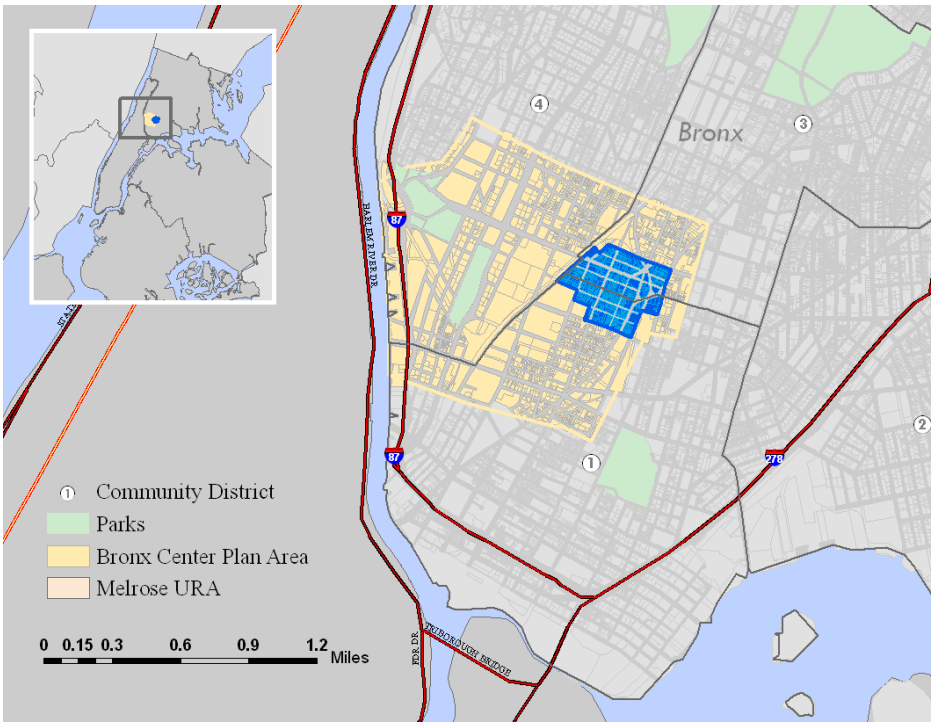

Figure 7.1 The Melrose Commons Neighborhood

Background

Melrose Commons is located in the northern part of the South Bronx, a half mile from Yankee Stadium and the South Bronx's defining artery, the Grand Concourse (figure 7.1). Like most of the surrounding areas in the South Bronx, the The Melrose Commons Urban Renewal Area (URA) was historically home to predominantly white and working class residents (Gonzalez 2004). In 1960, over 75% of the workers in the areas were clerical workers, craftsmen, operatives, or service workers while less than 10% were professionals or managers (Minnesota Population Center 2004). At the time the neighborhood consisted mainly of a mix of tenement housing, small stores, and light industrial uses (Sanborn Map Company 1952).

The 1960s were a time of major spatial change in the South Bronx. Through an ambitious program of urban renewal, Robert Moses tore down much of the borough's aging housing stock to make way for large housing projects, highways, and public amenities. For the residents, the results of these projects were disastrous. The borough's spatial reorganization interrupted the social networks that held communities together. Crime and drug use proliferated as middle class whites fled to the suburbs and to new complexes like co-op city on the borough's northern edge (Jonnes 2002, Gonzalez 2004, Berman 1988). Unlike many other South Bronx neighborhoods, Moses' projects did not directly affect the Melrose Commons area. Although the city leveled tenements to make way for large public housing blocks in nearby areas, it built none within what would be the URA boundaries. Highway construction similarly did not affect the area (figure 7.1).

If the area was spared urban renewal's bulldozers, it was nonetheless susceptible to its broader impacts. By 1970, poor Puerto Ricans and blacks replaced many of the neighborhood's departing white, working class residents. By 1970 nearly 80% of the neighborhood's residents were either black or Hispanic, up from 25% just ten years earlier. Poverty became a more pressing problem. While median family income in 1960 was roughly equivalent to the city as a whole, by 1970 the average family income in the south Bronx was half the citywide average with a quarter of the families earning less than $3,000 per year (table 7.1).

	1960	1970	1980	1990	2000
Housing Units	4,398	4,869	2,450	2,068	2,274
Avg Family Income					
Melrose	5,133	5,947	7,797	8,544	11,806
NYC	7,918 (65%)	12,491 (48%)	21,121 (37%)	50,703 (17%)	70,490 (17%)
Population					
White[1]	11,329 (90.8%)	9,931 (63.2%)	1,810 (27.0%)	993 (14.5%)	1,347 (20.6%)
Black[1]	1,077 (8.64%)	5,656 (36.0%)	2,958 (44.1%)	3,077 (45.0%)	2,589 (39.6%)
Other[1]	66 (0.53%)	138 (0.88%)	1,940 (28.9%)	2,765 (40.5%)	2,596 (39.7%)
Total[1]	12,472 (100%)	15,725 (100%)	6,708 (100%)	6,835 (100%)	6,532 (100%)
Hispanic	2,057 (16.5%)[2]	6,835 (43.5%)[3]	3,572 (53.2%)[4]	4,038 (59.1%)[4]	4,109 (62.9%)[4]

[1] Including Hispanic
[2] Puerto Rican Birth or Parentage
[3] Spanish origin or descent
[4] Hispanic

Table 7.1Census Data for Melrose Commons Urban Renewal Area (Minnesota Population Center 2004).

The grim conditions in the neighborhood were captured in a 1970 report from the city planning commission:

> Bleak tenements line block after block. The teeming district is peppered with shabby warehouses, lofts, garages, marginal businesses and trash-strewn lots. Schools are extremely overcrowded and green space is all but non-existent. The welfare load is twice the city average. The district is more crime-ridden than any other. Rapid social change in recent years has left few stable social or political organizations. (Stern 1970)

These desolate conditions were only a precursor to its future devastation.

1970 – 1990

With massive out-migration of middle-class whites and working-class blacks and Puerto Ricans, demand for housing dropped. For many landlords the most profitable option was to burn their buildings to the ground and collect fire insurance payments. As the decade wore on, more property owners embraced this strategy (Gonzalez 2004, Jonnes 2002, Mahler 2005). The results were disastrous. Arson became an epidemic and vacant lots proliferated. Between 1970 and 1980 the population and number of housing units both decreased by 50%. The remaining residents moved closer to the bottom-end of the city's income distribution. In 1980, average annual income was roughly $7,700 per year (slightly more than a third of the citywide average) with 25% of the families making less than $3,000 per year and an (table 7.1). Vacancy also expanded. By 1990, 60% percent of the land in the neighborhood was vacant with the city owning 85% of those parcels (Rothstein 1994).

Although many residents and businesses moved out of the neighborhood, many also chose to stay. By 1990 there were still almost 100 businesses, including nineteen automotive businesses and eleven manufacturing or warehousing concerns, employing roughly 450 employees. In

addition there were twenty-two institutional buildings including a police station, day-care centers, churches, and a school, and 120 residential buildings (Rothstein 1994).

Urban Renewal in the 1990s

In the early 1990's, both people and public and private funds were returning to the area. For politicians, businesses, and residents, the question then shifted from whether the South Bronx was going to rebuild to how it was going to rebuild. In general there were two conflicting visions for the South Bronx. The first was to follow the example of Brooklyn's Nehemiah homes and construct single-family attached dwellings. The South Bronx Churches (SBC) – an association of the borough's religious institutions - championed this vision. The second approach called for higher densities and mixed income development. The most vocal proponents for this redevelopment plan was the Bronx Center – a consortium of planners, architects, politicians, and local residents – and Bronx Borough President Fernando Ferrer (Jonnes 2002).

The two sides clashed around Site 404 - a large tract of city-owned land just east of what would become the Melrose Commons Urban Renewal Area (figure 7.2). While SBC wanted the land for single-family homes, the Bronx Center had slated the area as the eastern terminus of a more ambitious plan for 300 blocks in the central Bronx (Von Hoffman 2003, Gonzalez 2004). Under the Central Bronx plan, Site 404 would be used for mixed-income and mixed-density housing (Birch 1998). Also part of that plan was the designation of a thirty block "Melrose Common Urban Renewal Area" bounded by 156th St to the south, Courtland Ave to the west, 161st St to the north and 3rd Ave to the East (Rothstein 1994, Gonzalez 1993). Believing this area to be

largely vacant, the Bronx Center initially intended to remove any remaining structures and construct 2,600 units of new single family housing. Despite their intention of relocating 400 tenants and eighty businesses (Jackson 2005a), the Center never consulted with any remaining residents or business owners.

Melrose Commons residents first heard about the Bronx Centers' urban renewal plan when they encountered a city employee taking notes in the area in 1992. At a Department of Housing Preservation and Development (HPD) public hearing to discuss the urban renewal plan (which was now all but complete) many of the would-be displaced residents, now organized into the Nos Quedamos/We Stay Committee, showed up at hearings and voiced their disapproval (Gonzalez 1993). Rather than ignoring their complaints, the Bronx Center staff worked with the Nos Quedamos to devise an alternative. Meeting in the basement of a nearby home, Nos Quedamos collaborated with social workers and architects to establish their vision for the neighborhood (Jackson 2005a). They also tirelessly hounded local politicians for funding and support.

The end result was a revised Melrose Commons Urban Renewal Plan (URP). Through nine goals (table 7.2), the URP sets out an ambitious and comprehensive agenda to create a mixed income, mixed-use, and pedestrian friendly neighborhood. By placing new development on vacant lots and prioritizing housing rehabilitation, the URP protected 90% of the residents from displacement and guaranteed housing for those that would lose their homes. Following the dictates of Jane Jacobs, the URP emphasizes "eyes on the street" by setting aside space for ground level retail and creating "defensible" public spaces. To realize these goals, the URP

identifies sixty-five sites, each with a specific use. In addition, the plan extends or amends existing zoning codes by specifying the minimum number of housing units on a property (current zoning codes only specify the maximum number of units), reducing the number of driveways and curbcuts, and requiring property owners to landscape open spaces (HPD 2007b).

Goals of the Melrose Commons Urban Renewal Plan

1. The plan should cause no involuntary displacement of the existing community.
2. The plan should permit a mixed income community to develop and create a variety of ownership and rental housing.
3. The plan must provide affordable housing at densities appropriate to an urban community.
4. The plan should utilize architectural design guidelines that maximize the public investment by creating a visually desirable, urban environment that will encourage development.
5. The plan should promote physical development that is both environmentally conscious and sustainable.
6. The proposed open space should be distributed into a system that responds to the community's concerns of program and security.
7. The plan should respect the street pattern and movement patterns within the community.
8. The plan should provide for an appropriate distribution of commercial space and services and enable community residents and businesses to increase their earnings potential and expand their economic opportunities.
9. Development should complement the existing infrastructure and the community's regional location and provide for future growth and evolution.

Table 7.2 Goals of the Melrose Commons Urban Renewal Plan. Source: (Stand et al. 1996)

In order to realize the plan's objective, the city acquired those vacant spaces it did not already own. In 2003, there were 13 acres of vacant properties in the Melrose Commons URA; 90% of which were owned by the New York City Housing Preservation and Development Corporation

(HPD) (New York City Department of Planning 2003). As was true throughout the city, HPD disposed of those properties by first soliciting applications with a request for proposals (RFP). In many cases, the RFP placed restrictions on a property's future use. For instance, in an RFP for one site, HPD required the future property owner to "set aside 10,000 square feet for a community facility to be occupied by an early childhood education center" (HPD 2008: 8). In other cases, the RFP encourages, but does not require, applicants to use the property a certain way. For instance, the RFP for the same project recommends that "applicants should propose mixed-income housing in the form of rental and/or homeownership units," specifying that "at least 50% of all units should be affordable to households at or below 60% of HUD Income Limits" (HPD 2008: 8).

In both the process of its creation and its outcome, the plan was a revelation. After attending a community planning meeting, *New York Times* architecture critic Herbert Muschamp (1993) celebrated the work of the residents and volunteer planners as the hallmark of a new type of planning, one that seamlessly integrated design, politics, and community service. Two years later Henry Cisneros, Secretary of the US Department of Housing and Urban Development (HUD), upheld the Melrose Commons plan as an example of how "successful revitalization absolutely requires the participation of the community's residents," proclaiming "I salute this success" (Rothstein 1994). Since that time the Melrose Commons URP has been used to demonstrate community planning's potential and past successes (Angotti 2008a, MAS 2008).

Not everyone was equally enthusiastic. Throughout the 1990's, the developer-friendly Giuliani administration claimed that there was insufficient funding to realize the URP's goals. Officials like planning Commissioner Joseph Rose argued that the mixed-income, mixed-density community the URP described was not financially viable and would require extensive state and city subsidies. As city and state funds were not readily available, Rose advocated for greater flexibility in the plan's design controls so that the city could modify the plan to better meet prevailing market conditions (Rothstein 1994, Dunlap 1994, MAS 2008).

Ultimately, Bronx Borough president Fernando Ferrer along with the New York City Council rebuffed the Giuliani administration's effort to undermine the plan. The shortsightedness of the Giuliani administration's critique became apparent later in the decade. Through a combination of creative financing and shifting market conditions Nos Quedamos and the community planners realized many of the URP's key components. As of 2008 there are 2,300 units of newly constructed housing with an additional 500 units in the preconstruction phase, more than 1,000,000 square feet in retail space, and two new parks (HPD 2008, EDC 2007, Stand et al. 1996). Where Rose was correct, however, was that these successes would not have been possible without city and state subsidies. One important source of funds was the BCP.

Brownfield Development

There are four BCP projects in the neighborhood all of which offer a mix of affordable housing and retail space. Three of the projects – Courtlandt Corners 1, Courtlandt Corners 2, and Parkview Commons - are located along 161st St in the neighborhood's northwest corner (figure 7.1). Each project is between eight and ten stories tall and follows a standard brick, steel, and glass architectural design (figure 7.2). Given the area's history of auto-related uses, it is not surprising that the main sources of contaminants come from gas stations and auto repair shops. In the past several spills and underground storage tanks associated with these uses resulted in elevated levels of volatile organic compounds, heavy metals, pesticides, and semi-volatile organic compounds in the soil and vapors. The fourth site, La Terraza, was formerly the home to a dry cleaner, a carpet manufacturer, an undertaker, and an upholsterer. In all four sites, the developer followed a standard excavate, haul, and fill strategy by removing the top layer of contaminated soil, replacing it with clean fill, and then capping the site with a concrete barrier. Where soil vapor was a potential issue, vapor extrusion systems were also put in place (table 7.3).

Figure 7.2 A brownfield project in Melrose Commons (Source: Author)

In addition to protecting human and ecological health on individual sites, guided by the URP, these site-specific interventions also yielded several benefits to the surrounding areas. Most notably was the provision of affordable housing. Collectively the four orange brick, glass and steel BCP projects include 470 units of affordable housing more than 80% of which is targeted for families making between 40% and 60% of the Area Median Income (AMI) and the remainder targeted for families making between 60% and 100% of the AMI (table 7.3).

As is true of brownfield projects in other neighborhoods, although these projects yielded several clear benefits, they also exacerbated two sets of environmental problems in the surrounding

areas. First, new buildings and higher population densities increased energy consumption and solid waste. Second, the BCP projects ultimately leed to a reduction the neighborhood's already substandard stock of open space by displacing several community gardens. In contrast to other neighborhoods, however, city-supported community planning enabled residents, businesses, and developers to mitigate these negative externalities.

Solid Waste and Energy

Like most residential and commercial projects, the four brownfield projects in the URA increase waste and consume energy. If the projects adhered to city-wide averages they would produce about twelve tons of residential waste per week in addition to the waste from commercial uses. The residential and commercial uses would also consume nearly 80 million BTUs per year[4]. Taken by themselves these increases are negligible (the city handles 11,800 tons of waste per day), but within the context of the South Bronx these area-wide impacts have symbolic meaning.

[4] Waste production and energy consumption estimates are generated using methods in the CEQR manual.

	Park View Commons	La Terraza	Courtlandt Corners 1	Courtlandt Corners 2
Retail Space (ft)	1,246	7,700		22,000
Total Units (Affordable Units)	110 (78)	107 (69)	71 (71)	252 (252)
Former Uses	restaurant, automobile upholstery store, a gasoline station and an automobile service facility	dry cleaner, upholstery business, stores, undertaker, community gardens	auto repair shops, gasoline service station, parking lots, community gardens	gasoline service station, a residential building, an embroidery shop, and a filling station
Contaminants	Elevated levels of metals, pesticides and PAHs were documented in the central portion of the Site. Soil Gas sampling indicates the presence of high levels of VOCs, including both gasoline related compounds and chlorinated solvents (PCE).		VOCs, SVOCs, metals and pesticides have been detected in the soil and groundwater, VOCs were detected in soil gas samples throughout the site, There are 3 spills associated with this site	Elevated levels of BTEX, MTBE, naphthalene and some metals have been detected in the soil at levels exceeding unrestricted use SCGs. In the groundwater, elevated levels of VOCs, SVOCs, and metals have been detected at levels exceeding NYS groundwater standards. VOCs have been detected in soil vapor samples as well.
Remediation	Parkview Commons property has been remediated through excavation, removal and off-site disposal (225 tons) of hazardous soils and excavation and removal of contaminated non-hazardous soils. Excavated areas have been backfilled with clean soils. A Vapor Extraction System (VES) has been installed under the slab of the on-site building.		400 tons (10,000 cubic yards) of impacted soil has been removed; 12 USTs were removed and 2 new ones installed; an automated product recovery system was installed and activated (which removed 3,313 gallons of product between April 1995 and July 1999); and enhanced vapor fluid recovery (EVFR) has been performed (which has recovered 1,740 gallons of total liquids) since March 2000.	

Table 7.3 Characteristics of Melrose Commons projects enrolled in BCP (NYS DEC 2011)

In order to accommodate growing energy and waste disposal demands, the city must expand its power generating and waste handling infrastructure. In the past, this has led to the construction of new power plants, sewage treatement facilities, and other toxic projects in neighborhoods with predominantly poor and minority residents. The South Bronx neighborhoods directly surrounding the Melrose Commons URA have been particularly hard hit. The South Bronx handles 40% of the city's putrescible waste and 30% of its construction waste. It is home to fifteen open-air waste transfer stations, the second most in the city, a sewage treatment pelletizing plant, a sewage sludge plant, and four power plants. In addition, the South Bronx has one of the highest concentrations of highways and truck traffic in the city with 11,000 truck trips a day (Egbert 2005, Sustainable South Bronx 2010).

Collectively these land uses have resulted in deplorable environmental conditions. The South Bronx has some of the highest concentrations of air particulates in the city (Thurston, Spira-Cohen and Chen 2007). In 2002, thirteen out of every 1,000 children under the age of fifteen, and twenty-five out of every 1,000 children under the age of five living in the Melrose Commons URA visited an emergency room for an asthma related incidence. Both rates are roughly four times the national average and 2.5 times the citywide average[5].

[5] Data for analysis came from Infoshare, the US census, and Asthma Facts

In response Nos Quedamos has joined forces with other South Bronx organizations to insure that existing facilities comply with federal and state standards, to contest the siting of additional projects, to develop new parks, to expand greenspace, and otherwise promote environmental justice. Prior to Nos Quedamos's formation in 1991, for instance, these groups together contested the construction of a new medical waste facility. Similarly, in 2001 the groups once again collaborated to unsuccessfully challenge the construction of a new gas-fueled power plant. The groups have also worked to cleanup and expand access to the Bronx river through the construction of a new waterfront park and Bronx Greenway (Sze 2007).

This commitment to sustainability and environmental justice is evident in the URP and reinforced in HPD's disposition process. For instance, by targeting development on vacant sites and preserving existing structures, the URP cuts back on construction debris and emissions. The URP also emphasized the need to reduce traffic by increasing densities, incorporating commercial spaces on the ground floor of buildings, increasing bus service, and restricting the number of driveways and the frequency of curb cut-outs (Stand et al. 1996). HPD also furthered the environmental objectives by making compliance with the United States Green Building Council's Leadership in Energy and Environmental Design (LEED) standards a prerequisite for all applicants responding to RFPs (HPD 2008).

The three brownfield projects reflect the URP's emphasis on environmental benefits as well as green and sustainable building practices and are brick and mortar expressions of environmental justice activists' long-standing commitment to improving conditions in the South Bronx. Three

of the projects – La Terraza, Courtlandt Corners 1, and Courtlandt Corners 2 – included sustainable building features like a high performance building envelope, energy efficient HVAC, appliances and lighting, stormwater management, low-flush plumbing fixtures, and attention to indoor environmental quality. Collectively these measures made the building 20% more energy efficient than a comparable structure, making three of the projects eligible for subsidies under the New York State Energy Research and Development Agency's (NYSERDA) multi-family performance program.

Figure 7.3 Windmills on the Roof of the Eltona (Source: Author)

Within the URA, these projects are not unique. Driven by the community plan and reinforced throughout the URA, projects incorporate a number of energy efficient and sustainable design features. For example, another project, the Eltona, includes windmills along the roof (figure 7.3) that generate enough electricity to power the lighting in the building's common areas (Benfield 2010). Directly south of the URA is Via Verde, which is also enrolled in the BCP and includes an innovative design that links the rooftops of low-rise town homes, a mid-rise duplex building and an 18-story tower to harvest rainwater, grow fruits and vegetables and provide open space for its residents (BoogieDowner 2008, Welcome to Melrose 2010). Collectively these projects have garnered a neighborhood LEED certification – the first neighborhood to be so honored within the state (Kher 2010).

Community Gardens

Although formal brownfield development really took off in the 1990s, residents had been using these spaces as community gardens for some time before that. Starting in the late 1970s residents had moved into vacant and abandoned lots, cleared the trash and began planting fruits, vegetables and trees. Harkening back to their Puerto Rican upbringing, many gardeners also constructed *casitas*, or little shacks, in their spaces (figure 7.4). Different groups congregated around each garden, and each garden had a unique character. Some emphasized music and socializing, others were oriented towards cultivating crops, while still others provided informal after-school activities for the neighborhood's children. The gardens emerged as a striking

counterpoint to the devastating effects of capital flight, providing a communal space where remaining residents could congregate and reconnect with their ethnic roots.

Figure 7.4 A casita in Melrose Commons (Source: Author)

As is evidenced in posts on community listservs, the gardens became an important source of open space for the community. In one post on the More\Gardens listserv, for instance, the author speaks of how one garden grows "vegetables and fruit for their community," another is known "for its open and welcoming arms to the children who live in the projects and nearby homes," and another which is "open to several daycare centers, as well as to students from P.S. 29 who garden and build structures for playing and celebration, and to the Boy Scouts" (Javadi 2004b). On another post on the MoreGardens listserv, the author promises to post a weekly calendar of

events and speaks of how “kids in the neighborhood … have again started regularly spending time in the garden after school and on the weekends” (Peas@moregardens.org 2005).

These functions were particularly important because the Melrose Commons URA already suffered from a deficiency in open space. City guidelines recommend 2.5 acres of open space per 1,000 residents. The open-space ratio in Melrose Commons URA -- .45 acres of open-space for every 1,000 residents -- is less than one fifth of that number (HPD 2007a). These figures also obscure the extent of the problem as the calculations include several playgrounds and parks situated in the middle of neighboring housing projects or other private facilities. Further, while the emphasis on sustainable design has led many new developments to incorporate roof-top gardens and other green spaces, the commentor *Welcome2Melrose* argues on wired New York “All the new development going on have green spaces that are ExCLUSIVELY for the residents of said buildings” (Wired New York 2009).

Despite these benefits not all community residents were equally enthused about the gardens presence. Especially during the summer months, socializing at the gardens could be loud and carry on late into the evening. For instance, in one post on Wired New York, *3044Orion*, who moved to Melrose Commons from a nearby neighborhood, argued that the gardens were a nuisance:

> I can tell you first hand that the community garden located behind the Orion at 156th Street is very loud and every time i've walked past it, i see people drinking. The music is so loud i can't even open my windows in the summer time. … The community garden on Elton at 159th St is also loud and full of people drinking in open space. I sure [sic] the people who own the house next door or [sic] not happy with it. The house right a side from the community garden on Elton street at 159th, has Graffiti writing on it. I believe this is do [sic] to the community garden being open to people hanging out and drinking and vandalizing people property (Wired New York 2009).

Even those that were nominally supportive of the gardens thought that the spaces could serve a more productive use.

Affordable Housing Vs Gardens in Melrose Commons

Throughout the 1980s, many of the gardens throughout the five boroughs turned to the city's Green Thumb program for seeds, supplies, and gardening advice. Despite this relationship, the city did not formally recognize the gardens or grant the gardeners legal rights over the properties. Starting in mid-1990s the administration of then mayor Rudolph Giuliani called these informal relations to the fore. As part of their broader effort to transfer city-owned land to real estate developers the Giuliani administration targeted gardens throughout the city, bulldozing structures, and auctioning lots. Giuliani justified these actions by arguing that the city required the land to construct new units of affordable housing. As many gardeners asserted Giulliani's claims were deeply problematic. Not only was there no guarantee that new housing would be affordable to nearby residents, but there was also no assurance that new owners would develop the lots in the first place. The gardeners further argued that the city could just as easily develop

housing on the thousands of city-owned vacant lots where a garden did not exist. For the gardeners Giuliani's attack on the community gardens was driven more by political aspirations than a desire for affordable housing (Schmelzkopf 2002, Staeheli et al. 2002, Lehavi 2008, Elder 2006).

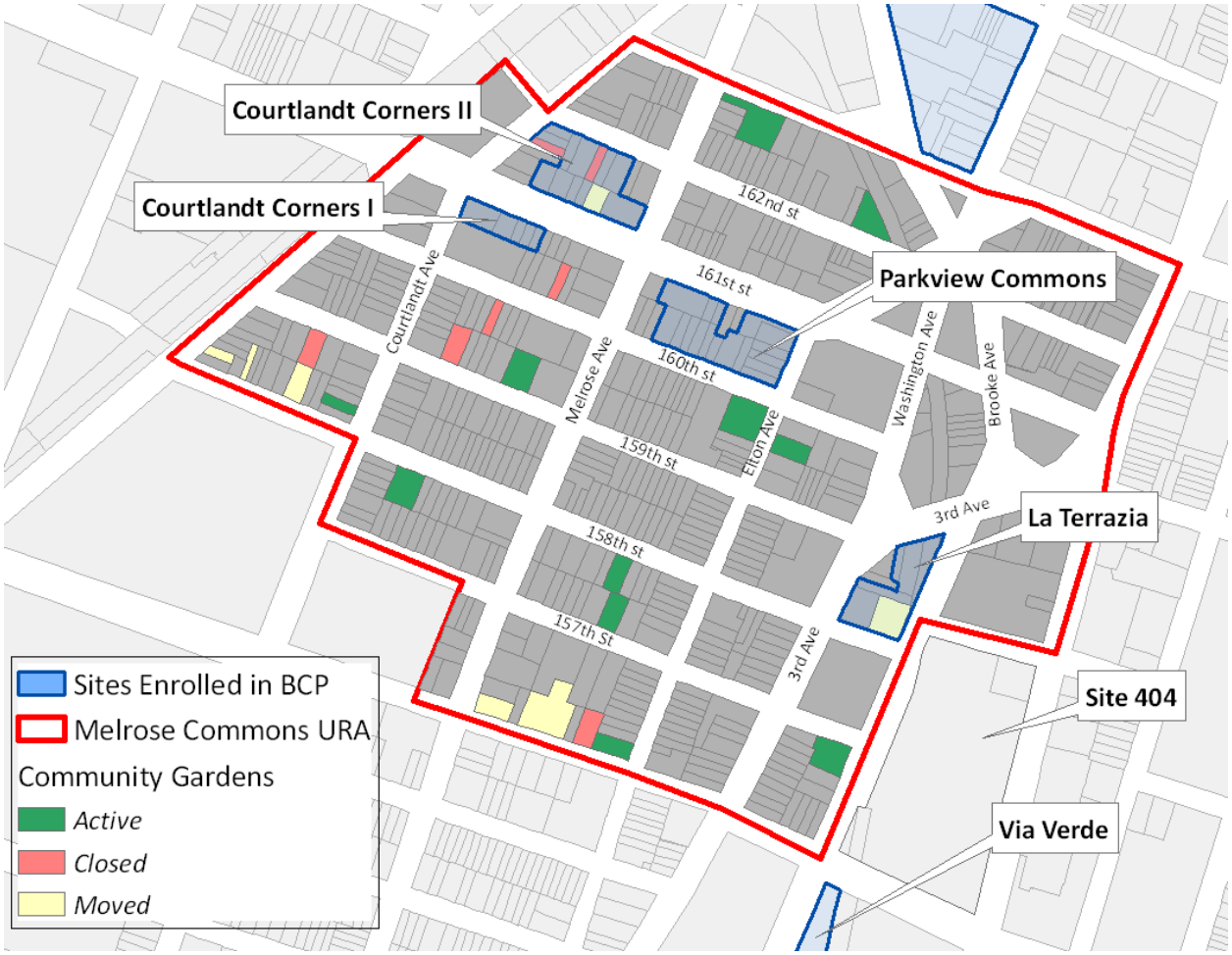

Figure 7.5 Brownfields Projects and Community Gardens in Melrose Commons

In Melrose Commons, however, the tension between affordable housing and the community gardens was much more than political rhetoric. One of the central tenets of the URP was to

minimize demolition and displacement by targeting development on the neighborhood's vacant lots (Angotti 2008a, Stand et al. 1996). Although labeled vacant on city maps, as shown in figure 7.5, the URP planned to replace nineteen of the neighborhood's twenty community gardens with housing. While Nos Quedamos' Executive Director, Yolanda Garcia, acknowledged the importance of these gardens, she also believed that they should take a back seat to the community's needs for housing arguing that "there are homeless people here … there are people tripling and quadrupling up, and they need housing" (Feuer 2003). Where gardens did exist, Garcia and the URP argued they should "occur in mid-block locations" and it should be clear that these are "interim land uses … with a community understanding of long-term planning goals" (Stand et al. 1996).

As is shown in figure 7.5, two of the four Melrose Commons projects that would eventually enroll in the state BCP significantly contributed to this loss. In the northwest corner of the neighborhood, Courtlandt Corners II displaced three community gardens. Initially the project was to preserve one of those gardens, the Little Green Garden, but then plans changed (HPD 2007a). Another garden, Cabo Rojo, had already been moved three times, each time HPD has promised that its current location would be made permanent (Kugel 2002, HPD 2007a). According to listserv posts, HPD rescinded these promises (Bussewitz 2002, Javadi 2002, Javadi 2008). Along the eastern edge of the neighborhood another project, La Terraza, would displace Rincón Criollo - one of the city's oldest and most well known gardens and a center for traditional Puerto Rican working-class music (Feuer 2003, HPD 2007a, Critchell 1999, Kennedy 1994).

Forging a compromise

In 2004 the tensions between the gardeners and the community planners surfaced around a proposed development that would provide 167 units for low-income and formerly homeless tenants. The project would have displaced three community gardens – including a garden used by tenants of the senior housing across the street and another that was used by area schools and day care centers (Subramanian 2004). In the months preceding the court hearings, South Bronx Urban Gardeners (SBUG) called for a series of community meetings to discuss the status of community gardens in the Melrose URA (Youngquest 2004, Javadi 2004a, Subramanian 2004). Reviving the spirit of community planning forged in the early 1990s, at those meetings the gardeners, community groups, private developers, public officials, and residents came together (Honigman 2004, Vega 2004, Zimmer 2004). Collectively they poured over area maps identifying ways to preserve some of the neighborhood gardens while assuring the continued development of low-income housing.

The outcome of these sessions was the Melrose More Homes and Gardens plan. The plan identified new lots for eleven of the neighborhood gardens, placing them under the management of the City's Parks Department (Zimmer 2004). At the same time, the plan preserved space for many of the new developments. In December, the plan became the basis for a settlement between the city and the three gardens threatened by the new development (Subramanian 2004) . Under the settlement the city would grant the three gardens long term security in new locations. Although the plan was never approved by Bronx Community Board 1, it did provide the

groundwork for protection of many of the neighborhood's other gardens. Today, there are eleven gardens in the neighborhood, six of which are permanent (figure 7.5).

To be sure, the compromise was far from perfect. In the final version many gardeners felt that they had been short-changed and that they were forced to make additional concessions in the eleventh hour. Further, moving a garden is no easy task. Many gardeners were forced to accept smaller spaces and lost many plants in the course of the move. Finally, the gardens' long-term security is contingent on a 2002 agreement forged between the City and the New York State Attorney General's office that expired in 2010. Although the agreement was renewed, there is no assurance about how long it will be enforced.

For all these drawbacks, however, the Home and Garden plan represents something of a triumph. It shows the potential for neighborhood groups to come together and overcome seemingly intractable land use disputes. As one post on the American Community Garden listserv argues:

> The SBUG gardens have shown that housing and community gardens can go hand in hand in Melrose. The SBUG plan charts a course for a win-win situation for Melrose residents. The plan also supported by local environmental agencies and over 100 local business and groups (Honigman 2004).

The Home and Garden plan also signifies the potential for area-wide planning in brownfield development. If development had followed a standard site-by-site approach, the city would be forced to choose between preserving the gardens or building affordable housing. By contrast, area-wide planning enabled the City, developers, Nos Quedamos, and the gardeners to identify other possible locations and block development on other lots. These alternative options were the

basis of the compromise plan that mitigated some of the negative externalities of brownfield development, particularly the loss of open, green, and communal space. As such this compromise fulfilled one of the city's environmental justice activists' long standing priorities - saving community gardens in neighborhoods with predominantly poor and black residents.

Conclusions

As far as brownfield development in New York City goes, Melrose Commons is a unique neighborhood. Not only is it one of the few areas with predominantly poor, black, or Hispanic residents and sites enrolled in the state's Brownfield Cleanup Program, it is also one of the only neighborhoods in New York City where a community authored plan guides development. Melrose Commons thus offers a stark contrast to gentrifying areas, like the Gowanus, or industrial areas, like East New York, where brownfield policy follows a site-by-site approach.

An area-wide approach, however, does not exempt the residents of Melrose Commons from brownfield developments' inherent environmental tradeoffs. The projects clearly benefitted the neighborhood included new units of affordable and low-income housing as well as much needed retail space. It also appears that brownfield development yielded environmental benefits by minimizing the risks of exposure to on-site contamination. At the same time, however, the neighborhood's four brownfield projects significantly depleted the neighborhood's already insufficient supply of open space by displacing four community gardens.

While not perfect, the commitment to a binding area-wide plan did create a more environmentally just process of brownfield development. Rather than excluding them or only soliciting their feedback after development decisions had been made, community residents were involved in all stages of the planning process. The emphasis on transparency and public participation did not guarantee a smooth or conflict free development process. Instead, significant tensions between community gardeners and developers arose as each sought control of the neighborhood's dwindling supply of vacant lots. The community planning process, however, created an opportunity for the two sides to openly deliberate about the neighborhood's future and fashion a compromise. The example of Melrose Commons thus indicates the potential of area-wide approaches to create an environmentally just brownfield development process. Not only did it open more avenues for participation but through open deliberation it broadened the range of possible outcomes.

Conclusions

Brownfield policies are emblematic of cities' broader embrace of the principles and discourses of sustainable development. As Campbell argues, urban sustainability combines three separate goals – environmental protection, economic growth, and equity. In this paper I examine how well New York City's and New York State's policies achieve this balance by asking three questions:

1. At the scale of the city, do New York State and New York City's brownfield policies decrease the disparity in environmental conditions between areas where white and wealthy residents live and areas where residents are predominantly poor and not white?
2. When brownfield development does occur in areas with predominantly poor and non-white residents, does it improve neighborhood-wide environmental conditions?
3. To what extent do these policies offer residents, business owners, and others living, working, and playing near brownfield sites a voice in the remediation and development process?

Contrary to case studies that provide models to city managers for combining urban sustainability's three Es, critics argue that there is a tension between these three goals. In the case of New York's brownfields policy, I find that this tension stems from contradictory and incompatible spatialities. In New York City, politicians have promoted growth by targeting the development of individual sites regardless of how these singular projects relate to surrounding areas or the citywide economy. The city's site-specific focus and rejection of more

comprehensive approaches affords real estate capital maximum flexibility to develop what, where, and how they want. As I've argued in chapter 3, state and city brownfield policies have taken on this spatiality. In hopes of reducing the risks and costs associated with brownfield development, both city and state initiatives have targeted conditions within the sites' boundaries while neglecting the properties' relationships to surrounding areas. I review the findings, make recommendations, delineate the limitations of this project, and identify potential future research directions.

Findings

1. *Brownfields cover a wide range of properties*

The State of New York (2004) considers any site that meets the following two criteria as a brownfield. First, "there must be confirmed contamination on the property or a reasonable basis to believe that contamination is likely to be present on the property," and second "there must be a reasonable basis to believe that the contamination or potential presence of contamination may be complicating the development, use or re-use of the property." This definition, however, encompasses a wide-range of properties.

Brownfields can differ significantly based on past use, the level of contamination, lot size, and future uses. For instance, in Gowanus, brownfields tend to be large, formerly industrial sites with high level contamination, while brownfields in East New York are smaller with lighter levels of contaminants in the soil, groundwater, or surface water. By contrast, in Melrose

Commons, many brownfield properties were once occupied by commercial enterprises like a coroner, gas stations, and repair lots. Elsewhere in the city, brownfields include sites that were once home to everything from nail salons and dry cleaners to rail yards and power stations. There are also countless sites within the city that may not qualify for the state's brownfield program but have contaminants from historic fill or absorbed high levels of lead before state and federal regulations phased out leaded gasoline.

Further expanding the brownfield universe, not all brownfields are vacant or abandoned. The second part of the state's brownfield definition does not specify whether the site is vacant or abandoned, but rather designates a brownfield site as one where contamination "may be complicating development." As Bjelland (2004: 634) notes, this definition is inherently ambiguous, because whether or not a site is considered a brownfield is contingent on "a hypothetical event that does not occur - a failed redevelopment attempt." Not only is the definition inherently vague, but it opens the door for the state to designate any site that is not employed at its "highest and best use" as a brownfield property even if it is occupied or in productive use. In East New York, for example, many lots are used for storage or parking. In the Gowanus, brownfield sites housed a cement recycler, a cable manufacturer, and a clothing warehouse. In Melrose Commons, brownfield projects displaced community gardens.

2. *Brownfields can be found in different neighborhoods*

In addition to on-site characteristics, the characteristics of surrounding neighborhoods differentiate brownfield sites. Policy makers almost always speak as if brownfields are inseparable from urban poverty. In a report for the National Environmental Justice Advisory Council (NEJAC), for example, the environmental justice activist Charles Lee claims:

> Abandoned commercial and industrial properties called 'Brownfields' which dot the urban landscape are overwhelmingly concentrated in people of color, low-income, indigenous peoples, and otherwise marginalized communities. By their very nature, Brownfields are inseparable from issues of social inequity, racial discrimination and urban decay--specifically manifested in adverse land use decisions, housing discrimination, residential segregation, community disinvestment, infrastructure decay, lack of educational and employment opportunity, and other issues (NEJAC 1996:18).

The noted brownfield scholar, Charles Bartsch (with Elizabeth Collaton) similarly states that "brownfields tend to cluster in areas with high poverty and unemployment rates" and that brownfield development would "particularly benefit low-income and minority residents who have suffered the consequences of living near blighted buildings and contaminated land" (Bartsch et al. 1996: 18). To the extent that these assumptions about the social and demographic characteristics of populations living among brownfield properties are true, developing and remediating brownfields necessarily reduce environmental risks in neighborhoods where there are both hazardous environmental conditions and a high percentage of poor, non-white residents. At least in New York City, however, there are strong reasons to question these assumptions.

Absent any systematic inventory of brownfield properties, scholars' and policy professionals' assertions about the social and demographic characteristics of populations living among brownfield sites are based more on conjecture and circumstantial evidence than empirical investigation. In Chapter 4, I argue that in New York City, the assumption that brownfield uniformly cluster in neighborhoods with a high percentage of poor and non-white residents is misleading. Although there are many brownfields in communities like the South Bronx or East New York, where residents are overwhelmingly poor and black or Hispanic, there are also a number of brownfields in places like Chelsea or downtown Manhattan where property values are very high and residents tend to be wealthy and white. In formerly industrial neighborhoods like Gowanus in Brooklyn or Long Island City in Queens, these relationships are further complicated since brownfield development occurs in the context of a broader neighborhood change as developers convert manufacturing sites into commercial and residential uses. In many cases these changes transform neighborhood demographics as new and wealthier gentry mix with long-term residents.

3. *State and City policies promote the development of properties in areas with higher property values, and a higher percentage of white and wealthy residents*

Given this variability, in order for state and city brownfield policies to advance the goals of environmental justice, they need to not only promote brownfield development but do so in the city's poor and environmentally compromised neighborhoods. According to several scholars, however, site-specific brownfield policies, like those in New York City and New York State, do

not achieve this goal (Eisen 1996, Meyer et al. 1995, Meyer 1998, Heberle and Wernstedt 2006). While these initiatives may lead to the clean-up and redevelopment of vacant and contaminated sites in areas with wealthier residents and higher property values, they are unlikely to significantly affect areas with predominantly poor and minority residents and lower property values where area-wide concerns like decaying infrastructure, inadequate access to open space, or underfunded schools often pose a greater obstacle to brownfield development than on-site contamination alone. Despite these criticisms, there has been little scholarship that explicitly tests this hypothesis.

In chapter 4, I address this gap by describing the characteristics of properties and populations in areas surrounding New York sites enrolled in New York State's Brownfield Cleanup Program. In my analysis I interpret data from the decennial census and New York City Department of Finance using methods of randomization. I perform my analysis in two steps. In the first step I compare sites enrolled in the BCP to all properties in New York City. I find that in areas immediately adjacent to sites enrolled in the BCP there are a significantly high percentage of Hispanic residents and percentage of families with incomes below $20,000 and $50,000 a year, a low percentage of white residents and high assessed property and land values. At distances from ½ mile to 1 mile from the site and again from 1 mile to 2 miles from the sites, the percentage of white residents increases dramatically while the percentage of black residents decreases, average household incomes, rents, house values, and assessed property and land values similarly

increase. At these distances the percentage of Hispanic residents, while decreasing, remains significantly high.

In the second step I control for the location of brownfield properties, by comparing sites enrolled in the BCP to the City's non-BCP enrolled brownfield properties. In this step the story changes somewhat. At all distances, compared to all brownfields in New York City, the percentage of black residents living near properties enrolled in the BCP is significantly low, the percentage of white residents living near properties enrolled in the BCP is significantly high, and the percentage of Hispanic residents living near properties enrolled in the BCP is no longer significant. Similarly, at all distances, the average household income of residents living within a half mile, ½ mile to 1 mile, and 1 mile to 2 miles from the properties enrolled in the BCP are significantly high, while the percentage of families with incomes below $20,000 and $50,000 per year are significantly low. Rents, house values, and assessed property and land values in areas surrounding sites enrolled in the BCP are also significantly high at all distances.

What all of this means is that, in general, areas immediately surrounding sites enrolled in the BCP have a high percentage of Hispanic residents and slightly lower household incomes. This changes with distance, as there is a much higher percentage of white and wealthier residents in areas slightly further away. Many of these benefits, however, are really just a function of the type of areas where the city's brownfields tend to cluster. When controlling for the spatial distribution of the city's brownfields, those brownfields that are enrolled in the program are the ones in areas with the highest property values, highest percentages of wealthy and white

residents, and the lowest percentage of poor blacks. This indicates that the state brownfield program is leading to the development of highly marketable properties but is having little impact in very poor neighborhoods.

In many ways these findings relate directly to the question of urban sustainability's elision of economic growth, environmental protection, and equity. When the motivating factor for environmental protection is economic gain, investors will necessarily gravitate to those areas of the city where they can realize the largest profits at the lowest risk. This may be in already developed neighborhoods, like Chelsea, or in "transitional" neighborhoods like Gowanus or Long Island City. While clarifying environmental standards and acceptable remediation practices removes many of the uncertainties and ambiguities associated with developing contaminated properties, many of the projects enrolled in city and state brownfield programs would most likely have been profitable without the generous tax breaks and other financial incentives. This may not just be an inefficient use of scarce financial and human resources but may also be exacerbating existing environmental inequalities. By targeting the most profitable and least risky projects, urban sustainability initiatives may address environmental problems in developing or established areas but have little impact in neighborhoods with predominantly poor and non-white residents where environmental conditions are often most problematic,.

4. *Brownfield development may lead to the improvement of environmental conditions within a site's boundaries but exacerbate environmental problems in surrounding areas*

Another assumption of brownfield development is that all brownfield projects yield environmental benefits at the site, the neighborhood, and the regional scales (Breggin, Pendergrass and Van Berg 1999, Greenberg et al. 1998, Litt, Tran and Burke 2002, Wernstedt 2004, Greenberg et al. 2001b, Opper 2005). At the scale of the site, brownfields development will lead to either the removal or containment of on-site contaminants. At the scale of the neighborhood, brownfield development will redevelop a blighted property and reduce nearby residents' exposure to toxins in the groundwater, surface water and soil. At the metropolitan scale brownfield development will encourage development in city centers leading to higher population densities, more efficient land use, greater use of public transportation, and less car use. The case studies indicate that there is reason to question at least the last two of these claims. Rather than uniformly addressing environmental problems, brownfield development often leads to the displacement of problems across scales and media.

The strongest argument for the policies' environmental benefits is at the scale of the site. In all of the case studies, developers implement a standard "excavate, haul, and cap" strategy where the property owner removes contaminated soil, replaces it with clean fill, and then caps the surface over with a concrete barrier. By removing the top level of contaminated fill, property owners often dilute existing toxins and reduce the overall concentration of harmful chemicals below what the state identifies as harmful to human or ecological health. Further, by creating a

concrete barrier and limiting direct contact with the soil, “excavate, haul, and cap” strategies limit exposure risks for those who live, work and play on the site. Critics of these remedies argue that barriers crack, break and otherwise degrade and without constant testing and upkeep these remedies may be compromised over time (Fernandez 1999, Plunz and Culligan 2007, Eisen 1996). Absent longitudinal testing data, however, it is impossible to know the accuracy of these critiques.

As is evidenced in the case studies, however, even if these remedies do protect human and ecological health within the sites’ boundaries, they may exacerbate environmental problems in surrounding areas. The brownfield projects in the Gowanus, for example, increase CSOs, dust and air-borne debris, and flooding conditions. In East New York, brownfield development worsened air quality problems by substantially increasing diesel and automobile emissions. In Melrose Commons, brownfield development further reduces the already existing shortage of green space and open space by displacing community gardens.

The tendency to displace negative externalities is not restricted to development in the case study facilities but, in many cases, is an inherent outcome of brownfield development. Because brownfield development often includes the conversion of industrial properties to residential and commercial uses, they necessarily increase population densities and place greater stress on power generating, waste handling, and sewage treatment facilities. As much of this municipal infrastructure is located in communities with predominantly poor and non-white residents, brownfield development in developing neighborhoods may actually degrade environmental

conditions in some of the city's neighborhoods with the highest percentage of poor and non-white residents. "Excavate, haul, and cap" remedies can further exacerbate environmental justices. Even though many contaminants are left in place under these remedies, much of the most contaminated soil is simply shipped to hazardous landfills in poor, rural counties.

There are also reasons to question brownfields metropolitan scale benefits. Rather than reducing car traffic and automobile dependency, many of the projects involve transportation intensive retail and industries. The Whole Foods project in the Gowanus, for example, includes plans for a three story garage, hundreds of parking spaces (well above the required number) and a substantial increase in automotive traffic in the area. In East New York, brownfield development was dedicated almost exclusively to transport- related uses like ambulettes, school buses, and limousine corporations. In neighborhoods like East Harlem in Manhattan or in parts of the South Bronx brownfield development has been used to support the creation of suburban style big box retail. Of course, not all projects fit within this model. The residential projects in Melrose Commons, for example, had fewer parking spaces than the citywide mandate, increased density and access to public transportation, while reducing resident needs to drive.

The Melrose Commons case also indicates that although brownfield development may displace environmental problems across scale and media, an area-wide approach may mitigate many projects' negative externalities. Not only did the Melrose Commons project reduce automobile dependency, but also by employing sustainable and green design features, the development limited demands on existing power generating and waste handling infrastructure. Further,

through a process of community planning, developers, residents, and community gardeners were able to limit the neighborhood's loss of open space by finding new, long term homes for many of the neighborhood's community gardens.

5. *Brownfield policies provide little opportunity for meaningful participation*

One shared belief across the brownfield policy spectrum is that in order to address environmental justice, brownfield policies must facilitate meaningful input from nearby residents (Byrne 1999, Eisen 1999, Gallagher and Jackson 2008, Greenberg and Lewis 2000, McCarthy 2002, Spiess 2008). Historically, brownfield development has occurred in a shroud of secrecy. Due to the presence of stringent liability laws, property owners have only investigated a site's environmental conditions prior to acquisition. Even then no law exists compelling property owners to make information about on-site environmental conditions public let alone solicit feedback from those that might be most affected. As such, if state or city laws compel any public involvement or disclosure, they represent an improvement over the status quo. In the case of New York State and New York City, however, these gains are negligible at best.

In New York State and New York City, brownfield policies do not meaningfully encourage participation. The extent of the BCP's participatory measures is to recommend (but not require) participants to maintain document repositories in nearby public libraries or community district offices (DiNapoli 2008, New York State Department of Environmental Conservation 2004). While these repositories may include useful information – like environmental impact statements or project plans – these materials are often very lengthy, dense, technical, and not at all

accessible to the lay citizen. The BCP's public participation provisions only invite public participation after the city, state, and property owner have agreed where, what, and how to develop. Once a project has reached this late stage of the development process, there is little potential for meaningful public insight or guidance. Even with these modest requirements, many property owners fail to establish a repository or neglect to include important documents in a timely fashion. In Gowanus, for example, the Whole Foods Corporation did not make environmental impact statements and many other relevant documents available or released them only after important permitting decisions were made.

The BCP further stymies participation by standardizing environmental cleanup targets. Historically, state regulators determined acceptable cleanup goals and methods on a site by site basis. Because these standards varied significantly between sites and determining them took a long time, the site-specific approach often undermined brownfield projects by increasing development costs, uncertainty, costs, and time. Recently, the state informally replaced these ad-hoc and site specific decisions with standardized tables that list acceptable concentrations for each of five land uses – industrial, commercial, mixed-residential, residential, and background. Although New York State regulators used these standardized tables for years, law makers did not formally recognize them until they passed the BCP in 2004. There are several good reasons for switching from site-specific standards to statewide tables. For instance, by decreasing developer uncertainty and streamlining the cleanup process, the formal adoption of statewide tables may make the cleanup and reuse of contaminated sites a financially viable alternative. At the same

time, however, the move to statewide tables reduces the opportunity for residents and other interested parties to intervene and participate when determining clean-up standards and methods. In none of the case studies was there any evidence that impacted populations had any say or influence on remedial decision making.

Other state and the city's initiatives – many which are expressly designed to encourage public participation – are not much better than the BCP. New York State's Brownfield Opportunity Areas (BOA) program provides community groups funding to identify potential brownfields, develop a neighborhood brownfield plan, and conduct initial environmental assessments. Although touted as an example of area-wide brownfield development, the BOA program has had little impact on development processes. In order to receive BOA grants, community groups must go through a lengthy, time-consuming, and heavily bureaucratic application process. Once they pass this hurdle, the funds they receive are not sufficient for analysis. Further there is nothing to insure that BOA groups actually represent the community. The Gowanus BOA, for example, was led by the Gowanus Canal Development Corporation, a highly contentious local development corporation that has long promoted a vision of high-end residential development in the area. Finally, there is nothing binding about the resulting plans. At best the plans serve as guidance for developers. At worst, they are ignored.

The city and the state have also neglected to use other tools at their disposal for promoting participation at brownfield sites. As is the case in East New York and Melrose Commons in New York City, many of the brownfields are publicly owned properties. When the city elects to

sell these sites to private owners, it is required by law to conduct a full environmental assessment and make the results publicly available. As is evidenced in East New York, however, the city often waives the mandatory environmental assessment and defers responsibility to the purchasers. In those cases, where environmental assessments were conducted, the only way for the public to have access to these documents is to file a request with the city under the Freedom of Information Law (FOIL).

Despite these minimal requirements for public participation, there are several examples where developers reach out to and include the public in the decision-making and remedial process. For instance, National Grid, the primary responsible party at the Public Place site in the Gowanus, maintains a website that provides:

> An activity update for neighbors of the Citizens former MGP site as developments related to the remediation of the site warrant. The update will describe the work that has been done, and provide[s] an outlook and schedule for upcoming work, including information about any work that may impact normal community activities (National Grid).

This type of participation may be more common in the future as community outreach can significantly reduce the time, and therefore costs, of brownfield development (Heberle and Wernstedt 2006). In Melrose Commons, residents were indirectly involved in the neighborhood's four brownfield projects through their contributions to the community plan.

Recommendations

The failure of New York State's and New York City's brownfield policies to successfully integrate environmental, economic, and equity objectives does not mean that doing so is impossible. But realizing truly sustainable brownfield development requires city and state policy makers to re-spatialize brownfield policy. Rather than privileging the site as the primary scale of intervention, the city has to explicitly address each property's relationship to the surrounding neighborhood, city, and region. While such a task may seem overwhelming several pieces for realizing this ambitious objective are already in place.

1. *Promote area-wide approaches to brownfield development*

The environmental justice implications of the state's and city's brownfield programs are inseparable from the policies' spatial orientation. By focusing on individual sites rather than broader areas, the policies fail to address the most significant barriers to brownfield development in economically distressed communities, displace environmental problems across scales and media, and limit the potential for public participation. There is, of course, no guarantee that area-wide approaches would reverse these outcomes. Surely, badly designed programs are likely to have undesirable outcomes regardless of policy makers' intents or spatial orientation; however, the best potential for aligning Campbell's (1996) three Es of urban sustainaibility is to approach the site's relation to surrounding properties and areas at a range of spatial scales.

This approach may not be as fanciful as it may seem. States and municipalities across the country are implementing approaches to brownfield development that connect individual land uses and seek to integrate them into their social and spatial context. For example, in New Jersey, through the Brownfield Development Area (BDA) initiative, a geologist, and case manager from the New Jersey Department of Environmental Protection (NJDEP) work with a steering committee comprised of business owners, residents, and other relevant stakeholders to coordinate brownfield projects, identify shared resources, and comprehensively address environmental issues (Van Hook et al. 2004, Eisen 2007). Both Florida and Michigan have laws that enable local administrators to designate brownfield areas with each area having its own plan. Sites within these areas are also eligible for grants, loans, and other financial incentives (Van Hook 2000). At the national scale, the US Environmental Protection Agency has awarded $4 million in grants to support area-wide brownfield planning (International City/County Management Association 2010). Local governments have also become more involved. The City Government Louisville, Kentucky, for example, funds the Louisville and Jefferson County Landbank Authority which buys individual properties, including brownfields, and then sells them to private developers, provided the developer's vision is consistent with the community's broader objectives (Leigh 2000).

Cities should be hesitant to simply adopt any one of these strategies, as each of the above programs is conceived and implemented in the context of local political, social, and economic relations. Instead, each government should recognize and build upon already existing resources.

Chief among those resources in New York is the City's already existing community plans, community-based organizations, like Nos Quedamos, and networks of community activists, like those in the Gowanus.

2. Integrate brownfield planning with existing community plans

New York City has vast community planning resources already at its disposal. In 1990 the city council revised the City Charter requiring each neighborhood to develop its own community plan. Although several neighborhoods expended significant time and resources in drafting their 197a plans, the city has done little to implement them and ignores them when they are not consistent with City Hall's broader objectives (Angotti 2008a). In addition to the thirteen existent 197a plans (New York City Department of City Planning 2011), the Municipal Art Society of New York (2008) identifies seventy-four other community plans already in place. In many cases these plans explicitly include sections on brownfield development. In other instances, the brownfield development is only implied.

Rather than trying to replace or supplement these plans – as the BOA (Brownfield Opportunities Area) program and city and state policies do –city and state policies should enable community planners to use BOA funds to incorporate brownfield development into existing plans' texts. These efforts should not be limited to identifying strategic sites and determining their future use but should also reflect an understanding of how individual projects and remedies impact environmental conditions and social relations in the surrounding area. In order to do so, planners must consider existing hazards both on and off the site as well as the full range of possible

remedial methods. Where community plans do not exist, the BOA should serve as the foundation for a more comprehensive community planning process.

3. *Create incentives for property owners to comply with and participate in the creation of community plans*

In order for these plans to be successful, property owners must participate in the planning process as well as act in accordance with the resultant community vision. As it now stands, a property owner with a site enrolled in the BCP receives tax breaks regardless of whether the proposed project is consistent with existing community or BOA plans. As such there is little reason for property owners to either contribute to or create projects in line with existing plans. If, however, state and city policies offer property owners additional financial incentives if they meet plan guidelines, property owners would have a greater stake in the plan's creation and outcome. One way the state and city can achieve these objectives is to tie financial incentives to compliance with plan outcomes. The community group, New Partners for Community Revitalization (2007b), has proposed a similar solution by advocating that the state increase program participants' tax benefits by 10% if they comply with existing plans. There is already precedent for such a solution as the current policy increases benefits by 8% if the project is constructed in an e-zone, or an area that meet broadly defined income and demographic thresholds. The above solution, however, would have a more widespread and beneficial impact.

One need only look at the example of Melrose Commons to fully appreciate this approach's potential. In the Melrose Commons URA, residents and property owners authored an urban

renewal plan (URP) that guides development. Because the neighborhood's diverse political actors deliberated over the plan's content, there was much less antagonism between residents, property owners, and developers than what exists in places like Gowanus. Further, the neighborhood's commitment to community based planning provided a forum for affected parties to voice their grievances and forge compromises earlier in the development process. The result benefits community residents and developers alike. For property owners and developers the planning process minimized development time by reducing community resistance. For residents there is greater assurance that brownfield projects will yield neighborhood-wide environmental and economic benefits.

4. *Seek avenues to increase public participation through the creation of a Brownfield Community Advocate*

In both Gowanus and East New York, tensions arose between developers and residents as the former excluded the latter from development processes. While it is certainly within their legal rights to do so, it would be wise for private developers to not follow this path. As is evidenced by struggles in the Gowanus, failure to include residents in development decisions can significantly increase the time and costs associated with project planning, cleanup, and development. This is not unique to New York City. In a survey of ninety recipients of US EPA brownfield pilot grants, the authors found that "nearly two-thirds of our public sector respondents indicate that it is always or almost always beneficial to developers to involve residents and community members in designing environmental response plans, and very few of

the respondents indicate that developers are highly concerned with public hearing requirements" (Alberini et al. 2004: 12).

Increased community participation, however, may not be just a nicety for involving people in the development process since it can create new alternatives. In many cases, community residents can provide novel insight, intimate knowledge of the area, and invaluable feedback. In Melrose Commons, for example, open deliberation created the possibility of preserving community gardens while expanding development. In Gowanus, when the Whole Foods Corporation finally worked with, rather than against, nearby residents they created a project that promoted area-wide environmental goals.

Public participation not only benefits property owners and developers by shortening the time frame for project completion but it is also an essential element for addressing issues of environmental justice. As discussed in chapter 3, environmental justice relates not only to the distribution of environmental risks and amenities in relation to racial, ethnic, and social groups but also to the processes that create those distributions in the first place. To a large part, achieving environmental justice entails including those most exposed to environmental risks in the environmental decision making process (Lake 1996, Schlosberg 2007, Holifield 2001, Hunold and Young 1998). Both the BCP and the city's emergent VCP provide few provisions to realize this goal. The city and the state must, therefore, substantially increase public participation requirements.

One major challenge to increasing public participation is that site remediation remains a complex endeavor. Understanding chemical toxicity, transport, and potential exposure routes requires extensive scientific knowledge and training. Even if he or she has access to important reports and documents, a layperson may not understand the report's findings. Any scheme for effective public participation therefore requires the presence of an environmental professional to translate highly complex technical reports so that they are accessible to the lay public.

A model for achieving this goal is the US EPA's technical assistance grants (TAG). Under a TAG, the EPA awards communities in areas surrounding Superfund sites funds to hire their own environmental professionals to help interpret technical reports and advocate for community interests in the environmental decision making process. To be sure the TAG process is far from perfect. Holifield (2004) argues that in EPA region 5 (the US southeast) EPA TAG grants are nothing more than show, offering community residents modest financial rewards rather than meaningful participation in the planning process. Elsewhere, however, TAG grants have become an effective tool. For example, on a Minnesota Indian Reservation, Holifield (2010) shows how a native American band use the EPA TAG grant to challenge scientific findings.

One major issue with TAG grants is that the process of hiring an environmental professional can be a time and labor intensive task. Although hiring times may not be a significant issue at a relatively small number of superfund sites where cleanups are often complex and take many years, they can be more problematic when applied to the city's brownfield properties. Following the TAG model exactly would involve issuing tens of thousands of grants and hiring

countless individual environmental professionals. All of this would make costs prohibitive. As an alternative, the city could hire one environmental professional per borough that would serve as a community advocate in relation to brownfield projects. As is true with the TAG grant, the brownfield community advocate (BCA) could assure that necessary documents are available and could help community groups evaluate documents and assess projects' environmental impacts as well as identify alternative remedies.

5. *Experiment with a broader range of environmental remedies*

Almost every brownfield project in New York City uses the same remediation method - excavate the top layer of contaminated fill, haul it to a waste dump, replace it with clean fill, and cap the site with a non-permeable barrier like parking lot or a building foundation. Proponents argue that these "excavate, haul, and cap" strategies provide an inexpensive alternative to more time and labor intensive solutions and that if these remedies were not available many projects would not be fiscally viable. Although these strategies may have environmental limitations, no solution is perfect. Ex-situ methods, where contaminated materials are removed off site, exacerbate environmental justice concerns by exporting contaminated soils to waste dumps in rural areas with mostly poor residents as well as increase the risk of exposure as trucks carry contaminants from the site to waste dumps. At the same time many in-situ methods, where contaminants are removed on-site, put nearby residents at risk of exposure to dust and fugitive emissions.

In response, critics of excavate, haul, and cap strategies argue that these remedies may become ineffective over time (Plunz and Culligan 2007). There is significant evidence to support this

claim. For example, in the Gowanus area a Loew's hardware store built under the BCP's predecessor, the state VCP, employed an excavate, cap, and haul strategy, yet just a few years later the cap was compromised and contaminants flowed into nearby properties. Assuring the long term viability of these approaches requires on-going maintenance and inspections. Given the state and city's limited resources, such a program does not appear feasible.

While there are clearly times where "excavate, haul, and cap" make sense, there are other instances where another remedy may be preferable. For example, at the Public Place Site in the Gowanus, students from Columbia University's engineering and architecture schools recommend natural attenuation, where contaminants migrate from the site into New York Harbor (Plunz and Culligan 2007). Others advocate for methods of phytoremediation whereby plants absorb many of the heavy metals and other contaminants that pollute a property's soil (Cunningham and Ow 1996, Salt, Smith and Raskin 1998) while still others promote synthetic alternatives (Beauvais and Alexandratos 1998, Alexandratos and Crick 1996). Although, many of these methods have proven both ecologically and fiscally feasible, they are still unfamiliar to many property owners and environmental engineering firms (Mulligan et al. 2001).

Both the state and the city would benefit by creating incentives for property owners to explore a broader range of remediation methods. One way to do this is to provide grants and other fiscal benefits (including increased tax breaks) to projects that use alternatives to standard entombment strategies. Another approach would treat residential buildings with first floor

commercial uses as residential thereby requiring more stringent claen-up targets. A third possibility would be for the City and the State to partner with universities to create pilot projects.

Limitations

There are significant limitations to the above findings and recommendations.

1. *Actual locations of brownfield sites are unknown*

The analysis in Chapter 4 compares existing brownfield projects to the assumed location of the city brownfield properties. Because these inventories are based on the current zoning and property assessment roles, they may not identify sites that were home to industries in the past but have since been converted to residential use. Brownfield inventories based on current assessment data may also exclude vacant residential sites where there may be historic fill or other contaminants. Even identifying vacant properties can be difficult as assessors may use different criteria. Further complicating brownfield identification is that a history of leaded gasoline use has left traces of lead in almost all properties.

The City's Department of Environmental Remediation has dedicated significant resources towards developing a more accurate and thorough inventory. Such efforts, however, are hampered by lack of data. Most property owners have not conducted environmental assessments and those that have are under no obligation to release data to the public. In the absence of these data, environmental engineers and city officials estimate current conditions based on past occupants (Litt and Burke 2002, Colten 1990, Leigh and Coff 2000, Frickel and Elliott 2008).

Constructing these historic property roles, however, is extremely time and labor intensive for one property let alone the roughly one million properties in New York City. Absent these data, however, analysts can only estimate whether there is a bias in the type of sites enrolled in the state's and city's brownfield programs.

2. Brownfield sites pose very different risks

In addition to knowing where brownfields are, analysis of the characteristics of populations and properties surrounding brownfield sites treats all brownfields as posing identical environmental risks. This assumption, however, is clearly problematic. While most definitions of brownfields exclude the most contaminated sites (usually those regulated under state and federal superfund programs), the law incorporates a broad range of properties from sites formerly used as manufactured gas plants to sites that were once home to nail salons, gas stations, and other small source polluters. Each of these past uses can have very different long-term effects on the site's groundwater, surface water, or soil. While some uses may leave residue of highly toxic chemicals like mercury or arsenic, others may have leave behind chemicals that pose a more moderate risk. The extent of environmental damage may further vary depending on geo-hydrological conditions that influence the contaminants' fate and transport. On some sites, for instant, groundwater flow may push contaminants into the surrounding areas, while on others exposure may be limited as contaminants are entombed deep in the subsurface.

Environmental risks, however, are just one of many types of risks a site may pose. The presence of brownfields or vacant sites may reduce quality of life in many different ways. Scholars

associate brownfields with elevated crime rates, trash, and rodent outbreaks (Bartsch et al. 1996, NEJAC 1996). Multiple vacant lots may also undermine social cohesion leading to the mental and physical health risks associated with isolation (Klineberg 2002). By assigning each site a binary indicator as to whether or not it is a brownfield, this research project does not capture the variable risks of contamination on each property poses.

3. *The research does not reflect the opinions and insights of all interests*

Brownfields invariably affect the day-to-day lives of countless individuals and groups from nearby residents, to workers, business owners, politicians, property owners, developers, and financiers. Each of these political actors has their own subjective interpretation of the benefits, drawbacks, and risks of brownfield development. In this research, case studies are primarily concerned with the environmental impacts of brownfield developments at the scale of the site, neighborhood, and city. To identify those impacts, I rely on archival reports, public documents, newspapers, blogs, and other electronic media. This choice of methodology and data necessarily privileges certain voices while marginalizing others. While the work and insight of engineers, active community groups, and some private interests may emerge, the research may not capture the opinions of other impacted groups. It is entirely possible that those whose voices were excluded from analysis could offer new and quite possibly contradictory insights into the development process. As such the scope of this is necessarily limited.

4. *The study focuses on environmental issues while it neglects other concerns*

The purpose of this research project is to assess the environmental justice implications of state and city brownfield policies in light of claims that these initiatives meld economic, environmental, and equity goals. As such this project remained relatively restricted to the narrowly defined environmental issues of solid waste management and contamination in the air, water, and soil. Brownfield development, however, can also dramatically impact other realms of social and economic life. For example, several scholars have linked brownfield development with gentrification (Essoka 2003, Banzhaf and Walsh 2004), de-industrialization (Bjelland 2004), and waterfront development (Huertas-Noble, Rose and Glick 2009).

5. *These findings are place specific*

The outcome of brownfield development always occurs in the context of place-bound political, economic, and social relations. Any conclusions drawn about the neighborhoods under study are therefore contextually specific and do not necessarily apply to other neighborhoods and communities. There are strong reasons to believe that brownfield development looks different elsewhere in the city. In Chelsea, for example, brownfield development is occurring in the context of an already gentrified community while in East Harlem, brownfield development is taking the form of large big box retail establishment. While many of the spatial concerns identified in Gowanus, East New York, or Melrose Commons undoubtedly extend to these communities, they will almost certainly manifest in different ways. Likewise the findings in New York City do not necessarily extend to other cities or locations.

Future Research

While this research presents a promising start to the study of urban sustainability, in general, and brownfields, in specific, a great deal more research is required in the study of both fields.

1. *Better inventories of brownfield sites*

Brownfield research is significantly complicated by the absence of city-wide inventories of brownfield sites. As described above there is no easy way to collect these data. Some solutions that researchers have used at the local scale include identifying current and past locations of firms in historically toxic industries (Colten 1990, Leigh and Coff 2000); the past uses of currently vacant properties (Litt and Burke 2002); a combination of federal data sources; inventories of industrial firms and site visits (Frickel and Elliott 2008); and combining aerial imagery and site visits (Ferrara 2008). Unfortunately, these approaches do not scale well and are not directly applicable to large areas like New York City. As is true with this study, in a study commissioned by the New York City Office of Environmental Remediation (OER), Been, Madar, and McDonell (2009) work around this limitation by estimating the location of New York City brownfields through a combination of zoning and tax assessment data. For reasons mentioned above, there are severe limitations to this approach.

There is therefore a need for more thorough methods for estimating the location of brownfield properties in New York City and other urban areas. One alternative would be to first use some of the more labor intensive methods identified above to locate brownfields in several small areas

and then test the accuracy of different proxies (for example, vacancy status, zoning designation, assessed land value to assessed value ratios). Researchers could then use those proxies that best predict brownfield location to identify brownfields city-wide. Another solution is to "crowd source" the problem by first publishing criteria for determining whether a site is a brownfield and then enabling individual communities and researchers to contribute to a broader citywide inventory. A third approach could be to digitize historic land use maps and land use atlases to allow better insight into property histories.

2. More longitudinal research on the efficacy of remedial strategies

"Excavate, haul, and cap" strategies have become the de facto standard for brownfield sites. While regulators initially allowed these remedies only for commercial and industrial properties, property owners now routinely use them on residential sites. Despite their wide-spread adoption, there is little research assessing the long term efficacy of caps. In part, this gap exists because many sites have only recently been capped; in addition, many private property owners have been reluctant to reveal those data. These challenges should become less daunting as "excavate, haul, and cap" strategies become more common and widespread. Researchers should thoroughly investigate these sites to see if barriers to continue to limit exposure, as promised. Further, these studies could evaluate the damage to human and ecological health where the barriers have been compromised. These results should be compared with other solutions on both economic and environmental grounds.

3. *Comparison with other cities and settings*

While the above research may give some indication of the relationships between economic growth, environmental protection, and equity within New York City, they do not necessarily reflect a universal experience. In particular it would be useful to compare outcomes with cities that have more comprehensive planning practices such as Portland, Oregon, or Seattle, Washington. It would also be helpful to compare the outcome of New York State brownfield policies with states that have enacted broader area-wide strategies, like Florida or New Jersey.

4. *Examine other sustainability initiatives*

In addition to brownfield development, PlaNYC – the city's widely heralded sustainability initiative - identifies many other sustainability initiatives including a commitment to green buildings, energy conservation, public transportation, parks and open space, and waterfront development. Each of these proposals promises to combine economic growth, environmental protection, and equity. Researchers should examine whether these initiatives exacerbate existing environmental injustices by reallocating resources and environmental benefits away from the city's poorest, most environmentally compromised neighborhoods towards wealthier areas. When tensions do arise between economic growth, environmental protection, and equity, what role does space play?

5. *Situate brownfield policies within transnational capital flows*

While this study primarily examines brownfields as a local phenomenon, as is true of all urban development, brownfield development both enables and is the product of transnational flows of capital. There is an increasing body of literature that talks about the methods, tools, and processes that the state uses to transform real estate from a difficult and hard-to-value asset into a liquid commodity. Gotham (2006), for example, examines the way that mortgage-backed securities and real estate investment trusts (REITS) make it easier for global real estate capital to invest in locally heterogeneous markets. Others, like Weber (2002) and Mele (2000), discuss the way that city policies homogenize space by both discursively and physically clearing urban neighborhoods of existing residents, buildings, and businesses.

State and municipal brownfield policies seem to fulfill a similar purpose. Desfor and Keil (1999), for example, argue that by standardizing cleanup targets and criteria, Toronto's brownfield policies enable distant investors to better evaluate brownfield sites. This is just one of many ways current changes in the regulation of contaminated properties enmesh these sites in global circuits of capital. For instance, claims of vacancy or underuse obscure the wide range of activities that may occur on brownfield sites, making these sites appear as blank slates primed for global investment. Brownfield development has also become an increasingly globalized endeavor as international development firms and large scale retailers like WalMart and Target are some of the most active brownfield developers.

Conclusion

Over the last twenty-five years almost every state and many cities have passed laws or created programs to encourage the cleanup and redevelopment of brownfield sites. New York State created its first brownfield program – the Voluntary Cleanup Program – in 1996 but did not formalize it into law until the passage of the Brownfield Cleanup Program and Brownfield Opporunity Areas Program (BOA) in 2004. New York City soon followed suit, creating its own Voluntary Compliance Program and several smaller initiatives in 2009.

In general these policies had three objectives – to put vacant or abandoned parcels into productive use, to stymie development along the urban periphery, and to improve environmental and economic conditions in the city's most destitute neighborhoods. This combination is emblematic of a broader shift in urban environmental policy. In contrast to past initiatives, city managers increasingly create policies that purport to simultaneously promote what Campbell (1996) famously referred to as the three Es of urban sustainability: economic growth, environmental protection, and equity. While past research has examined tensions that may arise between these objectives, they have largely overlooked the issue of space and spatiality. In this dissertation I argue that at least in the case of New York City brownfield policy, this oversight is deeply problematic.

As is true in most cities and states, New York City and New York State promote brownfield development by addressing site-specific concerns like environmental liability, remedial costs, and bureaucratic delays. Overlooked in these policies, however, is the impact of area wide issues

such as decaying infrastructure, a lack of public space, and underfunded schools. Also absent are provisions that assure projects have a beneficial impact on the surrounding neighborhoods, city, and region. The city and state's choice to privilege issues within the site's boundaries over conditions in the surrounding area is primarily driven by their approach to growth. As surveys of brownfield developers indicate, pursuing area-wide approaches may better promote brownfield development since issues in surrounding areas often pose a greater barrier to brownfield development than on-site contamination alone. To do so, however, would necessarily contradict the city's and state's emphases on converting properties to their "best and highest" use, affording property owners flexibility, aversion to comprehensive planning, and tendency to distantiate individual properties from their surrounding areas.

The city's and state's focus the focus on the site and neglect of the area has exacerbated environmental injustices in at least three ways. First, at the scale of the city, the promotion of site-specific policies promotes the clean up and development of contaminated properties in areas with predominantly wealthy and white residents while having little or no impact in many of the city's most environmentally compromised neighborhoods where residents are overwhelmingly poor, black, or Hispanic. Second, at the scale of the neighborhood, while state and city policies may protect human and ecological health within the sites' boundaries by promoting the the containment or removal of on-site contaminants, they also exacerbate environmental problems in the surrounding communities. Third, current brownfield policies fail to disclose important project details, and provide little opportunity for community input. While there are some

initiatives that do promote community participation, these programs are largely ineffectual and yield few tangible benefits.

Although there are tensions between economic growth, environmental protection, and equity in the city's brownfield policies, this does not mean that it is impossible to bring the three objectives into accord. Doing so, however, demands that the city and state fundamentally re-imagine their pursuit of economic growth by committing to a program of community driven comprehensive planning. Unless this commitment is made, the promise of brownfield development will remain beyond reach.

Sources

Abraham, G. (1997) Review of Actions Under President Clinton's Executive Order on Environmental Justice. *Buffalo Environmental Law Journal,* 5**,** 79.

Abrams, R. (1997) Superfund and the Evolution of Brownfields. *William and Mary Environmental Law and Policy Review,* 21**,** 265 - 292.

Adler, M. D. (2005) Against "Individual Risk": A Sympathetic Critique of Risk Assessment. *University of Pennsylvania Law Review,* 153**,** 1121-1250.

Agyeman, J., R. Bullard & B. Evans (2002) Exploring the Nexus: Bringing Together Sustainability, Environmental Justic and Equity. *Space and Polity,* 6**,** 77 - 90.

Agyeman, J. & T. Evans (2003) Toward Just Sustainability in Urban Communities: Building Equity Rights with Sustainable Solutions. *The ANNALS of the American Academy of Political and Social Science,* 590**,** 35-53.

Alberini, A., L. Heberle, P. Meyer & K. Wenstedt. 2004. The Brownfields Phenomenon: Much Ado About Something or the Timing of the Shrewd? Louisville, KY: Center for Environmental Policy and Management, University of Louisville.

Alberini, A., A. Longo, S. Tonin, F. Trombetta & M. Turvani (2005) The role of liability, regulation and economic incentives in brownfield remediation and redevelopment: evidence from surveys of developers. *Regional Science and Urban Economics,* 35**,** 327-351.

Alberini, A. & K. Segerson (2002) Assessing Voluntary Programs to Improve Environmental Quality. *Environmental and Resource Economics,* 22**,** 157 - 184.

Alexandratos, S. D. & D. W. Crick (1996) Polymer-Supported Reagents: Application to Separation Science. *Industrial & Engineering Chemistry Research,* 35**,** 635-644.

Alker, S., V. Joy, P. Roberts & N. Smith (2000) The Definition of Brownfield. *Journal of Environmental Planning and Manangement,* 43**,** 46 - 69.

Allred, C. 2000. Breaking the Cycle of Abandonment: Using a Tax Enforcement Tool to Return Distressed Properties to Sound Private Ownership. Boston, MA: Pioneer Institute for Public Policy Research.

Angotti, T. 2008a. *New York for Sale*. Cambridge, Mass: The MIT Press.

---. 2008b. Is New York's Sustainability Plan Sustainable? In *Sustainability Watch Working Papers,* ed. T. Angotti. New York City, NY: Hunter College Center for Community Planning and Development.

---. 2010. PlaNYC at Three: Time to Include the Neighborhoods. *The Gotham Gazette* April 12.

Army Corps of Engineers. 2006. Final Sediment Sampling Report. New York City, NY: Army Corp of Engineers.

Arnold, C. A. (1998) Planning Milagros: Environmental Justice and Land Use Regulation. *Denver University Law Review,* 76.

Associated Press. 2008. Lawmakers Reach Agreement on Brownfields. *The New York Sun* June 24, 2008.

Banzhaf, S. & R. Walsh. 2004. Testing for Environmental Gentrification: Migratory Responses to Changes in Environmental Quality. In *American Association of Environmental and Resource Economists*. Estes Park, CO.

Bartsch, C., E. Collaton & E. Pepper. 1996. *Coming Clean for Economic Development: A Resource Book on Environmental Cleanup and Economic Development*. Washington, DC: Northeast-Midwest Institute.

Bartsch, C. & R. Deane. 2002. Brownfields State of the States. Washington, DC: Northeast-Midwest Institute.

Bass, R. (1998) Evaluating Environmental Justice Under the National Environmental Policy Act. *Environmental Impact Assessment Review,* 18**,** 83 - 92.

Beauvais, R. A. & S. D. Alexandratos (1998) Polymer-supported reagents for the selective complexation of metal ions: an overview. *Reactive and Functional Polymers,* 36**,** 113-123.

Been, V. (1994) Locally Undesirable Land Uses in Minority Neighborhoods: Disproportionate Siting or Market Dynamics? *Yale Law Journal,* 103**,** 1383 - 1421.

Been, V. & F. Gupta (1997) Coming to the nuisance or going to the barrios? A Longitudinal Analysis of Environmental Justice Claims. *Ecology Law Quarterly,* 24.

Been, V., J. Madar & S. McDonnell. 2009. Underused Lots in New York City. New York City, NY: Furman Center for Real Estate and Urban Policy, New York University.

Benfield, K. 2010. Inclusive revitalization at its best: Melrose Commons in the South Bronx. In *Switchboard, Natural Resource Defense Council Blog*. Natural Resource Defence Council http://switchboard.nrdc.org/blogs/kbenfield/inclusive_revitalization_at_it.html.

Benford, R. 2005. The Half-Life of the Environmental Justice Frame: Innovation, Diffusion, and Stagnation. In *Power, Justice, and the Environment,* eds. D. Pellow & R. Brulle, 37 - 54. Cambridge, MA: MIT Press.

Berg, B. 2007. *Governing Gotham*. New Brunswick, NJ: Rutgers University Press.

Berman, M. 1988. *All that is solid melts into air : the experience of modernity*. New York, N.Y., U.S.A.: Viking Penguin.

Besag, J. & P. J. Diggle (1977) Simple Monte Carlo Tests for Spatial Pattern. *Applied Statistics,* 26**,** 327-333.

Biasci, J. & F. Verderame. 2002. Personal Communication to Mayor Michael Bllomberg. ed. M. Bloomberg. New York City.

Birch, E. 1998. From Flames to Flowers: Twenty Years of Planning in the South Bronx. In *Imagining the City. The Place of Media in City Design and Development.* Cambridge, MA: http://web.mit.edu/imagingthecity/www/sessions/birch.html.

Bjelland, M. (2004) Brownfield Sites in Minneapolis-St. Paul: Interwoven Geographies of Industrial Disinvestment and Environmental Contamination. *Urban Geography,* 25**,** 631 - 657.

Bloomberg, M. 2008. PlaNYC: A Greener, Greater New York. New York City, New York: The City of New York.

Bonnoris, S. 2004. *Environmental Justice For All, A Fifty-State Survey of Legislation, Policies, and Initatives*. American Bar Association.

BoogieDowner. 2008. Via Verde Development to Transform Melrose into a Green Oasis. http://boogiedowner.blogspot.com/2008/08/via-verde-development-to-transform.html.

Bowen, M. & M. Wells (2002) The Politics and Reality of Environmental Justice: A History and Considerations for Public Administrators and Policy Makers. *Public Administration Review,* 62**,** 688 - 698.

Bowen, W. 2001. *Environmental justice through research-based decision-making*. New York City, NY: Garland Pub.

Bowen, W., M. Salling, K. Haynes & E. Cyran (1995) Toward Environmental Justice: Spatial Equity in Ohio and Cleveland. *Annals of the Association of American Geographers,* 85**,** 641 - 663.

Brand, P. (2007) Green Subjection: The Politics of Neoliberal Urban Environmental Management. *International Journal of Urban & Regional Research,* 31**,** 616-632.

Braun, B. (2005) Environmental issues: writing a more-than-human urban geography. *Progress in Human Geography,* 29**,** 635.

Braun, B. & J. Wainwright. 2001. Nature, Postructuralism, and Politics. In *Social Nature: Theory, Practice and Politics,* eds. N. Castree & B. Braun, 41 - 63. Oxford, UK: Routledge.

Breggin, L., J. Pendergrass & J. Van Berg. 1999. Protecting Public Health at Superfund Sites: Can Institutional Controls Meet the Challenge? Environmental Law Institute.

Brenner, N. (1997) State Territiorial restructuring and production of spatial scale. *Political Geography,* 16**,** 273 - 306.

Brown, E. 2008a. City Makes New Office for Brownfield Cleanup. *The New York Observer* June 9.

Brown, J. 2008b. Complaint, United Staes of America vs Anthony Seminerio. ed. S. D. o. N. Y. United States District Court.

Brownstoner. 2007. Whole Foods Facing an Uphill Battle in the Gowanus. June 4. http://brownstoner.com/brownstoner/archives/2007/06/whole_foods_fac.php.

---. 2008. Streetlevel: Obstacles for Whole Foods. February 28. http://www.brownstoner.com/brownstoner/archives/2008/02/whole_foods_bui.php#comments.

Brunsdon, C., A. S. Fotheringham & M. Charlton (1998) Geographically Weighted Regression-Modelling Spatial Non-Stationarity. *The Statistician,* 47**,** 431 - 443.

Bullard, R. 1994. Dumping in Dixie: Race, Class, and Environmental Quality. Boulder, CO: Westview.

--- (1996) Environmental Justice: It's More Than Waste Facility Siting. *Social Science Quarterly,* 77**,** 493 - 499.

---. 2000. People of Color Environmental Groups Directory. Environmental Justice Resource Center, Clark University http://www.ejrc.cau.edu/poc2000.htm.

Bullard, R. & G. Johnson (2000) Environmental Justice: Grassroots Activism and Its Impact on Public Policy Decision Making. *Journal of Social Issues,* 56**,** 555 - 578.

Bullard, R., P. Mohai, R. Saha & B. Wright. 2007. *Toxic Wastes and Race at Twenty: 1987 - 2007*. Cleveland, OH: United Church of Christ.

Bullard, R. D. e. & G. S. e. Johnson. 1997. *Just transportation: dismantling race and class barriers to mobility*. New Society Publishers Stonu Creek Conn.

Burton, E. (2000) The Compact City: Just or Just Compact? A Preliminary Analysis. *Urban Studies,* 37**,** 1969-2006.

Bussewitz, C. 2002. Please take action to save NYC garden. GreenYes Listserv http://greenyes.grrn.org/2002/06/msg00158.html.

Byrne, J. 1999. The Brownfields Challenge: A Survey of Environmental Justice and Community Participation Initiatives Among Ten National Brownfield Pilot Projects. Wilmington, DE: Center for Energy and Environmental Policy, College of Human Resources, Education and Public Policy, University of Delaware.

Caine Miller, C. & B. Stone. 2009. 'Hyperlocal' Web Sites Deliver News Without Newspapers. *New York Times* April 12.

Campbell, S. (1996) Green Cities, Growing Cities, Just Cities?: Urban Planning and the Contradictions of Sustainable Development. *Journal of the American Planning Association,* 62**,** 296 - 312.

Campo, D. (2002) Brooklyn's Vernacular Waterfront. *Journal of Urban Design,* 7**,** 171 - 199.

Capuano, N. (2003) Silent Blight: New York's Brownfields and Environmental Justice. *Pace Environmental Law Review,* 20**,** 811.

Castree, N. (2002) Environmental issues: from policy to political economy. *Progress in Human Geography,* 26**,** 357 - 365.

Celock. 2007. Concrete Jungles are Farmed Out. *The Real Deal* May 4.

Center for Health Environment and Justice, Citizens' Environmental Coalition, Environmental Advocates of New York, New York Public Interest Research Group & Sierra Club - Atlantic Chapter. 2007. Cleaning Up: Fixing New York's Broken Brownfield Cleanup Program.

Chakraborty, J. & M. Armstrong (1997) Exploring the Use of Buffer Analysis for the Identification of Impacted Areas in Environmental Equity Analysis. *Cartography and Geographic Information Systems,* 24**,** 145 - 157.

Chen, D. 2009. Bloomberg and Aides Going to Copenhagen. *The New York Times* December 8.

Chinn, L. (1999) Can the Market Be Fair and Efficient? An Environmental Justice Critique of Emissions Trading. *Ecology Law Quarterly,* 26**,** 80 - 125.

Clinton, W. (1994) Executive Order 12898. *Federal Register,* 59**,** 7629.

Clueck, G. 1982. Gallery View; Drawing a Bead on Public Monuments. *The New York Times* October 3.

Cohen, A. 2006a. Gowanus toxic plume targeting Park Slopers. *The Brooklyn Paper* December 23.

---. 2006b. 'Whole' lot of parking. *The Brooklyn Paper* October 28.

---. 2007a. No 'Toll' on Gowanus. In *The Brooklyn Paper*. http://www.brooklynpaper.com/stories/30/1/30_01nets5.html.

---. 2007b. Public fight on Public Place. *The Brooklyn Paper* November 17.

Cole, L. & S. Foster. 2001. *From the Ground Up, Environmental Racism and the Rise of the Environmental Justice Movement*. New York City, NY: New York University Press.

Collaton, E. & C. Bartsch (1996) Industrial Site Reuse and Urban Redevelopment - An Overview. *Cityscape: A Journal of Policy Development and Research,* 2**,** 17 - 61.

Colten, C. (1990) Historical Hazards: The Geography of Relict Industrial Wastes. *Professional Geographer,* 42**,** 143 - 156.

Cooper, M. 2003. City-Sold Lots Stay Vacant, Report Says. *The New York Times* February 25.

Corburn, J. (2001) Emissions trading and environmental justice: distributive fairness and the USA's Acid Rain Programme. *Environmental Conservation,* 28**,** 323-332.

--- (2002) Environmental Justice, Local Knowledge, and Risk: The Discourse of a Community-Based Cumulative Exposure Assessment. *Environmental Management,* 29**,** 451 - 466.

Corburn, J., J. Osleeb & M. Porter (2005) Urban asthma and the neighbourhood environment in. *Health and Place,* 12**,** 167 - 179.

Council for Urban Economic Development. 1999. Brownfields redevelopment: Performance Evaluation. Washington, D.C.: Council for Urban Economic Development.

CPD 6. 1974. Proposed Map Change, April 3, 1974. ed. Borough of Brooklyn Community Planning District 6.

Creswell, J. W. 2003. *Research design : qualitative, quantitative, and mixed method approaches*. Thousand Oaks, Calif.: Sage Publications.

Critchell, D. 1999. NEIGHBORHOOD REPORT: SOUTH BRONX; A Group Named 'We Stay,' A Garden That Must Depart. *The New York Times* December 19.

Cunningham, S. & D. Ow (1996) Promises and Prospects of Phytoremediation. *Plant Physiology,* 110**,** 715 - 719.

Curbed. 2006. Toll Brothers' (Not So) Secret Battle Plans Revealed. http://curbed.com/archives/2006/04/05/toll_brothers_not_so_secret_battle_plans_revealed.php.

Cutter, S., M. Hodgson & K. Dow (2001) Subsidized Inequities: The Spatial Patterning of Environmental Risks and Federally Assisted Housing. *Urban Geography,* 22**,** 29 - 53.

Cutter, S., D. Holm & L. Clark (1996) The Role of Geographic Scale in Monitoring Environmental Justice. *Risk Analysis,* 16**,** 517 - 526.

Cutter, S. & W. Solecki (1996) Setting Environmental Justice in Space and Place: Acute and Chronic Airborne Toxic Releases in the Southeastern United States. *Urban Geography,* 17**,** 380-399.

Davies, L. (1999) Working Toward a Common Goal? Three Case Studies of Brownfields Redevelopment in Environmental Justice Communities. *Stanford Environmental Law Review,* 18**,** 285.

De Sousa, C. (2005) Policy Performance and Brownfield Redevelopment in Milwaukee, Wisconsin. *The Professional Geographer,* 57**,** 312-327.

Debbané, A.-M. & R. Keil (2004) Multiple disconnections: Environmental Justice and Urban Water in Canada and South Africa. *Space & Polity,* 8**,** 209-225.

DEC. 2009. Environmental Site Remediation Database. New York State Department of Environmental Conservation http://www.dec.ny.gov/cfmx/extapps/derexternal/index.cfm?pageid=3.

deCourcy Hinds, M. 1987. Mixed Record Emerges from Auction Sales of City Houses. *The New York Times* September 13.

DEP. 1999. City Activates Gowanus Flushing Tunnel. New York City: New York City Department of Environmental Protection.

DePalma, A. 1987. The Nehemiah Plan: A Success, but ... *The New York Times* September 27.

Desfor, G. & R. Keil (1999) Contested and polluted terrain. *Local Environment,* 4**,** 331.

---. 2006. *Nature and the City; Making Environmental Policy in Toronto and Los Angeles*. Tuscon, AZ: The University of Arizona Press.

Deyle, R. & R. Bretschneider (1995) Spillover of State Policy Innovations: New York's Hazardous Waste Regulatory Initiatives. *Journal of Policy Analysis and Management,* 14**,** 79 - 106.

Di Chiro, G. 1998. Environmental Justice from the Grassroots, Reflections on History, Gender, and Expertise. In *The Struggle for Ecological Democracy, Environmental Justice Movements in the United States,* ed. D. Faber, 104 - 136. New York City, NY: The Guilford Press.

DiNapoli, T. 2008. Overview of the New York State Brownfield Cleanup Program. Albany, NY: Office of the New York State Comptroller.

Dunlap, D. 1994. Taking City Planning in a New Direction. *The New York Times* April 24.

Egbert, B. 2005. South Bronx is Eyed for New Power Plant in New York. *Environmental News Network* August 17.

Eisen, J. (1996) Brownfields of Dreams?: Challenges and Limits of Voluntary Cleanup Programs and Incentives. *University of Illinois Law Review,* 94**,** 833 - 1039.

--- (1999) Brownfields Policies for Sustainable Cities. *Duke Environmental Law and Policy Forum,* 9**,** 187.

--- (2007) Brownfields at 20: A Critical Reevaluation. *Fordham Urban Law Journal,* 34**,** 721 - 756.

Elder, R. F. (2006) Protecting New York City's Community Gardens. *NYU Environmental Law Journal,* 13**,** 769 - 800.

Ellerbusch, F. (2006) Brownfields: Risk, property, and community value. *Local Environment,* 11**,** 559-575.

Elwood, S. (2006) Beyond Cooptation or Resistance: Urban Spatial Politics, Community Organizations, and GIS-Based Narratives. *Annals of the Association of American Geographers,* 96**,** 323 - 341.

Engels, F. & D. McLellan. 1993. *The condition of the working class in England*. Oxford England ; New York: Oxford University Press.

Environmental New Service. 2003. New York Funds Brownfields, Superfund Remediation. http://www.ens-newswire.com/ens/sep2003/2003-09-23-01.asp.

EPA. 2000. The Model Plan for Public Participation. ed. N. E. J. A. Council.

---. 2003. Towards an Environmental Justice Collaborative Model, An Evaluation of the Use of Partnerships to Adress Environmental Justice Issues in Communities. ed. F. I. W. G. o. E. Justice.

EPA, L. Schweitzer, J. Chakraborty & D. Forkenbrock (1998) Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analysis%4 Institution/Agency Publications%@ file://c:documents+and+settingsmikemy+documents esearchourcesarticlesepa_1998.pdf

Using GIS to Assess the Environmental Justice Consequences of Transportation System Changes. *Transactions in GIS,* 3**,** 239 - 258.

Essoka, J. 2003. Brownfields Revitalization Projects: Displacement of the Dispossessed. In *Environmental Sciences*, 213. Philadelphia, PA: Drexel University.

Faber, D. & D. Mccarthy. 2003. Neo-liberalism, Globalization and the Struggle for Ecological Democracy: Linking Sustainability and Environmental Justice. In *Just Sustainabilities,* eds. J. Agyeman, R. Bullard & B. Evans, 38 - 63. Cambridge, Mass: MIT Press.

Fainstein, S. S. (1991) Promoting Economic Development Urban Planning in the United States and Great Britain. *Journal of the American Planning Association,* 57**,** 22 - 33.

Feitelson, E. (2002) Introducing environmental equity dimension into sustainable transport discourse: issues and pitfalls. *Transportation Research Part D,* 7**,** 99 - 118.

Fernandez, B. 1999. Rules Let Contaminants Be Covered, Not Cleaned. *Philadelphia Inquirer* April 13, 1999.

Ferrara, V. 2008. Brownfield identification: Different approaches for analysing data detected by means of remote sensing. 45-54. http://www.scopus.com/inward/record.url?eid=2-s2.0-58449119178&partnerID=40&md5=381aa0146e29669909beb5a2525606a5.

Feuer, A. 2003. The End Is Near, Yet at a Distance; Bronx Haven Is Threatened, but Denizens Still Dream. *The New York Times* September 26.

Finn, D. 2008. New York City's PlaNYC Initiative: Does Greener Really Mean Greater? In *Sustainability Watch Working Papers,* ed. T. Angotti. New York City, NY: Hunter College Center for Community Planning and Development.

First National People of Color Environmental Leadership Summit. 1991. Principles of Environmental Justice.

Fischer, F. 2000. *Citizens, Experts, and the Environment*. Durham, NC: Duke University Press.

Florida, R. L. 2002. *The rise of the creative class : and how it's transforming work, leisure, community and everyday life*. New York, NY: Basic Books.

Florida, R. L., Sustainable Pittsburgh (Organization), Heinz Endowments (Organization) & Richard King Mellon Foundation. 2000. *Competing in the age of talent : environment, amenities, and the new economy*. S.l.: s.n.

Flowerdew, R. & M. Green (1992) Developments in areal interpolation methods and GIS. *The Annals of Regional Science,* 26**,** 67-78.

Foreman, C. 1998. *The Promise and Peril of Environmental Justice*. Washington, DC: The Brookings Institution Press.

Fotheringham, A. S., C. Brunsdon & M. Charlton. 2002. *Geographically Weighted Regression: The Analysis of Spatially Varying Relationships*. Hoboken, NJ: John Wiley and Sons.

Fotheringham, A. S. & W. D. W. S. (1991) The Modifiable areal unit problem in multivariate statistical analysis. *Environment and Planning A,* 23**,** 1025 - 1044.

Found In Brooklyn. 2007a. Developments on Bond Street. http://foundinbrooklyn.blogspot.com/2007/03/developments-on-bond-street.html.

---. 2007b. Gowanus/ Bond Street Area News .... November 4. http://foundinbrooklyn.blogspot.com/2007/11/gowanusbond-street-area-news.html.

---. 2008a. Some Thoughts on Toll Brothers Condo Complex along the Gowanus. February 15. http://foundinbrooklyn.blogspot.com/2008/02/some-thoughts-on-gowanus-village.html.

---. 2008b. Gowanus? Love Canal? No! It's the Clap Canal! . September 26. http://foundinbrooklyn.blogspot.com/2008/09/gowanus-love-canal-no-its-clap-canal.html.

Frickel, S. & J. R. Elliott. 2008. Tracking Industrial Land Use Conversions: A New Approach for Studying Relict Waste and Urban Development. 128-147. http://oae.sagepub.com/cgi/content/abstract/21/2/128

Fried, J. 1974. Worsening of Slum Housing Abandonment is Feared. *The New York Times* February 26.

Friends of Bond. 2008. What do the Toll Brothers Have to Offer: Reactions to the 4/26 Presentation. March 28. http://friendsofbond.blogspot.com/2008/03/what-do-toll-brothers-have-to-offer.html.

Gallagher, D. R. & S. Jackson (2008) Promoting community involvement at brownfields sites in socio-economically disadvantaged neighbourhoods. *Journal of Environmental Planning and Management,* 51**,** 615-630.

Gardner, S. 2001. Green Visions for Brownfields: The politics of Site Remediation and Redevelopment in Four New Jersey Cities. In *Political Science*. New York City: City University of New York.

GCCDC. 2006. Gowanus Canal Comprehensive Community Development Plan. Brooklyn, NY: Gowanus Canal Community Development Corp.

Gearin, E. 2004. Smart Growth or Smart Growth Machine? The Smart Growth Movement and Its Implications. In *Up Against the Sprawl,* eds. J. Wolch, M. Pastor & P. Dreier, 279 - 309. Minneapolis, MN: University of Minnesota Press.

GEI Consultants. 2007. Final Remedial Design Work Plan, Carroll Gardens/ Public Place. Brooklyn, NY: Keyspan Corporation.

Geller, A. L. (2003) Smart Growth: A Prescription for Livable Cities. *Am J Public Health,* 93**,** 1410-1415.

Geltman, E. G. 2000. *Recycling Land, Understanding the Legal Landscape of Brownfield Development*. Ann Arbor, MI: The University of Michigan Press.

Getis, A. & J. Ord (1992) The analysis of spatial association by use of distance statistics. *Geographical Analysis,* 24**,** 189 - 206.

Gibbs, D. 2002. *Local Economic Development and the Environment*. New York City, NY: Routledge.

Gibbs, D., A. Jonas & A. While (2002) Changing governance structures and the environment: economy–environment relations at the local and regional scales. *Journal of Environmental Policy & Planning,* 4**,** 123 - 138.

Gibbs, D. & R. Krueger (2005) Exploring local capacities for sustainable development. *Geogforum,* 36**,** 407.

---. 2007. Containing the Contradictions of Rapid Development? In *The Sustainable Development Paradox,* eds. R. Krueger & D. Gibbs, 95 - 122. New York City, NY: Guilford Press.

Giulliani, R. 1998. "Fair Share" Criteria. ed. D. o. C. Planning. New York City.

Glaser, M. (2004) The New Voices: Hyperlocal Citizen Media Want You (to Write). *Online Journalism Review*.

Glickman, T. S. & R. Hersh. 1995. Evaluating Environmental Equity: The Impacts of Industrial Hazards on Selected Social Groups in Allegheny County, Pennsylvania. Washington, DC: Resources for the Future.

Gonzalez, D. 1993. Revolution of People Power Wells Up in the Bronx; Residents Who Survived Bad Times Alter Development Plans for Their Neighborhood. *New York Times* July 8.

Gonzalez, E. D. 2004. *The Bronx*. New York: Columbia University Press.

Goodchild, M., L. Anselin & U. Deichmann (1993) A Framework for the areal interpolation of socioeconomic data. *Environmental and Planning A,* 25**,** 383 - 397.

Gotham, K. F. (2006) The Secondary Circuit of Capital Reconsidered: Globalization and the U.S. Real Estate Sector. *American Journal of Sociology,* 112**,** 231.

Gottlieb, M. 1986. F.H.A. Case Recalls Bushwick in 70's. *The New York Times* February 2.

Gottlieb, R. 2001. *Environmentalism unbound : exploring new pathways for change*. Cambridge, Mass.: MIT Press.

Gowanus Lounge. 2006a. Today's Must Reading + Map: Dirty Gowanus, . June 6. http://www.gowanuslounge.com/2006/06/06/todays-must-reading-map-dirty-gowanus/#more-150.

---. 2006b. Lake Gowanus Grows So Does Whole Foods Site. May 16. http://www.gowanuslounge.com/2006/05/16/lake-gowanus-grows-so-does-whole-foods-site/#more-70.

---. 2006c. Ceremonial Groundbreaking for Gowanus Whole Foods Site. November 17. http://www.gowanuslounge.com/2006/11/17/ceremonial-groundbreaking-for-gowanus-whole-foods/#more-1023.

---. 2006d. Scoop on Gowanus Whole Foods: Bigger Store, November Groundbreaking. October 20. http://www.gowanuslounge.com/2006/10/20/scoop-on-gowanus-whole-foods-bigger-store-november-groundbreaking/#more-864.

---. 2007a. Whole Foods Still Giving Park Slope The Cold Shoulder. April 11. http://www.gowanuslounge.com/2007/04/11/whole-foods-still-giving-park-slope-the-cold-shoulder/#more-2080.

---. 2007b. Gowanus Groundwork Laid for Toll Brothers in "Subarea B"? April 25. http://www.gowanuslounge.com/2007/04/25/gowanus-groundwork-laid-for-toll-brothers-in-subarea-b/#more-2198.

---. 2007c. Gowanus Flooding Redux. August 24. http://gowanuslounge.blogspot.com/2007/08/gowanus-flooding-redux.html.

---. 2007d. Residents to Whole Foods, Gowanus Edition: Hold the Hole. February 2. http://gowanuslounge.blogspot.com/2007/02/residents-to-whole-foods-gowanus.html.

---. 2007e. Speedy Demolition, Slow Rezoning in Gowanus. February 6. http://www.gowanuslounge.com/2007/02/06/speedy-demolition-slow-rezoning-in-gowanus/#more-1580.

---. 2007f. The Ground Beneath Gowanus, Whole Foods Edition. January 18. http://www.gowanuslounge.com/2007/01/18/the-ground-beneath-gowanus-whole-foods-edition/#more-1429.

---. 2007g. Gowanus #2: The Demolition Man Cometh to Second Street. January 25. http://www.gowanuslounge.com/2007/01/25/gowanus-2-the-demolition-man-cometh-to-second-street/#more-1486.

---. 2007h. Gowanus #2: Plans for Mostly Private Place Not Embraced. March 6. http://gowanuslounge.blogspot.com/2007/03/gowanus-2-plans-for-mostly-private.html.

---. 2007i. Gowanus Whole Foods #1: The Big Picture. May 5. http://gowanuslounge.blogspot.com/2007/01/gowanus-whole-foods-1-big-picture.html.

---. 2007j. Whole Foods Gowanus Plans Are Not Approved. May 24. http://www.gowanuslounge.com/2007/05/24/whole-foods-gowanus-plans-are-not-approved/#more-2455.

---. 2007k. Open Gowanus Whole Foods Site: Now Closed. November 26. http://www.gowanuslounge.com/2007/11/26/open-gowanus-whole-food-site-now-closed/#more-4538.

---. 2008a. Pre-Gowanus Green, They're Really Digging Public Place. April 21. http://gowanuslounge.blogspot.com/2008/04/pre-gowanus-green-theyre-really-digging.html#links.

---. 2008b. Is the City Trying to Piss People Off About "Gowanus Green"? December 15. http://www.bobguskind.com/2008/12/15/is-the-city-trying-to-piss-people-off-about-gowanus-green/.

---. 2008c. Gowanus Whole Foods Still Faces a few Hurdles. February 11. http://www.gowanuslounge.com/2008/02/11/gowanus-whole-foods-still-faces-a-few-hurdles/#more-5622.

---. 2008d. The Starting Bell: Toll Brothers Reveal Gowanus Plans. February 14. http://www.gowanuslounge.com/2008/02/14/the-starting-bell-toll-brothers-reveal-gowanus-plans/#more-5678.

---. 2008e. Public Place Asbestos Removal Spurs Concern, Anger. July 29. http://www.gowanuslounge.com/2008/07/29/public-place-asbestos-removal-spurs-concern-anger/#more-9319.

---. 2008f. Gowanus Bell Tolls: "Scoping" Hearing on Thursday. March 12. http://gowanuslounge.blogspot.com/2008/03/gowanus-bell-tolls-scoping-hearing-on.html.

---. 2008g. Scopng the Toll Brothers in Gowanus. March 13. http://gowanuslounge.blogspot.com/2008/03/scopng-toll-brothers-in-gowanus.html.

---. 2008h. With Public Place Work Underway, Safety Questions Remain. March 24. http://gowanuslounge.blogspot.com/2008/03/with-public-place-work-underway-safety.html.

---. 2008i. Toll Brothers Gowanus Project: Zoning, Toxins, and Shadows. March 25. http://www.gowanuslounge.com/2008/03/25/toll-brothers-gowanus-project-zoning-toxins-shadows/#more-6449.

---. 2009. A Carroll Gardens Resident's Letter About Development. January 22. http://www.gowanuslounge.com/2009/01/22/a-carroll-gardens-residents-letter-about-development/.

Greenberg, M., P. Craighill, H. Mayer, C. Zukin & J. Wells (2001a) Brownfield Redevelopment and Affordable Housing: A Case Study of New Jersey. *Housing Policy Debate,* 12**,** 515 - 540.

Greenberg, M., C. Lee & C. Powers (1998) Public health and brownfields: reviving the past to protect the future. *American Journal of Public Health,* 88**,** 1759 - 1760.

Greenberg, M. & M. J. Lewis (2000) Brownfields Redevelopment, Preferences and Public Involvement: A Case Study of an Ethnically Mixed Neighbourhood. *Urban Studies,* 37**,** 2501.

Greenberg, M., K. Lowrie, H. Mayer, K. T. Miller & L. Solitare (2001b) Brownfield redevelopment as a smart growth option in the United States. *The Environmentalist,* 21**,** 129-143.

Greenberg, M., K. Lowrie, L. Solitaire & L. Duncan (2000) Brownfields, Toads, and the Struggle for Neighborhood Redevelopment: A Case Study of the State of New Jersey. *Urban Affairs Review,* 5**,** 717 - 733.

Gunder, M. (2006) Sustainability: Planning's Saving Grace or Road to Perdition? *Journal of Planning Education and Research,* 26**,** 208-221.

Hack, C. 2006a. Pollution Delays Market Opening; Old Petro Tank Foul Third Street Building Site. *Cobble Hill / Carrol Gardens Courier* March 6.

---. 2006b. Whole Foods Market Revamps Design For New Site. *Cobble Hill/ Carrol Gardens Courier* March 31.

Hajer, M. 1995. *The Politics of Environmental Discourse: Ecological Modernization and the Policy Process*. Oxford: Oxford University Press.

Hammerman, C. 1993. Letter From Craig Hammerman, Brooklyn Community District 6 Manager to Kenneth Knuckles, Commisioner, New York City Dept of General Services.

Harner, J., K. Warner, J. Pierce & T. Huber (2002) Urban Environmental Justice Indices. *The Professional Geographer,* 54**,** 318 - 331.

Harvey, D. 1996. *Justice, Nature and the Geography of Difference*. Malden, MA: Blackwell Publishers, Inc.

Heberle, L. & K. Wernstedt (2006) Understanding Brownfields Regeneration in the US. *Local Environment,* 11**,** 479 - 497.

Hersch, R. & K. Wernstedt. 2003. *The Brownfield Bargain: Negotiating Site Cleanup Policies in Wisconsin*. Washington, DC: Resources for the Future.

Hevesi, D. 2001. East New York: a Neighborhood Reborn. *The New York Times* June 10.

Hird, J. 1994. *Superfund; The Political Economy of Environmental Risk*. Baltimore, MD: Johns Hopkins University Press.

Holifield, R. (2001) Defining Environmental Justice and Environmental Racism. *Urban Geography,* 22**,** 78 - 90.

--- (2004) Neoliberalism and environmental justice in the United States environmental protection agency: Translating policy into material practice in hazardous waste remediation. *Geoforum,* 35**,** 285 - 297.

Holt, D. 2007. Former Brooklyn Pol Wants Recreation, Not Housing, At Polluted Gowanus Wasteland. *The Brooklyn Eagle* November 6.

---. 2009. Superfund Won't Stop Development Along Gowanus Canal, Says EPA. *The Brooklyn Daily Eagle* April 15, 2009.

Honigman, A. 2004. Urgent call for help in NYC community gardens! American Community Gardens Association Listserv http://www.mail-archive.com/community_garden@list.communitygarden.org/msg04289.html.

Huertas-Noble, C., J. Rose & B. Glick (2009) Symposium: Entrepeneurship in a global economy: The Greening of community economic development: dispatches from New York City. *Western New England Law Review,* 31**,** 645 - 672.

Hunold, C. & I. M. Young (1998) Justice, Democracy, and Hazardous Siting. *Political Studies,* 46**,** 82 - 95.

Hurley, A. (1994) Creating Ecological Wastelands. *Journal of Urban History,* 20**,** 340 - 364.

ICLEI - Local Governments for Sustainability. 2010. Behind PlaNYC, How the City of New York Developed Its Comprehensive Long-Term Sustainability Plan. http://www.icleiusa.org/action-center/planning/sustainability-planning-resources/planyc-case-study-the-process-behind-the-plan.

International City/County Management Association (2010) EPA Awards $4 Million for Brownfields Area-Wide Planning Pilot Program. http://icma.org/en/Article/100748/EPA_Awards_4_Million_for_Brownfields_AreaWide_Planning_Pilot_Program (last accessed March 29, 2011).

Jackson, M. B. 2005a. LIVING IN/Melrose Commons, the Bronx; The Sound of Construction. *New York Times* March 6, 2010.

Jackson, T. (2005b) Groundwater Contamination and Real Estate Investment Risk. *Journal of Real Estate Practice and Education,* 8**,** 115 - 131.

Jackson, T. O. (2001) The Effects of Environmental Contamination on Real Estate: A Literature Review. *Journal of Real Estate Literature,* 9**,** 93.

Javadi, A. 2002. Urgent Bulldozer Alert - Encampment Week #3 - Soil Samplers Drilling Behind Community Gardens! In *hort.net*. http://www.hort.net/lists/community_garden/jan02/msg00008.html.

---. 2004a. Will the Gardens be Bulldozed? What Housing.... Town Hall Meeting. More Gardens Listserv https://lists.mayfirst.org/mailman/private/mg/2004-October/000009.html.

---. 2004b. Bulldozers held off 3 South Bronx Community Gardens, Court Date Dec 1st! In *MoreGardens Listserv*. https://lists.mayfirst.org/mailman/private/mg/2004-November/000011.html.

---. 2008. Cabo Rojo/ Melrose Green House. More Gardens! http://www.moregardens.org/node/166.

Jick, T. D. (1979) Mixing qualitative and quantitative methods: Triangulation in action. *Administrative Science Quarterly,* 24**,** 602 - 611.

John, D. & M. Mlay. 1999. Community-Based Environmental Protection: Encouraging Civic Environmentalism. In *Better Environmental Decisions, Strategies for Governments, Businesses, and Communities,* eds. K. Sexton, A. Marcus, K. W. Easter & T. Burkhardt, 353 - 376. Washington, DC: Island Press.

Johnson, B. L. & C. T. DeRosa (1995) Chemical mixtures released from hazardous waste sites: implications for health risk assessment. *Toxicology,* 105**,** 145-156.

Johnson, K. 1996. Bending the Rules -- A Special Report. Where a Zoning Law Failed Seeds of a New York Revival. *The New York Times* April 21.

Jonas, A. E. G. & D. C. Gibbs (2003) Changing local modes of economic and environmental governance in England: A tale of two areas. *Social Science Quarterly,* 84**,** 1018-1037.

Jonnes, J. 2002. *South Bronx rising : the rise, fall, and resurrection of an American city*. New York: Fordham University Press.

Kaiser, J. 2005. Mounting Evidence Indicts Fine-Particle Pollution. In *Science*, 1858-1861.

Keenan, J. (2005) The Small Business Liability Relief and Brownfields Revitalization Act of 2002: Promoting a Multi-Jurisdictional Policy. *Pace Environmental Law Review,* 22**,** 39.

Keil, R. & J. Graham. 1998. Reasserting nature: constructing urban environments after Fordism. In *Remaking Reality, Nature at the Millenium,* eds. B. Braun & N. Castree, 100 - 125. New York City, NY: Routledge.

Kelly, J. 2009. Hudson secures $43M for green East New York project. *The Real Deal* June 29.

Kennedy, R. 1994. NEIGHBORHOOD REPORT: MELROSE; Puerto Rican Institution Moving; Some Say Its Flavor May Not. *The New York Times* February 20.

Kher, A. 2010. Melrose Commons Earns First Stage II LEED-ND Silver in NY. In *Multi Housing News*. http://www.multihousingnews.com/2010/03/17/melrose-commons-earns-first-stage-ii-leed-nd-silver-in-nys-3/.

Kihss, P. 1975. Industry is Planned for East New York. *New York Times* October 12.

Klein, D. 1987. Personal Communication from Director of New York Dept of Sanitation Real Estate and Energy Conservation to Peter Pober, Chairman, West 9th St Assoc., ed. P. Pober.

Klineberg, E. 2002. *Heat Wave: A Social Autopsy of Disaster in Chicago*. Chicago, IL: The University of Chicago Press.

Krueger, R. & J. Agyeman (2005) Sustainability schizophrenia or "actually existing sustainabilities?" toward a broader understanding of the politics and promise of local sustainability in the US. *Geoforum,* 36**,** 410-417.

Krueger, R. & D. Gibbs (2008) 'Third Wave' Sustainability? Smart Growth and Regional Development in the USA. *Regional Studies: The Journal of the Regional Studies Association,* 42**,** 1263-1274.

Kuehn, R. (1996) The Environmental Justice Implications of Quantitative Risk Assessment. *University of Illinois Law Review,* 103.

Kugel, S. 2002. Neighborhood Report: Melrose; Young Protestors Think Globally and Act Locally to Save a Garden. *The New York Times* February 10.

Kurtz, H. (2003) Scale frames and counter-scale frames: constructing the problem of environmental injustice. *Political Geography,* 22**,** 887 - 916.

Kurtz, H. E. (2009) Acknowledging the Racial State: An Agenda for Environmental Justice Research. *Antipode,* 41**,** 684-704.

Kwan, M.-P. (2004) Beyond Difference: From Canonical Geography to Hybrid Geographies. *Annals of the Association of American Geographers,* 94**,** 756 - 763.

Lake, R. (1996) Volunteers, NIMBYs, and Environmental Justice; Dilemmas of Democratic Practice. *Antipode,* 28**,** 160 - 174.

---. 2000. Contradictions at the local scale: local implementation of Agenda 21 in the USA. In *Consuming Cities, The Urban Environment in the Global Economy after the Rio Declaration,* eds. N. Low, B. Gleeson, I. Elander & R. Lidskog, 70 - 90. New York City, NY: Routledge.

Lake, R. W. & L. Disch (1992) Structural constraints and pluralist contradictions in hazardous waste regulation. *Environment and Planning A,* 24**,** 663-681.

Lange, D. & S. McNeil (2004) Clean It and They Will Come? Defining Successful Brownfield Development. *Journal of Urban Planning and Development,* 130**,** 101 - 108.

Lavelle, M. & M. Coyle (1992) Unequal Protection; The Racial Divide in Environmental Law. *The National Law Journal***,** S1.

Lehavi, A. (2008) Mixing Property. *Seton Hall Law Review,* 38**,** 137 - 212.

Leigh, N. G. 2000. Promoting More Equitable Brownfield Redevelopment: Promising Approaches for Land Banks and Other Community Land Development Entities. In *Lincoln Institute of Land Policy Working Papers*. Cambridge, MA.

Leigh, N. G. & S. L. Coff (2000) How Many Brownfields Are There? Building an Industrial Legacy Database. *Journal of Urban Technology,* 7**,** 1 - 18.

Leikauf, G. (2002) Hazardous Air Pollutants and Asthma. *Environmental Health Perspectives,* 110**,** 505 - 526.

Lichtenstein, G. 1974. Educational Park Dream Now a Nightmare. *The New York Times* September 25.

Lin, S., J. P. Munsie, S.-A. Hwang, E. Fitzgerald & M. R. Cayo (2002) Childhood Asthma Hospitalization and Residential Exposure to State Route Traffic. *Environmental Research,* 88**,** 73-81.

Litt, J. & T. Burke (2002) Uncovering the historic environmental hazards of urban brownfields. *Journal of Urban Health,* 79**,** 464-481.

Litt, J., N. Tran & T. Burke (2002) Examining Urban Brownfields through the Public Health "Macroscope". *Environmental Health Perspectives (Suppl 2)*, 183 - 193.

Liu, F. 2001. *Environmental Justice Analysis: Theories, Methods, and Practice*. Boca Raton, FL: Lewis Publishers.

Logan, J. & H. Molotch. 1987. *Urban Fortunes, The Political Economy of Place*. Berkeley, CA: University of California Press.

Longo, A. & A. Alberini. 2006. What are the effects of contamination risks on commercial and industrial properties? evidence from Baltimore, Maryland. 713 - 737. Routledge http://www.informaworld.com/10.1080/09640560600850028

Low, N. & B. Gleeson (1998) Situating Justice in the Environment: The Case of BHP At the OK TEDI Copper Mine. *Antipode,* 30**,** 201.

Maantay, J. (2002a) Mapping Environmental Injustices: Pitfalls and Potential of Geographic Information Systems in Assessing Environmental Health and Equity. *Environmental Health Perspectives,* 110 (suppl 2)**,** 161 - 171.

--- (2002b) Zoning Law, Health, and Environmental Justice: What's the Connection. *Journal of Medicine and Ethics,* 30**,** 572 -594.

Maantay, J., A. Maroko & C. Herrmann (2007) Mapping Population Distribution in the Urban Environment: The Cadastral-based Expert Daysmetric System (CEDS). *Cartography and Geographic Information Systems,* 34**,** 77 - 102.

Mahler, J. 2005. *Ladies and gentlemen, the Bronx is burning : 1977, baseball, politics, and the battle for the soul of a city*. New York: Farrar, Straus and Giroux.

Mank, B. (2000) Reforming State Brownfield Programs to Compy with Title VI. *Harvard Environmental Law Review,* 24**,** 115 - 187.

Manta. 2011. Consolidated Bus Transit Inc. http://www.manta.com/c/mmyl1gx/consolidated-bus-transit-inc.

Marcotullio, P. 2005. Time-Space Telescoping and Urban Environmental Transitions in the Asia Pacific. Yokohama, Japan: United Nations University, Institute for Advanced Studies.

Marcotullio, P. & G. McGranahan. 2007. Scaling urban environmental challenges from local to global and back. London ; Sterling, VA: Earthscan http://www.myilibrary.com?id=81917

http://www.netlibrary.com/urlapi.asp?action=summary&v=1&bookid=181287.

Marcuse, P. (1998) Sustainability is not enough. *Environment and Urbanization,* 10**,** 103-112.

Maxwell, J. & T. Lyon. 1999. What Caused US Voluntary Environmental Agreements? Kelley School of Business, Indiana University.

Mazmanian, D. A. 1999. *Toward sustainable communities : transition and transformations in environmental policy*. Cambridge, Mass. u.a.: MIT Press.

Mazmanian, D. A. & M. Kraft. 1999. The Three Epochs of the Environmental Movement. In *Toward Sustainable Communities,* eds. D. A. Mazmanian & M. Kraft, 3 - 43. Cambridge, MA: MIT Press.

McCarthy, L. (2002) The brownfield dual land-use policy challenge: reducing barriers to private redevelopment while connecting reuse to broader community goals. *Land Use Policy,* 19**,** 287-296.

McFadden. 2007. East Coast Storm Breaks Rainfall Records. *The New York Times* 4/16/2007.

McGranahan, G., P. Jacobi, J. Songsore, C. Surjadi & M. Kjellen. 2001. *The citizens at risk : from urban sanitation to sustainable cities*. London ; Sterling, VA: Earthscan.

McLaughlin, M. 2007. The Gowanus has the clap. *The Brooklyn Paper* October 13.

McMaster, R., H. Leitner & E. Sheppard (1997) GIS-based Environmental Equity and Risk Assessment: Methodological Problems and Prospects. *Cartography and Geographic Information Systems,* 24**,** 172-189.

McMorrow, A. P. (2004) CERCLA Liability Redefined: An Analysis of the Small Business Liability Relief and Brownfields Revitilization Act and Its Impact On State Voluntary Cleanup Programs. *Georgia State University Law Review,* 20**,** 1087 - 1127.

Mele, C. 2000. *Selling the Lower East Side : culture, real estate, and resistance in New York City*. Minneapolis: University of Minnesota Press.

Melosi, M. (2000a) Environmental Justice, Political Agenda Setting, and the Myths of History. *Journal of Policy History,* 12**,** 43 - 71.

Melosi, M. V. 2000b. *The sanitary city : urban infrastructure in America from colonial times to the present*. Baltimore: Johns Hopkins University Press.

Mennis, J. (2002) Using Geographical Information Systems to Create and Analyze Statistical Surfaces of Population Risk for Environmental Justice Analysis. *Social Science Quarterly,* 83**,** 281 - 297.

Mennis, J. L. & L. Jordan (2005) The Distribution of Environmental Equity: Exploring Spatial Nonstationarity in Multivariate Models of Air Toxic Releases. *Annals of the Association of American Geographers,* 95**,** 249-268.

Meyer, P. 1998. Accounting for Differential Neighborhood Economic Development Impacts in Site-Specific or Area-Based Approaches to Urban Brownfield Regeneration. Louisville, KY: Center for Environmental Policy and Management, University of Louisville.

Meyer, P. & C. Reaves. 1998. Accounting for Stigma on Contaminated Land. Louisville, KY: Center for Environmental Policy and Management.

Meyer, P., R. Williams & K. Yount. 1995. *Contaminated Land, Reclamation, Redevelopment and Reuse in the United States and the European Union*. Brookfield, VT: Edward Elgar.

Mills, C. F. (2006) Global RBCA: Its Implementation, Foundation in Risk-Based Theory, and Implications. *Florida State University College of Law,* 22**,** 101 -138.

Minnesota Population Center. 2004. National Historical Geographic Information System: Pre-release Version 0.1. Minneapolis, MN: University of Minnesota http://www.nhgis.org.

Mirabella, A. 2007. Whole Foods Plan for Toxic Site Roils New Yorkers. *Bloomberg* June 1.

Mohai, P. & B. Bryant. 1992. Environmental Racism: Reviewing the Evidence. In *Race and the Incidence of Environmental Hazards: A Time for Discourse,* eds. B. Bryant & P. Mohai, 163-176. Boulder, CO: Westview Press.

Molotch, H. (1993) The Political Economy of Growth Machines. *Journal of Urban Affairs,* 15**,** 29-53.

Monahan, R. & V. Belenkaya. 2008. Area farmers fill the void for produce-hungry residents. *The Daily News* July 14.

Mueller, G. R. (2005) Brownfields Capital - Unlocking Value in Environmental Redevelopment. *Journal of Real Estate Portfolio Management,* 11**,** 81-92.

Mueller, L. 1999. New York City Case Study & Summary. New York City, NY: Local Initiatives Support Corporation.

Mulligan, C. N., R. N. Yong & B. F. Gibbs (2001) Remediation technologies for metal-contaminated soils and groundwater: an evaluation. *Engineering Geology,* 60**,** 193-207.

Municipal Arts Society of New York (MAS). 2008. Planning for All New Yorkers: An Atlas of Community-Based Plans. http://mas.org/planningcenter/atlas/.

---. 2009. Statement from the Municipal Art Society of New York Regarding Gowanus Rezoning and Related Actions.

Muschamp, H. 1993. Architecture View; Slouching Toward Utopia in the South Bronx. *The New York Times*.

NAPA. 2003. Addressing Community Concerns: How Environmental Justice Relates to Land Use Planning and Zoning. Washington, DC: National Academy of Public Administration.

National Grid. National Grid:Citizens. http://www.citizensmgpsite.com/.

Navarro, M. 2009. Mayor's Environmental Record: Grand Plans and Small Steps Forward. *The New York Times* October 22.

New Partners for Community Revitalization. 2007a. Missing the Target, Making the Brownfield Tax Credits Work for Communities. New York City, NY: New Partners for Community Reviatalization.

---. 2007b. Brownfield Opportunity Area Program. In *Brownfields Breakthrough, A Report on New York's Community Revitalization Tool for the Future*. New York City, NY: New Partners for Community Reviatalization.

New York City. 2006. Mayor Bloomberg Announces Appointment To Offices of State and City Legislative Affairs. http://tinyurl.com/3fwgvzr.

New York City Department of City Planning. 2007. Gowanus Canal Corridor Framework, Land Use Framework. http://www.nyc.gov/html/dcp/html/gowanus/gowanus3.shtml.

---. 2008. Address Translator. New York City, Department of City Planning http://gis.nyc.gov/dcp/at/f1.jsp.

---. 2009. NYC GIS Zoning Features. http://www.nyc.gov/html/dcp/html/bytes/applbyte.shtml.

---. 2011. Community-Based Planning, The 197-a Plan. http://www.nyc.gov/html/dcp/html/community_planning/197a.shtml.

New York City Department of Housing Preservation and Development (HPD). 2007a. Melrose Commons Urban Renewal Amendments Final Environmental Impact Statement. http://www.nyc.gov/html/hpd/html/developers/melrose_commons_urban_renewal_amend.shtml.

---. 2007b. Melrose Commons First Amended Urban Renewal Plan.

---. 2008. Request for Proposals: Melrose Commons North, Bronx, NY.

New York City Department of Planning. 2003. The Primary Land Use Tax Lot Output (PLUTO). New York City: New York City Department of Planning.

New York City Economic Development Corp (EDC). 2007. Melrose Rising: Emerging Retail Opportunities in the South Bronx. http://www.nycedc.com/ProjectsOpportunities/CurrentProjects/Bronx/MelroseRetailStudy/Documents/melrose_study.pdf.

New York City Environmental Justice Alliance. 2011. Accomplishments, PlaNYC 2030. http://nyc-eja.org/?page_id=370.

New York City Office of Environmental Coordination (NYC OEC). 2011. 2010 CEQR Technical Manual. http://www.nyc.gov/html/oec/html/ceqr/technical_manual.shtml.

New York City Office of Environmental Remediation (NYC OER). 2010. Glossary, Searchable Property Envrionmental E-Database (SPEED) New York City, NY: https://gis.nyc.gov/moer/speed/help/public/SPEED_Portal_Help.htm.

---. 2011. Searchable Property Envrionmental E-Database, Glossary. https://gis.nyc.gov/moer/speed/help/public/SPEED_Portal_Help.htm.

New York State. 2004. Brownfield Cleanup Program. In *New York Codes, Rules, and Regulations (NYCRR) Title 6, Subparts 375-1 through 375-4 and Subpart 375-6*.

New York State Department of Environmental Conservation. 2002. Voluntary Program Guide. Albany, New York: New York State Department of Environmental Conservation.

---. 2003. Environmental Justice and Permitting. ed. N. Y. S. D. o. E. Conservation. Albany, NY.

---. 2004. Brownfield Cleanup Program Guide. Albany, NY: New York State Department of Environmental Conservation.

---. 2008. Environmental Site Remediation Database. http://www.dec.ny.gov/cfmx/extapps/derexternal/index.cfm?pageid=3.

---. 2011. Environmental Site Remediation Database. http://www.dec.ny.gov/cfmx/extapps/derexternal/index.cfm?pageid=3.

New York State Department of Environmental Conservation (NYS DEC). 2011. SEQR - Environmental Impact Assessment in New York State. http://www.dec.ny.gov/permits/357.html.

New York State Department of State. 2006. Brownfield Opportunity Areas Program Guidance for Applicants.

---. 2009. Brownfield Opportunity Areas Program Current Projects. http://www.nyswaterfronts.com/BOA_projects.asp.

Newell, C. J. & J. A. Connor. 1996. The ASTM risk-based corrective action (RBCA) program. Pages: 104d. United States.

NYT. 1872. South Brooklyn Terrors. *The New York Times* 5/5/1872.

---. 1922. Gowanus Tonnage $100,000,000 A Year. *The New York Times* 10/29/1922.

---. 1930. Canal Terminals Show Freight Rise. *The New York Times* 1/21/1930.

Oakes, J. M., D. Anderton & A. Anderson (1996) A Longitudinal Analysis of Environmental Equity in Communities with Hazardous Waste Facilities. *Social Science Research,* 25**,** 125 - 148.

Opper, R. (2005) The Brownfields Manifesto. *The Urban Lawyer,* 37**,** 163 - 190.

Oregon Department of Envrionemtnal Quality. 1997. Perspective Purchaser Program Guidance.

Page, G. W. & R. S. Berger (2005) Property Characteristics of Contaminated Land in Environmental Cleanup Programs in New York State. *Public Works Management and Policy,* 10**,** 157 - 169.

Page, G. W. & H. Rabinowitz (1993) Groundwater contamination: Its effects on property values and cities. *Journal of the American Planning Association,* 59**,** 473.

--- (1994) Potential for redevelopment of contaminated brownfield sites. *Economic Development Quarterly,* 8**,** 353 - 363.

Pardon Me For Asking. 2007. Once Upon A Time on the Shores of the Gowanus: Frank Shifreen And "The Monument Redefined" Show. October 16. http://pardonmeforasking.blogspot.com/2007/10/once-upon-time-on-shores-of-gowan-us.html.

---. 2008. A Must See Video For Carroll Gardeners: “Brownfield of Dreams”. September 12. http://pardonmeforasking.blogspot.com/2008/09/must-see-video-for-carroll-gardeners.html.

---. 2009a. Apparently City Planning Commission Approved Toll Brothers Gowanus Development On February 17th. February 28. http://pardonmeforasking.blogspot.com/2009/02/apparently-city-planning-commission.html.

---. 2009b. "Defend Gowanus" Petition Signers Leave Some Insightful Comments. January 21. http://pardonmeforasking.blogspot.com/2009/01/defend-gowanus-petition-signers-leave.html.

---. 2009c. Carroll Gardens and Gowanus Residents Show Up to Testify, But Council Members Not There to Hear Them. March 5. http://pardonmeforasking.blogspot.com/2009/03/carroll-gardens-and-gowanus-residents.html.

---. 2009d. Gowanus Toll Kiddies Zoned For P.S.32 ? March 13. http://pardonmeforasking.blogspot.com/2008/03/gowanus-toll-kiddies-zoned-for-ps32.html.

---. 2009e. Bravo! State Senator Velmanette Montgomery Supports Gowanus Superfund Designation. May 4. http://pardonmeforasking.blogspot.com/2009/05/state-senator-velmanette-bravo-state.html.

Pastor, J. M., J. Sadd & J. Hipp (2001) Which Came First? Toxic Facilities, Minority Move-In, and Environmental Justice. *Journal of Urban Affairs,* 23**,** 1.

Paull, E. 2008. The Environmental and Economic Impacts of Brownfield Redevelopment. Washington, D.C.: Northeast Midwest Institute.

Pavlovskaya, M. (2004) Theorizing with GIS. *Environment and Planning A,* In Press.

Peas@moregardens.org. 2005. This Week in the Courtlandt Garden. In *MoreGardens Listserv*.

Peck, J. & A. Tickell (2002) Neoliberalizing Space. *Antipode,* 34**,** 349 - 379.

Pellow, D. 2002. *Garbage Wars, The Struggle for Environmental Justice in Chicago*. Cambridge, MA: MIT Press.

Pellow, D. N. 2007. *Resisting global toxics : transnational movements for environmental justice*. Cambridge (Mass.): MIT Press.

Pellow, D. N. & R. Brulle. 2005. Power, Justice, and the Environment: Toward Critical Environmental Justice Studies. In *Power, Justice, and the Environment,* eds. D. N. Pellow & R. Brulle. Cambridge, MA: MIT Press.

Pepper, E. 1997. Lessons from the Field, Unlocking Economic Potential with an Environmental Key. Northeast-Midwest Institute.

Plunz, R. & P. Culligan. 2007. Eco-Gowanus: Urban Remediation by Design. New York City, NY: Graduate School of Architecture, Planning and Preservation of Columbia University.

Pollard, O. (2000) Smart Growth: The Promise, Politics, and Potential Pitfalls of Emerging Growth Management Strategies. *Virginia Environmental Law Journal,* 247.

Polsky, S. 2008. Brooklyn home sales drop nearly 40 percent, prices fared a little better. *The Real Deal* October 15.

Pope, C. & P. Rauber. 2004. *Strategic Ignorance*. San Francisco, CA: Sierra Club Press.

Porter, M. E. (1995) The Competitive Advantage of the Inner City. *Harvard Business Review,* 73**,** 55 - 71.

Portney, K. E. 2003. *Taking sustainable cities seriously : economic development, the environment, and quality of life in American cities*. Cambridge, Mass. [u.a.: MIT Press.

Prytherch, D. (2002) Selling the Eco-Entrepreneurial City: Natural Wonders and Urban Stratagems in Tucson, Arizona. *Urban Geography,* 23**,** 771-793.

Pulido, L. (1996) A Critical Review of the Methodology of Environmental Racism Research. *Antipode,* 28**,** 142 - 159.

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

Rabin, Y. 1989. Expulsive Zoning: The Inequitable Legacy of Euclid. In *Zoning and the American Dream: Promises Still to Keep,* eds. C. Haar & J. Kayden. Washington, D.C.

Raco, M. (2005) Sustainable Development, Rolled out Neoliberalism and Sustainable Communities. *Antipode,* 37**,** 324-347.

Real Estate Weekly. 2000. IDA incentives, land sales aid Brooklyn industrial firms. *Real Estate Weekly* Feburary 9.

Reddy, K., J. Adams & C. Richardson (1999) Potential Technologies for Remediation of Brownfields. *Practice Periodical of Hazardous, Toxic, and Radioactive Waste Management,* 3**,** 61 - 68.

Reis, M. 2000. *Red Hook and Gowanus Neighborhood History Guide*. Brooklyn, NY: The Brooklyn Historical Society.

Roberts, S. 1987. Manufacturing Reclaims Pasture in East New York. *The New York Times* July 30.

Rogin, R. 1971. This place makes Bedford Stuyvesant look beautiful. *The New York Times* March 28.

Rothstein, M. 1994. A Renewal Plan in the Bronx Advances. *The New York Times*.

Rules of the City of New York. 2008. New York City Brownfield Financial Incentive Grant Program. In *Chapter 14, subchapter 2 of Title 43*.

Ryley, S. 2008a. Toll trolls For NYC developments. In *The Real Deal*. http://therealdeal.com/newyork/articles/toll-trolls-for-nyc-developments.

---. 2008b. Developers Could Take Double Dip Into Gowanus Canal's Public Place. *The Brooklyn Daily Eagle* February 26.

Saha, D. (2009) Empirical research on local government sustainability efforts in the USA: gaps in the current literature. *Local Environment,* 14**,** 17-30.

Salt, D. E., R. D. Smith & I. Raskin (1998) Phytoremediation. *Annual Review of Plant Physiology and Plant Molecular Biology,* 49**,** 643-668.

Sanborn Map Company. 1952. Sanborn Maps of the City of New York, Borough of the Bronx. Sheets 9, 10, 11, 12, 31, 33, 34. New York City, NY: Sanborn Map Co.

Schlosberg, D. 1999. *Environmental Justice and the New Pluralism: The Challenge of Difference for Environmentalism*. New York City, NY: Oxford University Press.

---. 2007. *Defining Environmental Justice*. New York City, NY: Oxford University Press.

Schmelzkopf, K. (2002) Incommensurability, land use, and the right to space: Community gardens in New York City. *Urban Geography,* 23**,** 323-343.

Scobey, D. M. 2003. *Empire city : the Making and Meaning of the New York City Landscape*. Philadelphia: Temple Univ Press.

Sexton, K. (1997) Sociodemographic Aspects of human susceptibility to toxic chemicals: Do class and race matter for realistic risk assessment? *Environmental Toxicology and Pharmacology,* 4**,** 261 - 269.

Shaker, L. 2009. Life After Newspapers: Local Political Information on the Web. Princeton, NJ: Princeton University.

Shaw, D. 2007. Really Local. In *American Journalism Review*.

Sheftell, J. 2008. Is East New York the new Harlem? *The Daily News* March 13.

Sheppard, E., H. Leitner, R. McMaster & H. Tian (1999) GIS-based measures of environmental equity: Exploring their sensitivity and significance. *Journal of Exposure Analysis and Environmental Epidemiology,* 9**,** 18 - 28.

Shipler, D. 1972. For Brooklyn Industry, a Mixed Report. *New York Times* April 9.

Shutkin, W. 2000. *The Land That Could Be: Environmentalism and Democracy in the 21st Century*. Cambridge, MA: MIT Press.

Simon, H. & J. Buntin. 1999. The East New York Urban Youth Corps and Community Policing: A New Initiative in the "Dead Zone". Cambridge, MA: John F Kennedy School of Government, Harvard University.

Simons, R. A. (1998) How Many Urban Brownfields Are Out There? *Public Works Management,* 2**,** 267 - 273.

Simons, R. A. & A. Sementelli (1997) Liquidity Loss and Delayed Transactions with Leaking Underground Storage Tanks. *The Appraisal Journal,* 65**,** 255 - 260.

Siriani, C. & L. Friedland (1997) Civic Innovation and American Democracy. *Change,* 29**,** 14 - 24.

Smith, N. 1996. *The New Urban Frontier, Gentrification and the Revanchist City*. New York City, NY: Routledge.

Solomon, B. D. (1999) New directions in emissions trading: the potential contribution of new institutional economics. *Ecological Economics,* 30**,** 371-387.

Spiess, D. 2008. Public Participation in Brownfields Cleanup and Redevelopment: The Role of Community Organizations. In *Department of Urban and Regional Planning*. Ann Arbor, MI: University of Michigan.

Staeheli, L., D. Mitchell & K. Gibson (2002) Conflicting rights to the city in New York's community gardens. *GeoJournal,* 58**,** 197-205.

Stand, P., Y. Garcia, E. Bautista & B. Olshansky. 1996. Melrose Commons A Case Study for Sustainable Community Design. Planner's Network http://www.plannersnetwork.org/publications/melrose.htm.

Stann, S. & R. Airst. 1999. Turning Brownfields Green. In *Commercial Real Estate Investment*.

Stern, M. 1970. City Seeks To End Decline of Bronx. *New York Times* October 13.

Studnicka, M., E. Hackl, J. Pischinger, C. Fangmeyer, N. Haschke, J. Kuhr, R. Urbanek, M. Neumann & T. Frischer. 1997. Traffic-related NO2 and the prevalence of asthma and respiratory symptoms in seven year olds. 2275-2278. http://erj.ersjournals.com/cgi/content/abstract/10/10/2275

Subramanian, M. 2004. Gardens Get New Roots: Bronx Deal Paves Way For Housing. *City Limits* December 6.

Sui, D. 1999. GIS, Environmental Equity Analysis, and the Modifiable Areal Unit Problem (MAUP). In *Geographic information research : trans-Atlantic perspectives,* eds. M. Craglia & H. J. Onsrud, 40 - 53. Bristol, PA: Taylor & Francis.

Sui, D. & J. Giardano. 1995. Applications of GIS in Environmental Equity Analysis: A multi-scale and multi-zoning scheme study for the City of Houston, Texas, USA. In *GIS/LIS Annual Conference and Exposition proceedings*, 950 - 959. Nashville, Tenessee.

Sustainable South Bronx. 2010. Policy, Advocacy, and Research. http://www.ssbx.org/index.php?link=38.

SustainLane. 2008. SustainLane's 2008 US City Rankings. http://www.sustainlane.com/us-city-rankings/.

Sze, J. 2007. *Noxious New York*. Cambridge, Mass: The MIT Press.

Talih, M. & R. Fricker (2002) Effects of neighborhood demographic shifts on findings of environmental injustice: a New York City case study. *Journal of the Royal Statistical Society A,* 165**,** 375 - 397.

Tarr, J. A. 1996. *The search for the ultimate sink : urban pollution in historical perspective*. Akron, Ohio: Univ. of Akron Press.

Tashakkori, A. & C. Teddlie. 2003. *Handbook of mixed methods in social & behavioral research*. Thousand Oaks, Calif.: SAGE Publications.

Taylor, D. (2000) The Rise of the Environmental Justice Paradigm. *American Behavioral Scientist,* 43**,** 508 - 580.

Thabit, W. 2003. *How East New York became a Ghetto*. New York City, NY: New York University Press.

The City of New York. 2008. PlaNYC: A Greener, Greater New York. New York City, New York: The City of New York.

---. 2009. *Comments of the City of New York on the United States Envirommental Protection Agency's Proposal to Add the Gowanus Canal in Brooklyn, New York to the National Priorities List*.

---. 2010. PlaNYC Progress Report.

The Gowanus Dredgers Canoe Club. Gowanus Canal History. http://www.waterfrontmuseum.org/dredger/history.html.

The Gowanus Lounge. 2008. GL Exclusive: South Brooklyn Neighborhood Alliance Ready to Go. http://www.gowanuslounge.com/2008/04/10/gl-exclusive-south-brooklyn-neighborhood-alliance-ready-to-go/.

The Municipal Arts Society of New York (MAS). 2001. Making it in New York. The Manufacturing Land Use and Zoning Initiative New York City, NY: The Municipal Arts Society of New York.

The Real Deal. 2006. Brooklyn Affordable Housing Buy. December 27. http://therealdeal.com/blog/2006/12/27/brooklyn-affordable-housing-buy/.

---. 2009. Rents increase 90 percent at Brooklyn apartment complex. August 27. http://therealdeal.com/blog/2009/08/27/rents-increase-90-percent-at-brooklyn-apartment-complex-linden-plaza/.

Thurston, G., A. Spira-Cohen & L. C. Chen. 2007. South Bronx Environmental Health Policy Study. New York City, NY: New York University School of Medicine, Department of Environmental Medicine.

Tietenberg, T. (1995) Tradeable permits for pollution control when emission location matters: What have we learned? *Environmental and Resource Economics,* 5**,** 95 - 113.

Tobler, W. (1970) A Computer Movie Simulating Urban Growth in Detroit Region. *Economic Geography,* 46**,** 234 - 240.

Towers, G. (2000) Applying the Political Geography of Scale: Grassroots Strategies and Environmental Justice. *Professional Geographer,* 52**,** 23 - 36.

Trager, C. 2000. East new York sheds bad old image. *Crain's New York Business* June 12.

Tregoning, H., J. Agyeman & C. Shenot (2002) Sprawl, Smart Growth and Sustainability. *Local Environment: The International Journal of Justice and Sustainability,* 7**,** 341 - 347.

United Church of Christ. 1987. Toxic Wastes and Race in the United States. United Church of Christ Commission for Racial Justice.

United Nations. 1987. Report of the World Commission on Environment and Development. http://www.un.org/documents/ga/res/42/ares42-187.htm.

United States Conference of Mayors. 2006. Recycling America's Land, A National Report on Brownfields Redevelopment. Washington, DC: United States Conference of Mayors.

Urban Institute, Northeast-Midwest Institute, University of Louisville & University of Northern Kentucky. 1997. The Effects of Environmental Hazards and Regulation on Urban Redevelopment. US Department of Urban Developement.

US Bureau of the Census. 1990. Deccenial Census of the United States of America. Washington, DC: US Bureau of the Census.

---. 2000. Deccenial Census of the United States of America. Washington, DC: US Bureau of the Census.

US Congress. 2002. Small Business Liability Relief and Brownfields Revitilization Act of 2001. 2356 - 2381. United States Statutes at Large.

US Environmental Protection Agency. 1998. Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analysis.

---. 2000a. Environmental Justice in the Permitting Process. ed. N. E. J. A. Council.

---. 2000b. Region 2, Interim Environmental Justice Policy.

---. 2008. Brownfields and Land Revitalization Frequent Questions. http://www.epa.gov/compliance/resources/faqs/cleanup/brownfields/#a4.

---. 2009. Brownfields and Land Revitalization. http://earth1.epa.gov/swerosps/bf/index.html.

US Environmental Protection Agency (US EPA). 1989. Risk Assessment Guidance for Superfund Volume I. Washington, D.C.

---. 2011a. The National Priority List. http://www.epa.gov/superfund/sites/npl/.

---. 2011b. Environmental Justice. http://www.epa.gov/environmentaljustice/.

US Environmental Protection Agnecy (US EPA). 2011. Terms of Environment: Glossary, Abbreviations and Acronyms. http://www.epa.gov/OCEPAterms/bterms.html.

US EPA. 2008. NPL Site Totals by Status and Milestones.

US General Accounting Office (US GAO). 1983. Siting of Hazardous Waste Landfills and Their Correlation with the Racial and Socio-Economic Status of Surrounding Communities. Washington, DC: General Accounting Office.

USCM. 2000. Recycling America's Land, A National Report on Brownfields Redevelopment. Washington, DC: US Conference of Mayors.

Van Hook, D. E. (2000) Area-Wide Brownfields Planning, Remediation and Development. *Fordham Environmental Law Journal,* 11**,** 743 - 772.

Van Hook, D. E., J. A. Shaw & K. J. Kloo (2004) The Challenge of Brownfield Clusters: Implementing a Multi-site Approach for Brownfield Development and Reuse. *New York University Environmental Law Journal,* 12**,** 111 - 152.

van Vliet, P., M. Knape, J. de Hartog, N. Janssen, H. Harssema & B. Brunekreef (1997) Motor Vehicle Exhaust and Chronic Respiratory Symptoms in Children Living near Freeways. *Environmental Research,* 74**,** 122-132.

VanLandingham, H. W. & P. Meyer. 2002. Public Strategies for Cost-Effective Community Brownfield Redevelopment. ed. S. R. E. F. Center. Louisville, KY: Center for Environmental Policy and Management, University of Louisville.

Vega, M. 2004. Gardens of Roses and Thorns. *NYC IndyMedia* August 13.

Viscusi, W. K. & J. T. Hamilton (1999) Are Risk Regulators Rational? Evidence from Hazardous Waste Cleanup Decisions. *American Economic Review,* 89**,** 1010-1027.

Von Hoffman, A. 2003. *House by house, block by block : the rebirth of America's urban neighborhoods*. Oxford ; New York: Oxford University Press.

Von Spreckelsen, D. 2009. On the Gowanus, Say 'No' to Superfund. *Gotham Gazette* May 26.

Walker, G. (2006) Geographies of Environmental Justice. *Geoforum,* 37**,** 655 - 659.

Warshawer, G. 2007. Houses rise in hardscrabble East New York. *The Real Deal* October 29.

Waste and Facility Siting Subcommitee of the National Environmental Justice Advisory Council (NEJAC). 1996. Environmental Justice, Urban Revitalization, and Brownfields: The Search for Authentic Signs of Hope. ed. W. a. F. S. National Environmental Justice Advisory Council.

Weber, R. (2002) Extracting Value from the City: Neoliberalism and Urban Redevelopment. *Antipode,* 34**,** 519-540.

Weiser, B. & D. Hakim. 2008. Queens Assemblyman 'Put His Office Up for Sale,' Prosecutrors Say. *The New York Times* September 11, 2008.

Welcome to Melrose. 2010. City Officials Break Ground at Via Verde. http://welcome-to-melrose.blogspot.com/2010/05/city-officials-break-ground-at-via.html.

Wernstedt, K. 2004. Overview of Existing Research on Community Impacts of Land Reuse. National Center for Environmental Economics.

---. 2005. Areawide Brownfield Regeneration through Business-Based Land Trusts and Progressive Finance. Resources for the Future.

Wernstedt, K., L. Heberle, A. Alberini & P. Meyer. 2004. The Brownfields Phenomenon: Much Ado about Something or the Timing of the Shrewd? Washington, DC: Resources for the Future.

Wernstedt, K., R. Hersh & K. Probst (1999) Grounding hazardous waste cleanups: a promising remedy? *Land Use Policy,* 16**,** 45-55.

Wheeler, S. & T. Beatley. 2009. *The sustainable urban development reader*. London ; New York: Routledge.

While, A., A. E. G. Jonas & D. Gibbs (2004) The environment and the entrepreneurial city: searching for the urban sustainability fix in Manchester and Leeds. *International Journal of Urban & Regional Research,* 28**,** 549.

Whitman, T. 2005. Trying to Curb Those Trucks *The Brooklyn Daily Eagle* February 23, 2005.

Williams, R. (2005) Getting to the Heart of Environmental Injustice: Social Science and its Boundaries. *Theory and Science,* 6.

Winson-Geidman, K., R. A. Simons & J. Pendergrass (2004) Tracking Remediation and Redevelopment Trends of Brownfield Clean-up Programmes: The Cook County Experience. *Journal of Environmental Planning and Manangement,* 47**,** 393 - 405.

Wired New York. 2009. Bronx Development. http://wirednewyork.com/forum/archive/index.php/t-5081-p-2.html.

Wolf-Powers, L. (2005) Up-Zoning New York City's Mixed-Use Neighborhoods. *Journal of Planning Education and Research,* 24**,** 379-393.

--- (2008) Expanding Planning's Public Sphere: STREET Magazine, Activist Planning, and Community Development in Brooklyn, New York, 1971 - 1975. *Journal of Planning Education and Research,* 28**,** 180 - 195.

Wolf, M. A. (1998) DANGEROUS CROSSING: STATE BROWNFIELDS RECYCLING AND FEDERAL ENTERPRISE ZONING. *Fordham Environmental Law Journal,* 9**,** 495 - 540.

Yandle, T. & D. Burton (1996) Reexamining Environmental Justice: A Statistical Analysis of Historical Hazardous Landifill Siting Patterns in Metropolitan Texas. *Social Science Quarterly,* 77**,** 477 - 492.

Youngquest, B. 2004. Green Space Assured in South Bronx. *Epoch Times* December 6.

Yount, K. (2003) What are brownfields? A conceptual definition. *Environmental Practice,* 5**,** 25 - 33.

Zimmer, A. 2004. Gardeners' Last Stand. *City Limits* May 15.

Zukin, S. 1982. *Loft Living: culture and capital in urban change*. Baltimore, MD: Johns Hopkins University Press.

---. 2010. *Naked City*. New York City, NY: Oxford University Press.