

2018

Between “the potential” and “the actual”: lead poisoning in New Orleans as state sanctioned environmental racism

Eliana Marcus-Tyler
Vassar College

Follow this and additional works at: https://digitalwindow.vassar.edu/senior_capstone

Recommended Citation

Marcus-Tyler, Eliana, "Between “the potential” and “the actual”: lead poisoning in New Orleans as state sanctioned environmental racism" (2018). *Senior Capstone Projects*. 778.
https://digitalwindow.vassar.edu/senior_capstone/778

This Open Access is brought to you for free and open access by Digital Window @ Vassar. It has been accepted for inclusion in Senior Capstone Projects by an authorized administrator of Digital Window @ Vassar. For more information, please contact library_thesis@vassar.edu.

Vassar College

Between “the Potential” and “the Actual”: Lead Poisoning in New Orleans as State Sanctioned
Environmental Racism

A Thesis submitted in partial satisfaction of the requirements for the degree Bachelor of Arts in
Sociology

by

Eliana Marcus-Tyler

Thesis Advisors:
Professor Pinar Batur
Professor Jasmine Syedullah

May 2018

Between “the Potential” and “the Actual”: Lead Poisoning in New Orleans as State Sanctioned Environmental Racism

This thesis investigates the relationship between lead poisoning in New Orleans and broader structures and histories of environmental racism in the state of Louisiana. I argue that lead poisoning in the city is not an anomaly, but rather an example of the state-sanctioned environmental racism that is foundational to the economic, political, and social functioning of Louisiana. In this project I draw together definitions of environmental racism; histories of social and environmental degradation in the state; accounts of grassroots activists fighting for their communities; research on the causes of lead poisoning and the subsequent health impacts; and statistics on soil and blood lead in New Orleans. I propose that action be taken to address lead poisoning in the city through lead abatement strategies such as the importation of low-lead alluvial soil from the Mississippi River. This is an issue that necessitates immediate government action in redressing the disproportionate impact of lead poisoning on Black, inner city New Orleans residents.

This work is dedicated to the Black women in Louisiana who have bravely fought for justice for their communities, specifically Emelda West (Convent, Louisiana), Beverly Wright (Convent, Louisiana), Gloria Roberts (Convent, Louisiana), Margie Eugene Richard (Norco, Louisiana), Mary McCastle (Alsen, Louisiana), Casey Billieson (New Orleans, Louisiana), and Elodia Blanco (New Orleans, Louisiana).

Table of Contents

| | | |
|--|-----|-------|
| Chapter 1: Introduction | / / | 1 |
| <i>New Orleans Housing Projects, 1991</i> | | ...1 |
| <i>How I Ended Up Here</i> | | ...2 |
| <i>What is Environmental Racism?</i> | | ...3 |
| <i>The Precautionary Principle and Treadmill of Production</i> | | ...4 |
| Chapter 2: Environmental Racism and the Fight for Environmental Justice | / / | 8 |
| <i>Environmental Racism</i> | | ...8 |
| <i>Intersectional Environmental Justice</i> | | ...11 |
| <i>Rift Between the Environmentalist and Environmental Justice Movements</i> | | ...14 |
| <i>The North of the South and the South of the North: The Environmental Justice Movement in an International Context</i> | | ...17 |
| <i>Conclusion</i> | | ...17 |
| Chapter 3: Environmental Racism in Louisiana | / / | 18 |
| <i>Louisiana's Legacy of Environmental Racism</i> | | ...20 |
| <i>Cancer Alley</i> | | ...24 |
| <i>The Treadmill of Production and Precautionary Principle in Cancer Alley</i> | | ...36 |
| <i>Conclusion</i> | | ...37 |
| Chapter 4: The Causes and Health Implications of Lead Poisoning | / / | 39 |
| <i>Causes of Lead Exposure</i> | | ...39 |
| <i>The Health Implications of Lead Exposure</i> | | ...44 |
| <i>Lead Exposure and Violent Crime</i> | | ...48 |
| <i>Conclusion</i> | | ...50 |
| Chapter 5: Lead Poisoning in New Orleans | / / | 52 |
| <i>Lead in New Orleans Before Hurricane Katrina</i> | | ...52 |
| <i>Ghettoization of Lead Poisoning</i> | | ...54 |
| <i>Casey Billieson et al. v. City of New Orleans</i> | | ...55 |
| <i>Hurricane Katrina</i> | | ...57 |
| <i>Lead in New Orleans After Hurricane Katrina</i> | | ...58 |
| <i>Conclusion</i> | | ...60 |
| Chapter 6: Conclusions and Recommendations | / / | 62 |
| <i>Policy Recommendations</i> | | ...64 |
| <i>Limitations</i> | | ...67 |
| <i>Directions for Further Research</i> | | ...67 |
| <i>Towards an Equitable Future</i> | | ...69 |
| Appendix A: Summits I and II and the Importance of Grassroots Organizing for Environmental Justice | / / | 70 |
| Appendix B: Graphs and Maps | / / | 75 |
| References | / / | 80 |

Acknowledgements

There are so many people without whom this project would not have been possible.

I am deeply indebted to the scholars whose work I draw upon. Thank you for your bravery and diligence in the questions you ask. You inspire me to dig deep and to listen.

Thank you to my parents, Jane Marcus and Johnson Tyler. Your commitments to fighting for justice in your professional and personal lives have set me on this path, and bring me great pride. Thank you for instilling in me a love of learning, and teaching me how to work hard while being kind to myself. Thank you for your support in this project.

Thank you to Ezra Marcus-Tyler, for your questions and for your pride. For making me laugh after long days at the library. For your wisdom and for your enormous heart.

Thank you to Sophie Deixel, Meghan Willcoxon, and Elena Janney for your comments, edits, and support. This project is better because of you, and I am better because of you.

Thank you to Professor Pinar Batur: for the deadlines and the comments, the support and the enthusiasm. Thank you for lighting the spark inside of me two-and-a-half years ago that led me to this thesis.

Thank you to Dr. Jasmine Syedullah for pushing my brain in directions I did not even know existed. Thank you for your enthusiasm. Thank you for your smiles and laughter. Thank you for reminding us of balance and perspective.

Thank you to James McCowan and Justin Harris, for getting it.

Thank you to Hannah Megally, my Montclair Public Library partner and oldest friend. Your friendship is a blessing.

Thank you to Joel Johnson, for your listening and grounding and pushing and loving.

List of Figures

Figure 1: Use of lead in paint and motor fuel in the United States from 1910 to 1990 (Mielke et al. 2014).

Figure 2: Relationship between aggravated assault rates and atmospheric Pb in six U.S. cities from 1972 to 2002 (Mielke and Zahran 2012).

Figure 3: Relationship in the United States between gasoline lead and violent crime and teenage pregnancy, respectively (Drum 2016).

Figure 4: Soil lead of public housing census tracts in New Orleans before, and ten years after, Hurricane Katrina (Mielke 2017).

Figure 5: Percentage breakdown of racial demographics in New Orleans by SPb (in mg/kg) from 1998-2000 (Campanella and Mielke 2008).

Chapter 1: Introduction

New Orleans Housing Projects, 1991

Casey Billieson's two sons had been diagnosed with learning disabilities and were progressing at a slow pace for their grade; one of Sheila Green's two sons exhibited hyperactivity and had multiple learning disorders; Joyce Galmon's four children had speech problems; Detress Lewis's two kids had lead levels so high that they had to be hospitalized; Joan Dominique's children had hearing problems, ADHD, and learning disabilities which continue to affect them today; Marcel Coleman and Ronald Green would grow up to be shot and killed, after having been "made turbulent, their mothers claim, from the lingering effects of lead" (Newkirk 2017:15). These children, who were among the hundreds of plaintiffs in the landmark case, *Casey Billieson et al. v. City of New Orleans*, were poisoned by lead (Pb) while living in Housing Authority of New Orleans (HANO) owned public housing. Plaintiffs in the case had blood lead levels (BPb) five to ten times the current Centers for Disease Control and Prevention (CDC) reference level, resulting in permanent neurological and physical damage (Newkirk 2017; U.S. Centers for Disease Control and Prevention 2016).

Lead is a neurotoxin, and any level in a person's blood is dangerous. Once exposed to lead, impacts often last a lifetime, as there is no cure once someone has been poisoned. The health ramifications of lead poisoning are wide-ranging, including pregnancy-induced hypertensive disorders, learning and behavioral problems, Alzheimer's disease, loss of gray matter in the prefrontal cortex, stroke mortality, chronic diseases such as cataracts, poor kidney function, osteoporosis, diabetes, and high blood pressure, and damages to the peripheral and central nervous systems (Zahran et al. 2014; Mielke et al. 2014; Drum 2016; Campanella and Mielke 2008; Needleman 2003). Prevention is key to addressing lead poisoning. But when the

government does not deem a population worthy of protection -- as was the case with those living in the New Orleans projects -- then the window for prevention is missed, and children are permanently harmed.

How I Ended Up Here

During the summer before my senior year of college, I read Vann R. Newkirk II's article in *The Atlantic* about the *Billieson* lawsuit and lead poisoning in New Orleans more generally. What I had read stuck with me throughout my busy summer days, and I began to do more research into the subject of lead poisoning, specifically in New Orleans. I have been interested in environmental racism since taking a course on the topic during my sophomore year my college, and New Orleans and Hurricane Katrina have long intrigued me due to the ways in which the natural and social collided before, during, and after the storm. As I continued to do research, a question kept on resurfacing – did lead poisoning in New Orleans relate at all to the larger history of Louisiana? I became curious about how the environment and social factors, such as race, intersected in the state.

The case of lead poisoning in New Orleans seemed like such a clear-cut example of environmental racism, and I wanted to investigate the history of Louisiana more broadly, to see where it fit in. Where and how did the case of lead poisoning in New Orleans mesh with larger structures of oppression and inequity in the region? What I found surprised me. Louisiana is in fact infamous for their abysmal environmental record, and environmental racism is deeply engrained in the state.

From that point onwards, my research gained momentum and direction. I found that while scholars had studied both the environmental policies of Louisiana and lead in New Orleans, little attention had been given to understanding these two phenomena in tandem. There

seemed to be a gap in the research regarding the ways in which lead poisoning in New Orleans was representative of the larger structures of environmental racism in Louisiana. This thesis is an effort to fill in that gap.

In the succeeding chapters I contextualize the disproportionate lead poisoning of Black, urban New Orleans residents within the history of environmental racism in the state of Louisiana writ large. In doing so I argue that the case of lead poisoning in New Orleans is not an aberration, but rather an example of the state sanctioned environmental racism that constitutes the backbone of the state.

What is Environmental Racism?

Environmental racism refers to a policy or practice that differentially impacts or disadvantages an individual or a group of people because of their race or color (Bullard 2005:32). Vann R. Newkirk II (2017) states that environmental racism is in fact the “new Jim Crow”, due to the ways in which environmental harm disproportionately impacts people of color, particularly Black people (p. 1). I argue that a history of environmental racism and injustice are foundational to the economic, political and social structures of the state of Louisiana. I look at lead poisoning in New Orleans as a case study, positing it as an example of the ways in which the state systematically discriminates against people of color by exposing them to environmental hazards.

Environmental racism in general, and the case of lead poisoning in New Orleans in particular, constitutes structural violence. Johan Galtung (1969), the principle founder of the discipline of peace and violence studies, defines violence as “*the cause of the difference between the potential and the actual*, between what could have been and what is” (p. 168). In the case of lead poisoning in New Orleans, lead is the cause of this difference between “what could have

been and what is” (Galtung 1969:168). Lead poisoning resulting from lead contaminated soil impacts children’s intellectual, physical, and psychological growth, creating a gap between their “actual” and their “potential.” Black children living in the inner city are particularly impacted by this violence, as they experience lead poisoning at rates disproportionate to their white counterparts (Campanella and Mielke 2008; Mielke et al. 2006).

I ground my argument in Ruth Wilson Gilmore’s (2007) definition of racism as the “state-sanctioned or extralegal production and exploitation of group-differentiated vulnerability to premature death” (p. 28). Per Gilmore’s definition, the government and/or other groups/individuals create and reify certain groups of people as “other”, marking them for physical, psychological, and economic violence. This definition is useful because it makes explicit the intensity of the violence inherent in the poisoning of Black people in New Orleans: the state is literally condoning the killing of people due to socially constructed parameters of difference, in the name of corporate profit.

The Precautionary Principle and Treadmill of Production

The concepts of the precautionary principle and the treadmill of production connect the issue of lead poisoning in New Orleans to broader struggles of environmental justice. They explain how lead poisoning was made possible through both a failure to implement the precautionary principle and through the economic pressures brought about through the treadmill of production. Drawn from the German sociological tradition, the precautionary principle centers on the concept of preventing harm. It places the onus of responsibility for avoiding harm on those whose actions raise suspicions of harm in the first place, as opposed to those who suspect harm. Robert Bullard (2005), a foremost scholar on environmental racism, explains that the precautionary principle “states that, before you undertake an action, if you have any reasonable

suspicion that harm may result from it, and there is scientific uncertainty about it, then you have a duty to act to prevent harm” (p. 28). Put into practice, the precautionary principle requires a shift from asking, “How much harm is allowable” to asking, “How little harm is possible”? The precautionary principle failed to be implemented in the case of lead in New Orleans. For example, though many in the gasoline industry and even in the Environmental Protection Agency (EPA) knew that leaded gasoline was dangerous, they ignored research on the health impacts of lead and delayed action in regulating the substance, putting profit above human health (Needleman 2000).

Allan Schnaiberg’s (2000) treadmill of production captures the ways in which capitalist economies and ecological and social harm are codependent. Schnaiberg (2000) argues that post-1945, new production systems changed industry’s relationship to the environment in two keys ways. First, as factories became larger, more “capital-intense” and more “efficient,” industry began to require ever-increasing “withdrawals” from the environment in the form of raw materials needed to power these factories (Schnaiberg et al. 2000:1). This augmented need for raw materials (increased “withdrawals”) resulted in resource depletion (Schnaiberg et al. 2000:1). Second, the modernization of factories increased the use of chemicals and energy in production. As a result, “workers were increasingly engaged in managing energy and chemical flows, and directing their flows through the complex machinery, to create marketable products” (Schnaiberg et al. 2000:2). This created “additions” to the ecosystem in the form of pollution (Schnaiberg et al. 2000:2). Thus, Schnaiberg argues, capitalist production harms the environment through its cycle of “withdrawals” and “additions” (Schnaiberg et al. 2000:1-2).

This theory is useful in understanding the ways in which lead poisoning in New Orleans is part of a larger system of American capitalism. Within this system the need for unfettered

growth necessitates environmental destruction, which is in turn codependent upon the oppression of those deemed inferior along lines of race, class, and gender (such as Black families living in the lead-contaminated projects of inner city New Orleans). Pellow (2007) writes, “Capitalist economies behave like a ‘treadmill of production’ that continuously creates ecological and social harm through a self-reinforcing mechanism of (generally) increasing rates of production and consumption” (p. 20). In other words, capitalism is dependent on unrestrained growth, and unrestrained growth is dependent on the constant extraction and exploitation of natural resources.

When resources become limited and/or extinct, the treadmill looks for alternative resources rather than conserving the ones that already exist and/or restructuring production. The theory of the treadmill of production demonstrates the irony of the role of the state, as its duty under capitalism to promote growth exists in direct conflict with its duty to the public to provide social welfare and environmental protection. More broadly, an understanding of the treadmill of production illuminates the ways in which the goals of profit, natural resource access, wage stability and job protection, public welfare, and environmental protection exist in tension (Pellow 2007).

* * *

In Chapter 2, I outline the concept of environmental racism, and the attendant fight for environmental justice. In this chapter I expand upon my definition of environmental racism, and address the ways in which the environment intersects with other facets of identity alongside race, specifically gender and class. I then provide an overview of the environmental justice movement and its relationship with the environmentalist movement, and go on to address the importance of utilizing an environmental justice approach that works outside of the confines of the nation state. Chapter 3 provides a history and analysis of environmental racism in the state of Louisiana,

starting at the regional level of the Southern United States before narrowing the focus to Cancer Alley, the most notorious case of environmental racism against Black residents in U.S. history (Shrader-Frechette 2002). I cover specific examples of communities along the Alley that, led by Black female residents, stood up to environmentally racist corporations and governments that were poisoning their communities.

Chapter 4 covers the causes and health implications of lead poisoning in New Orleans. I explain how lead became introduced to gasoline, and, from there, how it eventually ended up in the soil. I go on to outline how lead gets from soil into the human body, and the myriad of health issues that arise from lead poisoning. Chapter 5 addresses lead poisoning in New Orleans specifically. I provide a history of lead poisoning in the city before Hurricane Katrina, focusing on the ghettoization of lead, and the *Billieson* lawsuit. After a brief overview of the storm itself, I delve more deeply into how the lead levels changed after the storm, and the implications of this shift. To conclude, I offer suggestions on how to address the problem of lead poisoning in New Orleans, emphasizing the importation of low-lead, Mississippi River alluvial soil. I argue that such solutions must be grounded in procedural, geographic, and social equity (Bullard 2005).

Chapter 2: Environmental Racism and the Fight for Environmental Justice

In December of 1993, leaders of Black churches from around the United States came together in Washington D.C. for a historic summit addressing how the environment¹ intersected with the concerns of their communities. Speaking on the subject, Bishop Frederick C. James of the African Methodist Episcopal Church stated, “We in the Black community have been disproportionately affected by toxic dumping, disproportionately affected by lead paint at home, disproportionately affected by dangerous chemicals in the workplace” (Cone 2001:27). Over two decades later, people of color and others of marginalized identities continue to be disproportionately impacted by toxins in the environment. This chapter focuses on the ways in which environmental harms are unequally distributed along lines of race, gender, class, and nation, and how the fight for environmental justice seeks to remedy that. The theories that I cover in the following pages form the foundation of my argument: that lead poisoning in New Orleans is symptomatic of the larger structure of environmental racism that undergirds the state of Louisiana.

Environmental Racism

Ruth Wilson Gilmore (2007) defines racism as the “state-sanctioned or extralegal production and exploitation of group-differentiated vulnerability to premature death” (p. 28). Per this definition, environmental racism is a form of racism in that certain groups, as defined by socially constructed markers of difference (i.e. “group-differentiated vulnerability” (Gilmore 2007:28), are disproportionately harmed by environmental toxins. More concretely, environmental racism refers to “any policy, practice, or directive that differentially affects or disadvantages (whether intended or unintended) individuals, groups, or communities because of

¹In the context of the environmental justice movement, the definition of “environment” applies to the places where people work, live, go to school, and play (Bullard 2005).

their race or color” (Bullard 2005:32). Beverly Wright (2005), a Black, grassroots activist who fought against the siting of a polyvinyl chloride plastics plant in her hometown of Convent, Louisiana, charts the history of environmental racism in the United States back to slavery. In doing so, she ties environmental racism to larger structures of de facto and de jure segregation and discrimination. Wright (2005) states that:

A history of slavery spawned environmental racism in the United States. Environmental racism is also a by-product of the racial segregation and discrimination legitimated in the southern United States by Jim Crow laws (enacted between 1877 and 1954, when the U.S. Supreme Court, in *Brown v. Board of Education*, struck down ‘separate but equal’ laws) that made all forms of segregation and discrimination legal. Customs and practices in other parts of the United States [outside of the South] as well permitted segregation and discrimination, even without laws specifically authorizing them...Environmental racism is merely one vestige of the overall pattern and practice of racism in the United States. (P. 87)

Pellow (2007) frames environmental racism as a toxin in and of itself, a construction that is useful both metaphorically and literally. He argues that this conception is particularly powerful because it speaks to the ways in which racism harms “both its victims and its perpetrators or beneficiaries” (Pellow 2007:45). Thus, like all forms of racism, environmental racism actively advantages white people while hurting people of color, and is reinforced by government, legal, economic, political and military institutions (Bullard 2005).

Environmental racism is constructed in part through the equation of nature with non-European bodies. A central tenet of modernity has been the separation of nature from “civilized” human culture, and the subsequent urge of Europeans (and white people more broadly) to dominate all that they have deemed “uncivilized.” “Sub persons” or “savages” -- anyone who is not white -- have been equated with nature, and thus have been devalued and seen as a site for domination; or only valued insofar as they are able to provide a strategic benefit to the project of modernity (Pellow 2007). Pellow (2007) argues “the meaning of space and race codeveloped to produce racism and environmental harm as one integrated process as European expansion took

hold during the sixteenth century” (p. 38). In combination, “the wealth of nature and the labor power of subjugated people were sapped for the benefit of the privileged few” (Pellow 2007:38). By understanding the ways in which the equation of nature and non-whites justified the domination of both, for the benefit of white people, we are able to better understand the roots of environmental racism.

This association between nature and non-whiteness extends to the context of environmental racism in American cities. Pellow (2007) writes that “through the psychology of whiteness, many European Americans view the inner cities where many African Americans are concentrated as wild places, or a kind of frontier populated by shadowy, dark, subhuman others - - places to be feared, avoided, or conquered” (p. 39). In the minds of many white Americans today, inner cities have replaced the mysterious frontier of the 16th century as places where racialized conceptions of danger lurk, to be both feared and conquered.

Thus, in both the context of 16th century colonialism and modern American cities, the construction of non-white bodies as “savage”, “primitive” and inherently connected with nature, has reified the white desire to dominate nature as a white desire to dominate non-whites. As Pellow (2007) argues, the subjugation of nature and of bodies of color was, and is, an “integrated process” (p. 39). Accordingly, “basic functions of industrialized societies (primarily in the global North) involve the production of both intense ecological harm and extensive social hierarchies (primarily by race, class, gender, and nation)” (p. 5). The project of modernity is thus predicated upon simultaneous and continuous ecological degradation, social stratification, and oppression -- especially of Black people.

Along with the co-domination of nature and people of color, particularly Black people, zoning practices have also served as a cornerstone of environmental racism in the United States.

Zoning laws dictate what land can be used for what purpose (residential, commercial, or industrial usage) and serve as a strategy through which the government regulates urban land use. Zoning practices have historically been used by the government to covertly “foster and perpetuate discriminatory practices, including discriminatory environmental planning practices” (Bullard 2005:32), and to maintain de facto segregation. Zoning can be exclusionary, in which it is used to prevent certain people or types of industry from entering an area, or expulsive, wherein it is invoked to push residents out and to allow dirty industry in (Bullard 2005). Bullard (2005) writes:

Zoning laws are often legal weapons ‘deployed in the cause of racism’ by allowing certain ‘undesirable people’ – such as immigrants, people of color, and poor people – and operations, such as polluting industries, to be excluded from areas...Historically, local land use and zoning policies are the ‘root enabling cause of disproportionate burdens and environmental injustice’. (P. 33)

It is not surprising that zoning laws are in actuality far from objective, considering that planning and zoning boards are made up of mostly white, middle-aged, male professionals (as opposed to nonprofessionals that represent the community as a whole) (Bullard 2005:32). The rules themselves reflect those who write them. Zoning laws are a manifestation of environmental racism in that they are a state-sponsored strategy through which people deemed undesirable and undesirable industry are excluded from certain areas. Consequently, dirty industry and marginalized communities are forced into the same areas, subjecting already marginalized people to toxins in their water, soil, and air.

Intersectional Environmental Justice

The fight for environmental justice is the fight against environmental racism and against policies and actions that disproportionately affect certain people based on their identities (along lines of gender, class, religion, nationality, etc.) As such, it is essential that the fight for environmental justice be undertaken through an intersectional lens -- one that acknowledges the

different and simultaneous oppressions that people face and how those intersections of identity relate to individuals' experiences with the environment (Crenshaw 1989). For example, Pellow (2007) outlines four of the ways in which gender and environmental injustice are connected. First, men (often white men in particular) are usually the ones in control of the states and corporations that inflict environmental injustice, and therefore gain the material and social benefits that result from such instances of injustice. Second, men (again, often white men) exercise the greatest control over labor unions and mainstream environmental organizations and thus receive credit for any successes that these organizations achieve. Third, women benefit the least from these struggles, as they are often relegated to the most toxic workplaces and residential areas, and tend to work for grassroots organizations that receive less funding and less media coverage. And fourth, the very areas that are polluted are "imbued with meanings that are that raced, classed, and gendered" (Pellow 2007:17). In sum, the states and corporations that perpetuate environmental injustice in the first place are led by men who reap the rewards of such discrimination; the polluted areas are themselves classed, raced, and gendered; and the heads of organizations that receive recognition for environmental work are often men who ignore the specific needs of women (especially women of color), while simultaneously eliding the women that are leading grassroots efforts.

Despite the unique ways in which gender-based oppression and environmental injustice intersect, women of color have been the driving force behind the environmental justice movement, and Bullard and Damu Smith (2005) assert that they are the "unsung heroes" of the movement (p. 62). They write, "These women represent the heart and soul of the modern environmental justice movement and provide a vision for environmentalism in the new millennium" (Bullard and Smith 2005:65). Women of color had a central role in the planning and

execution of the Second National People of Color Environmental Leadership Summit in 2002 (see Appendix A), and they have led the fights for justice in parishes² throughout Louisiana, as well as on a national level (Bullard and Smith 2005).

The impact of class and its intersections with the environment, race, and gender, is also an essential part of the environmental justice movement. As Pellow (2007) argues, “class inequalities intersect with and reinforce racial and gender inequalities, creating complementary ecological impacts...” (p. 53). Thus, it is essential to create an environmental justice framework that does not pit race and class against one another. This, Pellow (2007) contends, is avoided in part through an understanding of the treadmill of production and of Ulrich Beck’s (2006) theory of a risk society. As a concept, the risk society argues that modernity is antithetical to environmental and ecological well-being, and that the modern world is “increasingly occupied with debating, preventing and managing risks that it itself has produced” (Beck 2006:332). In other words, to be modern means to engage in greater environmental risk and to create a hierarchy where certain people are designated as “others” (Pellow 2007:23). Taken together, the treadmill of production and the risk society make clear the ways in which “class (like race) reflects not only social position but relationships and conflicts among groups vying for resources”(Pellow 2007:52).

Understanding environmental justice through a Marxist lens also makes clear the class component of environmental injustice. Marx (1913) argues that class inequalities in capitalism reveal that the domination of nature and humanity is predicated on the commodification of all living things via the notion of private property -- they only have worth insofar as their market value. This is especially damaging for people of marginalized identities, as their “market value”

² A parish is equivalent to a U.S. county (Mielke et al. 2016).

is “further degraded as a result of ideologies that define them as socially and culturally worth less than others” (Pellow 2007:53). According to this logic, the government and those in power deem certain people as being inferior due to their lessened “market value”, thus designating them to be suitable victims of environmental injustice.

The fight for environmental justice must be undertaken in a way that acknowledges the simultaneity of oppressions that people face, based upon their complex and interwoven racial, class, and gender identities³.

Rift Between the Environmentalist and Environmental Justice Movements

In order to understand the environmental justice movement, it is essential to understand how the movement relates to the environmentalist movement. The relationship between the two movements is important because the split illustrates 1) Why there is a need for the environmental justice movement in the first place, 2) The key issues that the movement is trying to address, and 3) The gaps that the movement is filling. Much like the way many mainstream feminist groups have historically marginalized the concerns of women who are Black, and many Black Power groups have historically ignored the concerns of Black people who are women -- resulting in the needs of Black women being discounted by both groups -- environmentalist groups have often neglected the social inequalities related to the environment and Black Power groups have tended to overlook environmental issues. This has resulted in a lack of activism regarding the ways in which racial inequality and the environment intersect. As James Cone (2001), a Black theologian, writes:

³ People face oppression related to identities beyond race, gender, and class, but I focus on these categories in this project because this is what the contemporary literature on environmental justice covers. Work related to how sexual orientation, ability, religion, and other facets of identity intersect with environmental injustice is an area worthy of further study, but beyond the scope of this thesis.

People who fight against white racism but fail to connect it to the degradation of the earth are anti-ecological -- whether they know it or not. People who struggle against environmental degradation but do not incorporate in it a disciplined and sustained fight against white supremacy are racists -- whether they acknowledge it or not. The fight for justice cannot be segregated but must be integrated with the fight for life in all forms. (P. 23)

The mostly white environmentalist movement exemplifies the danger of a narrow focus, as it has largely failed to extend its key aims beyond the “preservation of scenic wilderness areas and the protection of endangered species,” to address the intersections of the environment and social inequalities (Sandler and Pezzullo 2007:8-9). The environmental justice movement has grown out of this failure of the environmentalist movement.

A seminal achievement of the environmental justice movement has been expanding the definition of environment to the places where people work, play, and live. This definition stands in contrast to traditional understandings of the “environment” that were held by many in the environmentalist movement. Sandler and Pezzullo (2007) write that environmental groups like the Sierra Club and the Natural Resources Defense Council (NRDC) failed to see issues such as the siting of a 1,600-pound-per-day solid waste incinerator in South Central Los Angeles in the 1980s as worthy of environmental concern. The lack of response and support from environmentalist groups on this and similar issues was indicative to the environmental justice movement that the environmentalist movement “was not interested in significantly challenging the established social and political power structure. Environmentalism failed...to provide a much needed radical cultural critique” (Sandler and Pezzullo 2007:10).

This “radical cultural critique” was precisely what the environmental justice movement was aiming for, as they brought, for the first time, the language of the civil rights movement (i.e. “racism”, “economic blackmail”, “justice”) into the context of the environment (Sandler and Pezzullo 2007:10). In doing so, the leaders of the movement inextricably linked social justice

with the environment. The contributions of the environmental justice movement in transforming public discourse and pushing the terms of the debate beyond that of the environmental movement was essential precisely because “the dominant environmental protection paradigm reinforced instead of challenged the stratification of people (according to race, ethnicity, status, power, and so on), places (central cities, suburbs, rural areas, unincorporated areas, Native American reservations, and so on), and work (for example, office workers are afforded greater protection than farmworkers)” (Bullard 2005:29). By failing to challenge existing social and political power structures in their activism, the environmentalist movement has ignored the needs of people of color and low-income people, and in some cases, directly contributed to discrimination against these groups.⁴

The work of environmental justice advocates brought to the public’s attention the fact that the environmentalist movement was (and to a large extent still is) a mostly white, upper-middle class movement concerned with “protecting the earth rather than the humans who inhabit it” (Shrader-Frechette 2002:3). The environmental justice movement has fought to broaden the scope of the term “environment” and to prove that social justice and environmental activism are inextricable from one another. As Reverend James Cone (2001) writes, “If we save the planet and have a society of inequality, we wouldn’t have saved much” (p. 31).

The North of the South and the South of the North: The Environmental Justice Movement in an International Context

⁴ For more information on the relationship between the two movements, specifically the letters to the “group of ten” critiquing the whiteness of the environmentalist movement, and the National People of Color Environmental Leadership Summits in 1991 and 2002, see Sandler and Pezzullo (2007:3-7); and Appendix A, respectively.

Understanding the environmental justice movement as an international movement is useful in that it demonstrates that the codependence of the oppression of people of color and low-income people and the environment in the United States is a phenomenon that is replicated around the world. Thus, the struggle for environmental justice in the United States is deeply tied to the struggle for justice internationally. Pellow (2007) uses the terms “global North” and “global South” to discuss inequalities both within and between countries, and to refer to the ways in which the excessive consumption patterns of the global North hurt communities in the global South. The two designations (“global North” and “global South”) are social more than they are strictly geographic, and encompass “politically and economically vulnerable communities” (Pellow 2007:2). “Global North” and “global South” as primarily social, rather than geographic, markers is visible in the existence of communities that can be labeled “North of the South” or “South of the North” (Pellow 2007:3). This distinction works to complicate simple binaries and to emphasize ways in which oppression works within, as well as between, nations. This phenomenon is at work in Louisiana. Bullard (2005) writes, “The environmental and economic conditions in Louisiana’s petrochemical corridor...are linked to some of the same transnational corporations that have waged resource wars against native and indigenous peoples around the world” (p. xvii).

Conclusion

Environmental justice is the fight against the disproportionate impacts of environmental harm along lines of race, gender, class, and nation. Bolstered through theories regarding the codomination of nature and non-white bodies, and zoning laws, environmental racism is a toxin that is engrained in our country’s history. Efforts towards environmental justice, a movement that historically (and today) has differed significantly from the environmentalist movement, must

be intersectional, radical, and undertaken with an understanding of the international connections between systems of oppression. The state of Louisiana is an important site for understanding the manifestations and lived realities of environmental racism, and the grassroots, women-led fight for environmental justice that emerged in response.

Chapter 3: Environmental Racism in Louisiana

Within a region notorious for an abysmal environmental and civil rights record, Louisiana manages to stand out. And within a state infamous for regular collusions between polluting industry and the government, Cancer Alley, an 85-mile-stretch along the Mississippi River between Baton Rouge and New Orleans, similarly stands out from the rest of the state. This chapter provides a history of environmental racism and injustice in the state of Louisiana, outlining the state government's benevolence towards polluting industry, and the disproportionate impact of such policies on Black residents. It then outlines patterns of environmental racism in parishes along the corridor -- injustices that were fought by grassroots organizing efforts led by Black female residents.

This sort of grassroots organizing is an integral part of the environmental justice movement, and the fight against petrochemical plants in Cancer Alley was no exception.⁵ Unlike many traditional activists, environmental justice activists are fighting out of necessity, as their survival is dependent on this work. In fact, environmental justice is often at the core of most community-centered activism. According to Bullard (1993), 80 percent of minority community resistance groups began as environmental organizations. Rather than focusing on securing media attention, these activists -- often women of color from small towns -- are focused on change and results. The leaders of the fights in Convent, Norco, and Alsen all exemplify this.

Lead poisoning in New Orleans is not an aberration; rather, it is a continuation of a history of environmental and racialized degradation in the state. In order to understand it as such, one must understand the history of the South, Louisiana, and Cancer Alley.

⁵ See Appendix A for more information on the environmental justice movement as a grassroots struggle.

Louisiana's Legacy of Environmental Racism

In the South, a legacy of slavery and subsequent Jim Crow segregation combines with ecological destruction by big business to paint a dangerous picture for minorities, the poor, public health, and the environment (Wright 2005). The disproportionate influence of industry on corrupt state and local governments has made this possible. Beverly Wright (2005) argues that the “the South is characterized by ‘look-the-other-way environmental policies and giveaway tax breaks.’ It is our nation’s Third World, where ‘political bosses encourage outsiders to buy the region’s human and natural resources at bargain prices’” (p. 88). As a result, the region has become “an environmental sacrifice zone, a dump for the rest of the nation’s toxic waste” (Wright 2005:88).

The region’s earlier reliance on the plantation system which exploited both people and the land -- the codomination of humans and nature being a central tenet upon which environmental racism rests -- resulted in a “colonial mentality...where local governments and big business take advantage of people who are politically and economically powerless” (Pellow 2007; Wright 2005:88). The South is a prime example of the codomination of nature and people through an equation of nature with people deemed “subhuman.” The exploitation of Black people through slavery, Jim Crow segregation, and contemporary polluting industry sitings, and the simultaneous exploitation of the environment through monocrop plantation farming and polluting industry are thus mutually constitutive. From the sugar plantations that lined the banks of the Mississippi River during slavery, to the petrochemical plants that line the River’s shores today, environmental racism forms the foundation of the region.

Even in an area rife with political corruption, pollution, and intense class- and race-based inequalities, Louisiana is unique in the extent to which social inequality and ecological

destruction are co-produced. The state is characterized by its off the charts pollution rates and patterns of collusion between polluting industry and state and local governments, both of which disproportionately affect residents of color. Wright (2005) states, “No place better exemplifies the deleterious effects of the incestuous relationship between government and the petrochemical and chemical industry than Louisiana. The unholy alliance between government and industry has been unbreakable, and the people of Louisiana have suffered its consequences” (p. 89).

Louisiana is consistently rated as one of the most polluted states in the country, and the poverty rate in the state is significantly higher than the national average. As of 2000, Louisiana was ranked 50th out of all U.S. states in terms of environmental quality, and 49th in the number of chemical accidents (Wright 2005:93). In 2010 it produced the third-most tonnage of toxic waste per year, at 3.8 million tons, and had the eighth highest carbon footprint (24/7 Wall St. 2010). On top of its dismal environmental record, Louisiana has high poverty rates, particularly among Black residents. In 2017, the state’s poverty rate was 20.2 percent, almost eight percentage points higher than the national average, and ranking it 50th in the nation. Of those living in poverty, 34.2 percent identified as African-American, representing the largest racial group (second were Native Americans, at 29.0 percent) (Center for American Progress 2017). Taken together, the state’s environmental and social records speak to the deep-seated nature of inequality in the state.

Industry has been drawn to the area due its proximity to the Mississippi River, as well as the local and state governments’ favorable stances towards big business. With the end of the sugar plantation system after World War II, the state government began to emphasize attracting international business to locate along the river. As a result, the area became the prime location for the petrochemical industry. The river was also a pull factor for petrochemical businesses because it gave them barge access and the river served as a disposal site for chemical waste

(Wright 2005). Its proximity to the Gulf of Mexico also opened the area up to international businesses. Louisiana is the second largest producer of refined oil in the country, making the state's petroleum industry immensely valuable to both Louisiana and the broader United States. Due to its geographic and resource advantages, Louisiana's economy has become largely dependent on the petrochemical industry, and attempts to diversify its economy have been unsuccessful (Wright 2005; Ausick and Sauter 2013).

The prominence of the petrochemical industry is due in large part to government benevolence towards the industry, exemplified in the copious tax breaks that are offered to corporations in return for locating in the area. Louisiana ranks first in the United States in providing tax subsidiaries to corporate polluters -- the state provides \$350 million in tax breaks to industry, the majority of which go to heavily polluting manufacturers, which provide only 10 percent of jobs in the state (Wright 2005:92). Further, industrial associations spend time and money to influence and mold politicians who will push their interests. The Louisiana Association of Business and Industry and the Louisiana Chemical Association both work to groom, influence, establish connections with, and ultimately support politicians whose stances align with theirs. This is all in an effort to "influence and promote a pro-industry economic development model that supports the industry's expansion" (Wright 2005:91).

This partnership has had significant impacts on legislation that directly affect residents, such as the Industrial Property Tax Exemption Program. This program gives manufacturing corporations property-tax relief on building, machinery, and equipment for up to ten years, after which point they still receive a property tax reduction. Wright (2005) describes this program as a "corporate welfare program paid for by the poor of Louisiana" (p. 91). Because businesses do not have to pay property taxes, the government does not receive the money that would have

come from such taxes. As a result, the government does not have adequate operating funds to maintain local schools, roads, parks, and libraries. As Louisiana state senator Cleo Fields puts it - - “education subsidize[s] business” (Wright 2005:91). Countless efforts to repeal this legislation have been stymied due to the lobbying of the Louisiana Association of Business and Industry.

This history of government complicity with the actions of the polluting industry and the government’s simultaneous refusal to address public health concerns has eroded the public’s confidence in the state government. For example, the Louisiana Tumor Registry, a taxpayer-funded cancer data collection agency, was brought to court in 2007 by concerned residents and researchers for their refusal to release zip-code specific information regarding rare cancers, such as pediatric cancers. The Registry’s withholding of data calls into question who the agency is meant to serve in the first place, and who they are trying to protect. Allen (2007), writes, “In Louisiana, citizens’ trust in their state public health system to distribute accurate information has been eroded by questionable activity or, in some cases, inactivity” (p. 155).

The geography of the region, combined with government policies that directly benefit industry, have drawn polluting corporations to the area, resulting in 135 petrochemical plants and seven oil refineries lining the 85-mile stretch of the river between Baton Rouge and New Orleans -- roughly one facility per every half mile of river (Shrader-Frechette 2002; Wright 2005). Over one-quarter of the nation’s petrochemicals are produced in this corridor, emitting one billion pounds of toxic chemicals each year, and earning the area of the designation of “Cancer Alley” (Shrader-Frechette 2002).

Cancer Alley

Though all Louisiana residents⁶ are impacted by its horrendous environmental record, those living in communities along Cancer Alley -- communities that existed prior to the introduction of petrochemical industry -- are most impacted (Wright 2005). Residents in the corridor are exposed to the toxins emitted from over 125 factories that produce fertilizers, paints, plastics, and gasoline, and residents are constantly fighting proposals for new plants (Shrader-Frechette 2002; Wright 2005). Further, many homes in the area were built on landfills (Wright 2005). The area “has been dubbed ‘Cancer Alley’ because the air, ground, and water are full of carcinogens, mutagens, and embryotoxins. The area was described in a *Washington Post* article as a ‘massive human experiment’ and an ‘environmental sacrifice zone’. Residents...have also described their environment as ‘toxic gumbo’” (Wright et al. 1994:114). Wright explains how the marriage of the state’s economy and the petroleum industry has created Cancer Alley, and how the fight of residents there is connected to national and international struggles for environmental justice. She writes that Cancer Alley

...challenges nearly every environmental policy and regulation in this nation. The struggles of communities in the corridor exemplify many of the environmental conflicts fought by numerous communities in this country and abroad. Louisiana’s overdependency on petrochemical production has placed its economy and the health of Louisiana’s citizens and its environment in dire straits. (Wright 2005:89)

Noxious facility sitings and toxins in the water, air, and soil along Cancer Alley have disproportionately impacted Black residents. Kristin Shrader-Frechette (2002) argues that the case of Cancer Alley represents the most notorious example of environmental injustice against

⁶ In fact, the impact of Cancer Alley goes even beyond Louisiana. The nearly two billion pounds of toxins emitted in Cancer Alley are not contained within the corridor, or even within the state. Within three days they reach the Great Lakes region and the Northeast, and within a few more days they reach people throughout the rest of North America and on other continents. Further, Louisiana, which is the second-largest seafood-exporter in the nation, has been found to have fish that are contaminated with cancer-causing chemicals, furthering the reach of the toxins in the area (Wright et al. 1994).

Black Americans in the nation's history. In 1993, the Louisiana Advisory Committee to the U.S. Commission on Civil Rights published a report entitled "The Battle for Environmental Justice in Louisiana...Government, Industry, and the People," marking the first time that the commission had undertaken a study regarding the relationship between environmental policy and race-based discrimination (Louisiana Advisory Committee to the U.S. Commission on Human Rights 1993:1). The study ultimately found that Cancer Alley has disproportionately impacted Black residents because "the system of state and local permitting for Louisiana hazardous waste facilities is unfair" and because "citizens living in Cancer Alley have low socioeconomic status and limited political influence" (Shrader-Frechette 2002:9). Despite the fact that state and local officials along the corridor acknowledged that Black communities were disproportionately impacted by the siting of hazardous industry, they "...failed to establish regulations or safeguards to ensure such communities are reasonably protected from a high concentration of hazardous waste and industrial facilities and risks associated with living in and around such facilities" (Louisiana Advisory Committee to the U.S. Commission on Human Rights 1993:63).

Ten years later, a U.S. EPA report analyzing the relationship between race and facility siting went even further: it found that all nine parishes along Cancer Alley that were studied had "clusters of air-polluting facilities largely located in areas with high concentrations of African Americans. Approximately 80 percent of the total African American community in the nine parishes live within three miles of a polluting facility" (Wright 2005:95).

Further, when industries came into the area, many promised jobs to local residents. In reality however, few jobs have been offered to Black residents, and in the instances when they have, they were often the lowest-paying and most labor-intensive positions. Overall, the number

of residents employed by the companies operating in their neighborhoods has been steadily decreasing, from 87,200 in 1956 to 47,300 in 2004 (Wright 2005).

The poisoning that Black communities in the corridor face -- many of which were founded by formerly enslaved Louisianans and existed long before the petrochemical plants came to the area -- is in many ways a modern-day iteration of the abuses faced by those in the area during slavery and Jim Crow segregation. Emilie Townes (1995), a renowned scholar and theologian, made those connections explicit in her contention that “Contemporary versions of lynching a whole people are toxic waste landfills in African-American communities” (55). Amos Favorite, a resident of Geismer, Louisiana (a town in Cancer Alley), and a World War II and civil rights movement veteran, makes similar connections in his positing that the petrochemical industries are the new “masters”:

We are the victims... We are all victimized by a system that puts dollars before anything else. That's the way it was in the old days when the dogs and the whips were the masters, and that's the way it is today when we got stuff in the water and air we can't even see that can kill us deader than we ever thought we could die. (Wright et al. 1994:113)

Favorite's Marxist critique connects the oppression of his community by polluting industry to the oppression faced by Black people living in the same areas while they were enslaved on sugar plantations. Thus, racism, in the form of “the dogs and the whips” during slavery and in the form of polluting industries placed in Black communities in present day, has always been a harbinger of “premature death” (Gilmore 2007:28).

The cases of Convent, Norco, Alsen, Morrisonville, Reveilletown, Sunrise, and the Agriculture Street Landfill illustrate the ways in which such collusion between government and industry impact Black communities located in Cancer Alley.

Convent, Louisiana

The case of Convent brought Cancer Alley to the forefront of national discussions surrounding race disparities in toxic facility sitings. Convent is an unincorporated community in St. James Parish (one of the nine parishes analyzed in the 2002 EPA report), and has a population of roughly 2,000 people, 80 percent of whom are Black. In the 1800s, agriculture that resulted from slave labor, mainly on sugar plantations, was the chief economic source in the parish. Today, petrochemical plants dominate the area. The companies that moved into the parish promised jobs to local residents, yet the unemployment rate remained high, and as of 2005 the average annual income of residents was \$6,000, and 40 percent of residents lived below the poverty line (West⁷ 2005).

The emissions from the facilities near Convent have resulted in water, soil, and air contamination, and the facilities' proximity to residents presents a risk in terms of chemical accidents. Convent residents report asthma, respiratory problems, cancers, and other diseases that they attribute to the toxins released by the plants operating in their communities. The water in the area is polluted, and as a result it is unsafe to eat fish from the Mississippi River, and residents who can afford to do so install water filters and/or drink bottled water. Those that cannot afford filters or bottled water must drink water that is pumped directly from the Mississippi.⁸ Further,

⁷ In this section on Convent, I draw primarily from Emelda West's firsthand account of the struggle. In her own words, West was a "seventy-nine-year-old great-grandmother, environmental activist, and longtime resident of Convent, Louisiana", and one of the leaders of the community organization, St. James Citizens for Jobs and the Environment, that fought against Shintech (West 2005:68). Where applicable, I quote West directly in an effort to center her voice and experience. This reflects a key environmental justice principle: that of allowing people to speak and advocate for themselves (Bullard 2005).

⁸ Water contamination resulting from polluting industries is a problem not only in Cancer Alley, but also throughout the state. Nearly three-quarters of Louisianans get their drinking water from underground aquifers. However, the aquifers are at risk of contamination from polluting industry, and the companies posing the greatest risk are Dow Chemical, Vulcan, and PPG. If the

the pollution of the soil and water has prevented people from gathering fruits and growing their own vegetables, adding to poverty in the region because residents must rely exclusively on wage-labor to purchase food, as opposed to being able to grow and gather their own produce.

Residents are especially concerned about the students at the two elementary schools in the town, as both are within three miles of most of largest polluters in the parish. The majority of the students are Black. School buses pass polluting industries everyday on their way to and from school, exposing students to pollutants that are known to be health hazards. In addition to being exposed to the pollution from these dirty industries, residents have the added concern of a chemical accident occurring in one of the plants in the parish. The schools' proximity to the plants would spell disaster in the case of such an accident. Further, there are 36 dead-end residential streets in Convent that are within three miles of industrial plants, which would make evacuation resulting from a chemical accident difficult, as these roads are all one way, narrow, and poorly paved (West 2005).

In September 1996, Shintech, the U.S. subsidiary of a Japanese multinational corporation, announced that they were planning to buy the last three plantations in Convent, totaling 3,500 acres, to be the site of their polyvinyl chloride plastics plant. The plant would have been the largest in the world at that time and would have consisted of three chemical-processing units, a hazardous waste incinerator, and a number of on-site storage tanks (Wright 2005). Polyvinyl chloride is associated with dioxin, which is one of the most lethal synthetic chemicals and is linked to human hormone disruption, cancers, and reproductive damage (West 2005; Wright 2005). The complex would emit 600,000 pounds of airborne toxins per year into the area and

aquifers were to become unusable due to contamination, residents would be forced to rely on bottled water, a switch that would be cost prohibitive for many low-to-moderate income households (Wright et al. 1994).

discharge over eight million gallons of wastewater per day into the Mississippi River (West 2005).

In response to Shintech's announcement, residents gathered in the living room of Gloria and Clifford Roberts, long-time Convent residents, to found the community organization St. James Citizens for Jobs and the Environment. According to Wright (2005), lifelong Convent residents and seventy-nine-year-old grandmothers Emelda West and Gloria Roberts were the key figures in the movement. West (2005) writes "The Shintech struggle was an environmental justice case because African Americans and poor people in Convent would be disproportionately affected by the plant siting" (p. 70). The movement consisted of mostly Black, "working-poor" (West 2005:70) residents, and West (2005) argues that:

...the heroes of the struggle are individual leaders who live in communities in Cancer Alley. They stood with us and never gave up. These leaders included black and white residents working together. Community activists such as Pat McIncon, Dee Simmons, Gloria Roberts, and Amos Favorite kept the issue on the community's radar. We also had assistance from attorneys and environmental advocates such as Bob Kuehn of Tulane and Mary Lee of Louisiana Environmental Action Now. (P. 71)

The actions of St. James Citizens for Jobs and the Environment were also supported by Greenpeace, The Commission for Racial Justice, the Congressional Black Caucus, and prominent entertainers including Bonnie Raitt, Danny Glover, Aaron Neville, and Stevie Wonder. The citizens group took their battle to the courts,⁹ and in 1998, West and two other

⁹ The group could not afford a private lawyer, so sought legal services from Tulane University's Environmental Law Clinic, the sole environmental law clinic in the state and one of two in all of the South. However, in 1998, a ruling came down from the Louisiana Supreme Court which barred university legal clinics from representing community organizations unless 51 percent of its members were indigent (meaning earning less than \$16,000 per year for a family of four). It also barred representation of any community organizations that were affiliated with a national organization. Because most community organizations are not majority indigent families, the ruling effectively blocked the working poor's access to the legal system. This ruling had a profound impact, as university law clinics are one of the most common ways that the working-poor receive legal assistance, and are an "essential component of American democracy, because they safeguard and enhance the principle of equal protection under law" (West 2005:72).

Louisiana residents, along with a Greenpeace representative, visited the Shintech Corporation headquarters in Japan to submit protest documents. They accused the Shin-Etsu Chemical Company (Shintech's parent company) of environmental racism and argued that the siting of the facility "would pose a health hazard, exacerbating damage to an already overly polluted region" (West 2005:73). They also filed a complaint with the U.S. EPA against the company. This case served as a litmus test for President Clinton's 1994 Executive Order¹⁰ – how intensely would the administration enforce the Order (West 2005)?

The governor at the time, Murphy J. "Mike" Foster criticized the movement in Convent, claiming that it was "undermining his administration's efforts to bring economic development to poor communities in the state" (West 2005:71). The community responded by saying that they did not want jobs at the cost of polluting their community, and that there was no guarantee that the jobs would even go to residents -- especially considering previous instances in which industrial development efforts had failed to produce jobs for the local residents. Despite community pushback, the governor continued to side with Shintech (West 2005).

Finally, "on September 18, 1998, just under three years after its initial announcement, Shintech withdrew its plan to build the polyvinyl chloride plastics plant in St. James Parish" (West 2005:73). In a precedent-setting decision, the EPA had rejected Shintech's application for a permit on technical grounds, marking the first time that the EPA had accepted a citizen complaint under Title V. Wright (2005) argues that "citizen activism, organization, grassroots

Accordingly, civil rights and environmental activists and lawyers, as well as journalists and politicians, pushed back against this ruling (West 2005).

¹⁰ In 1994, "in response to growing public concern and mounting scientific evidence," President Bill Clinton issued Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (Bullard 2005:21). Broadly, the Order called for improved assessments on how project proposals by federal agencies would impact human health and the environment, specifically over multiple exposures, and especially in low-income and minority communities (Bullard 2005). For more information on the Order, see Appendix A.

mobilization, and national support were the defining qualities of the struggle that led to this victory” (p. 102). The Shintech case has been described as being as important for the environmental justice movement as *Brown v. the Board of Education* was for the civil rights movement (Wright 2005).

Norco, Louisiana

Like Convent, Norco -- a town located 40 miles northwest of New Orleans -- employed community action to protest the siting of a chemical plant in the town, specifically in the Diamond community. Before the plant siting, Diamond was prosperous, but in the 1950s, the Shell Norco Refining Company bought part of the Diamond Plantation with plans to build a new wing for its chemical plant. In order to do so, they displaced those living there and relocated them to a smaller plot of land between the company’s oil refinery and chemical plant. In this area, residents were constantly exposed to loud noises, noxious odors, and deadly chemicals. Flares erupted at unpredictable intervals, trucks rumbled through the community carrying deadly chemicals, unexplained booming noises shook their homes, and smells wafted through their houses, resulting in headaches and breathing difficulties for residents. As of 1997, over 50 percent of the toxic emissions in the entire parish came from this complex (Wright 2005). Further, despite close proximity to the plant, only a few residents acquired jobs at the plant. Wright (2005) argues that “the displacement and relocation of this small community marked the beginning of economic strife and environmental injustice in the Norco area” (p. 97).

After an explosion at the Norco refinery in 1988 killed eight workers, injured 20 others, and caused the evacuation of 4,500 people, 250 Diamond residents sued Shell. The jury sided with the defendants in this case. In 1993, the community group Concerned Citizens of Norco, also filed a lawsuit against Shell in hopes of forcing the company to buy out and relocate the

residents of Diamond, due to the unusually high rates of death and respiratory illness of those in the area. After these lawsuits, the community organization appointed Margie Eugene Richard as their president. Richard was a longtime Norco resident, and had grown up in a house just 25 feet from the fence that separated the residential streets of Diamond from the plant. The Diamond residents remained convinced that the high rates of disease and death in their community were related to the Shell plants, and fought for Shell to pay for the residents' relocation (Wright 2005).

In June of 2002, their efforts came to fruition when Shell announced the "Diamond Options Program", which gave residents the option of either relocating or remaining in the Diamond community and receiving assistance from Shell's home improvement and community development program. Originally, the relocation option was only given to two of the five streets near the plants. However, thanks to the continued efforts of members of the Concerned Citizens of Norco and the support of the Congressional Black Caucus, which wrote a letter to Shell urging them to consider buying out all Diamond residents, Shell agreed to offer a relocation option to all residents (Wright 2005).

Alsen, Louisiana

In 1980, Alsen was a small, solidly working-class suburban town whose residents were 98.9 percent Black. The town is in the shadow of Rollins Environmental Services' hazardous waste landfill and incinerator. In 1986, the landfill was the fourth largest remaining capacity in the country. Residents and plant workers repeatedly complained about odors and other health issues, and in a five-year span the plant was cited for over 100 state and federal violations, though they did not pay any penalties. The community action group Coalition for Community Action (CCA), headed by seventy-five-year-old resident Mary McCastle, filed a lawsuit against Rollins with the aim of making the plant comply with state and federal regulations. After many

years, the suit was settled out of court for several hundred thousand dollars. Coalition for Community Action was also successful in obtaining a technical assistance grant from the EPA to clean up a Superfund site near the town (Wright et al. 1994).

Morrisonville, Reveilletown, and Sunrise, Louisiana

In addition to the pollution that has resulted from the industries along Cancer Alley, residents in these communities have also suffered from the loss of historic lands and communities due to the intrusion of industry into their towns. For Black residents,

...this means the loss of land owned by their ancestors who were former slaves. Louisiana's chemical corridor has become a graveyard for the African American communities of Morrisonville, Reveilletown, and Sunrise. All three communities were intrinsically tied to African Americans' freedom from slavery. Blacks survived the horrors of slavery, but some of the homesteads of their offspring were destroyed by the modern petrochemical industry. (Wright 2005:102-3)

In 1959, the town of Morrisonville, which was founded by freed slaves in the 1870s, sold some land to Dow Chemical, and over the years the company continued to expand into the community until the plant was Dow's largest in the state. Thirty years later, in 1989, the company began to buy out residents, spending \$10 million over two years in buyouts that resulted in nearly all of the residents relocating (Wright 2005). These buyouts brought devastation to the community. Former resident Doretha Thompson stated, "It's like a big death taking place...I always thought I'd spend the rest of my life in Morrisonville with my relatives. But it seems like what Dow wants, Dow gets" (Wright et al. 1994:119). Dow's buyout strategy was closely watched (and eventually mimicked) by other companies in the corridor who also had the problem of the "too close neighbor" (Wright 2005:104).

Similarly to Morrisonville, Reveilletown was founded by freed slaves, and also has a chemical plant, Georgia Gulf Corporation, alongside it. The plant produces plastics, a process which releases vinyl chloride, which can cause liver disease. In 1987, when traces of the poison

were found in local children's blood, 13 Reveilletown property owners sued the corporation. The case was settled and the plaintiffs moved away. Twenty other families soon followed suit in relocating, and sold their properties to Georgia Gulf for a combined \$1.2 million. By 1990, Georgia Gulf had bought out 17 other families and "as in Morrisonville, the move marked the death of a community that had been founded by freed slaves" (Wright 2005:104). Janice Dickerson, a Black resident of the town who was one of the leaders in the fight against the Georgia Gulf, stated that corporate greed and racism were at the root of the poisoning of Reveilletown (Wright et al. 1994).

Also founded by former slaves, Sunrise was established on land purchased by Alexander Banes, a former slave, -- but in 1979 the Placid Refining Company started to buy out Sunrise community members. Placid Refining Company is an oil-refining and marketing company that converts crude oil from Louisiana into gasoline, jet fuel, and diesel. The company supplies jet fuel to the U.S. military. By 1985, the company had bought \$947,000 worth of land in the area, however, only the properties of white residents were purchased, leaving Black residents to suffer from the pollution caused by the Placid Refining Company's plants. Remaining residents of Sunrise filed suit against Placid, listing 241 plaintiffs. In response, the company offered to buy out any residents that were not plaintiffs in the case, which resulted in Placid acquiring over 90 percent of homes owned by non-plaintiffs. Eventually, the plaintiffs and Placid reached an out-of-court settlement under which the company purchased all of the land of the plaintiffs (Wright 2005).

Agriculture Street Landfill, New Orleans, Louisiana

The Agriculture Street Landfill in New Orleans marks the bottom of Cancer Alley. The area was used as a city dump starting in 1910, and covered 190 acres. In 1969, the federal

government created a homeownership program in hopes of encouraging lower-income families to buy homes. Press Park and Gordon Plaza, which were built atop the Agriculture Street Landfill, were the program's first subsidized housing projects in New Orleans. The developments were planned, controlled and constructed by the U.S. Department of Housing and Development (HUD) and HANO.

In 1983, the Orleans Parish School Board bought a portion of land atop the landfill to build a school. Concerns were raised about the site because it had been a municipal dump for almost 60 years (Webster 2015). Due to this history of the area, the site was surveyed and assessed for contamination by hazardous materials, and upon inspection, heavy metals and organics were discovered. Despite these findings, and the subsequent results of a 1986 EPA investigation, which found lead, zinc, cadmium, mercury, and arsenic in the soil, the construction of the school went ahead as planned. Moton Elementary School opened in 1989, with 421 students enrolled. In 1990, as a result of community pressure, the EPA conducted an expanded inspection of the Agriculture Street Landfill area, which consequentially placed the community on the National Priorities List.¹¹ The EPA ordered a cleanup of the area, which entailed replacing the top two feet of contaminated soil with clean soil. This cost \$20 million dollars and took three years -- even though community members had pushed instead for a buyout of their properties and relocation (which would have cost \$6 million less than the cleanup).

The community still sits atop twenty feet of toxic waste, and only 10 percent of the land is remediated. At the time of the lawsuit, the area was home to about 900 Black residents, and the average family income was \$25,000, with most adults having attained a high school education

¹¹ After the initial EPA investigation in 1986, the area was given a three on the Hazard Ranking System model, which was not high enough to place the area on the EPA's National Priorities List for cleanup, despite clear evidence of toxic chemicals in the soil (Wright 2005).

or above. After the cleanup, a community group -- the Concerned Citizens of Agriculture Street Landfill, which was led by resident Elodia Blanco -- filed a class action suit against the city of New Orleans for damages and relocation costs. In 2006, Civil District Court Judge Nadine Damsey ruled in favor of the residents, finding the city, HANO, and the school board liable for building the two residential communities and Moton School on the toxic landfill. The city, HANO, and the school board appealed the ruling. Nine years later, the court ordered four former HANO insurers to pay \$14.2 million to over 5,000 residents of Gordon Plaza and Press Place. After attorneys' fees and court administrative expenses, the residents were awarded an average of a few thousand dollars each. They are unlikely to receive any more money from the suit, as the city, HANO and the school board are protected by the state from paying any judgments rendered against them (Wright 2005; Webster 2015; Smith 2005).

Across all of these sites, certain patterns emerge: 1) In all areas, Black residents are disproportionately impacted by the siting -- either because of where a noxious facility is located in a town, or due to the fact the town itself is majority Black; 2) When jobs are promised to residents, they often do not actually get those jobs; 3) In many areas, residents are fighting the siting of new facilities while still having to contend with the facilities that already exist; and 4) In each town, the fight against polluting corporations is led by Black, female residents who draw power from community support and grassroots organizing.

The Treadmill of Production and Precautionary Principle in Cancer Alley

It is useful to understand the environmental racism intrinsic to the state of Louisiana and the case of Cancer Alley through the lens of the precautionary principle and the treadmill of production. The treadmill of production is implicated in the case of Cancer Alley because the petrochemical plants in the areas necessitated unrestrained growth. They required increased

withdrawals of crude oil and other raw materials that were needed to power the plants, and created additions to the ecosystem in the form of pollution that plagued communities in the area. Further, corporations needed more space to create larger facilities, resulting in buyouts of residents. The success of these plants required unfettered growth, irrespective of how that growth impacted the ecosystem and the humans living in the area.

The case of Cancer Alley demonstrates how the treadmill of production elucidates the irony of the state: the government's duty under capitalism to grow at ever-increasing rates exists in contradiction to its ostensible obligation to the public to provide social welfare and environmental protection. Those living in the corridor experienced this first-hand, as the government failed to protect them from a problem that they themselves had created (by drawing polluting industry to the area in the first place).

Further, the government and industry failed to implement the precautionary principle, causing harm to thousands of residents in the area. They showed no concern for the health of residents and failed to take steps to minimize -- and certainly not to fully prevent -- irreversible harm. This can be seen in the fact that factories were constructed in such close proximity to schools and homes; that noxious fumes from the factories wafted into houses and school buses; that water and soil in the area were contaminated; and that communities were driven off of lands with deep historical and personal significance.

Conclusion

In Louisiana, the confluence of lax governmental regulations, high poverty rates, polluting industry, and a legacy of plantation slavery all result in a dangerous state of affairs for residents, specifically those at the intersections of inequalities related to race, class and gender, such as low-income Black residents. In Cancer Alley, petrochemical plants now populate an area

that used to be dominated by sugar plantations; the means of oppression of both Black residents and the environment has merely changed in form. In the aforementioned communities, residents were forced to choose between remaining in their homes and being poisoned, and selling their houses to corporations and leaving behind their communities and ancestral lands. Needless to say, this hardly constitutes a “choice.”

Hurricane Katrina exacerbated the issues in Cancer Alley -- on top of the destruction of the storm itself, many of the area’s landfills received tons of debris from the storm. In one town along in the corridor, a landfill was reopened to receive the waste, and soon after, it started to emit noxious smells and “black ooze” (Allen 2007:155). A high school student in the town took samples of the “ooze” and sent it to the Louisiana Department of Environmental Quality. The department claimed that the landfill was only accepting construction waste, and that the smell was probably just from decaying gypsum board. Barbara Allen, whom the student contacted about the issue, writes, “I suspect her story will be repeated many times across south Louisiana as these marginal waste sites receive the debris from homes and businesses ruined by the hurricane. The full environmental impact of Hurricane Katrina’s waste and its hastily designated removal sites will not be known for many years” (2007:155).

It bears repeating that Kristin Shrader-Frechette (2002) has argued that Cancer Alley is the most notorious instance of anti-Black environmental racism in U.S. history. Clearly, the environmental racism experienced by lead poisoned residents of New Orleans is part and parcel of this deeper history.

Chapter 4: The Causes and Health Implications of Lead Poisoning

The health impacts of lead are socially, neurologically and physically devastating. There is no safe level of lead in one's blood (U.S. Centers for Disease Control and Prevention 2016). No vaccine exists to protect against lead poisoning, and there is no cure once a child has been exposed, besides removing them from the source of contamination -- which still does not remove the lead that is already in their blood and bones. Researchers of the neurotoxin have described lead poisoning as the "silent epidemic," and the "most significant and prevalent disease of environmental origin among US children" (Mielke et al. 1998:117; Silbergeld 1997:187). Due to the way in which lead dust travels, the issue of lead poisoning extends beyond the individual level to impact entire communities, making government action an imperative. Mielke et al. (2016) write "It should be emphasized that lead exposure is a public health problem shared by communities, encompassing entire neighborhoods, and multiple residences and associated businesses, parks, schools, streets, and open spaces. An individual residence influences and is in turn influenced by the movement of lead in dust beyond property boundaries" (p. 567). This chapter will open with an overview of the causes of lead exposure, covering the seasonal aspect of soil lead (SPb) levels, and charting lead's path from leaded gas emissions and lead paint to the soil, and eventually to humans. It will then turn to the health implications of lead exposure, focusing on the changing governmental guidelines regarding "safe" lead levels, the unique ways in which children are affected by lead, the negative health impacts of lead exposure, and the associations between lead exposure and violent crime.

Causes of Lead Exposure

Lead poisoning is especially prevalent in cities, and New Orleans is no exception. Cities have disproportionately high lead levels, and as of 2008, 15-20 percent of children in U.S. cities

had BPb levels above 10 µg /dL, compared to less than two percent of children in the general population (Laidlaw and Filippelli 2008). Campanella and Mielke (2008) have found that city size and lead level have a direct relationship -- the larger the city, the more lead in the soil. Those living in inner cities are most impacted of all. Inner cities had the most congestion during the heyday of leaded gasoline, and therefore the highest concentration of leaded gasoline emissions, which have since seeped into the soil.

According to Mielke et al. (2007; 2014), lead from paint and lead from gasoline are the two main ways that soil gets contaminated (see Figure 1).¹² Though lead paint was banned from household use in 1978, many old homes in New Orleans still have lead paint on the exterior, presenting a danger in the form of peeling and chipped paint, and lead dust resulting from sanding (Mielke et al. 2007). Mielke et al. (2007) estimate that if all of the lead paint was sanded off of all 86,000 homes in New Orleans (a practice that is necessary before re-painting can take place), it would result in 1,000 metric tons of Pb dust contaminating the city.

Lead dust from paint combines in the soil with lead from gas emissions. Motor vehicles in the United States used leaded gasoline from the 1920s until its ban in 1986. By 1950, nearly all grades of gasoline contained tetraethyl lead (TEL), and its usage peaked in the 1960s and 1970s (Laidlaw and Filippelli 2008; Mielke et al. 2007) (see Figure 1). Lead poisoning due to leaded gasoline emissions was largely preventable, as adding TEL to gasoline was motivated by a drive to increase profits by big corporations including General Motors. TEL was added to

¹² Researchers and the public more broadly initially thought that lead-based paint was the main source of soil contamination, however researchers found, in city after city, that levels were substantially higher in inner cities and decreased moving outwards, regardless of paint-status (an unpainted brick building in Baltimore for example, had higher lead levels in surrounding soil than a painted building in the suburbs). Since then, leaded gasoline has been found to be a significant source of soil contamination, though lead paint is still a concern (Laidlaw and Filippelli 2008).

gasoline as an anti-knocking agent. While there were other additives, such as alcohol, that would have served the same purpose, those would have negatively affected gas mileage, and so TEL was used in favor of other, safer methods (Kitman 2000). Silbergeld (1997) writes that “The decision to permit the use of alkyl lead additives in automobile fuels represents the greatest single failure in preventing lead poisoning” (p. 193). The use of TEL in gasoline exemplifies the ways in which the treadmill of production pushes for increased profit over human and environmental health.

The lead industry and its scientists had a large influence on the U.S. government’s involvement and stance regarding leaded gasoline. Robert Kehoe, a toxicologist employed by General Motors, led the charge. He argued that lead levels found in human blood and in the environment were nothing of concern, despite strong evidence within his own research to the contrary. This is a prime example of the precautionary principle not being put into practice, as the risks of the situation were known but no action was taken to minimize or prevent harm.

Though by 1973, restrictions had begun to be put on lead emissions, progress was threatened with the inauguration of President Reagan in 1981. The first item on Vice President George H.W. Bush’s Task Force agenda was to deregulate lead in gasoline, an initiative that was helped along by EPA Administrator Anne Gorsuch. Despite these challenges, members of the EPA and scientists such as Clair Patterson fought back, and the regulations remained. In 1990, lead was finally banned from gasoline, though it took another five years for the regulations to fully go into effect. The impact of the removal of lead from gasoline cannot be understated. Dr. Herbert Needleman (2000), a pediatrician and leading researcher on childhood lead poisoning stated, “The removal of lead from gasoline spared as many as 3.4 million children from growing up with hazardous concentrations of the toxic metal in their bodies” (p. 34).

However, the regulations did not come soon enough for many Americans, and there were millions who were not spared. The near ubiquitous use of leaded gasoline in the 1960s and 1970s had drastic consequences on human health. By the time it was banned, 5-6 million metric tons of Pb had been used as a gasoline additive, 75 percent of which was released into the atmosphere (Chaney and Mielke 1986; Mielke and Reagan 1998). In New Orleans alone, motor vehicle emissions from leaded gasoline released over 10,000 metric tons of lead into the city (Mielke et al. 2014). This is on top of the Pb deposited into the environment as a result of lead paint and industrial emissions. If there was any doubt about the impact of leaded gasoline on lead levels, the fact that the eventual removal of lead from gasoline resulted in a 90 percent decrease of childhood blood lead (BPb) levels over three years should answer any questions regarding the connection between lead poisoning and gasoline emissions (Mielke and Zahran 2012).

Though lead is now completely banned in gasoline for use in highway vehicles, the problem persists. Lead gasoline is still used in Avgas (aviation gasoline) for small aircrafts. Avgas accounts for nearly 60 percent of Pb aerosols in the United States, and emissions from Avgas pose a threat to communities near airports (U.S. EPA 2008). In 2011, Mielke et al. (2011) found that children living within .5-1 kilometer of general aviation airports had higher BPb levels than children living at least one kilometer from airports.

Additionally, the legacy of leaded gasoline lives on in the continued blood poisoning of children -- children who are disproportionately poor, Black, and living in U.S. inner cities. As Beller (2015) writes, though the lead itself is removed from paint and gas, the lead that accumulated in the soil over decades is still causing harm. "Removing lead from paint and gasoline...created a false complacency. Lead is an element. It doesn't break down. Even if we

are no longer adding it to our environment, we must still be vigilant against what is already there” (Beller 2015:4).

An essential site for such vigilance is soil. Looking at soil is integral in understanding lead poisoning because soils are an integrator, and as such they “reflect all of the activities that have taken place in the course of their existence” (Mielke et al. 1998:117). Zahran et al. (2013) write that “Soil integrates all dust sources of Pb including lead-based paint (either deteriorated, haphazardly removed by power sanding, sand blasted, scraped without capture, or released by building demolition), lead additives in vehicle fuel emissions, and incinerator or industrial Pb emissions” (p. 7). In other words, looking at the soil of an area allows researchers to see all of the lead-related activity that has happened in that area.

From soil, lead gets ingested by humans in two main ways: 1) Through hand-to-mouth contact by toddlers and infants, and 2) By the general population during the warmer months, when evapotranspiration is maximized and soil moisture decreases, causing lead to become resuspended in the air as dust particles¹³ (Zahran et al. 2013; Laidlaw and Filippelli 2008). Because of this, SPb levels are positively associated with BPb levels, nationally and in New Orleans specifically (Mielke et al. 1997; 1998). Mielke et al. (1997; 1998) have found through their New Orleans-focused studies that reducing SPb levels would reduce BPb levels. The statistics on SPb and BPb levels in the city prove this point. In New Orleans, Mielke et al. (2007) found that children living in areas with SPb levels of 100 ppm had an average BPb of 3.8 µg/dL, while those in areas with SPb levels of 500 ppm had an average BPb of 5.9 µg/dL. This exposure to lead through contact with the soil has dire health effects.

¹³ There are alternative theories about the reasons behind seasonal fluctuations in the lead levels, including about the impact of vitamin D on gastrointestinal Pb absorption, and about the impact of closing and opening of windows with lead paint in warmer months. However, both theories have been refuted (Laidlaw and Filippelli 2008).

The Health Implications of Lead Exposure

Since the 1960s, the U.S. CDC has been steadily decreasing the BPb level that they deem safe. Importantly, the uncertainties about what constituted “safe” lead levels justified inaction regarding lead abatement and even the continued usage of lead (Silbergeld 1997). The guideline dropped from 60 µg/dL in the 1960s, to 30 µg/dL from 1970-1985, to 25 µg/dL from 1985-1991, to 10 µg/dL from 1991-2012. In 2012, the CDC changed the language of “guideline” to that of “reference,”¹⁴ and declared the BPb reference level to be 5 µg/dL (Mielke et al. 2014). This shift in language marked a fundamental change in the understanding of lead poisoning: lead exposure is toxic at any level (Mielke et al. 2014; U.S. Centers for Disease Control and Prevention 2016).

Children are especially susceptible to lead poisoning, and the Federal Agency for Toxic Substances and Disease Registry has declared lead poisoning to be the “number one environmental health threat to children” (Bullard 1994:19). Children are disproportionately impacted by lead for three main reasons. First, they are more exposed to lead contaminated soil and other sources of lead dust due to frequent hand-to-mouth contact. Second, their “high ingestion efficiency” and less-developed gastrointestinal pathway means that children’s intestines absorb up to 50 percent of ingested Pb, in contrast the 5 percent that adults’ bodies take up on average (Needleman 2004:212; Laidlaw and Filippelli 2008:2022). Finally, children’s still developing central nervous system (CNS) is more impacted by toxins than fully developed CNSs (Needleman 2004).

Lead exposure is most common among children between the ages of two and six, and this is also the time during which exposure has the biggest developmental impact. Nonetheless,

¹⁴ The reference level is decided by the results of the National Health and Nutrition Examination Survey (NHANES), and is the BPb level of 97.5 percentile of the children surveyed (Mielke et al. 2014).

younger children, and also fetuses, are still susceptible to lead poisoning (Zahran et al. 2009). Exposure during pregnancy is especially dangerous to both the woman and the developing fetus: pregnant and lactating women with elevated lead levels run the risk of exposing their children to lead, because “neither the placenta nor mammary glands are a perfect barrier to Pb” (Laidlaw and Filippelli 2008:2023). Further, studies have shown that pregnancy-induced hypertensive disorders such as chronic and gestational hypertension, preeclampsia, and eclampsia all increase with maternal exposure to Pb (Zahran et al. 2014). Moreover, lead that is stored in the bones can be re-released into the woman’s bloodstream during pregnancy, affecting both the woman and the developing fetus (Zahran et al. 2009).

The main way that lead enters the body is through ingestion and subsequent absorption by the intestines (Laidlaw and Filippelli 2008). Lead is metabolized like calcium, in that it is stored in one’s bones. This is an especially pernicious feature of lead, because lead that has accumulated in a person’s bones may be remobilized into their blood during times of stress, such as pregnancy, test-taking, illness, aging, and major life events (Zahran et al. 2009). Further, because lead in blood only has a half-life of thirty-five days, blood tests may not indicate high Pb levels, but the person’s bones may continue to store the element, impacting their long-term health.

Once inside the body, Pb has dramatic impacts on neurological and biological functioning. Mielke et al. (2014) write that “The critical societal issues connected with exposure of infants and toddlers to Pb are chronic health outcomes ranging from learning and behavioral problems for children to Alzheimer’s disease (AD) and violence later in the lifespan” (p. 7487). One way in which lead exposure impacts the developing brain is that it inhibits and degrades the formation and structure of myelin, which forms an insulating sheath around the connection

between neurons. As a result, “The network connections within the brain become both slower and less coordinated” (Drum 2016:8). Lead exposure also results in a loss of gray matter in the prefrontal cortex. This is detrimental, as the prefrontal cortex controls aggression and executive functions such as emotional regulation, impulse control, attention, verbal reasoning, and mental flexibility (Drum 2016). In sum, lead degrades the areas of the brain responsible for executive functioning, as well as the pathways of communication between those areas. As a result, children who have been exposed to lead have been found to have lower IQ scores (by four to six points)¹⁵, learning disorders, mental retardation, and ADHD (Laidlaw and Filippelli 2008).

Unsurprisingly, these neurological impacts of lead exposure have detrimental effects on children’s educational outcomes. In 2009, Zahran et al. (2009) released a study regarding the association between pre-Katrina BPb levels of elementary school children and test performance. They observed that across all subject areas tested -- English, mathematics, science, and social studies -- there were “significant negative associations between percentage of children at or above 5 µg /dL and test performance” (Zahran et al. 2009:893). On a community-wide level, they found that as the percentage of Pb poisoned children increased, test performance decreased and variation in student performance compressed. This is corroborated by other studies that have found higher levels of lead on the properties of inner city schools when compared to outer city schools (Zahran et al. 2009). After looking at associations between test scores and class size, and test scores and poverty level, respectively, Zahran et al. (2009) go on to conclude that “BPb is a more powerful predictor of student performance than poverty (offset with free or discounted

¹⁵ It is important to note that IQ tests are controversial and their efficacy and objectivity are doubtful, especially pertaining to racial IQ gaps (Herrnstein and Murray 1994; Gardner 1994; Patterson 1995). Nonetheless, looking at the impact of lead poisoning on IQ scores can still provide useful information about the ways in which lead poisoning affects neurological functioning -- even if the measurement itself is flawed, a drop in scores is still a drop in scores.

lunch) and class size” (p. 894). Further, not only are students’ lead levels impacting their academic performance, they are also not receiving the adequate support necessitated by such disparities, as educators tend to have a lack of awareness about the impact of Pb on children’s learning achievement (Zahran et al. 2009).

The National Health and Nutrition Examination Survey (NHANES) III, which covers the years of 1999-2002, found that 2.4 million children nationwide had BPb levels between 5 and 9.9 $\mu\text{g}/\text{dL}$ (Centers for Disease Control and Prevention 2002). A deeper look into these numbers shows that not all children are equally impacted by lead. Forty-seven percent of non-Hispanic Black one-to-five-year-olds had levels of 5 $\mu\text{g}/\text{dL}$ or higher, compared to 28 percent of Mexican American one-to-five-year-olds, and 19 percent of non-Hispanic White one-to-five-year-olds (Bernard 2003). Laidlaw and Filippelli (2008) write that “the fact that children of color are nearly 4 times more likely than white children to have blood Pb levels between 5 and 10 $\mu\text{g}/\text{dL}$ [and 13 times more likely to have blood Pb levels above 20 $\mu\text{g}/\text{dL}$] raises concerns about social justice and the long-term health of these children” (p. 2023; Bernard 2003).

Though children are most impacted by lead due to their still developing brains, CNSs, and intestines, and more frequent contact with lead-contaminated soil and lead dust, adults also feel the effects of exposure -- both those who were poisoned as children and those who are first exposed as adults. Cecil et al. (2008) found that the gray matter of adults who were exposed to lead as children was significantly reduced when compared to that of adults who did not have childhood lead poisoning. Further, research has found that at levels $\geq 2 \mu\text{g}/\text{dL}$, lead exposure is significantly associated stroke mortality and with chronic diseases such as cataracts, kidney function, osteoporosis, diabetes, and high blood pressure, and also impacts the peripheral and central nervous systems (Campanella and Mielke 2008; Needleman 2004).

Lead Exposure and Violent Crime

Recent studies have drawn connections between lead's impact on neurological functioning and rates of violent crime (Mielke and Zahran 2012; Drum 2016; Reyes 2007) (see Figures 2 and 3). Due in part to the inadequacy of explanations for the drop in the crime rate in American cities in the 1990s -- theories which pointed to increased policing and the legalization of abortion as being the cause of the drop in violent crime did not hold water in an international context -- an environmental hypothesis emerged regarding the impact of lead on the unexpected decline in crime rates (Mielke and Zahran 2012). Scientists began to suspect links between the drop in violent crime rates and the phase out of TEL from gasoline. Mielke and Zahran (2012) write that "the environmental hypothesis [regarding the drop in violent crime] is similar to the neurotoxicity hypothesis" which states that "exposure to Pb alters neurotransmitter and hormonal systems and may thereby generate aggressive and violent behavior" (p. 48). In other words, this hypothesis extends the fact that lead exposure impacts decision making and executive functioning to analyze the ways in which this may impact behaviors related to criminalized activities.

This theory rests on two key propositions. The first is known as the "self-control theory" in criminology, which essentially argues that "the cognitive and behavioral traits of impulsivity, aggression, and low cognitive IQ are statistically associated with criminality and anti-social behavior" (Mielke and Zahran 2012:48). Put differently, the theory posits that "*low self control* is among the most important predictors of criminal behavior" (Mielke and Zahran 2012:48). The second proposition is that traits such as impulsivity, aggression, and low IQ, which result in low

self-control -- in turn resulting in criminalized behavior -- are increased with exposure to lead (Mielke and Zahran 2012).¹⁶

There is a wealth of evidence backing up this theory. Through measuring lead in children's bones, Needleman et al. (2002) found significant associations between elevated lead levels and "adjudicated delinquency" (p. 711). The Cincinnati Lead Study had similar results in their study of BPb and crime, finding "an association between early childhood Pb exposure and antisocial acts by adolescents" (Mielke and Zahran 2012:49). Rick Nevin, a former consultant for the federal HUD office, is on the front lines of research regarding associations between lead and violence. He found positive associations between leaded gasoline emissions and both teenage pregnancy and violent crime rates; the parabola charting gasoline emissions was nearly identical to that charting violent crime and teenage pregnancy rates 23 and 17 years later, respectively (when people who were exposed to lead as children came of age) (see Figures 2 and 3). He went on to find the same phenomenon in every other country that he studied, including Canada, Great Britain, Finland, France, and Italy (Nevin 2006). Around the same time as Nevin was doing his research, Jessica Reyes, who was a graduate student at Harvard, found that in states where the consumption of leaded gasoline slowly decreased, so did the crime rate. In states where the consumption of leaded gasoline decreased quickly, the crime rate also dropped quickly (Reyes 2007).

¹⁶ It is important to recognize that actions by children that are labeled as "impulsive" and "aggressive" are often typical childhood behaviors that are "adultified" when exhibited by children of color, especially Black and Latinx students. In reality, these actions are often normal responses to marginalizing conditions (Epstein et al. 2017; Chapman et al. 2014; Heitzig 2014). This is not to discount the relationship between lead poisoning and these actions, nor to ignore the reality of one's actions being labeled as such. Rather, it serves as a reminder to be wary of how we label children's behavior in the first place, and the ways in which such labels may be racialized.

This relationship extends to New Orleans specifically, where Mielke and Zahran (2012) found that:

...85 percent of temporal variation in the aggravated assault rate is explained by the annual rise and fall of air Pb (total = 10,179 metric tons) released on the population of New Orleans 22 years earlier. For every metric ton of Pb released 22 years prior, a latent increase of 1.59...aggravated assaults per 100,000 were reported...Our findings along with others predict that prevention of children's lead exposure from lead dust now will realize numerous societal benefits two decades into the future, including lower rates of aggravated assault. (P. 48)

They also discovered that violent crimes in the city cluster around lead contaminated neighborhoods (Mielke and Zahran 2012). Mielke and Zahran's (2012) findings, as well as Nevin (2006) and Reyes (2007), speak to the dramatic impacts of lead exposure on individuals and societies, even decades after initial exposure.

Conclusion

Throughout the country, especially in inner cities, children are being poisoned by lead contaminated soil. Decades of leaded gasoline emissions and lead paint dust have accumulated in people's yards, along sidewalks, in public parks and playgrounds, and beside schools (Mielke et al. 2007; 2014; Zahran et al. 2013). This contaminated soil disproportionately harms children due to their still-developing bodies and brains and frequent hand-to-mouth contact (Zahran et al. 2013; Laidlaw and Filippelli 2008; Needleman 2004). The effects of this poisoning are devastating on individual and community-wide levels, and Black residents are disproportionately harmed by lead poisoning, an injustice that is constitutive of environmental racism (Mielke et al. 2014; Laidlaw and Filippelli 2008). Lead poisoning, which happens at thresholds as low as 5 $\mu\text{g}/\text{dL}$ (though there is no safe level of BPb), impacts the brain's development and functioning and the CNS, and often results in chronic health conditions (Mielke et al. 2014; U.S. Centers for Disease Control and Prevention 2016). On a community-wide level, resuspension of lead dust during warmer months can spread the toxin throughout the area, thus affecting a larger radius of

residents (Laidlaw and Filippelli 2008). Further, lead has been found to be related to crime rates, as the decline in the use of TEL precipitated the decline in violent crime rates two decades later (Mielke and Zahran 2012; Drum 2016; Reyes 2007).

The case of lead poisoning in New Orleans specifically, illustrates the ways in which lead poisoning “differentially affects or disadvantages (whether intended or unintended) individuals, groups, or communities because of their race or color” (Bullard 2005:31).

Chapter 5: Lead Poisoning in New Orleans

Across the United States, people of color and poor people are disproportionately impacted by the dangers of lead. Elise Gould (2009) found that “Males, Hispanics, African Americans and children in households below 200% of the federal poverty line are disproportionately more likely to have higher than average lead exposures” (pp. 1162-3). This was corroborated in a CDC report, which found that “Poor, urban minorities disproportionately reside in housing units containing lead-based paint hazards, creating significant inequity in health and neurologic outcomes by ethnicity and socioeconomic status” (Gould 2009:1162). The city of New Orleans is no exception. In fact, the city is representative of the ways in which Black children living in inner cities are disproportionately impacted by lead -- a social, economic, physical, and psychological tragedy and a clear case of environmental racism. This chapter will cover lead in New Orleans, breaking the down history into pre- and post- Hurricane Katrina. I argue that, in a stroke of painful irony, Katrina did what the government failed to do, as the storm drastically lowered lead levels in the city by washing away contaminated soil and necessitating the importation of low-lead soil.

Lead in New Orleans Before Hurricane Katrina

New Orleans has especially felt the dangers of lead poisoning. Almost one-third of residents in the city live “on or near levels of lead that many experts regard as a potential public health risk” (Campanella and Mielke 2008:535). In pre-Katrina New Orleans, 93.5 percent of children had BPb levels ≥ 2 $\mu\text{g}/\text{dL}$ (Mielke et al. 2007), and “the median BPb for children across elementary school census tracts was 4.37, [while] the average percentage of children with BPb equal to or exceeding 10 $\mu\text{g}/\text{dL}$ was 11.59 percent” (Zahran et al. 2009:890). This estimate does

not reflect the disparities between inner city and outer city children; Mielke et al. (2006) found that 20-30 percent of inner city kids had BPb levels $> 10 \mu\text{g/dL}$.

Elevated lead levels were found in the soil of pre-Katrina New Orleans, which makes sense due to the correlation between SPb and BPb levels. Research conducted prior to the storm revealed that 71 of the 286 census tracts¹⁷ (CTs) surveyed had median SPb levels of $\geq 400 \text{ mg/kg}$ and 10 CTs had a median SPb of $\geq 1000 \text{ mg/kg}$ (Zahran et al. 2010). The U.S. SPb standard is 400 mg/kg . Just like BPb levels, those high SPb levels are not equally distributed among the population of the city. For example, the soil at the Iberville Housing Project, where the majority of residents are poor, Black and under the age of 18 (and 18 percent are younger than 5-years-old, making them especially susceptible to lead poisoning), has SPb levels as high as 916 mg/kg (Campanella and Mielke 2008). (See Figures 4 and 5 regarding the relationship between race and SPb levels in New Orleans).

As the work of Mielke et al. (2006) and Campanella and Mielke (2008) make clear, not all New Orleans residents have been equally impacted by lead poisoning (see Figures 4 and 5). High lead levels occur primarily in the inner city due to years of congestion and consequential leaded gas emissions. These areas are home to the largest and most concentrated Black populations in the city, meaning Black residents are disproportionately affected by lead poisoning (Campanella and Mielke 2008). More specifically:

Whites, who predominate in suburban Jefferson and St. Bernard parishes, [made] up diminishing percentages of the population subjected to progressively higher levels of lead. African-Americans, who mostly live[d] in Orleans Parish and particularly in its old inner city, home to thousands of old wooden homes with lead paint as well as heavy traffic and congestion, [were] relatively more exposed to high-lead areas by a roughly 2-to-1 ratio. Those of Asian and Hispanic ancestry, who comprise[d] relatively small

¹⁷ Census tracts range in population from 2,500 to 8,000 residents and “are delineated by boundaries which conform to recognizable physical, cultural, economic, and demographic characteristics” (Zahran et al. 2010:4434).

components of the population and (unlike many other metropolises) tend[ed] to live far from the city center, made up a consistently small percent of all levels of lead exposure. (Campanella and Mielke 2008:534-5) (See Figure 5)

Accordingly, Black and white residents were both five times more likely to live in high-lead areas than Asian or Hispanic residents (Campanella and Mielke 2008:535). Yet, Black residents had it worse off than even white residents. Data from the NHANES III showed that Black residents had higher BPb levels -- 5.4 µg/dL for males, 3.4 µg/dL for females -- than their white counterparts, who had levels of 4.4 µg/dL for men and 3.0 µg/dL for women (Needleman 2003). These statistics show that the case of lead poisoning in New Orleans is an issue of environmental racism, as Black residents were disproportionately impacted by lead in pre-Katrina New Orleans.

Disparities related to lead exposure in the city also exist along lines of class. Campanella and Mielke (2008) found that as socioeconomic status decreases, lead levels increase. Thus, those who are at the intersections of racialized and class-based disadvantages are especially impacted by lead exposure.

Ghettoization of Lead Poisoning

The fact that lead poisoning is a problem that disproportionately impacts poor, Black, urban residents is a large part of the reason why it has been ignored for so long -- the problem of lead poisoning has been ghettoized (Silbergeld 1997). As long as lead poisoning has been understood to be a problem of poor urban minorities, the government and policy makers have shown little concern for the issue. Silbergeld (1997) writes that “Until the late 1970s, it is fair to say that this disease was ‘ghettoized’, considered to be a risk exclusively to the urban minority poor” (p. 191). This misconception prevailed in spite of the fact that in reality lead poisoning affects people of all income brackets, though not equally (Drum 2016).

In the 1970s, with increased data showing the dangers of lead poisoning, the issue became more widely recognized, and effectively de-ghettoized. However, the pendulum

eventually swung back again, and the issue receded from the public's attention. Little public concern was shown for the issue, and the issue continued to disproportionately affect Black, poor children living in cities. The issue of lead in the water of Flint, Michigan, once again brought the issue of lead poisoning into the consciousness of "mainstream America" (i.e. white, non-urban, middle class residents).¹⁸

In New Orleans, the issue has been ghettoized due to the fact that Black, inner city communities were being the most impacted by lead. Little government concern has been shown for the issue, as the case of *Casey Billieson et al. v. City of New Orleans* illustrates.

Casey Billieson et al. v. City of New Orleans

Casey Billieson et al. v. City of New Orleans (1994) is a landmark case in the history of lead poisoning in New Orleans. Casey Billieson -- on her own behalf and on behalf of her two children, Ryan and Ronnie, and along with thousands of other plaintiffs -- sued the City of New Orleans, HANO, C.J. Brown Public Housing Management Company, XYZ Insurance Company, and the Louisiana Insurance Guaranty Association in the Civil District Court for Orleans Parish for injuries related to lead exposure in her HANO-owned public housing apartment (Lexus Legal News 2016).

The mid-1990s in New Orleans saw a spike in drug, gang, and police related crime -- in 1994, the city's murder rate was the highest in the country. In hopes of insulating their children

¹⁸ In 2014, while a new pipeline was being built from Lake Huron, the town of Flint switched their water supply to the Flint River. During the switch, the town failed to assess the state of the pipes that were carrying the water, and lead from the pipes leached into the water. As a result, tests conducted by the U.S. EPA and Virginia Tech in 2015 found dangerous lead levels in the town's drinking water. After at least 18 months of contamination, the levels have returned to "normal levels for a city with old lead pipes" (Associated Press 2017). However, the fact the water is still being transported to residents' homes via lead pipes is very concerning, and Marc Edwards, a Virginia Tech researcher who first brought the issue to the public's attention, advised residents to continue to use water filters (Associated Press 2017).

from the violence, many parents kept them inside as much as possible. Two of these children were Ryan and Robbie, five and three-years-old at the time, who lived with Casey in the Lafitte housing projects in Treme, New Orleans. Into the mid-20th Century, Lafitte and other projects in the area served as anchors for the Black, inner city, middle class community. However, white flight, reductions in government spending and services, and a backlash against Black political power resulted in increased violence and an overall deterioration of the area. By 1979, HANO, which owned the Lafitte housing projects, had been labeled by the federal HUD office as “troubled,” and “by 1994, HANO housing was among the most miserable places to live in the country” (Newkirk 2017:9-10).

However, in their attempts to keep their children safe by keeping them inside, residents in the projects ended up being exposed to a whole new form of violence in their homes -- that of lead poisoning. Parents (mostly mothers) living in the projects throughout the city sued HANO on behalf of themselves and their children, and Billieson’s lawsuit came on the heels of many such cases. In 1991 alone, HANO settled over 60 lawsuits related to lead poisoning in their projects, amounting to over \$1 million in claims and attorneys’ fees.

Twelve years after Billieson brought the case the city settled. After lawyers’ fees, the average settlement awarded to the 2,000 eligible plaintiffs was a paltry \$17,000. These 2,000 plaintiffs did not even represent all of those who had been poisoned. Hurricane Katrina had destroyed many of the city’s medical records, preventing some people from being able to prove that they had in fact been poisoned, and barring them from receiving their due compensation. Further, many potential settlement recipients had been displaced across the country by the storm and never received their settlements. Even for the 2,000 plaintiffs who were part of the

settlement, the amounts that they were awarded were meager considering the permanent impact of lead on both an individual and community-wide level. Newkirk (2017) writes:

Estimates from the CDC put the average lifetime costs for even mild and initially asymptomatic cases of lead poisoning around \$50,000, and many of the HANO children had tested for lead levels that indicated immediate medical emergencies. Most of the plaintiffs were already too old for the money to help with education, and they'd probably already lost thousands in potential earnings from the psychological and educational effects of lead poisoning. (P. 39)

Speaking on the settlement, Billieson stated, "We did receive compensation, and no, I don't think it was adequate, I think they could have had more of these kids tested...They should send us the research [too], because none of us knew anything about lead poisoning, and we didn't know what the side effects could've been" (Newkirk 2017:40). Joan Dominique, a resident of the Desire projects whose three children were plaintiffs in the case, emphasized the inadequacies of the compensation, and the responsibilities of the government moving forward. She stated:

I don't know that you can correct the problem, but we can help [the children] now. Buy them homes. Get them educated. These are things they took from these kids. You can never make up the gap, but you can try to do something. And there are funds. The city is still operating. The award that we received was nowhere near what it needed to be to compensate these kids for their trouble. It just wasn't enough. (Newkirk 2017:40)

Hurricane Katrina

While a comprehensive overview and analysis of the complexities of Hurricane Katrina are beyond the scope of this paper, it is important to have a background on the storm in order to understand how Hurricane Katrina impacted lead levels in New Orleans, specifically regarding the flooding that resulted from the storm. On August 29, 2005, Hurricane Katrina made landfall in Alabama, Mississippi and Louisiana, bringing with it heavy winds, rainfall, and flooding, and devastating communities in the area. Over one million people in the Gulf Region were displaced by the storm, and one month later, 600,000 remained displaced. At least 986 Louisiana residents died from the storm, 40 percent of whom died from drowning. The strength of the rainfall and

the storm surge, combined with the breach of the Lake Pontchartrain levees, resulted in floodwaters covering 80 percent of the city. In some areas the waters were over ten feet deep. As a result, over 70 percent of all occupied housing units in the city were damaged. Additionally, high winds destroyed buildings and critical infrastructure components such as the city's floodwater removal system (The Data Center 2016; Zahran et al. 2010). The inundation of floodwaters into the city raised concerns about toxins that had previously been contained in Lake Pontchartrain and SuperFund sites in the city being spread throughout New Orleans. Among the toxins tested for in the aftermath of the storm was lead.

Lead in New Orleans After Hurricane Katrina

While lead levels found in the soil after the storm exceeded U.S. EPA standards (as did arsenic and iron levels), SPb and BPb generally declined after the storm (Cobb et al. 2006; Presley et al. 2006; Mielke et al. 2016; Mielke et al. 2017; Zahran et al. 2010; Zahran et al. 2014). Five years after Hurricane Katrina, Zahran et al. (2010) assessed changes to SPb levels by census tract. They found a decrease in median SPb levels in 29 of the 46 tracts surveyed, and across all tracts, the average median SPb decreased from 328.54 mg/kg to 203.33 mg/kg -- a 45.59 percent decrease. Further, tracts with SPb levels exceeding the U.S. EPA standard of 400 mg/kg decreased from 15 out of 46 tracts to 6 out of 46 tracts (Zahran et al. 2010). In 2015, 10 years after Hurricane Katrina, Mielke et al. (2017) assessed median SPb levels in 176 CTs across the city and found that they had decreased even further, from 280 mg/kg to 132 mg/kg (see Figure 4).

Zahran et al. (2010) found that BPb levels also decreased significantly five years after the storm. In 37 of the 46 CTs assessed, average median child BPb levels decreased 32.85 percent from 5.14 to 3.45 $\mu\text{g/dL}$. Ten years after Hurricane Katrina, Mielke et al. (2017) found that BPb

levels had further decreased across the 176 CTs they analyzed, from 5 $\mu\text{g}/\text{dL}$ to 1.8 $\mu\text{g}/\text{dL}$. Further, the percentage of children with BPb $\geq 5 \mu\text{g}/\text{dL}$, the current CDC reference level, decreased 38.1 percentage points, from 64 percent to 18.9 percent (Mielke et al. 2017). Decreases in SPb and the associated decline in BPb levels further prove the correlation between SPb and BPb levels. Using ordinary least-squares regression analysis, Zahran et al. (2010) proved that the “relationship between median SPb and median BPb holds with the addition of statistical controls” (p. 4437). Further, while children born after Hurricane Katrina benefit most from decreased Pb levels, children born prior to the storm also experienced decreased to their BPb levels (Zahran et al. 2010).

Such a reduction in SPb, and thus BPb, can largely be attributed to the flooding that resulted from Hurricane Katrina (Mielke et al. 2016; 2017). Not only did the floodwaters wash away large amounts of lead-contaminated soil, the destruction caused by them necessitated the rebuilding of many houses, which was done with “lead-free” paint and other building materials. Low-Pb soil was brought in large quantities into the city for landscaping and land elevation projects, covering lead contaminated soil that remained after the storm (Mielke et al. 2016; 2017). This influx of clean soil and wave of lead-free construction was good news for residents throughout the city, not just in the areas that directly benefitted from these actions. While in pre-Katrina New Orleans, lead dust got resuspended and spread throughout the city, lower lead levels post-Katrina reduced such resuspension. Consequentially, low lead levels localized in one part of the city had far reaching positive effects, improving air conditions well beyond one location.

Though lead levels in New Orleans are significantly lower after Hurricane Katrina, they still pose a significant health risk to children in the area (Mielke et al. 2014; Mielke et al. 2016; Presley et al. 2010). It bears repeating that nearly one in five children in the city still have BPb

levels above the reference level, a level that itself has been argued as being too high, as there is no safe level of lead in one's blood (Mielke et al. 2014; 2016; U.S. Centers for Disease Control and Prevention 2016).

After the storm, the demographics of those most in danger of lead poisoning have become complicated. Consistent with the situation pre-Katrina, there are higher levels in the inner city than the outer city, and poorer, Black communities still tend to be located in the inner city, while white, wealthier communities tend to be located in the outer parts of the city. However, after the storm, public housing projects, which had once been the focus of hundreds of lead-contamination related lawsuits (the most famous among them being *Billieson et al. v. the City of New Orleans*), had significantly lower lead levels than private, inner city houses. This can be attributed to the fact that post-Katrina, all HANO owned projects, with the exception of the Iberville projects, were razed and re-built "lead-free." Landscaping was done with low-lead soil (< 20 mg/kg) brought from outside of the city, and low-lead paint (< 90 ppm) (Mielke et al. 2011; 2017). It is important to note that "low-lead" is not the same as "lead-free", and children in these projects are still being exposed to lead, even at low levels. Additionally, concerns persist about children living in inner city private homes, most of which have not been renovated to be "lead-free" (Mielke et al. 2011; 2017).

Conclusion

Tragically, Hurricane Katrina ended up doing what the government refused to do -- getting rid of a significant amount of lead contaminated soil. In pre-Katrina New Orleans 93.5 percent of children had BPb levels ≥ 2 $\mu\text{g}/\text{dL}$ (Mielke et al. 2007), and 20-30 percent of inner city kids had BPb levels > 10 $\mu\text{g}/\text{dL}$ (Mielke et al. 2006). Lead in New Orleans was a public health crisis that disproportionately impacted Black, inner city kids, and accordingly, the government

paid little attention to the issue -- it was “ghettoized” (Silbergeld 1997:191). The government refused to adequately address the problem, despite the fact that a solution was readily available -- the transfer of low-Pb alluvial soil from the Mississippi River to cover Pb contaminated soil in the city (Zahran et al. 2010; Mielke et al. 1998; 1999; 2007). As a result of the flooding caused by Hurricane Katrina, this is what was eventually accomplished through landscaping and land-elevation projects, and it significantly decreased lead levels. The lack of government action in relation to lead levels in New Orleans is an example of what happens when the precautionary principle fails to be implemented.

Chapter 6: Conclusions and Recommendations

Bullard (2005) asks us “who *pays* and who *benefits* from the current environmental and industrial policies” (p. 34)? In Louisiana broadly, and New Orleans specifically, the answer is clear: government and big business (specifically petrochemical and gasoline corporations) benefit, while residents pay in the form of chronic health problems, devastation to communities, and loss of homes and ancestral lands. The case of lead poisoning in New Orleans is particularly tragic because it was preventable and, when prevention had failed, solvable. It was preventable because lead was added to gasoline despite the fact that those in the industry and in the EPA knew that it was dangerous, and it was solvable because low-lead alluvial soil in the Mississippi River could have easily been transferred into the city for soil remediation (Silbergeld 1997; Kitman 2000; Needleman 2000; Mielke and Zahran 2012; Mielke 1998; Mielke et al. 2007).

However, because the people being impacted by lead were deemed unworthy of protection by the government and corporations -- in view of the logic of environmental racism, which equates non-white individuals with nature, thereby devaluing them as a site for domination -- no action was taken to prevent lead poisoning or to address the problem once it arose (Pellow 2007). It was not until Hurricane Katrina flooded 80 percent of the city, washing away contaminated soil and necessitating the importation of clean soil, that SPb (and consequently BPb) were reduced (Zahran et al. 2010). The case of New Orleans is thus a striking example of what happens when the treadmill of production drives progress and the precautionary principle is not implemented, namely, that corporate profit trumps environmental and social protection, and the government fails to prioritize the prevention of harm.

* * *

As demonstrated in the preceding chapters, the case of lead poisoning in New Orleans is indicative of the deep-rooted history of environmental racism in the state of Louisiana. Rather than an anomaly, this injustice is emblematic of the structures of environmental racism that uphold the state's economic, social, and political systems. Charting the history of Cancer Alley from the days of plantation slavery to the present day -- when petrochemical plants poison and destroy communities along in the corridor -- demonstrates the ways in which politics, polluting industry, and racism conspire to spell "premature death" for Black residents of Louisiana (Gilmore 2007:28).

Lead poisoning in New Orleans is thus a continuation of this history, and understanding it as such makes the structural violence inherent in this case clear. Galtung (1969) shows us that structural violence is that which creates a gap between one's "potential" and their "actual." Lead poisoning acts as the cause of this gap, spelling not only "premature *death*," (emphasis added; Gilmore 2007:28) but also stunting *life* -- relegating certain groups of people to an eternal "actual;" depriving them of the chance to discover their "potential," a chance to which we all have the right.

In the cases of both Cancer Alley and lead poisoning in New Orleans, the government condoned the poisoning of Black individuals and communities. Local and state governments actively drew polluting industries to the area that became Cancer Alley, and HANO and HUD refused to adequately address the lead crisis in its public housing units until Hurricane Katrina left them with no other option (Wright 2005; Newkirk 2017).

In spite of this, residents from Baton Rouge to New Orleans have resisted. These grassroots fights have been led by Black women -- West, Wright, Richard, Roberts, McCastle, Billieson, and Blanco -- and have set a strong precedent for the continued fight against lead in

New Orleans. I argue that an essential part of that fight must include a push for the following actions.

Policy Recommendations

The ultimate irony of lead poisoning in New Orleans is that Hurricane Katrina, an event that devastated the city and the region, did what the government failed to do: The flooding of the city removed lead-contaminated soil on a large scale, while also prompting the importation of low-lead soil for landscape and land-elevation projects. Additionally, the reconstruction of buildings destroyed by the storm was done with low-lead or lead-free materials, further decreasing lead levels in the area. The efficacy of these changes can be seen in the dramatic decrease in lead levels five years after the storm. Within the city, the average medium SPb level dropped 45.59 percent and the average medium child BPb level dropped 32.85 percent (Zahran et al. 2010). These positive changes speak to the promise of lead abatement in addressing lead poisoning in New Orleans.

Primary prevention is essential in tackling the problem (Mielke et al. 2012; 2014). Such an approach embodies the precautionary principle, which requires a shift from asking, “How much harm is allowable?” to asking, “How little harm is possible?” By acting proactively, as opposed to reactively, communities and individuals are able to get ahead of the problem and minimize harm instead of retroactively attempting to mitigate it. This is especially paramount due to the nature of lead. Reactive responses to lead fail because they incorrectly assume that there is a BPb level that is safe for children. Clinicians tend to test children for lead, find that they have high levels, and then react. But at this point, it is too late, as the patients have already been negatively impacted by lead exposure. The fact that lead is more dangerous the younger one is exacerbates the need for primary and proactive prevention techniques, because under a

reactive approach children and their families might not find out that they have been poisoned until years after the initial exposure. Instead, a proactive approach must be taken, in which communities with high SPb levels should be detected and then actions should be taken to prevent poisoning (Mielke et al. 2014).

One of these actions should be the replacement of contaminated soil with low-lead soil. This solution is perfectly suited for New Orleans, as it has easy access to clean soil in the form of low-lead (5 mg Pb/mg) alluvial soil from the Mississippi River (Mielke and Zahran 2012; Mielke 1998; Mielke et al. 2007). Soil from the Mississippi River has been brought into the city for this purpose, with positive results (Laidlaw and Filippelli 2008). Mielke et al. (1998) also suggest “paving, constructing artificial surfaces (decking to outdoor carpeting), and building sandboxes that are maintained with clean sand” (p. 127). Soil remediation efforts should also be undertaken at playgrounds, schoolyards, and parks -- all areas where children are regularly in contact with the soil. Such a pilot project is currently underway in New Orleans, and signifies a start in the right direction (Zahran et al. 2010).¹⁹

Another important avenue for reducing lead exposure is through Pb-safe paint renovation and the safe disposal of Pb paint (Mielke et al. 2007; Mielke and Zahran 2012). Mielke et al. (2006) call for a ban on the use of power-sanding and the implementation of requirements to safely collect and dispose of any lead paint chips that flake off as a result of construction. Due to resuspension of lead dust, soil remediation, power-sanding bans, and clean construction practices (such as the safe removal of lead paint chips) must be undertaken throughout the city, not just on a property-by-property basis (Mielke et al. 2006).

¹⁹ Norway can also be looked at as a model for lead abatement on public properties, as the country has implemented a national program to test and renovate soils at schools, parks, and playgrounds in its ten largest cities (Zahran et al. 2010).

There are also calls from scientists to lower the SPb safety standard itself to one that is health-based and takes into account the fact that SPb enters the body through ingestion (Mielke et al. 2006; Mielke et al. 2012; Zahran et al. 2010). When ingestion is involved, a factor of ten is generally applied to standards to provide a margin of safety. Accordingly, the current EPA SPb standard of 400 mg/kg should be lowered ten-fold, to 40 mg/kg (Mielke et al. 2012).

Beyond the fact that all people have the right to “breathe clean air, drink clean water, and be protected from environmental toxins” (Shrader-Frechette 2002:16), which justifies the remedies discussed above, lead abatement via the aforementioned methods also makes economic sense. Looking on the national scale, Gould (2009) found that “For every dollar spent on controlling lead hazards, \$17-\$221 would be returned in health benefits, increased IQ, higher lifetime earnings, tax revenues, reduced spending on special education, and reduced criminal activity” (p. 1166). Drum (2016) calculated that the benefits of lead cleanup on a national scale to be roughly \$200 billion per year (p. 12).

The returns in educational spending are also significant. Zahran et al. (2009) found through cost-benefit calculations that “it is more cost effective to pay for onetime primary prevention instead of paying continuous expenses focused on reversing neurotoxic damage...Remediation strategies can provide long-term achievement improvements for many cohorts of disadvantaged children with a single upfront investment” (pp. 888-896). They went as far as to posit that “...lead remediation may indeed be relatively more cost-efficient than teacher investment strategies for increasing student achievement to the target level” (Zahran et al. 2009:896). Proactively addressing lead contamination thus stands as a necessary investment on both an individual and a societal level.

It is important that grassroots environmental justice movements take up this cause, considering their historical strength in the state -- as seen along Cancer Alley and in the New Orleans projects -- and throughout the nation (see Appendix A for information on the movement's grassroots organizing on a national scale). Reflecting on her research on the environmental justice movement in Louisiana, Allen (2007) writes that the "strongest and most effective citizens' groups have the following: (1) alliances with well-organized national and multi-national environmental and social justice groups, (2) have enrolled the support of activist and independent scientists and professional experts to work on their behalf, and (3) are cross-class and multi-ethnic in composition" (p. 158). Grassroots efforts to push for soil remediation of yards, school grounds, parks, and playgrounds using Mississippi River alluvial soil are paramount to proactively addressing lead poisoning in the city.

The impact of Hurricane Katrina on lead levels proves the efficacy of soil remediation, and the necessity of government action. In addition to transferring low-lead alluvial soil to the city, clean (re-)building techniques such as banning power-sanding and requiring the safe cleanup of lead paint chips must be enforced (Mielke et al. 2007; Mielke and Zahran 2012). This effort must be community-wide, as resuspension spreads lead beyond the confines of an individual property (Mielke et al. 2006). Those in the scientific community must also push for a lowering of SPb standards, as the current numbers do not account for the fact that SPb is often ingested, requiring a ten-fold margin of safety (Mielke et al. 2006; Mielke et al. 2012; Zahran et al. 2010).

Limitations

A limitation of this thesis is that I was unable to travel to New Orleans myself, inhibiting me from being able to talk to people personally affected by lead poisoning, from getting to know

the area I was writing about first-hand, and from conducting my own original research. I am grateful (and indebted to) the wealth of research that does exist on this topic, particularly that which has come out of Tulane University. This pre-existing research has allowed me to form my own hypotheses about lead in New Orleans and to make my own arguments about how this particular case is connected to the history of the area.

Directions for Further Research

While significant research has been devoted to analyzing the ways in which environment and race intersect, and, to a lesser extent, class and gender, little attention has been given to researching how other identities like ability, religion, and sexual orientation interact with the environment. This is an area that is worthy of further analysis.

Now is an especially pertinent time to study these intersections, as the Trump administration continues to roll back Obama-era policies aimed at tackling climate change and pollution, and to threaten federal funding for programs related to science and the environment (Greshko et al. 2018). *National Geographic* is actually keeping a running list of the Trump administration's actions regarding the environment since the President took office in 2017. The list is currently 109 pages long (Greshko et al. 2018). Undoubtedly, these attacks on the environment will continue to disproportionately impact those who already occupy vulnerable positions due their identities.

Another area that would benefit from further research is the cause of reparations for the victims of lead poisoning. As Billieson and Dominique (Newkirk 2017) spoke about when reflecting on *Casey Billieson et al. v. City of New Orleans*, the settlement from the case failed to even come close to remedying the decades of lead poisoning experienced by their children. What would it mean for victims of lead poisoning to be justly compensated? Where would the

resources for such compensation come from? These are questions that are worthy of future research and analysis, leading to action.

Towards an Equitable Future

The fight against lead poisoning in the city is, in itself, a fight for equitable futures, as it addresses inequities related to the environment along the lines of procedural, geographic, and social structures. Bullard (2005) breaks the concept of equity into three main categories: procedural, geographic, and social. Procedural equity refers to the extent to which laws, regulations, evaluation criteria, and enforcement are applied equally to all parties. Procedural inequity can be seen in the fact that, regardless of class, white communities who are exposed to environmental hazards receive a faster and more thorough government response than communities of color (Bullard 2005). Geographic equity refers to the location and spatial configuration of communities and their proximity to polluting facilities and environmental hazards. The concentration of Black residents in the inner city of New Orleans, where there were the highest amounts of leaded gas emissions, is an example of this. Social equity assesses the role of sociological factors, such as race, class, gender, and political power on environmental decision-making. Social inequity can be seen in the ghettoization of lead poisoning, wherein public awareness and concern regarding the issue has waxed and waned depending on who the issue was perceived to be affecting. This three-fold conceptualization of equity is an important framework because it elucidates the complexity of the fight for justice, both within and beyond the context of lead in New Orleans. The battle is multifaceted and must be fought simultaneously on all three of these fronts. Just as Audre Lorde (1981) writes that the freedom for one group of people is inextricably linked to freedom for all peoples, equity in one category is contingent upon equity in all categories.

Appendix A: Summits I and II and the Importance of Grassroots Organizing for Environmental Justice

Grassroots organizing was paramount in both the 1991 and the 2002 National People of Color Environmental Leadership Summits. The 1991 Summit (Summit I) was the “single most important event in the environmental justice movement’s history” (Bullard 2005:20). Planned by people of color, the Summit was attended by over 650 grassroots and national leaders from all fifty states, as well as from Puerto Rico, Chile, Mexico, and the Marshall Islands (Bullard 1994). The goal of the Summit was to “share action strategies, redefine the environmental movement, and develop common plans for addressing environmental problems affecting people of color in the United States and around the world” (Bullard 2005:20). The Summit succeeded in broadening the movement’s focus beyond issues of toxins to include public health, worker safety, land use, transportation, housing, resource allocation and community empowerment (Bullard 2005).

The culminating achievement of the Summit was the construction of the seventeen principles of environmental justice. Wright et al. (1994) state that the principles are the “summation of diverse struggles for survival and propagation of the total human family and species” (p. 123). The Principles called for “a robust activist agenda and a wide range of spiritual, ecological, sustainable, educational, and social justice commitments”, and detail a fight against colonialism, oppression, and the “poisoning of communities and land” (Sandler and Pezzullo 2007:5; Delegates to the First National People of Color Environmental Leadership Summit 1991). Further, the authors emphasize the universal right to protection from all testing, disposal, extraction, and production of toxic materials (Delegates to the First National People of Color Environmental Leadership Summit 1991).

The Summit also addressed the environmental justice movement's relationship with the environmentalist movement. A session during the Summit was dedicated to this topic, featuring Black, Latinx, Asian American, and tribal representatives of the environmental justice movement in conversation with executive directors of the NRDC and the Sierra Club. Sandler and Pezzullo (2007) write that "representatives of both movements hoped that the Summit might mark a starting point toward better communication, understanding, responsiveness, and alliances" (p. 7). The leaders of the NRDC and the Sierra Club acknowledged that their organizations had historically focused on concerns such as wildlife preservation over issues of environmental justice, and stated that they were ready to forge new partnerships. Michael Fisher, executive director of the Sierra Club, positing the Summit as a turning point, expressed his hope that moving forward the two movements would be able to focus on ways to collaborate, as opposed to ruminating on past differences.

Leaders from the environmental justice movement also seemed to desire to find ways to work together, though remained wary. For example, Dana Alston, senior program officer for the Panos Institute of Washington DC, emphasized that any collaboration between the movements must be

...based on equity, mutual respect, mutual interest and justice. We refuse narrow definitions. It is not just ancient forests; it is not just saving the whales or saving other endangered species. These are all very important. We understand the life cycle and the inter-connectedness of life. But our communities and our people are endangered species, too. We refuse a paternalistic relationship. We are not interested in a parent-child relationship. Your organizations may or may not be older than ours. You organizations definitely have more money than ours. But if you are to form a partnership with us, it will be as equals and nothing else but equals. (Sandler and Pezzullo 2007:7)

Thus, the mission of the Summit was two-fold. It clarified the goals and positions of the movement, while also setting the groundwork for a "just partnership" with the environmentalist movement (Sandler and Pezzullo 2007:8).

Summit II, in 2002, was also successful, and its goals included integrating youth into the leadership of the movement, honoring the movement's "sheroes," and assessing the progress that the movement had made in the eleven years since Summit I (Bullard 2005:24). The Summit was "held together by a few hardworking, fearless, and dedicated women of color... [and] women chaired Summit II and all but one of its key subcommittees" (Bullard 2005:63). As was the case with Summit I, Summit II was a grassroots-led conference, with over 75 percent of attendees coming from community-based organizations. The Summit brought three generations of the movement together -- elders, seasoned leaders, and youth activists -- and centered female activists of color, as over half of the workshops and plenaries were women-led, and awards were given to 12 sheroes.

The conference signified the progress that had been made since Summit I. In the time since the 1991 Summit, there had gone from zero environmental justice networks, university-based environmental justice centers, or environmental justice legal clinics to twelve environmental justice networks, four environmental justice centers, and a growing number of university-based environmental justice legal centers. The University of Michigan had also begun to offer the nation's first program in masters and doctoral degrees in environmental justice. Three key themes emerged from the conference: 1) Environmental justice had to be a top priority in the 21st century; 2) Students and youths should be integrated into the leadership structure of the movement; 3) The adoption of three new principles: Principles of Working Together, Youth Principles, and Principles Opposing the War in Iraq. Both Summit I and II were events in the environmental justice movement that reaffirmed the importance of grassroots organizing in working towards a "just environment" (Bullard 1994:7).

Grassroots organizing has been such a central component of the environmental justice movement precisely because the EPA, and the U.S. government more generally, have been so slow to acknowledge environmental injustice in the first place. The EPA did not admit until its 1990 report on environmental equity that minority communities bare a disproportionate burden of environmental hazards. Policy makers are partially to blame for the lack of government action around environmental injustice, because the studies that they conduct often use quantitative measures and risk assessment in ways that fail to address issues of justice (Shrader-Frechette 2002).

It is important to note that the Congressional Black Caucus is an exception when it comes to government action regarding environmental justice, as the Caucus has, on multiple occasions, backed grassroots fights for justice. James H. Cone (2001) writes that the “Congressional Black Caucus has the best environmental record of any voting bloc in congress”, and Representative John Lewis of Georgia stated that “Working for clean air, clean water, and a clean planet is just as important if not more important, than anything I have ever worked on, including civil rights” (Cone 2001:28). The Caucus has also supported the fights against petrochemical plant sitings in both Convent and Norco, Louisiana (Wright 2005; West 2005).

In 1994, “in response to growing public concern and mounting scientific evidence,” President Bill Clinton issued Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (Bullard 2005:21). Broadly, the order called for improved assessments on how project proposals by federal agencies would impact human health and the environment, specifically over multiple exposures, and especially in low-income and minority communities (Bullard 2005). However, ten years after the executive order, the EPA had received failing marks for its implementation efforts, and the government had

done little to address environmental injustices. As Bullard (2005) writes, “Laws, regulations, and executive orders are only so good as their enforcement” (p. 41). When their enforcement fails, the change that they intend to bring about also fails. Therefore, it is no surprise that historically marginalized communities cannot -- and do not -- rely on the EPA and the government to address environmental injustices. This, in part, is why grassroots organizing is so powerful and essential to the movement -- activists and communities of the movement are constantly fighting for justice, regardless of what the government is doing (or not doing) to further the movement. Grassroots organizations are the backbone of the movement.

Ultimately, the EPA and the U.S. government have failed minority communities by not integrating environmental justice into their missions. This should not be surprising, considering the duty of the government to uphold capitalism, a system that is in direct contrast with environmental justice (a contradiction that the treadmill of production illustrates). As Bullard argues, the EPA was not created to address issues of environmental injustice, and, as a result, vulnerable communities fall between the “regulatory cracks” (Bullard 2005:30). This failure of the EPA is corroborated by a 2004 report by the Office of the Inspector General, which found that the EPA “has not developed a clear vision or a comprehensive strategic plan, and has not established values, goals, expectations, and performance measurements’ for integrating environmental justice into its day-to-day operations” (Bullard 2005:42). It is important to emphasize that any action that the government *does* take for the cause of environmental justice is a direct result of decades of grassroots activism, as the case of *Billieson et al. v. The City of New Orleans* illustrates.

Appendix B: Graphs and Maps

Figure 1: Usage of lead in paint and motor fuel in the United States from 1910 to 1990 (Mielke et al. 2014).

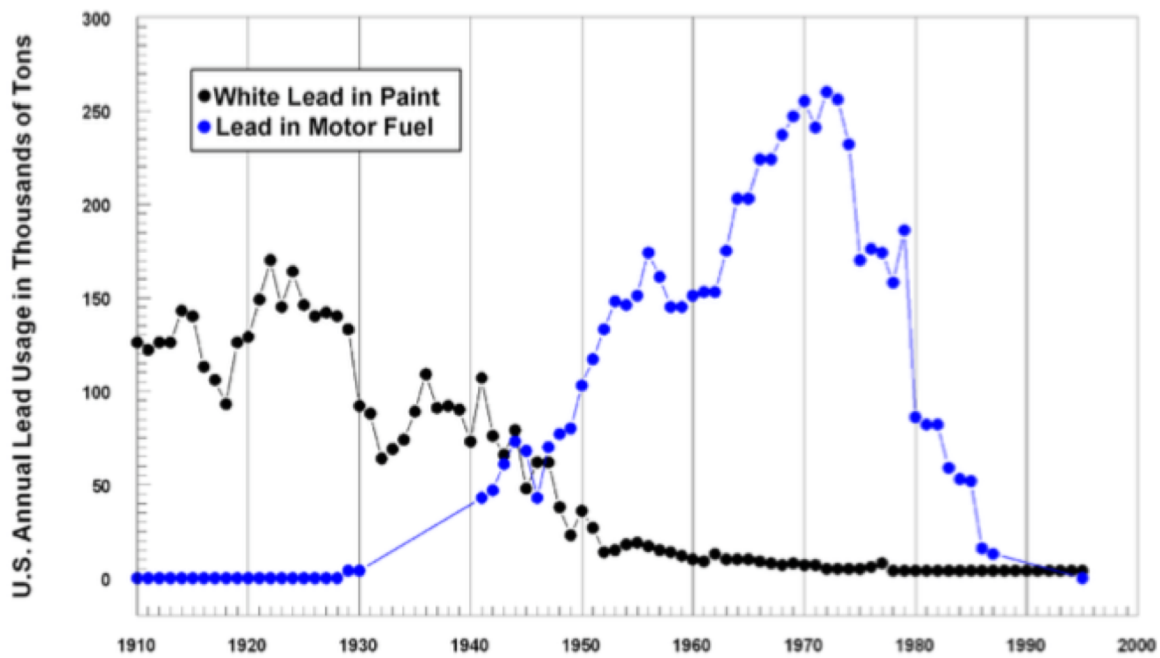


Figure 2: Relationship between aggravated assault rates and atmospheric Pb in six U.S. cities from 1972 to 2002 (Mielke and Zahran 2012).

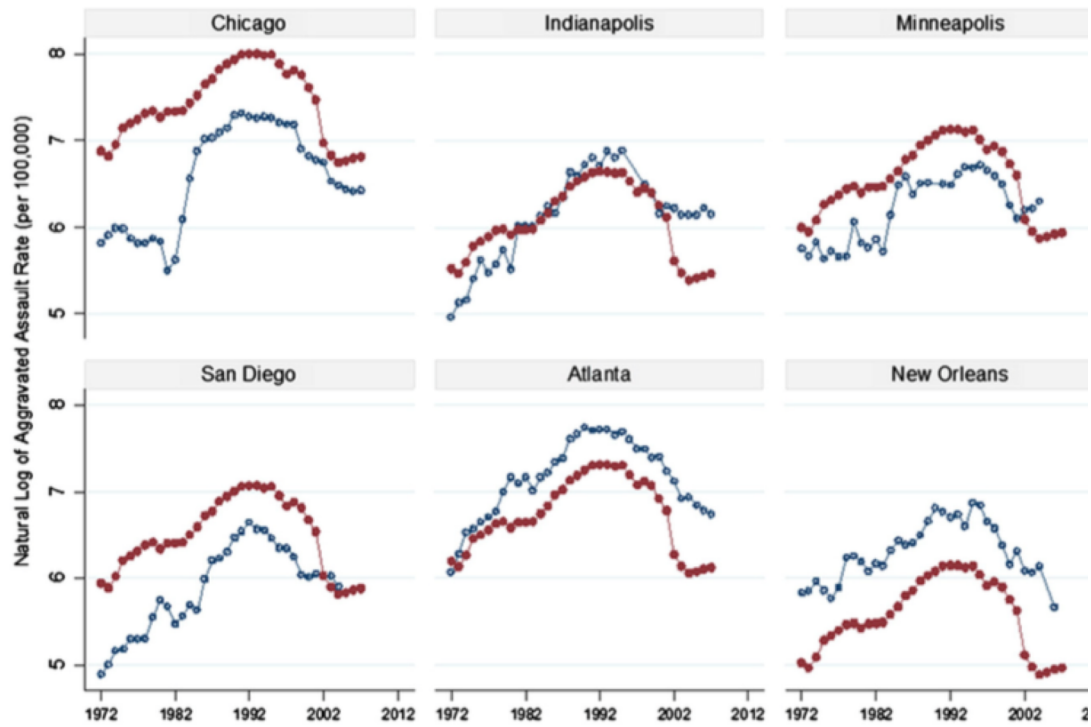


Figure 3: Relationship in the United States between gasoline lead and violent crime and teenage pregnancy, respectively (Drum 2016).

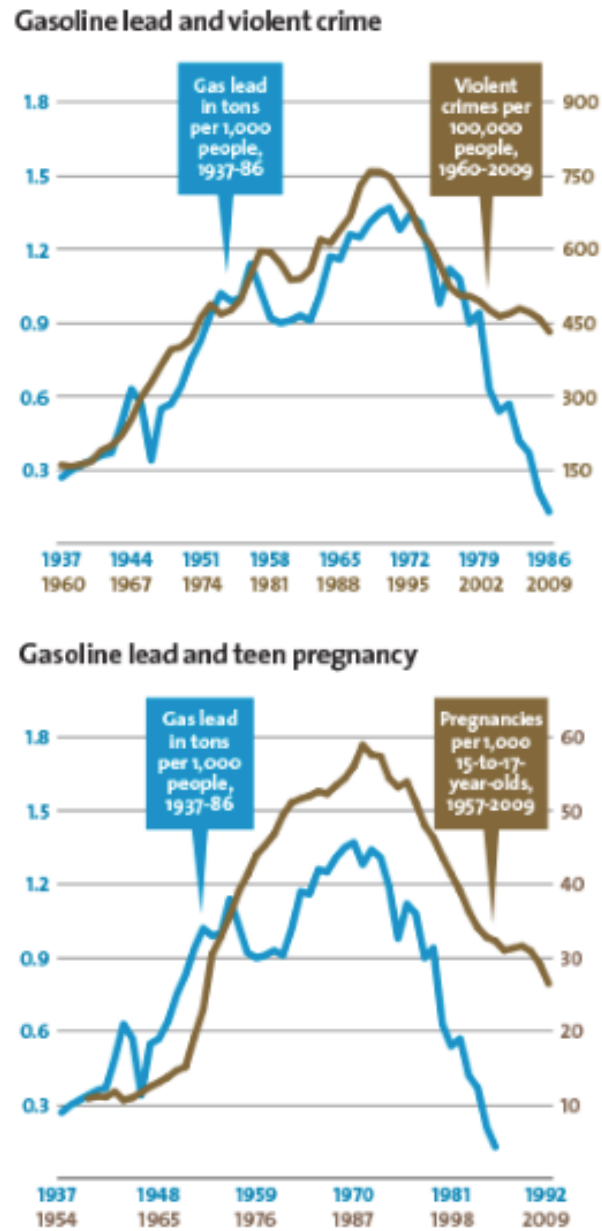


Figure 4: Soil lead of public housing census tracts in New Orleans before, and ten years after, Hurricane Katrina (Mielke 2017).

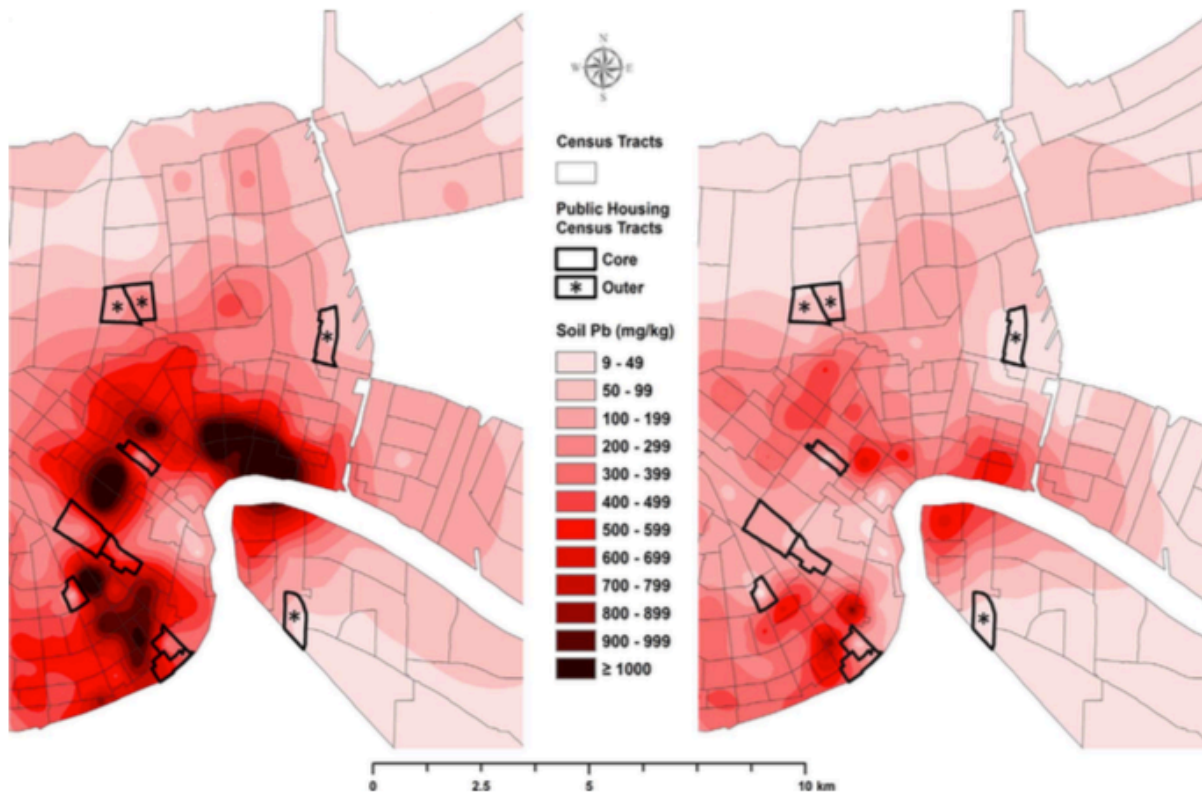
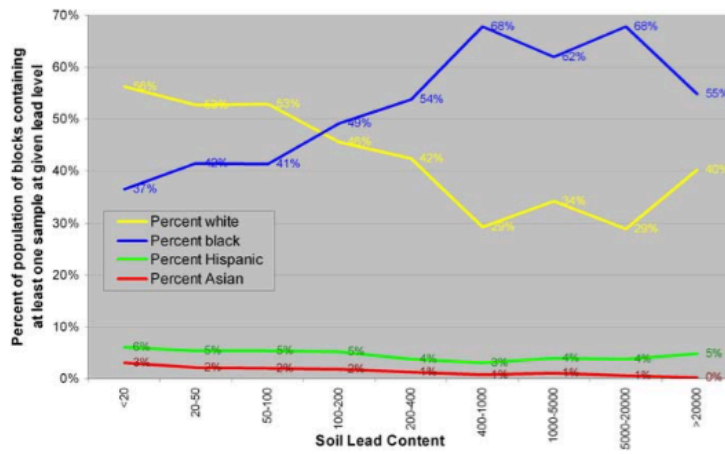


Figure 5: Percentage breakdown of racial demographics in New Orleans by SPb (in mg/kg) from 1998-2000 (Campanella and Mielke 2008).



References

- Allen, Barbara L. 2007. "Environmental justice, local knowledge, and after-disaster planning in New Orleans." *Technology in Society* 29:153-159.
- Associated Press. 2017. "Flint water crisis: expert says lead levels normal but warns against celebration." Retrieved March 5, 2018 (<https://www.theguardian.com/us-news/2017/sep/15/flint-water-crisis-lead-levels-marc-edwards>).
- Ausick, Paul and Michael B. Sauter. 2013. "The 10 most oil-rich states." *USA Today*, Aug. 3.
- Beck, Ulrich. 2006. "Living in the World Risk Society." *Economy and Society* 35(3):329-345
- Beller, Thomas. 2015. "The Toxic Legacy of Lead Paint," *The New York Times*, June 13.
- Bernard, Susan M. 2003. "Should the Centers for Disease Control and Prevention's Childhood Lead Poisoning Intervention Be Lowered?" *American Journal of Public Health*. 93:8(1253-1260).
- Bullard, Robert, ed. 1993. *Confronting Environmental Racism: Voices From the Grassroots*. Boston, MA: South End Press.
- Bullard, Robert, ed. 1994. *Unequal Protection: Environmental Justice and Communities of Color*. San Francisco, CA: Sierra Club Books.
- Bullard, Robert, ed. 2005. *The Quest for Environmental Justice: Human Rights and the Politics of Pollution*. San Francisco: Sierra Club Books.
- Bullard, Robert D. and Damu Smith. 2005. "Women Warriors of Color on the Front Line." Pp. 62-84 in *The Quest for Environmental Justice: Human Rights and the Politics of Pollution*, edited by R.D. Bullard. San Francisco: Sierra Club Books.
- Campanella, Richard, and Howard W. Mielke. 2008. "Human geography of New Orleans' high-lead geochemical setting." *Environmental Geochemistry and Health* 30:531-540.

- Cecil, Kim M. Christopher J. Brubaker, Caleb M. Adler, Kim N. Dietrich, Mekibib Altaye, John C. Egelhoff, Stephanie Wessel, Ilayaraja Elangovan, Richard Hornung, Kelly Jarvis, Bruce P. Lanphear. 2008. "Decreased Brain Volume in Adults with Childhood Lead Exposure." *PLoS Med* 5(5):e112.
- Center for American Progress. 2018. "Talk Poverty: Louisiana 2017." Retrieved Jan 30, 2018(<https://talkpoverty.org/state-year-report/louisiana-2017-report/>).
- Centers for Disease Control and Prevention. 2002. "National Health and Nutrition Examination Survey." Retrieved Oct 15, 2017(<https://www.cdc.gov/nchs/nhanes/index.htm>).
- Centers for Disease Control and Prevention. 2016. "Childhood Lead Poisoning Data, Statistics, and Surveillance." Retrieved Sept 30, 2017(<https://www.cdc.gov/nceh/lead/data/index.htm>).
- Chaney, R.L. and H.W. Mielke. 1986. "Standards for soil lead limitations in the United States." *Environmental Health* 20:357-377.
- Chapman, C., Carey, A. C., & Ben-Moshe, L. 2014. Reconsidering Confinement: Interlocking locations and logics of incarceration. In L. Ben-Moshe, C. Chapman & A. C. Carey (Eds.), *Disability Incarcerated* (pp. 3-24). New York: Palgrave Macmillan.
- Cobb, George P., Michael T. Abel, Thomas R. Rainwater, Galen P. Austin, Stephen B. Cox, Ronald J. Kendall, Eric J. Marsland, Todd A. Anderson, Blair D. Leftwich, John D. Zak, and Steven M. Presley. 2006. "Metal Distributions in New Orleans Following Hurricanes Katrina and Rita: A Continuation Study." *Environmental Science & Technology* 40:4571-4577.

- Cone, James H. 2001. "Whose Earth Is It, Anyway?" Pp. 23-32 in *Earth Habitat: Eco-injustice and the Church's Response*, edited by Dieter Hessel and Larry Rasmussen. Minneapolis, MN: Fortress Press.
- Crenshaw, Kimberle. 1989. "Demarginalizing the Intersection of Race and Sex: A Black Feminist Critique of Antidiscrimination Doctrine, Feminist Theory, and Antiracist Politics." *University of Chicago Legal Forum* 1989:1(139-167).
- Data Center. 2016. "Facts for Features: Katrina Impact." Aug. 26, Louisiana. Retrieved March 3, 2018 (<https://www.datacenterresearch.org/data-resources/katrina/facts-for-impact/>).
- Drum, Kevin. 2016. "Lead: America's Real Criminal Element: The hidden villain behind violent crime, lower IQs, and even the ADHD epidemic" *Mother Jones*, February 11.
- Epstein, Rebecca, Jamilia J. Blake, and Thalia González. 2017. "Girlhood Interrupted: The Erasure of Black Girls' Childhood." *Georgetown Law: Center on Poverty and Inequality* Washington D.C.
- First National People of Color Environmental Leadership Summit, *17 Principles of Environmental Justice*. October 24-27, 1991, Washington D.C.
- Galtung, Johan. 1969. "Violence, Peace, and Policy Research." *Journal of Peace Research* 3(6): 167-187.
- Gardner, Howard. 1994. "Cracking Open the IQ Box." *The American Prospect* Winter:71-80.
- Gilmore, Ruth Wilson. 2007. *Golden Gulag*. Berkeley, CA: University of California Press.
- Gould, Elise. 2009. "Childhood Lead Poisoning: Conservative Estimates of the Social and Economic Benefits of Lead Hazard Control." *Environmental Health Perspectives* 117(7):1162-1167.

- Greshko, Michael, Laura Parker, and Brian Clark Howard. 2018. "A Running List of How Trump is Changing the Environment." *National Geographic*, April 6.
- Heitzig, Nancy. 2016. *The School to Prison Pipeline: Education, Discipline, and Racialized Double Standards*. Santa Barbara, CA: Praeger.
- Herrnstein, Richard J. and Charles Murray. 1994. *The Bell Curve: Intelligence and Structure in America*. New York: Free Press Paperbacks.
- Kitman, Jamie Lincoln. 2000. "The Secret History of Lead." *The Nation*, July 3.
- Laidlaw, Mark A.S., and Gabriel M. Filippelli. 2008. "Resuspension of urban soils as a persistent source of lead poisoning in children: A review and new directions." *Applied Geochemistry*. 23:2021-2039.
- Lexus Legal News. 2016. "Louisiana Appeals Panel Says \$457,500 Fee Award Proper in Lead-Poisoning Lawsuit." Retrieved October 20, 2017 (<https://www.lexislegalnews.com/articles/5645/louisiana-appeals-panel-says-457-500-fee-award-proper-in-lead-poisoning-lawsuit>).
- Louisiana Advisory Committee to the U.S. Commission on Human Rights. 1993. *The Battle for Environmental Justice in Louisiana...Government, Industry, and the People*.
- Lorde, Audre. 1984. *Sister Outsider*. Berkeley: Crossing Press.
- Marx, Karl. 1913. *Capital: A Critique of Political Economy*. Chicago: Charles H. Kerr and Company.
- Mielke, Howard W. 1999. "Lead in the Inner Cities." *American Scientist* 87:63-72.
- Mielke, Howard W., Dianne Dugas, Paul W. Mielke, Jr., Kabrina S. Smith, Stephanie L. Smith, and Chris R. Gonzales. 1997. "Associations between Soil Lead and Childhood Blood

Lead in Urban New Orleans and Rural Lafourche Parish in Louisiana.” *Environmental Health Perspectives* 105:950-954.

Mielke, Howard W., Chris R. Gonzales, Paul W. Gonzales Jr. 2011. “The continuing impact of lead dust on children’s blood lead: Comparison of public and private properties in New Orleans.” *Environmental Research* 111:1164-1172.

Mielke, Howard W., Chris R. Gonzales, Eric Powell, Morten Jartun, and Paul W. Mielke Jr. 2007. “Nonlinear association between soil lead and blood lead of children in Metropolitan New Orleans, Louisiana: 2000-2005.” *Science of the Total Environment* 388:43-53.

Mielke, Howard W., Christopher Gonzales, Eric Powell and Paul W. Mielke. 2014. “Evolving from Reactive and Proactive Medicine: Community Lead (Pb) and Clinical Disparities in Pre- and Post-Katrina New Orleans.” *International Journal of Environmental Research and Public Health* 11:7482-7491.

Mielke, Howard W., Christopher R. Gonzales, Eric T. Powell and Paul W. Mielke. 2017. “Spatiotemporal exposome dynamics of soil lead and children’s blood lead pre- and ten years post-Hurricane Katrina: Lead and other metals on public and private properties in the city of New Orleans, Louisiana, U.S.A. *Environmental Research* 115:208-218.

Mielke, Howard W., Christopher R. Gonzales, Eric T. Powell and Paul W. Mielke Jr. 2016. “Spatiotemporal dynamic transformations of soil lead and children’s blood lead ten years after Hurricane Katrina: New grounds for primary prevention.” *Environment International* 94:567-575.

- Mielke, H.W., C.R. Gonzales, M.K. Smith, and P.W. Mielke. 1998. "The Urban Environment and Children's Health: Soils as an Integrator of Lead, Zinc, and Cadmium in New Orleans, Louisiana, U.S.A." *Environmental Research* Section A:81(117-129).
- Mielke, Howard W., Eric T. Powell, Christopher R. Gonzalez, and Paul W. Mielke Jr. 2006. "Hurricane Katrina's Impact on New Orleans Soils Treated with Low Lead Mississippi River Alluvium." *Environmental Science & Technology* 40(24): 7623-7628.
- Mielke, H.W. and P.L. Reagan. 1998. "Soil is an important pathway of human lead exposure." *Environmental Health Perspectives* 106:217-229.
- Mielke, Howard W. and Sammy Zahran. 2012. "The urban rise and fall of air lead (Pb) and the latent surge and retreat of societal violence." *Environment International* 43:48-55.
- Needleman, Herbert L. 2000. "The Removal of Lead from Gasoline: Historical and Personal Reflections." *Environmental Research*. Section A:84(20-35)
- Needleman, Herbert L. 2004. "Lead Poisoning." *Annual Review of Medicine* 55:209-222.
- Needleman, Herbert L., Christine McFarland, Roberta B. Ness, Stephen E. Fienberg, and Michael J. Tobin. 2002. "Bone lead levels in adjudicated delinquents: A case control study." *Neurotoxicology and Teratology* 24:711-717.
- Nevin, Rick. 2006. "Understanding international crime trends: The legacy of preschool lead exposure." *Environmental Research* 104:315-336.
- Newkirk II, Vann R. 2017. "Environmental Racism is the New Jim Crow," *The Atlantic*, June 5.
- Office of Transportation and Air Quality. 2015. "Airport Lead Monitoring." *U.S. Environmental Protection Agency*. EPA-420-F-15-003.
- Patterson, Orlando. 1995. "For Whom the Bell Curves." *Journal of Blacks in Higher Education* 187-209.

- Pellow, David Naguib. 2007. *Resisting Global Toxins: Transnational Movements for Environmental Justice*. Cambridge, MA: The MIT Press.
- Presley, Steven M., Thomas R. Rainwater, Galen P. Austin, Steven G. Platt, John C. Zak, George P. Cobb, Eric J. Marsland, Kang Tian, Baohong Zhang, Todd A. Anderson, Stephen B. Cox, Michael T. Abel, Blair D. Leftwich, Jennifer R. Huddleston, Randall M. Jeter, and Ronald J. Kendall. 2006. "Assessment of Toxicants in New Orleans, LA Following Hurricane Katrina." *Environmental Science & Technology* 40:468-474.
- Presley, Steven M., Michael T. Abel, Galen P. Austin, Thomas R. Rainwater, Ray W. Brown, Les N. McDaniel, Eric J. Marsland, Ashley M. Fornerette, Melvin L. Dillard, Richard W. Rigdon, Ronald J. Kendall, George P. Cobb. 2010. "Metal concentrations in schoolyard soils from New Orleans, Louisiana before and after Hurricanes Katrina and Rita." *Chemosphere* 80(67-73).
- Reyes, Jessica Wolpaw. 2007. "Environmental Policy as Social Policy? The Impact of Childhood Lead Exposure on Crime." *The B.E. Journal of Economic Analysis & Policy*. 7(1):Article 51.
- Sandler, Ronald, and Phaedra C. Pezzullo. 2007. *Environmental Justice and Environmentalism: The Social Justice Challenge to the Environmental Movement*. Cambridge, MA: The MIT Press.
- Schnaiberg, Allan, David N. Pellow, and Adam Weinberg. 2002. "The Treadmill of Production and the Environmental State." *The Environmental State Under Pressure (Research in Social Problems and Public Policy)*. 10:15-32.
- Shrader-Frechette, Kristin. 2002. *Environmental Justice: Creating Equality, Reclaiming Democracy*. Oxford, UK: Oxford University Press.

- Silbergeld, Ellen. 1997. "Preventing Lead Poisoning in Children." *Annual Review of Public Health* 18:187-210.
- Smith, Damu. 2005. "Environmental Racism: How Minorities are Exposed to 'Toxic Soup'." *Democracy Now!*
- Townes, Emilie. 1995. *In a Blaze of Glory: Womanist Spirituality as Social Witness*. Nashville: Abingdon Press.
- Webster, Richard A. 2015. "Timeline of the Agriculture Street Landfill lawsuit," *The Times Picayune*, April 22.
- West, Elmida. 2005. "Women Warriors of Color on the Front Line: 'Emelda West: St James Citizens Defeat Shintech'." Pp. 68-73 in *The Quest for Environmental Justice: Human Rights and the Politics of Pollution*, edited by R.D. Bullard. San Francisco: Sierra Club Books.
- Wright, Beverly. 2005. "Living and Dying in Louisiana's 'Cancer Alley'." Pp. 87-107 in *The Quest for Environmental Justice: Human Rights and the Politics of Pollution*, edited by R.D. Bullard. San Francisco: Sierra Club Books.
- Wright, Beverly, Pat Bryant, and Robert D. Bullard. 1994. "Coping with Poisons in Cancer Alley." Pp. 92-109 in *Unequal Protection: Environmental Justice and Communities of Color*, edited by R. D. Bullard. San Francisco, CA: Sierra Club Books.
- Zahran, Sammy, Sheryl Magzamen, Ian M. Breunig, and Howard Mielke. 2014. "Maternal exposure to neighborhood soil Pb and eclampsia risk in New Orleans, Louisiana (USA): Evidence from a natural experiment in flooding." *Environmental Research* 133:274-281.
- Zahran, Sammy, Howard W. Mielke, Christopher R. Gonzales, Eric T. Powell, and Stephan Weiler. 2010. "New Orleans before and after Hurricanes Katrina/Rita: A Quasi-

Experiment of the Association between Soil Lead and Children's Blood Lead.”

Environmental Science & Technology 44(12): 4433-4440.

Zahran, Sammy, Howard W. Mielke, Shawn P. McElmurry, Gabriel M. Filippelli, Mark A.S.

Laidlaw, and Mark P. Taylor. 2013. “Determining the relative importance of soil sample locations to predict risk of child lead exposure.” *Environment International* 60:7-14.

Zahran, Sammy, H.W. Mielke, S. Weiler, K.J. Berry, C. Gonzales. 2009. “Children's blood lead and standardized test performance response as indicators of neurotoxicity in metropolitan New Orleans elementary schools.” *NeuroToxicology* 30:888-897.

24/7 Wall St. 2010. “The Environmental State of the Union: A Survey of Pollution, Energy Use and Policy in all 50 States.” Retrieved March 18 2018