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CITIES OF NATURE: SOCIO-NATURAL CRISIS AND THE PRODUCTION OF SPACE IN NEW ORLEANS AND SEATTLE

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Abstract

Cities of Nature: Socio-natural Crisis and the Production of Space in New Orleans and Seattle

Nik Janos

This dissertation shows how the seemingly *social* processes of urbanization are deeply entangled with seemingly *natural* processes, such as ecological, biological, and climatological ones. Using historical comparative methods and archival research, I compare urbanization in New Orleans and Seattle by looking at two apparently distinct social and ecological crises. One, in New Orleans I examine the entangled relationship between urbanization and hurricanes in Southeast Louisiana. Specifically, I trace the path dependent history between Hurricane Betsy in 1964 and Hurricane Katrina in 2005. Two, in Seattle I examine the entangled relationship between urbanization and the decimation of salmon populations in the Puget Sound. Specifically, I trace the path dependent history between a landmark 1974 court ruling called the Boldt Decision, which granted Native Americans half the salmon catch, and the 1999 Endangered Species Listing for Chinook salmon, which made the Seattle metropolitan area the first urban area to have an endangered species listing. Case one appears to be induced by nature, whereas case two by humans. But I say these are indistinct. The case studies indicate that the distinctions between what comes to us and what comes from us dissolves if you look at "natural disasters" as hybrid socio-natural processes. Furthermore, what people call disasters are not one-time events but rather crises long in the making. Overall, this dissertation tells a story

about how the urbanization of New Orleans and Seattle has made the natural and social *more* entangled, which in turn has made some populations of humans and non-humans more vulnerable than others. The comparison of New Orleans and Seattle sheds light on how each urbanized region is shaped by particular social and ecological relations, but additionally, how city builders shape and are shaped by generalized strands of socio-natural entanglement: capitalist urbanization, deployment of technology, governance practices, and social participation. The comparison also illuminates how socio-natural relations and potential crises of the future are made by events and decision of the past as well as ones that unfold in the present.

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This dissertation is the confluence of influences, inspiration, and ideas from many people. From the outside, an author's work appears as a hermetically sealed endeavor in which the author's labor and ideas are his/hers alone. This is not the case. Assistance, influence, and inspiration came in many forms over the years and each person listed below made their mark in different ways.

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"Men go and come, but earth abides."

Ecclesiastes, 1.4,
quoted by George R. Stewart, *Earth Abides* (1949)

"And because we are alive, the universe must be said to be alive. We are its consciousness as well as our own. We rise out of the cosmos and we see its mesh of patterns, and it strikes us as beautiful. And that feeling is the most important thing in all the universe—its culmination, like the color of the flower at first bloom on a wet morning."

Kim Stanley Robinson, *Green Mars* (1994)

"Our world appears to be on the brink of disaster, an appearance that is itself disastrous. The disaster of disaster is that disaster is everywhere, all the time: while on the one hand it appears obvious that disaster should be the exception that proves the rule of a generally non-disastrous world, in actuality no non-disastrous moment arrives."

Timothy Morton,
"Romantic Disaster Ecology: Blake, Shelley, Wordsworth."

Introduction

The future Is Uncertain, But Not Without Precedent

Hurricanes and Salmon, New Orleans and Seattle

On the night of September 9, 1965, Hurricane Betsy, with powerful wind, rain, and tidal surge, met head on with New Orleans' 20th century levee, canal and drainage system. In some areas of the city, such as the western lakefront, the system worked, and water did not break through. In other areas—Gentilly, the 7th, 8th and 9th Wards, New Orleans East, and the downriver parishes—tidal surge from the Gulf of Mexico and Lake Pontchartrain gushed up the human made canals, breaching in some areas and overtopping in others. The result, massive swaths of the eastern portion of the city temporarily joined the Gulf of Mexico. The neighborhoods of the 7th, 8th, and upper 9th Wards were under 5-8 feet of water, Gentilly up to four feet, the soon to be developed New Orleans East area 2-4 feet. The hardest hit was the Lower 9th Ward, under 9 feet of water (United States Army Corps of Engineers New Orleans District 1965). All totaled, the number of people flooded throughout the city was 141,600 out of 627,500 residents, or about 1 in 4 people.

Meanwhile, the areas of the city built during the 18th and 19th centuries, with the practice of building on highest ground, sustained only wind and rain damage, no flooding. The flooding followed the geography of the protection systems—older, higher ground areas experienced little flooding, whereas the newer lower-lying areas

experienced the most. But in fact these protection systems were made by and reflected the geography of vulnerability along race and class lines. Eastern and downriver working class neighborhoods were hard hit, while the hardest hit neighborhood, the Lower 9th Ward, was overwhelmingly black working class. At the time, public officials, members of the media, and citizens who lived through it considered Betsy to be one of the biggest disasters in U.S. history. Louisiana Governor described it as "the greatest catastrophe in our State since the Civil War…Nothing has approached it in the way of a natural disaster" (US Congress 1965:8).

After a massive evacuation and relief effort conducted by the various local, state, and federal agencies, and the Red Cross, the weeks following the storm were a busy time assessing the damage, understanding the storm and the failures of the protection system, assigning responsibility and blame, and planning a revamped protection system. Discontent began stirring in the Lower 9th Ward. A group comprised of white and black Lower 9th residents, calling themselves Betsy Flood Victims, decried the lack of long-term assistance that the city, state, and federal relief plans were offering to the hardest hit residents. Meanwhile, only months after Betsy, New Orleans city planners, including Mayor Schiro, and the LaKratt Corporation[1] busily hashed out plans to transform the last remaining marsh and swampland within city limits into a massive network of neighborhoods, which would come to be known

[1] The LaKratt Corporation was the corporate entity of Marvin Kratter, a wealthy New York businessman. The LaKratt Corporation purchased vast tracts of eastern New Orleans in the late 1950s, and under the parent company National Equity developed the Forest Lakes tract in NOLA East.

as New Orleans East. As they met to plan an idyllic housing development, the area was covered with four feet of water, and had became part of the Gulf of Mexico. So strong was their belief in the drainage and levee systems hardly a mention of Betsy is found in their meeting minutes.

Forty years later in 2005, Hurricane Katrina pushed the Gulf of Mexico over New Orleans East, which had become New Orleans' predominate black middle class neighborhood. The Lower 9th Ward was once again largely destroyed. Decisions made after Hurricane Betsy came to haunt New Orleans during the unprecedented flooding during Katrina. The past and present met dramatically as an inadequate protection system and underlying environmental and economic inequalities mixed with the tidal surge of Katrina.

In the early 1970s on the other side of the continent, the Puget Sound, Washington was also in a state of social and ecological crisis, though of a different sort. Low-level battles were ensuing between government agencies, federal judges, white fishermen, and Native American tribes over who was entitled to the "last fish in the sea." In the first few years of the 1970s, the Washington State Department of Fish and Wildlife, backed by state biologists and government officials, began curbing fishing access in the Puget Sound fisheries, particularly for salmon. Scientists, politicians, and government officials were becoming more aware that century-old industrial fishing practices were causing severe, and possibly irreversible, damage to salmon and other fish stocks. Officials placed restrictions on both commercial and

recreational fishing operations, both of which were overwhelmingly controlled by white working-class fishermen. In addition, the State of Washington began to regulate Native American fishermen. Fishermen of all ethnicities were unhappy. White fishermen began to stage "fish-ins" in waterways across the Sound. There were a number of arrests. Meanwhile, the tribes argued that they were not subject to the State of Washington Fish and Wildlife regulations. A common news story from 1970-78 involved Indians being arrested for illegal fishing, and non-Indian fishermen protesting State regulation.

Then, in 1974 came the big shock to white fishermen and State officials. In early 1974 the Federal government sued the State of Washington on behalf of the Puget Sound tribes. The case *The United States versus Washington* sought to prohibit the State of Washington from regulating tribal fishermen, as they were regulating white fishermen. On February 12, 1974, Federal Judge George Boldt ruled in favor of the Federal government, and declared that Native Americans were entitled to half the salmon catch and could not be impeded by the State while fishing off-reservation. The ruling largely hinged on one important sentence from the original 1854 Treaty of Medicine Creek: Indians will have the right to fish at their "usual and accustomed grounds...in common with all citizens of the territory." Judge Boldt ruled that this sentence meant that since 1854 Indians had had the right to fish unimpeded off-reservation, and thus had been historically denied their rightful portion of the salmon catch. The case became known simply as the Boldt Decision.

By November of 1974, Washington Governor Dan Evans urged President Ford to declare the state's commercial salmon-fishing industry “a major disaster area” (Seattle Times 1974). Evans argued that the commercial fishing industry lapsed into disaster once the Boldt Decision granted tribes half the salmon catch. In Seattle, Tacoma, and throughout the Sound, white fishermen angrily protested the Boldt Decision. They believed that their livelihoods were about to vanish. In the years that followed, clashes between whites, the State, and Native Americans were common. This low-level, racially fueled fish war continued until the early 1980s. The US Supreme Court upheld Boldt’s historic decision in 1979, all but cementing his ruling as the law of the land. Forlorn, white fishermen bitterly blamed Indians for what they saw as a coming biological disaster, and chastised the Federal government for violating the 14th Amendment, the Equal Rights Amendment.

While a century of heavy fishing was certainly one cause of the salmon crisis, the impact of Seattle’s growth and the urbanization of salmon habitat in the region went largely unacknowledged during he 1970s, despite the larger role of urbanization on the protracted decline of salmon. The unacknowledged role of urbanization contributed to whites’ racially fueled attacks on Native Americans. From the late 1970s to the late 1990s Puget Sound salmon remained in perilous existence. In 1999, Seattle, along with Portland, Oregon, became the first urban areas in the United States to have a Threatened Species Listing. The National Oceanic and Atmospheric Administration listed Chinook salmon as threatened under the Endangered Species

Act. During this period of crisis, the city and the process of urbanization were recognized as major contributors to the decline of salmon. Actors who once battled one another now struggled to find ways to reconcile urban development and the lifecycle of the most iconic and prized symbol of the Puget Sound, the Pacific salmon.

Space and Crisis in New Orleans and Seattle

How can we compare Hurricanes in New Orleans to salmon that pass through Seattle? It appears as if we are discussing two distinct phenomena, one that appears to *come to us*, hurricanes, versus one that appears to *come from us*, salmon decline. In fact, the differences between both cases help us tease out the ways in which the social and the ecological come together to produce a hybrid urban ecology. In both New Orleans and Seattle, a crisis of society and nature has been a defining and recurring feature of each city's history, and its probable future. In a sense, it's an existential crisis: what is our place in nature? How do people live with hurricanes and salmon, and more broadly with climatological, biological, and ecological systems? And what role does urban settlement play in creating—or mitigating—ecological crisis? The study of these social and ecological crises opens the way to answer these questions.

Specifically, the case studies in this dissertation reveal how human decisions and the process of urbanization, embedded race and class inequalities, wetland alterations, and hurricanes come together to produce specific spaces and vulnerabilities in New Orleans. I then compare that to developments in the Seattle

urban region. Here, I show how human decisions and the process urbanization, spatially produced racial inequalities, watershed alterations, and salmon decline come together to produce specific spaces and vulnerabilities in greater Seattle. Comparing these two disparate cities reveals some interesting findings: One, the distinctions between what comes to us and what comes from us dissolves if you look at "natural disasters" as hybrid socio-natural processes. Two, what people call disasters are not one-time events but rather crises long in the making. Three, the urbanization of New Orleans and Seattle has made the natural and social *more* entangled, which in turn has made some populations of humans and non-humans more vulnerable than others.

These findings indicate that city making is entangled with natural processes, that city builders and natural processes produce one another, and that in this production humans, non-humans, and ecosystems are made vulnerable to crisis. The theoretical work of this dissertation is two-fold: one is to deconstruct rigid binaries between society/nature. The second is to construct an expository framework that understands the production of society, including cities, and nature as hybrid spaces, not wholly social and not wholly natural. Seeing spaces as socio-natural avoids both the hubris of capitalist modernity—with it's domination of nature narrative—and the "end of the world narratives" coming from many in the environmental movement, which sees nature and society as incompatible. In place of thinking of the society/nature relationship as a binary, whereby we can have more society and less nature, or have more nature and less society, we can instead ask what kind of socio-

ecological space do we want to inhabit? How is it produced, by whom, and for what purpose?

Socio-Natural Entanglement in New Orleans and Seattle: Nature, Capital, Technology, Governance, and Social Participation

Comparing socio-natural entanglements in New Orleans and Seattle, and comparing crises that appear to come to us versus those that appear to come from us helps us understand how events like Hurricanes Betsy and Katrina, and the protracted decimation of Pacific salmon are entangled in complex socio-natural relationships. The case studies further demonstrate that the process of urbanization in the 20th century has deepened the entanglement between human society and nature, rather than led to its separation, as some have argued.[2]

In the collective imagination, at least in the West, cities have a long history of being seen as dirty, dangerous, and anti-natural human creations. In the late 19th century nature began to be scripted as good and pure, whereas the city became scripted as evil and corrupt (Kaika 2005). There is a long running schism within European and American thought on nature and culture. Prior to the 19th century, nature was something to fear, something to be subdued. Over time, people believed wild nature had been tamed, and a more subdued and "feminine" nature took its place (Merchant 1980). Culture, on the other hand, was the gift of humans, or the gift of god. Human domination and transformation *improved* nature. Entrepreneurs,

[2] This idea was inspired in part by historian Filipe Fernando-Armesto's (2001) thesis in which he argues that civilization can be measured by the degree of environmental transformation.

boosters, and politicians came to see cities as grand human achievements that elevated humans out of nature. However, by the late 19th and early 20th century the development of Western environmentalism introduced a new philosophical trajectory. This new philosophy was a direct counter point to the former. The former remained: nature is bad; culture and cities are good. But nineteenth century environmentalism introduced a flipped epistemology: nature is good; cities are evil. In both readings a dichotomy between good and evil persists.

Over the past twenty years environmental scholars as well as environmental justice activists have taken the lead to navigate a way out of the dichotomy of good versus evil that frames so much of the common assumptions of development as well as environmental protection.[3] Rather than a declensional narrative in which the trajectory of human history is the destruction of nature, or an ascensional narrative in which the trajectory is the improvement of nature, I argue that through technology, culture, and capitalism 20th century urbanization increased the entanglement to make the distinction of history and nature indeterminable. The more humans have built, transformed, reworked, and modified space, the more they became dependent on, vulnerable to, and entangled in ecological processes. Neither at the whim of nature, nor its dominator, the human reworking of space is the production of hybrid socio-natural space. The concept of entanglement allows us to talk about these hybrid

[3] There is a legacy of important works in this tradition. See Cronon (1991; 1996); Smith (1984); White (1995), and Williams (1973).

spaces. The concept allows us to see how nature is full of the social; the social is full of nature.

Urban areas have become an immensely important intersection of socio-natural relationships. In an urbanizing world, the urban ecology of the city is increasingly becoming spaces of everyday life, commerce, and politics for hundreds of millions of people. The extent of global urbanization can be read from recent statistics that show that, in 2009, 82% of the population of North America lives in urban areas, and in the same year the world urban population cross the 50% mark (United Nations 2011). New Orleans and Seattle fit into these trends. The processes of urbanization have transformed both Southern Louisiana and the Puget Sound over the past century.

The histories of New Orleans and Seattle exemplify the production of socio-natural space. For example, socio-natural transformations, such as draining marshes for housing developments, building levees, erecting shoreline commercial or residential units, and terraforming and leveling as well as the cultural and scientific narratives about urban nature, all contribute to the production of hybrid cities. In New Orleans, an entanglement of local, state, and federal agencies, land developers, residents, hurricanes, swamps and marshes come together to produce socio-natural space and recurring crises. This particular socio-natural space is predicated on a technologies of nature comprised of levee and drainage systems (Campanella 2008; Colten 2005). In Seattle, an entanglement of local, state, and federal agencies, land

developers, residents, salmon, streams, and rivers and human river terraforming come together to produce socio-natural space, and recurring crises. This particular socio-natural space is predicated on technologies of nature, which include fish hatcheries, fish ladders, and waterway modifications.

The production of socio-natural space is also underpinned by the production of uneven development and geographies of racial and class inequality. In New Orleans urban space and the technologies used to defend the city against hurricanes are constituted by race and class inequality. The poorest residents and overwhelmingly African Americans live in the most vulnerable areas of the city. The racial geography manifests itself in the quotidian effects of poverty and environmental hazard as well as in the dramatic effects of hurricanes and social failures during crisis. White working class, Cajun, and Native American fishermen, many living on the edges of New Orleans, are also affected. They have seen fish and shrimp habitats altered for the sake of the oil and shipping industry, both of which benefit from urban development in New Orleans and the throughout the US. Most recently the BP deep horizon oil spill of 2010 further impacted these communities.

There is also a racial geography to fish harvest and management. In the nineteenth century euro-Americans forced Native Americans onto reservations. As the Euro-American fishing practices evolved into ocean bound industrial fishing in the late 19th and early 20th centuries, Native Americans, who took most of their fish from the rivers, were left with fewer and fewer fish. By the late 20th century, white

working class fishermen additionally lost their livelihood as overall stocks of Puget Sound salmon got smaller and smaller. During the mid-20th century acceleration of urbanization in the Seattle urban area, salmon habitat was re-arranged into industrial areas, drinking water sources, and housing and commercial developments. Native Americans most of whom, but not all, did not participate or benefit from these developments, saw salmon habitat further eroded.

Lastly, urbanization has created uneven development in the local ecologies of both Southern Louisiana and the Puget Sound. In Louisiana, the Mississippi River Delta has been crisscrossed with hundreds of miles of canals and shipping channels. This has undermined the marsh and swamp ecologies, which have shrunk dramatically in the last half-century (Campanella 2008). Conversely, urban beautification movements in the 20th century have led to the proliferation of plant and animal growth in city parks, along the river, and around the canals (Campanella 2008; Kelman 2003). In the Puget Sound the situation is quite similar, as wilder spaces in the Cascade Mountains were set aside as preserved spaces, while nature that moves in and out or resides within the urbanized areas was ignored. Additionally, 20th century urban beautification movements focused attention on city parks, while overlooking the wider ecological processes in which the city was embedded. In both cities, 19th and early 20th century urban nature only referred to trees, plants, and animals planted by humans.

Though impacted by industry and urban development, the environs surrounding New Orleans and Seattle have also benefited from the development of National Parks, National Forests, State Parks, and other land sequestration measures. However, the development of sequestered land—that is lands taken off the market and set aside for non-market use—has had marginal effects on mitigating socio-natural crisis in both regions. In fact, many of these wilder lands have become part of the urbanized region. None of this is to say that nature in the city is bad, and that nature in the hinterlands is good; they are both in fact entangled spaces. What is important is that the uneven development of socio-natural space contributes to the production of vulnerability in both regions. The urbanization of the wilder spaces adjacent to each city has been and continues to be a contributing factor.

Through my research I have identified four stands of entanglement that when taken together build a complete picture of the social and ecological transformation that have occurred in New Orleans and Seattle. In order to better understand each strand of the entanglement I will pull each strand apart and analyze each separately. Doing so will enable me to dig into the complexity of the larger story. They are: 1) capitalist urbanization, 2) urban and environmental knowledge and technology; 3) the shifting role of the state and governance practices; and 4) the role of inhabitants, and of social participation in general, in providing challenges and alternatives to top-down technocratic urbanization and environmental governance. The point of entanglement is that we can conceptually pull them apart, but in the material and discursive world

of everyday happenings, pulling them apart is not so easy. Therefore, at the end of this dissertation I will put the strands back together and discuss their implications as a whole.

Comparative Urban Studies: Conjuncture, Contingency, and Events

How and why do I compare New Orleans and Seattle? Following on what other authors see as the relative absence of comparative city studies, I use historical comparative methods for this study (Beauregard 2003; Kantor and Savitch 2005). Comparative urban studies is a rather disparate "subfield". A subfield which Kantor and Savitch (2005) argue has not been very comparative, tending to plop case studies next to one another in an attempt to draw out some unifying themes. A rigorous comparative urban study is more than a compendium of cases. It helps illuminate similarities as well as differences across space, time, scale, cultures, and events. In addition, it can be a productive tool to build meso level or macro level theory by providing a set of testable propositions (Kantor and Savitch 2005; McMichael 1990; Walton and Masotti 1976). However, in addition to these benefits there are a number of serious obstacles in comparative urban research. Kantor and Savitch (2005:136) outline three obstacles: 1) scope versus depth; 2) contextual meanings; 3) and conceptual parochialism. My dissertation addresses these obstacles by using an "interpretive" (Sewell 1996) and "incorporative" (McMichael 1990) approach to comparative methods that looks at the role of events in historical change.

An interpretive approach is based on Sewell's (1996) idea of "eventful temporality" and McMichael's (1990) "incorporated comparison." Sewell wants to offer a new direction for historical sociology towards what he calls "eventful sociology." Sewell and McMichael's approaches moves away from the "law" oriented macro approaches of Immanuel Wallerstein and Charles Tilly, and the positivist methods of Theda Skocpol (the heavy-weights of historical sociology). In their place Sewell advocates for an eventful temporality, which "sees the course of history as determined by a succession of largely contingent events" (Sewell 1996:247). McMichael argues that rather than the whole determining variation of the parts, as Wallerstein and Tilly's methods do (world-system determining national or urban phenomenon), that "in effect, the 'whole' emerges via comparative analysis of 'parts' as moments in a self-forming whole" (1990:386).

This dissertation avoids both the limits of detached monographs, which reproduce the "exceptional city" literature, where the city stands outside of wider processes, and the "ecological fallacy", in which macro-level data and theory explain all local events and process. Instead, using incorporated comparison, I show how "local" events play a large role in shaping long-term social and natural processes and structures at multiple scales (local, regional, national). The advantage of incorporated comparison is that I can better explain the connection between seemingly wider socio-spatial processes and seemingly local events and processes, or what we might

call, wholes and parts, or universals and particulars. Urbanization and crisis in New Orleans and Seattle then are neither particularly unique nor wholly indistinguishable.

Eventful temporality as a method examines how events transform structures, rather than sociological laws (e.g., capital accumulation) or macro structures (e.g., world-system). Events are path dependent, which means that what happens at an earlier time, will affect the possible outcomes of a sequence of events in a later time (1996:263). Eventful temporality still offers cause and effect but through a heterogeneous pathway of events and consequences. Furthermore, recognizing the contingency of events and conjunctural factors, at different historical times as well as spatially, is a cornerstone of this approach. This methodological and narrative approach gives weight to events and their influence on the breaks and changes as well as endurances of structures over time. It recognizes both the "stubborn durabilities" and "sudden breaks" in social structures (1996:264). I treat socio-natural crises as events, and event-processes, to examine the co-productive relationship between nature and urban development.

My research design takes into consideration the three obstacles to comparative urban research. In regards to *scope versus depth*, this work does not attempt to write new or exhaustive historical case studies of New Orleans and Seattle. This has already been done extraordinarily well (e.g., Campanella 2008; Colten 2005; Klingle 2007). Instead, my aim is to interweave empirical data from New Orleans and Seattle to interrogate and build upon existing theories of urban political ecology of natural

disasters. In regards to *contextual meaning*, I have conceptualized the primary terminology that I will apply across each case, so that when I am talking about, for example, technological systems in New Orleans, I use the same conceptualization for Seattle. However, I take time to also highlight the differences and nuances within each concept. For example, while New Orleans has a levee, canal, and pump system; Seattle instead has a system of fish ladders, hatcheries, and river management. These are key differences, yet both examples of hybrid social, technological, and natural systems.

Lastly, in regards to *conceptual parochialism*, in selecting these two cities I am not arguing that they are wholly unique or exceptional. Instead, I use New Orleans and Seattle as prime examples of a generalized relationship between city and nature. One could pick any number of cities to examine the relationship between urban development and nature. For example, one could pick Los Angeles or Japan and earthquakes; looking at water issues one could examine Phoenix, Arizona, or Athens, Greece (Kaika 2006); or Chicago and heat waves; or Mexico City and the H1N1 epidemic of 2009. Singular or comparative analyses of any of these cities would have to acknowledge the general trends of urbanization and intensification of social, political, and economic processes, while at the same time acknowledging "parochial" cultural, historical, and ecological subjects and processes—for example earthquakes, viruses, or droughts—in the production of socio-natural relationships. These differences matter, but not in the sense that they blow apart theorization and

comparison. This dissertation takes the three obstacles into account, and reflexively wades through them.

By using an eventful sociology, I examine the contingent factors and path-dependence of Hurricane Betsy in 1965 to Hurricane Katrina in 2005, and the Boldt Decision in 1974 to the threatened species listing in 1999. A major theme in this dissertation is the relationship between urbanization and socio-natural crisis; however I avoid the thesis that urbanization is the sole or most important causal process for these crises. At times throughout this work, urbanization has little impact or plays a smaller role than other events and social and ecological processes. For example, in Chapters 3-5, knowledge production, technological projects, and environmental governance and law play a large role in shaping the city, more so than just a narrow conception of urbanization as the proliferation of buildings and roads. The contingent, conjunctural, and path-dependent events and processes in each case are intersected with general national-level trends of post-WWII urbanization. Additionally, the events and processes are produced by specific actors, by knowledge and governance practices, by the relative influence of social movements and citizen participation, and by the particular characteristics of each city's social and ecological history. These particulars will be put into incorporated comparison throughout each substantive chapter (e.g., Chapters 2, 3, 4, and 5). Throughout, there will be a back and forth between the production of particular socio-natural spaces in each city, and the larger

processes of urbanization, urban environmental governance, and the movements of people, hurricanes, and fish.

Outline of the Dissertation

This dissertation is organized into three parts: Part 1: Urban Natures, Part 2: Socio-natural Crisis; and Part 3: The Urban Future(s). In Chapter 1, I elaborate on the concept of socio-natural entanglement and build a conceptual framework of an urban-environmental sociology needed to understand the recurring crises of hurricanes in New Orleans and salmon in Seattle. In Chapter 2, I provide abridged urban environmental histories of each city in order to provide historical context. Additionally, in Chapter 2 I explore the strand of capitalist urbanization, in which we see the power of industry, capital, and urbanization to make and reshape socio-natural space. Chapters 3-5 detail three separate strands of the entanglement: Chapter 3 examines the role of urban and environmental technology, Chapter 4 examines the role of shifting urban environmental governance practices, and Chapter 5 examines the role of social participation, and urban environmental justice movements.

Chapters 2 through 5 each cover one strand of the entanglement; and each tell two stories of transformation. The first story is about how nature increasingly became an important object in the deployment of urban technology, urban politics, including state and non-state actors, and the overall process of urban development. The second tells a story of transition from modernist 20th century scientific, technological and political frameworks to new frameworks based on collaboration, market oriented

public-private partnerships, and ecosystem management. Both of the transitions have occurred in New Orleans and Seattle, however, they have occurred in uneven and different ways. Here are synopses of each empirical chapter:

Chapter 2: Capitalist urbanization. In the late 20th century, urban space became an increasingly important site of capital accumulation, and much has been written on the relationship between capitalism and urbanization (e.g. Harvey 1985; Lefebvre 1991; Lefebvre 2003; Logan and Molotch 1987). Particularly, during the economic crisis of the early 1970s cities served as a "spatial fix" to the crisis of over accumulation at the end of the Fordist/Keynesian period (Harvey 1985; Harvey 1990; Lefebvre 1991). Over the past 40 years a new round of "creative destruction" was unleashed on urban space, remaking the urban landscape in cities around the world. In the US it largely took a suburban form. The study of capitalist production of space is a widely established body of work. More recently, environmental historians, sociologists, and geographers have turned their attention to the intersection of capitalism, urbanization and nature, and the effects of this intersection on urban life more broadly (e.g. Cronon 1991; Harvey 1996; Heynen, Kaika, and Swyngedouw 2006; Keil 2003). In this dissertation I argue that capitalism is only a point of departure for understanding the crises of hurricanes in New Orleans and salmon in Seattle. Rather, we will see how city building is largely the process of transforming social and ecological relations.

Chapter 3: Knowledge and technology. Over the course of the 20th century, technology increasingly came to mediate the social and the natural. New technologies enabled city builders, real estate developers, and inhabitants to incorporate nature into the city, and build new urban spaces, whether housing developments, industrial areas, or transportation networks. In New Orleans technology took the form of levees, amongst others, and in Seattle technology took the form of hatchery-bred salmon. These technologies were predicated on modernist notions of society and nature, precisely that humans were separate from nature. The discursive framework operated on domination and control of nature. However, rather than failsafe technologies to control nature, these are better thought of as techno-natures, part social, part natural (White and Wilbert 2006). My case histories will show that these techno-natures were not failsafe, and that they contributed to recurring crisis in each city. In the 1990s, ecosystem management entered as new framework, which was a counter to the modernist framework. Ecosystem management introduced the ideas of interconnectivity, systems and process, and multi-use land management. Although conceptually different from the modernist framework, ecosystem management has run into a myriad of obstacles to it implementation in both New Orleans and Seattle, which will become clear in Chapter 3. In short, repeatedly, scientists, engineers, policy makers, and everyday inhabitants offered technological fixes to the crisis. Many times, these technological fixes actually perpetuated or deepened the crisis, rather than resolve it.

Chapter 4: Governance. State institutions and governance practices also contribute to the entanglement. Urbanization and industrialization unfold within a web of laws, policies, and governance frameworks. There has been a historical development of state regulation and governance practices concerning urban and environmental issues in both cities. Since the 1960s and 70s, state institutions (local, state, and federal) have increased their regulation of society-nature relations. Policy makers enacted laws to control land-use, and air, land, and water pollution. In the 1970s, these laws were structured top-down, as part of an environmental Keynesian framework (Purcell 2008), whereas by the 1990s and 2000s, neoliberalized governance practices restructured responsibility horizontally to local and state private-public partnerships. This transition raises important questions about the role of the state in organizing socio-natural relations as well as in the governance of crisis. In short, since the 1970s, state actors and agencies have made nature a key organizing object in the building of urban space. Similar to the application of technology, governance practices and policy decisions have contributed to the perpetuation of the crisis, rather than resolutions.

Chapter 5: Social Participation. Everyday inhabitants, citizens, and tribes (Puget Sound) have also played a large role in the production of socio-natural relations. Bottom up pressure, in the form of environmental justice or right to the city organizations, have challenged as well as participated in the management and governance of social and ecological space in both cities. Non-state actors challenge

acute and latent urban environmental inequalities. Rather than a fight over wild spaces far from urban centers, the city became a space for a new (urban) environmentalism. These nascent environmental justice actors made urban ecology an organizing object in their fight for healthier, safer, equitable, and less vulnerable living and working spaces. Yet since they are entangled in larger processes and the decisions of other actors, these movements have had an uneven record of achieving their goals.

From the perspective of different actors, one or another strand represents a panacea or fix to the crisis. From the vantage point of economic development officials, modernization and growth represented the best possible way to improve efficiency, reduce pollution, and pay for the restoration of environmental damage and enact sustainability programs. From the vantage point of scientists, engineers, technocrats, policy makers, and the public, technology represented the optimal way to solve the problem. Other actors turned their attention to the state, and advocated for new state powers to regulate social and environmental relations, while others argued that rather than new institutions; we need new democratic governance practices. Yet others extoled the virtue of grassroots, bottom up activism, and the solutions found by everyday people.

Part I: Urban Natures

Chapter 1

Cities of Nature:

Theories of Space, Nature, and Crisis

Introduction

The task of this chapter is to build a spatial and environmental sociology which explains the crises of hurricanes in New Orleans and salmon in Seattle. To do so, I outline theories of space, nature, and ecological crisis, and develop a lexicon of a hybrid social and natural space, hereafter, *socio-natural space*. This lexicon is not superfluous; it serves as a reminder that society and nature are always entangled. The concept of *entanglement* is a way to talk about socio-nature, and it refers to how our understanding of natural processes, and the processes themselves, shapes how people create cities with and against nature; how people create ways to govern themselves and the natural world from which cities are made; and how in doing so, create the contradictions and inequalities that form the basis of urban environmental justice movements. In this chapter, I make the case that environmental and urban politics are increasingly becoming one and the same.

Think of the city as an entanglement. It is a social and ecological entanglement. The urban studies literature typically poses this as a tension between the *use-value* and *exchange-value* of urban space, and between the social and the

ecological.[4] However, capitalist urbanization, policy decisions, technology, and social movements have increased the entanglement of the social and the ecological in the past 100 years. What do I mean by entanglement? By this I mean there is no clear boundary between society and nature, between the urban and the natural.

A complex and conflicutal politics arises out of socio-natural entanglement, however. Since the development of modern cities, people have been struggling to define the city's place in nature. Often the entanglement reveals itself in the conflict between people with different visions and values of what the city should look like; between people from different classes or racial groups; or between people who live within the city and those who do not. These are very visceral struggles, as the story of Lower 9th Ward residents in New Orleans, and Native American and white fishermen in the Puget Sound will make clear.

Understanding cities as entangled socio-natural spaces opens up three important political questions. One question involves who and what has a "right to the

[4] There is a long running conversation in the urban studies literature about the tension between use-value and exchange-value in the city. However, the conversation is about the social production of space, whereas nature and ecology are often not addressed. For example Henri Lefebvre's *The Production of Space* (1991) deals extensively with how capitalism creates space as a circuit of exchange-value. Space becomes a commodity. However, he points out that lived spaces as well as spaces that oppositional movements create are based upon a use-value of the space, rather than a exchange-value. This is taken up by Don Mitchell, in *The Right to the City* (2003), in his examination of urban based social movements of the past 30 years. In addition, Logan and Molotch's classic text *Urban Fortunes* draws the distinction between place as commodity (a neighborhood as a real estate and housing market) and place as a use-value (a neighborhood as a home, a community, and a place of daily life). These account deal explicitly with the social production of space. The tension that I examine brings nature in and widens the scope of use-value to include use by non-human animals and natural processes.

city."[5] *Who* or *what* is counted as a legitimate actor in the production of the city? A second question involves conflicts between the needs, wants, and desires of the differing people, governments, corporations, land owners, animals, and even ecological processes, which reside in or come in and out of urban space. *How* and by *what process* is the city built? Yet a third question involves land use. What *form* should the city take? The entanglement of society and nature is created through crises, conflict, and historical processes. The histories of New Orleans and Seattle will help answer these questions, but a conceptual framework that holds them together also will.

"Natural" Disaster or Socio-Natural Crisis?

Empirically, what is a natural disaster? Are we talking about war? AIDS? Chernobyl? Or are we only talking about earthquakes, hurricanes, floods, and droughts? All of these have natural components. For example, HIV is a specific pathogen, different than tuberculosis, with its specific set of parameters and behaviors. Moreover, the social component of HIV and AIDS is different than that of tuberculosis. War is not overtly a natural event. Humans make war. But, we couldn't make war without nature: the manipulation of the powers of chemistry and physics; the destruction of agricultural systems and ecosystems; the harnessing of human

[5] Henri Lefebvre is credited with giving rise to the idea of a "right to the city." Within this right lies a heterogenic and participatory use and creation of urban space. This idea has inspired a number of authors (e.g. Michell 2003; Purcell 2008), and a loose social network in the US called The Right to the City Alliance.

endurance in physical, mental and emotional sacrifice. However, war is not usually, and for sound reasons, considered a natural disaster.

Understanding the embeddedness of humans in nature—the hybridity of our social-natural systems—allows us to look at the natural and ecological components of seemingly social crises and disasters, such as war, disease, and industrial pollution. Some events and processes appear to *come to us* instead of *coming from us*. Hurricanes, forest fires, earthquakes, droughts appear to be acts of God(s), or an indifferent nature, or simply tragic accidents. The attribution of responsibility is what sets these events apart from events such as war, industrial disaster, and deforestation. Pelling (2003) argues that we need to disentangle natural hazards from other sources of threat to life and livelihood (especially violence and war). Hoffman and Oliver-Smith (2002) make a similar claim by excluding those events and processes that have human *intentionality*, say for example, the nuclear attack on Hiroshima.

Conversely, the point here is not to rigidly divide what constitutes a natural disaster, because we can find the *natural* component of a war; rather the point is to illustrate the myriad of ways to empirically locate disaster, and to parse out intentionality and responsibility. Therefore, it is instructive to consider the apparent difference between those events that *come to us* from those *come from us* (see Figures 1 and 2 below). Events that appear to *come to us*, a hurricane for example, in fact, also importantly *come from us* (improper levees, and the social geography of vulnerability, to name two). Disasters are neither fully natural, nor fully human-made,

thus they are socio-natural. Further, disasters can be powerful singular events, but more often they are event-processes—crises unfolding over time, often punctuated by events—and are more fully characterized by calling them crises rather than disasters. Thus, I will use the term *socio-natural crisis* in place of what are typically called natural disasters.

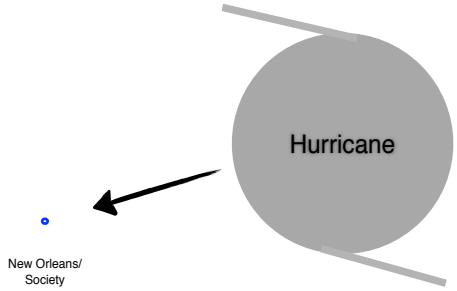

Figure 1 Crisis that Appears to Come to Us

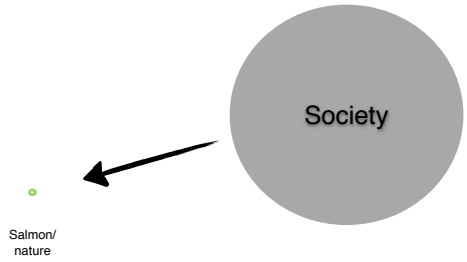

Figure 2 Crisis that Appears to Come From Us

The histories that I explore in this dissertation were chosen to explicitly contrast crises that appear to *come to us* versus those that appear to *come from us*. New Orleans and the Gulf Coast are deeply enmeshed with the cycles of hurricanes. As climatological events hurricanes appear as prototypical phenomenon that ravish human society from the outside. However, as I argue, the crises of Hurricane Betsy and Hurricane Katrina amply demonstrate that the story is far more complex. Seattle

and the Puget Sound are deeply enmeshed with the five species of salmon that reside in and migrate through the waterways of the region. The decimation of salmon populations appears as a prototypical phenomenon in which human society ravishes nature. However, as I argue, the crisis of the Boldt Decision and the Endangered Species Act Listing demonstrate that, like in New Orleans, the story is far more complex. The biological lifecycle of salmon, which includes large spatial and scalar dimensions, makes human and salmon co-existence extremely difficult.

In both cases, it is neither sufficient to say they are natural disasters or completely social decisions. Whether the crises appear to come to us or come from us, the socio-natural relationships necessitate a different kind of narrative, a different kind of theory, and a different kind of politics. This new narrative, and politics, explicitly examines the human decisions that lead to particular kinds of crises, but it also explicitly shows the limits of human decision-making. The co-produced entanglement in New Orleans and Seattle allows us to see that human agency does not have omnipotent control over nature, nor does it show that nature is gone, cemented into the social. Moreover, these histories also show us that humans can make different decisions, and that these decisions have the potential to co-produce new entanglements that might mitigate vulnerability and inequality for humans and non-humans alike. This is why a simple narrative of urbanization or capitalism paving over nature will not suffice. To remedy this, I focus on knowledge production,

governance, social participation, and the hurricanes and salmon as important variables in the production of socio-natural crisis in New Orleans and Seattle.

Wither the Binary

The study of social and ecological crisis is one point of entry for unraveling binary human/nature narratives as well as for constructing a spatial and environmental sociology. The most prominent narratives describing the relationship between humans and nature rest on a set of dichotomies: humans/nature, culture/nature, cities/nature. In each of these binary narratives human beings have either transcended natural constraints or achieved enough power to rework or destroy natural settings and processes, thus separating themselves from nature. However, a number of environmental historians have endeavored to deconstruct these dichotomies and make the case that human societies now, as in any other time, are embedded within natural relations. Environmental historians have shown that these dichotomies fail when scrutinized through an historical or a cross-cultural comparative lens (Cronon 2003; Merchant 1996; White 1995; Williams 1973).

There are two prominent narratives in popular discourse about the causes of natural disasters. The first, as historian Ted Steinberg (2000) thoroughly details, is through the narrative of "acts of god." In this narrative an otherworldly power is responsible for a disaster, whether hurricane or earthquake. The second replaces "god" with "nature", and holds that all *natural* disasters are just that, "acts of nature." In both of these narratives cause and responsibility are abstracted to powers outside of

human society. The old dichotomies are preserved: humans/god and humans/nature. Often, the result of such narratives is to absolve governments, private firms, and society of blame.

In order to avoid the conceptual and political pitfalls of dichotomous thinking, we need to de-naturalize natural disasters. So-called natural disasters are not acts of God, nor are they simply acts of Nature. Instead, natural disasters are a confluence of social and natural actors and processes. However, there is a danger that this de-naturalizing will over determine the role of society (see Figure 3). What I call "acts of society" narratives relegate natural processes and non-human actors to, at best, secondary phenomena, and, at worst, as absent. In these narratives natural disasters are caused by neoliberalism (Klien 2007; Lipsitz 2006), racism (Dyson 2006; Mann 2006), politics or government ineptitude (Brinkley 2006; Dreier 2006), and inequality (Logan 2005), or a combination these. While these social forces are indeed powerful, and this dissertation will address them, they are not the whole story.

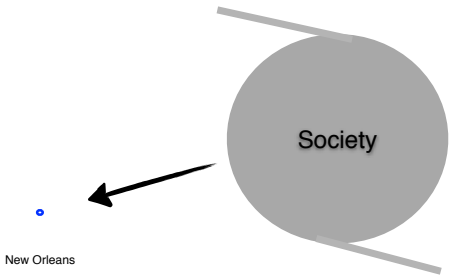

Figure 3 Acts of Society Narrative Looks Similar to Acts of God

What we call nature cannot be subsumed by or separated from the social causes of disaster. Furthermore, the ecological processes and nonhuman animals are

not passive; they are active co-participants in creating socio-natural relations. Understanding these crises will involve examining the social aspects, and importantly the cultural and scientific assumptions about nature as well as the non-human actors and processes themselves. However, a richer account will examine them together, always in conversation. This will still be true even if one part of the narrative appears to deal more extensively with the social, for example when examining the Boldt Decision, as well as the times it appears to deal more extensively with the natural, for example examining the properties of Hurricane Betsy. The key is remembering how the two are mutually constituted. As environmental historian Richard White reminds us, we cannot write a history of society and a history of nature side by side and call it environmental history (1995:x). Society and nature need to be treated as a co-producing whole.

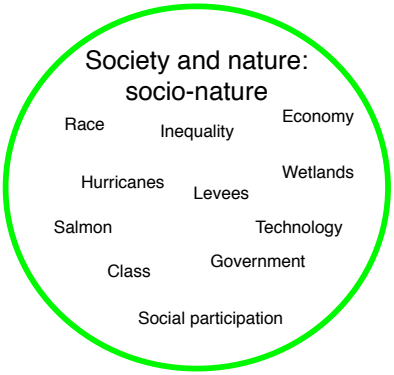

Figure 4 Socio-nature and Entanglement in New Orleans and Seattle

The study of natural disasters in *urban contexts* not only helps dissolve the dichotomy between humans/nature and illuminate the socio-natural relations of disasters, but it contributes to the deconstruction of a pervasive dichotomy that

understands cities as antithetical, or wholly separate from nature. William Cronon (1996) and David Harvey (1996) attack these binaries from different places, yet they arrive at similar destinations. If Cronon demonstrates that "wilderness" is not an *a priori* entity, but rather an idea and material space produced by humans in a certain historical context, then the study of urban ecological crisis gives dramatic support to David Harvey's famous line, "there is nothing *unnatural* about New York City" (italics in original Harvey 1996:186). I would say there is something very *socio-natural* about New Orleans and Seattle, something that is deeply entangled with capital, politics, race, and nature.

Theorizing Space and Nature

In order to build a spatial and environmental sociology, the concepts of *space* and *nature* need to be further fleshed out. Historically, sociology has been hampered by three conceptual fallacies: one, treating space as merely a container for sociological processes and two, treating nature as a static, a priori world, the non-social. The former fallacy originates with the Chicago School of urban sociology, whereas the latter owes its origins to broad Durkeheimian and Weberian traditions that situate sociology as the science of the social, nestled behind its disciplinary walls within the academy. Third, in the past thirty or so years the post-structuralist and post-modernist turn within sociology advanced a conception of nature as a socially constructed realm of narratives, concepts, and ideas. Within the framework of strong social constructionism nature is rendered as a web of meanings, narratives, and

discourses organized through power relations within a given social context. However, strong social constructionism neglects a tangible materiality beyond human constructions. Each of these traditions is a good starting point to building a truly spatial and environmental sociology. However, because of these fallacies sociology has lagged behind geography, environmental studies, anthropology, and history in the study of society/nature relations. I will draw upon a plethora of disciplines and authors as I advocate for a dynamic spatial and environmental sociology.

The Production of Space

French scholar Henri Lefebvre is the perhaps the most influential theoretician of space. His work now influences geography, environmental studies, gender studies, urban studies, and increasingly sociology. His two most used ideas are "the right to the city" and "the production of space." For now, I want to briefly outline his ideas on the production of space.

Even to this day, Lefebvre's (2003[1970]) book *The Urban Revolution* is intensely provocative and relevant to urban studies. This book renewed what is known as the "urban question": how do we define a city, and what exactly is the role of space in the social reproduction of society (Brenner 2009a; Castells 1977; Saunders 1986)? The core argument that Lefebvre makes in this book is that the "urban problematic"—his name for urban society—is supplanting industrial society and producing a "critical zone" that contains the seeds of a fully urban society. The urban—his term for urban society and what today might be called urbanization—is

not the city; it is not a collection of things in space. It is not simply a superstructure on top of capitalist industrialization. It is a supplanting social totality that is rearranging and changing societies around the world. The urban (urbanization) is a new period of human civilization. It is at once oppressive in its capitalist and technocratic organization and liberatory in its heterogeneous social life.

In the *Production of Space*, Henri Lefebvre fully forms his theory of space. In this work he introduces three conceptualizations of space. The interplay between the three composes *space* (Shields 1998:161). Furthermore, taken together they constitute the make up of physical (built space), mental (individual), and social space (collective). He calls these spaces: 1) social practice, 2) representations of space, and 3) spaces of representation (1991:38-39).[6] Social practice is the *perceived space* of everyday life, ripe with contradiction, often ignored or over-fetishized (Shields 1998:161). Representations of space are the discourses *on* space, on, as in imposed onto space (Shields 1998:161). These spaces are the facades of order, centrality, and stability that capitalist economic and political actors and urban planners attempt to impose on space. An example is the quick and costly reopening of the Super Dome for football after Hurricane Katrina in New Orleans as a *sign* of progress. Whereas, spaces of representation refer to actual lived experience. These are the "third spaces," the "other," in Lefebvre's dialectic. As discourses *of* space, they call forth space as it

[6] In the 1991 edition of Lefebvre's *Production of Space*, the translator chose "representational space" to mean "spaces of representation." I use Rob Shield's (1998) correction by using "spaces of representation."

might be, a fully lived space. For Lefebvre it is in the spaces of lived experience that new and oppositional forms of the production of space can take place. People attempting to build an alternative or more egalitarian space seek to build spaces of representation.

Lefebvre argues that contemporary capitalist space is a "contradictory space," at once centralizing in power and wealth as well as specializing and fracturing. Capitalist space is at once "exploding" in space, that is expanding as suburbs, edge cities, and the urbanization of nature, and at the same time "imploding" in space, that is concentrating and centralizing of people, activities, capital, and objects (Lefebvre 2003[1970]:14). The contradictory nature of these spaces can be seen in everyday life in urban society, as well as in the globalization of capital. Moreover, he argues that space is fetishized, much like Marx's description of the commodity, in capitalist and urban planning discourse (Lefebvre 2003[1970]; 1991). What lies behind the veil are the process of how space is produced, its historical development, and its contradictions. The task for urban scholars is to remove the veil, and historicize and critique the social relations that compose space.

Out of these multiple and fractured spaces might come spaces of difference, what he calls spaces of representation. Spaces of difference are openly heterogeneous, whether it takes the form of different kinds of people, beliefs, or ways of life. Furthermore, differentiated space does not veil contradictions that are embedded within it. That is to say, whatever conflicts between ways of life or ideas are not

cloaked in the guise of hyper-constructed sameness or order as are representation of space I described above. Lefebvre says, "Difference [sic] endure or arise on the margins of the homogeneous realm, either in the form of resistance or in the form of externalities" (1991:373). Lefebvre argues that any group of people attempting to create spaces of representation or counter-space (1991:382) must build them on difference as well as qualitative ideals such as solidarity (1991:381). He states, "Pressure from below must therefore also confront the state in its role as organizer of space" (1991:383).

The Production of Nature

Lefebvre and the authors that have furthered his theories deal primarily with the production of social space. Lefebvre had a conceptualization of nature that was, even for its time, not as rigorous as his theory of space (Smith 1984). He clung to a binary schematic: 1st nature is untouched original nature and 2nd nature was the modified and transformed nature that human beings made. His idea of 2nd nature, the space of a transformed and modified human-nature relationship, is a good starting point. However, Lefebvre did not fully articulate the relationship between space and nature, and between urbanization and nature, aside from his critique that capitalism damaged nature. Not long after the spatial turn, in which Lefebvre played a leading role, even if it took decades for his work to percolate into the social sciences and humanities, the so-called environmental turn happened. If the spatial turn pushed sociology and other disciplines to build a theory of space as it relates to the social

world, the environmental turn pushed social studies to articulate a theory of nature. The pioneers of environmental studies were ecologists in the sciences, and, somewhat strangely, historians in the humanities.

Environmental historians show us that the relationship between humans and nature is not static, it is a product of historical change; and that social scientists need to take nature seriously as an intervening variable in the production of human society. However, there remain conflicting views on how to actually describe nature and society at its basic relationship. Most scholars studying society and nature accept that humans are part of nature. Yet, there is disagreement over whether to treat nature as a solely objective physical fact (reality) (e.g. Soule 1995; Worster 1990); or a set of categories organized by language and culture, made evident by the heterogeneous ideas of nature that exist around the world (e.g. Sayer 2000); or some combination, some dialectic of the two (e.g. Soper 1996; Harvey 1996; Heynen, Kaika, and Swyngedouw 2006). These three stances represent the realist, strong constructionist, and the amalgam of soft constructionists, critical realists, or dialectical political ecologists. This debate might seem trite and stale, and most researchers simply go on with their work, not getting wrapped up in the philosophical back and forth. However, the substance of the debate over how to define nature is a critical starting point. Whichever position is taken has serious theoretical, methodological, and political consequences. This is why I take the time to briefly discuss these tensions here before moving on to a full discussion of urban political ecology.

The debate between the strong realists and the strong constructionists forms the two poles of the debate. This debate is exemplified by the classic debate between William Cronon and Donald Worster. In a nutshell, Cronon (1990) accuses Worster of excessive materialism for basing his research program on modes of production. Because of Worster's Marxist leanings, Cronon accuses him of economic determinism, and for reducing the analysis to economic steamroller paving over nature. Worster accuses Cronon (1990) of writing an idealist construction of environmental history. If nature is nothing but a set of social constructs, Worster (1990) argues, then Cronon reduces environmental history to social history. In the end, both authors tried to acknowledge that they did not do what the other claimed. I'll leave it to the reader to sort through that debate further.

But, their debate does highlight a significant rift in environmental studies, between realists and social constructionists. The realist position holds that nature, the cosmos, and materiality exist independently from human consciousness, language, and culture. Human beings using language, consciousness, theory and method can uncover the way nature works, operates, and is structured. The realist position is the dominant paradigm of the physical, natural, and biological sciences. Some social scientists, including environmental studies scholars, use this stance as well. They point out that nature operates independently from humans, when not in a relationship with them, but humans organize their endeavor to learn about nature by using human consciousness, language, and metaphor to represent the material phenomenon in

question (Soule and Lease 1995) However, human language does not structure the fundamental relationship between humans and nature, it only works to describe the relationship. Therefore, the representations and theories can be wrong, and can be modified, changed, and updated by the practice of science. These modifications, in this paradigm, help us move closer to describing and understanding the order(s) of nature. Realist environmental studies takes nature as an *a priori* external reality, and proceeds to explore the human impact on nature (e.g. Soule and Lease 1995). Their argument against constructionism says if nature is a social construction then how can we research and analyze human's impact on the environment (Soule and Lease 1995). Realists argue that constructionism is a vacant politics and an inadequate tool kit to examine the environmental conditions and problems humans face (Soule and Lease 1995).

Strong constructionists, or radical constructionists as Robbins (2004) calls them, on the other hand use poststructuralist and postmodern theory to argue that humans' understanding of the world is constructed through language, symbols, stories, and ideas (Robbins 2004:113-114). Nature or reality is true only in so far as people believe and (re)produce narratives, ideas, and discourses on nature to understand how the world works. Rather than thinking of language as representations of how objective nature works, as realists do, strong constructivists hold that discourse and ideas of nature shape and make the world. Discourse has constructive power, and in turn has consequences and outcomes in the way society organizes itself

(Robbins 2004:114). Discourse and ideas of nature have power independent from any grounding in natural fact or reality. From a strong constructionist view, this is why environmental research should focus on the conflicts over ideas and discourses on nature, because the power play between competing groups does not rest on which group holds the most objective account of nature (e.g. global warming, or deforestation), but rather which group can mobilize power to create consensus on "truth" (Robbins 2004:114). The power to mobilize accounts, discourse, and ideas of nature is the power to make "reality," thus the power to also mobilize discourse on how society is and ought to be organized, and shape the range of social action. The above descriptions of realism and strong constructivism are ideal types, and somewhat caricatures. However, the descriptions roughly capture two different theoretical positions.

However, the bulk of environmental studies is moving beyond the polarized debate between what appears to be irreconcilable positions. There are, however, a number of approaches to a "third way" out of the realist/constructionist quagmire. Dickens (1996) makes the distinction between weak and strong constructionism, whereas Robbins (2004) draws the distinction between "hard" and "soft" constructionism. Both argue that weak and soft constructionism provides a theory that describes the dialectical relationship between nature and humans. Hannigan reviews the "co-constructionist strategy" (2006:33). Co-construction looks at the way that nature and human societies co-construct one another. This view allows the old

dichotomy to be melded into a more fluid and contextual understanding, which also avoids social or natural predetermination (Jasanoff 2006). Neumann, however, calls the third way "critical realism" (2005:50). Critical realism acknowledges the existence of material existence outside of human consciousness, and that human knowledge of this material world is only a representation of it. Therefore, nature exists "out there" and at the same time human discourse, ideas, and representations of nature must be seen as situated, contingent, and mediated by the social world.

Lexicon of Socio-natural Space

A new conceptual lexicon will help to bring the co-produced, entangled world of processes into clearer focus. The concept of *socio-nature* enables us to constantly recognize the embedded and entangled relationship between society and nature, broadly defined. The relatively new and diverse field of urban political ecology is making exceptional contributions to urban and environmental studies by integrating nature into theoretically and empirically driven work. Citing a lack of attention to nature in urban studies and a simultaneous lack of attention to cities in environmental studies, these authors combine the two to produce a better understanding, and more importantly a reconceptualization, of how cities are embedded within nature (e.g. Heynen, Kaika, and Swyngedouw 2006). With this new dimension researchers are able to understand the way that nature, capital, politics, and culture work together to shape the production and reproduction of everyday life in the city. For example, Maria Kaika (2005) constructs a powerful case study on the way that water

powerfully works both as a commodity and a symbolic representation of nature in arid contemporary Athens Greece.

Henri Lefebvre undertheorized nature in his work and urban political ecologists have been picking up where he left off (Smith 1984). Urban political ecology must be distinguished from Chicago School human ecology. Loosely, human ecology was the social *scientific* study of human behavior in cities, behavior that researchers made analogous to ecological processes (Savage, Warde, and Ward 2003:10). For example, human ecology argues that cities grew as waves of population movements increased. As people moved from one geographic area to another competition amongst different communities resulted in changes to the urban form (Savage et al. 2003:10). Urban political ecology, on the other hand, does not follow a systems approach that uses the metaphor of natural systems to understand cities. Instead, researchers acknowledge that there is a distinct urban ecology (Keil 2003:727).

Recognizing socio-natural entanglement has serious ramifications for urban studies. Heynen, Kaika, and Swyngedouw (2006), write, "Urban political ecology more explicitly recognizes that the material conditions that comprise urban environments are controlled, manipulated and serve the interests of the elite at the expense of marginalized populations. These conditions, in turn, are not independent from social, political and economic processes and from cultural constructions of what constitutes the 'urban' or the 'natural'" (2006:6). Urban political ecology integrates

the category of nature into the overall study of the production of space (Keil 2003) by adopting the insights of political ecology. Broadly, political ecology understands the human/nature interface and all human uses of natural resources to be matters of politics (Blaikie, Brookfield, and Allen 1994; Robbins 2004), and in its more radical formulation a matter of political economy (Peet and Watts 1996).

For example, authors in the loose field of urban political ecology challenge the urban planning paradigms for inadequately accounting for the ways in which existing political, economic, and cultural arrangements constrain attempts to make cities more sustainable. Urban political ecology more specifically argues that political, economic, and social arrangements shape urban development, and more importantly that the categories *urban* and *nature* cannot be separated. Cities, in this view, are combined socio-natural constructions that are historically produced, both in terms of social and physical-environmental qualities. They argue that the qualities of physical and environmental change, and the resulting conditions are not free from the particular historical, social, cultural, political or economic conditions and institutions that coexist with them. Consequently, urban political ecology charts the inequalities of socio-natural changes, in which socio-natural change might reduce the stability of one place, social group, or ecology, while enhancing the sustainability of another.

Urban political ecologists make their goal to elucidate who or what gains; who benefits from; and who suffers in what ways from particular manifestations of social and natural processes and conditions. Moreover, urban political ecologists argues that

environmental transformations are never independent from class, gender, ethnic or other power struggles Ultimately, urban political ecologists understand the dilemma of urban sustainability as an inherently political question. They argue that socio-ecological sustainability can only be achieved by a democratically controlled and organized production of city and nature. The study of urban ecological crises provides researchers with ample examples to examine the production of space as it relates environmental inequality and vulnerability to crisis.

Urban political Ecology of Socio-natural Crisis

What benefits does the melding of urban political ecology, urban environmental history, and natural disaster research have? I argue that urban political ecology of natural disasters provides the best framework to compare New Orleans and Seattle for a number of reasons. The quotidian socio-natural relations in New Orleans and Seattle are periodically punctuated by crises. New Orleanians are susceptible to flooding, whether from heavy rainfall, or from passing hurricanes. Hurricanes Betsy and Katrina were dramatic events in New Orleans. Seattleites are implicated in the decline of salmon, one of the very cultural symbols of the city. The Boldt Decision and the Threatened Species Listing brought the salmon crisis into the spotlight. In New Orleans it appears as if the crisis comes from outside the city, whereas in Seattle it appears as if the city itself is partly to blame for the crisis. One appears natural; the other appears social. In fact, they are both.

This understanding allows us to explore the complexities, contingencies, and the event temporality of history. From this we can better understand how socio-natural space is produced, under what social and ecological conditions, and the consequences of uneven geographies of vulnerability. But, it does more; it helps us move away from a binary politics in which we measure nature as good, society as bad, or conversely, society as good, nature as bad. Rather, we can begin to answer the questions posed earlier: *Who* or *what* is counted as a legitimate actor in the production of the city? *How* and by *what process* is the city built? What *form* should the city take?

Both case studies in this dissertation provide an opportunity to examine how the social and natural worlds are entangled. Whether appearing to come to us or come from us, it is the case that social actions, such as levee building or urban expansion, conjoin with processes and actors, such as hurricanes and fish, to build quotidian socio-natural space. These spaces periodically erupt into dramatic crises when the needs of differing people and of nonhumans come into conflict. This relationship is constantly in the process of being made and remade. This is a historical process in which an event temporality of human actions, urbanization, and natural phenomenon entangle to produce the hybrid socio-natural spaces millions of people work in and call home. Therefore, an historical analysis is germane in order to unveil the production of these spaces and crises. Further, urban political ecology of natural disasters allows us to examine the inequalities and vulnerabilities of these spaces,

their historical processes of becoming, and where humans' relationship to nature might be heading. Disasters let us look at both the material and discursive construction of human societies. They provide a lens to examine the confluence of physical, biological, and socio-cultural systems of a given society or community (Hoffman and Oliver-Smith 2002:5).

The study of urban ecology and in particular urban socio-natural crisis provides an opportunity to understand the larger question of humans' place in nature. With scientists and climate activists warning of a rapidly changing world, how do we find socially and ecologically sustainable economies, cities, and social systems? Moreover, as urbanization increases worldwide, cities become an important scale of inquiry. Mark Pelling argues, "Urbanization affects disasters just as profoundly as disasters affect urbanization" (2003:7). Urban political ecology specifically argues that natural disasters help us understand the material and discursive constructions and uses of power (Pelling 2003). He says, "power [relations] makes certain social groups within the city, and collectively, certain cities, more disaster-prone than others" (2003:4). It is a paradoxical case in which building of urban areas contributes to ecological crisis, but at the same time offers perhaps society's best solution out of the crisis. In the following four chapters I will put the theories outlined in this chapter to use. Specifically, in the next chapter I will use the concept of socio-natural space to narrate abridged urban environmental histories of New Orleans and Seattle. I will

explore the confluence of nature, industry, capital, and urbanization that made and reshaped socio-natural space in New Orleans and Seattle.

Chapter 2

From Cities of Mud To Cities of Gold:

Abridged Urban Environmental Histories of New Orleans and Seattle

Introduction

A little over six miles from downtown Seattle, in the old fishing neighborhood of Ballard, you can watch salmon pass through the fish ladders at the Chittenden Locks. The fish return from their time in the Pacific Ocean, channel into the Puget Sound, and some of them climb the ladders in Ballard on their way through Lake Union, into Lake Washington and up one of the streams or rivers that carry glacial water from the Cascade Mountains. Along the banks of these bays, lakes, and rivers sits the Seattle metropolitan region, home to almost two million people. It's a picturesque setting with sun—sometimes—glaring off the immense amount of water, and the grand Mount Rainer looming over it all.

Across the continent, a short drive outside New Orleans you can find a place where solid land becomes nothing more than alluvial marshes of the Mississippi River. It is a place where it's hard to tell where land ends and water begins. Perhaps you will see an American alligator, some waterfowl, or local fishermen slowly navigating their shrimp boats up a canal, even though the canal appears not to be able to accommodate such a boat. On the short return, you enter the Big Easy, the home of

Jazz music, beignets, and Marti Gras. These are idyllic narratives—ones typical of city boosters—but no doubt real ones and reasons people live in and visit New Orleans and Seattle.

But in the unreconstructed hurricane-damaged neighborhoods of New Orleans, the Lower 9th Ward for example, you will see what years of unabated plant growth can do to a house years after Hurricane Katrina. The plants have completely engulfed the house, and the vacant lots where houses once stood are so thick with plants that you cannot see through them to the next lot. If you literally dig in the soil as well as dig though the historical record of these neighborhoods—the Lower 9th ward, New Orleans East, and Lake View—your hands will be covered with swamp mud. The dirt these neighborhoods reside on, and the levees that protect them, are transformed marshes and swamps. They are extremely vulnerable to flooding.

In Seattle, the idyllic waterways have been transformed by urbanization and industrialization. For example, the Duwamish Valley is home to the heaviest concentration of industry and shipping in Seattle as well as the area's poorest residents. Since the city's incorporation in 1869, the landscape of Seattle has been radically altered by hill re-grades, mudflat in-fills, and river diversions. But it is not just the parts of the rivers that flow through Seattle, many miles up the rivers 20th century dams block salmon spawning grounds. The waterways of the Puget Sound are home to a diverse set of human, plant, and animal inhabitants. A century of

transformation has made many of those inhabitants vulnerable to a circumscribed existence, socially, economically, and ecologically.

These are less than idyllic narratives, different from the ones the city boosters tell, but again no doubt real. Furthermore, the development of industry, commerce, and housing has been a huge engine of wealth and job creation in both New Orleans and Seattle. The economic prosperity of each region is deeply entangled with its social and ecological relationships. Moreover, it would be false to think that the entanglement ends at the city limits. There are myriad of economic, cultural, and natural processes and flows continuously helping to make and re-make the urban regions of New Orleans and Seattle. The urban environmental histories of these two cities provide rich evidence to bolster the concept of socio-nature that I laid out in the previous chapter.

Origin Stories

New Orleans and Seattle share many similarities in their fabled, humble origins. In both places, Native Americans had been living there for thousands of years. Each city was eventually constructed on top of Native American land, with Seattle famously taking its name from Chief Seathl (Seattle)[7] of the Duwamish tribe. Each city began in the mud, surrounded by water, and pounded by rain from above. Like most cities in the United States, each city was founded by a set of "heroic" great men, the founding fathers. Before European settlement, each region had seen

[7] There are numerous spellings of his name: si' ahl, Seeathl, Sealth, and of course Seattle.

European explorers for a number of years, but only really in passing. It was not until the city builders arrived that a significant Euro-American transformation of the land took place. French colonist Jean Baptiste de Moyne, aka Bienville, founded New Orleans after he and his brother Pierre de Moyne, aka Iberville, claimed Louisiana for France. Earlier they had built a French colonial outpost in what is now Biloxi, Mississippi (Campanella 2008). Arthur Denny and "Doc" Maynard founded Seattle. After a hard start on the shores opposite present day Seattle, the founders moved across Elliot Bay to what is now Pioneer Square. Taking the name of the newly befriended Chief Seathl of the Duwamish, Denny named the new city Seattle.

Of course, this account negates the role played by the wives, sons and daughters of what is usually simply called the "Denny Party." Similarly, other men surrounded Bienville when he made landfall on the banks of the Mississippi River. Moreover, two other key points are typically overlooked. One, the city builders of both New Orleans and Seattle could not have survived their new environs without the help of the indigenous people (Campanella 2008; Klingle 2003; Thrush 2007). Two, the founding of each city was not a singular social or political or economic act, it was in a fundamental sense a production of a new socio-natural space, which had a dramatic effect on existing social and ecological systems. The fabled origin stories of New Orleans and Seattle are only a window to dig deeper into the murky and mucky socio-natural histories of each place. The crises of hurricanes and salmon are not the by-products of these cities; they are as much a constitution of each city, as are Chief

Seattle, Governor Stevens, the Denny Party, Bienville and the countless invisible makers of history. Moreover, the historical nuances, conjunctures, and contingencies as well as the ecological relations of both spaces add a great deal to the uniqueness of both New Orleans and Seattle. The differences can tell us a great deal about how city builders and nature produce one another and how in that production urban and rural peoples and ecosystems are made more vulnerable to crisis.

While humans certainly define boundaries, natural processes do not follow strict boundaries, although similar characteristics are made and remade in certain spaces and over varying scales. After all, alligators do not live in the Skagit River, nor do Seattleites worry about hurricanes. Scientists usually talk about three natural processes that shape regional and local landscapes: geology, climate, and ecology. A fourth, human activity, has been acknowledged and analyzed over the past forty years. These four factors are all entangled, each shaping the land, waterways, and the biosphere of each place. Sometimes the processes act independently; sometimes they act in concert. Their historical development is chronological; however understanding their confluence is key. There was a time when there was no water on earth, a time before plants, a time before animals, and of course a time before humans. In the two mini chapters that follow I will narrate some of the changes to the land in Southern Louisiana and Western Washington that geology, climate, ecology, and humans have made.

These socio-natural histories of each urban region are necessarily abridged. These chapters do not do these histories justice—there are many great books dedicated to that task—but they do serve a purpose for my task. By the end of each chapter I will have made the case that environmental history only gets us so far when narrowly focused on the political economy of development and urbanization. The chapters that follow this one make the case that to understand the protracted transformation of society and nature, punctuated by crisis, it is necessary to look at the role of knowledge and technology, governance, and social participation. Far from being "superstructures" to the base of political economy these other three factors form strands of the entanglement between society and nature. But first, we need a little historical context of each place.

Chapter 2.1: New Orleans

Geological and Ecological History

Driving along Highway 1 in Southern Louisiana, south of New Orleans, on a strip of road surrounded by water, marshes, and bayous, you realize how flat the earth can be. The tallest points on the horizon are made by humans: highway overpasses and the towers of distant oil refineries, billowing out smoke. Otherwise, the earth is flat, and there really is not much earth to stand on. Water dominates. Back in New Orleans, buildings and bridges dominate the skyline, but water is still everywhere; you cannot go far without encountering it. The Mississippi River, now "contained", is a prominent feature of the city. The alluvial planes of the Mississippi River delta have carved and flooded this region for thousands of years. This is a land of water, mud, and marsh.

Geology

Common imaginations of the Mississippi River watershed and Southern Louisiana do not typically involve thinking about geology. Swamps, bayous, and rivers dominate narratives of the Mississippi River. After all, what are Tom Sawyer and Huckleberry Finn without the mighty Mississippi River? However, land and water are not so separable. In fact, land is so valuable in the Mississippi River delta that each inch or foot is the difference between the flood and no-flood line, and between aquatic and terrestrial life. This importance will be come very clear when I

discuss Hurricanes Betsy and Katrina in subsequent chapters. For now, I will discuss how water has shaped the land and how the land has shaped water.

The inhabitants of Southern Louisiana do not reside on the bedrock of the North American lithosphere, rather all built and natural environments reside on a thin layer of alluvial mud and sentiment deposited from the Mississippi River since the great thaw of the last ice age nearly 20,000 years ago (Campanella 2008: 78). Campanella points out, founded in 1718, the city of New Orleans has resided on soil for 6 percent of the soil's existence, and even the oldest human inhabitants have witnessed one-fifteenth of the soil's life, almost wholly unique for a major urban area (2008: 78). Most of the alluvial mud of Southern Louisiana comes from the far reaches of North America: the Ohio River watershed, Montana and the Missouri River watershed, Northern Minnesota, and everything in between. Until humans began reshaping the landscape of the Mississippi River delta, continuous new deposits of sediment and mud were routinely spread across Southern Louisiana. Although, one of the flattest places in North America, over thousands of years, sediment deposits gradually built natural levees and contours that are hardly perceptible to the human eye.

The topographic contours have played a large role in helping to shape human settlement in the region—the higher the ground the more valuable the land and wealthy the residents, the lower and swampier the ground the less valuable the land and the poorer the residents. Lastly, the alluvial soil that forms the foundation of New

Orleans makes urban development expensive and problematic, if not at times deadly, a point that recurs throughout this dissertation (Campanella 2008: 85). Mud, swamps, bayous, and marshes are important natural and cultural features of Southern Louisiana and New Orleans. Understanding the role geology plays in producing socio-natural vulnerability in Southern Louisiana is an important starting point.

Climate

In New Orleans, water does not only come by way of the Gulf of Mexico or the Mississippi River; it constantly comes from the sky. Although hurricanes garner most of the attention when it comes to water related crises in New Orleans, quotidian rainstorms constantly deluge New Orleans. Particularly in the summer months, rainwater can quickly pool up. From a human's perspective—particularly those not from New Orleans—summertime in New Orleans is oppressively hot and humid. From a plants perspective, however, the abundance of water, sun, and warm air makes for incredible growing conditions.

The climate in New Orleans is shaped by four constitutive variables: latitude, bodies of water, continental position, and topographic elevation (Campanella 2008: 92-93). New Orleans' latitude, at 6 ½ degrees north of the tropics, has the largest impact on its climate. The area between the Tropic of Cancer and the Tropic of Capricorn, including the equator has the highest sun angle, with higher solar radiation, and higher temperatures. New Orleans is just north of this zone. The vast amount of water that surrounds and moves within New Orleans also causes an

increase in heat. Water acts as a heat sink for solar radiation as well as evaporates water molecules into the atmosphere, increasing the temperature and humidity (Campanella 2008:92).

Continental position acts to both reinforce heat and humidity (proximity to the Gulf of Mexico) but also to bring colder weather during the winter months (as compared to other longitudes). Cold fronts and west-east winds from the Rockies, plains, and arctic region cool New Orleans during the winter, snow is even possible, if however rare. Lastly, very low topographic elevation produces the conditions for very hot temperatures but also for the cooling effects in the winter, as cold fronts are not obstructed by mountain ranges. Human beings have also changed New Orleans' climate through the creation of the urban heat island effect—the effect of concrete surfaces on the regions temperature—and through modern temperature controlling technology, air conditioners, which has changed streetscapes and architecture (Campanella 2008:92). Overall, New Orleans has a distinctly maritime yet continental climate that fluctuates depending on the time of year and the movement of bodies of air from the tropics or from the artic.

Ecology

The flora and fauna of Southern Louisiana are wrapped up in geological, topographic, and climatic conditions of the region. Bridging the continental and subtropical zones brings year-round rain but with mild winters (Keddy 2008: 47). It's a paradise for plants. Two recurring phenomena further create the ecology of

Southern Louisiana: floods and fires (Keddy 2008: 47). The distinct habitats of Southern Louisiana have been repeatedly shaped by water and fire. Repeated flooding from rain, rivers, and hurricanes creates the marshes and swamps. The various hardwood forests and prairies that grow north and east of the Mississippi floodplain depend on fires to renew and reshape the habitat.

There are seven vegetation regions of Southern Louisiana: 1) bottomland forest, the impacted and endangered forest that grows on the Mississippi River alluvial plain; 2) river swamp forest, the trees that grow out of the swamps, submerged for much of the year; 3) lower hardwood swamp forests, which grow on the higher elevations of the marshes and swamps; 4) marshes, areas that receive massive amounts of flood water and sea water cannot sustain trees, instead other flora thrive here[8]; 5) upland hardwood forests and pine forests, these forests cover the northwest and northeast portions of the Louisiana, stretch west to Texas and East to Florida and South Carolina; 6) savannas, a mix of prairie vegetation and longleaf pine tree, not quite forest, not quite prairie; and 7) prairies, once spanning large areas of western Louisiana, stretching down from the Midwest prairies, with only one-percent remaining today in Louisiana (Keddy 2008: 52-90). All of these habitats have been drastically altered and transformed over the hundreds of years of human activity. Some of them, such as the bottomland forests, marshes, savannas, and prairies, are in danger of disappearing.

[8] Fresh water marshes have greater plant diversity than salt water marshes, about 93 species for the former to 17 species for the latter (Keddy 2008: 64).

Hurricanes

Hurricanes are as much a part of Southern Louisiana as the Mississippi River. For millennia hurricanes have carried the moisture of the Atlantic Ocean and Gulf of Mexico and depositing it over Southern Louisiana in the form of rain and storm surge. During a large storm surge what was once land can be dramatically subsumed into the Gulf of Mexico. Hurricane season runs from June to November every year. This dissertation addresses the immense impact that hurricanes have on human populations, however, from the viewpoint of ecology, hurricanes transform the landscape regardless of human beings. Among the ecological effects is the surge of salt water into freshwater marshes; wetlands are subsumed into open water; fierce winds rip apart forests, creating space for new growth; rains flood low-lying areas; and winds and water carry seeds to far away locations (Keddy 2008: 43). Ecologically speaking, hurricanes are beneficial. They also transform the geological landscape and coastline. Hurricanes are only catastrophic when they interact with human populations, technological infrastructure, and social, political, and economic systems. Let us now look at how humans have used and transformed Southern Louisiana, and in turn made human inhabitants more vulnerable to hurricanes.

Humanizing the Landscape Part 1: Indigenous and early Euro-American Economies

Before Europeans colonized the Mississippi River Delta, Native Americans had settled the region for thousands of years. Contrary to the myth of the "noble savage," or what in 2011 can be called the Avatar narrative, the Native Americans of

the Mississippi River did not passively and harmoniously live within nature. Rather, they used and transformed nature by fishing, hunting, farming, mining, and city building. Campanella writes, “Indians, like anyone else, exploited their environment to the capacity of their technology” (2008: 99). Large villages hugged the Mississippi from present day St. Louis, such as Cahokia with an estimated population of 40,000, to Natchez, Mississippi (Keddy 2008: 108).

In southern Louisiana there were five dominant tribes, the Caddo, Atakapa, Tunica, Natchez, and the Chitimacha. The people of these tribes relied on farming corn, beans, squash, sweet potatoes, sunflowers, and tobacco. Further transformation of the landscape resulted from higher fire frequencies, as tribes used fire to maintain open forest conditions and increase food supply for game animals (Campanella 2008: 100; Keddy 2008:109). Near the coast and marshes, tribes captured fish using weirs, traps, and nets and harvested clams, crabs, and oysters. Before Euro-Americans wiped out the bison populations of North America, bison were also found as far south as Louisiana, and were another resource for local tribes. The numerous bison herds seen in the 1700s by Iberville and his men, however, owe their existence to the decrease in Native American populations as a result of disease brought by first contact with Europeans nearly two hundred years earlier.

Other resources were also adapted and mined from the region, thus shaping the landscape. Along Lake Pontchartrain, the large lake that borders New Orleans to the north, tribes accumulated massive amounts of shells of rangia clams. They used

the clamshells to give their settlements elevation along the lake (Keddy 2008:109). In northern Louisiana and on the southern coast of Louisiana a major part of the economy and culture was salt mining. Large salt domes rise above the flat earth, one as high as 150 tall, now called Avery Island. These domes provide evidence of salt mining by the native peoples of the region (Keddy 2008: 109). From fishing, hunting, farming, mining, and city building the people of the Mississippi River used and transformed their landscapes, not nearly as dramatic as the Europeans and Euro-Americans in the 18th, 19th, and 20th centuries, but enough to have humanized the landscape and changing the ecology to suit their needs.

The indigenous people of Louisiana met the same fate as indigenous peoples throughout the Americas: disease and mass death. The great dying unfolded quickly. By the time of Iberville and Bienville, the Native American populations of the southern parts of North America were severely impacted by disease. Although the myth that the Native Americans of the region lived harmoniously within nature, never transforming it, is false; Richard Campanella points out that the great dying created spaces of forest and ecological growth that made the region seem more "pristine" in 1750 than it would have in 1492 (2008:101).

Nonetheless, the tribes that survived in the region aided Iberville and Bienville and their men in establishing the small village that would become New Orleans. Native Americans, who taught the French explorers the regional geography, ecology as well as indigenous knowledge of the plants and safe passages of the lower

Mississippi, aided Bienville in selection of New Orleans (Campanella 2008: 101). Once Europeans began settling New Orleans and the surrounding areas, they quickly began to make significant changes to the landscape and ecology. In the 1700s, New Orleans became a hub of fur trading, which had effects in far away places as tribes and trappers sought to bring much valued furs to market. By the 1800s, plantations began lining the banks of the Mississippi. By 1860, New Orleans had 168,675 inhabitants and the state of Louisiana had a population of about three quarters of a million people (Keddy 2008: 114).

Despite the population growth, in the middle of the 19th century New Orleans did not have any kind sewer system, or any kind of urban infrastructure to protect against floods and hurricanes (Keddy 2008: 114). The 19th century flood and hurricane protection system was the topographic features of the alluvial plane: build on high ground—every inch or foot of elevation made a significant difference in flood protection (Campanella 2008; Colten 2006; Keddy 2008). It was not until the late 19th century, but really the 20th century, that the massive urban, technological, and ecological changes were made to New Orleans and Southern Louisiana.

Humanizing the Landscape Part 2: Urbanization of New Orleans in the 20th Century

Similar to many places around the world, during the 20th century New Orleans city builders transformed the urban and ecological landscape more than had occurred in the previous several thousand years. New Orleans began as a strategic military

outpost, but in the centuries that followed became an important center of economic activity. City builders in the 19th century followed the topography of the flood plain and river system. At their peak, before massive urbanization, elevations ranged from a few feet to nearly twelve feet above sea level at Jackson Square in the French Quarter, where Bienville created the city (Campanella 2008). Plantations fanned out from the natural levee on rivers edge to the backwater swamps based on an old European property system of antecedent cadasters (Campanella 2008: 131). This gave New Orleans its radial street pattern that continues to influence city life today. Further, slaves and poorer inhabitants lived in the backwaters, where they were given land or land was available. This was the origin of the geography of vulnerability.

During the 19th century city building was predicated on taking advantage of the slight topographic elevation changes. Early maps of the city show a city hugging the river. Even today, the geography of race, class, and vulnerability mostly follow the slight topographic changes in elevation. Affluent and predominantly white residents continue to inhabit what Campanella calls the "white teapot", which stretches in concentration from uptown neighborhoods and sweeps like the spout of a tea pot around the rivers high ground through the garden district, the central business district, the French Quarter, and Marigny and Bywater in the downriver section of the city (2008). Poorer residents and African Americans inhabit more precarious and vulnerable lower-elevation areas of the city. Nineteenth-century city building created many of the urban features of contemporary New Orleans, yet the scale of the socio-

natural transformations were relatively modest, following natural features, compared to what was to come in the 20th century. In the 19th century, a socio-political factor, the antecedent cadaster plantation system instituted by the French, and the topographical and geographical factor of the natural levee influenced city building for the first 150 years of New Orleans. During the 20th century, city builders radically altered the city's footprint and socio-natural geography.

The growth of New Orleans follows a typical pattern for a US city. Initial expansion during the late 19th century was followed by accelerated growth in the early 20th century. After World War II there was an explosion of growth, which then saw a decline of population in the central city in the 1960s onward in favored of horizontal suburban growth. White flight and black middle class flight have continued to impact the central city neighborhoods as the former have moved to Jefferson Parrish and the latter to New Orleans East. Throughout the 20th century city builders continuously transformed the urban-ecological landscape in the city. As the city grew, so did the entanglement between society and nature. A vast interconnected socio-natural urban landscape was created, with both uneven development and a geography of vulnerability. Here, I want to highlight the origins of the social and technological water management structures that help shape New Orleans fate. The full impact of these developments will be dealt with in subsequent chapters.

Socio-natural Transformations

In the 20th century marshes and swamps became the home to tens of thousands of people. Rising prosperity of the city and technological developments enabled city planners to build massive levee, canal, and pumping systems to drain the backwater and open them up to real estate investment and development (Colten 2006). Although there were canal and levee projects throughout the 19th century, and in some cases these projects fueled real estate speculation as well as increased flooding, it was during the 20th century that the massive reworking of the landscape took place. These transformations took a few forms: containing and controlling the Mississippi River, expanding and building new canal networks, erecting human made levees, and building a electric mechanical pumping system (Colten 2006). A notable example is the containment of the Mississippi River, which was completed between the 1930s and 1960s (Campanella 2008: 206). After the disaster of the 1927 Mississippi River flood, engineers built floodways, spillways, and runoff channels; they strengthened and raised levees; and created reservoirs, locks, dams, weirs, and other structures. The result was a massive altering of the Mississippi Valley and as a socio-ecological byproduct the Mississippi River delta was altered, which depends upon silt and sediment to flow and settle in the delta, producing hundreds of miles of coastal wetlands.

Another good example is the creation of what can be described as New Orleans' "metabolic" water circulation system (Kaika, Heynen, and Swyngedouw

2006; Kaika 2005). One of the grand urban and technical engineering projects has been to circulate the water that accumulates in the city, out of the city, similar to a metabolic system that takes in inputs, processes them, and produces outputs. Water from storm clouds, hurricanes, or accumulates from levee overtopping pools up quickly in New Orleans. This is due to the uneven topographic features where some parts of the city are higher than others. Streets and other human made structures also trap water. The oldest water circulation system in New Orleans is the series of canals that channel water from the center of the city to Lake Pontchartrain. The first canal was built in 1794 on the order of the Spanish Governor Baron de Carondelet. The canal became known as the Basin Canal because it terminated at Basin Street in the French Quarter (Rogers 2008:609).

Throughout the 19th century more and more canals were dug in an ever-expanding water circulation and flood mitigation network. Not all efforts to build a canal system were motivated by floodwater; during the middle of the 19th century yellow fever outbreaks spurred planners and residents to drain the backwater swamps and marshes. Nineteenth and twentieth century city beautification efforts proclaimed the swamps between the French Quarter and Lake Pontchartrain to be "a nursery of disease" and a wasteland that needed to be drained and transformed so that citizens could enjoy uninterrupted breezes from the lake all the way to downtown (Reeves 1984: 2). The canals were an attempt to protect New Orleans from flood but also a

tool drain the swamps and marshes, which were thought of as vile breeding grounds for disease and unusable wastelands by the cities elites (Reeves 1984).

Near the turn of the 20th century, New Orleans planners were adding another tool in their metabolic network: water pumps. New Orleans has built and continues to maintain a system of large pumps that continuously pump water from the low-lying areas to Lake Pontchartrain, Lake Borgne, and the Mississippi River. Demonstrating that socio-natural crisis plays an important part in New Orleans history, the failure of the Hagan Avenue Canal in 1871 helped cajole city officials to find a better way to move water through the city (Rogers 2008: 612). Rudimentary attempts at a pumping infrastructure developed after 1871 but further drainage crises throughout the 1880s propelled the city to establish the Drainage Advisory Board in 1893. However, the City did not have the money to pay for the proposed plan. By 1896, the Louisiana legislature solved this fiscal crisis and proposed a system of taxation to pay for it (612). In 1899, voters passed a municipal bond mandating a tax to fund a municipal water and sewerage, and drainage works (612), thus establishing the New Orleans Sewerage and Water Board, which today continues to operate the City's water and drainage system.

During the Progressive Era city builders drastically transformed New Orleans' urban and ecological relationship by adding many municipal services: water distribution, sewerage, public health works, electrification, telephone, new transportation networks, and modern mechanical drainage and flood control

technologies (Campanella 2008: 182). Over the next 100 years, city builders cleared and drained the unruly swamps and marshes, and made them into urban habitats in relatively rapid fashion. Along with the canal system, the City's system of pumps has enabled new neighborhoods and new horizontal expansions of the city. It also helped remake the class and racial geography of the city as well, which I discuss below. Many of these neighborhoods were inundated by floodwater during Hurricanes Betsy and Katrina, the subject of chapter 3. In one of the great ironies, these urban and technological developments—marvels—are the exact things that make New Orleanians so vulnerable to hurricanes in the 20th and 21st centuries (Colten 2006).

Post-World War II Growth

Like many cities in the United States, New Orleans' population exploded after World War II. Similar to other cities, however, around the 1960s the City of New Orleans actually began to shrink as the size of the metropolitan population increased. Unlike Seattle, however, New Orleans does not have much land to expand horizontally. As I discussed above, for most of New Orleans' history the inhabitants lived on the high ground, along the banks of the river, or along the Metairie Ridge. The development of the water circulation infrastructure in the first half of the 20th century greatly reduced the cost and trouble of building in the backwater areas, towards the lake (Lewis 1976:75). In the 1930s, Louisiana Governor Huey P. Long attempted to expand the city outwards by building two highways, the Airline Highway connecting Orleans and Jefferson Parishes, and the Chef Menteur Highway

east to Mississippi (Castenell 2007:2). However, the highways did not have the intended effect. Only after WWII did a conjuncture of processes come together to allow New Orleans to expand horizontally like many cities post-WWII. Writing despondently in 1976, geographer Pierce F. Lewis remarked, "Because the new additions have been so sudden—and because they are different in population and appearance from the old city—New Orleans has become two cities in the last twenty-five years or so. Within is the compact prewar city. Around it in all directions is the new exploded tissue of suburbia" (75).

The conjuncture that enabled metropolitan New Orleans to follow a similar post-WWII horizontal expansion was based on three developments, 1) the technological water circulation system, 2) a population increase after the war, and 3) and desegregation in the 1950s and 60s (Castenell 2007). After the war, the population of the City of New Orleans actually increased by 133,000 people between 1940 and 1960 (Goody and Clancy 2010). However, the combination of the drainage of swamp and marshland in Jefferson Parish, bordering the western boundary of the City, and the City's expansion into eastern New Orleans coupled with desegregation precipitated what Campanella calls white flight "vertical migration," the movement of mostly white inhabitants north, northwest, and northeast to the newly drained low-lying areas along the lake (2008:188). However, in the 1960s and 70s, middle class blacks also began their own horizontal migration to the lower density, suburbanized New Orleans East.

From 1960 to the 1990s, growth in the New Orleans metropolitan area came at the expense of the City of New Orleans. Table 1 below helps illustrate the rapid growth from 1950 to 1960, but the steady decrease from 1960 to the 1990s. Though compared to some cities, such as Chicago, New York, Los Angeles, and even Seattle, the New Orleans area does not actually have abundant and cheap land to expand horizontally, white New Orleanians did move from the historically high ground areas out into newly created neighborhoods in the old swamp and marshlands, both within Orleans Parish and neighboring Jefferson and St. Barnard Parishes. City planners and mobile inhabitants either had unwavering confidence in the flood protection system, or unknowingly moved into the most vulnerable areas of metropolitan New Orleans. Over the course of the 20th century, triggered by cheap land, perceived threats of desegregation and central city life, and a confidence in 20th century flood protection system, inhabitants living on higher ground declined from 90 percent in the early 1900s, to 48 percent in 1960, to 38 percent in 2000 (Campanella 2008: 189). In the next section I will briefly sketch the history of uneven development and environmental vulnerability in New Orleans.

Table 1 City of New Orleans Population By Decade, Source: Goody and Clancy 2010

Year	Population	% Change
1950	570,445	
1960	627,525	10.0%
1970	593,471	-5.4%
1980	557,515	-6.1%
1990	496,938	-10.9%
2000	484,664	-2.5%

Environmental Inequality

Environmental vulnerability and racial inequality is a cornerstone of the environmental and urban history of New Orleans. Indigenous people were instrumental in assisting Bienville when he decided to create a city on the edge of a massive river, only miles from the delta, and surrounded by lakes, bays, bayous, swamps, and marshes. The local tribe helped Bienville and his men find the strategic "backdoor" route to the Mississippi River from the Gulf of Mexico (through the water passage known as the Rigolets, and into the calmer waters of Lake Pontchartrain). Campanella best describes the founding of the city by as *Bienville's Dilemma*: why (and how) do you build a metropolis in a bad site but excellent situation (2008: 113).

As I have been describing, New Orleans is a fairly poor site for a large city. A plethora of socio-natural conditions as well as challenging climatic and ecological features make the site a bad one. However, for Bienville, and the French Empire that he represented, the bad site was a superb situation (113). Ecological factors were not the first and foremost thing on his mind (Campanella 2008:113; Keddy 2008:110). Instead, finding a strategic center for French rule and control of the Mississippi River, and the gulf region were far more important. Ultimately, for the French, and Spanish and eventually United State's rulers, the bad site was a good situation. Bienville's dilemma still haunts the inhabitants of the city post-hurricane Katrina.

The building of the city involved a racial and ethnic division of labor. The original city builders consisted of 283 white men and women, 171 African slaves, and 21 Indian slaves (Campanella 2008:111). As discussed earlier, Eurasian diseases and other factors quickly decimated the Native American population of the region. European immigrants and African slaves provided the labor force necessary to build the city and the region's economy. New Orleans grew to become a slave hub of the south. Further, as discussed earlier, large slave labor plantations made up the earliest private property system in New Orleans. This influenced where people lived vis-à-vis vulnerability to flooding (whites on the higher ground along the river and slaves in the low-lying backwater), and how the expanded in a radial pattern outwards from highest ground to lowest ground. Further, freed slaves also moved to New Orleans during the antebellum and postbellum periods (Campanella 2008). In the 19th century

slaves and convicts built the first canal, the Basin Canal. By the middle of the 19th century European immigrants were employed to build infrastructure. For example, Irish immigrants built the New Basin Canal in 1830s as a replacement of the original canal (Rogers 2008: 609). Throughout its history racial, ethnic, and class divisions of labor helped build the city and transform the landscape.

Where people lived also follows racial, ethnic, and class geography. Not all areas of the city have equal levels of vulnerability to socio-natural crises or quotidian levels of pollution. African Americans have historically lived in the most vulnerable and polluted areas of the city. As mentioned earlier, up until 1900 most people lived within the small band of high ground along the river's edge. However, this did not mean that even during the 19th century's urban geography blacks and poor whites did not suffer flooding, disease, and pollution. By either inhabiting the backwater fringes or the down river neighborhoods blacks and poor whites inhabited the most vulnerable areas (garbage and pollution flows only in one direction, down river).

After the swamps and marshes were drained between 1910-1940 white inhabitants "leapfrogged" over blacks to the lakeshore neighborhoods (Campanella 2008: 182). However, middle class blacks also left the central parts of the city, and moved lake ward to the neighborhoods east of City Park and then into the subdivisions of eastern New Orleans (Campanella 2008: 182-183). Remaining in the central areas were extremely poor blacks living in the public housing tenements built in the 1960s and the Central City area, but also in the newly bisected Treme and 7th

Ward, cut in half by Interstate 10, and in the Lower 9th Ward. The Lower 9th Ward, the most devastated area of the city during Hurricanes Betsy and Katrina was mostly inhospitable, thus making it an inexpensive and available area for working class blacks (and some whites) to settle throughout the 20th century. Overall, vulnerability in New Orleans can be mapped by race, ethnicity, and class but also intersected with topography, and proximity to polluting industries and poor public services. These are all factors that I will address when looking at Hurricanes Betsy and Katrina.

Environmental Movements

Unlike Seattle and Washington State, New Orleans and Louisiana do not have the reputation, or the history, of well-organized and successful environmental movements at the grassroots or state level. But this does not mean they do not exist. Whereas the State of Washington created the Department of Ecology in 1970, after the National Environmental Policy Act and the creation of the Environmental Protection Agency in 1970. Louisiana state environmental agencies and organizations developed later and unevenly. The Department of Natural Resources (resource management) was created in 1976, while the Department of Environmental Quality (environmental protection) was created quite a bit later in 1986. The full effects of urban environmental policy, law, and governance will be discussed in Chapter 4. At both the State and city level state led environmental policy and law was slower to develop and not as encompassing in Louisiana as in Washington State.

Robert Bullard argues that out of the civil rights movement of the 1960s grew a new movement largely led by African Americans and spread throughout the southern US, the environmental justice movement (2008). Thinking of the environment not as wilderness but as healthy and livable communities, environmental justice activists have been challenging urban environmental conditions across the country since the 1980s. In New Orleans, two mostly black subdivisions, Gordon Plaza and Press Park were built on land that was once the municipal landfill (Bullard 2008: 761). These subdivisions became an epicenter of environmental justice in New Orleans, in what Bullard and Wright call a "black love canal" (2009:23).

In 1969, the federal government instituted a home ownership program in the area, which was aimed at assisting lower income families to purchase their first home. Construction began in 1977 and was controlled and planned by the US Department of Housing and Urban Development. In May 1986, the Environmental Protection Agency (EPA) inspected the Agriculture Street landfill communities and found lead, zinc, mercury, cadmium, and arsenic at the site, in levels, however, low enough to disqualify the area for listing on the National Priorities List. In 1989, despite the warnings of the engineering firm who surveyed the land in 1983 and the EPA's findings, Morton Elementary School was opened. In December 1990, the EPA revised the Hazard Ranking System based on new guidelines implemented in response to the Superfund Amendment and Reauthorization Act of 1986. Community leaders requested a new inspection of the area, and in 1993 the EPA re-inspected the

area. In 1994, the EPA placed the Agriculture Street landfill community on the National Priorities List (Bullard 2008).

As a response, the community's strategy was to force a buyout of their property and to be relocated. The EPA had other plans, and ordered a cleanup with a cost of $20 million, whereas the community buyout would have cost $14 million. In 1998, cleanup began and was completed in 2001. Not long afterwards, the Concerned Citizens of Agriculture Street landfill sued the City of New Orleans for damages and to force relocation from the contaminated neighborhood. Hurricane Katrina temporarily, and for some permanently, relocated residents. Shortly after Katrina, Seventh District Court Judge Nadine Ramsey ruled in favor of the residents. The City was ordered to pay residents thousands of dollars for emotional distress as well as fair-market value for their property, depending on how long residents had lived in the contaminated neighborhood. The ruling was appealed, but in July 2008, the Louisiana Supreme Court upheld the Ramsey ruling, and the nearly 8,000 residents of Agriculture Street landfill won their battle against the City, the public housing authority and the school board for allowing development on a toxic waste dump without telling residents (Bullard and Wright 2009). This story provides one, if not the most famous, example of an environmental justice campaign in New Orleans. In chapter 5, if will tell the story of another, less known campaign, the Betsy Flood Victims movement of the Lower 9th Ward after Hurricane Betsy.

Chapter 2.3: Seattle

Geological and Ecological history

Standing on Hurricane Ridge high atop the Olympic Mountain range you can gaze out over the Puget Sound. It is quite an amazing sight. Looking north, small islands, bays, and inlets punctuate the immense amount of water, and traces of human settlement look like model replicas. Turning around you will see the rising expanse of the Olympic range within Olympic National Park. At sea level, sipping coffee in a café near Pike Place Market in downtown Seattle, you can gaze across Elliot Bay and the Sound and look up at the Olympic range. This is just one reminder of Seattle's embeddedness within the geology and ecology of the Puget Sound. As you wander around the streets of Seattle, if you look, you will see the Puget Sound, the Olympic range, the Cascade Mountains, or the spectacular rise of Mount Rainier, a 14,441-foot active volcano. This is a land of fire, ice, water, and forests.

Geology

Western Washington is a sliver of flat land between the Pacific Ocean and the Cascade Mountains. Moreover, it is a sliver of temperate rainforest between water's edge and the arid dry lands east of the Cascade Mountains, which continue to the Rocky Mountains further to the east. In the Sound, life is abundant. The Puget Sound is also situated along the so-called "ring of fire," the volcanically and tectonically active Pacific plate, which stretches from New Zealand, through Japan, around

Alaska, down the West Coast of the United States, and all the way down to Patagonia at the tip of the Western hemisphere. Over millions of years the continued collision of the Pacific plate with the North American plate as well as eruptions from the many volcanoes of the region have shaped the hills and mountains, river basins, and the coastline of the Puget Basin. The land of present day Seattle was infilled by volcanoes about 10-15 million years ago (Kruckeberg 1991:11). This infill dwarfs the scale and magnitude of the human made Denny regrade in the early 20th century. Over millennia, earthquakes further shaped the landscape.[9] After the last gasps of major volcanic and tectonic paroxysm, around 5 million years ago, glaciers took over as the major shaper of the landscape. During this time, often called the "Ice Age", continuous advances and retreats of the continental ice sheets moved in and out of the Puget Sound. The push of ice and the gush of water during this period gave shape to the landscape that we see today (Kruckeberg 1991:19). About 10,000 years ago, as the last movement of ice receded, the first humans crossed the Bering Straight between present day Russia and Alaska. Over time, some of them made their way to the Puget Sound. A new era had begun.

Climate

As the Earth's climate changed over millions of years and the geology and ecology changed throughout the Puget Basin, so did Basin's climate. A present day visitor will notice water is everywhere. Water flows in the glacially fed rivers, sloshes

[9] For current day Puget Basin residents, the threat of volcanoes and earthquakes remains as evidenced by major earthquakes in the region in 1949 and 1965 (Kruckeberg 1991:18).

the countless inlets, ebbs in and out of the maze like Sound; and, as the near truism goes, it is always in the sky. The wet climate is created by a dynamic feedback between the rain and snow gobbling Cascade Mountains and the diverse temperate forest that begins as soon as the beach ends and ends soon after you cross east of the Cascades. The regional climate control system responsible for the daily weather in the Sound consists of three aspects: 1) the Pacific Ocean, which helps regulate air temperature and generates the moisture saturated air; 2) the semi-permanent high and low pressure cells that hang over the North Pacific Ocean, directing maritime air towards the Sound; and 3) the mountains ringing the Sound, which help to regulate the regional atmosphere (Kruckeberg 1991:35-36). The result is a mostly predictable maritime climate of mild and wet weather. The northern latitude, rain, and an abundant layer of clouds regulates the year round temperature in the Sound, which makes it possible for the plethora of aquatic and terrestrial flora and fauna. Humans seem to either love it or hate it though.

Ecology

The Puget Sound is an aquatic and terrestrial biological wonderland. Though the flora and fauna have changed radically over the past 30 million years, in the last 2 million years a steady array of plants and animals have colonized the Puget Basin. In the last 150 years, Euro-American industrial and urban development radically transformed the ecology, a topic that I will turn to shortly. Even today, however, the forest rises as soon as the sand of the beach gives way to soil. An evergreen forest

surrounds the rivers, inlets, cities, and houses. Though Euro-Americans cut the old growth forest of old, the lowlands of the Sound are still blanketed by a regrowth of these forests. As the lowlands gently turn into hills then morph into the Cascades, the forests, populated by different species of fir, spruce, hemlock, and pine, change with elevation. The forest dominates the landscape. From afar ecologists categorize the Puget Sound as a biome, an ecological area that shares similar characteristics as well as plants and animals. However, this regional biome is actually made of smaller ecological zones, which depend on elevation, terrain, and aquatic features such as rivers, estuaries, bays, or open sea. Any ecological variation of the Sound is always interconnected but sometimes there are particular animals or plants that only live in one zone, whether aquatic or terrestrial. One animal is remarkable for the number of zones, waterways, and elevations in which it lives throughout its life. That animal is Pacific salmon.

Salmon

Salmon are not just a passer-by in the ecologies of the Puget Sound; they contribute to the ecological feedback systems, from the high mountain streams where they spawn and die to the Pacific Ocean where they grow to maturity, and everywhere in between. Bears once scooped salmon from the streams high in the Cascade Mountains, sustaining the bears through the long winters. Salmon die after they spawn, and their decomposed carcasses become the nutrients of a living forest high in the mountains. Throughout their lifecycle salmon contribute to numerous

ecological zones, and help to make the ecology of the Puget Sound. Along with the temperate forest, salmon are a keystone species[10] of the Puget Sound ecology. Salmon and human interaction in the Sound first began with the first peoples 10,000 years ago. Salmon formed the basis of a regional economy and social system that first introduced humans as the fourth major shaper of the Puget Sound landscape, along with geology, climate, and ecology.

Humanizing the Landscape Part 1: Indigenous and early Euro-Americans Fishing Economies

Human salmon economies went through two major phases: Native American then Euro-American. Before Europeans took control of the Pacific Northwest, Native Americans had been harvesting salmon for millennia. Salmon was a primary staple of sustenance for the indigenous peoples of the Puget Sound. The shear abundance of salmon and the relative ease with which they could be harvested made them an ideal source of caloric intake. Around 10,000 people are believed to have lived in the Puget Sound around the time of contact with Europeans and harvested no more than a couple million salmon annually (Montgomery 2003:40). That is about one thousand salmon for every one person. The gift economy of the Puget Sound tribes had two important consequences for what Lichatowich calls, the "first salmon management" system (1999:37). One, the gift economy meant that salmon were not commodities, things to be bought and sold on a market. Rather, power and prestige were gained

[10] A keystone species is an organism that is so critical to a healthy ecosystem that its removal or disturbance threatens the whole system. It was a concept and a term introduced by Robert T. Paine in 1969 (University of Washington 1996).

through the size of the gifts (Lichatowich 1999:34). Thus salmon and other resources were gifted, circulated, and reciprocally traded throughout the region. Two, the gift economy and potlatch system, a formal gathering usually between tribes to exchange goodwill and gifts, meant that there was no private property system by which to turn salmon into commodities. The economy of the region had positive effects on salmon populations. Tribes that suffered through a temporary low period would be gifted salmon from tribes that had an exceptional run. This helped to prevent total depletion on certain watersheds (Lichatowich 1999:35). Moreover, the position of salmon as the central subsistence food as well as the central cultural icon meant that the Pacific Northwest tribes placed great emphasis in understanding salmon lifecycles and preserving their numbers for the benefit of their way of life (Lichatowich 1999 35-37). Without private property, commodification, large human populations, and fishing industries, Native American's harvest never threatened the overall health or population of Pacific salmon.

Euro-American industrial fishing and eventual agricultural and urban development have threatened the overall salmon population, which by the turn of the 21st century is nearing extinction for some species. Euro-Americans brought major changes to the salmon economy once they pushed out the Pacific Northwest tribes. Four transformations impacted salmon: one, large-scale ocean-based commodity fishing; two, timber harvest; three, agriculture and dam building; and four, urban development. These transformations took decades to develop, and one through three

have trailed off in the past 30-40 years, whereas the fourth, urban development has only increased.

All of these transformations resulted in decreased salmon population numbers as well as impacted the capacity for salmon to reproduce and regenerate. Overfishing, the typically identified culprit of salmon decline, made an initial and direct impact on salmon population numbers. In less than 100 years, commercial fishing decimated the Pacific salmon stocks from the Puget Sound to the Sacramento River in California. The Columbia River harvest peaked in 1883, with a catch of nearly 43 million pounds (Montgomery 2003:135). It was downhill after that. As early as the 1880s, government officials in the western states were issuing warnings about the coming salmon collapse. Because salmon are anadromous, meaning they are born in freshwater, migrate to the ocean, and return to freshwater to spawn, they are susceptible to disruptions to their lifecycle in a number of spaces: high mountain streams, lakes and estuaries, the Puget Sound, and the Pacific Ocean.

Timber harvest, agriculture development, and urban development, while not usually killing fish outright, have rearranged salmon habitat, damaging their capacity reproduce, and to grow to maturity in impacted estuaries that are now the Port of Seattle and the urbanized Lake Washington. Urbanization of the Puget Sound has dramatically altered every habitat of a salmon's lifecycle. In the 21st century, the human population of metropolitan Seattle and Western Washington outnumber the populations of wild salmon in the state. As far as sub-Alaskan salmon fisheries go,

the 20th century was a protracted salmon crisis, which formed the developments that led to the overt crisis of the 1970s and re-emerged in the 1990s.

The city of Seattle began on the mud flats across Elliot Bay of present day Seattle. The storied, humble origins of the Denny party sound quaint along side the massive social, ecological, and demographic changes that would push out the Native American societies of the region and transform the socio-natural relations, from the mudflats of Seattle to the stream and forest of Cascade Mountains. During the 20th century the region changed more dramatically than it had in millennia.

Humanizing the Landscape Part 2: Urbanization of Seattle in the 20th century

Like New Orleans, during the 20th century Seattle city builders radically transformed the urban and ecological landscape. Unlike in New Orleans, there was a "double movement," in Polanyi's sense, in which industrialists, land developers, and city planners drastically transformed socio-natural space for needs of capitalist growth, while citizens, some politicians and government workers sought to transformed socio-natural space for the needs and desires of a healthy, livable, and usable city. Sometimes these movements went hand in hand, whereas other times they were marked by conflicts. There were also socio-geographic differences between the competing groups. For example, those who lived in the central city often did not share the same vision as those who lived in the outer city. Seattle Public Utilities was some times at loggerheads with the logging industry for control of the forests and watersheds in the Cascades. The massive transformation of city and nature that took

place in the 20th century sets up the crisis that unfolds in the early 1970s regarding fishing rights and fisheries management, and ultimately the role of urbanization in producing the salmon crisis.

The growth of Seattle follows a typical pattern for a US city. Initial expansion during the late 19th century was followed by accelerated growth in the early 20th century. After World War II there was an explosion of growth, which saw a decline of population in the central city in 1960s onward in favor of suburban growth. Since the 1970s and 80s city planners and mayors have worked to entice business and residents back to the central city, with some gains by the turn of the 21st century. Throughout the 20th century city builders continuously transformed urban-environmental landscapes. As the city grew, so did the entanglement between society and nature. A vast interconnected socio-natural urban landscape was created, constituted by racial, ethnic, and class inequalities. The full impact of these developments will be dealt with in subsequent chapters. Here I will briefly describe some of the most important socio-natural transformations.

Socio-natural Transformations

In the early 20th century during the Progressive Era, transformations of city and nature took many forms: river diversions, hill regrades, and mudflat infill. A notable examples include the Denny Hill and Jackson Street regrades, in which engineers moved nearly 50 million cubic yards of earth and infilled the mudflats on the edge of Elliot Bay, drastically increasing the size of Seattle's waterfront (Klingle

2003:101-102). The future Port of Seattle and the area just south of Pioneer Square were made out of the hills of Seattle. These infills displaced the poor Native American and Eastern and Southern European immigrants that lived on the most vulnerable terrain, but also had direct access to fish and shellfish harvest (Klingle 2003). Another good example was the creation of the Duwamish Waterway and the rerouting of the Cedar River into Lake Washington. The Duwamish Waterway project straightened the Duwamish/Green River as it approached its confluence with Elliot Bay. South Seattle and Harbor Island, as mentioned early, were created from the hills of Seattle. The Duwamish Water way would provide the home for the Port of Seattle and the industrial center of the Puget Sound—Boeing is located here. The Duwamish was also home to the Duwamish Tribe—the tribe of Chief Seathl. This river system also included the Black River, the Cedar River, and the Green River, all historically containing heavy salmon runs.

The three major Rivers that flow through Seattle, the Duwamish, Cedar, and Sammamish were all altered in the early 20th century (see Figure 5). In the first decade of the 20th century, City engineers, after wining a court case against local property owners, diverted the Cedar River from its flow through the Black River into the Duwamish to a new course that emptied into Lake Washington. In 1910, City engineers and the Army Corp of Engineers opened Lake Washington to the Puget Sound by building the Lake Washington ship canal. In doing so, a new river system was created for the Sammamish and the newly connected Cedar River.

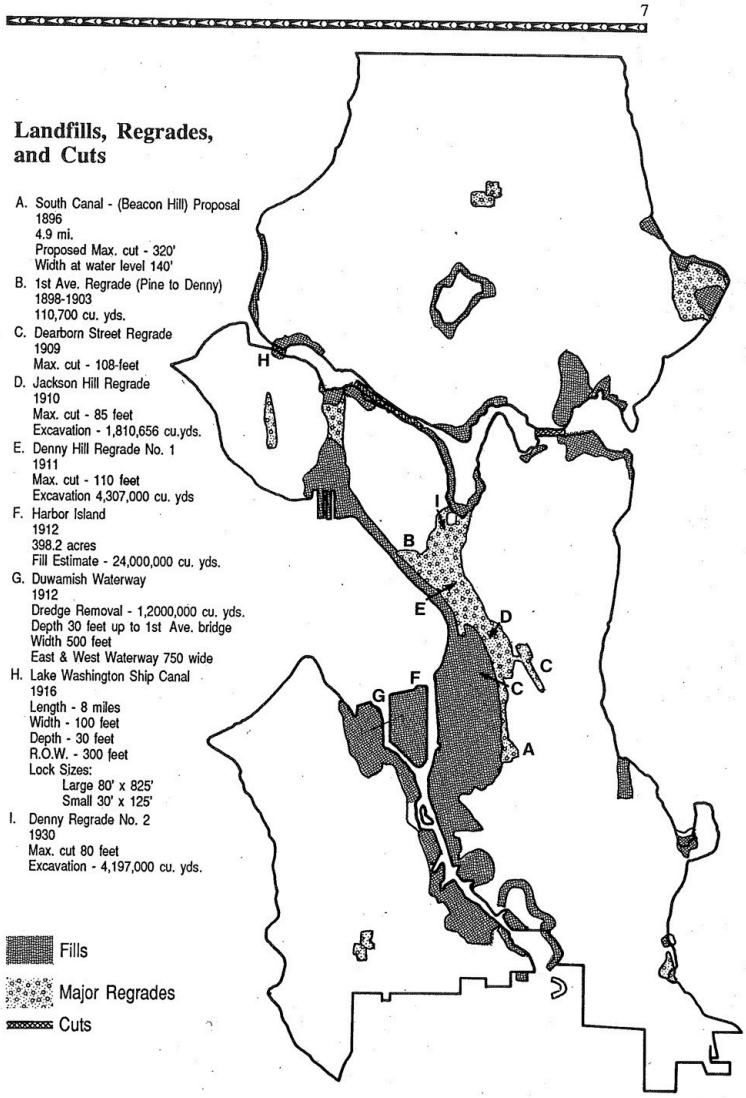

Figure 5 Major Landfills, Regrades, and Cuts, Source: City of Seattle

The Sammamish River now flows through Lake Washington, out to Elliot Bay and the Sound, whereas it use to flow south through the lake and out to the Black River and into the Duwamish, then out to the Sound. The ship canal with the addition to the Chittenden locks drastically altered the watersheds and fish habitat of the

Sammamish River and the Cedar River. Lake Washington became a center of industry, shipping, and the home of a large fishing fleet in the neighborhood of Ballard on the north side. Added together these river modifications radically altered the social and ecological landscape. Over the years a number of socio-natural crises have erupted as a result of these changes.

Post-World War II Growth

Similar to New Orleans, and many other US cities, after World War II Seattle went through another round of expansion. The expansion happened in two ways. One, the City annexed previously unincorporated areas, thus increasing the City's jurisdictional footprint. This happened mostly in the north end. Second, population numbers increased all around. The chart below documents some of the annexations, with dates, square miles, and population numbers.

Table 2 Annexations by City of Seattle, Source: Phelps 1978

Lake City District	Sand Point District	Northgate District	Pinehurst District
Ordinance number 82426	Ordinance number: 81655	Ordinance number: 81186	Ordinance number: 81704
Annexed: 1/4/1954	Annexed: 3/1/1953	Annexed: 8/20/1952	Annexed: 3/1/1953
Area: 2.59 sq. miles	Area: 4.4 sq. miles	Area .85 sq. miles	Area: .37 sq. miles
Population: 9,000	Population: 17,500	Population: 4,009	Population: 1,500

The Seattle Post- Intelligencer remarked that these annexations "will mark and important stage in Seattle's steady territorial expansion northward" (Seattle Post-Intelligencer 1952). In a 1970 background paper, the City remarked,

> "The areas annexed to Seattle in the mid 1950's have contributed markedly to Seattle growth. They account for 92% of net population gain for the city between 1950 and 1960, or, if the population already resident in that area at the time of annexation is discounted, for 81% of the new construction of homes and new population growth between 1950 and 1960. They have continued to play a strong part, contributing 49% of city population net growth between 1960 and 1965 and 36% between 1965 and 1969" (City of Seattle 1970).

Hemmed in by water on three sides, the City viewed annexation as the primary means to increase useable land, increase the tax base, grab valuable land, and solve particular needs such as streets, sewers, and other municipal services in unincorporated areas (City of Seattle 1970; Seattle Post-Intelligencer 1952). In the background paper, the City explains the power of annexations: "Without the annexation area, the city would be about 100,000 persons smaller than it is. It would be less well represented in the state legislature, would include proportionally fewer single family homes, proportionally more older structures, have proportionally less commercial tax base, would be proportionally more dense, have proportionally less vacant land for new development, and would not had the participation in public affairs of many able people" (City of Seattle 1970).

The City's northward expansion stopped at 145th Street, where it has remained ever since (See the map below for a birds eye view of the territorial changes). The north end became a site for community and neighborhood environmental activism in

the 1960s and 70s, as residents challenged the infrastructural and commercial changes to the landscape that annexation and growth brought to the area after the 1950s. In particular, the Thornton Creek watershed became an epicenter of citizen-led salmon restoration. I will return to these developments in subsequent chapters.

An increase in total population also occurred in Seattle after WWII. In addition, much of the growth occurred horizontally as the metropolitan region and King County expanded through waves of suburban development. Much of this population increase was due to the boom in the aerospace industry, particularly with Boeing Corporation. From 1900 to 1910 the City doubled in size, and from 1910 to 1930 the city added nearly 100,000 people. Then for two decades the population numbers plateaued at around 350,000. After WWII, the City grew from 350 thousand to a peak in 1960 of 557,097 people. Similarly to New Orleans after the peak in the 1960s the City lost population through the 1970s and 80s, coming close to 1950 levels by 1980. Through the 1990s and 2000s, Seattle actually gained population as more people moved back to the central city. City planners and leaders put great emphasis on luring residents back to the City.

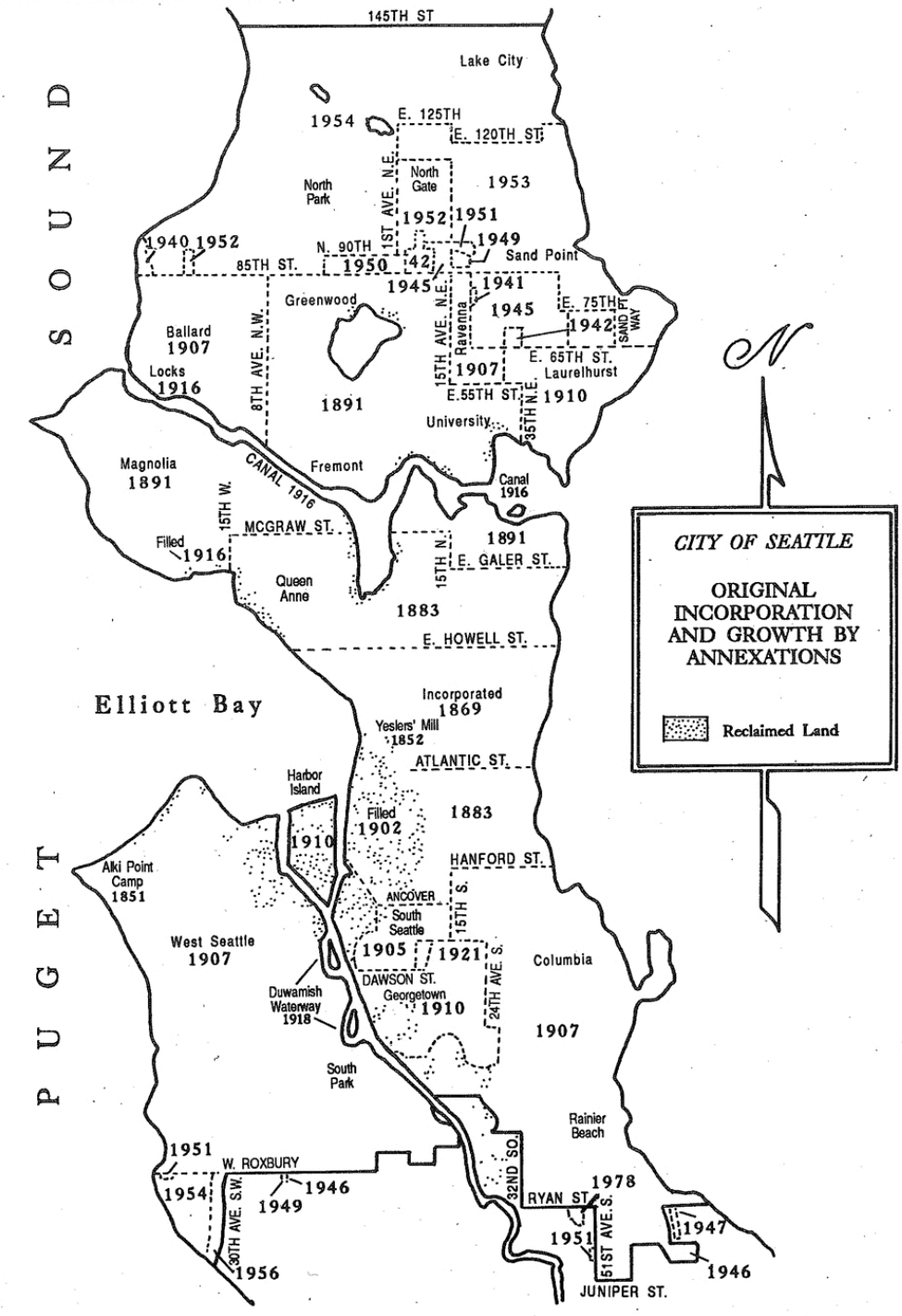

Figure 6 Map of Seattle Annexations and Land Claims. Source: City of Seattle

Nevertheless, during the same periods King County grew at faster rates than the City, and became to suburban periphery of Seattle. In 1950, the population of King County was 732,992 people with a steady increase of about 100,000 to 200,000 per year. In 2000, King County had a population of 1.7 million people (Puget Sound Regional Council). Unlike the City, King County grew during the 1970s, albeit at a slower rate than the 1950s and 80s. The overall central Puget Sound went from a 1950 population of 1.2 million to a whopping 3.3 million people by 2000 (Puget Sound Regional Council). The population numbers by themselves are not that interesting. What the numbers allude to, however, are the massive social, economic, and environmental transformations that occurred in in the second half of the 20th century in Seattle.

Environmental Inequality

From the beginning Seattle has been organized by a racial and class geography. Euro-American settles pushed Native Americans further and further from their accustomed living spaces, eventually settling them on demarcated reservations—much like what transpired across the United States during this time. Yet, Seattle builders were keen on keeping tribal heritage alive, albeit only in the realm of signifiers and narrative, including the city's name. However, urban Seattle has never been devoid of living indigenous people (Thrush 2007).

As waves of white colonists moved east during the 19th and 20th centuries to settle in places like Seattle another racial hierarchy within Euro-America was set into

the fabric of the urban geography. Poor "ethnic" whites, mostly from southern and eastern Europe, formed the basis of a second-class citizenship. These people, mostly working in the extractive industries, including salmon fishing, lived in the most vulnerable and precarious areas of the city. In particular, many of them lived along the mudflats, close to the water's edge (Klingle 2003). They lived near the water in order to harvest shellfish and other foods in order to supplement their income.

Klingle details that for early entrepreneurs the early real estate problem in Seattle was mudflats and tidelands, which were neither earth nor water. Real estate speculators and developers demanded clear boundaries between terrains so as to provide an easier measure for exchange-value. Solid land has exchange-value in so far as it can be developed. Water has exchange-value in so far as it allows access to docks for boats and access to the open waters of the Sound. From the capitalists point of view mudflats and tidelands were a no mans land, offering poor exchange-value because no development could take place nor did those spaces grant access to open water. For poor Greeks, Italians, Swedes, Jews, and Native Americans, squatting and living in these in-between spaces provided them access to affordable housing and subsistence resource extraction (Klingle 2003: 81). From an ecological standpoint mudflats and tidelands are important transition zones between ecological zones, and have high use-value for the plants and animals that live there as well as for the general health of the regional ecology. For the capitalist city builder and city planners these spaces needed to be annihilated. And over time they were.

Seattle's African American population has an interesting, if not largely ignored history. Black Seattlites were granted the right to vote in 1867, and black women were granted voting rights in 1883, both well ahead of national laws (Taylor 1995:2). Additionally, in 1890 the City passed a public access law that granted blacks equal access to restaurants, hotels, and public transportation (Taylor 1995:2). In general, Seattle's black population never had to face the collective violence that blacks faced across the US, mostly in the south (Taylor 1995:2). Nonetheless, blacks were also part of the historic racial geography. Like other minorities in the city they have tended to live in enclaves—both out of strategy and as a consequence of segregationist policies. During the 1960s and 70s Seattle had a lively and active civil rights movement, one that Taylor (1995) remarks both followed the general thrust of the national movement, but which operated within its local context and history. The white liberal Seattle narrative endures but over generations blacks have fought for better living and working spaces and continue to create alternative spaces and narratives to counter the hegemonic racial geography.

Historically, like other US cities, Seattle has been organized around geographies of class and race. Often the transformation of natural landscapes went hand in hand with the dismantling or relocation of working class whites, Native Americans, Asians, blacks, and more recently Latinos. The city is still a city of enclaves. Whites have settled north of downtown and out into the far-reaching suburbs and edge cities; blacks continue to live in large numbers south of downtown,

as do Asians and Latinos. The vibrant and self-identifying European immigrant neighborhoods have all but disappeared, with perhaps the exception of the Norwegian and Scandinavian fishing neighborhood of Ballard. Racial segregation in Seattle goes hand in hand with the transformation of nature. As the city progressed, it undermined the resource base of both European immigrants and Native Americans. The latter group was pushed further and further from their historic fishing grounds.

Environmental Movements

In the mid-20th century, city and regional governments have played a large role in transforming greater Seattle's urban and natural landscapes. In the middle of the 20th century, white middle and upper class residents and city governments in the region created the Municipality of Metropolitan Seattle, which came to be known as simple Metro. Metro was formed through intense political battle, pitting residents in the urban core against those on the suburban periphery. The battle lasted years. After a protracted campaign against red-baiting opponents, a dry summer resulting in an alarming algae bloom in Lake Washington, and a renewed coalition, in 1958 proponents were able to secure the needed votes in King County to pass the creation of Metro (Klingle 2003:213-218). Metro was created as a supra-governmental organization that had the power to tax and develop regional sewerage infrastructure and mass transit, regulate zoning, and create parks (Klingle 2003:213). City of Seattle and regional governance structures, such as Metro, operated within the tension of the use-value and exchange-value of the urban and natural spaces of greater Seattle.

Institutions such as Metro, which had the intention of cleaning up urban environmental pollution, and initiatives like the 1972 Seattle 2000 Commission, which attempted to enroll citizen participation in urban and environmental planning, seesawed between protecting, increasing, and enhancing the urban environment and fostering, expanding, and deepening the commercial and industrial use of land in Greater Seattle.

Summary

New Orleans and Seattle are quite different places, yet their histories are not wholly unique, or even separate. To be sure, local geological, climatological, ecological, and human factors have shaped how urbanization has unfolded in both regions. However, urbanization—the production of socio-natural space—is not simply a local or regional process. In both cities, we can see the larger factors at play, from colonial governments and law, to Eurasian disease, to the introduction of capitalism, to the large-scale technological and urban infrastructures of the 20th century. This perspective is the benefit of incorporated comparison. On the ground the history of space looks contained, flat even, without dimension. From the vantage point of comparison we can see the larger regional, national, and international connections. From this point of view space looks curved, connected, and uneven. The myriad of historical events, processes, and conjunctures I covered in these two mini chapters illuminates the entanglement between society and nature in different and similar ways.

All across the United States urbanization and the socio-natural entanglement that accompany it accelerated during the 20th century. Urbanization unfolds as an incorporated generalized process (Brenner 2009b; McMichael 1990). What this means is that local as well as generalized national, and international, events and processes were incorporating to make local and national spaces. The history of any place, such as New Orleans and Seattle, is the simultaneous history of other places, spaces, and processes. Take for example, the geopolitical colonial wrangling that provided the impetus for the settlement of New Orleans, or the contingent fact that Native Americans were susceptible to Eurasian disease, thus clearing the landscape of indigenous economies and peoples. For each city I tried to demonstrate that a conjuncture of events and process (ecological as well as human) has transformed both regions profoundly over the course of millennia and centuries.

New Orleans and Seattle were reworked from cities of mud to cities of gold, and became economic and political powerhouses in different historical periods. In both regions, however, city building has been distinctly wrapped up in the production of vulnerability. Ecosystems, salmon, habitats as well as a plethora of human inhabitants have been made more vulnerable the more the landscape has been transformed. Many of the inequalities and vulnerabilities built into the landscape result from historical forms of anthropocentrism, racism, ethnocentrism, and classism. The production of these inequalities and vulnerability, I argue, is not an accident but rather constitutive of the kinds of social, economic, political, and ecological changes

humans have made in the past 200 years. Although my account of each city has been through the lens of the political economy of urban space and nature, I also tried to emphasize, rather than forming the "superstructure" to the political economy, that knowledge and technology, the state and governance, and social participation and opposition form strands of the entanglement between society and nature in New Orleans and Seattle from the Native American peoples to urbanization in the 20th century. In the following three chapters I will delve more deeply into each strand and demonstrate their entanglement with the socio-natural crises that unfold in the 1960s and 70s and then re-emerge in the 1990s and 2000s.

Part II: Socio-Natural Crisis in New Orleans and Seattle, 1960s-2000s

Chapter 3

Techno-natures:

Technologies of Cities, Nature, and Crisis

Introduction

The building of human settlement in both New Orleans and Seattle has always involved knowledge and technologies of nature. In the last chapter, I highlighted the differences between indigenous people's understanding and use of nature and that of Euro-Americans, both in scale and in scope. For Euro-Americans the modernist narrative has always been predicated on human domination and improvement of nature. However, recurring crises and nascent environmental movements began to chip away the prominence of the modernist narrative (Cronon 1996; Kaika 2005). By the 1960s and 1970s a new phase of environmental regulation was building in the United States (Grumbine 1994; Yaffee 1999). Citizens, tribes, and governments began to push for the regulation of commerce, industry, and by the late 1970s urban development. At the same time, scientists, planners, decision-makers, and others conceived of and implemented a series of technological fixes to the crises of hurricanes in New Orleans and salmon in Seattle.

This chapter is about how city builders, scientists, and engineers used scientific knowledge and technology to build the city, and while doing so contributed to distinct socio-natural crises in the 1960s and 70s. Though the modernist dream of

using technology to control nature is still very much alive, the cases of New Orleans and Seattle show the limit of the technological fix framed as control. Technology has always been important to human society. However, throughout the 20th century urban and industrial development, at least in the industrializing countries, has deepened societies relationship with nature, and in the process, made human and non-human populations more vulnerable to socio-natural crisis. These developments have led to a hybrid urbanism (Swyngedouw 2006), one that melds engineering, design, technology, and nature into the urban fabric. New Orleans and Seattle are "cyborg cities," to use Swyngedouw's apt term (2006).

However, city builders and environmental managers did not see the city as a hybrid space, but rather a separate realm, a bastion against nature. Through the 1970s, they believed that science and technology could solve or circumvent threats seen as caused by or coming from nature. What these city builders did not acknowledge were the larger spatial and socio-natural transformations that occurred throughout the 20th century. In response, in the 1970s, a new environmental management framework began to emerge: ecosystem management. This new framework challenged the modernist notion of control and domination, and introduced a systems approach with the goals of sustaining "ecosystem health, integrity, diversity and resilience to disturbances" (Cortner, Wallace, Burke, and Moote 1998). Emerging in the field of environmental science, however, this framework has had a limited understanding and concern for urban ecologies, and the increasing role that urbanization plays in

ecosystem changes (Pickett, Burch, Dalton, and Foresman 1997; Spyke 2001). The contemporary cyborg city is susceptible to crisis, and repeatedly city builders have deployed new technologies and technological systems to address the crisis. But in turn, this has often led to the emergence of new crises.

In place of natural disaster, in Chapter 1, I advocated for the concept of socio-natural crisis. However, prima facie, what does that term really mean exactly? To answer this, I problematized disaster research by finding what we can learn from comparing crises that appear *to come to us* (hurricanes), and those that appear *to come from us* (salmon decline). I argue in this chapter that the kinds of scientific and technological systems deployed in each city shapes the geography of vulnerability in unique but similar ways (Pelling 2003). In New Orleans the apparent technological fix for the crisis are the levee and pumping systems, whereas in Seattle, the fix seems to be deeply tied to governance practices. However, in both cases scientific and technological practices are the threads by which we can compare crises that appear to come to us, and those that appear to come from us.

In building New Orleans on alluvial flood plains at the mouth of the Mississippi River, city builders constructed New Orleans into the fabric of the wetlands of New Orleans. In doing so pre-existing wetlands were transformed and then diminished, supplanted by a hybrid space of a new urban ecology. Seattle city builders faced a different ecology than that in New Orleans. The Puget Sound was a land of abundance: water, trees, and fish were everywhere. City builders constructed

Seattle into the fabric of the temperate forests of the Puget Sound, and into the fabric of the millennia old salmon habitat. In doing so, pre-existing social and ecological relations were transformed into a new urban ecology, one that became a center of extractive industries. In both cases the outcome is recurring crisis, neither coming to us nor coming from us, but rather the coming together of social and ecological relations.

City builders, scientists, and engineers repeatedly sought technological solutions to remedy these vast socio-natural transformations. They hoped to dominate or circumvent nature. This is the modernist trap. In New Orleans an expansive levee, canal, and pumping system circulates water through and out of the city. It is designed to keep the city dry. In Seattle, river modifications in the form of dams and river diversions remade the urban and aquatic landscape. To compensate, planners and engineers relied on fish ladders to get the salmon past the barriers. To further compensate, they also introduced new breeds of hatchery salmon, and in the 21st century, genetically engineered salmon. In neither case have these efforts achieved the results scientists, engineers, and decision-makers hoped for, and in both these attempts actually further entangled the city with nature and made humans and non-humans more vulnerable to crisis.

Urban Techno-natures

Instead of modernist weapons against nature, the technologies that I will discuss in this chapter are better seen as always part human and part natural; they are

techno-natural artifacts (White and Wilbert 2006). Their existence is shaped by a complex matrix of human actions and natural processes. The case studies I present below demonstrate the mistake of thinking that these technologies can control nature; instead, these technologies increasingly constitute our entanglement with nature. White and Wilbert write, "the term 'technonatures' highlights a growing range of voices that are ruminating over the claim that not only is it the case that knowledge of our worlds are ever more technologically mediated, produced, enacted, and contested but also that many modern peoples find themselves, or perceive themselves, as ever more entangled with things, with technological, cultural, urban, and ecological networks and diverse hybrid materialities" (2006: 99-100).

The city itself can be seen as set of technologies aimed at the reproduction of social systems (Kaika 2005). The modern city enables the flow of capital, labor, people, waste, electricity, and non-human animals in, through, and out of the city (Swyngedouw 2006). These systems are critical for the operation of the modern city. Urban environmental historians Tarr (1996) and Melosi (2005[1981]) have detailed the development of urban technologies in the 20th century, including systems to deal with such things as human waste, garbage, sanitation, and urban water. The building and implementation of these systems have reshaped and produced new socio-natural relationships. Overall, many cities in the US have become cleaner as a result, but often environmental problems have shifted around, either to new parts of the city or to the hinterland, or to cities in other parts of the country or in other parts of the

world. Because of the increasing entanglement of cities and nature, the history of urban ecology is not set only in the hinterlands and wild lands typical of most environmental histories, but instead it is about how nature becomes incorporated in and circulates through the city (see Cronon 1991 and Kaika 2005). Twentieth century urban technologies came to mediate the urban-nature relationship. Nature was becoming urbanized, at the same time the city was become more entangled in nature. White and Wilbert point out, "We not only need to understand how nature is becoming urbanized but also how the urban and the city itself needs to be understood as a set of complex socio-ecological and socio-technological processes" (2006:100).

Ecosystem Management

A new environmental management framework crystalized in the 1990s under the rubric ecosystem management (Grumbine 1994; Yaffee 1999). This new framework, which actually began in the 1970s, grew out of a critique of the dominant use framework, which reigned supreme from the 19th century to the 1950s. The dominant use framework was based on the modernist notion that humans are separate from nature, and that management should focus on promoting single-purpose human use (Yaffee 1999:716). In the 1960s and 70s, this framework shifted to multiple-purpose use, which recognized the diversity of human use. Nonetheless, these modernist and industrial frameworks saw nature as a commodity to control for optimal human use.

Rather than offering a singular, coherent framework, Yaffee (1999) nicely separates ecosystem management it into three distinct meanings: 1) environmentally sensitive, multi-use management, 2) ecosystem-based approach to resource management, and 3) ecoregional management. Yaffee argues that each meaning can

Figure 7 Ecosystem Management Continuum

be placed on a continuum from anthropocentric to biocentric to ecocentric. On the left, environmentally sensitive, multi-use management fits with anthropocentric, ecosystem-based approach fits with biocentric, and ecoregional management fits with ecocentric. Each framework is both an ethical and political claim about the human-nature interface and applied science and management. Here are quick descriptions of Yaffee's typology:

> 1) **Environmentally sensitive, multiple-use management** continues to focus on the primary objective of satisfying human interests by fostering production of different outputs desired by people, but it recognizes the constraints imposed by ecological systems and some aspects of their complexity (716).
>
> 2) **An ecosystem approach** sets out to maximize ecological integrity or health subject to the need to allow sustainable human uses. Rather than managing arbitrary administrative units or landownership boundaries, managers seek to define boundaries that match the problems or issues addressed, many of which should be defined by their ecological characteristics (718).
>
> 3) **An ecoregional management approach** adopts many of these same principles for management but differs in its view of ecosystems and management. In this view, an ecosystem is no longer an abstract concept implying interconnectedness and complexity. Rather, ecosystems are identifiable places, real geographic units that can be mapped on the landscape and that fit together in a nested hierarchy (718).

Each framework references a different center: framework one continues to place humans at the center, while recognizing the need for healthy ecosystems; framework two places biota at its center, focusing on protecting key plants and animals, while advocating for sustainable human use; and framework three places the ecosystem at the center, and is less concerned about individual biota, and more concerned with ecological process of the entire system.

Ecosystem authors acknowledge the limits of ecosystem framework. One, it is important to note, that although there are historical contexts in which people developed these frameworks, including dominant use, there is continuity of practice of each of the main environmental management sciences and strategies (Yaffee 1999). Old and new frameworks, practices, laws, and policies coexist. This has led to disjointed management as well as conflicts over policy implementation (Cortner et al. 1998). Two, overlapping and adjacent jurisdictional boundaries, and the fact that socially constructed ecological boundaries (ecosystem approach), or actually existing ecological boundaries (ecoregional management) do not always align with political and administrative boundaries (Cortner et al. 1998). Again this creates scientific and governance barriers. Lastly, economic dimensions, whether fiscal or conflicts over private property and commodity production, prevent implementation of ecosystem management strategies. Despite its potential to reshape environmental science and management, and the fact that it acknowledges the social construction of knowledge

and the politics of management (Yaffee 1999), ecosystem management faces the above limits to its actual implementation and success as a new management strategy.

My case studies show another limit to ecosystem management: it is almost entirely non-urban. Based in environmental science, practitioners and theorists position ecosystem management as a remedy to industrial and urban society. This is a significant limit and disciplinary oversight. Though they acknowledge science and technology as embedded in social, economic, and political systems (Cortner 1998), they have not fully recognized how urban areas have become new ecologies, which humans and non-humans use and circulate through. My case studies demonstrate that for humans, non-human biota, wetlands, and ecosystems, in both New Orleans and Seattle, the urban ecology has become a signification space in which society-nature relations take place. In both cities, scientists and decision-makers have identified the city as a specific site of each crisis as well as identified the process of urbanization as a cause. However, ecosystem management is ill equipped to deal with eco-urban space in which the crisis of hurricanes and salmon take place.

The concept of socio-nature can help us here. I propose that neither an anthropocentric, biocentric, or ecocentric framework will adequately address the urban dimension of these recurring crises. We will be stuck because an anthropocentric position could continue to posit the city as the space of the *anthro*, where as the hinterland and spaces further out as the *natural*. Management would then bifurcate. The biocentric and ecocentric approaches have considerable social

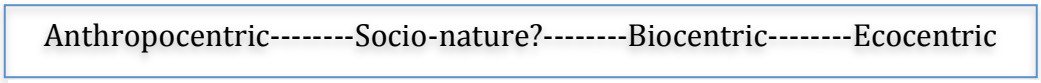

Figure 8 Adding a fourth framework between anthropocentric and biocentric

justice implications. Should nature be prioritized over human need? Do biocentric and ecocentric frameworks contribute to the privileging of some spaces and subjects, human or not, over others? The environmental justice framework I discuss in Chapter 5 will explore this in more detail; here I want to foreshadow these questions. Urban political ecology, with its recognition of entanglement, similar to ecosystem management, has an advantage over ecosystem management because it explicitly synthesizes the social and ecological, and the ecological and the urban. The crises of hurricanes and salmon are wrapped up in the production of hybrid urban ecologies. Any solution needs to address the entangled techno-natural systems, urban development, and political decisions that give rise to these crises.

Chapter 3.1: New Orleans

1960s

Hurricane Betsy happened at the height of 20th century modernism. Although facing some criticism from affected residents, after the hurricane engineers and planners doubled down on the hurricane protection infrastructure, the levee system. The response to Betsy was "build them higher, build them everywhere." Working within the modernist framework, post-Betsy planners and engineers saw the levee technology as a solution to what they thought was a technological problem. However, my story will show the problem that was only partly technological. Further, by thinking of the levees as only a bulwark, and instead of vulnerable techno-natural system, planners only made New Orleans more vulnerable to hurricanes.

A Hurricane Named Betsy

Before the Weather Channel and 24-hour cable news, New Orleans meteorologist Nash Roberts became something of a celebrity for being one of the few people to accurately predict the path of Hurricane Betsy.[11] Residents of Southeast Louisiana came to rely on Roberts, and trust his judgment (Gauthier 2010). Using felt pens and rudimentary maps, Roberts would calmly draw the path of the hurricane, which gave viewers a chance to get ready. This was a time before local stations used radar and high-tech computers. Upon Roberts death at the age of 92 in 2010, Bill

[11] Roberts also accurately predicted Hurricane Camille that devastated Mississippi in 1969, and he accurately predicted the path of Hurricane George in 1998.

Capo, a reporter for WWL, remembers Robert's impact, "He truly became an icon during hurricane Betsy, everyone became locked into what Nash had to say, from Betsy on, Nash's word was weather law" (Gauthier 2010). Robert's accuracy and in-depth reporting aided residents leading up to Betsy's landfall.

In 1965, like today, Betsy was closely monitored by government agencies and weather stations. For people living along the Gulf of Mexico, Florida, Cuba, and the many islands of the Caribbean, initial hurricane protection actually begins with the US Weather Bureau and the US Navy. A constellation of radar stations, a weather satellite named TIROS X, and Navy pilots who flew into the storms to monitor their conditions were part of a large system of monitoring, tracking, and categorizing of potential tropical storms and hurricanes. The reliability and predictability of this system is of great importance to the millions of people who live in hurricane territory. It is also of great importance to local, state, and federal governments, which must prepare a response to an approaching storm. Hurricanes—however sophisticated our tracking systems—are not easily predictable; nor are they simple systems. For the people of Southern Louisiana and New Orleans the hurricane protection system extend thousands of miles away and is multinational, relying on technologies and people far outside Southern Louisiana.

At first, Betsy did not seem destined to come anywhere near New Orleans. Starting as a tropical depression east of the Leeward Islands in the Atlantic Ocean, it formed into a tropical storm as it began moving west-northwest late in the day on

August 27, 1965. On that day it was given the name Betsy. On August 29, Betsy was classified as a hurricane as it moved 200 miles north-northeast of San Juan, Puerto Rico. Betsy then made a series of loops. The most significant loop was on September 4 as it moved parallel to the Bahamas. A high-pressure ridge over the Eastern United States forced Betsy south towards the Florida Keys, rather than taking a north-northeast route towards the eastern seaboard. On September 8, Betsy sloshed past Miami and made its first landfall at Key Largo, Florida as a category 3 hurricane. It then moved into the Gulf of Mexico, gained energy and speed, and made landfall in the small village of Gran Isle on the Louisiana coast on the night of September 9. A newspaper reported "Only foundations and debris were left where Betsy made landfall in Grand Isle on Sept. 9. In St. Bernard Parish, the fishing villages of Yscloskey and Delacroix Island were washed away" (Times-Picayune 2010). A little time later, it washed over New Orleans. As it did, it put the levee, canal, and pumping system to its greatest test.

Bastion of the City: Levees, the Techno-polis, and the Army Corp of Engineers

Like a medieval castle, New Orleans is fortified in a ring of walls (levees) and moats (canals). Instead of keeping out marauding armies, this system is designed to keep the Mississippi River, Gulf of Mexico, and Lake Pontchartrain from washing over the city. It's a herculean task and requires an immense amount of engineering as well as mechanical systems to work. Life in New Orleans, whether in 1965 or 2005, greatly depends on the success of the system. On a year-to-year basis, the system

actually does a good job keeping New Orleans dry. The Sewerage and Water Board's mechanical pumping stations and canals circulate water accumulated during the rainy months out of the city, while the Army Corp of Engineer's levee system protects from overflows along the canals. It is quite amazing. Unfortunately, the system does not have the best record during hurricanes. The system failed during Betsy, and it failed again during Katrina, resulting in massive damage and death. Analyzing how the Army Corp of Engineers and the S&WB understood the failure during Betsy will give us insight into the complex techno-natural protection system, and demonstrate how efforts to build the modernist, 20th century protection system has actually made much of the population more vulnerable.

During the 1960s and up until Betsy in 1965, Congress, local and state officials, and the Army Corp of Engineers worked to modernize and strengthen the levee and canal protection system (Colten 2009). The New Orleans District Corps of Engineers was given charge of designing and maintaining the levees that protect the city. The period from the late 1950s to the early 1970s[12] was an especially active period of tropical storms and hurricanes in the Gulf of Mexico. These repeated crises aided to the momentum of building up and extending the levee system in and around New Orleans. During this time, the Weather Bureau developed what they called the "standard project hurricane" (Colten 2009:42). This was an attempt to harmonize and

[12] Hurricane Flossy (1956) and Hurricane Audrey (1957) were the two biggest close calls. About 800 people in New Orleans sought shelter during Flossy, but the storm passed well south of the city at the mouth of the Mississippi River (Colten 2009).

categorize storms. The standard project hurricane was defined as a storm with "one-hundred-miles-per-hour winds and a return frequency of about two hundred years" (Colten 2009:42). The Corps predicted that the passage of a storm of this magnitude through New Orleans could inundate 700,000 acres in the region, and 460,000 urbanized acres (Colten 2009:42). Although the Corps acknowledged that the increasing horizontal expansion of New Orleans and the neighboring parishes in the coming decades was going to increase vulnerability and storm damage costs, there was never a coordinated land use policy to curb expansion (see Chapter 4).

The manner in which Corps engineers set standards for hurricanes and created cartographic representations of projected storms greatly shaped the manner in which they sought to build up the levee system. If the levees were a fortress protecting the people against the Gulf of Mexico, the reasoning went, then surely higher walls would be the best means to achieve safety. This is the modernist gamble: believing humans can control nature with increasingly sophisticated technology as well as by sheer quantity of such technology. On the eve of Betsy, Congress and the Corps were still in the planning phase. The failure of the system during Betsy, instead of shifting the course of planning, reinforced the idea that higher, longer, and more levees were the answer. It was not only a political decision, which I explore in the next chapter; it was also a technical and engineering decision. Let us see how it unfolded.

It was only on the morning of Thursday September 9 that the Corps understood that Betsy was going to come ashore somewhere along the Louisiana

coast. Considering that the Weather Bureau and others had been tracking the storm since it began in the Atlantic Ocean, this shows how difficult it its to predict a complex system like a hurricane. It keeps planners, engineers, and scientists guessing until the last minute. The Corps reported, "The unusually high forward speed of the storm, and its erratic course, limited the time available for prestorm preparation" (US Army Corps of Engineers 1965). However, the District Engineer put precautionary measures into effect "for the protection of Government property and installations, including the establishment of a 24-hour-per-day hurricane watch by the Operations Division" (Army Corps of Engineers 1965). The Corps' reported there was only a period of 10 hours in which they had to prepare for the arrival of the hurricane just south of New Orleans at Grand Isle (Army Corps of Engineers 1965).

You might imagine that heavy rain, wind, and the Mississippi River might be the biggest threat to New Orleans, but in fact, during Hurricanes Betsy and Katrina, it was massive tidal surge, which came through the backdoor of the City, the northern and eastern portions. To mobilize for the tidal surge the Corps reported:

> Vast areas of Orleans, Plaquemines, and St. Bernard Parishes were inundated by the tidal surge that accompanied the storm. This surge either overtopped or breached the non-Federal levee protecting these areas. Because of the low elevation of the flooded areas, it was necessary to pump out the floodwaters. The Corps mobilized eight dredges to aid in the relieving the flooding…These dredges worked continually until the area was essentially dry (1965: 8).

During the post-Betsy hearing held on September 25, 1965 Major General Ellsworth I. Davis, Corps of Engineers testified, "First, wind damage, for which there is little

means of protection. We don't know how to protect against that at this time. Second, flooding from the torrential rains which generally accompany hurricane, and for which protection can be provided by adequate drainage and pumping facilities; and last, and far from least, flooding along the coastal areas caused by extremely high tides generated by the hurricane winds" (United States Congress 1965: 35). Governor McKeithen testified that "The Corps of Engineers has declared that a tidal rising to the height of 26 feet was responsible for the vast great avalanche of water was responsible for the vast flooding and consequent water damage that resulted from the storm" (29). Offering a contradictory assessment, the Major General Davis testified, "These tides approximated 10-12 feet in height in the vicinity of New Orleans, and reached a height of about 16 feet down near the mouth of the river" (35). Tidal surge was strong, but it was the failure of the levees that caused widespread flooding in the 9th Ward and New Orleans East.

Assessing the Failure and the Future

Assessing why something failed is always an assessment of the future. From day one of the crisis, leaders vowed that this would never happen again. To make sure it did not, planners, politicians, engineers, and scientists had to understand why it happened. The first cause was attributed to the massive tidal surge, as discussed above. The second cause was the massive levee failures along the Industrial Canal, over topping of levee in the 9th Ward, St. Bernard Parish and along Lake Pontchartrain. The city pumping system also failed when 90% of the city lost

electricity. The probable third cause, and the most controversial, was the effect that a deep-water shipping canal, called the Mississippi River Gulf Outlet (MR-GO), had on funneling storm surge into the Industrial Canal and into the more developed areas of the city. The diagnosis of the crisis and the unshaken belief in the levee system led to the doubling down and expansion of that system.

The levees that failed became the levees that planners deemed would save the city in the future. Governor McKeithen declared the importance of the levees, "I think perhaps we are right in first immediately attempting to protect this metropolitan area where approximately a third of our citizens live; but then as I say, we must proceed I submit with protecting our entire coastal area" (United States Congress 1965:11). As governor, he wanted to protect the entirety of coastal Louisiana. However, disagreement ensued as to whether time and money should be spent on protecting all of coastal Louisiana or the urbanized parts in and around New Orleans (Colten 2009: 47). To protect New Orleans and to protect the urbanizing areas east of the city, and the down river 9th Ward and St. Bernard Parish, levee expansion and revamping took place in these areas, rather than the entirety of coastal Louisiana.[13]

Levees failed or were overtopped along three human made canals: the Industrial Canal, the Intercoastal Waterway, and the Mississippi River Gulf Outlet. All three human made waterways cut through the wetlands that surround eastern New Orleans, and all three bring water, along with economic and industrial activity, into

[13] It was a bit of the practice of sacrificing the hinterland to save the city.

New Orleans. Water also overtopped the back levee in the Lower 9th Ward and St. Bernard Parish. Portions of the 7th and 8th Wards, Gentilly, and Pontchartrain Park (the first contemporary subdivision for African Americans) were flooded along with the relatively undeveloped (and developing, see Chapter 4) portions of New Orleans East. These were the areas targeted for levee revamping after the storm (Campanella 2008:322).

From an engineering stand point, the Corps had identified two projects to revamp the levee system: one, build higher levees, two, build a levee barrier around New Orleans, which would include gates at the two entrances to Lake Pontchartrain, Chef Menteur Pass and at Rigolets (Colten 2009). Major General Davis of Corps testified,

> The second project is that Lake Pontchartrain and vicinity project shown in green at the upper right; will protect the area of St. Charles Parish, north of the Mississippi River and downstream from the Bonnet Carre Spillway; Jefferson Parish north of the Mississippi River; New Orleans proper and its suburbs of Citrus and New Orleans East, Chalmette area of St. Bernard Parish and Mandeville on the north shore of Lake Pontchartrain. This project includes barrier levee enclosure structures at the Chef Menteur and Rigolets, the two entrances into Lake Pontchartrain. These are there to prevent the gulf tidal effects from entering the lake. The plan also provides for the construction of a lock at the Lake Pontchartrain end of the inner harbor navigation channel (United States Congress 1965: 36).

The Corps favored both approaches and even had plans in place before Betsy to begin work on these projects. However, as I will explore in Chapter 4, political controversies and slowdowns threw the barrier plan into a holding pattern, which it remained in until Hurricane Katrina.

Another factor for the engineers was the characteristics of hurricane. Betsy was a fast moving hurricane with a rather large eye (Hurricanes: Science and Society nd). The hurricane protection classification system developed before Betsy and the properties of Betsy itself contributed to post-Betsy protection plans. After Betsy, planners and engineers designed the levees to withstand a hurricane roughly the size and with the same characteristics as Betsy. In 1965, the standard project hurricane classification was for a storm like Betsy, with 100 mile an hour winds, to appear every two or three hundred years (Colten 2009:43). The National Oceanographic and Atmospheric Administration updated its standard project hurricane classification in 1979, based on data gathered in post-Betsy storms; the Corps did not update and adjust their classification until the 1980s. This left plenty of time for post-Betsy levee construction to be based on early and inadequate models of projected hurricane strength and frequency.

In a Regional Planning Commission, Hurricane Protection Committee meeting in 1969, Chairman Denis A. Barry said this about the Corps post-Betsy report:

> Perhaps the most discouraging thing of all, I read the U.S. Corps of Engineers' report after Betsy, which is very detailed, and it tell us that had the system which they had begun before Betsy been fully completed before Betsy—*and it may not be completed now until approximately 1990 to the year 2000*—had it been completed before Betsy, it would not have been sufficient. The system was designed for the on hurricane in 100 years, and if Betsy was it, then we have had our second hurricane [Camille 1969] in 100 years that the system was designed for (italics added, Dietrich 1969: 6-7).

The Chairman was right; something was missing from the hurricane projection plans. But even if they had been complete, they would not have been enough to protect against Betsy. He was incorrect, however, when he said that the revamped protection system would not be ready until the year 2000. It was not finished even on the eve of Katrina in 2005. The error of the post-Betsy protection revamp came to light when Katrina, a slow moving and powerful hurricane made landfall and passed to the east of New Orleans. The same areas affected during Betsy were once again underwater, and the many of the levees enhanced after Betsy failed, along with levees that were not affected during Betsy.

In a major crisis like Hurricane Betsy much is actually uncertain. Political and economic considerations as well as a lack of engineering consensus made the Mississippi River Gulf Outlet a significant object of controversy after Betsy. Congress authorized the MR-GO on March 29, 1956 (Public Law 84-455) "to provide an emergency outlet from the Mississippi River in the interest of National defense and general commerce and as a safer and shorter route between the Port of New Orleans and the Gulf of Mexico" (United States Army Corps of Engineers 2012a). The MR-GO connects the Industrial Canal and Intercoastal Waterway via a 36-foot deep and 500-foot wide channel to the Gulf of Mexico. Work began in 1958 and was completed in 1968, three years after Betsy. To build the channel engineers dredged through shallow bays, coastal marshes and cypress swamps (United States Army Corps of Engineers 2012a).

Planners and politicians all promised jobs and economic growth and envisioned a new "'Centroport,' a vast import/export complex complete with warehousing, a cargo airport, and road and rail connections" (United States Army Corps of Engineers 2012a). Operating under modernist dominant use framework, the Corps treated the wetlands of Southern Louisiana, not as an ecosystem, but as an open canvas with which they could carve shipping channels without regard the ecosystem. Shipping and extractive industries were given priority in the wetlands for economic and industrial use. By the 20th century, the vision did not materialized, with neither jobs nor an increase in shipping traffic occurring. MR-GO was never an economic success, and the Centroport remained an unrealized idea.

After Betsy, MR-GO's socio-natural impact had been thoroughly scrutinized. During a post-Betsy community meeting organized by the Corps, residents of hard hit St. Bernard Parish openly blamed MR-GO for funneling water up through Lake Borgne (not really a lake, actually a bay connected to the Gulf) and over the back levees of the Parish, which resulted in a great damage in the area (Colten 2009). After Betsy, residents of St. Bernard launched a lawsuit against the US government claiming that the US government was responsible for flood damage (Colten 2009:49). In Chapter 5 I explore the political battles that "settled" this controversy—until it was renewed after Katrina—but here I raise it to point out engineering decisions about the techno-natural infrastructure are formed in overlapping scientific as well as political worlds.

Corps engineers maintained that there was no evidence that the MR-GO contributed to an increase in flooding (Colten 2009; United States Congress 1965). Citing a 1915 hurricane that produced massive tidal surge before the MR-GO, Colonel Bowen testified that the MR-GO did not contribute to the flooding. The original MR-GO levees were constructed at 11 feet, but post-Betsy the Corps planned to raise them to 16 feet. During the testimony Colonel Bowen had this exchange (italics added, United States Congress 1965:41-42):

> Q: Mr Hebert: In the construction, was the possibility of tidal rise or a tidal rise in the future taken into consideration when you placed the levees at 11 feet?
>
> Col. Bowen: In the planning as it's contained in the project for Lake Pontchartrain and vicinity project, which has been approved by the Congress, that is considered.
>
> Mr. Hebert: This is considered? But, prior, in the original construction of the protective levees to the Mississippi-gulf outlet at that time, and with the basis of the information on hand, the judgment was that an 11-foot levee would be appropriate?
>
> Col Bowen: That is correct, sir.
>
> *Mr. Hebert: So, assuming we have another Betsy tomorrow, next week, next year, the 16-foot levee would protect that area?*
>
> *Col. Bowen: Absolutely, sir; in fact, it would take care of something bigger and more dangerous than Betsy.*
>
> Mr. Hebert: "I do want the record to show that the presence of the Mississippi-gulf outlet in no way attributed in any major devastation or major rise of the tidal wave; it would have occurred even if the Mississippi-gulf outlet had not been there?
>
> Col. Bowen: "That is correct, Mr. Hebert.

Colonel Bowen: "Absolutely, sir; in fact, it would take care of something bigger and more dangerous than Betsy." Similar to the story of the levees along the Industrial Canal, the Corps of Engineers was to be proven wrong after Hurricane Katrina about the MR-GO. The MR-GO *did* cause an increase in flooding during Betsy, and it was a major factor in the flooding of New Orleans during Katrina (Campanella 2008).

Future Tech: Storm Seeding

There is one last story that brings the modernist notions of society and nature into relief. This story involves the idea that at some point in the future, scientists will be able to modify the weather and make hurricanes dissipate before they make landfall. Weather modification is the ultimate techno-natural fix for hurricane hazards within the modernist paradigm.[14] Louisiana Governor McKeithen hoped that in the long-term scientists could control the weather and stop hurricanes. He said, "Of course we know that until our scientists can determine how they can seed those storms and perhaps that may come sometime, and let them spend themselves out in the waters; we realize that our only help is hurricane protection" (United States Congress 1965:11). He did acknowledge that for now the technological fix of choice would remain the levees, canals, and pumping system. US Representative Hale Boggs testified,

[14] The idea that hurricanes could be controlled by modern technology was part of a larger movement for weather modification. In 19th century New Orleans the technological fix meant building on the highest ground. In most of the 20th century the technological fix revolved around levees, canals, and pumps. At the height of the Cold War, in the 1950s and 60s, filled with modernist hubris about the power of modern technology, scientists and politicians began dreaming that they could modify and control weather systems like we might control the flow of water through a faucet (Steinberg 2000). See Steinberg's *Acts of God* (2000) for a great history of the dream and practice of weather modification.

> There are other programs underway. There is a great research program being conducted in conjunction with and cooperation of the Navy Department and Weather Bureau called Operation Storm Fury, which is designed if possible to use all of the knowledge of mankind to take a look at what a hurricane is, how to maybe change its direction if possible. It's estimated that 1 hour's energy of a hurricane that size of Betsy is the equivalent of all the electrical energy generated in the United States in a year, gives some idea of the force of this kind of disaster (United States Congress 1965:67-68).

In 1990, Edward Teller, regarded as the "father" of the hydrogen bomb, went as far as to suggest that one day we could even detonate strategically placed nuclear bombs in the area where a hurricane is forming in the Atlantic Ocean, thereby fracturing the storm system, and weakening its potential for harm (Knight-Ridder Newspapers 1990). In the 21st century, geoengineering is taking weather modification from regional modification to the possibility of global modifications to roll back the effects of global climate change.

The point here is that each protection system aims to control and modify nature at different scales, from the local, to regional, to global. As they are today, people during the time of Betsy were searching for the silver bullet technological fix that could save New Orleans from the wrath of hurricanes and from the onslaught of the Gulf of Mexico. During the 1950s-1970s, techno-natural defense systems were built with modernist notions that humans can ultimately control nature. The techno-natural infrastructure enabled New Orleans and the surrounding parishes to grow after World War II. Day to day, the systems did their jobs. However, Betsy demonstrated that a hurricane passing just about over New Orleans could poke holes in the levee, canal, and pumping infrastructure. Rather than re-imagine the relationship between

the city and nature, and the scale and scope of the defense system, engineers and planners—and politicians and residents—doubled down on the modernist dream of controlling hurricanes. The Corps build more and higher levees. The walls were erected higher; the city expanded wider. Luckily, they were spared a direct encounter for decades, but rather than 100 or 200 years, a direct encounter occurred in August 2005. Enter Katrina.

2000s

After Hurricane Katrina the technological infrastructure and the organizations responsible for it, the Army Corp of Engineers and the New Orleans Sewerage and Water Board, came under heavy criticism. Following the storm, attention once again turned to strengthening and building up the defense system. However, in 2005 there was room for a greater critique of the modernist 20th century techno-natural systems. Advocates for an ecosystems approach called for a restoration of the wetlands and swamps that surround New Orleans. They argued that hurricane protection should not only include the levee system but that a healthy and expanded wetland system could be used as a way to protect New Orleans. In this section I want to highlight the similarities to post-Betsy understandings of the crisis as well as discuss some of the ideas that challenge the reliance on the techno-natural infrastructure.

If You Have Seen One Hurricane, You Have Not Seen Them All: A Storm Named Katrina

Hurricane Katrina was not like Hurricane Betsy. Standard hurricane project characteristics help planners and engineers model best and worsted case scenarios, but in the case of New Orleans Betsy became the model hurricane after 1965. After a relative dry spell following Hurricane Camille (1969) and a few close calls in the years prior to Katrina, the New Orleans hurricane protection system was not ready for a storm like Katrina. Moreover, the hurricane protection system designed after Betsy was still not complete. Katrina happened in an age of 24-hour news, extremely mobile reporters, the Internet, and thousands of researchers ready to go. As a result, much more is known and reported about Katrina than Betsy. Although the failure of the human made defense system is largely to blame for the crisis, the unique and peculiar properties of each hurricane system matter. Not every hurricane is alike; and modeling and projecting for the largely unpredictable characteristics of hurricanes is essential to developing better infrastructural as well as evacuation measures.

Like most Atlantic Hurricanes, Katrina began as a tropical depression in the southeastern Bahamas on August 23, 2005. By the next day it strengthened into a tropical storm, and was given the name Katrina. The storm plodded slowly northwesterly, then westerly, as it moved through the Bahamas. It gained in intensity during this time. Just before making its first landfall in Southern Florida, Katrina was reclassified as a category 1 hurricane (wind speed of 75 mph or greater). Katrina slightly lost wind speed as it moved across Southern Florida, but regained intensity as

it moved into the open warm waters of the Gulf of Mexico. Katrina interacted with a mid-level ridged that was centered over Texas. As this ridge weakened and moved west, this allowed Katrina to move further west, then north. Katrina was given major hurricane status on the afternoon of the August 26.

Between August 26 and 28, Katrina continued to move northward, gaining strength as it did. By the morning of August 28 Katrina had reached its maximum wind speeds of 170 mph, and was reclassified as a category 5 hurricane. NOAA described Katrina, at its peak strength, as being comparable to Camille's intensity, though Katrina was a significantly larger storm and impacted a wider area of the Gulf coast. Katrina's category 5 status did not last long (hurricanes rarely remain category 5 for long), but did remain a powerful category 4 storm up until landfall at Grand Isle (the same Grand Isle where Betsy made landfall). Wind speeds at landfall were about 125 mph.

On August 26, there was no certainty which state was going to be hit by Katrina: Louisiana or Mississippi or Alabama. On Friday August 26, Louisiana Governor Kathleen Blanco and Mississippi Governor Haley Barbour declared states of emergency. Still, up until August 27, two days before landfall, planners and scientist were not certain that Katrina was going to move over New Orleans. Even though hurricanes are massive weather systems—Katrina covered the entire Gulf of Mexico—predicting exactly where they will move is difficult. That is why on Friday afternoon, New Orleans-based geographer described the feeling in New Orleans as "Yet as schools and offices closed down in New Orleans of Friday afternoon, most

conversation and email communication concerned weekend plans and next week's meetings, not evacuations and possible closures, much less national calamity" (Campanella 2008:330).

However, by the morning of August 28, it became clear that New Orleans was in the direct path. After making landfall near the mouth of the Mississippi, in the very early hours of Monday August 29, Katrina moved just east of New Orleans—Betsy had moved west of the city up the Mississippi River—and it brought with it heavy rain, wind, and most importantly massive tidal surge. Because the hurricane eye passed to the east of the city unusually severe wind and storm surges put severe strain on the eastern portions of the protection system as well the canals flowing into Lake Pontchartrain (Seed, Dalrymple, Batties, et al. 2005). In the hours after landfall the human made levees and Katrina conspired to drown 80% of the city underwater.

Bastion Redux: More City, More Destruction, More Techno-natures

The bastion did not work, again. A massive wall of water moved in from the eastern edge of New Orleans forcing levee overtopping and levee breaches. Once again, the US Army Corps of Engineers faced opprobrium from residents, who asked how a massive breach in the defense system could have happened. Dredging up controversy from the days of Betsy, two shipping canals, the Intercoastal Waterway, and the MR-GO, were the first structures to allow water to reach inside New Orleans. Around 4:30 a.m. a tide of water overwhelmed the MR-GO guide levees, and gushed to within a few hundred feet of the Lower 9th Ward (Campanella 2008:331). Around

6:30 a.m. another tidal surge sent water up the Intercoastal Waterway, and in the process inundated low-lying New Orleans East (Campanella 2008:331). During Betsy, New Orleans East was also inundated with water, but during that time it was lightly populated. By 2005, it had grown into a heavily populated middle-class black section of the city.

The hotspots during Katrina were many of the same sections of the city that were flooding during Betsy, but Katrina affected many more areas. There were fifty significant breaches during Katrina. Overtopping and erosion, rather than a structural failure of the I-wall levees[15], however, caused the vast majority of the failures (Still et al. 2008:558). There were four I-wall breaches overall. These occurred in the Inner Harbor Navigation Canal (Industrial Canal), the same area that failed during Betsy, and in the outflow canals in the north end of the city. An 11-foot storm surged pushed through Lake Pontchartrain and entered the 17th Street Canal and the London Avenue canal. The canals were not overtopped but, instead, the I-wall levees failed at two locations on the London Ave. canal and one location on the 17th St. canal. Both breaches caused major flooding. The four I-wall levees breached before water levels reached the top of the wall and in a few instances, breached at water levels below the intended design for wall freeboard (Sill et al. 2008:558). As a result of these failures, combined with the topography of New Orleans, which funneled water into the city,

[15] An I-wall levee is a type of structural levee in which a concrete wall is built into an earthen levee and supported by a steel sheet pile underground. The second type, which did cause as many problems during Katrina, was the T-wall levee. T-wall levees have a horizontal cement base underneath the earthen levee with a protruding wall, thus the name T-wall.

nearly 80% of the city was inundated with water, there was billions of dollars in loses, and over a thousand dead.

In the immediate aftermath, many engineers and scientists set out to fully understand the causes of the failure. The Katrina post-mortem engineering reports tell a tale of politicized and conflicting accounts about why the levees failed, and what engineers should do to fix the system. The first to report was the only official US governmental report. The US Army Corps of Engineers, under the name of the Interagency Performance Evaluation Task Force (IPET), conducted this report. After releasing draft reports in 2006, the final report was released in 2008. Understanding what happened is not an easy task. The IPET breaks down the analysis in four categories: 1) the storm, 2) performance of the protection system, 3) consequences, and 4) risk. The interaction between "the storm" and "the performance" was the crucial mystery to be solved. With regards to Katrina, the IPET concluded:

> Wave heights during Katrina were typically similar to those assumed for the design of the structures, except for Plaquemines Parish where they were higher than the design assumptions. Wave periods, however, were three times longer than the design assumptions, particularly along the east side of St. Bernard and Plaquemines Parishes. *The longer period, more energetic waves created much greater potential for runup and overtopping.* Conditions within Lake Pontchartrain were roughly equal to the design criteria for the shoreline structures. *The Mississippi River Gulf Outlet (MRGO) channel, presumed to be a major factor in propagating storm surge into the IHNC, was demonstrated to have little impact on storm water levels for large storms* (italics added, Interagency Performance Evaluation Task Force 2008:2).

With regards to the performance of the protection system the IPET concluded:

> *Reduced protective elevations increased the amount of overtopping, erosion, and subsequent flooding, particularly in Orleans East*. Ironically, the

> structures that ultimately breached performed as designed, providing protection until overtopping occurred and then becoming vulnerable to catastrophic breaching. *The levee-floodwall designs for the 17th Street and London Avenue Outfall Canals and IHNC were inadequate for the complex and challenging environment*. *In four cases the structures failed catastrophically prior to water reaching design elevations. A significant number of structures that were subjected to water levels beyond their design limits performed well.* Typically, in the case of floodwalls, they represented more conservative design assumptions and, for levees, use of higher quality, *less erodible materials* (italics added, Interagency Performance Evaluation Task Force 2008:2-3).

The IPET report was the Corps in-house assessment of the failure of the system to which they are charged with designing, implementing, and maintaining. Subsequent independent reports were released in the years following Katrina that added to as well as challenged the official IPET report (Van Heerden 2007).

Building on and also challenging the Corps report, teams of researchers set out to solve the mystery. The arguments they forwarded can be divided into two camps, those that build on the IPET report and those that challenge it. In the first camp, Dunbar et al. (2008) and Sill et al. (2008) argued that the 17th St. and London Ave. levees were built on top of a buried sandy ridge typical of a Holocene era "bay sound or estuarine, nearshore-gulf, sandy beach, lacustrine, interdistributary, and paludal marsh and swamp environments," rather than the Pleistocene clay, which is much harder and more stable (the Industrial canal levees had thicker soils). Dunbar et al. (2008) conclude, "Weak lacustrine soils were responsible for the levee failure at the 17th Street Canal. The high storm surge in the canals produced elevated pore pressures in the beach sands that ultimately led to the levee failures at the London

Avenue Canal" and that the Corps did not account for soil types during planning and implementation of the canal levees (Dunbar et al. 2008; Sill et al. 2008). Dunbar et al. (2008) and Sill et al. (2008) mostly follow the conclusions of the IPET report, and do not offer a critical analysis.

In the second camp came is the so-called Berkeley report (Seed et al. 2005). This report is more critical of the Corps and the IPET report. Seed et al. (2005) critiques the levee design and implementation of the protection system but also the Corps investigation post-Katrina. Finding many of the same causes, Seed et al. introduce critical conclusions: "Although most of the failures/breaches that occurred were primarily due to overtopping and subsequent erosion, several major and costly breaches appear to have been the result of stability failures of the foundation soils and/or the earthen levee embankments themselves. In addition, it appears that many of the levees and floodwalls that failed due to overtopping *might have performed better if relatively inexpensive details had been added and/or altered during their original design and construction*" (italics added, Seed et al. 2005: v). Additionally, contrary to the Corps, Seed et al. (2005) found that the MR-GO and the Intercoastal Waterway did contribute to flooding in St. Bernard Parish, New Orleans East, and put considerable pressure on the levees of the Industrial Canal, which contributed to the devastation of the lower 9th Ward and major flooding in the heart of New Orleans. As far back as Betsy, the Corps had refused to acknowledge that the MR-GO was a liability to the system. Seed et al. (2005) challenged this position, and in subsequent years political battles ensued to decommission the MR-GO (see Chapters 4 and 5).

In 2007, Raymond Seed, the principle investigator on the Berkeley report, wrote a long and critical letter to William F. Marcuson, III, President, American Society of Civil Engineers (ASCE). In this letter Seed accuses the Corps, and some in ASCE, of inappropriately stonewalling their investigation, covering up facts, and preventing an independent investigation. Seed says, "But it was, of course, really the Corps investigating itself with the help of its own selected consultants. To add credibility, the ASCE would provide an External Review Panel (ERP)…ASCE would be paid $2 million for its part in this" (2007:9). Additionally, Seed critiques the scope of the IPET investigation ("the storm" and "performance"). He says, "The scope of their first year of investigation was to consider only purely 'technical/physical' issues and phenomena. There would be no consideration or study of organizational issues, political issues, funding issues, human factors, etc. Led jointly by Larry Roth and Dr. Paul Mlakar, the mantra was repeatedly espoused at the first ERP meeting that the investigation 'would look only forward'; there would be no looking back, and no consideration of fault or blame" (Seed 2007:9). Seed emphatically concludes that engineers must investigate one another via independent investigations, and that the ASCE should not allow itself to become compromised by working—and taking money—from the Corps. The Corps, and IPET, was firmly in control of the investigation—with a budget of $25 million compared to $250,000 for the Berkeley team.

The most outspoken critic of the Corps was Ivor Van Heerden. Van Heerden was a Deputy Director of the Louisiana State University Hurricane Center until his

dismissal in 2009.[16] Van Heerden (2007) critiqued the Corps on five points: 1) the post-Betsy (1965) Greater New Orleans Hurricane Protection System, mandated by Congress, was not properly conceived to protect against the "most severe combination for meteorological conditions reasonably expected" (28); 2) the levels of protection (crown elevations) of the Hurricane Protection System were insufficient to "resist overtopping by surge and waves associated with a one-in-100-year standard project hurricane. Floodwall and levee crown elevations were built 1 foot to 2 feet low because of an erroneous assumption by the New Orleans District that an elevation of zero referenced to the National Geodetic Vertical Datum of 1929 (NGVD29) was equal to—and interchangeable with—local mean sea level" (29); 3) the Corps did not follow "existing engineering practice and its own guidance for the construction of levees and floodwalls" (29); 4) the "free-flowing, deep-draft Mississippi River Gulf Outlet navigation canal that pierces the Hurricane Protection System on its eastern side" compromise overall system performance; and 5) the system was not "maintained and operated to ensure the required level of protection" over the 40-year construction schedule. Van Heerden said the system "was managed like a circa-1965 flood control museum" (30). Van Heerden recommended a complete overhaul and expansion of the levee system as well as a restoration of the wetlands that surround New Orleans. In short, the Corps were mostly invested in building up and revamping the old system, while a number of engineers, ecologists, geographers,

[16] Much controversy surrounds Van Heerden's dismissal from LSU. He claims he was fired for his continued criticism of the US Army Corps of Engineers following the levee failures during Katrina. LSU gave no public or private reason for his termination.

and activists are advocated for an "ecological defense system" to accompany the structural defense system.

Bringing the Past Into the Present For the Future: More Structural Defense Infrastructure

After Katrina, the Corps got busy rebuilding and revamping the modernist structural defense system. They had to repair the breached levees as well as implement some old ideas, such as pieces of the "high level plan" that was envisioned after Betsy. Specifically, the Corps received authorization to build floodgates at the confluence of the 17th St. canal and London Ave. canal, an engineering plan that was proposed by the Corps as part of their high level plan. Temporary gates were constructed in 2006, and the Corps projects that permanent gates will be completed in 2014. The original plan dates back to the 1960s, but was scuttled in 1992, after the New Orleans Sewerage and Water Board objected to the proposal because the Corps refused to implement pumps to push water past the gates, and out of the canals into the Lake. The Corps argued that pumping was not part of hurricane protection, but instead part of drainage, thus the responsibility of the S&WB. The S&WB forced the Corps to abandon this plan with successful lobbying of Congress for the passage of the Water Resources Development act of 1990, which passed in 1992 (Nelson 2011). This story demonstrates how entangled engineering decisions are with political decisions, something that I explore more fully in Chapter 4.

The Corps also revised the hurricane projection standards. The Corps has adopted a "storm probability" that categorizes based on storm size and intensity,

rather than wind steed, storm track, and forward motion. The Corps, stated, "One hundred year level of protection actually means reducing risk from a storm surge that has a 1% chance of being equaled or exceeded in any given year. The 1% chance is based on the combined chances of a storm of a certain size and intensity (pressure) following a certain track. Different combinations of size, intensity and track can result in a 100-year surge event" (United States Army Corps of Engineers 2012b). Using super computers, technicians "generated models of 152 different hurricanes with a wide variety of paths, forward speeds, rainfall volumes, intensities, and physical size (radius). Powerful supercomputers calculated the conditions that would result from these theoretical storms" (United States Army Corps of Engineers 2012b) The Corps used the data to determine the structural specifications for the hurricane protection system that would provide a 100-year level of protection.

The Corps declared, "The greater New Orleans system of hurricane and storm damage risk reduction is stronger and better than it has ever been." Continuing, they claim, "In repairing and rebuilding levees and floodwalls, the Corps is incorporating lessons learned and recommendations from international experts, scientific organizations, government agencies and the private sector who studied causes of system failure during Katrina" (United States Army Corps of Engineers 2012b). Some even argue that the barrier plan, scuttled in political wrangling in 1977 (see Chapter 4) needs to be implemented for a region-wide, comprehensive structural protection plan (Van Heerden 2007).

Revamping and expanding the 20th century, modernist techno-natural protection system is critical for New Orleans future. However, the levees should be seen as a particular techno-natural system. They are a techno-nature that fuses millennia old sediment with expensive and anchored—meaning not easily moved or re-built—20th century engineering practices and building materials, predicated on climatological mapping that shifts and become obsolete over time (Colten 2009; Van Heerden 2007). As a system they are fallible. The modernist dream of controlling water failed in many ways during Katrina, but paradoxically, if done better, it is also what partially enables the city's future.

Future Tech: Restoring the Wetlands

Others people have turned to ecosystem management as a model for a new ecological and geographic based techno-nature protection system. What if the future of hurricane protection in New Orleans did not only include the levee technology, but was augmented by the restoration of the wetlands that surround the city? Experts and social justice organizations have been advocating this idea as a potential fix to the overreliance on the 20th century techno-natural defense system (Campanella 2008; Colten 2006; Colten 2009; Costanza, Mitsch, Day 2006; Day et al. 2007; and Common Ground Relief, see Chapter 5). Focus on the wetlands is not new. Beginning in the 1970s, scientists and environmental movements (e.g., Save Our Wetlands, see Chapter 5) have been highlighting the effects of eroding wetlands on hurricane vulnerability as well as general concerns for the health of the ecological systems.

However, in the first decades of the 21st century, the idea has become a mainstream one. Instead of a technology of civic engineering, it would be a technology of ecological engineering. Advocates argue that by restoring the wetlands, and thereby, reversing coastal erosion, New Orleans could be made safer because the wetlands would provide a buffer, which would diminish the strength of passing hurricane and create a wider area for storm surge to travel. If the 20th century techno-natural defense system was about controlling water through infrastructural projects, then the proposed 21st century techno-natural system is about controlling water through human manipulated landscapes and ecology.

There are, however, some problems with the proposal. The first has to do with the scale and scope of the depleted wetlands. Nearly 4900 km2 of wetlands in coastal Louisiana have been lost, since 1900, with rates as high as 100 km2/year (Day et al. 2007). The reason? The levees that line the Mississippi River are the largest contributor to wetland loss. Before the human made levees, every year for thousands of years the river deposited silt collected from the vast interior of North America. With the modern levees, the silting process is cut off, and instead most of the river's deposits are deep in the Gulf of Mexico (Day et al. 2007). To save New Orleans, the wetlands were sacrificed. The second factor is the miles and miles of crisscrossing canals, channels, and shipping lanes (e.g. Intercoastal Waterway and the MR-GO) (Day et al. 2007). For the benefit of fishermen, the shipping industry, and most of all the oil and gas industry (and all those who like shrimp, oil, and other commodities), the wetlands have been rearranged into a muddy highway for commerce. The result is

saltwater intrusion, altered hydrology that undermines the ecological system, and changes in pressure in underlying geology from oil pumping, which increases the rate of subsidence (Day et al. 2007). Any plans to revive and expand the wetlands come up against the sheer scale of the issue as well as the politically and economically entrenched nature of the wetlands.

Most advocates are not calling for a restoration of pristine nature, or even a planned shrinkage of the footprint of New Orleans. Instead, they are proposing a new techno-natural infrastructure based on a reworking of the human-nature relationship on the wetlands, one that could ease the burden on the old one. It is not a silver bullet fix and it faces serious political and economic hurdles. Restoring the wetlands themselves will not make New Orleans safer. The social justice implications are such that wetland restoration also competes with attention on the historical spatial inequalities; people with money have been able to live on higher, safer ground, as well as the historical and recent inequalities and vulnerability of living next to, and being dependent on, the structural defense system. Advocates of wetland restoration, as a conceptual as well as technological strategy, needs to situate themselves within the wider discussion of hurricane vulnerability and the existing geography of risk (Day et al. 2007).

The story of the techno-natural infrastructure from the time of Betsy to the time of Katrina, and beyond, has been the story of entrenchment and belief in the structural hurricane defense system. In the years before Betsy, the Corps, along with Congress, was already developing plans for more levees. Despite the massive levee

failures during Betsy, the modernist dream was not shaken. Congress, the Governor, New Orleans mayor and city council, and the Corps built more levees, and raised existing ones. Following Betsy, and through the 1970s, these new levees enabled both middle class whites and middle class blacks to expand to new suburban homesteads, onto the former swamps and marshes that were once feared (see Chapter 2 and 4). In the late 20th century, urbanization and the "solution" of the water problem go hand in hand. However, the water problem was not solved. Horizontal expansion increased vulnerability for more residents, both working class as well as middle class.

Engineering errors were made; calculations were wrong, or conditions changed such that they were wrong. By the time of Katrina, the 20th century techno-natural system was vulnerable to failure—and people in serious risk. Katrina exposed the hubris of the structural engineering system. After Katrina, many called for a new revamping of the same system. But new ideas emerged within the space that the crisis created, these ideas called for an ecological engineering that would harness the power of the wetlands to protect the city. Rather than seeing these technological systems as weapons against nature, the history of Betsy and Katrina remind us that these systems are hybrid techno-natural systems, dependent on social and natural systems and processes. They are not within our total control. Yet, we do not want to be "blinded by science," as New Wave musician Tomas Dolby reminds us. In Chapter 4, I explore how the techno-natural fix was actually entangled with governance practice and government institutions. As good or bad as any technology is, the political web it is suspended in matters to what purpose it is put and to what effect. First, let us see how

the techno-natural fix has been conceived and applied with regards to salmon in Seattle.

Chapter 3.2: Seattle

1970s

During the Puget Sound salmon crisis of the 1970s, the conversation centered on too few fish, for too many fishermen. For all the actors involved, policy makers, judges, fishermen, and tribes, overfishing was seen as the prime cause of the crisis. Understanding that habitat alteration, both historic as well as ongoing, was a wider cause of the decline of salmon was only just emerging. As a result, intense social and political battles ensued, as competing actors maneuvered to control the dwindling salmon stocks. A dominant use framework for salmon management was giving way to multi-use ecosystem management framework. Another result of the focus on overfishing was an attempt to mitigate the crisis by using new technologies. Similar to New Orleans, a technological fix was proposed that would enable the fishing industry, urban development, and salmon to co-exist. Again, similar to New Orleans the technological fix was implemented as a maneuver to get around nature, rather than a hybrid techno-natural solution. In this section, I explore how new urban technological projects were launched in order to address the complex socio-natural crisis of salmon decline.

Too Many Fishermen, Too Few Fish

It seems obvious, doesn't it? If you have too many fishermen, taking too many fish from the sea, at rates that cannot be replenished, then eventually you will have no

more fish. This was the prevailing explanation throughout most of the 20th century. This explanation still dominated the conversation during the salmon crisis of the 1970s; though an ecosystem and spatial framework was emerging. Holding onto the overfishing thesis, policy makers, scientists, and those in the fishing industry favored a technological fix that aimed to increase the number of fish in the rivers and the Pacific Ocean. By the 1970s, they also made the governance of fishing rights paramount; however, I explore that aspect in Chapter 4. In 1976, in the midst of social conflict between non-Indians and Indians, Washington Governor Dan Evans declared that all parties must work to develop salmon and steelhead runs (O'Connor 1976). How to get more fish was not an easy answer. The overfishing thesis was an outcome of both a 20th century modernist idea that fish could be manufactured to replenish the stock (more below) as well as a fisheries management that made the commodification of salmon sacrosanct (Lichatowich, Mobrand, and Lestelle 1999).

To recap from Chapter 2, the salmon fishery in the western United States was in slow decline since the late 19th century. Even as early as 1875, Spencer Baird, the first US Fish Commissioner, identified the factors that would lead to the decimation of salmon: habitat alteration, dams, and over harvest (Lichatowich et al. 1999:468). These factors represent nearly the same factors that contemporary scientists call the "Four Hs": Harvest, Hydropower, Habitat, and Hatcheries. However, Bairds warning faded into the background, as the salmon fishing industry remained an unfettered, and lucrative, industry during the end of the 19th century and throughout the first half of

the 20th century. Instead, planners, policy makers, scientists and engineers put their faith in salmon technologies, mostly hatcheries, while they attempted to mitigate the effects of overfishing and the drastic transformation of the Puget Sound and Cascade Mountains that urbanization, extractive industries, and dams for agriculture were causing. I'll now turn to the original techno-natural solution to the salmon crisis.

Let Us Help You: Hatchery Salmon Giving Nature a Hand

A combination of political and economic factors (fishing industry), and ideas about technology enabled the depletion of salmon to go unchecked for over 100 years. Within the dominant use framework, in the late 19th century, science and fishery management came together to develop the salmon hatchery system in order to address the problem of salmon decline (Taylor 1999). For over a century, hatcheries were implemented as a technological fix, which industry and policy makers hoped would allow the unfettered harvest of salmon to continue. Lichatowich et al. (1999) point out that the popularity of hatcheries was due not to their scientific merit but because they harmonized with the practice of unfettered access to natural resources in the Western states. As the number of wild salmon decline, technocrats set out to augment those declines with cultivated hatchery fish. By 1910, "half a billion artificially propagated salmon were being planted each year in Pacific coastal streams" (Lichatowich et al. 1999). Rather than attempting a policy or ecosystem fix, managers went with the technological fix they believe circumvented the problem.

Fishery actors wanted it both ways: maximum harvest, maximum repopulation. Hatcheries seemed like the magical solution. Lichatowich et al. explain it nicely, "The belief that an excess of eggs was created in anticipation of human needs reflects the view that eco-systems and watersheds were merely warehouses where commodities were stored for man's use" (1999:469). Further, hatcheries allowed managers, policy makers, and economic and industrial interests to ignore the salmon habitat they were urbanizing, mining, and damning. There was little need to address the transformation of salmon habitat, if technocrats could easily replace wild salmon with hatchery salmon (Meffe 1992).

But were hatcheries successful? In the late 19th century, soon after the hatchery fix began, little to no evidence could be found that the hatcheries were working (Lichatowich 1999; Lichatowich et al. 1999; Taylor 1999). However, fishery managers continued to rely on them as well as extol their virtues. Continually throughout the 20th century, scientists could find little or no evidence that hatcheries were increasing and solving the protracted crisis (Lichatowich et al. 1999; Taylor 1999). Yet, again, they remained the favored technology to address the crisis, despite no documentation that they were successful. Lichatowich et al. write, "In the absence of critical scientific evaluation, artificial propagation evolved into a myth: a set of unsubstantiated but strongly held beliefs which suspended healthy skepticism, impeded improvements, and contributed to the loss of natural production" (469).

Conversely to success, long-term evidence now shows that hatcheries actually made the problem worse but weakening and damaging wild salmon populations (Lichatowich 1999; Lichatowich et al. 1999; Meffe 1992). Damage to wild stocks occurred for several reasons. One, a false sense of success increased harvest of salmon, both wild and farm raised. This resulted in an excess of vulnerable wild salmon being harvested. Two, the propagation of hatchery salmon undermined wild salmon through disease, an increase in hatchery waste that polluted streams, and inter-breeding, which has been shown to weaken the fish stock (Lichatowich et al. 1999).

From different vantage points, a salmon is not a salmon; just like in New Orleans, if you've seen one hurricane, you haven't seen them all. For the salmon industry and its nascent fishery managers in the late 19th century one salmon could be substituted for another, and an end round could be established for the crisis (Lichatowich et al. 1999). In fact, for technocrats hatchery salmon were actually better because the variables for their propagation could be control. Modern science, it seemed, could solve the crisis. Indeed, in the 1960s and 70s there were some measured successes for hatchery fish (Lichatowich 1999). Data indicated that during this time some Oregon hatchery programs were seeing 10 years of sustained population growth for coho salmon. Better disease prevention and nutrition that was implemented in the 1940s seemed to be paying off (Lichatowich 1999).

Another breakthrough occurred when the Oregon Fish Commission announced in 1962 that they no longer needed to search streambeds for wild salmon eggs in which to breed salmon; they had succeeded in dramatically increasing the amount of hatchery eggs from 6 million in the 1953-1954 year to 82 million eggs in the 1965-66 year (Lichatowich 1999:209). At the height of the Puget Sound salmon crisis (1970s), and the effects of the Boldt Decision, which granted Native American half the catch, the State of Washington launch an assertive hatchery program (Lichatowich 1999). In order to dissipate the intense social unrest, the State of Washington banked on the hatchery program to provide a technological fix, one that would simply and easily just add more fish to the crowded waters of the Sound. Unfortunately, the hatchery fix fell apart in 1977, when the Oregon coho population suddenly collapsed, going from a peak of 3.9 million fish in 1976 to a million the following year, and by 1997, only 28,000 coho were harvested out of a total population of 300,000 (Lichatowich 1999:212). Hatcheries were not the techno-natural fix they had been made out to be.

From the vantage point of contemporary ecosystem management, the hatchery program represented a "techno-arrogance" (Meffe 1992), a modernist dream to circumvent nature with a hybrid techno-nature in the form of farmed hatchery salmon (Lichatowich et al. 1999). Montgomery (2003) argues that the salmon crisis is actually due to the mismatched time scales between societal and evolutionary processes. Industrial fishing, resources extraction, dams, and urbanization gradually

transformed the ecological conditions that salmon depended upon. To make matters worse, humans tried to "help" salmon by introducing hatchery prorogation and hatchery stocks, to either no gain, to measured further damage to the fragile wild salmon stocks. Small changes can translate to large impacts that radically alter natural systems, and it is very hard for humans to notice these changes and for salmon to adapt.

The fishing industry and managers of the 19th and 20th century techno-natural system had unending faith that modern science would allow a renewable, unfettered salmon fishery. By the time of intense social crisis in the 1970s, policy makers, including the governor and Washington Fish and Game, pinned their hopes to the idea that they could breed more fish, and in doing so diminish the impact of social crisis, and the economic collapse of the fishing industry in the Sound. They were wrong. The salmon crisis was not simply a crisis of overfishing; it was a crisis produced by the much larger socio-natural transformations to salmon habitat during the 20th century. This idea was only just gaining a foothold in the wider conversation over the fate of salmon, which I will turn to next.

1990s

Up until the 1970s salmon science and technology was primarily focused on over fishing and finding ways to circumvent ecological changes in salmon habitat with the hatchery programs. However, beginning in the late 1970s, and maturing in the 1990s, salmon science shifted focus to an ecosystem framework, which

highlighted a number of interrelated factors that were causing salmon decline. The hatchery techno-natural fix did not work in the 1970s, and by the 1990s a new salmon crisis emerged. This time around, scientists and policy makers did not put sole blame on the fishing industry, which was largely moribund in the Sound, or Native Americans, but instead fishery experts and policy makers set their sights on urbanization, specifically the Seattle metropolitan area, as a principle cause of the ongoing salmon crisis.

During the 1990s, the relationship between salmon decline and urbanization became a mainstream view, as the City of Seattle, King County, and other urban municipalities and utilities openly recognized their role in the crisis. A new scientific and technological framework emerged to deal with the crisis; however, despite the wider focus, its success is by no means guaranteed.

Too Many Buildings, Not Enough Fish: Urbanization Comes to the Fore

The new ecosystem framework as applied to salmon is commonly known as the Four Hs: Harvest, Hydropower, Habitat, and Hatcheries (Montgomery 2003:5). If you recall, this is a modern version Spencer Baird's 1875 thesis, in which he identified habitat alteration and dams, along with overfishing as the causes of salmon decline (Lichatowich et al. 1999:468). As we explored in Chapter 2, urban development has changed the Puget Sound dramatically throughout the 20th century. The logging industry felled forests; agricultural interests and municipal water utilities dammed rivers; industrialists built factories and ports near the mouth of rivers; and

developers and consumers, along with government agencies, built residential and commercial buildings and infrastructure extending outwards from Seattle. All of these historic changes transformed the socio-natural space of the Puget Sound, but also salmon habitat. For this reason, Montgomery (2008) says we should add a fifth H, history. The issue is not all about salmon either; urbanization also accounts for habitat loss and species stress in urban streams throughout Western Washington (Morley and Karr 2002). The new ecosystems framework practiced by biologists, ecologists, and others maps the very complex and entangled ways that human transformations of nature have undermined salmon's very capacity to reproduce itself as a species. Therefore, disaggregating the term salmon is essential to gain a clearer understanding of the impacts.

Scientists conceptualize and disaggregate the category *salmon* is through the stock concept (Nehlsen et al. 1991). Anadromous salmonid (salmon) are populations that originate from specific watersheds as juveniles and typically return to the same natal streams to spawn. This results in a significant degree of reproductive isolation of interbreeding individuals. Scientists refer to these groups of salmon as stocks. Over long spans of time these unique stocks adapted to local environmental conditions. The loss of unique salmon stocks threatens the overall health of each species. This is because the loss of stocks changes the genetic composition and reduces the overall genetic diversity in Pacific salmon. This is not as much of a concern to scientist for species not stock-structured. Each watershed, stream, river, estuary, bay is important

to the various salmon stocks that live in the Puget Sound. The ecological conditions of the Puget Sound and the Pacific Ocean are also important. Therefore, healthy watersheds throughout Western Washington are critical for the health of species (Nehlsen et al. 1991). Nehlsen et al. (1991) believe that it is at the stock level that that rehabilitation of salmon will take place.

The Urban Meets the Natural: Using Ecosystem Science to Save Urban Salmon

Ecosystem management, particular variants of environmentally sensitive multi-use management and ecosystem approach, became the basis for the salmon restoration plans of the City of Seattle, King County, and the State of Washington. These are the largest government and governance bodies in the Puget Sound, save the US government. In Chapter 4, I will discuss the governance and policy history of the Threatened Species Listing of 1999, in this section I want to explore how each governance body understood the salmon crisis. In many ways, the fact that these bodies based their recommendations and action reports on the findings of contemporary ecosystem management has major significance. Unlike in previous eras, state actors at the turn of the 21st century understood the salmon crisis in a holistic and comprehensive manner by using the ecosystem framework. Their analysis takes into consideration the historic and far reaching socio-natural spatial transformations of the entire Puget Sound and the watersheds that feed into it. It is a wide reaching critique, and has many governance and policy implications, which I

will save for the next chapter, but here I want to discuss their framework of understanding.

In 1999, King County released a massive report called *The Return of the Kings*, which is a multi-chapter evaluation of the crisis, and its title refers to Chinook salmon, aka, King salmon. The report reads, "In a fisheries context, the definition of conservation is changing from maximum sustainable yield toward...the protection, maintenance and rehabilitation of native biota, their habitats, and life-support systems to ensure ecosystem sustainability and biodiversity" (King County Wash. 1999:1-2). Using the stock concept (discussed earlier) the report states two goals of salmon restoration: 1) "The sustainability of a fish stock requires protection of the specific physical and chemical habitats utilized by the individual members of the stock, and 2) "The sustainability of a fish stock requires maintenance of its supporting native community" (1999:2).

The King County report explicitly states that they will follow the ecosystems approach. Central to this approach is the recognition "that the characteristics of watersheds—disturbance history, distribution and abundance of habitats, and species composition—vary over time from basin to basin, the result of interactions among process, structure and function" (1999:2). Process, structure, and function are the basis of ecosystem interactions and health. For salmon to be successful management strategies should aim for the purpose of maintaining, and restoring in some areas,

ecosystem function, structure, and processes. In sum, King County approach is "intended to be ecosystem-based, multi-species, and precautionary" (1999:3).

In order to implement the ecological framework to salmon management King County drafted a set of principles. These principles can be seen as early action ideas: 1) "Maintain and restore natural watershed processes that create habitat characteristics favorable to salmonids;" 2) "Maintain and restore habitats required by salmonids during all life stages;" 3) "Maintain and restore functional corridors linking these habitats;" 4) "Maintain a well-dispersed network of high quality refugia;" 5) "Maintain connectivity among refugia;" 6) "Protect the core areas first;" and 7) "Employ adaptive management principles in all activities" (1999:3).

However, King County also cautioned that the implementation and success of ecosystem rehabilitation would meet barriers. The report reads, "Much of the native landscape has been *irretrievably altered and will require considerable intervention and management* if wild salmon populations are to survive and flourish. The once dynamic relationship among landscape structure, process and function has been so modified that restoration, as defined by the National Research Council, may be impractical, if not impossible" (italics added, 1999:3). The historic and wide scale socio-natural transformation of salmon habitat throughout the watersheds of King County and beyond is the largest barrier to salmon restoration. Urban and industrial development has transformed most of the ecosystem function, structure, and process that salmon depend upon. The new landscapes, ecological processes, and watershed

conditions are a hybrid social and ecological space, which favor human use over non-human use. The ecosystem framework, in order to be successful, will have to incorporate these new urban ecologies. It will also have to balance the needs of a diverse set of humans as well as a diverse set of salmonids and other biota. Salmon's future is not just natural, the restoration of pre-human habitat; it is social, the building of hybrid, co-existing socio-ecologies.

The City of Seattle and the State of Washington came to similar conclusions. King County is the suburban governance structure of metropolitan Seattle, but the City is responsible for much of the streams and rivers as they enter the Sound as well as much of the forest and upriver watersheds, which the City relies upon for electricity and water. Urban development and agriculture have impacted the estuaries and bays in which juvenile salmon use to grow to maturity before heading to the Ocean (City of Seattle 1999:20). Logging has disrupted the water quality and sediment of the upper tributaries where salmon spawn (1999:20). Further, the City reports that dams which provide electricity as well as water for consumption and agriculture block salmon on the major rivers in the area (Cedar, Elwha, Green/Duwamish, Snohomish, and White Rivers).

All of these changes impact each stage of a salmon's lifecycle, making it hard for the stocks to grow to maturity, return to their natal streams, and reproduce. The City further cites that the high percentages of wild salmon that are harvested in the Pacific Ocean continue to contribute to the crisis. All facets of the City's industrial

and urban infrastructure (dams, roads, ports, water and waste systems) contribute to weakening of the salmon stocks. Over the 20th century, salmon had become urban inhabitants, and at the turn of the 21st century, the City of Seattle was finally acknowledging this development. For example, Mayor Paul Schell, who presided over the 1999 Threated Species Listing, wrote in *Chinook in the City*, "Seattle is a gateway for chinook salmon, a species threatened with extinction in Puget Sound. As juveniles, chinook make their way through our city on a long journey to open ocean, and as fully grown adults, they come through again on their way to the Cedar and Green rivers to spawn" (City of Seattle 2001). Mayor Nickels, who succeeded Schell, echoed the sentiment in his follow up edition of *Chinook in the City*. He also added, that salmon restoration would coincide with his plans to green the city. He wrote, "My Environmental Action Agenda recognizes that there is a connection between saving salmon and constructing energy and water-efficient buildings, reducing pesticide use in the city parsec and preventing polluted stormwater from flowing into creeks and lakes. All of these actions make Seattle a more livable city and help protect habitat" (City of Seattle 2002). As high as the mayor's office, saving salmon was a stated priority.

From the Environmental Protection Agency, to the State of Washington, to King County, and the City of Seattle, a mainstreaming of the ecosystem framework occurred during the 1990s. Scientists, planners, technicians, and policy makers were beginning to acknowledge that salmon were now an urban animal, and that in

becoming such, the urbanization of salmon habitat had critically weakened the ability of the species to reproduce. Coupled with the centuries old harvest and hatcheries practices, the salmon crisis could be described as four interconnected factors: harvest, hydropower, habitat, and hatcheries. Similar to the height of the modernist dream to create a better salmon—and blinded by the belief in science and technology to solve the problem—contemporary actors are certain that better science and better technologies can be applied to make room for healthy and viable salmon stocks in the urbanized Western Washington. However, as Montgomery points out, science and technology, though potentially helpful, are not the panacea. He writes, "Saving salmon in the Pacific Northwest will not succeed as a surgical effort orchestrated by fishery technocrats. If history has a lesson here, it is that technological fixes and politically motivated half-measures will at best delay the inevitable" extinction (2003:6). Rather than singularly a technical and scientific problem, the salmon crisis is also a crisis of governance and the existing, in place, urban environment of salmon habitat. Like all techno-natural fixes, salmon ecosystem management is deeply entangled with political and governance practices and decisions.

Future Tech: A Better Fish, Aquaculture, and Genetically Engineered Salmon

There is, however, one more development to consider. For the past several decades there has been an attempt to use science and economics to by-pass the problem once again, much the same way people tried with hatcheries. The rise of salmon aquaculture (farmed fish) and genetically engineered salmon are two recent

scientific developments; they are also political and economic developments. Since the major governance institutions, policy makers, leading scientists, and the broad amalgam of human inhabitants of the region mostly agree that saving *wild* salmon is a worthy goal, there is a parallel development that wants to use aquaculture and biotechnology to achieve it. There are potentially large market opportunities for both aquaculture and genetically engineered salmon. The development of new human "improved" salmon is another attempt at the end round a problem that is spatial, related to governance, and ecological fix, not technological.

Think of salmon aquaculture as modern industrialized farming, or fish factories (Montgomery 2003:171). Salmon are raised in submerged pens, beginning life in pens on land, then moved to open sea or estuary pens as they mature. Salmon aquaculture, on the surface, obviates the need for a spatial and ecosystem fix. Why unduly rearrange our urban, industrial, and forest spaces, when we can just farm salmon like we farm pigs? Salmon aquaculture was first developed in Norway in the 1960s, but eventually companies began the practice in the North Atlantic on the east coast of the US. The practice has also been taken up in Chile, South Africa, and New Zealand (2003:172). By the 1990s, farmed Atlantic salmon dominated the US and Canadian salmon markets. Atlantic salmon farming operations have now been opened up in the Pacific Northwest, in the heart of Pacific salmon ecosystem.

Salmon aquaculture is controversial for a number of reasons, especially so in the Pacific Northwest, where the cultivators are using Atlantic salmon. For one, it is very difficult to contain any animal in a pen, particularly submerged pens in the open

waters of the Sound. Farmed salmon do escape. Scientists and environmentalists are concerned that these escapees will out breed wild salmon, and reduce the overall health of the stock (Montgomery 2003:172-173). Second, similar to industrialized livestock operations, critics are concerned about the pollution risks of salmon aquaculture. Additionally, critics are worried about the spread of sea lice, which could impact wild young salmon as they move past the fish farms (172). Lastly, another potential outcome of salmon aquaculture is its effects on the desire to restore wild salmon. Farmed salmon do not require the seemingly massive changes to the socio-natural relations of Western Washington. Salmon aquaculture is a techno-natural solution that presents itself as an easy solution to a complex problem, a path of least resistance.

In another arena, scientists and biotech companies have been hard at work building a *better* farmed salmon. They have introduced the genetically engineered salmon. The GE salmon is a hybrid between Atlantic salmon and Pacific Chinook salmon. By inserting genes from a Chinook salmon and genes from an ocean pout,[17] companies such as AquaBounty Technologies position themselves as creating a better salmon. AquaBounty believes these new salmon are better than wild as well as better than traditional farmed salmon. The company has name these new animals: AquAdvantage® Salmon (AAS). The genes from the Chinook help AAS—note here that the animal has become an initialism—to grow faster, obviously something that

[17] The ocean pout is an eelpout, in the family of ray-finned fish. They live in the North Atlantic, and their unique ability to withstand near-freezing waters is what interests scientists and genetic engineering companies.

aquaculturalists would desire, while the gene from the ocean pout, which contains an anti-freeze agent, locks the Chinook growth hormones in the blood, which helps boost the rate of growth.

AquaBounty markets the AAS as having the "potential to grow to market size in half the time of conventional salmon. In all other respects, AAS are identical to other Atlantic salmon" (AquaBounty). They further tout AAS as an environmentally sustainable alternative to current farmed salmon. They position their product as fixing the problems of traditional aquaculture (discussed above). Using genetic engineering as well as aquaculture techniques that base all of production in tanks embedded inland, and not in the open water, the company says this will reduce the effects of pollution and decrease the chance of contamination and impact on wild salmon. It sounds like perfect blend of advanced technology and environmental sustainability.

Critics, however, point out the uncertainty involved in their consumption (LeVaux 2012) as well as their potential to contaminate wild stocks through accidental escape or introduction into wild habitat (Montgomery 2003). Further, AquaBounty has not been a profitable company (LeVaux 2012). Nearly two decades after the company built the first prototype AAS, the AAS has yet to receive Food and Drug Administration approval. The AAS approval process is the FDA's first use of the guidelines for GE food. Interestingly, the FDA decided to classify the AAS as a drug rather than an organism (food) because every cell it its body contains genetically engineered DNA (LeVaux). The story of the AAS represents an attempt to use an

entangled hybrid socio-natural technology to deal with a hybrid socio-natural urbanization that has led wild salmon to the brink of extinction.

However, the trouble of AquaBounty Technologies, to turn a profit or bring their (drug) salmon to market, shows that high-tech fixes to the salmon problem have many market as well as regulatory barriers for their introduction. AquAdvantage® Salmon represent another attempt to circumvent the wider socio-natural changes that urbanization and policy decision have had on wild salmon habitat. Meanwhile, traditional salmon aquaculture continues as a leader in the salmon market; and wild Pacific salmon continue their slide into extinction, at least in the Sound. Much like New Orleans, planners, policy makers, and scientists continuously try to find a techno-natural fix to a problem that is only partly technological.

The techno-natural systems that have been built in the Puget Sound have greatly contributed to the ongoing salmon crisis. Fisheries experts and fisheries managers continue to rely on new scientific understandings and new techno-natural fixes, but the crisis endures. Techno-natural fix change, and scientists now see these technologies less as modernist endeavors to circumvent nature, but as a way to modify and shape a new hybrid socio-nature. Yet the crisis endures because the crisis is wrapped up in historic and significant changes to salmon habitat. Puget Sound salmon are urban inhabitants. Ecosystem management will butt up against actually existing urban infrastructure and social and economic processes of urban life. Technology might help, and new scientific understands open new possibilities. The mainstreaming of the ecosystem framework was an achievement during the 1990s,

but it has run up against barriers: capitalist urbanization and urban environmental governance practices in the Puget Sound.

Summary

Whether the crisis appears to come to us or come from us, the development and application of technological infrastructure in New Orleans and Seattle demonstrates how city builders, scientists, and engineers attempted various techno-natural fixes to address the recurring hurricane crisis and the protracted decline of salmon in each city. The modernist dream of the human control and improvement of nature guided actors as they built the city, and paradoxically to their goals, entangled urban and rural inhabitants as well as salmon, hurricanes, and habitats in more complex socio-natural relationships. Yet in both places, city builders, scientists, and engineers had continual faith in the power of technology to address what were seen as natural problems, rather than entangled natural, social, political, and economic ones. Enamored by a technological fix, actors were able to keep a focus on perpetuating capital accumulation, which favored the nascent environmental regulators, extractive industries, and land developers in both cities. The technological fix actually was not a solution to each crisis, and in both cases the expansion of new techno-natural projects contributed to new crises and new vulnerabilities for diverse sets of humans and non-humans.

If we want to avoid the modernist trap, we must acknowledge that even the most ingenious and seemingly foolproof technology is always a hybrid technology

that is susceptible to failure, to things out of our control, and is quite often implicated in the production of risk and vulnerability. Technologies such as sewage, waste disposal, water delivery systems, hurricane protection systems, and river modification for salmon help us see the ways in which modern urban environments are mediated and regulated by technological systems and artifacts. Whether the crisis appears to come to us, or from us, technology and techno-natural systems increasingly mediate the relationship between the city and nature. More importantly, these technologies cannot be seen as triumphant Promethean endeavors that save society from nature. Rather, politics, racial geographies, and inequalities inherent in them must be unveiled in order to see the limits as well as possibilities these technologies have for any give human population, and ecological system. This is especially true given the vulnerabilities of urban inhabitants to socio-natural crisis.

By the 1970s, new ecosystem frameworks were emerging. However it was not until the turn of the century that these new frameworks largely replaced the older modernist ones. In both cities, new technologies have been proposed to deal with the crisis. In New Orleans, along with the rebuilding of the 20th century levee system, scientists and engineers are proposing ecological engineering to augment or even replace the reliance on the fixed levee infrastructure. The proposal is to rebuild the wetlands that surround the city. Similarly, in Seattle a new ecosystem framework is focusing on restoring habitat and making transformation to the urban infrastructure to allow both humans and salmon to co-exist. In both cases, city builders, scientists and

engineers are proposing spatial and ecological fixes, rather than mechanical infrastructure. However, the new ecosystem and spatial framework, though making it into the mainstream, is so complex that it challenges governance practices, economic practices, and living and working arrangements for hundreds of thousands of people in each city. There remain many social, economic, and political barriers to their implementation.

This then highlights the limit of the techno-natural fix, whether it's 1970 or 2012, the development and application science and technology is always embedded in a web of politics, economics, social relations, and increasingly urbanization. Particularly in New Orleans, the deployment of techno-natural systems was meant to address the "physical vulnerability" of inhabitants in the city (Youngman 2010). Physical vulnerability refers to the proximity to risks and hazards based on geography and technological infrastructure, such as levees. However, as we saw in the previous chapter, in both New Orleans and Seattle, long-standing social inequalities have produced geographies of vulnerability and a set of "social vulnerabilities" (Youngman 2010) for a plethora of human and non-human inhabitants of Southern Louisiana and the Puget Sound. Social vulnerabilities refer to the ways in which populations are put at risk through inequalities based on race and class, which put them at risk to crisis as well as affect their capacity to respond to crisis.

Technology will not solve crises that are only partly technological. In the case of New Orleans and Seattle, the crises are also the result of institutional organization, governance practices, and policy decisions. Science and technology are always

political, and wrapped up in governance practices. The techno-natural fix can only go so far, and then it becomes clear that governance, policy, and law significantly shape the application of these scientific and technological practices. I will now turn to this strand of the entanglement in the next chapter.

Chapter 4

States of Nature:

Crisis, Nature, and Urban Environmental Governance

Introduction

It is not enough to understand knowledge and technology without also considering how states organize space and govern by using these technologies and scientific understandings. Technology, knowledge, and governance are tightly entangled. Building on the previous chapters I want to highlight the historical development of state regulation, policy, and governance in shaping urban development in New Orleans and Seattle as well as producing and addressing socio-natural crises. The case studies in this chapter show how state institutions and actors made hurricanes and salmon key organizing objects in the transformation of socio-natural space in New Orleans and Seattle. In doing so they built what I call *states of nature*: conflicting and overlapping institutions and governance practices that use nature as a tool to govern as well as produce socio-natural space.

To discuss state of nature, I use Neil Brenner's (2004) concept of "state spaces" to understand how states organized laws, institutions, boundaries, and governance practices in the governing of socio-natural crisis in New Orleans and Seattle. In both periods, Seattle and New Orleans became state spaces for the dual project of crisis governance and urban development. During the 1960s and 70s, state

actors only barely acknowledged the role of urbanization in the each crisis, and in fact, most notably in New Orleans, carried out plans for further urban expansion into vulnerable areas. During the 1990s and 2000s, state actors were grappling with the consequences of urban development, and in both cases the conversation turned to ways to transform and even shrink the urban footprint of both regions. In both examples, "the state" is shown to be a fractured and conflictual set of institutions and actors, but a set of actors who have a large role in producing and organizing urban space and the regulation of socio-ecological crisis.

This chapter is about two periods of urban environmental governance. In period one (1960-1980), I look at how urban environmental governance practices operated in a Keynesian top-down framework (e.g. marked by federal laws and policies to regulate economic impacts on the environment). In period two (1990-2005), I examine how urban environmental governance practices operated in a neoliberalized framework (e.g. public-private partnerships and privatization). These cases will tell a story about the shift from a top-down "environmental Keynesianism" during period one to a horizontal government-public-private framework of period two (Purcell 2002; 2008). During this transition, state governance practices increasingly enrolled non-state actors into governance practices. Actors whether decision-makers, inhabitants, tribes, and even salmon, were both constrained and empowered by the expansion of environmental governance during both periods.

In the months following Hurricane Katrina, pundits, reporters, politicians, and concerned citizens all over the US asked: "how could this have happened?" Blame was assigned to then president George W. Bush for his administration's slow and ineffectual response, in particular Michael Brown, the head of the Federal Emergency Management Agency, former commissioner of the International Arabian Horse Association. Blame was slung on then New Orleans Mayor Ray Nagin for being unprepared and ordering a mandatory evacuation with no organized plan or shelter of last resort. Further, blame was lobbed at then Louisiana Governor Kathleen Blanco. Additionally, people—including inhabitants of New Orleans—blamed the Army Corp of Engineers for allowing the levees to fail.[18] Accusations of racism, classism, ageism, and general governmental incompetence circulated in the papers and in everyday conversations.

Researchers, for their part, took a few steps back and took a historical approach. Mike Davis (2004), for example, pointed out that he had written an article one year prior to Katrina in September 2004 that described New Orleans lacking an evacuation plan for the poorest and most vulnerable residents, evidenced after Hurricane Ivan nearly washed over New Orleans. In the years after Katrina researchers have diagnosed the causes of Katrina in a myriad of ways: racism (Bond Graham 2007; Bullard and Wright 2009; Mann 2006), race and class (Hartman and Squires 2006; Logan 2005), neoliberalism (Klein 2007; Lipsitz 2006; Varner 2006).

[18] In my three visits to New Orleans after Katrina I observed graffiti on abandoned house deriding the Army Corps of Engineers as well as banners and lawn signs blaming the Corps and calling for action against them.

Not content with the extent of these explanations I asked how did governance practices and state spatial projects contribute to the production of vulnerability? Quite a bit of the answer comes from the hundreds of year of urban and environmental development in New Orleans (Chapter 2) but much of the answer can be found in the aftermath of Hurricane Betsy of 1965.

Following the crisis of Hurricane Betsy federal disaster management greatly expanded. Local, state, and federal institutions launched new governance strategies and spatial projects organized around hurricanes. These projects and governance strategies took the form of an expanded role of the Army Corp of Engineers, the Southeast Hurricane Relief Act of 1965, Small Business Association grants to affected inhabitants, and mandated flood insurance. The outcome of these changes actually led to increased urbanization of wetlands, which in turn made more people vulnerable to flooding and the effects of hurricanes. Combining with the multi jurisdictional hurricane techno-natural system (Chapter 2 and 3) that developed over two hundred years, these new state strategies formed the late 20th century hurricane mitigation system. By the time of Hurricane Katrina in 2005 little had changed or developed in regards to hurricane mitigation in Southern Louisiana.

Across the country in the Puget Sound, state governance strategies and projects have been just as extensive. In the State of the Union address of 2011, President Barack Obama made a joke about salmon management. He remarked, “The Interior Department is in charge of salmon while they're in fresh water, but the

Commerce Department handles them when they're in saltwater. And I hear it gets even more complicated once they're smoked" (Sewell 2011). It was an unexpected comment for a State of the Union address, but President Obama's fish joke only just hinted at the simultaneously fractured, overlapping, and multi-actor nature of salmon management. How did it get this way? Prior to the 1960s and 70s fisheries in the Puget Sound were largely dominated and governed by market forces and the fishing industry. In late 1960s and through the 1970s, a social and ecological crisis ensnarled the Sound, as it became clear that salmon stocks were in serious peril. As a result of social unrest and protest in the late 1960s, and throughout in the 1970s, various state institutions, from local, to State, to Federal, expanded their power in organizing the Puget Sound fishery as well as organizing the Puget Sound as a socio-political and socio-natural space. During the 1990s, there was an additional expansion of spatial and territorial based organizational, governmental, and tribal jurisdictions.

An historical and complex relationship between the different levels of government as well as traditional conflictual economic, political, and cultural differences between various actors and institutions defined the Puget Sound salmon fishery (sports fishermen versus commercial fishermen; industry versus environmentalists, protection versus commercialization, etc.). My case studies show that since the 1970s, in the Sound, state institutions have used "nature," in particular salmon, as a vehicle to increase state involvement in the regulation of fisheries and to mediate social discord between conflicting actors, including wide socio-natural

spaces. Both of these cases give insight in to wider changes in the state's organization of space, and the manner in which urban environmental space is governed.

State Spaces

Many have theorized how socio-natural space is produced through capital accumulation, real estate markets, or growth machines (Harvey 1985; Logan and Logan and Molotch 1987). Others have suggested that in addition space is produced through the creation of "state spaces" within the city (Lefebvre, Brenner and Elden 2009; Brenner 2004). What are state spaces? After detailing capitalist strategies of organizing space and social relations (*The Production of Space*, see Chapter 1), Lefebvre turned his attention to the state (Lefebvre et al. 2009: 223). This was during the 1970s, exactly at the time of a global shift underway in capitalism towards a transnational system and what has come to be called the neoliberalization of state activities and governance structures (Peck and Tickell 2002). In subsequent years many wrote off the nation-state, but Lefebvre was not convinced that state spatial activities diminish with the development of so-called globalization (Lefebvre et al. 2009:223). In fact, he argued that state spatial strategies to regulate economy and social relations are intertwined with the "deterritorialization" of capital (aka globalization). The concept "state spaces" thus refers to the ways that state institutions are organized to regulate social and spatial relations through territory, place, and scale-specific ways (Brenner 2004:80). Building on the work of Lefebvre et al. (2009) and Brenner (2004), I expand the concept of state spaces to understand

the ways that state institutions made nature a key object in the production and regulation of socio-natural space in the 1960s and 70s.

Urban Environmental Governance

Urban environmental governance refers to the way that cities and nature (socio-natural space) are governed. To speak of governance does not simply refer to government agencies, institutions, and actors. Governance structures—the manner and practices by which space is organized—vary across time, space, place, and scale. For example, within so-called globalization debates scaled governance has come to be defined as the process of re-scaling by which the national state has "rolled-back" Keynesian era responsibilities and then "rolled-out" (Peck and Tickell 2002) responsibilities to both city ("local") and global institutions and actors (Swyngedouw 2002; Uitermark 2002), rather than power just moving up one scale from the national to the global.

Beginning in the 1960s and especially the early 1970s there was a proliferation of local, state, and federal environmental laws, policies, and programs in the United States. These laws and policies were an attempt to regulate the 100 years of nearly unbridled industrialization and urbanization as well as citizen's demands for cleaner and healthier living, working, and recreational spaces. Some well known examples include the Clean Air Act of 1963/1970, the Occupational Safety and Health Act of 1970, and the National Environmental Policy Act of 1970, which introduced mandated Environmental Impact Statements on proposed federal actions;

and the formation of the Environmental Protection Agency in 1970. These laws and institutions represent the beginning—and the height—of what can be called environmental Keynesianism (Purcell 2008). For all the original and present shortcomings, these laws and institutions had far reaching effects on and implications for wild spaces, urban areas, and coastal zones.

Much of the discussion has positioned capital as the driving force in the process of state rescaling (Brenner 1997; Brenner 2001a; Brenner 2001b; Swyngedouw 1997; Swyngedouw 2002). However, as Mansfield rightly argues, the process of scale should not be ossified into a *thing* by making economy, capital, or capitalism the single agent of change (2001:1811). The case studies discussed in this chapter will add weight to Mansfield's argument by exploring the ways in which state actors made nature, in the form of hurricanes and salmon, key organizing objects in formation of new governance practices as well as scaled governance relationships. Additionally, Bulkeley's (2005) work on environmental governance looks at horizontal scaling through inter-urban cooperation on global climate change as a form of multi-scalar politics. Rather than top down governance frameworks, my case studies, particularly in the Puget Sound, will demonstrate the growth of horizontal governance frameworks around salmon management in the period from 1990-2005.

Of particular significance in this chapter are the National Environmental Policy Act (NEPA), the Environmental Protection Agency (EPA) and the Endangered Species Act and their relationship to State and city level environmental governance.

One area of the US that created state versions of the NEPA and the EPA was State of Washington. The State of Washington created the Department of Ecology in 1970 (Ecology), the State Environmental Policy Act in 1971 (SEPA), and the Shoreline Management Act in 1971 (SMA). In Louisiana, the creation of a State environmental institution took a bit longer to develop. After a series of incremental laws and institutions through the 1970s, in 1984 Governor Dave Treen created the Department of Environmental Quality, fourteen years after Washington created the Department of Ecology. Additionally important for New Orleans was the creation of the Federal Emergency Management Agency (FEMA) as well as National Flood Insurance Act, both of which I discuss. These agencies and acts would come to play a large role in environmental and urban governance in both regions. Moreover, their original mandates and governance practices have been reshaped between the two periods, moving from a Keynesian framework to a neoliberalized framework.

Questions of nature, ecology, and environment are particularly fitting for analyses of governance for two reasons. One, as I made evident in Chapter 3, ecological processes and objects (e.g., plants and animals) are not static or contained within rigid boundaries; they are mobile and spatially diffused. The salmon lifecycle is a multi-scaled, trans-spatial, and trans-territorial biological phenomenon. Similarly, hurricanes are multi-scaled, trans-spatial, and trans-territorial climatological phenomenon. In both cases, governance of human and non-human entities and

systems present unique challenges. Salmon and hurricanes and the biospheres they interact with are alive and dynamic.

Second, during both periods state governance practices have attempted to bound ecosystems through the practice of territorial jurisdictions, legal jurisdictions, and cartographic mapping. Efforts at bounding nature are difficult because ecosystems are dynamic, scaled, and spatially diffused; but in addition governance practices and state institutions are also territorialized, fractured, incoherent, inconsistent, and often in tension with one another. Humans have crisscrossed the landscape with borders, boundaries, fences, canals, dams, and other human made infrastructure, and social and legal demarcations. Environmental and urban institutions and governance structures do not neatly fit over the biomes and ecosystems that they are set up to govern. Thus, urban environmental governance of ecological and social processes is intense, conflictual, and high stakes, and it is also what makes its analysis so interesting and important.

Chapter 4.1: New Orleans

Hurricane Betsy

The crisis of Hurricane Betsy provides three key insights into the creation of states of nature and environmental governance practices. The crisis facilitated: one, the expansion of federal environmental policy and law, two, expansion of state spaces within New Orleans, which enabled continued urbanization into wetlands and resulting in the increased vulnerability, and three, the crisis highlights a state-centered model of crisis governance very different than the privatized and neoliberalized governance practiced during Hurricane Katrina. To illustrate these insights I will focus on the creation of federal disaster legislation, the organization of flood control governance, including the power of the Army Corps of Engineers, and local, state, and federal disaster response.

Governance I: Shelters of Last Resort

Compared to Hurricane Katrina, the evacuation and relief efforts were quite organized, characterized by the large role that local, state, and federal agencies played. In a sense, it was a public rather than a private affair, with government agencies, non-governmental agencies, and even local businesses involved in the effort. As described by Campanella a "micro-scale, inter-urban affair" of moving to durable and dry shelters rather than an all out exodus from the city as is the practice today (2008:321). This is not to say that the response in 1965 was without problems,

only that compared to Hurricane Katrina there were different governance and organizational practices, which did enable more organized evacuation and relief efforts.

Evacuating an urban area like New Orleans and rural Southern Louisiana is not an easy social activity. Before Betsy a coordinated set of institutions played a role in evacuating approximately 250,000 people. The United States Army Corp of Engineers reported,

> The relatively low incidence of fatalities is creditable to the willing cooperation of the general public, local police, Civil Defense officials, and other disaster relief agencies in one of the largest evacuations of danger areas accomplished in the continental United States. It is estimated that 90 percent of the population in the southeastern Louisiana coastal area—approximately 250,000 persons—was evacuated and moved to safe shelter on high ground. It is believed that, except for this mass evacuation, the number of fatalities would have been greater than that of the 1915 hurricane when 272 persons were killed. The tentative count of casualties in the state of Louisiana attributable to hurricane 'Betsy' has been placed at 81 persons killed and some 17,600 persons injured (1965:13).

The State of Louisiana Civil Defense Agency conducted evacuation of the low-lying areas from their center in Baton Rouge. Louisiana governor would visit the control center, and then conducted his business from his nearby office and his mansion.

In the city of New Orleans, Mayor Victor H. Schiro was the official in charge of all local evacuation and relief efforts. Schiro made himself the epicenter of authority and activity leading up to, during, and following the storm. He was both a controversial figure—a staunch segregationist—as well as a persona of the

government's response during Betsy, and in many ways his legacy remains as the "hurricane mayor" (Haas 1990:488). Schiro was accustomed to the spotlight, having worked as an extra in Hollywood movies as well as a being a radio personality in New Orleans before his mayorship. He took the spotlight during Betsy. He was out in the trenches in a roving headquarters, wearing a civil defense helmet in public. When asked where city headquarters was, he famously declared, "Headquarters is wherever I am" (Haas 1990: 488). Moving around the city, attempting to coordinate evacuation and relief efforts, Schiro did not sleep for 40 hours at the start of the crisis.

On September 9, the first day of the storm, winds knocked out power and telephone service to the Civil Defense Control Center, and after operating a mobile command center, on September 10, Schiro and staff relocated to city hall—where some 150 evacuees from the Ninth Ward and nearby St. Bernard Parish were camping out on the first and second floor of city hall (Haas 1990: 489). Telephone service was cut, so the mayor relied on newly purchased radios to coordinate the efforts of the Red Cross, Salvation Army, National Guard—there were incidences of looting, including a report of looters using scuba gear to steal from submerged homes—federal agencies, and municipal workers (Haas 1990:491). On the night of September 10, Schiro was able to make an outgoing call; he called Lyndon B. Johnson, President of the United States.

President Johnson had to be cajoled by his friend "Little Mayor" Schiro and Louisiana Congressman T. Hale Boggs and Senator Russell Long (son of former

Louisiana governor Huey Long) to put aside other matters of state and fly to New Orleans on September 10, 1965, the day after Betsy washed ashore. He landed, and following a speech at the airport, toured the devastated areas of the city. In a famous incident while visiting George Washington Elementary School, a makeshift emergency shelter, President Johnson shouted to the evacuees, "This is your president. I am here to help you" (Haas 1990: 409). After touring the city, he returned to the airport where he made this declaration of assistance:

> I have ordered that all red tape be cut. Our assistance will be given the highest priority. The Department of Agriculture is already providing emergency food at food stations such as we visited. They've been set up by the Red Cross and the help of other local agencies. Troops from Fort Polk have called into action to prevent starvation and to protect life and property. The Small Business Administration, under the direction of Gene Foley, will tomorrow morning begin processing the first long-term loans in New Orleans. The Corps of Engineers is at work tonight, opening levees and dikes and removing debris. But we're ready to do much more. Within the hour, Governor McKeithen asked us to declare Louisiana a disaster area. We will so declare it tonight.

Highest priority was given, and on September 12, the President, now back in Washington, sent Mayor Schiro a 16-page telegram outlining the extent of federal aid.

After the storm had passed, a multitude of agencies set up shelters around the city where displaced residents could go for shelter, food, clothing, and assistance. The Red Cross assigned over 250 staff workers to aid the local Red Cross chapter volunteers in feeding 60,000 people in emergency shelters and another 65,000 people in mobile canteens throughout the disaster area (United States Army Corps of Engineers 1965). The Red Cross reported that they set up 287 shelters with nearly 10,000 people staying overnight (Red Cross 1965). However, displaced residents took

matters into their own hands and took over local schools and other areas for use as emergency shelters. These impromptu shelters eventually led the Civil Defense and the Mayor's office to move the evacuees (Forrest 1979:32). As a result, they set up a "super shelter" across the river from New Orleans in Algiers at the Algiers Naval Station. At one point 10,000 people were housed in the barracks. More than 2,000 volunteers served at the Algiers center alone.

All in all, between coordinated evacuation efforts, proactive mayor, congressmen, and senators, a responsive president, and governmental and non-governmental organizations the response to Hurricane Betsy was a relative success of crisis governance. It was not perfect, nor was it equal—as I will discuss in the next chapter—but decisions were made, things got done, and lives were saved. The next step for state institutions and actors was the expansion of the regulatory domain of the state into new hurricane mitigation strategies and policies.

Governance II: Southwest Hurricane Relief Act 1965, SBA grants, and Flood Insurance

After Hurricane Betsy, elected officials at the local, state, and federal levels declared Betsy the worst disaster in US history. Speaking before a congressional hearing soon after Betsy, Governor McKeithen said, "We feel like, as I say, obviously we have suffered the greatest catastrophe in our State since the Civil War…Nothing has approached it in the way of a natural disaster" (United States Congress 1965:8). Echoing a sentiment at the time from elected officials McKeithen declared that the

magnitude of the disaster can only aided by one institution capable of handing the depths of the disaster: the federal government. He testified:

> We feel like…that here in our State—and of course the only people we can look to for the tremendous amount of money, the tremendous amount of work that's going to be required to give us the protection which we feel is required to protect us from these hurricanes, the only people we can look to, of course, are the people, the Federal Government in Washington, D.C., and the amount of money required to construct this is something beyond anything we can possibly hope to raise…(United States Congress 1965:9).

Congress soon began to debate and draft legislation to address Hurricane Betsy and plan for a future where the federal government could shoulder much of the burden, and aid disaster struck areas.

Two major pieces of legislation were created after Hurricane Betsy. The first was the Southwest Hurricane Relief Act of 1965 and the second was the National Flood Insurance Act (NFIA) of 1968 (PL 90-448). The Southwest Hurricane Relief Act was implemented to address the acute financial crisis after Hurricane Betsy, whereas the NFIA was designed to address the long-term financial impact of future disasters. Both acts increased the scope of federal involvement in urban and ecological issues at the local level. Further, each act was uneven in their implementation, not achieving it's desired results and benefiting some people more than others.

In 1965, Hurricane Betsy was the costliest disaster in US history at $1.42 billion in damages, which prompted the nickname "Billion Dollar Baby." Insurance

agencies were hit hard, companies doing business in the Gulf Coast were heavily impacted, and homeowners and renters saw costly damage. Congressman Boggs along with Senator Long pushed for Small Business Administration loans to those affected by Betsy. He wrote, "In addition, Senator Russell Long and myself and other members of the Louisiana delegation have offered special legislation for Hurricane Betsy victims providing, in some cases, for a grant of up to $1,800 for home, farm and small business owners who had uninsured flood damage over $500. The legislation also provides for a waiver of interest for three years on loans to farmers, schools and colleges, easy purchase of house trailers distributed to victims and a full study of a permanent program for future natural disaster protection, including full implementation of the Flood Insurance Act of 1956" (Boggs 1965). The Southeast Hurricane Disaster Act of 1965 was created to address the financial needs of those affected by Betsy. The Small Business Association loan program was a primary tool for disaster relief.

Small Business Administration initiated a loan program to individuals, small and large businesses and nonprofit organizations (United States Army Corp of Engineers 1965:13). The SBA loans were not without controversy, however (see Chapter 5 on the response from Lower 9th Ward activists). "The loans carried an interest rate of 3 percent and a maturity period of up to 30 years. The loans covered losses to building, furniture, equipment, inventory, and automobiles caused directly by the storm (US Army Corp of Engineers 1965:13). Senator Long had reservations,

saying, “What I would suggest be this: That the Federal Government should not make a loan for the entire amount of the damage and this forgiveness feature would not be forgiveness to make a man entirely whole; that this be somewhat conservative in this matter. If a person only lost his clothes, or a few pieces of furniture, that you say that is something the Red Cross could handle. That is something the State and local levels could handle” (United States Congress 1965). Long cited the case of a poor man who looses everything ($500 value) then is burdened by a loan. He advocated for loan forgiveness for the poor (US House of Representatives 1965).

In the end, the Southeast Hurricane Disaster Act of 1965 enacted what was called “self help and public programs” rather than full and unconditional government aid to those affected (United States Congress 1966). In 1966 the Secretary of the Department of Housing and Urban Development wrote a report evaluating PL 89-339. In it the Secretary articulated the two-pronged approach to self-help and public programs. One, to create federal programs and laws to facilitate self-help disaster recovery with targeted government assistance to foster individual initiative, rather than paternalistic dependence (United State Congress 1966:1). Two, the self-help and assistance program are designed to discourage the settlement, development, and occupancy of lands vulnerable to flooding (United States Congress 1966:1). The Secretary argued that unconditional government bailout would encourage risky behavior and habitation patterns, thereby raising the costs that the government wants to minimize. Reviving the Flood Insurance Act of 1956 (PL 84-1016).

Although the Flood Insurance Act was originally passed in 1956, by the time of Betsy in 1965 it had not been implemented. Hurricane Betsy along with the Great Alaskan Earthquake, also known as the Good Friday Earthquake of 1964[19], which was a major national crisis, were both catalysts for the federal government to extend law, policy, and institutions to crises of society and nature. It was not so much the death toll but rather the monetary toll on individuals, local, state, and federal expenditures as well as the toll on business and the insurance industry. The Insurance Information Institute released a report saying, "For the insurance business she [Betsy] was 'Catastrophe 90.' But she was also 'Disaster Number One'—the biggest, toughest, costliest calamity ever to hit he nation's insurance business" (Insurance Information Institute). Platt writes, "The federal disaster assistance began modestly in 1950 and thereafter grew rapidly in cost to the nation's taxpayers, reaching billions of dollars annually today. To stem the rising tide of disaster assistance costs, Congress in the Southeast Hurricane Disaster Relief Act of 1965 called for a study of flood insurance and other measures as alternatives to structural flood control and disaster assistance. The reports cautiously recommended that a National Flood Insurance Program might be a feasible way to reduce federal disaster costs, provided that it included land use and building standards to reduce future losses. Congress responded by creating the National Flood Insurance Program (NFIP) in 1968" (1999). Both the SHDR and the NFIP are examples of how crisis spurred the formation of urban

[19] Interestingly, the massive 1964 earthquake in Alaska sunk a few fishing boats off the coast of Louisiana. The force was so great that all the worlds oceans ebbed and swayed, further example that "local" environmental crises are rarely simply local in cause and consequence.

environmental governance structures and deepened the state's regulation of "local" socio-natural space.

It is noteworthy that the creation of the Federal Emergency Management Agency (FEMA) in 1977 was also, in part, a response to the crisis of Betsy. After hurricane Betsy and Hurricane Camille, a very powerful 1969 Hurricane that caused massive damage in Mississippi, but which passed to the east of New Orleans, federal officials saw the need for a centralized command and control agency for crisis response. It was not until President Carter's administration in 1977 that FEMA was created.

State Spaces: Army Corp of Engineers and the Levees

In the wake of Betsy, the Flood Control Act of 1965 (see above) granted the United States Army Corps of Engineers control of the hurricane protection system in greater New Orleans, replacing the Orleans Levee Board, an institution of the State of Louisiana. The original impetus was explained as follows:

> Congress first authorized the Lake Pontchartrain and Vicinity, Louisiana Hurricane Protection Project in the Flood Control Act of 1965. The project was to construct a series of control structures, concrete floodwalls, and levees to provide hurricane protection to areas around Lake Pontchartrain. The project, when designed, was expected to take about 13 years to complete and cost about $85 million. Although federally authorized, it was a joint federal, state, and local effort (United States Government Accountability Office 2005).

The Corps made revamping New Orleans levee system a top priority (Colten 2009:53). The Corps original idea was a comprehensive "barrier plan," which would have encircled the city and protected it from floodwater from both Lake Pontchartrain

as well as from the levees (Colten 2009:53). With the barrier plan the Corps wanted to build a levee that spanned the peninsula from New Orleans to the north shore and install several devices to close two water passages from the Gulf of Mexico and Lake Pontchartrain. The doors would be open during normal times but during hurricanes the doors could be closed so as to block tidal surge from reaching the lake (59). Ultimately, the barrier plan was tied up in courts through the 1970s and into the 80s by the objections of local inhabitants and environmental organization (see chapter 5). The Corps focused instead on raising the height of the levees in key areas of the city that were compromised during Betsy (discussed in Chapter 3).

The Flood Control Act of 1965 and the National Flood Insurance Act of 1968 (NFIP) are a bit at odds. The former mandated the Corps to build and maintain stronger and higher levees in critical areas of the city. The latter created a program to map 100-year floodplains and mandated communities to develop land-use flood protection policies. The first act was to protect flood prone areas with *structural* measures the second Act was to ease development—and easy the financial burden of floods—in high-risk areas with *land-use* measures. In New Orleans and Jefferson Parish defensive measures won out as city governments never implemented the land-use controls necessary to make the NFIP effective (Colten 2006:149). Corps structural flood abatement programs became extremely important to the region and helped spur horizontal growth of the city and adjoining suburban parishes into vulnerable areas. In short, horizontal urban expansion was made possible by state

spatial projects: levees, pumps, insurance mandates, and land use laws. The safety of inhabitants increasingly became entangled in federal and state agencies and policies. One clear example is the history of New Orleans East.

City Within A City: Urbanization and State Spaces

Various government agencies and actors were busy assessing the damage, understanding the storm and failures of the protection system, assigning responsibility and blame, and planning a revamped protection system. At the same time, while water still covered the eastern portion of the city, New Orleans city planners and the La Kratt Corporation busily hashed out plans to transform the last remaining marsh and swampland within city limits into a massive network of neighborhoods, which is known as New Orleans East. This story foreshadows events forty years later when Hurricane Katrina pushed the Gulf of Mexico over this same area, which had become New Orleans' predominate black middle class neighborhood. By 2009, this neighborhood has been one of the slowest to recover to pre-Katrina levels.

The general trend in greater New Orleans after World War II was horizontal expansion, otherwise known as suburbanization (see Chapter 2). Since there was limited available land left in New Orleans proper, much of the expansion occurred in neighboring St. Bernard Parish and Jefferson Parish (Campanella 2008; Castenell 2007). There was a racial component to these population shifts. White residents began leaving the City of New Orleans for the more homogenous white suburban areas. There was one large-scale development jewel left within the city limits of New

Orleans: eastern New Orleans. In the years prior to Betsy, during Betsy, and into the 1970s the City and land developers set their sites on this golden opportunity.

As water was receding in New Orleans East following Betsy, city officials, including Mayor Schiro and city council members, the Orleans Levee Board, and a successful New York real estate mogul Marvin Kratter met to discuss transforming the last remaining swamp and marshland into a utopian "city within a city" called Lake Forest. LaKratt promotional material extolled the 5,000-acre development saying that it will provide happy, healthy living space for 100,000 people. There would be "special landscaping" that would provide open greenery that connects "14 uninterrupted miles of connecting lakes, lagoons, and waterways." Residences would be arranged in "villages," each with it's own "architectural flavor." Regional shopping centers (today known pejoratively as "strip malls") would "provide homeowners "maximum convenience" and it assured readers that "famous store names" have already leased space. Lastly, Lake Forest would be connected to central New Orleans and the NASA-Michoud manufacturing plant, a very large employer in the region, when the new Interstate Highway 10 was completed through the heart of NOLA East. Kratter laid out his vision,

> Unfortunately, many American cities today are going down the drain and suffering a blight, and the blight that they're suffering is because there has never been the kind of gross planning on a large-scale nature for a community that we are attempting to do here. We were trying to create a thing of beauty here and a thing of permanence and a place for people to live that would be unusual and different. We don't want to t go into the old egg crate pattern of square roads and square streets, which today all over this nation are going into blight. We're trying to make something here that will be good for 100 to 150

> years that people will be happy to live in. (Special Executive Committee Meeting 1966).

Kratter argued against piecemeal development. He energetically argued to the S&WB that only his grand comprehensive development could transform this swamp into "one of the show places of New Orleans" (City of New Orleans 1965). If the whole of eastern New Orleans was not developed all at once, Kratter argued "that it is silly to go out and build a whole city within a city with all the churches, schools and shopping centers and parks and golf courses and every thing that are going into this thing, and in effect have modern twentieth century city sitting in the middle of a nineteenth century swamp" (City of New Orleans 1965). In the meeting notes the word swamp was crossed out and written above was the word setting, but the sentiment was noted. In order to make his idea come true, an integrated coordination between his firm, city leaders, and city and federal agencies would have to occur.

In order for eastern New Orleans to be developed the space had to be opened up by the city, and it also had to be drained. This required a new state spatial project that included the Mayor's office, city council members, the Sewerage and Water Board (S&WB), the Orleans Parish Levee Board, the La Kratt Corp, and the Army Corps of Engineers. There were many issues to hammer out. First, there was the issue of ownership. Kratter argued with the S&WB in February 1966 that he made a deal with the city in 1963-64 where he did not have to pay any money for maintenance, and where he was 100% owner of the land, rather than 40% owner (City of New Orleans 1966). Kratter argued that the City should be responsible for paying for the

cost of drainage because his land was at the center of a drainage basin, and receives water from the surrounding area not owned by him (States-Item 1965). George Piazza, Special Council for the S&WB argued that the City had long-term interests and responsibilities and that short-term planning by Kratter will have lasting effects on the City of New Orleans. Piazza said,

> In this project of yours, of course, may last about five years…then you move out again, you may or may not, but that is what usually developers do. Now, the Sewerage and water Board is going to be for five, 10 years, 100 years, I don't know how long. Now, that system there, the waterways, is part of the cost of the drainage system in the city of New Orleans. If we don't have some control of that particular area, and damage to our drainage system, then we're gone. We just can't do anything about it (Special Executive Committee Meeting 1966).

The issue of ownership, money, investment, and responsibility were sticking points in the creation of New Orleans East. However, Mayor Schiro essentially controlled the S&WB. Schiro had a favorable relationship with Kratter; Kratter offered to donate 155-acres of land to the City for a new football stadium in the mayoral election of 1965 (right after Betsy). Schiro wanted the New Orleans East development prioritized. He said, "We've got to get it going because after all, this one piece of ground between New Orleans East and New Orleans proper seems to be the camel that can break our backs in the next few years, and I'd like to see it get started especially when we have somebody who's willing to pay their portion of the share" (City of New Orleans 1966). The dissenting voice in the New Orleans East planning discussions was Councilmember James Fitzmorris, who incidentally ran against Mayor Schiro in the '65 election and lost. In late 1965, Mayor Schiro shook up the

S&WB, replacing Fitzmorris and Richard Freeman, and replaced with City Councilmember Joseph Di Rosa and James B. Gueno, a retired employee of the S&WB (States-Item 1965 10-A). The S&WB fell further inline with Schiro.

The second issue was drainage. This required the coordination of the governing bodies, S&WB and the Orleans Parish Levee Board, the developers, and the Army Corp of Engineers, who were tasked with revamping and expanding the levees after Betsy (see above). Kratter tried to convince the S&WB that his grand designs of an interconnected set of lakes, lagoons, and canals would transform the ecology of the area and help the city avoid flooding during rainstorms and hurricanes. He warned that if the area south of I-10, between I-10 and Chef Menteur Highway, was not drained the whole area would become a lake. That is exactly the area he owned and wanted developed. Di Rosa argued against delaying the development, favoring the grand development over piecemeal development because the latter would cause drainage problems for the city (States-Item 1965 10-A). The consideration of cost and responsibility met the consideration of drainage. They were tightly bound together. Kratter wanted the city to take a large share of the burden and he proposed having the homeowners pay for the upkeep of the lagoons adjacent to their property. Councilmembers and members of the board were skeptical, however realizing that Kratter had influence over them because he was putting up good deal of capital for the development. One committee member remarked “Our problem, we have a policy, New Orleans East has a whole lot more area yet to develop than this guy. Now

anything we do for him, you've got to do for New Orleans East, so I hesitate to—I think our policy is extremely liberal. We're going overboard in order to help to develop this area" (City of New Orleans 1965). He was followed with a quick retort from another committee member who said, "He couldn't sit on that place for 20 years and finance it the way he was. He went broke in 5 years, just paying the interest off it. At least this guy's telling you the truth, he knows he has to do it within a five year period, or he's in bad shape himself, which is right, there's no question about it" (City of New Orleans 1965).

Both the City and Kratter saw this space as a golden opportunity for a massive urban and engineering project that would once and for all fill in the last remaining swamp and marshland within city limits, and stem the tide of suburban flight to the neighboring parishes. Hurricane Betsy had minimal impact on the plans to develop eastern New Orleans. In fact, it spurred desire to drain the area, create a system of waterways, and pave it over with houses, shopping centers, hospitals, churches, and I-10. Lake Forest never materialized the way Kratter envisioned it; development in New Orleans East ended up more piecemeal and involved many development projects that were not completed until the middle of the 1970s, nearly ten years after Betsy. And although the lagoons, lakes, and canals that were build in this area have at times eased the severity of flooding by providing larger sinks for water compared to other areas of the city, New Orleans East became one of the most vulnerable areas of the city. New Orleans East is surrounded by water on all sides, with Lake Pontchartrain

to the north, the Industrial Canal slicing it off from New Orleans proper to the west; the Mississippi River Gulf Outlet (MR-GO) to the south; and Lake Borgne to the east. Despite the wild dreams of boosters to create a paradise, a city within a city, New Orleans East was one of the most abandoned areas of New Orleans following Hurricane Katrina.

Hurricane Katrina

The crisis of Hurricane Katrina provides insight into the changes in crisis governance between Betsy and Katrina. The response to Betsy was largely characterized by a centralized response and rebuilding effort, whereas the response to Katrina is largely characterized by an "everybody for themselves" evacuation and a policy of rebuilding that gives responsibility to each neighborhood to demonstrate that their viability. At the time of Katrina, the Army Corps of Engineers levee system was incomplete, and the failure of the federal government's spatial project put the people of New Orleans in acute risk.

Governance: Everybody for Themselves

Evacuation during Hurricane Katrina was quite different than during Hurricane Betsy. Recall that during Betsy, neighborhood shelters, whether official or ad hoc, were used to house residents in higher ground or multistory buildings. In some cases residents commandeered schools and other buildings, but in other cases state and local agencies created shelters around the city. All in all, evacuation meant leaving one's house and relocating to a shelter within the city rather than an exodus

from the city itself. During Katrina it was nearly opposite. After Betsy, the lessons learned about hurricane preparedness did not endure to 2005. This part of the story is riddled with a bit of chance and bad luck as well as what can only be described as a failure of hurricane crisis planning in Louisiana, which implicates the federal, state, and city governments.

A major difference between Betsy and Katrina was the *mandatory* evacuation ordered by Mayor Nagin on Saturday August 28, 2005, the first in the city's history. The repercussions of the mandatory evacuation were many. First, New Orleans did not have a concrete hurricane action plan (Brinkley 2006: 19). After Betsy, government officials and residents were convinced that strengthening and building taller levees would solve the hurricane problem. Less focus was on how to prepare to move people out of harms way. As fate would have it, between 1965 and 2005 New Orleans did not have a major direct encounter with a hurricane. The closest was Hurricane Camille in 1969, which did flood some urban areas but mainly devastated the then still rural Mississippi Coast. There were a few other close encounters but nothing on the scale as Betsy. The relative absence of major hurricane crises between Betsy and Katrina enabled residents, planners, and government officials to become complacent in regards to crisis preparedness and mitigation. As I detailed above tens of thousands of people settled in harms way between Betsy in 1965 and Katrina in 2005. In 2000, city officials prepared a fourteen-page booklet called "City of New Orleans Comprehensive Emergency Management Plan." Despite its comprehensive

title, it did very little to prepare the city for a massive evacuation (Brinkley 2006: 19). What little the report did recommend, Mayor Nagin largely ignored.

Second, the mandatory evacuation meant that everybody had to get out. Without a comprehensive evacuation plan thus meant essentially everybody for themselves. In 21st century United States, this implied the use of an automobile. As many have pointed out since Katrina (Campanella 2008; Brinkley 2006; Bullard, Johnson, and Torres 2009), an everybody for themselves evacuation based on personal automobile transportation created an unequal situation, where those with the means to get out (drive or fly) could do so, while those who could not were left behind. It is often assumed that the United States is a nation of cars, which it mostly is with 91.7 percent of households owning at least one vehicle (Bullard, Johnson, and Torres 2009: 66). However, as of 2005, 11 million households in the US do not have vehicles (Bullard et al. 2009: 66), making them vulnerable to crises that require personal automobile evacuation. In New Orleans the number is higher, with about 27 percent, or 130,000 residents did not own a car at the time of Katrina. Bullard et al. (2009) demonstrate that car ownership is unequal across race and class, showing that poor African Americans and Latinos have significantly lower levels of car ownership compared to whites. This was significant in New Orleans during Katrina. As white and black middle and upper class residents fled, tens of thousands of poor working class black and white residents stayed behind.

Third, those who stayed behind, either because they lacked access to a car or for whatever reason—and there were many who stayed behind for reasons only known to them—faced a situation in which there was no clear plan for an evacuation within the city similar to Betsy. For example, the Red Cross had refused to open any shelters in New Orleans for hurricanes greater than category 2 (Brinkley 2006; Bullard et al. 2009). Lacking any suitable schools, hospitals, gymnasiums above sea level to use as emergency shelters the American Red Cross would not open shelters inside the flood zone, which is over 80% of New Orleans (Brinkley 2006: 17-18). As a result, in the 11th hour, the city designate the enormous sports stadium the Super Dome and the New Orleans Convention Center as "shelters of last resort." For the tens of thousands remaining in the city these two sites, along with bridges and overpasses, became the only place to seek shelter. In the following days and weeks after landfall, the Super Dome and the Convention Center became infamous as thousands of residents were stranded without food, water, or basic sanitation as the floodwater filled the city around them.

It is easy to scapegoat Mayor Nagin, who in comparison was not seen as a folk "hero" like Mayor Schiro during Betsy. The larger picture reveals that crisis governance broke down at all levels of government. In fact, finding responsibility in one level of government, one agency, or one official became a partisan pastime. Right-wing pundits attacked Democratic Mayor Nagin and Louisiana Governor Kathleen Blanco. Left-wing pundits attacked President George W. Bush, or his key

officials such as the head of FEMA Michael Brown, Bush's fall guy who resigned in September 2005, weeks after Katrina. Rather than any one person or agency, the overwhelming crisis of Katrina is due to the confluence of three factors: the failure of the post-Betsy flood protection system (see Chapter 3), race and class inequality and vulnerability related to housing and access to transportation, and the failure of coordinated inter-governmental crisis preparedness and management.

Local, state, and federal governments in the US do not always fail in their response to crisis. There are always varying degrees of success and failure based on multiple variables, such as scale and scope of the crisis, and the quality of crisis preparation. In the case of Katrina, Schneider (2008) suggests that the failure is "tied more directly to the collapse of the intergovernmental framework upon which the entire system is based" (2008:716). Disaster response in the US is legally designed to work in a bottom up fashion. Response begins at the local level and "follows a series of pre-specified steps through the state and, ultimately, to the national government" (716). Schneider argues that during Katrina, because of "misperceptions within the governmental system about the roles and responsibilities of national, state, and local emergency management agencies," the intergovernmental framework broke down and no single branch or level of government claimed responsibility. The Mayor was against the Governor, but more aligned with the President, who was also unfavorable to the Governor. Agencies and levels of government were not acting in a coordinated manor, and at times flat out finger pointing. It was not as if there was no plan for

crisis response at any level. It was that all levels of governance broke down, and ultimately no solid coordinated response was deployed until the situation was catastrophic.

State Spaces: The Corps' Unfinished Business

After Hurricanes Betsy and Camille, the entire New Orleans region became a state space as the Army Corps of Engineers assuming dominion over the flood defense system that protects one of the US's most culturally and economically important city. The existing physical and governance infrastructure failed during Betsy, and local state, and federal officials, and residents wanted a stronger and better levee system. The Army Corps of Engineers was given the task. As I mentioned earlier, Southern Louisiana and New Orleans were mostly spared from hurricanes in the time from Hurricane Camille in 1969 to Hurricane Katrina in 2005. Of course, the absence of major hurricanes making landfall near or over New Orleans is always a positive thing for New Orleaneans, but the long drought of storms in the region actually led to a slow down of work on the post-Betsy levee system. What hurricanes did not destroy in that time; humans were able to make New Orleans more vulnerable with incomplete infrastructure, infrastructure not designed for anything more than a once in 30-year hurricane (e.g., Betsy), and continued urbanization of the wetlands (see below).

There is a direct link between post-Betsy planning and the levee failure during Hurricane Katrina. New Orleans became more vulnerable because of persistent

tensions between federal and local governments, construction delays, and a diminished lack of urgency after the acute crisis of Betsy subsided, and the long relatively calm period ensued (1969-2000s). After Betsy, the bulk of responsibility for the region's protection was put in the hands of the Army Corp of Engineers. The design for post-Betsy protection system took place throughout the 1980s, with construction mostly taking place during the 1990s (Colten 2009: 124). However, work on the project moved slowly. By 2001, the project was 88 percent complete, and by the eve of Katrina progress stood at 90 percent complete.

There are two main functions of a good flood and hurricane protection system in greater New Orleans. The system needs to be able to keep water out, to hold back the Gulf of Mexico, Lake Pontchartrain, and the Mississippi River. The system also needs to be able to pump water out, to circulate water that accumulates in areas of the city below sea level, and creates flood hazards. These two systems need to work together. Besides the technical and engineering concerns, two different institutions, one federal and one local, govern these two systems. The Corps is responsible for designing and maintaining the levees. The New Orleans Sewerage and Water Board (S&W Board) is responsible for designing and maintaining the pumping system. This bifurcated governance structure creates not only governance bottle necks but in the time between Betsy and Katrina led to an increase in the vulnerability of New Orleans. The levee and pumping systems form a complex and dependent technological relationship (Comfort 2006: 510), in which the latter is dependent on

the former. If the levees cannot keep the water out, then the pumping system risks being overwhelmed. What is also true is that the governance structures overseeing the technical operations of both systems should be interdependent and closely coordinated. This has not always been the case.

Plans, Plans, and More Plans: The Footprint Debate and State Spaces

Beyond evacuation policy decisions and governance failures related to the levee and pumping systems, post-WWII (sub)urbanization in the New Orleans region created the most vulnerability and contributed to destruction of the late 20th century neighborhoods. The areas of the city where levees breached (see Chapter 3) and floodwater was most destructive were Lake View, West End, Filmore, Gentilly, New Orleans East, and the 9th Ward (see Figure 9 below). Because of these breaches and the topography of the city, non post-WWII areas were also heavily impacted, such as mid-City, Broadmoor, Seventh Ward, and Treme, all of which are below sea-level. The oldest parts of the city, those on the highest ground, were less affected. In Chapter 3 and earlier in this chapter I explored the relationship between the expansion of the levee system and the increase in horizontal expansion of the city, and with this development a greater vulnerability to tidal surge. State spatial projects enable certain types of urbanization, in this case low-density housing developments in former wetlands and swamps.

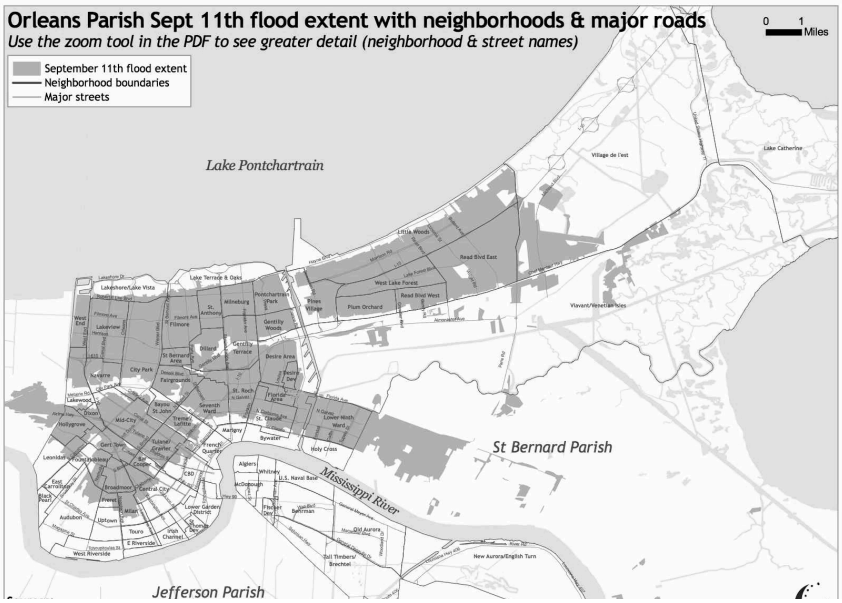

Figure 9 Extent of Orleans Parish Flooding After Katrina. Source: Greater New Orleans Data Center

In 2005, the urban footprint of the region was extensive, and after Katrina, the big question became should the city's geographic footprint remain the same or should it shrink (Campanella 2008)? Similar to Mansfield's (2001) description of neoliberalized governance structures in North Pacific fisheries, policy makers and elected officials created an overlapping, conflicting, and interrelated local-state-federal rebuilding governance nexus in New Orleans. Moreover, each effort was a public-private partnership, where state actors initiated the plans but contracted to private organizations to carry out the actual plans. Despite the complexity, the initial outcome of these plans favored a market oriented, "citizen empowered," and every neighborhood for themselves approach. Policy makers and elected officials created

the rebuilding blueprints that would determine the city's racial, class, and geographic makeup. The formation and failure of the various rebuilding plans gives insight into the neoliberalization of post-Katrina state spatial projects (Gotham and Greenberg 2008; Peck 2006).

Months after Katrina, in late 2005, Mayor Ray Nagin launched the first recovery plan, dubbed Bring New Orleans Back Commission (BNOB). The commission was comprised of seventeen members, which included a racial make up of eight Whites, eight African-Americans, one Latino, and included ten business leaders, two representatives from the city's religious community (Burns and Thomas 2006:523). The Commission was led and inspired by land developers and urban planners. The most prominent committee of the Commission was the Land Use Committee, which was charged with deciding where the build/no build line would be (Irazabal and Neville 2007). Joseph Canizaro, a local developer with close ties to the White House, chaired the committee, and borrowed significantly from the rebuilding strategy of the Urban Land Institute (ULI), with little input from communities in New Orleans (Irazabal and Neville 2007; Nelson, Ehrenfeucht, and Laska 2007). The Committee then outsourced the production of the planning document to Philadelphia-based Wallace Roberts & Todd. The Action Plan was published in January 2006 (Nelson, Ehrenfeucht, and Laska 2007).

The Action Plan offered a comprehensive, master plan for post-Katrina New Orleans. The plan highlighted four-point framework: 1) Flood and Stormwater

Protection Plan, 2) Transit and Transportation Plan, 3) Parks and Open Space Plan, and 4) Neighborhood Rebuilding Plan (Wallace Roberts & Todd 2006). The Action Plan stated this vision for a rebuilt New Orleans: "New Orleans will be a sustainable, environmentally safe, socially equitable community with a vibrant economy. Its neighborhoods will be planned with its citizens and connect to jobs and the region. Each will preserve and celebrate its heritage of culture, landscape, and architecture" (Wallace Roberts & Todd 2006). In order to achieve the Action Plans goals, the Land Use Committee recommended a planned shrinkage of the city's geographic footprint. In the Action Plan, a map of proposed Parks and Open Space depicted green dots to represent proposed areas for future parkland (See Figure 10). It so happened that the large green dots covered significant areas of the Lower 9th Ward, New Orleans East, Gentilly, and around the 7th Ward (all heavily African American neighborhoods). Backlash from residents was immediate, and sustained throughout winter and spring of 2006. To inhabitants the BNOB Commission represented their worst fears of post-Katrina rebuilding, a planned shrinkage back to the old 19th century topography, the sections of the city I described in Chapter 2 as the white teapot. After inhabitant backlash and uproar, the BNOB Commission fell apart as Nagin distanced himself from his own Commission (Burns and Thomas 2008).

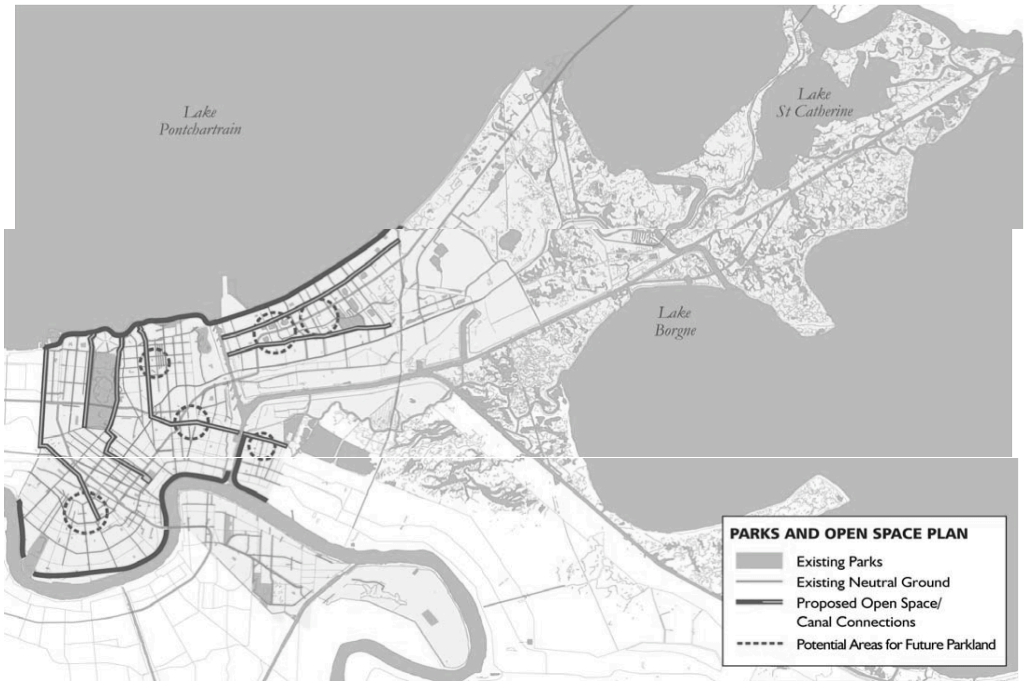

Figure 10 Bring New Orleans Back Parks and Open Space Plan, Dotted circles indicate planned open space. Source: Wallace Roberts and Todd 2006

Signifying fractured city governance and the "dysfunctional tradition of New Orleans political fiefdoms" (Irazabal and Neville 2007:139) the City Council launched its own rebuilding plan called the New Orleans Neighborhoods Rebuilding Plan (NONRP). The NONRP was a neighborhood approach, which focused on the most damaged neighborhoods (Irazabal and Neville 2007). The plan specifically enrolled resident participation and called for the rebuilding of all storm damage neighborhoods (Nelson et al. 2007). As the NONRP was wrapping up in the spring of 2006, yet another plan was launched called the Unified New Orleans Plan (UNOP), which was funded by the Rockefeller Foundation. UNOP explicitly called for a citywide comprehensive plan that would be the basis for federal recovery funding.

The UNOP also explicitly enrolled neighborhood participation, unlike the BNOB Commission. The UNOP plan brought together neighborhood residents and planners to develop rebuilding plans. Despite the enrollment of resident participation, many neighborhoods remained skeptical that their needs and desires would be represented in the final reports and plans (Irazabal and Neville 2007).

All told, two years after Katrina New Orleans has had five citywide recovery plans (Nelson et al. 2007). Residents grew weary of the top down, technocratic plans, such as the Bring New Orleans Back Commission. And although the NONRP and UNOP plans enrolled citizen participation, their inclusion was mediated by city governance structures and outside firms, hired to do the actual consulting and planning. Residents feared that *their* neighborhood would be annihilated through a comprehensive planned shrinkage. As a result of this distrust, amplified by the green-dot controversy, rebuilding efforts eventually settled on a plan of individual and neighborhood-by-neighborhood approach, rather than a comprehensive citywide rebuilding blueprint. The family-by-family approach was aided by federal money through the State of Louisiana's Road Home Program, which dispersed federal block grants to homeowners. In many ways residents got what they wanted, neighborhood and individual control over their right to return and rebuild. Some extol this approach calling it "neighborhoods in the lead" (Irazabal and Neville 2007); while others point out that early on the city squandered any hope of building a mutual city-resident-

professional framework that would have been both participatory and inclusive, yet facilitated by professional planners (Nelson et al. 2007).

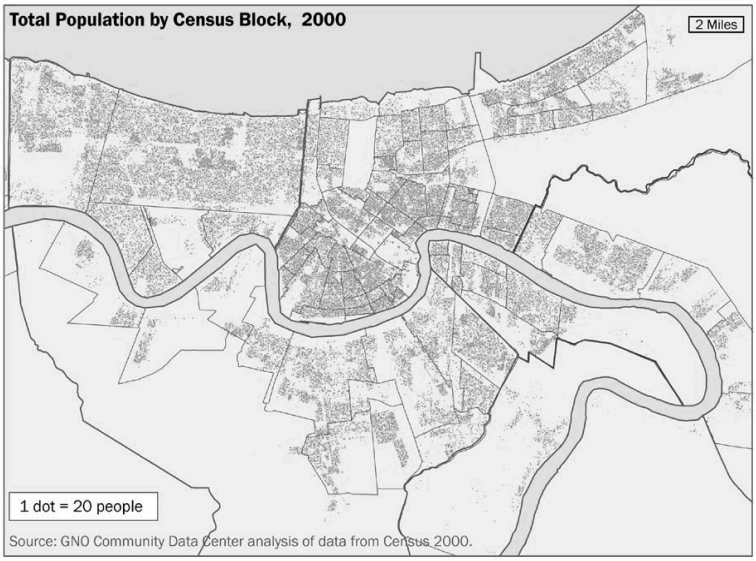

Figure 11 Total Population Year 2000, Source: Greater New Orleans Data Center

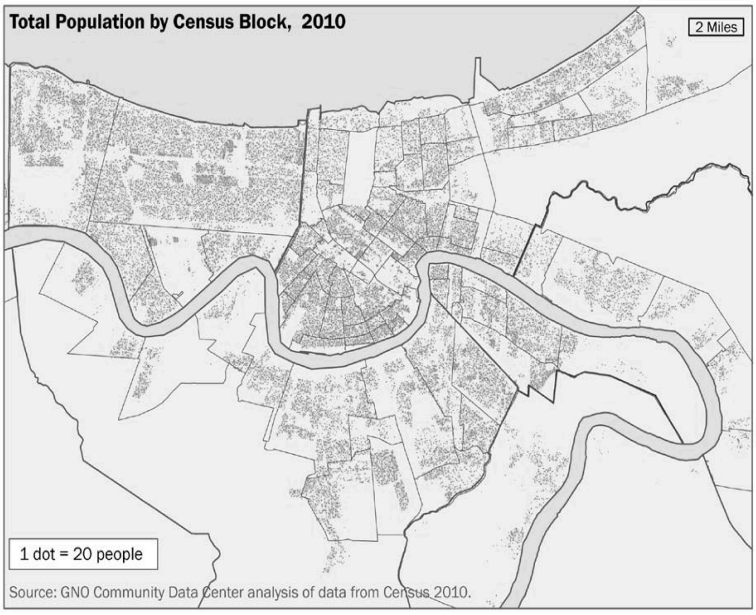

Figure 12 Total Population Year 2010, Source: Greater New Orleans Data Center

In the years since Katrina, the "neighborhoods in the lead" approach has become the path of least resistance, and ironically it has led to a very similar socio-spatial outcome of the BNOB Commission (see Figures 11 and 12 above). The city has gone through an *unplanned* shrinkage as residents have voted with their feet and moved out of, and never returned to, the most damaged and vulnerable neighborhoods, in particular New Orleans East and the Lower 9th Ward. This approach has been a boon to well organized, relatively affluent and white and "successful" neighborhoods such as Broadmoor and Lake View, but it has not done enough to draw up a conversation about what a truly participatory, technically informed, and socially just, rebuilding scheme would look like. The time for frank and open discussions about the build/no build line appears to have passed (Campanella 2008). The laissez faire approach, which appears to empower residents, enables longstanding economic, racial, and geographic inequalities to remake socio-natural boundaries of post-Katrina New Orleans. Long a phenomenon, and problem, in New Orleans, geographic uneven development still marks the post-Katrina socio-natural landscape. Vulnerability is only being eased by some people's unwillingness to return to their homes. Neoliberalized urban environmental governance structures and state spatial projects pre and post-Katrina shaped the process of uneven development and the production of vulnerability.

Chapter 4.2: Seattle

Boldt Decision

The salmon crisis in the 1970s provides insight into three key developments: one, how nature becomes a key organizing object of state institutions; two, how the federal government created new state spaces in the Puget Sound aimed at addressing the on going crisis; and three, the role of tribal protest and civil rights adjudication in these developments. As I described in Chapter 3, scientists began to understand that urbanization of salmon habitat was a larger cause of the salmon crisis. In the 1970s, for policy makers the Four Hs was only an emerging framework. In this Chapter I describe how governance, policy, and legal practices began to shift from stock management to habitat management. In the previous chapter my focus was on the science of salmon, this chapter is about the governance of salmon.

Fish Wars 1970s

Within the backdrop of the development of Federal and State environmental regulation in the 1960s and 70s, and regional bodies such as Metro (described in Chapter 2), a regional social and ecological crisis was brewing over the dwindling salmon stocks of the Puget Sound. In the early 1970s the Puget Sound was in crisis. Low-level battles ensued between government agencies, federal judges, white fishermen, and Native American tribes over the dwindling salmon stocks. In the first few years of the decade, the Washington State Department of Fish and Wildlife,

backed by state biologists and government officials, began curbing fishing access in the Puget Sound fisheries, particularly for salmon harvest. State officials placed regulations on both commercial fishing operations, which was overwhelmingly controlled by white working-class fishermen. In addition, the State began to regulate Native American fishermen.

As the State began to enforce environmental regulations, white fishermen began to scapegoat Native Americans, arguing that the tribes were the largest threat to salmon stocks. As tensions mounted, it kicked off an ugly decade long fish war. Both white fishermen and tribal fisherman began to stage "fish-ins" in waterways across the Sound to protest the State's regulations; they also battled one another. Both whites and Native Americans were arrested as they staged public protests on the water and in the streets. Tribes also continued a direct action campaign that actually began in the late 1960s. Overall, during this crisis, the federal government began enacting a new regulatory framework, one that attempted to adjudicate salmon management and create new state spatial powers over economy, society, and the environment.

Crisis Governance: Boldt Decision Phase 1: Resource Management, Judicial Governance, and Civil Rights

Two important court cases set legal precedents to the monumental Boldt Decision of 1974. In 1963 the Washington Department of Game filed a lawsuit that sought to enforce the State's ban on net fishing of steelhead at the Payallup tribe's fishing grounds (Blumm 2002:77). The state Supreme Court ruled in favor of the

State, saying that the State could enforce the ban if it was a necessary conservation measure (Blumm 2002: 77). The US Supreme Court then took the case and initially issued a similar judgment. The US Supreme Court said that regulation of tribal fishing was a "reasonable and necessary" conservation measure. The tribes felt they were unduly and overbearingly regulated as hook and line fishing by non-Indians was allowed. Once the State began enforcing the regulations the issue went back to the US Supreme Court, this time the Court had a change of opinion and found that the State was discriminating against the tribes. This was one small step in redrawing salmon management practices with a priority on equal share and responsibility for Indians and non-Indians.

The second case was more significant and focused on fishing on the Columbia River in Oregon. The case *Sohappy v. Smith* saw the Yakama Indian Nation, joined by the federal government, challenge the State of Oregon's policy of limiting salmon harvest above the Dalles Dam. The State argued that regulating fishing above the dam was a necessary conservation measure. Judge Belloni did not agree and concluded that although there were conservation merits, the regulations "foisted the entire conservation burden on the tribes while allowing non-native sport and commercial harvest to go unabated" (Blumm 2002:79). Belloni concluded that the tribes were entitled to a "fair share" and that the Oregon needed to develop conservation plans based on a "regulatory policy coequal with conservation of fish for other users" (79). Further, Belloni established standards with which the State had to achieve coequal

status, which included allowing the tribes to meaningfully participate in the development of harvest regulations, and two, ensure that the regulation of tribal fishing came only after downriver non-tribal fishing was regulated (79). Blumm argues that this revolutionized salmon management in the Columbia River. It helped set the stage for an even bigger case that shook up salmon management in the Puget Sound.

After years of pressure from tribes, in early 1974 the Federal government sued the State of Washington on behalf of the Puget Sound tribes. The case *The United States versus Washington* sought to prohibit the State from regulating tribal fishermen in the same manner the State was regulating white fishermen. On February 12, 1974, Federal Judge George Boldt ruled in favor of the Federal government, and declared that Native Americans were entitled to half the salmon catch and could not be impeded by the State while fishing off-reservation. The ruling largely hinged on one important sentence from the original 1854 treaty: Indians will have the right to fish at their "usual and accustomed grounds...in common with all citizens of the territory." Judge Boldt ruled that this sentence meant that Indians had had the right to fish unimpeded off-reservation since 1854. Boldt's ruling also upheld what the tribes had been arguing for decades, that the State had violated the treaties signed in the nineteenth century, which granted tribes access to salmon. The ruling became known simply as the Boldt Decision.

By November of 1974, Washington Governor Dan Evans urged President Ford to declare the state's commercial salmon-fishing industry "a major disaster area" (Seattle Times 1974). The commercial salmon fishing industry was in severe decline in the Sound, and Evans and others argued that once the Boldt Decision kicked in the tribes would further erode salmon populations. In Seattle, Tacoma, and throughout the Sound, white fishermen angrily protested the Boldt Decision. They believed that their livelihoods were about to vanish. In the years that followed, clashes between whites, the State, and Native Americans were common. During a commercial fisheries regulations hearing Gillnet fisherman Wayne Cornett explained, "We won't allow the department to feed us to the Indians...we won't go away quietly. I've got nothing against Indians, and I've got nothing for the Indians. They're just people...I'm tired of hearing about their heritage. I'm an American and I have a heritage too...and we're going to have another Boston Tea Party right here in Puget Sound" (Seattle Times 1974). Another fisherman, according to a Seattle Times reporter, was applauded loudly when he proclaim, "If you are going to kill us—and what you are doing is economic murder—I'm going to fight and so are others" (Seattle Times 1974).

A low-level, racially fueled fish war continued until the early 1980s. The US Supreme Court upheld Boldt's historic decision in 1979, all but cementing his ruling as the law of the land. Forlorn, white fishermen bitterly blamed Indians for what they saw as a coming biological disaster, and chastised the federal government for

violating the 14th Amendment, the Equal Rights Amendment. While a century of heavy fishing was certainly one cause of the salmon crisis, the impact of Seattle's growth and the urbanization of salmon habitat in the region were under-acknowledged, creating a veil over the larger role of urbanization in the protracted decline of salmon. The focus on fishing rights and access contributed to white's racially fueled attacks on Native Americans, all but ignoring how urban and industrial development created vast transformations to salmon habitat, and in the process undermined the species capacity to reproduce.

Urbanization: Boldt Decision Phase II: The Beginning of Urban and Environmental Regulation in the Sound

Along side the historic ruling to grant Native Americans half the salmon catch, a clear re-distributive measure, was the so-called Phase II of the Boldt Decision, known as the "environmental phase" (Raymond 1975). The original plan of Phase II was to decide if environmental degradation of the rivers in which salmon make their runs violate tribal fishing rights (Raymond 1975). Phase II represents a move towards understanding the role of large ecological and urban transformations on the dwindling salmon runs, and away from the narrow resource battles that defined the war during Phase I. Attorneys for the tribes were bring cases to the courts arguing that industrial, agricultural, and urban development has transformed and damaged historic tribal fishing areas. In Phase II, Judge Boldt was tasked with determining whether human activities, such as dam building, logging, road construction or other urban development approved by State agencies have damaged rivers to the point that

they no longer had healthy salmon populations returning to the tribes' "usual and accustomed" fishing grounds, as mandated in the original treaty and upheld by Boldt in Phase I (Raymond 1975). This legal move by the tribes is an overt challenge to urban and industrial development, and a significant shift from resource redistribution to what can be argued as an environmental justice position. An environmental justice position seeks to address underlying ecological and social causes of inequality, distress, and vulnerability. Moreover, Phase II represents the beginning of the shift from resource management—a mid 20th century strategy—to a late 20th century ecological restoration strategy (Blumm 2002:15-16).

However, in the mid-1970s Judge Boldt deferred the Phase II ruling. After Boldt retired in 1979, Judge William Orrick took over Phase II adjudication. In 1984, Orrick ruled in favor of Phase II, and ruled that the State has an obligation to protect salmon habitat to ensure that tribes have access to healthy salmon stocks guaranteed to them by Phase I. This was a landmark ruling. However, the following year a higher appellate court determined that Orrick had gone too far. Phase II of the Boldt Decision was stopped in its tracks. An end to Phase II came in 1993 when U.S. District Court Judge Barbara Rothstein dismissed "without prejudice" Phase II. By the early 1990s, however, salmon management and protection had changed drastically since the days of the low-level fish war that characterized the 1970s.

The 1970s fish war and the Boldt Decision provide insight into, one, how socio-natural crisis drove the production of new forms of salmon management and

governance practices, in this case a top down structure controlled by federal judge George Boldt; two, how various state actors created new state spaces, which severely regulated commodity and livelihood based economies (salmon fisheries) in the Puget Sound; and three, how tribal struggles for civil rights, or what might be more appropriately called sovereignty rights, helped alter the course of salmon management and environmental governance more broadly. These developments are a pivot moment in salmon management that forms the basis for the governance framework in the second crisis period in the late 1990s. Still at stake were the questions of who should have jurisdiction over Puget Sound salmon, who should be included as a stakeholder, and whether or not urban and environmental space be organized to protect human livelihoods as well as salmon.

Endangered Species Listing: 1990s and 2000s

If the salmon management in the 1970s was marked by conflict, and even violence, salmon management in the 1990s and onwards is marked by an overt and oft-repeated call for cooperation amongst stakeholders and managers. Of course, the political, economic, and philosophical differences between actors have not gone away. Instead, they are being channeled into a variety of different strategies. The various strategies to address the crisis are as follows: multi-scaled state facilitated governance (watershed management areas, EPA directives, Commerce Department directives, and fisheries management); private-public partnerships (e.g., For the Sake of Salmon); Tribal lawsuits; grassroots, community-based restoration projects (e.g.,

Thornton Creek Alliance); and grassroots campaigns (e.g., Duwamish River Clean Up Coalition). Along with a plethora of scientific and technical reports, these political strategies are defining salmon management for the 21st century. The formation of salmon governance in the 1990s suggests how nature continues to be an organizing object for state activities, but how these activates are organized by newly neoliberalized modes and rationales of governance.

Crisis Governance: The Endangered Species Listing

By the 1990s, scientists, citizens, tribes, government officials, and fishermen began coming to a common understanding that over-fishing was only one part of the decline of salmon. Instead, they understood that there was a confluence of four factors: Habitat alteration, Hydroelectric power stations (dams), Harvest, and Hatcheries, the Four Hs (see Chapter 3). In the early 1990s, federal officials listed salmon in two major western rivers as threatened under the Endangered Species Act, the Sacramento River in California and the Snake River in Idaho. In the Puget Sound another acute salmon crisis was unfolding. The Cedar River is the largest watershed in King County and largest river that runs through Seattle Metropolitan area. Two critically impacted species of salmon, chinook and sockeye, inhabit the river. In 1992, King County entered into a cooperative agreement to support the 1992-93 emergency sockeye relief program to enhance sockeye stocks in the Cedar River Basin. The Washington State Department of Fisheries successfully implemented an emergency sockeye relief program in cooperation with the Seattle Water Department and

numerous other stakeholders, including National Marine Fisheries Service, US Fish and Wildlife, the Muckleshoot Indian Tribe, and Puget Sound Anglers. In 1994, the closure of the salmon fishery in major fishing areas of Washington State, resulting in the governor declaring coastal counties disaster areas. In a motion discussed by King County supervisors, they stated:

> The President of the United States is requested to expedite delivery of services to be funded by the $15.7 million contingency disaster funds through the Department of Commerce, and ensure ten timely and efficient implementation of other federal disaster aid programs for eligible individuals and businesses, including low interest loans through the Small Business Administration, rent and mortgage assistance and disaster unemployment compensation through the Federal Emergency Management Agency (King County 1994).

This new acute crisis was building and pointing to a new round of developments within salmon environmental governance and regulation.

In 1999, Seattle, along with Portland, Oregon, became the first urban area to have a threatened species listing under the Endangered Species Act (ESA). NOAA, a sub-department of the Department of Commerce, issued a threatened species listing for chinook salmon in the Puget Sound, including the rivers that flow through Seattle. In rivers and watersheds up and down the west coast salmon species were on the verge of extinction, and in some 40% of their historic spawning rivers they are extinct (Lichatowich 1999:204). In 1999, it was the urban rivers that were additionally targeted. Newspapers highlighted the myriad of groups that would be affected by the listing: commercial timber companies, owners of small timber stands, farmers, dairy farmers, developers, and urban and suburban dwellers (Dobrovolny 1999:2). By

1999, with the exception of controversial salmon hatcheries, fisheries management and commercial fisheries regulations had drastically reduced the impact of overfishing on salmon populations. The new focus was development, specifically urban development.

The Urbanization of Salmon

The ESA mandated that King County and the municipalities must take steps to mitigate the crisis through urban policy, law, and planning. In the early 1990s with the passage of the State's Growth Management Act, King County and the City of Seattle were embroiled in growth debates. Then a few years prior to the 1999 ESA listing, Seattle's city council and mayor crafted resolutions to declare Seattle a major player in recovering chinook salmon habitat. The ESA merged the issue of growth with the issue of salmon protection. Planning reports from various government organizations written after the ESA listing spoke with self-professed determination that they would not let chinook, the King of salmon disappear from the Puget Sound. Washington State's report is entitled "Extinction is Not an Option"; King County declared, "The Return of the Kings"; and the City of Seattle took a more sophisticated approach with "Chinook in the City: A blueprint to Restore and Protect Chinook Salmon in Seattle."

The City of Seattle responded to the ESA in several ways. One, the City initiated a built environment study, which was tasked "to improve its scientific knowledge regarding how chinook salmon use the urban environment and to identify

strategies to improve the habitat conditions" (City of Seattle 1999:33). Two, the city council passed an Emergency SEPA amendment, which was meant to "clarify the City's authority to use SEPA, in addition to the Shoreline Master Program, to condition development projects to respond to the listing of Chinook salmon under the ESA" (City of Seattle 1999:33). Third, the City responded to the ESA by saying:

> Not only is Seattle already a built environment, but consistent with the mandate of the state Growth Management Act, the City also has adopted a Comprehensive Plan that envisions additional growth for the city's population and job base. One of the primary reasons for the City's adoption of higher growth targets was to meet state and county policies which encourage higher density development in existing urban centers to reduce development pressure on suburban, rural and forest lands--areas which can have a significant impact on sensitive salmon spawning and rearing habitat (City of Seattle 1999).

In 2000, the City released its "Chinook in the City" document recognizing the City's role in the salmon crisis and outlining the steps that the City will take to mitigate the crisis. The City stated its commitments to launching habitat projects; modifying regulations and codes, working jointly with other governments and citizens; and continuing research to understand salmon needs (City of Seattle 1999). It remained to be seen how each jurisdictional authority was going to successfully address a problem that spanned jurisdictional boundaries, and involved the efforts of agencies, governments, and actors at different scales.

State Spaces: A New Cartography

A large development during this period was the proliferation of jurisdictional, territorial, and cartographic plans. Beginning in 1972, Metro organized the River

Basin Coordinating Committee (RIBCO) to supervise the river basin water and waste management for King County. This was an early territorial and jurisdictional governance structure. Around the same time the State's newly minted Department of Ecology divided up the state in to Water Resource Inventory Areas, simply known as WRIAs. The Seattle metropolitan area is within WRIAs 7, 8, and 9, but primarily WRIA 8 and 9. WRIA 8 contains the Cedar River, which drains into Lake Washington and connects to the Puget Sound at the Chittendden Locks in Ballard. WRIA 9 contains the Green River and Duwamish River, which connects to the sound through the Duwamish in the heart of the Port of Seattle. The WRIAs have become jointly administered environmental management zones, transcending the control of Ecology (See figure 13 below).

Additional jurisdictional control is administered by Seattle City light, the regions public power utility. City Light owns and operates dams on the Skagit River, a heavily impacted river north of Seattle, and on the Cedar River. City Light also owns large swaths of forestland in the Cascade Mountains. Moreover, the City Public Utilities owns and operates forestlands, including streams and rivers, as a water source for the Seattle metropolitan area. The US government has jurisdiction of the National Forest lands and National Parks within the State of Washington. Different branches of the federal government control these two distinctions.

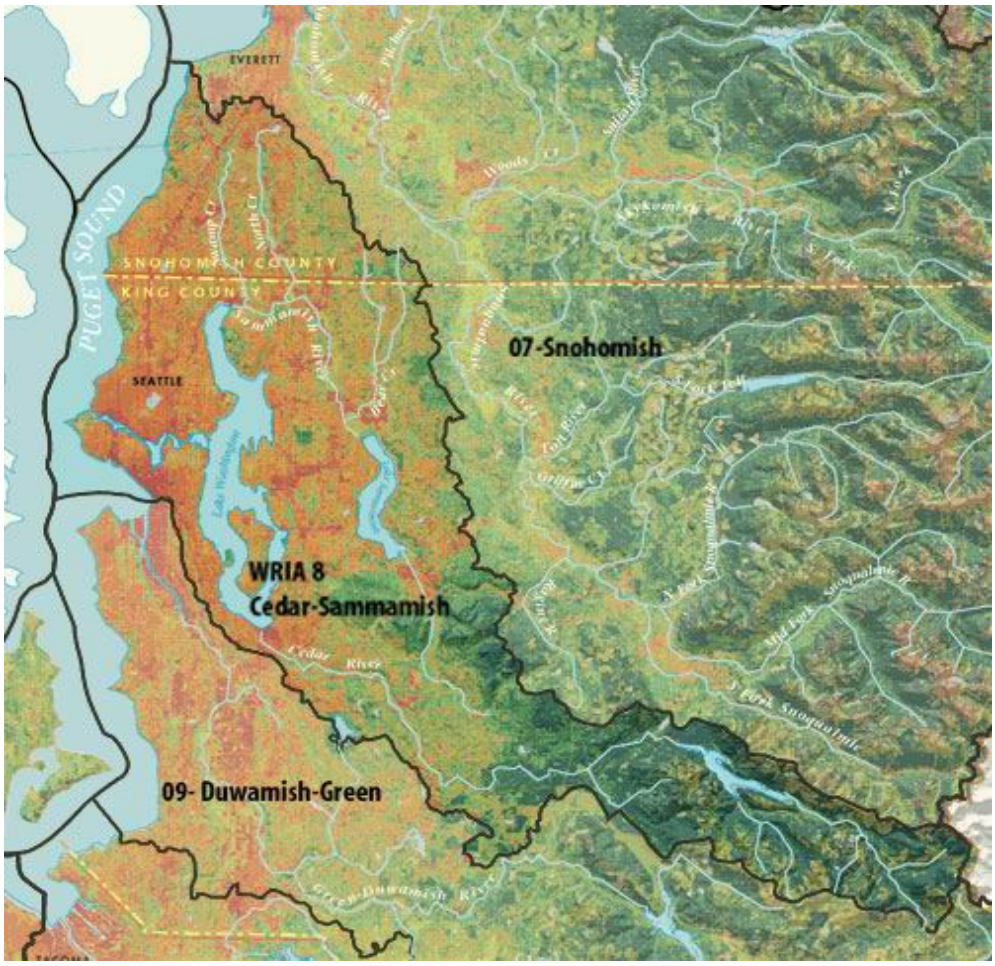

Figure 13 Water Resource Inventory Map. Source: King County

Meanwhile, National Forest lands are leased out to timber companies for harvest, and have been a site of contention for environmentalist as well as the City, both arguing that timber harvest negatively affects salmon habit, among other environmental impacts. Other jurisdictional stakeholders are private property owners (both urban and rural), Native American tribes as well as a plethora of City and State agencies. As you can see in Figure 13, Seattle metro area spans three WRIAs, while the WRIAs span two counties. On top that, not identified in the map, are the

multitude of territorial jurisdictions mentioned above. Each institution, planning committee, and organization creates its own governance map, reflecting the new jurisdictional complexity.

Summary

In both New Orleans and Seattle, state actors made *nature*, in the form of hurricanes and salmon, key organizing objects in the transformation of socio-natural space in each city. In doing so they built *states of nature*: conflicting and overlapping institutions and governance practices that use nature as a tool to govern as well as manage socio-natural relations. Forming during particular crises, new governance practices and institutions were built in the 1960s and 1970s in both urban regions. These practices, along with laws and policy, were built upon federal environmental laws and regulation that mark the environmental Keynesian period of the 1970s. These governance practices attempted to mediate conflicting goals: the amelioration of the particular socio-natural crisis and the continued urbanization of each region. In both cases, expansion of urban environmental governance practices did not ameliorated each crisis. In fact, in each case, governance practices facilitated the ongoing urbanization of each region. The result, by the turn of the 21st century each region was embroiled in an unresolved and renewed crisis, fueled in part by the continued urbanization of each region.

The federal government coordinated and directed urban environmental governance during the 1970s, whereas by the 1990s and 2000s the federal

government pushed down governance responsibility to local, state, and regional institutions. It was not as if the federal government retracted its state spatial projects, but rather frameworks like the Endangered Species Act and post-Katrina recovery were used to turn action planning and responsibility over to local, state, and regional governments as well as public-private partnerships, and even citizen and tribal initiatives. New matrixes of governance emerged in the 1990s and 2000s that were more horizontal, and complex, but also reflected prevailing processes of the neoliberalization of governance.

To be sure, in both cases, and in both periods, states of nature were put in place to regulate economic development and its consequence for socio-natural conditions. In both cases, and in both periods, preserving capital accumulation (extractive industries) and urban development were key goals. For example, in the Puget Sound the Keynesian intervention was more pronounced as both the State of Washington and Judge Boldt severely cut back fishing rights and put restrictions on the commodification of salmon. This did not happen in New Orleans. So the difference between the two periods, then, is in the manner by which these states of nature govern. In the 1960s and 70s governance was more of a top down approach, whereas by the new millennium it had become a flatter, more horizontal practice. In many ways, the reconfiguration of state practices of environmental governance in the 1990s and 2000s has opened up many more possibilities for grassroots initiatives,

community involvement, and the participation of non-state actors. I will turn to this strand of the entanglement in the next chapter.

Chapter 5

Voices Out of the Wilderness:

Social Participation in the Production of Socio-natural Space

Introduction

Everyday people have had a significant part in shaping urbanization and crisis in New Orleans and Seattle. During much of the 20th century, their voices often went overlooked in discussions about science or engineering or law and policy. In this chapter I explore how non-state actors participate in as well as challenge the state's modes of environmental governance. I argue that attempts to address inequality must acknowledge the entangled social and ecological dimensions of inequality and vulnerability. Further, no longer confined to the wilderness, in the past 30 years urban areas have become an epicenter of environmental movements. Through the work of scholars (Bullard 1996; Bullard 2000) as well as environmental organization, *urban* and *environment* have been joined together under the framework of *environmental justice*. Despite continuing tensions between the needs of people and the needs of nature, environmentalism is now as much about urban space as it is about wild or rural spaces. This is a significant development.

Not all activities of these social movement actors were confrontational; therefore, I will use the term *social participation* in order to understand how these activities are both enrolled in as well as oppositional to state governance structures. In

particular, I look at two aspects of social participation. One, I look at the degree to which non-state actors participate in creating governance practices and law in both cases. Two, I look at how non-state actors challenge inequalities and vulnerabilities and participate in what is generally called "environmental justice" (Bullard 1996; Mascarenhas 2009), or in other circles "the right to the city" movements (Lefebvre 1968; Mitchell 2003; Purcell 2002). In the literature and in practice these two frameworks have not been in direct conversation. The former has historically been concerned with environmental issues in urban contexts, whereas the has latter historically been concerned with social issues in the city, such as housing, gentrification, policing, and public space. Both concepts and movements have much to share with one another and it is in this spirit that I explore the history of urban environmental organizing in New Orleans and Seattle.

This chapter tells another story about transition. In the 1960s and 70s, in both New Orleans and Seattle, social participation was marked by intense conflict and oppositional and confrontational strategies. However, by the 1990s and 2000s, in both places, confrontational politics had transformed into collaborative politics, a politics less about confronting the state than providing grassroots initiatives that often align with the goals of state institutions or provide services that the various levels of government do not want to provide or spearhead. This transition fits with what I argued in Chapter 4 about the shift from environmental Keynesianism (1960-1980), where the interventionist state regulates and redistributes social, economic, and

environmental relations, to a neoliberlized environmentalism, where each stakeholder is asked to come to the table to work on shared goals, usually in new public-private partnerships (Purcell 2008). The story of urban environmental action in New Orleans and Seattle gives evidence of this shift. It is both a boon and curse as environmental justice organizations and concerned citizens take on more and more of the burden of responsibility as well as fall into the potential trap of furthering the goals of land developers and other economic interests.

This story is also about how crisis is both latent and manifest. Rachel Luft (2009) makes a helpful distinction between "first generation" relief organizations and "second generation" ones. First generation organizations are concerned with the manifest crisis of Katrina, getting people food, clothing, and shelter immediately after the hurricane. Second generations organizations are concerned with the latent, long-term, and quotidian crisis of poverty, racism, exclusion, and environmental hazard and vulnerability. Here vulnerability is a key concept. Fishermen in the Puget Sound, both white and Native American, were made vulnerable by the continued decline of salmon and the slowness of reversing the decline. Native Americans were especially vulnerable as they had few options for livelihood, but so were white commercial fishermen. The crisis roared to life in the 1960s and 70s, and then again in the 1990s, but there is a latent crisis that came before and persists into the 21st century. Similarly, in New Orleans vulnerability to hurricanes is not only when an actual hurricane is washing over the city, but in the slow day to day movements of people,

the almost imperceptible receding of the wetlands surrounding the city, and the multi generational racial geography, which put poor and working class whites and blacks in the most danger. Vulnerability is not evenly spread. This story then is about how people respond to these environmental inequalities.

Environmental Justice

The history of social and environmental justice organizing in New Orleans and Seattle should be seen as part of a larger history of environmentalism in the United States. In the United States, wilderness preservation has played a dominant role in the environmental movement. This comes from the legacy of John Muir and the Sierra Club and their push for a preservationist position in the late 19th century. They were fighting to set aside spaces to be preserved during the late stages of westward expansion and during the industrial revolution in the US. The National Park and State Park systems are an outcome of successful preservationist environmentalism. Millions of people enjoy these wilder spaces each year. However, since the 1970s a counter narrative has been launched against what William Cronon calls the "wilderness idea" (1996). The counter narrative challenged the notion that wilderness protection is the bastion of environmentalism and the only true focus for defending nature against society (Guha 1989). This counter narrative was not launched in the academy but by concerned citizens living near toxic waste cites such as Warren County, North Carolina, Love Canal, New York, and Woburn, Massachusetts (Cutter 1995:113; Mascarenhas 2009:127; Szasz 1994). Beginning in

the 1970s and 80s a new branch of US environmentalism left the discussion of wilderness and came into cities across the country. The environmental justice movement merged the attention to race and class of the civil rights movement with urban environmental concerns of toxic waste and pollution in proximity to where people live and finally with a position of social equity (Cutter 1995:113).

Environmental justice (EJ) is both a movement as well as a conceptual framework. Environmental justice refers to actually existing political action and social mobilization campaigns and organizations that seek to challenge environmental inequality (Cutter 1995:113). Environmental inequality can be roughly defined as when "a specific group is disproportionally affected by negative environmental conditions brought on by unequal laws, regulations, and policies" (Mascarenhas 2009:129). Environmental justice is also a conceptual framework, a way of thinking about and talking about the environment and environmentalism. As a conceptual framework, environmental justice challenges the wilderness idea that has been at the center of white middle and upper class environmentalism since the 19th century (Cutter 1995:113). By bringing nature and the environment, and hence environmentalism, from the wilderness and into cities and neighborhoods, especially to working class neighborhoods and communities of color, the EJ framework widens the notion of what counts as "the environment" and who counts as an environmentalist. The EJ framework makes environment and social justice compatible. This has been a major and fruitful development within environmentalism.

In the academy, EJ has formed into a major conceptual framework and research agenda. Research is two fold, and often combined. One approach is to understand patterns and actually existing environmental inequalities (Bullard 1996; Bullard 2000; Pastor et al. 2001), while the other approach is to understand environmental justice movements and organizations (Capek 1993; Szasz 1994). The EJ framework has also been applied to concerns, movements, and debates in the global south (Agyeman et al. 2003). A classic piece from Guha (1989) devastates the wilderness idea, and the politics of groups like Earth First! and the World Wildlife Fund. Guha writes,

> This brief overview of German and Indian environmentalism has some major implications for deep ecology. Both German and Indian environmental traditions allow for a greater integration of ecological concerns with livelihood and work. They also place a greater emphasis on equity and social justice (both within individual countries and on a global scale) on the grounds that in the absence of social regeneration environmental regeneration has very little chance of succeeding, Finally [sic], and perhaps most significantly, they have escaped the preoccupation with wilderness preservation so characteristic of American cultural and environmental history (1989).

In the natural disaster literature, EJ has also been employed as a concept (Allen 2007; Bullard and Wright 2009). Interestingly, what has not happened is a consideration of how the concept and movement for environmental justice relates to the parallel growth of the concept and movement of the right to the city.

The Right to the City

Around the same time as the concept of environmental justice was coming into use another set of political actors and academics were beginning to talk about the

city as the site of contemporary political struggle. In the decades following the May 1968 uprising in Paris, geographers and activists have taken up Henri Lefebvre's (1968) idea of the *right to the city*, mostly in a social context. Researchers have explored the social, political, and economic production of urban space, and the resultant inequalities of race, class, and gender, and decision-making power. As articulated by Lefebvre, the foundation of a right to the city lies in the rights of inhabitants to be active participants in the production of space, and to have that space be constituted by a politics of difference (Purcell 2002). Key areas of focus have been gentrification, policing, and public space and free speech (Mitchel 2003). However, less theorized and studied is the question of nature in the city and environmental justice as it relates to the idea of a right to the city. Using the examples of social participation in the creation of and the attempts to mitigate socio-natural crisis, I want to draw out two key limitations within the right to the city literature.

First, in Lefebvre's conception, the right to the city is fundamentally the right of the *inhabitant* in the production of urban space. The RTTC literature has moved the discussion away from the right to the city to be about a set of legal and juridical rights within the narrow framework of citizenship in a representative democracy (Purcell 2002; Mitchell 2003). Further, Lefebvre's use of the word *inhabit* should be read as meaning more that the right of people to simply inhabit space (Purcell 2002). In its radical implication, the right to inhabit is neither a set of legal guarantees nor is it a right to inhabit space per se; rather it is the right of inhabitants to collectively

organize and produce space (Purcell 2002) as well as have control over the process of urbanization, what Lefebvre called *the urban* (Lefebvre 2003). While this move has enabled a more radical and inclusive notion of the right to the city, the concept of the inhabitant has developed into a murky and ambiguous catchall term. Like other meta-concepts it means everything and anything, thereby potentially meaning nothing. How do we rescue this powerful term by drawing out what exactly we mean by the inhabitant? The case studies below show us how the concept of the inhabitant, is messy, especially with respect to nature, non-humans, and the amalgam of people involved in environmental justice movements.

The case studies also help us explore more explicitly what it would mean to say that *nature*, writ large, has a right to the city. The RTTC literature provides a powerful framework for imagining—and practicing—a participatory and democratic use, and equally important, production of urban space. Recognizing that urban space is not separate and distinct from ecological processes and non-human entities (Heynen et al 2006), I argue we can explore the right to urban nature along two parallel questions. One, I argue that environmental justice campaigns can be read as attempts by inhabitants to challenge existing spatial and environmental inequalities and, importantly, attempts to participate in the production of urban natural arrangements. Two, I argue that a right to urban nature might also include the right of ecological processes and non-human entities to use as well as make urban natural

spaces. These two questions have been conspicuously absent from the RTTC literature.

I ask a series of questions: in what ways do the co-inhabitants humans and non-humans, and nature broadly defined, share a right to the city? How have environmental justice movements and coalitions mobilized to articulate a right to urban nature, and how do they navigate the tension between the needs of humans and the needs of nature? Melding ideas from urban political ecology, the right to the city literature, and urban environmental history I explore how inhabitants, tribes, experts, as well as hurricanes and salmon participate in the making of urban socio-natural crises.

Chapter 5.1: New Orleans

Hurricane Betsy

As I detailed in Chapter 2, New Orleans has been racially segregated since its inception. Racial and class segregation affects everything from housing conditions, home ownership, education, healthcare, and vulnerability to hurricanes. Hurricanes Betsy and Katrina show this to be true. There is one part of the city that gets overwhelming attention, the Lower 9th Ward. This is for a few good reasons: 1) this area of the city is repeatedly the hardest hit, 2) this area of the city has some of the highest black home ownership in New Orleans, and 3) this area of the city has seen the most grassroots, bottom up organizing after hurricanes. The story about a little known but forward-thinking organization who called themselves Betsy Flood Victims tells us a great deal about what happens when there is a lack of attention paid to the some of the most vulnerable people in New Orleans

Have you Heard of Us? We're Betsy Flood Victims

The Lower 9th Ward experienced a massive flood when Betsy and levee overtopping covered the area in up to 9 feet of water. The Lower 9th was the hardest hit area of the city during Betsy. After the water receded and residents return to the destruction, a group of Lower 9th residents formed a little known organization called the Betsy Flood Victims (BFV), advocates for the needs of Lower 9th residents. BFV launched a campaign to get redress from the federal and local governments for the

great losses sustained by the poor and mostly African American residents of the lower 9th. BFV, led by long-time activists Walter and Elizabeth Rogers, advocated for a humanist and socialist response to the crisis, fixing blame solely on the human-made protection system, and asking that remedies focus on the human needs of the population (e.g., money, infrastructure, education). BFV pushed for social, economic, and racial justice in the wake of Hurricane Betsy. To the detriment of the Lower 9th residents, they were almost completely ignored by city, state, and federal officials. Based on the Roger's self published article *Riding the Nightmare Express* (1975) and other items from the Elizabeth and Walter Roger's collection at the University of New Orleans Special Collection, the history of the Betsy Flood Victims give a different vantage point to see Betsy compared to the technocratic and bureaucratic perspectives we saw in Chapters 3 and 4.

Elizabeth and Walter Rogers and the Lower 9th Ward

The Roger's begin by saying "The people's story of New Orleans' Betsy is about the flooding—to the eaves—of the whole lower part of the city, known as 'Below Industrial Canal.' That's some 300 blocks of working-class homes, about 80% of them owned by Black folk—in short, a cherishable [sic] part of the city's Ninth Ward. The press has shown photographs but not too much of any victim's view" (Rogers 1975:1). The Rogers lived in the thick of the worst Betsy flooding and had to evacuate with thousands of other residents. At the time of Betsy, they were the only white family left in that part of the 9th Ward. In 1954, after the US Supreme

Court ordered school integration, the Rogers said whites had left the area en masse. The Rogers had moved to the Lower 9th in 1951, coming from the French Quarter. In the early 50s they describe the area as being "like country" where "cows and goats grazed along the railroad levee" (11). Beyond the railroad lay a "big leafy swamp—cypress, maple, hackberry, sweetgum, elder—was home to scores of wild songbirds; people fished and crabbed there; children picked blackberries by the pailful to sell" (12). They describe an idyllic setting, but one that was in the midst of demographic and economic changes.

White people left throughout the 50s and 60s; blight set in as landlords bought half of the area. Land was extremely cheap; the Rogers claimed to have bought their lot for $750. Developers erected new bungalows, two-story tenement with one-room apartments (according to the Rogers these became perfect sites for new prostitution rings). The Rogers describe how over time the cheap houses and tenements were neglected, abandoned, and even torn apart by area residents. Further, an open drainage canal ran down the middle of Tupelo Street, becoming fettered and full of trash. The Lower 9th had inadequate streets, sewerage, and drainage. Well before Betsy, the Lower 9th residents lacked the basic infrastructure that more well to do areas of the city enjoyed.

Hurricane Betsy and the Residents of the Lower 9th

Hurricane Betsy compounded the pre-existing inequalities that resulted from racial and class divisions within New Orleans. The Lower 9th was not the poorest area

of the city but it was perhaps the most vulnerable. In addition to being pounded by rain and wind, the Lower 9th was devastated by two major breeches in levees along the Industrial Canal. The Rogers described an evacuation scene of people scrambling to gather essential items (identification, pets, records) and move to high ground, wading through water. Other people were trapped in their homes, climbing to the attic, or in some cases breaking through the roof to climb outside. Contrary to city reports, the Rogers reported that finding a neighborhood shelter was not a seamless and easy task (see Chapter 4). They first took shelter in a firehouse, and then moved around to a few different schools where they describe segregation between the white families and black families, including the children.

Incidentally, Elizabeth Rogers discusses her own examination of prejudice. She grew up in a New England Protestant family, and was taught to distrust Catholics. She recalled that during the Betsy ordeal her prejudices withered as she saw how hardworking and involved the Catholic nuns were in assisting the evacuees. She was irked by the fact that the press would photograph the priests (and Protestant clergymen and Black clergymen) but not the nuns, who she observed did all of the relief work, whereas the priests gave mass to the evacuees and talked with the press. The Rogers describe a situation where religious and civic organizations volunteered their time to help in the immediate aftermath of Betsy.

Not long after they arrived at the school in the Lower 9th Ward, the Rogers and the other evacuees were moved across the Mississippi River to a naval base in

Algiers. They were housed, along with 14,000 other evacuees, in large hangers. This was October 2, nearly a month after Betsy made landfall. At the naval base, the Rogers describe that they were "sheltered, fed, medicated, given some clothes" (Rogers 1975:8). They wrote, it was "a big task, its performance somewhat clouded because it was so little, so late, and much of it so grudging" (8). They described the logistical troubles the Navy had running the operation. Sanitation was the largest problems. They described that there were not enough toilets and toilet paper, and no way to wash clothes. Evacuees would beg the cooks for empty gallon cans so that they could do laundry. Medical care, however, was free. Mass vaccinations were administered; there was also a dispensary for medication and doctors on hand. Overall, despite the effort the Rogers felt that the evacuees were mostly treated like animals, especially as time passed and sanitation worsened.

Let's Organize

The formation of Betsy Flood Victims took place at the naval base in Algiers. After working on immediate needs of both themselves and the other evacuees, the Rogers and other evacuees began to turn their attention to the future of the Lower 9th Ward, and to the causes of the destruction during Betsy. The Rogers wrote that during the time they were in the naval base, unbeknownst to the evacuees, the US congress was holding hearings on Betsy. Evacuees and affected residents were not invited. It was during these hearings that post-Betsy relief and disaster legislation was being decided. Word came that congress, including local representatives, was considering

issuing disaster relief in the form of Small Business Administration (SBA) loans, rather than as grants, which would not need to be repaid.

Many of the residents of the Lower 9th Ward and St. Bernard Parish lost everything. Housed together in a naval hanger, some of them began talking, organizing for the long-term needs of the Lower 9th Ward residents. The first issue that surfaced and became the first point in what would become a six-point platform was disaster relief in the form of loans. Betsy Flood Victims was formed out of response to the idea that displaced residents would be given loans, only in the amount to buy back essential clothes and furniture, not to repair and replace destroyed houses. The original members of BFV produced a leaflet warning evacuees against taking the loans. Elizabeth Rogers cautiously began circulating the leaflet amongst the evacuees at the naval base, concealed in a beige beret that Walter had bought on a trip to town (Rogers: 1975:15).

The original BFV received help from numerous people and organizations. Lacking supplies or printing apparatus they needed outside assistance. The list includes Jim Bombrowski and his staff at the Southern Conference Education Fund; black students at the Straight Business School; and two unions, United Packinghouse and Sacksewers and Water Carriers (16). This outside assistance helped the original members emerge from the naval base in October with a skeleton organization that eventually became Betsy Flood Victims. Walter Rogers was appointed temporary vice-chairman; Reverend John Henry Craft was appointed Charimanship, Hattie Mae

Craft (no relation to the Reverend) became secretary. Corrie Dixon became membership chairperson. They had an organization; and over a two-year period they met on a regular basis and had an unofficial membership of 200 people.

Back in their neighborhood, either in soiled homes or rental units, the BFV began their public campaign. They organized around a six-point set of demands. They were:

1. $10,000 grant (not loan) per family, to rebuild
2. Moratorium on collections for ruined time-payment purchases
3. Free food stamps to needy
4. Rent control (as in World War II)
5. Safe levees for all New Orleans
6. End Vietnam War—apply that wasted money to home needs

The BFV took their demands to all institutions of decision-making, and to all representatives, local to federal. One after another, they were ignored. They took their demands to the city council, which was all male and all white. Mayor Schiro passed them over to Representative Herbert, the representative of the Lower 9th Ward; he ignored them as well. They took their demands to Senator Birch Bayh, to the US Army Corp of Engineers, to the SBA, all of which ignored their questions and demands.

During the Betsy crisis a whisper and a rumor floated amongst the Lower 9th residents: the levees along the industrial canal had not broken by engineering fault but

had been blown up by those who wanted to use the Lower 9th as a spillway to avoid flooding in other areas of the city. Residents report hearing loud booms the night of September 9, the night that Betsy made landfall. The same type of rumor circulated during Katrina as well. A large gulf of distrust existed between residents of the lower 9th Ward and city officials and the US Army Corp of Engineers. A history of racial and class segregation and the fact that all major local and federal institutions and decision-makers ignored lower 9th residents and the BFV compounded the belief that the levees had deliberately been blown along the Lower 9th Ward.

The Betsy Flood Victims were also ignored in what the Rogers called "the court of public opinion" (19). As a political stunt, the BFV organized a mock lawsuit to present their demands and demand that their questions about how and why the lower 9th Ward was devastated during Betsy. Their press release got some coverage in newspapers around the country (Pittsburgh Courier; Houston Informer; Black Dispatch, Oklahoma; York, PA Gazette and Daily; People's World, CA; and the Daily World, NY). They got no coverage in the local paper the Times-Picayune. As time went by, it became harder and harder to get coverage anywhere, as the news cycle turned away from the crisis in Louisiana to other stories elsewhere.

Civil Rights and Betsy Flood Victims

The Rogers also took issue with the lack of support from the Congress of Racial Equality (CORE). The BFV appealed to CORE to aid in the struggle of the lower 9th residents, who were overwhelmingly black. The BFVs highlighted the ways

in which the catastrophe in the New Orleans, and in particular the Lower 9th Ward was due to class and racial inequalities. The Rogers listed these items in their critique and their disappointment that CORE did not include post-Betsy organizing as part of the larger civil rights movement: "failure to give timely evacuation warnings; official locking of schools after the storm; undeniable bombing of the canal levee; insufficiency of the river levees downstream; the levee-lacking Gulf Outlet Canal (officially known as the Mississippi River Gulf Outlet, MR-GO); numerous unexplained gaps in levees rebuilt after Betsy; the post-Betsy collapse of the Florida Avenue railroad canal; the generally callous attitude towards refugees[20], especially Blacks" (22-23). The BFVs were arguing, though not in contemporary environmental justice language, that the social and environmental catastrophe was a civil rights issue for the African Americans who lived in the Lower 9th Ward. The national organizations and even local churches, besides the few that were members of BFV, were not interested in making this a national cause for civil, and urban and environmental rights. The Rogers write:

> The lasting damage done to city areas of Black and white workers' and professionals' homes called for a drive for adequate compensation. This was clearly a fundamental issue on which, with CORE help, there could have been a long-term people's movement under combined Black and white leadership (and legwork!). CORE had the prestige, the experience, the skills, the forces. It was known and admired for its splendid work for New Orleans through the '60s. But it closed its New Orleans office soon after Betsy. We felt, and still feel, that an opportunity was missed here, which, if grasped, would have kept

[20] In contemporary discourse the term "refugee" to describe evacuees and displaced persons is not considered a correct term. Refugee is a term for people who are forced to leave their country because of extreme circumstances, typically war.

> the liberation movement of the '60s alive and growing, at least in New Orleans (23).

All organizations, institutions, and decision-makers who they took their message to mostly ignored Betsy Flood Victims and their demands. Local and national politics were not yet ripe for working class blacks to be heard in their cry for urban and environmental justice. As Betsy faded from the media and policy spotlight through 1966, BFV shifted their attention elsewhere.

From Betsy to Urban Renewal

By 1967 and through '68 and '69, BFV and the Rogers turned their attention to Urban Renewal. The President Johnson Urban Renewal programs had efforts in New Orleans. Lacking adequate sanitation, streets, schools, and other amenities the lower 9th Ward was slated for renewal. The BFV targeted what they called the "concealed aid-to-big-business aspects of Urban Renewal" (Rogers 1975:18). They argued that the 1954 Supreme Court decision Berman vs. Parker, which changed the wording of eminent domain from seizure for "public use" to seizure for "public purpose", legalized "government eviction of masses of poor folk in favor of developers, heavily subsidized via government loans; their alleged 'purpose' of low-cost housing actually resulted in rents of $100 per room and up" (18). The BFV argued that in effect Urban Renewal meant the displacement of poor folk in the name of modernization and the handout to private developers land to be developed for low-income residents but in a free market. This looks to be a classic case of what David Harvey (2003) calls "accumulation by dispossession." Public tools are used to

privatize and open up spaces for capital accumulation, benefiting developers, at the expense of both the "public good" and the needs of the working class. BFV recognized that the Lower 9th needed renewal for both its pre and post-Betsy conditions, but they challenged the public giveaways to private developers at the expense of the working class, predominately black residents.

The efforts of the Betsy Flood Victims were ignored during their time, but have also been lost in the public and academic record of Hurricane Betsy. They challenged urban environmental racism and advocated for the rights of poor working class white and black residents; they challenged the US Army Corp of Engineers and the (re)construction of the levees; they challenged the city and federal representatives who wanted to give out small loans instead of examine the deeper needs and vulnerably of the Lower 9th residents; they even challenged one of the leading civil rights organizations for not connecting hurricane vulnerability to racial justice. In 1965 and 1966 conditions were not ripe for an organization like the Betsy Flood Victims to have their demands listen to, let alone met. However, perhaps if they could have been part of the policy and rebuilding efforts the Lower 9th Ward could have been spared a repeated blow in 2005, when Hurricane Katrina and levee failures once again made the Lower 9th the most devastated part of New Orleans, and the epicenter of another round of environmental justice organizing.

Other Social Movements Post-Betsy

There were two other important ways social movements influenced post-Betsy Hurricane politics. The first was the outcry against the Mississippi River Gulf Outlet (MR-GO) in St. Bernard Parish. The second was the citizen campaign against the barrier plan (see Chapter 4), which by 1975 coalesced into a formal organization called Save Our Wetlands. The former at least brought the issue of MR-Go to the table, but ultimately did not succeed. The latter not only brought the issue of public input on levee construction to the fore but actually succeeded in delaying and altering the design of levees, which Craig Colten concludes, ultimately delayed comprehensive levee reconstruction and raised costs (2009:63). The failure of the MR-GO efforts and the relative success of the anti-barrier efforts both contributed to the conditions of Hurricane Katrina flooding. It's not that these organizing efforts bare sole responsibility, it is more the case that an effective participatory governance structure did not exist.

In 1965, technocratic government decision-makers were relatively insulated from public pressure and input, especially challenges coming from black residents of the Lower 9th Ward. Put another way, in the mid 1960s, residents had few avenues to affect hurricane policy, law, and the design of the technological infrastructure. The fact that the story of Betsy Flood Victims fell on deaf ears exemplifies how a lack of social participation contributes to everyday inequality and in the production of vulnerability to catastrophe. Residents of St. Bernard Parish (white working class),

just over the parish line from the Lower 9th Ward, were more successful in their attempts to participate in post-Betsy reconstruction. The Corps held hearings in Chalmette following the storm to gather input. Angry residents of St. Bernard Parish and the town of Chalmette pointed fingers at MR-GO for contributing to the devastation in their area (Colten 2009:64). St. Bernard residents filed a suit alleging that the Corps were responsible for flood damages because of its inadequate design of MR-Go.

The Corps remained steadfast that MR-GO did not contribute to the flooding. During a Congressional hearing on Betsy Colonel Tom Bowen, US Army Corps of Engineers argues that tidal surge out of Lake Borgne, not the MR-GO or Intercoastal Waterway were responsible for the pressure that eventually broke levees and overtopped them (United States Congress 1965:40). He states, "This surge overtopped the back levees in St. Bernard Parish, and eventually overtopped the levees on both sides of the industrial canal, causing three breaks on the east industrial canal levee. This overtopping and breaks caused the flooding. The levee elevation along the industrial canal is approximately 8 feet. The tidal surge in the industrial canal area was about 11 feet. The gulf outlet did not increase the height of the tidal surge in the New Orleans and St. Bernard areas" (41). Ultimately, the court sided with the Corps testimony regarding how MR-GO did not contribute to the flooding. Regardless of the loss, St. Bernard residents and BFVs were convinced that MR-GO made Betsy flooding worse.

This issue changed somewhat after 1970 when environmental issues became an increased concern for local residents and local decision-makers (Colten 2009:66). The passage of several federal environmental laws, in particular the National Environmental Policy Act (NEPA) of 1969 and the Clean Water Act of 1972, aided residents in their fight to shape hurricane protection and the socio-natural space of the region more broadly. As part of NEPA, the Corps was required to complete Environmental Impact Statements (EIS) (Colten 2009:66). These statements allowed residents and organizations to gain knowledge about specific plans and their potential consequences. The statements also slowed the process down. As part of the Clean Water Act, public hearings were required. Opponents seized the opening to make their case against the Corps barrier plan.

In 1975, the Save Our Wetlands umbrella group filed suit to block the barrier plan. In 1977, the plaintiffs were awarded an injunction against the Chef Menteur Pass, Rigolets, New Orleans East, and Chalmette components of the barrier plan (Colten 2009:72). A few months later the judge lifted the injunction on all parts of the barrier, except the Rigolets and Chef Menteur projects, which created a gap in the encircled barrier plan. As a result of these delays and belief that strengthening the levees was less damaging to the environment, focus was shifted to the high level plan (raising the height of the levees) rather than the barrier plan that would control water flow through the surrounding bodies of water, including Lake Pontchartrain (72). Environmentalists advocated for a restoration of the surrounding wetlands, in part for

its usefulness as a "natural" barrier to the city, a barrier that would absorb energy and force from an approaching hurricane. In the end, New Orleans and the surrounding parishes got higher levees, and more horizontal urban expansion into the wetlands. By 1990, the revamped protection system was only 77 percent complete. Social participation increased after 1970, in part aided greatly by the passage of federal environmental laws; opponents of the barrier plan succeeded in scuttling it, but large portions of the city and surrounding parishes were to be perhaps even more vulnerable in 2005 than in 1965.

Hurricane Katrina

The hurricane protection system upgrades from Betsy may not have been complete on the eve of Hurricane Katrina, but the social and environmental justice landscape had changed. Betsy occurred during the civil rights movement, but it did not elicit a major response from national civil rights organizations. The aftermath of Hurricane Katrina became a national conversation on race, class, and environmental justice. It also galvanized the attention of a myriad of social and environmental justice organization, churches, activists, and concerned citizens from all over the country. Katrina highlighted the failure of the post-Betsy hurricane protection system and the post-Betsy hurricane governance practices but it also highlighted the immense importance that grassroots social participation and organizing had become by the mid part of the first decade of the 21st century. The general phenomenon of volunteer relief work, and homegrown post-Katrina organizations as well as those that were

formed by outside organizations and volunteers demonstrate how EJ organizing had changed since Betsy.

We're Here to Help: Volunteer Relief Work After Katrina

Volunteerism and charity played a role during Betsy, but the scale and scope of post-Katrina volunteerism far surpasses that during Betsy. The Corporation for Community and National Service (CNCS) estimated that by 2007, 1.1 million volunteers helped with Gulf recovery. The CNCS said that AmeriCorp and all organization that receive funding from the CNCS that "1 million civilian volunteers have donated their time and talents to Katrina relief efforts, a total of 14 million hours. In the last year alone, they have rebuilt or repaired nearly 10,000 homes, served meals to 1,800 people a month, built 59 playgrounds and started construction on more than 1,000 new homes" (Stuckey 2007). By 2009, the new estimate was that two million volunteers had worked on the Gulf Coast since Katrina in 2005 (Quinn 2009).

There are no definitive numbers on how many volunteers worked in New Orleans specifically. Using a crude measurement, I counted the self-reported number from some of the top relief organizations:

Table 3 Approximate Number of Post-Katrina Volunteers[21]

Name of Organization	Number of Volunteers Reported	Year Reported
Catholic Charities	4,500	2005-2006
Habitat for Humanity	75,000	2009
Jewish volunteers working with synagogues	10,000	2008
Episcopal Diocese of Louisiana	10,000	2007
Operation Nehemiah	10,000	2007
ACORN	10,000	2009
Common Ground Relief	25,000	2009
Mardi Gras Service Corp	3,000	2009
Project Homecoming	6,500	2009
Total Estimate	154,000	

The total number for New Orleans must be in the hundreds of thousands of volunteers. Many of the organizations and volunteers were faith based or churches, but there were a number of non-religious organizations as well.

Volunteering was not confined to dedicated relief and charity organizations. Disaster relief volunteering is hard, dirty, and even dangerous work. It is done with no pay, and the living conditions of volunteers are not always comfortable. In response, some people combined a vacation in the Big Easy with volunteerism. You sightsee for part of the day, gut homes another part, and fall asleep in a comfy hotel room, after eating gumbo and drinking bourbon. This is known as *voluntourism*. Hotels in New Orleans even began offering voluntourism packages. Best (2009)

[21] These data were collected in conjunction with research for Fox Gotham and Greenberg, forthcoming.

writes, "Quantifying the exact number of voluntourists to the Crescent City is hard, but officials estimate that of the 7.1 million tourists in 2007, approximately 6 percent were voluntourists." This works out to approximately 420,000 voluntourists. This is not an insignificant number, and if true, indicates that the number of traditional volunteers in New Orleans is even higher.

The types of volunteer organizations took many shapes and sizes. Some were well known national and international organizations (Red Cross, Habitat for Humanity), others were local and regional organizations (Catholic Charities, The Green Project), while others were created specifically for the task of post-Katrina relief (Common Ground Relief, People's Hurricane Defense Fund). Fifty-one organizations have a presence on the Internet. This is not an exhaustive list but it is fairly comprehensive:

Table 4 Names of Post-Katrina Relief Organizations[22]

New Orleans CrossRoads	**AmeriCares**	**AIGA New Orleans**
Ground Work New Orleans	Church World Service: "Neighborhood New Orleans Project"	National Trust for Historic Preservation
St. Bernard Project	Make It Right Foundation New Orleans	People's Hurricane Relief Fund
SAFER Student Advocacy for Equitable Recovery	Food Not Bombs	Episcopal Diocese of Louisiana

[22] These data were collected in conjunction with research for Fox Gotham and Greenberg, forthcoming.

United Way for the Greater New Orleans Area	Volunteers of America: Greater New Orleans	Volunteer New Orleans
Louisiana SPCA	The Green Project	Latino Farmers' Co-op
Rebuild New Orleans Now	The Phoenix of New Orleans	American Red Cross: Southeast Louisiana Chapter
Volunteer Expeditions	RAI Ministries	St. Jude Rebuild
Operation Nehemiah	Rebuild Green	Relief Spark
United Saints	Plan B Bicycle Collective	Lower Nine
Project Homecoming	Small Axe Urban Farms	The United Methodist Committee on Relief
Preservation Resource Center's Rebuilding Together New Orleans	City Year	Green Light New Orleans
Hands On New Orleans	New Orleans Recreation Department (NORD)	City Park, New Orleans
Saint Charles Avenue Presbyterian Church	Parkway Partners	Mardi Gras Service Corps
IMPACT Ministries	Common Ground Relief	ACORN
Katrina Corps	There's No Place Like Home National™, a program of Jeanie C. Linders Fund	Bayou Rebirth
Beacon of Hope	Catholic Charities	Habitat For Humanity

In the United States volunteerism is not unusual during and after hurricanes, floods, tornadoes and other crises, but the scale and scope of post-Katrina volunteerism is unprecedented. For all the looting and reports of crime and chaos after Katrina, mass volunteering dwarfs the real and perceived acts of violence. Dave Eggers' *Zeitoun* (2009) and Rebecca Solnit's *Paradise Built in Hell* (2009) give excellent first hand accounts of the under recognized activities of New Orleans residents, relief volunteers, and first responders, who came to the aid of those in need of help. Solnit argues that disasters and crises enable new political and social experimentation. This is true in post-Katrina New Orleans. The everybody for themselves material and discursive landscape of post-Katrina New Orleans allowed residents, volunteers, and organizations to challenge existing socio-natural relations, existing inequalities as well as attempt to build new ones. This is particularly well illustrated by the work of Common Ground Relief, which confronted neoliberalized governance practices, race and class inequalities. In doing so, they introduced new crisis relief practices, presented new ways to build socio-natural space. But they also ended up replicating race and class inequalities, which they worked to break down.

Environmental Justice and the Right to the City: Common Ground Relief in the Lower 9th Ward

On September 5, 2005 Malik Rahim, a long-time New Orleans resident and organizer, met with a few of his closest friends, some of whom came from out of town, and formed the Common Ground Collective, a "people- centered relief organization" that mushroomed in size and scope in the year after it began. Common

Ground launched with the motto: “solidarity not charity,” and positioned itself as a radical organization in the traditions of the Black Panthers, Ella Baker, anarchism, and environmentalism (Luft 2008:11). Two early volunteers in leadership positions described the mission as a “two-fold strategy of providing short-term relief for victims of hurricane disasters in the Gulf Coast region and long-term support for rebuilding these communities in more just and sustainable ways” (cited in Luft 2008:11). They saw CGR as “part of a new movement, creating a parallel social infrastructure to replace the one responsible for the conditions causing this disaster” and tactically used “race and class privileges to bring resources into the city and redistribute them to the communities most in need” (cited in Luft 2008:11).

In October 2005, Common Ground Collective (the original name) released a statement declaring that relief actions have begun in the Lower 9th Ward. They wrote,

> The 9th ward has gained international media attention since hurricane Katrina due to the severity of flooding the area has received along with the human rights violations and neglect the residents have suffered at the hands of the New Orleans Police Department and the State government of Louisiana. The city and state governments have attempted to purchase land from the areas residents for decades in order to expand the Industrial Canal and allow a cruise ship line to build it's hub in the region. The 9th hasn't received any aid or clean up efforts from any state, city, or non-profit agencies. Local realtors and business are pushing to have the entire area bull-dozed so that the city can get a ‘new face.’ Garbage, decaying animals, and other debris remain untouched while other areas in the city are receiving services (Katrina Reader 2012a).

Between October and December 2005, CGR reported that they cleaned out over 30 homes, cleaned the streets around our distribution center, and opened a community center and a women’s center. In December 2005, during winter break, Common

Ground organized its first mass volunteer operation called Holiday Roadtrip for Relief, aimed at college students around the country (Katrina Reader 2012b). In the spring of 2006 they geared up for an even bigger volunteer convergence during Spring Break. The summer of 2006 also saw an extremely large inflow of volunteers.

Common Ground Relief worked on many facets of direct relief. Since Katrina, according to Common Ground Relief, from September 2005 to 2011 they hosted 35,000 volunteers; cleaned and gutted over 3,000 homes, a dozen churches and four day care centers; contributed millions of dollars to communities in the form of supplies, food, water and labor; opened up two free health care clinics; established a free-to-use media center (with telephone, fax and internet); as well as many other projects (Common Ground Relief). These accomplishments came from an organization that began in the living room of an Algiers resident in September 2005, a week after the storm (Common Ground Relief). The main period of activity for the organization was between fall 2005 and 2008. CGR operated with an all-volunteer staff with little to no institutional experience; funded by private donations only, yet it became quite a large, relatively formal, organization. Additionally, the organization tries to include 9th Ward residents along with outside volunteers in the operation. Bridging direct relief with environmental concerns, CGR also conducts soil testing, aids residents in building raised garden beds, and has a wetlands restoration project aimed at helping to repair the wetlands of coastal Louisiana (Common Ground Relief).

Not So Common Ground

Common Ground Relief became one of the biggest volunteer relief organizations and in the process gained a fair amount of critique and criticism. Critique has ranged from questions regarding authority, decision-making, and accountability (Crow 2006), to sexual assault (Luft 2008), to racism (Luft 2008; McClure 2010). As early as December 2005, Scott Crow, a long-term volunteer with CGR, circulated a piece that attempted to clear up the misconception that CGR was a decentralized anarchist utopia. He explained that through long-term and daily commitment those in leadership positions build accountability to their projects, their contacts in the community, and ultimately over the major decisions facing the organization. Short-term and temporary volunteers, Crow argued, are misguided if they believe that just showing up entitles you to decision-making power and equal voice in the organization. Crow also warned short-term volunteers and travelers of loose anarchist networks, that they should ask themselves one question: "why are you volunteering in New Orleans?" Crow then took to task the implicit and explicit assumptions of outside volunteers who bring their preconceived notions of what New Orleans should do, what kind of politics the people of New Orleans need, and what is best for an organization like Common Ground Relief. According to Crow, the issues of accountability, decision-making, and organization structure were intense and problematic for volunteers attempting to build a people centered relief organization in post-Katrina New Orleans.

Another area of critique and criticism was the reproduction of racism, despite the mission of CGR to challenge racism and build new relationships across race and class lines. Molly McClure, a sexual health worker and racial justice organizer, spent time working at the CGR health clinic. She witnessed the reproduction of stereotypes and white privilege in her work at the clinic among relief volunteers. She writes, "While I was there, I heard comments like 'this is so cool that New Orleans is going to have a free clinic now!' or other statements suggesting that we, the white saviors, had come to bring capital a ACTIVISM to the region, which before we got there was presumably some kind of political wasteland. Now, I definitely didn't do my homework like I should have before I got there, but I was pretty sure that the city had had a vibrant history of resistance and organizing from the time of the slave revolts on, and I had recently learned about the Saint Thomas Clinic and other local healthcare justice projects" (McClure 2010).

In another example, McClure writes about the phenomenon when white activists bemoaned the fact that people of color were not coming to "their" meetings. She writes, "I've been part of this dynamic in the past—wondering why "they" don't come to "our" meeting or event, without understanding how alienating the white culture of our project or organization might be to people of color, from the language, timing, and structure of our meetings to the way we dress (especially in places like Common Ground, which, when I was there, had a predominantly punk/hippie subcultural scene going on)" (McClure 2010). Common Ground struggled to find a

way to build an organization that included residents from the 9th Ward and non-residents who greatly outnumbered locals. For most of its history CGR remained a relief organization comprised mostly of outside volunteers, despite its solidarity not charity motto.

Rachel Luft (2008) examines another more troubling scandal. In the spring of 2006, during CGR big spring break influx, there were a string of sexual assaults reported at St. Mary, a gutted three story former catholic school that served as CGR operational headquarters. This is where all the volunteers stayed while working with CGR; it could accommodate hundreds of people. Several white female volunteers reported that they had been sexually assaulted. Luft writes, "While the leadership of CG [Common Ground] downplayed the violence in a classic demonstration of sexist minimization, the white volunteers began to display increased fear and mistrust of the surrounding black community in an equally classic reflex of racism, although almost every single accused perpetrator was both a nonlocal volunteer and white" (2008:6). Luft argues that CGR had failed to instill or work on the intersectionality of race and gender, and in doing so enabled outside white volunteers to perpetuate racial tropes and stereotypes of local black men, and begin to distrust the very people they supposedly came to help.

Volunteer relief work in neighborhoods affected by decades of racism, classism, and environmental inequality is fraught with uncertainty, tension, and the potential for harm. McClure challenges the mostly white college age students, who

make up the rank and file of organizations like CGR, to examine their often-unconscious biases and privileges around race and class. She notes that outsiders working in an area devastated by social and ecological forces, including centuries of racism, need to take great care to understand the local history, listen to the needs and desires of the inhabitants, and be humble in their work. She says, "Real solidarity means keeping up the conversation about race and class in the US with other white folks, and working diligently to break down the racism in mainstream white communities—where institutional power currently resides—as well as challenging racism in the white left. Real solidarity requires me to go on an ongoing, difficult journey to reckon with my own stuff, and my family's stuff—to recognize and challenge our collusion in the system of white supremacy" (McClure 2010).

Common Ground Relief was only one of hundreds of relief and charity organizations in post-Katrina New Orleans. It was one of the largest and most powerful grassroots efforts, and because of this it offers a great lens to look at the accomplishments of amateur volunteer relief workers, the possibilities of residents and outside volunteers to work side by side, the challenges of post-disaster recovery, and perhaps most importantly the divisive and corrosive problems of race and class privilege, and at times implicit and explicit racism amongst volunteers. CGR attempted, though its success is in doubt, to build an environmental justice organization dedicated to direct relief during a time of acute crisis. In doing so, CGR assert itself to have a right to New Orleans, that is, a right to shape relief efforts as

well as help determine the future of the Lower 9th Ward. The racial division of power and the over representation of outside volunteers has prevented CGR from being a full fledged movement of the inhabitant to exert control over the city, and the social and ecological relations that underlie the quotidian social and environmental inequalities and the periodic cataclysmic hurricanes.

Post-Betsy urban environmental justice organizing was confrontational and adversarial—and much of it was ignored by local elites until the 1970s. Post-Katrina organizing was more about filling in the vacancies left by the state (local, state and federal). Writing about post-Katrina New Orleans, Nickel and Eikenberry (2007) call this the "voluntary state," which sees a citizen's wellbeing as a matter of choice. In one way we can read post-Katrina organizing as aligning with the aims of a neoliberalized, or voluntary state, but it might miss the fact that post-Katrina organizing extraordinarily eclipsed that of post-Betsy organizing. Post-Betsy organizing was about getting redresses from the Keynesian state, mounting pressure on "our representatives" to do something. By 2005, church groups, volunteer groups, and humanitarian groups were actively clamoring to get into New Orleans to provide direct relief and once the crisis was less acute work on lasting social and environmental vulnerabilities. Debate continues about whether this is a good change or not. For all their failures and limits, residents and outside volunteers mounted a monumental effort of citizens to affect the conditions that matter most to them. They made the production of socio-natural space one of their major concerns.

Chapter 5.2: Seattle

The Boldt Decision: 1960s and 70s

As I discussed in Chapter 4, during the 1970s the Puget Sound was in a low-level fish war. Lines were drawn mostly between race and citizenship and between those who wanted to use the salmon for livelihood and those who wanted to protect salmon for conservation and recreational use. Even amongst those who wanted to use salmon for livelihood there was a split between the mostly white commercial fishermen who were US citizens and the Native American fishermen. The latter had been barred from fishing off reservation for over one hundred years and in the late 1960s and 70s were demanding a place on the Sound along side white commercial and recreational fishermen. The actions and motivations of Native American tribes and of the backlash from white commercial and recreational fishermen demonstrate how intense conflicts over nature can be. In this case, both groups battled over the fate of Puget Sound salmon.

Tribal Protest: A Prototypical Urban Environmental Justice Movement

Tribal protest to protect and expand their fishing rights was always a two-pronged approach. Tribes used a direct action campaign, with the tactic of fish-ins to advance their strategy of forcing the court system to expand and protect their fishing rights. The actions of indigenous people created what is surely one of the first *urban* environmental justice movements, even if it has not be recognized as such in the

environmental justice literature. The struggle took the good part of two decades, spanning from the early 1960s to the late 1970s. By the early 1980s, Puget Sound tribes had secured their position as major stakeholders in the management of salmon and more widely in the governance of socio-natural space in greater Seattle (Thrush 2007).

The struggle for fishing rights began in the early 1960s, at the same time as African Americans were struggling for civil and equal rights, and for self-determination throughout the United States. The Puget Sound tribes actually modeled their campaign on aspects of the black civil rights movement (Chrisman 2012). In 1964 the Survival of the American Indian Society (SAIA) formed. SAIA was a self-proclaimed radical group, which saw direct action and civil disobedience as a key strategy to defend treaty rights. Not long after the founding, SAIA launch their first fish-in campaign. SAIA formed with assistance from national organizations such as the NAACP, the National Indian Youth Council (NIYC), and eventually the ACLU (Chrisman 2012). Unlike the black civil rights movement, which largely fought for assimilation within mainstream US society, SAIA and NIYC worked to preserve tribal cultural distinctness and sovereignty as part of their strategy (Chrisman 2012). SAIA and the tribes used the concepts of separateness and sovereignty even as they allied and worked with the United States Justice Department and federal judges. Sovereignty as civil right became part of their strategy.

From 1964 to the Boldt Decision in 1974, SAIA and the Puget Sound tribes, which began to support the fish-ins officially in 1970, sustained a campaign of civil disobedience (Chrisman 2012; Thrush 2007). The fish-in campaign made tribal sovereignty and salmon a topic of regional, national, and international conversation (Thrush 2007). A good example of mixing direct action with the power of celebrity was the 1964 Puyallup River fish-in organized by NIYC, which featured the arrest of Marlon Brando and John Yaryan (an Episcopal minister from San Francisco). Brando and Yaryan were released after only two hours, with the prosecutor saying, "This was done for show only, and we are not going to make a mockery out of the law or our own offices" (Chrisman 2012). However, that same day Native Americans were also arrested and remained in jail until the next day. Organizers led a march on Olympia, WA in protest, and Brando and indigenous leaders met with the governor. A journalist described the direct action tactics as "a new kind of Indian warfare in which Hollywood showmanship and Madison Avenue promotion methods are used for defense" (Chrisman 2012).

Low-level warfare did come to the Sound, but it cannot solely be blamed on SAIA, NIYC, or the tribes. SAIA was not a pacifist, non-violent organization. They did make it clear that they would use force to defend themselves if need be. During fish-ins battles with authorities, protestors did use oars, sticks, fists, and stones at times (Chrisman 2012). Second, the police, on behest of the State, increasingly showed up to the fish-ins and protest in greater numbers and more militarized for

conflict. In 1968, police ramped up their presence during a major action in which supporters, including members of the Washington Peace and Freedom Party, the Students for a Democratic Society, the Socialist Workers' Party, and a single member of the Black Panthers Party joined the tribes in solidarity (Chrisman 2012). Conflict between native and non-native protesters and police were recurring up until the Boldt Decision in 1974.

The two pronged campaign involving fish-ins on the water and protests on land, with legal action in the courts, won Puget Sound tribes a guarantee to half the salmon catch, rights to fishing off reservation in their usual and accustom grounds, and made them major stakeholders in the future of Puget Sound salmon. For SAIA, direct action did work. It took more than a decade of arrests and conflicts but after sympathetic attorneys at the US Justice Department and Judge Boldt, 1974 became the year that their efforts gained them sovereignty rights. Nothing was guaranteed to last in Boldt's original ruling in 1974, but after the US Supreme Court upheld the Boldt Decision the efforts of SAIA, NIYC, and the tribes were vindicated. Tribal sovereignty rights can be read as new urban and environmental rights. Coll Thrush writes, "In the city named for an indigenous man now thought of as its 'first environmentalist,' Native authority had returned" (2007).

The Other Environmental Movement: White Backlash to Tribal Rights

Native Americans were not the only group in the Puget Sound to claim salmon as a civil right. The conflict on the Sound did not end after the Boldt

Decision. White commercial and sports fishermen launched their own self-branded civil rights and civil disobedience campaign to reverse what they saw as a violation of their rights as US citizens. In defiance of State and federal regulations of the salmon fishery, white fishermen began defying the bans on fishing. For example, a November Seattle Times headline read, "10 Arrests Made in 'Fish War'" (Wilson 1976). Dave Milholland, President of the Puget Sound Gillnetters Association said the Boldt had given many advantages to Native American fishermen that 'our fishermen feel these advantages put them at a disadvantage" and that "our fishermen feel it makes them second-class citizens" (Hannula 1976 A8). Beginning in 1970 and throughout the decade sports fishermen and commercial fishermen staged fish-in and protests. They directed their opprobrium at Native Americans, the federal government, Judge Boldt, and State Fish and Wildlife, arguing that regulating the fisheries as well as allowing Native Americans increased access and rights was taking away their rights as citizens as well as putting the remaining fish in peril. Like the tribes, they had allies within the State government, including, at times, Washington Governor Dan Evans.

Opposition from white sports fishermen actually began in earnest in 1964 when the Washington State Sportsmen's Club (WSSC) passed a resolution that encouraged "the State Fisheries and Game Departments to destroy the fish runs on the rivers affected by the fish-in protests" (Chrisman 2012). It read: "Be it further resolved that the Department of Game and the Department of Fisheries open all affected streams and adjacent waters to all legal sport and commercial fisheries and to

allow such waters to become barren until such time as the Congress of the United States or the courts of our land sets up enforceable regulations that will allow the State to carry on a reasonable fisheries management program…" (Chrisman 2012). The WSSC was not a small outfit; it was an organization devoted to conservation with between 20,000 and 30,000 members in the State of Washington (Chrisman 2012). The statement reached national environmental organizations during the National Wildlife Federation Annual Convention. The Oregon Wildlife Federation (OWF) circulated a similar resolution during the convention, blaming Native Americans what the OWF saw as the coming salmon catastrophe (Chrisman 2012).

Overt racism was one tactic by some people supporting and advocating for the rights of sports fishermen. For example, an organization named CURE (Citizens United for Resources Emergencies) created a flyer proclaiming their dedication "to re-establishing the right of the State to manage its resources for the benefit of ALL its citizens" (McLeod Collection). Other posters depicted Boldt in a wanted poster: "For robbery of the civil rights of all non-Indian citizens", while others took aim at Native Americans in subtly racist ways. For example, one poster depicts an Indian fisherman in a canoe in 1855, and below depicts an Indian in a modern fishing vessel with the word Boldt written on it in 1976. Another poster depicts two Indians with a flat tire on their car, the car has bumper stickers that say "Boldt For Pres." and "Red Power," the caption underneath reads, "Don't sweat it, ace! The judge will give us 50% of the fishermen's tires next, anyway…" and the owl in the tree asks, "When has charity

ever made men free?" These conservationist groups couched their attacks on the Boldt Decision in the language of freedom, civil rights, and the classic American notion of equality, meaning the "equal opportunity to share equally in the natural resources, based on skill, hard work, and training in accordance with U.S. Constitutional guarantees (McLeod Collection). Couching it in the language of freedom, these activists attempted to side step the racist overtones of their campaign.

Another advocate for the rights of US fishermen was Kenneth McLeod, a lifelong sports fishing activist. McLeod was born in 1898, and fought for salmon and trout conservation from the 1920s to his death in the 1980s. Primarily working with the Salmon Conservation League and the Steelhead Trout Club, he was instrumental in shaping the State of Washington's game policies. His involvement in the State's decision to de-commercialize steelhead fishing was one of his key achievements. The de-commercialization of steelhead meant that they could only be caught by hook and line (i.e., by sports fishermen) and could not be sold on the market (catch and release or single use consumption). In general, McLeod was opposed to commercial fishing on grounds that it damages fish populations.

However, McLeod and his associated conservation groups practiced an environmentalism that blended conservation with racial and class exclusion. After the Boldt Decision he and others turned their attention to Judge Boldt and the tribes that stood to benefit from the decision. Arguing from a constitutionalist framework, McLeod railed against Judge Boldt for violating the rights of "98% of the non-Indian

population" by granting tribes half the catch (McLeod February 12,1974). He wrote, "The potential disaster is not to our natural resources, but in a much larger sense to our entire guarantee of freedom for all people" (McLeod 1971:8). The point of contention was the phrase in the original treaty "in common with all citizens of the territory." McLeod argued that Native Americans were in fact citizens of both the United States and the State of Washington, and therefore had to abide by the same laws, policies, and institutions that non-Indians had to. He wrote, "Nothing in the treaties said that they could take fish off-reservation at all times, in any guaranteed number, or in any manner at their 'usual and accustomed grounds', but only that they could take fish at their off-reservation accustomed grounds 'in common with all citizens of the territory" (McLeod 1971:2). His argument held that Indians fishing off-reservation were subject to the law of the State "in common with all citizens." On these grounds, he believed the Boldt Decision, by granting special privilege to tribes, violated the constitutional rights of non-Indians.

Yet, McLeod went further by attacking Boldt ad hominem. In a mock letter to Judge Boldt McLeod wrote:

> YOU ARE A TYRANT: YOU TRAITOR to the American way of life and to every citizen who abides by the United States Constitution…For one man to be able to trample the rights of 98% of the non-Indian population into the mire of today's so-called jurisprudence is both preposterous and unthinkable. THINGS HAVE GONE TOO FAR AND IT IS TIME FOR A CHANGE IF THIS NATION IS TO SURVIVE. Your time will be long remembered by millions of sincere conservationists of this country as the BENEDICT ARNOLD of this crazy era. YOU SENILE OLD SOBSISTER. May your remaining days be miserable and mentally painful (capitals in the original. February 12, 1974).

Years later, in another mock letter to Boldt, McLeod juxtaposed a news article about the ailing Boldt with a obituary section of the paper and wrote, "This is as near as we could come this time to putting you in the obituary columns, where you so definitely belong. But maybe better luck next time" (McLeod Collection). Sports fishermen and conservationists wanted to protect salmon, but they wanted to protect salmon for the use of white fishermen at the expense of Native Americans. The battle was ugly and it finally died out by the early 1980s.

The Puget Sound was the site of social and environmental conflict during the 1960s and 1970s. Native Americans launch an aggressive direct action campaign, along side a legal campaign, and they were successful. By the end of the 1970s, Native Americans had succeeded in becoming major stakeholders and decision-makers of the Puget Sound fishery, whereas in 1960 they had been completely excluded. This was a major achievement.

During the low-level fish war, salmon became a contested object to define rights and citizenship. White commercial and recreational fishermen launched their own campaign to advocate for their rights to catch as well as protect the fish. Commercial fishermen had historically been the benefactors of the unregulated and Euro-American dominated fishing industry. The decimation of salmon and the new regulations of the 1970s destroyed this industry, and in the process the livelihood of thousands. Conservationists and sport fishermen wanted to protect the salmon as a goal in and of itself, but they also wanted to maintain the racial geography of the

fishery. Salmon, in their view, were a right of US citizens, not to be shared with Native Americans. Salmon also became a contested object to define livelihood, and the use-value versus exchange-value of nature. The Puget Sound fish war brings these tensions into focus, and shows what can happen when an urban environmental justice movement succeeds. The tribes changed the terrain of politics; and along with the Boldt Decision, salmon management was changed dramatically.

Endangered Species Listing 1990s to 2000s

In the 1990s and 2000s, the conflict on the Sound was over and an era of collaborative environmentalism began. Native Americans had won their place at the governance table. Similar to New Orleans after Hurricane Katrina, the amount and variety of grassroots and people centered organizing is immense in the Puget Sound. Tribes, neighborhoods, environmental organizations, and social justice organizations launched a plethora of initiatives, campaigns, and projects to restore and rehabilitee Puget Sound salmon. The variety of strategies helps us understand better the opportunities as well as obstacles non-state actors have in mitigating, let alone reversing, the decline of salmon. They additionally illuminate how avenues for social participation align or butt against the neoliberalized governance structures.

Keeping the Fight Going: Tribal Activism in the 1990s

Tribal activism continued into the 1990s and 2000s. The days of direct action were over, but tribes continued to use a range of tactics and strategies to expand and maintain their rights. Particularly, the tribes have continued to use the legal process to

enact salmon management changes. In a rebirth of Phase II of the Boldt Decision, in 2001 tribes settled with the State of Washington in federal court, and agreed to use culverts as the guiding example of salmon habitat damage. In 2007, U.S. District Judge Ricardo Martinez ruled that treaty rights required the State to remove and fix culverts that blocked hundreds of miles of streams (Welch 2009). Tribes and the State cannot agree to a timeframe, cost, and the State continually denies its responsibility, even though numerous courts have ruled in favor of the tribes. In addition, the State questioned the ecological importance of culvert removal. Marty Brown, Governor Chris Gregoire's legislative director said, "the state's holistic approach to salmon recovery showed fixing culverts wasn't always the most ecologically important thing to do, especially since cities, counties and federal agencies—including national forests—often had hundreds of culverts blocking the same streams" (Welch 2009). It appears, however, that the tribes will continue to use federal courts as a strategy to shape socio-natural space and mandate salmon restoration.

One Neighborhood at a Time: Grassroots Salmon Restoration

Thornton Creek watershed in Northeast Seattle became an epicenter of community-based organizing to restore salmon habitat. Northeast Seattle expanded in the 1950s and 60s through City annexations and post-World War II suburban development. It is the home of the Northgate Shopping Mall, one of the country's first malls, which was built on small tributaries of Thornton Creek. By the late 1960s, Northgate Mall expansions sparked citizen concerns about the environmental impact

(Klingle 2003:237). By 1978, 83% of the watershed had been developed. The City's Department of Engineering found that by 1978, "Over the years, urbanization of the Thornton Creek watershed has eliminated the anadromous fish runs in the stream. The extreme flows, both peak flows from runoff and low flows during the summer, the degradation of water quality, and man-made blockages such as culverts have all had detrimental impacts on the fish population" (City of Seattle 1978:52). The North Seattle Chapter of Steelhead-Salmon Council of Trout Unlimited initiated a program to restore the salmon runs. The club released 50,000 Coho eggs in 1976, another 40,000 in 1977, and 80,000 in 1978 with minimal results.

In 1992, the Thornton Creek Alliance (TCA) formed to promote a neighborhood-based monitoring and restoration of the Thornton Creek Watershed. Their focus includes water quality and quantity, streambank stabilization, open space acquisition, community stewardship, education and awareness, advocacy, research, watershed planning, and habitat restoration and protection. Through a program called Stream Care, the TCA seeks facilitates neighborhood-based stream groups and individuals who organize around specific restoration projects. There are numerous local organizations, such as the education-based Thornton Creek Project, and State and national environmental organizations working to restore Thornton Creek as well as other urban creeks. There are similar neighborhood organizations in other parts of the city, such as the Ravenna Creek Alliance, a group dedicated to restoring the creek that flows through the University of Washington. These neighborhood-based

organizations loosely represent a one-neighborhood at a time approach to salmon restoration. There are serious questions as to what efficacy these approaches can have, beyond a better backyard, for a crisis that spans hundreds of miles of streams, rivers, and ocean, and with causes so diffuse that a complex and under-coordinated governance matrix has developed to mitigate the crisis.

Figure 14 Thornton Creek Watershed.
Source: City of Seattle

Environmental Justice and Right to the City in the Duwamish River Valley

In 2001, salmon and Superfund law made their confluence in the Duwamish Basin. In response to the high levels of pollution in the lower Duwamish River, the EPA declared a five and a half mile stretch of the river from the Harbor Island to the neighborhoods of South Park and Georgetown. The Superfund regulation requires that the entities primarily responsible for causing the pollution must take

responsibility to clean it up (required by the Comprehensive Environmental Response, Comprehension, and Liability Act (CERCLA). In the Duwamish River Superfund the EPA and the Washington State Department of Ecology (Ecology) are the joint oversight agencies. The actual responsibility for cleanup has gone to a private-public entity called the Lower Duwamish Waterway Group (LDWG), which was originally formed as a voluntary study group in 2000 and comprises four entities: The Boeing Company, the City of Seattle, King County, and the Port of Seattle. These four entities were identified under CERCLA as the available and remaining "potentially responsible parties" (PRPs) (Purcell 2008).

Within the Superfund law, CERCLA includes language for community involvement, specifically the formation of Community Advisory Groups (Purcell 2008:140). In the Duwamish Basin a group formed called the Duwamish River Cleanup Coalition (DRCC) and petitioned to be a Community Advisory Group. The EPA accepted. The DRCC, now with non-profit status, is an inclusive coalition comprised of environmental, resident, tribal, environmental justice, and small-business groups (DRCC 2012). The DRCC says that they work "to ensure that the Duwamish River Superfund cleanup not only restores environmental health and protects fishers and families who use the river, but also reflects the priorities, values and will of the people who live and work in the region" (DRCC 2012). As an official CAG, the group receives funding from the EPA to hire a Technical Advisor to assist in reviewing all cleanup plans and reports. The DRCC has been able to utilize the small provision within the Superfund law to advocate for the needs of the inhabitants

of the Duwamish Waterway, those not included in the EPA/Ecology, or the LDWG plans.

For ten years DRCC has worked to make sure the conversation of cleanup involved issues of environmental justice, and the needs of salmon and the ecosystem as a whole. Because it is a "coalition of coalitions" (Purcell 2008:144) the DRCC has had to work hard balancing the demands and foci of its myriad of members (Purcell 2008: 144). They take care to not let human health and well-being trumped the well-being of salmon and the river's ecological system. Their vision statement reads, "It is the vision of DRCC/TAG that South Seattle residents will be able to crab in the river without risks to their family's health, that endangered salmon will be able recover without PCBs or other toxic body burdens, and that the banks of the Duwamish River will be a welcoming and risk-free place for our children and their children to wade, fish and play" (DRCC 2012). They have been successful maintaining the coalition as well as navigating the complexities of the cleanup governance structure.

The group has worked inside the Superfund governance structure, rather than as an oppositional movement working on the outside, but they have not simply let the EPA/Ecology or the LDWG define the vision of a cleaned up Duwamish River. In 2009, the DRCC published the *Duwamish Valley Vision Map and Report*. They described the report as "an ongoing, comprehensive, community-based future visioning project, which engaged people who live, work or visit the Duwamish Valley through workshops, mapping and interviews. The project compiled over 500 diverse

community ideas, concerns, and visions into a comprehensive 'future map,' which includes transportation, housing, recreation, jobs, and habitat restoration" (DRCC 2012). They designed the participatory visioning process to accomplish three things: "1) define the existing conditions, 2) conduct a future visioning process, and 3) develop strategies for implementation" (2009:16). The DRCC solicited input from a wide array people:

Table 5 DRCC Visioning Participants. Source: DRCC 2009

Residents	**Business owners**	**Industrial workers**	**Recreational users**
Youth (teens and children)	Low-income community members	Homeless and transient populations	Fishermen and subsistence harvesters
Immigrants and non-English speakers	Social and community service providers	Environmental stakeholders	

A total of 260 people participated Visioning Workshops. The DRCC also conducted one-on-one interviews with individuals who were not easily reached through the workshops (typically Spanish speakers). Through this participatory visioning process the DRCC was able to produce a vision map that represented design ideas with broad support as well as those more particular to certain sections of participants (Figure 15).

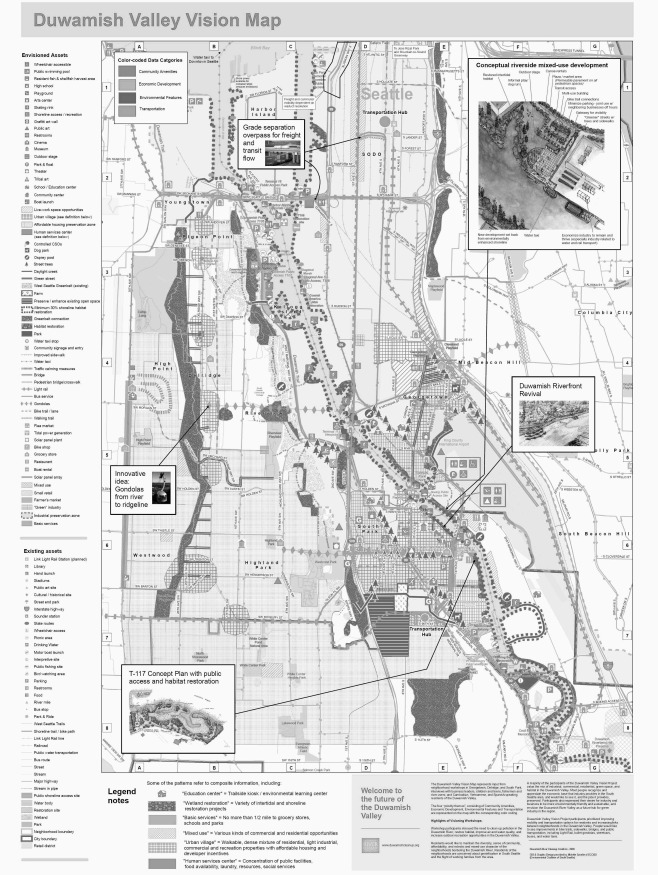

Figure 15 Duwamish River Cleanup Coalition Vision Map. Source: DRCC 2009

Going into the vision process the DRCC was aware of the environmental justice and gentrification implications of a cleaned up and healthy Duwamish River. They state, "there are even unintended consequences of cleaning up our river that require us to consider how to manage these impacts as we move forward. Will a clean river make our community more attractive and lead to rising housing prices in our neighborhoods? Do we want condos on the shoreline? Will businesses move into or out of our community as a result of the cleanup? If so, where will we work in the future? And how can we prevent being pushed out of our community once we've

improved our environment?" (DRCC 2009:14). In a non-technocratic or bureaucratic way the DRCC and the visioning project represent a desire by inhabitants, small businesses, and concerned citizens to re-imagine the Duwamish River as a space for human use and need, the needs of commerce, and the needs of the various plants and animals and ecological systems.

The DRCC, along with Seattle Mayor McGinn and Councilmember Conlin, sees the Duwamish Valley as a space to reconcile industry, inhabitants, and nature. The DRCC does this by delicately threading the line between confrontational politics and working within the Superfund governance structure. Their position at the table is evident in the fact that at the press conference for the launch of the Slip 4 clean up the head of the DRCC joined Seattle Mayor McGinn and Dennis McLerran, EPA Region 10 Administrator at the podium. The plan to shape the socio-natural relations of the Duwamish River is unsure; it is an unfolding story.

Summary

Inhabitants in New Orleans and Seattle challenge as well as participate in urban environmental governance structures. There has been a general rise of environmental justice and urban justice movements across the United States since the 1970s and 80s and people in both New Orleans and Seattle have formed such organizations. These organizations have challenged state spatial projects by using a myriad of strategies and tactics. Further, they launched their own spatial projects that at first glance appear to work "outside" of the large governance structures. Yet some

of these have actually participated in state governance structures (e.g. Duwamish River Cleanup Coalition and Common Ground Relief). In the 1960s and 70s, direct confrontation was typical of these proto environmental justice organizations. But as governance frameworks began to shift through the 1970s, and more fundamentally in the 1990s, an era of collaborative environmental governance emerged. Rather than open hostility, environmental justice actors participated and "rolled with" these new public-state-private initiatives (Keil 2009). These changes in governance practices have enabled the tremendous growth of non-state urban environmental organizations, institutions, and grassroots campaigns.

As the city becomes the space and scale of environmental and social justice struggles, this can be seen as a positive development. Whereas during the environmental Keynesian period (1960s and 70s) non-state actors were putting pressure on State and federal institutions and actors (judges) to regulate socio-natural relations, in the 1990s and 2000s, activity and effort was put into changing urban space and the politics of the city (Purcell 2002). Environmental justice and right to the city organizations have focused on local institutions and actors, and in some cases no longer concern themselves with a politics centered on state redress. This end round of the state has enabled organizations like Common Ground Relief and Thornton Creek Alliance to implement their own socio-natural transformation of their respective neighborhoods (Lower 9th Ward, and North Seattle).

The case studies in this chapter highlight two similarities between the environmental justice and right to the city frameworks. One, both frameworks are about rights. Two, both frameworks are claims about the production of space. In both cities inhabitants and allies made claims about legal rights. Native Americans in the Puget Sound have historically used the courts to wage environmental and urban battles. More recently, the Duwamish River Cleanup Coalition worked within the legal framework of the Superfund law in order to push for a grassroots response to the pollution of the Duwamish River. In New Orleans, Betsy Flood Victims emphatically argued that post-Betsy victims needed guarantees through law that they could get equitable and fair compensation.

Additionally, and perhaps more importantly to legal rights, all the examples highlight the ways that urban environmental justice organizers were claiming the to the production of socio-natural space. From the tribes push for Phase II of the Boldt Decision to Common Ground Relief, these organizations were saying we have a right to participate in the building of the city and its relationship to nature. This is fundamentally more significant that a set of legal rights in that when successful it enables everyday people to participate in urban design and in social and ecological relations. The case studies that I presented in this chapter demonstrate that urban activism increasingly became a conversation about the environment, and that environmental activism increasingly became a conversation over urbanization. That is

to say, these organizations have become avenues for the social participation in the production of socio-natural space.

There are limits to the anthropocentric framework of these efforts. A people centered, urban framework has the potential to ignore the regional and global processes that contribute to vulnerability and inequality. Rather than advocate for a biocentric or ecocentric approach, which would argue for the rights of nature over the rights of people, a socio-nature position might help unveil the regional and global ecological relations that are deeply connected to the future of neighborhoods, inhabitants, the livelihoods, and the places called home. Can this be done in a way that takes into account the needs of a diverse set of human inhabitants and users, and a diverse set of non-human biota? There are no easy answers to this question. However, groups like Common Ground Relief, the Duwamish River Cleanup Coalitions, and the Puget Sound tribes help us recognize that you need not sacrifice the social or the ecological in order to imagine, and build new socio-natural spaces. They argue that effort has to be made by policy makers, scientists and engineers as well as the groups themselves to include human and non-human concern when addressing solutions to the crises of hurricanes and salmon. Furthermore, these organizations demonstrate the strength of the environmental justice framework by making the city a space of environmental politics. A city is not just the buildings; it is also in fact the hybrid techno-natural infrastructure as well as the ecosystems that are incorporated throughout the urbanized region. Perhaps salmon and wetlands are not

objects, but rather urban subjects that hold part of the key to a healthier, safer, and ecologically just city.

Whether in New Orleans and Seattle, inhabitants have taken it upon themselves to build new socio-natural relations with in the city, and in doing so help mitigate and reduce environmental inequalities. They still deployed confrontational politics but a more complex and entangled politics of collaboration has emerged in the last decade or two. This has enabled a plethora of organizations and strategies, but it has worked to entangled urban environmental movements within in the prevailing neoliberalized public-private governance practices, which has made dramatic reduction of vulnerability and environmental inequality harder to achieve. These organizations may not solve the larger crisis, but through their activities they have directly helped and empowered themselves and various communities. In the contemporary city, environmental justice and the right to the city organizations are working towards similar outcomes. These efforts should be seen as an important thread of entanglement in New Orleans and Seattle.

Part III: The Urban Future(s)

Conclusion

Entangled Futures:

Imagining Socio-natures Past, Present, and Future

Introduction

In 1965, there were two sisters named Ida Mae and Corrie Dixon. They were black women, born in southern Mississippi, but had moved to more prosperous New Orleans to look for work some years earlier. Working for thirty years in hotels and the homes of white folks, saving what they could on an income of $1,000 a year, the sisters were able to secure mortgages on two small side-by-side homes on Tupelo Street in the Lower 9th Ward. Their homes were not far from the earthen levee that separated the neighborhood from the swamplands to the east. On the night of September 9, 1965 Hurricane Betsy pushed a wall of water over that swamp, over the levee, and filled their neighborhood with up to 8 feet of water. In the process, their homes were badly damaged. They then sought shelter in an evacuee center where they met Elizabeth and Walter Rogers. Together with other Lower 9th residents, they formed Betsy Flood Victims. Corrie became membership chairman of the organization. Returned to the Lower 9th, they waged a multi-year effort to secure disaster grants, improved city services, and safe levees. As we saw in the previous

chapter, their demands were ignored.[23]

Forty years later, not far from where the Dixon sisters once lived, I witnessed two white men engaged in a heated debate while engaged in volunteer relief work in the Lower 9th Ward after Hurricane Katrina. One man was a recently arrived volunteer and the other had been volunteering for months. The recently arrived volunteer was emphatically arguing that nobody should be living in New Orleans, let alone the Lower 9th. Further, he shouted, we should not be spending countless time, money, and labor to rebuild it. An obvious retort from the long-term volunteer could have been, "Well, then why are you here?" Rather, he kept debate going, much to the consternation of the disappointed new arrival. The latter man eventually left the organization as quickly as he had arrived.

Three years later, in 2009, while conducting research for this dissertation I drove my car to just about every neighborhood in New Orleans, stopping to get out, wander around, and take pictures. I had volunteered in the Lower 9th Ward in 2006, so I was particularly interested in what had changed since then. Not far from where the Dixon sisters lived and not far from where the two white volunteers debated the future of the Lower 9th, and New Orleans more broadly, I walked the streets of the Lower 9th, taking in the sight. A vast portion of the Lower 9th remained devoid of homes, while thick tangled plants claimed much of the open space. There were a few houses, scattered here and there. The most prominent ones were the Modernist style "Brad Pitt houses," built by his Make it Right Foundation. The bustle of volunteer

[23] This story was adapted from Elizabeth and Walter Rogers (1975).

relief workers, construction and debris removal crews, and the ebb and flow of returning residents had vanished. Instead, the few people who had returned seemed to go about their quotidian lives.

From an outsider's perspective, post-Katrina New Orleans appeared to have settled into a new norm. The more affluent and predominantly white Lake View neighborhood was bustling with construction projects and full of homes, whereas affluent and once predominantly black New Orleans East—once the idyllic vision of land developer Marvin Kratter—contained closed down strip malls and vacant houses. All over the city I saw that much had changed since 2006: the Army Corps of Engineers had erected new levees and were installing flood gates and pumps in key locations, the Mississippi River Gulf Outlet had been decommissioned, many of the neighborhoods that were empty in 2006 were now busy, and the amount of FEMA trailers had significantly decreased. After the devastation of Hurricane Katrina, these questions were asked: Should there be a line drawn to demarcate where the city ends and nature begins? Should the city shrink and nature reclaim the land? Geographer and New Orleans resident, Richard Campanella's called these questions the "great footprint debate" (2008:354). By 2008, he said the debated had come and gone, and New Orleans was beginning to live with the decisions made and not made during the critical years of 2005-2007. Questions were about the future were made in the present; they were also shaped by the past.

This dissertation explored how past events and decisions set in motion path dependencies that have shaped the outcome of urbanization and socio-natural crisis in

New Orleans and Seattle. These cases also demonstrated how questions about the future always involve concerns about both the past and the present. The Dixon sisters, the two relief volunteers, and myself were entangled in historical conjunctures; that despite being in three different moments, we were all connected by the entangled history of urban development, technological systems, governance decisions, and hurricanes. Similarly, in Seattle, the lives of salmon, Native Americans, commercial fishermen, and the city's relationship to nature were connected by historical conjunctures and path dependencies in which events, decision, and processes shaped the structures, and lived experiences of both fish and humans, at later moments in time. Whether we are speaking of the individual, the city, or hybrid socio-natural processes, the history of each are connected by path dependencies, and for each, history unfolds though a conjuncture of events and human decisions. This concluding chapter weaves together the four strands of entanglement as well as the path dependent thread of time: the relationship between past, present, and future.

Entangled Pasts and Presents

In this dissertation I argued that contrasting disasters that come to us from those that come from us is a false dichotomy. Comparing what appeared as two disparate cities revealed some interesting findings: One, the distinctions between what comes to us and what comes from us dissolves if you look at "natural disasters" as hybrid socio-natural processes. In chapters 2-5 we saw how human decisions about urbanization, technology, governance and law, and social justice were deeply

entangled with ideas about nature as well as entangled with material nature in the form of hurricanes and salmon and wider ecological systems. Two, what people call disasters are not one-time events but rather crises long in the making. In Chapter 2, I explored the industrial and urban transformation of New Orleans and Seattle, and in Chapter 3-5 showed how those historical transformations contributed to crises between 1960-1980. I then explored how the events and decisions made during the period from 1960-1980 created path dependences that resulted in crises that erupted during the 1990-2005 period. Three, the urbanization of New Orleans and Seattle made the natural and social *more* entangled, which in turn has made some populations of humans and non-humans more vulnerable than others. In each chapter, actors not only built hybrid socio-natural spaces, after the 1970s they increasingly enrolled nature as a discourse in matters of technology and engineering, policy, law, and governance, and social justice and rights.

In Chapter 2, we saw how urban and industrial development in New Orleans and Seattle involved the massive transformation of social and natural relations. Over the course of the 19th and 20th centuries the socio-natural landscape has been transformed from cities of mud, within the midst of indigenous people, to cities of gold, economic powerhouses, with indigenous people pushed to the margins. In New Orleans the legacy of slavery and post-slavery Jim Crow created a vulnerable population of poor African American inhabitants. In both cities, these socio-natural transformations have created particular vulnerabilities, inequalities, and recurring

crises. These outcomes are not tangential; they are part of the process of the capitalist reworking of society and nature. Urbanization and city building has made ecosystems, salmon habitats as well as a plethora of human inhabitants more vulnerable. Throughout each city's history capitalist urbanization, technology, political decisions, and social movements have transformed the socio-natural landscape of each place. Rather than forming the "superstructure" to political economy, I emphasized that hurricanes and salmon, urban knowledge and technology, the state and governance, and social participation along with capitalist urbanization form strands of the entanglement between society and nature in New Orleans and Seattle.

In Chapter 3, the case studies showed that the production of socio-natural space and the crises around hurricanes and salmon involved increasingly sophisticated techno-natural artifacts and systems, which city builders, scientists, and engineers used to address the recurring hurricane crisis in New Orleans and the protracted decline of salmon in Seattle. These techno-natural artifacts and systems were predicated on the modernist dream of the human control and improvement of nature. With a faith in these techno-natural artifacts actors were able to keep a focus on perpetuating capitalist urbanization and the building of state institutions. As a result, the technological fix actually was not a solution to each crisis, and in both cases the expansion of new techno-natural projects enabled urbanization to continue, creating renewed crises and new vulnerabilities for diverse sets of humans and non-humans.

After the 1970s and more clearly at the turn of the 21st century, scientists and engineers proposed a new techno-natural fix: eco-system management. Instead of tying to control nature or circumvent problems, the new proposal aimed to reshape socio-natural relations, the built environment, and daily lives of urban inhabitants. In both cities, actors advocated an ecological fix that proposed the restoration of wetlands and rivers, and the ecological systems that each urban region resides in. However, the complex ecosystem and spatial framework, though making it into the mainstream, had serious obstacles in that it challenged existing governance and economic practices, and the embedded living and working arrangements for hundreds of thousands of people in each city. Hybrid urban ecologies were deeply entangled with existing social, economic, and political practices, all of which created barriers to the building new socio-natural spaces.

In Chapter 4, we saw how questions of urbanization, techno-natures, and crisis involved changing modes of state policies and governance practices, which made changing socio-natural relations so difficult. In both New Orleans and Seattle, state actors made nature, in the form of hurricanes and salmon, a key organizing object in the transformation of space in each city. In doing so they built states of nature: conflicting and overlapping institutions and governance practices that use nature as a tool to govern as well as manage socio-natural relations. Forming during particular crises, new governance practices and institutions were built in the 1960s and 1970s in both urban regions. These practices, along with laws and policy, were built upon federal environmental laws and regulation that mark the environmental Keynesian

period of the 1970s. These governance practices attempted to mediate conflicting goals: the amelioration of the particular socio-natural crisis and the continued urbanization of each region. In both cases, expansion of urban environmental governance practices did not ameliorated each crisis. In fact, in each case, governance practices facilitated the ongoing urbanization of each region. The result, by the turn of the 21st century each region was embroiled in an unresolved and renewed crisis, fueled in part by the continued urbanization of each region.

The case studies told a story of two periods of state environmental activities. The first period was (1960-1980) was characterized as a period a top down state environmentalism, whereas the second period (1990-2005) was characterized as a flatter, more horizontal, and in many ways neoliberalized state environmentalism. In the first period, we saw non-state actors making demands of the state, and in the case of the Puget Sounds tribes, the state made redresses on their behalf, while social movement actors were ignored in the aftermath of Hurricane Betsy. The reconfiguration of state practices of environmental governance in the 1990s and 2000s has opened up many more possibilities for grassroots initiatives, community involvement, and the participation of non-state actors.

In Chapter 5, we saw the many ways inhabitants and environmental justice actors in New Orleans and Seattle challenge as well as participate in urban environmental governance structures. Urban social movements began to frame their work as environmental, and the city itself became a contested socio-natural space.

There has been a general rise of environmental justice and urban justice movements across the United States since the 1970s and 80s and people in both New Orleans and Seattle have formed such organizations. These organizations have challenged state spatial projects by using a myriad of strategies and tactics. Further, they launched their own spatial projects that at first glance appear to work "outside" of the large governance structures (e.g. Thornton Creek Alliance and Common Ground Collective).

Yet some actors and organizations participated in state governance structures directly (e.g. Duwamish River Cleanup). In the 1960s and 70s, direct confrontation was typical of these proto environmental justice organizations. But as governance frameworks began to shift through the 1970s, and more fundamentally in the 1990s, an era of collaborative environmental governance emerged. Rather than open hostility, environmental justice actors participated and "rolled with" these new public-state-private initiatives (Keil 2009). These changes in governance practices have enabled the tremendous growth of non-state urban environmental organizations, institutions, and grassroots campaigns.

As the city becomes the space and scale of environmental and social justice struggles, this can be seen as a positive development. Whereas during the environmental Keynesian period (1960s and 70s) non-state actors were putting pressure on State and federal institutions and actors (judges) to regulate socio-natural relations, in the 1990s and 2000s, activity and effort was put into changing urban

space and the politics of the city (Purcell 2002). Environmental justice and right to the city organizations have focused on local institutions and actors, and in some cases no longer concern themselves with a politics centered on state redress. This end round of the state has enabled organizations like Common Ground Relief and Thornton Creek Alliance to implement their own socio-natural transformation of their respective neighborhoods (Lower 9th Ward, and North Seattle).

However, there are spatial and scalar limits to these activities. Mark Purcell calls this the "local trap" (Purcell 2006). The cases I have outlined in this dissertation make it clear that although the city and urbanization play a large role in producing these crises, neither New Orleans nor Seattle, as urban municipalities, have considerable power to address the crises alone. The city is a limited scale and space in which to address crises that are regional and also depend on State and federal institutions. The neighborhood is an even more limited space and scale. Not all neighborhoods have the capacity, social infrastructure, or money to build successful urban environmental justice organizations. When urban environmental justice organizations do come on the scene, they are not always successful in changing environmental inequalities or reducing vulnerability.

We saw these limits with Common Ground Relief. They had some short-term immediate effects on resilience for some affected Lower 9th Ward residents, but they also introduced new race and class inequalities at the same time. At the city-wide scale, in Chapters 4 and 5 we saw that some neighborhood and grassroots

organizations were taken seriously by the local state (Broadmoor in New Orleans and North Seattle), while others were not (Betsy Flood Victims in New Orleans and the tribes in Seattle). The outcome, specifically in New Orleans, of the laissez faire approach to rebuilding after Katrina has empowered wealthier neighborhoods to bounce back (Broadmoor and Lake View), whereas places like the Lower 9th Ward, which experience an explosion of urban environmental justice activity, is largely overgrown with plants, and is falling behind socially and economically.

The neighborhood-by-neighborhood approach and a focus on the city-municipality scale are simply not enough to address vulnerability to hurricanes and the decline of salmon. The reason for this, as the case studies demonstrated, is because the crises are multi-spatial, multi-scale, and multi-actor. Attempts to address both the latent and manifest dimensions of these crises must occur at multiple scales of governance (local, state, federal) and throughout multiple spaces (neighborhoods, industrial areas, stream banks, wetlands, and surrounding wilder ecological areas). Social participation at the neighborhood and the municipal level is not a surefire panacea. In the comparison between Seattle and New Orleans we saw that the Puget Sound tribes have been much more successful at working with as well as challenging state policies and laws by working in multiple spaces and at multiple scales than environmental justice workers in New Orleans.

Furthermore, as Nelson, Ehrenfeucht, and Laska (2007) argue in their work on post-Katrina rebuilding, expert knowledge is essential to making a safer and more

socially just city. However, the gulf between what they call "local knowledge"—the lay knowledge of people who live in at risk communities—and "expert knowledge"—scientific, technical, and academic knowledge—has impeded efforts to reduce environmental inequality and vulnerability in New Orleans. To remedy this both Nelson et al. (2007) and Allen (2007) argue that the relationship between experts and local communities needs to be organized in a manner that encourages the development of empowered communities. Allen (2007) found in her work on environmental justice in Louisiana, including post-Katrina, that the strongest citizen campaigns were the ones that were able to partner with scientists and independent experts. My case studies bolster this claim. For example, the Duwamish River Cleanup Coalition and Common Ground Relief both employed experts in their respective campaigns. The Duwamish River Cleanup Coalition hired experts to aid in their assessments of pollution and salmon populations. Experts working as part of the Technical Advisory Group (TAG) helped the DRCC evaluate the official EPA/Ecology reports. In doing so they also helped present the DRCC vision for an environmentally and socially just clean up of the Duwamish River. As a result of the TAG they are able to achieve some parity with the EPA/Ecology and the official party of responsibility, the Lower Duwamish Waterway Group (City of Seattle, Boeing, Port of Seattle).

Entanglement in Seattle and New Orleans refers to the ways that all these strands come together to produce complex and recurring crises of hurricanes and

salmon. In this dissertation I separated each strand analytically in order to provide detailed histories about actors, events, and processes with in the realm of urbanization, technology, governance, and social participation. However, in the spatial event-temporality of everyday life, a myriad of actors made decisions and brought to life processes that entangle capitalist urbanization with techno-natural artifacts and systems, all of which operated in a complex web of laws, policies, and governance practices and state institutions and enrolled the participation of non-state actors (so-called everyday people).

The historical development of socio-natural space in New Orleans and Seattle gives us a glimpse at the changing, shifting, and transforming discourses and practices of how people use nature and understand nature to build cities. I discussed three historical periods. First, I briefly discussed how indigenous discourses and practices were characterized by small-scale transformation of local socio-ecologies in both regions as well as the incorporation of the natural world into cultural, political, and economic practices based upon ideologies of reverence for nature.

Second, nineteenth and twentieth century Euro-American discourses and practices were characterized by large-scale transformations of regional socio-ecologies as well as the incorporation of the natural world into cultural, political, and economic practices based upon ideologies of domination, control, and commodification of nature (Modernist framework). During this period, I argued that nature became even more deeply incorporated into industrial, commercial, and urban

development, paradoxically as nature was disappearing from ideology and discourses about civilization and society. Conceptually, land managers and environmentalists placed wild nature was placed into reservations in the form of National and State Parks at the same time that vast industries and economies were built using the natural world, scientists split atoms to devise powerful bombs, the remains of dead animals and plants were pumped to the surface to power new transportation networks, wetlands were dredge, drained, and made into aquatic highways or new industrial and living spaces. Nature had not disappeared; modern humans had incorporated it further and further into social systems and technologies.

Third, beginning in the 1970s, a new conceptual movement began to take shape that began working towards the re-naturing of social systems. In this period (1970s-2000s) American discourses and practices began to be characterized by plans for large-scale re-transformations and re-naturing of regional socio-ecologies as well as new re-natured cultural, political, and economic practices based on the ideas of an amalgam of frameworks, from multi-use management, ecosystem management, environmental justice, green urbanism, and sustainability. Many of the old Modernist discourses and practices still remained, but people began to implement new ones in attempts to displace and remedy the old ones. A plethora of actors put forward new plans for urban development, new technologies, new laws and governance practices, and new strategies of social participation, all of which incorporated nature as conceptual and material objects in the production of socio-natural space.

Efforts to transform socio-natural space in ways that would address the recurring crises have been difficult. Why? The reason has to do with both spatial and temporal path dependencies. All actors are entangled with existing socio-natural relationships as well as past decisions and events, many of which they did not make or participate in. Existing spatial, social, and wider processes are difficult to change for a number of reasons. One, as I have summarized above, the entanglement of existing economic practices, techno-natural systems and artifacts, laws and governance practices, social participation, and the movements of hurricanes and fish makes it difficult to implement new practices in any of these strands. Two, path-dependencies "lock in" laws, economic, political, and social practices, the built environment, and techno-natural systems. Decisions made ten, thirty, forty, and in some cases one hundred years prior shape the range of decisions possible. These past decision also contribute to the unfolding of new events in the present. For example, as we saw in Chapter 3 and 4 the revamped levees following Hurricane Betsy were not built sufficiently and they were not complete at the time of Hurricane Katrina. Moreover, decisions to transform the remaining wetlands surrounding New Orleans into housing developments as well as aquatic highways for shipping vessels made the low-lying neighborhoods more vulnerable to flooding. In Seattle, for example, the failure to implement Phase II of the Boldt Decision in the 1970s meant that no significant changes to the urban landscape were made. Horizontal urban expansion, thus, continued into vulnerable salmon habitat, deepening the crises in the 1990s. Each period of crisis did cause some breaks in the continuity of urban development,

which influenced how urbanization unfolded and how people made decisions. In the 1970s a new environmental consciousness did emerge that countered the hegemonic modernist one. However, many things remained the same and some of the new ways of doing things, if not made the crises worse, did little to mitigate them.

People cannot so easily free themselves from the past. Events, decisions, and processes that took place in the past are continuously shaping outcomes and what is possible in the present. Therefore, what will happen in the future is always being made in the present. Political, economic, and social systems, and the ecologies they are embedded within, are always entangled with the past. Questions about the future, made in the present, are also about the past.

Entangled Futures: Imagining the Socio-nature of the Future

Societies around the world face an array of ecological crises, from industrial pollution, to deforestation, to storms and droughts, to disease. Moreover, there is a growing concern and conversation about global climate change, despite the fact that the topic is not a concern with policy-makers in Washington, DC. Humans seem to face so many threats that a narrative of decline and destruction has made its way into popular discourse; whether through radical environmental organization or more moderate ones, or the media. We are bombarded with data and stories of environmental catastrophe, from global climate change, to water scarcity, to species extinction. In its quotidian form, everyday people openly discuss “the end of the world” or “the end of humans”, which is quite a popular literary, television, and film

topic today. The mainstream narrative simply has us waiting passively for the end to occur. From this vantage point, capitalism, state dysfunction, and consumer society are unstoppable. "Nature," and humans with it, appears to be in serious trouble. An imagine (dystopian) future is on many people's minds.

To address narratives of fatalism and to help image future worlds, I would like to return to two of the epigraphs that began this dissertation and in doing so compare the literary eco-science fiction of George R. Stewart and Kim Stanley Robinson. Science fiction is a useful tool to imagine the future and possible trajectories of the human society. The works of these two authors, though not about Seattle or New Orleans, allow us to imagine what the relationship between city and nature, and between society and nature could be like in the future. As works of fiction, it is improbable that the worlds they envision will come to pass. However, the contrast between a story of death at the hands of nature (*Earth Abides* by Stewart) and a story about the power of human beings to transform the seemingly impossible limits of the inhospitable planet Mars into a planet that enables a new planetary civilization (Mars trilogy by Kim Stanley Robinson) allows us to have a conversation about imagined socio-natures of the future.

At the beginning of George R. Stewart's (1949) classic eco-sci-fi novel *Earth Abides*, Stewart put this epigraph: "Men go and come, but earth abides." *Earth Abides* is about the collapse of human civilization from a pathogen. In this story, humans are at the whim of a more powerful and enduring nature. The story is set in the San Francisco Bay Area, CA. The main character miraculously survives the virus and

makes his way to Berkeley from his camping trip in the Sierra Nevada. He finds no one alive. Slowly, he wanders through the city, scavenging from the refuse of the urban and industrial civilization that is no more. Eventually, he meets a few other survivors. Together they slowly build a new society. Many of the technological artifacts of modern society still work, to his surprise. For a while water continues to flow. More ominously, he and the other survivors are at the whim of ecological, biological, and climatological forces, and without the full protection of civilization (they still live in houses), they are vulnerable to threats to their health and safety.

Over a generation goes by, and the survivors begin to develop new political, cultural, and technological practices, incorporating both the remains of the old society but also generating new ones. At the end of the book, the main character, now a very old man, walks over the still standing Bay Bridge with his great grand children. Watching them, he fully realizes that he is of the old society; they are of a new society. They believe new ideas about existence, about nature; they are masterful hunters and have little interest in preserving the remnants of 20th century American civilization. Stewart's book, though quite mechanical in its treatment of ecology and sociology, tells a tale of a future where modern hubris is reduced to nearly nothing, and a new society forms, adapting to as well as building new socio-natural relations, and a new society in the urban fabric of post-catastrophe San Francisco Bay Area. The city is the primary space of this future society, but the new inhabitants build new social and ecological practices.

Kim Stanley Robinson's Mars trilogy is a contrast to the catastrophic but ultimately regenerative story told by Stewart. In the Mars trilogy, Robinson envisions the human settlement and terraforming of Mars. It is a vast piece of literature, spanning three thick books. There are two main themes that I find interesting for this discussion. The first is the battle between the new inhabitants over what the socio-natural space of Mars should look like. Ironically with regards to current political positions in our world, Robinson pits the Reds, those who want to minimize the human transformation of Mars (keep it red) versus the Greens, those who want to fully terraform Mars, in the process creating rivers, lakes, oceans, and an atmosphere, and with it green plants (make it green, then blue). Secondly, Robinson pays considerable attention to the process by which new political and economic systems are built on Mars. The Mars trilogy is as much about the transformation of space on Mars as it is about intense battles for a new participatory democratic society, a society that can make informed and participatory decision about what kinds of socio-natural spaces they want to inhabit. A group of rebels, including Reds and Greens, also battle trans-planetary corporations that want to use Mars as a large mine, and who only see the exchange-value of Mars. The struggle is over who owns and who governs Mars itself.

By virtue of necessity, lacking an oxygen rich atmosphere, the new Martian society lives in cities, large domed cities that protect the inhabitants from the vacuum of the limited atmosphere. In Robinson's story, cities are a primary space in which the battle over Mars takes place. Robinson is very careful not to spend too much time

talking about place and space as it is, rather he interweaves a story that is about the intense production of socio-natural space on Mars, not unlike the conflicts and crises that I described in New Orleans and Seattle. Lastly, rather than a tale of collapse or a utopic tale of transcendence of nature, Robinson's trilogy is about becoming, about the realization of human's place in the cosmos. One of the characters named Hiroko, an original explorers and a strong political figure, says, "And because we are alive, the universe must be said to be alive. We are its consciousness as well as our own. We rise out of the cosmos and we see its mesh of patterns, and it strikes us as beautiful. And that feeling is the most important thing in all the universe—its culmination, like the color of the flower at first bloom on a wet morning." It's a bold statement; perhaps it's hubris. But I think it contrasts nicely to the epigraph that Stewart begins *Earth Abides* with: "Men go and come, but earth abides." In polarized ways, each notion reminds us of our place in nature.

Overall, both books are about an urban future. Moreover, both books depict a dialectic between what David Harvey (2000) calls "utopias of process" (how we govern space) and of utopias of form (what space looks like). Robinson's work in particular does excellent work getting us to think about how we imagine the future, and hence how we make decisions in the present. Questions about "what should we do" need to include attention to social process as well as spatial form, and need to integrate space and time (Levitas 2003). That is, according to Harvey, through participatory social process we make decisions now, which change spatial forms with an eye towards the future. Robinson and Stewart's works of fiction allow us to

imagine urban futures, and explore how the production of socio-natural space is both a struggle over form and process. We need not imagine a dystopia or a utopia, rather we need to imagine a dialectic between process and form of social space.

In our temporal and non-fictional world, we are in the midst of struggles over the form and process of urbanization. The history of space, whether in New Orleans and Seattle or beyond, is a struggle over who participates in the production of space, how space is produced and governed, and what form space ought to take. In the 21st century urban areas around the world play a key role in generating and experiencing socio-ecological problems. Global Cities thesis advocate Saskia Sassen argues that as cities become the prime sites of capitalist accumulation in the global economy and take more governance power through the process of re-scaling global governance away from the nation-state, cities also become the epicenter of environmental problems, but also their solution. Others are pointing out that dense central cities have more ecological benefits than the expanse of suburbs and edge cities (Owen 2009). Furthermore, if the projected consequences of global climate change come to pass it will be harder and harder to distinguish what is a "local" ecological crisis from what is a "global" ecological crisis. In fact, my case studies highlight how hurricanes and the salmon lifecycle are prime examples of multi-scalar phenomenon. In these conversations, attention needs to focus on the who, how, and what of the production of space.

Each urbanized region experiences its own manifestations of ecological crises, and a manifestation of interconnected crises with other areas around the world. This

dissertation has not been an argument for "best practices," whereby actors in different places need to find normative solutions to abstract generalized ecological problems. Rather, using the method of incorporated comparison, I argued how each city was produced by and co-produced generalized historical trends: 20th century urbanization, modernist science and technology, the transition from Keynesian to neoliberalized state environmentalism, and the growth of urban environmental justice movements. Yet the case histories highlighted some path dependent and conjunctural factors, such as particular events, human decisions, and unique socio-natural histories that do not lend themselves to generalizable causes or solutions. For example, race was an important factor in both cases. However, African Americans in New Orleans and Native Americans in and around Seattle have different relationships vis-à-vis local, state, and federal institutions and laws. The tribes of the Puget Sound were successful in making the battle over salmon management a fight about sovereignty rights (the environment became an important political right), whereas in New Orleans the Betsy Flood Victims were unsuccessful in making hurricane vulnerability a civil rights issue. The environment never became a rights issue in New Orleans like it did in Seattle.

These different histories and socio-natural relations mean that there are no sure-fire, ready-made solutions for all places and all times. I have been interested in how actors in different places experience and build solutions to crisis particular to their social and ecological context. Yet, we need not abandon the idea of collaboration and learning across difference. Thinking about the ways that people can

help each other to build more socially and ecologically just cities has been very much the spirit of this dissertation. Using the histories of New Orleans and Seattle, this dissertation has explored the obstacles to and possibilities for building new socio-natural relations, to make these spaces more just and more livable. I believe this is a peculiar 21st century problem. We have seen dramatic urbanization around the world in the 20th century, and now many places in the world have large urban settlements. In the 21st century the problems arising from the entangled urban ecologies are ours to tackle.

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