KTH Architecture and
the Built Environment

Collapse and the City

The Breakdown of New Orleans during Hurricane Katrina, 2005

Angelina Jakobsson

Degree Project SoM EX 2012-23

Master Program (Two years) Environmental Engineering and Sustainable Infrastructure

---

Stockholm 2012

KTH, Royal Institute of Technology

Department of Urban Planning and Environment

Division of Urban and Regional Studies

Abstract

The environment has become the center of attention in recent years. The world is at the brink of several interrelated 'green' crises: environmental degradation, climate change, peak oil, food crisis, and various natural disasters. Hence, there is a viable threat to society. This essay aims to explore the significance of the environment for societal collapse—with a Western world city focus. The method of choice is a literature-based critical instance case study. In this thesis, the environmentally focused collapse theories of Jared Diamond and Clive Ponting are tested on the empirical example of the city of New Orleans, USA. In 2005, New Orleans was wrecked by Hurricane Katrina. As a result, 80% of New Orleans was flooded, almost 1,800 people lost their lives, and the infrastructural systems suffered lengthy breakdowns. Consequently, the supply of basic services such as water, food, sewage, electricity, heating, communications, transportation and shelter was severely compromised.

The study shows that in the specific case of New Orleans, the underlying reasons for collapse cannot be explained by 'green' collapse theories alone. In fact, poor wetlands management was the only environmental issue of importance. Contributing causes were various managerial flaws (including lack of financing) on all levels in terms of emergency prevention, preparedness and response, as well as long-term structural implications for social justice. Thus, the environmentally related theories of Diamond and Ponting do not prove a perfect match. Instead, the collapse of New Orleans had better been explained by a 'root cause mix' theory, which takes political, economic, social *and* environmental aspects into consideration.

Keywords: societal collapse, city collapse, environment, natural disaster, crisis, catastrophe, flooding, Jared Diamond, Clive Ponting

Abstract in Swedish

Miljöfrågor har hamnat allt mer i fokus de senaste åren. Världen står på tröskeln till ett flertal miljörelaterade kriser: miljöförstöring, klimatförändring, peak oil (oljeproduktionstoppen), global matkris samt diverse naturkatastrofer. Detta medför sammantaget ett allvarligt hot mot samhället. Examensarbetet syftar till att belysa miljöns betydelse för samhällskollaps – med fokus på den västerländska staden. Den metod som tillämpas är en litteraturbaserad fallstudie. I uppsatsen testas Jared Diamonds och Clive Pontings miljöinriktade teorier om samhällskollaps på det empiriska exemplet New Orleans, USA. År 2005 ödelades New Orleans av orkanen Katrina. Så mycket som 80 % av staden drabbades av översvämning, 1 800 invånare omkom och hela infrastrukturen bröt samman. Katastrofen fick därmed allvarliga konsekvenser för grundläggande samhällsfunktioner som försörjningen av vatten, livsmedel, avlopp, elektricitet, värme, kommunikationer, transporter samt boende.

Studien visar att miljöorienterade teorier om samhällskollaps inte fullt ut kan förklara grundorsakerna till det sammanbrott som skedde i New Orleans. Den enda miljörelaterade orsaken av betydelse var inadekvat skötsel av våtmarkerna. Bidragande faktorer var istället bristande politisk styrning (inklusive otillräcklig finansiering) på alla nivåer vad gäller förebyggande, beredskap och hantering av kriser, samt långvariga strukturella hinder för social rättvisa. Slutsatsen blir därför att varken Diamonds eller Pontings miljöinriktade teorier träffar helt rätt. För större träffsäkerhet, borde New Orleans' sammanbrott förklaras med en teori som förutom miljöfaktorer även innefattar politiska, ekonomiska och sociala aspekter.

Nyckelord: samhällskollaps, stadskollaps, miljö, naturkatastrof, kris, sammanbrott, orkan, översvämning, Jared Diamond, Clive Ponting

Acknowledgement

I would hereby like to express my sincere gratitude towards my supervisor Lina Suleiman who has allowed for me to think big, spread my wings and reach my research goals. I would also like to thank the other teachers at KTH for their constant support, compassion and inspiration throughout the master's program in Environmental Engineering and Sustainable Infrastructure. Finally, I would like to thank my family for believing in me no matter what. I could not have done this without you.

List of Contents

1. INTRODUCTORY CHAPTER

1.1 Introduction

This thesis is dedicated to revealing the underlying causes of contemporary societal collapse—with a strong emphasis on the implications for Western world cities. At this time, the lion's share of the global population resides in urban areas. In case of societal or city collapse, there may or may not be an intricate interplay between various environmental, social, political and economic aspects. There is a multitude of potential reasons for collapse: conflict, political turmoil, mismanagement, financial matters, resource depletion, to mention but a few. Still, in this day and age, 'green' issues such as environmental degradation, climate change, natural disasters, food crisis, and peak oil have emerged as 'hot' topics. Taken to its extreme, each and every one of these features could wreak havoc to the society as we know. As a result, environmental and climatologic considerations have been catapulted to the top of the agenda in as diverse fields as planning, policy and politics. What's more, the environment and societal collapse are intimately linked throughout history, as argued by some. In light of these revelations, the infrastructure and built environment of the world unexpectedly seem to rest on increasingly risky ground.

One Western metropolis recently shattered by natural disaster is New Orleans in Louisiana, USA. In the wake of Hurricane Katrina in 2005, flooding took a heavy toll of this Gulf Coast city, once cheerfully known as 'the Big Easy' or 'the City that Care Forgot'. According to some, this proved the worst natural disaster ever on US soil. In fact, during the course of the catastrophe roughly 80% of this soup bowl-shaped city was swamped by contaminated water, sometimes popularly referred to as a 'toxic gumbo'. Others yet have compared the flooded New Orleans to a 'Cajun Atlantis'. In addition, the price tag of the disaster reached never-seen-before numbers. By using New Orleans as a case study, this thesis strives to expose the complex causes of contemporary societal and city collapse, in order to reveal the significance of environmental factors. What causes a modern time Western world city to fall when struck by natural disaster? Can it be explained with the help of societal collapse theories relating primarily to the environment? Or will such theories prove insufficient when tested against a real-life situation? These are the matters that will be explored.

1.2 Research problem and significance

In the maelstrom of research on Hurricane Katrina, as far as I know, no one has explored, tested, compared, analyzed, and discussed the relevance of the environmentally related societal collapse theories of Diamond (2005) and Ponting (1992). This is a gap in research, which my study intends to bridge. The environmentally focused theories of Diamond (2005) and Ponting (1992) could prove priceless in revealing the risk factors for collapse.

In the wake of Hurricane Katrina in 2005, New Orleans was wrecked by flooding in a most remarkable manner. The wash-out of this Bayou metropolis serves as a blatant reminder that not even Western world superpower preparedness and crisis management in disaster-prone areas are 'watertight'. Hence, by pinpointing the reasons for the ruin, valuable insights could be gained in order to prevent similar disastrous course of events in the future. A deeper understanding of what underlying factors may cause city collapse is urgently needed in policy and planning globally, in order to prevent and/or alleviate further catastrophes. Years to come, the whole world is thought to face climate change and subsequent changes in weather patterns. As mentioned by Brokking (2011), in a future scenario characterized by potential global warming, increased precipitation and/or temperature may spark a mounting number of natural disasters such as storms, flooding or drought, depending on region. This less-than-lucky development is likely all over the globe. Sweden is but one country expected to be the future target of an escalating amount of storms and floods, when climate change hits at the middle and end of the 21st century (Brokking, 2011). As argued by Kunstler (2005), the near future might prove a dark journey through a time period characterized by several conveying crises. These are for instance peak oil, global warming—natural or man-made, flooding brought on by storms or sea-level rise, wars, disease and agricultural crisis (Kunstler, 2005). In accordance with Kjörling (2011), these depressing future prospects are already in effect. Several on-going global crises—the climate crisis, the environmental crisis, the agricultural crisis, the food crisis, and the financial crisis—can be considered to be interrelated (Kjörling, 2011). This study traces a linkage from climatologic/environmental aspects and resource scarcity (most notably lack of fossil fuels) to security matters and resource wars. Thus, unlike conventional research where the fallen city is to be found primarily in the Third World as described by Short (2004), this study considers it a viable risk that city collapse will

increasingly take place in the Western world in times to come. Furthermore, cities are coming on strong throughout global society. As of now, due to rampant urbanization most people worldwide reside in cities (Fröberg, 2011). The argument here is that in case of emergency, more and more people, and vaster areas, will be wide open to impact. For these reasons, increased understanding of societal and city collapse in relation to natural disasters is imperative in global society of today. As stated by Brokking (2011), a resource-heavy society such as Sweden is thought to prevail in climate change—if only proper preparedness starts now. Hence, knowledge gained from the New Orleans scenario, with flooding and stormy weather, must be taken into account in contemporary policy and planning worldwide in order to avoid a 'repeat performance' elsewhere. This is vital lessons learnt.

Even as we speak, natural disasters are already taking a heavy toll. Flooding and wave/surges—and to a lesser degree storms—are among the deadliest as well as the most wide-ranging disasters globally in later years (United Nations, 2005). The repercussions of crises hang on for years; studies in public health science show a long-term decrease in life expectancy even in finance crisis survivors (Vågerö, 2011). In addition to human lives lost and people impacted, there are also economic losses due to natural disasters (United Nations, 2005). An early estimate set the price tag of Hurricane Katrina's wreckage of New Orleans to a staggering US$300 billion—equivalent to four years of US warfare in Iraq *and* Afghanistan (Associated Press, 2005). Consequently, there are vast economic values at stake globally.

All things considered, an enhanced understanding of the causes of societal and city collapse, and subsequently improved crisis preparedness, crisis management and post-disaster response, is pivotal. How else can we successfully safeguard human lives, cultural values and the built environment and infrastructure, in the midst of several severe crises? Collapse is no longer an issue for the developing world only; neither an obscure threat in a distant future in case oil wells truly dry up. On the contrary, it's imperative that the leaders of nations universally address the upcoming situation already. There is simply no time to waste. This justifies and demands an in-depth study on contemporary societal collapse, focusing on cities.

1.3 Aim of study

The aim of the study is to test the environmentally related societal collapse theories of Jared Diamond (2005) and Clive Ponting (1992) against empirical studies on the case of New Orleans, in order to determine their applicability. In doing so, this study will simultaneously serve to increase the scientific body of knowledge on societal collapse. In particular, the overall understanding of the complex web of underlying causes of societal collapse (stressing environmental factors) will be greater than before. The actual manifestation of collapse will be highlighted as well. More specifically, the insights into contemporary Western hemisphere urban breakdown as a result of natural disaster will be improved. Given the specific empirical context of this study—that is, the cave-in of New Orleans—societal collapse will be equaled to city collapse. Consequently, this essay provides enhanced knowledge of city collapse.

1.4 Objective

The specific objective of the study is to identify the actual root causes of the breakdown of New Orleans during Hurricane Katrina in 2005, and define the most significant factors. It will be displayed whether or not these causes are in fact related to the environment and in what way they may or may not relate to the two theories tested. Attention will also be paid towards the manner in which New Orleans broke down in the wake of Hurricane Katrina.

1.5 Research questions

These are the research questions that this thesis strives to answer:

- What were the main underlying causes of the wreckage of New Orleans in the wake of Hurricane Katrina (with emphasis on potential environmental factors)?
- To what extent do the collapse theories of Diamond (2005) and Ponting (1992) explain the damage done to New Orleans by Hurricane Katrina?
- How did the breakdown of New Orleans due to Hurricane Katrina primarily manifest itself (with a focal point on social, political, economic, environmental and infrastructural aspects)?

1.6 Method, sources and limitations

This master's thesis involves a qualitative desktop and literature type of study on societal and city collapse. There will not be any field investigation. I have never actually visited the 'Mardi Gras capital' of New Orleans, which is the chosen site for the case study. Hence, this is a clear case of so called "armchair geography" (Aitken, 2005:233-234), a brave new branch of science in the era of globalization and communication technology, where you needn't even leave your couch in order to conduct a geographical field study. Aitken (2005) explains that in reality, the geographical field where to conduct research actually stretches out to encompass spheres such as books and films. This approach opens up new and intriguing possibilities in terms of geographical methods and mindset (Aitken, 2005). This puts my study in the cutting-edge forefront. The focus of my study is on city collapse rather than New Orleans.

The thesis revolves around a critical instance case study, where city collapse theories are tested on the case of New Orleans in the wake of Hurricane Katrina. As stated by Davey (1991), Stake (1995) and Yin (1994), a case study as a method is concerned with profound investigation of a particular instance or incident. During the course of the study, you systematically examine the chain of events, gather and analyze information, and report the outcome. The result will give a detailed explanation why an event unfolded the way it did, illuminating the underlying factors (Davey, 1991). More specifically, a critical instance case study deals with one or a few sites. Here, one out of two objectives comes into effect: either the scrutiny of a unique situation with little potential for generalization, or the testing of a generalized assumption by exploring a single case. The latter is apt for highlighting cause and effect scenarios for the topical case (Davey, 1991).

The scope of the thesis is to test and compare two theories of societal collapse—that is, the findings by Jared Diamond (2005) and Clive Ponting (1992), which both relate societal collapse to environmental degradation—on various empirical studies of the impact on New Orleans by Hurricane Katrina, in order to expose what caused the subsequent societal breakdown. In doing so, an important step in science is establishing whether or not these environmentally related theories of collapse are at all applicable to this specific scenario. These two theories stand out against other prominent theories of societal collapse; most notably Tainter's (1990) which is concerned with economic reasons. By now, Diamond's

(2005) and Ponting's (1992) works on societal collapse come in several editions; I have deliberately chosen pre-Katrina versions in order for the outcome not to be (sub)consciously influenced by the actual event. Other notable collapse theories, primarily preoccupied with city collapse in a future peak oil scenario, are those of Newman (2007), Newman et al (2009), and Kunstler (2005). These theories and others will be accounted for in a contextual background section to societal and city collapse incorporated into the theoretical framework.

The primary purpose of this degree project in urban planning, is to explore the relevance of the environment for societal and city collapse. Thus, both theories tested relate societal collapse to environmental degradation, more or less. The study will be limited in such a way that other types of theories explicitly attempting to explain the downfall of New Orleans in the wake of Hurricane Katrina—for instance theories more directly related to institutions, social behaviour, environmental justice, marginalization, or sociologic human rights in line with Somers' (2008) *Genealogies of Citizenship*—will not be covered as theories to test in the theoretical framework, but may still be accounted for in the empirical section. Thereby, I by no means intend to imply that these types of theories have no relevance for explaining the impact of Hurricane Katrina on New Orleans. Yet, these types of theories could not primarily be referred to as theories on 'societal collapse', neither as environmentally related theories. In addition, there is already vast scientific coverage on these issues (social and racial marginalization, et cetera) in connection with New Orleans. Hence, in this here and now, I find it imperative to study the relevance of environmentally-focused societal collapse theories, as opposed to theories mainly related to sociology. The same goes for Tainter's (1990) collapse theory, which is related to economics rather than the environment. Still, in reality I find that various socio-economic and environmental factors generally tend to be interrelated. However, it is *not* within the scope of this thesis to question Diamond's (2005) and Ponting's (1992) respective theories in general, nor will this essay attempt to examine the relevance of Diamond's (2005) and Ponting's (1992) findings for *other* contexts than post-Katrina New Orleans. Neither will I venture into a debate as to whether or not Diamond's (2005) and Ponting's (1992) claims of societal collapse are actually accurate as far as their empirical examples of, say, Easter Island go.

The selection of the empirical literature—for depicting what actually happened when New Orleans fell—proves way more tricky to motivate, than nailing the theoretical ditto. There are

likely many sides to the truth. This is a bit of an Achilles heel. Whether or not the theories tested will fit the New Orleans context, may depend on the selection of the empirics. Consequently, the whole outcome of the study is a 'captive' of the empirical material. Hence, to solve this dilemma, this thesis is considering a selection of literature from various authors with differing backgrounds and likely conflicting points of view, in order to avoid any kind of bias. As far as the authors of the empirical studies are concerned, Widegren was a co-worker at the Washington, D.C. office of the Swedish Institute for Growth Policy Analysis, Van Heerden is a PhD in marine sciences and the former deputy director of the Louisiana State University Hurricane Center (fired due to his candor concerning the Katrina disaster, in accordance with Schleifstein [2009]), Bullard is a professor of sociology and Wright is a sociologist and New Orleans-residing Katrina survivor, Brown is a former FEMA (Federal Emergency Management Agency) director and undersecretary of the DHS (US Department of Homeland Security), Brinkley is a New Orleans professor of history, McQuaid and Schleifstein are Pulitzer prize winning journalists—at least one of them is local to New Orleans, Bergal et al are reporters based at the Washington, D.C. research institute The Center for Public Integrity, Parker et al are researchers based either at Uppsala University or the National Defence College in Sweden, Somers is a professor of sociology and history at the University of Michigan, and Klein is a Canadian author, journalist and film-maker. This may account for various perspectives on the issue (in particular: perceived breakdown causes). Given the highly politicized and infected nature of the debate surrounding Hurricane Katrina, the background of the authors is vital knowledge. Furthermore, due to the massive amount of literature on Hurricane Katrina available, one has to admit that for this time-limited study one has only been able to 'scratch the surface'. Hence, the aim is to stick to what appears to be general trends.

As the thesis title states, the empirical case study focus will be on the city of New Orleans, even though other Gulf Coast cities suffered an impact from Katrina as well. This is a limitation of geographical scale. Another limitation is on time scale; Hurricane Katrina is not the first tropical storm to wreak havoc to New Orleans. Yet, the study will focus on the breakdown caused by this particular cyclone.

Furthermore, the thesis will not cover the form of urban breakdown which is commonly referred to as 'urban decay'. That is, when large areas of formerly blooming industrial cities

such as Detroit, USA, or Glasgow and Manchester, UK, are drained of productive activity and/or population and get rundown. Neither will criminological issues be covered. Albeit an adjacent and sometimes overlapping theme, this study will not explore the concept of 'ghost towns', either. Although potentially void of life for a variety of reasons, I have come to regard the typical Western world ghost town as the empty shell of a former boomtown—often a smaller mining-camp—which was abandoned when the boom economy ceased. Such deserted camps hold little relevance for the study of the collapse of complex societies. However, some authors, for instance Burdeau (2011) and McQuaid & Schleifstein (2006), also refer to post-Katrina New Orleans as either reminiscent of, or an actual, ghost town. Neither will this thesis investigate Patrick Geddes' nor Lewis Mumford's findings on the city life cycle, where, according to Short (2007), the developmental stages of gigantic cities are believed to go from the vigor of Metropolis to the degenerative Megalopolis, the predatory Tyrannopolis, and finally Necropolis. As stated by Short (2007:2), the Necropolis is: "/--/ the city of war, famine, and abandonment." Yet, just as this study goes beyond the scope of giant cities; neither is it restricted to theories on the urban development cycle.

In this thesis on the specific case of New Orleans, this study finds it suitable to equal the concept 'city collapse' to 'societal collapse'. This is a fairly controversial approach, an 'exception to the rule' which may not automatically be appropriate in other scenarios. A number of objections could be anticipated in relation to this stunt; for instance, that the US society on the whole still prevails, even if the city of New Orleans faced wreckage. Conversely, in the Bayou region, other cities than New Orleans, such as for instance Biloxi and Gulfport, were wrecked as well—indicating an impact on local society rather than a single city. These potential protests all come down to the definition of *scale* of city or society. Furthermore, there's not necessarily a sharp delimitation between a city and its surroundings. All in all, I still deem that equalizing 'city collapse' to 'societal collapse' goes in the case of Hurricane Katrina hitting New Orleans. It's worth noticing, though, that so far 'city collapse' is a little used concept compared to 'societal collapse'; the former primarily being utilized by writers such as Newman (2007), Newman et al (2009) and Kunstler (2005) who are predicting the future in the face of peak oil. Moreover, there is Short (2004), deeply concerned with cities out of reach for the globalized economy—such 'black holes' of capitalism comprising the collapsed cities of Kinshasa, DRC and Khartoum, Sudan. For Diamond (2005), Ponting (1992) and Tainter (1990), 'societal collapse', or similar, is normally the phrasing of choice. I,

however, perceive the relevance of studying city collapse already in the present day, including the Western hemisphere. The following sentences will elaborate on this line of reasoning. The site for the case study, New Orleans, is built around a natural structure of a river delta. In accordance with Andersson (2011), cities based on natural features, as opposed to a functional grid system, are often highly appreciated for cultural values. Yet Brokking (2011) objects that such a seaside location, built in a time of maritime transportation, is less than desirable from a crisis and disasters-preparedness perspective. This is a feature that also characterizes Stockholm, the capital of Sweden. Cities would not be planned like this today (Brokking, 2011). In fact, alongside New Orleans; Istanbul, Turkey, and San Francisco, USA, are accidents waiting to happen (Paglia, 2011). Albeit not mentioned in his book on societal collapse; in a speech Diamond has addressed and stated the significance of his collapse theory for the post-Katrina situation of New Orleans (Roberta, 2011). This reinforces the linkage between 'city collapse' and 'societal collapse', as well as the relevance of these concepts for cities wrecked—or threatened—by natural disaster. Whether or not Diamond's assumption for New Orleans is right or wrong, I expect my study to tell.

With this essay, I also strive to widen and deepen the relevance of 'city collapse' from its hitherto scenarios of future Western world peak oil breakdown and present time Third World ruin, towards a usage applicable to modern-day Western cities as well. (Unlike the findings of Short [2004], I also recognize the concept's potential for *globalized* cities of the Third World, but this thesis is not a Third World case study). In fact, as the world turns ever more urbanized in a risky manner, the concept of 'city collapse' might eventually become more significant than 'societal collapse'. With high precision, the concept also pinpoints the area of breakdown. Yet, severe depopulation matters or other potential reasons for collapse of the rural areas cannot be ignored either, prospectively causing 'societal collapse' or what might even be referred to as 'countryside collapse'. This essay does not deal with the countryside, however.

As will be made clear in the following theoretical chapter; in his definition Diamond (2005) partially equals population loss to societal collapse. I do not fully support this definition, which I find overly generous, in regard to the issue of population loss. In short, I more or less perceive societal/city collapse as a durable large-scale breakdown of many basic/vital societal functions (which could be brought on by disaster, war or conflict, epidemic, political unrest,

poor governance, exodus, et cetera). All the same, I don't expect this rather 'loosely knit' definition to be suitable for every situation. Ponting (1992) never really makes a definition of societal collapse. According to Tainter (2008), societal collapse is rarely defined.

In this thesis, I frequently refer to the concept of climate change. This by no means implies that I have taken sides in the much-infected on-going debate of anthropogenic green house gas-driven climatic change 'to be or not to be', which drives a wedge through academia and society both. Only time will tell what's going on climatologically. In addition to the recent dispute, I consider it important to highlight that natural induced climate change has taken place on earth from the dawning of time, long before humans entered the scene.

1.7 Disposition

The disposition of the thesis is as follows:

Chapter 1: Following the title page, abstract and index page—an introductory chapter ensues. It covers the introduction, research problem and significance, aim, objectives, research questions, method (including sources and limitations), and disposition.

Chapter 2: Next is a theoretical framework, which deals with various theories on societal and city collapse. It also serves to establish the contextual backdrop of the subject. All in all, chapter two will provide an understanding of the previous research within the topical field. To begin with, subchapter 2.1 introduces a brief discussion of the importance and challenges of cities in a contemporary context, debating the recent trend of urbanization as well as the inherent nature of city resilience. Furthermore, subchapter 2.2 presents an overview of *societal collapse* theories. Here, Tainter's (1990) compilation of various other writers' societal collapse theories, as well as Tainter's (1990) own economy-related theory, comes in handy. Yet another subchapter, 2.3, highlights established *city collapse* theories. These are the futuristic peak oil scenario theories on city collapse of Newman (2007), Newman et al (2009), and Kunstler (2005), as well as Short's (2004) explanation of incomplete globalized capitalism as a reason for present time city collapse. Then comes one subchapter each, 2.4 and

2.5, for Diamond's (2005) and Ponting's (1992) theories on societal collapse respectively. These are the environmentally related collapse theories that are subject to testing in this study.

Chapter 3: Chapter three presents the empirical results from the critical instance case study investigation of New Orleans. It starts out with a brief history in subchapter 3.1, moves on to the local geography and built environment in 3.2, depicts the events and subsequent societal breakdown during Hurricane Katrina in 3.3, and describes the Katrina aftermath in 3.4. Finally, in 3.5 diverse explanations of various writers on the breakdown causes are introduced in relation to different themes: environmental degradation, climate change, flaws in disaster prevention/preparedness/management/financing/response, environmental and social justices including 'the genealogies of citizenship' and 'the shock doctrine', and 'deadly indifference'.

Chapter 4: Chapter four contains the analysis and discussion of the findings. Theory and empirics will be debated and linked together. Here all the little 'pieces of the puzzle' are expected to fall into place.

Chapter 5: The conclusion, agenda for further research and summary are found here, as a final point.

Chapter 6: The sixth and final chapter comprises the references.

2. THEORETICAL FRAMEWORK AND BACKGROUND

For theory, I will test, compare and analyze the environmentally-related studies on societal collapse by Jared Diamond in *Collapse: How Societies Choose to Fail or Succeed* and Clive Ponting in *A Green History of the World: The Environment and the Collapse of Great Civilizations*. These theories will be tried against empirical studies on the impact of Hurricane Katrina on New Orleans, in order to determine to what degree they fit this real-life situation. I have chosen these theories due to the present-day state of affairs where environmental and climatologic considerations are high on the agenda. As stated by Tainter (2008), today's intensive popular debates on sustainability and sustainable development have spurred academic collapse theories built around various environmental causes. Both Diamond (2005) and Ponting (1992) press on environmental reasons for societal collapse, before anything else.

In addition, this chapter starts out with an outline of the importance of cities for the contemporary world, and overviews of other authors' collapse theories (societal as well as city collapse). A basic knowledge of this contextual setting and existing research frontier is crucial for a full comprehension of the thesis subject.

2.1 Cities on the rise: a backdrop

Recently, life on earth has become increasingly urban. In fact, cities are rapidly becoming the new fabric of society. Thus, the rising importance of cities is a development that must not be ignored as far as crisis management, planning and preparedness go. This subchapter gives a brief outline of the current status and challenges of cities globally.

The present-time trend of booming urbanization emerged during the 20th century. By now, more people worldwide live in cities than in the countryside (Tannerfelt & Ljung, 2006). Cities currently grow by 2.3% per year globally, while rural areas lack behind at a mere 0.1% increase (Newman, 2007). There are still vast regional differences, though. As stated by the European Commission (2008), in Europe 80% of the population resides in cities already. The urbanization has taken place in the era of cheap oil, where most cities partake in a global

economy based on the continuation of low-cost fossil fuels (Newman, 2007). Urbanization thus has a most far-reaching impact throughout society (Tannerfeldt & Ljung, 2006).

A blessing as well as a curse—cities do cause the environmental challenges of today, but they also bring the tools to resolve them (The European Commission, 2008). Orrskog (2011) agrees that the city concentrates all global problems, but people still want to live there. According to Tannerfeldt & Ljung (2006), some of these 'challenges' involve spatial segregation, exclusion, discrimination and ignorance. When residing in rickety housing of the big city slum, there is a greater than average risk of falling victim to natural hazards, poverty, and crime. However, the problem is not urbanization in itself, but rather the poor management of the situation at hand. Good urban governance is the key (Tannerfeldt & Ljung, 2006). Even so, an inherent issue of urban areas is the fixed nature of infrastructure, as explained by Kirshen et al (2008). This obviously restricts the adaptation prospects (Kirshen et al, 2008).

Furthermore, there is no easy way of defining what actually constitutes a city, for instance in terms of scale (Ponting, 1992). As argued by Marcus (2011), the city should not be regarded as separate from the areas around it. The city is always dependant on the hinterlands, external subsidies and trade for sheer survival, as clarified by Neuman (2005). A 'sustainable city' is a contradiction in terms (Neuman, 2005). Cities, however, are resilient—during the last 500 years, only 22 cities have disappeared from the face of the earth (Marcus, 2011). Hence, big cities, bright lights remain *the place to be* (Polèse, 2010).

2.2 Societal collapse theories

The following subchapter will introduce an overview of differing societal collapse theories, at times in conflict with those of Diamond (2005) and Ponting (1992). These theories are attained from Joseph A. Tainter's (1990) work *The Collapse of Complex Societies*, where Tainter debates the findings of other scientists as well as presents his own view on this subject. Tainter has a PhD in anthropology and serves as a professor in the Department of Environment and Society at Utah State University in the USA (Tree Media Group, 2010). Tainter is also considered somewhat of a pioneer within the research field of societal collapse

(Williams, 2008). Within the research field of societal collapse, Tainter's and Diamond's theories have received the most attention in later years (Sjöberg, 2012).

Tainter (1990) has divided the findings on societal collapse of some scholars into three different theories depending on societal model: 'the Dinosaur', 'the Runaway Train' and 'the House of Cards'. 'The Dinosaur' stipulates that the society in question has become an out-dated, immobile giant, stuck in its old ways, and unable to adapt. 'The Runaway Train' presupposes a society stuck on its firm path while racing towards increased complexity—when obstacles arrive, it can't change tracks and a full-scale disaster is a fact. 'The House of Cards' implies that complex societies are inherently weak; hence they are doomed to collapse from the get-go (Tainter, 1990). Tainter (1990) himself, however, is not a firm believer of any of the above theories, which he finds relying on unproven guesstimates about societies.

In fact, within the existing body of literature on societal collapse, Tainter (1990:42, 89-90) has pinpointed as many as eleven recurrent root cause themes: resource depletion or cessation, the discovery of new plentiful resources (leading to a sharp shift in lifestyle), catastrophes, insufficient response to circumstances (this category harbours *the Dinosaur*, *the Runaway Train* and *the House of Cards* models), conflicts with other complex societies, intruders, class conflict/societal contradictions/elite mismanagement or misbehaviour, social dysfunction (due to deficiencies of the internal societal fabric), mystical explanations (regarding societal decadence and similar), chance, and economic reasons. Yet, Tainter's (1990) own take on societal collapse mainly has to do with economic factors. Tainter (1990:90) claims that into such an economic framework for a general explanation of collapse, the best characteristics of most of the above mentioned eleven themes (save the mystical, which is unscientific) could be incorporated.

Tainter (1990:194) explains that societies are inherently problem-solving—complexity is a strategy to solve problems. In order to maintain the sociopolitical systems, energy input is necessary. Tainter (1990) claims that the best bet for a society to raise its marginal productivity and thereby safeguard continued socio-economic growth, involves the discovery of a new energy subsidy. In the present time, this means utilizing fossil fuel sources or the atom, while in historical times, territorial expansion came in handy. Thus, the marginal productivity will rise for the societal traits of complexity that are related to the development

of the subsidy. Yet, such a 'breathing space' from declining marginal productivity is only momentary. As the societal complexity sky-rockets, so do the costs per capita. At some point, the marginal return will begin to decline again. Hence, the very investment in sociopolitical complexity in order to solve societal problems actually causes *fewer* yields. Now, Tainter (1990) argues, only three options remain for the society in question: further innovation, further expansion—or collapse. Eventually, an expanding complex society will reach a point of no return, where additional extension is no longer possible. The ever-increasing marginal cost will simply be too high for the defense of the growing territory, pacifying internal upheavals, traveling from the capital to the frontier, dealing with competitors, and the set-up of a sizable administration, various benefits and a specialized employment apparatus for the rising number of population. Hence, as stated by Tainter (1990), when complex societies finally do fall, huge geographical areas are severely impacted. Tainter (1990:4) defines societal collapse in the following manner: "*A society has collapsed when it displays a rapid, significant loss of an established level of sociopolitical complexity*." Still, the effects of collapse may often spill over into economics, art and literature (Tainter, 1990:4).

As argued by Tainter (1990), it's important to keep in mind that industrial societies are just as vulnerable to collapse as are previous societies. Tainter (1990) finds it hard to tell if the overall marginal return for the world of today has already began to decline, even though findings related to fossil fuels point towards this turn of events. Yet, single nations in our day can no longer collapse on their own, since both the population and territory will be absorbed by another nation in case of governmental disintegration. Another option to evade collapse is economic support from another state or international agency. As a result of globalization, if collapse strikes again, human civilization will crumble worldwide (Tainter, 1990:213-216).

2.3 City collapse theories

This subchapter presents a selection of conventional city collapse theories, which now and then are somewhat different from mainstream theories on societal collapse. Kunstler (2005), Newman (2007), and Newman et al (2009) link a future lack of oil to potential full-scale disaster for Western world cities. By now, the forthcoming of a future peak oil scenario is more or less established within academia. Short (2004); however, maintains more or less

implicitly that the collapsed city is located in the non-globalized Third World. This essay strives to broaden the usage of the concept 'city collapse' on a temporal and spatial scale.

Kunstler (2005) maintains that the world is already at the threshold of the "Long Emergency of Conveying Crisis", as described by Haas (2011). This phrase refers to the disastrous societal events that are expected to take place when fossil fuel runs out, with no proper energy successor in the picture, as stated by Kunstler (2005). Peak oil alone is enough to put an end to civilizations. The world will be propelled into a dark passage of population loss, decreased life expectancy and reduced living standard, losses in technology and knowledge, as well as declining decent behaviour. Global warming—natural or man-made, natural disasters such as flooding, storms and sea-level rise, speeding environmental degradation, emerging infectious diseases, refugees en masse, crumbling financial globalism, resource wars, starvation, a populace traumatized to the verge of suicide, and a crisis of industrial oil-based agriculture, will ensue. Kunstler (2005) maintains that the end of fossil fuel will strike the world full on by mid century, yet disruptions will happen before that. During the long emergency, life will become local. In the USA, suburban sprawl has no future—these suburbs are the slums of the tomorrow. Big cities are in big trouble, some of them may not remain habitable without oil, while skyscrapers will prove truly experimental. Human existence, however, will prevail past cheap oil. Throughout history there are cycles of expansion and detraction, we are presently at the end of one such cycle (Kunstler, 2005). Hence, this essay considers Kunstler's (2005) study to be a future forecast of peak oil-induced societal as well as city collapse.

Unlike Kunstler (2005), Newman et al (2009) actually use the term 'collapse' in relation to cities. According to Newman et al (2009), in the wake of climate change and peak oil in the future, cities might become either: collapsed, ruralized, divided or resilient. The collapsed city, stuck in denial, fails to adapt to change. When civil society, the legal system, governmental services such as food, water, waste and health care services shut down one by one; dispersion and death ensue. Lack of oil—and natural disasters—could spur such panic, social collapse and (sub)urban decline. In fact, history is already full of fallen cities. Yet, unlike the doomsday outcries of some 'peakers', full-scale collapse of civilization due to peak oil is not realistic; there are ways to govern with resilience (Newman et al, 2009). Still, there seems to be no dichotomy between the past, the present and the future as far as climate

change related city collapse is concerned—Newman et al (2009) also maintain that New Orleans underwent a collapse due to an extreme climate event as early as in 2005.

Newman (2007) also deals with the prospect of city collapse in the face of peak oil. Newman (2007) explains that while collapse may well follow in cities unable to adapt to life after oil, many cities already get by virtually without fuel (Indian or Chinese cities) or on very low amounts (Tokyo, Japan; and Barcelona, Spain). Hence, Newman (2007) maintains that in most cases, apocalyptic collapse in line with the work of Jared Diamond (2005) should simply not be an issue.

Short's (2004) take on the collapsed city mainly involves the present day developing nations. Short (2004) argues that uneven globalization may give rise to collapsed cities, particularly in the Third World. There are four types of such large non-global(ized) cities: the collapsed city (for instance Kinshasa, DRC; Khartoum, Sudan), the poor city (Khartoum, Sudan; Dhaka, Bangladesh; Kinshasa, DRC), the excluded city (Baghdad, Iraq; Pyongyang, North Korea), and the resisting city (Tehran, Iran; Pyongyang, North Korea). These cities were either ignored, abandoned, or excluded by global capital, or sites of resistance towards capitalism. Risk aversion by capital investors is the fifth reason behind non-global city status. Still, the various types are interrelated and most cities share some traits of all elements. Hence, these cities make 'black holes' in global economic connections. Khartoum and Kinshasa recently witnessed social anarchy due to a decline in law and order. In fact, dislocated from global capitalism they experience a complete internal collapse. So far, First World cities are more noted for connectivity, while Third World cities are more noted for isolation (Short, 2004).

2.4 Jared Diamond on societal collapse: *Collapse—How Societies Choose to Fail or Succeed*

Jared Diamond (2005), professor of geography at the University of California in Los Angeles, USA, wrote the book on *Collapse—How Societies Choose to Fail or Succeed*. Diamond (2005) currently claims that environmental damage alone is yet to cause the collapse of any society, since contributing factors are always in the picture. Indeed, Diamond admits that he's made a u-turn as far as this standpoint is concerned, having initially naively believed that all it

took was environmental degradation. Instead, a "/--/ five-point framework /--/" of interrelated factors is relevant for any supposed environmental collapse (Diamond, 2005:11). These are: environmental damage, climate change, hostile neighbours, friendly trade partners, and the society's responses to environmental problems. Diamond (2005) emphasizes that the former four factors may or may not be at play in a certain society, while the latter reason is always relevant. I will cover the workings of this five step framework in detail below.

The first and foremost factor of the framework is environmental degradation. In past collapses, Diamond (2005) asserts that ecocide (ecological suicide) has proven pivotal. Such precedent resource depletion, where societies unintentionally undercut themselves, has come in eight categories: deforestation and habitat destruction (besides forests, these land-use changes also concern natural habitats such as for instance wetlands, coral reefs, and the ocean bottom), soil problems (erosion, salinization, losses in soil fertility), water management problems, overhunting, overfishing, introduced species affecting native species, human population growth, and increased per-capita impact of people. In accordance with Diamond (2005), societal collapse thus tended to follow a certain cycle, where population boom brings about intensive farming practices such as irrigation and terracing. As agriculture expands, environmental damage sets in. This leads to diminishing farming areas. Hence, the unsustainable practices of society cause food shortages, famine, resource wars and revolution/coup d'état. At that point, wars, hunger and disease inflict heavy losses on the population, while the cultural, political and economic complexity of society takes a nose dive as well. In addition to the aforementioned eight older categories of ecocide, contemporary environmental hazards also encompass the four following aspects: man-induced climate change, increase of toxic chemicals in the environment, energy shortages and full human utilization of the earth's photosynthetic capacity. Thus, as stated by Diamond (2005), all twelve aspects of ecocide are tied either to destruction or decline in natural resources (such as habitats, wild foods, biological diversity and soil), ceilings on natural resources (energy, fresh water and photosynthetic capacity), hazardous side-effects of production (toxic chemicals, introduction of alien species, and atmospheric gases), and the human population boom. Simultaneously, all these twelve characteristics are also interrelated in terms of problem-causing. Nowadays, for better or worse, societies can no longer collapse unnoticed. Due to globalization, for the first time in history there is a risk of a 'chain reaction' leading to global

impact. The population boom and the advanced technology of the present day, increase the pressure on the natural resources of the world (Diamond, 2005).

As a matter of fact, Diamond (2005) goes as far as pinpointing deforestation, alongside soil erosion, as the single major factor for societal collapse in every single one of the long-ago breakdowns covered by his book. However, Diamond (2005) also stresses that the notion that all societal collapse should take place due to environmental reasons—is preposterous. In fact, one modern time contraindication is the collapse of the Soviet Union, which had nothing to do with the environment. Military or economic factors may be enough. However, other examples of modern-time societal collapse commonly referred to as 'state failures' involve Somalia, the Solomon Islands, Haiti and Rwanda. In these nations and others, environmental stress and population pressure, resulting in desperate, starving masses, have manifested in political unrest, civil war, the overthrow of governments and possibly even terrorism and genocide. Still today, many people view ecocide as the foremost threat to civilization before risks of nuclear war or infectious disease (Diamond, 2005). Diamond (2005) also maintains that contrary to the 'big corps' opinion of today, economic gains and advanced technology will *not* be enough to safeguard the environment from degradation due to over-usage.

The second factor of Diamond's (2005) five-point framework is climate change, where climate becomes "/--/ hotter or colder, wetter or drier, or more or less variable between months or between years /--/" (Diamond, 2005:12). It can be set off by humans or nature itself. Due to the short human lifespan in many ancient societies, climatic cycles of a few wet decades followed by a dry half-century could come as a shock. When the good times came to an end, the society already had larger a population than could be sustained. When no longer favourable the climate, a resource depleting society might collapse. It's the co-existence of climate change and environmental degradation that proves the nail in the coffin. However, some societies have thrived on climate change, depending on the conditions (Diamond, 2005).

The third factor is hostile neighbours. Most societies lie adjacent to one another, sometimes the relations are frosty. In case of any display of weakness, hostile takeover could be spurred. Hence, the actual cause of the downfall of society is not the military conquest itself, but the reason that initially thrust the society into the weakened state. This cause could be—environmental degradation (Diamond, 2005).

The fourth factor concerns the importance of friendly trade partners. Diamond (2005) explains that the partner in trade commonly shifts back and forth between goodwill and antagonism—this will impact the accessibility to imported goods as well as the cultural cohesion. In case a weakened trade partner can no longer supply what the importing society needs, the latter society runs the risk of becoming destabilized as well. The reason for such weakness in the trade partner—may be environmental degradation (Diamond, 2005).

The fifth factor, which is always significant in societies where collapse ensues, is the level of societal response to the issues at hand. These pressing matters may be environmentally related or not. Yet, in case of problems stemming from deforestation, proper management of the forest is required to avoid collapse. Whether or not proper management is applied, depends on the nature of the societal institutions in the political, economic, and social spheres as well as cultural values. These institutions and values determine the degree of problem-solving—if any—in the society in question (Diamond, 2005).

Diamond's (2005:3) definition of collapse is as follows: "/--/ a drastic decrease in human population size and/or political/economic/social complexity, over a considerable area, for an extended time." Diamond is careful to explain that it's a subjective decision whether or not a mere decline of society is actually grave enough to count as a collapse. Though less severe declines, such as for instance the overthrow of one reigning elite by another or the conquest of a society by an adjacent region without impact on population size or complexity throughout the entire area, could not be considered a collapse. In case of societal collapse, the worst case scenario is that of complete collapse where the entire population exiles or perishes. However, collapse may take place to varying degrees or not at all. Yet when in effect, societal collapse often strikes *rapidly* shortly after the 'peak' in supremacy and population, taking everyone by surprise. Past societies that have collapsed include the Maya cities in Central America, the Roman Empire in Europe, and Easter Island in the Pacific (Diamond, 2005).

2.5 Clive Ponting on societal collapse: *A Green History of the World—the Environment and the Collapse of Great Civilizations*

Ponting (1992), introduced in his book as a historian and honorary research fellow in residence at the University College of Swansea in the UK, argues that societal collapse occurs when the resources of the earth are exploited to the point where they can no longer sustain the population. This is the 'red thread' running through his entire piece of work. There is no actual definition of societal collapse. In order to exemplify his theory, Ponting (1992) swiftly sets the pace by presenting somewhat of a theoretical model based on the events that unfolded on the remote Easter Island in the Pacific. Following the arrival of some 20-30 Polynesians at the Easter Island in the fifth century, a clan-based society headed by chiefs slowly emerged. This organizational setup spurred competition over what little resources existed. There were no domestic mammals on the island, a very few fish, a few species of plants—and the chickens and rats that the colonizers brought with them. In the severe climate, low-labour sweet potato was the only crop cultivated. The abundant amount of leisure time made room for recurrent competitive ceremonial clan activities such as monument construction. The challenge proved to be transportation: the gigantic statues were dragged across the island by humans using trees as rollers. This would ultimately lead to societal downfall. The deforestation—going from dense vegetation to only a few specimens left—caused severe environmental degradation. Timber was also used for fuel, building material in housing, and transportation (canoes). After 1600, this lack of trees put an effective end to all complex social and cultural activities on Easter Island. By necessity, people resorted to living in caves or reed huts, and using reed boats. Without its forest cover, the soil was eroded and drained of nutrients. Chickens became the only food source unaffected, but the human population still fell due to the diminishing resource base. The population was literally trapped on the island—no trees meant no canoes and thus no exodus. When people couldn't be supported; decline stroke. The ruin of the religious practices and the shattered social cohesion smashed the entire societal structure to pieces. By then, there were constant resource wars, slavery, and cannibalism. Hence, as stated by Ponting (1992:7), environmental destruction led to rapid societal collapse and "/--/ a state of near barbarism." At its peak around 1550, the Easter Island had approximately 7,000 inhabitants. In 1722, only 3,000 remained. This example should serve as a warning to the world of today, according to Ponting (1992). The Easter

Island disaster proves no less than a self-inflicted environmental collapse. The number of trees available on the small island must have been fairly obvious; still the populace failed to balance the usage of the resource. Ponting (1992) explains that just as the Easter Islanders in their time, humans in our day are trapped on earth with a limited access to resources for meeting the various demands of society. The simple solution is not to extract more resources than the ecosystems can endure (Ponting, 1992).

Ponting (1992) maintains that a pivotal turning point in global history is the gradual shift in livelihoods that occurred some 10,000 years ago. This change involved a departure from the previous two-million-year-old lifestyle of ecologically stable hunting and gathering supported by natural ecosystems towards an intensive and productive food agriculture, which created a steady population increase. In fact, the global population was no larger than four million by 10,000 BC; by the late 1980s it was already five billion! In the wake of this initial agricultural transition, hierarchical settlements, cities and powerful elites emerged over a time period of 4-5,000 years. This was also the first example of humans as destroyers of their immediate environment. The earliest societies to collapse, due to self-created environmental degradation, swiftly followed. The second crucial transition, where considerably more of the natural resources of the world were spent on sustaining a growing number of people, is the now bicentennial adoption of fossil fuels for energy and the subsequent industrialization. Thus, the trick question for human societies past and present, according to Ponting (1992), is the delicate balance act of how to obtain the ecosystem services (food, clothing, shelter, energy) needed for the society to prevail, without causing irreversible damage to the natural ecosystems. We humans literally run the risk of eroding our own foundation (Ponting, 1992).

In the present day, Ponting (1992) points out that societies are exceedingly vulnerable to environmental problems. The risk factors include the European type of lifestyle that's spread like wildfire across the globe ever since the 16th century in "/--/ a wave of destruction /--/" from an ecological standpoint (Ponting, 1992:397), the global population boom, the expansion of farm lands into sensitive natural habitats as well as the harsh demands of industrialization in terms of natural resources and energy. All in all, these aspects speed up the scale and complexity of environmental damage. Human societies are wrongfully viewed as separate from the natural ecosystems. Never seen before issues such as the interrelated crises of deforestation, soil erosion, desertification, salinization, loss of biodiversity, pollution, as well

as unequal distribution of food, wealth and basic needs, make an entrance. In order to survive, the right set of keys in political, economic and social response from society, is required to meet the threat of environmental ruin. Otherwise, societal collapse will likely ensue, as it has in the past. At times, environmental degradation has gone on for thousands of years without causing societal collapse, due to the resilience of societies. In other cases, the decline and collapse set in gradually over a thousand years (as for instance in Mesopotamia). Yet on Easter Island collapse hit quickly. Unfortunately, the current worldwide organizational setup of highly unequal sovereign states drastically reduces the possibilities of addressing cross-border situations (Ponting, 1992). Notably, in total contradiction to the findings of Diamond (2005), Ponting (1992:407) argues that in modern time "/--/ a breakdown has not so far occurred /--/".

Ponting (1992) clearly states that political, military, diplomatic and cultural history is not covered by his book, while the 'green' perspective is emphasized throughout his study. Yet, it's implied that the environmental degradation described is brought on by unsustainable or downright poor human managerial decisions and practices. Humans depend on their environment; if they allow it to be damaged; there will be consequences (Ponting, 1992).

3. EMPIRICAL CHAPTER—THE CASE OF NEW ORLEANS

The following chapter contains the case study of New Orleans, USA. It begins with a brief historical background, moves on to urban planning in a difficult environment, depicts the disastrous ravages of Hurricane Katrina in 2005, and describes the post-Katrina situation. Finally, it covers various general trends in explaining the reasons for disaster.

Figure 1. The location of New Orleans (thecajuns.com, no date).

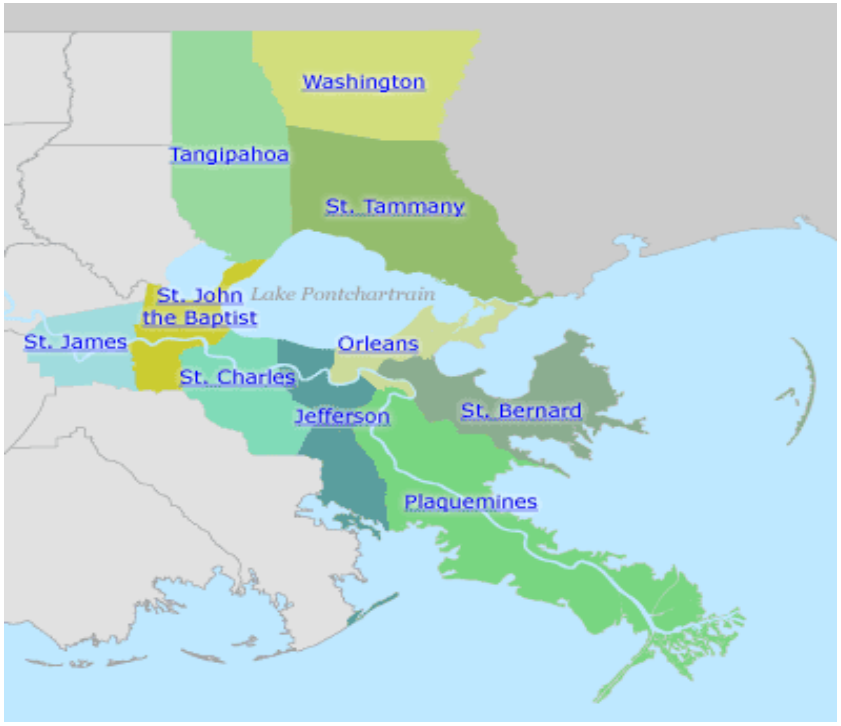

Figure 2. Parishes of the greater New Orleans area (thecajuns.com, no date).

Figure 3. The city of New Orleans and surroundings (thecajuns.com, no date).

3.1 The dawning of New Orleans: a trouble-spot from day one

Prior to the shocking events of Hurricane Katrina, New Orleans was best known to the world for its food, music and Mardi Gras festival, in accordance with Smith (2011). The city had many nicknames such as *The Big Easy*, *The Crescent City* or even *The City That Care Forgot*, some alluding directly to the image-building strategy of a 'carefree nature'. The colonial French Quarter proved a true trademark of tourism. Yet, contrary to common opinion, Smith (2011) maintains that New Orleans has been ill-fated from the very beginning. In fact, recurrent traumas are something of a hallmark for this city, celebrated for its exotism. There have been constant swift changes back and forth, as far as failure and success are concerned. Founded in 1718, it is no stranger to: "/--/ flood, fire, plague, famine and war" (Smith, 2011). Traded between colonial France and Spain due to its strategic riverside location, New Orleans was acquired by the USA in 1803. The city soon became famous and flourishing in the 19th century as a consequence of cotton commerce and slave labour. Yet, the specific location at the river mouth proved a blessing and a curse; as fabulous as it was for trade, as dangerous was the site in terms of yellow fever, floods, scorching summer heat—and the occasional hurricane (Smith, 2011). Since the year of 1559, no less than 177 hurricanes have slammed into coastal Louisiana (Rogers, 2008:602). Hurricanes ripped the city apart already in 1722 and 1814, while fire took its toll in 1788 and 1794, as maintained by Smith (2011). In the mid

19th century, New Orleans had the highest mortality rate in the USA owing to yellow fever in particular, according to Smith (2011). All in all, more than 100,000 inhabitants in the low-lying areas of New Orleans are estimated to have succumbed to the disease during the course of the 19th century (Rogers, 2008:602). The incidence of infectious disease earned New Orleans the less-than-flattering nickname of *The Wet Grave* (Smith, 2011). The majority of the victims were poor immigrants who lived in tight, unsound quarters without means to leave town during the onset of disease. In a chilling nod to present days, Smith (2011) claims that the ruling class frequently blamed the poor for the disastrous epidemics, instead of showing sympathy. Closing the city ports to contain the disease would slow down business—it was simply too expensive. Yet, the 1862 capitulation—and consequent loss of business—during the US Civil War proved the final death knell to the glory days. New Orleans would never regain its supreme position in terms of domestic prosperity, as water course transportation lost ground to the railroad network. In accordance with Smith (2011), inequalities are deep-rooted in New Orleans. In the years after the Civil War, the blacks of New Orleans were systematically marginalized and oppressed, as was common in the South, as stated by Smith (2011). By the 21st century, New Orleans had the highest per-capita murder rate in the entire USA (Smith, 2011). Smith (2011) maintains that in New Orleans, the past and the present have been perceived as interlinked. The constant balance act between life and death even has its charms according to some, as explained by Smith (2011). In New Orleans, it was long ago noticed that you simply had no choice but to carry out your daily life in the face of danger (Smith, 2011).

3.2 City planning in a bowl below sea level: a set-up for disaster

Long before Hurricane Katrina ever formed on the horizon, New Orleans was basically raised on quagmire grounds. As explained by McQuaid & Schleifstein (2006), in the late 19th century the built environment of New Orleans was concentrated to the higher ground along the winding Mississippi River bank. The area between the then city and Lake Pontchartrain in the north, consisted of a cypress swamp traversed by smaller ridges. As time went by, the modern day New Orleans was gradually built upon the swamp. Most of these newer neighbourhoods between the river and Lake Pontchartrain were situated below sea level. As a consequence, they all suffered high flood in the wake of Hurricane Katrina in 2005 (McQuaid

& Schleifstein, 2006). The older quarters along the Mississippi River bank of New Orleans, were the only ones still standing when Hurricane Katrina hit (McQuaid & Schleifstein, 2006). New Orleans has not endured flooding from the Mississippi River since 1895—instead, most floodwaters have been generated from Lake Pontchartrain when impacted by hurricane surge (Rogers, 2008). In the case of Katrina, the more than one billion dollars worth and hundreds of miles long system of earthen levees, levee walls and drainage canals that had been created to shield New Orleans from storm surge flooding, proved insufficient when needed the most (McQuaid & Schleifstein, 2006).

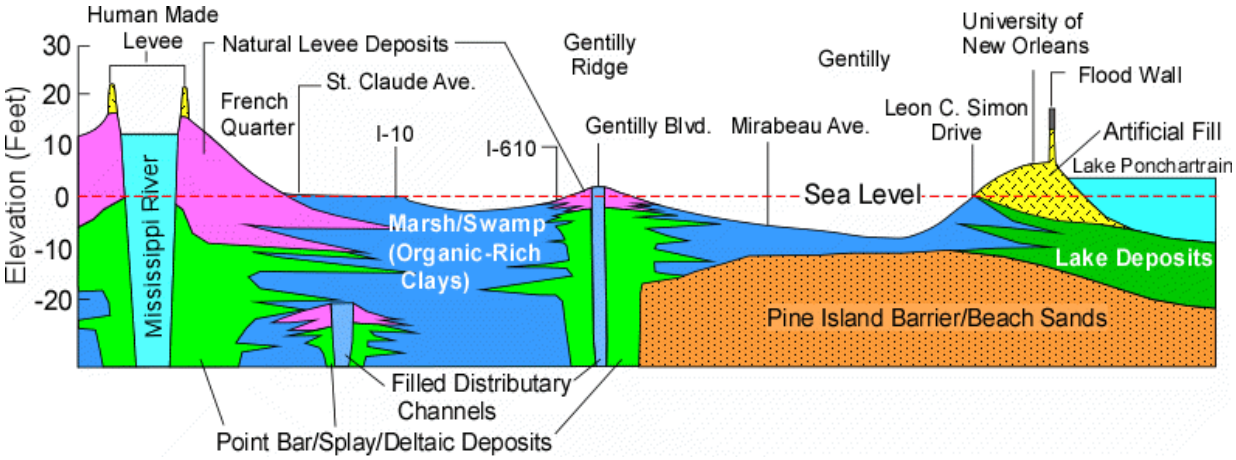

Figure 4. Elevation and soil type cross section of the city of New Orleans (Brown, 2009).

As explained by McQuaid & Schleifstein (2006), not only was New Orleans slowly but steadily sinking into the marshy grounds of the Mississippi delta; the city also formed a shallow soup bowl surrounded by the hurricane levees. If a flooding disaster struck during a storm, anyone still in the area would be trapped inside the bowl as the water rose. There would literally be no way out as the streets turned into waterways. Thanks to the levees, neither would there be a natural way out for the floodwater. Situated on such a risky location, New Orleans virtually risked extinction during six months every hurricane season (McQuaid & Schleifstein, 2006:xi). As argued by McQuaid & Schleifstein (2006), the once attractive location next to the water routes, now proved a pathway to doom. In case of emergency, there was no rescue strategy from the authorities, local or national (McQuaid & Schleifstein, 2006:xii). As stated by McQuaid & Schleifstein (2006:xii): "If New Orleans got hit, the plan was simply to let it be destroyed, then clean up the mess." It seemed as if the entire city and nation relied on opportunism: the Big One was always going to avoid the Big Easy (McQuaid

& Schleifstein, 2006:xii). In addition, the advanced hurricane protection system provided a false sense of security to the residents of New Orleans (Walsh, 2009).

What's more, pre-Katrina New Orleans was also characterized by a socio-economic spatial divide. Widegren (2007:11) maintains that the low-lying areas of the bowl, which were to be swamped during Hurricane Katrina, were mainly populated by African Americans (76%). Considerably fewer African Americans (43%), but more well-to do residents, inhabited the higher grounds that were spared during the disaster. Furthermore, the lower areas of New Orleans were frequently inhabited by people living in poverty, often in rundown and cheaply constructed public housing (Widegren, 2007). In fact, out of the next to half a million inhabitants of the city center, a whopping 28% were classified as poor according to federal US standards (Pehrson, 2005). A large share of this segment of society consisted of single mothers (Widegren, 2007). As many as 54% of the population in New Orleans resided in rental housing, as opposed to merely 34% in the entire nation (Luft & Griffin, 2008:50). In addition, 95% of the public housing residents were African American (Blakely & Hartman, 2012). Pehrson (2005) explains that over the years, the entire New Orleans had experienced a 'white-flight' to the suburbs. The sky-high murder rate, poverty issues and poor schools had the tax-paying middle class running scared (Parker et al, 2009). As stated by Frailing & Harper (2010), the desegregation of the school system in the 1960s in combination with the oil recession in the early 1980s—which led to a loss of 13,000 oil industry jobs in New Orleans—also contributed to this development. As high-paid employment opportunities in the manufacturing and oil industries were lost and only low-wage service jobs in the food and hotel businesses remained, whites fled the scene while blacks remained. From 1980 to 2000, the population of Orleans parish decreased by 80,000 inhabitants; those too poor to leave, often had to face issues related to unemployment, drugs and violence. In the year of 1960, there were 392,594 whites and 234,931 blacks residing in New Orleans; while in 2000, there were 136,241 whites and 325,216 blacks (Frailing & Harper, 2010). The population of New Orleans had decreased, but simultaneously the percentage of black inhabitants had increased and arrived at 67% (Pehrson, 2005). In the entire state of Louisiana, blacks make up 32.5% of the population (Bullard & Wright, 2009:5). According to the US Census Bureau, New Orleans had an estimated population of 454,863 on the 1st of July 2005 (Willinger & Gerson, 2008:25). At the same time, the greater New Orleans area, consisting of Orleans parish and six adjacent parishes, had an estimated population of 1,316,510 (Luft & Griffin, 2008:51).

3.3 The outcome of Hurricane Katrina: a "toxic gumbo"

Hurricane Katrina made landfall on New Orleans on August 29th 2005. According to Widegren (2007), this was the worst disaster on US grounds ever in terms of material damage. The flooding was the main source of destruction. Due to the storm surge, Widegren (2007) explains that 80% of New Orleans was flooded by as much as 6 meters of water. The submerged areas of the city normally harboured 583,000 people. Approximately 215,000 homes were wrecked in New Orleans during the course of disaster. Yet in total, some 1.1 million New Orleanians, 85% of the entire population in the greater New Orleans metropolitan area, were impacted by Katrina in one way or the other. All in all, the entire Gulf region under water was as large as half the area of Sweden, 230,000 km². Eventually, roughly 785,000 people were evacuated from the New Orleans area, while 1,723 people perished in the disaster and 135 went missing (Widegren, 2007:22). The majority of the approximately 1,856 deaths in New Orleans occurred as a result of drowning, exposure to the elements, dehydration, or snake and alligator-infested floodwaters (Somers, 2008:64). Katrina is the tropical cyclone that has caused the worst material devastation ever (Widegren, 2007:13).

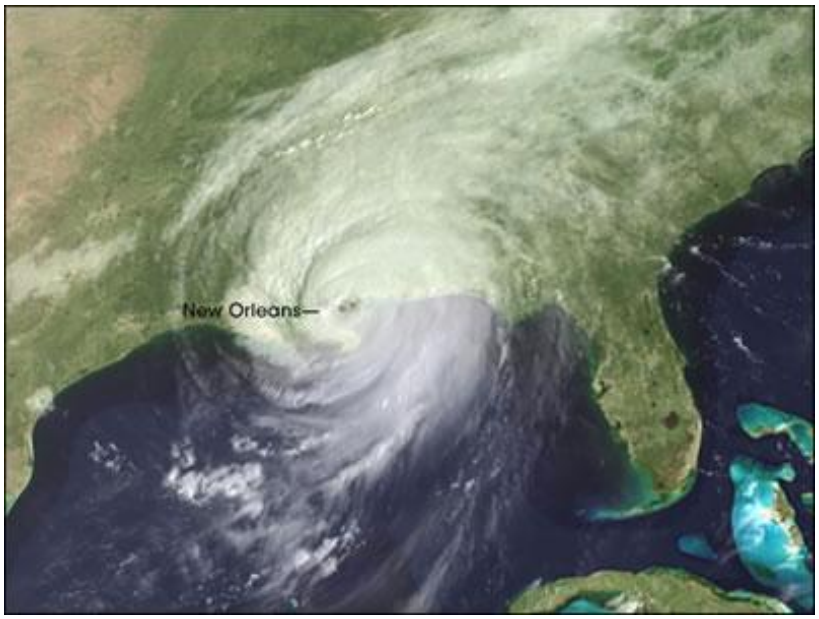

Figure 5. Satellite image of Hurricane Katrina slamming into New Orleans (Jeremiahtren, 2010).

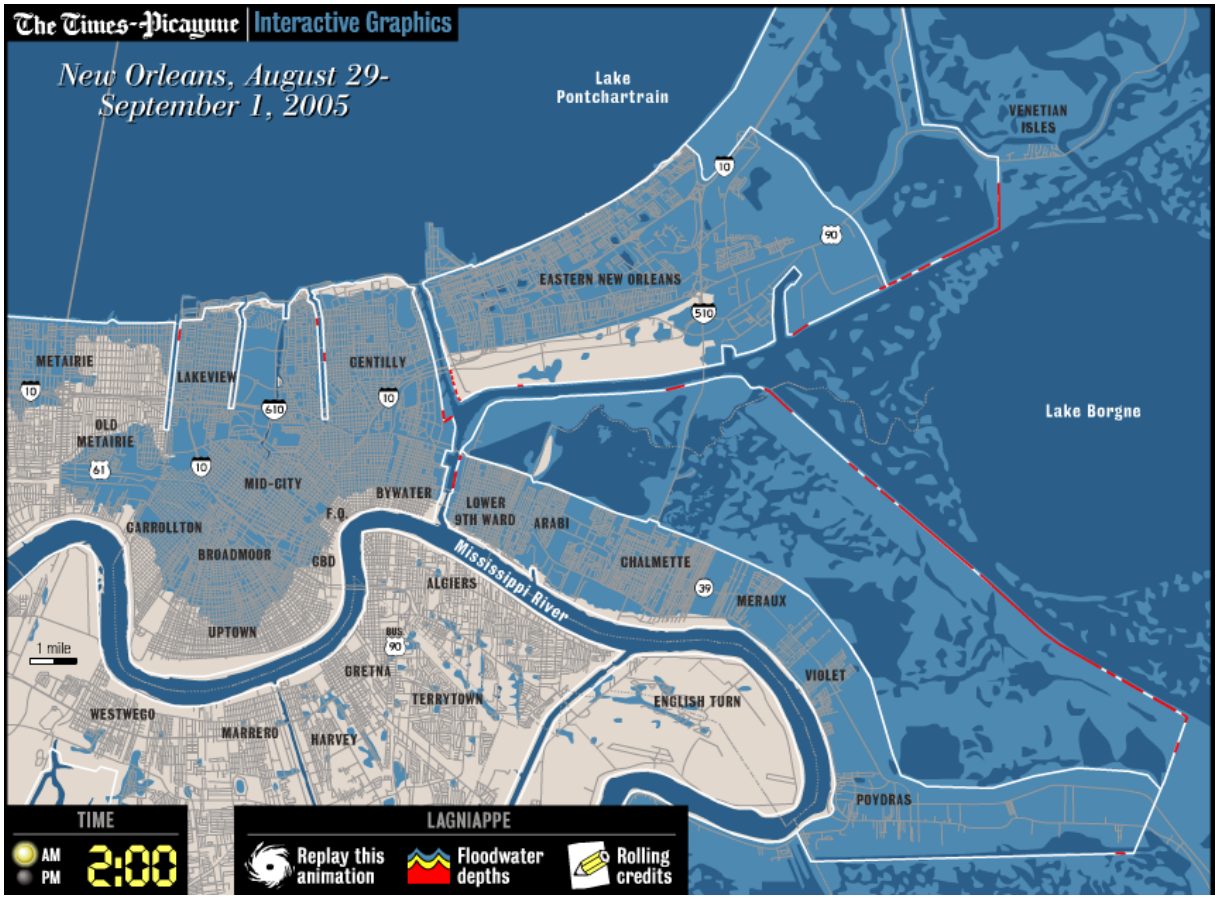

Figure 6. Hurricane Katrina's flooding of New Orleans—flooded land in light blue, prior water courses in dark blue, and levee breaches in red (Swenson, no date).

As retold by Widegren (2007), the course of events during the disaster is as follows: Hurricane Katrina first materialized over the Mexican Gulf on August 24th 2005. A hurricane of lesser force at first, Katrina was classified as a mere category 1 on the Saffir-Simpson scale when impacting southern Florida on August 25th 2005. When crossing the Gulf during the following days, Katrina quickly gained strength. On August 28th 2005, Katrina had reached category 5. That is as strong as a hurricane could possibly get. The average wind speed of Hurricane Katrina was 78 meters per second—and it was heading straight for New Orleans. However, due to a slight change in orbit, Katrina barely passed New Orleans by, as a category 3 type of hurricane (Widegren, 2007). Hence, the wind belt was not catastrophic (Marshak, 2008). Unfortunately, while still a category 5, Hurricane Katrina had created a massive wave surge that rushed towards New Orleans (Widegren, 2007). At the height of 18 foot, the storm surge in Katrina's wake towered above the 16 feet hurricane levees of eastern New Orleans (McQuaid & Schleifstein, 2006). Consequently, during August 30th 2005, the storm waves

breached the levees on several locations. Thus, the low-lying areas of New Orleans became drenched (Widegren, 2007). The waters flooding New Orleans were a mixture of rain, Lake Pontchartrain, the Gulf of Mexico and other elements (Roper, no date). At this point in time, Hurricane Katrina had already blown by and the rain had ceased (Witness: Katrina, 2010). During August 31st 2005, the flood water level stabilized in New Orleans (Widegren, 2007).

Figure 7. The path and strength of Hurricane Katrina (Lawrenceville Weather, 2007.)

Katrina's looming path of destruction had not gone unnoticed by the US authorities, as recapped by Widegren (2007). The warnings of the imminent disaster first emerged from the National Hurricane Center on August 26th 2005. As a result, the George W. Bush administration at the White House alerted the Federal Emergency Management Agency (FEMA), the Department of Homeland Security (DHS) and the National Guard. The governor of the state of Louisiana, Kathleen Blanco, also declared a state of emergency. The day after, on August 27th 2005, the then mayor of New Orleans, Ray Nagin, declared a state of emergency as well. At this point, the people of New Orleans were recommended by the mayor to evacuate as best as they could. It wasn't until the next day that the mayor decided to go for mandatory evacuation (Widegren, 2007). The well-off New Orleanians simply left by car, checked into hotels and let their insurance companies cover the damages (Klein, 2007). Widegren (2007) explains that the residents of New Orleans, who couldn't evacuate on their

own accord, were offered transportation by bus to various refuges within the city of New Orleans, most notably the sports arena called the Superdome. By nightfall, some 10,000 New Orleanians had gathered at the Superdome, alongside 150 members of the National Guard (Widegren, 2007). Brown & Schwarz (2011) explain that some people also broke into the Convention Center in order to seek shelter. However, this was no official refuge. Hence, there was no food, water or security—as a result, some refugees fell victim to crimes inside. What's more, the many tourists in New Orleans were largely left to themselves (Brown & Schwarz, 2011:94-95). On August 29th 2005, Bush declared emergency disaster for the entire state of Louisiana and had federal disaster funds released, as stated by Widegren (2007). The National Guard had been called in, but was yet to arrive. Meanwhile, the Coast Guard was actively rescuing flood victims in New Orleans. On August 30th 2005, the day after the onset of the catastrophe, approximately 50,000-100,000 New Orleanians were still stranded in the city (Widegren, 2007). Some thousand inhabitants found themselves stuck on rooftops or trapped inside their houses, as the water rose (McQuaid & Schleifstein, 2006). At that point, all airports were closed (Brown & Schwarz, 2011). New Orleans was now completely cut off from the rest of the world—and the situation was getting worse by the minute (Widegren, 2007). This was "/--/ New Orleans' week of hell /--/" (Rather, 2007:xii).

Figure 8. Car-borne New Orleanians evacuating on August 28th 2005 (Boston.com, 2010).

Figure 9. New Orleanians stranded on roof top, August 30th 2005 (Boston.com, 2010).

As a result of Hurricane Katrina, the critical infrastructure (including the communication systems) and the energy supply of New Orleans, as well a major part of the Gulf-side oil and gas plants, suffered a complete breakdown (Widegren, 2007:11). As stated by McQuaid & Schleifstein (2006:332): "The infrastructure that made ordinary day-to-day life possible—clear roadways, gas, electricity, telephone service, hospitals, police, stores—was obliterated across a vast area." In addition to the previously mentioned disarray, the "/--/ freshwater pipelines and pumps /--/ [as well as] cell phone towers, and Internet servers" all ceased to function (McQuaid & Schleifstein, 2006:7). The same goes for food supply, shelter (Resource4ThePeople, no date) and sewerage (Brown & Schwarz, 2011). The smelly, dark floodwater that filled the once vibrant city was full of bacteria (McQuaid & Schleifstein, 2006:330). These "/--/ foul, fetid, putrid, industrially polluted, bloated corpse filled flood waters that innundated 'soup bowl' shaped New Orleans for weeks after the damage from Hurricane Katrina /--/" are sometimes referred to as "toxic gumbo" (Ludd, 2005). In this gumbo, there was also polluted water from sewage plants and petrol from vehicles under water (McQuaid & Schleifstein, 2006), lead and household pesticides (Rastogi, 2010), components from a flooded hazardous waste site (Roper, no date), as well as fire ants,

alligators and snakes (Witness: Katrina, 2010). Frankly, in this rather distasteful metaphor, the dead human and animal bodies symbolize the meat in the soup (Casnig, 2007). Others yet equated the now sunken city of New Orleans to a "Cajun Atlantis", disregarding the fact that the local culture is actually Creole (Van Heerden & Bryan, 2007:167). At that time, the thousands of New Orleanians trapped upon rooftops were deprived of food as well as water (Widegren, 2007). As a consequence of the disaster, many New Orleanians had to resort to drinking rainwater or even 'toxic gumbo' in order to survive, as claimed by the lawsuit-chasing online legal help agency Resource4ThePeople (no date). People who had to drink from the toxic gumbo risked their lives in the process (Resource4ThePeople, no date).

Figure 10. Distressed residents of New Orleans, August 30th 2005 (AJC, no date).

Besides the cave-in of basic services, there were severe security issues as well. New Orleans suffered a full-scale breakdown of law and order, as looting went on in broad day light (Widegren, 2007). Sometimes the looting was carried out for sheer survival (Pehrson, 2005). This was the only way for people to feed their starving families (Sjöström, 2005). Due to the

utter chaos of the situation in New Orleans—sometimes described as a 'Baghdad under water'—as many as 200 police officers had abandoned their positions, while at least two committed suicide (Pehrson, 2005). What's more, despite the seaside location; the New Orleans police force was merely in possession of five boats in total (McQuaid & Schleifstein, 2006). As far as transportation goes, the authorities had initially asked anyone who owned a boat to help out in the rescue missions (Widegren, 2007). Shortly, the communications, computer systems, and emergency telephone numbers of the authorities broke down as well—and the very offices of various agencies, such as the police, were flooded (McQuaid & Schleifstein, 2006). Though, not all officers of the law proved cooperative; when some 200 Katrina refugees attempted to cross a bridge into the adjacent Jefferson parish on August 31st 2005, they were refused entry by armed police, who screamed insults and claimed to put the interests of their own inhabitants first (Brinkley, 2007:633). Martial law was declared in New Orleans on August 31st 2005 (Brinkley, 2007). In this anarchy, the local police had no choice but to focus primarily on crime-fighting, while the Pentagon performed a military search and rescue mission. There were 30,000 members of the National Guard operating in the area by September 1st 2005 (Widegren, 2007).

Figure 11. Superdome evacuees awaiting bus rescue, August 2nd 2005 (Boston.com, 2010).

Figure 12. Ghost city: New Orleans under water (Utrecht University, no date).

A full-scale mandatory evacuation of New Orleans had been proclaimed by governor Blanco on August 31st 2005. To begin with, buses were vacating the Superdome, while military transportation was bringing the ill or injured to the city of Houston, Texas. However, this was no way near enough. By September 1st 2005, as many as 45,000 refugees presided in the

Superdome and the Convention Center, where the sanitation had failed miserably along with the electrical system (Widegren, 2007). The Superdome was located in the flooded area, and food supplies for the refugees were scarce as well (Sjöström, 2005). There had initially been merely six days of food for the then ten thousand refugees inside the Superdome (Brown & Schwarz, 2011). Within the Convention Center alone there were 15,000-25,000 people by September 1st 2005, yet no supplies (Brinkley, 2007:634). At the same time, as stated by Brinkley (2007:634), another 4,000 refugees—among them many elderly and ill people in great need of medication—were left high and dry on a freeway overpass in New Orleans. On September 2nd 2005, Katrina victims were also flown from New Orleans to San Antonio, Texas (Widegren, 2007). In Houston, Texas, 11,000 evacuees had already filled the Astrodome, why an additional 11,000 refugees were brought to the Reliant Center (Brinkley, 2007:636). As argued by Brinkley (2007:637), the Superdome, Convention Center and freeway overpass were completely evacuated by September 3rd 2005, while Widegren (2007) maintains that the Superdome wasn't completely empty until September 4th 2005. By September 6th 2005, the crime wave had been stalled, according to Widegren (2007). The US Army Corps of Engineers had started repairing the levees and was pumping water out of New Orleans. Still, 60% of the city remained under water. At this point, only some 10,000 people lingered in New Orleans—while the number of National Guards peaked at 50,000 on September 8th 2005 (Widegren, 2007). From one day to another, the number of inhabitants in the nearby city of Baton Rouge, Louisiana, had skyrocketed from 425,000 to 1.2 million due to Katrina (Bullard & Wright, 2009:5). In Texas, as of September 3rd 2005 there were approximately 120,000 Louisianans staying in shelters, about 100,000 in hotels, and others yet staying with friends and family (Brinkley, 2007:637). By all means, New Orleans was now a veritable ghost town (McQuaid & Schleifstein, 2006).

Throughout the Gulf Coast region, Widegren (2007) maintains that Hurricane Katrina wrecked havoc to many a vital civic function. For instance, 17 hospitals were shut down, 30 facilities for higher education were impacted and as many as 100,000 students within higher education and 370,000 students in basic education were evacuated. In terms of employment, the Gulf Coast region as a whole lost a total of 300,000 job opportunities, while New Orleans itself lost 18,700 businesses and 220,000 job opportunities, practically overnight (Widegren, 2007). Out of the Louisiana businesses affected, 20,000 were owned by blacks (Bullard & Wright, 2009:6). In combination with the population loss, virtually the entire tax base of New

Orleans was instantly eroded (Widegren, 2007). Hence, the city of New Orleans had no choice but to sack three thousand employees in the months after Katrina (Klein, 2007:414). The regional GDP dropped from 4.1% to 1.9% from one quarter year to the next in 2005 (Widegren, 2007:27). As far as infrastructural services go, Widegren (2007) states that as many as 1.3 million customers were rendered without electrical power as a result of Katrina. Furthermore, 20% of the Gulf Coast oil platforms were ruined by Katrina and the succeeding Hurricane Rita in September 2005. All in all, 8% of the US refinery capacity was cut short. As the local US production of oil and gas came to a halt as a consequence of Katrina, the world market price of oil rose, before stabilizing in early September 2005. According to Widegren (2007), this proves that a disaster in one corner of the world may well make a global imprint. Post-disaster, New Orleans also ended up considerably closer to the shoreline, due to vast coastal erosion of the wetlands by Hurricane Katrina (Bullard & Wright, 2007).

3.4 The post-Katrina aftermath: long-running implications

The post-Katrina recovery of New Orleans has proven a drawn-out matter (Widegren, 2007). As far as the post-disaster recovery stages of New Orleans are concerned, Amaratunga & Haigh (2011) maintain that the *emergency phase*, that is, the immediate relief stage where search and rescue as well as provisioning of food and shelter are the key issues, lasted for approximately 15 weeks. The *restoration phase*, where repair is in focus, debris is removed and temporary access routes established, lasted from something like week three to week 45. There was an overlap with the *reconstruction phase*, where community infrastructure is rebuilt for the sake of resilience and capability, which began in week four and has been estimated to continue for ten years after the disaster. Finally, the *resettlement phase*, regarding permanent resettlement of the impacted districts, is expected to go on for twenty years post-Katrina (Amaratunga & Haigh, 2011).

However, post-Katrina there were also more profound issues at stake than the re-instatement of the infrastructure. In national debates on topics as diverse as politics, racial issues and terrorism preparedness, Katrina has become a *symbol* (Rather, 2007). In fact, Blakely and Hartman (2012) argue that the emotional scarring of the nation due to Katrina was even worse in 2010 (when their texts were compiled), than during the actual event. Besides the US$100

billion worth of property lost across the region in the immediate disaster; the social, economic and political implications still prevailed—to a point where people even started to ask themselves if there was any democracy and justice within the boundaries of the USA (Blakely & Hartman, 2012:1). Blakely & Hartman (2012:3) emphasize that the most marginalized of the population had proved the most vulnerable to disaster, and there was no appropriate planning whatsoever from the authorities in terms of targeting the underlying social and economic inequities. Smith (2011) even claims that Hurricane Katrina proved such a life-changing event that New Orleanians commonly refer to time as pre- or post-Katrina.

In terms of infrastructure, the pre-Katrina levee system was restored in just 40 weeks time, as opposed to the 60 weeks which had been anticipated (Amaratunga & Haigh, 2011:243). Furthermore, the floodwater was pumped out of New Orleans and into Lake Pontchartrain and the Mississippi River in record time, according to Roper et al (no date). After merely 43 days time, the dewatering effort was complete by October 11th 2005. In average, five billion gallons of water per day had been removed from New Orleans by the US Army Corps of Engineers (Roper et al, no date). According to the US Environmental Protection Agency (EPA), 99% of the sewage treatment systems and the water supply systems were functioning again by early December 2005—even though tests of the water quality were yet to be performed (Manuel, 2006). Yet, this statement seems to be the subject of some debate. As stated by Widegren (2007), still a year after the disaster, some of the flooded areas were still uninhabitable. Klein (2007) also accentuates the lack of drinking water as well as energy, in some parts of the town, still two years after the disaster.

However, as claimed by Widegren (2007), some segments of the private sector industry were quickly back in business. The oil and gas producing refineries at the Gulf Coast were operating on full scale in April 2006. The electrical system made a quicker recovery still. Most hospitals were back on the grid within 24 hours, while half of the customers affected were back on after a week. Most people had access to electricity within a two weeks' notice. By January 2006, only the most devastated areas of New Orleans—Lower Ninth Ward, Lake Catherine area, Lakeview—still lacked electricity (Widegren, 2007). Yet, in the Lower Ninth Ward, as much as half of the area still lacked electricity and water nine months after the disaster (Bergal, 2007a:6). Associated Press (2006) reports that as long as a year after Hurricane Katrina's ravages, the infrastructure of New Orleans was still in shatters. Almost

60% of the housing and businesses went without electricity or heating. Many houses in the formerly flooded areas were in decay, filled with mold and mud, and waited to be demolished by bulldozers (Associated Press, 2006). Over 100,000 houses were damaged or destroyed in New Orleans during Hurricane Katrina (Bergal, 2007a:2-3). In 2007, some 30,000 damaged buildings still awaited removal (Widegren, 2007:28). Björkman (2006) estimates the number of houses in need of demolition to 50,000—adding that only some 22,000 private house owners had full insurance. Out of the public housing, nearly all was boarded up and vacant (Klein, 2007). Furthermore, as explained by Widegren (2007), large tracts of the low-lying areas of New Orleans had been contaminated by salt water intrusion, chemical pollutants and heavy metals from silt, during the course of disaster. In order to render the flooded areas fit for human habitation, some hundreds of millions tons of litter had to be removed. The sanitation process proved stretched out as well, mainly due to unclear separation of responsibilities. Yet, in the beginning of 2007, some 40 millions of m^3 had been cleared, corresponding to 78% of the total cleanup needed (Widegren, 2007:28). Most of the oil spill and bacteria degraded without intervention (Shipley Hiles, 2007:13-14). As for the retrieval of the dead, Klein (2007) explains that it proved a long-stretched-out process in the hands of the contractor Kenyon. Still a year after the disaster, dead bodies were found in attics (Klein, 2007). The overall stress of the situation, also took its toll on the local health. Post-Katrina, the suicide rate was abnormally high (Associated Press, 2006).

One year after the disaster, Widegren (2007:27) states that the capacity of many societal functions such as schools, hospitals and public transport were cut in half as compared to the pre-Katrina context. Also, the court system was not fully functional yet (Klein, 2007). Still, in 2007, the region had managed to regain its tax base to high a degree—it reached 80% of the pre-Katrina level, as maintained by Widegren (2007). The very same year, the labour force also amounted to 78% of the pre-disaster number. Initially, the local economy was stimulated by post-Katrina recovery investments, which led to a falling unemployment rate in New Orleans. However, in 2007 the unemployment level was rising again, closing in on pre-disaster digits. As a direct result of the disaster, the number of employment opportunities within construction peaked, while job openings within the service sector, such as education and health care, were few and far between (Widegren, 2007). The many black-owned smaller Louisiana businesses seldom made a quick come back either, since their customer base—other African Americans—was largely eroded (Bullard & Wright, 2009). In the booming

building sector, as well as in recovery over all, Klein (2007) explains that the Bush administration frequently made use of private contractors. Some of these, like Halliburton (rebuilding military bases for US$60 million), Blackwell (providing security to FEMA workers), as well as Fluor, Shaw, Bechtel, and CH2M Hill (all supplying mobile homes for refugees for a total of US$3.4 billion) had previously—and somewhat infamously—been hired as contractors by the Bush administration in Iraq (Klein, 2007:410-411). Kenyon (retrieving dead bodies for US$12,500 a victim), then again, was a key donor in the Bush campaign (Klein, 2007:410-411). No doubt, there was big money to be made in the Big Easy. Yet, not many job opportunities were provided for the locals; and those that were, were often underpaid or even relying on low-cost illegal immigrants (Klein, 2007). As far as health care and education were concerned, throughout the region, as many as 36% of the hospitals remained closed and only 58 out of 128 public schools had been reopened in 2007 (Widegren, 2007:28). This appears like a minor step up from the year before, when merely three out of nine hospitals in the city of New Orleans were working, and 72 out of 128 public schools remained closed (Associated Press, 2006). Not more than 40% of the New Orleans students had found their way back to the local schools in 2007 (Widegren, 2007:27). Yet, the most noticeable transformation of the post-Katrina school system in New Orleans was the rampant privatization—because of it, 4,700 teachers, all members of the union, were fired chiefly not to be rehired (Klein, 2007:5).

There were also various demographical implications in the wake of Hurricane Katrina. In March 2006, there were still 400,000 inhabitants less in the New Orleans metropolitan area than before disaster struck, in accordance with Widegren (2007:27). Willinger & Gerson (2008:25) maintain that in July 2006, New Orleans had an estimated population of 223,388; approximately 50 percent less than the year before. Compared to the previous year, New Orleans had plummeted from the 38th to the 82nd spot in terms of largest city within US borders (Willinger & Gerson, 2008:25). As depicted by Björkman (2006), the former New Orleanians turned Katrina refugees were dispersed over a vast area. Initially, in September 2005 there had been as many as 1,042 different barrack types of shelters, for some 100,000 evacuees, spread across 26 states (Bullard & Wright, 2009:4). Out of the few New Orleanians that had returned already in 2006, Björkman (2006) maintains that the majority stayed with acquaintances, in hotels, or in emergency shelters (in practice, little more than tent camps) and trailers supplied by FEMA. Some FEMA trailers turned out to be contaminated with the toxin

formaldehyde, which further compromised the health of the Katrina evacuees (Bullard & Wright, 2009: 4). In some emergency shelters, guarded by heavily armed police, families with children stayed side by side with drug addicts, in accordance with Björkman (2006). Björkman (2006) also reports that the FEMA shelter personnel were often too young, too inexperienced, too incompetent or too traumatized to help out with the rehabilitation of the Katrina refugees, which had suffered severe mental and/or physical trauma. In June 2007, as argued by Widegren (2007), 66% of the pre-disaster populace—in actual numbers—had returned to New Orleans already. However, slightly fewer African Americans had chosen to return as opposed to Hispanics, which were increasing in numbers. Widegren (2007) speculates that as a consequence of the reduction in job opportunities within the service sector, fewer single mothers had chosen to return as well. The low amount of school children post-Katrina seems to confirm this presumption. Prior to Hurricane Katrina, single mothers in low wage jobs were over-represented in New Orleans (Widegren, 2007). Willinger & Gerson (2008:25) confirm that many dispersed New Orleanians who wanted to return faced several obstacles down the way, such as the lack of low-wage jobs that still pay the bills, inexpensive housing, proper transportation and childcare.

In 2010, the city of New Orleans was still 22% smaller than before Hurricane Katrina, as stated by Nolan (2010). In the greater New Orleans metro area as a whole—consisting of the seven parishes Jefferson, Orleans, Plaquemines, St. Bernard, St. Charles, St. John the Baptist and St. Tammany—Nolan (2010) maintains that the population had decreased from 1,313,460 pre-Katrina to 987,535 in 2006, only to gradually rise again to 1,210,171 in 2010. Hence, the entire region was merely 7.9% smaller than before disaster struck. In addition, the city of New Orleans was less poor post-disaster, with rising average wages and median household income. The main reason for this trend is that 125,000 residents, mainly from the poorest sections of society, were scattered to other cities as a result of Katrina (Nolan, 2010). The gaining in income and wages was uneven though; benefitting only the men of New Orleans, while the women's earnings had been reduced (Willinger, 2008:48). It's not uncommon for cities to become "/--/ smaller, richer, and whiter /--/" after disasters (McQuaid & Schleifstein, 2006:335). Even so, the communities of New Orleans were more segregated post-Katrina than before (Smith, 2011). Still six years after the catastrophe, the New Orleans neighbourhood worst impacted by Katrina, the Lower Ninth Ward, was yet to recover, as reported by Burdeau (2011). The streets were lined with vacant, decaying houses, many of them for

sale—without any buyers in sight. Man-high grass was thriving, where there used to be a home. Redevelopment lacked behind, while schools and churches were closed. In fact, the whole area still resembled a ghost town. There were now merely 5,500 inhabitants in the district—before Katrina hit, there were three times more (Burdeau, 2011). Prior to Hurricane Katrina, 98% of the residents in Lower Ninth Ward were African American (Van Heerden & Bryan, 2007:128-129). However, in other parts of the city, federal recovery funding had built new businesses, schools and streets, as described by Burdeau (2011). In those areas, there was an entrepreneur spirit and a vibrant civil society. The middle class was growing, and the crime rate was kept in check—yet twice the national average (Burdeau, 2011).

Why, at this point, did New Orleans still resemble a ghost town in part? As explained by Blakely & Hartman (2012), *the Road Home Program*, designed to help home-owners receiving settlements to rebuild, or simply selling their damaged homes to the state of Louisiana, was a failure. Funded by the US Department of Housing and Urban Development; it was too expensive, too complicated to comprehend, and yet too low in awards (an upper limit of US$150,000) to rebuild for residents lacking first-rate insurance (Blakely & Hartman, 2012:3). Hence, home vacancies popped up all over New Orleans (Blakely & Hartman, 2012). Still, according to Blakely & Hartman (2012), owners and those affluent enough to rent at market rates were more fortunate than those who lived in public housing. Blakely & Hartman (2012) implicitly raise the concern that the low-income public housing of New Orleans was never meant to be rebuilt. In fact, prior to Katrina, the Bush administration had already decided to demolish as much as 70% of the public housing of New Orleans. Post-Katrina, measures to prevent the rebuilding of the public housing, and thus undermine the possibility for African American residents to return to New Orleans, came into effect (Blakely & Hartman, 2012). This was nothing but "/--/ black removal" (Blakely & Hartman, 2012:2). The proportion of African American residents in New Orleans had decreased from 67% pre-Katrina to 61% post-Katrina (Nolan, 2010). Bullard & Wright (2009) maintain that the destruction of public housing by the city of New Orleans had created an acute shortage of affordable rental accommodation, which displaced people. Post-Katrina, market rent apartments in New Orleans were pricier than in New York; from a median income perspective (Nolan, 2010). In the wake of Hurricane Katrina, the poor were no longer welcome in New Orleans (Blakely & Hartman, 2012).

Besides lengthy, the recovery phase in Katrina's wake has also proved quite costly. According to the US Senate in May 2006, the estimated price tag of Hurricane Katrina is somewhere in the vicinity of US$125-150 billion (Widegren, 2007:26-27).

3.5 Blame game: debating the prospective reasons for disaster

This subchapter will introduce some of the major trends—with a slight emphasis on environmentally related causes—in explaining the reasons for the disastrous effects on New Orleans by Hurricane Katrina, as discerned from the empirical literature. There are likely to be other explanations than those described here 'out there', hence this study does not claim to be 'all-encompassing'. This thesis covers the issues of: environmental degradation, climate change, flawed prevention/preparedness/financing/management/response, various environmental and social justices, as well as the concept of 'deadly indifference'.

3.5.1 Environmental degradation: vanishing wetlands and a 'sinking feeling'

Proper wetlands management must not be underrated as far as hurricane prevention is concerned, as argued by several authors. Newman et al (2009) explains that when wetlands and mangroves along the Gulf Coast shorelines were lost, New Orleans' capacity to withstand wave surges was diminished. McQuaid & Schleifstein (2006) agree that as the natural barriers of seaside marshes failed in the Bayou region, the storm surges of hurricanes moved increasingly closer to the built environment. A hurricane moving inland, is instantaneously disconnected from the heat and humidity of the ocean. Hence, it loses strength and starts to disintegrate into thunderstorms. Yet, if the marshes were already swamped, the hurricane could gain power instead (McQuaid & Schleifstein, 2006). Moreover, wetlands stall and absorb floodwaters during storms (Rastogi, 2010). Alongside thriving wetlands, barrier islands also serve as an efficient natural buffer zone against storm surges (Van Heerden & Bryan, 2007). According to Van Heerden & Bryan (2007:167), the state of Louisiana loses as much as 25 square miles of wetlands every year. In total, this makes more than a million acres since the 1930s (Van Heerden & Bryan, 2007:167).

There are several concurrent reasons for the rapidly diminishing wetlands of the Bayou region (Rastogi, 2010). Firstly, the Mississippi River levees prevent the natural process of the watercourse to overflow its banks; hence there will not be any fresh sediment to reinforce the wetlands. As a consequence, wetlands erosion has ensued. Secondly, the developments of the gas and oil industries slice the wetlands to pieces (Rastogi, 2010). These eight thousand miles long cuts and canals traverse the marshes and disturb the natural water circulation (Van Heerden & Bryan, 2007:161). Thirdly, Rastogi (2010) explains that the rising sea level takes its toll. Van Heerden & Bryan (2007) blame the rising seas globally on long-time worldwide climatic changes, mainly due to fossil-fuel dependency. Last but not least, small rodents called *nutrias* damage the wetlands (Rastogi, 2010). The marsh grass-grazing nutrias are not domestic to this region; in fact, they are a South African fur market import that made a break for it during a hurricane (Van Heerden & Bryan, 2007). In addition to the four threats as mentioned by Rastogi (2010); Bullard & Wright (2009) also point out highway projects, agriculture and urban development as further detriments to the wetlands of Louisiana. What's more, Shipley Hiles (2007) draws attention to the detrimental effect on marshy wetlands by saltwater intrusion into navigation canals, which were built by the US Army Corps of Engineers to endorse shipping. Wetlands were at one time considered nothing but "/--/ mosquito breeders /--/" that were better off drained (Shipley Hiles, 2007:9).

In addition to wetlands as a storm barrier; Van Heerden & Bryan (2007) emphasize that New Orleans is practically built on marshy grounds. Due to this fact, there is ample subsidence (sinking grounds) in the area. The draining of the swamps beneath the built environment has speeded up the pace of the subsidence, as has the constant pumping of water out of the low-lying 'bowl' area. The man-made constraints of the Mississippi River flow also hamper the deposition of sediments as a wetlands 'stabilizer'. Furthermore, the extraction of oil and gas has increased the subsidence and the wetlands loss both (Van Heerden & Bryan, 2007). It's highly unlikely that the subsistence will ever cease—in the Bayou region, the oil industry always comes first (Van Heerden & Bryan, 2007). Nearly 30% of the US oil is produced in the Gulf Coast (Widegren, 2007:11). Without the oil and the gas businesses, Van Heerden & Bryan (2007) claim that Louisiana would face economic ruin. Nevertheless, the relationship between wetlands condition and storm vulnerability has been established since the early 1980s. Still, the politicians in charge have chosen to disregard the findings so far (Van Heerden & Bryan, 2007). To some extent, Hurricane Katrina proved such a destroyer since

nothing but beat-up wetlands stood in its way (Van Heerden & Bryan, 2007). As explained by Shipley Hiles (2007), it's difficult to determine the impact of Katrina had there been less prior wetlands destruction. Yet, according to a public campaign for coastal restoration by the state of Louisiana, around 80 miles of restored coastal wetlands would have blocked most of the flooding Katrina brought (Shipley Hiles, 2007). Due to the flooding during Hurricane Katrina, an additional 295 km² of wetlands were lost along the Gulf Coast (Widegren, 2007:28); or 100 square miles of marshy coastal wetlands, according to Shipley Hiles (2007:17). Hence, when rebuilding New Orleans, wetlands and barrier islands 60 miles from the city must be restored as well (Van Heerden & Bryan, 2007).

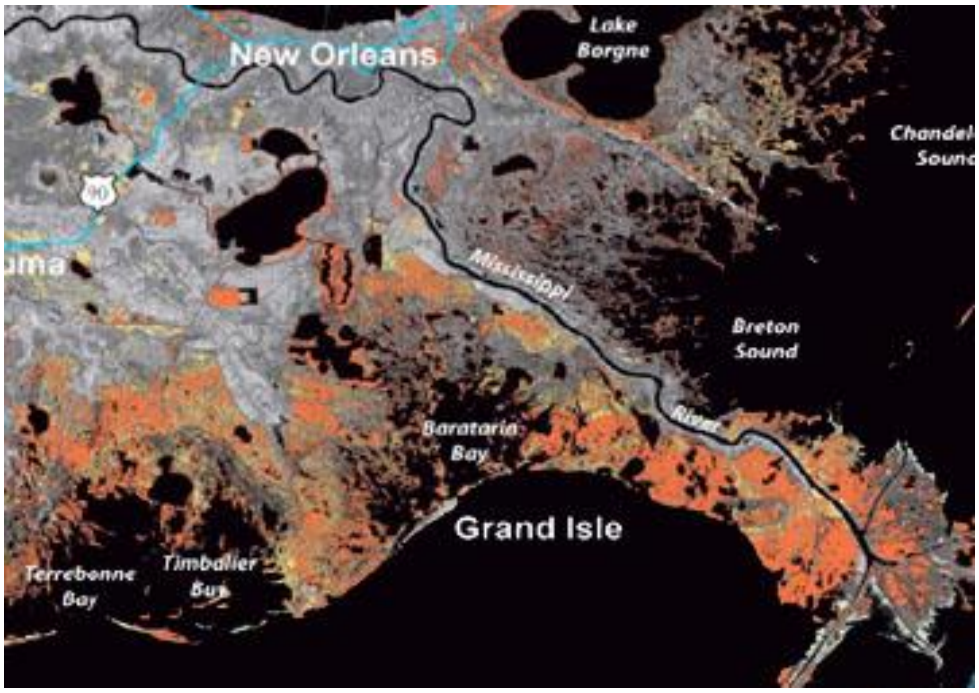

Figure 13. Louisiana wetlands loss 1932-2000 in orange, with yellow predicting future losses (EV World, 2005).

3.5.2 Climate change as apocalypse now

McQuaid & Schleifstein (2006:346) maintain that the year of 2005 was "/--/ the hottest on record /--/". As the global temperature sky-rocketed, the superstorms—such as Hurricane Katrina—were just one symptom, as claimed by McQuaid & Schleifstein (2006). According to McQuaid & Schleifstein (2006:347), many scientists link this recent birth of massive hurricanes to anthropogenic global warming due to industrial era green house gases. The

average global temperature has risen by one degree Fahrenheit since 1900, mostly in late twentieth century (McQuaid & Schleifstein, 2006:348). In 1970-2004, the sea surface temperatures of tropical waters rose by 0.9 degrees [temperature scale not stated, my remark]. The hotter the ocean, the more steam is let off. This will spur hurricanes. The superfluous heat in the atmosphere triggers unpredictable actions. With a sharp shift in 1995, not only has oceanic temperature increased—the strength of the hurricanes has doubled. If proven accurately, many more hurricanes as destructive as Katrina will see the light of day (McQuaid & Schleifstein, 2006:349-351). Yet, other scientists view the formation of superstorms as a naturally occurring phenomenon related to cyclical shifts in ocean temperature, commonly referred to as the Atlantic Multidecadal Oscillation (McQuaid & Schleifstein, 2006). As it seems, McQuaid & Schleifstein (2006) are far from alone in this belief of apocalypse now by global warming. Newman et al (2009:8, 37) also maintain that during Katrina: "New Orleans was one of the first modern cities to be destroyed by a climate change-induced phenomenon."

In accordance with the above claims of McQuaid & Schleifstein (2006) and Newman et al (2009); Marshak (2008) maintains that the global climate does indeed appear to be changing for the warmer as of recently—and anthropogenic activities play a part in this development. Albeit divisive, if further global warming occurs (5 to 11 degrees Celsius warmer than today by 2150: the worst case scenario), stronger hurricanes might appear (Marshak, 2008:824). However, Marshak (2008) also cautions against the typical newspaper headlines screaming 'global warming' every time there is a hot spell. Short term variations in temperature in a given area can only be regarded as a change in weather. In order for climate change to occur, there must be a change in weather conditions and their daily to seasonal variability in a region over a period of many decades. Besides, Marshak (2008) explains that the climate has always been shifting back and forth throughout the geological history of the earth. There are short term and long term climatic changes. In a long-term perspective, colder times are referred to as ice-house periods, while warmer times are called greenhouse or hothouse periods. In fact, as stated by Marshak (2008:813), for the last 33 million years the world has faced an ice-house period. Within this ice-house, there are short term climate changes, such as variations between warmer interglacial periods and colder ice-ages. Pleistocene interglacials lasted about 10,000 years and the present one has gone on for 11,000 years already—hence, no one knows if thousands of years from now there will be another ice-age with glaciers covering major cities, or if global warming will put an end to the ice-age forever (Marshak, 2008:797, 830).

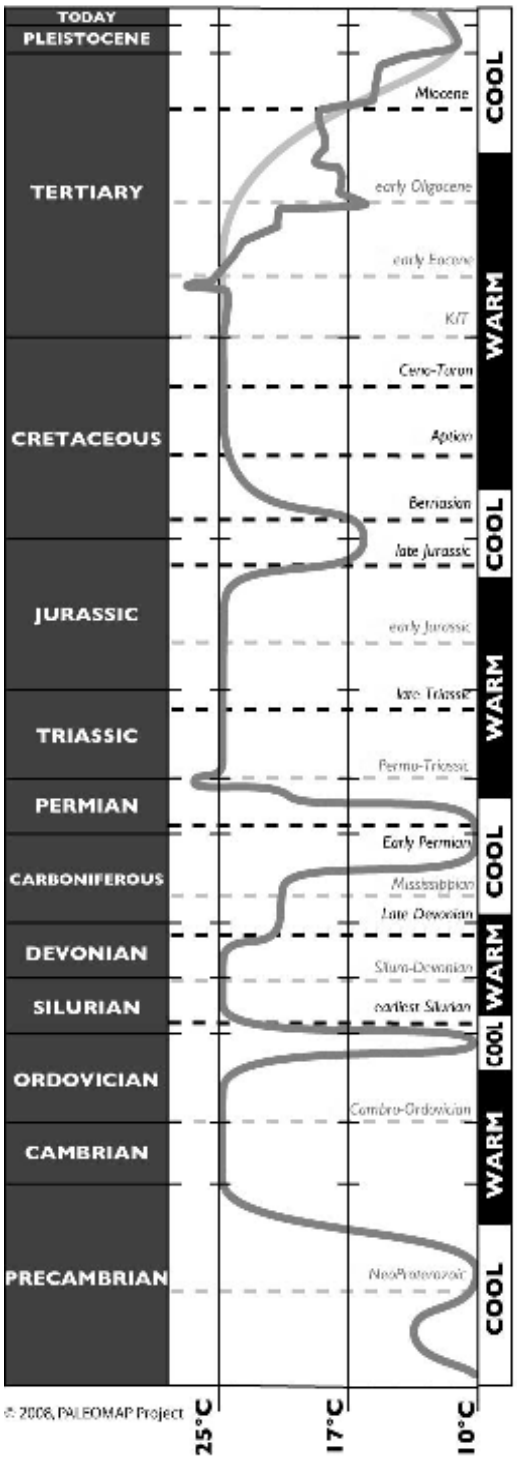

Figure 14. Historical average global temperatures in Centigrade, showing cool ice-house and warm greenhouse time periods (Scotese, 2002).

3.5.3 Flawed prevention, preparedness, financing, management and response

This subchapter will begin by introducing various reasons declared by the US Senate and the US House of Representatives as pivotal for the breakdown of New Orleans. In the following sections of this subchapter, some of these causes will be elaborated upon further. In accordance with Bullard & Wright (2009), Katrina revealed severe weaknesses within US emergency preparedness and response on all levels: federal, state and local. In every respect, this was a man-made disaster (McQuaid & Schleifstein, 2006:xii).

As argued by most authors, there was not one single occurrence that went wrong during Katrina; rather there was a co-occurrence of many managerial mishaps. As stated by Widegren (2007), a report—*Hurricane Katrina: A Nation Still Unprepared*—put forward by the US Senate in May 2006, mentioned a fourfold set of root causes of the disastrous turn of events during Hurricane Katrina:

- The politicians in charge had not paid proper attention to the manifold notices given in advance in regard to the exceptionally risky location of New Orleans.
- The measures taken by the authorities shortly prior to and after the disaster were insufficient—and the decision-making was feeble.
- There was a breakdown of technological systems, such as logistics and communications, on behalf of those in command.
- There was a failure of efficient management among decision-makers and politicians at all levels (federal, state and local). In fact, the only institutions that worked smoothly were the Coast Guard's rescue operations and the private sector initiative in regard to recovery of the energy supply (Widegren, 2007).

As maintained by Widegren (2007), in the February 2006 report *Failure of Initiative*, the US House of Representatives also identified flaws in regard to the following aspects: The breach of the levees, the failure to evacuate, the implementation of *The National Response Plan*, the inability of the Department of Homeland Security (DHS) and the states to manage the crisis, support systems for the everyday communications, command and control, military coordination, public safety, health care and preparedness for evacuation, temporary lodging

for evacuees, logistics and contracts of the Federal Emergency Management Agency (FEMA), and putting the capacity of nonprofit organizations to good use (Widegren, 2007).

McQuaid & Schleifstein (2006) explain that some of the above mentioned organizational disarray stems from the fact that the federal government had been restructured in response to the 9/11 terrorist attacks in 2001. As an unforeseen side-effect, this reform weakened the national response capacity to domestic disasters (McQuaid & Schleifstein, 2006). The main security concern of the Bush administration at the time was *the War on Terror*; all other matters, such as combating natural disasters, had to stand back in terms of funding and political attention (Parker et al, 2009). Widegren (2007) outlines the new organizational set-up in US emergency management as in effect during Hurricane Katrina: the DHS was created in 2002. Its main responsibilities involved leading and coordinating overall domestic societal security issues on all levels (Widegren, 2007). Yet, in practice, the DHS maintained a strict focus on fighting terrorism (Parker et al, 2009). FEMA, an independent authority within the DHS, served as the operational contingency organization (Widegren, 2007). Prior to the incorporation into the DHS, FEMA had been in charge of emergency mitigation, preparation, response and recovery; after the incorporation, only response and recovery remained to a degree (Parker et al, 2009). *The National Response Plan* stipulated that prevention, preparedness, response and recovery of crises should be handled on as decentralized a level as possible—in practice: local, regional or state. The state Governor had to ask for assistance from the federal level in case local means were insufficient. DHS was in charge of the federal resources. The US military forces were handled by the Defense Department and could be utilized for domestic issues, if the US President so decided (Widegren, 2007).

As argued by Michael Brown, former director of FEMA, there were several organizational obstacles due to the incorporation of FEMA into DHS (Brown & Schwarz, 2011). In reality, DHS couldn't handle other crises than prevention of terrorism, according to Brown & Schwarz (2011). FEMA, however, responded to any crisis. When FEMA was merged into DHS, Brown & Schwarz (2011:108) maintain that 'red tape' on behalf of the DHS delayed actions and crippled the abilities of FEMA to act. More specifically, according to Brown & Schwarz (2011), the director of DHS, Michael Chertoff, has accused Brown of having displayed inability to act during Katrina. However, Brown & Schwarz (2011) claim that from his Washington, D.C. office, Chertoff would constantly counteract Brown's decisions on-site

in Louisiana during the disaster—in fact, Chertoff had even ordered Brown to stay at the Baton Rouge office, far away from the crisis. In New Orleans, FEMA's hands were also tied due to a lack of personnel, equipment and material. Furthermore, Brown & Schwarz (2011) state that it in view of the public eye; it didn't look good that in the midst of the crisis, President Bush devoted much of his attention to unrelated public relations stunts. Bottom line, it's deeply unfair that it has become legitimate to hate on FEMA (Brown & Schwarz, 2011). Ridiculed by a nation, Brown resigned shortly after Katrina; while Chertoff, who had behaved in an even more "/--/ clueless /--/" manner, remained in charge (McQuaid & Schleifstein, 2006:338). Before resigning, Brown had long fought an uphill battle to oppose the integration of FEMA into the DHS, in order to preserve the independence of FEMA (Parker et al, 2009).

Widegren (2007) maintains that post-Katrina, there was ample critique against the DHS, FEMA, as well as the local authorities (Widegren, 2007:23-24). The Bush administration made several fateful mistakes during the post-Katrina crisis management. During the course of the disaster, it became evident that the local and national authorities failed to agree on a division of responsibilities. Hence, better coordination between federal authorities is called for. There was also a lack of communication within the separate authorities involved. Communication is the key. In case of a breakdown of communication services, rescue personnel must know in advance what to do. It's been noticed, and much criticized, that the authorities' approach was reactive rather than proactive (Widegren, 2007).

For starters, there is the issue of neglect in relation to prevention. For many years prior to Katrina, analysts had alerted the authorities on city and state level that the substandard levees of New Orleans were too weak for a stronger hurricane—if one struck, the end result would be disastrous (Bullard & Wright, 2009:xix). What's more, already in 2002, the journalists McQuaid & Schleifstein (2006) had written an exposé for the local Louisiana newspaper The Times-Picayune on the risky location of New Orleans in terms of hurricanes, flooding and storm surges. Admittedly, the US Army Corps of Engineers, who had designed the levees of New Orleans, recognized the fact that the levees in question would only stand for shock waves from weaker hurricanes, such as categories 1-2 and sometimes 3 on the Saffir-Simpson scale that measures the strength of hurricanes (McQuaid & Schleifstein, 2006:xi-xii). As a result, during the course of the Hurricane Katrina disaster, the levees as a protective system failed miserably. There were several design errors on behalf of the US Army Corps of

Engineers. Some levees proved lower than previously agreed upon, others had sunk, while others yet were washed away due to material flaws. Due to faulty design, others crumbled under the pressure and were toppled by the storm surge. Some levees were not even set up yet, 40 years past its due time (McQuaid & Schleifstein, 2006). Brown & Schwarz (2011:87, 94) also maintain that for years, the US Army Corps of Engineers had neglected to provide proper maintenance to the levees for financial reasons. There was even a persistent rumour that the state government of Louisiana misused some of the funding by developing an offshore casino (Brown & Schwarz, 2011: 87). In addition to the levee system, Shipley Hiles (2007) explains that in the 1960s, the US Army Corps of Engineers had also built a 76-mile shipping canal, the Mississippi River-Gulf Outlet, between New Orleans and the Mexican Gulf. Modestly frequented by less than one boat per day, this canal became infamous as a "/--/ hurricane highway /--/" during Katrina, leading the storm surge straight into New Orleans (Shipley Hiles, 2007:11). What's worse, in case of emergency, the city of New Orleans had no rescue strategy whatsoever (McQuaid & Schleifstein, 2006:xii).

There were also severe weaknesses within the US crisis preparedness, as shown by Widegren (2007). For one thing, the DHS was criticized on grounds of what regions had gotten funding for preparedness. DHS was thought not to know how to handle large, high-cost procurements, and the independence of some of the DHS contractors has been contested (Widegren, 2007). As explained by Klein (2007), the state of Louisiana had applied for FEMA funding already in 2004, in order to establish a disaster plan for a hurricane. Yet, the request was turned down. Instead, a private contractor got the job for US$1 million—but in the end; the plan was never implemented due to a shortage of money (Klein, 2007). What's more, on the local scale, the call to evacuate proved too little too late (Widegren, 2007). Brown & Schwarz (2011:202) maintain that a mandatory evacuation should have been carried out way earlier. For days, it was known to the authorities that Katrina was coming. In particular, it was the Mayor of New Orleans, Ray Nargin, who had refused to evacuate in due time, according to Brown & Schwarz (2011:86). Widegren (2007) declares that some residents within the marginalized segments of society never even got the information to vacate. Others yet had no possibilities to evacuate on their own. In New Orleans, 200,000 people in the low-lying areas worst affected, did not even own a car (Widegren, 2007). Out of these inhabitants, 90% were blacks (Van Heerden & Bryan, 2007:128-129). There was no plan for the evacuation of residents who lacked transportation (McQuaid & Schleifstein, 2006:xii). According to Widegren

(2007), the evacuation worked rather smoothly for car-borne residents, while those that were dependant on public transportation were left behind. Hence, in the future there must also be collective options as far as evacuation goes (Widegren, 2007). As it was, the public buses and vehicles were left stranded in New Orleans; subsequently, these resources were drenched in the disaster (Newman et al, 2009). Widegren (2007) also stresses the necessity of preparedness for practical assistance along the evacuation route. Furthermore, for various reasons some people tend to downright refuse to evacuate—the authorities must also be prepared to deal with this issue (Widegren, 2007). Parker et al (2009) explain that the latter response may be due to the so called *cry wolf* syndrome. That is, having experienced too many warnings of evacuation not followed by actual disaster, certain parts of the population may be desensitized to later evacuation calls. Other reasons could be so called *hurricane roulette*, where the inhabitants simply hope and pray that the hurricane will miss, or sheer overconfidence in one's capacity to survive a storm (Parker et al, 2009). In terms of pre-disaster evacuation, Widegren (2007) makes clear that the *Comprehensive Emergency Management Plan of New Orleans* recommends transportation out of the city, in addition to harbouring refugees within city limits. However, this measure was not employed during Hurricane Katrina (Widegren, 2007). Another sector lacking proper preparedness, as depicted by Bergal (2007b), was the health care system. The emergency generators and power sources of the New Orleans hospitals were frequently located underground—hence, during Katrina, they were flooded. A similar flooding incident during a storm in Houston, Texas, had served as a wake-up call to other hospitals in the region. But in the bowl of New Orleans, there was no "/--/ money or will /--/" to make a change (Bergal, 2007b:79). During Katrina, as described by Bergal (2007b), the health care sector in New Orleans experienced a near-complete meltdown, with patients, elderly and disabled left largely to themselves. Ultimately, the failure to evacuate hospitals and nursing homes in time cost the lives of 215 people in the New Orleans region (Bergal, 2007b:80). Hence, when the New Orleans transportation system fell, so did the rest of the urban system, spiraling into social chaos (Newman et al, 2009). In fact, Newman et al (2009:37-38) argue that the overall lack of preparedness in New Orleans was nothing short of "/--/ scandalous."

However, the efforts of the Bush administration in terms of response failed to impress as well. As sarcastically stated by the blogger Thinksquad (2010): "The U.S. Army Airborne Rangers, can be anywhere in the world in 24 hours, but it took The US government 4 days to reach the

hazardous terrain of New Orleans and the gulf region." During these days, the flood victims suffered while waiting for food, water and rescue—some perished unnecessarily (Morial, 2009:xv). As stated by Bullard & Wright (2009), one should rightfully be able to expect more from the government than the separate states. Prior to Katrina, it had been taken for granted by the US public that in such a rich country as the USA, the state would stretch out a helping hand to the needy in case of disaster (Klein, 2007:408). In addition to sluggish response; during post-Katrina recovery the US government repeatedly hired private contractors that paid back with campaign contributions rather than good work, as stated by Klein (2007:412). There were frequent and systematic overcharges and mismanagement on behalf of the contractors. The big business interests also viewed non-profit organizations in a negative light, since they might provide for free the goods for the needy that the contractors sought to profit from (Klein, 2007). As argued by Klein (2007:409): "/--/ a weak, underfunded, ineffective public sector on the one hand, and a parallel richly funded corporate infrastructure on the other /--/" is a telling example of the unbalanced state the Bush administration created.

3.5.4 Environmental and social justice perspectives

Alongside managerial aspects, Widegren (2007) explains that, within US borders, issues concerning social marginalization have received their fair share of attention in relation to Hurricane Katrina. Indeed, these very matters have become the focus of the debate. This is due to the fact that the poor segments of the population—and poor Black Americans in particular—suffered the majority of the consequences of Hurricane Katrina (Widegren, 2007).

Bullard & Wright (2009) maintain that poverty and race were pivotal as determinants for the inadequate governmental response to Hurricane Katrina. Prior to Katrina, poverty within city limits coincided with the African American communities. Out of these two aspects (poverty and race), race seems to be the characteristic most closely tied to structural discrimination, as stated by Bullard & Wright (2009). In general, marginalized segments of society are more likely than others to live in risky, poor-quality homes in low-lying city districts. This scenario proved true for New Orleans, where racism and segregation still run deep, in accordance with Bullard & Wright (2009:xx). The affluent sections of society resided on higher ground, while low-income minority neighbourhoods were situated in areas vulnerable to environmental hazards such as flooding. As argued by Bullard & Wright (2009:xxii), it seems as if

prevention and preparedness were not sufficiently invested in on the institutional level, when it came to the districts of the African Americans and the poverty-stricken. Furthermore, when disaster did strike in the wake of Hurricane Katrina, the recovery of the marginalized communities was slower than elsewhere in New Orleans. This was due to indifference on behalf of the agencies in charge, according to Bullard & Wright (2009:xx). Post-Katrina, people from these unfortunate districts also ran a higher risk of facing information loss, loan rejection, disproportionally low amounts of governmental relief, as well as discrimination when seeking new lodging. Disaster prevention, preparedness, response, clean-up and recovery—all these aspects are affected by inequalities due to race, in accordance with Bullard & Wright (2009). In New Orleans, this proved nothing out of the ordinary, since the minority and poor communities had been economically and environmentally discriminated against by society for decades. Ultimately, the disaster brought on by Katrina was "/--/unnatural and man-made" (Bullard & Wright, 2009:2).

So how come the most vulnerable were confined to the most risky quarters—and deserted during a disaster? Somers (2008) claims that in the present era market driven society, poverty is no longer regarded as a social problem. Instead, as maintained by Somers (2008:99-102), the ideology of the powers to be is to put the blame on the victims, which are wrongfully perceived as immoral and dependent on society (in particular, welfare payments) as opposed to productive and responsible citizens. In fact, although US citizens according to law, in practice the many marginalized New Orleanians left behind during Hurricane Katrina were long since regarded as nothing but stateless, rightless and expendable, as argued by Somers (2008). That's how they were forgotten to begin with. In the eyes of society, they lacked human dignity (Somers, 2008:114). Yet, contrary to the 'blaming the victim' theory, which stipulates that the abandoned New Orleanians were too needy to evacuate on their own, the Superdome evacuees were actually enterprising and independent (Somers, 2008).

Could a disaster even come in handy? Klein (2007) explains that shock, for instance from natural disaster, provides the perfect cover for a radical change—towards further capitalism. These systematical raids on the public sector for market incentives, in the shadow of a crisis, are coined "disaster capitalism" (Klein, 2007:6). According to Klein (2007), the USA has applied these shock tactics for decades. In the case of New Orleans, as argued by Klein (2007:4-6, 410, 414-415), US politicians (local and national) and businessmen (for instance,

developers and the tourism industry) regarded Katrina's ravages as a godsend for wiping the slate clean. Finally, the low-income public housing was washed right out of the picture, to be replaced by condos. Public schools were auctioned off and became privately run, yet state funded. Post-Katrina, there were 31 such private schools (so called charter schools), as opposed to seven previously. Conversely, the public schools decreased from 123 to four. This transformation of the school system took place within just 19 months of Katrina's wreckage (Klein, 2007:5). In stark contrast, Klein (2007) argues that the survivors of a crisis normally want to restore what they can. They feel a strong sense of place and have no wish for a fresh beginning (Klein, 2007).

3.5.5 Deadly indifference: the outlook of the authorities

This subchapter illustrates the view of the US authorities—as represented by Brown and Schwarz (2011)—on the devastation of Hurricane Katrina. Brown & Schwarz (2011) more or less maintain that everyone is responsible for his or her own fate. If you deliberately choose to settle down in a catastrophe-prone area, then you had better be prepared for disaster. Shutting a blind eye to the risks, only makes you guilty of so called "/--/ deadly indifference /--/" (Brown & Schwarz, 2011:1-2). If you live in, or move into, a potential disaster area, casualties will likely occur. If you are unaware, or simply do not care, it might well get you dead. In New Orleans, Brown & Schwarz (2011:196) argue that prior to Katrina, most residents were fully aware that the levees were in poor shape due to lack of financing. Still, people remained indifferent rather than proactive. Instead, cities and residents should plan ahead for disaster. There must be ready-made evacuation plans and emergency housing for the entire city—including the suburbs. According to Brown & Schwarz (2011:196), it's nothing but foolish to believe that disaster will not strike, simple because it hasn't already. Hence, they stress the following point: "If you live in New Orleans, you either rent or buy on the highest ground, or you might die" (Brown & Schwarz, 2011:195). In case the message didn't get through the first time, Brown & Schwarz (2011:195) declare once again: "Live in the wrong section of New Orleans and you might die." Furthermore: "Rebuild the city to its grandeur pre-Katrina, and guess what? You might die" (Brown & Schwarz, 2011:195-196).

4. ANALYSIS AND DISCUSSION

4.1 Analysis and discussion of the findings

To what extent do the 'green' collapse theories of Diamond (2005) and Ponting (1992) explain the damage done to New Orleans by Hurricane Katrina? Neither goes the full distance, in my opinion. In their theories, they emphasize the environmental aspects, but downplay the social, economic and political ditto. This does not cut it for explaining the breakdown of New Orleans during Hurricane Katrina. As stated by Widegren (2007), and seemingly maintained for the most part by most authors in unison, the managerial flaws on all levels as well as the social justice issues were the main causes of disaster. The aforementioned managerial errors include inadequate emergency prevention, preparedness and response such as for instance faulty levee design and maintenance, lack of financing, flawed evacuation, communication breakdown between and within agencies, sluggish relief, failure to uphold law and order, as well as a general lack of political attention. There were also long-standing flaws in the wetlands management. Furthermore, as exposed by Klein (2007), politicians and businessmen both viewed the post-Katrina recovery phase as a golden opportunity to make a buck; while the local people were regarded as an obstacle to be removed. The social justice concerns have to do with long-term, underlying, structural issues of exclusion and discrimination, which ultimately caused a large amount of the populace to be left behind during the hurricane, as maintained by many authors. This was nothing new; as mentioned by Bullard & Wright (2009) these marginalized segments had been left largely on their own before Katrina, and still remained so after Katrina. Furthermore, as shown by Bullard & Wright (2009), social justice issues were *linked* to poor crisis prevention, preparedness and response, since it lacked behind particularly in the flood-prone New Orleans neighbourhoods where the most marginalized resided. Actually, for this essay, written with the intent to maintain an environmental focus, there were not many environmental aspects to be found in the literature on Hurricane Katrina, save for the flawed wetlands management. In fact, most 'environmental' facets concerning the root causes of the impact of Hurricane Katrina tend to come in the way, shape and form of so called *environmental justice*. Tellingly, even this concept relates to social justices above all. As stated priorly, I for one do subscribe to the viewpoint of environmental, socio-economic and political issues as being interrelated in

general. However, the key here is the *proportion*. Diamond (2005) and Ponting (1992) do not get the ingredients right. In their collapse theories, they most dutifully incorporate minor glimpses of managerial, social, political and economic matters into a wide range of green aspects, as if trying to avoid future criticism. Yet, their main emphasis lies firmly within the environmental aspects. This comes as no surprise; that's why their green theories were chosen for testing in the first place. Nonetheless, as a consequence, their green theories do not shed sufficient light on the causes of collapse when Katrina came. Still, I cannot precisely pinpoint the actual degree of contribution to collapse of each aspect—green, social, political or economic. But the scale does not tip towards green issues.

Even so, at first glance it may appear that Diamond's (2005) theory comes closer than Ponting's (1992). This is up for debate, though. On the surface, Diamond (2005) might argue that it's naïve to believe that environmental degradation alone wrecks any society. Yet, his entire five-point framework works as a 'Trojan horse' of environmentalism; inside each set of factors lingers the ecological foundation. Hence, in a way, Diamond (2005) is every bit as one-note when it comes to environmental aspects as a reason for collapse as is Ponting (1992). Diamond (2005) only wraps it up more neatly, hence perhaps the impact of his studies within the emerging genre of 'societal collapse'. It could all be down to a smart marketing stunt. Diamond's (2005) green theory simply seems to be more suitable than Ponting's (1992).

In terms of Diamond's (2005) five-point framework, only environmental degradation and the society's responses seem to have relevance for the collapse of New Orleans, while climate change, friendly trade partners, and hostile neighbours seem to lack bearing. Indeed, as emphasized by Diamond (2005), not every point is fulfilled in every collapse. In the former category of environmental degradation; habitat destruction (of the wetlands), soil erosion (in the sense of the Mississippi River levees restraining the sedimentary inflow into the active delta where New Orleans and the wetlands both are located), salinization (again, of the wetlands), introduced species causing damage to the domestic ecosystem (the nutrias impacting the wetlands), and water management issues (relating to poor management of the wetlands), proved pertinent in the case of the collapse of New Orleans. The majority of the many prospective reasons for ecocide, as mentioned by Diamond (2005), did not appear in correlation to the New Orleans inundation though, by judging from the empirical literature of

this case study. At least temporarily, there was also an increase of toxic chemicals in the environment during the flooding of New Orleans; yet, this was an effect, not a cause. The latter category of flawed management—in environmental matters or others—proved highly relevant. In New Orleans, crisis management failed on all levels, in prevention, preparedness, response as well as recovery. This contributed to causing the collapse and prolonging it.

As far as Diamond's (2005) point of climate change is concerned; global warming has been put forward as a reason for Hurricane Katrina by McQuaid & Schleifstein (2006) as well as Newman et al (2009). Yet, in my opinion, they fail to prove the connection between a potential change into a hotter global mode—and Hurricane Katrina. In fact, the McQuaid & Schleifstein (2006) notion of extra heat in the atmosphere sparking *unpredictable* events, sounds just about like an explanation befitting the mystical category of Tainter's (1990) root cause themes of collapse. Hence, I dismiss the out-of-the-blue claim of climatic change as the cause of Katrina, due to a lack of hard scientific evidence regarding this exact hurricane in their respective studies. It seems hopeless to prove that Hurricane Katrina appeared as a result of climate change, as opposed to being a hurricane that would have materialized anyway. And even though the climate seems to be warming currently; we are still in an ice-house period.

More so, in the case of New Orleans, I consider it a matter of definition if Diamond's (2005) point of hostile neighbours as a reason for collapse is in effect or not. Albeit, I lean towards denial. Surely, as stated by Parker et al (2009), the US attention towards fighting and funding the 'the War on Terror' in the Middle East has detracted from proper financing and management of domestic crisis prevention and preparedness. Hence, behold a reason that helped catapulting New Orleans into a weakened state, which facilitated collapse. Yet, Iraq and Afghanistan are not an *adjacent* neighbour, as the prerequisite, as described by Diamond (2005). Still, in this globalized era, where Diamond (2005) has also emphasized the brand new worldwide implications of societal collapse, I guess it could be argued that the neighbour in question no longer needs to share an actual border, but be situated on the other side of the earth instead. Yet admittedly, this line of reasoning is a bit of a stretch.

In the case of Ponting (1992), his green collapse theory latches on to the unsustainable human practices of resource depletion, in an all the more competitive setting. In addition, Ponting (1992) briefly debates the importance of good governance—from a social, political and

economic standpoint—as a response to the risks posed by environmental degradation. At some point, Ponting (1992) even highlights uneven societal distribution of wealth as a potential threat. Still, these social, political and economic aspects are lost in the crowd of environmental root causes of collapse. Let's not be side-tracked, Ponting's (1992) theory is all about the environment. It could indeed be argued that the poor wetlands management is a case of humans eroding their resource base, in line with Ponting's (1992) collapse theory. There were various industrial constructions, Mississippi river levees, a shipping canal, highways, farm lands, and planted pests (the rodent nutria), et cetera, in these sensitive marshy environs. These measures led to several manifestations of environmental degradation in the vicinity of New Orleans, such as salinization, soil erosion (that is, hampered river sedimentation) and biodiversity loss, which are concurrently mentioned by Ponting's (1992) theory. Yet, it's difficult to determine to what degree the failed management and environmental degradation of the wetlands contributed to the hurricane disaster. In other words, it's hard to tell the extent of the flooding during Katrina, had only the wetlands been managed better, but everything else was equal. That's why I find it tricky to decide on the relevance of Ponting's (1992) green theory for New Orleans.

Hence, what's noticeable in Diamond (2005) and Ponting (1992) both, is the lack of concern for sociological theorization of marginality as a reason for collapse. Such issues, can also be referred to as political matters. This overlook is quite surprising, due to the profound attention to the matter paid by other authors in the wake of Hurricane Katrina. Then again, Diamond's (2005) and Ponting's (1992) respective theories were formulated *prior* to the mental milestone in the history of city breakdown, which Katrina was to become in the USA. Furthermore, big business interests are not thoroughly covered by Diamond (2005) and Ponting (1992) as a collapse reason (albeit sketchily referred to in other contexts). This is even more surprising. At this point in time, could you really address the societal response to environmental degradation—as do Diamond (2005) and Ponting (1992) directly or indirectly—without simultaneously debating the potential influence of competitive natural resource-depleting corporations that the authorities must continuously relate to? Issues of the political system on one hand, business interests on the other—yet, sometimes they seem to go hand in hand, as shown by the shock-doctrine theorist Klein (2007) in her exposure of campaign-funding private contractors reaping the benefits of the hurricane disaster. The same goes for the oil-pipe traversed Louisiana wetlands, the only major environmental 'hotspot'

among the disaster root causes. Should the state of Louisiana assume the full blame for the wetlands fragmentation? Oil in the Mexican Gulf area is not solely a local political matter; it's big business for the entire nation.

As stated by Klein (2007), the people of New Orleans put their trust in the US authorities to save them from flooding. As for the authorities, symbolized by Brown & Schwarz (2011) in this thesis, they make clear that from where they are standing, each and every man, woman and child have a responsibility of their own. In their book titled *Deadly Indifference*, Brown & Schwarz (2011:195) argued that: "If you live in New Orleans, you either rent or buy on the highest ground, or you might die." I find this line of reasoning a clear case of 'blaming the victims', as described in detail by the theory of Somers (2008), if yet not related to welfare. In fact, the attitude displayed by Brown and Schwarz (2011) adds a whole new dimension to the concept of 'deadly indifference'—this time around, it's directed from the authorities towards the constituents. This may indeed be what Bullard & Wright (2009) refer to as indifference of the agencies in charge. Besides Brown & Schwarz (2011), none of the other authors covered by this thesis have resorted to the blaming-the-victims cop-out as a root cause of disaster. (Albeit far more nuanced, the debate by Parker et al [2009] of the significance of psychological mechanisms such as the *cry wolf* syndrome and *hurricane roulette* for refusal to evacuate, may or may not be a less crude side of the same coin. As maintained by Widegren [2007], the authorities are responsible to have a plan on how to deal with prospective lingerers.) Mind you, it was not informal settlements that were drenched in the flood-prone areas of New Orleans—some were even public housing, intended directly for the marginalized minorities. Paradoxically, due to the built-in managerial flaws in the evacuation design, the affluent car-borne citizens in less flood-prone areas evacuated on their own—while those most vulnerable, living below sea-level, remained. Notably, in their theories on collapse, in addition to the failure in distinguishing social issues at all, Diamond (2005) and Ponting (1992) almost completely miss out on these lingering power issues and the dichotomy between the general public—in particular, the marginalized sections of community—and the leaders of society. Hence, when it comes to what little coverage there is on management, prevention, preparedness and response, Diamond (2005) and Ponting (1992) for the most part discuss society as 'a whole', as if all segments of society are one and the same entity that shares a common goal. In Ponting's (1992) main scenario, it seems as if the entire societal sphere on Easter Island was busy raising statues—a competitive move that most noticeably

eroded the resource base and the very foundation for human existence on the island. Hence, on the Easter Island the competition was on between clans; not between various players (politicians, big businesses—including oil, et cetera) in the upper social strata—which intentionally or unintentionally eroded or neglected the way of life for the marginalized—as in New Orleans. Here, I refer to the severing of the wetlands due to industry goals, poor wetlands management of the authorities, faulty prevention due to high-cost levee maintenance, inadequate crisis preparedness in terms of evacuation and response, and a mutual understanding between politicians and business interests to once and for all keep the marginalized segments out by method of privatizing public housing in the recovery phase, et cetera. As stated by several authors in this thesis, the US authorities were well aware of the risky location of New Orleans pre-Katrina. In all fairness, Ponting (1992) maintains that his study does not cover politics or cultural history. (Here, Ponting [1992] seemingly contradicts himself, having also declared that human societies are wrongfully viewed as separate from the natural ecosystems.) This could no doubt account for the environmental focus, in expense of detailed socio-political issues. Still, this makes the theory that Ponting (1992) puts forward less suitable for the case of Katrina-context New Orleans. In addition, Diamond's (2005) theory also nails the rapid pace of the collapse that took place in New Orleans, while Ponting (1992) perceives collapse as either speedy or gradual depending on the case.

As for the city of New Orleans, hovering precariously along the Mississippi River bank, it's a typical example of a city which is highly praised for cultural values and yet unfeasibly built around natural geographical features, in line with the statements of Brokking (2011), Andersson (2011) and Smith (2011). Whether or not New Orleans is actually resilient—a normal characteristic of cities as claimed by Marcus (2011)—is arguable. There was a massive infrastructural breakdown and an actual exodus in the wake of Hurricane Katrina; and during the centuries, New Orleans has been ravaged by nearly 200 hurricanes, several floods, blazing flames of wildfire as well as raging disease. Still, despite it all, it is yet to be wiped off the face of the earth. Nevertheless, New Orleans seems every bit as reliant on its surroundings (that is, above all the wetlands) for its existence as any other city, relating to the declaration by Marcus (2011) and Neuman (2005) of the dependency between urban areas and their hinterlands. As mentioned by Smith (2011), one side to New Orleans surely seems to be 'exotic charms on an impossible site'. Still, the catastrophic flooding of New Orleans in 2005 was not a mere case of 'hurricane versus city'. As claimed by many authors, from McQuaid &

Schleifstein (2006) to Bullard & Wright (2009), the catastrophic events during Hurricane Katrina were 'unnatural' as well as 'man-made'. This tells us one thing—contrary to the statement of the European Commission (2008), big cities do not always have the means to right the wrongs their creating. As shown by Smith (2011), New Orleans has constantly been in trouble: first yellow fever; later on segregation, exclusion and the worst murder rates in the nation—then Katrina came. Notably, long before the great deluge brought on by Hurricane Katrina, New Orleans was already known as 'The Wet Grave'. Corresponding to the account of Tannerfelt & Ljung (2006), typical urban pitfalls such as poverty, segregation, exclusion, low-quality housing and an increased vulnerability to natural hazards—features present in pre-Katrina New Orleans as well—always stem down to poor governance. Yet, as declared by Somers (2008) and confirmed by Smith (2011), the marginalized segments of society in New Orleans were the ones to blame at all times.

So, what about other theories? Unlike the prophecies of Newman (2007), Newman et al (2009) and Kunstler (2005), who for the most part place city collapse in a far-flung future, in New Orleans the collapse has already taken place. It's no longer a question for a distant oil-free future. Unlike Short (2004), in New Orleans the city collapse did not occur due to inadequate reach of global capitalism in the developing world. As argued by Klein (2007), capitalism actually made the collapse of New Orleans *worse* (deepened and prolonged). There is not sufficient evidence to support that the drastic downfall of New Orleans during Hurricane Katrina was due to declining marginal returns either, which is Tainter's (1990) economically related take on societal collapse. Yet, in agreement with the modifications of Tainter's (1990) and Diamond's (2005) theories due to present era globalization, New Orleans did not collapse unnoticed in its soup bowl—in fact, oil prices were impacted all over the globe. Notably, as early as in 1990, Tainter (1990) also linked his potential collapse scenario to upcoming fossil fuel depletion in times to come. More so, in line with Tainter's (1990) argument that modern nations do not collapse in isolation; the New Orleans population (that is, the dispersed poor segment) as well as the area (where developers and politicians jointly moved in on the drenched public housing) was indeed absorbed—but domestically, not by a foreign intruder. Yet, compared against Tainter's (1990) compilation of other authors' eleven root cause themes for societal collapse, the city collapse of New Orleans during Hurricane Katrina comes closest to the category referred to as class conflict/societal contradictions/elite mismanagement or misbehaviour, with a tinge of the resource depletion

kind. Still, Ponting (1992) and Tainter (1990) both claim that the type of societal collapse they describe in their theories, haven't occurred yet in modern times. Unlike Ponting (1992) and Tainter (1990), the case of New Orleans proves that city collapse actually *has* taken place in our own time, not merely in the past. Yet, this may not be the revelation it first seems, since the societal collapse theories of Ponting (1992) and Tainter (1990) *pre-dates* Katrina. It's not the type of collapse that's explained by their theories, either. Nevertheless, judging from the evidence of the case of New Orleans struck by Hurricane Katrina, it should be proven once and for all that a city collapse actually *did* occur. Consequently, city collapse may well take place in our own time and in the Western world.

Yet, in a way, peak oil—or, rather, the fading amounts of oil on US grounds specifically—in the former oil-boom town of New Orleans, essentially set off its decline. The population of New Orleans was already declining *before* Katrina hit. According to Diamond's (2005) definition of societal collapse, all it takes to constitute collapse is population decrease. Hence, one could argue that the collapse was already in effect prior to Katrina. Still, using my own definition of societal collapse as stated in the method section, I consider the wreckage of Hurricane Katrina the starting-point of the collapse of New Orleans. I'd like to argue that no matter how you look at it, New Orleans experienced a full-scale breakdown during Katrina. In line with my own definition of collapse, the infrastructure was down and out. This involves the complete or near-complete breakdown of all basic systems such as power, heating, drinking water, sewage, communications, and transportation. Food supply was affected and security issues grave. Schooling, housing, health care, commerce and business crumbled as well. For exactly how long is hard to maintain, due to variations in facts. But the resettlement phase, and thus recovery as a whole, is thought to take 20 years. It may not be the same populace that returns, either. The whole area experienced a 'whitewash' during the flooding disaster, as is not uncommon during crises. New Orleans finally enriched, when poor segments were dispersed. Still, the recovery does not come cheap; an estimate gives figures in the range of US$125-150 billion. Furthermore, the wetlands faced further ruin. Diamond (2005), too, perceives an extended drop in social, political and economic complexity over a sizeable area, in accordance with his definition of societal collapse. Hence, this part of his definition definitely fits the context of post-Katrina New Orleans. Ironically, in terms of determining the manifestations of societal collapse, Diamond (2005) presses way harder on social, economic and political factors, than in his root causes of collapse. In fact, in his

definition, Diamond (2005) does not consider any decline in *environmental* complexity as an indication of societal collapse. This, too, indicates that Diamond (2005) may tend to perceive the environmental and the social, economic and political spheres as separate entities. In his theory, Ponting (1992) has called attention to the inadequacies of this point of view—but then still chooses to focus on the environment, and sets the political sphere aside, himself.

Yet, contrary to Newman et al's (2009) concept of the collapsed city, and Tainter's (1990) depiction of other theories relating societal collapse to inability to adjust (such as 'the Dinosaur', 'the House of Cards' or 'the Runaway Train'), no evidence suggests that New Orleans failed to adjust to new circumstances. As described by McQuaid & Schleifstein (2006), the locale of New Orleans has been in the path of thunderstorms from day one. The faulty levee system, the poor wetlands management and the high hurricane risk had long since been there. Strangely, in a way the very *adjustment* of the US government towards the new geopolitical enemy (that is, fighting and financing 'the War on Terror') made domestic emergency management forget all about hurricane prevention, preparedness and response.

All in all, this case study reveals that more balanced a combination of green, socio-political and economic issues should provide a better framework for the understanding of city collapse, by judging from the case of New Orleans. Diamond (2005) and Ponting (1992) are too 'narrow' in their theoretical set-up. In fact, they have positioned themselves into a 'green corner'. In doing so, they are not even close. Despite the unlucky fit for New Orleans, I much appreciate the 'green' collapse theories of Diamond (2005) and Ponting (1992). I did not select them with the hidden intent to 'shoot them down'. They simply did not fit this case. This is much to my astonishment, I admit. I had personally believed that Diamond's (2005) theory in particular would prove a better match. Further studies are much needed in order to deduce if 'fusion' collapse theories (a blend of green, social, economic and political causes), or green theories unaided, match other cases of collapse. Until then, there is simply no way of telling if the mixture of green, social, political and economic root causes is truly unique for the collapse of New Orleans during Hurricane Katrina.

5. CONCLUSION AND SUMMARY

5.1 Conclusion

So, why did the 'Mardi Gras capital' of New Orleans turn into a 'toxic gumbo', or 'Cajun Atlantis' for that matter, due to Hurricane Katrina in 2005? There is no easy answer. Instead, there appears to be a multitude of interrelated causes of the collapse of New Orleans. In particular, there was poor management on all political levels—in terms of crisis prevention, preparedness, financing and response as well as in dealing with matters relating to environmental degradation of the local wetlands—in connection with various lingering political issues concerning socio-economic marginalization and exclusion. (The faulty levees, by the way, should be considered covered by the previous category of managerial failures.) In this mix of reasons, there were subsequently socio-political, economic and 'green' issues intertwined. Furthermore, the (in)actions of the authorities during the recovery phase could come into question as well, even if it didn't cause the initial disaster. Yet, insufficient response during the emergency phase served to deepen the disaster, while inadequate recovery prolonged it. At this point, however, I do not find it scientifically proven beyond reasonable doubt that global warming was one of the contributing root causes, but this perspective may be subject to change in time. Neither do I find it fit to blame the victims, that is, the residents that for various reasons had settled in flood-prone areas along the 'hurricane highway'. These were not informal settlements; some were even public housing. And last time I checked, the area did not officially 'wear a warning'. It does appear though, all in all, that managerial and social justice issues are in the driver's seat, while environmental issues fall behind. Despite the 'green theme' of the theories tested in this essay, the environment presumably did not play the major part in wrecking New Orleans apart. This was not a case of 'hurricane versus city'; on the contrary, it was a clear case of man-made disaster due to unfortunate governance. All evidence so far point in this direction. The slamming of Hurricane Katrina into New Orleans and the subsequent events has become *the* epitome of poor political leadership in combination with social and racial oppression, unbecoming of America. In addition, the present time collapse of the Western world city of New Orleans was not caused by futuristic peak oil or Third World non-globalized capitalism, as has been argued as common city collapse reasons

in other instances. Hence, in New Orleans we have a new scenario, where traditional city collapse theories do not quite cut it.

During the course of disaster, all infrastructural services fell in New Orleans. As much as 80% of New Orleans was suddenly under water; hence all normal activity ceased. There were no more systems for drinking water, electricity, heating, sewage, communications or transportation. The food supply was cut off, as well. Also, the housing was affected. In addition, sectors such as health care, law and order, court justice, schooling, commerce, business activity, et cetera, suffered a complete breakdown as well. Approximately 1,800 inhabitants were deceased. Eventually, as a direct result of disaster, the city was even empty of people. There was an eerie resemblance of a ghost town. Getting back on track again, proved a lengthy process. The reconstruction phase is expected to take 10 years; the repopulation process 20 years. Hence, the definition of societal collapse that I made prior to my empirical case study of New Orleans, where I bring up breakdown of basic services—which in this context could be equaled to infrastructure—hits close to home.

So, did Diamond (2005) and Ponting (1992) nail the New Orleans chain of events in their respective theories? No, they relied too heavily on environmental causes, as opposed to the social and managerial issues that unraveled in New Orleans. Matters of social justice are neglected by them both. Ponting's (1992) theory in particular never quite takes off from environmental causes. Though, there is a brief statement that competition for status spurred degradation of environmental resources, why people in actuality eroded their own foundation. At the end of a long range of green collapse issues, he also briefly mentions the increasingly uneven distribution of resources and basic services as problematic in terms of collapse. Here, he argues, the authorities need to deal with the situation (which mainly consists of environmental risks) in a suitable economic, social and political manner. Then again, the lack of proper response did indeed materialize in New Orleans. As claimed by Ponting (1992), deep down, the inhabitants on Easter Islands must have realized that they were on a path to doom. It must have been just as clear in New Orleans that the situation was not going in the right direction, in case of wetlands management, crisis prevention and preparedness, maldistribution between the rich and the poor segments of society, et cetera. To correct these wrongs, Ponting (1992) has pinpointed a timely social, economic and political response as crucial. Yet, his momentary attempt to mention socio-political issues gets lost in the crowd of

environmental matters. Disappointingly, Ponting (1992) never made a definition of societal collapse. Furthermore, pre-Katrina, Ponting (1992) insisted that his theory is yet to come true in the modern day. Here, I argue that he's still right, at least if judging from the example of collapse in New Orleans. Diamond (2005), on the other hand, perceives managerial issues in relation to environmental degradation and other matters. Hence, Diamond (2005) does nail the lame response to the wetlands loss as well as the many failures in crisis response that took place during Hurricane Katrina, even if his theory does not comprise of the social justice aspects. I guess, though, it could be argued that social justice issues could be incorporated within the framework of poor management. But ultimately, I perceive this a tad bit too far-fetched. More so, as far as environmental degradation is concerned, most reasons Diamond (2005) mention for societal collapse in relation to ecocide did not unfold in New Orleans. However, there was habitat destruction (wetlands), salinization (wetlands), water management issues (wetlands), and new species (the rodent nutria—in the wetlands). In fact, the wetlands seem to be the only weak spot in environment as far as the collapse of New Orleans during Hurricane Katrina is concerned. Yet, in Diamond's *definition* of societal collapse, social, political and economic aspects also get some attention. I would like to argue that in New Orleans, there is a sharp drop in complexity in all of these spheres as a result of Hurricane Katrina. The whole system broke down, the authorities lost grip of the situation, communications fell through together with the rest of the infrastructure, businesses closed down, immense amounts of money were lost, people were dispersed, polarization and segregation increased, illness prevailed, et cetera. Hence, this part of Diamond's definition proves true. However, in his definition, Diamond (2005) also links societal collapse to a population drop. The population of New Orleans did indeed plummet due to Katrina. However, it was already plunging even before the onset of disaster. Hence, when it comes to capturing the Katrina impact on New Orleans, to a greater or lesser degree, Diamond's (2005) and Ponting's (1992) theories simply will not do. A theory that would latch on to the whole situation would have to cover environmental aspects, social justice issues, and managerial matters. In stating this, I by no means intend to imply that their theories are flawed per se. This is the study of the breakdown of one specific city; it does not say much of the theories' applicability in general. Yet, I am truly enthusiastic about Diamond's (2005) and Ponting's (1992) green collapse theories. I would be thrilled to see the results if tested on other cases of collapse, in further scientific research. I find both their theories very appealing and relevant—

yet not for the case of New Orleans. Here, they miss the target, either partially (Diamond, 2005) or almost fully (Ponting, 1992).

5.2 Agenda for further research

The following subchapter contains a brand new research framework for city collapse worldwide. It's based on the turn of events in New Orleans when Katrina came—and it draws on bits and pieces from collapse theories as well as empirical findings presented in this thesis. The framework serves to establish the new research background within city and societal collapse. In doing so, it aims to inspire the design of further research problems and research questions, as well as point towards theories to be analyzed, within this research field.

Diamond's (2005) origins of ecocide as well as Ponting's (1992) resource depletion theme may well prevail, as one set of hazards among others. The city is not a separate entity; it's dependent on ecological systems. If you erode your resource base or jeopardize the environment in other manners, it might prove a risk factor for collapse. In New Orleans, the critical environmental issue was the wetlands loss. Furthermore, governance is the key. Here, Diamond's (2005) green-centered notion of proper response from the authorities does not quite cut it; there must be sufficient prevention, preparedness and recovery as well as response. As stated by Widegren (2007) concerning New Orleans, the proactive measures, as opposed to the reactive ditto, were noted as a particular problem. Furthermore, as opposed to Diamond (2005), the appropriate measures must consider other spheres than the environment as well. Here, Tainter (1990) comes in handy with his category of class conflict/societal contradictions/elite mismanagement or misbehaviour. This broad a category could be considered to encompass both flawed governance on all political levels as well as a structural lack of social justices; problems that haunted New Orleans, as maintained by Widegren (2007), Bullard & Wright (2009), Somers (2008), and others. Notably, this is not Tainter's (1990) own theory; it's part of his findings concerning *other* authors' collapse themes. However, Tainter's (1990) category of insufficient response to circumstances will not be considered for the framework. This category involves 'the House of Cards', 'the Runaway Train' and 'the Dinosaur' models, but none them match the course of events in New Orleans. The issue is to plan ahead rather than simply respond. Insufficient societal response per se

could still prove a detriment and made up part of the problem in New Orleans, tied to matters such as emergency management and wetlands loss. Hence, I regard a lack of proactive and reactive measures both as part of the class conflict/societal contradictions/elite mismanagement or misbehaviour category. Tainter (1990) also sports an economic theory of his own, regarding declining marginal returns. Yet, this was not the cause of the cave-in of New Orleans. In fact, the economic root causes of collapse appear more or less built into the category of class conflict/societal contradictions/elite mismanagement or misbehaviour, as derived from the case of New Orleans. Based on the findings of Klein (2007), profiteering of the private sector may not pose as a resilient feature, either. This particular risk factor, which is related to governance, could also be considered to be covered by the category of class conflict/societal contradictions/elite mismanagement or misbehaviour, as presented by Tainter (1990). In relation to the breakdown of New Orleans, a catastrophe—one of Tainter's (1990) compiled root causes—set the whole chain of events in motion. Still, had not the other components failed, chances are there would not have been any disaster.

Consequently, a city collapse research framework derived from the events of New Orleans, would—to varying degrees—involve the following risk factors for collapse (in random order of importance):

- Environmental degradation
- Flawed political governance on all levels in terms of proactive and reactive emergency measures—including financing
- Structural inequalities in respect to social and environmental justices

So, this is the threefold set of planning faux pas to avoid, in regard to preventing a New Orleans-style breakdown. Among these research issues, I consider a potential lack of appropriate managerial actions, proactive as well as reactive, by the proper authorities to the situation at hand to be inherent to the categories concerning environmental and social aspects (that is, points one and three—in the second point, concerning political aspects, it's stated explicitly). It's been argued by most authors in this study that flawed governance was *the* fatal mistake in the collapse of New Orleans, more so than any other cause. Hence, the emphasis is on this category. There are, however, linkages between—and layers within—all three root causes of collapse. There is no sharp line between them. More so, these three categories—

environmental degradation, inadequate governance in regard to crises, and social inequalities—strike me as of universal concern.

All the same, it is important to keep in mind that any upcoming city collapse may not unfold in the very same manner as did the breakdown of New Orleans. No one knows what the future holds; in times to come, climate change—or any other phenomenon—may emerge as a prospective destroyer of urban areas. One must not zone in on too narrow a future scenario. Accordingly, it is of crucial importance to continue the scientific research into the field of city and societal collapse; a journey on which I've already taken the first step with this degree project. Issues regarding resilience, sustainability, city and societal collapse as well as emergency prevention, preparedness, response and recovery must be firmly incorporated within policy and planning, in order for cities and societies to withstand potential future 'shock waves'. Let the breakdown of New Orleans serve as a lesson for all of us—history must not repeat itself, if only we plan ahead.

5.3 Summary

This thesis strives to explain, identify, and increase the knowledge of the underlying causes of societal and city collapse primarily in the Western hemisphere, with the hope to prevent further instances of breakdown during diverse types of crises. For this purpose, the thesis introduces and tests two theories—Diamond's (2005) and Ponting's (1992)—that attempt to shed light on societal collapse from an environmental standpoint. Diamond (2005) and Ponting (1992) both link societal collapse to environmental degradation. Diamond (2005) also perceives managerial root causes of collapse, while Ponting (1992) mainly envisions environmental reasons. In this day and age, ever more people reside in potentially hazardous settings in urban areas. Hence, the city as such will concentrate the global challenges in times to come. No one has previously attempted to apply an explanatory framework of traditional 'green' societal collapse theories on an actual breakdown of a contemporary city. Herein lays the contribution of this thesis to science.

With the aim of achieving the aforementioned research goals, this essay examines Diamond's (2005) and Ponting's (1992) collapse theories against the real-life backdrop of the natural

disaster that hit the US city of New Orleans in 2005. The empirical case study has revealed that in the wake of Hurricane Katrina, roughly 80% of New Orleans was flooded with up to six meters of water, approximately 1,800 lives were lost, and vast economic values were obliterated. As a consequence of the disaster, basic services and infrastructural systems faced a near-complete and lengthy breakdown. Law and order broke down as well. In addition, as a result of Hurricane Katrina, large segments of the poorest populace of New Orleans were dispersed all over the USA. The post-disaster repopulation phase has been estimated to take close to 20 years. In other words, New Orleans experienced a full-scale collapse—with infrastructural, political, social and economic repercussions—during Hurricane Katrina.

When all is said and done, this case study points to a mixture of interrelated 'green', political, social and economic reasons for the collapse of New Orleans during Hurricane Katrina. Among those, various managerial and social justice issues—that is, in practice the political and socio-economic causes—can be considered the most prominent. In fact, environmental issues only seem relevant in relation to wetlands management. The coastal wetlands of Louisiana have suffered a significant decrease in later years due to oil-business related fragmentation with subsequent habitat loss, introduction of new species in the shape of the nutria rodent, and saltwater intrusion into man-made canals, among other reasons. This has diminished the capacity of the wetlands to withstand the impacts of hurricanes and reduce storm surges. At this point, however, there is not enough scientific evidence to support that climate change had anything to do with the impact of Hurricane Katrina on New Orleans.

Hence, Diamond's (2005) collapse theory partially matches the events that triggered the breakdown of New Orleans during Hurricane Katrina. In his theory, Diamond (2005) mentions both flawed managerial practices (inadequate societal responses in environmental matters and others) as well as environmental degradation (for instance wetland habitat loss, poor water management, salinization and introduction of alien species) as reasons for collapse. Furthermore, the events that unfolded in New Orleans match Diamond's (2005) definition of societal collapse, which is related to long-time demographical, social, economic and political downsides. Still, there is no evidence that hostile neighbours or friendly trade partners were part of the equation, and most matters Diamond (2005) has mentioned in relation to so called ecocide did not materialize in New Orleans. Indeed, Diamond (2005) has argued that not all factors of his five-point framework—environmental damage, climate

change, hostile neighbours, friendly trade partners, and the society's responses to environmental problems—have to be at play in each and every instance of societal collapse. However, Diamond's (2005) study is not preoccupied with social justice issues, either. As we have seen, social justice issues played an important part in the cave-in of New Orleans. Ponting's (1992) theory, on the other hand, only nails the environmental effects of the shrinking Louisiana wetlands. Here, his arguments of human activities ruining the delicate ecosystems, farmland entering into sensitive habitats, biodiversity loss and salinization, come in handy. In his defense, Ponting (1992) has explicitly stated that his theory does not deal with issues relating to other spheres such as politics, et cetera. He does, however, also point out in his theory that with the spread of the European lifestyle during the last centuries, the warped distribution of wealth and basic needs between the haves and the have-nots has increased. Ponting (1992) claims that this situation could lead to the downfall of civilization, in case the proper authorities fail to respond sufficiently. This latter chain of development could also seem to be somewhat true for New Orleans.

In sum, by judging from the case of New Orleans, it appears as if 'green' collapse theories alone will not do in so far as to explain the underlying causes of collapse. There needs to be an inclusion of reasons relating to social, political and economic matters into the green theory, in order to get a true match. Such a fusion of a theory would likely have proven a perfect match in the case of New Orleans. Hence, Diamond's (2005) theory appears to come closer than Ponting's (1992), since the former also pays more attention to managerial issues outside sheer environmental aspects. Nevertheless, albeit newsworthy, the results gained from this single-scenario case study cannot be instantly generalized on all other contexts of collapse globally. Still, this essay could well serve as an eye-opener in terms of the interrelated nature of environmental, political and socio-economic matters in relation to city collapse. The study can be regarded as a forerunner for future research in the field, in order to further examine the relevance of green collapse theories for the root causes of real-life societal and city collapses.

6. REFERENCE LIST

6.1 References

Aitken, S.C., Textual Analysis: Reading Culture and Context, *in*: Flowerdew, R., & Martin, D. (eds.), *Methods of Human Geography*, Harlow : Prentice Hall, 2005

Amaratunga, D., & Haigh, R., *Post-Destruction Reconstruction of the Built Environment: Rebuilding for Resilience*, John Wiley and Sons, 2011

Andersson, T., lecture on Landscape Urbanism vs. Landscape Design during the course in Sustainable Urbanism and Green Metropolitan City Regions, KTH, March 30th 2011

Associated Press, *Katrina May Cost as Much as Four Years of War*, Sep. 10th 2005, http://www.msnbc.msn.com/id/9281409/ns/us_news-katrina_the_long_road_back/t/katrina-may-cost-much-four-years-war/, accessed Jan. 29th 2012

Associated Press, A Year Later, Signs of Life Return: New Orleanians Struggle to Rebuild, *Boston.com*, Aug. 13th 2006, http://articles.boston.com/2006-08-13/news/29241272_1_worst-hit-neighborhoods-future-floods-lower-ninth-ward, accessed March 26th 2012

Bergal, J., The Storm, *in*: Bergal, J., et al., *City Adrift: New Orleans before and after Katrina*, Baton Rouge: Louisiana State University Press, 2007a, pp. 1-6

Bergal, J., Health Care, *in*: Bergal, J., et al., *City Adrift: New Orleans before and after Katrina*, Baton Rouge: Louisiana State University Press, 2007b, pp. 71-85

Björkman, M., New Orleans Ännu i Ruiner, *Metro.se*, April 27th 2006, http://www.metro.se/new-orleans-annu-i-ruiner/ObjfdA!08_1352-23/, accessed April 8th 2012

Blakely, E.J., & Hartman, Ch., Guest Editors' Introduction, *Housing Policy Debate*, Jan. 2012, Vol. 22, No. 1, pp. 1-3

Brinkley, D., *The Great Deluge: Hurricane Katrina, New Orleans and the Mississippi Gulf Coast*, New York, N. Y. : Harper Perennial, 2007

Brokking, P., introductory lecture to the course in Urban Infrastructure, KTH, Jan. 18th 2011

Brokking, P., lecture on Strategic Considerations in Infrastructure Planning and Management during the course in Urban Infrastructure, KTH, Feb. 1st 2011

Brown, M.D., & Schwarz, T., *Deadly Indifference: The Perfect (Political) Storm—Hurricane Katrina, the Bush White House, and Beyond*, Lanham : Taylor Trade Pub., 2011

Bullard, R.D., & Wright, B., *in*: Bullard, R.D., & Wright, B. (eds.), *Race, Place and Environmental Justice after Hurricane Katrina*, 2009

Burdeau, C., Hard-hit New Orleans' Area Still Resembles Ghost Town, *Boston.com*, Aug. 29th 2011, http://articles.boston.com/2011-08-29/news/29941930_1_lower-ninth-ward-new-orleans-ghost-town, accessed March 26th 2012

Casnig, J.D., Blog Comment Posted on Jan. 30th 2007, The Metaphor Observatory, *In a Stew over Toxic Gumbo*, Sep. 18th 2005, http://www.metaphorobservatory.com/2005/09/in-a-stew-over-toxic-gumbo/, accessed April 1st 2012

Davey, L., The Application of Case Study Evaluations, *Practical Assessment, Research & Evaluation*, 2(9) 1991, http://pareonline.net/getvn.asp?v=2&n=9, accessed Jan. 15th 2012

Diamond, J., *Collapse: How Societies Choose to Fail or Succeed*, New York, N.Y. : Viking, cop., 2005

European Commission, *Declaration Establishing: the European Green Capital Award*, Brussels, May 22nd 2008, http://ec.europa.eu/environment/europeangreencapital/docs/about/egc-declaration.pdf, accessed March 1st 2011

Frailing, K., & Harper, D.W., School Kids and Oil Rigs: Two More Pieces of the Post-Katrina Puzzle in New Orleans, *American Journal of Economics and Sociology*, Vol. 69, No. 2, April 2010, pp. 717-735

Fröberg, P., lecture on The World Goes to Town: Urban Slums of the World during the course in International Health: Regional and Global Changes over Time, Stockholm University, Dec. 1st 2011

Haas, T., introductory lecture to the course in Sustainable Urbanism and Green Metropolitan City Regions, KTH, March 22nd 2011

Kirshen, P., et al, Interdependencies of Urban Climate Change Impacts and Adaptation Strategies: A Case Study of Metropolitan Boston USA, *Climatic Change*, 2008, 86, pp 105-122

Kjörling, L., journalist, lecture on Environmental, Labour and Ownership Impacts of Biofuel Production during the course in Project Sustainable Infrastructure, KTH, Sep. 20th 2011

Klein, N., *The Shock Doctrine: The Rise of Disaster Capitalism*, London : Allen Lane, 2007

Kunstler, J.H., *The Long Emergency: Surviving the Converging Catastrophes of the Twenty-first Century*, New York, 2005

Ludd, N., *Toxic Gumbo*, Urban Dictionary, Sep. 17th 2005, http://www.urbandictionary.com/define.php?term=toxic%20gumbo, accessed April 2nd 2012

Luft, R.E., & Griffin, S., A Status Report on Housing in New Orleans after Katrina: An Intersectional Analysis, *in*: Willinger, B. (ed.), *Katrina and the Women of New Orleans*, Dec. 2008, pp. 50-53, http://tulane.edu/nccrow/upload/NCCROWreport08.pdf, accessed April 23rd 2012

Manuel, J., In Katrina's Wake, *Environmental Health Perspectives*, Jan. 2006, 114 (1), pp. 32-39, http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1332683/, accessed April 8th 2012

Marcus, L., lecture on Sustainable Urban Planning for Ecosystems and Resilience during the course in Sustainable Urbanism and Green Metropolitan City Regions, KTH, April 12th 2011

Marshak, S., *Earth: Portrait of a Planet*, 3. ed., New York : Norton, cop., 2008

McQuaid, J., & Schleifstein, M., *Path of Destruction: The Devastation of New Orleans and the Coming Age of Superstorms*, New York, N.Y. : Little, Brown and Company, 2006

Morial, M.H., Foreword, *in*: Bullard, R.D., & Wright, B. (eds.), *Race, Place and Environmental Justice after Hurricane Katrina*, 2009, pp. xv-xviii

Neuman, M., The Compact City Fallacy, *Journal of Planning Education and Research*, 2005, 25, pp. 11-26

Newman, P., et al, *Resilient Cities: Responding to Peak Oil and Climate Change*, Washington, DC : Island Press, 2009

Newman, P., Beyond Peak Oil: Will Our Cities Collapse?, *Journal of Urban Technology*, 14(2) 2007, pp. 15-30.

Nolan, B., Hurricane Katrina Altered Demographic Picture in New Orleans Area, *The Times-Picayune*, Published Aug. 25th 2010, Updated Aug. 26th 2010, http://www.nola.com/katrina/index.ssf/2010/08/hurricane_katrina_altered_demo.html, accessed April 19th 2012

Orrskog, L., lecture on Sustainable City & Beyond: Rethinking the Discourse during the course in Sustainable Urbanism and Green Metropolitan City Regions, KTH, April 14th 2011

Paglia, E., lecture on Crisis Management during the course in Urban Infrastructure, KTH, March 1st 2011

Parker, Ch.F., et al., Preventable Catastrophe? The Hurricane Katrina Disaster Revisited, *Journal of Contingencies and Crisis Management*, Vol. 17, No. 4, Dec. 2009, pp. 206-220

Pehrson, L., Analys: En Stad Bryter Samman, *DN.se*, Sep. 5th 2005, http://www.dn.se/nyheter/varlden/analys-en-stad-bryter-samman, accessed April 8th 2012

Polèse, M., Why Big Cities Matter More Than Ever, *City Journal*, autumn 2010

Ponting, C., *A Green History of the World: The Environment and the Collapse of Great Civilizations*, London : Penguin, 1992

Rastogi, N., After the Flood: The Ecological Impact of Hurricane Katrina, Five Years Later, *Slate*, Aug. 17th 2010, http://www.slate.com/articles/life/katrina/2010/08/after_the_flood.html, accessed April 7th 2012

Rather, D., Foreword, *in*: Bergal, J., et al, *City Adrift: New Orleans before and after Katrina*, Baton Rouge: Louisiana State University Press, 2007, pp. xi-xiii

Resource4ThePeople, *Toxic Water from Hurricane Katrina*, no date, http://www.resource4thepeople.com/chemicalexposure/toxicwater.html, accessed April 2nd 2012

Roberta [no last name given], *Jared Diamond—Collapse and Political Will at the Philomathean Society's Annual Talk*, The Artblog, April 10th 2011, http://theartblog.org/2011/04/jared-diamond-collapse-and-political-will-at-the-philomathean-societys-annual-talk/, accessed Oct. 12th 2011

Rogers, J.D., Development of the New Orleans Flood Protection System prior to Hurricane Katrina, *Journal of Geotechnical and Geoenvironmental Engineering*, May 2008, pp. 602-617

Roper, W.E., et al, Water Quality Assessment and Monitoring in New Orleans Following Hurricane Katrina, no date, http://www.epa.gov/osweroe1/docs/oil/fss/fss06/roper_3.pdf, accessed April 7th 2012

Schleifstein, M., Ivor Van Heerden, Who Pointed Fingers in Hurricane Katrina Levee Failures, Fired by LSU, *The Times-Picayune*, April 9th 2009, http://www.nola.com/news/index.ssf/2009/04/ivor_van_heerden_who_pointed_f.html, accessed April 26th 2012

Shipley Hiles, S., The Environment, *in*: Bergal, J., et al, *City Adrift: New Orleans before and after Katrina*, Baton Rouge: Louisiana State University Press, 2007, pp. 7-19

Short, J.R., *Global Metropolitan: Globalizing Cities in a Capitalist World*, Routledge, 2004

Short, J.R., *Liquid City: Megalopolis and the Contemporary Northeast*, Earthscan, 2007

Sjöberg, B., lecture on A Changing World—Eastern Mediterranean during the course in The Near East during 10,000 Years, Stockholm University, Feb. 29th 2012

Sjöström, S., Kaotisk Situation i New Orleans, *Sverigesradio.se*, Aug. 31st 2005, http://sverigesradio.se/sida/artikel.aspx?programid=83&artikel=683280, accessed April 8th 2012

Smith, Th.R., The Big Uneasy, *History Today*, Aug. 2011, Vol. 61, Issue 8, pp. 26-33

Somers, M.R., *Genealogies of Citizenship: Markets, Statelessness, and the Right to Have Rights*, Cambridge : Cambridge University Press, 2008

Stake, R.E., *The Art of Case Study Research*, Thousand Oaks, Calif. ; Sage, 1995

Tainter, J.A., *The Collapse of Complex Societies*, Cambridge, Cambridge University Press, 1990

Tainter, J.A., Collapse, Sustainability and the Environment: How Authors Choose to Fail or Succeed, *Reviews in Anthropology*, Oct. 2008, Vol. 37, Issue 4, pp. 342-371

Tannerfeldt, G., & Ljung, P., *More Urban—Less Poor: an Introduction to Urban Development and Management*, London: Earthscan, 2006

Thinksquad, *This Day in History: Katrina Survivors Finally Get Food*, Sep. 2nd 2010, http://thinksquad.net/2010/09/02/this-day-in-history-katrina-survivors-finally-get-food/, accessed April 11th 2012

Tree Media Group, *Joseph Tainter*, 2010, http://11thhouraction.com/ideasandexperts/josephtainter, accessed March 10th 2012

United Nations (UN), *World Conference on Disaster Reduction*, 2005, Kobe, Hyogu, Japan, http://www.unisdr.org/wcdr/media/wcdr-presskit/wcdr-press-kit.pdf, accessed March 21st 2011

Vågerö, D., lecture on The European Health Divide during the course in International Health: Regional and Global Changes over Time, Stockholm University, Nov. 10th 2011

Van Heerden, I., & Bryan, M., *The Storm: What Went Wrong and Why During Hurricane Katrina—the Inside Story from One Louisiana Scientist*, New York : Penguin Books, 2007

Walsh, J., A Harbour in the Tempest: Protecting the Crescent City, *In Focus*, Spring/Summer 2009, vol. 9, no. 1, http://www.infocusmagazine.org/9.1/env_hurricane_protection.html, accessed April 8th 2012

Widegren, K., *Återuppbyggnaden efter Orkanerna Katrina och Rita*, Swedish Institute for Growth Policy Analysis (ITPS), Arbetsrapport R2007:011

Williams, P., The Future of Global Systems: Collapse or Resilience?, *Scribd Inc.*, uploaded Nov. 23rd 2008, http://www.scribd.com/Silendo/d/8329024-The-Future-of-Global-Systems-Collapse-or-Resilience, accessed March 18th 2012

Willinger, B., The Effects of Katrina on the Employment and Earnings of New Orleans Women, *in*: Willinger, B. (ed.), *Katrina and the Women of New Orleans*, Dec. 2008, pp. 32-49, http://tulane.edu/nccrow/upload/NCCROWreport08.pdf, accessed April 23rd 2012

Willinger, B., & Gerson, J., Demographic and Socio-Economic Change in Relation to Gender and Hurricane Katrina, *in*: Willinger, B. (ed.), *Katrina and the Women of New Orleans*, Dec. 2008, pp. 25-31, http://tulane.edu/nccrow/upload/NCCROWreport08.pdf, accessed April 23rd 2012

Witness: Katrina, Documentary, National Geographic, Siskel/Jacobs Productions, 2010, 90 minutes

Yin, R.K., *Case Study Research: Design and Methods*, 2. ed., Thousand Oaks, CA : Sage, cop. 1994

6.2 Figures

Figure 1: Thecajuns.com, *MAPS*, no date, http://www.thecajuns.com/maps.html, accessed March 11th 2012

Figure 2: Thecajuns.com, *MAPS*, no date, http://www.thecajuns.com/maps.html, accessed March 11th 2012

Figure 3: Thecajuns.com, *MAPS*, no date, http://www.thecajuns.com/maps.html, accessed March 11th 2012

Figure 4: Brown, T., *New Orleans: An "Inevitable City on an Impossible Site"*, Feb. 24th 2009, http://nstacommunities.org/blog/2009/02/24/new-orleans-an-inevitable-city-on-an-impossible-site/, accessed April 10th 2012

Figure 5: Jeremiahtren, *Remembering Hurricane Katrina*, Aug. 29th 2010, http://www.tudiabetes.org/profiles/blogs/remembering-hurricane-katrina, accessed April 19th 2012

Figure 6: Swenson, D., Flash Flood, *The Times-Picayune*, no date, http://www.nola.com/katrina/graphics/continuous.swf, accessed April 8th 2012

Figure 7: Lawrenceville Weather, *Hurricane Katrina (Not Active)*, Oct. 12th 2007, http://www.lawrencevilleweather.com/storms/2005/atlantic/katrina.html, accessed April 10th 2012

Figure 8: Boston.com, *Remembering Katrina, Five Years Ago*, Aug. 27th 2010, http://www.boston.com/bigpicture/2010/08/remembering_katrina_five_years.html, accessed April 17th 2012

Figure 9: Boston.com, *Remembering Katrina, Five Years Ago*, Aug. 27th 2010, http://www.boston.com/bigpicture/2010/08/remembering_katrina_five_years.html, accessed April 17th 2012

Figure 10: The Atlanta Journal Constitution (AJC), *Hurricane Katrina Hits New Orleans, August 29, 2005*, no date, http://projects.ajc.com/gallery/view/metro/news/today-pictures/katrina-6th-anniversary/5.html, accessed April 17th 2012

Figure 11: Boston.com, *Remembering Katrina, Five Years Ago*, Aug. 27th 2010, http://www.boston.com/bigpicture/2010/08/remembering_katrina_five_years.html, accessed April 17th 2012

Figure 12: Utrecht University, *Hurricane Katrina*, no date, http://www.geo.uu.nl/fg/palaeogeography/results/katrina, accessed May 29th 2012

Figure 13: EV World, *Losing Louisiana*, Nov. 5th 2005, http://evworld.com/article.cfm?storyid=923, accessed May 29th 2012

Figure 14: Scotese, Ch.R., *Climate History*, April 20th 2002, http://www.scotese.com/climate.htm, accessed May 30th 2012