

*Exploring Institutional Responses to Climate Change:
A case study of adaptation and vulnerability in Hampton Roads, Virginia*

A Thesis Presented for the
Master of Science
Degree
The University of Tennessee, Knoxville

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May 2014

Acknowledgements

Throughout the process in which this study was created I received generous support from numerous individuals. I would like to thank my committee chair, Carol Harden, for her devotion and generous amounts of time allocated to helping the development of this project. I would also like to acknowledge my committee members, Dr. Gregory Button and Dr. Micheline van Riemsdijk, who have given significant time and energy to this project. All three of the committee members have gone above and beyond their academic duty and have graciously extended moral support. A special thanks to Dr. Benjamin Preston and Dr. Tom Wilbanks, two very special and well-respected researchers in the field of adaptation studies, who have so humbly donated their efforts to helping me better understand adaptation studies, and therefore this research project. I would also like to acknowledge all the informants of this study who generously responded to my emails and took hours out of their days for research interviews.

Lastly, I am hugely thankful to my three children who have been patient and understanding with the demands of this project. Their innocence, love, and joy drives my passion and desire to help make positive social change and mindfully address global future challenges. Lastly, my deepest gratitude is due to my husband who worked harder and sacrificed more than I to help me achieve the goal of this thesis-track M.S. Geography degree. His support was endless and the project would not have been feasible without him. Holland, thank you; words fail to express the gratitude that I have in my heart for all you have done.

Thank you to all who so graciously helped me along this journey that is this research project.

Abstract

This research was undertaken to understand the role institutional actors play in shaping the social process of adaptation to climate change. Through a case study of coastal adaption in Hampton Roads, Virginia, I investigated the socio-political landscape in which institutional adaptation activities (e.g. planning, and formal and informal decision-making) are occurring. Using a qualitative methodological approach, data were gathered from semi-structured interviews with key actors, direct observation at regional Adaptation Forums, and content analyses of local and federal level adaptation planning documents. In this research, I examine the case of adaptation in Hampton Roads through a political ecology lens and identify three ways in which institutional approaches to adaptation may hinder adaptive capacity of at-risk and vulnerable population segments. First, politically charged climate change and adaptation discourse in Hampton Roads limits the scope of adaption planning to address the social and some of the biophysical determinants of place-based vulnerability to climate change. Second, processes of inclusion and exclusion have resulted in the exclusion of critical stakeholders (general public, including the at-risk populations, certain business sectors, and elected officials) from regional adaptation discussions. Lastly, funding for adaptation projects in Hampton Roads is overwhelmingly allocated to large-scale development projects that prioritize protecting the economic centers and high value properties over the most socially vulnerable and at-risk properties. Despite the efforts of current institutional actors to adapt municipalities to the increasing intensity and frequency of regional flooding, all three of these identified facets contribute to undermining the ability of institutions to alleviate vulnerability and risk within the most vulnerable segments of the population. The findings of this research raise broader concerns regarding the current state of institutional adaptation practices within the United States.

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Chapter 1: Introduction

As the biophysical effects of climate change enter into a socially stratified world, altering assets, meaning, and security, the need for social science research and understanding is clearly evident (Agrawal, 2008; Marino and Ribot, 2012). However, some of the social sciences have been slow to engage in climate change research despite their valuable insights for societies beginning the social process of adaptation to climate change. Agrawal et al. (2012) suggested social scientists can productively contribute to climate change research through theoretical advancement, empirical research, and policy engagement. As climate change is a global phenomenon, affecting people in myriad ways, how a place or person experiences climate change will uniquely vary over time and space. Thus, “studies of adaptation need to be especially attentive to scale, equity, and ethical issues because, despite the global character of climate change, its consequences are produced, experienced and responded to at the local level and disproportionately by those with the least capacity to adjust” (Agrawal et al., 2012: 329). This ‘capacity to adjust’ is known commonly as *adaptive capacity* in the adaptation literature and is unequal across and within societies (IPCC, 2007).

As Kates (2000) illustrated, the vulnerable are social groups within countries rather than countries themselves, implying that within each country are vulnerable populations that will experience differences of a weakened leverage in adapting to climate change. Social responses to climate change can further exacerbate existing social stratification through wealth and resource redistribution, often having negative outcomes for vulnerable populations. The ecological conditions, distribution of assets, and systems of power that place certain communities at risk in the face of climate change can also place them at risk in the face of policy and planning responses (Marino and Ribot, 2012). Adaptation interventions are necessary and inevitable; but, without

understanding their effects, we can inadvertently reproduce or deepen the damages they intend to ameliorate (Barnett and O'Neill, 2010).

This thesis research was designed to contribute to the growing body of social science literature on institutional adaptation to climate change. Taking a case-study approach, this research investigated the relationships between institutional actors and other stakeholders, as well as perceptions, attitudes, and values institutional actors have towards place-based adaptation to climate change.

Research Question(s):

The overarching research question is: *What role do institutional actors play in the social process of adaptation to climate change in Hampton Roads, VA?*

The research question is enriched by three sub-questions:

1. How do institutional actors perceive climate change risks to Hampton Roads?
2. What stakeholders have a voice in regional adaptation in Hampton Roads, and why?
3. How do institutions prioritize and allocate funding for adaptation projects?

These research questions were investigated in the coastal region of Virginia known as Hampton Roads (Figure 1). This low-lying region contains a 10-city, 16-county district, and is home to approximately 1.6 million people (Hampton Roads Planning District, 2009). As Hampton Roads faces significant sea-level-rise and flooding-related climate change challenges, decision makers, scientists, and local stakeholders have begun to engage in adaptation activities. Direct observation of these activities, as well as in-depth interviews with institutional actors and a content analysis of local and federal adaptation planning documents, have made it possible to answer these research questions and gain insights into the broader social process of adaptation to climate change.

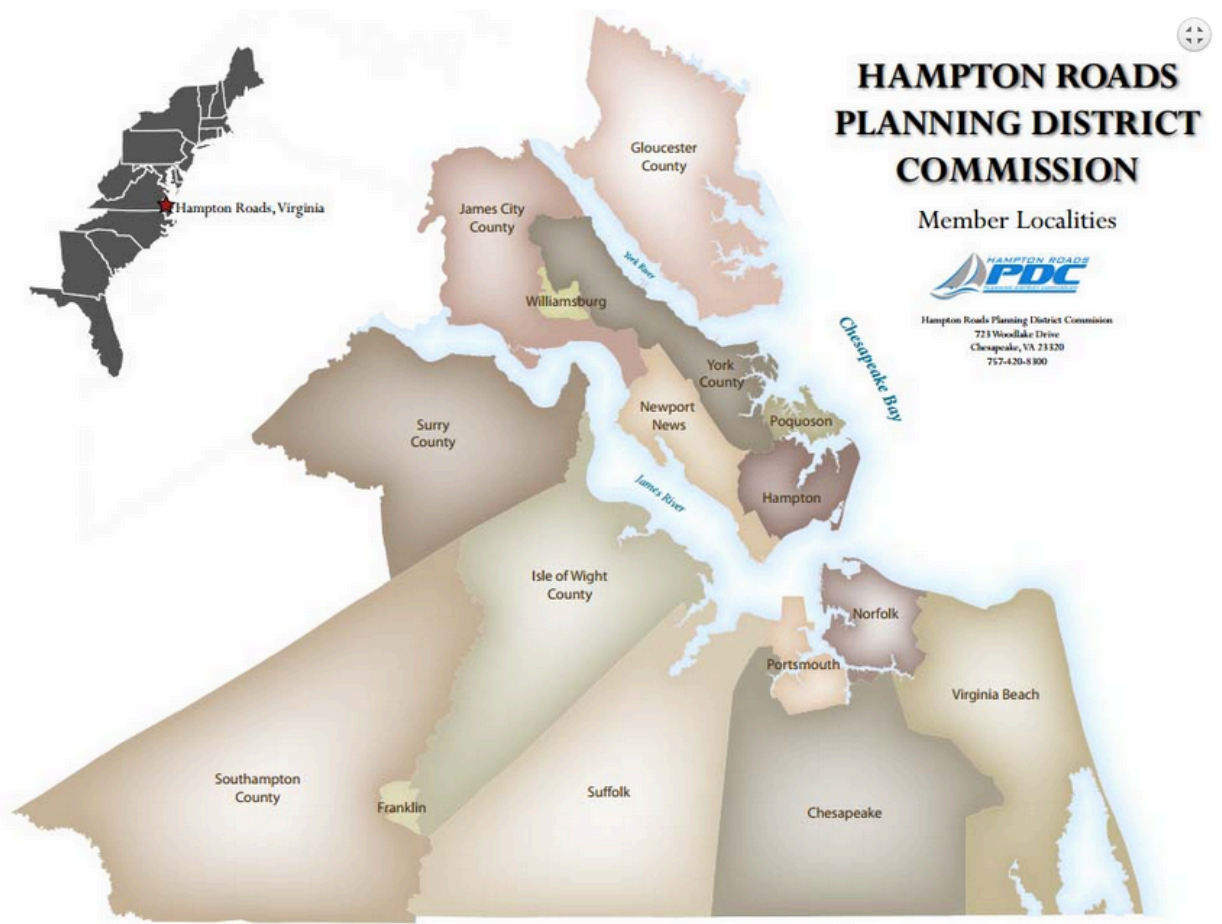


Figure 1.1 Map of the member localities in Hampton Roads, Virginia (Hampton Roads Planning District Commission, 2010).

Purpose

The purpose of the research is to gain insights into the social process of institutional adaptation, not only as a set of responses to ecological conditions, but as a set of mediated perspectives and political decisions that have material and social consequences across the Hampton Roads landscape. The research questions are specifically designed to increase understanding of institutional responses to climate change and to promote further consideration of dimensions of equity associated with those responses. With a greater understanding of these issues at the local scale, incremental steps can be made towards creating a more equitable adaptation process (Adger,

2001) and thereby possibly preventing maladaptive outcomes (Barnett and O'Neill, 2010), development disasters (Oliver-Smith, 2009a), or 'adaptation apartheid' (UNDP, 2007). Additionally, nuanced and place-specific insights that emerge from this research may prove beneficial to Hampton Roads, possibly informing local policy and planning and thereby benefitting local inhabitants.

Why Hampton Roads?

I had been driving along I-64 for nearly three hours, when suddenly the interstate transitioned into a tunnel diving below the waters of the Chesapeake Bay. Uncertain of how long or how well engineered the tunnel was, I was relieved to see the light of day appear at the other end relatively quickly. However, the interstate did not return to solid ground for nearly two more miles as it continued on as a bridge hovering just slightly above the waters of the Chesapeake. To one side, I saw the Chesapeake Bay and, looking inland, there was Willoughby Bay and tributaries winding their way through infrastructure and coastal marshlands as they left the terrestrial environment and entered the oceanic. There were beachfront homes along a narrow peninsula called Willoughby Spit and noticeable dredging, shipping, and naval activities bustling within the natural harbor. This was Hampton Roads. Immediately upon my arrival, the relationship between the seawaters and the built environment were evident, illuminating understanding of how sea level rise could pose such a threat to this society. This is a land where many of the 1.6 million residents live in a densely populated coastal fringe of the landscape and will experience risks to human security and infrastructure from sea-level rise and storm-surge related flooding.

I conducted rigorous preliminary research on the selection of a suitable location in which to conduct this research project. My rationale for the selection of Hampton Roads, Virginia was three-fold: first, significant place-specific biophysical risks posed by climate change; second, an active state

of the local government's engagement in anticipatory adaptation management and planning; and third, the contextual factors of the socially stratified landscape.

Biophysical Vulnerability

For the residents of this coastal region of Virginia, flooding caused by high tides and heavy storms is nothing new. However, the risks of storm surge, sea level rise, and flooding are consistently increasing as a direct result of the biophysical effects of climate change and the geomorphology of the landscape. These factors include the shallow slope of the landscape, rendering it particularly susceptible to sea level rise, the warming of the ocean surface waters, increasing the frequency and intensity of tropical storms and hurricanes, and land subsidence in reaction to the unloading of the Laurentide Ice Sheet from the North American Continent (Kleinosky et al., 2006). A 2006 Pennsylvania State University study found that a significant percent of developed land and wetlands in Hampton Roads is currently at risk of flooding and that, assuming an unchanged land-cover distribution, risk to both of these land-cover types increases substantially with sea level rise (Kleinosky et al., 2006). Additionally, assessment of the most conservative sea level rise scenarios by Kleinosky et al. (2006) revealed that critical infrastructure is at risk of flooding, even with weak storms. The National Oceanic and Atmospheric Association (NOAA) warns that Norfolk, the economic and cultural hub of Hampton Roads, is at the greatest risk of sea level rise for a U.S. metro-city its size, second only to New Orleans (Fears, 2012). Furthermore, sea level rise will be experienced disproportionately across the world's oceans (Sallenger, 2012). Hampton Roads is projected to experience a sea level rise that is approximately 3-4 times greater than the global average sea level rise. Parts of Hampton Roads are particularly vulnerable to storm surge created when tropical storms pass by. Norfolk Mayor Peter Fraim stated in a National Public Radio (NPR, 2012) interview that, in the days after Super Storm Sandy, "Sandy turned streets into rivers (Figure 1.2), even though it was just a Category 1 storm that passed by well

out at sea [...] A severe Category 2 or 3 storm, if we were to receive a direct hit, almost all of the city would be under water.”



Figure 1.2 Flooding caused by Super Storm Sandy as a category 1 tropical storm as it passed by Hampton Roads. (AP/Virginia Pilot, October 29, 2012)

Active State of Adaptation

Of all of the 10 incorporated cities within the region of Hampton Roads, Norfolk leads the way in preventative measures towards climate change impacts. “Norfolk has already done a lot to protect itself,” observed Larry Atkinson, an oceanographer at Old Dominion University (NPR, 2012). Norfolk’s downtown economic sector usually stays dry due to a massive sea wall already in place (Figure 1.2 and 1.3): roads have been elevated to prevent flooding, property buy-outs are in place, and a Dutch engineering firm, Furgo Atlantic, was hired to devise a comprehensive plan “to keep water out of several neighborhoods” (NPR, 2012). Furgo Atlantic finished its assessment in 2012, suggesting an adaptation plan for Norfolk that would include more sea walls, floodgates, pumping stations, and an earthen berm, with estimated costs exceeding \$1 billion, a figure that may prove unfeasible for the city.



Figure 1.3 Sea wall designed by Army Corps of Engineers to protect downtown Norfolk.
(Jamie Haverkamp, July 11, 2013)

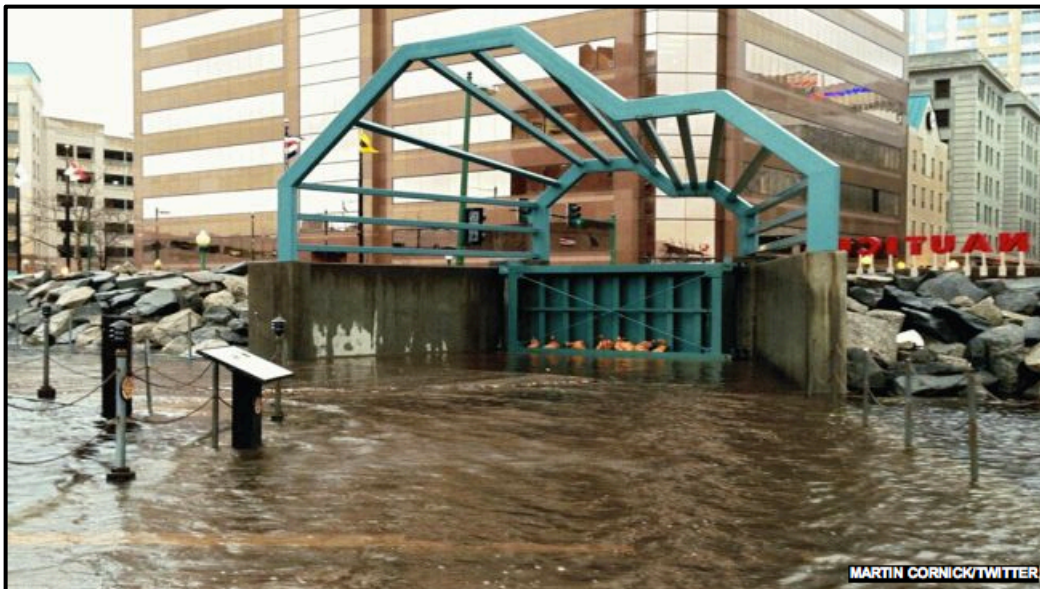


Figure 1.4 Flooding in Norfolk, VA. (The Weather Channel, March 6, 2013)

The current risk of flooding in Hampton Roads has the potential to render the region dysfunctional, and this will only be exacerbated by future climate change. Therefore, scientists,

decision makers, and local stakeholders are preventatively collaborating to decide how to prepare and adapt Hampton Roads to the changing environment. Mayor Fraim has been a visible public figure, speaking out on Norfolk's climate change crisis, looking for help from the state and federal governments as well as cooperation from Norfolk residents whose homes will not be protected by a sea wall. Reading about facilitated adaptation in these ways sparked my research questions pertaining to inclusion and exclusion, power relations, and equity.

Vulnerability and Risk: the Socially Stratified Landscape

In addition to the biophysical risks posed to the region of Hampton Roads, this area was selected as the case study site due to the contextual social factors that place the most socially vulnerable at the greatest risk of sea level rise and flooding issues. According to Kleinosky et al. (2006) the regions of Hampton Roads most likely to experience storm-surge floods were identified by spatial statistical methods as the same areas where the most socially vulnerable population segments live. The socially vulnerable in this study refers to minorities and people of color, the poor, elderly, and disabled. Paying attention to the socially vulnerable is an important consideration from the perspective of environmental justice, as studies have consistently shown that in coastal communities, the most vulnerable citizens are often the most affected by sea level rise impacts. This study aims to consider, not only the biophysical vulnerability of the region, but on a more holistic level, the underlying social factors (political, social, and cultural) that contribute to the production of socio-ecological vulnerability. According to Kelley and Adger (2000) these dimensions of vulnerability must be tackled if we are to develop sustainable responses to extreme events and climate change.

Organization of This Thesis

Moving beyond Chapter 1, the introduction, this thesis will next provide a literature review in Chapter 2 to discuss the theoretical foundation of this body of work. Then in Chapter 3, a detailed account of the methodological approach used to gather and analyze data is given. Chapter 4, with four sub-sections, presents and discusses the results of the research. Each of the first three sections presents a thematic body of research results and a brief discussion of them. Section 4 brings the three thematic results together and discusses them in a collective way, linking them to theory. Lastly, Chapter 5 concludes the thesis.

Chapter 2: Relevant Literature

This chapter contains a review of literature from the broad subject area of social adaptation to climate change, with particular focus on relevant literature addressing climate governance, dimensions of equity, and vulnerability. I have synthesized these bodies of literature and linked them to the research questions to provide a theoretical foundation for the examination of institutional adaptation in Hampton Roads.

Adaptation to Climate Change

Global climate change is a multi-scalar environmental issue because the drivers of climate change operate across a global scale even though its effects are most often felt at local levels (Lemos and Agrawal, 2006). Climate change is a global phenomenon with potentially catastrophic effects on the economically and politically marginalized social groups in many areas of the world. This is of concern with respect to universal human rights, and global action is required to alleviate vulnerability and reduce the threat (Adger, 2001). However, this does not mean that global is the appropriate scale for all climate change governance. Rather adaptation “is primarily made up of individual choices and actions to which collective action at local levels is often the appropriate response” (Adger, 2001, p. 929).

According to the IPCC Fourth Assessment Report, adaptability or adaptive capacity is the ability of a system to respond successfully to climate change (IPCC, 2007). This ability to adapt is based on multiple factors, including availability and entitlements to resources (e.g., finance, technology, knowledge), institutional arrangements and policies, social and cultural characteristics, as well as cognitive factors (IPCC, 2007). Thus, adaptive capacity is experienced disproportionately, resulting in some actors having high levels of adaptive capacity and others having very little ability to

adapt to the impacts of climate change. It is suggested that an understanding of the constraints and limitations of adaptive capacity can be gained through examination of the adaptation process in situ (IPCC, 2007). Although this study of adaptation in Hampton Roads is not holistic in nature, it is designed to illuminate ways in which institutional attitudes and values can possibly create opportunities, as well as constraints and limitations, to adaptive capacity (the ability to adapt) within a society.

According to Adger (2001), the greatest single equity issue in adapting to climate change is that of the differential impacts of climate change and the highly unequal costs of adaptation at global and local scales. Put another way, because social vulnerability and adaptive capacity are distributed unequally, they raise concerns of equity and justice. Recently, there has been increased attention to discovering the determinants of adaptive capacity and developing new models for assessing vulnerability.

Adaptation Governance & Vulnerability

Governments can play a significant role in facilitating equity of adaptation and adaptive capacity. Through the engagement of equitable institutions at appropriate scales, governance can help construct adaptation options that can contribute to equitable and sustainable policies designed to reduce present-day risk from climate variability as well as differences in vulnerability among social groups (Adger, 2001; Aaheim et al., 2008). The concept of vulnerability is fundamentally a political ecology concept, which acknowledges both biophysical and social environmental forces in the construction of risk (Oliver-Smith, 2009a). Vulnerability studies in particular link the relationship that people have with their environment with social forces and institutions and the cultural values that sustain or contest them (Oliver-Smith, 2009a, p.15). High levels of vulnerability reflect a lack of

or inappropriate adaptations and therefore, low levels of resilience. Thus, vulnerability explicitly links environmental issues, such as hazards, with the structure and organization of society, and the rights associated with membership.

Agrawal (2008) suggested that adaptation to climate change is inevitably local and that institutions can influence adaptation and climate vulnerability in three critical ways. First, they can structure impacts and vulnerability; second, they are often the mediators between individual and collective responses to climate impacts and thereby shape outcomes of adaptation; and lastly, they govern the delivery of and access to external adaptation resources.

In this study of institutional adaptation, I give particular attention to two phenomena occurring in adaptation governance: adaptation spillovers and adaptation bottlenecks. Adaptation spillovers can be thought of as the ripple effects of adaptive responses to climate change. From a system's perspective, adaptation is a nested process (Figure 2.1). A vulnerability at one scale of the system may affect activities at another scale. Likewise, adaptation responses implemented at one scale can create positive or negative impacts at other scales (Preston and Stafford-Smith, 2009). The rates of these feedbacks can vary from hours to years. According to the Fifth IPCC report (IPCC, 2014), if spillovers go unregulated it is likely that the most vulnerable social groups will end up bearing many of the new social and economic risks that arise as a result of climate change.



Figure 2.1 Scalar Model of the Nested Processes of Adaptation. “‘I’ indicates the local impact with cascading consequences at high spatial scales. ‘A’ indicates a high-level adaptation action that trickles down to affect local activity” (Preston & Stafford-Smith, 2009: p.2).

The second phenomenon within adaptation governance that is a focus of this research is adaptation bottlenecks. Preston & Stafford-Smith (2009) found that, to some extent, adaptive research is happening in a vacuum, resulting in adaptation bottlenecks, where the research on risk and vulnerability is not reaching the decision makers. Experts in the adaptation literature suggest that, within the adaptation arena, a clear pathway is needed for moving beyond simply assessing vulnerability and impacts to ensuring that those assessments are informing policies, programs, and measures that reduce vulnerability (Preston & Stafford-Smith, 2009).

The ways in which responses to climate change are implemented and their outcomes for society have strong parallels to the development literature on institutional responses to environmental changes. Top-down adaptive responses to climate change, with the power to redistribute people, meaning, and social systems, can be thought of as development projects (Marino

and Ribot, 2012). “Development projects are typically capital-intensive, high-technology, large-scale projects that take place in the name of national and regional development but often at the expense of displacing or haphazardly resettling vulnerable population segments” (Oliver-Smith, 2009a:4). Large development projects, the result of intentional decisions by authorities, are seen as positive steps forward that fit well within national ideologies of development. Such projects are justified by a cost-benefit analysis that assigns losses and gains on a political basis (Oliver-Smith, 2009a). Furthermore, empirical evidence, written up in the development literature, has shown that implemented, large-scale adaptation projects have the support of the politically empowered, yet may impede the socially vulnerable and marginalized population segments (Marino and Ribot, 2012). Similarly, institutionally initiated adaptive responses to climate change often are authoritative decisions made with the intention of ensuring the wellbeing of the local population, but often pose controversial outcomes for different segments of the affected population. Adaptation interventions are necessary and inevitable, but without understanding their effects, we can inadvertently reproduce or deepen the damages they intend to redress (Barnett and O’Neill, 2010, cited in Marino and Ribot, 2012).

This case study explores how institutional actors perceive climate change risks and how they prioritize and allocate funds of proposed adaptation responses, such as the engineering projects of new sea walls, flood gates, and more heavily engineered transportation routes, and other anticipatory actions, including housing and property buyouts. I investigated how decision makers decided to implement a large-scale development project, who has been included in decision making, and who might gain or lose from those decisions. The idea of winners and losers links to the political economy literature, which demonstrates that there will always be winners and losers from extreme events (Adger, 2006). How nations, societies, communities, and households respond to the impacts of climate changes and climate variability will, in many instances, determine their prospects for

growth, equity, and sustainability (Agrawal, 2008). Like other large-scale development, the extent to which climate change development can be carried out ethically, democratically, and effectively is of considerable dispute (Oliver-Smith, 2009a).

In this study, I approach understanding social adaptation to climate change and the role of government from the theoretical underpinnings of political ecology. Political ecology is an approach to investigating human-environment relationships that emphasize the economic and political processes affecting access to and use of land and resources. More specifically, this study is framed within political ecology concepts stemming from cultural ecology and political economy theories. Simply stated, cultural ecologists have long insisted on the role of culture in human adaptation. The outcomes of this understanding have been the incorporation of the broader political and economic systems, proposed in the field of political economy, into current understandings of socio-ecological phenomenon (Robbins, 2012).

Implementing this theoretical framework requires that this study pays careful attention to the social and ecological construction of vulnerability, and to concerns of equity. The understanding that governments can play a significant role in regulating equitable adaptation within a community and that unregulated adaptation to climate change may cause the most vulnerable social groups to bear many of the new social and economic risks is a prevailing global notion within the context of adaptation research (IPCC, 2014). This research was designed to contribute to the current understanding of this notion by gathering empirical evidence of the process of institutional adaptation responses to climate change in Hampton Roads, Virginia, and by keenly studying the socio-political structures that facilitate adaptation responses there.

Chapter 3: Methodology

The research questions have been investigated through a qualitative methods approach. My research design is structured in two phases. The first phase of research focused on data collection, while the second phase was concerned with data analysis and interpretation. For the first phase, I relied upon three methods: observation, semi-structured interviews, and a content analysis. Data were gathered with direct observation methods at two Sea Level Rise and Flooding Adaptation forums held in Hampton Roads, Virginia. This is the only regional effort to date that brings stakeholders across the 10-city region, as well as stakeholders across governance scales (local, state, and federal), together to collaborate about place-based adaptation to future environmental change. I also investigated the research questions through in-depth interviews with seven local institutional actors who are acutely involved in institutional adaptation and decision making. Lastly, I completed two content analyses: one reviewed the most current version of 10 Comprehensive City Plans, and the second reviewed 2013 Adaptation Strategic Plans of seven federal agencies. These plans had been mandated by Federal Executive Order 13515. During the second phase of research, I transcribed and coded field notes, recordings and thick descriptive notes from informal interviews gathered during observation at the forums, as well as the seven semi-structured interview recordings and notes. I also compared the results of the two content analyses in a systematic comparative analysis approach and interpreted the results.

The timetable below identifies the timeframe in which all research stages took place, from the beginning of the research project to the thesis defense.

Table 3.1: Research Project Timetable

Thesis	Due or Completed by	Notes
Research and Development	Aug. 2012 - June 2013	
IRB Research Exempt Form approval	March 12 th , 2013	Adaptation forum observation exempt of IRB approval under 45 CFR 46 Exempt Category #2
Pilot Study	March 13 th , 2012	Participant observation at Sea Level Rise and Flooding Adaptation Forum (2 nd meeting) in Hampton Roads, VA
Obtained Certificate of Completion of IRB training	April 29 th , 2012	
IRB Form Approved	May 14 th , 2013	
Proposal Defense	May 3 rd , 2013	
Fieldwork	July 9-13 th , 2013	Participant observation at the Sea Level Rise and Flooding Adaptation Forum (3 rd meeting) in Hampton Roads, VA. Completion of semi-structured key informant interviews.
Content Analyses	October 2013	
Data Analysis	July 2013 - Dec. 2013	
Write-up	Dec 2013 - Feb. 2014	
Revisions and Edits	Feb 2014 – March 2014	
Thesis Defense	April 1 st , 2014	

Phase 1: Data Collection

Participant observation is one of the methods I used to gather data pertaining to my research questions. I directly observed two Hampton Roads regional Adaptation Forums, both organized by Old Dominion University's (ODU) Climate Change and Sea Level Rise Adaptation Initiative (CCSLRAI) in Hampton Roads. The CCSLRAI jointly hosted a series of Sea Level Rise and Adaptation forums along with Virginia Sea Grant at Virginia Institute of Marine Science (VIMS),

and the Hampton Roads (regional) Planning District Commission (HRPDC). According to the CCSLRAI's website, the main objectives of the forums were to ultimately enable the most effective and efficient local government adaptation activities by bringing together regional stakeholders to work together on adapting the region to flooding issues caused by sea level rise, among other things (Old Dominion University, 2013). The first forum took place on March 13th 2013, and the second on July 10th 2013 (Figure 3.1). I chose to use observation methods to investigate my research questions because they allowed for a vantage point, a place both geographical and social, at which I could position myself to obtain empirical evidence and gain holistic insights into the institutional adaptation process. The adaptation literature suggests that to best understand the empirics of adaptation, "scholars must observe and document adaptation actions and build critical qualitative and quantitative databases to test and explore theories about vulnerability and adaptation" (Agrawal et al., 2012).



Figure 3.1 July 10th, 2013 Sea Level Rise and Adaptation Forum held at Old Dominion University's Regional Higher Education Center - Virginia Beach. (Jamie Haverkamp/ July 10th, 2013)

Through participant observation at the Hampton Roads adaptation forums, I systematically observed the social process of adaptation and engaged in discussions, networked with potential informants, and at times probed for deeper understanding into the research questions. Passive participant observation refers to one side of the gradient in which one can engage in observation; at the other is active participant observation (Winchester and Rofo, 2010). My level of engagement in the forum identifies with observer-as-participant (Kearns, 2010), or passive participant, as I primarily observed the adaptation process in situ while engaging, when appropriate, in the activities and discussions at the forums. I was a passive participant observer during the first adaptation forum on March 13th, 2013, with an IRB-approved exemption. This exposure to the field provided a pilot study to the subsequent July 10th forum, illustrating the project's feasibility and producing preliminary insights. The second adaptation forum I attended, on July 10th 2013, had full IRB approval. There, I used passive participant observation techniques and conducted informal interviews with the invited forum stakeholders. Through direct observation at these two adaptation forums, I gained a contextual understanding of the role the forum plays in regional adaptation, as well as complementary evidence that would inform interpretations of later findings from the in-depth interviews.

As ethnographic approaches such as participant observation “can most brightly illuminate the relationships between structure, agency and geographic context” (Herbert, 2000, p. 550), I have found them indeed appropriate to gaining insights into my research questions on institutional responses to climate change and dimensions of equity. As I observed formal stakeholder situations (e.g. Adaptation Forums) I gained insights into the power relations within this contextual setting. I relied upon a carefully constructed observation chart (Appendix A) to keep my observations in the field focused and systematic so that they could be replicated at each forum that I attended. Attending the Adaptation Forums helped to inform a rich understanding of social and political

underpinnings of institutional responses to climate change in Hampton Roads. By attending the Hampton Roads Adaptation forums, I was able to observe how science informs policy and what relationships existed between the social actors in each sector. Observations of what sources of knowledge were presented and discussed in the adaptation forums proved insightful to understanding the foundation from which adaptation responses are made.

In addition to observation, I primarily relied upon in-depth, semi-structured interviews to investigate the construction of institutional adaptation actions. Conducting interviews helped me bridge the gap between the observed actions of adaptation and the underlying drivers and outcomes of institutional adaptation in Hampton Roads. Based on recommendations from the literature, for the intended hour-long interviews, I composed 11 primary questions, with sub-questions or prompts nested below each one (Dunn in Hay, 2010). Though these questions were developed for only an hour long interview session, often informants were passionate and engaged enough to carry the interviews out to one-and-half to two hours in length. This set of 11 semi-structured interview questions (Appendix B) were posed to all key informants. In total, seven in-depth interviews were conducted with institutional actors who represented top-down perspectives in policy, planning, and decision making for place-based regional adaptation. Though the interview questions required some degree of predetermined order, they nicely allowed for flexibility within the way the informants addressed the issues (Dunn in Hay, 2010). The interview questions were designed to investigate the social processes and underpinnings of adaptation decision-making, i.e. process of inclusion/exclusion, institutional perceptions of climate change and flood risk, as well as institutional values.

I identified key informants through ethnographic research methods conducted during the pilot study. During observation at the adaptation forums, I was able to identify actors involved in the regional adaptation process, build initial rapport with them, and subsequently gain access to in-

depth future interviews. Additional informants later emerged from snowball sampling, a method by which my initial informants referred me to interview other institutional actors who had not been in attendance at the adaptation forums. Additionally, one follow-up interview was also conducted to investigate details of another adaptation forum meeting I was not able to attend.

Prior to entering the field, I gave significant consideration to the means by which to record field data, the construction of an observation chart and interview questions, and the process of implementing a reflexive research approach. Materials for collecting data were obtained: an audio recorder, memory card, extra batteries, as well as a hardcover field notebook and pens. During observation and interviews, data were recorded in both a field notebook and an observation chart, using a ‘thick’ approach to descriptive note taking. An audio recorder was also used to record all interviews and portions of the adaptation forums. All recorded field notes, interview logs, and other audio-recorded data have been transcribed to text files on my computer. Transcripts of each interview have been created. Additionally, the reflective audio field notes, recorded immediately after fieldwork, have also been transcribed.

I constructed an observational chart (Appendix A) and an interview outline (Appendix B). The observational chart was designed for use during the Adaptation Forums, keeping in mind the forum’s program schedule as well as my research questions. The chart aided in focusing my observations while in the field. The questions and prompts in the chart were made to be answerable by observation and adhere to Kearns’ three ‘C’s’ – the purposes of observation: counting, complementary evidence, and contextual understanding (Kearns in Hay, 2010). The interview outline was also rigorously constructed. Intended to be culturally sensitive and to incorporate contextual understanding, my interview questions were designed to reveal insights into the dimensions of equity with the process of adaptation, investigate how institutional actors perceive climate change risks, and identify institutional actor values. These interview findings have been

linked to scientific adaptation literature relevant to the case study site, which suggests the poor and most socially vulnerable will bear the greatest impacts of climate change in Hampton Roads (Kleinosky et al. 2006).

Reflexivity was built into all stages of this research. As Kearns (in Hay, 2010: p. 242) stated, “observation is the outcome of active choice rather than mere exposure,” implying that our choices influence what we see and how we see it. How I choose to interpret the meanings of my observations and how I choose to focus on one interaction over another are ways in which observation is unavoidably subjective. This is why it is crucial as a researcher to be critically reflexive, to accept rather than deny one’s own subjectivity, and thus to allow for clarity in observation (Kearns in Hay, 2010). The subjective nature of research is due to the fact that qualitative research consists of social interactions and does not exist in a social vacuum (Dowling in Hay, 2010). Dispassionate interpretation, according to Dowling (in Hay, 2010: p. 35), is “difficult if not impossible because we all bring our personal histories and perceptions to research.”

In a rigorous attempt to be critically reflexive, before attending the forums I reflected upon on my own thoughts, identifying preconceived notions pertaining to the research and recording them in a field diary. I also reflected upon my positionality in the field, whether I was an ‘insider’ or ‘outsider’ (Kearns in Hay, 2010). Lessons learned from the pilot study suggest that an asymmetrical power relationship, called ‘studying up’ (Dowling in Hay, 2010), was the established relationship between me, as researcher, and the subjects of the research. This research dynamic worked surprisingly well in the first forum, as I was perceived as very little threat to the group’s agenda and therefore people responded very candidly to my investigation.

Lastly, this study implemented two content analyses to review local and federal climate change planning documents. By implementing these content analyses, I was able to identify themes of how local and federal institutions are framing adaptation discourse and how they are planning for

adaptation to climate change. The first content analysis analyzed ten Comprehensive City Plans, one for each of the ten cities within the Hampton Roads regional scope. A second content analysis was conducted, using the same methodological approach as the first, but it instead analyzed the Strategic Adaptation Plans of the seven federal agencies. A comparative analysis of the results of the two content analyses was also conducted for the sake of looking into similarities and difference in climate change adaptation discourse, and therefore into adaptation goals and planning across governance scales.

I analyzed the most current version of each city's Comprehensive City Plans. These documents were chosen for analysis because they provide a blueprint as to how city planners are planning for community development, growth, and safety. Some of the documents have a planning horizon out to 2025, and others plan through 2030. According to the Virginia Beach planning department, comprehensive plans "are a series of planning policies designed to guide and manage the future physical growth of the City" (City of Virginia Beach, 2013). The documents are especially suitable for analysis, because, in July of 2012, the Hampton Roads Planning District Commission asked all municipalities within its regional scope to implement planning strategies for climate change and sea level rise related impacts into their comprehensive city plans (HRPDC, 2013). Therefore, I found these documents a suitable source for assessing how cities are discussing and preparing for future environmental change.

The second content analysis reviewed Strategic Adaptation Plans of seven federal agencies. These documents were found suitable for investigating climate change planning discourse as they were designed to explain how each agency will be affected by climate change impacts and what role each agency will play in national level adaptation. These documents originated by the mandate of Executive Order 13514 on Federal Sustainability in 2009, which required all federal agencies to produce a plan detailing their strategy for adaptation to climate change. The seven plans analyzed in

this study were selected because of the stake their creating agencies have in adaptation to climate change in Hampton Roads. The seven agencies whose plans have been analyzed are not considered an exhaustive group of federal agencies with a stake in adaptation within Hampton Roads; however, they are the agencies that have been in attendance at the regional adaptation forums and/or have been identified by local level institution actors as playing a part in adaptation within regional Hampton Roads.

A list of six analytic codes/or adaptation phrases were searched for within the both types of documents: *place-based flood mitigation, flooding attributed to sea level rise (SLR) and/ or climate change, sea level rise (SLR), climate change, adaptation, and community resilience and/ or capacity building*. By searching for the use or lack of use, as suggest by Waitt (in Hay, 2010), of these phrases within the planning documents, I was able to assess how local and federal institutions are conceptualizing the issue of flooding related to climate change, as well as what their desired end-state goals are (e.g. to build coastal resiliency, reduce vulnerability, or mitigate flooding).

This methodological approach provided a systematic and comparable way in which to analyze the framing of the socio-ecological impacts of climate change, as well as to consider how these frames forge social realities to the extent of community development and planning.

Phase 2: Data Analysis

Moving beyond data collection and into data analysis, Watson and Till (2010) said that, as we work through, reflect upon, and analyze our primary recorded and material data, we develop questions and insights about our work and begin the difficult task of representing our data. Because I analyzed the observation and interview data by coding, the thick descriptive notes gathered in the field notebook and on the audio recorder have been transcribed to the computer using descriptive, reflective, and interpretive/analytical notes (Watson and Till, 2010). This made the coding process

easier later on. After building the transcript file for each interview, I created a congruent word column for the personal and analytical log, in the fashion suggested by Dunn (in Hay, 2010). The personal log consisted of comments to myself concerned with issues of access, ethics, and the overall practice of the method. The analytical notes served as an outline of the substantive matters that have arisen. Here, I also made references to the literature, and identified themes and theories pertaining to the aims of my research. The coding process began with building a codebook with initial codes, but relied mostly on an inductive coding approach, such as in grounded theory, in which the objective is to generate theories from empirical data (Cope in Hay, 2010). By the end I had 30 codes, which underwent an iterative process of revising to prevent too many codes from emerging. Some of the key descriptive codes used in the coding process included: *prioritization*, *power relations*, *inclusion/exclusion*, a series of sub-codes for *stakeholder perceptions and stakeholder values*, and *goals*. These codes were systematically applied to the transcribed data and helped to highlight similarities and difference within the interview and observation results.

In summary, the objective of this research study, conducted through observations, interviews, and content analyses, was to gain a better understanding of power relations between those who have a stake in adaptation to climate change in Hampton Roads, including the process of inclusion and exclusion and how climate change discourse manifests in material planning and decision-making outcomes. As a geographer, I felt particularly well suited to conduct this research project, as “geographers are particularly sensitive to the different forms of power/knowledge that enable access for some individuals and prevent movement for others” (Watson and Till, 2010, p.123). Additionally, my academic training has been focused on human-environment interactions, allowing me to interpret the biophysical changes in climate and assess their implications across a social landscape.

Chapter 4: Results & Discussion

The research results presented in this chapter are interwoven in the narrative of institutional adaptation in Hampton Roads. While mindful of the overarching research question, *What role do institutional actors play in the social process of adaptation to climate change in Hampton Roads, Virginia?*, the three sub-questions are each addressed in detail in the following three thematic section of this chapter. The first section, *The Politics of Adaptation Discourse*, addresses institutional attitudes and perceptions related to adapting to climate change; the second section, *Systems of Power*, investigates process of inclusion and exclusion within regional adaptation decision-making and matters of procedural justice, and the third section, *Prioritization and Allocation of Adaptation Projects*, investigates how funding for projects is prioritized and allocated across the region. In section four, the three themes are linked to theory and placed in a broader academic context of institutional adaptation.

Section 1: The Politics of Adaptation Discourse

*“I cannot offer the protection Holland has, we don’t have the political will”
– City planner, Hampton Roads, Virginia*

The politics of place play a significant role in shaping adaption options and outcomes through their influence on adaptation discourse. This part of the research identifies politics involved in shaping climate change discourse and extrapolates the implications for creating or ameliorating climate change vulnerability.

During my initial fieldwork visit in Hampton Roads, I attended and observed the Sea Level Rise and Adaptation forum (the second forum in a series of four). I informally interviewed forum attendees, all of whom were invited local, state, or federal, organizational or institutional stakeholders involved in adaptation to sea level rise and flooding in Hampton Roads. As I

posed the question, “to the best of your knowledge what are the climate change challenges facing Hampton Roads?” to one informant after another, they often would hesitate for a minute, then they would respond, giving an answer related to flooding impacts. The informants were often dismissive and did not seem too interested in continuing on with further questioning. Quickly, I identified my question as threatening or offensive to the forum stakeholders, so I modified my approach and avoided any mention of climate change. This made all the difference, dispelling any suspicion or threat that I once posed. I found this stakeholder reaction to the climate change discourse in my carefully constructed interview question at odds with what I had expected to find in the context of the forum. After all, the adaptation forum series was organized in part by Old Dominion University’s *Climate Change and Sea Level Rise Initiative* and has a website stating one of the forums goals is to establish targeted and specific adaptation action plans (Appendix C). My initial understanding of the purpose of the forums was that they wanted to enable multi-scalar adaptive management to deal with climate change impacts of regional flooding due to sea level rise and more frequent and intense precipitation storms. I found that adaptation to climate change was not the objective of the forum, however adapting to regional flooding in order to maintain the status quo was.

In 2012, Virginia state lawmakers ran into a similar problem when they requested a scientific study on sea level rise. Their problem was not a budgetary issue or a scientific issue; rather it was an issue of linguistics. Lawmakers discovered that they could not use the phrase “sea level rise” or “climate change” in requesting the study, in part because of objections from colleagues that opposed climate change viewpoints, and also for fear of stirring up conservative activists, some of whom believe such terms are “liberal code words” (Harper, Virginia Pilot, June 10, 2012). So lawmakers did

away with all mention of sea level rise, substituting the more politically neutral phrase: “recurrent flooding.”

Interview results from local-level institutional actors interviewed at the March 13th Adaptation Forum suggest that climate change in Hampton Roads is a matter of sea level rise and flooding, and, as one informant says, *“maybe heat, but no one brings that up.”* One forum stakeholder, whose work for a regional non-profit very much addresses a range of climate change impacts, elaborated, saying that,

“we got out of the conversation about climate change because it was so controversial, and it’s not necessary for us... necessarily.” – Key Informant, Wetlands Watch

Another local institutional actor who presented at the March 13th Adaptation Forum claimed:

“we very early on found out that climate change just got a bunch of people arguing about things [...] but the same people will not argue about sea level rise” –Portsmouth City Official

and,

“You said climate change but the way I look at sea level rise is I don’t look at it as a climate change issue, I look at it as a land use issue” - Portsmouth City Official

Investigating the regional climate change discourse outside of the forum setting, I gained further insights during an in-depth interview with one of the sponsors of the Adaptation Forums. The informant stated:

“I recognize that there are people doing this in a strategic way because saying climate change gets you into fights you really don’t want to have” – Key Informant, Virginia Institute of Marine Science

This appears to be the overwhelming sentiment of local-level institutional actors who have a seat at the adaptation table in Hampton Roads. Avoidance of engaging in conversations around climate change is very evident, and is the acceptable local norm, even in the context of the Sea Level Rise and Adaptation Forums that exist to bring stakeholders together to collaborate on how to adapt to

the regional environmental changes. These political discourse tensions may have real-world implications at the local and regional level, specifically on long-term planning for climate change impacts.

To gain insights into how the politics of adaptation discourse are manifesting in the climate change preparedness of the regional localities, I conducted a content analysis of the 2012/2013 Comprehensive City Plans for the ten regional cities of Hampton Roads (Table 4.1). These planning documents are indicative of how cities are planning and preparing for climate change impacts (e.g. flooding) through planning and community development. Although traditional planning may not be suitable for thinking in terms of long temporal scales, such as those necessary for the impacts of climate change, the Hampton Roads Regional Planning District Commission (HRPDC) asked that all cities within the region incorporate adaptation to climate change within their city comprehensive plans (HRPDC, 2013). The HRPDC made additional recommendations for city planning to address long time-scale issues, stating, “Local governments should consider using these practices [scenario planning, adaptive management, and anticipatory governance] to begin planning for the impacts of sea level rise” (HRPDC, 2013).

Table 4.1 A discourse analysis of adaptation claims (by classification) made in ten Comprehensive City Plans within the regional scope of Hampton Roads, Virginia.

Cities/Localities	Adaptation claims (by classification) made in Comprehensive City Plans					
	Place-based Flood mitigation	Flooding attributed to SLR or climate change	Sea Level Rise (SLR)	Climate Change	Adaptation	Community Resilience or Capacity Building
Norfolk	x		x			x
Portsmouth	x					
Hampton	x					
Virginia Beach	x	x	x	x		x
Chesapeake	x	x	x			
Suffolk	x		x			
Newport News	-	-	-	-	-	-
Poquoson	x	x	x	x	x	
Williamsburg	-	-	-	-	-	-
Franklin	x					

Despite these regional planning efforts and calls for anticipatory action to combat climate change impacts, the content analysis shows that 80% of the city plans, as of 2013, still neglect planning for *climate change*, and a mere 10% make any mention of *adaptation*. Furthermore, of all the city comprehensive plans, only five have actually addressed *sea level rise*, compared to the eight cities that plan for *flooding mitigation*. This may largely be due to the politics of place. As shown through interview and observation data above, both *climate change* and *adaptation* are politically heated terms in Hampton Roads. Furthermore, local government officials responsible for city planning in the

Hampton Roads region may not attribute the area's worsening repetitive flooding issues to climate change, and therefore use *flood mitigation* discourse to talk about the changing environmental issues.

I conclude that the politics circumventing climate change discourse in Hampton Roads have resulted in a failure of city councils to include holistic climate change planning into their comprehensive city plans, despite the top-down push from the Hampton Roads Planning Districts Commission (HRPDC) to do so.

I conducted a second content analysis on Climate Change Adaptation Strategic Plans of seven federal agencies. In this content analysis, I sought to understand how planning for climate change is happening across governance scales, as both federal and local agencies play a role in adaptation in Hampton Roads. Federal level Adaptation Strategic Plans were made in accordance with Executive Order 13514 on Federal Sustainability put into effect in 2009. The analysis was conducted on each agency's most current version of their (either 2012 or 2013) Adaptation Strategic Plans. Among other things, EO 13514 mandated that all federal agencies produce a plan detailing their strategy for adaptation to climate change. This is analogous to the top-down push that the Hampton Roads Planning District Commission placed on its ten member cities.

Discourse at the federal level widely addresses *climate change* and *adaptation* (100% of all assessed federal Strategic Plans), and 87% of the federal agency plans discuss issues of *capacity and resiliency building* (Table 4.2). In contrast to local planning, the content analysis of the federal level Climate Change Adaptation Strategic Plans shows that national level adaptation planning largely neglects place-based climate change, with only 28% of the assessed federal agencies addressing mitigation of place-based flooding impacts. In general, the federal agencies take a more abstract and big-picture approach to the socio-ecological issues that climatic change is co-producing.

Table 4.2 A discourse analysis of adaptation claims (by classification) in federal agency 2012/2013 Climate Change Adaptation Strategic Plans

National Agencies	Adaptation claims (by classification) made in Climate Change Adaptation Strategic Plans					
	Place-based Flood mitigation	Flooding attributed to SLR or climate change	Sea Level Rise	Climate Change	Adaptation	Community Resilience or Capacity Building
Homeland Security (FEMA)		x	x	x	x	x
Department of the Interior		x	x	x	x	x
Department of Defense (ACE)		x	x	x	x	
Department of Commerce (NOAA)	x	x	x	x	x	x
Department of Health and Human Security		x		x	x	x
Department of Housing and Urban Development (HUD)	x	x	x	x	x	x
Homeland Security (FEMA)		x	x	x	x	x

After completion of the discourse analysis of the ten Comprehensive City Plans and of the seven federal agencies' Climate Change Adaptation Strategic Plans, I conducted a comparative analysis of the two sets of results (see Figure 4.1 below). This comparative analysis helps highlight the disparities and similarities in adaptation discourse between local and federal government. The results show a large discourse divide between the objectives of federal agencies and the local city councils in long-term planning and adaptation policy.

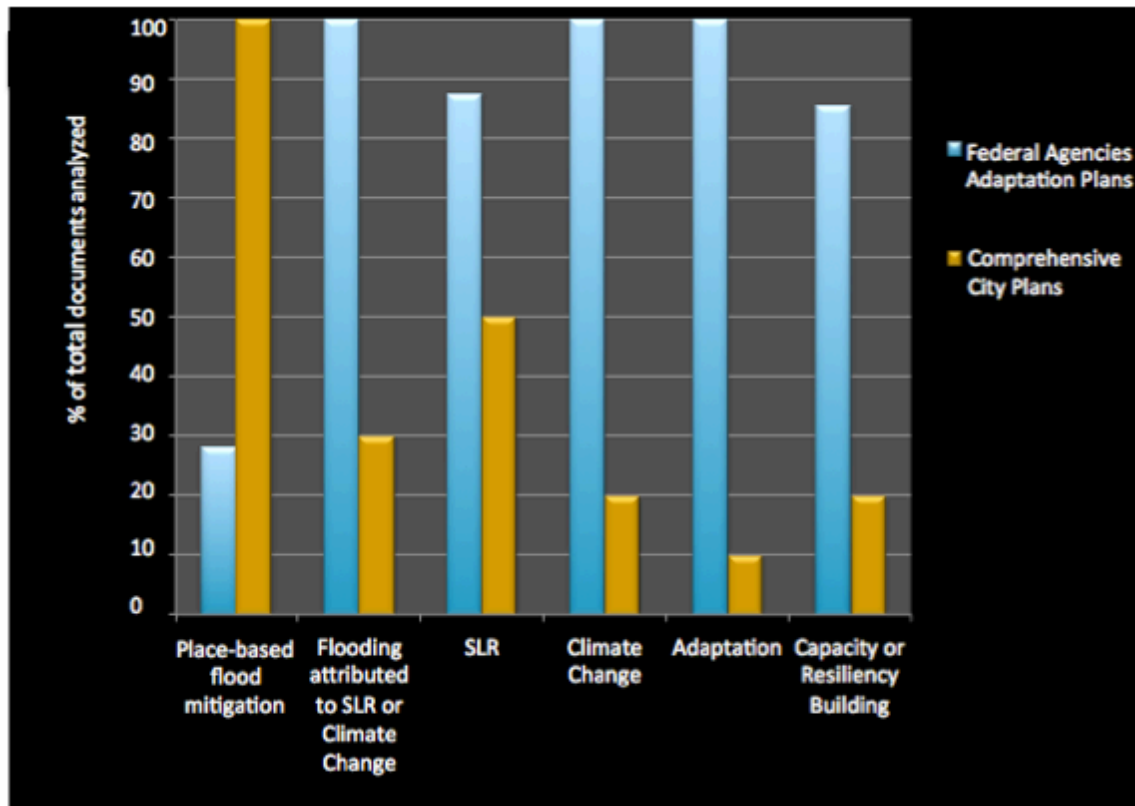


Figure 4.1 Federal and Local Institutions Adaptation Discourse Divide
A comparison of the results between the discourse analyses of adaptation claims made in seven federal agencies' 2012 Climate Change Adaptation Strategic Plans, and the adaptation claims made in ten cities' Comprehensive Plans. SLR is the abbreviated form of sea level rise.

Figure 4.1 illustrates how far apart the federal and local level adaptation discourses are from one another. Implications of this 'discourse divide' on multi-scalar collaborative governance and decision-making could be gridlock or misunderstandings when trying to achieve goals of adaptation, such as reducing the vulnerability of a system, community capacity building, and resiliency building.

When linking results of the discourse analysis to the adaptation literature, this 'discourse divide' may be problematic. According to Preston et al. (2011), the goal of adaptation is to reduce vulnerability. This does not align, however, with the ideologies at the local government level, where capacity building (to reduce vulnerability to climate change) remains 80% absent from local city planning. Reducing vulnerability is tightly linked to capacity building (or adaptive capacity), in an

inverse relationship. As there is a reduction in vulnerability, we can expect that adaptive capacity will increase. Capacity building is presently recognized as an adaptation objective in six of the seven assessed federal strategic plans. Therefore, I conclude that reducing vulnerability to climate change is a primary federal level adaptation goal.

Local-level political constraints on adaptation discourse have significant implications for the region's ability to adapt and build resiliency to climate change impacts. Furthermore, political tensions restricting climate change discourse may infringe upon a multi-scalar governance adaptation process because, "the way in which a problem is conceptually framed determines the way in which responses are identified and evaluated and therefore influences the range of response characteristics" (Pisano, 2012). Therefore, as local and federal level agencies address the place-based impacts of climate change, they are identifying the socio-ecological problem differently and looking for solutions aimed at differing objectives.

Section 2: Systems of Power: Processes of Inclusion and Exclusion

By investigating process of inclusion and exclusion through direct observation at two Sea Level Rise and Adaptation Forums in Hampton Roads, coupled with semi-structured interview data, I was able to gain insights into the power relations that underpin adaptation decision making in this place. In this section, I specifically report insights gained from fieldwork pertaining to the research question: *who is included and who is excluded from adaptation planning and decision making in Hampton Roads*. This question addresses matters of *procedural justice*, which is concerned with the fairness and the transparency of the processes by which decisions are made, within the context of adaptation to climate change related impacts. According to Paavola & Adger (2002), recognition, participation, and legitimacy are common concepts within procedural justice. Central dilemmas of procedural justice in adaptation to climate change include (Paavola & Adger 2002 p.8):

- Whose interests are taken into account in planning and decisions related to adaptation, and how?
- Who can participate in planning and decisions related to adaptation, and how?
- How much influence do different parties have on plans and decisions, and on what basis?

While presenting research results in this section, I will address these procedural justice dilemmas as they relate to the research question of inclusion and exclusion.

Contextualizing the Hampton Roads Sea Level Rise and Adaptation Forums

I observed two Adaptation Forums in Hampton Roads, one on March 13th, 2013 and one on July 10th, 2013, aiming to gain insights into who is included and who has influence in adaptation decision making in this region and *why*. First, it is necessary to contextualize the Sea Level Rise and Adaptation Forums I attended. The two Adaptation Forums I attended are only two in a series of five regional forums taking place over a two-year span from 2012 to 2014. The Climate Change and Sea Level Rise Initiative at Old Dominion University spearheaded the Sea Level Rise and Adaptation Forum series, in collaboration with the Hampton Roads Planning District Commission, and with funding from Virginia Institute of Marine Science National Sea Grant. Although the presenters, discussion topics, and to some small extent the attendees varied between forums, the overarching objectives remained the same. According to the Hampton Roads Adaptation Forum's website (Appendix C), "the forum strives to serve as the regional dialogue among municipalities committed to adopting effective adaptation designs and plans, tailored to meet the needs of our communities in the face of rising sea levels due to climate change" (ODU, 2013). The forum is furthermore designed to be inclusive of academic institutions and local, regional, state and federal agency officials with a stake in adapting infrastructure and facilities to rising sea levels (ODU, 2013). Through fieldwork conducted in Hampton Roads I observed two Adaptation Forums, where I was able to observe forum activities and actor relations. During the forums I noticed disparities in word and deed, with

respect to the purpose of the forums, when I contrasted institutional stakeholder's words (e.g. what the forum objectives are advertised as being, and what institutional stakeholders claim the forum objectives are) and their deeds (e.g. what the forum objectives were directly observed to be through stakeholder actions).

The institutional actors interviewed repeatedly made claims that the adaptation forums are not a decision-making place, rather an information-sharing place for invited guests.

“The forum is not a decision-making place, it is an information sharing place where best management practices can be shared, it is supposed to be a place to get tips. It is not the regional strategic planning place, it is the information sharing place” -Key Informant, Virginia Institute of Marine Science

It is important to note that the forum indeed is not a decision-making place and that there actually is no regional strategic planning place for adaptation in Hampton Roads. Furthermore, insights gained from observation at the Adaptation Forums confirm the informant's statement that decision-making does not happen in this setting, at least not formally. However, scientific as well as political influencing of decision-making does take place here, despite the verbal recognition by this stakeholder. The forum creates a formal space where multi-scalar (federal, state, regional, and local) institutional actors, government staff, and scientists come together and share best practices and regionally relevant information. The forum also serves the unique function of being the only meeting place for invited stakeholders across the region's 16 municipalities to openly collaborate about adaption to sea level rise and flooding issues. However, through my active engagement in two Adaptation Forums, I have directly observed that the forum's unspoken, and perhaps most controversial, function is actually to provide a place for social actor networking, including the development of hierarchical relationships.

Public expressions of praise and recognition were given repeatedly throughout both observed forums, often bolstering the reputation of the same institutions or institutional actors over and over again. The term “shout-out” was frequently used by presenters and stakeholders during the forum, identifying certain community leaders. A *shout-out* according to Urban Dictionary (2013) is slang for a public expression to acknowledge someone or to make someone’s presence known; a positive public acknowledgement of a friend; or, to acknowledge with respect. A documented friendly exchange between stakeholders after the forum recorded:

“Thanks for the shout out, you scratch my back I’ll scratch yours” – Invited Forum Stakeholder

The influence of *shout outs* and public displays of recognition was further evident from interviews conducted after the Adaptation Forums. Key informants all mentioned the names of the people who were giving or receiving *shout outs* at the Adaptation Forums during the interview sessions in the days after the forums. These interview results show that there was either a lasting impression on forum attendees of the social actors recognized through *shout outs*, or that those given public recognition already have political clout within regional adaptation. Through this informed understanding, I suggest that the forums are not only a place for invited stakeholders to share information, but rather they are constructs of an “inner circle” political process, fostering participation between an elite corps of scientists, decision-makers, and institutional actors.

When I inquired informally to a stakeholder at the first forum I attended, *“who gets invited to participate in the Adaptation Forums?”* The informant responded with, *“who they are comfortable with.”* They, in this statement refers to the inner circle stakeholders who are already included in the Adaptation Forums. Therefore, I began the investigation seeking to understand who the included stakeholders are comfortable with, who they are not comfortable with, and why.

The act of selecting institutions and social actors to include in the regional Adaptation Forums raises concerns of procedural justice, such as equitable stakeholder participation. The actors

invited to the regional Adaptation Forums have leverage in informing institutional perceptions of the locally experienced vulnerabilities to sea level rise and flooding. By exclusionary actions, a non-forum-participant stakeholder will not experience the same opportunities to gain regional knowledge, network, or potentially be identified as a key player in regional or local adaptation efforts. Hence, it is important to at least be invited to the Adaptation Forums if you have a stake in adapting to the regional sea level rise and flooding issues. When I asked one of the architects of the forum who is in need of adapting to climate change impacts in Hampton Roads the informant replied:

“who isn’t? There’s coastal property, there’s transportation that’s vulnerable, there’s going to be a level of adaptation that almost everyone will have to figure out.” – Virginia Institute of Marine Science

Despite this institutional perception of who is vulnerable and who has a stake in adaptation in the community, the research results show that there is a deliberate choice to not include all known regional stakeholders in the Adaption Forums.

In general, institutional actors tied to city planning and floodplain management, as well as federal agencies related to water resources and academic or science agencies, are documented as having been in repeated attendance. Some of the institutions included were: the Federal Emergency Management Agency (FEMA), the Army Corps of Engineers (ACE), the National Oceanic and Atmospheric Administration (NOAA), Virginia Institute of Marine Science (VIMS), Old Dominion University (ODU), and the College of William and Mary, to name a few. According to one of the three forum directors, the forum is

“targeted to all the members of the HRPDC (Hampton Roads Planning District Commission), emergency management, planners, decision-makers at the city level - the professionals, not elected officials.”

He added,

“we’ve seen it [the forum] grow, we didn’t expect the media, the student researchers, and the business community”

The informant continued saying that the process of stakeholder inclusion has been an *organic process*. Observational evidence of the social actors that attend the forums coincides with the stakeholder’s comments. Showing that the notion of an “organic process” is fitting, as the included regional actors at the Adaptation Forums are constantly evolving, usually expanding over time. Therefore, identifying the *inner circle* stakeholders is difficult, as it is just now taking shape.

A better way to examine who has a voice in Hampton Roads’ regional adaptation efforts is to ask *who is not* invited to participate at the forums. The intentionally excluded voices are much more consistent over time and therefore more easily identified. During a key informant interview I was informed that,

“the forum is driven by what do the stakeholder’s need” – Key Informant, Virginia Institute of Marine Science

Research results indicate that one way the forum meets the needs of regional stakeholders is by excluding confrontational or oppositional regional actors from being in attendance. Through observation and interview methods, I have been able to identify the uninvited stakeholders as: elected officials, general public, certain business sector actors (i.e. real estate agents), and community outsiders. The following three sections highlight the research results that provide new insights into institutional perceptions and beliefs that have resulted in stakeholder exclusion.

Avoidance of Political Turmoil

Both interview and observational data identify a strong desire to avoid political turmoil as one rationale for not including elected officials in the regional forums. During an interview, the informant stated,

“We didn’t want the professionals to be at the table with their elected boss there. We thought it could limit and inhibit what the professional staff could talk about because of the political sensitivities of our own climate” [Also] “they [forum stakeholders] don’t want to have Tea Party leaders screaming at them” –Key Informant, Virginia Institute of Marine Science

This statement gives insights into the perceptions of the architects of the adaptation forums and how they went about making decisions of who should be invited.

Observational data from the March 13th adaptation forum illustrates a candid stakeholder interaction between one of the forum’s co-directors and an invited guest.

“We know it’s [adaptation to sea level rise] a sensitive issue so we don’t want to limit the discussion because of having officials in attendance. We want to create a safe environment” – Forum Speaker, Old Dominion University

“I would encourage you to keep the forum that way because I can honestly tell you a lot of us in this room would not be saying half of what we are saying otherwise [if our elected officials were here]” - Invited Forum Stakeholder, City Emergency Management Official

It is with this institutional understanding of the political sensitivity around sea level rise and adaptation that elected officials have been excluded from the Sea Level Rise and Adaptation Forum series.

Apprehensive of Public Responses

In addition to the intentional exclusion of elected officials from the adaptation forum meetings, only limited invitation was extended to the general public. The null to minimal public engagement and participation is most likely due to multiple factors. Practicalities, such as funding a forum much larger in scope, would require larger facilities and larger food budgets. This may be cost prohibitive within the means of the awarded grant-funded adaptation forums. Also, informing the general public is not the objective of the forums. As identified before, the forums are more for the

purpose of professional information sharing, science informing decision-making, and stakeholder networking. Although these factors may drive the decision to exclude the general public, this study finds that deeper institutional perceptions of the public also contribute to prohibiting a fully participatory approach.

Through observation at the July 10th adaptation forum, interesting results emerged from a panel discussion held about “lessons learned” in regards to communicating risk to the general public. One stakeholder in the audience, a former city planner, shared their perceptions on how the public perceives government:

“I think sometimes there’s a controversial relationship that goes on between public and private, and people have this ...they don’t think of you as human, they think of someone [government actor] as the enemy that is trying to control them”

- Invited Forum Stakeholder, Wetlands Watch

Another stakeholder, from an institutional perspective, identified the relationship between the public and local government as a “fight” during the previous adaptation forum on March 13th, 2013.

“for example, when you’re recommending raising a house you’re having to fight the citizens, then your elected officials, and then the special interest groups and that is really hard” – Invited Forum Stakeholder, City

Floodplain Manager

Other negative sentiments about collaborating with sectors of the general public were also obvious during the March Adaptation Forum when stakeholders openly discussed who should be invited to the required public forums. When one of the directors of the Adaptation Forum asked the stakeholder audience, “*who are some audiences that need to hear the message?*” responses such as this came back:

“We have a certain group of people that we automatically think of communicating

to, real estate and bankers, but they are also the folks that don't necessarily see themselves as audiences to bear about sea level rise and the effects of the area" - Invited Forum Stakeholder

Discussions continued between two stakeholders at the forum with:

"Should we invite someone from real estate? The ones I know are fairly open to it." -Forum Stakeholder, Old Dominion University

"Yeah, but their knowledge level is surprisingly low" - Forum Stakeholder, City of Hampton Official

These candid statements were revealing, as they enable a window into what segments of the population institutional actors perceive to be at risk of flooding impacts and in need of outreach and awareness. Overwhelmingly, institutional actors view the general public as naïve, disinterested, or not well educated enough to comprehend the issue of sea level rise and local flooding issues. This has been a justification to limit the inclusion of certain business sectors and the public in the forums.

Additionally, engaging the public in the Adaptation Forums is a source of concern for the invited stakeholders because of prior negative experiences at public meetings. Prior public meetings related to flooding, were discussed at the July 10th Forum. This facilitated discussion focused on the topic of "how to deal with meeting disrupters." The meeting opened up with four panelists discussing previous experiences:

"for us, that is our biggest problem, how to deal with meeting disrupters" - Forum Panelist 1, Hampton City Official

"meeting disrupters happen with everything we do" - Forum Panelist 2, Portsmouth City Official

A former city council member attending the forum recalls meeting disrupters as "scary" and stated that:

"... I have also heard horror stories about public meetings"

This sentiment of poorly behaving public actors is echoed by another panelists' recollection of physical threats made at a public flood meeting. That person further stated:

“if you can’t be civilized and have a discussion using a civilized voice then that’s a real problem” –

Hampton City Official

These statements made by institutional actors show that institutional perceptions of the general public are that they lack awareness, understanding, and civility. The decision to exclude the general public from the regional Adaptation Forums has apparently been accepted.

Though the Adaptation Forum series limits the engagement of the general public, two public outreach forums are held in order to comply with the guidelines of the National Sea Grant award, which provided funding for the forums. One of the public meetings was held in October of 2013 and the other has not yet been planned. After the first public forum in October, I conducted follow-up interviews with institutional actors who had been in attendance at the forum in order to learn more about the inclusion of the public at the public Adaptation Forum.

When I asked a key informant to describe who had been in attendance at the public Adaptation Forum I was told:

“About 40 people were there, but probably half or more were professionals in the field [...] basically all the people who go to all the other forums” – Key Informant, Wetlands Watch

Additionally, the informant shared:

“I am pretty sure, the people that were attending were the people who have already drunk the cool-aid, it’s the people who are already on the mailing list working on sea level rise or the professionals who are already working on sea level rise.” – Key Informant, Wetlands Watch

Interview results found that there is an awareness among the inner-circle stakeholders that advertisement for the public forum received little attention. One key informant shared that:

“there was a little bit of a glitch, I think they [forum directors] forgot about it until last week [less than one week before event]. It was sent to all the forum participants and Anna Smith asked forum participants to

mail it out to those on their mailing lists. [...] I think it was just by email and word of mouth between people who are already interested in the subject” – Key Informant, Wetlands Watch

These interview statements revealed that the public attendance was primarily limited to friends, co-workers, or acquaintances of members of the original forum stakeholder group, and failed to reach far beyond the inner circle to bring in those with different views on the flooding related regional risks or those representing at-risk and vulnerable populations.

The exclusion or neglect of engaging public stakeholders in the regional Adaptation Forums limits the voice and access of the most socially vulnerable, as well as the segments of the population at-risk of flooding and sea level rise. As surface-level explanations may be given for why the public has not been involved in the Adaptation Forums, my findings suggest that institutional attitudes of apprehension and uncertainty about how the general public may interpret and respond to the environmental problems actually contributes to the overall exclusion of the general public.

Other studies done on public awareness of sea level rise issues in Hampton Roads have found that, when flooding and sea level rise public awareness meetings were conducted in the past, it was overwhelmingly the wealthy, white, well educated, and retired portions of the population that actually attended (Figure 4.2) (UVA, 2011). This UVA (2011) participatory study was structured to inform at-risk population in Hampton Roads of their vulnerability to sea level rise. There were a series of meeting held in friendly public places, on weekends, on weekdays, after working hours and mid-day, and offered food; however, despite the genuine outreach attempt of the meetings, the underrepresented or missing social groups include the poor and impoverished, youth to middle aged, persons with low education status, renters, minority groups, African Americans, and other people of color (Institute for Environmental Negotiation, University of Virginia, 2011).

Demographics

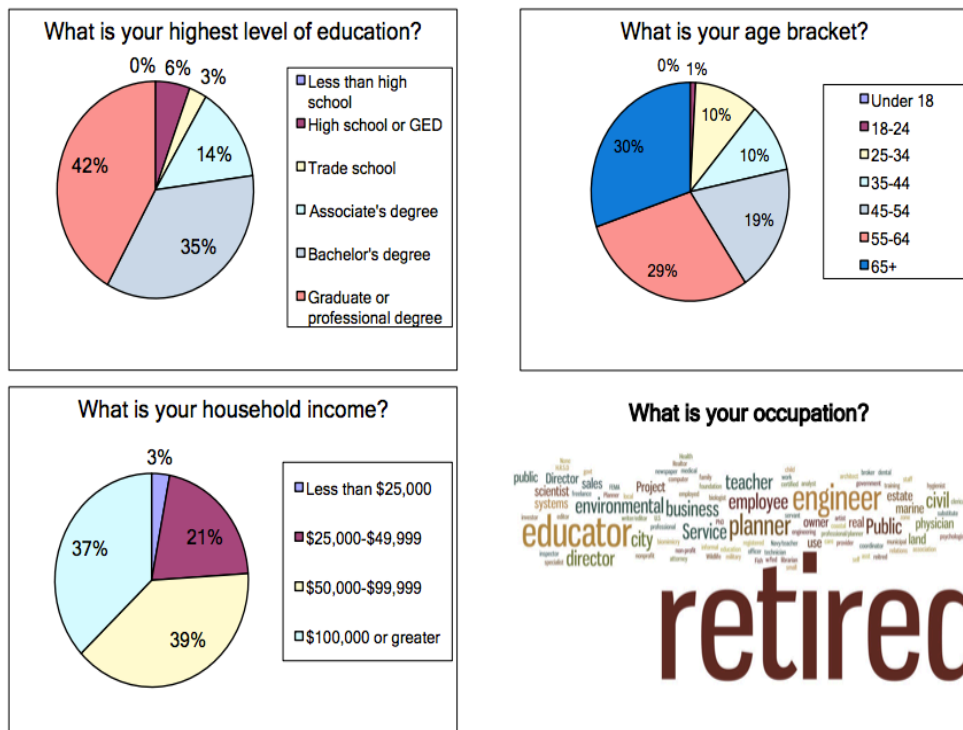


Figure 4.2 Demographics of Attendees at Four Listening Sessions in Hampton Roads (Institute for Environmental Negotiation, University of Virginia, 2011).

The above findings from the UVA (2011) study highlight the complications of raising awareness to the risks of climate change within marginalized and socially vulnerable sectors of the population. As this thesis research has found that there are minimal efforts made in a top-down approach to raise awareness within the most socially vulnerable social groups, the UVA (2011) study identified the counterpoint, that there is not much if any effort made in a bottom-up approach (voluntary citizen engagement) to take advantage of what few outreach opportunities there are. With this understanding, it can be inferred that the most socially vulnerable, at-risk populations will continue to experience less access to capacity building and tools for adapting to future environmental threats such as flooding and sea level rise.

Distrust of Outsiders

The Adaptation Forum stakeholders also have reservations toward the inclusion of “outsiders” at the meetings. One invited stakeholder at the July 10th Adaptation Forum stated,

“one of the things that’s happened is that you’re getting all of these people from outside of the area that are coming in that want to do stories, or study it, or whatever, and you can send mixed signals” – Invited

Forum Stakeholder, Wetlands Watch

Expressed in the key informant’s statement is a desire to be accurately represented and a perceived threat that adaptation efforts in Hampton Roads will be unfairly judged. This stakeholder perception is something I have tried to be mindful of while conducting research in this place. As an outside researcher, I have attempted to be reflexive of my positionality during data collection, data analysis, and through the process of writing up the findings.

Through personal experiences as an outsider researching the social process of adaptation in this community, I have direct insights into the community’s suspicion and reluctance towards outsiders. When attempting to conduct a survey at the July 10th Adaptation Forum, I found great resistance. Up until I asked to bring a survey into the forum setting, I had been warmly welcomed into the community. Once I had inquired about administering a survey to the forum attendees, a sharp response came across saying “we do not want polling done at the forum.” I obliged, but later on asked one of the forum directors why this was the case. He replied,

“There is a bit of sensitivity in the community to being in the fish bowl, to being the guinea pig. They don’t want outside judgments... why are you guys having so much trouble adapting... they don’t want to be studied, ... or have others say we have solutions for you. The universities and local institutions and scientists want to be the source of science and adaptation solutions. [...] I think that people are suspicious of social science- why are you asking the questions? They don’t want to be studied. The forum is new, they don’t have enough to be confident in what they are or who they are. They don’t want to become a science experiment.”

Although difficult to accept as a researcher studying the power relations within this landscape, the rejection of the survey and explanation given brought about other insights into the attitude and perceptions of the institution actors.

Inclusion and Exclusion in the Case of Hampton Roads

In Hampton Roads, the excluded stakeholders are seemingly not invited to participate at the regional Adaptation Forums on account of avoidance of political turmoil in the forum settings, apprehension of the perceptions and responses from the general public stakeholders, and distrust of outsider judgments. Overall, decisions about who is included and excluded in the regional adaptation discussion appear to be underpinned by institutional attitudes of insecurity and uncertainty, thus facilitating a social process of adaptation to climate change in Hampton Roads in which the most socially vulnerable populations will likely experience institutionally produced vulnerability, in addition to their high physical risks of flooding impacts. This institutional production of vulnerability that may ensue is the result of unequal access to resources, capabilities, and rights for the most vulnerable segments of the population. Through the lens of procedural justice, communities have the right to be involved in equitable decision-making processes that affect their lives, and participation from all community stakeholders can aid in fostering trust and building social capital (Paavola and Adger 2002). The transaction costs associated with participatory planning can be high, albeit necessary to achieve long-term objectives. As stakeholders within the Adaptation Forums strive to share tips for adaptive management they may want to facilitate a more genuine participatory and transparent approach. According to literature, a fully participatory decision-making approach is often best applied to social challenges characterized by complexity, deep uncertainty, and conflicts among values (Oliver-Smith, 2009b). While climate adaptation would appear to epitomize such challenges, truly participatory approaches to adaptation planning remain relatively unusual and not standard practice (Preston, 2009). According to Heijmans (in Bankoff et al., 2004),

“if we are serious about addressing vulnerabilities, then people’s participation should be made part of an empowerment process: joint assessment of capacities and vulnerabilities build awareness.”

Furthermore, the inclusion process should reach beyond consultation and providing information, and should be robust, including participants in all stages of decision-making that will impact them or their livelihoods (Heijmans in Bankoff et al., 2004). Given these statements from literature, the lack of an open participation approach observed in adaptation actions in Hampton Roads could indicate that, reducing vulnerability to climate change is not a top priority within institutional decision-making.

Section 3: Prioritization and Allocation of Adaptation Projects

This section addresses the third research question, investigating how institutions prioritize and allocate funding for adaptation projects. This question was posed through the lens of distributive justice. According to Paavola & Adger (2002), *distributive justice* is concerned with how the beneficial and adverse effects of human-induced climate change and adaptation to climate change impacts are distributed across groups of people and over time. This thesis study looks closely at matters of equity in the context of prioritization and allocation of institutional adaptation projects. Specifically, I examine how institutions prioritize and allocate funds for adaptation response to climate change, as well as distribute (intentionally or unintentionally) beneficial and adverse consequences of adaptive responses (e.g. who benefits and who loses from adaptive responses).

In Hampton Roads, there is a shared perception among institutional actors that there is simply not enough money to adapt each municipality adequately or *successfully* to the environmental changes of flooding and sea level rise without outside or federal funding for large-scale engineering projects. When I asked Hampton Roads stakeholders *what is needed to adapt to the future threats of sea level rise in this place?* the most commonly given response can be generalized as: more funding. In fact, all

seven semi-structured interview informants identified the lack of local funds as a limitation to adaptation. *“The bottom line is, there is just not enough money for everything that needs to be done, for all the houses that need to be elevated, or for all the houses that need to be removed, there just isn’t enough money there,”* a key informant with Wetlands Watch shared during an interview. A second key informant with the William & Mary Coastal Policy Clinic echoed this notion, identifying a lack of local institutional financial capacity to fund adaptation projects, and raising concerns of equity regarding the prioritization of adaptation projects.

“...there is not going to be enough money to do everything that needs to be done. So, I think it’s going to be really hard for decision makers to prioritize work without creating winners and losers”- Key Informant,
William & Mary Virginia Coastal Policy Clinic

The notion of “winners” and “losers” appears in the political ecology literature (Adger, 2012) and has been integrated into adaptation studies in recognition of the fact that climate change and human responses to climate change will have differential impacts across different segments of the population. As discussed in Chapter 2, different impacts produce groups of “winners,” those who benefit from climate change and adaptation, and “losers,” those who suffer losses or negative consequences as a result of climate change and adaptation. My research results appear to support this concept from political ecology. The institutional actors are conscious of the notion of winners and losers and they perceive preventing environmental injustice outcomes as a real challenge for planners and local decision-makers.

One city planner informed me that some people will be the recipients of the city’s adaptation projects, such as sea walls and floodgates, and some will not, saying,

“you’ll have to make the general public understand that there are going to be some losers” – City of
Portsmouth Official

The interview statements highlighted thus far identify institutional perceptions of inadequate local-level financial capacity as a regional dilemma for achieving adequate adaptation to sea level rise and flooding. However, other key informants gave insights into the more deeply rooted social constructions that are constraining adaptation options. When I asked, *what is needed for Hampton Roads to successfully adapt?* other key informants stated,

“I think the cop-out, easy answer, is money. A lot of municipalities will talk about the money.” – Key

Informant, Virginia Institute of Marine Science

Indeed this was the case in my other interviews, as all informants did readily identify money as the culprit preventing “successful” adaptation. This informant continued on to say that two things would be helpful in obtaining “successful” regional adaptation: (1) leadership by example from federal agencies, and (2) a regional effort in which the collective municipalities would organize and get creative by pooling funds and adapting collectively as a region. Both of these recommendations were suggested by multiple other informants as well.

Leadership by Example

Leadership by example is something that many informants suggested would be very helpful in aiding local-level adaptation efforts. However, a lack of communication and collaboration across governance scales appears to be instilling a significant amount of uncertainty in the local institutions about stakeholders at the state and federal levels. Statements full of suspicion and a lack of trust for federal-level agencies were commonly heard in the institutional actor interviews. *“I am wondering why the military or the other federal government agencies are not communicating more with the local community,”* one informant told me. The informant continued by saying, *“what has also come from that [lack of communication] is that it makes the economic development community and local governments very anxious because they don’t know what the military infrastructure is thinking and they know they are planning.”* Hampton Roads is home to the largest U.S. naval shipyard in the world (Figure 4.3 and 4.4).



Figure 4.3 Norfolk Naval Ship Yard on the James River (Jamie Haverkamp/ July 9th 2013)



Figure 4.4 Norfolk Naval Ship Yard on the James River (Jamie Haverkamp/ July 9th 2013)

During this interview, I was informed that the people of Hampton Roads *love* the military, and furthermore, they largely depend upon the military for jobs and the local economy.

“this region is very nervous about the military, they love the military, and they don’t want them to leave.”

These interview insights suggest that the lack of collaboration across multiple scales of government is creating attitudes of anxiety and uncertainty in local-level institutional actors. The implications of these attitudes for adaptation planning and decision-making will be discussed in section four of this chapter.

A Regional Effort

A regional effort was the second most common solution suggested by informants to addresses the deeper social constructs that inhibit adequate adaptation to sea level rise and flooding. From interview statements, it appears that there are no regional adaptation efforts or regional level adaptation decision-making in Hampton Roads. A key informant stated that,

“...there are no regional entities but they are each in their own stovepipes- they are not having a conversation with each other or confident that they are influencing each other” – Key Informant, Virginia Institute of Marine Science

Through a regional-level effort, informants hope for a pooling of resources from which the 16 localities of Hampton Roads can share information and funding for projects aimed at the broader interest of the region. An overwhelming sentiment of the institutional actors, both interviewed and observed, is that there is a region-wide environmental problem of flooding in Hampton Roads, yet there is no regional consensus or collaborative problem-solving effort. Instead, each of the 16 Hampton Roads municipalities is facing the same environmental problem, yet they are independently scrambling to come up with solutions to mitigate the flooding impacts. Furthermore, they are only looking for solutions that apply within the political boundaries of their jurisdictions.

“The 16 municipalities that are part of the HRPDC geographic scope – they are not always seeing eye to eye. They are not working in a fully collaborative way. They are sharing information at the forum, but they are not collaborating on long-term planning” - Key Informant, Virginia Institute of Marine Science

Another informant made a similar statement and linked the lack of collaboration to the fact that there is competition over limited financial resources.

“There is gridlock between different institutions. Sometimes we work together to collect and gather information, but that’s not spending money, so there is competition” - Key Informant, Portsmouth City Official

“I think there is competition between user groups within any locality [...] it’s limited money, and who gets what. I think there is competition between agencies over the budget” - Key Informant, Portsmouth City Official

Institutional actors in favor of a regional approach hope that it would foster sharing of resources (e.g. knowledge and money) for larger adaptation projects that have benefits regional in scope.

Additionally, this approach could potentially abate the competition that exists between neighboring cities and agencies. A regional City Official shared concerns, stating *“some localities will take on adaptation strategies that will have negative impacts on their neighbors.”* Proponents of the regional-level effort suggest that there would likely be a reduction in the potential risk of negative adaption spillovers if decisions or regulations were enforced at the regional level and specifically not at the local level.

Other informants pointed out that the state could provide the resources that a new regional organizational structure would, and moreover, the state governing structure already exists. However, the political agendas and diverging stakeholder interest at the state level in Virginia create too much gridlock, and therefore a regional governing entity is thought to be needed.

“I think that it [a regional effort] is more likely than state leadership because we flip back and forth all the time between a Democratic governor, and they believe in climate change, and when we get a Republican governor, they don’t believe it’s happening. There’s interesting political dynamics in Virginia politics, 30% of delegates are from the coastal zone. That means 70% are outside of the coastal zone, and many of them are from the western part of the state where they mine coal, and they ship down to Norfolk to ship out to China because its sulfur coal, and its dirty. So, the coal industry is not real keen on talking about climate. The

politics in the state make it very difficult to have a conversation about this, and you get inconsistent state leadership.” – Key Informant, Virginia Institute of Marine Science

Other institutional actors voiced frustration with the state-level leadership on climate change and adaptation during the July 10th Adaptation Forum. One presenter at the Adaptation Forum recalled that a climate change report, done by the state, was removed when the new governor took office and there was a change in the political make-up. The Adaptation Forum stakeholder stated,

“and the state, we had done a climate change report and then that was politically a problem [...] and all our work went by the wayside, it was really frustrating”

- Adaptation Forum Stakeholder, Wetlands Watch

Another key informant recalled the same event stating,

“back in our previous governor, Tim Caine did have a climate commission and we had a climate report [...] much of which was removed when the new governor came in” -Key Informant, Virginia Institute of Marine Science

These interview statements show how the frustrations of institutional actor with state-level governance on climate change and adaptation has been an impetus for the desire for a new regional adaptation governing structure in Hampton Roads.

Much of the adaptation literature (e.g. Tol, 2005; Measham et al., 2011) suggests that adaptation is a local-level issue. This case study finds that, although the impacts of climate change are inherently felt at the local level, in the case of Hampton Roads, the local and the state level experience political boundaries, political ideologies, and financial limitations, that have proven prohibitive to achieving effective, equitable, and adequate institutional adaptation to climate change. Thus, incorporating all levels of government and planning at a regional level may be necessary to address environmental hazards with geographical scopes that reach beyond political boundaries.

Prioritization and Allocation of Adaptation Projects

Despite the factors (competition, lack of resources, and scientific uncertainty) that constrain local-level adaptation in Hampton Roads, decision-makers are still faced with the reality of adapting the community to increasing flood risks and are currently responding using *best practice* management strategies.

Three million city dollars have recently been spent on protecting Portsmouth's downtown from increasing sea level rise and flooding in what is known as the *Crawford Street Project*. The project included the installation of four floodgates, replacement of the failing sea wall, and elevation of roads. Information gathered from interviews suggests that local government recognizes that this project is directly benefiting the downtown businesses and high-end residential properties. Institutional informants working on the installation of the Crawford project suggest that the project may also offer indirect benefits to segments of the population who live outside the wealthy downtown neighborhoods, as it opens up an alternative emergency evacuation route, is greener, and improves the aesthetics of downtown.

When I asked why this project had been prioritized, a Portsmouth City Official stated, "*other places are at risk but they don't have an easy solution.*" Elaborating upon this, I was informed that decision-makers rely heavily, if not solely, on a modified cost-benefit analysis to prioritize their large-scale adaptation projects. The goal is to get "*the biggest bang for our buck*" several institutional actors stated in independent interviews. The informant claimed that the cost-benefit analysis is easy and that it is an industry standard, used by other municipalities as well as by federal agencies such as the Army Corps of Engineers and FEMA. The informant further stated, "*either the numbers work or they don't,*" alluding to the fact that that prioritization of adaptation projects is not a values-based decision, but rather the outcome of non-subjective numerical evaluation. However, in regards to the traditional cost-benefit analysis that the informant had described, it is widely accepted that environmental and some social

factor criteria are not well represented. Therefore, the higher revenue, higher tax-producing and wealthy sectors tend to have a higher benefit-to-cost ratio.

Other city planners and policy informants informed me that the allocation of adaptation projects is more about protecting the local economic base (revenue) rather than reducing the vulnerability of the at risk populations to flooding and sea level rise.

“To be honest, the high income, beach-front properties provide a lot to the locality’s tax base, and they will not ask them to relocate, but the low income properties will be forced to adapt [move, relocate, retreat] first. “The localities are going to say okay we don’t get enough tax revenue from these properties, what are we going to abandon first. [...] which ends up being really unfair, because it’s the wealthy that are paying those high property taxes and they end up being the ones getting their properties saved [...] so it’s not going to go over well” – Key Informant, Wetlands Watch

Another key informant with the Virginia Institute of Marine Science shared the same insights, recalling a community in Virginia Beach that is at great risk of sea level rise and flooding; however, the city continues to provide very costly city services to the community because it is a very wealthy community that contributes significantly to city taxes.

“Sandbridge, a high end community in Virginia Beach, there’s only one road that gets out to this sandspit, and this road washes out a lot. The city spends a lot on maintaining this road, but they are kicking in so much to the tax base that they will continue to do so. This community has the capital to build protective infrastructure, sea walls, until you get to that road.” – Key Informant, Virginia Institute of Marine Science

If indeed cities choose to prioritize adapting the wealthy properties and economic hubs that generate a lot of the city taxes, then issues of justice and equity may arise. This may be the case as the low to mid-range income classes will experience differential access to government-facilitated options for adapting to climate change than that of the upper class. Under this scenario, those who

are seemingly better provided for by institutional adaptation strategies are the privileged of society and those with the least ability to adapt will receive lesser amounts of assistance. The socially vulnerable in the Hampton Roads area are not currently being prioritized in the allocation of top-down adaptation funding. Therefore, they may experience weaker access to institutional adaptation projects. This finding requires sensitivity when acknowledging the research findings of Klienovsky et al. (2006), that the most at risk (of flooding and sea level rise) segments of the population in Hampton Roads are the most socially vulnerable population segments, the poor, elderly, minority groups, and the disabled (i.e. those with the least amount of adaptive capacity).

Key informants go as far as to say that within some localities there is “inequitable distribution of funds” for money allocated to adaptation projects. Furthermore, it can be said that reducing the vulnerability of the population segments most at risk from the effects of climate change and building household level adaptive capacity do not appear to be the primary goals of adaptation decision-making at the local level. Through this study, I have found that the primary local government goal when adapting to climate change in Hampton Roads is to reduce the vulnerability of the city’s economy to the increasing risk of sea level rise and flooding. This approach to adaptation undermines the gravity of the needs of the most vulnerable population segments.

This is not to say that low-income, high flood-prone areas of cities are not receiving government-funded adaptation projects. Indeed they are. As one key informant pointed out, Portsmouth has spent millions of dollars over the last several years adapting its low-income neighborhoods to flooding. When I inquired further about the project, the informant shared that the city of Portsmouth is adapting the low-income neighborhoods by updating the drainage systems that are back flooding (or reverse flooding). Even when it is not raining, backup is happening in neighborhoods just on a high tide, the informant explained to me.

“some of these lower-income neighborhoods had no drainage system, so we are doing it incrementally... piecemealed”- Key Informant, Portsmouth City Official

From a collection of interview insights similar to this one, I note that projects allocated to adapting low-income communities are not typically large-scale engineering solutions, nor anticipatory in nature, like the sea walls protecting the downtown sectors of Portsmouth and Norfolk. Rather, adaptation strategies for low-income neighborhoods are incremental and reactive adjustments made to help communities cope with flooding issues that are, in fact, due largely to the inadequate state of their current living conditions, and have less to do with adapting to future environmental changes. I argue that providing a neighborhood with an adequate storm-water drainage system is not an adaptation to climate change, but a public service project that a city should be expected to provide with or without climate change. From this perspective, projects in the lower-income neighborhoods are not adaption projects and should not claim to be such.

The fairness of prioritizing and allocating adaptation projects in the region is largely determined by local government decision-making. When asking a key informant if they felt government funding for adaptation projects was distributed equitably, they replied,

“It depends upon how equitable the local city government is” – Key Informant, Wetlands Watch

City planners are key stakeholders who have significant decision-making power in the prioritization and allocation of adaptation projects. Therefore, how city planners perceive climate change risks, coupled with their motivational values, will largely determine adaptation outcomes.

Interview results revealed a shared perception among institutional actors that the populations most vulnerable to sea level rise and flooding in the region are the most socially vulnerable population segments. When I asked institutional actor informants, *what population segments do you think are the most vulnerable to sea level rise and flooding in Hampton Roads?*, one informant stated:

“There is very little question. It’s the low-income, elderly, retirement or assisted communities- not the high-end retirement communities. Also the ethnic minorities [...]. These folks are not showing up at meeting nor are they talked about.” –Key Informant, Virginia Institute of Marine Science

This response shows that at least some institutional actors, specifically those with a seat at the adaptation decision-making table, are aware of the region’s vulnerable populations. They are also aware of the lack of inclusion of vulnerable populations in the adaptation process and of the difficulty that exists when trying to inform them of the local sea level rise and flooding risks. Despite this awareness, helping the most socially vulnerable and those with the greatest exposure to climate change has not been made high priority in the allocation of adaptation projects.

I Conclude

In summation, based on this research I argue that the issue of a lack of funding for adaptation projects is largely the result of deeper social and institutional constructs linked to institutional attitudes of fear and uncertainty, which are prohibiting a more equitable prioritization and allocation of adaptation funds. In addition, the *adaptation* projects allocated to lower-income neighborhoods are not adaptations, but rather incremental adjustments made to existing infrastructure, which would have been needed regardless of climate change impacts.

Part 4: The Big Picture: Linking to Theory

Institutional actor attitudes of insecurity and uncertainty have been reoccurring themes throughout this chapter, from the attitudes circumventing institutional adaptation discourse, to those underpinning matters of procedural and distributive justice. Situating this research finding in Schwartz’s Value Theory (1992 &1994), I infer that institutional actors are informing decision-

making and responding to place-based sea level rise and flooding from motivational values of security, power, and achievement (Table 4.3).

Table 4.3 Definition of values and motives (Schwartz, 1992).

VALUE	DEFINITION AND UNDERLYING MOTIVES
Power	Social status and prestige, control or dominance over people and resources (social power, authority, wealth)
Achievement	Personal success through demonstrating competence according to social standards (successful, capable, ambitious, influential)
Hedonism	Pleasure and sensuous gratification for oneself (pleasure, enjoying life)
Stimulation	Excitement, novelty, and challenge in life (daring, a varied life, an exciting life)
Self-direction	Independent thought and action choosing, creating, exploring (creativity, freedom, independent, curious, choosing own goals)
Universalism	Understanding, appreciation, tolerance and protection of the welfare of all people and of nature (broadminded, wisdom, social justice, equality, a world at peace, a world of beauty, unity with nature, protecting the environment)
Benevolence	Preservation and enhancement of the welfare of people with whom one is in frequent personal contact (helpful, honest, forgiving, loyal, responsible)
Tradition	Respect, commitment, and acceptance of the customs and ideas that traditional culture or religion provides the self (humble, accepting my portion in life, devout, respect for tradition, moderate)
Conformity	Restraint of actions, inclinations, and impulses likely to upset or harm others and violate social expectations or norms (politeness, obedient, self-discipline, honoring parents and elders)
Security	Safety, harmony, and stability of society, of relationships, and of self (family security, national security, social order, clean, reciprocation of favors)

In the case of Hampton Roads, I find that those who already have power within the political landscape of regional adaptation appear to be operating from “self-enhancement” and “conservation” values (Figure 4.5), striving for (1) security, (2) power, and (3) achievement and thereby avoiding or overcoming the threat of uncertainties by controlling relationships (through processes of inclusion and exclusion) and resources (funds and information related to adaptation). The control or domination over resources and relationships may have negative and inequitable implications for the population segments most at risk in Hampton Roads. For example, the exclusion of the most socially vulnerable social groups from discussions of regional adaptation in

Hampton Roads may produce negative consequences from a procedural and environmental justice standpoint. Additionally, as top-down funding resources are prioritized and allocated to high value properties and local tax bases over human life and welfare, situations that exacerbate or reproduce vulnerability may arise. These insights into the current process of adaptation in Hampton Roads are of concern when considering the fact that vulnerability is driven by inadvertent or deliberate human action that reinforces self-interest and the distribution of power (Adger, 2006).

According to Schwartz (1992), motivational values pertaining to “self-enhancement” (power, wealth, and control over resources and relationships), are in direct opposition to values emphasizing acceptance of others as equals, concern for the welfare of others, and values pertaining to environmental justice (Schwartz, 1994, 24) (Figure 4.5). Within the context of adaptation, motivational values of “self-enhancement” and “conservation” were frequently recorded in the actions and statements of institutional actors in Hampton Roads. The dominance of these values in the institutional process of adaptation may undermine institutional actors’ values of equity, and environmental and social justice.

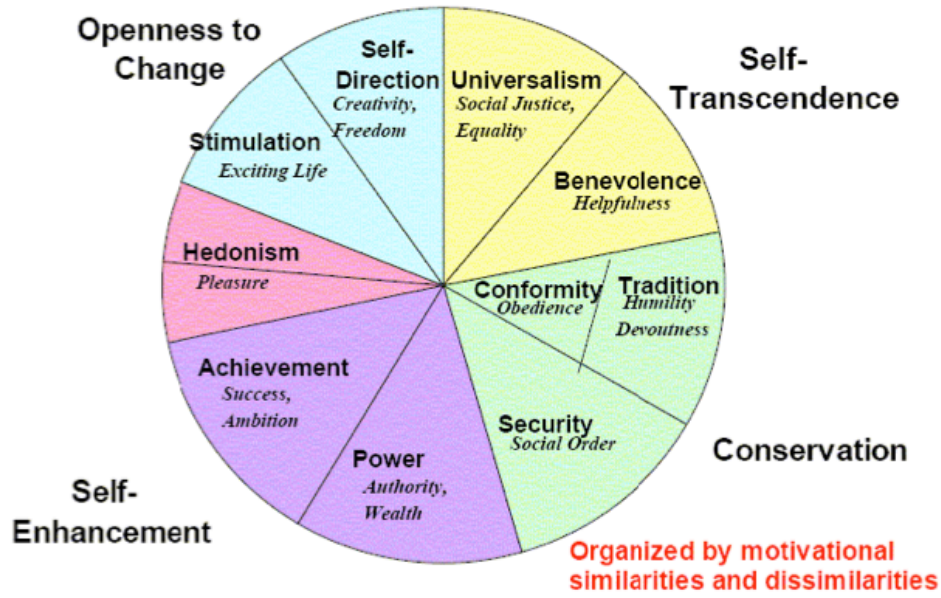


Figure 4.5 Schwartz's Value Theory (1994) organizational structure of Motivational Values.

Prevailing values underpinning institutional adaptation in Hampton Roads have parallels to those described in the development literature, which has long found that implemented, large-scale projects often have the support of the politically empowered, yet may constraint agency of the socially vulnerable and marginalized population segments (Marino and Ribot, 2012). As institutional adaptation responses unfold in Hampton Roads, and globally, lessons could be learned from studies done on previous development projects to avoid unintentional harm to vulnerable population segments.

It is important to notice that motivational values striving for security, power, and achievement do not only originate from within institutional structures, but also from the external forces put on institutional actors. As one city planner recalled:

“in early 2000, like 2002 through 2005, you started getting this pushback, of okay these people knew it was going to flood, so why are you taking my tax dollars and supporting them, I’d rather you use my tax dollars to do something for someone who pays attention to where they are living - and that sentiment is actually gaining a lot of speed” – Key Informant, Portsmouth City Official

As a result of internal (e.g. best-practices procedures, cost-benefit analysis, political tensions around discourse, inclusions and exclusion processes) and external (e.g. citizen stakeholder agendas) pressures, institutional attitudes of fear and uncertainty may be well founded and not exclusive. However, they still may have negative implications on the most socially vulnerable population segments as they may 1) constrain equitable inclusion of the most socially vulnerable in the process of adaptation and 2) produce a downward spiral of vulnerability, by which those with the least amount of adaptive capacity experience restricted or limited access to top-down adaptation projects and funding.

As the social process of adaptation to climate change is operating under motivational values of power, security, and achievement, there may be negative adaptation outcomes. While notions of *successful* adaptation are ill defined, it becomes challenging to suggest whether or not successful adaptation is a realistic outcome in the context of Hampton Roads. However, utilizing a *success to failure continuum* model (Moser & Boykoff, 2013) from the adaptation literature (Figure 4.6), speculations can be made as to what kind of outcomes may transpire from the adaptation process in Hampton Roads.

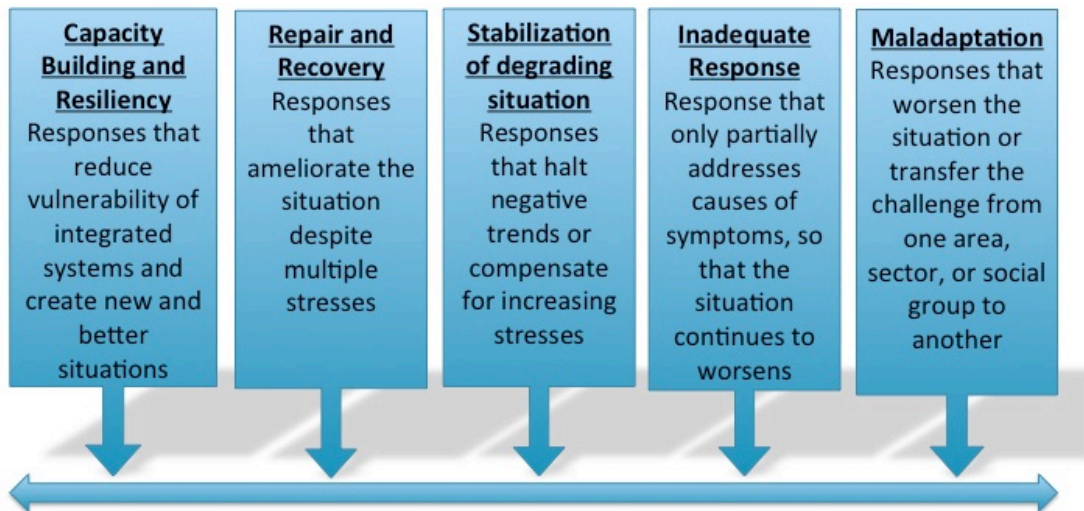


Figure 4.6 Success-to-Failure Continuum, with definitions of more *successful adaptation* on the left end, and definitions of *adaptation failures* on the right (Moser and Boykoff, 2013).

As adaptation decision-making unfolds over the next several decades, evaluation of the implications of adaptation decisions will become feasible. Currently, with the finding that that most socially vulnerable are largely neglected in the social process of adaptation (in both procedural and distributive contexts), it would be accurate to suggest that overall adaptation to climate change in Hampton Roads is not holistically building adaptive capacity or reducing vulnerability of the most at-risk populations. Although speculative at this point, I would suggest that, to the extent institutional adaptation is constructed in the fashion observed through this research, institutional responses are only partially addressing the symptoms of vulnerability to climate change (flooding) and therefore producing adaptation outcomes that would fit within the range of *Inadequate Response* to climate change along the *Success-to-Failure Continuum* (Moser & Boykoff, 2013). The social constructs influencing vulnerability related to climate change in the study area are not being addressed. Furthermore, the observed institutional actions related to adaptation in Hampton Roads

appear to be on a course that will exacerbate social vulnerability and weakening adaptive capacity within the most socially vulnerable and at-risk segments of the population.

Future research is needed to understand the implications of the social construction of adaptation responses to climate change, especially in the context of institutions and their role in building or restricting adaptive capacity. With a better understanding of this relationship, incremental steps can be made towards creating a more equitable adaptation process.

Chapter 5: Conclusion

The objective of this research was to contribute to the state of knowledge related to institutional responses to climate change and dimensions of equity. By seeking a greater understanding of multi-scalar institutional relations and responses at the local scale and by conducting research focused on equitable adaptation issues, I hope that incremental steps can be made towards creating a more equitable top-down adaptation process, a process that prioritizes the reduction of social and biophysical vulnerability. On a grand scale, a more equitable institutional adaptation process could aid in preventing maladaptation (Barnett and O'Neill, 2010), development disasters (Oliver-Smith, 2009a), and/or 'adaptation apartheid' (UNDP, 2007), and could effectively facilitate stronger adaptive capacity and resiliency at every social level (household, local, regional, state, federal and international).

The overarching research question posed was, *What role do institutional actors play in the social process of adaptation to climate change in Hampton Roads, VA?* This study finds that adaptation decision-making of institutional actors is underpinned by attitudes of insecurity and uncertainty, which are preventing equitable and holistic institutional responses to climate change in Hampton Roads. As a result, current adaptation procedures and options have largely neglected and not prioritized vulnerability and risk reduction for the segments of the population with the least ability to adapt to the region's environmental changes.

This study has also identified three ways in which social and political factors facilitate *inadequate* institutional adaptation responses. First, politically charged climate change adaptation discourse limits the creation of adaption plans that address multiple biophysical and social root causes of place-based vulnerability to climate change. The political tensions around the local-level discourse lead to the production of poorly conceptualized notions of place-based risk and the

constructs of vulnerability. Furthermore, those tensions restrict open discussions related to climate change. Second, thus far, the processes of inclusion and exclusion have resulted in exclusion of critical stakeholder groups (i.e., general public, including the at-risk populations, certain business sectors, and elected officials) from regional adaptation discussions. Through the exclusion of certain stakeholders, the politically empowered can operate in a control-and-command governance style, in which those in the 'inner circle' maintain power through enabling their own access to decision-making, influencing decision-making, actor networking, and information sharing, while restricting the access of the excluded stakeholders. The third socio-political finding of this study is that of distributive injustices found within the process of prioritization and allocation of institutionally funded adaptation projects. In this study, I found that funding for adaptation projects in Hampton Roads is overwhelmingly allocated to large-scale development projects that prioritize protecting the economic centers and high value properties over the most at-risk properties and thus undermines the ability of institutions to alleviate vulnerability and risk within the most socially vulnerable segments of the population.

When looked at individually, these findings are important, but when woven together, a more complete picture of the social process of adaptation can be understood. That picture of social adaptation, understood through this research, raises concerns of achieving equitable and effective adaptation, with the goal of reducing the vulnerability of a system without weakening other systems.

Bibliography

1. Aaheim et al., 2008. "Adaptation to Climate Change: Why is it Needed and How Can it be Implemented?" Center for European Policy Studies Policy Brief. [online] Available at: < available at: <http://ssrn.com/abstract=1334046> >
2. Adger, N. W., 2001. Scales of Governance and Environmental Justice for Adaptation and Mitigation of Climate Change. *Journal of International Development*, 13, 921-931.
3. Adger, N. W., Arnell, N. W., & Tompkins, E. L., 2005. Successful Adaptation to Climate Change Across Scales. *Global Environmental Change*, 15(2), 77-86.
4. Adger, W. N., 2006. Vulnerability. *Global Environmental Change*, 16(3), 268-281.
5. Adger, W. N. (Ed.). (2006). *Fairness in Adaptation to Climate Change*. MIT press. Cambridge, MA, USA.
6. Adger N. and Barnett J., 2009. Four Reasons for Concern About Adaptation to Climate Change. *Environment and Planning*, [print journal] 41(12), 2800-2805. Available through: Environment and Planning archive < <http://www.envplan.com/abstract.cgi?id=a42244> > [Accessed 22 March 2013].
7. Agrawal, A., 2012. Cool Heads for a Hot World – Social Sciences Under a Changing Sky. *Global Environmental Change*, [online] Available at: < <http://www.sciencedirect.com/science/journal/09593780/22/2> > [Accessed 2 April, 2013].
8. Agrawal, A., 2008. The Role of Local Institutions in Adaptation to Climate Change. In: Social Dimensions of Climate Change, Social Development Department, The World Bank meeting. Washington, DC, 5-6 March 2008.
9. Alberini, A., Chiabai, A., and Muehlenbachs, L., 2006. Using Expert Judgment to Assess Adaptive Capacity to Climate Change: Evidence From A Conjoint Choice Survey. [pdf] Available at < <http://ideas.repec.org/p/wiw/wiwrse/ersa06p292.html> > [Accessed 22 February 2013].
10. Allen, 2003. A Question of Language. In Pryke et al. (eds.) *Using Social Theory: Thinking Through Research*, 11-27. Sage.
11. Barnett and O'Neill, 2010. Maladaptation. *Global Environmental Change*, [online] Available at: http://d3n8a8pro7vnmx.cloudfront.net/nowaterdeal/pages/31/attachments/original/1363981240/Maladaptation_Editorial.pdf?1363981240 [Accessed 1 July 2013].
12. Brooks, N., and Adger, N., 2003. Country Level Risk Measures of Climate-Related Natural Disasters and Implications for Adaptation to Climate Change Report. [pdf] Norwich, UK: University of East Anglia Tyndall Centre for Climate Change Research And Centre for Social and Economic Research on the Global Environment. Available at: < http://start.org/program/advanced_institute3_web/p3_documents_folder/Brooks_Adger.pdf > [Accessed 13 February 2013].
13. City of Virginia Beach, 2013. *Comprehensive Planning Division*. Retrieved on December 2014 from: < <http://www.vbgov.com/government/departments/planning/plandivision/Pages/CompPlanning.aspx> >
14. Cope, 2010. 'Interpreting and Communicating' Qualitative Research. In Hay (ed.), *Qualitative Research Methods in Human Geography*, 279-295. Oxford University Press. Victoria, Australia.
15. Dowling, 2010. Power, Subjectivity and Ethics in Qualitative Research. In Hay (ed.), *Qualitative Research Methods in Human Geography*, 26-39. Oxford University Press. Victoria, Australia.
16. Dunn, 2010. 'Doing' Qualitative Research in Human Geography. In Hay (ed.), *Qualitative Research Methods in Human Geography*, 99-137. Oxford University Press. Victoria, Australia.

17. Fears, D., 2012. Built on Sinking Ground, Norfolk Tries to Hold Back Tide Amid Sea-Level Rise. *The Washington Post*, June 17. [online] Available at: < http://articles.washingtonpost.com/2012-06-17/national/35459771_1_sea-level-rise-sea-levels-hampton-roads > [Accessed 12 November 2012].
18. Ford, Ford, and Patterson, 2011. Are We Adapting to Climate Change? *Global Environmental Change*, [online] Available at: < http://resilient-cities.iclei.org/fileadmin/sites/resilient-cities/files/Images_and_logos/Resilience_Resource_Point/Ford__Paterson_Are_we_adapting_to_climate_change.pdf > [Accessed 22 February 2012].
19. Hampton Roads Planning District Commission, 2009. *Virginia's Hampton Roads Regional Profile*. Virginia, Hampton Roads Planning District Commission. Available [online] at: < http://www.hrp.org/Site/docs/ResourceLibrary/HR_Performs_Regional_Profile_FINAL_01-30-09.pdf > [Accessed 13 January 2012].
20. Hampton Roads Planning District Commission, 2010. *Climate Change in Hampton Roads Impacts and Stakeholder Involvement*. [online] Available at: < <https://docs.google.com/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbngxvZHVjbGltYXRlY2hhbmdlfGd4OjdmOGI5ZDVkYWWM4Mzk1MzU> > [Accessed 12 April 2013].
21. Hampton Roads Planning District Commission, 2012. Climate Change in Hampton Roads, Phase III: Sea Level Rise in Hampton Roads, VA. Available online: Accessed at http://www.hrpdcva.gov/uploads/docs/HRPDC_ClimateChangeReport2012_Full_Reduced.pdf
22. Harper, S., 2013. Virginia Must Lead Fight in Sea Level Rise. *The Virginia Pilot*, January 12. [online] Available at: < <http://hamptonroads.com/2013/01/report-virginia-must-lead-fighting-sea-level-rise> > [Accessed 20 January 2012].
23. Heffernan, O. 2012. Adapting to a Warmer World: No Going Back. *Nature Special Edition*, 491,659–661(29 November 2012). Available [online] at: < <http://www.nature.com/news/adapting-to-a-warmer-world-no-going-back-1.11906> > [Accessed 15 April 2013].
24. Heijmans, A. 2004. From vulnerability to Empowerment. In Bankoff, Frerks, and Hilhorst (ed) *Mapping Vulnerability, Disasters, Development, and People*. Earthscan Publications, London.
25. Herbert, S. 2000. For Ethnography. *Progress in Human Geography*, 24(4), 550-568.
26. Institute for Environmental Negotiation, University of Virginia (UVA), 2011. *Sea Level Rise in Hampton Roads: Findings from the Virginia Beach Listening Sessions*, Final Report. [Online] at: http://www.virginia.edu/ien/sealevelrise/docs/Sea_Level_Rise%20final%20report%207-19.pdf
27. IPCC (Intergovernmental Panel on Climate Change) (2007) *Climate Change 2007: Impacts and Adaptation*. Contribution of working group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, UK and New York, NY, USA.
28. IPCC (Intergovernmental Panel on Climate Change) (2014) *Climate Change 2014: Adaptation Opportunities, Constraints, and Limits*. Contribution of working group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, UK and New York, NY, USA.
29. Kates, R.W., 2000. Cautionary Tales: Adaptation and the Global Poor. *Climatic Change*, [online] Available at: < <http://www.rwkates.org/pdfs/a2000.02.pdf> > [Accessed 15 April 2013].
30. Kates, R.W., Travis, W.R., and Wilbanks, T.J., 2012. Transformational Adaptation When Incremental Adaptations to Climate Change are Insufficient. *Proceedings of the National Academy of Sciences*, 109(19), pp. 7156-7161.

31. Kearns, R. A. 2010. Seeing With Clarity: Undertaking Observational Research. In Hay (ed.), *Qualitative Research Methods in Human Geography*, 241-258. Oxford University Press. Victoria, Australia
32. Kelly, P. M., & Adger, W. N. (2000). Theory and practice in assessing vulnerability to climate change and Facilitating adaptation. *Climatic change*, 47(4), 325-352.
33. Kitchen, R. and Tate, N. 2000. Planning a Research Project. In Kitchin, R. and Tate, N. (ed) *Conducting Research in Human Geography: Theory, Methodology and Practice*, 28-44.
34. Kleinosky, L. R., Yarnal, B., and Fisher, A., 2006. Vulnerability of Hampton Roads, Virginia to Storm-Surge Flooding and Sea-Level Rise. *Natural Hazards*, [online] Available at: < <http://www.cara.psu.edu/about/publications/2006-Kleinosky%20et%20al.pdf> > [Accessed 22 February 2013].
35. Lemos, M.C. and Agrawal, A., 2006. Environmental Governance. *Annual Review of Environment and Resources*, Vo., 31, November 2006. [online] Available at: < http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1081963 > [Accessed 1 April 2013].
36. Luers, A., 2005. The Surface of Vulnerability: An Analytical Framework for Examining Environmental Change. *Global Environmental Change*, [online] Available at: < <http://yaquivalley.stanford.edu/pdf/LuersGEC20051.pdf> > [Accessed 23 February 2013].
37. Marino, E. and Ribot, J., (eds.), 2012. Special Issue Introduction “Adding Insult to Injury: Climate Change, Social Stratification, and the Inequities of Intervention.” *Global Environmental Change*, [online] Available at: < <http://www.sciencedirect.com/science/journal/09593780/22/2> > [Accessed 2 April 2013].
38. Measham, T. G., Preston, B. L., Smith, T. F., Brooke, C., Gorddard, R., Withycombe, G., & Morrison, C., (2011). Adapting to climate change through local municipal planning: barriers and challenges. *Mitigation and Adaptation Strategies for Global Change*, 16(8), 889-909.
39. Moser, S. C., and Boykoff, M. T. (Eds.), 2013. *Successful Adaptation to Climate Change: Linking Science and Policy in a Rapidly Changing World*. Routledge, London.
40. New York Times, 2012. *What Could Disappear*. [online] Available at: < <http://www.nytimes.com/interactive/2012/11/24/opinion/sunday/what-could-disappear.html> > [Accessed 1 December 2012].
41. NOAA’s National Climate Data Center, 2010. Continental United States Hurricane Strikes (1950-2010). U.S. Southern and Eastern Shoreline. [Online] Available at: < <http://www1.ncdc.noaa.gov/pub/data/images/2010-Landfalling-Hurricanes-11x17.pdf> > [Accessed 23 Jan. 2013].
42. NPR (National Public Radio), 2012. [Radio Broadcast] “Norfolk, VA., Puts Flooding Survival Plan to the Test,” 6 November 2012. Available [online] at: < <http://m.npr.org/news/Science/164362276> > [Accessed 7 November 2012].
43. NRDC (National Resource Defense Council), 2011. Norfolk, Virginia: Identifying and Becoming More Resilient to Impacts of Climate Change. [online] National Resource Defense Council at: < https://www.nrdc.org/water/files/ClimateWaterFS_NorfolkVA.pdf > [Accessed 10 March 2013].
44. ODU (Old Dominion University), 2013. Climate Change and Sea Level Rise Adaptation Initiative 2. [online] Available at: < <http://www.odu.edu/research/initiatives/ccslri> > [Accessed 1 December 2012].
45. Oliver-Smith, A., 2009a. *Development & Dispossession: The Crisis of Forced Displacement and Resettlement*. School for Advanced Research Press.

46. Oliver-Smith, A., 2009b. *Sea Level Rise and the Vulnerability of Coastal Peoples: Responding to the Local Challenges of Global Climate Change in the 21st Century*. Interdisciplinary Security Connections' Publication Series No.7. Bonn, Germany: United Nations University Institute for Environment and Human Security. [Online] at: < <https://www.ehs.unu.edu/article/read/800> >
47. Osbahr, H., Twyman, C., Adger, W. N., and Thomas, D. S. G., 2010. Evaluating Successful Livelihood Adaptation to Climate Variability and Change in Southern Africa. *Ecology and Society*, [online] at: < <http://www.ecologyandsociety.org/vol15/iss2/art27/> > [Accessed 10 March 2013].
48. Paavola, J., and Adger, W. N., 2002. Justice and Adaptation to Climate Change. *Tyndall Centre Working Paper*, 23. School of Environmental Science, University of East Anglia, Norwich, UK. Available [online] at: < <http://www.tyndall.ac.uk/sites/default/files/wp23.pdf> >
49. PBS (Public Broadcast Station), 2012. *Battleground Dispatches: Norfolk Readies for Future Storms, Sea Level Rise*. [TV Report] PBS, Dec. 6, 2012. Available [online] at: < http://www.pbs.org/newshour/bb/politics/july-dec12/norfolk_12-06.html > [Accessed 12 January 2012].
50. Pisano, U., 2012. *Resilience and Sustainable Development: Theory of Resilience, Systems Thinking and Adaptive Governance*, report N 26. Vienna, Austria: European Sustainable Development Network. Available [online] at: < http://www.sd-network.eu/quarterly%20reports/report%20files/pdf/2012-September-Resilience_and_Sustainable_Development.pdf >
51. Preston, B.L. and Stafford-Smith, M., 2009. *Framing vulnerability and adaptive capacity assessment: Discussion paper*. CSIRO Climate Adaptation Flagship Working paper No. 2, [online] at: < <http://www.csiro.au/org/ClimateAdaptationFlagship.html> > [Accessed 12 January 2013].
52. Preston, B. L., Westaway, R. M., & Yuen, E. J., 2011. Climate adaptation planning in practice: an evaluation of adaptation plans from three developed nations. *Mitigation and Adaptation Strategies for Global Change*, 16(4), 407-438.
53. Robbins, P. (2012). *Political Ecology: A Critical Introduction* (Vol. 20). John Wiley & Sons. USA.
54. Sallenger, A.H., Jr., Doran, K.S., and Howd, P.A., 2012, Hotspot of Accelerated Sea-Level Rise on the Atlantic Coast of North America: *Nature Climate Change*, [online] at: < <http://dx.doi.org/10.1038/nclimate1597> > [Accessed 15 February 2013].
55. Schwartz, S. H., 1992. Universals in the Content and Structure of Values: Theoretical Advances and Empirical Tests in 20 Countries. *Advances in Experimental Social Psychology*, 25(1), 1-65.
56. Schwartz, S. H., 1994. Are There Universal Aspects in the Structure and Contents of Human Values?. *Journal of Social Issues*, 50(4), 19-45.
57. Tol, R. S., 2005. Adaptation and mitigation: trade-offs in substance and methods. *Environmental Science & Policy*, 8(6), 572-578.
58. The Weather Channel (March 6, 2013). Retrieved from: <http://www.weather.com/news/coastal-flooding-photos-tweets-20130306>
59. UNDP (United Nations Development Programme), 2007. *Human Development Report 2007/2008*
60. Urban Dictionary, 2013. Shout Out. (n.d.). In *Urban Dictionary* online. Retrieved from <http://www.urbandictionary.com/define.php?term=shout-out>
61. Virginia Department of Health, Office of Minority Health and Public Health Policy, 2008. *Inequities in Infant Mortality and Low Birth Rate in Hampton Roads: Rethinking Birth Outcomes Using GIS and*

Geospatial Analysis. [online] Available at:
<http://www.vdh.virginia.gov/OMHHE/policyanalysis/documents/hamptonroads-IM-SDOH-8-2008.pdf>
[Accessed 12 February 2013].

62. Virginia Institute of Marine Science, 2013. Recurrent Flooding Study for Tidewater Virginia (SJR 76, 2012). [pdf] Commonwealth of Virginia Senate Document 3. Available at
< [http://leg2.state.va.us/dls/h&sdocs.nsf/By+Year/SD32013/\\$file/SD3.pdf](http://leg2.state.va.us/dls/h&sdocs.nsf/By+Year/SD32013/$file/SD3.pdf) >
[Accessed 22 Jan 2013].
63. Virginian Pilot (October 29, 2012). [Photograph] Retrieved from:
<http://mynews13.com/content/news/cfnews13/news/article.html/content/news/articles/cfn/2013/10/29/hurricane_sandy_one_year.html>
64. Waitt 2010. Doing Foucauldian Discourse Analysis- Revealing Social Identities. In Hay (ed) *Qualitative Research Methods in Human Geography*, 217-240. Oxford University Press. Victoria, Australia.
65. Watson and Till 2010. Ethnography and Participant Observation. In D. DeLyser et al. (eds.), *The Sage Handbook of Qualitative Geography*, 156-171.
66. Winchester and Rofo 2010. Qualitative Research and its Place in Human Geography. In Hay (ed.), *Qualitative Research Methods in Human Geography*, 3-25. Oxford University Press. Victoria, Australia.

Appendices

APPENDIX A: Observation Chart

Observation Chart: Hampton Roads Sea Level Rise/ Flooding Adaptation Forum- 2nd meeting

Place:

Date:

Activity:

Time Start-End:

Group Size:

Overall demographic make-up of the group

Age, Education attainment, Race, Gender, Affiliation

Engagement Level of Group: *low* *medium* *high*

Group Level of Understanding: *learned something new* *already understood*

complete lack of understanding *some members understood* *others were lost*

Purpose of the activity:

science informing policy & stakeholders *policy voicing needs* *stakeholders call for action*

community-based participatory action/outreach *networking & actor identifying*

Identify power relations in context of presentation

Who is talking/presenting?

Who is listening?

Is there agreement or disagreement among participants?

Does speaker present a call to action or identified gaps in the research?

Identify key words and the context they are used during presentation and in the responses to presentation (*examples: priority, vulnerability, risk, best practice, concerns, outreach, include, exclude, invite*) .

Identify power relations during the adaptation forum

Who are the stakeholders included in the forum?

What segments of the Hampton Roads population are not included in the forum?

Are networks being created or reinforced?

Is there talk of outreach or community-based participatory action? Is it well received?

How do forum participants relate with each other? Specific examples.

Professionally/ Formal Causally/ Informal Friendly

What is the overall feel of the forum?

Formal Informal Inviting and Welcoming Exclusive

How do stakeholders perceive those who are not invited to the forum ('outsiders')?

APPENDIX B: Interview Outlines
Semi-Structured Interview Questions with Institutional Actors

Background Information:

- i Name
- ii Place of work
- iii Job title
- iv What are your work responsibilities related to adaptation?

- v Are you a resident of Hampton Roads? If so, for how long?

- vi Do you currently experience, or have you experienced, sea level rise and/or flooding impacts on your livelihood or place of habitual residence?

1. How would you describe your knowledge of climate change impacts related to the Hampton Roads Region?

☐

Extremely knowledgeable

☐

Somewhat knowledgeable

☐

Not at all knowledgeable

2. To the best of your knowledge, in what ways does climate change present challenges for Hampton Roads?

What are the challenges posed for the natural environments?

What are the challenges for social systems in Hampton Roads (infrastructure, job-sectors, planning, etc.)?

3. **From what sources do you rely on to gain a knowledgeable understanding of climate change, especially climate change related to Hampton Roads?**

Would you say these are the same sources used to inform adaptation decision-making?

4. **Who is involved in the adaptation decision-making process in Hampton Roads?(Who has a voice in adaptation decision making?)**

Identifying the actors of adaptive governance by demographics, job-sectors, socio-economic status...

5. **Who is in need of adapting to climate change impacts?**

Identifying who is in need by demographics, job-sectors, socio-economic status, etc...

6. **At what scale (individual, community, local, regional, state, national, international) are adaptations funded and facilitated in Hampton Roads?**

7. **If people are displaced due to SLR and/or flooding, or adaptation projects, what institutions or agencies, if any, are financially or ethically responsible for providing aid or assistance to the displaced individuals?**

8. **To the best of your knowledge, what adaptation projects are being considered for Hampton Roads?**

What is hopefully achieved by each proposed adaptation?

Who is each project intended to benefit?

9. Could any population segments potentially be negatively impacted by any of the above adaptation projects? If so, which population segments?

(In regards to socioeconomic classes and economic sectors)

How?

10. What population segments of Hampton Roads do you anticipate to be the least resilient to the impacts of SLR and flooding?

☐

Low-income households

☐

Middle-class households

☐

Upper-class households

☐

Homeowners

☐

Renters

11. If it is not economically feasible to implement all desired adaptations, how is implementation of the adaptation projects prioritized?

What factors (potential risks) make an adaptation project high priority?

What or whose value system is the prioritization of projects based upon?

12. In your opinion, what is currently needed for Hampton Roads to successfully adapt to anticipated climate change challenges?

Demographic Information:

Gender: Male / Female

Age:

Ethnicity/Race:

Native language:

Married: Yes / No

Highest level of education:

Homeowner: Yes / No

Employed: Yes / No

Children/dependence: Yes / No

Appendix C: Sea Level Rise and Adaptation Forum Objectives

Sea Level Rise & Adaptation Forum

[ODU Home](#) > [Research & Impact](#) > [Research Initiatives](#) > [CCSLRI](#) > [Sea Level Rise & Adaptation Forum](#)

Climate Change and Sea Level Rise in Hampton Roads

A Forum to Address Concerns, Best Practices and Plans for Adaptation

Troy W. Hartley, *Virginia Sea Grant, Virginia Institute of Marine Science. (PI)*

Benjamin McFarlane, *Hampton Roads Planning District Commission, Chesapeake, VA*

C. Ariel Pinto, *Engineering Management & Systems Engineering, Old Dominion University*

Larry Atkinson, *Climate Change and Sea Level Rise Initiative, Old Dominion University*

The Hampton Roads Adaptation Forum is a regional dialogue among municipalities committed to adopting effective adaptation designs and plans, tailored to meet the needs of our communities in the face of rising sea levels due to climate change. The Forum will be composed of academic institutions and local, regional, state, and Federal agency officials with authority and responsibility for critical infrastructure and facilities in Hampton Roads (e.g., engineers, planners, facility managers, administrators, etc.). We seek to build a professional network that shares information and adaptation lessons learned through communication and information management.

The Forum will enable the most effective and efficient local government adaptation activities by:

- Identifying community-specific **best practices** in adaptation strategies, technologies, and specifications, and promoting broad adoption for regional compatibility.
- Facilitating consistency in **data management** and sharing to ensure common scientific understanding and foundation for local and regional response.
- Establishing targeted, specific adaptation **action plans** for the priority sub-areas identified in current sea level rise, inundation and flooding assessments.
- Facilitating communication and enabling coordination across these priority sub-areas to promote **nested sub-systems** into the broader local city, metropolitan area, and Hampton Roads regional adaptation planning and response.
- Conducting pro-active **Federal liaison** functions to provide a venue for local-state-Federal dialogue that promotes a comprehensive system-wide response.
- Monitoring and sharing information on effectiveness of adoption and implementation of specific adaptation activities to enable **adaptive management** among Hampton Road municipalities and state and federal agencies.

A knowledge management system based on Basecamp, which is a widely used, web-based project management and collaboration tool, will allow the municipalities and local, state and federal facilities in the Hampton Roads region to fully leverage their intellectual capital (institutional, social, human) in support of climate adaptation implementation objectives. The Basecamp knowledge management system will provide a framework for a comprehensive inventory of the people, processes and enabling technologies directly related to support local climate change and sea level rise adaptation. To gain access to the Basecamp for the Hampton Roads SLR Adaptation Forum project please contact Liz Smith (exsmith@odu.edu).

Forum Meetings

- [Forum Meeting 1: November 16, 2012 at ODU's VMASC](#)
- [Forum Meeting 2: March 13, 2013 at ODU's VMASC](#)
- [Forum Meeting 3: July 10, 2013 at ODU's VB Higher Education Center](#)
- [Forum Meeting 4: October 2, 2013 at ODU's Ted Constant Center](#)
- [Forum Meeting 5: March 28, 2014 at ODU's Ted Constant Center](#)

(ODU, 2013)

Appendix D: March 13th, 2013 Sea Level Rise and Adaption Forum Agenda & Location



A joint meeting of the
Hampton Roads Sea Level Rise/Flooding Adaptation Forum
and the
Central East Coast Chapter of the American Shore & Beach Preservation Association

Wednesday, March 13, 2013

9:00AM – 3:00PM

Virginia Modeling, Simulation and Analysis Center of Old Dominion University
1030 University Blvd, Suffolk, VA 23435: 757-686-6200

Agenda

8:30 AM – 9:00 AM	Registration and coffee
9:00 AM – 9:15 AM	Opening Remarks and Introductions – Carol Simpson , Provost, Old Dominion University
9:15 AM – 9:45 AM	AccessEU Sea Level Rise Transatlantic Best Practices Symposium – Regina Karp , Professor of Political Science, Old Dominion University
9:45 AM – 10:45 AM	Central East Coast Chapter Meeting – Maura Boswell , CEC Chapter President
10:45 AM – 11:15 AM	City of Norfolk Coastal Flood Study – Brian Joyner , Moffatt & Nichol
11:15 AM – 11:45 AM	FEMA Region III Coastal Analysis, Mapping, and Outreach – Jeff Hanson , Research Oceanographer, USACE Field Research Facility, Duck, NC and Michelle Hamor , Chief of the Flood Plain Management Section, Norfolk District
11:45 AM - 12:15 PM	Lunch
12:15 PM – 1:15 PM	USACE Flood Risk Management and Public Works Projects – Michelle Hamor , Chief of the Flood Plain Management Section, Norfolk District
1:15 PM – 1:45 PM	VIMS Update on the Recurrent Flooding Study for Tidewater Virginia – Molly Mitchell Rogerro , Center for Coastal Resource Management, Virginia Institute of Marine Science
1:45 PM – 2:15 PM	Maryland's Sea Level Rise Projections – Larry Atkinson , Slover Professor of Oceanography, Old Dominion University
2:15 PM – 3:00 PM	Discussion, Networking, Next Steps

(ODU, 2013,
http://www.odu.edu/research/initiatives/ccslri/calendar/2013/7/slr_flooding_adaptat)

Appendix E: July 10th, 2013 Sea Level Rise and Adaptation Forum Agenda & Location



Hampton Roads Sea Level Rise/Flooding Adaptation Forum AGENDA

Wednesday, July 10, 2013

9:00AM – 3:00PM

New location: Old Dominion University's Regional Higher Education Center - Virginia Beach
1881 University Drive, Virginia Beach, VA 23453
<http://ww2.odu.edu/ao/vbhec/about/directions.shtml>

REGISTRATION REQUIRED

8:30 AM – 9:00 AM	Registration and coffee
9:00 AM – 9:15 AM	Opening Remarks and Introductions – Larry Atkinson , <i>Old Dominion University Climate Change and Sea Level Rise Initiative (CCSLRI)</i>
9:15 AM – 9:30 AM	Ice-Breaker/Networking Activity – Jenifer Alonzo , <i>Old Dominion University Department of Communication and Theater Arts and CCSLRI</i>
9:30 AM – 9:45 AM	RE.Invest Norfolk Update (http://www.reinvestinitiative.org/partner-cities/norfolk/) – Denise Thompson , <i>Manager of Environmental Protection Programs, City of Norfolk</i>
9:45 AM – 10:30 AM	Earning Trust and Explaining Complexities As You Communicate Climate Science – Katherine Rowan, PhD , <i>Director, Science Communication Graduate Program, George Mason University</i>
10:30 AM – 11:00 AM	Q&A with Speakers and Break
11:00 AM – 11:45 AM	Risky Business: Engaging the Public in Policy Discourse on Sea-Level Rise and Inundation – Karen Akerlof, PhD , <i>Research Assistant Professor, Center for Climate Change Communication, George Mason University</i>
11:45 AM – 12:45 PM	Lunch and Keynote Speaker: Margaret Davidson, JD , <i>Acting Director, Office of Ocean and Coastal Resource Management, NOAA</i>
12:45 PM – 1:00 PM	Communicating Adaptation: Notes from the Field – Shereen Hughes , <i>Wetlands Watch</i>
1:00 PM – 1:30 PM	Updates on Regional HRPDC and TPO Reports and Plans and HRPDC CZM/Virginia Beach Project – Ben McFarlane , <i>Regional Planner, HRPDC</i>
1:30 PM – 2:30 PM	Stakeholder Panel and Discussion Fred Brusso – Planning Administrator of the City of Portsmouth Julia Hillegass – Public Information & Community Affairs Administrator, HRPDC, askHRGreen.org Gayle Hicks – City of Hampton Public Works, Hampton Engages (Hamptonengages.com) Clay Bernick – Administrator of the City of Virginia Beach Environment and Sustainability Office Panelists are asked to address the following briefly (as appropriate) to kick-start a group discussion: • What do you do? • What do you need communications tools to do? (i.e., inform and increase awareness; or influence behavior?) • Who is your target audience and what is the key message? • What has worked well and what has not worked so well in your communications efforts? • How do you know when your outreach is successful? • What are best practices and strategies to effectively use different communications tools and tactics (i.e. social media, radio spots, public speaker series, town halls, etc.)? • What are strategies and lessons learned to best address deniers and meeting disruptors? • What are effective techniques for engaging the community?

Version: 6/26/2013

(ODU, 2013,

http://www.odu.edu/research/initiatives/ccslri/calendar/2013/7/slr_flooding_adaptat)

VITA

Jamie Allison Ratzlaff Haverkamp grew up in Fort Collins, Colorado. Upon graduating from Fort Collins High School she moved west to coastal California to attend school at Brooks Institute of Photography. There she studied photojournalism and documentary storytelling. Focusing on social issue documentary work she traveled repeatedly to inner city Los Angeles, Tijuana, Mexico, and spent three months documenting bonded labor in India. After completing a B.A. degree in photojournalism she married Holland Haverkamp and moved back to Colorado. Jamie and Holland settled in Boulder and then Denver for several years, had their first child, and Jamie worked as a freelance photojournalist for sports and news publications along the Front Range. In 2007, Jamie and the family moved to Northern Virginia when Jamie took a job as a staff photographer/editor for the Culpeper Times Call newspaper. After the closing of the Culpeper Times Call, along with many other domestic print news publications, Jamie rediscovered her interest in social and environmental issues and decided to enrich her understanding of them through the pursuit of a M.S. degree in Geography at the University of Tennessee. In 2011, Jamie, Holland, and their three children moved to Norris, TN to pursue this academic goal. Jamie started in the Geography program during the 2012 fall semester. She plans to complete her masters degree focused on social adaptation to climate change in May of 2014. Recently, Jamie completed a joint internship with the Geographic Information Science & Technology group and the Climate Change Science Institute at Oak Ridge National Lab (ORNL). She continues to collaborate with both ORNL directorates, bringing a social science perspective to interdisciplinary research projects related to adaptation to climate change.