Grantham Research Institute on Climate Change and the Environment

Centre for Climate Change Economics and Policy

Understanding decisions and disasters: A retrospective analysis of Hurricane Sandy's 'focusing power' on climate change adaptation policy in New York City

Samantha McCraine and Swenja Surminski

November 2019

Centre for Climate Change Economics and Policy Working Paper No. 360
ISSN 2515-5709 (Online)

Grantham Research Institute on Climate Change and the Environment Working Paper No. 328
ISSN 2515-5717 (Online)

E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL

The Grantham Foundation for the Protection of the Environment

University of Leeds

LSE The London School of Economics and Political Science

The Centre for Climate Change Economics and Policy (CCCEP) was established by the University of Leeds and the London School of Economics and Political Science in 2008 to advance public and private action on climate change through innovative, rigorous research. The Centre is funded by the UK Economic and Social Research Council. Its third phase started in October 2018 with seven projects:

1. Low-carbon, climate-resilient cities
2. Sustainable infrastructure finance
3. Low-carbon industrial strategies in challenging contexts
4. Integrating climate and development policies for 'climate compatible development'
5. Competitiveness in the low-carbon economy
6. Incentives for behaviour change
7. Climate information for adaptation

More information about CCCEP is available at www.cccep.ac.uk

The Grantham Research Institute on Climate Change and the Environment was established by the London School of Economics and Political Science in 2008 to bring together international expertise on economics, finance, geography, the environment, international development and political economy to create a world-leading centre for policy-relevant research and training. The Institute is funded by the Grantham Foundation for the Protection of the Environment and a number of other sources. It has six research themes:

1. Sustainable development
2. Finance, investment and insurance
3. Changing behaviours
4. Growth and innovation
5. Policy design and evaluation
6. Governance and legislation

More information about the Grantham Research Institute is available at www.lse.ac.uk/GranthamInstitute

Suggested citation:
McCraine S, Surminski S (2019) *Understanding decisions and disasters: A retrospective analysis of Hurricane Sandy's 'focusing power' on climate change adaptation policy in New York City*. Centre for Climate Change Economics and Policy Working Paper 360/Grantham Research Institute on Climate Change and the Environment Working Paper 328. London: London School of Economics and Political Science

UNDERSTANDING DECISIONS AND DISASTERS:
A Retrospective Analysis of Hurricane Sandy's 'Focusing Power' on Climate Change Adaptation Policy in New York City

Samantha McCraine,[1] Swenja Surminski[2]

ABSTRACT

Disasters such as hurricanes can open a window of opportunity for policy makers and practitioners when these act as 'focusing events' (FEs) on the policy agenda. The theoretical significance of focusing events stems from their supposed promise of policy change. However, this causal link continues to be tested, with the ability of events to "bowl over" other issues on the agenda (Kingdon 2003, 1996) becoming more nuanced. This paper explores the 'focusing power' of Hurricane Sandy in the context of New York City (NYC) during 2012. The leading question for this inquiry asks, *How, and to what extent, did Hurricane Sandy serve as a focusing event, creating a window of opportunity for re-evaluating climate change adaptation policies*? A key contribution of this study is the finding that issue mobilization (even after disasters) may rely heavily on pre-planning and organizational capacity. This is in part reinforced by the nature of disaster itself: demands for immediate action (i.e. emergency response) may constrain the options available to policymakers (in terms of recovery and adaptation), impacting their ability to account for the full array of risks which may be posed by climate change. By taking temporal distance from the event in question, this paper also revealed how response may change in time — both in terms of the actors influencing policy actions taken, and the actions themselves which appear viable. These and other findings create a new space within the literature on disaster risk reduction, urban adaptation and policymaking writ large to explore the dynamics at play in event-based decision-making.

[1] LSE Department of Geography & Environment

[2] Grantham Research Institute, LSE

1. Introduction

Although deadly and damaging, disasters can open a window of opportunity for policy makers and practitioners. Birkland holds that disasters such as hurricanes have the ability to act as 'focusing events' (FEs) on policy agendas (Birkland 1998; Kingdon 1994; Solecki et al. 2013) by unlocking 'windows of opportunity' for organizational, institutional and political change (Birkmann et al. 2010). The strategic interest in these events is their ability to mobilize political and public support for new policies (or examination of old policies), which may subsequently lead to improvement in society-wide conditions or to individual gain. Below, Figure 1 depicts a schematic of the theoretical relationship between focusing events, their resultant 'windows' and the potential for policy change. [3]

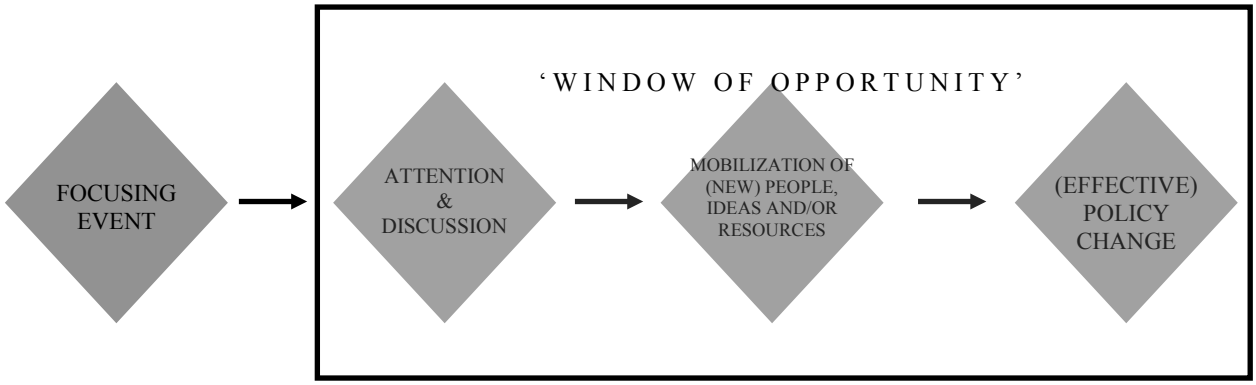


FIGURE 1. Schematic of focusing event influence on policy change, within the 'Window of Opportunity,' after Birkland (2006)

At the same time, reliance on the experience of hardship for policy making poses a danger to efforts to reduce current and future risks: the absence of events may decrease political attention and the willingness to act, as decision-makers begin prioritizing other policy and investment needs. This has been widely recognized as one of the key challenges for forward-looking action on adaptation and climate resilience (Surminski and Tanner 2016). In July of 2019, rainfalls in New York City (NYC) caused traffic jams, blackouts and damage across the metropolis. Reeling from the impacts, citizens, government officials and members of the media have begun to reflect on the experience of Hurricane Sandy seven years earlier. Although $14.7 billion was allocated to rebuild and increase the resilience of the city in the disaster's wake, only 54 percent of that money has yet been spent (Barnard 2019). Despite initial claims that Hurricane Sandy had been a "wake up call" and a "turning point" for the city, today city officials admit that "Every data point suggests that climate change is moving a lot quicker than the government" (*ibid.*).

[3] This draws largely from work by Thomas Birkland (1997, 2006) which will be examined in the literature alongside other authors dealing with focusing events and agenda setting.

To unpack the process of policy change following disaster, this paper explores the 'focusing power' of Hurricane Sandy on climate change adaptation policy in the context of New York City. Three questions structure this inquiry: 1) How, and to what extent, did Hurricane Sandy serve as a focusing event, creating a window of opportunity for re-evaluating climate change adaptation policies? To unpack this, two subquestions were addressed: 2) What are the factors that (dis)allow attention to be focused? and 3) How can the policy impacts of Hurricane Sandy on climate change adaptation be characterized? As the scope and scale of climate-related events continues to grow, understanding the relationship between these events and policy change is a necessary area of further inquiry (Abrams et al. 2018: 103; Herrfahrdt-Pähle & Pahl-Wostl 2012; Keskitalo et al. 2015). This paper contributes to answering such questions and also addresses the extent to which influencers of policy and action can use these events as guides to future climatic changes.

In NYC, the city's vulnerabilities are closely intertwined with its physical geography and role in the national and international economy (Elsner & Kara 1999; Keim *et al.* 2007; Rosenzweig *et al.* 2011; Simpson & Lawrence 1971). These relationships have resulted in the nestling of millions of human lives and billions of dollars along 520 miles of coastline and a network of rivers, estuaries and islands—with the majority of these situated at less than 5 meters above mean sea level (Colle *et al.* 2008). In 2008, an OECD study identified NYC as one of the world's most vulnerable port cities in terms of exposure to coastal flooding from storm surge and damage from high winds (Nicholls *et al*. 2008). Scientists contend that factors of geographic location, development decisions, economic density, and changing demographics increase the likelihood that NYC will be a hotspot for hazard-related harm into the near future (Jacob 2015; Solecki 2013). In anticipation of further chronic and acute risks etching their way across the city, a better understanding of the connection between disasters, climate change, and policymaking is urgently needed.

The storm's impacts included the deaths of 44 NYC residents, $19 billion in damages and lost economic activity within the city itself ("Impact of Hurricane Sandy"); beyond the island and its surrounding areas, the scope of harm extended for miles. Following the hurricane, many observers claimed that great political and societal changes within the city were inspired by the event (Rosenzweig & Solecki 2014). However, others claim that little in the way of genuine progress for future disaster and climate resilience was achieved (Greenberg 2014).

To unpack the role of the storm in shaping city policymaking on climate change adaptation, this paper conducts a retrospective analysis of the short- and long-term response to the disaster in NYC's climate change adaptation policies through the lens of focusing event theory. To restate the study questions above, the concern of this paper is not only the mechanics of change catalysis, but also the characterization of that change. Using an iterative research process consisting of media and literature reviews, analysis of policy documents, and semi-structured interviews with members

of NYC's policymaking community, we derived insights into causal connections between Hurricane Sandy and changes in climate policy at the city level. As a contribution to further research, we propose a framework for understanding the mechanisms involved in 'focusing' and for characterizing resultant climate adaptation policy, see Figure 2 and Table 1 below.

To develop the framework of focusing events, Section 2 proceeds with an introduction of theoretical groundings. The components of this framework guided data collection processes detailed in Section 3. Results presented in Section 4 follow the structure of the framework, providing evidence of theoretical saturation and evaluating the implication of findings. Section 5 concludes with a final assessment of the research questions.

2. Focusing Power and Post-Event Policy Change

Since the 1980s, there has been an ongoing debate between scholars — including Sabatier, Jenkins-Smith, Kingdon, Baumgartner, Jones, Birkland — about the decisive factors of policy change. A common thread arising throughout different manifestations of change theory is the potential significance of crises, shocks, perturbations and 'critical junctures.' These may be thought of as *focusing events (FEs).* Thomas Birkland defines these as *sudden, relatively rare events* that are *harmful* or *unveil the prospect for future harm,* and are *known to both the general public and policy elites simultaneously* (1997: 22; emphasis added). These events present opportunities for sparking change by disrupting the decision-making agenda[4] with a flow of (new) attention and resources.

In the aftermath of FEs, it is presumed that policymaking energy will go toward problems highlighted by the event.[5] However, the ability to identify problems, attribute their significance, and finally pair these with solutions in any context is narrowed by the limited capacity of both individuals and groups to process relevant issues and ideas, *i.e.* bounded rationality (Simon 1957). In addition to cognitive limits, Downs' (1972) work on the issue-attention cycle predicted that attention to any issue will gradually decline after an initial period of enthusiasm and high salience. Driving this decline are the realized costs of problem resolution, the boredom of the public with any one issue, and the number of other problems on the decision-making agenda (Downs 1972; Zahariadis 2003). Any study of policy change must therefore take an extended temporal scope to capture the dynamics of interest and action before, during, and after a focusing event.

Perhaps the most classic attribute of focusing events is their *magnitude* (Birkland 1997; Birkmann *et al*. 2010). Critically, this feature must link to the notion of *'harm.'* Following Birkland and

[4] There are at least three agendas identified in the literature: the public agenda, the political agenda, and the decision-making agenda. The latter is the agenda which leads directly to policy selection and implementation. For Kingdon (1995: 5), the policy (or political) agenda is "the list of subjects or problems to which governmental officials […] are paying serious attention at any given time".

[5] See Figures 1 & 2.

Warnement, "if the event was not harmful or did not raise the specter of potential harms in the future, it would be unlikely to significantly influence agenda setting" (2013: 16). As such, the literature points toward the need for a high level of damage and/or harm to mobilize attention, discussion, and resources (Baumgartner & Jones 1993; Birkland & Warnement 2014; Hill 2013; Kates *et al*. 2011; Pelling & Dill 2010).[6] Birkland (1998) predicts that if the risks inherent in events are characterized by *invisibility, ambiguity* or *lack of tangibility,* the issues they portend and their causal drivers are more easily kept away from the public and decision-making agendas. Difficulties appreciating risk and harm are heightened by the spatial and scalar disconnect between drivers of climate change (*e.g.* globally produced greenhouse gases) and its manifestations (*e.g.* geographically specific rates of sea level rise). The invisibility, uncertainty, spatio-temporal complexity and political polarity of climate change drivers and impacts may increase the degree of harm needed to increase dread and prioritization for action on adaptation. According to Birkland's (1997) definition of focusing events,[7] *geographic* or *communal concentration of harm* mediate attention. Where the immediate impacts of an event and the causal factors underlying harm are diffuse, focusing power may be diluted. In the schematic, this is listed as "scope." Liu *et al*. (2011) and Swim and Whitmarsh (2018) suggest that focusing events may be incapable of influencing climate policy in the U.S. given the underlying problem complexity (related to factors like uncertainty of effects, political bias) within which that field operates.

The literature on policy change and disasters varies regarding the import of *event rarity* (Birkland 1997; Mockrin *et al*. 2013; Wang *et al*. 2007) vs. *event familiarity* (Kingdon 2003; O'Donovan 2017). In the schematic this is listed as "rare or common." While rarity of natural hazards increases the likelihood of attention from the public to both the problem and policymaking processes, familiarity can lead to an aggregation of expertise within policymakers (Nohrstedt 2008; O'Donovan 2017). When shock leads to debate and a more active search for solutions emerges in the former scenario, the result is more likely to be dramatic policy change. However, Schüssler *et al.* (2014) and other authors recognize the ability for shock and 'high stakes' events to close the opportunity for debate when public expectations of rapid action and constant pressure imposed by media attention force decision-making to occur more rapidly, limiting the number of participants which may take part in the policy conversation, and resulting instead in incremental change. In both instances, Birkland's (1997) emphasis on *simultaneous awareness* amongst both the policymaking elite and the public about the event can have an intermediary impact on the solutions considered for problems revealed by a perturbation of the policy system. When capacity for response is unevenly concentrated amongst the policymaking elite, it can lead to policy changes which are politically expedient rather than appropriate to address the "true" nature of the hazard (Birkland 2009). This corroborates Kingdon's (2003) observation that extreme events may lead to

[6] Many authors writing in this field concentrate on crises rather than shocks, viewing the latter as disasters of less cataclysmic impact.

[7] See Section 2.1, this paper.

the advancement of preordained solutions not well-aligned with the revealed problem. Where policymakers have been disproportionately exposed to events and the problems they represent, and have also undergone preparation, the ability for focusing events to open debate is likely constrained. Instead, organizational path dependencies (Birkland & Lawrence 2009; Hilgartner & Bosk 1988) may inform a "short list" of policy options which can be considered in a time of crisis, *i.e.* following a focusing event (O'Donovan 2017: 206).

In themselves, events are "rarely sufficient" on their own to "propel an issue to prominence" (Solecki & Michaels 1994: 588). Hurdles to attention may be overcome through efforts by *policy entrepreneurs* (PEs), actors who use their political capital and asymmetric access to information to advocate for certain solutions (Kingdon 1995; Zahariadis 2007). PEs may also use other strategies such as issue linkage, and fostering of policy networks to sway the chances of policy change (Mallett & Cherniak 2018). The decisive role of PEs in launching and fomenting policy change has been recognized in hazard mitigation (Solecki & Michaels 1994), transformational adaptation to climate change (Kates *et al*. 2011) and in analysis of effective flood recovery (Albright & Crow 2015).

At the same time, these policy spaces—of hazards, disasters and climate change—are often said to be "public-less" or missing "mobilized publics" (Birkland 1997; Birkland & Warnement 2013). May's (1990) notion of "policies without publics" characterizes these policy areas as highly complex spaces which are monopolized by scientific and technical communities. Both the policy communities dealing with the acute hazards (hurricanes) and the chronic issue (climate change) are expected to be fragmented in so far as they are not unified around a plan of preferred action. As such, they are susceptible to influence over which actions should be taken.

These concerns have similarities with the concern in policy studies about media influence where individuals with direct experience in the issue area are lacking (Baumgartner *et al*. 2006). Following Ford and King (2015: 144), "for an emerging policy issue like adaptation, the media provides an arena through which discursive spaces over possible solutions are publicly created, debated, and bounded". Together, policy entrepreneurs and the media may influence the development of the event's "causal story" (Birkland & Warnement 2013), which frames the public's understanding of responsibility for the event's harm. Framing is intertwined with the salience of that policy field and the potential for harm (*i.e.* malignancy or benevolence) associated with problems (Bose & Brewer 2017). Consequently, framing is more apt to be effective in areas where public interest in the issue is high and/or there is a great potential of perceived harm (*i.e.* dread risk) attached to the focusing event. Framing is decisive; it can cause issues to be debated further or to make a non-issue through the selective control over information (Bachrach & Baratz 1962).

Within the literature on agenda setting, interest in focusing events stems from their (potential) ability to break up the otherwise incremental model of decision-making (Lindblom 1959). The initial indicator of this disruption is increased *"busyness" on the agenda* (Baumgartner & Jones 1993; Cobb & Elder 1983; Kingdon 1995). This can be evident in policymaking or media coverage spikes, which may be observed by quantifying legislation passed, meetings held, or stories published. Further on, the after-effect of focus can be seen in *a change in the approach to a problem* (Birkland 1998). Turning to the latter policy signal, change in approach, climate change policy is categorized by three primary approaches: protection, accommodation and retreat (O'Neill & van Abs 2016). These options have been at the heart of several post-Sandy studies (Brokopp Binder *et al*. 2015; Bukvic & Owen 2017; O'Neill & van Abs 2016). Each approach has its own drawbacks, including a limited timeline of effectiveness against hazards, need for constant updates, potential adverse economic and social costs, and political sensitivity. Notably, protection-based approaches which emphasize rebuilding have been highlighted by the IPCC for their propensity to recreate or increase existing vulnerabilities and to "preclude longer-term planning and policy changes for enhancing resilience and sustainable development" (IPCC SREX SPM 2012: 8). Indeed, the IPCC states that rather than maintaining status quo approaches, "Progress toward resilient and sustainable development in the context of changing climate extremes can benefit from questioning assumptions and paradigms and stimulating innovation to encourage new patterns of response" (IPCC SREX SPM 2012: 18).

Concern with CCA and post-event policymaking must be seen in the light of *incremental vs. transformational change,* a typology which has been gaining increasing traction for evaluating action in this space (Bierbaum *et al.* 2012; Birkmann *et al.* 2010; Kates *et al.* 2011; Pelling 2011; Pelling *et al*. 2010; Rosenzweig & Solecki 2014). Rather than classic evaluations of effectiveness, questions of transformational change are linked to the pertinence of post-event policies and the address of underlying causes of disaster, risk and harm (Birkland 2009; O'Neill & van Abs 2016; Solecki & Michaels 1994). Whether incremental or transformational, the change embedded within policy responses to disasters do not always guarantee greater resilience, and may in some cases exacerbate vulnerability through technical "fixes" and maladaptive solutions (Abrams *et al.* 2018: 2013; Adger *et al.* 2011; Shinn 2016). Challengingly, Birkmann *et al.* (2010) suggest the evidence that disasters can provide significant space for (transformational) change is largely anecdotal. This may in part be due to the factors surrounding the promulgation of adverse solutions.

A last consideration for evaluating post-Sandy policy change is the barriers involved. These include lack of institutional, organizational or cognitive capacity, lack of financial resources, lack of time and human resources, inability to maintain 'focus' (issues of policy and attention cycles), and finally, political constraints, organizational imperatives and institutional incentives (Gerber 2007: 236; Birkland 2006; May 1990; Sabatier & Jenkins-Smith 1993). These barriers can be intertwined and may impact different actors unevenly. Climate change adaptation is further

complicated by other social and natural considerations, including political polarity which characterizes conversations about climate change in most places around the world. Studies of climate change policy in the U.S. reveal a fragmented policy community (Brody *et al.* 2010). Despite the growing number of people and assets at risk along the coastal United States, Yusuf *et al. (*2016) find that political controversy crossed with lacking consensus about problems and on the policy solutions for their redress have contributed to policy inertia. Compared to issues such as jobs or transportation, adaptation is generally a low-priority issue for policymakers (Brody *et al.* 2010). For climate change adaptation in NYC, a cultural bias toward low risk aversion and political fragmentation within the metropolitan region have been identified as factors hindering the implementation of more aggressive or transformational policies to tackle climate risk (Rosenzweig & Solecki 2014).

Below, the factors which influence post-disaster policy change (as identified in the literature review above) are illustrated in Figure 2. These factors are then translated into indicators for analyzing the process of change, as summarized in Table 1. Together, these pieces capture the theory tested throughout this paper.

3. Methodology

The local arena of policymaking is especially crucial for climate change adaptation (CCA), this is the level at which risks and policy implementation unfold (Granberg *et al.* 2016). Despite proximate significance, a review of agenda setting research on multiple policy areas (Jones *et al*. 2016) found that only 15% of articles examine local governance (Henstra 2010; Liu *et al*. 2010; Mockrin *et al.* 2013). To bolster locally-derived insights, this paper focuses on city-level policymaking, while recognizing this cannot be considered in isolation from the multi-scalar dynamics which are inescapable elements of climate policy (Keskitalo *et al.* 2012).[8] Of the total studies coded by Jones and others (2016), 88% employed qualitative methods, primarily, case studies and/or interviews of policymakers. In agenda setting research, analysis of policy documents is also common (Granberg *et al.* 2016; Mockrin *et al*. 2013; Yusuf *et al*. 2016).

The mixed-methods case study employed in this research draws from this repertoire to capture Hurricane Sandy's influence on CCA policy in NYC. Based on the literature review, a framework of focusing events and number of indicators were identified, as are summarized in Table 1 above. Following this, interviews were conducted as well as policy documents, policy databases and media results reviewed. These reviews fed into a thematic analysis used to populate and validate the theoretical framework put forward in the literature.

[8] Different sets of (at times intersecting) incentives cause different levels of government to adopt different strategies. For instance, while at the city-level, the government was hesitant - bordering on opposed to - 'buyouts' as a strategy for coping with the increased and potentially intolerable flood risk signaled by Hurricane Sandy, state governor offices were active in pursuing and setting up such programs in both New York and New Jersey. Many point to the different relationships of these offices to taxes.

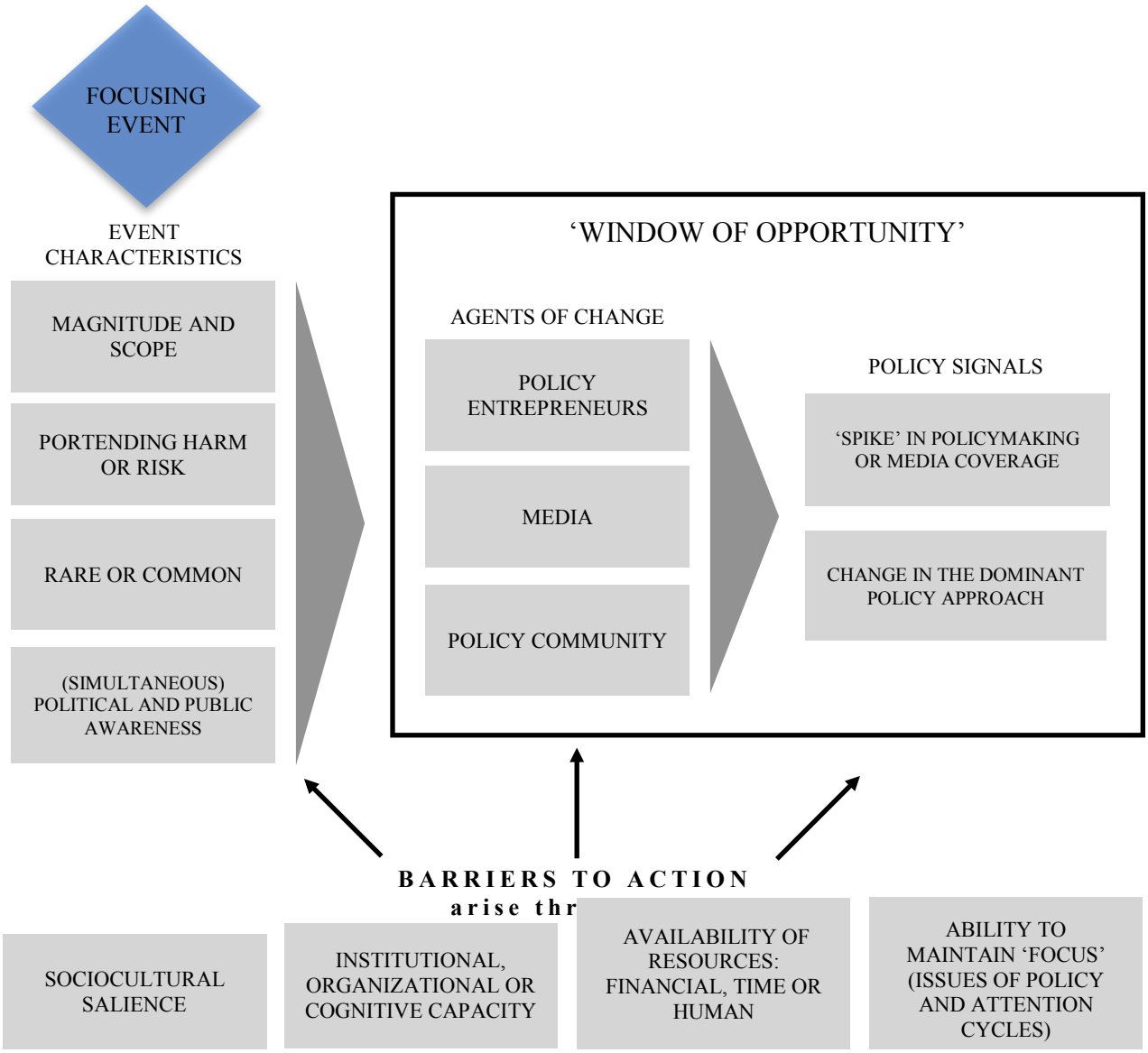
The literature review summarized above was conducted using Google Scholar and a combination of search terms. Key words used for the search included: "adaptation," "cities," "climat* change," "climate change adaptation," "climate change policy," "disaster," "focusing events," "Hurricane Sandy," "multiple streams framework," "New York City," "policy change," "policy response," "sea level rise," "shock event," "urban," "urban adaptation," and "window of opportunity." These terms derived from the research questions identified in Section 1 of this paper.

The theoretical scope of this analysis results from the intersection of two research fields. To reflect both the disaster community's concern with *iterative processes of learning and aggregation of knowledge* to improve policies (Birkland & Warnement 2013; Birkmann *et al.* 2010; Pelling *et al.* 2010) and the policy study community's growing appreciation of *policy dynamics* to understand influences on change (Baumgartner *et al*. 2006), this essay takes Hurricane Sandy as the nodal

TABLE 1. Framework for Understanding Focus, after Birkland 1997

FEATURES OF FOCUSING EVENTS		INDICATORS FOR ANALYSIS
Event Characteristics	Scope and Magnitude	1. Extent and type of harm
	Portending Harm or Risk	2. Connection to perception, experience 3. Spatial concentration 4. Visibility and tangibility
	Rare or Common	5. Narratives of shock or preparedness 6. Importance of experience 7. Path dependencies (cultural and organizational); evidence of learning
	Simultaneous Awareness	8. Narratives of shock or preparedness
Agents of Change	Influence of Policy Entrepreneurs and Media Organization of the Policy Community	9. Significant policy actors ('drivers' and 'sources' of information), seen as having a role in shaping post-Sandy outcomes 10. Consensus on problems and policy
	Framing	11. Control over understanding the problem and/or proposing solutions 12. Cultural norms and values 13. Linkages between groups, events and issues
Policy Change Signals	'Spike' in Policymaking or Media	14. Trends found in media and legislative databases, as well as those in policy documents 15. (Shifting) issue salience and prioritization
	Change in the Issue Approach	

FIGURE 2. Elaborated Schematic of the Relationship between Focusing Events and Policy Change, after Birkland 2006



point of analysis, while extending the temporal scope across the period 2008-2018.[9] This specifically accounts for the recommendation that a study period of a decade or more is necessary to capture dramatic rather than incremental change, to better understand *how* and *when* policy changes occur (Baumgartner & Jones 1993; Sabatier 1988). Given that "policy invariably builds on policy either moving forward with what has been inherited, or amending it or repudiating it"

[9] This temporal scope is the minimum period desired for study and analysis (i.e. one decade). This scope also reflects limitations on city climate data (particularly the existence of the city's formal climate change and resilience planning efforts, such as PlaNYC/OneNYC) which have restricted the study period. The Timeline in Annex 1 reflects the ideal study period, and extends the bounds of temporal scope to 2001, an infamous year in disaster policy at the city, state and federal level for the case in question. By extending the temporal scope in this informal addendum, the following influences can become more apparent: a) Bloomberg's election to NYC Mayor, b) ongoing climatic shock events, and c) increased international concern and attention to climate change (e.g. indicated by An Inconvenient Truth, see Brunner 2008).

(Heclo 1974: 305) focusing events' policy impacts must be viewed within the "flow of time" (Birkland & Warnement 2013: 10). The Timeline in Annex 1 sheds light on the preliminary work by actors in New York City and beyond that shaped post-Sandy climate policy.

Interviewees were selected based upon actor mapping, guided by a preliminary media and literature review using the terms, "Hurricane Sandy" and "climat* change" and "New York City." Agenda setting studies suggest that research respondents represent government employees, interest groups, and experts (Kingdon 2003; Liu *et al*. 2010).

Seeking to capture longitudinal changes within the scope of this study, only those who had been acquainted with NYC policymaking since 2012 were selected for participation. This reduced the number of candidates eligible and also created some constraints on access given seniority. The first round of interviews (n = 11) was conducted in New York City in person and by phone between July 9 - 20. The second round of interviews (n = 5) was conducted by phone between July 27 - August 3. Interviews were semi-structured in order to collect narrative evidence of personal conceptions of Sandy and policy concerns, with closed-ended questions facilitating the aggregation of data across thematic concerns identified in the literature review as being relevant to focusing event theory (Bryman 2016). Notably, a number of participants had held multiple roles in the city policymaking domain. The codes allotted reflect their position at the time of interview.[10]

The list below gives the codes used for references to the interviews throughout the paper:

GEC = Government Employee, City-Level
GES = Government Employee, State-Level
GEF = Government Employee, Federal-Level
ES = Expert in a Scientific Capacity (including academics)
EP = Expert in a Professional Capacity (e.g. planners)
EAG = Environmental Advocacy Group
M = Media

Following guidance from Bryman (2016), the media review consisted of a systematic search using Nexis for the New York Times and Factiva for the Wall Street Journal and the Associated Press on July 22, 2018. Sources were selected according to their influence within NYC, based on circulation and web metrics and their representation of different political leanings (Ford & King 2015). In the table below, the shortened Event Search time period reflects the reality that no records existed for "Hurricane Sandy" and "New York City" prior to the event in 2012. For the remainder of the paper, "the event" is used in reference to Hurricane Sandy and "the issue" in reference to climate change.

[10] For more information on interviews, see Annex 2.

TABLE 2. Search terms for media review.	
Event Search	Terms: “Hurricane Sandy” and “New York City” Time Period: 22/10/2012 - 22/07/2018 Geography: North America → US
Issue Search	Terms: “Climat* Change” OR “Global Warming” AND “New York City” Time Period: 01/01/2000 - 22/07/2018 Geography: North America → US
Approach Search	Terms: "Climat* change" OR "Global Warming" AND "New York City” AND retreat /accommodate / protect Time Period: 01/01/2000 - 22/07/2018 Geography: North America → US

Analysis of key policy documents was conducted to collect other insights on policy change. These include:

- PlaNYC, written by the Mayor’s Office of Long-term Planning and Sustainability (MOLTPS). Years reviewed: 2008, 2009, 2010, 2011, 2012, 2013, and 2014.
- A Stronger, More Resilient New York, (also known as the SIRR report), written by the Special Initiative on Resilience and Recovery (SIRR). Year published: 2013.
- OneNYC, written by the Mayor’s Office of Recovery and Resiliency (MORR). Years reviewed: 2015, 2016, 2017, and 2018.

Quantitative analysis was conducted using a random sample of 5/10 of the sections which track city-level milestones identified in PlaNYC and OneNYC, which lay out the city’s goals in particular domains and progress in their attainment. Alongside, the city’s legislative database was searched for meetings on the same key terms.[11] Together, these sources created a picture of whether and to what extent policies or focus on climate had changed. Both the policy documents and databases can be seen as robust sources of information for this analysis given their scope encompasses issues beyond that of climate alone (Baumgartner *et al*. 2006).

As noted by many authors (Bryman 2016; Saldaña 2013), all studies are structured by the biases of the researcher. Each form of data — personal interviews, policy documents and media articles — has limitations. A mixed methods approach helps to balance against these shortcomings and strengthen the robustness of findings. Each method also has its own strengths, e.g. the ability of interviews to capture tacit knowledge, vs. media and literature reviews to capture greater breadth of perspectives. However, as each was selected and parameterized by the same researcher, they may be subject to common shortcomings. The primary area for improving this methodology is the

[11] Accessed here: http://legistar.council.nyc.gov/Calendar.aspx.

selection process for interviewees. Purposive sampling was conducted to suit an agenda-setting framework, before attending to the breadth of actors implicated in the NYC policy agenda. Therefore, the majority of participants represented the environmental advocates, urban planners, economic interests, city employees, and academics or scientists with expertise in the policy field. The interest in, and understanding of, climate change (adaptation) at the city level may thus be over-stated. Although multiple scales (city, state, regional and federal) of policymaking were represented by participants, a broader sampling from within the NYC policy community may have been able to add more texture to understanding CCA's salience in the city, and thus of the other issues with which climate change had to vie for attention after Hurricane Sandy.

4. Results

This section details findings on *how* Sandy acted as a focusing event for NYC CCA policy, (attending to features of the event, agents of change and policy signals), before turning to *the extent of this focus* (by characterizing which changes came about).

4.1 How: Mechanics of Focus

4.1.1 Event Characteristics

Interviews often began with participants defining Sandy as a "wake up call," a "catalyst" for action, or a "crystalizing moment" for understanding the risks posed by climate change. The tropes used by interviewees to capture the storm's significance echoed those found throughout media coverage and official statements by local government officials.[12] In keeping with the popular frames of reference, lives lost and assets damaged (*e.g.* houses, buildings, boardwalks, and beaches) resurfaced throughout interviews and media articles, indicating the event's *harm*. These tangible features translated the disaster into a conceivable (*i.e.* 'dread') risk, which can be prioritized for policy action (see Birkland 1997; Slovic 1987). However, while it is true that the damage caused by Hurricane Sandy in NYC surpassed that of any natural hazard in almost a century,[13] physical damages and shock from the event were neither evenly distributed nor tightly bounded, in addition to causing damage throughout New York State, Sandy also affected twenty-three states within the U.S. and five Caribbean nations. Thus, while Sandy may have been one of the deadliest and costliest Atlantic hurricanes in living memory, its capacity for devastation was spread across multiple jurisdictions, diluting its potential to trigger critical policy conversations within the city itself. Instead, policy conversations within NYC were highly influenced by New Yorkers' *personal experience.* Respondents found that there is "a level [of risk] that people don't fully understand unless they're in it" (Interview 5 - EA). Dread risk is understood through proximate manifestations of climate-related harm, *e.g.* impacts on personal health or on daily commute. This allows

[12] e.g. Mayor Bloomberg following Sandy stated, "You don't have to be a believer in climate change to understand the dangers from extreme weather are already here. And the risk that climate change is driving these extreme weather patterns must compel us to act – both to prevent climate change and prepare for it" (Bloomberg Address 2012).

[13] The last comparable storm was the Long Island Express hurricane which hit the New York metropolitan region in 1938, leaving extensive damage (Solecki 2012).

individuals to understand climate risks within the frame of their everyday experiences, and subsequently, put pressure on the "policy needle" (Interview 3 - EP). Although essential for spurring individual action, personalized narratives of risk are muddled by the characteristics of climate risk in NYC: while outer boroughs are concerned with coastal flooding from SLR or storm surge (*e.g.* Coney Island, South Shore Staten Island), those on higher ground are primarily faced with heatwaves (*e.g.* Morningside Heights in Harlem, Brooklyn Heights).[14] Over time, climate-related risks revealed by Sandy include acute hazards such as storm surge, and chronic hazards such as SLR. While the former is expected to hit once every 10-20 years, the latter are ongoing; and, while Sandy-like events are good for drawing attention to acute hazard risk, chronic risks may be forgotten in the discursive process of understanding harm.

Policy responses, hard and soft, must account for the different suite of climate risks which may occur across the different spatio-temporal axes upon which NYC's climate planning operates. However, individuals and governments impacted by disaster are more apt to focus on ameliorating the harms they have just faced or preparing for future storms which look much like those they've just experienced (in magnitude, and even in geographic route). While one official stated that his office "struggled to get people away from Sandy and onto longer term planning" (Interview 6 - GEC), noting the fixation on rebuilding and insuring houses, another official described a form of policy lock-in created at the government level through the provision of impact-specific funding (*e.g.* those granted by the Federal Emergency Management Agency (FEMA) and the Small Business Administration (SBA)) (Interview 2 - GES). In this light, the potential to improve NYC's resilience to future climate risks may be constrained by immediate responses to shock events throughout different levels of society.

As an understanding of hazards, risks and vulnerability emerged unevenly amongst the public, the city is claimed to have capitalized on its *pre-established awareness* of climate change risks. This allowed swift, coordinated action stemming from the Mayor's Office, which ultimately allowed for controlling against excess loss of lives and economic damage, as well as securing post-event funding from the federal government and other resources. According to one interviewee, Sandy "wasn't an event that caused the city to change its plan or policy," rather than shocking city government, Sandy "activated" prior planning efforts for both emergency response and the long term (Interview 10 - GEC). While at the individual level, variable exposure to climate-related hazards may have complicated engagement with the problems and solutions related to Hurricane Sandy, the city government's *familiarity* with NYC's hazards gained through at least half a decade's planning effort under the Bloomberg-led Mayor's Office (MO) and New York Panel on Climate Change (NPCC)[15] provided a base for rapid response and near-term action. For one city-

[14] See maps in Annex 4.

[15] City law passed in 2012 incorporated the NPCC into the city's climate governance apparatus. The NPCC has however, been operating since 2007.

level employee, "without PlaNYC, we wouldn't have had any immediate response" (Interview 10 - GEC). To this, an independent consultant who led prior city-level planning added that, even now, "…if you look at what's getting done in the city, most [had] some level of work done before Sandy. Anything new is struggling to get off the ground." (Interview 3 - EP). The inception of two oft-cited examples of the post-Sandy policy responses — the SIRR Report and remapping the city's flood zones — actually preceded Sandy's landfall. In comparison to public confusion, policymakers' relative preparedness allowed them to navigate post-crisis ambiguity, dominating the emergency response period and the establishment of near-term actions. This links to findings in the literature which hold that escalation of governmental failings and public harm are essential for substantial debate in the immediate wake of disaster. Planned and rapid response in this sense foreclosed such a window of opportunity for opening the "discursive space" (Schüssler *et al*. 2014) amongst the public and policymakers alike regarding long-term city-wide DRR and CCA. These findings point toward the need for agenda setting and focusing event theory to give closer attention to the distribution of accumulated knowledge about disasters and risk amongst those exposed to the hazards involved.

A quintessential characteristic Sandy shares with most disasters is the division of post-event action and policy into 1) emergency response and 2) long-term planning. While there may be room for debate and community participation in the latter, the former is more likely to be the domain of formal policymakers (Birkmann *et al.* 2010; Cheema *et al.* 2016). One participant stated, "In a post-disaster city, there is pressure to do, do, do… this counteracts interagency collaboration, ability to reflect… it hems in the ability to have harder conversations about things like relocation" (Interview 16 - EP). Thus, the nature of disaster itself — tied up in harm, magnitude, and intensified pressure from the media and public to respond — may detract from conversation between different stakeholders on the underlying causes of vulnerability revealed in the event. Instead of opening up discussion on anthropogenic climate change and coastal urbanization, these findings confirm that FEs distract the public and policymakers alike from the drivers of vulnerability, as suggested by Birkland (1997), Bose & Brower (2017) and O'Donovan (2017). The geographic scope of Hurricane Sandy — stretching its impacts across resource-strapped states — further constrained policy conversations, as competition amongst these sub-national jurisdictions for post-disaster funding further incentivized rapid action. Although a full-scale examination of financial dynamics at play is outside the scope of this paper, there was a preliminary observation—in line with predictions made by Birkland (1997) and Bose & Brower (2017) regarding post-disaster policy financing—that funds were redirected from (new) policy creation and onto crisis management across multiple levels of government. This occurred as purpose-specific funds were created at the federal level by the Housing and Urban Development Authority, the Small Business Association and the Federal Emergency Management Agency (Interview 2 - GES). Although these funds played an essential role in restoring livelihoods (in the short-term), the action mandates of these financial mechanisms can exacerbate societal lock-in to

short-term impact response by maintaining focus on coastal flooding risk and Sandy-affected neighborhoods, leaving the full scope of climate-related hazards faced by New Yorkers throughout the city—such as heatwaves, cloud bursts, and Nor'Easters—to be planned for into the future.

4.1.2 Agents of Change

Interviewees identified the following actors as the primary divers of climate policy in NYC: the Mayor (Michael Bloomberg), NYC's communities, the Mayor's Office of Recovery and Resiliency (MORR), the New York Panel on Climate Change (NPCC), and the New York City Council (NYCC) (in descending order of mention frequency). The wide-ranging selection of policy drivers (35 in total, see Table 1 in Annex 5) indicates a fragmented policy community (Birkland 1998; Sabatier & Jenkins-Smith 1999). This connects to the above-mentioned findings regarding the aggregation of hazard and risk familiarity unevenly throughout the city. Within this context of knowledge and influence distribution, the Mayor himself acted as a policy entrepreneur, using political capital to frame the disaster within the context of climate change and set the parameters for post-event policy selection. Exemplifying this, one research participant noted, "the Mayor's staff weren't allowed to consider responses which couldn't be initiated while he was in office, nor anything which would require state or federal collaboration" (Interview 2 - EP, in reference to the "SIRR Report"). This decision allowed the Mayor to strategically curtail the complexities involved in climate policymaking, including a) working with regional governors (with whom he was known to have political difficulties), b) working with the notoriously gridlocked federal Congress, and c) relying on the incoming mayor to maintain progress on climate (while also assuring his personal climate legacy). These political considerations quietly shaped the calculus behind the actions taken by the Mayor in response to Hurricane Sandy, leaving room to question the 'focusing power' of Sandy over the CCA policies which resulted.

4.1.3 Signals from Media and Policy

The appearance of Sandy as a turning point in policy was revealed in a sampling of widely read NYC news sources (n = 3). Using the search terms, "Hurricane Sandy" (*i.e.* "the event") and "Climat* Change" (*i.e.* "the issue") the search yielded data that depict a flow[16] of media-generated attention toward the event almost twice that of the highest annual interest in the issue; "Hurricane Sandy" returned 680 articles vs. 350 returned with "Climat* Change" or "Global Warming" during the study period (see Figure 3 vs. Figure 4).[17] However, Figure 3 also captures how coverage of the disaster has predictably waned as distance from the event grows.

[16] This 'flow' is captured through the number of articles which mention either of the search terms.

[17] "Climat* Change" was complemented with a search on "Global Warming" to cover articles using synonymous term.

FIGURE 3. Event Search: “Hurricane Sandy”

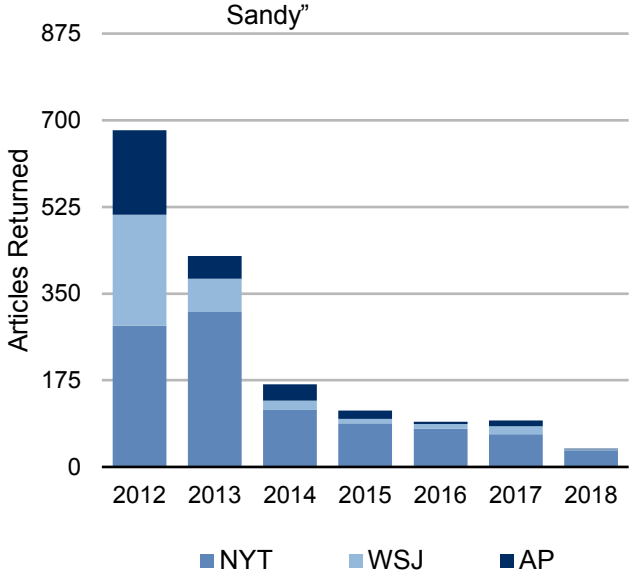
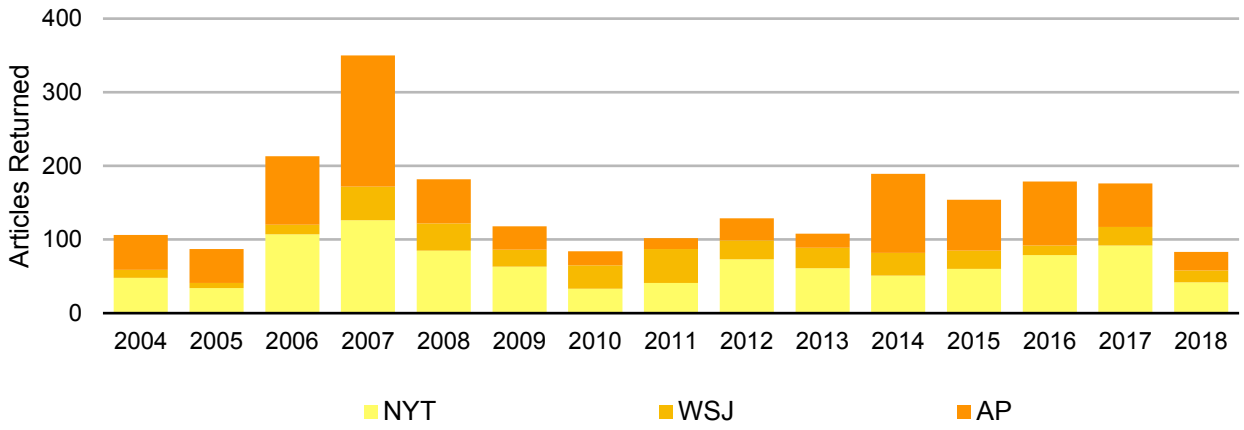


FIGURE 4. Issue Search: “Climat* Change” or “Global Warming”



In Figure 4 it is possible to observe the absence of a distinct event-associated bump in climate change coverage (*i.e.* around the year 2012), indicating that Sandy may not have been understood within the frame of climate change by all NYC media consumers. There also remains the possibility that the event was intentionally not framed in such a way by the media, however, this study did not explicitly test for an intervention of this kind.

The level of attention given to climate change in the media is further mediated by the number of other issues constantly vying for attention within the news (see Section 4.2.1). The interest of the media and the public is also influenced by the release of influential information (*e.g.* reports from the IPCC) as well as the policy priorities set by leaders (*e.g.* President Obama’s focus on climate),

both of which may have additionally influenced the degree of climate-related media coverage that can be observed in Figure 4 for the 2014-2017 period.

Turning to the legislative database pictured in Figure 5, a spike in concern is evident between 2012 - 2014, whereas, the spike in concern for Climate Change occurred around 2014 - 2015 (over 200% more legislation drafted than the year prior) before surging again in 2018 (with a 116% gain from 2017). The delayed increase in issue-centered legislation may point to a concentration of post-Sandy policymaking around emergency response, as seen in event-centered legislation focusing on damages to infrastructure and provision of support to hardest-hit communities in order to rebuild and bounce back. Slow moving action on climate change may also be indicative of the divergence within city government about how to implement policies highlighted by interviewees in responses regarding policy consensus.[18] Comparing Figures 5 and 6 (which show the number of records available on the event and issue), highlights a discrepancy between the amount of legislation and number of meetings on climate change (*i.e.* between actions vs. discussion on the issue) may also be interpreted as evidence of pre-existing capacity for climate change action, which foreclosed the need for debate.[19] This further corroborates the finding of this study on the significance of issue familiarity (*i.e.* aggregation of knowledge) within government as driving the post-event policy process.

Still, this conclusion on stifled debate is complicated by the synonymic usage of "resilience." Shortly after Sandy, frequency of the term "resilience" rose in both legislation and meetings, often surpassing mentions of "climate change." What differing degrees of attention paid to "climate change" versus "resilience" may illustrate is a movement of the government away from the former terminology given its political sensitivity. In this case, the emphasis given to "resilience" may again reflect strategic decision-making and framing underlying the city government's response to Hurricane Sandy. Finally, talk on resilience (meetings) outnumbered action (legislation) by over six records on average, possibly illustrating the uncertainty and debate which characterize this domain.

4.2 Characterizing Change

4.2.1 Change in Dominant Topic

Prior to Hurricane Sandy, economic development and security drove decision-making in NYC. Interviewees identified these concerns as underpinning Bloomberg's appeal in the wake of 9/11, lasting throughout the economic downturns of the 2000s. Concerns with CCA didn't become "fully

[18] Full data on this can be found in Annex 5, Table 2.

[19] Legislation on climate change per year averages over 200 times that of minutes on climate change per year. An indication of salience emerged from this review as well: comparison between total yearly legislation (~ 2278 bills on average) and the total amount of legislation dealing with the code words (< 20 per year) reflects low overall prioritization of climate change and resilience by the city government.

embedded" in city planning processes until NYC was hit by a severe flash-flood event in August of 2007, which caused subway closures and economic losses (Solecki 2012).[20] When Sandy entered the agenda, closely following the subprime mortgage crisis, conversation about the storm's impacts fell within the frame of economic opportunity. Interviewees referred to how potential solutions required links to people's feelings of confidence, safety, and security, as well as their capability to enhance economic opportunities (Interview 1 - EA). As a result, NYC's CCA and resilience policies — *e.g.* zoning and building code updates — were presented within the context of individual affordability. At the interface of policymakers and the public, the "economy of the household" became the frame adopted by city planners in order to communicate about risk and planning for climate change (Interview 6 - GEC). Rather than indicating a dramatic change in topic, this finding indicates that emergent concerns can be made to fit within pre-existing frameworks for action prioritization.

Within the domain of pre-existing climate policy, interviewees asserted a palpable shift from an emphasis on mitigation to one on adaptation. The most visible indicator given was the creation of

FIGURE 5. Change in NYCC Legislation Containing Key Words

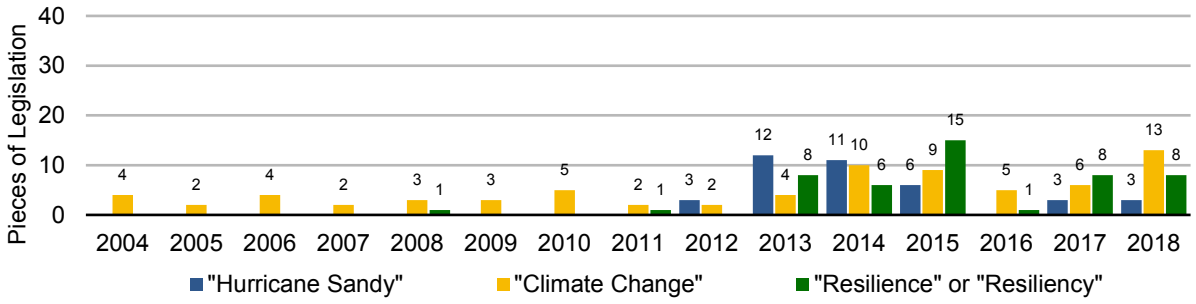
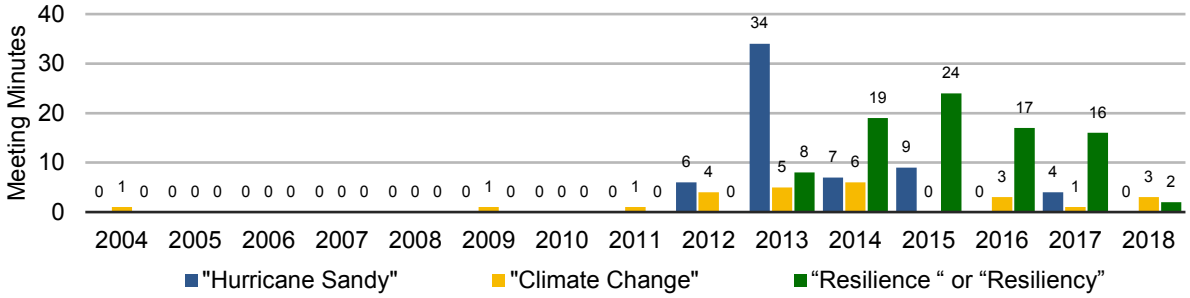


FIGURE 6. Change in NYCC Minutes with Key Words



the Mayor's Office of Recovery and Resiliency (MORR) to tackle adaptation in 2013. This shift, however, entailed a simultaneous rebranding of CCA as resilience. Resilience narratives are intertwined with the metaphor of "bouncing back," *i.e.* going back to normal. Drawing from

[20] This is but one example of an event-focused policy-making process in the domains of DRR and CCA.

analysis of the policy documents, the shift toward resilience appeared in the 2013 PlaNYC Progress Report which identified climate resilience as one of the city's two major climate goals, alongside carbon mitigation (NYC 2013). A notable weakness of the resilience goal is difficulty in tracking progress and setting a uniform objective at the city level.[21] Instead, an array of neighborhood-specific milestones account for the complexity of the climate change risks within PlaNYC 2013.

Below, Figure 7 reveals the results of the policy review, showing that attainment of climate change-specific objectives increased over the 2014 to 2018 period, with a peak in 2017. To be precise, the percentage of climate change milestones attained between 2014 to 2017 of 207%, compared to attainment of non-climate change milestones sampled, which decreased by almost 68% in that period (see also Table 3). The increased emphasis on CCA action is also indicated by the growing total CC milestones listed in absolute terms as well as relative to the total milestones in the plans signals increased support and prioritization of these areas, in comparison to other issues on the city's agenda (see Table 3). However, this has not remained constant in the 2016-2018. Instead, milestone completion rates in the final period signal waning focus and point toward the potential closing of the window of opportunity for CCA policy change as distance from the event builds. This may also be due to saturation of low-ambition actions, which will be discussed in Section 4.2.3.

FIGURE 7. NYC Policy Milestone Attainment, Proportions

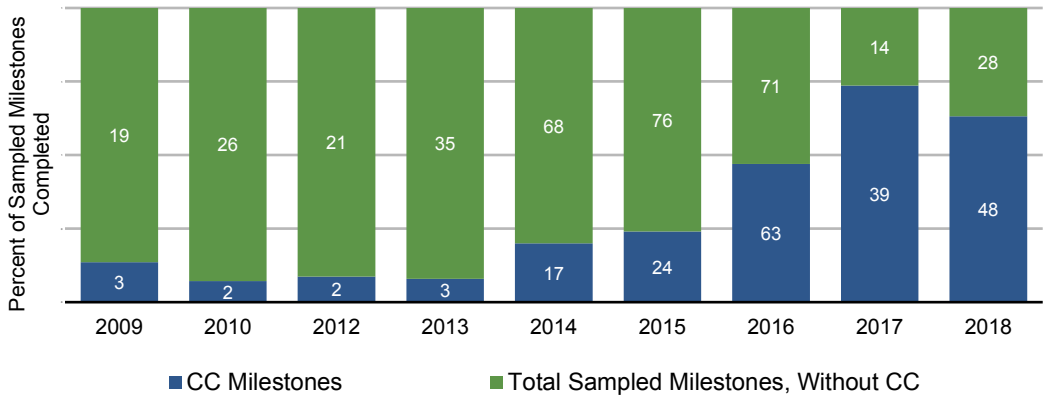


TABLE 3. NYC Policy Milestones Attained, Numbers

	2009	2010	2012	2013	2014	2015	2016	2017	2018
CC Milestones	3	2	2	3	17	24	63	39	48

[21] This vagueness complicates assessments of effectiveness and is an ongoing space for inquiry. See work by the Zurich Insurance Group on measuring resilience, e.g. https://floodresilience.net/frmc.

TABLE 3. NYC Policy Milestones Attained, Numbers

	2009	2010	2012	2013	2014	2015	2016	2017	2018
Sampled Milestones, Without CC	19	26	21	35	68	76	71	14	28
Attained Total	22	28	23	38	85	100	31	53	76

4.2.2 Change in Dominant Approach

Although resilience marks a shift in the way of framing climate concerns, the dominant approach to climate policy in NYC is still one of protection.[22,23] The preference for protection appears throughout evidence from interviews, media results, and policy documents. As explained in the methodology section, approaches were searched for in the media sources used in Section 4.1.3 above: the New York Times, Wall Street Journal and Associated Press. While articles containing the key search terms — "Climat* Change" and "New York City" and either "protect*" "accomodat*" or "retreat" — were sparse overall, those for "protect*" were substantially higher than for the other approach searches (Figure 8). The prevalence of protection over accommodation and retreat may not be due simply to the city's preoccupation with economic well-being, but also due to the trope's rhetorical connections to political speak in a range of different contexts;[24] protection, like resilience, casts a wide net, it may be used for talking about infrastructural measures (*i.e.* the strengthening of the built environment) and the protection of investments (in ongoing climate adaptation and mitigation measures, *e.g.* 1 million trees) (Foderano 2015). In either case, given that "protection" links to sunken costs and the prevention of future losses, this becomes the default position in an era of fiscal conservatism.

This default, however, may be challenged by the *ongoing policy conversation* testified to by interviewees. The emergence of new information and the "drumbeat" of events continuing to resound across the globe (Interview 14 - GEC) are transmitted through horizontal networks connecting policymakers, advocacy groups, scientists and think tanks, and cultural communities. As insights travel, more communities are discussing retreat and buyouts than were six or seven years ago (Interview 4 - GES), illustrating the dynamic and global nature of policy. This observation from primary sources was, however, not confirmed in the media search which shows no sustained or significant attention to CCA policy approaches as a whole. This may be due to the

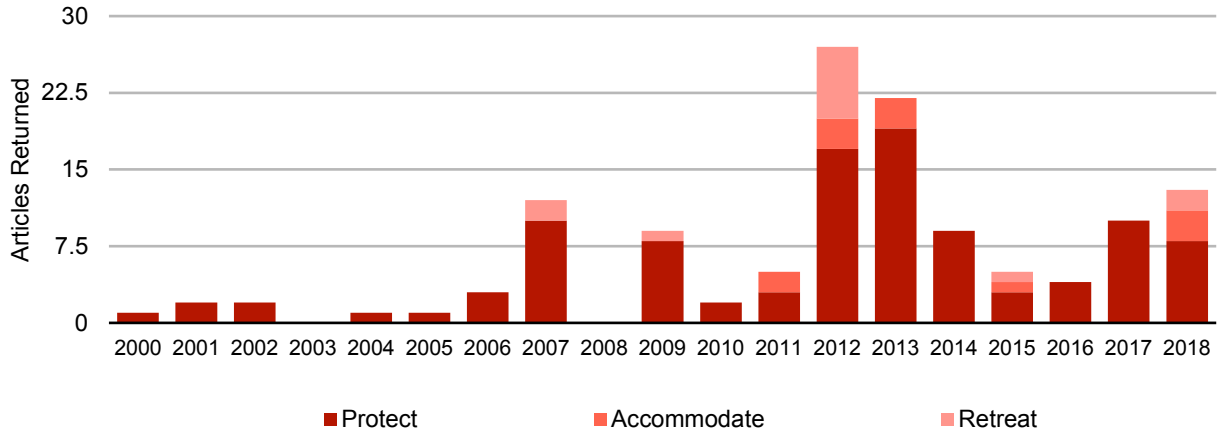
[22] "Still" given that media results revealed that the protection position of NYC on climate policy traces back to at least 2000 (see Johnson 2000).

[23] An alternative classification scheme put forward by Slavikova *et al.* (2018) includes "self-confidence," "fatalism," and "active skepticism." Of these, NYC's CCA approach in the run-up to and aftermath of Sandy can be identified as one of self-confidence. This is undoubtedly shaped by the city's access to financial resources for rebuilding and the need to remain confident to retain investment and attract tourism.

[24] Psychologically speaking, adopting a policy approach of protection can heighten dependence of constituents on politicians. Examples of politicians' deployment of "protection" across different contexts include "Text of Mayor de Blasio's State of the City Address" and "Text and Video of Obama's State of the Union Address."

small sample size as well as the complication in using such specific terms to cover a broad array of options and responses (which may be referred to in alternative terms).

FIGURE 8. Change in Media Coverage of CCA Approaches



Nonetheless, these observations illustrate the convolution and multiplicity of post-event policy pathways. These stretch through time and space, manifesting in post-disaster policy change through at least three different directions:

1. Bottom-up — where *public mobilization* leads to pressure on representatives, and then to discussion amongst formal decision-makers;
2. Horizontal — where *learning across epistemic communities* of planners, urban policymakers, or environmental advocacy groups is fueled by the experience of similar disasters or scientific advances and shared for the advancement of best practices; and
3. Top-down — where *"internal mobilization"* efforts promote the change that policy elites or experts prefer (Cobb & Elder 1983), rather than leading to wider debate and opening up to more transformational policy options.

Notably, these are not mutually exclusive and instead may be characteristic of different post-disaster periods. The third pathway dominated in the immediate period following Sandy, narrowing the remit of policy conversations to protection. Public mobilization at that time focused primarily on household economics and financial narratives, thereby legitimizing and supporting the protection paradigm coming from the better-organized top-down forces. With time's passing, slowly accumulated alternatives are being diffused horizontally throughout networks of actors, bringing retreat and accommodation into consideration.

So far, change has been slow and relatively shallow. Despite the insinuations that Sandy disrupted individual belief systems about what climate change would look like and heightened perceptions of harm potential detailed in Section 4.1, a number of respondents echoed the sentiment that "only

the low-hanging fruit" has been attained (Interview 15 - GEC). More stringent zoning and building codes increased the resilience of household and neighborhood design, however, rather than decreasing the amount of people and assets exposed to risk, respondents noted that development along the waterfront has continued at a swift pace. Such contradictions have caused claims that, "the lessons are not fully engrained." Targeting small rather than large interventions can be seen as a strategic move by Bloomberg but also a result of a preference for cheap and easy solutions, driven by budgetary limitations and time constraints. As well, multiple sources of complexity and limitations on capacity coalesced to drive down the ambition of CCA policy, resulting in an incremental rather than transformational approach in the short term. Even though there is more data on climate risk following Sandy and claims of greater understanding about related vulnerability, there remains a question of "whether that is translating into more effective policy" (Interview 9 - M). Where effectiveness of climate change adaptation can be understood as reduced exposure to disaster and severity of impacts, ongoing disaster experience is the true test of learning and risk reduction

5. Discussion

The theoretical significance of focusing events stems from their supposed promise of policy change. However, this causal link continues to be tested, with the ability of events to "bowl over" other issues on the agenda (Kingdon 2003, 1996) becoming more nuanced. A key contribution of this study is the finding that issue mobilization (even after disasters) may rely heavily on pre-planning and organizational capacity. When this is concentrated within government and disparately allocated amongst the public, the ability of events to open action-oriented debate is constrained. However, as time passes and policy conversations widen with the distance gained from the disaster itself, knowledge circulates throughout different levels of governance and society, generating different politically feasible policy options for DRR and CCA.[25] This finding reaffirms the analytical value of viewing shock events within the "flow of time." The framework developed and applied in this study can be used to provide insights on the relationship between FEs and policy change, within the context of urban environments, policy domain of CCA, and beyond. Extending the temporal bounds of study is particularly essential in the case of climate change and disaster risk policy, as the initial period following a disaster is likely to be dominated by emergency response, long-term planning, so that DRR and CCA are likely to be sidelined during that time.

A primary limitation of this study is the transferability of findings to other contexts beyond NYC. Given that NYC is a hub of global economic activity and center of wealth and innovation, a high volume of resources await mobilization by policymakers. In addition, the city's centrality to the

[25] For instance, the Earth Institute at Columbia University hosted a conference during June 19-21, 2019 titled, "At What Point Managed Retreat? Resilience Building in the Coastal Zone." Among the topics of conversation were buyouts, migration as adaptation and real estate. This indicates a shift in the options for CCA in NYC within the academic and scientific community.

national and international economy strengthen the ability of policymakers to attract support from federal, international and private parties when disaster strikes. This pull factor may not be matched in other contexts, particularly when complemented by the political capacity (i.e. policy entrepreneurship) of Mayor Bloomberg. Finally, the presence of a highly informed, active, and well-placed scientific community shaped responsiveness. For instance, William Solecki, Cynthia Rosenzweig, and Klaus Jacob, who are embedded in research as well as deeply involved in NYC planning processes, were previously leads on studies of NYC's vulnerability (e.g. the ClimAID Report). As such, these actors were able to seize the opportunity provided by the event to shape policy processes and maintain an aura of control over the situation (Rosenzweig & Solecki 2014). These reflections lead to the first avenue for further study: although the institutional, human and capital resources of NYC are unparalleled in most cases, diffusion networks - what this paper terms networks of concern - are strengthening nationally and internationally, giving reason to ask whether the policy process should be considered as one which develops within a contained set of actors (see Brunner 2008). These networks consist of academics and policy researchers facilitating learning by exchanging insights about incoming science, community concerns and implemented policies. Further research could investigate the interplay of these different communities by extending the list of interviewees – the relatively small sample size used in this study is a limitation, and casting the net wider is likely to offer further insights into the roles and influences of different stakeholders.

Developments in climate policy are actively tracked by other municipalities, "everyone jumps on the bandwagon once something's proven to work… dissemination of knowledge travels through colleagues … the question is, how do we make this work in NYC?" (Interview 8 - EAG). Across the different stakeholders interviewed, a number mentioned looking to cities like London, Amsterdam, and Rotterdam for inspiration and collaboration. To capture these, a multi-scalar lens is necessary, particularly given the characteristics of adaptation (Keskitalo 2010; Keskitalo *et al.* 2012; Naess *et al.* 2005). Furthermore, networks of concern encapsulate emotive ties between cultural communities. Many interviewees referenced the empathetic link between the Puerto Rican communities of NYC as sustaining concern over potential climate-related damages through cultural connectivity with those badly impacted by Hurricane Maria.[26] The importance of these networks is magnified by the insinuation that the window of opportunity for dealing with CCA in NYC is still "being climbed through" (Interview 16 - EP). This suggests that not only is there continued ability to influence the debate on solutions, there is also potential for the horizontal learning throughout these networks to be diffused into NYC and beyond. Events around the world—including those of the 2018 hurricane season—keep the "drumbeat" of climate change at the forefront of the (ever-growing) policy community's mind, demanding increased action.

[26] This, however, may be a novel linkage due to the sociocultural character of NYC.

The pathways of change—bottom-up, horizontal, and top-down—constitute a theoretical contribution to the study of focusing events and agenda setting, as these push studies to take both a longitudinal and multi-scalar perspective in order to capture the full breadth of influences on policy change. The temporal distance from disaster taken in this research was intended to capture learning, amongst policy makers and the public at large. Unexpectedly, this time lag allowed participants to internalize story lines which have become prevalent in the media and policy discourse, *e.g.* the idea that climate change is the driver of severe events. Such a finding suggests that people "fall in line" with dominant narratives as policy and the agenda is set. Taking a longitudinal perspective illustrates the convergence of these forces on individuals' perceptions of disaster over time. Future studies must continue evaluating temporal effects on policy development, how different actors influence policy change over time, and the role that knowledge about events and issues play in this. A final consideration for further inquiries is the quality of policymaking which follows disaster. The extended temporal scope of this study gave insight into the extent to which CCA following Sandy was actually 'event-based': while Sandy's shock curtailed the options for response, much of what came forward was already in the policy pipeline. To strengthen understanding of the relationship between hazards and decision-making, a critical point for evaluation is whether 'event-based' policymaking can be considered positively adaptive or maladaptive.

The focusing power of Sandy illustrates a fundamental weakness in disaster risk reduction: when reliant on the experience of events for policy change, emergency response and short-term concerns tend to take precedence. The results of this study reveal that *how* focus occurs and *the extent* of change that results are shaped by the *nature of disaster itself*. Where shock, losses and harm lead to calls for immediate action, the 'window' for a considered exploration of options, by a wide range of stakeholders, is narrowed by feelings of urgency. Those left homeless and heatless, at economic or physical loss, heightened the political pressure upon government, demanding rapid action. Seeking to display their competence and capacity, to maintain morale and economic stability, and also to secure limited national funding, the metropolis became further locked into a protection paradigm. Although unintentional, the initial policy response to the hurricane aggregated resources around the acute experience of disaster (*e.g.* rebuilding efforts), rather than creating space for a wider debate about the causes of hazards and vulnerability that they reveal. This indicates that the optimism about events as harbingers of policy change for adaptation within the disaster and climate communities—be it incremental or transformational—may be overstated (at least in the short term). Instead, this study contributes to the need for discussion about the adverse effects of focusing or 'shock' events on policy creation, and their ability to distract policymakers and public from the full array of risks.[27]

[27] To make a conclusive statement on the productivity of event-based policy, an assessment of positive or negative adaptivity (as suggested in Section 4.2) is necessary.

So far, the CCA approach of protecting shoreline communities continues to expose a high percent of the population and financial assets of NYC to storm surge and SLR. While protection may be a suitable CCA approach in the short-term, evidence is building that retreat must become a more considered part of the policy conversation. Despite years of learning opportunities, flooding is still an ongoing issue in NYC. During field work for this paper in the summer of 2018, NYC sweltered under a week-long heatwave. Extreme temperatures were followed by intense rain showers, leading to sewer backups and overflows around the city. This demonstrates not only the difficulties of forward-looking policy to address particular climate risks, but also the necessity of planning for the full suite of climate risks. The public and policymakers must learn how to plan for a life of increasing risk without dependence on the experience of hazard.

Ultimately, the results of learning from disaster (if opened by focused discussion) will not be apparent until the next disaster strikes. Adaptation is about behavioral change, in order to accommodate changes in circumstance. In the absence of constant hazards, the question of how deeply the citizens and policymakers of New York have internalized the necessity of climate adaptation remains. As noted in the introduction, the city's experience of flooding in the wake of a rainstorm earlier this summer raised questions of whether or not the city had actually improved its preparedness following the 2012 disaster. Events such as Sandy are not only linked to a broader array of unfolding changes in the global climate and geographic landscapes which change the intensity of hazards, but also to everyday human decisions which underpin individual, municipal and statewide exposure and vulnerability to harm. Focusing events will continue to unfold, inspiring new ideas or reinforcing old ones. However, their occurrence should not distract from the overarching need for more ex-ante, future oriented decision-making. Relying on events and lessons learned is likely to be an unsustainable and unnecessarily costly strategy. Instead, aligning city planning with the changing times, can benefit from framing CCA as part of sustainable development, seeing it as an investment that, if integral to planning and decision-making will help to keep a city viable in the face of rising climate risks (Surminski and Tanner 2017). This can help transition cities from a state of reaction to premeditated action, saving money and lives along the way.

6. References

Abrams, J., Huber-Stearns, H., Bone, C., Nelson, M., & Moseley, C. (2018). Does policy respond to environmental change events? An analysis of Mountain Pine Beetle outbreaks in the Western United States. *Environmental Science & Policy 90:* 102-109.

Adger, W. N., Dessai, S., Goulden, M., Hulme, M., Lorenzoni, I., Nelson, D. R., … Anita, W. (2009). Are there social limits to adaptation to climate change? *Climatic Change (2009)* 93: 335–354.

Albright, E. A., & Crow, D. A. (2016). Learning in the Aftermath of Extreme Floods: Community Damage and Stakeholder Perceptions of Future Risk. *Risk, Hazards & Crisis in Public Policy 6*(3): 308–328.

Bachrach, P., & Baratz, M. S. (1962). Two Faces of Power. *American Political Science Review, 56*(04): 947–952.

Barnard, A. (2019). "*If a Rainstorm Causes Flooding in New York, What Would a Hurricane Bring?*" The New York Times. https://www.nytimes.com/2019/07/23/nyregion/ny-nj-flooding.html

Baumgartner, Frank R., & Bryan D. Jones. 1993. Agendas and Instability in American Politics. Chicago: University of Chicago Press.

Baumgartner, F. R., Green-pedersen, C., Jones, B. D., Baumgartner, F. R., Green-pedersen, C., Jones, B. D., … Jones, B. D. (2006). Comparative studies of policy agendas. *Journal of European Public Policy 13(*7): 959–974.

Beck, U. (1992). Risk society: Towards a new modernity. *Nation 2*: 260.

Birkland, T. A. (1997). After Disaster: Agenda Setting, Public Policy, and Focusing Events. Washington, D.C.: Georgetown University Press.

Birkland, T. A. (1998). Focusing Events, Mobilization, and Agenda Setting. *Journal of Public Policy, 18*(1): 53–74.

Birkland, T.A. (2009). "Disasters, Lessons Learned, and Fantasy Documents." *Journal of Contingencies and Crisis Management 17*(3):
146–156.

Birkland, T. A., & Lawrence, R. G. Lawrence. (2009). "Media Framing and Policy Change After Columbine." *American Behavioral*
Scientist 52(10): 1405–1425.

Birkland, T. A., & Warnement, M.K. (2013). Focusing events, risk, and regulation. September. 1–26.

Birkland, T., A., & Warnement, M., K. (2014). Focusing Events in Disasters and Development. In N. Kapucu & K. T. Liou (Eds.), *Disaster and Development* (pp. 39–60). Springer International Publishing AG.

Birkmann, J., Buckle, P., Jaeger, J., Pelling, M., Setiadi, N., Garschagen, M., … Kropp, J. (2010). Extreme events and disasters: A window of opportunity for change? Analysis of organizational, institutional and political changes, formal and informal responses after mega-disasters. *Natural Hazards,* 55(3): 637–655.

Bose, F., & Brower, J. (2018). Do environmental incidents affect state - level environmental building policy? 192–203.

Brody, S., Grover, H., Lindquist, E., Vedlitz, A., Brody, S., Grover, H., … Vedlitz, A. (2010). Examining climate change mitigation and adaptation behaviours among public sector organisations in the USA, 9839.

Brokopp Binder, S., Baker, C.K., & Barile, J.P. (2015). Rebuild or Relocate ? Resilience and Postdisaster Decision-Making After Hurricane Sandy. *American Journal of Community Psychology:* 180–196.

Brunner, S. (2008). Understanding policy change: Multiple streams and emissions trading in Germany. *Global Environmental Change,*
18(3): 501–507.

Bryman, A. (2016). *Social research methods.* (Fifth Edition). Oxford University Press.

Bukvic, A., & Owen, G. (2017). Attitudes towards relocation following Hurricane Sandy: should we stay or should we go? *Disasters,*
41(1): 101–123.

Chhetri, N., Easterling, W. E., Terando, A., & Mearns, L. (2010). Modeling path dependence in agricultural adaptation to climate variability and change. *Annals of the Association of American Geographers 100*(4): 894-907.

Chung, J. "Map: NYC Has New Hurricane Evacuation Zones." Gothamist. June 18, 2013. http://gothamist.com/2013/06/18/map_nycs_new_hurricane_evacuation_z.php#photo-1.

City of New York. [Bloomberg Address] MAYOR BLOOMBERG DELIVERS ADDRESS ON SHAPING NEW YORK CITY'S FUTURE AFTER HURRICANE SANDY. December 6, 2012. http://www1.nyc.gov/office-of-the-mayor/news/459-12/mayor-bloomberg-…livers-address-shaping-new-york-city-s-

future-after-hurricane-sandy.

Cobb, R. W., & Elder, C. D. (1983). Participation in American Politics: The Dynamics of Agenda-Building. Baltimore: Johns Hopkins University Press.

Colle, B.A., Buonaiuto, F., Bowman, M.J., Wilson, R.E., Flood, R., Hunter, R., Mintz, A., & Hill, D. (2008). New York City's vulnerability to coastal flooding: storm surge modeling of past cyclones. *Bull Am Meteorol Soc 89*:829–841.

Downs, A. (1972). Up and Down with Ecology-the Issue-Attention Cycle. *Public Interest 28:* 38-50.

Elsner, J. B., & Kara, A. B. (1999). *Hurricanes of the North Atlantic: Climate and society.* New York: Oxford University Press.

Foderano, L. W. January 11, 2015. "On City Parks, Mayor de Blasio Is Seen as Friend, Foe and Something in Between." https://www.nytimes.com/2015/06/12/nyregion/on-parks-mayor-de-blasio-is-seen-as-friend-foe-and-in-between.html.

Ford, J. D., & King, D. (2015). Coverage and framing of climate change adaptation in the media: A review of influential North American newspapers during 1993 – 2013. *Environmental Science and Policy 48:* 137–146.

Fowler, L., Neaves, T. T., Terman, J. N., & Cosby, A. G. (2017). Cultural Penetration and Punctuated Policy Change: Explaining the Evolution of U.S. *Energy Policy 34*(4): 559–577.

Gerber, B. J. (2007). "Disaster Management in the United States: Examining Key Political and Policy Challenges." *The Policy Studies Journal 35*(2): 227.

Georgeson, L., Maslin, M., Poessinouw, M., & Howard, S. (2016). Adaptation responses to climate change differ between global megacities. *Nature Climate Change Letters 6:* 584-589.

Granberg, M., Nyberg, L., & Modh, L. (2016). Understanding the local policy context of risk management: Competitiveness and adaptation to climate risks in the city of Karlstad, Sweden. *Risk Management 18*(1): 26–46.

Greenberg, M. (2013). The Disaster inside the Disaster: Hurricane Sandy and Post-crisis Redevelopment. *New Labor Forum 23*(1): 44 –52.

Greenberg, M. R., Weiner, M. D., Noland, R., Herb, J., Kaplan, M., & Broccoli, A. J. (2014). Public Support for Policies to Reduce Risk After Hurricane Sandy. *Risk Analysis 34*(6): 997-1012.

Heclo, H. (1974). Modern Social Politics in Britain and Sweden; from Relief to Income Maintenance. *Yale Studies in Political Science,*
25. New Haven: Yale University Press.

Henstra, D. (2010). Explaining local policy choices: A Multiple Streams analysis of municipal emergency management. *Canadian Public Administration-Administration Publique Du Canada, 53*(2): 241–258.

Herrfahrdt-Pähle, E., & Pahl-Wostl, C., 2012. Continuity and change in social-ecological systems: the role of institutional resilience. *Ecol. Soc*. 17.

Hilgartner, J., & Bosk, C. (1988). "The Rise and Fall of Social Problems: A Public Arenas Model." *American Journal of Sociology 94*
(1): 53–78.

Hill, D. (2013). Vulnerability and potential losses in New York City from coastal flooding. In *Storm surge barriers to protect New York*
City: Against the deluge (pp. 58-70). New York University, USA: American Society of Civil Engineers (ASCE).

"Impact of Hurricane Sandy." NYC Community Development Block Grant Disaster Recovery. https://www1.nyc.gov/site/cdbgdr/about/About%20Hurricane%20Sandy.page

Intergovernmental Panel on Climate Change, [IPCC] (2015) *Climate change 2014: synthesis report*. Geneva, Switzerland.

Jacob, K. H. (2015). Sea level rise, storm risk, denial, and the future of coastal cities. Bulletin of the *Atomic Scientists, 71(*5): 40-50.

Johnson, K. (2000). "Global Warming Moves From Impassioned Words to Modest Deeds." The New York Times. https://www.nytimes.com/2000/11/19/nyregion/global-warming-moves-from-impassioned-words-to-modest-deeds.html

Jones, M. D., Peterson, H. L., Pierce, J. J., Herweg, N., Bernal, A., Raney, H. L., & Zahariadis, N. (2016). A River Runs Through It: A Multiple Streams Meta-Review, *The Policy Studies Journal, 44*(1): 13-36.

Joseph, M. (2013). *Fluid New York: Cosmopolitan Urbanism and the Green Imagination*. Duke University Press: Durham & London.

Kates, R. W., Travis, W. R., Wilbanks, T. J., Is, W., & Adaptation, T. (2012). Transformational adaptation when incremental adaptations to climate change are insufficient. *Proceedings of the National Academy of Sciences May 2012, 109* (19): 7156-7161. doi: 10.1073/pnas.1115521109.

Keim, B. D., Muller, R. A., & Stone, G. W. (2007). Spatiotemporal patterns and return periods of tropical storm and hurricane strikes from Texas to Maine. *Journal of Climate, 20*(14): 3498-3509.

Keskitalo, E.C.H., Legay, M., Marchetti, M., Nocentini, S., & Spathelf, P., 2015. The role of forestry in national climate change adaptation policy: cases from Sweden, Germany, France and Italy. *Int. For. Rev. 17:* 30–42.

Keskitalo, E. C. H.; Westerhoff, L., & Juhola, S. (2012). Agenda-setting on the environment: the development of climate change adaptation as an issue in European states, *Env. Pol. Gov. 22:* 381–394.

Kingdon, J. W. (1984, 2003). Agendas, Alternatives, and Public Policies. 1st ed, 2nd ed. Longman Classics in Political Science. New York: Longman.

Luers, A.L., & Moser, S.C. (2006) Preparing for the impacts of climate change in California: opportunities and constraints for adaptation. Report prepared for the California Energy Commission (CEC) and California Environmental Protection Agency, CEC-5000-198-SF, CEC, Sacramento, CA.

Lindblom, C. E. 1959. "The Science of 'Muddling Through'." *Public Administration Review 19*: 79–88.

Liu, X., Lindquist, E., & Vedlitz, A. (2011). Explaining Media and Congressional Attention to Global Climate Change, 1969-2005: An Empirical Test of Agenda-Setting Theory. *Political Research Quarterly 64*(2): 405–419.

Liu, X., Vincent, K., & Lindquist, E. (2010). Understanding Local Policy Making: Policy Elites' Perceptions of Local Agenda Setting and Alternative Policy. *Policy Studies Journal 38*(1): 69-91.

May, P. J. 1990. "Reconsidering Policy Design: Policies and Publics." *Journal of Public Policy 11*(2): 187–206.

May, P. J. 1992. "Policy Learning and Failure." *Journal of Public Policy 12*(4): 331–354.

Mallett, A., & Cherniak, D. (2018). Views from above : policy entrepreneurship and climate policy change on electricity in the Canadian Arctic. *Regional Environmental Change 18*: 1323–1336.

Mettler, S. & Sorelle, M. (2014). Policy feedback theory. In: P.A. Sabatier and C.M. Weible (eds.) *Theories of the Policy Process*. 3rd
edn. Boulder, CO: Westview Press, pp. 151–182.

Mockrin, M. H., Fishler, H. K., & Stewart, S. I. (2018). Does Wildfire Open a Policy Window? Local Government and Community Adaptation After Fire in the United States. *Environmental Management:* 210–228.

Moser, S. C., Kasperson, R. E., Yohe, G., & Agyeman, J. (2008). Adaptation to climate change in the Northeast United States: opportunities, processes, constraints, *Mitig Adapt Strat Glob Change (2008)*13: 643–659.

Munich Re. (2013). Natural catastrophes 2012: Analyses, assessments, positions. Topics Geo. Available at: http://www.munichre.com/us/weatherresilience-and-protection/media-relations/productions-publications/publications/topics-geonat-cat-2012/index.html

Naess, L.O., Bang, G., Eriksen, S., & Vevatne, J. (2005). Institutional adaptation to climate change: flood responses at the municipal level in Norway. *Global Environmental Change 15*: 125–138.

National Research Council. (2013). [NRC 2013] Abrupt impacts of climate change: Anticipating surprises. Washington, DC:

National Academies Press. Available at: http://www.nap.edu/catalog.php?record_id=18373.

New York City, Office of the Mayor. (2013). [NYC 2013] PlaNYC Progress Report 2013. Office of the Mayor, New York, New York, USA. http://s-media.nyc.gov/agencies/planyc2030/pdf/planyc_progress_report_2013.pdf

New York City, Office of the Mayor. 2015. [NYC 2015] One New York: the plan for a strong and just city. Office of the Mayor, New York, New York, USA. http://www.nyc.gov/html/onenyc/downloads/pdf/publications/OneNYC.pdf

New York City Panel on Climate Change. (2015). [NPCC 2015] Building the knowledge base for climate resiliency. *Annals of the New York Academy of Sciences 1336 (January)*: 1-150. Available at: http://onlinelibrary.wiley.com/doi/10.1111/nyas.2015.1336.issue-1/issuetoc.

New York City, Special Initiative for Rebuilding and Resiliency. (2013). [NYC SIRR 2013] A stronger more resilient New York: special initiative on rebuilding and resiliency. SIRR, New York, New York, USA. http://s-media.nyc.gov/agencies/sirr/SIRR_singles_Lo_res.pdf.

Nicholls, R. *et al*. (2008). "Ranking Port Cities with High Exposure and Vulnerability to Climate Extremes: Exposure Estimates." *OECD Environment Working Papers*, No. 1. OECD Publishing, Paris. https://doi.org/10.1787/011766488208.

Nohrstedt, D. (2008). "The Politics of Crisis Policymaking; Chernobyl and the Swedish Nuclear Energy Policy." *The Policy Studies Journal 36* (2): 257.

O'Donovan, K. (2017). An Assessment of Aggregate Focusing Events, Disaster Experience, and Policy Change. *Risk, Hazards & Crisis in Public Policy 8*(3): 201-219.

O'Neill, K. M., & van Abs, D. J. (2016). *Taking Chances: The Coast After Hurricane Sandy.* New Brunswick, New Jersey: Rutgers University Press.

Pelling, M. (2011) Adaptation to Climate Change: From Resilience to Transformation. London: Routledge.

Pelling, M., High, C., Dearing, J., & Smith, D. (2008). Shadow spaces for social learning: A relational understanding of adaptive capacity to climate change within organisations. *Environment and Planning A, 40*(4): 867–884.

Pralle SB. (2009). Agenda-setting and climate change. *Environmental Politics 18*(5): 781–799.

Rosenzweig, C., & Solecki, W. D. (2014). Hurricane Sandy and adaptation pathways in New York: Lessons from a first-responder city. *Global Environmental Change 28:* 395–408.

Rosenzweig, C., Solecki, W. D., Blake, R., Bowman, M., Faris, C., Gornitz, V… (2011). Developing coastal adaptation to climate change in the New York City infrastructure-shed: process, approach, tools, and strategies. *Climatic Change 106*(1): 93-127.

Rosenzweig, C., Solecki,W., & DeGaetano, A. (2011). ClimAID: integrated assessment for effective climate change adaptation strategies in New York State. In C. Rosenzweig, W. Solecki, A. DeGaetano, & M. O'Grady (Eds.), Responding to climate change in New York State: The ClimAID integrated assessment for effective climate change adaptation. Technical Report.

Rosenzweig, C., Solecki, W. D., & Hammer, S. A. (Eds.). (2011). Climate change and cities: first assessment report of the urban climate change research network. Cambridge University Press.

Sabatier, P. A. (1988). "An Advocacy Coalition Framework of Policy Change and the Role of Policy-Oriented Learning Therein." *Policy Sciences 21*: 129–68.

Sabatier, P. A. (1993). "Policy Change over a Decade or More." In *Policy Change and Learning: An Advocacy Coalition Approach*. Boulder,
Colorado: Westview.

Sabatier, P. A., & Jenkins-Smith, H. (1999). "The Advocacy Coalition Framework: An Assessment." In *Theories of the Policy Process*.
Boulder, Colo.: Westview.

Saldana, J. (2013). *Coding Manual*. (Second Edition). Sage Publications: London.

Sallenger, A.H., Doran, K.S., & Howd, P.A. (2012). Hotspot of accelerated sea-level rise on the Atlantic coast of North America. *Nat Clim Chang 2*:884–888.

Schüssler, E., Rüling, C., & Wittneben, Bettina B. F. (2014). On Melting Summits: The Limitations of Field-Configuring Events as
Catalysts of Change in Transnational Climate Policy. *Academy of Management Journal 57*(1): 140-171.

Slavíková L, Raška P, & Kopáček M. (2018). Mayors and "their" land: Revealing approaches to flood risk management in small municipalities. *J Flood Risk Management*. 2018:e12474.

Simpson, R. H., & Lawrence, M. B. (1971). Atlantic hurricane frequencies along the US coastline (No. 58). National Weather Service, Southern Region.

Simon, H. A. (1957). Models of Man: Social and Rational; Mathematical Essays on Rational Human Behavior in Society Setting. New York: Wiley.

Slovic, P. (1987). "Perception of Risk." *Science 236*(4799): 280–285.

Solecki, W. D. (2012). Urban environmental challenges and climate change action in New York City, *Environment & Urbanization 24*(2): 557–573.

Solecki, W. D. & Michaels, S. (1994). Looking Through the Postdisaster Policy Window, *Environmental Management 18*(4), 587–595.

Solecki, W., C. Rosenzweig, S. Hammer, & S. Mehrotra. (2013). The urbanization of climate change: responding to a new global challenge. pp. 197-220 in E. D. Sclar, N. Volavka-Close, and P. Brown, editors. The urban transformation: health, shelter and climate change. *Earthscan*, London, UK.

Swim, J. K., & Whitmarsh, L. (2019). Climate Change as a Unique Environmental Problem. In *Environmental Psychology* (eds L. Steg and J. I. Groot). doi:10.1002/9781119241072.ch3.

"Text and Video of Obama's State of the Union Address." The New York Times. January 28, 2014. https://www.nytimes.com/2014/01/29/us/politics/state-of-the-union-address-text.html.

"Text of Mayor de Blasio's State of the City Address." The New York Times. February 3, 2015. http://www.nytimes.com/2015/02/04/nyregion/new-york-mayor-bill-de-blasios-state-of-the-city-address.html.

The Global Risks Report 2019, 14th Edition. (2019). [WEF 2019] World Economic Forum. Geneva. http://www3.weforum.org/docs/WEF_Global_Risks_Report_2019.pdf.

Travis, W. T. (2012). Extreme Events as Pacemaker of Adaptation to Climate Change. Paper prepared for Adaptation Futures: 2012 International Conference on Climate Adaptation, Tucson, AZ. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.299.7724&rep=rep1&type=pdf.

Wagner, M., Chhetri, N., & Sturm, M. (2014). Adaptive capacity in light of Hurricane Sandy: The need for policy engagement. *Applied Geography 50:* 15–23.

Wang, X, & Kapucu, N. (2007). Public complacency under repeated emergency threats: Some empirical evidence. *Journal of Public*
Administration Research and Theory 18:57–78.

Yusuf, J. W., & Neill, K. (2016). The sea is rising … but not onto the policy agenda : a multiple streams approach to understanding sea level rise policies. *Environment and Planning C: Government and Policy 34*: 228–243.

Zahariadis, N. (2003). *Ambiguity and Choice in Public Policy: Political Decision Making in Modern Democracies.* Washington, DC:
Georgetown University Press.

Authors' acknowledgments

Thank you to the participants in this research, your insights brought theory to life. Thank you as well to Richard Perkins, for his guidance in formulating this research, to Declan Conway for taking the time to provide an academic review and to LSE colleagues for informal inputs along the way. We are grateful for support from the Grantham Foundation for the Protection of the Environment and from the Economic and Social Research Council (ESRC) through the Centre for Climate Change Economics and Policy.

Annex 1. Timeline of Multi-Scalar Dynamics Influencing CCA Policy in NYC

Year	City Climate Policies	Policymaking at State or National Level	Political Changes	Focusing Events, Indicators and Feedback		
				NYC	National	International
2001		FEMA and federal government extend disaster response mandate to terrorism; redirection of funds toward manmade disasters		9/11		IPCC Third Assessment
2002			Michael Bloomberg first elected as NYC Mayor			
2003						European Heatwave
2004	First Climate Change Taskforce established by the NYC DEP; foundation laid for communication across government agencies and climate stakeholders beyond the city; focus on critical infrastructure, like water supply					
2005	Bloomgberg signs up to the Kyoto Protocol, indicates NYC climate action will not be constrained by national level				Hurricane Katrina	Adoption of the Hyogo Framework (fuels international conversation about resilience)
2006	Office of Long-term Planning and Sustainability created, focus on mitigation of greenhouse gases (in line with the international agenda)		Bloomberg re-elected as NYC Mayor	Floods occur throughout NYS		"An Inconvenient Truth" is released

2007	Bloomberg declares climate change the "greatest threat of all"; reveals First PlaNYC with climate action emphasis on mitigation NPCC created CCATF established, focus on protection of critical infrastructure Bloomberg addresses UNFCCC in Bali, criticizing national-level climate policy and calling on cities to lead (Fuller 2007, from Cohen et al. 2015)			Intense downpour in NYC causes transport shutdowns, economic losses (Solecki 2012)		IPCC Fourth Assessment
2008	Second PlaNYC Report revealed NPCC convened for the first time to provide guide on climate risks		Barack Obama elected to President of the United States, campaign prioritizes climate change		Economic recession / subprime mortgage crisis	
2009		Governor Paterson signs Executive Order No. 24, setting a goal to reduce greenhouse gas emissions in NYS by 80% below the levels emitted in 1990 by 2050				COP15 in Copenhagen
2010	First NPCC report released NYC begins working with FEMA to remap flood plane Green Codes Task Force Report published, includes making the city's building and infrastructure more resilient to climate change through building code adjustments as means of increasing climate protection		Bloomberg re-elected as NYC Mayor for a third term Bloomberg becomes chair of C40			

2011	ClimAID Commissioned at State Level, highlights the extensive vulnerability of NYC Vision 2020 - Waterfront Development Plan released; notable inclusions are a strategic planning process for climate resilience, collaboration with FEMA to update flood insurance maps, zoning changes for flood protection of buildings, and an expanding inventory of adaptation strategies for flooding and storm surge			Tropical Storm Lee and Hurricane Irene hit areas surrounding NYC, cause evacuations of the city		
2012	September: NPCC & CCATF institutionalized through NYCC Local Law 42 December: Special Initiative on Recovery and Resilience created, focus on resilience of built environment and critical infrastructure	Hurricane Sandy Rebuilding Task Force created though Executive Order 13632.	Obama re-elected to President of the United States	Hurricane Sandy		IPCC Fourth Assessment released, finds > 95% likelihood that humans contributing to global warming
2013	SIRR Report released by Mayor's Office, laying out a spending plan for federal funds NYCC passes 16 local laws to improve building codes, protect against climatic risks; CC and SLR projections more deeply engrained in city planning processes	Preliminary flood map released by FEMA Obama's climate plan released; National Climate Change Adaptation Force created				
	Buyout Programs begin to be developed; however, approach of state and city differ					
2014	PlaNYC rebranded as OneNYC; City makes pledge to reduce GHG emissions by at least 80% by 2050	Community Risk and Resiliency Act (CCRA) proposed by the State of New York, requiring state agencies' funding and permitting decisions to consider the effects of climate change, including sea level rise	Bill de Blasio elected Mayor of NYC	11 winter storms hit NYC		IPCC Fifth Assessment

2015						COP 21 (Paris Agreement) Global Compact of Mayors pledges cities to reduce GHGs
2016	NYC becomes a party to the Paris Agreement, agrees to emissions reductions		Donald Trump elected as President of the United States			
2017	NYC begins reporting to the UNFCCC on mitigation actions		de Blasio re-elected as Mayor		Hurricanes Harvey, Irma and Maria hit the southern U.S.	
2018	NYC's Climate Resiliency Design Guidelines released					

Annex 2. Interview Details and Materials

At the beginning of each interview, participants were re-briefed on the project using standardized text. Out of the total sixteen interviews, five were not recorded due to noise interference and confidentiality protocol. These five interviews were transcribed by hand and sent to interviewees for verification. The question guide was altered twice, firstly to increase clarity, reduce repetition and enhance standardization of responses, and secondly to integrate insights from the iterative research process recommended by Bryman (2016) for grounded theory analysis. Given the small scale of the overall study, after interviews were transcribed, data were processed using manual coding methods, drawing on guidance from Saldaña (2013: 26; cf. Bazeley 2007: 92).

Below the question guide from interviews is included to indicate the wording and order of questions. Participants were refreshed with the opening statement and research questions before proceeding to the interview. Italicized headers were inserted as a guide for the researcher when evaluating the answers. As stated in the paper, questions colored in blue are those which were added later in the research process.

Opening statement:

This research concerns the ability of Hurricane Sandy to act as a focusing event on climate change adaptation policy New York City. This is a critical area of inquiry in order to understand how the risks related to climate change and sea level rise come to be addressed by policymakers.

Research questions:

How, and to what extent, did Hurricane Sandy serve as a focusing event, creating a window of opportunity for re-evaluating climate change adaptation policies?

What are the factors that (dis)allow attention to be focused?

How can the policy impacts of Hurricane Sandy (on climate change adaptation) be characterized?

Interview Questions

Defining and Framing the Problem

1. How did you understand Hurricane Sandy?
    a. What, if any people, organizations, experiences or other factors influenced this?

Changes in the Topic and/or Approach

2. From your perspective, did Superstorm Sandy serve to focus attention on climate change adaptation in NYC? Did Sandy open a window of opportunity?
    a. Could you please identify 1-5 major city-level policy concerns, in order of significance, that Sandy brought to light?
        i. Are these consistent with **concerns prior** to Sandy? (If not answered, ask: With what issues was NYC most concerned with prior to Sandy?)
        ii. How do these compare with **current priorities**?

Sociopolitical Factors

3. How do you identify areas in which action is needed (i.e. who participates, what evidence is used)?
   a. Who, from your perspective, are the main suppliers of policy-related information?

4. Can you please indicate the key barriers to choosing certain policies and solutions, in order of significance?

Policy Community, Problem Conception

5. On a scale of 0-5, how clear would you rate the consensus on **problems** related to climate change?

6. On a scale of 0-5, how clear would you rate the consensus on **policies** related to climate change?

7. Did Sandy create any debate about problems or policies?

8. Did Sandy shift the policy community, those involved in policymaking, their organization?

9. Who, from your perspective, would you consider to be the key actors driving action on climate change in NYC?

Changes in the Topic and/or Approach

10. a. What, if any, changes in **approach to the climate change adaptation** have you seen in the period *since* Sandy?
    b. What, if any, changes in the **issues on the NYC policy agenda** have you seen in the period *since* Sandy?

Problem Factors

11. Would you agree with the statement that "Hurricanes, tropical storms, and flooding events are necessary to keep climate change (i.e. adaptation and mitigation concerns) on the map?"
    a. Please identify any other relevant factors in determining problems of interest.

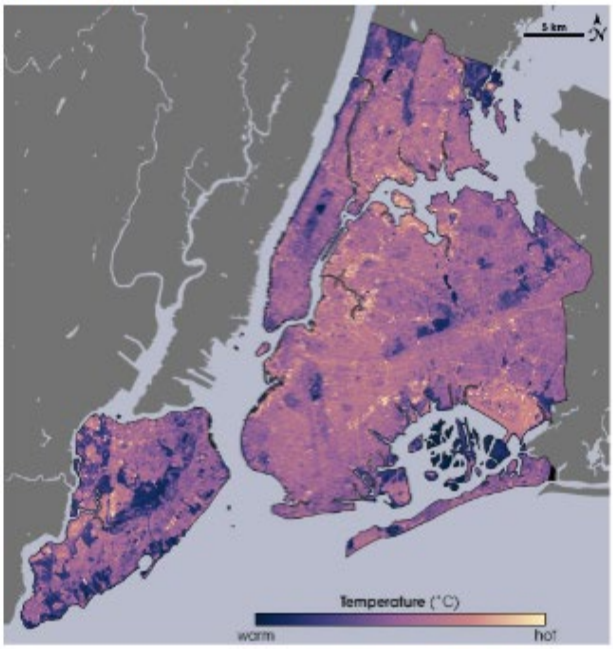
Sociocultural Salience

12. With what issues is NYC most preoccupied? Please identify 1-5.
    a. Where does climate change adaptation rank among these?

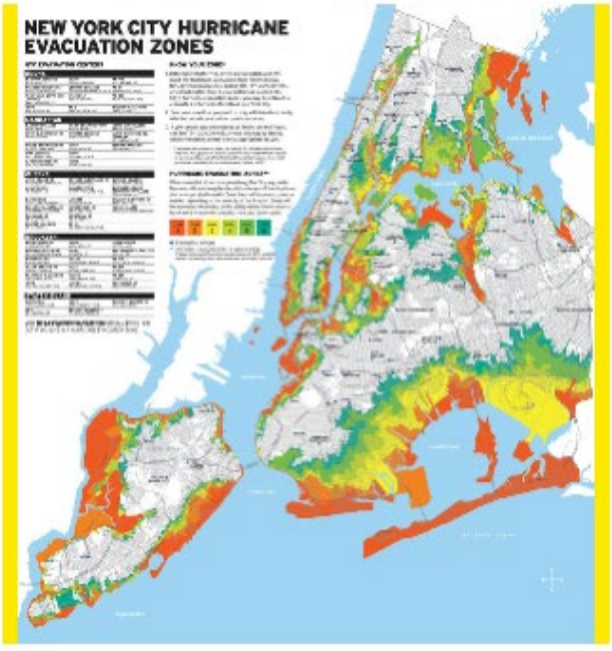
Annex 3. Maps of NYC's Hazard Exposure

These maps are included to support conversation about the full suite of climatic risks faced by NYC and the need to account for these when planning for future resilience and sustainability. As argued throughout the paper, focusing on only the risks revealed by one hazardous incident can otherwise lead to actions which leave parts of the population exposed to future harm. Maladaptation in this manner is one of the dangers inherent in event-based policy-making.

A4. F1. NYC HEAT RISK MAP (NPCC 2015)



A4. F2. NYC FLOOD RISK MAP (CHUNG 2013)



Annex 4. Extended Data from Interviews

A4 TABLE 1. Drivers and Sources of Climate Policy Information

Sources*	Frequency of Mention
NYC Communities	7
Academia/Universities, including Columbia and CUNY	6
'Science'	3
New York Panel on Climate Change (NPCC)	5
"Media" or AP, WNYC, NYT	6
Mayor	7
Mayor's Office	2
Mayor's Office of Sustainability (MOS)	2
Mayor's Office of Recovery and Resilience (MORR)	6
OEM	2
DCP	3
DEP	2
Department of Transportation	1
New York City Council (NYCC)	5
EDC	2
Other Cities, and "100 Resilient Cities" (100RC)	4
Governor	2
NYS DEC	3
GOSR	1
Policymakers ('Public'/'Formal')	2
Federal Level	2
Environmental Groups, including the Nature Conservancy and River Keeper	5
Other policy documents	1
"ThinkTanks," including Urban Institute, Brookings	3
RPA	2

A4 TABLE 2. Differences in Perceived Consensus (Respondents' Rankings)

On policies	On problems
3	4.5
1.5	2.5
2.5	4
3.25	4
4	3.5
3	3.75
3	3
2.5	4
3.5	4
2.92 Avg.	**3.69 Avg.**

* Indicates aggregated categories which reflect groupings used by respondents as well as post-collection sorting by the researcher.

A4 TABLE 3. Policy Concerns Revealed by Sandy, According to Interviewees

Issues*	Frequency of Mention
1. Life in the flood zone A) Building and zoning code, new design requirements B) Updating FEMA maps C) Lack of risk awareness D) Rethinking life on the coast and uses of the waterfront E) Ability to afford risk insurance	16
2. Resilience A) Communities B) Infrastructure C) Shoreline	5
3. Emergency Management	5
4. NPCC / Climate Projections	3
5. Adaptation	2
6. Mitigation and Greenhouse Gases	2
7. Erosion / Changing Environments	1
8. Increasing Ambition	1
9. Transportation	1

* Subcategories listed within this table were linked by respondents directly to the numbered category, or have been linked by the researcher during data analysis. The lack of clarity observed in the way participants spoke of climate change and its risks, as well as Hurricane Sandy (as a hazard) and its associated harms, is indicative of the amount of complexity shrouding policy-making in this domain.

A4 TABLE 4. Changes in Policy Approaches Across Media Sources

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Protect	1	2	2	0	1	1	3	10	0	8	2	3	17	19	9	9	4	10	8
Accommodate	0	0	0	0	0	0	0	0	0	0	0	2	3	3	0	0	0	0	3
Retreat	0	0	0	0	0	0	0	2	0	1	0	0	7	0	0	0	0	0	2

A4 TABLE 5. Influences on Timing of Policy Response

	POLITICAL WILL/POWER	INDIVIDUAL WILL/POWER
Cost of Action (in monetary and other resources)	Budgetary Limitations	Personal Financial Limitations
Cost of Inaction (damage)	Political Risk	Physical Risk
Conflict of Interests	(between costs and risks) e.g. Economic Development vs. Environmental Security at the national scale or Economic Growth vs. Environmental Impact at the personal level	
Adaptive Capacity and Path Dependency	Organizational Constraints	Cognitive Constraints
Complexity of Problem, Solution and Implementation	Evolving Understanding and Informational Inputs; High Degree of Uncertainty; Diverse Array of Affected Stakeholders at Multiple Scales	

These barriers primarily affect the drivers of NYC climate policy, which are the city government and secondarily, the communities as highlighted in Section 4.1.2. The table therefore presents the findings through the frame of will power at the level of individuals and of organizations. There are feedbacks between the horizontal categories for each actor, as well as feedbacks between the actors.

With at least three sources of complexity listed (political, problem, and implementation), substantial capacity for action from policymakers and the organizations they constitute is necessary. Additionally, complexity and capacity create more opportunity for policy entrepreneurs who have privileged access to information, experience in government and the policy field. Together, these barriers shape the ability and willingness of policymakers to make tradeoffs, and know how much leadership and (political) capital to invest in any given solution. In the aftermath of Sandy, pre-established options, budgetary restrictions, a clear political agenda on behalf of the city government, a fragmented public, and the pressure for rapid action resulted in a preference for fast and easy action on climate change adaptation and hazard risk reduction. The findings of this study point toward the need to view sources of complexity inherent in policy domains and political contexts as barriers in and of themselves, and the need to identify ways of working productively with these to attain change.