ESTABLISHING AND EVALUATING CLIMATE CHANGE HEURISTICS OF MULTI-ACTOR PROFESSIONAL LEADERSHIP IN THE NEW YORK METROPOLITAN REGION

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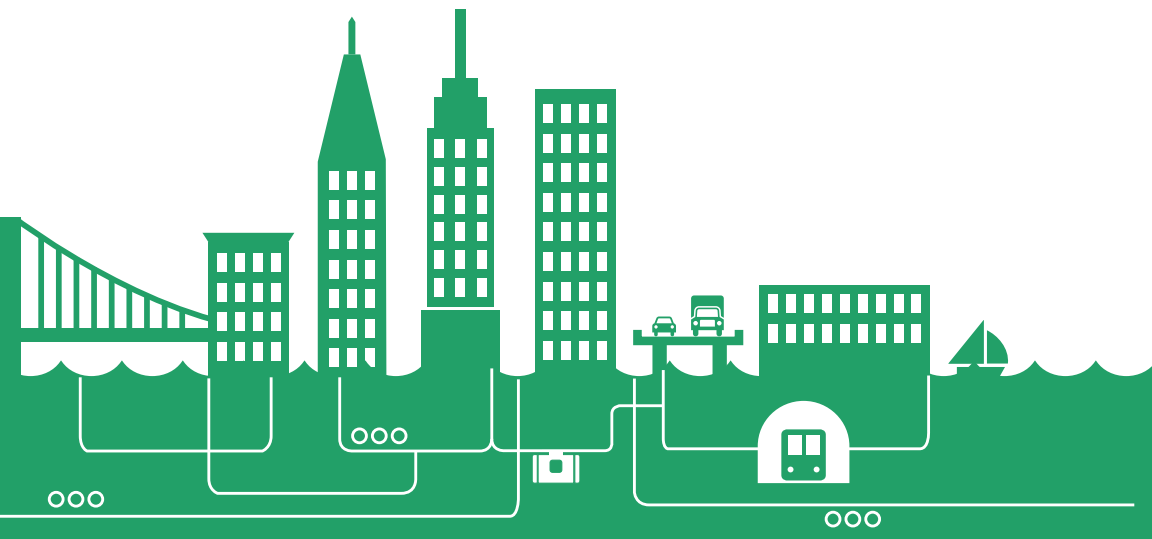

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ABSTRACT:

This article sets out to evaluate the existing range of heuristics and preferences for the concepts of adaptation, resilience, mitigation and coping of a variety of actors in the metropolitan region of New York City who are undertaking professional leadership positions in developing policies and practices which address a multitude of risks associated with climate change. Prior interviews and observations have suggested that the inconsistent usage of these concepts—including, the rhetorical application of resilience as a leading framework—are thwarting the development of planning instruments and decision tools. This article positions a normative set of meanings for each of the aforementioned concepts based on a review of existing literature. Then, utilizing a survey, these normative meanings are evaluated by and between the: (i) concepts and meanings; (ii) concepts and applications; and, (iii) applications and preferences, as applied to various risk based scenarios ranging from sea level rise to heat waves. This survey tests the hypotheses that the respondents: (a) are unable to consistently match the concept of resiliency with the normative meanings or applications: and, (b) will not consistently show a preference for resilience applications or outcomes ahead of other concepts. The results of the survey confirm both hypotheses, which is demonstrative of the inadequacy of the current framework dominated by resilience in its rhetorical form. It is anticipated that the results of this article will advance an argument for the necessity to develop consistent meanings for concepts which bridge the scientific, policy and popular domains.

KEY WORDS:

Climate Change Heuristics, Resilience, Adaptation, Urban Planning, Built Environment

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I. INTRODUCTION:

As the science for adaptation branches off into the science of adaptation, one of the most significant challenges facing academics and practitioners is a lack of consistent heuristics in conceptualizing various responses and preparations for dealing with climate change (Swart, Biesbroek and Capela-Lororenco 2014). Interviews with practitioners have suggested that the lack of consistent heuristics in the various meanings of coping, mitigation, resilience and adaptation (the "Concept(s)") are arguably holding back the development of comprehensive plans, laws, resource allocations and investment strategies by actors in the public, private and civic sectors. Each Concept varies in its core meaning and can be additionally categorically distinguished by actor orientation, time horizon, and application. Specifically, the domestic American practice to-date has been dominated by the rhetorical usage of the Concept of resilience, whose applications have offered little consistency with scientific and social scientific scholarship or with emerging internationally recognized frameworks. This confusion and dilution of meanings of the aforementioned Concepts has the potential to thwart the development of clear legislative intent, which is critical for developing strategic and tactical action for addressing climate change. If a clear division of Concepts is left unattended, then the current framing in favor of resilience in its various inconsistent manifestations may lead to long-term maladaptation.

This article sets out to evaluate the existing range of heuristics and preferences of a variety of actors in the metropolitan region of New York City (the "NYMR") who are undertaking professional leadership positions in developing policies and practices which address a multitude of risks associated climate change (collectively, the "Respondents"). While scholarly consensus is still emerging by and between various academic domains, this article positions a normative set of meanings for each of the aforementioned Concepts based on a review of existing literature. Then, utilizing a survey, these normative meanings are evaluated by and between: (i) Concepts and meanings; (ii) Concepts and applications; and, (iii) applications and preferences, as applied to various risk based scenarios ranging from sea level rise to heat waves. This survey tests the hypotheses that the Respondents: (a) are unable to consistently match the Concept of resilience with the normative meanings or applications of those meanings: and, (b) will not consistently show a preference for resilience applications or outcomes ahead of other Concepts—despite the predominance of its rhetorical usage. This article concludes with a discussion on the implications for continued misalignment and/or exclusive focus on the aforementioned Concepts, meanings and preferences with regard to policy development. It is anticipated

that the results of this article will advance an argument for the necessity to develop a set of consistently applied Concepts which bridge the scientific, policy and popular domains. A failure to develop consistent meanings is likely to result in the dilution of legislative and design intent of critical strategies and interventions.

II. HEURISTICS AND CLIMATE CHANGE:

A. PRACTICAL APPLICATION

The study of heuristics can be traced to ancient Greece with modern conventions over the last 150 years falling into the fields of psychology, behavioral science, economics, and, more recently, computer science. One definition of heuristics is that they "are strategies that guide information search and modify problem representations to facilitate solutions…[and have] been used to refer to useful and indispensable cognitive processes for solving problems that cannot be handled by logic or probability theory" (Goldstein and Gigerenzer 2002, pp. 75). However, this definition assumes that an individual is challenged by a complex problem which defies an individual's capacity for logical reasoning as opposed to an individual's desire to more quickly frame and evaluate the problem. To this end, Gigerenzer and Gaissmaier offer a more compelling definition of a heuristic as a "strategy that ignores part of the information, with the goal of making decisions more quickly, frugally and/or accurately than complex methods" (2011, pp. 454). With time, the focus in the scholarship—including climate scholarship—shifted from evaluating the positivist substitute functions to how those substitutes or heuristics negatively impact reasons, judgments and decision-making based on certain illusions and/or biases (Nicholls 1999; Grothman and Patt 2005; Sunstein 2006; Chen 2011; Kahan, et al. 2012; Preston, Mustelin and Maloney 2013).

While this article acknowledges the inherent limitations to utilizing heuristics (i.e., balancing efficiency and accuracy), it returns the focus on the necessity to develop simplified substitutes which can serve as a foundation for decision making in the advancement of policy development in the public, private and civic sectors. At present, moral judgments about the allocation of resources in the advancement of resilience and adaptation are assumed to be framing heuristics which have the potential to lead to inefficient and morally ambiguous outcomes (Sunstein, 2005; Klinsky Dowlatabadi, and McDaniels 2012). By developing normative meanings which have a sensitivity to actor orientation—and the economics of who wins and who loses—it is anticipated that this level of criticality will minimize the occurrence of morally subjective steering of responsive heuristics to climate change. For instance, one argument rooted in critical theory against the utilization of resilience

as a meta-concept for responding to change is that through the perpetuation of the operations of the status quo—as will be discussed—one is perpetuating existing power regimes which possess a certain latent moral foundation which does not necessarily serve the ends of a socially equitable distribution of common pool resources (Vanderheiden 2008; Whitehead 2013). While this may be an extreme perspective, it highlights the necessity for the development of normative and consistent meanings which offer critical sensitivities in the construction of heuristics and the application of those heuristics in the decision-making which serves as the foundation for matters of public and private policy.

B. HEURISTICS AS A FOUNDATION FROM DISCOURSE TO POLICY

In order to understand the NYMR's professional leadership's varying concepts, applications and preferences for conceptualizing responses to climate change, it is necessary to first position a normative set of heuristical meanings for the Concepts of adaptation, resilience, mitigation and coping. To this end, we reject the strict division of heuristics between affective and associative reasoning and analytical reasoning under the assumption that heuristics will build supplemental meanings with greater depth as the diversity of their usage and application proliferate (Evans 2008). As such, as heuristics become more sophisticated in the depth of their multiple—yet hopefully consistent—meanings, they have the propensity for application within conventional modes of analytical reasoning. For instance, heuristics may drive a discourse which leads to the foundation of laws and policies which may become part of a more sophisticated framework for the application of analytical reasoning in addressing problems which are increasingly becoming more complex. Conversely, addressing complex problems with inconsistent foundational meanings and applications presents a significant challenge for policy development. This is a particularly ripe problem as interviews with drafters of model climate change legislation in the NYMR have observed that the lack of consistent meanings by and between the aforementioned Concepts poses a significant barrier to drafting with clear legislative intent (Kass 2014). As will be discussed, this is also a significant challenge for the drafting of the 4th Regional Plan for the NYMR by the Regional Plan Association.

C. NORMATIVE HEURISTICS FOR CONCEPTS OF CHANGE

By and between the Concepts of coping, mitigation, resilience and adaptation there exists a number of overlapping and inconsistent meanings which make it difficult to ascertain emerging consensus in the physical sciences, social sciences and professional literature (Moser and Ekstron 2010). However, a lack of consensus

does not imply a lack of consistency in the conceptualization of the Concepts. Following the literature survey methods of Downes, et al. (2013) for resiliency and Preston, Mustelin and Maloney (2013) for adaptation, definitions for each Concept in both social science and ecological science were distilled against a common set of criteria, including time horizon, mode and design of host response, and ontological disposition. Thereafter, through a textual analysis of each definition, the common criteria and phrases were interpreted and transposed to their most simplified meaning. For example phrasing such as: (i) "…before the system change its structure…"(Hollings and Meffe 1996, pp. 330); (ii) " system…changes stable states" (Gunderson 2000, pp. 427); and, (iii) "…before the system changes in structure…"(Berkes, Folke and Colding 2000, pp. 12) can all be transposed to the concept of—in whole or in part—maintaining the operations of the status quo. As represented in Table 1, the transposed and simplified meanings ultimately assigned to the host response provide the foundation for a set of normative heuristical meanings.

In short, the history of the usage and conceptualization of coping, predominately in the fields of psychology and organizational management, suggests that its core meaning relates almost exclusively to maintaining the critical, core and minimal functions of a host in response to external stimuli (Fuller, et al. 2010; Reser and Swim 2011). This

Table 1: Normative Heuristics for Responsive Concepts to Change

	Host Response	Designs	Time Horizon	Ontology	Literature	
Coping	Maintain Minimal Operations of Status Quo	- Internal	- Short-term	- Subjective Reality	- Fuller, et al. (2010) - Lazarus and Folkman (1984) - Ojala (2012, 2013) - Reser and Swim (2011)	- Reser, Bradley and Ellul (2012) - Salovey (1999) - Swim, et al. (2009)
Mitigation	Prevent Risk from Occurring in the Future	- Internal	- Short-term - Mid-term - Long-term	- Objective Reality	- Golkany (2005) - IPCC (2007a) - IPCC (2007b) - Klein, Schipper and Dessai (2005)	- Swart and Raes (2007) - Vijaya, VenkataRaman, Iniyan and Goic (2012) - Walsh, et al. (2011)
Resilience	Maintain Full Operations of Status Quo	- Internal	- Short-term - Mid-term	- Subjective Reality - Objective Reality	- Adger, et al. (2005) - Carpenter, et al. (2001) - Cumming, et al. (2005) - Folke et al. (2002) - Gunderson (2000) - Holling (1973) - Hamel and Valikangas (2003)	- Holling and Meffe (1996) - Klein, Nicholls and Thomalla (2003) - Laprie (2008) - Lee, Vargo and Seville (2013) - Manyena (2006)
Adaptation	Maintain Flexibility to Accommodate Change through Transformability to Alternate Domains of Operations	- Internal - External	- Mid-term - Long-term	- Subjective Reality - Objective Reality	- Angelucci, Di Sivo and Ladiana (2013) - Folke et al. (2010) - IPCC (2014) - Nelson (2007, 2011) - Pelling (2010) - Pelling, O'Brien and Matyas (2014) - Ribtot (2011)	- Rickards (2013) - Rosenzweig and Solecki (2014) - Vogus and Sutcliffe (2007) - Walker, et al. (2006) - Wiggins (2009) - Woods and Wreathall (2008)

simplified meaning is consistent with popular usage of the word. By contrast, mitigation is consistently conceptualized to speak to the prevention of the occurrence of a stimulus (e.g., risk) or the occurrence or manifestation of a stimulus in some magnitude which results in negative impacts and/or loss (IPPC 2007(a),(b)). Scholarly usage of mitigation either relates to climate mitigation (i.e., prevention of climate change through a reduction in greenhouse gases) or risk mitigation (i.e., prevention of risk). Both of these applications are conceptually consistent; however, risk mitigation is most closely aligned in its simplicity with the normative meaning assigned herein. As a final distinction, risk mitigation herein relates to the prevention of the occurrence of a risk and not to the prevention or mollification of the harm or consequence of a risk as connoted in popular lay usage.

Resilience on the other hand is related to coping in that it speaks to the preservation of the operations of the status quo; but, as opposed to coping which preserves the minimum functions, resilience is a process which preserves the entire functions of the status quo based on the host's internal designs (Swart and Raes 2007; Lee, Vargo and Seville 2013). The concept of the status quo should be conceptualized to speak to a certain relative elasticity of a system (or, host) to revert to a stable environment within the same or similar pre-stimuli boundaries (Ulrich 1987; Caswell and Neubert 2005). In applied terms, this can be conceptualized to speak to a certain relative standard of living or stable mode of consumption and production. One iteration of the popular usage of resilience speaks to resilience resulting in a "stronger" state which has the capacity to "bounce back" (Manyena, O'Brien, O'Keefe and Rose 2011; Freudenberg 2015). This is consistent with the assigned normative meaning herein to that extent that the status quo is a relative concept. This elasticity function to the status quo of resilience is also acknowledged to be an outcome, in part, on the reduction of vulnerability through risk mitigation (Berkes 2007; Adger, Kelly and Ninh 2012; Menoni, et al. 2012). However, this elasticity is not exclusively a function of mitigation (i.e., reducing risk) as reduction of vulnerability (e.g., reducing impacts) may also be accomplished through the promotion of other activities such as the development of social networks and the investment of social and financial capital for emergency response (Cote and Nightingale 2012; Scheffran, Marmer and Sow 2012; Lorenz 2013). Therefore, certain actions may serve both resilient and mitigation ends. This has led to a considerable amount of popular confusion between the concepts, as will be referenced in the next section.

Adaptation can be distinguished in that it does not preserve the relative status quo but represents a state in the future which is progressive to the predicate state by virtue of its flexible ability to transform to alternate domains of operation (Anonymous Year). It is

the language of transformation across domains of operation, consumption, geography, etc…, which is consistent across the cited literature (Angelucci, Di Sivo and Ladiana 2013; Rickards 2013; Pelling, O'Brien and Matyas 2014). Although, it should be noted that consistency as to these meanings is by no means certain as to consensus. For instance, there is still some debate within the adaptation literature as to whether it is a function of transformative or incremental institutional change—although a process of transformation is getting the upper hand in empirical terms, particularly in the NYMR (Rosenzweig and Solecki 2014). The transformation function of adaptation has implications from institutional change to consumer behavior in that there is a certain assumed inevitability of the occurrence of climate change which dictates that consumers of all types will not be able to consume products, services and resources in the same manner as they do today.

Therefore, perpetuating resilience may lead to maladaptation. The classical example of this potential friction is the scenario where resilient flood barriers on properties simply funnel the water inland to previously less vulnerable properties. In the NYMR, one could argue that resource allocation of resilient interventions in certain highly vulnerable geographies may be an unwise capital allocation if sea level rise causes these resilient interventions to fail prior to the end of their useful life. However, this scenario also highlights a potential synergy between resilience and adaptation in that those resilience interventions (e.g., flood barrier) are: (i) part of "Reduced Decision Horizon" adaptation strategy which essentially buys time as a function of parity between cost and the reduction in risk (Hallegatte 2009); and/or, (ii) able to accretively bare additional physical and capital inputs which can accommodate, in this case, sea level rise (Youn, Hu and Wang 2011; Dircke 2015).

In either event, this distinction between resilience and adaptation (i.e., domain of the status quo vs. transformation to alternate domains) has significant ramifications in policy development because resilience intuitively preferences existing actors that bear their own moral and economic biases for self-preservation and the status quo which may or may not be aligned with future populations or other related populations impacted by and responding to the same or similar stimuli. If existing frameworks in America are exclusively driven by resilience then it obviates around the necessity to make difficult decisions about the allocations of resources which run the risk of being mono-functional, limited in their duration and utility, and biased to an existing political constituency. This research evaluates the extent to which these normative heuristical meanings are consistent with existing meanings and applications for responding to and planning for climate change by and between the Respondents. More precisely, this research evaluates the extent to which Respondents really have

preferences for resilience or whether their preferences show an awareness of the long-term implications of the necessity to adapt.

III. RESEARCH DESIGN & METHODOLOGY:

A. HYPOTHESIS DEVELOPMENT

The initial impetus for undertaking this research was based on the observations from the participation of one of the authors in the development of the 4th Regional Plan for the New York metropolitan region by the Climate Change Working Group of the Regional Plan Association (the "RPA") and in the deliberations of the Municipal Art Society's Resilience Roundtable (the "MAS"). Observations over the course of one and two years, respectively, consistently found a widespread inconsistency and misalignment in the concepts and meanings utilized by the RPA and the MAS participants and those Concepts and meanings which are cited in the scholarship. Likewise, when accounting for an inconsistent assignment of concepts and meanings, preferences were observed to be intransitive and unstable (see Regenwetter, Dana and Davis-Stober 2011). Very often what was described as a resilience preference was not an example of resilience. These observed inconsistences served as the empirical basis for the two hypotheses of this article.

Late stage deliberations among the groups at the time of the survey began to draw distinctions between coping—referenced as 'recovery'— and resiliency. In this case, resiliency was referenced to mean additional capital investments in infrastructure and in housing which mitigated known risks from flooding. Some participants were keen to point out that resiliency also included social aspects relating to a community's or a household's ability to cope. Finally, adaptation in these late stage deliberations was referenced almost exclusively to the withdrawal of housing units in highly vulnerable areas through various state-run buyouts—an objectively accurate example of adaptation. However, none of these deliberations resulted in any consensus in conceptual terms other than a highlighted tension between recovery (i.e., coping) and resiliency, with the primary focus of government actors being on matters relating to recovery. A minority set of participants propositioned that adaptation was a long-term strategy which bore little to no relevance in the current state of affairs—particularly in the aftermath of the recovering from Hurricane Sandy. Collectively, the observations from the deliberations of these groups provided the impetus for the undertaking of this research with the underlying ambition that the results might

[1] See, www.arch.columbia.edu/climatesurvey

be able to be utilized to build a consistent foundation for more complex analysis and deliberation.

B. SAMPLING METHOD

Under the leadership of Mayor Michael Bloomberg, NYC developed over the course of the last decade to be a global leader in mitigating and preparing for climate change; and, as such, the associated professional ranks have benefited from an emerging set of practices and applied experiences. This level of comparative professional maturity highlights the value of understanding the perspectives of the Respondents. The survey (see Appendix) was distributed electronically via personal invitations to a population (n=266) of individuals who are taking a professional leadership role in the deliberation and development of private and public sector policies relating to the risks of urban flooding and climate change.[1] The population count was derived from cross-referencing active professional participants of the aforementioned RPA and MAS working groups, together with active invited membership within the Metropolitan Waterfront Alliance, the Rebuild By Design initiative, the NYC Panel on Climate Change ("NPCC"), the NYC Building Resiliency Task Force and other individuals who were personally known by the authors, or the participating partner organizations, to be actively engaged in a senior professional capacity.

The invited sample population is qualitatively estimated to be a fair representation of active professionals undertaking a leadership role in the NYMR. However, it is not estimated to be a representative population of public employees assigned to climate related tasks who otherwise may have discretionary functions or academics who undertake applied research activities in the NYMR. In addition, due to NYC's history of addressing climate change, this sample is most likely not representative of a similarly distributed professional population in other U.S. cities. As will be discussed, a very high response rate (87.5%, n=233) is attributable to actively engaging individuals through emails or personal phone calls to solicit their participation in the survey. Such solicitations were conducted over the course of a month and each communication was tempered in its content so as to not bias respondents as to the nature of the survey. However, such solicitations were deemed to be of limited utility as the completion rate (44.6%, n=104) for completing every question was comparatively modest. This may also be attributable to the overestimation within the survey design as to respondent's time and attention for completing an estimated 15 minute survey.

C. SURVEY DESIGN

The survey consisted of 36 questions and 6 scenarios as it is represented in Table 2. The survey was designed to evaluate: (i) Respondents' ability to match

Table 2: Survey Question & Scenario Matrix					
		Matching Concepts & Meanings	Matching Concepts &	(a) Matching Applications & Preferences (Likert)	(b) Matching Applications & Preferences (Absolute)
Scenarios	**Actor Orientation**	Q. 9	X	X	X
Flooding	Mayor	X	Q. 15	Q. 10, 11,12,13	Q. 14
Heat Wave	Power Company	X	Q.21	Q. 16, 17, 18, 19	Q. 20
Post-Hurricane Sandy	First Person	X	Q.28	X	Q. 27
Sea Level Rise	Public Advisor	X	Q. 34	Q. 29, 30, 31, 32	Q. 33
Subsidence	Homeowner	X	X	X	Q. 35
Drought	Local Farmer	X	X	X	Q. 36

Concepts with normative heuristical meanings ("Concepts & Meanings"); (ii) Respondents' ability to match Concepts with applications or examples (collectively, "Applications") based on the normative heuristical meanings ("Concepts & Applications"); and, (iii) Respondent's preferences for Applications which are categorically assigned to one of the concepts based on the normative heuristical meanings ("Applications & Preferences"). Applications were derived initially by the researchers and then tested and edited following several focus groups made up of university climate change researchers. Finally, the edited list of Applications was subject to external review by peers operating as researchers within the previously cited partner organizations. It should be noted that not all Applications fit clearly within each categorical Concept. For instance, several Applications could be viewed as either mitigation or resilience, which is consistent with the larger debate within the scholarship that suggests that the division in terms of the implicit reduction of vulnerability is not always so discernable (Manyena 2006; Béné, et al. 2012). Ultimately, each Application was assigned to just one Concept following internal deliberation and consensus of the researchers.

This tension in linking Applications and Concepts highlights a limiting qualification to the survey design in that these Concepts can represent both static and transient states and/or actions. This survey is fundamentally looking at the application of Concepts under a set of scenarios that are limited in their time duration and horizon. The continuous state of action or being by and between these Concepts is not being evaluated as the ordinal data is not longitudinal or hypothetically positioned as being within a time frame other than a present action or inaction. However, this is an avenue ripe for future research in understanding how people frame what is theoretically regarded as moving to variable states of stability along a continuum from coping to resilience, and across the resilience threshold to adaptation, with the risk of moving across the adaptation frontier into a state of failure or loss (Wiggins 2009; Preston, Dow and Berkhout 2013; Anonymous Year).

Every scenario within the survey is followed by Applications which could be classified as a means (i.e., process) or an ends (i.e., outcome) that could objectively be categorized as being one of the Concepts. In some scenarios, Respondents were asked to evaluate each Application on a five point Likert scale. The resulting data was classified as ordinal data coded as binary, in that 'Strongly Agree' or 'Agree' were given a score of one (1) and all other selections were give a score of zero (0) (Gadermann, Guhn and Zumbo 2012). In some scenarios, Respondents were then asked to select their absolute or preferred option among a list of Applications. In at least one question per survey, a randomized 'other' category was incorporated into these otherwise closed-ended questions to allow some insight into either the Respondents' preferences not listed or to highlight potential overlooked problems in the construction of the Applications themselves. Likewise, scenarios, Applications, Concepts and all options were randomized in terms of order and on the vertical and/or horizontal axis where applicable.

Finally, the substantive elements of the survey were prefaced by questions regarding the Respondents' professional background, professional membership and experiences attributable to climate change. It was initially anticipated that controlling for experience might be a useful undertaking for evaluating potential status quo or selection bias. Finally, inquiries were made as to the nature of the Respondents' belief in climate change and the underlying relevancy and urgency of those beliefs. These questions are asked in order to establish the extent to which the sample pool was representative of the beliefs and perceptions of climate change among the general U.S. population (Leiserwotz 2005; Leiserwotz, et al. 2010).

IV. SURVEY RESULTS:

A. SAMPLE CHARACTERISTICS

The survey sample consists of 233 Respondents of which 104 (44%) completed all 36 questions. Table 3 represents the professional distribution of the sample, which is weighted heavily in favor of architects, designers and urban planners (n=94, 40%), as well as real estate professionals (n=32, 19%). The sample was also weighted towards the private sector (n=154, 66%), with the public sector (n=52) and civic sectors (n=27) accounting for 22% and 11% of the sample, respectively. Only 35% (n=83) of the Respondents cited being a member of a designated climate change related organization or initiative of a professional organization.

Respondents overwhelmingly believe climate change is currently happening (n=223, 96%), while only

Table 3: Professional Distribution of Sample					
	Response Percent	Response Count		Response Percent	Response Count
Scientist	5.2%	12	Real Estate	18.5%	43
Social Scientist	4.7%	11	Architect / Planner	40.3%	94
Engineer	4.3%	10	Policy Maker	3.4%	8
Community Organizer	4.3%	10	Public Health	0.4%	1
Banker/Financier	2.1%	5	Lawyer	3.0%	7
Insurer/Underwriter/Re-Insurer	0.4%	1	Other	13.3%	31
				Total Respondents	**233**

2.5% (n=6) do not believe climate change is happening and 1.7% (n=4) are unsure.[2] This is compared with 63% of the general American population who believe in climate change, 20% who do not and 17% who are unsure (Leiserowitz, et al. 2014, pp. 13). Of those who believe in climate change, 68% (n=154) are extremely sure, 23% (n=52) are very sure, 6.7% are somewhat sure, and .90% (n=2) are not sure at all whether climate change is happening. This is compared with only 20% of the general American population who believe in climate change and are extremely sure in their beliefs (Id.).

Respondents cited a number of personal experiences or impacts which they attributed to climate change, including 70 Respondents (30%) who resided or worked in properties which were flooded. Of those who were flooded 43 where flooded during Hurricane Sandy, which is 18.4% of the total sample. However, only 1 Respondent cited a total loss of real estate. A number of Respondents experienced a loss of power (n=109, 46%), as well as interruption of business or work (n=135, 58%). In addition, Respondents independently cited transportation disruption, community stress and instability and meteorological observations. Only 18% (n=42) of Respondents cited no observations attributable to climate change.

B. CONCEPTS & MEANINGS

The results of the survey indicate that a majority of Respondents were correctly able to match the concept and meaning of coping (62%, n=79)(See Appendix Table 1). Pursuant to Table 4, Respondents can distinguish between: (i) coping and mitigation 96% of the time; (ii) coping and resilience 79% of the time; (iii) and, coping and adaptation 96% of the time. Mitigation is slightly less discernable among Respondents with 53% (n=72) correctly matching the meaning and

[2] Given the limited definition of Respondent, it cannot be fully explained whether the 6 who do not believe in climate change qualify to be Respondents by virtue of their professional capacities or whether their answer is more nuanced in terms of their personal perceptions and/or observations.

the concept. However, 89% of the time Respondents could correctly discern between mitigation and adaptation and only 63% of the time could Respondents discern between mitigation and resilience.

Adaptation demonstrated a similar range of results to mitigation in that 53% (n=73) of Respondents correctly matched the concept with the meaning. Likewise, as previously cited, Respondents' were consistently able to draw distinctions between adaptation and coping and mitigation. However, resilience demonstrated a much less clear conceptual perspective of the Respondents. Only 25% (n=31) of Respondents could correctly match the Concept and Meaning of Resilience. While Respondents were generally able to discern by and between resilience and coping, and to a lesser extent mitigation, there was a near statistically random outcome (51%, p-value .5) by and between resilience and adaptation. Likewise, Respondents were more likely to incorrectly match the concept of resilience with the adaptation meaning (38%) that they were with the correct resilience meaning (25%). As will be discussed, this is partially consistent with an affirmation of the first hypothesis.

C. CONCEPTS & APPLICATIONS

On average across all scenarios, 64% (n=291) of Respondents correctly matched Coping with the various Applications. As represented in Tables 5 and 6, Respondents were able to

Table 4: Matching Concepts (x-Axis) & Meanings (y-Axis)

Ability of Respondents to Distinquish Between Two Concepts

Percentage (%)

	Coping	Mitigation	Resilience	Adaptation
Coping		0.9615385	0.7941176	0.9615385
Mitigation	0.9615385		0.627907	0.8928571
Resilience	0.7941176	0.627907		0.5102041
Adaptation	0.9615385	0.8928571	0.5102041	

p-value

	Coping	Mitigation	Resilience	Adaptation
Coping		0.000003231	0.0005601	0.000003231
Mitigation	0.000003231		0.06363	0.00003614
Resilience	0.0005601	0.06363		0.5
Adaptation	0.000003231	0.00003614	0.5	

Null Hypothesis, if p-value <0.05
Chi-test_p-value correction rate=0.5. a=0.05
Margin of Error Based on 95% Confidence, 2.81%

consistently discern between coping and all other Concepts. The one exception was by and between coping and resilience in the flooding scenario (59%, p-value .2207).

On average, only 32% (n=156) of Respondents correctly matched mitigation with the various Applications compared with 53% (n=72) who correctly matched mitigation with its normative heuristical meaning. Across all scenarios, mitigation was somewhat discernable with coping (75%, p-value .1055), marginally discernable with adaptation (59%, p-value .07428) and not statistically discernable with resilience (45%, p-value .8693). The greatest deal of confusion between mitigation and resilience occurred in the sea level rise scenario (37%, p-value .892). This collective confusion between resilience and mitigation is consistent with the aforementioned confusion in the literature and in practice.

Likewise, resilience was only marginally discernable with coping among all scenarios (71%, p-value .2207) and was not statistically discernable with any other Concept. Across all scenarios, only 22% (n=106) of Respondents could correctly match resilience with its Applications. Respondents were more than twice as likely to correctly match the concept of adaptation across all scenarios (46%, n=228) than resilience. Finally, adaptation was consistently discernable with coping in both the flooding (86%, p-value .004912) and sea level rise (80%, p-value .01943) scenarios. However, in both of these scenarios and across all scenarios (45%, p-value .7219), adaptation and resilience were consistently undiscernible. At the same time, Respondents were more likely to match the resilience Applications with the adaptation concept (30%, n=140) than they were to correctly match resilience across all scenarios (22%, n=106).

A chi-square test was used to assess whether the results shown in Table 6 were statistically consistent with those in Table 4. The results suggested that there is a consistent observational distribution in the Respondents' ability to match Concepts and Meanings (Table 4) and Concepts and Applications (Table 6). It was also considered whether Respondents who suffered flood damage (70) may be more likely to match Concepts and Applications, as personal experience is a strong determinant of interest and knowledge in these matters. It was determined that there was no statistically significant difference between responses of those who were affected and those who weren't. Flood victims were no better or worse in matching Concepts and Meanings or Applications. The absence of an effect from personal experience may be explained by the population from which the sample was drawn, in that all Respondents are engaged with climate change leadership activities. It may be that in the general population those who are directly affected do have more knowledge of the Concepts and Applications than those who do not. To this end, this is a potentially valuable avenue of future

research to the extent that those who are affected by extreme weather events often play a disproportionate role relative to the general population in guiding future planning efforts.

D. APPLICATIONS & PREFERENCES

Applications categorically assigned to a specific Concept for each scenario and were evaluated on a 5-point Likert scale and by an absolute ranking of a Respondent's preferred choice. As represented in Table 7 with regard to the Likert rankings, Respondents consistently preferred adaptation and mitigation Applications in roughly equal measure in each of the scenarios and in the aggregate. Only in the flooding scenario was resilience (n=111, 35%) preferred among the other Concepts and only by a slim margin. In both the heat wave (n=49, 16%) and the sea level rise (n=18, 9%) scenarios, the resilience Application was the least preferred Application.

Table 8 highlights the results from the absolute preference scenarios, which included additional scenarios regarding a subsidence of a residential structure, a post-Hurricane Sandy reconstruction policy agenda and a drought impacting farmers. For the flooding, heat wave and sea level rise scenarios, adaptation (n=240, 62%) was the overwhelming preferred Application.

Adaptation was also the preferred Application (n=322, 45%) for all scenarios followed by mitigation (n=243, 33%). Resilience ranked 3rd place (n=119, 16%) among the Applications and was the only absolute preferred Application in the drought scenario (n=44, 50%). Although, consistent with the Likert ranking for the flooding scenario, resilience (n=35, 26%) was within the margin of error to be a second preference behind adaptation (n=54, 40%). Overall, adaptation was a double digit preferred Application ahead of all other Concepts in the absolute selection of preferences.

V. DISCUSSION:

Respondents were more than twice as likely to correctly match the Concept and Meaning of adaptation as they were for resilience. To that end, ranking last among all correct matches, it can be inferred that resilience is the least understood Concept. Only in the immediate context of a post-Hurricane Sandy damage and the sea level scenarios could Respondents clearly distinguish between resilience and coping (79%, p-value .01089)—or, by and between resilience and any other concept for that matter. With coping being synonymous with reconstruction, this result is partially explained by the current popular framing between resilience and coping in the NYMR following Hurricane Sandy. The political pressure to rebuild to the same general qualities in the same location (i.e., minimal functions of the status quo) is running up against the larger planning efforts to utilizing internal designs of replacement structures and

Table 5a: Matching Concepts (x-Axis) & Applications (y-Axis)				
Flooding Scenario: Ability of Respondents to Distinguish Between Two Concepts				
Percentage (%)				
	Coping	**Mitigation**	**Resilience**	**Adaptation**
Coping		0.6521739	0.5925926	0.8666667
Mitigation	0.6521739		0.4102564	0.5238095
Resilience	0.5925926	0.4102564		0.4230769
Adaptation	0.8666667	0.5238095	0.4230769	
p-value				
	Coping	**Mitigation**	**Resilience**	**Adaptation**
Coping		0.1055	0.2207	0.004912
Mitigation	0.1055		0.8317	0.5
Resilience	0.2207	0.8317		0.7219
Adaptation	0.004912	0.5	0.7219	
Null Hypothesis, if p-value <0.05 Chi-test_p-value correction rate=0.5. a=0.05 Margin of Error Based on 95% Confidence, 2.52%				

Table 5b: Matching Concepts (x-Axis) & Applications (y-Axis)				
Heat Wave Scenario: Ability of Respondents to Distinquish Between Two Concepts				
Percentage (%)				
	Coping	**Mitigation**	**Resilience**	**Adaptation**
Coping		0.8571429	0.68	0.8571429
Mitigation	0.8571429		0.6071429	0.7777778
Resilience	0.68	0.6071429		0.25
Adaptation	0.8571429	0.7777778	0.25	
p-value				
	Coping	**Mitigation**	**Resilience**	**Adaptation**
Coping		0.06529	0.0548	0.06529
Mitigation	0.06529		0.1724	0.09121
Resilience	0.0548	0.1724		0.993
Adaptation	0.06529	0.09121	0.993	
Null Hypothesis, if p-value <0.05 Chi-test_p-value correction rate=0.5. a=0.05 Margin of Error Based on 95% Confidence, 3.05%				

Table 5c: Matching Concepts (x-Axis) & Applications (y-Axis)				
Post-Sandy Damage Scenario: Ability of Respondents to Distinguish Between Two Concepts				
Percentage (%)				
	Coping	**Mitigation**	**Resilience**	**Adaptation**
Coping		0.8095238	0.7894737	0.8
Mitigation	0.8095238		0.4285714	0.5833333
Resilience	0.7894737	0.4285714		0.5
Adaptation	0.8	0.5833333	0.5	
p-value				
	Coping	**Mitigation**	**Resilience**	**Adaptation**
Coping		0.004414	0.01089	0.01943
Mitigation	0.004414		0.7505	0.2701
Resilience	0.01089	0.7505		0.5
Adaptation	0.01943	0.2701	0.5	
Null Hypothesis, if p-value <0.05 Chi-test_p-value correction rate=0.5. a=0.05 Margin of Error Based on 95% Confidence, 3.44%				

Table 5d: Matching Concepts (x-Axis) & Applications (y-Axis)				
Sea Level Rise Scenario: Ability of Respondents to Distinquish Between Two Concepts				
Percentage (%)				
	Coping	**Mitigation**	**Resilience**	**Adaptation**
Coping		0.7857143	0.8571429	0.6923077
Mitigation	0.7857143		0.375	0.6
Resilience	0.8571429	0.375		0.4736842
Adaptation	0.6923077	0.6	0.4736842	
p-value				
	Coping	**Mitigation**	**Resilience**	**Adaptation**
Coping		0.03068	0.008078	0.1336
Mitigation	0.03068		0.892	0.3028
Resilience	0.008078	0.892		0.5
Adaptation	0.1336	0.3028	0.5	
Null Hypothesis, if p-value <0.05 Chi-test_p-value correction rate=0.5. a=0.05 Margin of Error Based on 95% Confidence, 3.57%				

Table 6: Matching Concepts (x-Axis) & Applications (y-Axis)				
All Scenarios / Aggregate: Ability of Respondents to Distinquish Between Two Concepts				
Percentage (%)				
	Coping	**Mitigation**	**Resilience**	**Adaptation**
Coping		0.753846154	0.705882366	0.800000018
Mitigation	0.753846154		0.447761193	0.594202883
Resilience	0.705882366	0.447761193		0.405940586
Adaptation	0.800000018	0.594202883	0.405940586	
p-value				
	Coping	**Mitigation**	**Resilience**	**Adaptation**
Coping		0.0000361	0.0001131	0.00002055
Mitigation	0.00003607		0.8693	0.07428
Resilience	0.0001131	0.8693		0.9634
Adaptation	0.00002055	0.07428	0.9634	
Null Hypothesis, if p-value <0.05 Chi-test_p-value correction rate=0.5. a=0.05 Margin of Error Based on 95% Confidence, 1.40%				

Table 7: Matching Applications & Preferences (Likert)							
Flooding Scenario				***Heat Wave Scenario***			
	N	**Score**	**%**		**N**	**Score**	**%**
Coping	25	0.1572	7.84%	**Coping**	49	0.3657	15.96%
Mitigation	95	0.5975	29.78%	**Mitigation**	108	0.8060	35.18%
Resilience	111	0.6981	34.80%	**Resilience**	30	0.2239	9.77%
Adaptation	88	0.5535	27.59%	**Adaptation**	120	0.8955	39.09%
Margin of Error: 2.52%		95% Confidence		Margin of Error: 3.05%		95% Confidence	
Sea Level Rise Scenario				***Total (3 Scenarios)***			
	N	**Score**	**%**		**N**	**Score**	**%**
Coping	26	0.2203	12.94%	**Coping**	100	0.2433	12.09%
Mitigation	78	0.6610	38.81%	**Mitigation**	281	0.6837	33.98%
Resilience	18	0.1525	8.96%	**Resilience**	159	0.3869	19.23%
Adaptation	79	0.6695	39.30%	**Adaptation**	287	0.6983	34.70%
Margin of Error: 3.44%		95% Confidence		Margin of Error: 1.72%		95% Confidence	

Table 8: Matching Applications & Preferences (Absolute)							
Flooding Scenario				***Post Sandy Damage Scenario***			
	N	**Score**	**%**		**N**	**Score**	**%**
Coping	8	0.0503	5.97%	**Coping**	5	0.0442	4.42%
Mitigation	37	0.2327	27.61%	**Mitigation**	46	0.4071	40.71%
Resilience	35	0.2201	26.12%	**Resilience**	6	0.0531	5.31%
Adaptation	54	0.3396	40.30%	**Adaptation**	56	0.4956	49.56%
Margin of Error: 2.52%		95% Confidence		Margin of Error: 3.57%		95% Confidence	
Heat Wave Scenario				***Subsidence Scenario***			
	N	**Score**	**%**		**N**	**Score**	**%**
Coping	1	0.0075	0.75%	**Coping**	12	0.1062	10.62%
Mitigation	32	0.2388	23.88%	**Mitigation**	74	0.6549	65.49%
Resilience	4	0.0299	2.99%	**Resilience**	8	0.0708	7.08%
Adaptation	97	0.7239	72.39%	**Adaptation**	19	0.1681	16.81%
Margin of Error: 3.05%		95% Confidence		Margin of Error: 3.57%		95% Confidence	
Sea Level Rise Scenario				***Drought Scenario***			
	N	**Score**	**%**		**N**	**Score**	**%**
Coping	6	0.0508	5.08%	**Coping**	6	0.0545	5.45%
Mitigation	12	0.1017	10.17%	**Mitigation**	42	0.3818	38.18%
Resilience	11	0.0932	9.32%	**Resilience**	55	0.5	50.00%
Adaptation	89	0.7542	75.42%	**Adaptation**	7	0.0636	6.36%
Margin of Error: 3.44%		95% Confidence		Margin of Error: 3.66%		95% Confidence	
Total (Flooding, Heat Wave, Sea Level Rise)				***Total (All Scenarios)***			
	N	**Score**	**%**		**N**	**Score**	**%**
Coping	15	0.0365	3.89%	**Coping**	38	0.0503	5.26%
Mitigation	81	0.1971	20.98%	**Mitigation**	243	0.3219	33.66%
Resilience	50	0.1217	12.95%	**Resilience**	119	0.1576	16.48%
Adaptation	240	0.5839	62.18%	**Adaptation**	322	0.4265	44.60%
Margin of Error: 1.72%		95% Confidence		Margin of Error: 2.59%		95% Confidence	

infrastructure to be able to maintain its operations in the face of the next known risk (i.e., resilience).

An evaluation of the assignment between meanings and Concepts is arguably only of limited value in that it is only testing to see if Concepts and normative meanings and/or Applications are consistent with present usage and conceptualization. As was observed in the hypothesis development stage of this research, any inconsistency in the results for Concepts and Meanings and Concepts and Applications were to be expected. Although more than half of Respondents correctly matched Concepts and Meanings for all Concepts, except for resilience which was matched by 25% (n=31) of Respondents. When viewed across scenarios and inquires, the results support an affirmation of the first hypothesis in that the Concept of resilience defied consistent discernment by Respondents both as an independent Concept and as discerned relative to other Concepts. However, these results do not speak to the capacity of individuals to correctly match Concepts with Meanings and Applications in the future. It can be argued that future consistency in usage may be a function of assigning Concepts to preferences and then demonstrating what individual and collective preferences are so that policy makers and/or Respondents have a benchmark for developing future applications which may be consistently applied to Concepts.

To this end, the results support a confirmation of the second hypothesis in that resilience preferences are scored and ranked low relative to the other Concepts. Adaptation Applications were shown to have a clear preference across almost all of the scenarios, with the exception of the subsidence and drought scenarios. However, these scenarios may demonstrate the existence of a status quo bias in that these are the only questions which put the Respondents in a second person orientation as a household or worker (i.e., farmer) to take action (Samuelson and Zeckhauser 1988; Bazerman 2006). In both of these scenarios, Respondents showed a preference for mitigation, and to a lesser extent resilience, which speaks to an outcome oriented in favor of the status quo.

Mitigation demonstrated a strong preference second only to adaptation. This can be explained in part by the professional orientation to construct material interventions which serve mitigation functions. Given the weighting in the sample for architects, planners, designs and real estate professionals, this argument is reasonable. This raises the question as to whether the long-term interests of the NYMR are well served by leadership composed of professionals who are potentially biased by the material solutions and responses to climate change. In either event, the parallels of the preferences for mitigation and adaptation are consistent with the focus recommended by the

NPCC who suggests further research into "transformative" adaptation and the extent to which mitigation and adaptation have co-benefits (NPCC 2015a). It can be argued that even the NPCC recognizes that governments are biased toward material and/or technological solutions which are almost by definition serving mitigation functions. By framing mitigation and adaptation together, there is a practical acknowledgement that the present (i.e., mitigation) should be tempered with the future (i.e., adaptation). Therefore, there is evidence in this research to suggest that the Respondents are also struggling to balance mitigation and adaptation as reflected in their preferences.

However, when one acknowledges that the top three scenarios most imminently relevant to the NYMR are flooding, sea level rise and heat waves, the overwhelming absolute preference is for adaptation (62%, n=240). When viewed together with the confirmation of the two hypotheses, it can be argued that an exclusive focus on resilience by and between public, private and civic leadership is potentially problematic. At the very least, the current focus is certainly ineffective to the extent that there rests very little clarity in the communication of the concept as reflected herein. Even the NPCC has arguably been subject to what has been observed to be a political steering in favor of the resilience nomenclature as demonstrated in the shifting of the naming conventions from adaptation to resilience in the titles of their 2010 to 2015 reports, respectively (NPCC 2010, 2015b, de Blasio 2015). However, the NPCC has been substantively consistent in that the Concepts of mitigation, resilience and adaptation are carefully and precisely discerned in their usage and application. Perhaps instead of highlighting the use of one Concept over the other in the naming conventions of policy and planning materials, the catch all phrasing of "responses and preparations to and for climate change" is more appropriate. At present, this research provides evidence that resilience in its current construction as interpreted by the Respondents is simply insufficient by itself as a meta-framing concept for guiding and steering policies and plans.

VI. CONCLUSION:

The results of this Survey support a confirmation of the hypotheses in that Respondents are not quite sure how to define or apply the concept of resilience and that resilience is not their dominant preference. Equally as important, adaptation is demonstrated to be a clear and stable preference. This evidence suggests that it is incumbent upon policy and decisions makers to think beyond resilience as an exclusive meta-concept for framing policies and plans. This major shift could transition the domestic planning discourse from inconsistent rhetoric to consistent heuristics which are in line with an international urban policy discourse increasingly framed by adaptation as the ultimate goal over the

long-term given the acknowledgement that climate change is happening and is going to increase in its extreme impacts (Crawford and Davoudi 2009; Keskitalo 2010; Corfee-Morlot 2011; Carmin, Anguelovski and Roberts 2012; Reckien, et al. 2014; Albers, et al. 2015; Carter, et al. 2015).

This is not to say that adaptation is in absolute terms superior to resilience (Davoudi, et al. 2012). Resilience—particularly social and physical resilience—has an important function in perpetuating the interests of residents and the operations of urban services and commerce. However, the potentially rapid and historically unprecedented change associated with climate change will most likely necessitate a transformation to alternative domains of operation beyond the threshold of resilience. This means that individuals, organizations and institutions will need to rethink existing modes of production and consumption which are grounded in the logics of the status quo. Climate change will dictate not whether exiting modes of production and consumption are sustainable but whether they will exist at all. Likewise, we cannot be resilient to all risks. As such, the systematic impacts of climate change will likely be widespread and largely unanticipated, leaving adaptation and robust adaptive capacities as a crucial backstop for when the resiliency threshold is crossed (see Groffman, et al. 2006).

In the interim, the results of this survey provide a clear insight into the limitations of the current discourse driven exclusively by resilience and very often in rhetorical terms. However, on a positive note, this survey demonstrates that Respondents are able within varying degrees of consistency to discern and apply the distinctions by and between the normative heuristics of adaptation, mitigation and coping which suggests a potentially high degree of contextual intelligence. This is also a partial validation as to the normative meanings assigned to the Concepts. In addition, Respondents' preference for adaptation, together with mitigation, suggest a perspective which acknowledges that perpetuating the status quo is of a limited duration and utility in climate change planning and must be weighted between short-term interventions and long-term planning.

As represented in Appendix Table 2, this research has already led to the early stage development of planning values and communication strategies for the development of a consistent framework for future planning efforts in the advancement of the 4th Regional Plan for the NYMR under the auspices of the RPA. By acknowledging a framework which provides an un-weighted assignment by and between specific Concepts and Applications, together with the associated risk-adjusted costs and benefits of each strategy, there rests an opportunity to develop evidence based decision making processes which can provide clarity and transparency for the regional planning efforts. This measure of objectivity allows for a translation of strategies

across scales and across the diversity of interests which define the NYMR.

With future research into the interrelationships of the Concepts on a continuum of stable and unstable states, policy makers will be able to extend frameworks which accommodate a variety of risks both known and unknown, isolated and systematic. Likewise, future research into the supplemental heuristical meanings for each of the Concepts may benefit from the utilization of Q methodology (Niemeyer, Petts and Hobson 2005; Albizua and Zografos 2014) and consensus-based assessment techniques to build consensus and give order in decision making contextualized by increasing systematic urban complexity. To this end, similar inquires and techniques may also be extended to advance private sector decisions and strategies which must underwrite new asset classes and find value in the prospects of the unknown (O'Brien and Wolf 2010). However, whether it is the public or the private sector, the first step in advancing these capacities for accommodating change is to build consensus and consistency behind a foundation for describing social-ecological responses to and preparations for change. A failure to develop a consistent foundation is likely to result in an inefficient distribution of critical resources which may be the difference between stability and failure for an entire region in the face of changing climates, economies and societies.

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VII. APPENDIX:

Appendix Table 1: Descriptive Statistics of Matching Concepts & Meanings/Applications

		Concept (x-Axis) & Meanings (y-Axis)									
		Coping		**Mitigation**		**Resilience**		**Adaptation**		**Total**	
Question #	**Correct Answer**	*(%)*	*(n)*	*(%)*	*(n)*	*(%)*	*(n)*	*(%)*	*(n)*	*(n)*	
9	*Coping*	62%	79	19%	24	7%	9	12%	15	127	4.65%
	Mitigation	4%	5	53%	72	27%	36	16%	22	135	4.51%
	Resilience	36%	45	19%	24	25%	31	21%	26	126	4.67%
	Adaptation	4%	5	5%	7	38%	52	53%	73	137	4.48%
		Concept (x-Axis) & Applications(y-Axis)									
15* (Flooding)	*Coping*	50%	78	10%	15	17%	27	6%	9	129	4.62%
	Mitigation	15%	23	31%	48	26%	40	23%	36	147	4.30%
	Resilience	18%	28	25%	39	23%	35	31%	47	149	4.27%
	Adaptation	16%	25	20%	31	12%	18	47%	73	147	4.30%
21* (Heat Wave)	*Coping*	58%	77	12%	16	10%	13	12%	16	122	4.73%
	Mitigation	14%	18	35%	45	17%	22	29%	38	123	4.72%
	Resilience	39%	50	17%	22	11%	14	24%	31	117	4.81%
	Adaptation	6%	8	14%	19	38%	51	38%	51	129	4.62%
28* (Post-Hurricane Sandy)	*Coping*	65%	74	8%	9	8%	9	9%	10	102	5.05%
	Mitigation	11%	13	32%	37	26%	30	23%	26	106	4.99%
	Resilience	11%	13	22%	25	26%	30	37%	42	110	4.93%
	Adaptation	9%	10	9%	11	32%	38	45%	53	112	4.89%
34* (Sea Level Rise)	*Coping*	56%	62	12%	13	10%	11	15%	16	102	5.05%
	Mitigation	6%	6	24%	26	37%	40	31%	33	105	5.00%
	Resilience	36%	39	11%	12	25%	27	18%	20	98	5.11%
	Adaptation	6%	7	16%	18	27%	30	46%	51	106	4.99%
Average (%) All Scenarios)	*Coping*	64%	291	12%	53	13%	60	11%	51	455	4.86%
	Mitigation	12%	60	32%	156	27%	132	28%	133	481	4.75%
	Resilience	27%	130	21%	98	22%	106	30%	140	474	4.78%
	Adaptation	10%	50	16%	79	28%	137	46%	228	494	4.70%

*Percentages do not add up to 100% because Respondents were randomly allowed to manually select an "other" category and input their own concept based on their own Application.
** Based on a 95% confidence.

Appendix Table 2: Early Stage Regional Planning Concept Framework			
	Core Meaning	***Practical Meaning***	
Mitigation	Prevent Risk from Occurring in the Future	**Maintain:**	the desire to maintain stability through preventing risks from occuring
		Manage:	the need to manage immediate known risks
		Marginal:	acknowledging that marginal risk is amplified across urban scales
		Media:	the necessity to communicate risk across a variety of media to communities
		Modified:	acknowledging that preventing one risk may come at the cost of overlooking another risk
Resilience	Maintain Operations of Status Quo	**Recover:**	the ability of buildings, infrastructure and communities to recover from extreme events
		Reduce:	the necessity to reduce vulnerabilties of people and places
		Retain:	retaining water to live with the water
		Resist:	building a material and social capacity to resist the negative impacts of change
		Restore:	the desire to restore and preserve neighborhoods, communities and buildings
Adaptation	Maintain Flexibility to Accommodate Change through Transformability to Alternate Domains of Operations	**Accommodate:**	the capacity to accommoate risks you aren't or can't be resilient to
		Alternative:	changing how, where and what we consume from everything from energy to water
		Analytical:	building intelligence to identify impacts from incremental changes in climate
		Anticipate:	anticipate the need to be flexible as circumstances change
		Ability:	the ability or capacity of everything from buildings to people to adapt

Appendix Table 3: Answer Key for Concept Applications			
Question	**Concept**	**Question**	**Concept (top down)**
10	Mitigation	27	Coping
11	Resilience		Resilience
12	Adaptation		Mitigation
13	Coping		Adaptation
16	Mitigation	35	Coping
17	Coping		Resilience
18	Adaptation		Adaptation
19	Resilience		Resiliency/Mitigation
29	Adaptation	36	Adaptation
30	Resilience		Resilience
31	Mitigation		Mitigation
32	Coping		Coping

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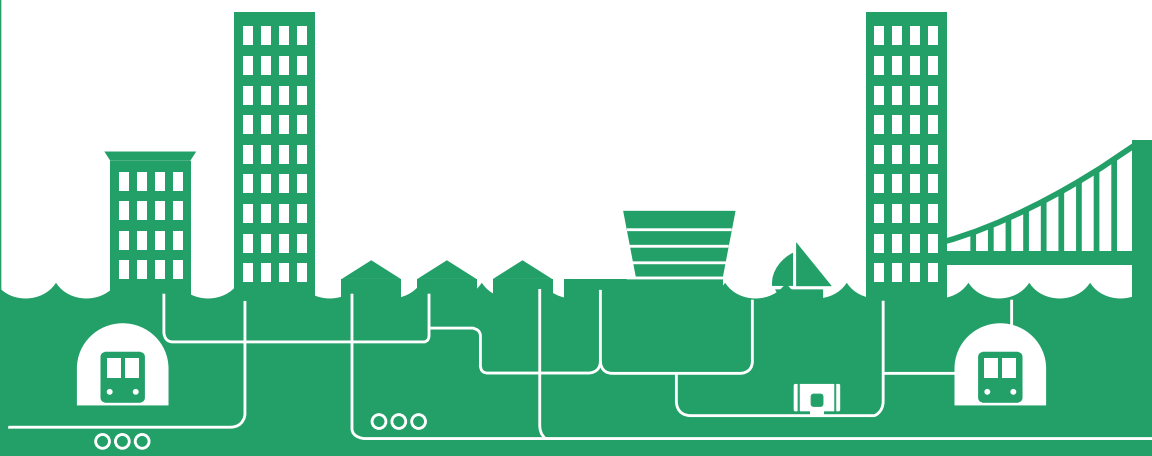

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