

**Institutionalizing Urban Resilience:  
Coordination Strategies within 19 North American City Governments**

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**Abstract:**

City governments are increasingly interested in the concept of urban resilience. While theoretical debates continue to develop and critique the value of ‘urban resilience,’ a growing number of cities are organizing policies and projects around the concept. Building urban resilience is viewed as a key concern for cities facing, in particular, climatic threats –although other urban challenges and equity concerns are increasingly prioritized. Support from city leadership and large funding opportunities, such as the Rockefeller Foundation’s 100 Resilient Cities program, have encouraged some leading cities to create and manage city-wide resilience strategies. Yet pioneering cities have few guideposts to institutionalize resilience. This research evolved out of conversations with city officials in Portland, OR who were interested to learn how other cities were organizing resilience work. We explore how urban resilience is being structured and coordinated in 19 North American cities, focusing on emerging definitions, organizational structures, internal and external coordination efforts, and practitioners’ insights. We situate our findings on emerging governance approaches and lessons learned within the current urban resilience literature on governance by reviewing 40 academic papers and identifying 6 recurrent factors for effective governance. Additionally, we conducted 19 semi-structured interviews with North American resilience practitioners to describe emerging organization trends and share lessons from practice. Based off our interviews, we propose 5 key findings for structuring resilience work in cities effectively. These include: establishing a clear, contextual definition and scope, bringing communities into the process, championing the agreed-upon vision, balancing a centralized and dispersed approach, and recognizing tradeoffs in organizational placement. This research provides practitioners with insights to help facilitate resilience work within their cities and contributes to the scholarly debate on moving resilience theory toward implementation.

**Keywords:** urban resilience, governance, institutions, urban planning, institutions

**Introduction:**

Cities in the 21<sup>st</sup> century are confronted with current and future urban challenges that require an unprecedented level of foresight, coordination and urgency. While theoretical debates continue to develop and critique the value of ‘urban resilience,’ a growing number of cities are organizing policies and projects around this trending concept. Building urban resilience is seen by cities as a positive, flexible approach to manage complex, uncertain and unpredictable risks such as: extreme weather, shifting climate norms, aging infrastructure, volatile social and health threats, economic instability, and equity concerns. Support from city leadership and large funding opportunities have grown over the past decade, encouraging leading cities to engage in resilience work. A search for “urban resilience” in the Devex funding opportunities database brought up 153 opportunities, many of these financial support services from major international institutions such as the World Bank, Asian Development Bank, UK Department for International Development, Rockefeller Foundation’s 100 Resilience Cities, Ford Foundation, and USAID, among others. Government and philanthropic funding agencies are seeking to institutionalize urban resilience thinking within cities in both the developed and developing world. For this study we focus on 19 North American cities, 11 of whom have received funding from the Rockefeller Foundation’s 100 Resilience Cities program, which provided 2 years of support to member cities to create a Chief Resilience Officer position, develop a resilience strategy, work with consultants, and learn from their cohorts. Additionally, 3 of the cities we interviewed were selected for \$10,000 grants through the National League of Cities’ Leadership in Community Resilience program and 5 were identified by our team for known resilience leadership.

While in theory, urban resilience is often linked to innovative approaches in governance, applying the concept is political, context-specific and time-intensive. How resilience is defined influences the goals, metrics, and outcomes of resilience planning (Meerow & Stults, 2016). Additionally, who sets the resilience agenda and who receives the benefits or bears the costs have become central questions in resilience scholarship (Vale 2014). Yet, pioneering cities have few guideposts to institutionalize resilience (Boyd & Juhola, 2015). Across a growing list of North American cities engaged in resilience thinking, there is no uniformity or consensus on how resilience positions should be incorporated into departments or how resilience efforts should be coordinated between ‘siloes’ departments, within communities, or across scales. While there may not be a “one size fits all” solution to arrange resilience efforts (Beilin & Wilkinson, 2015),

understanding how cities are coordinating resilience offers important insights into priorities, levels of integration, and support. These strategies are important because coordination may have specific trade-offs, priorities, and outcomes within city governments (Wilkinson, 2012).

Cities have become test-beds for novel institutional arrangements, strategies and planning for urban resilience (Boyd & Juhola, 2014). As urbanization trends predict massive population shifts to cities around the world, local governments are pressured to address climate change, disasters, infrastructure maintenance, social cohesion and chronic urban stresses with limited resources. Large philanthropic and government funders like the Rockefeller Foundation backed 100 Resilient Cities, invested in resilience building efforts, incentivizing action and preparedness efforts. Smaller funding opportunities like the National League of Cities' \$10,000 Leadership in Community Resilience grant are also helping small to mid-sized cities workshop and strategize resilience building plans. In reaction to urban challenges and the popularity of urban resilience, demand for city guidance for structuring and applying resilience concepts is growing.

Several research papers have looked across cities' resilience plans and strategies, (Keenan, 2018; Woodruff, Meerow, Stults, & Wilkins, 2018). However, we could identify few studies focused on the process of institutionalizing resilience across a range of cities (Sellberg, et al., 2018), especially in the context of how cities are structuring and coordinating resilience work internally. In 2015, an *Urban Studies*' special issue on Governing for Urban Resilience examined issues of scale, adaptive capacity, modes of governance, transformability, and location of action (Beilin & Wilkinson, 2015). Between now and then, many more resilience plans and projects have been initiated at the city level, making it valuable to add to these insights through a broad review of cities' processes to structure and organize resilience work. We address this research gap by looking across cities and describing how they are structuring and coordinating resilience building efforts, describing practitioners' insights, and situating these findings within urban resilience literature on governance.

Additionally, we included a diverse sample of cities, including larger cities who received funding from 100RC, smaller cities who received funding from the NLC's community resilience program, and other cities outside of these two programs. This sampling tactic provided a range of opinions toward structuring resilience in practice. Understanding how cities across different funding streams are organizing resilience may provide more useful guidance than focusing narrowly on cities within a common funding network. For instance, after concluding our

interviews, the Rockefeller Foundation cancelled funding for 100RC. Without financial incentives to structure resilience according to the 100RC model, cities may shift their approaches. We captured a broader landscape of structural tactics than those made by 100RC cities. Moving forward, these other cities may provide more useful guidance on resilience institutionalization, primarily because their decisions were based on more typical funding scenarios than the large resilience-building grants that 100RC provided.

This paper investigates urban resilience governance in theory and practice. Our research objectives are to: 1. Synthesize theorized features of effective governance for urban resilience; 2. Describe how resilience is being incorporated into city governance with an emphasis on resilience coordination efforts in 19 North American cities; 3. Qualitatively analyze this real-world governance using our theoretical framework to determine how theory and practice align; and 4. Provide lessons learned and practitioners' insights of pathways and hurdles to resilience in practice. The paper is organized as follows. First, we discuss our methodology, introducing the North American cities we interviewed and our rationale for selection. Then we provide an overview of urban resilience and governance in theory. We present 6 recurrent features of effective urban resilience governance based on our literature review. After describing how cities are arranging resilience work, we use our urban resilience governance framework to compare theoretical features to practitioners' insights. Finally, we present 5 key insights and lessons learned from practice.

## **Methods:**

The driving motivation for this study was to understand how resilience is being incorporated into city governance, with an emphasis on city-scale resilience coordination and on practitioners' perspectives of pathways and hurdles to resilience in practice. We evaluated how cities are structuring resilience work and compare theorized urban resilience governance to emerging institutional strategies from practice. As resilience thinking moves toward practice, scholars and practitioners are increasingly interested in features of effective resilience planning and governance. In order to understand emerging governance themes and trends across resilience literature, we conducted a Scopus citation database search for references with "Urban Resilience" AND "Governance" in the title, abstract, or keywords. This search produced 66 results. We reviewed these papers and excluded those without any focus on the city-scale or that did not focus

on urban resilience directly. After exclusions, 40 papers were systematically reviewed for insights on urban resilience practice. Our review focused on modes of governance for resilience coordination, planning and organization. We identified 6 recurrent factors in theory for effective governance, which help to ground our empirical work in theory.

### *Interviews:*

The empirical component of this research project was co-produced with practitioners. The research questions evolved out of conversations with local government officials from the City of Portland, Oregon, USA, who were grappling with how to structure their own resilience efforts and eager to know what other cities recommended. Co-production of research and interview questions, we argue, enabled this project to provide relevant information that practitioners identified as important to their decision-making process (Lemos et al., 2018). We identified leading North American cities in resilience, mostly from the United States, with input from the City of Portland's Bureau of Planning and Sustainability (BPS). Our goal was to identify how resilience work is being structured within cities, so we only contacted those cities that are engaged, in some capacity, with resilience. Our interview questions (appendix A) focused on emerging and evolving definitions of resilience, organizational structure, actor identification and involvement, internal coordination and communication, and external partnerships or engagement.

We included cities facing diverse challenges and of different sizes to learn about coordination efforts across a spectrum of specific contexts. Geographic location, population size, disaster occurrences, organizational culture and other factors influence the decision-making process in any government. Table A denotes interviewees' positions and the major characteristics of each city we interviewed. While we independently developed our recruitment list, we used lists of cities in the 100 Resilient Cities (100RC) network and the National League of Cities (NLC) resilience network to find potential interviewees. In total, we sent recruitment emails to 40 cities and completed 19 interviews, for a participation rate of 47.5%. All interviews were conducted over the phone or in person and were recorded and transcribed, except one in which the interviewee was allowed to answer via written response due to scheduling conflicts. The interviews were semi-structured, with each interviewee asked the same set of 6 overarching questions (appendix A), which took an average of 47 minutes, with some flexibility to allow for follow-up questions where

needed. We took an inductive approach to our interview analysis, first identifying categories and themes through in-vivo coding of the 1. definition, 2. organization, 3. coordination, 4. successes and challenges, and 5. advice segments within transcripts. After independently developing common themes, we discussed and synthesized these into the final findings and lessons learned.

Our sample of 19 North American cities represents early adopters and leaders in resilience thinking, enabling us to learn about emerging resilience coordination strategies at a timely stage of institutionalization. As such, these cities are not a representative sample of North American cities generally. We might expect our interviewed cities to engage in more theoretically-promoted resilience strategies than the average city. Additionally, cities' association with 100RC and NLC also influenced their organization, goals, and strategies. Rather than deeply dive into any one city's strategies and governance innovations, we strove to capture a broad picture of resilience work, interviewing one person per city. Our rationale for this is the variability in staffing assignments for resilience work –some cities have one

Characteristics of cities			Interviewees' positions
City	Population (2016-2017)	Per capita	Title and Office
New York	8,622,698	\$41,098	CRO and Senior Director, Climate Policy and Programs, Mayor's Office of Resiliency
Los Angeles	3,999,759	\$32,284	CRO (former), Office of the Mayor
Vancouver	2,555,884	\$44,337	CRO - Office of the City Manager
Philadelphia	1,580,863	\$35,418	Senior Program Manager, Office of Sustainability
Dallas	1,341,075	\$33,667	CRO and Assistant City Manager, Office of the City Manager
Austin	950,715	\$41,106	Climate Program Manager, Office of Sustainability
Seattle	724,745	\$53,411	Director, Office of Sustainability and Environment, (former CRO)
Washington DC	693,972	\$59,284	Deputy CRO, Office of the City Administrator
Boston	685,094	\$46,495	Coordinator, Climate Ready Boston, Office of Environment, Energy and Open Space
El Paso	683,577	\$30,063	CRO and Director, Community and Human Development Department
Baltimore	611,648	\$38,181	Climate and Resilience Planner, Office of Sustainability, Planning Department
Miami	463,347	\$26,282	CRO, Office of Resilience and Sustainability, Planning Department
Honolulu	350,395	\$40,102	Deputy CRO and Deputy Director, Office of Climate Change, Sustainability and Resiliency
Pittsburgh	302,407	\$36,423	CRO and Assistant Director, Department of City Planning
Ann Arbor	121,477	\$46,701	Environmental Coordinator, Systems Planning Unit (retired post-interview)
Cambridge	113,630	\$56,834	Environmental Planner, Community Development Department
Nashua, NH	88,341	\$42,065	Director, Emergency Management Department
Kingston NY	23,169	\$31,445	Environmental Education and Sustainability Coordinator, Energy & Sustainability Department
Durango	18,465	\$39,146	Sustainability Coordinator, Community Development Department

US Census Estimates, Canada Census Estimate

person working on resilience in limited capacities, while others have fully staffed resilience departments with Chief Resilience Officers. In order to gather expert institutional knowledge of each city's decision-making and organizational structure, our tactic was to recruit the most senior leader we could access. Resilience positions or projects, however, were typically less than 5 years old, and staff were often new to their role, department, or city's government. Our sampling strategy introduces several additional limitations: we represent only one person's perspective for each city, high level staff may be unaware of daily operations, interviewees may provide limited or positive-skewing information, and work not labeled "resilience" may be left out of discussions.

Additionally, much of our interview protocol was focused on internal and city-scale coordination. Interviewees' discussed cross-scale elements of resilience, but responses more fully describe their work at a single scale. We recognize that these factors limit the depth of analysis for any one city, yet we argue that our study design allows for broad descriptive comparisons of city structures and resilience governance approaches. Since few studies have evaluated how cities are institutionalizing resilience, our study offers a descriptive approach. We do not cross-compare cities in our sample or intent to rank or assess the value of one governance approach over another. Future studies can build on this broad foundation by delving deeper into particular cities and interviewing or surveying a wide range of officials and stakeholders to examine how their perspectives and approaches compare. Following the cancellation of 100RC, a broader sample could provide additional insights into cities' organizational strategies toward resilience. Additionally, a comparison of modes of governance for resilience, sustainability and climate change adaptation would help clarify any differences in approach for institutionalizing these three concepts and issues.

Finally, we focus descriptively on organizational choices and practitioners' perspectives on pathways toward successful resilience implementation. We do not compare practitioners' opinions of successes and challenges to those of other stakeholder groups, such as residents in vulnerable neighborhoods, local business owners, or regional authorities. Practitioners are directly emerged in resilience building initiatives within their cities, which potentially generates a gap between how success is perceived by practitioners and city residents. We recognize that in many instances interviewees describe 'success' in terms of producing resilience planning documents, strategies and goal-setting rather than through demonstrable, on-the-ground project outcomes, adaptations, or transitions. As cities move from more diagnostic processes toward implementation,



researchers should analyze project goals against outcomes, explore how communities perceive resilience building plans and projects, and debate whether resilience initiatives are leading toward positive adaptations and transformations on the ground.

### **Urban Resilience at the city-scale:**

Resilience has a multitude of definitions, arising from diverse disciplines. For city-scale urban resilience, influential resilience concepts from ecology, social-ecological systems and complex adaptive systems scholarship have had a significant impact. Resilience, in this context, emerged from debates over ecological stability theory in population ecology. In 1973, ecologist C.S. Holling argued against a single, stable state equilibrium, advocating instead for a model of ecosystems based on resilience, or the ability of a system to be impacted and yet maintain key functions (Holling, 1973). This work evolved to incorporate human activities and the decision-making context within which ecosystems function. While the dominant view evaluated ecosystem management in isolation from a human context, Holling and his colleagues incorporated human decision making into their models for adaptive resource management (Folke, 2006). In a similar manner, work in complexity science, complex adaptive systems, and common-pool resource management were considering uncertainty, feedback loops, tipping points and human decisions across systems and scales. By the 1990s, the term social-ecological system (SES) was being used to describe the integral nature of human-environment relationships within systems (Berkes, Fikret ; Colding, Johan ; Folke, 2002; Berkes, Folke, & Colding, 1998; Stojanovic et al., 2016). While SES literature is not the only scholarship on resilience thinking, previous studies have confirmed its influence on the urban resilience scholarship (Meerow et al. 2016) and this literature explores topics important to urban resilience planning, such as adaptive governance (Berkes et al., 1998; Stojanovic et al., 2016).

Adaptive governance has been suggested as a critical transition framework for fostering urban resilience. In 2003, Dietz et al. introduced the concept of adaptive governance for social-ecological systems. The authors argued that given the complexity of SES's, knowledge for governance is inherently limited or even incorrect. With this in mind, governance structures must be flexible enough to incorporate changing information, cross-scale effects, and social values. Others argued for more dialogue between stakeholders and layered, complimentary private and state institutions which are attuned to adaptation (Chaffin, Gosnell, & Cosens, 2014; Dietz,

Ostrom, & Stern, 2003). Similarly, (Folke, 2006) argued that social capital, including trust-building, shared power, and learning should be key features of governance institutions for SES's. Community-inclusive decision-making, paired with leadership in the face of crises, have been common themes in adaptive governance literature.

More recently, adaptive governance characteristics have been tested against emerging city strategies to face urban challenges. Boyd & Juhola examined climate governance, primarily at the city-scale, by evaluating to what extent cities' technical, social, or ecological "urban experiments" embodied theorized adaptive governance features. They found that cities often prioritized social and economic concerns over ecological, that local authorities alone seem to take on projects, and that partnerships tend to be limited in scope (Boyd & Juhola, 2014). Given the multi-scalar approach of adaptive governance, they suggest there may be a mismatch of city-led resilience coordination to wider contexts. Likewise, research on municipally organized infrastructure policies (Monstadt & Schmidt, 2019) and landscape conservation planning (Beilin, Reichelt, & Sysak, 2015) suggest that the local-scale or city planning may not have the capacity, control, or incentives to build resilience in broad and holistic ways.

Resilience is often viewed as a malleable concept, posing both opportunities and challenges for scholars and practitioners. On the one hand, resilience can serve as a "boundary object" between different disciplines or stakeholders (Brand & Jax, 2007). However, differences in definition can also make it difficult to operationalize resilience. For instance, resilience can be viewed as a system trait, process or outcome (Moser, Meerow, Arnott, & Jack-Scott, 2019). Additionally, a 'dynamic view' of resilience is often contrasted with a 'static' definition, termed engineering resilience (Hollings, 1996). Engineering resilience refers to a systems ability to bounce back from a disturbance and is typically goal driven, with the aim to return to normalcy quickly. Ecological resilience, in contrast, is associated with bouncing forward, or a systems ability to maintain key functions and processes but potentially transform to a more desirable state. These static and dynamic concepts of resilience effect the goals, metrics, and outcomes of resilience planning (Sara Meerow & Stults, 2016). While scholars have moved toward the dynamic view of resilience, practitioners often define urban resilience in terms of "bouncing back," which potentially limits more transformational goal setting and visions (Meerow & Stults, 2016).

Critics have expressed frustration with urban resilience, arguing that the ecological foundation for resilience thinking has not been sufficient to address important, less measurable

social issues such as power, equity, transformability, and the political context of decision-making in human institutions (Cote & Nightingale, 2012; Davidson, 2010). While many SES scholars define resilience as a non-normative, descriptive concept, critics have dissented, arguing that any concept which deals with social dynamics is inherently normative (Cote & Nightingale, 2012; Stojanovic et al., 2016). Additionally, some scholars argue that resilience does not address the root causes of unsustainable systems and may impede the ability of cities to transform (Pelling, Manuel-Navarrete, & Redclift, 2011). For these scholars, resilience employs conservative tactics and goals. Resilience scholars have begun to answer these questions, assessing trade-offs, looking closely at equity issues, and prioritizing adaptive capacity within resilience work (Sara Meerow & Newell, 2016).

Even as some scholars question the value of the concept, urban resilience is growing in popularity in city planning. Resilience, as used in practice, is often viewed as both a guiding normative concept and a goal for cities to achieve (Moser et al., 2019). How cities define and plan for urban resilience is an important area of scholarship. Both recent and historical disasters, for instance, have shown that societal vulnerability and capacity to respond to disaster is uneven across socioeconomic classes, geographic areas, and temporal scales (Endfield, 2011). Understanding institutional arrangements and modes of governance for urban resilience is critical to ensure just applications of the concept within cities.

Decision-making for resilience at a local scale also can lead to path-dependencies which can limit or enhance cross-scale work (Perrings, 1998; Raco & Street, 2012; Wagenaar & Wilkinson, 2013). Decision-making context, institutional culture and past experiences influence how resilience thinking is approached and differences in context ensure resilience planning will not look the same across cities (Perrings, 1998; Raco & Street, 2012). For instance, (Monstadt & Schmidt, 2019) note that cities that have experienced disasters approach resilience planning differently than cities that have not experienced recent acute shocks. Diverse decision-making structures and authority regimes are leading to different framings for resilience priorities and outcomes. (Beilin & Wilkinson, 2015) argue that resilience should not be a catch-all, but rather should address local priorities. Yet, cross-scale incentives could be affecting local decision making. For instance, (Berke & Smith, 2009) found that federal incentives discourage local planning for mitigation. While resilience is becoming an important framework for cities to manage

long term uncertainties and risks, few studies have focused on how cities are structuring resilience within or across departments (Boyd & Folke, 2012).

Our review of urban resilience and governance literature revealed 6 recurrent factors for successful resilience governance, namely: clear vision and objectives, well defined rules and responsibilities, learning and feedback, social-ecological systems approach, knowledge co-production and trust, multi-scale governance. Table B provides an in-depth overview of these common factors, descriptions, and illustrative citations. We discuss interviewees' responses against these and find that they generally seem to agree, but practitioners offer more advice on structural choices and barriers for resilience work. We narrow their insights down to 5 key findings from practice, which complement and build on these theoretical insights.

Table B:

Recurrent factors from literature review	Explanation	Illustrative Citations
Clear vision and objectives	Defining the scale and context, fostering a shared vision and identifying areas of focus are critical factors for effective governance.	(Boyd & Juhola, 2015; da Silva, Kernaghan, & Luque, 2012; Ernstson et al., 2010; Meerow, 2017; Paterson et al., 2017; Spaans & Waterhout, 2017; Zaidi & Pelling, 2015)
Well-defined roles and responsibilities	Clarifying both the roles and responsibilities of agencies and individuals working on urban resilience plans is needed for action and coordination.	(Medd & Marvin, 2005; Olazabal & Pascual, 2016; Razafindrabe, Kada, Arima, & Inoue, 2014; van der Jagt et al., 2017; Wamsler & Brink, 2016)
Learning and feedback	Effective governance must be adaptive, engaging in continuous learning and assessment. Resilience work is iterative, so refocusing and including feedback to understand implementation successes and challenges is important.	(Frantzeskaki & Kabisch, 2015; Frantzeskaki & Tillie, 2014; Khazai, Anhorn, & Burton, 2018; Mcphearson, Andersson, Elmqvist, & Frantzeskaki, 2015; Wagenaar & Wilkinson, 2015)
Social-ecological systems approach	Resilience must focus on urban challenges from a systems perspective, linking environmental, social and economic issues to fully address vulnerabilities and reduce risks.	(da Silva et al., 2012; Frantzeskaki & Kabisch, 2015; Komendantova, Scolobig, Garcia-Aristizabal, Monfort, & Fleming, 2016)
Knowledge co-production and trust	For resilience work to be impactful, local context and community input are essential features. Knowledge that is co-produced with communities and stakeholders creates trust and buy-in. Bringing stakeholders together to discuss issues and potential solutions is key.	(Boyd & Juhola, 2015; Frantzeskaki, 2019; Frantzeskaki & Kabisch, 2015; Wamsler & Brink, 2016)
Multi-scale governance	Building resilience is a cross-cutting issue across governing jurisdictions and scale. Without a coordinated and multi-scale component to resilience governance, policies and planning at the local scale may not be able to build resilience to multi-hazard long-term risks.	(Boyd & Juhola, 2015; Dezio & Marino, 2018; Ernstson et al., 2010; Medd & Marvin, 2005; Niemelä, 2014; Paterson et al., 2017; Vandergert, Collier, Kampelmann, & Newport, 2016; Wagenaar & Wilkinson, 2015)

## **FINDINGS:**

### **Descriptive Overview**

First, we provide a descriptive overview of cities' resilience definitions and scope, structural organizations and collaborations. After reviewing the data, we categorize unifying themes across interviews, condensing these findings into 5 key themes for urban resilience coordination

### ***Resilience Definitions***

In our interviews, we asked practitioners how the definition of resilience has emerged and evolved within their cities. Definitions were context specific to each cities' challenges, organizational culture, and previous experiences. Table C breaks down the definitions, focus areas, frameworks, and evolving nature of resilience across cities. Overall, we found that 11 practitioners adopted the 100RC definition: "Urban resilience is the capacity of individuals, communities, institutions, businesses and systems within a city to survive, adapt, and grow no matter what kinds of chronic stresses and acute shocks they experience. City resilience is about making a city better, in both good times and bad, for the benefit of all its citizens." Of these cities, 4 practitioners provided clarifications and modifications of their use of the 100RC definition. Vancouver, for instance, specifically focuses on social resilience and took issue with seemingly underlying assumptions of the term "growth" in the 100RC definition. El Paso emphasized chronic stressors and economic development over acute shocks. Dallas prioritized social resilience and racial equity. While Boston split resilience efforts into climate and racial equity focuses. Several other resilience definitions emerged from interviews. We found that 2 cities defined resilience in terms of "bouncing back." While 4 cities primarily defined resilience as climate mitigation and adaptation. We sought to speak with cities on the forefront of resilience institutionalization, but also found 2 cities that do not typically use the term resilience, but instead use the term "preparedness." These cities felt that preparedness was the better term for broad understanding and that it helped facilitate collaboration on risk reduction strategies within their cities better than the concept "resilience."

The majority of cities we interviewed take a holistic approach to defining resilience. However, most cities choose to focus on climate change risks, either narrowly (e.g. flooding, fire risk, urban heat island) or in combination with other urban challenges (e.g. flooding, fire, urban heat island). All of the cities we interviewed have some climate component to their resilience work.

Of these, 7 cities are predominantly focused on climate issues alone, 10 cities are focused on a combination of interrelated climate risks and social challenges, and 2 cities are largely focused on chronic socioeconomic challenges. We noted that smaller cities tend to focus on more narrow resilience challenges, while larger cities tended to incorporate a broader set of challenges (Keenan, 2018).

Many scholars argue that resilience does not adequately address equity, yet we found that most cities we spoke with claim to be considering equity and prioritizing vulnerable communities in some capacity. Where practitioners had noted an evolution in the understanding of resilience within their city, they generally moved from a single, climatic focus (e.g. flooding, fires, hurricanes, adaptation) to a more holistic framework to address interconnected issues. Equity often came up as a framing concept for understanding both climate adaptation strategies and as an integral piece of resilience. In particular, equity was considered an essential component of resilience in 4 cities; 9 cities said they are addressing climate and equity issues in tandem; 3 cities are shifting toward a community-based approach to resilience, and 1 city is not addressing equity at this point. All cities framed resilience normatively, referring to the benefits of either a resilience building process or outcome, with no cities conceptualizing resilience as a system trait (Moser, 2019).

Table C: Definitions of Resilience

City	Definition	Focus	Framing of problems	Evolution of definition
Ann Arbor	<b>Climate mitigation and adaptation</b>	<b>climate change</b> - precipitation and flooding, urban tree canopy		
Austin	<b>Climate mitigation and adaptation</b>	<b>climate change</b> - climate adaptation, primarily of city properties and operation	<b>Climate adaptation lens</b> - but now at a crossroad: "...we sort of learned that when you say "resilience" without saying "climate," you talk about a lot of different things.	Austin's definition is evolving to include an <b>equity lens</b> . However, they are debating how to move forward without losing focus on specific goals and worry about making resilience mean everything
Baltimore, MD	<b>Bouncing back</b> : Baltimore is looking at climate, economic and social risks: Quote: "...resilience is preparedness to offer that ability to bounce back faster. The more people are prepared the more the city and community is able to get back on track and get people back living their lives as they want to do other things."	<b>climate change and other hazards</b> - also considers economic stability of infrastructure, social cohesion and spatial structure, equity and vulnerability	<b>Three pillars of sustainability</b> - incorporating equity lens and holistic approach	Evolution of resilience to include more of an <b>equity lens</b> , especially for mapping vulnerable communities' risks. Quote: "I feel like it's constantly evolving definition and our initiatives are constantly evolving to represent the latest understanding of resilience and the latest climate science and the latest issues that the city itself is facing"
Boston	<b>100RC</b> : clarification, there are two major components of Boston's resilience work: 1. climate change with preparedness and response and 2. social resilience, with a focus on racial equity	<b>climate change and social resilience</b> : separate departments for 1. flooding sea level rise and coast storms 2. racial equity	<b>Starts with equity lens</b>	No, interviewee felt that the incorporation of equity from the beginning has made the current framework effective and flexible.
Cambridge MA	<b>Does not use "resilience" in work</b> - ( <b>Climate mitigation and adaptation</b> ) - preparedness is the preferred term; resilience to climate change focusing on four strategies: social, buildings, infrastructure, and ecosystems.	<b>Climate change</b> : adaptation to increasing temperatures, increasing rates of precipitation, sea level and storm surges; mitigation of greenhouse gases	<b>Climate adaptation lens</b> : Physical risks and social risks of climate changes	Cambridge has worked on climate change issues for a long time, but work has evolved from greenhouse gas reduction to a vulnerability assessment to adaptation strategies.
Dallas	<b>100RC</b> - clarification, focus is on social resilience, equity and poverty reduction. Quote: "...resilience is basically the capacity of communities, businesses, institutions, individuals, and the systems that we work in with intercity to be nimble, to be adaptable, to thrive."	<b>Social resilience</b> - using an equity lens to address racial inequalities and poverty, also addressing acute environmental shocks and chronic socioeconomic problems	<b>Starts with equity lens</b>	The 100RC strategy helped prioritize issues; CRO had to select the initial focus, which is equity and poverty reduction.
Durango CO	<b>Climate mitigation and adaptation</b> : Still working on the definition. Quote: "Striving and thriving regardless of the challenge. And so anything that we can do to adapt, to change, to prepare for uncertainty, including in the context of talking about climate, including some of those things which were more traditionally thought of as like climate investigations."	<b>Climate change</b> - drought and fire, but also incorporates looking at vulnerable populations, affordable housing, disaster event impacts	<b>In the process of framing resilience, climate risks are the starting point.</b> Quote: "...[resilience] is used by different people in different ways."	Definition is still being established: Quote: "We're still figuring out exactly how we define it" While they are trying to define resilience broadly, interviewee notices that "different departments use the term differently."
El Paso	<b>100RC</b> but she goes into their specific contextualized definition - more about chronic stressors than about acute shocks, especially given that El Paso has few disaster threats.	<b>Social resilience</b> - focus on economic development, social vulnerabilities, and equity, also considering climate impacts	<b>Cultural lens</b> - Quote: "building a fair and less vulnerable city system which an emphasis on economic empowerment"	Evolved from single threat to a holistic perspective. Resilience work started initial for flash flooding, freezing and heating, but now they define it broadly: social threats, binational vulnerabilities, & strengthening of the community as a whole.
Honolulu	<b>100RC</b>	<b>Climate change and social resilience</b> - developed with community; three foci: 1. cost of living and affordability, 2. natural disasters, 3. impacts of climate change like sea level rise	<b>Climate adaptation lens and equity lens</b> : resilience focus is mandated by the city's charter: they incorporate and equity lens in two ways: 1. five stakeholder working groups provided recommendations for equitable policies and for engaging vulnerable communities 2. they are hiring a climate resilience and equity manager	The mission is established by charter, however the department is growing; the city is hiring a hazard mitigation and long-term recovery program manager, climate resiliency and equity manager, and a senior policy and communications advisor.
Kingston NY	<b>Climate mitigation and adaptation</b> : Quote: "Being able to make it through some sort of difficulty and to be able to stay on board, or stay open, or stay functioning through that kind of disaster"	<b>Climate change</b> - Flooding (smaller initiatives around heat) to major storms and longer climatic changes that would increase sea level and storm frequency and intensity	<b>Climate change adaptation lens</b> : Equity is not prioritized at this time; vulnerable communities are not in the highest flood risk areas. Resilience education is unilateral across all demographics and incomes.	The concept is limited by the staffing capacity to incorporate new issues. Quote: "Resilience means different things to different people in our community depending on what field they are in, whether it's resilience to a natural disaster or resilience to the economy or basically it all comes down to being able to respond after some sort of disaster and be able to recover equally, if not better than you were beforehand. That's how we define resilience here."
Miami	<b>100RC and Climate mitigation and adaptation</b>	<b>Climate change and social resilience</b> - regional focus is on climate adaptation and mitigation and city focus is on system challenges: acute shocks from hurricanes and flooding and other threats, such as economic collapse, disease, cyber terrorism. Chronic issues like affordable housing and equity are components.	<b>Tiered focus: climate adaptation lens and social resilience lens</b> - the regional focus is on climate risks, but the City of Miami is concerned with more holistic resilience building initiatives.	Resilience work is approached differently across regional and local governing scales. City of Miami joined 100RC as part of a regional team focused on climate change and sea level rise, but they are also focusing more on socioeconomic challenges and equity.
Nashua NH	<b>100RC</b> - Resilience is a holistic approach to long-term hazards, reducing risks; started with social capital and built capital, then took on a more holistic perspective to build healthy community	<b>Climate change and other hazards</b> - infrastructure, buildings, community health, and hazard mitigation, included community stakeholder engagement to include vulnerable populations	<b>Systems approach</b>	The definition has evolved from issues typical in emergency management to a broader perspective. Initially partnered with technical experts on acute shocks (e.g. flooding, extreme weather events, terrorism), but then expanded to look at chronic stressors (e.g. climate change, aging infrastructure, opioid crisis). Decided to adopt 100RC definition.
New York City	<b>Bouncing back</b> - Quote: "We define resilience as our ability to bounce back from shocks or stresses. I think, in terms of bouncing back, we talk about it in terms of rebounding and thriving, in the face of climate shocks, extreme events and other shocks or stresses."	<b>Climate change</b> - particularly to extreme events, but has evolved to include chronic stresses	<b>Climate adaptation lens, with strong equity component</b>	Resilience work evolved from a climate focus to include a strong equity lens. Most funding for their office was received after Hurricane Sandy - so recovery and resiliency are highly interlinked.
Philadelphia	<b>Does not use "resilience" in work</b> - ( <b>Climate mitigation and adaptation</b> ) - preparedness is the preferred term; resilience to climate change risks	<b>Climate change</b> - adaptation or climate preparedness; specific risks are flooding and heat, municipal operations	<b>Climate mitigation and adaptation</b>	Climate focus has shifted from mitigation to adaptation. 2009 Greenworks sustainability plan had no resilience or climate adaptation: "It really sounded defeatist." Then Hurricane Sandy hit New York and more literature was published on climate impacts. Greenworks plan review included a climate adaptation working group (cross-departmental). By 2015, the Growing Stronger plan included adaptation and they have mapped the urban heat island effect, recognizing impacts to vulnerable communities.
Pittsburgh, PA	<b>100RC</b>	<b>Climate change and social resilience</b> - top concerns are equity, aging infrastructure, energy optimization, racial inequality	<b>Equity and climate are connected</b> , they are doing both their resilience plan and climate plan at the same time and integrating in equity concerns into the climate issues - commission: "sustainability, resilience, equity and climate commission"	Before 100RC, resilience was seen as defeatist and not explored. Quote: "And at that time, I would say there was a fair level of conflict between the environmental community related to if you're dealing with resilience, your quote on quote, you're giving up." Today, they are examining connections between energy optimization, asthma, aging infrastructure and racial inequality.
Seattle	<b>100RC</b>	<b>Climate change and social resilience</b> - Climate impacts, social cohesion, and especially racial inequities	<b>Starts with equity lens</b> : Focus is on racial equity; guiding questions: Quote: "How can we make sure benefits accrue to communities that most need benefits and have been historically underinvested in? And then just as importantly, how can we make sure that anything we're doing is building power and capacity for the communities that have long been left out of the traditional government power structure?"	
Vancouver	<b>100RC, in part.</b> Quote: "...we're looking at resilience as our collective ability to be able to adapt to a quickly changing future. And that may include disasters, other trends, and threats. And what we're finding is that the answers to what's going to help us adapt and thrive in Vancouver, most people are prioritizing the social elements of resilience."	<b>Climate change, social resilience and other hazards</b> (e.g. seismic, flooding, fires), affordability, food supply and economic issues, and social resilience implications	<b>Starts with equity lens</b> : "So for me, equity is the foundation to resilience." social resilience lens on climate change issues, coming up with equity definitions and a framework for resilience work in the city.	Resilience work had been going on in Vancouver for many years, but "depending on who you talked to, resilience is something different." They have used the 100RC definition in part, but focus on racial equity. Quote: "And I would say one of the biggest challenges that I personally see, and that I've heard from others, is the inclusion of the word growth, or the assumption of growth in resilience. And so...we're not necessarily using the word growth"
Washington DC	<b>100RC</b>	<b>Climate change, other hazards and social resilience</b> - especially flooding risks, heatwaves, terrorism, aging infrastructure, affordable housing, population increase, inequality, racial inequality, social cohesion	<b>Systems approach</b>	Washington, D.C. takes a systems approach to resilience, but stressed that they are in a diagnostic phase of work. They intend to be tactical and look to achieve multiple benefits to different problems through resilience work.
Los Angeles	<b>100RC</b>	<b>Other hazards and climate change</b> - Seismic risk is the top concern, but with the inclusion of equity lens and understanding of climate risks	<b>Systems approach</b>	Resilience primarily is focused on seismic concerns, but LA has taken an integrated approach through the scale model, which has helped in defining resilience with community input.

### ***Structural Organization***

Cities are structuring resilience work differently, including diverse choices in department placements, staffing decisions, and managerial levels. We observed that resilience was most often placed in departments with broader mandates that collaborate on a regular basis, rather than in departments with narrow responsibilities. Additionally, we identified 4 tiers of staffing commitments and tallied how many cities fit within these: Part-time involvement (less than 5 staff) – 6 cities; Part-time involvement (greater than 5 staff) – 2 cities; Full time positions (1-3 staff) – 5 cities; and Dedicated positions or departments (3+ staff), 6 cities. In all cases where full time staff lead resilience work, other departments were pulled into efforts to distribute resilience across the city. Cities who participated in the 100RC cohorts typically held senior level positions with more direct influence on their city’s leadership (e.g. city administrator, mayor, deputy mayor). Other cities typically worked in and with middle management. Most cities placed resilience within existing city departments, but in 4 cities resilience work is expanding through dedicated departments, creation of new departments, and new, full-time supporting positions. For instance, in Boston, the Mayor’s Office of Resilience and Racial Equity is tasked with achieving actions within their resilience strategy. In Dallas, two new departments, the Office of Equity and Human Rights and Office of Welcoming Communities and Immigration Affairs, and four new resilience positions will report to their CRO by Spring 2019. Honolulu is expanding its Office of Climate Change, Sustainability and Resiliency with 3 new full-time staff. Table D provides an in-depth overview of resilience placement across cities.



Table D: Structural organization

City	Interviewees' Resilience Position	Who (e.g. department, committees, individuals) is leading the resilience work? Number of Staff	Cross-departmental collaborations
Ann Arbor	Environmental Coordinator, Systems Planning Unit (retired post-interview)	Systems Planning Unit; No dedicated staff; unit uses a sustainability framework	The Systems Unit is a city collaboration between professionals across disciplines; coordinates across city systems
Austin	Climate Program Manager, Office of Sustainability	No full time staff; resilience work is embedded in several departments, including Office of Sustainability (climate) and Office of Safety and Emergency Management (disaster response); Sustainability Dept. has 3 staff involved, the Chief Sustainability Officer, Climate Program Manager, and the Environmental Program Coordinator	Office of Sustainability convenes cross-departmental groups for specific topics; Austin owns its own utilities, so coordinating essential services is a key focus for resilience work. The most motivated people are the manager-level, who have staff reporting to them, but also have deliverables to executive leadership, these managers are the most "in the know" and tend to be engineers, planner supervisors, managers, rather than those in political positions.
Baltimore	Climate and Resilience Planner, Office of Sustainability, Department of Planning	One climate resilience planner in the Office of Sustainability (14 staff)	Office of Sustainability's strength is as a convenor: "forging connections throughout other agencies and nonprofits" They also have both a short-term and long-term focus, positioning them to engage in many areas
Boston	Coordinator, Climate Ready Boston, Office of Environment, Energy and Open Space	Mayor's Office of Resilience and Racial Equity & Climate Ready Boston	Resilience initiatives are housed across departments, but the climate office finds advocates and pushes for implementation of the city's climate plan.
Cambridge	Environmental Planner, Community Development Department	7 main staff on climate steering committee is made up of: a commissioner of public works and the city engineer, the environmental health director and the manager of community resilience at public health department, assistant city manager for community development, the director of departmental transportation planning, community development, and the inter-departmental planning/project manager	Another committee, the Climate Protection Action Committee acts as the standing advisory team to the city manager made up of appointed community stakeholders (universities, businesses, and environmental groups, citizens).
Dallas	CRO and Assistant City Manager, Office of the City Manager	The CRO & Assistant City Manager (same person), reports to the City Manager. Six departments report to the CRO: Code Compliance, Animal Services, Office of 311, Office of Homeless Solutions, Office of Community Care (includes Senior Affairs, Community Centers, Bureau of Vital Statistics, and WIC), Office of Equity and Human Rights. CRO is hiring staff at time of interview - city council approved funding for four new full time positions: 2 focused on resilience and 2 focused on racial equity	Highly collaborative; works across city primarily with director level staff; Resilience work has led to two new offices: Office of Equity and Human Rights (reports to the CRO) and the Office of Welcoming Communities and Immigrant Affairs
Durango	Sustainability Coordinator, Community Development Department	no full time staff; resilience work is being discussed internally.	National League of City Funding for two workshops: mid-level directors first on climate change impacts on operations, second on methods and decision-making tools, included community development, city clerk's office, public information office, HR, finance, every department - one person there, participating in USDN resilience equity workshop next month
El Paso	CRO and Director, Community and Human Development Department	CRO and 2 staff (Marketing Coordinator, Research and Management Assistant) coordinate resilience efforts directly, then all of the department directors address strategic goals - currently the lead is the Economic Development Director	Collaborative, CRO works with City Manager in advisory capacity, 3 deputy city managers and CRO meet with departments heads in resilience portfolio; also standing meeting with city manager
Honolulu	Deputy CRO and Deputy Director, Office of Climate Change, Sustainability and Resiliency	Charter-established Commission, Advisory/Steering Committee, CCSR Staff (7, soon to be 10), including CRO and Deputy CRO, AmeriCorps VISTA staff (4), and Interns, Unpaid, (up to 4)	Centralized office, but highly coordinated. "As an executive-level policy office, CCSR's work is highly coordinated with other City departments and agencies whose functions are necessary for carrying out specific resilience initiatives."
Kingston NY	Environmental Education and Sustainability Coordinator, Parks and Recreation	one person focused on resilience, dedication of time is grant dependent	Its primarily one person; others include grants management director - project manager on some sustainability grants, economic development director, planning director, engineering, waste water treatment plant operator, public works director, alderman of floodplain community, parks and recreation director, floodplain administrator, the mayor.
Miami	CRO, Office of Resilience and Sustainability, reports to the Assistant City Manager of Infrastructure > Deputy City Manager > Assistant City Manager	City of Miami: CRO and Deputy CRO; Regionally: (3 CROs) City of Miami, City of Miami Beach, and Miami-Dade County	Resilience to action group - CRO of City of Miami co-chairs with the Deputy Manager, includes the assistant city manager for infrastructure, capital improvements, public works, planning, housing and community development, economic incentives, and communications - core group that is operationalizing resilience
Nashua, NH	Director, Emergency Management Department	No full time positions	For Resilient Nashua Initiative which was co-led by the emergency management and the community development department, additionally there was a core planning team, with 12 team members from public health, engineering, economic development, waterways department, and a short term community resilience coordinator.
New York	CRO and Senior Director, Climate Policy and Programs, Mayor's Office of Resiliency	Every city agency involved, embedded across departments - but Office of R&R has dedicated staff (30 staff); policy teams, functional teams for getting projects done, external affairs, climate science	Mayorial priority - highly collaborated across departments
Philadelphia	Senior Program Manager, Office of Sustainability	Climate adaptation working group with staff from city government, historically one person with 70% of the work and one other with 25% of work	Centralized, mostly in the Office of Sustainability
Pittsburgh	CRO and Assistant Director, Department of City Planning	6 person team: CRO & Assistant Director of Planning, resilience coordinator, sust. Coordinator, analyst, food policy, energy policy and data	No real collaboration before 100RC, enabled conversation with emergency response and preparedness, new commission on sustainability, resilience, climate and equity
Seattle	Director, Office of Sustainability and Environment, (former CRO)	Two dedicated staff: CRO and Deputy CRO, then many departments collaborating on resilience	Resilience breakfast groups: invited staff from across city to learn about resilience work and collaborate
Vancouver	CRO - Office of the City Manager	CRO and 3 staff, Seismic policy planner, resilient neighborhoods, and communications and engagement	5 workgroups of 30-40 people across all departments
Washington DC	Deputy CRO, Office of the City Administrator	CRO and Deputy CRO, Resilience Cabinet, and Commission on Climate Change and Resilience formed by Mayor and City Council	Centralized, with coordination across diagnostic teams
Los Angeles	CRO (former), Office of the Mayor	CRO and Deputy CRO.	CRO and Deputy CRO, departmental CROs, 30 of them

In terms of placement we also asked interviewees if they considered their resilience work to be centralized, meaning that responsibilities are housed primarily in one office; dispersed, so that the responsibilities are spread across departments; or a combination of both. Of the cities we interviewed, 7 were primarily centralized, 2 were dispersed, and 10 were a combination.

Cities balanced resilience work between internal capacity-building and external engagement with communities, businesses and other governing bodies, such as regional, state and federal authorities. We found that 6 cities focused more of their efforts internally, 9 cities divided their time 50/50 between internal and external facing resilience building, and 4 cities primarily focused externally on community engagement. Both internal and external collaborations were key aspects of resilience work. We asked interviewees about their collaborations to get a sense of what stakeholders are involved in resilience work. These findings are summarized in Tables E-G. All cities mentioned working across scales of government, with either regional, state, federal or international partners on resilience. Cross-departmental and inter-agency collaboration repeatedly emerged as a top priority for resilience-building. Internally, departments of planning, potable water, sewage or watersheds, public works, and environmental/sustainability were pulled into resilience efforts most frequently. Steering committees, task forces, and project – implementation groups commonly involve the top departments listed in Table E. Interviewees also mentioned the following city agencies or departments with less frequency: city council, corporate counsel, city hall, chamber of commerce, public schools, and departments of transportation, communications, capital improvements, public affairs, equity, innovation, and engineering.

Table E: Top Collaborators

<b>Department</b>	<b>Number of Cities</b>
Planning	10
Sewage and/or Water	9
Public Works	8
City Leadership (e.g. Mayor)	8
Environmental/Sustainability	7
Public Health	6
Emergency Management	5
Parks & Recreation	4
Budgeting & finance	4
Economic Development	4
Housing	4
Community Development	4
Utilities	2

Given the highly collaborative nature of resilience work, cities often believed additional department and agency involvement could enhance resilience work. Practitioners' mentioned barriers, such as mission alignment and limited capacity and resources, as reasons for less engagement with departments and agencies such as police, transportation, community development, education, and engineering. Several cities felt that they had engaged as many internal and external stakeholders as possible, while a few noted that the scope of resilience work had not expanded yet to bring in additional collaborators. Of the departments cited for future collaboration, the majority related to expanding resilience into economic and social challenges. Table F listed the departments and agencies most frequently mentioned. Others included: departments of planning and water, or stronger engagement with leadership, such as working more closely with the mayor or city administrator.

Interviewees' stressed that resilience work requires engaging the community, including residents, businesses, and institutions such as universities. As important was the relationship of city government to regional, state, and federal agencies. The interdependency of cities with regional, state or federal regulations, financial and infrastructure support, and grant opportunities shaped the influence city-level planning and policy efforts had on resilience work. We asked about top external collaborations and most frequently heard examples of multi-disciplinary teams of consultants, advisory committees, regional resilience consortiums, and knowledge sharing peer networks. Table G lists the top mentioned external collaborations, including examples of stakeholders and institutions.

Table F: Departments practitioners would like to collaborate with more

<b>Department</b>	<b>Number of Cities</b>
Police	3
Transportation	3
Community development	2
Education	2
Engineering	2
Equity offices	2
Public Works	2
Economic development	2
Public health	1
Emergency management	1
Innovation	1
Facilities	1
Energy	1
Parks and Recreation	1

Table G:

Number of Cities	Partner Type	Examples of Stakeholds/Institutions
19	Information networks	Urban Sustainability Directors Network, 100 Resilient Cities, National League of Cities
15	Non-profits, community groups, and foundations	Foundation, Abell Foundation, Baltimore Tree Trust, Friends of Patterson Park, The Miami Foundation, US Green Building Council
11	Technical consultants	AECOM, universities, science panels
10	Regional: resilience or climate committees, transportation authorities, planning departments, utilities, counties	Boston Metropolitan Area Planning Council (MAPC), PECO Energy Company, Cambridge Metro-Mayors' Climate Preparedness Task Force
8	Federal agencies	NOAA, National Institute of Standards and Technology, EPA, FEMA, HUD, Department of Homeland Security, Army Corp. of Engineers
7	Universities	University of Michigan, UMass Boston, MIT, Harvard, Texas A&M, Arizona State University, Cornell
4	Regional public-private partnerships and committees	Climate Protection Action Committee (universities, businesses, environmental groups, residents)
3	State agencies	Colorado Resilience Office, New York Department of State
1	International governing bodies	Ciudad Juárez, Mexico

### ***Successes, challenges and advice:***

We asked interviewees what their biggest successes, challenges, and advice were for other cities engaging in resilience planning to highlight typical governance considerations. The most frequently cited successes were cross-departmental collaborations, community engagement and external partnerships, identifying & implementing actionable projects and aligning resilience strategies with existing city plans. Practitioners brought up many of the same success factors that are discussed in theory: trust-building (Frantzeskaki, 2019; Schauppenlehner-Kloyber & Penker, 2016; van der Jagt et al., 2017), credibility and urgency (Ernstson et al., 2014) and bringing together stakeholders (Khazai et al., 2018; Medd & Marvin, 2005). While some researchers (Frantzeskaki & Tillie, 2014) emphasize the need to integrate resilience into existing planning documents, practitioners stressed this factor more frequently than scholars. Practitioners also discussed pilot projects in a different context than scholars. Urban resilience literature typically focuses on how innovation and experimentation lead to learning, flexibility or new governance practices. Practitioners mentioned these outcomes as important, but more frequently mentioned “actionable projects” in relation to political support, interdepartmental buy-in, and available funding. Engaging with residents through pilot projects also helped create an atmosphere for

sustaining community support. Table H lists the top 7 most frequently identified successes in our interviews. Through these answers, it became clear that resilience practitioners are integrators who work across departments to build interdisciplinary teams, who can think in systems, and who can identify multiple social, ecological, or technical benefits for resilience projects.

Table H:

Number of Cities	Successes	Explanation
15	Cross-departmental collaboration	Facilitating training sessions, workshops, and committees to define resilience, prioritize issues, and identify actionable goals across departments. Creating relationships between 'silos' of government.
8	Community engagement and external partnerships	Resilience must be supported by the wider community, including residents, businesses, non-profit groups and authorities in regional, state and federal positions to sustain support and lead toward actionable goals.
8	Identifying & implementing actionable projects	Resilience work needs to produce outcomes; projects that are actionable lead to more buy-in from leadership and the community
7	Plan integration (aligning resilience with city strategic plans)	Definition and scope needs to be integrated into cities' strategic plans so that budgeting process and goals are aligned with resilience.
4	Credibility of information (data-driven)	Cities must have credible and actionable science-based models and local data for decision-making
4	Staff, budget or outside grants	Resilience is time-intensive, with broad long-term goals which require ample staffing and funding. Grants, budget and staff are a critical limiting factor to the scope and success of resilience-building efforts.
3	Embedding across city departments (making business as usual)	Resilience needs to be embedded in the daily responsibilities and processes of all departments for sustained impact.

In addition to these insights, practitioners emphasized the need for constant leadership on urban resilience to move the vision forward. In particular, practitioners who were placed in executive-level departments and had political will backing their authority, emphasized their successes and recommended similar placement in other cities. Regardless of where resilience was placed, however, cities that identified champions in government and the community were able to bring more urgency and legitimacy to their resilience building efforts. Resilience practitioners identified the same leadership factors as those previously studied by climate adaptation governance scholars. In particular, the need for enthusiastic staff and community champions, backed by the authority of city executives to make adaptation (and resilience) a legitimate city priority (Anguelovski & Carmin, 2011; Carmin, Dodman, & Chu, 2013; Pasquini, et al., 2015). Champions mentioned by resilience practitioners included mayors, city managers, city council, regional commissioners, federal agencies, community leaders, and enthusiastic staff who were willing to take on resilience in addition to other responsibilities. When discussing champions,

interviewees' interestingly mentioned disasters, because these events, while devastating, elevated resilience work to a top priority, increasing both political will and public support.

Interviewees also emphasized the importance of knowledge sharing, often explaining that networks of peer cities provide valuable information for identifying resilience strategies, department placement, and approaching planning documents. Additional research on municipal urban resilience networks could provide valuable information on governance practices. Previous research on urban climate governance indicates that municipal networks offer a multitude of benefits for participating cities including, sharing of best practices, expertise, and resources (Bulkeley, 2010). Especially as 100RC ends, researchers should investigate if and how cities form networks to discuss urban resilience challenges and then evaluate how these municipal networks shape strategies. Similarly, practitioners highlighted the importance of well-developed regional, state and federal relationships. Multi-scale governance is one of the major theoretical characteristics for successful urban resilience governance. Social-ecological systems researchers, in particular, argue that bio-regional (Wagenaar & Wilkinson, 2013) and multi-level collaborations (Boyd & Juhola, 2015) are essential for managing the complex boundaries of resources within an SES. Practitioners generally acknowledged broad, cross-scale dynamics of urban resilience challenges (e.g. air quality, flooding, fire and drought risks). One interviewee even mentioned holding back from creating municipal resilience initiatives to see if a more robust regional approach will develop. However, the majority of practitioners worked across governance scales to address specific barriers to resilience planning, such as a lack of authority over transportation, building codes, or utilities. Scholars tend to start with broad SES boundaries, then match problems to necessary governing authorities. Practitioners, on the other hand, seek multi-level support to address specific problems, then expand on these collaborations with time.

In contrast to successes, we also asked interviewees about their biggest challenges. Table I describes the top 7 challenges interviewees discussed, which include issues such as scope, definition, urgency, relevancy, resources, and risk communication as the most significant barriers to successful resilience work. As a trendy, but fuzzy concept, resilience is difficult to apply. Researchers have well-documented differences in resilience definitions and uses (Meerow, et al., 2016), which continues to be a challenge in practice. The most commonly mentioned issue, however, was not definition, but scope. Delineating the boundaries of resilience work means matching idealistic visions and expectations of urban resilience to internal staff capacity, political

will, and financial resources. In comparing climate adaptation and resilience plans, (Woodruff et al., 2018) found that resilience plans discuss many strategies and benefits, but offer little prioritization or implementation resources. This lack of prioritization in plans may reflect the initial challenge to define the scope and select a starting point.

Table I:

Number of cities	Challenge	Explanation
11	Scope: boundaries of resilience work	The fuzziness of resilience means that the concept can be applied to a plethora of urban challenges. Cities must narrow the scope of resilience to that goals are actionable. Priorizing resilience work requires negotiation and trade-offs.
10	Definition of resilience	Resilience can mean different things to different people. The concept is constantly evolving. Scientific-based climate models change, theory broadens the scope, and departments consider resilience against different issues areas.
8	Relevancy, urgency, and longevity	Resilience is less tangible than "front and center" issues such as economic development, transportation, and maintaining essential city services.
13	Staff, budget, grants	Capacity to do the work is a critical limiting factor for resilience planning. The time-intensive processes of interdepartmental coordination and big, long-term projects put boundaries on what can be accomplished.
7	Long-term risk communication	Both internally and when engaging with residents, resilience practitioners struggle to communicate long-term risks, especially when many of the details of system shocks and stressors are uncertain, evolving, and 50 years down the road.
4	Cross-scale coordination	Regional, state and federal level authority over codes, funding or infrastructure can limit the options cities have build resilience. Coordinating across scales is another critical factor to success.
3	Embedding across city departments (making business as usual)	Resilience work must become a daily-process or "business as usual" for departments. Training departments to integrate resilience strategies into their responsibilities takes time and support from leadership to establish.

Federal agencies and resilience funders have tried to address this problem by providing a plethora of tools, frameworks, and consultants for cities to access. Several practitioners mentioned that these resources can be both beneficial and problematic when framing resilience. For instance, cities often must string together a series of grants to fund resilience efforts, each of which approach urban challenges from a different angle and provide different resources for defining resilience, engaging stakeholders and creating strategies. Rather than

creating a resilience program from start to finish, many cities must reframe and refocus frequently. In the climate adaptation context, funding opportunities have produced similar tensions, sometimes requiring cities to funnel resources and staff toward funders' performance metrics, which may sometimes be in conflict with other priorities, previously collected data, or regulation requirements (Carmin et al., 2013). For urban resilience funding, the most frequently cited tension is between diagnosing broad, system level urban challenges and identifying priorities and actionable steps toward change.

Keeping up with the latest climate -modeling projections also made defining resilience and its scope challenging. Practitioners mentioned a need for credible data-driven and scientific information to make a case for action, especially against the context of current urban challenges. Relevancy, urgency, and longevity were frequently cited as critical barriers to resilience communication. Without champions, interviewees had difficulty in bringing resilience “to the table” to receive staffing, budget or leadership endorsement. Long term risk communication similarly emerged as a top concern for resilience practitioners. Making resilience tangible, while also maintaining a long-term perspective for the scope of the work, was challenging when engaging both internal departments and agencies and the wider community. Engaging vulnerable communities was particularly challenging for 4 practitioners, who struggled to focus equity and risk conversations on long-term resiliency, rather than on current struggles such as job-availability, deteriorating roads, or blighted structures.

In addition to the challenges listed in Table I, interviewees discussed other barriers to success. For instance, 3 cities discussed issues with their departmental placement, explaining mismatches in mission alignment, narrow application of resilience to specific goals (e.g. infrastructure, disaster recovery), or lack of influence. Indeed, some cities who had overcome departmental challenges noted similar issues. One practitioner felt that placing resilience initially in the sustainability office, had limited its interpretation to environmental issues. Another noted that involving public works, in addition to their sustainability office, added credibility because the public works department was not seen as “the environmentalists.” While many interviewees agreed that placing resilience in an executive-level department facilitated resilience’s development, one city considered this as a challenge due to political resistance after an administration change. Others frequently identified challenges included lack of clarity to roles and responsibilities, a need for more public engagement, and a need for more data and specific expertise. Additionally, 3 cities expressed frustration with the complicated nature of resilience work, in general.

Following our discussions of successes and challenges, we asked practitioners what advice they would share with other cities. Practitioners’ insights focused on resilience staffing, placement and responsibilities (5 respondents), starting with a rigorous diagnostic phase (4 respondents), data-driven decision-making, (3 respondents) definitions (2 respondents), community engagement (2 respondents), equity (2 respondents), and fostering interdepartmental collaboration (1 respondent). Advice for positions included placing resilience staff at senior levels where they can



directly engage with city leadership, ensuring that senior city administration supports resilience-building, hiring individuals with interdisciplinary backgrounds and strong communication skills, and generally increasing the capacity of staff responsible for resilience work. These success factors, challenges, and advice are similar to those identified by researchers studying climate change adaptation measures (Anguelovski & Carmin, 2011) and sustainability organization (Hawkins, Feiock, & Krause, 2014). Resilience practitioners additionally stressed the importance of taking the initial stages slowly, resisting temptations to jump into resilience work without first negotiating the definition and scope with stakeholders and to assess what work has already been started. Respondents focused on understanding risks and vulnerabilities rigorously, building-trust with the community, some framing resilience through an equity lens and ensuring consensus on definition and scope. Overall, the main theme of advice was the need to begin resilience work holistically and collaboratively in order to ensure long-term buy in and sustained interest and resources for resilience work. Online appendix B lists representative quotes of respondents' key advice for other cities and practitioners.

## **DISCUSSION:**

### **5 Key Themes for Urban Resilience Coordination:**

After reviewing the data from interviews, we categorized these into 6 unifying themes across interviews; these are: 1. establishing a clear, contextual definition and scope, 2. bringing communities into the process, 3. championing the agreed-upon vision, 4. balancing a centralized and dispersed approach, and 5. recognizing tradeoffs in organizational placement. These key findings encompass the leading tensions and challenges to successful urban resilience practice and organization. Moreover, these areas incorporate the most frequently cited tensions and challenges that respondents discussed and recommended are key features for other cities to consider as they institutionalize resilience.

#### ***Establishing a clear, contextual definition and scope:***

As discussed above, resilience means different things to different individuals, departments, and cities. Practitioners found that resilience work must start with a well-established definition and scope or else operationalizing becomes difficult, if not impossible. In both our literature review and empirical study, resilience emerged as a “boundary object” able to bring departments to the

table (Brand & Jax, 2007). However, several of our respondents noted that resilience was too politically charged or difficult to define to be useful, reflecting other literature which questions operationalization (McGreavy, 2016). Practitioners emphasized that broad support from city leadership and the public must be built early into the institutionalization process in order to ensure resilience is a legitimate and credible process or goal. The need to engage stakeholders and the community early in the process is also emphasized in literature (Schauppenlehner-Kloyber & Penker, 2016; van der Jagt et al., 2017). Applicability within local context was a key factor for defining resilience. In fact, we found that practitioners were most emphatic in their advice to take time to understand urban resilience contextually. As one respondent noted, the value of resilience came from its potential to “creat[e] a space for government to very carefully consider an approach.” This same respondent elaborated, arguing that by “creating a space for deep diagnostic thinking to occur,” resilience slowed down typical processes for developing plans and strategies internally, thereby “build[ing] time to fully consider whether [they] understand the core fault lines as well as [they] think [they] do.” Urban resilience literature on governance practices frequently discusses reflexive thinking (Paterson et al., 2017) and continuous learning (Olazabal & Pascual, 2016), but to the best of our knowledge, few papers focus on the value of slowing processes, stepping back and taking stock as a useful governance practice in itself.

In many cities we interviewed, resilience-building required over a year of engagement with internal departments, external stakeholders and the public to define and to diagnose a starting point. While we found that many cities incorporated a holistic, normative stance toward resilience, we also found that practitioners needed to narrow the scope of resilience work to a manageable size. As one respondent noted: “Anything connects to sustainability just like anything can connect to resilience, but we can’t be the office of everything. One person can’t be in charge of everything so choosing a few actionable areas can, I think, help you make progress.” The need to define a starting point for resilience work was similarly highlighted by (Spaans & Waterhout, 2017) in their case study of Rotterdam’s participation in the 100RC program. While some cities struggled to narrow their scope, other cities who had begun resilience work on a single environmental challenge, such as flooding risks, were challenged to expand their scope. Practitioners from these cities felt they had to rethink and reprioritize resilience to incorporate community engagement and social resilience as a core component. One practitioner, for instance, worried that the focus on

long-term risk mitigation and adaptation, central to their city's resilience definition, might be lost to present-day equity concerns, jobs, and affordability issues.

Practitioners concerns over trade-offs in scope and actionability find support in resilience, climate adaptation, and sustainability planning studies. (Lyles, Berke, & Overstreet, 2018) found that narrow-scope climate adaptation plans provide an advantage over broader-scope plans because narrow goals reference other city plans smoothly, incorporate land-use planning, and fit into routine planning assessments more seamlessly. Similarly, (Woodruff et al., 2018) found that while resilience strategies tend to recognize chronic social inequities, few resilience strategies prioritize issues and actions, which may limit outcomes. For sustainability organization, (Krause, Feiock & Hawkins, 2014) found that the scope of sustainability influenced where it was placed within cities, but conversely, administrative structures influenced whether cities adopted narrower or broader sustainability definitions and scopes.

As urban resilience becomes a more popular concept, some cities are feeling pressured to include more social resilience within their strategies. As one respondent put it: "It has been challenging to find the right definition. Is it long-term climate stressors, extreme events, or community equity affordability? Which one is it? Or is it all of these things? How do you break it up and focus on it? It becomes all of the things the city does." The tension between creating a comprehensive definition and selecting a starting point for action was clearer in cities expanding from a single-issue to a multi-factor approach to resilience. Departmental mismatch, staff capacity and resources tended to become larger barriers when shifting toward a broader resilience approach from a narrower focus. Several cities noted they had redefined resilience as climate change research advanced. Climate adaptation, for instance, only became a legitimate resilience approach after climate-change projection models started to discuss unavoidable negative impacts to cities. Reframing resilience within city plans and strategies then took several additional years to embed, revealing a lag time between continuous learning and implementation of new knowledge.

How resilience is defined is also highly influenced by external funding organizations. Several of our respondents explained the challenge of creating a comprehensive resilience strategy while pursuing different grant opportunities. For instance, one respondent noted: "I think one of the issues that we had was, because of funding, we piece-mealed the whole thing. We had all these different funding partners, they all started at different times, and I think if you were in a situation where you were self-funding or you didn't need the grant funding, I think you would step back

and look at the tools that are available and start from zero and work your way to the end.” Similarly, another respondent noted both the challenges and benefits in accessing externally available resources: “It’s great that there are all these resources and technical assistance opportunities out there, but I think that everyone uses resilience as a word in a slightly different way. It makes it very difficult to have a consistent and coherent idea of what it is and what it looks like going forward.” Urban resilience literature on governance understands that building resilience is an iterative, contextual process, but few studies have discussed the role in which the growing number of resilience funding opportunities shapes and dictates cities’ resilience agendas (Razafindrabe et al., 2014). Large funding programs like the Rockefeller Foundation’s 100RC incentivized cities to structure resilience according to their model. Now that 100RC is cancelled, researchers have the opportunity to examine cities choices to maintain that model or shift toward alternative governance strategies.

***Bringing communities into the process:***

Urban resilience literature on governance stresses the importance of knowledge co-production, trust-building and contextual goal-setting. We found that respondents generally agreed that these governance features were important to urban resilience work in their cities. Many respondents valued community engagement, with some cities heavily investing time in 1. Learning from residents and 2. Explaining long-term risks. These practitioners explained that understanding the context, challenges, and current state of the city requires public input and reflexive evaluation. For instance, one practitioner stressed the importance of defining resilience in partnership with community engagement: “Don’t assume that you understand what the problem is...Find out first. Talk to the people. Listen to them.” Many respondents emphasized a need for trust-building, listening, and prioritizing vulnerable communities to create a comprehensive strategy for resilience: “Don’t do it to the people. Include them. You’ll find out that you may have missed something very critical. Or you may have missed an opportunity to achieve great outcomes if you included the community at the beginning.” Involving stakeholders and community members early in the process is a recurrent theme in urban resilience governance literature, (Olazabal & Pascual, 2016). Practitioners generally noted a connection between engagement, risk communication and embedding resilience in governance. On explaining why it took three years to write a resilience strategy, one respondent noted, “Well, that’s how you make it permanent. So that would be my

advice. Don't rush it. Listen early, listen hard, listen long. Make sure you understand what you heard...then put it in with the bricks and mortar of your organization and, I think, that's what will build success in the long run."

While bringing communities into the process is critical, many respondents explained the challenges of risk communication, especially in terms of climate change risks. Making resilience tangible, increasing a sense of urgency, and explaining long-term climate risks is an ongoing challenge. Without spending time in risk communication, "[public engagement] becomes about short-term concerns from the community perspective...what's affecting them now." One respondent explained that it is easier to communicate some risks over others: "People more easily grasp flood risk, but we think heat vulnerability is a more eminent risk and something people don't appreciate because we are not used to dealing with it here...we have visualization techniques we can use for flooding, but you don't really have those for heat." Pilot projects have been one method to overcome risk communication issues. Philadelphia, for instance, received a grant to engage a vulnerable neighborhood on extreme heat, both to current understand experiences with heat risk and to communicate long-term risks based on projected increases. These pilot projects have potential to build collaborations and trust with local businesses, residents, and community organizations. Several cities mentioned interest in resilience hubs, which are "community-serving facilities augmented to support residents and coordinate resource distribution and services, before, during or after a natural hazard event" (Resilience Hubs white paper, USDN webpage). Rather than creating city-based resilience hubs, the Baltimore respondent explained that Baltimore is enabling community leaders and organizations that already serve "naturally" as their communities' resilience hubs by being the first to help during flooding events or other times of crisis. Baltimore is now signing memorandums of understanding with these community-drive networks to provide city resources such as generators and food.

### ***Championing the agreed-upon vision:***

Resilience is political, abstract, new and evolving. Both theory and practice suggest that strong leadership is needed to move urban resilience into practice (Meerow, 2017). Our interviews revealed several reasons why leadership is important to practitioners, including the need to create a sense of urgency, to coordinate and facilitate time-intensive and large-scale plans, and to ensure the authority, legitimacy and credibility of the work. Practitioners identified several levels of

needed leadership for success including, executive-level champions, departmental champions, and external champions. Administrative leadership must support resilience work for it to be sustainable across the organization. Providing staff, budget, and a sense of urgency creates the atmosphere for collaboration that resilience practitioners need for cross-departmental integration. Administration changes influence resilience work by putting plans on hold or by refocusing the work to new priorities. The short-term political cycle and the long-term goals of resilience planning can also be problematic. As one practitioner mentioned, it's difficult to maintain a sense of urgency, especially if actions "don't come to fruition in this election cycle, and that's always important." Urgency, practitioners noted, is easier to maintain after their cities' experienced disaster because then preparedness is on everyone's minds. Practitioners with strong executive-level support tended to emphasize successes over challenges and often associated their success with facilitated cross-departmental collaboration.

Another common theme in both literature and our empirical work is the importance of assigning roles and responsibilities to ensure accountability (Medd & Marvin, 2005). Practitioners brought up several reasons why clearly designating roles and responsibilities is critical to implementation. First, institutionalizing resilience is a time-intensive and large-scale endeavor. Practitioners must advocate for resilience continuously and against other pressing everyday priorities. Commenting on leadership, one respondent highlighted the creation of 30 departmental CRO positions by their administration. Designating these roles and responsibilities brought attention to resilience concerns and helped facilitate uptake of the concept into daily operations within each unit. Resilience practitioners noted that they must be passionate, "tenacious," and innovative in their approaches to resilience. Often, respondents had championed the concept first, by going after grant opportunities and building interest. As one respondent put it: "...I wanted to see this happen, so that's probably one of the only reasons why it ended up happening." Departmental leadership was often noted as the key reason for the depth of resilience uptake. Additionally, external leadership from businesses and community-enthusiasm helped to elevate resilience work.

***Balancing a centralized and dispersed approach:***

Capacity to work across city departments and with external partners is critically important to resilience governance. Resilience requires staff to help facilitate trainings, challenge 'siloed' departments, and embed resilience thinking across the institution. Urban resilience literature discusses the need to coordinate resilience-building efforts across scales, within planning documents and within the community. However, less is written about the tensions between centralized offices and achieving integration across city bureaus. Resilience is cross-cutting but seems to need some centralization to facilitate cross-departmental relationships. The majority of our respondents agreed that a centralized position or department was useful to gather support. Some interviewees, however, were unconvinced that resilience work should remain as a specific position or department after an initial diagnostic period. For example, one respondent felt that it was “the antithesis of resilience to have one person” assigned to that magnitude of responsibilities. The same respondent recommended housing resilience centrally for a short period, but then to have resilience “normalized really quickly” and become an embedded process across the institution. Other respondents described resilience officers (or similar positions) as integrators that were necessary for maintaining attention to long-term challenges. This tension between a centralized and a dispersed approach mirrors the theoretical debate on global trends of government decentralization. Some scholars argue that a decentralized governance approach, involving private and public partnerships with less central direction, enhances the resilience of a system (Ahern, 2011). Others feel that decentralized government can silo resilience work by involving too many entities without any coordinating element, hindering adaptation and transformation (Meerow, 2017).

Another difference in cities approaches was the level of integration between resilience planning documents and their city’s strategic plan. Some researchers recommend that resilience work should be integrated into existing planning documents to ensure the resilience approaches get incorporated across departments (Frantzeskaki & Tillie, 2014). We found similar sentiments among interviewees. Plan integration emerged as a key point of success for 8 cities that were able to incorporate resilience into broader planning strategies. Examples include: integration into city’s overall strategic plans, into a five-year FEMA hazard mitigation plan, a multi-hazard pre-disaster mitigation plan, a climate action plan, disaster preparedness and planning project, and sustainability plans. One practitioner mentioned that their goal is to integrate resilience as the city

strategic plan gets updated every two years, to: “blur the lines more and more between the two [plans] until, quick frankly, the resilience strategy itself is not a separate piece. It just becomes the city’s strategic direction.” While these are some tensions between a centralized and distributed approach to resilience, our interviews made it clear that practitioners’ goal is to distribute resilience strategies city-wide.

This trend toward full integration of resilience into other planning documents mirrors the idea of mainstreaming in climate change adaptation literature. Mainstreaming is the incorporation of mitigation and adaption strategies directly within typical city planning processes to streamline integration of climate consideration (Klein, Koenig, & Schmitt, 2017). As a broad, cross-cutting concept, urban resilience may benefit from mainstreaming processes. However, also like climate considerations, resilience plans are challenged to address multiple social, technical, and ecological issues. In recent research, (Berke, et al., 2018) developed a scorecard to assess resilience hazard mitigation strategies and found that resilience plans do not prioritize the most vulnerable neighborhoods to flooding. If urban resilience is to be incorporated within city-wide planning documents, the diagnostic phase of resilience challenges will be a key component to avoid maladaptation. Starting with a more narrow scope has potential to create more actionable strategies (Lyles et al., 2018) and perhaps bridge the gap between a slow diagnostic phase and implementation.

***Recognizing tradeoffs in organizational placement:***

There are trade-offs and tensions between housing resilience work in existing departments, cross-departmental committees or high to mid-management positions. Placing resilience close to leadership (e.g. city managers, mayors, deputy mayors, bureau and departmental directors, executive office of the city) facilitates wide-spread support for resilience across the city, helps get access to resources, and legitimizes the work. However, resilience work can then be politically vulnerable. One respondent, while advising resilience be placed in an executive -level position, also recommended that the office or position be established by law to ensure durability.

Some interviewees advised placing resilience work in middle management, where the strategy and positions are insulated from political turnover and where resilience officers can work with others responsible for daily implementation. Trade-offs, political and strategic, exist between the departments that are selected to house resilience. Some offices may silo resilience work by



boxing in the mission to a particular issue (e.g. infrastructure, flooding). One respondent mentioned that initially housing resilience work in their sustainability office made it difficult to discuss broader social and economic issues. Another respondent noted that having public works involved directly on resilience efforts “gives the work a lot of credibility,” rather than if it had only been initiated in their “environmentalist” office. Emergency management proved to be an office that the majority of respondents agreed was an essential partner, but not the right place to house resilience work. For instance, one respondent mentioned: “you just can’t have a team that is literally putting out fires all the time also leading recovery work.”

While our interview protocol primarily focused on city-scale resilience coordination, all of our respondents mentioned the importance of working across governing scales. Regional, state, and federal collaborations provided important information and financial resources. Additionally, cities resilience strategies were intertwined and limited by regional, state or federal authority over transportation, building codes or utilities. Cross-scale governance for resilience was important to all of the cities we interviewed, consistent with urban resilience governance literature (Duit, et al., 2010). In particular, smaller cities noted a limited capacity to build resilience at the city-scale similar to trends found by (Keenan, 2018). One respondent noted: “Right now, I feel a bit like I’m waiting to see what happens on a regional scale. It’s difficult to know what scale these things should be done and whether you should just pick one framework or model...or make use of all those different opportunities that are out there.” While cities are making different choices to structure resilience work, our interviews clearly showed that practitioners are networking, modeling frameworks, including the 100RC program, and developing strategies which mirror current trends.

### ***Conclusion:***

Urban resilience is a popular lens for cities to evaluate and address urban challenges. Our literature analysis and empirical work suggest that practitioners and scholars are discussing many of the same factors for effective urban resilience governance. The clearest overlaps are in definition and object setting, defining roles and responsibilities and community engagement. While theory and practice identify similar characteristics for effective resilience governance, scholars tend to define resilience according to broad, SES management issues and practitioners tend to emphasize city-scale resilience challenges. Practitioners adopt resilience to address

contextual urban challenges. Scholars typically consider bio-regional challenges, overlaying resilience concepts on cities. This disconnect is seen in how scholars and practitioners discuss multi-scale governance. While both understand the importance of multi-jurisdictional collaboration, practitioners look toward regional, state and federal agencies to address specific challenges and barriers, especially when there is a lack of local authority or financial resources. This difference suggests that scholars should consider municipal barriers to implementation more thoroughly. Defining resilience is challenging, however practitioners emphasized that their visions are limited by political context, staffing and budget, and funding incentives.

Comparing urban resilience governance to research on climate adaptation and sustainability governance could enrich theory and inform practice. Overlap in conversations are present in these streams of literature, especially regarding plan integration and diagnostic processes. Urban resilience scholarship would benefit from a close examination of the idea of mainstreaming. Sustainability departments, which are farther along in terms of incorporation within cities, offer an important comparison point to the process of institutionalizing resilience. This is an especially interesting contrast in that many practitioners emphasized that sustainability and resilience are not the same thing, yet resilience work was often placed within offices of sustainability. Perhaps this is because resilience practitioners are integrators who facilitate resilience thinking in the daily activities of cities. While theory focuses on the broad, regional scale resilience challenges, practitioners highlight the need for actionable projects, and perhaps, a narrow starting point to move resilience work forward.

One takeaway from our interviews is that resilience strategies pulled practitioners away from typical planning processes, adding a challenging level of coordination, but enabling a reflective planning process to occur. Practitioners repeatedly highlighted the value of urban resilience planning in enabling deep diagnostic thinking to occur. Scholars have the opportunity evaluate these diagnostic stages, potentially leveraging slower processes to facilitate more transformational strategies for implementation. Additionally, when practitioners identified chronic inequities they did not refer to these as resilient, but detrimental, features of their cities. Self-reflection on historical policies and planning practices which created and enable injustices to persist could be better framed as resilience challenges. Scholars critical of urban resilience could help shift conversations toward equity and transformation.

In a similar way, theory and practice discuss priorities from different angles. Urban resilience critics and enthusiasts want to see holistic resilience strategies that incorporate social, technological, and environmental factors into planning. While practitioners generally adopted holistic definitions of resilience, they more frequently identified barriers to implementation, including piece-meal funding opportunities, risk communication, political will, and limited resources. Local dynamics, including the presence of champions and disaster experiences also impact decision-making at the city-scale. Practice links resilience directly to limitations. Understanding local barriers and trade-offs will clarify steps toward implementation. Our research is one of the first examinations of how resilience is being structured and organized by city practitioners. We present key insights from practice which will influence theoretical discussions on urban resilience governance and implementation. Results from this study suggest that urban resilience theory should consider urban context in a more critical light. Urban resilience planning is still in early stages of implementation, presenting an opportunity for additional guidance and support. Linking climate adaptation and sustainability governance literature to social-ecological systems literature would strengthen understanding of implementation processes for a cross-cutting and complex concept like urban resilience.

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## APPENDIX A: Interview Questions

1. **Definition: How is resilience defined or framed for your city?**  
 [can ask for both their personal definition and the city's definition]
  - a. How has that definition emerged and/or evolved over time?
  - b. What risks/impacts is your resiliency work focused on? (seismic, climate, other)
  - c. Is recovery planning a core component of your city's resilience work (i.e., developing plans for medium- to long-term rebuilding and repair, NOT near-term emergency response)?
  - d. How is equity and/or prioritizing vulnerable communities factored into your city's resilience and/or recovery work?
  
2. **Organization: How is your city's resiliency work organized or operationalized?**
  - a. Is it centralized (e.g. led by a single position or department) or dispersed (e.g. multiple staff in different departments)?
  - b. What type of staff are primarily involved with advancing and/or leading this work? (e.g. engineers, planners, emergency responders, political staffers, etc.)
  - c. Is the work primarily focused internally (e.g., infrastructure, planning/code, etc.) or externally (e.g., community engagement).
  - d. Is there a dedicated position(s) to lead this work? If so, how many FTE and in what role(s)?
  - e. If there is a dedicated position (e.g., Chief Resilience Officer):
    1. Where is it positioned within the institution?
      1. What are the core responsibilities?
      2. What authority, budget or other mechanisms for influence does the position(s) hold?
      3. How was the position created?
  
3. **Collaboration**
  - a. Who would you say are the 5 people you work most closely with on resilience? What are their positions and organization?
  - b. What departments would you like to work with but haven't yet? Why?
  - c. What other organizations in [city] do you work with?
    1. [Referring to first organization they mention] Tell me a little more about the nature of this collaboration.
  
4. **What is working well?**
  - a. Particularly, what about how your city's resiliency work is internally organized/operationalized has been successful?
  - b. Who have been the biggest champions or change makers?
  - c. What have been your biggest successes or innovations? What were the critical factors that led to their success?
  
4. **What has been challenging?**
  - a. Particularly, what about how your city's resiliency work is internally organized/operationalized has been challenging?
  - b. How have you worked through/around those challenges?

- c. What would you change about how your city approaches resiliency work if you could?
5. **If you were to give advice to other cities seeking to advance their resilience work, what would you tell them?**
- a. What do you know now that you wish you knew then?
  - b. Are there other people in your city, other cities or other organizations, that you think we should talk to?

## APPENDIX B: Practitioners' Advice in Representative Quotes

### Resilience staffing, placement, and responsibilities:

- "Make sure your resilience officer is placed at the senior cabinet level and not placed under a department that has more narrow function (e.g. planning, public works, economic development, etc.). In addition, resilience officers can't do the work alone; they need to have additional capacity and resources necessary to work across city agencies and outside partners and stakeholders. It is also advised that the office (or at least position) is established in either charter or ordinance (law) to ensure continuity of the mission and work, even as administrations change"
- "Keep your leadership in the loop about what you're doing, and that they feel like that they're giving you feedback and that they're owning it for both administration and elected leadership; make sure your well-staffed"
- "Appoint a leader of the work that has the power of the mayor, council, etc. behind them. So give them authority to go do their work but make sure that they have the right team of folks who are also working with them to make it happen"
- "I think its critically important to have people leading the effort, to have experience across various paradigms and subject matter focuses that are often involved in resilience thinking...identify people who have kind of a broad jack-of-all-trades experience to help facilitate the conversations that need to be had"
- "Increase the capacity of your staff - hire somebody to work on it, funding can come from finding grants rather than the general fund, but find it because If it's not somebody's job, it just gets passed around and it will not get done"

### Starting with a rigorous diagnostic phase:

- "Look at resilience across multiple sectors for co-effects; find things that in common better issues; don't have to have a big strategy to start resilience work, you are probably already doing it in some capacity - so start with assessing what is already happening, -that stock taking in important"
- "Challenge everything you think you know about your city. Don't be afraid to pick it apart and do it publicly. That's so important. And I think particularly in a city that has had a lot of successes, start to challenge whether those successes are enough. And don't try to put resilience in a box where you think it fits...Don't assume that you understand what the problem is...also "resilience and sustainability are different."
- "Before embarking on something like this [you need] to stop, to step back and to look at everything before starting."
- "The starting points and trajectories are totally different [for each city] so keeping that in mind is really important...you have to be able to kind of adapt and have your own kind of resilience built in order to see accomplishments take place"

### Data-driven decision-making

- "Try to understand your climate risks with some rigor...using the best science available" and "bring the community along with you."
- "Just start with data. I think, having access to the science and the data is really, really important...I would say prioritize and sequence, think about what the most impactful strategies are. I would say it's a learning process, make sure that you are creating space for learning along the way, and incorporating those lessons."
- "Think of the importance of data and need for collaboration (in this case between city and university) and capital planning."

### Definitions:

- "Defining is key and the scope, also there is difficulty in measuring success (especially with equity and disaster preparedness)"
- "So I think that it's almost folly to try and define resilience for a city because that is going to change everyday...When you talk to people in the community about resilience you can often find yourself in a very personal conversation and you need to be really sensitive about that/ I think that's both a point where you

can really engage people and get buy-in or you can really damage your relationship by being insensitive to that."

**Community engagement:**

- "Bring the community along with you...there is a lack of trust and it's increasing, from the federal level of our government, all the way down to the local. Its going to take the local government to sustain and strengthen that trust between local government and its people"

**Equity**

- "I think the equity lens is just a crucial component of resilience in this day and age and really needs to be highlighted and thought about well in advance...Thinking not just now but in the long term, who and what are vulnerable and then coming up with a strategic way to address that"
- "So for me, equity is the foundation to resilience."

**Interdepartmental collaboration:**

- "I think being intentional about fostering [interdepartmental] groups is really important, whether those are groups that you're creating yourself, or whether those are groups that are already starting to appear, and you have the opportunity in whatever capacity you are in....So I think kind of being flexible, but really recognizing that because this is, for most cities, never going to be the number one priority, how do you kind of fit this into existing processes is super important, and we've had some pretty good luck doing that."