What It Means to Become "More Resilient": An Analysis of Local Resilience-Building Approaches in Three Florida Communities

HANNAH TORRES AND KAMAL ALSHARIF

University of South Florida, Tampa, Florida

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ABSTRACT

From international to local scales of governance, resilience building is being presented as the way to prepare for impacts of both slow- and quick-onset disasters. Having transitioned from ecological to social applications, the concept of resilience has multiple interpretations, and definitions tend to emphasize both resistance to and acceptance of transformational change. The purpose of this research is to investigate how the concept of resilience is being conceptualized in three south Florida communities in order to understand and compare what ideal types and dimensions of resilience are prioritized at those local scales. To do this, content analyses of city and county documents were conducted to extract explicit definitions of resilience as well as implicit definitions based on context clues using carefully selected keywords. The term resilience appeared 684 times in documents from Broward County, Lee County, and the city of Punta Gorda, yet only one document provided any explicit definition. Based on a keyword analysis, the engineering resilience concept was most prevalent across all three study areas. Furthermore, keywords related to the dimension of the built environment were most common by far in Broward and Lee Counties. While this could indicate a need for communities to shift toward more progressive, social–ecological conceptualizations of resilience, a more central conclusion of this research is that local applications of resilience frameworks need to be more explicit about how they define resilience and what resilience building looks like in that particular context.

1. Introduction

During the Atlantic hurricane seasons of 2004 and 2005, an astonishing 15 named storms made landfall in the United States, setting a number of records for the quantity and magnitude of tropical cyclones (NOAA 2005, 2006). Perhaps due in part to this unprecedented meteorological activity, the term resilience has become prominent in fields such as disaster management and global environmental change, as seen in reports such as the National Academies' *Disaster Resilience: A National Imperative* (National Academies 2012). First emerging as a concept in ecology, Holling (1973, p. 14) defined resilience as "a measure of the persistence of systems and their ability to absorb change and disturbance and still maintain the same relationships between populations or state variables." Since then, resilience has been increasingly applied as a framework to manage future uncertainties in complex social–ecological systems, which consist of a resource system along with its users and governance systems (Folke 2006; Garmestani and Benson 2013; Nelson et al. 2007; Ostrom 2007). This transition toward more social applications has led to multiple interpretations of the concept, creating challenges for implementing resilience frameworks at local scales (Davidson et al. 2016; Fisichelli et al. 2016). For example, if one interprets resilience as the ability to quickly return to some original condition, then a community could be considered resilient even if it returns to an unsustainable or vulnerable condition following a disturbance. However, if one interprets resilience as integrating elements of change and adaptability, the same community would be considered nonresilient for its inability to transform to a more desirable condition.

Despite some ambiguity of the concept, resilience is often held up as a "holy grail" for which environmental managers at multiple levels should strive. For instance, at a national level in the United States, federal agencies are now required by executive order to integrate resilience into international development programs; the U.S. Department of Housing and Urban Development

Corresponding author: Hannah Torres, hrtorres@mail.usf.edu

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launched a $1 billion (U.S. dollars) National Disaster Resilience Competition for cities; the National Oceanic and Atmospheric Administration (NOAA) released a U.S. Climate Resilience Toolkit; the U.S. Agency for International Development (USAID) announced a Global Resilience Partnership; and President Obama initiated a Task Force on Climate Preparedness and Resilience (White House 2016). The list of resilience-building initiatives could stretch on. At this grand scale, resilience tends to be defined rather abstractly, which may facilitate its flexibility for context-specific applications at local scales. The National Academies' report, for example, defines resilience as "The ability to prepare and plan for, absorb, recover from, or more successfully adapt to actual or potential adverse events" (National Academies 2012, p. 16), which aligns with national and international definitions [United Nations Office for Disaster Risk Reduction (UNISDR) 2011; Subcommittee on Disaster Reduction 2005; Department of Homeland Security (DHS) Risk Steering Committee 2008; National Research Council 2011]. Yet this description does little to inform local governments whether resilience-building should prioritize resistance to or acceptance of change in the face of disturbance. Moreover, it leaves open the idea of what it means to "more successfully adapt."

Research has shown that narratives of resilience can be empowering, and a community that self-identifies as resilient and self-reliant is more likely to respond proactively to disturbances than one that self-identifies as vulnerable (Farbotko and Lazrus 2012). However, this begs the question of whether such a response is due to the framing of the problem or due to a certain set of resilient practices or characteristics. Some scholars, like Benson and Craig (2014, p. 780), fear that at its current stage of development; "resilience is in danger of becoming. . .a rhetorical device with little influence on actual decision making."

The National Academies (2012) report and other academic literature (Brand and Jax 2007; Cutter et al. 2008; Davidson et al. 2016; Gunderson et al. 2010; Garmestani and Benson 2013) have made extensive efforts to categorize different types of resilience and make recommendations for implementing resilience frameworks in complex social–ecological systems. However, little has been done to understand how practitioners, particularly at local levels of governance, conceptualize resilience (Aldunce et al. 2015). This type of understanding is critical, considering the relevance of cross-scale dynamics in much resilience literature (see, e.g., Gunderson and Holling 2002; Folke et al. 2003; Carlsson and Berkes 2005; Garmestani and Benson 2013; Sundstrom et al. 2014).

The purpose of this research is to assess and compare how localities define resilience in order for larger-scale, resilience-building efforts to more effectively frame their resilience goals. Toward this aim, our research investigates how the concept of resilience is being used in local government documents in three Florida communities in order to 1) better understand what resilience ideal type (engineering, ecosystem, or social–ecological resilience) resonates most prominently and 2) determine which dimensions of resilience (social dimensions, built environment, economic development, population, and governance) are being prioritized in planning and how they are being balanced. As communities are acting locally to reach goals set at larger scales (like building national resilience), research like this is imperative so communities can ensure that they are, indeed, working toward a common vision of national resilience, even though local strategies may vary. For example, infrastructure hardening, like modifying sea walls to withstand more extreme storms, may be a local resilience strategy. Yet, if not adequately complemented by longer-term strategies like enhancing multilevel governance, infrastructure hardening may do little to enhance a community's ability to cope with unanticipated disturbances.

The rest of this paper is structured as follows: Section 2 provides a background and justification of the resilience ideal types and dimensions being analyzed. Section 3 describes the methods used for a content analysis of local government documents. Section 4 presents the results of this research along with discussion points, and section 5 concludes the article, providing recommendations for the local application of resilience concepts.

2. Resilience ideal types and dimensions

Resilience is often categorized into two or more basic ideal types (Brand and Jax 2007; Davidson et al. 2016; Folke 2006; Gunderson et al. 2010; Holling 1996; Walker et al. 2004). Building off Folke (2006), this research emphasizes three basic types of resilience: engineering, ecosystem, and social–ecological.

a. Engineering resilience

Engineering resilience is generally thought to be the most narrow, short-term interpretation of the resilience concept and refers to how quickly a social–ecological system can return to a single steady state, or equilibrium, following a disturbance event (Holling 1996). In other words, this interpretation implies a desirability to bounce back to some initial condition or state. Engineering resilience tends to view nature as balanced, emphasizing resistance to change, conservation of the status quo, and the prediction and management of resources for the sake of optimal production (Folke 2006; Gunderson and Holling 2002). Managing for engineering resilience often entails imposing static goals on

dynamic systems to reach social, economic, or engineering objectives, causing them to be "more spatially uniform, less functionally diverse, and more sensitive to disturbances that otherwise could have been absorbed" (Holling 1996, p. 36). This type of resilience tends to give little attention to the frequency and extent of disturbances or to the spatial heterogeneity of systems (O'Neill 1998).

b. Ecosystem/ecological/social resilience

Ecosystem resilience (which integrates ideas from ecological and social resilience) moves away from the single steady-state paradigm toward a complex adaptive systems approach (Folke 2006). This conceptualization acknowledges the unpredictable, dynamic, and process-dependent nature of ecosystems, favoring regeneration, renewal, and reorganization over recovery (Bellwood et al. 2004; Folke 2006). According to Levin (1998), complex adaptive systems, which can include coral reefs, urban coastal zones, or any other large assemblage of living and nonliving entities, are difficult to model and predict because higher-level processes are driven by localized interactions. This means local actors have some agency to effect change in larger social, economic, and environmental structures from the bottom up, reducing predictability.

While Levin's (1998) conceptualization of ecosystem resilience emphasizes heterogeneity, it also continues to assume resistance to change as the overarching goal of resilience, describing resilience as becoming better "buffered to changes" (Levin 1998, p. 431).

A number of essential elements have been identified to enhance ecosystems' capacities to withstand shock and maintain function in the face of disturbance. These include diversity, individuality of individual components, continual adaptation, and cross-cutting hierarchical organization (Levin 1998; Janssen and De Vries 1998; Folke 2006). Whereas engineering resilience approaches to disaster management would likely prioritize the need to build back quickly after a disturbance, ecosystem resilience approaches would prioritize the need to build back better, promoting diversity of ecological systems, institutions, and livelihoods and improving buffer capacity or the ability to withstand disaster impacts in the first place (Adger et al. 2011; Aldunce et al. 2015).

c. Social–ecological/adaptive resilience/structural resilience

Social–ecological resilience is the broadest resilience ideal type explored in this research. Advancing from Holling's earlier work on ecological resilience, regarding the ability to absorb disturbance, the adaptive renewal heuristic model is a useful tool for understanding resilience from a social–ecological perspective.

This model of ecosystem dynamics is premised on four phases of development: periods of rapid change (exploitation or r phase), periods of growing rigidity (conservation or K phase), periods of readjustment or creative destruction (the release or Ω phase), and periods of renewal (reorganization or α; Gunderson and Holling 2002). While management strategies in the engineering and ecosystem resilience paradigms have focused on the exploitation and conservation phases of development, social–ecological resilience approaches recognize destruction and reorganization as equally important elements of development (Gunderson and Holling 2002; Folke 2006).

Hence, social–ecological resilience acknowledges the necessity and inevitability of disturbance in ecosystems and promotes management strategies that balance resistance to change with the need to take advantage of opportunities for desirable transitions that may open up during or after a disturbance (Folke 2006; Walker et al. 2004; Smit and Wandel 2006). So while buffer capacity and ecosystem resilience are also important in a social–ecological resilience framework, this ideal type also emphasizes flexibility and adaptiveness (as opposed to adaptedness; Folke 2006). Social learning, self-organization, collaborative research and management, and transformability are some key components of social–ecological resilience (Folke 2006; Lambin 2005).

d. Four dimensions of resilience

In an effort to bridge the gap between conceptualizations of resilience at national and local scales, the National Institute of Standards and Technology (NIST)'s Science and Technology Policy Institute developed a report about how various communities are implementing resilience approaches into their local governments (Gupta et al. 2016). In the NIST report, four dimensions of resilience were synthesized from previous research, including Cutter et al.'s (2008) Disaster Resilience of Place (DROP) model and Norris et al.'s (2008) theory of community resilience, and then indicators for each dimension were constructed and analyzed. Cutter et al.'s (2008) DROP model emphasizes social resilience to natural hazards, representing the association between vulnerability and resilience. Adger (2000) defines social resilience as the communities' ability to cope with impacts of social, political, or environmental change. While it is clear that vulnerability and resilience are related concepts, the nature of their relationship tends to be ill-defined. According to Gallopin (2006), vulnerability is best considered in terms of changes in a system, while resilience is an internal attribute. The theory of community resilience poses that communities build resilience by reducing

TABLE 1. Four dimensions of resilience with search terms, or codes, used to represent each. Adapted from IDA Science and Technology Policy Institute Resilience Analysis. Table adapted from Gupta et al. (2016).

Population and governance	Economics	Built environment	Social dimensions
Municipal government	GDP	Built environment	Vulnerable
City government	Income	Energy	Children
Population	Per Capita	Power	Elderly
Funding	Employment	Natural Gas	Foreign
Budget	Jobs	Liquid Fuels	Disability
	Industry	Water	Senior citizens
	Property values	Wastewater	Uninsured
	Economy	Transportation	Unemployed
		Roads, bridges, tunnels	Religion
		Public transport/transit	Crime rate
		Maritime	Voter
		Communications	Food
		Housing	Education
		Hospitals	Income

risks and resource inequalities, while enhancing local engagement and flexibility to ''plan for not having a plan'' (Norris et al. 2008, p. 127). The four dimensions include population and governance, economics, built environment, and social dimensions. Keywords, or codes, for each dimension of resilience were adapted from Gupta et al.'s (2016) report (Table 1). Because social–ecological systems emphasize the interaction between natural resource systems and their users, environment is not represented as its own dimension but is instead tied into the terms representing the other more human-oriented dimensions. According to Gupta et al. (2016), all of these dimensions must be considered when assessing a community's resilience to any unanticipated disturbance, whether it be human or natural.

3. Methods

a. Research design

This research uses content analysis of government documents, presentations, and reports to address the research question of how resilience is being defined, conceptualized, and applied in three Florida communities. Similar to a discourse analysis, this work explores various storylines about resilience to uncover how meaning is given to the concept either explicitly or through contextual clues (Aldunce et al. 2015). However, since this study is looking strictly at how the term is defined and used in a particular set of documents rather than across a variety of practices and contexts, content analysis more appropriately describes the method used here.

Broward County, Lee County, and the city of Punta Gorda were selected as the study areas for this research since these communities are exposed to risks from both slow-onset disasters (e.g., climate change, sea level rise) and fast-onset disasters (e.g., hurricanes, flooding, coastal erosion) and because the Florida chapter of the American Planning Association (APA) highlighted these three places on their website as having exemplary plans for creating more resilient communities (APA Florida 2016; Fig. 1). For instance, Broward has its own Division of Environmental Planning and Community Resilience and received a grant from NOAA and the Florida Department of Environmental Protection called ''Working Toward Resilient Coastal Communities.'' Broward County has also collaboratively created a vision for climate resilience and has worked with a regional climate compact to host multiple Resilient Redesign workshops, where ''experts and stakeholders developed potential design solutions to the evolving urban challenges of climate change and natural hazards'' [Southeast Florida Regional Climate Change Compact Counties (SFRCCC) 2015]. Yet these communities' definitions and perceptions of resilience guide the choices they make for becoming more resilient. Therefore, this research seeks to understand local conceptualizations of the term and determine how local definitions align with national and international definitions.

b. Document and segment selection

To understand how communities conceptualize resilience at a local scale, local government documents were collected for analysis of resilience definitions. Documents were selected by conducting a web search of all PDF documents on the counties' or city's official websites. For example, in Broward County the search included all PDFs from the website www.broward.org with the terms ''Broward County'' and any form of the word ''resilient.'' Because the most recent hurricane to make landfall in Florida was Hurricane Wilma on 24 October

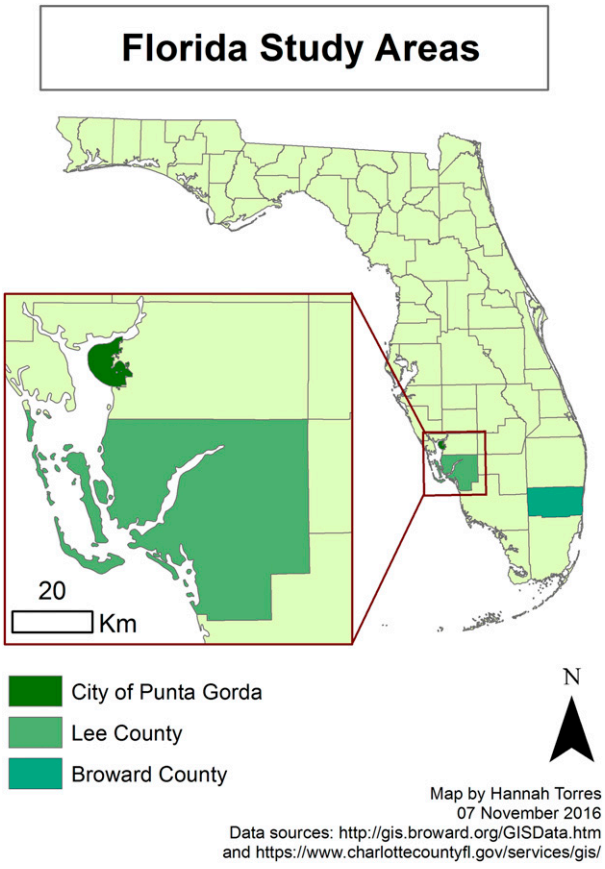

FIG. 1. Location of study areas.

2005, documents were selected from that date through the date the search took place (24 March 2016).

The initial search for Broward County yielded 103 documents of various lengths. Duplicate results were excluded, along with meeting minutes and agendas. Documents were also excluded if the only occurrence of the term resilience was in the phrase "Environmental Planning and Community Resilience Division," referring to an agency located within Broward's Department of Environmental Protection and Growth Management. After these exclusions, 63 documents (over 3300 pages) remained for analysis in Broward County, including various reports, elements of the county Comprehensive Emergency Management Plan, planning documents and drafts for discussion, presentations, and city-level vulnerability assessment reports.

The initial document searches for Lee County and the city of Punta Gorda yielded far fewer results, with 8 and 17 documents, respectively, which may be due to their smaller sizes and populations. According to the 2010 U.S. census, Broward comprises 31 municipalities and nearly 1.9 million residents, compared to Lee County which has only 6 cities and about one-third the population. The city of Punta Gorda is a single municipality with a population just over 17 000. Yet despite differences in size and population, the three communities face similar risks, share similar climatic conditions, and have developed plans for resilience, making a comparison valid.

For Lee County and Punta Gorda, duplicate documents were also excluded along with those where the only occurrence of the word resilience was in the context of "resilient-seated shutoff valves," referring to sprinkler system requirements. Furthermore, since neither the website for Lee County nor Punta Gorda provided access to the plans highlighted by APA Florida, Beever et al. (2009, 2010) were sought out manually for inclusion in the analysis. In the end, seven documents were included for Lee County (over 1800 pages) and eight for Punta Gorda (nearly 860 pages).

These documents were imported into MAXQDA, a qualitative analysis software, where a lexical search was performed to locate each instance where the word (or any form of the word) resilience appeared. Then each paragraph where the word resilience appeared was extracted by hand (in presentations, the entire page, or slide) for further analysis, except when the context could not be determined (e.g., in presentations that listed the word resilience as a bullet point, without any further explanation). These extracted paragraphs and presentation slides are referred to hereafter as segments. In all, 234 segments including a form of the word resilience were extracted for analysis in Broward compared to 95 segments in Lee County—many of which contained more than one instance of the resilience—and only 24 segments in Punta Gorda.

c. *Coding scheme*

To begin, segments were manually scanned to parse out any explicit definitions of resilience provided within. Next, a coding scheme was developed for the resilience ideal types using carefully selected keywords in order to provide context clues about what resilience ideal types and/or dimensions were being emphasized in the segments (Table 2). Keywords were drawn from definitions of the resilience ideal types found in academic literature (Bellwood et al. 2004; Folke 2006; Gunderson and Holling 2002; Holling 1996; Janssen and De Vries 1998; Lambin 2005; Levin 1998; O'Neill 1998; Smit and Wandel 2006; Walker et al. 2004). There were 17 keywords, or subcodes, chosen for each resilience ideal type. For most keywords, all grammatical forms were searched within the segments, and in some cases synonyms were also searched and coded. For instance, integrative science was a keyword for the social–ecological resilience ideal type. Segments were searched for all forms of the word integrative as well as for various

TABLE 2. Resilience ideal types with keywords or codes used for analysis. Table adapted from Folke (2006).

Resilience ideal type	Characteristics	Focus on	Keywords codes for analysis
Engineering	Return time, efficiency	Recovery, constancy	Armor, constancy of system, control, efficiency of function, equilibrium, expert led, fortify, harden, predict, rebound, recovery, regulate, resistance, restoration, return time, stability/stable state, top down
Ecosystem/ecological/ social	Buffer capacity, withstand shock, maintain function	Persistence, robustness	Absorb, adaptability, buffer, complex, conserve, diversity, ecosystem, unstable/instability, maintain, persist, preserve, regenerate, renew, reorganize, robust, sustain, withstand
Social–ecological/ adaptive/structural	Interplay disturbance and reorganization, sustaining and developing	Adaptive capacity, transformability, learning, innovation	Adaptive capacity, adaptive management, change, collaborate, coordinate, cross-scale/multilevel, dynamic, innovation, integrative/interdisciplinary, knowledge sharing, learning, opportunity, renewal, self-organization/decentralization, sustainable development, transform, transition

spellings and hyphenations of interdisciplinary and multidisciplinary.

If certain keywords were used in the same paragraph as the term resilience, the assumption was that those concepts were either implicitly or explicitly being linked to the concept of resilience, providing evidence of how resilience was being conceptualized. After keywords were searched, they were automatically coded and then manually read to determine their context and usage within the segments. Although some keywords had zero hits in the resilience segments, the terms remained part of the coding scheme since the absence of a keyword can provide as much information as the presence of one.

After documenting the occurrence of keywords related to each resilience ideal type, a second coding scheme was developed to determine what dimensions of resilience were most prominently emphasized in each community. This coding scheme used keywords, or subcodes, adapted from Gupta et al.'s (2016) indicators of the four dimensions of resilience, shown in Table 1. In this case, each dimension had a different number of keywords, with population and governance having the least (5) and built environment having the most (17). Economics and social dimensions had 8 and 15 keywords, respectively. To account for this variation, data about resilience dimensions were analyzed using normalized frequencies.

4. Results and discussion

a. Definitions of resilience

This research set out to understand how different types of resilience were being defined and conceptualized at local levels in three Florida communities. While there was an expectation that explicit definitions of resilience may be few and that definitions would likely emphasize resistance to change, a surprising result of this research was that only one of the study areas, Lee County, provided any explicit definition for resilience, despite all three places citing resilience as a major goal in planning documents, policies, and presentations.

Lee County's 2010 Climate Change Resiliency Strategy (CCRS) was created as the second component of a contract with the Southwest Florida Regional Planning Council, with the first component being a Climate Change Vulnerability Assessment. The CCRS was exceptional in that it not only defined resilience but differentiated between ecological resilience, climate change resilience, and system resilience and, moreover, explained the relationship between resilience and adaptation (Table 3). After defining these and other terms in the introduction, the CCRS outlined seven elements considered desirable for any resilience plan. These included flexibility from individual to systemic levels; a multifaceted skill set; redundancy of processes, capacities, and response pathways; collaborative, multisector approaches to planning, execution, and recovery; planning and foresight to prepare for identified risks; diversity and decentralization of planning, response, and recovery efforts; and plans for failure "so that break-downs happen gracefully, not catastrophically" (Beever et al. 2010, 13–14). These elements clearly reflect principles of social–ecological resilience, acknowledging the inevitability of the destruction and reorganization phases in Gunderson and Holling's (2002) adaptive renewal cycle model.

Lee County went on to call their resilience strategies "alternatives to consider" (Beever et al. 2010, p. 11), and these strategies were influenced both from the top down and bottom up. Using the U.S. Environmental Protection Agency's recommendations for resilience planning, Lee County's resiliency strategy described particular implementation actions, summarized how actions were selected and prioritized, communicated with stakeholders and decision-makers, and created a

TABLE 3. Key definitions exactly as provided in Lee County's 2010 Climate Change Resiliency Strategy.

Term	Definition/explanation
Climate change adaptation	An adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, an adjustment that moderates harm or exploits beneficial opportunities (Beever et al. 2010, p. 13, 141).
Climate change resilience	The capacity of an individual, community, or institution to dynamically and effectively respond to shifting climate impact circumstances while continuing to function at an acceptable level. It is the ability to survive, recover from, and/or live with the effects of climate change. It includes the ability to understand potential impacts and to take appropriate action before, during, and after a particular consequence to minimize negative effects and maintain the ability to respond to changing conditions (Beever et al. 2010, p. 13, 141).
Resilience (in ecology)	Building the capacity of a system to withstand perturbations and shocks and to rebuild and respond to change, including unanticipated change. Resilience (in planning) as the capacity of a system to absorb disturbance, undergo change and still retain essentially the same function, structure, identity, and feedbacks (Beever et al. 2010, p. 13, 141).
System resilience	Resilience is not simply the result of adding up resilient individuals. The uncertain nature of climate impacts means that no one individual or institution can possibly prepare for, or recover from, all of the potential scenarios. Therefore, resilient systems are required. Systems are combinations of resources, institutions, individuals, and processes that combine to accomplish a set of specific functions. To achieve resilience, systems build redundancies of resources, multiple response paths, and safety nets (Beever et al. 2010, p. 15).

plan to monitor and evaluate results (Beever et al. 2010). However, the specific strategy areas and actions included in the document were determined through stakeholder surveys and interviews, providing locally relevant perspectives.

In Broward County, none of the 234 segments mentioning the word resilience provided an explicit definition. In fact, seven of the documents mentioning resilience were cities' sea level rise vulnerability assessments, created in 2014–15 as part of the "Working toward Resilient Coastal Communities" grant. However, no segments were extracted from these reports at all, since none mentioned resilience aside from two subtitles referencing the grant. On the other hand, the seven reports did mention some form of the word "vulnerable" a total of 645 times.

This finding was notable given warnings from scholars like Susan Cutter, who caution against positioning vulnerability as the opposite of resilience, since doing so may imply that vulnerable people or places lack resilience rather than viewing resilience as a strategy or resource that can be developed (Cutter et al. 2008; Thoma 2014). While vulnerability assessments are essential for identifying people and places that are at risk, it is equally important to recognize measures vulnerable groups can take to increase their resilience (Thoma 2014). As such, vulnerability assessments should be conducted in conjunction with resilience plans whenever possible to emphasize communities' agency to reduce potential future risks (as was done in Lee County).

At the other end of the spectrum, a 2012 Regional Climate Action Plan, created by Broward and three other counties as part of a regional climate compact, mentioned the word resilience over 40 times, which was more than any other single document. The plan claims it "creates a common vocabulary. . .to effectively communicate the steps from risk to resilience with the general public, voters, elected officials and decision makers in Southeast Florida, the state and the nation" (SFRCCC 2012, p. v), seemingly recognizing the need to use clear, consistent terminology. Yet the plan consistently included calls to create, maintain, improve, enhance, increase, maximize, or move toward resilience, without any explicit definition of the term.

The plan does identify several focal areas under which 110 action steps are categorized, which could provide insight about how resilience is perceived. These areas included providing a common framework for sustainable communities and transportation planning; protecting and addressing vulnerable water supplies, management, and infrastructure; preserving natural and agricultural systems; decreasing energy and fuel consumption; integrating climate change hazards into risk reduction and emergency management; and creating a common vocabulary for outreach and public policy (SFRCCC 2012). Unlike Lee County, which balanced preparing for known risks with preparing for unanticipated disturbances, Broward appeared to emphasize known vulnerabilities and specific risks.

Other segments of the 2012 Climate Action Plan, from Broward County's website, provided additional insight into how resilience was being conceptualized:

> [The Southeast Florida Regional Climate Change Compact] respects the diversity of the region and the autonomy of the many governing bodies (SFRCCC 2012, p. 1).

> The regional scale of the resilience strategies effectively integrate human and natural systems (SFRCCC 2012, p. 1).

Referenced in these quotations, diversity and human–natural system integration are common themes in ecosystem resilience frameworks, whereas collaboration and autonomy of governing bodies are concepts often seen in social–ecological resilience. Thus, one could infer that the 2012 Regional Climate Action Plan may look toward resilience-building strategies that balance goals from ecosystem and social–ecological resilience frameworks.

While the city of Punta Gorda was not as explicit as Lee County in defining resilience, its comprehensive plan generally stated that "climate resiliency planning provides a planning framework for addressing the physical, economic, environmental, and social impacts that changes in climate are expected to have on the City of Punta Gorda" (City of Punta Gorda 2016a, p. 2B-26). This definition is reminiscent of definitions for sustainability that use the triple bottom line approach to address economic, environmental, and social factors in planning, although physical impacts are also added to the equation.

In their adaptation plan, Punta Gorda outlines five general objectives for addressing climatic changes: 1) increase robustness of infrastructure, 2) promote flexibility in managed systems, 3) enhance adaptability of vulnerable natural areas, 4) reduce trends that increase vulnerability (like overdeveloping coasts), and 5) improve education and awareness (Beever et al. 2009; Klein and Tol 1997). Like Lee County, Punta Gorda identified local vulnerabilities and adaptation actions through participatory processes, including workshops where attendees played vulnerability, adaptation, and acceptability games that helped group members analyze alternative actions and locations for their implementation.

Hence, based on the explicit and implicit definitions of resilience found in local documents, there are some initial differences in how each study area uses the term. In Lee County, definitions are deliberate and explicit, tending toward the social–ecological resilience paradigm and accepting uncertainty and flexibility as central tenets for planning. Broward County uses the term resilience frequently, yet somewhat generically, without apparent critical reflection of its multiple meanings. Furthermore, Broward's explanations of resilience are more focused on preparing for known risks than uncertain futures. The city of Punta Gorda tends to emphasize adaptation more than resilience in their documents, though their objectives for addressing climate change reflect many of the principles of social–ecological resilience, like promoting flexibility and adaptability.

Regardless of these differences, all three study areas identified similar categories of issues they were seeking to address (dubbed resiliency strategy areas in Lee County, goal areas or action areas in Broward County, and climate change vulnerabilities in the city of Punta Gorda). Categories that appeared across all study areas included infrastructure, public policies and programs, land-use management, water supply, natural systems and resources, and education/outreach (Beever et al. 2009, 2010; Broward County Climate Change Task Force 2010; Broward County 2015b; SFRCCC 2012).

To determine other similarities and differences between study areas' local perceptions of resilience, the next section discusses results from a keyword analysis conducted for each resilience ideal type.

b. Resilience ideal types

1) ENGINEERING RESILIENCE

Overall, keywords related to engineering resilience made up the greatest proportion of occurrences in both Lee County and Punta Gorda's extracted segments, composing 41% and 53% of overall keyword occurrences, respectively. In Broward County, engineering resilience keywords were tied for most frequent with ecosystem resilience, composing 37% of all engineering keywords. When comparing the prominence of each keyword across the three study areas, there were some key similarities and differences (Fig. 2a).

In the extracted segments for Broward and Lee Counties, forms of the word "regulate" (including searches for the terms policy and law) were by far most common, making up 50% and 45% of all engineering keywords, respectively. In Broward segments, occurrences of the keyword regulate were rather varied, including discussions of regulations related to growth management, building codes, land development, and integration of climate resilience into planning documents. While some segments promoted collaborating to develop a list of already existing regulations, others supported the creation of new policies or amendments to guide climate change efforts. One segment specifically mentioned the need to *not* enact any new policies that might inhibit the placement of cost-effective housing that meets the Florida building codes, though most segments were discussing ways to improve regulations.

The command-and-control approach, often apparent in management strategies developed under the engineering resilience paradigm, was particularly apparent in part of one segment that mentioned regulations:

> The recommendations presented. . .provide a foundation for establishing a more predictable physical environment in the face of climate change through regulations, adaptation strategies, and emergency operations, with the goal of reducing future economic losses and threats to public safety (SFRCCC 2012, p. 39).

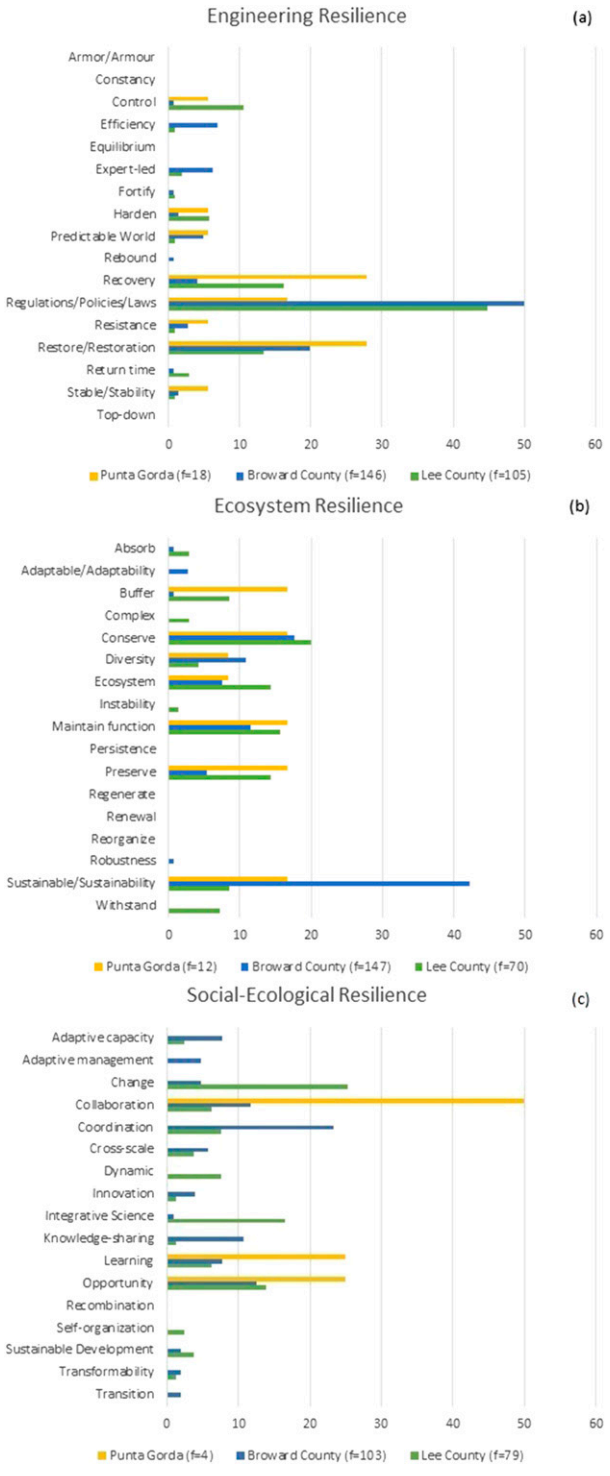

FIG. 2. Comparison of keyword prevalence for each resilience ideal type. Frequencies (f) in legends represent the total number of keyword occurrences for the given type. For the sake of comparison between study areas, numbers on the x axis represents individual keyword count/overall frequency ($f \times 100$).

In Lee County, all but one occurrence of ''regulate''/''policy''/''law'' appeared in segments from the CCRS, which is not surprising since policy and program-related strategies are a key action area. Like Broward, Lee County was primarily focused on improving and implementing existing regulations rather than creating new ones. For example, the CCRS recommended policy analyses for land-use regulations and discussed the need to identify conflicting policies between programs as well as policies that could be implemented without funding. It also highlighted existing policies that could better integrate climate change and proposed ''climate policy integration where federal, state, and local governments work collaboratively'' (Beever et al. 2010, p. 122). However, there were some recommendations to adopt new policies or laws including ones that would limit public investment in infrastructure with high future maintenance costs and direct that funding toward projects that could result in energy savings. Also, the CCRS recommended establishment of strong habitat protection laws.

In extracted segments for the city of Punta Gorda, forms of regulate/policy/law were third most common after the forms of the words restore and recover. Despite being one of the most common keywords, there were only three occurrences. Two were stated policy objectives to 1) continually update the city's adaptation plan with identified strategies that would promote coastal resilience and 2) acquire funding for exotic species removal to ''increase coastal resiliency to the built environment'' (City of Punta Gorda 2016a, p. 2B-44). The third instance was a goal in the city's long-range financial plan to expand the role of the Charlotte Harbor National Estuary Program to provide policy advice to local, state, and federal governments for the sake of climate resilience (City of Punta Gorda 2016b).

Given the overall prevalence of keywords about regulation across the three study areas, it is important to consider that while regulatory instruments can be powerful tools for creating change, scholars like Gunderson and Holling (2002, p. 12) caution that ''static assumptions can create the very surprise and crisis they wish to avoid.'' Hence, regulations that encourage flexibility and coordination should be emphasized.

Also across all three study areas, restoration was one of the top three most frequent keywords, composing 20% of Broward's ($f = 29$) engineering resilience terms, 28% of Punta Gorda's ($f = 5$), and 13% of Lee County's ($f = 14$).

In Broward County, restoration was often linked to the Everglades and coastal dunes or shorelines. In the city of Punta Gorda, restoration was mentioned in two contexts. First, it was included three times in a report when discussing an oyster restoration project the Nature

Conservancy was implementing to improve the health of Charlotte Harbor. Next, restoration was mentioned in the city's comprehensive plan in its objectives and policies related to enhancing native species and removing exotics.

Like Broward County and Punta Gorda, Lee County most often referred to restoration in the context of natural areas and native species. However, Lee County's resilience strategy was unique in two ways: First, it specified that habitat restoration should only be conducted in places where landward recession is possible, allowing room for sea level rise. Second, it mentioned restoration of historic buildings, addressing cultural impacts of climate change.

There were also many engineering resilience keywords that were rare, or completely absent, in segments from all three study areas. Four engineering resilience keywords had zero hits: top down, equilibrium, constancy, and armor. Rebound was also rare, only appearing once in a Broward document explaining how native landscapes fare better in disasters and rebound faster.

The keyword with the greatest variation in proportions across study areas was recovery. While recovery was fairly common in Punta Gorda and Lee County's documents, it made up only 4% of Broward County's engineering resilience keyword occurrences. The city of Punta Gorda most often referred to recovery in the context of the 2004 hurricane season, when they were heavily impacted by Hurricane Charley. Even so, Punta Gorda discussed both short- and long-term recovery as priorities.

In Lee County, recovery was included in the definition for climate change resilience [''the ability to survive, recover from, and/or live with the effects of climate change'' (Beever et al. 2010, p. 13)] and as one of three phases of resilience activities (along with planning and response/execution). Hence, it is worth noting that while quick recovery is a stated goal for Lee County, it is always discussed as part of a larger process.

2) ECOSYSTEM/ECOLOGICAL/SOCIAL RESILIENCE

Overall, in Broward County, ecosystem resilience keywords were tied with engineering resilience keywords as most common. In Punta Gorda, ecosystem resilience was the second most common category of keywords, whereas in Lee County, these keywords were least common.

There were two ecosystem resilience keywords that composed more than 10% of keywords for all three study areas: conserve and maintain (function; Fig. 2b).

In Broward County, the term conserve appeared in generic recommendations for water and energy conservation as well as in the context of conservation land acquisition. Specifically, multiple references are made to Florida's Water and Land Conservation Amendment, which Florida voters approved in 2014 by nearly 75%. Among other outcomes, this amendment created a Land Acquisition Trust Fund to ''acquire and improve conservation easements, wildlife management areas, wetlands, forests, fish and wildlife habitats, beaches and shores, recreational trails and parks, urban open space, rural landscapes, working farms and ranches, historical and geological sites, lands protecting water and drinking water resources and lands in the Everglades Agricultural Areas and the Everglades Protection Area'' (FL Const. art. IX, section 28). This amendment has since become somewhat controversial because funds that many expected to go directly toward conservation land acquisition have instead been spent on agencies' administrative costs.

Lee County's use of the term conservation was similar to Broward County's, focusing largely on water, energy, and coastal land conservation, although Lee County indicates a longer-term vision, explaining that conservation strategies are one potential entry point for mainstreaming climate resilience. Land conservation strategies included land acquisition, conservation easements, and the purchase or transfer of development rights, yet the county notes the importance of prioritizing the implementation of conservation strategies in areas with the ability to support coastal ecosystem migration (Beever et al. 2010). Lee County also recommended promoting conservation through educating residents and business and proposed establishing a system to pay farmers for implementing practices that would enhance carbon sequestration on croplands.

Punta Gorda emphasized conservation through public education. The city expressed two main conservation goals in their resilience segments: the need to effectively communicate with the public about the environment and conservation strategies and the desire to conserve energy and water through green building alternatives, which should be promoted through education and incentive programs.

Segments discussing maintaining function were also prevalent in all three study areas. Broward County recommended maintaining seasonal water levels and implementing fire management schemes to help the Everglades continue to function as a carbon sink. They also proposed a number of ways to maintain resilience, including natural area diversity and connectivity as well as protecting beaches and dunes between developed areas and the shoreline to function as natural buffers. Other functions of the vegetated dunes Broward sought to maintain were trapping windblown sand, absorbing wave energy, and minimizing erosion.

One function Lee County sought to maintain was sediment transport, and rolling easements were suggested as a strategy for doing so as sea level rise causes inland ecosystem migration. Furthermore, Lee County set a resilience strategy to maintain the function of local food systems for the sake of both human and environmental health. Similarly, the city of Punta Gorda cited the maintenance of agriculture as a benefit of increasing resilience.

One of the most fascinating excerpts about maintaining function came from Punta Gorda's adaptation plan, where questions about maintaining function as a constraint for improving natural resource management are raised. Specifically, the plan questioned how short-term management goals should be balanced with longer-term habitat resilience, asking ''what ecosystem should be maintained, the current or the future?'' (Beever et al. 2009, p. 257).

While conserve and maintain were common keywords across the three study areas, other keywords were very rare across the sites, such as instability, persistent, regenerate, renew, and reorganize.

The prevalence and use of the keyword sustainability varied greatly across the three study areas. Sustainability was a term used very frequently in Broward County, composing 42% of its ecosystem resilience keywords.

In some cases, Broward documents lumped sustainability and resilience together in general statements about goals or objectives:

- ''dedicated to a more sustainable and resilient Southeast Florida'' (SFRCCC 2012, p. 13);
- ''building resilience and sustainability as cornerstones of Southeast Florida's regional economic, social and ecological system'' (SFRCCC 2012, p. 48); and
- ''presenting goals and policies to address sustainability, resiliency and quality of life'' (Broward County 2012, p. 8).

The differentiation between the use of resilience and sustainability in other segments appeared to be that resilience was applied primarily to climate change, whereas sustainability was used to refer to other environmental issues, most often those related to wetlands or water resources. For instance, multiple excerpts specifically talk about building or achieving ''a sustainable, climate resilient community.''

Lee County used the term sustainability less frequently, yet more specifically in its segments. Segments discussed the need for sustainable food systems, the need for reducing greenhouse gas emissions while maintaining economic sustainability, and the need to develop adequate strategies for monitoring and evaluation to promote long-term sustainability. In Lee County's documents, sustainability planning is considered one part of a larger resilience strategy, whereas Broward cites climate resilience as a single component of sustainability.

Punta Gorda's segments use the term sustainability only in the context of creating a more pedestrian-friendly city.

3) SOCIAL–ECOLOGICAL RESILIENCE

Social–ecological resilience keywords made up the smallest proportion of total terms in both Broward County and Punta Gorda, composing 26% and 12% of overall keyword occurrences for each study area, respectively. In Lee County, social–ecological resilience keywords made up the second smallest proportion of total keyword occurrences, with 31%. Because Punta Gorda segments only had four social–ecological keyword occurrences, the proportion of each keyword appears falsely enhanced (Fig. 2c).

For social–ecological resilience keywords, there were no terms that occurred very frequently across all three study areas. However, forms of the word opportunity made up over 10% of keyword occurrences for each study area, suggesting this may be a promising frame for approaching climate change resilience strategies proposing more transformational adaptation options.

One Broward segment proposed that opportunities could be enhanced by using a no regrets approach to sustainable development and community resilience:

> By promoting a ''no regrets'' approach, it is possible to affect positive outcomes that further regional climate change mitigation and adaptation goals while improving community livability, economic opportunities and resource sustainability. These adaptation strategies address: building design, elevation and hardening; transportation networks; other critical public infrastructure (potable water, wastewater, stormwater and energy/power); and green infrastructure (SFRCCC 2012, p. B-1).

Though not explained within the segment, a no regrets approach typically refers to adopting climate change strategies that would make sense for sustainable development whether or not specific climate risks are realized in the future (Siegel and Jorgensen 2011). These approaches emphasize improving both knowledge and capacity (Siegel and Jorgensen 2011). Yet nearly every adaptation strategy listed above appears to address the built environment rather than social dimensions of resilience.

In Broward County, the term that made up the greatest proportion of social–ecological resilience keywords was coordination, which was used similarly to

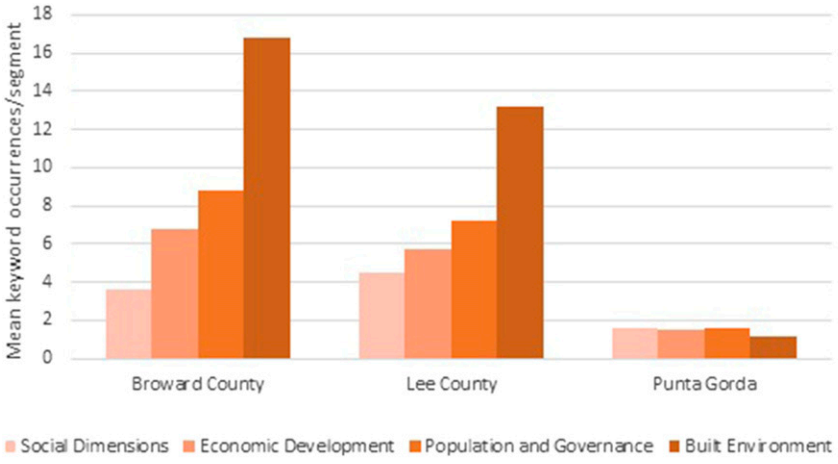

FIG. 3. Prevalence of each resilience dimension across study areas, expressed as average number of keyword occurrences per segment.

collaboration. Both keywords were applied to a wide range of topics in Broward's segments. In 13 segments, municipal, county, and regional coordination were emphasized, as in the following goals:

> Achieve a sustainable, climate resilient community by. . .continuing to coordinate and communicate locally and regionally to monitor and address the changing needs and conditions of the community (Broward County 2015a, p. 19-1).

> Broward County shall, in coordination with its municipalities, pursue policies and programs to maintain the resilience and adaptive capacity of coastal resources by providing buffers between developed areas and the shoreline, thereby reducing the impacts of climate change on both ecosystems and communities (Broward County 2015a, p. 19-5).

Larger-scale coordination was also mentioned four times in Broward County segments, with discussion of the need to work across state, regional, and federal levels. Only one occurrence of the term collaborate emphasized cross-sector collaboration among public, private, and nonprofit entities. Other coordination needs were linked to transportation, policies, water resources, and fire management.

Collaboration was also the most frequent keyword in Punta Gorda's segments, despite appearing only twice. In both cases, it referred to TEAM Punta Gorda, a nonprofit launched by concerned citizens to assist with Hurricane Charley recovery in 2004. The nonprofit's mission has since shifted to promoting healthy growth and development in general (TEAM Punta Gorda 2016).

In Lee County, the keyword composing the greatest proportion of social–ecological terms was change, which excluded any use of the phrase climate change. In one case, Lee County proposed encouraging behavior changes that would reduce vehicle miles traveled. The county also proposed changing building codes and design to become more efficient, changing to energy efficient buses and taxis, making necessary changes in resilience strategies based on regular monitoring and evaluation, and engaging vulnerable populations to strengthen community mental health to prepare for changes that might come after a disaster (Beever et al. 2010). These proposed strategies indicate a willingness to remain flexible in the face of uncertainty.

c. *Dimensions of resilience*

As mentioned in the methods section of this paper, each dimension of resilience (built environment, population and governance, economic development, and social dimensions) had a different number of keywords, which would skew results if left unchecked. Therefore, data were normalized to provide a more valid perspective. To normalize, a mean was calculated to determine the average number of times any single keyword appeared in a segment about resilience. For example, in Broward County the built environment dimension had 17 keywords that appeared a total of 285 times; therefore, each keyword for this dimension occurred an average of 16.76 times per segment.

Broward and Lee Counties showed very similar patterns of keyword prevalence per segment. From most to least frequent, the most prevalent dimensions were built environment, population and governance, economic development, and then social dimensions. In Punta Gorda's segments, there were not enough data to identify clear trends (Fig. 3); therefore, this section focuses primarily on Broward and Lee Counties.

Within the dimension of the built environment, water and energy were key concerns in both cases, followed by transportation and housing. In fact, although there were 17 keywords representing the dimension of the built environment, these clearly dominated the discussion.

Likewise, the dimension of population and governance in Broward and Lee Counties was dominated by discussions of budgets or funding. In Broward segments, many of these occurrences were in the context of supporting or prioritizing funding for infrastructure projects related to finding alternative water supplies or energy sources. In Lee County, discussions about funding also prioritized funding for the built environment but included additional goals to fund long-term research, education and outreach programs, and identify policies that could be implemented without funding.

For the economic dimension of resilience, most keywords found in Broward and Lee County segments were actually some form of the word economy. In Broward, many of these occurrences were related to strengthening local economies through green jobs, economic growth, and ''green collar'' training programs. Additionally, these terms appear in many statements about enhancing sustainability by mitigating potential economic, environmental, and social impacts of climate change, acknowledging the ''triple bottom line'' of sustainability. Similarly, Lee County emphasized the connectedness of local economies with local natural resources.

Finally, for the social dimensions of resilience, three indicator keywords dominated the segments in all three study areas: vulnerability, education, and food.

5. Conclusions

The goal of this research was to analyze definitions of resilience used in official documents from three study areas in order to understand how the term was being conceptualized at a local level. Across the three study areas, only Lee County's Resiliency Strategy provided any explicit definition of resilience, despite Broward County using the term 142 times more often. However, a number of themes related to different types of resilience were apparent based on the context clues and keywords that appeared in segments that contained the word resilient.

This research revealed that there is some inconsistency, and even confusion, about how the term resilience is used at a local level, even in communities that are heralded for their resilience-building efforts. While some communities carefully reflect on the meaning of resilience, working to balance short- and long-term goals across dimensions, others seem to use the term to refer to climate change in general. However, some common themes resonate across all three resilient communities, including priority action areas like infrastructure, public policy, natural resources, and education/outreach. Also, while the exact configurations of resilience dimensions and types varied across study areas, it is notable that all three places include a combination of resilience approaches and appear to focus on multiple dimensions.

With the more nuanced understanding of resilience this research provides, planners may be able to reflect more deeply on specific resilience needs for a given locality. Therefore, they would be better able to identify the most appropriate resilience approach, or combination of approaches, to balance short- and long-term objectives for social, economic, political, and physical components of the social–ecological system.

Previous research has called for the adoption of a common conceptual framework for resilience to improve its application, operationalization, and measurement (Brand and Jax 2007; Davidson et al. 2016; Burton 2015). Others have recommended shifting away from the engineering resilience paradigm toward a more holistic, social–ecological approach (Gunderson et al. 2010; Garmestani and Benson 2013). While there is value in these recommendations, this research does not intend to determine an ideal configuration of different resilience interpretations; instead, a more fundamental preceding step is recommended.

Resilience, or any other term used as a central tenet for planning, should be explicitly defined in planning and policy documents. Furthermore, planners and planning documents should be able to explain how they are working toward resilience via specific actions. Lee County's Resiliency Strategy (Beever et al. 2010) is recommended as a prime example of this. When thinking globally and acting locally to enhance resilience across scales, it is important for communities to be explicit about what resilience means in the context of their local system to understand how they are contributing to a larger-scale, supposedly common vision. While this work indicates the need to critically engage with the concept of resilience at a local level, further research is necessary to understand the effectiveness of specific resilience actions in achieving broader objectives like building flexibility or adaptiveness into a system.

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