# Understanding Multisector Stakeholder Value Dynamics in Hurricane Michael: Toward Collaborative Decision-Making in Disaster Contexts

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**Abstract:** Despite a growing acknowledgement of shared responsibilities in emergency management, one of the hidden and overlooked issues in the disaster literature is the identification and integration of multisector stakeholder values: the things that are of importance, merit, and utilities to the stakeholders. Stakeholders (e.g., public, private, and nonprofit sectors and community residents) hold numerous values with varying degrees of importance, forming a system of value priorities. Stakeholder values and value priorities—referred to as value systems—are not static in a disaster context; they are dynamic, time-sensitive, and event-driven. A more in-depth understanding of the dynamics of stakeholder value systems is crucial to facilitate the policy makers to introduce more proactive and timely measures toward building resilient communities. To address this gap, this paper focuses on identifying and understanding the stakeholder values across different disaster phases in the context of Hurricane Michael. Based mainly on semistructured interviews with 51 stakeholders in Hurricane Michael affected areas in Florida, 16 stakeholder values were identified and classified into four broad categories of Schwartz's theory of basic human values: conservation, openness to change, self-transcendence, and self-enhancement. Despite different value priorities of stakeholders, some of the most prioritized values include safety, resource efficiency, community adaptability, community cohesion, and community growth. In addition, the importance of stakeholder values dynamically changes across different disaster phases (i.e., preparedness, response, recovery, and mitigation). The study's findings inform practitioners about implementing disaster resilience strategies that account for diverse stakeholder needs and priorities, thus facilitating value-centered decision-making in emergency management. **DOI: [10.1061/(ASCE)NH.1527-6996.0000400](https://doi.org/10.1061/(ASCE)NH.1527-6996.0000400).** © 2020 American Society of Civil Engineers.

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## Introduction

Strengthening partnerships among multisector stakeholders is one of the fundamental strategies to transform the way we prepare for, respond to, and recover from increasingly severe weather events. In the 2018 hurricane season, 15 named storms, eight hurricanes, and two major hurricanes caused a total of over $50.2 billion in damage. The 2018 hurricane season has thus become the third in a consecutive series of above-average and active Atlantic hurricane seasons (NOAA 2018). Given this context, FEMA as well as other emergency management agencies and resilience offices have been calling for the need to thoroughly engage multisector stakeholders in a collaborative effort to build more resilient communities. For example, as noted by FEMA (2018, p. 50) in its 2017 Hurricane Season After-Action report, "The work of the emergency management does not belong just to FEMA. It is the responsibility of the whole community, federal, [state and local governments], private sector partners, and private citizens to build collective capacity and prepare for the disasters we will inevitably face."

Despite the broader acknowledgment of shared responsibilities in emergency management, one of the hidden and overlooked issues in disaster literature is the identification and integration of multisector stakeholder values: things that are of importance, merit, and utility to stakeholders (Zhang and El-Gohary 2016). Stakeholders are individuals who are either involved in different phases of disaster management or simply impacted by a disaster. These stakeholders can be from different levels of government, the private sector, nongovernment organizations (NGOs), and community residents. Different stakeholders have different values with varying degrees of importance which form a system of value priorities (Zhang and El-Gohary 2016). Stakeholder values and value priorities, referred to as value systems, drive and motivate stakeholders' actions and decisions throughout different phases (e.g., preparedness, response, recovery, and mitigation) of a disaster.

Stakeholder value systems are not static in the context of a disaster; they are dynamic, time-sensitive, and event-driven. Research shows that major life events could impact individuals' value systems (Bardi et al. 2014; Tormos et al. 2017). Disasters, as a devastating experience to most of the impacted people, could potentially alter people's value systems. Stakeholder value priorities could change throughout different disaster phases. Having a comprehensive and deep understanding of stakeholder value systems and how they dynamically change in each disaster phase is crucial,

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as stakeholder value systems motivate and orient decision-making processes (Cheng and Fleischmann 2010). A more in-depth understanding of stakeholder value systems allows decision-makers to implement different strategies and practices in a way that addresses stakeholders' prioritized concerns and needs in a time-sensitive manner.

Despite the importance of stakeholder values, there is a lack of empirical studies that explicitly and systematically identify and analyze them in a disaster context. There is also limited research that examines how stakeholder value systems change in the aftermath of disasters or with the time elapsing after disasters. Many studies have emphasized the importance of engaging multisector stakeholders in preparing for, responding to, and recovering from disasters and in building disaster-resilient communities (e.g., Ganapati and Ganapati 2009; Ganapati and Mukherji 2014; Kapucu and Garayev 2011; Kapucu and Van Wart 2006; DeLorme et al. 2016, 2018), and these studies have proposed strategies for facilitating stakeholder engagement. Although the underlying goal of stakeholder engagement is to account for their diverse values in decision-making, these studies have not explicitly or systematically captured stakeholder value systems. In addition, during a disastrous event, stakeholders may have an entirely different set of value priorities compared with their original value priorities in nondisaster time. Existing research has mainly focused on examining socioeconomic or demographic variables (e.g., gender, poverty, unemployment) as antecedents of individuals' value priorities (Hitlin and Piliavin 2004; Schwartz 2004). However, contextual variables (e.g., the disaster context) may be just as important as understanding the value priorities and their potential changes over time.

To address the aforementioned gaps, this study aims to understand and analyze the dynamics of multisector stakeholder value systems during the preparedness, response, recovery, and mitigation phases of Hurricane Michael. It aims to address the following research questions: (1) What do stakeholders from the public, private, and nonprofit (NGOs) sectors and community residents value? (2) What are the value priorities of these multisector stakeholders? (3) Are there any similarities or differences of stakeholder value priorities across different sectors? and (4) How do stakeholder value priorities change during different phases of a disaster (i.e., preparedness, response, recovery, and mitigation phases)? Based on 51 semistructured interviews with multisector stakeholders and review of secondary sources (e.g., newspaper reports), we find multisector stakeholder values to fall into the four categories of Schwartz's theory of basic human values (Schwartz 2012): conservation, openness to change, self-transcendence, and self-enhancement. Despite stakeholder group differences in value priorities, there are some prioritized values across all stakeholder groups, including safety, resource efficiency, community adaptability, community cohesion, and community growth. We also find stakeholder values to be dynamically changing across different disaster phases (i.e., preparedness, response, recovery, and mitigation).

The remainder of the paper discusses existing studies, identifies the knowledge gaps, explains the methodology and the research background, discusses the results and findings, and concludes with a summary and contributions.

## Literature Review

### Human Values and Schwartz's Theory of Basic Human Values

Schwartz (2012) developed the theory of basic human values in the context of intercultural research. This theory aims to measure universal values that are recognized throughout people from different cultural backgrounds. According to this theory, values are the things that are of importance to stakeholders. Each stakeholder holds numerous values (e.g., achievement, security, benevolence) with varying degrees of importance. A specific value may be very important to one stakeholder but unimportant to another. The theory has three main features (Schwartz 2012):

1. Values refer to desirable goals that motivate actions and decision-making processes. For example, a community resident who values the property's safety would install hurricane shutters prior to a disaster;
2. Multiple values are ordered by importance relative to one another to form a system of value priorities. Different people have different systems of value priorities. For example, in the context of disasters, a businessman may value safety over business development; and
3. Multiple values guide actions—the tradeoffs among relevant but competing values guide actions and decision-making processes. For example, a community resident may value both property safety and renovation cost savings. He/she may need to make a tradeoff when deciding whether to install expensive high-impact windows or more affordable hurricane shutters.

Schwartz's theory identifies 10 basic human values, including self-direction, stimulation, hedonism, achievement, power, security, conformity, tradition, benevolence, and universalism (Schwartz 2012). These 10 values are universal because they are grounded in three common requirements of human existence, including needs of individuals as biological organisms, requisites of coordinated social interaction, and survival and welfare needs of groups. They are further grouped into two bipolar dimensions with four main categories: self-transcendence, self-enhancement, conservation, and openness to change. The first dimension contrasts self-enhancement and self-transcendence values; it captures the conflicts or synergies between (1) values that emphasize the pursuit of one's own interests and relative success and dominance over others (power, achievement); and (2) concerns for the welfare and interests of others (universalism, benevolence). The second dimension contrasts openness to change and conservation values. This dimension captures the conflicts or synergies between (1) values that emphasize the independence of thoughts, actions, and feelings as well as readiness and willingness for change (self-direction, stimulation); and (2) values that emphasize protection and preservation of past and current conditions (security, conformity, tradition) (Schwartz 2012). To graphically portray these relationships, the theory arranges the 10 values in a circular structure (Fig. 1).

Schwartz's theory of basic human values was chosen for this study as it is "one of the most commonly used and tested transcultural theories in the field of behavioral research, with numerous validations" (Giménez and Tamajón 2019, p. 1). Across the disciplines, this theory has been applied to examine values of diverse groups, ranging from high-tech employees (Cohen 2009) and knowledge workers (Lyons et al. 2006) to police officers (Cohen and Shamai 2010) to hospitality employees (Ariza-Montes et al. 2017) in a number of different countries. Some of these countries include the United States (Goren et al. 2016; O'Dwyer and Çoymak 2020; Watanabe et al. 2020), Canada (Lyons et al. 2006), the United Kingdom (O'Dwyer and Çoymak 2020), Sweden (Glückstad et al. 2017), Italy (Rossi et al. 2019), Spain (Giménez and Tamajón 2019), Turkey (O'Dwyer and Çoymak 2020), Israel (Cohen and Shamai 2010), Australia (Lee et al. 2016), Japan (Glückstad et al. 2017; Watanabe et al. 2020), China (Tang et al. 2017), and Ethiopia (Lilleoja et al. 2016). A recent study presented a comparative analysis of basic human values across 32 European countries (Tormos et al. 2017).
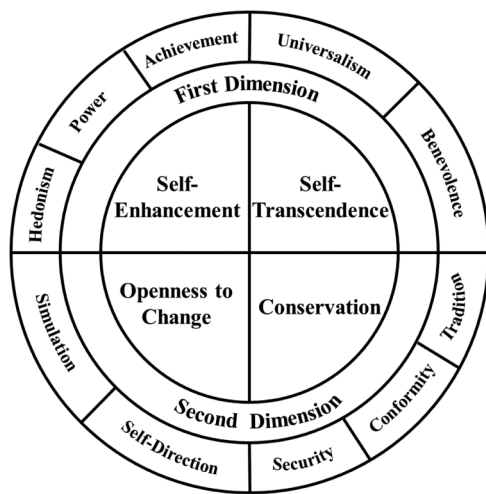
**Fig. 1.** Schwartz's value framework. (Adapted from Schwartz 2012.)

There is a growing literature in public administration and other disciplines that applies Schwartz's theory of basic human values to understand the link between individual-level values and employee attitudes and behaviors in the workplace. Studies, for instance, have looked at the links between values and organizational commitment (Cohen and Shamai 2010; Glazer et al. 2004), between values and organizational justice (Fischer and Smith 2006) or organizational learning (Cohen et al. 2011), and between values and psychological contracts (Cohen 2012) or innovative behavior (Purc and Laguna 2019). Some studies have extended this work to examine how individual-level values are linked to the work-family interface (Cohen 2009). Others have examined generational value differences and their impact on employee behaviors in organizations (Tang et al. 2017). Still other studies have looked at how societal culture within which an organization is embedded influences organizational values. Sagiv and Schwartz (2007), for instance, established a direct link between societal culture and organizational values and an indirect influence of the societal culture on values of its members and on the nature of tasks at an organization. Additional studies have compared the work values and organizational commitment across the sectors, such as private sector, public sector, and para-public sector. Lyons et al.'s study (Lyons et al. 2006) revealed no differences in general values across sectors but value differences in terms of work that contributes to society, opportunities for advancement, intellectually stimulating and challenging work, prestigious work, and organizational commitment.

Public administration literature also has studies that do not directly apply Schwartz's theory of basic human values per se but focus on public sector values. Some of the values studied by the literature include responsibility, commitment, development, professionalism, quality, continuity, respect, trust, cooperation, openness, representation, equity, and individual rights (Jørgensen 2006; Pandey et al. 2016; Weske et al. 2019), just to name a few. Jørgensen and Bozeman (2007, p. 375) suggested that a government's founding documents (e.g., the Constitution and the Federalist Papers in the US) "provide insight into the most fundamental public values" and that "even with the most fundamental public values, one should not expect universal assent or immutable self-evident truths." Jørgensen and Vrangbæk (2011) and Van Wart (1998) acknowledged that values in the public sector change over time. In a more recent study, Witesman and Walters (2015, p. 1) similarly noted the elusive nature of having "a universal hierarchy

of public values" and called for studying public value hierarchies in specific decision contexts.

## State of the Art and Knowledge Gaps in Disaster Literature

Schwartz's theory of basic human values has been applied to disaster contexts as well. Most of this literature calls for a value-based approach to emergency management. Based on their research on bushfires in Victoria, Australia, Rawluk et al. (2017, p. 13) introduced the idea of a valued entity: "a concrete, mappable entity that is important to individuals." These researchers argued that people's valued entities vary from prevalent abstract-valued ones (e.g., benevolence, universalism) to midlevel ones (e.g., natural attributes of landscapes) and to prevalent valued entities (e.g., properties and people close to the individual). They also added that "people with more recent experience with bushfire refer less to the importance of natural places and natural attributes" (p. 11). The researchers further refined and tested the usefulness of their conceptual framework in another article (Williams et al. 2018, p. 665), demonstrating the usefulness of "considering values at three levels of abstraction: localised valued entities such as people, places and objects; valued attributes of communities and landscapes; and core values, or ideals that guide in life" (p. 665). They highlighted that the public's values are "much more diverse than those typically considered in wildfire risk management," relating to people, places, and objects. They called for a value-based approach to wildfire management. In another work on bushfire management, Rawluk and her colleagues (Rawluk et al. 2018) built on Schwartz's theory and highlighted the importance of making participatory scenario planning value-based. They presented three different scenarios developed as a result of a planning activity in Victoria, reflecting residents' values placed on self-reliance and their communities, safety, and living with nature.

There are also some studies in the disaster literature focusing on the link between values and risk perceptions. Building on Schwartz's theory, Kaptan et al. (2013) conducted a cross-cultural study on the relationship between values and risk perceptions regarding terrorist attacks among college students in Turkey and Israel. Also focusing on the same topic, Nordenstedt and Ivanisevic (2010) gathered data from South Africa, Sweden, and the US and found a link between motivational values and risk perceptions. Their results also confirmed earlier research on risk perceptions with respect to the influence of demographic variables (e.g., females expressing more of a concern about hazard risks).

These research studies have provided important contributions to value analysis in the context of disasters. However, three main knowledge gaps were identified. First, there is limited research that explicitly and systematically understands stakeholder values in the context of disasters. Human values and individual systems of value priorities are the key predictive and explanatory factors in investigating decision-making (Cheng and Fleischmann 2010), and they motivate and guide actions and decisions (Schwartz 2012). To deliver greater collective value to all the stakeholders, there is a need to explore how to better prepare for, respond to, recover from, and mitigate the impacts of disasters to fulfill stakeholder values and how the decisions can be made to align with stakeholder value priorities.

Although stakeholder values and their link to decision-making may appear well-addressed in the literature (e.g., Hostmann et al. 2005; Keeney 1992; Lynam et al. 2007; Tantalo and Priem 2016), it is one of the least studied and understood areas. For example, researchers have emphasized the importance of engaging stakeholders in disaster management or building disaster-resilient

communities (e.g., Kapucu and Garayev 2011; DeLorme et al. 2016, 2018), and proposed approaches for better involving stakeholders in disaster management (e.g., Ganapati and Ganapati 2009; Kapucu and Garayev 2011; Ganapati and Mukherji 2014; Kapucu and Van Wart 2006). While the underlying goal of stakeholder engagement is to account for their diverse values in decision-making, these efforts have not explicitly and systematically captured the stakeholder value systems.

Second, there is a lack of research that compares the differences among different stakeholder sectors' value systems in the context of disasters. The differences in stakeholders' value systems could become a central cause of conflicts and disputes (Jehn 1994) while trying to prepare for, respond to, and recover from disasters. For example, tenants may focus on their safety and building robustness in a hurricane, while building owners may see their properties as a short-term investment and prefer to buy insurance with lower cost instead of retrofitting the building with high-impact windows. Stakeholders constantly negotiate, compete, and/or cooperate with one another; and their values are fundamentally important in their decisions in the context of disasters. Existing research (e.g., Choi and Brower 2006; Choi and Kim 2007; Guo and Kapucu 2015; Hu et al. 2014; Kapucu and Garayev 2011, 2014) emphasizes the importance of multisector stakeholder collaboration in facilitating more effective decision-making for disaster management. Much of this literature hails from the public administration discipline. Such orientation is not surprising given this discipline's focus on public sector agencies and the hollowing out of the state, which involves contracting with nonprofit and private sector entities to provide public services (Frederickson and Frederickson 2006; Milward and Provan 2000; Rhodes 1994). Although this literature advocates for different approaches and tools for studying multi-stakeholder collaboration, it fails to comparatively analyze how stakeholder values vary due to stakeholders' specific roles and responsibilities.

Third, there is a lack of research that analyzes how stakeholder value systems are dynamically affected by natural disasters. Stakeholder value systems are dynamic and uncertain (Daniel et al. 2013; Rudnev 2014). Value priorities have been found to change when individuals go through major life events such as wars and migration (Bardi et al. 2014; Daniel et al. 2013; Rudnev 2014). With time elapsing after a life transition of a disastrous event, rebound effects come into play (i.e., values may return close to their baseline levels) (Lönnqvist et al. 2013; Verkasalo et al. 2006). During a disaster event, stakeholders may have an entirely different set of value priorities, comparing with their value priorities in nondisaster time. Existing research has mainly focused on examining socioeconomic or demographic variables (e.g., gender, poverty, unemployment) as antecedents of individuals' value priorities (Hitlin and Piliavin 2004; Schwartz 2004). For example, research shows that people's age, education, gender, and other characteristics could significantly determine the life circumstances to which they are exposed to, and thus will affect their value priorities (Schwartz 2004). For instance, older people may attach higher importance to security values because a safe and predictable environment becomes more critical as older people's capacities to cope with change wanes. In terms of gender difference, women show more concerns for an ethic of care and responsibility, while men attach higher priorities to ethic of rights based on justice and fairness (Schwartz 2004). These important literatures have provided valuable understanding of human values and how different demographic and socioeconomic variables could affect people's value priorities. However, contextual variables (e.g., disastrous context) may be just as important to consider to understand value priorities and their potential changes over time more thoroughly. There is little research that has been conducted to understand how human values are dynamically affected by natural disasters.

## Research Methodology and Context

A qualitative research approach was adapted to identify multi-sector stakeholder values in the context of Hurricane Michael. Hurricane Michael was a Category 5 storm with maximum sustained wind speeds reaching 259 km/h (161 mi/h). It made landfall in Florida's Northwest Panhandle region on October 10, 2018. It was the strongest storm to hit the contiguous US in more than 25 years, and the most powerful on record in the Florida Panhandle area (Reeves and Lush 2018). According to a NOAA report (NOAA 2018), approximately 75 deaths were caused directly or indirectly by Hurricane Michael. Along with tragic loss of lives, the catastrophic wind damage and devastating flooding caused around $53 billion in losses to the US economy (Perryman 2018). Fig. 2 shows a track map of Hurricane Michael (NWS 2018).

The qualitative methodology was used because qualitative data offers detailed descriptions of research subjects' feelings, opinions, and experiences, and the interpretation of values are deeply embedded in the feelings, opinions, and experiences of stakeholders. The open-ended structures of qualitative research also allow for a deep analysis of reasons and rationales underneath the responses and the extraction of new information and knowledge from research participants (Singer and Couper 2017). Because human values and value priorities are intangible and are deeply embedded in the people's consciousness, a qualitative method is the most appropriate way to discover and identify the values.

The primary data collection method in the study was in-depth semistructured interviews with community stakeholders who were impacted by Hurricane Michael in the Florida Panhandle area. The following sections discuss the interview design, data collection and preparation, and data analysis methods.

### Interview Design

The interviews followed a semistructured format. In the interview instrument, a set of open-ended questions were grouped into five major sections based on disaster management cycles: (1) before Hurricane Michael (normal condition); (2) preparedness; (3) response; (4) recovery; and (5) future of the community (mitigation). Under each of these sections, a similar set of open-ended questions was asked. Examples of the questions include:

1. What did you/your group/your organization value about this community the most before Hurricane Michael?
2. Can you please tell me why this mattered to you/your group/ your organization the most at that time?
3. Given that this is what you valued at the time, please tell me one thing that you should have done but did not do right before Hurricane Michael? and
4. Please explain why you think doing this would have helped the community at the time.

At the end of the interview, the background information of the interviewees was solicited, including age, gender, education, ethnicity, race, profession, and work experience.

### Sample and Data Collection

The interviews were conducted with 51 individuals ($n = 51$) face-to-face or over the phone through 41 interviews distributed across
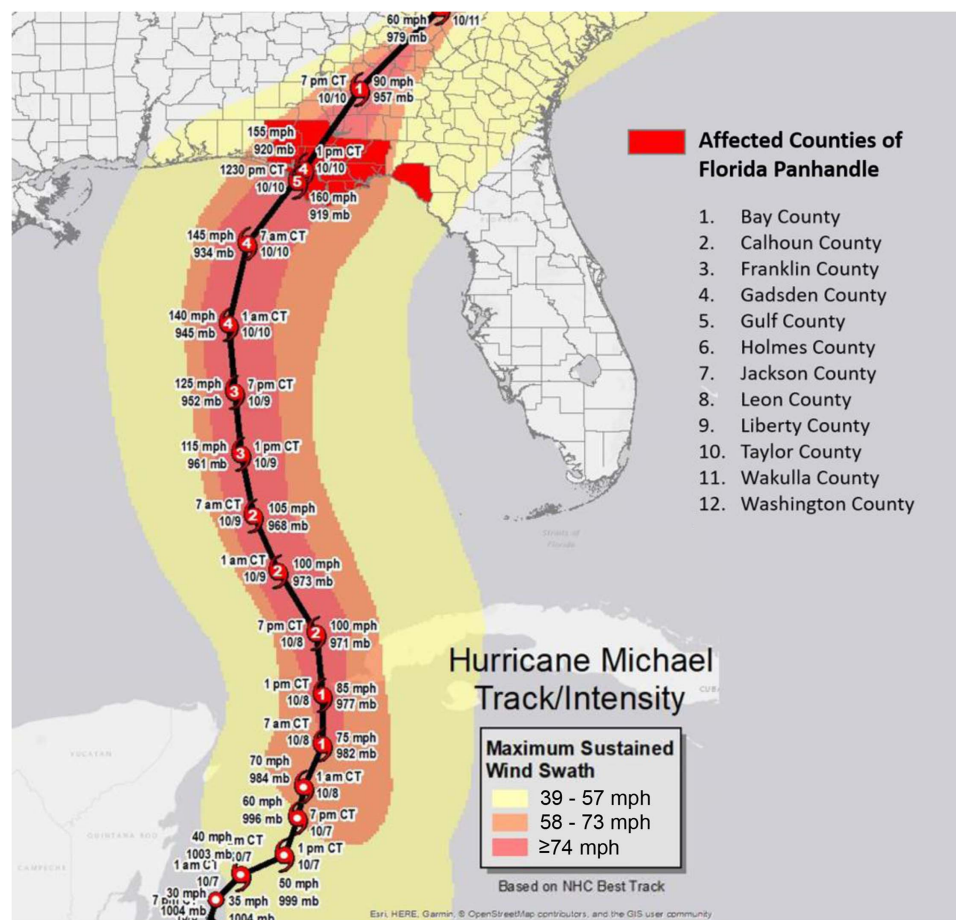
**Fig. 2.** Track map of Hurricane Michael. (Reprinted from NWS 2018.)

Bay, Leon, and Gulf counties in Florida. The face-to-face interviews were conducted during three visits to the Florida Panhandle area from December 2018 to February 2019, followed by phone interviews from March 2019 to May 2019. Among the 41 interviews, 37 of them were individual interviews and four of them were group interviews. The following stakeholders were targeted for the interviews: (1) representatives from public sector agencies (e.g., state emergency management departments and city governments), such as city commissioners, city managers, city planners, emergency management officers, department of transportation officers, and county chairpersons; (2) representatives from private sector entities (e.g., construction firms, tourism businesses, healthcare facilities, and financial institutions), such as small business owners, doctors, construction project managers, civil engineers, bankers, insurance agents, and school principals; (3) representatives from the NGOs (e.g., volunteer organizations and groups), such as church authorities; and (4) residents of impacted areas, specifically community leaders.

The initial set of interviewees were identified through a review of secondary sources (e.g., websites of government agencies and local news websites and articles). These interviewees were either individuals who have had disaster management responsibilities or liabilities (e.g., emergency managers, housing contractors) or were impacted by Hurricane Michael (e.g., local business owners). A snowball sampling technique, which is a nonprobability sampling technique where exiting interviewees help researchers recruit future interviewees from among their acquaintances (Goodman 1961), was then used to expand the initial list of interviewees.

The descriptive statistics of study participants are summarized in Table 1.

All the interviews took place during the daytime as per the availability of the stakeholders and were recorded upon receiving the approval of the interviewees. Out of the 51 interviewees, four interviewees did not allow for recording of the interviews. For these cases, detailed notes were taken. The interviews were in a semi-structured format, which allowed for a comprehensive, in-depth discussion with the interviewees and for the researchers to modify the questions as per the professions and/or backgrounds of the interviewees. Such a format also enabled researchers to identify new ideas or additional insights relevant to the discussion. For example, during the interviews with the government officials, additional questions were added to include topics such as what their scopes of work were during the disaster, what their expectations from the residents were, and what they valued about the civil infrastructure.

Prior to coding of data, recorded interviews were automatically transcribed initially using Sonix (2019) and were then checked for accuracy and revised manually. For the four interviews in which recording was not permitted by the interviewees, detailed notes were taken. Data collected from the interviews—including the transcription data and notes—was imported into NVivo version 12 Pro, a qualitative analysis software. The interview data was supplemented with secondary data, including reports and articles published by FEMA, government agencies, international organizations, academic researchers, NGOs, and media (e.g., Chang et al. 2010; Chhotray and Few 2012).

**Table 1.** Demographic information of the interviewees

| Demographic parameter | Public stakeholders | Private stakeholders | NGOs | Community residents | All stakeholders |
|---|---|---|---|---|---|
| Stakeholder group | | | | | |
|   Number of stakeholders | 12 | 18 | 9 | 12 | 51 |
| Region | | | | | |
|   Bay county | 9 | 16 | 3 | 10 | 38 |
|   Gulf county | 3 | 2 | 0 | 1 | 6 |
|   Leon county | 0 | 0 | 1 | 1 | 2 |
|   Others | 0 | 0 | 5 | 0 | 5 |
| Gender | | | | | |
|   Male | 10 | 16 | 4 | 9 | 39 |
|   Female | 2 | 2 | 5 | 3 | 12 |
| Age | | | | | |
|   18–25 | 1 | 1 | 0 | 2 | 4 |
|   26–30 | 2 | 0 | 0 | 0 | 2 |
|   31–35 | 2 | 5 | 2 | 1 | 10 |
|   36–40 | 1 | 3 | 2 | 4 | 10 |
|   41–45 | 1 | 3 | 2 | 0 | 6 |
|   46–50 | 3 | 2 | 1 | 1 | 7 |
|   51–55 | 1 | 3 | 2 | 3 | 9 |
|   56–60 | 0 | 1 | 0 | 0 | 1 |
|   61–65 | 1 | 0 | 0 | 1 | 2 |
| Education | | | | | |
|   High school degree | 0 | 0 | 0 | 0 | 0 |
|   Bachelor's degree | 6 | 9 | 5 | 4 | 24 |
|   Graduate degree | 3 | 4 | 3 | 4 | 14 |
|   Associate degree | 0 | 1 | 0 | 2 | 3 |
|   Professional degree | 1 | 2 | 1 | 0 | 4 |
|   Others (credit, no college) | 2 | 2 | 0 | 2 | 6 |
| Work experience in current company (years) | | | | | |
|   Less than 1 year | 0 | 2 | 0 | 3 | 5 |
|   More than 1 but less than 3 | 1 | 0 | 0 | 1 | 2 |
|   More than 3 but less than 6 | 2 | 4 | 1 | 2 | 9 |
|   More than 6 but less than 9 | 2 | 1 | 3 | 2 | 8 |
|   More than 9 but less than 12 | 3 | 3 | 3 | 0 | 9 |
|   12 years and more | 4 | 8 | 2 | 4 | 18 |
| Race | | | | | |
|   Asian | 1 | 7 | 0 | 8 | 16 |
|   White | 9 | 9 | 9 | 4 | 31 |
|   Black or African American | 2 | 1 | 0 | 0 | 3 |
|   American Indian or Alaska Native | 0 | 1 | 0 | 0 | 1 |

## Data Analysis

In this study, a hybrid approach was used to derive the values of multisector stakeholders. The hybrid approach employs a combination of both top-down and the bottom-up data analysis (Zhang and El-Gohary 2016). The top-down approach starts by identifying and defining the most abstract values and extends to more specific values, whereas a bottom-up approach starts by identifying and defining the most specific values and classifies them into abstract ones (Zhang and El-Gohary 2016). Benchmarking Schwartz's theory of basic human values (Schwartz 2012), the four categories from two bipolar dimensions, including conservation, openness to change, self-transcendence, and self-enhancement, were used to construct a value framework. Based on these higher-level values, the interview data was analyzed to derive the sublevel values. For example, under the conservation value, five specific values were identified from the interview data, including safety, resource efficiency, environmental preservation, cultural preservation, and infrastructure restoration. These high-level values and specific values were coded as parent nodes and child nodes in NVivo, respectively. All the interview data were then coded based on these nodes. To further classify the interview data based on stakeholder

groups and disaster phases, two additional sets of nodes were created, including (1) nodes for different types of stakeholders (i.e., public, private, and nonprofit sector stakeholders and community residents); and (2) nodes for different phases of a disaster (i.e., preparedness, response, recovery, and mitigation). This polymorphic way of coding and analysis supported the identification of values and analysis of value priorities for different types of stakeholders and/or at different phases of Hurricane Michael.

## Research Findings

Below are the study's findings on identified stakeholder values with detailed explanations on the top five values, followed by stakeholder value priorities across sectors and across disaster phases.

### Identification of Stakeholder Values

A total of 16 values were identified from the coded data and were first classified based on Schwartz's theory of basic human values (Fig. 1). The four main categories are conservation, openness to change, self-transcendence, and self-enhancement (Fig. 3).
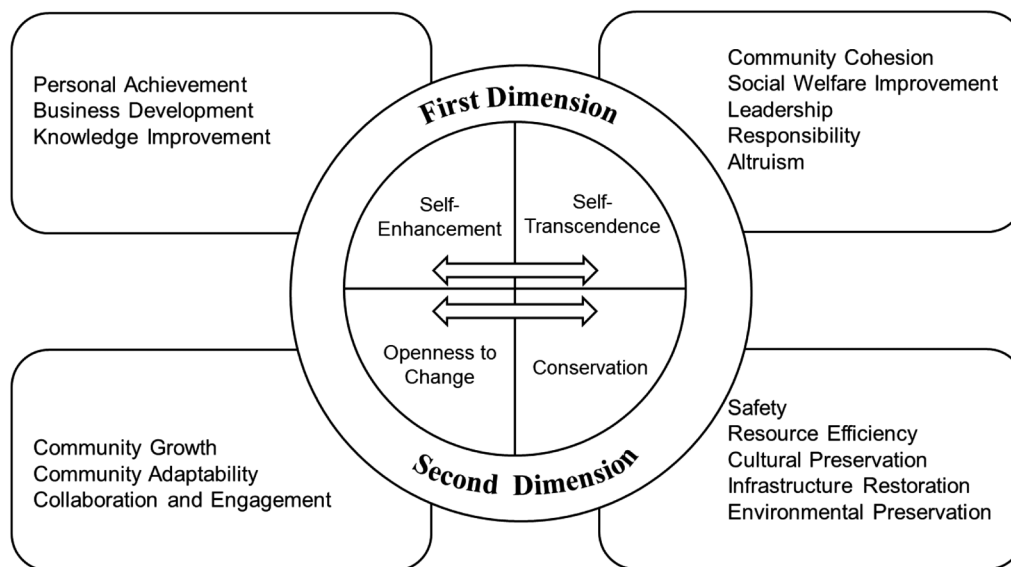
**Fig. 3.** Identified stakeholder values in the context of Hurricane Michael.

## Conservation

In the context of Hurricane Michael, the conservation value includes safety, resource efficiency, environmental preservation, cultural preservation, and infrastructure restoration.

- Safety refers to the value that is concerned with the conditions of being protected from disasters. Safety has multiple levels and dimensions, including personal life safety, family safety, employee safety, home safety, business property safety, and public safety.
- Resource efficiency refers to the value that is concerned with using or consuming resources (e.g., water, energy, gas, materials, staff) more efficiently throughout different phases of disasters.
- Environmental preservation refers to the value that is concerned with the protection, preservation, restoration, and/or enhancement of ecosystems (e.g., wetlands, coral reefs, forests), biological resources (e.g., wildlife), geological formations, and hydrology.
- Cultural preservation refers to the value that is concerned with the protection or preservation of the local historical or cultural resources (e.g., historical sites) from disasters.
- Infrastructure restoration refers to the value that is concerned with restoration and redevelopment of disrupted and damaged structures and facilities (e.g., health facilities, roads, bridges, shopping centers, community development zones, religious structures).

## Openness to Change

In the context of Hurricane Michael, openness to change refers to community growth, community adaptability, collaboration, and engagement.

- Community growth refers to the value that is concerned with opportunities of growth brought by disasters.
- Community adaptability refers to the value that is concerned with the ability of community members to adjust their responses to the changing environments and/or conditions caused by disasters.
- Collaboration and engagement refers to the value that is concerned with actions of working together among multisector stakeholders to cope with damage and stresses caused by disasters.

## Self-Transcendence

In the context of Hurricane Michael, self-transcendence includes community cohesion, social welfare improvement, leadership, responsibility, and altruism.

- Community cohesion refers to the value that is concerned with togetherness and bonding exhibited by members of a community prior to, during, and following a disaster event. It includes features such as a sense of belonging, trust in neighbors, and/or assistance and support from neighbors.
- Social welfare improvement refers to the value that is concerned with providing public or private social services for assisting disadvantaged groups (e.g., the elderly, disabled, economic disadvantaged) during disasters.
- Leadership refers to the value that is concerned with the actions of leading the community to prepare for, respond to, and recover from disasters. It requires skills such as decisiveness, integrity, relationship-building, problem-solving, and communication.
- Responsibility refers to the value that is concerned with the sense of having a duty to or having control over the efforts for disaster preparedness, response, recovery, and mitigation.
- Altruism refers to the value that is concerned with altruistic activities or attitudes that an individual or a group of people provide services willingly for no financial gains (e.g., volunteering activities) in the context of a disaster.

## Self-Enhancement

In the context of Hurricane Michael, self-enhancement includes personal achievement, business development, and knowledge improvement.

- Personal achievement refers to the value that is concerned with personal success through demonstrating competencies according to social norms.
- Business development refers to the value that is concerned with building new opportunities in business and growth in the future.
- Knowledge improvement refers to the value that is concerned with acquiring new knowledge about disaster management through organizational skills, communications, education and training, and government support.
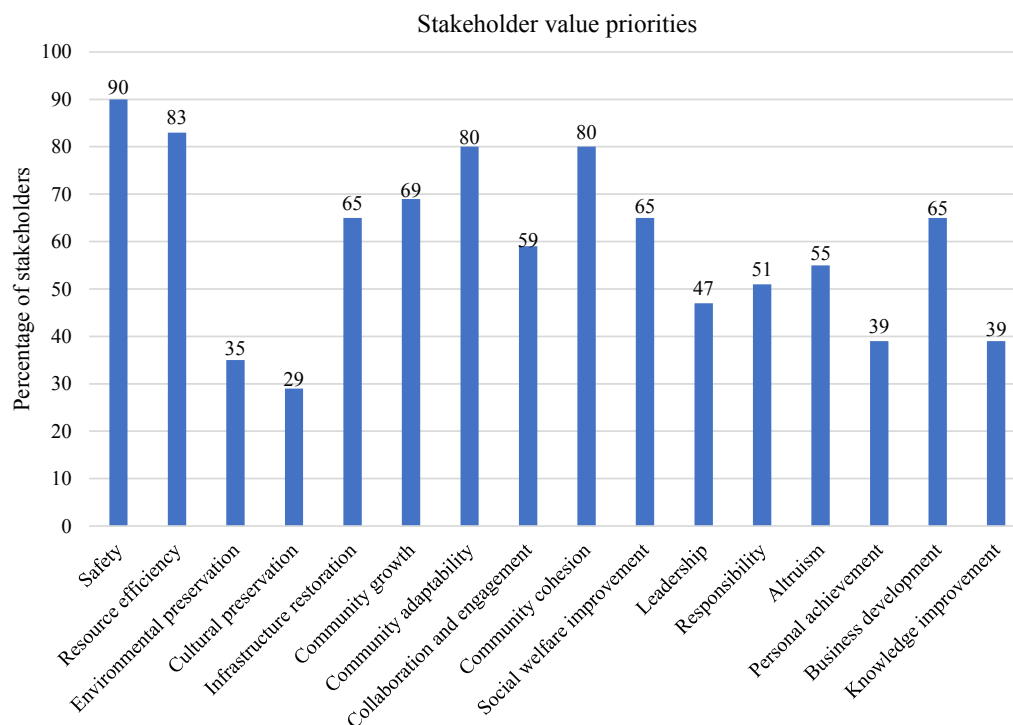
Stakeholder value priorities

**Fig. 4.** Stakeholder value priorities.

## Stakeholder Value Priorities

The identified values were ranked based on the percentage of interviewees who mentioned the values during the interviews. Fig. 4 shows the overall rankings of values for all stakeholders across different phases of Hurricane Michael. Detailed discussions on the top five most important values—safety, resource efficiency, community adaptability, community cohesion, and community growth—are presented in the following paragraphs.

### Safety

Among the 16 values, safety was mentioned or discussed by 90% of the interviewees, thus it was considered as the most prioritized value based on the stakeholders' perspectives. As safety includes different dimensions, different stakeholders have varying value priorities toward different safety dimensions. For example, the interviewees from the private sector and community residents focus more on personal life safety, family safety, employee safety, and safety of personal belongings. As mentioned by one of the interviewees from the tourism sector, when Hurricane Michael was initially predicted to be a Category 2 hurricane, the local residents' initial value priority was the potential economic effects of Hurricane Michael because 30% of their jobs are tied to tourism. However, as the hurricane approached, "our main value had nothing to do with tourism business," one interviewee said, adding, "our main value was the safety of our family and friends." On the other hand, public stakeholders and NGOs attached high importance to the safety of the whole community besides their personal life and property safety. They took different actions to ensure the safety of the entire community. For example, an interviewee from a disaster relief and recovery focused nongovernmental organization claimed that their primary value was to "serve and ensure the safety of the people who are affected in the disaster." Similarly, a government emergency management employee mentioned that the number one goal of emergency management is to "ensure the safety of

the whole community." To do that, he emphasized, all different sectors need to work collaboratively to ensure that the communities are aware of the emergency knowledge and of resources available to them in the disaster. In addition, he highlighted the importance of mitigation efforts. For example, more stakeholders and sectors need to be engaged in emergency training and exercises throughout the state. "We should not wait until the disaster hits us, we need to take better mitigation actions and be better prepared," the interviewee said. Another public sector interviewee mentioned that a public safety risk-management framework or flow chart could/should be designed to include multiple sectors with clear definitions on the roles and responsibilities to collaboratively reduce disaster risks.

### Resource Efficiency

Mentioned by 83% of the respondents, resource efficiency was the second most emphasized value according to the responses of the interviewees. Disaster management involves a coordinated and co-operative process of preparation to match the urgent needs of the public with limited resources. One of its critical goals is to ensure an efficient use of lifesaving and recovery resources, including water, power, gas, food, materials, and staffing. According to a public sector interviewee involved in transportation, one of the most challenging tasks during the response phase was the coordination of limited resources to effectively remove the debris and open up the roads. "After Hurricane Michael, all roads are impacted, all roads need to be reopened, but we only have limited resources," the interviewee said, so "how to make a better use of these limited resources became a challenge." Similarly, limited access to water, food, power, gas, and medical supplies was mentioned by several private sector interviewees. "To ensure the patients get the medicine they need after the disaster, I prepared all the prescriptions before Michael hits us," said one interviewee from a private health clinic, "because I knew there would be limited medical supplies once Michael passes." The local infrastructure conditions further

worsened the limited resource supplies, as many local roads were completely inaccessible due to debris and fallen trees and branches. In some regions, water and power outages lasted for several weeks after the disaster because of the severely damaged infrastructure. Efficiently using and allocating limited resources became an important value priority to the stakeholders in that particular context.

## Community Adaptability
Community adaptability is another highest ranked value, with 80% of interviewees mentioning it. Community adaptability is a critical element of community resilience, as "community resilience is composed of a set of networked adaptive capacities" (Plough et al. 2013, p. 1191). The adaptability of the communities in the Florida Panhandle was tested and challenged by the rapid intensification of Hurricane Michael. Hurricane Michael rapidly intensified from a tropical storm into a Category 5 hurricane in three days, leaving little time for preparedness. Many residents decided to shelter in place as they did not have time to safely evacuate. One of the interviewees mentioned that the news of the hurricane was not taken seriously until the storm had actually started. As a result, local residents were not prepared for the disaster to be of this magnitude, and they did not store enough supplies to withstand the resulting damage.

Meteorologists have provided a number of explanations for the rapid intensification of hurricanes and storms in recent years, one of which is climate change and global warming. The climate-added rapid intensification will make hurricanes increasingly difficult to predict in the future (Pielke et al. 2005; Mousavi et al. 2011). Given such a situation, one emergency management officer emphasized that "to build the capacity of community adaptability, we should not just focus on the disaster response phase. Rather, we need to spend more efforts on disaster mitigation." "Public education and outreach are the key; training and exercises are the key," he highlighted. Emergency management officials noted that such education, training, and exercises should engage all different sectors, including different levels of government, private sectors, NGOs, and the community residents. To build more resilient communities, different stakeholders should not only collaboratively adjust to short-term extreme events such as Hurricane Michael but also adapt to the gradually changing climatic conditions to prepare for and deal with the effects of climate change in the long term, especially coastal flooding, erosion, and ecosystem changes.

## Community Cohesion
Similar to community adaptability, community cohesion and trust in neighbors were prioritized by the stakeholders (80% of respondents). This result coincides with a number of research studies (e.g., Chang 2010; LaLone 2012; Tompson et al. 2013; Townshend et al. 2015) that confirm social cohesion as a critical component in building more resilient communities as well as earlier studies that have documented cohesive postdisaster behaviors (e.g., Bardo 1978; Barton 1969; Drabek and McEntire 2003; Fritz and Mathewson 1957; Ganapati 2009; Parr 1970). For example, Tompson et al. (2013) proved that communities with a strong sense of social connection recovered at a faster pace. People living in those communities with the fastest recovery were more inclined to say that "others can be trusted" and "the disaster brought out the best in their neighbors." In communities that had a harder time bouncing back, more people reported seeing looting, vandalism, and hoarding of food and water (Tompson et al. 2013).

During Hurricane Michael, stakeholders emphasized the importance of community cohesion and took actions to help one another. Hurricane Michael had a catastrophic impact on every individual, household, and community in the area. Many residents' houses were damaged or destroyed, and they suffered from water, power, and phone service outages due to damage to critical infrastructure systems (e.g., transportation, electricity, water, sewer). In the immediate aftermath of Hurricane Michael, although federal and state governments quickly announced that emergency aid had been made available to the affected communities, some of the hardest hit areas were nearly impossible to reach because the roads were flooded or buried with debris. As a result, community residents and private stakeholders volunteered to check to ensure the safety of their neighbors after the disaster; shared resources such as water, food, gas, and generators; and assisted each other in conducting the initial damage assessment and rebuilding. For example, in Tallahassee, some grocery stores were open the day after the hurricane, and the store employees started to work at 3 a.m. to ensure that food and other supplies were available for customers. A physician, who lost her own home, mentioned that she tried to help her patients "at any cost." She reopened her clinic the day after the disaster to serve the patients when the two large hospitals in the area were severely damaged. Public sector agencies also took all the necessary actions to reach out to and improve the conditions of the impacted communities, and they worked extra hours for the betterment of communities. For example, a government official mentioned that his priority immediately after the disaster was not to repair his own damaged house, but rather "to make sure all citizens" had access "to the drinking water and medical facilities."

## Community Growth
Around 69% of interviewees discussed the importance of community growth. Stakeholders affected by Hurricane Michael expressed a surprisingly positive and optimistic attitude toward Hurricane Michael's impacts. Although their homes, businesses, and infrastructure systems were severely damaged, they emphasized that "it [the hurricane] opens doors for growth and change." When talking about the future of their communities, they are determined to rebuild stronger structures instead of restoring what was there prior to the disaster. For example, a public sector employee emphasized that the building codes should and will be upgraded due to the impact of Hurricane Michael, and he said, "There is no doubt that [the standard in the building code] should be raised." As an example, most new homes and commercial buildings in Miami-Dade county must be built to withstand the design wind speed of approximately 282 km/h (175 mi/h), but these specifications are only approximately 193 km/h (120 mi/h) in the Mexico Beach area. To build more resilient communities in the Florida Panhandle area, there is a growing consensus that building codes along the Florida Panhandle area should be stricter.

Similarly, a number of interviewees from the private sector and community residents, who have lived in the Florida Panhandle for their entire lives, are optimistic about the future of their communities; they embrace changes and are looking forward to more resilient communities. "Panama City has not changed for decades, now it is the time for a more resilient community," said a business owner who has lived in Panama City for more than 30 years. "Panama City Beach is a small town that was developing slowly at its pace. After the hurricane, there will be more motivations among people to rebuild and grow," another property developer from Panama City Beach stated. "The city is generally very resilient, and it will always come back strong. Now the goal is to grow back and grow stronger." Similarly, an interviewee who is the owner of a construction company at Panama City mentioned, "It's going to be a better future, as the development in Florida Panhandle has always been laid-back, but this time it's an opportunity to rebuild and grow with new codes and regulations."
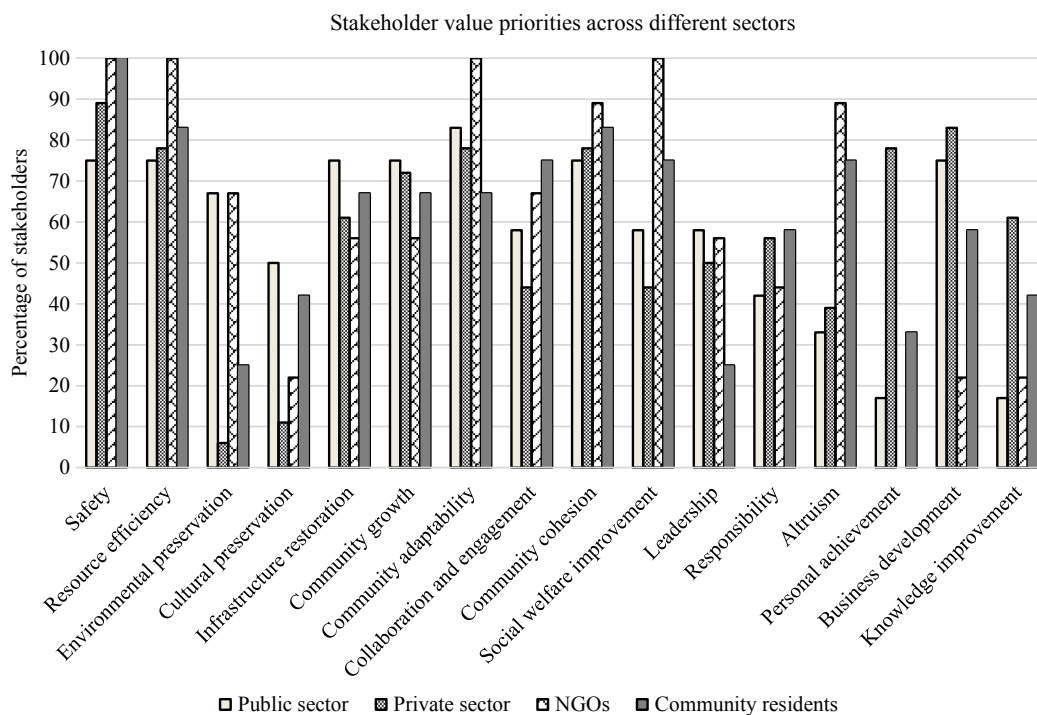
**Fig. 5.** Stakeholder value priorities across different sectors.

**Table 2.** Stakeholder value priorities

| Values | Public stakeholders (S1) | | Private stakeholders (S2) | | NGOs (S3) | | Community residents (S4) | | All stakeholders (S) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Percentage | Rank | Percentage | Rank | Percentage | Rank | Percentage | Rank | Percentage | Rank |
| Safety | 75 | 2 | 89 | 1 | 100 | 1 | 100 | 1 | 90 | 1 |
| Resource efficiency | 75 | 2 | 78 | 3 | 100 | 1 | 83 | 2 | 83 | 2 |
| Environmental preservation | 67 | 8 | 6 | 16 | 67 | 7 | 25 | 15 | 35 | 15 |
| Cultural preservation | 50 | 12 | 11 | 15 | 22 | 13 | 42 | 12 | 29 | 16 |
| Infrastructure restoration | 75 | 2 | 61 | 8 | 56 | 9 | 67 | 7 | 65 | 6 |
| Community growth | 75 | 2 | 72 | 7 | 56 | 9 | 67 | 7 | 69 | 5 |
| Community adaptability | 83 | 1 | 78 | 3 | 100 | 1 | 67 | 7 | 80 | 3 |
| Collaboration and engagement | 58 | 9 | 44 | 12 | 67 | 7 | 75 | 4 | 59 | 9 |
| Community cohesion | 75 | 2 | 78 | 3 | 89 | 5 | 83 | 2 | 80 | 3 |
| Social welfare improvement | 58 | 9 | 44 | 12 | 100 | 1 | 75 | 4 | 65 | 6 |
| Leadership | 58 | 9 | 50 | 11 | 56 | 9 | 25 | 15 | 47 | 12 |
| Responsibility | 42 | 13 | 56 | 10 | 44 | 12 | 58 | 10 | 51 | 11 |
| Altruism | 33 | 14 | 39 | 14 | 89 | 5 | 75 | 4 | 55 | 10 |
| Personal achievement | 17 | 15 | 78 | 3 | 0 | 16 | 33 | 14 | 39 | 13 |
| Business development | 75 | 2 | 83 | 2 | 22 | 13 | 58 | 10 | 65 | 6 |
| Knowledge improvement | 17 | 15 | 61 | 8 | 22 | 13 | 42 | 12 | 39 | 13 |

### Stakeholder Value Priorities across Sectors: Similarities and Differences

Stakeholder value priorities were further analyzed based on the stakeholder sectors the interviewees belong to, and the results of stakeholder value priorities based on stakeholder sectors are presented in Fig. 5 and Table 2. As per Fig. 5 and Table 2, although there is a general consensus on the importance of the identified values, the ranks of these values were different based on different stakeholders' perspectives. The results indicate that stakeholders from different sectors have different value priorities, and the importance of some specific values were emphasized by only certain groups of stakeholders. These differences may be attributed to various

factors, such as differences in (1) personal or work responsibilities, 2)) concerns and needs, (3) interests or preferences, (4) knowledge backgrounds, (5) previous disaster experiences, and (6) professional backgrounds. For example, besides the generally top-ranked values discussed in the previous section, public stakeholders and NGOs tended to attach relatively higher priorities toward values that are relevant to their work responsibilities. Public stakeholders, for instance, attached a higher priority to infrastructure restoration, while NGOs placed a higher importance on altruism value, both of which tie closely to these agencies' work responsibilities. As highlighted by an interviewee who works in the Florida Department of Transportation, the most urgent work after Hurricane Michael was to

"ensure all roads were cleared and reopened as soon as possible." The public stakeholders emphasized that the restoration of public infrastructure, such as roadways, power, and communication, is the prerequisite for a speedy and effective recovery. On the other hand, because of their professional and knowledge background, public stakeholders and NGOs placed relatively lower importance on self-enhancement values such as personal achievement, knowledge improvement, and business development. Stakeholders from these agencies are typically knowledgeable in disaster management, and they also tended to express their values from their agencies' perspectives. In contrast, for private stakeholders and community residents, their top-ranked values are aligned with their personal interests and concerns, such as business development and personal achievement, while their lower ranked values are values that are not relevant with their immediate needs or concerns in the context of a disaster, such as environment preservation and cultural preservation. The following paragraphs discuss some examples of values that were rated differently across different sectors of stakeholders.

Based on the number of interviewees who mentioned the values, environmental preservation and community adaptability were ranked much higher by stakeholders from the public sector and NGOs compared with stakeholders from the private sector and community residents. This is probably because environmental preservation can encourage economic health, influence property values, and spur revenue from recreational and tourism activities. It is indeed closely linked to community adaptation, as it can play a critical role in the community's ability to prevent, cope with, and recover from disasters and to mitigate further disaster damage. There is a growing consensus around linking disaster risk reduction with natural resource protection. The Hyogo Framework for Action (HFA) calls for efforts to "encourage the sustainable use and management of ecosystems, including through better land-use planning and development activities to reduce risk and vulnerabilities" (UNEP 2019, p. 3). It facilitates the implementation of integrated environmental and natural resource management approaches that incorporate disaster risk reduction, such as integrated flood management and appropriate management of fragile ecosystems (UNEP 2019). A public sector interviewee highlighted that "while large-scale disasters like Hurricane Michael cannot be entirely avoided, there are ways we can mitigate the devastating impact of disasters through better ecosystem management." Strategically planning for green space and vegetated land and restoring large swaths of natural resources (e.g., wetlands) can reduce the effects of disasters. Vegetated land absorbs water, retains it, and slows its movement, thus reducing the flooding and its subsequent effects. Planning that incorporates these features not only helps reduce flooding but also helps mitigate broader storm impacts. Similarly, in coastal regions, coral reef systems act as physical barriers and reduce wave energy, thus reducing the impact of hurricanes (Ferrario et al. 2014). In Mexico Beach, the Mexico Beach Artificial Reef Association initiated one of the most active artificial reef programs in Florida. Since 1997, the organization has built over 300 patch reefs off the sandy shores of Bay and Gulf counties (Cox 2019). Without the protection provided by natural resources and ecosystems, the detrimental effects of disasters could become more catastrophic.

Social welfare improvement, on the other hand, is a value that is mostly highlighted by the community residents and NGOs. The regions struck by Hurricane Michael—both the coastal counties under an evacuation order and inland counties people fled to—are among the most socially vulnerable regions in the United States (DirectRelief 2018). Disasters such as Hurricane Michael have had a huge impact on disadvantaged or vulnerable groups (e.g., economically disadvantaged, the elderly, the homeless).

The economically disadvantaged are particularly exposed to natural disasters and they have limited access to risk-management instruments. Research studies show that low-income households are less able to cope with disasters than high-income households (Vakis 2006; Vakis et al. 2004). Similarly, people who are elderly or disabled, have mobility impairments or require special medical assistance, lack transportation, or do not understand English in the US are the most vulnerable to disasters, and they may require additional help and resources to recover. In addition, many coastal communities are particularly vulnerable during Hurricane Michael (Millis 2018). Those impacted regions have limited infrastructure and little coastal protection. Some areas in the Panhandle, such as Destin and Panama City, have dense development behind the beachfront homes, condos, and hotels, and there are bays and inlets that can easily dump water into the nearby neighborhoods. Most sections of the major highway—US-98—in the affected communities are only 30 m (100 ft) away from the coast. If the storm surge damaged one section of the highway, it would be extremely challenging for the emergency responders to reach the residents in need. Hence, in preparation for the hurricane, those coastal communities encouraged residents to take shelter in the community's central schools. One of the school principals mentioned that his school property was used as a shelter for the homeless people during Hurricane Michael. He also emphasized that there was a need to build more emergency shelters for people who are vulnerable in the disasters. He believed that incentives and funding provided by the government would facilitate these practices, and there should be more collaboration efforts across the public sector, private agencies, and NGOs.

Some values, such as personal achievement and business development, were mostly prioritized by private stakeholders. For example, business development was one of the highest priorities to private sector stakeholders, including many small business owners in the Florida Panhandle region. Due to the impact of Hurricane Michael, many local businesses suffered severe property structure damage and water, power, and phone service outages. As one interviewee from the private sector said, "We were fortunate enough to have generators and so we were able to get power going right away. However, internet signal and cellular phone signals were not available. It took a month to get back to normal situation after the disaster." Although most small businesses purchased the insurance to cover the direct damage (e.g., structure and inventory damage), a considerable number of small companies did not have the small business interruption insurance, which could partially cover the indirect damage such as loss of customers and revenues due to a prolonged closing period. "Some businesses may never return," said an interviewee who owns a hotel. Furthermore, the interviewees expressed concerns over the employment rate. Hundreds of people could be out of work due to the impact of Hurricane Michael on local businesses. Thirty percent of the jobs in the Panama City area are linked to the service and tourism industry, which was severely impacted by the hurricane. It is important to note, however, that the construction industry is booming in the aftermath of Hurricane Michael. Many companies have reported labor and resource shortages due to the overwhelming number of reconstruction projects. Several interviewees from the construction industry said that although their houses were damaged, they felt "blessed" that they did not lose their jobs.

### Stakeholder Value Dynamics: Comparison across Disaster Phases

Stakeholder value priorities are not static, and they dynamically change across different phases of a disaster. Fig. 6 shows the
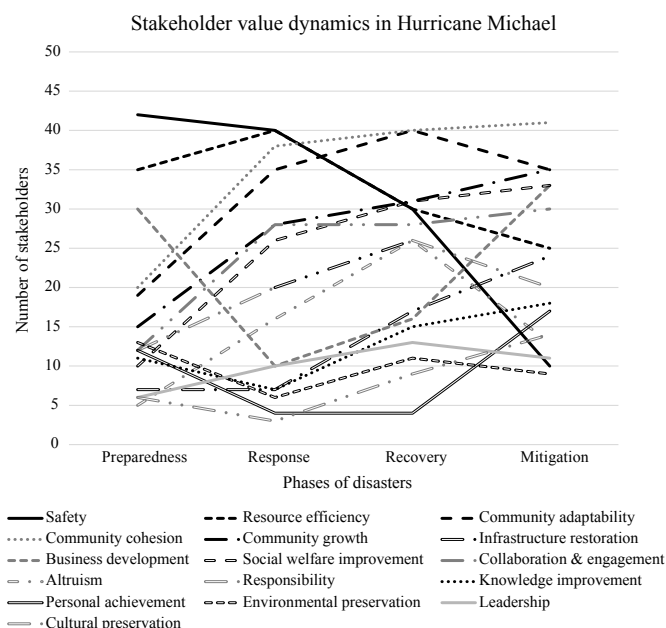
Stakeholder value dynamics in Hurricane Michael

**Fig. 6.** Stakeholder value dynamics in Hurricane Michael.

dynamics of stakeholder values by plotting the number of interviewees who mentioned the identified values across different phases of Hurricane Michael, including disaster preparedness, response, recovery, and mitigation. For example, the top three values emphasized during the preparedness phase are safety, resource efficiency, and business development, whereas during the mitigation phase the top three prioritized values are community cohesion, community adaptability, and community growth.

As per Fig. 6, the number of interviewees who emphasized the importance of safety and resource efficiency gradually decreased throughout the disaster management cycle (i.e., from disaster preparedness to mitigation). This indicates that, in general, stakeholders have attached less importance on safety and resource efficiency soon after Hurricane Michael passed. For example, safety was emphasized by almost all stakeholders when they discussed about their value priorities in the preparedness and response phases. The rapid intensification of Hurricane Michael left little time for the local communities to get well prepared and learn about safety precautions for the disaster. Many local residents decided to shelter in place as Hurricane Michael quickly intensified from a Category 2 to a Category 5 in less than 24 h. In the immediate aftermath of Hurricane Michael, some communities were faced with houses and infrastructure completely smashed by storm surges and strong winds and weeks of power losses. Thus, ensuring family and property safety was the main theme throughout the preparedness and response phases. During the recovery and mitigation phases, the priority on safety gradually declined, in part because there were no longer risks to stakeholders' lives and property. For resource efficiency, the tendency of declining was milder compared to safety. This is probably because, during the recovery and mitigation phases, interviewees from the private sector and NGOs raised an important concern related to resource efficiency: the construction material and labor shortage. The effort to rebuild many of the damaged communities is hampered by a severe labor shortage in the construction industry. According to a survey conducted by the Association of General Contractors of America, 80% of the construction firms in the US are unable to find the labor they require (AGCA 2018). As a result, homes that used to take 3–4 months to

rebuild now take 6–8 months. "We need to reach out to high school kids to spread the information and provide training," said one interviewee from a representative of the construction industry. He continued, "We need to build the positive image of [the] construction industry and bring more labor." Another interviewee from a local church highlighted that "having a plan for [construction] resource supply in [an] emergent situation is crucial."

As per Fig. 6, the number of interviewees who emphasized the importance of community cohesion, collaboration and engagement, social welfare improvement, community growth, and infrastructure restoration gradually increases after Hurricane Michael. These results are supported by a number of studies (e.g., von Dawans et al. 2012, 2018) that suggest that acute stress (e.g., disaster) may lead to greater cooperative, social, and friendly behavior. Such positive and social response could help explain the human connection that happens during disasters. This human connection is responsible for and critical to the collective survival and potential improvement of the communities. Community cohesion and connection is a fundamental human need linked to both psychological and physical health in the context of disasters. It may be particularly important in a disaster setting, because disasters naturally lead to a sense of vulnerability and loss of control. The feeling of vulnerability and lack of control may have led people to seek comfort from others in multiple ways (Maguire and Hagan 2007). In addition, individuals who are involved in disasters are more willing to be friendly, generous, helpful, and contribute to the community, and they realize the importance of cooperation and collaboration in achieving a common goal, which could be the overall resilience of the community (Mannakkara and Wilkinson 2013).

Fig. 6 also shows that the number of interviewees who emphasized the importance of community adaptability, altruism, responsibility, and leadership gradually increase to the maximum during the recovery phase. Disaster recovery and reconstruction is a long and complex process that demands united efforts across multisector stakeholders. Successful recovery requires a sense of responsibility by public sector leaders, volunteers, and residents and adaptation to the institutional, cultural, environmental, and social context within which recovery takes place. For example, regarding leadership, a public sector interviewee mentioned, "Disaster relief is a complex process, but it would be simpler if you have the right people manage it in the right way." This requires the leaders not only to possess technical knowledge and soft skills, but also to actively engage with the affected populations. He continued, "More than often, the people just want to see that you are there for them." As an important act that reflects the altruism value, volunteering activities also play an important role in facilitating the recovery process. Although many volunteers helped provide immediate disaster relief in the response phase of Hurricane Michael, it has been challenging to connect volunteers or charities to the impacted communities with resources to plan, coordinate, support, and finance the long-term recovery. Thus, several interviewees from the NGOs have emphasized the importance of strengthening the value of altruism during the recovery phase. "Things begin to calm down in the recovery phase, so this should be the time for us to replenish ourselves and have more people join our team," said an interviewee from a local volunteer group. The act of volunteering not only allows individuals to have a feeling of accomplishment but also supports the whole community by building social connections.

According to Fig. 6, the number of interviewees who mentioned business development, personal achievement, knowledge improvement, cultural preservation, and environmental preservation dropped to the bottom in the response phase. Three of these values (i.e., business development, personal achievement, and knowledge improvement) belong to the category of self-

enhancement, which emphasizes the pursuit of one's own interests and success. This result shows that people are less self-concerned in a disaster setting. Several interviewees explained that the priority of values such as safety, community cohesion, and community adaptability transcended their personal interests or success in a disaster setting, even though these self-enhancement values are prioritized more in a normal context. The affected populations are less concerned about self-enhancement in a disaster setting, probably because stress and distress caused by disasters force people to focus more on social bonding and safety rather than personal wealth, power, and prestige (Albrecht 2011). Whereas research (e.g., Taylor and Sherman 2014) also shows that self-enhancement is very dynamic, it has positive illusions in a normal context as it helps manage challenging events, encourages adaptive behavior, and supports well-being.

Similarly, the priorities on cultural and environmental preservation dropped to the bottom at the response phase while increased in the other phases. For example, cultural preservation was at the minimum during the response phase, but it steadily grew in the recovery and mitigation phases. Building a resilient community includes the preservation of historic and cultural resources in the short- and long-term recovery and future mitigation efforts (WBDG 2017). As highlighted by UNESCO, "The symbolism inherent in heritage is a powerful means to help victims recover from the psychological impact of disasters. In such situations, people search desperately for identity and self-esteem," and they find it in restoring their heritage and historic places. Heritage contributes to social cohesion, sustainable development, and psychological well-being. Protecting heritage is an essential way to promote community resilience (UNESCO 2015). Hurricane Michael seriously damaged and completely destroyed many historical structures(e.g., the Old Callaway School and the Judge Sapp House) in Panama City and Mexico Beach (Breaux 2019). A city commissioner emphasized the need "to preserve and maintain the historic sites of the towns and preserve the landscape of the cities." During the recovery phase, following the guidance on protecting heritage and the treatment of historic areas and individual historical buildings, the city commissioner strived to work with landscape planners and architects to restore the historic districts of urban areas. "It is a challenging process," said the city commissioner. "We need to balance the life safety, economic value, and preservation values in the long-term recovery and planning." The key is to retain historic features while sensitively incorporating new features that reduce the risk of future damage from the disaster.

## Recommendations for Improving Disaster Resilience of Communities

Based on the results of the interviews, some possible actions to enhance the disaster resilience of communities at the Florida Panhandle region are as follows:

1. Prioritize disaster management policies and practices based on stakeholder value priorities: The results of the interview indicate that although the ranks of the values were different based on different stakeholders' perspectives, there is a general consensus on the importance of the identified values; stakeholders consistently attached higher importance to certain values (e.g., safety, resource efficiency). Thus, there is a need to prioritize the policy-making and implementation based on stakeholder value priorities. In the Florida Panhandle area, many local communities are still not investing enough in supporting disaster resilience policies or practices, and many decision-makers have not yet galvanized enough support to improve disaster resilience.

Given limited resources, future efforts should be spent on the policies or practices that can best fulfill stakeholder values. To offer higher benefits and satisfaction to community stakeholders, resilience policies should be enacted in a way that is aligned with stakeholder value priorities. For example, policy makers can offer additional training or education sessions to their workforce, NGO personnel, and interested residents on planning for, allocating, and utilizing resources more efficiently prior to and after disasters, because resource efficiency was considered one of the most prioritized values by these stakeholders. These value-driven policies or practices can be integrated into community development plans in order to prioritize the implementation of disaster-resilience strategies within the community budget.

2. Tailor disaster management policies or practices to different stakeholders' value priorities: The results of the interview show that some values were ranked differently by different sectors of stakeholders. Given such a difference, there is a need to tailor disaster management policies or practices to different stakeholders' value priorities. Instead of a universally applied disaster management/resilience plan, some practices or guidelines can be developed through consultation and coordination with the relevant stakeholders, given their specific needs, resources, and expectations. Although some stakeholders, such as private stakeholders and community residents, are not typically involved in disaster management processes, they are directly impacted by disasters, and they also possess additional resources and knowledge that can be used to support disaster management. Therefore, their values in a disaster context, though sometimes different than the values of the public stakeholders, should be taken into consideration when disaster management decisions are being made. For example, given that social welfare improvement is heavily emphasized by community residents, decision makers from the public sector can prioritize actions or allocate more resources to identify vulnerable populations in a disaster and offer specialized support to address the needs, concerns, and risks to these populations.

3. Customize disaster management policies or practices across different phases of disasters based on stakeholder value dynamics: Disaster management involves activities, programs, and measures that are implemented based on the disaster management cycle—i.e., disaster preparedness, response, recovery, and mitigation phases. According to the results of our study, stakeholder value systems are not static in the context of a disaster; they dynamically change throughout different phases of a disaster. For example, a community resident who considered safety as the top priority during the preparedness phase changed to attach the highest importance to community adaptability during the mitigation phase. Thus, decision makers and/or policy makers should customize the implementation of disaster management practices based on stakeholder value dynamics and ensure that the right practices are implemented at the right time. For example, policy makers can build on postdisaster community cohesion for implementing new resilience policies regarding sea-level rise in coastal communities, given that the value priority toward community adaptability (e.g., adapt to climate change, sea-level rise) becomes relatively higher in this phase.

4. Integrate and unite the value systems of multisector stakeholders: Disaster management is a shared responsibility among all stakeholders, which requires collaboration and engagement of multisector stakeholders. Thus, to build more resilient communities, it is important to understand and integrate the values of all these stakeholders. Different stakeholders have different value priorities in a disaster context. The differences in the value

systems of these stakeholders motivate them to make different judgments, evaluations, or decisions, lead to conflicts and disputes, and result in longer decision-making time and potentially millions of dollars in disaster losses in the future. Thus, more systematic and formal integration and unification of stakeholders' diverse value systems is sorely needed. Such integration will facilitate more resilient communities by contributing to (1) fewer conflicts and disputes among multisector stakeholders in disaster management processes, (2) shorter time and money-saving for decision making, (3) more transparency and consistency, and most importantly, (4) a higher level of satisfaction and greater collective value delivered to multisector stakeholders.

## Conclusions, Contributions, and Future Work

This paper presents a study on identifying and understanding multisector stakeholder values in the context of Hurricane Michael. A total of 41 interviews were conducted with 51 interviewees from the public and private sectors, NGOs, and community residents of the impacted communities in the Florida Panhandle area. Based on the interview results, 16 values were identified and analyzed, including safety, resource efficiency, environmental preservation, cultural preservation, infrastructure restoration, community growth, community adaptability, collaboration and engagement, community cohesion, social welfare improvement, leadership, responsibility, altruism, personal achievement, knowledge improvement, and business development. These values are diverse, as revealed in Williams et al.'s (2018) study, and range from prevalent abstract ones (e.g., altruism) to concrete ones (e.g., infrastructure restoration) (Rawluk et al. 2017). While some of these values (e.g., collaboration) were identified in the public administration literature earlier as public sector values (Jørgensen 2006; Pandey et al. 2016; Weske et al. 2019), a majority of them are new and unique to disaster contexts. These values were then classified into conservation, openness to change, self-transcendence, and self-enhancement categories based on Schwartz's (2012) theory of basic human values. The priorities of values were further analyzed based on the number of interviewees who mentioned these values during their interviews. Safety, recourse efficiency, community cohesion, and community growth were among the most prioritized values based on stakeholders' opinions. Although there is a general consensus on the importance of the identified values, the ranks of these values were different based on different stakeholders' perspectives, in parallel with Lyons et al.'s (2006) study findings. In addition, the dynamics of stakeholder values were analyzed by investigating how their importance changed throughout different phases of Hurricane Michael. The results show that different values have different changing patterns. For example, the priorities of safety and resource efficiency gradually decrease throughout the disaster phases, while the priorities of community growth, community cohesion, social welfare improvement, collaboration and engagement, and infrastructure restoration show a steady growth. This finding is in line with the public administration literature that acknowledges the changing nature of values in the public sector (Jørgensen and Vrangbæk 2011; Van Wart 1998) and the importance of studying public value hierarchies in specific decision contexts (Witesman and Walters 2015).

This research contributes to the body of knowledge on disasters in three primary ways. First, it provides important knowledge on the interactions between the human element and built environments by explicitly identifying and defining what stakeholders value in community disaster resilience. Second, it offers a critical understanding of the priorities, consistency, and differences among multisector stakeholders in achieving disaster resilience of the communities, which could facilitate stakeholder engagement and collaboration in building more resilient communities. Third, it advances the knowledge on human value theory by investigating how natural disasters impact multisector stakeholder value systems, which are fundamental to timely and human-centered decision making during the preparedness, response, and recovery phases of disasters. From a practical perspective, a comprehensive understanding of the dynamics of multisector stakeholder value systems opens doors for policy makers to introduce more proactive and timely policies that are well-aligned with stakeholder value priorities to address disaster resilience challenges in the future. It also helps decision makers prioritize preparedness, response, and recovery actions when only limited resources are available by showing them whether their actions are aligned with stakeholder value priorities. In addition, this research can facilitate disaster-resilient communities to be planned and developed in a way that is more human sensitive. By understanding stakeholder values, communities can be developed in a way that is more tailored to and aligned with public needs and priorities.

This article indicates several directions for future research. First, more data can be collected (e.g., through a survey) and analysis can be conducted to understand and compare the value priorities and their dynamics of stakeholders with different demographic and socioeconomic backgrounds. Second, different types of data can be collected using survey or social media to involve a larger number of stakeholders. These surveys or social media data analyses can focus on understanding the value priorities of multisector stakeholders in a quantitative manner across different disasters, across different communities, and/or across different sublevel sectors (e.g., different sectors of public agency and different businesses or industries). Third, future studies can conduct social network analyses to understand whether stakeholders' value priorities are affected by other stakeholders. Fourth, there is a need for developing mathematical models that further unite the value priorities of multisector stakeholders while accounting for the influences among these stakeholders.

## Data Availability Statement

Some data that support the findings of this study are available from the corresponding author (Lu Zhang) upon reasonable request. These data include the analyzed interview data, which removed the information that could associate the data with the interviewees. Some data generated or used during the study are proprietary or confidential in nature and may only be provided with restrictions. These data include the raw interview data with the interviewees' identity information.

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