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Thesis Title: Evaluation of Climate-Related Disaster Communication Strategies' Impact on Overall Community Resilience in the Thomas Fire's Preparedness, Response, and Recovery

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Summary

Wildfires continue to be a high priority climate-related hazard in California including Santa Barbara, where experts estimate a 48% likelihood of a wildfire event within any year (Wood, 2022). However, disaster communication strategies and the levels to which they are implemented within local areas has substantial variation, which is caused by a lack of consistent requirements across the United States US and California in disaster management and variation in event typology. This in turn can affect the overall community resilience outcomes following climate-related disaster events.

In 2017, Santa Barbara, California experienced the Thomas Fire, which was at the time the largest recorded wildfire in California history (Andone, 2018). This resulted in substantial environmental damage, economic losses for residents and businesses, and public safety implications. However, no academic data collection has occurred on the Thomas Fire to explore to what extent climate-related disaster communication strategies were used in preparedness, response, and recovery and how this affects the overall local community resilience.

Therefore, this thesis' main objective is to identify to what extent climate-related disaster communication influenced the combined community resilience outcomes of Santa Barbara's residents to the Thomas Fire event during the preparedness, response, and recovery phases.

The research approach is a case study of the Thomas Fire. Fourteen semi-structured interviews were held with a range of local experts in the disaster management and planning field. To achieve triangulation, desktop research was used through policy analysis, review of relevant websites, and newspaper articles (Appendix 1).

The data analysis of this thesis found climate-related disaster communication strategies used by local agencies in the Thomas Fire case study increased overall community resilience in the County. This finding is based on the independent variable, climate-related disaster communication strategies', indicators results showing there is potential across the disaster cycle to have overall positively affected community outcomes. In tandem, the majority of the community resilience indicators showed an increased community resilience score overall.

The answer to the main research question is local agency climate-related disaster communication strategies influenced Santa Barbara's residents by overall increased community resilience in the Thomas Fire across the preparedness, response, and recovery stages.

Keywords

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Foreword

In 2017, I was completing my Environmental Science degree at the University of California Santa Barbara when the Thomas Fire progressed into Santa Barbara County. A week after the Thomas Fire ended, I started a course, Hazards and Society, which included discussion on communication through the lens of disaster events. This course is what motivated me to find a professional path to study and work on this interaction.

Post-graduation I received a job in Santa Barbara as an Environmental Planner. I had the opportunity to work on the other side of this process as a consultant to local agencies communicating to the public on plans that would affect the community's overall resilience to climate-related disasters. Through this work, I became curious on how communication with the public in completion of environmental plans and policies was affecting community outcomes and if possible, how we as planners and managers could improve the communication process with residents.

Therefore, I enrolled in IHS as a masters student and have completed a thesis on evaluating how the disaster communication strategies used in preparedness, response, and recovery to the Thomas Fire have affected the overall community resilience outcomes of Santa Barbara residents. To achieve objectivity due to my range of interaction with this disaster as resident, student, and professional in the area, I selected a combination of qualitative semi-structured interviews with local experts in the disaster management field as well as policy analysis to improve the learning outcomes from the Thomas Fire for the community, planners, and disaster managers alike.

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Abbreviations

ADU	Accessory Dwelling Unit
BAER	Burned Area Emergency Response Report
Cal OES	California Governor's Office of Emergency Services
CAUSE	Central Coastal Alliance United for A Sustainable Economy
CCCJN	Central Coast Climate Justice Network
CEC	Community Environmental Council
County	Santa Barbara County
CRED	Centre for Research on the Epidemiology of Disasters
CWPP	Community Wildfire Protection Plan
Fire Safe Council	Santa Barbara Fire Safe Council
FLA	Future Leaders of America
HFHZ	High Fire Hazard Zones
HIA	Home Improvement Association
HOA	Home Owners Association
IHS	Institute for Housing and Urban Development Studies
ILRC	Independent Living Resource Center
IPCC	Intergovernmental Panel on Climate Change

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LPNF	Los Padres National Forest
MERRAG	Montecito Emergency Response and Recovery Action Group
MFPD	Montecito Fire Protection District
MICOP	Mixteco Indigena Community Organizing Project/Proyecto Mixteco Indigena
MJHMP	Santa Barbara County Multi-Jurisdictional Hazard Mitigation Plan
NFPA	National Fire Protection Association
NRCs	National Resource Conservation Service
OEM	Santa Barbara County Office of Emergency Management
Ready SBC	Ready Santa Barbara County
SBC Fire	Santa Barbara County Fire Department
SBCAG	Santa Barbara County Association of Governments
SBDC	Small Business Development Center
UCSB	University of California Santa Barbara
UNDRR	United Nations Office for Disaster Risk Reduction
UNISDR	United Nations International Strategy for Disaster Reduction
US	United States
VCFD	Ventura County Fire Department

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VOAD	Voluntary Organization Active in Disasters
WUI	Wildland Urban Interface

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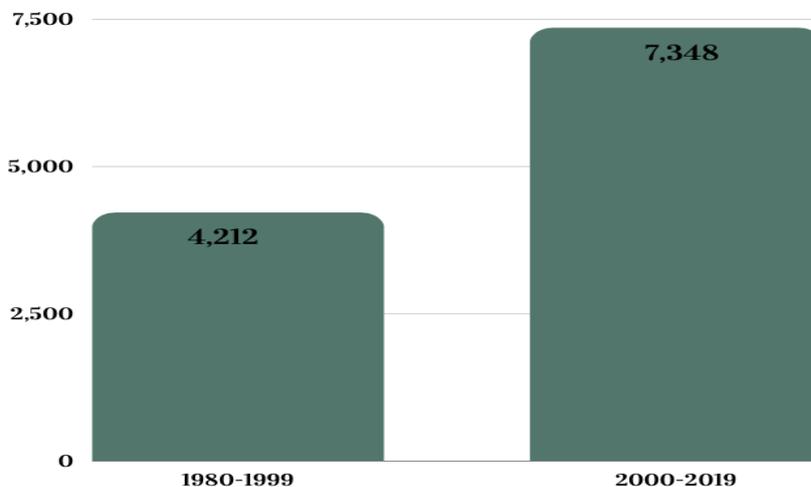
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1. Introduction

Experts estimate, in the last 20 years, an average of 200 million people annually were affected by climate-related disasters with over 1.2 million deaths (UNDRR, 2020). Disasters led to approximately 2.97 trillion USD in global economic losses from 2000 to 2019 (UNDRR, 2020). With an anticipated two-thirds of the world's population projected to reside in urban areas by 2050, "hazards hitting densely populated areas are now more likely to turn into disasters" due to the greater amount of people exposed (Thomas, 2017, p. 1). Therefore, climate-related disasters are causing globally detrimental impacts to community infrastructure, social networks, economies, and the physical environment with the majority of the population affected.

A **natural hazard** can be defined as any "natural process or phenomenon that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage" (UNISDR, 2009, p. 20). On the other hand, a **climate-related disaster** is "a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses or impacts which exceed the ability of the affected community or society to cope using its own resources" (UNISDR, 2009, p. 9). Therefore, a natural hazard may or may not result in a disaster event if there is limited impacts of the event to a population, or if a population has sufficient resilience to mitigate the effects; therefore, the aspect of community is critical to this field (Chaudhary & Piracha, 2021; Prasad & Francescutti, 2017).

As climate change conditions grow due to the greenhouse gas effect and rising average surface temperatures, the number of unprecedented climate-related disasters continues to rise (Thomas, 2017). Natural fluctuation and extreme events occur without the influence of climate change as shown by historical climate-related disasters. However, "[a] changing climate leads to changes in the frequency, intensity, spatial extent, duration, and timing of extreme weather and climate events, and can result in unprecedented extreme weather and climate events"(IPCC, 2012, p. 7). This has led to a growing rate of recorded disaster events with an approximately 74% increase from 2000 to 2019 compared to 1980 to 1999 (Chart 1) (UNDRR, 2020)**.** This raises the importance of the disaster management field in finding approaches to improve community resilience.

Chart 1: Number of Disaster Events from 1980-1999 to 2000-2019

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Source: (UNDRR, 2020).

In academia, communication is commonly only described as a component or aspect of community resilience models, or is entirely missing from theoretical approaches (Houston, Spialek, Cox, Greenwood, & First, 2015; Spialek & Houston, 2019). Therefore, an important emergence of scholarly work over the last decade provides a holistic lens to communication as a guiding and central element to the study of community resilience. Additionally, the components to community resilience influence each other and can affect the outcomes (Houston, 2015). The role of communication in community resilience has three key purposes: 1) Assist in prevention, preparation, and mitigation through communication mediums and methods to the public 2) "facilitate emergency response during a crisis," and 3) improve the outcomes and speed of recovery efforts through information and dialogue with the community (Nicholls, 2012, p. 47).
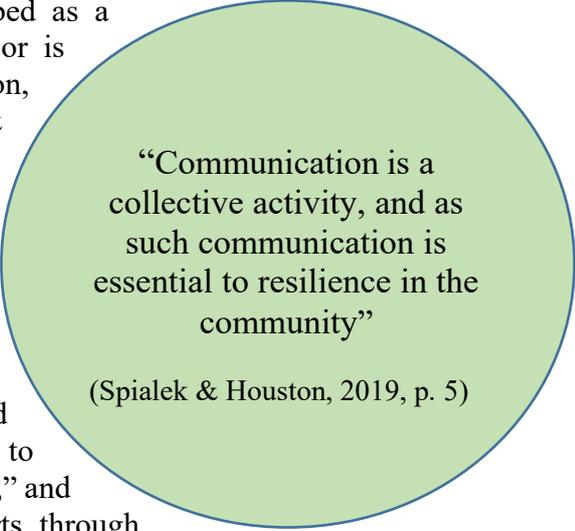
> "Communication is a collective activity, and as such communication is essential to resilience in the community"
>
> (Spialek & Houston, 2019, p. 5)

Problem Statement & Research Gap

Over the past 50 years, wildfire rates in California have increased five times (Williams et al., 2019). Projections show the wildfire burn area in California "is likely to increase by 77% by the end of the century" (Dudek, 2021a, p. 17). This increase in wildfires is in part due to the well documented data on the "reduced fuel moisture due to warming-induced increases in evaporative demand, reduced snow-pack, and reduced warm-season precipitation frequency" (Williams et al., 2019, p. 893). However, climate change is not the sole cause of California's uptick in wildfire rate and intensity; increased development in the wildland-urban interface (WUI), historical fire suppression policies, and increased accidental ignitions in urban areas all play a key role. Urban sprawl into the WUI increased the population exposed to the high fire hazard zones (HFHZ) increasing the risk of a wildfire hazard becoming a disaster (Miller, 2020).

The 2017 Thomas Fire in Santa Barbara, California was the "largest wildfire in California's modern history" until it was surpassed by another wildfire in 2018 (Andone, 2018, p. 1). The Thomas Fire burned a recorded 281,893 acres with estimated losses at $1.8 billion USD across Ventura and Santa Barbara counties (Cal Fire, 2022; Ding, 2018). This case study was selected due to the duration of time since the event as well as the magnitude of damage.

Today in Santa Barbara, "fires have been burning faster and bigger due to drier vegetation related to recent drought conditions, potentially exacerbated by climate change," which can "threaten urban areas" (Wood, 2022, p. 5–14). The likelihood of future occurrence of a major wildfire in Santa Barbara is high with the local government estimating a "48% chance of occurrence in any given year" (Wood, 2022, p. 5–19). However, no academic data collection has occurred on the Thomas Fire to explore to what extent climate-related disaster communication strategies may have influenced community resilience. Further, California has not updated the Risk
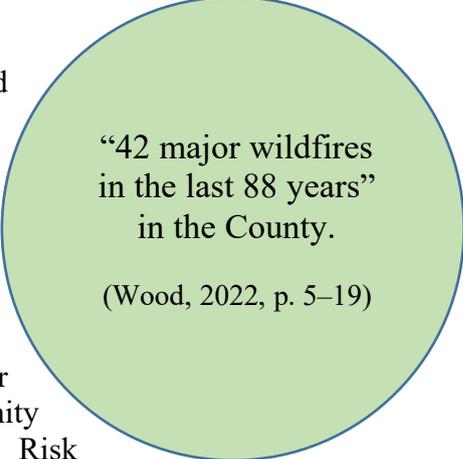
> "42 major wildfires in the last 88 years" in the County.
>
> (Wood, 2022, p. 5–19)

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Communication Guidance for State and Local Agencies since 2006, which does not include consideration of climate change exacerbated risks, including wildfire (Governor's Office of Emergency Services, 2006). This heightens the importance of localized actions and strategies on communication with the public in the preparedness, response, and recovery stages to improve community resilience in Santa Barbara.

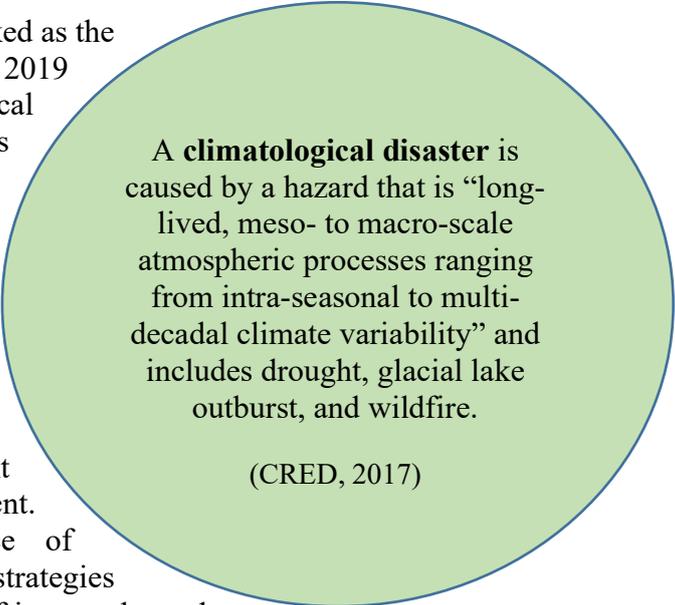This thesis will evaluate how climate-related disaster communication strategies were used in preparing, responding, and recovering from the 2017 Thomas Fire in Santa Barbara County. Additionally, the researcher assesses to what extent the combined communication strategies used in the disaster stages affected the overall community resilience of Santa Barbara's residents.

While a recent 2019 academic study was completed on the Thomas Fire, the academic study focused solely on the community of Montecito within Santa Barbara County and used quantitative geospatial data and MFPD interviews to identify overall mitigation strategies to improve community resilience. The 2019 academic study did not include any discussion on communication strategies and is limited to the prevention stage of the disaster cycle (Kolden & Henson, 2019). Therefore, this thesis fills a research gap within the Thomas Fire academic knowledge to expand beyond the prevention stage to evaluate preparedness, response, and recovery strategies. Additionally, this thesis' inclusion of local expert interviews within the field of wildfire disaster management on the Thomas Fire will be the first account of documented academic interviews with local agency personnel on specifically how communication operated in the disaster stages of the Thomas Fire.

1.1 Relevance of Research Topic

While disasters are increasing globally, the US ranked as the second most disaster affected country from 2000 to 2019 (UNDRR, 2020). Interestingly, the climatological disaster category, which includes wildfires, is substantially higher in the US than in any other country. Therefore, the study of wildfires is heavily centered within the US. Approximately, 18,280 wildfires occur annually in California each with the potential to become a climate-related disaster (Fire Safe Council, 2021).

A **climatological disaster** is caused by a hazard that is "long-lived, meso- to macro-scale atmospheric processes ranging from intra-seasonal to multi-decadal climate variability" and includes drought, glacial lake outburst, and wildfire.

(CRED, 2017)

Disaster communication strategies within local contexts vary substantially due to a lack of consistent requirements across the US in disaster management. Academic literature highlights the importance of understanding how appropriate communication strategies vary across the disaster phases because of shifting goals and objectives (Spialek & Houston, 2019). The relationship between generalized disaster communication strategies and overall community resilience has existing, recent academic literature (Houston et al., 2015; Nicholls, 2012; Spialek & Houston, 2019).

1.1.1 Research Gap

However, literature has limited application of disaster communication strategies to climate-related disasters, including wildfires, and no evaluation of solely disaster communication

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strategies relationship with community resilience on the outcomes of a wildfire case study has occurred. Instead the field has focused on generalized disaster management (Kolden & Henson, 2019). Therefore, this thesis works to fill an important academic gap in the study of how local agencies disaster communication strategies within disaster cycle stages affect the overall resilience of a community in a wildfire area. Additionally, due to the rapidly evolving nature of temporal wildfire risk in California and geographic diversity, recent case studies in wildfire communication to the public provide important insights for other planning jurisdictions to consider evaluating their existing wildfire management approach.

1.2 Research Objective

Main Objective: The overall objective of this research is to identify to what extent climate-related disaster communication influenced the combined community resilience outcomes of Santa Barbara's residents to the Thomas Fire during the preparedness, response, and recovery stages.

Sub-Objectives:

1. Assess to what extent existing, academic climate-related disaster communication characteristics identified in the Literature Review were used in Santa Barbara in preparedness, response, and recovery to the Thomas Fire.
2. Understand how local Santa Barbara experts implemented climate-related disaster communication strategies to provide community resilience in preparedness, response, and recovery to the Thomas Fire?

1.3 Research Questions

Main Question: To what extent did climate-related disaster communication strategies influence the overall community resilience of Santa Barbara's residents in preparedness, response, and recovery to the Thomas Fire?

Sub-Questions:

1. To what extent were the climate-related disaster communication characteristics identified in the Literature Review used in Santa Barbara preparedness, response, and recovery to the Thomas Fire?
2. What communication strategy actions did Santa Barbara take to implement climate-related disaster communication to provide community resilience in preparedness, response, and recovery to the Thomas Fire?

2. Literature Review

Stages of a Disaster Cycle

While climate-related disasters vary substantially across typology and event scale, these disasters can be described in generalizable stages, known as the Disaster Cycle (Houston, 2012; Spialek & Houston, 2019). The following stages were the most frequently used within relevant literature: Bradley et al., (2014); McCool et al., (2006). The Disaster Cycle is divided into the following four stages of mitigation and prevention, preparedness, response, and recovery (Bradley et al., 2014; McCool et al., 2006). Given the existing academic research on the

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Thomas Fire in the mitigation and prevention stage in Montecito, this paper excludes this stage (Kolden & Henson, 2019).

Agency to community communication is critical throughout the Disaster Cycle stages "with different aims at each stage" and can be described as risk communication during the preparedness stage, crisis communication during the response stage, and recovery communication during the recovery stage (Figure 1) (Bradley et al., 2014, p. 1).

Figure 1: Disaster Management Cycle

2.1 Concept 1: Climate-Related Disaster Communication Strategies

For the purposes of this paper, "a **communication strategy** is a well-organized sequence of actions to achieve specific objectives through the implementation of a mix of communication methods, techniques and approaches" (Skinner & Rampersad, 2014, p. 3). Actions include policy creation given this is a step towards establishing expanded communication pathways. In the field of disaster management, communication strategies should be designed to "address and solve problems especially at community level through using research findings, communication methods, techniques and media" to improve community resilience within a climate-related disaster stage (Skinner & Rampersad, 2014, p. 3).

2.1.1 Risk Communication

Academic Foundation

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Climate-related risk communication is the critical communication pathway for the preparedness stage for a future disaster threat to a community. Disaster risk communication grew out of communication approaches for public health risks and environmental hazards on the potential effects on the public. Relevant literature and academic studies span the previous two decades on disaster risk communication, and of the disaster communication stages, risk communication has the substantially highest level of academic research (Bradley et al., 2014; Rahman & Munadi, 2019a; Reynolds & Seeger, 2005; Ropeik, 2008; Skinner & Rampersad, 2014; Steelman & McCaffrey, 2013).

Definitions

Disaster risk communication definitions can be broken into two main categories including 1) consideration of risk communication as explicit actions aiming to communicate in a "one-way transfer of information, knowledge, and opinions" between risk managers and the community that has the potential to be adversely effected by a natural hazard; versus 2) the more recent academic shift to define risk communication for climate-related disasters as interactive exchange of knowledge (Höppner, Buchecker, & Bründl, 2010, p. 7). This paper utilizes the more recent academic shift in climate-related disaster **risk communication definition**:

"an interactive exchange of information and opinion amongst individuals, groups and institutions, with the goal of assessing, minimizing and regulating risks" (Skinner & Rampersad, 2014, p. 3).

In the context of climate-related disasters, risk communication's purpose is to serve as a forward looking planning and policy setting "to increase the quality of future decisions and actions in the event of a disaster" (Rahman & Munadi, 2019b, p. 3). The overall goal of disaster risk communication in the context of a climate-related disaster is to inform the public of the potential adverse effects of the disaster to community members as well as provide clear actions the community can use to prepare itself for a future event (Bradley et al., 2014). This creates a communication relationship of information and knowledge dissemination from local agencies to local communities to enable improved community resilience to unknown future natural hazards, including wildfire, to aim to avoid and/or lessen climate-related disasters.

Key Characteristics of Risk Communication

- Credibility of the Messenger
- Trust
- Local Context from Local Sources
- Interactive Exchange of Information

The key components for acceptability and efficacy of climate-related disaster communication strategies remain similar to the general disaster field including the importance of the credibility in the messenger as well as the greater results from communication that considers "audience needs, values, background, culture, and experience" (Reynolds & Seeger, 2005, p. 45). However, additional components to risk communication strategies for climate-related disasters have been incorporated including trust and an understanding of the local context of community.

Trust plays an important role given local community members have differing levels of technical knowledge on natural hazards, which affects their capacity for decision making to reduce risk (Samaddar et al., 2018). Therefore, trust plays a critical role from agencies to the community to fill the gap of technical knowledge and scientific understanding on natural hazards to reduce

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the likelihood of potential disaster outcomes. In addition, the trustworthiness of the source plays a major role in if risk reduction actions are taken by community members; therefore, careful communication and appropriate messenger selection impacts the community outcomes (Hernández-Moreno & Alcántara-Ayala, 2017; Samaddar et al., 2018; Terpstra, 2011). The trustworthiness of communication in the preparedness stage is heavily reliant on agency transparency to the community (Lachapelle & McCool, 2012). Further, climate-related disaster communication strategies from literature emphasize the importance of selection of information and actions that are focused on the local context and from local sources (McCaffrey & Olsen, 2012; Steelman & McCaffrey, 2013). While broader scale risk management and reduction communications are important for disasters on a state to national level, climate-related disasters are recognized as "place dependent" (Soto Gómez, n.d., p. 15). Therefore, most climate-related disasters, including wildfires have predominately localized impacts to communities given events are unlikely to span extreme geographical areas.

2.1.2 Crisis Communication

Academic Foundation

Disaster Crisis Communication is associated primarily with the response phase of a climate-related disaster. Similarly to Disaster Risk Communication, Disaster Crisis Communication research was founded in other disaster categories, specifically public health, which expanded in academic literature into climate-related disaster communication in the late 1990s to early 2000s (Haupt, 2021; Reynolds & Seeger, 2005). Seeger, Sellnow, & Ulmer (1998) acknowledges the contentious history of disaster crisis communication approach by agencies to the public. Public relation representatives for a crisis historically denied the presence of a crisis, limited information dissemination to the media, offered minimal interagency coordination, and provided only partial or wholly inaccurate information on the crisis (Wilcox, Ault, & Agee, 1986). This has led to continued challenges today in trust, credibility, and acceptability of information by many communities despite agency efforts to improve relationships.

Definitions

A **crisis** is a "specific, unexpected, and non-routine event or series of events that create high levels of uncertainty and threaten or are perceived to threaten high priority goals;" this includes climate-related disasters (Seeger et al., 1998, p. 233; Spence, Lachlan, & Griffin, 2007, p. 540). High priority goals encompass physical safety, built environment safety from damage to financial losses, and overall community well-being.

While academia has no universal definition for disaster crisis communication, the majority of peer-reviewed definitions have similar underlying traits. Therefore for the purposes of this paper, (Sellnow & Seeger, 2013) definition was selected as they are two of academia's leading scholars on crisis communication with published, peer-reviewed papers as well as books for institutional instruction on the topic.

Disaster Crisis Communication is defined as "the ongoing process of creating shared meaning among and between groups, communities, individuals and agencies, within the ecological context of a crisis, for the purpose of preparing for and reducing, limiting and responding to threats and harm" (Sellnow & Seeger, 2013, p. 13).

Comparison to Risk Communication

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Disaster Crisis Communication is almost exclusively discussed in tandem with Disaster Risk Communication with papers typically comparing, contrasting, or describing their interaction (Reynolds & Seeger, 2005; Steelman & McCaffrey, 2013). Disaster Risk Communication contrasts with Disaster Crisis Communication in the ultimate goal of the communication. Crisis communication aims to "protect health, safety, and the environment by keeping the public informed and to restore public confidence in the organization's ability to manage an incident" (Reynolds & Seeger, 2005, p. 46,47). Risk communication works to first identify what are the risks to a community and aims to prepare the public, which is typically associated with longer term changes prior to an event. Therefore, in the response stage of a climate-related disaster, focus and prioritization of communication is centered around immediate community protection.

Key Characteristics of Crisis Communication

- Harm-reducing Information
- Transparent and clear communication
- Address situational uncertainty
- Accurate, timely, and prompt communication

The overall aim of disaster crisis communication is "to explain the specific event, identify likely consequences and outcomes, and provide specific harm-reducing information to affected communities in an honest, candid, prompt, accurate, and complete manner" (Reynolds & Seeger, 2005, p. 46). The key characteristics of crisis communication include addressing 1) the situation's uncertainty in geographical extent, potential physical safety threats, level of physical damage, and amount of time the event will take place over, which makes effectively communicating to the public accurate and helpful information a challenge and 2) urgency of stakeholders to receive accurate, timely information on the disaster (Turner, 2008). Additionally, critical components to disaster crisis communication include correct "recognition of intended audience and potential communication barriers, recipient needs, and awareness of how plans and procedures require adaptation" with transparent and clear communication (Haupt, 2021, p. 128).

2.1.3 Recovery Communication

Academic Relevance

Within the Disaster Cycle, "compared to the other phases of emergency management, recovery is the least studied, which has led to a lack of theories" (Yeo, Knox, & Hu, 2020, p. 1). This has resulted in a reliance on international aid agencies, such as the International Federation of the Red Cross, The World Bank, and United Nations, to commission studies. Olshansky & Johnson (2014), focuses on community-level disaster recovery based on government actions in the US; however, the study only covers federal governmental recovery actions opposed to local governments and is not solely focused on communication. Nevertheless, the conclusions determine in a time-sensitive space with a diversity of "self-organizing actors, enhanced communication becomes crucial for informing actors and coordination actions" (Olshansky & Johnson, 2014, p. 294). Yeo, Knox, & Hu (2020) provides an exploratory approach to Disaster Recovery Communication; however, the paper is specific to social media use in a flooding case study. Nevertheless, their assessment includes a brief literature review on existing papers highlighting the limited number of communication specific studies for the recovery stage of a disaster and is the only climate-disaster specific case study.

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Definitions

Disaster Recovery can be defined as a "self-organizing process within a complex community system in which the "community repairs or develops social, political, and economic processes, institutions, and relationships that enable it to function in the new context within which it finds itself" (Olshansky & Johnson, 2014, p. 294).

Disaster Recovery Communication is defined as "the practice of sending, gathering, managing and evaluating information in the recovery stage following an emergency" (Australian Red Cross, 2010, p. 13).

However, in Disaster Recovery Communication, it is critical to the overall community outcomes the communication forms a "dialogue with the community" and "provides a basis for important social processes such as bonding between individuals, groups, and communities" (Australian Red Cross, 2010, p. 13). Effective disaster recovery communication necessitates agencies to set achievable expectations for community members on what agencies can provide, identify the appropriate messenger and communications leader, and define for community members what recovery assistance will be available to them (Roberts, 2015).

Key Characteristics of Recovery Communication

- Interactive Exchange of Information
- Multiple Platform Communication
- Coordinated and consistent communication
- Iterative process
- Diversity of Mediums

The key characteristics to disaster recovery communication are 1) utilize two-way interactive communication process to involve the input and feedback of the community; 2) provide communication information and knowledge in a method that reaches diverse audiences, hits multi-criteria needs of the community, and uses a diversity of mediums such as social media and SMS message; 3) create a systematic approach for "coordinated and consistent communication" amongst individuals and agencies to avoid mixed messages; and 4) Use an iterative process that repeats recovery communication messages so that it can be received and up took by the community in a greater percentage of the population (Australian Red Cross, 2010, p. 13).

"Effective communication empowers both disaster-affected and non-affected communities alike, helping to increase social cohesion, and acting as a valuable form of community development" (Roberts, 2015, p. 4). Information in the disaster recovery stage is as critical of a resource for community members as water, food, and shelter materials. Government's role within disaster recovery is to "inform, support, facilitate, and influence" community members including those that are unaffected by the disaster (Olshansky & Johnson, 2014, p. 294).

2.2 Concept 2: Community Resilience

The concept of disaster community resilience emerged as a response to the increasing magnitude and frequency of disasters in tandem with the increasing concentration of "people, activities, and resources in urban areas" (Sharifi, 2016, p. 629). Therefore, the "need for local decision-makers, practitioners, and community members to assess the disaster resilience of

their communities" expanded and continues to grow in the 21st century (Tariq, Pathirage, & Fernando, 2021a, p. 1).

Definitions

This paper relies upon an existing assessment of seventeen definitions of community resilience, which found the key components as "reducing impacts or consequences, reducing recovery time, and reducing future vulnerabilities" (Tariq, Pathirage, & Fernando, 2021b, p. 2).

The term community has no universally accepted definition in academic literature (Sharifi, 2016). The most frequently used community definition is "a diverse group of individuals in a shared geographical area, who have common interests, are linked by dynamic socio-economic interactions, and engage in collective action"(Sharifi, 2016, p. 630).

Community Resilience in the context of a disaster can be defined as "the ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions" (UNISDR, 2009, p. 24).

Meaningful community resilience efforts must "facilitate a genuine shift in thinking and policy, rather than just a rebranding of existing practice" to reduce overall disaster risks communities face (Yokomatsu & Hochrainer-Stigler, 2020, p. 172).

Challenges Operationalizing

Currently there is no consensus on how to measure community level resilience, including in the field of Disaster Management (Winderl, 2014). There is overall agreeance in academia on the notion of disaster community resilience, but the method in which they are applied varies (Summers, Harwell, Smith, & Buck, 2018). Further, operationalization of disaster community resilience is a challenge given the range of possible approaches based on to what level of analysis the researcher is seeking and/or what the policy goals are for the assessment (Koliou et al., 2018). These "differences in application have historically made it difficult for policy makers to identify priorities for improving resilience" (Summers et al., 2018, p. 373).

Dimensions

Due to the existing methodological approach challenges in defining what dimensions and characteristics of resilience should be measured, for what purpose, and in what community context, this paper reviewed and cross-analyzed the most cited academic reviews of community resilience dimensions. Sharifi (2016) completed a comprehensive review of 36 community resilience assessment tools and frameworks, which are designed for communities to assess their resilience, and identified the dimensions used in each assessment on a global scale. Sharifi found the five most commonly used dimensions across the tools and frameworks were institutional, social, environment, economic, and physical with physical the number one most cited dimension.

Overall, these findings closely correlate with the dimensions used by Pasteur & McQuistan, (2016) who substitutes a human resilience dimension (e.g. education, skills, and knowledge) for institutional, and Tariq et al., (2021a) (Tariq, H, Pathirage, C, Fernando, 2021b), which also adds a human/health dimension having an overall six dimensions. Therefore, practically used tools by disaster managers and academic literature closely overlap.

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Given this paper is analyzing community level resilience, there is a substantial variation within the population on individual human metrics, which is often associated with individual resilience. Therefore, the human dimension was not added for this paper's analysis, and Sharifi (2016) is used for operationalization based on the near consensus on the key dimensions.

Social resilience encompasses social networks, social cohesion, existing social capital, and community linkages (Tariq, H, Pathirage, C, Fernando, 2021b). Economic resilience includes access to financial resources by the community, community livelihoods, and community funds available for emergencies. Environmental resilience encompasses the environment's physical resilience to a hazard, level of natural resources (e.g. fertile soil, clean air, recreational amenities), and level of biodiversity. Institutional resilience includes "the ability of the local government and organizations to plan for, and deal with, the impacts of hazards" (Tariq, H, Pathirage, C, Fernando, 2021b, p. 4). Physical resilience relates to infrastructure and at it's core "enables society's daily activities" (Tariq, H, Pathirage, C, Fernando, 2021, p. 5). This can include buildings, critical facilities (e.g. hospitals, police stations), lifeline systems (e.g. utility infrastructure), early warning systems, and green infrastructure that may help reduce community susceptibility to a hazard.

Table 1 identifies the five key dimension's definitions for community resilience for operationalization (see Chapter 3).

While academic literature provides important conceptualization and a range of operationalizations to the frameworks of disaster community resilience, context is critical to ground the applicability and usefulness of community resilience. Therefore any resilience assessment or operationalization that "ignores local priorities, their contexts, and the aspirations and motivations of local actors" risks misinterpretation and misportrayal of a community's resilience to a climate-related disaster (Tariq et al., 2021b, p. 10).

While community resilience is typically associated with positive attributes, it is important to consider the theory of normativity, which describes a preferred or inherently good action. Viewing community resilience through the lens of normativity can result in accidently ignoring community conflicts, agencies role in problem emergence, and can cause "sub-optimal conditions for people living in that community if resilience is linked to recovering to a previous status quo" (Tariq et al., 2021b, p. 10). Therefore, evaluation of the outcomes of community resilience must be objective and empirical for thoughtful analysis and to avoid unintended consequences to a community.

2.3 Conceptual Framework

The conceptual framework is underpinned by the findings of academic literature on the concepts of climate-related disaster communication and community resilience in the context of the Thomas Fire (Figure 2). This conceptual framework reflects the findings of the Literature Review. In this study, the researcher aims to evaluate the effect of disaster communication strategies (independent variable) during the preparedness, response, and recovery disaster stages in the Thomas Fire on the overall community resilience of Santa Barbara residents (dependent variable). Given these three disaster communication stages of the Disaster Cycle work in a cumulative nature to assess community resilience outcomes, a combined framework evaluation is most effective in alignment with current academic literature recommending a holistic lens to Disaster Management. As shown in the framework, this analysis will evaluate how the wildfire disaster communication strategies caused increased community resilience, no effect on community resilience, or diminished community resilience.

The independent variable, climate-related disaster communication strategies, is divided into the three sub-variable- Risk Communication Strategies, Crisis Communication Strategies, and Recovery Communication Strategies for analytical consistency with academic literature (Bradley et al., 2014; McCool et al., 2006; Reynolds & Seeger, 2005; Steelman & McCaffrey, 2013). This sub-variable selection is in alignment with the above concept's climate-related disaster communication stages with the same three indicators used to measure each stage for consistency in analysis to acknowledge the importance of each stage in the disaster cycle.

The dependent variable, community resilience, is divided into five sub-variables of Social, Environmental, Physical, Economic, and Institutional. This sub-variable selection was guided by the range of academic works identifying these five dimensions as critical for measurement of community resilience outcomes (Sharifi, 2016). Indicators for each dimension vary but are at the community-level of measurement.

Figure 2: Wildfire Disaster Communication Strategies Effect on Community Resilience Outcomes in Santa Barbara

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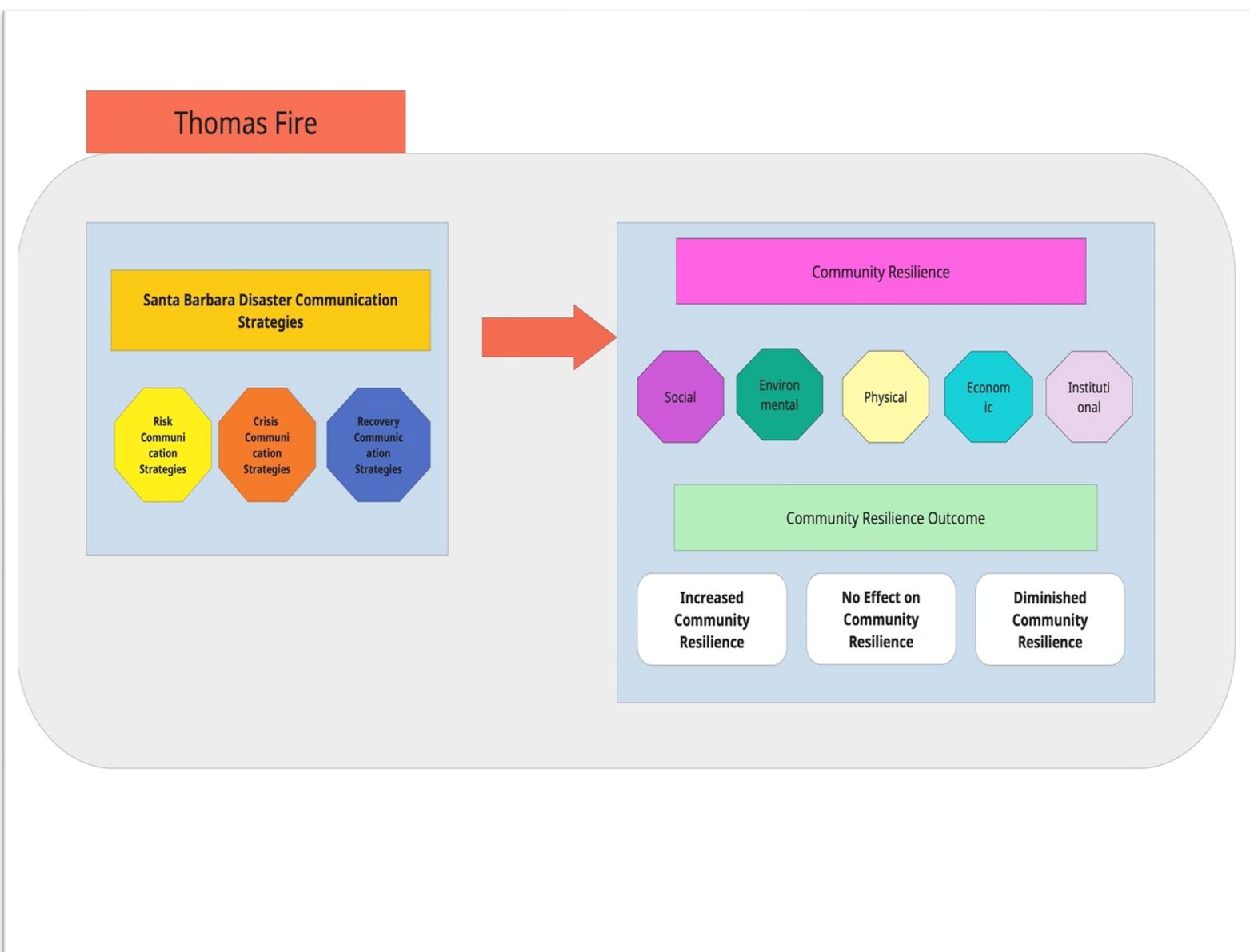
3. Research Design & Methodology

3.1 Description of Research Design and Methods

Given the presence of existing frameworks for disaster communication, this paper does not aim to create a new academic framework but instead apply to a specific case study through use of a combination of disaster communication and community resilience frameworks. The first step was primary data collection using a qualitative semi-structured interview guide to hold approximately 30 minute interviews with local experts on climate-related disaster communication strategies to the Thomas Fire, and the overall effect these strategies had on community resilience (Appendix 1). Interviews took place via Zoom for consistency with current local COVID-19 meeting guidance. While interviews with community members would be beneficial to receive a full dataset on community resilience, due to the event's associated trauma, the researcher selected to not survey the public due to subject sensitivity.

For triangulation, data collection included secondary data desktop research for climate-related disaster communication strategies and community resilience to fill primary data collection gaps and compare and contrast primary data for validity (Appendix 1).

The selected methodology, desktop research and qualitative semi-structured interviews, relied upon the academic guidance of Bryman (2012), which provides research-backed approaches to these methods. Conceptual framework conceptualization, which encompasses the overall approach of this paper's methods relied upon Kivunja (2018) who provides academic conceptual framework guidance.

3.1.1 Validity and Reliability

Reliability, the replicability of a study, is achieved through clear attention given to the concepts, definitions, variables, and indicators as well as the methodological approach selection rationale (Bryman, 2012). Terms are defined consistently throughout the research with academic relevance for the choices made. The variables selected for the concepts of disaster communication and community resilience come from recent academic literature and worked to utilize variables with the highest rate of use and peer review. This is a qualitative research approach; therefore, replicability may be limited by the ability to re-interview subjects, and answers may change overtime for respondents. However to the greatest extent possible, replicability conditions are followed. Interview questions were written in a neutral, unbiased tone.

Validity, "the integrity of the conclusions that are generated from a piece of research," was considered in terms of external and internal validity (Bryman, 2012, p. 47). **Internal validity** for qualitative research can be linked to: credibility, authenticity, criticality, and integrity (Whittemore, Chase, & Mandle, 2001)). This researcher ensures credibility through full transcription of recorded interviews to avoid misinterpretation of information. Authenticity is achieved through use of a variety of local interviews with diverse experts. Chapter 4 provides a critical analysis of the results. Integrity is achieved through proper documentation of steps taken, objective analysis, and the researcher keeping distance from the subject matter. **External validity** in a case study-based research is more limited given results are not fully generalizable due to the role of context. However, this research aimed to identify key characteristics of disaster communication strategies to consider in development of wildfire plans and key dimensions to consider in community resilience assessments.

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3.1.2 Sample Size and Interviewee Selection

Fourteen semi-structured interviews were conducted with local experts in the County's disaster management field, which were recorded with interviewee permission. Local agency websites with personnel information were used to identify potential respondents. Additionally, snowball sampling technique was used with an interview question asking respondents to name any local experts who may be relevant to the research (Appendix 1) (van Thiel, 2014). Fifty local experts were contacted including fire personnel, local planners, wildfire consultants, and the non-profit staff. The sample size was selected based on the objective of saturation, which was achieved by the researcher when repetition of response began as well as the goal of achieving a balanced range of local personnel from various departments and agencies.

Interviewee outreach was concentrated to local personnel working within the South Coast region of Santa Barbara County given this was where the physical effects of the Thomas Fire were concentrated. Respondents were named in analysis as R1 to R14, and with permission granted by all interviewees, corresponding titles and agencies are provided in Appendix 1.

Interview participants provided a range of responses to closed and open ended questions. The purpose of the interview structure was to learn about the professional knowledge related to local agencies strategies in wildfire disaster communication in the preparedness, response, and recovery stages as well as professional perception of how these actions affected the overall community resilience of Santa Barbara residents from the Thomas Fire.

3.2 Data Analysis

3.2.1 Interviews

The researcher manually transcribed each interview conversation to ensure quotations were accurate using an edited transcription approach. Afterwards, the researcher used Delve, a qualitative coding software, as it allowed transcription import to identify and code important indicator quotations.

This semi-structured interview analysis was a combination of inductive and deductive qualitative coding. This started with a **deductive code** structure using pre-determined codes that are in alignment with the indicators while completing quotation highlighting for interviews. The researcher chose this approach as deductive coding can be used as "a first cycle of coding to create an organizational schema" (Bingham & Witkowsky, 2022, p. 1). Deductive coding allowed the researcher to maintain concentration on the objective of the research due to the amount of data processed.

Inductive coding can be used to "understand the themes present in the data" (Bingham & Witkowsky, 2022, p. 2). Therefore for subsequent regrouping, the researcher used open coding to identify themes in the responses for certain indicators to allow for future discussion of the results to be guided by the interviewee's responses instead of what the researcher anticipated.

3.2.2 Desktop Research

This research's primary form of data collection was expert interviews; however, to fully analyze communication strategies and community resilience outcomes, review of plans, websites, and news reports was necessary to give a complete picture and ensure accuracy of findings beyond those involved in the Thomas Fire's management (Appendix 1). In indicators

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where solely desktop research was used, this was based on the constraints of interviewee's memories on specific data or were too specific for interview approach.

The following indicators were given equal weight in scoring to ensure results were not skewed and remain in alignment with literature's dimensions of community resilience.

3.3 Operationalization: Variables & Indicators

Table 1 identifies the definition of each variable and sub-variable in this research.

The concepts, variables, and sub-variables for this research were operationalized in order to identify indicators to measure the results of qualitative data collection (Table2). Operationalization provides the opportunity to identify how the concepts in one's literature review were measured and connects to the research question to ensure it is adequately measured (Bryman, 2012). The research question and associated sub-questions were measured through the below identified indicators. Indicators were selected based on academic literature as well as the researcher asking themselves if communication level has the potential to affect the outcome of the indicators.

Table 1- Variable and Sub-Variable Definitions

Concepts	Variables	Definition	Sub-Variables	Definition
Climate-Related Disaster Communication (Independent)	Climate-Related Disaster Communication Strategy	"a communication strategy is a well-organized sequence of actions to achieve specific objectives through the implementation of a mix of communication methods, techniques and approaches" (Skinner & Rampersad, 2014, p. 3).	Disaster Risk Communication	"an interactive exchange of information and opinion amongst individuals, groups and institutions, with the goal of assessing, minimizing and regulating risks" (Skinner & Rampersad, 2014, p. 3).
			Disaster Crisis Communication	"the ongoing process of creating shared meaning among and between groups, communities, individuals and agencies, within the ecological context of a crisis, for the purpose of preparing for and reducing, limiting and responding to threats and harm" (Haupt, 2021, p. 127).
			Disaster Recovery Communication	"the practice of sending, gathering, managing and evaluating information in the recovery stage following an emergency" (Australian Red Cross, 2010, p. 13).
Community Resilience (Dependent)	Community Resilience Dimensions	Community Resilience in the context of a disaster can be defined as the ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions" (UNISDR & WMO, 2012, p. 3). Community Resilience consists of five dimensions: social, economic, environmental, institutional, and physical (Tariq et al., 2021b) .	Social	"Social resilience focuses on the capacity of people to connect with each other as individuals, groups and organizations." (Tariq, Pathirage, Fernando, 2021b, p. 5; Tariq, Pathirage, & Fernando, 2021a, p. 13a).
			Economic	"The economic resilience category includes both the static assessment of a community's current economy (economic activity) and the dynamic assessment of a community's ability to continuously sustain economic growth (economic development)" (Tariq, Pathirage, Fernando, 2021b, p. 5).
			Environmental	"Environmental or ecosystem resilience focuses on the amount of disturbance an ecosystem can absorb without drastically altering its functions, processes and structures" (Tariq, Pathirage, C, Fernando, 2021a, p. 5).
			Institutional	"Governance is an overreaching dimension that looks at application of laws, regulation and the capacity of organizations to respond to, and assist, in the case of disasters" (Tariq, H, Pathirage, C, Fernando, 2021a, p. 5).
			Physical	"Those facilities or structures that form a network of structures that perform a vital function that is of critical importance to the normal functioning of the community" (Tariq, Pathirage, Fernando, 2021b, p. 5).

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Table 2 – Operationalization of Variables and Indicators

Concept	Variables	Sub-Variables	Indicators	Data Collection Method	Data Type	Data Source*
Climate-Related Disaster Communication	**Communication Strategy**	**Risk**	The extent local agencies wildfire communication characteristics meet the Risk Key Literature Characteristics	Interviews	Qualitative	1 Local Experts (Primary, qualitative data)
			The extent local agencies risk communication strategies describe how to communicate wildfire disaster risk characteristics to the community.	Interviews Newspaper articles Websites Plans		2. Official Plans, including the 2017 MJHMP and 2022 MJHMP, Ready! Set! Go!, and CWPPs (Secondary qualitative data)
			The extent local agencies disaster risk communication strategies were applied prior to the Thomas Fire.	Interviews Newspaper articles Websites Plans		3 Newspaper articles (Secondary qualitative data) 4. City, County, Ready SBC, Fire Safe Council, and non-profit Websites (Secondary qualitative data)
		Crisis	The extent local agencies wildfire communication characteristics meet the Crisis Key Literature Characteristics.	Interviews		
			The extent local agencies crisis communication strategies describe how to communicate wildfire crisis characteristics to the community.	Interviews Websites Plans		
			The extent local agencies disaster crisis communication strategies were applied during the Thomas Fire event.	Interviews Websites Plans		
		Recovery	The extent local agencies wildfire recovery communication	Interviews		

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			characteristics meet the Recovery Key Literature Characteristics.	Websites		
			The extent local agencies recovery communication strategies describe how to communicate wildfire recovery characteristics to the community.	Interviews Websites Plans		
			The extent local agencies recovery communication strategies to the community were applied post-Thomas Fire.	Interviews		
Community Resilience **Indicator References:** (Tariq et al., 2021a)	**Community Resilience Dimensions**	**Social**	The number of nonprofits currently working on community resilience in Santa Barbara County.	Interviews Websites	Qualitative	1. Local Experts (Primary, qualitative data) 2. Official Plans, including the 2017 MJHMP and 2022 MJHMP (Secondary qualitative data) 3 Newspaper articles (Secondary qualitative data) 4 City, County, SBC Fire, NFPA, Fire Safe Council, and non-profit Websites (Secondary qualitative data) 5 Expert reports and surveys on environmental and economic conditions (Secondary qualitative data)
			The number of Firewise communities pre-Thomas Fire compared to post-Thomas Fire.	Interviews Websites		
		Economic	Extent local businesses' profits were affected from Thomas Fire in Santa Barbara County	Data Surveys/Reports		
			Number of structures destroyed or damaged in the Thomas Fire in Santa Barbara County	Interviews Plans Newspaper articles		
		Environmental	Acreage of burned land during Thomas Fire event.	Interviews Maps Journal Articles Plans		
			Extent of trails and recreational area damage in Los Padres National	Reports Websites		

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	Forest Santa Barbara Ranger District			
Institutional	The extent to which policies, objectives, and/or actions aimed at improving community resilience through wildfire communication have changed from the 2017 MJHMP to 2022 MJHMP.	Interviews Plans		
	Extent of change to disaster management staffing numbers in City and County local governments since Thomas Fire.	Interviews Social Media		
Physical	Number of structures in the HFHZ of Santa Barbara County.	Interviews Reports Websites		
	Number of wildfire personnel and equipment in Santa Barbara County pre- and post-Thomas Fire.	Plans Reports		

3.4 Expected Challenges and Limitations

3.4.1 Challenges

This researcher anticipates two main challenges to arise in conducting fieldwork:

1. Finding and conducting interviews with qualified, local experts within the data collection period, and
2. Collecting unbiased and non-censored responses from local experts.

While the researcher plan's to utilize existing contacts and use snowballing technique to reach qualified Santa Barbara experts on the topic of wildfire communication and community resilience, the County has a limited number of personnel with applicable wildfire disaster experience; therefore, a high response rate and availability is needed to meet the timeline.

A challenge in interviews with locally employed experts who work for or collaborate with local agencies directly or indirectly is the potential for biased responses and problems with interviewees being critical of past or ongoing performance. Therefore, the impartial framing of questions that allow for candid responses are a key methodological priority.

3.4.2 Challenges Outcomes

To accommodate the availability of all participants, the researcher extended the data collection period to allow for a greater number of responses, which achieved saturation. To identify qualified local experts, this researcher used local agency websites that had staff job titles.

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Desktop research of non-profits websites achieved finding non-profits that specifically worked in resilience and/or disaster management.

This researcher used a semi-structured interview method without using leading questions. All interviewee's were informed of their right to be anonymized, (which they waved) prior to beginning the interview to reduce potential employment concerns. Therefore, the anticipated challenges did not impede the research outcomes.

3.4.3 Limitations to Data Collection

Three main limitations are unavoidable from this research's chosen approach and topic matter:

1. The selection of the Thomas Fire case study has limitations on applicability to other planning jurisdictions and events in California; however, an aim of this research is to serve as a potential method of assessment of other wildfire events.

2. No climate-related disaster communication framework, which is agreed upon within literature is available, so it is not possible to encompass all possible approaches, yet this is a limitation of all research in this field and acknowledged in the literature review.

3. This paper analyzes the effects of the wildfire events through the lens of Santa Barbara County; however, the wildfire also had impacts to Ventura County. Regional disaster updates occurred with fire personnel coordination; however, the communication policies, strategies, and plans are developed on a City to County basis; therefore, it is beyond the scope of this research to include analysis of Ventura County's communication approaches.

4. Presentation of Data Results & Analysis

4.1 The Thomas Fire Case Study

The Thomas Fire ranks as the eighth largest wildfire in California's recorded history at approximately 281,893 acres burned; however, until 2018 the Thomas Fire was the state's largest recorded wildfire (Cal Fire, 2022). The wildfire began on December 4, 2017 due to power lines knocking together during a high wind event resulting in a 40 day wildfire (Cal Fire, 2022; VCFD, 2019). The intensity of the Santa Ana and Sundowner winds lasted weeks, which was one of the primary drivers of the scale of wildfire impacts (Kolden & Henson, 2019). The Thomas Fire spanned Ventura and Santa Barbara Counties; the event began in Ventura spreading through the WUI and Los Padres National Forest (LPNF) to Santa Barbara on December 9, 2017 (Picture 1) (Kettmann, 2017).

A major wildfire response launched across the region involving over 8,500 emergency response personnel. The wildfire, located within a WUI, destroyed a recorded 1,063 structures and killed two persons (Dudek, 2021, p. 29,82). Thomas Fire suppression costs for federal, state, and local agencies were estimated at $177 million (Magnoli, 2018). Countywide, approximately 69,825 persons currently live in a HFHZ; therefore, communication on this continued community resilience concern is required in Santa Barbara. (Fire Safe Council, 2021).

Photograph 1: Wildfire Fighting Efforts in the County

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Source: (Macfadyen, 2017)

The Thomas Fire in combination with a rainstorm on January 9, 2018 triggered the Montecito Debris Flows which claimed the lives of 23 residents in the County and damage to 285 recorded structures (Picture 2) (Holland, 2020). Due to this event occurring right as wildfire efforts were ending in Santa Barbara, there is overlap and connectivity of recovery activities by local agencies and non-profits. However, for the purposes of this analysis, communication strategies' analysis and the outcomes on community resilience do not include the Debris Flows as they were separate events.

Photograph 2: Montecito Debris Flow Damage

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A range of largescale wildfires in California's modern history could have been analyzed within a community instead of the Thomas Fire, however, this paper selected the Thomas Fire for four key reasons:

1. The wildfire ended 4.5 years ago, which gave sufficient time for recovery efforts to be analyzed. However, the case study is recent enough within the rapidly changing climate-driven wildfire conditions in California.
2. Powerlines are a leading cause of California wildfires causing two times more wildfires in 2015 than any other cause; however, investigation into this wildfire source type is recent in literature (Penn, 2017).
3. Case Study selection of California wildfires is typically centered in northern California leaving an academic gap for southern California wildfires, and only one previous academic study has investigated the Thomas Fire, which did not include a communication analysis (Kolden & Henson, 2019).
4. Hazard plans post-Thomas Fire were updated with the release of the 2022 Barbara MJHMP (Wood, 2022).

4.2 Data Findings

The following data findings and analyses are completed at an indicator level.

4.2.1 Concept 1: Climate Related Disaster Communication

4.2.1.1 Variable: Communication Strategy & Sub-variables: Risk

Indicator 1: The extent local agencies wildfire communication characteristics meet the Risk Key Literature Characteristics.

The risk stage key characteristics according to academic literature are:

- Credibility of the Messenger
- Trust
- Local Context from Local Sources
- Interactive Exchange of Information

Risk key characteristics received the highest number of quotations compared to crisis and recovery. In this analysis, these were cross-compared to the literature characteristics and re-grouped as shown below.

Table 3: Interviewee Responses on Disaster Risk Communication Key Characteristics

Interviewee Key Characteristic	Respective Literature Key Characteristic Category	No. Quotations	Alignment with Literature Review Characteristics?
Preparedness Activities		7	

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Consistent Messaging/ Coordination	• Local Context from Local Sources	6	☑
Risk Familiarization	• Credibility of the Messenger • Trust	5	☑
Repetition		4	
Bilingual	• Trust • Credibility of the Messenger	4	☑
Individual Responsibility		4	
Clear Messaging	• Local Context from Local Sources	3	☑
Multiple Platforms of Communication		3	
Grassroots	• Trust • Credibility of the Messenger	2	☑
Trust	• Trust	2	☑
Correct Information	• Local Context from Local Sources	2	☑
Total		**42**	

R10 explains the Fire Safe Council uses a bottom up approach to facilitate trust in preparedness strategies by *"[going] out and communicating directly with the communities [they] are trying to build"* trust with. Given all interviewees work for local agencies within the local context, a range of sub-categories of this characteristic arose. R4 explains, identifying and explaining risk to the community requires *"[making] sure all of [their] agencies are on the same page as to messaging, that all the agencies are putting out the same message, and reinforcing that message with all of [their] community."* Therefore, preparedness strategies achieve local context and use established local agencies with community familiarity, which align with the literature key characteristics.

Additionally, local experts identified other key characteristics for their risk communication including, using multiple platforms. R2 highlights "*informing the masses on a platform or in a way that makes sense for that community, whether that is electronically or word of mouth, and using a variety of platforms.*" R5 similarly emphasizes this adding "*using a range of platforms*

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and multilingual communication" to ensure that the community can all access the information across platforms in an equitable manner.

As shown in Table 3, interviewee's key characteristics of local agency communication to the public on risk overlap with the literature characteristics of Local Context from Local Sources, Credibility of the Messenger, and Trust. However, no interviewee's identified the Interactive Exchange of Information. Interviewee's identified four additional key characteristics of local risk communication: individual responsibility, repetition, multiple platforms of communication, and preparedness activity communication. This shows there is correlation between the in practice characteristics of communication in the County and literature, as well as expands academic knowledge on key characteristics through local communication characteristic priorities for this stage. Therefore findings indicate there is potential for these communication results to **positively** affect local community outcomes.

Indicator 2: The extent local agencies risk communication strategies describe how to communicate wildfire disaster risk characteristics to the community

Interview results included quotations on the strategies used for risk communication by local agencies with the public for preparedness to wildfires. Overall the strategies can be divided into mediums and methods (Table 4).

Table 4: Interview Risk Communication Strategies

Risk Communication Strategies	No. Quotations
Mediums	
Ready SBC/ Ready! Set! Go!	8
Social Media	7
Hard Copy Forms	5
Plans & Policies	5
Website	4
Press Release	2
Mapping	1
Methods	

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Coordination with Community Events	5
Alerts & Newsletters	5
Coordinated Messages	3
Bilingual	2

The results show a strong diversity of communication strategy mediums with Ready SBC, which is the County's alert system for all emergencies, being the most cited by interviewees. However strategies are only as effective as the number of people they are reaching, and a recent study found 14% of County residents are registered to receive notification on the system (Magnoli, 2022). This percentage is substantively higher in the South Coast at 39%. The Director of OEM emphasized this shows County "*registrations are not inclusive of our entire community, and that's why [they] use so many communication tools and processes,*" which is consistent with findings on number of mediums (Magnoli, 2022, p. 1).

The Ready! Set! Go! Program has a plan created and managed by SBC Fire for the County, which communicates to homeowners how to prepare their homes for wildfires (SBC Fire, n.d.). For preparedness, the plan provides a checklist on how to create one's own wildfire action plan to improve public safety before an event. The checklist includes the importance of knowing beforehand how to turn off physical infrastructure, having a personal disaster plan for family communication, and how to sign up for alerts with ReadySBC. The focus of this plan; however, is on the mitigation and prevention stage, which is corroborated by interviewees with R3 stating "*Ready! Set! Go! Captures pretty much the whole wildfire mitigation program to the public.*" In comparison, Ready SBC webpage provides similar resources, includes how to sign up for alerts, and a more diverse planning lens beyond homeowners, including schools and businesses (County of Santa Barbara, 2022a).

Social media is a major focus for local agencies to reach different community subsets. R11 explains City of Goleta has found "*a lot of our Spanish speakers will just never go to [the City] website, but it turns out Facebook is very big in that community.*" This also represents the key characteristic of credibility of the messenger, which highlights the importance of local and diverse agencies communicating information to the public. R7 identified that wildfire personnel strategies include "*looking at the analytics on social media*" to make sure they are "*getting the right number of people*" indicating there is an agency understanding that different populations use different social media platforms.

Therefore, results show consistency in diversity of communication strategies used by local agencies to reach the overall risk communication characteristics and full population, which is consistent with secondary data findings. Therefore, there is potential for these communication results to **positively** affect the community outcomes.

Indicator 3: The extent local agencies disaster risk communication strategies were applied prior to the Thomas Fire event.

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Overall, interviewee's expressed the risk communication strategies were applied sufficiently as R3 states *"we were fairly well prepared"* in the County. For preparedness for the next disaster stage, R12 highlights risk communication was a success given *"people were not surprised when they were asked to evacuate"* from the Thomas Fire. R7 echoes this perspective by stating *"for somebody to say they did not know about it would surprise [him]"* referring to preparedness planning. However, R14 disagrees with the rest of respondents stating *"government does not put a lot of resources into it's disaster preparedness."*

Additionally, R14 highlights *"communication from the government is aimed at land holders who live in high risk areas"* which was consistent with the responses of the rest of the interviewees, and the Ready! Set! Go! Program guidance is explicitly directed at homeowners (SBC Fire, n.d.). Additionally, R14 describes sign-ups for alerts are likely not distributed evenly across the County as evidence suggest by 14% of County respondents signed up with ReadySBC but 39% of South County; therefore, the North County communities may be less prepared, and suggests agencies have had lower success rates in communication strategies to this area (Magnoli, 2022). However, alerts and notifications signups are directed at the whole community with the goal of having all sign up for the alerts (County of Santa Barbara, 2022b).

Only one interviewee felt the community was underprepared from a communication standpoint; however, they highlight the potential inequity in preparedness communication actions beyond homeowners. While this is a critical component for preparing for evacuations, physical resilience, and public safety; nonland holders within the community may be receiving lower levels of communication from local agencies. Therefore, there is potential for these communication results to have a **neutral effect** on the community outcomes given some groups may have positive outcomes and others negative.

4.2.1.2 Variable: Communication Strategy & Sub-variables: Crisis

Indicator 4: The extent local agencies wildfire communication characteristics meet the Crisis Key Literature Characteristics.

The key characteristics according to literature for the risk stage are:
- Harm-reducing Information
- Transparent and clear communication
- Address situational uncertainty
- Accurate, timely, and prompt communication

Crisis communication key characteristics received the second highest number of quotations from interviewees in coding (Table 5).

Table 5: Interviewee Responses on Disaster Crisis Communication Key Characteristics

Interviewee Key Characteristic	Respective Literature Key Characteristic Category	No. Quotations	Alignment with Literature Review Characteristics?
Timely	• Accurate/Timely/Prompt	10	☑

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Accurate/Verified Information	• Accurate/Timely/Prompt	9	☑
Coordinated/Consistent Message	• Transparent and Clear	4	☑
Reach Target Audience		3	
Rumor Control	• Harm-reducing information	2	☑
Multiple Platforms		2	
Honest Communication	• Address situational uncertainty • Transparent and Clear	1	☑
Bilingual	• Transparent and Clear	1	☑
Total		**32**	

Over half of the quotations related to the Accurate/Timely/Prompt Communication characteristic; therefore, this high degree of consistency in response by interviewees represents an understanding of what characteristics communication strategies should encompass during a wildfire crisis. R5 explains for this stage "i*mmediacy really comes into play; really getting that information out as quickly as possible."* Multiple respondents highlighted the importance of local agencies not speculating and the challenging role of countering misinformation that emerges from social media that is not verified. The obstacle is balancing timely information with local agencies "*distributed information has to be a 100% accurate 100% of the time,"* (R12). Therefore, social media often outpaces how quickly agencies can provide community details.

Interviewees stated using multiple platforms is a locally identified characteristic, as was described for risk communication. R5 closely mirrors R2's account for risk characteristics with R5 stating "*its really important for [local agencies] to disseminate information not only in electronic means of communication, but as much as possible by word of mouth."* This acknowledges the role of community leaders and importance of community networks in adequately spreading crisis communication information through multiple platforms and trusted messengers.

Interviewee's key characteristics of local agency communication to the public on crisis overlap with all literature characteristics, and local experts added reach target audience and multiple platforms communication characteristics as key to County crisis management. Given response consistency, key characteristics within the local context, and consistency with literature, there is potential for these communication results to **positively** affect the community outcomes.

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Indicator 5: The extent local agencies crisis communication strategies describe how to communicate wildfire crisis characteristics to the community.

Interview results showed a comparable number of quotations on the strategies used for crisis communication compared to risk communication with the public (Table 6).

Table 6: Interview Crisis Communication Strategies

Crisis Communication Strategies	No. Quotations
Mediums	
Alerts/Notification	11
Social Media	4
Formal Communication Plan	3
Press Release	3
Methods	
Interagency Coordinated Message	6
Tiered Alerts	5
Lead Agency	5
Multiple Communication Methods	3
Bilingual	1

Consistently, Alerts and Notifications received the highest number of quotations. This is consistent with the primary characteristic of crisis communication being accurate and timely information. The responsibilities of local agencies within a wildfire response vary, such as alert dissemination, evacuation performance, social media updates, and supply support to affected communities. R4 highlights a huge diversity of strategies are used during the crisis stage including "*door knocks, sirens and announcements over from law enforcement vehicles or helicopters, reverse notifications*" on top of the ReadySBC alerts. This is consistent with R3's statement ReadySBC requires individuals to "*sign up with your phone*" or on their website. Therefore, it is critical that communication strategies be consistent and coordinated as quotations indicate to reach the whole community.

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The ReadySBC page does not include crisis information outside of the timing of an event to avoid confusion to the public; therefore, it is not possible to analyze the crisis communication information available during the Thomas Fire. However, the Ready! Set! Go! Program includes instructions on early evacuation by individuals in evacuation areas and what to prepare for evacuation. Some CWPPs within the County publish preliminary wildfire evacuation routes so community members can practice the routes, while others do not based on the unpredictability in burn area during an event and not wanting individuals to use outdated information (Fire Safe Council, 2022).

The mediums and methods used by local agencies in crisis communication are consistent with the characterization of key communication during this stage. The strategies identified by interviewees are consistent with secondary data. Therefore, there is potential for these communication results to **positively** affect the community outcomes.

Indicator 6: The extent local agencies disaster crisis communication strategies were applied during the Thomas Fire event.

As indicated in risk communication, the Thomas Fire in the County was an unusual type of wildfire with about a week to prepare communities. The widescale destruction with almost 1,000 homes destroyed in Ventura, R3 explains made the public increasingly receptive to evacuation and made people in evacuation zones "*very conservative on how much they were going to evacuate.*" Therefore, emerging incident communication on the first priority group, which R4 explains are "*those who are the most immediately at risk*" of physical hazards was successful.

The interviewee's overall stated the crisis communication strategies of the local agencies positively affected the community outcomes; however, some state the public felt there could have been higher levels of communication. A possible reason for this relates to the level of ReadySBC sign ups in the County (at the time Aware and Prepare alerts). R8 explains timely updates are first put out through alert platforms and Twitter so "*if you're not on either of those you are probably not getting a ton of notification.*" This is consistent with R4's characterization of the crisis communication strategy of the County, which considers the third priority as "*general awareness for the community*" who are not directly threatened by the event. Additionally, the ReadySBC website identifies that a sign up must be made for notification and informs the public on how to sign up (County of Santa Barbara, 2022b)

An area identified for communication improvement by two interviewee's was the concept of how to address evacuation fatigue during a crisis as long as the Thomas Fire. Due to the length of evacuation, people in areas at risk, including to the secondary hazard type of debris flows, returned to their homes and led in part to the level of lives lost to the Montecito Debris Flows. Interestingly, evacuation fatigue is not mentioned in the Ready! Set! Go! materials available to the community. However, given each wildfire varies in spatial extent and duration, it may be the case that the disaster managers feel it is more useful to provide this information on a case by case basis.

Overall, the emerging and during crisis communication strategies used were successful by local agencies in protecting the public and keeping information updated. The County continues to work on how to communicate the issue of evacuation fatigue and the findings of the primary and secondary data are in close alignment. Therefore, there is potential for these communication results to **positively** affect the community outcomes.

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4.2.1.3 Variable: Communication Strategy & Sub-variables: Recovery

Indicator 7: The extent local agencies wildfire recovery communication characteristics meet the Recovery Key Literature Characteristics.

The key characteristics according to literature for the recovery stage are:

- Interactive Exchange of Information
- Multiple Platform Communication
- Coordinated and consistent communication
- Iterative process
- Diversity of Mediums

Table 7: Interviewee Responses on Disaster Recovery Communication Key Characteristics

Interviewee Key Characteristic	Respective Literature Key Characteristic Category	No. Quotations	Alignment with Literature Review Characteristics?
Prepare for Next Disaster		6	
Consistent Messaging/Communication	• Coordinated and Consistent Communication	5	☑
Interagency Coordination		4	
Repeated Information	• Iterative Process	4	☑
Communicate Resources		2	
Diversity of Methods		1	
Total		**22**	

Recovery communication stage had the lowest number of overall quotations, which is consistent with Literature Review findings that recovery is the least researched stage of the disaster cycle. Nevertheless, consistent messaging and communication was the second most received characteristic with R11 highlighting that local emergency responders consider "*no message is the same as a message*" and "*silence is loud*" to the community. This is completed according to respondents by having a regularly occurring public message or announcement so the community is aware of when recovery information will be available. In terms of repeated information, interviewee's characterized recovery strategies as needing to be an iterative

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process; this can be accomplished by "reass*urance; there has to be continued communication*" (R6).

An important finding of primary data collection was the characterization of the Disaster Cycle as cyclical and the prioritization of communicating this to the public. This key characteristic is not identified in literature; however, this is critical to communication to the community to ensure future hazards have a lower chance of manifesting into a disaster. Local experts, including R6 highlighted the importance in recovery of explaining to the public "*there is no fire season; we have to be prepared constantly now with climate change.*" R6 and R14 highlight that recovery communication should include "*preparation for maybe the next*" and need to "*prepare for the next one.*" County maps on the number of fires overlaid with HFHZs aligns with this finding (Figure 3).

Figure 3: Times Burned 1912-2021
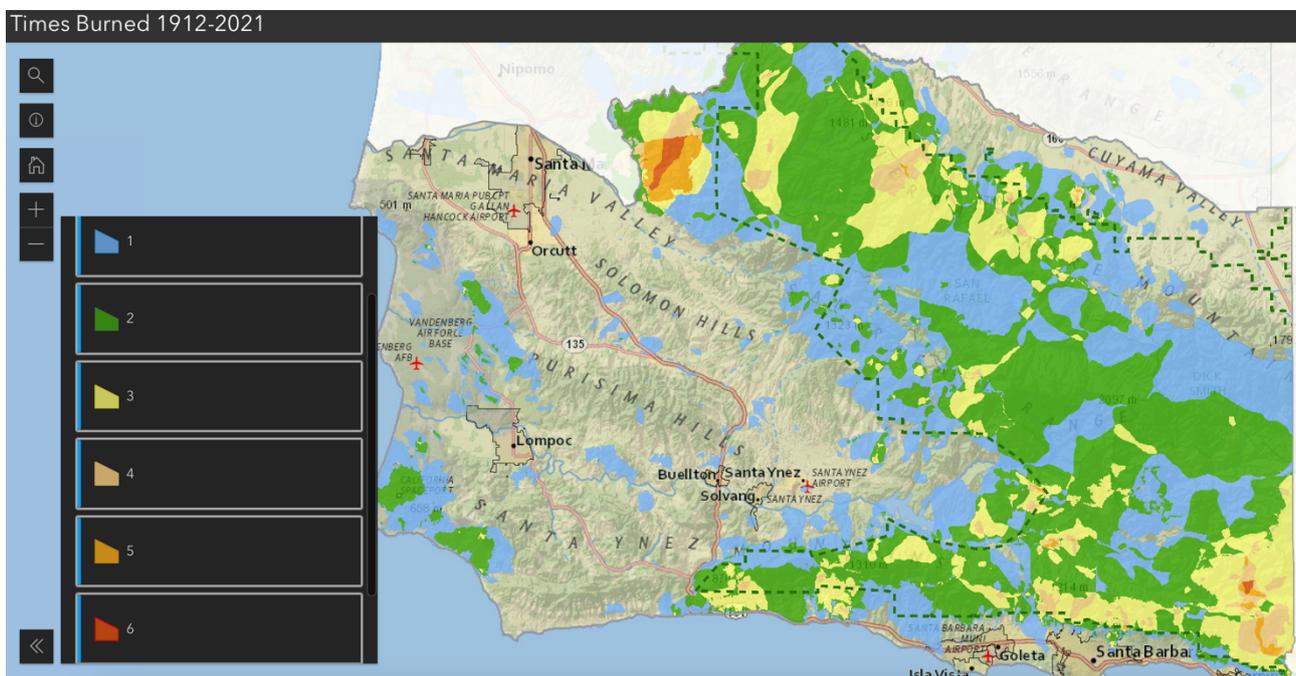
Source: (SBC Fire, 2021)

As shown in risk communication no respondents identified the literature characteristic of Interactive Exchange of Information. This is an interesting outcome given planning has historically been seen as local agency to community communication instead of a dialogue. It cannot be stated whether this is the perspective of local agencies or instead merely not considered by respondents as a communication characteristic. The highest number of quotations is not a literature characteristic but was a consistent response indicating the importance of not only academic characterization of communication but also local approach. Therefore, there is potential for these communication results to **positively** affect the community outcomes.

Indicator 8: **The extent local agencies recovery communication strategies describe how to communicate wildfire disaster recovery characteristics to the community.**

Interview results show substantially lower levels of quotations on the strategies used for recovery communication with the public from a wildfire compared to risk and crisis communication (Table 8).

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Table 8: Interview Recovery Communication Strategies

Recovery Communication Strategies	No. Quotations
Mediums	
Local Assistance Centers/Shelters	1
Social Media	1
Methods	
Reiterate Information	4
Unstructured Response Plan	3
Agency Coordination	3
Target Outreach to Most Affected	1
Permits	1
Use Local Organizations	1
Assigned Public Information Officer	1
Mental Health Services	1

The interviewee's identified a key method of communication is reiterating information, which is consistent with the key characteristic of iterative processes. R4 explains there has been *"continued outreach and coordination with these community members because [the County] still has quite a few residences that have not rebuilt."* Therefore, resources are prioritized to continue this iterative process of those most affected to receive information and assistance where needed. Additionally, R4 highlights the importance of "*coordination with a lot of different agencies as that is the best way to serve to community,*" which is consistent with the key communication characteristics of recovery.

Review of the six completed CWPPs within the County indicates some consideration to strategies for recovery are ongoing but at a lower level than risk or crisis communication. The 2016 Montecito CWPP included creation of the MERAG, the 2021 City of Santa Barbara CWPP set an action of creating post-fire educational materials, and the 2011 Mission Canyon CWPP identifies post-Fire strategies for the Jesusita Fire included public workshops (Dudek,

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2021b; Geo Elements, 2016; SBC Fire, 2011). However, half of CWPPs do not mention recovery strategies (Geo Elements, 2012; Mingee & Larsen, 2013; SBC Fire, 2019). In comparison, ReadySBC provides a recovery webpage with resources available to post-Thomas Fire assessments completed by LPNF. Similar to the crisis stage, it is unknown what resources were available via website in the years most closely following the Thomas Fire (County of Santa Barbara, 2022b).

In comparison to the risk and crisis communication strategies, recovery has substantively less quotations, and the majority of respondents stated they were unaware of recovery communication strategies. This could be interpreted as there is lower levels of communication in recovery compared to preparedness and response, or the personnel involved in this stage are a specialized group that the researcher could not identify. This potentially indicates there is lower levels of communication during this disaster stage to the public, including that desktop review found personnel for this stage are not identified on websites as they are for risk and crisis communication. However, responses received are in alignment with the key recovery communication characteristics and ReadySBC does provide a recovery page for community resources post disasters. There is potential for these communication results to **negatively** affect the community outcomes.

Indicator 9: The extent local agencies recovery communication strategies to the community were applied post-Thomas Fire.

Overall, the interviewees characterized the recovery communication outcomes as successful. The reason cited as the level of non-profit agency involvement and level of interagency coordination. R3 characterizes for recovery communication the "*lion share was the local non-profits groups that came together.*" R10 agrees stating non-profits "*are putting in a lot of effort to create safer, more resilient communities to make people feel safe*" particularly post-Thomas Fire. In terms of local government agency communication, the role focused on rebuilding and document replacement given low levels of lost homes "*it was actually more of a one on one communication*" to those communities (R12). In terms of secondary data comparison, the level of agencies involved in this stage makes it challenging to cross compare these findings due to the high number of actors.

R4 and R14 identify however, that not all groups in the community were equally reached, which was an after action lesson. R14 states there was limited crisis and recovery information translated into Spanish; however, local jurisdictions have now addressed this including the County by "*hiring a Spanish speaking public information officer.*" Additionally, R4 explains that the County is aware post-recovery there are uncounted groups who were directly affected and may not have received adequate recovery communication, particularly individuals who worked on or for the large homes within the burn acreage who lost jobs and/or their residence. R4 explains this is "*hard to track*" given the employer would need to connect them to local agencies to address "*these are the resources that are available.*"

R12 also identifies a challenge in distinguishing the recovery stage of the Thomas Fire from the Montecito Debris Flows as the debris flows followed the wildfire by a matter of days within primarily the same community. R12 states "*there was really no recovery period from the Thomas Fire; we immediately started preparing the community for the risk from the debris flows.*" This highlights the importance of communication strategies aimed at preparation for the next disaster and communicating to the public that time does not determine when a new disaster may emerge.

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Interviews suggest recovery communication strategies to homeowners was successful by local agencies and overall interagency coordination and non-profit support provided a range of communication to the diverse public. However, recovery communication cannot be considered a total success if there is a directly affected group who missed key information. Therefore, there is potential for these communication results to positively affect some groups while other groups negatively on community outcomes, so a **neutral** overall affect is concluded.

4.2.2 Concept 2: Community Resilience

4.2.2.1 Variable: Community Resilience Sub-variable: Social

Indicator 10: The number of non-profits currently working on community resilience in Santa Barbara County.

Interviewees had a diversity of knowledge on non-profits. The Santa Barbara Bucket Brigade and Fire Safe Council were the most mentioned non-profits. Desktop research identified four additional non-profits; however, this research does not insinuate this list is 100% complete as further non-profits may be operating that were not identified (Table 9). All interview-identified non-profits were also reviewed through secondary data via website or Facebook, showing all are web-accessible.

Table 9: County Non-profits in Community Resilience

Title	Interviewees Mentioned?	Established Post-Thomas Fire?
805 Undocufund	☑	☑
Santa Barbara Bucket Brigade	☑	☑
Salvation Army	☑	
ILRC	☑	
American Red Cross	☑	
VOAD	☑	
Land Trust	☑	
MICOP	☑	

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FLA	☑	
HOPE 805	☑	☑
United Way	☑	
Unite to Light	☑	
Santa Barbara Fire Safe Council	☑	
CEC	☑	
Montecito Foundation	☑	
Santa Barbara Foundation	☑	
Partnership for Resilient Communities	☑	
CCCJN	☑	
CAUSE	☑	
LEONE	☑	
Legacy Works		
The Project for Resilient Communities		
Orfalea Fund		
CommUnify		

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Source: (CommUnify, 2022; Legacy Works, 2022; Orfalea Foundation, 2022; The Project for Resilient Communities, 2022)

Post-Thomas Fire at least three new non-profits were established, including 805 Undocufund, which used local trust with the undocumented population and provided economic resources to at least "*1,400 families*" post-Thomas Fire, according to R14 given this community was unable to be served by traditional resources due to immigration status. HOPE 805 was established to provide mental health services to the community and communicate resources (Sierra, 2018).

The number and growth of non-profits working locally on resilience in Santa Barbara results in an indicator finding of **increased community resilience.**

Indicator 11: The number of Firewise communities pre-Thomas Fire compared to post-Thomas Fire.

A Firewise Community is national program which "provides specific criteria for communities regarding wildfire preparedness" primarily homeowners that can have additional benefits for improved fire safety and serve as a community network (NFPA, 2022a, p. 1). This indicator arose from interviewee responses on community networks given four individuals mentioned the growth of Firewise communities in social resilience to wildfires and level of staff time used to communicate at associated HOA/HIA meetings. This finding was cross-compared with secondary data with a web review of the NFPA, which lists communities certified. R10 identified there are two certified Firewise communities in the County, San Marcos Trout Club and Hollister Ranch, which aligns with web review. However, after interviews were completed one additional community in the County, Maria Ygnacia Creek Community, was added, as identified by secondary data collection (NFPA, 2022b). This is a high priority by local HFHZ communities given the increase in insurance rates and/or loss of insurability due to wildfire hazards.

Pre-Thomas Fire, no communities in the County were designated Firewise Communities, so this is an increasing community network, and R10 states local agencies are "*working with many other [organizations] at the moment*" to become Firewise. Therefore, proper messaging and communication's approach remains critical by local agencies in this process of "*bringing neighborhoods together to kind of work on increasing their wildfire resilience together*" (R10). Therefore, this indicator receives **an increased community resilience outcome.**

4.2.2.2 Variable: Community Resilience Sub-variable: Economic

Indicator 12: **Extent local businesses' profits were affected from Thomas Fire in Santa Barbara County**

Surveying of the business community and communication to the public on economic losses was completed by Visit Santa Barbara, the Economic Forecast Project at UCSB, and the Small Business Association; however, no local government agency worked to collect data that is publicly-accessible. Post-Thomas Fire, the SBDC for Santa Barbara and Ventura counties conducted public outreach in the communities most affected by the Thomas Fire to survey business economic losses (SBDC, 2018). The results of public outreach within the County show in City of Santa Barbara sales dropped an average of 35% for retail businesses while Montecito Coast Village Association recorded losses of approximately $15 million (including from Debris Flows). In the North County, Solvang's businesses recorded an average of $5 to $30 thousand in revenue losses. Therefore, the business community losses align as

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substantively affected by the Thomas Fire from loss of tourism as well as closures due to evacuation, available staff, and/or air quality.

Publication of the results of this study were posted on City of Ventura's website; however, no City nor County website within the County published this information. No local jurisdiction within Santa Barbara published a comprehensive analysis of economic losses to the business community making during- and long-term impacts unknown and not communicated. Comparison of websites between the counties shows a locally lost opportunity in economic outcome reporting by Santa Barbara. Therefore, this indicator receives a **diminished community resilience outcome.**

Indicator 13: Number of structures destroyed or damaged in the Thomas Fire in Santa Barbara County

Precise numbers on total destroyed and damaged homes within solely the County is not made accessible by agency communication. The recently drafted MJHMP includes the number of bi-County losses at 1,063 structures and 281 damaged; however, no specifically Santa Barbara losses (Wood, 2022). The only report of losses within the County were reported by Noozhawk, a local newspaper which gives the number as 80 homes (Bolton, 2018). This is consistent with interview statements by local experts including R12 who states "*we had very little property loss or damage.*" He estimated approximately 40 to 50 homes were lost, which is in close alignment to news reports. However, estimates between respondents varied with R3 citing "*in the first 24 hours in Ventura City they lost a thousand homes,*" which is inconsistent with secondary findings of a total of 504 recorded homes destroyed (Carlson, 2018). Therefore, knowledge by experts interviewed on property damage/destruction by county similarly to secondary data findings is limited and precise knowledge is not widescale.

Post-Thomas Fire, Ventura County released the Thomas Fire Emergency Response After-Action Review, which details structural losses within the Thomas Fire; however, the County of Santa Barbara nor any other local agency did not release a similar document (County of Ventura, 2018). Communication on structural losses is far more limited within Santa Barbara to the community. Therefore, this indicator receives a **diminished community resilience outcome.**

4.2.2.3 Variable: Community Resilience Sub-variable: Environmental

Indicator 14: Acreage of burned land during Thomas Fire.

Given the Thomas Fire was a multi-county wildfire, data publication of precise burned acreage per County is largely unavailable. However, one County map indicates 46,810 acres of the 281,893 total acres was in Santa Barbara (SBC Fire, 2022). This finding aligns with multiple interviewee responses including R3 who stated "*The Thomas Fire started in Ventura County and did most of its burned acreage and loss there.*" According to interviewee's this was in part due to the Thomas Fire beginning in Ventura, so time was available to prepare.

Additionally, MFPD "*had been doing a lot of vegetation management projects in the interface,*" which minimized environmental losses in the County (R3). R12 explains MFPD requested this now publicly-accessible study (Kolden & Henson, 2019) be completed by researchers for an "*independent, objective look at what [they are] doing and tell [them] what [they] can change to do better,*" which informed the public on outcomes of the prevention stage.

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However, the County and City agency websites, non-profit websites, and the MJHMP, do not provide summaries on specifically County-level acreage burn level; and the specific burned acreage identified is on one map after the review of dozens of resources. This is a missed communication opportunity of local agencies to the community. Nevertheless, while the Thomas Fire was at the time the largest burned acreage wildfire in California history, the overall losses were substantively lower in comparison to Ventura County and bi-county information was well communicated. Therefore, this indicator receives an **increased community resilience outcome.**

Indicator 15: Extent of Trails and Recreational Area Damage in Los Padres National Forest Santa Barbara Ranger District

LPNF – Santa Barbara Ranger District holds the majority of the front country trail system and campgrounds within the County and has substantive environmental and recreational value. A Post-Thomas Fire Burned Area Emergency Response (BAER) Report for specifically recreation was produced and communicates the damage and suggested solutions to the ten recreational resources that were damaged (Rendano-Cross & Huebner, 2018). Overall, the Thomas Fire resulted in temporary loss of the majority of recreational resources in the front country, which minimized access to the outdoors.

This report communicates a detailed description of the damage; however, given this agency has limited interaction with the public and did not publicize the report, it is unknown to what extent the public was informed. This report however is provided on the Recovery page for Ready SBC, and MFPD posted in April, 2018 on their websites alerting the public on the opportunity to attend a presentation on the results of the BAER, showing the County and fire departments improved the community accessibility of LPNF findings (Briner, 2018; County of Santa Barbara, 2022b).

However, the BAER Report states signage should be posted for public safety to inform the public the trails should not be used. Nevertheless, it is noted that the damaged OHV trail should have a blockade given it is anticipated the public may not all listen to signage. This instils worry that communication through solely signage without a larger public safety campaign may not have been an effective communication method. This contrast of increased resilience from communication on BAER findings, but diminished resilience from the lack of blockages results in an outcome of **no effect on resilience.**

4.2.2.4 Variable: Community Resilience Sub-variable: Institutional

Indicator 16: The extent to which policies, objectives, and/or actions aimed at improving community resilience through wildfire communication have changed from the 2017 MJHMP to 2022 MJHMP.

The 2017 MJHMP ranked wildfire on a community vulnerability scale of medium and was adopted a few months before the Thomas Fire, which caused widescale community damage (Petrow, 2017). Therefore, this policy assessment was inaccurate, and mitigation and specified objectives were vague and not disaster-type specific.

The 2022 MJHMP, R5 explained *"has a lot more specific [policies] to communication"* comparatively and analysis of wildfire in the revised plan had increased. The 2022 MJHMP policy analysis aligns with the findings of the interviews, including wildfire was moved to high vulnerability and priority category with a substantively higher amount of context and analysis

provided. In terms of policy priorities to minimize community risk and improve preparedness outcomes, the following were added (Table 10).

Table 10: MJHMP Wildfire Policies

Goal/Objectives/Actions	Description
Goal 5	"Prepare for, adapt to, and recover from, the impacts of climate change and ensure regional resiliency"
Objective 3A	"Engage, inform, and educate the public on tools and resources to improve community resilience to hazards, reduce vulnerability, and increase awareness and support of hazard mitigation activities."
Objective 3B	"Ensure effective outreach and communications to vulnerable and disadvantaged communities."
Objective 3F	"Monitor and publicize the effectiveness of mitigation actions implemented countywide."
Wildfire Resilient Design Information	Create a digital and print informational form on preparation for wildfires in WUI and use multiple media platforms to reach community (bilingual).
Collaborative Wildfire Risk Reduction Program	Create new CWPPs for vulnerable communities to improve planning and improve outreach to those communities on mitigation actions.
County Community Resilience Program	Includes use of multiple communication platforms to increase community resilience planning including CERT, alerts, websites, and information improvement.
County Hazard Awareness and Preparedness Public Outreach Program	Creation of a Public Outreach Program
Air Quality Awareness- Wildfires	Improve awareness on air quality alerts and information dissemination in multi-lingual approach.
Disadvantaged Community Outreach	Create a collaboration based plan for mutual aid with local non-profits, and collaborate with local community groups for information dissemination and disadvantaged community feedback.
Ongoing Wildfire Education Programs	Continue implementing Ready! Set! Go! Countywide and Firewise Community Program

Source (Wood, 2022, pp. 7–61 - 7–68)

The creation of seven disaster actions, which are exclusive to or include wildfire and all have a communication component shows growth in institutional policies. Goal 5 shows the

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importance to local agencies on prioritizing community resilience. Therefore, this indicator receives an **increased community resilience outcome.**

Indicator 17: Extent of change to disaster management staffing numbers in City and County local governments since Thomas Fire.

Overall, interviewees reported an increase in the degree of personnel staffing post-Thomas Fire to ensure future wildfire communication needs are met. In terms of prevention and preparedness, staff at City of Santa Barbara currently have three employees, which is up from an average of one to two according to R8.

The City of Goleta and community of Montecito both hired post-Thomas Fire an Emergency Services Coordinator. R11, the Emergency Services Coordinator for Goleta reported his position was created in "*response to the Thomas Fire*" and additional recent, local wildfires. Additionally, the City hired a "*specifically Spanish engagement specialist ... to improve our communication to that community.*" The City of Santa Barbara's public outreach coordinator, according to Linked In, pre- and post-Thomas Fire is bilingual. R14 acknowledged there were concerns by the Spanish-speaking community on the limited amount of communication in Spanish during the crisis, and stated "*Santa Barbara County has hired a Spanish speaking public information officer in the aftermath,*" due to non-profit and community feedback. R12 identifies the MFPD hired a "*full time public information officer and is helping immensely to bridge that gap,*" which is a bilingual member of the team.

Post-Thomas Fire, local agencies have acknowledged there is an increased need for communication coordinators, including bilingual staff and has addressed this community concern. Therefore, this indicator receives an **increased community resilience outcome.**

4.2.2.5 Variable: Community Resilience Sub-variable: Physical

Indicator 18: Number of structures in the HFHZ of Santa Barbara County.

Housing is a major component to the physical resilience landscape in the County. In the Thomas Fire, almost all structures lost were located within HFHZs (County of Santa Barbara, 2018). The recorded number of structures within the County HFHZ as of 2021 was 30,359 buildings (Fire Safe Council, 2021). No data is available on the number of structures pre-Thomas Fire.

A state-wide policy has interacted with this physical resilience characteristic. The County adopted in 2016 state requirements to streamline the ADU development process to expedite and increase development of new structures to address the housing crisis. However, this statewide requirement includes allowing for development in HFHZs. R8 raises the City's Fire Marshal attempted to push back on this policy as it would increase the number of structures in HFHZ and ultimately the number of evacuees; however, "*ultimately the pressure from the State superseded the Fire Marshal.*" These policies affect the community resilience of the County because it may alter the number of structures in HFHZ.

Due to the limitation of available data on structure quantities in the HFHZ pre-Thomas Fire, this research cross-compares population growth in HFHZ making an assumption that a substantive population increase would indicate a growth in structural development of the area and a lack of sufficient communication of risk. From 2010 to 2020, neighbourhoods within the HFHZ including Toro Canyon and Mission Canyon saw an increase of 21.7% and 6.7%,

respectively (SBCAG, 2021). In contrast, Montecito and Carpinteria, which are also located partially in a HFHZ decreased by 3.6% and 8%, respectively. The Thomas Fire caused structural losses in the HFHZ of Montecito, Carpinteria, and Toro Canyon, so surprisingly Toro Canyon experienced a greater than County average increase in population size.

R6 and echoed by R1 provides an understanding of how land use allowances for development in HFHZs has changed over time explaining the "*County had some good land use designations in place like resource management by fire hazard areas …. [but] through time politically people forgot what that meant and fought to get their homes built in areas I shun about.*" This is in alignment with the outcomes of population increase in Toro Canyon and Mission Canyon according to County-available secondary data; however, contrast the findings of Montecito and Carpinteria's population levels.

While no change in structure data is available, over 30,000 residential structures within a known risk area poses a detrimental effect to community resilience, and interviewee accounts indicate the number is not decreasing. Therefore, this indicator receives a **diminished community resilience outcome**.

Indicator 19: Number of wildfire personnel and equipment in Santa Barbara County pre- and post-Thomas Fire.

This analysis uses solely SBC Fire metrics given they are the sole agency with publicly-accessible tracking of this data; however, their data includes personnel and equipment for Cities of Buellton, Goleta, and Solvang. Therefore, personnel and equipment resources within the County exceed these numbers. Additional fire departments within the County, such as the MFPD, Carpinteria-Summerland Fire District, and City of Santa Barbara Fire Protection Fire District, do not report these statistics annually, which is a missed communication opportunity for the local fire agencies to the community. However, the MFPD provided a complete report of staffing and equipment numbers in the 2022 MJHMP, which was the only agency to do so (Wood, 2022).

In 2015, Santa Barbara County Fire Department had 228 personnel and a total of 36 engines (SBC Fire, 2015). In 2017, staff increased to 278 personnel and engine levels remained the same at 36 (SBC Fire, 2017). In 2021, personnel increased to 295 persons and 2 additional engines were added (Fire, 2021).

Available information informs this research there has been an increase in staffing numbers within Fire Stations and an additional engines added to the fleet, which is available and updated annually on their website. Additionally, the majority of fire station's personnel and equipment changes are published and publicly-accessible. However, some districts can improve their community communication on staffing and equipment changes to a greater extent. Therefore, this indicator receives an overall **increased community resilience outcome**.

4.2.3   Summary of Results:

Table 11 shows the results at an indicator level for the data analysis of this research through the triangulation of semi-structured qualitative interviews and secondary data from desktop review. Therefore, in relation to the Conceptual Framework, the independent variable, climate-related disaster communication strategies, shows there is overall potential for these communication results across the disaster cycle to have positively affected community outcomes for the dependent variable, community resilience, as more than half received a

positive outcome. The dependent variable, similarly found more than half of the indicators experienced an improved community resilience outcome across the disaster cycle in the Thomas Fire. Therefore, the analyses overall finding is the climate-related disaster communication strategies used by local agencies in the Thomas Fire **increased community resilience in the County.**

Table 11: Data Analysis Outcomes

Sub-variable	Indicator	Outcome
Risk	1. The extent to local agencies wildfire communication characteristics meet the Risk Key Literature Characteristics	Positive
Risk	2. The extent local agencies risk communication strategies describe how to communicate wildfire disaster risk characteristics to the community.	Positive
Risk	3. The extent local agencies disaster risk communication strategies were applied prior to the Thomas Fire event.	Neutral
Crisis	4. The extent local agencies wildfire communication characteristics meet the Crisis Key Literature Characteristics.	Positive
Crisis	5. The extent local agencies crisis communication strategies describe how to communicate wildfire crisis characteristics to the community.	Positive
Crisis	6. The extent local agencies disaster crisis communication strategies were applied during the Thomas Fire event.	Positive
Recovery	7. The extent local agencies wildfire recovery communication characteristics meet the Recovery Key Literature Characteristics.	Positive
Recovery	8. The extent local agencies recovery communication strategies describe how to communicate wildfire recovery characteristics to the community.	Negative
Recovery	9. The extent local agencies recovery communication strategies to the	Neutral

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	community were applied post-Thomas Fire.	
Social	10. The number of non-profits currently working on community resilience in Santa Barbara County.	Increased
Social	11. The number of Firewise communities pre-Thomas Fire compared to post-Thomas Fire.	Increased
Economic	12. Extent local businesses' profits were affected from Thomas Fire in Santa Barbara County	Diminished
Economic	13. Number of structures destroyed or damaged in the Thomas Fire in Santa Barbara County	Diminished
Environmental	14. Acreage of burned land during Thomas Fire.	Increased
Environmental	15. Extent of trails and recreational area damage in Los Padres National Forest Santa Barbara Ranger District	No Effect
Institutional	16. The extent to which policies, objectives, and/or actions aimed at improving community resilience through wildfire communication have changed from the 2017 MJHMP to 2022 MJHMP.	Increased
Institutional	17. Extent of change to disaster management staffing numbers in City and County local governments since Thomas Fire.	Increased
Physical	18. Number of structures in the HFHZ of Santa Barbara County.	Diminished
Physical	19. Number of wildfire personnel and equipment in Santa Barbara County pre, and post-Thomas Fire.	Increased

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4.3 Discussion

Literature Connection

Overall, the results of this research's data findings closely align with recent academic literature, which shows academia and practical application are well connected in this case study. As described in Chapter 2, the recovery stage of the disaster cycle is by far the least researched stage, and primary and secondary data collection results for the independent variable indicators, show this with interviewees less able to answer questions related to this stage. Secondary data including local plans, policies, and websites also showed lesser or no mention of the recovery stage. Enhancing local assessments and planning by local agencies and academic research for this stage may improve the communication strategies in place when recovery occurs.

Review of relevant academic literature identified key characteristics per stage of disaster communication strategies, which had strong overlap with the responses received in primary data collection across the stages. Local experts consistently identified additional key characteristics with overlapping answers exhibiting that there may be further capacity for academic findings to improve characterization through use of local experts in this field.

Chapter 2 identifies the physical resilience dimension as the most cited and studied dimension in literature; however, in practice this researcher found limited information on the indicators, including the number of structures in the HFHZ in the County. Given the emphasis of planning materials in the County on residential structures for preparedness and response, it surprised the researcher to see no local government agency was reporting on the change in number of structures overtime.

Unexpected Findings

This researcher was surprised to find the level of burned acreage and structures lost was substantively higher in Ventura versus Santa Barbara County. Given, the data is nearly always reported by agencies as bi-county, this information was unexpected.

This researcher did not expect this to be a unique case study of a wildfire within the County as the two disaster events- the Thomas Fire and subsequent Montecito Debris Flows- coincided so closely together. Therefore, the recovery stage of the Thomas Fire and Debris Flows were inherently interconnected. Primary and secondary data collection showed information on the recovery stage for the events is often intertwined making it a challenge in distinguishing results for solely the Thomas Fire, particularly for the economic dimension.

Critical Thoughts

The largest surprise in data collection relates to communication on the subsequent Montecito Debris Flows and communication to the public on risk for the next disaster. The County states homeowners affected by the Thomas Fire and/or Montecito Debris Flows that had non-conforming properties from destruction or damage were required to be rebuilt within 24 months of the event (with the option to extend granted, if requested) (County of Santa Barbara, 2022c). While this is potentially aimed at avoiding individuals living in unsafe structures, this is problematic in a similar lens to the continued allowance to develop residential structures in the County HFHZ, because there is a known higher risk, which the community may not all be adequately aware of. Policies and practice by local agencies communicate to the community the safety and risk of an area. An unintended consequence of allowing or requiring further

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development in high hazard areas with recent County impacts shown is potential misunderstanding or misinterpretation of the community of the level of risk to reside in these areas. This is an example of the clash of wicked problems, which can generate even greater local agency planning and policy challenges as the housing crisis in California puts pressure on local jurisdictions to continue to develop and may inadvertently lead to continued zoning of land for use in climate at risk locations.

5. Conclusions & Recommendations

5.1 Research Question Results

5.1.1 Sub-Question 1: To what extent were the climate-related disaster communication characteristics identified in the literature review used in preparedness, response, and recovery to the Thomas Fire by Santa Barbara?

The literature review identified the key characteristics of communication strategies that should be used by local agencies to communicate in each disaster stage. Findings showed there is variation in what characteristics and strategies for communication should be used at each stage as the overall communication goal will vary. Literature showed in crisis communication the primary characteristic of strategies should be accurate, timely, and verified information to enhance public safety. Whereas in risk and recovery communication where immediate danger is not a concern, interactive communication should be used in strategies to create a community dialogue. Academic knowledge can provide an assessment tool for which local agencies can analyze their communication strategies on a stage by stage basis and see if there is consistency and/or where improvements are needed. However, as shown in the primary data collection process, local experts understand other key characteristics in local context, which also hold important value for communication strategy creation and assessment.

Data analysis results for this thesis showed communication characteristics from literature and associated strategies were used in the preparedness and response stages through communication strategies in a strong and correlated manner in the Thomas Fire; however, recovery communication data indicates there is lower alignment in this stage with academic communication characteristics and a lower expert level of knowledge on recovery communication strategies.

Primary and secondary data findings were overall in alignment throughout these findings for climate-related communication strategies. Risk communication findings showed the County used a strong diversity of communication strategy mediums and methods, particularly alert systems and social media, which were in alignment with the majority of key characteristics from literature for preparation to the Thomas Fire. However, desktop research indicates only 14% of the County is signed up for alerts, which shows the importance of using a multitude of strategies, in alignment with literature. Crisis communication data showed local experts prioritize the importance of accurate and timely information communication strategies, which is in direct alignment with literature characteristics. Recovery communication had the lowest levels of results both with primary and secondary data with the majority of interviewee's stating they were unaware of recovery communication strategies used. However, characteristics of an iterative process and agency collaboration were identified and align with literature.

5.1.2 Sub-Question 2: What communication actions did Santa Barbara take to implement climate-related disaster communication to provide community resilience in preparedness, response, and recovery to the Thomas Fire?

Community resilience's indicators evaluated how the communication actions by the County in the Thomas Fire effected the overall resilience across disaster stages. Communication strategies varied widely by indicator and stage. As shown in Table 11, some communication strategies increased overall community resilience. Institutional resilience indicators showed increased community resilience, including there has been policy updates and improvement, to the 2022 MJHMP from the 2017 MJHMP with substantively higher policy and actions levels associated with communication and resilience. Additionally, the number of staff hired in local agencies, particularly those that are bilingual has enhanced equity in local disaster communication. Social resilience indicators all showed an overall increased community resilience as well, including increased number of Firewise certified communities and expansion of the number of non-profits working in resilience since the Thomas Fire.

The community resilience indicator findings; however, show there are areas the local agency's communication strategies have decreased overall community resilience. Both economic and physical resilience dimensions have one indicator with such scoring. For example, the lack of after-action summary for the community on economic outcomes is a missed communication opportunity given surveying was completed solely by private agencies and identified that these were not a holistic report. The number of structures in HFHZ in the County indicate there may be a communication strategy discrepancy with physical risk level as policy and zoning still permits development in high risk areas post-Thomas Fire.

5.1.3 Main Question: To what extent did climate-related disaster communication strategies influence the overall community resilience of Santa Barbara's residents in preparedness, response, and recovery to the Thomas Fire?

The level of communication strategies used across the stages of the Thomas Fire substantially affected community resilience of Santa Barbara's residents. Indicators with lower levels of communication strategies resulted in diminished community resilience outcomes in some areas. Additionally, this assessment is a complex challenge as some indicators had portions of successful communication but in other areas were falling short of meeting the community in an equitable manner, which resulted in some scores of no effect as all communities must be counted. Overall, the independent variable, climate-related disaster communication strategies, shows there is potential for these communication results across the disaster cycle to have positively affected community outcomes. The community resilience variable similarly found more than half of the indicators experienced an improved community resilience outcome across the disaster cycle in the Thomas Fire in relation to the Conceptual Framework. Therefore, the answer to the main research question is local agency climate-related disaster communication strategies influenced Santa Barbara's residents by overall increased community resilience in the Thomas Fire across the preparedness, response, and recovery stages.

5.2 Practical Implications and Limitations of Study

This research serves as the first academic study of the communication strategies used throughout the disaster cycle of the Thomas Fire in Santa Barbara County. As described in the problem statement, County planning documents including the CWPPS and 2022 MJHMP acknowledge the current and growing level of hazard wildfires pose to the County's

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residents. Therefore, this paper adds to this ongoing Countywide work by providing an evaluation of key characteristics of communication and what communication strategies are being used to date by a range of local agencies to provide a cross-agency lens. This comparison to how it has affected overall community resilience from a recent, impactful climate-related disaster, the Thomas Fire, provides local agencies with further information on areas they may continue to expand communication and through what strategies to enhance resilience.

Three key limitations of this research for practical application emerged, which would benefit from future study: 1) Indicators 2, 4, and 6 would benefit from a cross comparison of primary data collection responses to available information in desktop review on each individual medium and method, which was outside the scope of this study. 2) This paper does not analyze community resilience from the perspective of the County's residents and solely focuses on perception of local experts. 3) This paper does not include the prevention stage of the disaster due to the level of existing academic analysis for the community of Montecito. Therefore, further study of this topic is recommended to enhance established knowledge.

5.3 Policy and Planning Recommendations

This researcher identified four policy and planning recommendations for local agencies based on data findings: Complete a Countywide Community Resilience Assessment; Complete a County after-action economic report from the Thomas Fire; Create a plan with collaboration by grassroots organizations on how to improve outreach to hard-to-read communities; and 4) Create a local governmental position that includes explicitly the recovery stage of a climate-related disaster.

5.4 Recommendations for Future Research

This study has only analyzed the wildfire communication strategies from local agencies within the County of Santa Barbara and overall community resilience outcomes, given communication to the public typically happens at a city to county basis on the local level. However, the Thomas Fire also occurred in Ventura County, which had higher levels of property loss and burned acreage; therefore, a comparative review of the overall community resilience of the two counties would be beneficial.

Additionally, the Montecito Debris Flows occurred directly following the Thomas Fire and had largescale community impacts; however, the scope of this research could not analyze the combined community resilience of these two events on the County. Therefore, this would be a beneficial addition to this research to add further depth of understanding of how these two disasters interacted in a short timescale.

While approaches to effectively measure community resilience remain in "infancy" the continued localized, case specific studies of community resilience provide important "insights into how assets and capacities interact and influence each other" in a climate-related disaster, which will assist in continued adjustments to community resilience frameworks and operationalization **(Pasteur & McQuistan, 2016, p. 11)**.Therefore, this research is a useful addition to existing academic works to provide case study-level analysis at a community level.

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Appendix 1: Research Instruments

Appendix 1.1. R1 to R14's Titles and Agencies

Table 12: Interviewees' Name Code

Name	In-Text Naming	Title	Agency
David Stone	R1	Lecturer/Senior Technical Advisor	UCSB/Wood
Gina Sawaya	R2	Deputy Project Manager	Wood
Rob Hazard	R3	Fire Marshal/Board Member	Santa Barbara County Fire Department/ Fire Safe Council
Kelly Hubbard	R4	Director	Santa Barbara County OEM
Sydnie Margallo	R5	Deputy Project Manager	Wood
Rita Bright	R6	Principal Planner	UCSB/City of Carpinteria
Mark von Tillow	R7	Wildland Specialist	City of Santa Barbara
Chris Braden	R8	Fire Services Specialist	City of Santa Barbara
Anonymous	R9	Staff	NRCS
Kevin Varga	R10	PhD Researcher/ Board Member	UCSB/Fire Safe Council
Michael Baris	R11	Emergency Services Coordinator	City of Goleta
Kevin Taylor	R12	Fire Chief	Montecito Fire Protection District
Erick McCurdy	R13	Volunteer	American Red Cross – Santa Barbara/SLO Chapter

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| Lucas Zucker | R14 | Policy and Communications Director | CAUSE |

Appendix 1.2 Interview Questionnaire

<u>Introduction</u>

Thank them for allowing me to interview you and taking time out of your busy day to participate.

Introduce Myself: My name is Hannah Thomas, and I am a Masters student at the Institute for Housing and Urban Development Studies in the Urban Management and Development Program in Rotterdam, Netherlands. Previously, I was an Environmental Planner with Wood, a global environmental consulting firm who serves as a consultant to the City and County of Santa Barbara.

Purpose of the Interview: I am currently completing a thesis to evaluate the disaster communication strategies, policies, and actions used by local government in preparing, responding, and recovering from the 2017 Thomas Fire and how these strategies affect the overall community resilience of Santa Barbara's community members.

Duration of the interview: This interview will take approximately 30 minutes. However, if at any time you would like to take a break, do not feel comfortable answering a specific question, or no longer feel comfortable continuing, please inform me. Further, I also understand that the Thomas Fire event can be a sensitive subject to discuss, so please let me know if a question is triggering.

Nature of the Interview: This interview will be comprised of open ended questions in which I hope to learn about your professional experience related to local agencies strategies in wildfire disaster communication before, during, and following the Thomas Fire as well as your personal and professional perception of how these actions have affected overall community resilience in Santa Barbara. Additionally, I have closed questions related to general background information, and City and County policies and statistics.

There is no right or wrong answer to any of these questions as the importance of this interview is to better understand from the perspective of local government actors how disaster communication strategies in the context of the Thomas Fire impacts community resilience. These questions cover a breadth of knowledge; therefore, if any questions are outside your area of knowledge or you can only answer partially, that is understandable and please state so.

Privacy and anonymity: You will remain anonymous in any use of this recording or interview for research purposes, unless you choose to waive this right. Any individual answers you provide will further not be traceable back to you. If you desire, I can provide the transcript of this interview for your records. The recordings and transcripts of this interview will be stored in a secure platform and all coding will not use your name or personal details.

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However, for the purposes of analysis, I request to be able to use your generalized title, such as City of Santa Barbara Planner to ensure accuracy in portrayal of information in the thesis. Please indicate otherwise if not permissible.

Informed consent to participate and record the interview: Before we proceed, I would like to ask your permission to participate and record this interview?

Okay great, before I proceed do you have any questions on the interview's purpose, use, or your privacy? No, okay then I will continue on with the questions.

Background Information

1. First and Last Name:
    a. Name can be included in Thesis findings: Yes __ No__
2. Years of Professional Experience in this field:
3. Current Job Title and Agency or Company:
4. Do you have any other previous relevant professional roles:
5. Were you working in Santa Barbara area prior to and/or during to the Thomas Fire?

Opening Question:

1. Can you please describe your professional experience in relation to wildfire management?
2. Have you worked on a local Santa Barbara strategy, planning, or policy document related to wildfire?
    a. Follow up: Can you please name the document and what did it entail?

Risk Communication

3. What are the key communication goals for wildfire preparedness of local agencies to communicate risk to the community?
4. Can you tell me about any wildfire communication strategies used, such as plans, policies, actions, and/or social media use, by the local government to prepare the community for the Thomas Fire?
5. Can you describe how these communication strategies prepared residents for the Thomas Fire prior to the event?

Crisis Communication

6. Please describe the key communication goals of wildfire crisis communication during an event to reach the community?
7. Can you describe how local government agency's wildfire strategies identified how to communicate during the Thomas Fire event to residents including on through what communication mediums and content to use?
    a. Follow up: What individuals or agencies had the primary responsibility of this communication during the Thomas Fire, including for evacuations?
8. Please describe how crisis communication strategies affected built infrastructure and public safety outcomes during the Thomas Fire?

Recovery Communication

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9. Please describe what Santa Barbara's local government considers the key characteristics of wildfire recovery communication following an event?
10. Can you tell me about the ongoing communication strategies and actions used by Santa Barbara's government entities for recovery of residents to the Thomas Fire?
    a. Follow up: How are available resources communicated to the community and on what platforms or mediums?
11. Please describe how recovery communication strategies have affected to date, recovery levels for the community to the Thomas Fire?

Community Resilience

12. Can you please describe, if applicable, how the number of community networks related to wildfire disasters in Santa Barbara has changed since the Thomas Fire?
13. Can you please name any non-profits you are aware of that work on community resilience in Santa Barbara County.
14. Can you please identify any policies or actions taken in Santa Barbara to improve landscape resilience, such as fuel management, zoning requirements, or housing materials?
    a. Were these policies or requirements in place prior to the Thomas Fire?
15. Can you please describe any changes in the Fire Safe Council's or SB Bucket Brigades' arrangements or priorities over the timeline of the Thomas Fire?
16. Please approximate, if known, the number of wildfire personnel in Santa Barbara area pre, during, and post Thomas Fire.
17. Can you please to your awareness describe any wildfire-related community events held in Santa Barbara pre Thomas Fire and/or post event?

Closing Questions

18. Is there any lessons learned from your experience, which you feel other Cities facing this challenge could benefit from?
19. Does the City or County to your knowledge employ or work with any other outside organizations or companies to communicate wildfire related information on risk, crisis, and recovery that we have not discussed?
20. Are there any additional individuals you feel this research could benefit from speaking to to further the breadth of knowledge?

That concludes the questions I had for you. Thank you again for your time! Are there any questions you have for me?

Appendix 1.3 Data Sources

Table 13: Secondary Data Used

Source Name	Data Type	Indicators Used
SBC Fire Statistical Summaries	Annual Reports	19

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Kolden & Henson, 2019	Journal Article	14
County of Santa Barbara	Maps	18
Noozhawk	Newspaper	2, 3, 13
VCStar	Newspaper	13
Thomas Fire Emergency Response After-Action Review	Plans	13
CWPPs	Plans	5, 8
2017 MJHMP	Plans	14, 16
2022 MJHMP	Plans	13, 14, 16, 19
Ready! Set! Go!	Plans	2, 3, 6
SBDC Economic Report	Report	12
Post-Thomas Fire BAER	Report	15
SBCAG Census	Report	18
Linked In	Social Media	17
Ready SBC	Website	2, 3, 6, 8, 15
NFPA Certification Listings	Website	11
MFPD	Website	15
Santa Barbara Fire Safe Council	Website	5, 18

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SBC Fire	Website and Maps	2, 7, 14
Non-profits	Websites	10

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