Community and Agency Perspectives on Local Self-Reliance in Disasters

Cristina Cano-Calhoun

A thesis

submitted in partial fulfillment of the

requirements for the degree of

Masters of Urban Design and Planning

University of Washington

2021

Committee:

Daniel Abramson, Co-Chair

Cynthia Chen, Co-Chair

Program Authorized to Offer Degree:

College of Built Environments, Urban Design and Planning

University of Washington

Abstract

Community and Agency Perspectives on Local Self-Reliance in Disasters

Cristina Cano-Calhoun

Chairs of the Supervisory Committee: Daniel Abramson and Cynthia Chen

Department of Urban Design and Planning

One of the most critical activities to occur in the response to and recovery from a large-scale disaster is the connecting of affected people to the things they need, especially in scenarios that can leave a community stranded from external support. This study explores aspects of Information Sharing (IS), Resource Planning (RP), and Resource Matching (RM) through community and agency perspectives on five areas of interest: (1) Communication Platforms, (2) Information Sharing, (3) Community Resource Centers, (4) Resource Planning and Matching, and (5) Leadership and Participation. In order to inform future improvements to community-based disaster support, this study interviewed community members and leaders of three case communities in Washington: Laurelhurst (Seattle), South Park (Seattle), and the City of Westport. This study finds that communities and agencies are currently unprepared to coordinate during extreme disaster scenarios, but they can capitalize on individuals' community knowledge and willingness to participate in order to bring information about a communities' needs and capabilities to agencies, and vice versa. Future interventions might include the development of programs that make it easier for individuals to access and adopt community leadership and participation roles.

Acknowledgements

This thesis, and the community knowledge on which it is built, was not possible without our dedicated community partners. To the community members and leaders of the City of Westport and the Laurelhurst and South Park neighborhoods, thank you for your time, insights, and passion for the people and places you call home and for sharing those valuable resources with this study. Thank you, Dan and Cynthia for your unending guidance as this study took form and for your questions, challenges, and dissents that took this thesis from a good effort to a great final report. To Katie Idziorek and the Smart and Connected Communities team, thank you for sharing your vast knowledge and expertise with me and for your willingness to mentor me throughout this process.

To Bob Freitag, thank you for your mentorship, friendship, and for expanding my understanding of the human-felt impacts of disaster. Thank you to my peers and friends for our many late-night Zoom calls, for your texts of encouragement, and for your company along this journey, be it in-person or through a screen. And finally, to my family - Dad, Mom, Sister, Brother - my gratitude for you all cannot be captured on page alone. This thesis would reflect a fraction of its potential were it not for your limitless wisdom, compassion, and eagerness to see me excel. I say it always and it is still somehow never enough: thank you.

We go further together.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

INTRODUCTION

Problem Identification

One of the most critical activities to occur in the response and recovery to a large-scale disaster is the connecting of affected people to the things they need. Emergency management in the United States relies on a combination of institutional, community, and personal preparedness to sustain these affected populations. Hazards like earthquakes and tsunamis, however, pose a considerable threat to critical infrastructure that supports the movement of people, resources or goods, and information. Damaged or destroyed roads, bridges, power grids, and cell towers can isolate a community. When this happens, affected communities will need to shift to greater reliance on community and personal capabilities for survival as immediate institutional support may not be available for a sustained period. Community-based self-sufficiency is then dependent on the knowledge of who in your community has what resources, and where in your community those resources are located. Resource sharing, then, is the function of one's ability to communicate a need for a particular resource; the availability of that resource in an accessible location; and the ability of a resource seeker to be matched with an appropriate resource provider.

Depending on a community's institutional, social, spatial, and technological characteristics, emergency resource sharing can primarily occur in two ways, taking either a more centralized or decentralized form. In a decentralized model, the exchange of resources occurs between two or more parties (households or individuals) and there is not a central authority that coordinates the sharing of the resources. In this model there is little to no oversight or regulation by an external entity, such as a government agency or volunteer-led organization. Alternatively, resource sharing can be coordinated and facilitated by formal or informal institutions which work to aggregate resources and then distribute them to community members. This form represents a centralized model. In both models--decentralized or centralized, the relationship between resource seekers and providers can be either one-to-one or one-to-many.

Goals and Objectives

The assets and capabilities supporting information sharing, resource planning, and provider-recipient matching impact community outcomes in a disaster scenario, particularly if a community is vulnerable to disasters like earthquakes and tsunamis. This study stems from a long-term interest in exploring future technological and social interventions which might build resource sharing capabilities where they do not yet exist and strengthen them where they do. The goal of this study, then, is to learn from communities what factors might affect their use or acceptance of these technological and social interventions. When planning for disaster scenarios, then, agencies and communities must consider how information sharing (IS), resource planning (RP), and resource matching (RM) may evolve over time, specifically;

- What communication platform functionalities are desirable for communities and agencies?
- What is the level of trust community members have in using a platform for communicating private information about themselves? Does addressing their privacy concerns with a technology such as blockchain raise trust levels?
- What factors matter in identifying locations in the community to serve evolving needs before, during, and after a disaster?
- What future modes of resource planning and matching do communities and agencies envision?
- What are communities and agencies' expectations of leadership regarding disaster planning and response?

To address these research questions, this study engaged three case study communities in Washington State: Laurelhurst and South Park, in Seattle, King County; and the City of Westport, in Grays Harbor County on the Pacific coast. These three communities have expressed interest in improving their disaster resilience, preparedness, and response capabilities and have already been engaged as case study communities for

related resilience research with the University of Washington. In addition to this interest, they represent a variety of combinations across the spectrum of communities with either high socioeconomic status (SES) or low SES, and being either largely rural or urban. These two factors play a considerable role in how readily a community might have access to emergency resources. Such variety among the case study communities allows for further exploration into factors affecting disaster preparedness in communities across the United States.

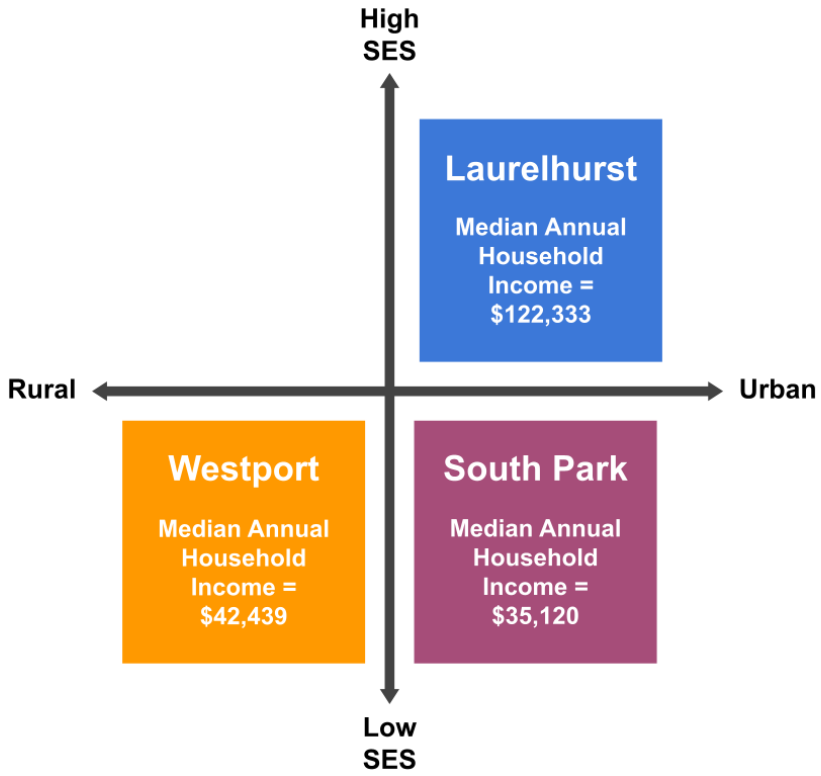

Figure 1: Socioeconomic and physical characteristics of case study communities (Idziorek 2021)

This study's research questions are addressed using qualitative data collected from interviews with both community stakeholders who currently fulfil leadership roles in emergency or disaster contexts, as well as interviews with community members. Understanding both community member and leader perspectives on topics related to disaster preparedness and response serves a foundational role in exploring future, community-driven interventions developed to improve community outcomes and mitigate human suffering in a disaster scenario.

CONCEPTUAL FRAMEWORK

In order to address the social, technological, spatial, and institutional factors influencing a community's preparedness for, and response to, disasters, the author developed a framework for community-based disaster support. Community-based disaster support is a framework that addresses the relationship between anticipating, learning, and fulfilling a community's resource needs in a disaster scenario with the ultimate goal of connecting affected people to appropriate emergency resources, which includes information and services. The community-based disaster support framework consists of three of three elements: information sharing, resource planning, and resource matching.

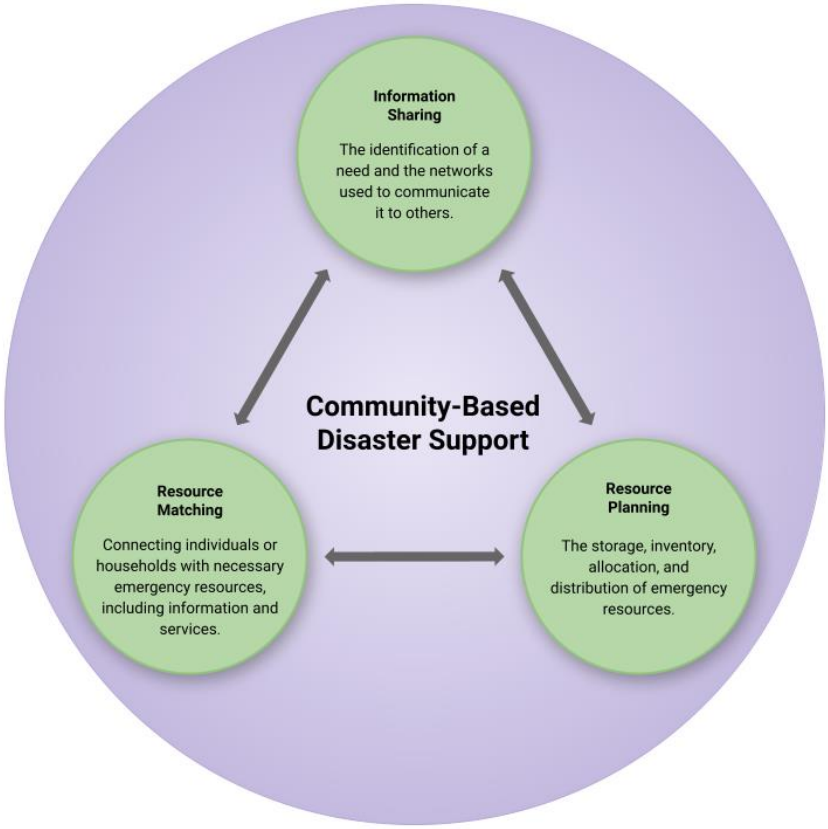

Figure 2: Community-based disaster support framework

In the context of a disaster, information sharing refers to the behaviors, technology, and infrastructure an individual or community uses to signal needs to others and identify the needs of others. This also includes the proactive identification of community needs on the part of governmental and community leaders. Resource planning is the spatial and logistical administration of goods, information, and services. Individuals or agencies are responsible for the staging, inventory maintenance, and distribution of emergency resources as needed. Finally, resource matching concerns the process of actually uniting a resource provider and resource recipient. The elements of the community-based disaster support framework can be thought of as responding to a number of key questions, such as:

Information Sharing

- What are communities and agencies' preferences for how is information shared? How do they imagine information sharing be improved?
- What information is important to for communities and local agencies to share for disaster scenarios? Are communities and agencies willing to share important information before a disaster?

Resource Planning

- What emergency resources are present in a community before a disaster? What factors support or constrain communities and agencies' resource planning capabilities?
- How are emergency resources managed by agencies or households? How can emergency resource management be improved?

Resource Matching

- How will individuals and communities be connected to the emergency resources they need?
- How can communities and agencies improve their emergency resource matching capabilities?

Based on this community-based disaster support framework, this study explores five specific areas of interest: (1) Communication Platforms, (2) Personal Information Sharing, (3) Community Resource Centers, (4) Resource Planning and Matching, and (5)

Leadership and Participation, which are explained in detail in the subsequent sections of this chapter. These five areas of interest allow for more detailed analysis of community and agency perspectives on the elements of the community-based disaster support framework, perspectives that are fundamentally different and, at times, conflicting. In exploring these perspectives, this study aims to identify opportunities for communities and agencies to better harmonize their perspectives and capabilities as they ultimately share the same goals in disaster scenarios.

For this study, information sharing is expanded into communication platforms and personal information sharing, allowing participants to reflect on individual sharing behaviors and the mechanisms they use to share or receive information. Exploring perspectives on community resource centers, centralized facilities that allow individuals and agencies to share information and goods, can inform future systems promoting community-level organization in a disaster scenario. Resource planning and resource matching are explored together to better understand the relationship between the management of goods and information and how communities and agencies envision those things being shared in a disaster scenario. Lastly, the concepts of leadership and civic participation were included because they are considered fundamental components of any coordinated management process, especially in the context of a disaster scenario.

Finally, coastal communities, particularly those along the Pacific Ring of Fire which elevates the risk of experiencing high magnitude earthquakes and tsunamis, are increasingly aware of the likelihood they will become isolated from other communities and sources of external aid following disasters of that nature. This “islanding” problem is the result of damaged or destroyed infrastructure networks (telecommunications, power, and transportation) which would otherwise allow people, goods, and information to move freely outside of a community. If these networks become unavailable, a community is essentially on its own to sustain and support itself until external aid can be provided. As a result, this study seeks to explore ways a community’s self-sufficiency can be improved if it is cut off from external support and efficiently manage the distribution of aid and information when they become available.

Communication Platforms

Communities need to share information between members and with other communities on a daily basis, but especially during disaster scenarios. While in-person interactions are often viewed positively for the social value, communicating in this way alone greatly restricts how many individuals can learn information, how quickly information can be spread in a community, and how reliable or consistent information remains as it is shared. In addition to face-to-face interactions, individuals and communities use other communication platforms to share information. Understanding the roles and benefits or challenges associated with these platforms can reveal opportunities to optimize existing functions or to develop new platforms.

Individuals use a variety of platforms to communicate with others, near and far. One common mode for communication for individuals and agencies of the same community is printed media, such as fliers, posters, mail-outs, or newsletters. These media can help keep vulnerable populations who may not have access to or comfort with digital platforms, such as the elderly or impoverished individuals, informed about developments in their community. While its accessibility to vulnerable populations is a benefit of printed media, hard copies of information can be costly to produce en masse and present logistical challenges when information is no longer current and needs to be updated. An alternative mode for communication is digital or social media. These platforms, such as email, apps like Twitter, Facebook, or Nextdoor, and texting, can be used to share information with more individuals, more quickly, than printed media. As alluded to earlier, however, the use of digital media presents a number of barriers to populations who are not comfortable learning or using a new technology or to those without stable access to a computer or smartphone.

Beyond its everyday functions, social media has been found to serve valuable emergency functions during disaster scenarios. In a disaster, social media can offer communities and agencies access to timely, on-the-ground information that might not be available through other communication channels (Simon et al. 2015). While social media

can present challenges with the spread of inaccurate or misleading information, an increasing flow of information can be viewed as a worthwhile asset for both agencies and community members, and can be planned to be used systematically (Simon et al. 2015). However, digital media is at the mercy of available infrastructure, such as electricity and cell power. Disruptions to either power or connectivity can greatly reduce the use of digital communication platforms in a disaster scenario. For this reason, communities and agencies should plan to use a combination of communication platforms.

Recognizing the central role digital communication platforms will have in disaster scenarios, however, this study explores communities and agencies' views on platforms like texting, and apps such as Facebook, Nextdoor, and WhatsApp. Participants discuss their own preferences for communicating with others in their communities and how the community at large uses different platforms. Additionally, participants reflect on their concerns regarding the use of digital communication platforms and the desired functionalities that might increase their acceptance of such platforms. Community and agency perspectives on communication platforms can inform future improvements to the speed and dexterity of information sharing in disaster scenarios, which can ultimately improve a communities overall disaster planning and response capabilities.

Personal Information Sharing

In a disaster scenario, simple acts like sharing basic personal information with others may become difficult or impossible for extended periods of time. For example, if a diabetic individual who lives alone is in some way incapacitated or injured during a disaster, and they had not shared their medical needs with neighbors or first responders beforehand, that individual runs the risk of being unable to contact someone for help and no one outside of their home knowing their needs in order to respond proactively. Personal information sharing can improve the speed and efficiency of response during a disaster, whether that response comes from trained first responders or active neighbors and community members. While some information can be easily discovered if you know what to look for and where, more sensitive information like medical health records,

allergies, and prescriptions are less likely to be widely shared and available in a disaster. This type of information, however, could be particularly important in disaster response as time and resources are often of the essence for medical emergencies.

Trust has been found to play a key role in personal information sharing, especially on digital platforms (Salehan et al. 2018). Trust in the particular platform information is shared on and trust in the recipients of a person's information are especially important. With social media in particular, it has also been found that the presence of social ties among users positively impacts the volume of information a person is willing to share, meaning individuals are willing to share personal information more freely if they have a higher degree of social connection to others using the same platform (Salehan et al. 2018). Trust in the platform itself is another important aspect of digital sharing behaviors. For this reason, privacy or security concerns can keep individuals from sharing potentially critical information in a disaster scenario, or from using a platform altogether.

Recently, blockchain experts have begun exploring future intervention using the technology to improve trust in data management and increase information sharing as a result. As opposed to traditional means of data storage which rely on a centralized server, blockchain operates by having multiple copies of data stored in many places, in what is known as a distributed ledger (International Business Machines Corporation 2021). Blockchain systems rely on peer-to-peer networks, as opposed to centralized networks, meaning that partial copies of information are stored with the different accessors of a particular blockchain system and changes and access to any single block of data in the blockchain must first receive consensus from peers in the network (International Business Machines Corporation 2021). The nature of blockchain technology makes it very difficult for someone to tamper with data, as it essentially means a hacker must edit and validate every copy of the data they are trying to change, and they must hack more than half of the participants in the peer network to achieve consensus on accepting any changes.

It is argued that while trust and confidence in blockchain technology, like any new technology, takes time to cultivate and establish, the "control" that users of a blockchain

network have over their own data, and the shared data of their peers, may result in greater information sharing (De Filippi et al. 2020). The sense of control or ownership over the system itself, and the data within it, may increase how much information community members are willing to make accessible to one another and relevant agencies, whereas there may be greater hesitation to share personal information if data is centrally stored or managed by a single, third-party entity like the government or a company like Facebook.

In order to inform the development of future disaster-related communication platforms, this study explores the role of trust in participants' digital information sharing behaviors. Participants reflect on questions such as who might be allowed to access their personal information, when, what specific personal information would they be comfortable sharing, and what characteristics about a platform might influence their use at all? Participants also explore the potential impacts of the presence of blockchain technology in a platform and whether or not this added security measure might influence sharing behaviors.

Community Resource Centers

Community Resource Centers (CRCs) are centralized facilities that allow individuals and agencies to share goods and information in a disaster scenario. A community might plan for facilities with everyday functions, such as a school, church, or community center, to also serve this emergency function when needed. Alternatively, a community may identify or construct a facility entirely dedicated as a space for emergency resource storage. In countries like Japan and New Zealand, which experience more consistent threats of tsunamis than the US, some of these facilities have been designed to not only store emergency resources and congregate people following an event, they serve as evacuation facilities as well.

Centralizing people, goods, and information can offer an affected community a number of benefits. Facilities that have been identified as CRCs may have the capacity to

store bulky resources, such as cases of water and cots, if agencies are struggling to identify alternative locations. This capability would serve the additional function of staging emergency resources around a community, having them in positions to improve their distribution when necessary. Regardless of how well stocked a CRC might be before a disaster, known gathering locations will allow community members to more readily share their resources with one another. Instead of being limited to the few neighbors one might have on their street or block, individuals can have a platform to learn the needs of others in a broader community, and vice versa, and share accordingly.

Similarly, a CRC can be used to centralize specialized skills and knowledge. Community members with valuable medical or first response knowledge can more readily render aid to those in need if they are in a centralized location. Finally, centralized gathering spaces can lead to faster goods and information sharing. If telecommunications and transportation infrastructure are unavailable, first responders who need to share critical information or distribute goods from external entities can do so in a more systematic way than if they needed to go door-to-door for an entire community.

Japan has already experienced success with CRCs and the centralization of people and resources when responding to tsunamis and extreme flooding events. For example, Sendai, the largest city in the Tohoku Region, which experienced the devastating Great East Japan Earthquake and Tsunami of 2011, had constructed 13 CRCs by the end of 2016 (City of Sendai 2021). These facilities, including 6 stand-alone towers and 5 facilities with attached fire stations, have been stocked with generators, food, blankets, and other essentials to sustain evacuees for approximately 24 hours (City of Sendai 2021). Furthermore, local schools and community groups hold regular evacuation drills, ensuring that community members, especially children, are familiar with their nearest CRC and can help guide others to those locations if necessary.

This study explores community members' notions of places in their communities that are known popular places to gather and places they see as valuable to the community. These place-based perspectives can inform the development of future CRCs, capitalizing on community knowledge to place facilities in populous and identifiable locations.

Participants go on to imagine where they themselves might place new CRCs in their community and describe the factors influencing those decisions. These discussions can ultimately reveal previously unexplored values or benefits a CRC might offer a community, identifying new ways a center might meet a community's every-day and emergency-specific needs.

Resource Planning and Matching

The most critical aspect of community-based disaster support is that communities and agencies must either have emergency resources on hand to sustain themselves following a disaster or they must rely on external support, either in the form of mutual aid between neighboring communities or from overarching entities such as the State, the United States Coast Guard, or from the Federal Emergency Management Agency (FEMA). Leaders across all levels of government recognize that a dependency on external emergency support places communities at a stark disadvantage for disaster response. A disaster that impacts an entire region can mean already limited supplies become all the more difficult to acquire, and a severe event can disrupt or completely destroy anticipated modes for resource delivery, such as roads, airports, and docks. As the highest authority on emergency management in the US, FEMA has very clear messaging to state and local leaders that "a disaster always occurs at the local level" (Federal Emergency Management Agency n.d). Preparedness and response start with individuals and neighborhoods, as communities should anticipate and plan for a 72-hour period in which they should be self-sufficient.

As the name suggests, resource planning includes the activities an individual or agency would perform before a disaster in order to access the emergency resources they might need during and after a disaster. For an individual or household, resource planning might include identifying the potential hazards they are at risk of experiencing, creating a list of necessary resources like food, water, and medical supplies to prepare, going out to purchase those items, and storing them in a safe and easy-to-access location. For a local agency, resource planning might consist of calculating a community's total population,

including visitors, and estimating the potential needs of different populations within that community, using that information to either purchase and store resources at the agency, or to be used as a quick reference when requesting aid from external entities after an event.

For any need an individual or agency is not able to fulfill themselves, emergency resources must be shared with them. Resource matching is the act of connecting resource providers and recipients. Resource matching requires recipients to identify their needs, be able to share information about their needs with resource providers, and finally get their hands on the resources they seek. One challenge individuals and communities face, however, is the ad-hoc nature of disaster response and emergency resource distribution around the country. Budgetary constraints across all levels of government make emergency management, most specifically emergency resource management, a reactive process as opposed to a proactive one. This reality underscores the value of individual households and neighborhoods preparing to support themselves in a disaster, as resource matching with external entities cannot be reasonably expected to occur in a timely manner.

Formal governmental response to large disasters is carried out following the Incident Command System (ICS) procedures under the National Incident Management System (NIMS). Using the ICS, on-site responders from local, county, and/or state agencies can coordinate response efforts and emergency resources in a systematic way. A disaster declaration from a local or state government will activate the Emergency Operation Center (EOC), the headquarters through which agency communication and coordination are performed. Through the EOC, affected jurisdictions and agencies submit requests for support, be it emergency resources or additional personnel or first responders, and operators connect those requests to other jurisdictions or agencies that can fulfill them. This operations system is highly effective in managing the numerous and complex needs of multiple affected communities but it is slow moving as a result. For this very reason, community leaders place considerable emphasis on households being knowledgeable about their risks and being adequately prepared themselves.

In summary, there are two approaches to resource planning and matching: top-down and peer-to-peer. Top-down resource planning and matching means that a community relies on emergency resource and support to come from largely non-local sources, such as a county or state agency. Dependence on top-down disaster support can mean that a community is completely disconnected from the emergency resources it needs in a disaster that disrupts telecommunications and transportation networks. These scenarios might be avoided, however, if a community has greater peer-to-peer resource planning and matching capabilities. Peer-to-peer resource planning and matching means that individuals and households in a community have appropriate levels of emergency resources within the community at the time of a disaster, and community members are able to share those resources with one another, without the presence of a centralized agency coordinating that sharing. In this study, participants reflect on their current preparedness levels and the capabilities they might offer their communities in response to disaster scenarios. Participants discuss the challenges and barriers they currently experience in their resource planning and matching efforts, and share ideas on ways resource planning and matching could be improved.

Leadership and Participation

In a disaster, leaders serve to calm, guide, and organize their communities. Leadership is critical in times of crisis as communities can fall into disorder and lead to individuals struggling to access emergency resources. An important consideration, however, is that leadership must not exist in a vacuum. Following an intense investigation from the House Select Committee into the mishandling of government response to Hurricane Katrina, it was concluded that effective leadership must include a willingness and ability to collaborate (William L. Waugh Jr. and Gregory Streib 2006). Agencies are not the only entities responding to a disaster; individuals, faith-based organizations, and community groups will mobilize and have demonstrated clear benefits to communities during disaster response. As a result, effective leadership must acknowledge and leverage these partners.

Leadership and civic participation can be present in a community in a variety of ways. Perhaps the most common source for leadership comes from government agencies, from elected officials like mayors and governors, or from first responders and government employees such as police officers, firefighters, and city officials. These formal channels represent a top-down form of leadership, whereby guidance and instruction are developed at the top of the leadership structure and flow down to subordinate leaders and then down to community members. Top-down leadership alone, however, can leave a community "in the dark" during a disaster if communication is disrupted or slow-coming. An alternative or supplementary form of leadership and participation is community-led or "grassroots" organization efforts. Groups like a local neighborhood watch or disaster preparedness coalition leverage active community members and their community knowledge to help organize people at streets, blocks, and neighborhood levels. These efforts need not always have a single, identifiable figurehead leading them; participants in the group itself may become prominent members in their community, creating a network of co-leaders and key informants liaising between community members and agencies.

And in fact, volunteerism in disasters is a major part of response. Be it emergent volunteerism, individuals or newly-formed groups stepping up to support others, or extending volunteerism, existing community groups or clubs assuming a new disaster-time role, local stakeholders can take advantage of well-established community knowledge, social ties, and emergency resources (Whittaker et al. 2015). Whether agencies and formal leaders recognize the value of unsolicited volunteers or not, they will emerge all the same. For this reason, it is in agencies', and the communities they serve, best interest to plan for cooperation and coordinate with volunteers and community-led response efforts (Whittaker et al. 2015). Effectively cultivating and managing these relationships can improve both immediate and long-term community outcomes following a disaster.

This study explores community members' perspectives on, and confidence levels in, the current state of leadership in their communities, including both formal and informal sources of leadership. Community members are asked to reflect on the necessary

and valuable attributes of leaders or those who step up to as leaders in disaster scenarios. Similarly, community members are asked if they identify themselves as community leaders or as individuals who would participate in disaster response, and if not, what factors might influence them to do so. Community leaders are also asked to reflect on the impacts of community-led leadership and participation on disaster response efforts. Community member and leader perspectives on leadership and participation can inform future interventions to promote greater civic engagement in disaster planning and response, and capitalize on the shared community knowledge of existing social networks.

COMMUNITY CONTEXT

Three communities in the state of Washington were identified as target populations for this study due in part to their distinct physical and socioeconomic characteristics, and to these communities participating in past or ongoing disaster preparedness and response projects with University of Washington researchers. Two of these communities are Laurelhurst and South Park, neighborhoods of the City of Seattle in King County, along the inner coast of the Puget Sound. The other community, Westport, is a city in Grays Harbor County on the outer coast of Washington (shown in Figure 3).

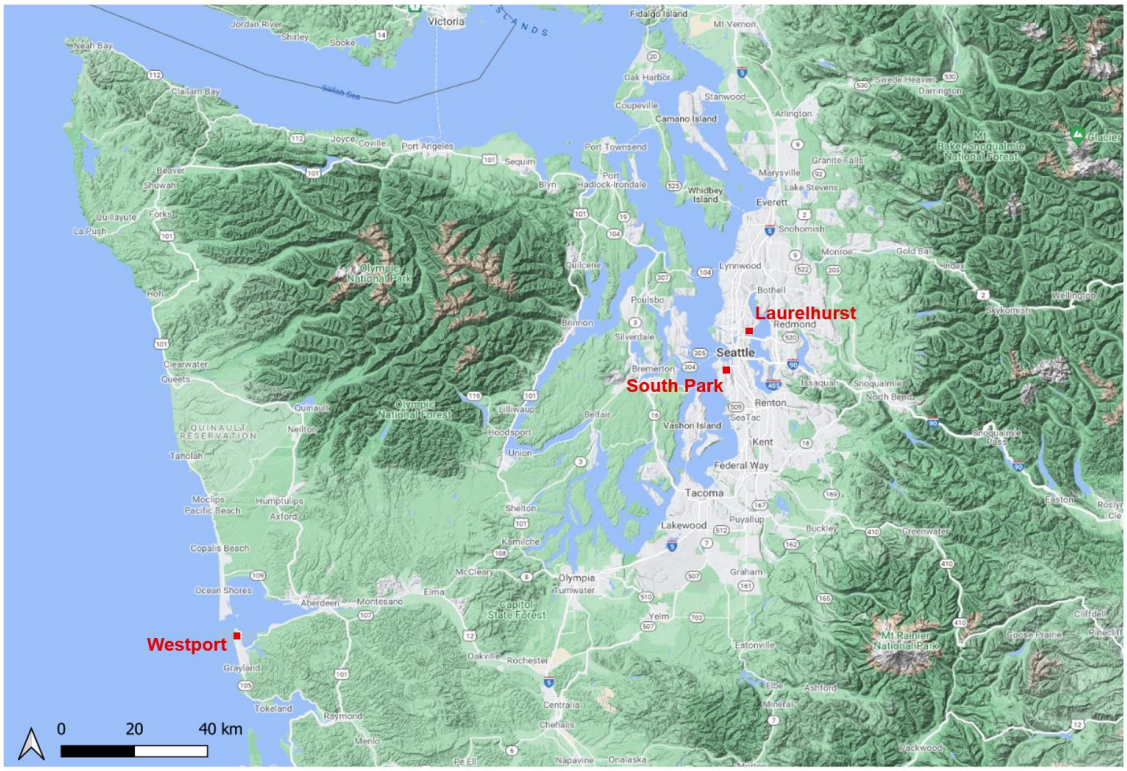

Figure 3: Regional view of case communities. Map created using QGIS (Google Maps, accessed August 11, 2021)

Because the primary research interest of this study was to explore community and agency perspectives on topics related to disaster preparedness, response, and community-based disaster support, it was important to hear from a variety of communities with distinct spatial and social characteristics. Both Laurelhurst and South Park are urban communities, each centrally located in the City of Seattle. However, the disparity between Laurelhurst and South Park's overall socioeconomic statuses, made evident by their median household incomes, presented an opportunity to explore the different perspectives of members of each community. Westport, on the other hand, is a small, rural community which also has a low overall socioeconomic status. Identifying ways rurality and greater distances between neighbors might impact social networks and resource sharing in a disaster was another central interest of this study.

Table 1: Characteristic comparison of case communities[1]

	Laurelhurst/Sandpoint[2]		South Park		Westport	
	Estimate	% Community Population	Estimate	% Community Population	Estimate	% Community Population
Community Overview						
Total population	4,159[3]	-	3,719	-	1,817	-
Total occupied housing units	1,753[4]	-	1,413	-	844	-
Residents/sq. mi.	3,718[5]	-	3,381	-	491	-
Median household income (dollars)	$122,333	-	$35,120	-	$42,439	-
Language other than English	1,685	16.0	1,040	32.0%	28	1.6%
Disability status	924	8.3%	362	10.0%	399	22.3%
Gender and Age						
Male	5,503	49.5%	3,719	54.5%	1,011	55.6%
Female	5,615	50.5%	1,691	45.5%	806	44.4%
Median age (years)	38.7	-	34.1	-	49.7	-
65 and over	1,762	15.8%	350	9.4%	372	20.5%
Race and Ethnicity						
White	8,830	79.4%	1,697	45.6%	1,718	94.6%
Black/African American	393	3.5%	200	5.4%	1	0.1%
American Indian/Alaskan Native	0	0.0%	17	0.5%	5	0.3%
Asian	1,271	11.4%	362	9.7%	15	0.8%
Native Hawaiian/Pacific Islander	16	0.1%	156	4.2%	0	0.0%
Hispanic/Latino (of any race)	204	1.8%	1,285	34.6%	78	4.3%
Two or more races	581	5.2%	762	20.5%	78	4.3%
Housing						
Owner-occupied units	2,891	67.7%	561	39.7%	527	62.4%

[1] With the exception of values otherwise noted, data for Laurelhurst/Sandpoint and South Park are from the 2013-2017 American Communities Survey and data for Westport are from the 2019 American Community Survey.

[2] With the exception of values otherwise noted, Census data for Laurelhurst are only available for Laurelhurst and Sandpoint combined tracts.

[3] Estimate generated by researcher Katherine Idziorek as part of prior sampling fieldwork in Laurelhurst.

[4] See previous note.

[5] See previous note.

Renter-occupied units	1,381	32.2%	852	60.3%	317	37.6%
Vacant housing units	224	5.0%	128	8.3%	738	46.6%
Median value (dollars)	$908,950	-	$287,100	-	$188,900	-

Laurelhurst

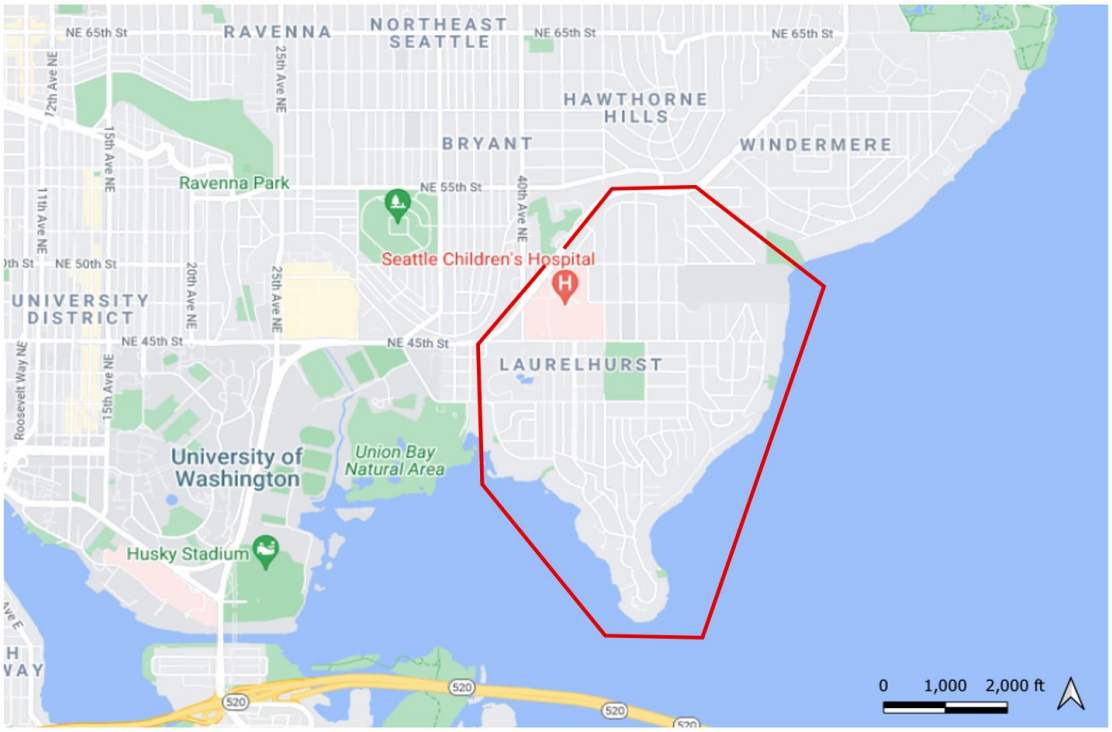

Figure 4: Laurelhurst, Seattle, Washington. Map created using QGIS (Google Maps, accessed August 11, 2021)

One of the two case communities located in the City of Seattle, the Laurelhurst neighborhood is situated on Lake Washington and Union Bay in eastern Seattle and is home to approximately 4,000 residents. The neighborhood is adjacent to the University of Washington, one of the largest public research institutions in the county, and University Village, a large outdoor shopping center. Laurelhurst residents have access to a number of high-quality medical facilities; Seattle Children's Hospital is located within the Laurelhurst neighborhood and is considered one of the best children's hospitals in the

county. Due to its proximity to the university campus, community members can also reasonably access UW Medical services.

The Laurelhurst neighborhood has an array of community assets, including a number of churches and parks across the neighborhood. A large horticultural center in the southwest of the community offers a botanical garden and library to visitors. On the other side of the neighborhood, the Laurelhurst Beach Club provides members docks, boat launches, and rentable recreational equipment such as kayaks and stand-up paddle boards. Laurelhurst has at least four locations offering childcare services and Villa Academy, a private Catholic school in the neighborhood, educates 375 kindergarten to 8th grade students each school year.

The Laurelhurst community is highly educated and relatively wealthy, especially when compared to the education and socioeconomic statuses of South Park and Westport. Nearly all Laurelhurst residents, 96.6%, have a high school diploma or higher and 84.3% have a bachelor's degree or higher (United States Census Bureau 2019). Laurelhurst's median household income is approximately 3.5 times higher that South Park's, which has the lowest median household income of the three case communities. Property values in Laurelhurst are also the highest in the study as the median property value is nearly one million dollars.

With regards to disaster relief efforts, the City of Seattle has Seattle Emergency Hubs, a volunteer-led effort to educate and organize Seattle neighborhoods on disaster preparedness, and establish predetermined locations where community members can gather to share information and resources. There are currently 135 hubs already designated across Seattle (Seattle Office of Emergency Management 2021). The Laurelhurst neighborhood has taken this initiative even further, establishing the Laurelhurst Emergency Action Plan (LEAP) in 2016. Using the Seattle Emergency Hubs initiative as a framework, LEAP has further divided the neighborhood into clusters, roughly one or two streets of homes, and works to identify "cluster captains" for each. Cluster captains serve as key informants between cluster residents, LEAP itself, and City or County agencies.

South Park

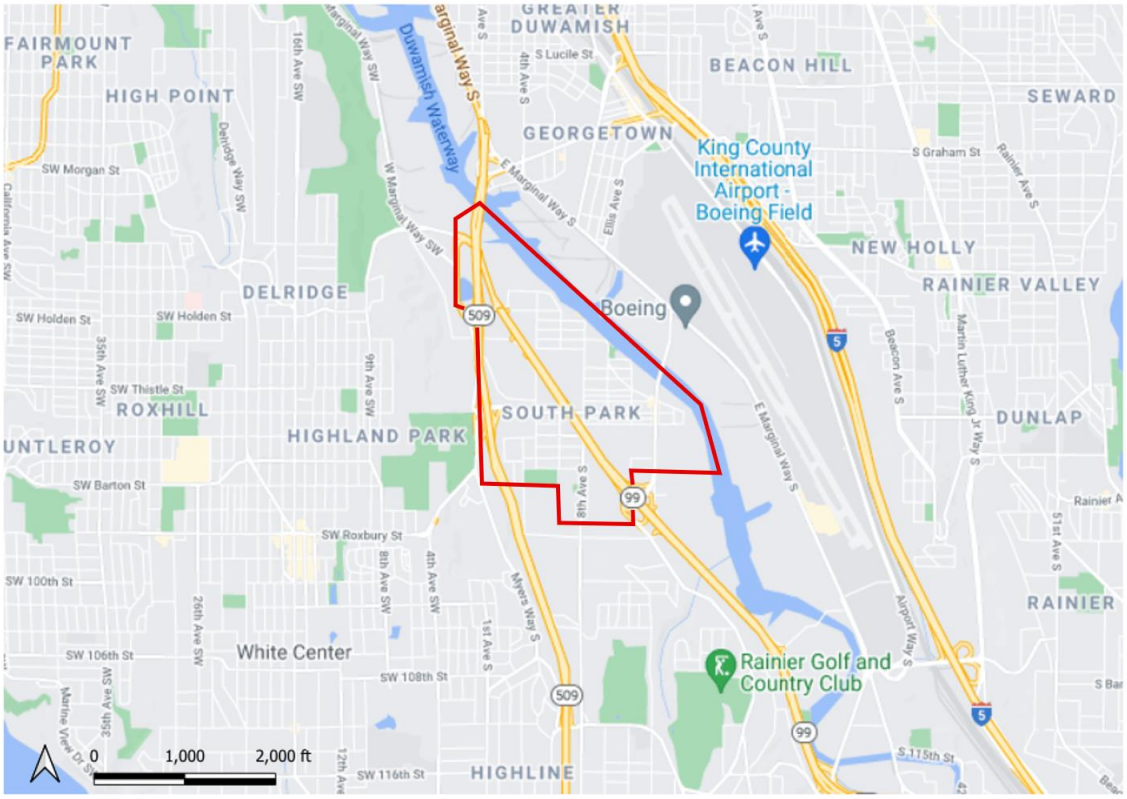

Figure 5: South Park, Seattle, Washington. Map created using QGIS (Google Maps, accessed August 11, 2021)

Located in the southern end of the City of Seattle, the South Park neighborhood is bordered by the Duwamish Waterway to the East, the 5-lane SR 509 highway to the West, and is bisected by the 4-lane SR 99 highway which has a number of points of overpass in the community. On the opposite side of the Duwamish Waterway is the King County International Airport-Boeing Field, one of the busiest airports in the United States, seeing over 180,000 takeoffs and arrivals annually (King County 2019).

South Park has a variety of community assets including neighborhood parks, the South Park Community Center, and a local recreational marina. The neighborhood also has a number of coffee shops, cafes, and restaurants, especially to the east of route 99. Additionally, there is a Federally Qualified Health Center (FQHC) in the southeast of the

neighborhood called Sea Mar Medical, which offers emergency services, primary care, and specialist medical health services to the community.

While both Laurelhurst and Westport have a majority of their residential units occupied by owners, the opposite is true of South Park which sees 60.3% of its units renter-occupied. In recent years the community has observed an increase in property development activity, often seeing new projects replacing single-family homes with multi-family residential and mixed-use properties. Over 80% of South Park residents have attained a high school diploma or higher and a majority work in clerical or service positions. The largest industries in the neighborhood are educational and health services, and retail trade, together accounting for 40.6% of all industry in the community (United States Census Bureau 2019).

Residents of the South Park neighborhood are the most racially and ethnically diverse of the three case communities, having the lowest relative White population which makes up 45.6% of the population. More than a third of the community is Hispanic or Latino, the highest proportion for a race other than White across the three communities, and a fifth identifies as two or more races. At 32%, South Park also has the highest rate of residents who speak a language other than English of the three communities. This rate is likely related to South Park's considerable population of residents born outside of the US, who make up 17.5% of the neighborhood's total population, 60.3% of whom are not a US citizen (United States Census Bureau 2019).

In response to the unique needs of South Park's large Hispanic and Latino population, Villa Comunitaria, formerly the South Park Information & Resource Center (SPIARC), was formed in 2005. This community-led organization offers a variety of health and safety programs, including initiatives to foster community leadership, efforts to provide culturally-sensitive health resources, and assistance navigating systems such as food assistance and human services.

Westport

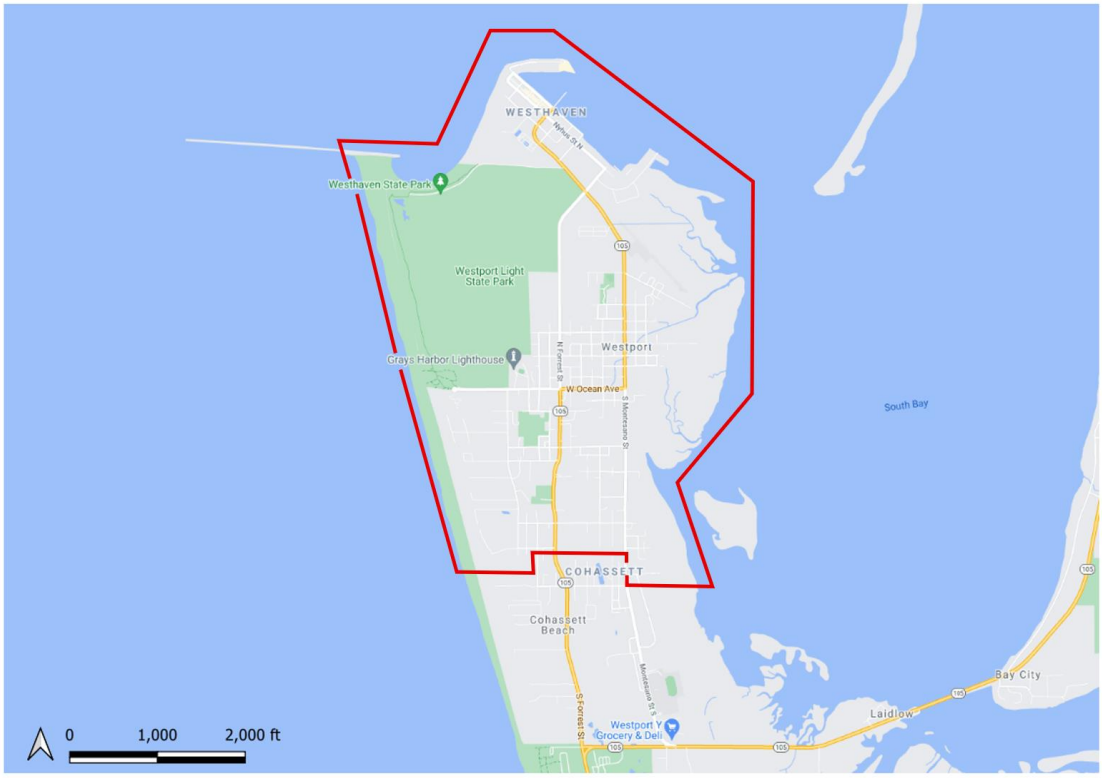

Figure 6: Westport, Washington. Map created using QGIS (Google Maps, accessed August 11, 2021)

Located on Washington's outer coast, the City of Westport is a small, rural community with strong ties to its seaside identity and prominent sea-based industries. The city is home to the Westport Marina, one of the largest public marinas in the Pacific Northwest and is Washington's largest fish landing port. Westport has a number of natural resources and parks, the largest being the Westport Light State Park which occupies the northwestern quadrant of the city. A United States Coast Guard station is also located in the Westport Marina, with family housing available to servicemen and women on property adjacent to the Grays Harbor Lighthouse in the State Park. The peninsula has a number of hotels and restaurants but only a single grocery store in the entire city. Westport families are serviced by the Ocosta School District which has a combined middle and high school facility, and an elementary school located on a campus just beyond the city limits in the Cohassett Beach community. In 2016, community members of the Ocosta School District passed a levy in an effort to fund necessary

renovations to the elementary school in addition to allowing for the construction of the first tsunami vertical evacuation structure in the United States.

Westport is home to a sizable retirement community, made evident by the city's median age of nearly 50, more than a decade older than Laurelhurst or South Park. In addition to having an older resident-base, Westport also comprises the highest rate of residents with any disability status of the three communities at 22.3% percent. Beyond known, permanent residents, however, Westport is also home to a number of RV parks and campgrounds, migrant laborers, and is frequented by a seasonal, yet robust, tourist population. There are at least four RV and trailer parks on the peninsula which may be occupied by vacationers or long-term residents, or a combination of the two. Individuals and families permanently living in RVs or trailers are not captured by the US Census which makes accurately measuring this population's size, and resultant needs, a challenge. Westport's largely blue-collar economic base draws in seasonal waves of migrant laborers, many coming from a mixture of Latin American and Slavic countries. Further complicating efforts to precisely calculate Westport's total population at a single point in time, the coastal community also attracts a considerable volume of tourists and non-permanent residents with second homes and vacation properties. The latter population, those with second residences in Westport, are likely a sizable portion of the total population. Using residential vacancy rates as a proxy measurement, almost half of the community's habitable units, 46.6%, are vacant.

Most of Westport's population over the age of 25 has a high school diploma or associates degree but only 250 individuals have a bachelor's degree or higher (United States Census Bureau 2019). The two largest industries on the peninsula are educational and health services, and manufacturing with 23% of the eligible working population being employed in natural resource collection, construction, and maintenance (United States Census Bureau 2019).

Beyond its city limits, the Westport community also has identity ties to a broader South Beach region which includes a number of smaller towns and unincorporated areas extending to the South beyond Westport. When the populations of Cohassett Beach,

unincorporated Grayland, Tokeland, and Westport are combined, this broader community is some 3,430 individuals strong (United States Census Bureau 2019). This region is also home to the Shoalwater Bay Tribe, a sovereign tribal nation approximately 15 miles south of Westport. The Shoalwater Bay Tribe reports 311 enrolled community members and services approximately 1,150 residents on the reservation (Shoalwater Bay Tribe 2019).

Westport is serviced by a mixture of municipal, county, and regional agencies for its emergency response needs. The Westport Police Department services the entire city but currently only staffs seven officers, often just two on a single shift. Westport PD does have the ability to respond to calls outside of the city limits as officers have been deputized by the County Sheriff's Office, extending their jurisdiction. The city does not have an emergency management department or their own emergency manager, meaning the community relies on the Grays Harbor County Emergency Management Department for many of those capabilities. Fire and EMS response are provided by the South Beach Regional Fire Authority (SBRFA) which services communities in both Grays Harbor County and its southerly neighbor Pacific County. One SBRFA representative estimated that the agency services about 6,000 individuals across a 32 square mile area.

APPROACH

Research Design

In order to identify emergent themes characterizing agency and community expectations for information sharing, resource planning, and resource matching in disaster scenarios, this study relied on a qualitative research design achieved through interviews with community leaders from agencies within the state of Washington, and interviews with community members across the three engaged communities.

Data Collection

Target Population and Recruitment

This study centered around the perspectives of communities and agencies regarding information sharing, resource planning, and resource matching in disaster scenarios. For this reason, the study's target populations were members and leaders of American communities. Sampling was conducted in three case communities: Westport, South Park, and Laurelhurst. Community members were characterized as any individual who lived, worked, or otherwise generally identified themselves as a stakeholder in one of the case communities. Community leaders were described as individuals representing an agency that plays a role in the planning and response for disasters that would affect those communities. These agencies included local or municipal organizations - such as police, fire and emergency medical services (EMS), and emergency management departments -, county or state agencies, and volunteer or community-led preparedness and response groups.

The goal of this study was to obtain a wide range of thoughts, and beliefs, and perspectives of the target community in relation to information sharing, resource availability and matching during disaster scenarios. In other words, this study was exploratory in scope and interested in uncovering diverse shared or dissimilar notions between agencies and the communities they serve regarding disaster preparedness. As such, the study relied on convenience sampling to identify and interview participants. With regards to community member interviews, it was determined that at least two participants from each community were acceptable for the scope of this study. For community leaders, the author sought to interview at least one individual from a local governmental agency, a community organization, and a county or state response agency.

Prospective participants were previously known to the author by virtue of their participation in other related research studies. Some participants, such as the community leaders and the Westport community members, had previously been in direct contact with the author or an academic advisor. Prospective participants from the South Park and

Laurelhurst neighborhoods were shared with the author through emailing lists generated by PhD candidate Katherine Idziorek as part of her research on willingness to share in those communities (Idziorek 2020). Emailing lists included only residents of the South Park and Laurelhurst neighborhoods who indicated, after completing an initial survey, that they were interested in being contacted for additional research opportunities.

All participants were recruited via email, sent either directly to the individual if they were previously known to the author or through mass-email. Emails delivered directly to prospective participants included an invitation to be interviewed, a brief explanation of the study's general research interests, and information about the anticipated interview length. Participants recruited through emailing lists were contacted using a mass-email. These emails similarly included a call for interview participants, an explanation of the study's research interests, and information about the anticipated interview length, in addition to an explanation of the relationship between this study and Katherine Idziorek's prior research. It should be noted that these emails included a statement indicating that individuals on the mailing lists could request to be removed from the emailing list at any time.

Five of the six community leaders contacted to participate responded to either an initial email or a follow-up email sent a week later. Two of the three prospective participants from Westport, who were contacted via direct email, responded to the initial invitation and went on to be interviewed. Participants from both the South Park and the Laurelhurst neighborhoods were contacted through mass-email; the South Park mailing list consisted of thirty-three individuals and the Laurelhurst mailing list consisted of ninety-six individuals, all of whom indicated they were interested in participating in future research studies. Only two residents from the South Park neighborhood responded to the invitation and both prospective participants were interviewed. Ten individuals from Laurelhurst responded to the initial invitation. The author initially reached out to four of the ten respondents to schedule an interview in anticipation of some respondents becoming unresponsive. Two of the four respondents continued on to confirm interview times, which was acceptable given the study's previously outlined sampling requirements.

Interview Administration

Both the community leader interviews and the community member interviews followed a semi-structured format for which interview protocols were developed and followed, including prepared probing questions (full community leader and community member interview protocols can be found in Appendix A). The author maintained the flexibility to ask follow-up questions responding to specific information shared by the interview participant.

All participants were instructed to anticipate interviews taking up to 90 minutes to complete and all interviews were conducted in English. Due to ongoing circumstances as the result of the coronavirus pandemic, interviews were conducted over the teleconferencing software Zoom or phone to ensure the observation of safety protocols for both researchers and research participants. Interviews with community leaders were conducted via phone call as a number of participants indicated a preference for the mobility and flexibility afforded by cellphones. Community member interviews were conducted using Zoom in an effort to improve interview engagement as well as to facilitate a personal information sharing exercise that utilized the visual collaboration platform Miro, which will be explained in greater detail below. Additionally, conducting interviews virtually allowed for considerable flexibility to schedule interview times. One-on-one interviews were advantageous for a number of reasons: many questions could be explored in a single interview; certain questions requiring detailed explanations could be presented methodically and additional explanation could be offered; some questions exploring more personal or sensitive subject matter could be responded to more comfortably than if they were asked in a group setting.

All interviews began with a brief introduction of the interviewer and the participant, an overview of the study's research objectives and areas of interest, and the author reading an informed consent document to which participants were asked to agree to or deny verbally. Once participants provided consent to move forward with the interview, the interviewer moved into introduction and ice-breaker questions.

Community leader interviews largely focused on how participants' agencies anticipate communicating and coordinating response efforts in the event of a large-scale disaster. The first areas of interest (sections B and C in Table 2 below) related to the resources each agency is capable of providing, what resources they anticipate needing help providing, and from where they expect those resources to come. Next, leaders were asked about how resource matching is currently coordinated within their own agency and across their agency and others, in addition to how they expect that coordination to occur in a disaster scenario (sections D and E).

Table 2: Community leader interview protocol summary

Area of Investigation	**Goals of Questioning**
A. Interviewee Background	● To establish a rapport and increase level of comfort ● To establish basic understanding of participant's role and responsibilities
B. Resource Capability Identification	● To establish what the participant's agency is responsible for, and able to provide in a disaster event
C. Resource Need Identification	● To establish what resources the participant's agency will need support to provide, deliver, or distribute
D. Intra-agency Resource Matching Mechanisms	● To identify how resource matching is performed within the participant's agency
E. Inter-agency Resource Matching Mechanisms	● To identify how resource matching is performed between the participant's agency and others
F. Functionalities	● To identify how matching mechanisms are

	being coordinated ● To explore what opportunities exist to improve/expand use of existing functionalities and develop new ones

Community leaders were then asked to identify the communication methods and technologies they use, both internally and when connecting with other agencies or organizations (section F). Finally, participants were then asked to offer their thoughts on the impacts of actions which could be undertaken by community members, such as providing personal information before a disaster and developing greater community-level leadership.

Community member interviews similarly addressed the topic of communication as participants were asked to describe the platforms or the ways they use to connect with their neighbors and to reflect on any changes or improvements that could be made to those platforms (section B in Table 3 below). Participants were then asked to identify areas within their community they see as popular gathering spaces, both before and during the coronavirus pandemic (section C). Participants were then posed a hypothetical exercise asking, if given the opportunity, where they would place two community resource centers in their communities and why.

Table 3: Community member interview protocol summary

A. Introduction	● To introduce participants and establish level of comfort
B. Communication Platform Functionalities	● To identify existing digital communication functionalities ● To explore opportunities to improve or add communication functionalities

C. Place Making and Value Mapping	• To identify nodes of activity across the community • To explore participant's considerations for community resource center placement
D. Community-Embedded Leadership (Captains)	• To identify preconceived notions of role of captain in terms of activities and commitments • To explore willingness to assume role of captain
E. Personal Information Sharing	• To identify willingness to share personal information in terms of sensitivity, with whom it can be shared, and when
F. Emergency Communication	• To identify willingness to access emergency communication technology

From this part of the conversation, interviews moved on to questions about the participants' thoughts regarding their confidence in community or neighborhood leadership during times of disaster and what factors might impact their willingness to assume a leadership role if they didn't already (section D).

Participants were then asked to take part in a personal information sharing exercise aimed at discovering factors that might impact willingness to share that information (section E). Participants were read a brief statement summarizing the goals of the exercise. A scenario description was then read which described a hypothetical app the participant could download before some disaster was declared and into which they could put different types of personal information and indicate with whom they would be willing to share it in the event a disaster was declared. Participants were informed in

this scenario that while the information they share would not be visible to the people they indicated unless a disaster was declared, that information would be known to the server on which it was stored. At this point the interviewer's screen was shared to facilitate the exercise (as seen in Figure 7).

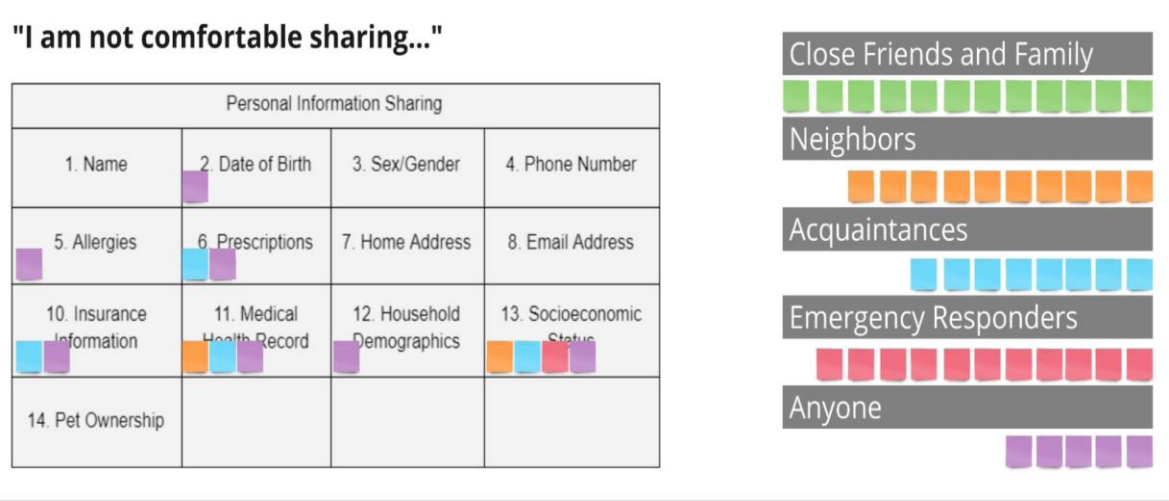

Figure 7: Screenshot of Miro board used for personal information sharing exercise

Going through each of the individual-types, participants were asked to indicate what pieces of information they would not be comfortable sharing in the described scenario (for example, participants were asked "What pieces of information would you not be comfortable sharing with close friends and family."). Once the exercise was completed and participants were satisfied with their responses, the interviewer then introduced the concept of block-chain, roughly summarized as a technology that ensures information could not be visible even to the app's controller or the servers, even in the case that a disaster had been declared. Participants were asked to reflect on the impacts a technology like that might have on their willingness to share personal information. The relevant factors explored with this exercise related to the type of information being shared, when the information would be shared, the perceived security of the storage device, and the relationship between the participant and a potential accessor of that information. Finally, participants were asked to reflect on their willingness to download and use disaster-specific communication platforms (section F).

Analytical Methods

In order to explore agency and community insights regarding information sharing, resource planning, and resource matching in disaster scenarios, this study employed a content analysis of qualitative data collected from semi-structured interviews. Content analysis is used to interpret qualitative data through the "systematic classification process of coding and identifying themes or patterns" (Hsieh and Shannon 2005). An iterative, two-round coding approach was used whereby structural coding, open coding, category identification, and memo development led to a final narrative summary of the findings.

In qualitative analysis, coding is the process of applying labels - often in the form of a word or phrase - that symbolically represent or attribute meaning to data (Saldana 2009). Codes can then be used to identify patterns in the data which can go on to inform the development of themes and ultimately the creation of new theories (as seen in Figure 8). Figure 8 reflects a high-level overview of the progression from single data points (codes) to broad theories. In this study, the author employed both structural and open coding to perform the analysis. Structural codes are prescriptive codes assigned to sections of qualitative data. The author used this approach in the first round of coding, wherein whole sections of a transcript would be given the label 'Community Resource Centers,' for example, to break up and organize the data according to the five areas of interest. Open coding is a deductive approach to coding which entails observing qualitative data and developing labels as a result of those observations; this approach was taken in the second round of coding.

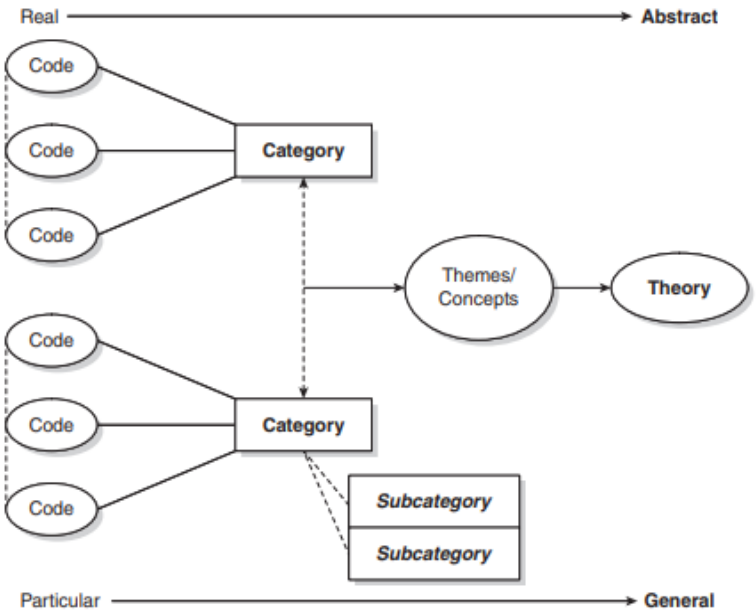

Figure 8: Streamlined code-to-theory model for qualitative inquiry (Saldana 2009)

Approaches to coding, such as structural and open coding, refer to the actual treatment performed on qualitative data. Lumping and splitting describe certain characteristics of those treatments. When applying structural codes to the data in the first phase of coding, the author was often lumping data, assigning a single code to large sections of text (for example, an entire paragraph being labeled 'Community Resource Center'). In the second phase of coding, as open coding was being performed, the author was necessarily splitting the data, analyzing smaller sections of information within previously lumped sections (rereading a paragraph labeled 'Community Resource Center' and coding a single sentence with 'Identifiability,' for example).

The 12 one-on-one interviews conducted for this study produced 185 single-spaced pages of text which were coded in MAXQDA, a qualitative data analysis software program. MAXQDA - like other computer-assisted qualitative data analysis software (CAQDAS) - is a tool that allows researchers to systematically organize data and their relationships (VERBI 2020). To be clear, these tools are not responsible for performing qualitative content analysis itself; rather they support researchers who are themselves interpreting and analyzing the data (MacMillian and Koenig 2004). MAXQDA was selected for this

study because of its user-friendly interface and data visualization capabilities (as seen in Figure 9).

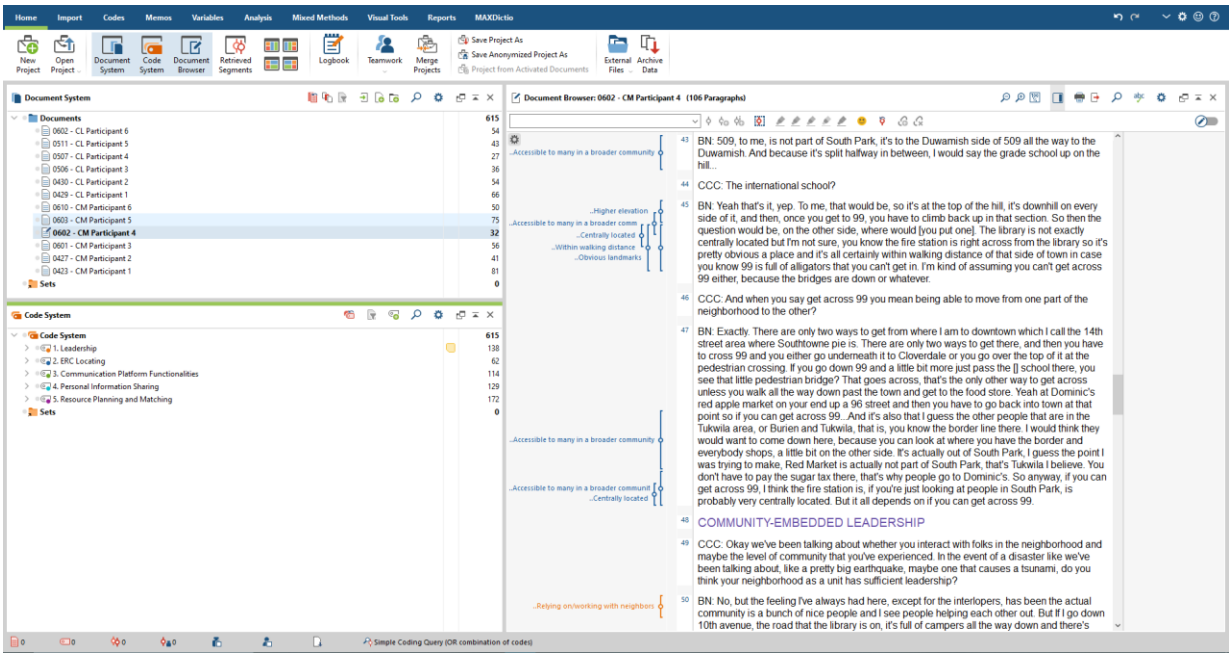

Figure 9: Screenshot of the MAXQDA interface

In MAXQDA, the author manually attributed codes to passages of text which the software then tracked to the left of the Document Browser (as seen in Figure 10).

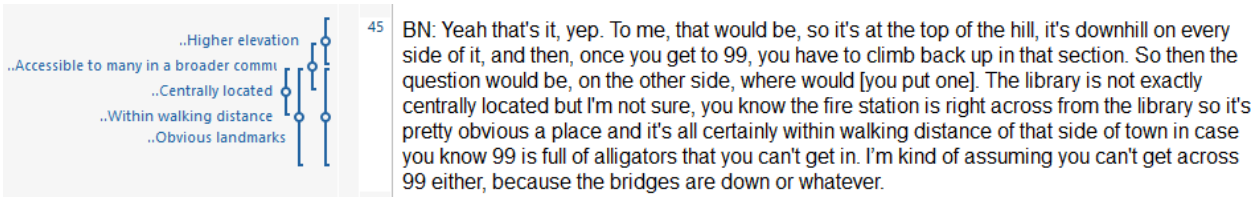

Figure 10: Screenshot of codes (in blue on the left side) applied to a section of text in MAXQDA

The author could track codes and categories in the Code System window which allowed the author to manage relationships between data contributed from different participants. Codes could then be attributed to specific categories or subcategories, and this hierarchy is visually demonstrated in the Code System window (as seen in Figure 11). While codes are manually attributed to the data, MAXQDA automatically generates frequency counts for codes and categories.

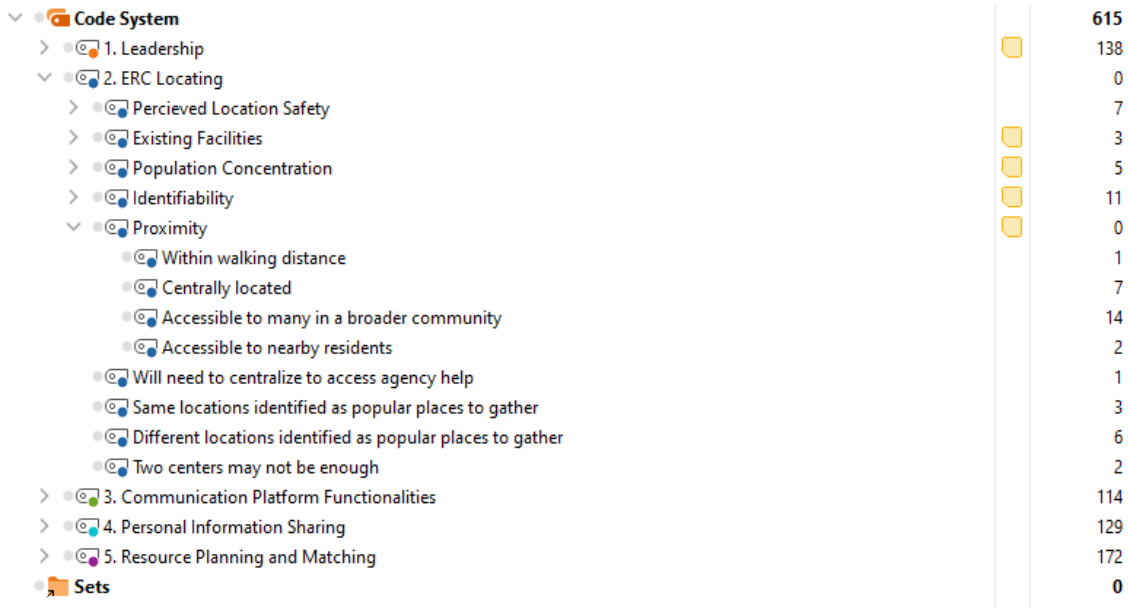

Figure 11: Screenshot of code management in MAXQDA demonstrating ability to organize codes and categories hierarchically

The author performed the analysis in two phases: a coding phase and a conceptual development phase. The coding phase included two rounds of coding, beginning with structural coding then moving to open coding, while the conceptual phase entailed grouping codes together according to themes or concepts that emerged while coding and using memos to define, clarify, and explain those themes or concepts (Saldana 2009).

Analysis began with a first round of structural coding which allows data to be identified and organized in order to address specific, predefined research questions or areas of interest (Saldana 2009). This study's research questions correspond to five areas of interest (*Communication Platforms, Personal Information Sharing, Community Resource Centers, Resource Planning and Management, and Leadership and Participation*) which are discussed in detail in the Conceptual Framework chapter. Based on this framework, the author read through each transcript and coded sections of text relating to one area of interest at a time ('Community Resource Center,' for example) and this process was repeated for the four remaining areas of interest. This resulted in codes which were attributed to rather lengthy sections of text as the author used a "lumping"

approach to make navigating the data easier in subsequent rounds of coding (Saldana 2009).

In the second round of coding, “splitting” the data allowed greater nuance within a single section of text to be identified and coded (Saldana 2009). Splitting occurred through the process of open coding; open coding derives codes from the text itself and is thought to only capture or reflect ideas raised by the data (Blair 2015). The author then coded the sections of transcripts relating to one area of interest at a time, allowing multiple codes to be applied to a single passage. Once open coding had been performed according to the five areas of interest, codes were revisited to identify opportunities to merge similar codes, as well as to ensure that codes were still considered representative of their ascribed passages. This round of coding revealed patterns - which may represent similarities, differences, frequencies, correspondence, or causation - that informed categories and themes developed in the next phase of analysis (Saldana 2009).

Once all rounds of coding were completed, the author began organizing codes into emergent categories and subcategories based on patterns identified in the coding phase. During this conceptual development phase, the author used memos - a note-keeping function available in MAXQDA - to record and define relationships within or across codes and categories. This process resulted in a variable number of hierarchies of categories, subcategories, and codes under a single each area of interest (an example of which has been visualized in Figure 12). These hierarchies and their attributed memos became the foundation of the final narrative summary of the findings.

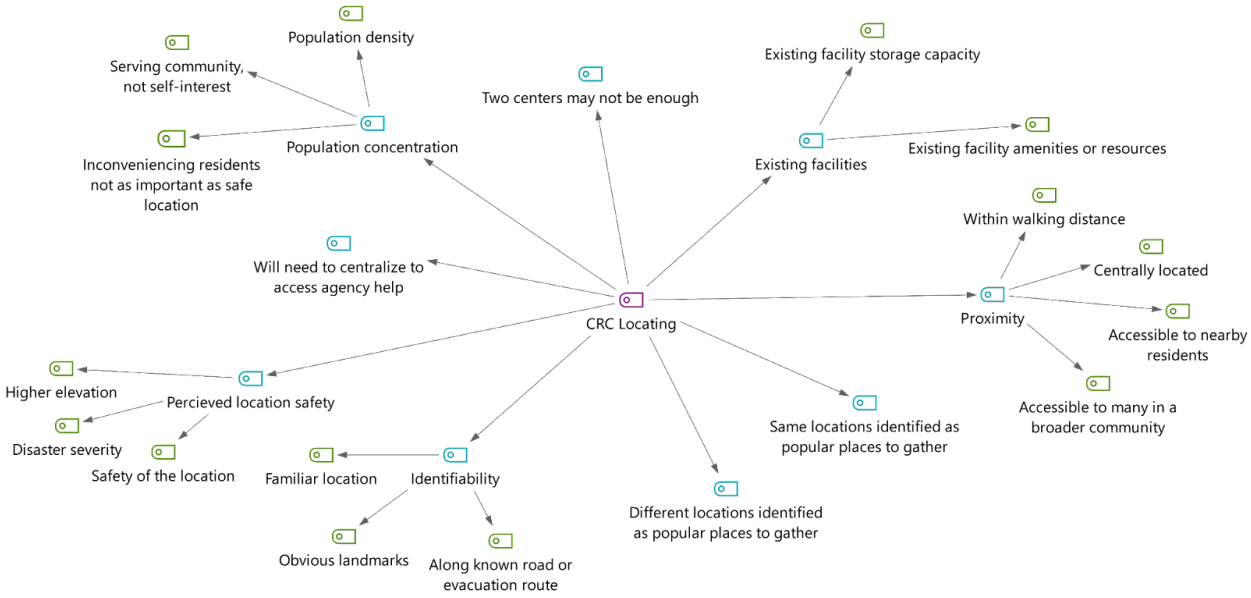

Figure 12: Visualization of code network for 'Community Resource Centers' using MAXQDA's Creative Coding function

Finally, it must be acknowledged that some degree of subjectivity is unavoidable when coding text-based data (Blair 2015). The author of this paper was also the facilitator of the interviews conducted for this study. As a result, interpretations and analysis were informed not just by the text but by participants' body-language, facial expressions, tones, pauses, emphasis, and other social queues which are considered meaningful context for the words themselves, but are not captured in interview transcripts.

FINDINGS

Communication Platforms

As the world moves toward a greater acceptance of digital platforms for everyday communication, the ways we can connect to the people around us - and far from us - are increasing in number and improving constantly. This acceptance means that the platforms a community uses on a day-to-day basis are likely to be the first methods used by its members in a disaster. Investigating how communities share information, and what they value or see as shortcomings of those means of communication, can shape future interventions aimed at increasing levels of engagement across digital platforms. This

knowledge can also inform the ways community leaders develop plans for spreading information in times of disaster, not just within and across their agencies, but to and within the community. In exploring a community's everyday use of these platforms, however, it is also important to learn about possible alternative means of communication, in case the usual platforms are unavailable in a disaster scenario.

Individual Preferences

Most participants shared that they use a variety of digital platforms to communicate with others in their communities, including combinations of emailing, phone calls, texting, Facebook, and Nextdoor. These modes of communication were generally spoken of with positivity, both in the sense that the platforms functioned in ways that served participants' needs, and that using multiple platforms offered flexibility in accommodating different communication preferences across individuals.

A few participants expressed a disinterest in communicating via digital platforms at all. One South Park participant shared, "I've never had a Facebook; why would I? That's not how I communicate or gather information." Another from Westport offered, "It's a smaller community; if I run into [a neighbor], I don't mind talking to them. I am not one to talk on the phone that much; I don't like it, it's impersonal." Both of these participants shared that they would rather opt for traditional media like community newsletters, or simply face-to-face interactions with neighbors. Another participant from South Park admitted that he had apps like Facebook and Nextdoor, but he never actively engages with his community members through those platforms. Rather, he uses them to stay passively informed about the goings-on in his neighborhood.

Participants shared a number of functionalities or user experience factors that they liked or would like to see changed. A participant from Laurelhurst pointed out the different response times generally associated with different modes of communication, "I mean, email is just slower response [times] because someone has to open it up and look, as opposed to like a text or something that generally gets a quicker response." Much to her chagrin, her neighbors are more inclined to communicate with email, not text. One participant from South Park shared his frustration that posts on the app Nextdoor, which

allows him to see information about items for sale or lost pets in his neighborhood, were not presented in chronological order. He jokingly exclaimed, “You get excited because you see something for sale and then it’s four days old!”

Community Acceptance and Use

The variety of platforms an individual may use to communicate with other community members is not very meaningful if others in the community don’t also make use of those platforms. Many participants shared that their communities and closer networks of neighbors do in fact use a number of modes for communicating, from apps like Facebook and Nextdoor to online blogs and more traditional forms of media like mailed newsletters and physical postings around the community. As one Laurelhurst participant was listing a number of platforms and was jokingly asked if her community uses a little bit of everything, she swiftly confirmed, “Everything!”

However, some communities take advantage of existing functionalities offered through digital platforms that other communities do not, which some participants expressed frustration over. Another participant from Laurelhurst shared that, before relocating to the Seattle neighborhood, her former neighbors used Facebook’s group-chat function, while her current street in Laurelhurst does not. When asked why she thought that that was, she speculated, “I don't know if that's because our particular street is pretty mixed in that there's younger people with young kids on our street and then retired folks and I don't know if it's because they're like not on Facebook that we don't think about using like a messenger group or something like that.”

Many participants expressed a strong disapproval of the way certain platforms are actually used by their communities. Nextdoor was by far the most frequently discussed app regarding these issues. The most commonly stated factors related to concerns about community-surveillance and the overwhelming negativity present on the platform. Regarding surveillance, one participant from South Park revealed, “I just think it’s kind of suspect that people are reporting on people and what they are doing around the neighborhood,” alluding to a concern she had shared earlier that people are becoming too

comfortable with surveillance in the digital era. She went on to elaborate, “It’s intrusive, it’s not necessary, it’s very negative. Because you’re not looking for good things, you’re looking for bad things [in the community].” Others shared a frustration with the negative use of what would otherwise be a valuable platform for sharing information. As one participant from Laurelhurst shared, “I feel like everybody just complains and then it can get pretty mean pretty quick; I think because people feel like there's anonymity there and I just think it gets pretty mean. I don't know, nobody feels that they should be polite I guess.” This pervasive negativity drove a number of participants off of Nextdoor altogether.

On the other hand, Westport participants explained that they did not really use digital platforms to communicate with their neighbors and other community members. One participant speculated that his “neighbors are not very tech-savvy,” going on to acknowledge that “the technology is there, just not the know-how!” This sentiment may be indicative of Westport’s older population when compared to other communities like South Park or Laurelhurst. Similarly, this may reflect a cultural choice to not rely on digital communication as another Westport participant shared he was not one to use them for personal communication, suggesting, “It’s a small town…maybe I’m kind of old fashioned; I picked up from my parents that if I want to talk to somebody, I’ll just go and, for lack of a better word, hunt them down and talk to them!”

How Community Leaders Communicate Internally

Much like community members participants, community leaders were found to make regular use of phone calls, emails, and radio to communicate within and across agencies when not in a disaster context. However, in the event of a large-scale disaster that might impact multiple communities in a given region, communication between agencies is coordinated and facilitated through an emergency-specific network called an emergency operation center (EOC). An EOC is a centralized emergency management effort that allows state level leaders to match resources across federal, state, county, and municipal players. In responding to a disaster, the EOC receives a digital message from an impacted local leader requesting some specific support or resource for their community. As a state level leader explained, “[A] request comes in either straight

through webEOC (an online submission portal), or they fill out the 213RR form and they email it to us and then we enter it in."

While this system has proven to be a generally effective and efficient way of coordinating emergency relief to communities in need, it suffers from the same vulnerability of other digital communication methods. The loss of power or the destruction of infrastructure used to provide cell service, radio coverage, or internet can render the EOC immobile for unknowable lengths of time. The same state level leader shared, "But if the internet is down, and they were, I guess, going to [have to] call us and tell us what they needed, that would certainly slow things down. And if the phone lines were down as well, suddenly that becomes almost…not impossible, but it becomes so much more complicated." These complications can produce catastrophic outcomes, like a severely impacted community not receiving urgently needed medical supplies or the delay of time-sensitive search and rescue efforts.

However, community leaders raised a valuable asset in mitigating or avoiding those outcomes: their relationships with one another. When asked if he viewed the relationship between his agency and others as something to be leveraged in a disaster, one Westport community leader effused, "I know that I can go knock on those other agencies' doors and they'll answer in a heartbeat, and they'll be there to help. Because they know that they can do the same for me and our agency, that we will be happy to reach out and help them. So, it's a give-and-take relationship and we have developed that quite well." A state level leader affirmed with her own experience the value of those connections when a disaster strikes. She recalled an instance such as receiving a request for cots from one county, knowing that not a week earlier she had chatted with another county's emergency manager who divulged their inventory of cots. With this knowledge, she was able to circumvent the waiting game associated with the webEOC and connected the two counties to one another directly. The establishment and maintenance of interpersonal relationships across the many levels of leadership can clearly result in the faster delivery of emergency aid, and likely reduce human suffering in doing so.

How Community Leaders Communicate with the Public

In terms of engaging with and providing information to their communities, many community leaders indicated that they often rely on traditional media, such as printed handouts, mailouts, and postings around the community. The community leaders from Laurelhurst shared that their regularly mailed-out newsletters were well received in the neighborhood. One Westport community leader speculated that traditional media was so popular because of his community's demographics, explaining, "We have a very old, geriatric population at the retirement community, so they still find value in a hard copy, an old-fashioned newspaper, and then posting notifications in local gathering places, like post offices and community centers and things of that nature."

Another popular means of communication with the general public was social media, though it was presented with a combination of both advantages and disadvantages. One Westport community leader revealed, "Probably our most effective forms of communication are social media, through Facebook or Instagram," but went on to state there was still plenty of room to expand this use, sharing, "More social media would help to reach some of the underserved areas [of the community]." But these widely used platforms present challenges to the flow of timely and accurate information. As another Westport community leader explained, "We get too many people that get…on the [City of Westport Police] Facebook page and the Grays Harbor County Scanner and everybody calls into that and everybody posts on [the Facebook page] and then misinformation gets out there."

Stemming from a desire to have faster access to the community, some community members expressed an interest in Reverse 911 capabilities, a function that would allow first responders to send out recorded emergency alerts to cell phones and landlines. "If I wanted to [share] something that was emergent, that could be sent out to the community and that would be an effective means of communication," one Westport community leader explained. While emergency notifications, such as tsunami warning and Amber alerts, are already in place for many communities, these functions are often controlled and distributed by agencies at the county or state level, not local or municipal leaders.

Whether discussing internal or public-facing communication, however, nearly all community leaders described a pressing need to improve the infrastructure that supports communication over electronic networks, such as cell and radio towers, and internet cable systems. Leaders from the Westport community shared that they would like to have more robust radio capabilities but that they struggle with limited coverage, which is often spotty even when available. Another barrier discussed by a state level community leader was challenges associated with getting critical emergency information translated into commonly spoken languages. The biggest barrier cited was the cost associated with the translation itself, but also with technical aspects of translating video materials, which require someone timing subtitles to the appropriate sections of speech. This cost is rapidly compounded when the varied language needs of communities are taken into account. In Westport for example, while an English and Spanish version of emergency materials may already be available, the community's large population of predominantly Russian-speaking migrant laborers does not yet have access to important disaster information in their first language. In communities around Seattle, however, a language like Arabic or Vietnamese may be the next most commonly spoken. Adequately addressing the communication needs of different populations has been a challenge for community leaders and agencies alike, be they at the local, county, or state level.

Platforms for Emergency Use

All community member participants expressed a willingness - sometimes even an eagerness - to download a stand-alone emergency communication app onto their phones. Participants were clearly interested in some platform that could support their disaster response and information gathering. As one participant from Westport explained, "I would download anything that would help me to be better informed and prepared…yeah, an app would be totally perfect."

Many participants stated, however, that their acceptance of such an app was contingent on issues relating to their phones' storage capacity, the app's consumption of battery, and surveillance concerns. One participant from Laurelhurst was happy to download the app, though she clarified, "I probably wouldn't want it live all the time, where it's open, just because I'm trying to save battery on my phone." Concerns about

surveillance were again presented by participants, as one from Westport made it clear that his acceptance of an emergency communication app hinged on the potential gathering of his data, stating, "I would say yes [to downloading it], as long as it's not collecting my personal information or my location, like geotagging me 100% of the time."

In response to questions raised in previous sections of the interview, a number of participants expressed a dislike and distrust of certain existing platforms, such as Facebook and Nextdoor. While discussing a standalone emergency communication app, some participants were asked if they would access the same emergency functions if offered through an app like Facebook or Nextdoor. All participants expressed some degree of reluctance when presented with this scenario. Most cited a distrust of the owners or users of these apps, with one Laurelhurst participant sharing, "I would probably be less willing to engage [with] it if it was part of Facebook or Nextdoor because they do all that data mining on you." Clearly, there is a present need to address concerns around the surveillance of potential users and the collection or use of their personal data.

In terms of desired functionalities for a disaster-specific communication platform, participants had varied preferences regarding emergency alerts, though the general consensus was that more alerts were better than no alerts. One participant from South Park shared that she already receives a number of emergency alerts from the City of Seattle, admitting, "Sometimes it's annoying," but continuing on to say, "It doesn't happen very often, but sometimes it's really nice to know [what's going on]." These alerting preferences will need to be identified in the various social and cultural contexts of different communities. The management of these alerts by local community leaders may help tailor a notification system to a community's preferences.

Tapping HAM Radio

Nearly all participants, both community members and leaders, acknowledged a considerable value in HAM radio technology and operators in disaster scenarios. The most commonly stated sentiment reflected a sense of reliability in HAM radio; as one participant from Laurelhurst summarized, "They're a little bit more connected when we are disconnected." Participants were generally aware of the fact that the networks

supporting HAM radio stand a good chance of surviving severe storms or natural disasters that might otherwise disrupt commonly used means of communication like cell and internet. Participants also recognized HAM radio's ability to not only keep members in the same community connected to one another, but to keep the community connected to outside information as well. One South Park participant stated that "not only communication within the community, but externally, outside the bounds of the neighborhood" must be part of a community's communication planning for disaster preparedness and response.

A community recognizing this platform's value, however, might pose a challenge to the successful implementation of coordinated HAM radio efforts. Individuals and households may be reasonably expected to seek out those with HAM radio capabilities to reach worried friends and family or to learn important information about incoming aid. These interests could potentially overwhelm the HAM radio network. For participants who indicated they would not seek out HAM radio operators in a disaster, their reasoning often reaffirmed acknowledgements of the network's value. One Westport participant acutely recognized the substantial role HAM radio operators might play in a large-scale disaster, stating, "If they're…helping emergency services, they're doing what they need to be doing, they don't need me coming in there…trying to slow them down… [they are] providing help for everybody."

Community leaders were also clearly aware of the benefit HAM radio stands to serve the community in the time of disaster. One community leader indicated that at the state level there "are plans in place for…HAM radios [to be used]," suggesting that emergency management decision makers may anticipate using HAM radio as a means of trickling information down to local leaders. One such local leader from Westport highlighted that his agency was already positioned to use HAM radio in a disaster, stating that one of its stations "was in an elevated position…and has HAM radio capabilities." Other local leaders expressed an interest in coordinating with HAM radio operators or even investing in the required equipment for their own organizations, though this desire was often leveled with an acknowledgement that those "prep-costs" were not negligible.

Beyond the cost of buying HAM radio equipment, identifying existing HAM radio operators in a given community was also introduced as a barrier to taking this interest further. One leader from Westport jokingly recalled his only interaction with known operators, sharing that he responded to a trespassing call only to discover a group corresponding with users in Japan; “It was a good spot for them to get reception,” he admitted. While he confirmed that operators in his community hadn’t yet been identified by his agency, he was quick to clarify that “there would be an interest, definitely, in reaching out to them,” not only for their assistance in large-scale disasters, but to assist his agency’s everyday emergency response as well.

It would appear that making the most use of HAM radio in disaster scenarios requires a planning infrastructure to manage users and the systematic distribution of information. One participant from South Park proposed that HAM radio be integrated into response frameworks, reflecting that planning should include “mapping it out, [asking] what use they could be put to during an emergency, how to control usage, so it remains functional and not just overwhelmed.” Additionally, HAM radio can be a resource-intensive capability, from the cost to purchase equipment to the time and money needed to certify and train potential users. These barriers may ultimately mean that identifying and coordinating with established networks of HAM radio operators is the most efficient means of leveraging HAM radio.

Personal Information Sharing

In the aftermath of a disaster, as emergency response is set in motion, knowledge about the people in an impacted community can be a critical resource for first responders. Even basic identifiers like name and home address can inform the way first responders move about the community and how effectively they provide aid to those who need it. For this reason, it is worthwhile exploring the types of information community members would be willing to share, with whom they would be comfortable sharing it, and under what specific scenarios or conditions.

Community members participated in an exercise which asked them to imagine an emergency communication app into which they could input pieces of personal information, and indicate who they would be comfortable having access to that information if a disaster was declared. Under this first scenario, it was explained to participants that all of their information would be stored on a single server. Once the exercise was completed, a second scenario was described, introducing blockchain technology as an alternative way of storing and protecting participants' information, and participants were asked to discuss what impacts this might have on their sharing behaviors. Participants discussed a variety of factors that played a role in their sharing decisions, reflecting the complex nature of privacy, security, and surveillance concerns in the digital age.

Recipient Factors

The identity of a potential recipient of someone's personal information was a primary factor that affected participants' sharing behaviors. Of the five recipient categories presented to participants - family and close friends, neighbors, first responders, acquaintances, and anyone - family and close friends were overwhelmingly viewed as a category with whom participants would be comfortable sharing their personal information. Most commonly cited was the fact that family and close friends likely already knew the information presented in the exercise, and that this category of information-recipients was viewed as a trusted population. One Westport participant indicated that his trust in family and close friends was related to the time and effort spent in establishing those relationships, sharing, "I built these personal relationships with everybody around me that I extremely trust; I trust them with the information." The establishment of these trusted relationships appeared to make participants more willing to share information under the described scenario, as it was likely not new information being shared. One Laurelhurst participant reflected, "I think [my husband and I] are pretty open to close friends or family; they know most of this stuff anyway, so yeah, I think that's fine [to share with them]."

In one instance, however, a participant indicated a distinction between family and close friends, expressing that the information she would be willing to share with either

category would be different. Regarding certain health-related information, this participant from Laurelhurst admitted, “You know, I feel differently about family and close friends…so I wouldn’t be comfortable sharing with close friends, but I would with family.” It was clear from all participants that trust in the people who could access their information was an unwavering requirement.

First responders - such as individuals who provide fire, emergency medical services (EMS), and police services - was another category with whom participants were particularly willing to share their personal information. Similar to other participants, one from Laurelhurst made it clear that first responders could have access to any information, stating, “Emergency responders? I would be comfortable giving any of those [pieces of information].” Participants acknowledged that the information they would be willing to provide to first responders may directly translate into the level or quality of care they may receive in a disaster scenario. One participant from Westport summarized, “I feel like they are entitled to know things like that I have insurance, not that it should matter, and what my medical health records are if they needed access to that in order to better care for me.” Much like family and close friends, first responders appear to a trusted category of personal information recipients.

Participants were comfortable sharing most pieces of information with neighbors, though health-related information was the least likely to be shared. When asked what pieces of information he would not be comfortable sharing with neighbors, one Westport participant listed, “Probably my prescriptions, insurance information, and health record.” The perceived sensitivity of certain information was used to explain participants’ reservations, a factor which will be further explored in the next section. As one participant from Laurelhurst shared, “Most of my neighbors have the rest of [that information], like…my name, my sex and gender, and phone number, and all that kind of stuff; I don’t care if they know,” but information such as medical health records and date of birth were excluded from this list.

The category of “anyone” saw a sharp restriction in the type and volume of information participants would be willing to share. Concerns about privacy, the misuse of

their information, or the impacts of their personal information being shared with the general public - all of which will be discussed in detail in a later section - were cited as reasons for the hesitation to share with just anyone. In sharing information like date of birth, many participants raised concerns for possible identity theft if that information could be readily available to anyone in a disaster. As one Westport participant made it clear, "I wouldn't share my date of birth with just anyone because…I feel like that's one of the pieces of information that can be used in identity theft." It should be noted that participants did not generally make substantive comments related to the acquaintances recipient category. Some participants did comment, however, that they saw little distinction between neighbors and acquaintances, as well as anyone and acquaintances.

Information Factors

As participants completed the information sharing exercise, it became clear that not all information necessarily needed protection to the same extent. Some pieces of information were viewed distinctly as being more sensitive, or even valuable, to participants. Overwhelmingly, the piece of information participants were most protective of was their date of birth. Half of participants explicitly shared their concern regarding identity theft, either because they had experienced it in their past, they knew a family member or close friend who experienced it, or because they were aware of high-profile data breaches that resulted in widespread identity theft. After sharing his experience witnessing a close family member deal with the aftermath of identity theft, one Westport participant was adamant that he wished to avoid a similar situation, stating, "Knowing my birthday, knowing some of that other stuff, they can possibly open up a credit line. And who's going to be responsible for it? Me." This potential threat to participants' personal or financial security was a serious matter that influenced a person's willingness to share sensitive information.

Conversely, personal information considered to be less sensitive was more freely shared with any category of recipient. Information such as name, sex or gender, phone number, email address, or physical address were often met with greater tolerance to be shared and stored freely. A commonly offered reason for this was participants' acceptance that their more basic personal identification information already exists online in some

fashion. One South Park participant was resigned to the fact that her personal information can be discovered by someone so inclined, sharing, "Frankly, if you're a good Googler, you can find all of that out anyway; I mean…all of that is easily available. My home address? Well just walk down the street and look at my house number!" Even when considering risks like data breaches or hacking, participants were less protective of information perceived to be less sensitive. One participant from Laurelhurst compared her thinking to when she signed up for Solv, Washington's online portal for tracking Covid-19 cases and vaccinations. She concluded, "I signed up for Solv and that [information] is just kind of out there; someone could hack into my personal information through there and I didn't really take a long time making a choice on that."

The pieces of information participants would be willing to share were also scrutinized for their relevance, especially in the context of a disaster scenario. The single biggest offender was socioeconomic status, as nearly all participants questioned the relevance of it being collected in the first place or being shared with any category of potential recipient. Some participants did ultimately concede that knowing socioeconomic status might influence the way first responders move within communities, perhaps prioritizing areas with an overall lower socioeconomic status. As one Laurelhurst participant reflected, "I don't understand why socioeconomic status is on there, so I would say I wouldn't really want to share that…I mean, I guess you want to take care of the most vulnerable and the people that are struggling the most…maybe that's why they would want it." However, it was not clear that this potential outcome of providing socioeconomic status made a participant more willing to share it with any recipient category.

Some participants were also mindful of the fact that their personal information may not be theirs to share freely or without additional input. As one Laurelhurst participant was going through the exercise, she discussed her decisions using "we," referring to her and her husband, even noting that in reality she would confer with her husband before agreeing to sharing any information at all. Another Laurelhurst participant was reluctant to share information about her household demographics, stating that she was not comfortable sharing information about her young daughter who did not yet have an opportunity to provide informed consent. She explained, "My

daughter might not want everyone to know stuff about her…if she doesn't want to tell people stuff then she shouldn't have to just because her mom said so." These points indicate that decisions about personal information sharing may extend beyond the individual to decisions made at the scale of households or family units.

Security Factors

Various factors relating to the platform itself were another major consideration for participants. Questions about who owned and managed the platform, how it was managed, and how information may or may not be protected were found to play an important role in determining what personal information a participant would be willing to share. These factors relating to the internal management and security of the app stem from a need for trust in its owners. As one Westport participant expressed, "I don't trust a computer that I don't know who's running it."

Simply knowing who the owner might be, however, was not sufficient for most participants. Whether the app was to be privately or publicly owned, there was nonetheless a palpable distrust expressed by participants. "If it were [owned] in the private sector, who in the private sector? I'm not trusting Google to do anything, or Mark Zuckerberg," one South Park participant shared, adding that Facebook's history of data-mining had almost turned her away from the platform entirely. A Westport participant shared a similar opinion of the government, revealing, "I just don't trust the government, I guess…with my personal stuff like that, I just don't trust them." He went on to elaborate that the government "doesn't have a really good track record" for securing data, which contributed to his hesitation.

How responsible a platform owner would or wouldn't be with a participant's personal information was another factor. Responsibility was often discussed as a combination of both accountability and transparency. This concern extended to the potential selling of a participant's information or using it for marketing purposes. As one participant from Westport shared, "I get annoyed when I feel like people have been irresponsible with my information or sold it for money." The possibility that a platform owner would not be forthcoming or transparent about what they might do with a

participant's information once they have it was also unacceptable. One South Park participant mocked potential platform owners, sharing that she worried they may say "'I'm going to take this data' and oh, by the way, there's this little phrase down here that says they can sell it to people to do whatever they want with [it]."

A number of participants also expressed a disinterest in an app potentially tracking them or being used for surveillance outside of a disaster context. This was raised with tones of mild annoyance, like in the case of one Laurelhurst participant who jokingly recalled the targeted ads she began receiving not long after purchasing a Solo Stove, or measured unease as one participant from Westport shared his trepidation about being tracked within his own community. Whether raised with a tone of mild annoyance or measured unease, concerns about surveillance were prevalent when digital engagement of any kind was the focus of discussion.

Participants were especially concerned about the potential for a platform to be hacked, risking the security of any personal information shared there. Mentions of this unease were more often than not accompanied by recollections of prominent data breaches in recent memory, such as the Equifax breach in 2017 and the 2021 breach of the Washington State Employment Security Department. Participants shared a general wariness of placing themselves in a similar position, with one Westport participant cautioning, "There's always something that can happen and that's where I'm at…something could go wrong, someone could hack it." There was also a prevalent sense that there is an inescapable risk associated with providing any information to a digital platform; the price of being connected to others in the digital age.

However, the question remained: is the potential to get more efficient aid in a disaster worth the risk to a participant's online security? One Laurelhurst participant contended, "Of course the usefulness is that in the event [of a disaster] it's kind of like insurance: it's really great [to have], but then when you're not using it you just have that information out there for people to access through hacking." It was not clear that any potential benefit of sharing personal information with an app, even one used to improve

disaster response, was viewed as sufficient enough reason to risk a participant's security in every other context.

Impacts of Blockchain Technology

In the personal information sharing exercise, blockchain was introduced to participants who were then asked if the technology would impact their willingness to share. Most participants stated that blockchain technology would likely not impact their willingness to share personal information, either because they hesitated to trust claims of a privacy guarantee or because they are not concerned with the technology itself, rather they will always be concerned about the people who could get around it.

A number of participants were skeptical of any technology claimed to be impenetrable or perfectly secure. "If they tell you it is a 100% guarantee, they are joshing you because nothing is 100%. So, I mean, you can sit there and tell me [that], and it sounds great, but in the back of my head I'm like, nothing can be 100% completely failsafe," one Westport participant shared. Even more, participants generally agreed that a technology can only be as secure as the extent of bad actors' motivation and cunning. When asked if the use of blockchain in the information sharing exercise would impact her sharing behavior, one South Park participant retorted, "I don't think it would at all. I think either storage method, I'm not particularly concerned about. For me it's not the storage, it's the people that can have access to the data; it doesn't matter where it's stored." This notion that "criminals will find a way" was prevalent.

Another commonly shared sentiment was that participants were just not knowledgeable enough about this new technology to know if it would impact their sharing behavior or not. Some indicated that even with this unknown they might be more likely to ease their restrictions, but it would be contingent on learning more about the technology, and perhaps seeing it used, accepted, and visibly tested in their everyday lives. One Westport participant shared, "I guess it might cause me to be willing to loosen up on some of the things…I have heard of blockchain but…I'm pretty sure I don't have a sophisticated [enough] understanding of the difference between blockchain or not blockchain. So, I don't have a very strong feeling about how that would change things."

When asked to clarify if there would still be a hesitation to share certain information even with blockchain, however, one Laurelhurst participant shared, “Yes, but I might be more open to it.”

What Community Leaders Would Like to Know

Community leaders offered many pieces of information they considered beneficial to know of their community members in a disaster scenario, particularly information about an individual and the members of their household, including their preparedness capabilities and household’s physical characteristics. General identifiers, such as name, address, and contact information were among the most commonly raised pieces of information community leaders were interested in having. Regarding physical address, a piece of information most community member participants were willing to share freely, one Westport community leader reflected, “If we know where all of these people live…we can help them better in the event of a tsunami and track that they are there or not there, because some people simply disappear during storms and hurricanes and tsunamis; they literally fly off the face of the earth.”

Another type of information discussed was household demographics. Knowledge about who lives in a home and their potential mobility or medical needs were considered to offer community leaders an advantage when the time comes to implement a disaster response plan. One Laurelhurst community leader shared that it would be nice to know “if you have a disabled person in your house, or somebody on some kind of serious medical equipment.” But she went on to acknowledge, “And that's the kind of information people are more reluctant to share because it's very personal, [information] about who's in the house and who's vulnerable in the house.”

Community leaders were also eager to learn what resources an individual or household may have access to in the event of a disaster, in addition to their overall level of preparedness. As one Westport community leader explained, “Simply [knowing] your hierarchy of needs, [for] those that don’t have the ability to fend for themselves; food, water, shelter, safety, those types of things. [If] they cannot evacuate to an area of safety. At that most basic level, I would like to know.” There was an overall recognition from

community leaders and members that socioeconomic inequity in a community may need to be taken into consideration when planning for and implementing disaster response to ensure that levels of assistance appropriately correspond to levels of need.

New categories of information not discussed in the information sharing exercise were raised by community leaders as valuable knowledge to have. These types of information included facts about the layout of a community member's home, general accessibility or egress factors, or where hook-ups to utilities are located around a property. Factors such as one Westport community leader wanting to know "access problems" at a property or Laurelhurst community leaders being interested to know "where [a home's] gas line is…where the water line is," were deemed relevant information. It is worth nothing that information of this nature could potentially be accessed through the public domain or other city or community agencies.

However, some community leaders firmly put forth that no additional information would change the way they respond to a disaster event. Said one Westport community leader, "When you boil all the stuff off the top, it doesn't matter, we still respond, it doesn't matter if the person is wheelchair-bound or not, we are still going to have to go there and do our stuff to help them or find them help." And when it comes down to it, as one community leader lamented, no amount of information shared before a disaster will change the fact that his agency does not have the means to act on that information. As this community leader from Westport admitted, "I can't think of any pre-loading information or anything like that that would help me do my job any better…quite frankly, I don't have the resources (sufficient food, water, medical supplies) to be that agency where I can, if you are unable to evacuate or help yourself during that situation,…help you in that worst-case scenario." When asked to imagine what alternative means of assistance might address this gap, he continued, "I would hope that the community would rally around and know their community and help each other. Kind of a neighbors-helping-neighbors philosophy."

Whether community leaders saw value in knowing community members' personal information or not, most acknowledged widespread reservations about sharing certain

information and being tracked by companies, governmental agencies, or hackers. This reality frustrated one Westport community leader, sharing, “So the more people who are reluctant to give information because they think we are going to steal their identity or if they watch too much tv about Big Brother spying on them…I could care less what they are doing at three in the morning, and 99.9% of the time I don’t want to know!” In recognizing this challenge, one Laurelhurst community leader offered the value of leveraging trust and familiarity among neighbors, and systematically coordinating those connections with an intervention like block captains. She offered, “But when we were talking about preparations…we thought of a lot of information [that would be good to know] that was quite personal and private. Like who has the generator? You might not want to share that [information] with all of us, but maybe you would share it with your immediate neighbors. So that was another key reason why we thought the cluster captain might be able to help, because they pull information and resources at the local level.”

Community Resource Centers

In a disaster, having designated locations for sharing critical emergency information and resources can both enable community members and local agencies to disseminate what they *do* have, and centralize the distribution of external aid if and when it arrives. As one Westport participant reflected, “If it was a large regional catastrophe…I would feel like, in order to receive any sort of help from the State, I would have to definitely take myself to a gathering area because I wouldn’t expect them to come find me…!” When given the opportunity to place two such centers in their communities, participants identified a number of factors that contributed to their thinking and recommendations for potential locations. These factors included proximity, identifiability, perceived safety, population concentration, the benefits of existing facilities, and a location’s potential as a future gathering space.

Proximity

Perhaps the most common consideration raised by participants was the distance any one facility might be from future users. The notion of centrality was brought up by

four participants, at least one from each community. After a marked pause, one participant from Laurelhurst stated, “I’m trying to think what is centrally located.” Participants seemed to relate centrality with general accessibility; as one participant from South Park considered a clinic in another area of the community, she stated “[it] is down in a different geographical area so that might provide access pretty equidistant for all residents.”

But in a disaster scenario, as another South Park participant alluded to, centrality may come at the expense of overall reachability for those in the broader community. This participant was considerate of the fact that, in the event of an earthquake, the large highway overpass which bisects his community might collapse, isolating one side from the other. He reflected, “If you can get across [route] 99, I think [where] the fire station is, if you're just looking at people in South Park, probably very centrally located. But it all depends on if you can get across [route] 99.” Others echoed an acknowledgement of the reality that a post-disaster landscape may not resemble the landscape they knew prior to the disaster.

This thinking around who might actually need to reach a particular location, and where they are located within the community, was also raised in the context of residential areas versus commercial areas. While it was generally acknowledged that commercial areas in a community may be populated in a disaster, some participants chose to prioritize a residential area’s access to a community resource center. One Westport participant made it clear that proximity to residences was a key factor in his decision, stating, “The town is kind of weird in that it's got this marina with all of these businesses and there are people up in that area but it's more of a business district and I…feel like the place where people live, that's where support needs to be provided, and that’s not in the business area. I’m just inclined to say…where all the houses and residents are.”

Many participants were additionally mindful of the need for a center to be proximate to users from a broader community. A flexible application of “community,” one which recognized ties between people beyond city limits or neighborhood boundaries, was presented by both Westport participants. One ultimately decided that a second

facility should be "kind of…down in the Grayland area," an unincorporated area just outside of the Westport city limits, recognizing the challenges people in that area might face accessing community resources or centralized information. Similarly, a participant from South Park recognized that "the other people that are in the…Burien and Tukwila [area]… I would think they would want to come down here, because you can look at where you have the border and everybody shops a little bit on the other side. It's actually out of South Park… (these communities' proximity to South Park can be seen in Figure 13)."

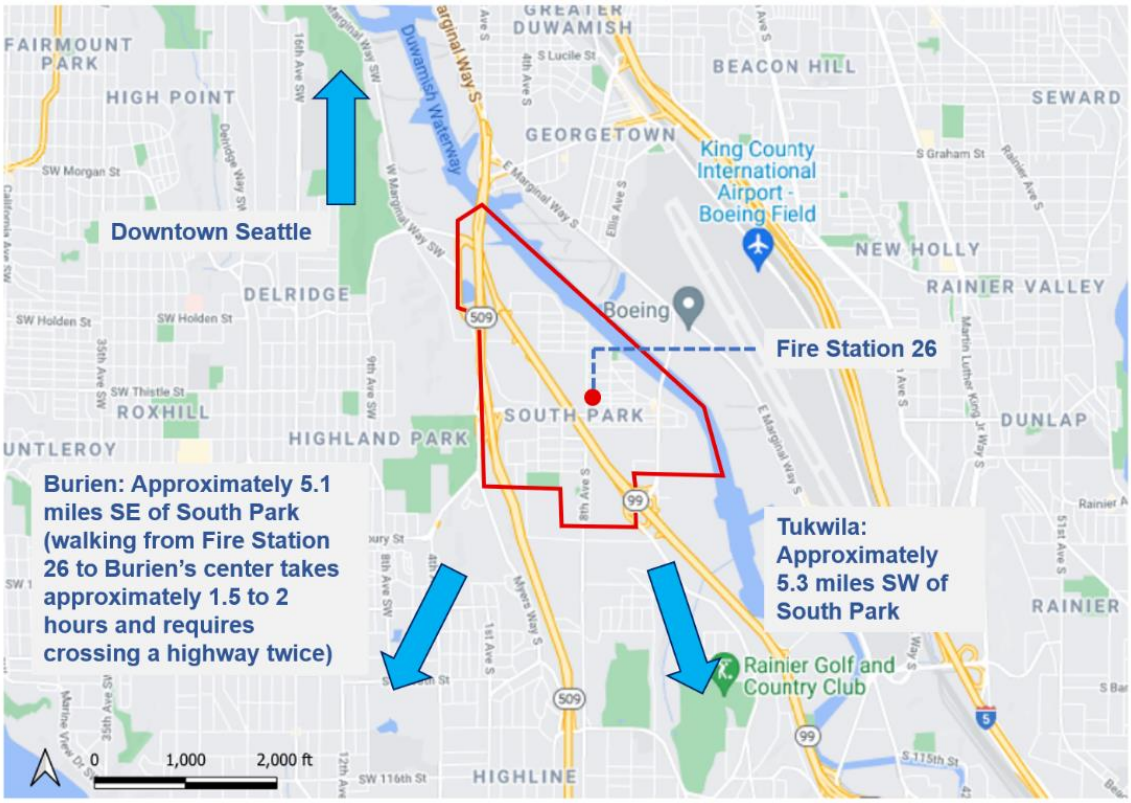

Figure 13: South Park and neighboring communities. Map created using QGIS (Google Maps, accessed August 11, 2021)

Identifiability

In addition to its placement relative to community members, the ability to find a community resource center when necessary is just as important. Familiarity with both the community at large, and the buildings and services within it, was a major factor considered by all participants. As one South Park participant jokingly remarked, "You want people to know…where *where* is!" This notion of selecting locations because of their

familiarity to community members was raised alongside the idea that a place should be recognizable to people, one that is not only known but seemingly inextricable from the community itself.

For this reason, too, participants frequently named locations in their communities they viewed as landmarks, or prominent nodes that establish a sense of orientation. This list featured large hospitals or clinics, fire stations, and community centers. After considering a children's hospital and the local community center, one Laurelhurst participant explained, "I was really thinking about buildings that are just kind of obvious markers for people." These considerations may have been additionally supported by participants' understanding that their regular means of communication and geolocating might not be available in a disaster scenario.

In fact, identifiability was considered by participants in the context of both everyday activity and a disaster scenario. In terms of walking or otherwise getting oneself to one of these locations, two participants indicated a value in their positioning relative to roads or paths. One participant from South Park shared that she picked the clinic in her neighborhood not just for its recognizability but for its position "on a main arterial" in the area. In thinking about the evolving needs of his community during a disaster, one participant from Westport justified his selection, explaining, "I know that one of the evacuation routes is just up the hill from that…location. So it seems like, in the event of an emergency caused by an earthquake or tsunami, people would sort of be channeling themselves in that direction anyway."

One challenge that was not necessarily addressed by participants, however, was the reality that there may be people present in their communities at the time of a disaster who are not familiar with the area. One participant from Westport shared that the city is "mainly like a tourist area," indicating that there may be a substantial volume of people present if a tsunami occurs who may not know what to do or where to go. This potential scenario means that knowledge about a community's assets should not necessarily be assumed. As one South Park participant indicated, "You would assume that everybody knows where the school is, everybody knows where the community center is, everybody

knows where [the clinic] is…you would think." These types of assumptions may need to be avoided or otherwise mitigated if identifiability is to be intended for visitors and community members alike. For this reason, identifiability achieved through familiarity might need to reduced, using prominence and distinction to greater extents. For example, facilities can have brightly-colored roofs or flashing lit paths leading to them.

Perceived Safety

Half of the participants raised points about the potential safety of a location they might select. These included factors such as the types of hazards that might be present around the location. For example, one Westport participant was mindful of the threat along the coast in the midst of a storm, sharing, "I would probably keep it away from the docks and…away from the ocean." Another factor introduced was the perceived benefit of open space, with one Laurelhurst participant explaining, "[at that location] there's a lot more open space so in the case of an earthquake…there's less of a chance of things falling down [on people]." Participants were mindful not only of the safety a location may provide users following a disaster, but also the safety of a location before or during that same event and the impacts that would have on the viability of the structure itself. A community resource center could be used as an evacuation shelter, protecting evacuees from extreme winds or flooding, and falling debris.

Taking advantage of higher elevation was another prominent consideration. One South Park participant reflected, "To me that would be [the best location], it's at the top of the hill, it's downhill on every side of it." Others indicated that high elevation would help to shelter the facility and its users from rising floodwaters and unexpected debris. This may reflect an inclination to see these community resource centers additionally as pre-event evacuation shelters.

Another factor raised when thinking about where to place a community resource center was the severity of a possible disaster and the impact it may have on ground stability and the overall feasibility of potential locations around a community. As one Westport participant assessed, "So it depends on how bad the earthquake is; is [the ground] going to liquify, are the roads going to be passible?" Addressing this concern will

require a comprehensive geospatial assessment of potential sites and the threat disasters may pose to their stability during and after an event.

Population Concentration

The density and distribution of people around a prospective location was mentioned by nearly all participants to some extent. Not surprisingly, participants were noticeably interested in ensuring that a location would serve as many people as possible. In some instances, this interest was even preserved in spite of a recognition that there may be a need elsewhere in the community. One Westport participant talked through this dilemma, sharing "It's kind of like, Grayland needs one but Westport has more people; they could probably use a second one." This potential conflict was discussed by other participants too: what does "level of need" really mean? Does it refer to the most people in need or the intensity of a group's need? Participants in this study tended to align with the former. As another Westport participant summarized the explanation of his choice, "But yeah, a slightly greater concentration there and, therefore, that seems like [where] the need would be the greatest."

This interest in establishing centers around dense clusters of people was also pursued at the expense of locating a facility near a participant's own home. One Westport participant admitted to living in a more spread-out part of the community and opted to select locations outside of his neighborhood because he recognized that there are more people elsewhere in the community, confessing, "I am, by the way, not near either of those!" Certain sacrifices, both individual and community-wide, appeared to be acceptable in the case that a decision was benefiting some population in the community. Another Westport participant recognized the potential everyday-inconvenience of a community resource center being located in a residential area, but concluded that to be "the most realistic spot" to be reachable by as many people as possible.

Increasing the number of individuals that can reach a given community resource center would clearly be desirable to communities and agencies. Expanding such an accessibility radius around a center could be achieved through the creation of circulation networks – footpaths, trails, streets – that connect various areas of a community to a

single center. Emphasizing the development of circulation that serves an emergency function can dually improve the identifiability of community resource centers. Paths can be designed to include emergency lighting and signaling, for example.

The Benefits of Existing Facilities

Existing structures - particularly hospitals, libraries, community centers, churches, and fire stations - were identified by most participants as good places to either house a community resource center permanently or as locations where disaster operations could be set up following a disaster. Many of these existing structures were identified for the explicit reason that these facilities offer something to be leveraged in a disaster, or that they have a capacity for storage which may further assist a community's disaster preparedness.

Participants appreciated that certain existing facilities like hospitals and churches may provide easy access to resources such as generators and medical supplies, as well as amenities like refrigeration. Participants were quick to acknowledge, however, that in the absence of power to the area, these benefits may not in fact be fruitful. As one Laurelhurst participant realized, "I don't know for refrigerating things, the church would definitely have it, and the school, but then again if we're in the earthquake situation, we might not have power so that could be an issue." It should be noted that even a factor as potentially problematic as the loss of power did not ultimately result in any participant selecting a different location.

An additional benefit mentioned was the opportunity to use existing facilities for the storage of emergency supplies for the community. Such use responds to challenges raised by participants regarding the difficulty of keeping sufficient emergency goods in their homes or on their property. One Laurelhurst participant discussed her aversion to keeping an inventory of resources in her dining room, seemingly the only available space in her home. When considering outdoor storage, she went on to contemplate, "If you build a shed…[with weather], does this stuff just kind of deteriorate? Do animals get into that sort of thing?"

Opportunities as Future Gathering Spaces

Community resource centers have the potential to serve communities in more contexts than disaster scenarios alone. In fact, a selected location that is programmed for daily or otherwise regular use may positively impact the number of people who gather there during a disaster. For example, both Westport participants recognized the Ocosta Elementary School as a popular gathering place for the community. Said one participant, "Well…the school is kind of the center of the community in a lot of ways, not just for the students attending there, but all the sporting events and community events that go on there." Perhaps unsurprisingly, major renovations in 2016 made the Ocosta School the first tsunami evacuation structure in the United States, capitalizing on both the building's need for renovations as well as the prominence of the school as a gathering space for the community, especially children.

However, the absence of existing disaster centers and a call for more community assets present opportunities to develop those efforts simultaneously. As one Westport participant reflected, "There's not a lot of things to do in this community." Similar sentiments were shared by other participants, such as those from the South Park community. "There's been a lot of work to develop some more public spaces; there's not a lot of public spaces in South Park," was shared by one South Park participant who admittedly recognized the existence of a "pretty vibrant community center." However, she went on to clarify that its offerings were simply not directed toward her lifestyle or interests, seeing it as a children and family-oriented facility. Another South Park participant expressed a similar frustration, recalling that a local senior center supports an active and engaged population, but he was not interested in the exclusive association with an older demographic. These perspectives reflect a desire for more gathering spaces or community assets that can accommodate diverse uses and attract a variety of demographics.

Resource Planning and Matching

Understanding what emergency resources may or may not be available to a community in a time of crisis and identifying how emergency resources and the people

who need them will be connected to each other are two of the most critical aspects of disaster response. This is especially true for communities at risk of experiencing events like massive earthquakes and tsunamis. These disasters can disrupt or completely destroy the infrastructure used to share information about needs and the infrastructure used to move resources around an affected region. Disrupted telecommunications, transportation, and power networks may mean that communicating and coordinating with external resource providers will be difficult or impossible in the immediate aftermath of a disaster. As a result, a community's best strategy is to be able to support itself and its neighbors, be it at the scale of house-to-house or town-to-town. Exploring future improvements to resource planning and matching requires knowledge about the existing capabilities of local governments and their communities, the challenges communities face in resource planning, and learning how communities plan to work with other entities in order to match resources to the people who need them.

Limits of Local Capabilities

All community leaders made it unquestionably clear: their agencies and organizations are not in a position to provide sufficient emergency resources to their communities in the event of a large subduction zone earthquake. As one Westport leader explained, "We're not prepared at the moment to provide much by way of resources. So we don't have, for example, additional bottled water…we don't have beds and blankets." Though a variety of factors were discussed to explain these apparent shortcomings, the most frequently raised were challenges securing funding and a lack of physical capacity.

One of the biggest challenges, one Westport leader shared, is getting the community's decision makers to prioritize disaster preparedness in the first place. He speculated that individuals might be concerned with how their support could be perceived by others, offering, "Maybe people are afraid to take it seriously, because then you are a doomsday prepper." Support notwithstanding, some communities already struggle with adequately funding projects to meet a community's everyday needs. The same Westport leader continued, "[The next challenge] is making the case that [preparedness] is important enough to divert funds away from some other thing…[because] where else are

you going to get the money to do it? And if you spend the money on that, then something else isn't going to get funded."

Agencies' limited spatial capacities also contribute to their inability to store a meaningful stock of emergency resources for the community. One leader from Westport shared that his agency was in the process of constructing an offsite emergency communication center; one they envisioned could serve as a place for resource storage in addition to being an emergency shelter for staff or passersby caught in a disaster. He went on to recount his struggles being compliant with the numerous zoning restrictions in place for an emergency facility of any kind. He explained, "We had to actually leave some things out that we would have [otherwise] incorporated had we been able to build it as the shelter we kind of envisioned. But it will still function." The current inflexibility of municipal zoning ordinances, as well as building standards for facilities seeking FEMA funding, is leaving communities with emergency facilities and structures that may not be fully meeting their needs.

Barriers like these are especially impactful as existing facilities have inadequate storage capacity, especially when the size of certain items like bottled water is taken into account. As one Laurelhurst community leader explained, "The volume of it is overwhelming and then turn over maintenance of it is overwhelming on any level. The most functional unit [for resource storage] is a household." It is important to note that, even if agencies had access to suitable storage space, monitoring and maintaining those supplies to ensure they are appropriate for use is an additional barrier agencies do not yet have the financial capacity to overcome.

Preparedness Starts with You

Given agencies' limited capacity to offer emergency resources, leaders made it clear that their agencies emphasize individual preparedness, and helping those around you, in their messaging out to community members. As one Laurelhurst community leader underscored, "There's no provision for food and water being provided by anyone. [Seattle's] not going to do it, therefore nobody's going to do it. So, it is completely dependent on neighborhoods and individuals to be prepared."

Some community leaders were additionally eager to emphasize that first responders are people too; people who may find themselves stuck at work, away from family, when a disaster strikes. This reality means that leaders are trying to ensure that their own personnel are even prepared to take care of themselves and eventually assume their emergency functions. Just as easily as a disaster could strand first responders at their place of work, however, it could prevent leaders and responders from entering the community at all, potentially disrupting anticipated response plans. With an agency that currently only employs seven first responders, one Westport leader acknowledged potential challenges associated with his agency's size and the spread of his first responders within and outside of the community. He stated, "There is only myself and one other officer that actually lives within the City of Westport…so [the others] would be coming in, if they could, and me and one of the other officers would be one of the [only] two people here." These possibilities highlight that leaders and first responders will likely be unable to offer timely and robust aid to their communities, further justifying the push for individual preparedness.

In spite of their best efforts and messaging, however, leaders are painfully aware that community members are not as prepared as they should be. When asked if it concerned him that the community may still have a level of dependency on his agency in a disaster scenario, one Westport leader quickly retorted, "Well the answer to that is a resounding yes." Some leaders shared that they have even encountered community members who have unrealistic expectations of where they might access resources following a disaster. Another leader from Westport recalled a number of occasions speaking with community members who shared they weren't too worried about stocking up on supplies; they would simply go to the city's single grocery store once the dust had settled to collect what they needed. In sharing these stories, the community leader could not help but let out an exasperated laugh; he wondered, if a disaster destroyed their home, what made someone think the grocery store wouldn't suffer the same fate?

Knowing that individuals are likely not as prepared as they should be, however, must be balanced with an understanding that preparing for an unpredictable event is a

luxury for those trying to survive on a day-to-day basis. Just as one Westport leader described in an earlier section, funds put toward preparedness are funds diverted away from some other need. One Westport participant is a teacher in the community, sharing that most of his students come from households of low socioeconomic status. He described his constant reminders to students about preparing a go-bag and having resources set aside for an emergency, lamenting, "And then I realized, they don't have these things to necessarily put in that go-bag. And for them to go out and ask their parents to buy it, is kind of asking a lot, maybe." He would go on to echo a sentiment proven time and time again in the aftermath of severe disasters: if you are struggling before a disaster, you will only struggle more after one.

Some leaders proposed that a community's misguided expectations of where they can get emergency resources following a disaster may be capitalized on, however. One Westport community leader alluded to the fact that early talks with the community's single grocery store and many commercial fisheries could lead to a cooperation allowing their inventories to be distributed among community members. An arrangement like this would likely be mutually beneficial as a disaster that resulted in a sustained power outage would mean no refrigeration, thus creating a scenario where massive amounts of food could spoil. Additionally, if it's known that people are inclined to go to the grocery store after a disaster, leaders may identify those locations as places to stage emergency resources when they do become available.

Challenges in Planning and Matching

For any community, one of the single biggest hurdles in any level of planning for a large-scale disaster is the multitude and variety of events to prepare for, each requiring different levels of response and coordination. One leader from Westport shared that the variety of scenarios was not only a challenge to plan for, but it also made getting consistent messaging out to the community difficult. He explained, "Here is Plan A for this scenario, and then you've probably got a Plan B and Plan C for that scenario. Then you go to scenario 2, Plan A, Plan B, Plan C, and so on. So, when it's all going sideways, the average person [will not remember the plans]…they'll just panic and run to the grocery store."

Leaders are currently working to mitigate confusion by developing unified strategies and messaging across multiple communities and regions.

Leaders went on to explain that regional level planning produced a spectrum of results, with perceptions ranging from beneficial to a waste of time and energy. These outcomes often corresponded with how the way planning talks were facilitated and the perceived effectiveness of those strategies. When leaders were able to participate in in-person meetings offering presentations about relevant scientific data for a given disaster, they generally viewed these meetings positively as they offered a sense of consistency and leaders liked that they were being updated on rapidly evolving science and technology. Alternatively, virtual meetings and large table-top exercises were found to involve too many participants in environments that make it difficult to engage and manage participants. Local community leaders also shared that plans developed by outside entities are not necessarily responsive to their communities' unique spatial and social characteristics. One Westport leader expressed his frustration with outside planners, often from the county or state level, who have never been to Westport telling his agency where it will need to send people following a major disaster. Leaders were clearly not overjoyed by the thought of response plans not truly aligning with the needs of their communities.

Leaders acknowledged difficulties in anticipating their communities' needs as part of their preparedness efforts. For a community like Westport, seasonal peaks in tourism make it hard to know how many people may be present when a disaster strikes and forces leaders to assume that visitors are unfamiliar with evacuation and response protocols. Further adding to this unpredictability, community members may not be present during an event; individuals may be at work in another city or residents with second homes may be out of town. As one community leader from Laurelhurst reflected, "There'll be people from Seattle everywhere and who knows who will be in [Laurelhurst] at the time. Some people work, some residents won't be here, but then some workers, visitors, and guests will be."

Once a disaster has taken place, learning of individuals' needs and actually fulfilling them become herculean tasks in and of themselves. Community leaders are prepared to anticipate that communication via telephone and internet will not be available, which begs the question: how will they know who needs what resource and where in the community they are? One Westport leader revealed that his agency expects to send personnel out into the community on foot for reconnaissance, if it is the case that roads are also impassable to vehicles. He acknowledges that this strategy would be slow and time consuming. Once they discover needs, however, "then you have to have a plan for how [resources] get to the people that might need it at some point," he continued. All leaders confessed that the delivery of emergency resources to the community is a step in the planning process they have not yet made.

Coordinating with Other Entities

Leaders shared that there was already talk between different agencies to plan a coordinated disaster response strategy. A number of multijurisdictional meetings have already been underway, such as the 2016 Cascadia Rising tsunami response exercise and meetings of the Tsunami Task Force hosted by the Washington Emergency Management Division of the state's National Guard. Local agencies are also facilitating tsunami and earthquake preparedness conversations, such as at the Grays Harbor County Fire Chiefs meeting, for example. These partnerships are also trying to take advantage of different agencies and organizations' variety of strengths and the ways they expect to respond. As one Westport community leader explained, "If there is an event…the Fire Authority is probably going to be the first responder for health and safety and that sort of thing. Then Westport Police will join that effort in some sort of a crowd control assistance kind of manner; keeping the peace…. And then…Public Works…[will] make sure that people can get from one place to the next." Coordinating these different agencies' strengths was viewed as a key component of a successful response plan.

In spite of early plans for coordinating across communities, however, getting external aid to a community is a challenge leaders must consider. Many community leaders shared that they expect external support from an agency like FEMA to be preoccupied with large-scale problems, such as rebuilding downed bridges and restoring

hospitals. Leaders see this reality as even more evidence that communities' survival will rely on support offered by one another. However, the unpredictability of future disasters again makes it difficult to anticipate what support a community can reasonably rely on as leaders will not until after an event which communities and agencies will be in a position to support others.

Community leaders overwhelmingly concluded, however, that timely and successful resource matching will ultimately be a direct result of relationships between different community and agency leaders. As guidance from leaders to their communities has emphasized neighbors helping neighbors in times of crisis, the same philosophy applies to neighbors of a larger scale. One state level leader made it clear that her familiarity with and amiability toward representatives of communities across Washington allowed her to more readily connect a resource recipient to a resource provider. She viewed those interpersonal capabilities as essential for disaster response, confirming, "It absolutely will come down to communities taking care of communities."

Leadership and Participation

Leadership in a community can come from individuals, groups, and organizations. The presence of organized and trusted leadership in an everyday context can be the difference between a community falling into outright panic or systematically working together in a disaster scenario. Acknowledging the value of leadership means it is a worthwhile capability to improve where it already exists and identify strategies for developing leadership in communities without. Such an undertaking requires an understanding of what leadership in communities looks like today, what participants expect of leaders and see as gaps in leadership, and to learn what might impact a person's decision to become a leader.

The Current State of Leadership

Understanding the current state of leadership allows for further exploration into the perceived limitations and successes of leadership's different forms, especially as it

operates in disaster scenarios. Whether leadership comes from more traditionally expected sources like government agencies or elected officials, or from community-led efforts to self-organize neighborhoods, participants overwhelmingly viewed leadership as a necessary component of effective disaster response. In communities without organized systems of leadership, some participants feared that well-intentioned individuals could do more harm than good without appropriate training. As one participant from South Park shared with concern, "You can have people…they will step up to the challenge…but do they have the right instincts? Do they have the right innate skill sets? Do they have the right experiences to guide people with the right decision making, the right judgment calls?" An established framework from which leadership can develop, such as a community's existing block watch program, may provide interested individuals a platform to be coordinated and trained in a systematic way. For this reason, it is important to learn participants' thoughts on the current state of leadership in their communities, particularly their confidence in that leadership, if they think it exists at all.

It was clear that certain communities had organized, community-led disaster preparedness and response initiatives in addition to government efforts while others did not. In Laurelhurst, for example, LEAP is an active and highly coordinated volunteer organization that works to promote disaster preparedness in the community and develop response plans to ensure that the neighborhood is capable of supporting itself in a large-scale event. Laurelhurst participants viewed LEAP positively, citing the group's proactive and communicative practices.

Westport and South Park do not have comparable organizations operating in their communities. The presence of other existing community programs, however, may present opportunities to develop disaster-specific efforts similar to LEAP. In Westport, for example, the city's police department offers Neighborhood Watch programs that train community members to identify and call in suspicious or criminal activity. While one Westport community leader agreed that these programs could serve as a prototypical framework for a future disaster program, he shared that one challenge to overcome would be that there is "no real organization as far as block captains and organizing block watches." He offered that the rural characteristics of Westport made it difficult to garner

enough participation on a single street or block of residents to have a meaningful, coordinated program.

There were varied degrees of confidence in the current state of leadership across communities. Confidence was generally the highest in participants from the Laurelhurst neighborhood. When asked if she thought her community had sufficient leadership in the event of a disaster, one Laurelhurst participant offered "yes" without pause. While another participant from the same community shared that she wasn't necessarily confident in their leadership, she recognized that there were clearly people actively trying to support the community. Participants from the South Park neighborhood were admittedly disconnected from the community, with one sharing that there very well could be sufficient leadership, she simply wouldn't know. She went on to speculate that this was due to a lack of "community-feel" in South Park, not even among the residents on her street.

Participants from Westport shared mixed perspectives about leadership in their community, with some expressing a high degree of confidence in their leaders' capabilities and others sharing doubts about leaders' ability to do much for them in a disaster scenario. One participant hypothesized that the combination of local and regional first response agencies having responsibility for Westport and its surrounding areas made it difficult to know from where, exactly, disaster-time leadership would come. He shared, "I don't know, in the midst of a disaster who would be in charge, it'd be kind of like everybody for themselves." Whether they believed there was sufficient leadership or not, however, all Westport participants expressed a sense that they need to be self-reliant.

The Job Description and Qualifications of a Leader

Existing community leaders overwhelmingly described their role in a disaster as being curators of information to the community. One leader from Westport quickly explained, "The community [would] turn to us [expecting us to fulfill] some sort of a…public information role, or leadership role; being able to identify when and where resources might appear." Community members had similar expectations as most identified communication as a central responsibility of leaders. As one South Park

participant shared, “I think getting as much honest communication to everybody [is part of their job]. So [identify] what the situation is and communicate it [to the community].” Strong leaders were described as being knowledgeable about the community and having close relationships with community members, ensuring they are well connected.

Most participants viewed tasks like community organizing, response planning, and helping to coordinate relevant agencies in a disaster as primary responsibilities for leaders. The considerable scope of these responsibilities also meant that soft-skills often associated with leadership, such as reassuring the public and setting an appropriate tone to calm a community in times of crisis, were just as important. It was also clear that a sense of authority would be especially important for leaders to have in a disaster. Some participants shared concerns that, if a leader was not respected or viewed as having command over a scenario or community, their value as a leader was essentially null. A leader should look and act the part.

Many participants indicated that they expected, assumed, or would like to see leadership come from their local fire department. The reasons frequently provided were the advantageous proximity of fire stations to residential areas and the fact that, as first responders, participants viewed individuals associated with fire departments as trustworthy, capable, and experienced in matters related to disaster response. As one South Park participant shared, “I mentioned the fire department because they're here, they obviously have strengths in those areas, it's not my sense that the fire department is perceived as being biased in any way or untrustworthy.” Another participant from Westport echoed this confidence, stating, “We have a pretty robust fire department which is, I feel, pretty well [equipped] and pretty well led.”

Top-Down Leadership Isn’t Enough

Many participants shared that they were not confident in the present state of leadership in their communities with regards to disaster response. It is important to clarify that most were not referring to a perceived lack in capabilities necessarily, rather their lack of confidence stemmed from concerns about communication and coordination in the post-disaster landscape. Even if leaders were well prepared, in the event of a large-

scale disaster, how did they expect to actually share resources and information with the community given the likely disruption to road and telecommunication networks? Additionally, some participants viewed confidence as a moot point since their communities had never experienced a disaster like a tsunami or major earthquake. One Laurelhurst participant saw experience on the part of leaders as a major factor influencing her confidence, sharing, "I don't feel confident because we haven't experienced the scary earthquake that we're supposed to get. So, I don't think we're really as prepared; I'm not confident. I'm not super confident in the city either."

Participants were also wary of the likelihood that government response to a large-scale disaster will be slow and, as a result, unreliable. One Westport participant made it clear that he managed his expectations of government leadership, sharing, "[A] timely [response] would be nice! But no, I wouldn't leave it to them. I mean, I have my own responsibilities, I don't want to leave it to them to respond in a timely way when there are things I still need to do myself." Participants cited a knowledge that they will be on their own as a reason to not be exceedingly expectant of formal leadership, instead placing an emphasis on individual-level preparedness and neighborly support. As another participant from Laurelhurst stated, "I kind of get the feeling that we're all kind of responsible for ourselves," being sure to clarify that this responsibility extended to residents on her street like the elderly woman a few houses down from her own.

The flexibility of the term "community" means it can be attributed to populations of varied sizes and scales, and this is generally regarded as a positive characteristic. This characteristic, however, can lead to challenges in disaster response. Participants believed agencies with responsibility to larger areas or regions would not prioritize certain communities, adversely impacting if and when participants would receive disaster relief. In a city like Westport, community members include not only residents within the city limits but also households across a number of unincorporated areas bordering the city and individuals like the participants in this study who work within Westport but live outside of the city. As a result, Westport and its broader population of community stakeholders rely on a combination of local and regional first response agencies for emergency support. One Westport participant shared that he lived just outside of

Westport and Aberdeen, another major city in the region. While discussing his level of confidence in potential support from government leaders, he stated, “I sort of feel like I’m in the in-between zone over here. So, I have always anticipated that I would work with my neighbors mostly, to get anything that I need.” It would appear that meaningful and effective disaster leadership should also come from community-based sources in order to avoid an imprudent dependence on government or formal leadership.

Stepping Up as a Leader

A call for leadership can only be answered by individuals who have an appropriate combination of desire, experience, and personality to step into such a role. All participants shared that they were interested in supporting the people around them to some degree. An interest in service was broadly shared by participants, with one from Laurelhurst sharing, “I am currently a deacon at our church so I want to help people and I want to be there as support.” Some participants were eager to offer their knowledge and experience in management and community organizing. “I am really good at planning, figuring out what has to happen…the logistics piece, the infrastructure piece,” a participant from South Park explained. If interest alone were enough to form effective community groups, one would imagine a wide selection of organizations to join across all communities. The absence of numerous community groups, however, indicates that other factors are holding participants back from further acting on their interest.

There were a number of personal factors participants suggested were keeping them from assuming a leadership role in the community. Many pointed to issues of financial instability and a lack of free-time impacting the effort they could put into assuming an additional role with its own sets of responsibilities. One South Park participant shared that his pursuit of financial stability left him with little freedom to work toward much else. He lamented, “If there was a way I could support myself playing music…I would have time; I would not hesitate to…do something that gets me involved with the community.” Another participant from South Park shared that long days of work, supporting her business, preparing food, and maintaining her home left her with few moments of personal time; moments she would prefer to spend relaxing or visiting family.

Other participants shared that they didn't feel they had the right personality-type for leadership. One participant from Laurelhurst was more than happy to support a network of leaders in the community, but she confessed, "I'm kind of more of a helper, that's kind of my style so I'm happy to help, but I don't necessarily want to take on responsibilities and drive things." She went on to describe herself as "thin-skinned," stating that the stresses of receiving criticism for her efforts to help were a considerable deterrent from doing more. It is clearly important for people's diverse interests, experiences and skills, and personality types to be accommodated in a leadership framework if increased participation is a goal.

Fostering a Leadership-receptive Community

In order for leadership to effectively guide and support a community's disaster preparedness and response efforts, community buy-in is essential, regardless of the source of that leadership. One Laurelhurst participant noted, "The people that are focused on this [disaster planning] 24/7 are very aware and are trying to get people ready, but it has to be the will of the people to ultimately follow through and be ready." Getting community members to prioritize their readiness for unpredictable and infrequent events like severe natural disasters is clearly a challenge. Community leaders shared that this is especially true for efforts to practice their evacuation plans and response protocols for disasters like tsunamis. "Getting people to actually take [drills] seriously enough to participate [is a challenge]. Because you can spend hours and hours and months and months planning, and then you actually have to get people to take it seriously and do it," one Westport leader revealed.

Some participants shared that their communities struggle with identifying and fostering interest in community-wide initiatives broadly, making widespread participation in a disaster-specific effort all the more challenging to garner. One participant from South Park speculated that a high turnover rate for residents and a large population of renters contributed to individuals being less interested in community-building. A Westport community leader theorized that an absence of volunteer culture made it difficult to get any program off the ground. He shared, "We try to encourage citizens to…be part of those programs to better their community, their neighborhood. And

we can grow those programs if those citizens are interested in doing that, it's just finding the number of people."

Community interest aside, leaders expressed frustrations over the challenges of even getting the word out about their efforts and ways the community can get involved in the first place. As he tries to garner interest in bringing Washington's Community Emergency Response Team (CERT) Program to Westport, one Westport community leader offered, "I think access and knowing about the opportunity is an issue; being able to message has been a problem." Leaders cited limited access to resources like funding for mail-outs and dedicated communications personnel as the largest barriers to publicizing their programs and activities. Additionally, in a community like Westport which has a considerable retirement population, community leaders proposed that the demographics of the community also played a role. Said another Westport community leader, "We probably have an older age demographic and they probably are not as Twitter savvy as the younger generation is, so they may be lacking or falling behind." Community leaders shared that they generally use a combination of social and traditional media to communicate disaster preparedness and response information, but neither seem to produce much overall awareness with their current states of use. Increasing older populations' interest and level of comfort in accessing social media might be a strategy to overcome cost-related barriers associated with traditional media, and allow community leaders to more effectively use digital platforms that offer unarguably wider coverage than mail-outs and fliers.

An established framework for community-led leadership is critical in order to get people to participate and support those efforts. While imagining the many responsibilities of a community leader, one South Park participant reflected, "How can you have leadership without any infrastructure in place to accomplish any of these things [we're discussing]?" Participants agreed that having a framework for participation in community-wide disaster preparedness and response initiatives would make picking up an activity easy and effortless, mitigating uncertainties about joining in the first place. As one Laurelhurst participant shared, "If I know what the expectation is and…if everything

was explained and the expectations were clearly laid out then yeah, that would make it a lot easier to be amenable to [stepping up as a leader]."

It was again acknowledged that establishing a framework of any kind is costly and labor intensive. Community leaders and members agreed, however, that early investments translate into changes in culture and behavior that mitigate those costs over time. As one South Park participant shared, "I think developing things at the community-level takes time and resources and is not easy, but when you start setting community standards, it becomes a norm." The formation of these norms may directly address concerns raised by Laurelhurst community leaders; as one leader revealed, "We're aware as volunteers in the neighborhood project that we might set things up and then, as we move on to different things, it dwindles; so we're very keen to make sure we set up something that is a permanent good for the neighborhood." A culture of community involvement can be reasonably expected to produce individuals who feel empowered to step up as leaders.

CONCLUSION

Implications

It is vitally important that communities and agencies have conversations about their own preparedness and risks, both agency-to-community and neighbor-to-neighbor. However, this study's findings reveal that even when these conversations are taking place, bringing people to the table and keeping them there is a challenge. Individuals are interested in working together but they need to be *brought* together in order for change or progress to occur at the community level. On the whole, communities need a framework for participation in disaster planning and response efforts, allowing individuals to contribute their diverse and valuable skill sets freely and easily.

Community Preparedness and Response (CPR) Exchange

Clearly, some communities are farther along in the process of organizing community members for disaster response and cultivating a preparedness culture than others. As an example, a group like LEAP offers invaluable support to its own community, but there is no reason its leaders' cumulative experience, trials and errors, and strategies cannot be shared with other communities. For communities, it could prove a worthwhile investment to develop a regular series of workshops aimed at facilitating conversations centered around the "communities-helping-communities" philosophy. At these meetings, representatives from different communities, including individual members, volunteer leaders, and first responders, might share their plans, challenges, and successes with regards to community disaster preparedness and response.

Conversations across communities might also promote conversations within communities. It is in community members' best interest to more freely share information about their levels of preparedness with one another before a disaster and a public workshop might serve as an icebreaker for neighbors to begin having these conversations. Such an intervention could simultaneously address gaps raised by community leaders who shared their struggles keeping outreach and communication to community members current and consistent by supplementing major events they might already hold, like National Night Out. A series of public workshops could facilitate a new and more direct channel from government officials and first responders to active participants and finally to their neighbors and other community members.

In practice, community leaders, be they representatives of government agencies or leaders of community-led organizations, could volunteer their community to participate in an annual or semi-annual Community Preparedness and Response (CPR) Exchange workshop series. These events could be held either in-person or virtually and, much like a "sister cities" concept, one community would be partnered with another (Westport with Laurelhurst for example) to share with and learn from one another throughout the course of the year. A workshop series would then be held for three or four pairs of partnered communities and might consist of two parts: (1) updates from agencies and (2) updates and comments from local community leaders and participants.

Communities with more experience implementing preparedness and response initiatives can present to the others, providing them an opportunity to rehearse and talk through their own plans while giving other communities an opportunity to learn new strategies and ask questions relating to implementation. Finally, an intervention of this nature would serve as a networking opportunity for agency leaders and first responders. In such a setting, leaders can establish and cultivate new interpersonal relationships with leaders in other counties and jurisdictions, relationships community leaders made clear they would leverage in a disaster scenario.

Community Preparedness and Response (CPR) Fund

In order to influence a population's social norms and culture around disasters, communities and agencies must normalize conversations about preparedness and response, making them no less a part of everyday conversations than topics like sports or the weather. It will likely always be a challenge to persuade decision makers to prioritize funding for disaster preparedness and response planning, especially when those funds would being diverted away from pressing needs, but adequately investing in these efforts before an event serves to mitigate human suffering and the potentially overwhelming financial toll emergency response and recovery can have on a community after the fact.

For this reason, money should be allocated toward community outreach broadly, but with a more specific goal of further enabling individuals and agencies to "help themselves," so to speak. Striving for self-sufficiency is not a cost-free endeavor and an individual or single agency is not always in a position to reasonably shoulder those costs. In response to this challenge, one strategy a city might employ is the creation of a dedicated line item within its General Fund to be spent on Community Preparedness and Response (CPR) initiatives. Alternatively, the same concept could be applied to a specific agency's, such as a fire or police department, budget as further outreach and education spending.

As an example, funds allocated under a CPR budget could be used to establish radio education programs. A school or police department might hold recurring Radio Day

events, teaching participants about radio technology and how it is used in disasters. Such an event could also be a partnership with local HAM radio operators, giving them a platform to share their passion and knowledge with their community and allowing the community to become more familiar with their local HAM radio operators. A Radio Day event might also provide participants with NOAA weather and emergency radios to take home, additionally serving as a platform for experts to help those needing assistance setting up their radio.

With a CPR budget a school might even start a Radio Club, bringing HAM radio operators into the classroom to let students explore and cultivate interest and proficiency with the technology. A Radio Club might lead to an operator electing to permanently station their equipment at the school, meaning a potential disaster-time gathering place would have access to the technology and a newly trained population of operators might be present to use it if necessary. Regardless of the specific program CPR funding might be used to support, necessity lies in fostering and integrating emergency capabilities alongside everyday needs and interests.

This fund and similar investments can align with Kretzmann and McKnight's (1993) guide for Asset-Based Community Development (ABCD) by focusing on the assets, capacities, and skills of a community's most in-need members. Centering future investments and interventions around vulnerable populations' contributions to the community, rather than framing progress as a need to make up for deficiencies, can help build greater social cohesion and lift a community up as a whole.

Thoughts on Future Research

For some communities, extensive improvements to information sharing, resource planning, and resource matching are long-term goals due to the community' limited ability to change its institutional, social, spatial, or technological conditions. If this is the case, future research might explore the extent to which targeted improvements in one variable could offset poor performance in another. For example, in a community like Westport where cell and radio service are known to have limited coverage, and improving telecommunications infrastructure can be costly and time consuming, could this

challenge be addressed, and ultimately compensated for, with improvements to the community's resource planning and/or resource matching capabilities? A community struggling to address shortcomings in a single response variable will undoubtedly struggle to address all, meaning it is worth exploring the distinct ways a community can optimize its own disaster aid management.

Limitations

This study had a number of limitations worth addressing. One primary limitation relates to the number of interviews conducted for this study and the specific individuals identified to participate. Though representativeness was not a goal of this study, interviewing more individuals, community members in particular, would have generated more diverse, and potentially conflicting, perspectives on the areas of interest addressed in the interviews. It is also acknowledged that the use of convenience sampling in this study meant that individuals with a history of participation in research and projects relating to disaster preparedness and response were mostly likely to reply to invitations to participate and be subsequently interviewed. In future work, it will be beneficial to target outreach towards individuals and populations whose perspectives are historically underrepresented in qualitative disaster research, particularly ethnic minorities, individuals who speak English as a second language, and individuals from low or extremely low socioeconomic backgrounds.

Additionally, the broad scope of interests this study covers restricted the depth participants could explore when discussing a single area of interest. It would have sufficed to pursue only two or three key areas of interest to allow for more comprehensive exploration into unique perspectives on each. Finally, the interview protocols for community members and leaders were initially developed independent of one another. For this reason, ideas or challenges raised by an individual responding to one interview protocol were not necessarily addressed in the other. In future studies it will be beneficial for the areas of interest explored, and the questions under each, to be parallel in community member and leader interview protocols.

Key Takeaways

Among many findings, this study particularly highlights the acknowledged value of HAM radio from community leaders and members. Further research in disaster planning and response should prioritize outreach to HAM radio operators in order to explore their response plans and ideas regarding future coordination with emergency agencies. Local community leaders and agency representatives should begin identifying and partnering with HAM radio operators in their communities to coordinate their response plans. Individuals and households should focus on the "power of one," building their emergency kits one item at a time or starting disaster-plan conversations with one neighbor.

SOURCES

Blair, Erik. 2015. “A Reflexive Exploration of Two Qualitative Data Coding Techniques.” *Journal of Methods and Measurement in the Social Sciences* 6 (1). doi:10.2458/v6i1.18772.

City of Sendai. 2021. “Towards a Disaster-Resilient and Environmentally-Friendly City.” *Sendai Resilience*. Accessed August 11. https://sendai-resilience.jp/en/efforts/government/development/evacuation_facilities.html.

De Filippi, Primavera, Morshed Mannan, and Wessel Reijers. 2020. “Blockchain as a Confidence Machine: The Problem of Trust & Challenges of Governance.” *Technology in Society* 62: 101284. doi:10.1016/j.techsoc.2020.101284.

Federal Emergency Management Agency. n.d. *Unit 3 Disaster Sequence of Events - State Disaster Management Course – IS 208*.

Hsieh, Hsiu-Fang, and Sarah E. Shannon. 2005. “Three Approaches to Qualitative Content Analysis.” *Qualitative Health Research* 15 (9): 1277–88. doi:10.1177/1049732305276687.

Idziorek, Katherine. 2021. “Beyond Land Use and Building Codes: Disaster Response and the Built Environment,” Natural Hazards Center Researchers Meeting. Virtual conference.

Idziorek, Katherine 2020. “Social Ties, Attitudes, and Community Scale Disaster Preparedness,” 45th Annual Natural Hazards Research & Applications Workshop. Virtual conference.

International Business Machines Corporation. 2021. “What Is Blockchain Technology - IBM BLOCKCHAIN.” *IBM*. Accessed August 11. https://www.ibm.com/topics/what-is-blockchain.

King County. 2019. “King County International Airport-Boeing Field.” *King County International Airport-Boeing Field - King County*. January 3. https://kingcounty.gov/services/airport.aspx.

Kretzmann, John P., and John L. McKnight. 1993. “Building Communities from the Inside Out: A Path Toward Finding and Mobilizing a Community’s Assets.” ACTA Publications.

MacMillan, Katie, and Thomas Koenig. 2004. “The Wow Factor.” *Social Science Computer Review* 22 (2): 179–86. doi:10.1177/0894439303262625.

Saldaña Johnny. 2009. *The Coding Manual for Qualitative Researchers*. Los Angeles, CA, CA: SAGE.

Salehan, Mohammad, Dan J. Kim, and Chulmo Koo. 2018. “A Study of the Effect of Social Trust, Trust in Social Networking Services, and Sharing Attitude, on Two Dimensions of Personal Information Sharing Behavior.” *The Journal of Supercomputing* 74 (8): 3596–3619. doi:10.1007/s11227-016-1790-z.

Seattle Office of Emergency Management. 2021. “Community Emergency Hubs.” *Community Emergency Hubs - Emergency Management*. Accessed August 11. https://www.seattle.gov/emergency-management/prepare/prepare-your-neighborhood/community-emergency-hubs.

Shoalwater Bay Tribe Office of Emergency Management, and Shoalwater Bay Tribe. 2019. *Shoalwater Bay Tribe Tribal Hazard Mitigation Plan*.

Simon, Tomer, Avishay Goldberg, and Bruria Adini. 2015. “Socializing in Emergencies—a Review of the Use of Social Media in Emergency Situations.” *International Journal of Information Management* 35 (5): 609–19. doi:10.1016/j.ijinfomgt.2015.07.001.

VERBI. 2020. “MAXQDA Manual: All You Need to Know to Get Started.” *MAXQDA*. April 1. https://www.maxqda.com/help-mx20/welcome.

Waugh, William L., and Gregory Streib. 2006. “Collaboration and Leadership for Effective Emergency Management.” *Public Administration Review* 66 (s1): 131–40. doi:10.1111/j.1540-6210.2006.00673.x.

Whittaker, Joshua, Blythe McLennan, and John Handmer. 2015. “A Review of Informal Volunteerism in Emergencies and Disasters: Definition, Opportunities and Challenges.” *International Journal of Disaster Risk Reduction* 13: 358–68. doi:10.1016/j.ijdrr.2015.07.010.

APPENDIX A

COMMUNITY MEMBER INTERVIEW PROTOCOL

Area of Investigation	**Goals of Questioning**	**Relevant Questions**
A. Introduction (5 min)	● To introduce participants and establish level of comfort	
B. Communication Platform Functionalities (20 min)	● To identify existing digital and non-digital communication functionalities ● To explore opportunities to improve or add communication functionalities	
C. Place Making and Value Mapping (20 min)	● To identify nodes of activity across the community ● To explore emerging spatial patterns across interviewees	
D. Community-Embedded Leadership (Captains) (20 min)	● To identify preconceived notions of role of captain in terms of activities and commitments ● To explore willingness to assume role of captain	
E. Personal Information Sharing (20 min)	● To identify willingness to share personal information in terms of sensitivity, with whom it can be shared, and when	
F. Emergency Communication (5 min)	● To identify willingness to access emergency communication technology ● To identify the impact of tool ownership on trust and use	

A. Introduction

1. Could you tell me a little bit about how you came to live in your community? Would you say you are close to your neighbors? Why or why not?

B. Community Network Functionalities

2. On the topic of neighborhoods, do you use any digital platforms to communicate with your neighbors? This could be anything like calling them on the phone, texting, Facebook, NextDoor, Twitter, ect.
    If yes, what services or platforms do you use?
    Is there anything these platforms cannot currently do that you wish they could?
    OR
    If no, why?
    What might it take for you to use digital platforms?

C. Place Making and Value Mapping

3. Before the Coronavirus pandemic, what are some locations around your community that you know are popular places for people to gather?
    During the pandemic, are these gathering places the same? If not, are there new gathering places? Where?
4. If you had the ability to place two emergency centers (which would be centralized gathering spaces with emergency resources and information) in your community, where would you put them?[map to be presented]

D. Community-Embedded Leadership (Captains)

5. In the event of a disaster, do you think your neighborhood has sufficient leadership? (tell me what your idea of your community is)
    What activities do you think people in these roles should perform?
    What time commitment do you think this entails on an everyday basis? During a disaster?

6. Do you see yourself as one of the people fulfilling this role currently?
    If yes, why? In what ways specifically?
    OR
    If no, what would it take for you to be willing to fulfill that role?

7. Are you confident in your community leaders' abilities to support you in a disaster? [probes to be added if needed]

E. Personal Information Sharing

8. Information Sharing Matrix Exercise
    Preface: “We know that people tend to be unwilling to share certain personal information outside of an emergency. Because of this concern, researchers are interested in exploring the impacts different privacy and security technologies might have on a person’s willingness to share that information *before* a disaster,

as well as what can be done to help mitigate or eliminate those concerns. We'll begin with me setting up a hypothetical scenario. Do you have any questions before we get started?

"Here is the scenario. Your community has decided to pilot a new app which you could access either on a phone or a computer. Before a disaster, this app allows you to input a piece of information (e.g., your prescription drugs) and indicate with whom you would be comfortable sharing it under a specific circumstance like a natural disaster. The information you will share will not be visible to anyone including the person you indicate you will share the information with, unless that certain circumstance takes place. However, the information will be known to the server that stores the information.

Would this described technology make you comfortable sharing certain information with others in the event of a disaster? Using the following table, please identify which pieces of information you would be willing to share for questions A through E. You can simply write the corresponding number."

a. Which pieces of information are you comfortable being shared with only **close friends and family**?
b. Which pieces of information are you comfortable being shared with **neighbors**?
c. Which pieces of information are you comfortable being shared with **acquaintances**?
d. Which pieces of information are you comfortable being shared with **emergency responders**?
e. Which pieces of information are you comfortable being shared with **anyone**?

Personal Information Sharing			
1. Name	2. Date of Birth	3. Sex/Gender	4. Phone Number
5. Allergies	6. Prescriptions	7. Home Address	8. Email Address

10. Insurance Information	11. Medical Health Record	12. Household Demographics	13. Socioeconomic Status
14. Pet Ownership			

9. Would you be willing to elaborate on your unwillingness to share certain information?

10. Now imagine that the app was designed so that your information could not be visible even to the app's controller, even in the case that an emergency had been declared or some disaster triggered the system. This type of data storage means that your privacy would be guaranteed.
    What, if any, information would you be more willing to share in this scenario?
11. Is there a level of compensation the government could offer that would impact your willingness to share private information?

F. Emergency Communication

12. Are you willing to download an app solely used for emergency communication and resource connection before some future disaster?
13. Are you familiar with HAM radio?
    Do you know anyone in your community who can operate a HAM radio?
    Do you think you would contact a HAM radio operator in an emergency? Why or Why not?

COMMUNITY LEADER (OFFICIAL CAPACITY) INTERVIEW PROTOCOL

Area of Investigation	**Aims and Goals of Questioning**	**Relevant Questions**
A. Interviewee Background (5 min)	● To establish a rapport and increase level of comfort ● To establish basic understanding of interviewee's role and responsibilities	
B. Resource Capability	● To establish what the	

Identification (10 min)	interviewee's agency is responsible for, and able to provide in a disaster event	
C. Resource Need Identification (10 min)	● To establish what resources the interviewee's agency will need support to provide, deliver, or distribute	
D. Intra-agency Resource Matching Mechanisms (within) (20 min)	● To identify how resource matching is performed within the interviewee's agency	
E. Inter-agency Resource Matching Mechanisms (across) (20 min)	● To identify how resource matching is performed between the interviewee's agency and others	
F. Functionalities (5 min)	● To identify how matching mechanisms are being coordinated ● To explore what opportunities exist to improve/expand use of existing functionalities and develop new ones	

A. Interviewee Background

1. Could you tell me a bit about your (work experience) agency and your current role there?
    How long have you worked there?
    What were your past roles and/or responsibilities?

B. Resource Capability Identification

2. In the event of a disaster, can you talk me through what resources and support your agency/organization is capable of providing to the affected community?
    Are there gaps between what you are capable of providing and what you might be expected to provide? How so?
    How would these resources be distributed?
    Where are these resources stored across the community?
    How would the community's needs be communicated to your agency?

3. In what capacity do you serve on the ground disaster response?

How does your organization plan to function if you are not there/not able to access the affected community?

C. Resource Need Identification

4. In the event of a disaster, what resources would your agency need additional support in order to provide?
    - In terms of providing the resource itself?
    - In terms of the distribution of the resource?
    - What agencies are providing this support? (Who do you rely on?)
    - What agencies should be providing additional support?

D. Intra-agency Resource Matching Mechanisms

5. How is (that coordination managed) resource matching coordinated and executed within your agency (between departments)?
    - What gaps are generated by operating in this way?
    - How do you think communication and coordination within your agency could be improved?

E. Inter-agency Resource Matching Mechanisms

6. How is resource matching coordinated and executed between/across your agency and others?
    - What gaps/shortcomings do you think are generated by operating in this way?
    - How do you think communication and coordination between your agency and others could be improved?

F. Functionalities

7. What platforms do you use to coordinate resource sharing or matching within or across agencies?
    - What platforms do you use to coordinate and communicate with the community?
8. What might you like to see in terms of new functionalities of a new platform (or to enhance a platform)?
9. What, if any, personal information would be helpful to have from community members before an emergency was declared?
10. How might community leadership, more grassroots efforts at a smaller scale, impact your agency? Would this be beneficial to you?
    - What obstacles are there to doing this?
    - What challenges might this bring?