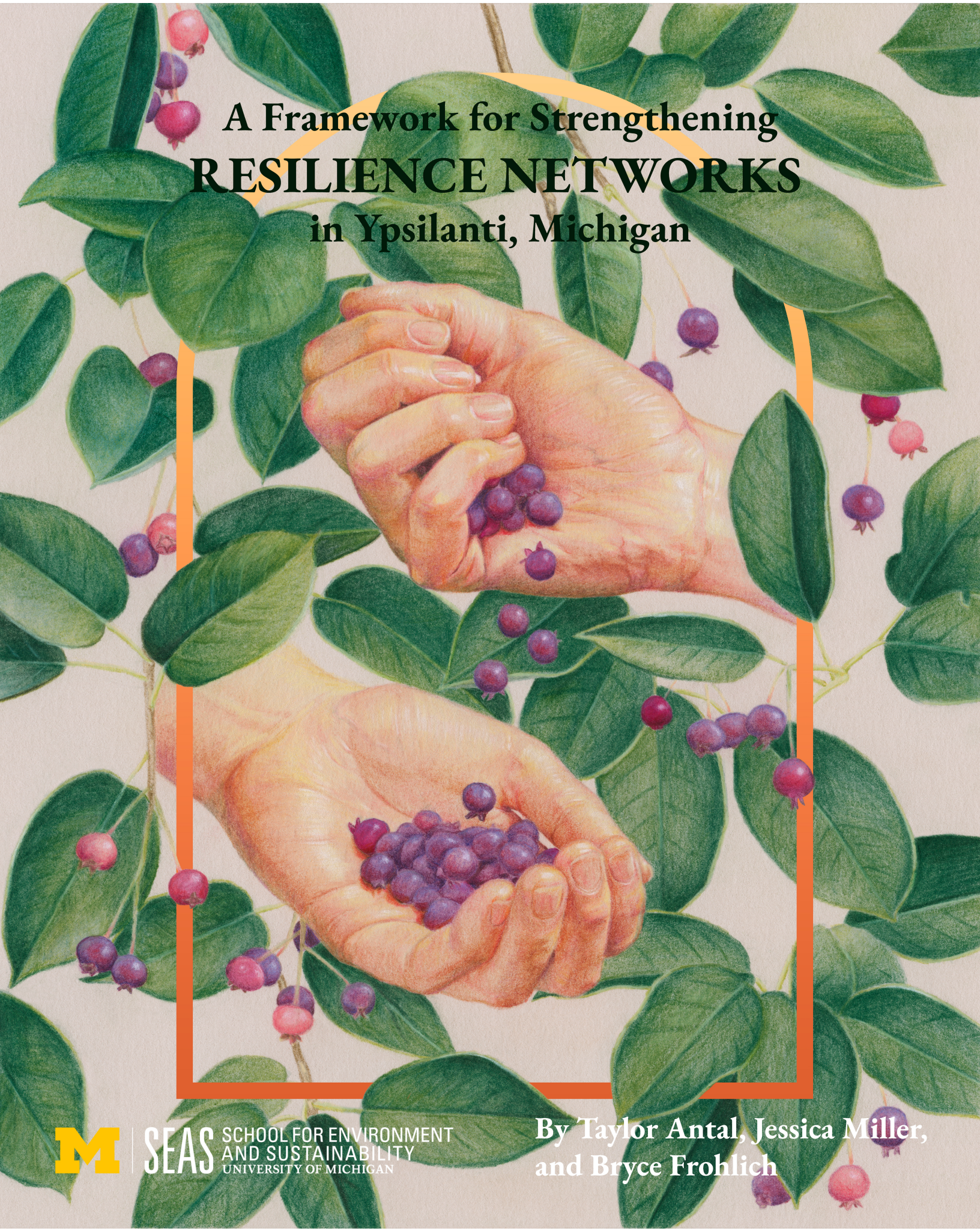


A Framework for Strengthening RESILIENCE NETWORKS in Ypsilanti, Michigan

SEAS SCHOOL FOR ENVIRONMENT AND SUSTAINABILITY
UNIVERSITY OF MICHIGAN

By Taylor Antal, Jessica Miller, and Bryce Frohlich

A Framework for Strengthening Resilience Networks in Ypsilanti, Michigan

by

Taylor Antal

Bryce Frohlich

Jessica Miller

An integrated research seminar project submitted

in partial fulfillment of the requirements

for the degree of

Master of Science

(Environment and Sustainability)

in the University of Michigan

April 2022

Practicum Advisor:

Professor Raymond De Young

Abstract

Extreme weather events are increasing in magnitude and frequency around the world. In the work to avert these worsening consequences, there is a growing need to develop resilience at the local level. Within a community, a climate resilience network is an interconnected group of partners prepared to deal with, recover from, and adapt to the impacts of climate change. The present study investigates what is needed for development of a resilience network in the City of Ypsilanti, located within Washtenaw County in Southeast Michigan. 132 survey participants and 5 interview participants provided insight into the level of concern, resource needs, and influence of commitment that exists in the community. Findings from this research indicate that there is already a strong sense of social cohesion and community pride among Ypsilanti residents. These relationships provide a strong foundation in the development of a resilience network.

Despite the existence of strong community bonds, Ypsilanti still has a need for more resources and greater preparation. When comparing physical and emotional needs, results suggest that physical resources are the most important resource-type to focus on within the community. Additionally, survey results indicate that there is a moderate level of concern for extreme weather events in Ypsilanti. Two independent predictors were found for resource needs. The first, level of concern, was a predictor for both physical and emotional needs. The second, level of commitment (both previous and future), was established as a predictor for only physical resource needs. Thus, increasing the level of concern while encouraging greater buy-in to community resilience efforts through commitment are important steps in developing a resilience network in Ypsilanti.

A Framework for Strengthening Resilience Networks in Ypsilanti, Michigan

Research Team

Jessica Miller - jessfm@umich.edu
Taylor Antal - tayantal@umich.edu
Bryce Frohlich - bfroh@umich.edu

Advisor

Dr. Raymond DeYoung - rdeyoung@umich.edu

Acknowledgments

This project would not have been possible without the support and encouragement from our advisor, Professor Raymond De Young, who inspired us to consider the power of community and the importance of building resilience through the Localization Seminar. Additionally, we want to acknowledge Grant Faber, Desmond Kirwan, Paige Porter, and Trevor McCarty whose work on the first iteration of this project is referenced throughout our report. Their initial research on resilience in Ypsilanti laid much of the foundational work for the current study, making this continued research possible. We would also like to extend great thanks to the Ypsilanti Sustainability Commission for their continued support for the second iteration of this project and their commitment to bettering their community. We thank the Ypsilanti community members that took the time to speak with us about their experiences. The incredible artwork that you see throughout this report was created by Jessica Tenbusch, an Ypsilanti-based artist. This project team also gives thanks to Kristin Baja and the Urban Sustainability Directors Network, whose work in reporting on community resilience hubs greatly inspired the foundations for both iterations of this project.

Artwork

The works displayed on the cover of and inside this report were designed by Ypsilanti-based artist Jessica Tenbusch. These pieces were commissioned exclusively for this project. You can find more about Jessica's (@jessicatenbusch) work at her website www.jessicatenbusch.com.

Table of Contents

Key Terms

Adaptive Capacity - the ability to adjust or respond to impacts and take advantage of opportunities.

Block Leader - a trusted individual within a neighborhood, responsible for similar aspects of what a physical hub can provide.

Community – a group of people connected by a shared place, attitudes, passions, or goals.

Downshift - the inevitable response to the climate crisis that will require reduced consumption, curtailed mobility and decentralized responses to community needs

Mutual Aid – a form of community-wide social connection and participation, where all members are cared for by one another and new social bonds are forged.

Pattern Language - a structured composition of design-oriented solutions that when combined, form a type of language.

Qualtrics - digital software program utilized to develop, write, and distribute surveys.

Resilience – the adaptive ability to resist and recover from hardship.

Resilience Hub - physical locations intended to support community member's everyday needs and assist in resource distribution prior to, during, and post-significant stressors (USDN, 2022).

Resilience Network – an interconnected group of resilience-oriented partners and resources in a community.

Social and Emotional Needs – concepts that residents find important for supporting social health, mental health, and wellbeing.

Social Vulnerability - the degree to which people, institutions, systems, or communities are susceptible to and unable to cope with adverse effects of extreme weather and climate.

Executive Summary

Background

As extreme weather events around the world increase in both frequency and magnitude, available resources and national support systems continue to dwindle. Throughout this, a downshift will be the inevitable response to the climate crisis, requiring reduced consumption, curtailed mobility, and decentralized responses to community needs. As a result, building localized resilience is more important than ever as we envision this new climate normal. This project focuses on the City of Ypsilanti, located in Washtenaw County in Southeast Michigan. Dating back over 12,000 years ago, Ypsilanti's shared history encompasses a strong sense of community pride and diversity. Since no area is immune to the consequences of climate change, this research aims to serve as a guideline for similar localized resilience building efforts in other communities.

Based on the recommendations of the first iteration of this project (Faber et al., 2021), this report focuses on building a resilience network in Ypsilanti, Michigan. This interconnected group of places, organizations, resources, and people within a community will act as a support system between community members, creating an infrastructure that does not put all the community's "eggs in one basket". This will be supplemented with a pattern language guidebook which acts as a collection of design-oriented solutions that can be applied to community resilience. A pattern language guidebook allows for a bottom-up approach to be used in communities' climate adaptation, offering resources in which a community can be empowered to leverage on their own accord. Within this, this project proposes the inclusion of community members in the establishment of the network. Greater community participation will create a foundation of trust and an overall more durable resilience network.

Methods

To strengthen a resilience network within Ypsilanti and develop a pattern language guidebook that centered around the community's needs, wants, and desires, our project team gathered community input through a survey and interviews.

The survey aimed to measure Ypsilanti residents' level of concern for climate instability in the community. It also aimed to determine which *physical resources* were identified as most important by Ypsilanti community members in response to emergency events. Additionally, the survey intended to measure which resources were identified as most important by Ypsilanti community members in the response to *emotional distress* caused by climate instability. Participants were also asked which resources were available in Ypsilanti and where those resources could be accessed. In addition, demographic questions were provided including age, ethnicity, and education level. Lastly, participants were asked how long they have lived in Ypsilanti and how long they intend to live there. 132 participants who were all residents of Ypsilanti, MI and ranged in ages from 18 to 79 participated in the survey. (See Table 1 and Figures 3-7 for demographic distributions). To create and distribute the survey, the Qualtrics

operating system was used. The survey was distributed via an anonymous link that was sent by the project team to pre-identified community leaders whose relationship had been established by the first iteration of the project (Faber et al., 2021), via snowball sampling, and via a second anonymous link posted on various social media platforms.

This study also utilized the interview guide developed and piloted by the first iteration of this project's team (Faber et al., 2020, 83-84) (Appendix B). The interview guide questions were separated into three distinct categories to gauge residents' 1) material needs, 2) social and emotional needs, and 3) potential preferences in approaches to building community resilience through utilizing a block leader model, a physical location, or a blend of the two. 5 Ypsilanti residents (Township of Ypsilanti and City of Ypsilanti) 18 years or older were interviewed in a one hour virtual discussion via Zoom. All participants voluntarily participated in the interview process and were reached via a snowball sampling of contacts made through individuals who completed the project survey.

Results

Throughout this research, our team found that the City of Ypsilanti has a need for more resources and greater preparation. However, it is still important that this research continues to assess residents on their specific needs. Based on this, our first recommendation is to provide in-person surveying and interviewing and widen the interview and survey distribution area. The network is not intended to end at city boundaries. Thus, merging this research to the county level to survey residential areas outside of the city that were not represented in the current study is an important next step.

Within our results, physical resource needs such as greater access to food and food distribution were established as the main priority by Ypsilanti residents. Thus, our second recommendation is that this resilience network be utilized to address those needs first. This can be accomplished by continuing to develop the pattern language guidebook through cooperative action. While this is a time intensive process, building trust and strengthening social relationships at the community level is an important part of this process. We suggest starting by holding more in-person engagements and events within neighborhoods. As residents take on leadership roles within the resilience building process, they should be compensated for their time and knowledge.

Additionally, results from this research showed a moderate level of concern for extreme weather events among Ypsilanti residents. Within this study, level of concern served as a predictor for both physical and emotional resource needs. Those who were more concerned had a greater awareness of which resources existed in the community and saw a greater need for more resources to be established. Increasing the level of concern for climate change related events is a necessary part of building and developing a resilience network in Ypsilanti. Therefore, our final recommendation includes turning patterns into specific community level

educational workshops. This will not only teach residents the importance of developing localized climate resilience, but will get them engaged in the process and establish feelings of wide-spread social cohesion and competency.

Introduction

Purpose and Project Summary

This project aims to address how communities in the United States could identify collective desires to establish resilience networks and increase local adaptive capacity in the face of increasing climate instability. This second iteration of the Ypsilanti Community Resilience Project continues to work within the context of Ypsilanti, Michigan (see Faber et al., 2021) to apply the framework of this research to other areas. In the past two years, the world has witnessed some of the most severe climate events in recorded history and a global pandemic that has highlighted the need for greater systems change. Government delay or inaction when extreme events occur can leave citizens vulnerable and without the necessary resources to respond effectively. Building resilience at the community level allows citizens to act without the need for outside assistance and with a quicker response time than government intervention.

The deliverables from this project serve as a guide to assessing perceptions of climate risks and identifying community resources that are seen as a priority for increasing climate resilience. Although this project focuses on Ypsilanti, a resilience network's reach can expand well beyond a single brick and mortar location and adaptive strategies to various climate events can be made generalizable. The findings from this report will help Ypsilanti residents and decision-makers in gathering data, advancing program proposals, and continuing to strengthen Ypsilanti community resilience networks.

Climate challenges, disruptions, and Southeast Michigan

Extreme weather events around the world are increasing in both frequency and magnitude (Intergovernmental Panel on Climate Change (IPCC), 2021). In 2021, 40% of Americans lived in counties that were affected by extreme weather events. On a global level, the world experienced 21 climate related events that resulted in the death of at least one individual in December of 2021 alone (Kaplan & Ba Tran, 2022). A study done by the United Nations Office for Disaster Risk Reduction highlights just how much these events have increased and worsened in recent years (Pavlinovic, 2021). The first data points analyzed extreme weather events that occurred between 1980 and 1999. In this period, 4,212 natural disasters occurred, claiming 1.19 million lives, and causing $1.63 trillion in economic losses. The period between 2000 and 2019 saw a significant increase in these events with data showing that 7,348 major natural disasters occurred around the world, killing 1.23 million people, and resulting in $2.97 trillion in global economic losses (Pavlinovic, 2021). The phenomenon of climate change has already, or will soon, impact everyone in the world in one way or another (IPCC, 2021).

While understanding the increasing intensity of climate challenges on a global level is fundamental, the focus of this report lies on Ypsilanti, a small city in Southeast Michigan composed of 20,648 individuals (United States Census Bureau, 2021). Compared with other places in the world, this region has remained fairly untouched by major natural disasters. Recent weather events in the area, however, have not proven to be as kind as they were in the

past. In the last century, temperatures in Southeast Michigan have increased between 2° to 4 ° Fahrenheit with winter months seeing the greatest increase in average temperature (GLISA, 2022). As a result, ice on the Great Lakes is forming later in the year and melting earlier in the spring. Looking at Michigan as a whole, GLISA (2022) has predicted that the state will see a temperature increase of 6° to 11° Fahrenheit resulting in a fivefold increase in heat wave days by the year 2050. In a region that has historically rarely seen temperatures rise above 90° Fahrenheit, most homes do not have air conditioning. This absence will have a compounding effect, leading to a reduced availability of related resources such as medical supplies, battery powered fans, or cooling center vacancies. With a heightened need to respond to more heat related emergencies, the demand for these resources is expected to increase.

Rising precipitation proves to be another major climate challenge impacting Southeast Michigan. In the last 50 years, precipitation levels have risen between 5 and 10% with heavy precipitation events increasing by 34% (GLISA, 2022). The effects of this are detrimental to the natural environment, public health, and the economy. For example, one heavy rainfall in Southeast Michigan in 2014 resulted in a 10-billion-gallon overflow of sewage into Lake St. Clair and Lake Erie (Lawrence, 2014). Because of bacterial contamination from sewage overflows, it is unsafe to swim in the Detroit or Rouge river after a rainfall. To add, it is not uncommon for drinking water bans to be placed in surrounding areas after heavy rain as many sicknesses and even seven deaths have been reported from drinking toxic water in recent years (Lawrence, 2014). With heavy rainfalls and severe thunderstorms in the region projected to intensify, more sewer overflows are anticipated. This will result in greater pollution of surrounding watersheds and beaches, affecting the wellness of wildlife and humans in the area. While Michigan is often viewed as one of the best places to live in the face of climate change, these extreme events highlight that its residents must also begin to prepare for an inevitable transition to this new normal shaped by climate instability.

As a part of Southeast Michigan, Ypsilanti specifically has already begun to experience the consequences of the increase in extreme weather events. On September 14, 2021 multiple rounds of severe thunderstorms left many residents in a compromising position for an extended period of time. The headline of a local newspaper after the event read, “Severe thunderstorms exit Michigan, leaving thousands in the dark, freeway flooding” (Hicks, 2021). With no power for days on end, individuals were left without access to hot water, and any food that had been previously refrigerated quickly spoiled. One unfortunate outcome of this is increasing levels of criminal activity such as theft and vandalism. However, there are also many potential long term consequences such as deteriorating physical health, emotional distress, and financial insecurity related to recurring climate challenges like this one (Center for Disease Control and Prevention, 2021).

With the frequency and intensity of these events projected to increase in coming years, emergency efforts to counter the rise in human fatalities and economic losses will dissipate.

Throughout the duration of the COVID-19 pandemic the world has faced shortages in personal protective equipment for not only the general public, but for those deemed essential workers as well. Healthcare professionals across the globe have found themselves in uncharted waters as they are forced to make medical decisions based on the absence of lifesaving resources. Since strong social relationships are essential to successfully deal with climate change (Carmen et al., 2022), community divisions over how to best respond to extreme events (e.g., COVID-19) only hinders the potential for a more resilient future.

The experiences many people have had with a lack of resources as a result of the pandemic are expected to become a commonality as extreme events continue to worsen (National Oceanic and Atmospheric Association, 2019). According to Princen and DeYoung (2012), the threat of extreme weather on humans is widely unappreciated as the reliability of essential infrastructure tends to decline as population vulnerability rises. Thus, the transition to living in a world with fewer resources appears to be inevitable. However, the implications of this downshift do not all have to be negative. A positive response through collective community actions can make this transition more manageable and even increase psychological well-being (Princen & De Young, 2012). As detailed above, there are many potential consequences related to increasing climate instability. The current study aims to evaluate these consequences within the context of Ypsilanti, identifying what resources are already present and what resources the community needs to further develop their resilience.

Resilience Hubs and Networks

As we work to avert the worsening consequences of climate change, there is an increasing need to become resilient to those impacts. Originating in the 1960's, climate resilience is a relatively new area of study (Folke, 2006). It includes the ability to prepare for, recover from, and adapt to the impacts related to climate change. Responding to the climate crisis is often associated with isolated or acute events such as heat waves, hurricanes, or wildfires. Therefore, developing resilience at the local level will allow for a more appropriate and planned response to chronic climate change-related events such as worsening air quality and rising sea levels (Center for Climate and Energy Solutions, 2019). According to Cutter et al. (2008), resilient communities are much less vulnerable to the consequences of climate change. In order to build resilience, a community must have the tools to respond and recover from disasters in a way that includes inherent conditions of vulnerability that exist within the community. This includes absorbing impacts prior to and after an event. In response to a threat, a resilient community will have the ability to reorganize, change, and learn.

As discussed, the unavoidable impacts of climate change will soon, if they have not already, impact everyone at some level. While achieving resilience is not something that can be done effectively at the individual level, the response to climate change at the federal level is often slow-moving (Hogue, 2020). The compounding effect of these factors reinforces the need for localized and equitable resilience planning. Fortunately, there are various community-level

resilience initiatives increasing in popularity across the globe as an approach to climate adaptation today. For the purpose of the current study, the focus will be on resilience hubs, and primarily, resilience networks.

Resilience hubs are physical locations intended to support community members' everyday needs and assist in resource distribution prior to, during, and after significant stressors (USDN, 2022). Hubs can serve a variety of purposes which are ultimately shaped by the community and their respective needs and desires. A bottom-up participatory approach, involving interviews, surveys, and workshops can be used to determine the resources and services that a community wants in a hub. In general, hubs are trusted and accessible locations that may serve as resource provisioning locations and/or as meeting spaces for community members to spread knowledge and information, hold events, and access resources. Additionally, resilience hubs utilize alternative energy sources and energy storage systems so that when electrical grids are disrupted, they are still operable and able to assist the community. Implementing resilience hubs in communities enhances their adaptive capacity to climate-related emergencies and helps facilitate a transition to a new normal: one in which communities must undergo and recover from increasingly severe and more frequent climate change impacts.

Contrastingly to hubs, resilience networks are not solely based on physical locations, but rather act as support systems between community members. This idea of a network comes from the ability of citizens to access resources that exist within their communities and can operate outside of or in addition to a physical hub space. The inability for people to safely gather at one location during the course of this pandemic highlights the necessity of a resilience network. A benefit of building resilience networks alongside resilience hubs is that it creates an infrastructure that does not put all of the community's "eggs in one basket". For example, if an extreme weather event occurs and makes the resilience hub inaccessible, the community becomes more vulnerable and is less able to respond to the situation at hand. The same benefits apply to everyday needs or deeper community stressors. An individual will not have to rely on traveling to a physical hub if their needs are able to be met in their neighborhood or through an existing resilience network.

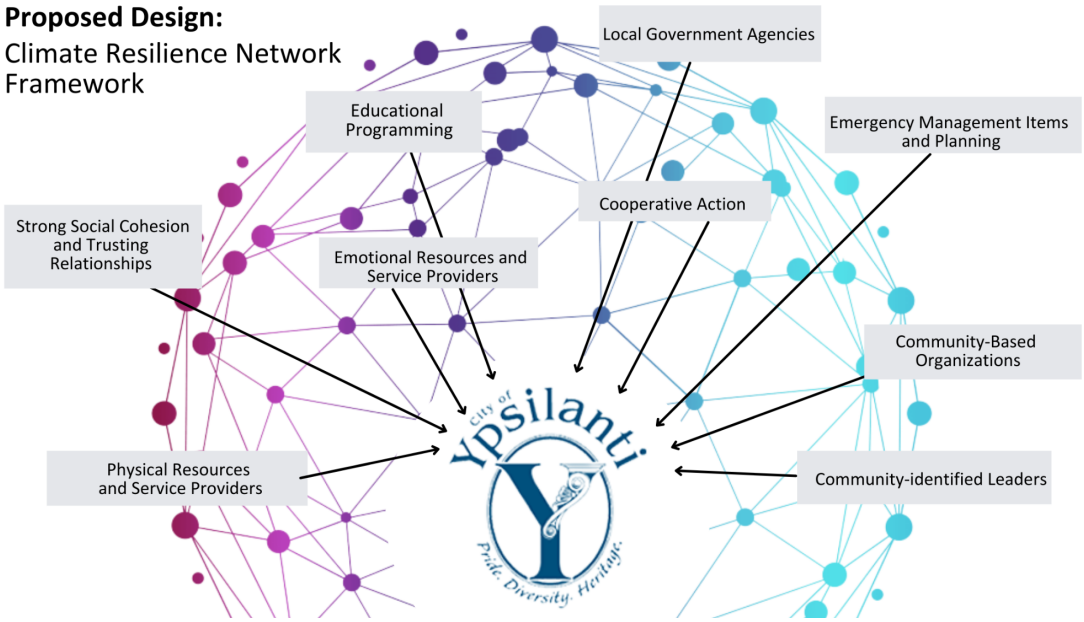


Figure 1. Visual representation of components necessary to make up a resilience network. This could be generalized to any community

The development of resilience networks requires extensive planning and a strong partnership between trusted community-based organizations (CBOs), community members, and local government. The following CBOs could prove useful in the planning process of resilience networks as they may have access to, and knowledge of, resources and services that will be required (Baja, 2018):

- Educational programming leadership groups
- Resource and service providers
- Advocacy-based organizations
- Faith-based groups

Similarly, the USDN (Baja, 2018) has also identified the following local government agencies as important to involve in the development of a resilience network:

- Health Department
- Housing Department
- Transportation Department
- Sustainability Department
- Emergency Management
- Public Works

Allowing community members to play a role in establishing a resilience network is a critical part of this process. This partnership increases the likelihood of greater community participation and support (Baja, 2018). Additionally, those who live in the community and therefore require resources needed for resilience will have the greatest knowledge of which resources and services already exist, and which resources they are in greatest need of. Resilience networks created in partnership with trusted community members are therefore stronger and more durable. Within this, a block leader (Figure 2) should be considered as a potential point of connection between these organizing efforts and the greater community. These individuals should be chosen by residents of that neighborhood to ensure they are trusted within the community. These individuals serve as a community ambassador within a given neighborhood, lead resilience efforts, store resources in their home, provide educational tools and direct assistance in some cases (Faber et al., 2021). Within this model, however, it is important to acknowledge the responsibility and time commitment that comes with this role. Establishing a resilience network in conjunction with block leaders will provide a decentralized community-wide support system.

Figure 2. Visualization of characteristics and responsibilities of block leaders

Resilience networks operate well in tandem with physical hubs and block leader approaches to support a holistic approach to community resilience. To add, once a strong resilience network is established, much of the groundwork for the development of a physical hub will be set. Although these networks have high maintenance requirements and logistical

obstacles around program durability or ability to allocate resources, creating resilience networks may be a more financially viable solution that highlights existing resources already within communities (City of Ann Arbor Office of Sustainability and Innovations, 2020).

Resilience Network Examples

While resilience networks are a fairly new concept, there are examples of these frameworks that have recently been developed and are currently operating to support communities around the world. The 100 Resilient Cities Program was pioneered in 2013 by the Rockefeller Foundation and has since transformed into the Resilience Cities Network which operates in the Asia Pacific, the Middle East, Latin America, the Caribbean, and Africa to implement holistic urban resilience. This program is city-led and impact focused, developed with the aim to help communities become self-sustainable in combating the climate crisis (Resilient Cities Network, 2022).

With an initial 100 cities implementing resilience networks through this program, it is impossible to discuss the details of all these networks in depth. However, our team found it may be helpful to highlight how the development of a resilience network is playing out in Chicago. Despite being much larger in population than Ypsilanti, Chicago provides one example of a resilience network's implementation in a city that experiences similar climate patterns to Ypsilanti. The first step in their resilience plan included mapping out and analyzing neighborhoods to assess their vulnerability (100 Resilient Cities, 2022). Based on these assessments, the city has worked to develop tools to combat the significant unequal distribution of resources and opportunities that exist. With blizzards, flooding, and high-wind storms being their biggest climate-related concerns, the city of Chicago is developing preparation and response plans. A combination of CBOs, government agencies, and community members have partnered to establish shared goals, making sure expectations for this network are the same. While this is a long process, the detailed plans created through community collaboration have provided residents with a resource in and of itself.

Separate from the 100 Resilient Cities initiative, Climate Resilient Communities (CRC) was created in 2020 to provide under-resourced communities in the Bay Area of California with the tools to develop a resilience network. Since the launch of this organization, CRC team members have worked in these communities to learn their specific needs while providing residents with the opportunity to make sure their voices are heard (Climate Resilient Communities, 2020). One major success outlined in the 2021 Annual Report was the Climate Change Community Teams (CCCTs). These teams consist of community residents, CBOs, and government officials, operating as a vehicle to express neighborhood priorities (Climate Resilient Communities, 2021). Additionally, CCCTs have contributed to an upsurge in environmentally responsible behaviors in the area, proposing the idea for widespread rain gardens and even securing grants to prevent habitat loss and restore nearby wetlands. Moving forward, they have just begun the process of enrolling participants in their "Our Communities,

Our Bay" study which is looking to measure the adaptation potential local low-income households have to the changing climate. This study is a huge step forward in the realm of climate-based community resilience research as one of the largest and longest studies of climate change ever conducted.

While there are plenty of examples of resilience network plans that are currently being implemented across the globe, the novelty of these programs makes it difficult to assess specific outcomes and which aspects of these frameworks are most effective. With the two examples provided in this report, we attempted to highlight that the planning and development of these networks is largely dependent on the needs of each community. For example, with Chicago being the third largest city in the United States, their plan had to include narrowing down the resource needs based on particular neighborhoods. Additionally, as an important cultural and economic center and transportation hub, this large city needs to take factors that are not a concern to smaller communities into account. Contrastingly, the Bay Area communities that the CRC works with have a much different set of needs specifically regarding the high level of diversity that exists in the area. Therefore, as we work to develop plans for a resilience network in Ypsilanti, Michigan, it is important to acknowledge that no single previous framework will be a perfect fit for this community.

Historical Context of Ypsilanti

To aid with the development of a resilience network in Ypsilanti, the current study aims to use the approach of cooperative action. Using a cooperative action framework emphasizes the active role of local residents in the development of community interventions. This has proven to be much more effective in the long term success of implementing behavior change within a community. To successfully follow a cooperative action framework, it is important to first learn the community's history (Urban Sustainability Directors Network, 2019). A vulnerability assessment of Ypsilanti was completed by Faber et al. (2021) to "eliminate the need for multiple research groups to periodically revisit a community and re-collect data." This vulnerability assessment was therefore analyzed prior to engaging with residents of Ypsilanti for the current study. While the results of the assessment are extensive, it is important to convey the following elements related to the community's racial distribution and level of poverty before moving forward.

The existence of human inhabitants in Ypsilanti dates back to over 12,000 years ago. While the intricacies of this history is a lot to unpack, certain aspects have played an important role in shaping the Ypsilanti that exists today. As a stop on the underground railroad, the population of black residents tripled in Ypsilanti in the 1850's and 1860's. During this period, escaped slaves and others fleeing from racial violence stopped in the southern part of city to build homes for themselves. The 1920's, 1930's, and World War II era each saw the black population in Ypsilanti double. This is largely attributed to the Great Migration or exodus of Black Americans from the south that took place between 1916 and 1970, causing a major

demographic and cultural shift in large cities in both the northern and southern United States (Wiggan, 2018, 30-33). Although Ypsilanti is not considered a major city, its close proximity to Detroit also resulted in the migration of people looking to flee from racial discrimination. Although these individuals were able to find a sense of security by escaping a lot of the racial violence they had experienced in the southern parts of the United States, structural racism and systematic oppression is still very prevalent in present-day American society.

When addressing challenges surrounding climate change and environmental protection today, considering topics of environmental justice related to race is critical. People of color are often discriminated against in environmental policymaking, enforcement of environmental rules and regulations. Additionally, communities of color are intentionally targeted as sites for waste disposal and polluting industries (Lester, 2018). According to the most recent census results, Ypsilanti's population of 20,649 is 28.2% black and 64.9% white (United States Census Bureau, 2021). Comparatively, the state of Michigan has a black population of 14.1% (United States Census Bureau, 2021). Therefore, when comparing this data to that of the state of Michigan, Ypsilanti is home to a significantly higher percentage of black individuals. Therefore, it is critical to understand Ypsilanti's history and current racial and ethnic composition when determining how to implement a resilience network.

Race, however, is not the only factor to consider when discussing topics of environmental justice. Research indicates that low-income communities and people of color who already experience structural racism, fewer resources, inadequate infrastructure, food insecurity, and health disparities are more vulnerable to negative impacts of climate change (American Public Health Association, 2021). In Ypsilanti, 31.6% of residents currently live below the poverty line (United States Census Bureau, 2021). When comparing this data to poverty levels in Michigan and the United States, data collected by the U.S. Census Bureau in 2020 determined Michigan's poverty rate is 10.6%, and the poverty rate of the U.S. is 11.4%. There are various factors that have contributed to Ypsilanti's high poverty rate over time. Faber et al. (2021) explained how the construction of I-94 in 1960 has made it so that people traveling en route to Chicago no longer have to pass through downtown Ypsilanti as they previously had. Additional factors which are further detailed in the vulnerability assessment conducted by Faber et al. (2021) include the passing of the North American Free Trade Agreement by President Clinton in the 1990s, out-of-state corporations purchasing large volumes of subsidized Section 8 housing in the city, and the tax-exempt Eastern Michigan University owning 40% of the city's property. These components in conjunction with issues of structural racism and systemic oppression have compounded, leading to the high poverty rate that exists in present-day Ypsilanti.

As a result of Ypsilanti's high poverty rates and population of people of color when compared with that of Michigan and the United States, one goal of this project is to provide a channel for Ypsilanti residents to build community resilience from within. As a team located

outside of the community, gaining an understanding of these areas of vulnerability was necessary in establishing trust. However, it is also important to touch on areas identified in Ypsilanti's recent history that indicate the community is highly motivated to combat the negative effects of climate change. As the owner and operator of the Ypsilanti Daily Press from 1917 until his death in 1958, George C. Handy was a prominent figure in the community. His role as one of Ypsilanti's greatest advocates allowed him to play a major part in the development of the strong sense of pride that exists in present day Ypsilanti. His motto, "Consider the good of Ypsilanti first" (Mackowiak, 2008) and career long focus on the growth of the city is something that our project team has worked to embrace in the development of our own education on the rich culture and history of this community and the people that call it their home.

The sense of motivation and pride engrained in Ypsilanti residents has already laid a lot of the groundwork for building community resilience. Annual events and festivals such as DIYpsi, Ypsilanti Heritage Festival, Michigan ElvisFest, Orphan Car Festival, and the Michigan Brewers Guild Summer Beer Festival highlight the pride residents have in showing off their community while simultaneously building stronger relationships among residents (Ypsi Real, 2022). As the first Michigan city to pass a living wage ordinance in 1990, and one of the first cities in Michigan to dramatically reduce the penalty for use of cannabis (Faber et al, 2021), Ypsilanti's progressive history demonstrates the community-wide desire for growth and resilience. These examples only provide a glimpse into what life in Ypsilanti looks like. However, understanding their progress, pride, and hopes for the future is key as the current study approaches the research goal of working with community members to collaboratively build a sustainable and effective resilience network.

Pattern Language

A Pattern Language by Christopher Alexander, Sara Ishikawa, and Murray Silverstein (1977) piloted the idea that people could design their own rooms, buildings, neighborhoods, or towns through the use of his book. With each pattern presented in the same clear format, the audience of *A Pattern Language* can easily choose which patterns, or recurring elements of an environment, they want to utilize to develop their own physical construction(s). Each pattern is formatted to include an example of the pattern, the context of the issue, evidence for how the pattern solves an issue, and how to implement the solution (Alexander et al., 1977). The structured composition is intended to connect all patterns to one another such that when they are combined, they form a type of language. Additionally, it allows the reader to determine what is useful to them and alter the pattern or solution as they see fit. Each pattern follows a specific sequence which is deemed as critical to its language. The language begins with broad patterns for larger scales, then gradually transitions to smaller patterns, or the details of a creation. For example, a neighborhood is a large pattern, a green space is an intermediate pattern, and a garden wall is a small pattern. Each of these patterns differing in scale are seen as connected to one another and essential for the project's development. Thus, no single pattern

is deemed as its own entity as it requires either smaller and/or larger patterns to complete it (Alexander et al., 1977). This language is intended to reflect reality and the fact that entities must be built in reference to all in which surrounds them and all in which they encompass to generate holistic solutions.

The concept of a pattern language can also be applied to resilience. Resilience enhancing patterns, resources, or other ideas can be developed and consolidated into a guidebook for community use. This way, rather than implementing a top-down approach to communities' climate adaptation, a pattern language guidebook offers resources in which a community can be empowered to leverage on their own accord. It provides a variety of tools and strategies communities can use to identify their needs and the feasibility of various implementation measures in their pursuit toward climate adaptation.

A pattern language guidebook helps to strengthen resilience networks through increased transparency regarding the accessibility of resources. It enables the spread of information and provides an opportunity for residents to enhance their resilience in ways they see fit. Doing so generates a sense of ownership over such efforts and thus, a sense of ownership over the community. Collaboration through the development of a pattern language has the potential to strengthen local bonds and further contribute to the adaptive capacity of the area.

Developing a resource guidebook, or pattern language, was a major goal of the current study. To begin the process, our project team aimed to generate priority patterns identified by Ypsilanti residents. Based on this research's findings, patterns on various tools and strategies which Ypsilanti residents can leverage to enhance their community's resilience to differing climate impacts were developed. In addition, information specific to existing resources in Ypsilanti were incorporated into each pattern. The hope is that this pattern book may be used as a framework for future efforts in Ypsilanti, and other communities, to increase resilience.

The Present Study

The current study aimed to establish a framework for building a resilience network in Ypsilanti. The first phase of this required the evaluation of overall feelings towards the climate crisis and community understanding of how it already has and will continue to affect Ypsilanti. From there, this research intended to identify which resources are of greatest importance and need to the community in regard to the climate crisis. Based on what was learned through the initial phase, our team initiated the compilation of these resources in a pattern language guidebook to serve as the foundation for the community's resilience network. Within this, our team wanted to ensure that Ypsilanti residents had a say in the development of this resilience network, making sure local needs, wants, and desires remained the central focus of our research. Through this, we intended to structure our deliverables, including the findings in this report and the Ypsilanti pattern language guidebook (Appendix A), in a way that is generalizable

to other communities in establishing their own resilience networks.

Illustration by Jessica Tenbusch

Cultivated and foraged foods of spring and summer: radishes, purslane, fiddlehead ferns, and blueberries

Survey and Interview Instruments

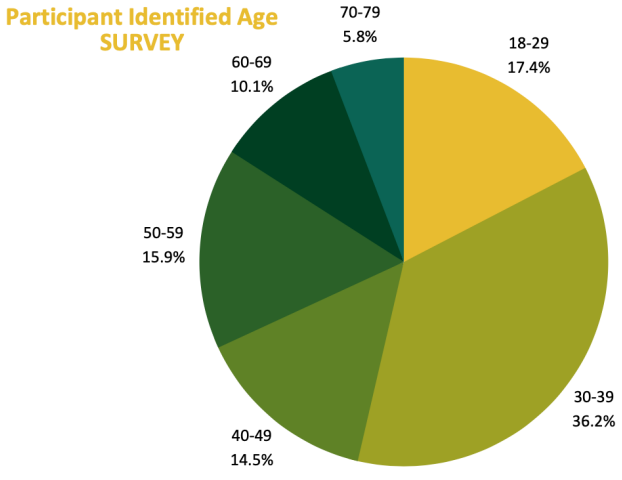
To strengthen a resilience network within Ypsilanti and develop a pattern language guidebook that centered around the community's needs, wants, and desires, our project team gathered community input through a survey and interviews.

Survey Method

Participants

For the current study, data was collected through a survey that was completed by 132 participants who were all residents of Ypsilanti, MI and ranged in ages from 18 to 79 (See Table

1 and Figures 3-7 for demographic distributions). For survey creation and distribution, the Qualtrics operating system was used. The first method of survey distribution was through an anonymous link that was sent by the project team to pre-identified community leaders whose relationship had been established by the first iteration of the project (Faber et al., 2021). From there, snowball sampling was used to distribute this link to additional community members which resulted in the recruitment of 26 participants. The second method of distribution was a separate anonymous link posted on various social media platforms. Specifically, the survey link and a short description of the project purpose and goals were posted to pages on Facebook and Reddit that are centered on Ypsilanti area discussion. This method of survey distribution resulted in the recruitment of 108 respondents.



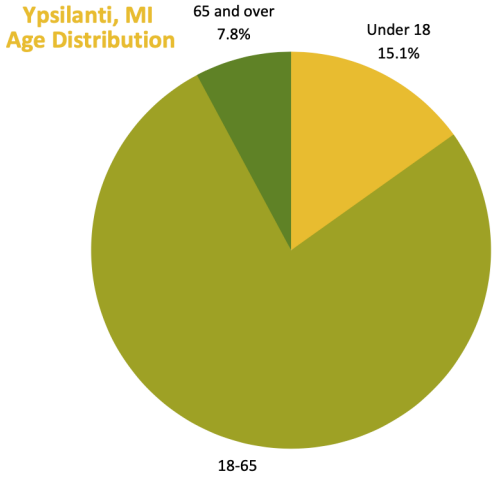
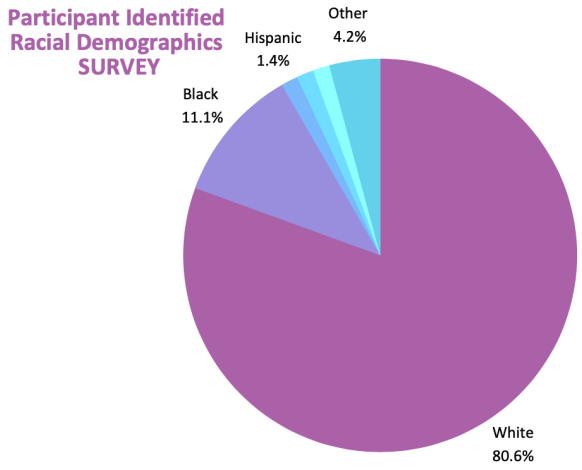


Figure 3 (left) represents the age distribution of the survey participants. **Figure 4** (right) represents the age distribution of Ypsilanti, Michigan (United States Census Bureau, 2021).



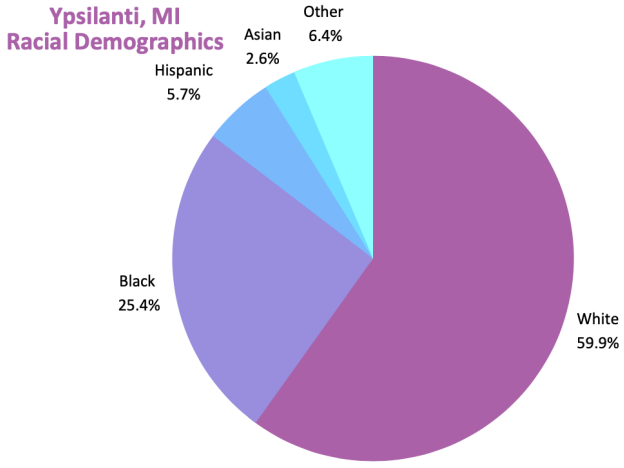


Figure 5 (left) represents the racial and ethnic composition of the survey participants.**Figure 6** (right) represents the racial and ethnic composition of Ypsilanti, Michigan.

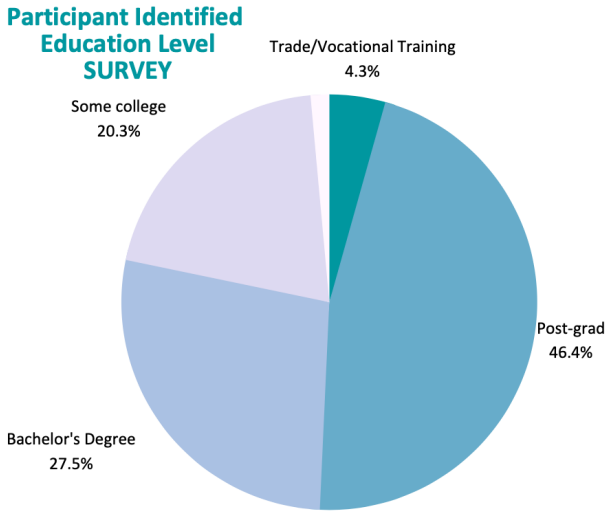


Figure 7. represents the educational level of the survey participants.

Materials

The survey created and distributed by the project team provided a brief introduction regarding the premise of the survey to participants. This introduction communicated that all recorded responses were anonymous and that respondents were free to stop participating at any time. The first bank of questions measured the existing level of concern for climate instability in the community. For this, participants were specifically asked how concerned they were about various extreme weather events affecting Ypsilanti. A 5-point Likert response set ranging from “not at all concerned” to “extremely concerned” was provided for each weather event. These events which were individually evaluated included extreme cold, blizzards, heat waves, storms, tornadoes, floods, and an “other” category for participants to enter their own extreme event of concern.

Next, to determine which *physical resources* were identified as most important by Ypsilanti community members in response to emergency events, the following statement was provided: “Climate change increases the likelihood of emergencies in Ypsilanti. Extreme events will happen more often and more intensely as time goes on.” Participants were subsequently asked to rate how important the following resources were for responding to extreme events on a 5-point Likert response set ranging from “not at all important” to “extremely important”. Resources were listed in categories, grouped as food access/distribution, infrastructure, health items, emergency items, transportation, education, and an “other” category which provided participants with a fill-in-the blank option for additional resources. A short list of examples were included for each category. Following this, two fill-in-the-blank questions were provided, asking participants to indicate which of the listed resources they could access in Ypsilanti and where in Ypsilanti these resources could be accessed.

Then, to measure which resources were identified as most important by Ypsilanti community members in the response to *emotional distress* caused by climate instability, the following statement was provided: "Extreme events cause distress." Participants were subsequently asked to rate how important the following resources were to them on a 5-point Likert response set ranging from "not at all important" to "extremely important". These resources were also listed as categories including community building, counseling and trauma support, physical health care, financial assistance, care assistance, and an "other" fill-in-the blank category. A short list of examples were provided for each grouping. This question was also followed up by asking participants to indicate which of the listed resources they could access in Ypsilanti and where they could access those resources through two separate fill-in-the-blank questions.

Lastly, to be able to assess whether the sample was representative of the Ypsilanti population, demographic questions were provided including age, ethnicity, and education level. Additionally, participants were asked to identify which neighborhood they lived in using a picture of Ypsilanti with neighborhood names for reference. To determine commitment to the community, participants were also asked how long they have lived in Ypsilanti and how long they intend to live there.

Survey Bias and Error

The online survey used for this project, similar to all online surveys, was imperfect. Thus, it may not perfectly reflect the level of concern for extreme weather events or level of importance for physical or emotional resources of the entire Ypsilanti community. For more detail on potential survey error see Appendix B.

Survey Results

Repeated Measures ANOVA Assessing Level of Concern for Extreme Events

A within subjects repeated measures ANOVA was conducted between all survey items within the level of concern section to determine if there was a significant difference between the means of concern for each extreme weather event (see Table 4). Results showed that there was a statistically significant difference in level of concern between at least two groups ($F(4.590, 514.128)=19.02$, $p < .001$). To determine which extreme weather events were significantly different from one another, Bonferroni post hoc tests were conducted (Table 5). Results showed that concern for extreme cold was rated as the highest concern ($M=3.21$, $SD=.949$) differing significantly from blizzards and tornadoes ($p<.001$). Tornadoes were rated as the lowest concern ($M = 2.39$) differing significantly from all other extreme weather events (heat waves, storms, floods, blizzards, and extreme cold) independently ($p<.001$). Overall, descriptive statistics from these tests (Table 2) showed a moderate level of concern for extreme weather events among residents in Ypsilanti ($M=2.95$, $SD=.727$).

Repeated Measures ANOVA Assessing Physical and Emotional Resource Needs

A within subjects repeated measures ANOVA was conducted between all survey items within the physical resource needs section to determine if there was a significant difference between the means of certain physical resource needs within Ypsilanti (see Table 6). Results showed that there was a statistically significant difference in physical resource needs between at least two groups ($F(4.082, 346.965)=37.55$, $p<.001$). To determine which physical resources were significantly different from one another, Bonferroni post hoc tests were conducted (Table 7). Results showed that food was rated as the highest physical resource need ($M=4.48$, $SD=.864$) differing significantly from transportation and education independently ($p<.001$). Transportation and education were rated as the two lowest physical resource needs within Ypsilanti, both rated significantly less important than food, infrastructure, health items, and emergency items independently ($p<.05$). There was no significant difference found between the importance of food, infrastructure ($M=4.27$, $SD=.868$), health items ($M=4.37$, $SD=.887$), and emergency items ($M=4.24$, $SD=.867$).

An additional within subjects repeated measures ANOVA was conducted to determine if there was a significant difference between the means of certain emotional resource needs within Ypsilanti (see Table 8). Results showed that there was a statistically significant difference in emotional resource needs between at least two groups ($F(3.32,242.46)=10.99$, $p<.001$). To determine which emotional resources were significantly different from one another, Bonferroni post hoc tests were conducted (Table 9). Results showed physical care was rated as the greatest emotional need ($M=4.23$, $SD=.900$) differing significantly from community building, trauma support, and financial assistance independently ($p<.05$).

Paired Sample T-Test Measuring difference between Physical and Emotional Resource Needs

A paired sample t-test was conducted to compare whether physical resource needs were rated higher than emotional resource needs in Ypsilanti. There was a significant difference in the scores for physical resource needs ($M=4.09$, $SD=.716$) and emotional resource needs ($M=3.68$, $SD=.877$); $t(73)=5.409$, $p<.001$. Overall, physical resources were rated as more important in the face of climate change in Ypsilanti than emotional resources.

Linear Regression Analyses Measuring Predictive Factors of Physical and Emotional Resource Needs

Various linear regressions analyses were conducted to assess predicting factors of physical resources and emotional resources independently. The first simple linear regression (Table 10) was calculated to predict physical resource needs based on level of concern. A significant regression equation was found ($F(1,82)=12.929$, $p<.001$) (Figure 8), with an R^2 of .136. Overall, participants' physical resource needs increased 0.381 for each unit increase in level of concern.

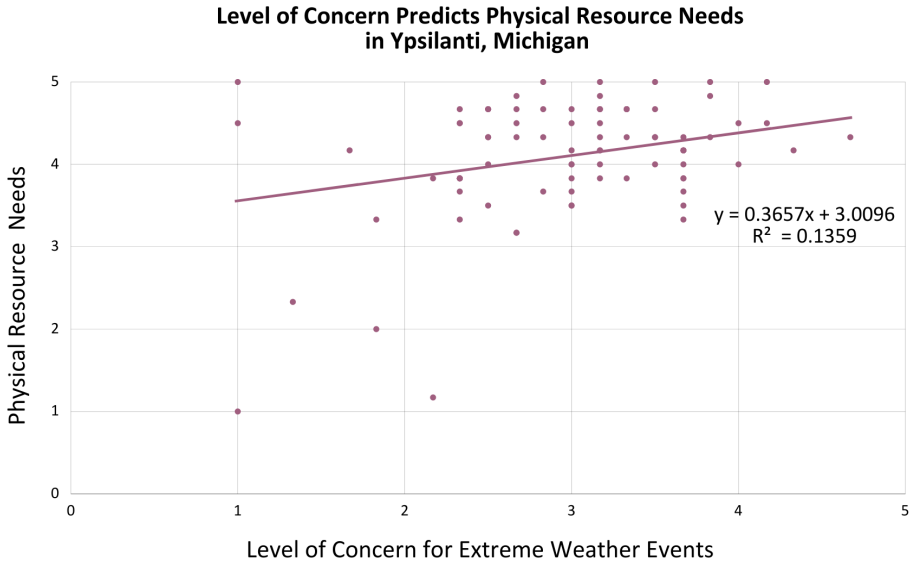


Figure 8. The linear relationship between level of concern and physical resource needs in Ypsilanti.

The second simple linear regression was calculated to predict emotional resource needs based on level of concern. A significant regression equation (Table 11) was found ($F(1,70)=8.570$, $p<.005$) (Figure 9), with an R^2 of .109. Overall, participants' emotional resource needs increased 0.355 for each unit increase in level of concern.

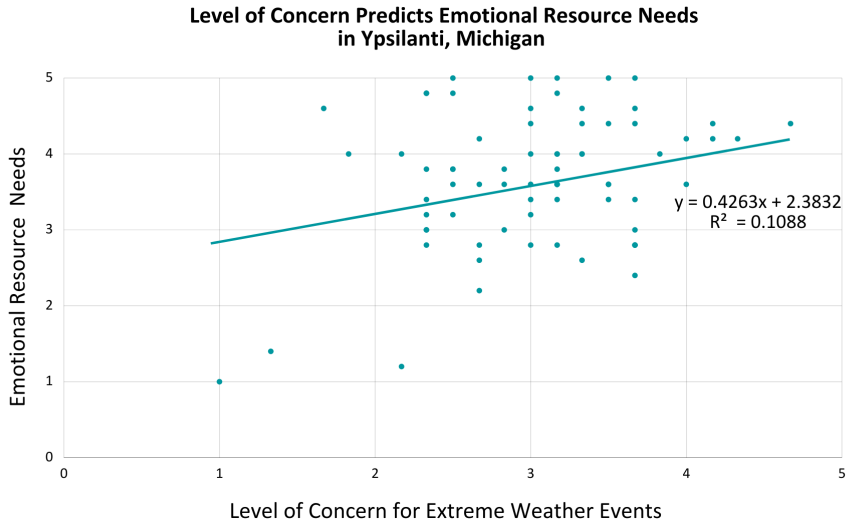


Figure 9. The linear relationship between level of concern and emotional resource needs in Ypsilanti.

To assess whether commitment was predictive of physical and emotional resource needs, separate simple linear regressions were conducted. The first of which was calculated to predict physical resource needs based on the previous number of years lived in Ypsilanti (Table 10). A significant regression equation (F(1,69)=5.676, *p*=.02) (Figure 10), with an R^2 of .076 was found. Overall, participants' physical resource needs increased 0.199 for each unit increase in years previously lived in Ypsilanti. The linear model conducted to determine whether the previous number of years lived in Ypsilanti was predictive of emotional resource needs was insignificant.

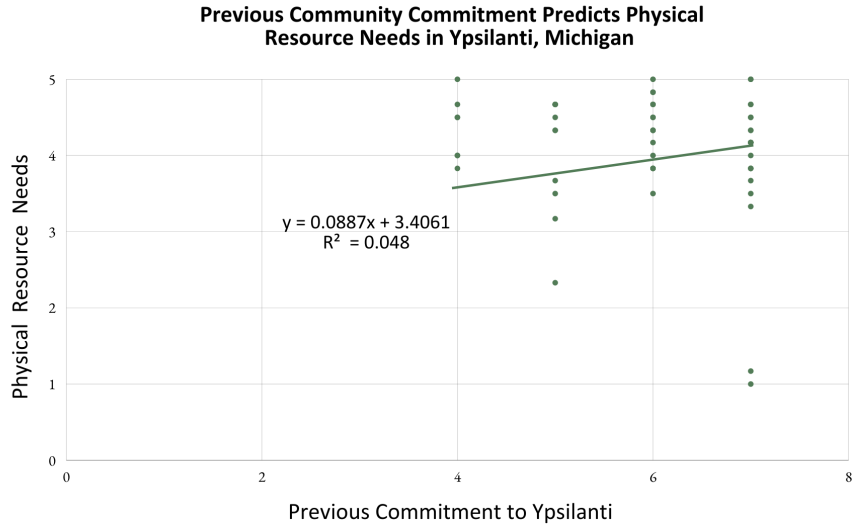


Figure 10. The linear relationship between previous commitment to Ypsilanti and physical resource needs.

To get a well-rounded view of commitment as a predictive factor a final set of simple linear regressions were conducted to calculate physical resource needs based on how long participants intended to continue living in Ypsilanti. A marginally significant regression equation (Table 10) was found (F(1,69)=3.962, *p*=.051) (Figure 11), with an R^2 of .054. Overall, participants' physical resource needs increased 0.19 for each unit increase in how long participants intended to continue to live in Ypsilanti. The linear model conducted to determine whether participants' intent to continue living in Ypsilanti was predictive of emotional resource needs was insignificant. These results show that participants who had a greater commitment to Ypsilanti reported having a higher need for physical resources within the community.

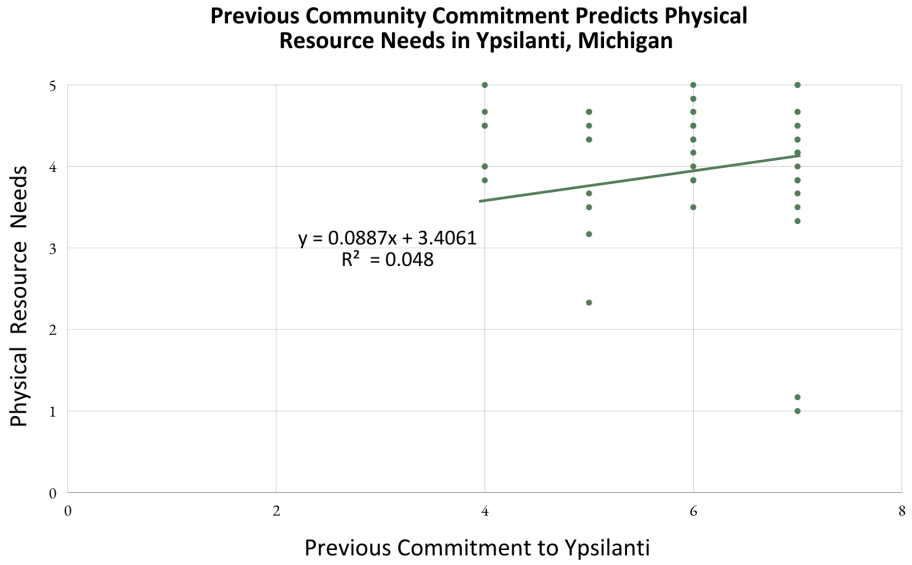


Figure 11. The linear relationship between future commitment to Ypsilanti and physical resource needs.

Interviews

This iteration of the Ypsilanti Community Resilience Project utilized the interview guide developed and piloted by the first iteration (Faber et al., 2020, 83-84)(Appendix C). Using their interview framework we were able to continue to support the previous iteration's effort to establish a physical resilience hub as well as collect community input for our deliverables. The interview guide questions are separated into three distinct categories to gauge residents' 1) material needs, 2) social and emotional needs, and 3) potential preferences in approaches to building community resilience through utilizing a block leader model, a physical location, or a blend of the two. The interview guide also prompts interviewees to envision the future they would like to see in their community in the near future and what changes need to take place to make that a reality. Lastly, the interviewees are questioned on whether they feel they themselves are integral to building their communities' resilience and if they know anyone who would be important to include in the neighborhood planning process. We instituted this to actively build a snowball sampling approach to incorporate community input that would be used to develop a pattern language guidebook.

Participants

5 Ypsilanti residents (Township of Ypsilanti and City of Ypsilanti) 18 years or older were interviewed in a one hour virtual discussion via Zoom. All participants voluntarily participated in the interview process and were reached via a snowball sampling of contacts made through individuals who completed the project survey. Participants reached out to our project team or

submitted their email in survey responses, designating they were interested in further contributing to the Ypsilanti Community Resilience Project. Participants who were interested in further contributing were sent a follow up email (Appendix D) for them to select the option(s) in which they wanted to engage. Participants were given the opportunity to opt into the one hour digital interview or participate in the co-development of the pattern language guide. Once participants confirmed how they would like to further contribute to the project they were sent a Calendly[1] link to reserve an hour block that was most convenient for them to participate.

Participants' perceived race and age were self-identified by the interview team since racial/ethnic identification and age were not questions included in the interview. Among the 5 Ypsilanti residents the project team identified 1 as Black, 1 as Hispanic, and 3 as White (Figure 12). 3 residents were self-identified in the range of 30-39 years of age, 1 resident as 40-49 years of age, and 1 as 60-69 years of age (Figure 13). Responses were coded using the same co-coding approach in Faber et al., 2020.

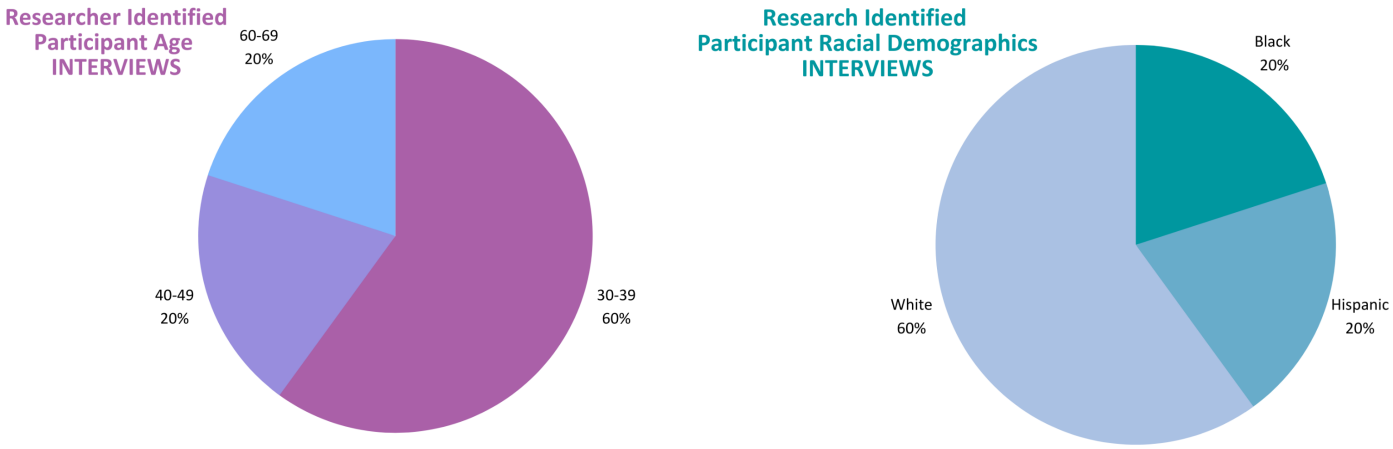


Figure 12 (left) & **Figure 13** (right). Charts representing the demographic composition of interview participants.

Interview Bias and Interview Methods in the era of COVID-19

The current study took into consideration the recommendations laid out by the first team concerning interview bias. Specifically, the evidence cited in Groves et al., 2009, Couper, 2005, and Krouwel et al., 2019 helped inform our intentions as facilitators throughout the

[1] Calendly is an online calendar scheduling tool that was utilized to assist participants in scheduling one hour time blocks that were convenient to them (*https://calendly.com*).

project. Interviews were conducted purely in a virtual format in accordance with university research protocols and public health guidelines due to the COVID-19 pandemic. We acknowledge that this unique circumstance may have provided different responses because of the interview setting. Despite virtual interviews not being the traditional method of conducting qualitative data, in the era of physical distancing this virtual format has become more normalized and may not be as disruptive as early literature would suggest (Deakin & Wakefield, 2014, 610). However, it is recognized that to even be able to participate in these interviews participants had to be able to access a digital or cellular device that was capable of connecting to the internet or have the capability to make calls. Access is a privilege and because of the format in which these interviews were conducted our team missed out on incorporating those who lacked the financial means, time, or technological knowledge necessary to participate with this method.

Some of the methodological drawbacks to conducting interviews in a purely online format is the possibility for platforms, such as Zoom, to have connectivity issues which can stall or completely disrupt interviews. Broken dialogue or unsynchronized video can inhibit participants from building a repertoire with the facilitators, making it nearly impossible to follow along with the already limited body language available through the participants' webcam (Oliffe et al., 2021, 5). Having the ability to call in from anywhere, with the right device, can also create an atmosphere where participants are not fully engaged and facilitators are unable to control outside noise. In a less controlled environment, external noise, lighting, and limited participant or facilitator focus can lead to disorientating conversations and poor data capture (Oliffe et al., 2021, 4). Most participants took part in the interview from home which is typically a private location and could make participants feel exposed compared to a more neutral setting. There are a myriad of complications that come from conducting interviews over Zoom but researchers can mitigate some of the more common problems by (1) testing zoom ahead of the interview, (2) providing technical information to participants, (3) having a backup plan for to conducting the interview, (4) planning for distractions, (5) providing a direct link to the meeting, and (6) having visual reminders to receive participant consent before recording or taking notes of the conversation (Gray et al., 2020).

Despite some drawbacks, conducting interviews in an online setting allowed data collection to continue as planned, acting as an overall benefit to the research team and participants. During the academic Fall of 2021 and Winter of 2022, Washtenaw County and Michigan saw a steady increase in COVID-19 cases (New York Times, 2022) which made in person interviews potentially unsafe, even for vaccinated individuals. By conducting interviews online, this team was able to safely receive community input towards building resilience without the risk of transmission of COVID-19. Some participants noted that being able to conduct interviews via Zoom would have been the only way they felt comfortable speaking because of the concern for their health. Others who had busy schedules noted that the convenience of not having to commute for the interview to meet up made it so they could

participate. There is also a comfortability in being in one's own home that can create an environment for honest conversation and flexibility with the length of the interview (Gray et al., 2020, 1297; Oliffe et al., 2021). Additionally, Zoom also reduced the cost of participation for both the participant and the research team, making it a cost efficient option to mitigate the distance of space and prioritize wellness (Deakin & Wakefield, 2014, 607).

Discussion

Evaluating Level of Concern

Based on the results of this study, there is a moderate overall level of concern among Ypsilanti residents for extreme weather events affecting their town. Assessing the level of concern was necessary to help gain an understanding of the willingness or lack thereof that may exist within the community when it comes to building a resilience network. Although the average level of concern for all extreme weather events was moderate, it is important to note that certain extreme weather events yielded a higher level of concern among Ypsilanti residents. Specifically, extreme cold was rated as having the highest of concern. A look at Michigan's recent weather history explains why we may have seen these results. In January of 2019, a polar vortex hit Michigan, causing record low temperatures throughout the state (Manzullo & Siacon, 2019). On Wednesday, January 31, 2019, temperatures in Ypsilanti reached values of -18° Fahrenheit with a wind chill of -40° Fahrenheit whereas the previous record of -15° Fahrenheit was set in 1899 (Burns, 2019). Residents throughout the region were warned to avoid going outside for any period longer than 10 minutes or risk facing frostbite or hypothermia. This resulted in school and work closures, disrupting the everyday life of Michigan residents. Although people were encouraged to plan for this event with news sources providing preparation checklists, warnings were only issued a few days ahead of the subzero temperatures making it difficult to prepare in advance. This occurrence was one of the most recent and largest extreme weather events that residents of Ypsilanti have faced, providing one possible explanation surrounding the higher level of concern for extreme cold.

Storms were rated as the second most concerning extreme weather event among community members. This too can be explained by the increasingly frequent and intense storms Ypsilanti residents have faced over the past few summers (GLISA, 2022). When discussing extreme weather events in interviews, concern for storms was a recurring theme. In one instance, discussion of storms led a participant to describe the increasing frequency with which they have noticed houses flooding due to major storms. Another conversation noted that other residents "complain about this too. That there have been some very intense storms." Therefore, repeated exposure to these events may be the cause for this high level of concern. Despite this, the same participant who expressed concern for the storms also explained that "There's no discussion of how we can prepare ourselves for future flooding, or what we do when there's the next catastrophe or pandemic."

It is important to note that concern for heat waves was not far behind concern for storms and extreme cold, rating significantly higher in terms of concern than both blizzards and floods. This result was interesting when comparing it to the extreme cold Southeast Michigan tends to be known for. However, looking at recent heat trends in the region may explain why this was rated as high as it was. According to the Mid-Michigan Heat Model produced by GLISA (2022), there are more annual deaths caused by extreme heat events than any of the other natural disasters combined. This model indicates that more severe and longer lasting heat events have been on the rise in the region in recent years. Nonetheless, Detroit and Ann Arbor, two larger cities that adjourn Ypsilanti, are still not using cooling centers during extreme heat events. Additionally, people of lower socioeconomic status are at a greater risk of exposure to extreme heat (GLISA, 2022). Due to the high percentage of Ypsilanti residents living below the poverty line when compared with state and national averages, it is likely that these individuals have faced greater consequences as a result of heat events.

Tornadoes were reported as the least concerning and rated as significantly lower than all other extreme weather events. The risk of tornadoes in Michigan is fairly low with the last one in Washtenaw County, where Ypsilanti resides, occurring in 1990 (USA.com, 2022). Even when there are tornadoes in the area, the damage is mostly caused by the storm that comes with it. Overall, tornadoes are not a common occurrence in the Ypsilanti area, which may explain why residents report it as their lowest concern.

Due to the projected increase in magnitude and frequency of extreme weather events as a result of the climate crises (Pavlinovic, 2021), community plans are needed to prepare. Based on the results of the current study, those who report a higher level of concern also report a greater need for all types of resources, both physical and emotional (see Figures 3 & 4). This indicates that residents of Ypsilanti who feel greater concern about the climate crisis also see a greater need for more resources to be provided within their community in preparation for the climate crisis. Although not true in all situations, research by Chakraborty et al. (2019) shows that having a higher-level of concern will tend to lead to heightened awareness of the consequences. For the purposes of this study, awareness of consequences is defined as individual beliefs about the negative impacts of environmental problems (Hasla et al., 2008). Since community members who are aware of the seriousness of climate change indicate that more resources are needed in Ypsilanti, it is likely that a number of resources are still needed for the development of a strong resilience network within the community.

These results were further highlighted in interviews. Participants whose interviews exhibited themes of concern for extreme weather events also displayed themes of needing more resources for emergency preparation throughout the community. For example, an interviewee who discussed the increasing impact flooding has had on their neighbors subsequently explained how medical care and shelters for homelessness are lacking and in high need. In the end, this participant concluded that the community is only “somewhat prepared

for future emergencies." To them, this has become increasingly apparent given the situation that arose from the COVID-19 pandemic. Interview participants who demonstrated high concern not only showed greater awareness surrounding what resources existed and how to use them, but were also better prepared themselves to deal with an emergency.

Overall, extreme weather events are affecting residents throughout Southeast Michigan (Pavlinovic, 2021). Despite this, the moderate level of concern within Ypsilanti indicates that some residents may not be ready to respond. The following comment of one survey respondent demonstrates this lack of concern; "The built-in premise that climate change will create extreme emergencies is lacking evidence. Stop trusting models." As stated above, those residents lacking concern are unlikely to be aware of the consequences tied to the climate crisis (Chakraborty et al., 2019). Various environmental-based behavior change models suggest that having an awareness of consequences is a precondition for promoting environmentally responsible behaviors. Research by Hansla et al. (2008) demonstrates this through the Value Belief Norm theory of pro-environmental behavior, explaining how awareness of consequences and feelings of personal responsibility are major indicators of an intent to act. Within the current study, it can therefore be concluded that having a moderate level of concern may not be enough to motivate individuals to take initiative in the development of community resilience.

Illustration by Jessica Tenbusch

Cultivated and foraged foods of fall and winter: kale, squash, acorns, black walnuts, and sunchoke flowers

Common Survey & Interview Themes

After analyzing results from the survey and interviews, we found that many responses brought up themes that will be helpful in discussing the establishment of a community resilience network in Ypsilanti. These themes were established through a co-coding process among project team members (Appendix F). While many important ideas emerged throughout the interviews and surveys, the following discussion sections will focus on themes that frequently recurred the most and were therefore deemed as most beneficial to the resilience network planning and pattern language guidebook development process. The notable themes include the following:

- An expressed feeling of social cohesion at the neighborhood level
- How access to already existing resources can improve psychological as well as physical well being

- The need to invite people into leadership opportunities and provide support for those individuals who step up so that they are not overburdened; Multiple Block Leaders are needed to maintain a resilience network
- A need for greater trust building opportunities between local government and the greater Ypsilanti community
- The celebration of diversity in Ypsilanti and support for international residents, particularly relocated refugees
- The need for assistance for everyday needs outside of an emergency event

Identifying Resources Needed in Ypsilanti

This study identified that there is an overall relatively high need for resources in Ypsilanti, both physical and emotional. This section will break these results down to further identify which resources within these categories are most needed. Specifically, the current study identified the category of physical resources to be of higher importance in Ypsilanti than the category of emotional resources. These results could be explained in terms of Maslow's hierarchy of needs (Maslow, 1943). Understanding what people need and how these needs differ is an important part of building a resilience network with strong relationships. According to Maslow's theory (1943), immediate physiological and safety needs such as food, water, and shelter need to be met before other needs can be adequately realized. An Ypsilanti community member supported this notion by explaining, "when we had the 3-day blackout, things got grim. And I live in a "good" neighborhood. When people lose basic supplies, it can get bad." The high number of Ypsilanti residents living below the poverty line compared to the national average may explain why the need for physical resources is rated higher than the need for emotional resources.

Research suggests that when individuals have access to physical resources, such as those assessed in the survey, they will experience an increased perception of health and independence. On the other hand, having access to the emotional resources present in this survey will provide individuals with mastery of self-esteem and coping skills (Roberts et al., 1994). While it may be that the capacity to meet daily living needs are the primary motivation factor among Ypsilanti residents, it is also important to note that motivation can be influenced by multiple independent factors such as shared history, environmental opportunity, and social relationships (Kenrich et al., 2010). The interviews conducted for this project allow for a more thorough look at existing motivational factors within Ypsilanti.

To start, the interviews for this research reaffirms the desire for physical resources. When asked what services residents perceived were difficult to access in their community, physical resources such as food, medical care, emergency items, transportation, and shelters were common initial responses. Upon further discussion of these needs, residents brought up a major recurring theme of positive social cohesion in their neighborhood. Interview participants

were quick to explain that despite the community having certain resource needs people are typically aware of the needs of their neighbors.

> *"It is very friendly and if something really terrible happens, a kind of mass catastrophe, I think that people would go out of their way to be neighborly and try to help one another."*

The strong importance placed on a sense of social cohesion identified throughout the interviews may in part explain the lower importance with which emotional resources were rated; residents may feel that their emotional needs are already adequately met. Nonetheless, interview participants still expressed relationship building as an area where continued growth is needed. Specifically, establishing great community buy-ins is believed to help motivate individuals to pay attention to what resources are available and begin preparing for the future.

When looking at motivational factors beyond physical needs, the social relationships and shared history discussed by Kenrich et al. (2010) seem to be a good starting place. Grant et al. (2021) found having a shared history to be a notable theme. Having similar experiences and mutual geographic origins in some cases was important in strengthening community bonds. This shared history, combined with the theme of strong social cohesion found in the current study, are likely to be significant motivational factors within Ypsilanti. Therefore, using these existing strengths to establish a sense of accountability among neighbors could be a major motivating factor for the development of a community-built resilience network.

There may already be needs met within Ypsilanti. Although physical needs are rated as more important than emotional needs, and while certain emotional resources may already exist, this **does not** mean that there are sufficient emotional resources in existence within the community. The primary purpose of this survey was to gauge how important residents felt it was to make sure that certain resources were available in their community to help them to respond to climate change. The moderate level of concern in the community might suggest that there is not yet a need to be aware of which resources exist. This possibility was highlighted in the fill-in-the-blank options throughout the survey. These survey questions asked what resources are currently available and therefore provided insight into the lack of awareness surrounding their presence in Ypsilanti. A few standout quotes are highlighted below:

- "I don't know what Ypsilanti has to offer, and I think that is a major problem."
- "Unknown. Would need to research as never been in a position to need those resources."
- "I have no idea where I would go to access emergency resources in Ypsilanti. My first decision in a crisis would be to look on social media for what is advised for the Ypsilanti

residents for that crisis. Although, I believe Ypsilanti doesn't have what's needed for a crisis and would have to receive outside help to support all of its residents."

- "I'm not really sure. There are loose networks like church food banks and public transit exists here, but would these function after/during a climate-induced emergency situation when they would be most needed?"

While many responses to these fill-in-the-blank options indicate lack of awareness of what currently exists in the community, there were still a few responses that identified what resources do and do not exist. Most of the responses that highlighted existing resources included more general categories such as churches, food banks, and warming shelters without providing specific locations. The resources identified as being needed but seemingly absent within the community included grocery stores, public transportation, and homeless shelters. However, due to the scope of this project the current study was unable to specifically identify how many of these resources exist. Overall, it is likely that the need for physical resources is the first and most important thing to tackle within the community in the face of climate change before it is appropriate to build emotional related resources.

Physical Resource Needs

Within the category of physical resources, some resources were rated as significantly more important than others. Food was rated as the greatest need across both physical and emotional resources. Within the physical resource category, it was rated as significantly more important than transportation or education resources. The importance for food was further supported in interviews with discussion surrounding how "food insecurity [is] immediately a major concern." Although there are some food banks present in the community, one participant described how hard it can be while working to get to them during open hours. Additionally, discussion of food in interviews highlighted how difficult it is to access any larger grocery store without a car. Access to affordable fresh fruits and vegetables is even more difficult. The food retailers that are more accessible within neighborhoods do not provide enough healthy options for residents. While there is a food co-op in Ypsilanti, "most people are pretty priced out of that."

Looking at other physical resource needs, infrastructure, health items, and emergency item needs were also rated significantly higher than the needs for transportation or education. This was primarily supported in survey fill-in-the-blank responses through mention of needing homeless shelters, warming and cooling centers, and more equitable access to medical care. While the survey responses did indicate that many respondents in the current study already had owned or had the financial means to access many of these resources, it was noted by many that 1) they would not know where to access these items within the broader Ypsilanti community and 2) accessing the resources that do exist can be expensive and time consuming. The following quote sums up this theme:

"Very little is available for free. There may be scarce amounts of food from food banks and gardens, but there isn't enough to feed all of Ypsilanti. I don't know of any infrastructure that could be used by residents for shelter. The transportation system would not be able to meet the demands that an emergency would require of it. As far as education on crises and items to be used during those crises, I don't know what Ypsilanti has to offer, and I think that is a major problem."

Surprisingly, transportation was rated as significantly less important than food, health items, and emergency items in the survey. After conducting interviews where transportation needs were a recurring theme, especially when it comes to having access to food, it was our expectation that the survey results would match. This discrepancy might be explained by the way transportation and food were listed on the survey, appearing as mutually exclusive items. The interview acted as more of a conversation between researchers and participants, allowing for deeper exploration of certain needs and how they may overlap with one another. The survey only allowed participants to rate how important a specific resource was in response to climate change on a scale of "not at all" to "extremely". Overall, the survey results go back to the theme of basic needs being of greatest importance. Food, infrastructure, health, and emergency items all fit in the "basic needs" category within Maslow's hierarchy of needs. This further highlights that in the face of climate change, making sure basic needs are met is of highest priority for Ypsilanti residents. These results show what resources residents of Ypsilanti believe are the most important to focus on, to ensure they exist, and to ensure are equitably accessible. Additionally, it is important to note that although analysis of the survey responses had transportation rated as less important than the other physical resource needs, open ended survey responses did indicate a need to attend to transportation needs.

Emotional Resource Needs

Emotional resources were rated lower in importance in responding to extreme weather events than physical resources in Ypsilanti. Despite this, they were still rated as highly important to the community in general. Therefore, it is useful to discuss specific emotional resource needs in Ypsilanti that were rated as more important than others. To start, physical health resources were rated as most important. While this may seem to have some overlap with the physical resource category, access to physical health resources were intentionally included and presented as an emotional resource needed in the survey. According to the Mental Health Foundation (2022), physical health problems significantly increase the risk of having mental health issues. Within this research, eating well is provided as a key physical factor that can improve one's well-being and mood. This, however, requires a balanced diet, procedural knowledge on eating well, proper access to the right food, and the financial means to continuously maintain this lifestyle. Again, with food resources being rated as the most

important need in the study, these results indicate that focusing on providing more food resources may also improve emotional well-being. Worry and stress over access to basic needs can be a major contributor to mental health issues such as depression, chronic headaches and fatigue, anxiety, and digestive issues (Mental Health Foundation, 2022). Therefore, providing subsequent access to basic needs is important from both a physical and mental health standpoint.

Results of the current study identified care assistance as the second most important emotional resource need. This category encompassed elderly care, sick care, and childcare. This theme carries over from the first iteration of the project with Faber et al. (2021) noting "explicit recommendations to prioritize elders and senior communities in the resilience planning process." Interview participants also indicated an absence of care assistance options, and specifically childcare, in the community. Concern for this stemmed from lack of preparation for past crises, "not having the ability to have childcare covered," and having "no community resources to turn to in that situation." One interview participant proposed a solution which included getting more people involved in the organizing of community resilience, in turn strengthening bonds and relationships. As a result, residents' capacity to build a network of neighbors and other community members that could help provide this care in times of need was strengthened. The expressed importance of care assistance further highlights the already existing tendency of Ypsilanti residents to look out for one another, ensuring that basic needs are met for not only themselves, but their loved ones, and the greater community.

Financial assistance was rated as the least important emotional need. It is worth noting that it was only rated as significantly less important than physical health care within the emotional need category. This result was not congruent with what the project team had expected. Due to 31.6% of residents living in poverty (United States Census Bureau, 2021), and interview discussions which expressed concern for the pockets of extreme poverty in the community, we expected this to be rated as more important. The reason for the results shown in this report could be because the survey question was specifically asking about the need for this resource in response to extreme weather events. While many individuals in the community may need financial assistance, they may not consider this as a need uniquely related to climate change impacts.

Overall, emotional well-being is an important factor to address in relation to building community resilience. While the implications of major mental health issues have been discussed, other seemingly minor mental health related issues can build up over time causing just as many problems. Some of these include irritability, difficulty concentrating and planning, and low motivation. Verdugo (2012) found that having positive psychological antecedents such as these is a significant determinant of pro-environmental behaviors. Therefore, addressing mental well-being is critical in making sure individuals feel willing and capable of becoming more resilient to the climate crisis. Having resources focused only on the climate crisis, however,

is not the only concern for Ypsilanti residents. A theme identified in the interviews highlights the need for assistance for everyday needs beyond emergency events. While this may not directly funnel into the development of a climate crisis related resilience network, making sure residents of Ypsilanti are getting their everyday needs met will improve community well-being and allow individuals to feel more capable in tackling issues related to climate change (Verdugo, 2012).

After analyzing community physical and emotional resource needs came the need to assess access to resources that are already available in Ypsilanti. While certain resources may already exist, where they are and how they can be accessed needs to be communicated to all residents. Part of building a resilience network includes raising community awareness around what is available in the community, connecting people with resources they need, and ensuring equitable access (Cutter et al., 2008). An example of an existing resource that has been identified in both project iterations is the Hope Clinic. Their mission includes providing free care for medical, dental, food, and behavioral health (Hope Clinic, 2022). Although this is a well-known resource in the community and there are "a lot of other agencies providing food assistance", individuals who work during the day and/or do not have a car are still at a disadvantage. As a response to this issue, places like the Hope Clinic provide at-home food delivery services to work toward equitable access. Additionally, with "40,000 people [in Washtenaw County] food insecure, [the Hope Clinic] is only serving a few thousand." Therefore, there are still many residents of Ypsilanti struggling to access existing resources. As mentioned earlier, a major theme identified through the interviews of the current study is that being able to access already existing resources leads to improved psychological and physical well-being. Thus, identifying and ensuring better access to resources already present in the community may be a precondition for developing a strong resilience network.

Community Commitment

Another facet of the results indicated that residents who had lived longer in Ypsilanti reported a greater need for physical resources than residents who had lived in Ypsilanti for a shorter period of time. Longer-term residents may have been better aware of the resources available to them, or lack thereof, than shorter-term residents due to the experiences that accompany living in an area for a longer period. Thus, long-term residents of Ypsilanti may have identified a greater need for physical resources in their community due to more considerable knowledge of gaps in resource availability compared to residents who have lived in Ypsilanti for a shorter period. Consequently, experience within the community and knowledge regarding the availability of physical resources may have been a contributing factor to this disparity.

In addition to past commitment to the community, the results also demonstrated what resident future commitment looks like in Ypsilanti. Survey participants who indicated having a stronger future commitment reported a greater need for physical resources than those with an intent to live in Ypsilanti for a shorter period of time (Figure 11). It is possible that residents may recognize that living in Ypsilanti for longer increases their chances of experiencing extreme

weather events that impact the community and thus, constitutes a greater need for physical resources to respond to such events. Additionally, those who did not intend to live in Ypsilanti for a long time may have placed less emphasis on the need for physical resources due to the decreased possibility that they will encounter extreme weather events in the area compared to their counterparts. Furthermore, research shows that environmental beliefs are considerably influenced by social groups (Fielding & Hornsey, 2016). It is possible that residents who intend to live in Ypsilanti for a longer period of time belong to a distinct social group compared to individuals who do not intend to live in Ypsilanti for as long. If so, the emphasis placed on the need for physical resources in responding to extreme weather events may have been influenced by intragroup dynamics. While there is already a sense of commitment within Ypsilanti, boosting community commitment is one area for potential growth. Overall, higher levels of both past and future commitment result in residents who are more aware and likely more motivated to prepare and respond to the climate crisis.

Writing the Pattern Language Guidebook

The attached Pattern Language Guidebook (Appendix A) is one of this study's deliverables. The guidebook can serve as a template for future community action groups to further develop resource patterns specific to Ypsilanti or any interested community. Our project team initiated the compilation of patterns based on the most common themes gathered from survey and interview responses. This included resources related to food access/distribution since survey participants rated it with the greatest importance. Additionally, resources that aid resilience to experiencing extreme cold, such as warming centers, were also included as Ypsilanti residents rated extreme cold as the most concerning extreme weather event.

Each individual pattern was divided into four sections: vision, utility, context, and importance. The vision serves as each pattern's introductory statement where the author describes how a world with the pattern implemented could look or feel like. For example, a seed bank within a community may bring peace to community members in knowing that extra seeds are stored for times of need. This feeling of peace may be described in the vision portion of the pattern, if the author so chooses. Next, the utility section of each pattern discusses the purpose and function of the pattern (i.e., what the resource does). Subsequently, the importance section provides background information as to why the resource is important and how it can aid in preparing for and/or responding to climate impacts or other disruptions. Lastly, the context section provides additional information regarding how the resource can be implemented, what other information or resources are needed, who can carry out the activity or who else may need to be involved, when it may be appropriate to implement said resource, etc.

The pattern language guidebook is structured such that patterns are organized based on scale and grouped into categories. In this context, scale refers to the physical or conceptual size of the resource. For example, a neighborhood may be considered a large pattern, a community

garden an intermediate pattern, and seeds may be a small pattern. The combination of different patterns with varying scales is integral to the language of this guidebook, and in producing holistic solutions. In addition to differing scales, each pattern is also organized according to the category that it falls under. For example, categories include food, shelter, supplies, or other.

Although this study's pattern language guidebook was organized in this way, it is important to note that it can be modified and adapted to fit the needs of any community. As there is no one-size-fits all solution to addressing climate impacts, there is also no one-size-fits all method to writing or using patterns. Ultimately, each pattern language guidebook may have a differing organizational structure based on the needs of the community it aims to assist. Additionally, each pattern may be unique in its creation as each author brings their own perspective, insights, and vision.

As our project team initiated the development of this guidebook, we recognize that it is by no means comprehensive of the high-priority resources Ypsilanti residents identified as necessary in responding to climate impacts. Although we hoped to gain contributions from Ypsilanti residents in its development, we did not identify any residents who were interested in writing a pattern through guided instruction. However, our project team is hopeful that Ypsilanti residents and/or other communities will acquire this guidebook and further develop it as it is intended to be a living document that is continuously added to and refined as needed. We envision Ypsilanti and other communities utilizing this in their pursuit toward strengthening their respective resilience networks.

Limitations

As previously mentioned, due to the scope of the project, our project team was unable to validate the availability of each resource identified by survey and interview participants in Ypsilanti. Therefore, further research could involve a compilation of identified community resources that are validated as being available within the community, including their contact and location information. This information would prove extremely useful, particularly if implemented into current and/or future patterns within the pattern guidebook. Once this information is collected, it can be compared to the survey results to identify currently unavailable resources within Ypsilanti. Such resources could be regarded as top priority to establish within the community which will aid in the development of a resilience network.

It is also important to reiterate that the participants from the survey and interviews were not entirely reflective of the Ypsilanti population. As noted earlier, survey participants over-represented the White population and under-represented the Black and Hispanic populations within Ypsilanti. In addition, age and education level could not be directly compared due to differences in the data collection categories between the survey and the United States Census Bureau (2021) data. However, it is speculated that a larger proportion of highly educated residents participated in the survey compared to the proportion of individuals

with the same education level who reside in Ypsilanti. Taking this information into consideration, the results from this research be cautiously interpreted. Additional research could be conducted in an attempt to capture the ideas of participants who are better reflective of the entire community.

In addition, it is crucial to emphasize that the results and deductions drawn from the survey and interviews are limited to Ypsilanti. Each community has their own unique characteristics including resource availability, socioeconomic makeup, political and religious beliefs, etc. and will therefore produce differing results. Regardless, the research methodology utilized within this project, including the survey and interview instruments, can be adapted and applied to other communities. However, future research should take the survey bias and error previously described, including the incorporation of prompts, word selection, and syntax choices into consideration prior to conducting any research. For example, it is recommended that both questions asking participants to rate physical and emotional resources be prompted and phrased identically to rule out any factors, such as phrasing, that may have influenced the results.

Future Recommendations

With our survey and interview findings highlighting the need for more physical resources such as greater food access and distribution to respond to extreme climate events, we recommend that this framework be utilized to address those identified needs first. To further engage and assess residents on their specific needs, we suggest widening the interview and survey distribution area. This could include in person engagements, or reaching out to residents beyond the City of Ypsilanti to the township level. The network is not intended to end at city boundaries. Thus, merging this research to the county level to survey residential areas outside of the city that were not represented in the current study is an important next step.

When it comes to continuing the implementation of the resilience network, this study recommends that groups utilize and build on the included language guidebook. This could include developing new patterns as more community input is collected. The following future recommendation sections will provide more detail on 1) How cooperative action can be incorporated in the writing of the pattern language guidebook, and the overall development of community resilience and 2) How these patterns can be turned into specific community level workshops to cultivate wide spread feelings of competency.

This framework was intended to serve as a low-stakes way to build resilience in Ypsilanti and made to be generalizable to other places. This team recognizes that building resilience is a time intensive process which is why our framework is meant to be a method that has limited barriers to start and draws on peoples' lived experiences as the foundation. This framework also was designed to serve as a direct complement to the work already done by the greater Ypsilanti community to establish resilience, not as a replacement.

Cooperative Action

Often, community members do not have a direct role in decision making in their local governments. Historically, these institutions have a top-down approach lacking involved collaboration or engagement with stakeholders (Gouillart & Hallett, 2015). This lack of direct involvement may lead to assumptions about the effectiveness of existing programs, the desire or need for certain services, or general paternalistic governance. We saw throughout our conducted interviews residents mentioning that the inability of the government to engage in deeper cooperation with Ypsilanti residents has strained their trust in government institutions. As non-residents of Ypsilanti, our team recognizes that the way in which we engaged with the community not only framed the outcome but the ability to build mutual and consenting cooperative relationships along the way (Davis, 2005). This process is especially important in building a community resilience network because it is the residents, through their lived experiences, that create a wealth of localized knowledge.

Prior to engaging with any Ypsilanti residents our team visited Ypsilanti to conduct a walking tour of different neighborhoods to get a better understanding of the area. We also researched and learned about the history of Ypsilanti and what makes it a unique community. Having a better understanding of the built environment and the city's history helped us gain some context for understanding residents' personal experiences. However, throughout the community engagement process we remained mindful that despite the vast amounts of knowledge we gained, we were still non-residents. Therefore, we made our best effort to center Ypsilanti resident voices as the driving force behind our project. Involvement in this project was completely voluntary and consent was acquired prior to any interview taking place. Ensuring participant anonymity made a safe space for our participants to open up and speak freely about their experiences and share their ideas without fear of external judgment. Our team also leaned on a strength-based approach rather than deficit-based approach to community engagement, prompting residents to name the aspects that they enjoy about their neighborhood and its strengths.

Our group also notes the limitations of our community engagement process as graduate students with limited time and funding. Per our IRB approval, we were not able to financially compensate our participants for their time and recognize that shared localized knowledge is incredibly valuable. Restricted University of Michigan research protocols and public health recommendations due to the COVID-19 pandemic limited us to conducting our survey distribution and interviews digitally. Thus, distribution of surveys at community events and in-person focus groups were engagement methods that were not realized in this iteration of the project. However, this is something we recommend to future groups conducting community-centered research.

Considerations for cooperative action

I. **Building trust** - Prior to conducting any survey or interviews, future engagement groups should work to establish trust with community members and organizations. If future engagement groups are residents of the community they are engaging in, starting within existing networks and building out through personal connections can be an effective low-stakes starting point. If public or government officials utilize this framework, hiring a community liaison may help build trust between residents and institutions.

II. **In-person engagement(s)** - If it is consistent with public health guidelines, the future groups should attend and potentially host in-person engagements in different neighborhoods of their community to receive broad collaboration. Attending community events and involving consenting participants could help collect a larger response population. In-person engagement could also limit the coverage bias of strict digital communication.

III. **Compensate people for their time and knowledge** - If future research groups are able to do so, then financially compensate people for their time and shared knowledge. This uplifts the value of individual participation. Future groups may want to investigate existing literature on best practices for participant compensation (e.g., process of determining fair compensation, communication of compensation, effect compensation may have on responses).

Educational Workshops

While there is a fine line between creating too much fear and having a healthy level of concern for extreme weather events and the climate crisis, the results from the current study indicate that the only modest level of concern that exists in Ypsilanti may be limiting the potential resilience network development. To address this, we recommend that a future iteration of this project implement a series of educational workshops throughout the community. In addition to providing residents with the facts about climate change, these workshops should establish procedural knowledge for different skills that will be useful in preparing for and responding to the climate crisis. Some of these more applicable skills could include composting, gardening, canning, first-aid, effective communication, or water and storm-water management. There are many environmental stewardship-based behavior change models that incorporate procedural knowledge among their variables. Faber et al.'s report (2021), recommended the Supportive Environments for Effectiveness (SEE) model as a good fit for the needs of Ypsilanti. While this section will not explain the SEE model in its entirety, it is important to point out that one of the variables included, “model building,” is something that should be targeted within these workshops.

According to Kaplan and Kaplan (2009), a mental model is a simplified version of reality that is stored in one's brain and is used to make sense of things, plan, and evaluate. This internal representation allows for deeper understanding and exploration of an environment. Thus, providing procedural knowledge skills through educational workshops will strengthen residents' mental models and provide a sense of competence and capability in building resilience. In addition to the SEE model, the Clarity-Based Decision-Making Model (Kaplan, 1991), various Team Based Models, or Hines et al.'s (1987) Educational Models incorporate elements of procedural knowledge that could also provide a foundation for these educational workshops.

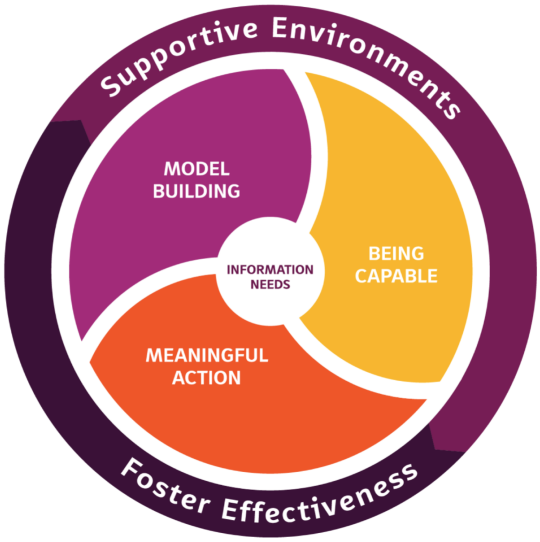


Figure 14. Kaplan and Kaplan's (2009) Reasonable Person (RPM) Model. This behavior change model is now referred to as the Supportive Environments Foster Effectiveness (SEE) Model.

Running educational workshops requires committed individuals to take on the role of program facilitator or teacher. We recommend these leaders have similar qualities to those of block leaders. This includes being a trusted and dedicated member of the community, having a strong understanding and working knowledge of the topic at hand, being an effective communicator, and most importantly, having genuine compassion for community members (Faber et al., 2021). Additionally, to ensure the durability of these programs, it is recommended that this series of workshops continue for an extended time with a plan to be revised after program evaluation and feedback. Providing a limited number of workshops for each skill with no follow up will likely result in termination of any skills or behaviors learned. One study on this topic found that two 4-week long educational interventions that took place a year apart showed attrition of taught behaviors in 50% of cases (Staats et al., 2004). This suggests that periodic application of these skills is necessary. Once behavior changes and community resilience are

developed, the goal is that they will eventually be maintained without continued intervention (De Young, 1993). Therefore, commitment at the workshop organizational level but also at an individual level is necessary so that skills learned by participants become self-sustaining and long-lasting.

Conclusion

The current research was successful in determining what resources are rated as most important in responding to climate change induced extreme weather events. Understanding this is an important step in making sure the necessary resources are available to a community in the face of climate change. While the survey allowed this study to identify which resources were viewed as most important, the interviews gave us deeper insight into which resources exist and what is most needed. The combination of this data allowed us to narrow down the focus of our pattern language guidebook, making sure the resilience network we started to develop is founded on ideas that are of highest priority to the people that will be utilizing the network. As described throughout this report, a climate resilience network has various components. At the heart of it, however, lie the community members. This research has shown that a sense of social cohesion and strong relationships are already present in Ypsilanti. This bodes well for the emergence of a local climate resilience network.

"There are a lot of long-lasting relationships within my neighborhood and I think many of the neighborhoods and communities [in] Ypsilanti. I think those relationships are going to be the foundation of any strong response."

While building community should continue to be a priority in Ypsilanti, using this framework as a foundational piece in the development of a climate resilience network will allow for faster and more durable progress.

References

Alexander, C., Ishikawa, S., Silverstein, M., Jacobson, M., Fiksdahl-King, I., & Angel, S. (1977). *A Pattern Language*. Oxford University Press. https://arl.human.cornell.edu/linked%20docs/Alexander_A_Pattern_Language.pdf

American Public Health Association. (2021). *Climate Changes Health: Vulnerable Populations*. American Public Health Association. Retrieved February 8, 2022, from https://www.apha.org/topics-and-issues/climate-change/vulnerable-populations

Burns, R. (2019, December 24). *Top 3 West Michigan weather stories of 2019*. WWMT. Retrieved March 11, 2022, from https://wwmt.com/weather/severe-weather-center/top-3-west-michigan-weather-stories-of-2019

Carmen, E., Fazey, I., Ross, H., Bedinger, M., Smith, F. M., Prager, K., McClymont, K., & Morrison, D. (2022). Building community resilience in a context of climate change: The role of social capital. *Ambio*. https://doi.org/10.1007/s13280-021-01678-9

Center for Climate and Energy Solutions. (2019). What is Climate Resilience and Why Does it Matter?oes. *Climate Essentials*. https://www.c2es.org/wp-content/uploads/2019/04/what-is-climate-resilience.pdf

Center for Disease Control and Prevention. (2021). *Climate Effects on Health*. CDC. Retrieved March 25, 2022, from https://www.cdc.gov/climateandhealth/effects/default.htm

Chakraborty, i., Daloz, A. S., Kumar, M., & Dimri, A. P. (2019). Does Awareness of Climate Change Lead to Worry? Exploring Community Perceptions Through Parallel Analysis in Rural

Himalaya. *Mountain Research and Devleopment*, *39*(2). https://doi.org/10.1659/MRD-JOURNAL-D-19-00012.1

City of Ann Arbor Office of Sustainability and Innovations. (2020, March). *Ann Arbor's Living Carbon Neutrality Plan*. A2Zero. https://www.a2zero.org/wp-content/uploads/2020/03/A2Zero-Carbon-Neutrality-Strategy_DRAFT_march-20-2.pdf

Climate Resilient Communities. (2020). *Adaptation and Resilience*. Climate Resilient Communities. Retrieved February 18, 2022, from https://www.climatercommunities.org/

Climate Resilient Communities. (2021, December). *End of Year Report 2021*. End of Year Report 2021. https://static1.squarespace.com/static/6046932c5163815f72a28b56/t/61e072059fa0ad78876bc72a/1642099210438/2021+End+of+Year+Finalized+Report11.pdf

Couper, M. P. (2005). Technology Trends in Survey Data Collection. *Social Science Computer Review*, *23*(4), 486-501. 10.1177/0894439305278972

Cutter, S. L., Barnes, L., Berry, M., Burton, C., Evans, E., Tate, E., & Webb, J. (2008). A place-based model for understanding community resilience to natural disasters. *Global Environmental Change*, *18*(4), 598-606. https://doi.org/10.1016/j.gloenvcha.2008.07.013

Davis, A. Y. (2005). *Abolition Democracy: Beyond Empire, Prisons, and Torture* (1st ed.). Seven Stories Press.

Deakin, H., & Wakefield, K. (2014). Skype interviewing: reflections of two PhD researchers. *Qualitative Research*, *145*(5), 603-616. 10.1177/1468794113488126

De Young, R. (1993). Changing behavior and making it stick: The conceptualization and management of conservation behavior. *Environment and Behavior*, (25), 485-505.

Faber, G., Kirwan, D., McCarty, T., & Porter, P. (2020). *A Framework for Implementing Resilience Hubs in Ypsilanti, Michigan*. University of Michigan School for Environment and Sustainability.

Fielding, K. S., & Hornsey, M. J. (2016, February 11). A Social Identity Analysis of Clmate Change and Environmental Attitudes and Behaviors: Insights and Opportunities. *Frontiers in Psychology*, *7*, 12. 10.3389/fpsyg.2016.00121

Folke, C. (2006). Resilience: The emergence of a perspective for social-ecological systems analyses. *Global Environmental Change*, *16*(3), 253-267. https://doi.org/10.1016/j.gloenvcha.2006.04.002

GLISA. (2022). *Southeast Lower Michigan - MI10*. Great Lakes Integrated Sciences and Assessments. https://glisa.umich.edu/division/southeast-lower-michigan/

Gouillart, F., & Hallett, T. (2015). *Co-Creation in Government*. Stanford Social Innovation Review. https://ssir.org/articles/entry/co_creation_in_government

Gray, L. M., Wong-Wylie, G., Rempel, G. R., & Cook, K. (2020). Expanding Qualitative Research Interviewing Strategies: Zoom Video Communication. *The Qualitative Report*, *25*(5), 1292-1301. 10.46743/2160-3715/2020.4212

Groves, R. M., Fowler Jr, F. J., Couper, M. P., Lepkowksi, J. M., Singer, E., & Tourangeau, R. (2009). *Survey Methodology* (2nd ed.). WIley.

Hansla, A., Gamble, A., Juliusson, A., & Gärling, T. (2008). The relationships between awareness of consequences, environmental concern, and value orientations. *Journal of Environmental Psychology*, *28*(1), 1-9. https://doi.org/10.1016/j.jenvp.2007.08.004

Hicks, M. (2021, September 14). *Severe storms exit Michigan, leaving thousands in dark, some freeway flooding*. Detroit News. Retrieved February 8, 2022, from https://www.detroitnews.com/story/weather/2021/09/14/severe-thunderstorm-warning-effect-parts-wayne-oakland-macomb/8339123002/

Hines, J. M., Hungeford, H. R., & Tomera, A. (1987). Analysis and Synthesis of Research of Responsible Environmental Behavior: A Meta-Analysis. *Journal of Environmental Education*, *18*(2), 1-8.

Hogue, C. (2020, February 10). *Governments are slow to put in place the policies we need for adaptation to climate change*. C&EN. Retrieved February 15, 2022, from https://cen.acs.org/environment/sustainability/Governments-slow-put-place-policies/98/i6

Hope Clinic. (2022). *Hope Clinic*. Hope for tomorrow - A campaign to make lives better. https://thehopeclinic.org/?gclid=Cj0KCQjwuMuRBhCJARIsAHXdnqMo4sRtounzHAclJn8qDAQC5UW50qucXQ5TgoAQAiEQ0GaOQ9E3ImQaAgCnEALw_wcB

Huff, A., & Thomas, A. (2014). Lake Superior Climate Change Impacts and Adaptation. *Prepared for the Lake Superior Lakewide Action and Management Plan – Superior Work Group*. http://www.epa.gov/glnpo/lakesuperior/index.html

Intergovernmental Panel on Climate Change (IPCC). (2021). *Climate Change 2021: The Physical Science of Basis, Summary for Policy Makers*. IPCC. https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM_final.pdf

Kaplan, S. (1991). *Environment, Cognition, and Action: An Integrated Approach* (G. W. Evans & T. Gärling, Eds.). Oxford University Press.

Kaplan, S., & Ba Tran, A. (2022, January 5). *More than 40 percent of Americans live in counties hit by climate disasters in 2021*. The Washington Post. Retrieved February 11, 2022, from https://www.washingtonpost.com/climate-environment/2022/01/05/climate-disasters-2021-fires/

Kaplan, S., & Kaplan, R. (2009). Creating a larger role for environmental psychology: The Reasonable Person Model and as integrative framework. *Journal of Environmental Psychology*, (29), 329-339.

Kenrich, D. T., Griskevicius, V., Neuberg, S. L., & Schaller, M. (2010). Renovating the Pyramid of Needs: Contemporary Extensions Built Upon Ancient Foundations. *Perspect Psychological Science*, *5*(3), 292-314. 10.1177/1745691610369469

Krouwel, M., Jolly, K., & Greenfield, S. (2019, November 19). Comparing Skype (video calling) and in-person qualitative interview modes in a study of people with irritable bowel

syndrome - an exploratory comparative analysis. *BMC Medical Research Methodology*, *19*(1).

Lavrakas, P. J. (2008). *Encyclopedia of Survey Research Methods*. SAGE Publications. https://methods.sagepub.com/reference/encyclopedia-of-survey-research-methods

Lawrence, E. D. (2014, October 26). *Michigan's sewer overflows raise regional concerns*. USA Today. Retrieved February 11, 2022, from https://www.usatoday.com/story/news/nation/2014/10/26/sewer-overflows-hit-10b-gallons-during-mich-storm/17935649/

Lester, J. (2018). *Environmental Injustice in the U. S.: Myths and Realities*. Taylor & Francis Group. https://doi.org/10.4324/9780429500787

Mackowiak, A. V. (2008, June 22). *"Consider the good of Ypsilanti first" was publisher's motto*. MLive.com. Retrieved February 10, 2022, from https://www.mlive.com/annarbornews/2008/06/consider_the_good_of_ypsilanti.html

Manzullo, B., & Siacon, A. (2019, January 28). *Polar vortex 2019 hits Michigan: What you need to know*. Detroit Free Press. Retrieved March 11, 2022, from https://www.freep.com/story/news/local/michigan/2019/01/28/michigan-weather-radar-polar-vortex-2019/2694248002/

Maslow, A. H. (1943). A theory of human motivation. *Psychological Review*, *50*(4), 370–396. https://doi.org/10.1037/h0054346

Measurement Error. (2008). In P. J. Lavrakas (Ed.), *Encyclopedia of Survey Research Methods*. SAGE Publications. https://dx.doi.org/10.4135/9781412963947.n291

Mental Health Foundation. (2022). *Physical health and mental health*. Mental Health Foundation. Retrieved March 16, 2022, from https://www.mentalhealth.org.uk/a-to-z/p/physical-health-and-mental-health

National Oceanic and Atmospheric Association. (2019, February 1). *Climate change impacts*. National Oceanic and Atmospheric Administration. Retrieved February 8, 2022, from https://www.noaa.gov/education/resource-collections/climate/climate-change-impacts

New York Times. (2022). *Michigan Coronavirus Map and Case Count*. The New York Times. Retrieved January 23, 2022, from https://www.nytimes.com/interactive/2021/us/michigan-covid-cases.html

Oliffe, J. L., Kelly, M. T., Gonzalez Montaner, G., & Yu Ko, W. F. (2021). Zoom Interviews: Benefits and Concessions. *International Journal of Qualitative Methods*, *20*, 1-8. 10.1177/16094069211053522

100 Resilient Cities. (2022). *Resilient Chicago: A Plan for Inclusive Growth and a Connected City*. Resilient Cities Network. Retrieved February 18, 2022, from https://resilientcitiesnetwork.org/networks/chicago/

Pavlinovic, D. (2021, September 1). *Climate and weather related disasters surge five-fold over 50 years, but early warnings save lives - WMO report*. UN News. Retrieved February 11, 2022, from https://news.un.org/en/story/2021/09/1098662

Princen, T., & De Young, R. (2012). Downshift-Upshift: Our Choice. In *The Localization Reader: Adapting to the Coming Downshift*. MIT Press.

Resilience Cities Network. (2022). *The world's leading urban resilience network*. Resilient Cities Network. Retrieved February 18, 2022, from https://resilientcitiesnetwork.org/network/

Roberts, B. L., Dunkle, R., & Haug, M. (1994). Physical, Psychological, and Social Resources As Moderators of the Relationship of Stress to Mental Health of the Very Old. *Journal of Gerontology*, *49*(1), S35-S43. https://doi.org/10.1093/geronj/49.1.S35

Salganik, M. J. (2018). Asking Questions. In *Bit by Bit: Social Research in the Digital Age* (pp. 85-107). Princeton University Press.

Simpson, L. B. (2017). *As We Have Always Done: Indigenous Freedom Through Radical Resistance*. University of Minnesota Press.

Staats, H. P., & Wilke, H. (2004). Effecting durable change: A team approach to improve environmental behavior in the household. *Environment and Behavior*, (36), 341-367.

United States Census Bureau. (2021). *US Census Bureau QuickFacts: Michigan*. U.S. Census Bureau. Retrieved February 8, 2022, from https://www.census.gov/quickfacts/MI

United States Census Bureau. (2021). *US Census Bureau QuickFacts: Ypsilanti city, Michigan*. U.S. Census Bureau. Retrieved February 8, 2022, from https://www.census.gov/quickfacts/ypsilanticitymichigan

USA.com. (2022). *Ypsilanti, MI Natural Disasters and Weather Extremes*. USA.com. Retrieved March 11, 2022, from http://www.usa.com/ypsilanti-mi-natural-disasters-extremes.htm

Verdugo, V. C. (2012). The positive psychology of sustainability. *Environment, Development and Sustainability*, (14), 651-666. https://link.springer.com/article/10.1007/s10668-012-9346-8

Wiggan, G. (2018). Afterword: Black Migrations and Urban Realities. *Black History Bulliten*, *81*(2), 30-33. https://www.jstor.org/stable/10.5323/blachistbull.81.2.0030

Ypsi Real. (2022). *Ypsilanti Events | Ypsilanti, MI*. Ypsi Real. Retrieved February 10, 2022, from https://www.ypsireal.com/event

A Pattern Language Guidebook:

A Framework for a Resilience Network in Ypsilanti

SEAS SCHOOL FOR ENVIRONMENT AND SUSTAINABILITY
UNIVERSITY OF MICHIGAN

By Taylor Antal, Bryce Frohlich & Jessica Miller

Acknowledgements

The works displayed on the cover of this pattern language guidebook were designed by Jody Lynn Burton. You can find more about Jodi's work on her website www.jodilynndoodles.com.

Table of Contents

Community Fruit Trees

Vision: Imagine walking down your street and being able to reach up and grab fresh fruit at every street corner. Nutritious and accessible food will become commonplace as more and more fruit trees are planted and nurtured. Fruit trees have the power to increase community food security and the availability of delicious treats.

Utility: A community fruit tree is a publicly owned fruit tree that is easily accessible for anyone to pick from. Community Fruit Trees not only help feed people but strengthens communities by bringing people together over food, creating a sharing mindset, and improving the air, soil and water.[1]

(Image: https://www.robgreenfield.org/communityfruittrees/)

Importance: Having access to healthy foods can have a positive impact on people's quality of life. One way to ensure greater access to healthy foods is to grow food in places where people already live; if a communities' access to healthy foods is limited by transportation, availability of grocery stores, or other factors, locally grown food can provide a reliable food source for generations. The farther removed communities are from reliance on industrial agricultural and food store chains the more resilient they become.

Context: Community Fruit Trees can be planted in many different locations that are accessible to people including residential front yards and businesses with access from a public sidewalk, in the medians between streets and sidewalk, at schools, in public parks, and churchyards. A friendly sign next to the Community Fruit Tree usually identifies the fruit and invites people to enjoy the fruit. A group of volunteers are organized to provide care for the tree after it has been planted. Caring for a Community Fruit Tree can bring people together around a common purpose and create new relationships between neighbors.

Resources: *Community Fruit Trees Project:* 2018. "Rob Greenfield." Community Fruit Trees: Improving Communities One Fruit Tree at a Time. https://www.robgreenfield.org/communityfruittrees/.

[1] *Community Fruit Trees*. (2022). Rob Greenfield. Retrieved April 18, 2022, from https://www.robgreenfield.org/communityfruittrees/

Seed Banks

Vision: Ecological richness and plant diversity for generations to come. The delicious appeal of seeing an array of colors on each plate at dinner and a sense of security knowing that extra seeds are stored for times of need.

Utility:
Properly stored seeds ensure the survival of genetic lines of different species of plants. Seed banks are used to store seeds that can later be used to grow food, medicines, and other plants with various utilities.

Importance:
In the face of social, economic, or political turmoil supply or access to food may be limited. During such circumstances, it is incredibly important to have the capacity to rely on a local seed bank who has a generous supply of diverse seeds from a variety of plants. Having a local seed bank increases the resilience of a community as it acts as a 'back-up' resource for crop production when supply chains are disrupted or extreme weather events occur, leading to food shortage. Seed banks allow for communities to grow new crops in hopes of meeting the local food demand.

Additionally, preserving seeds is essential to protect varieties from extinction. Climate change and corresponding extreme weather events, habitat loss, pollution, and pests and disease are main drivers for species extinction[2]. Seed banks aim to protect plant species, especially vulnerable ones, from extinction. Plant diversity is important as it provides a variety of ecosystem services in which all life benefits.

Context:
Seed banks should be areas or containers that are on average: cool, dry, and dark. Proper storage preserves seeds which extend their usability for future use. Storage areas are intended to be spaces protected from extreme weather conditions or events such as storms, floods, fires, or excessive heat. Seeds can be stored in containers such as jars on shelves within a vault, or by other feasible means. Better storage equates

[2] Curran, O. (2018, November 13). *Seeds of World's Rarest Trees and Crops Can't Be Banked*. Science | HowStuffWorks. Retrieved April 18, 2022, from https://science.howstuffworks.com/environmental/green-science/worlds-rarest-seeds-cant-be-banked.htm

to greater longevity of seeds. Seed collection can be carried out by experts, volunteers, or any willing participant. Further research may be needed to determine how, where, when, and which seeds should be collected for storage within seed banks.

Resources: *Ypsilanti Seed Library:*
https://www.ypsilibrary.org/collections/library-of-things/seed-library/

Image source:
https://science.howstuffworks.com/environmental/green-science/worlds-rarest-seeds-cant-be-banked.htm

Washtenaw County Warming Center; Ypsilanti Freighthouse + Delonis Center

Vision: Relief from the cold during the winter is a welcomed feeling when temperatures drop. Walking into a Warming Center folks will be able to shed off heavy winter coats and take shelter from the extreme temperatures.

Utility: Governments, businesses, or community organizations may open Warming Centers up in the coldest of months of the year to help those experiencing houselessness and other people in vulnerable positions escape the dangers of extreme cold in heated facilities. Warming Centers can operate under daytime hours and extend overnight services to those who would otherwise not have access to shelter.

Importance: Adaptation to extreme weather events will be a necessary part of adjusting to a changing climate. Shock events such as power outages and lack of housing could jeopardize people's wellbeing and expose folks to the effects of extreme cold. Having a public place where residents may gather, and potentially stay the night, protects people from the elements.

In this file photo, the Ypsilanti Freighthouse at 100 Market Place is seen on Monday, November 28, 2016 in Ypsilanti, Mich.Katy Kildee | The Ann Arbor News.Source:https://www.mlive.com/news/ann-arbor/2021/10/historic-depot-town-building-will-host-ypsilanti-winter-warming-center-amid-covid-closures.html

Context: Temperatures during winter in South-East Michigan can drop to very low temperatures. Exposure to these low temperatures can be dangerous for folks in the Ypsilanti Community if they are outside for a prolonged period. Winter 2021-22 Warming Centers such as the one located at the Ypsilanti Freighthouse (100 Market Place, Ypsilanti, MI) are publicly funded and provide relief from the cold that businesses, faith based institutions, or other organizations may not have the capacity to serve during the COVID-19 pandemic.

Ypsilanti residents may view operating dates and hours of current operating Warming Centers in Washtenaw County at washtenaw.org. There is no pre-registration necessary for daytime warming centers currently. For access to overnight warming centers, each client must call Housing Access of Washtenaw County (HAWC) and obtain a referral to the Delonis Center (312 W Huron St, Ann Arbor;). More information is available by calling HAWC at (734) 961-1999 or visiting www.housingaccess.net. If you are seeking shelter after 5 pm, there will be onsite assistance provided at the Delonis Center.[3]

[3] Winter Warming Centers | Washtenaw County, MI. Washtenaw County. Retrieved April 17, 2022, from https://www.washtenaw.org/2789/Winter-Warming-Centers

Winter 2021-22 Warming Centers:

Location	Dates	Times
Ypsilanti Freighthouse (100 Market Place Ypsilanti, MI)	November 1, 2021 - March 31, 2022	Monday - Thursday 8am - 6pm
Journey of Faith (1900 Manchester, Ann Arbor, MI 48104)	December 2021	
St. Mary's Student Parrish (331 Thompson Street, Ann Arbor, MI 48104)	January 2022	
First Baptist Church (517 E. Washington Street, Ann Arbor, MI 48104)	February 2022	

Image source: https://www.washtenaw.org/2789/Winter-Warming-Centers

Buy No Things Groups; A Curricular Economy and Mutual Aid Network

Vision: Reuse, pass on, or repurpose. Imagine you are clearing out your home of items that you no longer are in need of. You find old toys that your children have outgrown, old clothes that you don't need anymore, or cooking ware that is in great condition but is taking up space in your kitchen cabinets. Instead of throwing away your unneeded items you take a quick photo of them and post them to your local "Buy No Things" group. Not long after your post is up you are arranging a pick-up time for a neighbor(s) to swing by and collect the items you want to get rid of. Your neighbor(s) have a friend who has just had a child and could use some toys, know a person just starting out on their own doesn't have a complete kitchen but wants to cook for themselves, and that old blazer that you don't wear anymore is going to help someone present themselves in an upcoming job interview. You're gifted items are helping others.

Utility: Establishing a "Buy No Things" group allows individuals to advertise physical possessions or services they are interested in getting rid of or in search of (ISO). "Buy No Things" groups can be facilitated through social media sites such as Facebook or NextDoor. Implementing the practice of reuse and repurposing used items diverts waste and supports folks who may not have the ability to buy items new. Posts in "Buy No Things" groups are usually restricted to three types of posts - Gifts, Asks, Gratitudes[4].

Context: Instituting a "Buy No Things" group can create a localized aid network that helps neighbors support each other with physical resource needs. Utilizing a collective network allows neighbors to pool resources together to support each other's needs at a scale that is easily accessed (e.g., Neighborhood or City level)

Importance: Having this network helps create a circular and reuse economy, fighting against planned obsolescence. The pooling of community resources is a fast way for someone to have their needs met in moments of need or uncertainty.

Resources:
Community Guidelines: http://buynothingproject.org/guidelines
Groups in action:
Ypsilanti's FREEcycle: https://www.facebook.com/groups/539995416070519/
"Buy No Things Ann Arbor": https://www.facebook.com/groups/2296360694004095/

[4] Guo, A. (2021, April 22). 'Buy Nothing' groups: A place to share goods, services — and gratitude. The Washington Post. Retrieved April 17, 2022, from https://www.washingtonpost.com/lifestyle/home/buy-nothing-groups-gift-economy/2021/04/20/e392b896-964d-11eb-a6d0-13d207aadb78_story.html

Local Bike Repair; Common Cycle and Ypsi Bike Co-Op

Vision: On your bike ride home from work you replace your car commute with a route that lets you take in fresh air, get some exercise, and have some restorative time to unwind after a workday. You have saved money on gas and have found your bike to be a more reliable form of transportation for short distances. Although your bike gears lock up or chain comes undone sometimes you are able to get help in fixing your bike from local volunteers who are willing to repair your bike for little to no cost.

Utility: Bikes maintenance can be overwhelming to those who have never had to patch a tire or replace a bike chain. With a little assistance or guidance you can have your bike back up and running in a little to no time at all. Having and supporting organizations such as Common Cylce and Ypsi Bike Co-Op can help folks who use bikes as their main form of transportation stay mobile and get to where they need to go.

Context: Although most of us rely on cars for our daily needs they are not always reliable or accessible and if they break down repairs can be expensive. Expenses such as car insurance or gas can also put a strain on a household's or individual's budget. For able bodied people, biking can be a reliable alternative to cars with fewer maintenance costs and provides an alternative to a reliance on cars.

Importance: Non-motorized transportation is often a reliable alternative method of getting around for many people who are lower-income or without access to an automobile. The unpredictable fluctuation of gas prices and the need to reduce greenhouse gas emissions from automobile use make the bike a more resilient and reliable alternative to reliance on cars.

Resources:

Ypsi Bike Co-Op:

Facebook: https://www.facebook.com/search/top?q=buy%20no%20things%20ypsilanti

Email: ypsibikecoop@gmail.com

Common Cycle:

Website: https://commoncycle.org/

Facebook: https://www.facebook.com/CommonCycleA2/

Phone or Contact Chain

Vision: Coordinated support can be calming and reassuring in unexpected or stressful situations. Neighbors being able to rely on other neighbors during a community wide event creates a collective safety network that promotes cooperation and creates leadership roles.

Utility: After an unexpected or severe event has occurred, people may need immediate assistance. Getting into direct contact with neighbors and other members of your community, via phone or direct contact, will help determine who is in need of assistance and what assistance they require. Living close to your neighbors may allow you to identify those who are in need of assistance prior to service or care providers arriving.

Context: Severe or unexpected hazardous events can find or catch communities off guard. Therefore, it is useful to establish a manageable phone or contact chain within neighborhoods to create a person-to-person check in system. Identifying who and how your neighbors have been affected will determine if emergency responders will need to be called.

Importance: Ideally, each household will be assigned a preassigned list or group of other households to call or contact during or after an extreme or unexpected event. The list should include households that are within reasonable travel distances in case of phone or power outages, blocked roads, or other transportation issues.

When an extreme event occurs one household is designated as the initiator, contacting the next household grouped on the list. The caller ensures that there are no immediate or life threatening needs. The second household on the list proceeds to check in with the third, then the third contacts the fourth, and so on. The last household on the list calls or contacts the first household to signify that the chain has been completed.

Specifications:
Consider these factors when developing your contact chain:

1. The initiating household may be in need of assistance or unable to initiate the contact chain. Consequently, a neighborhood may want to designate several households as backup initiators.
2. No one household should be responsible for contacting the entire contact chain list.
3. Chain groups may need to be divided into smaller groups if phone or internet communication is not available.
4. If emergency services such as 9-1-1 are needed there should be clear designations on who is going to call and remain on the line with dispatchers.
5. If contacting your designated household could potentially put you at risk of harm, wait until it is safe to do so (ex. Down power lines, fire, flooding, etc.)

Community Walk* Audit

Vision: Living in a place builds a deeper understanding of your surroundings. Live someplace long enough and you come to know the shortcuts and local landmarks like the back of your hand. Who better to ask what a community needs or desires than someone who lives their each and every day?

Utility: Community Walk* Audits are a great tool to gather information about street conditions, engage community members, and inform planning and community betterment projects. Through Walk* Audits, you can help improve non-motorized transportation, health, and quality of life in your community![5] In a walk audit, community members go for a walk together, noting what makes their community feel resilient and what they feel could be added. Walk audits can be informal and casual events with just a few friends, or can include city council members, community organizations, and detailed forms.

Context: Community Walk* Audits can be conducted to assess any aspect of the community an organized group wishes to investigate. This could include the number of groceries stores within a certain distance of neighborhoods, the amount of non-motorized transportation options available such as bike lanes and sidewalks, or amount of public green spaces are just some examples. Often visualization and recorded data through efforts such as Community Walk* Audits are great ways to engage local officials to back community desires because there is a documented and "visible" need. Forms that are given to those participating are easily understood and filled out. Often forms include a map of the area being audited so that walkers* are able to physically mark their observations.

Importance: Community Walk* Audits help document community member's lived experiences in a way that is easily communicated to those local decision makers. Audits conducted can serve as a platform for people to advocate for investment in their community to make their home a healthier and safer place. These audits are a direct reflection of community member observations that take few resources to do while laying the groundwork for a large impact on the community.

Resource: Safe Route Partnership. (2018). Let's Go For A Walk: A Toolkit for Planning and Conducting a Walk Audit. Safe Routes Partnership.
https://www.saferoutespartnership.org/sites/default/files/walk_audit_toolkit_2018.pdf

[5] Safe Routes Partnership. (2018). Get to Know Your Neighborhood With a Walk Audit. Safe Routes Partnership. https://www.saferoutespartnership.org/sites/default/files/get_to_know_your_neighborhood_with_a_walk_audit.pdf

*Though the term 'Walk Audit' implies that this activity is reserved for able body individuals people of all ages and abilities are encouraged to participate if able. Input and cooperation with a diverse group provides greater potential feedback.

Block or Community Events

Vision: A gathering that strengthens long-term friendships and cultivates new ones; neighbors sharing laughs, playing games, spreading knowledge or skills, telling stories, and having fun!

Utility: Block or community events can have an array of purposes and involve a variety of activities. Neighbors can meet for a weekly cup of joe, form a book club, have a potluck or a game night. Community gatherings can also be held for any reason such as for a car show, farmers market, art gallery, holiday celebration or whatever a community member's heart desires!

Context: Typically, block events involve neighbors within a block of a neighborhood, but that can constrict or expand up to the event planner's discretion. Additionally, they are held within the block, either at an individual's home or on the street where block members can easily join by stepping outside their homes. Community events usually aim to involve the entirety of the community and are held at a centralized location. Larger events may need to be planned further in advance as compared to block events, and may need to be approved by the city or the county depending on what will be involved (e.g., food or other vendors, streets blocked off, etc.).

Importance: Block or community events offer a means of including all within a community to gather and share an experience with one another. This contributes to social cohesion and strengthening of community bonds. Having a strong community enhances resilience as it builds trust amongst community members and a sense of security that people can be dependent on one another when turmoil ensues, whether it be financial, political, or the occurrence of an extreme weather event.

Neighbor Service Map

Vision: A sense of joy and feeling of competence! Lending a hand to a neighbor in need not only makes us feel better but tightens community bonds and feelings of reciprocity. From time to time we all find ourselves trying to get in touch with that person who would be willing to lend us a helping hand plowing the snow on our sidewalks or the garden enthusiast who would be willing to share their knowledge in helping you start your own garden. Communities have people with a wide range of interests, talents, and skills; you may not have to travel far to find experts in a variety of fields. Identifying individuals' knowledge and skill sets could make learning a new skill or asking for help may be as easy as talking to your neighbor right next door.

Utility: Having access to a Neighborhood Service Map allows you to see who in your area would be willing to extend a helping hand, lend neighbors tools/equipment, or offer up their skills/knowledge. Service Maps contain contact information of those willing to offer up assistance or their time. Creating a community that practices sharing and altruism can help establish deep and meaningful connections between neighbors while bettering peoples' lives.

Context: In an increasingly complex and specialized world it is hard to gain all the skills that you need to go through life without ever leaning on others' help. Without having to search very far neighbors would be able to call on eachother for assistance using a compiled physical or digital directory. Contact information and the services and/or skills are cataloged as a community resource for all members of the community to access.

Importance: If people feel that they are able to go to their neighbors when they need help the bonds between that community are strengthened. Being able to learn a new skill from someone local and familiar can save people money, time, provide greater options, and creates a culture of communal sharing. The more knowledge people have access to the more competent they will be when faced with new challenges.

Appendix B - Survey Bias and Error

The flaws within this survey can be explained by total survey error which includes representation and measurement errors (Salganik, 2018, 89). Representation refers to the conclusions made about the target population from the sampled population (Salganik, 2018, 91). Measurement refers to the deductions made from participants' responses regarding their thoughts and actions (Salganik, 2018, 94). Due to total survey error, careful consideration must be taken to minimize such errors to gain a more accurate understanding of the intended information acquired from a desired population. Thus, prior to this survey instrument being implemented again, either in Ypsilanti or other communities, it is important to discuss the potential survey errors that accompany it.

Before distributing the survey to Ypsilanti residents, it was piloted by a combination of 19 graduate students, staff, and faculty members, all of whom are part of the University of Michigan community. Being so, the survey was piloted by a population whose education level does not match that of the education level participants self-identified in the survey. Thus, to determine whether the survey questions and terminology used would be easily understood by survey participants, it would have been advantageous to pilot the survey in a population with a diverse educational background or better, the frame population. The frame population refers to the list of individuals that were used for sampling (Salganik, 2018, 92). Having the frame population pilot the survey may have better addressed unclear phrasings, potential misunderstandings, or other errors associated with a population who reflects the Ypsilanti community.

Regarding representation, several errors can be involved, one of which includes coverage error. Coverage error refers to the difference between the target and frame populations (Salganik, 2018, 92). The target population of this survey was the Ypsilanti community. Contrastingly, the frame population included pre-identified community leaders, other residents directly contacted by those individuals, residents who were on the city-wide LISTSERV, and individuals who were active on Ypsilanti-focused social media pages. Thus, there may have been an error in that the entire Ypsilanti community did not participate in the survey. Coverage bias can result from coverage error when there is a systematic difference between individuals in the target and frame populations (Salganik, 2018, 92-93). Coverage bias was minimized due to the city-wide LISTSERV distribution of the survey. However, it may have been increased as a result of the online distribution of the survey. Including an in-person survey distribution option in the future would allow for greater inclusivity as individuals from lower socioeconomic backgrounds may not have had the means to access it online. To add, the online format of the survey may have limited residents with certain disabilities or those who did not have the technological accessibility to complete the survey. Having an in-person option not only allows for people who do not have access to technological devices or the internet to be included, but it also provides a personal touch where relationships can be developed between the research team and participants, and clarifying questions can be asked. Since the intent of this research is to identify

resources that serve the whole community, especially those living in poverty who may have a greater need, it is important that these voices are also included.

Sampling error can also be at play when there is a discrepancy in characteristics between the frame and sample populations (Salganik, 2018, 92). Since, in this study, the frame population is the list of people that were used for sampling, the sample population includes the individuals who the project team tried to survey (Salganik, 2019, 93). Due to the attempt to survey all of the individuals in the frame population through distribution of the survey link via email, snowball sampling, and social media posts, the sample population equated to the frame population. Thus, there was no apparent sampling error involved in this study.

Non-response error, or bias, occurs when there is a disparity between the individuals in the sample population and the survey respondents (Salganik, 2018, 93). In this voluntary study, self-selection bias was a factor since respondents chose whether they wanted to participate or not. This may have resulted in biased results due to the possibility that the individuals who chose to participate may have been systematically different than those who did not. For instance, upon posting the survey link to social media outlets, information that the Master's project team was from the "School for Environment and Sustainability at the University of Michigan conducting research on building community resilience in Ypsilanti" was included. This information may have attracted individuals who are interested in this area and/or who hold certain values, attitudes, and beliefs to take the survey. Similarly, information regarding the topic of our research may have dissuaded a dissimilar population from taking the survey due to diverging interests, values, and/or opinions. Thus, it is entirely possible that self-selected respondents resulted in biased survey results. However, in an attempt to determine whether the survey respondents accurately reflected the Ypsilanti community, demographic questions were included.

Demographic questions including age, ethnicity, and education level were used in the survey to compare differences between the survey respondents and the Ypsilanti population. Our results indicated that out of 69 respondents who answered the age question, there was a fairly equal distribution (Table 1). As of 2021, 77.8% of individuals in Ypsilanti were ages 18-65 while 7.6% were 65 and above (United States Census Bureau, 2021). Due to the differing age categories between the data from the United States Census Bureau (2021) and the survey, it is difficult to determine whether the survey respondents represented the age distribution of Ypsilanti residents over the age of 18. It is also important to note that due to IRB restrictions, the current study was unable to interview residents under 18 and therefore, their voices are not reflected in the results.

In addition, our results showed discrepancies between survey participant racial and ethnic distribution (Table 2) and the racial and ethnic distribution that exists in Ypsilanti (United States Census Bureau, 2021). Survey respondents closely reflected the Asian, Islander, and Native populations of Ypsilanti, however they over-represented the White population and under-represented the Black and Hispanic populations.

Lastly, our results indicated that there may have also been a distinction in the educational status of survey participants and the Ypsilanti population (Table 3). According to 2019 data from the United States Census Bureau (2021), 91.8% of Ypsilanti residents aged 25 or older had at least a high school diploma and 43.3% of individuals aged 25 or older had at least a Bachelor's degree. Overall, 73.92%, and thus a significant proportion of the survey respondents who answered the education question had earned at least a bachelor's degree. Contrastingly, less than half of the Ypsilanti population aged 25 or older had achieved the same level of education. However, it is important to note that this is not a direct comparison since the survey respondents also included individuals aged 18-25 who may still be pursuing further education. Overall, it is unclear whether the age and education level of the survey respondents accurately reflects the age and education level of the Ypsilanti population. Therefore, deductions made from this survey should be cautiously made in reference to the Ypsilanti community as a whole.

Measurement error, a threat to the internal validity of the survey instrument, is the extent to which a chosen measure of a variable diverges from the actual value of that variable (Lavrakas, 2008). For example, it is possible that the survey results for respondents' level of concern for heat waves does not equate to respondents' true level of concern for heat waves. The degree of disparity between the survey results and the true value of respondents' level of concern for heat waves is measurement error. Measurement error occurs when participants lack understanding of what is being asked, when they are unable to access related information to derive a response, or when they provide an inaccurate answer (Lavrakas, 2008).

To minimize the potential lack of understanding on respondents' behalf, the survey employed simple, clear, and concise questions, and provided specific examples for the material and emotional resources it asked the participants to rate. For example, when participants were asked to rate how important the following resources were for responding to extreme events, food access/distribution was followed by the examples of "food banks, community gardens, food delivery, etc." Providing examples increased the probability that respondents understood each listed resource's intended construct and thus, would be able to provide information that accurately measured said construct. In addition, the inclusion of "etc." conveyed to respondents that the list of examples was not exhaustive. Despite taking this action, there is a possibility that respondents still misinterpreted one or multiple measures and their intended construct(s). However, due to the examples provided for each item, this possibility is deemed to be fairly low.

Another method that was employed to increase the internal validity of the survey was item randomization. To combat the potential for non-response to items listed further down each list, items within each question were randomized. For example, one participant may have been asked to rate the importance of food access/distribution for responding to extreme events first whereas another participant may have been asked to rate the importance of education first. Thus, item randomization mitigated the potential order effect that may have influenced the results if items were listed in a specific order for all participants. However, questions were maintained in the same order for each participant to uphold the logical flow of the survey.

Additionally, questions were ordered by their level of importance for generating abundant responses. For example, the project team deemed it the most essential to ask participants their level of concern for various extreme weather events impacting Ypsilanti. Thus, it was the first question within the survey. Contrastingly, the project team regarded questions relating to the participants' level of commitment to their community as the least important for the purposes of this study. As a result, questions including how long the participant has lived in Ypsilanti and how long they intend to live in the community were placed last within the survey. This choice, however, resulted in non-responses to questions asked later on in the survey. For example, 115 participants indicated their level of concern for extreme weather events whereas only 71 responses were recorded for participants' level of commitment to their community. There are a variety of possibilities for why this occurred; respondent fatigue is one of them. As participants moved through the survey, they may have become increasingly fatigued resulting in the decrease in responses from the initial question compared to subsequent questions. Respondents may have also chosen to not complete the survey due to the word choices, syntax, and/or prompts involved. For example, the question asking participants to rate the importance of physical resources was preceded by the statement that, "Climate change increases the likelihood of emergencies in Ypsilanti. Extreme events will happen more often and more intensely as time goes on." Although there is abundant evidence to support these claims, no resources or citations were included within the survey. Therefore, it is possible that climate-related information discouraged participants from continuing or completing the survey due to the lack of evidence to support the claims made and/or prior held beliefs.

In addition to the potential impact word choices, syntax, and/or prompts had on participation, it is also possible that they influenced survey responses. As previously stated, the question asking participants to rate the importance of physical resources was preceded by a prompt regarding the progressive increase in frequency and severity of extreme weather events. Contrastingly, the question regarding emotional resources was not preceded by any such statement. Thus, including this statement prior to asking residents to rate the importance of material-based resources may have precipitated respondents to rate them with a greater level of importance than emotional resources. Furthermore, regarding physical resources, participants were asked to "Please rate how important the following resources are for responding to extreme events." Regarding emotional resources, participants were asked to "Please rate how important the following resources are to you." Therefore, the difference in how these questions were phrased (asking individuals to rate the importance of physical resources in responding to extreme weather events compared to asking them to rate how important emotional resources were to them) may have contributed to their contrasting results.

An additional technique chosen to increase internal validity and reduce measurement error within the survey was the inclusion of a Likert response set. A Likert response set includes the categories given to participants for their responses to items (Lavrakas, 2008). For the purpose of this survey, the Likert response set included five points: "not at all", "not very", "somewhat", "very", and "extremely". This method allowed for the use of a uniform continuum for participants' responses in determining their level of concern for extreme weather events

impacting Ypsilanti and the level of importance they attributed to various material and emotional resources in responding to such events (Lavrakas, 2008). However, it is important to note that participants may have perceived each option and the differences between them differently. For example, “somewhat concerned” may have been interpreted and answered differently by one respondent compared to another. Furthermore, central tendency bias may have influenced the results due to participants’ potential unwillingness to choose extreme response options, in this case referring to “not at all” and “extremely” (Lavrakas, 2008). Therefore, differing perceptions and central tendency bias may have contributed to respondents’ inaccurate answers and thus, measurement error.

It is also possible that respondents took the survey more than once. This could have resulted if a participant started to take the online survey, paused, and then attempted to continue the survey over 48 hours after they edited their last response. Rather than be able to continue their initial survey responses, the participant would have had to re-start the survey which could have resulted in duplicate responses from the same participant. The project team chose to include in analysis those surveys left incomplete after 48 hours from the last edited response due to the desire to record as many responses as possible, despite incomplete results. Additionally, this choice was based on the assumption that if participants wanted to complete the survey at a later time than they began, they would likely do so within 48 hours.

Lastly, an error that was made in the survey involved the incorporation of an inaccurate map intended to represent the different neighborhoods in Ypsilanti. Our team received notice after the survey was distributed that the map was not representative of Ypsilanti neighborhoods. Thus, our question asking participants to indicate which neighborhood in Ypsilanti they lived in was not used for analysis.

Appendix C - Interview Guide

Mention the following key points:

- Thank participants for joining the call today and for their previous participation in filling out our online survey.
- Purpose of the call: To discuss community resilience and how we may plan with our community to…
    - Prepare for climate impacts and other possible futures[2] and
    - Positively adapt to these impacts
- What our questions and the session will look like: This is in no way a formal interview. Our session shouldn't last more than about an hour, and we plan to record it. Their participation throughout is completely voluntary.
    - Ask if anyone has questions before continuing (gain consent to record)

(*Distribute hub infographic in person or display on-screen if in an online format*)

- Introduction to resilience hubs and resilience block leaders > "The services found in resilience hubs can be provided to a community either through a physical location or in the form of a block leader."
    - A physical hub = 1) a community building in a trusted location, 2) open year-round, 3) staffed by volunteers, and 4) includes important resources for the community.
    - A block leader approach = a trusted individual within a neighborhood, responsible for similar aspects of what a physical hub can provide.
        - i.e., they may host or share informative workshops, or distribute resources during an emergency.
        - More localized approach, typically on a block-by-block basis, while a physical hub extends to an entire neighborhood or beyond.[3]
- "We **hope to determine which may be the best approach** for your neighborhood to increase resilience, while also **understanding the day-to-day needs** you have in your community."
- Intro questions: Have them go around and introduce themselves to establish a sense of familiarity, asking who they are and what neighborhood they're from, as well as how long they've been a resident.

[2] Mention when talking that "possible futures" might entail things like higher food prices, higher energy prices, less stable government support

[3] If an interviewee asks about differences, discuss how block leaders can be a bit easier to implement in terms of time and money

Community Needs Questions

("The following are questions about your needs as a resident in your neighborhood…")

1. What makes your neighborhood a great place to live?
2. What challenges are present in your neighborhood?
3. Reflecting on past situations, what kinds of things are easily accessible in your neighborhood?
4. Reflecting on past situations, what kinds of things are difficult to access in your neighborhood?
5. Given the situation that arose from COVID-19, how prepared do you think your neighborhood is to meet the needs of residents in future emergencies?

Social and Emotional Needs Interview Questions

("The following are questions that ask about your experience with others in your neighborhood, and your experience as a resident more generally…")

6. Have you attended neighborhood-wide events in the past?
    a. Which events?/What kind of events?
    b. Can you describe what your experience was like at this event?
7. Are you part of any organizations designed to help residents in your neighborhood, and if so, which ones?
8. Have you felt that you could go to your neighbors with any needs you had in an emergency?
9. When you imagine your neighborhood in 5-10 years, what do you hope for?
    a. What is needed to get there?
    b. What challenges or barriers do you anticipate?

Approach Questions

("Based on the above information…")

10. In the resilience hub located in a physical community building as described above, what would you include?
    a. What should the space look like?
    b. What services or programs would be available to people in your neighborhood?
11. Similarly, what would you expect of a resilience block leader in your neighborhood?
    a. What should they do to coordinate a neighborhood emergency response?
12. Do you feel either yourself or any of your neighbors could build resilience in your neighborhood? (If yes, ask who and what qualities they have that make the interviewee confident that they could serve as a block leader.)
13. Imagine an emergency event[4] happening in your community 5-10 years down the road. What positive neighborhood responses do you expect in this situation?

[4] If asked to describe an example of an emergency event, mention we don't want to be too specific or narrow in how we think about this, but examples could include floods, tornados, pandemics, etc. and that we are trying to get a general sense of neighborhood responses to collective issues.

a. What are the strengths of your neighborhood that would help create a positive neighborhood response in this situation?
b. What are the weaknesses of your neighborhood that would prevent creating a positive response in this situation?

Appendix D - Email Response to Survey Respondents

Hello,

Thanks for your interest in further contributing to the Ypsilanti Community Resilience Project!

First, we want to thank you for taking the time to respond to our survey. Your response is greatly appreciated. Secondly, we wanted to offer two opportunities for you to further be involved in this iteration of the project.

The first option would be an opportunity to participate in a one hour interview with our team to receive your input as a Ypsilanti resident in building community resilience. As an Ypsilanti resident your personal knowledge of your neighborhood and community is incredibly valuable.

The second option would be to participate in development of a community resilience resource guide that would be developed and distributed for free to residents of Ypsilanti and community organizations.

If you are interested in participating in an interview or in the development of the community resilience guide please respond to this email and we will provide a resource for you to schedule a one hour block that is most convenient for you to meet via *Zoom or telephone.*

Any participation is completely voluntary and anonymous, if that is your preference.

If you have any questions or concerns please contact our project team at ypsireshub@umich.edu!

Thanks again for your interest in the Ypsilanti Community Resilience Project,

Bryce, Jessica, and Taylor
(Ypsilanti Community Resilience Project Team)

Appendix E - Survey

Introduction

This survey was created by University of Michigan School for Environment and Sustainability graduate students. The goal is to gain input from Ypsilanti residents regarding which resources would best prepare your community to the effects of climate change.
Your response will be anonymous, and your participation is voluntary. Any of the questions can be skipped. The survey should take less than 5 minutes to complete. Thank you in advance for your participation as your responses are extremely valuable!

Climate Concern

How concerned are you about each of the following extreme events affecting Ypsilanti?

	Not at all	Not very	Somewhat	Very	Extremely
Heat waves	☐	☐	☐	☐	☐
Storms	☐	☐	☐	☐	☐
Floods	☐	☐	☐	☐	☐
Blizzards	☐	☐	☐	☐	☐
Extreme cold	☐	☐	☐	☐	☐
Tornadoes	☐	☐	☐	☐	☐
Other:	☐	☐	☐	☐	☐

Material Based Climate Resources

Climate change increases the likelihood of emergencies in Ypsilanti. Extreme events will happen more often and more intensely as time goes on.
Please rate how important the following resources are for responding to extreme events.

	Not at all	Not very	Somewhat	Very	Extremely
Food access/distribution (food banks, community gardens, food delivery, etc.)	☐	☐	☐	☐	☐
Infrastructure (shelters, cooling/warming centers, etc.)	☐	☐	☐	☐	☐
Health items (first aid kit, toiletries, medication and storage, etc.)	☐	☐	☐	☐	☐
Emergency items (batteries, tool-kits, blankets, etc.)	☐	☐	☐	☐	☐
Transportation (bus, bicycle, ride-share, etc.)	☐	☐	☐	☐	☐

Education (workshops, classes, pamphlets, etc.)	☐	☐	☐	☐	☐
Other: _____	☐	☐	☐	☐	☐

Which of the above resources can you access in Ypsilanti? Please be as specific as possible.

Where in Ypsilanti would you go to access those resources? Please be as specific as possible.

Emotional Resources

Please rate how important the following resources are to you.

	Not at all	Not very	Somewhat	Very	Extremely
Community building (social media groups, community-wide events, etc.)	☐	☐	☐	☐	☐
Counseling and trauma support (therapy, help lines, support groups, etc.)	☐	☐	☐	☐	☐
Physical health care (primary care, dental, physicals, bodily injuries, etc.)	☐	☐	☐	☐	☐
Financial assistance (rent, utilities, groceries, etc.)	☐	☐	☐	☐	☐
Care assistance (elderly, child, sick, etc.)	☐	☐	☐	☐	☐
Other: _____	☐	☐	☐	☐	☐

Which of the above resources can you access in Ypsilanti? Please be as specific as possible.

Where in Ypsilanti would you go to access those resources? Please be as specific as possible.

_____

_____

Demographic Information

Please answer the following demographic questions. It helps to ensure the responses received from this survey accurately reflect the thoughts of Ypsilanti residents.

What is your age?

- ☐ 18-29
- ☐ 30-39
- ☐ 40-49
- ☐ 50-59
- ☐ 60-69
- ☐ 70-79
- ☐ 80+

Which categories describe you? Select all that apply.

- ▢ Asian
- ▢ Black
- ▢ Hispanic
- ▢ Islander
- ▢ Native
- ▢ White
- ▢ Other _____

What is your highest education level attained?

- ☐ No degree
- ☐ High school / GED
- ☐ Trade / Vocational Training
- ☐ Some college
- ☐ Bachelor's degree
- ☐ Post-grad

Which neighborhood in Ypsilanti do you live in?

_____

Commitment

How long have you lived in Ypsilanti?

- ☐ Less than 1 year
- ☐ 1-5 years
- ☐ 5-10 years
- ☐ Indefinitely

How long do you intend to live in Ypsilanti?

- ☐ Less than 1 year
- ☐ 1-5 years
- ☐ 5-10 years
- ☐ Indefinitely

Conclusion

Thank you for your participation! Please contact our project team by email (ypsireshub@umich.edu) if you have questions or comments. The results will be presented at the Ypsilanti Sustainability Commission meeting in April of 2022.

Is there anything else you would like to add?

_____

_____

If you would like to further contribute to this project, please add your email below. Your email will not be linked to your responses.

_____

_____

Appendix F - Interview Codebook

Deductive Codes: those informed and anticipated by the main research questions

Name	Definition	Example Quote
Block Leaders	Attributes or descriptions of block leaders	"Most affected communities are asked to bring leadership to these spaces but not compensated for the leadership and expertise that they bring. They're just expected to do it for free as a volunteer, which is a lot harder on somebody who has to work multiple jobs or, you know, have these sorts of other constraints. And so, I think that creating space to compensate community members for the time that they spend working on this vision and need solutions - I think that's part of equity in action." "So, block leaders will tend to self-select, even without any sort of formal title. So, a person who is interested in being a block leader will generally be a block leader or whatever that means. So, I would say that probably the best thing to do to prepare for any sort of emergency, or along those lines, was simply make sure that everybody knows where the information will be coming from and how to get it for themselves. Because the people that, you know, are naturally block leaders will continue to update themselves, will obsessively check, you know, the emergency response, news, or the Public Health website, or what have you. And then they will, you know, because everybody knows that, you know, Bob knows all of this stuff, go swing by and check on Bob, and see if Bob can tell them what's up. So, I don't think, unless you're planning to compensate people, or to give them other resources and then also not expect those resources back so effectively compensating them. I don't think there's a whole lot of need to necessarily designate block leaders, maybe block liaisons would be a better way to do it. Because a lot of people are also uncomfortable with the title of leader, because that implies a lot of responsibility." "A concern I have with this is if one person is not there it falls apart."
Communication Channels	Mentions of strengths or weaknesses of current and/or future community communication approaches	"So, the neighborhood that I live in is very trusting of the government, but not all neighborhoods are. So, you will have to rely on the neighborhood liaisons more in certain neighborhoods than you will in other neighborhoods." "Challenges that the [local government] faces are real. People don't automatically trust them. Taking a community-oriented approach can help build that trust. Having the right person in place can help a lot."
Events	Mentions of community events	"Community engagement is being lost that the generation [who planned previous events, pushed mutual aid] is getting older, retiring, moving out, and a few of them died"

Places	Mentions of significant places within the community (i.e., those that provide physical or social resources)	
Organizations	Organizations mentioned during interview	“The Interfaith Council for Peace and Justice is involved in a lot of issues of equity and injustice in our community.” “Yeah, so I know the County Office of Community and Economic Development, they actually coordinate a lot of the, or help to coordinate a lot of the warming and cooling centers, and they'd probably be a great first place to start to talk about these.” “I know that organizations such as United Way, United Way manages the 211 system which is oftentimes people's sort of first, first thing that they reach out to when they're in need.”
People	Names of individuals, or their roles, that are influential in community processes	N/A
Prospection	Interviewee generates and evaluates mental representations of possible futures (i.e., the imagination of future scenarios, and planning for their community)	“Resilience is a complicated concept because obviously we're talking about climate crisis, you know, but we're also talking about other potential emergencies.” “I think helping people to imagine a different scenario. Imagine a world where there's someone else to call or there are different people to rely on is going to help people to step into leadership because I think right now part of the lack of leadership is people don't have a vision” “So, what I would like to see is neighbors welcoming each other and saying, come stay with us or, you know, borrow a car or all these types of things, which takes a lot of faith and a lot of trust.” “Children practice preparedness. It’s funny that you see children practicing a tornado drill when the parents aren’t around because the parents do not practice it [emergency drills].”
Response	Community response to crises or emergencies	“It's how accessible it is for people to get involved in the organizing, you know, sometimes you know someone's work schedule or family needs are prohibitive so they can't go to a neighborhood meeting because there's not going to be childcare at it” “We’ve been running things on a volunteer basis. I mean it’s great, but it’s so hard to make something sustainable if it’s a matter of volunteering because as we’ve seen with the pandemic, so many of us who did certain things, once this hits you just have to go back to doing what you have to do for work and survival because you don’t have the bandwidth for anything else.”
Services	Services present or lacking in community	“I regularly run into folks who are having trouble finding easily accessible providers who take Medicaid. It’s largely a transportation

		issue." "On the city side it is important to have a communal meeting space in the community "We need a community center. A couple generations have grown up now without a community center. It needs to have senior programming and it needs to be multicultural because of the amount of different people we have and will have coming into the community."
Social (feelings toward others)	Social cohesion/disharmony in community or neighborhood, past, present or anticipated	"People are generally talking with each other and are connected. There are a lot of long-lasting relationships within my neighborhood and I think many of the neighborhoods and communities [in] Ypsilanti. I think those relationships are going to be the foundation of any strong response." "It is very friendly and if something really terrible happens, a kind of mass catastrophe, I think that people would go out their way to be neighborly and try to help one another" "Having more social gatherings where we actually get to know each other even if the gatherings are just to have fun and saw hello could be a way to start building more resiliency in that the more, we know each other, and the more there's a community, there's a better chance of, with another covid or another crisis, we know each other and can trust and rely on each other"
Economic	Mentions of economic challenges or growth opportunities (past, present or future)	"Obviously, affordable housing is a huge issue. And there's a lack of a shelter in Ypsilanti. So, folks who are experiencing homelessness need to get transportation to Ann Arbor for the Delano Center or one of the shelters. Not really having any of those emergency shelters available it's definitely a difficulty point." "Housing needs to be less expensive. And so that means that there needs to be more housing built in the area and more density so that there's not so much competition for housing" "When people aren't just trying to survive it's a little easier to help out others in your community – You might have a car or tools that allows you to help"
Education	Educational opportunities or needs in community	"I think generally people are interested (in creating a positive neighborhood response) they just might not be fully informed. They feel like they're not fully informed about what the real issue is or what efforts have already gone into addressing it."
Services/ Institutions	Educational service or institutions such as public schools or universities	N/A

Skills	Skill development that should be focused on	N/A
Emergency Prep	Mentions of present or future emergency preparations	“It depends on what sort of disaster we are planning for? And what sort of range does somebody have on a bike, let's say? Because a bike is pretty disaster resilient to get more resources?
Emergency Events	Mentions of past, present, or future emergency events	
Past Crises	Mentions of challenges faced in community	“[When COVID first hit and the schools shut down] that was the another big issue with people just not being prepared, or not having the ability to have childcare covered, and there weren't really, you know, community resources you can turn to in that situation” “We’re had a lot of flooding over the last year” “There have been a couple houses down the street with basements that got destroyed from flooding and a lot of people complain about this too, that there were some very intense storms.” “So, with emergency response, information is always changing. Like as we saw during COVID, you know, you'll have information sent out one day and then the next day well, it's different” “When we had the 3-day blackout things got grim and I live in a good neighborhood. When people lose basic supplies, it can get bad.”
Planning	Mentions of emergency planning efforts that are pre-existing	“It’s not like the neighborhood has organized preemptively” “There’s no discussion of how we can prepare ourselves for future flooding, or what do we do when there’s the next catastrophe or pandemic” “I mean, the flooding is going to keep happening. That’s not going away and is turning into a thing” “The county leads a lot of emergency response like cooling centers in the summer and warming centers in the winter. And so, along with other sort of emergency resources, they could be paired up for sort of maximum efficiency.”
Resources	Mentions of resources that are/should be present in emergency responses	“We do okay on public transportation, but with the pandemic when they sort of started cutting different things – a lot of the bus lines got their hours changed and reduced, and that was really difficult” “For food assistance you have to be able to get to a pantry and you have to be able to get to it during the hours that it's open. And that's just really difficult for a lot of people. Hope clinic added some grocery delivery. But you know that has its limitations that can only do so much”

		"You can't walk to a grocery store. You still need to drive or take the bus to go to one so there isn't just an easy access to food without having to drive your car."
Hub Conceptualization	Descriptors of ideal hub	"I think a lot of times these sort of neighborhood centers really serve well as entry points for people. So, not necessarily that they would have to have all the resources and all the knowledge because knowledge is always changing about what resources out there, but rather be able to connect people to United Way, barrier busters, all of these other things that can help people out. You know, even in non-disaster times to sort of build that baseline of resiliency before they need it." "Having a service at the hub level where individuals can receive help applying for jobs. Somebody who can help coach on basic finance stuff or help someone sign up for assistance." "These hubs need to be prepared for a 6-to-18-month response."
Food	Mentions of food resources, either lacking or available	"We've got liquor stores and gas stations, we've got the food Co-Op, but most people are pretty priced out of that. So, getting access to fresh fruits and vegetables easily like grocery stores unless you have access to a car is really tough" "Food insecurity was immediately a major concern" "I think that the Food Safety Network has definitely strengthened over the last couple of years, possibly just due to the attention paid to it. There's still a long way to go. We look at Washtenaw County and you see almost 40,000 people were food insecure and we're only serving a few thousand of those people. Now we're not the only ones, serving the community there are a lot of other agencies providing food assistance. But we know there are a lot of folks who are struggling and we're not getting access." "Growing more food around the neighborhood is something that we should think about." "If we were to lose power, the only thing we have to cook food on are BBQ pits. Other than that, there is nothing to prepare food."
Psychological	Mentions of psychological needs	"We need grief counselors in emergency situations."

Inductive Codes: common themes that emerged throughout the coding process and appeared across all interviews

Name	Definition	Example Quote

Community Commitment	These are recurring words or phrases within interviews that demonstrate a commitment to and intimate understanding of their community	"As one of the newest [in the community] thought, 'oh maybe I should get involved.' but working and the pandemic just really does make it hard to do much of that."
Diversity	Interviewee reflects on diversity as a characteristic that is unique/special about Ypsilanti	"There are lots of issues the immigrant community experiences, landlords and renting and not being able to advocate for the right in that area" "I think the diversity of the community as a strength to be a university town that also has, you know, a diverse history in various industries" "For all of Ypsilanti's wonderful diversity, it is still pretty segregated. And I think that that's a big barrier. . .So, I would say it's not segregated in the same way that other communities are, but you still get your pockets of pretty extreme poverty. So, I think that to build community resilience, we have to be more comfortable with folks in different situations nearby each other so that we can support one another." "I would like for it to be more diverse. Not just issues of race and ethnicity but income as well. As I said, I'm worrying that it's just going to turn into an upper middle-class kind of neighborhood. I'd like to have neighbors from different income levels, but also from different cultures, races, and ethnicities as well.
Geographic Location	Interviewee reflects on the geographic location and proximity to other places as a unique/special characteristic of Ypsilanti	"There's a decent amount of walkability if you want to get to shops and things like that. But those tend to be a little bit specialized, you know, restaurants and coffee shops and that sort of thing."
Importance of natural environment	Interviewee reflects expresses the importance of and an appreciation for natural spaces	"I love seeing that our parks are really utilized in the neighborhood and in the area"
Shared History &/or story	Interviewee demonstrates a connection to those in their neighborhood and community by reflecting on their shared past or present	"It looks like that distinction between redlined neighborhoods is just growing – it's the difference between the parts of Ypsi that are wealthy and the parts . . .It feels deeper than it was when I first moved to Ypsi"

Table 1

Demographic Information

	Variable	Frequency (*n*)
Age	18-29	12
	30-39	25
	40-49	10
	50-59	11
	60-69	7
	70-79	4
Education Level	High School / GED	1
	Some College	14
	Bachelor's Degree	19
	Post-grad	32
	Trade / Vocational Training	3
Race / Ethnicity	Asian	1
	Black	8
	Hispanic	1
	Islander	0
	Native	1
	White	58
	Other	3
Previous Commitment to Ypsilanti	Less than 1 year	7
	1-5 years	13
	5-10 years	20
	Greater than 10 years	31
Future Commitment to Ypsilanti	Less than 1 year	3
	1-5 years	11
	5-10 years	14
	Indefinitely	43

Table 2

Descriptive Statistics

	Mean	*SD*	Minimum	Maximum	N
All Concern	2.95	.727	1	5	113
Heat Wave Concern	3.14	1.109	1	5	113
Storm Concern	3.17	.999	1	5	113
Flood Concern	2.96	1.160	1	5	113
Blizzard Concern	2.84	.960	1	5	113
Extreme Cold Concern	3.21	.949	1	5	113
Tornado Concern	2.39	.958	1	5	113
All Physical Resources	4.09	.716	1	5	86
Food	4.48	.864	1	5	86
Infrastructure	4.27	.868	1	5	86
Health Items	4.37	.887	1	5	86
Emergency Items	4.24	.867	1	5	86
Transportation	3.71	.956	1	5	86
Education	3.51	1.003	1	5	86
All Emotional Resources	3.68	.877	1	5	74
Community Building (social media groups, community-wide events, etc.)	3.54	.954	1	5	74
Trauma Support (therapy, help lines, support groups, etc.)	3.57	1.136	1	5	74
Physical Health Care (primary care, dental, physicals, bodily injuries, etc.)	4.23	.900	1	5	74
Financial Assistance (rent, utilities, groceries, etc.)	3.45	1.336	1	5	74
Care Assistance (elderly, child, sick, etc.)	3.64	1.299	1	5	
All Resources	3.90	.729	1	5	74

Table 3.

T-test Results Comparing Physical Resource needs to Emotional Needs in Ypsilanti

Resource Type	n	Mean	SD	Std. Error Mean	95% CI of the differences		t	df	p
					Lower	Upper			
Physical	74	4.09	.716	.0742	.254	.550	5.409	73	<.001
Emotional	74	3.68	.877						

Table 4

ANOVA Tests Within Subjects Effects: Climate Concern Level

Measure: Concern Level		Type III Sum of Squares	df	Mean Square	F	Sig.
Concerns	Sphericity Assumed	54.173	5	10.83	19.02	<.001
	Greenhouse-Geisser	54.173	4.389	12.34	19.02	<.001
	Huynh-Feldt	54.173	4.590	11.80	19.02	<.001
	Lower-bound	54.173	1	54.17	19.02	<.001
Error (Concerns)		318.994	560	.570		
	Sphericity Assumed	318.994	491.591	.650		
	Greenhouse-Geisser	318.994	514.128	.620		
	Huynh-Feldt	318.994	112	2.84		
	Lower-bound					

Table 5

Post Hoc Tests

	Mean Difference				
Variable	1	2	3	4	5
Heat Waves	-	-	-	-	-
Storms	-0.27	-	-	-	-
Floods	.186	.212	-	-	-
Blizzards	.301	.327*	.115	-	-
Extreme Cold	-.071	-.044	-.257	-.372*	-
Tornadoes	.752*	.779*	.566*	-.115	.823*

Based on estimated marginal means

*. The mean difference is significant at the <.001 level

b. Adjustment for multiple comparisons: Bonferroni

Table 6

ANOVA Tests Within Subjects Effects: Need for Physical Resources

Measure: Physical Resources		Type III Sum of Squares	df	Mean Square	F	Sig.
Physical Resources	Sphericity Assumed	65.667	5	13.13	37.55	<.001
	Greenhouse-Geisser	65.667	3.874	16.95	37.55	<.001
	Huynh-Feldt	65.667	4.082	16.08	37.55	<.001
	Lower-bound	65.667	1	65.67	37.55	<.001
Error (PRs)		148.667	425	.35		
	Sphericity Assumed	148.667	329.278	.45		
	Greenhouse-Geisser	148.667	346.965	.43		
	Huynh-Feldt	148.667	85	1.75		
	Lower-bound					

Table 7

Post Hoc Tests

	Mean Difference				
Variable	1	2	3	4	5
Food	-	-	-	-	-
Infrastructure	.209	-	-	-	-
Health Items	.105	-.105	-	-	-
Emergency Items	.233	.023	.128	-	-
Transportation	.767*	.558*	.663*	.535*	-
Education	.969*	.756*	.860*	.733*	-.198

Based on estimated marginal means

*. The mean difference is significant at the .05 level

b. Adjustment for multiple comparisons: Bonferroni

Table 8

ANOVA Tests Within Subjects Effects: Need for Emotional Resources

Measure: Emotional Resources		Type III Sum of Squares	df	Mean Square	F	Sig.
Emotional Resources	Sphericity Assumed	28.935	4	7.23	10.99	<.001
	Greenhouse-Geisser	28.935	3.16	9.15	10.99	<.001
	Huynh-Feldt	28.935	3.32	8.7	10.99	<.001
	Lower-bound	28.935	1	28.94	10.99	<.001
Error (ERs)	Sphericity Assumed	192.265	292	.66		
	Greenhouse-Geisser	192.265	230.79	.83		
	Huynh-Feldt	192.265	242.46	.79		
	Lower-bound	192.265	73	2.63		

Table 9

Post Hoc Tests

Variable	1	2	3	4
Community Building	-	-	-	-
Trauma Support	-.027	-	-	-
Physical Health Care	0.689*	-.662*	-	-
Financial Assistance	.095	.122	.784*	-
Care Assistance	-0.95	-.068	.595*	.189

Based on estimated marginal means

*. The mean difference is significant at the .05 level

b. Adjustment for multiple comparisons: Bonferroni

Table 10

Regression Analyses Predicting Physical Resource Needs in Ypsilanti

Predictor Variable	N	*t*	*b*(*β*)	*F*	df_1	df2	Adj. R^2
(Constant)		10.133	3.05	12.93	1	82	.126**
Level of Concern	84	3.596	.355				
(Constant)		10.334	5.303	5.676	1	69	.063*
Prior Commitment	71	-2.382	-.199				
(Constant)		4.714	2.998	3.962	1	69	.041*
Future Commitment	71	1.990	.190				

Note: N = 84

*p<.05, **p < .001.

Table 11

Regression Analysis Predicting Emotional Resource Needs in Ypsilanti

Predictor Variable	*t*	*b*(*β*)	*F*	df_1	df2	Adj. R^2
(Constant)	10.133	3.05	12.93	1	82	.126**
Level of Concern	3.596	.355				

Note: N = 84

*p<.05, **p < .001.

Table 12

Regression Analysis Predicting Emotional Resource Needs in Ypsilanti

Predictor Variable	*t*	*b*(*β*)	*F*	df_1	df2	Adj. R^2
(Constant)	6.452	2.559	8.570	1	70	.096*
Level of Concern	2.928	.381				

Note: N = 72
*p<.01, **$p < .001$.