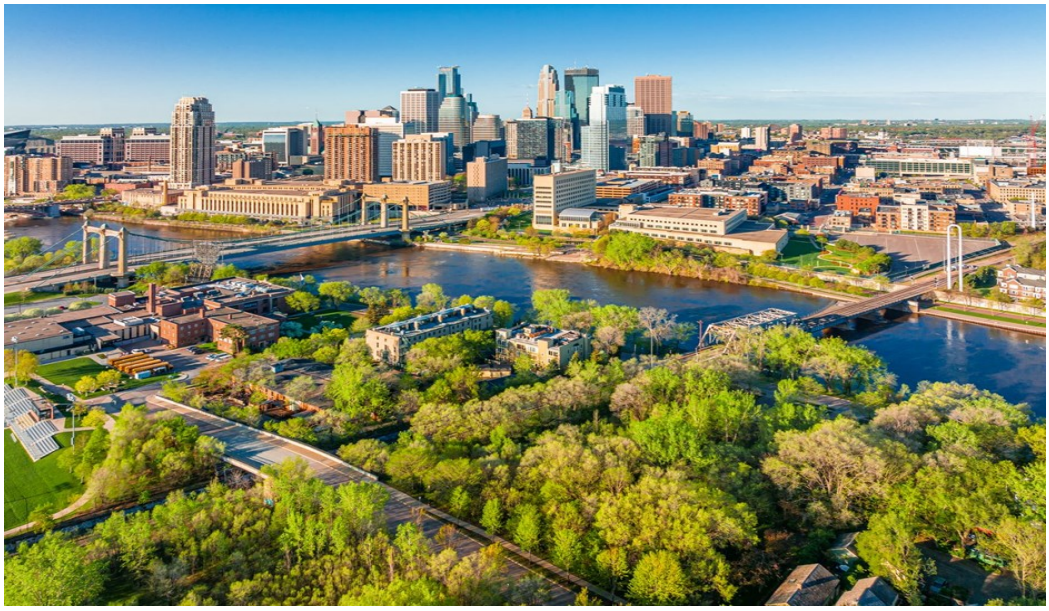
TOWARDS A MORE DISASTER RESILIENT MINNESOTA

Re-engineering the Division of Homeland Security and Emergency Management



Strengthening MN's Resilience and Independence

Hailey Graff
Kevalin McNeil
Aleah Miller
Isabella Miller

May 2025

SODAA LADREM

HSEM Homeland Security and Emergency Management

About This Report

This report is one of three reports produced as part of a semester-long, innovative problem solving engagement between the Minnesota Division of Homeland Security and Emergency Management (HSEM) and North Dakota State University's Disaster Resilience and Emergency Management Academic Program (NDSU). Each report in this series addresses the following problem statement presented by HSEM: Re-engineer MN HSEM to better meet demands created by the interaction of four primary disaster contexts (economic, hazardscape, political, and social) and support enhanced community-based disaster resilience for 2025-2050. Addressing this challenge required students to consider the entire emergency management spectrum.

NDSU offered the model interdisciplinary course focused on innovative problem solving for MN HSEM in partnership with Kevin Reed, Deputy Director, and Brian Olson, Director of Preparedness and Recovery, both of MN HSEM. The goal was to bring the perspectives and insights of next generation leaders to current (and future) challenges facing emergency practice from a state-level perspective. Students began their problem-solving process assigned to one of the primary disaster contexts (economic, hazardscape, political, and social). Working with their problem sponsors and subject matter experts to better understand and contextualize the challenge. Solution teams including one student representing each context then collaborated to create feasible solutions. The data collected from interviews, coupled with an understanding of the existing literature, allowed the teams to develop and test solutions within a systems thinking framework, and offer specific insights and recommendations. The teams approached problem solving from a research and development approach, similar to the approach used by the Pentagon's Defense Advanced Research Projects Agency (DARPA). Using a Pasteur's Quadrant perspective (a use-inspired basic research approach) allowed teams to seek a fundamental understanding of the problem with a focus on dynamic solutions. This approach

required a grounded understanding of the problem, and the context and systems within which it exists. The solutions offered often pushed beyond existing programs and workflows.

NDSU's evaluation of this model course's development and delivery is supported, in part, by a service-learning instructional grant award through the NDSU College of Arts and Sciences. NDSU faculty, Dr. Caroline Hackerott, will supply all modified materials to the Emergency Management Higher Education Network to encourage other DREM higher education programs to engage in similar partnerships. It is envisioned that this model course can be used with partners at all government levels and across multiple sectors to bring new perspectives to enduring challenges.

NDSU would like to that the MN Division of HSEM problem sponsors, as well as all the emergency management and partner agency subject matter experts who graciously shared their time, energy, expertise, and guidance. In particular, the team thanks Kevin Reed and Brian Olson, who brought this opportunity to NDSU and fueled the faculty and students with a level of vision, commitment, and enthusiasm that set the tone for the entirety of the experience.

Table of Contents

Executive Summary

The summary of this report finds ways that Minnesota's Homeland Security and Emergency Management (HSEM) department will be able to best serve the people of Minnesota by exploring key drivers that lead to practical recommendations. Key findings include drivers coming from an economic, political, environmental, and social context. Economic findings include unreliable federal aid and insurance, how people handle their finances, and insufficient horizontal and vertical integration. Key findings within the political context include the rural and urban divide and lack of governmental trust throughout the community. Key findings within the environmental context include the threats climate change poses to Minnesota, along with aging infrastructure and mitigation methods. Key drivers within the social context include many social vulnerabilities and a lack of technologies. These findings drive the recommendations, with the goal being to make Minnesota more independent of federal funding and incentives. Some key recommendations to ensure this are fostering trust within the communities, providing more support to rural communities, investing in emergency management in public education, protecting Minnesota's natural environment, strengthening in-state and out-of-state partnerships, keeping up with critical infrastructure, addressing social vulnerabilities, and leveraging accessible technology and knowledge. These key recommendations will pave the way to make Minnesota more independent, ultimately leading to a more resilient state.

Challenge Overview

This report is one of three reports produced as part of a semester-long, innovative problem-solving engagement between the Minnesota Division of Homeland Security and Emergency Management (HSEM) and North Dakota State University's Disaster Resilience and Emergency Management Academic Program (NDSU). Each report in this series addresses the following problem statement presented by HSEM: Re-engineer MN HSEM to better meet demands created by the interaction of four primary disaster contexts (economic, hazardscape, political, and social) and support enhanced community-based disaster resilience for 2025-2050. Addressing this challenge required students to consider the entire emergency management spectrum.

NDSU offered the model interdisciplinary course focused on innovative problem solving for MN HSEM in partnership with Kevin Reed, Deputy Director, and Brian Olson, Director of Preparedness and Recovery, both of MN HSEM. The goal was to bring the perspectives and insights of next-generation leaders to current (and future) challenges facing emergency practice from a state-level perspective. Students began their problem-solving process, assigned to one of the primary disaster contexts (economic, hazardscape, political, and social). Working with their problem sponsors and subject matter experts (SMEs) to better understand and contextualize the challenge. Solution teams, including one student representing each context, then collaborated to create feasible recommendations. The data collected from interviews, coupled with an understanding of the existing literature, allowed the teams to develop and test recommendations within a systems thinking framework and offer specific insights and recommendations.

The teams approached problem-solving from a research and development approach, like the approach used by the Pentagon's Defense Advanced Research Projects Agency (DARPA). Using Pasteur's Quadrant perspective (a use-inspired basic research approach) allowed teams to seek a fundamental understanding

of the problem with a focus on dynamic recommendations. This approach required a grounded understanding of the problem and the context and systems within which it exists. The recommendations offered often pushed beyond existing programs and workflows.

NDSU's evaluation of this model course's development and delivery is supported, in part, by a service-learning instructional grant award through the NDSU College of Arts and Sciences. NDSU faculty, Dr. Caroline Hackerott, will supply all modified materials to the Emergency Management Higher Education Network to encourage other DREM higher education programs to engage in similar partnerships. It is envisioned that this model course can be used with partners at all government levels and across multiple sectors to bring new perspectives to enduring challenges.

NDSU would like to thank the MN Division of HSEM problem sponsors, as well as all the emergency management and partner agency subject matter experts who graciously shared their time, energy, expertise, and guidance. In particular, the team thanks Kevin Reed and Brian Olson, who brought this opportunity to NDSU and fueled the faculty and students with a level of vision, commitment, and enthusiasm that set the tone for the entirety of the experience.

Introduction

Over the next 25 years, disaster management will face many challenges. Hazard events are inevitable, and the obstacles Minnesota HSEM will encounter are bound to increase in frequency and complexity. This issue needs to be understood and addressed for Minnesota to effectively achieve its goal of resilience within HSEM and the economic, political, social, and environmental realms present in the state.

This report includes five main sections. The first section is problem contextualization, where the issue that drives the purpose of this project is summarized. The second section outlines the research process design, discusses ethical concerns, and identifies limitations that impact the project. The third section is the literature review, which provides additional context to the team's framing process for problem identification, support, and proposed recommendations. The fourth section of the report, Findings, outlines key problem drivers Minnesota needs to confront to increase disaster resilience. Lastly, the fifth section offers recommendations, describing how HSEM can structure itself to best address the problem drivers and what changes or goals HSEM should prioritize going into the future.

This report explains Minnesota's challenges and recommends restructuring HSEM to increase disaster resilience for individuals and communities. After June 1, 2025, this report and a recording of our presentation will be available through the NDSU Department of Disaster Resilience and Emergency Management website under projects and partnerships. Please feel free to contact the department with any questions or to request additional information regarding this project.

Problem Contextualization

Research shows that disasters are increasing in intensity and frequency (Ritchie & Rosado, 2024). Along with this phenomenon, societal systems, functions, and norms are becoming more complex and controversial. The interaction between these observed patterns results in increased costs of disasters, disputes over how to approach problems, and uncertainty for the future of disaster management. The effects of climate change and unsustainable development contribute heavily to the rising expenses that individual, local, state, and federal institutions struggle to manage year after year. These issues will not be resolved as human interactions with hazards continue to create hazard events. Hazard events affect people and communities throughout the state, with the most adverse impacts affecting Minnesota's vulnerable communities. Flooding, tornadoes, blizzards, and fires are the most common hazards. Flooding, historically seen in the Red River basin in Northwestern Minnesota, also occurs along the Mississippi River, the St Croix, and the Cannon River, among other areas. Typically, flooding happens when there is excessive rainfall and or spring snowmelt. Individuals, businesses, nonprofit organizations, and government agencies are all impacted by floods in Minnesota. However, as most of the state is rural, unlike the urban centers such as Duluth and the Twin Cities, the rural communities are disproportionately affected by flooding. Rural communities across the nation typically fare worse with the impacts of disasters as they do not have the same level of resources or attention as urban centers. In Minnesota, there is an imbalance in disaster management between the rural and urban communities, an issue that exacerbates the devastation of events such as floods, blizzards, or tornadoes. Although flooding is the most expensive hazard event involving Minnesota HSEM, the agency must also prepare to address other hazards, including tornadoes, blizzards, wildfires, and other hazards. Preparedness is critical due to the growing demand for support from the most socially vulnerable.

Minnesota also experiences threats from human-created hazards. However, unlike natural hazard, human-based hazards are less predictable. Events such as school shootings, cyber threats, and civil unrest do happen and must remain a focus for HSEM. Because these problems differ from Minnesota's natural hazards, people often assume they can't be mitigated in the same way. However, with an all-hazards approach, Minnesota can increase its resilience to natural and man-made threats.

Research Process

Design

The NDSU team gathered information from multiple sources to determine the key drivers for state-level emergency management. The team's report is structured first by focusing on four context areas concerning disaster management in Minnesota: social, political, economic, and environmental. Each project team member studied one of these four contexts for approximately eight weeks to ensure a balanced and knowledgeable approach to this proposal. The social context focus group studied the issues regarding people, culture, and the interaction between different groups. The political context focus group examined the various drivers in our systems and government. The economic focus group investigated Minnesota's financial system and market vulnerabilities, diving deeper into insurance, budgets, trade, energy, and business. The last focus group explored problems related to the natural environment, public health, cyber threats, and aging infrastructure. The input from each of these focus groups informed the research process.

Collection Methods

The data and information obtained for this report came from various sources. Several experts were interviewed and consulted in the creation of this report. These experts have experience in emergency management, homeland security, higher education, nuclear energy, public health, and legal services. The research team also gathered information from academic journals, newspaper articles, books, and courses taught at North Dakota State University (NDSU).

Ethical Considerations

All subject matter experts who consulted for this project participated voluntarily and consented to the information they shared being used in this report. To maintain confidentiality, the project team does not cite them directly. However, all subject matter experts are credited anonymously.

Limitations

The main limitation of the research process and the project is the time constraint. Being that the scope of the problem is extremely large, one could devote years to the task of providing solutions to Minnesota's biggest challenges with disaster management. Instead, the research team was limited to an academic semester to tackle this project. Another limitation is the fact that this entire report is centered around future casting, which will never be perfectly exact. Factors that impact disaster management might not always be within the state of Minnesota's control, and the future can be unpredictable.

Literature Review

This literature review outlines concepts, definitions, and models as context for the rest of the report. The information presented in this section explains the framework from which the research team approaches disaster resilience and emergency management. This perspective clarifies the usage of specific terms in the Findings and Recommendations sections. It also gives initial insight into multiple concepts and topics' importance, implications, and applications.

Comprehensive Emergency Management

Emergency management is vital in protecting a state's citizens and often serves as the quintessential role of any government entity (Waugh, 1999). Government emergency management agencies usually focus on life- and property-threatening situations beyond the resources and capabilities of individuals, community groups, and private organizations (Waugh, 1999). State emergency management and governments aim to protect people's welfare and safety. Every state has its branch of emergency management, which is responsible for coordinating between local governments and the federal government, maintaining emergency operations plans, conducting training, providing information and support for local governments, and more (National Institute of Health, 2012). Local governments are much more reliant on state emergency management because they offer support directly related to the state, such as information, technical support, personnel, funding, and different resources (Center, 1979). The governor also plays a significant role in emergency management. The governor has specific legislative powers in emergency management, such as issuing emergency declarations, activating emergency contingency plans, and applying and monitoring federal assistance (Center, 1979). Interstate partnerships are essential for states to keep people safe and protect their livelihoods. Any public sector emergency management organization is expected to practice comprehensive emergency management (CEM). Comprehensive

emergency management was coined by the National Governors' Association (NGA) report in 1979 and defined as the responsibility and capability for managing all types of emergencies and disasters by coordinating the actions of numerous agencies, including all four phases of disaster or emergency activity: mitigation, preparedness, response, and recovery (National Governors' Association, 1979). The NGA report also stated that CEM is applicable for all risks, natural and man-made, in a federal-state-local partnership. Figure 1 illustrates the concept of the CEM cycle.

Mitigation is action or measures taken to reduce or eliminate long-term risk and its effects on people and property from unavoidable hazards (Han, 2017; NDSU LADREM, 2025). Mitigation can take many forms, such as local planning and regulations, infrastructure projects, natural systems protection, and education programs (FEMA, 2013). Although some mitigation projects are large and expensive, it is often forgotten that mitigation can occur on a smaller scale as well.

Preparedness is the state of readiness to respond to, recover from, and mitigate against hazard events. Readiness changes based on the characteristics of the person, organization, or community (e.g., for a person, their social network is part of their readiness, and for a business, how their business operates) (NDSU LADREM, 2025). Preparedness includes planning (for example, premade evacuation plans, stocking up on goods like food, water, and medication), organization, tools, and training to assist recovery operations better (Han, 2017). The state of readiness varies from place to place, organization to organization, and over time (NDSU LADREM, 2025).

Response is the period when a hazard event is imminent, during, and after, when immediate actions are taken to save lives, property, and/or the environment. These actions include evacuation, sheltering, opening shelters, search and rescue, and first responders. Response can start when the hazard is imminent, the hazard's onset (when you know it is coming), which can be as long as a few days or minutes. The response phase ends about 96 hours after the event. After three days, unless well prepared, the likelihood of survival while waiting for first responders significantly decreases. This phase is the shortest

but is seen more in media and news coverage than in the other phases. Recovery is a differential and complex process by which individuals, households, organizations, and jurisdictions seek to restore, rebuild, and/or reshape what has been directly or indirectly impacted by a hazard event. Recovery also represents a state in which those affected rebuild and/or reshape all the event's impacts. Any entity can assess the extent to which they have achieved this state by comparing their pre-event status relative to each dimension of the concept to their post-event status. Recovery begins approximately three days after impact. First responders have completed their tasks. Other organizations and the community work together to establish a new "normal." "Normal" or "back to before" is never the correct goal, as a return to pre-existing conditions is not possible or desirable. Communities face rebuilding, restoring, and, most importantly, reshaping their structures, routines, and institutions. This challenge encompasses pre-event planning and post-event actions. (Smith & Wegner, 2006).

Although these phases are shown as a cycle, they are not always chronological as shown in Figure 1, and can occur at the same time (Neal, 1997). Communities may be experiencing activities associated with multiple phases concurrently. Therefore, a state agency (i.e., HSEM) must navigate multiple phases as well.

Stakeholders

A stakeholder is an individual, group, or government entity with something to gain or lose from creating, interacting with, or coping with hazards, risks, vulnerabilities, and associated events (NDSU LADREM, 2025). NDSU LADREM concentrates on four stakeholder groups: individuals and households, businesses, nonprofits (NGOs), and government (federal, state, local, and tribal). Each stakeholder group plays an important yet different role in the emergency management phases and shapes how disaster management operates.

Vulnerability

Vulnerability is a defining component of emergency management, but has multiple meanings and definitions. Vulnerability is more than exposure to the direct and indirect impacts of a disaster. It also includes the environment and social conditions that constrain people and communities from coping with the implications of a hazardous event (UNDRR, 2017). Vulnerability can be the

but is seen more in media and news coverage than in the other phases. Recovery is a differential and complex process by which individuals, households, organizations, and jurisdictions seek to restore, rebuild, and/or reshape what has been directly or indirectly impacted by a hazard event. Recovery also represents a state in which those affected rebuild and/or reshape all the event's impacts. Any entity can assess the extent to which they have achieved this state by comparing their pre-event status relative to each dimension of the concept to their post-event status. Recovery begins approximately three days after impact. First responders have completed their tasks. Other organizations and the community work together to establish a new "normal." "Normal" or "back to before" is never the correct goal, as a return to pre-existing conditions is not possible or desirable. Communities face rebuilding, restoring, and, most importantly, reshaping their structures, routines, and institutions. This challenge encompasses pre-event planning and post-event actions. (Smith & Wegner, 2006).

Although these phases are shown as a cycle, they are not always chronological as shown in Figure 1, and can occur at the same time (Neal, 1997). Communities may be experiencing activities associated with multiple phases concurrently. Therefore, a state agency (i.e., HSEM) must navigate multiple phases as well.

Stakeholders

A stakeholder is an individual, group, or government entity with something to gain or lose from creating, interacting with, or coping with hazards, risks, vulnerabilities, and associated events (NDSU LADREM, 2025). NDSU LADREM concentrates on four stakeholder groups: individuals and households, businesses, nonprofits (NGOs), and government (federal, state, local, and tribal). Each stakeholder group plays an important yet different role in the emergency management phases and shapes how disaster management operates.

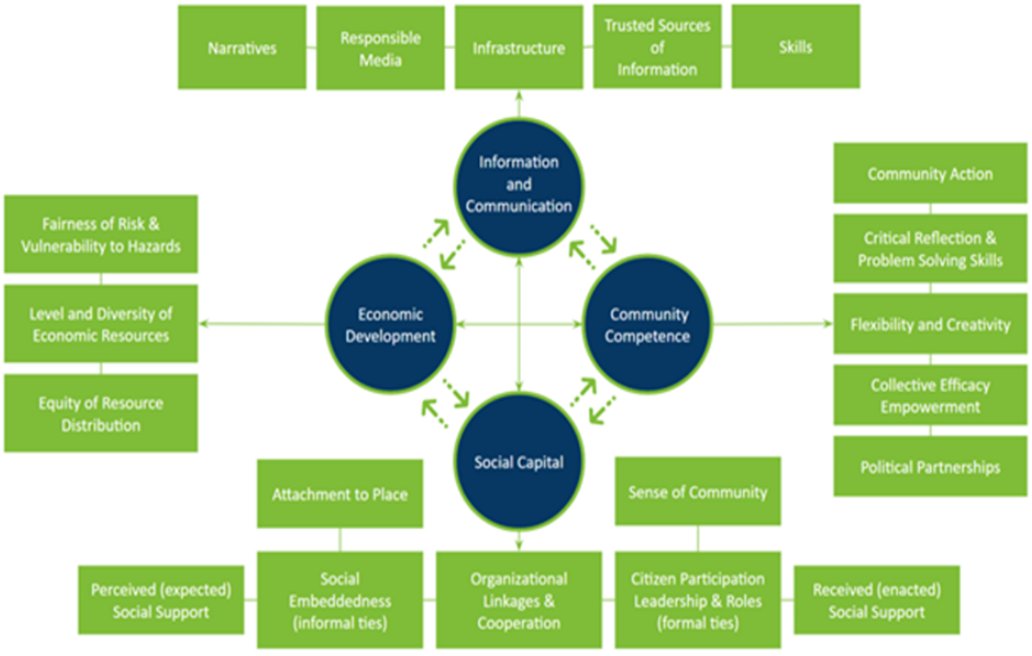
Vulnerability

Vulnerability is a defining component of emergency management, but has multiple meanings and definitions. Vulnerability is more than exposure to the direct and indirect impacts of a disaster. It also includes the environment and social conditions that constrain people and communities from coping with the implications of a hazardous event (UNDRR, 2017). Vulnerability can be the

physical conditions, social factors, environmental factors, and economic factors. Physical factors include buildings, land use, transportation, and others. Social factors can include population statistics, including the elderly, poverty, marginalization, status, and more. Environmental factors include resource management, climate change, and environmental deterioration (Srinivas, 2022). Economic factors include dependence on single industries, uninsured informal sectors, and dependency on outside countries. Because so many factors drive vulnerability, it is highly complex. Vulnerability plays an essential role in creating risk. Risk is a combination of hazard, exposure, and vulnerability. Limiting vulnerability in a community will ultimately lower risk levels. Throughout this report, there is a significant focus on social and environmental vulnerability. Social vulnerability includes but is not limited to factors like poverty, disabilities, and lack of insurance. It is often associated with functional needs and the acronym CMIST, which stands for communication, medical, independence, supervision, and transportation.

Disaster Resilience

The concept of disaster resilience is central in emergency management. The term has, however, also increased in popularity with policymakers and others. As a result, the definition and usage vary across fields and disciplines. Resilience for this report is defined as the ability of a system, community, or society to resist, absorb, accommodate to, and recover from the effects of a hazard in



a timely and efficient manner, by preserving and restoring its essential basic structures and functions (ISDR, 2009). This is a key concept for this report since the goal is to make Minnesota more independent and resilient. Figure 2 demonstrates the model that this research team uses to approach the idea of resilience for a community and the state of Minnesota.
This model displays four core aspects of resilience: economic development, social capital, information and communication, and community competence. Within these four aspects are sub-factors that contribute to resilience within that area. The arrows connecting all these components in the model demonstrate how each of the four networked adaptive capacities influences the other and interacts (Norris et al., 2008).

Trust

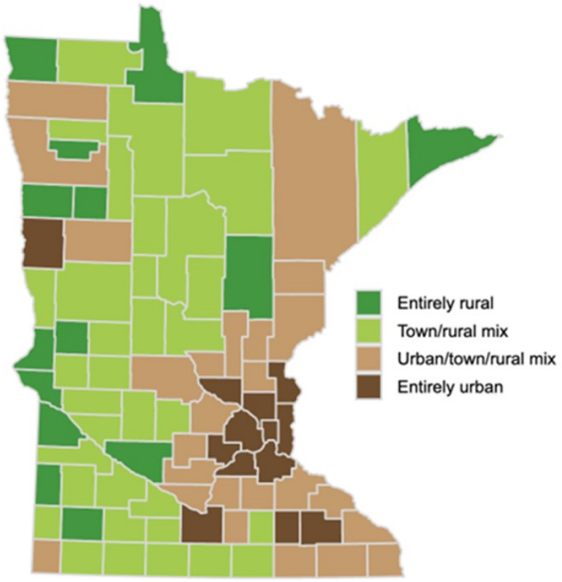
Trust is one group or person relying on another to do what is promised or expected without taking advantage (Bonfanti et al., 2024). Trust is essential to social interaction, which is evident in government and emergency management (Johansson, 2024). Trust plays a vital role in emergency management because trust in institutions increases the likelihood that recommended appropriate behaviors will be adopted. Trust is a critical component in disaster risk reduction and is present in every phase of emergency management. In preparedness, studies have shown that when people trust institutions before disasters, they are better prepared (Bonfanti et al., 2024). Trust is essential to create meaningful relationships with community members, and meaningful relationships also generate trust, making it an important cycle in which HSEM needs to participate.

Rural-Urban Divide

The rural-urban divide refers to the disparities between rural and urban areas, focusing on differences in economics, health services, social systems, and more (Hankes et al., 2024). According to the Census Bureau, a rural area is a settlement with fewer than 2000 housing units and 5,000 residents, while an urban area is a densely developed area with more than 2000 housing units and 5,000 residents (Sanders & Cromartie, 2025). Because Minnesota is hard to categorize into only rural and urban areas, the state demographer has created two categories: town/rural mix and urban/town/rural mix. According to Minnesota's demographer's office, census tract data classifies rural areas as consisting

entirely of rural census tracts. A county is classified as a town/rural mix if it has census tracts, including at least one rural and one large or small town. A county is classified as an urban/town/rural mix if it has census tracts, including one rural census tract, a large or small town, and urban. A county is entirely urban if every census tract is urban (Asche & Werner, 2021). Minnesota has 87 counties. There are 14 entirely rural counties, 35 town/rural mix, 25 urban/town/rural mix, and 13 altogether urban counties. (Asche & Werner, 2021). Please see Figure 3 to identify the different categorizations.

Urban Heat Island



The urban heat island (UHI) refers to higher atmospheric and surface temperatures in urban areas than in the surrounding rural areas (Maimaitiyiming, 2014). This is observed in cities regardless of their size and location. Urban development is a significant cause for UHI because it modifies land surfaces and uses materials that effectively store short-wave radiation. As a result, land surface temperature (LST) increases due to the UHI, which may disrupt species composition and distribution by increasing the length of growing seasons, decreasing air quality, and leading to greater health risks, like heat stroke standards in the elderly population. The UHI also decreases water quality as warmer waters flow into streams, putting additional stress on aquatic ecosystems. About 73% of Minnesota's residents live within urban geographical boundaries, and 32% of these urban-living Minnesotans are 50 or older (Egbert, 2017).

Climate Change

Despite political pressure to find an alternative term, the team applies the phrase 'climate change' similarly to how the scientific community uses 'climate crisis,' 'climate emergency,' ‘global warming,' ‘climate disruptions,' and 'environmental change' for simplicity. The Intergovernmental Panel on Climate

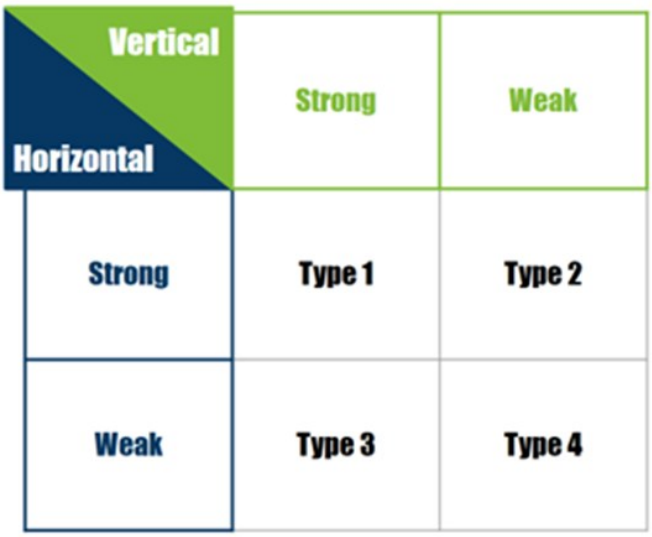
Change (IPCC) refers to climate change as "a statistically significant variation in either the mean state of the climate or in its variability, persisting for an extended period (typically decades or longer). Climate change may be due to natural internal processes, external forcings, or persistent anthropogenic changes in the atmosphere's composition or land use." Referring to a change in the state of climate (average weather, in terms of the mean and variability over a period ranging from months to thousands of years, most often temperature, precipitation, and wind) by changes in the mean or the variability that persists decades or longer (IPCC, 2018). Climate change is attributed directly or indirectly to human activity, natural internal processes, and/or external forces. Regardless of how it is changing, it will affect how communities operate (FEMA, 2011c). There will be impacts on mitigation, preparedness, response, and recovery operations, critical infrastructure, and more, which are listed and not listed below in Table 1 (FEMA, 2011b).

Hazard	**Impacts From Climate**	**Citations**
Heat	- Temperature increasing 2.5°F to 11.5°F by the end of the century from fossil fuel emissions - More frequent, longer, and severe heat waves - Drive food scarcity - Infrastructure overheating - Increase likelihood of flooding as warmer air holds more water, while the dry land can't absorb the water effectively - This is the leading cause of weather-related deaths - Increased use of cooling causes increased energy use - More heat causes less water, which leads to droughts and wildfires, and results in poor air quality	(Farhan 2024) (FEMA, 2011c)
Drought	- Hotter dryer periods in between heavy rainfall events - Drive food scarcity	(Farhan 2024) (FEMA, 2011c)
Water Events: Precipitation Flood	- More concentrated heavy rainfall - Changing seasonal precipitation patterns - Greater property damage - Heavy downpours harm water treatment infrastructure	(Farhan 2024)

Air Quality	- Health effects: can cause or worsen heart and lung	(Farhan 2024)
Wildfire	- Smoke decreases air quality - Loss of trees that could help air quality - Release of carbon dioxide can contribute to future heat waves	(Farhan 2024) (FEMA, 2011c)
Infectious Disease	- Changing and longer flu and tick seasons - Risk of diseases transmitted by food, water, and insects increases - Disease and species will migrate, changing the loca-	(Farhan 2024) (FEMA, 2011c) (Public Health SME)

Horizontal and Vertical Integration

Horizontal and vertical integration used by this research team has roots in Berke et al.'s Community Type Model and vision of a Type 1 community (Berke et al., 1993). A Type 1 community fares the best in recovery because of strong horizontal and vertical integration (Berke et al., 1993). Horizontal integration refers to the relationship across local groups, organizations, and institutions on the same level, whereas vertical integration refers to the connections to organizations and social networks outside of local institutions (Berke et al., 1993). Figure 4 displays this.



Although this model is specific to a community, horizontal and vertical integration encompasses individuals, agencies, and communities. Therefore, this theory can be tied to the state and an organization such as HSEM. This idea also makes sense when considering the "Minnesotan community" and viewing the entire state as the entity in need of strong horizontal and vertical integration for effective disaster management.

FEMA and Federal Aid

The Federal Emergency Management Agency (FEMA) was created in 1979 to coordinate the federal government's role in practicing comprehensive emergency management (National Archives). The Stafford Act, passed in 1988, enables the federal government to provide financial and logistical support to state and local governments when they are overwhelmed. The federal government is responsible for most of the disaster management, aid, and mitigation programs, such as the ones listed in Table 2.

Significant Federal Grants/Programs for Disaster Management

Program/Grant	Purpose	Design
Emergency Management Performance Grant (EMPG)	Helps state, local, and tribal governments build and sustain core capabilities for CEM	Administered by FEMA, the federal government provides up to 50% of the total program cost while the state/local/tribal entity pays for the
Hazard Mitigation Grant Program (HMGP)	Provides funding to state, local, and tribal governments for developing mitigation plans and rebuilding in a way that reduces future disaster losses for communities	Administered by FEMA, the federal government provides up to 75% of the project costs while the remaining 25% must come from non-federal entities (FEMA, 2025).
Public Assistance (PA) Program	Provides grants to state, local, and tribal governments, along with certain NGOs, for response and restoring infrastructure after a federally declared disaster or emergency	Administered by FEMA, the federal government provides 75% (for special cases, this share can be increased) of the funding for eligible projects, while the remaining 25% must come from non-federal entities (FEMA, 2023).
Individual Assistance (IA) Program	Provides several types of financial and direct assistance to eligible individuals and families	Administered by FEMA, the federal government helps individuals and families through Housing Assistance (HA) and Other Needs Assistance (ONA) with a maximum of 42,500 in Minnesota for each program (Federal Register, 2023).

Losing the Building Resilient Infrastructure and Communities (BRIC) program

On April 4, 2025, FEMA announced that it would be terminating the Building Resilient Infrastructure and Communities (BRIC) program and all applications that were sent in between the 2020 and 2023 fiscal years (WisPolitics, 2025). The BRIC program was established by the Disaster Recovery Reform Act of 2018 to provide a stable funding source for mitigation projects across the nation (Association of State Floodplain Managers, 2025). Approximately $882 million in unspent funds from the Infrastructure Investment and Jobs Act (IIJA) will be returned to the U.S. Treasury or redirected as Congress sees fit (Association of State Floodplain Managers, 2025). The loss of this program is a significant step backward in establishing resilient communities across the country.

Key Drivers

The research process organized the NDSU team's findings into nine separate drivers. These drivers are the main issues Minnesota faces now and, as the research team predicts, over the next 25 years. This report outlines and discusses each driver independently. However, it is important to note that each driver influences and interacts with the others. A summary of these findings and key drivers can be found in Appendix C.

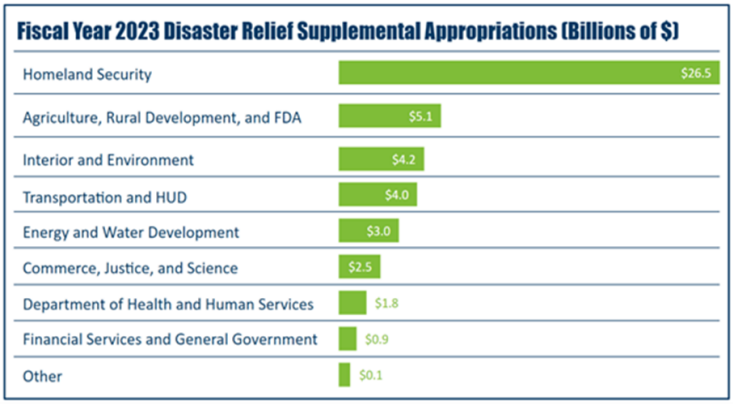
Unreliability of Federal Aid and Insurance Industry

Both federal aid and insurance provide support to individuals, businesses, nonprofits, and government entities after a disaster. These sources of aid are heavily relied on as most Americans, organizations, and governments do not have the resources to cover the entirety of disaster expenses themselves. However, both aid sources for stakeholders are becoming increasingly unreliable.

Federal aid. The uncertain future of federal aid is problematic because many Americans misunderstand the role of the Federal Emergency Management Agency (FEMA) and depend too heavily on the false notion that FEMA will cover the cost of any impending disaster, making their lives whole again. Even for the individual who does not solely rely on FEMA aid, if their other sources of emergency funds or insurance are not enough to cover the entire cost of damage, concerns surrounding the future of federal disaster aid are still valid. Based on recent events, including the termination of FEMA's BRIC program, the team concluded that disaster management, especially aid, for the next 25 years will become more of the individual state's responsibility rather than federal agencies such as FEMA. Interviews with SMEs revealed that this direction will significantly impact how disaster management is done at the state level but also have implications at the community and individual levels. Until now, disaster aid has mostly been distributed by the federal government, primarily due to the Stafford Act. Although disaster management at the federal level

cannot completely disappear, if a significant amount of funding for mitigation programs or individual aid is reduced, Minnesota will need to prepare for an alternative funding source. The Peterson Foundation reveals that since 2020, climate and weather-related disasters have caused an average of 141 billion in damages annually and are increasing in frequency (2025).

Figure 5 shows the various departments and agencies involved in disaster relief efforts and the billions of dollars they supply. FEMA is housed under the Department of Homeland Security, and its Disaster Relief Fund (DRF) in 2023 accounted for 55% of all federal disaster relief funding (Peterson Foundation). If, for example, FEMA's Disaster Relief Fund is dissolved, it will eliminate over half of the federal dollars administered to families and communities in need. Another significant FEMA program is the Emergency Management Performance Grant. In 2024, Minnesota received $5,646,155 from EMPG (Grants Office). If this program were to be cut, Minnesota's state and local governments would lose a large portion of funding for disaster management.



Minnesota's last presidential disaster declaration was issued on June 28, 2024, for flooding and severe storms across multiple counties (Federal Register, 2024b). As of September 2024, Minnesota approved over 15 million in aid from the federal government (FEMA, 2024b). If Minnesota experiences a disaster and no longer has access to these funds, communities will struggle more with recovery or not recover. A standard error in the perception of recovery is that it is guaranteed at some point for each individual or community, and unfortunately, in the wake of disasters, many do not recover at all (Austin et al., 2024). Research shows another important perception issue is that county emergency managers expect support from the federal government (Jensen et al., 2014). The county emergency managers are assumed to serve as the leaders, coordinators, and facilitators of their communities' preparedness, mitigation, response, and recovery (Samuel & Siebeneck, 2019). If their expectations include federal support, then the community's will as well.

Changes in insurability and insurance. In the context of disasters, the insurance industry is also becoming increasingly unreliable. Conversations with a FEMA analyst revealed that insurance companies are rapidly pulling out of hazard-prone areas as they struggle to honor their clients or stakeholders. A CNBC news article states that some providers, such as Allstate and State Farm, are pulling back specifically from fire and flood-prone areas (Jacobson, 2024). This directly impacts Minnesota since flooding is common due to the lakes, rivers, rainfall, and rapid snowmelt after winter. The first recovery mode individuals' access is their insurance if they have it, making insurance the first line of defense when disaster hits (Gould, 2014). Purchasing insurance has also historically been heavily encouraged by emergency managers, as research shows that those with insurance typically fare better in recovery than those without (Jensen & Gould, 2014). As this industry becomes less reliable, Minnesota's vulnerability increases, as residents will find recovery and resilience less attainable.

The other insurance issue is that, due to disasters increasing in frequency and intensity, rates are rising quickly. The National Bureau of Economic Research report shows that homeowners nationwide have seen insurance premiums rise by up to 33% (Washington Post, 2025). Despite residents' risk, the Minnesota Department of Commerce reports that few are enrolled in the National Flood Insurance Program (NFIP), which protects against major flooding, unlike the add-ons to basic homeowners' policies (Severson, 2024). As of 2021, fewer than 11,000, or 0.5% of homes, have coverage through the NFIP (Severson, 2024). Even with a program like the NFIP, the cost is the most significant factor, as Minnesotans are likely already feeling the effects of rising rates and are further disinclined to purchase additional insurance for an event that may not impact them (Severson, 2024). Based on current trends, Minnesota will likely continue to experience a loss in insurance coverage from now till 2050 because people cannot afford the higher rates, and/or because insurance companies are leaving the area completely.

Those without insurance could typically qualify for FEMA aid, such as their Individual Assistance (IA) programs. However, as that support may no longer be available, Minnesota faces a severe financial crisis regarding disasters. The state must prepare for the increase in uncertainty with insurance and federal aid. Minnesota must also be ready to adapt protection and assistance structures with the possibility of these factors being eliminated.

Threats to Nature Via Climate Change

Outdoor recreation and natural parks offer various benefits, such as hunting, fishing, skiing, wildlife viewing, a sense of place, positive experiences, and improved mental health (Bakashi, 2022). These aspects establish outdoor recreation as both culturally and economically significant for Minnesota. It is an essential ecosystem service and economic driver, generating over $4 billion annually from hunting, fishing, and wildlife viewing. Minnesota's Laurentian Mixed Forest (LMF) supports diverse natural habitats and species. The LMF encompasses 85% of the state's forests and provides opportunities for nature-based activities like biking, hiking, hunting, angling, skiing, and wildlife viewing. Approximately 70% of Minnesotans engage in these activities, contributing over $4 billion in annual expenditures, adding $8 billion to the state's gross domestic product (GDP), and creating more than 89,000 jobs. Outdoor recreation is a large portion of the state's $12 billion tourism industry.

Research shows that spending time in nature, predominantly through recreational activities, promotes positive psychological outcomes. Studies indicate that nature-based recreation tends to have either neutral or positive effects on mental health, with the most common benefit being anxiety and stress reduction (Lackey, 2019). Minnesotans feel a sense of place outdoors, bringing peace and belonging. Green spaces give communities a place to meet and socialize, bringing them closer together. Nearby parks, walking trails, and green spaces create an inviting area where people will be more active, having more opportunities to walk, bike, and play sports. More parks could improve communities and the state's overall obesity level and heart disease rates, and lower blood pressure. Green areas like parks reduce heat island effects in large cities. Trees provide natural shade while soil, grass, and plants absorb less heat, and other natural features contribute to cooling. Trees and plants filter air pollutants, improving air quality in the community. Homes and businesses also have a higher value around well-kept parks and green spaces.

Climate change may amplify the effects of invasive species, insects, and pathogens, negatively impacting forests and recreation and altering visitor preferences for certain types of activities. It could also degrade water quality through droughts and floods, leading to higher concentrations of pollutants, which influence specific recreational options (Bakashi, September 2022).

Climate change will bring direct effects, altering climate variables like

temperature, precipitation, snow cover, and depth, and indirect effects through interactions with factors that affect outdoor recreation, such as forest composition, invasive species, and wildlife populations. Changes in forest composition will influence the forest products industry, which includes both timber and non-timber products. The timber industry will likely shift from predominantly softwood-bearing species like aspen-birch, pines, and spruces to hardwood and temperate species like oaks and maples. Based on the LMF's predicted landscape of mainly deciduous forests and higher precipitation events in the future, water quality in the region could be affected by higher nutrient loading from forests, higher nutrient loading from agricultural runoff, and increased water acidity.

Rural-Urban Divide

As stated in the literature review and Figure 3, a rural area consists of fewer than 2000 housing units and 5,000 residents. An urban area is densely developed, with over 2000 housing units and 5,000 residents (Sanders & Cromartie, 2025). The rural and urban divide is a complex and persistent issue. It reflects variations in urban and rural areas' economic, social, environmental, and political systems and resources. Poverty appears differently in rural and urban communities. Poverty rates are much higher in rural America than in urban areas (Nee, 2021). While urban areas produce high gross domestic product (GDP), rural areas create the four essential ecosystem services, including provisioning, supporting, cultural, and regulating services. (Love & Loh, 2020; Gebre & Gebremedhin, 2019).

Ecological Services. Provisional services are the tangible goods we receive from ecosystems. Urban and rural areas rely on provisional services, including food, water, and building materials (cotton, timber, and wool). The rural regions are responsible for providing these resources (Gebre & Gebremedhin, 2019). Food production represents the most significant disconnect between rural and urban communities. Rural areas are responsible for producing almost 70% of the food consumed worldwide. By 2050, projections show that 2.5 billion people will make up the urban population. Greater urbanization will increase the demand for food produced in rural areas (Gebre & Gebremedhin, 2019). Supporting services are ecological services that support all other ecological services. They are critical to rural communities because they create positive

ecological systems that ultimately provide better services and improve rural economic value, ultimately benefiting rural and urban populations (Gebre & Gebremedhin, 2019). The foundational services that supporting services provide will lead to long-term environmental and economic resilience.

Cultural services are the things people ultimately gain from interacting with ecosystems, such as green spaces. These services are primarily provided in rural areas because urban areas have fewer natural recreational services (Gebre & Gebremedhin, 2019). These cultural services play a role in maintaining human mental and physical health (Gebre & Gebremedhin, 2019).

The regulating services are the natural processes that ecosystems perform to regulate environmental conditions. These include maintaining air and soil quality, regulating climate, controlling disease, and other vital services. In rural areas, these services are critical because the ecosystems are more capable of delivering benefits. The increase in urbanization diminishes the ability of urban ecosystems to provide these services, putting a higher demand on urban environments. (Gebre & Gebremedhin, 2019).

Political and Social Dividers. Differences in rural and urban political perspectives reflect the growing political polarization. In Minnesota, rural areas are increasingly more conservative, while urban areas reflect a growing progressive perspective (Ingraham, 2022). These political differences fuel a greater sense of cultural divide. Disparities in the experience of life increase the political divide (Brown & Mettler, 2023). Rural communities experience more stagnant economies, population decline, and modest improvements in education (Brown & Mettler, 2023).

In contrast, urban areas typically experience population growth and employment increases. Furthermore, urban communities offer broader and better educational opportunities, often resulting in a significant knowledge gap. Significant achievement gaps exist in rural and urban schools in Minnesota (Grunewald & Nath, 2019). Multiple factors contribute to disparities in rural and urban education systems, such as geographic isolation, economic isolation, and social capital isolation (Schoenberg, 2021). Because the rural-urban divide has become a substantial feature in politics today, it is essential to unite rural and urban communities to diminish these disparities (Brown & Mettler, 2023).

Several additional social dividers exist, including a critical disparity in healthcare access. Rural areas have fewer healthcare providers, less access to

dental care, higher healthcare expenditures, and a higher likelihood of being uninsured (Georgetown University, 2019). In Minnesota, rural communities also have less access to licensed healthcare professionals. There are fewer services offered in rural hospitals and less access to surgical procedures due to hospital closures. There is also a disconnect with mental health services in rural communities. Suicide rates are higher in rural Minnesota, and people must travel farther to receive mental health care (Minnesota Department of Health, 2022).

Internet Access. A key disparity that significantly affects rural citizens is internet access. Rural Minnesotans have less access to the internet, often due to inadequate infrastructure networks. As of 2019, 43.3% of people living in rural Minnesota lacked access to broadband internet (American Immigration Council, 2022). Lack of internet access has vast effects on rural Minnesota. Rural Minnesotans have lower rates of telehealth use, and almost 20% lack internet that is reliable enough to use telehealth services, contributing to the higher healthcare disparities (Minnesota Department of Health, 2022). Lack of internet also affects students and their ability to access connectivity for remote learning and digital homework (Curtis et al., 2021). Students without access to the internet have been shown to have lower performance rates on standardized tests, complete homework at lower rates, and are less likely to attend college (Valentín-Sívico et al., 2023). Internet access is also associated with mental health benefits due to the social connectivity support and reduced feelings of isolation. Therefore, a lack of access can cause a disproportion in quality of life. In addition, a lack of internet access hinders the recruitment of health professionals and teachers in rural areas.

Capacity. Critical to this project, rural and urban communities differ in capacity and capabilities in emergency management. Rural economies have less diversified economic systems and less financial support for emergency management, resulting in fewer government positions dedicated to this role. Because of these limitations, emergency preparedness differs in rural communities, limiting the ability to recover and respond to hazardous events. Rural communities often have one full-time emergency manager who also takes on multiple other duties while being expected to have the capacity and capability to perform them (Cwiak & Butterfass, 2024). With money and time lacking at the local level in demand, there needs to be more support from the state level.

Social Vulnerability

Many aspects of daily life in Minnesota reflect social vulnerabilities, and people often take these aspects for granted. This section draws information from various census tracks and maps, including the Natural Resources Research Institute's Minnesota Natural Resource Atlas SVI (Social Vulnerability Index) Composite and the U.S. Census Bureau. The purpose of these censuses is to indicate what demographics exist within communities, to what extent they make certain groups more susceptible to impacts from a hazard event, and how likely they are to need assistance in the post-disaster setting. As of writing this, the recorded population of Minnesota circa 2024 is roughly 5.793 million for perspective.

The U.S. Bureau (2024) indicates that, between the years of 2019 and 2023, regarding the health and disabilities of Minnesotan residents, the percent of persons with a disability under the age of 65 years is 8.0%, and the number of persons without health insurance in that same age range is 5.0%. Regarding income and poverty, the median household income (in 2023 dollars) was $87,556, and the percentage of persons in poverty is 9.3%. For perspective, 11.1% is the national average poverty rate of the United States from 2023, equating to 36.8 million people. The racial statistics of the state are made up of 82.3% White (76.9% of which are non-Hispanic/Latino), 7.9% Black, 1.4% American Indian and Alaska Native alone, 5.5% Asian, 0.1% Native Hawaiian and Other Pacific Islander alone, 2.9% are two or more races, and 6.5% are Hispanic/Latino. Lastly, concerning languages spoken within Minnesota, the amount of solely English speakers is 4,711,130 (88.0%), speakers of languages other than language is 643,616 12.0%), and the population of those who speak English worse than "very well" is 240,339 (4.5%) (MNCompass, 2018-2022).

Each of the factors listed above influences the resources and support available to an individual. 8% of Minnesotans with disabilities will require different forms of travel, medical attention, or communication depending on what their specific disability is. The 9.3% of impoverished residents have fewer financial options, significantly increasing their vulnerability. Roughly one in twenty residents does not have a strong understanding of the English language and thus will require assistance or alternative services to receive communication. Knowing these vulnerabilities exist, it is the responsibility of Minnesota and its communities to equitably support those in need. Overlapping demographics must

also be considered, as individuals with multiple vulnerabilities significantly increase their susceptibility to faring worse in disasters.

Lackluster Utilization of Available Technologies and Knowledge

Using disaster-related technologies and proper education regarding emergency management are integral to creating a well-structured environment apt for many disaster situations. However, there is a notable lack of common knowledge about the disaster context and an insufficient use of existing tools (primarily information communication technologies or "ICTs") that can help across all four phases of emergency management.

Many modern forms of communication exist that expedite and increase the efficiency of action amidst a disaster, whether before, during, or after the hazard event has occurred. Effective cooperation and communication of partner organizations are a necessity in the emergency context (Qu & Kapucu, 2014). Knowing this, it should be a priority to acknowledge not only what ICTs are accessible within Minnesota but also to what extent each form of communication can assist and increase emergency preparedness, response, recovery, and mitigation. The Minnesota Department of Public Safety's Emergency Communication Networks (ECN) is responsible for and oversees four core program areas: The Statewide 911 Program, the Allied Radio Matrix for Emergency Response (ARMER) radio communications network, the Interoperability Program, Integrated Public Alert and Warning Systems (IPAWS), and a statewide Wireless Broadband. While all of these programs are greatly helpful and well utilized, there is always room for improvement and alternative means of communication. Minnesota is susceptible to flaws in existing ICTs, many of which are rooted in problems such as poor pre-event planning, rushed deployment amidst disaster situations, inadequate training/testing, a general lack of user involvement, weaknesses in security, and outdated technology.

In addition to issues in the use of ICTs, there are also issues about education surrounding these tools. Multiple scholars state that while technology may support learning and provide opportunity, technology itself may be problematic depending on the context (Ciroma, 2014; Cloete, 2017; Hernandez, 2017). The use of tools and technologies (in this case, ICTs) must be integrated into a broader curriculum to standardize the use of these helpful tools amidst the appropriate emergency contexts while also being aware of the potential misuse of ICTs by the public.

One last factor to consider is the threat of cyberattacks and the need to combat them with adequate cybersecurity. As technology advances and becomes more complex, the options presented to cyber terrorists broaden, making it increasingly more challenging to protect against cyber-attacks. As of December 1, 2024, public agencies, state agencies, local governments, public education entities, and government contractors must report cybersecurity incidents that impact their entity (Minnesota IT Services, 2024). Lawmakers also established legislation to acknowledge further and defend against potential cyberattacks. Due to the rapidly evolving nature of technology, being able to identify these technology-based threats and defend against them is crucial in ensuring the safety and security of Minnesota's future.

Poor Public Understanding of Disaster Management and Financial Literacy

Across the nation, there is a general lack of knowledge regarding disaster management or the role of an emergency manager. There is also a lack of consideration for disasters incorporated into the typical individual's financial planning. This is assuming, of course, that every American does some sort of financial planning, which, when looking at data, may not necessarily be true. These two factors work together to create a vulnerability within Minnesota's society.

Perception of emergency management. There is discourse within the profession on what disaster management should look like or what an emergency manager's role should be, and there is confusion surrounding these topics for the public. An emergency management professional shared in an interview that they believe these two factors are intertwined because a lack of standardization within the profession creates confusion for the emergency management community and everyone outside of the profession. Many assume emergency management is another term for first response. Although that is not what emergency management is intended to be, this assumption is not entirely unfounded since research shows a heavy preparedness and response bias currently in the profession (Rubin, 2020). Research also shows that for recovery, most county emergency managers view filling out FEMA paperwork as their primary responsibility (Jensen et al., 2014). Emergency management is much more than preparedness, response, and FEMA paperwork, but the public will not know if their emergency manager believes that to be their role.

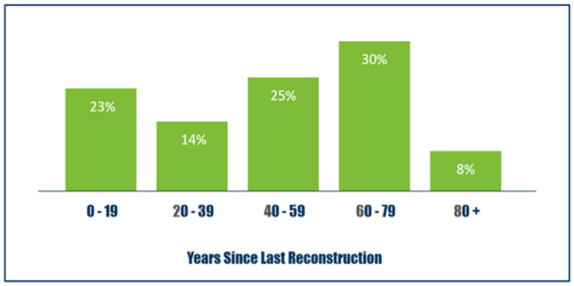
Financial difficulties. The public generally struggles with prioritizing disaster preparedness or resilience with their finances. This makes sense since if the public does not understand what disaster management means, they will undoubtedly be unwilling to invest in disaster preparedness, and as a result, people are not adequately protecting their assets. This could be due to people not understanding their risk, understanding their risk but being unsure of the best protection methods, or not being financially capable.

The typical American mindset can be part of the issue. The United States is the top consumer market in the world, mainly because American culture emphasizes consumption and has made the acquisition of goods or services a symbol of status and wealth (ResearchFDI, 2023). Although this is also due to a large population, diversity, and high disposable income, consumer spending habits are one of the biggest drivers in the US economy. Excessive household spending may be good for the economy, but on an individual level, it might not be the best for disaster preparedness or mitigation. The issue with American consumerism is that many people would rather spend their money on something that they can enjoy right away or that will boost others' perception of their status or success, rather than protect their homes and livelihoods against something that they may never be impacted by. Some, in addition to being fueled by the American consumer culture, are spending their way into debt, desperate to increase their social status. For that individual, when a disaster hits, they will not have the resources to recover and struggle to get approved for loans.

Although poor financial decisions across the nation are a concern for emergency management, the root issue is the lack of financial literacy and financial education in school. Minnesota's financial literacy levels are debated, as some view Minnesota as the most literate state in the country, while others are still concerned. WalletHub argues that Minnesotans have the highest median credit score in the country and the lowest percentage of adults who spend more money than they make (Kiernan, 2025). However, the level at which Minnesota ranks first is 15%, meaning that one in every ten people, or approximately 868,950 Minnesota residents, is spending more than they earn (Kiernan, 2025). These results also represent the current adult generations and do not account for the direction of financial literacy in the next 25 years. With the next generations in mind, educators have expressed concern about the level of financial education, with only 7% of high school students guaranteed to take a personal finance course (Minnesota House of Representatives, 2023).

Aging Infrastructure

Minnesota's critical infrastructure suffers from insufficient maintenance. These aging systems—such as roads, bridges, sewer and waste systems, buildings, and the power grid—compromise emergency management response, recovery, and a community's potential resilience. Poorly maintained or downed bridges and roads delay first responders and can make some areas impossible to reach. Aging water and sewage systems harm community health through things like lead piping, outdated treatments, and pollution released into natural waterways, which can lead to disease outbreaks. Proactive improvements to infrastructure prove crucial for effective emergency management response and recovery, public safety, and community resilience.



Most of Minnesota's highways were constructed around 60-70 years ago due to a funding increase from the Federal Aid Highway Act of 1956, resulting in a large number of run-down freeways and expressways throughout the state. Roads generally are reconstructed fully every 50 years, depending on use, traffic levels, heavy freight traffic, the amount of maintenance, and other factors. See Figure 6 for the years since the last construction. Roads should receive routine maintenance treatments before falling into a poor or unusable condition, which is much cheaper than a complete reconstruction. Not doing maintenance promptly can make future maintenance even more costly and time-consuming as the pavement quality decreases (Aging Infrastructure, 2021). Because MnDOT's budget for maintenance cannot cover the increasing miles of freeway and expressways, the agency will not maintain as many roads as needed and on time, leading to a complete reconstruction, which requires more time and money.

The same goes for state highway bridges. They are designed to last 50 years, with newly constructed ones having a life of 75-100 years due to materials and engineering improvements. A "worst-first" maintenance strategy has been implemented, which is more expensive in the long term. It uses resources that could be used to maintain bridges that need minor, preventative maintenance. This has caused more bridges to fall into "poor" condition over time (Aging Infrastructure, 2021).

Public Distrust of Government and Institutions

Public distrust in Minnesota government institutions can threaten HSEM in Minnesota. A recent study by APM Research Lab states that only 48% of Minnesota's population trusts that the government will do the right thing (Helmstetter, 2022). This is a problem for HSEM because it can reduce public cooperation in safety precautions and resilience while increasing communities' vulnerability. Fostering trust within Minnesota is important not only for governmental trust but also for making people feel like they are part of a community. Public cooperation regarding safety precautions is essential for HSEM and keeping people safe from different sources of risk. People are less likely to follow safety precautions when trust in the government is low (Tsai & Morse, 2019). Trust has been positively correlated with adopting policies related to disaster risk reduction, thus proving how quintessential it is to have trust in our governments (Bonfanti et al., 2024). If governments are not trusted and do not offer adequate support, they have lower levels of disaster resilience and take longer to recover (Bonfanti et al., 2024). Having distrust in the government can lead people not to take warnings and preparedness measures seriously, ultimately creating more community vulnerability (FEMA, 2022).
Mistrust in the government will make it harder for governmental interventions, making it important to create meaningful relationships with the community (Federal Emergency Management Agency, 2022). When people feel embedded in a community, they feel respected and prioritized, which generates trust within the community (Friedman, 2017). Fostering trust within Minnesota will generate more resilience in the state, ultimately enhancing Minnesota's independence. Ultimately, generating trust saves lives and strengthens Minnesota's communities.

Insufficient Vertical and Horizontal Integration

In the next 25 years, Minnesota will need stronger vertical integration than the current state as disasters increase in frequency, intensity, and expenses. Vertical integration refers to the connections to organizations and social networks outside local institutions (Berke et al., 1993). Research indicates that communities with strong vertical and horizontal integration will have better chances of recovery (Berke et al., 1993). As revealed in an interview with an emergency management professional, a recurring problem in disaster management is a

lack of effective communication and collaboration across the various levels of government agencies and jurisdictions and the multiple levels of external partners. This issue is even more prevalent in a climate of extreme political polarization. As mentioned, Minnesota experiences a rather drastic rural-urban divide, which can reduce communities' level of vertical integration and, from the state's perspective, horizontal integration. Minnesota is also home to 11 tribal communities, and although most of them work with the state government, this still illustrates the need for vertical and horizontal integration to be a priority in the years to come.

Minnesota has generally secure coordination with its fellow states thanks to the HSEM's Emergency Management Assistance Compact (EMAC). EMAC is an agreement made by partnerships existing between both states and territories due to the constant threat of disaster all neighboring locations share (HSEM, 2025). While EMAC functions as a practical foundation for horizontal integration between states in the disaster context, more can be done at the local/community levels to understand individuals' needs, lives, and expectations nationwide. By developing a deeper understanding of other communities, decision-makers can determine what resources each jurisdiction requires based on its specific context and plans.

The Developing and Maintaining Emergency Operations Plans Comprehensive Preparedness Guide from FEMA explains that horizontal integration serves two specific purposes:

"First, it integrates operations across a jurisdiction. For example, an agency, department, or sector would write its plan or standard operating procedures/standard operating guidelines (SOPs/SOGs) for its role in an evacuation to fit the controlling jurisdiction's plan for such an evacuation. Horizontal integration allows departments and support agencies to produce plans that meet their internal needs or regulatory requirements and still integrate into the EOP. Second, horizontal integration ensures that a jurisdiction's set of plans supports its neighboring or partner jurisdictions' similar sets of plans. A jurisdiction's plan should include information about mission assignments that it executes in conjunction with, in support of, or with support from its neighbors or partners." (FEMA, 2010).

Minnesota's plans need to be self-sufficient while applicable to other neighboring states and their jurisdictions' contexts.

Recommendations

The goal of this report is to give recommendations that outline how Minnesota can increase effectiveness and efficiency in disaster management and create a more resilient society. These recommendations are derived from the problems identified in the findings and aim to build a stronger, more unified Minnesota, capable of being self-sufficient. Specifically, the research team's recommendations focus on protecting the natural environment, addressing the rural-urban divide, strengthening in and out-of-state partnerships, improving social vulnerabilities, leveraging accessible technologies, public education on emergency management, critical infrastructure upkeep, and fostering trust throughout the state. To do so effectively, the team proposes adding a Community Outreach Bureau (complete with a director) to the existing organizational chart, consisting of varied positions that relate to the key drivers in the findings.

Increase Minnesota's Financial Independence

Due to the unreliability of federal aid and the insurance industry, the state of Minnesota needs to increase its financial independence. Minnesota needs to prepare financially since the responsibility for covering most disaster costs will increasingly be pushed down from the federal government onto the states. In addition to the financial need, not relying on the federal government will lead to less state fragmentation due to the lack of coordination of federal programs (Center, 1979). Minnesota can increase financial independence by minimizing costs, protecting top industries and supply chains, prioritizing trade relationships, and creating an in-state disaster fund.

Minimize costs. To work towards resilience while understanding the lack of funding is a primary challenge, Minnesota's state government needs to focus on efficiency and minimizing costs across the board. One of the basic concepts applied in microeconomics is to improve efficiency in a business, one can either raise revenue or reduce costs. This same concept can be applied to the

state government. However, raising revenue is significantly more challenging than simply finding ways to minimize costs. Raising revenue is more challenging for firms because, in a competitive environment, they are limited in raising their prices since the customers will go elsewhere. Therefore, the more practical way of increasing profitability is to minimize costs. In terms of the government, raising revenue is difficult as increasing taxes could result in residents moving elsewhere, not to mention general civil unrest since the tax burden in Minnesota is already one of the highest in the country compared to other states (Treadway, 2025). Ways to minimize costs within the government would include, but are not limited to, leveraging technology, identifying areas that can be consolidated, collaborating with other departments to share resources, adjusting staffing, and negotiating for better contracts. Another important aspect throughout this whole process is transparency and keeping stakeholders involved and informed.

Protection of top industries and supply chains. Protecting Minnesota's top industries is important because they generate revenue for the state, employ citizens, and encourage consumer confidence. Well-functioning supply chains also contribute to the success of these top industries. Some of the highest contributing industries to Minnesota's gross domestic product are finance, real estate, insurance, business services, manufacturing, educational services, and healthcare (Statista, 2022).

Prioritize trade relationships. Prioritizing trade relationships is simply the economic angle of vertical and horizontal integration. Successful trade relationships allow Minnesota to specialize in the areas that make sense given the state's capacity, expertise, geography, and culture. Specialization can increase profitability and help bridge the gap between the financial burden of disasters and the resources to which Minnesota has access. Maintaining meaningful relationships with the Dakotas, Wisconsin, and Iowa specifically is important because of the shared supply chains and similar business climates.

In-State Disaster Fund. Multiple SMEs agreed that the creation of an in-state disaster fund would be beneficial given the current uncertainty and political climate surrounding disaster management. This fund would create certainty that Minnesotans will not be left to bear the burden of disasters on their own. The state currently has money to make the creation of this fund possible, as

Minnesota has a budget surplus, but the window of opportunity may be shrinking since Minnesota Management and Budget Officials predicted a budget deficit of over 5 billion by 2029 (Mohr, 2024). This fund should serve as a potential replacement for post-disaster aid but could also take on the absence of mitigation programs such as BRIC. This could be done by making two core functions for the disaster fund or by creating two separate programs from the start.

Implications for HSEM. For HSEM specifically, they should serve as an advocate for these recommendation areas as they directly impact the future of disaster management. The finance and grants department should lead this initiative as they have the technical expertise, but also need to work closely with representatives from the preparedness and recovery bureau, since the disaster funds would specifically apply to disaster recovery and hazard mitigation. For the In-State Disaster Fund specifically, the team proposes a new position to specialize in the details of this fund and what projects would qualify. This changes the current HSEM organizational chart (see Appendix B) and would add to the context of which employees in the finance, recovery, and mitigation areas work. When hiring new individuals, advocacy and specific attention to this problem should be considered.

Protect Minnesota's Natural Environment

Minnesota must protect the natural features within the state (lakes, forests, animal life), ensure outdoor recreation is economically beneficial and environmentally sustainable as climate change impacts increase on Minnesota's landscape and local tourism (Bakashi, September 2022). To do this, HSEM will have to create an Environmental Liaison position that helps facilitate coordination, communication, and cooperation between local and other nearby state governments, public health sectors, Minnesota Game and Fish, Park Management, and other connected agencies. This position will be under the proposed Community Outreach Bureau (See Appendix B).

Together, these agencies can utilize natural systems like forests and waterways to minimize climate change impacts through actions like reforestation. HSEM should promote policies that protect and maintain current natural areas, create new green spaces, both urban and rural, expand clean energy usage, and reduce greenhouse gas emissions. They should support research and development for new climate-friendly technology by donating and advocating and

incorporate climate change adaptation and forest management into existing management strategies. In the proposed Community Outreach Bureau, education and outreach for hunters, fishers, school children, and adults across different communities, demographics, and socioeconomic strata should be implemented as HSEM launches more effective strategic decision-making on climate change in the LMF and statewide. It is also important to understand how tourism shapes Minnesota's natural environment, both positively and negatively, to meet the increased demand for outdoor recreation in the future while optimally utilizing income from tourism.

Address Rural-Urban Divide

Using a whole-community approach when working with rural communities is essential to leveraging their strengths to be more prepared and leveraging the strengths of what the community already has, along with its assets. It is important to empower local action within rural communities because they have fewer health services, public transportation, and communication strategies (FEMA, 2011a).

Ecological services can link and strengthen rural and urban communities. As urbanization increases, it will be important that the supply of rural ecosystem services and rural lifestyles is not affected. The interactions between rural and urban areas are important for the development of social and economic conditions for both communities. Policies largely impact how rural areas provide ecological services and food production. Focusing on policies that improve land use management for food production, such as protecting the environment from contamination, and specifically emphasizing reducing urban areas' developmental impacts on agricultural production.

To provide rural emergency managers with capacity and capability, a program that funds hiring a liaison position to work exclusively with them is needed (Cwiak & Butterfass, 2024). This position would be titled Rural Community and Emergency Management Liaison, and they would facilitate the development of community partnerships, community planning, and other activities to develop more resilience in Minnesota's rural areas by using a whole community approach (Cwiak & Butterfass, 2024). This position will be under the proposed Community Outreach Bureau but still work closely with the program and policy analysis department because it gives the role a way to bridge rural community input and state-level decision-making, as policy influences the divide heavily.

In addition to this, the research team suggests an Urban Community and Emergency Management Liaison and a Tribal Emergency Management Liaison position.

Using community involvement to strengthen rural emergency management. Creating more community coalitions can build community involvement and increase preparedness capacity. Rural communities lack communication strategies, and communication is essential to emergency management. Building up communication technology and infrastructure in rural communities so they get access to timely and accurate information (Kearley et al., 2023). Providing rural emergency managers with up-to-date communication technologies to give them the support they need to be accurately prepared to respond and recover from a hazardous event. Rural communities need the tools and resources to be better prepared, and focusing on supporting them will bridge the gap and make Minnesota more resilient.

Identify & Reduce Social Vulnerability

Social vulnerability envelops financial, social, and environmental aspects of life. Social vulnerabilities must be accurately assessed to ensure that the needs of Minnesotan residents are met. Insurance should be more broadly accessible. Infrastructural and technical accommodations must also be made for those with disabilities that would limit their access to locations or services intended for able-bodied individuals. Multilingual communication methods must also be implemented, as more than 1 in every 10 residents of the state speaks a language other than English, and many of those people may not speak English at all. The availability of virtual and physical translation services would greatly aid those who speak languages other than English.

In addition to these accommodations, an approach structured on the foundation of “C-MIST” will encompass all vulnerabilities within society. Assessments and identification of vulnerabilities must also be specific, depending on the context, aiming to move away from vague or broad terms such as “special needs.” Disaster preparation and emergency response processes, procedures, and systems can be made more effective for people with disabilities, as well as for the population (Kailes & Enders, 2008). Moving beyond the vague use of “special needs” to identify the diverse and unique necessities of individuals will allow for specific and effective action to be taken. HSEM can restructure how social vulnerability and the needs it generates are perceived by creating

consistent definitions of need-types. HSEM can also cooperate with other agencies, organizations, or businesses that play a significant role in providing specific services for any of the identified needs to better understand what action can be taken to reduce the social vulnerability experienced by these individuals and groups.

Leverage Accessible Technology & Knowledge

With the existing ICTs at Minnesota's disposal and the potential for integrating technology-related education, improving upon technology and shared knowledge about their use is made plausible. For example, the ECN is currently working on developing a NextGen 911 Service (NG911) that aims to: *"enhance emergency number services to create a faster, more resilient system that allows voice, photos, videos, and text messages to flow seamlessly from the public to the 911 network. NextGen 911 will also improve public safety answering points (PSAPs) ability to help manage call overload, natural disasters, and transfer of 911 calls based on caller location data." (ECN, 2025).*

Implementing these innovations and maintaining the quality of useful technology will result in better action in all disaster settings and phases. The team also recommends cooperating with and recruiting more diverse knowledge backgrounds, primarily individuals with thorough technical (ICT) and emergency management experience. The combination of these proficiencies and their implementation in educational contexts will result in well-rounded professionals collaborating to increase the efficacy of actions in the emergency context. Regarding cybersecurity and protection against cyber-attacks, the Minnesota Government's Minnesota IT services page explains in detail the efforts made, and legislation enacted to preserve cybersecurity, as well as what individuals can do if a cyber-attack is to occur (how to identify an attack, whom to contact, and other resources).

A large piece of improving disaster management for Minnesota is leveraging local knowledge, which the team recommends doing through the proposed Community Outreach Bureau. This also connects with addressing the rural-urban divide, reducing social vulnerability, and building public trust of HSEM. Leveraging local knowledge starts with including diverse stakeholders in the planning process and making sure communities have a voice in each phase of comprehensive emergency management. For HSEM specifically, one of the

All-Hazards Planning employees should work closely with the Community Outreach liaisons to ensure stakeholders are included in the planning process.

Invest in Public Education on Disaster Management

Census data for Minnesota currently shows that 93.9% of people over the age of 25 have graduated from high school (U.S. Census Bureau, 2024). When looking at how many Minnesotans over age 25 have at least a bachelor's degree, that number falls to 38.8% (U.S. Census Bureau, 2024). Emergency management courses are only offered at the college level, meaning only 38.8% of the population may have had an opportunity to learn about what emergency management means and why it is important. Realistically, the percentage who learned about emergency management in college is much lower since not every university offers those courses. There are many problems with emergency management higher education, including, but not limited to, funding, lack of political understanding and support, and student recruitment (Cwiak, 2014). These three issues can be improved through the investment in disaster management public education at the state level.

Specifically, disaster management needs to be incorporated into the high school curriculum. This topic can fit easily into various classes because of the interdisciplinary nature of emergency management. For example, it attaches nicely to social studies with disasters consistently being historically significant events, and certain policy changes like those prompted by 9/11 and Hurricane Katrina can be studied in a government class. Vulnerable areas and populations could be incorporated into geography, and the impacts of pandemics could be discussed in science and health courses. Similar to the way schools practice tornado, fire, and active shooter drills, including a course on emergency management can help educate the average Minnesotan about the importance of an organization like HSEM.

Not only would this help student recruitment at the college level, political understanding and support, and therefore funding for higher education, but it could also increase the financial literacy of Minnesotans, as they may be more inclined to understand the importance of an emergency fund. Investing in public education can improve multiple areas of concern with the current state of disaster management by creating a well-equipped emergency management workforce to deal with the growing nature of disasters, a better financially protected general public, and overall competent stakeholders who can impact

Minnesota's future in a positive way.

HSEM again needs to serve as an advocate for this initiative and leverage the connection with the Minnesota Department of Education and school districts around the state that should exist through the school safety department. The team also proposes creating a Disaster Management Education Liaison under the Community Outreach Bureau to front this initiative and work with the Minnesota Department of Education and possibly school districts as well. When hiring, HSEM should consider finding someone who is comfortable working with education and has a strong comprehensive emergency management background. Including emergency management in high school curriculum also needs to be advertised to parents and key stakeholders of each community, since, without local support, the concept will not succeed.

Sustainable Restoration and Upkeep of Critical Infrastructure

It is crucial that Minnesota develops comprehensive plans for critical infrastructure throughout all of the life stages to maintain its performance (Tafazzoli, 2019). This starts in pre-planning and plans created must be revisited often as external and internal factors change throughout the infrastructure's life. Minnesota HSEM, facility managers, engineers, government personnel, decision makers, and maintenance supervisors and personnel must understand the necessity of investing in the upkeep of critical infrastructure. Collaboration and motivation from all stakeholders must be met to effectively implement mitigation practices for long-term quality and minimize negative impacts. The state must break free of the "worst-first" strategy when approaching upkeep of critical infrastructure, as it is failing to keep up with the changing climate and the increasing frequency and intensity of hazards. Without proper maintenance, negative impacts will continue to accumulate and lead to irreversible damage to many infrastructures and more falling into a "critical" stage. Continuous data collection, inspections, and measurement of environmental impacts are essential to identify how the infrastructure's maintenance and mitigation plans will change as impacts grow and change. Identified in Figure 7 are five main categories of maintaining critical infrastructure. This will encompass practices as maintaining community goals, early cooperation from all stakeholders, minimizing the disturbance of maintenance operations, having a commitment to sustainability, material and waste management, extending the life of critical infrastructure, selecting sustainable material supplies, purchasing

from local manufacturers when possible, monitor and lower energy consumption, minimize disturbance to wildlife and the natural environment, survey environmental impacts, and limit and restore damages caused by infrastructure.

HSEM will need to create a new position of Environmental Infrastructure Specialist that works closely with their current critical infrastructure planner and reports to the same operations and readiness bureau director (See Appendix B). They must be the voice for actions, plans, and regulations to promote health and safety, sustainable actions during planning, voicing concerns and impacts before a hazard, protecting the natural environment, and other demands for the upkeep of critical infrastructure during the infrastructure's "life" and teardown. This new position should be filled by an individual who not only has an emergency management background, but also engineering and environmental science.

Build Public Trust of HSEM

To solve trust issues associated with HSEM, the agency must focus on fostering relationships with community members and elected officials. Since awareness of risk can lead to a lack of trust as people recognize the complexity of emergency management, emergency managers must build relationships with community members and elected officials based on participation and collaboration (Bonfanti et al., 2024). Developing preparedness programs requires the collaboration of every stakeholder group. Studies found that developing preparedness programs based on collaborative partnerships among different stakeholder groups can lead to trustworthy relationships between community members and officials. The collaboration efforts create a way for both parties to share ideas, exchange knowledge, and collaborate on preparedness plans (Kitagawa, 2015). Fostering trust throughout Minnesota by creating partnerships within the community will lead to a more resilient Minnesota.

Another recommendation is to provide emotional support during recovery

because the emotional support offered throughout the recovery phase is important for building community trust (Parkinson et al., 2022). Trust in authorities is often connected to the emergency information put out by those authorities (Zander et al., 2022). HSEM needs to focus on providing transparent communication methods that focus on clarity, accessibility, credibility, and simplicity to ensure people are getting accurate information. By implementing these recommendations, creating collaborative preparedness programs, creating more emotional support opportunities in recovery, and creating communication strategies that generate trust, HSEM will generate more trust throughout the state.

Strengthen Both In-State and Out-of-State Partnerships & Communication

The primary goal regarding strengthening both vertical and horizontal integration is to achieve a "Type 1" Community. According to Berke et al.'s Community Type Model, a great way to begin strengthening partnerships and communication between relevant stakeholders and jurisdictions is by standardizing language in the disaster context. Having shared definitions, acronyms, and more will create clarity and lessen the likelihood of confusion or misunderstanding amidst a disaster. The language used should be professional and clear. Operations and procedures also need to be communicated across all jurisdictions to prevent overlapping efforts and procedures. As mentioned previously, strong horizontal and vertical integration can have more than social benefits. Maintaining healthy relationships within and outside of Minnesota can help increase resiliency in each of the four contexts. Although this is something the team believes Minnesota does fairly well, there is always room for improvement, and with the increasing challenges facing the future of disaster management, simply maintaining our current ties may not be enough. Instead, Minnesota, and specifically HSEM as the leader for disaster management, needs to be intentional about fostering new and diverse relationships, creating a stronger network as disasters increase in frequency and intensity. HSEM can prioritize in and out-of-state partnerships by encouraging staff to attend networking events and search for ways to involve key stakeholders from Minnesota and surrounding states in disaster planning. HSEM should also continue to prioritize the relationships with tribal governments and keep encouraging tribal-state relations training.

Conclusion

Building a more resilient and independent state requires a strategic focus on these drives and recommendations to ensure Minnesota can support its vulnerable populations in both rural and urban locations. This report outlines the drivers and recommendations that create actionable pathways to improve the future of HSEM and the people of Minnesota.

These recommendations will allow Minnesota to rely less on federal funds and incentives and enhance capacity for self-sustaining emergency management that will ultimately better support residents of Minnesota. Setting the foundations of HSEM and Minnesota will bring more independence and more ways to be stable in handling emergencies. In the long term, these recommendations will contribute to creating a more secure and responsive system that prioritizes the residents of Minnesota.

References

American Immigration Council. (2022). Examining gaps in digital inclusion in Minnesota. https://www.americanimmigrationcouncil.org/sites/default/files/examining_gaps_in_digital_inclusion_in_minnesota.pdf

Asche, K., & Werner, M. (2021, December 15). The state of rural – 2021 update. Center for Rural Policy and Development. https://www.ruralmn.org/the-state-of-rural-2/

Association of State Floodplain Managers. (2025, April 11). FEMA ends BRIC program, leaving states in the lurch. https://www.floods.org/news-views/fema-news/fema-ends-bric-program-leaving-states-in-the-lurch/#:~:text=BRIC%20was%20established%20by%20Congress,Disaster%20Mitigation%20(PDM)%20program

Austin, B., Avchen, R., Bagwell-Adams, G., & Schumacher, V. (2024). Barriers to equitable disaster recovery: A scoping literature review. International Journal of Disaster Risk Reduction, 110, 104220. https://doi.org/10.1016/j.ijdrr.2024.104220

Bonfanti, R. C., Oberti, B., Ravazzoli, E., Rinaldi, A., Ruggieri, S., & Schimmenti, A. (2024). The role of trust in disaster risk reduction: A critical review. International Journal of Environmental Research and Public Health, 21(1), 29. https://doi.org/10.3390/ijerph21010029

Center, A. (1979). Comprehensive Emergency Management.

Ciroma, Z. I. (2014, November). ICT and education: Issues and challenges [PDF]. ResearchGate. https://www.researchgate.net/publication/311938684_ICT_and_Education_Issues_and_Challenges

Curtis, M. E., Clingan, S. E., Guo, H., Zhu, Y., Mooney, L. J., & Hser, Y. (2021). Disparities in digital access among American rural and urban households and implications for telemedicine-based services. The Journal of Rural Health, 38(3). https://doi.org/10.1111/jrh.12614

Cwiak, C. L. (2014). Increasing access and support for emergency management higher education programs. Journal of Emergency Management, 12(5), 367–377. https://doi.org/10.5055/jem.2014.0201

Cwiak, C., & Butterfass, M. (2024). The point-of-failure that continues to stymy emergency management efforts at the federal level: Addressing rural capacity and capability [White paper]. North Dakota State University. https://www.ndsu.edu/fileadmin/emgt/CVs/Rural_Area_Capacity_and_Capability_White_ Paper_March_2024_Cwiak_and_Butterfass.pdf

Egbert, A., & Brower, S. (2017). Greater MN: Refined & revisited [Report]. Minnesota State Demographic Center. https://mn.gov/admin/demography/reports-resources/greater-mn-refined-and-revisited.jsp

Farhan. (2024, August 13) Heatwaves, extreme heat and climate change. Chatham House. https://www.chathamhouse.org/2024/08/heatwaves-extreme-heat-and-climate-change

Federal Register: Daily Journal of the United States Government. (2024, September 18). Federal Register: Minnesota; major disaster and related determinations. federalregister.gov/documents/2024/09/18/2024-21203/minnesota-major-disaster-and-related-determinations

Federal Register: Daily Journal of the United States Government. (2023, October 20). Notice of maximum amount of assistance under the Individuals and Households Program. Federal Register. https://www.federalregister.gov/documents/2023/10/20/2023-23168/notice-of-maximum-amount-of-assistance-under-the-individuals-and-households-program

FEMA. (2010). Comprehensive Preparedness Guide (CPG) 101: Developing and maintaining emergency operations plans. https://www.fema.gov/sites/default/files/2020-05/CPG_101_V2_30NOV2010_FINAL_508.pdf

(2011a). A whole community approach to emergency management: Principles, themes, and pathways for action. https://www.fema.gov/sites/default/files/2020-07/whole_community_dec2011__2.pdf

(2011b). FEMA climate change adaptation policy statement. https://www.fema.gov/sites/default/files/2020-07/fema_climate-change-policy-statement_2013.pdf

(2011c). Strategic foresight initiative: Long term trends and their implications for emergency management. https://www.fema.gov/pdf/about/programs/oppa/climate_change_paper.pdf

(2013). Mitigation ideas. https://www.fema.gov/sites/default/files/2020-06/fema-mitigation-ideas_02-13-2013.pdf

(2022). Evolving public trust and emergency management: Strategic foresight 2050. U.S. Department of Homeland Security. https://www.fema.gov/sites/default/files/documents/fema_strategic-foresight-2050_current-trend-paper-evolving-public.pdf

(2023). FEMA public assistance. FEMA.gov. https://www.fema.gov/fact-sheet/fema-public-assistance-0

(2024a). Emergency management performance grant. FEMA.gov. https://www.fema.gov/grants/preparedness/emergency-management-performance

(2024b). More than $15M and other resources supporting Minnesota recovery. FEMA.gov. https://www.fema.gov/press-release/20240919/more-15m-and-other-resources-supporting-minnesota-recovery

(2025). Hazard mitigation grant program (HMGP). FEMA.gov. https://www.fema.gov/grants/mitigation/learn/hazard-mitigation

Friedman, T. L. (2017). Thank you for being late: An optimist's guide to thriving in the age of Accelerations. Thorndike Press, a part of Gale, Cengage Learning.

Gebre, T., & Gebremedhin, B. (2019). The mutual benefits of promoting rural–urban interdependence through linked ecosystem services. Global Ecology and Conservation, 20, e00707. https://doi.org/10.1016/j.gecco.2019.e00707

Georgetown University. (2019). Rural and urban health. Health Policy Institute. https://hpi.georgetown.edu/rural/

Gould, L. A. (2014). A conceptual model of the individual and household recovery process: Examining Hurricane Sandy (Master's thesis). North Dakota State University.

Grants Office. (n.d.). Emergency Management Performance Grant (EMPG) (Minnesota). https://www.k12grants.info/Grant-Details/gid/36732

Grunewald, R., & Nath, A. (2019). A statewide crisis: Minnesota's education achievement gaps. Federal Reserve Bank of Minneapolis. https://www.minneapolisfed.org/-/media/assets/pages/education-achievement-gaps/achievement-gaps-mn-report.pdf

Han, S. (2017, November 14). Preparing for the worst with the four phases of emergency management. Everglades University. https://www.evergladesuniversity.edu/blog/four-phases-emergency-management/

Hankes, M. J., Judd, S. E., & Jones, R. (2024). Bridging the rural-urban divide: A commentary on Rural-Urban Commuting Area codes. The Journal of Rural Health, 41(1). https://doi.org/10.1111/jrh.12911

Helmstetter, C. (2022, February 7). Many Minnesotans—especially white & Indigenous Minnesotans—lack trust in state government. APM Research Lab. https://www.apmresearchlab.org/blog/many-minnesotansespecially-white-amp-indigenous-minnesotanslack-trust-in-state-government

Hu, Q., & Kapucu, N. (2014). Information communication technology utilization for effective emergency management networks. Public Management Review, 18(3), 323–348. https://doi.org/10.1080/14719037.2014.969762

Ingraham, C. (2022, November 14). Data shows widening partisan divide between cities, greater Minnesota. Minnesota Reformer. https://minnesotareformer.com/2022/11/14/data-shows-widening-partisan-divide-between-cities-greater-minnesota/

IPCC. (2018). Annex I: Glossary. In V. Masson-Delmotte, P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P. R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J. B. R. Matthews, Y. Chen, X. Zhou, M. I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, & T. Waterfield (Eds.), Global warming of 1.5°C: An IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty (pp. 541-562). Cambridge University Press. https://doi.org/10.1017/9781009157940.008

ISDR. (2009). UNISDR terminology on disaster risk reduction. United Nations International Strategy for Disaster Reduction. https://www.undp.org/sites/g/files/zskgke326/files/migration/ge/GE_isdr_terminology_2009_eng.pdf

Jacobson, L. (2024, February 5). Insurers such as State Farm and Allstate are leaving fire- and flood-prone areas. Home values could take a hit. CNBC. https://www.cnbc.com/2024/02/05/what-homeowners-need-to-know-as-insurers-leave-high-risk-climate-areas.html

Jensen, J., Bundy, S., Thomas, B., & Yakubu, M. (2014). The county emergency manager's role in recovery. International Journal of Mass Emergencies & Disasters, 32(1), 157–193. https://doi.org/10.1177/028072701403200107

Johansson, B. (2024, May 29). Crisis communication and trust in the multi-public society. ResearchGate. https://www.researchgate.net/publication/380938351_Crisis_communication_and_Trust_in_the_Multi-Public_Society

Kailes, J., & Enders, A. (2008). Moving beyond "special needs": A function-based framework for emergency management and planning. https://www.jik.com/KailesEndersbeyond.pdf

Kearley, J., Hill, K., & Perkins, J. (2023). Emergency preparedness in rural communities. National Rural Health Association. https://ruralhealth.us/getmedia/a1601122-e5b7-489c-855f-b178be47a32e/NRHA-Emergency-Preparedness-in-Rural-Communities.pdf

Kitagawa, K. (2015). Living with an active volcano: Informal and community learning for preparedness in the south of Japan. Advances in Volcanology, 677–689. https://doi.org/10.1007/11157_2015_12

Love, H., & Loh, T. H. (2020, December 8). The “rural-urban divide” furthers myths about race and poverty—concealing effective policy solutions. Brookings. https://brookings.edu/articles/the-rural-urban-divide-furthers-myths-about-race-and-poverty-concealing-effective-policy-solutions/

Maimaitiyiming, M., Ghulam, A., Tiyip, T., Pla, F., Latorre-Carmona, P., Halik, Ü., Sawut, M., & Caetano, M. (2014). Effects of green space spatial pattern on land surface temperature: Implications for sustainable urban planning and climate change adaptation. ISPRS Journal of Photogrammetry and Remote Sensing, 89, 55–66. https://doi.org/10.1016/j.isprsjprs.2013.12.010

Minnesota Department of Public Safety. (n.d.). Emergency management assistance compact. https://dps.mn.gov/divisions/hsem/programs/mn-homeland-security/emergency-management-assistance-compact

MinnesotaGo. (2021, December). Aging infrastructure trend analysis. https://minnesotago.org/trends/aging-infrastructure#:~:text=Aging%20infrastructure%2C%20a%20lack%20of,needs%20competing%20for%20limited%20funds

Minnesota, population by language. (n.d.). Minnesota Compass. https://mncompass.org/profiles/state/minnesota/language

Mohr, J. (2024, December 4). State’s latest budget forecast projects shrinking surplus, “significant financial headwinds.” Minnesota House of Representatives. https://www.house.mn.gov/sessiondaily/Story/18424

National Archives. (n.d.). Federal Register. https://www.federalregister.gov/agencies/federal-emergency-management-agency#:~:text=The%20Federal%20Emergency%20Management%20Agency,the%20Department%20of%20Homeland%20Security

National Governors' Association. (1979). Comprehensive emergency management: A governor’s guide. National Governors' Association.

Nee, E. (2021, February 18). The urban and rural divide. SSIR.org. https://ssir.org/articles/entry/the_urban_and_rural_divide

North Dakota State University Department of Landscape Architecture, Disaster Resilience, and Emergency Management (NDSU LADREM). (2025). Threshold concepts. Fargo, ND.

Norris, F. H., Stevens, S. P., Pfefferbaum, B., Wyche, K. F., & Pfefferbaum, R. L. (2008). Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness. American Journal of Community Psychology, 41, 127–150. https://doi.org/10.1007/s10464-007-9156-6

Parkinson, D., Duncan, A., Kaur, J., Archer, F., & Spencer, C. (2022). Gendered aspects of long-term disaster resilience in Victoria, Australia. AJEM. Australian Institute for Disaster Resilience. resources/ajem-january-2022-gendered-aspects-of-long-term-disaster-resilience-in-victoria-australia/

Peterson Foundation. (2025, January 14). What is the Disaster Relief Fund? Peterson Foundation. https://pgpf.org/article/what-is-the-disaster-relief-fund/

ResearchFDI. (2023, March 15). Understanding the US consumer market: Key trends and insights. https://researchfdi.com/understanding-the-us-consumer-market/#:~:text=With%20a%20large%2C%20diverse%2C%20and,range%20of%20products%20and%20services

Ritchie, H., & Rosado, P. (2024, June 3). Is the number of natural disasters increasing? Our World in Data. https://ourworldindata.org/disaster-database-limitations

Rubin, C. B. (2020). Emergency management: The American experience. Routledge Taylor & Francis Group.

Samuel, C., & Siebeneck, L. K. (2019). Roles revealed: An examination of the adopted roles of emergency managers in hazard mitigation planning and strategy implementation. International Journal of Disaster Risk Reduction, 39, 101145. https://doi.org/10.1016/j.ijdrr.2019.101145

Sanders, A., & Cromartie, J. (2025, January 8). USDA ERS - What is rural? USDA Economic Research Service. https://ers.usda.gov/topics/rural-economy-population/rural-classifications/what-is-rural

Schoenberg, K. (2021, July 25). How much do you know about rural education? Minnesota Rural Education Association. https://www.mreavoice.org/how-much-do-you-know-about-rural-education/

Severson, G. (2024, June 25). How flood insurance works and why only 0.5% of Minnesota homes are protected. Kare11.com. https://kare11.com/article/news/local/how-flood-insurance-works-and-why-only-05-of-minnesota-homes-are-actually-protected-minnesota/89-0efd5b4f-8a25-4b5e-8cb5-bf575dbce825

Smith, G., & Wenger, D. (2006). Sustainable disaster recovery: Operationalizing an existing agenda. Mari-odu.org. https://www.mari-odu.org/academics/2016s_readings/documents/Smith%20Wenger%202006.pdf

Srinivas, H. (2022). Environmental vulnerability and disaster risk reduction. Global Disaster Risk Reduction Center. https://gdrc.org/uem/disasters/envulnerability/e-vulnerability.pdf

Statista. (2022). GDP by industry Minnesota U.S. 2022. Statista. https://www.statista.com/statistics/594130/minnesota-real-gdp-by-industry/

Svi – Composite – Census Tracts. (n.d.). SVI – Composite – Census Tracts: Minnesota Natural Resource Atlas. https://mnatlas.org/resources/svi-composite-census-tracts/

Tafazzoli, M. (2019, July 13). Maintaining the sustainability of critical infrastructure. Infrastructure Management and Construction. https://www.intechopen.com/chapters/66727

Tsai, L. L., & Morse, B. S. (2019, March 5). Why citizen trust in government matters — Especially when crises strike. Scholars Strategy Network. https://scholars.org/contribution/why-citizen-trust-government-matters-especially-when-crises-strike

Treadway, C. (2025). How the 50 states rank by tax burden. CPA Practice Advisor. https://www.cpapracticeadvisor.com/2024/12/01/how-the-50-states-rank-by-tax-burden/103495/

UNDRR. (2017). Vulnerability. PreventionWeb. https://preventionweb.net/understanding-disaster-risk/component-risk/vulnerability

U.S. Census Bureau. (2024, n.d.). QuickFacts: Minnesota. https://census.gov/quickfacts/MN

Valentín-Sívico, J., Canfield, C., Low, S. A., & Gollnick, C. (2023). Evaluating the impact of broadband access and internet use in a small underserved rural community. Telecommunications Policy, 47(4), 102499. https://doi.org/10.1016/j.telpol.2023.102499

Vitcenda, M. (2025). Urban vs. rural? More like urban and rural together, study says. University of Minnesota Extension. https://extension.umn.edu/vital-connections/urban-vs-rural-more-urban-and-rural-together-study-says

Washington Post. (2025, January 18). More homeowners lose insurance in areas hard-hit by climate disasters. Washington Post. https://www.washingtonpost.com/business/2025/01/18/homeowners-insurance-california-florida-climate-change/

Waugh, W. L. (1999). Living with hazards, dealing with disasters. M.E. Sharpe.

WisPolitics. (2025, April 22). U.S. Sen. Baldwin: Demands Trump administration reverse abrupt cancellation of funding for rural school districts. WisPolitics. https://www.wispolitics.com/2025/u-s-sen-baldwin-demands-trump-administration-reverse-abrupt-cancellation-of-funding-for-rural-school-districts/

Zander, K. K., Rifka, S., Jonatan, L., Duy, N., & April, D. (2022). How do Australians use social media during natural hazards? A survey. International Journal of Disaster Risk Reduction, 81, 103207. https://doi.org/10.1016/j.ijdrr.2022.103207

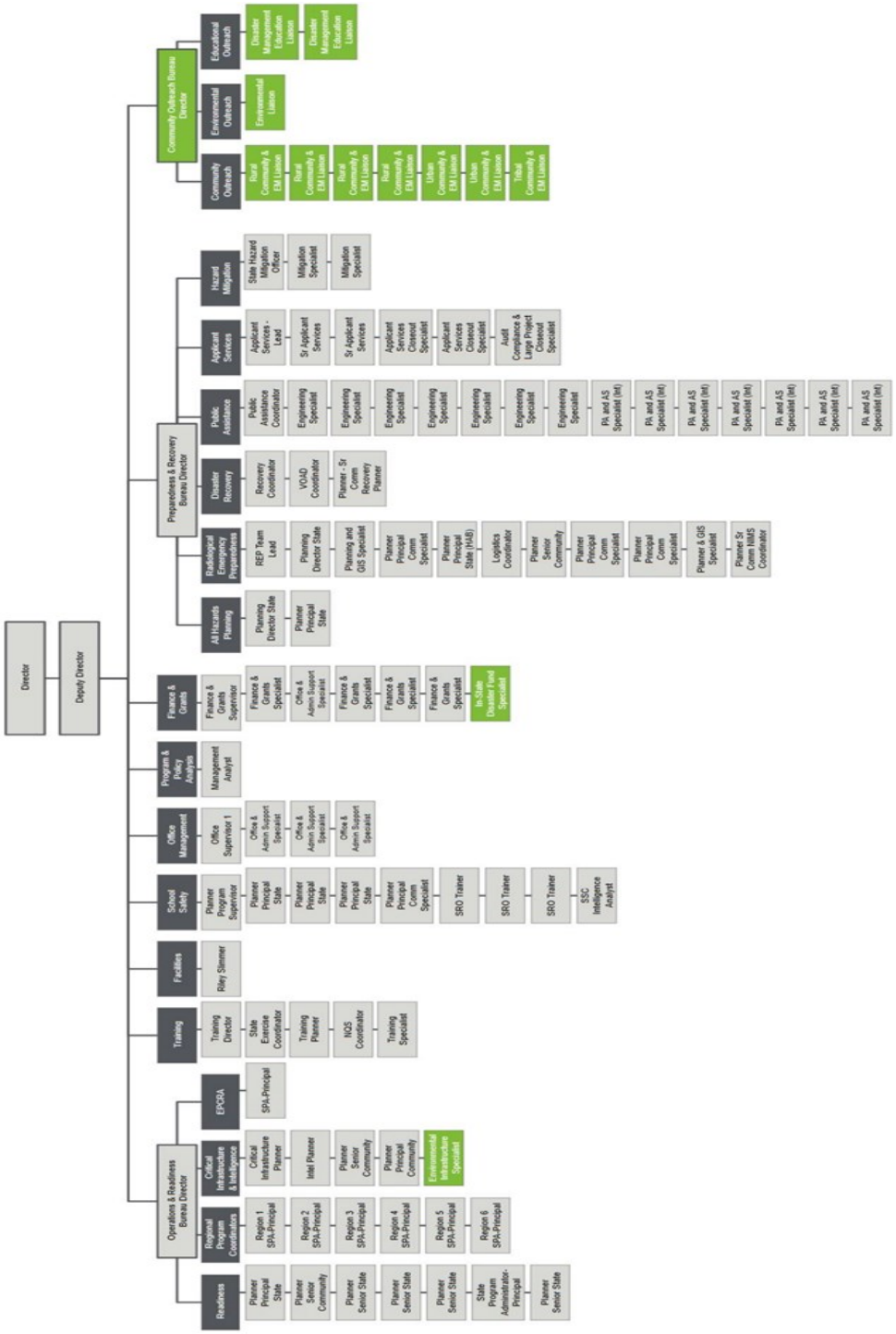
Appendix A

Current Organizational Chart for HSEM

HSEM Organization Chart – Revised 4/14/2025

Appendix B

Proposed Organizational Chart for HSEM



Appendix C

Summary of Problem Findings

Key Driver	Justification	Citations
Unreliability of Federal Aid and Insurance Industry	- Termination of FEMA's BRIC program - Political uncertainty regarding other disaster management funding - Insurance companies leaving hazard-prone areas - Rising insurance premiums	(Association of State Floodplain Managers, 2025) (FEMA SME) (Jacobson, 2024) (Washington Post, 2025)
Threats to Nature via Climate Change	-Degrade water quality, higher concentrations of pollutants -Altering temperature, precipitation, snow cover, and depth -Affect outdoor recreation, forest composition, invasive species, and wildlife populations	(Bakashi, September 2022)
Rural-Urban Divide	-Political Polarization -Variations in urban and rural areas' economic, social, environmental, and political systems and resources -Lack of internet access	(Love & Loh, 2020) (Minnesota Department of Health, 2022) (Nee, 2021)
Insufficient Vertical and Horizontal Integration	- All jurisdictions share the constant threat of disaster - Communities need to understand one another's contexts, as well as the variety of their own	(Berke et al., 1993) (FEMA, 2010)
Social Vulnerability	- Demographic factors such as poverty, access to education, ethnic background, and more can inhibit the assistance groups and individuals receive in disaster situations	(MNCompass, 2018-2022) (Kailes & Enders, 2008)

Lackluster Utilization of Available Technologies and Knowledge	- Effective communication required in disaster management - Technologies and tools need to be updated/ maintained - The public should be made more aware of the options at their disposal - Technology is inaccessible/underutilized in cer-	(Qu & Kapucu, 2014) (Ciroma, 2014) (Cloete, 2017) (Hernandez, 2017)
Poor Public Understanding of Disaster Management and Financial Literacy	- Preparedness/Response bias currently in EM - People are not properly protecting their assets - Only 7% of high school students are guaranteed to take a personal finance course	(Rubin, 2020) (FEMA SME) (Minnesota House of Representatives, 2023)
Aging Infrastructure	-Compromise emergency management response, recovery, and resilience -Failing to withstand Minnesota's harsh winters, blizzards, and floods -Can delay first responders and can make some areas impossible to reach -Harm community health	(Aging Infrastructure, 2021)
Public Distrust of Government and Institutions	- People are less likely to follow safety precautions when trust in the government is low - Having low trust in the government results in low resilience, creating more vulnerability	(Tsai & Morse, 2019) (FEMA, 2022) (Bonfanti et al., 2024)

Appendix D

Summary of Recommended Solutions

Recommendation	Key Driver Addressed	Impact on HSEM
Increase Minnesota's Financial Independence: -Minimize Costs -Protect Top Industries and Supply Chains -Prioritize Trade Relationships -Create an In-State Disaster Fund	Unreliability of Federal Aid and Insurance Industry	- HSEM needs to advocate for these recommendations - Finance and Grants specialists should work closely with the preparedness and recovery bureau - Creation of an In-State Disaster Fund Specialist - When hiring in the finance department, consider applicants who have a background in economics and EM
Protect Minnesota's Natural Environment	Threats to Nature via Climate Change	- Create an environmental liaison officer position - Work with local and other nearby state governments, public health sectors, Minnesota Game and Fish, and Park Management - Optimally utilize income from tourism - Utilize natural systems to minimize
Address Rural-Urban Divide	Rural-Urban Divide	- Create a liaison position that facilitates the development of community partnerships, community planning (rural, urban, and tribal) - Focus on policies that strengthen ecological services
Identify and Reduce Social Vulnerability	Social Vulnerability	- Define and acknowledge a wide array of vulnerabilities - Collaborate with groups and organizations that provide services for cer-

Leverage Accessible Technology and Knowledge	Lackluster Utilization of Available Technologies and Knowledge	-Expand on existing technology - Implement tools and tech in areas that may have limited/no access to them - Integrate useful technology into education curriculum to broaden public understanding - Update and maintain any current and future forms of technology - All Hazards Planning employees should work closely with the Community Outreach liaisons
Invest in Public Education on Disaster Management	Poor Public Understanding of Disaster Management and Financial Literacy	-Advocate for disaster management to be included in high school curriculum - Utilize connections from the school safety department - Create a Disaster Management Education Liaison
Sustainable Restoration and Upkeep of Critical Infrastructure	Aging Infrastructure	- Environmental Infrastructure Specialist position that must be the voice for actions, plans, and regulations to promote health and safety, and sustainable actions - Voicing concerns and impacts before a hazard, concerns around protecting the natural environment, and other demands
Build Public Trust of HSEM	Public Distrust of Government and Institutions	- Focus on fostering relationships with community members and elected officials -Provide emotional support during recovery -Developing preparedness programs requires the collaboration of every stakeholder group
Strengthen Both In-State and Out-of-State Partnerships and Communication	Insufficient Vertical and Horizontal Integration	- Create and use consistent, thorough language between jurisdictions to optimize clarity - Involve prominent local community leaders and key stakeholders in disaster planning