



# 2020 National Preparedness Report

[Based on Data as of December 31, 2019]

December 22, 2020



Homeland Security

**I am pleased to announce the release of the National Preparedness Report (NPR). Every year, the Federal Emergency Management Agency (FEMA) releases this report to provide a picture of how prepared the Nation is to prevent, protect against, respond to, recover from, and mitigate the impacts of any disaster, as well as ensure the continuity of lifelines, essential functions, and services.**

Through the NPR, FEMA hopes to inspire action by the whole community—including individuals; communities; state, local, tribal, and territorial (SLTT) governments; the private and non-profit sectors; and the Federal Government—to increase capabilities and make us more resilient, prepared, and ready to address any challenges that we as a Nation may face. National preparedness is the responsibility of all levels of our society, including individuals, local governments, the private sector, and the Federal Government.

The world this report has been released into is forever changed by the novel coronavirus (COVID-19) pandemic, the largest pandemic in human history since the 1918 influenza pandemic. The COVID-19 pandemic resulted in the first ever Stafford Act major disaster declaration of all 50 states, five territories, and the District of Columbia for a naturally occurring infectious disease<sup>1</sup>, and has altered

<sup>1</sup> This statement does not include federally recognized tribes because some tribes have requested major disaster declarations directly (as Recipients), while others have requested assistance under state disaster declarations (as Subrecipients).

the way of life for people across the world. Before the emergence of the novel coronavirus, only 42% of communities that completed the 2019 Community Threat and Hazard Identification and Risk Assessment (THIRA) identified a pandemic as a threat or hazard of concern and considered in their assessment the potential for a pandemic disease to disrupt public health systems, the economy, and daily life for Americans. Of the nine threats and hazards identified in the National THIRA—those that met the criteria of causing the greatest stress to national capabilities—a pandemic scenario was included because of the potential to occur nationwide, compounding management challenges and increasing the scale of impacts. The Nation has seen this play out with COVID-19 stressing emergency management and public health capabilities and impacting economic and social structures across the country.

Though several communities included a pandemic scenario in their 2019 THIRA, the majority of communities (58% of those reporting) did not identify a pandemic as a threat or hazard of greatest concern. This could represent a lack of awareness of the full scope of impacts a pandemic could have or a calculation that a pandemic would not cause as much stress to their capabilities as other risks in their communities.

Over the coming years, stakeholders will explore the impacts of the COVID-19 pandemic and evaluate the response to it—future FEMA assessments will prioritize pandemics, the NPR published in 2021 will reflect the data that becomes available as the incident continues, and after-action reviews will look more in-depth at the Nation's performance during COVID-19—but the Nation will also continue to face other catastrophic, systemic, and emerging risks. Whether a community highlighted a pandemic scenario or not in its 2019 THIRA, the full suite of threats and hazards that the Nation faces continue to present challenges for communities. This report will discuss the Nation's all-hazards preparedness to manage a catastrophic incident, as it was known on December 31, 2019, but will not evaluate the impacts of or the response to COVID-19. Even during an ongoing response to this pandemic, it is important to release this report to highlight the significance of preparedness across all potential threats and hazards that could affect the Nation.

All-hazards preparedness is the hallmark of professional emergency management, enabling the Nation to focus on managing a full spectrum of risks. It is critical to recognize that while there are unique facets of every incident, including COVID-19, there are fundamental aspects of risk management that cut across all threats and hazards. Focusing investments strategically in these fundamentals builds national capacity to manage a wide range of threats and hazards, rather than a select few.



– **Pete Gaynor,**  
**FEMA Administrator**

# FOREWORD

## EXECUTIVE SUMMARY

The National Preparedness Report (NPR) summarizes the progress made, and challenges that remain, in building and sustaining the capabilities needed to prevent, protect against, mitigate, respond to, and recover from the threats, hazards, and incidents that pose the greatest risk to the Nation. As a requirement of the Post-Katrina Emergency Management Reform Act (PKEMRA) of 2006, and as a key element of the National Preparedness System, this annual report offers all levels of government, the private and nonprofit sectors, and the public practical insights into preparedness that support decisions about program priorities, resource allocation, and actions that can create more resilient communities.

The NPR includes analysis based on data available as of December 31, 2019, that helps decision-makers understand the risks facing the Nation and the country's ability to address those risks. Additionally, the report includes content that can inspire action and identify areas of focus. The report provides an annual picture of the risks the Nation faces; the capabilities the Nation has—and needs—to prepare for those risks; and data-driven analysis of current, critical considerations in emergency management.

Catastrophic risks will truly stress national resources and should not be confused with incidents that may result in regional impacts only. Systemic risks affect interconnected systems, such as cybersecurity threats or impacts to established supply chains. Emerging risks are either new risks or familiar risks that evolved due to new or unfamiliar conditions; and, therefore, often lack the historic data traditionally used to assess risk. These emerging risks are a category of risk as well as a call for preparedness. The whole emergency management community must work together to build resilience to be adaptable to new threats and hazards with unknown impacts.

Capabilities are the ways that the Nation manages risks. Goals related to capabilities can be characterized by capability targets, which include actions and time frames. In 2019, the Federal Emergency Management Agency (FEMA), along with other stakeholders, defined a series of capability targets through the National Risk and Capability Assessment (NRCA) to establish

### The report covers the calendar year 2019 and contains the following sections:

- **Introduction:** A summary of the background and purpose of the NPR.
- **Risk:** A discussion of the risks the Nation faces and how those risks drive the Nation's capability requirements. This section also includes overviews of three critical risk management challenges: Catastrophic Risks, Systemic Risks, and Emerging Risks.
- **Capabilities:** A discussion of how the Nation uses capabilities to manage risks. This section also provides a high-level overview of the Nation's current capabilities.
- **Critical Considerations in Emergency Management:** A discussion on four identified focus areas: Cascading Impacts, Public-Private Partnerships, Vulnerable Populations, and Housing.
- **Conclusion:** A summary of the contents of the analysis.

The Nation's risks drive the Nation's required capabilities to manage those risks. Risks can be managed through avoidance, control, transference, or acceptance. The NPR focuses on three categories of risk:

1. **Catastrophic Risks**, distinguished by magnitude;
2. **Systemic Risks**, distinguished by interconnectedness; and
3. **Emerging Risks**, distinguished by novelty or evolution due to new or unfamiliar conditions.

a baseline for assessing national preparedness. Communities—which include states, territories, tribes, and urban areas—identify their targets and capabilities to FEMA through the Threat and Hazard Identification and Risk Assessment (THIRA) and the Stakeholder Preparedness Review (SPR). FEMA used this community-level capability information to assess national capabilities related to the NRCA targets.

National targets are based on nationally catastrophic scenarios that would stress the capabilities and resources of the Nation. Community-level capabilities are not likely to meet the needs of the national target. Despite this, community-level capabilities for communities directly affected by national scenarios are within 70–100 percent of the national goal for eight target impacts. When factoring in possible mutual aid, that number rises to 24 target impacts. The Capabilities section of the report discusses these targets at length.

Although there are many challenges and successes that this report could highlight, there are four areas that merit a more detailed discussion; identified through analysis of the THIRA/SPR submissions, Federal and regional data call submissions, and open source research. Each of these research streams yielded key findings that fell into these areas of critical consideration; highlighting some of the persistent challenges the Nation faces, how the Nation is working collectively to solve those challenges, and what the Nation must continue to do to build on those successes. These four areas are:

**Cascading Impacts**—Increasingly connected systems raise the risk of cascading impacts, exacerbating existing vulnerabilities and inhibiting the stabilization of complex interactions among Community Lifelines. Cascading impacts can result in longer and more costly recovery.



2. "Access and functional needs refer to persons who may have additional needs before, during, and after an incident in functional areas, including but not limited to maintaining health, independence, communication, transportation, support, services, self-determination, and medical care. Individuals in need of additional response assistance may include those who have disabilities, live in institutionalized settings, are older adults, are children, are from diverse cultures, have limited English proficiency or are non-English speaking, or are transportation disadvantaged." Source: FEMA, National Response Framework, 4th ed., 2019, [https://www.fema.gov/media-library-data/1582825590194-2f000855d442fc3c9f18547d1468990d/NRF\\_FINALApproved\\_508\\_2011028v1040.pdf](https://www.fema.gov/media-library-data/1582825590194-2f000855d442fc3c9f18547d1468990d/NRF_FINALApproved_508_2011028v1040.pdf), accessed April 14, 2020.

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## INTRODUCTION

National preparedness relies on the contributions of individuals and communities, the private and nonprofit sectors, faith-based organizations, and all levels of government. Preparedness activities take many forms, from simple actions, such as investing in an emergency fund, to complex actions, such as building response and recovery capabilities to manage a major earthquake, cyber incident, or wildfire. Together, stakeholders work to achieve the National Preparedness Goal: “A secure and resilient Nation with the capabilities required across the whole community to prevent, protect against, mitigate, respond to, and recover from the threats and hazards that pose the greatest risk.”

The National Preparedness Goal identifies “the threats and hazards that pose the greatest risk” as the benchmark against which to assess preparedness. Achieving the National Preparedness Goal requires the Nation to understand its risks and to build and sustain capabilities to successfully manage those risks, including the use of continuity planning and operations as an inherent component of each Core Capability to increase resilience and the likelihood that organizations can perform essential functions. The National Preparedness Report (NPR) seeks to measure the Nation’s Core Capabilities from the perspective of how comprehensively they can be used to manage the Nation’s risks. By addressing future risks, the whole community is better prepared for future changing conditions and is able to bounce back faster at the individual and community level. The Nation uses Core Capabilities as tools to manage its risks, but successful risk management is defined by achieving outcomes. When discussing strategies for managing risk, this report focuses on outcomes, while never losing sight of the Core Capabilities that the Nation needs to build and sustain to achieve those outcomes.

The NPR contains an evaluation and measurement of progress for the Nation’s preparedness capabilities and identifies where challenges and opportunities for improvement remain. As an annual requirement of Presidential Policy Directive 8,

and consistent with the Post-Katrina Emergency Management Reform Act (PKEMRA) reporting responsibilities, the NPR has assessed the Nation’s preparedness posture since 2012. This report provides partners across the Nation with insights into risks, vulnerabilities, and capabilities to support decisions about program priorities, resource allocations, and community actions.

This year’s report is the product of rigorous research, analysis, and input from stakeholders at the state, local, tribal, territorial, and Federal levels. The Federal Emergency Management Agency (FEMA) conducted open-source research to identify existing or emerging risks, national preparedness policy developments, and innovative programs being implemented at all levels of government. FEMA also engaged with more than 40 Federal departments and agencies to better understand both the threats and hazards that challenge their respective departments and the actions taken to strengthen their preparedness efforts. Finally, FEMA conducted a quantitative and qualitative analysis of preparedness assessment data to better understand preparedness capability strengths and gaps nationwide.

### The NPR:

- Presents an updated approach to summarizing the state of national preparedness;
- Provides an overview of the risks that communities face, the vulnerabilities present in those communities, and how those risks drive the need for capability growth and sustainment;
- Describes the capabilities needed to manage the Nation’s risks and how close communities are to meeting target goals; and
- Highlights four critical considerations that underscore the complexity of managing the Nation’s risks and that offer a path forward for emergency management across the Nation.

Previous NPRs organized research and analysis on the five mission areas outlined in the National Preparedness Goal—**Prevention, Protection, Mitigation, Response, and Recovery**. Although the mission area construct continues to inform research and analysis, the NPR focuses on assessing national risks, vulnerabilities, and capabilities that span one or more mission areas. This year’s NPR grounds discussions of national preparedness in the risks that drive the Nation’s capability requirements. This risk-focused approach incorporates national preparedness data, identifies attributes of the Nation’s future operating environment, and presents Federal, state, local, tribal, and territorial (SLTT) partners, and emergency management decision-makers with findings that better inform preparedness challenges.

After the **Introduction**, the report includes a discussion of the **Risks** the Nation faces and how those risks drive the Nation’s capability requirements, including overviews of three critical risk management challenges: **Catastrophic, Systemic, and Emerging Risks**. The **Capabilities** section discusses how capabilities are used to manage the Nation’s risks and provides a high-level overview of the Nation’s current capabilities. Next, the **Critical Considerations in Emergency Management** section discusses four identified focus areas. The report ends with a **Conclusion** summarizing the contents of the analysis.



## WHAT IS RISK?

*Risk is the potential for an unwanted outcome resulting from an incident, event, or occurrence as determined by its likelihood and the associated consequences.*

### RISK COMPONENTS<sup>3</sup>:

**Likelihood:** The chance of something happening, whether defined, measured, or estimated objectively or subjectively, or in terms of general descriptors (e.g., rare, unlikely, likely, almost certain), frequencies, or probabilities.

**Threat:**<sup>4</sup> A natural or man-made occurrence, individual, entity, or action that has or indicates the potential to harm life, information, operations, the environment, and/or property.

**Vulnerability:** A physical feature or operational attribute that renders an entity, asset, system, network, or geographic area open to exploitation or susceptible to a given hazard.

**Consequence:** An effect of an incident, event, or occurrence.

In 2019, FEMA released the fourth edition of the National Response Framework, introducing the Community Lifelines construct. The Framework defines “Community Lifelines” as “those services that enable the continuous operation of critical government and business functions and are essential to human health and safety or economic security.

<sup>3</sup> For a more complete discussion of risk, please see the Department of Homeland Security (DHS) Risk Management Fundamentals, <https://www.dhs.gov/sites/default/files/publications/rma-risk-management-fundamentals.pdf>.

<sup>4</sup> When defining risk, “threat” is used as an umbrella term but the DHS Risk Lexicon further distinguishes threats as being directed at an entity, asset, system, network, or geographic area, while a hazard is not directed.



# RISK

If disrupted, rapid stabilization of Community Lifelines is essential to restoring a sense of normalcy.” As the underlying services vital to the viability of a community, risks to these lifelines have become the basis through which we measure risk from various threats and hazards. The National Threat and Hazard Identification and Risk Assessment (National THIRA) process maps existing impact and capability targets to the Community Lifelines, allowing better integration of preparedness data and operational planning. Using the lifelines as the lens through which the whole emergency management community looks at the Nation’s risk to threats and hazards allows for improved understanding of risk and the various means through which the community can manage those risks.

Threat and hazard identification is a fundamental step in risk management. Risks and their impacts are the reasons to be prepared, with the type and scale determining the capabilities the Nation should build and sustain. Understanding future risks and changing conditions that may cause them, such as those posed by extreme weather events, regardless of their cause, is integral to national preparedness. By addressing future risks, SLTT governments are best prepared for future extreme weather events and other hazards and are able to bounce back faster at the individual and community level. This section identifies examples of significant risks that drive the Nation’s requirements for risk management. To better understand how prepared the Nation is to manage its risks, the NPR focuses on three categories of risk that affect the way the Nation approaches risk management:

1. Catastrophic Risks, distinguished by magnitude;
2. Systemic Risks, distinguished by interconnectedness; and
3. Emerging Risks, distinguished by novelty or evolution due to new or unfamiliar conditions.

These categories are by no means comprehensive or exclusive. A single risk may have features of more than one category. For example, an earthquake may pose both a catastrophic and systemic risk to the Nation because the scale of the damage would be catastrophic and it could impact assets such as critical manufacturing that have systemic effects on supply chains throughout the nation, even those

needed for response. Similarly, emerging risks may involve incidents that impact these and other critical infrastructure systems.

Each of these risk types points to a particular set of challenges, strategies, and tools that the Nation may employ to manage these risks. This section of the report explores the Nation’s risk landscape, which drives the discussion of required capabilities and critical considerations in the following sections.

## HOW DOES THE NATION MANAGE RISK?

Risk management is about finding balance. One of the most difficult challenges that risk managers<sup>5</sup> face is balancing the risk of high-probability events that have comparatively lower, but still significant, consequences against low-frequency events with unthinkable high consequences. Managing national strategic risks involves balancing preparedness across a range of consequences and likelihoods. The NPR seeks to explore this balance and highlight important considerations when determining how best to manage both individual risks and the full spectrum of risks.

### Who is Responsible for Risk Management?



Figure 1: Risk management is the responsibility of governments, individuals, and the private sector. It requires overlapping actions between sectors to avoid, control, transfer, and accept risks.

<sup>5</sup> Managing risk is a whole community endeavor. People across government, within the private sector, and individuals all play important roles and are collectively “risk managers.”

**Risk management** is a shared responsibility between governments, individuals, and the private sector (Figure 1). Risk management is the process of identifying, analyzing, assessing, and communicating risk and avoiding, controlling or transferring it to an acceptable level considering associated costs and benefits of any actions taken. Sometimes the cost of taking action is worse than the risk. The whole community can take steps to manage risks. Figure 2 depicts the four strategies of risk management<sup>6</sup> that anyone dealing with risk may employ.

**Risk avoidance** involves strategies or measures taken that effectively remove exposure to a risk. For example, from 1967 to 1977, the World Health Organization (WHO) ran the successful Intensified Eradication Program to end the Smallpox virus. The campaign involved a combination of risk and vulnerability elimination, and it ultimately removed the risk of the virus hazard. Even in situations where vaccination successfully leads to a full avoidance of consequence (exposure to risk), it’s extremely rare to fully eliminate vulnerability.

**Risk control** consists of deliberate actions taken to reduce the potential for harm or maintain it at an acceptable level. Wildfire mitigation efforts can reduce the effects of fires that occur through controlled burns and can reduce structural vulnerabilities to fires by using fire-resistant construction materials and employing defensible space techniques. The risk is not completely gone, but the likelihood, impact, or both are reduced.

**Risk transfer** occurs when action is taken to manage risk that shifts some or all of the risk to another entity, asset, system, network, or geographic area. The risk still exists, but multiple parties share the burden of recovery. This is typically accomplished through the use of insurance or social safety net programs. One example of risk transfer is the National Flood Insurance Program (NFIP), which provides funds to those with coverage to rebuild after flooding.

<sup>6</sup> More information on risk management can be found in the Department of Homeland Security Risk Management Fundamentals (2011).

Similarly, FEMA’s Individual Assistance (IA) Program also provides a small amount of post-disaster support for qualified survivors. NFIP and IA may transfer “financial” risks, but they do not transfer all the risks (e.g. death, injury, loss of income).

**Risk acceptance** can be intentional or unintentional. Intentional risk acceptance can occur when the cost of other types of risk management exceeds the potential benefits. For instance, a residential apartment building without a backup generator is accepting the risk of occasional, weather-related outages. Risk acceptance can be a deliberate choice; however, sometimes risk managers are unaware that they are not addressing the risk. Unintentional risk acceptance can occur when decision-makers do not have all the needed information to make an informed choice regarding risk management. This also includes instances when a risk is unknown and is, therefore, accepted by default.

Management of most risks that the Nation faces requires a combination of multiple strategies. A risk management program includes continuity of operations as part of its risk mitigation strategy. The best balance of those strategies depends on the type of risk that the Nation seeks to manage.

The Nation uses various approaches and tools to manage risks through Prevention, Protection, Mitigation, Response, or Recovery efforts based on the types of threats and hazards the Nation faces. To fully understand how the Nation can manage its risks, the rest of this section identifies national threats and hazards, and the features of risk—catastrophic, systemic, and emerging—associated with those threats and hazards.

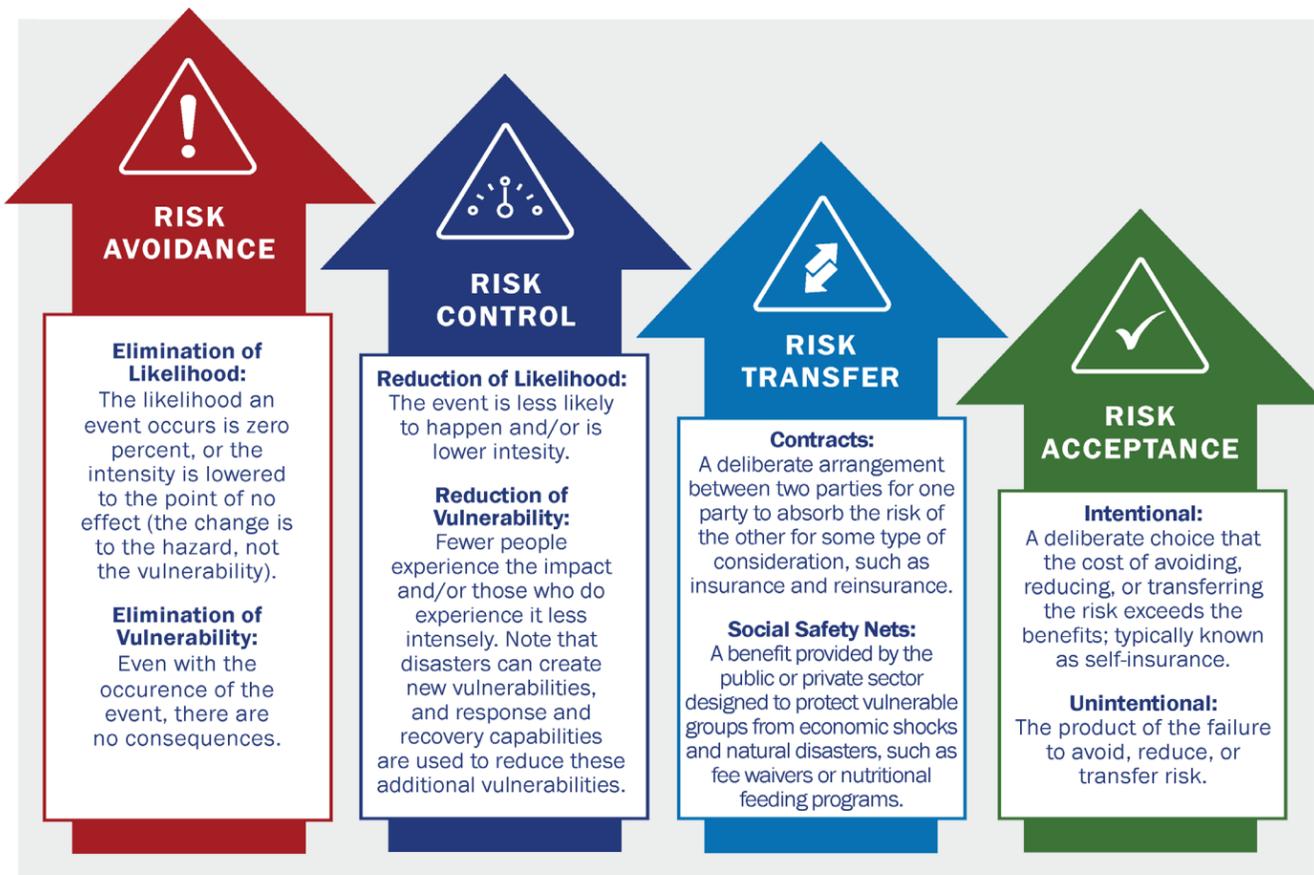


Figure 2: The four strategies of risk management.

## NATIONAL THREATS AND HAZARDS

Threats and hazards<sup>7</sup> are the incidents, events, or occurrences that, when combined with vulnerabilities, create risk. FEMA splits threats and hazards into three categories:

- **Natural hazards:** acts of nature.
- **Technological hazards:** accidents or the failures of systems and structures.
- **Human-caused incidents:** the intentional actions of an adversary.

<sup>7</sup> The DHS Risk Lexicon distinguishes threats as being directed at an entity, asset, system, network, or geographic area, while a hazard is not directed.

**Table 1: Examples of threats and hazards by category.**

Source: *Comprehensive Preparedness Guide 201: THIRA/Stakeholder Preparedness Review (SPR) Guide, 3rd Edition. THIRA Step 1.*

Natural	Technological	Human-Caused
Avalanche/Landslide	Dam Failure	Active Shooter Incident
Drought	Hazardous Materials Release	Armed Assault
Earthquake	Industrial Accident	Biological Attack
Epidemic	Levee Failure	Chemical Attack
Flood	Mine Accident	Cyber Attack Against Data
Extreme Weather	Pipeline Explosion	Cyber Attack Against Infrastructure
Hurricane/Typhoon	Power Outage	Explosives Attack
Space Weather	Radiological Release	Improvised Nuclear Attack
Tornado	Train Derailment or Bridge/Tunnel Failures	Insider Threat
Tsunami	Transportation Accident	Nuclear Terrorism Attack
Volcanic Eruption	Urban Conflagration	Radiological Attack

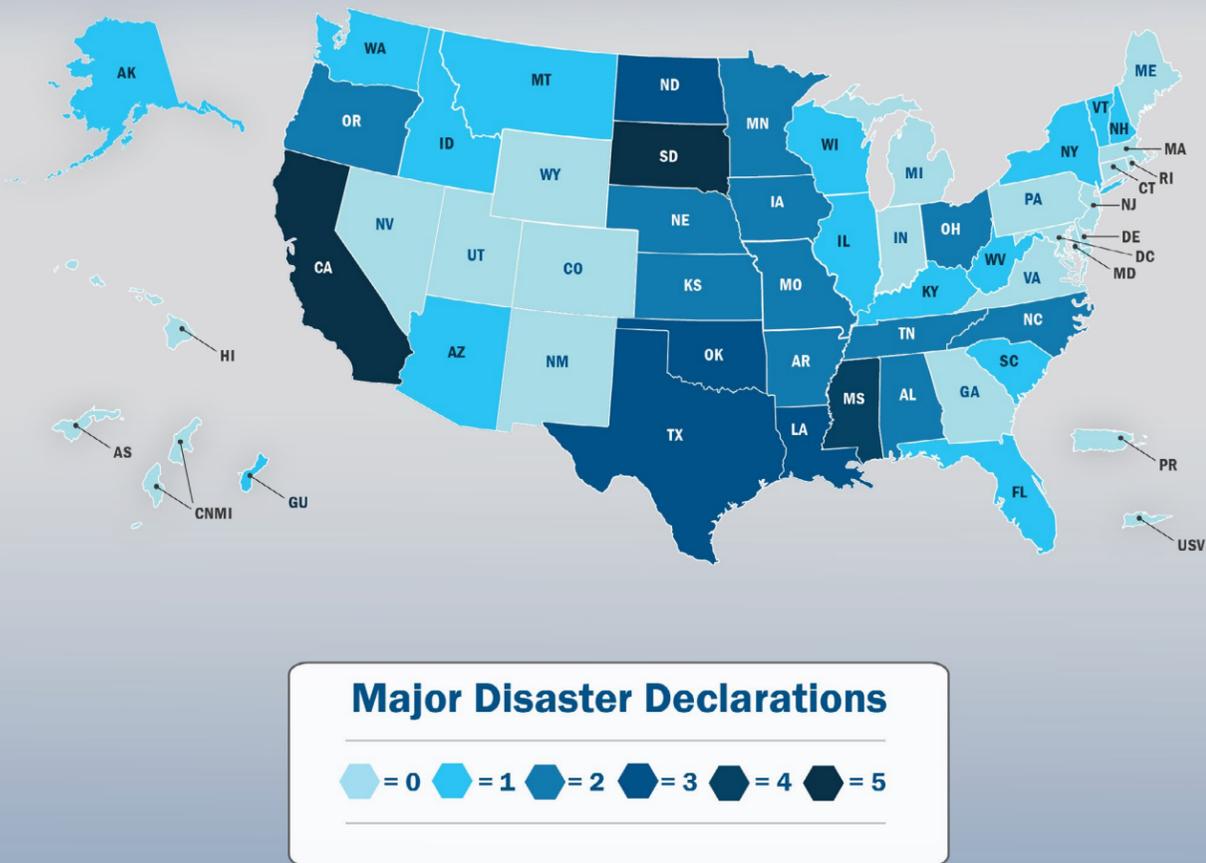
**Table 2: Real-world examples of the three categories of threats and hazards.**

Natural	Technological	Human-Caused
<b>Hurricane Dorian</b> August 24, 2019	<b>Texas Chemical Plant Explosion</b> November 27, 2019	<b>El Paso Shooting</b> August 3, 2019
<b>Typhoon Wutip</b> February 18, 2019	<b>Harpers Ferry Train Derailment</b> December 21, 2019	<b>American Medical Collection Agency Data Breach</b> March 2019

In 2019, Federal agencies responded to a wide variety of threats and hazards and assisted in 61 major disaster declarations across 33 states, territories, and tribal nations. Declared disasters in 2019 included tropical storms, earthquakes, fires, flooding, tornadoes, straight-line winds, landslides, mudslides, severe storms, snowstorms, and hurricanes/typhoons. Figure 3 highlights the frequency of major disaster declarations in 2019. Notably, California and South Dakota experienced the highest frequency of major disaster declarations due to wildfires and severe weather events, respectively. In addition to facing a wide variety of natural threats

and hazards in 2019, over the past several years the Nation’s emergency responders have had to increase attention toward active shooter incidents and other attacks that strive for casualties and terror. The scope and magnitude of these incidents may result in a resource-scarce environment and may affect the provision of assets, assistance, and services. As such, the whole community must consider continuity planning and operations in the context of all national threats and hazards. The following section examines these threats, particularly active shooter incidents, in greater detail.

# The Frequency by State and Territory of Major Disaster Declarations in 2019



## Red Flag Laws

As communities recognize the risk posed by active shooters, they are also taking initiatives to mitigate this threat. Red flag laws are state laws that authorize courts to issue a special type of protection order, allowing the police to temporarily confiscate firearms from people who a judge deems are a danger to themselves or others.

In 2019, the U.S. Secret Service published a study that examined mass attacks in public spaces from the previous year. The researchers found that 63% of attacks were over in less than five minutes, and 85% of the attacks were over in less than 15 minutes. These statistics underscore the importance of the prevention of active shooter incidents.

Before the 2018 active shooter incident at Marjory Stoneman Douglas High School in Parkland, Florida, only five states had red flag laws. At least 17 states have approved a version of a red flag law, including Florida, New York, Connecticut, Illinois, Indiana, and California. In 2019, 1,614 red flag petitions were filed in the first half of the year. Data is not yet available for the second half of the year.



States, tribes, territories, and urban areas have highlighted the risks of active shooter incidents at ST-CPs through their THIRA/SPR submissions. According to the 2019 THIRA/SPR data, 40 jurisdictions identified an active shooter incident as one of the threats or hazards that creates the most stress for their capabilities (including 32 percent of states and territories, 29 percent of Urban Area Security Initiative [UASI] communities, and 50 percent of tribes). Across all human-caused threats identified through the THIRA/SPR process, jurisdictions identified active shooter incidents as the fourth-most challenging risk to community preparedness capabilities.

Because ST-CPs are public spaces, these attacks can be carried out with minimal preparation and expertise. The relative ease of conducting these types of attacks on ST-CPs and the rising frequency of active shooter attacks creates a growing challenge and demonstrates the importance of community prevention activities, such as intelligence and information-sharing.

Fusion centers serve as the primary focal points within communities for the receipt, analysis, and distribution of threat-related intelligence products between Federal partners and local law enforcement. Fusion centers and Federal partners primarily disseminate unclassified products via the Homeland Security Information Network-Intelligence (HSIN-Intel), which the Office of Intelligence and Analysis within DHS manages. HSIN-Intel, which currently has over 4,000 members from more than 25 Federal offices and partnerships, provides a unified information-sharing platform for fusion centers and Federal partners to share unclassified products and to bolster partnerships between these entities. From 2018 to 2019, views of HSIN-Intel products rose 34 percent, and in 2019, there was a 41 percent increase in the sharing of collaborative products, including products co-authored between fusion centers and Federal partners.

## CATASTROPHIC RISKS

### UNDERSTANDING CATASTROPHIC RISKS

*Catastrophic risks are distinguished by the scale of their impacts. These risks can result from natural, human-caused, or technological incidents. Some examples of catastrophic impacts are widespread damage to buildings and infrastructure, mass casualties or injuries, severe impacts to the environment, or significant disruptions to basic life-sustaining services or government functions.*

Catastrophic risks are difficult to manage due to their extraordinary scale and potential to overwhelm the Nation's collective capability. When these impacts exceed the level that the Nation can successfully manage, they could affect national security, the economy, and/or the public health and safety of the Nation. Risk managers face difficult choices when deciding how to balance preparation for more probable, lower-impact events with lower-frequency, higher-impact events, which are more likely to have catastrophic impacts and a national footprint. The need to manage these extraordinary consequences drives national capability requirements. Catastrophic incidents' low-frequency, high-impact profile makes them particularly challenging from a risk management perspective: the highest-consequence events are typically the most difficult and costly to mitigate or otherwise prepare for.

For hazards that may exceed local mitigation measures, response and recovery capabilities are extremely important. Catastrophic risks are the primary drivers of the Nation's response and recovery capability requirements because these risks will stress local, state, tribal, territorial, supply, and national resources. Although nationally catastrophic risks are rare, regionally or locally catastrophic impacts occur with some regularity. The 2019 flooding season throughout the central United States, the 2018 Camp Fire, and hurricanes Harvey, Irma, and Maria in 2017 recently overwhelmed local or regional response capabilities. The 2017 *Hurricane Season FEMA After-Action Report* directly stated that "Continuity planning and resilient all-hazards communications must be built into FEMA and its partners' plans and guidance for catastrophic disasters." Particularly for no-notice events, such as earthquakes or fast-moving fires, communities may rely heavily on support from neighboring jurisdictions, nearby states, or the Federal Government.





## Media Influence: The Impacts of a National Catastrophe

In recent years, the topic of nationally catastrophic incidents has proliferated in both traditional and social media. Individuals can read or listen to dramatizations of nationally catastrophic incidents and their potential impacts in a variety of media formats, including newsprint, magazines, and podcasts. In July 2015, The New Yorker published the article, “The Really Big One,” on the Cascadia subduction zone. A full rupture of the fault has the potential to unleash a massive earthquake between 8.7 and 9.2 on the seismologic Richter scale that could devastate the Pacific Northwest. In addition to exploring the geology and seismic history of the region, the article provides readers with a realistic portrayal of what this earthquake would look and feel like to those experiencing it. For example, FEMA projects that roughly 13,000 people would die in the earthquake and subsequent tsunami, with another 27,000 injured and 1 million displaced. Cascading impacts include up to 30,000 landslides in Seattle alone. In the Cascadia region, it could take between one and three months to restore electricity, and one month to a year to restore drinking water and sewer service.

In January 2019, National Public Radio delved into a related topic in its podcast, “The Big One: Your Survival Guide.” Over the course of 10 episodes, which include guest speakers from the scientific community, this podcast brings to life a 7.8 magnitude earthquake that is expected to hit Los Angeles, California, within the next 30 years. The storyline and the sound effects of these episodes illustrate how critical infrastructure—including traffic control systems, roads and freeways, water, power, and cell phone service—would be crippled. More than 1,000 people would die in the earthquake. Displaced survivors would face difficult decisions, such as walking 15 miles from their offices in downtown Los Angeles to their homes in the suburbs.

Although a single incident can have catastrophic impacts, a series of smaller events, when combined, can also potentially overwhelm national capabilities. This idea is explored further in the [Capabilities](#) section.

### What Would Stress National Capabilities?

The risk of catastrophic impacts drives the level of response and recovery capabilities that the Nation needs. FEMA has sought to understand which scenarios would create the most stress for each national capability to answer questions, such as “How much shelter capacity, food, water, and long-term housing does the Nation need?” Through the 2019 National THIRA, FEMA conducted an expansive literature review, analyzed past threats and hazards, and consulted subject-matter experts (SME) and other key stakeholders to develop a list of scenario-based threats and hazards expected to cause the most challenges to the Nation’s capabilities. This analysis is also the basis of the Nation-wide Community Capability targets discussed in the [Capabilities](#) section.

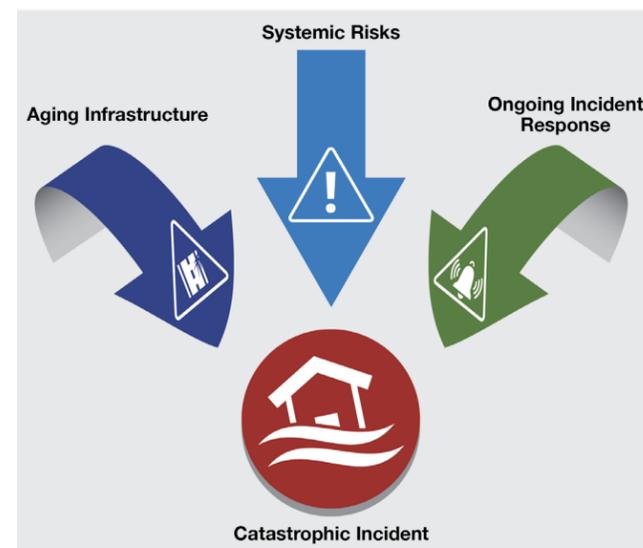


Figure 5: A catastrophic incident can result from multiple factors that work to magnify a hazard.

Working groups composed of interagency SMEs identified the scenarios listed below as each resulting in the largest amount of stress on at least one capability target. These are not the Nation’s only catastrophic risks, but the list represents the scenarios that these experts identified, based on the available data, that would create the most stress for national response and recovery capabilities (Figure 5).

- **Cascadia Earthquake:** A 9.2 magnitude earthquake that affects the Pacific Northwest
- **San Andreas Earthquake:** A 7.8 magnitude earthquake along the Northern San Andreas fault line in California
- **New Madrid Seismic Zone Earthquake:** A 7.7 magnitude earthquake with an epicenter on the Arkansas–Tennessee border
- **Pandemic:** A novel influenza strain beginning in the National Capital Region and ultimately infecting 30 percent of the population across the Nation
- **Space Weather:** A severe magnetic storm that results in power outages across most of the continental United States
- **Improvised Nuclear Detonation:** An improvised nuclear device detonation in a major U.S. city
- **Biological Attack:** A biological attack that affects three major U.S. cities

Communities across the Nation have also identified these same threats and hazards of concern within their THIRAs based on current planning scenarios that would cause the most significant impacts to a particular lifeline. Across all but two nationally identified catastrophic hazards, at least one community impacted by the scenario identified those hazards in their 2019 THIRA. For two of the scenarios, all the impacted communities identified the scenarios as threats or hazards of concern. This indicates that individual communities are aware of and are planning for threats and hazards that can have nationally catastrophic impacts.

In all of these scenarios, another major feature of risk—systemic risks—could be a contributing factor in stressing national capabilities. The following section explains the systemic risks and explores the risk management strategies that the Nation is pursuing to address these vulnerabilities.

## SYSTEMIC RISK

### UNDERSTANDING SYSTEMIC RISK

*Systemic risks are distinguished by their interconnectedness. Systemic risk propagates or emerges in interconnected systems across boundaries of situational awareness or operational control, resulting in unwanted effects that cascade with amplifying harm. This type of risk begins as a distributed vulnerable state that increases with the complexity of our social, technological, and environmental systems. Once a triggering incident takes place, systemic risk can destabilize entire systems’ critical functions by affecting multiple sectors and producing cascading effects that may amplify the original incident’s impact. These risks are especially concerning when they appear in critical infrastructure sectors (e.g., electric, financial).*

The world is becoming increasingly connected. For example, an individual with an internet-enabled phone, a business with integrated supply chains, or a government agency that shares a network with thousands of individuals, all have enabled global efficiencies. However, increased connectedness can also create risks. The scale and connectedness of systemic risks pose challenges for risk managers, who, with other stakeholders, share the task of protecting the Nation’s growing cyber and physical infrastructure. The scale and interconnectedness of systemic risk means that often no single entity has enough information to fully characterize the risk and no one entity can manage it alone. Managing systemic risk requires extensive information-sharing and collaboration.

Interconnected systems comprised of hardware, software, data, operational technology, physical elements, and other components, underpin our Nation's infrastructure. Dependence on information and communications technology that supports a broad range of applications and functions can be sources of systemic risk. Components in these systems can be compromised by intentional or unintentional vulnerabilities which could have cascading impacts on the functions the nation needs. Additionally, adversarial nation-states may subsidize the cornering of strategic markets, forcing dependence on untrusted vendors, forcing competitors out of business, and otherwise introducing systemic risks in markets and supply chains across a number of industries and sectors.

Systemic risks can be triggered by non-malicious risk transfers. In 2019, power shutoffs were planned to mitigate the potential for electrical infrastructure to cause wildfires in the United States. In this case, risk managers took action to drive down wildfire risk, transferring electric outage risk to the communities they serve. This example highlights risks that are inherent in society's dependency on critical systems and the

trade-offs that are necessary to reduce risk. Critical systems, such as communications or energy systems, are considered so vital to the United States that their incapacitation or destruction would have a debilitating effect on security, national economic security, or national public health or safety.

A major challenge with systemic risk is the coordination required to understand and manage them. The private sector is the primary provider of important services like power and communications. These owners and operators have information and expertise regarding their systems that is needed for effective preparedness, response and recovery efforts. Private organizations, including businesses, trade associations, and other non-governmental organizations, are a critical component in the efforts to enhance national resilience. Government and private sector joint planning and prioritization are necessary to address systemic risks that span Community Lifelines (Figure 6).



## Risk and the Internet of Things

The Internet of Things (IoT) is the networking capability that allows information to be sent to and received from devices (such as fixtures and kitchen appliances) using the internet. These devices are a growing feature of American life. In 2019, the average American household owned 11 internet-connected devices. In 2017, the number of internet-connected devices in American households was only five. In 1997, more than 75 percent of American households did not use the internet.

As all internet-enabled devices are vulnerable to malicious actors, the challenge of IoT devices is that they may not have the same level of security that a computer does. These IoT devices can cause systemic risks, because each one is a possible method of entry for a malicious actor to affect an entire system. The FBI has warned that hackers can use those unsecured devices to access home-based routers, allowing hackers access to everything on home networks.



Figure 6: The private sector is a key stakeholder in all Community Lifelines and, in many cases, is responsible for the services or supply chain for each lifeline. Federal and SLTT officials also provide essential services within the lifelines and help to guide and track response and recovery actions.

Understanding how the Nation's interconnected critical infrastructure systems are dependent or interdependent on one another is vital to prioritize risk management activity. In April 2019, the DHS Cybersecurity and Infrastructure Security Agency (CISA) released a set of 55 National Critical Functions (NCF) to guide the Nation's work to manage its most strategic risks. The NCF are the functions of government and the private sector that are of such vital importance to the United States that their disruption, corruption, or dysfunction would have a debilitating effect on security, national economic security, national public health or safety, or any combination thereof.<sup>10</sup>

DHS developed the NCF in coordination with private sector and SLTT partners. These functions enable the critical infrastructure community to analyze complex challenges that cannot be easily identified, understood, or examined within the existing risk management structures for cyber and physical infrastructure.

<sup>10</sup> The National Response Framework defines Community Lifelines as services that enable the continuous operation of critical government and business functions and are essential to human health and safety or economic security. If disrupted, rapid stabilization of Community Lifelines is essential to restoring a sense of normalcy.

## The National Critical Functions (NCF) and Electric Power

A disruption or loss of electric power will directly affect the security and resilience of critical infrastructure within and across numerous sectors. For example, the energy sector provides essential power and fuels to the communication, transportation, and water sectors, and, in return, the energy sector relies on them for fuel delivery (transportation), electricity generation (water for production and cooling), as well as control and operation of infrastructure (communication). The connections and interdependencies between these indispensable functions mean that the loss of one typically has an immediate impact on the operation in other sectors. Consequently, loss of additional other functions may occur over time.

Technological advancements can be used to further strengthen community resilience. For example, advances in sensors and operational technology can help power grid operators protect critical infrastructure, better understand potential threats, conduct diagnostic testing, predict changes in systems, and ultimately protect critical infrastructure. These advances support critical functions, such as communications and power, which in turn allow the emergency management community to strengthen resilience and adopt technology to manage cyber threats. Collaboration across sectors, understanding of interdependencies, and information-sharing can promote continuity of operations and services. Understanding and collaborating across a variety of disciplines to maintain the security of the grid will increase fortification.

### Systemic Risks in Context: Election Security

The first critical component of the Nation's election security is its infrastructure. Election infrastructure includes:

- Voter registration databases
- Systems used to manage and report on elections
- Voting systems and storage facilities
- Polling places
- Information technology systems associated with all of the above

Under the U.S. Constitution, state and local governments are responsible for running elections. This means across the fifty states, the District of Columbia, and five territories there are more than eight thousand local offices responsible for running elections. The decentralized nature of the American election system is useful from a security perspective in that it does not provide a single system or entity of failure. However, it also poses challenges as many local jurisdictions lack the IT resources needed to maintain a complex IT operation.

One measure of resilience that security experts and the election community have embraced is that all digital votes should have a paper backup. The ability to audit the results of the election after election day is a critical resilience measure.

DHS is working to provide support to state and local governments in advance of the 2020 elections. CISA has launched the #Protect2020 campaign to secure election infrastructure and ensure an election free from interference. This campaign has partnered with election officers, operators, and stakeholders to secure and ensure the confidentiality and integrity of free elections in the United States.

In order to help CISA provide vital support, election infrastructure was designated as part of the Nation's critical infrastructure in January 2017. Under this designation, CISA has authority to provide an array of services that state and local election officials can use to control both cyber and physical risk to their election systems and facilities. The critical infrastructure designation allows DHS to provide services on a prioritized basis at the request of state and local election officials.

The second critical component of the Nation's election security is the voters. Although there are benefits to voters having greater access to a wider community online, this access also creates the potential for negative and incorrect information to spread with ease.

Foreign adversaries continue to exploit the Nation's interconnectedness online, which poses a significant threat to election security. Foreign interference is defined as "malign actions taken by foreign governments or foreign actors designed to sow discord, manipulate public discourse, discredit the electoral system, bias the development of policy, or disrupt markets to undermine the interests of the U.S. and its allies."



### How Do Individuals or Groups Attempt to Influence Public Opinion through Malign Actions?

- **Misinformation:** Misinformation results from innocent reporting errors, satire, or parody and can be re-purposed maliciously with the intent to deceive.
- **Disinformation:** Disinformation is fake content that is created with the specific intent to deceive or incite audiences.
- **Malinformation:** Malinformation occurs when facts are used maliciously and out of context to improperly influence audiences.

Since the 2016 election, the social media company Facebook has discovered several coordinated disinformation campaigns, including Russia-linked groups that used Facebook to reach 126 million users. Some estimates suggest that Russian-created propaganda attracted up to a billion views. Facebook addressed the issues by removing 652 fake accounts that spread information and originated in Russia and Iran.

As part of the #Protect2020 campaign, CISA provided steps that the public can take at the individual level to counter the potential impacts of disinformation (Figure 7).



Figure 7: Individual awareness steps recommended by CISA.

Notably, the same connected system that enables the problem can also enable the solution. Unfortunately, research suggests that spreading accurate information across social media is more difficult than spreading false information. A study by the Massachusetts Institute of Technology found that false information posted on the social media site Twitter was shared more often and carried further than true news. This challenge may also be particularly impactful for election security, as the effects of false political news may be more pronounced than false news about terrorism, natural disasters, science, urban legends, or financial information. On average, it took accurate information about six times as long as false information to reach 1,500 people.

## EMERGING RISKS

### UNDERSTANDING EMERGING RISK

*Emerging risks are either new risks or familiar risks that evolved due to new or unfamiliar conditions; and, therefore, often lack the historic data traditionally used to assess risk. Emerging risks can appear suddenly and often arise from advancements in technology or changes in the threat environment.*

The emergency management community's understanding of its risks is primarily driven by events and incidents that have already occurred. Future capability investment must also factor in emerging risk to successfully ensure adequate preparedness. Risk assessment processes leverage historic data to try to understand what could happen in the future. This work is important to manage a broad swath of known risks such as hurricanes, wildfires, or even terrorism.

When basing risk assessments only on well-understood hazards, the Nation is vulnerable to unknown and emerging threats. Someday, these threats could shape the way risk is considered. To build resilience against all of the Nation's risks, the emergency management community should continue to identify how vulnerabilities change and how conditions evolve leading to novel threats or hazards that may affect or exploit those vulnerabilities.

Risk management responsibilities are shared across individuals, the private sector, and Federal and SLTT governments. Developing laws and procedures for the unique roles of each of those partners is a complicated and time-consuming process, but the absence of these roles can leave the Nation exposed to relatively unregulated risks.

### 2019 Executive Orders on Emerging Risks

There were four executive orders related to emerging risk that were enacted in 2019:

- **Executive Order on America's Cybersecurity Workforce:** Implements programs that will grow and strengthen the Nation's cybersecurity workforce to meet the challenges of the 21st century.
- **Executive Order on Maintaining American Leadership in Artificial Intelligence:** Aims to sustain and enhance the scientific, technological, and economic leadership position of the United States in artificial intelligence (AI), research and development, and deployment.
- **Executive Order on Coordinating National Resilience to Electromagnetic Pulses (EMP):** Fosters sustainable, efficient, and cost-effective approaches to improving the Nation's resilience to the effects of EMPs.
- **Executive Order on Securing the Information and Communications Technology and Services Supply Chain:** Protects the security, integrity, and reliability of information and communications technology and services provided and used in the United States.

Today's cybersecurity vulnerabilities and the risks that accompany them arose out of the development of the internet. The Nation is vulnerable to internet-based attacks precisely because individuals and organizations increasingly rely on digital infrastructure. Additionally, an increasing quantity and quality of data about persons and organizations is stored or transmitted online. Promising fields such as artificial intelligence (AI), quantum computing, and blockchain hold exciting possibilities, but risk managers should be mindful of how their developments can shape the Nation's future risk environment. Rapid technological and social changes have the potential to broadly improve quality of life while simultaneously increasing exposure to new risks.

One example of an emerging risk is the risk that is posed by electromagnetic pulses (EMP). As stated in the Executive Order on Coordinating National Resilience to EMPs in 2019, "an EMP has the potential to disrupt, degrade, and damage technology and critical infrastructure systems. Human-made or naturally occurring EMPs can affect large geographic areas, disrupting elements critical to the Nation's security and economic prosperity, and could adversely affect global commerce and stability."

The management of emerging risks shares some commonalities with the management of catastrophic and systemic risks. This unpredictability may create additional vulnerability that may be managed with adaptability and flexibility. Management of emerging risks focuses primarily on understanding the future risk landscape, as well as developing national resilience. Resilience can be defined as: the capacity to absorb unexpected consequences and quickly develop new capabilities that are necessary to manage a risk once it has emerged. National resilience includes the ability to quickly adapt and recover from any known or unknown changes to the environment through holistic implementation of risk management, contingency, and continuity planning.



## How the Cybersecurity Risk Information Sharing Program (CRISP) Works

CRISP participants install an information-sharing device (ISD) on their network border. The ISD collects and shares data in an encrypted form to the CRISP data repository. Analysts review the data and, using government-provided information, send alerts and mitigation measures back to participants about potential malicious activity. CRISP intelligence analysts have identified intrusions that otherwise would have gone undetected and alerted appropriate operators to these threats. During these incidents, the U.S. Department of Energy (DOE) coordinates Federal onsite assistance teams to help the stakeholders respond to and recover from the incident.

One way stakeholders in the private and public sectors are aiming to improve national resilience against emerging risks is through increased information-sharing. In 2019, the Office of the Inspector General of the Intelligence Community cited cybersecurity information-sharing as a major and persistent national challenge for public and private institutions. To improve cybersecurity information-sharing capabilities, the Office of Cybersecurity, Energy Security, and Emergency Response (CESER) within the U.S. Department of Energy (DOE) developed the Cybersecurity Risk Information Sharing Program (CRISP). CRISP is a voluntary, subscription-based program that identifies sophisticated attacks targeting critical U.S. energy systems. The Electricity Information Sharing Analysis Center (E-ISAC) manages CRISP and facilitates this public-private data-sharing and analysis platform. CRISP ensures bi-directional sharing of threat information among energy sector stakeholders. Improving the speed and accuracy of data-sharing enhances the Nation's ability to identify cyberattacks and to respond quickly before critical systems become

affected—in essence, building resilience. CRISP supports its participants before, during, and after cyber incidents occur. The 26 current CRISP participants and stakeholders provide power to over 75 percent of the Nation's electricity customers.

## Emerging Risks in Context: Unmanned Aircraft Systems (UAS)

Emerging risks are often derived from the application of either new technologies or known technologies in novel ways which result in risks that are new and/or unanticipated. UAS are an example of a recently emerged risk. While the potential risks associated with UAS have long been anticipated, recent changes in the volume of systems deployed and the ease of access and reconfigurability have significantly altered the context of the use applications and therefore the risk environment. Some of the successes and challenges of managing this risk speak to the broader challenges of managing emerging risks. Recent UAS legislation underscores the primary difficulties of addressing emerging risks, as risk management can take a long time to catch up to an emerging threat. The first unmanned aerial vehicle (UAV) was invented in 1917, but the first law to allow a government agency to neutralize a potential threat from a UAV was penned over 100 years later in 2018. UAS have a wide range of applications and users, including recreational flyers and community-based organizations, commercial operations, public safety and government, and educational or research-based endeavors.

UAS have rapidly proliferated for both private and government use. A December 2017 study estimated that the U.S. drone industry grew from \$40 million in 2012 to more than \$1 billion in 2017. The Federal Government estimates that by 2022, the number of drones in U.S. national airspace will grow to more than seven million. Although the potential dangers of UAS have been known for quite a while (UAS have operated in the national airspace since the early 1990s), the general public's lack of accessibility limited the overall risk. However, more recently, increasing affordability and diversified functionality in the UAS industry has expanded. The use of UAS now includes a broad range of public and commercial applications (including law

enforcement activities, assisting in search and rescue operations, inspecting pipelines and infrastructure, photographing real estate, surveying land, disaster assistance, news gathering, and recreational purposes). As UAS use has become increasingly prominent, new risks for unauthorized surveillance have emerged, and facility security models designed for perimeter security have become insufficient.

In the case of UAS, significant progress in policy has been made at the Federal level. The National Aeronautics and Space Administration (NASA) and the Federal Aviation Administration (FAA) have partnered to create a system that will manage national drone traffic, known as the Unmanned Aircraft Systems Traffic Management (UTM) infrastructure. As part of this effort, in March 2020 the FAA released the *Unmanned Aircraft System Traffic Management Concept of Operations Version 2.0*. This document matures the UTM initiative by outlining the way in which the FAA will support operations for UAS operating in low altitude airspace. In addition, with the passing of the FAA Reauthorization Act of 2018, DHS now has the legal authority to detect, disrupt, seize control of, disable, or otherwise mitigate, consistent with 6 U.S.C. 124n, credible UAS-based threats to certain covered facilities, assets, and missions. The UTM and the FAA Reauthorization Act of 2018 create a foundation for continued improvements in security regarding UAS use, such as UAS remote identification (Remote ID). In December 2019, the FAA introduced a Remote ID proposed rule that provides a framework for the FAA, law enforcement, and Federal security agencies to remotely identify all UAS operating in the airspace of the United States.

Even with significant progress in managing this risk at the Federal level, vulnerabilities still exist for business and communities. For example, soft targets, including stadium events, parks, and other mass gatherings, are not often equipped to respond to an active UAS incident or are not authorized to counter a drone. This lack of preparedness paired with the increasing prevalence of privately-owned UAS amplifies the risk that extremists or other malicious actors pose when armed with weaponized UAS.

The fact that progress has been made, yet vulnerabilities remain, underscores the management challenge posed by emerging risks. Risk management depends on the ability to identify risks as early as possible, to quickly create a new capability to manage the risks as they emerge, and to build resilience to unpredictable impacts (including response and recovery capabilities).

The next section highlights an analysis and discussion of the capabilities that communities use to manage risks. A key component of the discussion is how close communities are to meeting their own goals as well as national goals.



## HOW DO RISKS RELATE TO CAPABILITIES?

A national capability assessment can help the whole emergency management community understand how prepared the Nation is to respond to potential risks. The National Preparedness System describes 32 Core Capabilities that the Nation must build and sustain to effectively manage its greatest risks. Targets measure a subset of activities within each Core Capability. To ensure specificity, this report refers to target names throughout the following analyses. This report refers to Core Capabilities and the critical tasks that support them as simply “capabilities.” These capabilities enable the Nation to manage risk by avoiding, controlling, transferring, or accepting it (Figure 8). A prepared Nation is one that has developed the appropriate mix of capabilities needed to successfully manage risks, both known and unknown.

Capabilities can be difficult to evaluate and measure. An ideal capability assessment starts with the desired outcome or a *capability target*: What needs to be done within a particular time frame? To answer that question, stakeholders must consider the mechanisms that help achieve capability goals, such as teams, resources, and plans. When fully matured, a capability assessment can help the Nation understand how investments in mechanisms to build capabilities affect real-world outcomes.



# CAPABILITIES



Figure 8: How risk and risk management relate to capabilities and goals.

The NPR takes a first step toward reporting on an integrated understanding of national preparedness, which will eventually translate risks into requirements and requirements into capabilities. This year’s report examines community capability across the Nation, identifying commonalities that will help inform national preparedness efforts. The 2021 NPR will also examine nationwide community capability, building upon the community-level analysis. Future NPRs will continue to mature this process, expanding what we know about preparedness and better drawing connections between required outcomes and how we achieve them.

## INTRODUCTION TO THE NATIONAL RISK AND CAPABILITY ASSESSMENT

FEMA assesses nationwide community capability through the National Risk and Capability Assessment (NRCA). The NRCA meets requirements of the Disaster Recovery Reform Act of 2018 (DRRA), which requires “tiered, capability-specific performance objectives” to assess national preparedness. FEMA first assessed its national requirements to respond to threats and hazards with national impacts through the NRCA in 2020. The NRCA is a suite of preparedness assessments that measure risk and capability across the Nation in a standardized and coordinated way (Figure 9). Through this process, all 56 states and territories, as well as many major urban areas and tribes, measure catastrophic risks and the capabilities to manage those risks using the same language. The Federal Government then uses the same common language to assess the Nation’s catastrophic risks and capabilities to support communities. The NPR uses the NRCA data as an indicator to better understand how prepared the Nation is and where significant capabilities remain to be built.

### Community and National Capability Targets

Community and national capability targets facilitate *capabilities-based planning*, which emergency managers use to determine the Nation’s capability requirements to manage its risk. Since 2012, states, territories, urban areas, and tribes have used the community THIRA to set goals for how much capability they want to have. In 2020, for the first time, FEMA established national response and recovery capability targets. These targets represent estimates of the capabilities required to manage the Nation’s realistic worst-case scenarios, using standardized language. With the completion of the National THIRA, all levels of government, including the Federal Government, now use this same standardized target language to assess these requirements. In 2019, 56 states and territories (including the District of Columbia), 31 tribes, and 33 urban areas completed THIRAs.

## The Four Parts of the National Risk and Capability Assessment (NRCA)

- 1. Risks and Associated Impacts:** All levels of government use the Threat and Hazard Identification and Risk Assessment (THIRA) process to identify and assess threats and hazards of concern.
- 2. Capability Goals:** The **Community THIRA** process uses capability targets to convert the likely impacts of events into goals for how much capability that the communities want to have, while the **National THIRA** establishes capability targets for the Nation to collectively address.
- 3. Current Capabilities:** The **Community Stakeholder Preparedness Review (SPR)** enables communities to measure their current capabilities, while the **National SPR** will assess the Nation’s ability to provide support beyond current community capabilities (*the National SPR is currently under development and not included in this report*).
- 4. Gaps:** The SPR process helps all levels of government to identify the current gaps that are preventing them from reaching their capability goals and develop strategies to close those gaps.

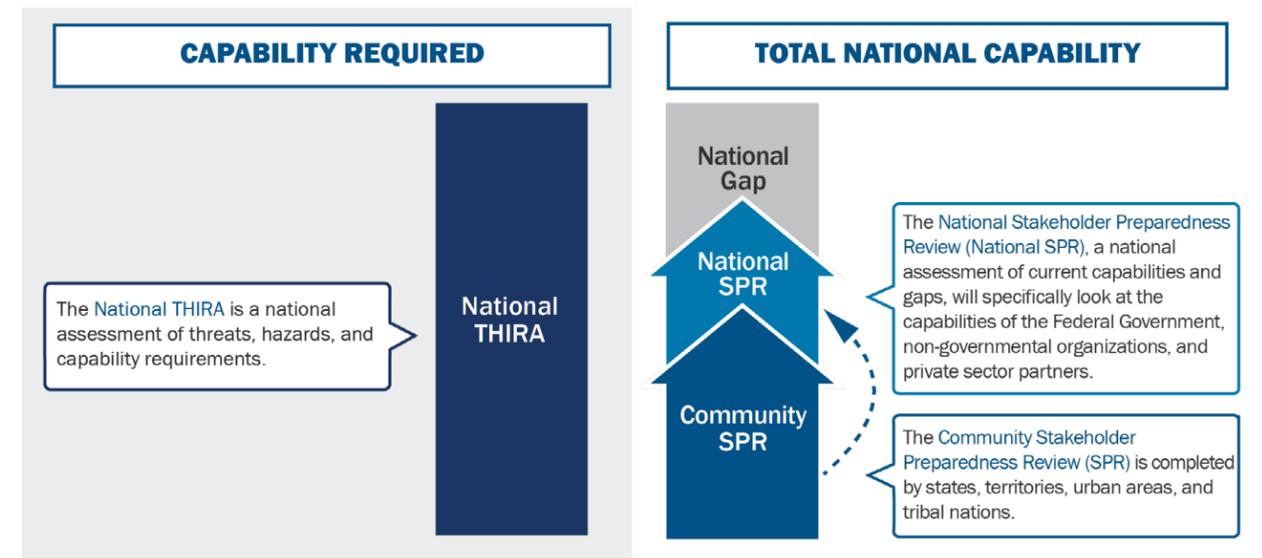


Figure 9: The assessments identify the national-level capability needs and the gaps to meet catastrophic incidents. Note: The National SPR is currently under development, and analysis of this data is not included in this report. Future iterations of the NPR will include an analysis of this data.

Each standardized capability target has three components. **Critical tasks** apply to a wide range of threats and hazards—not only those identified in the THIRA—that emergency managers nationwide routinely plan for. The Nation’s ability to perform critical tasks indicates the Nation’s overall preparedness. Each standardized target also incorporates **impacts** and **time frame metrics**. Standardized impacts are key metrics used by the emergency management community with quantifiable consequences associated with major threats and hazards. Time frame metrics describe the amount of time or level of effort needed to successfully manage the impact and take into account how quickly communities and the Nation should be able to activate a given capability and how long it can be sustained. Capability targets define success for one or more aspects of a Core Capability (Figure 10).

The NRCA compares the level of capability that communities collectively intend to build and sustain to the estimated level of capability that the Nation will need to manage a catastrophic threat or hazard. By identifying and understanding resulting gaps in capability, the Nation can strategize how best to close these gaps using data-driven decision-making.

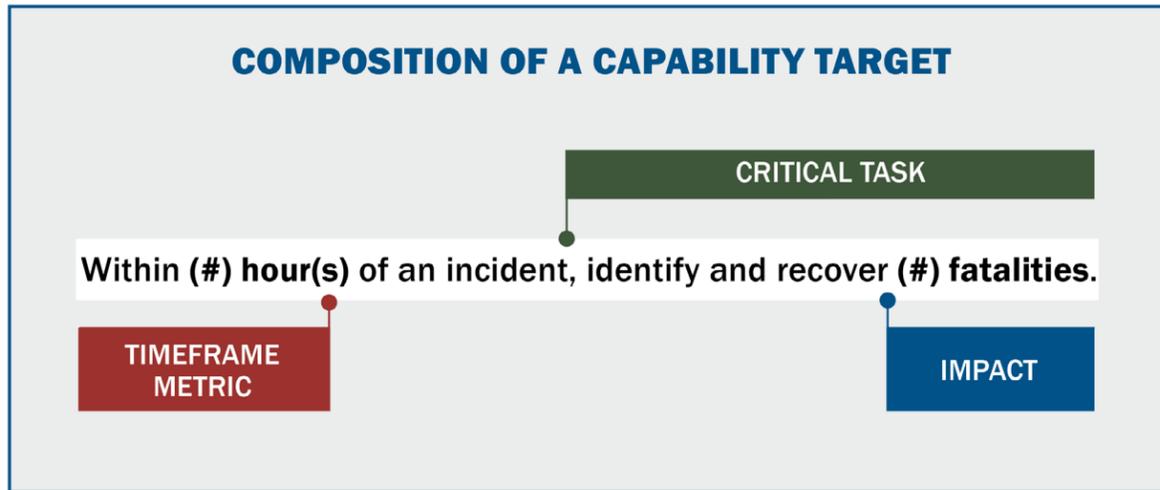


Figure 10: Example of standardized target language, including timeframe and impact.

At a national level, disasters rarely occur in isolation. Because of this, the national targets also account for the likelihood that FEMA and other Federal partners will be engaged in ongoing disaster operations at the same time as a catastrophic incident, thereby increasing the total impact that the Nation will have to address. For this reason, in their analysis, FEMA included plausible concurrent operations (PCO) based on historical impact data for hurricanes, floods, and wildfires. Using these PCOs alongside the National THIRA scenarios, FEMA worked with stakeholder agencies and SMEs to determine the estimated impacts and the time frames within which those impacts should be addressed.<sup>11</sup>

The following section provides an analysis of the 2019 THIRA/SPR data on community capability, followed by a comparison of community capability against national goals. Through this comparison—corroborated by Federal input and open-source research—four critical considerations in emergency management become apparent. These considerations are outlined in greater detail in the **Critical Considerations in Emergency Management** section of this report.

## COMMUNITY CAPABILITIES

### Introduction to the THIRA/SPR: What Are Communities Saying About Their Capabilities?

Understanding capabilities at the SLTT level is the first step to understanding national capabilities. FEMA requires states, territories, urban areas, and tribes that receive some types of Federal preparedness grant funding to submit THIRA and SPR assessment data. The THIRA helps communities identify their threats and assess the capability they need to manage impacts of threats and hazards. The outputs from this process lay the

<sup>11</sup> FEMA established 11 working groups, requesting participation from departments, agencies, and offices with subject matter expertise. In total, FEMA engaged 43 offices and programs across the Federal Government to develop the **target language**, and 32 Federal and nongovernmental agencies and organizations to establish **impact** and **time frame metrics** for the 22 national standardized capability targets across the Cross-Cutting, Response, and Recovery Core Capabilities.

foundation for determining a community's capability gaps in the SPR. The SPR is a self-assessment of a community's current capability levels using the same language as the targets identified in the THIRA. In the SPR, communities assess their current capability and identify whether capability was lost, built, or sustained over the last year. Communities also identify capability gaps and describe strategies for closing those gaps to achieve their goals.

Communities' THIRA and SPR assessments include both quantitative evaluations of risk and capability, as well as qualitative, free-text responses to contextualize their evaluations. In 2018, communities completed the THIRA/SPR process for the Response and Recovery mission areas. In 2019, communities completed the THIRA in all five mission areas, and the SPR for four mission areas.<sup>12</sup>

In 2019, for the first time, states, territories, and urban areas were required to report their capability assessments for four targets across the Prevention and Protection Mission Areas: **Intelligence and Information Sharing; Interdiction and Disruption; Screening, Search and Detection; and Cybersecurity**.<sup>13</sup> In 2019, states, territories, and urban areas were required to identify capability goals for three targets in the Mitigation Mission Area: **Community Resilience (Risk-Appropriate Insurance); Long-term Vulnerability Reduction; and Risk and Disaster Resilience Assessment**. Communities were not required to identify their current level of capability for these targets but were required to assess their gaps in capability across all 32 Core Capabilities.

This report contains an analysis of the 2019 THIRA/SPR submissions to assess trends, highlight areas of strength, and note key gaps in community preparedness across the Nation. To highlight these

strengths and gaps, FEMA's analysis identified the targets for which a majority of communities tended to be closer to or further from their capability goal. FEMA also refers to this analysis as *goal achievement*.

### Which goals are communities closer to reaching?

Overall, communities, including states, territories, urban areas and tribes, most frequently reported being closer to achieving their desired goals in: **Auditing and Executing the Intelligence Cycle; Unified Operations; Establishing Interoperable Communications; Interdiction and Disruption Activities; and Providing Information and Warnings to the Public**.<sup>14</sup> Figure 11 shows the five targets, and their corresponding Core Capabilities, for which communities most frequently report being closer to their goals.<sup>15</sup>

FEMA's analysis of community THIRA/SPR data found that in 2019, communities were generally closer to their goals for those targets that are central to delivering other capabilities.

## National Emergency Communications Plan

The National Emergency Communications Plan, updated by CISA in 2019, aims to enable the Nation's emergency response community to communicate and share information securely across communications technologies. The plan includes traditional emergency responder disciplines and other partners from the whole community that share information during incidents and planned events.

<sup>12</sup> Communities will complete the SPR for one Mitigation mission area target for the first time in 2020.

<sup>13</sup> Of these four targets, tribes were only required to report on Cybersecurity.

<sup>14</sup> Communities are defined as closer to their goals when they have achieved at least 70 percent of their desired capability for a given target area.

<sup>15</sup> Unless otherwise specified, "communities" refers to all communities completing the THIRA/SPR process: states, territories, urban areas receiving Urban Area Security Initiative grants, and tribes receiving Tribal Homeland Security Grant Program funding with the exception of the National THIRA Aggregation analysis, which only includes data from states and territories.

Notably, four of the five high-capability targets described in Figure 11 are related to information gathering and communication capabilities; the ability of an emergency management office to coordinate with partners from within the government and from the wider community is central to effective preparedness, response, and recovery efforts. For example, **establishing interoperable communications** between emergency responders enables other capabilities in disaster response, such as search and rescue operations or firefighting. Similarly, having **coordinated operations** and effective **intelligence and information-sharing** enables emergency management officials to collaborate efficiently with external stakeholders both before and during response efforts. Communities' THIRA/SPR responses reflect this: Communities reported that successful alert systems and message delivery capabilities are built through internal communication and collaboration. This collaboration enables representatives to **deliver information** through community meetings and other networks of communication to all community stakeholders. This information saturation improves alert systems and standardizes messaging across jurisdictions. Improving these and other enabling capabilities may positively impact capability in other critical tasks as well.

Additionally, although communities reported that they are closer to their goals in **auditing and executing the intelligence cycle**, they often reported that they are challenged by a lack of interoperability between partner agency and stakeholder databases and other technical limitations. Communities also noted that they would be able to more effectively inform stakeholders about potential threats or suspicious activity with additional training on best practices. Continuous trainings on updated security and communications protocols are effective in addressing similar interoperability challenges in establishing **operational communications**. Overall, communities recognized that additional training and resources would enable more effective regional coordination, community information-sharing, and threat assessment and response.

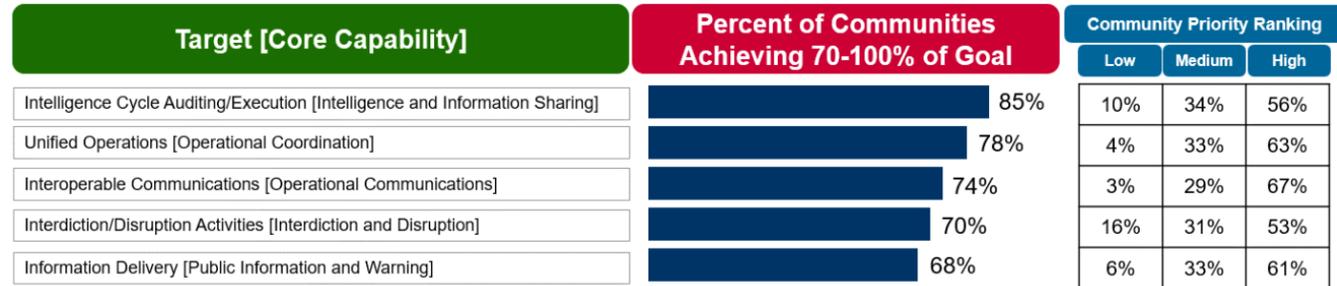


Figure 11: The five targets for which communities most frequently report their current capability is closer to their desired goals. In 2019, at least 68 percent or more of communities reported achieving at least 70 percent of their goal for these five targets. Communities also reported the priority they place on either working toward closing existing gaps or sustaining their capability in these target areas. Note that percentages are rounded, and in some cases may not add up to 100%.

Overall, communities tend to report being relatively close to their goals in the prevention and protection target areas—at least 54 percent of communities reported being close to their community goals for the four prevention and protection targets: **Conducting Screening Operations, Updating Cybersecurity Plans, Auditing and Executing the Intelligence Cycle**, and **Interdiction and Disruption Activities**. This may indicate that communities are generally well equipped to demonstrate these capabilities in a real-world scenario. However, communities may have weaknesses in areas of these Core Capabilities that are not measured by the targets.

## Most Challenging Threats and Hazards for Targets Closer to Community Goals

As part of the Threat and Hazard Identification and Risk Assessment (THIRA) process, communities estimated which threats or hazards would most challenge their ability to achieve each standardized target (Figure 12). For the targets that communities are closer to achieving their capability goals, **communities most frequently identified natural hazards and human-caused threats as most challenging to their ability to achieve their desired capability**. Within the category of natural hazards, earthquakes and hurricanes/typhoons were most frequently identified as the most challenging hazard. Regarding human-caused threats, communities most frequently identified explosive devices and cyberattacks as the most challenging threats to their capabilities.

Threats and Hazards Identified as Most Challenging (For Targets Closer to Community Goals)				
TARGET	Threat/Hazard			
	Most Frequently Identified as Most Challenging	Second Most Frequently Identified as Most Challenging	Third Most Frequently Identified as Most Challenging	
INTELLIGENCE CYCLE AUDITING/EXECUTION	Explosive Devices	Other – Human Caused Incident	Cyber Attack	
UNIFIED OPERATIONS	Earthquake	Hurricane/Typhoon	Active Shooter	
INTEROPERABLE COMMUNICATIONS	Earthquake	Hurricane/Typhoon	Cyber Attack	
INTERDICTION/DISRUPTION ACTIVITIES	Explosive Devices	Other – Human Caused Incident	Active Shooter	Cyber Attack
INFORMATION DELIVERY	Earthquake	Hurricane/Typhoon	Cyber Attack	Winter Storm/Ice Storm

Figure 12: In the THIRA data, communities estimate the threats/hazards that most challenge their ability to achieve their capability goals. This table shows the top three most frequently identified threats/hazards across areas where communities reported being closer to their goals.

 Natural  Human-caused or Technological

### Which goals are communities further from reaching?

Overall, communities most frequently reported being further from achieving their desired capability target goals in: **Providing Long-Term Housing; Community Sheltering; Providing Relocation Assistance; Providing Life-Sustaining Goods; and Body Recovery and Storage**. Figure 13 shows the five capability targets, and corresponding Core Capabilities, which communities most frequently reported as being further from their goals.

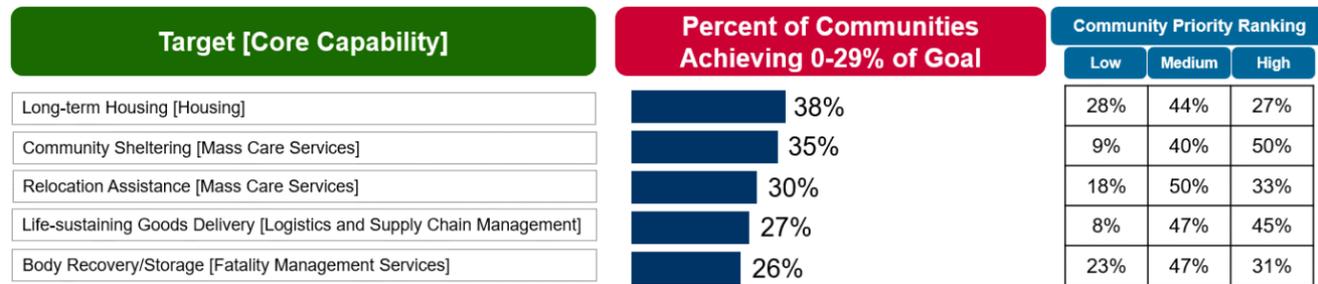


Figure 13: The five targets that communities reported as being furthest from their desired capability goals. In 2019, at least 26 percent of communities reported achieving less than 30 percent of goal capability for these five targets. Communities reported the priority they place on either working toward closing existing gaps or sustaining their capability in these target areas. Note that percentages are rounded, and in some cases may not add up to 100%.

FEMA has identified common elements among the capabilities with which communities struggle. FEMA's analysis of community THIRA/SPR data demonstrates that communities across the Nation have trouble maintaining foundational activities that allow capabilities to be built and sustained over time, such as mitigating staff turnover or sustaining partnerships with stakeholders.<sup>16</sup> Maintaining staff readiness is particularly important to supporting capability development. While communities cite understaffing at state, local, and regional agencies as an explanation for low capability or a loss in capability for many targets, communities specifically cited the absence or loss of institutional knowledge among personnel as a key explanation for the low capability across these five targets. Institutional awareness of protocols or specialized knowledge erodes over time, requiring continued reinforcement through training and exercises. Communities describe expanding trainings and exercises for staff as a central approach to addressing capability gaps in these targets. Similarly, communities tend to report relatively low confidence in their assessment of their capability in providing **long-term housing**,<sup>17</sup> **relocation assistance**,<sup>18</sup> and **community sheltering**.<sup>19</sup> Communities reported that existing gaps related to community sheltering are mainly due to gaps in *planning, organization, equipment, and training*. Furthermore, communities reported the greatest percentage of existing gaps in *planning* in their capability to **provide long-term housing** and to **provide relocation assistance**.

<sup>16</sup>. Communities' ability to sustain their current capabilities is critical to effectively managing risks and training, equipping, and preparing whole community partners for disaster response efforts. Continuous stakeholder engagement is a critical element of capability sustainment because many capabilities rely on coordination with other jurisdictions or non-governmental partners. For example, most critical infrastructure, including communications and power installations, are privately held and managed. Strengthening these relationships and involving these partners in steady-state preparedness activities are crucial to effective disaster response.

<sup>17</sup>. 24 percent of communities reported having high confidence in their assessment of their capability to **provide long-term housing**.

<sup>18</sup>. 25 percent of communities reported having high confidence in their assessment of their capability to **provide relocation assistance**.

<sup>19</sup>. 30 percent of communities reported having high confidence in their assessment of their capability to **provide community sheltering**.

### Most Challenging Threats and Hazards for Targets that are Further from Community Goals

Federal Emergency Management Agency (FEMA) analysis of the Threat and Hazard Identification and Risk Assessment (THIRA)/Stakeholder Preparedness Review (SPR) data found that communities most frequently cited natural threats and hazards as the most challenging to their **long-term housing, community sheltering, relocation assistance, and life-sustaining goods delivery** capabilities (Figure 14). These types of threats are likely to cause the largest number of displaced people and people requiring both short-term and long-term sheltering options. As communities face extreme weather events each year, with both of the housing-related targets—**long-term housing** and **relocation assistance**—being most challenged by natural hazards, communities may require greater collaboration with Federal and private sector entities to build capability in these areas. Communities reported a combination of human-caused threats and natural hazards as the most challenging to their **body recovery and storage** capabilities.

Threats and Hazards Identified as Most Challenging (For Targets Further from Community Goals)			
TARGET	Threat/Hazard		
	Most Frequently Identified as Most Challenging	Second Most Frequently Identified as Most Challenging	Third Most Frequently Identified as Most Challenging
LONG-TERM HOUSING	Hurricane/Typhoon 	Earthquake 	Flood 
COMMUNITY SHELTERING	Hurricane/Typhoon 	Earthquake 	Flood 
RELOCATION ASSISTANCE	Hurricane/Typhoon 	Earthquake 	Flood 
LIFE-SUSTAINING GOODS DELIVERY	Hurricane/Typhoon 	Earthquake 	Flood 
BODY RECOVERY/STORAGE	Explosive Devices 	Earthquake 	Pandemic - Human 

■ Natural      ■ Human-caused or Technological

Figure 14: In the THIRA/SPR data reports, communities identified the threats/hazards that most challenge their capability to achieve their desired goal in each target area. This table shows the top three most frequently identified threats/hazards by communities across areas where communities reported being further from their goals.

In particular, communities reported that they require additional planning and staffing to manage the transition from congregate housing to non-congregate temporary housing and require additional housing resources to be able to serve impacted communities after a disaster. This analysis shows that communities face challenges across the sheltering and housing spectrum—from short-term community sheltering and relocation assistance to long-term housing. In their THIRA/SPR data reports, communities cited a lack of long-term housing plans and trained staff as sources of major concern. Specifically, they cited the need for integrated and collaborative post-disaster housing plans and trainings that include private sector partners, housing authorities, and local community and regional partners.

Challenged by foundational project management activities such as maintaining appropriate staffing levels and effectively allocating limited funds, communities often struggle to address long-term development of operational capabilities. Long-term priorities, such as addressing aging technology or developing long-term recovery plans, are activities that require long-term investments and focus. Although some communities prioritize long-term capability challenges in their qualitative THIRA/SPR responses, the same communities still cited foundational challenges, such as maintaining staff readiness, as impediments to capability development. These and other long-term capability challenges—including coordinating regionally across local jurisdictions and building relationships with whole community stakeholders—may be especially difficult to address. Challenges associated with long-term capability improvements may be caused by the limits of local budgets and annual funding cycles, changing patterns of extreme weather events resulting in increasingly severe and costly disasters, and maintaining the capacity of local staff to develop planning mechanisms for their communities.

Overall, a lack of familiarity and low capability suggest that communities may have difficulty mobilizing resources for these five targets. Communities further indicated that even in the face of strategic improvements to areas of weakness, capability is

more difficult to improve for some targets—such as **long-term housing**—than for others. Activities associated with consistently challenging targets are more likely to be impacted by external factors than other targets, and therefore are more likely subject to systemic risks (see “Housing” key consideration below for further detail).

### Prioritization of Capabilities in Communities

Analyses of THIRA/SPR data confirm that communities often do not see their less-developed capabilities as high priorities. However, the data does not show whether the capabilities are a low priority because communities consider them less important, or because communities are less equipped to improve them and instead focus elsewhere. Communities identified **long-term housing** as an area of medium priority, along with **providing relocation assistance and recovering and storing fatalities**.

Across all targets, communities most highly<sup>20</sup> prioritized **updating cybersecurity plans** in their THIRA/SPR submissions despite more than half of communities reporting being close to their goals for that target. A large portion of communities’ cyber infrastructure is owned and managed by the private sector, highlighting the dependency of this capability on strong stakeholder relationships—a functionality that challenges many communities in the Nation. Communities also reported that they have relatively low confidence in their assessment of their current cybersecurity capabilities.<sup>21</sup> Therefore, communities appear to recognize cyberattacks as a concerning threat, but they may not fully understand their cybersecurity capabilities. Communities also frequently reference *planning* and *training* as main areas that contribute to existing gaps in **the updating cybersecurity plan** target.<sup>22, 23</sup> As a result, communities may require additional support to strategize about mitigating actions to close existing gaps in cybersecurity planning. However, initiatives such as California’s recent IoT Security Law may indicate that communities are recognizing and working to address cyber vulnerabilities.



## California’s Internet of Things (IoT) Security Law

California passed the first IoT Security Law in the Nation. It mandates that all IoT devices that are sold in the State must also have “reasonable cybersecurity measures” embedded so that devices are protected from unauthorized access, destruction, use, modification, or disclosure.

The law went into effect on January 1, 2020, and applies to a broad range of “smart” devices that are included under the definition of *connected devices*, including “any device, or other physical object that is capable of connecting to the Internet, directly or indirectly, and that is assigned an Internet Protocol address or Bluetooth address.”

### Trends in Community Preparedness

FEMA analysis of the community-reported capability data between 2018 and 2019 generally indicates lower capability than previously reported: In 2019, fewer communities reported achieving at least 90 percent of their capability goal across 18 of the 22 targets than in 2018.<sup>24</sup> Most notably, the targets with the greatest decrease in communities achieving at least 90 percent of their capability were **delivering information** (16 percent fewer communities), **structural firefighting** (16 percent fewer), **hazardous materials cleanup** (15 percent fewer), **restoring natural and cultural resources** (12 percent fewer), and **reopening businesses** (10 percent fewer; Figure 15).

## Communities Reporting 90% of Capability Goal Achieved

PERCENT CHANGE 2018 - 2019



Figure 15: Between 2018 and 2019, the percentage of communities achieving 90 percent of their goal dropped by at least 10 percent across five targets.

<sup>20</sup> 76 percent of communities identified **updating cybersecurity plans** as an area of high priority.

<sup>21</sup> 33 percent of communities reported having high confidence in their assessment of their capability to **update cybersecurity plans**.

<sup>22</sup> 74 percent of communities reported gaps in *planning* in **updating cybersecurity plans**.

<sup>23</sup> 73 percent of communities reported gaps in *training* in **updating cybersecurity plans**.

<sup>24</sup> “Targets” refers to the 22 standardized targets in the Cross-Cutting, Response, and Recovery Core Capabilities required in both 2018 and 2019.

It is important to understand that this change in reported capability may not be a loss of capability, but a correction from overestimated capabilities in 2018. Communities may also have a better understanding of how to assess their capability. As communities continue to better understand the updated THIRA/SPR methodology, the reasons behind the changes in capability will become more apparent and will provide FEMA and the Federal Government with a greater understanding of areas in which they can support capability building and sustainment across the Nation.

Although communities reported lower capability levels across most targets, the percentage of communities achieving 90 percent of their capability goal increased slightly for the **long-term housing** target. Additionally, fewer communities reported achieving less than 10 percent capability across five targets: **relocation assistance** (eight percent fewer communities), **restoring natural and cultural resources** (two percent), **evacuation, reestablishing healthcare and social services**, and **restoring wastewater services** (one percent, respectively).

## National Capability Aggregation Methodology

Beyond assessing community data against community-specified threats, FEMA sought to understand how prepared the Nation is against nationally catastrophic risks through the National THIRA and SPR process. The National THIRA process identifies the scenarios that most challenge national capability. Most scenarios of national concern do not impact all states. For example, a Cascadia earthquake scenario would likely directly impact only a few select states (California, Oregon, Washington, and Idaho); however, the scope of the incident would likely surpass local and regional community capabilities in these states, thus elevating the event to a nationally catastrophic incident. Figure 16 identifies two different methods FEMA uses to calculate community capability and to compare the capabilities to the national targets. **Scenario-based community capability** refers to capability of the impacted states and territories and displays the progress of communities impacted by nationally catastrophic scenarios in achieving the national goal, arranged by standardized impact.

## Whose Capability is Assessed?

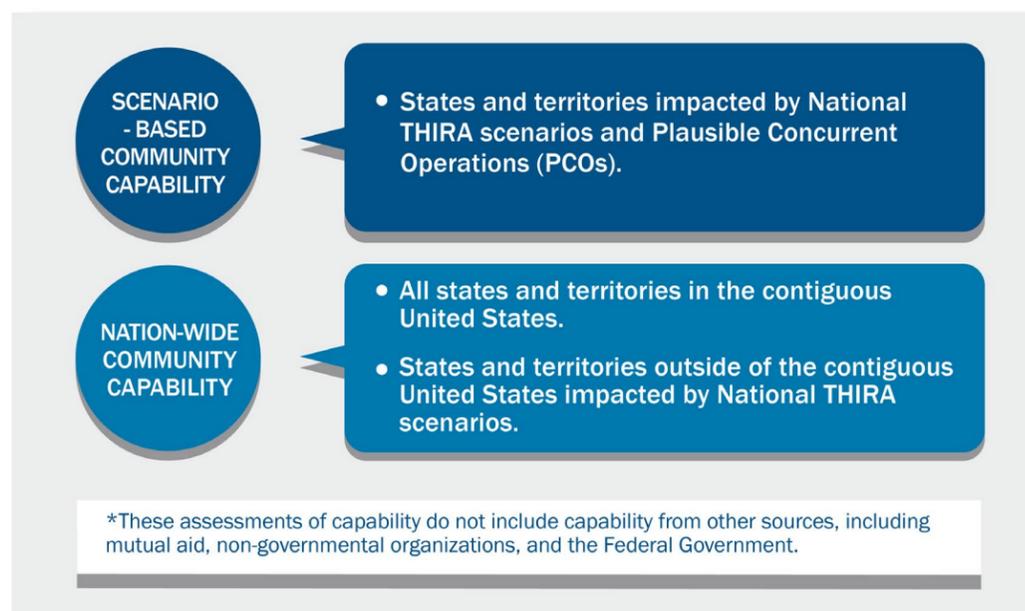


Figure 16: Scenario-based community capability versus national capability for the National THIRA aggregation analysis.



## Estimating Capability

In this report, the Federal Emergency Management Agency (FEMA) seeks to identify how prepared communities are in comparison to nationally catastrophic incidents. It is important to note that the estimates of capability are conservative estimates. These estimates do not include possible mutual aid, Federal support, or other national private or nonprofit capabilities.<sup>25</sup> They exclusively represent conservative estimates of internal capability and **do not** account for a variety of mitigating factors that may influence the level of capability a community can bring to bear during an event.

However, communities that are not impacted at the time of any theoretical incident will have existing capabilities that can be leveraged at the national level. **Nationwide community capability** refers to a capability that has been reported by all states and territories within the contiguous United States, as well as states and territories outside of the contiguous United States that have been identified as directly impacted by nationally catastrophic scenarios.

The purpose of the analysis of national capability is to account for capabilities that could be theoretically shared or deployed across the Nation to support incident response. The Nation's ability to deliver capabilities takes on a dynamic rather than static nature: Levels of capability may fluctuate depending on varied factors that include the shareability and deployability of the specific resource; the type, scope, or timing of the incident; and the number of concurrent incident responses.

Additionally, some resources may be deployed more easily when responding to specific incidents than others. As such, scenario-based community capability likely represents a conservative estimate of the capabilities and resources available to respond to a

nationally catastrophic incident, whereas national capability likely represents an overestimation of the available shareable and deployable community resources. The most accurate estimate of capability for a nationally catastrophic incident likely falls somewhere between the scenario-based community capability and the national capability. **Neither estimate includes Federal support capabilities, which should increase overall capability.**

In the future, FEMA plans to assess Federal support capabilities through the National SPR. This analysis will assess the capability that can be brought to bear by the Federal Government, national non-governmental organizations, and private sector partners. After the completion of the National SPR, FEMA and the Federal Government will have a greater understanding of the specific capability available to communities and the Federal Government. FEMA and the Federal Government will also better understand the combined capability that can be leveraged in response to and recovery from a catastrophic incident compared to assessed capability needs. In the current report, FEMA only analyzes community-based capability as assessed through the THIRA/SPR and does not include the estimates of additional capability available to FEMA and the Federal Government, non-governmental organizations, and the private sector.

## National Target Results

Figure 17 displays communities' progress toward achieving the national goals set in the National THIRA across both scenario-specific community capability (left) and national community capability (right). Specifically, Figure 17 displays how close communities are to achieving the national goal by ranking the goals according to three categories of achievement: 0–29 percent of the national goal, 30–69 percent of the national goal, and 70–100 percent of the national goal. Before accounting for national capabilities, communities impacted by National THIRA scenarios achieved less than 30 percent of the national goal across 16 impacts, indicating a significant gap between community

<sup>25</sup> For information about the Emergency Management Assistance Compact, see <https://www.emacweb.org/>

### NATIONAL ACHIEVEMENT ACROSS SCENARIO COMMUNITIES

Impact Count	Target	Standardized Impact Language
<b>70-100% NATIONAL GOAL ACHIEVED</b>		
<b>8 IMPACTS</b>	Information Delivery	(#) people affected
	Information Delivery	(#) people with limited English proficiency affected
	Operational Communications	(#) jurisdictions affected
	Operational Communications	(#) partner organizations involved in incident management
	Operational Coordination	(#) jurisdictions affected
	Operational Coordination	(#) partner organizations involved in incident management
	Reestablish Services	(#) affected healthcare facilities and social service organizations
	Search and Rescue	(#) people requiring rescue
<b>30-69% NATIONAL GOAL ACHIEVED</b>		
<b>9 IMPACTS</b>	Clear Critical Roads	(#) miles of road affected
	Communication Systems	(#) customers without communication service
	Community Power	(#) customers without power
	Evacuation	(#) people requiring evacuation (with access and functional needs)
	Information Delivery	(#) people with access and functional needs (affected)
	Life-sustaining Goods Delivery	(#) people requiring food and water
	Life-sustaining Goods Delivery	(#) people requiring shelter
	Resource Restoration	(#) damaged natural and cultural resources and historic properties registered in the jurisdiction
	Sanitation	(#) customers without wastewater service
<b>0-29% NATIONAL GOAL ACHIEVED</b>		
<b>16 IMPACTS</b>	Body Recovery/Storage	(#) fatalities
	Community Protection	(#) people affected
	Community Sheltering	(#) animals requiring shelter, food, and water
	Community Sheltering	(#) people requiring food and water
	Community Sheltering	(#) people requiring shelter
	Community Sheltering	(#) people with access and functional needs (requiring food and water)
	Community Sheltering	(#) people with access and functional needs (requiring shelter)
	Evacuation	(#) people requiring evacuation
	HAZMAT Cleanup	(#) hazmat release sites
	Long-term Housing	(#) people requiring long-term housing
	Long-term Housing	(#) people with access and functional needs (requiring long-term housing)
	Medical Care	(#) people requiring medical care
	Relocation Assistance	(#) people requiring temporary, non-congregate housing
	Relocation Assistance	(#) people with access and functional needs (requiring accessible, temporary, non-congregate housing)
	Structural Firefighting	(#) structure fires
	Water Service	(#) customers without water service

### NATIONAL ACHIEVEMENT ACROSS ALL NATIONAL CAPABILITIES

Target	Standardized Impact Language	Impact Count
<b>70-100% NATIONAL GOAL ACHIEVED</b>		
Clear Critical Roads	(#) miles of road affected	<b>24 IMPACTS</b>
Community Power	(#) customers without power	
Community Sheltering	(#) people requiring food and water	
Community Sheltering	(#) people requiring shelter	
Community Sheltering	(#) people with access and functional needs (requiring food and water)	
Community Sheltering	(#) people with access and functional needs (requiring shelter)	
Communication Systems	(#) customers without communication service	
Evacuation	(#) people requiring evacuation	
Evacuation	(#) people requiring evacuation (with access and functional needs)	
HAZMAT Cleanup	(#) hazmat release sites	
Information Delivery	(#) people affected	
Information Delivery	(#) people with access and functional needs (affected)	
Information Delivery	(#) people with limited English proficiency affected	
Life-sustaining Goods Delivery	(#) people requiring food and water	
Life-sustaining Goods Delivery	(#) people requiring shelter	
Operational Communications	(#) jurisdictions affected	
Operational Communications	(#) partner organizations involved in incident management	
Operational Coordination	(#) jurisdictions affected	
Operational Coordination	(#) partner organizations involved in incident management	
Reestablish Services	(#) affected healthcare facilities and social service organizations	
Resource Restoration	(#) damaged natural and cultural resources and historic properties registered in the jurisdiction	
Sanitation	(#) customers without wastewater service	
Search and Rescue	(#) people requiring rescue	
Water Service	(#) customers without water service	
<b>30-69% NATIONAL GOAL ACHIEVED</b>		
Community Protection	(#) people affected	<b>2 IMPACTS</b>
Medical Care	(#) people requiring medical care	
<b>0-29% NATIONAL GOAL ACHIEVED</b>		
Body Recovery/Storage	(#) fatalities	<b>7 IMPACTS</b>
Community Sheltering	(#) animals requiring shelter, food, and water	
Long-term Housing	(#) people requiring long-term housing	
Long-term Housing	(#) people with access and functional needs (requiring long-term housing)	
Relocation Assistance	(#) people requiring temporary, non-congregate housing	
Relocation Assistance	(#) people with access and functional needs (requiring accessible, temporary, non-congregate housing)	
Structural Firefighting	(#) structure fires	

Figure 17: National goal achievement across all scenarios and national capabilities.<sup>26</sup> The list of impacts on the left indicate the percentage of the national goal achieved by scenario-based communities against the national target. The list of impacts on the right indicate the percentage of the national goal achieved across the Nation.<sup>27</sup>

<sup>26</sup> The national THIRA scenario identified for Unified Operations affects all 48 contiguous states. Therefore, the estimated capability within the “Scenario Communities” and “All National Capabilities” tables is the same for Unified Operations. As with the estimated capability for all other National Targets, the estimated capability for this target is likely a conservative one, and currently does not account for non-governmental organization, private sector, and Federal capabilities.

<sup>27</sup> Because the scope of “( # ) jurisdictions affected” and “( # ) of partner organizations” is different at the community level and at the national level, FEMA did not compare capability against National Targets for Interoperable Communications and Unified Operations. Instead, FEMA compared capability to capability targets set by scenario-impacted communities in its 2019 THIRA submission.

capability and national goals for over half of the impacts. Similarly, scenario-based communities have achieved more than 70 percent of the national goal across just eight impacts.

Although affected communities may not be fully prepared to respond to nationally catastrophic incidents, an analysis of shared national capabilities indicates the Nation as a whole is closer to achieving its national goals. With the addition of the national capability, nine impacts increased from the lowest category of achievement to one of the two higher achieving categories, indicating that shared national capabilities could help scenario-impacted communities respond to a catastrophic incident.

However, even when national capability is aggregated, there are seven standardized impacts that communities across the nation—not just in those impacted by possible nationally catastrophic incidents—are far from reaching national goals: **body recovery and storage, community sheltering for animals, long-term housing, relocation assistance, and conducting structural firefighting.**

This gap in capability may indicate areas in which shareable and deployable capabilities are unlikely to fill the gap in capability between scenario-based community capability and national goals. In addition to being far from national goals, **community sheltering, body recovery and storage, long-term housing, and relocation assistance** also represent four of the five capabilities that communities reported being furthest from achieving in their own community goals (Figure 17).<sup>28</sup> The capabilities that communities reported being further from reaching national goals indicate areas within response and recovery that require identifying alternative solutions for capability building in order to effectively respond to nationally catastrophic incidents. Communities, FEMA, and the Federal Government can use this analysis to understand where those national gaps exist and to develop strategies to close those gaps.

## The Risk and Reward of Mutual Aid

When faced with limited resources, communities can augment their capabilities through mutual aid agreements. However, concurrent operations and multi-jurisdictional or catastrophic incidents could stress capabilities that rely on the mutual aid if neighboring (and even distant) communities also experience the same or a different catastrophic incident and cannot spare any resources to deploy. If communities rely on mutual aid alone to fill capability gaps, they are relying on an unconfirmed and potentially unreliable source of resources and capability. For this reason, mutual aid can be both a risk and a capability for communities, depending on situational factors such as concurrent operations, incident severity, and the community's level of capability pre-incident. For example, as large-scale wildfires strike with more frequency in western states, resources that are not already participating in a mobilization system or compact—which can be called upon to deploy and support long-term operational periods—will grow increasingly limited. Data from Los Angeles County indicates that statewide, communities experienced more than 6,000 wildfire-related mutual aid requests in 2018 that could not be filled by the initial agency that was contacted. Although most requests were later filled by other agencies, this indicates that the County's closest partners were unable to assist as they may have been able to do in the past.

A comparison of scenario-based community capability and national capability also identifies capabilities where shareable and deployable resources from across the Nation may be able to support incident response in the aftermath of a nationally catastrophic incident. **Community sheltering (with the exception of sheltering animals), evacuation, hazardous materials cleanup, and restoring water service** capabilities all increased from furthest from the national goals (0–29 percent of goal achievement) to closest to the national goals (70–100 percent of goal achievement) after the addition of shared national capabilities. These results suggest that although communities directly impacted by nationally catastrophic scenarios may struggle to address capability needs in these areas, mutual aid support and resources from communities across the Nation may be available to support incident response and fill the gaps in capabilities. This may suggest that in some cases, building capability to share resources across jurisdictions is as or more important than building local capability.

### Community Goals versus National Goals

Comparing community capability to community goals and national goals indicates that communities are significantly closer to achieving their community-specific goals than the national goals. Although communities and the federal government set goals using the same target terminology, the scope of community goals may be narrower, while national goals may better account for multiple sources of capability (i.e., are broader in scope). Figure 18 displays the percentage of impacts based on the percentage of capability that communities have achieved compared to community goals (top bar) and national goals (bottom bar). The communities identified through the National THIRA process indicated that they have achieved more than 70 percent of their goal capability across 45 percent of impacts against their community goals compared to just 24 percent of impacts against the national goals.

For impacts in which communities are closer to achieving their goals, the national goal far outweighs any level of capability that the community would strive to reach. In addition to identifying gaps in capability, analysis of community goals against national goals helps FEMA identify areas of capability where communities are not planning to build to the level of capability identified by the national target. In other words, for some capabilities, community goals may only achieve 70 percent of the national goal, meaning that communities, in concert with FEMA, the Federal Government, and the private sector may need to identify alternative solutions to meet the remaining 30 percent gap between the community goal and the national goal for a nationally catastrophic incident.

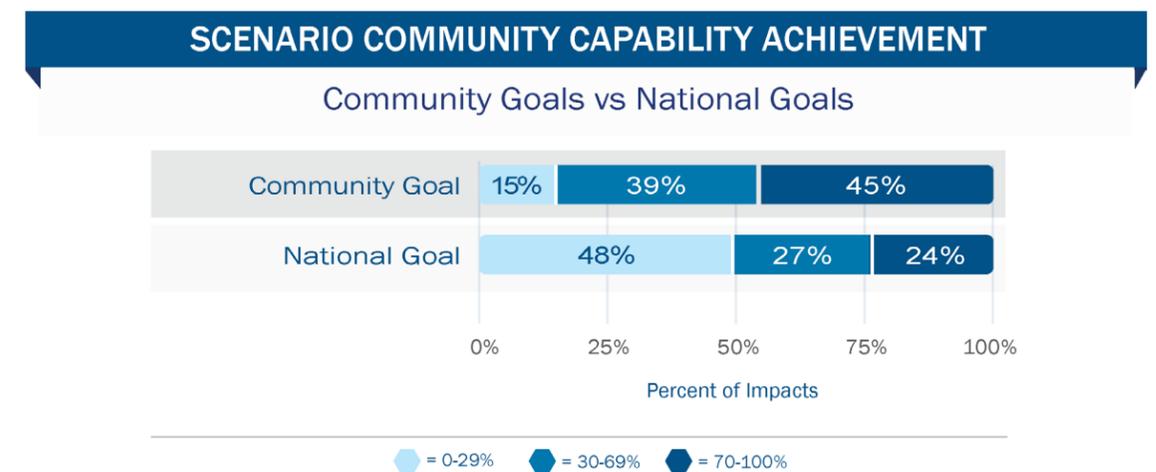


Figure 18: Communities are significantly closer to achieving community goals than nationally catastrophic goals. Note that percentages are rounded, and in some cases may not add up to 100%.

<sup>28</sup> **Cybersecurity**, which was the fifth furthest target from reaching community goals, was not included in the national aggregation.

## HOW ARE COMMUNITIES INVESTING IN PREPAREDNESS?

SLTT governments, private sector partners, and non-governmental organizations play an important role in advancing preparedness initiatives across the Nation. The Federal Government plays a supporting role in these initiatives by providing a wide variety of Federal grants that focus on building and sustaining these capabilities (Figure 19). With these grants, recipients can build emergency capabilities through activities that include risk assessments, exercises, and planning initiatives.

### FEMA Preparedness Case Studies

Each year, FEMA conducts grant effectiveness case studies to demonstrate how communities across the Nation use a mix of homeland security non-disaster grant programs to improve preparedness. Since 2014, FEMA has conducted 21 case studies across 19 communities. In 2019, FEMA conducted case studies for Hawaii; the Port Authority of New York and New Jersey; New York City, NY; the Mashpee Wampanoag Tribe, MA; and Las Vegas, NV.

FEMA is the Nation's largest provider of preparedness grant funding. In fiscal year (FY) 2019, FEMA awarded \$1.7 billion in preparedness grant programs for use across the Nation.<sup>29</sup> Other Federal agencies, including the Department of Education (ED), the Department of Health and Human Services' Centers for Disease Control and Prevention (HHS CDC), the HHS Assistant Secretary for Preparedness and Response (ASPR), the Department of Housing and Urban Development

(HUD), the Department of Agriculture (USDA), the Department of the Interior (DOI), the Bureau of Indian Affairs (BIA), and the Department of Commerce (DOC) Economic Development Agency, provide additional grant funding for disaster preparedness, response, and recovery. Together, these agencies provide critical resources and programs needed to build national preparedness.

### Limited Resources and Capabilities

States, territories, and urban areas often use Homeland Security Grant Program (HSGP) funding, which includes the UASI, State Homeland Security Program (SHSP), and Operation Stonegarden (OPSG) to build and sustain capabilities. Tribes often use the Tribal Homeland Security Grant Program (THSGP) for the same purposes. The HSGP and THSGP were designed to fund planning, organization, equipment, training, and exercises to prevent, protect against, respond to, and recover from acts of terrorism. Some of the targets for which communities are furthest from their goals—including **long-term housing, community sheltering, and relocation assistance**—typically align with catastrophic natural hazards rather than acts of terrorism. Besides investments in planning for these targets, relevant investments generally do not meet the eligibility requirements for HSGP allocations. Alternatively, the target goals communities reported on as being closest to achieving—including **intelligence cycle auditing/execution, unified operations, and interoperable communications**—all have a terrorism nexus. Post-disaster funding, which is separate from HSGP preparedness allocations, have broader allowance potential. On their own, communities likely do not have sufficient funds to build all of the capabilities they need. The HSGP was established to support communities in building capabilities to manage terrorism risks. Due to grant investment requirements additional funds are available for some capabilities relating directly to preventing, protecting

<sup>29</sup> Preparedness grant program allocations for fiscal year 2019 include: the Emergency Management Performance Grant (EMPG); the HSGP, which encompasses the SHSP, UASI, and OPSG; the THSGP; the Nonprofit Security Grant Program (NSGP); the Intercity Passenger Rail - Amtrak (IPR) Program; the Port Security Grant Program (PSGP); the Transit Security Grant Program (TSGP); and the Intercity Bus Security Grant Program (IBSGP).

against, responding to, and recovering from terrorism. The HSGP cannot be used to build capabilities related to catastrophic natural events unless a capability has cross-benefits across both threat types (such as interoperable communications). In this way, the structure of the HSGP encourages communities to prioritize investing in some capability gaps over others.



Figure 19: In FY 2019, grant recipients reported the greatest amount of obligated funding to projects supporting the Planning, Operational Coordination, and Operational Communications Core Capabilities.

## Exercising Gaps

To support communities' ability to identify and address low-level capabilities, the Federal Government has introduced several preparedness initiatives targeted to areas facing potentially catastrophic risks, such as the Cascadia Subduction Zone, Wasatch Fault, and New Madrid Seismic Zone. In 2019, communities most frequently cited earthquakes as the most challenging hazard of concern to one or more of their targets. In 2019, FEMA conducted "Shaken Fury 2019," involving a series of tabletop, functional, and full-scale exercises in partnership with the Department of Energy, Northern Command, state and local governments, and the private sector. The purpose of Shaken Fury was to evaluate and improve the whole community's response to an earthquake, to identify gaps in resources, and to implement a coordinated recovery strategy that prioritizes resources for incident response. Over the next few years, FEMA will hold large-scale exercises related to targets with larger gaps as identified by communities in the THIRA/SPR. In 2021, FEMA will support a large logistics and supply chain management exercise in Alaska. The 2022 National-Level Exercise will center around a Cascadia Subduction Zone incident and will test communities' bottom five capabilities (Mass Care, Housing, Search and Rescue, Logistics and Supply Chain Management, Economic Resilience).

## Individual and Family Capabilities

Although national and community capabilities are critical, preparedness begins with individuals and families. One significant way individuals and families can ready themselves is to take concrete steps to improve their financial preparedness for disasters. Savings are extremely important for managing impacts from disasters, but whether people save and how much they save varies significantly according to how much money they make. Unfortunately, savings rates fell between 2010 and 2016 across four out of five income quintiles (Figure 20). Although only the lowest earners in the first quintile showed an increasing likelihood to save, individuals with lower incomes remained less likely to save than individuals with higher incomes. Overall, significant gaps in individual financial preparedness persist.

### Likelihood of Saving by Income Level and Time Period

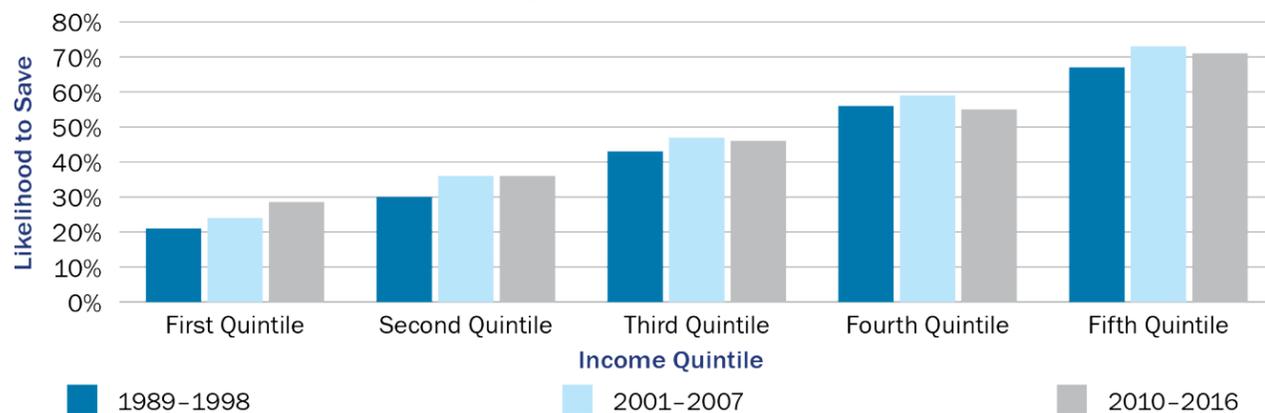


Figure 20: The likelihood of saving by income level and time period. Income quintiles divide the population into five groups from lowest (first quintile) to highest income (fifth quintile), with each quintile representing roughly 20 percent of the population. Calculations based on Federal Reserve, Survey of Consumer Finances.

Encouragingly, recent results from FEMA's 2019 National Household Survey show that individuals and families prioritize important non-financial preparedness steps. Figure 21 illustrates actions that individuals have made to increase preparedness, factors that may influence individual capability, and individuals' perceived preparedness levels. The graphic provides trends in preparedness for each of these subcategories. In 2019, 94 percent of households took at least one preparedness action, such as storing supplies to last three or more days. Furthermore, 62 percent of households took three or more basic actions to prepare for a disaster—an increase of five percentage points compared to 2018. The survey also reported that U.S. residents have taken other actions to prepare for disasters, including gathering emergency supplies, participating in emergency drills, and seeking out information on preparedness among other measures. Other individual preparedness best practices include setting aside money for an emergency, making copies of important financial documents, establishing and practicing an individual or family evacuation plan, and preparing the home for possible incident impacts. Information, resources, and examples of these and additional preparedness measures can be found on the DHS website Ready.gov.

## National Preparedness Results

Legend: Gray = 2018 NHS; Blue = 2019 NHS

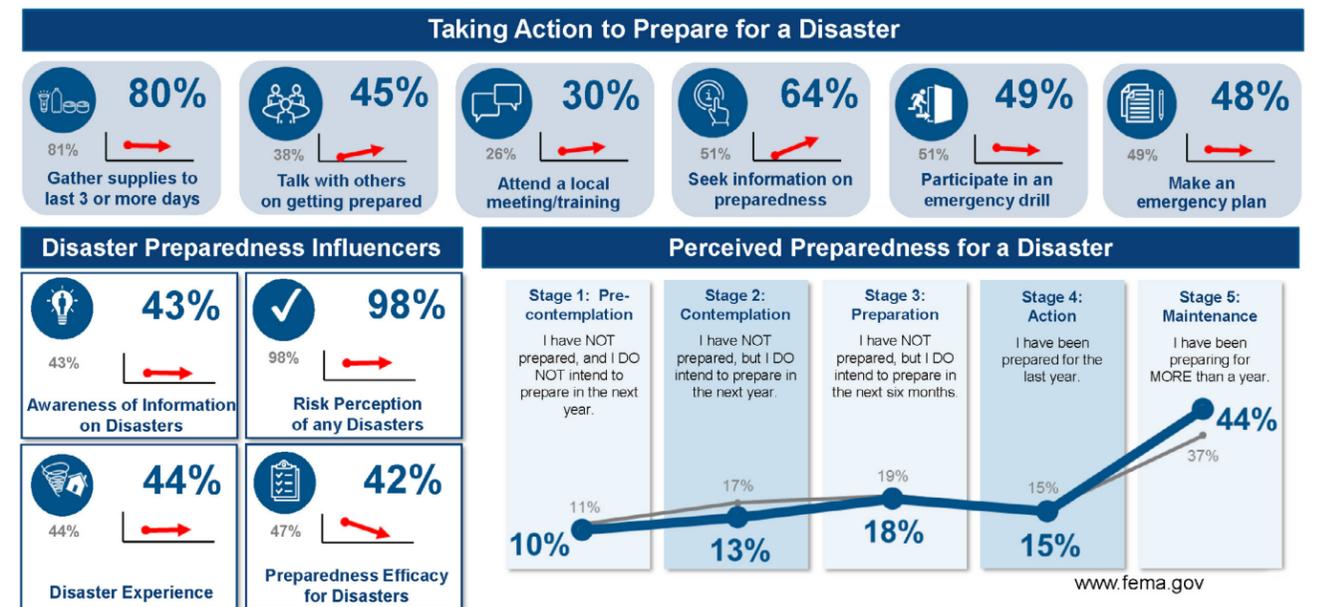


Figure 21: In 2019, Americans reported greater preparedness for disasters compared to 2018.

Although this section provided a broad overview of national, community, and individual capabilities to manage the Nation's risk, the Nation's preparedness for managing any risk is nuanced and situational. The next section, **Critical Considerations in Emergency Management**, explores some of those nuances by providing essential context for some of the Nation's greatest challenges, how stakeholders are working to manage those challenges, and what they can do moving forward to bring the Nation closer to meeting the National Preparedness Goal.

## CRITICAL CONSIDERATIONS IN EMERGENCY MANAGEMENT

Although there are many challenges and successes that this report could highlight, four considerations stood out that merit a deeper discussion. These four areas emerged through analysis of THIRA and SPR submissions, Federal and regional data call submissions, and open-source research. Each of these research streams yielded key findings that fell naturally into the four critical focus areas. These considerations highlight some of the persistent challenges the Nation faces, how it is working collectively to solve those challenges, and what it must continue to do to build on those successes.

**Cascading Impacts:** Increasingly connected systems raise the risk of cascading impacts that challenge the stabilization of the Community Lifelines.

**Public-Private Partnerships:** Disasters disrupt pre-existing networks of demand and supply. Well-developed relationships between emergency managers and the private sector are important for quickly reestablishing key supply chain networks as well as the flow of goods and services.

**Vulnerable Populations:** Disaster preparedness and response starts at the individual level, and as resilience increases among individuals, so too does the collective resilience of the Nation. However, even in communities with a high level of preparedness capability, there are individuals and families who are particularly vulnerable to disasters due to access and functional needs (AFN),<sup>30</sup> a lack of financial savings or insurance, or other circumstances.

**Housing:** For the past eight years, the NPR has reported on communities' low capability to provide long-term housing. External forces in the housing market, including supply, demand, availability, and costs, affect communities' ability to provide long-term housing after an incident.

## CASCADING IMPACTS

Increasingly connected systems raise the risk of cascading impacts, exacerbating existing vulnerabilities and inhibiting the stabilization of complex interactions among Community Lifelines. As discussed in the **Risk** section, a central feature of systemic risks is how a sprawling web of cascading consequences can be initiated by a single origin event. This section focuses on the risk of cascading impacts and how people responsible for risk management can prioritize controlling risk to these most important points of failure and building response and recovery capability to restore them if they fail.

### Lifelines

There are certain core functions that all others depend on. After the 2017 hurricane season, FEMA set out to identify the functions that enable the continuous operation of critical community government and business functions and that are essential to human health and safety or economic security. Defined through seven Community Lifelines (see Figure 22), the failure of these functions can have significant cascading consequences for an entire community, and as such communities should integrate continuity of operations planning to ensure the resiliency of each lifeline.



Figure 22: This figure illustrates the seven community lifelines, which identify the critical sectors of emergency management that enable continuous operation. Refer to <https://www.fema.gov/lifelines> or FEMA's website for additional information on the community lifelines.

<sup>30</sup> "Access and functional needs refer to persons who may have additional needs before, during, and after an incident in functional areas, including but not limited to maintaining health, independence, communication, transportation, support, services, self-determination, and medical care. Individuals in need of additional response assistance may include those who have disabilities, live in institutionalized settings, are older adults, are children, are from diverse cultures, have limited English proficiency or are non-English speaking, or are transportation disadvantaged." Source: FEMA, *National Response Framework*, 4th ed., 2019, [https://www.fema.gov/media-library-data/1582825590194-2f000855d442fc3c9f18547d1468990d/NRF\\_FINALApproved\\_508\\_2011028v1040.pdf](https://www.fema.gov/media-library-data/1582825590194-2f000855d442fc3c9f18547d1468990d/NRF_FINALApproved_508_2011028v1040.pdf), accessed April 14, 2020.

## CRITICAL CONSIDERATIONS IN EMERGENCY MANAGEMENT

FEMA and the Federal Government can use THIRA/SPR data to gain a stronger understanding of a community's capability related to restoring critical services and stabilizing lifelines. THIRA/SPR-standardized impacts directly link to the seven lifelines, and an analysis of impacts across these functions indicates a community's ability to stabilize in the wake of an incident. As discussed in the Capabilities section, FEMA assessed communities' reported capability against national goals to find out how close, or how far, communities are from being able to stabilize community lifelines on their own, without any mutual aid, non-governmental, or Federal support, after a nationally catastrophic incident.

Figure 23 indicates that internal community capability varies across Community Lifelines. Communities may have internal capability to manage impacts from a nationally catastrophic scenario for certain lifelines but may require more significant support in others. Understanding where these potential strengths and vulnerabilities exist can help focus preparedness efforts. The figure displays the standardized impacts (each dot represents one impact) across the lifelines based on the percentage of the national goal that communities have achieved. Communities reported achieving less than 30 percent of the national target across many Community Lifelines, including Food, Water, Shelter; Hazardous Material; Health and Medical; and Safety and Security. Additionally, multiple FEMA regions cite Food, Water and Shelter, Communications, Energy, and Safety and Security as consistent gaps. In these areas, communities anticipate greater need for support from either mutual aid or other non-governmental, private sector, or Federal sources to effectively respond to a nationally catastrophic incident.

### National Achievement Across Scenario Communities By Lifeline

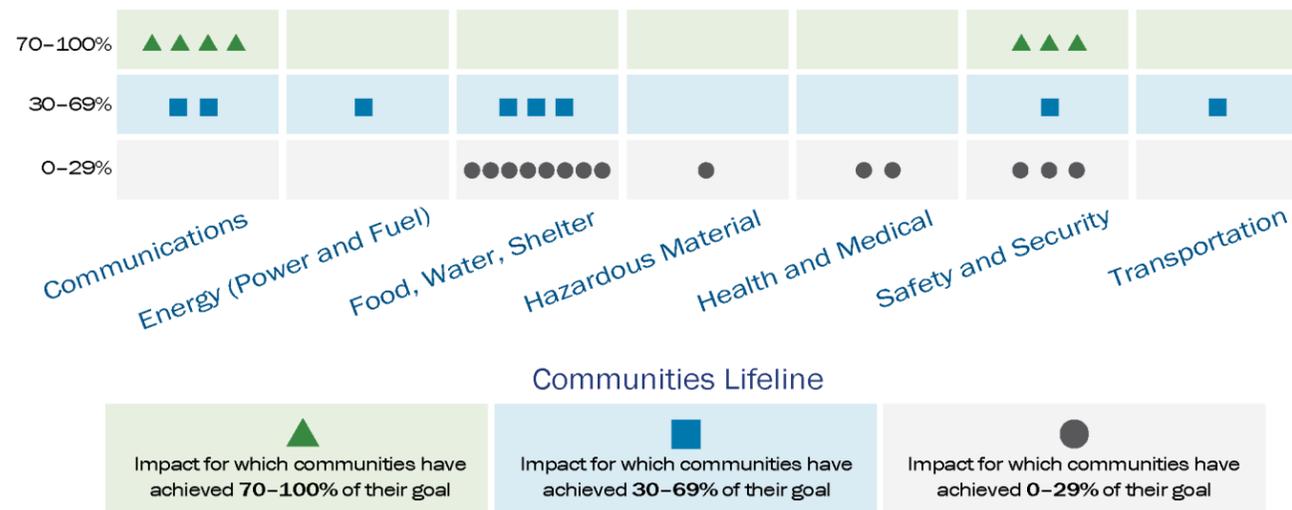


Figure 23: Level of national goal achievement for scenario communities varies across Community Lifelines.

### National Critical Functions

CISA developed the NCF in 2019 to focus on national-level risk (Figure 24). The NCF are “the functions of government and the private sector so vital to the United States that their disruption, corruption, or dysfunction would have a debilitating effect on security, national economic security, national public health or safety, or any combination thereof.” The NCF serve as a risk management tool and help prioritize critical infrastructure protection and mitigation efforts. Moreover, the NCF “enable the organization of similar critical infrastructure operations across sector lines.”

By establishing a set of critical functions performed by critical infrastructure, the NCF approach enables a richer understanding of how entities come together to produce critical functions, which then contributes to understanding the key assets, systems and networks that contribute to the functions, as well as critical technologies, and dependencies that enable the function. Investments in controlling risks to critical infrastructure and responding to related incidents have the potential to mitigate significant consequences for communities and the Nation.

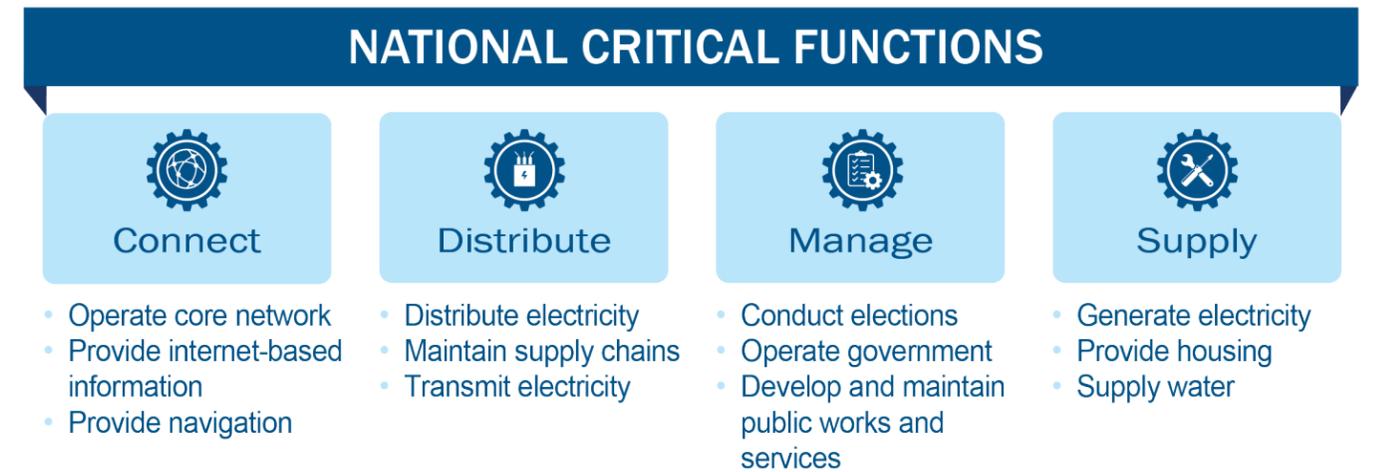


Figure 24: A subset of the CISA-developed NCF. NCF identify the essential functions of government and the private sector that if disrupted, could cause detrimental effects.<sup>31</sup>

### The Complexity of Managing Interconnected Systems—Power and Supply Chain

Whether before or during an incident, it is vital to identify the potential or actual failure of a system, and what function within that system could or has failed. It is typically less complicated to manage a single failure than a web of consequences. Figure 25 demonstrates the possible impacts to both government and private sector entities and underscores why securing the Nation against major outages is so important to preserving Community Lifelines. This figure also demonstrates the types of consequences the whole community should prepare for and attempt to mitigate if major power outages remain a threat. Because power is a system, a risk to one function can be a risk to the entire system. The NCF are structured to support this analysis, identifying energy connection, generation, distribution, and management as separate critical functions.

<sup>31</sup> The full set of NCF may be accessed at <https://www.cisa.gov/national-critical-functions-set>. Source: CISA

One management strategy is to build a capability to sustain power on a short-term basis. When power is out, generators and fuel enable critical response capabilities that limit cascading consequences. Unfortunately, the capability of governments, businesses, and individuals to access needed resources such as fuel and generators is also susceptible to threats in the supply chain. For instance, a major hurricane could cause widespread power outages while also damaging a major port, limiting the flow of goods to the affected area.

## CASCADING IMPACTS OF A POWER OUTAGE



Figure 25: Potential cascading impacts from a long-term power outage.

These challenges are most acute in communities likely to become isolated after an incident. For example, Ocracoke Island, located off the coast of North Carolina, experienced the worst effects in the state following Hurricane Dorian (2019). The island, which is only accessible by boat, remained closed to all but emergency personnel as ferries brought three days' worth of fuel and drinking water to residents who had remained in their homes throughout the incident. The island experienced a mass power outage, and those with electrically

dependent medical conditions had to be taken inland to ensure their safety.

After Hurricane Florence in 2018, areas in North and South Carolina experienced mass power outages that disrupted the supply chain function. To help address these impacts, the United Parcel Service (UPS) partnered with FEMA and other humanitarian aid groups to provide monetary support as well as provide critical goods and services. This collaboration also worked to assess long-term needs and committed additional funding and assistance during the post-crisis recovery phase. Partnering with private businesses like UPS that have extensive resources and established infrastructure will help to ensure the supply chain is sustained after a disaster.

Supply chains, like power systems, are extremely complex and require both physical and cybersecurity management strategies. To address the cybersecurity aspects of securing supply chains, the National Institute of Standards and Technology (NIST) has issued several publications that provide guidelines to Federal agencies relevant to managing these risks. Specifically, NIST Publication 800-161 provides a multi-tiered risk management process to mitigate supply chain risks throughout the system development life cycle. The 2019 FEMA Supply Chain Resilience Guide identifies two primary roles for emergency managers related to supply chain resilience: "(1) To foster collaboration with and among supply chain partners to promote actions that make supply chains of critical goods and services more resilient, and (2) To develop an awareness of supply chains and their vulnerabilities and use that information to inform response and recovery planning."

DOE CESER is also focused on supply chain security with the Cyber Testing for Resilient Industrial Control Systems (CyTRICS) program. CyTRICS will test cyber resilience of critical operational technology components in the energy sector by identifying priority vulnerabilities in the digital supply chain – the software and firmware underlying key system components. These observations will inform both mitigation of discovered vulnerabilities and downstream improvements in design and manufacturing.

## The Complexity of Managing Interconnected Systems—Dependence on Technology

Interconnectedness creates challenges for large-scale systems, while individuals have simultaneously grown more dependent on those systems. This confluence of challenges has increased potential risks to Community Lifelines and the potential impacts to communities. Over the past two decades, adult internet usage has increased from 52 percent of adults to 90 percent of adults (Figure 26), but access to the internet through smartphones or home broadband is not uniform (Figure 27). Perhaps more importantly, the number of critical, everyday functions delivered through the internet has grown significantly over time.

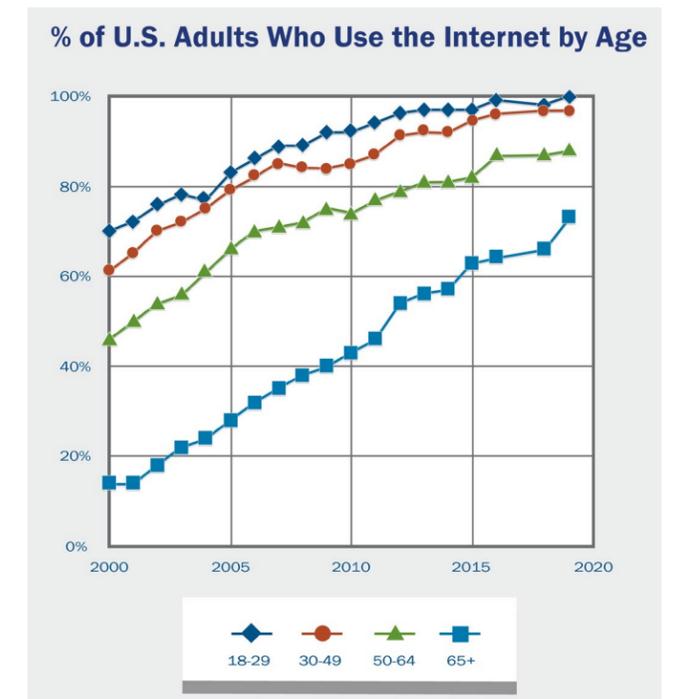


Figure 26: Percentage of U.S. adults who use the internet by age. Source: Pew Research Center

Many services, such as banking, global positioning systems (GPS), and information sharing are done via smartphones. For example, in 2018, 46 percent of Americans said they are not concerned whether they have cash with them, since there are other ways to pay for things. This represents a seven-percent increase in only three years. Those other ways to pay for things typically depend on power and/or internet. Drivers have become similarly reliant on GPS, with less than 50 percent keeping a paper map in their vehicles, a number that is even lower for younger drivers (34 percent for drivers between 18 and 39 years of age). This lack of individual resilience can hinder emergency evacuation efforts.

The dependency of effective communication on adequate power supply can also make it difficult for government officials to communicate with survivors during a power outage. Further, individuals and communities without plans may not know where to find public information such as evacuation warnings or shelter locations without access to the internet or cellular phones.

### % of U.S. Adults Who Say They Have or Own the Following

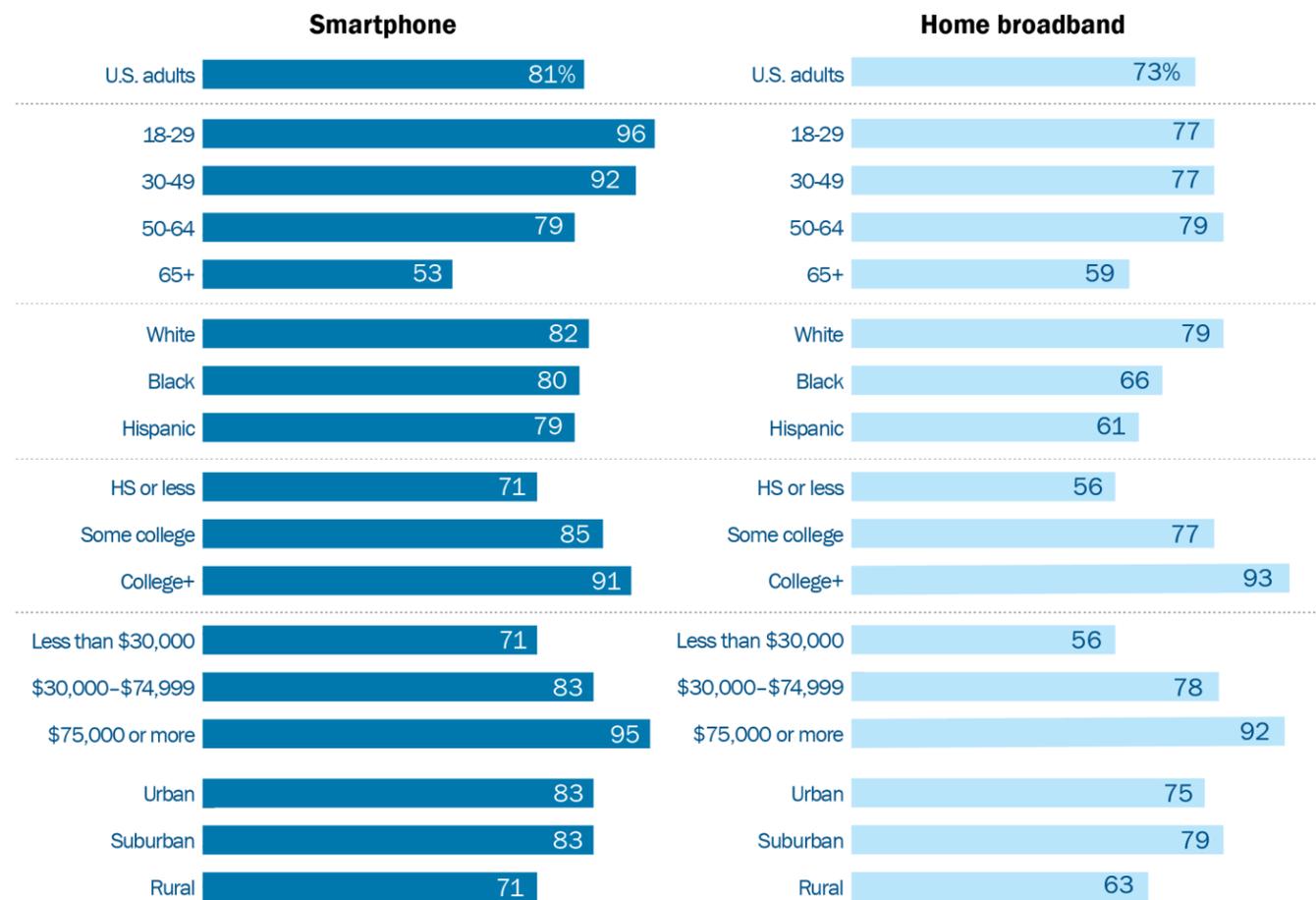


Figure 27: Percentage of U.S. adults who say they have or own smartphones or home broadband.

Source: Pew Research Center

### The Path Forward: Collaboration for Resilience

Connected systems are an inevitable and growing part of modern life. Risk managers should continue to prioritize controlling risk to critical areas and work with individuals to make them aware of their dependencies and help them plan to manage the absence of technology.

The National Response Framework’s (NRF) emphasis on Community Lifelines promotes deeper collaboration with the private sector and nongovernmental organizations (NGO). During disasters in 2017 and 2018, businesses and infrastructure owners worked together to form collaborative relationships with government agencies to help accelerate the stabilization of dependent lifelines. Additionally, using the Emergency Support Function (ESF) 14: Cross-Sector Business and Infrastructure annex, the emergency management community can institutionalize this progress to build official channels of collaboration and establish roles for public, private, and NGO partners during a disaster. Building these connections before an incident occurs will help all parties prioritize risk control and restoration efforts. Cross-community efforts can reduce consequences during incidents, hasten recovery, and improve community resilience.

Emergency managers should also work with private sector stakeholders, such as small business owners and farmers, to explain the potential limitations of public infrastructure and stress the need for self-sufficiency. Likewise, emergency managers should continue to work with the public to help individuals and families make their own plans, so they will know what to do, where to go, and how to access critical resources during a power or communication outage. FEMA’s Business Emergency Operations Center Alliance functions to advocate for these public-private partnerships in emergency management. Services may include information sharing, business continuity, and critical infrastructure collaborations.

### PUBLIC-PRIVATE PARTNERSHIPS

The private sector owns much of the Nation’s critical infrastructure and manages much of the Nation’s risk. Both the NCF and Community Lifelines recognize the role that private sector risk management plays in the control and overall management of risk. As such, national doctrine reflects the need for the private sector to play a larger, more comprehensive role in preparedness and response activities. In 2019, the NRF introduced ESF #14: Cross-Sector Business and Infrastructure to coordinate multi-sector response operations between (or across) the government and private sector for natural or human-caused catastrophic incidents that jeopardize national public health and safety, the economy, and national security. ESF #14 is built on the principle that infrastructure sectors are interdependent and can help prevent and limit the cascading impacts of disasters.

The private sector plays a critical role in all aspects of risk management. This section highlights examples of how the public and private sectors work together to avoid, control, transfer, and accept risk and how those actions can provide a blueprint for the path forward.

#### Communication in Practice

Communication is vital to ensure proper goods and services are provided during a disaster. During 2017’s Hurricane Maria in Puerto Rico, media reporting a shortage of water prompted FEMA to send this essential good. However, the private sector had enough water to distribute and communication outages prevented survivors from learning where it was available. To avoid these situations, communities should establish alternate channels of communication to relay messages.

## Risk Avoidance

Risk avoidance is the most difficult of the risk management approaches, but also the most impactful. Risk is not always avoidable but identifying those risks that are provides insight into the threat landscape. One area in which the Nation has been successful in fully avoiding risk is public health investments which have eradicated certain diseases. Vaccines, which are often created and sourced through public-private partnerships, have proven effective at stopping the spread of specific illnesses and diseases among the population. In the case of public health, avoidance typically starts as risk control and, in time, advances toward full avoidance.

On September 19, 2019, the President issued an executive order on modernizing influenza vaccines in the United States to promote national security and public health. In accordance with this executive order, HHS established a public-private partnership through a contract between the Biomedical Advanced Research and Development Authority, part of the HHS ASPR, and Sanofi Pasteur, a global pharmaceutical company headquartered in New Jersey. The partnership is part of a \$226 million contract between the two organizations to expand pandemic influenza preparedness.

Most current influenza vaccines are made in chicken eggs, using a 70-year-old process that requires months-long production timelines, limiting their utility for pandemic control. These vaccines rely on a potentially vulnerable supply chain of eggs and are unsuitable for efficient and scalable continuous platforms. Recombinant vaccine technology produces new vaccines faster than traditional egg-based technology. As a result of this public-private partnership, Sanofi Pasteur could provide nearly 100 million doses of recombinant influenza vaccine for use during a pandemic, potentially protecting individuals from pandemics and saving lives.

## Risk Control

Risk can be controlled by decreasing the probability of occurrence, limiting vulnerabilities to a threat or hazard, or providing timely response and recovery.

### REDUCTION OF PROBABILITY OF OCCURRENCE

Disease eradication often begins with control measures that reduce the likelihood of the disease being spread. These measures make individuals less vulnerable and reduce the likelihood that outbreaks will occur. Human adversaries also can be deterred by actions to protect assets and networks. Sometimes the actions make it harder for the adversary to succeed; other efforts may substantially reduce the direct effects and consequences of an attack. These controls reduce the likelihood of attacks, causing some adversaries to give up or to move on to other targets whose vulnerability makes them more attractive. New York Police Department (NYPD) SHIELD, a public-private partnership built around bi-directional information sharing, is built on this premise. NYPD SHIELD provides training services and intelligence briefings to private sector partners on how to defend against terrorism, helping create a more vigilant and involved community.

### CONTROL OF VULNERABILITIES

Communities across Southeast Texas engage in public-private partnerships to control vulnerabilities through improved community resilience and situational awareness. The Southeast Texas Alerting Network (STAN) is a messaging and notification system that keeps the communities of Southeast Texas informed about emergencies and other important events in the area. Through the STAN, industrial companies and emergency management officials quickly notify stakeholders, including local residents and company workers, about emergencies. After the 2019 TPC chemical plant explosion in Port Neches, Texas, the STAN provided critical situational awareness messaging to residents within the evacuation area of the chemical plant. The TPC chemical plant explosion prompted the evacuation of 60,000 residents within a four-mile radius of the plant. Several weeks after the explosion, TPC

officials and local fire chiefs engaged in a series of alerting tests through the STAN to improve alerting networks, after reports that some locals did not receive STAN messaging services during the incident. Despite some gaps in coverage, the STAN provides critical situational awareness to Southeast Texas communities and residents, allowing them to leave harm's way and decreasing their vulnerability to impacts from the event. State and local governments in high-risk areas can consider the STAN as a model to alert its residents of emerging threats and hazards in real time.



**The TPC Chemical Plant Explosion**

*The TPC chemical plant explosion shattered windows, destroyed roofs, and forced the evacuation of 60,000 local residents. The explosion injured eight people, three of whom worked for TPC.*

## IMPROVED RESPONSE AND RECOVERY

Improved pre-event coordination between governments and the private sector can improve post-event response and recovery. As an example, the Michigan State Police, Emergency Management and Homeland Security Division (MSP/EMHSD) expanded its Public/Private Partnership (P3) program to improve response and recovery efforts (Figure 28). MSP/EMHSD organizes the P3 program around FEMA's seven Community Lifelines, designating certain stakeholders as main points of contact in an emergency to help stabilize their appropriate community lifeline. MSP/EMHSD remains in continuous contact with its stakeholders, offering Incident Command System training year-round and bolstering relationships systematically through Local Energy Assurance Planning workshops. These workshops develop regional and local energy assurance plans, bolstering Michigan's and its partners' energy sector resilience. Through the P3 program, MSP/EMHSD and its 17 private sector partners improve information sharing, disaster resilience, and community lifeline stabilization before, during, and after a disaster.



## FEMA Regions' Success with Private Sector Engagement

- Region V identified a way to improve Individual Assistance case management services by using Interagency Reimbursable Work Agreements with the American Red Cross to increase capacity and deliver quicker support.
- Region VI Individual Assistance partnered with the ride-share company Lyft to offer voucher codes to enable disaster survivors with limited mobility to take reduced-cost Lyft rides to and from Disaster Recovery Centers.
- Region VII partnered with the Boy Scouts of America to help create a culture of preparedness by training and empowering Boy Scouts during an emergency and to contribute to community preparedness.



Figure 28: The P3 Program enhances public-private partnerships at the community level.

Other public-private sector coordination efforts include the National Oceanic and Atmospheric Administration (NOAA)'s Weather-Ready Nation (WRN) Ambassador initiative that formally recognizes NOAA partners who are improving the nation's readiness, responsiveness, and overall resilience against extreme weather, water, and climate events. The WRN Ambassador initiative helps unify the efforts across government, non-profits, academia, and private industry toward making the nation more ready, responsive, and resilient against extreme environmental hazards.

### Risk Transfer

Insurance is a classic example of how one party (the insured) transfers risk to another (the insurer). Although most insurance is individual to private sector, or private sector to private sector, a growing amount of risk is being transferred from governments to the private sector.

One mechanism for doing this is through catastrophe (CAT) bonds. An increasing number of companies and governments have been using CAT bonds to better prepare themselves for major disasters. A CAT bond is a high-yield debt instrument designed to raise money for companies in the insurance industry in the event of a natural disaster. A CAT bond allows the issuer to receive funding from the bond only if specific conditions occur, such as a hurricane or earthquake. In this way, CAT bonds transfer risk to investors. In return, investors receive a higher interest rate than most fixed-income securities over the life of the bond, typically having a maturity of up to five years.

In 2012, Congress granted FEMA the authority to obtain reinsurance from the private sector through the Biggert-Waters Flood Insurance Reform Act. This legislation enables FEMA to take key steps toward achieving a stronger and more resilient NFIP. On April 17, 2019, FEMA entered into a three-year reinsurance agreement with Hannover Re (Ireland) Designated

Activity Company. Hannover transferred \$300 million of the NFIP financial risk to capital markets investors by sponsoring the issuance of CAT bonds. For a given flood incident, this agreement is designed to cover 2.5 percent of losses between \$6 billion and \$8 billion, and 12.5 percent of losses between \$8 billion and \$10 billion. Similarly, the Texas Windstorm Insurance Association, a residual market property insurance company, secured \$2.1 billion in private market reinsurance and catastrophe bond protection for the 2019 Atlantic hurricane season. Effective June 1, 2019, the agreement provided a total aggregate funding of \$4.2 billion, with 50 percent of the funding coming from insurance-linked securities markets via catastrophe bond transactions. These private contributions better prepare communities for disaster-related costs after an incident and can decrease recovery time.

### Risk Acceptance

Risk managers may decide that avoiding, controlling, or transferring all risk is not cost effective, and instead accept the risk that remains. Intentional acceptance of risk is a critical tool for balancing priorities. The private sector can play an important role in providing incentives for state and local governments to be financially prepared to balance the amount of risk they have accepted.

Communities depend on borrowing funds for any number of public projects. The cost of those funds depends on their community's credit rating. These credit ratings are administered by private sector companies, such as Standard and Poor's (S&P) and Moody's, which assess community financial risk. Disaster risk is one form of financial risk.

In recognizing the important role disaster risk plays in community credit ratings, Moody's found that cities are increasingly adopting plans that detail specific projects designed to strengthen infrastructure and minimize economic disruption from natural disasters.<sup>32</sup> This increasing focus on disaster risk reduction can have a positive effect on communities' credit, lowering their cost of borrowing.

On the other hand, a lack of financial reserves to manage disasters can have a negative impact on credit ratings, increasing the overall cost of borrowing. Rainy-day funds are an effective way for communities to self-insure against disaster risk. All 50 states have a rainy-day fund (or equivalent), but keeping those funds adequately funded can be a challenge. Some states, such as California, specifically identify disasters as a justification for accessing rainy-day funds. States that have rainy-day funds to cover response and recovery costs are less likely to see a decrease in credit rating after a disaster.

### The Path Forward: Policy and Doctrine

Investments in community infrastructure represent a critical mitigation action, particularly given that communities' main threats and hazards of concern—including hurricanes, earthquakes, flooding, and wildfires—all disproportionately affect infrastructure currently in need of repair. Public-private coordination may allow government agencies to recommend or support threat-specific updates to better protect critical infrastructure facilities. Public-private coordination safeguards essential services while protecting privately held assets. The 2019 National Mitigation Investment Strategy (NMIS) describes steps to improve private-public coordination, catalyze private and nonprofit sector mitigation investments and innovation across the whole community, and make data- and risk-informed decisions that account for long-term costs and risks. The Investment Strategy addresses future

<sup>32</sup> 2019 THIRA/SPR data for economic recovery and infrastructure systems indicates communities mainly sustained capability over the last year for these two targets, with some communities reporting they built capability. However, the THIRA/SPR is one of many metrics that can measure communities' capability, and since the THIRA/SPR uses standardized indicators, there are some aspects of preparedness that are not encompassed in this analysis. Moody's analysis offers an additional method for understanding community capability in these areas.

risks throughout, as the scope includes a focus on population growth, development, and changing weather conditions (“changing conditions”), which will influence mitigation needs and priorities. The NMIS encourages community members to invest in pre- and post-disaster mitigation by adopting the strategy’s three goals.

Recognizing that the private sector plays a role in every aspect of risk management is the first step toward harnessing its power to build a more resilient Nation. Although significant progress has been made in recent years toward involving the private sector, 2019 was a big step forward in formally incorporating the private sector into national policy and doctrine. The NCF, ESF #14, and the 2019 NMIS all point the way forward to a better and more incorporated private sector.

## VULNERABLE POPULATIONS

Disaster preparedness and response starts at the individual level. However, even in communities with high levels of preparedness capability, there are individuals and families who are particularly vulnerable to disasters due to AFN,<sup>33</sup> a lack of financial savings or insurance, or other circumstances. Age, financial insecurity, pregnancy, and identification with a historically disadvantaged group—including minorities and the lesbian, gay, bisexual, transgender, queer (LGBTQ+) community<sup>34</sup>—are all factors that can increase vulnerability. The presence of these characteristics indicates that affected individuals or groups are more likely than others to be severely impacted by disasters and may require additional or distinct support after a disaster occurs or

<sup>33</sup>. “Access and functional needs refer to persons who may have additional needs before, during, and after an incident in functional areas, including but not limited to maintaining health, independence, communication, transportation, support, services, self-determination, and medical care. Individuals in need of additional response assistance may include those who have disabilities, live in institutionalized settings, are older adults, are children, are from diverse cultures, have limited English proficiency or are non-English speaking, or are transportation disadvantaged.” Source: FEMA, *National Response Framework*, 4th ed., 2019, [https://www.fema.gov/media-library-data/1582825590194-2f000855d442fc3c9f18547d1468990d/NRF\\_FINALApproved\\_508\\_2011028v1040.pdf](https://www.fema.gov/media-library-data/1582825590194-2f000855d442fc3c9f18547d1468990d/NRF_FINALApproved_508_2011028v1040.pdf), accessed April 14, 2020.

<sup>34</sup>. This acronym non-exhaustively represents a spectrum of sexual orientations and identities that have historically been socially repressed and excluded.

during steady-state disaster preparation. Although Americans are taking important steps to increase their preparedness, many vulnerabilities are difficult to address at the individual level. This section presents a discussion on the need for emergency managers to plan for the whole community, including those with civil rights protections such as individuals with disabilities and individuals with limited English proficiency. The Stafford Act requires that disaster assistance be delivered without discrimination on the grounds of race, color, religion, nationality, sex, age, disability, English proficiency, or economic status. Engaging these protected populations within their communities through advocacy organizations, businesses, and nonprofit organizations can prepare emergency managers to address needs more holistically in real time. Emergency managers cannot resolve all such vulnerabilities, but they should work with partners to control pre- and post-disaster vulnerabilities, plan to address the unique needs of vulnerable populations, and quickly restore social safety nets after a disaster.



### Types of Vulnerability

Individuals may experience one or more of many diverse vulnerabilities, any of which may be more or less influential during or after a disaster.

Highly impactful vulnerabilities include:

- Individual economic insecurity
- Lack of access to transportation
- Language barriers
- Dependence on electricity for in-home medical equipment
- Isolation and lack of familial resources

## Socioeconomic Vulnerabilities

With less of a financial safety net, individuals and households at a lower socioeconomic status face greater vulnerability during and after a disaster incident. Additionally, individuals with disabilities are far more likely to be impacted by poverty than individuals without a disability. Recent data from the American Community Survey indicates that 22 percent of the nearly 60 million Americans with disabilities live in poverty, significantly reducing the chance that they can successfully recover from any disaster. Disasters can be costly, as a storm can damage or destroy belongings. Households may need to pay out of pocket for additional expenses such as evacuating to a hotel, and difficulty finding a Wi-Fi signal may prompt individuals to exceed their normal cell phone plan to stay connected and informed. Recent survey results from FEMA indicate that although about 70 percent of adults have some emergency savings, nearly half of all adults have no more than \$700 on hand. Another widely cited figure shows that nearly 40 percent of Americans are unable to meet an unexpected expense of \$400 with cash or savings. Households without emergency savings or with little or no access to credit will struggle to meet out-of-pocket expenses, even if some expenditures can be reimbursed later.

Low-income individuals and families may also have limited access to transportation options, which can impede a variety of pre- and post-disaster activities.<sup>35</sup> Individuals who rely on public transportation, including paratransit and other accessible options, will have less flexibility and possibly less capability to evacuate from an affected area. This individual capability gap is compounded if public transportation options are temporarily reduced or eliminated in preparation for a disaster or due to the damage caused by an incident. After a disaster, households displaced by damage may not have access to their customary public transportation options, making it difficult to maintain employment. Post-disaster transportation options may take longer

<sup>35</sup>. Additional populations that have limited access to transportation options include individuals with physical disabilities.

and be more expensive, absorbing resources that would otherwise be used for recovery. Individuals reliant on public transportation may also experience challenges visiting a FEMA Disaster Recovery Center to access recovery services.

Housing and insurance affordability are also particularly persistent problems for people with socioeconomic vulnerabilities. As discussed further in the Housing section of this report, a nationwide shortage of affordable housing may be locally intensified after a disaster, as damage to affordable and general housing stock increases the demand for a reduced number of housing units. Investments in risk transfer measures, like insurance, are cost-effective in the long term but often cost-prohibitive in steady-state for households with low income. For example, although 51 percent of households in areas with the highest flood risk are considered to have low income, only 26 percent of NFIP policies in high-risk areas are held by low-income households—exactly the population that would benefit most from a post-disaster insurance payout. Compounding this, Federal disaster aid is not intended to cover the full cost of recovery, so these individuals will likely fall further behind after a disaster.

## Individuals with Power-Dependent Medical Equipment

Government and private sector stakeholders are increasingly aware of the impact of power disruptions on households of individuals with disabilities and older adults who use electricity-dependent equipment. With more individuals using in-home medical equipment (e.g., dialysis machines, oxygen delivery devices) to live independently while maintaining their quality of health, it is critical that emergency managers work with community organizations and private industry to ensure that power restoration to these households is addressed quickly and early in response operations. Among the 129 fatalities related to Hurricane Irma in 2017,

20 of those fatalities were identified by the HHS CDC as power-outage related, including fatalities caused by heat exposure due to lack of air conditioning in facilities and by failure of electricity-dependent medical equipment. Planned electrical outages intended to control wildfire risk during California's 2019 wildfire season further highlighted the susceptibility of these populations to power outages and the necessity of electricity and backup power options at emergency shelters. Individuals were not always aware of, or able to access, substitute electrical resources available during outages, and often incurred additional expenses to adjust to the interruption of residential electrical service. Identifying these individuals is critical for emergency managers to mitigate impacts from an incident. HHS's emPOWER program can help SLTT partners locate electricity-dependent Medicaid recipients who may be especially vulnerable during a disaster. Figure 29 illustrates the potential impacts specific to different groups of vulnerable populations.

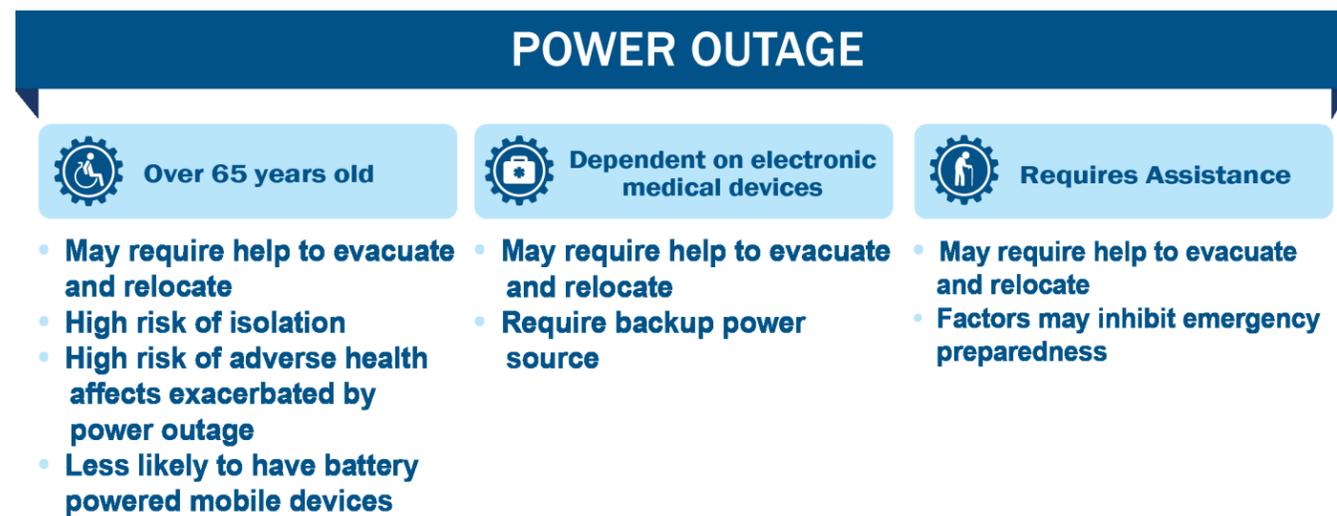


Figure 29: Specific impacts of power outages on vulnerable populations.

The Mashpee Wampanoag Tribe in Massachusetts addressed this problem by prioritizing the needs of its Tribal Elders in its planning and funding allocation. The tribe purchased generators for Elders' homes, especially to keep medical equipment running during power outages. Further, the Mashpee Wampanoag Tribe Emergency Management Department purchased emergency response vehicles and used them to check in on Elders and children affected by snowstorms and other emergency situations.

Other local emergency response structures have been challenged to address power and medical needs during outages. In jurisdictions affected by Hurricanes Harvey, Irma, and Maria in 2017, older adults and individuals with disabilities struggled to effectively evacuate when roads became impassable. People who were deaf or hard of hearing could not receive key emergency communications in areas where those messages were

primarily broadcast by radio because the medium was inaccessible to them. Federal agencies have dedicated offices that are specifically tasked to address and support the disability community in accessing emergency communications. These should be leveraged to address issues with the disability community. In addition, unless the radios were battery operated, the lack of electricity also made the radio broadcasts ineffective for many without power. Within some shelter facilities, medical, power, and other needs could not be accommodated. During the 2018 Camp Fire in California, 67 of the 85 fatalities were individuals 65 or older, and 13 lived with AFN. Increased training and preparation for emergency responders to serve and support individuals with disabilities, or AFN, in coordination with community disability organizations, will improve emergency managers' ability to serve the whole community during a response operation.

Both the Federal Government and states are working to address these challenges. FEMA and HHS ASPR are updating the 2010 Functional Needs Support Shelter Guidance to address the gap, noted above, between individual needs for power and availability of power and backups in emergency shelters. States are working to improve coordination and outreach to individuals who rely on electrically dependent medical equipment. In 2019, during the public safety power shutoffs in California, the state initiated a Public Safety Power Shutoff Planning Team within the California Health and Human Services Agency (CHHS) to share information with in-home support services on upcoming power shutoffs. CHHS also created a data dashboard for local response partners to share and message information related to individuals with durable medical equipment, healthcare facilities, community care facilities, weather, and utilities.

### Isolation and Lack of Familial Resources

Many individuals with vulnerabilities rely on government services or nonprofit programs for supplementary social or financial support, but those resources may become more difficult to access post-disaster, exacerbating existing vulnerabilities. One example is that after disasters, incidents of domestic violence and abuse may become more prevalent, and some programs and services, such as violence prevention, child welfare, and other social support programs, can be interrupted through evacuation or disruptions to physical supply chains and electronic record-keeping systems. Individuals who are already affected by domestic violence and use these programs may often be uniquely unable to connect with conventional family or community support systems for fear of continued or renewed abuse.

After disasters, the risk of child maltreatment may also increase, and children in the foster care system who rely on their foster families and public support are particularly susceptible. Child welfare agencies frequently manage high caseloads and everyday emergencies, and during a disaster, many of these agencies and services may struggle to continue normal operations.

In addition to funding over 1,600 local organizations and programs that serve domestic abuse survivors, HHS Administration for Children and Families (ACF) has issued guidance materials to improve disaster services for individuals with additional social needs. New training materials for disaster response personnel increase their awareness of domestic violence survivors' needs and strengthen their ability to connect survivors to appropriate post-disaster services. ACF has also established the Child Welfare Information Gateway Center to connect state and local child welfare agencies to resources and guidance in preparing for, responding to, and recovering from disasters. The Information Gateway also provides agencies audience-specific information and tools to equip families and service providers to respond to natural and man-made disasters, along with a guide for disaster preparedness and response professionals to understand how they and child welfare professionals can support each other's efforts when addressing the safety and well-being of children and families during all phases of disasters.

Across the United States, single-parent households account for about 30 percent of households with children, a share that has grown in recent decades. Single-parent households tend to have lower socioeconomic status and fewer social support resources—characteristics of many types of vulnerability—than two-parent families. A strategy of coordinated outreach to single-parent households during steady-state preparation led by state or local emergency preparedness offices can raise awareness of existing community resources such as the Supplemental Nutrition Assistance Program (SNAP), Head Start, and local foodbanks. Community emergency response plans should also be structured to account for local childcare needs. The highest concentration of single-parent households is found throughout the southeast region of the Nation as well as in Puerto Rico; emergency managers in these regions can improve disaster preparedness for this significant segment of their communities by partnering with the above organizations or similar, local organizations.

## Federal Efforts to Reduce Post-Disaster Financial Hardship

Certain risks cannot be controlled with individual action alone; recognizing this, the Federal Government has been working to address broader financial vulnerabilities and the challenges that stem from them post-disaster. As an immediate response measure, the U.S. Department of Labor’s Employment and Training Administration can provide Disaster Unemployment Assistance to disaster-impacted individuals who are unemployed or between jobs. This support not only helps affected families to make ends meet after a disaster, but because distributed Assistance funds are often spent locally, this program helps to stabilize the local economy and prevent additional loss of businesses and jobs after a disaster.

The Consumer Financial Protection Bureau (CFPB) is another resource for household financial guidance at all stages of disaster recovery and preparedness. CFPB offers a series of free guides to managing household finance, including a specific guide for building financial disaster preparedness. Other general guides discuss the importance of building an emergency fund and include a comprehensive set of strategies to make saving money easier; resources like CFPB’s Savings Boot Camp can encourage people to start or continue building their emergency fund. Further, and in line with the agency’s mission to protect consumers, CFPB has issued statements in response to major disasters that advise other financial entities on how best to provide flexibility to affected customers.

At a broader level, FEMA is updating NFIP to make coverage more accessible. NFIP has historically struggled to serve low income areas, partly due to the cost of providing insurance and partly due to an outdated method of calculating and pricing risk. In response to the latter issue, FEMA is using industry best practices and modern technology to redesign

the NFIP risk rating system: Risk Rating 2.0 will make coverage easier to understand for policyholders and will address a property’s specific flood risk, lowering premiums for policyholders living on lower-risk properties. At the same time, the NFIP continues to investigate the results of a 2018 affordability study to find ways to incorporate risk into household premiums without becoming overly burdensome, including by proposing affordability legislative proposals as part of the most recent President’s Budgets. Comprehensive coverage for low-income homeowners will ultimately improve recovery time.

## Integrating Assistance into Planning

To ensure a whole community approach in disaster preparedness and response, local emergency management institutions must build relationships and integrate community organizations that directly work with vulnerable populations who have needs into their planning and policies. Community organizations often maintain information on who those individuals are, their specific needs, and how to get in touch with them. For example, some local health departments partner with Meals on Wheels and the American Red Cross to ensure that homebound individuals, specifically the senior population, receive lifesaving medical countermeasures during disasters.

Likewise, emergency managers must work with the public to help individuals and families make their own plans. In Miami-Dade County, Florida, residents can register for Emergency and Evacuation Assistance. This service is available to individuals with AFN; with disabilities; or who need skilled nursing care, assistance with daily living, or have life-saving medical equipment dependent on electricity. Assistance for individuals who live alone or with family includes specialized transportation, sheltering, medical monitoring, and wellness checks. These services help individuals make their own emergency plans and help the county determine where assistance may be needed pre-, during, and post-disaster.<sup>36</sup>

<sup>36</sup> Use of registries has not proven to be effective in larger disasters for several reasons: people may not be at home when a disaster hits; emergency managers may not have the capacity to go door to door; and information sharing with community-based partners does not always occur because of privacy laws. Emergency managers are encouraged to plan with community partners and not to rely solely on a registry.

## HOUSING

Over eight years, the NPR has consistently identified communities’ low capability to provide long-term housing. This section considers that low capability and presents a discussion on risk management related to housing, ongoing challenges, and best practices.

External forces in the housing market, including supply, demand, availability, accessibility, and costs affect communities’ ability to provide long-term housing after an incident. Further, the actions of external stakeholders—such as zoning boards or homeowners associations—may independently affect or mutually reinforce external forces and, ultimately, community capability.

These effects can sometimes keep communities caught in a low-capability cycle. For example, communities with very low capability may not have the information or relationships with external stakeholders that would help compensate for a local housing shortage exacerbated by high demand, whereas a high-capability community may be able to coordinate with neighboring jurisdictions and structure a long-term housing plan around partnerships with private and public actors to offset a similar shortage. Because long-term housing is so dependent on external factors and stakeholders, low capacity can prevent a community not only from meeting local housing needs after an incident, but also from building capability before an incident.

## Underlying Conditions Drive Post-Disaster Housing Challenges

Insufficient steady-state housing has the potential to severely limit response and recovery officials’ ability to address post-disaster housing shortages. Over the last 10 years, an average of eight percent of the Nation’s rental housing and two percent of homes for purchase have been available on the market. These average vacancy rates reflect healthy housing markets, but they have fallen in recent years, indicating that demand for housing is catching up with supply across the country. Rising housing costs in many areas reflect these market conditions.



## Lack of Affordable Housing is an Increased Risk

Evidence is building that lower-cost housing is at greater risk of damage in disasters. These units may be located in more hazardous areas and are often older or built with lower-quality materials.

Of the buildings most impacted by Hurricane Sandy in 2012, over 80% were built before 1983—the year that the most recent flood-related building standards were adopted. Partly as a result of outdated construction, damage in affected areas was extensive and recovery is ongoing eight years later.

Similarly, Hurricane Katrina damaged nearly 150,000 New Orleans housing units in 2005, 79 percent of which were affordable to low-income residents. Although not all of these units were destroyed, housing costs have increased and remain a pressing issue in New Orleans 15 years after the storm.

In general, FEMA’s analysis shows that average household incomes are lower inside high-risk flood zones, suggesting that housing may be more affordable in these areas. Rates of flood insurance coverage are also disproportionately low among low-income households; without insurance funds after a disaster, damaged affordable units are less likely to be repaired.

In metropolitan areas, vacancy rates are often much lower than the national average. Many of these areas with low vacancy rates are at risk of natural disasters such as hurricanes, earthquakes, or flooding. Impacts stemming from these incidents can cause damage to houses, apartment buildings, and other residences and can result in a sudden reduction in available housing stock. Households displaced from their primary residence are likely to find that the cost of alternative housing increases due to scarcity. Housing costs can rise particularly quickly in areas with a low steady-state vacancy rate. These conditions can hinder communities' ability to meet housing needs after a disaster.

The impacts of damage and displacement can disproportionately impact low-income populations, particularly due to a nationwide shortage of affordable housing. No state has enough affordable, accessible, and available housing for very low-income renters, and nationwide, there is a gap of seven million affordable homes. In 2017—the most recent year for which data are available—about 15.2 percent of all households in the country spent more than half their income on housing.

Various socioeconomic vulnerabilities compound the affordability crisis: cost burdens are highest among low-income and minority households, with nearly 72 percent of these populations spending more than half of their income on housing. Further, low-rent housing in most metropolitan areas has become less available each year since 2011 (see Figure 30). A severe or potentially catastrophic incident would exacerbate the challenges that socioeconomically vulnerable individuals and families already experience in finding affordable housing.

In addition to a steady-state shortage of affordable housing, units that are available to low-income households are more likely to be damaged in a disaster. In many American cities, affordable and accessible housing is built in isolated and under-resourced areas where land is less expensive, making housing and tenants more vulnerable to extreme weather events.

## Rebuilding after Hurricane Michael

Hurricane Michael made landfall on the Florida panhandle on October 10, 2018, as a Category 5 hurricane. It was one of the strongest storms ever to make landfall in the United States.

The hurricane damaged more than 60,000 homes, leaving more than one in 10—22,000 out of 180,000—residents of Bay County, Florida, homeless. Rent skyrocketed. Local officials describe how rising labor costs, a shortage of construction workers, and a lack of available land for development devastated the housing market. Little or no available housing for construction workers compounded the challenge of rebuilding.

Bay County experienced some of the worst impacts of Hurricane Michael, and in the county's 2019 Recovery Plan, officials turned to some creative housing solutions: modular construction, tiny homes, and 3D printing to help quickly repair and rebuild affordable housing. As they are implemented, these innovations can serve as a blueprint for communities affected by disaster in the future.

Affordable housing units are also less likely to be repaired and rebuilt after flood, fire, or other damage. Landlords often do not properly insure their affordable units, and low-income homeowners are less likely to have hazard-specific insurance, such as flood insurance, than their wealthier counterparts. All of these challenges make post-disaster housing particularly difficult for low-income populations to find.

## Market Rebound Characteristics: Pre-existing Characteristics Help Determine Recovery

- After Hurricane Harvey in 2017, the Houston area was able to absorb displaced persons with minimal rent increases. The housing market had kept pace with growing demand in the years before the storm, so homes were available for households that needed to temporarily or permanently relocate.
- After Hurricane Maria in 2017, Puerto Rico was also able to absorb displaced persons with minimal rent increases. In this case, housing was available due to a years-long trend of outmigration from the island, driven by the economic downturn.
- After wildfires in 2017 and 2018, California's existing housing shortages, high cost of rent, and income inequalities were exacerbated. Implementing long-term housing solutions has been especially difficult for low- and middle-income communities.

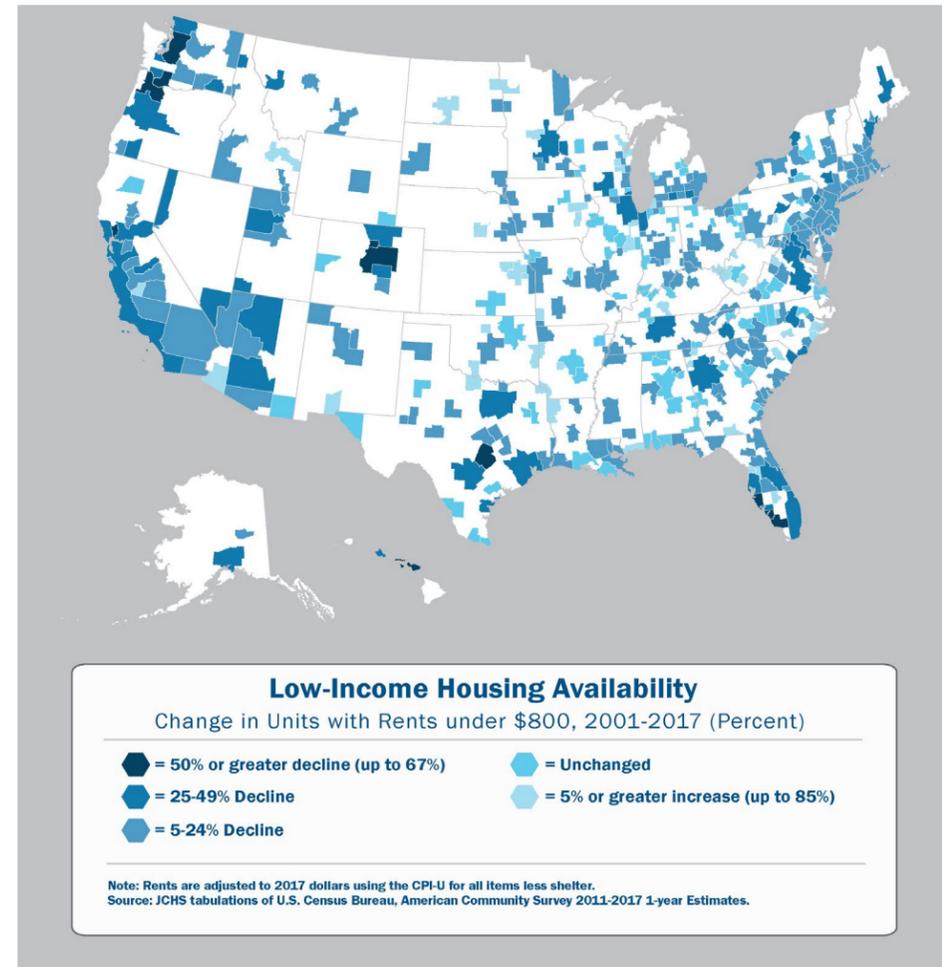


Figure 30: Low-income housing availability in metro areas is decreasing nationwide. Data are gathered and displayed only for metro areas; white spaces are outside of metro areas.

Source: JCHS tabulations of U.S. Census Bureau, American Community Survey 2011 to 2017 1-year Estimates

## State and Local Housing Capabilities

Local governments and housing authorities face similar challenges as they work to increase housing availability. These challenges often include lack of planning for long-term housing and difficulty strengthening or maintaining ties with private-sector partners. According to THIRA/SPR data, communities are further from achieving their long-term housing goals than they are from any other capability; only 38 percent of communities have achieved 70 percent or higher of their capability goal for this target (Figure 31). Communities also reported relatively low confidence in their assessment of their capability, with 42 percent of communities rating their confidence as a 1 or 2 out of 5. Additionally, 80 percent of communities reported a gap in planning within the long-term housing capability (Figure 31). Low confidence, in conjunction with low capability and gaps in planning, may indicate that long-term housing is an area in which communities do not have a strong understanding of their current capabilities, their gaps, and, therefore, the strategies needed to build long-term housing capability in the future.

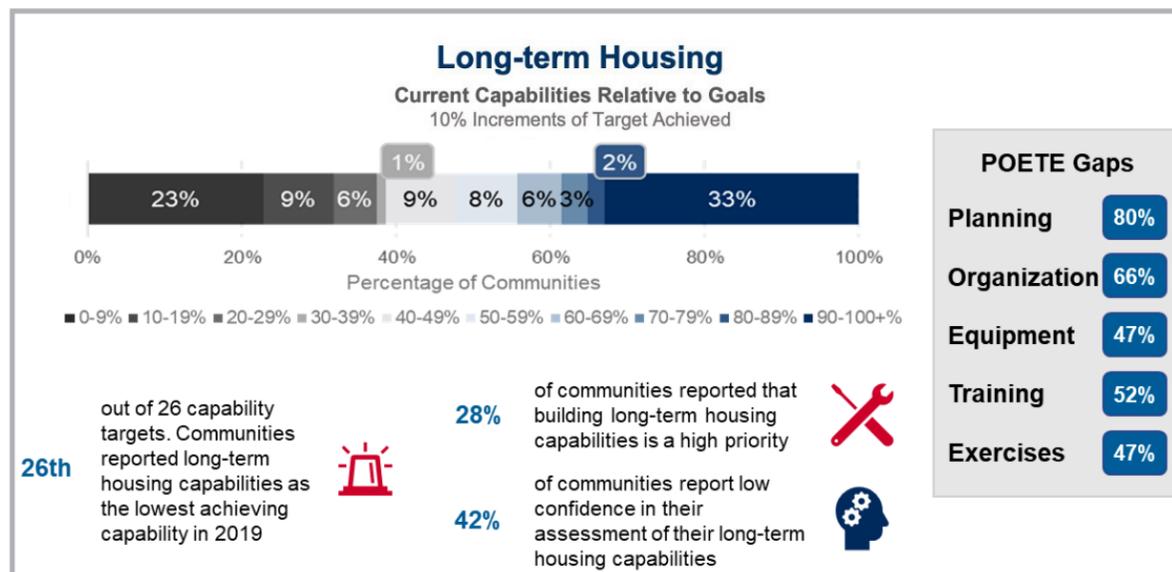


Figure 31: In the 2019 THIRA/SPR submission, communities assessed long-term housing as the lowest achieving area of capability compared to community goals.

The THIRA/SPR data also show that many communities consistently assign a low priority to achieving their targets in long-term housing, with less than one-third of communities indicating that housing is a high priority. Low-priority rankings may indicate that communities rely on neighboring jurisdictions, the private sector, or the Federal Government for housing support during an incident, or that communities otherwise do not intend to increase their housing capability. However, in 2019, more than three-quarters of communities reported that they intended to build, or build and sustain, their planning capabilities as they relate to **long-term housing**—indicating that this is an area where many communities are looking to improve. At the same time, in their THIRA/SPR responses, communities also described difficulty maintaining and strengthening ties with local and private-sector partners, suggesting that the partnerships necessary to build this capability may not yet be available.

With this issue consistently identified, regions are working with communities to support this seemingly intractable issue. FEMA Regions IV and VI have developed a housing task force and disaster housing plans to ensure states have a point of reference and training. Furthermore, the regions have been active in providing training and guidance to changes in the 2018 DRR to ensure states have the capability and understand the challenges implicit in a community-led housing mission.

## Individual Best Practices: Hazard-Appropriate Insurance

After a disaster, household recovery can stall through a lack of insurance coverage because individuals become responsible for a greater part of rebuilding costs. Homeowners or renter's insurance is often required under a mortgage or a lease and frequently covers damage from natural disasters such as hail or windstorms, but these policies do not cover damage from all types of natural disasters (e.g., floods or earthquakes). To transfer some risk, households can add specialized endorsements to their insurance policy (if this option is available) or purchase supplemental insurance to align their coverage with local threats and hazards. Appropriate insurance coverage transfers financial risk of damage away from the household and toward the private market, which will provide a cash disbursement in case of damage.

Unfortunately, sometimes hazard-appropriate insurance is unavailable or unaffordable in risk-prone areas. As risk increases, so too does the challenge of finding affordable coverage. The increasing strength and frequency of wildfires puts California communities on the front lines of this challenge. After the devastating 2017 Camp Fire, insurers in 10 high-risk counties refused to insure or renew regular homeowners insurance policies—which had historically included coverage for wildfire damage—for hundreds of thousands of properties. For some homeowners who retained coverage, premiums skyrocketed more than 100 percent. California offers last-resort insurance through its Fair Access to Insurance Requirements (FAIR) property insurance program, but often charges high premiums and usually does not cover loss from flooding, wind, or theft. To maintain insurance coverage for residents in risky areas, California temporarily prohibited private insurers from canceling highest-risk policies in December 2019. The State's insurance commissioner has mandated expansions to FAIR coverage as a first step toward an insurance solution in California.<sup>37</sup>

California is not alone in experiencing these coverage and insurance challenges. Purchasing and maintaining coverage can be a challenge for low-income individuals Nationwide. Indeed, both Federal agencies and NGOs cite affordability as a main cause of gaps in insurance coverage. Considering these systemic affordability issues, it becomes clear that although residential insurance is purchased by individuals and property managers, all levels of government and the private sector play important roles in enabling its purchase.

## State and Local Best Practices: Building to Local Risks

Improving the resiliency of physical infrastructure requires more stringent building codes and standards, as well as innovative programs, policies, and procedures that encourage adoption and implementation of higher building standards. Building codes dictate characteristics required of new or retrofitted construction within a jurisdiction and can be leveraged to reduce the risk of damage. A jurisdiction's building codes may dictate, for example, the number of exits required given a building's size, or the minimum strength characteristics of building materials. The International Code Council (ICC) established the International Building Code (IBC) in 1997 to mitigate hazards associated with the built environment and to protect health and safety. A companion code, the International Residential Code (IRC), provides standards for one- and two-family dwellings and for townhouses no more than three stories above grade. To date, the IBC has been adopted or is in use in 50 states, the District of Columbia, and four territories.

<sup>37</sup> California's Insurance Commissioner has ordered the California FAIR Plan to offer comprehensive coverage by June 1, 2020, to help homeowners in high-risk areas obtain comprehensive coverage. The FAIR Plan is established under California law as the homeowners' "insurer of last resort," and is required to offer a comprehensive homeowners policy known as HO-3 coverage. This coverage will save consumers from having to purchase a second companion policy to cover other hazards such as liability, water damage, and theft. Although the FAIR Plan is intended as a temporary solution, it is designed to mirror traditional coverage as much as possible. Source: <http://www.insurance.ca.gov/0400-news/0100-press-releases/2019/release089-19.cfm>

## Wasatch Front Case Study

The Wasatch Front earthquake is a major natural disaster risk to Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming. Over the next 50 years, there is a 57 percent probability of a magnitude 6.0 earthquake and 43 percent probability of an earthquake with a magnitude of 6.75 or greater. The Wasatch Front earthquake could have catastrophic impacts, including more than 2,000 anticipated fatalities, more than \$80 billion in economic losses, and significant damage to utilities and critical infrastructure.

This earthquake risk highlights unreinforced masonry (URM) vulnerabilities in the region. URM buildings present life-threatening risks even in a minor earthquake. There are more than 147,000 vulnerable buildings in the Wasatch Front region placing approximately 440,000 people at risk. More than 30,000 at-risk structures are in Salt Lake City. To address these risks, FEMA formed an inter-division collaboration called Resilient Wasatch Front 2023 to improve mitigation and response efforts to minimize damage to infrastructure and reduce response demands during an incident. The State of Utah also held a URM summit for emergency managers and government leaders to raise awareness of the issue. FEMA plans to use Utah's efforts as a pilot when implementing its National Mitigation Investment Strategy (NMIS).



As a result of these efforts, in April 2019 the Utah Seismic Safety Commission selected Salt Lake City as a *Fix the Bricks* mitigation grant funding recipient. The program emphasizes strengthening roof and wall connections and chimney bracing techniques to prevent collapses. Salt Lake City is in the process of collecting homeowner applications for program participation.

However, not all states adopt codes at the state level; rather, many states leave code adaptation up to municipal governments, creating inconsistent code applications across different communities. Additionally, 80 percent of U.S. homes were built before the development of IRC standards.

Recent standards developed by the ICC are the gold standard of building code requirements: adopting the 2018 IBC saves \$5 for every \$1 spent implementing the code (as compared to building codes from the 1990s).<sup>38</sup> The return on investment for adopting strong building codes can rise to 32:1 in certain geographic locations with the highest seismic activity such as San Bernadino, CA. Florida's experience with updated building codes demonstrates these cost savings in practice. After

Hurricane Andrew in 1992, widespread damage to buildings across the state prompted Florida to adopt some of the strongest building codes in the United States. After 10 years of enforcement, the new codes reduced windstorm losses by up to 72 percent and paid for themselves in avoided losses within eight years. Puerto Rico is also using this strategy to reduce future damages. The island's buildings sustained significant damage during hurricanes Maria and Irma, so officials have redeveloped local building codes to reflect the most up-to-date ICC-recommended standards. FEMA is supporting these improvements with updates of its own: The Hazard Mitigation Grant Program now allows expenditures associated with rebuilding to the higher standards of the ICC's most recent recommendations.

<sup>38</sup>. Investments adopting the IBC have a benefit-cost ratio of 11:1. After adjusting for the OMB discount rate, this is reduced to 5:1; meaning that every \$1 invested in exceeding select provisions of the IBC translates into \$5 of post-disaster savings.

## Federal Best Practices: Supporting Communities

Federal support can guide communities as they develop their housing capabilities. FEMA's continued support efforts include funding and guidance for housing-focused community exercises, updated principles for involving the community and private sector when setting up post-disaster housing, and improved guidelines for jurisdictions developing or updating their housing plans. The U.S. Small Business Administration (SBA) conducts outreach and engagement to increase awareness of its low-interest Disaster Loan Program for businesses, individuals and nonprofits. These disaster loans can be made available even without a major disaster declaration; SBA's authorities allow it to coordinate directly with state and local officials in support of an SBA Administrative (Agency) Declaration.

Recent Federal measures aim to support local housing resilience. In FY 2018, HUD received a congressional appropriation for a first-of-its-kind mitigation fund as an expansion to HUD's Community Development Block Grant program, a well-known resource that is often provided to communities in the aftermath of a disaster and is intended to primarily benefit low- and moderate-income individuals through, for example, housing, jobs, or services. Community Development Block Grant disaster recovery funds allocated in 2019 will support post-disaster measures to address recovery and to improve community resilience to future disasters. Additionally, the 2018 DRRRA strengthened state management in housing recovery by allowing states to administer areas of the post-disaster housing mission themselves, increasing flexibility to local conditions. Both of these measures can increase community participation in housing preparedness and recovery, enabling solutions that better serve the community.

In addition to housing concerns, critical infrastructure assets are nearing the end of their useful lifespans and need to be repaired or rebuilt in communities nationwide. FEMA has begun to address infrastructure mitigation efforts through

<sup>39</sup>. LocalHousingSolutions.org is an accessible, comprehensive resource for additional information on steps communities can take to improve their housing capabilities.

the Building Resilient Infrastructure and Communities (BRIC) program. The BRIC program will be funded through the Disaster Relief Fund and will focus on traditional mitigation efforts and incentivize innovative infrastructure projects that increase community resilience. The Federal Government is also increasing funding to support natural mitigation features, such as marshes, barrier islands, and reefs, which can minimize the impacts of storms and other natural hazards on nearby communities. The National Oceanic and Atmospheric Administration manages two grant programs for coastal infrastructure and is increasing the focus on building community planning capacity for implementing resilience measures.

## The Path Forward: Stakeholder Engagement and Resilient Planning

Emergency managers cannot solve the challenges of post-disaster housing on their own. Communities should incorporate disaster risk management strategies into broader housing policy decisions. An integrated approach may help to interrupt the mutually reinforcing challenges to long-term housing capability and identify housing resilient to disasters as a foundational goal of housing policy.

One of the most important steps a community can take toward this integration is to engage community stakeholders, such as community organizations (including disability-related organizations) and advocates, local government officials, planners, emergency managers, local developers, and landlords. Regular engagement through a task force or a similar structure can improve community plans, increase resident awareness and buy-in, and even lead to creative solutions to funding or policy challenges.<sup>39</sup> Communities can also expand their engagement with regional actors; by coordinating with neighboring jurisdictions and housing authorities, communities may be able to address or compensate for local challenges and lower their overall housing risk. These partnerships will also be key to effective response and recovery after an incident.

Cities nationwide are leveraging creative policies to address housing shortages and improve resilience. In Texas, San Antonio and Dallas have recently published long-term housing policies aiming to address acute shortages of housing, especially of affordable housing. Housing costs in both cities are rising faster than residents' incomes as demand for housing outpaces supply. These facts of affordability and availability form the foundation of both cities' policies. In addition, both relied on community input throughout the process of policy development; nearly 40,000 citizens called into virtual town hall meetings that Dallas held on key policy questions. One main strategy that Dallas and San Antonio are leveraging to incentivize housing development is modifying existing zoning laws, particularly those that discourage housing density. Zoning laws have historically favored single-family homes over multi-unit residences, limiting the supply of housing and reinforcing the current housing affordability crisis.

The most forward-looking housing policies and development strategies are not just focused on increasing housing supply; they are altogether

reimagining the role of housing. San Antonio is explicit about this change in perspective, arguing in its updated housing policy that the city's housing stock—and its affordability—should be considered an element of infrastructure, alongside energy, water, and transportation.

Norfolk, Virginia, takes a similar approach in its long-term plans. Housing and neighborhood development are central elements of both its 2030 and 2100 plans, and realigning zoning ordinances to achieve community goals is a primary strategy cited to implement the city's long-term vision. This reimagining of housing goals and capabilities is possible for communities at all capability levels, and can provide a productive framing for collaborative discussions around investment in community housing and development goals. Establishing integrated approaches to housing solutions pre- and post-disaster will mitigate costs and hasten the recovery of a community. By examining the successful methods of communities and agencies in housing, emergency management stakeholders can improve how housing is addressed during a disaster.





The *National Preparedness Report* provides an overview of the Nation's risk management approach for national threats and hazards, and a snapshot of the Nation's capabilities across all mission areas—highlighting progress made and challenges that remain—to prepare for those threats and hazards. By building and sustaining capabilities needed to prevent, protect against, mitigate, respond to, and recover from threats, communities can better position themselves to handle hazards and incidents that pose the greatest risk to the Nation.

In 2019, SLTT governments used the THIRA and SPR to assess the threats of greatest concern to their communities. For the first time, states and territories were required to report their capability assessments across the Prevention and Protection mission areas. Overall, communities reported being closest to their capability goals for targets that either support other capabilities or are already well-built, such as interoperable communications, coordination, and information-sharing. Communities reported being furthest from their goals in foundational activities that allow long-term capabilities to be built or sustained, such as building and updating recovery plans and maintaining staff and equipment. Across all targets, communities most frequently reported that natural hazards such as earthquakes and hurricanes/typhoons most challenge their ability to achieve desired capabilities. In 2019, communities across 33 states were impacted by a wide variety of natural threats and hazards that resulted in 61 major disaster declarations.

FEMA and other Federal agencies also used the THIRA process to improve preparedness at the national level. For the first time, FEMA established national response and recovery capability targets. With the completion of the National THIRA, all levels

## CONCLUSION

of government now use the same standardized language to assess capability requirements to manage the Nation's realistic worst-case scenarios. Most incidents of national concern only impact some states. For this reason, the Federal Government could leverage the existing capability of states not impacted by the incident. In the future, FEMA plans to assess national capability through the National SPR to account for those community, Federal, non-governmental, and private-sector partner capabilities that could be shared or deployed across the Nation to support response to a catastrophic incident.

Reporting of THIRA/SPR data by communities and at the national level allows FEMA and the Federal Government to understand how prepared the Nation is in its ability to respond to and recover from those threats and hazards of greatest concern and likelihood. Assessment of capability across the Nation as it pertains to nationally catastrophic incidents provides a greater understanding of capability needs and informs Federal planning and preparedness efforts. An essential aspect of Federal planning and preparedness efforts is the provision of Federal grants focused on building and sustaining community capabilities. In 2019, FEMA awarded \$1.7 billion in preparedness grants for use across the Nation. Data on preparedness grant investments from FY 2018 shows that communities prioritized investments in projects supporting the Planning, Operational Coordination, and Operational Communications Core Capabilities. Apart from financial grant investments at the community level, 62 percent of households took three or more non-financial preparedness actions to prepare for a disaster—an increase of five percentage points compared to 2018. Households across the Nation prioritized actions such as making household emergency plans, participating in emergency drills and evacuation plans, and assembling disaster preparedness toolkits.

The preparedness actions, spending patterns, and goals of SLTT governments, the Federal Government, and individuals indicate which threats and hazards are of greatest concern to the Nation; and demonstrate the Nation's current capability strengths and areas for improvement. This NPR focuses on persistent challenges in emergency management: mitigating cascading impacts, strengthening public-private partnerships, increasing individual preparedness, and improving access to long-term housing. All levels of government worked collectively to address these challenges and continue to build on successes.

To understand and address cascading impacts during disasters—which strain existing vulnerabilities and inhibit incident stabilization—the Federal Government established the Community Lifelines. The NCFs provide a risk management lens to holistically capture cross-cutting risks and associated dependencies that may have cascading impact within and across sectors. The public and private sectors worked together to avoid, control, transfer, and accept risk through initiatives across all levels of government. FEMA introduced the new ESF14 to coordinate multi-sector response operations between (or across) the government and private sector for natural or human-caused catastrophic incidents that jeopardize national public health and safety, the economy, and national security. Communities controlled vulnerabilities and improved response and recovery to incidents in the energy and insurance sectors through collaboration with the private sector and investments in critical infrastructure through the 2019 NMIS.

The Nation also identified areas for improvement in meeting the unique needs of vulnerable populations before, during, and after disasters. The Federal Government and states continue to work toward addressing challenges related to the impact of socioeconomic status on safety, transportation, housing, medical care, and reduced access to supplementary social or financial support in the aftermath of disasters. Progress is being made through broader coordination between Federal and state agencies and the establishment of information-sharing centers, outreach programs, and Federal planning and financial resources. However, significant challenges remain. Finally, the Nation took important steps toward mitigating one of the most intractable challenges faced by all levels of government: how to improve long-term housing capability despite challenging external forces in the housing market. States and local governments have adopted the IBC to improve the resiliency (and availability) of physical infrastructure. FEMA, through the BRIC program, continues to address critical infrastructure mitigation efforts, and other Federal Government agencies, such as SBA and HUD, have pursued initiatives to increase access to housing post-disaster.

Overall, the Nation has made important strides in addressing preparedness challenges. Federal departments and agencies are collaborating with SLTT government partners to build and sustain preparedness capabilities at the local level. However, significant challenges remain at all levels of government. By closing national capability gaps and increasingly focusing on preparedness and mitigation actions, including integration of continuity of operations planning, the Nation can increase its resilience to the most challenging threats and hazards. FEMA and its partners will use THIRA/SPR data and the National THIRA as part of the NRCA to better measure national preparedness, where the Nation will set national-level capability targets and develop strategies for closing national capability gaps. Future iterations of the NPR will continue to serve as a mechanism to report on the findings of the NRCA, including the National SPR, as this work progresses.



## APPENDIX A: ACRONYMS

Acronym	Definition
<b>AFN</b>	Access and Functional Needs
<b>AI</b>	Artificial Intelligence
<b>BIA</b>	Bureau of Indian Affairs
<b>BRIC</b>	Building Resilient Infrastructure and Communities
<b>CESER</b>	Office of Cybersecurity, Energy Security, and Emergency Response
<b>CFPB</b>	Consumer Financial Protection Bureau
<b>CHHS</b>	California Health and Human Services Agency
<b>CISA</b>	Cybersecurity and Infrastructure Security Agency
<b>COVID-19</b>	Novel Coronavirus
<b>CRISP</b>	Cybersecurity Risk Information Sharing Program
<b>CyTRICS</b>	Cyber Testing for Resilient Industrial Control Systems
<b>DHS</b>	Department of Homeland Security
<b>DOC</b>	Department of Commerce
<b>DOE</b>	Department of Energy
<b>DOI</b>	Department of the Interior
<b>DRRA</b>	Disaster Recovery Reform Act of 2018
<b>ED</b>	Department of Education
<b>E-ISAC</b>	Electricity Information Sharing and Analysis Center
<b>EMP</b>	Electromagnetic Pulse
<b>EMPG</b>	Emergency Management Performance Grant
<b>ESF</b>	Emergency Support Function
<b>FAA</b>	Federal Aviation Administration

Acronym	Definition
<b>FAIR</b>	Fair Access to Insurance Requirements
<b>FBI</b>	Federal Bureau of Investigation
<b>FCC</b>	Federal Communications Commission
<b>FEMA</b>	Federal Emergency Management Agency
<b>FY</b>	Fiscal Year
<b>GPS</b>	Global Positioning System
<b>HHS</b>	Department of Health and Human Services
<b>HHS ACF</b>	Department of Health and Human Services Administration for Children and Families
<b>HHS ASPR</b>	Department of Health and Human Services Office of the Assistant Secretary for Preparedness and Response
<b>HHS CDC</b>	Department of Health and Human Services Centers for Disease Control and Prevention
<b>HSGP</b>	Homeland Security Grant Program
<b>HSIN-INTEL</b>	Homeland Security Information Network-Intelligence
<b>HUD</b>	Department of Housing and Urban Development
<b>IBC</b>	International Building Code
<b>IBSGP</b>	Intercity Bus Security Grant Program
<b>ICC</b>	International Code Council
<b>IoT</b>	Internet of Things
<b>IPR</b>	Intercity Passenger Rail – Amtrak Program
<b>IRC</b>	International Residential Code
<b>ISD</b>	Information-Sharing Device
<b>LGBTQ+</b>	Lesbian, Gay, Bisexual, Transgender, Queer

Acronym	Definition
<b>MSP/EMHSD</b>	Michigan State Police Emergency Management and Homeland Security Division
<b>NASA</b>	National Aeronautics and Space Administration
<b>NCF</b>	National Critical Functions
<b>NFIP</b>	National Flood Insurance Program
<b>NGO</b>	Nongovernmental Organizations
<b>NIST</b>	National Institute of Standards and Technology
<b>NMIS</b>	National Mitigation Investment Strategy
<b>NOAA</b>	National Oceanic and Atmospheric Administration
<b>NPR</b>	National Preparedness Report
<b>NRCA</b>	National Risk and Capability Assessment
<b>NRF</b>	National Response Framework
<b>NSGP</b>	Nonprofit Security Grant Program
<b>NYPD</b>	New York Police Department
<b>OPSG</b>	Operation Stonegarden
<b>P3</b>	Public/Private Partnership Program
<b>PCO</b>	Plausible Concurrent Operations
<b>PKEMRA</b>	Post-Katrina Emergency Management Reform Act of 2006
<b>PSGP</b>	Port Security Grant Program
<b>SBA</b>	Small Business Administration
<b>SHSP</b>	State Homeland Security Program
<b>SLTT</b>	State, Local, Tribal, and Territorial
<b>SME</b>	Subject-Matter Experts
<b>SNAP</b>	Supplemental Nutrition Assistance Program
<b>SPR</b>	Stakeholder Preparedness Review

Acronym	Definition
<b>STAN</b>	Southeast Texas Alerting Network
<b>ST-CP</b>	Soft Targets and Crowded Places
<b>THIRA</b>	Threat and Hazard Identification and Risk Assessment
<b>THSGP</b>	Tribal Homeland Security Grant Program
<b>TSGP</b>	Transit Security Grant Program
<b>UAS</b>	Unmanned Aircraft Systems
<b>UASI</b>	Urban Area Security Initiative
<b>UAV</b>	Unmanned Aerial Vehicle
<b>UPS</b>	United Parcel Service
<b>URM</b>	Unreinforced Masonry
<b>USDA</b>	United States Department of Agriculture
<b>UTM</b>	Unmanned Aircraft Systems Traffic Management Infrastructure
<b>WHO</b>	World Health Organization
<b>WRN</b>	Weather Ready Nation

## APPENDIX B: CORE CAPABILITY, LIFELINE, AND TARGET NAME CROSSWALK

Mission Areas	Lifeline	Core Capabilities	Capability Targets
<b>Cross-Cutting Capabilities</b>	Safety and Security	Planning	EOP Updates
	Communications	Public Information and Warning	Information Delivery
	Safety and Security	Operational Coordination	Unified Operations
<b>Prevention</b>	N/A	Forensics and Attribution	Evidence Collection and Analysis
<b>Prevention/Protection</b>	N/A	Intelligence and Information Sharing	<ul style="list-style-type: none"> <li>Intelligence Cycle</li> <li>Auditing/Execution</li> </ul>
		Interdiction and Disruption	Interdiction/Disruption Activities
		Screening, Search and Detection	Conduct Screening Operations
<b>Protection</b>	N/A	Access Control and Identity Verification	Credential Acceptance
		Cybersecurity	Cyber Plan Updates
		Physical Protective Measures	Critical Infrastructure Security Plan Updates
		Risk Management for Protection Programs and Activities	Critical Infrastructure Risk Assessment
		Supply Chain Integrity and Security	Supply Chain Risk Assessment
<b>Mitigation</b>	N/A	Community Resilience	<ul style="list-style-type: none"> <li>Public Risk Awareness</li> <li>Community Outreach</li> </ul>
		Long-Term Vulnerability Reduction	Building Code Review
		Risk and Disaster Resilience Assessment	Threat and Hazard Modeling
		Threats and Hazards Identification	Community Threat & Hazard Assessment

Mission Areas	Lifeline	Core Capabilities	Capability Targets
<b>Response</b>	Transportation/ Safety and Security	Critical Transportation	<ul style="list-style-type: none"> <li>Clear Critical Roads</li> <li>Evacuation</li> </ul>
	Hazardous Material	Environmental Response/ Health and Safety	<ul style="list-style-type: none"> <li>HAZMAT Cleanup</li> <li>Decontamination</li> </ul>
	Health and Medical	Fatality Management Services	Body Recovery/Storage
	Food, Water, Shelter	Logistics and Supply Chain Management	Life-Sustaining Goods Delivery
	Food, Water, Shelter	Mass Care Services	<ul style="list-style-type: none"> <li>Community Sheltering</li> <li>Relocation Assistance</li> </ul>
	Safety and Security	Mass Search and Rescue Operations	Search and Rescue
	Safety and Security	On-Scene Security, Protection, and Law Enforcement	Community Protection
	Communications	Operational Communications	Interoperable Communications
	Health and Medical	Public Health, Healthcare, and Emergency Medical Services	Medical Care
	Safety and Security	Situational Assessment	Situation Briefings
<b>Response/Recovery</b>	Safety and Security	Fire Management and Suppression	Structural Firefighting
	Communications/Energy (Power and Fuel)/Food, Water, Shelter	Infrastructure Systems	<ul style="list-style-type: none"> <li>Communication Systems</li> <li>Water Service</li> <li>Sanitation</li> <li>Community Power</li> </ul>
<b>Recovery</b>	Recovery	Economic Recovery	Reopen Businesses
	Recovery	Health and Social Services	Reestablish Services
	Recovery	Housing	Long-Term Housing
	Recovery	Natural and Cultural Resources	Resource Restoration

## APPENDIX C: GLOSSARY

### Access and functional needs (AFN)

Persons who may have additional needs before, during, and after an incident in functional areas, including but not limited to maintaining health, independence, communication, transportation, support, services, self-determination, and medical care. Individuals in need of additional response assistance may include those who have disabilities, live in institutionalized settings, are older adults, are children, are from diverse cultures, have limited English proficiency or are non-English speaking, or are transportation disadvantaged.

### Capability assessment (THIRA/SPR)

The process of identifying how a community's capabilities have changed over the last year and how those changes affect the community's current capability.

### Capability gap (SPR)

The difference between the capability target a community sets in THIRA Step 3 and the current capability they determine in SPR Step 1.

### Capability goal (THIRA)

The amount or level of capability a jurisdiction wants to have, in relation to its current level of capability.

### Capability target (THIRA)

The level of capability that a community plans to achieve over time in order to manage the threats and hazards it faces. Otherwise known as "standardized targets."

### Cascading impacts

A "domino effect" risk phenomenon related to increasingly interconnected systems, in which a disruption or failure of one system causes impacts that lead to additional disruptions or failures in other, dependent systems.

### Catastrophic risks

Catastrophic risks are distinguished by the scale of their impacts. These risks can result from natural, human-caused, or technological incidents. Some examples of catastrophic impacts are widespread damage to buildings and infrastructure, mass casualties or injuries, severe impacts to the environment, or significant disruptions to basic life-sustaining services or government functions.

### Changing conditions

Changes such as population growth, development, and weather conditions that will influence mitigation needs and priorities.

### Community lifeline

The community lifeline construct is a model that documents the status of indispensable services that enable the continuous operation of essential business and government functions and is critical to human health and safety and/or national economic security. Community Lifelines are a common lens which all responders can use to assess whether critical lifesaving and life-sustaining services are disrupted and, if so, which Core Capabilities are required to provide and restore those services.

### Consequence

An effect of an incident, event, or occurrence.

### Core capability

Thirty-two distinct critical elements necessary to achieve the National Preparedness Goal.

### Critical infrastructure

Assets, systems, and networks, whether physical or virtual, that are considered so vital to the United States that their incapacitation or destruction would have a debilitating effect on security, national economic security, national public health or safety, or any combination thereof.

### Disaster relief fund (DRF)

An appropriation against which FEMA can direct, coordinate, manage, and fund eligible response and recovery efforts associated with domestic major disasters and emergencies that overwhelm state resources pursuant to the Robert T. Stafford Disaster Relief and Emergency Assistance Act.

### Emergency support function (ESF)

ESFs are the primary mechanism for grouping Federal functions most frequently used in emergency management. ESFs provide the structure for organizing, planning, and deploying Federal partner support to domestic disasters and emergencies. The Nation's critical infrastructure is composed of 16 sectors: chemical; commercial facilities; communications; critical manufacturing; dams; defense industrial base; emergency services; energy; financial services; food and agriculture; government facilities; healthcare and public health; information technology; nuclear reactors, material, and waste; transportation systems; and water and wastewater systems.

### Emerging risks

Emerging risks are either new risks or familiar risks that evolved due to new or unfamiliar conditions; and, therefore, often lack the historic data traditionally used to assess risk. Emerging risks can appear suddenly and often arise from advancements in technology or changes in the threat environment.

### Fusion Center

State-owned and operated centers that serve as focal points in states and major urban areas for the receipt, analysis, gathering and sharing of threat-related information between State, Local, Tribal and Territorial (SLTT), Federal, and private-sector partners.

### Hazard Mitigation Grant Program (HMGP)

A Federal program that assists SLTT communities in implementing long-term hazard mitigation measures following a major disaster declaration to significantly reduce or permanently eliminate future risk to lives and property from natural hazards.

### Homeland Security Grant Program (HSGP)

A Federal program with three components—the State Homeland Security Program (SHSP), Urban Area Security Initiative (UASI), and Operation Stonegarden (OPSG)—that supports enhancing the ability of state, local, tribal, and territorial governments, as well as nonprofits, to prevent, protect against, respond to, and recover from terrorist attacks.

### Homeland Security Information Network (HSIN)

The Department of Homeland Security's official system for trusted sharing of Sensitive But Unclassified information between Federal, state, local, territorial, tribal, international, and private sector partners.

### Impact

The community-specific effects a threat or hazard scenario would have on a community if the threat or hazard occurred, written in the language of common emergency management metrics.

### Information Sharing Analysis Center (ISAC)

Member-driven organizations that collect, analyze and disseminate actionable all-hazards threat and mitigation information to critical infrastructure asset owners and operators. ISACs provide 24/7 threat warning and incident reporting capabilities and have the ability to reach and share information within their sectors, between sectors, and among government and private sector stakeholders.

### Internet of things (IoT)

A system of interrelated computing, mechanical, and digital technology devices with the ability to collect and transfer data over a network without requiring human-to-human or human-to-computer interaction.

### Likelihood

The chance of something happening, whether defined, measured, or estimated objectively or subjectively, or in terms of general descriptors (e.g., rare, unlikely, likely, almost certain), frequencies, or probabilities.

### Mission area

Groups of Core Capabilities, including Prevention, Protection, Mitigation, Response, and Recovery.

### Mutual aid

Agreements that establish the terms under which one party provides resources—personnel, teams, facilities, equipment, and supplies—to another party.

### National Critical Functions (NCF)

The functions of government and the private sector so vital to the United States that their disruption, corruption, or dysfunction would have a debilitating effect on security, national economic security, national public health or safety, or any combination thereof.

**National Flood Insurance Program (NFIP)**

A Federal program that aims to reduce the impact of flooding on private and public structures by providing affordable insurance to property owners, renters, and businesses and by encouraging communities to adopt and enforce floodplain management regulations.

**National Mitigation Investment Strategy (NMIS)**

A single national strategy for advancing mitigation investment to reduce risks posed by natural hazards and increasing the nation's resilience to natural hazards.

**National Preparedness Goal**

Defines what it means for the whole community to be prepared for all types of disasters and emergencies. The goal itself is: 'A secure and resilient Nation with the capabilities required across the whole community to prevent, protect against, mitigate, respond to, and recover from the threats and hazards that pose the greatest risk.'

**National Preparedness System**

The instrument the Nation employs to build, sustain, and deliver Core Capabilities in order to achieve the goal of a secure and resilient Nation.

**National Response Framework (NRF)**

A guide to how the Nation responds to all types of disasters and emergencies. It describes specific authorities and best practices for managing incidents that range from the serious but purely local to large-scale terrorist attacks or catastrophic natural disasters.

**National Risk and Capability Assessment (NRCA)**

A suite of assessment products that measures risk and capability across the nation in a standardized and coordinated process. When analyzed together, these products will better measure national risks, capabilities, and gaps. The NRCA includes the following components: THIRA, SPR, National THIRA, National SPR.

**Nationwide community capability**

Capability that has been reported by all states and territories within the contiguous United States, as well as states and territories outside of the contiguous United States that have been identified as directly impacted by nationally catastrophic scenarios.

**Plausible concurrent operations (PCO)**

A representative sample of ongoing response and recovery operations the Nation could be supporting when other catastrophic incidents occur.

**POETE areas**

A model that divides capabilities into meaningful, broad categories of activity—planning, organization, equipment, training, and exercises.

**Red flag law**

State laws that authorize courts to issue a special type of protection order, allowing the police to temporarily confiscate firearms from people who are deemed by a judge to be a danger to themselves or to others.

**Resilience**

The ability to adapt to changing conditions and withstand and rapidly recover from disruption due to emergencies.

**Risk assessment**

A product or process that collects information and assigns a value to risks for the purpose of informing priorities, developing or comparing courses of action, and informing decision making.

**Risk management**

An approach to manage (i.e., lessen the severity of) a risk. Risk management approaches include risk avoidance, risk control, risk transfer, risk acceptance.

**Scenario-based community capability**

The progress made by communities potentially impacted by nationally catastrophic scenarios in achieving the national goal, arranged by standardized impact.

**Stakeholder Preparedness Review (SPR)**

A self-assessment of a jurisdiction's current capability levels against the targets identified in the Threat and Hazard Identification and Risk Assessment (THIRA).

**Standardized impact**

Metrics used by the emergency management community with quantifiable consequences associated with major threats and hazards.

**Systemic risks**

Systemic risks are distinguished by their interconnectedness. Systemic risk propagates or emerges in interconnected systems across boundaries of situational awareness or operational control, resulting in unwanted effects that cascade with amplifying harm. This type of risk begins as a distributed vulnerable state that increases with the complexity of our social, technological, and environmental systems. Once a triggering incident takes place, systemic risk can destabilize entire systems' critical functions by affecting multiple sectors and producing cascading effects that may amplify the original incident's impact. These risks are especially concerning when they appear in critical infrastructure sectors (e.g., electric, financial).

**Threat**

A natural or man-made occurrence, individual, entity, or action that has or indicates the potential to harm life, information, operations, the environment, and/or property.

**Threat and Hazard Identification and Risk Assessment (THIRA)**

A three-step risk assessment process that allows a jurisdiction to understand its threats and hazards (risks) and how the impacts may vary according to time of occurrence, season, location, and other community factors; as well as determine the level of capability required to address those risks.

**Tribal Homeland Security Grant Program (THSGP)**

A federal program that supports the ability of state, local, tribal, and territorial government, as well as nonprofits, to prevent, protect against, respond to, and recover from terrorist attacks.

**Unmanned aircraft system (UAS)**

A system of communications between an aircraft that operates autonomously (commonly referred to as a 'drone') and the ground-based controller that pilots the aircraft remotely.

**Urban Area Security Initiative (UASI)**

A Federal program that assists high-threat, high-density Urban Areas efforts to build, sustain, and deliver the capabilities necessary to prevent, prepare for, protect against, and respond to acts of terrorism.

**Vulnerability**

A physical feature or operational attribute that renders an entity, asset, system, network, or geographic area open to exploitation or susceptible to a given hazard.

**Vulnerable populations**

Populations that are less likely to be able to prepare for hazards; less likely to receive or be able to respond to warnings; more likely to die, suffer injuries, and have disproportionately higher material losses; have more psychological trauma; and face more obstacles during phases of response and recovery.

**Whole community**

Whole community is a means by which residents, emergency management practitioners, organizational and community leaders, and government officials can collectively understand and assess the needs of their respective communities and determine the best ways to organize and strengthen their assets, capacities, and interests.



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