# 2 HOMELAND SECURITY AND THE ALL-HAZARDS UMBRELLA

## CHAPTER LEARNING OBJECTIVES

This chapter will enable readers to do the following:

1. Remember and discuss the mission areas of the all-hazards umbrella
2. Evaluate nonterrorist emergency scenarios
3. Analyze the characteristics of natural hazards and hazards caused by human activities
4. Explain the association between terrorism and the all-hazards approach



## OPENING VIEWPOINT: UNDERSTANDING THE ALL-HAZARDS UMBRELLA

The all-hazards umbrella refers to preparation for all potential disasters, including natural and human-created disasters. In the field of risk management and emergency management, the adoption of an all-hazards approach is not a new concept. Prior to the post–9/11 era of homeland security, the Federal Emergency Management Agency and similar agencies were tasked with preparing for and responding to all hazards. In the post–9/11 era, the dynamic and evolving conceptualization of homeland security has, when necessary, incorporated features of the all-hazards concept.

As a matter of necessity, the United States is obligated to anticipate the likelihood of the occurrence of natural and human-created disasters—in essence, to prepare for the worst and hope for the best. Within the all-hazards umbrella, preparations involve planning for all potential disasters, including industrial accidents, earthquakes, hurricanes, floods, tornadoes, and, of course, terrorist incidents.

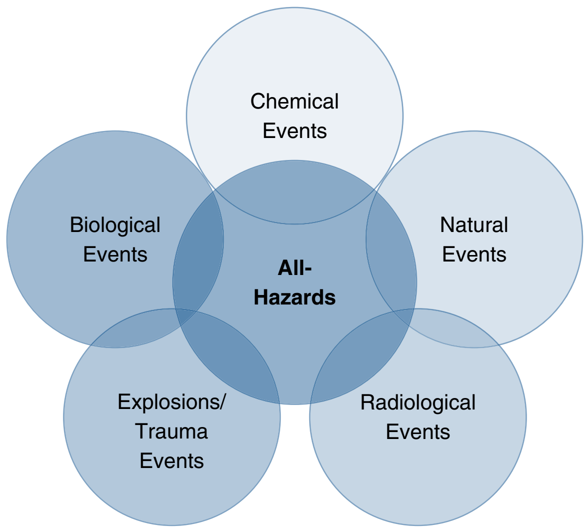
Considering the extensive scope of an all-hazards approach, the need for coordination extends to all levels of society. Because of this and the daunting task of preparing for *all* contingencies, the concept of *all hazards* has generated a debate about how to allocate resources (such as training and equipment) and, in fact, whether it is feasible to prepare for every contingency. Nevertheless, the need for consensus on a common approach to disaster preparation is a fundamental necessity for establishing a viable all-hazards umbrella.

The establishment of emergency response systems is a critical national necessity. They are needed at every level of society in preparation for the unfortunate (but inevitable) eventualities of natural disasters and incidents arising from human conduct. Historically, such response systems significantly predated the modern era of homeland security. The first national consolidation of emergency mitigation, preparedness, and response occurred on June 19, 1978, when President Jimmy Carter delivered Reorganization Plan Number 3 to Congress. Reorganization Plan Number 3 proposed the consolidation of emergency preparedness and response into a single federal agency: the Federal Emergency Management Agency (FEMA). This necessitated the transferal of several agency functions to the new FEMA bureau. These agencies included the Federal Preparedness Agency, Federal Disaster Assistance Administration, National Fire Prevention and Control Administration, Defense Civil Preparedness Agency, Emergency Broadcast System, and Federal Insurance Administration. FEMA was officially established pursuant to Executive Order 12127 on March 31, 1979, after congressional review.

The concept of a FEMA-managed emergency response system was expanded over time so that in the post–9/11 era considerable functional consolidation occurred as catastrophic natural and nonterrorist human-related emergencies arose, and many of these functions were incorporated into the homeland security enterprise. This conflation of natural and nonterrorist emergencies with homeland security happens periodically—for example, it occurred in the aftermath of Hurricane Katrina on the U.S. Gulf Coast in 2005. It is a logical progression in the ongoing conceptualization of homeland security, particularly in light of the post–9/11 effort, to coordinate nationwide response mechanisms to mitigate threats from violent extremists. The central premise is that the incorporation of additional nonterrorist hazard and threat scenarios within this framework benefits the nation at large. This premise necessitates the marshalling of critical resources and designing of adaptive response options in anticipation of plausible emergencies. Resilience and planning policies within the context of disaster management are discussed in Chapter 12.

The concept of an **all-hazards umbrella** has been adapted to the homeland security enterprise as an available mechanism to mobilize a broad array of resources when disasters occur. Figure 2.1 presents one view of this adaptation. The underlying conceptualization of homeland security continues to be that of a domestic security response to violent extremism.

**FIGURE 2.1 ■ A Summary of One View of the All-Hazards Umbrella, as Presented by the Centers for Disease Control and Prevention**



Nevertheless, the all-hazards umbrella is applied, when needed, as a practical necessity for emergency response to nonterrorist events. As explained in the 2010 *Quadrennial Homeland Security Review Report*,

> Homeland security describes the intersection of evolving threats and hazards with traditional governmental and civic responsibilities for civil defense, emergency response, law enforcement, customs, border control, and immigration. In combining these responsibilities under one overarching concept, homeland security breaks down long-standing stovepipes of activity that have been and could still be exploited by those seeking to harm America. Homeland security also creates a greater emphasis on the need for joint actions and efforts across previously discrete elements of government and society.[1]

Three levels of potential danger must be considered: hazards, emergency events, and disasters. A condition posing potential risks is referred to as a **hazard**, and depending on the nature of the hazard, it can result in either an emergency event or a disaster. When a hazard does in fact result in a condition of risk, an **emergency event** occurs. Emergency events necessitate intervention by institutions trained for emergency response operations, such as law enforcement, medical personnel, or firefighting agencies. A **disaster** occurs when emergency response institutions cannot contain the emergency event or stabilize critical services, such as fire control, order maintenance and restoration, providing immediate medical services, or providing shelter. Declarations of disaster are officially made by the president of the United States after a request is received from a governor; such declarations activate protocols for the provision of federal assistance to an affected region. Full consideration of presidential disaster declarations, as well as response and recovery options for disaster management, will be provided in Chapter 13.

This chapter will discuss the all-hazards umbrella and its applicability in the current homeland security environment. The discussion in this chapter will review the following:

- The terrorism nexus: Conventional and unconventional threats
- The all-hazards nexus: Nonterrorist hazards and threats
- Natural hazards
- Technological scenarios

## THE TERRORISM NEXUS: CONVENTIONAL AND UNCONVENTIONAL THREATS

In the modern era, terrorist environments are dynamic in nature with characteristics that consistently pose new and unanticipated threats to the global community and the United States. Full consideration of the nexus between modern terrorism and homeland security will be presented in Chapters 8 and 9. This chapter is an overview of the tools of the terrorist trade.

Terrorism-related threats can be classified along a sliding scale of technological sophistication and threat potential from weapons deployed by violent extremists. This scale includes conventional weapons and the use of weapons of mass destruction (WMD).

David Stewart-Smith/Contributor/Hulton Archive/Getty Images

Afghan mujahideen (holy warriors) during their jihad against occupying Soviet troops. Osama bin Laden formed the Al Qaeda network during the war.

## Conventional Weapons

Conventional weapons are military-grade and civilian weapons that are not used as WMD. Many conventional weapons do have the potential to cause mass casualties, but they are accepted as legal weapons of war or appropriate for civilian purposes. Standard firearms and explosives are conventional weapons.

### Firearms

Small arms and other handheld weapons have been and continue to be the most common types of weapons employed by terrorists. These are light- and heavy-infantry weapons and include pistols, rifles, submachine guns, assault rifles, machine guns, rocket-propelled grenades, mortars, and precision-guided munitions. Typical firearms found in the hands of terrorists include submachine guns, assault rifles, rocket-propelled grenades, and precision-guided munitions.

***Submachine Guns.*** Originally developed for military use, submachine guns are now mostly used by police and paramilitary services. Although new models have been designed, such as the famous Israeli Uzi and the American Ingram, World War II–era models are still on the market and have been used by terrorists.

***Assault Rifles.*** Usually capable of both automatic (repeating) and semiautomatic (single-shot) fire, assault rifles are military-grade weapons that are used extensively by terrorists and other irregular forces. The AK-47, invented by Mikhail Kalashnikov for the Soviet Army, is the most successful assault rifle in terms of production numbers and its widespread adoption by standing armies, guerrillas, and terrorists. The American-made M16 has likewise been produced in large numbers and has been adopted by a range of conventional and irregular forces.

***Rocket-Propelled Grenades (RPGs).*** Light, self-propelled munitions are common features of modern infantry units. The RPG-7 has been used extensively by dissident forces throughout the world, particularly in Latin America, the Middle East, and Asia. The weapon was manufactured in large quantities by the Soviets, Chinese, and other communist nations. It is an uncomplicated and powerful weapon that is useful against armor and fixed emplacements, such as bunkers or buildings.

***Precision-Guided Munitions (PGMs).*** Less commonly found among terrorists, though extremely effective when used, are weapons that can be guided to their targets by using infrared or other tracking technologies. The American-made Stinger is a shoulder-fired surface-to-air missile that uses an infrared targeting system. It was delivered to the Afghan mujahideen (holy warriors) during their anti-Soviet jihad and was used very effectively against Soviet helicopters and other aircraft. The Soviet-made SA-7, also known as the Grail, is also an infrared-targeted surface-to-air missile. Both the Stinger and the Grail pose a significant threat to commercial airliners and other aircraft.

### Common Explosives

Terrorists regularly use explosives to attack symbolic targets. Along with firearms, explosives are staples of the terrorist arsenal. The vast majority of terrorists' bombs are self-constructed, improvised weapons rather than premanufactured military-grade bombs. The one significant exception to this rule is the heavy use of military-grade mines by the world's combatants. These are buried in the soil or rigged to be detonated as booby traps. Antipersonnel mines are designed to kill people, and antitank mines are designed to destroy vehicles. Many millions of mines have been manufactured and are available on the international market.

Some improvised bombs are constructed from commercially available explosives such as dynamite and TNT, whereas others are manufactured from military-grade compounds. Examples of compounds found in terrorist bombs include plastic explosives and ammonium nitrate and fuel oil (ANFO) explosives.

***Plastic Explosives.*** Plastic explosives are puttylike explosive compounds that can be easily molded. The central component of most plastic explosives is a compound known as RDX. Nations that manufacture plastic explosives often use chemical markers to "tag" each batch that is made. The tagged explosives can be traced back to their source if used by terrorists. Richard C. Reid, the "shoe bomber" aboard American Airlines Flight 63, attempted to detonate a bomb crafted from plastic explosives molded into his shoe in December 2001. The case of Reid is discussed further in Chapter 9.

***Semtex.*** Semtex is a very potent plastic explosive of Czech origin. During the Cold War, Semtex appeared on the international market, and a large quantity was obtained by Libya. It is popular among terrorists. For example, the Irish Republican Army (IRA) has used Semtex-based bombs in Northern Ireland and England.

***Composite-4.*** Invented in the United States, Composition C-4 (C-4) is a high-grade and powerful plastic explosive. It is more expensive and more difficult to obtain than Semtex. The availability of C-4 for use by terrorists became apparent when a renegade agent of the Central Intelligence Agency (CIA) was convicted of shipping 21 tons of the compound to Libya during the 1970s. About 600 pounds of C-4 was used in the October 2000 attack against the American destroyer USS *Cole* in Yemen, and it was evidently used to bomb the American facility at Khobar Towers in Dhahran, Saudi Arabia, in June 1996.

***ANFO Explosives.*** Ammonium nitrate and fuel oil explosives are manufactured from common ammonium nitrate fertilizer that has been soaked in fuel oil. When ammonium nitrate is used as a base for the bomb, additional compounds and explosives can be added to intensify the explosion. These devices require hundreds of pounds of ammonium nitrate, so they are generally constructed as car or truck bombs. ANFO explosives were used by the IRA in London in 1996; Timothy McVeigh used a two-ton device in Oklahoma City in 1995.

Jeff Fusco/Getty Images

Replica of an explosive suicide vest. Suicide attacks became increasingly common during insurgencies in the post-September 11 era.

### Types of Bombs

***Gasoline Bombs.*** The most easily manufactured (and common) explosive weapon used by dissidents is nothing more than a gasoline-filled bottle with a flaming rag for its trigger. It is thrown at targets after the rag is stuffed into the mouth of the bottle and ignited. Tar, Styrofoam, or other ingredients can be added to create a gelling effect for the bomb, which causes the combustible ingredient to stick to surfaces. These weapons are commonly called "Molotov cocktails," named for Vyacheslav Molotov, the Soviet Union's foreign minister during World War II. The name was invented during the 1939–1940 Winter War by Finnish soldiers, who used the weapon effectively against Soviet troops.

***Pipe Bombs.*** These devices are easily constructed from common pipes, which are filled with explosives (usually gunpowder) and then capped on both ends. Nuts, bolts, screws, nails, and other shrapnel are usually taped or otherwise attached to pipe bombs. Many hundreds of pipe bombs have been used by terrorists. In the United States, pipe bombs were used in several bombings of abortion clinics and at the 1996 Summer Olympics in Atlanta.

***Vehicular Bombs.*** Ground vehicles that have been wired with explosives are a frequent weapon in the terrorist arsenal. Vehicular bombs can include car bombs and truck bombs; they are mobile, are covert in the sense that they are not readily identifiable, are able to transport large amounts of explosives, and are rather easily constructed. They have been used on scores of occasions throughout the world.

***Improvised Explosive Devices.*** These bombs are constructed by nonstate actors and outside of military or regulatory controls by terrorist and insurgent groups. The individuals producing the bombs have expertise in bomb making yet have limited access to equipment or materials. As such, the bomb can vary significantly in power and effectiveness.

## Chemical, Biological, Radiological, Nuclear, and Explosive Hazards[2]

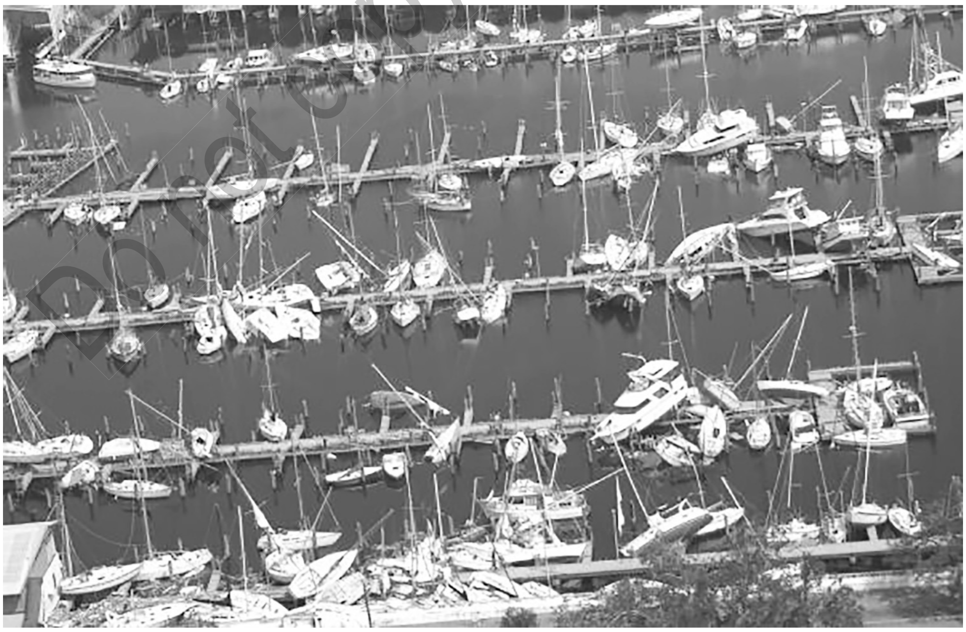
Plausible terrorist threat scenarios include the deliberate use of biological and chemical agents against perceived enemies. These threats are a serious concern within the context of an all-hazards approach to homeland security. There are five types of possible weapons, classified as chemical agents, biological agents, radiological agents, nuclear weapons, and explosives. These are known as **CBRNE** weapons. Explosive weapons were discussed in the previous section. Chemical, biological, radiological, and nuclear weapons and hazards are explored in detail in Chapter 12.

## THE ALL-HAZARDS NEXUS: NONTERRORIST HAZARDS AND THREATS

The all-hazards nexus encompasses preparation for responding to natural and human-made disasters and threats. The perceived need for such preparations reflects genuine concern over how to ensure effective emergency management regardless of the cause of the emergency. This concern is based in large part on problems and challenges encountered during actual implementation of preparedness, response, and recovery efforts for recent disasters. An additional concern is the unfortunate fact that recurrent human-initiated crises and incidents have not abated in the present era. For this reason, FEMA and other agencies subsumed under the U.S. Department of Homeland Security (DHS) are required to be prepared to provide leadership for addressing all-hazard scenarios.

### Background: Recent Difficulties in Disaster Relief

Prior to the September 11, 2001, terrorist attack, FEMA was tasked with providing primary leadership in coordinating preparedness, response, and recovery efforts for domestic emergencies. Domestic emergencies were broadly defined, and although the agency had been called upon to provide leadership in recovering from the 1993 World Trade Center and 1995 Oklahoma City terrorist attacks, FEMA's primary mission focus during the pre–9/11 era was the emergency management of natural and industrial disasters. With the establishment of DHS, FEMA was absorbed into DHS and tasked with responding to all hazards.



U.S. Federal Emergency Management Agency.

A marina in Louisiana devastated during Hurricane Katrina. The Katrina disaster had a profound effect on the development of the all-hazards approach to homeland security.

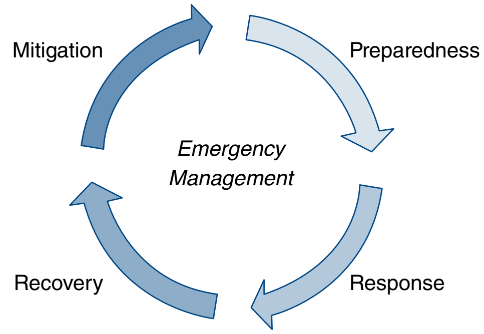
Unfortunately, two natural disasters occurred that highlighted significant shortcomings in the American emergency management system: one prior to September 11, 2001, and the other after the 9/11 attack. **Hurricane Andrew** struck the United States in 1992, causing approximately $26 billion in damage. Widespread criticism of the federal response argued that federal intervention was unnecessarily slow and uncoordinated. **Hurricane Katrina** struck the Gulf Coast of the United States in 2005, causing billions of dollars in destruction and resulting in nearly 2,000 deaths. Again, strong criticism of the federal response argued that federal intervention was unacceptably inadequate and ponderous. State emergency response authorities in Louisiana were also widely criticized as images of thousands of refugees were broadcast globally. **Hurricane Maria** struck Puerto Rico in 2017 when the territory was still recovering from Hurricane Irma two weeks prior. Hurricane Maria caused more than $8 billion in damage, with extensive destruction from flash flooding, storm surge, and high winds. The territory's power grid was completely destroyed, and an estimated 80 percent of agriculture was lost. During the aftermath, strong allegations were lodged that the federal response was unacceptably slow and inadequate, with much of the criticism centered on a perceived lack of empathy from the White House. International nongovernmental organizations (NGOs) such as Refugees International and Oxfam concurred with these assessments.

Experts argued that comparable policy decisions in the cases of Hurricane Andrew and Hurricane Katrina led to the allegedly poor coordination of federal responses to the disasters. Regarding Hurricane Andrew, the federal government was arguably less prepared than required because of the emphasis during the 1980s on preparing for nuclear attack, which effectively diverted resources and planning from the emergency management of natural disasters. Hurricane Katrina similarly occurred when the United States was devoting enormous resources to mitigating the new terrorist threat, thus diverting resources from preparing for other emergencies, such as natural disasters. Both cases illustrated the need for designing and implementing an all-hazards component to emergency management preparations and response.

## All-Hazards Emergency Management: Core Concepts

Managing emergencies under an all-hazards umbrella can be quite complex, and it requires the efficient coordination of several central sequential elements. Such coordination is necessary for the orderly implementation of response efforts when emergencies arise. The sequential elements of the all-hazards umbrella include mitigation of risk, preparedness planning, emergency response operations, and recovery systems. Implemented within the context of a whole-community approach, these elements are frequently referred to as a *phase of disaster model* and the life cycle of emergency management. Figure 2.2 illustrates the application of this concept.

**FIGURE 2.2 ■ The Emergency Management Life Cycle as Illustrated by the Kansas City Office of Emergency Management**




*Source:* Kansas City Office of Emergency Management.

## Mitigation of Risk

As defined by FEMA, **mitigation of risk** is the effort to reduce loss of life and property by lessening the impact of disasters. Mitigation is taking action *now*—before the next disaster—to reduce human and financial consequences later (analyzing risk, reducing risk, insuring against risk). Effective mitigation requires that we *all* understand local risks, address the hard choices, and invest in long-term community well-being. Without mitigation actions, we jeopardize our safety, financial security, and self-reliance.[3]

Thus, pre-emergency initiatives are put into place by mitigation mechanisms that are theoretically intended to reduce the potential costs and destructiveness of disasters when they occur. Such initiatives require partnerships between government and private agencies. For example, private insurance for floods, earthquakes, and other emergencies mitigates the financial losses of businesses and private individuals. Other mitigations may include flood-control systems, the posting of evacuation route information, new construction codes for buildings in areas of risk, and the dissemination of information about known hazards.

## Preparedness Planning

The adoption of emergency management contingencies prior to the occurrence of an emergency situation is a critical component of all-hazards emergency management. Such preparations are termed **preparedness planning**. Ideally, preparedness planning should be designed with the ultimate goal of ensuring the efficiency and success of the initial response effort and the subsequent recovery period. Preparedness planning cannot anticipate every contingency or emergency scenario, especially if it is a terrorist threat scenario. However, flexibility and adaptation can mitigate the consequences of unanticipated hazard and threat contingencies when they occur.

## Emergency Response Operations

When emergencies occur, coordinated interventions known as **emergency response operations** are undertaken. Unfortunately, disasters and other emergencies are rarely, if ever, predictable. Hence, emergency responders are usually called upon to reactively implement contingency plans. Significant resources must be efficiently mobilized during emergency response operations, requiring the complex deployment of personnel and equipment to disaster sites. Examples of services rendered during emergency response operations include caring for victims, evacuating endangered populations, maintaining order and security, containing hazardous conditions such as fires, and disseminating critical information.

## Recovery Systems

When emergency events occur, the implementation of **recovery systems** is critical to emergency response operations. Virtually synonymous with restoration, recovery operations attempt to return affected regions to predisaster baselines. At a minimum, this requires coordinated intervention to effectively restore affected populations to their pre-emergency norms of living and rebuild damaged infrastructure. Preparations must anticipate the possibility that recovery operations may be quite expensive and long term. Rebuilding infrastructure includes restoring communication, power, and water services. The restoration of transportation requires repair of damaged roadways and overpasses as well as reestablishment of transportation systems. Providing basic services to affected populations includes constructing shelters, providing climate-related assistance, and clothing and feeding those who are forced from their homes. Medical and financial recovery assistance is often essential when significant destruction and dislocation occur.

### The Whole-Community Approach to Emergency Management

FEMA has incorporated a policy-planning concept that attempts to meld government and private sector constituencies into a whole-community approach to the homeland security enterprise. FEMA acknowledges that "[p]reparedness is a shared responsibility; it calls for the involvement of everyone—not just the government—in preparedness efforts"[4] and "[b]y working together, everyone can help keep the nation safe from harm and help keep it resilient when struck by hazards, such as natural disasters, acts of terrorism, and pandemics."[5] The whole-community approach envisions collaboration from all segments of society at all levels on the design and implementation of an efficient emergency management system. In essence, whole community "includes individuals and families, including those with access and functional needs; businesses; faith-based and community organizations; nonprofit groups; schools and academia; media outlets; [and] all levels of government, including state, local, tribal, territorial, and federal partners."[6] Thus, all segments of society that may potentially be affected by a catastrophic event are ideally to be subsumed under an all-hazards umbrella, thereby promoting an efficient and effective homeland security enterprise.

### Case in Point: Nonterrorist Mass Shootings and Active Shooter Protocols

Nonterrorist disaster relief systems must be prepared to address a wider spectrum of potential crises than natural or technological disasters. (Both are discussed later in this chapter.) Examples of potential crises include intentional human-initiated crises such as nonterrorist mass shootings. When discussing this phenomenon, it is important to first consider that individual possession of firearms in the United States is a fundamental right guaranteed under the Second Amendment to the U.S. Constitution. Firearms are commonly purchased for personal defense, sporting activities, and other responsible purposes.

The United States periodically experiences incidents of nonterrorist mass homicides perpetrated by individuals who typically enter a facility and begin to randomly shoot victims, often using high-powered firearms such as assault rifles and high-caliber handguns. There is no settled definition of what constitutes a **mass shooting** in the United States. Broad consensus opinion holds that four fatalities in a single firearms incident qualifies as a mass shooting, although this is subject to debate among experts.[7] A baseline definition holds that a mass shooting is a single firearms incident that results in multiple fatalities.

Perpetrators of mass firearm killings rarely justify their actions by citing political motivations, such as ideology, race, or religion, and thus do not fit the modern profile of terrorist operatives or political lone-wolf actors. Rather, those who commit crimes of mass homicide are driven by the same antisocial motivations typically cited by other criminals. The distinctive difference is that they act out their antisocial rationales by engaging in mass firearm killings.

Nonterrorist mass shootings are not common among the world's prosperous democracies. The frequency of these incidents and the overall rate of firearm-related homicides are much higher in the United States than in similar high-income nations. For example, research of 23 populous high-income countries on firearm homicides reported that

> the US homicide rates were 6.9 times higher than rates in the other high-income countries, driven by firearm homicide rates that were 19.5 times higher. For 15-year olds to 24-year olds, firearm homicide rates in the United States were 42.7 times higher than in the other countries. For US males, firearm homicide rates were 22.0 times higher, and for US females, firearm homicide rates were 11.4 times higher. . . . Among these 23

countries, 80% of all firearm deaths occurred in the United States, 86% of women killed by firearms were US women, and 87% of all children aged 0 to 14 killed by firearms were US children.[8]

The April 20, 1999, mass shooting by two teenagers at Columbine High School in Littleton, Colorado, which resulted in 13 dead and 21 wounded, is arguably a tipping point for studying the profile of mass shootings in the modern era. The two perpetrators, Dylan Klebold and Eric Harris, were heavily armed and methodically shot students and teachers at Columbine High School, eventually committing suicide. Since the Columbine incident, dozens of nonterrorist mass shootings have occurred with a similar sequence of events, in which a shooter methodically shot victims before either committing suicide or being killed or captured by the police. After Columbine, many of the most lethal mass shootings occurred at educational institutions. For example, on December 14, 2012, in Newtown, Connecticut, 20 children and six adults were killed by gunman Adam Lanza at Sandy Hook Elementary School. Similarly, on February 14, 2018, in Parkland, Florida, 17 students were killed and 17 wounded by lone gunman Nikolas Cruz at Marjory Stoneman Douglas High School. And on May 24, 2022, 21 people, including 19 children and two teachers, were killed and 18 injured by lone gunman Salvador Ramos at Robb Elementary School in Uvalde, Texas.

Chapter Perspective 2.1 summarizes incidents occurring after the Columbine High School shootings. This is not an exhaustive list and serves as an instructive "snapshot" of an ongoing societal pattern in the United States. Terrorism-related mass homicide incidents in the United States, most of which are mass shootings, are discussed in Chapter 9.



## CHAPTER PERSPECTIVE 2.1

### NONTERRORIST MASS SHOOTINGS IN THE UNITED STATES AFTER THE COLUMBINE INCIDENT

The following timeline summarizes nonterrorist mass-shooting incidents in the United States from the time of the Columbine High School incident on April 20, 1999.

**April 20, 1999**. Two gunmen killed 13 people and wounded 21 during the Columbine High School mass shooting in Littleton, Colorado.

**July 29, 1999**. Mark Orrin Barton, 44, murdered his wife and two children with a hammer before shooting up two Atlanta day trading firms. Barton, a day trader, was believed to be motivated by huge monetary losses. He killed 12 including his family and injured 13 before killing himself.

**September 15, 1999**. Larry Gene Ashbrook opened fire on a Christian rock concert and teen prayer rally at Wedgwood Baptist Church in Fort Worth, Texas. He killed seven people and wounded seven others, almost all teenagers. Ashbrook committed suicide.

**December 26, 2000**. Edgewater Technology employee Michael "Mucko" McDermott shot and killed seven of his coworkers at the office in Wakefield, Massachusetts. McDermott claimed he had "traveled back in time and killed Hitler and the last six Nazis." He was sentenced to seven consecutive life sentences.

**July 8, 2003**. Doug Williams, a Lockheed Martin employee, shot up his plant in Meridian, Mississippi, in a racially motivated rampage. He shot 14 people, most of them African American, and killed 7 before killing himself.

**March 12, 2005**. Persons attending a Living Church of God meeting were gunned down by 44-year-old church member Terry Michael Ratzmann at a Sheraton hotel in Brookfield, Wisconsin. Ratzmann was thought to have had religious motivations, and killed himself after executing the pastor, the pastor's 16-year-old son, and seven others. Four were wounded.

**March 21, 2005**. Teenager Jeffrey Weise killed his grandfather and his grandfather's girlfriend before opening fire on Red Lake Senior High School, killing nine people on campus and injuring five. Weise killed himself.

**March 25, 2006**. Seven died and two were injured by 28-year-old Kyle Aaron Huff in a shooting spree through Capitol Hill in Seattle, Washington. The massacre was the worst killing in Seattle since 1983.

**October 2, 2006**. Children at an Amish schoolhouse in Lancaster, Pennsylvania, were gunned down by 32-year-old Charles Carl Roberts. Roberts separated the boys from the girls, binding and shooting the girls. Five young girls died, while six were injured. Roberts committed suicide afterward.

**February 12, 2007**. In Salt Lake City's Trolley Square mall, five people were shot to death and four others were wounded by 18-year-old gunman Sulejman Talović. One of the victims was a 16-year-old boy.

**April 16, 2007**. Virginia Tech became the site of the deadliest school shooting in U.S. history when a student, Seung-Hui Cho, gunned down 56 people. Thirty-two people died in the massacre.

**December 5, 2007**. A 19-year-old boy, Robert Hawkins, shot up a department store in the Westroads Mall in Omaha, Nebraska. Hawkins killed nine people and wounded four before killing himself. The semiautomatic rifle he used was stolen from his stepfather's house.

**February 7, 2008**. Six people died and two were injured in a shooting spree at the City Hall in Kirkwood, Missouri. The gunman, Charles Lee Thornton, opened fire during a public meeting after being denied construction contracts he believed he deserved. Thornton was killed by police.

**February 14, 2008**. Steven Kazmierczak, 27, opened fire in a lecture hall at Northern Illinois University, killing 6 and wounding 21. The gunman shot and killed himself before police arrived. It was the fifth-deadliest university shooting in U.S. history.

**March 29, 2009**. Eight people died in a shooting at the Pinelake Health and Rehab nursing home in Carthage, North Carolina. The gunman, 45-year-old Robert Stewart, was targeting his estranged wife who worked at the home and survived. Stewart was sentenced to life in prison.

**April 3, 2009**. Jiverly Wong, 41, opened fire at an immigration center in Binghamton, New York, before committing suicide. He killed 13 people and wounded 4.

**November 5, 2009**. Major Nidal Hasan, a psychiatrist in the U.S. Army, shot to death 13 people at the Fort Hood Army base, now known as Fort Cavazos, in Texas. More than 30 others were wounded.

**August 3, 2010**. Omar S. Thornton, 34, opened fire at Hartford Distributors in Manchester, Connecticut, after getting caught stealing beer. Nine were killed, including Thornton, and two were injured.

**January 8, 2011**. Former representative Gabby Giffords (D-AZ) was shot in the head when 22-year-old Jared Loughner opened fire on an event she was holding at a Safeway market in Tucson, Arizona. Six people died, including Arizona District Court chief judge John Roll, one of Giffords's staffers, and a 9-year-old girl. Nineteen total were shot. Loughner was sentenced to seven life terms plus 140 years, without parole.

**September 6, 2011**. Eduardo Sencion, 32, entered an IHOP restaurant in Carson City, Nevada, and shot 12 people. Five died, including three National Guard members.

**October 14, 2011**. Eight people died in a shooting at Salon Meritage hair salon in Seal Beach, California. The gunman, 41-year-old Scott Evans Dekraai, left six women and two men dead, while just one woman survived. It was Orange County's deadliest mass killing.

**April 2, 2012**. A former student, 43-year-old One L. Goh, killed seven people at Oikos University, a Korean Christian college in Oakland, California. The shooting was the sixth-deadliest school massacre in the United States and the deadliest attack on a school since the 2007 Virginia Tech massacre.

**April 6, 2012**. Jake England, 19, and Alvin Watts, 32, shot five Black men in Tulsa, Oklahoma, in a racially motivated shooting spree. Three died.

**May 29, 2012**. Ian Stawicki opened fire on Café Racer in Seattle, Washington, killing five and himself after a citywide manhunt.

**July 20, 2012**. During the midnight premiere of *The Dark Knight Rises* in Aurora, Colorado, 24-year-old James Holmes killed 12 people and wounded 58. Holmes was arrested outside the theater.

**August 5, 2012**. Six Sikh temple members were killed when 40-year-old U.S. Army veteran Wade Michael Page opened fire in a gurdwara in Oak Creek, Wisconsin. Four others were injured, and Page killed himself.

**September 27, 2012**. Five were shot to death by 36-year-old Andrew Engeldinger at Accent Signage Systems in Minneapolis, Minnesota. Three others were wounded. Engeldinger went on a rampage after losing his job, ultimately killing himself.

**December 14, 2012**. Twenty children and six adults were killed during the Sandy Hook Elementary School mass shooting in Newtown, Connecticut.

**February 3–12, 2013**. Los Angeles police officer Christopher Dorner crossed three counties in Southern California during a nine-day shooting spree, killing four people and wounding nine.

**September 16, 2013**. Lone gunman Aaron Alexis killed 12 people and wounded 8 at the headquarters of the Naval Sea Systems Command at the Washington Navy Yard in Washington, D.C.

**May 23, 2014**. In Isla Vista, California, near the campus of the University of California, Santa Barbara, Elliot Rodger killed 6 people and wounded 13 during a stabbing and shooting spree. His attack was apparently motivated by his hatred of women.

**October 24, 2014**. Freshman student Jaylen Fryberg shot five students, killing four, at Marysville Pilchuck High School in Marysville, Washington.

**February 26, 2015**. Lone gunman Joseph Jesse Aldridge shot eight people in four homes, killing seven, in Tyrone, Texas. Four of the fatalities were family members.

**October 1, 2015**. Student Christopher Harper-Mercer killed nine people and wounded eight on the campus of Umpqua Community College near Roseburg, Oregon. The nine fatalities were a professor and classmates, all shot inside a classroom.

**March 9, 2016**. Two gunmen in Wilkinsburg, Pennsylvania, killed six people and wounded three during a party. One of the victims was an unborn child.

**September 23, 2016**. A lone gunman killed five people at the Cascade Mall in Burlington, Washington.

**January 6, 2017**. A gunman at the Fort Lauderdale–Hollywood International Airport in Broward County, Florida, killed five people and wounded six near a baggage claim area. Thirty-six other people were injured during the ensuing panic.

**October 1, 2017**. Lone gunman Stephen Paddock shot at concertgoers from a high floor of the Mandalay Bay Resort and Casino in Las Vegas, Nevada. He killed 59 people and wounded 422. A total of 851 people were injured during the ensuing panic.

**February 14, 2018**. Seventeen people were killed and 17 wounded during the Marjory Stoneman Douglas High School mass shooting in Parkland, Florida.

**May 18, 2018**. Ten people—eight students and two teachers—were killed and 14 others wounded by gunman Dimitrios Pagourtzis at Santa Fe High School in Santa Fe, Texas. Pagourtzis was a student at the school. He also constructed explosive devices that were not detonated during the attack.

**June 28, 2018**. Lone gunman Jarrod Ramos killed five people and wounded two in the offices of the *Capital Gazette* newspaper in Annapolis, Maryland.

**November 7, 2018**. Lone gunman Ian David Long entered the Borderline Bar and Grill in Thousand Oaks, California, during a student line-dancing event. He killed 12 people and wounded more than 12 others.

**February 15, 2019**. A lone gunman killed five people and wounded six at a Henry Pratt Company factory in Aurora, Illinois. He was a recently terminated employee.

**May 31, 2019**. Twelve people were shot and killed at a municipal building in Virginia Beach, Virginia, by disgruntled city employee DeWayne Craddock.

**August 4, 2019**. Nine people were shot and killed by a 24-year-old lone gunman in Dayton, Ohio.

**February 26, 2020**. A former employee of the Molson Coors Beverage Company in Milwaukee, Wisconsin, shot and killed five people at the company campus.

**March 22, 2021**. Lone gunman Ahmad Al Aliwi Al-Issa shot and killed 10 people in a supermarket in Boulder, Colorado. Al-Issa was found to be mentally incompetent to stand trial.

**April 15, 2021**. A 19-year-old former FedEx employee killed nine people at a company facility in Indianapolis, Indiana.

**May 26, 2021**. Nine people were killed at a San Jose, California, Valley Transportation Authority railyard. The lone gunman was a 57-year-old employee of VTA.

**April 3, 2022**. Six people were killed in downtown Sacramento, California, when an estimated five gunmen opened fire.

**May 24, 2022**. Nineteen children and two teachers were shot and killed at the Robb Elementary School in Uvalde, Texas, by 18-year-old Salvador Ramos, a former student at the school.

**July 4, 2022**. Gunman Robert Eugene Crimo opened fire on an Independence Day parade in Highland Park, Illinois, killing seven people.

**November 20, 2022**. Five people were killed and 17 wounded when gunman Anderson Lee Aldrich opened fire on patrons at Club Q, a LGBTQ+ nightclub in Colorado Springs, Colorado.

**January 21, 2023**. Eleven people were killed and at least nine wounded when a gunman opened fire on patrons at a dance hall in Monterey Park, California. Most of the patrons were Asian American celebrants of the Lunar New Year.

**February 13, 2023**. A gunman killed three students and wounded five others on the Michigan State campus in East Lansing before committing suicide. He had no known affiliation with the university.

**April 15, 2023**. Several assailants opened fire at a dance party in Dadeville, Alabama. Five attendees were killed and 32 injured. Five suspects were taken into custody and charged for the incident.

**May 6, 2023**. Eight people were killed and seven wounded in Allen, Texas, when a gunman opened fire at a crowded mall. The assailant was fatally shot by a police officer.

## Discussion Questions

1. Do similarities exist in mass-shooting incidents?
2. Should such incidents be redefined as acts of terrorism?
3. Can procedures be designed to reduce the frequency or scale of such incidents?



Because of these incidents, adaptive law enforcement tactics have been designed to end mass shootings as quickly as possible. These tactics are intended to respond swiftly and decisively to **active shooter** scenarios. The Department of Homeland Security defines an active shooter as "an individual actively engaged in killing or attempting to kill people in a confined and populated area; in most cases, active shooters use firearm(s) and there is no pattern or method to this selection of victims."[9] Thus, rather than engaging in prolonged negotiations or otherwise awaiting word from perpetrators as was done in the past, police units are trained to enter affected areas aggressively to end the incident and apprehend suspects.[10] Contemporary protocols require that in active shooter scenarios the primary mission of the first units gaining entry is to hunt and neutralize suspects. Subsequent units evacuate and render aid to potential victims. Concurrently, many business facilities and educational campuses have adopted active shooter protocols. These protocols, sometimes referred to as *run, hide, fight protocols*, typically parallel recommendations published by the DHS. DHS's publication *Active Shooter: How to*

*Respond* presents a plan for responding to active shooter scenarios, including the following summarized measures[11]:

1. **Evacuate**

   If there is an accessible escape path, attempt to evacuate the premises.

2. **Hide out**

   If evacuation is not possible, find a place to hide where the active shooter is less likely to find you.

3. **Take action against the active shooter**

   As a last resort, and only when your life is in imminent danger, attempt to disrupt and/or incapacitate the active shooter.



## NATURAL HAZARDS

Emergency incidents arising from nonhuman causes are termed **natural hazards**. Phenomena arising from natural environmental conditions cause natural hazard incidents. Examples of natural hazard events include hurricanes, floods, tornadoes, and earthquakes; when they occur, they are capable of eventually being classified as natural disasters. Although incident scenarios for natural hazards can be projected and prepared for, such events are usually unanticipated, and their consequences can be unpredictable. The natural hazards discussed in this section represent common and potentially disastrous natural events.

Natural hazards are naturally occurring phenomena that are annually responsible for significant human and environmental destruction. Table 2.1 summarizes the characteristics, causes, and destructive potential of natural hazards.

**TABLE 2.1 ■ Natural Hazards**

| | Event Profile | | |
|---|---|---|---|
| **Natural Hazard** | **Primary Characteristics** | **Causes of the Event** | **Destructive Potential** |
| ***Tropical cyclonic storms*** | Large storm with rotating high winds and thunderstorms | Formation over tropical water | Extensive with prolonged event duration |
| ***Earthquakes*** | Sudden shaking or bouncing | Sudden slip in an Earth fault | Extensive with short event duration |
| ***Tornadoes*** | Violent storm with funnel cloud formation | Strong thunderstorms | Extensive with surprising speed |
| ***Floods*** | Surging water and frequent occurrences | Rainstorms and spring thaws | Normally limited because of predictability |
| ***Wildland fires*** | Fire outbreaks in woodland areas | Lightning and human negligence | Extensive natural destruction |

## Tropical Cyclonic Storms

A **tropical cyclone** is a "rotating, organized system of clouds and thunderstorms that originates over tropical or subtropical waters and has a closed low-level circulation."[12] The rotating pattern surrounds a calm center, popularly referred to as the *eye* of the storm. Tropical cyclonic storms begin over tropical water and can reach landfall with such intensity that destruction can be quite extensive along coastal regions. Depending on the size of cyclonic storms, they are capable of proceeding far inland and create an extensive swath of destruction. Tropical cyclonic storms are classified by the sheer force of their sustained winds as follows:

- **Tropical depression**. A type of tropical cyclone with maximum sustained winds of 38 mph (33 knots) or less.
- **Tropical storm**. A type of tropical cyclone with maximum sustained winds of 39 to 73 mph (34 to 63 knots).
- **Hurricane**. A type of tropical cyclone with maximum sustained winds of 74 mph (64 knots) or higher. In the western North Pacific, hurricanes are called **typhoons**; similar storms in the Indian Ocean and South Pacific are called **cyclones**.[13]

Hurricanes may last for weeks as they travel over tropical waters. Coastal areas in the path of hurricanes are usually struck by **storm surges**, which are walls of water pushed forward by approaching hurricanes. Chapter Perspective 2.2 discusses the measurement of hurricane intensities.

## CHAPTER PERSPECTIVE 2.2

### REPORTING HURRICANE INTENSITY: THE SAFFIR–SIMPSON HURRICANE INTENSITY SCALE

Hurricanes are classified further by the force of their sustained winds and are categorized by the Saffir–Simpson hurricane intensity scale as follows:

- **Category 1 Hurricane**. Sustained winds of 74–95 mph. Very dangerous winds will produce some damage. Storm surge 4–5 feet above normal.
- **Category 2 Hurricane**. Sustained winds of 96–110 mph. Extremely dangerous winds will cause extensive damage. Storm surge 6–8 feet above normal.
- **Category 3 Hurricane**. Sustained winds of 111–129 mph. Devastating damage will occur. Storm surge 9–12 feet above normal.
- **Category 4 Hurricane**. Sustained winds of 131–156 mph. Catastrophic damage will occur. Storm surge 13–18 feet above normal.
- **Category 5 Hurricane**. Sustained winds greater than 156 mph. Catastrophic damage will occur. Storm surge greater than 18 feet above normal.

### Discussion Questions

1. Are five levels of intensity a logical way to measure hurricanes?
2. What is the practical effect of selecting the scale of hurricane intensity on disaster relief efforts?
3. Who should have primary responsibility for designating the intensity of a hurricane?

## Case in Point: Superstorm Sandy's Swath of Destruction

Emergency relief systems and procedures were severely challenged in late 2012 when **Hurricane Sandy** struck the United States' Eastern Seaboard. The hurricane came ashore in the densely populated urban northeastern region of the United States, causing widespread damage. Hurricane Sandy had formed on October 22, 2012, and dissipated by October 31, 2012. Hurricane Sandy was a Category 3 hurricane at its peak, but it was transformed into an unusually large storm following its merger with a frontal weather system and thereafter became the geographically largest Atlantic hurricane ever recorded. Hurricane Sandy was given the popular nickname "Superstorm Sandy" for this reason.

Superstorm Sandy's path impacted seven nations in the Caribbean, the Atlantic, and North America. At least 286 people were killed, and the estimated $65 billion in damage in the United States made it the second-costliest hurricane in U.S. history, behind Hurricane Katrina.[14] Extensive damage was recorded along the entire Atlantic Seaboard from Florida to Maine, with particularly severe damage occurring when Sandy struck the New Jersey shore. A total of 24 states were affected, including the Midwestern states of Wisconsin and Michigan.[15]

Emergency response efforts were affected by some political controversy in the United States, primarily because the storm occurred during national election season and because of perceptions that some political leaders delayed adequate relief funding. Significantly, the hurricane was so destructive that the U.S. National Hurricane Center and World Meteorological Organization reported that the name *Sandy* has been permanently retired from named tropical cyclonic storms in the Atlantic and Caribbean region.[16]

## Earthquakes

The U.S. Geological Survey defines *earthquake* as "a term used to describe both sudden slip on a fault, and the resulting ground shaking and radiated seismic energy caused by the slip, or by volcanic or magmatic activity, or other sudden stress changes in the earth."[17] When an earthquake occurs, sudden shaking or bouncing of the earth's surface can cause extensive damage to the natural environment and built infrastructure. Although the intensity of earthquakes is measured using accepted measurement scales, it is impossible to predict when or where an earthquake will occur.

The two most accepted measurement scales for earthquakes are the **Modified Mercalli Intensity (MMI) scale** and the **Richter scale**. Arguably better known than the MMI, the Richter scale measures the magnitude of earthquakes using a logarithmic mathematical model in whole numbers and decimal fractions. For example, a magnitude 5.3 might be computed for a moderate earthquake, and a strong earthquake might be rated as magnitude 6.3. Because of the logarithmic basis of the scale, each whole-number increase in magnitude represents a tenfold increase in measured amplitude; as an estimate of energy, each whole-number step in the magnitude scale corresponds to the release of about 31 times more energy than the amount associated with the preceding whole-number value.[18]

The MMI measures the intensity of earthquakes without using the mathematical models employed by the Richter scale. The MMI is composed of 10 increasing levels of intensity, designated by Roman numerals, that range from imperceptible shaking to catastrophic destruction. Because it does not have a mathematical basis, it is an arbitrary ranking based on observed effects. The MMI value assigned to a specific site after an earthquake gives a more meaningful measure of severity to the nonscientist than does magnitude because intensity refers to the effects actually experienced at that place.[19]

Earthquakes that occur beneath the ocean floor can result in seismic sea waves. Earthquakes or other disturbances on the ocean floor can result in a series of massive waves known as **tsunamis**. They can travel extremely long distances at hundreds of miles per hour and strike land as high as 100 feet or more. Loss of life and damage to populated areas can be massive.

Chapter Perspective 2.3 discusses how the MMI reports the intensity of earthquakes.

## CHAPTER PERSPECTIVE 2.3

### REPORTING EARTHQUAKE INTENSITY: THE MODIFIED MERCALLI INTENSITY SCALE

The Modified Mercalli Intensity (MMI) scale reports the intensity of earthquakes by ranking the effects of an earthquake based on observed facts.

The following is an abbreviated description of the levels of Modified Mercalli intensity.[i]

| Intensity | Shaking | Description/Damage |
|---|---|---|
| I | Not felt | Not felt except by a very few under especially favorable conditions. |
| II | Weak | Felt only by a few persons at rest, especially on upper floors of buildings. |
| III | Weak | Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated. |
| IV | Light | Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably. |
| V | Moderate | Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop. |
| VI | Strong | Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight. |
| VII | Very strong | Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken. |
| VIII | Severe | Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. |
| IX | Violent | Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations. |
| X | Extreme | Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent. |

### Discussion Questions

1. Are 10 levels of intensity a logical way to measure earthquakes?
2. What is the practical effect of selecting the scale of earthquake intensity on disaster relief efforts?
3. Who should have primary responsibility for designating the intensity of an earthquake?

### Note

[i] U.S. Geological Survey, "The Modified Mercalli Intensity Scale," accessed June 27, 2023, http://www.usgs.gov/programs/earthquake-hazards/modified-mercalli-intensity-scale.



## Tornadoes

Tornadoes are powerful and violent storms originating from strong thunderstorms. They are capable of striking populated areas with exceptional and surprising speed, potentially killing residents and destroying neighborhoods in a few seconds. Tornadoes are characterized by revolving funnel clouds emanating from thunderstorms high in the atmosphere and extending from the storm to the ground.

Although not as large as tropical cyclonic storms, the wind force of tornadoes can potentially far exceed that of Category 5 hurricanes; tornadoes have been measured at up to 300 miles per hour. Tornado intensity is reported in accordance with the **Enhanced Fujita–Pearson Scale** (Enhanced F-Scale) developed in 2007 by the National Oceanic and Atmospheric Administration (NOAA). NOAA describes the Enhanced F-Scale as follows:

> *The Enhanced F-scale . . . is a set of wind estimates (not measurements).* . . . [It] uses three-second gusts estimated at the point of damage. . . . These estimates vary with height and exposure. Important: The 3 second gust is not the same wind as in standard surface observations. Standard measurements are taken by weather stations in open exposures, using a directly measured, "one minute mile" speed.[20]

Table 2.2 reports the Enhanced F-Scale.

Tornadoes typically carve swaths of destruction along the course of their passage, often dozens of miles in length and potentially more than one mile in width. Not every tornado is preceded by signature funnel clouds, so affected settlements or towns often have no notice—or extremely short notice—of approaching tornadoes. Particularly destructive results have occurred when clusters of tornadoes have struck in concentrated geographic areas. For example, between April 25 and April 28, 2011, more than 350 tornadoes struck the United States, the largest recorded tornado outbreak in history. During the outbreak, on April 27, an EF4 tornado struck the Tuscaloosa–Birmingham, Alabama, area. Its path of destruction stretched more than 80 miles, and more than 60 people were killed. Similarly, in May 2013, several tornadoes struck Oklahoma over several days. On May 20, an EF5 tornado from that storm system, with wind velocities exceeding 200 miles per hour, touched down near Moore, Oklahoma. Hundreds of residents were injured, and 23 were killed.

**TABLE 2.2 ■ Reporting Tornado Intensity: The Enhanced Fujita–Pearson Scale**

| Fujita Scale | | | Derived EF Scale | | Operational EF Scale | |
|---|---|---|---|---|---|---|
| F Number | Fastest quarter mile (mph) | Three-second gust (mph) | EF number | Three-second gust (mph) | EF number | Three-second gust (mph) |
| 0 | 40–72 | 45–78 | 0 | 65–85 | **0** | **65–85** |
| 1 | 73–112 | 79–117 | 1 | 86–109 | **1** | **86–110** |
| 2 | 113–157 | 118–161 | 2 | 110–137 | **2** | **111–135** |
| 3 | 158–207 | 162–209 | 3 | 138–167 | **3** | **136–165** |
| 4 | 208–260 | 210–261 | 4 | 168–199 | **4** | **166–200** |
| 5 | 261–318 | 262–317 | 5 | 200–234 | **5** | **Over 200** |

U.S. Federal Emergency Management Agency.

Destruction in the aftermath of intense tornadoes which struck Moore, Oklahoma in May 2013.

## Floods

Floods occur in all 50 states and in all U.S. territories, affecting more people and occurring more frequently than other types of disasters. Fortunately, the geographic location of floods is often predictable, and because of this predictability, FEMA has been able to demarcate national **flood zones** by identifying the risk of flooding in each area. Everyone lives in a flood zone; it's just a question of whether you live in a low-, moderate-, or high-risk area.[21]

Floods originate from a variety of causes, and damage occurs primarily as a result of human proximity to and development on floodplains. Spring thaws and rainstorms are common causes of floods in populated areas. To identify and standardize (label) the likelihood of flooding in specific locations, FEMA classifies flood-prone areas as follows:

- **Special Flood Hazard Areas**. Areas that "are at high risk for flooding" and have "a 26 percent chance of suffering flood damage during the term of a 30-year mortgage."[22]
- **Non-Special Flood Hazard Areas**. Areas with a moderate to low likelihood of flooding.

Because of the frequency and scope of floods, FEMA initiated the **National Flood Insurance Program (NFIP)** in 1978. The program regularly disburses funds for insurance claims, which have totaled nearly $40 billion since its inception. The NFIP maintains and regularly updates **Flood Insurance Rate Maps (FIRMs)**, which are "the official map[s] of a community" that define "both the special flood hazard areas and the flood zones applicable to the community. This map is used by the . . . NFIP for floodplain management, mitigation, and insurance purposes. The flood map is the official source for determining flood risk within a community."[23]

## Wildland Fires

**Wildland fires** occur in woodland areas and are a perennial problem in the United States. These fires number in the tens of thousands annually, burning millions of acres each year.[24] Wildland fires are often ignited by lightning or human negligence and mistakes. The risk of wildland fires increases during dry, hot conditions. This is often an annual regional phenomenon, occurring for example during California's highly destructive "burn season" between July and November.

The potential for extensive infrastructure damage and injuries is significant, especially as populations continue to increase near potential fire zones. Property damage and environmental destruction are regular consequences of wildland fires. Environmental damage includes an increased likelihood of flooding and the destruction of natural habitats.

## Climate Change

**Climate change** refers to long-term shifts in temperatures and weather patterns. It is a global phenomenon presenting unique challenges for nations generally, and homeland security in the United States in particular. Climate change is a scientifically accepted event that has become an integral feature of homeland security planning. Within a security context, it is expected to pose exacerbating ramifications for domestic stability and international conflict.

The relationship of climate change to homeland security policy is firmly established in government policy planning and discourse. Publications such as *The 2014 Quadrennial Homeland Security Review* (QHSR) explicitly recognize climate change as having potentially drastic consequences for remediating future natural hazard events. The 2014 QHSR argues that climate change is a central area of concern for homeland security, along with natural disasters and pandemics. In effect, "climate change and associated trends may also indirectly act as 'threat multipliers.' They aggravate stressors abroad that can enable terrorist activity and violence, such as poverty, environmental degradation, and social tensions."[25] Similarly, the 2014 *Quadrennial Defense Review* reported "[t]he impacts of climate change may increase the frequency, scale, and complexity of future missions, including defense support to civil authorities, while at the same time undermining the capacity of our domestic installations to support training activities."[26] And the 2022 *National Security Strategy* states "[o]f all of the shared problems we face, climate change is the greatest and potentially existential for all nations."[27]

In essence, climate change is understood to be a multifaceted and complex problem that will pose long-term and significant security challenges to the global community and homeland security policy development.

## TECHNOLOGICAL SCENARIOS

Unlike natural disasters, which occur as a consequence of environmental, ecological, or geological events, technological scenarios originate in human conduct. Technological scenarios arise when human-created infrastructures and apparatuses malfunction, fail, or are destroyed. New technologies are constantly being created and applied in new and innovative ways. These include new software, machinery, structures, and materials. Examples of potential hazards caused by human-created technologies include grid infrastructure malfunctions, hazardous material accidents, and nonwildland fires.

Technological hazards are human-originating phenomena that are potentially capable of significant harm. Table 2.3 summarizes technological hazards.

### Grid Infrastructure Malfunctions

Communication and power grids are essential to domestic commerce and quality of life. Vital services such as medical and workplace efficiency are dependent on stable communication and power infrastructures. When malfunctions or failures occur, financial consequences can be quite expensive. Power blackouts, computer crashes, and other grid malfunctions are inconvenient and costly. Losses to businesses, government, and private individuals are calculated annually in billions of dollars.



**TABLE 2.3 ■ Technological Hazards**

| | *Event Profile* | | |
|---|---|---|---|
| ***Technological Hazard*** | ***Primary Characteristics*** | ***Causes of the Event*** | ***Destructive Potential*** |
| ***Grid infrastructure malfunctions*** | Communication and power grid failures | Equipment malfunctions, human negligence, and deliberate sabotage | Uncommon but potential for wide disruption |
| ***Hazardous material accidents*** | Chemical, biological, and radiological accidents | Equipment malfunctions and human negligence | Uncommon but potential for extensive and prolonged event duration |
| ***Nonwildland fires*** | Fire outbreaks on human-constructed infrastructure | Natural phenomena, negligence, intent, and accidents | Extensive destruction |

Accidental grid infrastructure malfunctions can be caused by power line surges, lightning, human negligence, or other events. Intentional grid malfunctions may be caused by terrorist events or military attacks. For example, nations possessing nuclear weapons have known from the early years of the nuclear era that detonations of nuclear devices cause electromagnetic pulses (EMPs), which, at intensive levels, can damage or destroy electrical equipment. Weaponized non-nuclear EMP devices exist that can produce the same effect. As reported by the National Research Council and other organizations,[28] deliberate attacks and sabotage against grid infrastructure are very plausible scenarios.

U.S. Federal Emergency Management Agency

A FEMA relief agent interviews a civilian seeking assistance.

## Hazardous Material Accidents

Hazardous materials include chemical, biological, and radioactive materials. These materials are essential for industry, agriculture, and product manufacturing. However, they are also highly regulated and potentially quite dangerous and toxic if mishandled or when accidents occur. Accidents may occur at points of production in facilities where hazardous materials are manufactured. They also occur during transportation of these materials via railways, seaways, and road transport. Some accidents can be quite catastrophic to nearby population centers and the natural environment.

## Nonwildland Fires

**Nonwildland fires** affect human-constructed infrastructure and occur in populated areas. Many such fires have been structurally devastating to urbanized areas, as reported since the dawn of recorded history. Some fires are ignited by natural hazards, such as earthquakes, lightning, and volcanoes. Other fires may be ignited by arsonists, negligent residents, or industrial accidents. After ignition, the extent of devastation can be exacerbated considerably by flammable construction (such as wooden structures), facilities storing flammable chemicals and other materials, and high winds. Fires in densely populated areas are capable of spreading rapidly.

Statistically, nonwildland fires are a serious hazard. In 2021, according to the National Fire Protection Association, 49 percent of fires were classified as outside or other fires, 36 percent were structure fires, and 15 percent were vehicle fires.[29] That year, there were 1,350,000 fires, resulting in 3,800 civilian fatalities, 14,700 injuries, and damages totaling $15.9 billion. Home fires caused 75 percent of civilian deaths.

This chapter's Global Perspective reports the disaster that occurred in 2011 when an extraordinarily strong tsunami struck Japan and caused the destruction of the Fukushima Daiichi nuclear power installation.

## GLOBAL PERSPECTIVE

### DISASTER IN JAPAN: TSUNAMI AND THE FUKUSHIMA DAIICHI NUCLEAR DISASTER

On March 11, 2011, an earthquake known as the Tōhoku or "Great East Japan" earthquake occurred approximately 40 miles from the coast of Japan. It was an extremely powerful earthquake, the fourth strongest since measurements began to be recorded in 1900. The earthquake resulted in massive tsunami waves up to approximately 130 feet high that struck as far as 6 miles inland. More than 18,000 people were killed by the tsunami, including approximately 2,500 missing and presumed dead.

The tsunami wave struck the Fukushima Daiichi (Number One) nuclear plant, causing severe malfunctions in plant equipment. Three nuclear reactors at Fukushima eventually began to melt down and subsequently released radioactive material. Residents in the surrounding region were quickly evacuated and forced to abandon homes and belongings because of potential radiation contamination. Estimated deaths from plant workers' exposure and the evacuation are approximately 600. It is unknown how many more may become sickened by cancer and other diseases as a result of the released radioactive toxins.

Japanese and international health organizations regularly collaborate to monitor and study the site and the effect of the disaster on potential victims.

## CHAPTER SUMMARY

This chapter introduced the all-hazards umbrella of the homeland security enterprise. This approach casts the broadest net in terms of homeland security policy over potential hazards, emergencies, and disasters. Although the founding concept for the homeland security enterprise was that its primary mission is to prepare for and respond to threats from violent extremists, the all-hazards approach has been adapted as needed during emergency events. This is a logical adaptation because of the enormous resources available to the homeland security network.

Terrorism-related hazards include the use of conventional weapons and explosives as well as unconventional chemical agents, biological agents, radiological agents, and nuclear weapons. Nonterrorist mass shootings and the development of active shooter protocols for first responders are ongoing considerations for homeland security policy planning.

Natural hazards pose plausible scenarios that emanate from human proximity to the natural environment. They are largely unpredictable and potentially devastating in scope, and present long-term consequences as in the case of climate change. Technological scenarios consider potential risks to built infrastructure. They involve hazards and threats to populated centers from emergencies that are often exacerbated by or originate from human activities.

In Chapter 3, the legal foundations of homeland security will be analyzed from the perspectives of global origins and domestic legislative and executive mandates.

## DISCUSSION BOX

*This chapter's Discussion Box is intended to stimulate critical debate about the difficulty of managing a coordinated homeland security enterprise.*

### Challenges of Integrating Homeland Security Intervention

Managing an efficient and coordinated homeland security response system is a complicated and challenging process. The delivery of effective homeland security preparedness, incident response, and disaster recovery are inherently daunting administrative necessities. Nevertheless, coordinating these elements is absolutely vital to ensuring an adequate response to all hazards that may arise.

### Discussion Questions

1. Can the nation effectively prepare, respond, and recover regardless of what kind of hazard is anticipated?
2. If so, what is the best strategy for preparing for the eventual necessity of dealing with these hazards?
3. If not, should potential events be prioritized? Which ones?
4. Is the all-hazards approach to homeland security a reasonable use of limited resources?
5. Should an all-hazards approach be pursued regardless of cost?

## KEY TERMS AND CONCEPTS

The following topics were discussed in this chapter and can be found in the glossary:

active shooter
all-hazards umbrella
CBRNE
climate change
cyclone
disaster
emergency event
emergency response operations
Enhanced Fujita–Pearson Scale
Flood Insurance Rate Maps (FIRMs)
flood zones
hazard
hurricane
Hurricane Andrew
Hurricane Katrina
Hurricane Maria
Hurricane Sandy
mass shooting
mitigation of risk
Modified Mercalli Intensity (MMI) scale
National Flood Insurance Program (NFIP)
natural hazards
Non-Special Flood Hazard Areas
nonwildland fires
preparedness planning
recovery systems
Richter Scale
Special Flood Hazard Areas
storm surge
tropical cyclone
tropical depression
tropical storm
tsunami
typhoon
wildland fires

## RECOMMENDED READINGS

The following publications provide introductions to the all-hazards designation of homeland security:

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