

Chapter 3

The Expanding Role of the Federal Government: 1927–1950

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As communities in the United States recovered from one disaster after another, there was a growing body of knowledge about what response and recovery looked like. There was also a growing understanding that the needs of communities and their victims exceeded local capacity. The Great Mississippi Flood of 1927 and the drought that plagued the Dust Bowl for several years during the 1930s captured the attention of the nation. Each of these events demonstrated that disasters and their effects do not respect state boundaries; the financial effects of the drought that plagued the southern Great Plains during the Depression rippled across the nation.

Throughout this period, federal government response continued to be reactive and focus driven, but it was becoming increasingly common. From 1933 to 1937, disaster relief legislation emerged as part of President Franklin D. Roosevelt's New Deal administration. Beginning in 1934, Congress authorized the Reconstruction Finance Corporation to grant loans to rebuild public facilities damaged by disasters. Subsequent legislation in 1937 created the Disaster Loan Corporation. These programs eventually evolved into the Small Business Administration disaster loan program, which still exists today.

This chapter looks at three major disasters: the Great Mississippi Flood, the drought and storms that became known as the Dust Bowl; and the Texas City explosions, which occurred just after World War II. The explosions in Texas City captured the nation's attention not only because of the sudden onset and immediate death toll, but also because the event vividly demonstrated the risk that accidents and other human-induced threats pose to communities. The chapter explores why and how these disasters became focusing events. In particular, the discussion examines how these events prompted the federal government, as well as state and local governments, to take a greater role in disaster prevention, response, and

recovery—a gradual transformation that resulted in the passage of major federal disaster legislation in 1950.

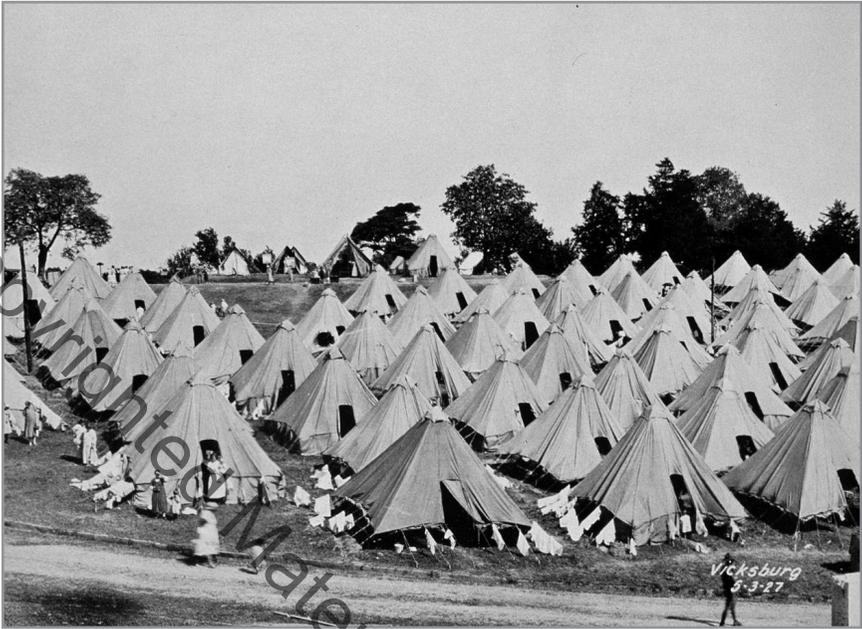
The Great Mississippi Flood of 1927

Communities along the Mississippi have been involved in flood control—primarily levee construction—since 1726, when residents of New Orleans began building levees to protect the city from the rising river. The federal government’s involvement dates back to 1824, when the U.S. Supreme Court ruled in *Gibbons v. Ogden* that it was constitutional for the federal government to finance and construct river improvements. Within two months of the ruling, Congress had appropriated funds and authorized the U.S. Army Corps of Engineers (USACE) to remove certain navigation obstructions from the Ohio and Mississippi Rivers. As flooding of the Mississippi River basin continued in the ensuing decades, the federal government—primarily through USACE—became increasingly involved in flood control efforts. In the Swamp Land Acts of 1849 and 1850, for example, Congress transferred “swamp and overflow land” along the lower Mississippi River from federal ownership to state governments on the condition that the states use revenue from the sale of the lands to build levees and drainage channels. In 1850, Congress commissioned two surveys of the Mississippi River delta, “with such investigations as may lead to determine the most practicable plan for securing it from inundation.”²¹ These surveys ultimately led to a federal policy of using levees—and only levees—to control flooding.

Continued flooding of the river led in 1879 to the creation of the Mississippi River Commission to regulate and coordinate the efforts of the many private and local entities, such as levee districts, that were independently trying to control the river. According to the Association of State Floodplain Managers (ASFPM), “To some, 1879 marked the turning point in the long battle to garner federal support for flood control. From that time forward, Congress gradually increased federal government responsibility to develop flood control throughout the nation.”²²

By 1890, the entire lower Mississippi valley from St. Louis to the Gulf of Mexico had been divided into state and local levee districts. In 1926, just one year before the Great Flood, USACE publicly declared that the levee system would prevent future floods in the Mississippi River basin—an assertion that would quickly prove false.

Beginning in 1926 the Mississippi drainage basin, which stretches from New York to Montana and includes tributaries in thirty-one states and southern Canada, received unprecedented precipitation. Heavy rains began in the summer and continued through the winter. On April 16, 1927, a 1,200-foot section of the levee collapsed thirty miles south of the confluence of the Ohio and Mississippi Rivers, flooding 175,000 acres. In the days to come, much of the levee system



The refugee camp at Vicksburg, Mississippi, was a relatively pleasant camp on high ground. Many refugees lived in such camps for months with inadequate shelter and food until the waters of the Great Mississippi Flood of 1927 receded. Photo courtesy of the National Oceanic and Atmospheric Administration.

along the lower Mississippi failed, affecting areas in Arkansas, Illinois, Kentucky, Louisiana, Mississippi, Missouri, and Tennessee. By May, the Mississippi River south of Memphis, Tennessee, spanned sixty miles.

As in all great catastrophes, the exact numbers of deaths, injuries, and homeless people resulting from the flood, as well as the precise amount of destruction, is uncertain. The American Red Cross reported 246 deaths, but the actual toll may have been several times greater. An estimated 700,000 people were rendered homeless, and more than 300,000 victims spent several months in more than 150 Red Cross camps hastily constructed following the flood. Another 300,000 people received food and other assistance outside the camps. Approximately 200,000 buildings were damaged or destroyed, and at least 20,000 square miles of land (or as much as 27,000 square miles, by some accounts) were flooded. In a comprehensive history of flooding in the United States, the ASFPM called the 1927 flood of the Mississippi River “the greatest natural disaster to befall [the United States] in terms of total human misery and suffering.”³

The Response

Kevin R. Kosar, a Congressional Research Service analyst, describes the federal government's response to the 1927 flood:

[It] was a mixture of pre-New Deal minimalist federal governance and... "governing by network." The federal government would make no immediate appropriations to the affected area. Instead, it would utilize federal resources and coordinate networks of federal, state, private, and not-for-profit organizations to deliver relief services. The President's Cabinet would direct the relief effort in close consultation with the American National Red Cross.... Thus, flood response policy was centralized, but its execution was decentralized.⁴

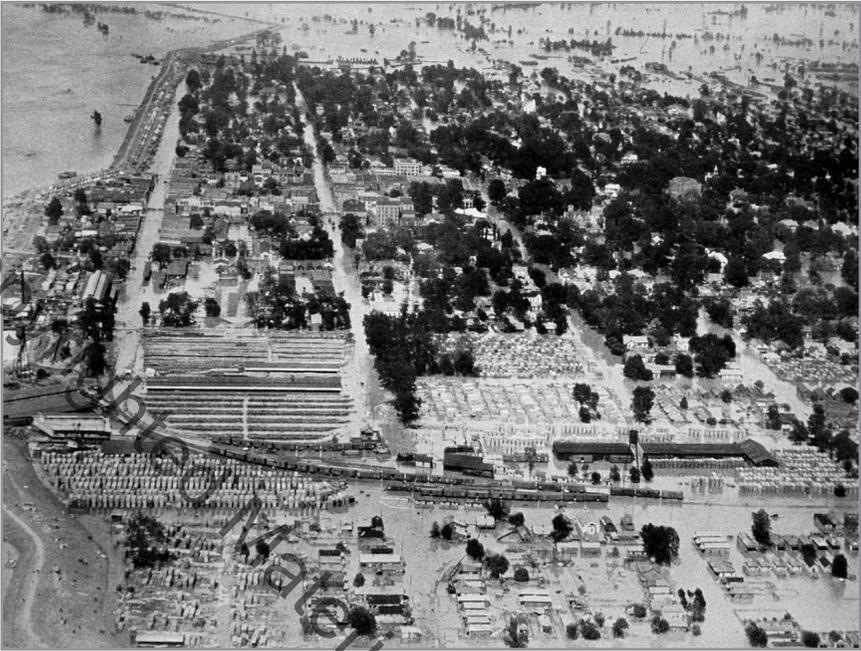
In *Rising Tide: The Great Mississippi Flood of 1927 and How It Changed America*, John M. Barry recounts two stories regarding how two different communities—Greenville, in the delta cotton-growing region of Mississippi, and New Orleans, farther downriver—responded to the flood.⁵ Each is instructive because of the light it sheds on American history and the lessons it offers for today's emergency managers.

In Greenville, African Americans were compelled, sometimes at gunpoint, to maintain the levees protecting the town. More than 13,000 African Americans around Greenville were evacuated to the crest of an unbroken levee and stranded there for days without food or clean water, even as boats arrived to evacuate white women and children. Meanwhile, armed members of the National Guard patrolled the levee and refused to allow anyone to enter or leave without a pass. In the town itself, whites stayed on the upper floors of offices and hotels, while African Americans were crowded into warehouses, mills, and stores. A report of the Colored Advisory Commission describes the plight of these people:

We found numerous instances where the colored people, as a result of years of living under a semi-peonage system, in many communities were afraid to ask for the things to which they were entitled under the Red Cross. In every community we visited we found some colored people of this type and many times their fear caused them a great deal of suffering.⁶

As the flood approached New Orleans, the city's rich and powerful residents (including Isaac Cline, head of the New Orleans weather bureau and previously the head of the weather bureau in Galveston at the time of the 1900 hurricane) had thirty tons of dynamite detonated to breach a levee downriver so that pressure would be relieved on the city's levees. The New Orleans oligarchs promised to compensate the trappers and other rural inhabitants inundated by the breach, but they all but reneged on this promise and paid no reparations to local residents. Moreover, the breach turned out to be unnecessary; major breaks upstream had already relieved pressure and minimized the risk.

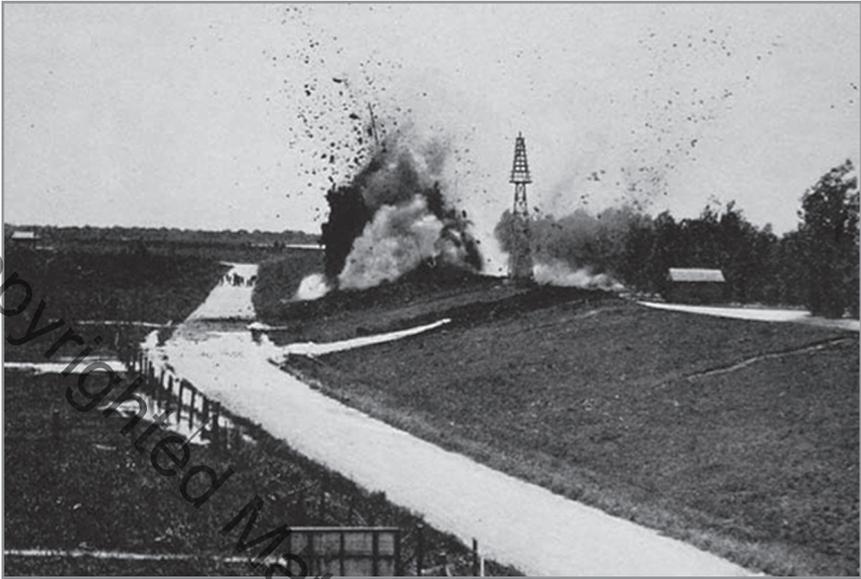
The American Red Cross carried most of the financial burden of recovery from the flood and normally would have been responsible for managing relief



Greenville, Mississippi, April 27, 1927. Photo courtesy of the National Oceanic and Atmospheric Administration.

operations. Given the enormity of the flood, however, President Calvin Coolidge named Secretary of Commerce Herbert Hoover to head a quasi-governmental commission that included cabinet members and representatives of the American Red Cross. With near-absolute authority to call on the resources of federal departments as well as other state and local entities and the private sector, Hoover oversaw and coordinated the response—the biggest disaster relief effort in U.S. history to date.⁷ The response blended federal, state, local, and private resources and was generally regarded as efficient and successful.

The concentration of power, combined with minimum accountability at all levels, caused problems, however. African American sharecroppers fared the worst. In some cases, relief and recovery supplies were given to the landowners for whom the sharecroppers worked, some of whom charged the sharecroppers for the supplies. Compounding these problems, Hoover had political ambitions—his eye was on the presidential nomination in the upcoming 1928 elections—and he was determined that any unsatisfactory conditions that might occur be hidden from public scrutiny. He used his influence and promises of future political patronage to African American community leaders to keep the media from learning about the deplorable situation in the refugee camps. His subsequent election was largely due to the positive publicity and praise he received from managing



The Mississippi levee below New Orleans was dynamited to reduce pressure on the levees within the city. However, the action was unnecessary (upstream breaches had already minimized the risk to the city) and resulted in the flooding of poor trappers and other rural residents downstream. Photo courtesy of the National Oceanic and Atmospheric Administration.

the flood response. But he failed to keep his promises to African Americans; as a result, their allegiance began to shift from the Republican to the Democratic Party.

The flood, then, had an impact not only on disaster management but also on the political and social fabric of the nation. Barry concludes his examination of the 1927 Great Mississippi Flood as follows:

[The flood] penetrated to the core of the nation, washed away surface, and revealed the nation's character. Then it tested that character and changed it. It marked the end of a way of seeing the world, and possibly the end of that world itself.... It shifted perceptions of the role and responsibility of the federal government—calling for a great expansion—and shattered the myth of a quasi-feudal bond between Delta blacks and the southern aristocracy.... It accelerated the great migration of blacks north. And it altered both southern and national politics.⁸

The Effect of the Great Mississippi Flood on Federal Floodplain Management

The 1927 flood demonstrated the inadequacies of the federal government's "levees-only" policy. Moreover, whereas flood management had been viewed primarily as a local issue, the Mississippi Flood demonstrated the limitations of an approach that relied on local governments, levee districts, and private efforts, and

the public began to warm to the idea of a federal flood control program to address flooding in the Mississippi River basin and protect their lives and property. After all, the 1927 flood involved drainage from far outside the lower Mississippi valley. Federal legislators further recognized “that locals were unable to finance effective flood control measures and that local governments were already making enormous contributions to flood control.”⁹

In the Flood Control Act of 1928, Congress abandoned the levees-only approach. The act provided for a partnership between the federal and local governments for the construction and maintenance of control structures. But while the federal allocation was significant—more than local governments had paid for flood control during the previous 200 years—the legislation held far greater significance: “The law set a precedent of direct, comprehensive, and vastly expanded federal involvement in local affairs,” explains Barry. “In the broadest sense, this precedent reflected a major shift in what Americans considered the proper role and obligations of the national government, a shift that both presaged and prepared the way for far greater changes that would soon come.”¹⁰ Congress appropriated \$10 million for relief and reconstruction associated with the 1927 flood, but it spent thirty times this amount—\$300 million—the following year on flood control projects along the lower Mississippi.

Federal involvement continued to expand in the ensuing years. In the wake of devastating floods in New England and the Ohio River basin, Congress passed the Flood Control Act of 1936, declaring “flood control a ‘proper’ federal activity in the national interest” and establishing a national policy of flood control.¹¹ The legislation passed easily—in part because, in the midst of the Great Depression, it supported numerous public works programs. The legislation launched

a two-pronged attack on the problem of reducing flood damages. On one side, the Department of Agriculture would develop plans to reduce runoff and retain more rainfall where it fell. On the other, the Corps [of Engineers] would develop engineering plans for downstream projects. In theory, the plan required cooperation between the two agencies but included no mechanism to ensure coordination. In reality, the major work fell to the Corps.

Not surprisingly, more flooding led to more legislation. Congress passed additional flood control acts in 1938 and 1941, authorizing more construction and increasing the federal cost share for dams and reservoirs to 100 percent. Between 1936 and 1952, Congress appropriated more than \$11 billion for flood control projects.

However, some floodplain managers, engineers, and scholars realized that this reliance on engineering and construction to mitigate floods was, in its own way, a policy as narrow-minded (and dangerous) as the earlier levees-only approach of USACE. Studies demonstrated that, despite structural measures to control floods, monetary losses continued to grow. Critics warned that with the country’s increasingly urban population, the national flood damage potential was growing faster

than structural solutions could control.¹³ As one researcher writes, “Federal flood control projects in fact often made matters worse by providing a false sense of security that attracted new development to floodplains.”¹⁴ Thus, critics called for a broader approach that considered all possible means to mitigate flooding, including land use planning, zoning, restrictions on the use of land in flood zones, flood proofing, and insurance.

A few members of President Roosevelt’s administration espoused these ideas in the 1930s. Perhaps the best known was Gilbert White, a young geographer from the University of Chicago, who in his PhD dissertation described the prevailing national policy as “essentially one of protecting the occupants of floodplains against floods, of aiding them when they suffer flood losses, and of encouraging more intensive use of floodplains.”¹⁵ White advocated taking a broader approach. “Dealing with floods in all their capricious and violent aspects,” he stated, “is a problem in part of adjusting human occupancy to the floodplain environment so as to utilize most effectively the natural resources of the floodplain, and at the same time, of applying feasible and practicable measures for minimizing the detrimental impacts of floods.”¹⁶

It took several decades for such ideas to be embraced, but today they influence and shape the approach to flood control at all levels of government. For example, the National Flood Insurance Program, administered by the Federal Emergency Management Agency (FEMA), requires local governments to institute effective floodplain management measures, and USACE now considers a wider range of approaches than just structural measures, such as levees and dams, to reduce flood losses. Still, the economic, social, institutional, and political forces that lead people to live in floodplains (and governments and government agencies to promote structural “solutions”) remain powerful and intractable. An equitable national flood control policy has yet to be devised and instituted.

Management Implications for Emergency Managers

Like most other great disasters of the twentieth century, the 1927 flood exposed problems and inequities in society. Wealthy white citizens fared far better than African Americans and other poor minorities. The manifold reasons for this differential effect are not always attributable to blatant racism or abuse of power, however. Rather, wealthier residents in almost any community tend to live in places that are less vulnerable to natural hazards and in structures that are better able to withstand the damage wrought by such hazards. In addition, wealthier citizens have more resources to respond to and recover from an event. They have cars in which they can leave when a threat occurs, and they can afford other means of transportation if needed. They have friends and family in other parts of the community, state, or nation with the means to take them in. Their jobs are likely to

be secure; and they have savings, insurance, and other resources to fall back on if work is disrupted. Moreover, they know how government agencies work, and they have relationships with banks and other financial institutions should they need to obtain loans or other financing.

The response and recovery issues following Hurricane Katrina in 2005, discussed in detail in Chapter 7, reveal that the issues of class and race that emerged during events of almost a century ago are still very much a part of the American social fabric. The fundamental lesson for emergency managers is clear: Any plans for preparedness, warning, evacuation, response, recovery, or long-term mitigation, as well as any actions, must consider *all* members of a community. This includes not only ethnic minorities but other groups as well—women, children, the disabled, the elderly, those with limited proficiency in English, and individuals housed in institutions such as hospitals or prisons. These people cannot or will not respond to the information and actions directed toward able-bodied, middle-class citizens with all the resources that “able-bodied” and “middle-class” imply. A modern emergency manager must consider the needs of the entire community.

The Dust Bowl

The 1930s Dust Bowl was a different species of disaster. It did involve some horrific dust storms that would qualify today as quick-onset events requiring immediate emergency response. Lawrence Svoboda, who wrote an eyewitness account of the Dust Bowl in Kansas, describes these dust storms:

A cloud is seen to be approaching from a distance of many miles. Already it has the banked appearance of a cumulus cloud, but it is black instead of white, and it hangs low, seeming to hug the earth. Instead of being slow to change its form, it appears to be rolling on itself from the crest downward. As it sweeps onward, the landscape is progressively blotted out. Birds fly in terror before the storm, and only those that are strong of wing may escape. The smaller birds fly until they are exhausted, then fall to the ground to share the fate of the thousands of jack rabbits which perish from suffocation.

Yet, overall, the Dust Bowl was a slow-onset disaster with very deep-seated ecological and social origins and widespread consequences. Researcher Richard A. Warrick compares it to more common disasters: “As opposed to the three-minute impact time of an earthquake, or the two-day impact time of a hurricane, the impact of a drought can cover many years. In addition, it is difficult to state precisely when the effects and their associated ‘costs’ begin, or when they cease.”¹⁸ In his award-winning analysis, historian Donald Worster maintains that the Dust Bowl was the worst ecological catastrophe in U.S. history.¹⁹

Severe drought and soil erosion first occurred in the Great Plains in eastern Montana and the Dakotas at the start of the 1930s. While drought was widespread during this decade and struck every state in the Union except Maine and Vermont,

historians generally define the Dust Bowl as the drought that plagued the southern Great Plains—specifically, southwestern Kansas, southeastern Colorado, northwest New Mexico, and the panhandles of Oklahoma and Texas—from the early 1930s to 1940. The Oklahoma panhandle was at the center of the Dust Bowl, which encompassed almost 100 million acres. By 1935, the landscape there had become, in the words of one reporter, “a vast desert, with miniature shifting dunes of sand.”²⁰ By 1938, the peak year for wind erosion, 10 million acres had lost at least the upper five inches of topsoil and another 13.5 million acres had lost at least two and a half inches. The average acre lost more than 400 tons of dirt. The soil drifted; in some cases it blew so far to the east that plumes of dust were witnessed in the skies over the Atlantic shore. At its height, the Dust Bowl involved sixty to seventy dust storms per year.

Aside from being an ecological and economic catastrophe, the blizzards of sand and dirt presented a major health hazard. Many people contracted upper respiratory diseases. Among the most vulnerable were the elderly and infants. To help handle the health risks, the Red Cross set up six emergency hospitals in Colorado, Kansas, and Texas and staffed them with its own nurses.

Thus, like the 1918 flu pandemic, the Dust Bowl severely affected human beings. To a lesser degree it affected structures and other personal property, although clearly one type of personal property—the land itself—was severely damaged. Hence, the effects can be classified as environmental as well as social and economic.²¹



Dust storms, like this one approaching Stratford, Texas, plagued areas throughout and beyond the Midwest in the 1930s. Photo courtesy of the National Oceanic and Atmospheric Administration.

The ongoing drought devastated crops, and the people of the Great Plains, namely farmers, suffered accordingly. The social and economic systems on which the farmers depended and which depended on them—from banks and businesses to schools and families—suffered as well. The severe economic hardship that resulted from the Dust Bowl uprooted many families in and beyond Oklahoma, who migrated in search of a livelihood. Some settled in a nearby county; more moved thousands of miles away. Thus, the effects of the drought rippled across the United States.

Because the Dust Bowl occurred during the Depression and because its effects were integrated into the regional and national economy, it is impossible to accurately estimate its economic consequences. The National Drought Mitigation Center (NDMC) calls the Dust Bowl one of the greatest economic disasters in the history of the United States but says that “determining the direct and indirect costs is a difficult task because of the broad impacts of drought, the event’s close association with the Great Depression, the fast revival of the economy with the start of World War II, and the lack of adequate economic models for evaluating losses at that time.”²² Worster concludes that “the financial cost of the 1934 drought alone amounted to one-half the money the United States had put into World War I. By 1936, farm losses had reached \$25 million a day, and more than 2 million farmers were drawing relief checks.”²³

The Dust Bowl was unique in at least one other way. Perhaps in large part because it came on top of the Great Depression, it soon passed into American culture through John Steinbeck’s *The Grapes of Wrath*, the photographs of Dorothea Lange, the songs of Woody Guthrie, and other works, all of which told the story of the crisis and its victims. The Dust Bowl was soon seen as a landmark social crisis that revealed social inequities and failures in the prevailing economic system and, perhaps, in humanity itself. Unsurpassed by subsequent events, the Dust Bowl of the 1930s remains the archetypical drought disaster.

The Causes of the Dust Bowl

Many researchers have identified the “causes” of the widespread drought that became known as the Dust Bowl. But experts reach different conclusions, depending in part on whether they define the Dust Bowl as a climatological event, an agricultural failure, a socioeconomic problem, or an ecological catastrophe, and on how they define the “cause” of such an event. Computer modeling undertaken by scientists at the National Aeronautics and Space Administration, for example, focuses on changes in surface temperatures of the Pacific and Atlantic Oceans and on the resulting synergistic effects.²⁴ Although there was substantial local variability, precipitation decreased markedly in the central United States during the 1930s. In Boise City, Oklahoma, the annual precipitation averaged over 19 inches



Dust buried farms and equipment, killed livestock, ruined crops, and increased the misery of the Depression. Photo courtesy of the U.S. Department of Agriculture.

(2 inches above normal) from 1926 to 1930, but averaged just 11.65 inches from 1931 to 1936. A change of 7 inches in a humid climate may be hardly noticeable, but in a marginal ecological zone like the southern Great Plains, it can—and did—make the difference between a bumper wheat harvest and a disaster.

But the 1930s Dust Bowl was more than a simple climatological event; it was a social disaster with social origins. As with any disaster, where and how people live makes them more or less vulnerable to the physical hazard. Worster points to a number of human actions that contributed to this particular disaster. Agricultural practices—including the destruction of natural grasslands; overgrazing of the range; tillage of poor, marginal soils; and the reduction of agriculture in the region to a single crop (winter wheat)—that worked in more humid regions of the United States proved destructive to the more fragile land of the southern Great Plains. Native grasses were replaced by wheat fields, undermining the Great Plains ecosystem. Dry-land wheat farming had been practiced extensively in the region for less than thirty years when the Dust Bowl hit, and the farmers lacked experience with changes in precipitation.²⁵ Unwise land use practices were fueled by the desire to maximize production and profits at the expense of taking a long-term view of the effects. Simply put, these agricultural practices led to greater exposure of the soil to wind erosion.

Another contributing factor was the increased use of machinery, including tractors, combines, and disk plows. The disk plow, in particular, increased the vulnerability of soil to erosion much more than the lister, or double-sided plow, which it had replaced. But there was a far greater impact: the widespread use of machinery, along with improved varieties of wheat, led to the cultivation of more and more land—including marginal land. This, in turn, increased the land's exposure to erosion. It also created ever-larger harvests. The increased production (including a bumper crop in 1931) caused a marked drop in the price of wheat. Thus, a destructive cycle emerged: increasing production led to declining prices, which led to even more production. In the race to survive, agricultural producers abandoned soil conservation practices and cultivated increasingly marginal land. Further exacerbating the problem was the need for farmers to increase their profits in order to pay for the capital equipment they needed to increase production. In sum, efficient methods led to overproduction and a drop in prices, which led to even more production.

An Eyewitness Account

When I knew that my crop was irrevocably gone I experienced a deathly feeling which, I hope, can affect a man only once in a lifetime. My dreams and ambitions had been flouted by nature, and my shattered ideals seemed gone forever. The very desire to make a success of my life was gone; the spirit and urge to strive were dead within me. Fate had dealt me a cruel blow above which I felt utterly unable to rise.

— Lawrence Svobida

Source: PBS, American Experience, "Surviving the Dust Bowl," pbs.org/wgbh/amex/dustbowl.

Social and cultural factors further contributed to the disaster. Tenant farming, for instance, created an arrangement in which decisions were made by people who had no permanent interest in the land. Most tenant farmers sought to maximize their annual yield and had little concern for the potential long-term effects on the soil. Further, tenant farmers tended to be a migratory population, moving from farm to farm. Many had no attachment to or understanding of the land they toiled. An increasing number of farms were owned by "suitcase farmers," who lived and worked elsewhere and visited their land only during planting and harvesting—if at all. Finally, agribusiness had taken hold in the area. Corporations working the land on a large scale sought primarily to maximize profits.

Collectively, these social circumstances alienated farmers from the land they worked, and they lost their connection to it. Examining deeper causes of the Dust Bowl, Worster argues that this alienation was a direct result of the American

culture and economic system. “The Dust Bowl,” he writes, “was the inevitable outcome of a culture that deliberately, self-consciously, set itself that task of dominating and exploiting the land for all it was worth.”²⁶ He goes on to claim that the Dust Bowl was a direct result of the American economic system—capitalism. “It came about because the expansionary energy of the United States had finally encountered a volatile, marginal land, destroying the delicate ecological balance that had evolved there,” he explains. “What brought [farmers] to the region was a social system, a set of values, an economic order. There is no word that so fully sums up those elements as ‘capitalism.’”²⁷

Yet it would be a mistake to place the blame solely on capitalism or broader aspects of the American culture. Droughts have occurred in many places where capitalism is not the prevailing economic principle. In fact, Worster himself notes that drought occurred in the Soviet Union in 1921–1922 and again in 1932–1934, resulting in widespread famine and the deaths of millions of people. A situation much like the Dust Bowl also occurred in the Soviet Union from 1954 to 1965, when, in an effort to massively increase wheat production, the country plowed almost 100 million acres in Kazakhstan and eastern Russia. Subsequent drought led to severe wind erosion and the destruction of the land.

In a 1986 article, Harry C. McDean questions Worster’s conclusions, noting that the circumstances of the American Dust Bowl were unique in both time and place.²⁸ McDean argues that the Dust Bowl was not the inevitable result of a capitalist society. Throughout time, farmers in the United States and elsewhere have adopted systems and practices that are more sympathetic to the land. In other capitalist agrarian regions, ecological disaster has not occurred.

Regardless, Worster’s analysis contains an essential truth about disasters: the catastrophe is the sum of a physical hazard and a complex social structure that put residents (some more than others) at risk. Any society, culture, or economic system that heedlessly seeks to maximize production without concern for either the welfare of the land or the safety of its inhabitants can and will suffer similar catastrophes. Furthermore, the penalty for such folly will be manifest first where the environment is fragile and resources are limited.

Prior Events, Response, and Recovery

The dry period that led to the Dust Bowl was not unprecedented. Droughts had occurred in the southern Great Plains in 1892 and 1912; at that time, however, the sod had not yet been “busted” and native grasses for the most part remained intact, so the soil was less vulnerable to erosion. Droughts have also occurred since the Dust Bowl. The area experienced a more severe drought (by climatological measures) in the mid-1950s, and major dry periods continue to this day.

The response to the severe dust storms of the 1930s was much like the response to any sudden-onset emergency, but the response to the overall drought at the individual, local, and national levels was different. Worster describes the reaction of those who lived in the affected region:

The pattern of reaction among plainsmen went something like this: fail to anticipate drought, underestimate its duration when it comes, expect rain momentarily, deny that they are as hard hit as outsiders believe, defend the region against critics, admit that some help would be useful, demand that the government act and act quickly, insist that federal aid be given without strings and when and where local residents want it, vote for those politicians who confirm the people's optimism and pooh-pooh the need for major reform, resent interference by the bureaucrats, eagerly await the return of "normalcy" when the plains will once more proceed along the road of steady progress.²⁹

Despite the denial of a recurring hazard and the sense of frontier independence that was prevalent in the area at the time, the severe economic hardship brought about by the drought during the Depression changed the general attitude regarding aid. More than 20 percent of rural families received federal relief during the Dust Bowl. Moreover, the federal government's role shifted. The NDMC explains:

[M]any measures were undertaken to relieve the direct impacts of droughts and to reduce the region's vulnerability to the dry conditions. Many of these measures were initiated by the federal government, a relatively new practice. Before the 1930s drought, federal aid had generally been withheld in emergency situations in favor of individual and self-reliant approaches. This began to change with the development of the Great Depression in the late 1920s and the 1933 inauguration of President Franklin Delano Roosevelt. The Depression helped "soften deep-rooted, hard-line attitudes of free enterprise, individualism, and the passive role of the government," thus paving the way for Roosevelt's New Deal programs, which in turn provided a framework for drought relief programs for the Great Plains.³⁰

As the Depression and drought continued, the federal government adopted a wide-ranging and long-term approach. Federal drought relief programs provided emergency supplies, cash, and livestock feed and transport to maintain the basic functioning of livelihoods and farms and ranches; established health care facilities and supplies to meet emergency medical needs; established higher tariffs, government-based markets for farm goods, and loan funds for farm market maintenance and business rehabilitation; and provided the supplies, technology, and technical advice needed to research, implement, and promote appropriate land management strategies.³¹

Roosevelt's administration established numerous agencies and programs to address the hardships of the Great Depression. The plethora of agencies and programs involved in the federal response, however, often resulted in contradictory goals and approaches, interagency conflicts, and competition for funds.

Among the first actions Roosevelt took was the creation of the Agricultural Adjustment Administration (AAA), which probably had a greater effect on farmers in the Dust Bowl than any other federal program. The AAA's principal approach to the problems created by the drought was to create "planned scarcity" by reducing agricultural production. To accomplish this, the AAA managed a program whereby wheat farmers could receive payments for not planting part of their previously productive land. From 1933 to 1937, these payments for not working the land provided many Dust Bowl farmers with their only source of income.³² They also laid the groundwork for today's federal farm policy, which involves a complex and often controversial system of price supports and subsidies.

Initially, the federal government focused on general economic problems. For instance, the Farm Credit Administration, created in 1933, was charged with refinancing farm mortgages and making low-interest production and marketing loans to farmers. As the drought progressed, however, the administration began to directly address issues related to agriculture and land use. On June 9, 1934, Congress approved President Roosevelt's comprehensive \$525 million drought program, making funding available for emergency livestock and feed programs, seed purchase, the purchase of submarginal lands, relief for farmers, and assistance for displaced residents. In August, the federal government formed the Drought Relief Committee chaired by the secretary of the U.S. Department of Agriculture (USDA) and with members from other federal agencies responsible for providing relief. Subcommittees were established to carry out specific tasks, including drought area designation, livestock purchase, and feed provision.

The Taylor Grazing Act of 1935 and the subsequent land use project represented further efforts on the part of the federal government to reverse the damage done to the land by overuse and to purchase submarginal lands in order to return them to their natural state. Such actions further increased direct federal government involvement in the stewardship of the land. At the same time, the USDA's Soil Conservation Service (SCS) worked with private citizens to help them preserve and manage their land for greater productivity. The Civilian Conservation Corps—another New Deal program designed to provide jobs—worked with the SCS to conduct soil conservation projects, including the creation of shelterbelts, which entailed the planting of rows of trees to decrease wind erosion.

The federal government continued to seek ways to provide relief to those affected by the drought. In January 1935, the administration formed the Drought Relief Service to coordinate relief activities, including the purchase of cattle in designated drought-affected counties. More than half the animals were deemed unfit for consumption and destroyed; the remaining cattle were given to the Federal Surplus Relief Corporation for food distribution to needy families. An account of the program concludes, "Although it was difficult for farmers to give up their herds, the cattle slaughter program helped many of them avoid bankruptcy.

The government cattle buying program was a God-send to many farmers, as they could not afford to keep their cattle, and the government paid a better price than they could obtain in local markets.”³³

On April 8, 1935, President Roosevelt signed the Emergency Relief Appropriation Act, which earmarked \$4.8 billion for the creation of government assistance programs. Prior to this legislation, most New Deal programs provided relief payments to qualified applicants, but this act ushered in a new approach by requiring many aid recipients to work on public projects. Several new employment programs, including the Works Progress Administration and the National Youth Administration, were put in place to provide jobs.

Federal Disaster Mitigation

Flood control and New Deal programs represented the first federal disaster mitigation policies. By the end of the Depression, one out of every three or four farmers in the area affected by the Dust Bowl had accepted government relief at one time or another, “with tenants represented most heavily and smaller operators more common than large ones.”³⁴ In short, federal policy regarding the drought and its economic consequences soon became a mix of disaster relief and disaster mitigation or prevention.

Some of the programs that took seed during the Depression continue today. The NDMC notes that the Roosevelt era “marked the beginning of large-scale



The federal government initiated a host of new programs to help Dust Bowl farmers deal with drought. Here, a Civilian Conservation Corps worker is planting seedling trees to form a shelterbelt to prevent soil erosion. Photo courtesy of the National Oceanic and Atmospheric Administration.

aid [and] also ushered in some of the first long-term, proactive programs to reduce future vulnerability to drought.”³⁵ Federal agencies, including the Natural Resources Conservation Service, which evolved from the SCS, continue to promote crop diversity, crop rotation, the use of irrigation, the enlargement of reservoir capacity, and other soil conservation measures. Moreover, crop insurance and other measures to mitigate the effects of a drought are widely available. These programs have played a fundamental role in reducing the vulnerability of the nation to drought.

Given the many factors that contributed to the Dust Bowl, one might question whether any of the actions perceived as “solutions” were in reality long-range answers to the fundamental problems that led to that event. Some analysts argue that the actions were simply stopgap measures that delayed the desecration and eventual desertification of large tracts of the Great Plains. To avoid future calamities, the tendency to deny the hazard and the fragility of the soil, the fierce independence that prevented some farmers from heeding advice regarding agricultural practices, and, above all, the tendency to maximize short-term production and profit would have to be counterbalanced by a deeper understanding of and appreciation for the land itself. These ideas took hold among some government leaders during the 1930s. Worster writes:

A few of Roosevelt’s administrators soon began to see that something more was required: a more far-reaching conservation program that would include social and economic changes. Some officials, therefore, began to call for major revisions in the faulty land system; others emphasized new agronomic techniques, rural rehabilitation, more diversified farming, or extensive grassland restoration. But their common theme was that staying meant changing. The Dust Bowl, in this evolving government view, must be explained as a failure in ecological adaptation—as an absence of environmental realism.³⁶

A comprehensive plan to achieve such adaptation was prepared by the Great Plains Drought Area Committee and presented to President Roosevelt in December 1936. The 194-page *The Future of the Great Plains: Report of the Great Plains Committee* provided possible strategies—both social and environmental—for overcoming the Dust Bowl and preserving the region.³⁷ It pointed out some of the fundamental cultural attitudes and economic assumptions that had led to land destruction in the southern Great Plains: the domination of the nature ethic, with the corollary view of natural resources as raw material to be exploited and used; the belief in the inexhaustibility of those natural resources; and the convictions that an owner could do as he liked with his property, that market forces should control production, and that industrial farming represented the way to maximum utility. The report failed to address these underlying causes in

its conclusions, however. In an evaluation of the report published fifty years later, geographer Gilbert White writes:

The committee was perspicacious in listing attitudinal obstacles to readjusting the system of social controls and incentives. It did not know how to gauge their weights in relation to the possible benefits from altering state and federal policies and procedures and it assumed its recommendations would be put into practice. It felt unable to recommend basic modifications in the economic and political organization of the nation.³⁸

Worster sees many of the New Deal approaches to the Dust Bowl as failures. "Neither the federal land-use planners nor the ecologists made a lasting impact on the region.... The return of dust-bowl conditions in the 1950s demonstrated, or should have demonstrated, the inability of a technical assistance program by itself to reform the old ethos."³⁹

Worster is somewhat more positive when discussing present-day federal policy:

Even free-market fundamentalists have come around to agree with pro-government planners... that aggressive farming must be controlled to prevent another thirties-style disaster. They have admitted that wind erosion is a human-caused problem and that its solution lies in grassland restoration on a large scale. The nation cannot, it is now agreed on all sides, depend on the farmer's economic self-interest to bring back the grass or prevent erosion. Pragmatism has triumphed over ideology.⁴⁰

White offers a more optimistic viewpoint. He points out unexpected developments—including the creation of high-yield, drought-resistant hybrid species of wheat and corn, and the development of central-pivot irrigation that draws water from massive subterranean aquifers below the Great Plains—that have made continued widespread, highly productive agriculture possible in the region. But White cautions that those living in the Great Plains—and the emergency managers who work there—should be vigilant about the possibility of further problems. The water pumped from the Ogallala Aquifer to irrigate the Plains is a finite resource, warns White, and there is no guarantee that another technological fix can be found once this water is depleted. Questions about whether the region can continue its current agricultural production and whether the area will be affected by a future severe drought remain unanswered.⁴¹

Drought and Emergency Management

What does the Dust Bowl imply for today's emergency managers? Those managers may not be directly involved in answering broader questions regarding resource management, but they will be involved in planning for, responding to, and mitigating the immediate problems and longer-term social consequences of a severe drought.

In the last few decades, interest in planning for drought has increased at all levels. Whereas only three states (Colorado, New York, and South Dakota) had drought plans in 1980, today thirty-eight states either have such a plan in place or are in the process of developing one. In several states, the plans are maintained by the state offices of emergency management.

The NDMC's website provides information (including a ten-step guide) designed for emergency managers to use to develop a drought plan, which, it says, should be based on three main components: monitoring and early warning, risk assessment, and mitigation and response.⁴² The site includes copies of existing state drought plans, which adopt a number of approaches to address the problem. Which specific approaches are appropriate depends on local circumstances, but many of the approaches require the knowledge, skills, and authority of an emergency manager. Indeed, the ability to conduct the planning process itself may be one of those essential skills.

Texas City Explosions, 1947

On April 16, 1947, a freighter containing more than 2,000 tons of ammonium nitrate caught fire and exploded in the port of Texas City. The blast—comparable to a two- to four-kiloton nuclear weapon—knocked people off their feet in Galveston, ten miles from Texas City, and shattered windows in Houston, more than forty miles from the explosion. Two small planes flying over Texas City were knocked from the sky, and numerous fires ensued among the crude oil and petrochemical facilities surrounding the docks. Fire reached another freighter loaded with ammonium nitrate and sulfur, causing it to explode sixteen hours after the first blast. At least 581 people were killed and 3,500 injured in what is still considered the worst industrial accident in U.S. history.

Preparedness and Response

The Texas City catastrophe was not without precedent. Perhaps the most devastating industrial explosion ever occurred on December 6, 1917, in Halifax Harbor, Nova Scotia, Canada, when a Norwegian vessel collided with a French munitions ship carrying more than 2,500 tons of explosives. The explosion—the largest human-induced detonation before the atomic bomb—leveled more than half a square mile and damaged virtually every building in Halifax. The blast killed more than 1,500 people outright; hundreds more would die in the hours and days to come. An additional 9,000 people were injured, not only by the blast itself but also by the debris and glass from Halifax's crumbling buildings.⁴³ Another devastating accident involving ammonium nitrate and ammonium sulfate occurred on September 21, 1921, at

a BASF chemical and fertilizer plant in Oppau, Germany, when a silo exploded, killing between 400 and 600 people and injuring more than 2,000.⁴⁴

Hence, port safety and the hazard posed by ammonium nitrate were recognized issues at the time of the Texas City catastrophe. The loading of this chemical compound was prohibited in Galveston, but Texas City officials seemed unaware of the risks it posed. Author Angus Gunn describes the scene at the port:

Within a one-square-mile area beside the docks were six oil-company complexes, eleven warehouses, and several other installations and residential blocks. Fire-prevention experts assured the port authorities that only one-fifth of this area was in danger of a serious fire and that existing precautions would be adequate to cope with such an eventuality.... [T]his thinking should have changed when large quantities of ammonium nitrate fertilizer began to be shipped from Texas City in 1946.⁴⁵

All twenty-eight members of Texas City's volunteer fire department were killed in the initial blast—more in one day than were killed in any previous fire in the United States. With no local firefighters to stem the ensuing blaze, as many as 200 volunteers from as far away as Los Angeles battled the fires for a week.

Convergence, Spontaneous Organization, and Improvisation

Immediately following the explosion, medical personnel, law enforcement officers, and other responders—some called in by authorities, others of their own accord—began to converge on the scene. The city's auditorium was transformed into a roughshod first-aid center to cope with the casualties. In his book on the 1947 disaster, author Hugh W. Stephens notes, "within an hour, doctors, nurses, and ambulances began arriving unsummoned from Galveston [and] state troopers and law enforcement officers from nearby communities helped Texas City's... police force maintain order and assisted in search and rescue."⁴⁶ These rescue workers were joined by news reporters, federal investigators, relief organization volunteers, and a host of others.

In Texas City, as in most disasters, both the immediate on-scene responders and those who converged on the disaster site in the hours and days that followed organized themselves into functional groups. And, as with almost any other disaster of significant size, responding to the Texas City explosion required improvisation. The first responders were those people near the blast who suffered no or inconsequential injuries, so these survivors could lend assistance to others who needed help. They were quickly joined by other altruistic, self-sacrificing citizens of the city, who improvised search and rescue strategies. Representatives from the oil companies, warehouses, and other organizations at the docks rushed to the

scene and sent their organizations' firefighters to help. An assistant to the mayor, who was put in charge of coordinating the city's response, describes the scene:

At first there were little groups doing separate jobs... There were many [people] standing around who seemed to want to help but did not know what to do. They were glad to follow any reasonable instructions. These separate crews started out working on their own, but they began to get together when they would come up against big jobs.⁴⁷

Any such activity undertaken by people who suddenly find themselves in the midst of a disaster is clearly improvised. But a sudden-onset disaster requires that those at more removed levels of responsibility and authority also improvise an appropriate response. Even the most comprehensive response plan cannot predict the precise pattern of a disaster or foresee all the elements that will be involved.

The actions undertaken by Texas City police chief William Ladish illustrate this point. The explosion threw Ladish to the ground as he stood in his office more than a mile from the explosion, and it knocked out the police radio. Upon finding that the radio was inoperable, he "ran to the telephone exchange through glass-littered streets filling with dazed and bleeding people [and] placed a call to the Houston Police Department, where he talked to Captain W. M. Simpson."⁴⁸ Ladish told Simpson of the explosion in the harbor and requested that Simpson send fifty officers and all available ambulances. He then returned to city hall, where he ordered his officers to establish roadblocks and seal off the dock areas. He sent the few remaining men of his seventeen-man department to the docks "with no more direction than advice to assist in any way possible and use anybody who would help."⁴⁹

Immediately following the disaster, the "emergency managers" in Texas City—including the assistant to the mayor and Chief Ladish—had to deal with the convergence of well-intentioned volunteers as well as curious onlookers and the local media. They quickly put spontaneously organized groups to constructive use. In a larger sense, the emergency managers had to improvise in order to deal with an unexpected and unprecedented situation, using whatever resources they could amid overwhelming disarray and uncertainty.

Liability and Compensation

Following the Texas City explosions, the first-ever class action lawsuit was filed against the U.S. government on behalf of 8,485 victims. A district court found the government responsible because "the explosion resulted from negligence on the part of the Government in adopting the fertilizer export program as a whole, in its control of various phases of manufacturing, packaging, labeling and shipping the product, in failing to give notice of its dangerous nature to persons handling it and in failing to police its loading on shipboard."⁵⁰ The U.S. Fifth Circuit Court of

Appeals overturned the decision, however, maintaining that the U.S. government had the right to exercise its own discretion in vital national matters. On June 8, 1953, the Supreme Court upheld the Appeals Court's decision (346 U.S. 15), concluding that the Federal Tort Claims Act clearly exempted "the failure to exercise or perform a discretionary function or duty" and that the government's actions were discretionary. As the twentieth century progressed, however, the responsibility of public organizations—or more specifically, their liability in a disaster—would become an increasingly salient issue for emergency managers.

After the lawsuit was decided, Congress enacted a special appropriation for victims' relatives—yet another ad hoc appropriation in response to a specific event. "At the time, Congress occasionally appropriated funds for flood relief, but only on a case-by-case basis," writes Stephens.⁵¹ He goes on to emphasize the lack of a centralized response or recovery agency:

No equivalent of today's Federal Emergency Management Agency existed to rush personnel and resources to the scene and provide emergency housing and grants for individuals and businesses under the aegis of a presidential disaster declaration. Rather, relief and recovery activities went forward in a decentralized manner: volunteer agencies, churches, companies, individuals, and, to a lesser extent, municipal, county, and state governments assumed or shared most of the burden.... Longer-term rehabilitation fell to volunteer organizations, particularly the Salvation Army, Volunteers of America, and the Red Cross.⁵²

The ad hoc approach to relief and recovery resulted in inconsistencies—both in the funding provided to disaster victims and in the ways that this funding was distributed. As discussed in the following chapters, the federal government tried to remedy these problems in the decades to come through overarching disaster legislation. Several federal government agencies, most notably FEMA, were created to improve disaster response, but even today, major disasters almost inevitably result in disaster-specific appropriations.

Responsibility

In hindsight, it is relatively easy to see many of the conditions, decisions, and actions that led to the Texas City catastrophe. Stephens proposes that "the event originated from complacency about hazardous materials; the close physical proximity of docks, petrochemical facilities, and residences; and an absence of preparation for a serious industrial emergency."⁵³ Angus Gunn adds that, despite USDA warnings and prior explosions, local railway managers, ships' masters, and others involved in leading port operations simply failed to recognize the risks posed by the transportation of ammonium nitrate. (Texas City did not have a port authority overseeing its operations.) Those who could have—or should have—taken responsibility failed to enact or coordinate safety measures that would protect the

city. Stephens calls the lack of governmental oversight of the transportation of hazardous materials (particularly the U.S. Coast Guard's failure to play a role) and the concomitant lack of oversight of dock operations a "sin of omission."⁵⁴

The Texas City disaster had a subtle but profound impact on disaster management in the United States as it changed the way people thought about disaster preparedness. "This [may have been] the beginning of a shift away from an essentially passive, reactive posture toward a more active, anticipatory mode," writes Stephens. "Clearly some individuals came to understand that when hazardous materials were at issue, the public interest required a community-wide effort to mitigate the worst effects of disaster and prepare response measures beforehand."⁵⁵ In the end, the tragedy of Texas City provided the impetus for fundamental improvements in preparedness and response for industrial catastrophes, not only locally but at the state and national levels as well.⁵⁶

Complex System Failures

The Texas City catastrophe might be considered an example of a new category of human-caused disaster resulting from the failure of complex systems. Although industrial accidents were common with the advent of the Industrial Revolution at the outset of the nineteenth century, complex human-caused disasters became increasingly common in the latter half of the twentieth century. Such disasters are the consequence of increasing industrialization, technological advances, increased residential development near industrial areas, and, particularly, complex industrial/human systems and processes in which cataclysmic risk is not immediately apparent and, thus, judgment and decision making are inadequate. In short, these are disasters resulting from hazards *created* by humankind. Indeed, major catastrophes resulting from advanced technologies; the storage, transportation, and use of hazardous materials; and complex industrial systems have become hallmarks of the disaster history in the late twentieth century.⁵⁷

In *Normal Accidents: Living with High-Risk Technologies*, a classic account of such disasters, Charles Perrow discusses the risk of "tight coupling" in which "processes happen very fast and can't be turned off, the failed parts cannot be isolated from other parts, or there is no other way to keep the production going safely."⁵⁸ Perrow explains that in recent years, accidents have been increasingly caused by

interactive complexity in the presence of tight coupling, producing a system accident. We have produced designs so complicated that we cannot anticipate all the possible interactions of the inevitable failures; we add safety devices that are deceived or avoided or defeated by hidden paths in the systems. The systems have become more complicated because either they are dealing with more deadly substances, or we demand they function in ever more hostile environments or with ever greater speed and volume.⁵⁹

Perrow demonstrates that we cannot foresee all the possible interactions in complex systems that might lead to catastrophic failure:

The argument is basically very simple. We start with a plant, airplane, ship, biology laboratory, or other setting with a lot of components (parts, procedures, operators). Then we need two or more failures among components that interact in some unexpected way. No one dreamed that when X failed, Y would also be out of order and the two failures would interact so as to both start a fire and silence the fire alarm. Furthermore, no one can figure out the interaction at the time and thus know what to do.... This interacting tendency is a characteristic of a system, not of a part or an operator.⁶⁰

In the case of Texas City, the individuals overseeing the port failed to recognize the additional risks resulting from a change in the system: the introduction of ammonium nitrate as cargo. Moreover, even those officials who knew that the hazardous material was passing through the port could not foresee the many ways in which its transportation could result in a disaster.

Implications for Emergency Management

The lessons for emergency managers are sobering. The first unavoidable conclusion is that not all disasters can be foreseen, much less mitigated. Even if people settle away from a floodplain, construct sturdier buildings in seismic zones, or design better evacuation systems for hurricanes, in an increasingly complex, interconnected society other risks remain—risks that will inevitably manifest themselves as catastrophes. Even those measures specifically designed to mitigate disasters can lead to failures that cannot be anticipated (consider, for example, the failure of flood control structures during and after Hurricane Katrina).

Hence, emergency managers must plan and prepare for the unexpected. “Preparing for the unexpected” might sound like an oxymoron, but it is essential. Although the specific hazards posed by and to some systems may not be clear, it is important to predict as many potential *consequences* of system failure as possible. How the Internet will collapse may not be known, for instance, but the resulting disruption to communication networks and those who use these networks (individuals, businesses, government, etc.) can be anticipated to some extent. Flexibility can and should be built into response plans, and improvisation in response is not only inevitable but essential.

Perhaps the most glaring problem shown by the Texas City example involved the lack of oversight and management regarding the transportation of hazardous materials. This lack of planning resulted in a failure to recognize the hazard and contributed to the second explosion. Additionally, those responding to the accident—from doctors to firefighters, from the Red Cross to the military—confronted myriad complicated issues and decisions, and their efforts were hampered by inefficient and ineffective communication and a general lack of coordination

among responding agencies. Moreover, the failure to identify the clear roles and responsibilities of the many agencies involved resulted in inadequate damage assessment. Other communication problems involved the media: the lack of a clear plan for communicating with the public contributed to widespread rumors and bad information.

Other problems related to medical aid and mass casualty management with regard to triage, transportation, care, and tracking injured and displaced individuals. Again, the sudden convergence of people and donations on the disaster scene wreaked havoc. And in the longer term, victims faced inadequate sanitation and homelessness, as well as issues involving the recovery and reconstruction of the community and compensation for losses.

Again, although the specific event—in this case, two massive explosions—may not have been foreseeable, most, if not all, of these problems could have been ameliorated through prior planning.

Ultimately—and beyond planning for such specific difficulties—emergency managers must appreciate that risks are constantly changing. New and more complex systems, with their attendant hazards, are appearing at an accelerating rate. In addition, the populations at risk are continually shifting in size, composition, distribution, and vulnerability. Modern emergency managers must repeatedly reevaluate the situation and adapt preparedness, warning, response, recovery, and mitigation to emerging hazards.

Disaster authority E. L. Quarantelli warns that regardless of the current situation, the future will be different. “As the world continues to industrialize and to urbanize, it is continually creating conditions for *more and worse disasters*,” he writes. “Both social processes... will increase the number of potential disaster agents and enlarge the vulnerabilities of communities and populations that will be at risk.”⁶¹ Quarantelli outlines five factors that will contribute to an increase in potential disaster agents:

- Accelerating incidents of accidents and mishaps in the chemical and nuclear areas
- Technological advances that reduce some hazards but make some old threats more dangerous
- New versions of old and past dangers, such as urban droughts
- The emergence of innovative kinds of technologies, such as computers and biogenetic engineering, whose breakdowns will present distinctively new dangers
- An increase in multiple or synergistic disasters resulting in more severe environmental consequences.⁶²

As we prepare for an era in which there will certainly be more disasters, many of which may be complex and unanticipated, emergency managers can nevertheless look to the past for lessons to guide them.

1900-1950: A Summary and Lessons Learned

The first half of the twentieth century was marked by numerous catastrophes, only a few of which have been covered in the last two chapters. At the time, there were no unified federal or (in most cases) state or local response and/or recovery programs. Nor were there federal government programs (with the exception of flood control programs) in place to minimize hazards. With no coordinated government response or recovery programs, the primary responsibility for victim aid fell to the American Red Cross.

Many of the major disasters of the early twentieth century quickly became part of the historical basis and national consciousness that informed the emerging, evolving practice of emergency management in the United States. In almost every case, the catastrophes discussed in these chapters demonstrated deficiencies—if not failures—in preparedness, response, recovery, and long-term mitigation. Mitigation was particularly lacking, and similar disasters, with similar consequences, occurred again in many of the same communities. In some cases, the disasters also exposed deep problems in the American social structure—problems relating to race, poverty, and social inequality, and extending to the economic system and our system of government.

A survey of U.S. disasters from 1900 to 1950 reveals at least four significant truths:

- **Disasters happen with greater frequency than most people think.** At least thirty-two hurricanes of Category 3 or stronger struck mainland U.S. from 1900 to 1950. At least seventy-five earthquakes of magnitude 5.3 or greater struck California during the same period. Flu outbreaks cause approximately 36,000 deaths annually. The U.S. Geological Survey lists thirty-two “significant” floods occurring in the United States in the twentieth century, seven prior to 1950. Flooding of some kind somewhere in the United States results in loss of life and property every year. Similarly, drought occurs almost annually somewhere in the country, and, as mentioned in the discussion of the Dust Bowl, severe droughts continue to occur every few years. Finally, technological/human-caused disasters are an increasing nightmare in this modern age, constantly evolving with new forms and new risks.
- **Disasters are soon forgotten and their causes often denied.** Disasters tend to be denied, or at least conveniently forgotten, by both ordinary citizens and political leaders. Despite the frequency of disasters, no one can ever say

exactly when or where one will occur. Therefore, nationally and locally, they tend to be overlooked relative to more pressing concerns. Galveston was rebuilt, only to be struck by another devastating hurricane fifteen years later. The oligarchs of San Francisco overtly censured mention of the seismic risk in their city so that it could be rebuilt, and it was struck again in 1989. The victims of the Dust Bowl attributed the massive dust storms and their subsequent misfortunes to “acts of God” as capricious as tornadoes, rather than to unsound agricultural practices; the region experienced an even worse drought two decades later. Today, the population of the American West continues to grow disproportionately relative to most of the rest of the country, despite a scarcity of water.

Rather than denying the risks, one of the ways that an emergency manager can improve his or her work is to look at previous disasters, consider what happened, and anticipate similar circumstances. One of the great mistakes that an emergency manager can make is to assume, “It can’t happen again,” “It won’t happen here,” or “I’m ready.” If a close study of disaster history tells us anything, it tells us that it can, it will, and you’re not.

- **Mistakes are often repeated.** It should be striking to anyone examining twentieth-century disasters how the tragic response to Hurricane Katrina reflects similar failures in 1900, 1906, 1918, 1927, 1930, 1947, and beyond. These include not only the failure to recognize the hazards and anticipate their consequences, but also recurring mistakes in response involving such factors as failure to deal with incapacitated, poor, and/or ethnic minorities, inability to manage unwanted relief supplies, failure to improvise needed actions, and inability to manage converging responders. They also include failures to recognize and deal with disaster myths such as alleged looting, anarchy, and the need for martial law. Often compounding these problems are poor communication and inadequate coordination. These failures can continue into recovery, during which rich and powerful business interests in a community often assume control, and communities are quickly rebuilt without consideration of the hazards that brought them down in the first place or any planning to mitigate future disasters.
- **Past disasters affect present-day disaster management.** Despite society’s propensity to look the other way, past disasters can and should inform disaster management policies and practices. As discussed in more detail in subsequent chapters, government at all levels has taken steps to address the hazards that occurred prior to 1950. The recurrence of hurricanes, for instance, has led to measures at the national level, including the establishment of the National Hurricane Center, as well as at the local level, where

some communities in hurricane-prone regions have strengthened building codes and adopted zoning ordinances to direct settlement away from areas that are most vulnerable. Similarly, earthquake hazards are now addressed by national programs, such as the National Earthquake Hazards Reduction Program, and by state and local legislation in California and other states. At the federal level, the National Flood Insurance Program addresses flood losses, while floodplain management has become an increasing concern of state and local governments.⁶³ At the same time, many state governments have put plans in place to deal with drought, while the NDMC offers information and technical assistance to both develop such plans and deal with drought generally. The Centers for Disease Control and Prevention and other federal agencies, as well as their counterparts at the state and local levels, are actively working to limit possible future flu pandemics. And finally, modern technological hazards are the focus of the Comprehensive Environmental Response, Compensation, and Liability Act; the Emergency Planning and Community Right-to-Know Act (also known as the Superfund Amendments and Reauthorization Act [SARA] Title III), and other major pieces of legislation that encourage and support knowledge about and management of hazards at both the national and local levels. In addition, for all these hazards, the federal government has established policies, programs, and agencies to deal with the attendant problems.

The numerous mistakes notwithstanding, there were also major successes in disaster management in the early 1900s, resulting in disasters averted, risks mitigated, and improved response that saved lives and reduced property damage. Such successes can be hard to measure, but it is important to recognize that the field of disaster management is evolving, building on the base of knowledge and experience of those who have come before.

By looking at failures and successes in past disasters and identifying the patterns that emerge, emergency managers and others can anticipate responses and problems that will arise with present-day disasters and plan accordingly. The consequences of disasters can be ameliorated by clearly identifying local hazards and the vulnerable populations and environments. The intersection of these two sets of data represents the overall risk to a community. Such risk analysis can then help inform a set of plans to deal with the various hazards. Each plan should address preparedness (including warning and evacuation when necessary), response, and recovery, as well as the long-term measures that can be undertaken to either reduce the hazard or minimize vulnerability.

The early-twentieth-century events discussed in this chapter and the one before it set the stage for an increased role by the federal government in all aspects of disaster management. The federal government has continued to react, through

legislation and appropriations, to individual major disasters and catastrophes up to the present day.⁶⁴ Over time, however, both private institutions and government agencies have increasingly recognized the need for better, more consistent, and proactive approaches to disaster management beyond event-based response. One result has been the advent of a new profession—emergency management—charged with overseeing disaster-related tasks at all levels of government.

Endnotes

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- 3 *Ibid.*, 9. The ASFPM report was published prior to Hurricane Katrina, which has perhaps eclipsed the 1927 flood.
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- 5 John M. Barry, *Rising Tide: The Great Mississippi Flood of 1927 and How It Changed America* (New York: Simon & Schuster, 1997).
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- 9 ASFPM, *Nation's Responses to Flood Disasters*, 9.
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- 11 Nicole T. Carter, *Flood Risk Management: Federal Role in Infrastructure*, CRS report RL33129 (Washington, D.C.: Congressional Research Service, 2005), 2.
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- 14 Rutherford H. Platt, *Disasters and Democracy: The Politics of Extreme Natural Events* (Washington, D.C.: Island Press, 1999), 6.
- 15 Gilbert F. White, *Human Adjustment to Floods: A Geographic Approach to the Flood Problem in the United States* (PhD diss., University of Chicago, 1942), 32.
- 16 *Ibid.*, 2. White is considered the father of modern floodplain management because of his advocacy of a broad range of human adjustments to floods.
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- 20 Robert Geiger, *Washington Evening Star*, April 15, 1935, as quoted in *ibid.*, 29.
- 21 See the National Drought Mitigation Center (NDMC) website (drought.unl.edu) for analyses of each of these dimensions, as well as extensive information on the phenomenon of drought and drought planning, monitoring, and mitigation.
- 22 NDMC, "What Is Drought?," drought.unl.edu/DroughtforKids/WhatisDrought.aspx.
- 23 Worster, *Dust Bowl*, 12.

- 24 National Aeronautics and Space Administration, "NASA Explains 'Dust Bowl' Drought" (March 18, 2004), nasa.gov/centers/goddard/news/topstory/2004/0319dustbowl.html.
- 25 NDMC, "What Is Drought?"
- 26 Worster, *Dust Bowl*, 4.
- 27 *Ibid.*, 5.
- 28 Harry C. McDean, "Dust Bowl Historiography," *Great Plains Quarterly* 6 (Spring 1986): 117–127.
- 29 Worster, *Dust Bowl*, 28.
- 30 NDMC, "What Is Drought?"
- 31 Warrick et al., *Drought Hazard in the United States*, 37; NDMC, "What Is Drought?"
- 32 PBS, *American Experience*, "Surviving the Dust Bowl," pbs.org/wgbh/amex/dustbowl/sfeature/newdeal.html.
- 33 PBS, *American Experience*, "Timeline: Surviving the Dust Bowl, 1931–1939," pbs.org/wgbh/americanexperience/features/timeline/dustbowl/.
- 34 Worster, *Dust Bowl*, 133.
- 35 NDMC, "What Is Drought?"
- 36 Worster, *Dust Bowl*, 41–43.
- 37 Morris Cooke et al., *Report of the Great Plains Drought Area Committee, August 27, 1936*, Hopkins Papers, Box 13, Franklin D. Roosevelt Library, Hyde Park, N.Y., newdeal.feri.org/hopkins/hop27.htm.
- 38 Gilbert F. White, "The Future of the Great Plains Re-visited," *Great Plains Quarterly* 6 (Spring 1986): 93.
- 39 Worster, *Dust Bowl*, 229.
- 40 *Ibid.*, 248.
- 41 White, "Great Plains Re-visited."
- 42 See NDMC, "What Is Drought?"
- 43 Many scholars mark the Halifax explosion as the beginning of modern social science research into disasters. Samuel Henry Prince, a curate in an Anglican church in Halifax, studied the effects of this traumatic event on the victims. His resulting 1920 doctoral thesis is generally regarded as the first in-depth sociological study of a disaster and its consequences.
- 44 See "Die Explosion von Oppau," wortlastig.de/text/oppau.htm.
- 45 Angus Gunn, *Unnatural Disasters: Case Studies of Human-Induced Environmental Catastrophes* (Westport, Conn.: Greenwood Press, 2003), 46.
- 46 Hugh W. Stephens, *The Texas City Disaster, 1947* (Austin: University of Texas Press, 1997), 4.
- 47 Quoted in *ibid.*, 50.
- 48 *Ibid.*, 43.
- 49 *Ibid.*
- 50 See *Dalehite v. United States*, 346 U.S. 15 (1953), caselaw.lp.findlaw.com/scripts/getcase.pl?court=us&invol=15&vol=346.
- 51 Stephens, *Texas City Disaster*, 103.
- 52 *Ibid.*
- 53 *Ibid.*, 1.
- 54 *Ibid.*, 18.
- 55 *Ibid.*, 114.
- 56 The next time the United States witnessed a policy-changing disaster of this magnitude was in 1984, when a deadly gas leak at a Union Carbide plant in Bhopal, India, resulted in approximately 3,400 deaths and countless disabilities.
- 57 Gunn provides succinct analyses of thirty-four such disasters in *Unnatural Disasters*.
- 58 Charles Perrow, *Normal Accidents: Living with High-Risk Technologies* (New York: Basic Books, 1984), 4.
- 59 *Ibid.*, 11–12.

60 Ibid., 4.

61 E. L. Quarantelli, "Disaster Planning, Emergency Management, and Civil Protection: The Historical Development and Current Characteristics of Organized Efforts to Prevent and to Respond to Disasters," Disaster Research Center Preliminary Paper 227 (Newark: University of Delaware, 1995), 22.

62 Ibid., 22.

63 ASFPM has grown steadily and, as of 2011, had 14,000 members and thirty-two state chapters.

64 See Claire B. Rubin, Irmak Renda-Tanali, and William Cumming, *Disaster Time Line: Major Focusing Events and Their Outcomes* (1979-2005) (Arlington, Va.: Claire B. Rubin & Associates, 2006), disaster-timeline.com.

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