



RESEARCH

Large Loss Fire in the United States 2015

Stephen G. Badger

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Acknowledgements

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Introduction

In 2015, the nation's largest fire in terms of direct property loss was a wildland/urban interface fire that occurred in California. Three days after that fire began, the next-biggest large-loss fire of the year broke out—also a wildland/urban interface fire and also located in California. Both of these fires ranked among the most costly in the state's history. Combined, the fires destroyed thousands of homes and other structures, were blamed for at least six deaths, and resulted in a loss of almost \$2 billion dollars. These fires rank as the second- and fourth-largest wildfire losses in the state in the past 10 years.

The larger fire was known as the Valley Fire. It began in the early afternoon in September, the result of an improperly wired hot tub on the rear porch of a private single-family dwelling. Dry grass and leaf litter in contact with the connection ignited. At the time the fire broke out, the temperature was 88 degrees F (31.1 degrees C), relative humidity was 12 percent, and winds were 18 mph (29 kph), with gusts to 30 mph (48.3 kph). The entire area had had drought conditions for nearly 48 months. The fire was originally reported as a two-acre (0.8-hectare) grass fire. Within five hours, the fire had grown to over 10,000 acres (4,047 hectares) and in another five hours grew to 25,000 acres (10,117 hectares). By early October, when it was 100 percent contained, the fire had grown to 76,067 acres (30,783 hectares), destroyed 1,280 single-family homes, 27 multi-family homes, 66 commercial properties, and 585 minor structures (including sheds and other small structures). Numerous vehicles were also destroyed. Another 93 structures of various sizes and types were damaged. At times, the flame heights reached 100 feet (30 meters) and massive evacuations were ordered to keep residents safe. At least four people lost their lives in the fire area. In addition, 77 firefighters were injured, including four who were trapped in their initial attack on the fire; they deployed their emergency shelters and survived but received serious burn injuries. The cost to fight this massive fire was \$56 million. The estimated property loss, as reported by insurer Aon Benfield, was \$1.5 billion.

Three days later, the second fire, known as the Butte Fire, broke out in the early afternoon when a tree came in contact with electrical power lines. This contact caused sparks and embers to fall and ignite fine dead and dry fuels. From that point, the fire grew rapidly in weather conditions similar to those at the Valley Fire. By evening, the fire had spread from 100 acres (40 hectares) to 14,500 acres (5,867 hectares) and reached 32,000 acres (12,949 hectares) in two days. By early October, when the fire was contained, it had burned 70,868 acres (28,679 hectares) and destroyed 965 structures, of which 475 were homes, and was responsible for at least two deaths. The estimated loss in this fire, as reported by insurer Aon Benfield, was \$450 million. Very erratic fire conditions were noted by fire officials during both the Butte and Valley Fires. For more information on wildfires in 2015, see "The Year in Wildfire" in the November/December 2015 *NFPA Journal*.

NFPA reports annually on large-loss fires and explosions that occurred in the United States the year before, defined as an event that results in property damage of at least \$10 million. There were 27 such fires in 2015, with a total of over \$2.5 billion in direct property losses. In order to compare losses over the past 10 years, we adjust losses for inflation to 2006 dollars. When adjusted for inflation, the number of fires in 2015 that would have been categorized as large-loss

fires—that is, fires resulting in a loss of \$10 million in 2006 dollars—drops to 17, with an adjusted loss of slightly more than \$2 billion.

According to “[Fire Loss in the United States During 2015](#),” published in the September/October issue of *NFPA Journal*, U.S. fire departments responded to an estimated 1,345,000 structure and non-structure fires, which caused an estimated loss of \$14.3 billion. Many of these fires were small or resulted in little or no reported property damage. Although the 27 large-loss fires accounted for only 0.002 percent of the estimated number of fires in 2015, they accounted for 18 percent of the total estimated dollar loss. In addition, those 27 fires accounted for 19 civilian deaths, with another five civilians and 80 firefighters injured, some critically.

With the two wildfires mentioned above, 2015 was the ninth year out of the past 10 that a wildfire topped the list of the year’s biggest large-loss fires. In two of those years, 2011 and 2015, wildfires were the largest and second-largest fires, and in 2007 the three largest fires were wildland fires. In the past 10 years, there have been 36 wildland fires that accounted for more than \$10 million in direct property losses. In human terms, these fires have been responsible for 73 deaths, including 32 firefighters, and \$7.4 billion in loss to property.

In 2015, 10 fires—five fewer than the previous year—resulted in more than \$20 million each in property damage. These fires included six in structures, three wildfires, and one aircraft fire, resulting in a combined property loss of \$2.3 billion, or 92 percent of the total loss in large-loss fires and 16 percent of the total fire losses in the United States for 2015.

Where fires occurred

Of the 27 large-loss fires in 2015, 20 involved structures that resulted in a total property loss of \$464.1 million, or 18 percent of the combined losses for all large-loss fires. The other fires included five wildland/urban interface fires and two vehicle fires that resulted in combined losses of \$2.1 billion, or 82 percent of the losses in all the large-loss fires. Both vehicles were aircraft: a military jet on takeoff for a test flight and a business jet.

Seven fires occurred in manufacturing plants: a glass manufacturing plant, a fertilizer plant, a silkscreening plant, a metal plating plant, a metal products plant, a meat processing plant, and a grain processing plant, causing a combined loss of \$185.7 million.

Four large-loss fires occurred in residential properties, including two apartment buildings, a 70-unit hotel, and a single-family home, causing a combined loss of \$58.8 million.

Two fires each occurred in storage properties (a book warehouse and an appliance parts warehouse), public assemblies (a church and a county administration building), and special properties (a vacant warehouse and a commercial structure under renovation), resulting in combined losses of \$120 million, \$41 million, and \$23.6 million, respectively.

One fire each occurred in the categories of industry (an electrical transformer), educational (an elementary school), and stores and offices (an office building), resulting in losses of \$14 million, \$11 million, and \$10 million, respectively, for a combined loss of \$35 million.

Cause of ignition was reported for 10 of the 27 fires, including six of the structure fires. Two of the structure fires were caused by cutting or welding operations too close to combustibles, two were due to a mechanical failure, and two were reported as due to electrical failures of unknown type. One of the vehicle fires was due to a fire following a collision and the other to a leak in an oxygen line caused by a loose coupling. One of the wildland fires was due to an installation deficiency and another to natural conditions, where winds caused a pine tree to come into contact with energized power lines.

The operating status was reported for 14 of the 20 structure fires. In seven cases, the facility was open and operating, with six at full operation and one in partial operation. Seven were closed and the properties were unoccupied. Seven of the fires involving structures broke out between 11 p.m. and 7 a.m. These fires had a direct property loss of \$215.6 million.

Detection and suppression systems

Information about automatic fire or smoke detection equipment was reported for 14 of the 20 large-loss structure fires. Four of those fires occurred in properties that had no automatic detection equipment installed. Of the systems in the other 10 structures with information reported, eight systems operated as designed. In two of the cases, it was not reported whether or not the system operated.

Information about automatic suppression equipment was reported for 15 of the 20 structure fires. Ten had no system present and five structures had some type of system. In two cases, the systems operated as designed, but the fire department reported the systems were ineffective. In one of the two cases, the fire broke out in rack storage; the sprinklers above the racks operated, but water could not reach the seat of the fire. No reason was given in the other case. In another fire, the system did not operate—it had been shut down prior to the fire. Information on the operation of the suppression systems in the other two fires was not reported.

Of the 14 structures for which the presence of both detection and suppression equipment was reported, three had neither an operational detection system nor an operational suppression system. Both types of systems were operational in four fires. Six structures had only detection equipment, and one included only suppression equipment.

What we can learn

There was one more large-loss fire in 2015 than in 2014, with an increase in associated property losses of \$1.8 billion. This is in large part due to two massive wildland/urban interface fires in 2015 with a combined loss of almost \$2 billion.

In nine of the past 10 years, at least one fire resulted in a loss of more than \$100 million. In 2015, there were three such fires: two wildfires and an appliance parts warehouse. Over the past 10 years, there have been 24 fires with more than \$100 million in losses, including two with more than \$1 billion in losses. Of these largest of losses, 12 were wildland/urban interface fires, 10 were structure fires, and two were vehicle fires. The two \$1 billion losses were wildfires. The only year in the past 10 in which the highest dollar loss fire was not a wildland fire was 2014.

It is evident that climate conditions around the country have played a role in large-loss fires. Four of the five wildfires this year were in California, where there has been a four-year drought, and it was reported that the drought situation was a factor in the fires.

Adhering to the fire protection principles reflected in NFPA's codes and standards is essential if we are to reduce the occurrence of large-loss fires and explosions in the United States. Proper construction, proper use of equipment, and proper procedures in chemical processes, storage, and housekeeping will make fires less likely to occur and help limit fire spread should a fire occur. Proper design, maintenance, and operation of fire protection systems and features can keep a fire that does occur from becoming a large-loss fire.

Where we get our data

NFPA identifies potential large-loss incidents by reviewing national and local news media, including fire service publications. A clipping service reads all U.S. daily newspapers and notifies NFPA's Research Group of major large-loss fires. NFPA's annual survey of the U.S. fire experience is an additional data source, although not the principal one. Web searches have proved useful in several cases where fire department and government reports have been released and published.

Once a fire has been identified, we request information about it from the fire department or agency having jurisdiction. We also contact federal agencies that have participated in investigations, as well as state fire marshals' offices and military sources. The diversity and redundancy of these data sources enables NFPA to collect the most complete data available on large-loss fires.

This report includes only fire incidents for which NFPA has official dollar-loss estimates. There are other fires that may have large losses but no official information has been reported to NFPA.

About the author

Stephen G. Badger is a Fire Data Assistant in NFPA's Research Group and a retired firefighter from the Quincy Fire Department, Massachusetts.

Table 1.
Large-Loss Fires that Caused \$10 million or more in Property Damage, 2006 – 2015

Year	Number of Fires	Number of Fires Causing \$10 Million or More in 2006 Dollars	Direct Property Damage (in Millions)	
			Unadjusted	In 2006 Dollars
2006	16	16	\$380	\$380
2007	45	40	\$3,393	\$3,251
2008	34	26	\$2,322	\$2,098
2009	25	20	\$950	\$845
2010	17	12	\$652	\$556
2011	23	16	\$820	\$670
2012	26	17	\$1,463	\$1,203
2013	21	15	\$845	\$678
2014	26	23	\$714	\$582
2015	27	17	\$2,535	\$2,063

Note: Number of fires and unadjusted loss are based on data from studies that appeared in previous annual large-loss studies. Some of the information may differ from previously published material because material was updated after publication.

Note: Adjustment for inflation is based on the Consumer Price Index using 2006 as a base year. Note that adjustment for inflation not only reduces the total dollar loss for each year but also reduces the number of fires when adjusted losses large enough to qualify as large-loss fires.

Source: NFPA’s Fire Incident Data Organization (FIDO).

Table 2.
Large-Loss Fires of \$20 Million or More in 2015

Incident and Location	Loss in Millions
The Valley wildland/urban interface fire, California	\$1,500.0
The Butte wildland/urban interface fire, California	\$ 450.0
Appliance parts warehouse, Kentucky	\$110.0
Aircraft fire, Nebraska	\$62.4
Glass manufacturing plant, Pennsylvania	\$55.0
Fertilizer manufacturing plant, Pennsylvania	\$40.0
Church, California	\$31.0
Silk screening promotional products plant, California	\$31.0
Grain processing plant, Idaho	\$24.0
The Carpenter Road wildland/urban interface fire, Washington	\$22.0
Total Losses	\$2,325.4

Sums may not equal totals due to rounding errors.

Source: NFPA's Fire Incident Data Organization (FIDO).

**Table 3.
2015 Large-Loss Fires by Major Property Use**

Property Use	Number of Fires	Percent of Fires	Total Dollar Loss	Percent of Loss
Manufacturing	7	26%	\$185,750,000	7.3%
Wildland Fires	5	19%	\$1,997,812,000	78.8%
Residential	4	15%	\$58,756,000	2.3%
Vehicle Fires	2	7%	\$73,400,000	2.9%
Public Assembly	2	7%	\$41,000,000	1.6%
Special Property	2	7%	\$23,600,000	0.9%
Storage	2	7%	\$120,000,000	4.7%
Industry	1	4%	\$14,000,000	0.6%
Educational	1	4%	\$11,000,000	0.4%
Stores/Office	1	4%	\$10,000,000	0.4%
Total	27	100%	\$2,535,318,000	100%

Sums may not equal totals due to rounding errors.

Source: NFPA's Fire Incident Data Organization (FIDO).

Figure 1
Large-Loss Fires, Unadjusted and Adjusted for Inflation
(2006- 2015)

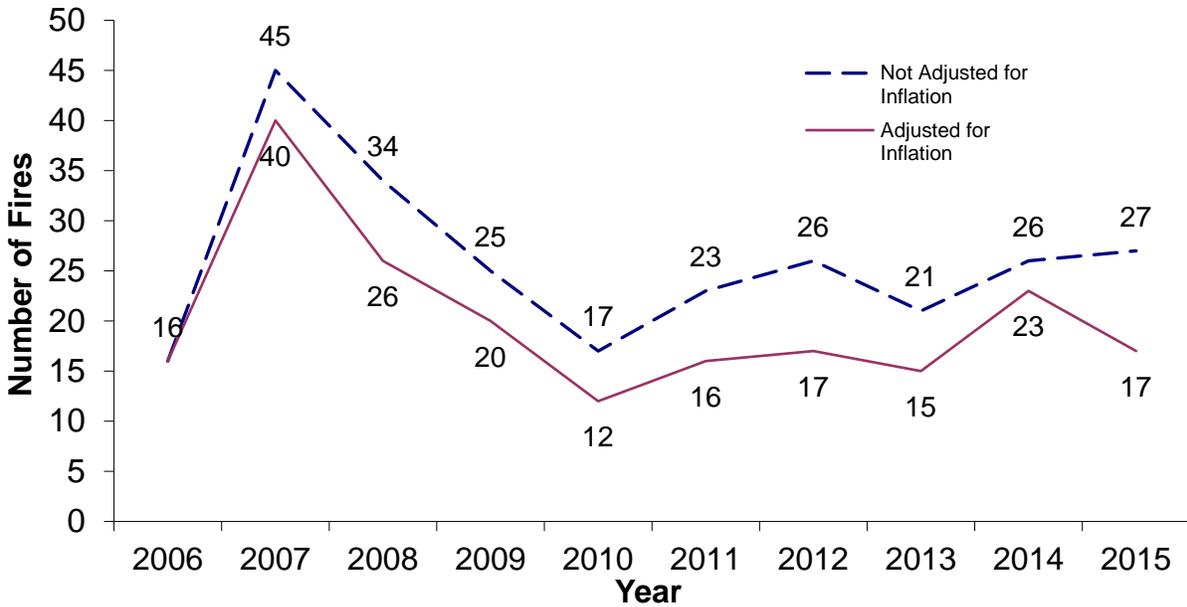
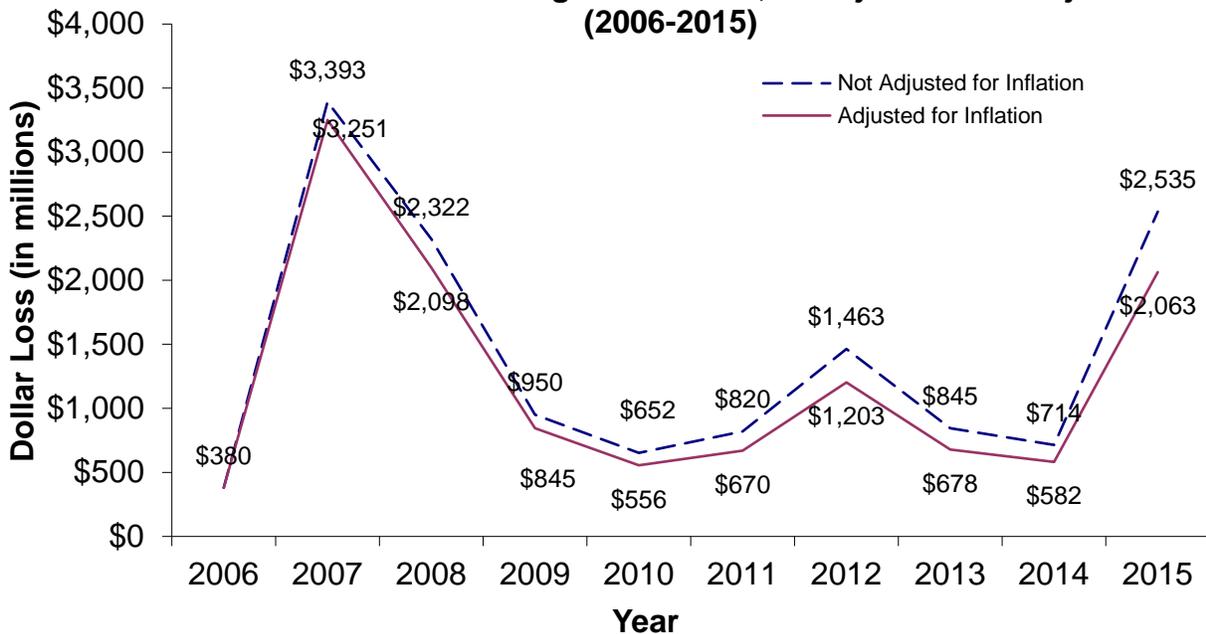
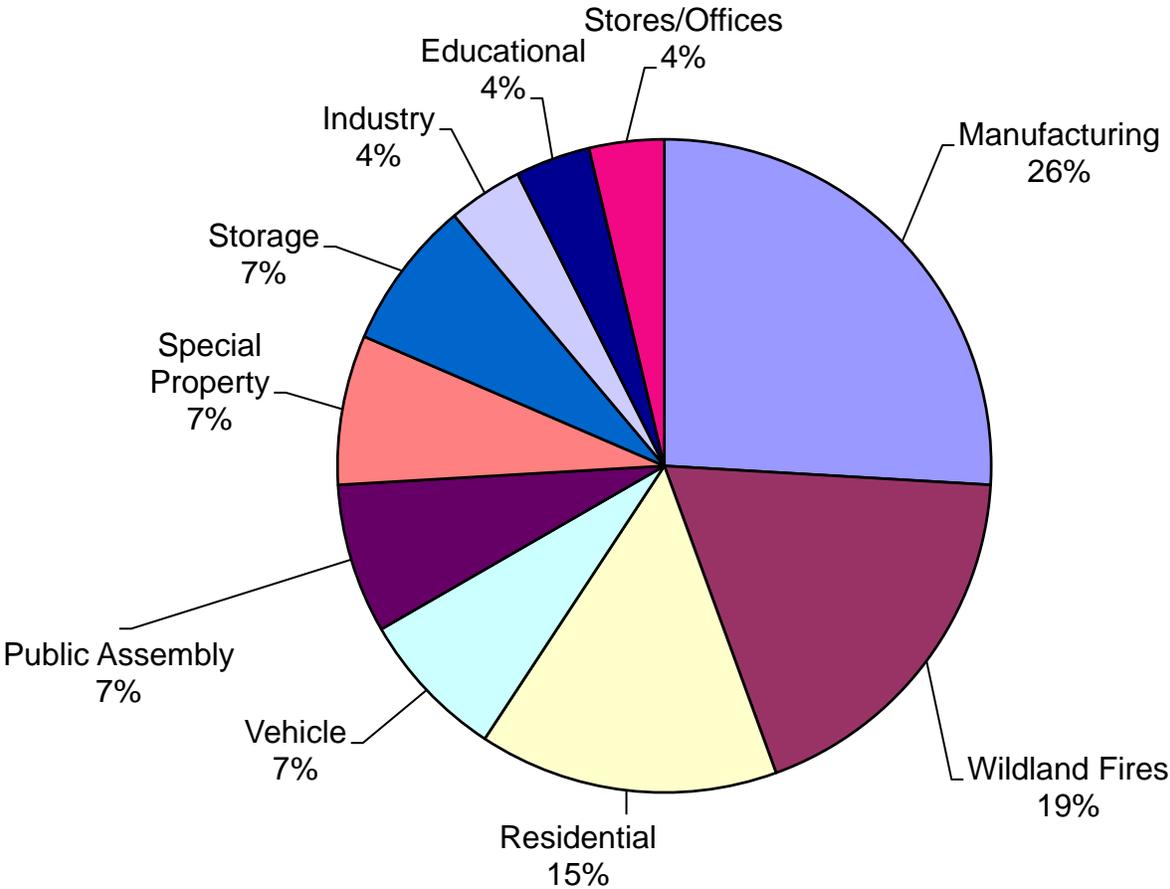


Figure 2
Direct Dollar Loss in Large-Loss Fires, Unadjusted and Adjusted
(2006-2015)



Source: NFPA's Fire Incident Data Organization (FIDO).

Figure 3
Large-Loss Fires by Major Property Use 2015



Source: NFPA’s Fire Incident Data Organization (FIDO).

2015 LARGE-LOSS FIRE INCIDENTS

MANUFACTURING

Pennsylvania

Month, Time of Alarm, Dollar Loss

March, 4:53 p.m., \$55,000,000

Property Characteristics and Operating Status

This was a one-story, 214,500-square-foot (19,928-square-meter) glass manufacturing plant of unprotected noncombustible construction. The plant was operating at the time of the fire.

Fire Protection Systems

No automatic detection or suppression was present.

Fire Development

The cause was listed as undetermined but unintentional in nature.

Contributing Factors and Other Details

None reported.

Pennsylvania

Month, Time of Alarm, Dollar Loss

June, 3:40 a.m., \$40,000,000

Property Characteristics and Operating Status

This was a one-story fertilizer manufacturing plant covering 136,000 square feet (12,635 square meters). The plant was closed for the night.

Fire Protection Systems

There was a system of smoke detectors, and they operated. There was no automatic suppression system present.

Fire Development

The cause of the fire was an electrical failure. No additional information was reported.

Contributing Factors and Other Details

None reported.

California

Month, Time of Alarm, Dollar Loss

September, 7:25 a.m., \$31,000,000

Property Characteristics and Operating Status

This was a three-story, 20,000-square-foot (1,858-square-meter) plant of unprotected ordinary construction that manufactured silk-screened promotional products. It was closed at the time of the fire.

Fire Protection Systems

There was no information reported on automatic detection in the facility, and there was no automatic suppression equipment.

Fire Development

This was a fire of undetermined cause that began on the third story and is still under investigation.

Contributing Factors and Other Details

The estimated loss was \$30 million to the structure and \$1 million to the contents.

Idaho

Month, Time of Alarm, Dollar Loss

March, unreported time, \$24,000,000

Property Characteristics and Operating Status

This was a grain processing plant. No additional information was reported.

Fire Protection Systems

No information reported.

Fire Development

No information reported.

Contributing Factors and Other Details

Loss estimates were \$12 million to the building and \$12 million to the contents.

Michigan

Month, Time of Alarm, Dollar Loss

March, 1:41 a.m., \$15,000,000

Property Characteristics and Operating Status

This was a one-story, 180,000-square-foot (16,723-square-meter) metal plating shop of unprotected noncombustible pole-style construction. The plant was closed for the weekend at the time.

Fire Protection Systems

There was a system of smoke and heat detection equipment in the building. This system operated and notified a central alarm office that in turn notified the fire department. The fire department reported the alarm system was inefficient as it activated after a delay. There was no automatic suppression system present.

Fire Development

This fire began when an operating heating system used to heat chemicals for plating metals malfunctioned and ignited natural gas. This was listed as a mechanical failure of some type. This caused a torch-like effect in the room and superheated the room until all materials in the area ignited.

Contributing Factors and Other Details

Near the point of origin, there was an energized electrical substation, an area where water could not be applied. This allowed the fire to grow and several explosions occurred. There was a delay also in shutting down all the gas to the structure, as one of the two shutoff valves was in the area of heavy fire and smoke. The loss was estimated at \$9 million to the structure and \$6 million to the contents.

Pennsylvania

Month, Time of Alarm, Dollar Loss

January, 1:22 p.m., \$10,750,000

Property Characteristics and Operating Status

This was a two-story, 76,137-square-foot (7,073-square-meter) metal products manufacturing plant of unprotected ordinary construction. The operation status was not reported.

Fire Protection Systems

There was neither a detection nor a suppression system present.

Fire Development

This fire broke out in a bathroom on the first floor, but the cause has not been determined.

Contributing Factors and Other Details

The loss was estimated at \$750,000 to the structure and \$10 million to the contents (metal products). One firefighter was injured fighting this blaze.

Wisconsin

Month, Time of Alarm, Dollar Loss

May, 12:57 a.m., \$10,000,000

Property Characteristics and Operating Status

This was a two-story, 30,450-square-foot (2,830-square-meter) meat processing plant of fire-resistive construction. It was closed at the time of the fire.

Fire Protection Systems

There was no automatic detection or automatic suppression equipment present.

Fire Development

The fire began in the first-level corridor knife room. The cause was listed as undetermined.

Contributing Factors and Other Details

The loss was listed as \$5 million to the structure and \$5 million to the contents.

WILDFIRE

California

Month, Time of Alarm, Dollar Loss

September, 1:24 p.m., \$1,500,000,000

Setting

Wildland/urban interface fire. Fuels included conifers intermixed with hardwoods, Manzanita, and chamise.

Climate

The temperature at the time was 88 degrees F (31 degrees C), relative humidity was 12 percent, with winds 18 miles per hour (29 kph) and gusts of 30 mph (48 kph).

Fire Origin and Path

A hot tub had been installed on the rear porch of a home by the homeowner and the work was not up to code. Thermal resistance heating in a poor circuit connection with a wire nut resulted in the ignition of dry grass and leaves that were in contact with the connection. The fire then spread and developed into a massive wildfire.

Contributing Factors and Other Details

This fire, known as the Valley Fire, burned 76,067 acres (30,783 hectares) and destroyed 1,958 structures, including 1,280 single-family homes, 27 multi-family properties, 66 commercial properties, and 585 minor structures. Another 93 structures were damaged. Four people died in the fire. Three of the victims were in their homes and one was located outdoors near his car. 77 firefighters were also injured in the fire, including four who sustained serious burn injuries when they became trapped in their initial attack on the fire and had to deploy their shelters.

California

Month, Time of Alarm, Dollar Loss

September, 2:26 p.m., \$450,000,000

Setting

Wildland/urban interface fire.

Climate

Average temperature was 76 degrees F (24 degrees C) with a maximum of 102 degrees F (39 degrees C). The humidity was 8 percent, winds were 4 miles per hour (6 kph) with gusts at 13 mph (21 kph). Conditions were very dry; there had been only a little over 6 inches (15 centimeters) of rain during the year, preceded by several years of drought.

Fire Origin and Path

The fire was caused when a pine tree contacted an electric power line. Burning embers dropped into fine dead fuels and ignited a wildfire. The fire was not fully contained until about three weeks later.

Contributing Factors and Other Details

This fire, which became known as the Butte Fire, burned 70,868 acres (28,328 hectares) and destroyed 965 structures, of which at least 475 were homes. Two people, aged 80 and 66, died in separate homes after ignoring an evacuation order. One person was injured. No information on firefighter injuries was reported.

Washington

Month, Time of Alarm, Dollar Loss

August, 8 p.m., \$22,000,000

Setting

Wildland/urban interface fire.

Climate

Temperature was 82 degrees F (28 degrees C). No other conditions were reported.

Fire Origin and Path

After investigation, the cause of the fire remains undetermined.

Contributing Factors and Other Details

The fuel included timber, litter, grass, and light logging slash. The fire destroyed 42 structures, 18 of which were homes, and burned 63,972 acres (25,888 hectares). One person suffered a fatal heart attack while escaping.

California

Month, Time of Alarm, Dollar Loss

February, 2:07 p.m., \$15,811,560

Setting

This was a wildland/urban interface fire.

Climate

The weather was 74 degrees F (23 degrees C) and clear, with 8 mph (13 kph) shifting winds. Humidity was 26 percent and there was no precipitation at the time of the fire.

Fire Origin and Path

The cause and origin are listed as undetermined at this time.

Contributing Factors and Other Details

This fire destroyed 53 structures and burned 7,000 acres (2,832 hectares). The estimated loss was \$13,476,560 to structures and \$2,335,000 to the contents.

California

Month, Time of Alarm, Dollar Loss

September, 3 p.m., \$10,000,000

Setting

Wildland/urban interface fire.

Climate

Temperature range was 84 to 92 degrees F (29 to 33.3 degrees C), humidity 15 percent, winds 15 mph (24 kph) gusting to 20 mph (32 kph), with no precipitation for that day or month and only 2.9 inches (7.3 centimeters) of rain, year to date.

Fire Origin and Path

The cause is listed as undetermined at this time but authorities are investigating that the fire may be connected to a person committing suicide.

Contributing Factors and Other Details

The fire burned over 1,100 acres (445 hectares). Eighteen structures were destroyed. The area had drought conditions and high fire danger at the time of the fire. One civilian died in this fire. Estimated loss was \$8 million to the structures and \$2 million to the contents.

RESIDENTIAL

Texas

Month, Time of Alarm, Dollar Loss

April, 4:41 p.m., \$19,955,800

Property Characteristics and Operating Status

This was a three-story, 36,540-square-foot (3,395-square-meter), 70-unit hotel of unprotected ordinary construction. The hotel was open and occupied when the fire broke out.

Fire Protection Systems

There was a detection system present, but the type, size, and operation of the system were not reported. There was also a wet pipe sprinkler system present, but no additional information was reported.

Fire Development

The fire started on an exterior wall, but its cause was undetermined.

Contributing Factors and Other Details

The loss was estimated at \$19,855,800 to the structure and \$100,000 to the contents.

Maryland

Month, Time of Alarm, Dollar Loss

January, 3:31 a.m., \$16,000,000

Property Characteristics and Operating Status

This was a two- and three-story, 16,386-square-foot (1,522-square-meter) single-family home of unprotected ordinary construction. The home was occupied by a family of six at the time the fire broke out.

Fire Protection Systems

There were smoke alarms present. The system activated and alerted an alarm company that in turn notified the fire department. Minutes after the alarm activated, several 911 calls were received from neighbors. There was no automatic suppression equipment present.

Fire Development

The fire is believed to have started in the great room when an electrical failure ignited plastic and the tree skirt under a 15-foot (4.5-meter) Fraser fir Christmas tree. No additional information was reported on the spread of the fire. The home was totally destroyed with major collapse of the structure.

Contributing Factors and Other Details

The Christmas tree had been cut down in mid-November and put in the home in early December. The lights were left on 24 hours a day, seven days a week, and it was watered approximately once a week. All six occupants died in the fire. It took investigators several days to locate and recover the bodies from under the collapse. Five of the victims were located in debris of the three bedrooms, and the sixth body was located in the great room. The victims included two adults and their four grandchildren.

Georgia

Month, Time of Alarm, Dollar Loss

June, 3:20 a.m., \$12,000,000

Property Characteristics and Operating Status

This was an apartment building in a retirement community. No additional information about the structure was reported.

Fire Protection Systems

No information reported.

Fire Development

The fire started in a billiards room on the third floor in the area of an air-conditioning unit. The cause was listed as unintentional.

Contributing Factors and Other Details

One person, 91 years old, died in this fire.

Oregon

Month, Time of Alarm, Dollar Loss

April, 2:45 p.m., \$10,800,000

Property Characteristics and Operating Status

This was a three-story, 16,000-square-foot (1,486-square-meter), 30-unit apartment building of protected, ordinary construction. The building was occupied at the time of the fire.

Fire Protection Systems

There was a complete coverage heat/smoke detection system that operated and notified a central alarm company. There was no automatic suppression system present.

Fire Development

The fire began on the third story, but the cause remained undetermined after an investigation.

Contributing Factors and Other Details

Upon arrival, firefighters found the third floor was well involved with fire. The fire was well-seated and protected by heavy construction and insulation. Firefighters fought this fire for five days and debris was pulled apart by heavy equipment to allow full extinguishment. The building was a total loss, with damage listed as \$6.3 million to the structure and \$4.5 to the contents.

VEHICLE

Nebraska

Month, Time, Dollar Loss

April, 6:25 p.m., \$62,400,000

Property Characteristics and Operating Status

This was a fire onboard a military reconnaissance aircraft while taking off on a training flight. The pilot aborted the takeoff and came to a safe stop off the runway.

Fire Protection Systems

No information was reported on automatic protection or suppression equipment in the aircraft.

Fire Development

A connection in the oxygen system onboard the plane was not tightened down and came loose during takeoff, causing the galley to fill with oxygen. The ignition source for this oxygen-fed fire was not reported. Airport fire apparatus arrived within four minutes and extinguished the fire.

Contributing Factors and Other Details

The 27 crew members safely evacuated the aircraft within two minutes. Four aircraft crewmembers were treated for minor smoke inhalation.

Ohio

Month, Time, Dollar Loss

November, 2:55 p.m., \$11,000,000

Property Characteristics and Operating Status

This incident involved a small business jet aircraft with seven passengers and two crew members. The aircraft crashed into a four-unit apartment building of unprotected ordinary construction and instantly caught fire.

Fire Origin and Path

The aircraft crashed into the second story of a four-unit apartment building and JP-4 fuel caught fire immediately. The fire burned the aircraft and apartment building and spread to two additional buildings of unprotected ordinary construction. The cause of the crash is still under investigation by the National Transportation Safety Board.

Contributing Factors and Other Details

This was a fatal fire, and the medical examiner's office reported that four of the nine occupants of the aircraft died of inhalation of products of combustion and/or thermal injuries and the other five died of multiple blunt-force trauma. The loss was estimated at \$10 million to the structure and \$1 million to the contents. No loss was listed for the aircraft as it was destroyed on impact. For more information see the Nation Transportation Safety Board's preliminary report at http://www.nts.gov/investigations/AccidentReports/Pages/cen16fa036_preliminary.aspx.

PUBLIC ASSEMBLY

California

Month, Time of Alarm, Dollar Loss

July, 2:38 p.m., \$31,000,000

Property Characteristics and Operating Status

This was a two-story, 10,000-square-foot (929-square-meter) church of unprotected ordinary construction. There was no one in the structure at the time of the fire.

Fire Protection Systems

It is not known if there was any automatic detection or suppression equipment present.

Fire Development

A brush fire extended to the exterior roof and attic of the church. The fire resulted in an early roof collapse due to lightweight construction and heavy fire load.

Contributing Factors and Other Details

Fire suppression efforts were hampered by poor access for firefighters, inadequate water supply, and drought conditions in the area. Two firefighters were injured fighting this blaze. The estimated loss was \$30 million to the building and \$1 million to the contents.

Tennessee

Month, Time of Alarm, Dollar Loss

January, 10:23 p.m., \$10,000,000

Property Characteristics and Operating Status

This was a one-story county administrative building of unprotected ordinary construction. Its size was not reported. The building was closed for the night.

Fire Protection Systems

Smoke/heat detection equipment was present and operated. There was no automatic suppression system present.

Fire Development

The cause of the fire was not determined, but it started in a service area and involved the floor covering.

Contributing Factors and Other Details

Cold weather hindered suppression operations, with freezing equipment and water and frozen ladders. Loss was estimated at \$1.5 million to the structure and \$8.5 million to the contents.

SPECIAL PROPERTIES**California****Month, Time of Alarm, Dollar Loss**

November, 4:30 a.m., \$12,600,000

Property Characteristics and Operating Status

No information was reported other than it was a three-story vacant former ice house of unprotected ordinary construction.

Fire Protection Systems

No information reported.

Fire Development

No information reported.

Contributing Factors and Other Details

None reported.

Kentucky**Month, Time of Alarm, Dollar Loss**

July, 4:31 p.m., \$11,000,000

Property Characteristics and Operating Status

This was a four-story commercial property of heavy-timber construction that was under renovation. The square footage of the structure was not reported. There was no one in the building at the time of the fire.

Fire Protection Systems

There was no automatic detection equipment present. There was a full-coverage automatic suppression system present. It did not operate because it had been shut down prior to the fire.

Fire Development

This fire started in the basement when hot slag or sparks from an acetylene torch or grinder ignited old wood during welding or cutting operations earlier in the day. No information was reported on the spread of the fire.

Contributing Factors and Other Details

The loss was estimated at \$11 million for the structure.

STORAGE

Kentucky

Month, Time of Alarm, Dollar Loss

April, 6:51 a.m., \$110,000,000

Property Characteristics and Operating Status

This was a two-story, 600,000-square-foot (55,742-square-meter) warehouse of unprotected noncombustible construction. The structure was used for the storage of appliance parts and included some office space. The building was partially operating with limited staff.

Fire Protection Systems

There was a system of heat and smoke detection with unreported coverage and operation. There was a wet-pipe sprinkler system in the building. The coverage and operation of the system were still under investigation.

Fire Development

The fire began on the first level rack storage area, but the cause was listed as undetermined after an investigation. No information was reported on the spread of the fire.

Contributing Factors and Other Details

First due apparatus were unavailable, having responded to other emergencies due to large storms in the area, so there was a delay in fire department arrival. Flooded or blocked roadways also hindered the arrival of fire apparatus. Firefighters went off the property to locate additional water sources, as only one fire pump out of eight was flowing water from the warehouse complex's pump house. The building was a total loss, with \$50 million in damage to the structure and \$60 million to the contents.

Pennsylvania

Month, Time of Alarm, Dollar Loss

October, 1:23 p.m., \$10,000,000

Property Characteristics and Operating Status

This was a one-story, 84,000-square-foot (7,800-square-meter) warehouse of protected ordinary construction. The warehouse was open and operating at the time of the fire.

Fire Protection Systems

There were smoke alarms and they operated. There was also a wet-pipe sprinkler system present. The system operated but was ineffective because the sprinkler heads were above the racks and water could not reach the fire.

Fire Development

The cause and origin of the fire are undetermined.

Contributing Factors and Other Details

No information reported.

INDUSTRY

Ohio

Month, Time of Alarm, Dollar Loss

November, 12:37 p.m., \$14,000,000

Property Characteristics and Operating Status

This was a two-story electrical transformer of unprotected noncombustible construction that was in operation at the time. The size was not reported.

Fire Protection Systems

A detection system was present and operated. Its type and coverage were not reported. There was a dry pipe sprinkler system present. The system did operate but was listed as ineffective, although the reason was not reported.

Fire Development

The fire was caused by an electrical failure of unknown type that caused arcing and ignition of transformer oils.

Contributing Factors and Other Details

The fire spread to a second transformer.

EDUCATIONAL

California

Month, Time of Alarm, Dollar Loss

September, 7:37 p.m., \$11,000,000

Property Characteristics and Operating Status

This was a two-story, 4,000-square-foot (372-square-meter) elementary school and administrative offices of unprotected wood-frame construction. The operating status was not reported.

Fire Protection Systems

There were smoke and heat detectors present. Their coverage was not reported but they did operate. There was no automatic suppression equipment present.

Fire Development

The cause of the fire was undetermined but was reported to have started in a first-floor garage/storage area and involved wood structural members.

Contributing Factors and Other Details

Upon arrival, firefighters immediately went to a defensive firefighting mode due to heavy fire conditions. Firefighters had difficulty accessing the building due to excessive storage of combustible materials and the presence of several gallons of flammable liquids. The estimated loss was \$10 million to the structure and \$1 million to the contents.

STORES AND OFFICES

Pennsylvania

Month, Time of Alarm, Dollar Loss

June. 9:23 p.m., \$10,000,000

Property Characteristics and Operating Status

This was a three-story business office building of unprotected ordinary construction.

Fire Protection Systems

No information reported.

Fire Development

No information reported.

Contributing Factors and Other Details

No information reported.