

LARGE-LOSS FIRES IN THE UNITED STATES 2012

Stephen G. Badger

November 2013



**National Fire Protection Association
Fire Analysis and Research Division**

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Acknowledgements

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Introduction

In 2012, the fire with the highest loss in terms of direct property damage was a wildland fire. In fact, two of the three largest losses last year involved wildfires, reported at \$453.7 million and \$113.7 million, respectively. (The second-biggest large-loss fire in 2012 was a \$400 million fire on a submarine.) Wildland events have produced fires resulting in the largest direct property damage in seven of the past 10 years.

The costliest fire of 2012 was the Waldo Canyon Fire in Colorado, which broke out at about noon on Saturday, June 23. It began in the Pike National Forest, three miles from Colorado Springs. The fire initially spread from the Waldo and Williams canyons west of Colorado Springs and moved east toward the city, fueled by brush, oak, grass mountain shrub, pinyon juniper, ponderosa pine, Douglas fir, spruce, and limber pine. By 12:20 p.m., the first air tanker was requested. Firefighting efforts, as well as a wind shift, prevented the fire from entering one residential neighborhood. But on the fourth day of the fire, winds of 65 miles per hour (105 kilometers per hour) pushed the fire into several other neighborhoods. As the fire grew, there were many voluntary and mandatory evacuations involving 26,000 homes, and more than 52,000 people were ordered out, including the staff, students, and tourists at the U.S. Air Force Academy. The fire burned 18,247 acres (7,384 hectares) as well as 346 structures (including homes and outbuildings) over 18 days and was not fully contained until July 10. It was the most destructive wildfire in the state's history. There were two civilian deaths attributed to the Waldo Canyon Fire, and the cause of the fire is under investigation

NFPA reports annually on large-loss fires and explosions that occurred in the United States the year before. Such fires and explosions are defined as any event that results in property damage of at least \$10 million. Last year, according to the "Fire Loss in the United States During 2012" report that appeared in the September/October issue of *NFPA Journal*, U.S. fire departments responded to an estimated 1,375,000 structure and non-structure fires, which caused an estimated loss of \$12.4 billion. Many of these fires were small or resulted in little or no reported property damage. However, 23 of them resulted in losses of \$10 million or more each, for a total of slightly more than \$1.4 billion in direct property losses. Although these fires accounted for only 0.002 percent of the estimated number of fires in 2012, they accounted for 11.3 percent of the total estimated dollar loss.

The number of large-loss fires annually has ranged from 16 to 45 over the past 10 years, with an average of approximately 24 fires per year. When adjusted for inflation to 2003 dollars, the number of fires in 2012 that could be categorized as large-loss fires—that is, fires resulting in a loss of \$10 million in 2003 dollars—drops to 14, with an adjusted loss of \$1.2 billion.

In 2012, 10 fires resulted in more than \$20 million each in property damage. These fires, which included seven structure fires, two wildfires, and a fire aboard a submarine in dry dock, resulted in a combined property loss of nearly \$1.2 billion, which represents 88.6 percent of the total loss in large-loss fires and 10 percent of the total fire losses in the United States for 2012.

Where fires occurred

Eighteen of the 23 large-loss fires last year occurred in structures, resulting in a total property loss of \$411.9 million. The other five fires—the submarine fire and four wildfires—resulted in combined losses of \$993.7 million, or more than double the combined losses of the large-loss structure fires.

Of the 18 large-loss structure fires, seven occurred in manufacturing properties. These included a vehicle parts plant, a paper mill, a paper products plant, a saw mill, a metal products manufacturing plant, a paraffin plant, and a printing plant. These seven fires resulted in total losses of \$255 million.

Of the five non-structure large-loss fires, the submarine (which was undergoing rehabilitation in dry dock) fire had a loss of \$400 million and the four wildland fires had a combined loss of \$593.7 million. The wildland fires destroyed almost 700 structures. The Waldo Canyon Fire alone resulted in a loss of \$453.7 million, or 32.3 percent of the large-loss fire losses in 2012.

Three fires occurred in residential properties. Two of those were in apartment buildings, one with 150 units and the other with 68. The third fire took place in a 30-room single-family home. The combined losses for these fires totaled \$49.9 million.

Two fires occurred in stores: a party goods store and an automobile dealership, resulting in a combined loss of \$35 million. Two fires also occurred in industrial properties—an installation of electrical transformers and a power generation storage facility—resulting in a combined loss of \$32 million. Two fires in storage properties—a food storage warehouse and a flammable fluid storage tank—caused \$20 million in losses. Two fires also occurred in the category of “special properties”; both were apartment buildings under construction, with a combined loss of \$20 million.

Cause of ignition was reported for 11 of the fires, including eight of the 18 structure fires and three of the non-structure fires. Four of the structure fires resulted from mechanical or part failures, including two electrical malfunctions of unknown type, one overheated compressor, and one conveyor belt malfunction. Of the other four structure fires with known cause, one each was the result of welding too close, misuse of heat of ignition (leaving hot material where it shouldn’t have been), a punctured natural gas pipe, and an electrical short circuit.

Cause of ignition was reported for three of the five non-structure fires. The submarine fire was the only reported arson fire in the study this year. One of the four wildfires resulted from a lightning strike, and another wildfire resulted from high winds spreading a contained fire outside the containment lines.

The operating status of the structure was reported for 15 of the structure fires. In 10 cases, the facility was in full operation. In three, operations were closed and the property was unoccupied. And in two, only security personnel were present. Seven of the fires in structures broke out between 11 p.m. and 7 a.m.

Detection and suppression systems

Information about automatic fire or smoke detection equipment was reported for 11 of the 18 large-loss structure fires. Five occurred in properties that had no automatic detection equipment. Of the other six structures with information reported, three had smoke detection equipment: one each with complete coverage, partial coverage, and unreported coverage. Two structures had heat and smoke detection systems—one with complete coverage and one with unreported coverage—and one structure had a smoke detection system and manual pull stations with unreported coverage. All of the systems operated effectively.

Information about automatic suppression equipment was reported for 16 of the 18 structure fires. Six of the structures had no suppression equipment. Of the remaining 10, four had wet-pipe sprinklers, three of which provided complete coverage and one had unknown coverage. Six systems were of an unreported type; two were partial coverage and four did not have the coverage reported.

Five of the 10 suppression systems operated, and three did not. The other two had unknown operation. Of the systems that operated, one was effective and helped contain the fire; two systems operated as designed, with no additional information reported on their effectiveness; and two systems were ineffective, with one not being located in the area of origin and one that operated but was damaged by a structural collapse.

Complete information on both detection and suppression equipment was reported for 11 of the 18 large-loss structure fires. Three of the structures had neither a detection nor a suppression system. Both types of systems were present in four structures. Two structures had just detection equipment, and two had just suppression equipment.

What we can learn

The number of large-loss fires in 2012 was the same as in 2011, but the associated property losses increased by more than \$585 million, or 71.4 percent. This is mostly due to a single incident, the \$400 million submarine fire (in the category of “vehicle fires”) in Maine. By comparison, the largest vehicle fire in 2011 resulted in a \$10 million loss.

In eight of the past 10 years, at least one fire has resulted in a loss of more than \$100 million. In 2012 there were three such fires: the submarine fire and two wildland fires. Over the past 10 years, there have been 22 fires with more than \$100 million in losses, including two with more than \$1 billion in losses. Of these largest losses, 11 were wildland fires, nine were structure fires, and two were vehicle 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 Fire Analysis and Research Division 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.

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 enable NFPA to collect the most complete data available on large-loss fires.

About the author

Stephen G. Badger is a fire data assistant in NFPA's Fire Analysis and Research Division and is a retired firefighter from the Quincy, Massachusetts, Fire Department.

Table 1.
Large-Loss Fires that Caused \$10 Million or more in Property Damage, 2003-2012

Year	Number of Fires	Number of Fires Causing \$10 million or more in 2003 Dollars	Direct Property Damage (in Millions)	
			As Reported	In 2003 Dollars
2003	21	21	\$2,623	\$2,623
2004	16	11	\$337	\$286
2005	16	8	\$217	\$137
2006	16	15	\$380	\$370
2007	45	38	\$3,393	\$3,321
2008	34	25	\$2,322	\$2,230
2009	25	20	\$950	\$899
2010	17	12	\$652	\$602
2011	23	14	\$820	\$724
2012	23	14	\$1,405	\$1,248

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 2003 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 2012

Incident and Location	Loss in Millions
Wildfire, Colorado	\$453.7
Submarine in dry dock, Maine	\$400.0
Wildfire, Colorado	\$113.7
Printing plant, Pennsylvania	\$75.0
Paper mill, Minnesota	\$50.0
Vehicle parts manufacturing, Georgia	\$50.0
Metal product galvanizing plant, Illinois	\$30.5
Single-family mansion, Pennsylvania	\$25.0
Party supply store, California	\$25.0
Electrical transformers, Massachusetts	\$22.0
Total Fires: 11	\$1,245.0

Sums may not equal totals due to rounding errors.

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

Table 3.
2012 Large-Loss Fires by Major Property Use

Property Use	Number of Fires	Percent of Fires	Total Dollar Loss	Percent of Loss
Manufacturing	7	30.4%	\$255,000,000	18.1%
Wildlands	4	17.4%	\$594,000,000	42.2%
Residential	3	13.0%	\$50,000,000	3.6%
Stores and offices	2	8.7%	\$35,000,000	2.5%
Basic industry	2	8.7%	\$32,000,000	2.3%
Special properties	2	8.7%	\$20,000,000	1.4%
Storage	2	8.7%	\$20,000,000	1.4%
Vehicle	1	4.3%	\$400,000,000	28.4%
Total	23	100.0%	\$1,406,000,000	100.0%

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
(2003 - 2012)

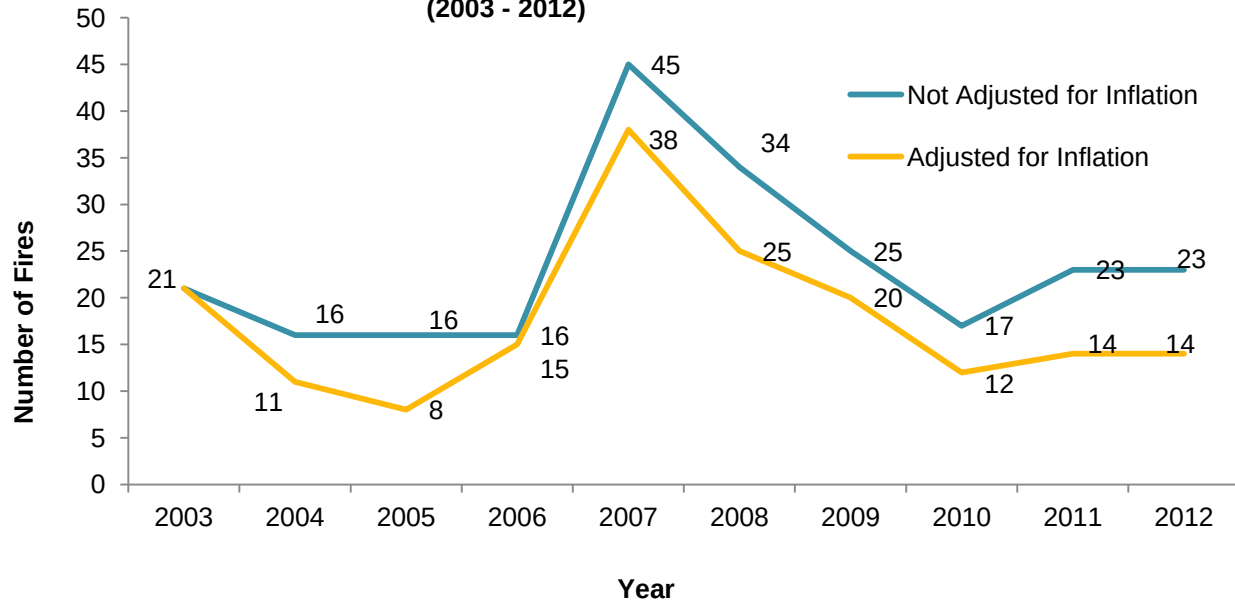
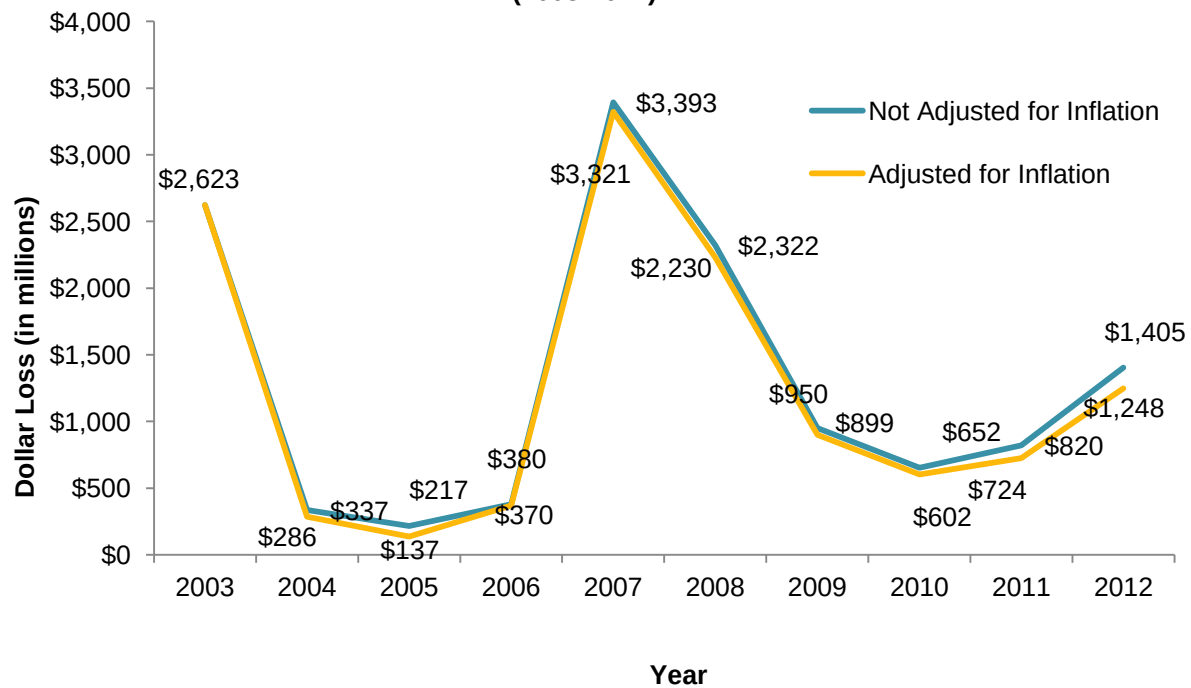
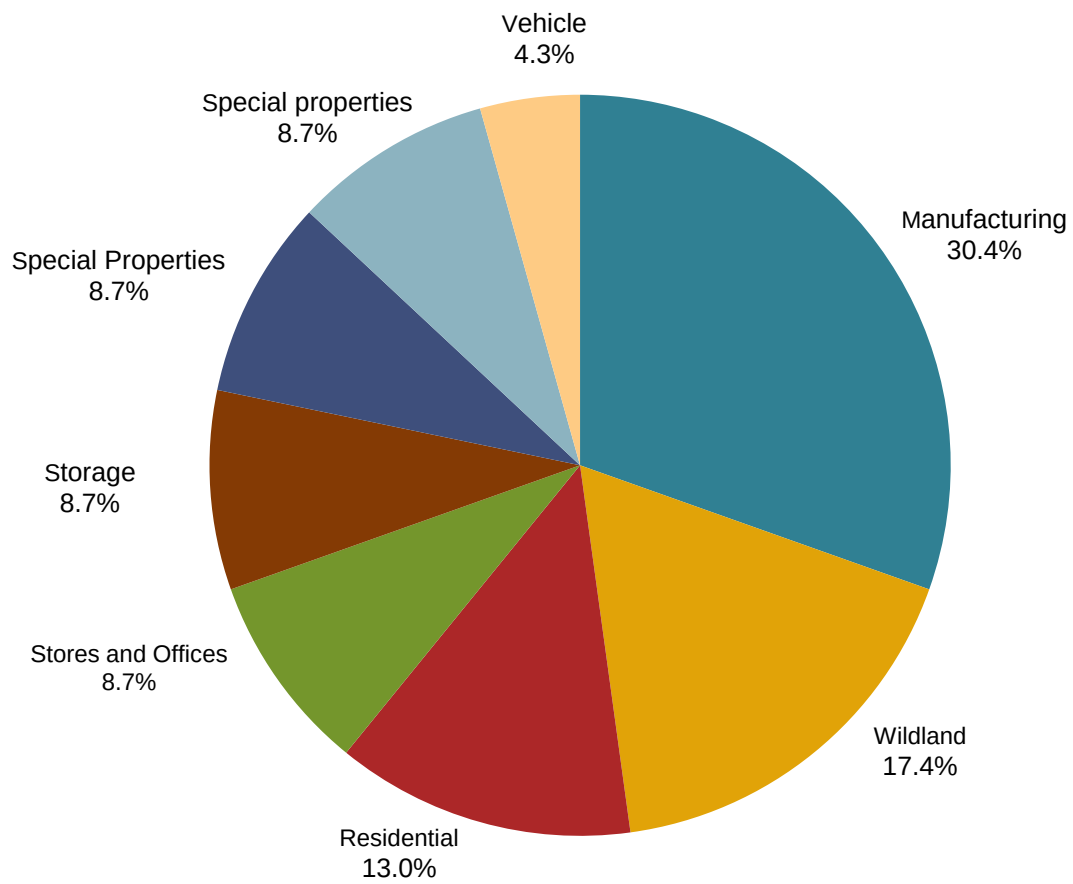


Figure 2
Direct Dollar Loss in Large-Loss Fires, Unadjusted and Adjusted
(2003-2012)



The inflation adjustment is based on the Consumer Price Index using 2003 as the base year.

Figure 3
Large-Loss Fires by Major Property Use



2012 Large-Loss Fire Incidents

Manufacturing Properties

Pennsylvania

Date, Time of Alarm, Dollar Loss

October, 8:37 a.m., \$75 million

Property Characteristics and Operating Status

This was a very tall one-story, 75,000 square-foot (6,968 square-meter) printing plant of unprotected non-combustible construction that was in full operation at the time.

Fire Protection Systems

There was no automatic detection or suppression equipment present.

Fire Development

The fire broke out in paper in a large printing press. The exact ignition sequence was not reported.

Contributing Factors

The fire spread rapidly through the paper products. Within 10 minutes of arrival, firefighters went to a defensive attack on the fire. At the height of the blaze, 175 firefighters were on scene. One hundred and fifty gallons (568 liters) of high-expansion foam was used inside the structure to assist in extinguishment.

Georgia

Date, Time of Alarm, Dollar Loss

March, 5:15 a.m., \$50 million

Property Characteristics and Operating Status

This was a 33-foot (10-meter) tall, one-story vehicle parts manufacturing plant of protected noncombustible construction with tilt-up concrete walls that was operating at the time. The floor area covered 741,233 square feet (68,863 square meters).

Fire Protection Systems

There was a complete coverage smoke and heat detection system with manual pull stations present. The detectors activated and notified an alarm company, which in turn notified the fire department. There was a complete coverage wet-pipe sprinkler system present. The system activated properly but was soon damaged and rendered ineffective by a structural collapse. There were also hand-held extinguishers present. They were used by employees, but the number of extinguishers was not reported, and they were ineffective.

Fire Development

This fire started when an employee left scraps of smoldering material hanging in a bin after the headliner had been cut out. (The headliner is foam material that is attached to the inside of the vehicle roof and covered with fabric.) This material then ignited other scrap material in the bin. Radiant heat ignited cardboard boxes stacked on a shelf 25 feet (8 meters) away, and fire spread throughout the building.

Contributing Factors

Employees fought the fire and hunted for extinguishers for an unreported length of time before pulling a fire alarm or calling 911.

Minnesota

Date, Time of Alarm, Dollar Loss

May, 11:21 a.m., \$50 million

Property Characteristics and Operating Status

This was a paper mill of varying height from one to six stories of unprotected noncombustible construction that was in operation with approximately 100 employees present. The ground floor area was not reported.

Fire Protection Systems

No information was reported on any detection equipment. There was a sprinkler system present. The type of system and whether or not it operated was not reported. The system was compromised by the explosion, which displaced water lines.

Fire Development

An air compressor overheated, igniting combustible oil vapors within the compressor. The fire spread to the mill air receiver tank through compressed air piping, and explosive oil vapors in the tank were ignited, causing an explosion and catastrophic rupture of the receiver tank. This blew out concrete walls and ignited stored rolls of paper.

Contributing Factors

Smoke and flames coming from the top of an air compressor in the air compressor room were discovered by employees. Employees started to exit the building and the property fire brigade was notified. Two employees remained behind and one used an unreported extinguisher type on the fire. Minutes later, as the two employees started to exit, the receiver tank exploded, killing one and injuring the other. A firefighter was also injured fighting the fire.

Illinois

Date, Time of Alarm, Dollar Loss

April, 1:33 a.m., \$33.5 million

Property Characteristics and Operating Status

This was a metal product galvanizing plant. No additional information was reported.

Fire Protection Systems

No information was reported on any automatic detection or suppression equipment present.

Fire Development

No information was reported.

Contributing Factors

When firefighters arrived, smoke and fire were visible from this large industrial building, with fire venting through the roof. Damage estimates are \$30 million to the structure and \$500,000 to the contents.

Ohio

Date, Time of Alarm, Dollar Loss

October, 9:44 a.m., \$18 million

Property Characteristics and Operating Status

This was a three-story paraffin manufacturing plant of unprotected ordinary construction that was operating at the time. The ground floor area was not reported.

Fire Protection Systems

No information was reported on automatic detection equipment. There was a sprinkler system present and it operated. Its type and effectiveness were not reported.

Fire Development

No information was reported.

Contributing Factors

Upon arrival, firefighters found heavy black smoke showing from windows on all three stories and fire from the windows on the second and third stories. Fire equipment pumped into a sprinkler system and a defensive attack was initiated. There were two civilian injuries.

Washington

Date, Time of Alarm, Dollar Loss

August, 10:56 p.m., \$16.6 million

Property Characteristics and Operating Status

This was a three-story sawmill of unprotected ordinary construction that covered 60,000 square feet (5,574 square meters). The mill was closed at the time with a security guard on duty.

Fire Protection Systems

There was neither automatic detection nor suppression equipment present.

Fire Development

The cause is listed as undetermined. It was reported as starting on the first floor.

Contributing Factors

This sawmill was fully involved when firefighters arrived, with fire extending to a chip bin. A defensive attack was initiated after firefighters confirmed that there was no life hazard. An inadequate water supply was reported. Damage estimates are \$2 million to the structure and \$14.6 million to the contents.

Minnesota

Date, Time of Alarm, Dollar Loss

March, 3:24 p.m., \$14.9 million

Property Characteristics and Operating Status

This was a one-story paper products manufacturing plant of protected noncombustible construction. The ground floor area was not reported. The mill was in operation at the time.

Fire Protection Systems

There was no automatic detection equipment present. There was a wet-pipe sprinkler system present that operated and assisted in containing the fire. A flash fire above the system caused 700 sprinkler heads to open and flow. While the fire pump was unable to keep up with the demand to extinguish the fire, it was able to keep the fire in check as water was shuttled to the scene.

Fire Development

After a conveyor belt malfunctioned, lint and paper built up on a natural gas-fired furnace. The build-up was ignited after it was heated to approximately 450 degrees F (232 degrees C). Fire spread to the ceiling, and a flash fire occurred that spread to a paper storage area.

Contributing Factors

Damage estimates were about \$7 million to the structure and \$7 million to the contents. One firefighter was injured during the fire.

Wildland

Colorado

Date, Time of Alarm, Dollar Loss

June 23, 12 p.m., \$453.7 million. (This was listed by officials as the start date, although there were reports of smoke in the area on the evening of June 22.)

Setting

This was a wildland/urban interface fire called the Waldo Canyon Fire.

Climate

On the day the fire started, the temperature was 94 degrees F (34 degrees C), winds 9 to 17 mph (14 to 27 kph) with gusts of 25 mph (40 kph), and the relative humidity was 28 percent. On several days during the fire, the National Weather Service issued “red flag warnings” indicating that conditions are ideal for wildfire ignition and rapid spread. During this time, the state of Colorado was facing one of its worst droughts due to an unusually warm and dry winter.

Origin and path

The area of ignition for this fire was off a hiking trail on a ridge in the foothills near Colorado Springs. The cause is under investigation. The fire burned easterly for 17 days through canyons and valleys and into several residential areas.

Contributing Factors and Other Details

The first community was affected after only three days, with numerous structures burning. As the fire progressed, many voluntary and mandatory evacuations were ordered. This was the most destructive wildfire in the state’s history. The fire was fueled by brush, oak, grass mountain shrub, pinyon juniper, ponderosa pine, Douglas fir, spruce, and limber pine. By the time the fire was extinguished, 18,247 acres (7,384 hectares) were burned and 346 structures, including homes and outbuildings, were destroyed. There were two civilian deaths attributed to this fire.

Colorado

Date, Time of Alarm, Dollar Loss

June, 5:54 a.m., \$113.7 million

Setting

This was a wildland/urban interface fire called the High Park Fire.

Climate

At the time, the area had record low live fuel moisture, with high temperatures and low relative humidity. On the day of the fire, weather conditions in the area included a high temperature of 96 degrees F (36 degrees C), winds 8 to 20 mph (13 to 32 kph) with gusts of 28 mph (45 kph), and relative humidity of 38 percent. During this time, the state of Colorado was facing one of its worst droughts due to an unusually warm and dry winter.

Origin and path

This fire was started by a lightning strike during a dry thunderstorm in a mountainous area.

Contributing Factors and Other Details

This fire, along with the Waldo Canyon Fire, combined to make 2012 the costliest year for wildfires in Colorado history. By 10:30 p.m. on the day the fire started, it had already spread to 8,000 acres (3,237 hectares). The next day, several structures were confirmed as destroyed or damaged. The 87,284-acre (35,322-hectare) fire burned through grass, brush, and timber and claimed 371 structures, including 259 homes. One death was attributed to this fire. Many mandatory evacuations were ordered during this time.

California

Date, Time of Alarm, Dollar Loss

August, 11:35 a.m., \$15 million

Setting

This was a wildland/urban interface fire called the Ponderosa Fire.

Climate

On the day of the fire, weather conditions in the area included a high temperature of 101 degrees F (38 degrees C), winds of 5 to 17 mph (8 to 27 kph), and gusts of 22 mph (35 kph).

Origin and path

The fire began when lightning struck and ignited an area of heavy vegetation.

Contributing Factors and Other Details

The fire destroyed 133 structures (including 52 homes and 81 outbuildings) and damaged six structures (1 home and 5 outbuildings). The fire also burned more than 27,676 acres (11,200 hectares). During the height of the fire, evacuations were ordered. More than 250 fire companies, 11 helicopters, 46 bulldozers, and 54 water tenders, with over 2,300 personnel, were involved in fire suppression activities over the course of the fire. Seven injuries were reported.

Colorado

Date, Time of Alarm, Dollar Loss

March, 1:50 p.m., \$11.3 million

Setting

This was a wildland/urban interface fire called the North Fork Fire.

Climate

On the day the fire started, the temperature was 80 degrees F (27 degrees C), winds were 15 to 20 mph (24 to 32 kph) gusting to 55 mph (89 kph), and the relative humidity was 55 percent.

Fire Origin and Path

A 50-acre (20-hectare) prescribed burn took place four days prior to this fire. The controlled burn was secured the next day and was patrolled and monitored the next two days. Strong winds carried ground-level embers across the prescribed burn fire control lines, however, and ignited three spot fires. Two of the spot fires were quickly contained, but the third became established and could not be controlled by ground crews already on scene. The fire spread rapidly and became a wildfire.

Contributing Factors and Victim Locations

The day before the controlled fire's escape, a red flag warning was issued for strong and gusty winds. Within three hours of the fire's start, it had already spread to more than 100 acres (40 hectares), and within five hours it had burned into a residential area and ignited several structures. The resulting fire killed three people, burned 4,140 acres (1,675 hectares) and destroyed 27 homes. Two of the victims were a married couple, and both bodies were found at their home, one inside and one outside. The third victim was found in her home.

Residential Properties

Pennsylvania

Date, Time of Alarm, Dollar Loss

April, 2:38 p.m., \$25 million

Property Characteristics and Operating Status

This fire involved a three-story, 30-room, single-family home of heavy-timber construction with granite block walls. The structure covered 22,000 square feet (2,044 square meters) and was occupied when the fire broke out. The house included several attached buildings of various heights.

Fire Protection Systems

There was a complete coverage fire alarm system present that was connected to a security company. The system operated and notified the company, which in turn called the fire department using 911. There was no suppression equipment present.

Fire Development

The fire began in the ceiling/floor space in the basement of an attached one-and-a-half-story building. Fire investigators could not determine the cause of the fire. The fire spread to a dumbwaiter that went up to the attic area. On the first floor, the dumbwaiter had been removed and equipment was installed in its place. The fire spread behind this equipment and up the rest of the shaft to the attic. From there, it spread throughout the attic of the structure, then down to the third floor.

Contributing Factors

Three firefighters suffered minor injuries.

Missouri

Date, Time of Alarm, Dollar Loss

August, 3 p.m., \$14 million

Property Characteristics and Operating Status

This was a four-story apartment building with 68 condominium units and was of unprotected wood-frame construction. The floor area was not reported. The building was occupied at the time.

Fire Protection Systems

There were smoke detectors as well as manual pull stations in the building. The detection system operated as designed. There was a sprinkler system present that had complete coverage in the occupied area of the building, and it operated. Its operation was reported as ineffective because there were no sprinkler heads in the attic, where the fire extended into the building, or on the balconies.

Fire Development

The fire originated on the second- or third-floor balcony and spread up the exterior, into the attic and fourth floor. No information was reported on the exact cause.

Contributing Factors

Due to the lack of sprinklers in the attic area and on balconies, the fire was not controlled in its early stages. The fire department reported that two thunderstorms during suppression activities contributed to the spread and intensity of the fire, but no additional information was provided.

Ohio

Date, Time of Alarm, Dollar Loss

March, 12:37 p.m., \$10.9 million

Property Characteristics + Operating Status

This was a six-story, 45,000-square-foot (4,181-square-meter) apartment building with 150 units. The building was of fire-resistive construction and was occupied at the time.

Fire Protection Systems

There were smoke alarms in the hallways that activated. Although a partial sprinkler system was present, its type was not reported and it did not operate, as the fire was not in the protected area. Smoke and fire dampers on the first three floors operated properly.

Fire Development

While drilling footings for new patios, a construction worker drilled into the main gas line. He immediately shut down his vehicle, and escaped the area. He and several other people started to evacuate occupants from the building. Twenty minutes later a furnace started and ignited the gas. Flames on the outside of the apartment building reached as high as the third story, then spread into an apartment on the third story and burned down to the first story.

Contributing Factors

Firefighters had to wait two and a half hours for a shut-off valve to be located by the gas company. While waiting for the gas to be shut off, firefighters tried to contain the fire and keep it from entering the structure. Three firefighters and one civilian were injured during the fire.

Stores and Office

California

Date, Time of Alarm, Dollar Loss

August, 1:56 a.m., \$25 million

Property Characteristics + Operating Status

This was a one-story, 200,000-square-foot (18,581-square-meter) party goods store of unprotected ordinary construction. The store was closed at the time of the fire.

Fire Protection Systems

There was no automatic detection or automatic suppression equipment present.

Fire Development

This fire of undetermined cause broke out in a product storage area. No additional information was reported.

Contributing Factors

Upon arrival, firefighters found this store fully involved in fire, with the fire self venting the roof. A heavy roll-up door was opened and an attack on the fire was made, but firefighters switched quickly to a defensive attack. The loss was estimated as \$20 million to the structure and \$5 million to the contents.

New York

Date, Time of Alarm, Dollar Loss

October, 3:45 a.m., \$10 million

Property Characteristics + Operating Status

This was a one-story, 10,000-square-foot (929-square-meter) automobile dealership of unprotected ordinary construction. The dealership was closed at the time of the fire.

Fire Protection Systems

There was no automatic detection or automatic suppression equipment present.

Fire Development

This fire originated as an unspecified short circuit at an electrical junction box in a storeroom. The fire spread to boxed materials and flammable fluids then throughout the business.

Contributing Factors

According to fire officials, the spread of fire throughout the building was influenced by the lack of detection and suppression equipment, as well as the storage of vehicles within. This led to a fire that was uncontrollable when firefighters arrived. A collapse of the building hindered firefighters in their ability to extinguish the blaze in its early stage. Heavy equipment was brought in to remove the collapsed area so firefighters could completely extinguish the fire.

Basic Industry

Massachusetts

Date, Time of Alarm, Dollar Loss

March, 6:30 p.m., \$22 million

Property Characteristics + Operating Status

This fire involved two electric transformers. No information on their size, height, or construction was reported.

Fire Protection Systems

It was not reported if there were smoke alarms present. There was a suppression system present with partial coverage. The system did not operate, but no reason was reported.

Fire Development

The fire started when there was an electrical malfunction. No additional information was reported.

Contributing Factors

Heavy smoke was visible from a nearby fire station, and the first arriving ladder company ordered a second alarm. Signage warned of a water-reactive material present, so hose lines were not used to fight the fire. Two nearby high-rise hotels were evacuated. Blitz guns were set up to cool the surrounding structure. A second transformer in the structure blew out, causing a blackout over a wide area. The fire was extinguished with the use of foam.

Hawaii

Date, Time of Alarm, Dollar Loss

August, 4:44 a.m., \$10 million

Property Characteristics + Operating Status

This 25-foot (7.6-meter) high, single-story, 8,000-square-foot (743-square-meter) structure for power generation and storage was of unprotected noncombustible construction. The facility was operating at the time.

Fire Protection Systems

There were heat and smoke detectors present. The system activated and alerted a central monitoring station that in turn notified the fire department. There was no automatic suppression equipment present.

Fire Development

This fire originated in a power unit known as an inverter and was caused by an electrical malfunction/failure. The exact sequence of events resulting in fire is not known at this time.

Contributing Factors

The loss was reported as \$400,000 to the structure and \$9.6 million to the equipment within.

Storage Properties

Minnesota

Date, Time of Alarm, Dollar Loss

June, 9:39 a.m., \$10 million

Property Characteristics + Operating Status

This was a one-story food storage warehouse of unprotected ordinary construction. The warehouse covered 112,500 square feet (10,452 square meters) and was operating with five people in the office area.

Fire Protection Systems

There was a fire alarm system present that activated and alerted occupants. There was a wet-pipe sprinkler system present, which operated with 17 heads flowing. The system was ineffective, but the reason why was not reported.

Fire Development

The fire broke out in the ceiling/roof component, but the cause was listed as undetermined.

Contributing Factors

The loss was estimated at \$6 million to the structure and \$4 million to the contents.

California

Date, Time of Alarm, Dollar Loss

November, 2 p.m., \$10 million

Property Characteristics and Operating Status

This was a large steel flammable fluid storage tank. The tank was located in a flammable fluid processing plant. No information was reported on the size of the tank.

Fire Protection Systems

It was not reported if there was a smoke alarm system present. There was an unreported type automatic suppression system present that operated and was reported as not effective. No additional information was reported on the type of system or why it was ineffective.

Fire Development

The fire broke out in the tank, but the cause was listed as undetermined.

Contributing Factors

No additional information was reported.

Special Properties

Arizona

Date, Time of Alarm, Dollar Loss

September, 3:15 p.m., \$10 million

Property Characteristics and Operating Status

This three-story apartment building was under construction and was of unprotected wood-frame construction. It was part of an apartment complex that covered 12 acres (5 hectares) with seven three-story, wood-frame buildings completed and occupied and five buildings of the same construction materials under construction. There were also eight garage buildings under construction. There was a security guard on site at the time of the fire.

Fire Protection Systems

There were no smoke alarms present at this point in construction. There was a sprinkler system partially installed, but it was not yet completed or operational.

Fire Development

A fire broke out in a second-story center apartment in the bathroom area. It was caused by plumbers' hot work igniting fiberboard being used in the wall construction around a water heater. Upon arrival of the fire department, three buildings under construction were already involved in fire.

Contributing Factors

At the time of the fire, the temperature was 102 degrees F (39 degrees C), winds were 5 to 10 mph (8 to 16 kph), and relative humidity was 18 percent. The fire destroyed five three-story apartment buildings in various stages of construction, as well as four garage buildings, and damaged two occupied three-story buildings. A sprinkler system in a nearby occupied building activated when the fire caused a window to break and ignited that building.

Missouri

Date, Time of Alarm, Dollar Loss

May, 5:11 a.m., \$10 million

Property Characteristics and Operating Status

This was a four-story, 145,000-square-foot (13,471-square-meter), 73-unit apartment building that was under construction. Only a security person was on site at the time of the fire.

Fire Protection Systems

No information reported.

Fire Development

The cause is under investigation.

Contributing Factors

The building was heavily involved in fire upon arrival of firefighters. A defensive attack was initiated. There was heat damage to several nearby buildings.

Vehicle Fire

Maine

Date, Time of Alarm, Dollar Loss

May, 5:40 p.m., \$400 million

Property Characteristics and Operating Status

This was a U.S. Navy nuclear submarine that was undergoing rehabilitation in dry dock with all operating systems off. The submarine was almost 362 feet (110 meters) long and nearly 33 feet (10 meters) wide. There were 50 shipyard employees and crew members working on board the vessel at the time of the fire.

Fire Protection Systems

No information was reported.

Fire Development

A lighter was used to ignite a bag of cotton rags in a state room in the submarine's forward compartment.

Contributing Factors

This was the first and largest of two arson fires associated with this incident, and occurred on board the submarine. Crew members, shipyard firefighters, and fire departments from a number of surrounding communities fought this fire for 12 hours before it was finally extinguished.

There were five injuries to personnel who fought this blaze. About three weeks later, a civilian employee of the shipyard was arrested after he was caught lighting the second fire outside the submarine. He pled guilty to two counts of arson. He was sentenced to 205 months in prison and ordered to pay \$400 million in restitution.