

**Fire – Wildfire and Urban**

**General**

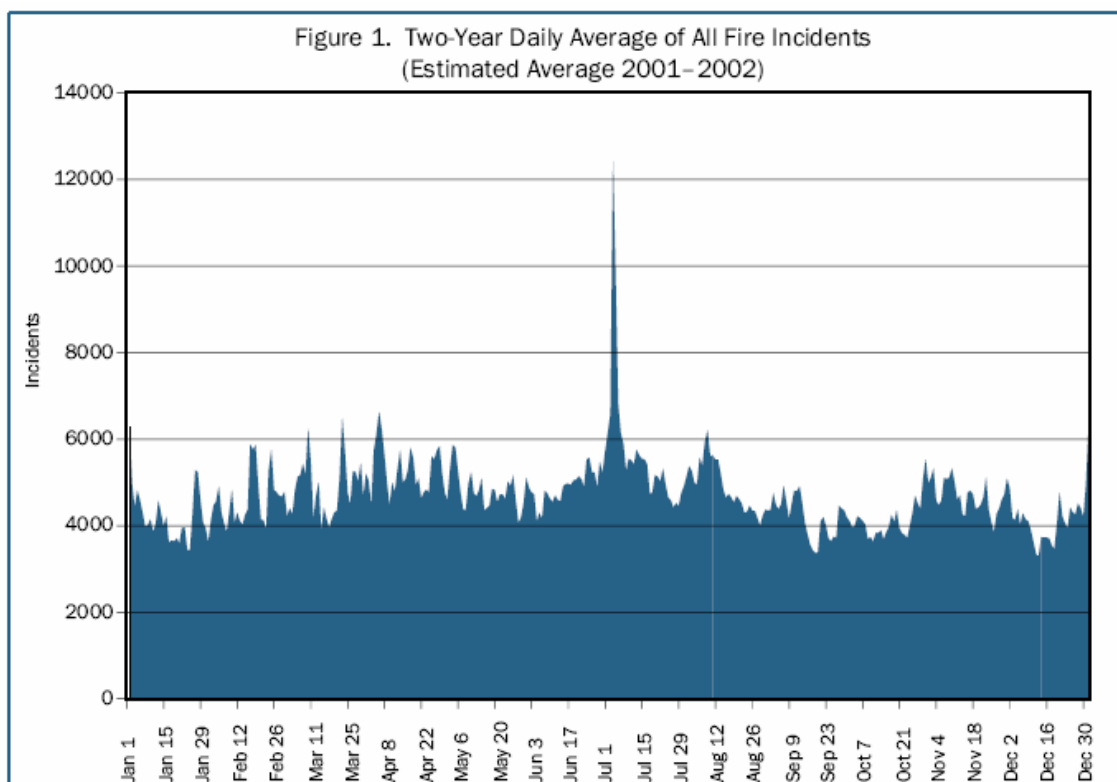
The U.S. Fire Administration (USFA) collects data from a variety of disparate sources to provide a statistical analysis of fire incidents nationwide. According to the USFA, the number of fires, fire casualties, and fire related economic losses has continued to decline over the last several years. From 1992 to 2001, fires per million population declined 24 percent, deaths per million declined 30 percent, and dollar loss per capita declined 6 percent. This data is confirmed by comparing it with the National Fire Protection Association’s (NFPA) data on national fire trends from 1977-2004. The NFPA data shows that in 1977, there were a total of 3,264,000 fires nationwide, resulting in 7,395 civilian deaths and 31,190 civilian injuries. Residential fires resulted in the highest percentage of fire deaths (77%), fire injuries (73%), and dollar loss (54%). Non-residential properties such as industrial and commercial establishments, institutions, and educational facilities accounted for only eight percent of all fires, but 28 percent of total dollar loss. In 2004, this number dropped to a total of 1,550,500 fires, 3,900 civilian deaths, and 17,785 civilian injuries nationwide.

Spring has the highest seasonal average of fire incidence with summer, winter, and fall following respectively. Spring’s high seasonal and daily average of fires is due to the low relative humidity and higher winds. Because leaves are still off trees or just beginning to bud, sunlight can directly reach the ground to both warm and dry surfaces. Summer is characterized by an increase in incendiary, suspicious, fires caused by lightning strikes. The dangers from summer lightning are compounded by potentially dry conditions and high temperatures that contribute to the rapid spread of wildfire during the summer and early fall.

<b>United States Daily Incidence of Fire by Month and Season (estimated average 2001-2002)</b>			
<b>Season</b>	<b>Month</b>	<b>Daily Average</b>	<b>Daily Seasonal Average</b>
Winter	January	4,203	4,548
	February	4,604	
	March	4,842	
Spring	April	5,291	4,986
	May	4,787	
	June	4,886	
Summer	July	5,683	4,932
	August	4,897	
	September	4,191	
Fall	October	4,103	4,285
	November	4,664	
	December	4,101	

*Source: U.S. Fire Administration*

In winter, structure fires increase, although total fires decrease. Cold winter weather increases indoor activities and the need for heating, which brings about the peak period of heating structure fires. Fire incidence is lowest in the fall. It is important to note that there is also a spike in fire incidence during several holiday periods, including: Independence Day, Halloween, Thanksgiving, and the Christmas holiday period up to and including New Year’s. More fires are reported on July 4<sup>th</sup> than any other day of the year, mainly due to the use of fireworks. This seasonal and holiday trend can be seen in Figure 1, with the July 4<sup>th</sup> spike particularly visible.



Source: U.S. Fire Administration

From 1992-2001, Pennsylvania had an average fire death rate above the national average, between 11-17 per million population. This is due primarily to the State's high population density. In 2001, Pennsylvania averaged 3.01 civilian deaths per 1,000 fires and \$22,609 in property loss per fire. In 2003, the USFA recorded a fire death rate of 15.9 per million for Pennsylvania. This was above the 2003 national average of 14.4 per million and ranked the Commonwealth as the 15<sup>th</sup> highest state that year.

All fires can be broadly categorized as either wildfire or urban fire. Both categories have been responsible for some of the nations largest, deadliest, and most destructive disasters.

### **Wildfires**

The most frequent causes of devastating wildfires are droughts, arson, and human carelessness. During the drought of 1999, almost 8,500 acres of forest were burned in Pennsylvania, while during the spring of 2001, 2,549 acres of forest land were burned. Pennsylvania will lose around 10,000 acres of forestland per year because of wildfires. In 2003, wildfires burned five million acres in the United States according to the National Interagency Fire Center.

**Urban**

Although fires can start from numerous causes, major fires are often the result of other hazards, such as storms, droughts, transportation accidents, hazardous material spills, and criminal activity (arson) or terrorism. Small structural fires occur often and will not have a large impact on an area, but the increase in insurance rates from these fires will.

**History**

The Pennsylvania Emergency Incident Reporting System (PEIRS) is the primary crisis management software that the Pennsylvania Emergency Management Agency (PEMA) uses to meet its responsibility. From November of 2000 through November 2006, 13 fire incidents in Huntingdon County were reported to PEMA.

**Wildfires**

According to the National Climatic Data Center (NCDC), no significant wildfires have been recorded in Huntingdon County. However, Huntingdon County also lies in parts of the Rothrock District (District Five) and the Tuscarora District (District Three) of the Pennsylvania Department of Conservation and Natural Resources Bureau of Forestry.

According to the Bureau of Forestry, the Tuscarora District experienced 36 fires from 1999-2002 which destroyed a total of 73.9 acres of forest. This equates to an average of nine wildfires per year affecting an average of 18.5 acres per year. During this period, the Tuscarora District accounted for 1.8 percent of all state fires and 0.33 percent of all acreage affected statewide. The Rothrock District experienced 69 fires from 1999-2002, which destroyed a total of 282.6 acres of forest. This equates to an average of 17.3 wildfires per year affecting an average of 70.7 acres per year. During this period, the Rothrock District accounted for 2.2 percent of all state fires and 1.3 percent of all acreage affected statewide. A record of the Tuscarora and Rothrock Districts can be seen in the table to the right.

<b>Statewide Wildfires by District, 1999-2002</b>			
<b>Year</b>	<b>Forest District</b>	<b>Fires</b>	<b>Acres</b>
1999	Tuscarora (D-3)	17	44.2
	Rothrock (D-5)	20	20.2
	<b>State Totals</b>	<b>1,404</b>	<b>8,423.50</b>
2000	Tuscarora (D-3)	8	22
	Rothrock (D-5)	22	53
	<b>State Totals</b>	<b>736</b>	<b>4,800</b>
2001	Tuscarora (D-3)	9	7
	Rothrock (D-5)	14	128
	<b>State Totals</b>	<b>508</b>	<b>7135</b>
2002	Tuscarora (D-3)	2	0.7
	Rothrock (D-5)	13	81.4
	<b>State Totals</b>	<b>429</b>	<b>1,904.70</b>

*Source: DCNR Bureau of Forestry*

**Urban**

From 1910-1990, Pennsylvania experienced 13 major fires in suburban and urban settings. Of these 13 fires, 10 occurred between 1980 and 1990. Between 1978 and 1982, the average number of deaths per fire was 2.7. Each year the average number of deaths per fire has decreased.

**Vulnerability**

The Pennsylvania State Data Center reports that in 2000, Huntingdon County had a population of 45,586, with 31,575 (69.3%) living in rural areas of the County, and 14,011 (30.7%) living in urban areas in the County. Generally speaking, this means approximately 30 percent of the County's population is susceptible to urban fires and 70 percent is susceptible to wildfires.

**Wildfires**

Huntingdon County has more than 400,000 acres of forest land; 66,360 acres are state forest land; approximately 282,000 acres are privately owned, and approximately 129,000 acres are publicly owned. This is primarily in the northern portion of the County (surrounding the Lake Raystown area) and in the eastern tip of the County. It includes: Rothrock and Tuscarora State Forests; Trough Creek, Greenwood Furnace, and Whipple State Parks; and several state game lands. Although no significant wildfires have been recorded by the NCDC for Huntingdon County, its rural nature makes it prone to wildfires.

<b>Huntingdon County Drought Event Summary, 1995-2006</b>	
<b>Date</b>	
08/01/1995	
09/01/1995	
10/31/1997	
12/15/1998	
07/01/1999	
08/01/1999	

**Source: National Climatic  
Data Center (NCDC)**

The size and impact of a wildfire depends on its location, climate conditions, and the response of firefighters. If the right conditions exist, these factors can usually mitigate the effects of wildfires. However, in times of drought, wildfires can be devastating. A summary of drought conditions from 1995 to 2006 can be seen to the right. Though the County has not experienced significant drought conditions since 1999, this summary demonstrates that the potential exists for prolonged drought conditions to occur, as evidenced by the droughts of 1995 and 1999. These conditions greatly increase the available fuel required for wildfires to spread, and increase the probability that a lightning strike or human carelessness will result in a fire. Coupled with the County's large acreage of forest land, this makes Huntingdon County highly vulnerable to wildfires.

While the leading cause of wildfires is human carelessness and negligence, causing 98 percent of wildfires in Pennsylvania, lightning strikes also have the potential to cause a wildfire. In July 1995, lightning strikes across the County resulted in downed trees in Robertsdale and Broad Top in Huntingdon County. Lightning started a fire at the Anchorage Enterprises Headquarters at Seven Points Marina at Raystown Lake on July 15, 1995, resulting in an estimated \$80,000 in damage. On July 28, 1995, lightning split several trees in the County and caused 4,000 West Penn Power customers to be without electricity. In August 1995, lightning started a fire that resulted in the destruction of a Cass Township home.

<b>Huntingdon County Lightning, 1995-2006</b>								
<b>Location or County</b>	<b>Date</b>	<b>Time</b>	<b>Type</b>	<b>Mag</b>	<b>Dth</b>	<b>Inj</b>	<b>PrD</b>	<b>CrD</b>
Raystown Lake	7/15/1995	2320	Lightning	N/A	0	0	80K	0
Huntingdon	7/28/1995	1430	Lightning	N/A	0	0	0	0
Cass Township	8/2/1995	1655	Lightning	N/A	0	0	0	0
<b>TOTALS:</b>					<b>0</b>	<b>0</b>	<b>80K</b>	<b>0</b>

*Source: National Climatic Data Center*

### **Urban**

The vulnerability for a fire greatly depends on the vulnerability of other hazards. As mentioned previously, most fires result from the secondary effect of another hazard. The probability of a fire occurring has increased with population growth. This is due to human error and carelessness, which are other factors that contribute to urban fires. This risk also increases as the use of wood burning and kerosene space heaters increases. The elderly (aged 65 and older) tend to be more vulnerable to fires than any other age group. They also experience the highest number of deaths per fire. The second most vulnerable age group is those aged 14 years and younger. These groups are generally affected while they are at home, often alone. Additionally, many homes destroyed by urban fires are often older homes in the community. Fire can spread faster in areas with higher concentrations of housing, as opposed to rural areas. The potential secondary effects of an urban fire include utility failures and hazardous materials spills.

As with all fires, the response time of emergency personnel can greatly mitigate the effects of a fire. This is particularly critical in urban fires, due to the potential for loss of life and property. The USFA defines fire “response time” as beginning at the moment of ignition and continuing until the fire is extinguished. A January 2006 report by the USFA’s National Fire Data Center shows that regardless of region, season, or time of day, structure fire response times are generally less than five minutes for 50 percent of the time; less than six minutes for 61 percent of the time; and less than eight minutes for 75 percent of the time. On average, nationwide, 98.7 percent of all response times are 20 minutes or less, with most response times to structure fires occurring in less than 11 minutes. It is important to note however, that as population densities increase, fire stations are situated to cover a smaller geographic area. In turn, this may contribute to reduced response times.

### **Probability**

The probability of an urban fire in Huntingdon County is relatively high, occurring every five years or less. However, most urban fires are contained and cause little damage. Rural fires, or wildfires, have a low probability here. According to historical records for Huntingdon County, the frequency of these events is also low. No significant wildfires have occurred in Huntingdon County’s recorded history.

**Maximum Threat**

Urban fires can occur in any populated area. Fires affecting one structure happen quite often. The greatest risk urban fire presents is the rapid spread of the fire from one structure to another. For this reason, the older boroughs in Huntingdon County, where homes and businesses are clustered, are at the greatest risk.

The rural areas of the County are at the greatest risk for wildfires. Less populated, wooded areas, such as publicly and privately owned forests, should be “watch-spots” for wildfires that could severely damage this natural resource.

**Secondary Effects**

If an urban fire or wildfire is not contained, certain secondary hazards may affect Huntingdon County. Power outages may be the most prevalent of these hazards. Additionally, temporary population displacements could occur as the result of large fires, and the economic impact from widespread fires which affect critical infrastructure, vital economic industries, or private residences could be high. Environmental hazards could also result from a wildfire or urban fire. Wildfires can damage lands and resources and urban fires can damage infrastructure and property. Wildfires reduce vegetation and can cause soil erosion. Soil erosion leads to soil runoff which can impact the health of the County’s watersheds by contaminating these water sources and making them unfit for drinking; ultimately affecting the entire ecosystem. Reduced vegetation and soil erosion can result in mudslides when precipitation returns, causing a significant hazard to vital transportation arteries. Existing forage for livestock and wildlife can be destroyed, further straining the ecosystem. The potential for brief periods of airborne ash, smoke, or soot to cause long-term health problems raises health concerns among segments of the County’s population who have pulmonary problems, heart disease, or breathing problems. The release of hazardous materials caused by a fire could cause a public health emergency.