

## **Fires – Wildfires and Urban Fires**

### **General**

The U.S. Fire Administration (USFA) collects data from a variety of sources to provide a statistical analysis of fire incidents nationwide. According to the USFA, the number of fires, fire casualties, and economic losses has continued to decline over the last several years. From 1992-2001, fires per million population declined 204 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 Administration'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. In 2004, this number dropped to a total of 1,550,500 fires, 3,900 civilian deaths, and 17,785 civilian injuries nationwide. A 2001 study by the USFA showed the largest number of fires were classified as "outside/other" and accounted for 41 percent of all fires, while 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 8 percent of all fires, but 28 percent of total dollar loss.

From 1992-2001, Pennsylvania had an average fire death rate above the national average, with an 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 1000 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 broadly be categorized as either wildfire or urban fire. Both categories have been responsible for some of the nation's largest, deadliest, and most destructive disasters.

Juniata County participates in the PennFIRS reporting program with the Office of the State Fire Commissioner. PennFIRS provides a statewide fire information and reporting system. The Office of the State Fire Commissioner is working with county agencies to encourage them to participate in PennFIRS as first level data collections sites to assure that this statewide data network works as smoothly and efficiently as possible. While there is no requirement that county EMA or 911 agencies get involved in the PennFIRS program, the valuable information available through PennFIRS can be beneficial and become an important resource.

### **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. During the spring of 2001, 2,549 acres of forestland were burned in Pennsylvania. Pennsylvania will usually lose around 10,000 acres of forestland per year

because of wildfires. Nationally, 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, criminal activity (arson), or terrorism. Small structural fires occur often and will not have a large impact on an area, but will increase insurance rates.

**History**

**Wildfires**

According to the National Climatic Data Center (NCDC), no significant wildfires have been recorded in Juniata County from January 1950 to the present.

Juniata County is located in the Tuscarora State Forest District. According to the Pennsylvania Department of Conservation and Natural Resources (DCNR), Bureau of Forestry, the Tuscarora District experienced 51 fires from 1999-2006, which destroyed a total of 129 acres of forest. This equates to an average of 7 wildfires per year, affecting an average of 18.5 acres per year. The Tuscarora District has a very low amount of incidents when compared to other forest districts.

<b>Tuscarora Wildfires, 2000-2006</b>					
<b>Year</b>	<b>Forest District</b>	<b>Fires</b>	<b>% of Statewide</b>	<b>Acres</b>	<b>% of Statewide</b>
2006	Tuscarora (D-3)	17	2	72.30	.9
	State Totals	912		7,919.73	
2005	Tuscarora (D-3)	9	1.1	13.45	.3
	State Totals	806		4,267.59	
2004	Tuscarora (D-3)	1	.4	.10	0
	State Totals	205		2,779.58	
2003	Tuscarora (D-3)	5	1.2	13.74	.6
	State Totals	408		2,026.62	
2002	Tuscarora (D-3)	2	.3	.71	0
	State Totals	639		2,902.99	
2001	Tuscarora (D-3)	9	1	7	.1
		856		7,135	
2000	Tuscarora (D-3)	8	1	22	.46
	State Totals	736		4,799	

*Source: DCNR Bureau of Forestry*

## **Urban**

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

## **Vulnerability**

### **Wildfires**

Although no significant wildfires have been recorded by the NCDC for Juniata County, the rural nature of the County makes it susceptible to wildfires. 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.

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. The table below depicts lightning-caused wildfires from 199-2002.

<b>Pennsylvania Statewide Wildfires Caused by Lightning</b>				
<b>Year</b>	<b>Cause</b>	<b>Fires</b>	<b>Acres Destroyed or Affected</b>	<b>Costs</b>
1999	Lightning	39	145	\$133,645.50
2000	Lightning	13	372	\$125,275.72
2001	Lightning	6	68	\$24,833.00
2002	Lightning	23	64.1	\$23,562.91

*Source: DCNR Bureau of Forestry*

Wildfires are most common in the spring (March – May) and fall (October – November) months. During spring months, the lack of leaves on the trees allows the sunlight to heat the existing leaves on the ground from the previous fall. The same theory applies for the fall; however, the dryer conditions are a more crucial factor.

## **Urban**

The probability of an urban fire increases with population growth. This is due to human error and carelessness, which are other factors contributing to fires. This risk also increases as the use of wood burning and kerosene space heaters increases. The elderly (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 who are aged 14 and younger. These groups are generally affected while they are at home. And in the case of children, they may often be home alone. Additionally, many homes destroyed by urban fires are

often the 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 utilities failure and hazardous materials spill.

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 “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 50 percent of the time, less than six minutes 61 percent of the time, and less than eight minutes 75 percent of the time. On average, 98.7 percent of all response times are 20 minutes or less nationwide, with the 90<sup>th</sup> percentile of response times to structure fires less than 11 minutes. It is important to note, however, that as population densities increase, fire stations are situated to cover less geographic area, which may ultimately contribute to reduced response times.

### **Probability**

The probability of an urban fire occurring in Juniata County is relatively high; however, the impacts of the fire depend greatly on its location and magnitude. Most urban fires are quickly contained and cause only localized damage, due to the proximity and rapid response time of emergency services personnel.

While Juniata County does not have a documented wildfire history, there still remains a probability that one could occur. However, this probability is low. Wild fire susceptibility is greater during drought conditions. With Juniata County having a high frequency of drought declarations, the potential exists for lightning or human carelessness to start wildfires.

### **Maximum Threat**

Urban fires often occur in more heavily populated and developed areas. The majority of all urban fires affect only a few structures before being contained. However, the greatest risk is the potential of an urban fire to spread from one structure to another faster than local fire departments can control them. The boroughs of Juniata County: Mifflin, Mifflintown, Port Royal, and Thompsontown are the most susceptible areas to urban fire due to their dense development structure and the age of their housing stock. Throughout the four Juniata County boroughs, a majority of the housing stock was constructed prior to 1960, before the present fire code and uniform construction code.

<b>Age of Housing Stock (2000 Census)</b>				
	<b>Mifflin Borough</b>	<b>Mifflintown Borough</b>	<b>Port Royal Borough</b>	<b>Thompsontown Borough</b>
Total:	258	391	434	365
Built 1999 to March 2000	0.0%	0.0%	0.0%	0.0%
Built 1995 to 1998	3.1%	0.5%	2.1%	3.8%
Built 1990 to 1994	0.0%	2.6%	2.3%	10.7%
Built 1980 to 1989	1.6%	9.5%	15.4%	20.0%
Built 1970 to 1979	7.4%	6.4%	10.4%	12.3%
Built 1960 to 1969	4.7%	6.1%	7.1%	6.0%
Built 1950 to 1959	5.8%	5.6%	12.2%	11.0%
Built 1940 to 1949	13.2%	5.6%	9.9%	6.0%
Built 1939 or earlier	64.3%	63.7%	40.6%	30.1%

Source: U.S. Census Bureau

The rural municipalities of Juniata County are at the greatest risk for wildfires. Densely wooded areas, such as public and privately owned forest land and recreation areas, are at risk that a fire will result from a lightning strike or human carelessness.

### **Secondary Effects**

If an urban fire or wildfire is not contained, certain secondary hazards may affect Juniata County. Power outages may be the most prevalent of these hazards. Additionally, temporary population displacements could occur as the result of large fires. The economic impact of widespread fires 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 ground water sources and making them unfit to drink. Reduced vegetation and soil erosion can result in mudslides when precipitation returns, damaging transportation infrastructure. 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 fires could create a public health emergency.