



4.3.12 Wildfire

This section provides a profile of and vulnerability assessment for the wildfire hazard. A wildfire is an uncontrolled fire spreading through vegetative fuels, exposing and possibly consuming structures. Wildfires often begin unnoticed and can spread quickly, creating dense smoke that can be seen for miles. A wildland fire is a wildfire in an area where development is essentially nonexistent, except for roads, railroads, power lines, and similar facilities. A wildland-urban interface (WUI) fire is a wildfire in a geographical area where structures and other human development meet or intermingle with wildland or vegetative fuels.

4.3.12.1 Location and Extent

Wildfires take place in less developed or completely undeveloped areas, spreading rapidly through vegetative fuels. They can occur any time of the year but mostly occur during long, dry, hot spells. Any small fire, if not quickly detected and suppressed, can get out of control. Most wildfires are caused by human carelessness, negligence, and ignorance; however, some are precipitated by lightning strikes, and in rare instances, spontaneous combustion. Wildfires in Pennsylvania can occur in open fields, grass, dense brush, and forests.

Wildfires can occur at any time of the year but are most likely in Fulton County during a drought. Wildfires can occur in fields, grass, and brush as well as in the forest itself. Under dry conditions or droughts, wildfires have the potential to burn forests as well as croplands.

The majority of Fulton County is forested (approximately 71.8%) and agricultural (approximately 22.6%) land. The majority of wildfires in Fulton County are relatively small in size, ranging from 0–200 acres. The greatest potential for wildfires is in the spring months of March, April, and May and the autumn months of October and November; 92% of all Pennsylvania wildfires occur in these two time periods. In the spring, bare trees allow sunlight to reach the forest floor, drying fallen leaves and other ground debris. In the fall, dried leaves are also fuel for fires (PEMA 2018).

Table 4.3.12-1. Land Use Summary for Fulton County

Land Use Category	Total Area (square miles)	Percent of Total
Agricultural	99.1	22.6%
Barren Land	0.9	0.2%
Forest	314.8	71.8%
Urban Built Up	22.4	5.1%
Water	0.4	0.1%
Wetland	0.6	0.1%
Total	438.2	100.0%

Source: USGS 2019

Figure 4.3.12-1 illustrates the land cover across Fulton County. As the figure shows, a majority of Fulton County is agricultural. Figure 4.3.12-2 shows the locations of wildfires throughout Pennsylvania between 1992 and 2015 that the United States Forest Service (USFS) has compiled based on reports from federal, state, and local agencies. Wildfires are known to be an under-reported event. Many wildfires occur every year and are suppressed by various agencies and departments and may not be accurately reported to the Department of Conservation and



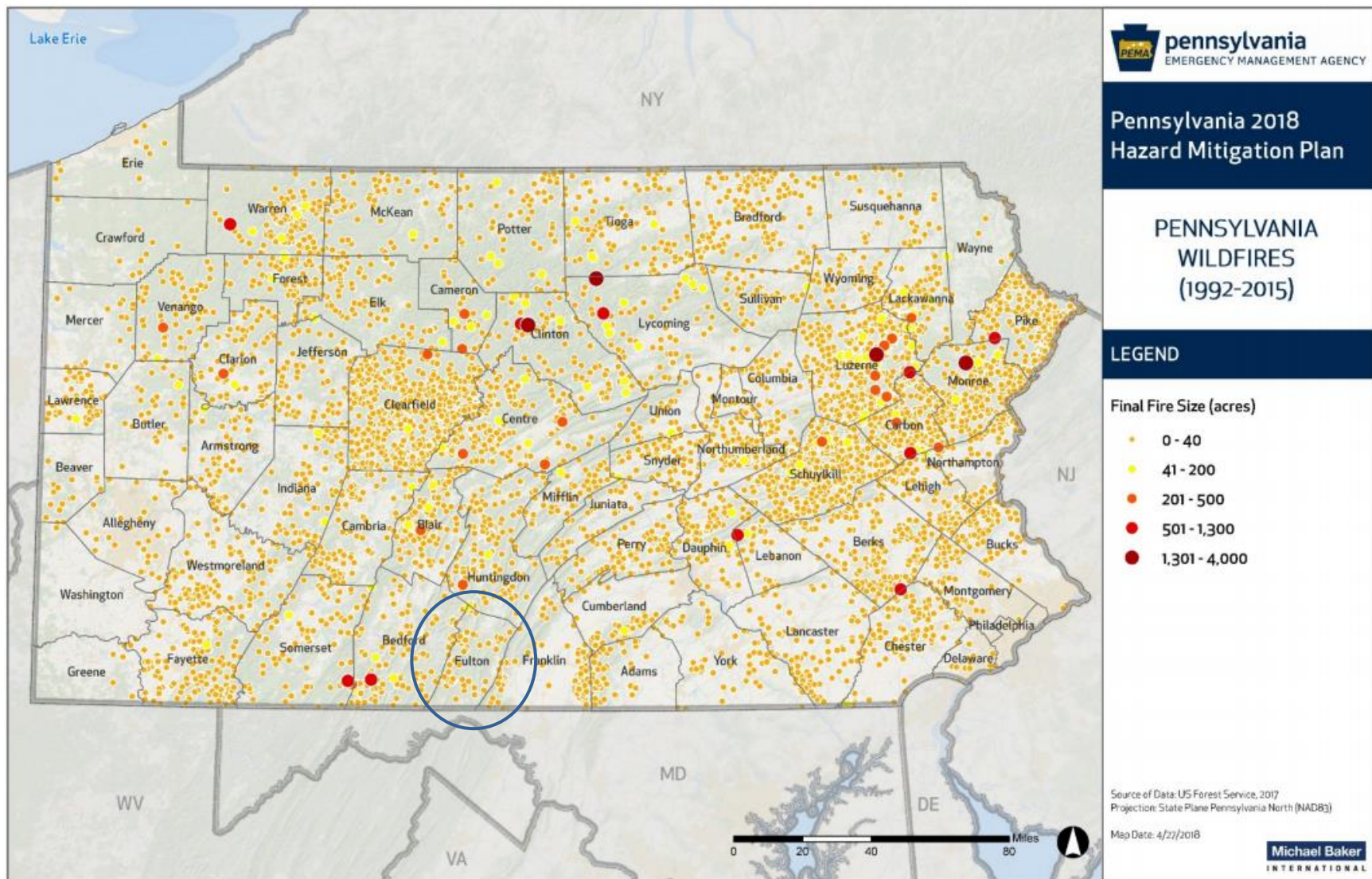
Natural Resources (DNCR) Bureau of Forestry (BOF). Therefore, these locally controlled blazes may not be represented in BOF or USFS records.

Figure 4.3.12-1. Land Cover in Fulton County





Figure 4.3.12-2. Location and Size of Wildfire Events



Source: PEMA 2018

Note: Blue circle was added to highlight Fulton County's location within Pennsylvania.





According to the Pennsylvania 2018 State All-Hazard Mitigation Plan Update, areas of the Commonwealth that have large home developments built in volatile fuel types are at risk for catastrophic wildfires. Many areas of the state are at risk for large wildfires, but northeastern Pennsylvania is the most at risk for loss of life and/or property due to the number of homes at risk for wildfires (PEMA 2018).

Several tools are available to estimate fire potential location and extent, including but not limited to the WUI, Wildland Fire Assessment System, and PA DCNR Priority Landscape Analysis. These tools are discussed in further detail below.

Wildland/Urban Interface (WUI)

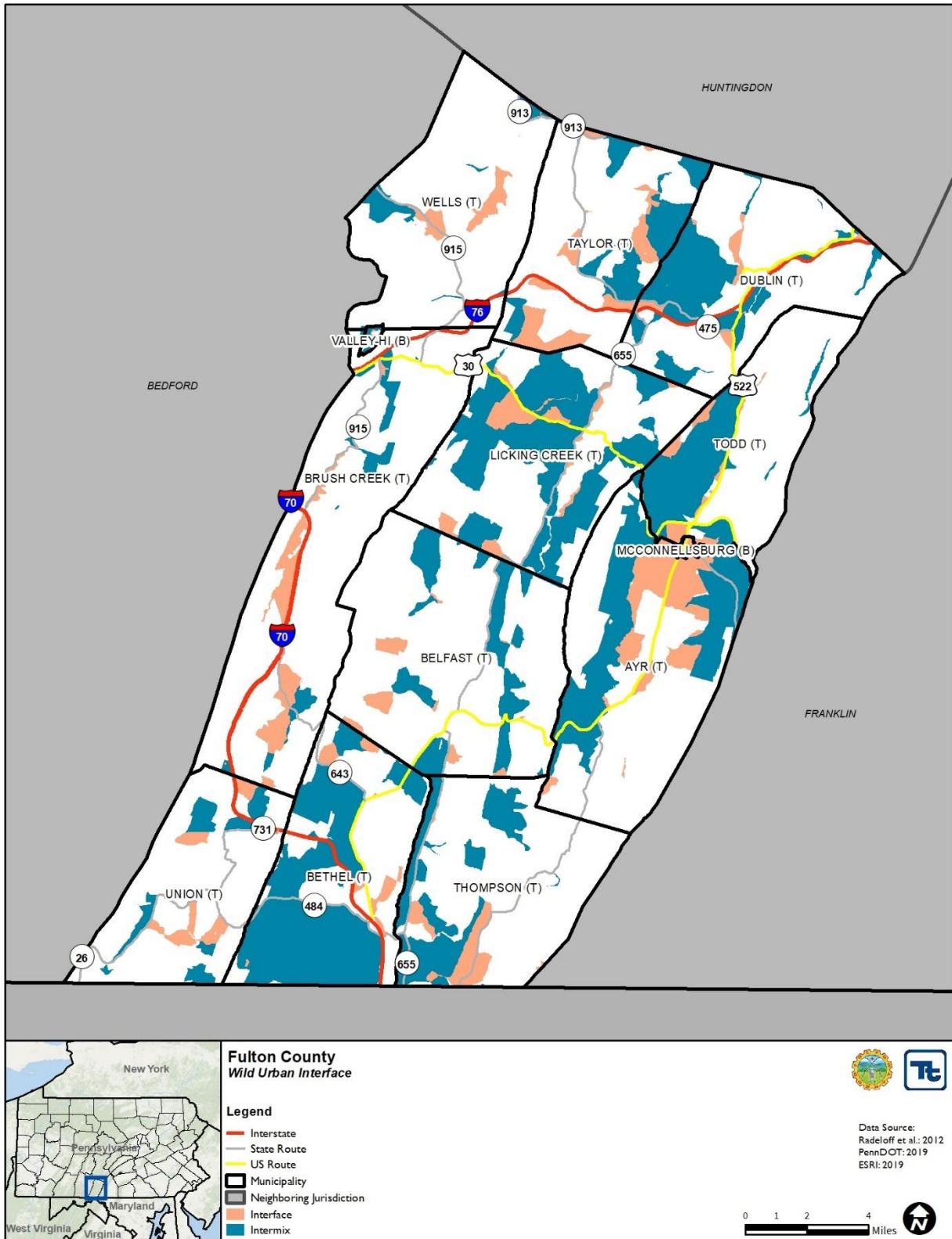
The WUI is the area where houses and wildland vegetation coincide. The WUI is divided into two categories: intermix and interface. Intermix WUI are areas where housing and vegetation “intermingle.” Intermix areas have more than one house per 40 acres and have more than 50 percent vegetation. Interface WUI are areas with housing in the vicinity of contiguous wildland vegetation. Interface areas have more than one house per 40 acres, have less than 50 percent vegetation, and are within 1.5 miles of an area larger than 1,235 acres that is more than 75 percent vegetated (Stewart et al. 2005).

The California Fire Alliance determined that areas within 1.5 miles of wildland vegetation are the approximate distance that firebrands can be carried from a wildland fire to the roof of a house. Therefore, even structures not located within the forest are at risk from wildfire. This buffer distance, along with housing density and vegetation type, were used to define the WUI (Stewart et al. 2005).

Concentrations of WUI can be seen along the east coast of the United States, including the area around Pittsburgh, Pennsylvania, and the eastern half of Pennsylvania. Fulton County is identified as having many areas of very low-density housing or no housing due to the large amount of forested area. Areas where recreation and tourism dominate are also places where WUI is common (Stewart et al. 2005). Figure 4.3.12-3 illustrates the WUI for Fulton County.



Figure 4.3.12-3. WUI for Fulton County





Wildland Fire Assessment System (WFAS)

The WFAS is an Internet-based information system maintained at the National Interagency Fire Center (NIFC) in Boise, Idaho, that provides a national view of weather and fire potential, including national fires danger, weather maps, and satellite-derived “Greenness” maps (U.S. Forestry Service [USFS] Date Unknown). Each day during the fire season, national maps of selected fire weather and fire danger components of the National Fire Danger Rating System (NFDRS) are produced by the WFAS (USFS 2012). The Fire Danger Rating level, described in Table 4.3.12-2 below, takes into account current and antecedent weather, fuel types, and both live and dead fuel moisture. The adjective class rating is a method of normalizing rating classes across different fuel models, indexes, and station locations. It is based primarily on a fuel model cataloged for the station, the fire danger index selected to reflect staffing levels, and climatological class breakpoints. Local station managers provide this information to USFS (USFS 2012).

Table 4.3.12-2. Fire Danger Rating and Color Code

Fire Danger Rating and Color Code	Description
Low (L) (Dark Green)	Fuels do not ignite readily from small firebrands, although a more intense heat source, such as lightning, may start fires in duff or punky wood. Fires in open cured grasslands may burn freely a few hours after rain, but woods fires spread slowly by creeping or smoldering and burning in irregular fingers. There is little danger of spotting.
Moderate (M) (Light Green or Blue)	Fires can start from most accidental causes, but with the exception of lightning fires in some areas, the number of starts is generally low. Fires in open cured grasslands will burn briskly and spread rapidly on windy days. Timber fires spread slowly to moderately fast. The average fire is of moderate intensity, although heavy concentrations of fuel, especially draped fuel, may burn hot. Short-distance spotting may occur but is not persistent. Fires are not likely to become serious, and control is relatively easy.
High (H) (Yellow)	All fine dead fuels ignite readily, and fires start easily from most causes. Unattended brush and campfires are likely to escape. Fires spread rapidly, and short-distance spotting is common. High-intensity burning may develop on slopes or in concentrations of fine fuels. Fires may become serious and their control difficult unless they are attacked successfully while they are small.
Very High (VH) (Orange)	Fires start easily from all causes and, immediately after ignition, spread rapidly and increase quickly in intensity. Spot fires are a constant danger. Fires burning in light fuels may quickly develop high-intensity characteristics such as long-distance spotting and fire whirlwinds when they burn into heavier fuels.
Extreme (E) (Red)	Fires start quickly, spread furiously, and burn intensely. All fires are potentially serious. Development into high-intensity burning will usually be faster and occur from smaller fires than in the very high fire danger class. Direct attack is rarely possible and may be dangerous except immediately after ignition. Fires that develop headway in heavy slash (trunks, branches, and treetops) or in conifer stands may be unmanageable while the extreme burning condition lasts. Under these conditions, the only effective and safe control action is on the flanks until the weather changes or the fuel supply lessens.

Source: USFS 2012

Pennsylvania Department of Conservation and Natural Resources (PA DCNR) Priority Landscape Analysis

The PA DCNR conducted a wildfire priority landscape analysis identifying areas where wildland fires are predicted to occur and become problematic. The areas are classified into high, medium, and low categories. The high classification is defined as an area prone to extreme fire behavior, with the potential to cause extensive property damage, or that could threaten the safety of the Commonwealth’s citizens. The following five datasets were used for this analysis:

- 2002 WUI





- 2006 LANDFIRE
- 2002–2008 Pennsylvania Wildfire Point Origin Occurrences
- Percent Slope
- 2009 Local Assessment of Values, Risks, Hazards

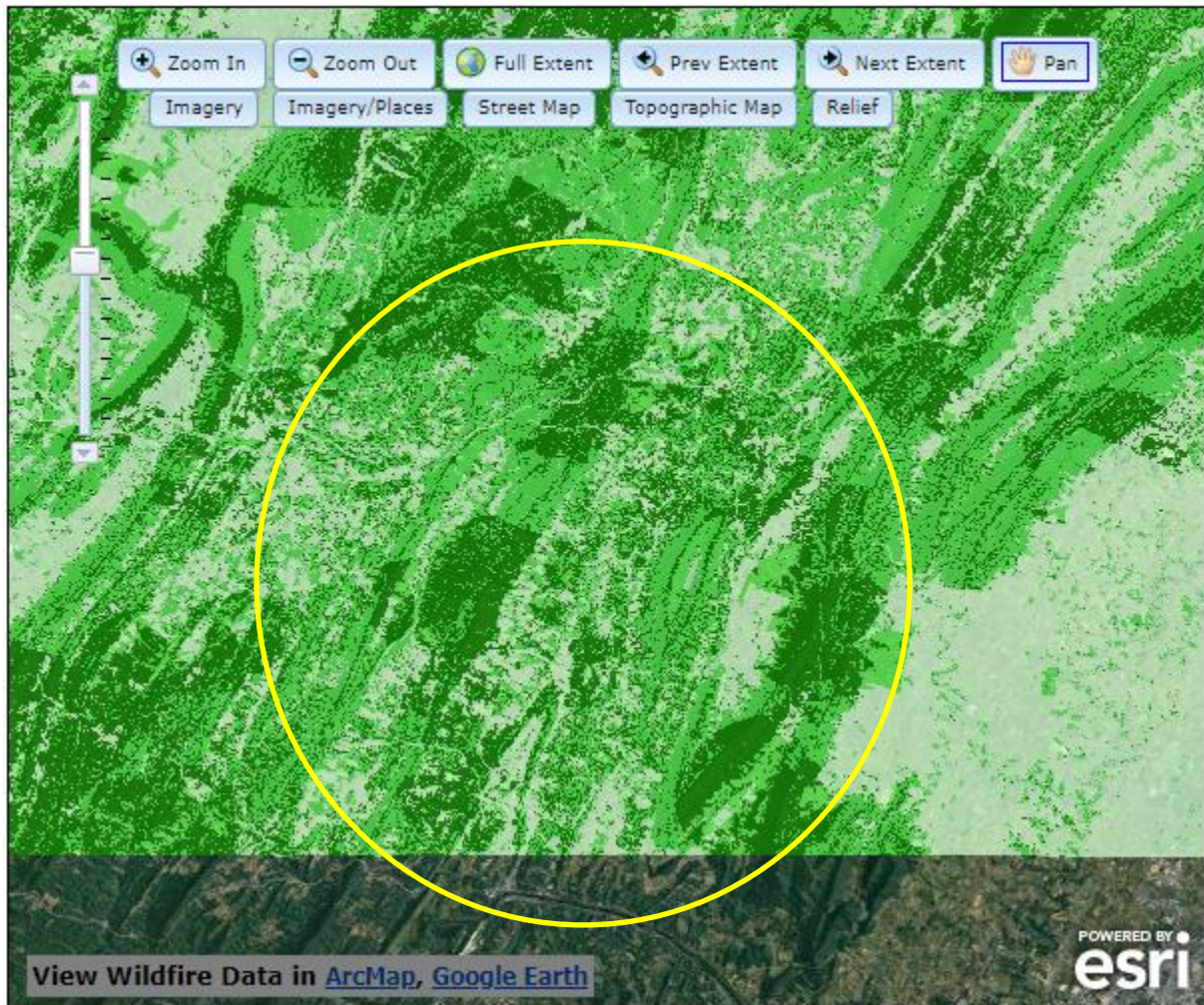
The WUI classifies areas where homes and other human development meet or intermingle with undeveloped land. LANDFIRE characterizes the land’s vegetation into fuel models that predict various fire behavior intensities. The Pennsylvania wildland point origin occurrences are records of wildland fire origins that have been reported. Percent slope aids in predicting fire behavior from the terrain. The local assessment of values, risks, and hazards is a municipality-based rating system; this assessment has been made by local wildland fire managers (PA DCNR 2017b). Figure 4.3.12-4 illustrates the output for the wildfire priority landscapes model for Fulton County, though it was not possible to show the borders of Fulton County in PA DCNR’s system.

The greatest potential for wildfires is in the spring months of March, April, and May and the autumn months of October and November. These months generally bring clear skies, high winds, low relative humidity, and prolonged periods of dry weather. In the spring, bare trees allow sunlight to reach the forest floor, drying fallen leaves and other ground debris. The same theory applies for the fall; however, the drier conditions are a more crucial factor. People cause most wildfires in Pennsylvania, often by burning debris. Several fires have started in a person’s backyard and traveled through dead grasses and weeds into bordering woodlands. According to the Pennsylvania Emergency Management Agency (PEMA) Standard All-Hazard Mitigation Plan, the Commonwealth experience an average of 650 wildfires annually between 2008 and 2017 with an average fire size of 7 acres (PEMA 2018).

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Figure 4.3.12-4. Wildfire Priority Landscapes in Fulton County



Source: PA DCNR 2017b

Notes: Low Priority = 0–0.21 (light green); Medium Priority = 0.21–0.35 (medium green); High Priority = 0.35–1 (dark green)
Fulton County's approximate location is within the yellow oval.

4.3.12.2 Range of Magnitude

Wildfire events in Fulton County can range from small fires that can be managed by local firefighters to large fires burning many acres of land. Large events may require evacuation from one or more communities and necessitate regional or national firefighting support. The impact of a severe wildfire can be devastating. A wildfire has the potential to kill people, livestock, fish, crops, and wildlife. They often destroy property, valuable timber, forage, and recreational and scenic resources.

In addition to the risk wildfires pose to the general public and property owners, the safety of firefighters is also a concern. Although loss of life among firefighters does not occur often in Pennsylvania, it is always a risk. More common firefighting injuries include falls, sprains, abrasions, or heat-related injuries such as dehydration. Response to wildfires also exposes emergency responders to the risk of motor vehicle accidents and can place them in remote areas away from the communities that they are chartered to protect.



While some fires are not human-caused and are part of natural succession processes, a wildfire can kill people, livestock, fish, crops, and wildlife. They often destroy property, valuable timber, forage, and recreational and scenic values. The most significant environmental impact is the potential for severe erosion, silting of stream beds and reservoirs, and flooding due to ground-cover loss following a fire event. Wildfire can also have a positive environmental impact in that they burn dead trees, leaves, and grasses to allow more open spaces for new vegetation to grow and receive sunlight. Another positive effect is that it stimulates the growth of new shoots on trees and shrubs, and its heat can open pine cones and other seed pods.

The worst-case scenario for Fulton County is a multiple-acre fire occurring during a period of drought, which could cause the fire to spread rapidly. Severe property damage could occur because much of Fulton County is characterized by a WUI.

4.3.12.3 Past Occurrence

Wildfires are a constant threat in Fulton County. For the 2019 Hazard Mitigation Plan (HMP), only wildfires reported to PA DCNR from 2011 to August 2019 were reflected in the HMP. From 2011 to August 2019, there were 25 wildfires reported to PA DCNR. Table 4.3.12-3 shows the numbers of wildfire events in the county from 2011 to August 2019. Of all of Fulton County’s jurisdictions, Brush Creek Township had the most wildfires between 2011 and August 2019. This data only includes fires reported to the BOF and does not include brushfires or wildfires that local or volunteer fire departments responded to.

Table 4.3.12-3. List of wildfire events reported in Fulton County from 2011 to August 2019

Municipality	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
Ayr Township	0	1	1	0	0	0	0	0	0	2
Belfast Township	0	0	0	0	0	0	0	0	1	1
Bethel Township	0	0	0	0	0	0	0	0	0	0
Brush Creek Township	1	7	0	2	0	0	0	0	0	10
Dublin Township	0	0	0	1	0	1	0	0	0	2
Licking Creek Township	1	0	0	1	0	2	0	0	0	4
McConnellsburg Borough	0	0	0	0	0	0	0	0	0	0
Taylor Township	0	0	0	0	0	0	0	0	0	0
Thompson Township	0	0	0	0	0	0	0	0	0	0
Todd Township	0	0	0	1	0	1	1	1	0	4
Union Township	0	0	0	0	0	0	0	0	0	0
Valley-Hi Borough	0	0	0	0	0	0	0	0	0	0
Wells Township	0	0	0	0	0	1	1	0	0	2
Fulton County	2	8	1	5	0	5	2	1	1	25

Source: PA DCNR 2019

Note: Numbers listed in 2011 to August 2019 were based on wildfires reported to PA DCNR.

PA DCNR BOF is not responsible for the accuracy of the data shown above, and these numbers should be used for planning purposes only.

4.3.12.4 Future Occurrence

In Pennsylvania, wildfire events will continue to occur each year. However, the likelihood of one of those fires attaining significant size and intensity is unpredictable and highly dependent on environmental conditions and



firefighting response. Weather conditions, particularly drought events, increase the likelihood of wildfires occurring. Additionally, invasive forest insects can increase the likelihood of wildfires occurring; insects that attack and kill trees increase the total wildfire fuel available in wooded areas. Climate change is also likely to increase the probability of future wildfires. Prolonged periods of drought caused by climate change can potentially increase the length of the wildfire season and provide a more favorable climate for ignition (PEMA 2018).

For the 2019 HMP update, the most up-to-date data was collected to calculate the probability of future occurrence of wildfire events for Fulton County. Data collected from the PA DCNR BOF was used to identify the number of wildfire events that occurred between 2011 and August 2019. Due to the fact that all brush or wildfires are likely not reported to Fulton County or the State, it is difficult to have a comprehensive record of wildfire incidents. The table below shows these statistics as well as the annual average number of events and the estimated percent chance of an incident occurring in a given year, using the PA DCNR BOF records from 2011 to August 2019. Based on these statistics, there is an estimated 100-percent chance of a wildfire event occurring in any given year in Fulton County.

Table 4.3.12-4. Probability of Future Wildfire Events

Number of Occurrences Between 2011 and August 2019	Rate of Occurrence or Annual Number of Events (average)	Percent Chance of Occurrence in Any Given Year
25	3.1	100%

Sources: PA DCNR BOF 2019

Based on available historical data, the future occurrence of wildfires in Fulton County can be considered *highly likely* as defined by the Risk Factor Methodology probability criteria (refer to Section 4.4). However, the likelihood of one of those fires attaining significant size and intensity is unpredictable and highly dependent on environmental conditions and firefighting response. Weather conditions like drought and wind can increase the likelihood of wildfires occurring. Any fire, without the quick response or attention of firefighters, forestry personnel, or visitors to the forest, has the potential to become a wildfire.

4.3.12.5 Vulnerability Assessment

To understand risk, a community must evaluate what assets are exposed and vulnerable in the identified hazard area. The following text evaluates and estimates the potential impact of the wildfire hazard on Fulton County, including:

- Impacts on (1) life, health, and safety; (2) general building stock and critical facilities; (3) the economy; (4) the environment; and (5) future growth and development
- Effect of climate change on vulnerability
- Further data collections that will assist in understanding this hazard over time.

The WUI (interface and intermix) obtained through the SILVIS Lab, Department of Forest Ecology and Management, University of Wisconsin-Madison, defines the wildfire hazard area utilized for the 2019 HMP update. The asset data (population, building stock, and critical facilities) presented in the County Profile (Section 2) was used to support an evaluation of assets exposed and the potential impacts and losses associated with this hazard. Available and appropriate geographic information system (GIS) data were overlaid on the hazard area



to identify what assets are exposed to wildfire. The limitations of this analysis are recognized, and as such, the analysis is used only to provide a general estimate.

Impact on Life, Health, and Safety

As demonstrated by historical wildfire events, potential losses include human health and life of residents and responders. The most vulnerable populations include emergency responders and those within a short distance of the interface between the built environment and the wildland environment. In addition, the population living within and along the WUI may only have one ingress/egress to their communities, making them highly vulnerable in the event of an evacuation. In order to estimate the number of exposed individuals to the hazard, the total population for each municipality was divided by the number of residential buildings to establish an average population per residential structure which intersects the WUI. In addition to being available at the census block level, the 2010 U.S. Census data is the default demographic data in HAZUS-MH v4.2. The census block level provides a higher resolution of population distribution than American Community Survey spatial data, which is only available at the census tract level. The 2010 U.S. Census data is also used to maintain consistency in data through the vulnerability assessments throughout this hazard mitigation plan. Table 4.3.12-5 summarizes the estimated population exposed by municipality.

Table 4.3.12-5. Estimated Population Located within the WUI in Fulton County

Municipality	U.S. Census 2010 Population	Estimated Population Exposed	
		Population Exposed to Interface/Intermix	% of Total
Ayr Township	1,942	1,543	79.4%
Belfast Township	1,448	480	33.2%
Bethel Township	1,508	1,032	68.4%
Brush Creek Township	819	418	51.0%
Dublin Township	1,264	947	74.9%
Licking Creek Township	1,703	1,276	74.9%
McConnellsburg Borough	1,220	1,208	99.0%
Taylor Township	1,118	625	55.9%
Thompson Township	1,098	556	50.7%
Todd Township	1,527	1,332	87.2%
Union Township	706	306	43.3%
Valley-Hi Borough	15	15	100.0%
Wells Township	477	268	56.2%
Fulton County	14,845	10,006	67.4%

Source: U.S. Census 2010, Radeloff et al. 2012

Notes:

WUI Wildland-Urban Interface

Impact on General Building Stock

The most vulnerable structures to wildfire events are those within the WUI. Buildings constructed of wood or vinyl siding are generally more likely to be damaged by the fire hazard than buildings constructed of brick or concrete. The WUI was overlaid on the default building inventory available in HAZUS-MH to estimate the



replacement cost of buildings in Fulton County potentially vulnerable to the wildfire hazard. The Replacement Cost Value (RCV) of the census blocks with their center in the WUI was totaled. To estimate the number of structures exposed to this hazard, the hazard area was overlaid on the building footprint spatial layer from Fulton County. Structures with their centroid in the hazard area were totaled. Table 4.3.12-6 summarizes the estimated building stock inventory exposed by municipality.

Table 4.3.12-6. Building Stock Replacement Value and Structures Located within the WUI in Fulton County

Municipality	Number of Buildings	Total Replacement Cost Value (RCV)	Estimated Building Stock Exposed			
			Number of Buildings - Interface/Intermix	% of Total	Estimated Structures Located in WUI (Interface + Intermix)	% of Total
Ayr Township	1,139	\$328,056,000	907	79.6%	\$271,587,000	82.8%
Belfast Township	740	\$181,485,000	242	32.7%	\$48,039,000	26.5%
Bethel Township	853	\$243,010,000	573	67.2%	\$143,191,000	58.9%
Brush Creek Township	519	\$110,481,000	242	46.6%	\$44,936,000	40.7%
Dublin Township	697	\$153,284,000	483	69.3%	\$106,106,000	69.2%
Licking Creek Township	881	\$203,625,000	658	74.7%	\$152,429,000	74.9%
McConnellsburg Borough	538	\$276,419,000	517	96.1%	\$250,091,000	90.5%
Taylor Township	697	\$141,644,000	381	54.7%	\$79,675,000	56.3%
Thompson Township	572	\$155,461,000	277	48.4%	\$81,153,000	52.2%
Todd Township	858	\$298,975,000	652	76.0%	\$250,520,000	83.8%
Union Township	421	\$106,265,000	166	39.4%	\$42,417,000	39.9%
Valley-Hi Borough	29	\$5,827,000	28	96.6%	\$5,827,000	100.0%
Wells Township	292	\$58,946,000	156	53.4%	\$35,818,000	60.8%
Fulton County	8,236	\$2,263,478,000	5,282	64.1%	\$1,511,789,000	66.8%

Source: HAZUS-MH v4.2; Stewart and Radeloff 2012; Fulton County 2019

Notes:

GBS General Building Stock

RCV Replacement cost value

WUI Wildland-Urban Interface

Impact on Critical Facilities

A number of critical facilities are located in the wildfire hazard area. Many of these facilities are the locations for vulnerable populations (schools) and responding agencies to wildfire events (fire and police). Table 4.3.12-7 summarizes the number of critical facilities identified by the county plan participants that are located within the wildfire hazard area.



Table 4.3.12-7. Number of Critical Facilities in the WUI in Fulton County

Municipality	Facility Types																				
	Commercial	Communication	County Office	Dam	Fire	Hazmat	Hospital	Library	Municipal Hall	Park	Police	Polling Station	Post Office	Potable Water	Power	School	Senior	Shelter	Substation	Wastewater Pump	Wastewater Treatment
Ayr Township	1	1	0	0	0	1	0	0	1	0	1	1	0	0	0	0	1	6	1	0	1
Belfast Township	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Bethel Township	0	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0
Brush Creek Township	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2	0	0	0
Dublin Township	0	2	1	0	1	1	0	0	1	0	0	1	1	0	0	0	1	5	0	2	1
Licking Creek Township	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	6	3	0	0
McConnellsburg Borough	0	1	0	0	2	1	0	1	0	0	0	0	0	0	0	1	0	9	0	0	0
Taylor Township	1	1	0	0	0	2	0	0	0	0	0	0	3	0	2	0	0	5	1	2	0
Thompson Township	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0
Todd Township	0	1	0	1	0	1	1	0	1	1	0	1	0	2	1	0	0	4	0	0	1
Union Township	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
Valley-Hi Borough*	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Wells Township	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	4	0	0	0
Fulton County	3	15	1	4	3	7	1	1	5	1	1	5	5	2	3	1	2	49	5	5	3

Source: Stewart and Radeloff 2012; Fulton County 2019

Notes:

WUI Wildland-Urban Interface

Impact on the Economy

Wildfire events can have major economic impacts on a community from the initial loss of structures and the subsequent loss of revenue from destroyed businesses and decreases in tourism. Wildfire can also severely damage roads and infrastructure. Portions of Interstate I-70, I-76, US Routes US-30, US-522, and multiple State Routes, including PA-475, PA-484, PA-655, PA-913, PA-915, and PA-928 run through WUI areas. This factor should be considered for determine evacuation routes for Fulton County residents.

Impact on the Environment

Vegetation loss is often a concern, but it typically is not a serious impact since natural re-growth occurs with time. The most significant environmental impact is the potential for severe erosion, silting of stream beds and reservoirs, and flooding due to ground-cover loss following a fire event. Wildfires also have a positive environmental impact in that they burn dead trees, leaves, and grasses to allow more open spaces for new and different types of vegetation to grow and receive sunlight. Another positive effect of a wildfire is that it stimulates



the growth of new shoots on trees and shrubs, and its heat can open pine cones and other seed pods (PEMA 2018).

Wildfires can increase the probability of other natural disasters, specifically floods and mudflows. Wildfires, particularly large-scale fires, can dramatically alter the terrain and ground conditions, making land already devastated by fire susceptible to floods. Lands impacted by wildfire increase the risk of flooding and mudflow in those areas. Normally, vegetation absorbs rainfall, reducing runoff. However, wildfires leave the ground charred, barren, and unable to absorb water, thus creating conditions perfect for flash flooding and mudflows. Flood risk in these impacted areas remains significantly higher until vegetation is restored, which can take up to five years after a wildfire (FEMA 2013).

Future Growth and Development

Areas targeted for potential future growth and development in the next 5 years have been identified across the Fulton County at the municipal level. It is anticipated that any new development and new residents in the WUI will be exposed to the wildfire hazard.

Effect of Climate Change on Vulnerability

According to USFS, climate change will likely alter the atmospheric patterns that affect fire weather. Changes in fire patterns will, in turn, affect carbon cycling, forest structure, and species composition. Climate change associated with elevated greenhouse gas concentrations may create an atmospheric and fuel environment that is more conducive to large, severe fires (USFS 2012).

Fire interacts with climate and vegetation (fuel) in predictable ways. Understanding the interactions of climate, fire, and vegetation interactions is essential for addressing issues associated with climate change that include:

- Effects on regional circulation and other atmospheric patterns that affect fire weather
- Effects of changing fire regimes on the carbon cycle, forest structure, and species composition
- Complications from land-use change, invasive species, and an increasing WUI (USFS 2012)

It is projected that higher summer temperatures will likely increase the high fire risk by 10 to 30 percent. Fire occurrence and area burned could increase across the United States as a result of the increase of lightning activity, the frequency of surface pressure and associated circulation patterns conducive to surface drying, and fire weather conditions, in general, which are conducive to severe wildfires. Warmer temperatures will also increase the effects of drought and increase the number of days each year with flammable fuels and extending fire seasons and areas burned (USFS 2012).

Pennsylvania's Department of Environmental Protection (PADEP) was directed by the Climate Change Act (Act 70 of 2008) to initiate a study of the potential impacts of global climate change on the Commonwealth. The June 2009 Pennsylvania Climate Impact Assessment's main findings indicate Pennsylvania may be at increased risk for wildfires, but it is unclear how large the increase in risk will be (Shortle et. al. 2009).

Future changes in fire frequency and severity are difficult to predict. Global and regional climate changes associated with elevated greenhouse gas concentrations could alter large weather patterns, thereby affecting fire weather conditions that are conducive to extreme fire behavior (USFS 2012).

Additional Data and Next Steps

As the data and resources become available, a custom building inventory can be generated to capture the construction of structures (such as roofing material, fire detection equipment, and structure age) to further refine



the vulnerability analysis. As stated earlier, buildings constructed of wood or vinyl siding are generally more likely to be damaged by the fire hazard than buildings constructed of brick or concrete. The proximity of these building types to the WUI should be identified for further evaluation. Development and availability of these data would permit a more detailed estimate of potential vulnerabilities, including loss of life and potential structural damages.

Fulton County may consider participating in Firewise, a program that teaches people how to adapt to living with wildfire and encourages neighbors to work together and take action to prevent losses. In locations where homes are at risk to wildfires, the State's WUI Guidance Document is available to assist homeowners, community associations, local government, and developers to assess and mitigate the potential dangers of a wildfire. The guidance also provides information for developing an action plan in coordination with local emergency managers. Communities at risk for wildfires can adopt by local ordinance the "International Wildland-Urban Interface Code" of the Uniform Construction Code. Fulton County and municipalities may consider different landscape requirements in the WUI and consider updating the subdivision and zoning ordinances to indicate as such. Further, as indicated in the Saladyga and Standlee study, residents agree about the need for active flue management and an increase in wildfire prevention education, trash disposal and recycling programs, and fire management training and infrastructure.

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