

5.4.3 Structural Fire

This section provides profile information, including description, location, extent, previous occurrences and losses, probability of future occurrences, and climate change impacts as well as the vulnerability assessment for the structural fire hazard in Wyoming County.

5.4.3.1 Hazard Profile

Description

As defined by the National Fire Protection Agency (NFPA) in the *NFPA 901: Standard Classifications for Incident Reporting and Fire Protection Data*, a structural fire is defined as “Any fire inside, on, under, or touching a structure.” This definition includes any mobile living structure, such as a mobile or modular residence, but does not include road-worthy vehicles such as recreation vehicles (NFPA 2016).

NFPA defines an urban city as a city with a population of more than 250,000. According to the NFPA, the top five urban fire causes include cooking (indoor and outdoor), heating, electrical, smoking, and candles (NFPA 2020a). Intentional fire rates and arson fire rates are the highest in large cities. Electrical equipment is a major cause of fire in older cities (NFPA 2020b). There are also behavioral risks associated with structural fires, including hoarding and a general burn awareness of the public (NFPA 2020c).

Extent

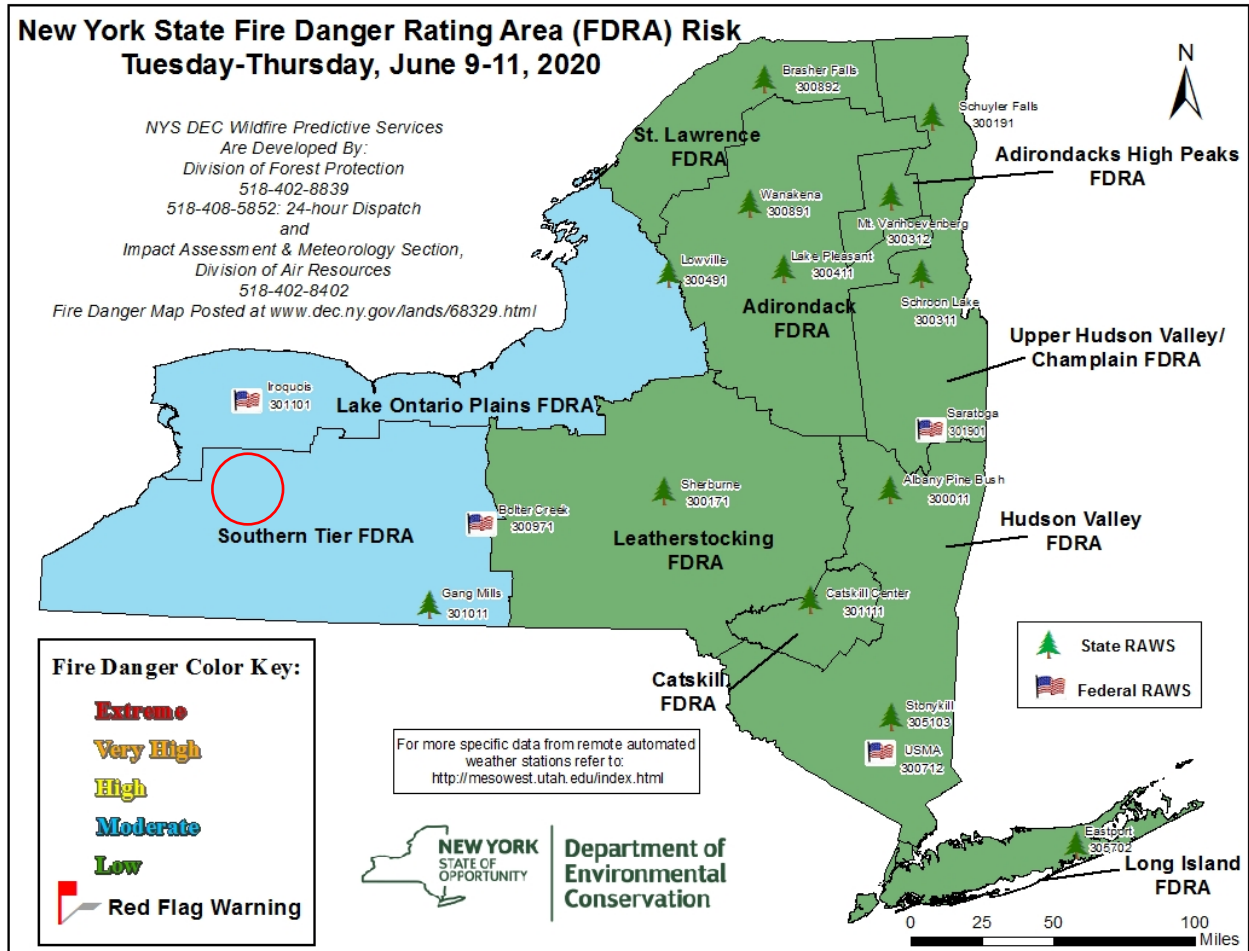
The severity of structural fires varies according to the losses associated with the incident. The impact to the local economy is minimal with the loss of a residential structure; however, effects of the loss of a large manufacturing facility that employs a large number of people can be extensive. Likewise, the impact to the local environment from a single residential fire is minimal, while the impact from an industrial or commercial fire can take years to measure. Finally, the loss of life caused by structural fires appears to be opposite of the previous two impacts. The loss of life during a residential fire is more likely than during an industrial or commercial building fire. The building composition is combined with the hour of the incident to increase the loss of life during a residential-type fire.

Wyoming County has 18 volunteer fire departments that collectively respond to over 1,000 calls per year (Wyoming County 2020). The structural fires within Wyoming County are usually small and generally affect residential structures. These fires are limited in duration and are generally contained within the local jurisdiction. While the average fire is small, the threat from a large or even catastrophic fire is always present. Many operations within larger industrial and commercial sites within Wyoming County are prone to and have experienced small fires that, if improperly contained, can and do lead to catastrophic fire losses. Combined with the presence of volatile materials, these threats are ever-changing and increasing within the region. According to the Wyoming County Office of Emergency Services 2019 Annual Report, there were 27 structure fires, including one commercial fire and one fire at a school storage building, resulting in damage to buildings, content, equipment, and vehicles of over 4.8 million dollars (Wyoming County 2019).

The *Fire Danger Rating* in New York is established using information from the National Fire Danger Rating System (NFDRS) and considers current and antecedent weather, fuel types, and both live and dead fuel moisture. This information is provided by local station managers (USFS, n.d.) in each of the 10 regions of New York State. Figure 5.4.3-1 shows the Fire Danger Rating Areas (FDRA) in NYS and the fire danger risk within each area on a specific date. Wyoming County is part of the Southern Tier FDRA.

On this particular day, the entire state’s fire danger was moderate. Table 5.4.3-1 lists fire danger ratings and color codes, also used by New York State Department of Environmental Conservation (NYSDEC) to update its fire danger rating maps.

Figure 5.4.3-1. Fire Danger Rating Areas in New York State



Source: NYSDEC 2020

Note: The approximate location of Wyoming County is within the red circle and lies within the Southern Tier FDRA.

Table 5.4.3-1. Description of Fire Danger Ratings in New York State

Adjective Rating Class and Color Code	Class Description
Red Flag	A short-term, temporary warning, indicating presence of a dangerous combination of temperature, wind, relative humidity, fuel, or drought conditions that can contribute to new fires or rapid spread of existing fires. A Red Flag Warning can be issued at any fire danger level.
Extreme (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 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.

Adjective Rating Class and Color Code	Class Description
Very High (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.
High (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 small.
Moderate (blue)	Fires can start from most accidental causes, but except for 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.
Low (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 burn in irregular fingers. There is little danger of spotting.

Source: NYS DHSES 2019

Location

Structural fires can occur anywhere within Wyoming County and can have a detrimental impact on life, property, and the local economy. The age of many residential structures within the region, combined with changes in building construction and materials, creates a threat of fire loss to any structure within the county.

Previous Occurrences and Losses

From 2014 to 2019, 296 structural fires were reported to Wyoming County. Table 5.4.3-2 shows an annual fire report for Wyoming County from 2014 to 2019. Details on losses, injuries, and fatalities caused by these events were not found. There have been no federally declared disasters as a result of structural fires in New York (FEMA 2020a).

Table 5.4.3-2. Reported Structural Fires 2014 to 2019

Municipality	2014	2015	2016	2017	2018	2019
Arcade (T)	2	3	3	-	-	3
Arcade (V)	4	2	3	4	1	-
Attica (T)	4	2	3	-	2	4
Attica (V)	-	4	3	-	1	2
Bennington (T)	3	8	3	-	2	-
Castile (T)	1	6	3	5	1	3
Castile (V)	1	1	2	2	-	-
Covington (T)	2	2	1		1	1
Eagle (T)	1	2	2	2	1	3
Gainesville (T)	1	1	3	3	3	7
Gainesville (V)	-	-	2	-	-	-
Genesee Falls (T)	-	1	1	-	3	-

Municipality	2014	2015	2016	2017	2018	2019
Java (T)	3	1	3	3	2	2
Middlebury (T)	3	3	-	1	1	-
Orangeville (T)	3	3	4	-	-	3
Perry (T)	4	6	1	4	6	1
Perry (V)	1	3	3	5	3	2
Pike (T)	1	1	2	2	4	1
Sheldon (T)	3	7	5	2	7	2
Silver Springs (V)	1	1	1	2	1	-
Warsaw (T)	2	2	4	3	1	3
Warsaw (V)	2	3	4	2	-	2
Wethersfield (T)	1	4	1	6	3	1
Wyoming (V)	1	-	1	-	-	-
Total	44	65	58	46	43	40

Source: Wyoming County Office of Emergency Management 2020

Note: (T): Town, (V): Village

Probability of Future Events

According to the NFPA 2019 report, *Home Structure Fires*, based on historical data collected, more than one-quarter (27 percent) of reported fires occurred in home environments during 2013–2017. Seventy-nine percent of these home fires caused property damage (NFPA 2019). While most of these fires will be considered small and may not cause any significant damage, the possibility of a catastrophic loss caused by fire is present (see Table 5.4.3-3). Given that there have dozens of fires each year in Wyoming County, the annual probability of a structure fire occurring in the county is 100 percent.

Table 5.4.3-3. Likelihood of Future Occurrences of Structural Fire

County	Avg. #/Year	% Probability	Category
Wyoming	49	100%	Frequent

The NFPA reports home fire deaths have been cut roughly in half since 1980, and population-based home fire and fire death rates have fallen by roughly two-thirds. The death rate per 1,000 reported fires has remained fairly consistent and was actually slightly higher in recent years than in 1980. It appears that most of the reduction in fire deaths over the past decades is due to a reduction in fires rather than the prevention of harm after a fire is reported (NFPA 2019). This was driven by an even more pronounced increase in the rate for one- and two-family homes. Despite the decrease reported in fire fatalities, Wyoming County saw an increase in the number of reported structural fires between 2015 and 2018, with the highest number of reported fires occurring in 2018. The quantity of residential and industrial structures within Wyoming County, combined with a varying range of fire code enforcement, equates to a greater probability of loss in the future. In addition, the influx of commercial and industrial sites within Wyoming County also increases the possibility of future commercial or industrial fires.

Impacts of Climate Change

According to National Oceanic and Atmospheric Administration (NOAA) National Centers for Environmental Information (NCEI) State Climate Summaries for New York State, the mean annual temperature has increased approximately 2 °F (Fahrenheit).

ClimAID: the Integrated Assessment for Effective Climate Change in New York State (ClimAID) was undertaken to provide decision-makers with information on the State’s vulnerability to climate change and to facilitate the development of adaptation strategies informed by both local experience and scientific knowledge (New York State Energy Research and Development Authority [NYSERDA] 2011). Each region in New York State, as defined by ClimAID, has attributes that will be affected by climate change. Wyoming County is part of Region 1, Western New York and the Great Lakes Plain. In Region 1, temperatures are estimated to increase by 4.3 to 6.3 °F by the 2050s, and 5.7 to 9.6 °F by the 2080s (baseline of 47.7 °F, middle-range projection). Precipitation totals will increase between 4 and 10 percent by the 2050s and 6 to 13 percent by the 2080s (baseline of 34.0 inches, middle-range projection).

As temperatures change, excessive heat on aging structures and/or infrastructure may be adversely affected, such as electrical wiring. Excessive heat on structures or containers containing hazardous materials may alter the material properties, such as outdoor propane tanks for gas cooking and structure heating purposes. In addition, hazardous substances stored at fixed locations in the floodplain may experience an increase in flood events due to the project changes in increased precipitation events, magnitude, and frequency.

5.4.3.2 Vulnerability Assessment

Structural fires most frequently affect the residential communities within Wyoming County. While the impact of most structural fires is considered minimal because of the availability of support services after a fire, these fires need to be classified as a high threat based on the frequency and potential for injury and loss of life.

As the population increases within Wyoming County, there is a greater probability of structural fires. The sustained growth within the county, both commercial and residential, will continue to affect the threat of structural fires in the future.

Overview of Vulnerability

Many factors influence vulnerability to a structural fire. Age of structure, building materials, density of the area of the building location, proximity to flammable vegetation, and the presence of accelerants are all factors that influence likelihood and vulnerability to structural fire. Older structures may not have been built with the same level of fire prevention required by modern building codes and therefore may be more susceptible to fire than a modern structure. More densely populated areas of Wyoming County face a higher vulnerability because of the close proximity of other structures. Industrial and commercial facilities are also susceptible to structural fire, which may have a greater impact on the county.

Impact on Life, Health, and Safety

The impact of structural fires on life, health, and safety will vary depending on the size and magnitude of fires and available firefighting resources. Structural fires that occur in industrial or commercial buildings may have a significant impact on life, health, and safety, depending on the contents of the structures.

Impact on General Building Stock and Critical Facilities

Structural fires will impact the Wyoming County General Building Stock. Impacts will vary based on the size, severity, and number of structures affected by the fire. Physical damage to structures and contents could occur.

Impacts to critical facilities may include damage to equipment, interruption of emergency communications, or disruption of services. If a public safety or medical facility is affected, the life, health, and safety of people within the county could be impacted.

Impact on Economy

Structural fires may cause impacts on the economy, depending on the scale and severity of the fire. Economic impacts of structural fires may result in lost wages from temporarily or permanently closed businesses, destruction and damage involving business and personal assets, loss of tax base, recovery costs, and lost investments in destroyed property (NYS DHSES 2019).

Impact on the Environment

Environmental impacts from a structural fire could occur if hazardous materials are released. Debris from fire can also contain chemicals or substances, which may also impact the environment.

Future Growth and Development

Areas targeted for potential future growth and development in the next 5 to 10 years have been identified in Wyoming County (further discussed in Section 2.4 of this HMP update). Any areas of growth could be impacted by the structural fire hazard because all structures within the county are potentially vulnerable.

Effect of Climate Change on Vulnerability

Climate change could potentially impact the likelihood of structural fire. Areas located in the wild-urban interface could be more susceptible to a structural fire if a naturally occurring wildfire spreads to structures. Extreme temperatures could potentially influence the instance of a structural fire, either from a higher air temperature or from using space heaters and heating appliances indoors during periods of colder weather.

Change of Vulnerability

Over time, Wyoming County will obtain additional data to support the analysis of this hazard. Such data may include additional details on past hazard events and impacts; specific building information, such as type of construction; and details on protective features (for example, sprinklers). Information on particular buildings or infrastructure age or year built would also be helpful in future analysis of this hazard.