5.4.13 Wildfire

This section provides a profile and vulnerability assessment of the wildfire hazard for the Livingston County Hazard Mitigation Plan (HMP).

5.4.13.1 Hazard Profile

This section provides information regarding the description, extent, location, previous occurrences and losses, and the probability of future occurrences for the wildfire hazard.

Hazard Description

According to the New York State NYS (HMP), wildfire is defined as an uncontrolled fire spreading through natural or unnatural vegetation that can threaten lives and property if not contained. Wildfires are commonly termed forest fires, brush fires, grass fires, wildland-urban interface (WUI) fires, range fires, or ground fires. Wildfires do not include fires naturally or purposely ignited to manage vegetation for one or more benefits (NYS Division of Homeland Security and Emergency Services [DHSES] 2014). Although destructive fires do not occur annually, the state's fire history shows a cycle of outbreaks that have caused death, property loss, forest destruction, and air pollution (NYS DHSES 2019).

The NYS Forest Ranger force is a division of NYS Department of Environmental Conservation (NYS DEC). It has fought fires and retained records for more than 125 years. During the 25-year period 1993-2017, division records indicate that rangers suppressed 5,423 wildfires that burned a total of 52,580 acres (NYSDEC 2018). Currently, more than 1,700 fire departments respond to an average of 4,500 wildfires each year. Forest Rangers respond to approximately 3 percent of all wildfires; however, Rangers help contain 33 percent of all wildfire acres (NYSDEC 2018).

Extent

The extent (that is, magnitude or severity) of wildfires depends on weather and human activity. Wildfire behavior and ecological factors that contribute to the severity of wildfires is discussed below.

Wildfire Behavior and Fire Ecology

Fire behavior is defined as the way fuel ignites, flame develops, and fire spreads; this behavior depends on interactions between fuel, weather, and topography. Fire behavior is one of the most important aspects of wildfires because almost all actions in response to a fire depend on how it behaves. Success in pre-suppression planning and actual suppression of wildfires is directly related to how well fire managers understand and can predict fire behavior.

Potential for wildfire and its subsequent development (growth) and severity are controlled by the three principal factors: topography, fuel, and weather. Each of these factors are described below:

Topography – Topography can powerfully influence wildfire behavior. Movement of air over the terrain tends to direct a fire's course. A gulch or canyon can funnel air and act as a chimney, intensifying fire behavior and inducing faster spread. Saddles on ridgetops tend to offer lower resistance to passage of air and draw fires. Solar heating of drier, south-facing slopes produces upslope thermal winds that can complicate behavior. Slope is an important factor. If the percentage of uphill slope doubles, the rate the wildfire spreads will most likely double as well. Terrain can also inhibit wildfires; fire travels downslope much more slowly than upslope, and ridgetops often mark the end of a wildfire's rapid spread (Federal Emergency Management Agency [FEMA] 1997).

Fuel – Fuels are classified by weight or volume (fuel loading) and by type. Fuel loading is a term used to describe the amount of vegetative material available. If the fuel amount doubles, energy released can also double. Each fuel type is given a burn index (an estimate of amount of potential energy that may be released), effort required to ignite a fire in each fuel and expected flame length. Different fuels have different burn qualities, and some burn more easily than others. Grass fires release relatively little energy but can sustain very high rates of spread (FEMA 1997). According to the U.S. Forest Service (USFS), a forest stand may consist of several layers of live and dead vegetation in the understory (surface fuels), mid-story (ladder fuels), and overstory (crown fuels):

- Surface fuels consist of grasses, shrubs, litter, and woody material lying on the ground. Surface fires burn low vegetation, woody debris, and litter. Under the right conditions, surface fires reduce likelihood that future wildfires will grow into crown fires.
- Ladder fuels consist of live and dead small trees and shrubs; live and dead lower branches from larger trees, needles, vines, lichens, mosses; and any other combustible biomass between the top of surface fuels and bottom of overstory tree crowns.
- Crown fuels are suspended above the ground in treetops or other vegetation and consist mostly of live and dead fine material. When historically low-density forests become overcrowded, tree crowns may merge and form a closed canopy. Tree canopies constitute the primary fuel layer in a forest crown fire (USFS 2003).

Fire behavior is strongly influenced by these fuels.

Weather / Air Mass – Weather is the most important factor influencing fire behavior, but it is always changing. Air mass, defined by the National Weather Service (NWS) as a body of air covering a relatively wide area and exhibiting horizontally uniform properties, can affect wildfire through climatic factors that include temperature and relative humidity, local wind speed and direction, cloud cover, precipitation amount and duration, and stability of the atmosphere at the time of the fire (NWS 2009). Extreme weather leads to extreme events, and often a subsidence of severe weather marks the end of a wildfire's growth and the beginning of successful containment. High temperatures and low humidity can produce vigorous fire activity. Fronts and thunderstorms can produce winds that radically and suddenly change in speed and direction, causing similar changes in fire activity. The rate of spread of a fire varies with wind velocity. Winds may play a dominant role in directing the course of a fire. The most damaging firestorms are typically marked by high winds (FEMA 1997).

Several tools are available to estimate fire potential, extent, danger, and growth, including the following:

The ***Wildland Fire Assessment System (WFAS)*** is an Internet-based information system that provides a national view of weather and fire potential, including national fire danger, weather maps, and satellite-derived "greenness" maps (USFS No Date [n.d.]).

The ***Fire Potential Index (FPI)*** is derived by combining information on daily weather and vegetation conditions and can identify areas most susceptible to fire ignition (Burgan et al. 2000).

Fuel Moisture (FM) content measures the quantity of water in a fuel particle expressed as a percent of oven-dry weight of the fuel particles. It is an expression of cumulative effects of past and present weather events used to help evaluate the effects of current or future weather on fire potential (Burgan et al. 2000).

The ***Keetch-Byram Drought Index (KBDI)*** is designed for fire potential assessment and is a number representing the net effect of evapotranspiration and precipitation in producing cumulative moisture deficiency in deep duff and upper soil layers (USFS n.d.).

The ***Haines Index***, also known as the Lower Atmosphere Stability Index, is a fire weather index based on stability and moisture content of the lower atmosphere that measures potential for existing fires to become large fires (USFS n.d.).

The ***Buildup Index (BUI)*** is a number that reflects combined cumulative effects of daily drying and precipitation in fuels with a 10-day time lag constant (North Carolina Forest Service 2007).

The ***Fire Danger Rating*** in New York State 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 ten regions of New York State. Livingston County is in the Southern Tier Fire Rating Danger Area. Table 5.4.13-1 lists fire danger ratings and color codes, also used by the NYSDEC to update its fire danger rating maps, identified later in this section.

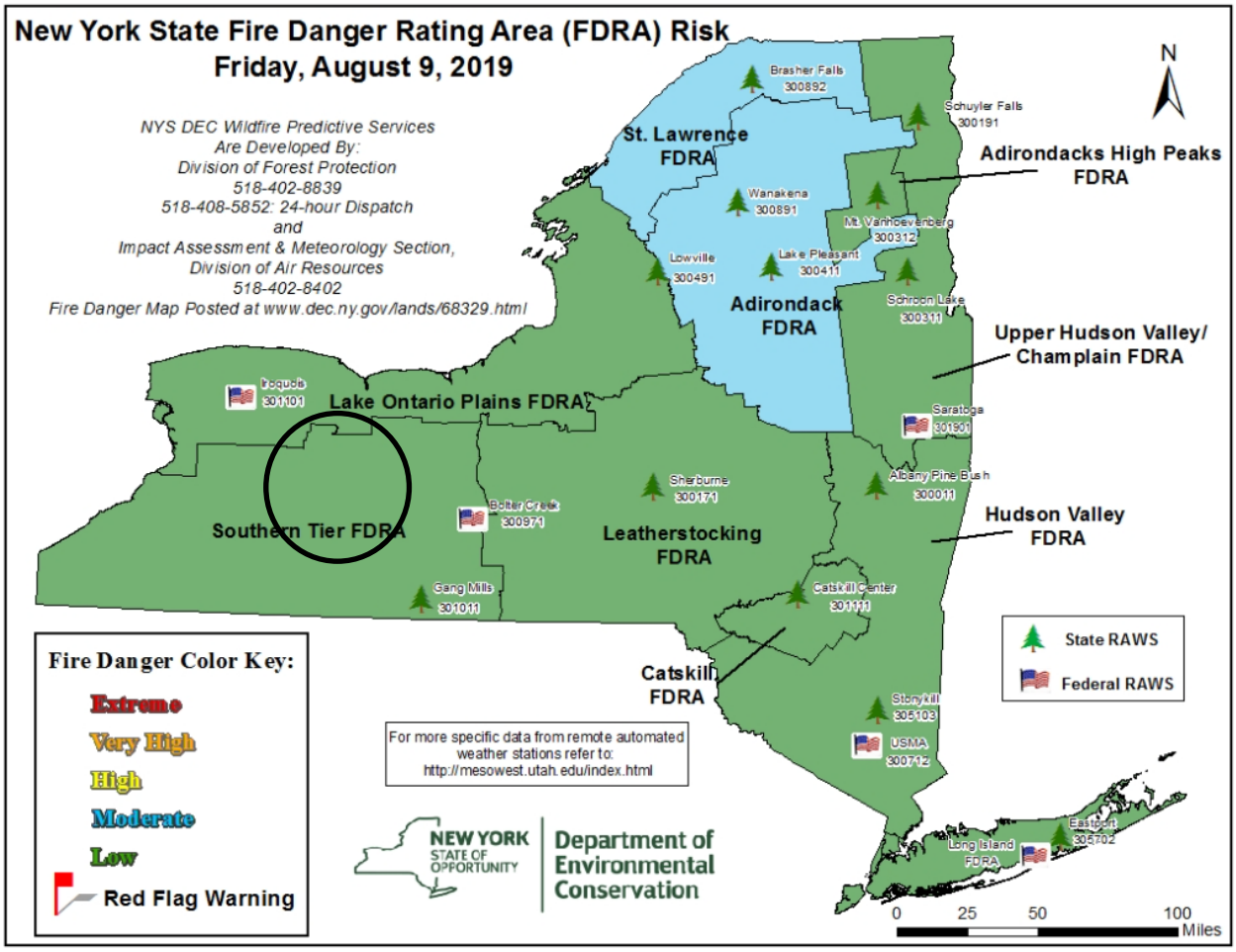
Table 5.4.13-1. Description of Fire Danger Ratings in New York State

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.
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 woodland areas. Fires in open cured grasslands may burn freely a few hours after rain, but wood fires spread slowly by creeping or smoldering, and burn in irregular fingers. There is little danger of spotting.

Source: NYS DHSES 2014

Figure 5.4.13-1 shows Fire Danger Rating Areas (FDRA) in New York State as well the fire danger risk within each area on August 9, 2019, as an example. NYS DEC stopped issuing these maps until Spring 2022.

Figure 5.4.13-1. New York State Fire Danger Rating Areas



Source: NYSDEC 2020 Note: The black oval indicates the location of Livingston County.

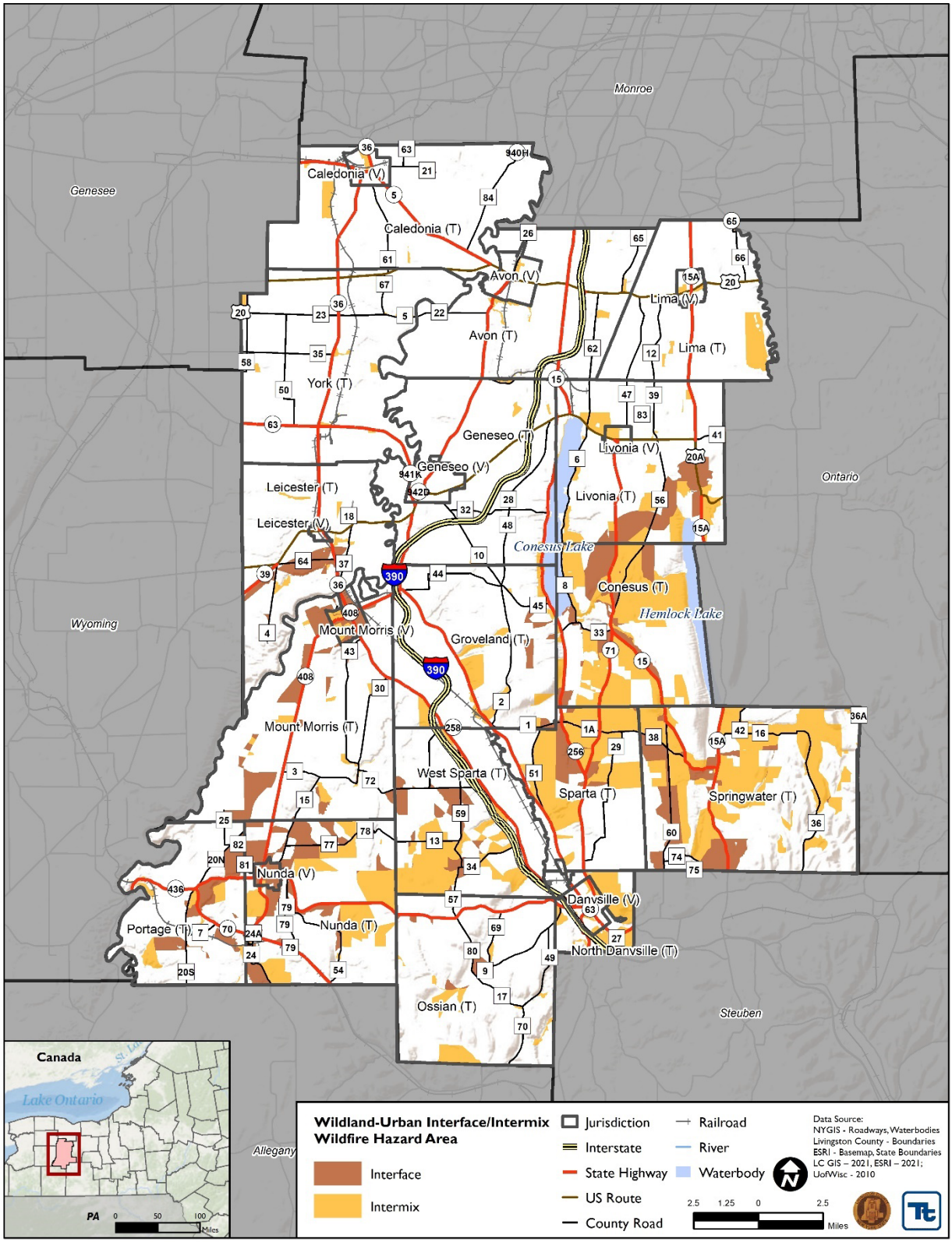
Location

Wildfires occur in Livingston County. Many areas in the county, particularly those that are heavily forested or contain large tracts of brush and shrubs, are prone to fires (NYSDEC 2018). In New York State, NYSDEC's Division of Forest Protection (Forest Ranger Division) is designated as the state's lead agency for wildfire mitigation. The Forest Ranger Division for Livingston County is Region 8: Finger Lakes Region. The boundaries of the FDRAs do not match the Forest Ranger Division boundaries.

Wildland-Urban Interface in New York State/Livingston County

As shown in Figure 5.4.13-2, the Wildlife-Urban Interface is divided into two categories: interface and intermix. The Interface WUI zone is land that stands between the undeveloped, natural land and developed, urban areas. The Intermix WUI zone is an area where human habitation is mixed with areas of flammable wildland vegetation. Intermix areas have more than one house per 40 acres and have more than 50-percent 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 over 1,235 acres that is more than 75-percent vegetated (Stewart et al. 2007). The California Fire Alliance determined that 1.5 miles is the approximate maximum distance that firebrands can be carried from a wildland fire to the roof of a house. Therefore, even structures not within the forest are at risk from wildfire. Approximately 12.6-percent of the County's land area is within the Intermix WUI, and 6.1-percent of the land area is within the Interface WUI.

Figure 5.4.13-2. Interface/Intermix WUI Hazard Areas in Livingston County

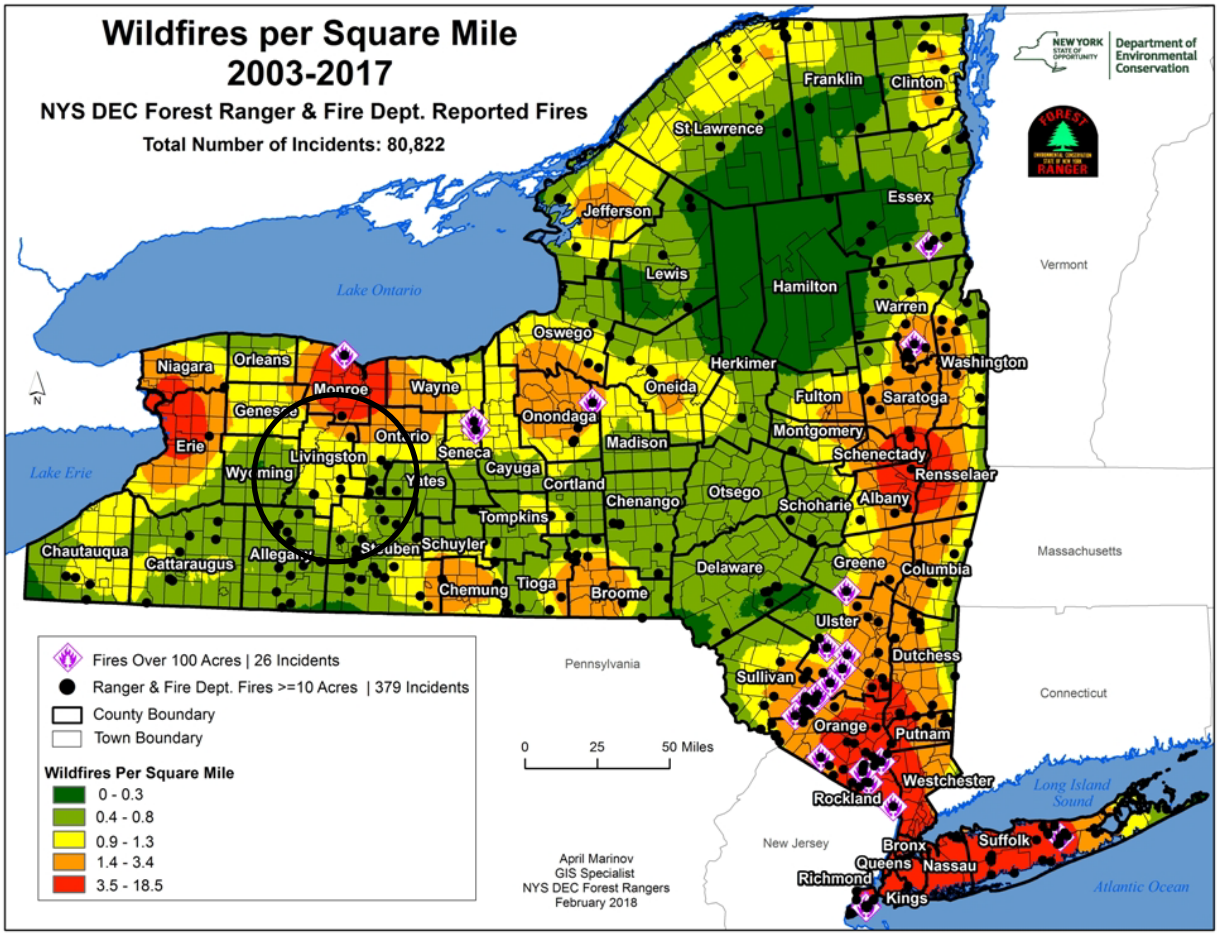


Previous Occurrences and Losses

Only limited historical information can be found on previous occurrences and losses associated with wildfires throughout New York State and Livingston County. Between 1954 and 2021, NYS was not included in any wildfire-related major disaster (DR) or emergency (EM) declarations (FEMA 2021).

Determinations of wildfire occurrences in New York State are based on two data sources: the New York State Forest Ranger force, and the New York State Office of Fire Prevention and Control (NYS OFP&C). According to Ranger Division wildfire occurrence data from 1993 through 2017, 95 percent of wildfires in the state were human caused; the remaining 5 percent resulted from lightning. Regarding human-caused fires, debris burning accounted for 33 percent, incendiary fires accounted for 16 percent, campfires accounted for 16 percent, and smoking accounted for 6 percent (NYSDEC 2018). Figure 5.4.13-3 illustrates occurrences of wildfires in NYS between 2003 and 2017 (the most current data available). This figure reveals occurrences of between 0.4 and 3.4 wildfires per square mile from 2003 to 2017 within Livingston County municipalities.

Figure 5.4.13-3. Wildfire Occurrences in New York State, 2003-2017



Source: NYSDEC 2018. Note: The black oval indicates the location of Livingston County.

Probability of Future Occurrences

According to the NYS Forest Ranger Division, wildfire occurrence data from 2003 to 2018 have shown that NYS, including Livingston County, is susceptible to wildfires. Forty-seven percent of all fire department response to wildfires occur from March 15 through May 15. Beginning in 2010, NYS enacted revised open-

burning regulations that ban brush burning statewide during this time period. Forest Ranger data indicate that this new statewide ban resulted in 74 percent fewer wildfires caused by debris burning in upstate New York from 2010 to 2012. Forest Ranger and fire department historical fire occurrence data recorded after the new burn ban regulations were enacted in 2010 will serve as a benchmark for analyses of wildfire occurrence (NYS DHSES 2014).

Nationally, wildfire risk is increasing, and wildfire experts point to the following four reasons:

- The way forests were handled in the past allowed fuel in the form of fallen leaves, branches, and plant growth, to accumulate. Now this fuel is lying around the forest with potential to "feed" a wildfire.
- Increasingly hot, dry weather has occurred and will continue to occur within the United States.
- Weather patterns across the country are changing.
- More homes are built within WUI areas, meaning that homes are built closer to wildland areas where wildfires can occur (NYS DHSES 2014).

Annual small wildfires likely will occur throughout Livingston County. However, advanced methods of wildfire management and control and better understanding of fire ecosystems should reduce the number of devastating fires in the future (NYS DHSES 2014).

Hazards of concern identified for Livingston County were ranked in Section 5.3. Probability of occurrence, or likelihood of the event, is one parameter used for ranking hazards. Based on historical records and input from the Planning Partnership, probability of occurrence of wildfire within the county is considered "occasional" (between 10 and 100% annual probability of a hazard event occurring), as presented in Table 5.3-2.

Climate Change Impacts

Climate change can make forests more susceptible to wildfires due to changing precipitation patterns, in addition to the projected temperature increases. Climate also affects frequency and severity of many forest disturbances, such as infestations, invasive species, wildfires, and storm events.

Each region in New York State, as defined by ClimAID, has attributes that will be affected by climate change. Livingston County is part of geographical Region 1, Western New York and the Great Lakes Plain. Some of the issues in this region, affected by climate change, include relatively low rainfall and increased summer drought risk, the need for irrigation for high-value crops, and improved conditions for grapes (NYSERDA 2014).

Temperatures and precipitation amounts are expected to increase throughout the State, as well as within Region 1. The State's temperature is expected to rise between 2.0 and 3.4 degrees Fahrenheit (ºF) through the 2020s, between 4.1 and 6.8 ºF by the 2050s, and between 5.3 and 10.1 ºF by the 2080s. The lower ends of these ranges assume lower greenhouse gas emissions scenarios, and the higher ends of these ranges assume higher greenhouse gas emission scenarios. By the end of the century, the greatest warming is projected to be in the northern parts of the State. (NYSERDA 2014).

Within Region 1, temperatures are anticipated to increase between 3.7 and 7.3 ºF by the 2050s, and between 4.2 and 12.0 ºF by the 2080s (baseline of 47.7ºF). Precipitation totals will increase between 0 and 10 percent by the 2050s, and between 0 and 15 percent by the 2080s (baseline of 37 inches). Table 5.4.13-2 lists projected seasonal precipitation changes within the Western New York and Great Lakes Plain ClimAID Region (NYSERDA 2014).

Extreme heat events and heat waves are also projected to increase, as listed in Table 5.4.13-2 below. Prolonged heat waves are likely to generate a greater number of wildfires. Stronger winds from larger storms may lead to more fallen branches for wildfires to consume. Increases in rain and snow events prime forests for fire by

supporting growth of more fuel. Drought and warmer temperatures lead to drier forest fuels (NYS DHSES 2014).

Table 5.4.13-2. Extreme Event Projections for ClimAID Region 1

Middle Range (25th to 75th Percentile)	2020s	2050s	2080s
Days over 90 °F (8 days)	14 to 17	22 to 34	27 to 57
# of Heat Waves (0.7 heat waves)	2 to 2	3 to 4	3 to 8
Duration of Heat Waves (4 days)	4 to 4	4 to 5	5 to 6
Days below 32 °F (133 days)	103 to 111	84 to 96	68 to 88
Days over 1" Rainfall (5 days)	5 to 5	5 to 5	5 to 6
Days over 2" Rainfall (0.6 days)	0.6 to 0.7	0.6 to 0.8	0.6 to 0.9

Source: NYSERDA 2014

Fire potential depends on climate variability, local topography, and human intervention. Climate change can affect multiple elements of the wildfire system: fire behavior, ignitions, fire management, and vegetation fuels. Hot, dry spells create highest fire risk. With temperatures increasing in New York State, wildfire danger may intensify with warming and drying of vegetation. When climate alters fuel loads and fuel moisture, the susceptibility of forest to wildfires is changed. Climate change also may increase winds that spread fires. Faster fires are harder to contain, and thus are more likely to expand into residential neighborhoods.

5.4.13.2 Vulnerability Assessment

To understand risk, a community must evaluate the assets that are exposed and vulnerable in the identified hazard area. A spatial analysis was conducted using the University of Wisconsin 2010 Wildland-Urban Interface/Intermix spatial layer. For the purposes of the assessment, an asset (population, structures, critical facilities, and lifelines) is considered exposed and potentially vulnerable to the wildfire hazard if it is in the Interface or Intermix WUI hazard areas.

Impact on Life, Health, and Safety

Wildfires have the potential to impact human health and life of residents and responders, structures, infrastructure, and natural resources. The most vulnerable populations include emergency responders and persons living within a short distance of the interface between the built environment and the wildland environment. First responders are exposed to the dangers from the initial incident and after-effects from smoke inhalation and heat stroke. Table 5.4.13-3 summarizes the estimated population exposed to the wildfire hazard by jurisdiction.

Based on the analysis, an estimated 18,171 residents, or approximately 28.6-percent of the County's population, are in the Interface/Intermix WUI hazard areas. Overall, the Village of Mount Morris has the greatest number of individuals located in the wildfire hazard areas (2,931 persons).

Of the population exposed, the most vulnerable include the economically disadvantaged and the population over age 65. Livingston County is home to 7,572 persons in poverty and 10,929 persons over 65 years old (American Community Survey 2019). Economically disadvantaged populations are more vulnerable because they are likely to evaluate their risk and make decisions to evacuate based on net economic impacts on their families. The

population over age 65 is also more vulnerable because they are more likely to seek or need medical attention that may not be available due to isolation during a wildfire event, and they may have more difficulty evacuating. Smoke and air pollution from wildfires can be a severe health hazard, especially for sensitive populations, including children, the elderly, and those with respiratory and cardiovascular diseases. Smoke generated by wildfire consists of visible and invisible emissions that contain particulate matter (soot, tar, water vapor, and minerals), gases (carbon monoxide, carbon dioxide, nitrogen oxides), and toxics (formaldehyde, benzene). Emissions from wildfires depend on the type of fuel, the moisture content of the fuel, the efficiency (or temperature) of combustion, and the weather. Public health impacts associated with wildfire include difficulty breathing, odor, and reduction in visibility.

Table 5.4.13-3. Estimated Population Located in the Wildland-Urban Interface/Intermix Wildfire Hazard Area

Jurisdiction	Total Population (American Community Survey 2015-2019)	Estimated Population Located Within the Wildland-Urban Interface/Intermix Wildfire Fuel Hazard Area	
		Number of People	Percent of Total
Avon (T)	3,637	334	9.2%
Avon (V)	3,260	273	8.4%
Caledonia (T)	2,060	82	4.0%
Caledonia (V)	2,078	243	11.7%
Conesus (T)	2,325	1,874	80.6%
Dansville (V)	4,586	282	6.2%
Geneseo (T)	2,540	430	16.9%
Geneseo (V)	8,095	0	0.0%
Groveland (T)	3,241	1,492	46.0%
Leicester (T)	1,798	415	23.1%
Leicester (V)	518	21	4.1%
Lima (T)	1,833	116	6.3%
Lima (V)	2,278	499	21.9%
Livonia (T)	6,231	1,939	31.1%
Livonia (V)	1,353	133	9.8%
Mount Morris (T)	1,340	478	35.7%
Mount Morris (V)	2,931	2,931	100.0%
North Dansville (T)	696	258	37.0%
Nunda (T)	1,716	1,186	69.1%
Nunda (V)	1,211	1,179	97.3%
Ossian (T)	701	108	15.3%
Portage (T)	837	408	48.7%
Sparta (T)	1,591	859	54.0%
Springwater (T)	2,233	1,688	75.6%
West Sparta (T)	1,229	744	60.5%
York (T)	3,273	202	6.2%
Livingston County (Total)	**63,591**	**18,171**	**28.6%**

Source: American Community Survey 2019; University of Wisconsin 2010
Notes: % - Percent; T – Town; V – Village; WUI - Wildland-Urban Intermix/Interface

Impact on General Building Stock

The most vulnerable structures to wildfire events are those within Interface/Intermix WUI hazard area. Buildings constructed of wood or vinyl siding are generally more likely to be impacted by the fire hazard than buildings constructed of brick or concrete. To estimate the buildings located in the wildfire hazard area, the Interface/Intermix WUI hazard areas were overlaid upon the updated building inventory at the structure level. The replacement cost value of the structures with centers in the Interface and Intermix WUI hazard areas were totaled (Table 5.4.13-4). Overall, 10,781 buildings with a replacement cost value of $4.6 billion is located in

the wildfire hazard areas in Livingston County. The Town of Conesus has the greatest number of structures located in the wildfire hazard area (i.e., 1,414 buildings, approximately $477 million).

Table 5.4.13-4. Total Number of Buildings and Building Stock Replacement Cost Value Located in the Wildland-Urban Interface/Intermix Wildfire Hazard Area

Jurisdiction	Total Number of Buildings	Total Replacement Cost Value (RCV)	Estimated Building Stock Located Within the Wildland-Urban Interface/Intermix Wildfire Fuel Hazard Area			
			Number of Buildings Within the Wildfire Hazard Area	Percent of Total	Total Replacement Cost Value of Buildings Located Within the Wildfire Hazard Area	Percent of Total
Avon (T)	2,149	$1,324,846,766	172	8.0%	$88,686,524	6.7%
Avon (V)	1,245	$1,365,771,007	94	7.6%	$38,134,282	2.8%
Caledonia (T)	1,362	$792,755,652	41	3.0%	$14,822,666	1.9%
Caledonia (V)	979	$735,609,120	111	11.3%	$43,653,964	5.9%
Conesus (T)	1,774	$625,005,723	1,414	79.7%	$477,449,903	76.4%
Dansville (V)	1,950	$1,341,807,175	119	6.1%	$56,850,384	4.2%
Geneseo (T)	1,753	$1,161,720,041	216	12.3%	$70,555,908	6.1%
Geneseo (V)	1,329	$1,570,704,963	0	0.0%	$0	0.0%
Groveland (T)	1,330	$1,203,662,583	431	32.4%	$166,611,927	13.8%
Leicester (T)	1,214	$715,987,145	243	20.0%	$89,658,383	12.5%
Leicester (V)	240	$142,879,953	10	4.2%	$3,641,072	2.5%
Lima (T)	1,436	$859,636,929	75	5.2%	$26,003,348	3.0%
Lima (V)	777	$452,768,112	152	19.6%	$64,638,277	14.3%
Livonia (T)	3,888	$1,866,897,181	1,190	30.6%	$528,305,186	28.3%
Livonia (V)	569	$371,319,429	62	10.9%	$46,078,411	12.4%
Mount Morris (T)	1,115	$646,574,328	401	36.0%	$164,142,640	25.4%
Mount Morris (V)	1,337	$785,505,655	1,331	99.6%	$779,937,585	99.3%
North Dansville (T)	607	$497,159,183	195	32.1%	$77,594,850	15.6%
Nunda (T)	1,354	$544,934,442	927	68.5%	$380,551,943	69.8%
Nunda (V)	641	$392,488,596	623	97.2%	$382,865,729	97.5%
Ossian (T)	817	$488,703,931	100	12.2%	$45,858,009	9.4%
Portage (T)	620	$338,465,763	275	44.4%	$147,711,065	43.6%
Sparta (T)	1,151	$449,674,840	608	52.8%	$208,528,558	46.4%
Springwater (T)	1,822	$702,256,303	1,323	72.6%	$471,497,256	67.1%
West Sparta (T)	1,010	$423,213,015	556	55.0%	$186,229,920	44.0%
York (T)	2,183	$1,677,949,006	112	5.1%	$43,591,701	2.6%
Livingston County (Total)	**34,652**	**$21,478,296,842**	**10,781**	**31.1%**	**$4,603,599,493**	**21.4%**

Source: University of Wisconsin 2010; Livingston County 2021; RS Means 2021
Notes: % - Percent; T – Town; V – Village; WUI – Wildland-Urban Interface/Intermix

Impact on Critical Facilities and Lifelines

It is recognized that several critical facilities are in the wildfire hazard area and are also vulnerable to the threat of wildfire. Majority of the critical facilities exposed to the wildland urban interface/intermix hazard areas are bridges and dams. Table 5.4.13-5 summarizes critical facilities located within the wildfire hazard areas by jurisdiction. Overall, 187 critical facilities are located in the wildfire hazard area. Of these facilities, 177 are considered lifelines for the county. The Village of Mount Morris has the greatest number of critical facilities and lifelines built in the Interface/Intermix WUI hazard areas (i.e., 26 total facilities, 22 are lifelines). The

critical facilities are also categorized into FEMA lifeline groupings and are summarized in Table 5.4.13-6. Refer to Appendix F for a distribution of the critical facilities listed by critical facility type that are located in the wildfire hazard areas.

Table 5.4.13-5. Number of Critical Facilities and Lifelines Located in the Wildland-Urban Interface/Intermix Wildfire Hazard Area

Jurisdiction	Total Critical Facilities Located in Jurisdiction	Total Lifelines Located in Jurisdiction	Number of Critical Facilities and Lifeline Facilities Located in the Wildland-Urban Interface/Intermix Wildfire Hazard Area			
			Critical Facilities	Percent of Total Critical Facilities	Lifelines	Percent of Total Lifelines
Avon (T)	51	46	4	7.8%	4	8.7%
Avon (V)	36	27	0	0.0%	0	0.0%
Caledonia (T)	19	16	0	0.0%	0	0.0%
Caledonia (V)	28	25	1	3.6%	1	4.0%
Conesus (T)	26	26	16	61.5%	16	61.5%
Dansville (V)	46	37	2	4.3%	2	5.4%
Geneseo (T)	48	45	2	4.2%	2	4.4%
Geneseo (V)	46	39	0	0.0%	0	0.0%
Groveland (T)	63	59	12	19.0%	12	20.3%
Leicester (T)	26	26	1	3.8%	1	3.8%
Leicester (V)	13	13	2	15.4%	2	15.4%
Lima (T)	16	14	0	0.0%	0	0.0%
Lima (V)	21	19	0	0.0%	0	0.0%
Livonia (T)	70	65	20	28.6%	20	30.8%
Livonia (V)	16	12	1	6.3%	1	8.3%
Mount Morris (T)	30	29	10	33.3%	10	34.5%
Mount Morris (V)	28	24	26	92.9%	22	91.7%
North Dansville (T)	35	31	10	28.6%	9	29.0%
Nunda (T)	25	25	11	44.0%	11	44.0%
Nunda (V)	23	20	21	91.3%	18	90.0%
Ossian (T)	20	20	1	5.0%	1	5.0%
Portage (T)	23	22	7	30.4%	6	27.3%
Sparta (T)	18	18	9	50.0%	9	50.0%
Springwater (T)	27	26	19	70.4%	18	69.2%
West Sparta (T)	25	25	8	32.0%	8	32.0%
York (T)	58	54	4	6.9%	4	7.4%
Livingston County (Total)	**837**	**763**	**187**	**22.3%**	**177**	**23.2%**

Source: Livingston County Planning Partners 2021; HIFLD 2020;.University of Wisconsin 2010
Notes: T – Town; V – Village; % - Percent

Table 5.4.13-6. Number of Lifelines Categorized by FEMA Lifeline Category Located in the Wildland-Urban Interface/Intermix Wildfire Hazard Area

FEMA Lifeline Category	Number of Lifelines	Number of Lifelines Located in the Wildland-Urban Interface/Intermix Wildfire Fuel Hazard Area
Communications	72	19
Energy	18	3
Food, Water, Shelter	100	32
Hazardous Materials	50	7
Health and Medical	36	5
Safety and Security	269	67
Transportation	218	44
Livingston County (Total)	**763**	**177**

Source: Livingston County Planning Partners 2021; HIFLD 2020; University of Wisconsin 2010; FEMA 2021

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 business. These events may cost thousands of taxpayer dollars to suppress and control and may involve hundreds of operating hours on fire apparatus and thousands of volunteer man hours from the volunteer firefighters. There are also many direct and indirect costs to local businesses that excuse volunteers from working to fight these fires. Due to a lack of data regarding past structural and economic losses specific to Livingston County or its municipalities, it is not possible to estimate future losses due to wildfire events currently.

Impact on the Environment

According to the USFS, post-fire runoff polluted with debris and contaminates can be extremely harmful to ecosystem and aquatic life (USGS n.d.). The age and density of infrastructure within Livingston County can exacerbate consequences of fires on the environment because of the increased amount of chemicals and contaminates that would be released from burning infrastructure. These chemicals, such as iron lead, and zinc, may leach into the stormwater, contaminate nearby streams, and impair aquatic life.

Cascading Impacts on Other Hazards

Wildfires result in the uncontrolled destruction of forests, brush, field crops, grasslands, real estate, and personal property, and have secondary impacts on other hazards such as flooding, by removing vegetation and destroying watersheds.

Future Changes That May Impact Vulnerability

Understanding future changes that effect vulnerability in the county can assist in planning for future development and ensure establishment of appropriate mitigation, planning, and preparedness measures. Changes in the natural environment and built environment and how they interact can also provide insight about ways to plan.

Projected Development

As discussed in Section 4, areas targeted for future growth and development have been identified across the county. Any areas of growth located in the Interface/Intermix WUI hazard areas could be at risk. The maps in each jurisdictional annex (Section 9 of this HMP) show the new development project areas and their proximity to the Interface/Intermix WUI hazard areas.

Projected Changes in Population

According to the 2019 American Community Survey 5-year population estimates, the population of the county has decreased by approximately 3-percent since 2010. While less people will reside in the county, those that remain may move into areas that are susceptible to wildfire events. Section 4, County Profile, provides additional discussion on population trends.

Climate Change

As discussed above, most studies project that the State of New York will see an increase in average annual temperatures and precipitation. Changes in temperature can influence how fire interacts with the surrounding natural habitat and built environment. Fire interacts with climate and vegetation (fuel) in predictable ways. Understanding the climate/fire/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, and
- Complications from land use change, invasive species and an increasing WUI (USFS 2020).

Fire occurrence and/or area burned could increase across the U.S. due to the increase of lightning activity, the frequency of surface pressure and associated circulation patterns conductive to surface drying, and fire-weather conditions, in general, which is conductive 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, 2020).

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 conducive to extreme fire behavior (USFS, 2020).

Change of Vulnerability Since the 2015 HMP

Since the 2014 HMP, population statistics have been updated using the 5-Year 2015-2019 American Community Survey Population Estimates. The general building stock was also updated using 2021 building footprint and tax assessor data from Livingston County. Furthermore, the replacement cost values of the building inventory were updated using 2021 RS Means values. 2021 critical facility inventory data provided by the Livingston County Planning Partners and the Homeland Infrastructure Foundation-Level Data (HIFLD) were used to assess the number of critical facilities and lifelines at risk to the 2010 University of Wisconsin wildfire hazard areas.

Overall, this vulnerability assessment uses a more precise and thorough approach, which provides increased accuracy for estimated exposure and potential losses for Livingston County.