5.4.7 WILDFIRE

This section provides a profile and vulnerability assessment of the wildfire hazard for Broome County.

5.4.7.1 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

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 fires, range fires, or ground fires. Wildfires do not include fires naturally or purposely ignited to manage vegetation for one or more benefits (NYS DHSES 2014). Although destructive fires do not occur annually, the State's fire history shows a cycle of outbreaks that have caused human death, property loss, forest destruction, and air pollution (NYS DHSES 2014).

Extent

Wildfire events can range in size and intensity; much of which depends on weather and human activity.

Wildfire Behavior and Fire Ecology

Fire behavior is defined as the manner in which fuel ignites, flame develops, and fire spreads, which depend on interactions among 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 are able to predict fire behavior.

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

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 inhibit wildfires: fire travels downslope much more slowly than it does upslope, and ridgetops often mark the end of a wildfire's rapid spread (FEMA 1997).

Fuel – Fuels are classified by weight or volume (fuel loading) and by type. Fuel loading is used to describe the amount of vegetative material available. If this 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 a given 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), midstory (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 directly 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, but not limited to, 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 fires 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 condition and can identify areas most susceptible to fire ignition (Burgan et al. 2000).

Fuel Moisture (FM) content is quantity of water in a fuel particle expressed as a percent of oven-dry weight of the fuel particle and is an expression of cumulative effects of past and present weather events, 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).

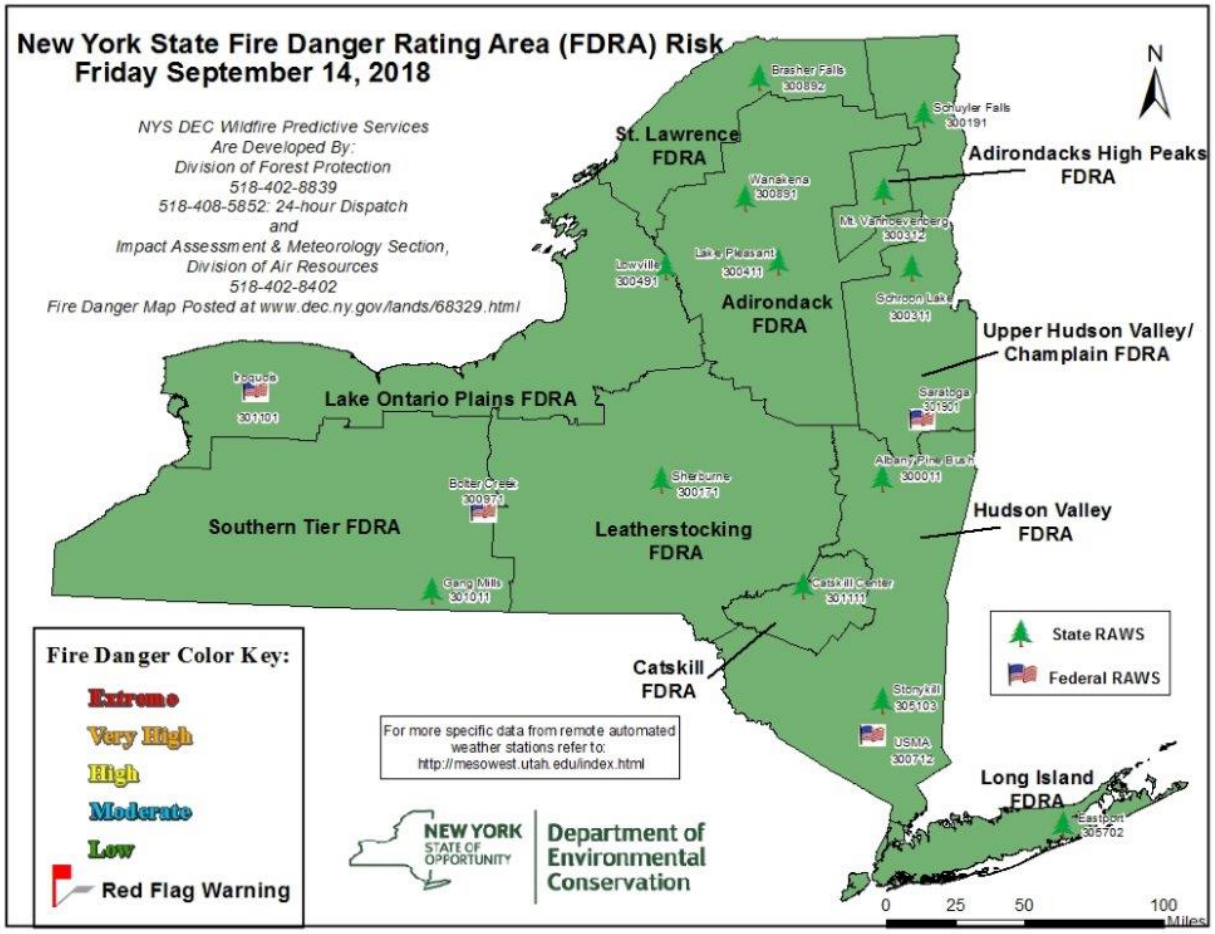
The ***Fire Danger Rating*** in New York is established using information from the National Fire Danger Rating System (NFDRS) and takes into account current and antecedent weather, fuel types, and both live and dead fuel moisture. This information is provided by local station managers (USFS, n.d.) in each of the ten regions of New York State. Figure 5.4.7-1 shows an example of a Fire Danger Rating Areas (FDRA) in NYS and the fire danger risk within each area on a specific date. Broome County is part of the Leatherstocking FDRA. On this particular day, the entire state's fire danger was low. Table 5.4.7-1 lists fire danger ratings and color codes, also used by NYSDEC to update its fire danger rating maps, identified later in this section.

Table 5.4.7-1. 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 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 2014

Figure 5.4.7-1. New York State Fire Danger Rating Areas



Source: NYSDEC 2018

Location

Many areas in Broome County, particularly those that are heavily forested or contain large tracts of brush and shrubs, are prone to fires (NYSDEC 2018). In NYS, NYSDEC's Division of Forest Protection (Forest Ranger Division) is designated as the State's lead agency for wildfire mitigation. It has fought fires and retained records for more than 125 years. Over the past 25 years (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% of all wildfires. However, they help contain 33% of all wildfire acres (NYSDEC 2018). The Forest Ranger Division (different than the Fire Danger Rating Area) for Broome County is Region 7. The boundaries of the Fire Danger Rating Areas do not match the Forest Ranger Division boundaries displayed in Figure 5.4.7-1.

The Broome County GIS & Mapping Services land cover dataset indicates that nearly 440 square miles of land area is classified as tree canopy - over 60 percent of the county's total area. In addition, there are approximately 22,959 acres of wild/forest land in the county (Broome County GIS & Mapping Services, 2016). Refer to Table 4-2 in Section 4 (County Profile) for the acreage of land use types in the county.

Broome County has an abundance of park and recreational land. Most of the park land in the county is owned by NYSDEC; these parks include Arctic China State Forest, Beaver Dam State Forest, Beaver Flow State Forest, Beaver Pond State Forest, Cascade Valley State Forest, Cat Hollow State Forest, Hawkins Pond State Forest, Long Pond State Forest, Marsh Pond State Forest, Melondy Hill State Forest, Nanticoke Lake State Forest, Skyline Drive State Forest, Tracy Creek State Forest, Triangle State Forest, Whittacker Swamped State Forest. Of these parks, Melondy Hill State Forest has the greatest contiguous area in the county – 1,975.7 acres (NYSDEC, 2018). Table 5.4.7-2 displays the acres of public park land by owner in Broome County.

Table 5.4.7-2. Parks & Recreation Land by Owner

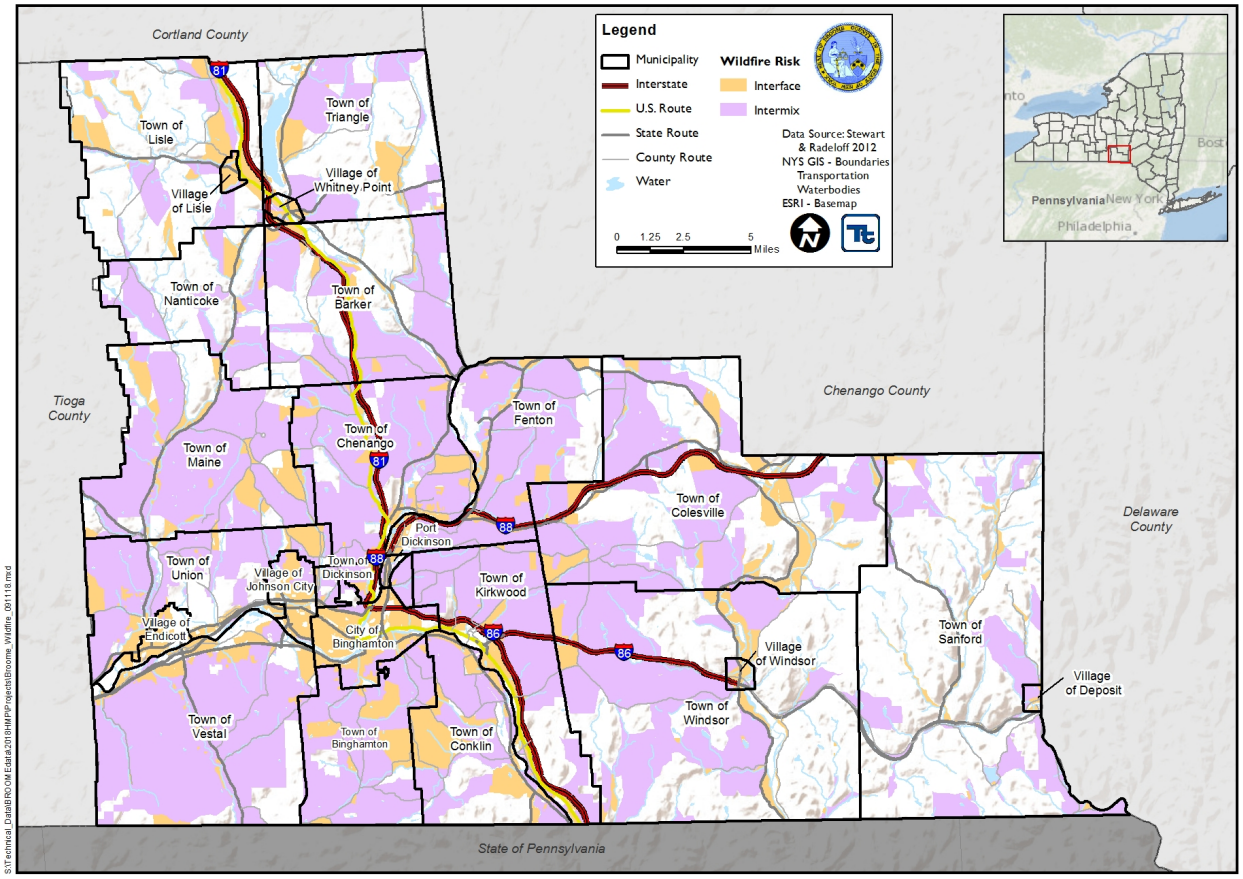
Owner	Acres
County	1,869
Federal	2,833
Municipal	1,803
State	10,806
Total	**17,311**

Source: Broome County GIS & Mapping Services, 2018

The wildland-urban interface (WUI) is the area where houses and wildland vegetation meet or intermingle, and where wildfire problems are most pronounced (Radeloff et al 2018). A detailed WUI, divided into Interface and Intermix areas, defines the wildfire hazard area for Broome County. Intermix WUI are areas where housing and vegetation intermingle; interface WUI are areas with housing in the vicinity of contiguous wildland vegetation. This data was obtained through the SILVIS Laboratory, Department of Forest Ecology and Management, University of Wisconsin – Madison.

Approximately 12.1 percent of the county's land area is within the WUI interface and 45.9 percent of the county's land is within the WUI intermix. At the municipal level, the Village of Lisle has the greatest percent of land area in the combined interface and intermix with 98.6 percent, and it also has the greatest percent of land area in the WUI interface with 82.5 percent. The Town of Binghamton has the greatest percent of land area in the WUI intermix with 77.0 percent.

Figure 5.4.7-2. Wildland Urban Interface and Intermix in Broome County

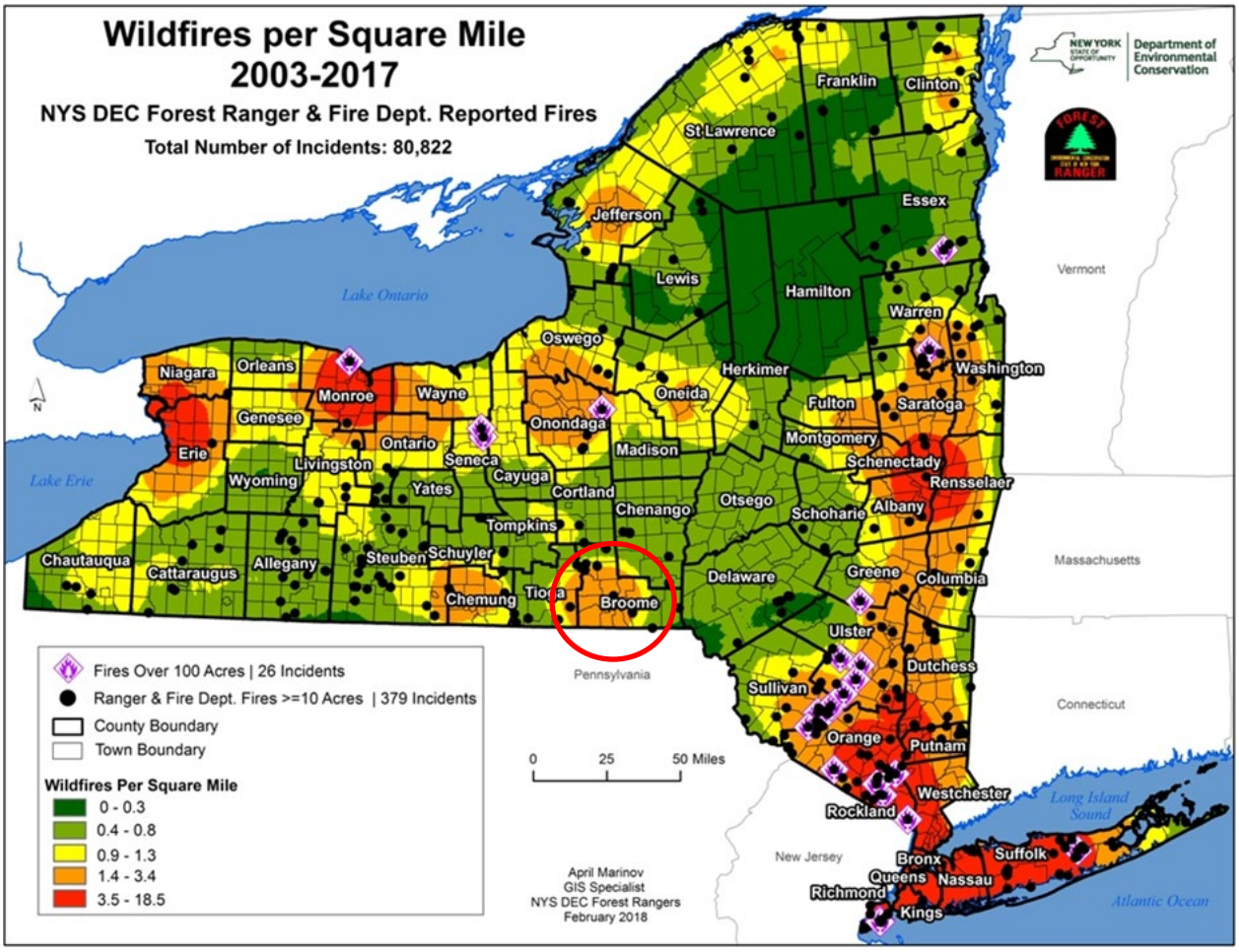


Previous Occurrences and Losses

Between 1954 and 2018, NYS was not included in any wildfire-related major disaster (DR) or emergency (EM) declarations (FEMA 2018).

Determinations of wildfire occurrences in NYS 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). Figure 5.4.7-3 illustrates occurrences of wildfires in NYS between 2003 and 2017. This figure reveals occurrences of between 0.4 and 3.4 wildfires per square mile from 2003 to 2017 within Broome County municipalities with the lowest rate of occurrence in the north and east ends of the county and the highest rate of occurrence in the center and southwest portions of the county. The majority of these fires are small brush fires.

Figure 5.4.7-3. Wildfire Occurrences in New York State, 2003-2017



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

Climate Change Projections

Climate change directly and indirectly affects growth and productivity of forests: directly as a result of changes in atmospheric carbon dioxide and climate, and indirectly through complex interactions within forest ecosystems. Climate also affects frequency and severity of many forest disturbances, such as infestations, invasive species, wildfires, and storm events. Extreme heat events and heat waves are also projected to increase, as listed in Table 5.4.7-3 below. As temperatures increase, suitability of a habitat for specific types of trees changes. 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 5.4.7-3. Extreme Event Projections for Region 3

Event Type (2020s)	Low Estimate (10th Percentile)	Middle Range (25th to 75th Percentile)	High Estimate (90th Percentile)
Days over 90 degrees Fahrenheit (°F) (8 days)	15	17-21	23
# of Heat Waves (0.7 heat waves)	2	2 to 3	3

Event Type (2020s)	Low Estimate (10th Percentile)	Middle Range (25th to 75th Percentile)	High Estimate (90th Percentile)
Duration of Heat Waves (4 days)	4	4 to 5	5
Days below 32°F (133 days)	119	122 to 130	134

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 NYS, wildfire danger may intensify with warming and drying of vegetation. When climate alters fuel loads and fuel moisture, susceptibility of forest to wildfires changes. 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.

Probability of Future Occurrences

Nationally, wildfire risk is increasing. Wildfire experts point to four reasons why wildfire risks are increasing:

- 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 occur within the United States.
- Weather patterns across the country are changing.
- More homes are built within areas of WUI, meaning that homes are built closer to wildland areas where wildfires can occur (NYS DHSES 2014).

According to the NYS Forest Ranger Division, 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).

Fire probability depends on local weather conditions, outdoor activities (such as camping, debris burning, and construction), and degree of public cooperation with fire prevention measures. Dry weather, such as drought, can increase likelihood of wildfire events. Lightning can also trigger wildfire. Other natural disasters can increase probability of wildfires by producing fuel in both urban and rural areas. Forest damage from windstorms may block interior access roads and fire breaks, pull down overhead power lines, or damage pavement and underground utilities (Northern Virginia Regional Commission [NVRC] 2006).

In Broome County, brush fire events will continue to occur each year. The likelihood of one of those fires attaining significant size and intensity cannot be predicted and is highly dependent on environmental conditions and firefighting response. 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). Invasive forest insects can increase the likelihood of wildfires occurring; insects that attack and kill trees, such as Emerald Ash Borer, 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.

In Section 5.3, the ranking of identified hazards of concern for Broome County is provided. The probability of occurrence, or likelihood of the event, is one parameter used for ranking hazards. Based on historical records

and input from the Planning Committee, the probability of occurrence for wildfire in the county is considered 'rare' (event has between a 1 and 10% annual probability of a hazard event occurring).

5.4.7.2 Vulnerability Assessment

A spatial analysis was conducted using the WUI obtained through the SILVIS Laboratory, Department of Forest Ecology and Management, at the University of Wisconsin, Madison. For the purposes of the vulnerability assessment, an asset is considered potentially vulnerable to the wildfire hazard if it is located in the wildfire urban interface or intermix. The limitations of this analysis are recognized, and as such, the analysis is used only to provide a general estimate of vulnerability. Refer to Section 5.1 for additional details on the methodology and inventories used to assess wildfire risk.

Impact on Life, Health and Safety

Potential losses from wildfire include human health and life of residents and responders, structures, infrastructure and natural resources. The most vulnerable populations include emergency responders and those within a short distance of the interface between the built environment and the wildland environment.

Based on the spatial analysis, 51,440 individuals, or 25.6 percent of the county's population, are located in the intermix WUI, while 113,833, or 56.7 percent of the county's population, is located in the interface WUI. Overall, the Town of Vestal, the Town of Chenango, and the Town of Union have the greatest number of individuals located in the hazard area. Refer to Table 5.4.7-4 which summarizes the estimated population living in the hazard area by municipality.

Table 5.4.7-4. Estimated Population Located in the Wildland-Urban Interface Hazard Areas

Municipality	US. Census 2010 Population	Estimated Population Exposed			Percent (%) of Total Exposed
		Intermix	Interface	Total	
Barker (T)	2,732	1,569	627	2,196	80.4%
Binghamton (C)	47,376	1,747	42,292	44,039	93.0%
Binghamton (T)	4,942	3,077	1,704	4,781	96.8%
Chenango (T)	11,252	5,958	5,145	11,103	98.7%
Colesville (T)	5,232	2,603	1,536	4,139	79.1%
Conklin (T)	5,441	2,431	2,736	5,167	95.0%
Deposit (V)	819	216	603	819	100.0%
Dickinson (T)	3,637	1,019	2,614	3,633	99.9%
Endicott (V)	13,392	106	9,732	9,838	73.5%
Fenton (T)	6,674	3,684	2,788	6,472	97.0%
Johnson City (V)	15,174	1,397	13,018	14,415	95.0%
Kirkwood (T)	5,857	3,189	2,516	5,705	97.4%
Lisle (T)	2,431	537	970	1,507	62.0%
Lisle (V)	320	38	282	320	100.0%
Maine (T)	5,377	3,625	1,335	4,960	92.2%
Nanticoke (T)	1,672	736	415	1,151	68.8%
Port Dickinson (V)	1,641	331	1,296	1,627	99.1%

Municipality	US. Census 2010 Population	Estimated Population Exposed			Percent (%) of Total Exposed
		Intermix	Interface	Total	
Sanford (T)	1,588	609	244	853	53.7%
Triangle (T)	1,982	718	705	1,423	71.8%
Union (T)	27,780	5,549	7,701	13,250	47.7%
Vestal (T)	28,043	8,702	13,044	21,746	77.5%
Whitney Point (V)	964	235	722	957	99.3%
Windsor (T)	5,358	3,203	1,053	4,256	79.4%
Windsor (V)	916	161	755	916	100.0%
Broome County	**200,600**	**51,440**	**113,833**	**165,273**	**82.4%**

Sources: U.S. Census 2010, Radeloff et al. 2012
Note: The WUI (Interface and Intermix) boundaries were overlaid on the U.S. Census block; the blocks with their centroids within hazard areas were totaled for each municipality.
(C) - City
(T) – Town
(V) – Village

Socially vulnerable populations (e.g. the elderly and low-income populations) are particularly vulnerable to a hazard event. There are approximately 17,828 people over the age of 65 and 13,839 people considered low-income populations residing in the intermix WUI. There are approximately 27,961 people over the age 65 and 36229 people considered low-income populations residing in the interface WUI.

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 in breathing, odor, and reduction in visibility.

Wildfires may also threaten the health and safety of those fighting the fires. First responders are exposed to the dangers from the initial incident and after-effects from smoke inhalation and heat stroke.

Impact on General Building Stock

Structures most vulnerable to wildfire events are those located in the WUI. Buildings constructed of wood or vinyl siding are generally more likely to be damaged by fire than buildings constructed of brick or concrete. Table 5.4.7-5 and Table 5.4.7-6 list the estimated replacement cost value (RCV) and numbers of buildings located in the WUI by municipality. There are 15 municipalities with over 90 percent of their structures located the WUI hazard area; of these 15 municipalities, 7 of them also have over 90 percent of their building total replacement cost value exposed. The Village of Lisle has 100-percent of its building stock inventory located in the wildfire hazard area.

Table 5.4.7-5. Building Stock Replacement Value Located in the Wildland-Urban Interface Hazard Areas

Municipality	Total RV (Structure and Contents)	Building RV Exposed			Percent (%) of Total Exposed
		Intermix	Interface	Total	
Barker (T)	$688,813,868	$329,859,222.61	$205,938,751.82	$535,797,974.43	77.8%

Municipality	Total RV (Structure and Contents)	Building RV Exposed			Percent (%) of Total Exposed
		Intermix	Interface	Total	
Binghamton (C)	$77,847,328,827	$1,143,479,407.92	$52,084,299,721.90	$53,227,779,129.82	68.4%
Binghamton (T)	$1,228,624,612	$859,124,400.97	$359,493,675.03	$1,218,618,076.00	99.2%
Chenango (T)	$4,543,298,114	$1,850,850,939.98	$1,809,180,451.93	$3,660,031,391.91	80.6%
Colesville (T)	$2,981,791,633	$615,121,955.01	$322,532,345.19	$937,654,300.20	31.4%
Conklin (T)	$1,795,243,811	$762,898,965.15	$835,924,761.11	$1,598,823,726.25	89.1%
Deposit (V)	$459,195,313	$59,049,380.26	$353,176,200.60	$412,225,580.86	89.8%
Dickinson (T)	$1,446,559,666	$511,343,296.75	$672,458,663.18	$1,183,801,959.93	81.8%
Endicott (V)	$11,814,240,767	$23,018,481.07	$8,557,947,382.81	$8,580,965,863.88	72.6%
Fenton (T)	$1,763,698,720	$714,929,970.96	$996,344,854.80	$1,711,274,825.75	97.0%
Johnson City (V)	$31,593,599,188	$4,784,430,372.57	$19,496,497,377.70	$24,280,927,750.27	76.9%
Kirkwood (T)	$3,589,691,107	$1,160,902,064.50	$1,862,530,553.81	$3,023,432,618.31	84.2%
Lisle (T)	$568,905,916	$118,325,461.91	$226,637,286.40	$344,962,748.31	60.6%
Lisle (V)	$107,968,636	$9,194,016.92	$98,774,619.09	$107,968,636.01	100.0%
Maine (T)	$1,702,703,387	$1,209,521,234.57	$387,941,566.33	$1,597,462,800.90	93.8%
Nanticoke (T)	$395,739,757	$222,205,976.29	$74,996,397.86	$297,202,374.14	75.1%
Port Dickinson (V)	$525,142,613	$112,711,589.15	$405,406,314.07	$518,117,903.22	98.7%
Sanford (T)	$770,815,458	$358,734,863.08	$95,362,292.04	$454,097,155.11	58.9%
Triangle (T)	$576,956,692	$173,637,881.25	$269,465,358.49	$443,103,239.74	76.8%
Union (T)	$30,465,363,557	$7,371,788,908.45	$10,822,513,899.50	$18,194,302,807.95	59.7%
Vestal (T)	$21,589,049,741	$4,731,589,549.84	$14,104,169,170.30	$18,835,758,720.14	87.2%
Whitney Point (V)	$519,433,248	$94,592,322.68	$415,398,744.88	$509,991,067.56	98.2%
Windsor (T)	$1,424,173,576	$753,309,730.00	$311,530,973.90	$1,064,840,703.90	74.8%
Windsor (V)	$719,873,967	$53,597,240.94	$647,902,748.18	$701,499,989.12	97.4%
Broome County	**$199,118,212,175**	**$28,024,217,232.80**	**$115,416,424,110.91**	**$143,440,641,343.71**	**72.0%**

Source: Broome County GIS & Mapping Services; Radeloff et al. 2012
Note: The WUI (Interface and Intermix) boundaries were overlaid on the custom general building stock; the structures with their centroids within hazard areas were totaled for each municipality.
(C) - City
(T) – Town
(V) – Village

Table 5.4.7-6. Number of Buildings Located in the Wildland-Urban Interface Hazard Areas

Municipality	Total Number of Building	Buildings Exposed			Percent (%) of Total Exposed
		Intermix	Interface	Total	
Barker (T)	1,265	669	331	1,000	79.1%
Binghamton (C)	25,243	1,331	22,280	23,611	93.5%
Binghamton (T)	2,121	1,377	728	2,105	99.2%
Chenango (T)	5,183	2,585	2,475	5,060	97.6%

Municipality	Total Number of Building	Buildings Exposed			Percent (%) of Total Exposed
		Intermix	Interface	Total	
Colesville (T)	2,476	1,225	698	1,923	77.7%
Conklin (T)	2,520	1,187	1,242	2,429	96.4%
Deposit (V)	468	101	364	465	99.4%
Dickinson (T)	1,446	396	1,009	1,405	97.2%
Endicott (V)	7,011	50	4,841	4,891	69.8%
Fenton (T)	3,166	1,626	1,477	3,103	98.0%
Johnson City (V)	7,904	785	6,564	7,349	93.0%
Kirkwood (T)	2,628	1,324	1,184	2,508	95.4%
Lisle (T)	1,108	229	457	686	61.9%
Lisle (V)	135	18	117	135	100.0%
Maine (T)	2,431	1,602	652	2,254	92.7%
Nanticoke (T)	762	377	217	594	78.0%
Port Dickinson (V)	845	182	660	842	99.6%
Sanford (T)	1,399	673	175	848	60.6%
Triangle (T)	915	326	348	674	73.7%
Union (T)	12,997	2,615	3,719	6,334	48.7%
Vestal (T)	9,532	3,695	5,436	9,131	95.8%
Whitney Point (V)	439	109	322	431	98.2%
Windsor (T)	2,685	1,604	551	2,155	80.3%
Windsor (V)	435	61	366	427	98.2%
Broome County	**95,114**	**24,147**	**56,213**	**80,360**	**84.5%**

Source: Broome County GIS & Mapping Services; Radeloff et al. 2012
Note: The WUI (Interface and Intermix) boundaries were overlaid on the custom general building stock; the structures with their centroids within hazard areas were totaled for each municipality.
(C) - City
(T) – Town
(V) – Village

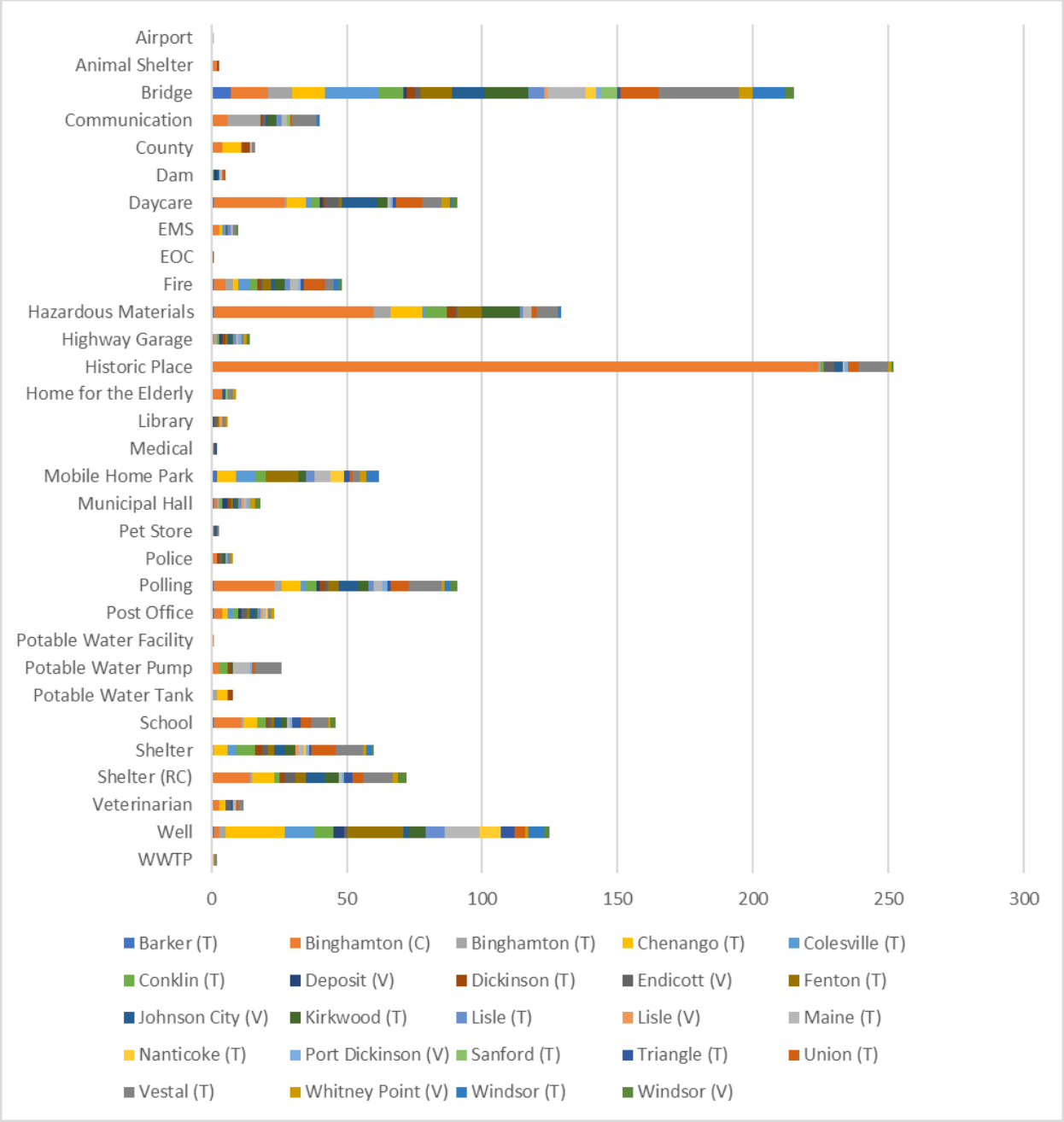
Impact on Critical Facilities

A number of critical facilities are located in the wildfire hazard area, many of which house vulnerable populations (schools and senior facilities) and agencies that respond to wildfire events (fire and police). Critical facilities with wood-frame construction are especially vulnerable during wildfire events.

4 displays the number of critical facilities within the wildfire hazard area by jurisdiction. Of the 1,399 critical facilities exposed, the City of Binghamton has the greatest number of critical facilities located within the WUI (410 facilities), followed by the Town of Vestal with 132 facilities.

The critical facility type with the greatest number of structures located in the wildfire hazard area is historic places (252) followed by bridges (215). Roads and bridges in areas of fire risk are important because they provide ingress and egress to neighborhoods. Fires can create conditions that block or prevent access and can isolate residents and emergency service providers. Wildfire typically does not have a major direct impact on bridges, but it can create conditions in which bridges are obstructed. As illustrated on Figure 5.4.7-2 earlier in this section, all of the Interstates, State Routes, and US Routes that traverse the county have segments located in the WUI.

Table 5.4.7-7. Critical Facilities Located in the Wildland-Urban Interface Hazard Areas in Broome County



Sources: Broome County GIS & Mapping Services, Radeloff et al. 2012.

Impact on 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 and decrease in tourism. In 2012, travelers spent more than $297 million and generated nearly $150 million in total labor income in Broome County (Central New York 2013). Wildfires can cost thousands of taxpayer dollars to suppress and control and can 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.

Future Changes that May Impact Vulnerability

Understanding future changes that impact vulnerability in the County can assist in planning for future development and ensuring that appropriate mitigation, planning, and preparedness measures are in place. The County considered the following factors to examine potential conditions that may affect hazard vulnerability:

- Potential or projected development
- Projected changes in population
- Other identified conditions as relevant and appropriate, including the impacts of climate change.

Projected Development

There are 138 new developments exposed to the wildfire hazard area; 88 of these developments are located within the interface WUI, and 50 are located within the intermix WUI. Both the City of Binghamton and Town of Union have the greatest number of developments located in the hazard area with 27 developments exposed. Of the City of Binghamton's 27 developments, 22 are located within the interface WUI, and of the Town of Union's 27 developments, 15 are located within the interface WUI. Refer to each jurisdictional annex for the results of each exposure analysis on new development.

Broome County GIS & Mapping Services conducted a developable land analysis to determine potential locations for relocating homes out of hazard areas or building homes once properties in hazard areas have been acquired. The criteria for determining potential locations is detailed in Section 4.6.8 (Housing and Relocation) in the County Profile. The spatial layers used to determine potential locations for development were used to calculate a percent of developable area for each vacant parcel; parcels with a percentage greater than zero were considered "developable." Of the 15,751 vacant parcels, 14,802 are developable. A total of 4,418 parcels are located in the interface WUI; the City of Binghamton has the greatest number of developable parcels located in the interface WUI with 1,037 of its 1,485 parcels (70.0 percent). A total of 7,859 parcels are located in the intermix WUI; the Town of Windsor has the greatest number of developable parcels located in the intermix WUI with 801 of its 1,291 parcels (62.0 percent).

Major new developments located in the wildfire hazard area can be retrofitted with flame-resistant materials or adjacent communities can institute vegetation maintenance programs to reduce the risk of wildfires spreading into developed areas.

Projected Changes in Population

According to population projections from the Cornell Program on Applied Demographics, Broome County will experience a continual population decrease through 2040 (an estimated decline of 17,400 people by 2040). While less people will reside in the county, those that remain may move into locations that are more susceptible to wildfire than others. According to the Comprehensive Plan (2012), the county has experienced a decrease in population in the City of Binghamton and most villages, while the more rural town populations have increased. Increased development in the more rural areas may result in an expansion of WUI. Additionally, the mix of

structures, ornamental vegetation, and wildland fuels may cause erratic fire behavior. These factors and others substantially increase risk to life, property, and economic welfare in the WUI. While many interface communities are present throughout NYS and Broome County, an official list that details location, type of interface, and surrounding fuel makeup does not exist (NYS DHSES 2014). Refer to Section 4.4.2 (Population Trends) in the County Profile for further discussion on population projections for Broome County.

Climate Change

As discussed earlier, temperatures are anticipated to increase, therefore, suitability of habitats for specific types of trees potentially changes, altering the fire regime and resulting in more frequent fire events and changes in intensity. Prolonged and more frequent heat waves have the potential to increase the likelihood of a wildfire. The increased potential combined with stronger winds can increase the County's vulnerability. If stronger winds occur near a wildfire and emergency services are unable to initially contain the event, the fast-moving fire can spread to nearby developments. This can directly impact the County's population and built environment in the vicinity of the fire, and also indirectly affect those served by utility infrastructure that can be damaged by a fire.

Change of Vulnerability

The wildfire hazard was not identified as a hazard of concern in the 2013 HMP and therefore a wildfire exposure analysis was not conducted as part of the 2013 HMP risk assessment.

Identified Issues

- A significant amount of future development is located within the WUI. Development in these areas should be managed or measures taken to implement preventative measures to mitigate impacts on these assets.
- Climate change could affect the wildfire hazard as increased frequency of drought events could affect water supply and prolonged heat waves could support increased risk of wildfire events.
- Future growth into interface areas should continue to be managed.
- Area fire districts should continue to train on wildland-urban interface events.