



5.4.9 Wildfire

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

5.4.9.1 Hazard Profile

This section provides profile information, including description, location, extent, previous occurrences and losses, and probability of future occurrences.

Description

According to the New York State Hazard Mitigation Plan (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 that burn in or threaten to burn buildings and other structures are referred to as wildland urban interface fires. 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 that are controlled for the defined purpose of managing vegetation for one or more benefits (NYS DHSES 2014).

Wildfire in Monroe County is assessed by reference to the same scientific and environmental factors applied for that purpose to any wildfire elsewhere. Fuels, weather, and topography are the primary factors in natural spread and destruction of every wildfire. New York State, including Monroe County, has large tracts of diverse forest lands, many of which have resulted from historical destructive wildfires. 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).

Wildfires are grouped within three classes: surface fires, ground fires, and crown fires. Surface fires, the most common, burn along the forest floor, moving slowly and killing or damaging trees. Ground fires are usually started by lightning, and burn on or below the forest floor. Crown fires spread rapidly by wind and move quickly by jumping along the tops of trees.

The Federal Emergency Management Agency (FEMA) defines the following four categories of wildfires that occur throughout the United States:

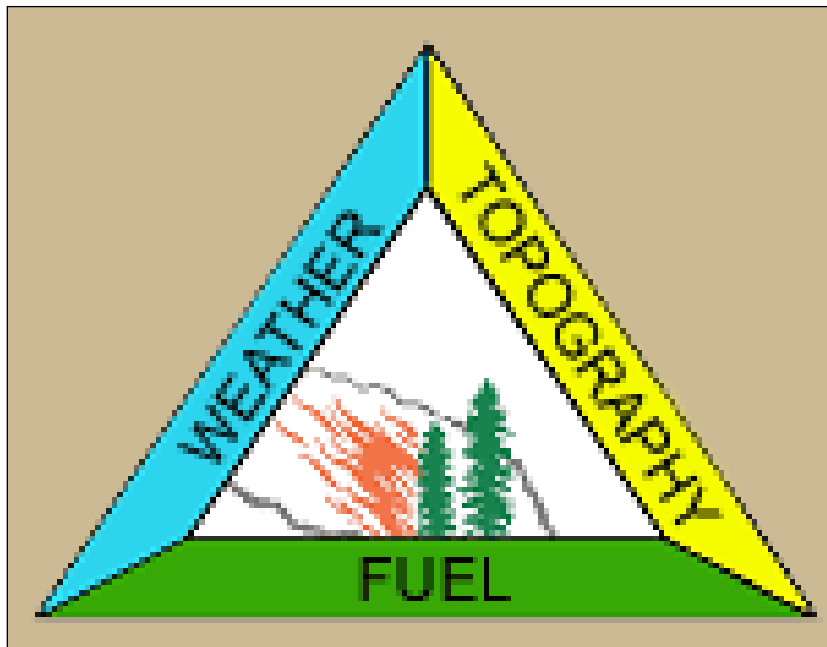
- Wildland fires – fueled almost exclusively by natural vegetation. These fires typically occur in national forests and parks, where federal agencies are responsible for fire management and suppression.
- Interface or intermix fires – urban/wildland fires where vegetation and the built environment provide fuel.
- Firestorms – events of such extreme intensity that effective suppression is virtually impossible. Firestorms occur during extreme weather and generally burn until conditions change or the available fuel is exhausted.
- Prescribed fires and prescribed natural burns – fires intentionally set, or selected natural fires that are allowed to burn for beneficial purposes (FEMA 1997).



Fire Ecology and Wildfire Behavior

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. 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. The wildfire behavior triangle (Figure 5.4.7-1) illustrates how each of these factors influences wildfire.

Figure 5.4.9-1. Wildfire Behavior Triangle



Source: U.S. Department of Agriculture (USDA) Forest Service date unknown

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. Fuels on the uphill side of the fire on steep slopes are closer to the source of heat. Radiation preheats and dries the fuel, thus intensifying fire behavior. 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 can be used to describe the amount of vegetative material available. If this amount doubles, the energy released



can also double. Each fuel type is given a burn index — an estimate of the amount of potential energy that may be released, the effort required to ignite a fire in a given fuel, and the 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, 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). Fire behavior is strongly influenced by these fuels. Each of these layers provides a different type of fuel source for wildfires.

- 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 the 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 located between the top of the surface fuels and the bottom of the 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 are the primary fuel layer in a forest crown fire (U.S. Forest Service [USFS] 2003).

Weather / Air Mass – Weather is the most important factor in a fire’s environment, 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).

Extent

The extent (that is, magnitude or severity) of wildfires depends on weather and human activity. Several tools are available to estimate fire potential, extent, danger, and growth including, but not limited to, the following:

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. It was developed by the Fire Behavior unit at the Fire Sciences Laboratory in Missoula, Montana, and is currently supported and maintained at the National Interagency Fire Center (NIFC) in Boise, Idaho (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, Date Unknown). The Fire Danger Rating level 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, Date Unknown). Table 5.4.7-1 shows



the fire danger rating and color code, which is also used by the NYSDEC to update its fire danger rating maps, which is identified later in this section.

Table 5.4.9-1. 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 the 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, 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.
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

The **Fire Potential Index (FPI)** is derived by combining information on daily weather and vegetation condition and can identify the areas most susceptible to fire ignition. The combination of relative greenness and weather information identifies the moisture condition of the live and dead vegetation. The weather information also identifies areas of low humidity, high temperature, and no precipitation to identify areas most susceptible to fire ignition. The FPI enables local and regional fire planners to quantitatively measure fire ignition risk (USGS 2005). FPI maps are provided on a daily basis by the U.S. Forest Service. The scale ranges from 0 (low) to 100 (high). The calculations used in the NFDRS are not part of the FPI, except for a 10-hour moisture content (Burgan et al, 2000).

Fuel Moisture (FM) content is the quantity of water in a fuel particle expressed as a percent of the oven-dry weight of the fuel particle. FM content is an expression of the cumulative effects of past and present weather events and must be considered in evaluating the effects of current or future weather on fire potential. FM is computed by dividing the weight of the “water” in the fuel by the oven-dry weight of the fuel and then multiplying by 100 to yield the percent of moisture in a fuel (Burgan et al. 2000).

There are two kinds of FM: live and dead. Live fuel moistures are much slower to respond to environmental changes and are most influenced by things such as a long drought period, natural disease and insect infestation,



annuals that cure out early in the season, timber harvesting, and changes in the fuel models caused by blowdown from windstorms and ice storms (Burgan et al. 2000). Dead fuel moisture is the moisture in any cured or dead plant part, whether attached to a still-living plant or not. Dead fuels absorb moisture through physical contact with water (such as rain and dew) and absorb water vapor from the atmosphere. Dead fuels are dried by evaporation. These drying and wetting processes of dead fuels are such that the moisture content of these fuels is strongly affected by fuel sizes, weather, topography, decay classes, fuel composition, surface coatings, fuel compactness, and arrangement (Schroeder and Buck 1970).

Fuels are classified into four categories that respond to changes in moisture. This response time is referred to as a time lag. A fuel's time lag is proportional to its diameter and is loosely defined as the time it takes a fuel particle to reach two-thirds of its way to equilibrium with its local environment. The four categories include:

- 1-hour fuels: up to ¼-inch diameter – fine, flashy fuels that respond quickly to changes in weather. Computed from observation time, temperature, humidity, and cloudiness.
- 10-hour fuels: ¼-inch to 1 inch diameter — computed from observation time, temperature, humidity, and cloudiness or can be an observed value.
- 100-hour fuels: 1-inch to 3-inch diameter — computed from 24-hour average boundary condition composed of day length (daylight hours), hours of rain, and daily temperature/humidity ranges.
- 1,000-hour fuels: 3-inch to 8-inch diameter — computed from a seven-day average boundary condition composed of day length, hours of rain, and daily temperature/humidity ranges (National Park Service, Date Unknown).

The **Keetch-Byram Drought Index (KBDI)** is designed for fire potential assessment. It is a number representing the net effect of evapotranspiration and precipitation in producing cumulative moisture deficiency in deep duff and upper soil layers (USFS, Date Unknown). The index increases each day without rain and decreases when it rains. The scale ranges from 0 (no moisture deficit) to 800 (maximum drought possible). The range of the index is determined by assuming that there are 8 inches of moisture in a saturated soil that is readily available to the vegetation. The depth of soil required to hold 8 inches of moisture varies for different soil types. A prolonged drought influences fire intensity, largely because more fuel is available for combustion. The drying of organic material in the soil can lead to increased difficulty in fire suppression (Florida Forest Service, Date Unknown).

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 the potential for existing fires to become large fires. It is named after its developer, Donald Haines, a Forest Service research meteorologist, who did the initial work and published the scale in 1988 (Storm Prediction Center [SPC], Date Unknown).

The Haines Index can range between 2 and 6. The drier and more unstable the lower atmosphere is, the higher the index. It is calculated by combining the stability and moisture content of the lower atmosphere into a number that correlates well with large fire growth. The stability term is determined by the temperature difference between two atmospheric layers; the moisture term is determined by the temperature and dew point difference. The index, as listed below, has shown to correlate with large fire growth on initiating and existing fires where surface winds do not dominate fire behavior (USFS, Date Unknown).

- Very Low Potential (2) – moist, stable lower atmosphere
- Very Low Potential (3)
- Low Potential (4)
- Moderate Potential (5)
- High Potential (6) – dry, unstable lower atmosphere (USFS, Date Unknown)



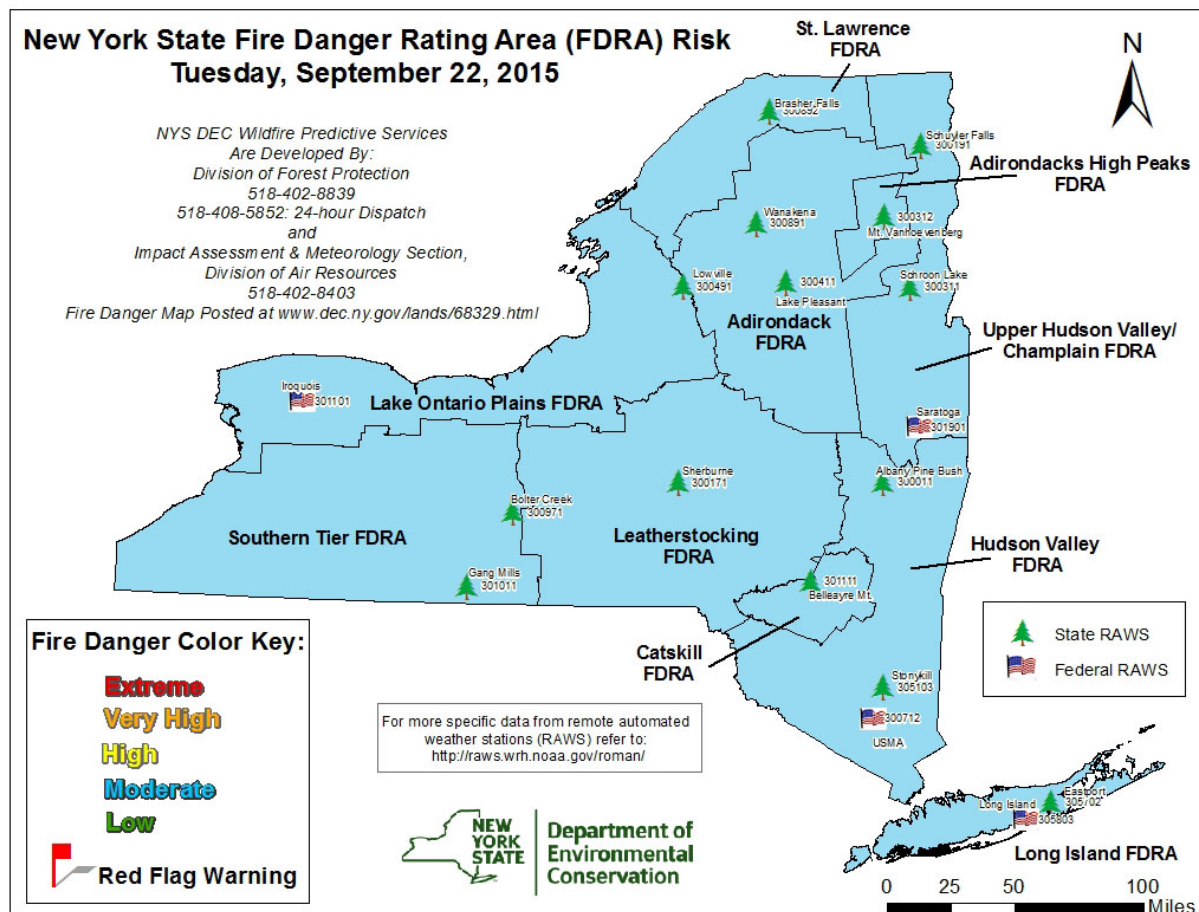
The Haines Index is intended to be used all over the U.S. It is adaptable for three elevation regimes: low, middle, and high elevations. Low elevation is for fires at or very near sea level. Middle elevation is for fires burning in the 1,000 to 3,000 feet in elevation range. High elevation is intended for fires burning above 3,000 feet in elevation (SPC, Date Unknown).

The **Buildup Index (BUI)** is a number that reflects the combined cumulative effects of daily drying and precipitation in fuels with a 10-day time lag constant. The BUI can represent 3 to 4 inches of compacted litter or can represent up to 6 inches or more of loose litter (North Carolina Forest Service 2007).

NYSDEC Fire Danger Rating Map

A current fire danger rating map is updated daily on the NYSDEC website at (<http://www.dec.ny.gov/lands/68329.html>). The map is developed by information obtained from the Division of Forest Protection and Division of Air Resources (impact assessment and meteorology section). Figure 5.4.9-2 shows the Fire Danger Rating Areas (FDRAs) in New York State and the current (as of September 22, 2015) fire danger risk for each of the areas. The figure is color coded and indicates where there are red flag warning areas. The table following the figure describes the fire danger ratings for New York State.

Figure 5.4.9-2. New York State Fire Danger Rating Areas



Source: NYSDEC, 2015

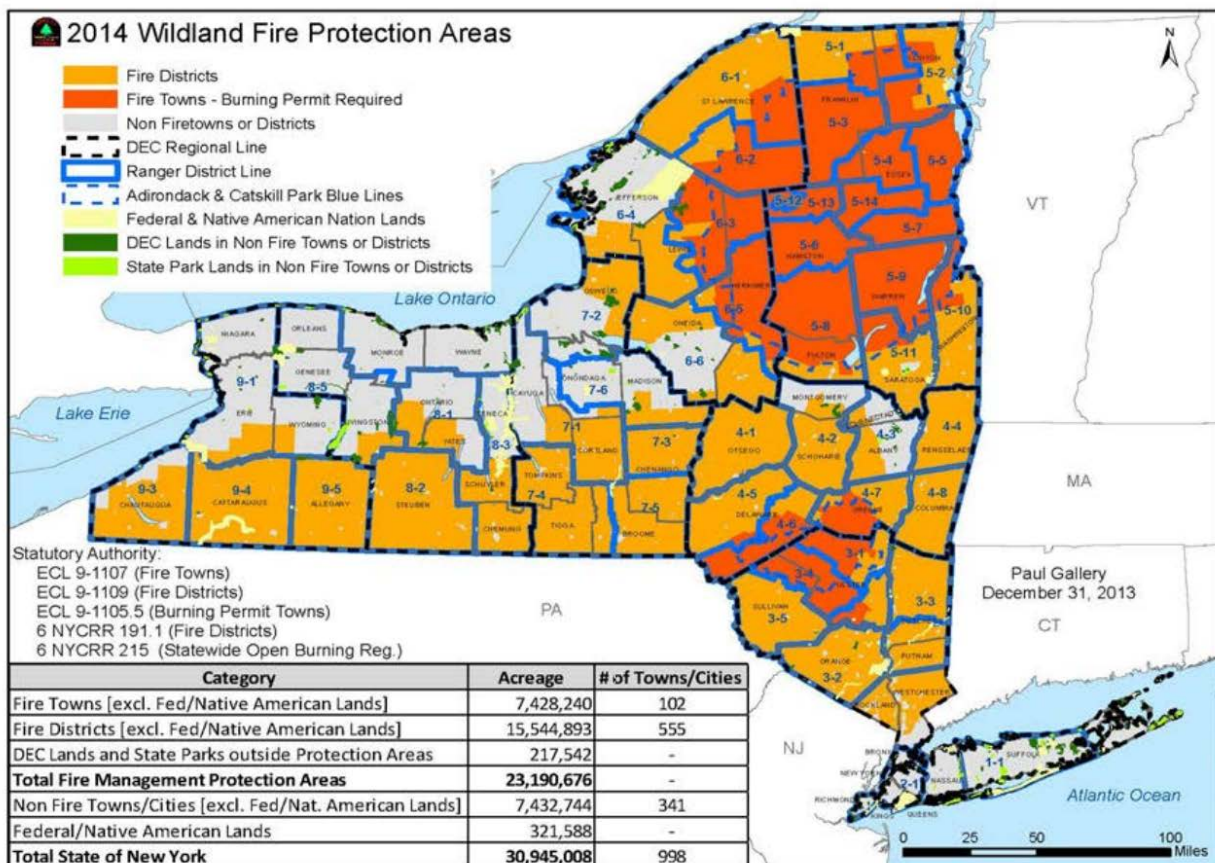


Location

According to the U.S. Fire Administration (USFA), the fire problem in the United States varies from region to region. This variation often is a result of climate, poverty, education, demographics, and other causal factors (USFA 2015). Wildfires do occur in Monroe 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 2015).

In New York State, the NYSDEC's Division of Forest Protection (Forest Ranger Division) is designated as the state's lead agency for wildfire mitigation. The Forest Ranger Division has a statutory requirement to provide a forest fire protection systems for 657 of the 932 jurisdictions throughout New York State. This jurisdiction includes cities and villages and covers 23.1 million acres of land, including all state-owned land outside of the jurisdictions. The Lake Ontario Plains and New York City-Long Island areas are the general areas not under the statutory requirement. Records on wildfires in this area are collected from fire department reports to evaluate any need to expand statutory responsibilities. Figure 5.4.9-3 displays the fire protection areas in New York State. This figure indicates that, as of 2014, Monroe County is not part of the wildfire protection area. Figure 5.4.9-4 shows the Fire Districts and Fire Station locations in Monroe County.

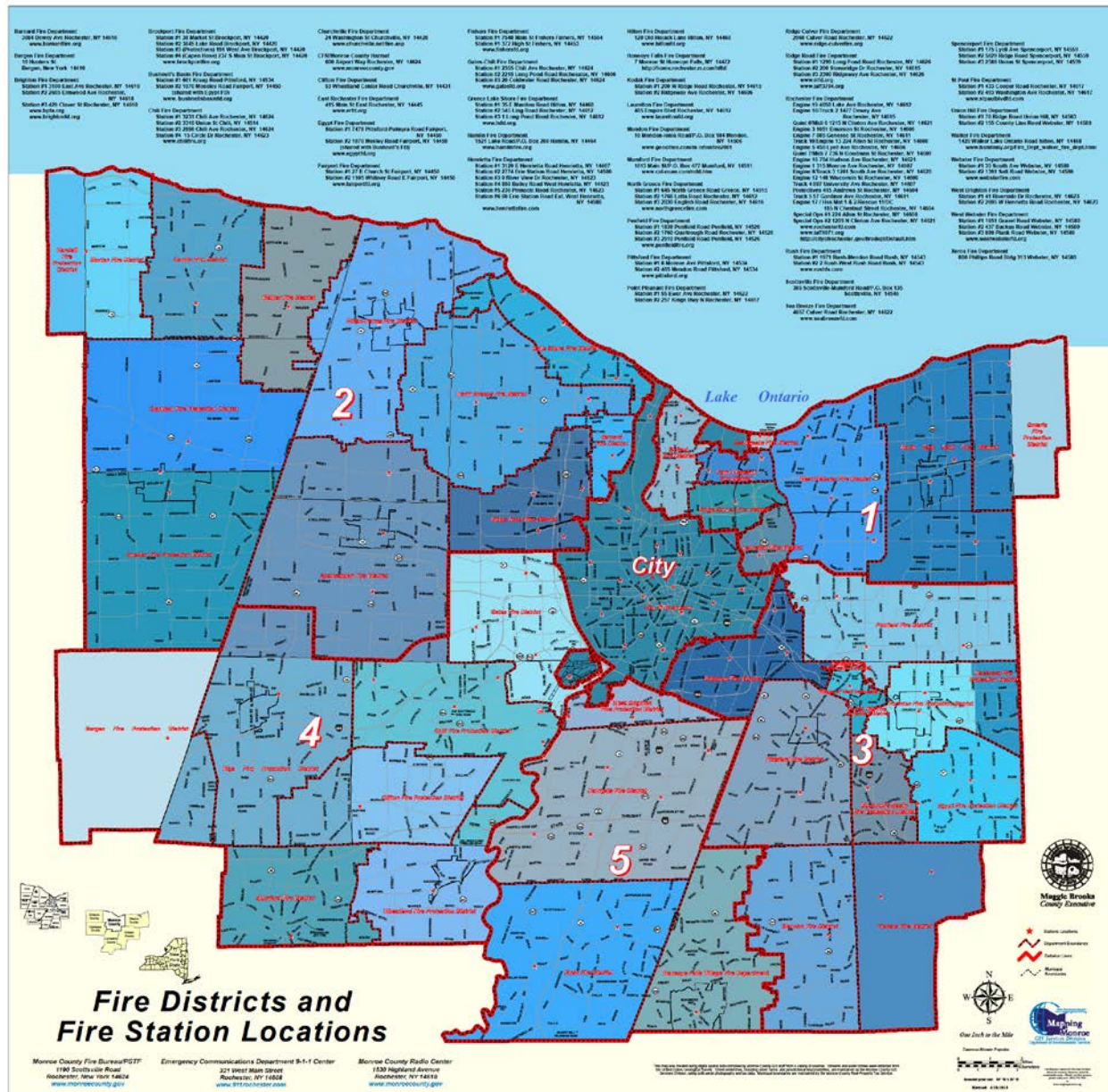
Figure 5.4.9-3. Forest Ranger Division Wildfire Protection Areas



Source: NYSDEC 2015



Figure 5.4.9-4. Fire Districts and Fire Station Locations in Monroe County



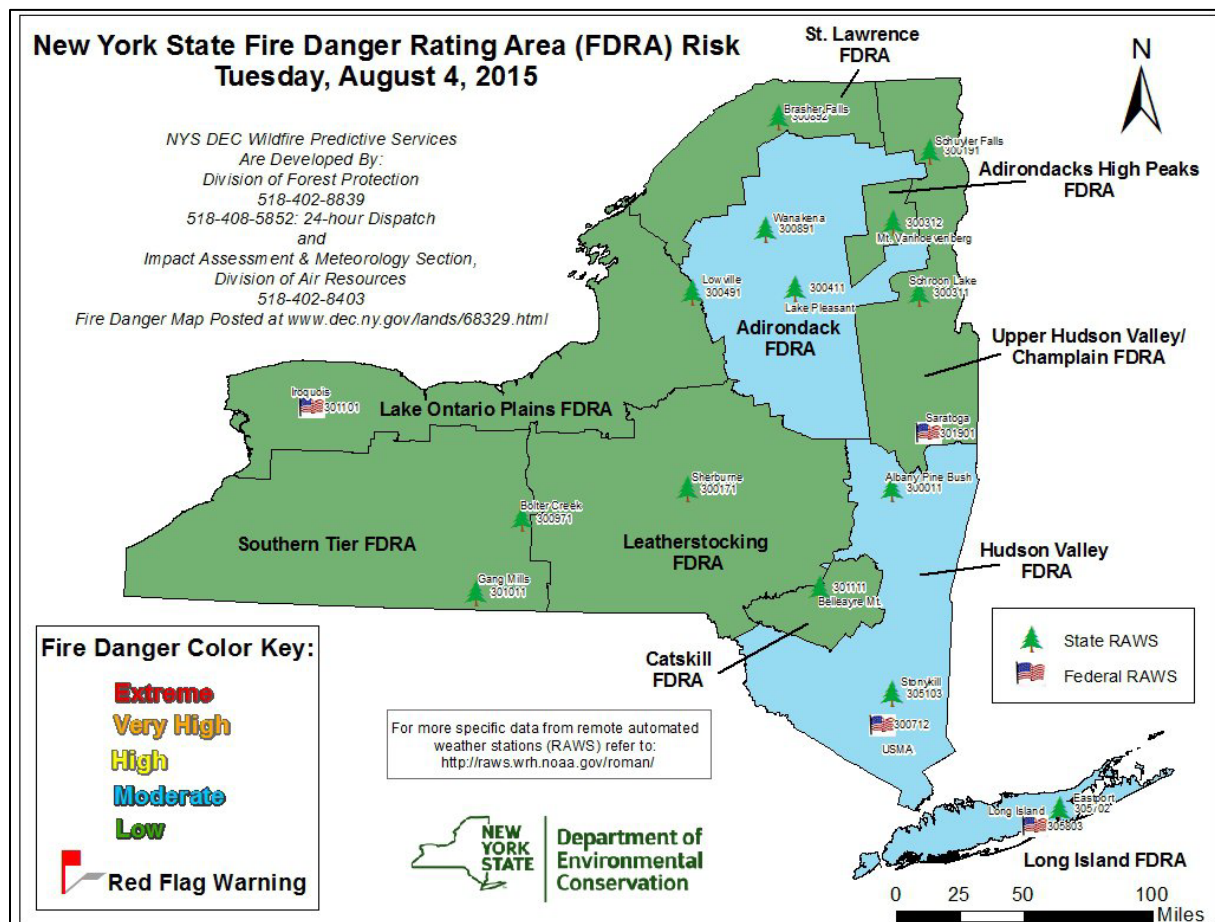
Source: Monroe County, 2013

Note: See http://www.monroecounty.gov/Image/Fire_Districts%202008.pdf for full-size graphic.



New York State is divided into 10 FDRAs. FDRAs are defined as areas of similar vegetation, climate, and topography in conjunction with agency regional boundaries, NWS fire weather zones, political boundaries, fire occurrence history, and other influences. The Forest Ranger Division issues daily fire danger warnings when the fire danger rating within one or more FDRAs is at “high” or above. A current fire danger rating map is updated daily on the NYSDEC website. Figure 5.4.9-5 shows FDRAs in New York State and the fire danger risk within each area on a specific date.

Figure 5.4.9-5. New York State Fire Danger Rating Areas



Source: NYSDEC 2015

Wildfire/Urban Interface (WUI) in New York State/Monroe County

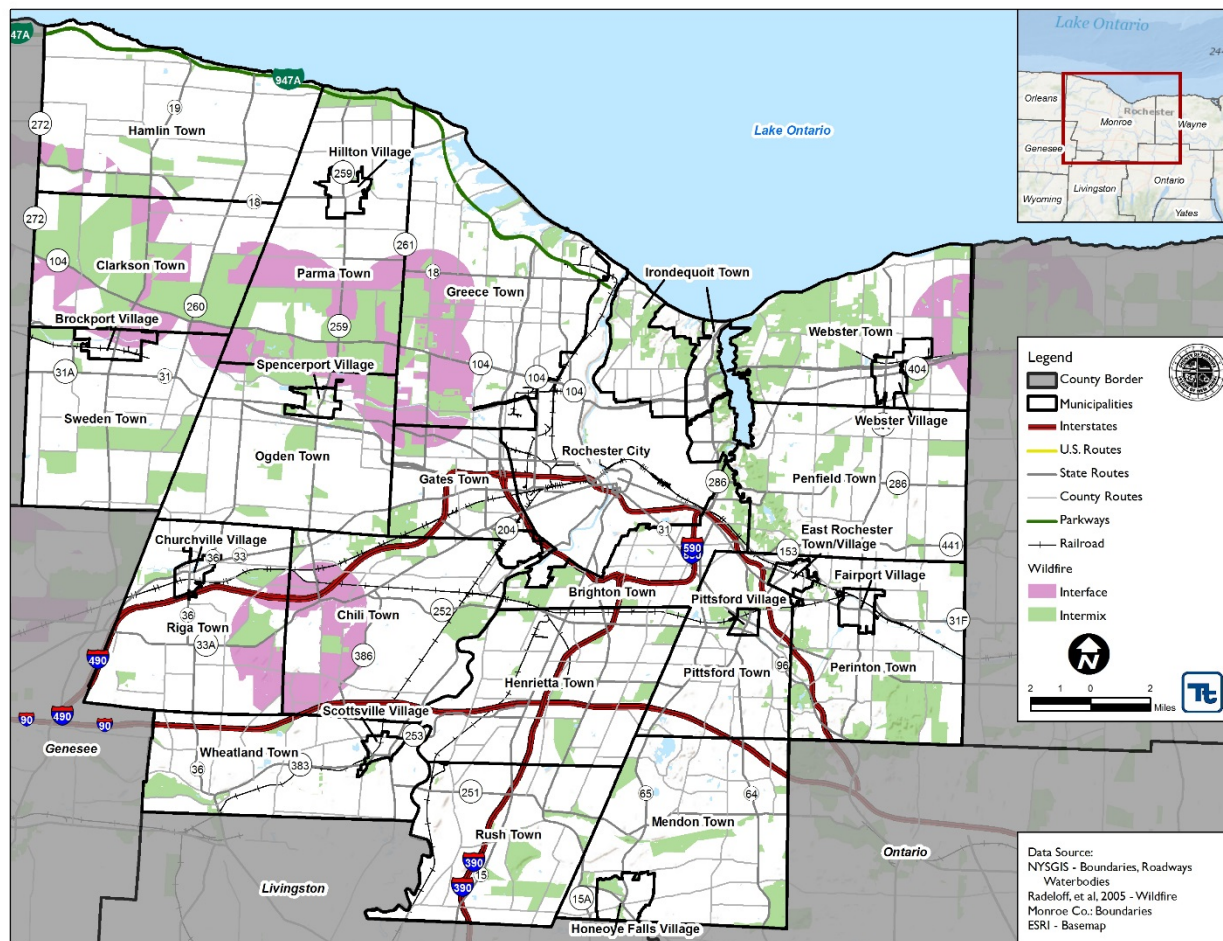
As previously stated, the NYS HMP indicates that New York State has all three types of WUI interfaces. The Adirondack and Catskill Mountains contain large tracts of forests with the mixed, and to a lesser extent, the classic interface occurring throughout. The remainder of the state contains classic and mixed interfaces, with some major cities containing an occluded interface. Population migration from urban to suburban and rural living will continue, increasing the possibility of loss or damage to structures in the WUI, for a number of reasons. Many property owners are unaware that a threat from a wildfire exists or that their homes are not defensible from it. Water supplies at the scene in the WUI are often inadequate. Access by firefighting equipment is often blocked or hindered by driveways that are narrow, winding, dead-ended, have tight turning radii, or have weight restrictions. Most wildland fire suppression personnel are inadequately prepared for fighting structural fires, and local fire departments are not usually fully trained or equipped for wildfire suppression. Furthermore, 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 New York State and Monroe County, an official list that details the location, type of interface, and surrounding fuel makeup does not exist (NYS DHSES 2011).

A detailed WUI (interface and intermix) that also defines the wildfire hazard area was obtained through the SILVIS Laboratory, Department of Forest Ecology and Management, University of Wisconsin – Madison. 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 illustrated on Figure 5.4.9-6 below (Radeloff et al. 2005). Approximately 144.18 square miles or 21.7 percent of the county’s land area is within the WUI interface, as shown in Figure 5.4.9-6. Specifically, significant portions of land area in the Towns of Clarkson Parma, Greece, Webster, Chili, and Riga are within the WUI interface, as shown in Figure 5.4.9-6.

Figure 5.4.9-6. WUI in Monroe County

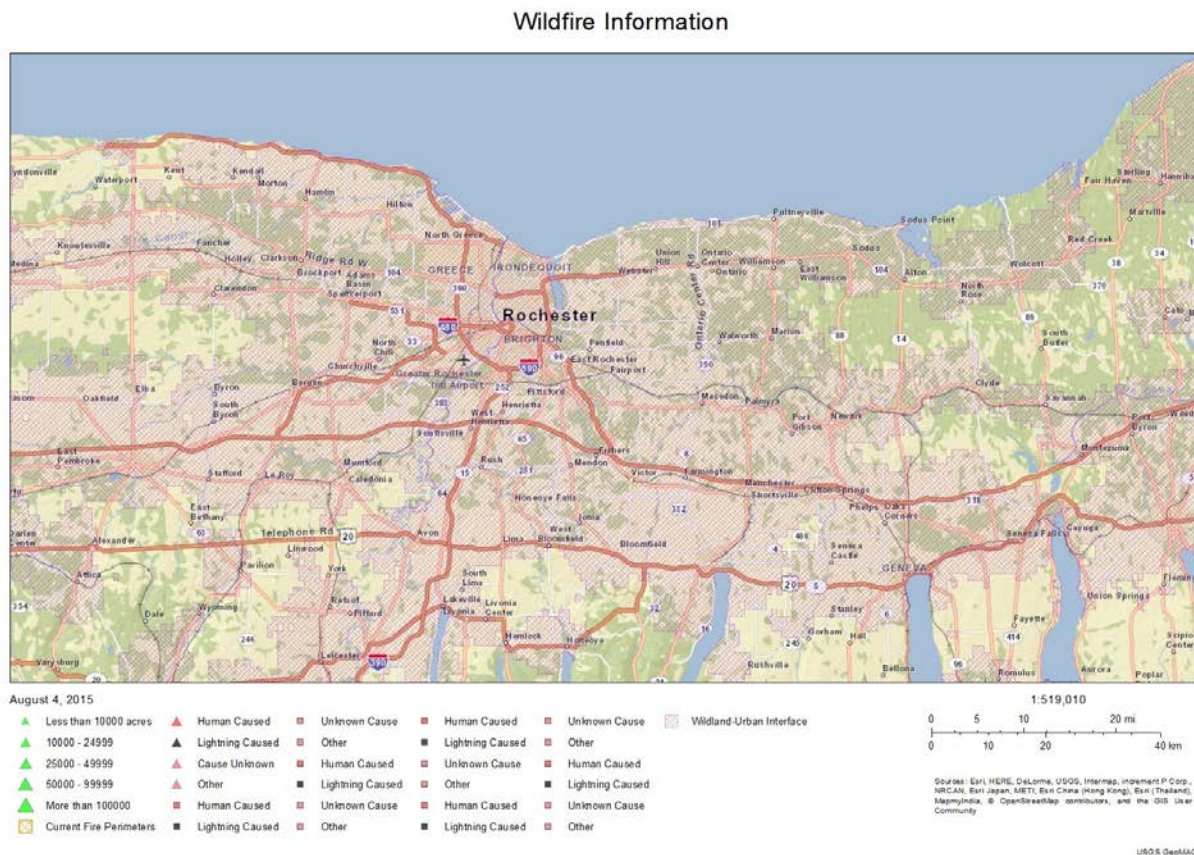


Source: Monroe County, 2015



The Geospatial Multi-Agency Coordination or GeoMAC, is an internet-based mapping application designed for fire managers to access on-line maps of current fire locations and perimeters in the United States. This information is publically available using a standard web browser to pinpoint the areas affected by fire. According to the USGS GeoMAC, large portions of Monroe County are within the WUI interface (see Figure 5.4.9-7) (USGS GeoMAC, 2015). Visit <http://www.geomac.gov/> for an interactive version of the map below and to view in full definition.

Figure 5.4.9-7. 2010-2015 Wildfire Information in Monroe County



Source: USGS GeoMAC, 2014

Previous Occurrences and Losses

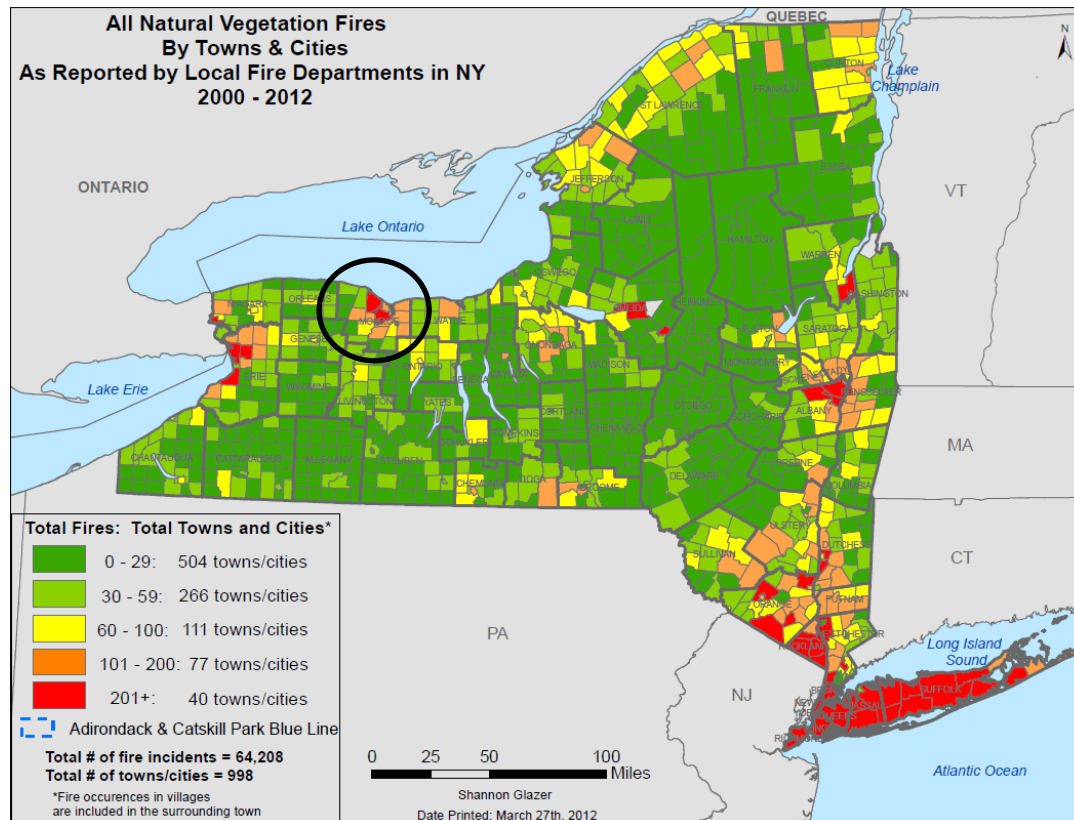
Short-term effects of wildfires can include destruction of timber, forest, wildlife habitats, scenic vistas, and watersheds. Business and transportation can also be disrupted in the short term. Long-term effects can include reduced access to recreational areas and destruction of community infrastructure and cultural and economic resources (USGS 2006).

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). The New York State Forest Ranger force is a division of the NYSDEC. It has fought fires and retained records for more than 125 years. Over the past 25 years (1988-2012), Ranger Division records indicate that rangers suppressed 6,971 wildfires that burned a total of 67,273 acres. Combined, fire departments and rangers responded to 1,269 wildfires that burned a total of 1,541 acres in 2014 (NYSDEC 2015).



According to Ranger Division wildfire occurrence data from 1988 through 2012, 95 percent of wildfires in the state were human-caused; the remaining 5 percent are the result of lightning. With regards to human-caused fires, debris burning accounted for 35 percent; arson accounted for 17 percent; campfires accounted for 13 percent; children accounted for 5 percent; and smoking, equipment, and railroads accounted for 30 percent (NYSDEC 2013). Figure 5.4.9-8 illustrates occurrences of natural vegetation wildfires in New York State between 2000 and 2012. This figure reveals occurrences of between 0 and more than 201 wildfires (indicated as 201+ on the map) from 2000 to 2012 within Monroe County municipalities. The Town of Greece and the City of Rochester have the highest occurrences, with more than 201 events from 2000-2012.

Figure 5.4.9-8. Wildfire Occurrences in New York State, 2000-2012



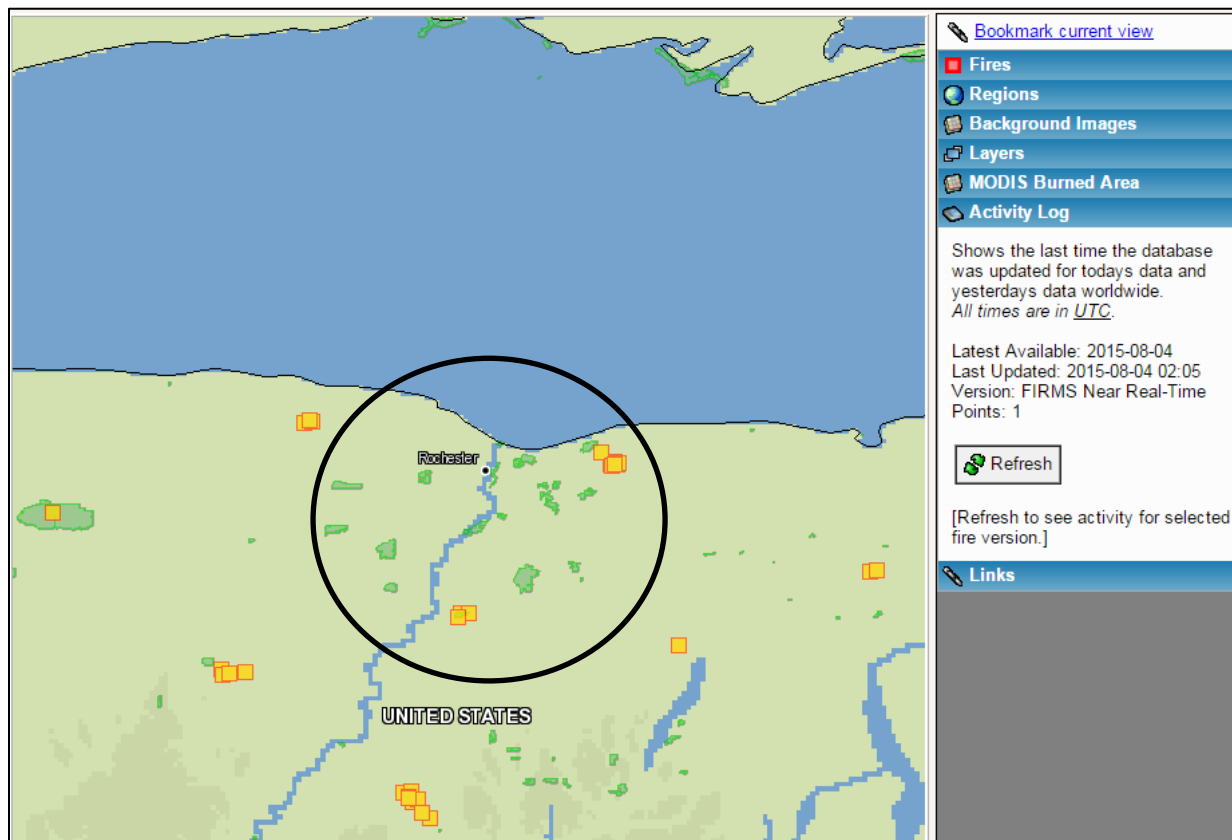
Source: NYSDEC, 2013

Note: The black oval indicates the location of Monroe County.

In 2014, NYSDEC reported that 836 acres burned by 131 wildfire events (NYSDEC 2015). The NASA Fire Information for Resource Management System (FIRMS) distributes real-time and archived data extracted from the standard MCD14ML fire product produced at NASA's MODIS Fire Science Computing Facility (SCF) at the University of Maryland. MODIS stands for MODERate Resolution Imaging Spectroradiometer. The MODIS instrument, on board NASA's Earth Observing System (EOS) Terra (EOS AM) and Aqua (EOS PM) satellites, makes an active fire detection out of images that represent the center of a 1-km (approximately) pixel flagged as containing one or more actively burning hotspots or fires. The resulting MODIS fire locations are good for identifying the location of active fires, providing information on the spatial and temporal distribution of fires, and comparing data between years. Figure 5.4.9-8 illustrates occurrences of wildfires in Monroe County between 2010 and 2015, as detected by the MODIS instrument.



Figure 5.4.9-9. Wildfire Occurrences in Monroe County, 2010-2015



Source: NASA FIRMS, 2015

Note: The black oval indicates the location of Monroe County.

Known wildfire events that have occurred Monroe County between 1994 and 2015 are identified in Table 5.4.9-2. However, Table 5.4.9-2 may not include a complete record of all wildfire events that have occurred within the county. Between 1954 and 2015, New York State was not included in any wildfire-related major disaster (DR) or emergency (EM) declarations (FEMA 2015).



Table 5.4.9-2. Wildfire Events between 1994 and 2015

Date(s) of Event	Event Type	FEMA Declaration Number	Location / County Designated?	Losses / Impacts
May 26, 2015	Wildfire	N/A	No	Fire detected in the Town of Hamlin
August 9, 2014	Wildfire	N/A	No	Fire detected in the Town of Webster
April 21, 2014	Wildfire	N/A	No	Between one and three fires were detected in the Town of Rush
June 5, 2013	Brush Fire	N/A	No	Brighton firefighters responded for the report of a brush fire at the Town of Brighton dump on Browncroft Blvd. Engine 303 went on location with a 200 feet ×200 feet pile of trees and brush on fire. Multiple mutual aid was called in to assist with fighting the fire. The cause of the fire is under investigation.
May 6, 2013	Brush Fire	N/A	No	Rochester firefighters responded for the report of a brush fire at Turning Point Park. Engine 19 went on location and reported a large area of brush burning. Additional equipment was dispatched to help extinguish the fire.
May 20, 2013	Wildfire	N/A	No	Fire detected in the Town of Hamlin
May 20, 2013	Wildfire	N/A	No	Fire detected in the Town of Hamlin
April 28, 2013	Brush Fire/Barn Fire (Orleans County)	N/A	No	The Kendall Fire Department was dispatched, along with the Carlton Fire Department, to a barn fire at 1857 Transit Road in the Town of Kent (Orleans County). The barn actually was situated in a triangular plot created by the Transit Road and the Roosevelt Highway. The header created by the large fire could be seen for miles from the incident. Kendall 1 arrived and immediately requested mutual assistance from several neighboring departments. Engines and tankers were requested from the Town of Hamlin. The fire consumed a large barn, spread to adjoining structures and vehicles, and created a brush fire that extended into a lightly wooded area north of the structures. It was reported that dynamite was stored in one standing building, and the Rochester Bomb Squad was called to the scene. Firefighters remained at the scene for several hours.
August 3, 2012	Wildfire	N/A	No	Fire detected in the Town of Webster
July 4, 2012	Wildfire	N/A	No	Fire detected in the Town of Webster
August 19, 2011	Wildfire	N/A	No	Fire detected in the Town of Webster
August 4, 2010	Wildfire	N/A	No	Fire detected in the Town of Webster
June 19, 2001	Landfill Fire	N/A	No	Mill Seat Landfill Fire in the Town of Riga for one hour. The event prompted activation of the Emergency Operations Center.
October 16, 1994	Fire	N/A	No	3-Alarm Fire, City of Rochester for 6.75 hours. The event prompted activation of the Emergency Operations Center.

Sources: NASA FIRMS, 2015; Monroe County Fire Wire, 2015

Note: Monetary figures within this table were U.S. Dollar (USD) figures calculated during or after the approximate time of the event. If such an event would occur in the present day, monetary losses would be considerably higher in USDs as a result of inflation.

FEMA Federal Emergency Management Agency N/A Not applicable





Probability of Future Events

According to the New York State Forest Ranger Division, wildfire occurrence data from 1988 to 2012 have shown that New York State, including Monroe County, will always be susceptible to wildfires. Ninety-five percent of wildfires in New York State are caused by humans, while lightning is responsible for only 5 percent. Forty-seven percent of all fire department-response to wildfires occur from March 15 through May 15. Beginning in 2010, New York State 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 analysis of wildfire occurrence (NYS DHSES 2014).

The state's large size, diverse topography, and variety of climates require division of the state into distinct units for describing wildfire potential and risk. See the Location section of this profile for information regarding the risk areas (NYS DHSES 2014).

Fire probability depends on local weather conditions, outdoor activities (such as camping, debris burning, and construction) and the degree of public cooperation with fire prevention measures. Dry weather, such as drought, can increase the likelihood of wildfire events. Lightning can also trigger wildfire and urban fire events. Other natural disasters can increase the probability of wildfires by producing fuel in both urban and rural areas. Forest damage from hurricanes and tornadoes 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).

Wildfire experts point to four reasons why wildfire risks are increasing:

- Fuel, in the form of fallen leaves, branches, and plant growth, has accumulated over time on the forest floor. Now, this fuel has the 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 2011).

Annual small wildfires likely will occur throughout New York State (as the state has regularly undergone in the past). However, advanced methods of wildfire management and control and a better understanding of the fire ecosystems should reduce the number of devastating fires in the future (NYS DHSES 2011).

Table 5.4.5-1 shows the probability of future occurrence of wildfire events in Monroe County, based on data provided by the 2011 Monroe County HMP, county-wide Fire Department reports, and other sources.

Table 5.4.9-3. Probability of Future Occurrence of Wildfire Events

Hazard Type	Number of Occurrences Between 1994 and 2015	Probability of Occurrence	Annual Number of Events (average)
Wildfire	14	63.64%	0.67

Source: NASA FIRMS, 2015; Monroe County Fire Wire, 2015

The hazards of concern identified for Monroe 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 Committee, the probability of occurrence of wildfire within the county is considered “frequent” (event that occurs within 25 years, as presented in Table 5.3-3).

Climate Change Impacts

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 the frequency and severity of many forest disturbances, such as infestations, invasive species, wildfires, and storm events. As temperatures increase, the suitability of a habitat for specific types of trees changes. There is also evidence that prolonged heat waves are likely to lead to a greater number of wildfires. Stronger winds from larger storms may lead to more fallen branches for wildfires to consume. An increase in rain and snow events primes forests for fire by supporting growth of more fuel. Drought and warmer temperatures lead to drier forest fuels (NYS DHSES 2014).

Climate change is beginning to affect both people and resources in New York State, and these impacts are projected to continue to grow. Impacts related to increasing temperatures and sea level rise are already evident within the state. 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 development of adaptation strategies informed by both local experience and scientific knowledge (New York State Energy Research and Development Authority [NYSERDA] 2011).

Each region within New York State, as defined by ClimAID, has attributes that will be affected by climate change. Monroe County is part of Region 1, Western New York and Great Lakes Plains. Some of the issues in this region that may be affected by climate change, include challenges for water supply and wastewater treatment, increase in heat-related deaths, an increase in illnesses related to air quality, and higher summer energy demand that will stress the energy system (NYSERDA 2011).

Temperatures in New York State are warming, with an average rate of warming over the past century of 0.25° F per decade. Average annual temperatures are projected to increase across New York State by 2° F to 3.4° F by the 2020s, 4.1° F to 6.8° F by the 2050s, and 5.3° F to 10.1° F 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 section of the state.

In Region 1, it is estimated that temperatures will increase by 4.3°F to 6.3°F by the 2050s and 5.7°F to 9.6°F by the 2080s (baseline of 47.7°F) (NYSERDA 2014). Extreme events are also projected to increase, as illustrated in Table 5.4.9.3 below:

Table 5.4.9-4. Extreme Event Projections for Region 1

Event Type (2020s)	Low Estimate (10 th Percentile)	Middle Range (25 th to 75 th Percentile)	High Estimate (90 th Percentile)
Days over 90 °F (8 days)	12	14-17	19
# of Heat Waves (0.7 heat waves)	2	2	2
Duration of Heat Waves (4 days)	4	4	4
Days below 32 °F (133 days)	99	103 to 111	116

Source(s): *NYSERDA 2014*



Heat waves will become more frequent and intense with the increase in temperatures, increasing heat-related illness and death and posing new challenges to the energy system, air quality, and agriculture. Summer droughts are projected to increase, affecting water supply, agriculture, ecosystems, and energy projects (NYSERDA 2011).

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 the 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 the 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.



5.4.9.2 Vulnerability Assessment

To understand risk, a community must evaluate what assets are exposed or vulnerable within the hazard area identified. The following factors are addressed in subsequent text that evaluates and estimates potential impacts of the wildfire hazard on Monroe County:

- Overview of vulnerability
- Data and methodology used for the evaluation
- Impact on: (1) life, health, and safety of residents; (2) general building stock; (3) critical facilities; (4) economy; and (5) future growth and development
- Effect of climate change on vulnerability
- Change of vulnerability as compared to that presented in the 2011 Monroe County Hazard Mitigation Plan
- Further data acquisitions that will increase understanding of this hazard over time.

Overview of Vulnerability

Wildfire hazards can affect significant areas of land, as evidenced by wildfires throughout the state and the United States over the past several years. Fire in urban areas has the potential for great damage to infrastructure, loss of life, and strain on lifelines and emergency responders because of the high density of population and structures that can be damaged in these areas. Wildfire can spread quickly, become a huge fire complex consisting of thousands of acres, and present greater challenges for allocating resources, defending isolated structures, and coordinating multi-jurisdictional response. If a wildfire occurs at a WUI, it can also cause an urban fire and in this case has the potential for great damage to infrastructure, loss of life, and strain on lifelines and emergency responders because of the high density of population and structures in these areas.

Potential losses from wildfire include human life, structures and other improvements, and natural resources. Given the immediate response times to reported wildfires, the likelihood of injuries and casualties is minimal. Smoke and air pollution from wildfires can be a health hazard, especially for sensitive populations, including children, the elderly, and those with respiratory and cardiovascular diseases. Wildfire 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. In addition, wildfire can lead to ancillary impacts such as landslides in steep ravine areas and flooding caused by the impacts of silt in local watersheds.

Data and Methodology

The WUI (interface and intermix) obtained through the SILVIS Laboratory, Department of Forest Ecology and Management, University of Wisconsin – Madison, was referenced to define the wildfire hazard areas. The University of Wisconsin-Madison wildland fire hazard areas are based on the 2010 Census and 2006 National Land Cover Dataset and the Protected Areas Database. The high-, medium-, and low-density interface areas were combined and used as the “interface” hazard area, and the high-, medium-, and low-density intermix areas were combined and used as the “intermix” hazard areas for this risk assessment. Figure 5.4.7-5 shown above displays the Wildfire Urban Interface and Intermix areas for Monroe County.

The asset data (population, building stock, and critical facilities) presented in the County Profile (Section 4) was used to support an evaluation of assets exposed and potential impacts and losses associated with this hazard. To determine what assets are exposed to wildfire, available and appropriate Geographic Information System (GIS) data were overlaid upon the hazard area. 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 in New York State and other parts of the country, potential losses include those of human health and life of residents and responders, structures, infrastructure, and natural resources. In addition, wildfires can have major economic impacts on a community because of the initial loss of structures and subsequent loss of revenue from destroyed business and the decrease in tourism. The most vulnerable populations include emergency responders and those within a short distance of the interface between the built environment and the wildland environment.

Wildfires can cost thousands of taxpayer dollars for suppression and control and can involve hundreds of operating hours on fire apparatus and thousands of volunteer hours from the volunteer firefighters. In addition, many direct and indirect costs burden local businesses that excuse volunteers from work to fight these fires.

As a way to estimate the county's population vulnerable to the wildfire hazard, the population located within the WUI was overlaid upon the 2010 Census population data (U.S. Census 2010). Census blocks with centers within the hazard area were used to calculate the estimated population exposed to the wildfire hazard. Table 5.4.7-4 summarizes the estimated population exposed by municipality.

Based on the analysis, 51,690 individuals, or 6.9 percent of the County's population, are exposed to the Intermix wildfire hazard, while 42,284, or 5.7 percent of the County's population, is exposed to the Interface wildfire hazard. Overall, the Town of Greece the greatest number of individuals located in the hazard area.

Table 5.4.9-5. Estimated Population within the WUI in Monroe County

Municipality	U.S. Census 2010 Population	Estimated Population Exposed			% of Total Exposed
		Intermix	Interface	Total	
Brighton (T)	36,609	3,733	0	3,733	10.2%
Brockport (V)	8,366	65	2,741	2,806	33.5%
Chili (T)	28,625	2,308	5,635	7,943	27.7%
Churchville (V)	1,961	0	0	0	0.0%
Clarkson (T)	6,588	2,491	3,004	5,495	83.4%
East Rochester (V/T)	6,587	44	0	44	<1%
Fairport (V)	5,353	0	0	0	0.0%
Gates (T)	28,400	1,306	3,709	5,015	17.7%
Greece (T)	96,095	4,907	19,485	24,392	25.4%
Hamlin (T)	9,045	1,273	639	1,912	21.1%
Henrietta (T)	42,581	2,368	0	2,368	5.6%
Hilton (V)	5,886	19	0	19	<1%
Honeoye Falls (V)	2,674	297	0	297	11.1%
Irondequoit (T)	51,692	5,289	0	5,289	10.2%
Mendon (T)	6,478	675	0	675	10.4%
Ogden (T)	16,255	1,729	2,695	4,424	27.2%
Parma (T)	9,747	2,977	1,993	4,970	51.0%
Penfield (T)	36,242	2,986	0	2,986	8.2%
Perinton (T)	41,109	4,749	0	4,749	11.6%
Pittsford (T)	28,050	2,004	0	2,004	7.1%
Pittsford (V)	1,355	167	0	167	12.3%
Riga (T)	3,629	381	862	1,243	34.3%
Rochester (C)	210,565	397	0	397	<1%
Rush (T)	3,478	508	0	508	14.6%



Municipality	U.S. Census 2010 Population	Estimated Population Exposed			% of Total Exposed
		Intermix	Interface	Total	
Scottsville (V)	2,001	50	0	50	2.5%
Spencerport (V)	3,601	429	0	429	11.9%
Sweden (T)	5,957	538	224	762	12.8%
Webster (T)	37,242	9,525	1,297	10,822	29.1%
Webster (V)	5,399	257	0	257	4.8%
Wheatland (T)	2,774	218	0	218	7.9%
Monroe County (Total)	744,344	51,690	42,284	93,974	12.6%

Sources: U.S. Census 2010, Radeloff et al. 2005

Impact on General Building Stock

The most vulnerable structures to wildfire events are those located within the WUI areas. 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 hazard areas were overlaid on the building inventory in the County (Census block) to estimate the buildings exposed to the wildfire hazard. The replacement cost value of the structures with their center in the hazard area were totaled. Table 5.4.7-5 and Table 5.4.7-6 summarize the estimated building stock inventory exposed by municipality. The limitations of this analysis are recognized, and as such the analysis is only used to provide a general estimate. Approximately 6.5 percent (\$18.1 billion) of the County's replacement cost value is located in the WUI Intermix hazard area, and approximately 3.9 percent (\$11.1 billion) of the County's replacement cost value is located in the WUI Interface hazard area.

Table 5.4.9-6. Building Stock Replacement Cost Value within the WUI in Monroe County

Municipality	Total RCV (Structure and Contents)	Building RCV Exposed			% of Total Exposed
		Intermix	Interface	Total	
Brighton (T)	\$18,462,216,409	\$1,399,521,656	\$0	\$1,399,521,656	7.6%
Brockport (V)	\$2,035,910,815	\$10,263,711	\$1,236,422,404	\$1,246,686,115	61.2%
Chili (T)	\$8,342,622,610	\$761,170,173	\$1,373,766,646	\$2,134,936,818	25.6%
Churchville (V)	\$920,696,714	\$0	\$0	\$0	0.0%
Clarkson (T)	\$1,812,049,577	\$782,811,200	\$817,153,402	\$1,599,964,603	88.3%
East Rochester (V/T)	\$2,846,820,718	\$13,179,403	\$0	\$13,179,403	<1%
Fairport (V)	\$2,449,020,743	\$0	\$0	\$0	0.0%
Gates (T)	\$9,547,208,635	\$553,078,077	\$673,448,838	\$1,226,526,914	12.8%
Greece (T)	\$25,595,860,286	\$1,844,087,328	\$4,836,544,279	\$6,680,631,606	26.1%
Hamlin (T)	\$1,737,395,194	\$292,322,229	\$86,049,809	\$378,372,038	21.8%
Henrietta (T)	\$13,259,007,785	\$439,624,634	\$0	\$439,624,634	3.3%
Hilton (V)	\$1,664,654,730	\$10,589,831	\$0	\$10,589,831	<1%
Honeoye Falls (V)	\$1,119,568,668	\$222,669,847	\$0	\$222,669,847	19.9%
Irondequoit (T)	\$16,075,218,322	\$1,872,980,110	\$0	\$1,872,980,110	11.7%
Mendon (T)	\$2,996,719,632	\$285,667,065	\$0	\$285,667,065	9.5%
Ogden (T)	\$4,469,332,464	\$485,333,028	\$636,377,789	\$1,121,710,817	25.1%
Parma (T)	\$2,595,035,929	\$821,431,110	\$517,442,667	\$1,338,873,777	51.6%
Penfield (T)	\$14,501,168,927	\$1,627,622,730	\$0	\$1,627,622,730	11.2%
Perinton (T)	\$17,896,609,894	\$1,575,923,409	\$0	\$1,575,923,409	8.8%
Pittsford (T)	\$12,295,191,719	\$680,127,937	\$0	\$680,127,937	5.5%
Pittsford (V)	\$2,204,429,074	\$321,740,096	\$0	\$321,740,096	14.6%
Riga (T)	\$1,283,085,436	\$126,080,593	\$167,627,132	\$293,707,724	22.9%



Municipality	Total RCV (Structure and Contents)	Building RCV Exposed			% of Total Exposed
		Intermix	Interface	Total	
Rochester (C)	\$94,424,953,585	\$111,866,888	\$0	\$111,866,888	<1%
Rush (T)	\$1,453,693,815	\$158,673,217	\$0	\$158,673,217	10.9%
Scottsville (V)	\$706,870,704	\$12,473,879	\$0	\$12,473,879	1.8%
Spencerport (V)	\$1,862,825,476	\$123,075,578	\$0	\$123,075,578	6.6%
Sweden (T)	\$1,771,453,297	\$125,595,567	\$85,524,353	\$211,119,920	11.9%
Webster (T)	\$11,420,618,527	\$3,286,635,569	\$674,945,881	\$3,961,581,451	34.7%
Webster (V)	\$1,799,326,797	\$28,315,842	\$0	\$28,315,842	1.6%
Wheatland (T)	\$1,061,455,206	\$110,469,698	\$0	\$110,469,698	10.4%
Monroe County (Total)	\$278,611,021,689	\$18,083,330,404	\$11,105,303,200	\$29,188,633,604	10.5%

Source: Monroe County, Radeloff et al. 2005

Notes:

GBS General Building Stock

RCV Replacement Cost value

WUI Wildland Urban Interface

Table 5.4.9-7. Number of Buildings Located within the WUI in Monroe County

Municipality	Total Number of Building	Buildings Exposed			% of Total Exposed
		Intermix	Interface	Total	
Brighton (T)	10,545	1,226	0	1,226	11.6%
Brockport (V)	1,604	22	988	1,010	63.0%
Chili (T)	9,774	908	1,586	2,494	25.5%
Churchville (V)	807	0	0	0	0.0%
Clarkson (T)	2,040	746	979	1,725	84.6%
East Rochester (V/T)	2,495	27	0	27	1.1%
Fairport (V)	2,056	0	0	0	0.0%
Gates (T)	10,550	479	1,489	1,968	18.7%
Greece (T)	32,375	1,577	6,454	8,031	24.8%
Hamlin (T)	2,808	442	209	651	23.2%
Henrietta (T)	12,657	545	0	545	4.3%
Hilton (V)	1,884	18	0	18	1.0%
Honeoye Falls (V)	922	183	0	183	19.8%
Irondequoit (T)	19,765	2,739	0	2,739	13.9%
Mendon (T)	2,366	248	0	248	10.5%
Ogden (T)	5,331	644	781	1,425	26.7%
Parma (T)	3,743	1,124	781	1,905	50.9%
Penfield (T)	13,077	1,532	0	1,532	11.7%
Perinton (T)	14,901	1,773	0	1,773	11.9%
Pittsford (T)	9,159	704	0	704	7.7%
Pittsford (V)	656	86	0	86	13.1%
Riga (T)	1,271	149	193	342	26.9%
Rochester (C)	58,996	160	0	160	<1%
Rush (T)	1,433	224	0	224	15.6%
Scottsville (V)	747	20	0	20	2.7%
Spencerport (V)	1,253	145	0	145	11.6%
Sweden (T)	1,986	199	83	282	14.2%
Webster (T)	13,477	3,868	608	4,476	33.2%



Municipality	Total Number of Building	Buildings Exposed			% of Total Exposed
		Intermix	Interface	Total	
Webster (V)	1,305	60	0	60	4.6%
Wheatland (T)	991	124	0	124	12.5%
Monroe County (Total)	240,974	19,972	14,151	34,123	14.2%

Source: Monroe County, Radeloff et al. 2005

Notes:

GBS General Building Stock

WUI Wildland Urban Interface

Impact on Critical Facilities

A number of critical facilities are within the wildfire hazard area, and are also vulnerable to the threat of wildfire. Many of these facilities are locations of vulnerable populations (schools and senior facilities) and agencies that respond to wildfire events (fire and police). Table 5.4.7-7 summarizes critical facilities within the wildfire hazard area by jurisdiction.



Table 5.4.9-8. Facilities within the WUI (Intermix or Interface) in Monroe County

Municipality	Facility Types																					
	Agriculture	Alcohol/Drug Rehabilitation	Communication	Court	Dam	DPW	Fire Station	Golf Course	Information Technology	Library	Police Station	Post Office	Potable Treatment Facility	Potable Pump	Recreation Center	Religious Center	School	Senior	Shelter	Town Hall	Wastewater Pump Station	Wastewater Treatment Plant
Brighton (T)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0
Brockport (V)	1	0	1	1	0	1	2	0	0	0	1	1	0	0	0	3	2	1	1	2	0	0
Chili (T)	0	0	1	0	1	0	3	1	0	0	0	0	1	2	0	3	5	0	0	0	6	0
Churchville (V)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clarkson (T)	0	0	0	1	0	1	1	2	0	1	0	1	0	0	0	4	1	0	0	1	0	0
East Rochester (V/T)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fairport (V)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gates (T)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	1	0	0	0	0	0
Greece (T)	1	3	2	0	2	0	3	1	0	0	0	2	0	0	0	9	4	0	1	0	0	0
Hamlin (T)	0	0	1	0	0	1	0	0	0	1	0	1	0	0	0	2	0	1	0	1	0	0
Henrietta (T)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	1	0	1	0
Hilton (V)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Honeoye Falls (V)	0	0	1	1	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	2	0	1
Irondequoit (T)	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0
Mendon (T)	0	0	0	0	2	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Ogden (T)	0	0	0	0	1	0	0	2	0	0	0	0	0	1	0	2	2	0	0	0	1	0
Parma (T)	1	0	1	0	1	0	1	2	0	0	0	0	0	1	0	5	0	0	0	0	0	0
Penfield (T)	0	0	0	0	1	0	1	0	0	0	0	1	0	0	0	3	1	0	0	0	0	0
Perinton (T)	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	3	0	1	0	0	0	0
Pittsford (T)	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0



Municipality	Facility Types																					
	Agriculture	Alcohol/Drug Rehabilitation	Communication	Court	Dam	DPW	Fire Station	Golf Course	Information Technology	Library	Police Station	Post Office	Potable Treatment Facility	Potable Pump	Recreation Center	Religious Center	School	Senior	Shelter	Town Hall	Wastewater Pump Station	Wastewater Treatment Plant
Pittsford (V)	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0
Riga (T)	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Rochester (C)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rush (T)	0	0	1	0	2	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Scottsville (V)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spencerport (V)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sweden (T)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Webster (T)	0	0	2	0	2	1	0	1	0	0	0	0	3	0	0	3	2	0	0	0	2	0
Webster (V)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wheatland (T)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monroe County (Total)	3	3	10	3	15	8	16	9	1	4	1	6	7	6	1	51	20	6	3	7	10	1

Source: Monroe County, Radeloff et al. 2005



Impact on the Economy

Wildfires jeopardize homes and businesses within the wildland-urban interface. These fires may cost thousands of taxpayer dollars for suppression and control and may involve hundreds of operating hours on fire apparatus and hundreds of volunteer hours from the volunteer firefighters. Many direct and indirect costs also burden local businesses that excuse volunteers from work to fight these fires. A number of critical facilities and transportation and utility assets are within WUI and may be vulnerable to the threat of wildfire.

Effect of Climate Change on Vulnerability

According to the U.S. Forest Service (USFS), climate change will likely alter the atmospheric patterns that affect fire weather. Changes in fire patterns will, in turn, alter carbon cycling, forest structure, and species composition. Climate change associated with elevated greenhouse gas concentrations may create an atmospheric and fuel environment more conducive to large, severe fires (USFS, 2011). Under a changing climate, wildfires are expected to increase by 50 percent across the U.S. (USFS, 2013).

According to the New York State 2014 HMP Update, climate change can promote drought and extreme heat, causing drier conditions that can lead to an increased number of wildfire events. The NYSDEC was forced to close public lands for recreational uses and ban open-burning at state campgrounds during several droughts in New York State. Climate also affects the frequency and severity of many wildfire-related forest disturbances, such as insect outbreaks, invasive species, and storms.

Fire interacts with climate and vegetation (fuel) in predictable ways. Understanding the interactions of climate, fire, and vegetation 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 wildland-urban interface (USFS 2011).

Higher summer temperatures likely will 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 increased lightning activity, frequency of surface pressure and associated circulation patterns conducive to surface drying, and general fire-weather conditions conducive to severe wildfires (USFS, 2011). Warmer temperatures may lead to longer dry seasons and multi-year droughts, creating triggers for wildfires, insects, and invasive species. Increased temperature and change in precipitation will also affect fuel moisture during wildfire season and the length of time during which wildfires can burn during a given year (U.S. Department of Agriculture [USDA] 2012).

Climate change has already been a factor in expansion of infestation and infectious diseases in the United States. The emerald ash borer currently presents a risk of potentially catastrophic loss of the ash tree throughout state forests and within Monroe County. A secondary impact of this loss would be an increase in fire risk, due to an increase of available fuel. For more information on the impact of Climate Change on Infestation, see section 5.4.5. Infestation.

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 2011).



Change of Vulnerability

The WUI (interface and intermix) obtained through the SILVIS Laboratory, Department of Forest Ecology and Management, University of Wisconsin – Madison, was not used for the 2011 HMP vulnerability assessment. The previous HMP detailed past fire events and their damages. The County's population, building stock, and critical facilities were evaluated in relation to the hazard area for this HMP. Overall, the County's vulnerability to the hazard remains unchanged.

Future Growth and Development

Areas targeted for potential future growth and development within the next 5 years have been identified across Monroe County at the jurisdiction level. Refer to the jurisdictional annexes in Volume II of this HMP. Any new development and new residents within the WUI are expected to be exposed to the wildfire hazard. Refer to the jurisdictional annexes in Volume II of this HMP.

Additional Data and Next Steps

A custom building inventory may be developed for this plan to include available data regarding construction of structures: roofing material, fire detection equipment, and structure age. As stated earlier, buildings constructed of wood or vinyl siding are generally more likely to be damaged by the fire hazard than are buildings constructed of brick or concrete. Proximity of these building types to the WUI should be identified for further evaluation. Development and availability of such data would permit a more detailed estimate of potential vulnerabilities, including loss of life and potential structural damages.