

4-8: Wildfire

Hazard Impacts	Probability	Potential Impact					Score*:
		Infrastructure	Life	Economy	Environment	Average:	
Wildfire	2	3	3	3	2	2.75	5.5

*Score = Probability x Average Potential Impact

A wildfire is the uncontrolled burning of woodlands, brush, or grasslands. According to FEMA, there are four categories of wildfires that can occur throughout the United States:

- **Wildfires:** Fueled by natural vegetation; typically occur in national forests and parks, where federal agencies are responsible for fire management and suppression.
- **Interface or Intermix Fires:** Urban wildfires in which vegetation and the built environment provide fuel.
- **Firestorms:** Events of such an extreme intensity that effective suppression is virtually impossible; occur during extreme weather and generally burn until conditions change or the available fuel is exhausted.
- **Prescribed Fires and Prescribed Natural Fires:** Fires that are intentionally set or selected natural fires that are allowed to burn for beneficial purposes.

Wildfires can be a result of naturally occurring influences such as lightning, drought and extreme heat (see: [Drought](#), [Extreme Heat](#)), and human influences such as a discarded cigarette, improperly extinguished campfire, or a stray spark from nearby railroad tracks. The potential for threat of wildfires is dependent upon topography and slope, surface fuel characteristics, recent climate conditions, current meteorological conditions, and fire behavior. Once a wildfire threatens a community, it is often too late to protect nearby structures, and populations have to be evacuated for their own safety. These fires could have the potential to damage structures and utilities as well as hundreds of acres of woodlands.

The 2017 Vermont Forest Action Plan¹, developed by the Department of Forests, Parks and Recreation, defines “wildland fire” as any non-structure fire that occurs in vegetation or natural fuels, including prescribed fire and wildfire. Most wildland fires in Vermont are quickly reported and contained, though fires burning deep in ground fuels or in remote locations require more time and effort to fully suppress. Town Forest Fire Wardens and local fire departments primarily handle wildland fire control with assistance from other towns and the State, when necessary.

Vermont has a reliable system of local fire suppression infrastructure coordinated at the State-level. Vermont’s climate, vegetation type, and landscape discourage major wildfire. The majority of fires in Vermont are caused by burning debris².

The National Weather Service (NWS) issues a Red Flag Warning when there is the potential for extreme fire danger within 24 hours based on the following criteria:

- Winds sustained or with frequent gusts > 25 mph
- Relative Humidity at or below 30% anytime during the day
- Rainfall amounts for the previous 5 days less than 0.25” (except 3 days in pre-greenup)
- Lightning after an extended dry period
- Significant dry frontal passage

1 http://fpr.vermont.gov/sites/fpr/files/Forest_and_Forestry/Vermont_Forests/Library/2017_VT_ForestActionPlan.pdf

2 <http://fpr.vermont.gov/sites/fpr/files/2017%20Vermont%20Wildland%20Fire%20Program%20Annual%20Report.pdf>

- Dry thunderstorms
- Keetch-Byram Drought Index values of 300 or greater (summer only)

Lightning:

In addition to being hazardous to human life, lightning can damage infrastructure, plants, and property, and can start forest fires. According to the NWS, lightning is the first thunderstorm hazard to arrive and the last to leave. Lightning can strike up to 50 miles away from a thunderstorm, carry up to 100 million volts of electricity, and reach temperatures upward of 50,000°F.

Since 1950, there have been 87 documented events of lightning strikes in Vermont, resulting in 4 deaths and 17 injuries³. Lightning is an unpredictable and dispersed weather-related event, making it challenging to mitigate.

Wildfire History

The wildfire threat in Vermont is relatively low based on historical occurrences. Wildfire conditions in Vermont are typically at their worst either in spring when dead grass and fallen leaves from the previous year are dry and new leaves and grass have not come out yet, or in late summer and early fall when that year's growth is dry. In drought conditions, this risk is obviously higher. The risk of wildfire due to drought was severe enough to warrant a statewide ban on open burning in 1966. That was the last such statewide ban until one was issued in 1999 due to drought. However, due to a very dry April 2000, the State once again had to declare a temporary burning ban, and at the end of 2001, the State remained in a drought. There was a statewide ban on open burning in October 2005, which was rescinded in April 2006. Most recently, there was a threat of explosive fire growth potential in March 2012. This was due to low humidity, warm temperatures, and strong winds. In addition, dry grass was a wildfire threat during the spring of 2012 due to a mild winter leaving grass exposed through the drier winter months.

Despite the drought in 2016-2017, Vermont's 2017 Wildland Fire Program Annual Report notes that the 2017 fire season was well below normal at 49 acres burned from 51 fires. The average between 2012 and 2016 was 109 fires and 317 acres per year⁴. There has not been a major wildfire in Vermont in the last 50 years. NOAA's Storm Events Database only include one documented wildfire event since 1950. This event was in July of 2002 in Windham and Bennington Counties, with no deaths, injuries, or noted damages:

"Smoke, from many forest fires across the Nemiscau region of northern Quebec, became trapped under a subsidence inversion, and was transported south across southern Vermont from the evening hours of July 5, to the late evening of July 7. The forest fires were sparked by exceptionally hot and dry weather over that part of Canada followed by an unusual amount of thunderstorm activity, resulting in many lightning strikes. The circulation between high pressure over Hudson's Bay and a low pressure off the Canadian Maritimes transported the smoke southward. The smoke obscured the sky, and even reduced surface visibilities to as low as one mile, especially on the early morning of July 7. Advisories were issued warning people with respiratory problems to remain indoors and all individuals to curb outside activity. No major problems were reported to the National Weather Service as a result of this smoke. By late Sunday, July 7, the low pressure weakened and moved further east, allowing the wind to back into more of a westerly direction, finally dissipating the smoke⁵."

3 <https://www.ncdc.noaa.gov/stormevents/>

4 <http://fpr.vermont.gov/sites/fpr/files/2017%20Vermont%20Wildland%20Fire%20Program%20Annual%20Report.pdf>

5 <https://www.ncdc.noaa.gov/stormevents/>

Wildfire Trends & Vulnerability

Although wildfires are currently uncommon in Vermont, the Steering Committee acknowledged that extended periods of warming due to climate change have the potential to increase the occurrence of wildfire events, thus ranking Wildfire with a probability score of Occasional. Vermont is seeing an increase in average annual maximum and minimum temperature (see: [Extreme Heat](#)), which is also contributing to an increased likelihood of drought (see: [Drought](#)) and wildfire risk, though an increase in precipitation events (see: [Inundation Flooding & Fluvial Erosion](#)) may limit that risk during certain times of the year.

The potential impact from a plausibly significant wildfire event is expected to be Moderate on infrastructure, life and the economy, with a less significant impact on the environment. Given the low probability of wildfire in Vermont, the risk is considered to be relatively low.

The vulnerability to wildfires is constantly changing. Predictive models for fire potential are often generated each month or season. These models incorporate the state of fuels across various areas based on the latest precipitation and soil moisture anomalies, drought, and snow depth data. While giving an overall prediction for each season, models cannot incorporate the daily weather changes that affect fire risks. The Wildland Fire Assessment System is available online from the U.S. Forest Service⁶. This system provides national fire danger ratings that are updated daily. The maps take into account current and antecedent weather, fuel types, and both live and dead fuel moisture.

There is no specific geographic area of the State particularly more vulnerable to wildfire, given that 76% of Vermont is forested⁷ – 79% and 21% privately- and publically-owned, respectively⁸.

In general, wildfire risk is considered statewide, though a specific location where infrastructure and life are potentially more vulnerable to structural fire is the wildland-urban interface (WUI) (Figure 56). The WUI represents the area where infrastructure interacts with undeveloped land, creating the potential for fire to move from a forested environment to a grassed neighborhood.

The 2017 Vermont Forest Action Plan defines the WUI as a priority landscape, noting that: “Although the WUI term originates in wildland fire management, the WUI is also a useful indicator of human influence on natural ecosystems. The WUI is an area where people and their homes affect the natural environment, contributing to the loss of habitat for native species, forest fragmentation, the introduction of exotic species, domestic pets that can disturb or prey on birds and other wild animals, and poorer water quality due to runoff from pavement and lawns. These trends will threaten biodiversity and ecosystem health if WUI residents and communities are not attentive to the potential harms and actively caring for the environment around their homes.” (pg. 45)⁹

A forest fire in Bolton, VT in 2016 due to dry conditions and warm temperatures.
Photo Credit: Lars Lund



6 <http://www.wfas.net>

7 Morin, R.S.; Domke, G.M.; Walters, B.F.; Wilmot, S. 2017. Forests of Vermont, 2016. (http://fpr.vermont.gov/forest/forest_business/forest_statistics/fia)

8 https://www.fs.fed.us/nrs/pubs/ru/ru_fs119.pdf

9 http://fpr.vermont.gov/sites/fpr/files/Forest_and_

Wildfire Mitigation

Several actions within this Plan address wildfire (see: [Mitigation Strategy](#)), such as the strategy on resilient design and construction standards, including actions around developing sample building standards and educational resources for resilient design and construction.

Within Vermont, much of the focus around wildfire is in the preparedness and response phases. On the prevention side, per Vermont statute, open burning of natural and untreated wood, brush, weeds, or grass requires a 'Permit to Kindle Fire' from the Town Forest Fire Warden. When there is significant fire danger, open burns can be banned entirely. The drought mitigation strategy (see: [Mitigation Strategy](#)) includes actions that will assist in preparedness planning for wildfire, including actions to expand monitoring wells and develop groundwater resource maps.

Large-scale mitigation for wildfire is predominately not feasible in Vermont. The 2017 Vermont Forest Action Plan has a much stronger focus on preventing forest fragmentation, which runs counter to mitigation actions, such as defensible space. The Action Plan including strategies to:

- Strengthen collaborative land use planning and policy efforts with partners to conserve forests, developing strategies to reduce or mitigate the rate of forest conversion and reduce forest fragmentation and parcelization at local, statewide, and regional levels (Strategy 3).
- Prepare for, mitigate, and respond to emergency events such as wildland fires and significant weather events (Strategy 16).
- Provide training and technical support, and maintain partnerships for wildland fire prevention and response (Strategy 53).

On a local level, a number of Regional Planning Commissions (RPCs) have assisted local communities with preparing Community Wildfire Protection Plans (CWPPs), which are aimed at lessening the impacts of interface wildfire. These CWPPs are authorized and defined in Title I of the Healthy Forests Restoration Act (HFRA, PL 108-148, 2003), which does not prescribe the exact form of a CWPP, but states that they should address local forest and range conditions, values-at-risk, and priorities for action. CWPPs are another tool to assist communities in understanding their vulnerability and can inform Local Hazard Mitigation Plans (LHMPs).

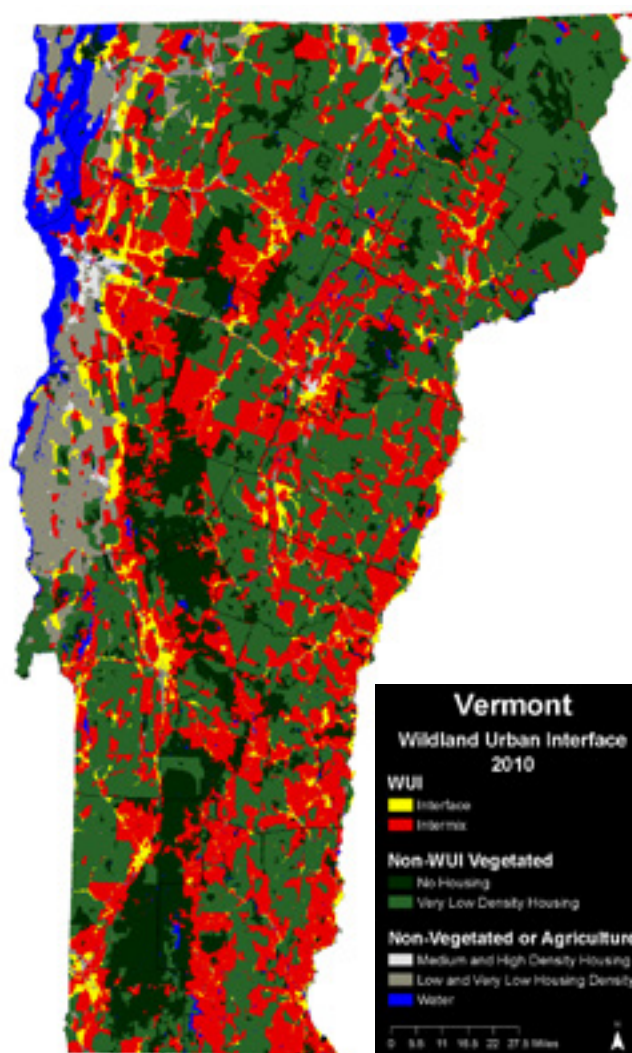


Figure 56: 2010 Wildland Urban Interface (WUI) map for Vermont
Source: <http://silvis.forest.wisc.edu/maps/wui/2010/download>