18. WILDFIRE

18.1 HAZARD PROFILE

18.1.1 Hazard Description

A wildfire is any non-structural fire that occurs in forested, semi-forested, or less developed areas (NPS 2023). Wildfires can be highly destructive and difficult to control, resulting in the uncontrolled destruction of forests, brush, field crops, grasslands, real estate, and personal property. They also threaten homeowners who live in or adjacent to forest environments (NJFFS 2023).

Each year, an average of 1,500 wildfires damage 7,000 acres of New Jersey's forests. Some are naturally caused (typically by lightning) and others are caused by human activities. Human-caused wildfires include prescribed burns, which are intentionally set to achieve wildland management objectives, as well as wildfires caused by accident, carelessness, or arson. Most wildfires in New Jersey are caused by humans (NPS 2023).

The height of wildfire season in New Jersey runs from March through May, corresponding with the driest live fuel moisture periods of the year (NJOEM 2019). However, wildfires can occur every month of the year. Drought, snow pack, and local weather conditions can expand the length of the fire season. Early and late season fires usually are human-caused. Lightning generally is the cause of most fires in the peak season (NJOEM 2019).

The New Jersey Forest Fire Service (NJFFS), a division of the New Jersey Department of Environmental Protection (NJDEP) under the direction of the state fire warden, is responsible for protecting the 3.15 million acres of wildland in the state. NJFFS has 85 full-time employees that provide an array of services including staffing the state's 21 fire towers, which are operational during in March, April, May, October, and November.

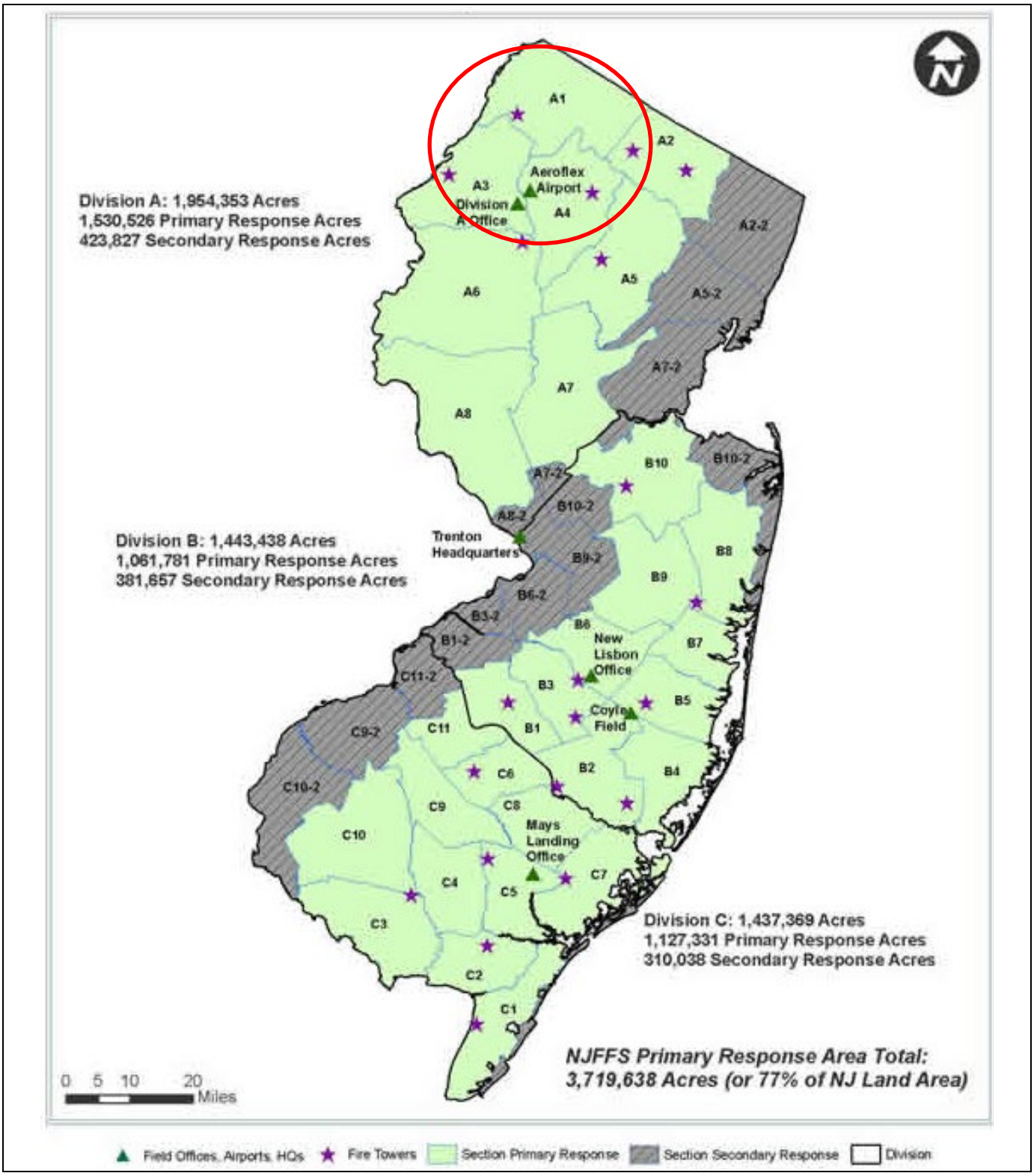
18.1.2 Location

NJFFS divides the State into three regions (A - Northern, B - Central, C - Southern) each totaling about 1,250,000 acres. The regions are further divided into 29 sections of about 125,000 acres with a forest fire warden in each and 269 districts of 15,000 to 20,000 acres. The 29 section forest fire wardens, 269 district forest fire wardens, and 2,000 trained crew members respond to fires on an as-needed basis (NJFFS 2020). Figure 18-1 shows the NJFFS regions and sections. Wildfire risks varies from region to region, due to a combination of factors, including climate, poverty, education, demographics, and other causal factors (USFA 2013). In Sussex County, located in Division A – Northern, wildfires have the potential to occur anywhere in the County.

Wildfire Fuel Hazard Areas and Wildfire Hazard Potential

NJFFS developed Wildfire Fuel Hazard data for the entire state (NJHC 2000). Figure 18-2 shows the fuel hazard areas in Sussex County. NJFFS also created the New Jersey Wildfire Risk Assessment as a consistent, comparable set of scientific results to be used as a foundation for wildfire mitigation and prevention planning in the state. This assessment tool was used to prepare a report for the wildfire hazard potential (WHP) for Sussex County, as shown in Figure 18-3. The WHP quantifies the relative potential for wildfire that may be difficult to control. Table 18-1 shows the number of acres of each WHP category in Sussex County

Figure 18-1. Fire Divisions of New Jersey



Source: NJDEP 2013
Note: The red circle indicates the approximate location of Sussex County, in Fire Division A.

Figure 18-2. Wildfire Fuel Hazard for Sussex County

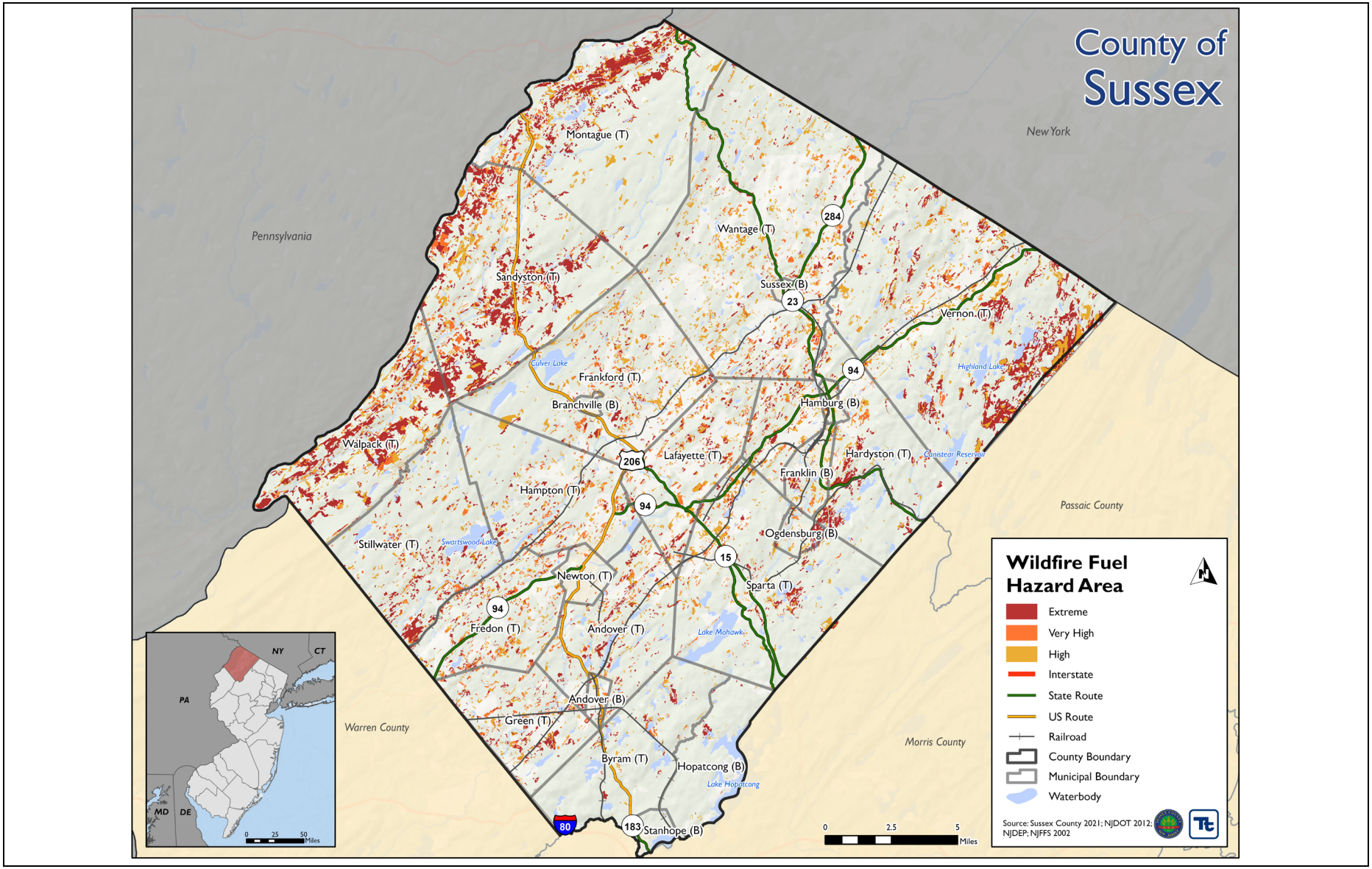
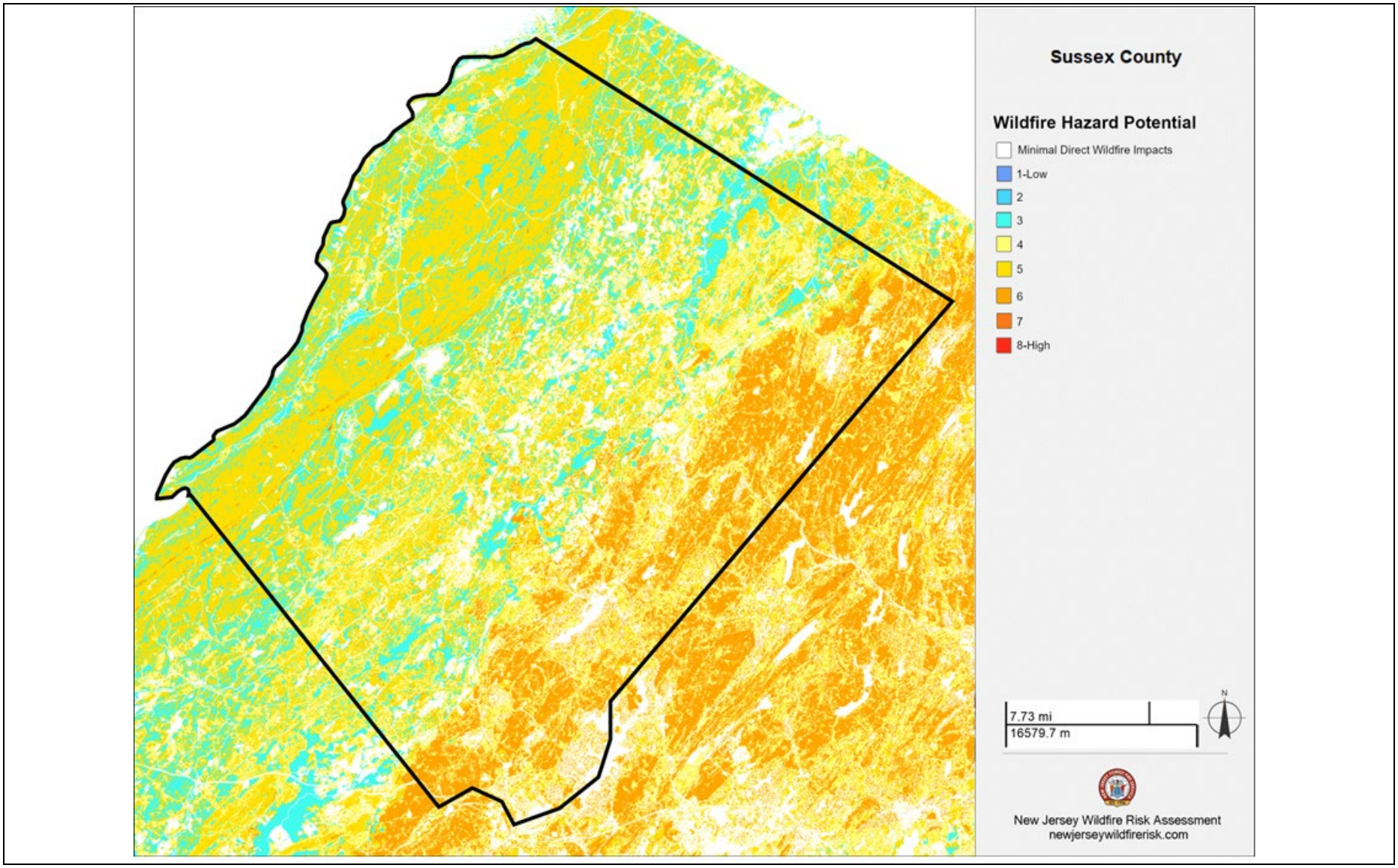


Figure 18-3. Wildfire Hazard Potential in Sussex County



Source: New Jersey Forest Fire Service 2024

Table 18-1. Wildfire Hazard Potential in Sussex County

	Wildfire Hazard Potential Category	Acres	Percent
	Minimal Direct Wildfire Impacts	53,647	15.8 %
	1-Low	0	0.0 %
	2	0	0.0 %
	3	47,753	14.0 %
	4	65,309	19.2 %
	5	128,722	37.8 %
	6	44,514	13.1 %
	7	160	0.0 %
	8-High	4	0.0 %
	Total	**340,109**	**100.0 %**

Source: New Jersey Forest Fire Service 2024

Burn Probability

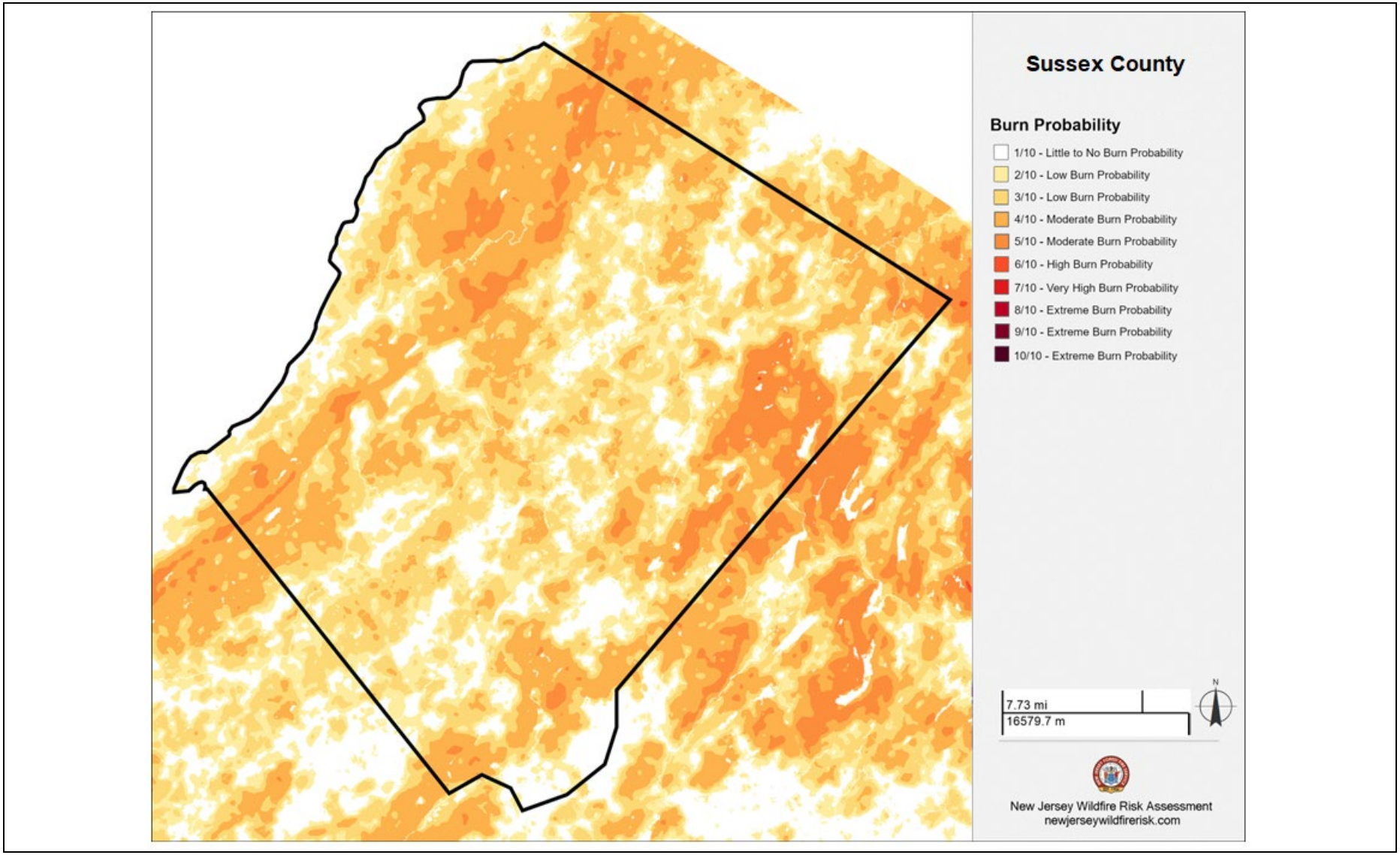
Burn probability is the annual probability of wildfire burning in a specific location, based on fire behavior modeling across thousands of simulations of possible fire seasons. Each simulation varies the factors contributing to the probability of a fire—including weather, topography, and ignitions—based on observations in recent decades (New Jersey Forest Fire Service 2024). Burn probability is not predictive and does not reflect any currently forecasted weather or fire danger conditions. Rather, it is a probability that any specific location may experience wildfire in any given year. It does not indicate the intensity of fire if it occurs (New Jersey Forest Fire Service 2024). Burn probability in Sussex County is listed in Table 18-2 and mapped in Figure 18-4.

Table 18-2. Sussex County Burn Probability

	Burn Probability Category	Acres	Percent
	1/10 - Little to No Burn Probability	53,946	15.9 %
	2/10 - Low Burn Probability	69,156	20.3 %
	3/10 - Low Burn Probability	98,676	29.0 %
	4/10 - Moderate Burn Probability	96,337	28.3 %
	5/10 - Moderate Burn Probability	21,966	6.5 %
	6/10 - High Burn Probability	11	0.0 %
	7/10 - Very High Burn Probability	0	0.0 %
	8/10 - Extreme Burn Probability	0	0.0 %
	9/10 - Extreme Burn Probability	0	0.0 %
	10/10 - Extreme Burn Probability	0	0.0 %
	Total	**340,092**	**100.0 %**

Source: New Jersey Forest Fire Service 2024

Figure 18-4. Sussex County Burn Probability



Source: New Jersey Forest Fire Service 2024

18.1.3 Extent

The extent (i.e., magnitude or severity) of wildfires depends on climate factors, such as dryness or presence of drought, and human activity. The NJFFS uses two indices to monitor the dryness of forest fuels and the possibility of fire ignitions becoming wildfires:

- The National Fire Danger Rating Systems Buildup Index reflects the combined cumulative effects of daily drying and precipitation fuels with a 10-day time lag constant. It is a rating of the total amount of fuel available for combustion (National Wildfire Coordinating Group 2023).
- The Keetch-Byram Drought Index determines forest fire potential based on a daily water balance, where a drought factor is balanced with precipitation and soil moisture (assumed to have a maximum storage capacity of 8 inches). It is expressed in hundredths of an inch of soil moisture depletion (NOAA NIDIS 2023).

Both indices are used for fire preparedness planning, which includes campfire and burning restrictions, fire patrol assignments, staffing of fire lookout towers, and readiness status for observation and firefighting aircraft.

The NJFFS also uses the National Fire Danger Rating System to provide a relative measure of the daily fire danger for a given area in the state (Western Fire Chiefs Association 2023). The rating system uses a five-color coded system to help the public understand fire potential. The NJFFS slightly adapted the color system; Table 18-3 shows the rating system, with the NFFS color scheme.

Figure 18-5 and Table 18-10 visualize surface fuels in Sussex County (New Jersey Forest Fire Service 2024). Surface fuels are generally defined as burnable materials less than 6 feet above the ground. They typically are categorized into one of the following fuel types based on the primary carrier of the surface fire:

- Grass
- Grass/shrub
- Shrub
- Timber/understory
- Timber litter
- Slash

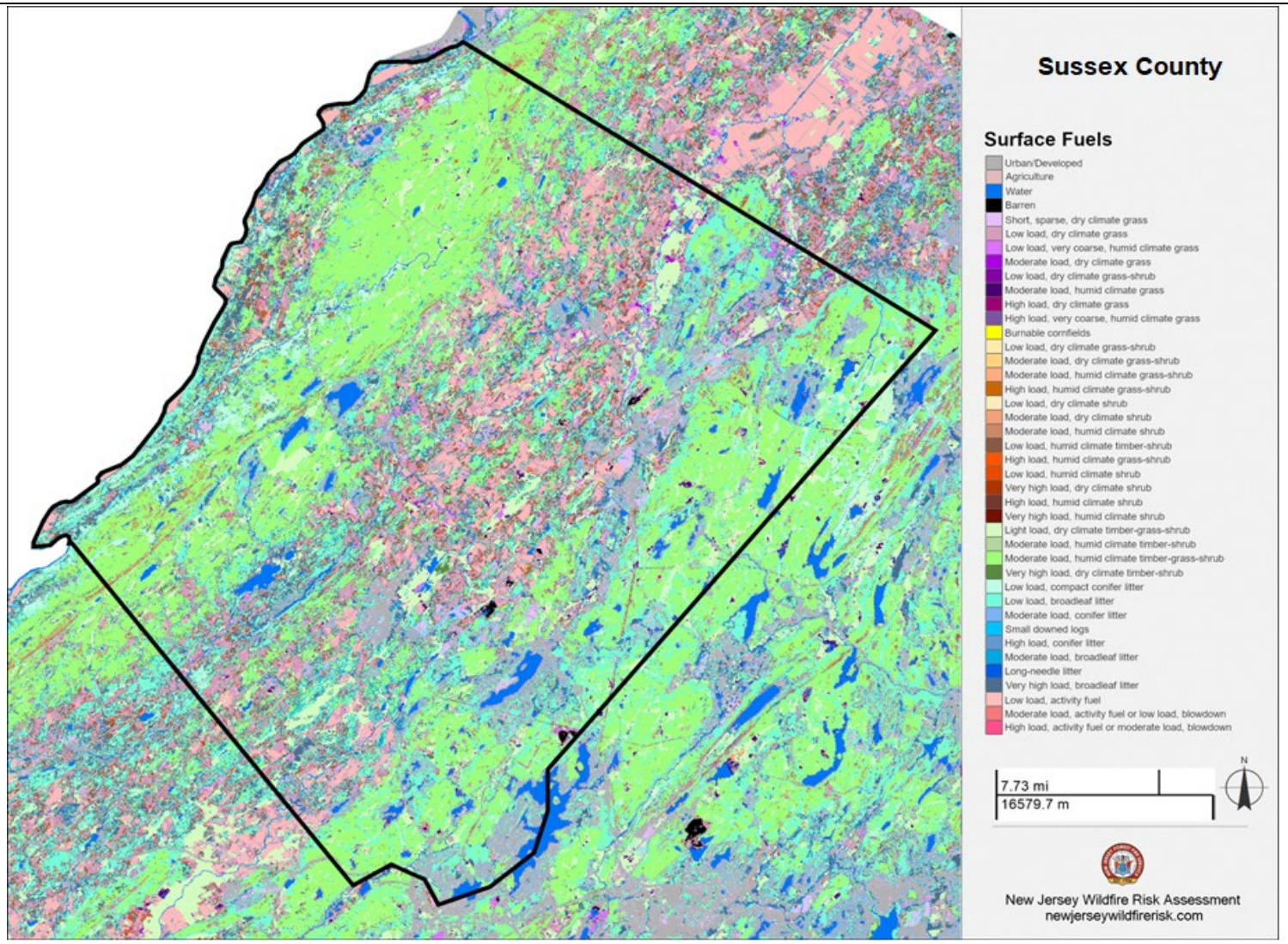
Surface fuels are defined by fire behavior fuel models, which contain parameters required by a surface fire spread model to compute surface fire behavior characteristics such as rate of spread, flame length, fire line intensity, and other fire behavior metrics.

Table 18-3. Fire Danger Rating and Color Code

Fire Danger Rating and Color Code	Description
Low (L) (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 (burning embers being transported by wind).
Moderate (M) (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.
High (H) (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.
Very High (VH) (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.
Extreme (E) (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 (trunks, branches, and treetops) 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.

Source: NJFFS 2023

Figure 18-5. Surface Fuels in Sussex County



Source: New Jersey Forest Fire Service 2024

Table 18-4. Surface Fuels in Sussex County

Surface Fuel Model	Description	Acres	Percent
NB1	Urban/Developed	24,711	7.3 %
NB3	Agriculture	18,056	5.3 %
NB8	Water	10,486	3.1 %
NB9	Barren	375	0.1 %
GR1	Short, sparse, dry climate grass	7,321	2.2 %
GR2	Low load, dry climate grass	17,284	5.1 %
GR3	Low load, very coarse, humid climate grass	4,026	1.2 %
GR4	Moderate load, dry climate grass	526	0.2 %
GR5	Low load, dry climate grass-shrub	0	0.0 %
GR6	Moderate load, humid climate grass	1,544	0.5 %
GR7	High load, dry climate grass	0	0.0 %
GR8	High load, very coarse, humid climate grass	0	0.0 %
AG9	Burnable cornfields	0	0.0 %
GS1	Low load, dry climate grass-shrub	829	0.2 %
GS2	Moderate load, dry climate grass-shrub	613	0.2 %
GS3	Moderate load, humid climate grass-shrub	0	0.0 %
GS4	High load, humid climate grass-shrub	0	0.0 %
SH1	Low load, dry climate shrub	31	0.0 %
SH2	Moderate load, dry climate shrub	168	0.0 %
SH3	Moderate load, humid climate shrub	7,739	2.3 %
SH4	Low load, humid climate timber-shrub	4,381	1.3 %
SH5	High load, humid climate grass-shrub	0	0.0 %
SH6	Low load, humid climate shrub	7,056	2.1 %
SH7	Very high load, dry climate shrub	0	0.0 %
SH8	High load, humid climate shrub	0	0.0 %
SH9	Very high load, humid climate shrub	0	0.0 %
TU1	Light load, dry climate timber-grass-shrub	31,682	9.3 %
TU2	Moderate load, humid climate timber-shrub	925	0.3 %
TU3	Moderate load, humid climate timber-grass-shrub	94,492	27.8 %
TU5	Very high load, dry climate timber-shrub	214	0.1 %
TL1	Low load, compact conifer litter	10,619	3.1 %
TL2	Low load, broadleaf litter	53,162	15.6 %
TL3	Moderate load, conifer litter	6,849	2.0 %
TL4	Small downed logs	0	0.0 %
TL5	High load, conifer litter	71	0.0 %
TL6	Moderate load, broadleaf litter	9,207	2.7 %
TL8	Long-needle litter	351	0.1 %
TL9	Very high load, broadleaf litter	27,399	8.1 %
SB1	Low load, activity fuel	0	0.0 %
SB2	Moderate load, activity fuel or low load, blowdown	0	0.0 %
SB3	High load, activity fuel or moderate load, blowdown	0	0.0 %
		Total	**340,117**	**100.0 %**

Source: New Jersey Forest Fire Service 2024

18.1.4 Previous Occurrences

FEMA Major Disaster and Emergency Declarations

Sussex County has not been included in any major disaster (DR) or emergency (EM) declarations for wildfire-related events (FEMA 2024).

USDA Declarations

The U.S. Secretary of Agriculture is authorized to designate counties as disaster areas to make emergency loans from the U.S. Department of Agriculture (USDA) to producers suffering losses in those counties and in contiguous counties. Since the previous Sussex County HMP, the County has not been included in any USDA wildfire-related agricultural disaster declarations (USDA 2024).

Previous Events

The NJFFS keeps records of wildfires and prescribed burns in the State of New Jersey. Events that impacted Sussex County between 2018 and 2023 are listed in Table 18-5. For events prior to 2018, refer to the 2021 Sussex County HMP.

Table 18-5. Wildfires and Prescribed Burns in Sussex County 2018-2023

	Wildfires		Prescribed Burns	
Year	Number of Fires	Acres Burned	Number of Treatments	Acres Treated
2018	19	6.75	26	389
2019	33	16.5	24	125
2020	91	32.75	29	230
2021	57	21.25	12	24
2022	53	35.5	14	57
2023	108	53.25	38	583
Total	**361**	**166**	**143**	**1,408**

Source: New Jersey Forest Fire Service 2024

18.1.5 Probability of Future Occurrences

Probability Based on Previous Occurrences

Information on previous wildfire occurrences in the County was used to calculate the probability of future occurrence of such events, as summarized in Table 18-6. Based on historical records and input from the Steering Committee, the probability of occurrence for wildfire in the County is considered “occasional.”

Table 18-6. Probability of Future Wildfire Events in Sussex County

Hazard Type	Number of Occurrences Between 2018 and 2023	Percent Chance of Occurring in Any Given Year
Wildfire	361	100%

Sources: New Jersey Forest Fire Service 2024

Effect of Climate Change on Future Probability

A gradual change in temperatures will alter the growing environment of many tree species, reducing the growth of some trees and increasing the growth of others. Tree growth and regeneration may be affected more by extreme weather events and climatic conditions than by gradual changes in temperature or precipitation. Warmer temperatures may lead to longer dry seasons and multi-year droughts, creating triggers for wildfires, insects, and invasive species. An increase in invasive species, such as the emerald ash borer, can lead to the destruction and death of ash trees, adding more fuel for fires. Increased temperature and change in precipitation will also affect fuel moisture during wildfire season and the length of time during while wildfires can burn during a given year (US EPA 2022).

Climate change may also increase the frequency of lightning strikes. A warmer atmosphere holds more moisture which is one of the key items for triggering a lightning strike. If the frequency of lightning strikes increases, the potential for wildfires from these strikes also increases (National Geographic 2014).

According to the temperature projections for Northern New Jersey, including Sussex County, this area can expect warmer and drier conditions, which may increase the frequency and intensity of wildfires. Higher temperatures are expected to increase the amount of moisture that evaporates from land and water. These changes have the potential to lead to more frequent and severe droughts, which, in turn, increases the likelihood of wildfires (US EPA 2022).

18.1.6 Cascading Impacts on Other Hazards

Debris and ash left after a wildfire can form mudflows. During and after a rain event, as water moves across charred and denuded ground, it can pick up soil and sediment and carry it in a stream of floodwaters. These mudflows have the potential to cause significant damage to impacted areas. Areas directly affected by fires and those located below or downstream of burn areas are most at risk (FEMA 2020).

Wildfires, particularly large-scale fires, can dramatically alter the terrain and ground conditions, making land already devastated by fire susceptible to floods. Normally, vegetation absorbs rainfall, reducing runoff. However, wildfires leave the ground charred, barren, and unable to absorb water, creating conditions perfect for flash flooding. Flood risk in these impacted areas remains significantly higher until vegetation is restored, which can take up to five years after a wildfire (FEMA 2016).

When wildfire hits in drought-stricken areas, watersheds and reservoirs can be further impacted by ash and debris flows, water treatment facilities may shut down with damage or loss of power, crops can be destroyed, and smoke can affect animal and human health (NIDIS 2023).

Intense wildfire events that destroy existing ecosystems can result in an increase in invasive species that may be able to move into an area with a lack of natural competitors (U.S. Department of the Interior 2012).

18.2 VULNERABILITY AND IMPACT ASSESSMENT

A spatial analysis was conducted using the 2009 NJDEP Wildfire Fuel Hazard spatial layer. For this risk assessment, the high, very high, and extreme areas were defined as the wildfire hazard area (see Figure 18-2). The boundaries of this hazard area were overlaid on the centroids of inventoried assets. Centroids that intersected the wildfire boundaries were totaled to estimate the building RCV and population vulnerable to the wildfire inundation areas.

18.2.1 Life, Health, and Safety

Overall Population

Wildfires have the potential to impact human health and life. Public health impacts associated with wildfire include difficulty in breathing, odor, and reduction in visibility. First responders and nearby residents are exposed to the dangers from the initial incident and after-effects from smoke inhalation and heat stroke. 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.

Table 18-7 summarizes the estimated population living in the extreme, high, and very high wildfire fuel hazard areas, by municipality. An estimated 2,834 residents, or 2 percent of the County's population, live in this wildfire hazard area. The Township of Hardyston has the greatest number of individuals in the hazard area (541 persons).

Socially Vulnerable Population

Economically disadvantaged populations are more vulnerable to wildfire because they are likely to lack financial resources for evacuation. The population over age 65 is also more vulnerable because they are more likely to need medical attention that may not be available due to isolation during a wildfire event, and they may have more difficulty evacuating. Smoke and air pollution from wildfires can be a severe health hazard, especially for sensitive populations, including children, the elderly, and those with respiratory and cardiovascular diseases.

Table 18-8 presents the estimated socially vulnerable populations located within the wildfire hazard area. There are 523 persons over the age of 65 years, 115 persons under the age of 5 years, 36 non-English speakers, 302 persons with a disability, and 141 living in poverty located in these areas.

18.2.2 General Building Stock

Buildings located within the NJFFS identified extreme, very high, or high wildfire fuel hazard areas are considered vulnerable to the wildfire hazard. Buildings constructed of wood or vinyl siding are generally more likely to be impacted by the fire hazard than buildings constructed of brick or concrete. Table 18-9 summarizes the estimated building stock inventory located in the defined hazard area by municipality. These buildings total 3.5 percent ($2.3 million) of the County's building replacement cost value. The Township of Hardyston has the greatest number of buildings located in the wildfire hazard area (277 structures, 6.3 percent of the township total).

Table 18-10 lists buildings in the wildfire hazard area by general occupancy. The residential occupancy is the most exposed to the wildfire hazard, with 1,262 structures, accounting for 84.7 percent of the buildings located in the extreme, very high, or high wildfire fuel risk hazard area.

Table 18-7. Population Living in the High, Very High, and Extreme Wildfire Fuel Hazard Areas

	Total Population	Population Living in the Wildfire Hazard Area	
		Number of Persons	% of Jurisdiction Total
Andover (B)	595	0	0.0%
Andover (Twp)	5,996	114	1.9%
Branchville (B)	791	4	0.5%
Byram (Twp)	8,028	28	0.3%
Frankford (Twp)	5,302	118	2.2%
Franklin (B)	4,912	32	0.7%
Fredon (Twp)	3,235	151	4.7%
Green (Twp)	3,627	131	3.6%
Hamburg (B)	3,266	181	5.5%
Hampton (Twp)	4,893	53	1.1%
Hardyston (Twp)	8,125	541	6.7%
Hopatcong (B)	14,362	26	0.2%
Lafayette (Twp)	2,358	49	2.1%
Montague (Twp)	3,792	267	7.0%
Newton (T)	8,374	3	<0.1%
Ogdensburg (B)	2,258	27	1.2%
Sandyston (Twp)	1,977	97	4.9%
Sparta (Twp)	19,600	284	1.4%
Stanhope (B)	3,526	0	0.0%
Stillwater (Twp)	4,004	109	2.7%
Sussex (B)	2,024	7	0.3%
Vernon (Twp)	22,358	206	0.9%
Walpack (Twp)	7	0	0.0%
Wantage (Twp)	10,811	406	3.8%
Sussex County (Total)	**144,221**	**2,834**	**2.0%**

Source: U.S. Census Bureau 2020, 2021; Sussex County 2021, 2023; NJDEP, NJFFS 2002; CDC/ATSDR 2020

Table 18-8. Vulnerable Persons Living in the High, Very High, and Extreme Wildfire Fuel Hazard Areas

	Vulnerable Persons Living in the Wildfire Hazard Area				
	Persons Over 65	Persons Under 5	Non-English Speaking Persons	Persons with a Disability	Persons in Poverty
Andover (B)	0	0	0	0	0
Andover (Twp)	26	4	0	10	5
Branchville (B)	0	0	0	0	0
Byram (Twp)	3	1	0	2	0
Frankford (Twp)	22	5	0	12	3
Franklin (B)	7	1	0	5	1
Fredon (Twp)	29	6	1	13	8
Green (Twp)	26	4	1	17	5
Hamburg (B)	25	7	18	13	9
Hampton (Twp)	12	2	1	7	3
Hardyston (Twp)	109	21	6	61	30
Hopatcong (B)	3	1	0	2	1
Lafayette (Twp)	10	3	0	5	4
Montague (Twp)	59	14	5	27	12
Newton (T)	0	0	0	0	0
Ogdensburg (B)	4	0	0	2	1
Sandyston (Twp)	15	5	0	11	3
Sparta (Twp)	38	16	1	22	10
Stanhope (B)	0	0	0	0	0
Stillwater (Twp)	28	2	0	15	7
Sussex (B)	1	0	0	1	1
Vernon (Twp)	33	9	0	21	8
Walpack (Twp)	0	0	0	0	0
Wantage (Twp)	73	14	3	56	30
Sussex County (Total)	523	115	36	302	141

Table 18-9. Number and Total Replacement Cost Value of Structures in the High, Very High, and Extreme Wildfire Fuel Hazard Areas

	Jurisdiction Total Buildings		Buildings in the Wildfire Hazard Area			
			Number of Buildings		Replacement Cost Value	
	Number of Buildings	Replacement Cost Value (RCV)	Count	% of Jurisdiction Total	Value	% of Jurisdiction Total
Andover (B)	326	$693,607,785	0	0.0%	$0	0.0%
Andover (Twp)	2,577	$4,012,892,721	53	2.1%	$106,111,462	2.6%
Branchville (B)	426	$598,388,025	2	0.5%	$1,190,044	0.2%
Byram (Twp)	3,676	$3,162,144,221	18	0.5%	$16,243,016	0.5%
Frankford (Twp)	3,529	$3,491,793,002	83	2.4%	$110,691,634	3.2%
Franklin (B)	2,058	$2,227,977,138	12	0.6%	$6,335,788	0.3%
Fredon (Twp)	1,615	$1,542,422,915	64	4.0%	$52,476,394	3.4%
Green (Twp)	1,697	$1,821,582,866	57	3.4%	$100,333,480	5.5%
Hamburg (B)	1,593	$1,809,235,911	83	5.2%	$38,470,860	2.1%
Hampton (Twp)	2,761	$2,474,023,610	38	1.4%	$48,497,898	2.0%
Hardyston (Twp)	4,401	$3,681,458,622	277	6.3%	$179,629,490	4.9%
Hopatcong (B)	8,004	$3,432,619,930	18	0.2%	$7,018,353	0.2%
Lafayette (Twp)	1,463	$2,142,628,709	28	1.9%	$38,953,064	1.8%
Montague (Twp)	2,175	$1,659,675,649	143	6.6%	$163,256,398	9.8%
Newton (T)	2,676	$5,699,120,026	5	0.2%	$43,312,741	0.8%
Ogdensburg (B)	992	$954,409,603	12	1.2%	$6,012,657	0.6%
Sandyston (Twp)	1,526	$1,350,071,503	66	4.3%	$91,496,892	6.8%
Sparta (Twp)	8,127	$10,316,900,290	144	1.8%	$838,435,991	8.1%
Stanhope (B)	1,552	$1,228,753,628	1	0.1%	$35,728	0.0%
Stillwater (Twp)	2,487	$1,611,608,776	64	2.6%	$23,920,038	1.5%
Sussex (B)	677	$2,187,092,184	2	0.3%	$1,669,287	0.1%
Vernon (Twp)	12,039	$6,816,863,576	122	1.0%	$256,853,458	3.8%
Walpack (Twp)	51	$68,015,712	8	15.7%	$22,151,059	32.6%
Wantage (Twp)	5,509	$5,527,803,803	194	3.5%	$219,231,358	4.0%
Sussex County (Total)	**71,937**	**$68,511,090,204**	**1,494**	**2.1%**	**$2,372,327,088**	**3.5%**

Source: Sussex County 2023; NJOGIS, Civil Solutions, Spatial Data Logic; RS Means 2022; NJDEP, NJFFS 2002

Table 18-10. Number of Structures in the High, Very High, and Extreme Wildfire Fuel Hazard Areas, by Occupancy Class

	Buildings in the Wildfire Hazard Area			
	Residential	Commercial	Industrial	Other[a]
Andover (B)	0	0	0	0
Andover (Twp)	41	3	3	6
Branchville (B)	2	0	0	0
Byram (Twp)	12	0	0	6
Frankford (Twp)	62	3	0	18
Franklin (B)	12	0	0	0
Fredon (Twp)	57	1	0	6
Green (Twp)	50	1	1	5
Hamburg (B)	82	0	0	1
Hampton (Twp)	25	1	0	12
Hardyston (Twp)	264	4	2	7
Hopatcong (B)	14	0	0	4
Lafayette (Twp)	20	1	1	6
Montague (Twp)	132	3	0	8
Newton (T)	1	1	1	2
Ogdensburg (B)	11	0	0	1
Sandyston (Twp)	54	3	1	8
Sparta (Twp)	107	28	1	8
Stanhope (B)	0	0	0	1
Stillwater (Twp)	54	0	0	10
Sussex (B)	2	0	0	0
Vernon (Twp)	103	8	2	9
Walpack (Twp)	0	3	0	5
Wantage (Twp)	157	2	0	35
Sussex County (Total)	**1,262**	**62**	**12**	**158**

Source: Sussex County 2023; NJOGIS, Civil Solutions, Spatial Data Logic; NJDEP, NJFFS 2002

a. Other = Government, Religion, Agricultural, and Education

18.2.3 Community Lifelines and Other Critical Facilities

Wildfires can have an impact on the water supplies because of residual pollutants like char or debris landing in water resources, which can clog wastewater pipes, culverts, etc. Wildfires may also impact transportation routes, blocking residents and commuters from getting in and out of the County during a wildfire event because of char and debris in the air making it difficult to drive, or the flames near roadways making the route unsafe. Roads and bridges in the areas of fire risk provide ingress and egress to large areas and, in some cases, to isolated neighborhoods. Fires can create conditions that block or prevent access and can isolate residents and emergency service providers.

18.2.4 Economy

Wildfire events can have major economic impacts on a community from the initial loss of structures and the subsequent loss of revenue from destroyed business. These events may cost thousands of taxpayer dollars to suppress and control and may involve hundreds of operating hours on fire apparatus and thousands of volunteer man hours from the volunteer firefighters. There are also direct and indirect costs to local businesses that excuse volunteers from work to fight these fires.

18.2.5 Natural, Historic and Cultural Resources

Natural

While wildfire is a necessary part of ecosystem health in Sussex County, intense wildfire that burns too hot can result in severe damage to the environment, including burning and killing of plant and animal life. Intense fire can also heat narrow and shallow waterways, resulting in damage to aquatic systems. Post-fire runoff polluted with debris and contaminants can be harmful to terrestrial ecosystems and aquatic life (USGS 2023). Intense wildfire events that destroy ecosystems can result in an increase in invasive species that may be able to move into an area with a lack of natural competitors (U.S. Department of the Interior 2012).

Historic

Wildfires are a major threat to historic resources, with the potential to cause extensive damage, and in some cases, complete destruction. The potential impacts on historic resources, particularly infrastructure, from wildfire depend heavily on the materials used for construction. Many historic structures are made of wood, which is a highly flammable material.

Cultural

Wildfires are a major threat to cultural resources, with the potential to cause extensive damage, and in some cases, complete destruction. The potential impacts on cultural resources from wildfire depend heavily on the materials used to construct the facility in which cultural resources are located. Many historic structures are made of wood, which is a highly flammable material. In many instances, historic structures house cultural resources and artifacts that also may be destroyed by fire. Outdoor events are likely to be postponed or cancelled as the result of wildfire conditions, as smoke conditions can have harmful impacts on the human body.

18.3 CHANGE OF VULNERABILITY SINCE 2021 HMP

Overall, the County's vulnerability to wildfire has not changed, and the entire County will continue to be vulnerable to this hazard. The NJDEP Wildfire Fuel Hazard spatial layer has not been updated since the last HMP; therefore, any changes in wildfire hazard exposure are attributed to changes in population density and new development. This updated HMP used updated building stock and critical asset inventories to assess the County's risk to these assets. The building inventory was updated using RSMeans 2022 values, which are more current and reflect replacement cost rather than the building stock improvement values reported in the 2021 HMP. Further, the 2021 5-year population estimates from the American Community Survey were used to evaluate the population exposed to the geological hazard areas.

18.4 FUTURE CHANGES THAT MAY AFFECT RISK

Understanding future changes that affect vulnerability can assist in planning for future development and ensure establishment of appropriate mitigation, planning, and preparedness measures. The following sections examine potential conditions that may affect hazard vulnerability.

18.4.1 Potential or Planned Development

Areas targeted for future growth and development have been identified across the County. Any changes in development can impact the County's risk to the wildfire hazard of concern.

Fire suppression capabilities are high at the state and local levels, but new development with a mix of additional structures, ornamental vegetation, and wildland fuels will require continued assessment of the hazard and mitigation risk. The County should implement wildfire management strategies in existing building code to protect structures against the residual impacts from wildfire such as heat, debris, and char. Furthermore, development should be built with access to transit routes that will enable easier evacuation during a wildfire event.

18.4.2 Projected Changes in Population

The New Jersey Department of Labor and Workforce Development produced populations projections by County from 2014 to 2019, 2024, 2029, and 2034. According to these projections, Sussex County is projected to have a decrease in population in the upcoming years. These projection totals include a population of 140,400 by 2024, 137,300 by 2029, and 136,600 by 2034 (State of New Jersey 2017). Any changes in the density of population can impact the number of persons living near wildfire hazard areas.

18.4.3 Climate Change

Climate change will likely alter the atmospheric patterns that affect fire weather. Changes in fire patterns will, in turn, impact carbon cycling, forest structure, and species composition. Climate change associated with warmer temperatures, changes in rainfall, and increased periods of drought may create an atmospheric and fuel environment that is more conductive to large, severe fires (United Nations 2021).

Understanding the climate/fire/vegetation interactions is essential for addressing issues associated with climate change that include (USFS 2011):

- 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 increasing area of interface between urban development and wildland areas

Average temperatures are anticipated to increase in New Jersey, with potential impacts on the suitability of habitats for specific types of trees, altering the fire regime and resulting in more frequent fire events and changes in intensity. Prolonged and more frequent heat waves and droughts have the potential to increase the likelihood of a wildfire. The increased potential combined with stronger winds may make it harder to contain fires and thus increase the County's vulnerability to this hazard.