13. WILDFIRE

13.1 Hazard Profile

13.1.1 Hazard Description

A wildfire is any non-structural fire that occurs in the wildland (forested, semi-forested, or less developed areas), including naturally occurring fires and human-caused fires, whether accidental or intentional (prescribed burns or arson). Most wildfires in New Jersey are caused by humans (NPS 2023). Wildfires can be highly destructive and difficult to control. They result in the uncontrolled destruction of forests, brush, field crops, grasslands, real estate, and personal property. In the State of New Jersey each year, an average of 1,500 wildfires damage or destroy 7,000 acres of forests. Wildfires also threaten homeowners who live within or adjacent to forest environments (NJFFS 2023).

The height of wildfire season in New Jersey is March through May, corresponding with the driest live fuel moisture periods of the year, though wildfires can occur every month of the year. Drought, snow pack, and local weather conditions can expand the length of the fire season. Fires in the early and late fire season usually are human-caused. Lightning generally is the cause of most fires in the peak season (NJOEM 2024).

Within the New Jersey Department of Environmental Protection (NJDEP), the New Jersey Forest Fire Service (NJFFS) is responsible for protecting the 3.15 million acres of public and private wildland in the State. Headquartered in Trenton, NJFFS is under the direction of the State fire warden and is broken up into three divisions (A, B, and C). Hudson County is in a secondary response area of Division A, as shown in Figure 13-1. NJFFS has 85 full-time employees that provide an array of services including staffing the State's 21 fire towers, which are operational during the months of March, April, May, October, and November (NJFFS 2020).

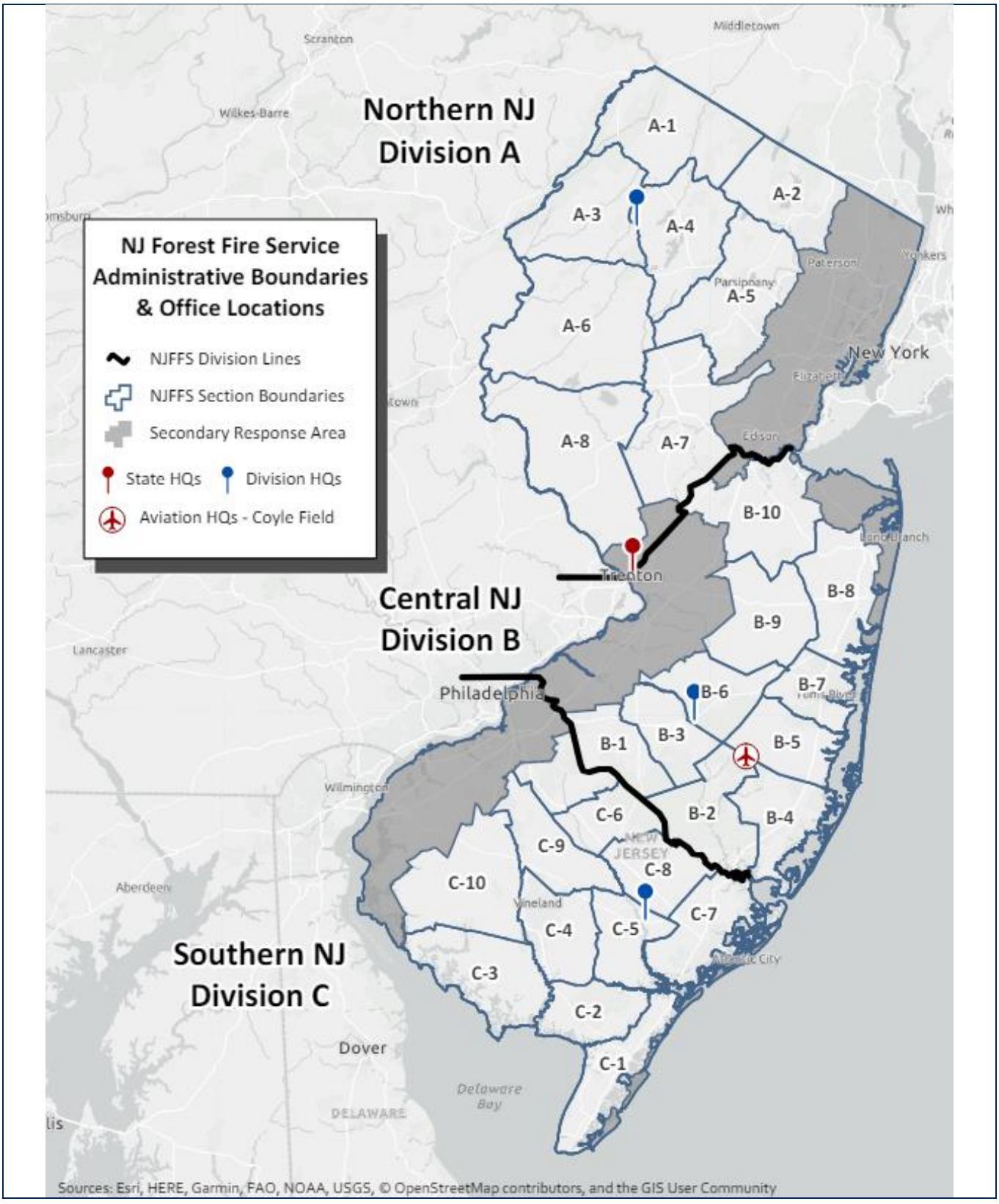
13.1.2 Location

NJFFS created the New Jersey Wildfire Risk Assessment to provide a consistent, comparable set of scientific results to be used as a foundation for wildfire mitigation and prevention planning in New Jersey. This assessment permits an area of interest to be defined for the user; a report for the wildfire hazard potential for Hudson County was created, identifying four measures of wildfire hazard—wildfire fuel hazard, wildfire hazard potential, wildfire burn probability, and surface fuel mapping—as described in the sections below.

WILDFIRE FUEL HAZARD AREAS

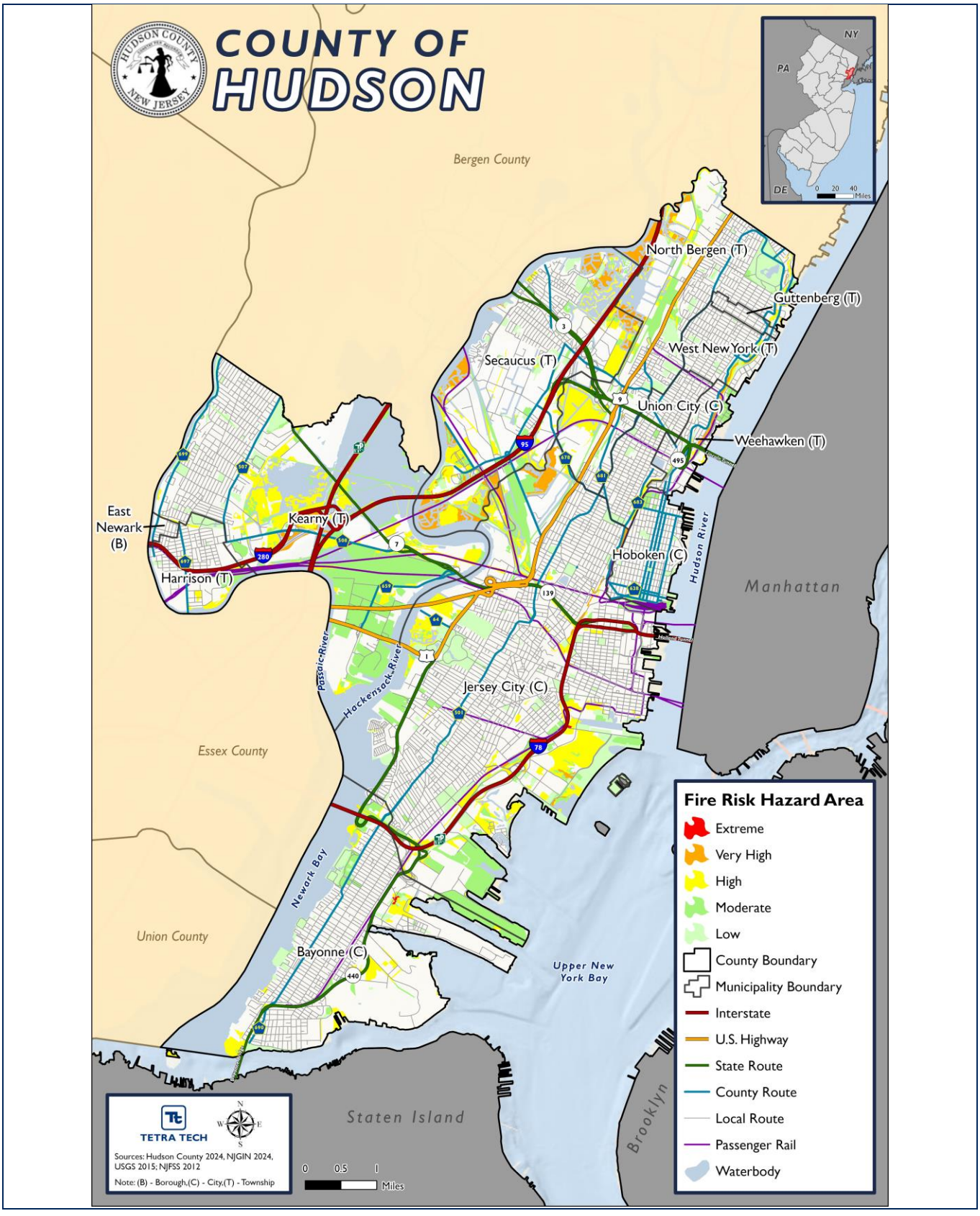
A majority of the County has low fuel hazard and low risk. Very small areas throughout the County are identified as having extreme fuel hazards (NJFFS 2024). These areas include the Meadowlands and areas along the Hackensack River in Secaucus, Liberty State Park in Jersey City, and parts of Kearny near the marshland. NJFFS developed Wildfire Fuel Hazard data for the entire state based on NJDEP data (NJHC 2000). Refer to Figure 13-2 for the locations of fuel hazards in Hudson County. The risk levels in Hudson County vary from very low to high.

Figure 13-1. NJFFS Administrative Boundaries



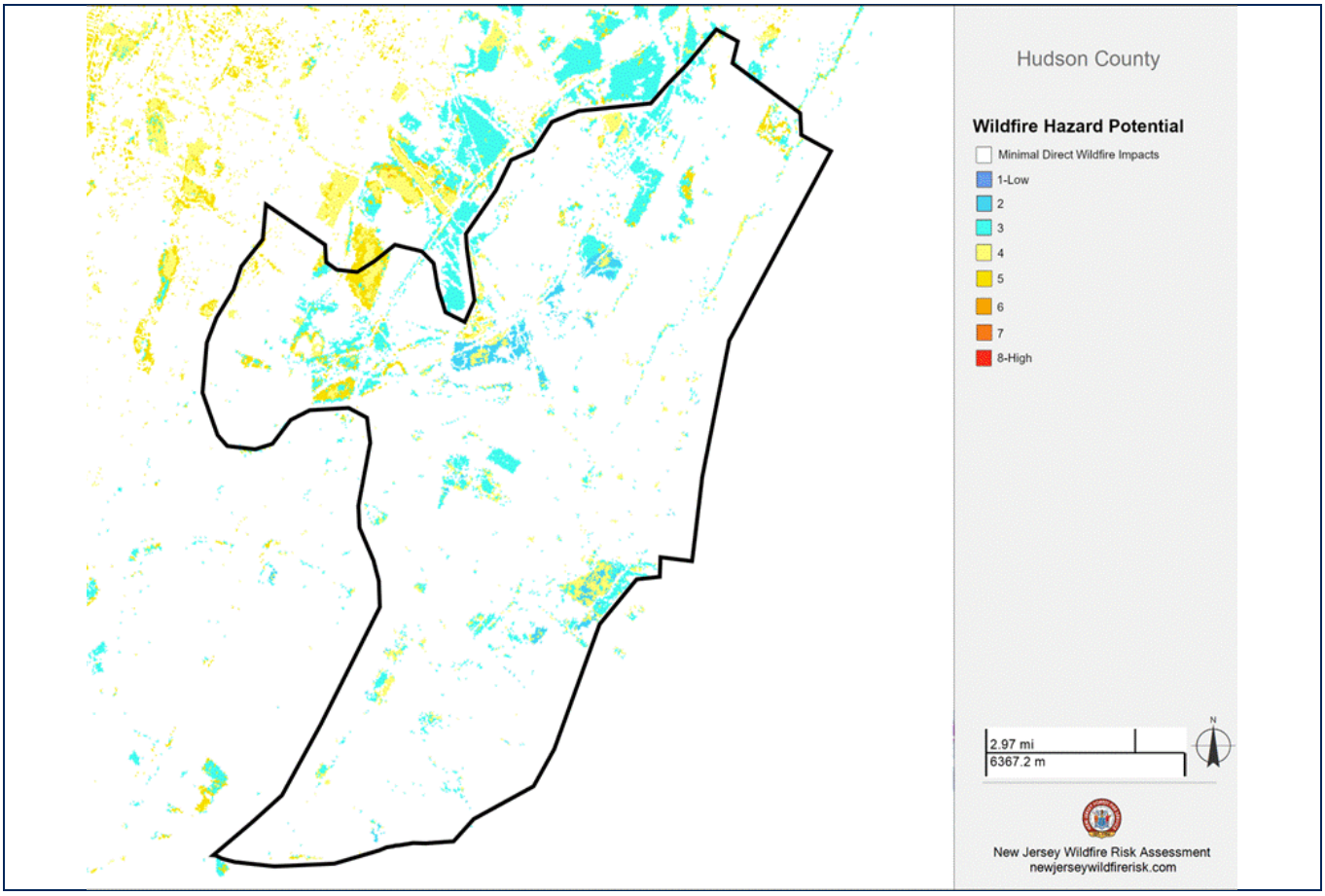
Source: NJDEP 2020

Figure 13-2. Wildfire Fuel Hazard for Hudson County



NJFFS created the New Jersey Wildfire Risk Assessment provides a consistent, comparable set of scientific results to be used as a foundation for wildfire mitigation and prevention planning in the state of New Jersey. This assessment tool permits an area of interest to be defined for the user; a report for the wildfire hazard potential for Hudson County was created. The wildfire hazard potential (WHP) dataset represents an index that quantifies the relative potential for wildfire that may be difficult to control. Figure 13-3 displays the WHP for Hudson County, and Table 13-1 shows the number of acres impacted by each WHP category.

Figure 13-3. Wildfire Hazard Potential for Hudson County



Source: New Jersey Forest Fire Service 2024

Table 13-1. Wildfire Hazard Potential in Hudson County

	Wildfire Hazard Potential Category	Acres	Percent
	Minimal Direct Wildfire Impacts	33,209	91.0 %
	1-Low	0	0.0 %
	2	412	1.1 %
	3	1,617	4.4 %
	4	842	2.3 %
	5	430	1.2 %
	6	1	0.0 %
	7	0	0.0 %
	8-High	0	0.0 %
	Total	**36,511**	**100.0 %**

Source: New Jersey Forest Fire Service 2024

BURN PROBABILITY

Burn probability is the annual probability of wildfire burning in a specific location. At the community level, burn probability or wildfire likelihood is averaged where housing units occur. Burn Probability is based on fire behavior modeling across thousands of simulations of possible fire seasons. In each simulation, factors contributing to the probability of a fire occurring, including weather, topography, and ignitions are varied based on patterns derived from 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. Burn Probability is simply a probability that any specific location may experience wildfire in any given year. It does not say anything about the intensity of fire if it occurs (New Jersey Forest Fire Service 2024). Table 13-2 displays Hudson County's Burn Probability; also refer to Figure 13-4.

13.1.3 Extent

The extent (that is, magnitude or severity) of wildfires depends on the weather (dryness/drought) and human activity. To determine the potential for wildfires, the NJFFS uses two indices to measure and monitor the dryness of forest fuels and the possibility of fire ignitions becoming wildfires. This includes the National Fire Danger Rating Systems Buildup Index and the Keetch-Byram Drought Index. Both are used for fire preparedness planning, which includes the following initiatives: campfire and burning restrictions, fire patrol assignments, staffing of fire lookout towers, and readiness status for both observation and firefighting aircraft (NJDEP 2023).

- The National Fire Danger Rating System's (NFDRS) **Buildup Index** measures the combined cumulative effects of daily drying and precipitation fuels with a ten-day time lag constant. It is a rating of the total amount of fuel available for combustion (NOAA 2020).
- The **Keetch-Byram Drought Index** helps determine forest fire potential. The drought index is 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 eight inches) and is expressed in hundredths of an inch of soil moisture depletion (NPS 2023).

In addition to the two indices, the NJFFS uses the NFDRS to measure relative seriousness of burning conditions and threat of fire in the State (Western Fire Chiefs Association 2023). It allows the NJFFS to estimate the daily fire danger for a given area. The NFDRS uses a five-color coded system to help the public understand fire potential (USFS n.d.). The NJFFS adapted the color system for their purposes, as shown in Table 13-3.

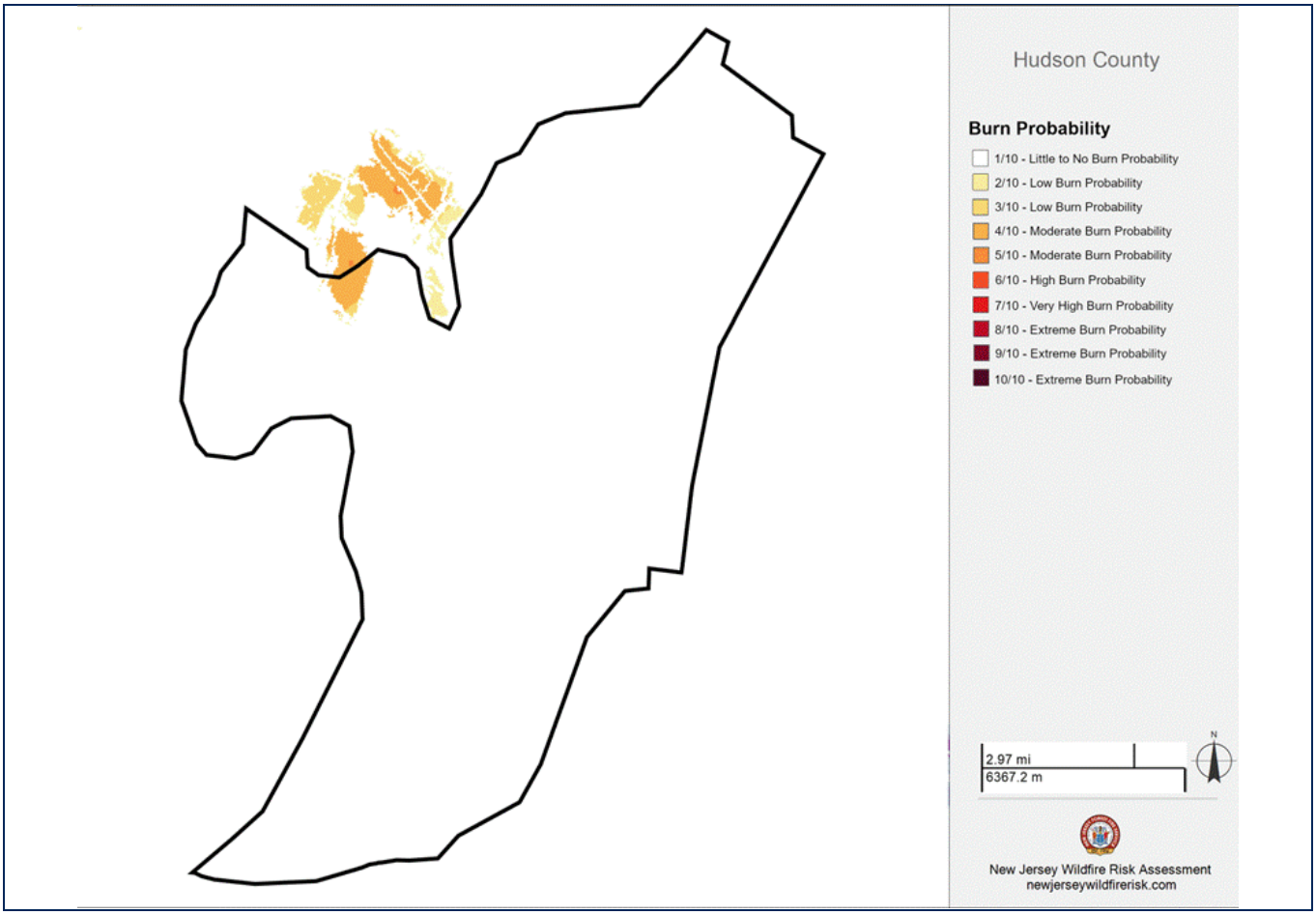
Surface fuels are defined by fire behavior fuel models. A fuel model contains the parameters required by the surface fire spread model to compute surface fire behavior characteristics, including rate of spread, flame length, fire line intensity, and other fire behavior metrics. As the name might suggest, surface fuels account only for surface fire potential and surface fuels are generally defined to be less than six feet in height off the ground. Surface fuels typically are categorized into one of six primary fuel types based on the primary carrier of the surface fire: 1) Grass, 2) Grass/Shrub, 3) Shrub, 4) Timber/Understory, 5) Timber Litter and 6) Slash. These surface fuel models provide the input parameters needed to compute surface fire behavior. Figure 13-5 and Table 13-4 visualize the surface fuel in Hudson County (New Jersey Forest Fire Service 2024).

Table 13-2. Hudson County Burn Probability

	Burn Probability Category	Acres	Percent
	1/10 - Little to No Burn Probability	36,327	99.5 %
	2/10 - Low Burn Probability	3	0.0 %
	3/10 - Low Burn Probability	18	0.0 %
	4/10 - Moderate Burn Probability	166	0.5 %
	5/10 - Moderate Burn Probability	0	0.0 %
	6/10 - High Burn Probability	0	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	**36,514**	**100.0 %**

Source: New Jersey Forest Fire Service 2024

Figure 13-4. Hudson County Burn Probability



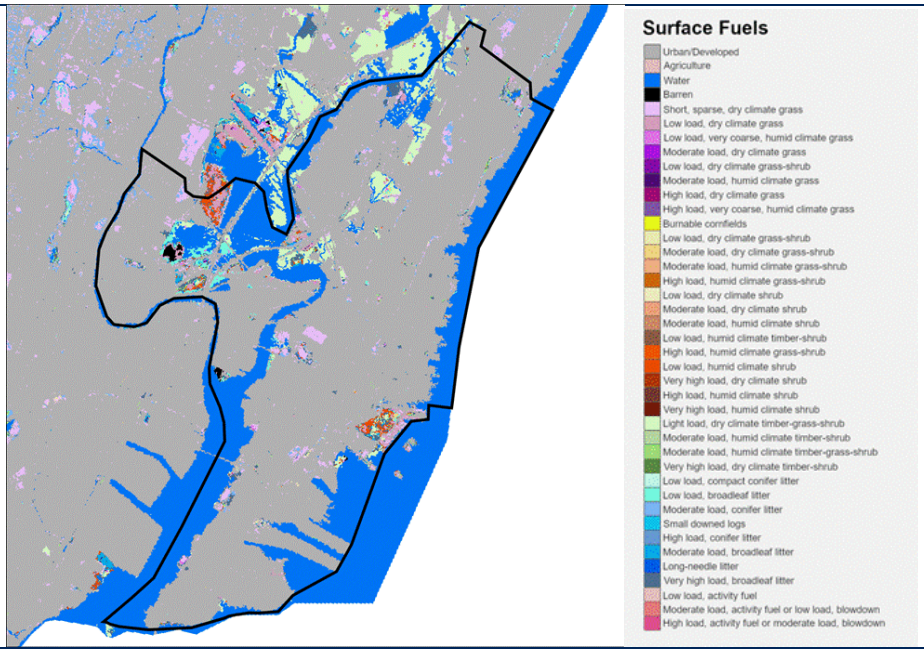
Source: New Jersey Forest Fire Service 2024

Table 13-3 Fire Danger Rating and Color Code

Fire Danger Rating and Color Code	Description
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.
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.
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.
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 bum into heavier fuels.
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.

Source: USFS n.d.

Figure 13-5. Surface Fuels in Hudson County



Source: New Jersey Forest Fire Service 2024

Table 13-4. Surface Fuels in Hudson County

	Surface Fuel Model	Description	Acres	Percent		Surface Fuel Model	Description	Acres	Percent
	NB1	Urban/Developed	25,445	69.7 %		SH5	High load, humid climate grass-shrub	0	0.0 %
	NB3	Agriculture	0	0.0 %		SH6	Low load, humid climate shrub	194	0.5 %
	NB8	Water	7,691	21.1 %		SH7	Very high load, dry climate shrub	0	0.0 %
	NB9	Barren	68	0.2 %		SH8	High load, humid climate shrub	0	0.0 %
	GR1	Short, sparse, dry climate grass	771	2.1 %		SH9	Very high load, humid climate shrub	0	0.0 %
	GR2	Low load, dry climate grass	292	0.8 %		TU1	Light load, dry climate timber-grass-shrub	842	2.3 %
	GR3	Low load, very coarse, humid climate grass	42	0.1 %		TU2	Moderate load, humid climate timber-shrub	2	0.0 %
	GR4	Moderate load, dry climate grass	0	0.0 %		TU3	Moderate load, humid climate timber-grass-shrub	77	0.2 %
	GR5	Low load, dry climate grass-shrub	0	0.0 %		TU5	Very high load, dry climate timber-shrub	0	0.0 %
	GR6	Moderate load, humid climate grass	5	0.0 %		TL1	Low load, compact conifer litter	5	0.0 %
	GR7	High load, dry climate grass	0	0.0 %		TL2	Low load, broadleaf litter	240	0.7 %
	GR8	High load, very coarse, humid climate grass	0	0.0 %		TL3	Moderate load, conifer litter	192	0.5 %
	AG9	Burnable cornfields	0	0.0 %		TL4	Small downed logs	0	0.0 %
	GS1	Low load, dry climate grass-shrub	32	0.1 %		TL5	High load, conifer litter	0	0.0 %
	GS2	Moderate load, dry climate grass-shrub	20	0.1 %		TL6	Moderate load, broadleaf litter	95	0.3 %
	GS3	Moderate load, humid climate grass-shrub	0	0.0 %		TL8	Long-needle litter	0	0.0 %
	GS4	High load, humid climate grass-shrub	0	0.0 %		TL9	Very high load, broadleaf litter	485	1.3 %
	SH1	Low load, dry climate shrub	0	0.0 %		SB1	Low load, activity fuel	0	0.0 %
	SH2	Moderate load, dry climate shrub	0	0.0 %		SB2	Moderate load, activity fuel or low load, blowdown	0	0.0 %
	SH3	Moderate load, humid climate shrub	11	0.0 %		SB3	High load, activity fuel or moderate load, blowdown	0	0.0 %
	SH4	Low load, humid climate timber-shrub	10	0.0 %					
							Total	**36,519**	**100.0 %**

Source: New Jersey Forest Fire Service 2024

13.1.4 Previous Occurrences

FEMA Major Disaster and Emergency Declarations

Between 1954 and 2023, Hudson County was not included in any major disaster (DR) or emergency (EM) declarations for wildfire-related events (FEMA 2023).

USDA Declarations

The Secretary of Agriculture from the U.S. Department of Agriculture (USDA) is authorized to designate counties as disaster areas to make emergency loans to producers suffering losses in those counties and in contiguous counties. Between 2019 and 2023, Hudson County was not included in any USDA wildfire-related agricultural disaster declarations (USDA 2024).

Previous Events

No know wildfire events occurred within Hudson County between August 2019 and December 2023, but the County was affected by wildfire smoke from fires originating in Canada in 2023 (NJDEP 2024). Table 13-5 summarizes this event and its impacts. For events prior to 2019, refer to the 2019 Hudson County HMP.

Table 13-5. Wildfire Events in Hudson County (2019 to 2023)

Event Date	Event Type	FEMA or State Declaration Number	County included in declaration?	Location Impacted	Description
June 1 to August 21, 2023	Wildfire	N/A	N/A	County-wide	Wildfire smoke from fires in Nova Scotia, Canada produced unsafe air conditions in the Northeast. NJDEP recorded 23 ozone and fine particulate exceedance days between June 1 and August 21, citing the Nova Scotian wildfires as the causes.

Source: NJDEP 2024

The NJFFS keeps records of wildfires and prescribed burns in the State of New Jersey; Hudson County's statistics between 2018 and 2023 can be viewed in Table 13-6. In Hudson County, between 2018 and 2023, there have been a total of 6 fires with a total acre burned of 28.75 and no occurrences of prescribed burns.

13.1.5 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 13-7. Based on historical records and input from the Steering Committee, the probability of occurrence for wildfire in the County is considered "occasional."

Table 13-6. Wildfires and Prescribed Burns in Hudson County 2018-2023

Year	Wildfires		Prescribed Burns	
	Number of Fires	Acres Burned	Number of Treatments	Acres Treated
2018	none reported	none reported	0	0
2019	1	2.5	0	0
2020	none reported	none reported	0	0
2021	none reported	none reported	0	0
2022	none reported	none reported	0	0
2023	5	26.25	0	0
Total	**6**	**28.75**	**0**	**0**

Source: New Jersey Forest Fire Service 2024

Table 13-7. Probability of Future Wildfire Events in Hudson County

Hazard Type	Number of Occurrences Between 1996 and 2023	Percent Chance of Occurring in Any Given Year
Wildfire	6	22.2%

Source: NOAA-NCEI 2024

Notes: This table includes events that occurred in Hudson County, so it does not include the air quality impacts from the Canadian wildfires in 2023.

Effect of Climate Change on Future Probability

Wildfire incidents are predicted to increase throughout the United States due to climate change, causing at least a doubling of areas burned within the next century (US EPA 2022). Potential climate change impacts on wildfire risk include the following:

- Higher temperatures are expected to increase the amount of moisture that evaporates from land and water. This can to lead to more frequent and severe droughts, which, in turn, increases the likelihood of wildfires (US EPA 2022).
- A gradual change in temperatures will alter the growing environment of many tree species in New Jersey, reducing the growth of some trees and increasing the growth of others.
- Warmer temperatures may lead to longer dry seasons and multi-year droughts, creating triggers for insects and invasive species. An increase in invasive species, such as the emerald ash borer, can lead to the destruction and death of 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 which wildfires can burn during a given year (US EPA 2022).
- 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).

Based on these projections, Hudson County 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).

13.1.6 Cascading Impacts on Other Hazards

Wildfires can increase the probability of other natural disasters, specifically floods and mudflows. Wildfires, particular large-scale fires, can dramatically alter the terrain and ground conditions, making land already devastated by fire susceptible to floods. Lands impacted by wildfire increase the risk of flooding and mudflow in those areas impacted by wildfire. Normally, vegetation absorbs rainfall, reducing runoff. However, wildfires leave the ground charred, barren, and unable to absorb water; thus, creating conditions perfect for flash flooding and mudflows. Flood risk in these impacted areas remain significantly higher until vegetation is restored, which can take up to five years after a wildfire (FEMA 2021).

13.2 Vulnerability and Impact Assessment

A spatial analysis was conducted using the 2009 NJDEP Wildfire Fuel Hazard spatial layer. For the purposes of the assessment, an asset (population, structures, critical facilities, and lifelines) is considered exposed and potentially vulnerable to the wildfire hazard if it is located in the 'extreme', 'very high' and 'high' wildfire fuel hazard areas. Refer to Section 4.2 (Methodology and Tools) for additional details on the methodology used to assess wildfire risk.

13.2.1 Life, Health, and Safety

Wildfires have the potential to impact human health and life of residents and responders, structures, infrastructure, and natural resources. The most vulnerable populations include emergency responders and those within a short distance of the interface between the built environment and the wildland environment. First responders are exposed to the dangers from the initial incident and after-effects from smoke inhalation and heat stroke.

Smoke generated by wildfire consists of visible and invisible emissions that contain particulate matter (soot, tar, water vapor, and minerals), gases (carbon monoxide, carbon dioxide, nitrogen oxides), and toxics (formaldehyde, benzene). Emissions from wildfires depend on the type of fuel, the moisture content of the fuel, the efficiency (or temperature) of combustion, and the weather. Public health impacts associated with wildfire include difficulty in breathing, odor, and reduction in visibility.

Overall Population

Table 13-8 summarizes the estimated population exposed to the wildfire hazard by municipality. Based on the analysis, an estimated 859 residents, or 0.1-percent of the County's population, live in the extreme, high, and very high wildfire fuel hazard areas. Overall, the City of Bayonne has the greatest number of individuals located in the extreme, very high, and high fuel hazard areas (366 persons).

Table 13-8. Population in Wildfire Fuel Hazard Areas

Jurisdiction	Total Population	Population Exposure to The Wildfire Fuel Hazard Area (Extreme High, Very High, High)	
		Number of Persons	% of Jurisdiction Total
City of Bayonne	71,686	366	0.5%
Borough of East Newark	2,594	0	0.0%
Town of Guttenberg	12,017	0	0.0%
Town of Harrison	19,450	0	0.0%
City of Hoboken	60,419	0	0.0%
City of Jersey City	292,449	223	0.1%
Town of Kearny	41,999	0	0.0%
Township of North Bergen	63,361	12	<0.1%
Town of Secaucus	22,181	250	1.1%
City of Union City	68,589	0	0.0%
Township of Weehawken	17,197	8	<0.1%
Town of West New York	52,912	0	0.0%
Hudson County	**724,854**	**859**	**0.1%**

Source: U.S. Census Bureau 2020; NJFFS 2012

Socially Vulnerable Population

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 13-9 presents the estimated socially vulnerable populations located within the Wildfire Fuel Hazard (High, Very High, and Extreme). There are 114 persons over the age of 65 years, 52 persons under the age of 5 years, 76 non-English speakers, 75 persons with a disability, and 88 living in poverty located in these areas. Economically disadvantaged populations are more vulnerable to wildfire because they are likely to evaluate their risk and make decisions to evacuate based on net economic impacts on their families. The population over age 65 is also more vulnerable because they are more likely to seek or need medical attention that may not be available due to isolation during a wildfire event, and they may have more difficulty evacuating.

13.2.2 General Building Stock

Buildings located within the NJFFS identified extreme, very high, or high fuel hazard areas are exposed and 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 13-10 summarizes the estimated building stock inventory located in the defined hazard area by municipality. Approximately 1.3 percent ($1.2 billion) of the County's building replacement cost value is located in the extreme, very high, and high wildfire fuel risk hazard area. The Township of Secaucus has the greatest number of buildings located in the wildfire hazard area (52 structures, 1.4 percent of its total).

Table 13-9. Estimated Number of Vulnerable Persons Located in the Wildfire Fuel Hazard (High, Very High, and Extreme)

Jurisdiction	Estimated Number of Vulnerable Persons Located in the Wildfire Fuel Hazard (High, Very High, and Extreme)				
	Persons Over 65	Persons Under 5	Non-English Speaking Persons	Persons with a Disability	Persons in Poverty
City of Bayonne	50	26	28	35	43
Borough of East Newark	0	0	0	0	0
Town of Guttenberg	0	0	0	0	0
Town of Harrison	0	0	0	0	0
City of Hoboken	0	0	0	0	0
City of Jersey City	24	15	22	17	32
Town of Kearny	0	0	0	0	0
Township of North Bergen	2	0	2	1	1
Town of Secaucus	37	11	24	22	12
City of Union City	0	0	0	0	0
Township of Weehawken	1	0	0	0	0
Town of West New York	0	0	0	0	0
Hudson County	**114**	**52**	**76**	**75**	**88**

Source: U.S. Census Bureau ACS 5-Year Estimates; NJFFS 2012

Table 13-10. Estimated Number and Total Replacement Cost Value of Structures Located in the Extreme, Very High, or High Wildfire Fuel Risk Hazard Area

Jurisdiction	Jurisdiction Total Buildings		Number of Buildings		Replacement Cost Value (RCV)	
	Number of Buildings	Replacement Cost Value (RCV)	Count	% of Jurisdiction Total	Value	% of Jurisdiction Total
City of Bayonne	9,264	$11,278,964,959	49	0.5%	$152,090,974	1.3%
Borough of East Newark	434	$300,712,303	0	0.0%	$0	0.0%
Town of Guttenberg	2,574	$1,062,772,505	0	0.0%	$0	0.0%
Town of Harrison	2,646	$2,812,269,922	0	0.0%	$0	0.0%
City of Hoboken	14,289	$6,922,849,652	0	0.0%	$0	0.0%
City of Jersey City	38,336	$29,829,276,781	39	0.1%	$557,805,690	1.9%
Town of Kearny	7,207	$9,630,626,567	11	0.2%	$7,626,936	0.1%
Township of North Bergen	6,002	$9,906,706,329	6	0.1%	$61,754,915	0.6%
Town of Secaucus	3,844	$12,075,088,549	52	1.4%	$414,530,037	3.4%
City of Union City	1,729	$4,009,712,429	0	0.0%	$0	0.0%
Township of Weehawken	2,112	$1,638,112,105	2	0.1%	$3,638,993	0.2%
Town of West New York	4,594	$3,076,856,343	3	0.1%	$6,781,464	0.2%
Hudson County (Total)	**93,031**	**$92,543,948,444**	**162**	**0.2%**	**$1,204,229,010**	**1.3%**

Source: NJOIT 2024; Microsoft BING 2019; RS Means 2024; NJFFS 2012

Table 13-11 displays the distribution of buildings at risk from wildfires across different jurisdictions and occupancy classes within Hudson County. In summary, Hudson County has 162 buildings at risk, comprising 103 residential, 13 commercial, 16 industrial, and 30 government, religious, agricultural, and educational structures. The Township of Secaucus has the highest number of residential buildings in this hazard area (37).

Table 13-11. Buildings in the Extreme, Very High, or High Wildfire Fuel Risk Hazard Area, by General Occupancy Class

Jurisdiction	Buildings in the Wildfire Fuel Hazard (High, Very High, and Extreme) by General Occupancy Class			
	Residential	Commercial	Industrial	Government, Religion, Agricultural, and Education
City of Bayonne	39	1	4	5
Borough of East Newark	0	0	0	0
Town of Guttenberg	0	0	0	0
Town of Harrison	0	0	0	0
City of Hoboken	0	0	0	0
City of Jersey City	25	2	2	10
Town of Kearny	0	0	3	8
Township of North Bergen	1	4	1	0
Town of Secaucus	37	6	3	6
City of Union City	0	0	0	0
Township of Weehawken	1	0	0	1
Town of West New York	0	0	3	0
Hudson County (Total)	**103**	**13**	**16**	**30**

Source: NJOIT 2024; Microsoft BING 2019; NJFFS 2012

13.2.3 Community Lifelines and Other Critical Facilities

Wildfires can have an impact on the water supplies throughout the County 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 polluting the air making it difficult to drive, or the flames having close proximity to the roadways making the route an unsafe passageway. In general, roads and bridges surrounding the areas of fire risk are important because they 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.

In Hudson County, several jurisdictions have no facilities in wildfire fuel hazard areas. The City of Jersey City has the highest number of facilities in the hazard area, totaling nine facilities, which is 2.1 percent of the jurisdiction total. Overall, Hudson County has 19 facilities in wildfire fuel hazard areas, representing 1.5 percent of the county's total facilities. Table 13-12 highlights the varying degrees of vulnerability to wildfire hazards across the county's jurisdictions.

Table 13-12. Number of Facilities in the Wildfire Fuel Hazard Area

Jurisdiction	Number of Facilities in the Wildfire Fuel Hazard Area, by Lifeline Category									Total Facilities in Hazard Area	
	Communications	Energy	Food, Hydration, Shelter	Hazardous Materials	Health & Medical	Safety & Security	Transportation	Water Systems	Other Critical Facilities	Count	% of Jurisdiction Total
Bayonne (C)	0	1	0	0	0	0	0	1	0	2	1.7%
East Newark (B)	0	0	0	0	0	0	0	0	0	0	0.0%
Guttenberg (T)	0	0	0	0	0	0	0	0	0	0	0.0%
Harrison (T)	0	0	0	0	0	0	0	0	0	0	0.0%
Hoboken (C)	0	0	0	0	0	0	0	0	0	0	0.0%
Jersey City (C)	0	0	1	0	0	0	4	4	0	9	2.1%
Kearny (T)	0	0	0	0	0	0	0	2	0	2	1.9%
North Bergen (T)	0	0	0	0	0	0	0	0	0	0	0.0%
Secaucus (T)	0	0	0	0	0	0	1	2	1	4	4.8%
Union City (C)	0	0	0	0	0	0	0	0	0	0	0.0%
Weehawken (T)	0	1	0	0	0	0	1	0	0	2	4.3%
West New York (T)	0	0	0	0	0	0	0	0	0	0	0.0%
Hudson County (Total)	**0**	**2**	**1**	**0**	**0**	**0**	**6**	**9**	**1**	**19**	**1.5%**

Source: Hudson County 2024; HIFLD 2024; NJGIN 2024; NJFFS 2012

13.2.4 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 many direct and indirect costs to local businesses that excuse volunteers from working to fight these fires.

Due to a lack of data regarding past structural and economic losses specific to Hudson County or its municipalities, it is not possible to estimate future losses due to wildfire events currently.

13.2.5 Natural, Historic and Cultural Resources

Natural

Wildfires are naturally occurring events in the ecosystem cycle, but intense wildfires can burn and kill 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 existing ecosystems can cause 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 pose a significant threat to historic resources, with the potential to cause extensive damage or even complete destruction. The impact on historic infrastructure from wildfires is largely dependent on the construction materials used. Many historic structures are constructed from wood, a highly flammable material. Furthermore, these structures were often built before the implementation of strict building codes and before there was a comprehensive understanding of wildfire risks.

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. In many instances, historic structures house cultural resources and artifacts; many historic structures are made of wood, which is a highly flammable material. Outdoor events are likely to be postponed or cancelled as the result of wildfire conditions, as smoke conditions can have harmful impacts to the human body.

13.3 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.

13.3.1 Potential or Planned Development

As discussed and illustrated in Chapter 3 (County Profile), 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. Therefore, 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.

13.3.2 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, Hudson County is projected to have a decrease in population in the upcoming years. These projection totals include a population of 747,400 by 2029 and 766,500 by 2034 (State of New Jersey 2017). With the population increasing, changes in population density can significantly impact the number of persons exposed to the wildfire hazard. Fire suppression capabilities are high at the State and local levels. However, new development and changes in population with a mix of additional structures, ornamental vegetation, and wildland fuels will require continued assessment of the hazard and mitigation risk.

13.3.3 Climate Change

According to the USDA Forest Service, 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, and
- Complications from land use change, invasive species and an increasing wildland-urban interface.

As discussed earlier, average temperatures are anticipated to increase in New Jersey, therefore, suitability of habitats for specific types of trees potentially changes, altering the fire regime and resulting in more frequent fire events and changes in intensity. Prolonged and more frequent heat waves 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.

13.3.4 Other Identified Conditions

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). Changes in climate patterns may impact the distribution and perseverance of insect outbreaks that create dead trees (increase

fuel). When climate alters fuel loads and fuel moisture, forest susceptibility to wildfires changes. Climate change also may increase winds that spread fires. Faster fires are harder to contain and are more likely to expand into residential neighborhoods.