5.4.16 WILDFIRE

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

Hazard Profile

This section presents information regarding the description, extent, location, previous occurrences and losses, and probability of future occurrences for the wildfire hazard.

Description

A wildland fire can be defined as any non-structural fire that occurs in the wildland. Three distinct types of wildland fires have been defined and include: naturally occurring wildfire, human-caused wildfire, and prescribed fire. Many of these are highly destructive and can be difficult to control. They occur in forested, semi-forested, or less developed areas. Wildland fires can be caused by lightning, human carelessness, and arson. Wildfires result in the uncontrolled destruction of forests, brush, field crops, grasslands, real estate, and personal property, and have secondary impacts on other hazards such as flooding, by removing vegetation and destroying watersheds.

Wildfires include common terms such as forest fires, brush fires, grass fires, wildland urban interface fires, range fires or ground fires. Wildfires do not include those fires, either naturally or purposely ignited, that are controlled for a defined purpose of managing vegetation for one or more benefits (NYS DHSES 2014).

Wildfire in New York State is based on the same science and environmental factors as any wildfire in the world. Fuels, weather, and topography are the primary factors that determine the natural spread and destruction of every wildfire. New York State, including Suffolk County, has large tracts of diverse forest lands, many of which are the result of historic destructive wildfires. Although destructive fires do not occur on an annual basis, the State's fire history shows a cycle of fire occurrence that result in human death, property loss, forest destruction, and air pollution (NYS DHSES 2014).

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

FEMA indicates that there are four categories of wildfires that are experienced throughout the U.S. These categories are defined as follows:

- Wildland fires – fueled almost exclusively by natural vegetation. They typically occur in national forests and parks, where Federal agencies are responsible for fire management and suppression.
- Interface or intermix fires – urban/wildland fires in which 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 that are intentionally set or selected natural fires that are allowed to burn for beneficial purposes (FEMA 1997).

Fire Ecology and Wildfire Behavior

A fire needs all of the following three elements in the right combination to start and grow: a heat source, fuel, and oxygen. The growth of the fire primarily depends on the characteristics of available fuel, weather conditions, and terrain. Climate change is also considered a potential source of influence. These four factors are described below:

- Fuel
    - Lighter fuels such as grasses, leaves, and needles quickly expel moisture and burn rapidly, while heavier fuels such as tree branches, logs, and trunks take more time to warm and ignite.
    - Snags and hazard trees–especially those that are diseased, dying, or dead—are quickly engulfed and allow fires to spread quickly.
- Weather
    - Strong winds within the vicinity of the flames produce extreme fire conditions. Of particular concern are wind events that potentially persist for longer periods of time, or ones with significant wind speeds, which can sustain and quickly promote the spread of fire through movement of embers or exposure within tree crowns.
    - Spring and summer months, which can experience drought-like conditions extending beyond the normal season, also expand the average fire season. Likewise, the passage of a dry, cold front through the region can result in a sudden increase in wind speeds and a change in wind direction affecting fire spread.
    - Thunderstorm activity, which typically begins with wet storms, turns dry with little or no precipitation reaching the ground as the season's progress.
- Terrain
    - Regional and local topography influence the amount and moisture of fuel.
    - Barriers such as highways and lakes can affect the spread of fire.
    - Elevation and slope of landforms affect fire spread; flames move more easily uphill than downhill.
- Changes to Environment
    - Without an increase in summer precipitation (greater than any predicted by climate models), areas susceptible to future burning are very likely to increase.
    - Infestation from insects is also of concern as it may impact forest health. Potential insect populations may increase with warmer temperatures as a result of warmer temperatures. Infested, stressed trees increase the fuel load.
    - Tree species composition will change as species respond uniquely to a changing climate.
    - Wildfires cause both short-term and long-term losses. Short-term losses can include destruction of timber, wildlife habitat, scenic vistas, and watersheds. Long-term effects include smaller timber harvests, reduced access to affected recreational areas, and the destruction of cultural and economic resources and community infrastructure.

Extent

The extent (that is, magnitude or severity) of wildfires depends on weather and human activity. There are several tools 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 n.d.).

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 n.d.). 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 n.d.). Table 5.4.16-1 shows the fire danger rating and color code.

Table 5.4.16-1. Fire Danger Rating and Color Code

Fire Danger Rating and Color Code	Description
Low (L) (Dark 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 (M) (Light Green or 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 (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 tree tops) 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.

The ***Fire Potential Index (FPI)*** is derived by combining daily weather and vegetation condition information and can identify the area's 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) is a tool that is used to understand the fire potential for locations across the United States. It is a measure of the amount of water in a fuel (vegetation) available to a fire, and is expressed as a perfect of the dry weight of that specific fuel. When fuel moisture content is high, fires do not ignite readily, or at all, because heat energy has to be used to evaporate and drive water from the plant before it can burn. When the fuel moisture content is low, fires start easily and will spread. When the fuel moisture content is less than 30 percent, that fuel is essentially considered to be dead (known as dead fuels). Dead fuels respond solely to current environmental conditions and are critical in determining fire potential (Burgan et al. 2000).

The ***Keetch-Byram Drought Index (KBDI)*** is a drought index 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 is eight inches of moisture in a saturated soil that is readily available to the vegetation. For different soil types, the depth of soil required to hold eight inches of moisture varies. 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 (USFS 2016).

The ***Haines Index***, also known as the Lower Atmosphere Stability Index, was developed for fire use. It is used to indicate the potential for wildfire growth by measuring the stability and dryness of the air over a fire. 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. This index has been shown to be correlated with large fire growth on initiating and existing fires where surface winds do not dominate fire behavior. The Haines Index can range between 2 and 6. The drier and more unstable the lower atmosphere is, the higher the index:

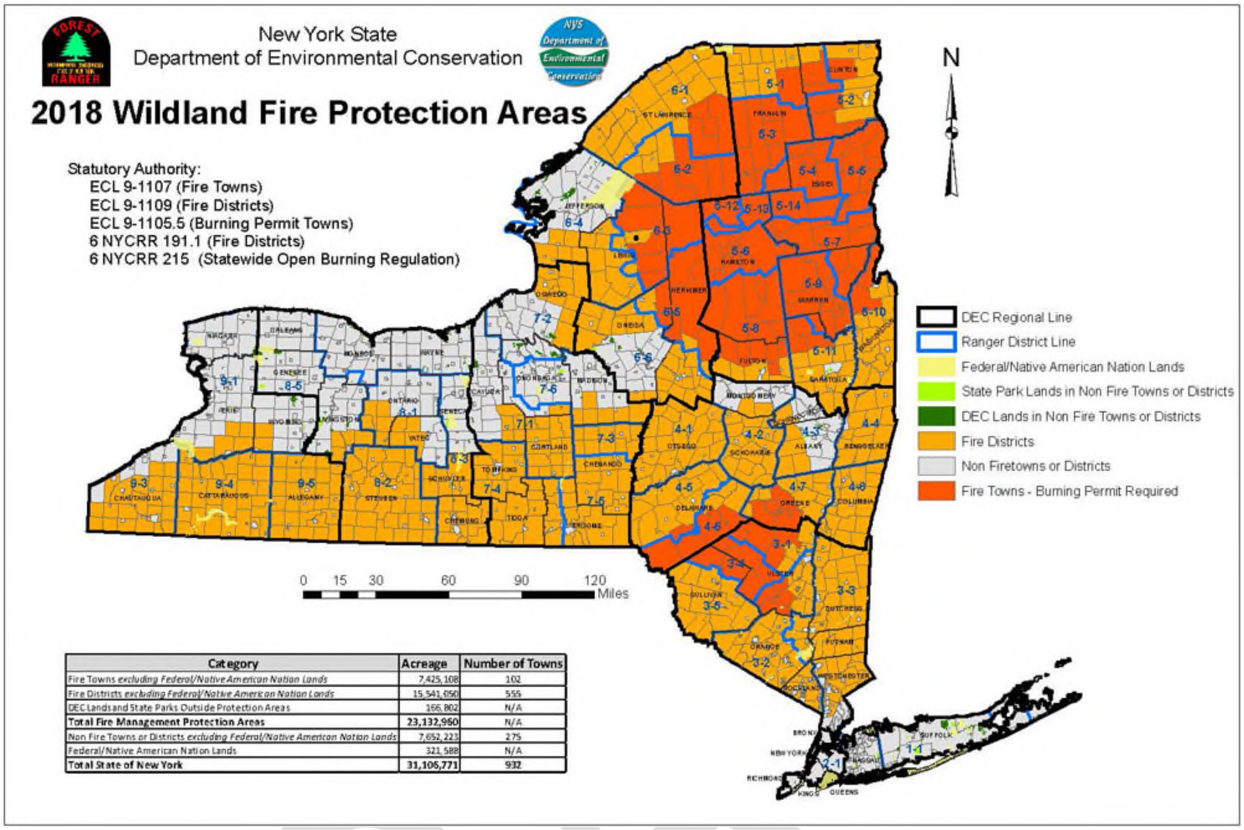
- Very Low Potential (2) – moist, stable lower atmosphere
- Very Low Potential (3)
- Low Potential (4)
- Moderate Potential (5)
- High Potential (6) – dry, unstable lower atmosphere (USFS 2016)

Location

According to the U.S. Fire Administration (USFA), the fire problem in the U.S. varies from region to region. This often is a result of climate, poverty, education, demographics, and other causal factors (USFA 2013). According to the NYS Hazard Mitigation Plan, Suffolk County is one of the 16 New York counties most susceptible to wildfire (NYS DHSES 2019). The Long Island Pine Barrens is a local example of a fire-prone area (NYSDEC 2020). Smoke and particulate matter from wildfires 500 miles north in Quebec often drifts to Long Island and wildfires in the surrounding wildland urban interface of often do the same leading to much news reporting and attention by public officials (NYSDEC 2020).

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 system for 657 of the 932 jurisdictions throughout New York State. It includes cities and villages and cover 23.5 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 included in the statutory requirement (NYSDEC 2020). Figure 5.4.12-1 displays the fire protection areas in New York State. This figure indicates that, as of 2018, Suffolk County is not part of the wildfire protection area.

Figure 5.4.16-1. Forest Ranger Division Wildfire Protection Areas



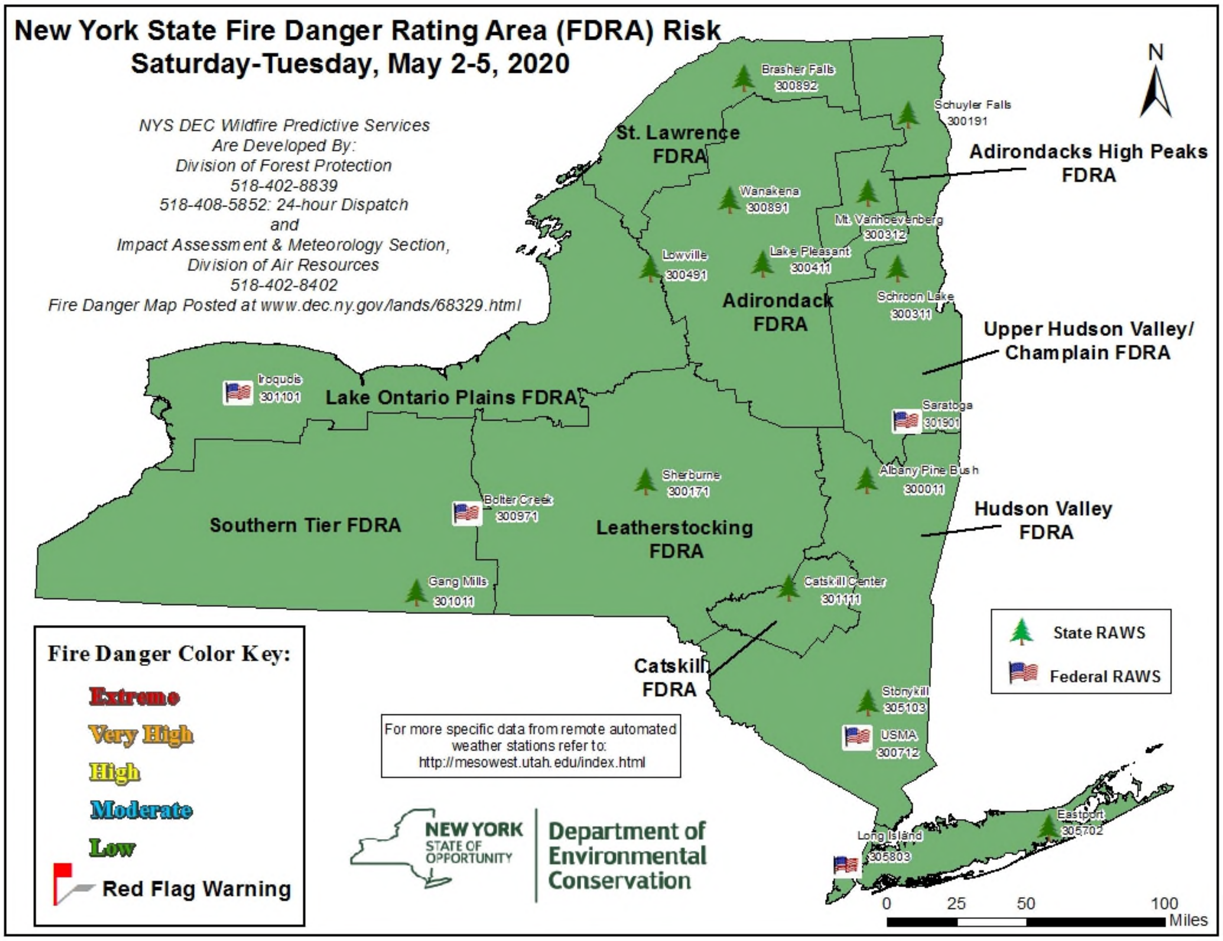
Category	Acreage	Number of Towns
Fire Towns *excluding Federal/Native American Nation Lands*	7,425,108	102
Fire Districts *excluding Federal/Native American Nation Lands*	15,541,050	555
DEC Lands and State Parks Outside Protection Areas	166,802	N/A
Total Fire Management Protection Areas	**23,132,960**	N/A
Non Fire Towns or Districts *excluding Federal/Native American Nation Lands*	7,652,223	275
Federal/Native American Nation Lands	321,588	N/A
Total State of New York	**31,106,771**	932

Source: NYSDEC 2020b

New York State is divided into 10 fire danger rating areas (FDRAs). FDRAs are defined by areas of similar vegetation, climate, and topography in conjunction with agency regional boundaries, National Weather Service (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 is at high or above in one or more FDRAs.

A current fire danger rating map is updated daily on the NYSDEC website (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 5.4.16-2 shows the FDRAs in New York State and the current (as of May 2-5, 2020) fire danger risk for each of the areas. The figure is color coded and indicates where there are red flag warning areas.

Figure 5.4.16-5.4.16-2. New York State Fire Danger Rating Areas



Source: NYSDEC 2020c

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

Wildland urban interface (WUI) is the area where natural areas and development meet. Since 1990, 60% of new homes in the United States have been built in the WUI. These homes are at risk of structure loss, injury and death from a wildfire. All states have at least a small amount of land classified as WUI, approximately 9.9% of all land is classified as WUI. The WUI is divided into two categories: intermix and interface. Intermix WUI refers to areas where housing and wildland vegetation intermingle, while interface WUI refers to areas where housing is in the vicinity of a large area of dense wildland vegetation (Martinuzzi et al. 2015). Intermix areas have more than one house per 40 acres and have more than 50% vegetation. Interface areas have more than one house per 40 acres, have less than 50% vegetation, and are within 1.5 miles of an area over 1,235 acres that is more than 75% vegetated (Stewart et al. 2006). In New York State, 31% (15,240 square miles) is located in the WUI; with 6.3% (3,111 square miles) is located in the WUI interface and 24.7% (12,129 square miles) is located in the WUI intermix (Martinuzzi et al. 2015).

A detailed WUI (interface and intermix) was obtained through the SILVIS Lab, Department of Forest Ecology and Management, University of Wisconsin-Madison which also defines the wildfire hazard area. 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 to wildfire. This buffer distance, along with housing density and vegetation type were used to define the WUI illustrated in Figure 5.4.16-3 through Figure 5.4.16-5 below. Table 5.4.16-2 summarizes the acres of Suffolk County located in the WUI. Approximately 180,795 acres, or 30.6-percent, of the County's land area is located in the WUI (interface and intermix).

Table 5.4.16-2. Acres of Suffolk County Exposed to Wildfire Urban Interface/Intermix Hazard Areas

Boundary	Acres	Percent of County Area
Wildfire Interface	81,513	13.8%
Wildfire Intermix	99,283	16.8%
Wildfire WUI	180,795	30.6%
County Total	590,299	100.0%

DRAFT

Figure 5.4.16-3. SILVIS Wildland Urban Interface in Suffolk County - West

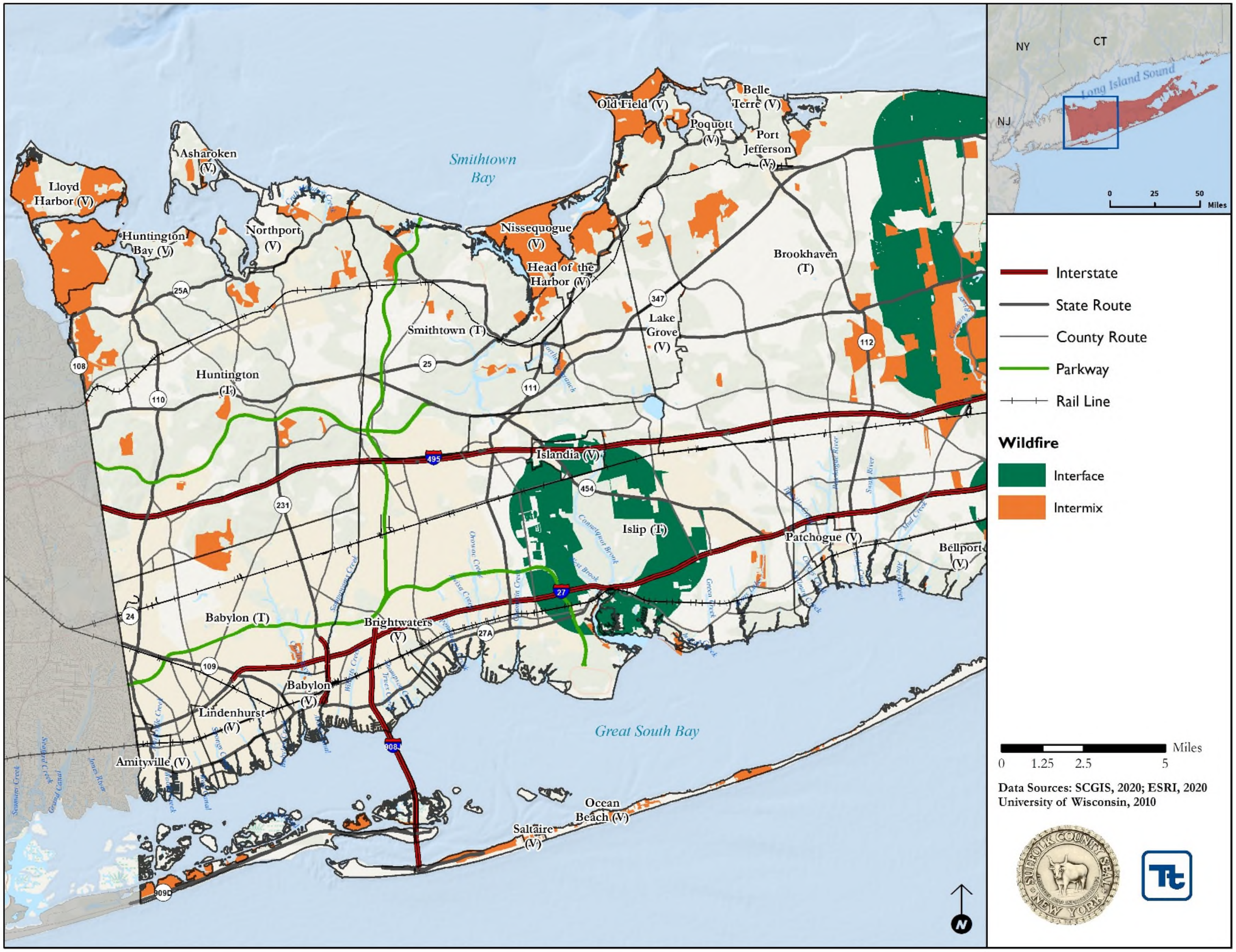


Figure 5.4.16-4. SILVIS Wildland Urban Interface in Suffolk County - Central

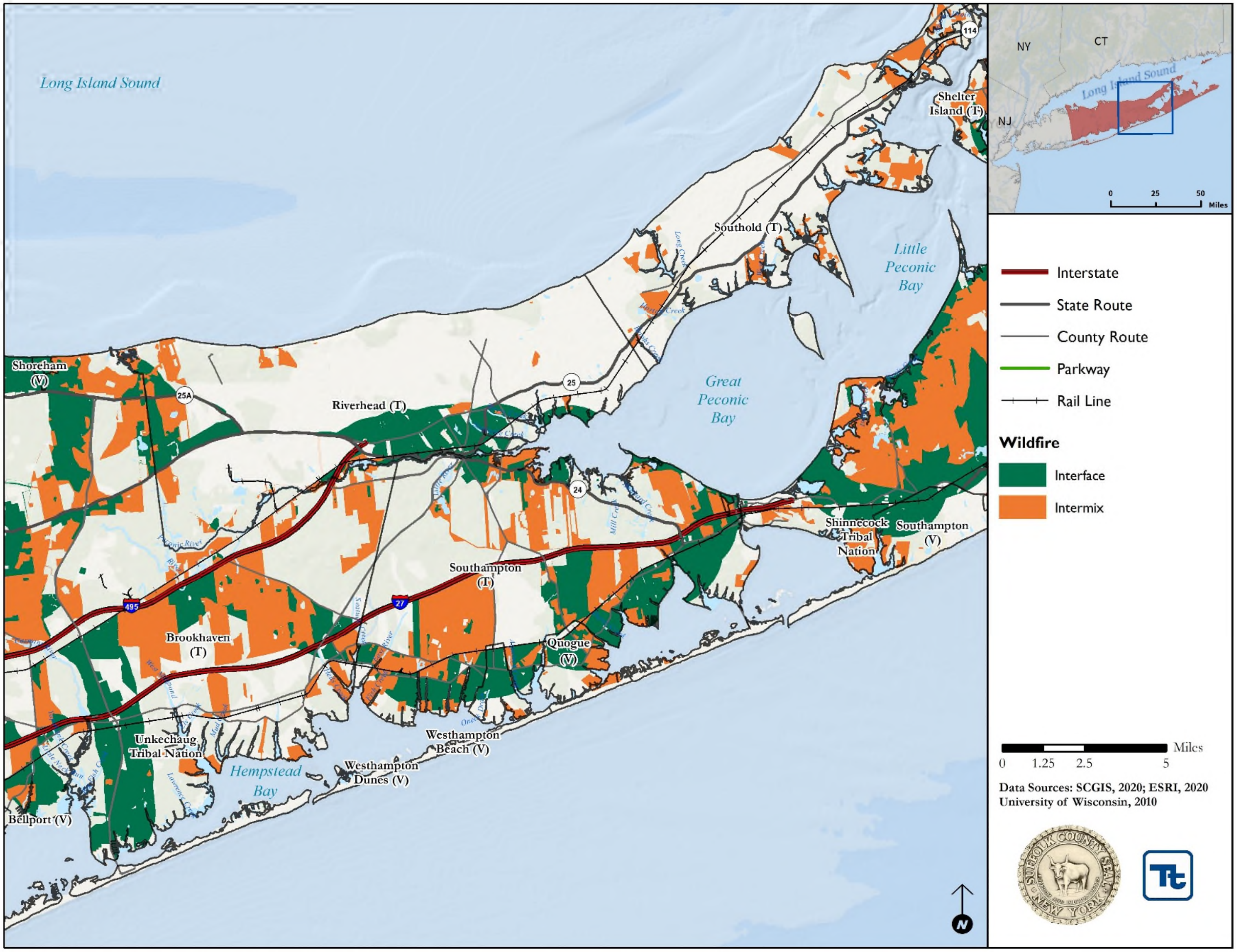
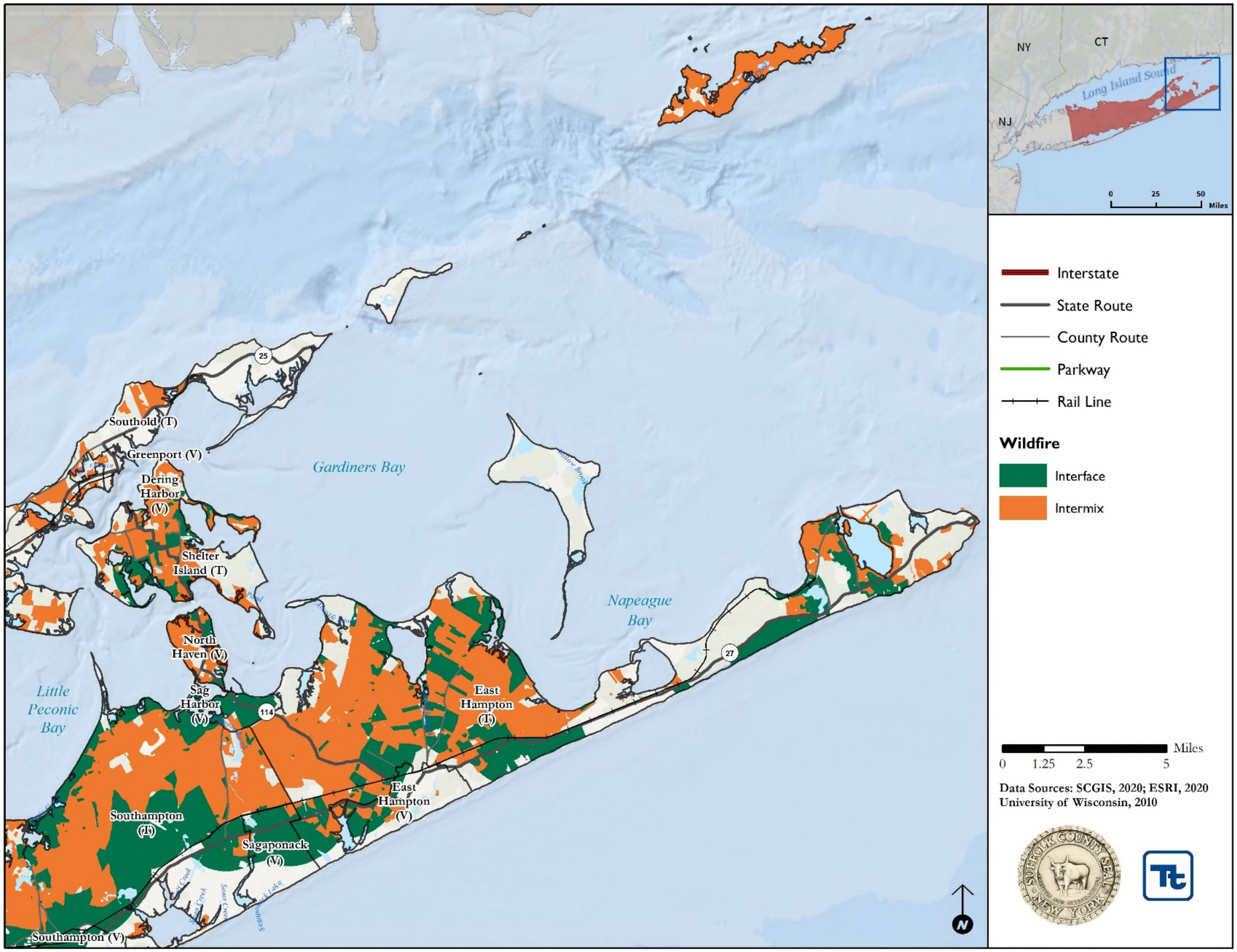


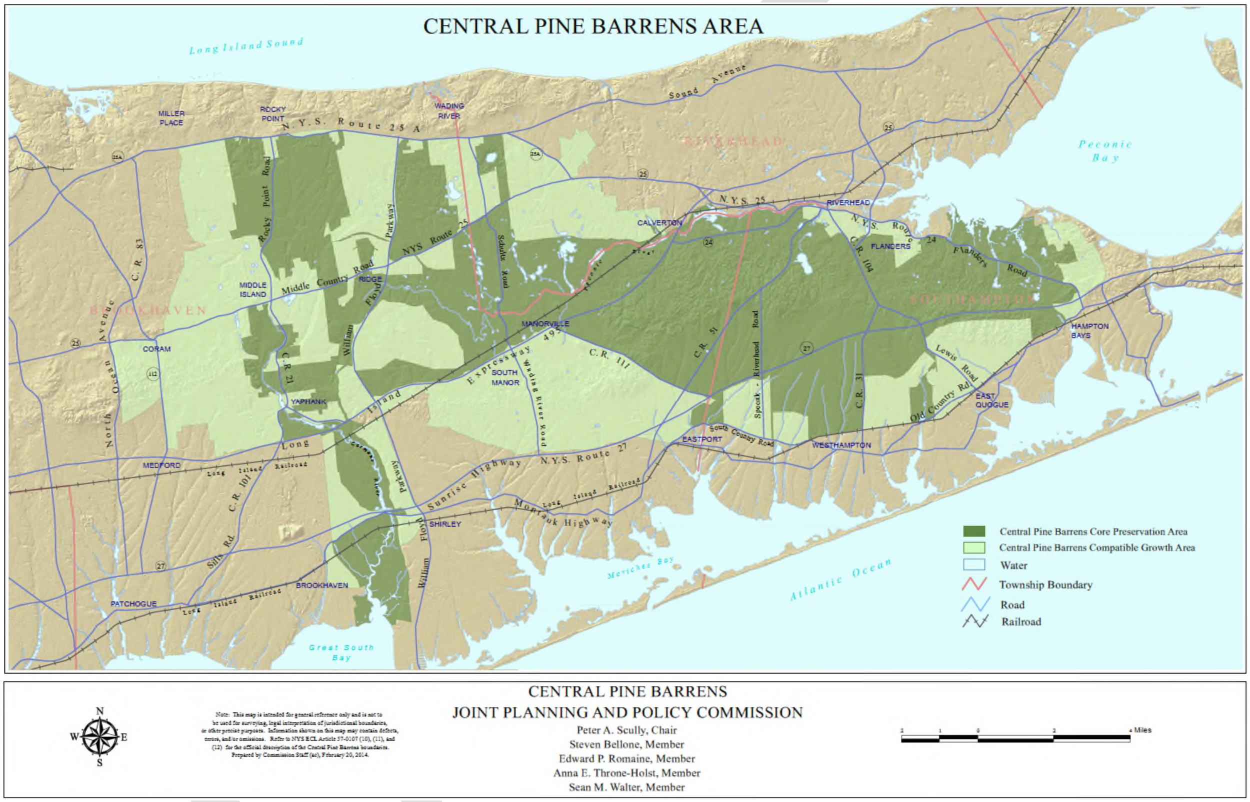
Figure 5.4.16-5. SILVIS Wildland Urban Interface in Suffolk County - East



Central Pine Barrens

The Central Pine Barrens on Long Island is a forested area of approximately 102,500 acres within the central and eastern portions of Suffolk County; this area has an extensive history and ongoing risk of frequent wildfire. Figure 5.4.12-6 shows a detailed map of the Central Pine Barrens, which include parts of the Towns of Brookhaven, Riverhead, and Southampton and is legally divided into a 55,000 acre Core Preservation Area and a 47,500 acre Compatible Growth Area (Central Pine Barren Wildfire Task Force 1999). Pre-fire planning and wildfire suppression in the area are coordinated by the Central Pine Barrens Wildfire Task Force, which maintains a Fire Management Plan (finalized in 1999) that provides a comprehensive evaluation of the issues associated with wildfire in the Central Pine Barrens.

Figure 5.4.16-6. Central Pine Barrens Area Detail



Source: Central Pine Barrens Commission 2014

At the center of the Central Pine Barrens is a mosaic of forests, coastal plain ponds, marshes, and streams. The three forest types, pitch pine-tree oak (covering approximately 35-percent), tree oak-pitch pine (55-percent), and pitch pine-scrub oak-heath woodlands and shrublands (7-percent), are predominantly fire dependent (meaning that many of the species have adapted to and depend on periodic fire for long-term survival) (Kurtz 2007). Pine Barrens are found on quick-draining soils with low nutrient content and high acidity. To help retain moisture, many of the plant species produce waxes and resins, which also are flammable (Brookhaven National Laboratory 2003). During periods of above average temperatures and below average rainfall and humidity, high resin content (which increases ignition potential, flammability, and fire intensity) and rapid drying rates, can result in extreme fire dangers. Pitch pines are able to survive most fires due to their thick, insulating bark and ability to rapidly sprout from buds in the trunk and root collar.

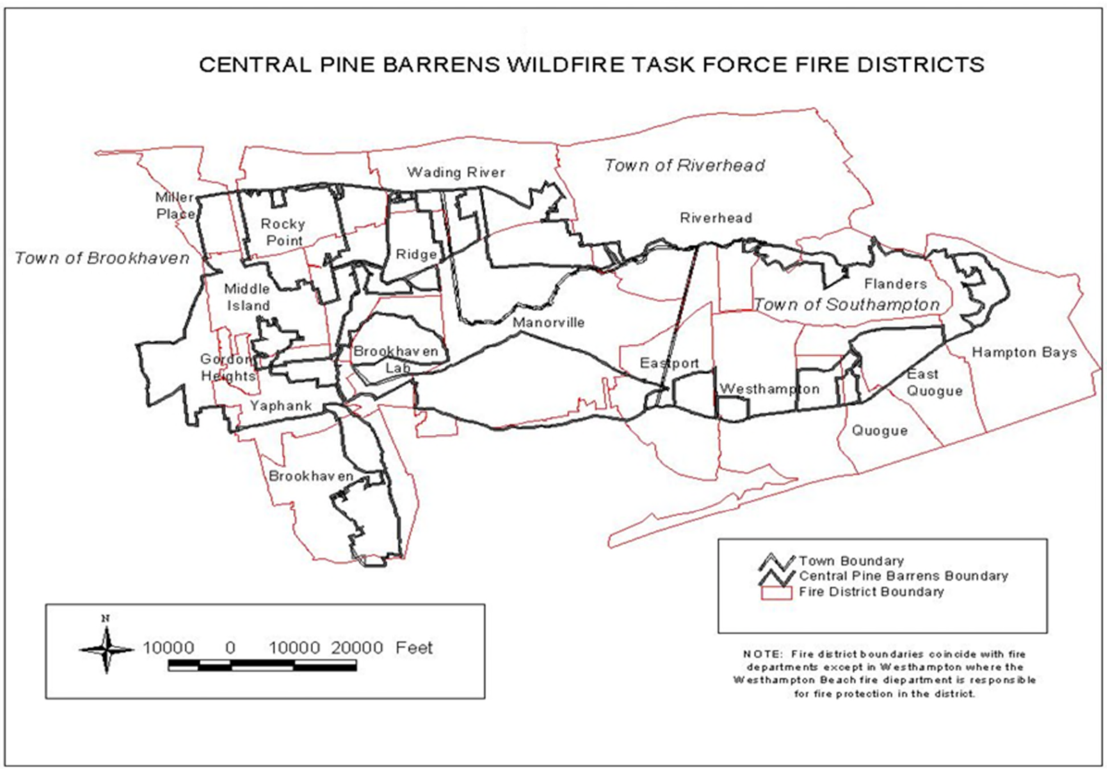
The Central Pine Barrens contains one of the greatest concentrations of endangered, threatened, and special concern plant and animal species in New York State and provides recharge to the aquifer from which Long

Island draws significant portions of its drinking water. There are approximately 1,000 annual wildfires in the Central Pine Barrens; as many as 75 brush fires may occur on a spring day. Over 95% of these fires are estimated to be anthropogenic (started by humans), including both accidental fires and arson.

Figure 5.4.16-7 shows the boundaries of those fire districts serving the Central Pines Barrens. The 17 fire districts whose jurisdiction includes some portion of the Core Preservation Area of the Central Pine Barrens (as defined by the State) include:

- Brookhaven Fire District
- Quogue Fire District
- East Quogue Fire District
- Ridge Fire District
- Eastport Fire District
- Riverhead Fire District
- Flanders Fire District
- Rocky Point Fire District
- Gordon Heights Fire District
- Wading River Fire District
- Hampton Bays Fire District
- Westhampton Beach Fire District
- Manorville Fire District
- Westhampton Fire Protection District
- Middle Island Fire District
- Yaphank Fire District
- Miller Place Fire District (Central Pine Barrens Wildfire Task Force, 1999)

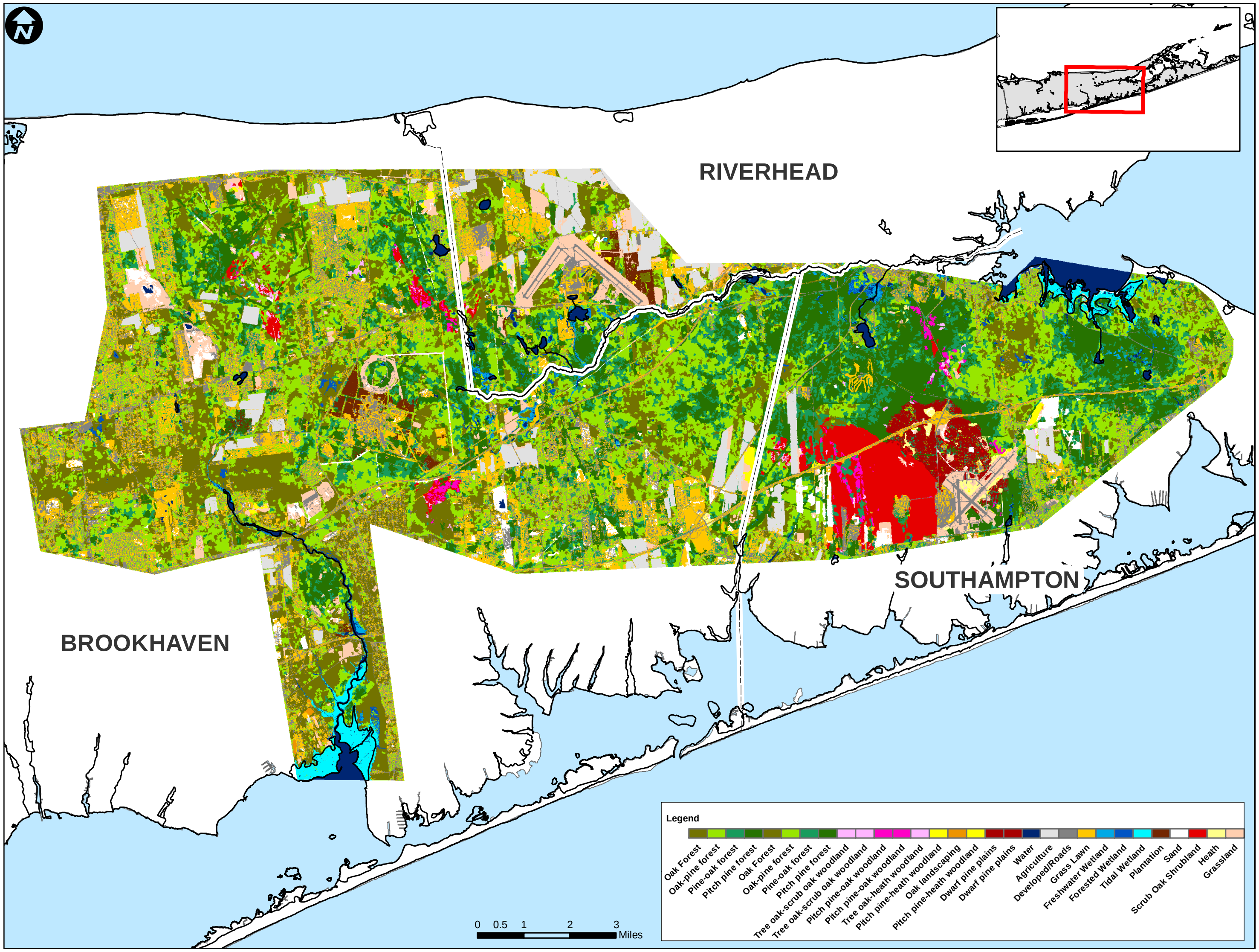
Figure 5.4.16-7. Central Pine Barrens Fire District Boundaries



Source: Central Pine Barrens Wildfire Task Force 1999

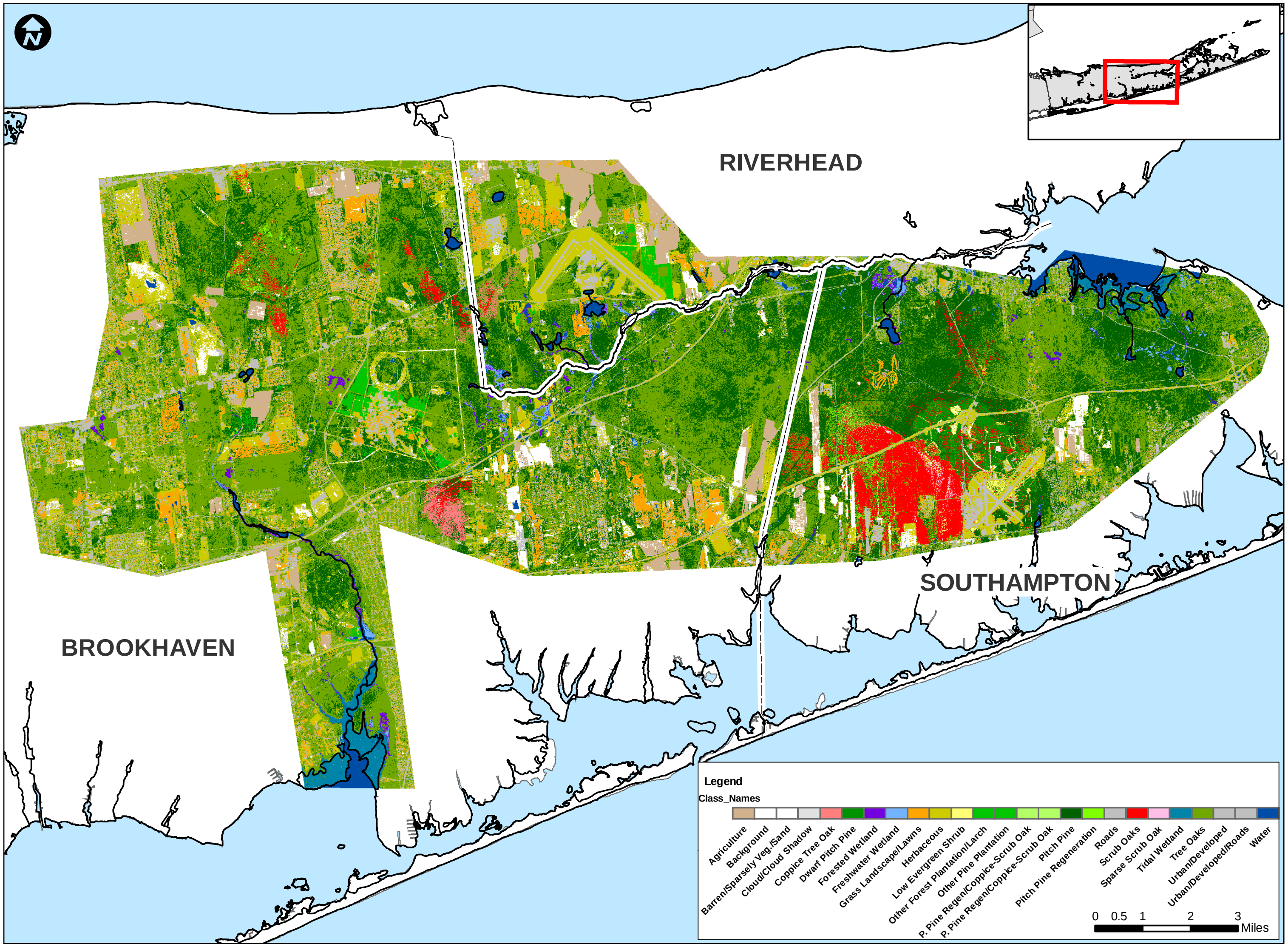
Figure 5.4.16-8 and Figure 5.4.16-9 illustrate Pine Barren vegetative communities and cover types for the Central Pine Barrens area in relation to towns and villages participating in the Suffolk County hazard mitigation planning process. These figures illustrate specific areas in the Central Pine Barrens that have a higher relative risk based on vegetation type (including factors such as resin content, ability to retain moisture, and proximity to occupied structures).

Figure 5.4.16-8. Central Pine Barrens Vegetative Communities



Source: The Nature Conservancy Eastern Heritage Task Force

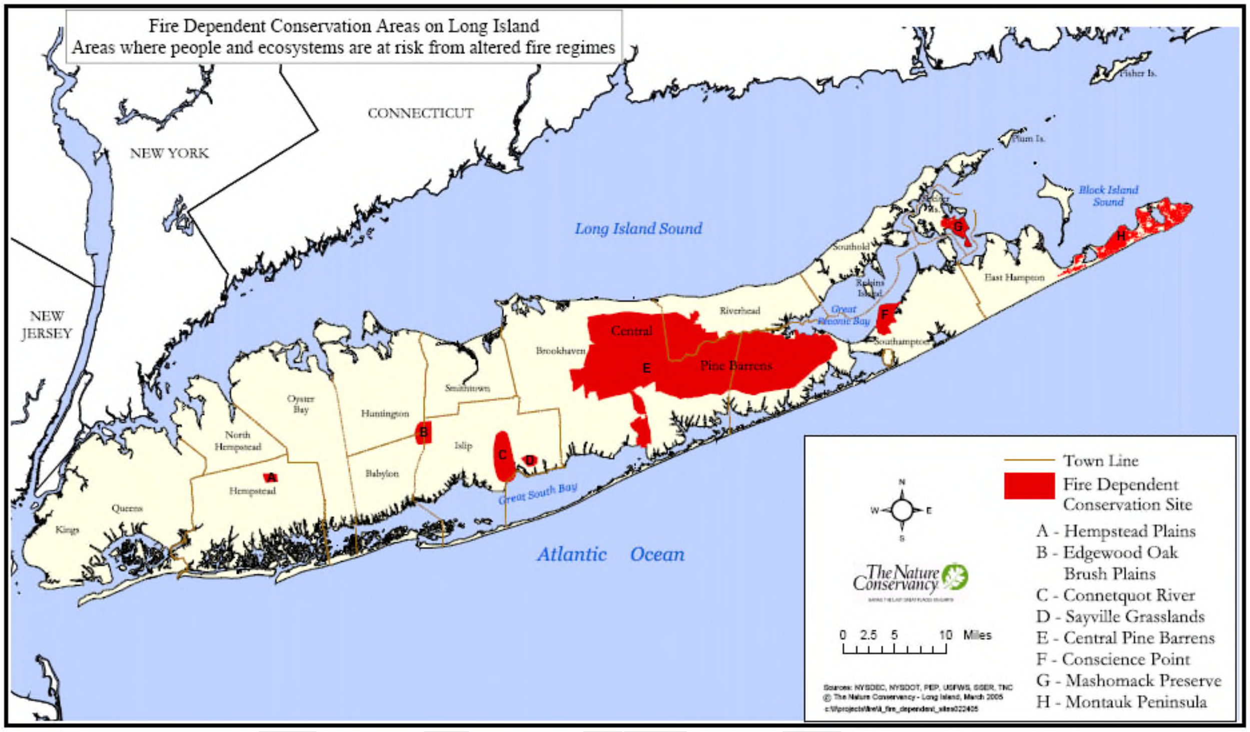
Figure 5.4.16-5.4.16-9. Central Pine Barrens Land Cover Types



Source: The Nature Conservancy Eastern Heritage Task Force

In addition to the Central Pine Barrens, there are several other wildfire hazard areas identified as "at risk" to the wildfire hazard by The Nature Conservancy. These areas include Edgewood Oak Brush Plains, Connetquot River, Sayville Grasslands, Conscience Point, Mashomack Preserve and Montauk Peninsula (Figure 5.4.16-10).

Figure 5.4.16-10. Fire Dependent Conservation Areas on Long Island



Source: The Nature Conservancy Eastern Heritage Task Force

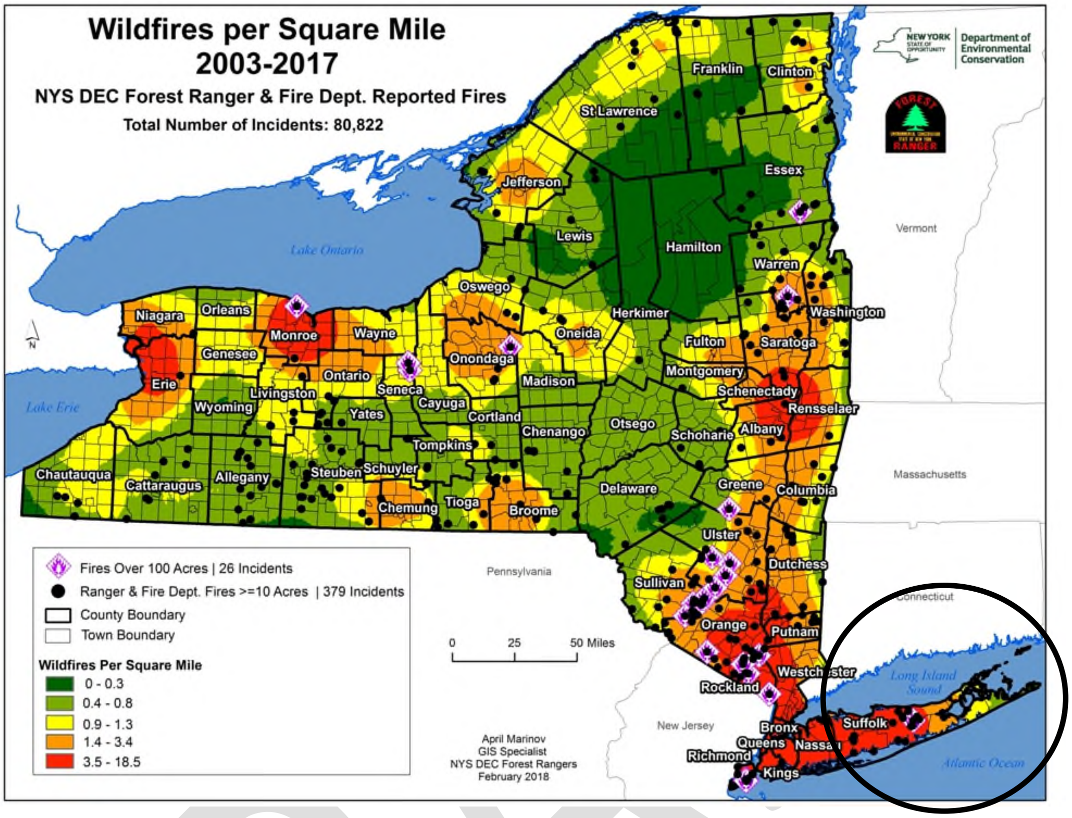
Previous Occurrences and Losses

Between 1954 and 2020, FEMA declared that New York State experienced one wildfire-related disasters (DR) or emergencies (EM). DR-2115 was declared for the Sunrise Fire in 1995. Generally, these disasters cover a wide region of the State; therefore, they may have impacted many counties. Suffolk County was declared as a disaster area for this wildfire event (FEMA 2020).

The short-term effects of wildfires can include destruction of timber, forest, wildlife habitats, scenic vistas, and watersheds. Business and transportation disruption can also occur in the short-term. Long-term effects can include reduced access to recreational areas, destruction of community infrastructure and cultural and economic resources (USGS 2005).

Wildfire occurrence in New York State is based on two data sources – the New York State Forest Ranger force and the New York State Office of Fire Prevention and Control. The New York State Forest Ranger is a division of the NYSDEC. It has fought fires and retained records for 130 years. According to the NYSDEC Forest Rangers, arson was responsible for 77% of Long Island's 191 fires between 2003 and 2017 (NYSDEC 2020). Figure 5.4.16-11 illustrates the occurrences of wildfires in New York State, between 2000 and 2012.

Figure 5.4.16-11. Wildfire Occurrences in New York State, 2003-2017



Source: *NYSDEC 2020*
Note: *The black circle indicates the location of Suffolk County.*

In 2012, a 992-acre wildfire burned through Long Island's Central Pine Barrens destroying three homes and one fire engine. There have not been any large wildfires in Suffolk County since this event.

Table 5.4.12-2 summarizes the wildfire events that have impacted Suffolk County between 2013 and 2020. Events identified in the 2014 HMP are included in Appendix E.

Table 5.4.16-3. Wildfire Events between 2013 and 2020

Dates of Event	Event Type	FEMA Declaration Number	Location / County Designated?	Losses / Impacts
July 17, 2013	Brush Fire	N/A	N/A	A brush fire occurred in the hamlet of Shinnecock Hills at the end of Black Watch Court.
July 7, 2019	Wildfire	N/A	N/A	10 acres burned near Manorville Hills.
Spring 2020	Wildfire	N/A	N/A	Several small wildfires occurred in Manorville near Brookhaven National Lab over several weeks, adding up to over 100 acres burned. The number of fires led many to believe arson may have been involved.

Sources: *GeoMAC 2020; NOAA-NCEI 2020; FEMA 2020; FEMA 2020; NYS DHSES 2020; NYSDEC 2020; Central Pine Barrens Joint Planning and Policy Commission 2020*
Note: *Monetary figures within this table were U.S. Dollar (USD) figures calculated during or within 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.*

Probability of Future Occurrence

According to the New York State Forest Ranger Division, wildfire occurrence data from 1988 to 2012 have shown that New York State, including Suffolk County, will always be susceptible to wildfires (NYS DHSES 2019). Ninety-five percent of wildfires in New York State are caused by humans, while lightning is responsible for only five percent. Beginning in 2010, New York State enacted revised open burning regulations that ban brush burning statewide from March 15th through May 15th. This time period is when 47% of all fire department-response wildfires occur. Forest ranger data indicates that this new statewide ban resulted in 74% fewer wildfires caused by debris burning in upstate New York from 2010 to 2012. Debris burning has been prohibited in New York City and Long Island for more than 40 years. Since compliance with this regulation, forest ranger and fire department historical fire occurrence data will serve as a benchmark for analysis of wildfire occurrence (NYDEC 2020).

Fire probability depends on local weather conditions, outdoor activities (e.g. 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 (NVRC 2006).

Debris burning has been prohibited in New York City and Long Island for more than 40 years. Since compliance with this regulation is a continuing objective, forest ranger and fire department historical fire occurrence data will serve as a benchmark for analysis of wildfire occurrence. As wildfires caused by debris burning decline through regulatory enforcement, incendiary or arson fires will likely be the primary cause of wildfires in the future (NYSDEC 2020).

The likelihood of a fire starting and maintaining itself can be gauged on a daily basis (NYS DHSES 2019).

In Section 5.3, the identified hazards of concern for Suffolk County were ranked. The probability of occurrence, or likelihood of the event, is one parameter used for ranking hazards. Based on historical records and input from the Planning Committee, the probability of occurrence for wildfire in the County is considered 'occasional'.

Climate Change Impacts

A gradual change in temperatures will alter the growing environment of many tree species throughout the United States and New York, 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. Increased temperature and change in precipitation will also affect fuel moisture during wildfire season and the length of time wildfires can burn in a given year (U.S. Department of Agriculture [USDA] 2012). 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. Lightning strikes cause approximately half the wildfires in the United States. If the frequency of lightning strikes increases, the potential for wildfires from these strikes also increases (Lee 2014). 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 (USDA 2012).

Summer temperatures have been increasing across New York State and are expected to continue rising. New York is currently the 8th-fastest warming state in the country, in terms of annual average temperature. By 2050, New York is projected to see a five-fold increase in heat wave days. In the past decade average summer temperatures have risen by 1-2 degrees in most areas in the state. The number of days with maximum temperatures above 95ºF in New York State has been increasing, putting New Yorkers at higher risk of heat-related illness. As a result of climate change, the frequency of extreme temperature events is expected to increase, and such events are associated with increased morbidity and mortality (NYS DHSES 2019).

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. By the end of the century, the greatest warming is projected to be in the northern section of the State (NYSERDA 2014). The total number of hot days in New York State is expected to increase as this century progresses. The frequency and duration of heat waves, defined as three or more consecutive days with maximum temperatures at or above 90 ˚F, are also expected to increase (Table 5). In contrast, extreme cold events, defined both as the number of days per year with minimum temperature at or below 32 ˚F and those at or below 0 ˚F, are expected to decrease as average temperatures rise (NYSERDA 2011).

However, each region in New York State, as defined by ClimAID, has attributes that will be uniquely affected by climate change. Suffolk County is part of Region 4. In Region 4, it is estimated that temperatures will increase by 4.1ºF to 5.7ºF by the 2050s and 5.3ºF to 8.8ºF by the 2080s (middle range estimate, baseline of 54.6ºF).

The frequency of heat waves is projected to increase while cold events is projected to fall in Region 4. With the increase in temperatures, heat waves will become more frequent and intense, increasing heat-related illness and death and posing new challenges to the energy system, air quality and agriculture (NYSERDA 2011). Table 5.4.16-4 displays the projected changes in extreme events and includes the minimum, central range and maximum days per year.

Table 5.4.16-4. Changes in Extreme Events in Region 4 – Heat Waves and Intense Precipitation

Event Type	# Days Per Year	Baseline	2020s	2050s	2080s
Heat Waves	Number of Days per year with maximum temperature exceeding minimum, (central range), and maximum				
	90°F	18	26 to 31	39 to 52	44 to 76
	Number of heat waves per year	2	3 to 4	5 to 7	6 to 9
	Average duration	4	5	5 to 6	5 to 7
Extreme Cold	Number of days per year: minimum, (central range), and maximum				
	Below 32°F	71	52 to 58	42 to 48	30 to 42

Source: NYSERDA 2014
Note: Based upon the middle range (25^{th} to 75^{th} percentile estimate)

Annual temperatures in New York State have been rising throughout the State since the start of the 20^{th} century. State-average temperatures have increased by approximately 0.6°F since 1970, with winter warming exceeding 1.1°F per decade. Extreme heat events are likely to increase throughout New York State and short-duration warm season droughts will become more common.

With the increase in temperatures, heat waves will become more frequent and intense, 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).

As stated above, according to the temperature projections for New York State and Suffolk 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 (U.S. EPA 2009).

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Vulnerability Assessment

To understand risk, a community must evaluate what assets are exposed and vulnerable in the identified hazard area. A spatial analysis was conducted using the University of Wisconsin 2010 Wildfire Urban Interface/Intermix 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 wildfire interface or wildfire intermix hazard areas.

Impact on 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. Table 5.4.16-5 summarizes the estimated population exposed to the wildfire hazard by municipality.

Based on the analysis, an estimated 320,756 residents, or approximately 21.6-percent of the County's population, are located in the wildfire urban interface/intermix hazard areas. Overall, the Town of Brookhaven has the greatest number of individuals located in the wildfire hazard areas (i.e., 155,232 persons).

Of the population exposed, the most vulnerable include the economically disadvantaged and the population over age 65. In Suffolk County, there are 104,660 persons in poverty and 239,284 persons over 65 years old. Economically disadvantaged populations are more vulnerable 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.

Table 5.4.16-5. Estimated Population Located within the WUI in Suffolk County

Jurisdiction	American Community Survey (2014-2018) Population	Estimated Population Exposed				
		Wildfire Interface	% of Total	Wildfire Intermix	% of Total	TOTAL WUI
Amityville (V)	9,452	0	0.0%	0	0.0%	0
Asharoken (V)	443	0	0.0%	91	20.6%	91
Babylon (T)	162,968	0	0.0%	842	0.5%	842
Babylon (V)	12,089	0	0.0%	0	0.0%	0
Belle Terre (V)	681	0	0.0%	71	10.4%	71
Bellport (V)	2,008	0	0.0%	0	0.0%	0
Brightwaters (V)	3,069	0	0.0%	0	0.0%	0
Brookhaven (T)	448,342	120,808	26.9%	34,423	7.7%	155,232
Dering Harbor (V)	0	0	0.0%	0	0.0%	0
East Hampton (T)	18,685	9,205	49.3%	7,265	38.9%	16,470
East Hampton (V)	1,034	324	31.4%	144	13.9%	469
Greenport (V)	1,945	0	0.0%	59	3.0%	59
Head of the Harbor (V)	1,463	0	0.0%	648	44.3%	648
Huntington (T)	189,840	0	0.0%	4,537	2.4%	4,537
Huntington Bay (V)	1,366	0	0.0%	43	3.2%	43
Islandia (V)	3,345	3,161	94.5%	0	0.0%	3,161
Islip (T)	326,416	60,668	18.6%	2,259	0.7%	62,928
Lake Grove (V)	11,130	0	0.0%	37	0.3%	37

Jurisdiction	American Community Survey (2014-2018) Population	Estimated Population Exposed				
		Wildfire Interface	% of Total	Wildfire Intermix	% of Total	TOTAL WUI
Lindenhurst (V)	27,053	0	0.0%	0	0.0%	0
Lloyd Harbor (V)	3,676	0	0.0%	3,307	90.0%	3,307
Nissequogue (V)	1,574	0	0.0%	1,434	91.1%	1,434
North Haven (V)	919	228	24.8%	460	50.1%	688
Northport (V)	7,348	0	0.0%	0	0.0%	0
Ocean Beach (V)	24	0	0.0%	6	25.2%	6
Old Field (V)	812	0	0.0%	792	97.6%	792
Patchogue (V)	12,398	0	0.0%	33	0.3%	33
Poquott (V)	992	0	0.0%	5	0.5%	5
Port Jefferson (V)	7,871	0	0.0%	175	2.2%	175
Quogue (V)	803	326	40.6%	124	15.4%	450
Riverhead (T)	33,625	12,659	37.6%	2,039	6.1%	14,698
Sag Harbor (V)	2,184	2,090	95.7%	92	4.2%	2,181
Sagaponack (V)	260	151	58.2%	9	3.4%	160
Saltaire (V)	8	0	0.0%	4	53.5%	4
Shelter Island (T)	2,744	868	31.6%	1,332	48.5%	2,200
Shoreham (V)	437	338	77.4%	99	22.6%	437
Smithtown (T)	112,224	0	0.0%	2,097	1.9%	2,097
Southampton (T)	51,008	27,698	54.3%	13,767	27.0%	41,465
Southampton (V)	3,263	1,789	54.8%	79	2.4%	1,869
Southold (T)	20,202	0	0.0%	2,780	13.8%	2,780
Village of the Branch (V)	1,770	0	0.0%	0	0.0%	0
Westhampton Dunes (V)	69	0	0.0%	0	0.0%	0
Westhampton Beach (V)	1,653	775	46.9%	24	1.5%	799
Shinnecock Tribal Nation	662	21	3.2%	566	85.4%	587
Unkechaug Tribal Nation	324	0	0.0%	0	0.0%	0
Suffolk County (Total)	1,488,179	241,111	16.2%	79,645	5.4%	320,756

Source: American Community Survey 2018 (ACS 2014-2018); University of Wisconsin, 2010

Impact on General Building Stock

The most vulnerable structures to wildfire events are those within the wildfire urban interface/intermix hazard area. 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. To estimate the buildings exposed to the wildfire hazard, the WUI was overlaid upon the updated building inventory at the structure level. The replacement cost value of the structures with their center in the WUI were totaled (refer to Table 5.4.16-6).

Table 5.4.16-6. Building Stock Replacement Value Located within the WUI in Suffolk County

Jurisdiction	Number of Buildings	Total Replacement Cost Value (RCV)	Estimated Building Stock Exposed									
			Number of Buildings - Wildfire Interface	% of Total	RCV of Buildings - Wildfire Interface	% of Total	Number of Buildings - Wildfire Intermix	% of Total	RCV of Buildings - Wildfire Intermix	% of Total	Total Buildings in WUI	Total RCV in WUI
Amityville (V)	4,161	$5,519,611,238	0	0.0%	$0	0.0%	0	0.0%	$0	0.0%	0	$0
Asharoken (V)	321	$379,192,198	0	0.0%	$0	0.0%	63	19.6%	$67,567,537	17.8%	63	$67,567,537
Babylon (T)	51,514	$82,740,965,827	0	0.0%	$0	0.0%	299	0.6%	$345,019,028	0.4%	299	$345,019,028
Babylon (V)	4,957	$6,110,029,951	0	0.0%	$0	0.0%	0	0.0%	$0	0.0%	0	$0
Belle Terre (V)	316	$680,761,603	0	0.0%	$0	0.0%	34	10.8%	$82,509,811	12.1%	34	$82,509,811
Bellport (V)	1,206	$2,358,752,934	0	0.0%	$0	0.0%	0	0.0%	$0	0.0%	0	$0
Brightwaters (V)	1,162	$1,932,120,865	0	0.0%	$0	0.0%	0	0.0%	$0	0.0%	0	$0
Brookhaven (T)	154,866	$221,811,756,528	40,448	26.1%	$42,243,022,389	19.0%	11,982	7.7%	$17,057,766,956	7.7%	52,430	$59,300,789,345
Dering Harbor (V)	41	$88,595,797	0	0.0%	$0	0.0%	13	31.7%	$20,219,409	22.8%	13	$20,219,409
East Hampton (T)	18,243	$26,516,571,402	8,936	49.0%	$11,843,125,647	44.7%	6,906	37.9%	$10,855,635,660	40.9%	15,842	$22,698,761,307
East Hampton (V)	1,938	$5,002,346,911	566	29.2%	$1,056,325,484	21.1%	242	12.5%	$600,764,320	12.0%	808	$1,657,089,804
Greenport (V)	982	$1,316,147,268	0	0.0%	$0	0.0%	28	2.9%	$10,655,345	0.8%	28	$10,655,345
Head of the Harbor (V)	527	$1,052,509,872	0	0.0%	$0	0.0%	224	42.5%	$489,508,167	46.5%	224	$489,508,167
Huntington (T)	62,226	$82,709,382,979	0	0.0%	$0	0.0%	1,483	2.4%	$2,052,992,724	2.5%	1,483	$2,052,992,724
Huntington Bay (V)	593	$642,162,208	0	0.0%	$0	0.0%	19	3.2%	$22,442,573	3.5%	19	$22,442,573
Islandia (V)	1,039	$4,798,220,611	883	85.0%	$2,491,479,401	51.9%	0	0.0%	$0	0.0%	883	$2,491,479,401
Islip (T)	86,764	$157,009,867,271	15,814	18.2%	$27,029,015,732	17.2%	646	0.7%	$747,169,449	0.5%	16,460	$27,776,185,181
Lake Grove (V)	3,693	$4,999,176,933	0	0.0%	$0	0.0%	12	0.3%	$16,743,255	0.3%	12	$16,743,255
Lindenhurst (V)	9,387	$9,110,586,538	0	0.0%	$0	0.0%	0	0.0%	$0	0.0%	0	$0
Lloyd Harbor (V)	1,301	$2,057,808,899	0	0.0%	$0	0.0%	1,128	86.7%	$1,652,783,392	80.3%	1,128	$1,652,783,392

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			Estimated Building Stock Exposed									
Jurisdiction	Number of Buildings	Total Replacement Cost Value (RCV)	Number of Buildings - Wildfire Interface	% of Total	RCV of Buildings - Wildfire Interface	% of Total	Number of Buildings - Wildfire Intermix	% of Total	RCV of Buildings - Wildfire Intermix	% of Total	Total Buildings in WUI	Total RCV in WUI
Nissequogue (V)	638	$1,430,093,283	0	0.0%	$0	0.0%	576	90.3%	$1,305,909,089	91.3%	576	$1,305,909,089
North Haven (V)	772	$2,221,433,929	190	24.6%	$510,952,441	23.0%	388	50.3%	$1,334,641,136	60.1%	578	$1,845,593,577
Northport (V)	2,702	$2,610,724,998	0	0.0%	$0	0.0%	0	0.0%	$0	0.0%	0	$0
Ocean Beach (V)	530	$483,689,958	0	0.0%	$0	0.0%	130	24.5%	$96,928,374	20.0%	130	$96,928,374
Old Field (V)	391	$967,667,970	0	0.0%	$0	0.0%	378	96.7%	$881,985,504	91.1%	378	$881,985,504
Patchogue (V)	3,900	$11,533,289,631	0	0.0%	$0	0.0%	9	0.2%	$7,003,200	0.1%	9	$7,003,200
Poquott (V)	379	$540,263,069	0	0.0%	$0	0.0%	2	0.5%	$1,947,600	0.4%	2	$1,947,600
Port Jefferson (V)	3,133	$10,546,648,033	0	0.0%	$0	0.0%	63	2.0%	$128,781,618	1.2%	63	$128,781,618
Quogue (V)	1,785	$5,371,998,365	676	37.9%	$1,461,624,943	27.2%	256	14.3%	$900,930,967	16.8%	932	$2,362,555,910
Riverhead (T)	16,853	$27,561,801,284	5,850	34.7%	$9,404,147,496	34.1%	967	5.7%	$1,238,543,717	4.5%	6,817	$10,642,691,213
Sag Harbor (V)	1,887	$3,157,033,580	1,788	94.8%	$2,959,844,834	93.8%	76	4.0%	$141,588,618	4.5%	1,864	$3,101,433,452
Sagaponack (V)	908	$3,548,811,980	517	56.9%	$2,033,518,534	57.3%	27	3.0%	$79,811,100	2.2%	544	$2,113,329,634
Saltaire (V)	399	$406,571,331	0	0.0%	$0	0.0%	208	52.1%	$183,841,707	45.2%	208	$183,841,707
Shelter Island (T)	2,729	$3,894,434,021	833	30.5%	$1,238,161,299	31.8%	1,297	47.5%	$1,761,603,127	45.2%	2,130	$2,999,764,426
Shoreham (V)	216	$381,052,410	167	77.3%	$304,085,715	79.8%	49	22.7%	$76,966,696	20.2%	216	$381,052,410
Smithtown (T)	35,517	$62,086,530,012	0	0.0%	$0	0.0%	628	1.8%	$973,978,334	1.6%	628	$973,978,334
Southampton (T)	33,290	$69,558,169,929	18,100	54.4%	$33,318,959,534	47.9%	8,734	26.2%	$19,156,190,468	27.5%	26,834	$52,475,150,002
Southampton (V)	3,500	$13,027,590,722	1,989	56.8%	$5,550,142,511	42.6%	74	2.1%	$566,617,363	4.3%	2,063	$6,116,759,874
Southold (T)	15,123	$17,842,698,534	0	0.0%	$0	0.0%	1,919	12.7%	$1,870,534,926	10.5%	1,919	$1,870,534,926
Village of the Branch (V)	624	$1,414,333,647	0	0.0%	$0	0.0%	0	0.0%	$0	0.0%	0	$0
Westhampton Dunes (V)	279	$766,363,715	0	0.0%	$0	0.0%	0	0.0%	$0	0.0%	0	$0

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			Estimated Building Stock Exposed									
Jurisdiction	Number of Buildings	Total Replacement Cost Value (RCV)	Number of Buildings - Wildfire Interface	% of Total	RCV of Buildings - Wildfire Interface	% of Total	Number of Buildings - Wildfire Intermix	% of Total	RCV of Buildings - Wildfire Intermix	% of Total	Total Buildings in WUI	Total RCV in WUI
Westhampton Beach (V)	1,965	$5,590,458,778	999	50.8%	$2,504,797,558	44.8%	27	1.4%	$59,368,028	1.1%	1,026	$2,564,165,586
Shinnecock Tribal Nation	378	$155,005,274	12	3.2%	$5,682,465	3.7%	323	85.4%	$135,437,415	87.4%	335	$141,119,881
Unkechaug Tribal Nation	144	$55,549,783	0	0.0%	$0	0.0%	0	0.0%	$0	0.0%	0	$0
Suffolk County (Total)	533,279	$861,988,782,069	97,768	18.3%	$143,954,885,982	16.7%	39,210	7.4%	$64,924,386,616	7.5%	136,978	$208,879,272,598

Source: Suffolk County GIS 2020; Suffolk County Real Property Tax Service Agency; University of Wisconsin, 2010
Notes: GBS = General Building Stock; RV = Replacement Value; WUI = Wildland Urban Interface

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Table 5.4.16-7 provides the estimated parcel status by ownership and land use for the Core Preservation Area in the Central Pine Barrens. The areas and resources identified here are considered vulnerable to the damages from wildfire. Please note that this table may not reflect current coverage of the Central Pine Barrens Core Preservation Area and reflects the acres assessed in the 2014 HMP.

Table 5.4.16-7. Central Pine Barrens Core Preservation Area – Estimated Parcel Status by Ownership and Land Use in Acres, 2004

Ownership / Land Use	Town of Brookhaven	Town of Riverhead	Town of Southampton	Total
Protected Lands				
Suffolk County	6,401	1,912	11,738	20,050
New York State	8,886	1,119	3,475	13,479
Unites States	2,528	0	182	2,710
Town	946	60	730	1,736
Nature Conservancy	0	58	178	236
Misc. Private	27	0	178	205
Pine Barrens Comm. Easement	371	37	73	480
Sub Total	**19,159**	**3,185**	**16,554**	**38,898**
Developed Lands by Land Use Code				
Residential (200)	798	176	378	1,352
Commercial (400)	193	23	123	338
Entertainment (500)	172	522	284	978
Commercial Services (600)	5,279	0	416	5,694
Industrial (700)	0	21	100	121
Private Club (900)	77	73	0	149
Sub Total	**6,518**	**814**	**1,301**	**8,632**
Utilities / Transportation (800) Combined Total (Rail, Airport, Phone, Water Authority, etc.)	150	617	305	1,072
Agricultural (100)	336	57	140	533
Other Ownership Categories including Grandfathered Parcels, Hardship Exemptions, Roadfront Exemptions, Private, Vacant, Unprotected and Otherwise Not Categorized Above	1,426	536	2,542	4,503
Total	**27,589**	**5,208**	**20,842**	**53,638**

Source: Central Pine Barrens 2007

Note: Land use codes are from the Property Type Classification and Ownership Codes produced by the State Board of Equalization and Assessment (Albany, NY, 1990; now known as the Office of Real Property Services). Actual built roadways are not included in the above data, as they are not assigned tax map parcel numbers or acreages. It is estimated that there may be approximately 3,000 acres of such roads in the core area.

Impact on Critical Facilities

It is recognized that a number of critical facilities are located in the wildfire hazard area, and are also vulnerable to the threat of wildfire. Many of these facilities are the locations for vulnerable populations (i.e., schools, senior facilities) and responding agencies to wildfire events (i.e., fire, police). Table 5.4.16-8 summarizes critical facilities located within the wildfire hazard area by jurisdiction. Overall, 2,129 critical facilities are exposed to the wildfire urban interface/intermix hazard area. 1,711 of the critical facilities are considered lifelines for the County. The Town of Brookhaven has the greatest number of critical facilities built in the wildfire urban interface/intermix hazard areas (i.e., 2,272). The exposed lifelines are categorized into FEMA lifeline groupings and are summarized in Table 5.4.16-9.

Table 5.4.16-8. Facilities in the WUI (Intermix or Interface) in Suffolk County

Jurisdiction	Total CFs Located in Jurisdiction	Total Lifelines Located in Jurisdiction	Number of Critical Facilities and Lifeline Facilities Exposed to Wildfire Hazard Area			
			Critical Facilities	% of Total Critical Facilities	Lifelines	% of Total Lifelines
Amityville (V)	85	62	0	0.0%	0	0.0%
Asharoken (V)	4	3	0	0.0%	0	0.0%
Babylon (T)	1,029	741	3	0.3%	2	0.3%
Babylon (V)	93	64	0	0.0%	0	0.0%
Belle Terre (V)	6	5	0	0.0%	0	0.0%
Bellport (V)	35	25	0	0.0%	0	0.0%
Brightwaters (V)	14	11	0	0.0%	0	0.0%
Brookhaven (T)	2,798	2,272	729	26.1%	591	26.0%
Dering Harbor (V)	2	2	1	50.0%	1	50.0%
East Hampton (T)	234	204	149	63.7%	128	62.7%
East Hampton (V)	37	23	4	10.8%	3	13.0%
Greenport (V)	33	20	0	0.0%	0	0.0%
Head of the Harbor (V)	11	9	2	18.2%	1	11.1%
Huntington (T)	961	664	27	2.8%	18	2.7%
Huntington Bay (V)	2	2	0	0.0%	0	0.0%
Islandia (V)	70	62	38	54.3%	33	53.2%
Islip (T)	2,275	1,740	324	14.2%	244	14.0%
Lake Grove (V)	50	38	0	0.0%	0	0.0%
Lindenhurst (V)	104	62	0	0.0%	0	0.0%
Lloyd Harbor (V)	16	12	11	68.8%	9	75.0%
Nissequogue (V)	7	4	7	100.0%	4	100.0%
North Haven (V)	3	1	3	100.0%	1	100.0%
Northport (V)	40	24	0	0.0%	0	0.0%
Ocean Beach (V)	5	4	0	0.0%	0	0.0%
Old Field (V)	4	3	4	100.0%	3	100.0%
Patchogue (V)	92	63	1	1.1%	1	1.6%
Poquott (V)	2	2	0	0.0%	0	0.0%
Port Jefferson (V)	95	71	0	0.0%	0	0.0%
Quogue (V)	19	13	2	10.5%	1	7.7%
Riverhead (T)	428	346	228	53.3%	179	51.7%
Sag Harbor (V)	37	24	34	91.9%	23	95.8%
Sagaponack (V)	3	3	1	33.3%	1	33.3%
Saltaire (V)	8	6	0	0.0%	0	0.0%
Shelter Island (T)	41	32	30	73.2%	22	68.8%
Shoreham (V)	7	5	7	100.0%	5	100.0%

Jurisdiction	Total CFs Located in Jurisdiction	Total Lifelines Located in Jurisdiction	Number of Critical Facilities and Lifeline Facilities Exposed to Wildfire Hazard Area			
			Critical Facilities	% of Total Critical Facilities	Lifelines	% of Total Lifelines
Smithtown (T)	708	542	4	0.6%	3	0.6%
Southampton (T)	667	580	410	61.5%	338	58.3%
Southampton (V)	63	44	36	57.1%	23	52.3%
Southold (T)	275	230	45	16.4%	42	18.3%
Village of the Branch (V)	38	23	0	0.0%	0	0.0%
Westhampton Dunes (V)	5	5	0	0.0%	0	0.0%
Westhampton Beach (V)	47	39	17	36.2%	13	33.3%
Shinnecock Tribal Nation	22	22	22	100.0%	22	100.0%
Unkechaug Tribal Nation	11	10	0	0.0%	0	0.0%
Suffolk County (Total)	10,486	8,117	2,139	20.4%	1,711	21.1%

Source: Suffolk County GIS 2020; University of Wisconsin, 2010

Table 5.4.16-9. Lifelines Exposed to the Wildfire Urban Interface/Intermix Hazard Areas

Lifeline Categories	Total Lifelines in County	Wildfire-Urban Interface Exposure	Wildfire-Urban Intermix Exposure
Communication	126	30	30
Energy	397	63	39
Food, Water, Shelter	1,458	193	229
Health and Medical	1,081	150	78
Safety and Security	1,956	239	144
Transportation	3,099	427	89
Suffolk County (Total)	**8,117**	**1,102**	**609**

Source: Suffolk County GIS 2020; University of Wisconsin 2010; FEMA 2020

Several of the planning partners including the Town of Smithtown, the Suffolk County Water Authority, the Unkechaug Tribal Nation, and the Shinnecock Tribal Nation provided specific parcel data for identified critical properties. More specifically, the Tribal Nations provided the location of sacred land. An exposure analysis was completed to identify the amount of land exposed. Table 5.4.16-10 below summarizes results of the exposure analysis.

Table 5.4.16-10. Planning Partner Property Specific Exposure Analysis

Jurisdiction	Total Acres of Critical Properties	*Entity Acreage				% of Total Critical Property Exposed			
		ST Parks	SCWA	ST Recharge	Tribe SL	ST Parks	SCWA	STr Rcharge	Tribe SL
Brookhaven (T)	458	0	198	0	0	0.0%	43.3%	0.0%	0.0%
East Hampton (T)	939	0	149	0	0	0.0%	15.9%	0.0%	0.0%
Huntington (T)	91	0	7	0	0	0.0%	8.0%	0.0%	0.0%
Islandia (V)	23	0	15	0	0	0.0%	64.2%	0.0%	0.0%

Jurisdiction	Total Acres of Critical Properties	*Entity Acreage				% of Total Critical Property Exposed			
		ST Parks	SCWA	ST Recharge	Tribe SL	ST Parks	SCWA	STr Rcharge	Tribe SL
Islip (T)	234	0	53	0	0	0.0%	22.8%	0.0%	0.0%
Lloyd Harbor (V)	4	0	4	0	0	0.0%	100.0%	0.0%	0.0%
Nissequogue (V)	137	33	0	3	0	24.1%	0.0%	1.8%	0.0%
Patchogue (V)	12	0	8	0	0	0.0%	65.0%	0.0%	0.0%
Sag Harbor (V)	13	0	13	0	0	0.0%	100.0%	0.0%	0.0%
Shinnecock Tribal Nation	37	0	0	0	37	0.0%	0.0%	0.0%	100.0%
Shoreham (V)	1	0	1	0	0	0.0%	100.0%	0.0%	0.0%
Smithtown (T)	1,751	152	2	11	0	8.7%	0.1%	0.6%	0.0%
Southampton (T)	275	0	165	0	0	0.0%	59.9%	0.0%	0.0%
Southampton (V)	3	0	3	0	0	0.0%	100.0%	0.0%	0.0%
Southold (T)	257	0	120	0	0	0.0%	46.6%	0.0%	0.0%
Westhampton Beach (V)	3	0	0	0	0	0.0%	11.8%	0.0%	0.0%

Source: FEMA, Town of Smithtown, Suffolk County Water Authority, The Unkechaug Tribal Nation, and The Shinnecock Tribal Nation; University of Wisconsin 2010

**Note: SCWA- Suffolk County Water Authority, ST Parks- Smithtown Parks, ST Recharge- Smithtown Recharge Basins Tribe SL- Tribal Sacred Land*

Impact on the Economy

The Central Pine Barrens Wildfire Task Force indicates that wildfires damage hundreds, sometimes thousands, of acres in the Pine Barrens each year. These fires jeopardize homes and businesses in the wildland-urban interface. These fires cost thousands of taxpayer dollars to suppress and control and 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 work to fight these fires. These fires often cause injury to both civilians and firefighters and may cause damage to structures as well (Central Pine Barrens 2007).

It is recognized that a number of critical facilities, transportation and utility assets are located in the Central Pine Barrens, and may be vulnerable to the threat of wildfire. Of particular note, the Long Island Expressway and the Long Island Railroad are two major east-west transportation arteries that were closed during the 1995 wildfires.

Impact on the Environment

According to the USGS, post-fire runoff polluted with debris and contaminates can be extremely harmful to ecosystem and aquatic life (USGS 2018). Studies show that urban fires in particular are more harmful to the environment compared to forest fires (USGS 2018). The age and density of infrastructure within Suffolk County can exacerbate consequences of fires on the environment because of the increased amount of chemicals and contaminates that would be released from burning infrastructure. These chemicals, such as iron lead, and zinc, may leach into the storm water, contaminate nearby streams, and impair aquatic life.

Cascading Impacts on Other Hazards

Wildfires result in the uncontrolled destruction of forests, brush, field crops, grasslands, real estate, and personal property, and have secondary impacts on other hazards such as flooding, by removing vegetation and destroying watersheds.

Future Changes That May Impact Vulnerability

Understanding future changes that effect vulnerability in the County can assist in planning for future development and ensure establishment of appropriate mitigation, planning, and preparedness measures. Changes in the natural environment and built environment and how they interact can also provide insight about ways to plan for the future.

Projected Development

As discussed in Section 4, areas targeted for future growth and development have been identified across the County. Any areas of growth located in the wildfire urban interface/intermix hazard areas could be at risk. There are 16 new development project areas within the wildfire urban interface/intermix hazard areas. Refer to Figure 5.4.16-12 through Figure 5.4.16-14 to view the new development project areas and their proximity to the wildfire urban interface/intermix hazard areas.

Projected Changes in Population

According to the Suffolk County Economic Development and Planning Department's February 2017 Annual Report update, the population of the County is growing. The report indicates that slow population growth is expected to continue in the future. 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. Refer to Section 4 (County Profile), which includes a discussion on population trends for the County.

Climate Change

As discussed above, most studies project that the State of New York will see an increase in average annual temperatures and precipitation. Changes in temperature can have an effect on how fire interacts with the surrounding natural habitat and built environment. Fire interacts with climate and vegetation (fuel) in predictable ways. Understanding the climate/fire/vegetation interactions 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, and
- Complications from land use change, invasive species and an increasing wildland-urban interface (USFS 2011).

It is projected that higher summer temperatures will likely increase the high fire risk by 10 to 30-percent. Fire occurrence and/or area burned could increase across the U.S. due to the increase of lightning activity, the frequency of surface pressure and associated circulation patterns conductive to surface drying, and fire-weather conditions, in general, which is conductive to severe wildfires. Warmer temperatures will also increase the effects of drought and increase the number of days each year with flammable fuels and extending fire seasons and areas burned (USFS 2011).

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 Since the 2014 HMP

Since the 2014 analysis, population statistics have been updated using the 5-Year 2014-2018 American Community Survey Population Estimates. The general building stock was also updated using RS Means 2019 building valuations that estimated replacement cost value for each building in the inventory. Updated building stock provided by the County was utilized to update the user-defined facility inventory and critical facility inventory dataset. Last, the University of Wisconsin 2010 wildfire urban interface/intermix hazard areas were referenced to assess the structures and persons at risk to the wildfire hazard.

Overall, this vulnerability assessment uses a more accurate and updated building inventory which provides more accurate estimated exposure and potential losses for Suffolk County.

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Figure 5.4.16-12. New Development and Wildfire Urban Interface/Intermix Hazard Areas in Suffolk County - West

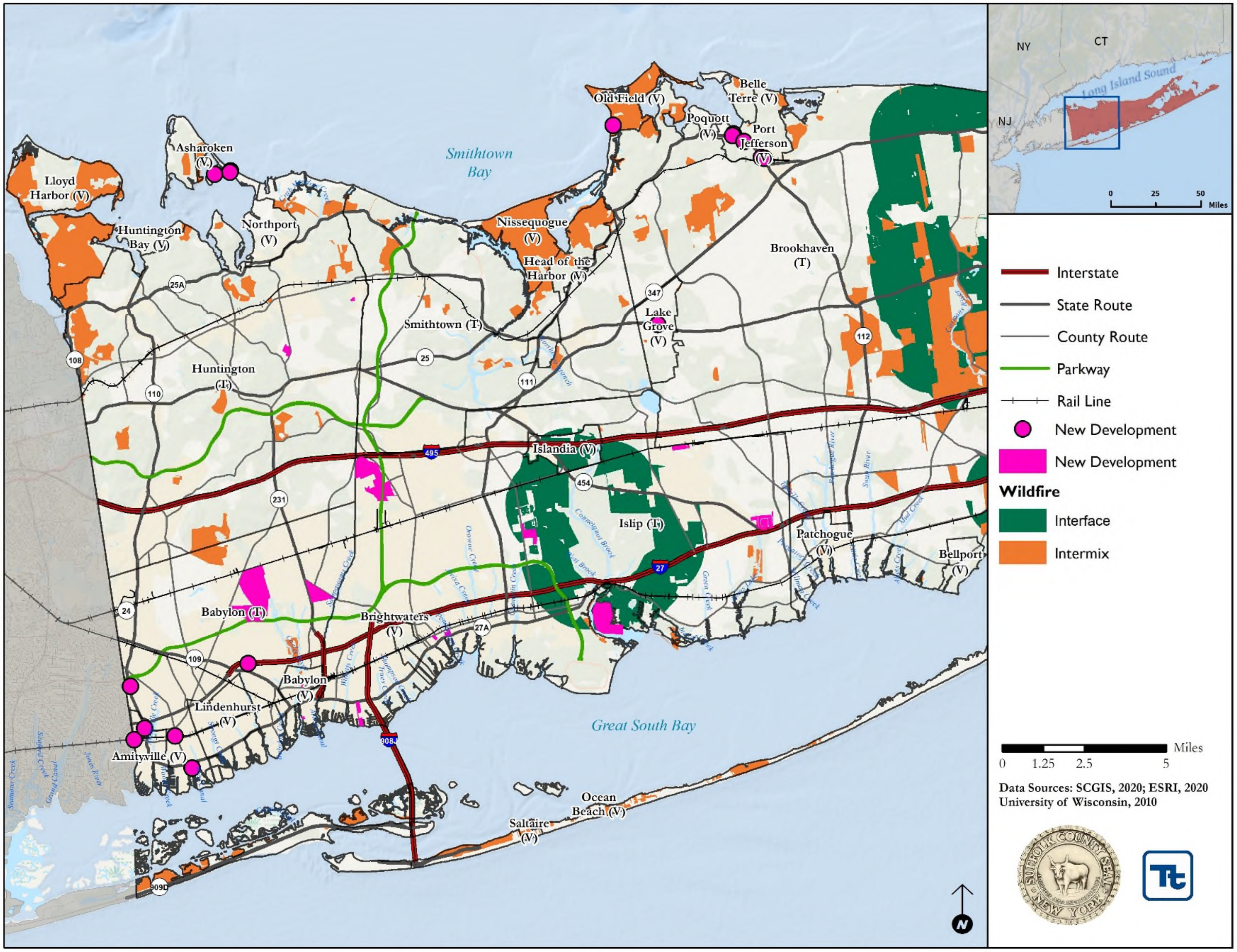

Figure 5.4.16-13. New Development and Wildfire Urban Interface/Intermix Hazard Areas in Suffolk County - Central

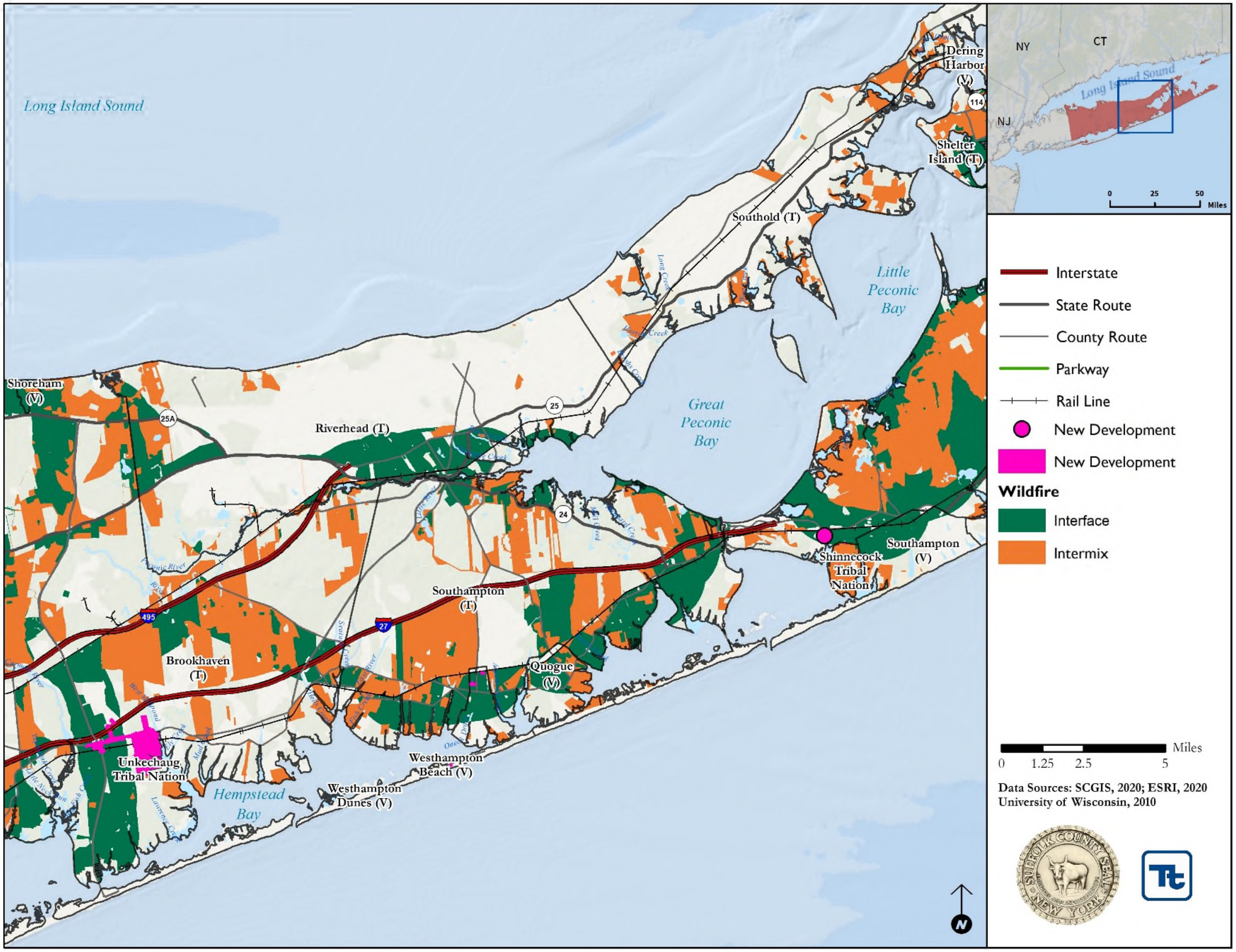

Figure 5.4.16-14. New Development and Wildfire Urban Interface/Intermix Hazard Areas in Suffolk County - East