9. EXTREME TEMPERATURE

9.1 HAZARD PROFILE

9.1.1 Hazard Description

Extreme temperature includes both heat and cold events, which can adversely affect human health and the economy, as well as cause primary and secondary effects on infrastructure (such as burst pipes and power failure). What constitutes “extreme cold” or “extreme heat” can vary across different areas of the country, based on the typical climate and seasonal patterns.

Extreme Cold

Extreme cold events occur when temperatures drop well below normal in an area. For example, near-freezing temperatures are considered “extreme cold” in regions relatively unaccustomed to winter weather. Conversely, “extreme cold” might be used to describe temperatures below 0°F in regions that are subjected to temperatures below freezing on more of a regular basis. For the purposes of this HMP, extreme cold temperatures are characterized when the ambient air temperature drops to approximately 0ºF or below (NWS n.d.). Extensive exposure to extreme cold temperatures can cause frostbite or hypothermia and can become life-threatening. The following health hazards are related to extreme cold temperatures (NWS 2022):

- Wind chill is not the actual temperature but rather how wind and cold feel on exposed skin. As the wind increases, heat is carried away from the body at an accelerated rate, driving down the body temperature.
- Frostbite is damage to body tissue caused by extreme cold. A wind chill of -20°F will cause frostbite in just 30 minutes. Frostbite can cause a loss of feeling and a white or pale appearance in extremities.
- Hypothermia is a condition brought on when the body temperature drops to less than 95°F, and it can be deadly. Warning signs of hypothermia include uncontrollable shivering, memory loss, disorientation, incoherence, slurred speech, drowsiness, and apparent exhaustion.

Extreme Heat

Extreme heat is defined as temperatures that hover 10°F or more above the average high temperature for a region and that last for several weeks (CDC 2024). Humid or muggy conditions occur when a “dome” of high atmospheric pressure traps hazy, damp air near the ground.

A heat wave is a period of abnormally and uncomfortably hot and unusually humid weather. A heat wave will typically last two or more days (NOAA n.d.). The following health hazards are related to extreme high temperatures (CDC 2022):

- Heat exhaustion is the body’s response to an excessive loss of water and salt, usually through excessive sweating. Symptoms can include headache, cramping, dizziness, and weakness.
- Heat stroke occurs when the body can no longer control its temperature: the body’s temperature rises rapidly, the sweating mechanism fails, and the body is unable to cool down. When heat stroke occurs, the body temperature can rise to 106°F or higher within 10 to 15 minutes. Heat stroke can cause permanent disability or death if the person does not receive emergency treatment.

Table 9-1 outlines the effects of prolonged exposure to heat on the human body during extreme heat events.

Table 9-1. Adverse Effects of Prolonged Exposure to Heat

Category	Heat Index	Effects on the Body
Caution	80°F - 90°F	Fatigue is possible with prolonged exposure and/or physical activity
Extreme Caution	90°F - 103°F	Heat stroke, heat cramps, or heat exhaustion is possible with prolonged exposure and/or physical activity
Danger	103°F - 124°F	Heat cramps or heat exhaustion is likely, and heat stroke is possible with prolonged exposure and/or physical activity
Extreme Danger	125°F or higher	Heat stroke is highly likely

Source: NWS n.d.

9.1.2 Location

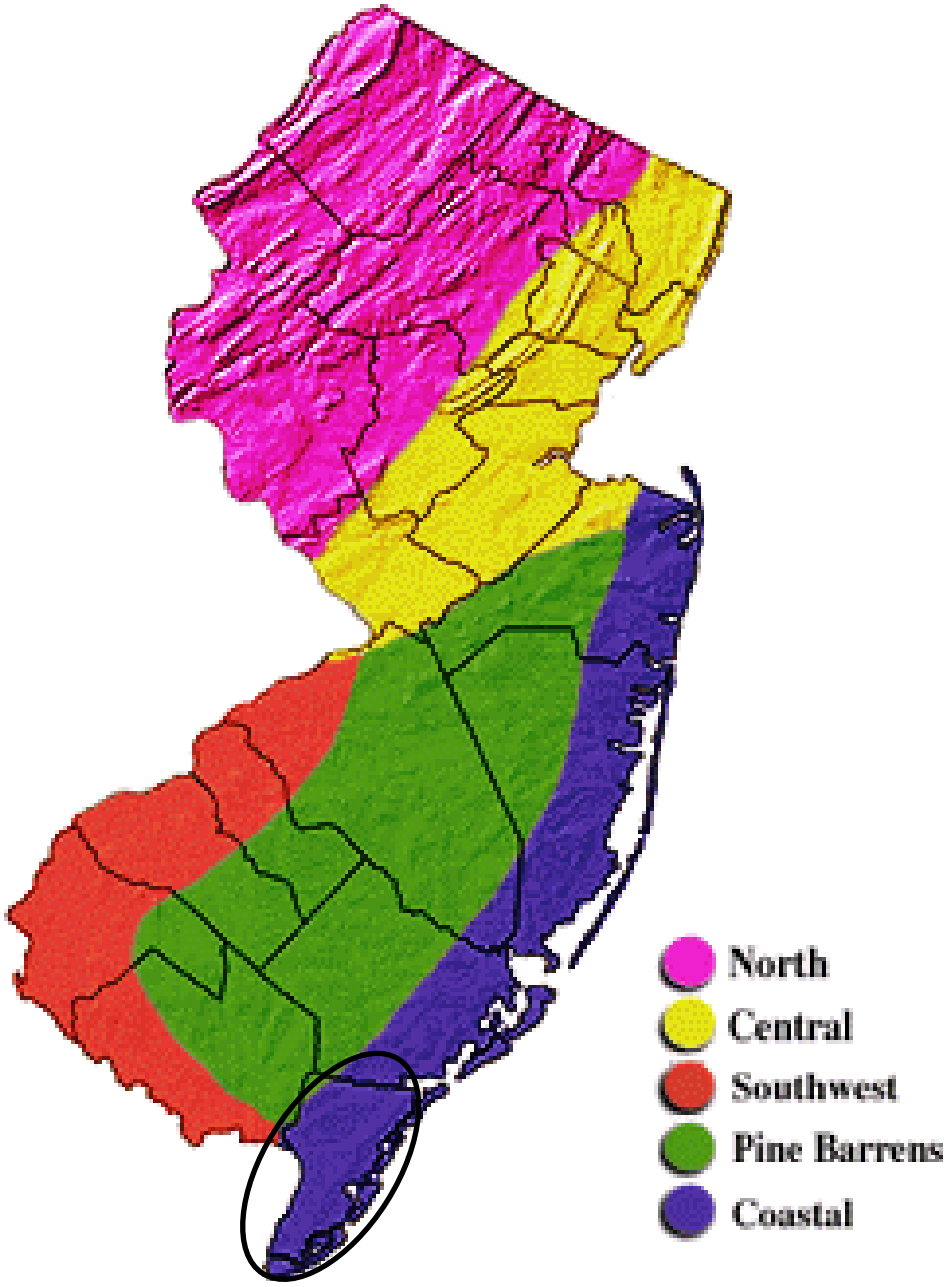
According to the Office of the New Jersey State Climatologist (ONJSC), the State of New Jersey has five distinct climate zones. Elevations, latitude, distance from the Atlantic Ocean, and landscape (e.g., urban, sandy soil) produce distinct variations in the daily weather between each of the zones. The five zones include North, Central, Pine Barrens, Southwest, and Coastal (Rutgers University 2019). Figure 9-1 depicts these zones. A majority of Cape May County is located within the Coastal Climate Zone, with a small portion of the southwest end of the County falling within the Pine Barrens Zone.

In the Coastal Climate Zone, the climate is influenced by both continental and oceanic factors, leading to warmer temperatures in autumn and early winter and cooler temperatures in spring due to ocean breezes. The Atlantic Ocean's high heat capacity moderates seasonal temperature fluctuations. Sea breezes, common in spring and summer, can penetrate inland up to 40 miles. Coastal storms, including nor'easters, are frequent from October to April, bringing strong winds and heavy rains, while tropical storms and hurricanes also pose significant threats, especially during high tides (Rutgers University 2019).

The southern interior portion of New Jersey, known as the Pine Barrens, is dominated by scrub pine and oak forests. The region's sandy, porous, and infertile soils significantly impact its climate, causing rapid radiation of solar heat on clear nights and resulting in notably low minimum temperatures. The porous soil allows precipitation to quickly infiltrate, leaving surfaces dry and creating a wider range between daily maximum and minimum temperatures, making the area susceptible to forest fires (Rutgers University 2019).

Urban areas and urbanization exacerbate risk during an extreme heat event, compared to rural and suburban areas. As defined by the U.S. Census, urban areas are those with at least 5,000 people (US Census 2022). As these urban areas develop and change, so does the landscape. Buildings, roads, and other infrastructure replace open land and vegetation. Surfaces that were once permeable and moist are now impermeable and dry. These changes cause urban areas to become warmer than the surrounding areas. This forms an “island” of higher temperatures known as an Urban Heat Island (UHI) (EPA 2024).

Figure 9-1. Climate Zones of the State of New Jersey

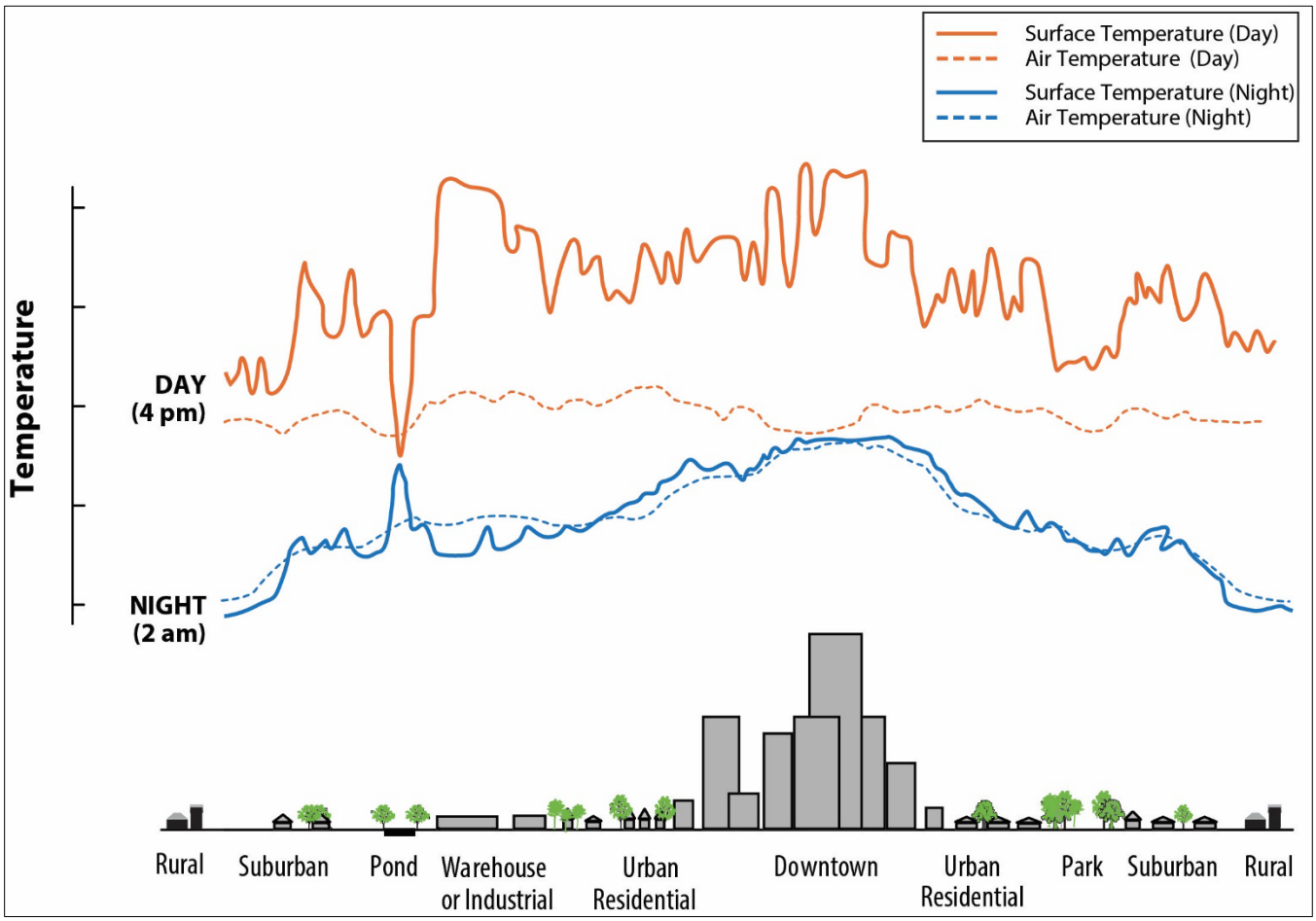


Source: Rutgers University 2019
Note: The black oval indicates the location of Cape May County.

The term 'urban heat island' describes built areas that are hotter than nearby rural areas. The annual mean air temperature of a city with more than one million people can be between 1.8ºF and 5.4ºF warmer than its surrounding areas. In the evening, the difference in air temperatures can be as high as 22ºF. Heat islands occur on the surface and in the atmosphere. On a hot, sunny day, the sun can heat dry, exposed to urban surfaces to temperatures 50ºF to 90ºF hotter than the air. Heat islands can affect communities by increasing peak energy demand during the summer, air conditioning costs, air pollution and greenhouse gas emissions, heat-related illness and death, and water quality degradation (EPA 2024).

As shown in Figure 9-2, surface temperatures vary more than atmospheric air temperatures during the day, but they are generally similar at night. The dips and spikes in surface temperatures over the pond area show how water maintains a nearly constant temperature day and night because it does not absorb the sun's energy the same way as buildings and paved surfaces. Parks, open land, and bodies of water can create cooler areas within a city. Temperatures are typically lower at suburban-rural borders than in downtown areas.

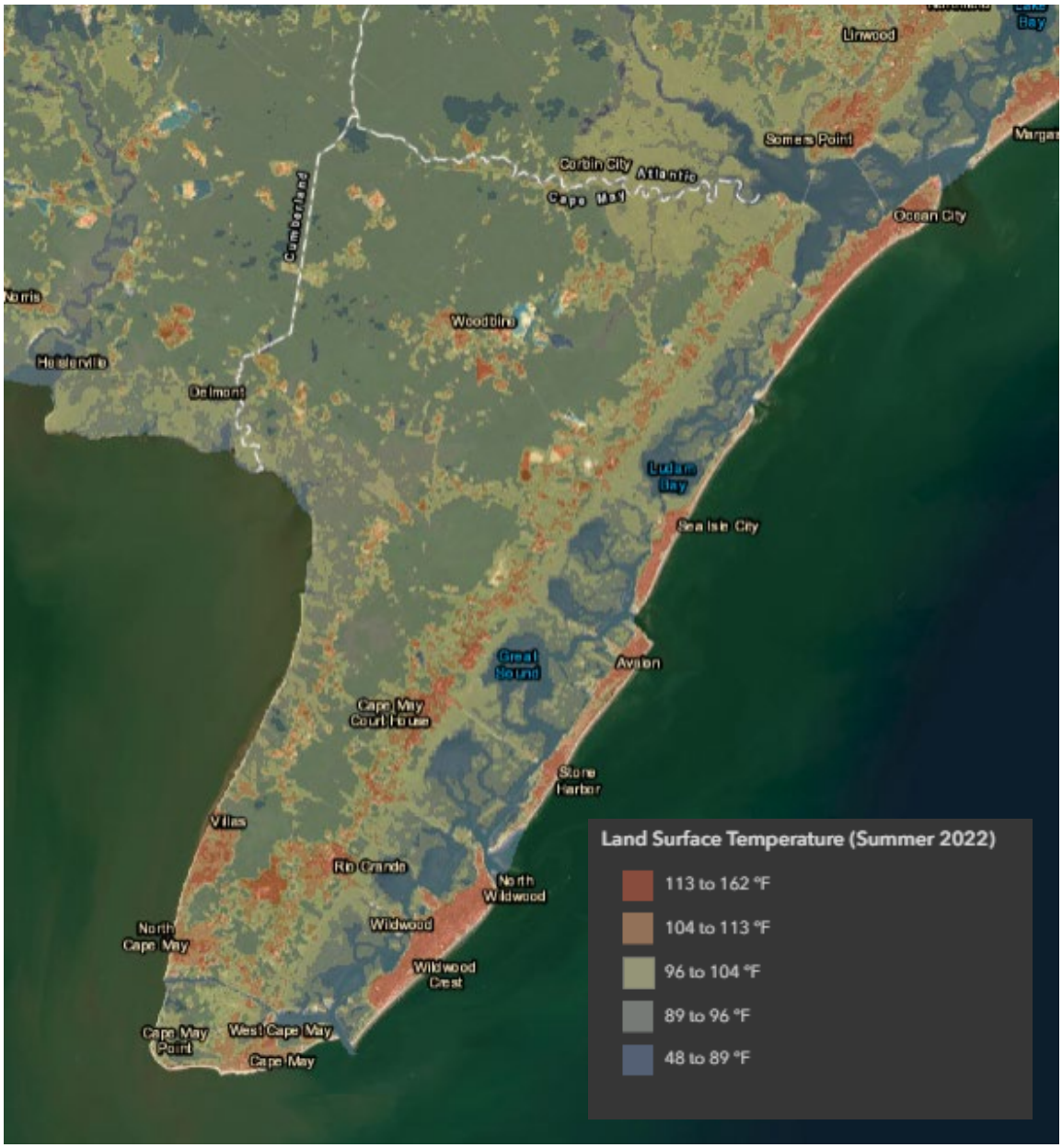
Figure 9-2. Urban Heat Island Effect Diagram



Source: US EPA 2023

To identify urban heat island areas throughout New Jersey, NJDEP used Landsat 8 and 9 satellite imagery provided by the United States Geological Survey (USGS) and developed a web application to visualize land surface temperature (LST) values for the State of New Jersey from the summer of 2022. This web application allows users to view the surface temperature values within specific areas of interest at a resolution of approximately 1000 ft, and land surface temperature within and surrounding the State's designated overburdened communities (NJDEP 2023). This web application shows that the highest land surface temperatures (113°F to 162°F) in summer 2022 were concentrated in Bergen, Essex, Hudson, Middlesex, and Union counties as well as eastern Passaic County and central Somerset County (NJOEM 2024). Figure 9-3 show the land surface temperature for Cape May County in the Summer of 2022.

Figure 9-3. UHI Effect and Land Surface Temperature in Cape May County



Source: NJDEP 2023

9.1.3 Extent

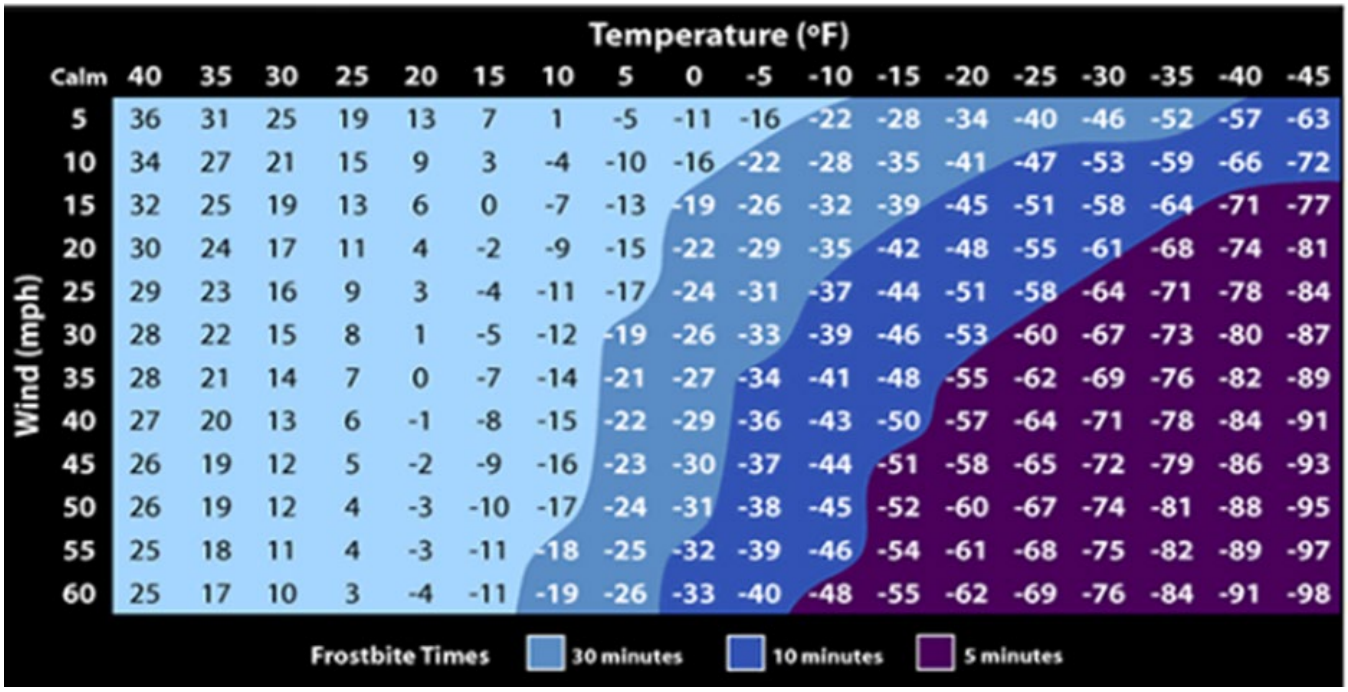
Meteorologists can accurately forecast extreme temperature event development and the severity of the associated conditions with several days lead time. These forecasts provide an opportunity for public health and other officials to notify vulnerable populations to allow sufficient time to prepare for the change in temperature.

Extreme Cold

For extreme cold temperatures, NOAA uses the Wind Chill Index, as shown in Figure 9-4. The Index is a formula developed by the National Weather Service (NWS) to estimate how cold the air feels on human skin when factoring

in wind speed. It combines air temperature and wind speed to give a “feels-like” temperature, which is helpful in determining the risk of frostbite and hypothermia. The Wind Chill Index is only applicable when temperatures are at or below 50°F and wind speeds are above 3 mph. Wind amplifies the cooling effect by blowing away the thin layer of warm air near a person’s skin, making it feel colder than the actual air temperature.

Figure 9-4. Wind Chill Index



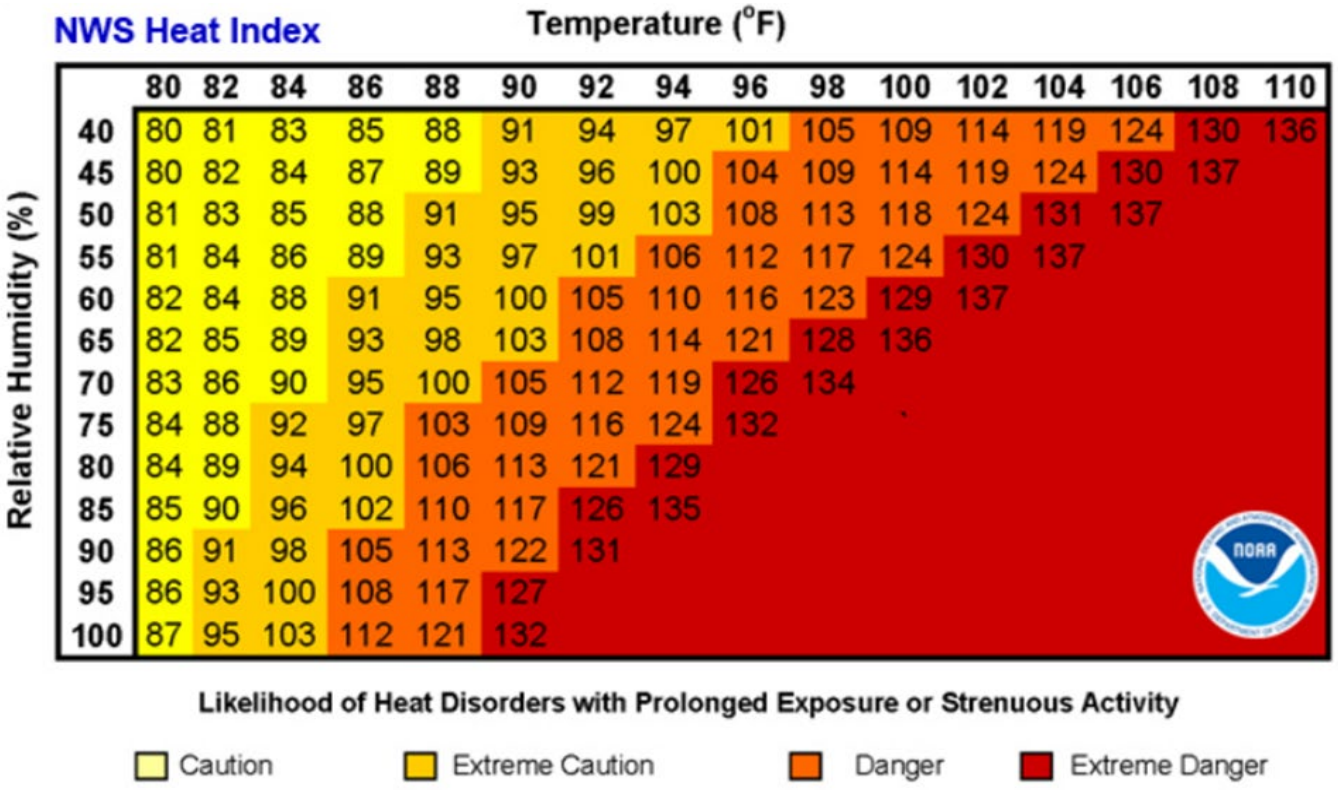
Source: NWS 2021

Extreme Heat

The Heat Index, shown in Figure 9-5, measures extreme heat temperatures. It calculates the apparent temperature by combining air temperature and relative humidity, indicating how hot it feels. The values are designed for shady, light wind conditions.

The NWS issues excessive heat outlooks when the potential exists for an excessive heat event in the next three to seven days. Watches are issued when conditions are favorable for an excessive heat event in the next 24 to 72 hours. Excessive heat warning/advisories are issued when an excessive heat event is expected in the next 36 hours (NWS 2021).

Figure 9-5. NWS Heat Index Chart – Shaded Areas



Source: NWS 2021

Extreme Temperature Alerts

Meteorologists can accurately forecast extreme heat and cold events and the severity of the associated conditions with several days of lead time. These forecasts provide an opportunity for public health and other officials to notify vulnerable populations, implement short-term emergency response actions, and focus on surveillance and relief efforts on those at greatest risk. Adhering to extreme temperature warnings and conducting appropriate mitigation and preparation measures can significantly reduce the risk of temperature-related deaths.

The NWS issues the following freeze/cold alerts depending on the severity of the wind chill and the time of the year (National Weather Service 2021):

- **A Wind Chill Advisory** is issued when seasonably cold wind chill values, but not extremely cold values are expected or occurring.
- **A Wind Chill Watch** is issued when dangerously cold wind chill values are possible.
- **A Wind Chill Warning** is issued when dangerously cold wind chill values are expected or occurring.
- **A Frost Advisory** indicates that areas of frost are expected or occurring and are posing a threat to sensitive vegetation.
- **A Freeze Watch** is issued when there is a potential for significant, widespread freezing temperatures within the following 24 to 36 hours.
- **A Freeze Warning** is typically issued when temperatures are forecasted to go below 32 °F for a long period of time.

- **A Hard Freeze Warning** is issued when temperatures are expected to drop below 28 °F, which typically kills most commercial crops and residential plants.

The NWS issues the following heat alerts depending on the severity of the heat index (National Weather Service 2020):

- An **Excessive Heat Outlook** is issued when potential exists for an excessive heat event within the following three to seven days.
- A **Heat Advisory** is issued within 12 hours of the onset of extremely dangerous heat conditions. This advisory is typically issued when the maximum heat index temperature is expected to be 100 °F or higher for at least 2 days, and nighttime air temperatures will not drop below 75 °F.
- An **Excessive Heat Watch** is issued when conditions are favorable for an excessive heat event within the following 24 to 72 hours. This watch is typically issued when the risk of a heat wave has increased, but the timing and occurrence is still uncertain.
- An **Excessive Heat Warning** is issued within 12 hours of the onset of extremely dangerous heat conditions. This warning is typically issued when the maximum heat index temperature is expected to be 105 °F or higher for two consecutive days with night temperatures not dropping below 75 °F.

9.1.4 Previous Occurrences

FEMA Major Disaster and Emergency Declarations

Between 1954 and 2025, Cape May County was included in one major disaster (DR) or emergency (EM) declarations for extreme temperature-related events of a snowstorm which resulted in extreme cold temperatures (FEMA 2025). For declarations that occurred between 2019 and 2025, refer to Table 9-2.

Table 9-2. FEMA Declarations for Extreme Temperature Events in Cape May County (2019 to 2025)

FEMA Declaration Number	Date(s) of Event	Date of Declaration	Event Type
DR-4597-NJ	January 31 – February 2, 2021	April 28, 2021	Severe Winter Storm and Snowstorm

Source: FEMA 2025

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 August 2019 to March 2025, Cape May County was included in one USDA extreme temperature-related agricultural disaster declarations. For declarations that occurred between 2019 and 2025, refer to Table 9-3.

Table 9-3. USDA Declarations for Extreme Temperature Events in Cape May County (2019 to 2025)

USDA Declaration Number	Date(s) of Event	Date of Declaration	Event Type
S5348	July 1, 2022 – Present	December 20, 2022	Heat, Excessive Heat, High Temperature, Drought

Sources: USDA 2025

Previous Events

Known hazard events that impacted Genesee County between August 2019 to March 2025 are discussed in Table 11-6. For events prior to 2019, refer to the 2019 Cape May County HMP.

Table 9-4. Extreme Temperature Events in Cape May County (2019 to 2025)

Event Date	Declaration or Proclamation Number	Cape May County included in declaration?	Location Impacted	Description
February 11, 2021	N/A	N/A	Countywide	Extreme cold conditions over the mid-Atlantic caused temperatures to drop throughout the state resulting in accumulation of snow ranging from 3 to 5 inches.
April 28, 2021	DR-4597-NJ	Yes	Statewide	Severe snowstorm led to extremely low temperatures for the County.
January 3-7, 2022	N/A	N/A	Countywide	Surface temperatures were sub-freezing which caused freezing rain to fall. Widespread light icing transpired across the eastern mid-Atlantic. The Cape May County Airport (AWOS) reported 0.01 inches of ice accretion due to extreme cold temperatures. Ocean City reported 3.3 inches of snow accumulation.
January 29, 2022	N/A	N/A	Countywide	A strong coastal storm impacted the eastern mid-Atlantic and Northeast. Light snow brought an influx of extreme cold air to the region. These two systems meeting resulted in a blizzard across the region. The combination of strong winds and heavy snow led to whiteout conditions along the coastline.
July 1, 2022	S5348	Yes	Statewide	Excessive heat throughout the State. This has contributed to drought impacts.
December 23, 2022	N/A	N/A	Countywide	Arctic cold front went through the region resulting in light precipitation and extreme cold. Temperatures dropped below freezing throughout the state and resulted in icy surfaces and roads.
December 24, 2022	N/A	N/A	Countywide	An arctic cold front moved through the region. Wind chills as low as -10 degrees occurred throughout the region including the County.
January 15-19, 2024	N/A	N/A	Countywide	A winter system moved throughout the state causing snow accumulation and extreme cold. This resulted in a light glaze of ice and freeze near the southeast of I-95 and the NJ Turnpike.
February 17, 2024	N/A	N/A	Countywide	A winter storm brought light snowfall and extreme cold temperatures. Snowfall accumulation ranged from 1 to 3 inches across the state.

Sources: NOAA NCEI 2025; FEMA 2025, USDA 2025

9.1.5 Probability of Future Occurrences

Information on previous extreme temperature occurrences in the County was used to calculate the probability of future occurrence of such events, as summarized in Table 9-5. The probability of occurrence, or likelihood of the event, is one parameter used for hazard rankings. In Chapter 20, the identified hazards of concern for Cape May County were ranked. The probability of occurrence, or likelihood of the event, is one parameter used for hazard rankings. Based on historical records and input from the Planning Partnership, the probability of occurrence for extreme temperature in the County is considered "*occasional*".

Table 9-5. Probability of Future Extreme Temperature Events in Cape May County

Hazard Type	Number of Occurrences Between 1950 and 2025	Percent Chance of Occurring in Any Given Year
Cold/Wind Chill	49	65.33%
Excessive Heat	23	30.66%
Extreme Cold/Wind Chill	4	5.33%
Heat	94	100.00%
Total	**170**	**100.00%**

Sources: NOAA NCEI 2025; FEMA 2025, USDA 2025

Notes: Due to limitations in data, not all extreme temperature events occurring between 1950 and 2015 are accounted for in the tally of occurrences. As a result, the number of hazard occurrences is calculated using the number of occurrences between 1950 and 2025.

100% probability indicates that it is statistically likely for an event to occur every year. It does not indicate that the occurrence of an event is a certainty in any given year.

Climate Change Projections

Climate change includes major changes in temperature, precipitation, or wind patterns, which occur over several decades or longer. Due to the increase in greenhouse gas concentrations since the end of the 1890s, the State of New Jersey has experienced a 3.5° F (1.9° C) increase in the State's average temperature, which is faster than the rest of the Northeast region (2° F [1.1° C]) and the world (1.5° F [0.8° C]). This warming trend is expected to continue. By 2050, temperatures in the State of New Jersey are expected to increase by 4.1 to 5.7° F (2.3° C to 3.2° C). Thus, the State of New Jersey can expect to experience an average annual temperature that is warmer than any to date (low emissions scenario) and future temperatures could be as much as 10° F (5.6° C) warmer (high emissions scenario). The State can also expect that by the middle of the 21st century, 70 percent of summers will be hotter than the warmest summer experienced to date. The increase in temperatures is expected to be felt more during the winter months (December, January, and February), resulting in less intense cold waves, fewer sub-freezing days, and less snow accumulation (NJDEP 2020).

9.1.6 Cascading Impacts on Other Hazards

Extreme temperature events can exacerbate the drought hazard, increase the potential risk of wildfires, and escalate severe weather and severe winter weather events for the County. For example, extreme heat events may accelerate evaporation rates, which may dry out the air and soils making some terrestrial plants and soil more susceptible to catching fire. Extreme variation in temperatures could also create ideal atmospheric conditions for severe storms or worsen the outcome of severe winter weather during freezing and thawing periods. Extreme cold may result in an increase in flooding as a result of ice jams altering the flow and release of water. For more information ice jams, see Chapter 12 (Flood).

9.2 VULNERABILITY AND IMPACT ASSESSMENT

To understand risk, a community must evaluate what assets are exposed or vulnerable in the hazard area identified. The entire County has been identified as exposed to extreme temperature events. Therefore, all assets in the County (population, structures, critical facilities, and lifelines), as described in the County Profile (Chapter 3), are exposed and potentially vulnerable.

9.2.1 Life, Health, and Safety

Overall Population

The entire population of Cape May County (95,263) is exposed to extreme temperature events. Extreme temperature events threaten potential health impacts including injury and death. Populations most at risk to extreme cold and heat events include the elderly, who are less able to withstand temperatures extremes due to their age, health conditions, and limited mobility to access shelters; infants and children up to four years of age; individuals with chronic medical conditions (e.g., heart disease, high blood pressure), low-income persons that cannot afford proper heating and cooling; and the general public who may overexert during work or exercise during extreme heat events or experience hypothermia during extreme cold events (CDC 2005, CDC 2024).

Meteorologists can accurately forecast extreme heat and cold events and the severity of the associated conditions with several days of lead time. These forecasts provide an opportunity for public health and other officials to notify vulnerable populations, implement short-term emergency response actions, and focus on surveillance and relief efforts on those at greatest risk. Adhering to extreme temperature warnings and conducting appropriate mitigation and preparation measures can significantly reduce the risk of temperature-related deaths.

Drought, coupled with extreme heat, can cause health risks to farmers and their workers. Workers who are exposed to extreme heat or work in hot environments may be at risk of heat stress. Heat stress can result in heat stroke, heat exhaustion, heat cramps, or heat rashes. Heat can also increase the risk of injuries in workers as it may result in sweaty palms, fogged-up safety glasses, and dizziness. Burns may also occur as a result of accidental contact with hot surfaces or steam. Sunlight exposure is highest during the summer and between 10:00 a.m. and 4:00 p.m. Working outdoors during these times increases the chances of getting sunburned. Workers at greater risk of heat stress include those who are 65 years of age or older, are overweight, have heart disease or high blood pressure, or take medications that may be affected by extreme heat (Centers for Disease Control and Prevention 2020, Centers for Disease Control and Prevention 2018).

On the other hand, workers exposed to extreme cold temperatures may experience cold stress, leading to cold-related illnesses such as hypothermia, frostbite, trench foot, and chilblains (CDC 2024).

Socially Vulnerable Population

Socially vulnerable populations, such as low-income groups, the elderly, and those with pre-existing health conditions, are disproportionately affected by extreme temperatures (EPA 2024). Extreme heat can lead to heat-related illnesses such as heatstroke and dehydration, with vulnerable groups often having limited access to air conditioning and cooling centers, increasing their risk (NIHHIS n.d.). Many socially vulnerable individuals work in outdoor or non-climate-controlled environments, such as construction and agriculture, making them more susceptible to heat-related health issues and reduced productivity.

On the other hand, extreme cold can exacerbate chronic conditions, like cardiovascular and respiratory diseases, with vulnerable populations struggling to afford adequate heating, increasing their risk of hypothermia and frostbite (NIEHS 2022). Poorly insulated housing and homelessness significantly heighten the risks associated with extreme cold, as these groups often lack the resources to improve their living conditions. Additionally, extreme cold can disrupt transportation and access to essential services, such as healthcare and food supplies, disproportionately affecting those with limited mobility or financial resources (EPA 2024).

Without a quantitative assessment of potential impacts of extreme temperatures on socially vulnerable populations, the Planning Partners can best assess mitigation options through an understanding of the general numbers and locations of such populations across Cape May County. Table 9-6 summarizes highlights of this information. For planning purposes, it is reasonable to assume that the percentages and distribution of socially vulnerable populations affected by extreme temperatures will be similar to the countywide numbers.

Table 9-6. Distribution of Socially Vulnerable Populations by Municipality

	Cape May County Total		Municipality Highest in Category		Municipality Lowest in Category	
Category	Number	Percent	Number	Percent	Number	Percent
			Lower (T)	Avalon (B)	Cape May Point (B)	Wildwood (C)
Population Over 65	**26,529**	**27.8%**	**5,517**	**61.5%**	**118**	**15.5%**
			Lower (T)	Dennis (T)	Cape May Point (B), North Wildwood (C)	Cape May Point (B), North Wildwood (C)
Population Under 5	**4,117**	**4.3%**	**1,111**	**7.7%**	**0**	**0.0%**
			Middle (T)	Wildwood (C)	Avalon (B), Cape May Point (B), North Wildwood (C), Stone Harbor (B), West Wildwood (B), Wildwood Crest (B)	Avalon (B), Cape May Point (B), North Wildwood (C), Stone Harbor (B), West Wildwood (B), Wildwood Crest (B)
Non-English-Speaking Population	**1,408**	**1.5%**	**497**	**7.2%**	**0**	**0.0%**
			Lower (T)	Woodbine (B)	Cape May Point (B)	Cape May (C)
Population With Disability	**14,049**	**14.7%**	**3,632**	**35.8%**	**43**	**6.0%**
			Lower (T)	Woodbine (B)	West Wildwood (B)	Upper (T)
Population Below Poverty Level	**8,443**	**8.9%**	**2,369**	**30.4%**	**18**	**1.8%**

Source: U.S. Census Bureau 2022 ACS Vulnerable Population Totals

9.2.2 General Building Stock

All the building stock in the County is exposed to the extreme temperature hazard. Extreme heat generally does not impact buildings; however, elevated summer temperatures increase the energy demand for cooling. Losses can be associated with the overheating of heating, ventilation, and air conditioning (HVAC) systems. Extreme cold temperature events can damage buildings through freezing/bursting pipes and freeze/thaw cycles, as well as increasing vulnerability to home fires. Additionally, manufactured homes (mobile homes) and older or poorly

constructed buildings often lack adequate capabilities to withstand extreme temperatures. These deficiencies can include insufficient insulation and less efficient heating systems.

9.2.3 Community Lifelines and Other Critical Facilities

Direct impacts to structures are expected to be minimal. However, it is essential that critical facilities remain operational. Extreme heat events can sometimes cause short periods of utility failures, commonly referred to as "brown outs," created by increased usage from air conditioners, appliances, and similar equipment. Similarly, heavy snowfall and ice storms, associated with extreme cold temperature events, can interrupt power as well. Backup power is recommended for critical facilities and infrastructure. Additionally, designating and developing emergency cooling or heating facilities can also enhance the resilience and safety of communities.

9.2.4 Economy

Extreme temperature can threaten loss of business function and damage and loss of inventory. Business owners may be faced with increased financial burdens due to unexpected repairs (e.g., pipes bursting), higher than normal utility bills, or business interruption caused by power failure (e.g., loss of electricity and telecommunications) (NJOEM 2024). The agricultural industry is most at risk in terms of economic impact and damage caused by extreme temperature events. Extreme heat events can result in drought and dry conditions and directly affect livestock and crop production.

Extreme heat and cold events can damage crops. Based on information from the 2022 Census of Agriculture, 171 farms were present in Cape May County, encompassing 7,821 acres of total farmland. The average farm size was 46 acres. Cape May County farms had a total market value of products sold of approximately $17,641,000 in crop sales (USDA 2022).

9.2.5 Natural, Historic and Cultural Resources

Natural

During periods of extreme heat, air quality in Cape May County deteriorates significantly. The high temperatures accelerate ozone production, which can aggravate respiratory and cardiovascular illnesses, particularly in sensitive populations (NJOEM 2024). Additionally, the combination of high temperatures and little rainfall creates ideal conditions for forest fires, which further degrade air quality by producing fine particulate matter from smoke.

Water resources are also heavily impacted by extreme heat. The prolonged high temperatures lengthen the growing season, increasing the demand for irrigation and affecting groundwater volumes. Drought conditions, often associated with extreme heat, can strain both surface and groundwater supplies, especially in areas with limited reservoirs. Freshwater and coastal wetlands face challenges as well. Increased drought frequency and intensity reduce the availability of freshwater vernal pools, which are crucial habitats for many sensitive wildlife species. Rising temperatures also create favorable conditions for invasive species like the clinging jellyfish (NJDEP 2020). Moreover, runoff from hot surfaces elevates the temperature of waterways, further stressing aquatic ecosystems.

Forests and vegetated lands are at heightened risk during extreme heat events. The dry conditions and high temperatures increase the likelihood and duration of wildfires (NJDEP 2020). Additionally, the warmer climate accelerates the maturation of insect pests, allowing them to invade new vegetated areas that previously did not experience such pressures

Extreme cold temperatures bring their own set of challenges to Cape May County. Prolonged cold spells can freeze wetland soils, reducing water seepage and causing snowmelt runoff to bypass wetlands. This makes water unavailable during the crucial spring and summer months. Heavy snow and ice accumulation during extreme cold weather can damage trees and crops by breaking vegetation and tree limbs. Prolonged periods of extreme cold can also harm vegetation and crops, negatively impacting the agricultural industry in the region (NJOEM 2024).

Historic

Historic buildings may be susceptible to damage from extreme temperature conditions. Proper strategies help safeguard buildings and their contents. Sudden and dramatic fluctuations in heating or cooling should be minimized. Slower heating and cooling give building materials and stored contents time to acclimate to new temperatures in the building and corresponding new humidity levels (CCAHA 2019).

Extreme heat can increase the risk of ignition of fires and their propagation. Fire causes material loss and deformation of cultural heritage assets and may also increase the probability of cracking or splitting in built structures (refer to Chapter 13 (Wildfire) for more information). Under extreme heat, stones can face both macro- (e.g., cracking of stones, soot accumulation, color change in stone containing iron) and micro-degradation (e.g., mineralogical and textural changes), leading to potential structural instability. The long-term impacts include weakened stones and increased susceptibility to deterioration processes such as salt weathering and temperature cycling (Sesana, et al. 2021)

Cultural

Extreme temperatures can significantly impact the County's cultural resources. Historical buildings and homes, which house many cultural artifacts, may not be built to withstand such temperature fluctuations, making them more vulnerable to damage. Climate change exacerbates decay rates and introduces new forms of deterioration. Changes in temperature can affect the structure and composition of building materials, accelerating physical, chemical, and biological degradation processes (Sesana, et al. 2021).

9.3 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.

9.3.1 Potential or Planned Development

The ability of new development to withstand extreme temperature impacts can be enhanced through land use practices and consistent enforcement of codes and regulations for new construction. New development will change the landscape where buildings, roads, and other infrastructure potentially replace open land and vegetation. Transformation of pervious surfaces (including vegetation) to impervious surfaces causes an island of higher temperatures. Specific areas of recent and new development are indicated in tabular form and/or on the hazard maps included in the jurisdictional annexes in Volume II, Section 9 (Jurisdictional Annexes) of this plan.

9.3.2 Projected Changes in Population

Population change is not expected to have a measurable effect on the overall vulnerability of the County's population over time. However, drastic increases in less densely populated areas of the County may require utility system upgrades to keep up with demands (e.g., water, electric) during extreme temperature events to prevent increased stresses on these systems. Additionally, by increasing development, green space preservation will need to continue to be a priority to mitigate increased heat islands.

Furthermore, an increase in the socially vulnerable population, including low-income households, elderly residents, and individuals with pre-existing health conditions, can exacerbate the impacts of extreme heat and cold events (EPA 2024). These populations are often less able to afford adequate heating and cooling, making them more susceptible to health risks such as heatstroke, hypothermia, and respiratory issues. Socially vulnerable groups may also live in poorly insulated or antiquated housing, which can further increase their risk during extreme temperature events.

9.3.3 Climate Change

Climate change has the potential to alter the prevalence and severity of severe weather events. Most studies project that the State of New Jersey will see an increase in average annual temperatures and precipitation. Annual precipitation amounts in the region are projected to increase, primarily in the form of heavy rainfalls, which have the potential to flood critical transportation corridors and other infrastructure.

With increased temperatures, people could face increased health impacts. Additionally, as temperatures rise, more buildings, facilities, and infrastructure systems may exceed their ability to cope with the heat. Thus, building efficiency and upgrading heating and cooling technology/HVAC will become an increasingly important issue for businesses and homeowners over the coming years.

9.3.4 Other Identified Conditions

Extreme temperatures can place significant stress on infrastructure, including roads, bridges, and buildings. High temperatures cause materials to expand and contract, leading to cracks and other forms of damage. Additionally, there is often an increased demand for energy during extreme temperatures, particularly for heating and cooling. This surge in energy use can lead to power outages and increased stress on energy grids. Furthermore, transportation systems are also affected by extreme heat, with rail tracks potentially buckling and asphalt softening, which can cause delays and safety concerns.