5.4.4 Extreme Temperature

This section provides a profile and vulnerability assessment for the extreme temperature hazard.

5.4.4.1 Hazard Profile

This section provides profile information including description, extent, location, previous occurrences and losses and the probability of future occurrences.

Description

Extreme temperature includes both heat and cold events, which can have a significant impact to human health, commercial/agricultural businesses and primary and secondary effects on infrastructure (e.g., burst pipes and power failure). What constitutes "extreme cold" or "extreme heat" can vary across different areas of the country, based on what the population is accustomed to.

Extreme Cold

Extreme cold events are when temperatures drop well below normal in an area. In regions relatively unaccustomed to winter weather, near freezing temperatures are considered "extreme cold." Extreme cold temperatures are characterized by the ambient air temperature dropping to approximately 0 degrees Fahrenheit (ºF) or below (National Weather Service [NWS] 2013). Extensive exposure to extreme cold temperatures can cause frostbite or hypothermia and can become life-threatening. Infants and the elderly are most susceptible to the effects of extreme changes in temperatures. Extreme cold also can cause emergencies in susceptible populations, such as those without shelter, those who are stranded, or those who live in a home that is poorly insulated or without heat (such as mobile homes). Infants and the elderly are particularly at risk, but anyone can be affected (Centers of Disease Control and Prevention [CDC] 2009). In New York State, extreme cold days are defined to reflect the State's regional climate variations. Extreme cold days in the State are individual days with minimum temperatures at or below 32° F or 0° F (NYSERDA 2014).

There are several health hazards related to extreme cold temperatures and include wind chill, frostbite, and hypothermia.

- *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

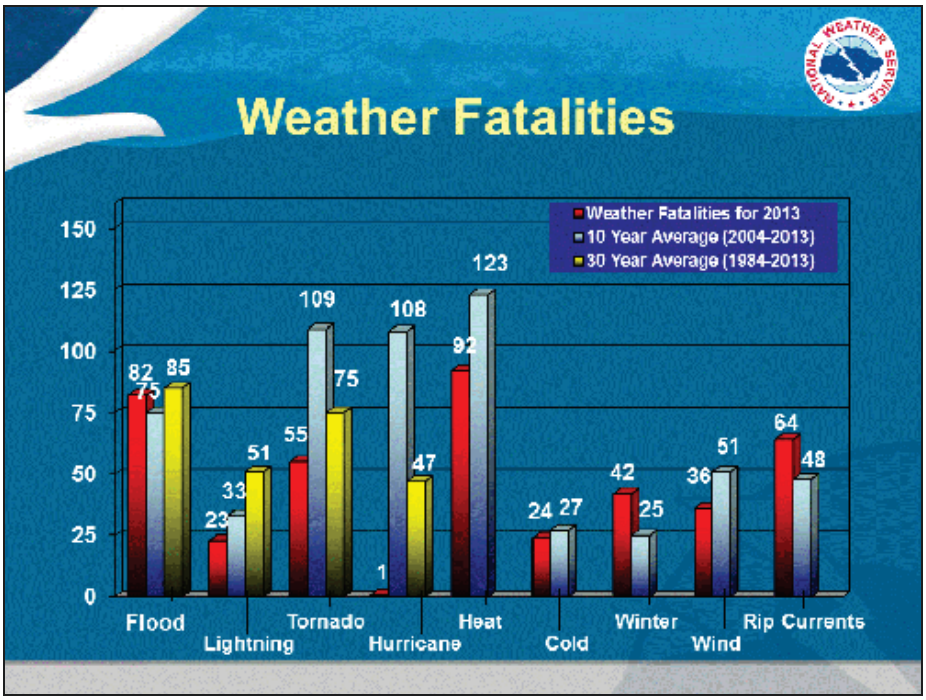
Extreme heat is defined as temperatures which hover 10 degrees or more above the average high temperature for a region and that last for several weeks (CDC 2009). Humid or muggy conditions occur when a 'dome' of high atmospheric pressure traps hazy, damp air near the ground. An extended period of extreme heat of three or more consecutive days is typically called a heat wave and is often accompanied by high humidity (NWS 2013). In New York State, high temperatures and heat waves are defined in several ways to reflect the diversity of conditions experienced across the State. Extreme hot days in New York State are defined as

individual days with maximum temperatures at or above 90° F or at or above 95° F. Heat waves are defined as three consecutive days with maximum temperatures above 90° F (NYSERDA 2014).

Depending on severity, duration and location; extreme heat events can create or provoke secondary hazards including, but not limited to, dust storms, droughts, wildfires, water shortages and power outages (CDC 2009). This could result in a broad and far-reaching set of impacts throughout a local area or entire region. Impacts could include significant loss of life and illness; economic costs in transportation, agriculture, production, energy and infrastructure; and losses of ecosystems, wildlife habitats and water resources (Adams Date Unknown; Meehl and Tebaldi 2004; CDC 2009; NYS DHSES 2014).

Extreme heat is the number one weather-related cause of death in the U.S. On average; more than 120 people die each year from excessive heat. In 2013, New York State reported 10 heat-related fatalities (NWS 2014). Figure 5.4.4-1 shows the number of weather fatalities based on a 10 year average and 30 year average. Heat has the highest average of weather related fatalities between 2004 and 2013.

Figure 5.4.4-1. Average Number of Weather Related Fatalities in the U.S.



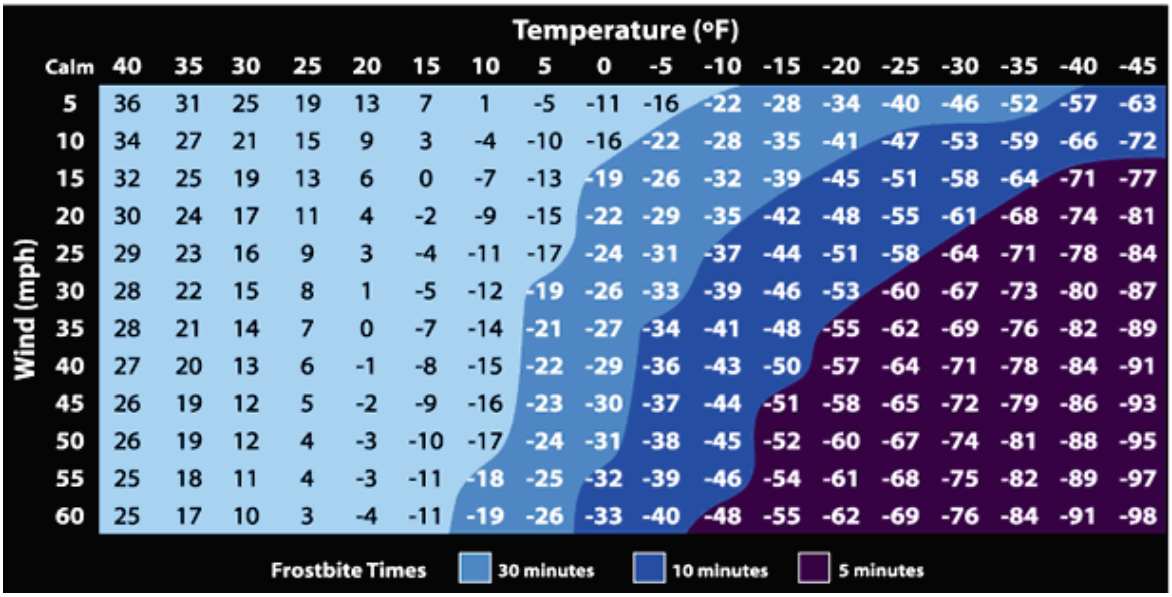
Source: NWS 2014

Extent

Extreme Cold

The extent (severity or magnitude) of extreme cold temperatures are generally measured through the Wind Chill Temperature (WCT) Index. The Index uses advances in science, technology, and computer modeling to provide an accurate, understandable, and useful formula for calculating the dangers from wind chill. For details regarding the WCT, refer to: http://www.nws.noaa.gov/om/winter/windchill.shtml. The WCT is presented in Figure 5.4.4-2.

Figure 5.4.4-2. NWS Wind Chill Index

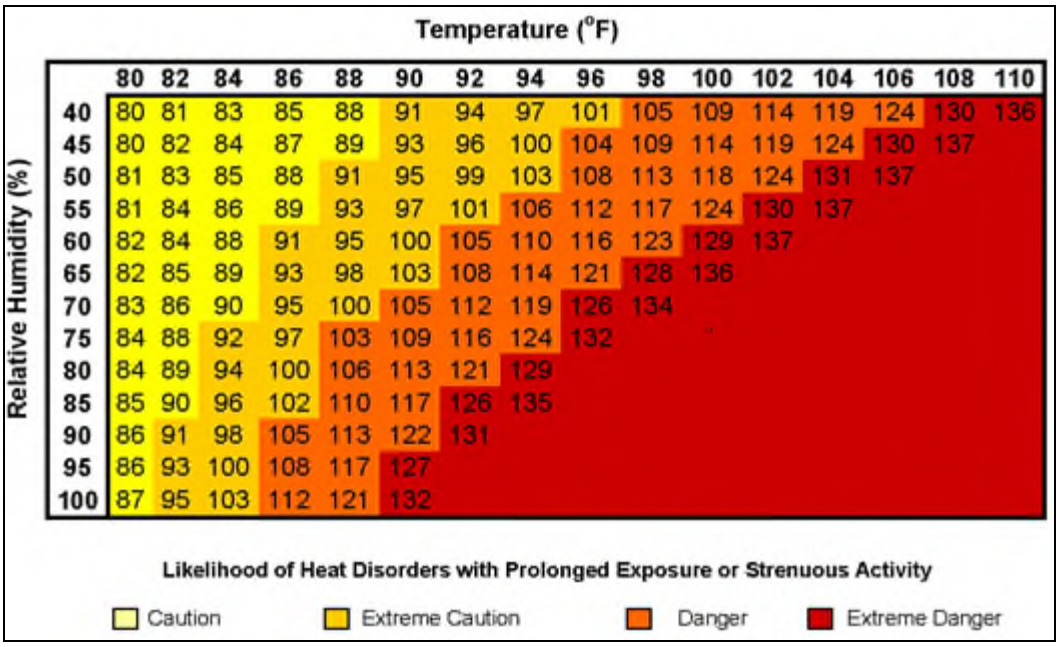


Source: NWS 2009

Extreme Heat

The extent of extreme heat temperatures are generally measured through the Heat Index, identified in Table 5.4.4-1. Created by the NWS, the Heat Index is a chart which accurately measures apparent temperature of the air as it increases with the relative humidity. To determine the Heat Index, the temperature and relative humidity are needed. Once both values have been identified, the Heat Index is the corresponding number of both the values (as seen in Table 5.4.4-1). This provides a measure of how temperatures actually feel; however, the values are devised for shady, light wind conditions. Exposure to full sun can increase the Index by up to 15 degrees (NYS DHSES 2014).

Table 5.4.4-1. Heat Index Chart



Source: NWS 2013

Table 5.4.4-2 describes the adverse effects that prolonged exposure to heat and humidity can have on an individual.

Table 5.4.4-2. Adverse Effects of Prolonged Exposures to Heat on Individuals

Category	Heat Index	Health Hazards
Extreme Danger	130 °F – Higher	Heat Stroke / Sunstroke is likely with continued exposure.
Danger	105 °F – 129 °F	Sunstroke, muscle cramps, and/or heat exhaustion possible with prolonged exposure and/or physical activity.
Extreme Caution	90 °F – 105 °F	Sunstroke, muscle cramps, and/or heat exhaustions possible with prolonged exposure and/or physical activity.
Caution	80 °F – 90 °F	Fatigue possible with prolonged exposure and/or physical activity.

Source: NYS DHSES 2014

The National Weather Service (NWS) provides alerts when Heat Indices approach hazardous levels. Table 5.4.4-3 explains these alerts. In the event of an extreme heat advisory, the NWS does the following:

- Includes Heat Index values and city forecasts
- Issues special weather statements including who is most at risk, safety rules for reducing risk, and the extent of the hazard and Heat Index values
- Provides assistance to state/local health officials in preparing Civil Emergency Messages in severe heat waves (NYS DHSES 2014).

Table 5.4.4-3. National Weather Service Alerts

Alert	Criteria
Heat Advisory	Issues 12-24 hours before the onset of the following conditions: heat index of at least 100°F but less than 105°F for at least two hours per day
Excessive Heat Watch	Issued by the NWS when heat indices of 105°F or greater are forecast in the next 24 to

Alert	Criteria
	72 hours
Excessive Heat Warning	Issued within 12 hours of the onset of the following criteria: heat index of at least 105°F for more than three hours per day for two consecutive days, or heat index more than 115°F for any period of time

Source: NYS DHSES 2014

Location

According to the New York State Hazard Mitigation Plan 2014 Update, the location of New York State and the typical air masses, combined with the atmospheric circulation, provides general climatic controls for the region, making the entire State susceptible to extreme temperatures. Changes in land elevations, the landscape, and its close proximity to large bodies of water play a significant role in the temperatures of New York State. Extended periods of either extreme cold or warm temperatures are a result from movement of great high pressure systems into and through the eastern United States (NYS DHSES 2014).

Extreme cold temperatures occur throughout most of the winter season and generally accompany most winter storm events throughout the State. The NYSC Office of Cornell University indicates that cold temperatures prevail over the State whenever arctic air masses, under high barometric pressure, flow southward from central Canada or from Hudson Bay (Cornell University, Date Unknown). Dutchess County's mean annual temperatures for the meteorological winter (December, January and February) is 27.3°F. On average, temperatures fall below 0°F five to 10 times each year during the winter, mainly in January and February. During milder winters, temperatures may not drop into negative territory (Bernhardt et al. 2010).

Extreme heat temperatures of varying degrees are existent throughout the State for most of the summer season, except for areas with high altitudes. Dutchess County's mean annual temperature for the meteorological summer (June, July, and August) is 69.5°F. Temperatures at any one place in the County normally exceed 90°F between five and 15 times each summer. It is uncommon for air temperatures to reach triple digits; however, higher temperatures combined with humidity may lead to deals that feel much hotter. Nearly every summer in Dutchess County has at least one heat wave with high temperatures and high humidity leading to uncomfortable conditions (Bernhardt et al. 2010).

Previous Occurrences and Losses

Many sources provided historical information regarding previous occurrences and losses associated with extreme temperatures throughout New York State and Dutchess County. With so many sources reviewed for the purpose of this HMP, loss and impact information for many events could vary. Therefore, the accuracy of monetary figures discussed is based only on the available information identified during research for this HMP.

The Midwest Regional Climate Center (MRCC) operates the MRCC's Application Tools Environment (cli-MATE) which provides access to climate data and value-added tools. This application can be used to look up information that includes raw climate data, rankings of climate information, thresholds, growing season tool, maps, graphs, etc. For the purpose of this hazard profile, the maximum and minimum temperatures and the maximum average and minimum average for the stations in Dutchess County were queried for information between January 1, 1990 and June 15, 2015. Based on the cli-MATE application, there are eight stations in Dutchess County. Based on the data provided by MRCC, Table 5.4.4-4 presents the extreme cold (minimum) and hot (maximum) temperature records for Dutchess County from 1990 to 2015.

Table 5.4.4-4. MRCC Temperature Extremes – Dutchess County

Name	Begin	End	Max (°F)	Max Date	Min (°F)	Min Date	Avg Max (°F)	Avg Min (°F)
GLENHAM	January 1, 1990	June 17, 2015	103	July 20, 1991	-16	January 27, 1997	62	42
MILLBROOK 3 W	January 1, 1990	June 17, 2015	98	July 22, 2011	-19	February 24, 2015	59	38
MILLBROOK	January 1, 1990	June 17, 2015	99	August 10, 2001	-29	January 21, 1994	60	36
POUGHKEEPSIE 7NNW	January 1, 1990	June 17, 2015	103	July 16, 1995	-20	January 22, 1994	60	40
POUGHKEEPSIE DUTCHESS CO AP	January 1, 1990	June 17, 2015	103	August 9, 2001	-14	February 16, 2015	61	40
RHINEBECK 4 SE	January 1, 1990	June 17, 2015	104	July 23, 2011	-33	January 22, 1994	62	33
STONYKILL NEW YORK	January 1, 1990	June 17, 2015	102	July 6, 2010	-12	January 28, 2005	62	42
STORMVILLE	January 1, 1990	June 17, 2015	101	August 9, 2001	-22	January 27, 1994	61	40

Source: MRCC 2015
Notes: Begin Year is when the data collection began; End Year is when the data collection stopped.

Between 1954 and 2015, New York State has not been included in any major disaster (DR) or emergency (EM) declarations due to extreme temperatures. Agriculture-related disasters are quite common. 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 counties that are contiguous to a designated county. Between 2012 and 2015, Dutchess County was included in only one USDA declaration involving extreme temperatures.

Information regarding specific details of temperature extremes in Dutchess County is scarce; therefore, previous occurrences and losses associated with extreme temperature events are limited. For this 2015 HMP, extreme temperature events were summarized from 1990 to 2015 and are identified in Table 5.4.4-5. Please note that not all events that have occurred in Dutchess County are included due to the extent of documentation and the fact that not all sources may have been identified or researched. Loss and impact information could vary depending on the source. Therefore, the accuracy of monetary figures discussed is based only on the available information identified during research for this HMP.

Table 5.4.4-5. Extreme Temperature Events in Dutchess County, 1990 to 2015

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts
July 15, 1995	Heat and Humidity	N/A	N/A	Hot and humid weather impacted the Northeast United States. In Dutchess County, the City of Poughkeepsie established a new record high when the temperature reached 106°F.
July 4-6, 1999	Heat Wave	N/A	N/A	Heat and high humidity impacted eastern New York State with temperatures of 90°F and greater. In Dutchess County, the temperature reached 99°F at the County Airport in Poughkeepsie.
August 8-9, 2001	Heat Wave	N/A	N/A	A heat wave reached its peak between August 8th and 9th, bringing temperatures of up to 102°F to Dutchess County. The humidity levels made it feel warmer with a heat index of 110 to 115 in the City of Poughkeepsie.
April 26-27, 2002	Extreme Cold	N/A	N/A	Cold temperatures were recorded in the Mid-Hudson Valley during the overnight hours. Temperatures fell to or below 32°F across portions of Dutchess and Ulster Counties.
January 15-16, 2004	Cold Temperatures / Wind	N/A	N/A	A period of gusty winds ranging from 15 to 30 mph brought cold, ambient temperatures ranging from 0°F to -15°F. This resulted in dangerous wind chills across eastern New York State. Wind chill temperatures ranged from -25°F to -30°F in the Mid-Hudson Valley to as low as -50°F across the western Adirondacks. Numerous schools and businesses were closed as a result of these temperatures. In addition, there were scattered reports of frozen and broken water pipes.
January 25-26, 2007	Cold Temperatures	N/A	N/A	Low temperatures ranged from 0°F to -10°F during the night of January 25th into January 26th. Some temperatures reached -15°F across the higher elevations of the Adirondacks. Northwest winds of 10 to 15 mph produced wind chills as low as -25 to -30°F.
July 20-23, 2011	Heat Wave	N/A	N/A	Temperatures across much of eastern New York State and western New England were well in the 90s during this time period. In Dutchess County, the Town of Rhinebeck reached 104°F and the Dutchess County Airport in the Town of Poughkeepsie reached 102°F on July 22nd. Temperatures in the County over the four days ranged from 88°F to 104°F.
June 20, 2012	Heat	N/A	N/A	On this day, temperatures in Dutchess County ranged from 91°F in Hopewell Junction to 102°F in Rhinebeck. Dutchess County was included in a USDA disaster declaration for this event (S3427).
July 14-20, 2013	Heat Wave	N/A	N/A	This week-long heat wave brought warm temperatures to Dutchess County. Temperatures ranged from 87°F to 101°F. The Town of Rhinebeck experienced the warmest temperatures with three days over 100°F.
September 11, 2013	Heat and Humidity	N/A	N/A	Temperatures in the County ranged from 86°F in Wappingers Falls to 96°F in Poughkeepsie.
January 31, 2015	Low Temperatures / Wind Chill	N/A	N/A	The daily low temperatures in the region ranged from 1°F in Pleasant Valley to 11°F in Cornwall-on-Hudson. Wind chill temperatures ranged from -13°F in Pleasant Valley to 0°F in Beacon.
February 3, 2015	Low Temperatures / Wind Chill	N/A	N/A	The daily low temperatures in the region ranged from -8°F in Red Oaks Mill to 4°F in Cornwall-on-Hudson. Wind chill temperatures in the region ranged from -12°F in Pleasant Valley to 18°F in Fairview.
February 20, 2015	Low	N/A	N/A	The daily low temperatures in the region ranged from -4°F in Fairview to 0°F in Cornwall-on-

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts
	Temperatures / Wind Chill			Hudson. Wind chills ranged from -23°F in Fairview to 2°F in Red Hook.

Source(s): *Dutchess County HMP 2014; East Dutchess HMP 2010; NYS HMP 2014; FEMA 2015; NWS 2015; NOAA-NCDC 2015; USDA 2015*
FEMA *Federal Emergency Management Agency*
NOAA-NCDC *National Oceanic Atmospheric Administration – National Climate Data Center*
NWS *National Weather Service*
NYS *New York State*
N/A *Not Applicable*
USDA *U.S. Department of Agriculture*

Probability of Future Events

According to the New York State HMP 2014 Update, there is an overall 6% average future probability that an extreme heat occurrence will impact the State at any given year. Extreme cold events have a 7% average future probability of occurrence (NYS DHSES 2014).

Several extreme temperature events occur each year throughout Dutchess County. It is estimated that the County will continue to experience extreme temperatures annually that may induce secondary hazards such potential snow, hail, ice or wind storms, thunderstorms, drought, human health impacts, utility failure and transportation accidents as well as many other anticipated impacts. Table 5.4.4-6 summarizes the occurrences of extreme temperature events and their annual occurrence (on average).

Table 5.4.4-6. Probability of Occurrences of Extreme Temperature Events

Event Type	Number of Occurrences between 1950 and 2015	Annual Number of Events Annually (average)
Extreme Heat	34	0.5
Extreme Cold	26	0.4
Total:	60	0.9

Source: NOAA-NCDC 2015
Note: Probability was calculated using the available data provided in the NOAA-NCDC storm events database.

Based on historical records and input from the Planning Committee, the probability of occurrence for extreme temperatures in Dutchess County is considered "frequent" (hazard event that is likely to occur within 25 years) (see Section 5.3, Tables 5.3-4 and 5.3-6).

Climate Change Impacts

Climate change is beginning to affect both people and resources in New York State, and these impacts are projected to continue growing. Impacts related to increasing temperatures and sea level rise are already being felt in the State. ClimAID: the Integrated Assessment for Effective Climate Change in New York State (ClimAID) was undertaken to provide decision-makers with information on the State's vulnerability to climate change and to facilitate the development of adaptation strategies informed by both local experience and scientific knowledge (New York State Energy Research and Development Authority [NYSERDA] 2011).

Each region in New York State, as defined by ClimAID, has attributes that will be affected by climate change. Dutchess County is part of Region 5, East Hudson and Mohawk River Valleys. Some of the issues in this region, affected by climate change, include: more frequent heat waves and above 90°F days, more heat-related deaths, increased frequency of heavy precipitation and flooding, decline in air quality, etc. (NYSERDA 2011).

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).

Regional precipitation across New York State is projected to increase by approximately one to eight-percent by the 2020s, three to 12-percent by the 2050s, and four to 15-percent by the 2080s. By the end of the century, the greatest increases in precipitation are projected to be in the northern areas of the State (NYSERDA 2014).

In Region 5, it is estimated that temperatures will increase by 3.5ºF to 7.1ºF by the 2050s and 4.1ºF to 11.4ºF by the 2080s (baseline of 47.6ºF). Precipitation totals will increase between 2 and 15% by the 2050s and 3 to 17% by the 2080s (baseline of 38.6 inches). Table 5.4.4-7 displays the projected seasonal precipitation change for the East Hudson and Mohawk River Valleys ClimAID Region (NYSERDA 2011).

Table 5.4.4-7. Projected Seasonal Precipitation Change in Region 5, 2050s (% change)

Winter	Spring	Summer	Fall
+5 to +15	-5 to +10	-5 to +5	-5 to +10

Source: NYSERDA 2011

5.4.4.2 Vulnerability Assessment

To understand risk, a community must evaluate what assets are exposed or vulnerable in the identified hazard area. For the extreme temperature events, the entire County has been identified as exposed. Therefore, all assets in the County (population, structures, critical facilities and lifelines), as described in the County Profile (Section 4), are exposed and potentially vulnerable. The following text evaluates and estimates the potential impact of extreme temperatures on Dutchess County including:

- Overview of vulnerability
- Data and methodology used for the evaluation
- Impact on: (1) life, health and safety of residents, (2) general building stock, (3) critical facilities (4) economy and (5) future growth and development
- Change of vulnerability as compared to that presented in the 2006 Dutchess County Hazard Mitigation Plan and 2010 Eastern Dutchess All-Hazard Mitigation Plan
- Effect of climate change on vulnerability
- Additional Data and Next Steps

Overview of Vulnerability

Extreme temperatures generally occur for a short period of time but can cause a range of impacts, particularly to vulnerable populations that may not have access to adequate cooling or heating. This natural hazard can also cause impacts to agriculture (crops and animals), infrastructure (e.g., through pipe bursts associated with freezing, power failure) and the economy.

Data and Methodology

At the time of this Plan, insufficient data is available to model the long-term potential impacts of extreme temperature on Dutchess County. Over time, additional data will be collected to allow better analysis for this hazard. Available information and a preliminary assessment are provided below.

Impact on Life, Health and Safety

For the purposes of this HMP, the entire population of Dutchess County is exposed to extreme temperature events. Refer to Section 4 for a summary of population statistics for the County.

Extreme temperature events have potential health impacts including injury and death. According to the Centers for Disease Control and Prevention, populations most at risk to extreme cold and heat events include the following: 1) the elderly, who are less able to withstand temperatures extremes due to their age, health conditions and limited mobility to access shelters; 2) infants and children up to four years of age; 3) individuals who are physically ill (e.g., heart disease or high blood pressure), 4) low-income persons that cannot afford proper heating and cooling; and 5) the general public who may overexert during work or exercise during extreme heat events or experience hypothermia during extreme cold events (CDC 2006).

According to NOAA's 2001 Winter Storms The Deceptive Killers, approximately 50% of the deaths related to extreme cold temperatures happen to people over 60 years old, more than 75% of those deaths are male and about 20% occur in the home (NOAA 2001); NYS DHSES 2014).

Exposure to excessive heat can post a number of health risks to individuals. Table 5.4.4-8 identifies different health hazards related to extreme heat conditions.

Table 5.4.4-8. Health Effects of Extreme Heat

Health Hazard	Symptoms
Sunburn	Redness and pain. In severe cases: swelling of skin, blisters, fevers, and headaches
Dehydration	Excessive thirst, dry lips and slightly dry mucous membranes
Heat Cramps	Painful spasms, usually in muscles of legs and abdomen, and possible heavy sweating
Heat Exhaustion	Heavy sweating; weakness; cold, pale and clammy skin; weak pulse; possible fainting and vomiting
Heat Stroke	High body temperature (104ºF or higher), hot and dry skin, rapid and strong pulse, and possible coma

Source: NYS DHSES 2014

Meteorologists can accurately forecast extreme heat event development 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 can significantly reduce the risk of temperature-related deaths.

Impact on General Building Stock

All of the building stock in the County is exposed to the extreme temperature hazard. Refer to Section 4 which summarizes the building inventory in Dutchess County. Extreme heat generally does not impact buildings. Losses may 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. Additionally, manufactured homes (mobile homes) and antiquated or poorly constructed facilities may have inadequate capabilities to withstand extreme temperatures.

Impact on Critical Facilities

All critical facilities in the County are exposed to the extreme temperature hazard. Impacts to critical facilities are the same as described for general building stock. Additionally, it is essential that critical facilities remain operational during natural hazard events. Extreme heat events can sometimes cause short periods of utility failures, commonly referred to as "brown-outs", due to increased usage from air conditioners, appliances, etc. Similarly, heavy snowfall and ice storms, associated with extreme cold temperature events, can cause power interruption as well. Backup power is recommended for critical facilities and infrastructure.

Impact on Economy

Extreme temperature events also have impacts on the economy, including loss of business function and damage/loss of inventory. Business-owners may be faced with increased financial burdens due to unexpected repairs caused to the building (e.g., pipes bursting), higher than normal utility bills or business interruption due to power failure (i.e., loss of electricity, telecommunications).

The agricultural industry is most at risk in terms of economic impact and damage due to extreme temperature events. Extreme heat events can result in drought and dry conditions and directly impact livestock and crop production.

Future Growth and Development

As discussed in Sections 4 and 9, areas targeted for future growth and development have been identified across Dutchess County. Any areas of growth could be potentially impacted by the extreme temperature hazard because the entire County is exposed and potentially vulnerable. Please refer to the specific areas of development indicated in tabular form and/or on the hazard maps included in the jurisdictional annexes in Volume II, Section 9 of this plan.

Effect of Climate Change on Vulnerability

Climate is defined not simply as average temperature and precipitation but also by the type, frequency and intensity of weather events. Both globally and at the local scale, climate change has the potential to alter the prevalence and severity of extremes such as extreme temperature events. While predicting changes of extreme temperature events under a changing climate is difficult, understanding vulnerabilities to potential changes is a critical part of estimating future climate change impacts on human health, society and the environment (U.S. Environmental Protection Agency [EPA], 2006).

Additional Data and Next Steps

For future plan updates, the County can track data on extreme temperature events, obtain additional information on past and future events, particularly in terms of any injuries, deaths, shelter needs, pipe freeze, agricultural losses and other impacts. This will help to identify any concerns or trends for which mitigation measures should be developed or refined. In time, quantitative modeling of estimated extreme heat and cold events may be feasible as data is gathered and improved.