

## Section 3.8: EXTREME TEMPERATURES

### 2014 SHMP Update

- Reformatted document into new outline
- Updated Maps and Figures and moved to appendix

### 3.8.1 Extreme Temperatures Profile

Hazard	Definitions and Key Terms
<p style="text-align: center;"><b>Extreme Temperatures (Heat and Cold)</b></p>	<ul style="list-style-type: none"> <li>• <u>Extreme Heat</u>- Temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks are defined as extreme heat.</li> <li>• <u>Extreme Cold</u>- Although no specific definition exists for Extreme Cold, the following are characteristics of an Extreme Cold event in New York State: temperatures at or below zero degrees for an extended period of time. Note that Extreme Cold events are usually part of Winter Storm events but can occur during anytime of the year and have devastating effects on New York State agricultural production.</li> </ul>

### Characteristics

#### Extreme Heat

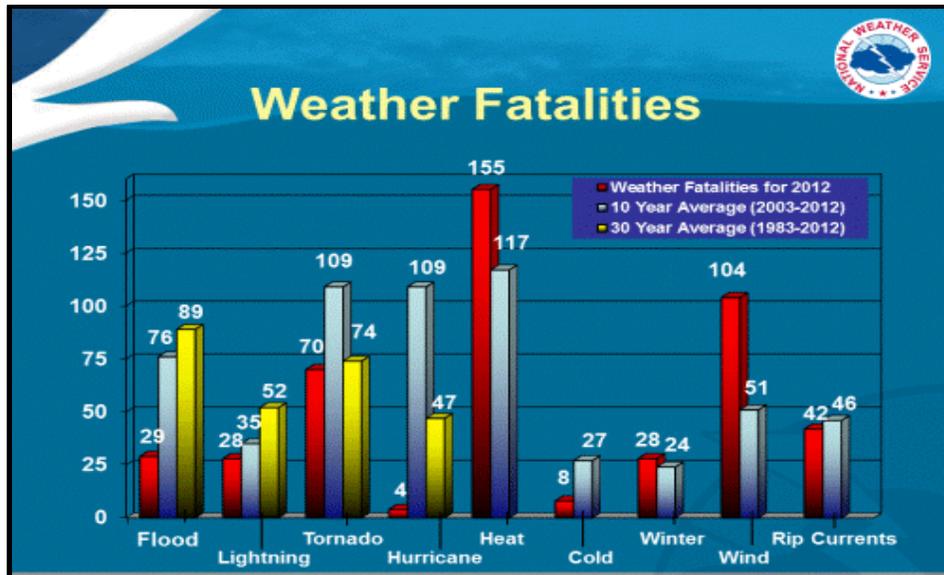
Extreme heat is defined as temperatures which hover 10 degrees or more above the average high temperature for a region and last for several weeks. Humid or muggy conditions, which add to the discomfort of high temperatures, occur when a "dome" of high atmospheric pressure traps hazy, damp air near the ground. Excessively dry and hot conditions can provoke dust storms and low visibility. Droughts occur when a long period passes without substantial rainfall. A heat wave combined with a drought is a very dangerous situation.

Although the event may not be as notable as other hazards which affect New York State (NYS), its effects can have devastating consequences. While it is hard to quantify the exact total number of deaths which are advanced by heat wave weather, in a normal year, documented records indicate about 162 people nationwide succumb to the conditions of summer heat. Its annual fatality potential is matched by no other natural hazards which are profiled by NYS (See **Figure 3.8a**). In the disastrous heat wave of 1980, nationally more than 1,250 people died as a result of extreme heat. In terms of New York State, from



1960 – 2012 there have been 140 fatalities as a result of extreme heat; 31 of the 140 fatalities took place in a period of 2 years, ranging from 2010 - 2012.

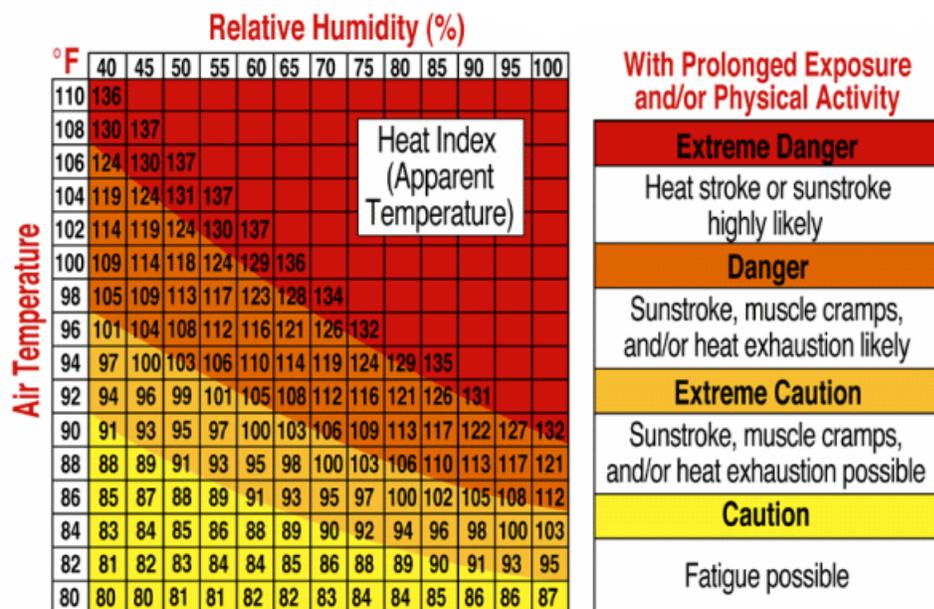
**Figure 3.8a: National Weather Fatalities**



Source: National Weather Service

Displayed below in **Figure 3.8b**, created by the National Weather Service, is the Heat Index (HI) chart that accurately measures apparent air temperature as it increases with relative humidity. The Heat Index can be used to determine what effects temperature and humidity can have on the population. The table also describes the adverse effects that prolonged exposures can have on individuals. To determine the Heat Index, the temperature and the relative humidity are needed. Once both values are identified, the Heat Index will be the corresponding number of both the values. This data collection provides a measure of how temperatures actually feel. It is important to know that Heat Index (HI) values are devised for shady, light wind conditions. Exposure to full sunshine can increase HI values by up to 15 degrees. Also, strong winds, particularly with very hot, dry-air can be extremely hazardous to individuals.

**Figure 3.8b: Heat Index**



Source: National Weather Service Weather Forecast Office

The National Weather Service (NWS) provides alerts when Heat Indices approach hazardous levels. **Table 3.8a** provides the alert procedures for NWS. In the event of an extreme heat advisory, NWS does the following:

- Includes HI 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 HI values
- Provides assistance to state/local health officials in preparing Civil Emergency Messages in severe heat waves



**Table 3.8a: National Weather Service Alerts**

Alert	Criteria
<b>Heat Advisory</b>	Issued 12-24 hours before the onset of the following conditions: heat index of at least 100F but less than 105F for at least 2 hours per day.
<b>Excessive Heat Watch</b>	Issued by the National Weather Service when heat indices of 105°F (41°C) or greater are forecast in the next 24 to 72 hours.
<b>Excessive Heat Warning</b>	Issued within 12 hours of the onset of the following criteria: heat index of at least 105°F for more than 3 hours per day for 2 consecutive days, or heat index more than 115°F for any period of time

Source: NOAA, National Weather Service

Exposure to excessive heat can pose a number of health risks to individuals. **Table 3.8b** below defines different health hazards and some of the symptoms associated with extreme heat conditions.

**Table 3.8b: NWS Effects Extreme Heat Hazards**

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

Source: NYC Heat Emergency Plan



**Extreme Cold**

Extreme Cold conditions typically accompany winter storm events and it is recommended to review the winter storm hazard profile of this plan for additional information. The National Oceanic and Atmospheric Administration (NOAA) acknowledge that extensive exposure to extreme cold temperatures can cause frostbite or hypothermia and can become life-threatening. Infants and elderly people are most susceptible to the effects of the extreme changes in temperatures.

What constitutes extreme cold varies in different parts of the country. In the South, near freezing temperatures are considered extreme cold. Freezing temperatures can cause severe damage to citrus fruit crops and other vegetation. Pipes may freeze and burst in homes that are poorly insulated or without heat. In the North, extreme cold is defined as temperatures well below zero.

**Table 3.8c** defines National Weather Service terms for Extreme Cold hazards.

**Table 3.8c: NWS Extreme Cold Hazards**

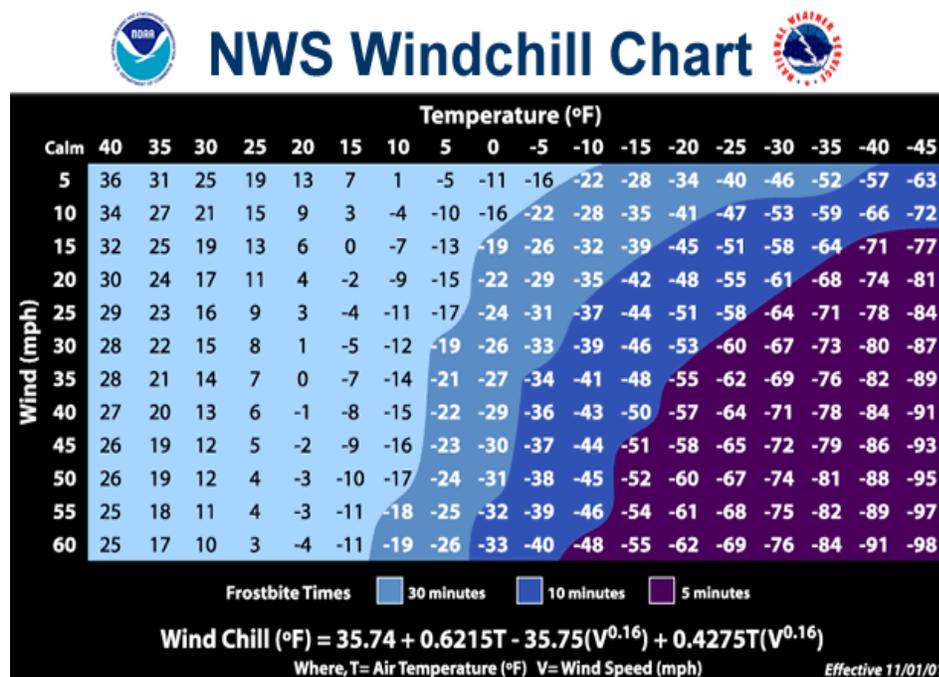
Health Hazard	Symptoms
<b>Wind Chill</b>	Wind chill is not the actual temperature but rather how wind and cold feel on exposed skin. As the wind increases, heat is carried away from the body at an accelerated rate, driving down the body temperature. Animals are also affected by wind chill; however, cars, plants and other objects are not.
<b>Frostbite</b>	Frostbite is damage to body tissue caused by extreme cold. A wind chill of -20 degrees Fahrenheit (F) will cause frostbite in just 30 minutes. Frostbite causes a loss of feeling and a white or pale appearance in extremities, such as fingers, toes, ear lobes or the tip of the nose. If symptoms are detected, get medical help immediately! If you must wait for help, slowly re-warm affected areas. However, if the person is also showing signs of hypothermia, warm the body core before the extremities.
<b>Hypothermia</b>	Hypothermia is a condition brought on when the body temperature drops to less than 95 degrees Fahrenheit (F). It can kill. For those who survive, there are likely to be lasting kidney, liver and pancreas problems. Warning signs include uncontrollable shivering, memory loss, disorientation, incoherence, slurred speech, drowsiness and apparent exhaustion. Take the person's temperature. If below 95 degrees F, seek medical care immediately!

Source: NOAA

**Figure 3.8.c**, depicts NOAA's Windchill Chart. NOAA's 2001 *Winter Storms The Deceptive Killers* preparedness guide documents that 50% of the deaths related to extreme cold temperatures happen to people over 60 years old, more than 75% happen to males, and about 20% occur in the home.



Figure 3.8.c: NWS Windchill Chart



Source: National Weather Service

**Location**

The State of New York’s geographical positioning and typical air masses combined with the atmospheric circulation provides general climatic controls for the region making the entire State susceptible to extreme temperatures. Varying land elevations, character of the landscape, and close proximity to large bodies of water play a significant role in the State’s temperatures. Dry air frequently arrives in the State from the northern interior of the continent bringing in masses of cold. From the south and southwestern regions of the continent winds transport warm, humid air that travel from the Gulf of Mexico and bordering subtropical waters. The third great air mass flows from the North Atlantic Ocean inland creating cool, cloudy, and damp weather conditions.

Extensive 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. Under higher than normal atmospheric pressures when Arctic air masses are present, extreme winter temperatures hover over New York, flowing southward from central Canada or the Hudson Bay. High-pressure systems often move just off the Atlantic coast, become more or less stagnant for several days, and then a persistent airflow from the southwest or south affects the State. This circulation brings the very warm, often humid weather of the summer season and the mild, more pleasant temperatures during the fall, winter, and spring seasons.



### Previous Extreme Temperatures Occurrences

Below in **Table 3.8d** is a synopsis of previous extreme heat occurrences for the State of New York dating from June 1994 to August 2006. According to National Climatic Data Center (NCDC) Storm Events Database, there were a recorded number of fifteen injuries and seventy-nine deaths as a result of extreme heat.



**Table 3.8d: Past Occurrences of Extreme Heat in New York State**

<b>Date</b>	<b>County/Area Affected</b>	<b>Injuries</b>	<b>Fatalities</b>	<b>Description</b>
<b>June 15-18, 1994</b>	Ulster	50	0	Record Heat occurred across much of eastern New York during the middle of June. In Dolgeville, 50 students were treated for heat exhaustion when all fans and air conditioners in the Dolgeville Elementary School failed.
<b>July 13, 1995</b>	Kings	Unknown	7	A heat wave during the month of July was responsible for several deaths. Hundreds were treated for various problems related to heat and high humidity. Temperatures rose to a record high of 102 in Central Park and hovered at 90 degrees or higher during July.
<b>July 4-July 6, 1999</b>	NYC, Westchester, Putnam, Suffolk, Orange, Nassau	0	33	An extremely hot and humid air mass covered the region from July 4th through July 6th. On Sunday July 4th, temperatures soared into the mid and upper 90s. The combination of high temperatures and moderate humidity caused most heat indices to range from 100 to 105 degrees. On Monday July 5th, many new maximum temperature records were set throughout NYC metropolitan region. With temperatures and Heat indices in the 100's, widespread blackouts were observed throughout the region. The Heat Wave was directly responsible for killing 33 people in the New York Metro Area: 14 in Brooklyn, 13 from Manhattan, 3 from Queens, 2 from Westchester County, and 1 from the Bronx.
<b>August 1-10, 2001</b>	Broome, Cayuga, Chemung, Chenango, Cortland, Delaware, Madison, Oneida, Onondaga, Otsego, Schuyler, Seneca, Steuben, Sullivan, Tioga, Tompkins, Yates	0	0	August was a very warm month across central New York. The first 9 days of the month featured a significant heat wave with several days of locations reporting temperatures in the upper 90's to lower 100's. Numerous high temperature records were set during this time. The heat wave peaked on the 9th when many locations saw temperatures above 100 degrees and some locations equaled or exceeded all-time temperature records for the month of August.



Date	County/Area Affected	Injuries	Fatalities	Description
<b>August 8-10, 2001</b>	Nassau, NYC, Putnam, Rockland, Suffolk, Westchester	0	4	A Bermuda high pressure system "pumped" hot temperatures and high humidity across the region. The 6 day heat wave began on Sunday, August 5th, when temperatures first reached 90 degrees at Central Park. Record high temperatures at Central Park were broken on two consecutive days, August 8th and 9th. High temperatures at Central Park reached 103 degrees on the 9th and 99 degrees on the 7th and 8th. Heat indices peaked across the entire region on Thursday, August 9th to between 105 and 110 degrees. Heat indices were also quite high on Friday, August 10th, reaching 105 to 110 degrees, as humidity levels increased, despite slightly lower temperatures. As temperatures rose, the demand for electricity increased. Power outages occurred within the region between Aug 7 <sup>th</sup> and Aug 10 <sup>th</sup> . Long Island Power Authority reported about 21,000 outages throughout Long Island. Excessive Heat conditions caused portions of the Sunrise Highway to "buckle", which caused road closures. A total of 4 deaths were attributed to the heat. Three individuals from Manhattan and one from Brooklyn, ranging in ages from 57 – 82.
<b>August 8-9, 2001</b>	Albany, Columbia, Dutchess, Fulton, Greene, Herkimer, Montgomery, Rensselaer, Saratoga, Schenectady, Ulster	15	0	A strong Bermuda high developed early in August and brought the most extensive heat wave of the summer to eastern New York and adjacent New England. Record temperatures were recorded in parts of Upstate New York. High humidity levels in addition to the heat produced heat indices between 105 – 110 near Albany and, 110 -115 in the Poughkeepsie region. St. Clare's Hospital in Schenectady reported 9 cases of heat-related symptoms. The victims were all children campers at the Pattersonville Camp also in Schenectady County. Four more campers were treated at the campsite. While there no other heat related problems reported to the National Weather Service, the heat led to record state electricity consumption, three days in a row. Governor Pataki closed down the State government at 2:00 PM on August 9 to conserve power. Hot weather also caused the railroad bridge to malfunction between the cities of Albany and Rensselaer, resulting in delays for four of Amtrak's passenger trains on August 9



Date	County/Area Affected	Injuries	Fatalities	Description
<b>July 2-4, 2002</b>	Nassau, New York City, Orange, Putnam, Rockland, Suffolk, Westchester	0	0	Temperatures rose into the mid and upper 90's across the region, averaging 10 - 15 degrees above normal. A record high was reached at LaGuardia Airport, at 98°. High humidity coupled with high temperatures produced heat indices of 100 - 105 degrees throughout the region. Hospital emergency rooms report minor cases of heat exhaustion and other heat-related ailments. Small power failures throughout the 4 <sup>th</sup> of July left as many as 20,000 homes without electricity. There were brownouts throughout the NYC Metropolitan Area.
<b>August 1-3, 2006</b>	Nassau, NYC, Orange, Putnam, Rockland, Suffolk, Westchester	0	42	Three consecutive days of excessive heat occurred mainly from noon to midnight. With temperatures hovering in the 90s to 100 degrees and surface dew points in the mid-70s, heat indices ranged from 105 - 115 degrees. The excessive heat conditions resulted in 42 deaths and scattered power outages throughout the NYC Metropolitan Area. Forty of the forty-two deaths occurred within NYC: 14 in Queens, 14 in Brooklyn, 9 in Manhattan, and 3 in the Bronx. The NYC Office of Emergency Management opened 383 cooling centers that served 25,000 people per day. They also opened 6000 pools and extended their routine hours of operation. Record temperatures were set throughout the region.

Source: National Climatic Data Center: NCDC Storm Events Database



Displayed below in **Table 3.8e**, **Figure 3.8d**, and **Figure 3.8e** are historical and recent loss data for extreme temperatures for the time frame of 1960 – 2012. Statistics derive primarily from SHELDUS, the Spatial Hazard Events and Loss Database for the United States. From 1960-2012 Franklin, Clinton and St. Lawrence Counties were ranked the highest for extreme temperatures events. However since 2010, New York, Queens, and Kings Counties have all experienced a significant spike in the number of events. Although extreme temperatures do not have a direct impact on the State’s property damage the agriculture sector has experienced a \$2,150,000 loss in this 52 year period.

**Table 3.8e: Extreme Temperature Events and Losses by County from 1960-2012**

County	Historical Record (1960-2012)							Recent Record (2010-2012)				
	Future Probability %	Recurrence Interval	Number of Events	Fatalities	Injuries	Property Damage	Crop Damage	Number of Events	Fatalities	Injuries	Property Damage	Crop Damage
Albany	0	0	8	1	1	\$2,890	\$0	0	0	0	\$0	\$0
Allegany	0	0	1	0	0	\$806	\$0	0	0	0	\$0	\$0
Bronx	6	17	13	12	0	\$36,521	\$0	7	5	0	\$0	\$0
Broome	0	0	7	0	1	\$2,890	\$0	0	0	0	\$0	\$0
Cattaraugus	0	0	17	0	0	\$1,289	\$0	0	0	0	\$0	\$0
Cayuga	0	0	3	0	0	\$2,890	\$0	0	0	0	\$0	\$0
Chautauqua	8	13	1	0	0	\$806	\$0	0	0	0	\$0	\$0
Chemung	0	0	3	0	0	\$806	\$0	0	0	0	\$0	\$0
Chenango	0	0	6	0	1	\$2,890	\$0	0	0	0	\$0	\$0
Clinton	0	0	22	0	1	\$806	\$500,000	2	0	0	\$0	\$500,000
Columbia	0	0	3	0	1	\$806	\$0	0	0	0	\$0	\$0
Cortland	0	0	6	0	1	\$2,890	\$0	0	0	0	\$0	\$0
Delaware	0	0	6	0	1	\$2,890	\$0	0	0	0	\$0	\$0
Dutchess	0	0	6	1	5	\$37,021	\$0	0	0	0	\$0	\$0
Erie	13	7	1	0	0	\$806	\$0	0	0	0	\$0	\$0
Essex	0	0	21	0	1	\$806	\$500,000	2	0	0	\$0	\$500,000
Franklin	0	0	24	0	1	\$806	\$450,000	4	0	0	\$0	\$450,000
Fulton	0	0	8	0	1	\$2,890	\$0	0	0	0	\$0	\$0
Genesee	0	0	2	0	0	\$806	\$0	0	0	0	\$0	\$0
Greene	0	0	4	0	0	\$806	\$0	1	0	0	\$0	\$0
Hamilton	0	0	7	0	1	\$2,890	\$0	0	0	0	\$0	\$0
Herkimer	0	0	15	0	1	\$2,890	\$0	1	0	0	\$0	\$0
Jefferson	0	0	2	0	0	\$2,890	\$0	0	0	0	\$0	\$0
Kings	8	13	15	31	0	\$36,521	\$0	9	6	0	\$0	\$0
Lewis	0	0	2	0	0	\$2,890	\$0	0	0	0	\$0	\$0
Livingston	0	0	1	0	0	\$806	\$0	0	0	0	\$0	\$0
Madison	0	0	4	0	1	\$2,890	\$0	0	0	0	\$0	\$0
Monroe	0	0	1	0	0	\$806	\$0	0	0	0	\$0	\$0
Montgomery	0	0	9	1	1	\$2,890	\$0	0	0	0	\$0	\$0

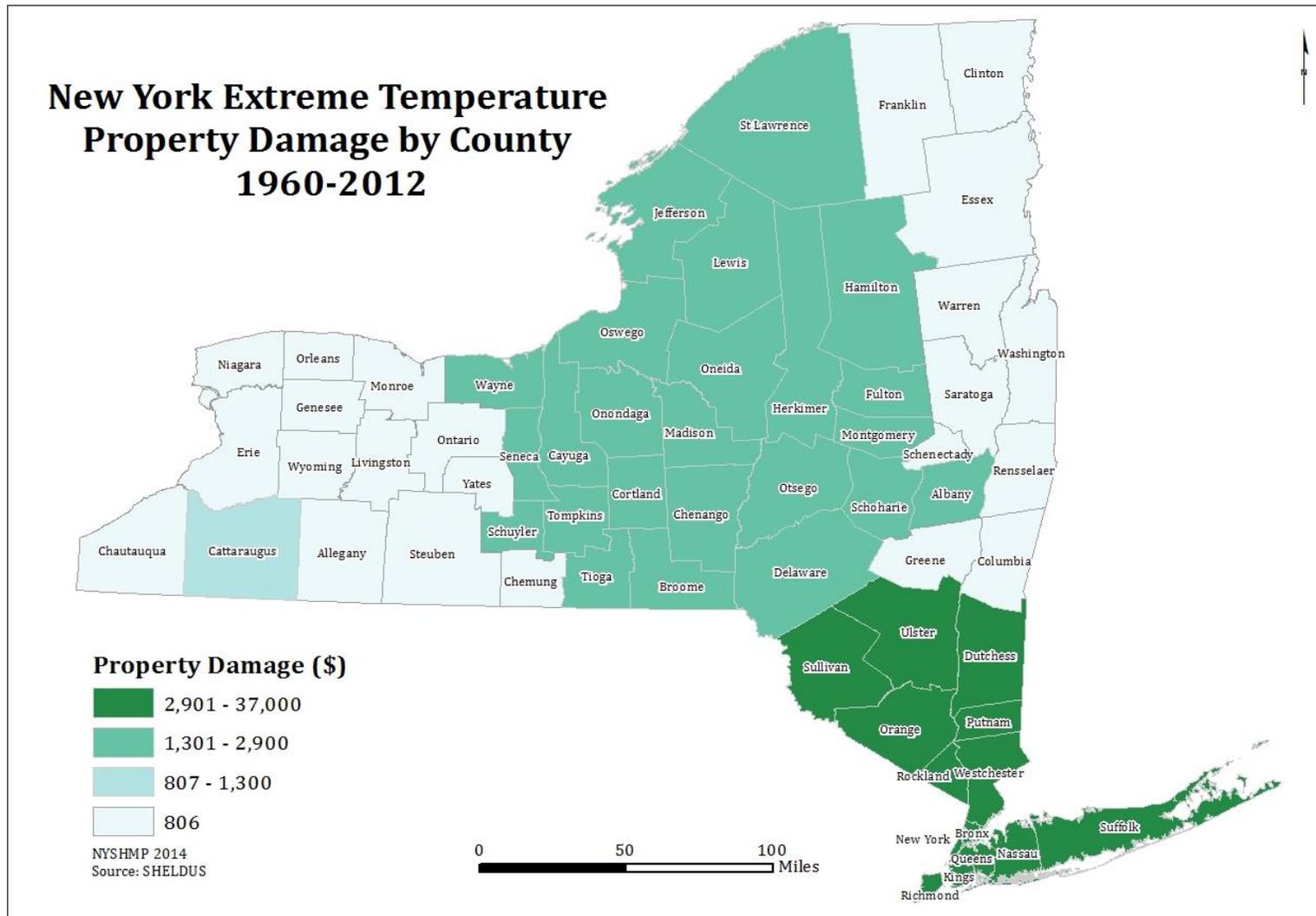


County	Historical Record (1960-2012)							Recent Record (2010-2012)				
	Future Probability %	Recurrence Interval	Number of Events	Fatalities	Injuries	Property Damage	Crop Damage	Number of Events	Fatalities	Injuries	Property Damage	Crop Damage
Nassau	25	4	6	5	0	\$36,521	\$0	2	1	0	\$0	\$0
New York	10	10	20	25	0	\$36,521	\$0	16	8	0	\$0	\$0
Niagara	2	52	1	0	0	\$806	\$0	0	0	0	\$0	\$0
Oneida	0	0	4	0	1	\$2,890	\$0	0	0	0	\$0	\$0
Onondaga	0	0	7	3	0	\$2,890	\$0	0	0	0	\$0	\$0
Ontario	0	0	1	0	0	\$806	\$0	0	0	0	\$0	\$0
Orange	2	52	6	5	1	\$36,521	\$0	1	1	0	\$0	\$0
Orleans	0	0	2	1	0	\$806	\$0	0	0	0	\$0	\$0
Oswego	0	0	4	3	0	\$2,890	\$0	1	0	0	\$0	\$0
Otsego	0	0	7	1	1	\$2,890	\$0	0	0	0	\$0	\$0
Putnam	2	52	6	4	1	\$36,521	\$0	0	0	0	\$0	\$0
Queens	25	4	18	19	0	\$36,521	\$0	11	6	0	\$0	\$0
Rensselaer	0	0	7	0	1	\$806	\$0	0	0	0	\$0	\$0
Richmond	4	26	7	6	0	\$36,521	\$0	3	2	0	\$0	\$0
Rockland	2	52	5	5	0	\$36,521	\$0	0	0	0	\$0	\$0
Saratoga	0	0	10	2	1	\$806	\$0	0	0	0	\$0	\$0
Schenectady	0	0	7	0	1	\$806	\$0	0	0	0	\$0	\$0
Schoharie	0	0	8	0	1	\$2,890	\$0	0	0	0	\$0	\$0
Schuyler	0	0	4	0	0	\$2,890	\$0	0	0	0	\$0	\$0
Seneca	0	0	3	0	0	\$2,890	\$0	0	0	0	\$0	\$0
St Lawrence	0	0	22	0	1	\$2,890	\$700,000	3	0	0	\$0	\$700,000
Steuben	0	0	3	0	0	\$806	\$0	0	0	0	\$0	\$0
Suffolk	27	4	5	7	0	\$36,521	\$0	0	0	0	\$0	\$0
Sullivan	0	0	6	0	1	\$36,521	\$0	0	0	0	\$0	\$0
Tioga	0	0	6	0	1	\$2,890	\$0	0	0	0	\$0	\$0
Tompkins	0	0	4	0	0	\$2,890	\$0	0	0	0	\$0	\$0
Ulster	0	0	5	0	1	\$36,521	\$0	0	0	0	\$0	\$0
Warren	0	0	10	0	1	\$806	\$0	0	0	0	\$0	\$0
Washington	0	0	7	0	1	\$806	\$0	0	0	0	\$0	\$0
Wayne	0	0	2	0	0	\$2,890	\$0	0	0	0	\$0	\$0
Westchester	4	26	7	8	0	\$36,521	\$0	1	2	0	\$0	\$0
Wyoming	0	0	1	0	0	\$806	\$0	0	0	0	\$0	\$0
Yates	0	0	1	0	0	\$806	\$0	0	0	0	\$0	\$0
<b>Total</b>			<b>430</b>	<b>140</b>	<b>30</b>	<b>\$600,983</b>	<b>\$2,150,000</b>	<b>64</b>	<b>31</b>	<b>0</b>	<b>\$0</b>	<b>\$2,150,000</b>





**Figure 3.8e: New York Extreme Temperature Property Damage**



The data found in **Table 3.8f** illustrates the total number of excessive heat, extreme cold/wind chill events, deaths, injuries, and losses recorded by the National Climatic Data Center database. The information generated was from January 1996 to July 2013. According to data drawn from the NCDC/ NOAA there have been a total of 55 deaths and \$63,000 in property damage since 1996.

**Table 3.8f: National Climatic Data Center Recorded Extreme Temperature Events From 1996-2013**

Excessive Heat, Extreme Cold/ Wind Chill Events and Losses From 1996-2013						
County	Date	Type	Death	Injuries	Property Loss	Crop Loss
Richmond	7/19/2013	Excessive Heat	1	0	\$ -	\$ -
Bronx	7/19/2013	Excessive Heat	1	0	\$ -	\$ -
New York (Manhattan)	7/19/2013	Excessive Heat	1	0	\$ -	\$ -
Kings (Brooklyn)	7/19/2013	Excessive Heat	4	0	\$ -	\$ -
Queens	7/19/2013	Excessive Heat	1	0	\$ -	\$ -
Orange	7/19/2013	Excessive Heat	0	0	\$ -	\$ -
Ulster	7/19/2013	Excessive Heat	0	0	\$ -	\$ -
Dutchess	7/19/2013	Excessive Heat	0	0	\$ -	\$ -
Nassau	7/19/2013	Excessive Heat	0	0	\$ -	\$ -
Suffolk	7/19/2013	Excessive Heat	0	0	\$ -	\$ -
Richmond	7/7/2013	Excessive Heat	1	0	\$ -	\$ -
New York (Manhattan)	7/18/2012	Excessive Heat	0	0	\$ -	\$ -
Queens	7/18/2012	Excessive Heat	0	0	\$ -	\$ -
Orange	7/18/2012	Excessive Heat	0	0	\$ -	\$ -
Rockland	7/18/2012	Excessive Heat	0	0	\$ -	\$ -
Westchester	7/18/2012	Excessive Heat	0	0	\$ -	\$ -
Bronx	7/18/2012	Excessive	0	0	\$ -	\$ -



Excessive Heat, Extreme Cold/ Wind Chill Events and Losses From 1996-2013						
County	Date	Type	Death	Injuries	Property Loss	Crop Loss
		Heat				
<b>Putnam</b>	7/18/2012	Excessive Heat	0	0	\$ -	\$ -
<b>Queens</b>	6/20/2012	Excessive Heat	1	0	\$ -	\$ -
<b>Suffolk</b>	7/22/2011	Excessive Heat	0	0	\$ -	\$ -
<b>Nassau</b>	7/22/2011	Excessive Heat	0	0	\$ -	\$ -
<b>Suffolk</b>	7/22/2011	Excessive Heat	0	0	\$ -	\$ -
<b>Dutchess</b>	7/22/2011	Excessive Heat	0	0	\$ -	\$ -
<b>Ulster</b>	7/22/2011	Excessive Heat	0	0	\$ -	\$ -
<b>Westchester</b>	7/22/2011	Excessive Heat	0	0	\$ -	\$ -
<b>Rockland</b>	7/22/2011	Excessive Heat	0	0	\$ -	\$ -
<b>Suffolk</b>	7/22/2011	Excessive Heat	0	0	\$ -	\$ -
<b>Putnam</b>	7/22/2011	Excessive Heat	0	0	\$ -	\$ -
<b>Orange</b>	7/22/2011	Excessive Heat	1	0	\$ -	\$ -
<b>Kings (Brooklyn)</b>	7/21/2011	Excessive Heat	7	0	\$ -	\$ -
<b>Queens</b>	7/21/2011	Excessive Heat	2	0	\$ -	\$ -
<b>Richmond</b>	7/21/2011	Excessive Heat	0	0	\$ -	\$ -
<b>New York (Manhattan)</b>	7/21/2011	Excessive Heat	4	0	\$ -	\$ -
<b>Bronx</b>	7/21/2011	Excessive Heat	6	0	\$ -	\$ -
<b>Greene</b>	7/21/2011	Excessive Heat	0	0	\$ -	\$ -
<b>Ulster</b>	7/21/2011	Excessive Heat	0	0	\$ -	\$ -
<b>Dutchess</b>	7/21/2011	Excessive Heat	0	0	\$ -	\$ -
<b>Albany</b>	7/21/2011	Excessive Heat	0	0	\$ -	\$ -
<b>Columbia</b>	7/21/2011	Excessive	0	0	\$ -	\$ -



Excessive Heat, Extreme Cold/ Wind Chill Events and Losses From 1996-2013						
County	Date	Type	Death	Injuries	Property Loss	Crop Loss
		Heat				
<b>Rensselaer</b>	7/21/2011	Excessive Heat	0	0	\$ -	\$ -
<b>Schenectady</b>	7/21/2011	Excessive Heat	0	0	\$ -	\$ -
<b>Saratoga</b>	7/21/2011	Excessive Heat	0	0	\$ -	\$ -
<b>Warren</b>	7/21/2011	Excessive Heat	0	0	\$ -	\$ -
<b>Washington</b>	7/21/2011	Excessive Heat	0	0	\$ -	\$ -
<b>Chenango</b>	7/21/2011	Excessive Heat	0	0	\$ -	\$ -
<b>Delaware</b>	7/21/2011	Excessive Heat	0	0	\$ -	\$ -
<b>Broome</b>	7/21/2011	Excessive Heat	0	0	\$ -	\$ -
<b>Tompkins</b>	7/21/2011	Excessive Heat	0	0	\$ -	\$ -
<b>Sullivan</b>	7/21/2011	Excessive Heat	0	0	\$ -	\$ -
<b>Oneida</b>	7/21/2011	Excessive Heat	0	0	\$ -	\$ -
<b>Seneca</b>	7/21/2011	Excessive Heat	0	0	\$ -	\$ -
<b>Yates</b>	7/21/2011	Excessive Heat	0	0	\$ -	\$ -
<b>Schuyler</b>	7/21/2011	Excessive Heat	0	0	\$ -	\$ -
<b>Otsego</b>	7/21/2011	Excessive Heat	0	0	\$ -	\$ -
<b>Oneida</b>	7/21/2011	Excessive Heat	0	0	\$ -	\$ -
<b>Madison</b>	7/21/2011	Excessive Heat	0	0	\$ -	\$ -
<b>Cayuga</b>	7/21/2011	Excessive Heat	0	0	\$ -	\$ -
<b>Tioga</b>	7/21/2011	Excessive Heat	0	0	\$ -	\$ -
<b>Steuben</b>	7/21/2011	Excessive Heat	0	0	\$ -	\$ -
<b>Onondaga</b>	7/21/2011	Excessive Heat	0	0	\$ -	\$ -
<b>Cortland</b>	7/21/2011	Excessive Heat	0	0	\$ -	\$ -



Excessive Heat, Extreme Cold/ Wind Chill Events and Losses From 1996-2013						
County	Date	Type	Death	Injuries	Property Loss	Crop Loss
Lewis	1/24/2011	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
Oswego	1/24/2011	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
Jefferson	1/24/2011	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
Herkimer	1/23/2011	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
Warren	1/23/2011	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
Greene	1/23/2011	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
Ulster	1/23/2011	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
Fulton	1/23/2011	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
Saratoga	1/23/2011	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
Hamilton	1/23/2011	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
Kings (Brooklyn)	7/24/2010	Excessive Heat	2	0	\$ -	\$ -
Queens	7/4/2010	Excessive Heat	4	0	\$ -	\$ -
Richmond	7/4/2010	Excessive Heat	2	0	\$ -	\$ -
New York (Manhattan)	7/4/2010	Excessive Heat	2	0	\$ -	\$ -
Herkimer	1/25/2009	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
Hamilton	1/16/2009	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
St. Lawrence	1/14/2009	Extreme	0	0	\$ -	\$ -



Excessive Heat, Extreme Cold/ Wind Chill Events and Losses From 1996-2013						
County	Date	Type	Death	Injuries	Property Loss	Crop Loss
		Cold/Wind Chill				
<b>Essex</b>	1/14/2009	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Clinton</b>	1/14/2009	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Franklin</b>	1/14/2009	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Broome</b>	10/5/2007	Excessive Heat	0	0	\$ -	\$ -
<b>Onondaga</b>	10/5/2007	Excessive Heat	0	0	\$ -	\$ -
<b>St. Lawrence</b>	3/9/2007	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Clinton</b>	3/9/2007	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Essex</b>	3/9/2007	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Franklin</b>	3/9/2007	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>St. Lawrence</b>	3/9/2007	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Clinton</b>	3/9/2007	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Essex</b>	3/9/2007	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Franklin</b>	3/9/2007	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>St. Lawrence</b>	3/6/2007	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Bronx</b>	3/6/2007	Extreme Cold/Wind Chill	1	0	\$ -	\$ -



Excessive Heat, Extreme Cold/ Wind Chill Events and Losses From 1996-2013						
County	Date	Type	Death	Injuries	Property Loss	Crop Loss
Franklin	3/6/2007	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
St. Lawrence	3/6/2007	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
Essex	3/6/2007	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
Clinton	3/6/2007	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
Kings (Brooklyn)	2/4/2007	Extreme Cold/Wind Chill	3	0	\$ -	\$ -
New York (Manhattan)	2/4/2007	Extreme Cold/Wind Chill	1	0	\$ -	\$ -
Bronx	2/4/2007	Extreme Cold/Wind Chill	3	0	\$ -	\$ -
Queens	2/4/2007	Extreme Cold/Wind Chill	4	0	\$ -	\$ -
Franklin	1/25/2007	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
St. Lawrence	1/25/2007	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
Essex	1/25/2007	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
Clinton	1/25/2007	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
Steuben	5/17/2002	Extreme Cold/Wind Chill	0	0	\$ 5,000	\$ -
Schuyler	5/17/2002	Extreme Cold/Wind Chill	0	0	\$ 3,000	\$ -
Oneida	5/17/2002	Extreme Cold/Wind Chill	0	0	\$ 5,000	\$ -



Excessive Heat, Extreme Cold/ Wind Chill Events and Losses From 1996-2013						
County	Date	Type	Death	Injuries	Property Loss	Crop Loss
Madison	5/17/2002	Extreme Cold/Wind Chill	0	0	\$ 5,000	\$ -
Delaware	5/17/2002	Extreme Cold/Wind Chill	0	0	\$ 10,000	\$ -
Cortland	5/17/2002	Extreme Cold/Wind Chill	0	0	\$ 3,000	\$ -
Chenango	5/17/2002	Extreme Cold/Wind Chill	0	0	\$ 8,000	\$ -
Broome	5/17/2002	Extreme Cold/Wind Chill	0	0	\$ 3,000	\$ -
Oneida	5/17/2002	Extreme Cold/Wind Chill	0	0	\$ 5,000	\$ -
Otsego	5/17/2002	Extreme Cold/Wind Chill	0	0	\$ 10,000	\$ -
Tompkins	5/17/2002	Extreme Cold/Wind Chill	0	0	\$ 3,000	\$ -
Tioga	5/17/2002	Extreme Cold/Wind Chill	0	0	\$ 3,000	\$ -
Albany	4/15/2002	Excessive Heat	0	0	\$ -	\$ -
Albany	12/1/2001	Excessive Heat	0	0	\$ -	\$ -
Schuyler	9/28/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
Madison	9/28/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
Delaware	9/28/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
Cortland	9/28/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
Otsego	9/28/2000	Extreme Cold/Wind	0	0	\$ -	\$ -



Excessive Heat, Extreme Cold/ Wind Chill Events and Losses From 1996-2013						
County	Date	Type	Death	Injuries	Property Loss	Crop Loss
		Chill				
<b>Onondaga</b>	9/28/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Oneida</b>	9/28/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Chenango</b>	9/28/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Broome</b>	9/28/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Tioga</b>	9/28/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Sullivan</b>	9/28/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Steuben</b>	9/28/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Yates</b>	9/28/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Tompkins</b>	9/28/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Cayuga</b>	9/28/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Seneca</b>	9/28/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Hamilton</b>	3/8/2000	Excessive Heat	0	0	\$ -	\$ -
<b>Schenectady</b>	3/8/2000	Excessive Heat	0	0	\$ -	\$ -
<b>Albany</b>	3/8/2000	Excessive Heat	0	0	\$ -	\$ -
<b>Washington</b>	3/8/2000	Excessive Heat	0	0	\$ -	\$ -
<b>Warren</b>	3/8/2000	Excessive Heat	0	0	\$ -	\$ -



Excessive Heat, Extreme Cold/ Wind Chill Events and Losses From 1996-2013						
County	Date	Type	Death	Injuries	Property Loss	Crop Loss
Saratoga	3/8/2000	Excessive Heat	0	0	\$ -	\$ -
Herkimer	3/8/2000	Excessive Heat	0	0	\$ -	\$ -
Schoharie	3/8/2000	Excessive Heat	0	0	\$ -	\$ -
Saratoga	3/8/2000	Excessive Heat	0	0	\$ -	\$ -
Dutchess	3/8/2000	Excessive Heat	0	0	\$ -	\$ -
Albany	3/8/2000	Excessive Heat	0	0	\$ -	\$ -
Rensselaer	3/8/2000	Excessive Heat	0	0	\$ -	\$ -
Greene	3/8/2000	Excessive Heat	0	0	\$ -	\$ -
Ulster	3/8/2000	Excessive Heat	0	0	\$ -	\$ -
Columbia	3/8/2000	Excessive Heat	0	0	\$ -	\$ -
Montgomery	3/8/2000	Excessive Heat	0	0	\$ -	\$ -
Fulton	3/8/2000	Excessive Heat	0	0	\$ -	\$ -
Orange	1/27/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
Putnam	1/27/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
Rockland	1/27/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
Westchester	1/27/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
Nassau	1/27/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
Suffolk	1/27/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
Bronx	1/27/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -



<b>Excessive Heat, Extreme Cold/ Wind Chill Events and Losses From 1996-2013</b>						
<b>County</b>	<b>Date</b>	<b>Type</b>	<b>Death</b>	<b>Injuries</b>	<b>Property Loss</b>	<b>Crop Loss</b>
<b>New York (Manhattan)</b>	1/27/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Richmond (Staten Is.)</b>	1/27/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Queens</b>	1/27/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Kings (Brooklyn)</b>	1/27/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Nassau</b>	1/21/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Queens</b>	1/21/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Kings (Brooklyn)</b>	1/21/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Bronx</b>	1/21/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>New York (Manhattan)</b>	1/21/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Richmond (Staten Is.)</b>	1/21/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Westchester</b>	1/21/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Rockland</b>	1/21/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Suffolk</b>	1/21/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Putnam</b>	1/21/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Orange</b>	1/21/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -



<b>Excessive Heat, Extreme Cold/ Wind Chill Events and Losses From 1996-2013</b>						
<b>County</b>	<b>Date</b>	<b>Type</b>	<b>Death</b>	<b>Injuries</b>	<b>Property Loss</b>	<b>Crop Loss</b>
<b>Putnam</b>	1/17/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Orange</b>	1/17/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Westchester</b>	1/17/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Rockland</b>	1/17/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Kings (Brooklyn)</b>	1/17/2000	Extreme Cold/Wind Chill	1	0	\$ -	\$ -
<b>Queens</b>	1/17/2000	Extreme Cold/Wind Chill	2	0	\$ -	\$ -
<b>Suffolk</b>	1/17/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Nassau</b>	1/17/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Bronx</b>	1/17/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>New York (Manhattan)</b>	1/17/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Richmond (Staten Is.)</b>	1/17/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Suffolk</b>	1/17/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Albany</b>	1/17/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Hamilton</b>	1/17/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Fulton</b>	1/17/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -



Excessive Heat, Extreme Cold/ Wind Chill Events and Losses From 1996-2013						
County	Date	Type	Death	Injuries	Property Loss	Crop Loss
Schenectady	1/17/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
Schoharie	1/17/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
Saratoga	1/17/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
Washington	1/17/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
Warren	1/17/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
Herkimer	1/17/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
Montgomery	1/17/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
Schenectady	1/17/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
Rensselaer	1/17/2000	Extreme Cold/Wind Chill	0	0	\$ -	\$ -
<b>Total</b>			<b>55</b>	<b>0</b>	<b>\$ 63,000</b>	<b>\$ -</b>

Source: National Climatic Data Center NOAA, <http://www.ncdc.noaa.gov/stormevents/choosedates>

### Probability of Future Extreme Temperatures Events

Based on historical events from 1960-2012 and average probability models, an average annualized future probability assessment was completed for the sixty-two counties found within the State of New York. The total future probability percentage for each county was added together and then divided by 62 for both extreme heat and extreme cold hazards. The data revealed that there is an overall 6% average future probability that an extreme heat occurrence will impact New York State in any given year. New York, Queens, and Kings Counties are the most probable to experience an extreme heat event. In comparison, extreme cold events have a 7% average future probability in a given year to occur, and are most likely to occur in Franklin, Clinton, and Cattaraugus Counties. Considering the State



as a whole, Franklin, Clinton, and St. Lawrence Counties were most probable to experience an extreme temperature event whether it's an extreme heat or cold/ windchill occurrence.

Records show that there has been an increase in climate change over the years and since 1970 the global temperature averages have risen by 0.9 degrees primarily resulting from greenhouse gases<sup>1</sup>. A big focus on limiting greenhouse gas emissions to keep climates close to what scientist refer to as the "Holocene" time period, (a time period during which human civilization was evolved) would help with minimizing extreme heat waves and reducing extreme weather frequencies. The increase in average temperatures have caused more days above 90°F, longer warmer seasons, and a spike in heavier precipitation.

#### **Justification for Minimal Vulnerability/ Loss Assessment**

Extreme Temperature occurrences are typically regional in scale; and, while past occurrences have resulted in loss of life, the severity is not considered likely to cause a life safety threat to large populations. Extreme temperature was ranked as "low" with a HAZNY-Mitigation score of 19. Consequently, it is determined that there is not sufficient evidence that Extreme Temperatures has a high level of risk to justify further analysis for the 2014 Plan update, but it is recommended that local hazard mitigation plans consider addressing Extreme Temperature preparedness measures in future plans.

The information provided in the Risk Assessment sections below serves as guidance for impact and consequence analysis and local hazard mitigation planning.

### **3.8.2 Assessing Extreme Temperatures Vulnerability by Jurisdiction**

Extreme temperatures can cause serious injury or death but not in large numbers. Extreme temperature occurrences can take place as often as once a year or once every seven years. None of the recent events have caused any apprehensions regarding an increase in frequency or severity of such events impacting New York State's capabilities to handle such measures. During periods of extreme temperatures, inadequate protection from harsh elements is especially dangerous. Consequently, during extreme temperature conditions, New York State has concerns for specific populations who have been identified as especially vulnerable.

Situational and physical characteristics help to identify vulnerable populations that may not comfortably or safely access and use disaster resources. Specifically, when discussing heat related emergency preparedness, the following groups could be considered vulnerable or at greater risk in extreme temperature emergencies. Information on some of the

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<sup>1</sup><http://news.nationalgeographic.com/news/2012/08/120820-extreme-weather-heat-waves-science-environment-global-warming/> "What's Causing Extreme Weather? Rotten luck and a warmer planet are at play, according to scientists."



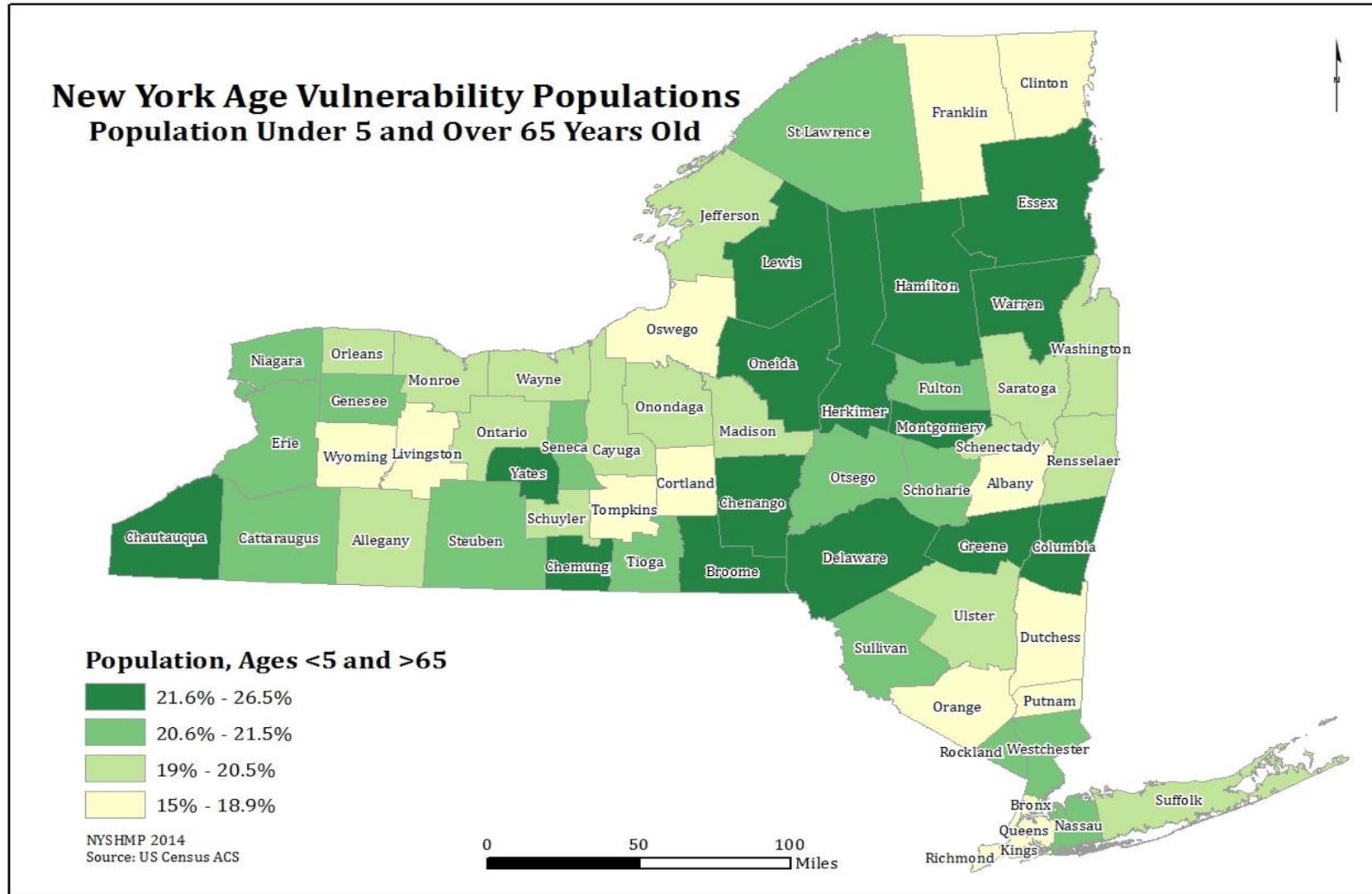
following identified populations can be obtained from the United States Census Bureau website, <http://www.census.gov>:

- Homeless Infants and small children under age five
- Women who are pregnant
- Elderly people (age 65 and older)
- Persons who have obesity
- Persons who are bedridden
- Persons with mental illness/disabilities
- Persons with cognitive disorders
- Persons with medical conditions (e.g., heart disease, diabetes, high blood pressure, insulin)
- Persons requiring life-saving medications (e.g., for high blood pressure, depression, insomnia)
- Persons who utilize medical equipment (e.g., ventilators, oxygen, G-tubes)
- Individuals with drug or alcohol addictions
- Persons who use mobility devices (e.g., wheelchairs, walkers, canes)
- Persons who are non-ambulatory
- Those with sensory impairments (blind/visually impaired or deaf/hard of hearing)
- Persons who are under extreme working conditions
- Persons who are poor
- Persons who are socially isolated
- Persons who do not speak English with minimal access to information

**Figure 3.8f** shows the spatial distribution of age-vulnerable populations. Individuals under 5 years old and over 65 are considered more vulnerable in disasters because of dependency, mobility, physicality, and other characteristics that make them more vulnerable in disaster situations. Hamilton, Delaware, and Yates Counties are the top three counties with the highest percentage of age-vulnerable populations in the State. This map contains a broad stroke of information for the counties. When profiling extreme temperatures, it is incumbent upon local municipalities to investigate their jurisdiction's number of vulnerable population to gain an accurate assessment of the represented age groups.



Figure 3.8f: New York Age Vulnerable Populations



## Local Plan Integration/ Risk Assessments

Since August 2013, 56 FEMA-approved local hazard mitigation plans (LHMP) have been reviewed for the 2014 Update. The State's planning team had the opportunity to review local county risk assessments to help the State better understand its vulnerability in terms of the jurisdictions most threatened by classified hazards. In its analysis, the State of New York reviewed the processes of local governments and how their hazards were ranked based on their jurisdictions and the potential losses (i.e., people, buildings, and dollar values) associated with the hazards of greatest concern.

Where data was available, the State extracted the ranking impact information from the LHMP hazard analysis. This ranking feature is based on a combination of probability, severity, and extent of the hazard and was determined to be the best measure of overall risk in the plans. This ranking was either numeric or described in terms of high, moderately high, moderate, or low. In cases where this information was not available, ranking values were not determined yet considered if identified in the individual county local plans.

For the sake of the 2014 Update, a proper analysis and summary of the data was required. During the review of the local plan risk assessments, all rankings used were based on the New York HAZNY ranking system, and measured on a scale rating from 44 (low) to 400 (high). This analysis revealed that selected county-level plans did include manmade hazards in their analysis, but the State hazard mitigation plan's 2014 Update focused solely on natural hazards.

The local risk assessment summary allowed for an analysis of which hazards are of high concern to particular counties. **Table 3.2a** in **Section 3.2** lists all the hazards and the number of counties that ranked them at each of the scale levels: High, Moderately High, Moderate, Moderately Low, and Low. None of the State's counties ranked Extreme Temperature as a neither "high" nor "moderate" hazard. However Delaware, Orleans, Rensselaer, Ulster, and Westchester County Counties ranked it as "moderately high". Specifically, there were sixteen counties that identified it as "moderately low", and four ranked it as a "low" hazard. **Table 3.8g** displays the highest ranked county Extreme Temperature hazards, because none of the counties ranked it as "high" the 2014 update considered "moderately high" ranking.



**Tables 3.8g: Summary of Extreme Temperature Hazard Impacts and Rankings by County**

Local County Extreme Temperature Hazard Impacts		
Highest Occurrences	Highest Fatalities	Highest Property Damage
Franklin	Kings	St. Lawrence
Clinton	New York	Clinton
St. Lawrence	Queens	Essex
Essex	Bronx	Franklin
New York	Westchester	N/A

Source: SHELDUS

Local County Extreme Temperature Hazard Rankings	
High	Moderately High
N/A	Delaware, Orleans, Rensselaer, Ulster, and Westchester

Source: LHMP

### Development in Hazard Prone Areas

Because Extreme Temperatures are not limited to geographical boundaries or population groups, it is difficult to identify development and population trends that impact this hazard. Current land use and building codes incorporate standards that address and mitigate extreme temperature accumulation.

### 3.8.3 Assessing Vulnerability of State Facilities to Extreme Temperatures

State owned and operated facilities could be vulnerable to multiple impacts and consequences of hazards related to extreme temperatures. **Table 3.8h** describes some of these vulnerabilities, which can potentially affect state facilities. Information in this table can serve as a guide to continuity planning for state agencies.



**Table 3.8h:** Potential Impacts and Consequences to State Facilities from Hazards Associated with Extreme Temperatures**Table 3.8h: Impact and Consequences to State Facilities**

<i>Hazard</i>	<i>Potential Impacts and Consequences to State Facilities</i>
<b>Extreme Temperatures</b>	<ul style="list-style-type: none"> <li>• Power Failure</li> <li>• Loss of critical infrastructure (communications, mechanical systems, power, water supply, technology)</li> <li>• Long-term conditions – rotating closures or full shut-down</li> </ul>

### 3.8.4 Estimating Potential Losses by Jurisdiction- Overview

Based on historical data derived by SHELDUS, from 1960 to 2012 the State of New York has had over \$3 billion in economic losses with \$1,186,555,000 of those losses generated since 2010. Broome, Tioga, and Delaware Counties found in the southwestern region of the State have had the greatest amount of property damage over the last five decades. Although crop damage contributes to far less of the State’s total economic loss, Essex, Orleans, and Clinton Counties have suffered the most in crop damage totaling \$7,868,494 since 1960.

**Table 3.8i** provides the annualized losses for extreme temperature events. The data used was based on SHELDUS records from 1960-2012, with the exception of hurricane, earthquake, and flood hazards which were derived from Hazus-MH 2.1. For those specific hazards, a probabilistic run was generated to determine the total annual losses for each county found within the State. The information provided by SHELDUS was determined by taking the total economic losses divided by the number of years of record (52) to obtain the losses per year. **Figure 3.8g**, illustrates the top ten counties annualized losses with a total of \$51,933 in extreme temperature losses for the entire State of New York.

**Table 3.8i: Average Annual Extreme Temperature Losses by County 1960-2012**

County	Extreme Temperature	County	Extreme Temperature	County	Extreme Temperature
St Lawrence	\$ 13,517	Chenango	\$ 56	Allegany	\$ 16
Clinton	\$ 9,631	Cortland	\$ 56	Chautauqua	\$ 16
Essex	\$ 9,631	Delaware	\$ 56	Chemung	\$ 16
Franklin	\$ 8,669	Fulton	\$ 56	Columbia	\$ 16
Dutchess	\$ 712	Hamilton	\$ 56	Erie	\$ 16
Bronx	\$ 702	Herkimer	\$ 56	Genesee	\$ 16
Kings	\$ 702	Jefferson	\$ 56	Greene	\$ 16
Nassau	\$ 702	Lewis	\$ 56	Livingston	\$ 16
New York	\$ 702	Madison	\$ 56	Monroe	\$ 16



County	Extreme Temperature
Orange	\$ 702
Putnam	\$ 702
Queens	\$ 702
Richmond	\$ 702
Rockland	\$ 702
Suffolk	\$ 702
Sullivan	\$ 702
Ulster	\$ 702
Westchester	\$ 702
Albany	\$ 56
Broome	\$ 56
Cayuga	\$ 56

County	Extreme Temperature
Montgomery	\$ 56
Oneida	\$ 56
Onondaga	\$ 56
Oswego	\$ 56
Otsego	\$ 56
Schoharie	\$ 56
Schuyler	\$ 56
Seneca	\$ 56
Tioga	\$ 56
Tompkins	\$ 56
Wayne	\$ 56
Cattaraugus	\$ 25

County	Extreme Temperature
Niagara	\$ 16
Ontario	\$ 16
Orleans	\$ 16
Rensselaer	\$ 16
Saratoga	\$ 16
Schenectady	\$ 16
Steuben	\$ 16
Warren	\$ 16
Washington	\$ 16
Wyoming	\$ 16
Yates	\$ 16
<b>Total</b>	<b>\$ 51,933</b>

Source: SHELDUS, 2013

Figure 3.8g: Average Annual Extreme Temperature Losses by County 1960-2012



Source: SHELDUS, 2013



### 3.8.5 Estimating Potential Losses of State Facilities

Although state agencies maintain internal databases that identify location and value of properties within their areas of responsibility, New York State does not currently have a comprehensive data set of state-owned and operated assets that can be integrated into the GIS methodology for analysis. However, a state facilities inventory project was initiated in August 2013, which will gather information that can be used to build a comprehensive data set. The pilot phase, which will look at a specific critical facility category and develop the methodology for the project, is expected to be completed in mid-2014. At that time, the next phase of the project will be developed for what is anticipated to be a multi-year project.

### 3.8.6 Data Limitations and Other Key Documents

The Extreme Temperature Hazard in New York State is often underestimated because other natural hazards occur more frequently (e.g., Floods, Tornadoes, Hurricanes) and its effects can vary based on region and vulnerable population within the State. The Mitigation Plan Development Team researched the extreme temperature hazard as it affects the State. Contents of this section result from research and outreach including the following sources:

- New York State Emergency Management Office, *New York State Comprehensive Emergency Management Plan Vol. II*
- National Weather Service, <http://www.noaa.gov/themes/heat.php>
- Federal Emergency Management Agency, <http://m.fema.gov/extreme-heat>
- New York City Office of Emergency Management, *New York City Heat Emergency Plan* [http://www.nyc.gov/html/oem/html/hazards/heat\\_safety.shtml](http://www.nyc.gov/html/oem/html/hazards/heat_safety.shtml)
- City of Long Beach New York, [http://www.longbeachny.org/index.asp?Type=B\\_BASIC&SEC=%7BF277C090-D853-4DA-A92C-8D99AFB90965%7D](http://www.longbeachny.org/index.asp?Type=B_BASIC&SEC=%7BF277C090-D853-4DA-A92C-8D99AFB90965%7D)
- National Climatic and Data Center, <http://www.ncdc.noaa.gov/oa/climate/severeweather/temperatures.html>
- State of California, *2007 Multi-Hazard Mitigation Plan*.
- The Climate of New York [http://nysc.eas.cornell.edu/climate\\_of\\_ny.html](http://nysc.eas.cornell.edu/climate_of_ny.html)

**Please note:** data obtained from the Spatial Hazard Events and Losses Database for the United States (SHELDUS™) is a county-level hazard data set for the U.S. for 18 different natural hazard event types such as thunderstorms, hurricanes, floods, and tornados. For each event the database includes the beginning date, location (county and state), property losses, crop losses, injuries, and fatalities that affected each county. The data derives from the national data source, National Climatic Data Center's monthly Storm Data publications. Using the latest release of SHELDUS™ 12.0, the database includes every loss causing and/or deadly event between 1960 through 1992 and from 1995 onward. Between 1993 and 1995, SHELDUS™ reflects only events that caused at least one fatality or more than \$50,000 in property or crop damages.

