

4.9 Extreme Summer Weather

Conditions of extreme heat are defined as summertime temperatures that are substantially hotter and/or more humid than average for location at that time of year. 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. Extremely 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.

An extreme heat event or heat wave describes a period of abnormally and uncomfortably hot and unusually humid weather. Typically a heat wave lasts two or more days. Extreme heat events are a leading cause of extreme weather-related deaths in the United States. The number of heat-related deaths is rising. For example, in 1995, 465 heat-related deaths occurred in Chicago. From 1999 to 2010, a total of 7,415 people died of heat-related deaths, an average of about 618 deaths a year.

Heat waves have the potential to cover a large area, exposing a high number of people to a hazardous combination of heat and humidity. In fact, heat is typically the leading cause of weather related fatalities each year. High temperatures and humidity are common in numerous locations across the country. However, when temperatures spike and humidity is on the rise in areas of the U.S. that are not accustomed to these conditions, people don't necessarily understand that they need to take action to stay safe.

Heat stress is heat-related illness caused by your body's inability to cool down properly. The body normally cools itself by sweating. But under some conditions, sweating just isn't enough. In such cases, a person's body temperature rises rapidly. Very high body temperatures may damage the brain or other vital organs.

Several factors affect the body's ability to cool itself during extremely hot weather. When the humidity is high, sweat will not evaporate as quickly, preventing the body from releasing heat quickly. Other conditions related to risk include age, obesity, fever, dehydration, heart disease, mental illness, poor circulation, sunburn, and prescription drug and alcohol use.

Heat stress ranges from milder conditions like heat rash and heat cramps, to the most common type, heat exhaustion. The most serious heat-related illness is heat stroke. Heat stroke can cause death or permanent disability if emergency treatment is not provided.

Risk Factors: Anyone can develop heat stress. However, the following groups of people have higher risks for experiencing heat stress or heat-related death:

- Infants and children up to four years of age,
- People 65 years of age and older,
- People who are overweight, and
- People who are ill or on certain medications

Each National Weather Service Forecast Office issues some or all of the following heat-related products as conditions warrant. NWS local offices often collaborate with local partners to determine

when an alert should be issued for a local area.

- Excessive Heat Warning—Take Action! An Excessive Heat Warning is issued within 12 hours of the onset of extremely dangerous heat conditions. The general rule of thumb for this Warning is when the maximum heat index temperature is expected to be 105° or higher for at least 2 days and night time air temperatures will not drop below 75°; however, these criteria vary across the country, especially for areas not used to extreme heat conditions. If you don't take precautions immediately when conditions are extreme, you may become seriously ill or even die.
- Excessive Heat Watches—Be Prepared! Heat watches are issued when conditions are favorable for an excessive heat event in the next 24 to 72 hours. A Watch is used when the risk of a heat wave has increased but its occurrence and timing is still uncertain.
- Heat Advisory—Take Action! A Heat Advisory is issued within 12 hours of the onset of extremely dangerous heat conditions. The general rule of thumb for this Advisory is when the maximum heat index temperature is expected to be 100° or higher for at least 2 days, and night time air temperatures will not drop below 75°; however, these criteria vary across the country, especially for areas that are not used to dangerous heat conditions. Take precautions to avoid heat illness. If you don't take precautions, you may become seriously ill or even die.
- Excessive Heat Outlooks are issued when the potential exists for an excessive heat event in the next 3-7 days. An Outlook provides information to those who need considerable lead-time to prepare for the event.⁷⁰

Other tools that can be used to protect you is the National Weather Service Heat Index. The Heat Index is a measure of how hot it really feels when relative humidity is factored in with the actual air temperature. As you can see from the chart below, high humidity levels combined with hot conditions can be extremely dangerous. Limit your outdoor activities during these periods.

⁷⁰Centers for Disease Control and Prevention (CDC), Extreme Heat;
<http://ephtracking.cdc.gov/showClimateChangeExtremeHeat.action>

NOAA's National Weather Service

Heat Index

Temperature (°F)

Relative Humidity (%)	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	128	136					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										

Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity

Caution
 Extreme Caution
 Danger
 Extreme Danger

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Storm Events Database

Search Results for Adair, Casey, Clinton, Cumberland, Green, McCreary, Pulaski, Russell, Taylor and Wayne Counties, Kentucky

Event Types: Excessive Heat, Heat

Adair, Casey, Clinton, Cumberland, Green, McCreary, Pulaski, Russell, Taylor and Wayne counties contain the following zones:

'Green', 'Taylor', 'Casey', 'Adair', 'Russell', 'Pulaski', 'Cumberland', 'Clinton', 'Wayne', 'McCreary'

17 events were reported between 01/01/1950 and 09/30/2016 (24380 days)

Summary Info:

Number of County/Zone areas affected: 3
 Number of Days with Event: 8
 Number of Days with Event and Death: 0
 Number of Days with Event and Death or Injury: 0
 Number of Days with Event and Property Damage: 0
 Number of Days with Event and Crop Damage: 0
 Number of Event Types reported: 2

⁷¹ NOAA's National Weather Service, Heat Index; http://www.nws.noaa.gov/om/heat/heat_index.shtml

Column Definitions:

'Mag': Magnitude, 'Dth': Deaths, 'Inj': Injuries, 'PrD': Property Damage, 'CrD': Crop Damage

Click on Location below to display details.

Available Event Types have changed over time. Please refer to the Database Details for more information.

Table 4.9(1) – NOAA Storm Events Database

Location	Deaths, Injuries, Property & Crop Damage	Date	Type	Episode/Event Narrative
Pulaski (Zone)	0	7/24/2010	Heat	Strong high pressure both at the surface and aloft brought temperatures in the mid to 90s and incides around 100 for a few locations on July 24th .
Mccreary (Zone)	0	8/4/2010	Excessive Heat	A large area of high pressure, both at the surface and aloft, brought record breaking heat to eastern Kentucky during the afternoon and evening hours of August 4th. High temperatures across the area were between 95 and 100 degrees for numerous locations. All 17 counties in the Excessive Heat Warning for that day met or exceeded warning criteria. In fact, the only county of the 33 counties covered by the Jackson weather office that did not meet heat warning criteria on August 4th was Letcher. Heat indices ran between 105 and 115, with a few areas approaching 120 degrees, on this day. The summer of 2010 will likely rank as one of if not the hottest summer on record in eastern Kentucky. Excessive heat warning criteria were met with highs between 95 and 100 and heat indices between 105 and 115.
Pulaski (Zone)	0	8/4/2010	Excessive Heat	
Wayne (Zone)	0	8/4/2010	Excessive Heat	

Wayne (Zone)	0	8/9/2010	Heat	During the afternoon and early evening hours of August 9th, a numerous locations around eastern Kentucky experienced very hot temperatures. Highs were between 93 and 96 degrees with heat index values around 100 degrees. Heat advisory criteria were met or exceeded.
Pulaski (Zone)	0	8/9/2010	Heat	
Wayne (Zone)	0	8/10/2010	Heat	A very large and strong area of high pressure brought a heat wave to eastern Kentucky on August 10th. During the afternoon and evening hours on this day, high temperatures in numerous locations soared to between 93 and 98 degrees, with heat index values around 100 degrees. High temperatures were between 93 and 98 degrees with heat indices around 100.
Mccreary (Zone)	0	8/10/2010	Heat	
Pulaski (Zone)	0	8/10/2010	Heat	
Pulaski (Zone)	0	8/11/2010	Heat	Numerous locations experienced highs between 93 and 97 and heat indices around 100 degrees during the afternoon and early evening hours of August 11th. High temperatures were between 93 and 97 degrees with heat indices around 100.
Wayne (Zone)	0	8/11/2010	Heat	
Mccreary (Zone)	0	8/12/2010	Excessive Heat	Strong high pressure continued to bring very hot and humid weather to eastern Kentucky during the afternoon and early evening hours of August 12th. High temperatures for numerous counties reached 93 to 98 degrees, with heat index values at or above 100 degrees. This marked the fourth consecutive day with temperatures and heat indices meeting or exceeding advisory criteria. Therefore, an excessive heat warning was issued.
Pulaski (Zone)	0	8/12/2010	Excessive Heat	
Wayne (Zone)	0	8/12/2010	Excessive Heat	
Wayne (Zone)	0	8/13/2010	Excessive Heat	The same ridge of high pressure that brought oppressive heat and humidity to eastern Kentucky most of the week, again brought scorching heat to the coalfields on August 13th. High temperatures were in the low to mid 90s with heat indices once again around 100 degrees. High temperatures were in the low to mid 90s with heat indices once again around 100 degrees.

Wayne (Zone)	0	8/14/2010	Excessive Heat	The residents of eastern Kentucky had to endure one more day of excessive heat and humidity on August 14th. High temperatures were again in the low to mid 90s with a heat index of around 100. Event Narrative High temperatures ranged from 93 to 99 with heat index values of 100 to 110.
Pulaski (Zone)	0	8/14/2010	Excessive Heat	
Lake Cumberland Region Totals:	0			

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⁷² NOAA's National Centers for Environmental Information, Storm Events Database;
http://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28Z%29+Excessive+Heat&eventType=%28Z%29+Heat&beginDate_mm=01&beginDate_dd=01&beginDate_yyyy=1950&endDate_mm=09&endDate_dd=30&endDate_yyyy=2016&county=ADAIR%3A1&county=CASEY%3A45&county=CLINTON%3A53&county=CUMBERLAND%3A57&county=GREEN%3A87&county=MCCREARY%3A147&county=PULASKI%3A199&county=RUSSELL%3A207&county=TAYLOR%3A217&county=WAYNE%3A231&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitButton=Search&statefips=21%2CKENTUCKY

Summary

Hazard Location:

- Extreme Summer Weather.
 - The researched data did show that the entire region has the possibility of being affected by this hazard

Potential Damage (All Hazards):

- Extreme Summer Weather.
 - Heat is one of the leading weather-related killers in the United States, resulting in hundreds of fatalities each year and even more heat-related illnesses

Scale / Extent:

- Extreme Summer Weather.
 - Heat waves have the potential to cover a large area, exposing a high number of people to a hazardous combination of heat and humidity

Previous Occurrences:

- Extreme Summer Weather.
 - 17 events were reported between 01/01/1950 and 09/30/2016 (data events from 2010 only)

Likelihood of Future Occurrences:

- Extreme Summer Weather.
- Table below shows a query based on the following: Climate Change | Future Projections of Extreme Heat | Projected Number of Future Extreme Heat Days | Kentucky | 2020, 2025, 2030 | Emissions Scenario: Low Emissions (B1) | Absolute Threshold: 90 degrees F

Table 4.5(10) – Future Projections of Extreme Heat Days => 90 Degrees¹⁴⁵

State	County	2020	2025	2030
Kentucky	Adair	41	42	44
Kentucky	Casey	33	34	36
Kentucky	Clinton	35	36	38
Kentucky	Cumberland	43	44	46
Kentucky	Green	49	51	53
Kentucky	McCreary	28	29	30
Kentucky	Pulaski	33	34	35
Kentucky	Russell	37	38	39
Kentucky	Taylor	42	43	45
Kentucky	Wayne	33	34	35

¹⁴⁵ Centers for Disease Control and Prevention, Future Projections of Extreme Heat;
<http://ephtracking.cdc.gov/showIndicatorPages.action?selectedContentAreaAbbreviation=CC&selectedIndicatorId=97&selectedMeasureId=>