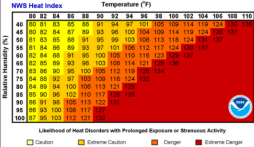
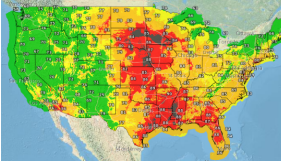
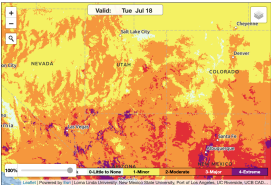


Last updated: 7/18/2023

The NWS has three different forecast heat stress indicators in addition to air temperature and maximum temperature data. Heat Index, Wet Bulb Globe Temperature, and HeatRisk prototype are referred to as Heat Tools. Each of these tools have strengths and limitations and are designed for different audiences. The application of each tool must be for the appropriate audience to ensure effective heat tool utilization and heat stress awareness.

NWS Heat Tools				
Product	What the Product Provides	What does it take into account?	Limitations or Considerations	Why use this product?
<p><b>Heat Index (HI)</b> aka <b>Apparent Temperatures</b></p> 	<ul style="list-style-type: none"> <li>● Measure of what the temperature feels like to the human body when relative humidity is combined with the air temperature</li> <li>● Temporal Resolution: hourly out to 36 hours, three-hourly to 72 hours; and six-hourly to 168 hours</li> </ul> <p>Available on: <a href="https://digital.mdl.nws.noaa.gov">https://digital.mdl.nws.noaa.gov</a> and many other NWS forecast products such as the Point and Click and Zone Forecast Product.</p>	<ul style="list-style-type: none"> <li>● Weather parameters: temperature and relative humidity</li> <li>● Calculated for shaded areas with light wind</li> <li>● Quantifies the effects of clothing, wind, and other parameters</li> <li>● Includes several (21) parameters and assumptions, including:               <ul style="list-style-type: none"> <li>○ body mass &amp; height</li> <li>○ clothing</li> <li>○ physical activity</li> <li>○ body mass &amp; height</li> <li>○ clothing</li> <li>○ physical activity</li> <li>○ See the <a href="#">Technical Attachment</a> for more information</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>● Not the best indicator of heat impacts in areas with low humidity</li> <li>● Not an accurate measure of heat impacts on active individuals</li> <li>● HI is calculated for shaded areas               <ul style="list-style-type: none"> <li>○ Exposure to full sunshine can increase heat index values by up to 15°F</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>● NWS's flagship heat stress indicator</li> <li>● Good for public messaging as HI is familiar to most and generally easy to understand</li> <li>● Based on <a href="#">Robert G. Steadman's work</a>, and was developed in Central Region in collaboration with state Public Health Departments</li> </ul>

Product	What the Product Provides	What does it take into account?	Limitations or Considerations	Why use this product?
<p><b><u>Wet Bulb Globe Temperature (WBGT)</u></b></p> 	<ul style="list-style-type: none"> <li>Measures heat stress on the body in direct sunlight, taking many factors into account</li> <li>This an index much like Heat Index, as it is an estimation of heat stress displayed by a number. Remember one of the big differences between the two: HI is calculated for shady areas and WBGT is calculated in direct sunlight unless under cloudy conditions (takes into account sky cover).</li> </ul> <p>Available on:  <a href="https://digital.mdl.nws.noaa.gov">https://digital.mdl.nws.noaa.gov</a></p>	<ul style="list-style-type: none"> <li>Forecasted weather parameters: temperature, dewpoint, wind and sky cover</li> <li>Effects of solar radiation with sun angle and forecast cloud cover</li> <li>Designed for acclimatized, active, outdoor communities such as outdoor workers</li> <li>See the <a href="#">Technical Attachment</a> and the <a href="#">Product Description Document</a> for more information</li> </ul>	<ul style="list-style-type: none"> <li>WBGT values will typically be lower than HI, which may cause the values to be perceived as a lower risk</li> <li>The heat stress categories produced through WBGT forecast values <a href="#">vary by climatological region</a> to account for geographic variations in heat exposure and acclimatization.</li> <li>The threat level <a href="#">color scale</a> broken out by WBGT climatological region. No matter which region you are located in, the higher the WBGT, the higher the risk for heat illness. Protective actions or activity modification can vary depending on the activity and clothing/equipment. Thus this should be coordinated with public health guidance.</li> <li>Given the above considerations, WBGT could result in confusion if provided to a general public audience without context and local guidance.</li> </ul>	<ul style="list-style-type: none"> <li>Great element to monitor for those who work, exercise, and/or recreate outside <ul style="list-style-type: none"> <li>Military agencies, OSHA, many universities, and numerous nations use the WBGT as a guide to managing workload in direct sunlight</li> </ul> </li> <li>Intended to help guide emergency management decisions and enhance response</li> </ul>

Product	What the Product Provides	What does it take into account?	Limitations or Considerations	Why use this product?
<p><b>HeatRisk (Prototype)</b></p> 	<ul style="list-style-type: none"> <li>● A color-numeric based index that provides a forecast risk of heat-related impacts to occur over a 24-hour period</li> <li>● Identifies unusual/extreme heat for a particular date and location, rather than just using a single threshold value applied across a large area</li> <li>● Better accounts for the variation in climatology that exists across most regions of the United States and human acclimation for those living in the area</li> </ul> <p>Available on:  <a href="https://www.wrh.noaa.gov/wrh/heatrisk/">https://www.wrh.noaa.gov/wrh/heatrisk/</a></p> <p>2024 available on:  <a href="https://digital.mdl.nws.noaa.gov">https://digital.mdl.nws.noaa.gov</a></p>	<ul style="list-style-type: none"> <li>● How unusually above normal the temperatures are at a location</li> <li>● Time of the year</li> <li>● Duration of unusual heat <ul style="list-style-type: none"> <li>○ Including overnight relief (lows &amp; humidity)</li> </ul> </li> <li>● Difference between lows and highs</li> <li>● If temperatures are at high enough levels to pose an elevated risk for heat complications (based on CDC heat-health thresholds)</li> <li>● Humidity is roughly estimated by temperature ranges and min temps</li> <li>● See the <a href="#">attachment</a> for more information.</li> </ul>	<ul style="list-style-type: none"> <li>● Currently only available for NWS Western Region</li> <li>● Color scales calculated for healthy populations with messaging regarding sensitive populations included at lower color categories</li> <li>● Does not directly account for humidity (there are not an adequate number of weather stations across the country which report humidity values for a long enough period of time to be used directly in the HeatRisk approach). However it leverages well known relationships between temperature and humidity to approximate the role of humidity</li> <li>● Does not include a wind component</li> </ul>	<ul style="list-style-type: none"> <li>● Great tool for IDSS and messaging; not intended for warning criteria</li> <li>● Helps the public understand what forecasted heat means to them</li> <li>● Provides heat risk guidance for decision-makers and heat-sensitive populations who may need to take action below NWS heat product levels</li> <li>● Uses high-resolution gridded climatology &amp; CDC mortality data</li> </ul>