

## Climate at a Glance: U.S. Heatwaves



### **Key Takeaways:**

- In recent decades in the United States, data indicate **heat waves have been far less frequent and severe** than they were in the 1930s.
- The all-time high temperature records set in most states **occurred in the first half of the twentieth century.**
- The most accurate nationwide temperature station network, implemented in 2005, shows **no sustained increase in daily high temperatures in the United States since at least 2005.**

### **Short Summary:**

Heatwaves have always been a natural part of the American climate. Global warming will not put an end to heatwaves. However, global warming is not making heatwaves worse, if at all. That is because the lion's share of the Earth's modest warming occurs during winter, at night, and closer to the poles.

As Figure 1 shows, there has been no sustained increase in daily high temperatures since at least 2005, when the National Oceanic and Atmospheric Administration launched its most accurate temperature station network, the Climate Reference Network.<sup>1,2</sup>

### Figure 1. Contiguous U.S. High Temperature Anomalies

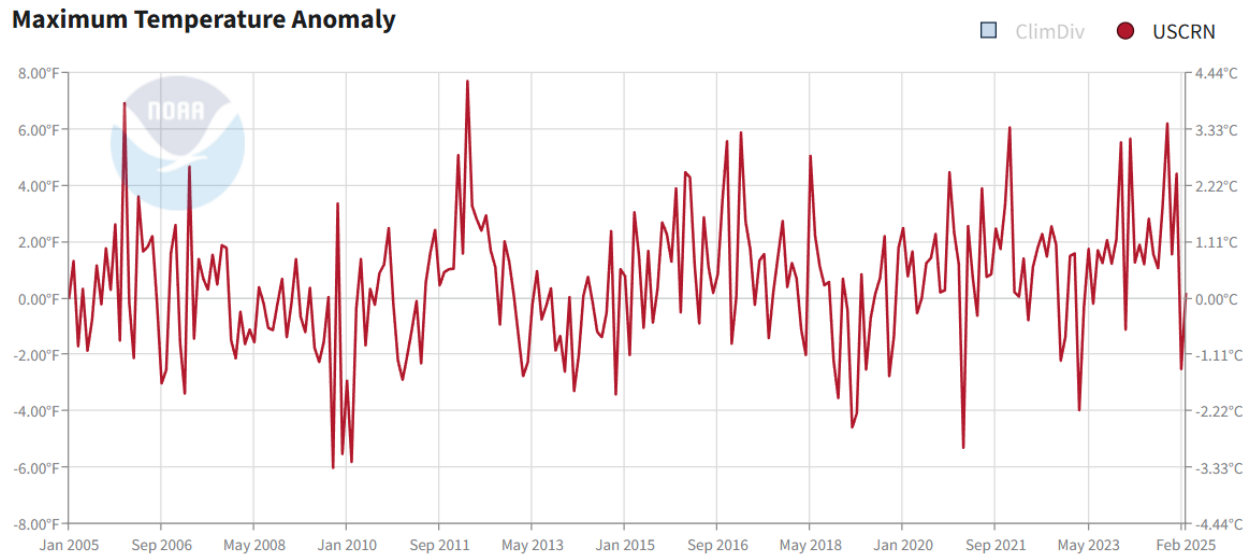


Figure 1: High surface temperature anomalies in the United States, January 2005 to February 2025. U.S. Climate Reference Network, “Average Surface Temperature, January 2005 to February 2025,” [ncdc.noaa.gov](https://www.ncdc.noaa.gov), National Climatic Data Center, National Oceanic and Atmospheric Administration, accessed March 19, 2025. <https://www.ncdc.noaa.gov/access/monitoring/national-temperature-index/time-series/anom-tmax/1/0>

Further, the data illustrated in Figure 2 show extended periods of very high temperatures were much more common in the 1930s than they have been in the present decade. Moreover, recent heat wave frequency and intensity remain in line with the historical norm.

Objective data show the all-time high temperature records set in most states occurred in the first half of the twentieth century, decades before anyone was talking about human-caused climate change.<sup>3</sup>

### Figure 2. Heat Wave Index for the Contiguous United States, 1895–2020

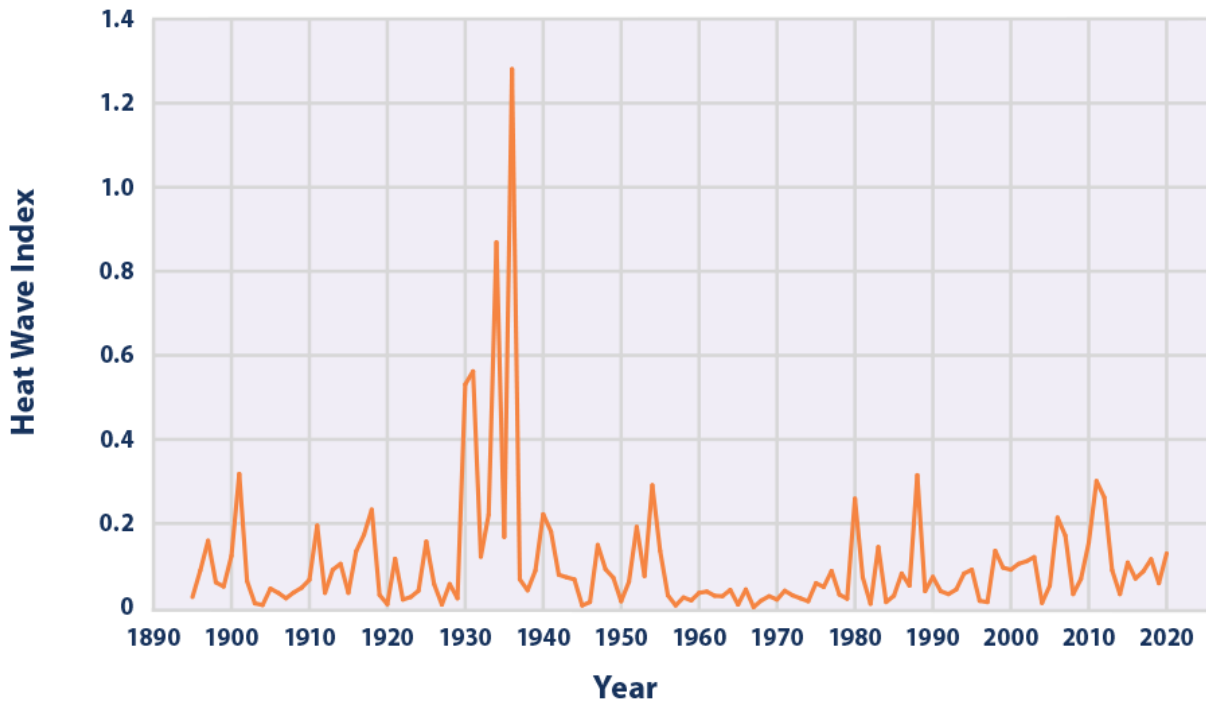


Figure 2. Annual values of the U.S. Heat Wave Index, from 1895 to 2020 for the contiguous 48 states. The index defines a heat wave as a period lasting at least four days with an average temperature that would only be expected to occur once every 10 years, based on the historical record. Source: Environmental Protection Agency, “Climate Change Indicators: Heat Waves,” accessed August 14, 2021, <https://www.epa.gov/climate-indicators/climate-change-indicators-heat-waves#%20>. Data Source: K. Kunkel, Figure 2.3 in “Weather and Climate Extremes in a Changing Climate,” U.S. Climate Change Science Program: Synthesis and Assessment Product 3.3, originally published in 2008, updated in 2021, accessed August 14, 2021, [www.globalchange.gov/browse/reports/sap-33-weather-and-climate-extremes-changing-climate](http://www.globalchange.gov/browse/reports/sap-33-weather-and-climate-extremes-changing-climate)

Further, the percentage of very hot days per year shows occasional higher frequency during the early 1900s of days greater than 95°F and 100°F – and no trend in days greater than 105°F, as seen in Figure 3 below.<sup>4</sup>

## Conterminous U.S. Observed Number of Very Hot Days Per Year 1895 to 2023

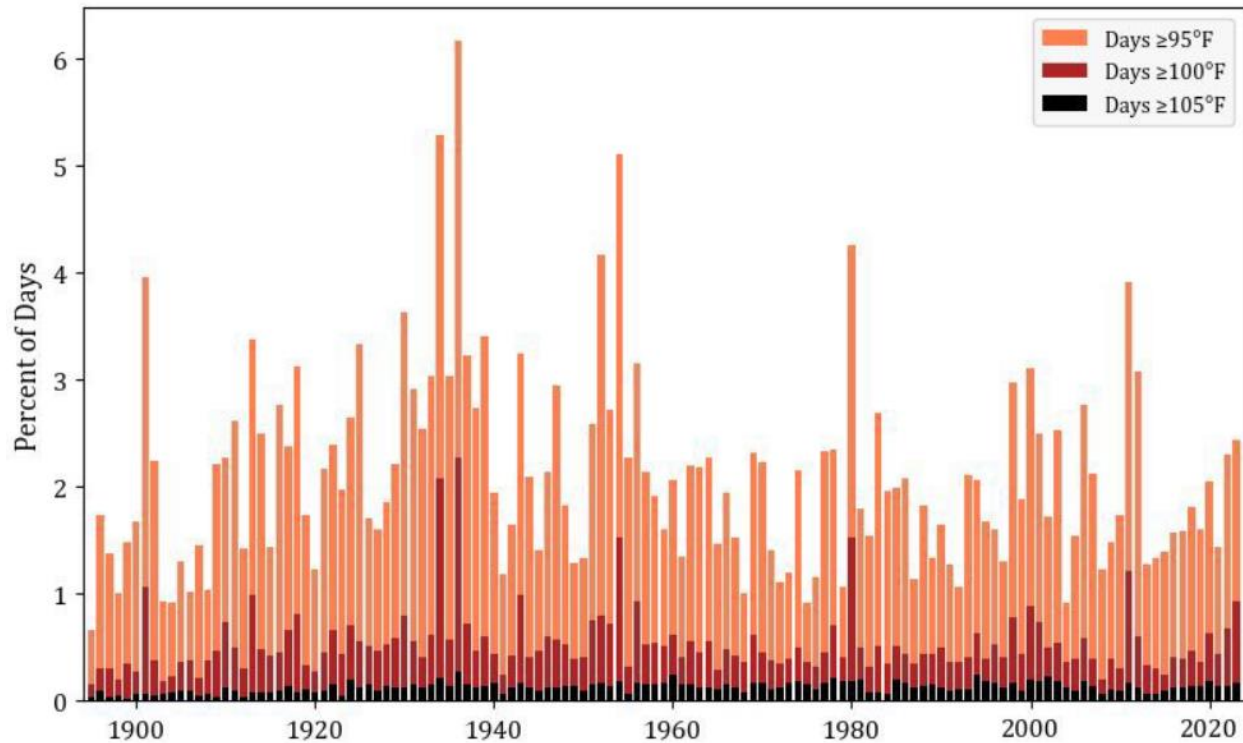


Figure 3: The annual mean number of days with a daily maximum temperature  $\geq 95^\circ$ ,  $\geq 100^\circ$  and  $\geq 105^\circ$  each at 828 NOAA USHCN stations with at least 100 years of daily temperature readings between 1895 and 2023. Graph by Chris Martz from NOAA data at <https://www.ncei.noaa.gov/pub/data/ushcn/v2.5/>

The data indicate the frequency of 95° days over the period 1961-2020 was approximately 18% lower than it was during the 60-year period 1901-60. The conclusion from the data is that U.S. heat waves are not increasing in frequency or intensity.

### References:

1. U.S. Climate Reference Network, National Oceanic and Atmospheric Administration's (NOAA) National Centers for Environmental Information, accessed August 17, 2021, <https://www.ncdc.noaa.gov/crn>
2. U.S. Climate Reference Network, "Maximum Surface Temperature, January 2005 to February 2025," Source: U.S. Climate Reference Network, "Maximum Surface Temperature, January 2005 to February 2025," [ncie.noaa.gov](https://www.ncie.noaa.gov), National Climatic Data Center, National Oceanic and Atmospheric Administration, last accessed

March 19, 2025. <https://www.ncei.noaa.gov/access/monitoring/national-temperature-index/time-series/anom-tmax/1/0>

3. Patrick Michaels, “Newly Found Weather Records Show 1930s as Being Far Worse than the Present for Extreme Weather,” World Climate Report, reposted to Watts Up with That, wattsupwiththat.com, July 14, 2012, <https://bit.ly/3k8OIIN>
  4. Annual mean number of days with a daily maximum temperature  $\geq 95^\circ$ ,  $\geq 100^\circ$  and  $\geq 105^\circ$  each at 828 long-term NOAA USHCN stations with at least 100 years of daily temperature readings between 1895 and 2023. Graph by Chris Martz *Graph by Chris Martz from NOAA data at <https://www.ncei.noaa.gov/pub/data/ushcn/v2.5/> on March 4, 2025 <https://x.com/ChrisMartzWX/status/1897067861656379670>*
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Photo: Heatwaves are a natural part of our summer climate. Image licensed from 123rf.com