

## **Climate – Heat: Temperature**

This metadata page provides a brief summary of this dataset. More detailed data and metadata may be available from the data sources listed, including the US Centers for Disease Control and Prevention (CDC) Tracking Program or the Louisiana Department of Health (LDH) Environmental Public Health Tracking Program ('LDH Tracking'). Please refer to the contact information on the last page under 'Questions?'

### **Definitions**

**Absolute Threshold:** The lowest temperature that can be detected.

**Extreme Heat:** Extreme heat for Louisiana can be defined as a maximum daily Temperature of 95°-100° degrees Fahrenheit (F) (or approximately 35°-38° Celsius C)).

- ☐ The [National Weather Service](#) issues heat advisories when the temperature is greater than or equal to 103°F, or when the Heat Index (HI) is greater than or equal to 108°F.
- ☐ An excessive heat warning is issued when the temperature is greater than or equal to 105°F or the heat index is greater than or equal to 113°F.

**Humidity:** Humidity refers to the amount of water vapor in the air. **Relative humidity** is a ratio, expressed in percent, of the amount of atmospheric moisture present relative to the amount that would be present if the air were saturated.

**Heat index:** Heat index can be explained as a measure of 'how hot it feels' when relative humidity is factored in with the actual air temperature. Several quite complex calculations are used to arrive at a Heat Index value.

### **Data Source(s)**

- [CDC Tracking Network](#)
- [North American Land Data Assimilation System \(NLDAS\) –Number of Extreme Heat Days](#)
- [NOAA's National Centers for Environmental Information – Global Summary of the Month \(GSOM\), V. 1](#)

### **Data Measure(s)**

The LDH Health Data Explorer ([healthdata.ldh.la.gov](http://healthdata.ldh.la.gov)) is providing **NEW monthly data** on the following climate – heat: temperature measures. Average minimum temperature has been proposed as a potential 'marker' for heat waves which don't allow the human body to cool over several consecutive evenings, leading to possible heat-related illness (HRI) including Heat Mortality:

- Average Minimum Temperature, by Louisiana Climate Division, by month (May-Sept), 2010-2023
- Average Maximum Temperature, by Louisiana Climate Division, by month (May-Sept), 2010-2023
- Average Daily Heat Index, by Louisiana Climate Division, by month (May-Sept), 2010-2023

### **Annual data by Louisiana Parish (2000-2019)**

- Number of Days with Max Temp 95°F + (May-Sept) by Louisiana Parish
- Number of Days with Max Temp 100°F + (May-Sept) by Louisiana Parish
- Number of Days with Heat Index 95°F + (May-Sept) by Louisiana Parish
- Number of Days with Heat Index 100°F + (May-Sept) by Louisiana Parish

### **Annual data by Louisiana Parish (2000-2021)**

The **CDC Tracking Program** shares the following data on temperature, which LDH Tracking re-share on our Health Data Explorer, More recent data may be available through the [CDC Tracking Data Explorer](#):

- Number of Extreme Heat Days, Daily Maximum Temperature by Absolute Threshold 95°F (May-Sept)
- Number of Extreme Heat Days, Daily Maximum Temperature by Absolute Threshold 100°F (May-Sept)
- Number of Extreme Heat Days, Daily Maximum Temperature by Absolute Threshold 105°F (May-Sept)

**19-year dataset (2000-2018).** This sample dataset demonstrates the differences in heat experienced between north and south Louisiana, as maximum temperatures are higher in the north, whereas higher heat index are seen in the south. Read more at the [link](#). These temperature data can assist us to see climate effects viewed side-by-side with heat-related illness (HRI) data beginning in 2010.

- Percent of Days with Max Temp 95°F + (May-Sept) by Louisiana Climate Division (2000-2018)
- Percent of Days with Heat Index 95°F + (May-Sept) by Louisiana Climate Division (2000-2018)

### **Monthly data by Louisiana Climate division (2010-2018)**

- Number of days with Max Temp 95°F + (May-Sept) by Louisiana Climate Division (2010-2018)

### **Annual data by Louisiana Climate division (2001-2019)**

- Number of days with Max Temp 95°F + (May-Sept) by Louisiana Climate Division (2001-2019)

**Figure 1. Louisiana Climate Divisions with Climate Station by city**



## Explore Data

The LDH Health Data Explorer (<http://ldh.la.gov/tracking>) is an online query tool which allows health, environmental hazard, exposure and population data to be explored and viewed side-by-side in tables, charts, and maps. These data can be downloaded, viewed and further analyzed.

To Explore Data on the query tool:

1. Select Criteria
2. Category: Environmental Quality
3. Topic: Climate
4. Focus: Heat
5. Indicator: Temperature
6. Additional Options: choose from the available Reporting Periods, Geography, and Measures.

## Heat and your Health

Extreme temperatures can overwhelm the human body's ability to regulate its temperature. Prolonged exposure to very high temperatures can result in illnesses such as heat rash, heat cramps, heat exhaustion, and heatstroke, which can lead to death. Certain medical conditions such as diabetes, cardiovascular disease, respiratory disease, and cerebrovascular disease (e.g. stroke) can be exacerbated by exposure to extreme heat.

A sequence of days over the daily highs, such as temperature of 95°F (35°C) and a heat index of 100°F (~38°C) have been shown to be a strong indicator of expected health impacts from heat. During extended periods of summer heat, a sequence of days where nightly temperatures (daily lows) do not fall below 75°F-80°F interfere with the body's ability to recover from high daytime temperatures, thereby introducing higher risk of heat-related illness emergency department visits and hospitalizations (see **Data Citations**, below).

Heat-related illness (HRI), also referred to as heat stress, affects everyone differently. At particular risk are adults who are older, people working outside (although it could be indoors if not air-conditioned), athletes, homeless individuals, individuals with underlying chronic disease(s), women who are pregnant, and children and individuals who are taking drugs that affect temperature regulation (e.g., beta-blockers, diuretics, and major tranquilizers). Increased metabolism places pregnant women at risk, potentially leading to premature labor or other adverse birth outcomes. Healthy teens and middle-aged adults are at risk if they engage in vigorous physical activity (work (indoor or outdoor) or athletics) and do not take proper precautions.

## Heat and the Environment

The Fifth National Climate Assessment (U.S. Global Change Research Program, 2023) summarizes the current status of climate variability in the United States and outlines potential impacts for the future. Among other impacts specifically related to the Southeast United States and Louisiana, increased temperatures and an associated increase in extreme heat events will increasingly impact the public's health. Increased heat illness, heat-related emergency department visits and hospitalizations, and a forecasted increase in deaths from heat stroke could occur, if we don't take precautions now to adequately prepare and protect the most vulnerable in the population from heat exposure. Increased frequency,

intensity, and duration of extreme heat events is expected to affect not only public health, but the natural and built environments, energy, agriculture, and forestry.

According to recent climate data, northern Louisiana has been registering a greater number of days where the maximum temperature exceeds 95°F. Southern Louisiana is somewhat more humid, so it may ‘feel’ oppressively hot, but not always reach high temperatures. Wetlands and naturally occurring bodies of water in South Louisiana actively regulate outdoor temperatures as they absorb heat through evaporation. Recent data have demonstrated that northern Louisiana registered a greater number of days than Southern Louisiana when the nighttime temperature did not fall below 80°F (27°C) as well. This is an important factor which may contribute to heat illness, particularly without adequate hydration and air conditioning, because the human body isn’t able to cool down each day (see **Data Citations**, below).

In Louisiana, thousands of workers are at risk of heat-related illness (HRI). Many industries and occupations are vulnerable, but those most affected by outdoor heat include construction, agriculture, and oil and gas well workers, comprising about 12.8% of Louisiana’s workforce. As an example, males accounted for 81% of all ED visits; their rate was 4.5 times the female rate, and the rate for males was highest in the 30-39 year-old age group (see **Data Citations**, below). Males aged 20-44 and 45-64 were the most frequent visitors to the Emergency Room (2010-2018) in Louisiana ([Extreme Heat in Louisiana: Staying Protected](#)).

## Data Methods

**Louisiana Climate Divisions.** To conceptualize heat and temperature, nine weather stations were selected to represent each of Louisiana’s Climate Divisions. Stations were selected based on their high accuracy and availability of historical data. Daily temperature data for nine different weather stations was obtained from the Southern Regional Climate Center’s Climate Information Data Portal (SRCC CLIMDAT).

**Data gaps:** Data gaps at Fort Polk can often be filled in using the Natchitoches Regional Airport, but not in all cases (relative humidity for Heat Index). Data from the IEM ASOS/AWOS/METAR Data Downloader can be acquired and used to fill in data gaps in some datasets. Gaps in the other stations can be filled in using the nearest station.

- ☐ Using the daily temperature data, the number of days with a maximum temperature or heat index over 95 or 100°F was calculated and summed by month or year.
- ☐ Only the months May – September are displayed in this dataset. To capture the most relevant data as trends, the months May–September are displayed to determine average summer temperatures and when temperatures are highest.
- ☐ Percentile values were calculated using data for 1979-2020. (CDC Tracking)

Climate Division	Weather Station Name	Weather Station ID
Northwest	Shreveport Regional Airport	13957
North Central	Monroe Regional Airport	13942
Northeast	Tallulah-Vicksburg Regional Airport	03996
West Central	Fort Johnson	165266
Central	Alexandria International Airport	13934

East Central	Baton Rouge Metropolitan Airport (Ryan Field)	13970
Southwest	Lake Charles Municipal Airport	03937
South Central	Lafayette Regional Airport	13976
Southeast	New Orleans International Airport	12916

[Climate Data Portal](#) station of interest ID codes include: Alexandria – 13935, Baton Rouge – 13970, Fort Polk – 03931, Lafayette – 13976, Lake Charles – 03937, Monroe – 13942, New Orleans – 12916, Shreveport – 13957, Tallulah-Vicksburg – 03996.

The LDH Tracking Program downloaded temperature, heat index and precipitation data from the National Oceanic and Atmospheric Administration’s Global Summary of the Month, Version 1 climate data portal; from the National Centers for Environmental Information download page; and from the US Centers for Disease Control and Prevention (CDC’s) National Environmental Public Health Tracking Network. Historical data (1895-2019) were obtained from NOAA’s “Climate at a Glance: Statewide Time Series.”

Temperature datasets aggregated to the geography of climate division are available and viewable alongside heat-related illness (HRI) or ‘Heat Stress’ data. HRI data may be aggregated to climate division since heat-related illnesses are rare, and parish-level heat health data may not be shared or suppressed due to requirements for privacy protection.

## Data Limitations and Important Considerations

**Temperature by Climate Division.** Louisiana has nine climate divisions. The parishes within each climate division have nearly homogenous characteristics regarding temperature, precipitation and humidity. One weather station in each climate division was selected as a representative station. In the West Central and Southeast climate divisions, there were gaps in the primary weather station data (Fort Polk Army Airfield and New Orleans International Airport, respectively); therefore, data from a secondary weather station was used to fill in the gaps.

[Metadata](#) for ‘Number of Extreme Heat Days, Daily Maximum Temperature by Absolute Threshold’ can be found on the CDC website under 1. Indicators and Data: Search 2. Metadata Search, or through CDC’s Network and Data Explorer. Please refer to their website for updates and current information.

Please note the following important data limitations:

1. Modeled temperature data obtained from North American Land Data Assimilation System (NLDAS) used to create measures. More about NLDAS: <http://www.emc.ncep.noaa.gov/mmb/nldas/>
2. Measure was calculated only for months May through September.
3. Percentile values are calculated using data for 1979-2020.
4. Modeled data performs relatively well in estimating temperature, however, the estimates may differ when compared to weather station-based observations. The differences vary by region and some of these differences are expected from a meteorological perspective. As a result, an area may be described as having higher or lower temperatures than actually occurred.
5. Census tract and county-level estimates of temperature and heat index are obtained by processing modeled data, which are available by 1/8th-degree grid. The process of converting grid-level data to other geographies using a population-weighted centroid approach may lead to potential misclassification of temperature and heat index for some areas.

6. For more information on heat warnings and alerts, please refer to the National Weather Service website: <http://www.weather.gov/>

## Data Re-release

This is a public dataset which can be freely shared. Personally identifiable health information have been removed. Please refer to the Data Methods section of these metadata for more information.

## Data Citations

Please cite the US CDC, LDH Environmental Public Health Tracking Program Cooperative Agreement NUE1EH001490, and any data source(s) listed on Page 1 when re-sharing or applying these data in analyses or publications.

References for this metadata include the following sources:

[Extreme Heat in Louisiana: Staying Protected. Alexis Williams, Louisiana Department of Health.](#)

[Louisiana Morbidity Report, November 2019. Vol 1, No. 1.](#)

[USCDC Tracking Program](#) Metadata Pages. Suggested Citation: Accessed From:

<https://ephtracking.cdc.gov/DataExplorer>. Accessed on [enter date].

## Disclaimer

Data are intended to spur further research and should be used only as a starting point to understanding how the environment and other contributing factors may be connected to disease. Datasets presented on the LDH Health Data Explorer site are intended to answer some basic questions, but should ultimately lead to further inquiry and more detailed study.

Data limitations should be noted if conducting exploratory ecological studies with these data. Limitations may include data gaps, reporting discrepancies (for example, a disruption of reporting or instrument recording) and insufficient data on all potentially confounding factors. There are numerous additional factors which may contribute to disease onset. These include genetics, access to health care, existing health conditions, medicines, other chemical substances we come into contact with or ingest, nutrition, route and duration of exposure, level of activity, level of stress, and others.

Responsible use of this data requires exercising caution when drawing conclusions based solely on views of the limited available data. Any perceived relationship, trend, or pattern apparent in the data should not be interpreted to imply causation; may in fact be unrelated; and should be regarded as preliminary, and potentially erroneous, until more in-depth study and if applicable, statistical evaluation, can be applied.

The Environmental Public Health Tracking Program and LDH Bureau of Health Informatics cannot guarantee the completeness of the information contained in these datasets and expressly disclaim liability for errors and omissions in their content.

## Additional Information

Please visit the following links for more information.

- [National Institute of Environmental Health Sciences - Health Impacts of Climate Change](#)
- [CDC Climate and Health](#)
- [CDC Extreme Heat and Your Health](#)

## Questions?

- Email: [healthdata@la.gov](mailto:healthdata@la.gov)
- Website: <http://ldh.la.gov/tracking>
- Toll free Phone: 1-888-293-7020