

East Tennessee State University

## Digital Commons @ East Tennessee State University

---

Tennessee Climate Office Monthly Report

---

12-1-2022

### 2022 December - Tennessee Monthly Climate Report

Tennessee Climate Office, East Tennessee State University

Follow this and additional works at: <https://dc.etsu.edu/tn-climate-monthly-reports>



Part of the [Climate Commons](#), and the [Meteorology Commons](#)

---

#### Recommended Citation

Tennessee Climate Office, East Tennessee State University, "2022 December - Tennessee Monthly Climate Report" (2022). *Tennessee Climate Office Monthly Report*. 64.  
<https://dc.etsu.edu/tn-climate-monthly-reports/64>

This Report is brought to you for free and open access by Digital Commons @ East Tennessee State University. It has been accepted for inclusion in Tennessee Climate Office Monthly Report by an authorized administrator of Digital Commons @ East Tennessee State University. For more information, please contact [digilib@etsu.edu](mailto:digilib@etsu.edu).

# December 2022 Tennessee State Climate Summary

Tennessee Climate Office \* East Tennessee State University

Prepared by William Tollefson and Dr. Andrew Joyner

With contributions by [Climate Data Representatives](#) across the state

## Monthly Temperature Summary:

December 2022 brought another month of roller-coaster temperatures to Tennessee. The first half of the month averaged warmer than normal, with the week of December 8-14 having mean temperatures that were 9-12°F warmer than normal across most areas of the state. Temperatures then moderated to near normal before the state plunged into a deep freeze as arctic air swept across the state from the 22<sup>nd</sup> to 24<sup>th</sup>. The week of December 23-29 had mean temperatures that were 12-15°F colder than normal, and brought some of the coldest December conditions seen in the state since 1989.

There were no record high temperatures set this month, but there were 31 broken and 12 tied daily records for warmest low temperature, and Monterey tied its warmest low temperature ever recorded in the month of December with a low of 61°F on December 12.

On the cold side of the record books, there were 29 broken and 5 tied daily record low temperatures. There were also 8 broken and 1 tied monthly low temperature records set for December. There were 31 broken and 10 tied daily records for coldest high temperature. Ten stations set a monthly record for coldest high temperature recorded during the month of December and 6 stations set an all-time record for coldest high temperature observed.

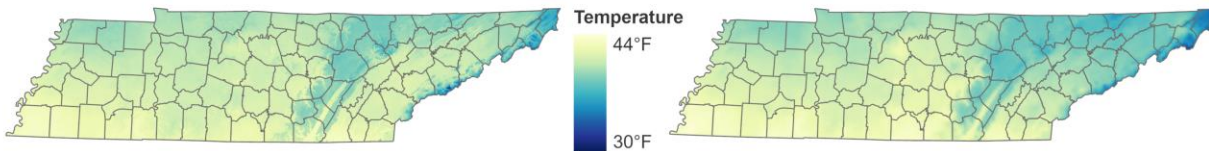


## December 2022 Mean Temperature



Normal Temperatures

Observed Temperatures



## Departure from Normal Temperature



Stations with the highest mean temperature

Station Name	Station Type	Mean Temperature (F)
CHATTANOOGA AP	WBAN	45
MEMPHIS INTERNATIONAL AP	WBAN	44.9
FAYETTEVILLE WATER PLANT	COOP	44
FRANKLIN SEWAGE PLANT	COOP	43.2
JACKSON EXP STA	COOP	43.1

Map Data from PRISM Climate Group, Oregon State University, 1991-2020 Climate Normals Used. Station Data Retrieved From xmACIS2.

Stations with the lowest mean temperature

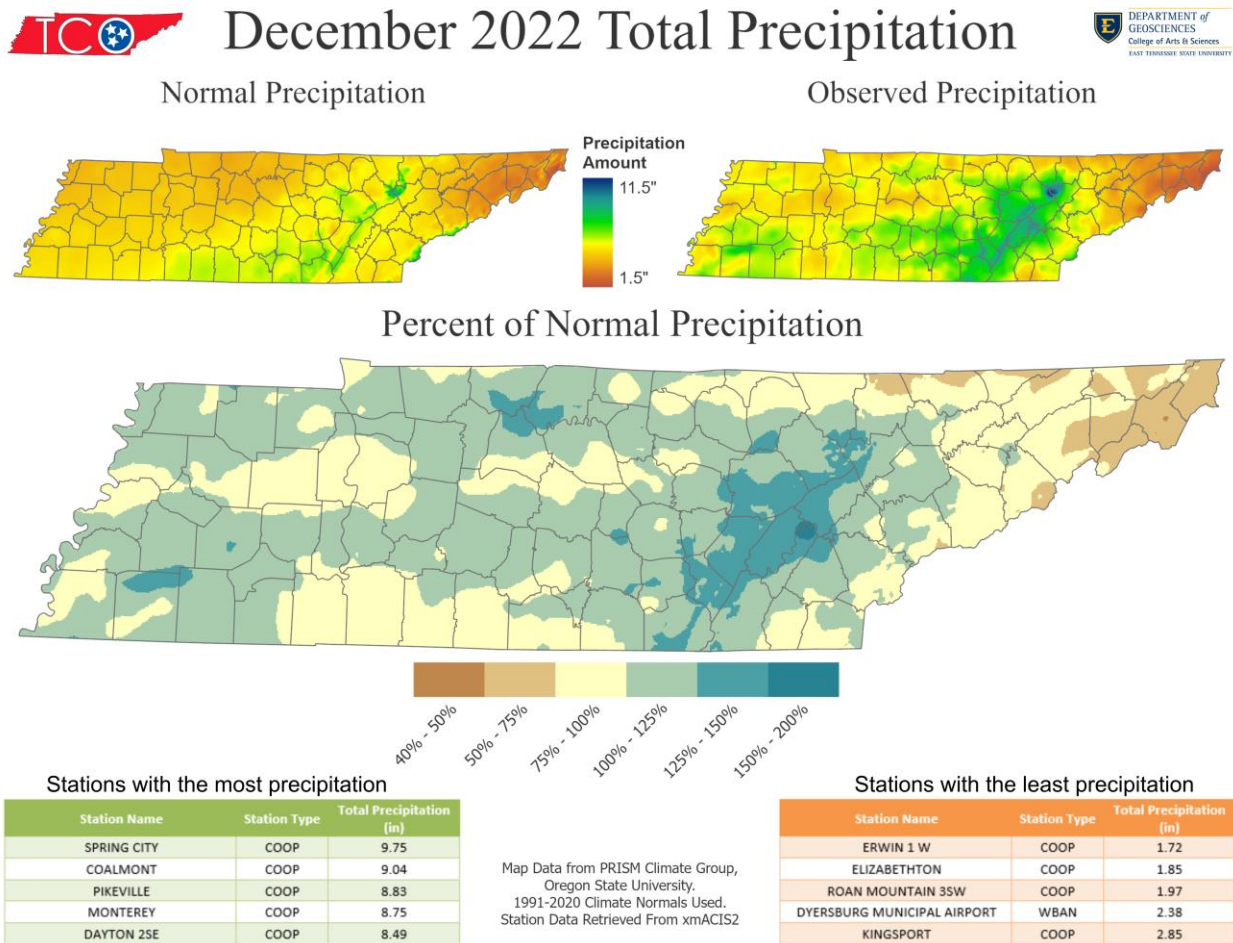
Station Name	Station Type	Mean Temperature (F)
MT LECONTE	COOP	29.6
NEWFOUND GAP	COOP	33.7
MOUNTAIN CITY 2	COOP	34.9
ROAN MOUNTAIN 35W	COOP	35.7
TAZEWELL	COOP	36.7

### Monthly Precipitation Summary:

Most areas of the state recorded near-normal precipitation for the month of December, with central portions of East Tennessee/Cumberland Plateau recording the most above normal totals (125-150% of normal for the month). Northeast Tennessee recorded the most below normal precipitation totals with only 50-75% of their normal December precipitation.

The first week of the month brought widespread heavy rainfall totaling 2-inches or more to most of the state. Another round of heavy rains brought 1-2-inches of rain in the middle of the month, and then widespread light rain and snow swept across the state from December 22-24 with the front that ushered in arctic temperatures and much drier conditions for the week. However, only light snowfall was reported through the 27<sup>th</sup>. Rainfall returned for the last days of 2022, with generally light totals in West and Middle Tennessee. These repeated heavy rainfall events and cold conditions helped to alleviate drought conditions across the state, with drought being eliminated from most areas by the end of the month.

There were 17 broken and 1 tied daily precipitation records set at weather stations across the state during December. There were also 15 broken daily records for highest snowfall totals during the month.



**Station Data and Top Tenn. (warmest/wettest, coldest/driest stations of the month):**

Station data for airports across the state using WBAN weather stations, compared to 1991-2020 30-year climate normals for departure from mean temperature and total precipitation:

Station Name	Temperatures (°F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	%Norm
<b>Memphis</b>	52.6	37.1	44.9	<b>+0.1</b>	72	12/6	1	12/23	5.95	<b>+0.46</b>	<b>108%</b>
<b>Jackson</b>	50.4	32.7	41.5	<b>-0.3</b>	73	12/6	-2	12/23	5.64	<b>+0.63</b>	<b>113%</b>
<b>Clarksville</b>	50.2	32.0	41.1	<b>+1.2</b>	70	12/6	-3	12/23	4.38	<b>+0.02</b>	<b>100%</b>
<b>Nashville</b>	52.1	34.2	43.1	<b>+0.4</b>	73	12/6	-1	12/23	4.49	<b>+0.06</b>	<b>101%</b>
<b>Chattanooga</b>	53.8	36.2	45.0	<b>+0.7</b>	73	12/8	7	12/23	6.10	<b>+0.85</b>	<b>116%</b>
<b>Crossville</b>	47.1	30.9	39.0	<b>+0.2</b>	64	12/7	-4	12/23	7.80	<b>+2.46</b>	<b>146%</b>
<b>Knoxville</b>	50.4	32.9	41.6	<b>-0.3</b>	68	12/30	4	12/24	5.66	<b>+0.66</b>	<b>113%</b>
<b>Bristol</b>	50.2	30.0	40.1	<b>+0.8</b>	66	12/29	1	12/24	3.85	<b>+0.09</b>	<b>102%</b>

Departures and %Norm Key: **Warmer than Normal**, **Cooler than Normal**; **Wetter than Normal**, **Drier than Normal**

**Hottest Stations (highest maximum temperature)**

Station Name	Station Type	Highest Temperature (F)	Date
BOLIVAR WATER WORKS	COOP	74	7
SHILOH NMP TENNESSEE	RAWS	74	6
FRANKLIN SEWAGE PLANT	COOP	73	7
SAVANNAH 6 SW	COOP	73	7
NASHVILLE BERRY FIELD	COOP	73	7
JACKSON MCKELLAR- SIPES AP	WBAN	73	6
CHATTANOOGA AP	WBAN	73	8
NASHVILLE INTL AP	WBAN	73	6
MOUNT PLEASANT 1N	COOP	72	7
HOHENWALD	COOP	72	7
JACKSON EXP STA	COOP	72	7
MURFREESBORO 5 N	COOP	72	7
MILAN EXP STN	COOP	72	7
AMES PLANTATION	COOP	72	7
CLARKSVILLE WWTP	COOP	72	31
MERIWETHER LEWIS TENNESSEE	RAWS	72	6
MEMPHIS INTERNATIONAL AP	WBAN	72	6
MEMPHIS WFO	WBAN	72	7

Ten stations tied for the 9<sup>th</sup> hottest temperature (72°F)

**Coldest Stations (lowest minimum temperature)**

Station Name	Station Type	Lowest Temperature (F)	Date
MT LECONTE	COOP	-22	24
NEWFOUND GAP	COOP	-14	24
HOHENWALD	COOP	-12	24
GAINESBORO	COOP	-8	26
ROAN MOUNTAIN 3SW	COOP	-7	24
LEWISBURG EXP STA	COOP	-6	24
MONTEREY	COOP	-6	24
LOOKOUT MTN-POINT PARK	COOP	-6	24
ERWIN 1 W	COOP	-5	24
LEBANON 7 N	COOP	-5	24
MOUNTAIN CITY 2	COOP	-5	25
DOVER 1 W	COOP	-5	27
COALMONT	COOP	-5	24
WAVERLY AIRPORT	COOP	-5	24
CHEROKEE TENNESSEE	RAWS	-5	24
MONTEAGLE	WBAN	-5	23
CROSSVILLE 7 NW	WBAN	-5	23

*Nine stations tied for the 9<sup>th</sup> coldest temperature (-5°F)*

**Warmest Stations (highest mean temperatures)**

Station Name	Station Type	Mean Temperature (F)
CHATTANOOGA AP	WBAN	45
MEMPHIS INTERNATIONAL AP	WBAN	44.9
FAYETTEVILLE WATER PLANT	COOP	44
FRANKLIN SEWAGE PLANT	COOP	43.2
JACKSON EXP STA	COOP	43.1
NASHVILLE INTL AP	WBAN	43.1
MEMPHIS WFO	WBAN	42.9
TULLAHOMA	COOP	42.8
NASHVILLE BERRY FIELD	COOP	42.8
PIKEVILLE	COOP	42.7

**Coollest Stations (lowest mean temperatures)**

Station Name	Station Type	Mean Temperature (F)
MT LECONTE	COOP	29.6
NEWFOUND GAP	COOP	33.7
MOUNTAIN CITY 2	COOP	34.9
ROAN MOUNTAIN 3SW	COOP	35.7
TAZEWELL	COOP	36.7
SHELBY BOTTOMS NATURE CNTR	COOP	37.1
ROGERSVILLE 1 NE	COOP	37.5
ERWIN 1 W	COOP	37.9
NEWCOMB	COOP	37.9
COALMONT	COOP	38

**Wettest Stations (highest precipitation totals):**

Station Name	Station Type	Total Precipitation (in)
SPRING CITY	COOP	9.75
COALMONT	COOP	9.04
PIKEVILLE	COOP	8.83
MONTEREY	COOP	8.75
DAYTON 2SE	COOP	8.49
DUNLAP 2.6 W	CoCoRaHS	8.23
MT LECONTE	COOP	8.2
DECATUR 7NE	COOP	8.06
KINGSTON	COOP	7.89
MONTEAGLE	WBAN	7.89

**Driest Stations (lowest precipitation totals):**

Station Name	Station Type	Total Precipitation (in)
ERWIN 1 W	COOP	1.72
ELIZABETHTON	COOP	1.85
ROAN MOUNTAIN 3SW	COOP	1.97
DYERSBURG MUNICIPAL AIRPORT	WBAN	2.38
KINGSPORT	COOP	2.85
ROGERSVILLE 1 NE	COOP	3.11
MORRISTOWN RADIO WCRK	COOP	3.45
BRISTOL AP	WBAN	3.85
WARNER PARK	COOP	3.97
FRANKLIN SEWAGE PLANT	COOP	3.99

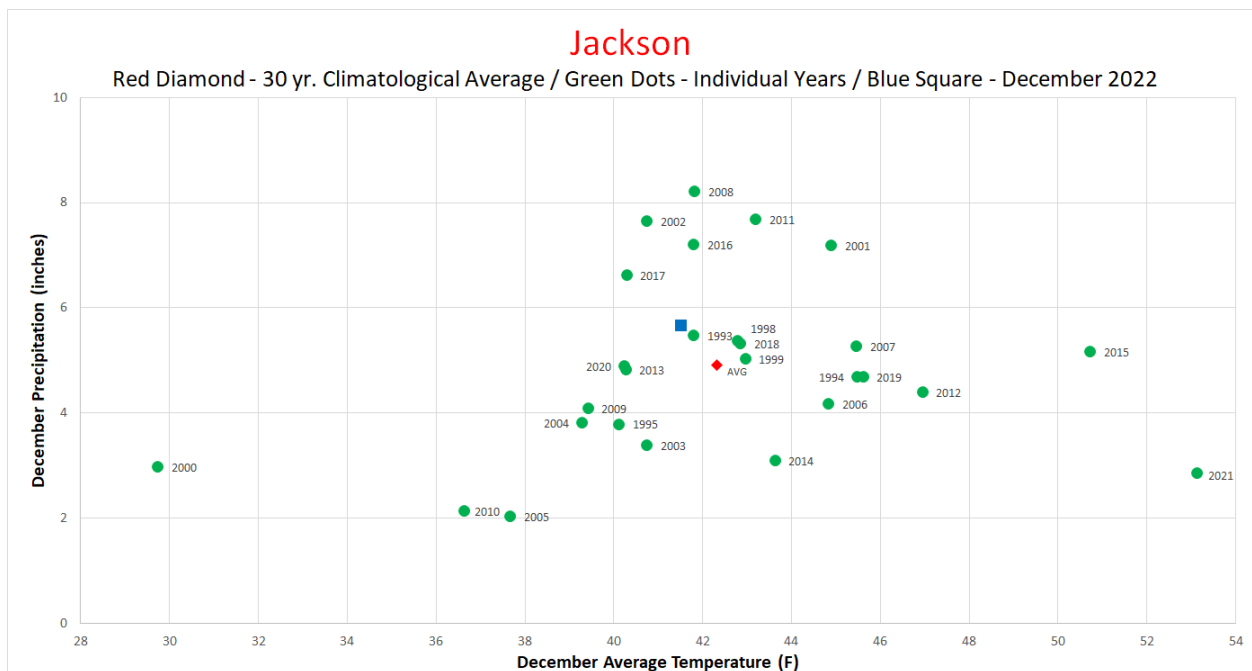
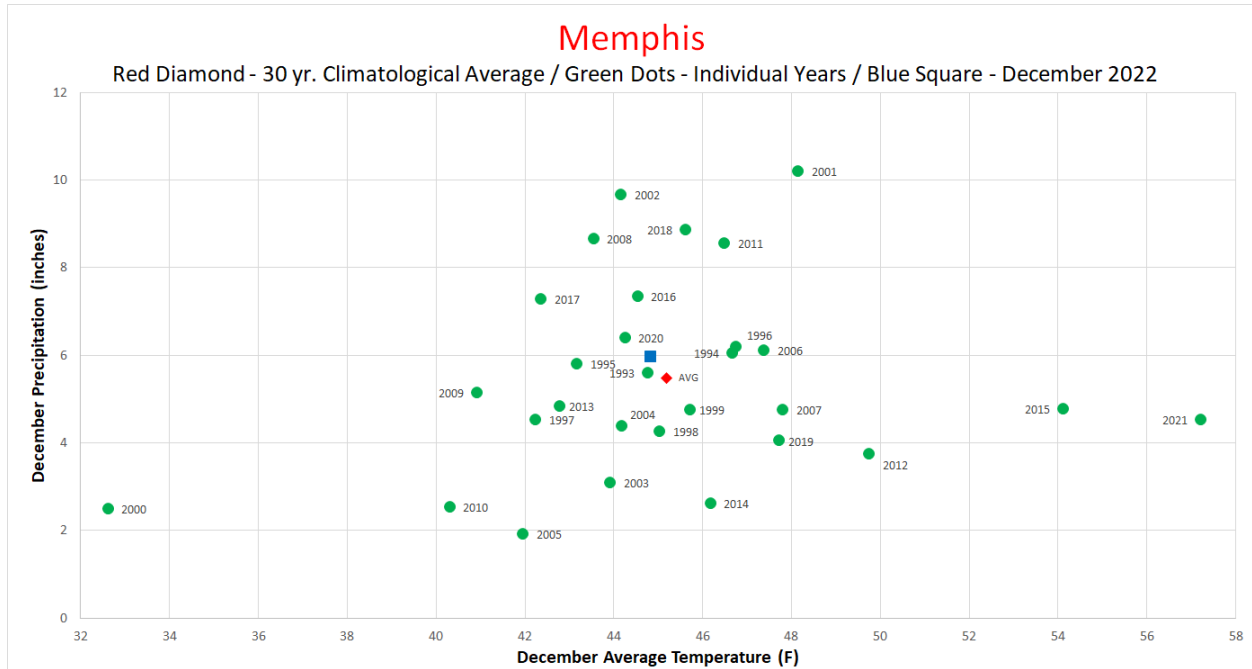
**Snowiest Stations (highest snowfall accumulations)**

Name	Station Type	Total Snowfall (in)
MT LECONTE	COOP	5.5
ATWOOD 0.8 WSW	CoCoRaHS	4.2
NEWFOUND GAP	COOP	4.1
CLARKSVILLE 9.3 ESE	CoCoRaHS	4
CARTHAGE	COOP	2.5
CLARKSVILLE WWTP	COOP	2.5
CLARKSVILLE 3.4 NNW	CoCoRaHS	2
CEDAR HILL 2.6 N	CoCoRaHS	2
DICKSON 6.3 WSW	CoCoRaHS	2
ROAN MOUNTAIN 7.1 W	CoCoRaHS	2
CELINA 0.3 NNE	CoCoRaHS	2
GATES 1.9 S	CoCoRaHS	2

*160 of 361 stations in the state reported measurable snowfall and an additional 23 reported a trace of snow this month.*

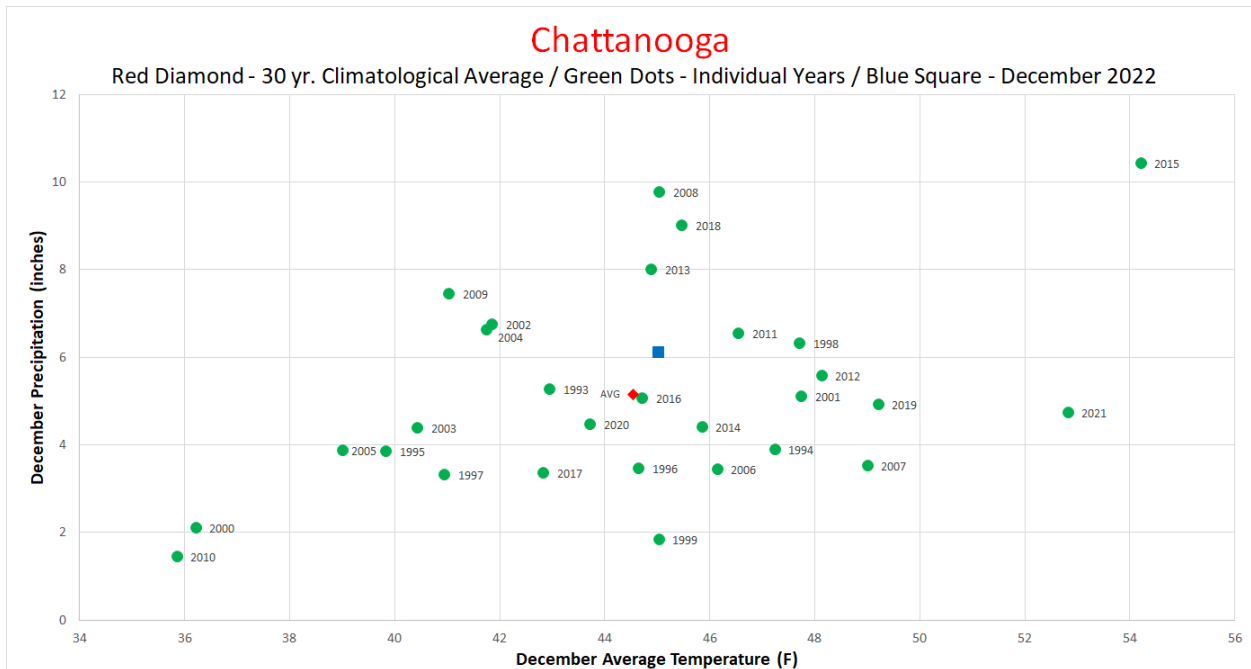
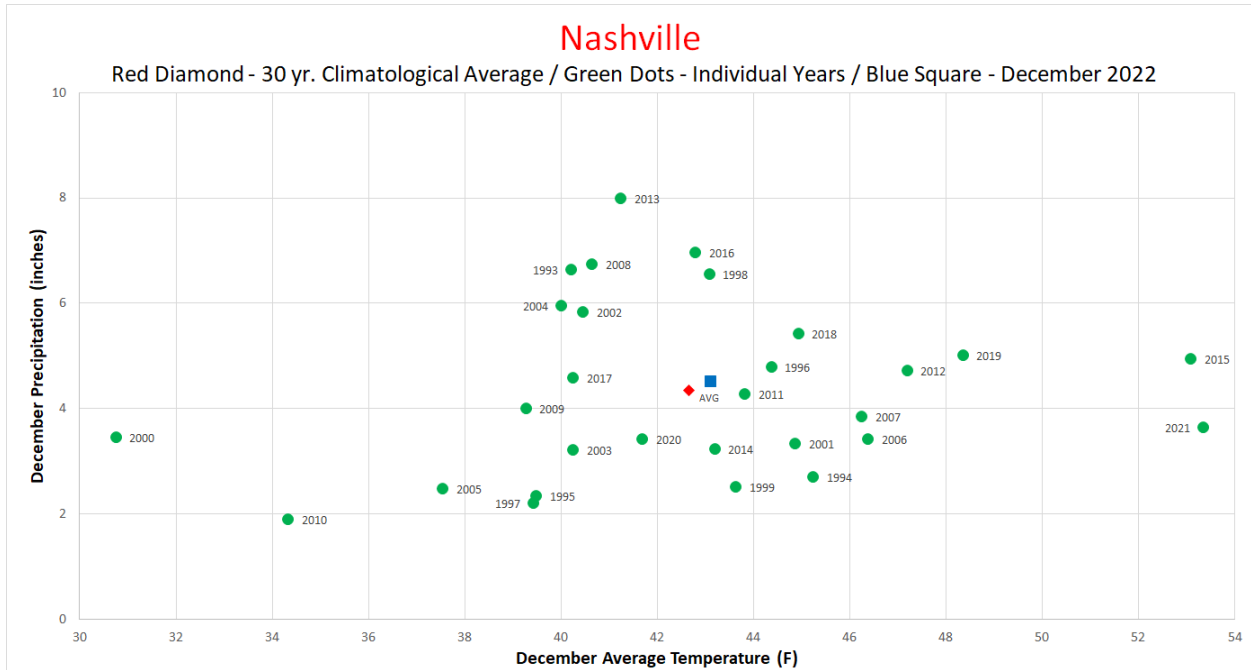
### The Month in Comparison:

Despite the record-setting cold spell around Christmas, December 2022 averaged out to be near normal in both mean temperature and precipitation for cities across the state. Comparing this month's total precipitation and average temperature to the conditions of December over the past thirty years, it was close to average and near the middle of the pack for Memphis, Jackson, Nashville, Chattanooga, Knoxville, and the Tri-Cities.

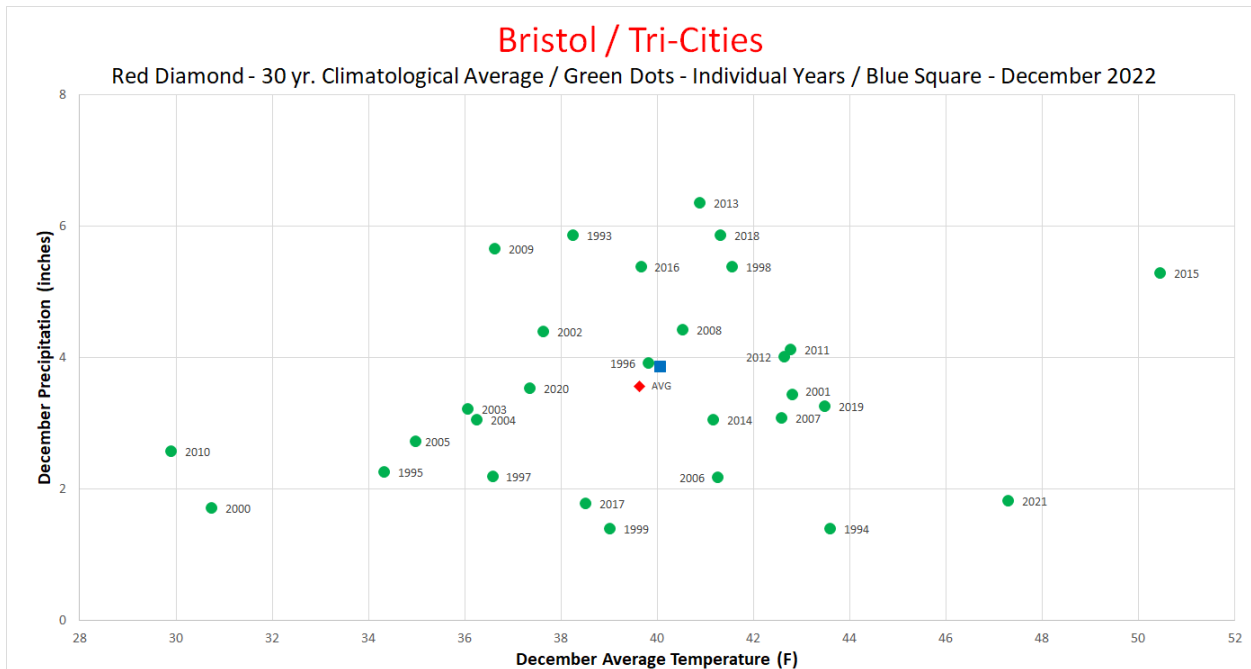
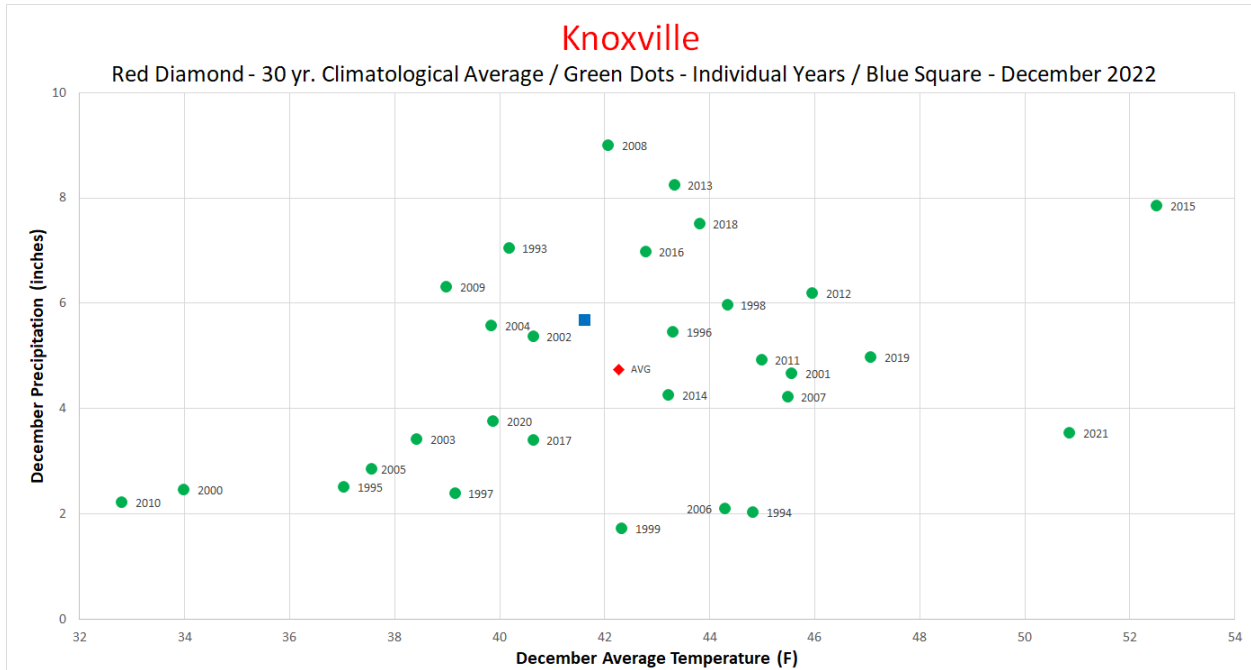




December 2022 Tennessee State Climate Summary

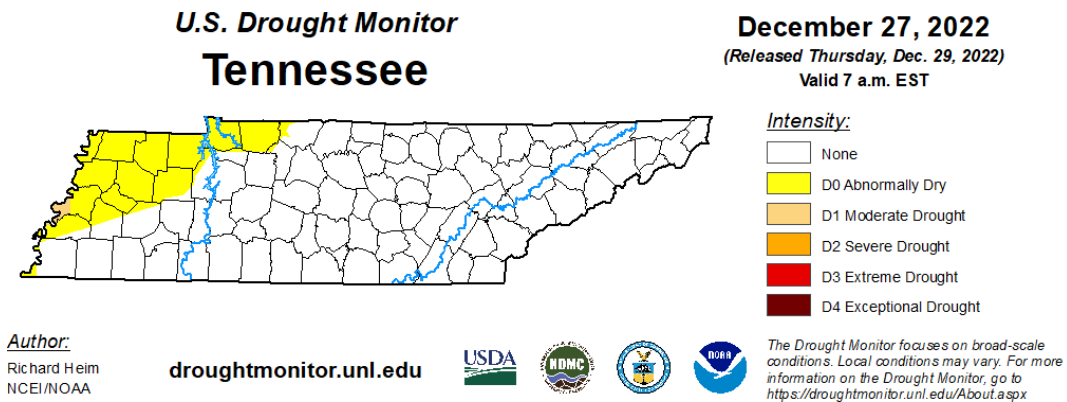
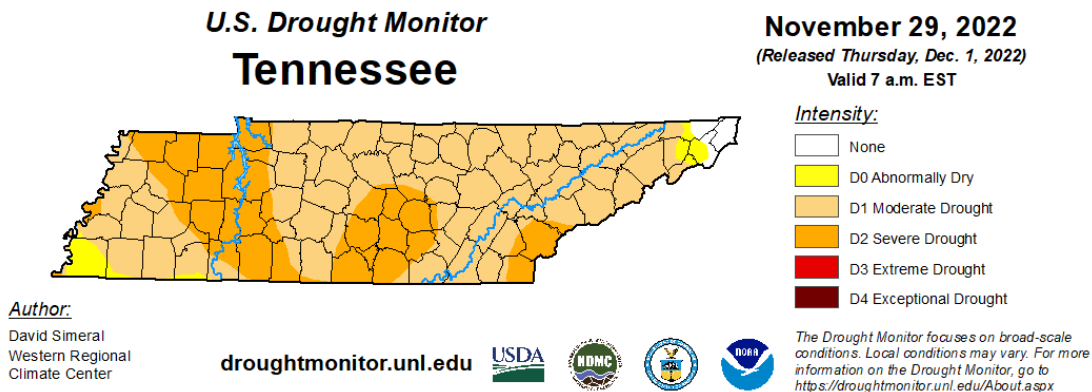


December 2022 Tennessee State Climate Summary



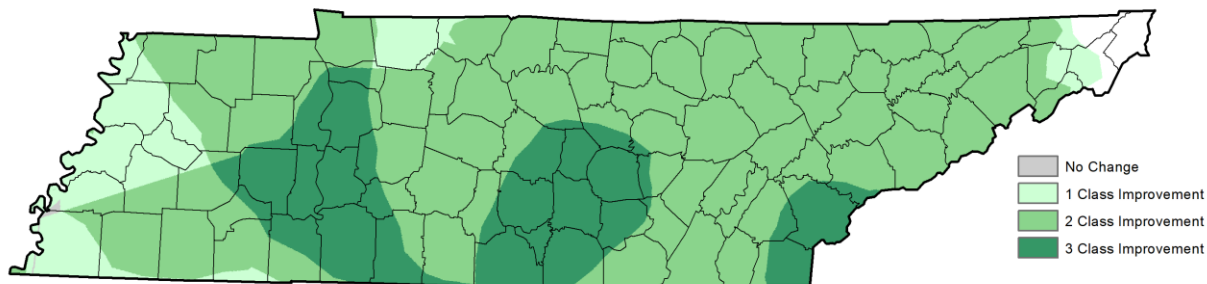
### Drought Monitor:

There were widespread improvements in drought conditions across Tennessee during December. Several rounds of heavy rains and some snow during the month led to the elimination of Severe Drought (D2) which had covered 30.53% of the state’s area in the last Drought Monitor of November. There were also major reductions in Moderate Drought (D1), dropping from 64.8% of the state’s area at the end of November down to just 0.35% by the end of December. The coverage of Abnormally Dry (D0) Conditions increased from 3.1% to 14.94% of the state’s area during December due to the change from D2/D1 to D0 in the northwest portion of the state.



December 27, 2022  
compared to  
November 29, 2022

### U.S. Drought Monitor Class Change - Tennessee 4 Week



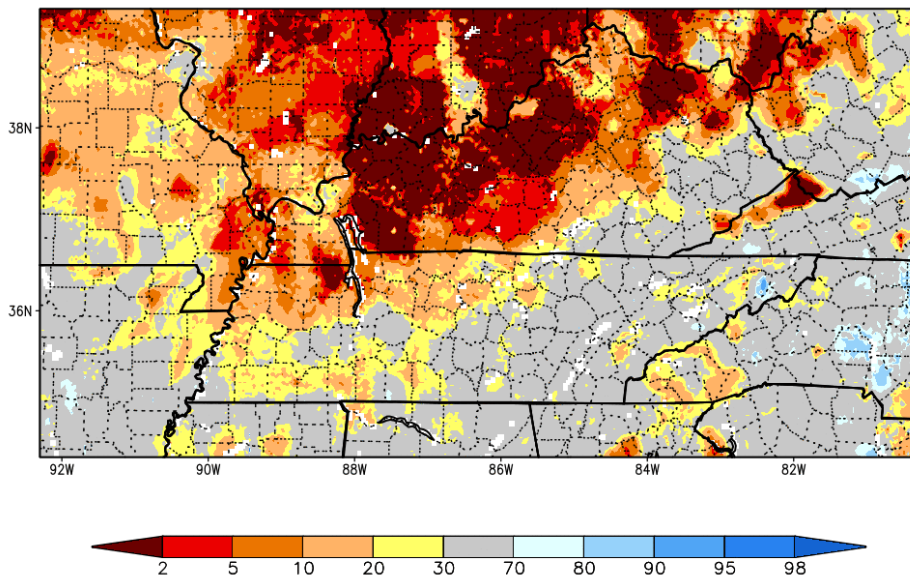
[droughtmonitor.unl.edu](https://droughtmonitor.unl.edu)



**Soil Moisture:**

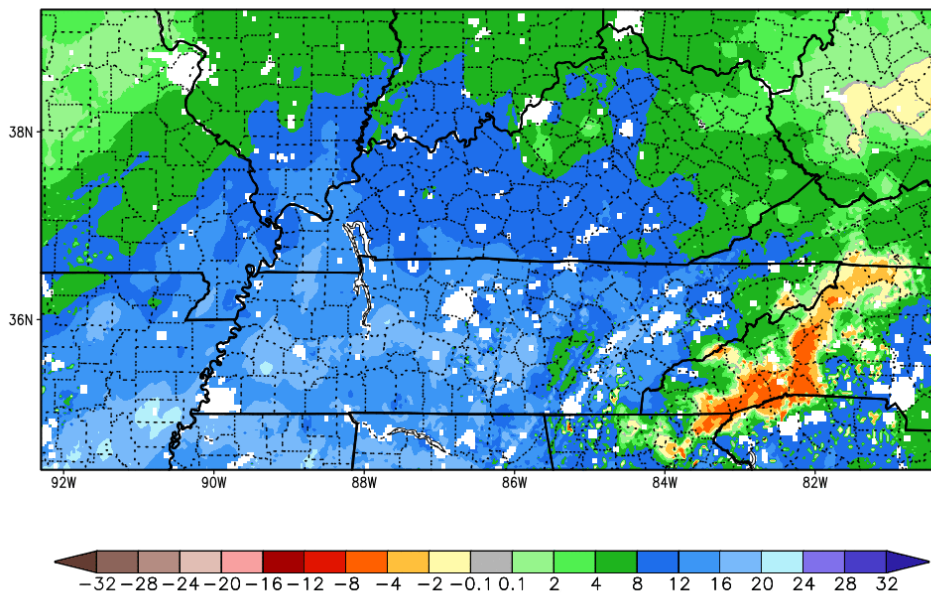
The NASA SPoRT Land Information System shows that most of East and southern portions of Middle Tennessee had soil moisture in the normal range by the end of December, while the northwest corner of the state still had some below normal soil moisture due to more persistent dry conditions earlier in the year. However, virtually all areas of the state saw an increase in soil moisture levels during the month of December, with most areas of the state recording an 8-16% increase in soil moisture levels. The USDA rated topsoil moisture as 6% short, 65% adequate, and 29% surplus; subsoil moisture was rated 6% short, 74% adequate, and 20% surplus.

SPoRT-LIS 0-200 cm Soil Moisture percentile valid 31 Dec 2022



\*\*NOTE\*\*  
\*\*Experimental\*\*

1-Month Difference in Column Relative Soil Moisture (%) valid 12z 31 Dec 2022



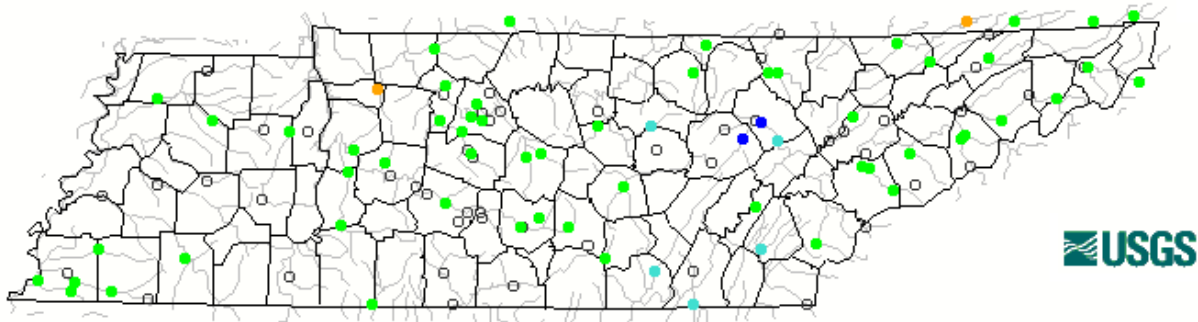
\*\*NOTE\*\*  
\*\*Experimental\*\*

**Streamflow:**

Following along with the precipitation and soil moisture increases, most streams in Tennessee averaged in the normal range for streamflow during December. Some streams on the Cumberland Plateau and in East Tennessee recorded above or much above normal flow, since these areas also recorded the most above-normal precipitation for the month.

**Map of monthly streamflow compared to historical streamflow for the month of the year (Tennessee)**

December 2022

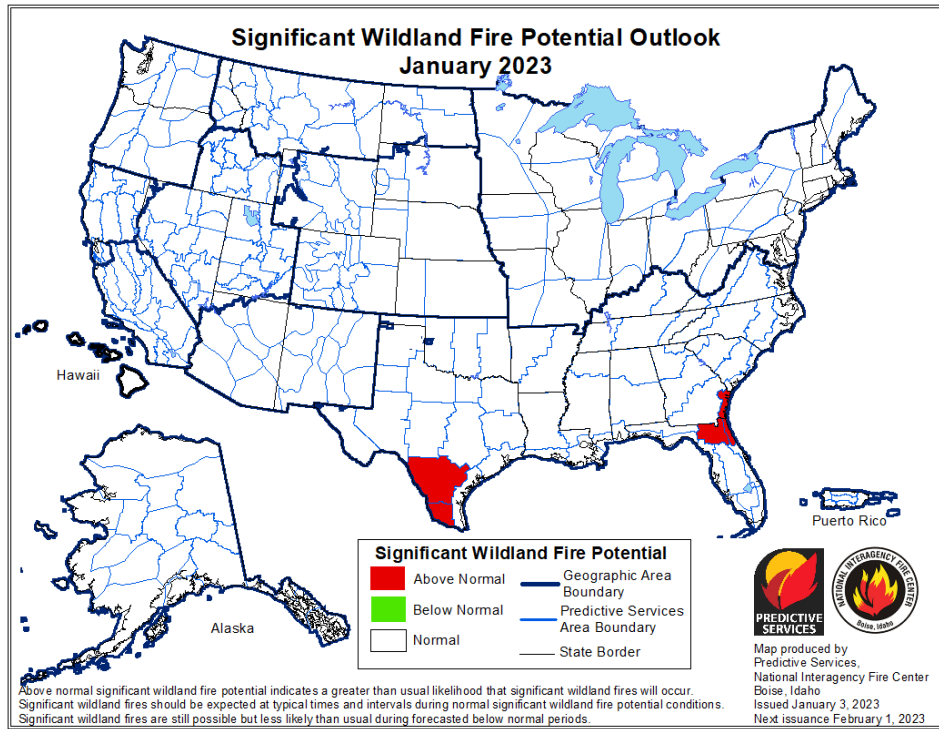


Explanation - Percentile classes							
●	●	●	●	●	●	●	○
Low	<10	10-24	25-75	76-90	>90	High	Not-ranked
	Much below normal	Below normal	Normal	Above normal	Much above normal		

**Miscellaneous:**

**Crop Conditions from USDA:** The strong cold spell around Christmas had negative impacts on winter wheat, pastures, and cattle across Tennessee, with 24% of the state’s winter wheat crop and 28% of the state’s pasture/range reported in poor or very poor condition. The drought and extreme temperature swings earlier in the summer/fall were also bad for hay and roughage supplies, with 25% reported short or very short by the end of December.

**Fire Danger:** The Interagency Fire Center outlook for January shows that all of Tennessee and surrounding regions will have a normal risk for significant wildland fires during January.



### Story of the Month:

The major story of December was the extreme cold and snow that impacted the state from December 22-27. A strong cold front swept the state on December 22-23 with temperatures falling over 40-degrees in a few hours into the single digits or sub-zero for many areas of the state. Along with these bitterly cold temperatures winds gusted in the 30-40mph range after the frontal passage, sending wind chills into the -20°F range for most areas of the state and prompting a wind chill warning issued for all counties in Tennessee on December 22. Light snowfall and strong winds also occurred as the temperatures plummeted after the frontal passage, with snow totals ranging from a dusting to ~2" across the state. Temperatures on the morning of December 23 were below zero at the airport weather stations in Jackson (-2°F), Clarksville (-3°F), Nashville (-1°F), and Crossville (-4°F). This was the first time these stations have recorded sub-zero temperatures since January 2018 for Clarksville and Crossville, February 1996 for Nashville, and December 1989 for Jackson.



37.4-degree temperature drop recorded at the NWS office in Memphis on Dec 22-23.



Map of wind chill warnings in the western half of Tennessee on Dec 22.



Snow-covered driveway on December 23 in Fairview, TN (photo by William Tollefson)



The cold conditions also set daily and monthly cold temperature records in Tennessee, as well as daily, monthly, and all-time records for coldest daily high temperatures. There were 29 broken and 5 tied daily record low temperatures, including 10 records set at stations with at least a 100-year station history and 9 records breaking the previous record by 10 degrees or more! There were 8 broken and 1 tied monthly low temperature records set for December, including 3 records set at stations with at least a 100-year station history.

Beyond the cold low temperatures this event also set several records for coldest high temperatures recorded at weather stations around the state. There were 31 broken and 10 tied daily records for coldest high temperature, including 11 records set at stations with at least a 100-year station history. Ten stations broke their old daily record by over 10 degrees, including Mt LeConte with a high of -11°F on Christmas Eve, beating the previous record cold high temperature for that date by 27 degrees!

From these daily records, 10 stations also set a monthly record for coldest high temperature recorded during the month of December, and for 6 stations it was an all-time record for coldest high temperature observed. The table below shows the six stations that set all-time records for the coldest high temperatures ever recorded at that station.

Station	Record (°F)	Date of Record	Previous Record (°F)	Previous Record Date	Station Age (Years)
Mount LeConte	-11	2022-12-24	-3	2018-01-05	35
Pulaski Water Plant	8	2022-12-24	14	1996-02-05	66
Monterey	1	2022-12-24	4	2014-01-07	119
Sparta Wastewater Plant	4	2022-12-24	6	1962-01-11	62
Newfound Gap	-2	2022-12-24	-1	1994-01-19	32
Old Hickory Weather Forecast Office	6	2022-12-24	7	1994-01-18	32

**Storm Reports:**

*\*Storm Reports are based on filtered NOAA Storm Prediction Center data or local NWS storm reports. Future quality control checks may change the official record of severe events, please see [spc.noaa.gov](http://spc.noaa.gov) for any updates.*

There were no severe storm reports in Tennessee during December 2022.

### CPC Outlooks for the Next Month:

The NOAA Climate Prediction Center outlooks for January show that all of Tennessee is leaning towards warmer than normal conditions (40-50% likely), and wetter than normal conditions. There is slightly higher confidence in the eastern half of the state for above normal precipitation with 40-50% likelihood compared to 33-40% for the western half of the state.

