

# February 2021 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 at University of Memphis, University of Tennessee-Martin, Vanderbilt University, University of Tennessee-Knoxville, and University of Tennessee-Institute of Agriculture

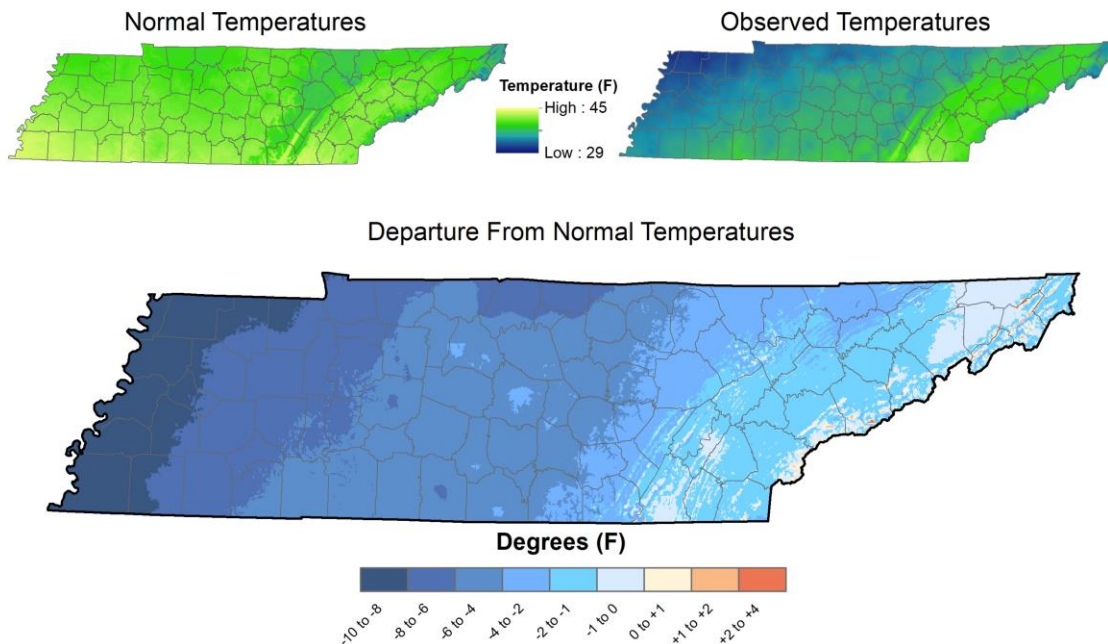
## Monthly Temperature Summary:

Temperatures varied widely this month, with several weather stations reporting temperatures from below 0°F to upper 70's. There was also a strong spatial gradient to mean temperatures across the state, with the westernmost counties averaging 8-10°F colder than the 1981-2010 climate normal, while eastern portions of the state were much closer to normal.

The coldest period of the month occurred from February 10 to 19, when there were 79 broken and 9 tied record-low daily high temperatures and 24 broken and 2 tied record-low daily low temperatures (at weather stations in the state with at least a 30-year record). The cold air mass was strongest and most persistent in West Tennessee with a moderating trend towards the east. This contrast was at its most extreme on February 15, when the high temperature recorded at Memphis International Airport was 15°F while the high temperature recorded at the Tri-Cities airport in northeast Tennessee was 55°F. The length of the cold outbreak was also extreme, with Memphis staying below freezing for nine days, which tied the record for longest streak below freezing (it happened previously in 1940 and 1899)!



## February 2021 Mean Temperature



Stations with the highest mean temperature

Station Name	Station Type	Mean Temperature (F)
CHATTANOOGA AP	WBAN	45.1
SELMER	COOP	44.1
INDIAN GRAVE TENNESSEE	RAWS	42
CLEVELAND FILTER PLANT	COOP	41.9
PIKEVILLE	COOP	41.9

Map Data From: PRISM Climate Group, Oregon State University, 1981-2010 Normals Used, Station Data retrieved from SC ACIS2

Stations with the lowest mean temperature

Station Name	Station Type	Mean Temperature (F)
MT LECONTE	COOP	27.9
TENNESSEE RIDGE	COOP	31.6
MILAN EXP STN	COOP	31.7
UT MARTIN BRANCH EXP STATION	COOP	31.7
GOODLETTSVILLE 7WNW	COOP	32.1

### Monthly Precipitation Summary:

Generally, the eastern half of the state recorded above normal precipitation for the month, whereas the western half recorded below normal precipitation. Northeast Tennessee recorded consistently above normal precipitation week-to-week through the month with several rain and snow events. Widespread rain, snow, and ice events brought normal to above normal precipitation to most of East and Middle Tennessee by the middle of the month. Heavy rains and thunderstorms brought above normal precipitation to all areas of the state at the very end of the month. A band of very heavy rains set up in West Tennessee and produced 4-5" of rain, leading to an area of above normal precipitation for the month from Memphis to the northeast through parts of Carroll and Benton counties.

The major winter storms that impacted the state in the middle of the month brought significant snow, sleet, and freezing rain accumulations to many areas in addition to increased rainfall. Memphis was the snowiest of the major cities in Tennessee, with the Memphis International Airport reporting ten inches of snow during the month.

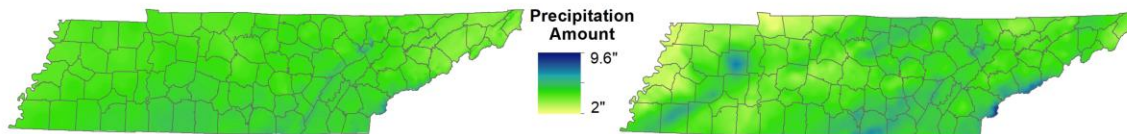


## February 2021 Precipitation

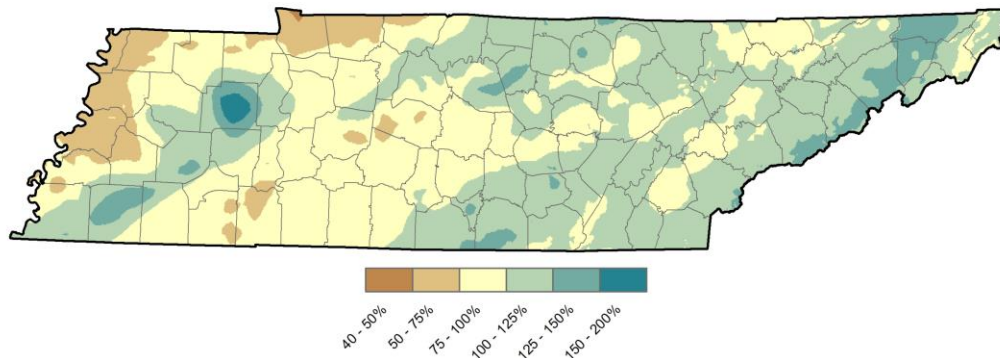


Normal Precipitation

Observed Precipitation



Percent Normal Precipitation



Stations with the most precipitation

Station Name	Station Type	Total Precipitation (in)
HUNTINGDON WATER PLANT	COOP	12.02
AMES PLANTATION	COOP	9.6
LEWISBURG EXP STA	COOP	8.79
MT LECONTE	COOP	8.35
GLADEVILLE	COOP	8.1

Stations with the least precipitation

Station Name	Station Type	Total Precipitation (in)
MCKENZIE 1.5 SSE	CoCoRaHS	1.89
TENNESSEE RIDGE	COOP	2.3
FRANKLIN SEWAGE PLANT	COOP	2.31
CLARKSVILLE 4.9 NW	CoCoRaHS	2.43
DICKSON 5.8 NW	CoCoRaHS	2.52

Map Data From: PRISM Climate Group,  
Oregon State University,  
1981-2010 Normals Used  
Station Data retrieved from SC ACIS2

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

Station data for airports across the state using WBAN weather stations:

Station Name	Temperatures (°F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	%Norm
<b>Memphis</b>	44.6	26.4	37.0	<b>-8.5</b>	75	2/28	1	2/16	6.95	<b>+2.56</b>	<b>158%</b>
<b>Jackson</b>	44.0	26.9	35.4	<b>-6.9</b>	74	2/28	0	2/16	6.84	<b>+2.67</b>	<b>164%</b>
<b>Clarksville</b>	42.2	26.1	34.2	<b>-5.4</b>	71	2/28	5	2/16	4.57	<b>+0.40</b>	<b>110%</b>
<b>Nashville</b>	47.0	29.9	38.4	<b>-3.3</b>	75	2/28	11	2/16	4.81	<b>+0.87</b>	<b>122%</b>
<b>Chattanooga</b>	54.8	35.4	45.1	<b>+0.7</b>	77	2/28	21	2/17	5.17	<b>+0.33</b>	<b>107%</b>
<b>Crossville</b>	45.0	28.8	36.9	<b>-2.4</b>	69	2/28	11	2/17	4.17	<b>-0.29</b>	<b>93%</b>
<b>Knoxville</b>	51.2	32.4	41.8	<b>-0.6</b>	75	2/28	20	2/17	4.35	<b>+0.09</b>	<b>102%</b>
<b>Bristol</b>	50.9	30.6	40.8	<b>+1.8</b>	76	28/28	19	2/4	4.89	<b>+1.44</b>	<b>142%</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
WOODBURY 1 WNW	COOP	78	28
CHATTANOOGA AP	WBAN	77	28
NEWPORT 1 NW	COOP	77	28
DECATURVILLE	COOP	77	25
BRISTOL AP	WBAN	76	28
HAMBLEN CO HQ TENNESSEE	RAWS	76	28
MERIWETHER LEWIS TENNESSEE	RAWS	76	24
MEMPHIS INTERNATIONAL AP	WBAN	75	28
NASHVILLE INTL AP	WBAN	75	28
KNOXVILLE AP	WBAN	75	28
SHILOH NMP TENNESSEE	RAWS	75	24
SELMER	COOP	75	8
NASHVILLE BERRY FIELD	COOP	75	25
THOMPSON STATION	COOP	75	28
MOUSETAIL LANDING STATE PARK	COOP	75	25

*Eight stations tied for the eighth highest maximum temperature (75°F).*

**Coldest Stations (lowest minimum temperature)**

Station Name	Station Type	Lowest Temperature (F)	Date
BRENTWOOD	COOP	-8	21
GERMANTOWN 4SE	COOP	-5	16
BROWNSVILLE	COOP	-1	16
MILAN EXP STN	COOP	-1	19
SAMBURG W. L. REFUGE	COOP	-1	16
CLARKSVILLE WWTP	COOP	0	15
JACKSON MCKELLAR- SIPES AP	WBAN	0	16
AMES PLANTATION	COOP	1	16
DRESDEN	COOP	1	17
UT MARTIN BRANCH EXP STATION	COOP	1	16
JACKSON 4 NE	COOP	1	17
MEMPHIS INTERNATIONAL AP	WBAN	1	16
DYERSBURG III GOLF	WBAN	1	16
MEMPHIS WFO	WBAN	1	17

*Seven stations tied for the seventh coldest temperature (1°F).*

**Warmest Stations (highest mean temperatures)**

Station Name	Station Type	Mean Temperature (F)
CHATTANOOGA AP	WBAN	45.1
SELMER	COOP	44.1
INDIAN GRAVE TENNESSEE	RAWS	42
CLEVELAND FILTER PLANT	COOP	41.9
PIKEVILLE	COOP	41.9
COKER CREEK TENNESSEE	RAWS	41.8
KNOXVILLE AP	WBAN	41.8
NEWPORT 1 NW	COOP	41.6
OAK RIDGE ASOS	WBAN	41.4
HAMBLEN CO HQ TENNESSEE	RAWS	41.1
LENOIR CITY TENNESSEE	RAWS	41.1

*Two stations tied for the tenth warmest mean temperature (41.1°F).*

**Cooltest Stations (lowest mean temperatures)**

Station Name	Station Type	Mean Temperature (F)
MT LECONTE	COOP	27.9
TENNESSEE RIDGE	COOP	31.6
MILAN EXP STN	COOP	31.7
UT MARTIN BRANCH EXP STATION	COOP	31.7
GOODLETTSVILLE 7WNW	COOP	32.1
DRESDEN	COOP	32.3
CROSSVILLE EXP STN	COOP	32.8
SPRINGFIELD EXP STATION	COOP	33.2
CLARKSVILLE NO.2	COOP	33.2
BETHPAGE 1 S	COOP	33.4

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

Station Name	Station Type	Total Precipitation (in)
HUNTINGDON WATER PLANT	COOP	12.02
AMES PLANTATION	COOP	9.6
LEWISBURG EXP STA	COOP	8.79
MT LECONTE	COOP	8.35
GLADEVILLE	COOP	8.1
CHRISTIANA 5W	COOP	8.05
BENTON 2.3 ESE	CoCoRaHS	7.86
OLD HICKORY DAM	COOP	7.85
CARTHAGE	COOP	7.84
HOHENWALD	COOP	7.61

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

Station Name	Station Type	Total Precipitation (in)
MCKENZIE 1.5 SSE	CoCoRaHS	1.89
TENNESSEE RIDGE	COOP	2.3
FRANKLIN SEWAGE PLANT	COOP	2.31
CLARKSVILLE 4.9 NW	CoCoRaHS	2.43
DICKSON 5.8 NW	CoCoRaHS	2.52
CLARKSVILLE 4.0 WNW	CoCoRaHS	2.52
LEBANON 10.5 ENE	CoCoRaHS	2.52
DRESDEN	COOP	2.52
CHEATHAM LOCK & DAM	COOP	2.65
BROWNSVILLE 1.0 SE	CoCoRaHS	2.67

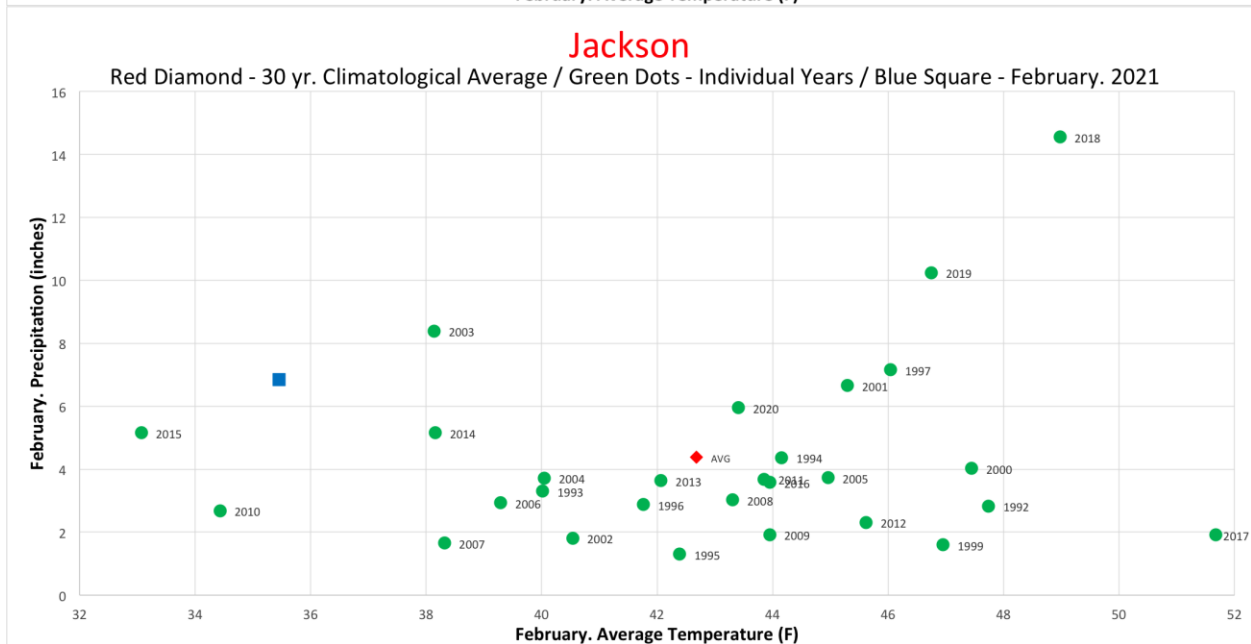
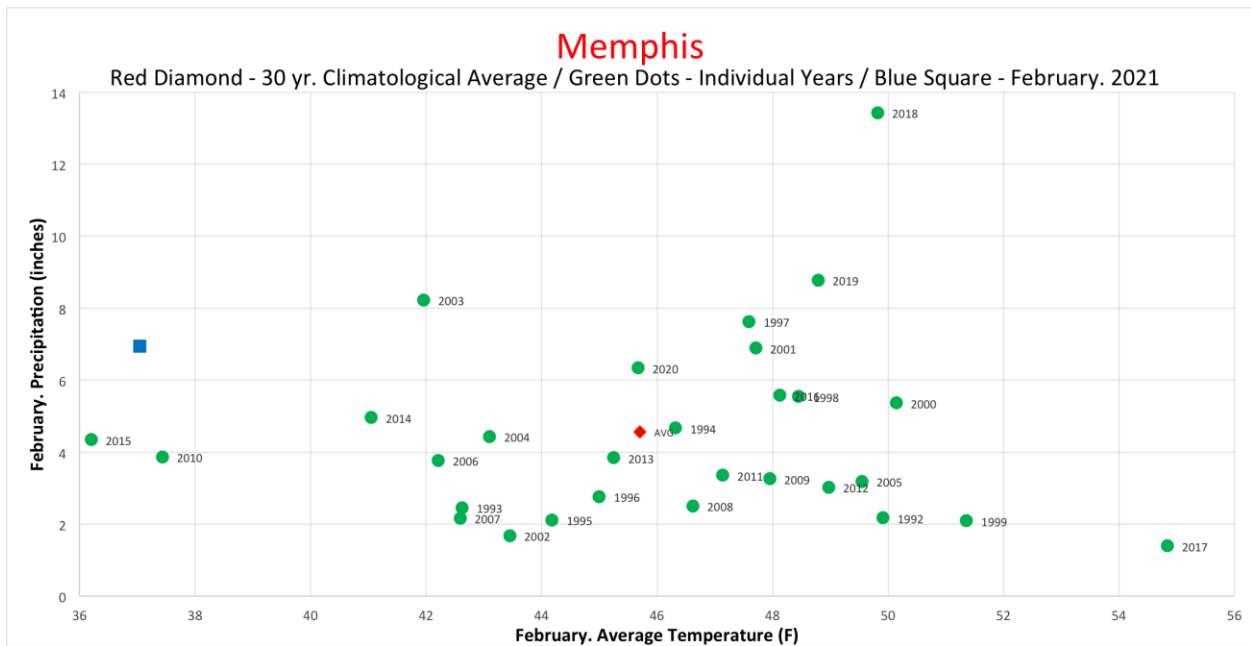
**Snowiest Stations (highest snowfall accumulations):**

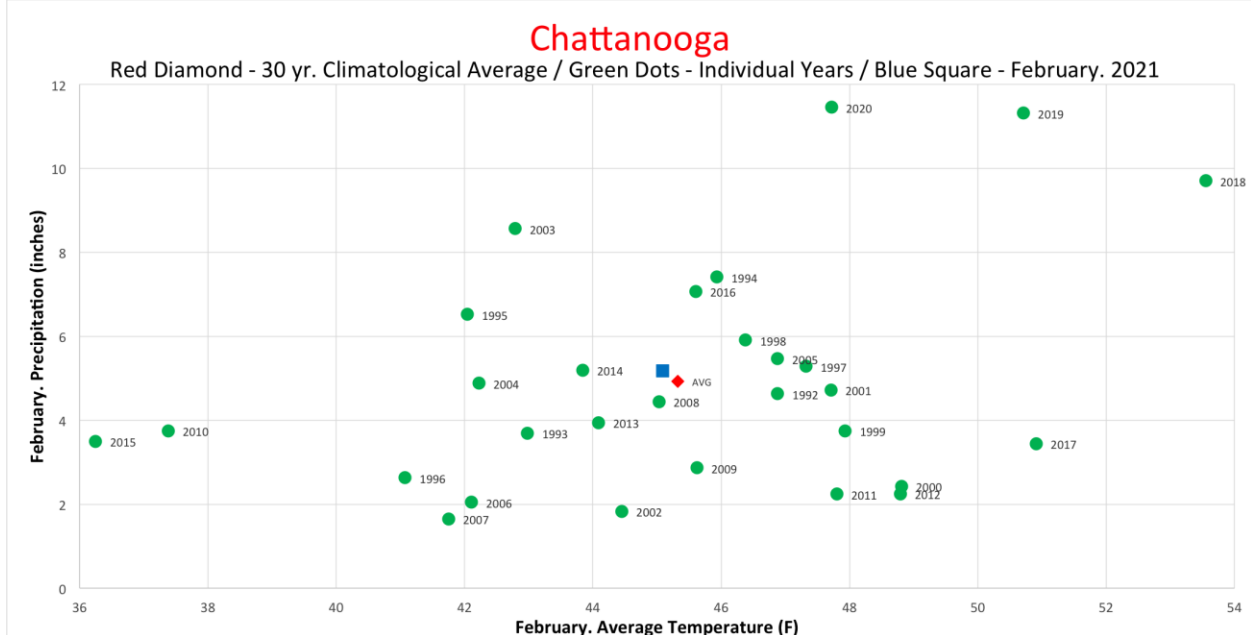
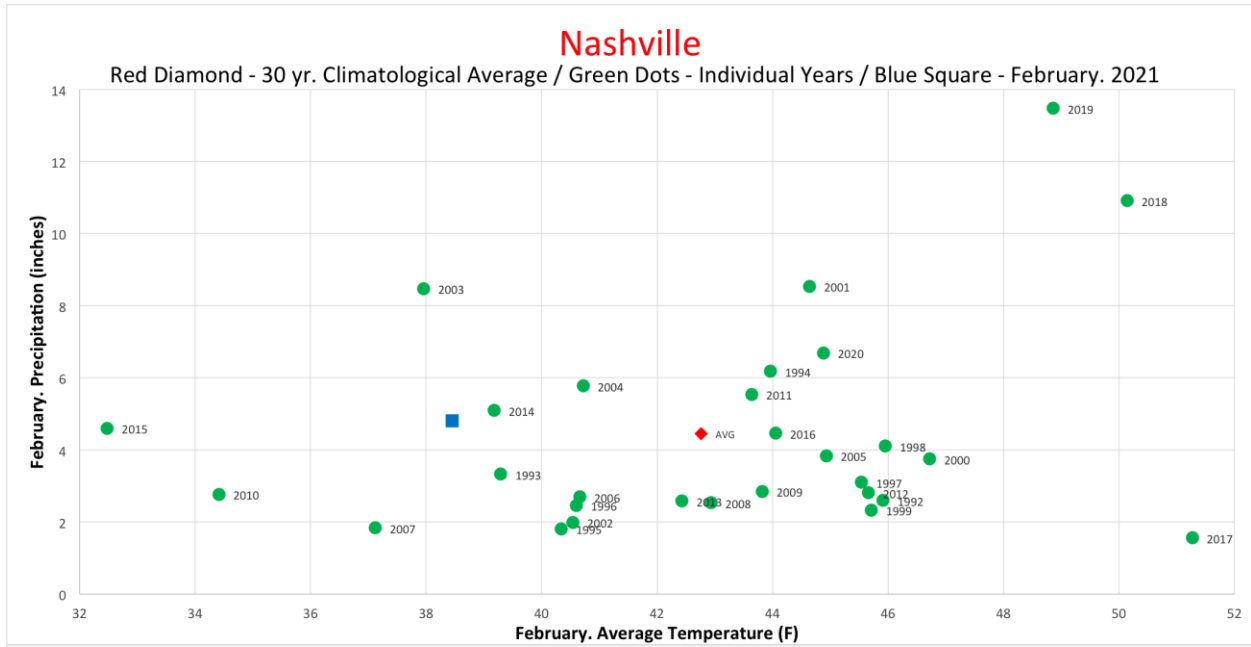
Station Name	Station Type	Total Snowfall (in)
MT LECONTE	COOP	18.6
NEWFOUND GAP	COOP	15.9
JAMESTOWN 3.1 SE	CoCoRaHS	12.9
FALL CREEK FALLS SP	COOP	12.6
MONTEREY	COOP	12.2
MCMINNVILLE 8.5 ESE	CoCoRaHS	11.9
COOKEVILLE	COOP	11.6
CROSSVILLE EXP STN	COOP	11.5
COOKEVILLE 3.3 SSW	CoCoRaHS	10.9
GREENFIELD 0.3 SW	CoCoRaHS	10.9

*An additional 260 stations reported measurable snowfall during the month, and an additional 21 stations reported a trace amount of snow (less than 1/10<sup>th</sup> inch). 104 stations reported no snow during February.*

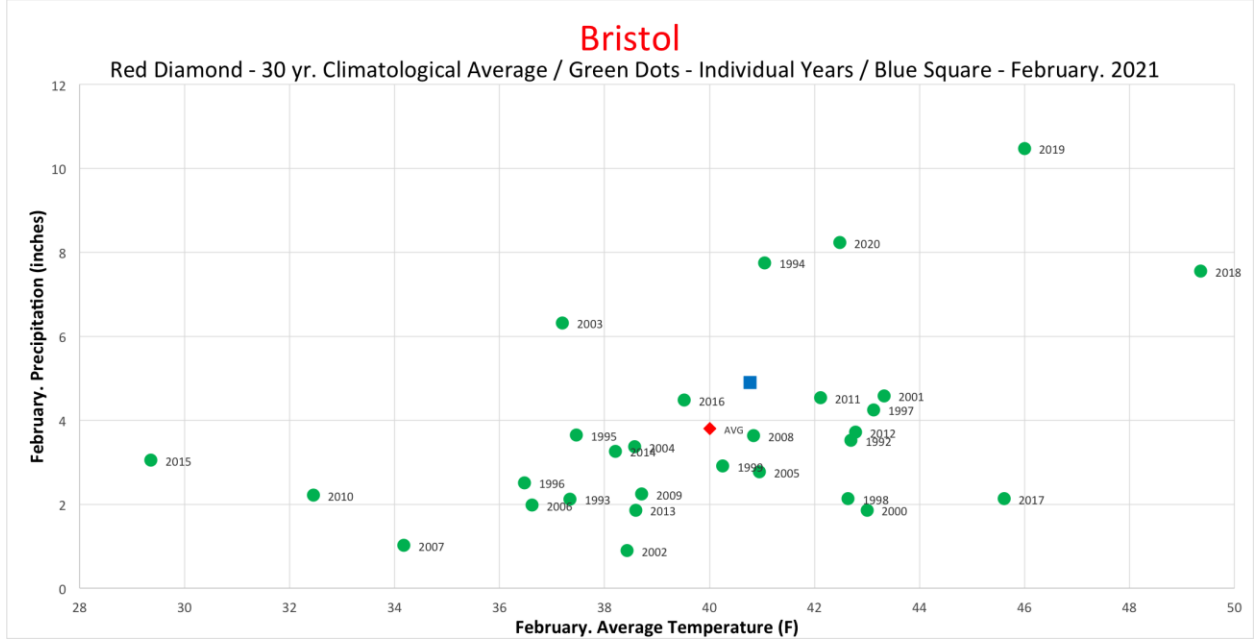
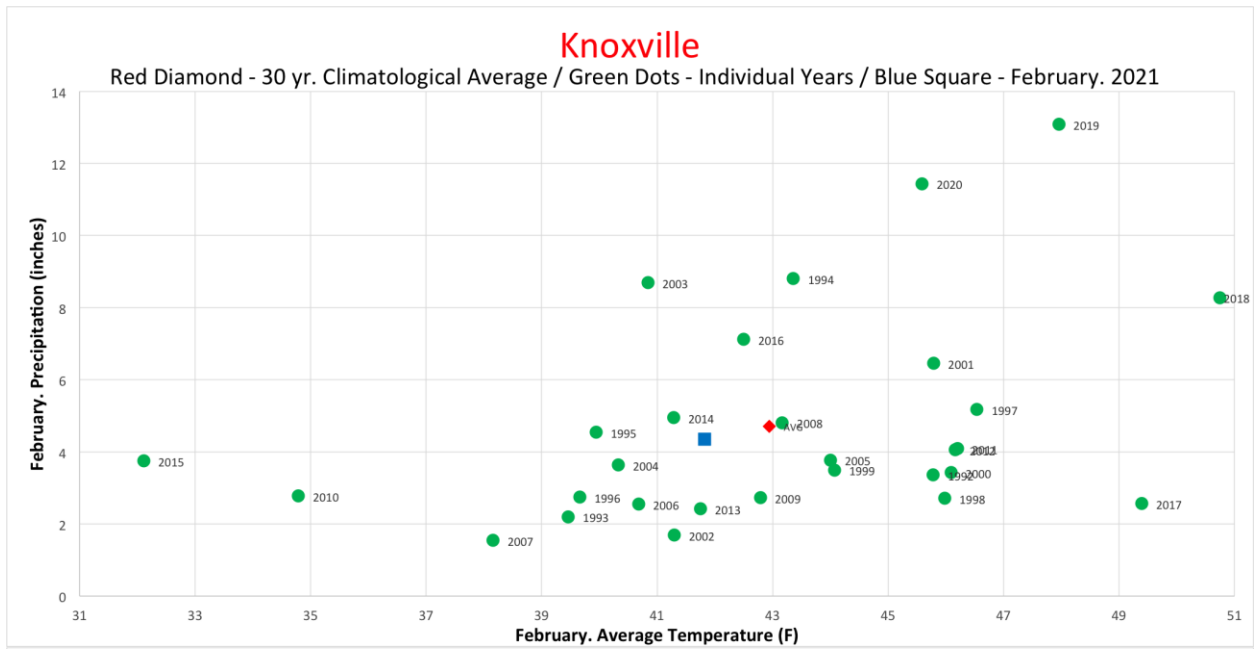
### The Month in Comparison:

Comparing the mean temperature and total precipitation of February 2021 to the February data from the previous thirty years, the same west-to-east trend in mean temperatures becomes apparent. Memphis recorded its second coldest February of the last thirty years (with only 2015 being colder), Jackson recorded its third coldest February, and Nashville recorded its fifth coldest February in that same time period. Whereas, Chattanooga, Knoxville, and Bristol were all near the middle of the pack, and close to the average value of the last thirty years. Precipitation was close to or above the average of the past thirty years at most of the airports as well. For the first time in three years, extremely above average precipitation and flooding weren't the major stories of February. These graphs highlight just how anomalous the rainfall totals were in February of 2018 through 2020 in most areas of the state.









### Drought Monitor:

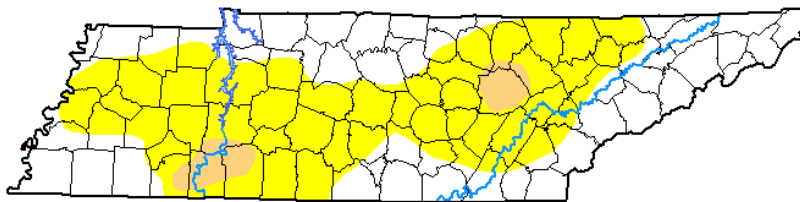
The last Drought Monitor release in February showed about half the state in D0 (Abnormally Dry) conditions, with two smaller regions of D1 (Moderate Drought) centered around Cumberland County in the eastern half of the state and Hardin and Wayne counties in the western half of the state totaling about 5% of the state’s area. Compared to the end of January, this was a similar pattern, with slight improvements in southern sections of the state, and slight degradation in the northern half of the state. Heavy rains and snow/ice melt towards the end of the month did result in major improvements, and the first drought monitor release of March cleared the state of D1 (Moderate Drought) and all areas that were depicted as abnormally dry as of February 23 were cleared from the drought monitor maps.

*Author:*

David Miskus  
NOAA/NWS/NCEP/CPC

## U.S. Drought Monitor Tennessee

**February 23, 2021**  
(Released Thursday, Feb. 25, 2021)  
Valid 7 a.m. EST



*Intensity:*

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

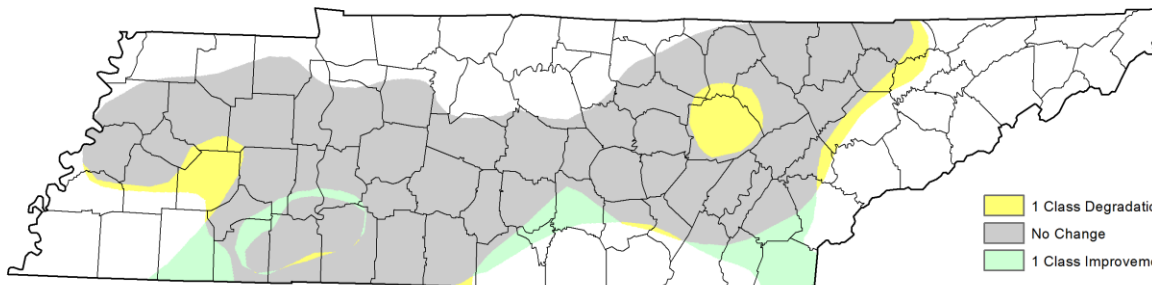
[droughtmonitor.unl.edu](http://droughtmonitor.unl.edu)



The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

February 23, 2021  
compared to  
January 26, 2021

### U.S. Drought Monitor Class Change - Tennessee 1 Month

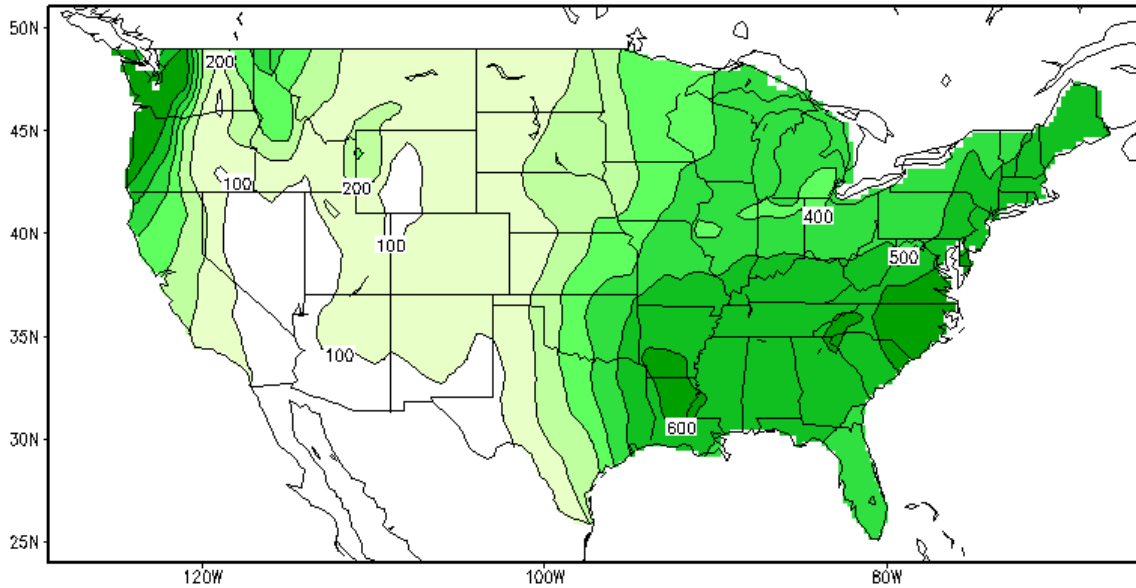


[droughtmonitor.unl.edu](http://droughtmonitor.unl.edu)

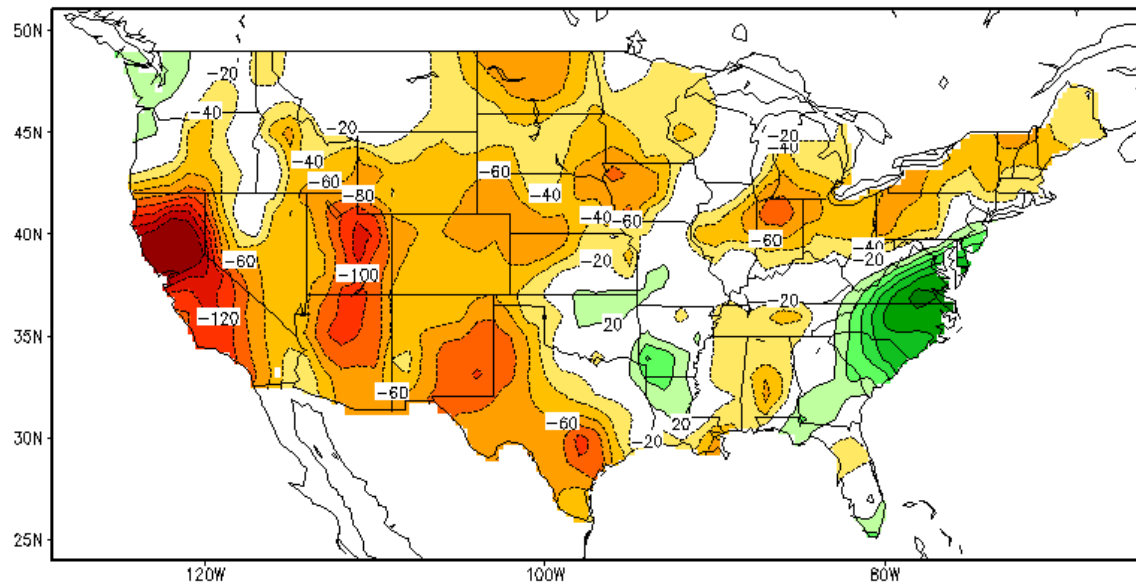
### Soil Moisture:

The calculated average soil moisture level for February was between 500 and 600mm, which was slightly below average for this time of year in most areas of the state. However, snow/ice melt and rain in the second half of the month led to improvements in soil moisture levels. The US Department of Agriculture state stories report for the week ending February 21, indicated that the percent of Tennessee reporting shortages in topsoil and subsoil moisture dropped to just 1% each. The percent of the state reporting surplus topsoil moisture increased to 52% and surplus subsoil moisture was reported in 38% of the state. Subsoil moisture is taking a bit longer to recharge after the abnormally dry and moderate drought conditions of earlier in the winter.

### Calculated Soil Moisture (mm) FEB, 2021



### Calculated Soil Moisture Anomaly (mm) FEB, 2021



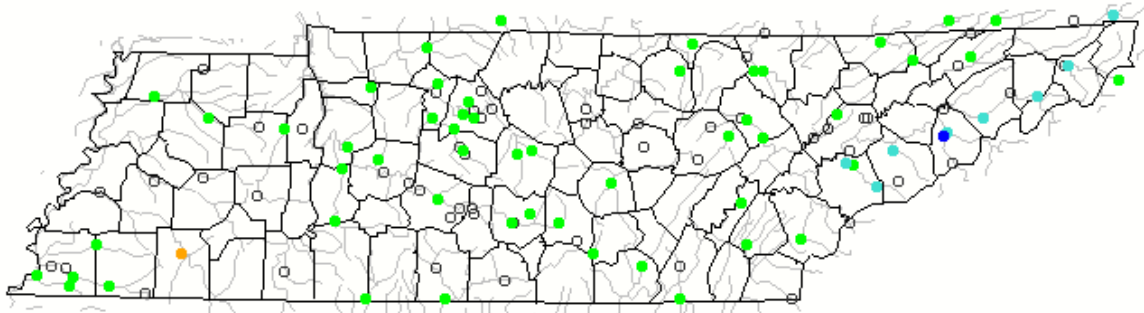
**Streamflow:**

Despite drier than normal conditions for most of the month, streamflow levels were in the normal range for this time of year across most of the state, with streams in extreme East Tennessee reporting streamflow levels above normal since that region of the state has recorded above normal precipitation for most of 2021.

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

Tennessee or Water-Resources Regions

February 2021



Search USGS streamgage

Choose a data retrieval option and select a location on the map

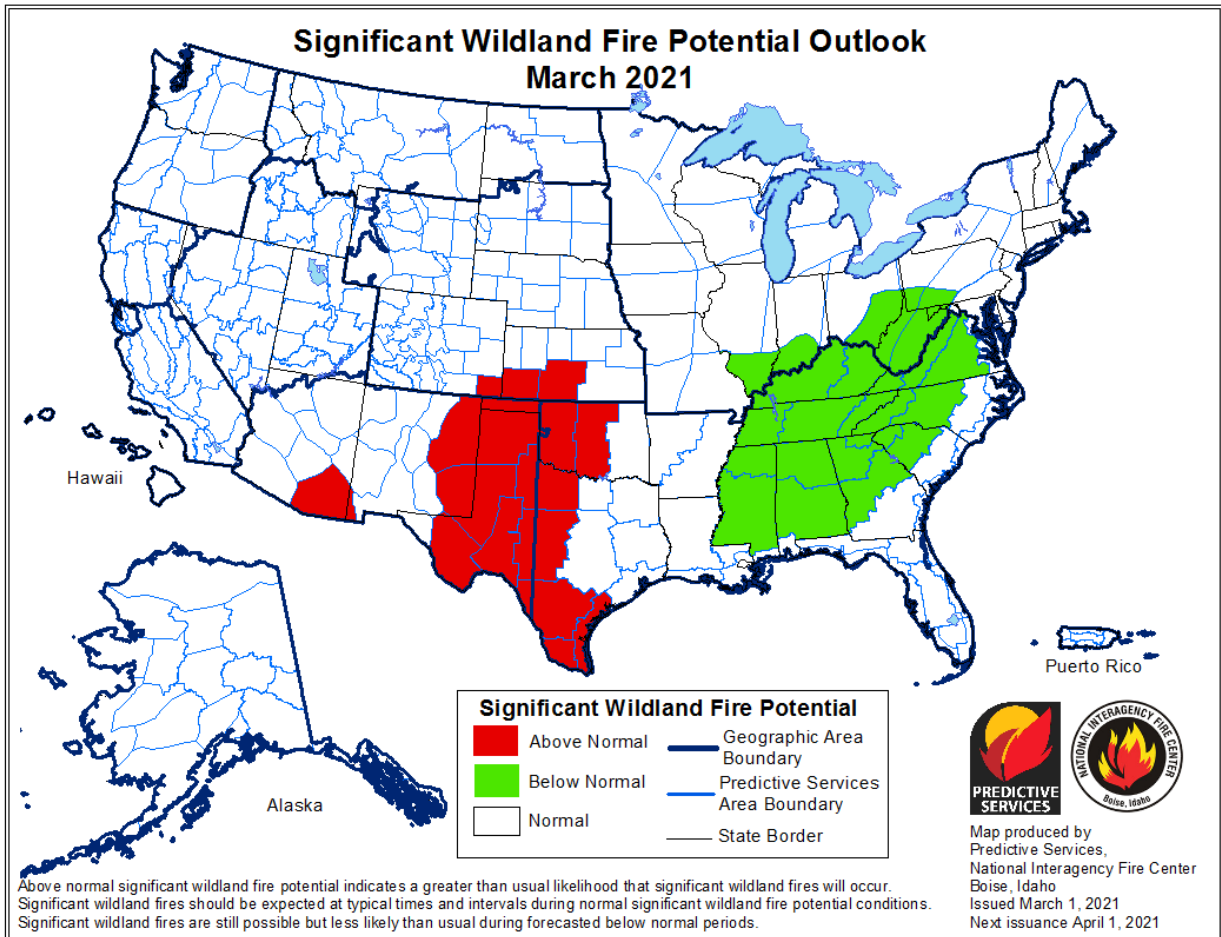
- List of all stations
- Single station
- Nearest stations
- Peak flow

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		

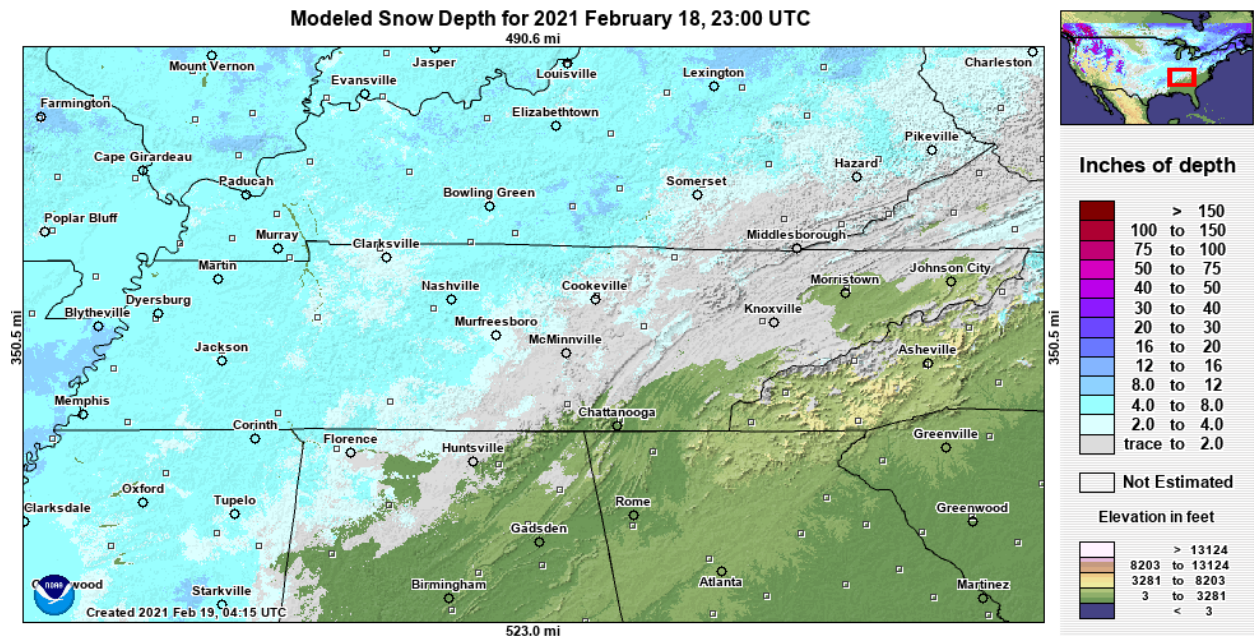
**Miscellaneous:**

**Crop Conditions from USDA:** Winter wheat conditions were reported as 5% poor, 33% fair, 53% good, and 9% excellent. Pasture and Range conditions were reported as 3% very poor, 32% poor, 39% fair, 23% good, and 3% excellent. Cattle conditions were reported as 7% poor, 36% fair, 50% good, and 7% excellent. Hay and roughage supplies were 1% very short, 20% short, 70% adequate, and 9% surplus. The cold conditions and multiple ice and snow events in February caused an increase in feeding cattle, but hay and roughage supplies are mostly adequate. Some reports indicate calf loss and other livestock stress due to cold temperatures.

**Fire Danger:** The Interagency Fire Center significant wildland fire potential outlook for March shows that all of Tennessee, as well as most surrounding regions will have below normal chance for significant wildfires.



**Snow:** Multiple snowstorms with significant sleet and ice accumulations as well impacted the state this month. West and Middle Tennessee were the most impacted during the back-to-back major winter storms in the middle of the month. The Cumberland Plateau and East Tennessee recorded a few moderate snowfalls in the first part of the month (February 2 & 7). Snow reports of up to six inches from northern portions of the Cumberland Plateau on February 7 were the highest snowfall totals reported in the Nashville National Weather Service forecast region in three years, that event was soon followed up by similar snow totals in southern Wayne, Lawrence, and Giles Counties along the Alabama border on February 18. The greatest extent of snow coverage occurred on February 18, when a majority of the state had snow on the ground.



### Story of the Month:

The main story of February 2021 was the back-to-back winter storms and the extreme cold affecting West and Middle Tennessee during the middle of the month. February 2021 brought the first winter storm warnings issued by the Nashville office of the National Weather Service since January of 2018, and the first winter storm warnings issued by the Memphis office of the National Weather Service since December of 2018.

The first winter storm impacted the state from February 14-15 with some snow, but more significant sleet and freezing rain ice accumulations. Icy trees and power lines led to some power outages and icy roads led to numerous traffic crashes across the state. In this storm, some locations reported over two inches of sleet accumulation.

After the first winter storm cleared out on February 15, the coldest temperatures were reported across the state as many locations didn't warm out of the teens for daytime highs. Morning lows on February 16 reached 0°F in Jackson, 1°F at Memphis, and several COOP weather observers reported conditions below zero.



[5:25 pm] Here is a photo from Moore county, TN at Bagley Hollow and Mt. Herman Road. Ice has already accumulated on trees, and phone lines are beginning to droop. Now is the time for final last-minute preparations before hunkering down through Wednesday. #HUNwx



NWS Nashville @NWSNashville · Feb 15  
Travel is extremely hazardous across #MiddleTennessee - so like @THPNashville said, just stay home!

THPNashville @THPNashville · Feb 15  
For the love of goodness, please stay home. It is very bad out here!!!! Another injury crash. The roads are white!!!!



The second winter storm followed from February 17-18 with some sleet and freezing rain, but with more snow and higher snow totals associated with this winter storm, which accumulated on top of the ice, sleet, and snow that had not melted from the first storm.

As noted in the monthly temperature summary section of this report, there was a strong west-to-east gradient in temperatures during this cold outbreak. This was due in part to the shallow nature of the arctic air pool which struggled to cross the higher elevations of the Cumberland Plateau, the shallow nature of the cold pool is also what led to so much ice and sleet with the winter storms. The location of the jet stream was also important in the temperature gradient, as East Tennessee had winds out of the south for most of the cold period resulting in a warmer air mass and down sloping winds from the Appalachian Mountains that produced further warming. This contrast is highlighted by the 40-degree temperature gradient observed on February 15, when Memphis International Airport recorded a high temperature of 15°F while the Tri-Cities Airport in northeast Tennessee recorded a high temperature of 55°F.

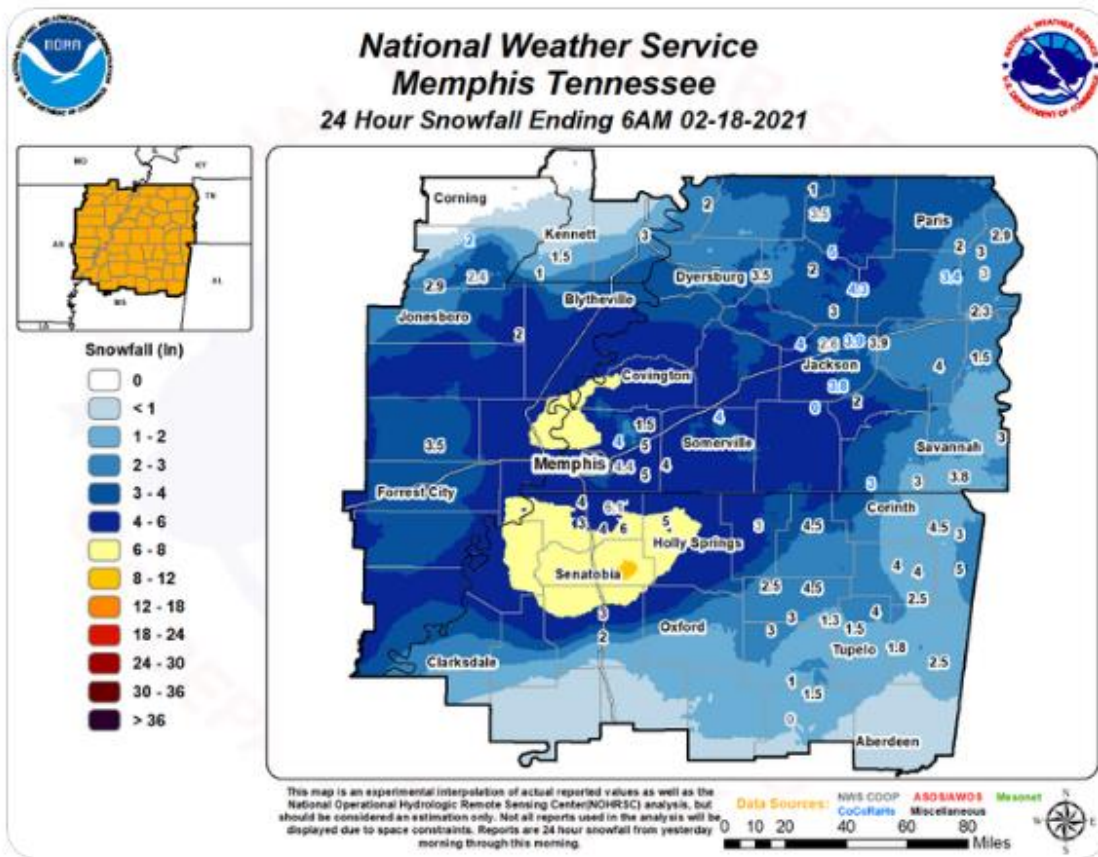
This cold spell was also notable due to its length, the coldest period of the month occurred from February 10 to 19, when there were 79 broken and 9 tied record-low daily high temperatures and 24 broken and 2 tied record-low daily low temperatures (at weather stations in the state with at least a 30-year record). Memphis stayed below freezing for nine days, which tied the record for longest streak below freezing (it happened previously in 1940 and 1899). In Nashville, temperatures remained below freezing for seven days, which tied the record for 5th longest streak of below freezing temperatures.



NWS Memphis  
@NWSMemphis

...

Here is the latest snowfall map from the 2/17-18/21 Winter Storm. This is a preliminary map and will change as additional data is entered and processed. #tnwx #arwx #mowx #mswx #midsouthweather



3:42 PM · Feb 18, 2021 · TweetDeck





Adding in the little bit of #snow we got yesterday, here's our updated estimated snowfall map for the Feb 17-18, 2021 winter storm. The big winners were southern Wayne, Lawrence, and Giles Counties which reported 6" of snow!



5:54 AM · Feb 19, 2021 · Twitter Web App



*On the left is a picture of snowfall in Martin, Tennessee during the first of the two storms (courtesy of Dr. Mark Simpson, UT-M). Dr. Simpson reported about a tenth of an inch of ice and five inches of sleet and snow in the first round and 3.5 inches in the second round. On the right is a picture of a 39" icicle in Memphis, Tennessee on Feb. 20<sup>th</sup> (yikes! Courtesy of Dr. Dorian Burnette, U. of Memphis).*

## 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 was one day with severe storm reports in Tennessee, resulting in 7 reports of severe wind damage (producing 2 injuries), and four reports of severe hail (one-inch or larger).



## Wind Reports:

Time (UTC)	Speed (mph)	Location	County	Lat	Lon	Comments
0:17	--	2 S FRAYSER	SHELBY	35.19	-89.97	<b>*** 1 INJ ***</b> LARGE TREE DOWN ON HOUSE AT BROWN AVENUE NEAR NORTH EVERGREEN. CHILD WAS RESCUED AFTER BEING TRAPPED. TIME IS RADAR ESTIMATED. (MEG)
0:35	--	3 ESE NEW JOHNSONVILLE	HUMPHREYS	36.01	-87.91	SEVERAL TREES AND POWER LINES DOWN AND DAMAGE REPORTED TO A FEW HOMES ON MILL ROAD AND OLD STATE ROAD IN NEW JOHNSONVILLE. (OHX)
1:45	--	1 SE NASHVILLE	DAVIDSON	36.16	-86.77	<b>*** 1 INJ ***</b> A CHILD WAS INJURED AFTER COMING INTO CONTACT WITH A DOWNED POWER LINE ON UNIVERSITY COURT IN NASHVILLE (OHX)
2:15	--	GAINESBORO	JACKSON	36.36	-85.65	TREES DOWN ON SEVERAL ROADWAYS ACROSS THE COUNTY (OHX)
2:30	--	LIVINGSTON	OVERTON	36.39	-85.33	TREE DOWN BLOCKING LINDER MOUNTAIN ROAD AND POWER POLE AND LINES DOWN BLOCKING HIGHWAY 111 NEAR BIG SPRINGS ROAD (OHX)
3:54	--	SHELBYVILLE	BEDFORD	35.49	-86.45	ROOF BLOWN OFF THE PRESS BOX AT SHELBYVILLE CENTRAL HIGHSCHOOL. TIME ESTIMATED VIA RADAR. (OHX)
3:55	--	9 NNW BELL BUCKLE	RUTHERFORD	35.71	-86.41	TSPOTTER REPORT OF A COUPLE TREES AND LIMBS DOWN NEAR CHRISTIANA. (OHX)

Hail Reports:

Time (UTC)	Size (in)	Location	County	Lat	Lon	Comments
1:53	1.50	GREEN HILL	WILSON	36.23	-86.57	RETIRED NWS EMPLOYEE REPORTED CYLINDRICAL SHAPED HAIL. OTHER PHOTOS IN AREA CONFIRM UNUSUAL LONG NARROW HAIL. (OHX)
2:02	1.00	HENDERSONVILLE	SUMNER	36.29	-86.6	TSPOTTER REPORT OF QUARTER SIZE HAIL REPORT NEAR INDIAN LAKE PENINSULA IN HENDERSONVILLE (OHX)
2:08	1.00	LAGUARDO	WILSON	36.3	-86.44	PEA TO QUARTER SIZE HAIL (OHX)
2:37	1.25	5 NW CAIRO BEND	WILSON	36.28	-86.48	FACEBOOK REPORT OF ESTIMATED 1.25" SIZED HAIL ON BURTON RD. IN WILSON COUNTY. (OHX)

CPC Outlooks for the Next Month:

Looking ahead to March, the NOAA Climate Prediction Center predicts that all of Tennessee will likely see warmer than normal temperatures for the month, and above normal precipitation.

