

December 2023 Tennessee State Climate Summary

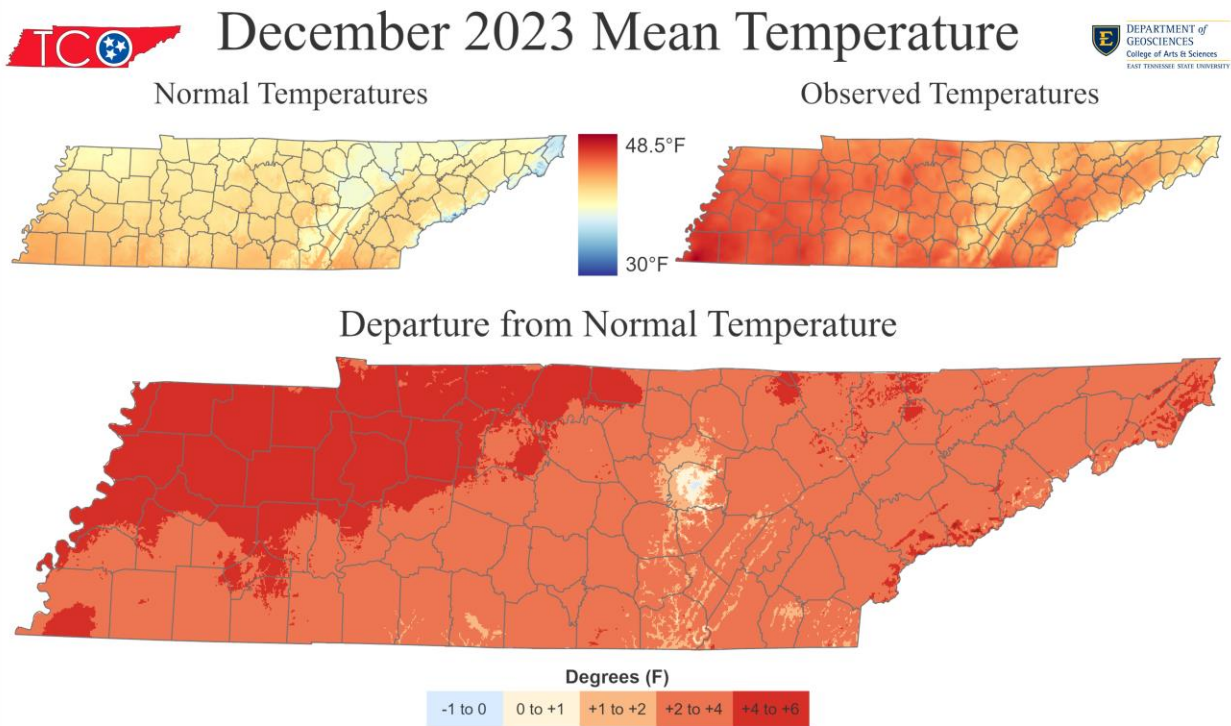
Tennessee Climate Office * East Tennessee State University

Prepared by William Tollefson and Dr. Andrew Joyner

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

Monthly Temperature Summary:

Average temperatures for the month of December 2023 were warmer than normal across almost all areas of Tennessee, with the northwestern sections of the state coming in at the most above average (4-6°F warmer than normal). Above average temperatures were observed in most areas of the state each week of the month, with East Tennessee seeing normal to slightly cooler than normal temperatures in the third week of the month. Many weather stations recorded their warmest high temperature of the month on Christmas Eve. Throughout the month, there were three broken and two tied daily high temperature records, and seven broken and two tied daily records for warmest low temperatures. On the cool side of the record books, there was one broken daily record for low temperatures, and one broken daily record for coolest high temperature. Despite the warmer than normal conditions, none of the six long-term climate monitoring stations in the state recorded a top-ten warmest or coolest December based on the monthly mean temperature.



Stations with the highest mean temperature

Station Name	Station Type	Mean Temperature (F)
MEMPHIS INTERNATIONAL AP	WBAN	49.0
CHATTANOOGA AP	WBAN	47.0
MEMPHIS WFO	WBAN	46.7
MC MINNVILLE	COOP	46.5
JACKSON EXP STA	COOP	46.4

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

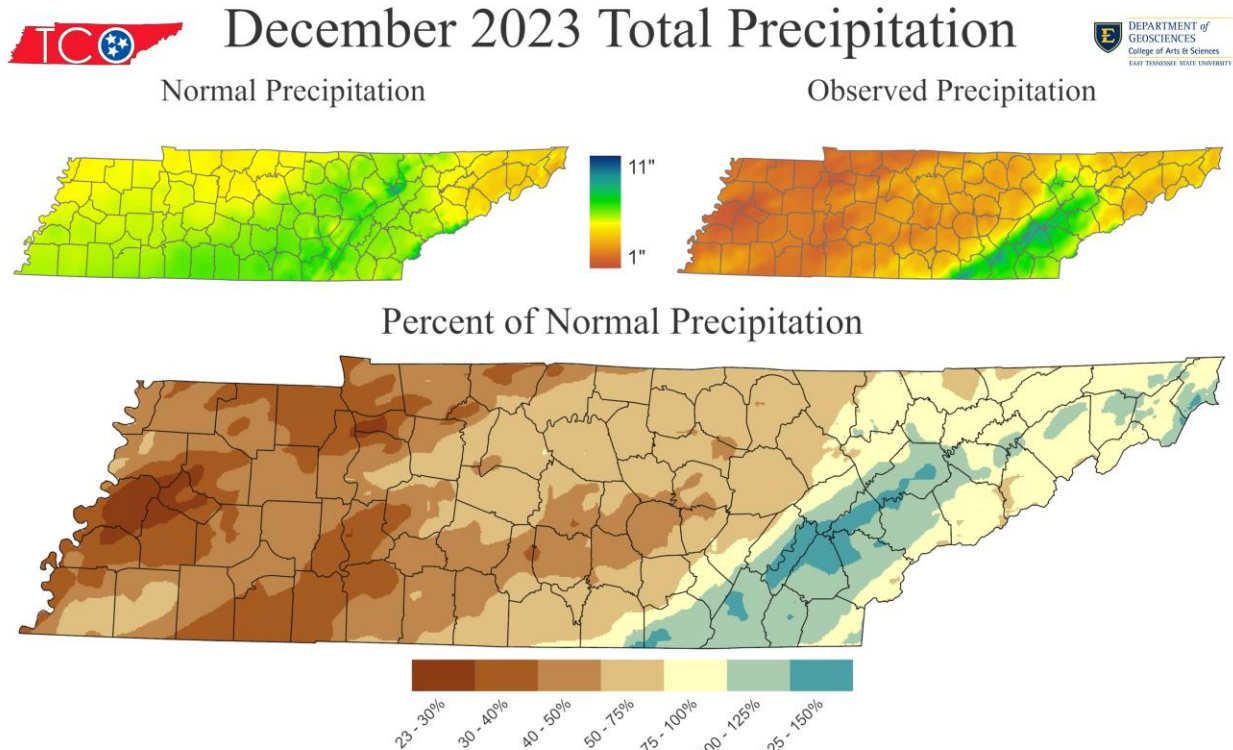
Stations with the lowest mean temperature

Station Name	Station Type	Mean Temperature (F)
MT LECONTE	COOP	31.3
NEWFOUND GAP	COOP	36.1
ROAN MOUNTAIN 3SW	COOP	38.0
MOUNTAIN CITY 2	COOP	38.9
SPARTA WASTEWATER PLANT	COOP	40.0

Monthly Precipitation Summary:

Another dry month for most areas of the state, with the exception of portions of East Tennessee, especially the southern Tennessee Valley, where there was above average precipitation for December. This was the fourth month in a row of below normal precipitation for most areas of the state, which led to continued and expanded drought conditions for Tennessee. The first week of December brought heavy rains to East Tennessee, especially the Tennessee Valley, where many areas recorded over twice their normal weekly precipitation; however, little to no rain fell in West Tennessee that week. The second week of December brought another round of heavy rains to parts of East Tennessee and the Cumberland Plateau, with only light rains in Middle and West Tennessee. Unfortunately, the little rain that did come to West and Middle Tennessee was accompanied by deadly severe weather in these parts of the state. The third week of December brought widespread light precipitation, but overall was drier than normal across Tennessee, and the fourth week of December again saw widespread light to moderate rainfall across the state, once again with parts of East Tennessee recording above normal precipitation for the week. There were 12 records set for highest daily precipitation totals this month, all of which were in East Tennessee.

Higher elevations of the state in the Appalachian Mountains and Cumberland Plateau did see some snowfall this month, with the largest totals in the Smoky Mountains on December 6th, northeast Tennessee on December 19th, and the Cumberland Plateau on December 30th.



Stations with the most precipitation

Station Name	Station Type	Total Precipitation (in)
NEWFOUND GAP	COOP	9.10
DECATUR 7NE	COOP	8.55
ATHENS	COOP	8.08
CLEVELAND FILTER PLANT	COOP	7.93
KNOXVILLE EXP STA	COOP	7.59

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

Stations with the least precipitation

Station Name	Station Type	Total Precipitation (in)
CHEATHAM LOCK & DAM	COOP	1.00
CLARKSVILLE OUTLAW AP	WBAN	1.19
JACKSON MCKELLAR-SIPES AP	WBAN	1.40
SPRINGFIELD EXPERIMENT STATION	COOP	1.65
DYERSBURG MUNICIPAL AIRPORT	WBAN	1.66

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
Memphis	58.8	39.1	49.0	+4.2	73	12/9	29	12/19	2.60	-2.89	47%
Jackson	56.3	33.0	44.7	+2.9	70	12/9	17	12/19	1.40	-3.61	28%
Clarksville*	54.4	33.5	43.8	+3.9	67	12/24	20	12/19	1.19	-3.17	27%
Nashville	56.1	36.0	46.0	+3.3	68	12/24	25	12/20	3.01	-1.42	68%
Chattanooga	57.1	36.9	47.0	+2.7	67	12/24	25	12/20	6.19	+0.94	118%
Crossville	51.8	33.3	42.5	+3.7	61	12/24	19	12/19	3.68	-1.66	69%
Knoxville	54.8	35.3	45.0	+3.1	66	12/24	25	12/21	6.06	+1.06	121%
Bristol	53.9	30.9	42.4	+3.1	67	12/24	18	12/20	3.59	-0.17	95%

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

**The Clarksville airport weather station did not record temperature data for December 1-7, so the average temperature may not accurately reflect the month's real conditions.*

Hottest Stations (highest maximum temperature)

Station Name	Station Type	Highest Temperature (F)	Date
SAVANNAH 6 SW	COOP	75	10
MEMPHIS INTERNATIONAL AP	WBAN	73	9
JACKSON EXP STA	COOP	72	10
SHILOH NMP TENNESSEE	RAWS	72	9
FAYETTEVILLE WATER PLANT	COOP	71	9
BOLIVAR WATER WORKS	COOP	71	10
AMES PLANTATION	COOP	71	9
WAYNESBORO	COOP	70	10
McAllister Farm	SCAN	70	9
Allen Farms	SCAN	70	9
JACKSON MCKELLAR- SIPES AP	WBAN	70	9
MC MINNVILLE	COOP	70	9
BROWNSVILLE	COOP	70	10

Six stations tied for the 8th hottest temperature (70°F)

Coldest Stations (lowest minimum temperature)

Station Name	Station Type	Lowest Temperature (F)	Date
MT LECONTE	COOP	4	20
NEWFOUND GAP	COOP	9	19
MOUNTAIN CITY 2	COOP	12	20
ROAN MOUNTAIN 3SW	COOP	12	1
KINGSPORT	COOP	13	19
SPARTA WASTEWATER PLANT	COOP	14	19
KINGSTON SPRINGS	COOP	14	20
GAINESBORO	COOP	14	19
TAZEWELL	COOP	15	21
GREENEVILLE EXP STA	COOP	16	20
GLADEVILLE	COOP	16	20
CROSSVILLE 7 NW	WBAN	16	19

Three stations tied for the 10th coldest temperature (16°F)

Warmest Stations (highest mean temperatures)

Station Name	Station Type	Mean Temperature (F)
MEMPHIS INTERNATIONAL AP	WBAN	49.0
CHATTANOOGA AP	WBAN	47.0
MEMPHIS WFO	WBAN	46.7
MC MINNVILLE	COOP	46.5
JACKSON EXP STA	COOP	46.4
EASTVIEW FARM	SCAN	46.4
FAYETTEVILLE WATER PLANT	COOP	46.0
NASHVILLE INTL AP	WBAN	46.0
MOUNT PLEASANT 1N	COOP	45.8
NASHVILLE BERRY FIELD	COOP	45.6

Coollest Stations (lowest mean temperatures)

Station Name	Station Type	Mean Temperature (F)
MT LECONTE	COOP	31.3
NEWFOUND GAP	COOP	36.1
ROAN MOUNTAIN 3SW	COOP	38.0
MOUNTAIN CITY 2	COOP	38.9
SPARTA WASTEWATER PLANT	COOP	40.0
TAZEWELL	COOP	41.0
GLADEVILLE	COOP	41.1
COALMONT	COOP	41.2
MAYNARDVILLE	COOP	41.2
ERWIN 1 W	COOP	41.3

Wettest Stations (highest precipitation totals):

Station Name	Station Type	Total Precipitation (in)
NEWFOUND GAP	COOP	9.10
DECATUR 7NE	COOP	8.55
ATHENS	COOP	8.08
CLEVELAND FILTER PLANT	COOP	7.93
KNOXVILLE EXP STA	COOP	7.59
MT LECONTE	COOP	7.21
LENOIR CITY	COOP	6.94
SPRING CITY	COOP	6.59
ROCKWOOD 2	COOP	6.42
CHATTANOOGA AP	WBAN	6.19

Driest Stations (lowest precipitation totals):

Station Name	Station Type	Total Precipitation (in)
CHEATHAM LOCK & DAM	COOP	1.00
CLARKSVILLE OUTLAW AP	WBAN	1.19
JACKSON MCKELLAR- SIPES AP	WBAN	1.40
SPRINGFIELD EXPERIMENT STATION	COOP	1.65
DYERSBURG MUNICIPAL AIRPORT	WBAN	1.66
PARIS 3 ESE	COOP	1.73
TENNESSEE RIDGE	COOP	1.81
CLARKSVILLE NO.2	COOP	1.86
CLARKSVILLE WWTP	COOP	1.92
JACKSON EXP STA	COOP	1.96

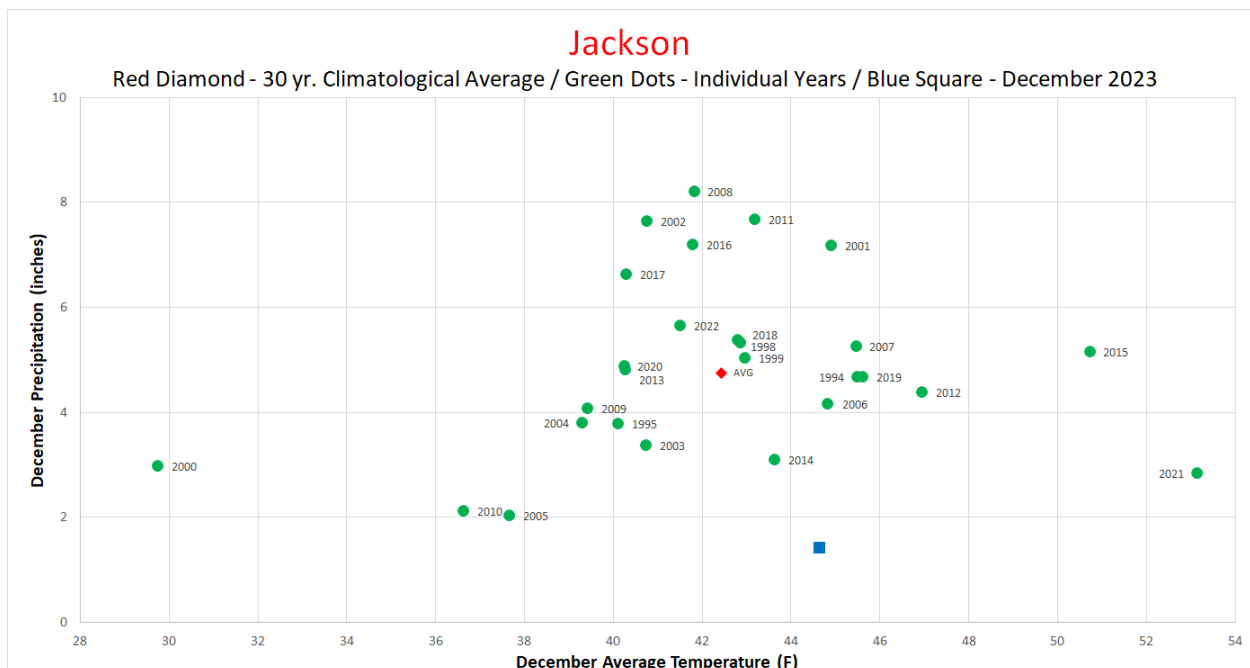
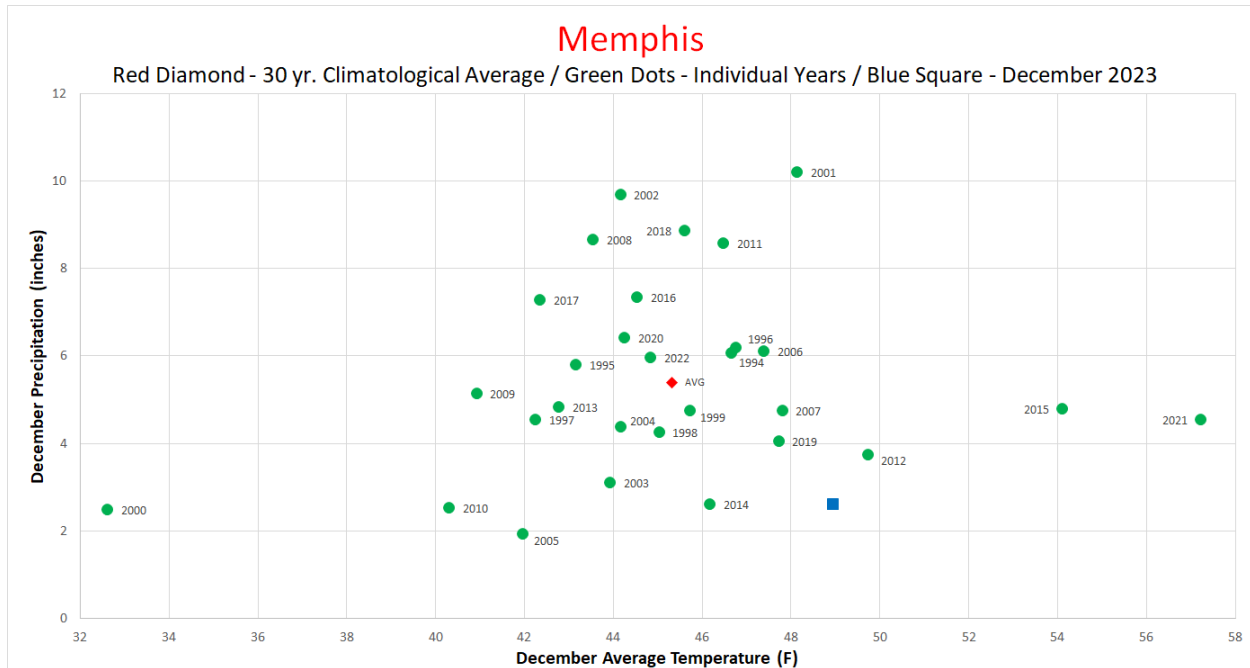
Snowiest Stations (highest snowfall totals):

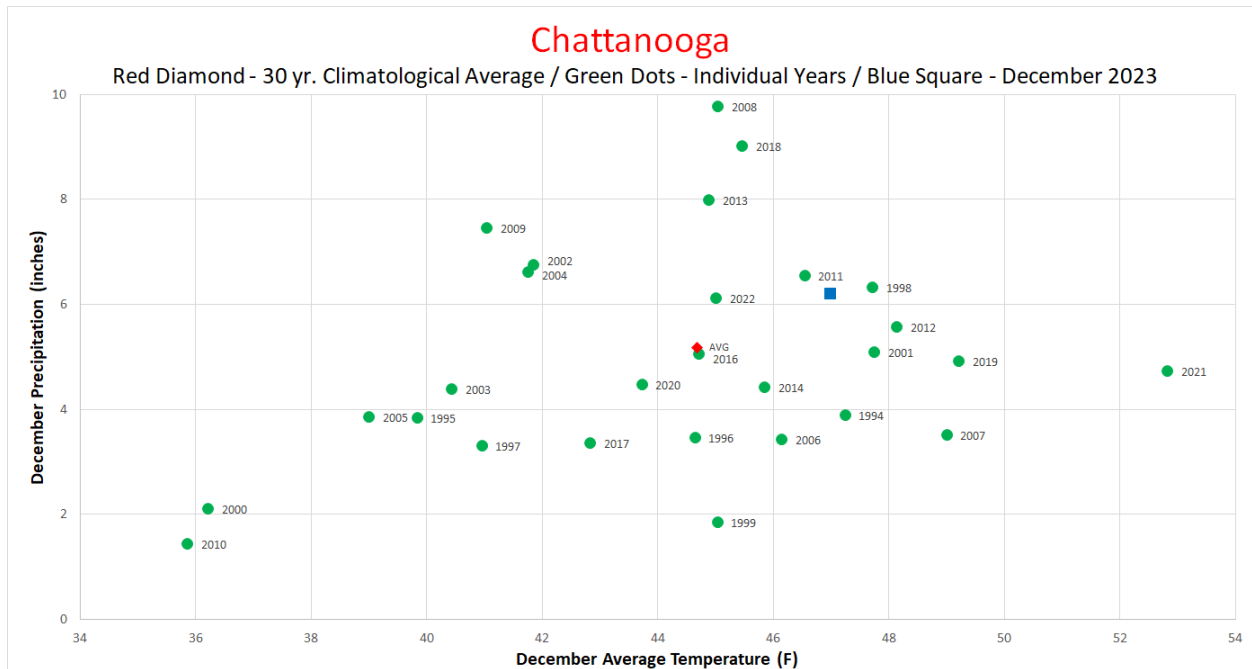
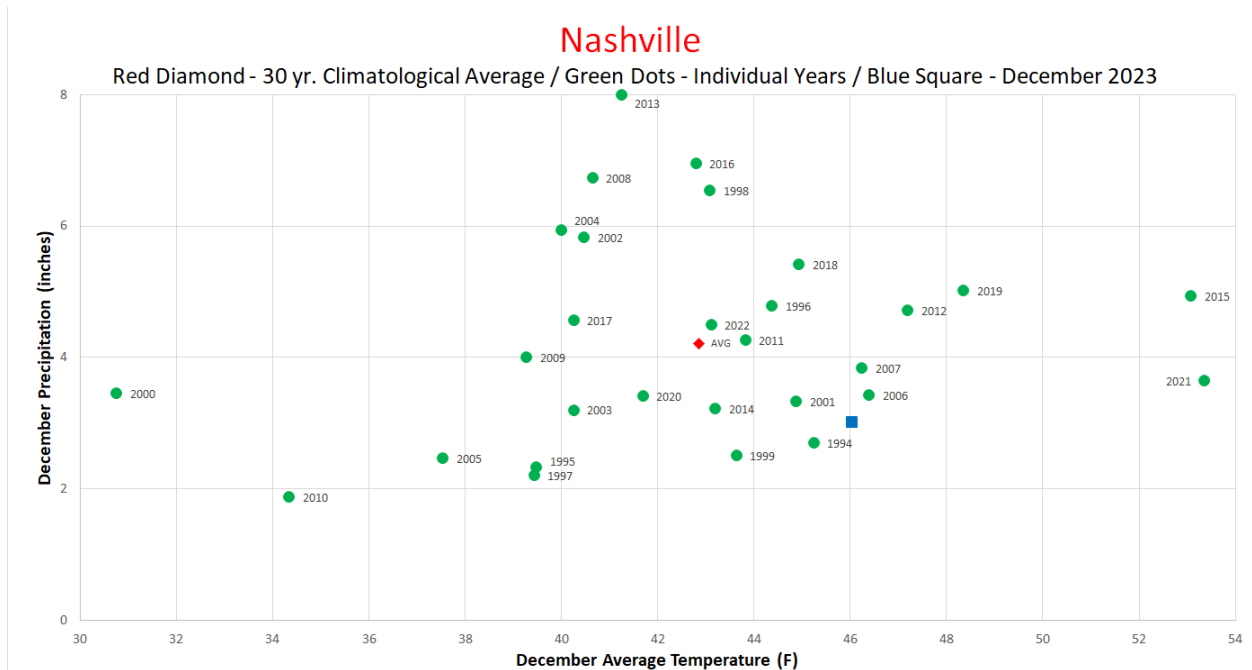
Station Name	Station Type	Total Snowfall (in)
MT LECONTE	COOP	11.5
NEWFOUND GAP	COOP	3.6
KYLES FORD 1.0 N	CoCoRaHS	1.8
MOUNTAIN CITY 2	COOP	1
FALL CREEK FALLS SP	COOP	0.7
KINGSPORT 4.3 ENE	CoCoRaHS	0.1

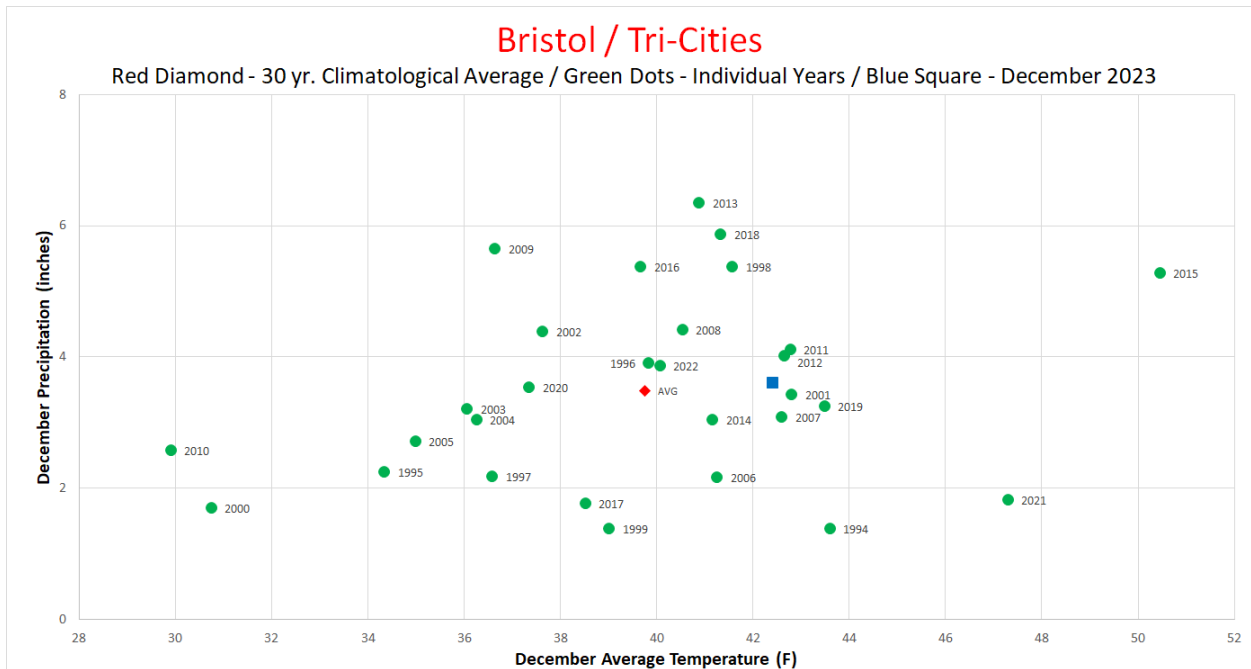
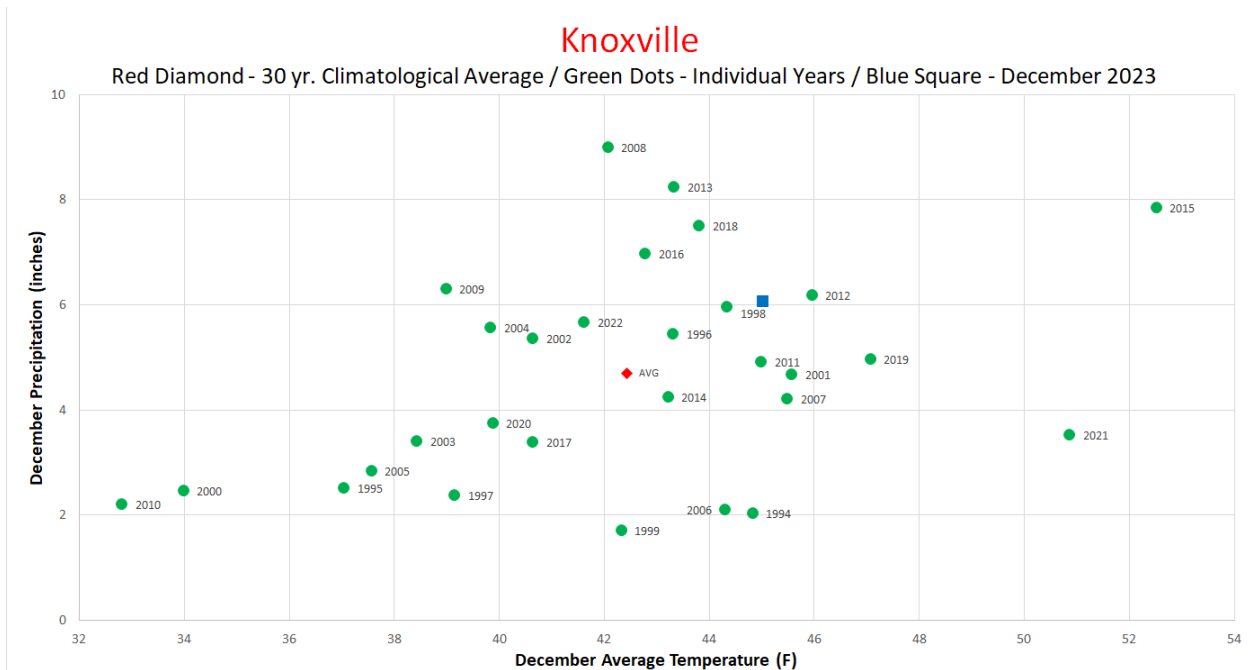
23 other stations recorded a trace (<0.1") of snow during the month

The Month in Comparison:

Comparing the average temperature and total precipitation for December 2023 to that of Decembers over the past 30-years, all major airports in the state saw warmer than average temperatures, with Memphis having the 4th warmest December of the past 30 years. However, looking at longer weather records, no station had a top-5 warmest December. Memphis, Jackson, and Nashville also had a drier than average December this year, with Jackson having the driest December of the past 30 years! Looking at the longer-term record for Jackson, it was the 5th driest December in the station's 74-year record. Chattanooga, Knoxville, and the Bristol/Tri-Cities airports all recorded a wetter than average December, but it was not a major outlier for any of these weather stations.

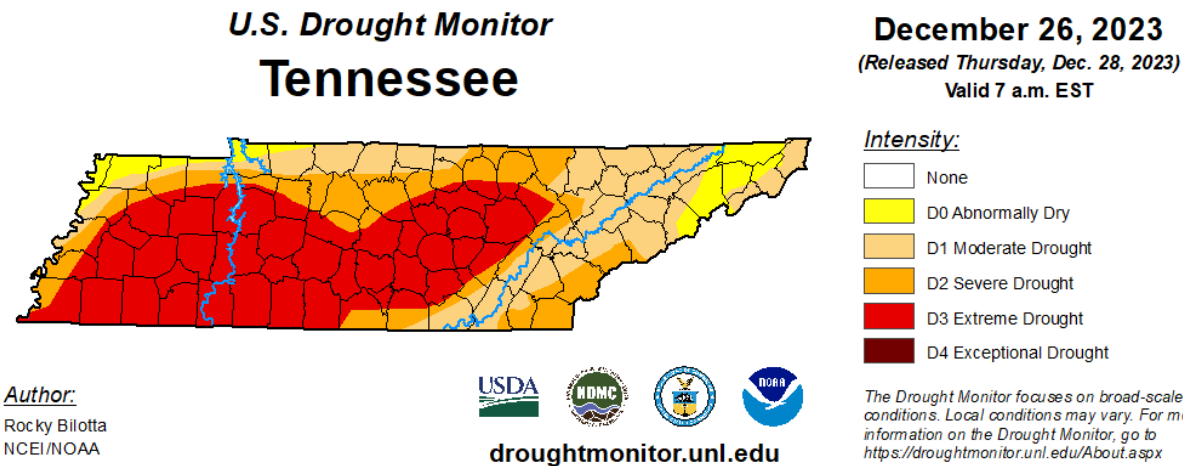






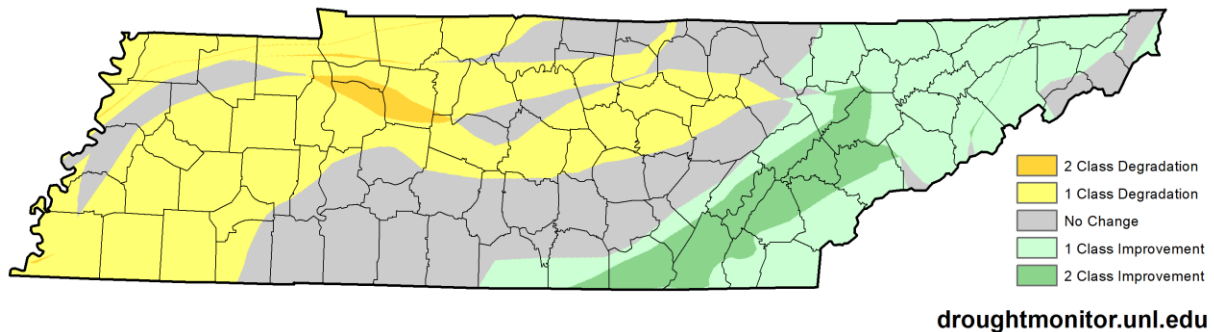
Drought Monitor:

In the last Drought Monitor release of December, 46.75% of Tennessee was shown in Extreme Drought (D3) conditions, another 21.16% of the state was shown in Severe Drought (D2), and 25.31% of the state was shown in Moderate Drought, for a total of 93.22% of the state in some level of drought. The remaining 6.78% of the state was shown in Abnormally Dry (D0) conditions. Drought conditions expanded and worsened in portions of the Cumberland Plateau, Middle Tennessee, and in most areas of West Tennessee during the month of December, with 1 or 2 category degradations in the U.S. Drought Monitor maps from the end of November to the end of December. In East Tennessee there were 1 or 2 category improvements in areas where above normal rainfall was recorded during two or more weeks this month, but most areas of East Tennessee were still experiencing some level of drought.



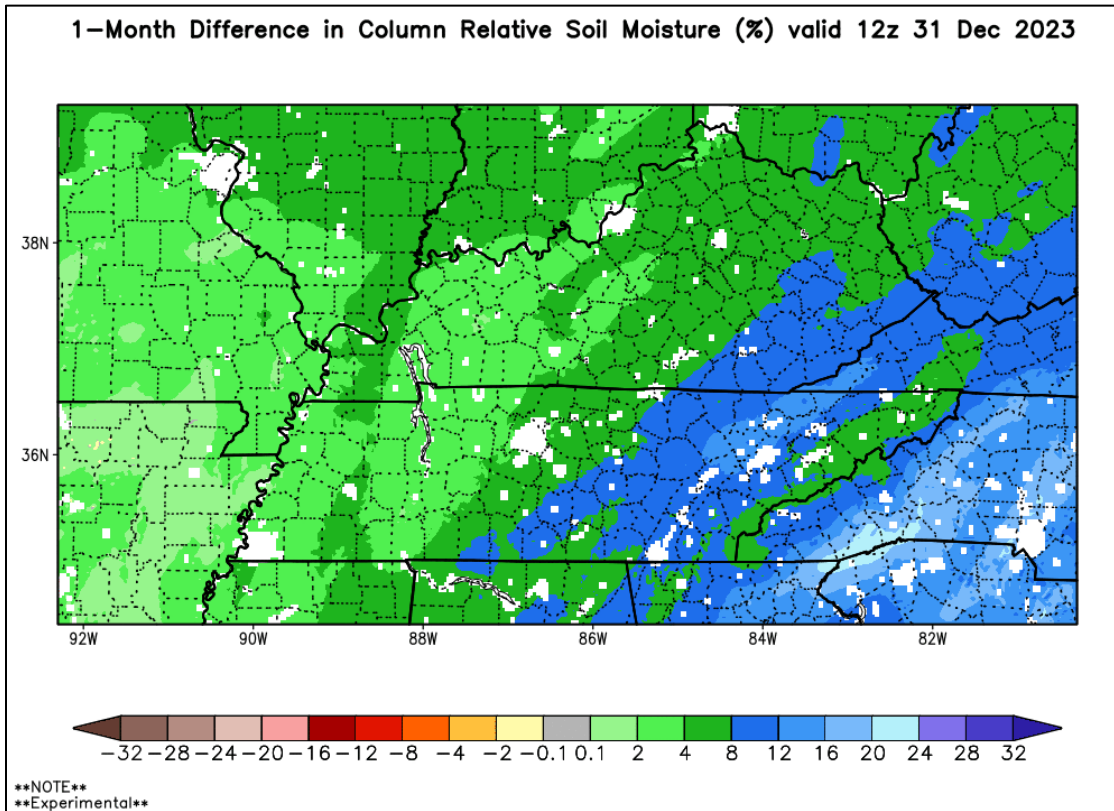
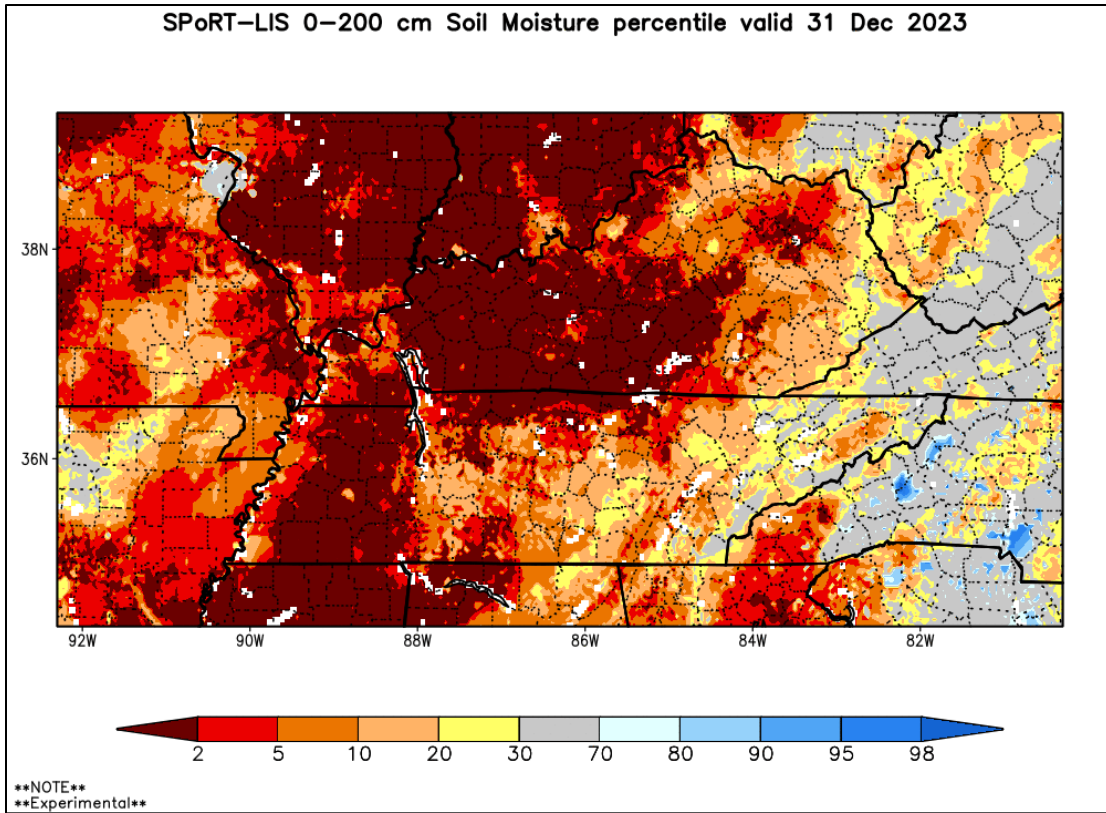
December 26, 2023
 compared to
 November 28, 2023

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



Soil Moisture:

After several months of below normal precipitation and drought conditions, most areas of Tennessee had below normal soil moisture. The NASA SPoRT Land Information System showed soil moisture levels in many areas of the state as below the 10th percentile, and the USDA Crop Weather Bulletin for the week ending December 31 rated topsoil moisture in Tennessee 7% very short, 37% short, 55% adequate, and 1% surplus. Subsoil moisture was rated 8% very short, 39% short, 52% adequate, and 1% surplus. With moderate to heavy rains in East Tennessee there were improvements in soil moisture levels in the range of 4-16%. Moderate to light rains in the second half of the month also helped to increase soil moisture levels in Middle and West Tennessee as well, but to a lesser degree.

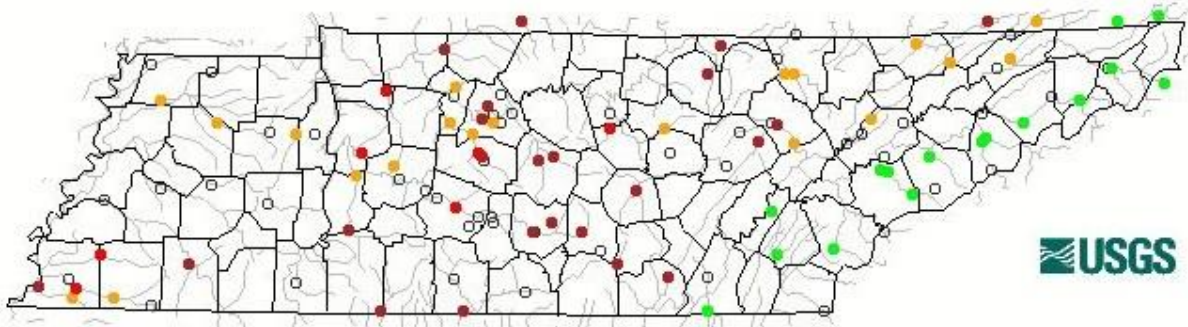


Streamflow:

Streamflow across most areas of Tennessee was ranked below or much below normal, with only stream gauges in the far eastern portions of the state averaging in the normal range for the month of December.

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

December 2023



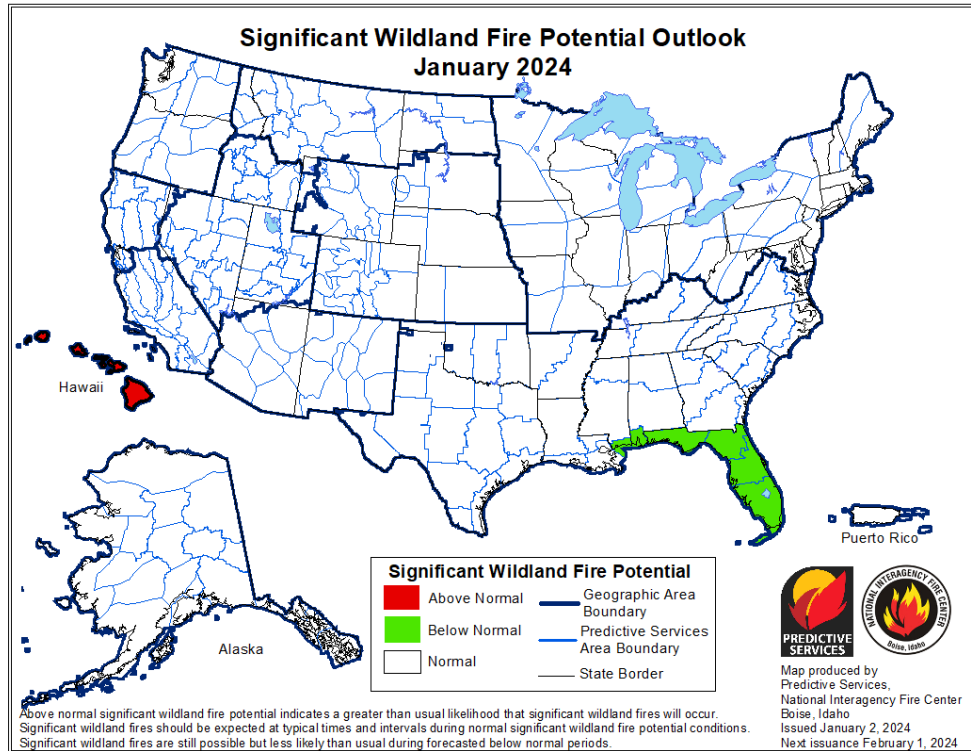
Explanation - Percentile classes							
●	●	●	●	●	●	●	○
Low	<10	10-24	25-75	76-90	>90	High	Not-ranked
	Much below normal	Below normal	Normal	Above normal	Much above normal		

Miscellaneous:

Crop Conditions from USDA: Sustained drought conditions have caused hay and pastures to continue to suffer. Winter wheat is behind the average progress for this time of the year, however a little over half of the crop was reported to be in good or excellent condition. Cattle producers are the most impacted by the fall drought that has continued into winter, with 44% of pastures and range in poor or very poor condition and hay and roughage supplies reported as 7% short, 32% short, 57% adequate, and only 4% surplus.

Crop	Very Poor	Poor	Fair	Good	Excellent
Winter Wheat	4%	6%	38%	40%	12%
Pasture and Range	14%	30%	40%	15%	1%
Cattle	1%	5%	28%	60%	6%

Fire Danger: The Interagency Fire Center reports that Tennessee and surrounding regions will have normal potential for significant wildland fires for the month of January 2024.



Snowfall: Many in the eastern half of the state saw some snowflakes flying in the air at some point during the month of December. Snow occurred with three different weather systems during the month, with snow reported on December 6, 19, and 30. Only six weather stations reported measurable snowfall, but another 23 stations reported a trace of accumulation (less than 0.1-inches). Most measurable snow was limited to higher elevations of the East Tennessee mountains or the Cumberland Plateau.

Story of the Month:

The major weather story of December was the severe weather outbreak that struck the state on December 9 that sadly proved fatal, killing 7 people and causing another 88 weather-related injuries. The Nashville NWS Office report for the December 9, 2023 tornado outbreak determined that there were 7 tornadoes produced, primarily by three different supercell thunderstorms ahead of a strong cold front that swept the state. The first tornado occurred in West Tennessee, with a path through Gibson and Weakley counties. The storms then moved into Middle Tennessee, and both the Clarksville and Nashville metro areas were hard-hit. The strongest of these tornadoes was an EF-3 that touched down near Clarksville and stayed on the ground for more than an hour, eventually crossing into Kentucky. This tornado resulted in 62 injuries and 4 fatalities, and damaged or destroyed many homes. Later in the afternoon, an EF-2 touched down in north Nashville and stayed on the ground through Madison, Hendersonville and Gallatin. This tornado resulted in another 22 injuries and 3 fatalities, as well as widespread structural damage.

****TORNADO EMERGENCY FOR HENDERSONVILLE, GALLATIN, AND GOODLETTSVILLE UNTIL 5:15PM. THIS TORANDO IS ON THE GROUND AND HAS PRODUCED DAMAGE. TAKE SHELTER NOW!!****

TORNADO WILL MOVE THROUGH GALLATIN OVER THE NEXT 15 MINUTES!

Tornado Emergency

Valid Until
5:15 PM CST Saturday
December 9, 2023

Threat Information



TORNADO
Damaging Tornado



HAIL
Pea
Sized Possible

Potential Exposure



Population: 238,619
Schools: 51
Hospitals: 4



! This is a life threatening situation. Seek shelter now!



Rare Tornado Emergency warning issued by the NWS Nashville. Image via Facebook.



Damage caused by the tornado in Clarksville, TN. Image via: Mark Zaleski/AP Photo



*A large explosion was caused when the tornado hit an NES substation in Madison, TN.
Image via: BrandonDavisBD/Twitter*

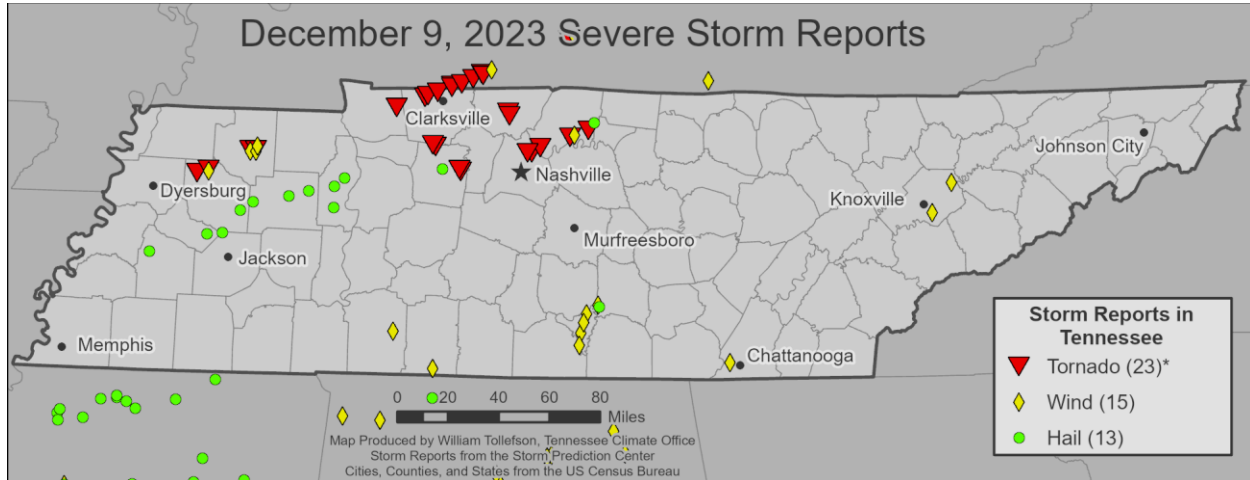
Storm Reports:

**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](https://www.spc.noaa.gov) for any updates.*

There was 1 day with severe storm reports in Tennessee during December 2023. There was a total of 23 tornado reports, although many of these reports were later confirmed to be produced along the tracks of

a total of 7 tornadoes in the state. There were also 15 severe wind damage reports and 13 reports of severe hail (hail with a diameter of 1” or larger). There were 7 fatalities and 88-weather related injuries reported due to these severe storms.

December 9



Tornadoes:

Time (UTC)	Strength	Location	County	Lat	Lon	Comments
17:32	EF1	3 ENE Yorkville	Gibson	36.12	-89.07	*** 3 INJ *** An EF-1 tornado touched down In Gibson County near Yorkville and tracked approximately 25 miles northeast into Weakley County Tennessee. Several structure (MEG)
17:38	--	1 N Rutherford	Gibson	36.14	-88.99	Corrects previous tstm wnd dmg report from 1 N Rutherford. Significant damage to the fire station north of Rutherford. (MEG)
17:58	--	1 SW Dresden	Weakley	36.26	-88.7	Corrects previous tstm wnd dmg report from 1 SW Dresden. Trees and powerlines down south of Dresden. (MEG)
18:03	--	2 ESE Dresden	Weakley	36.26	-88.66	Corrects previous tstm wnd dmg report from 2 ESE Dresden. Structural damage to the National Guard Armory. (MEG)
19:20	--	6 E Dover	Stewart	36.49	-87.74	The tornado first touched down just east of the Cumberland River near Cross Creeks National Wildlife Refuge off of Commissary Hollow Road. Minor damage was observed to (OHX)

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19:41	EF3	3 NNE Woodlawn	Montgomery	36.58	-87.47	*** 4 FATAL... 62 INJ *** This major EF-3 tornado first touched down on Fort Campbell just north of the Sabre Airfield with mostly minor tree damage. It quickly intensified (OHX)
19:51	--	4 NNW Clarksville	Montgomery	36.61	-87.38	Tornado continues across northern portions of Clarksville... TN. (OHX)
20:00	--	7 NE Clarksville	Montgomery	36.64	-87.28	Tornado crossed into Kentucky around this location. (OHX)
21:29	EF2	3 NW Cumberland Furnace	Dickson	36.3	-87.39	*** 1 INJ *** This EF-2 tornado touched down southwest of the intersection of Woods Valley Road and Bone Road... then moved east-northeast where it snapped a few pine t (OHX)
22:03	--	4 N White Bluff	Dickson	36.17	-87.22	Tornado with debris signature began near this area and tracked across Cheatham County into western Davidson County. (OHX)
22:19	EF2	Springfield	Robertson	36.5	-86.88	*** 4 INJ *** This EF-2 tornado touched down near Fairway Trail and Kemper Court in southern Springfield. Moving northeast... the tornado snapped and uprooted trees also (OHX)
22:39	EF2	4 W Madison	Davidson	36.26	-86.79	*** 3 FATAL... 22 INJ *** This strong EF-2 tornado touched down just to the east of I-24 west of Brick Church Lane. There were a few trees down and shingle damage to several structures (OHX)
22:46	--	1 NNE Madison	Davidson	36.27	-86.71	Tornado damage reported. Time estimated on radar. Debris signature on radar. (OHX)
22:50	--	3 WNW Hendersonville	Sumner	36.3	-86.65	Damage reported... tornado debris signature on radar as well. (OHX)
22:51	--	1 W Madison	Davidson	36.27	-86.74	Cars flipped on I65. (OHX)
23:09	--	1 SE Gallatin	Sumner	36.36	-86.44	Reports of damage on southern side of Gallatin. Time estimated by radar and tornado debris signature. (OHX)
23:18	--	6 S Bethpage	Sumner	36.4	-86.31	Damage reported in Castilian Springs. Time estimated by radar. (OHX)

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0:06	EF1	9 NE Red Boiling Spring	Clay	36.62	-85.72	A brief EF-1 tornado touched down just south of the Kentucky border in Clay County where it blew down a few trees on Barber Shop Road. The tornado intensified as it mov (OHX)
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Wind:

Time (UTC)	Speed (mph)	Location	County	Lat	Lon	Comments
17:38	--	1 N Rutherford	Gibson	36.14	-88.99	Significant damage to the fire station north of Rutherford. (MEG)
18:02	--	1 SW Dresden	Weakley	36.26	-88.7	Trees and powerlines down south of Dresden. (MEG)
18:04	--	2 ESE Dresden	Weakley	36.26	-88.66	Structural damage to the National Guard Armory. (MEG)
18:05	--	3 ENE Dresden	Weakley	36.29	-88.65	Large trees along Chicken Road. (MEG)
23:15	67	2 E Gallatin	Sumner	36.38	-86.41	AWOS station KXNX Gallatin Airport. (OHX)
0:01	--	7 NE Collinwood	Wayne	35.25	-87.67	Tree down in yard of home reported by Tennessee Valley Weather. Location and time estimated. (OHX)
0:43	--	4 SE Loretto	Lawrence	35.04	-87.39	Tree down on car on 1100 block of Lexington Highway southeast of Loretto. (OHX)
1:55	--	5 NNE Lynchburg	Moore	35.36	-86.32	Power lines were knocked down into the road at 110 Five Points Road. Time estimated by radar. (HUN)
1:59	--	2 S Lynchburg	Moore	35.25	-86.36	A tree was knocked down into the road at the intersection of Winchester Highway and Norman Wiseman Road. Time estimated by radar. (HUN)
1:59	--	2 NNE Lynchburg	Moore	35.31	-86.34	A tree was knocked down into the road at the intersection of Winchester Road and Cobb Hollow Road. Time estimated by radar. (HUN)
2:05	--	7 S Lynchburg	Moore	35.18	-86.37	A tree was knocked down at 642 Pierce Hollow Road. Time estimated by radar. (HUN)
2:12	--	3 NNW Tullahoma	Coffee	35.41	-86.24	A few trees down along Normandy road. Time is radar estimated. (OHX)
4:40	--	3 SSW Red Bank	Hamilton	35.08	-85.32	Powerlines down at 1200 block of East Elmwood Drive. (MRX)

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4:45	--	1 WSW Lake Forest	Knox	35.92	-83.89	Multiple trees down at the intersection of Live Oak Ln and Stone Rd. (MRX)
5:13	--	2 NNE Mascot	Knox	36.09	-83.75	Tree down blocking a lane of traffic near Mine Rd and Old Rutledge Pike. (MRX)

Hail:

Time (UTC)	Size (in)	Location	County	Lat	Lon	Comments
19:12	1.00	1.5 SE Nutbush	Haywood	35.67	-89.39	Corrects previous hail report from 2 SE Nutbush. (MEG)
19:30	1.75	Milan	Gibson	35.92	-88.76	(MEG)
19:36	1.00	Atwood	Carroll	35.97	-88.67	(MEG)
19:45	1.50	Gadsden	Crockett	35.78	-88.99	Quarter to ping-pong ball sized hail along Highway 79. (MEG)
19:52	1.25	2 NW Fairview	Madison	35.79	-88.88	Half-dollar size hail in the Three Way area. (MEG)
19:55	1.50	Huntingdon	Carroll	36.01	-88.42	(MEG)
20:06	1.00	Hollow Rock	Carroll	36.04	-88.28	(MEG)
20:20	1.00	Camden	Benton	36.07	-88.1	(MEG)
20:25	1.25	6 NE Camden	Benton	36.12	-88.03	Half-dollar sized hail off of Flatwoods Rd. (MEG)
21:21	1.00	8 S Camden	Benton	35.95	-88.1	(MEG)
21:57	1.25	1 SE Charlotte	Dickson	36.18	-87.34	Estimated hail size from social media picture. Time estimated on radar. (OHX)
23:50	1.00	4 SE Bethpage	Trousdale	36.45	-86.27	Estimated quarter size hail 1 mile north of TN-25 and US-231. (OHX)
2:12	1.00	2 NNW Tullahoma	Coffee	35.4	-86.23	Photo received of quarter-sized hail along Riley Creek Road between Normandy Lake and Tullahoma. Time is radar estimated. (OHX)

CPC Outlooks for the Next Month:

The NOAA Climate Prediction Center outlooks for January show that all of Tennessee has equal chances for normal, above normal, or below normal temperatures for the month. Almost all areas of Tennessee are shown leaning towards above normal precipitation (33-40% chance).

