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Tennessee Climate Office Monthly Report

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## 2018 December - Tennessee Monthly Climate Report

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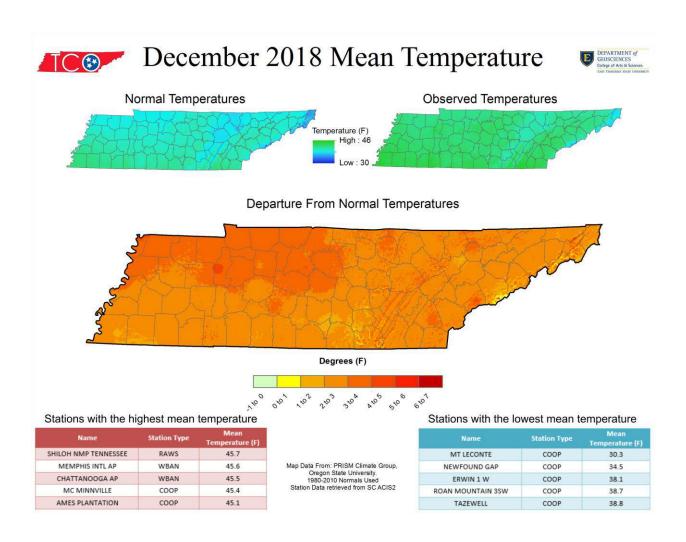
## December 2018 Tennessee Climate Summary

Prepared by William Tollefson and Dr. Andrew Joyner

Tennessee Climate Office \* East Tennessee State University

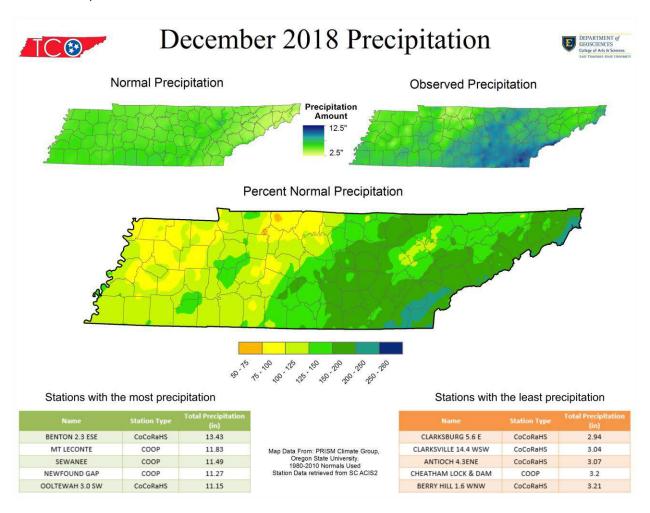
#### Monthly Temperature Summary:

Mean temperatures were above normal for most parts of the state, with the northwest observing the warmest anomalies (widespread 3-4 degrees above normal for the month). These temperature anomalies would be much higher, if not for a cold snap that arrived with a Gulf Coast storm in the second week of the month when many areas across the state recorded temperatures 6-8 degrees colder than normal for the week (6<sup>th</sup>-12<sup>th</sup>). The month also ended on a warm note, as warm air moved in behind a warm front and brought temperatures to the upper 60's and 70's. The Bristol/Tri-Cities Airport set their record high for New Year's Eve, with a high temperature of 75°F, the Morristown and Nashville NWS Office weather stations also recorded their warmest NYE with a high of 72 °F and 66 °F, respectively.



#### Monthly Precipitation Summary:

Precipitation was generally at or above normal; with some areas in northern Middle and West Tennessee slightly below normal (in the 75-100% normal range). Eastern parts of the state (from southeastern Hamilton County to Monroe County) recorded the most precipitation with many areas closing in on a foot! Otherwise, the highlands of Johnson and Carter Counties in northeast Tennessee recorded the most above normal precipitation, with some areas recording over 250% of normal! Each week of the month storm systems produced rainfall across the state, with a varied pattern resulting in many locations going from a generally dry week to a wet week and then back to dry. The second week of December brought a strong Gulf-Coast storm that produced widespread heavy rains in the southern parts of the state, and significant snowfall to the mountains and northeast Tennessee. The Bristol/Tri-Cities airport set a record for single-day December snowfall on Dec 9<sup>th</sup> with 9.1 inches of snowfall. Heavy rainfall occurred at the end of the month for most parts of the state (with totals over 3"), which led to flood concerns on rivers in Middle and West TN, as well as rivers in East TN which have headwaters in western North Carolina.



## Top Tenn (warmest, coldest, wettest, driest stations of the month):

#### **Hottest Stations (highest max temp):**

	<u> </u>	
Name	Station Type	Max Temperature (F)
BRISTOL AP	WBAN	75
NEWPORT 1 NW	COOP	75
GERMANTOWN 4SE	COOP	75
CHATTANOOGA AP	WBAN	74
MEMPHIS WFO	WBAN	74
MILAN EXP STN	COOP	74
KINGSPORT	COOP	74
MEMPHIS INTL AP	WBAN	73
KNOXVILLE AP	WBAN	73
BROWNSVILLE	COOP	73
JACKSON EXP STA	COOP	73

#### Coldest Stations (lowest min temp):

Condest Stations (1011CSt 11111 temp).						
Name	Name Station Type					
NORRIS	СООР	3				
MT LECONTE	COOP	8				
ROAN MOUNTAIN 3SW	COOP	12				
JACKSON EXP STA	COOP	13				
NEWFOUND GAP	COOP	13				
BRISTOL AP	WBAN	14				
DICKSON	СООР	15				
ALLARDT	COOP	15				
TAZEWELL	COOP	15				
BRENTWOOD	COOP	15				
GLADEVILLE	COOP	15				
WHITE HOUSE	COOP	15				

### Warmest Stations (highest mean temps):

Name	Station Type	Mean Temperature (F)
SHILOH NMP TENNESSEE	RAWS	45.7
MEMPHIS INTL AP	WBAN	45.6
CHATTANOOGA AP	WBAN	45.5
MC MINNVILLE	СООР	45.4
AMES PLANTATION	СООР	45.1
NASHVILLE INTL AP	WBAN	45
ARDMORE	СООР	45
NEWPORT 1 NW	СООР	44.5
GERMANTOWN 4SE	СООР	44.5
FAYETTEVILLE WATER PLANT	СООР	44.3
OAK RIDGE ASOS	WBAN	44.3
ROCK ISLAND STATE PARK	СООР	44.3

#### **Coolest Stations (lowest mean temps):**

Name	Station Type	Mean Temperature (F)
MT LECONTE	COOP	30.3
NEWFOUND GAP	COOP	34.5
ERWIN 1 W	COOP	38.1
ROAN MOUNTAIN 3SW	COOP	38.7
TAZEWELL	COOP	38.8
ROGERSVILLE 1 NE	COOP	39.1
JAMESTOWN	COOP	39.3
NORRIS	СООР	40
COALMONT	СООР	40
CROSSVILLE 7 NW	WBAN	40

#### Wettest Stations (highest rainfall totals):

Name	Station Type	Total Precipitation (in)
BENTON 2.3 ESE	CoCoRaHS	13.43
MT LECONTE	COOP	11.83
SEWANEE	COOP	11.49
NEWFOUND GAP	COOP	11.27
OOLTEWAH 3.0 SW	CoCoRaHS	11.15
COALMONT	COOP	11.13
MONTEAGLE	WBAN	11.1
MCMINNVILLE 8.5 ESE	CoCoRaHS	10.97
CLEVELAND 5.2 SE	CoCoRaHS	10.94
CLEVELAND 3.0 ESE	CoCoRaHS	10.6

#### **Driest Stations (lowest rainfall totals):**

Name	Station Type	Total Precipitation (in)
CLARKSBURG 5.6 E	CoCoRaHS	2.94
CLARKSVILLE 14.4 WSW	CoCoRaHS	3.04
ANTIOCH 4.3ENE	CoCoRaHS	3.07
CHEATHAM LOCK & DAM	COOP	3.2
BERRY HILL 1.6 WNW	CoCoRaHS	3.21
CLARKSVILLE 13.5 SSE	CoCoRaHS	3.42
GREEN HILL 3.1 NNE	CoCoRaHS	3.56
GREENBRIER 1.4 N	CoCoRaHS	4.09
PORTLAND SEWAGE PLANT	COOP	4.2
MOUNT JULIET 5.2 SSW	CoCoRaHS	4.24

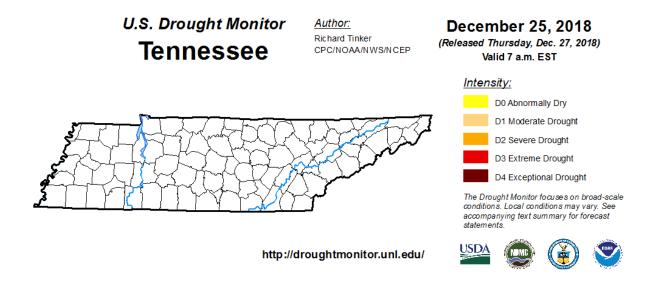
#### Snowiest Stations (total monthly snowfall):

Name	Station Type	Total Snowfall (in)
MT LECONTE	COOP	26.2
NEWFOUND GAP	COOP	15.6
ROAN MOUNTAIN 3SW	СООР	14.3
BRISTOL AP	WBAN	10.8
KINGSPORT	СООР	8.8
GREENEVILLE EXP STA	СООР	5.1
ELIZABETHTON	СООР	4.9
MORRISTOWN WFO	СООР	3.3
MORRISTOWN RADIO WCRK	СООР	3.2
MCMINNVILLE 8.5 ESE	CoCoRaHS	2.5

An additional 10 stations reported measurable snowfall, and 14 more reported trace amounts of snow during the month of December.

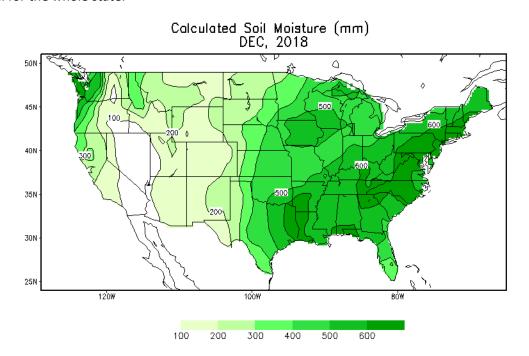
#### **Drought Monitor:**

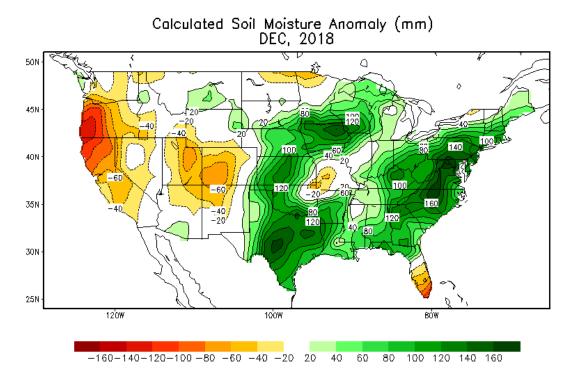
As of the last drought monitor report of the month (Dec 25<sup>th</sup>), Tennessee was drought free, and there were no drought conditions reported in Tennessee during the month of December.



#### Soil Moisture:

The mean soil moisture for the month ranged from over 500 to above 600mm, which was at or above normal for the whole state.

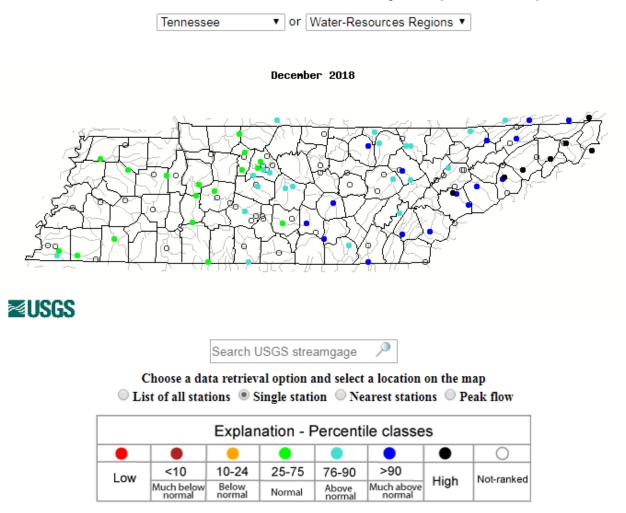




#### Streamflow:

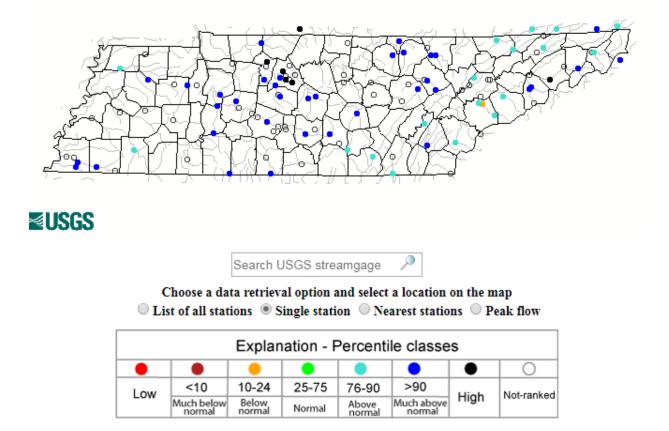
Monthly stream flow averaged normal to above normal for the state, with the eastern half showing the above normal conditions.

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

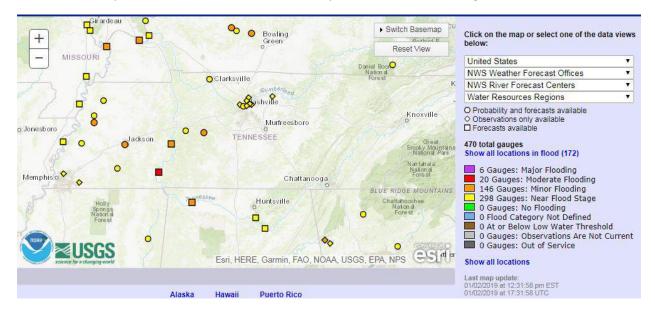


Widespread heavy rainfall during the last week of the month led to all but one stream gauge reporting above normal flow on January 1<sup>st</sup>, 2019.

Tuesday, January 01, 2019

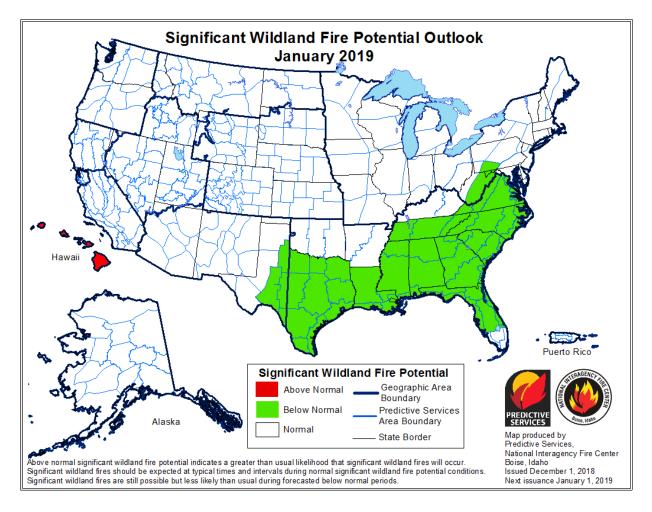


Additionally there were several streams in Middle and West Tennessee that exhibited flood or near flood conditions. Many of these streams are forecast to stay near or above flood stage for at least the next week.

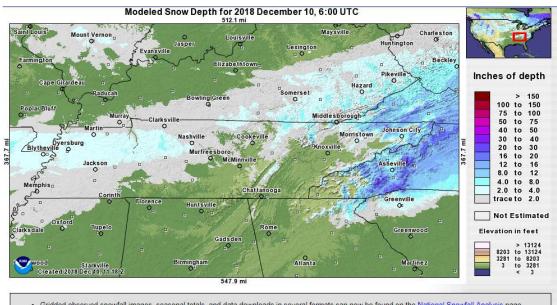


#### Miscellaneous:

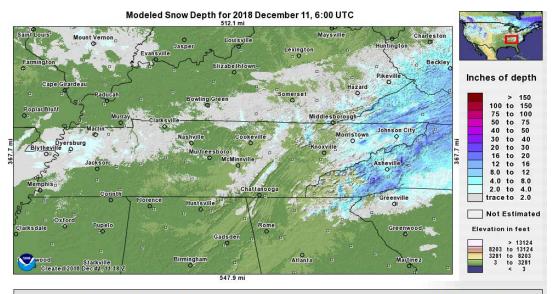
**Fire Danger:** Due to wet weather, fire danger is forecast to be below normal for the next month.



**Snowfall:** Snowfall occurred for northern portions of Tennessee from the 8<sup>th</sup> to the 10<sup>th</sup> of December. Maps below from the National Snow and Ice Datacenter show the maximum snow coverages on the 10<sup>th</sup> and 11<sup>th</sup>. For the week of Dec 6-12<sup>th</sup>, there were 289 weather stations reporting precipitation in TN, of which 69 stations reported measureable snow (39 recorded over an inch), and an additional 47 stations reported trace amounts. Some locations in NE TN recorded over a foot of snow in this 3-day period! The Tri-Cities Airport broke the record for the snowiest day in December with a total of 9.1 inches on Sunday (12/9), the previous one-day December snowfall record was 8.7" set on December 25, 1969.



Gridded observed snowfall images, seasonal totals, and data downloads in several formats can now be found on the National Snowfall Analysis page



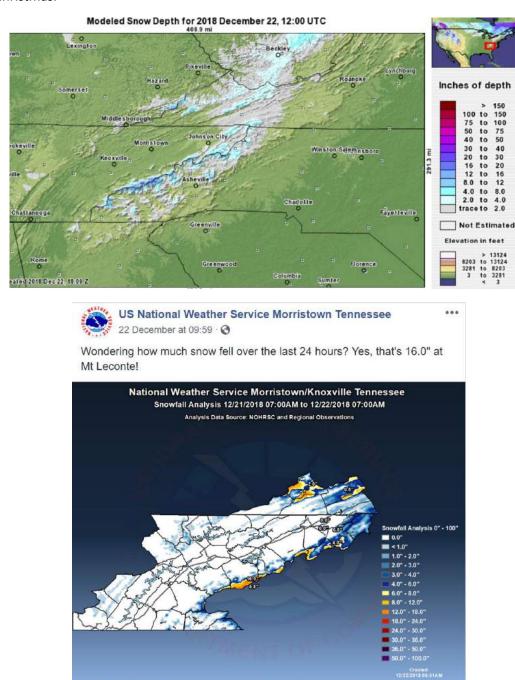
Gridded observed snowfall images, seasonal totals, and data downloads in several formats can now be found on the National Snowfall Analysis page

#### Data for December 6, 2018 through December 12, 2018

Click column heading to sort ascending, click again to sort descending.

Name	Station Type	Total Snowfall
GRAY 1.5 E	CoCoRaHS	11.5
KINGSPORT 4.3 ENE	CoCoRaHS	11.0
Bristol-Johnson City Area	ThreadEx	10.0
BRISTOL AP	WBAN	10.0
GRAY 1.3 S	CoCoRaHS	10.0
NEWFOUND GAP	COOP	9.8
MT LECONTE	COOP	9.2
OAK GROVE 3.0 E	CoCoRaHS	9.2
CHURCH HILL 3.4 NNE	CoCoRaHS	9.0
KINGSPORT	COOP	8.8
ROAN MOUNTAIN 3SW	COOP	8.7

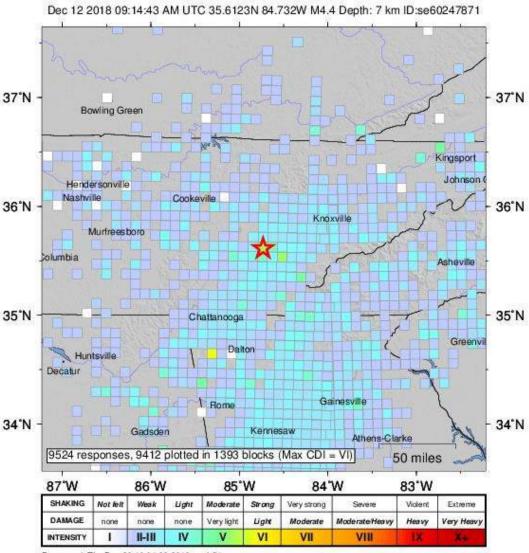
Another event brought heavy snow to the higher elevations of the mountains in East Tennessee on December 21<sup>st</sup> and 22<sup>nd</sup>. Mt LeConte in Great Smoky Mountains National Park recorded 16" of snow! The highest elevations of the Smoky's and northeast Tennessee maintained their snow cover and observed a white Christmas.



**Earthquake:** A Magnitude 4.4 earthquake rattled East Tennessee on Wednesday Dec. 12<sup>th</sup>, this was the second strongest recorded quake in east TN. The earthquake occurred at 4:14am EST, with an epicenter near Decatur, TN. Shaking was felt throughout East TN and even as far away as in the Atlanta Metro Area.



#### USGS Community Internet Intensity Map EASTERN TENNESSEE



Processed: Thu Dec 20 19:01:38 2018 vmdyfi1

#### Story of the month:

The two major stories of the month were the snowstorm of the 8<sup>th</sup>-10<sup>th</sup> and the severe weather and flooding at the end of the month, specifically on the 31<sup>st</sup>.

Snowstorm: As mentioned previously the snowstorm was associated with a strong Gulf-Coast storm and a series of shortwaves in the upper-air patterns that brought cold air and moisture into the northern half of TN. Along the southern border of TN this system produced over 2" of rainfall, but up to a foot of snow in some parts of northeast TN. This storm also set the record for single-day snowfall during the month of

Data for December 6, 2018 through December 12, 2018
Click column heading to sort ascending, click again to sort descending.

Name	Station Type	Total Snowfall
GRAY 1.5 E	CoCoRaHS	11.5
KINGSPORT 4.3 ENE	CoCoRaHS	11.0
Bristol-Johnson City Area	ThreadEx	10.0
BRISTOL AP	WBAN	10.0
GRAY 1.3 S	CoCoRaHS	10.0
NEWFOUND GAP	COOP	9.8
MT LECONTE	COOP	9.2
OAK GROVE 3.0 E	CoCoRaHS	9.2
CHURCH HILL 3.4 NNE	CoCoRaHS	9.0
KINGSPORT	COOP	8.8
ROAN MOUNTAIN 3SW	COOP	8.7

December for the Bristol/Tri-Cities Airport on Dec. 9<sup>th</sup> with 9.1" of snow recorded. The night following the snowstorm temperatures dropped into the teens across the region, hard freezing the snow in place, and many areas of northeast TN maintained snow cover until the following Friday (Dec 14<sup>th</sup>)

The snowstorm also proved fatal, as a pedestrian was killed on I-81 when he was struck by an SUV that was skidding on snow and slush. The man was a truck driver who was walking away from his disabled truck on the side of the interstate.

Additionally a 20-mile stretch of I-81 from Virginia to Tennessee came to a complete standstill for around 18 hours from Sunday into early Monday morning as traffic was stopped when cars near the start of the traffic jam slid off the road or became stuck on the highway.



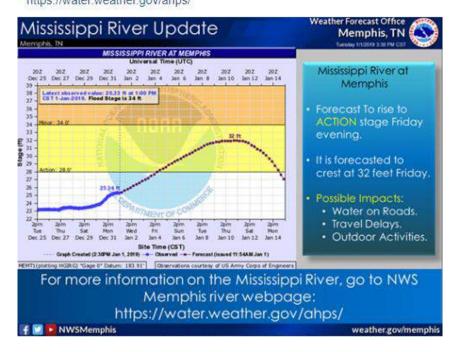
A view from the Tennessee Climate Office on Tuesday, Dec. 11th

Flooding concerns to end the year: Many rivers in West and Middle Tennessee were near or at flood stage as of the end of the year, with the wide-spread heavy rains that came during the last week of the month. Some rivers in East Tennessee, specifically those whose headwaters are in western North Carolina were also experiencing flooding.



As you can tell river stages are up! Here's a look at the Mississippi River at Memphis. Check out the graphic below for more information —.

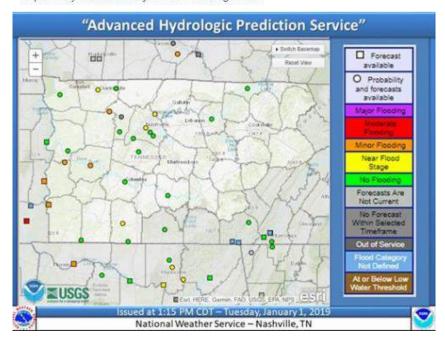
To look at more of these graphs please go to: https://water.weather.gov/ahps/





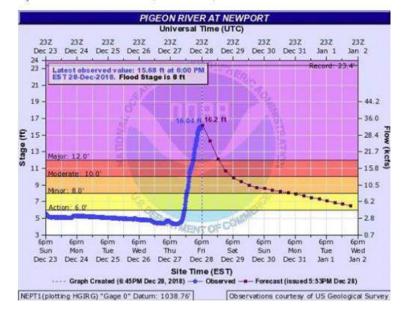
1 January at 14:07 - 3

With all the rain we had yesterday, those with interest along the rivers need to keep an eye on the AHPS page. All things river and creeks. http://ow.ly/WAQi30n9zjH #riverflooding #rain



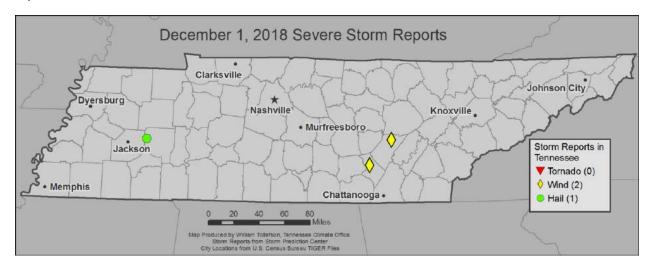
# US National Weather Service Morristown Tennessee

Major flooding continues for the Pigeon River at Newport. It has crested at 16 feet this evening, but will remain above flood stage through Monday. If you come to a flooded road, turn around, don't drown!



#### Storm reports:

December 2018 was bookended by severe weather events in Tennessee with severe storm damage reported on the  $1^{st}$  and  $31^{st}$ .

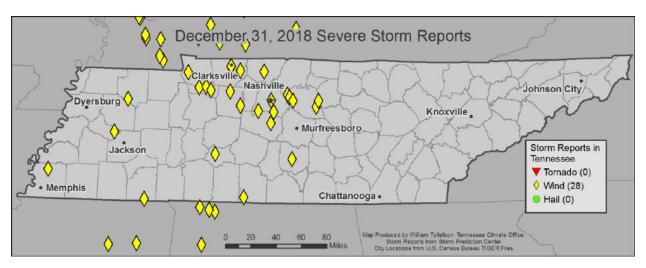


#### Hail reports:

Time (UTC)	Size	Location	County	Lat	Lon	Comments
19:55	1"	BLUE GOOSE	HENDERSON	35.7	-88.58	QUARTER SIZED HAIL IN BLUE GOOSE. (MEG)

#### Wind Reports:

Time (UTC)	Speed	Location	County	Lat	Lon	Comments
5:45		8 NNE PIKEVILLE	BLEDSOE	35.71	-85.14	SEVERAL TREES DOWN ACROSS BIG SPRINGS GAP RD. (MRX)
5:50		5 NW DUNLAP	SEQUATCHIE	35.42	-85.45	TREES DOWN ALONG STATE ROUTE 8 ON CAGLE MOUNTAIN. (MRX)



Wind Reports:

Time (UTC)	Speed	Location	County	Lat	Lon	Comments
16:35		MILLINGTON	SHELBY	35.33	-89.89	TREE LIMB DOWN ON POWER LINE. TIME ESTIMATED FROM RADAR. (MEG)
16:38		GREENFIELD	WEAKLEY	36.16	-88.8	TWO TREES DOWN ON HIGHWAY 54 IN GREENFIELD. TIME ESTIMATED FROM RADAR. (MEG)
17:35		GADSDEN	CROCKETT	35.78	-88.98	ROOF OF A STORAGE SHED DAMAGED. TIME ESTIMATED FROM RADAR. (MEG)
18:38		GUYS	MCNAIRY	35.02	-88.54	A CARPORT WAS TOSSED ACROSS A YARD. TIME IS RADAR ESTIMATED. (MEG)
18:40		6 W DOVER	STEWART	36.48	-87.96	NUMEROUS REPORTS OF TREES DOWN IN THE LAND BETWEEN THE LAKES AREA AND THE WESTERN PART OF STWEART COUNTY. TIME ESTIMATED VIA RADAR. (OHX)
18:56		2 WSW TENNESSEE RIDGE	HOUSTON	36.31	-87.8	A FEW TREES DOWN IN THE LARGENT HOLLOW AREA OF HIGHWAY 147. EM ALSO SAID THERE WERE TWO OTHER LOCATIONS ALONG HIGH 147 WITH TREES DOWN. LOCATION UNKNOWN AT THE TIME OF (OHX)
19:04		5 ESE ERIN	HOUSTON	36.28	-87.63	REPORT OF A TREE BLOCKING THE ROAD ON BATEMAN BRANCH ROAD. TIME ESTIMATED VIA RADAR. (OHX)
19:04		ERIN	HOUSTON	36.32	-87.7	REPORT OF A TREE BLOCKING THE ROAD ON BATEMAN BRANCH ROAD. TIME ESTIMATED VIA RADAR. (OHX)
19:12		5 ESE ERIN	HOUSTON	36.28	-87.63	REPORT OF A TREE BLOCKING THE ROAD ON BATEMAN BRANCH ROAD. TIME ESTIMATED VIA RADAR. (OHX)
19:23		1 S CLARKSVILLE	MONTGOMERY	36.55	-87.35	DOWNED TREE CAUSED EXTENSIVE ROOF DAMAGE TO A HOUSE ON HICKORY GROVE BOULEVARD IN CLARKSVILLE. (OHX)
19:23		CLARKSVILLE	MONTGOMERY	36.56	-87.35	TREE DOWN ON HOUSE ON RIVERSIDE DRIVE IN CLARKSVILLE (OHX)
19:35		5 ENE VANLEER	DICKSON	36.27	-87.36	REPORT OF TREE IN THE ROAD IN CUMBERLAND FURNACE. TIME ESTIMATED VIA RADAR. (OHX)
19:36		2 SSE RED RIVER ESTATES	MONTGOMERY	36.51	-87.22	HAM OPERATOR REPORTED TREES DOWN AT MACCADO RD. NEAR SANGO. TIME ESTIMATED VIA RADAR. (OHX)
19:45		HOHENWALD	LEWIS	35.55	-87.56	EM REPORTED A TREE DOWN ON BUFFALO ROAD. TIME ESTIMATED FROM RADAR. (OHX)
19:45		WHITE BLUFF	DICKSON	36.11	-87.21	REPORT OF TREE IN THE ROAD ON WHITE BLUFF AND CUMBERLAND FURANCE. TIME ESTIMATED VIA RADAR. (OHX)

					REPORT OF TREE IN THE ROAD IN
19:54	 WHITE BLUFF	DICKSON	36.11	-87.21	WHITE BLUFF. TIME ESTIMATED VIA
					RADAR. (OHX)
20.04	CDDINICEIELD	DODEDTCOM	26.5	06.00	REPORT OF A TREE DOWN ON A
20:04	 SPRINGFIELD	ROBERTSON	36.5	-86.88	HOUSE BESSIE STREET. TIME
					ESTIMATED VIA RADAR. (OHX)
20:13	2 SW	DAVIDCON	36.05	-86.96	TWO TREES DOWN ON POWER LINES AT POPLAR CREEK ROAD AND GRIFFITH
20.13	 BELLEVUE	DAVIDSON	30.03	-00.90	ROAD IN DAVIDSON COUNTY (OHX)
					A SPOTTER REPORTED A TREE DOWN
20:38	 NASHVILLE	DAVIDSON	36.17	-86.78	ON MARRIOT ROAD. (OHX)
					TREE DOWN AND BLOCKING ROAD
20:39	 4 ESE	WILLIAMSON	35.91	-86.78	NEAR CLOVERCROFT ROAD AND HWY
20.39	 FRANKLIN	WILLIAMSON	33.31	-80.78	96 (OHX)
					PICTURE OF A FENCE PIECE DOWN.
20:40	 2 SSE CRIEVE	DAVIDSON	36.04	-86.74	MOST LIKELY FROM A TREE FALLING
	HALL		30.01	00.7	ON IT. (OHX)
					TREE DOWN ON HIGHWAY 11 JUST
20:45	 2 NNE	GILES	35.06	-87.15	NORTH OF MINOR HILL. TIME
	MINOR HILL				ESTIMATED VIA RADAR. (OHX)
	1 E				TREE DOWN AT N. GREENHILL ROAD
20:48	 LANGFORD	WILSON	36.24	-86.55	AND VANDERBILT ROAD. TIME
	COVE				ESTIMATED VIA RADAR. (OHX)
20.50	 MOUNT	WILCON.	26.21	00.53	TREE LIMBS DOWN ON GOLDEN BEAR
20:50	 JULIET	WILSON	36.21	-86.52	PARKWAY. (OHX)
	1 E BELINDA				TREE DOWN AT BELINDA PARKWAY
20:56	 CITY	WILSON	36.17	-86.47	AND ADELMONT COURT. TIME
	CITI				ESTIMATED VIA RADAR. (OHX)
	2 WNW				PHOTO OF DOWNED TREE ON HWY
21:29	 SHELBYVILLE	BEDFORD	35.5	-86.48	41A. TIME ESTIMATED VIA RADAR.
	S. ILLD I VILLE				(OHX)
	WATERTOW				TREE DOWN ON SHERRILLTOWN
21:36	 N	WILSON	36.1	-86.14	ROAD. TIME ESTIMATED FROM RADAR.
					(OHX)
	4 ESE		06.4=	004	TREE IN ROAD AT SOUTH COMMERCE
22:33	 TUCKERS	WILSON	36.17	-86.11	ROAD AT BLUEBIRD ROAD (OHX)
	CROSSROAD				, ,

#### CPC outlooks for the next month:

There is no strong climate forcing signal for temperatures for the month of January, so Tennessee, along with most of the eastern and southern sections of the country, has equal chances for observing temperatures that are normal, above normal, or below normal.

There is a moderate chance (33-40%) that the state will observe above normal precipitation during January, with the higher confidence in southeast Tennessee.

