





KENTUCKY LIGHTNING REPORT



ABOUT THIS REPORT

The 2020 Lightning Report was prepared by Earth Networks using the Earth Networks Total Lightning Network (ENTLN). The following report includes in-cloud, cloud-to-ground, and total lightning data for this state and the surrounding water bodies (if any) throughout 2020. Counts, densities, rankings, Dangerous Thunderstorm Alerts (DTAs), and Thunder Days in this report are from January 1, 2020 to December 31, 2020.

THE EARTH NETWORKS TOTAL LIGHTNING NETWORK (ENTLN)

The lightning data in this report is derived from the Earth Networks Total Lightning Network (ENTLN), which monitors the combination of in-cloud and cloud-to-ground lightning strikes over 100 countries. With over 1,800 sensors, the ENTLN is the most extensive and technologically advanced total lightning network in the world. ENTLN has been specifically deployed to detect real-time lightning and provide advanced warning for severe weather events that could threaten public safety and operational efficiency.

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REPORT TERMINOLOGY

To help you better understand the insights from this lightning report, we've included definitions of our frequently used report terminology below.

Lightning Pulse: This report measures lightning pulses. A pulse is a surge of electric current in lightning usually accompanied by a burst of light. Pulses are classified as In-cloud (IC) or Cloud-to-Ground (CG).

Lightning Flash: A lightning flash is a collection of pulses close in space and time that approximates the continuous ionized channels of a complete bolt of lightning.

Cloud-to-Ground Lightning (CG): Lightning that happens between opposite charges in a cloud and on the ground.

In-Cloud Lightning (IC): Lightning that occurs between opposite charges within a thunderstorm cloud.

Total Lightning Detection: The combination of all in-cloud and cloud-to-ground lightning activity.

Pulse Density: The number of lightning pulses per square mile per year.

Dangerous Thunderstorm Alerts (DTAs): Earth Networks patented advanced severe weather warnings that notify users of incoming storms up to 45 minutes before storm arrival.

Thunder Days: Any given day where lightning was detected in a certain area.

TOTAL LIGHTNING

is the combination of cloud-to-ground (CG) and in-cloud (IC) lightning strikes



Cloud-to-Ground lightning:

Lightning that happens between opposite charges in a cloud and on the ground

In-Cloud lightning:

Lightning that occurs between opposite charges within a thunderstorm cloud

KENTUCKY TOTAL LIGHTNING PULSES 7,974,926 6.45% 93.55% Total Lightning Type Percentages





LIGHTNING COUNT RANKINGS



Kentucky ranked 23 in total lightning pulses for 2020.

TOTAL (CG+IC) PULSE DENSITY MAP







Total Pulse Density (sqmi)

Pulse density is a better indicator of lightning activity than total lightning counts because it enables us to compare different sized areas (like states and counties) fairly.

We cluster pulses together into a flash. With every pulse we detect, we receive a more precise measure of lightning activity. At left, areas in bright yellow experienced the highest lightning pulse density per square mile in 2020.

500

TOTAL PULSE DENSITY RANKINGS

This chart shows the top 15 counties in the state ranked by total pulse density, which is the total lightning divided by the area of the county (in square miles).

COUNTIES 500 400 300 200 100 Union Nonteomery 0 spencer ROWAL Webster 11000 Ohio WON



DANGEROUS THUNDERSTORM ALERTS IN THE U.S.



Earth Networks issued 29,401 Dangerous Thunderstorm Alerts (DTAs) in 2020. This year's map clearly shows the persistent drought conditions that have plagued the South and Southwest.

Dangerous Thunderstorm Alerts (DTAs), available exclusively to Earth Networks, provide **50% more lead time** to severe storms compared to publicly available alerts.

DANGEROUS THUNDERSTORM ALERTS BY MONTH

Earth Networks issued 204 Dangerous Thunderstorm Alerts for the state in 2020.

KENTUCKY



TOTAL STATE THUNDER DAYS: 166



-10 -5 -15 **Change in Thunder Days Map**

This year, the Southwest and Midwest experienced significantly less lightning than in previous years due to a persistent drought and weak monsoon. States in the Southeast experienced a substantial uptick in lightning activity this year, including Tennessee, North Carolina, South Carolina, Virginia, West Virginia, Georgia, Alabama, Mississippi, Florida, Louisiana, Arkansas, and Kentucky.

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15

Thunder Days are the days we detected lightning over a certain area. The map shows a deviation from our 7-year average and illustrates our overall finding that lightning decreased about 15% from 2019.

EARTH NETWORKS®



THANK YOU

For additional insights or permission to use data or graphics from this report, please contact us at: info@earthnetworks.com or call 1 301.250.4000



APPENDIX

This table ranks all U.S. states by total lightning pulses, including in-cloud and cloudto-ground from highest to lowest. Total number of thunder days in each state (the total number of days in the year when lightning was detected by ENTLN) are also included. The period covered is January 1, 2020 to December 31, 2020.

STATE	TOTAL LIGHTNING PULSES	TOTAL THUNDER DAYS
ТХ	63,683,799	278
FL	35,430,198	246
ОК	26,159,420	205
KS	23,125,675	179
IL	16,785,149	166
NE	14,433,875	178
МО	14,081,658	184
VA	13,234,163	176
GA	13,016,803	217
ОН	12,009,955	143
SD	11,940,870	156
LA	11,787,379	230
AL	11,448,621	202
AR	11,417,155	211
NC	10,666,834	203
PA	10,024,978	151
MS	9,236,279	210
IN	9,175,986	149
IA	9,121,097	140
WI	8,812,327	145
TN	8,458,373	186
MN	8,009,792	148
KY	7,974,926	166
MI	7,769,382	159
ND	7,634,287	131
SC	7,454,219	197
CO	7,360,769	185
MD	6,666,766	124
NM	5,819,550	196
MT	5,107,593	154
WY	4,951,397	166
NY	4,943,122	152
WV	4,684,226	150
AZ	3,532,759	151
NJ	3,465,297	96
	1,951,574	172
	1,518,171	172
	1,207,040	8U 14C
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	930,107	122
	913,033 802 252	70
	612 7/3	70
	402 333	117
	702,333	£17 §1
	350,337	75
	190 992	42
	44 204	<u>47</u> <u>4</u> 7
	TT,2VT	

APPENDIX

This table ranks all counties in the state by total lightning pulses, including in-cloud and cloud to-ground from highest to lowest. Total number of thunder days in each county (the total number of days in the year when lightning was detected by ENTLN) are also included. The period covered is January 1, 2020 to December 31, 2020.

COUNTY	TOTAL LIGHTNING PULSES	TOTAL THUNDER DAYS	COUNTY
Ohio County	183,275	63	McCracke
Christian County	182,021	78	McCreary
Union County	167,945	65	Jackson (
Trigg County	144,542	74	Bourbon
Hardin County	136,063	72	Bath Cou
Muhlenberg County	133,521	67	Edmonso
Logan County	123,095	72	Lawrence
Daviess County	123,076	67	Lyon Cou
Pike County	122,725	70	Bullitt Co
Breckinridge County	122,428	69	Morgan C
Warren County	121,292	70	Allen Cou
Pulaski County	118,876	84	McLean C
Graves County	114,400	78	Boone Co
Grayson County	111,028	71	Floyd Cou
Casey County	110,638	68	Spencer C
Jefferson County	110,040	63	Madison
Hopkins County	108,095	70	Taylor Co
Butler County	104,966	63	Harrison
Lewis County	102,971	67	Mason Co
Fleming County	101,902	61	Owen Cou
Webster County	97,292	59	Ballard Co
Rowan County	91,120	58	Nicholas
Nelson County	91,113	72	Estill Cou
Livingston County	89,233	70	Fulton Co
Henderson County	88,751	62	Adair Cou
Crittenden County	81,909	68	Knott Cou
Calloway County	80,751	71	Laurel Co
Pendleton County	80,651	55	Green Cou
Caldwell County	80,414	69	Knox Cou
Washington County	79,667	67	Menifee C
Whitley County	79,430	82	Bracken
Todd County	77,526	71	Wolfe Cou
Marion County	77,184	62	Monroe C
Barren County	76,268	<i>15</i>	Henry Co
Hart County	76,217	62	
Meade County	76,134	65	
Rockcastle County	73,205	71 64	Clay Cour
Shelby County	73,042	62	
Broathitt County	13,304 73 605	7/	Cumborla
Grant County	72,095		
Marshall County	71 202	43	Harlan Co
	70 811	60	Russell Co
Montgomery County	70,775	60	Simnson
Wayne County	70.741	74	Hickman
Greenup County	70,457	69	Scott Cou

	TOTAL LIGHTNING PULSES	TOTAL THUNDER DAYS
n County	68,279	63
County	67,307	79
ountv	67.138	76
County	66.312	60
itv	66.035	61
n County	65,692	65
County	65,497	73
ntv	64.219	67
inty	64,125	62
ounty	63,605	67
nty	62,769	73
ounty	61,052	57
unty	60,531	61
nty	60,423	63
ounty	60,183	59
ounty	59,352	70
inty	59,053	64
County	58,791	56
unty	58,606	46
nty	57,576	58
unty	56,622	62
County	56,209	51
nty	56,192	63
unty	55,478	66
nty	55,168	73
nty	53,637	64
inty	52,981	86
nty	52,518	67
nty	52,027	80
ounty	51,922	60
ounty	51,299	44
nty	49,176	62
ounty	49,048	71
inty	48,911	57
ounty	48,731	55
ounty	45,953	64
ty	45,044	83
ounty	44,993	59
y	43,735	70
nd County	43,207	64
nty	42,523	79
unty	41,366	(4
unty	41,245	63
County	40,630	62
	40,563	61 52
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COUNTY	TOTAL LIGHTNING PULSES	TOTAL THUNDER DAYS
Metcalfe County	39,160	67
Campbell County	38,836	52
Powell County	38,052	64
Carlisle County	37,950	67
Franklin County	37,439	55
Mercer County	36,544	59
Boyd County	35,773	53
Magoffin County	35,677	65
Elliott County	35,465	59
Perry County	35,452	76
Letcher County	35,151	64
Clark County	35,119	66
Anderson County	34,060	62
Trimble County	33,929	49
Johnson County	33,581	63
Fayette County	33,366	65
Kenton County	31,927	53
Garrard County	31,554	64
Owsley County	29,831	68
Lee County	27,323	56
Boyle County	26,559	55
Clinton County	23,031	52
Woodford County	22,755	58
Carroll County	22,740	47
Martin County	22,205	59
Jessamine County	21,315	60
Gallatin County	19,579	50
Robertson County	17,152	38