



2020

# *PENNSYLVANIA LIGHTNING REPORT*



## ABOUT THIS REPORT

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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)

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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

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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:

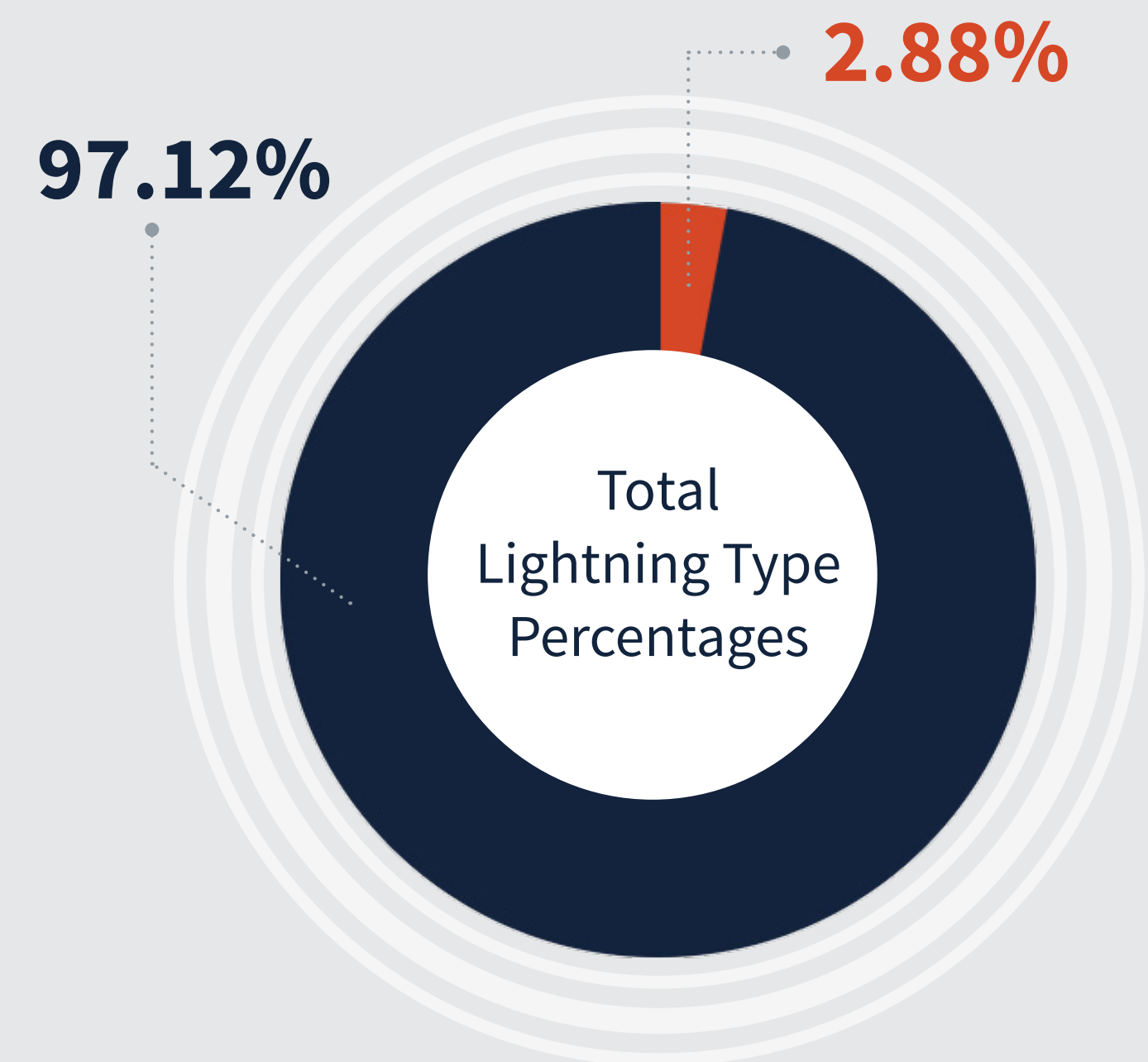
Lightning that happens between opposite charges in a cloud and on the ground

### In-Cloud lightning:

Lightning that occurs between opposite charges within a thunderstorm cloud

## PENNSYLVANIA TOTAL LIGHTNING PULSES

# 10,024,978

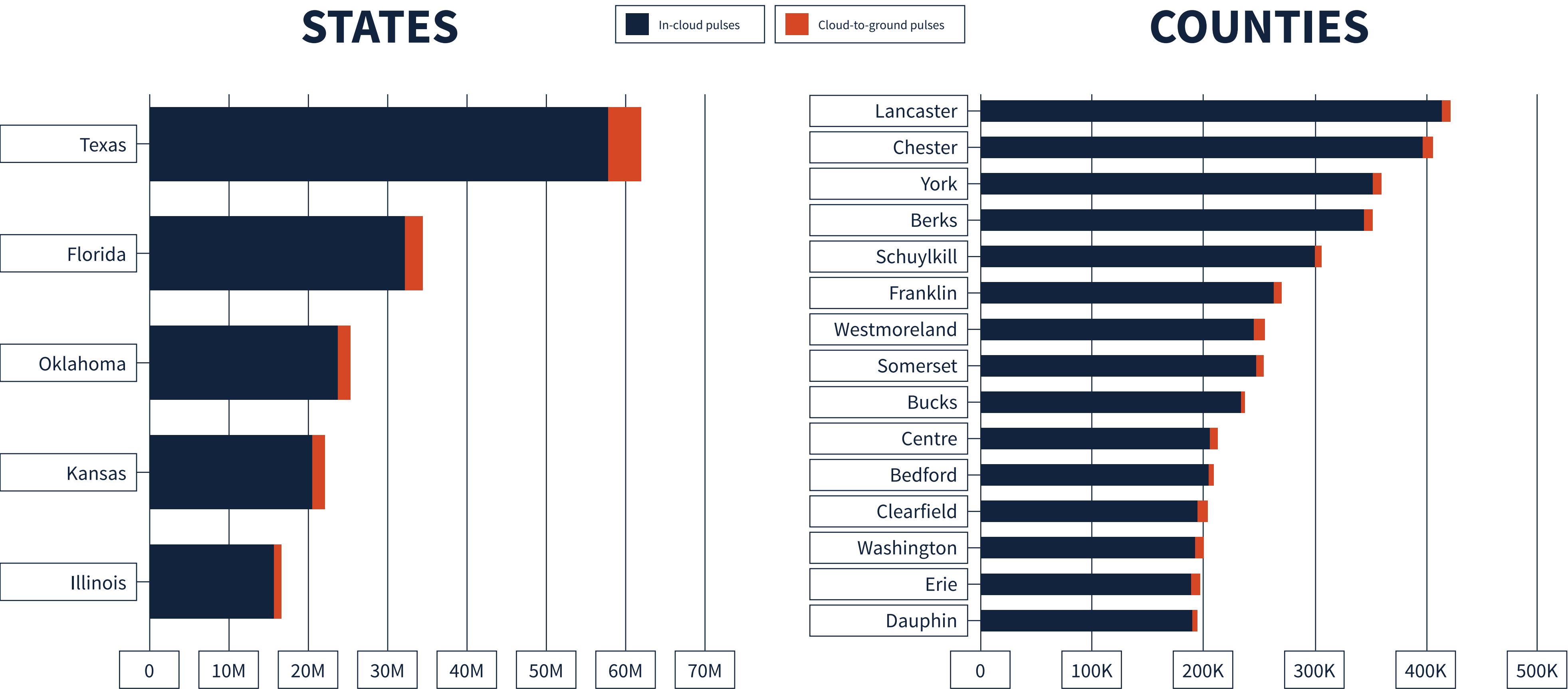


Cloud-to-ground  
**288,930**



In-cloud  
**9,735,897**

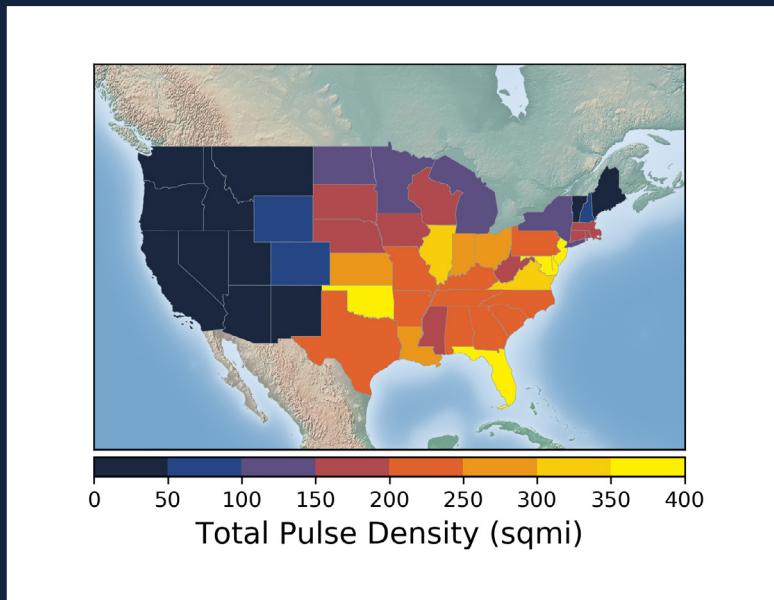
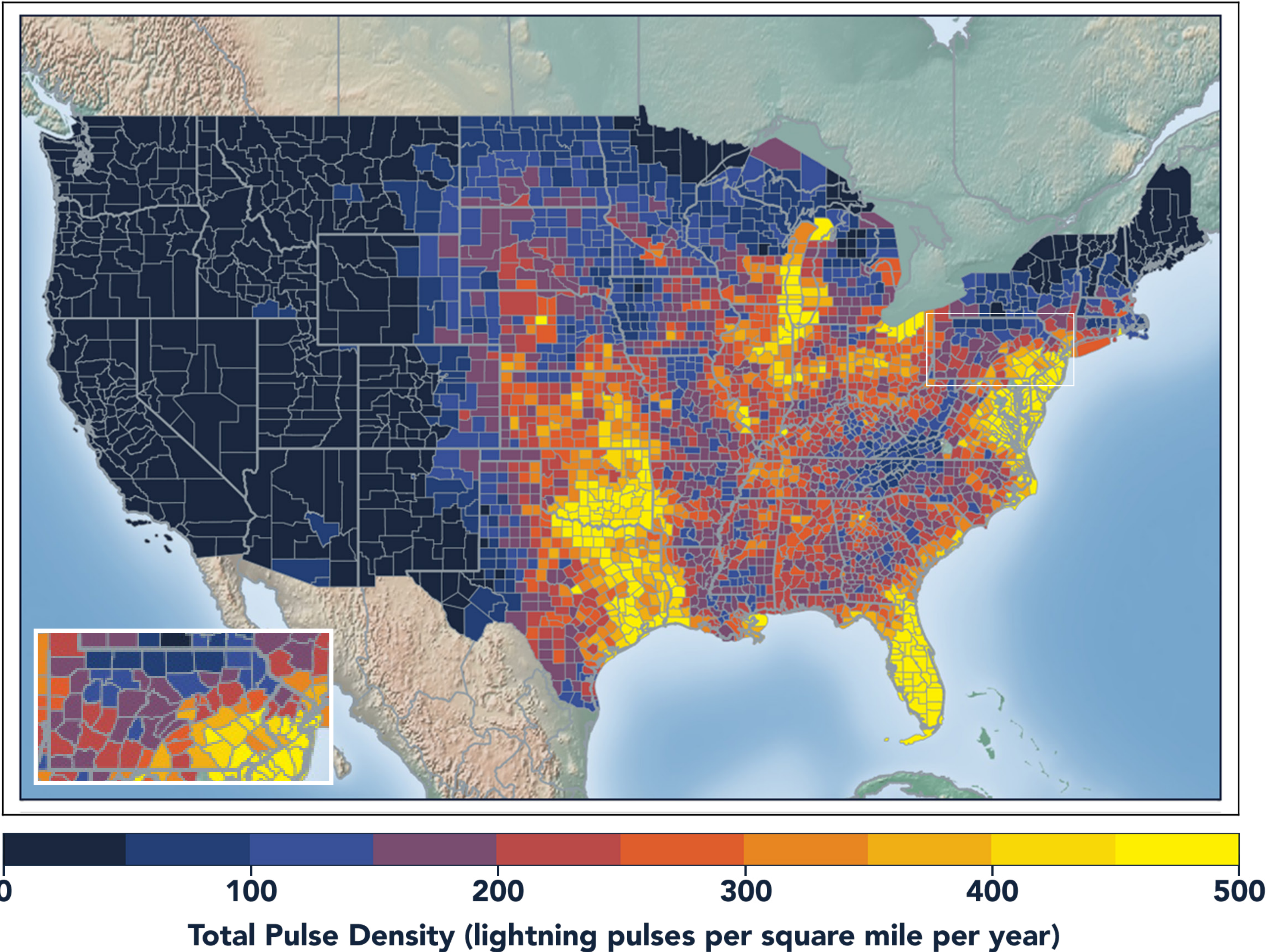
# LIGHTNING COUNT RANKINGS



Pennsylvania ranked 16 in total lightning pulses for 2020.



# TOTAL (CG+IC) PULSE DENSITY MAP



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.

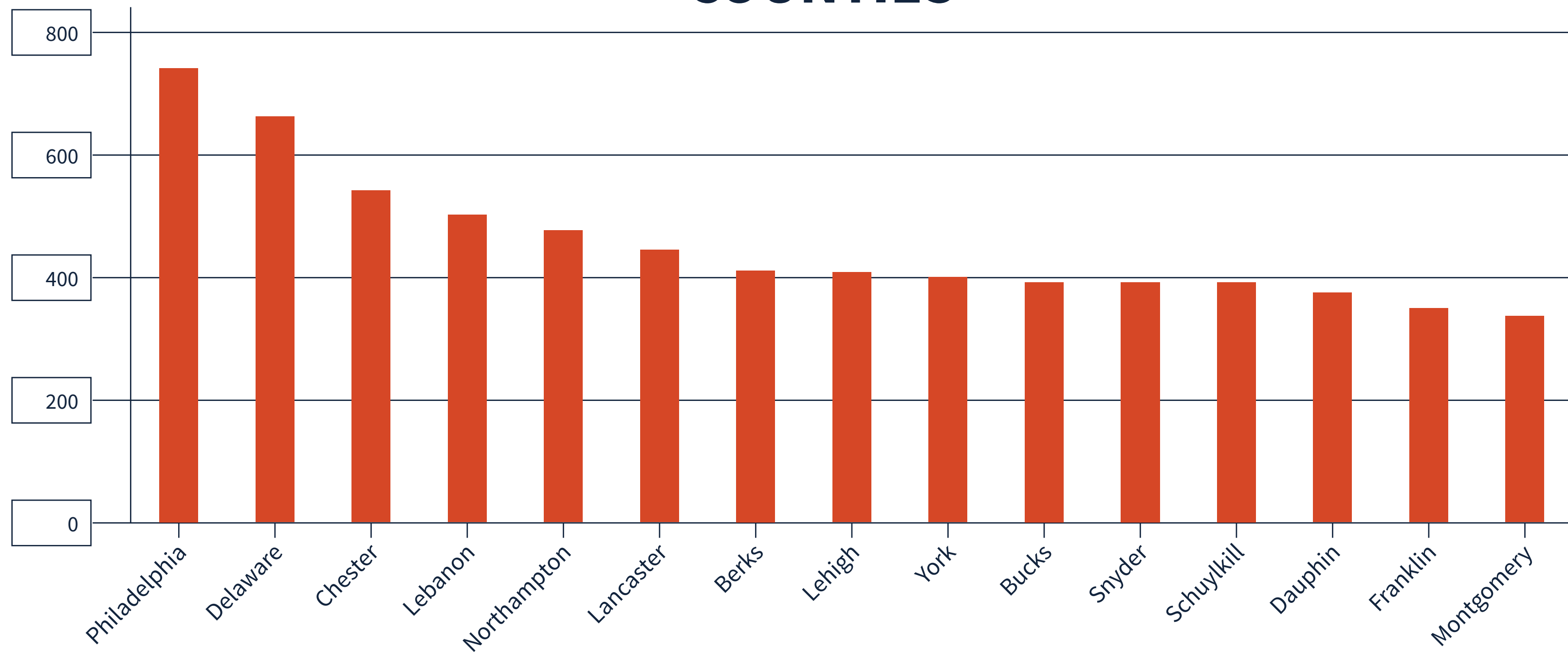
We cluster pulses together into a flash. With every pulse we detect, we receive a more precise measure of lightning activity. At left, areas in bright yellow experienced the highest lightning pulse density per square mile in 2020.



# TOTAL PULSE DENSITY RANKINGS

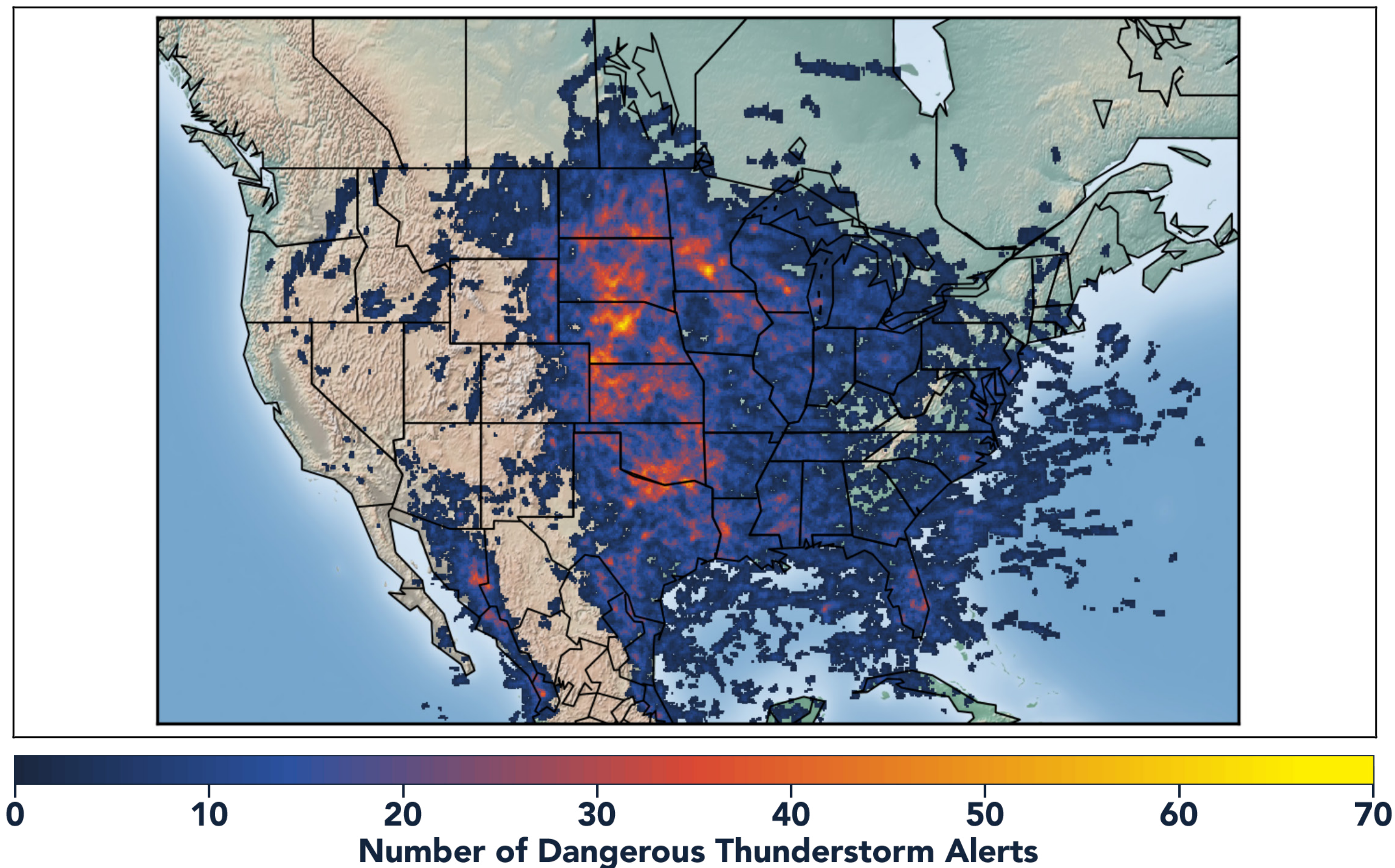
This chart shows the top 15 counties in the state ranked by total pulse density, which is the total lightning divided by the area of the county (in square miles).

## COUNTIES





# DANGEROUS THUNDERSTORM ALERTS IN THE U.S.



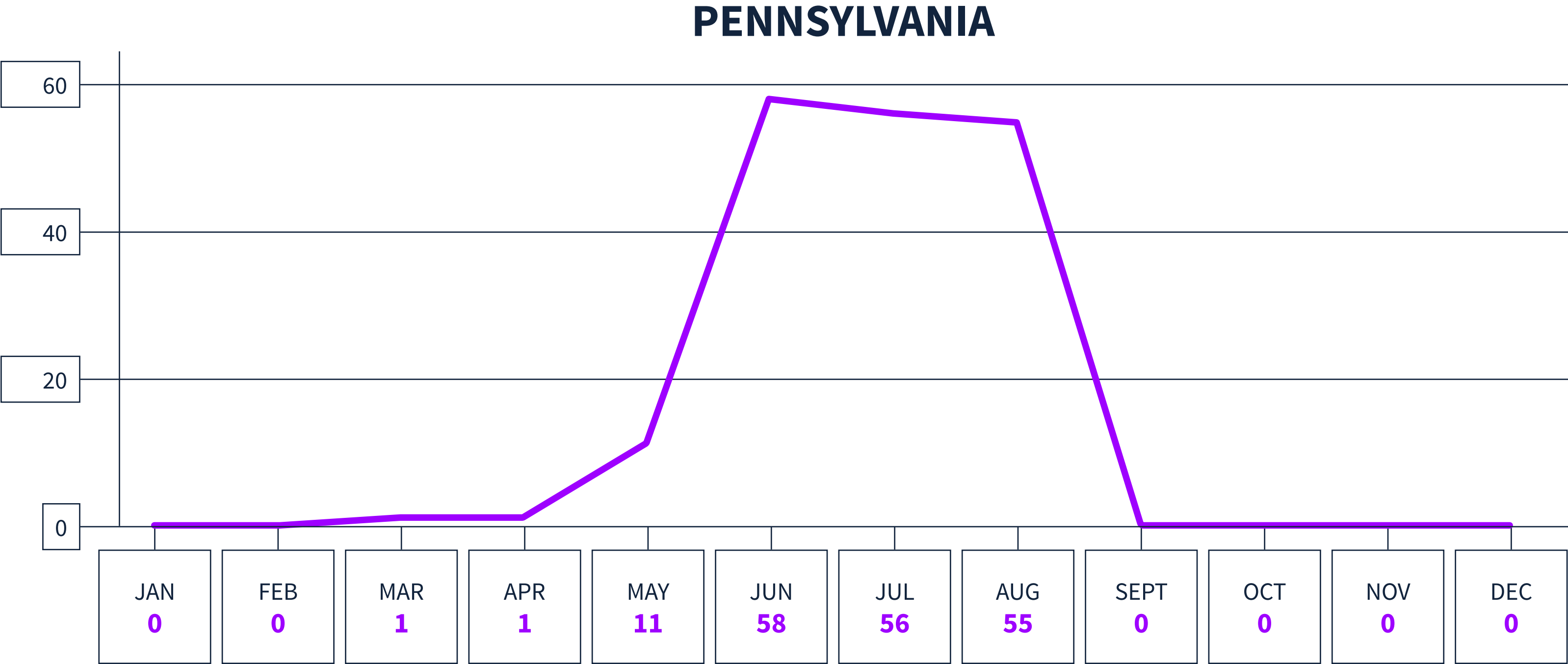
Earth Networks issued 29,401 Dangerous Thunderstorm Alerts (DTAs) in 2020. This year's map clearly shows the persistent drought conditions that have plagued the South and Southwest.

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



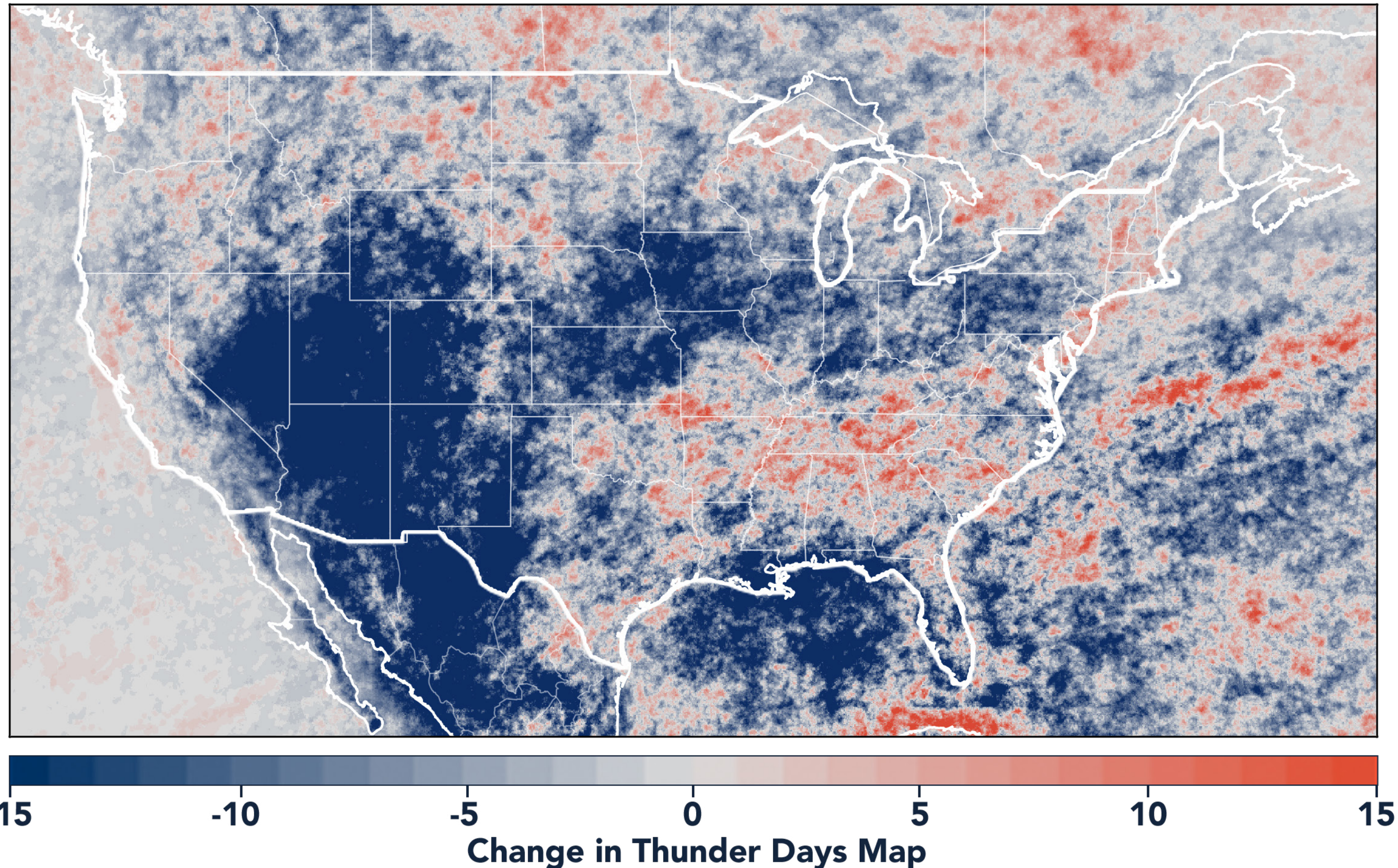
# DANGEROUS THUNDERSTORM ALERTS BY MONTH

Earth Networks issued 182 Dangerous Thunderstorm Alerts for the state in 2020.





# TOTAL STATE THUNDER DAYS: 151



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.

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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# ***THANK YOU***

For additional insights or permission to use data or graphics from this report, please contact us at: [info@earthnetworks.com](mailto: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 cloud-to-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
TX	63,683,799	278
FL	35,430,198	246
OK	26,159,420	205
KS	23,125,675	179
IL	16,785,149	166
NE	14,433,875	178
MO	14,081,658	184
VA	13,234,163	176
GA	13,016,803	217
OH	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
UT	1,951,574	162
ID	1,518,171	172
MA	1,267,046	80
NV	1,237,862	146
DE	1,168,918	89
CA	956,187	151
OR	915,855	132
CT	802,252	70
NH	618,242	70
WA	402,333	117
ME	358,334	81
VT	354,695	75
RI	190,992	42
DC	44,204	47

# 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
Lancaster County	421,784	53
Chester County	406,116	52
York County	360,261	51
Berks County	352,062	52
Schuylkill County	306,005	47
Franklin County	270,211	51
Westmoreland County	255,116	58
Somerset County	254,664	65
Bucks County	237,677	60
Centre County	212,768	44
Bedford County	209,635	57
Clearfield County	203,162	50
Washington County	200,425	56
Erie County	196,942	54
Dauphin County	194,760	42
Luzerne County	189,499	43
Lebanon County	181,708	46
Indiana County	181,610	59
Crawford County	179,585	49
Northampton County	175,213	44
Mercer County	171,733	49
Montgomery County	161,308	53
Monroe County	158,685	42
Clinton County	154,038	43
Cumberland County	151,000	48
Butler County	150,778	50
Perry County	150,621	43
Lycoming County	143,479	42
Allegheny County	142,809	51
Lehigh County	141,161	46
Fayette County	139,300	59
Huntingdon County	138,596	49
Cambria County	134,484	51
Armstrong County	131,909	51
Snyder County	129,232	33
Adams County	126,200	45
Carbon County	124,974	43
Fulton County	124,661	45
Delaware County	121,911	42
Elk County	117,408	41
Northumberland Coun-	112,185	37
Bradford County	108,066	47
Columbia County	103,138	38
Greene County	102,164	57
Venango County	101,558	44
Wayne County	99,758	44
Philadelphia County	99,520	40

COUNTY	TOTAL LIGHTNING PULSES	TOTAL THUNDER DAYS
Union County	96,541	30
Jefferson County	93,544	47
McKean County	91,869	44
Potter County	91,413	43
Lawrence County	90,884	42
Susquehanna County	89,399	44
Clarion County	85,200	39
Pike County	80,533	44
Mifflin County	79,011	35
Sullivan County	76,902	36
Tioga County	76,586	43
Juniata County	71,509	43
Wyoming County	68,755	34
Beaver County	68,738	45
Cameron County	66,660	37
Warren County	65,747	42
Blair County	63,428	50
Forest County	54,679	40
Lackawanna County	50,773	39
Montour County	32,777	29