



2020

# *MICHIGAN 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:

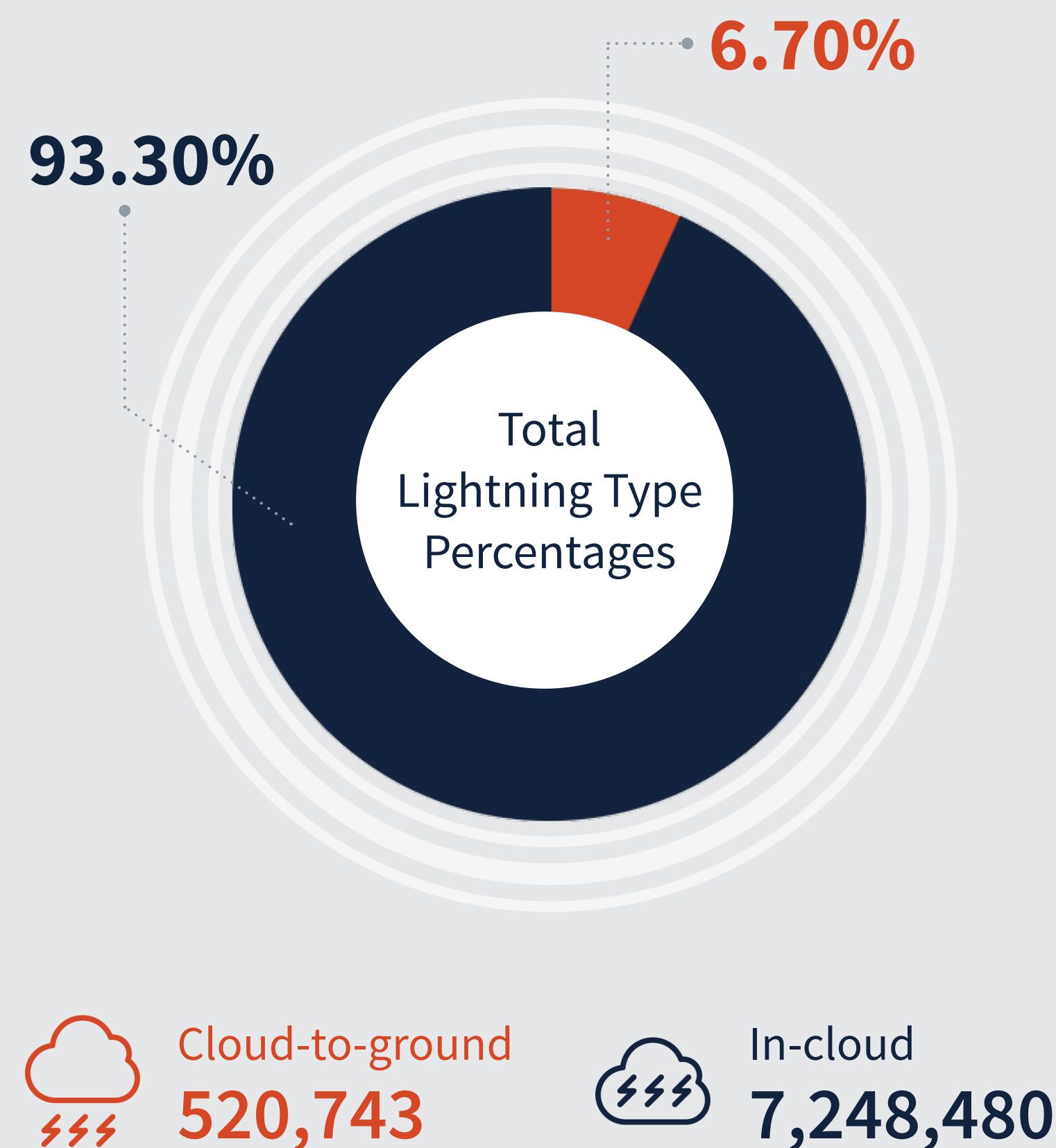
Lightning that happens between opposite charges in a cloud and on the ground

### In-Cloud lightning:

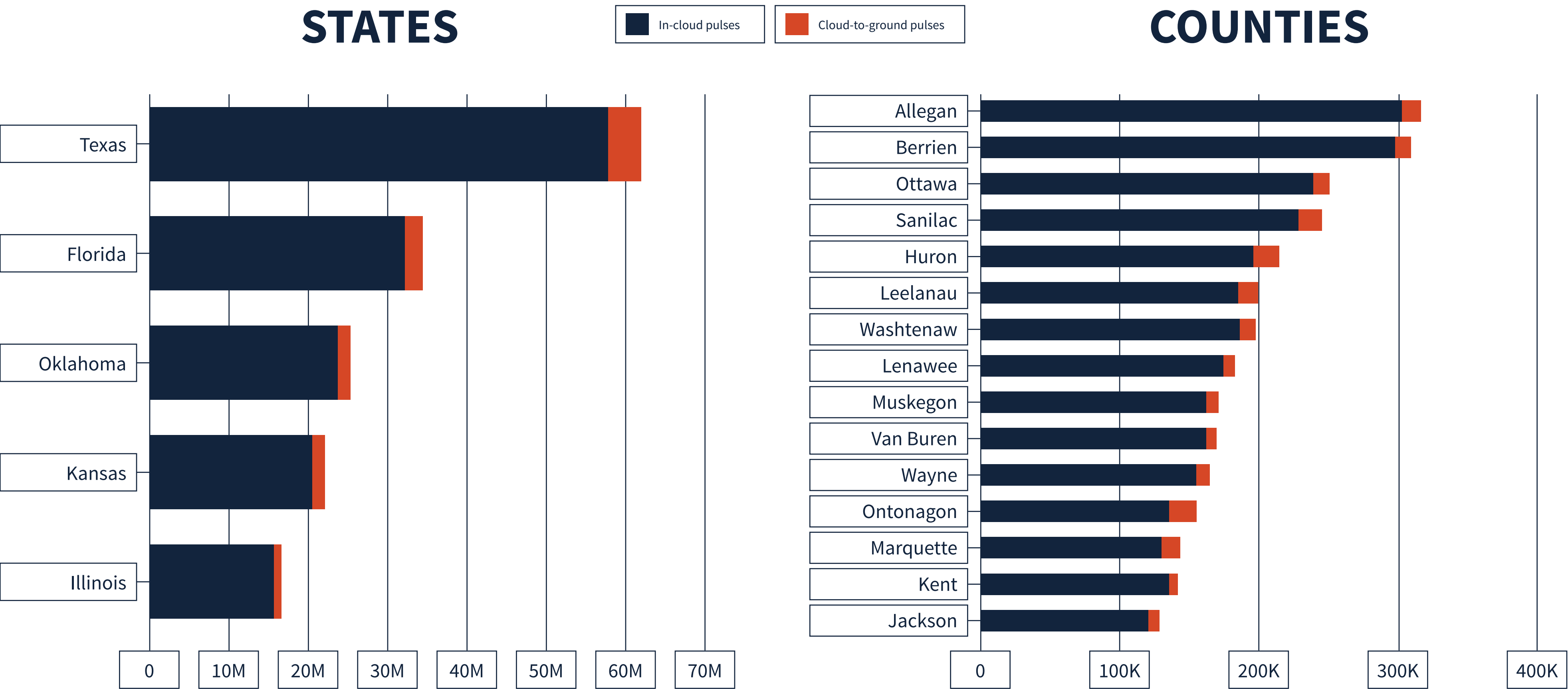
Lightning that occurs between opposite charges within a thunderstorm cloud

## MICHIGAN TOTAL LIGHTNING PULSES

# 7,769,382



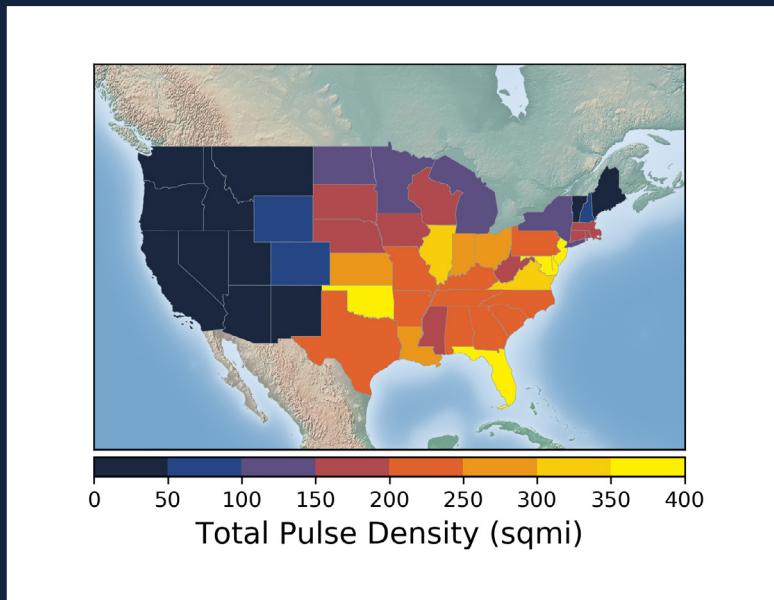
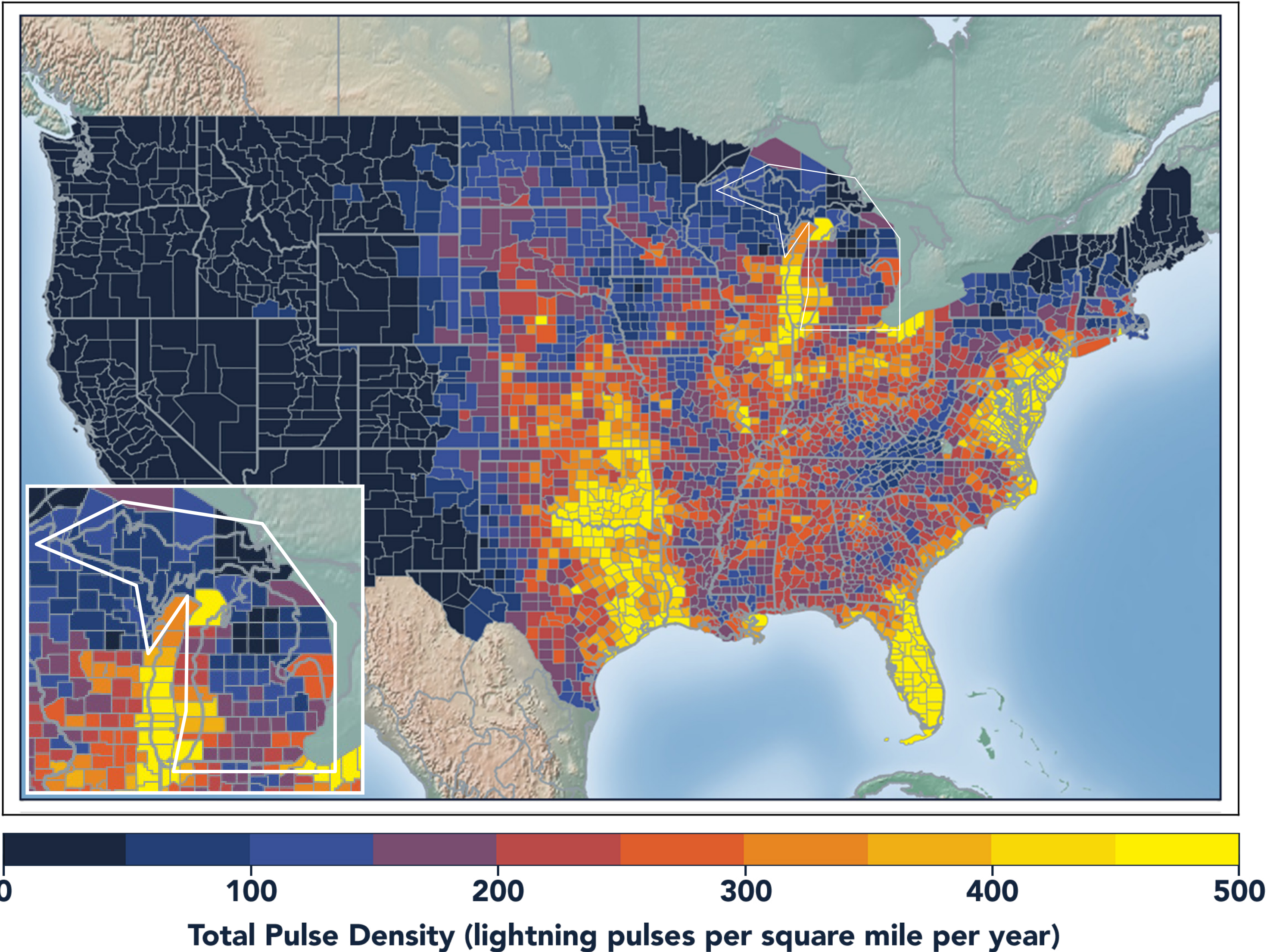
# LIGHTNING COUNT RANKINGS



Michigan ranked 24 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.

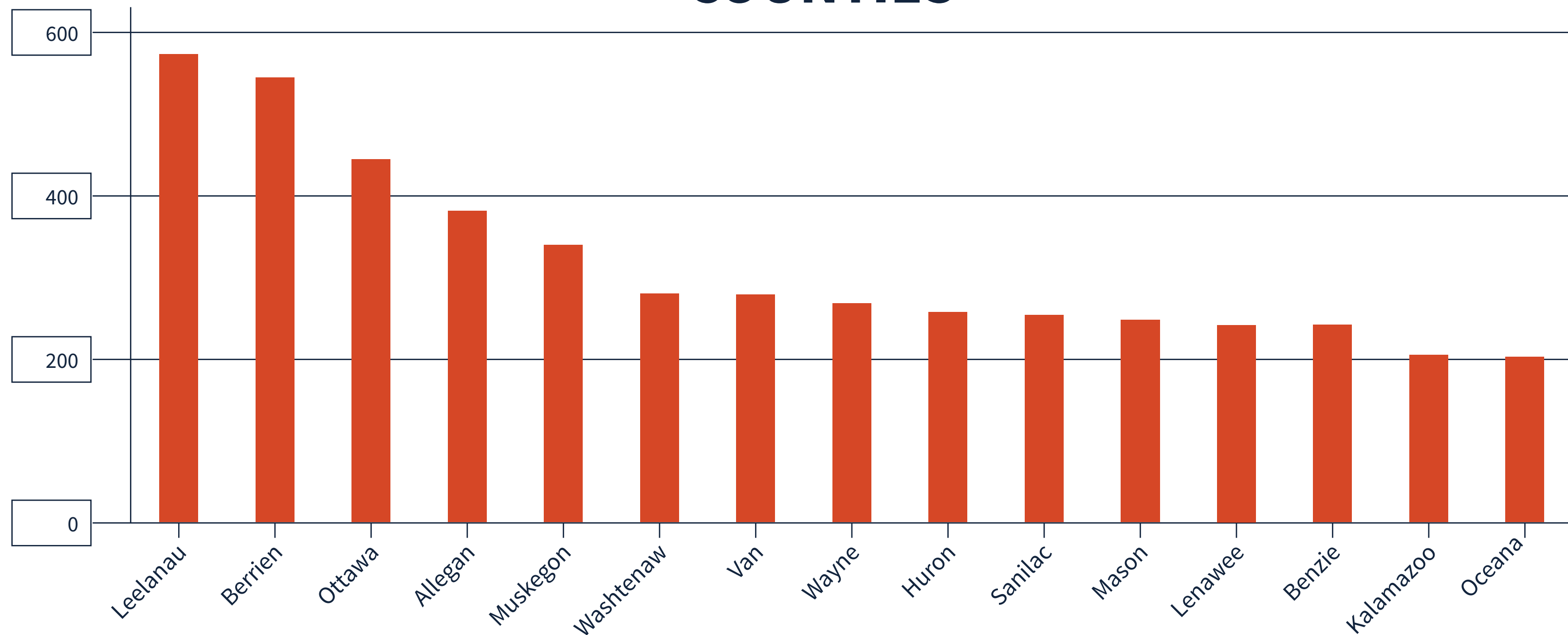
We cluster pulses together into a flash. With every pulse we detect, we receive a more precise measure of lightning activity. At left, areas in bright yellow experienced the highest lightning pulse density per square mile in 2020.



# TOTAL PULSE DENSITY RANKINGS

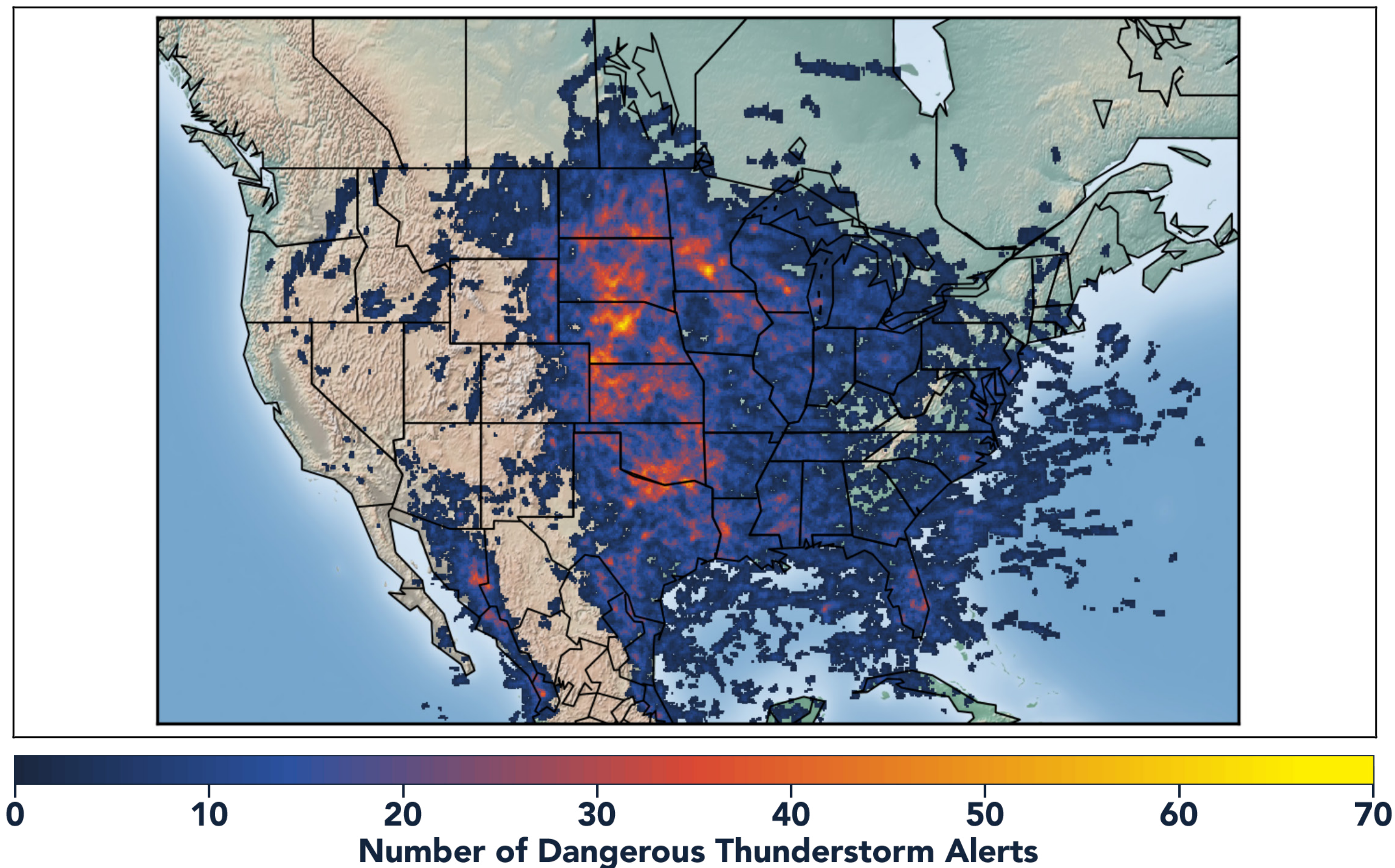
This chart shows the top 15 counties in the state ranked by total pulse density, which is the total lightning divided by the area of the county (in square miles).

## COUNTIES





# DANGEROUS THUNDERSTORM ALERTS IN THE U.S.



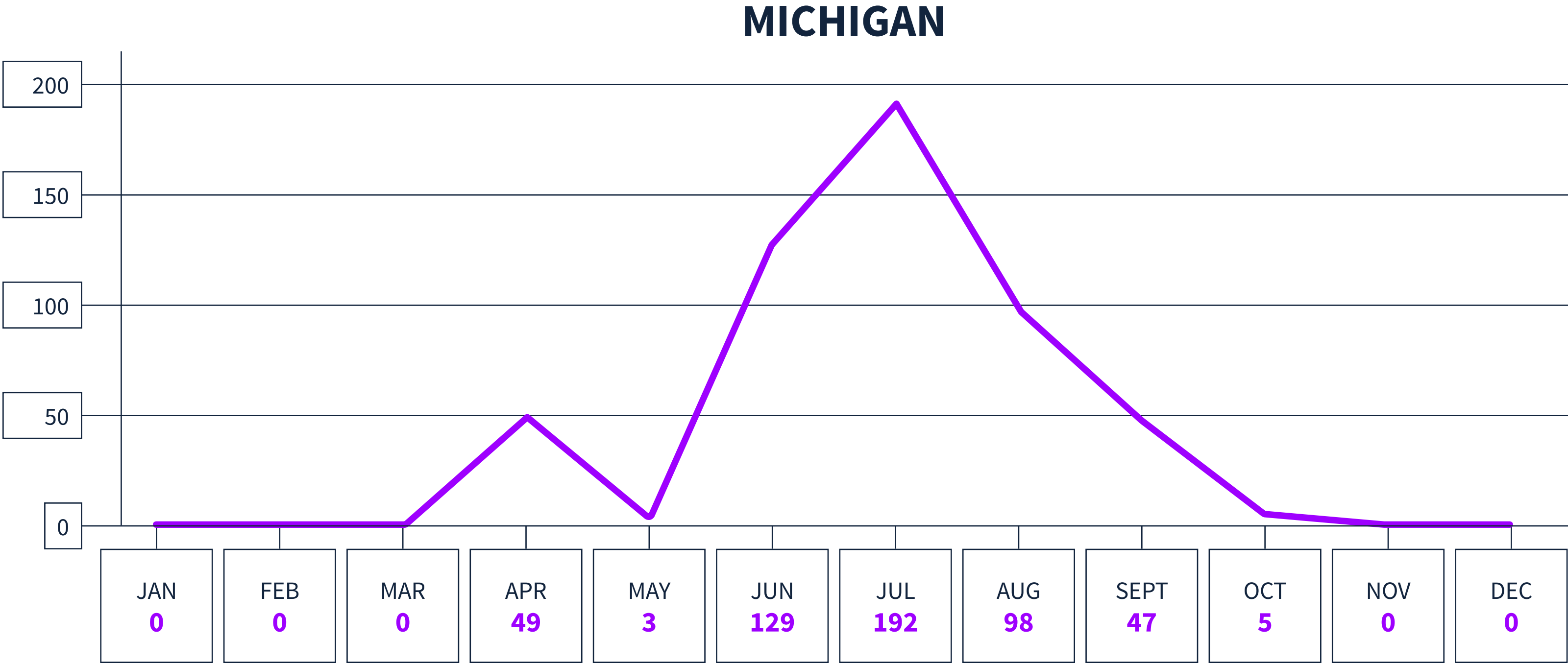
Earth Networks issued 29,401 Dangerous Thunderstorm Alerts (DTAs) in 2020. This year's map clearly shows the persistent drought conditions that have plagued the South and Southwest.

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



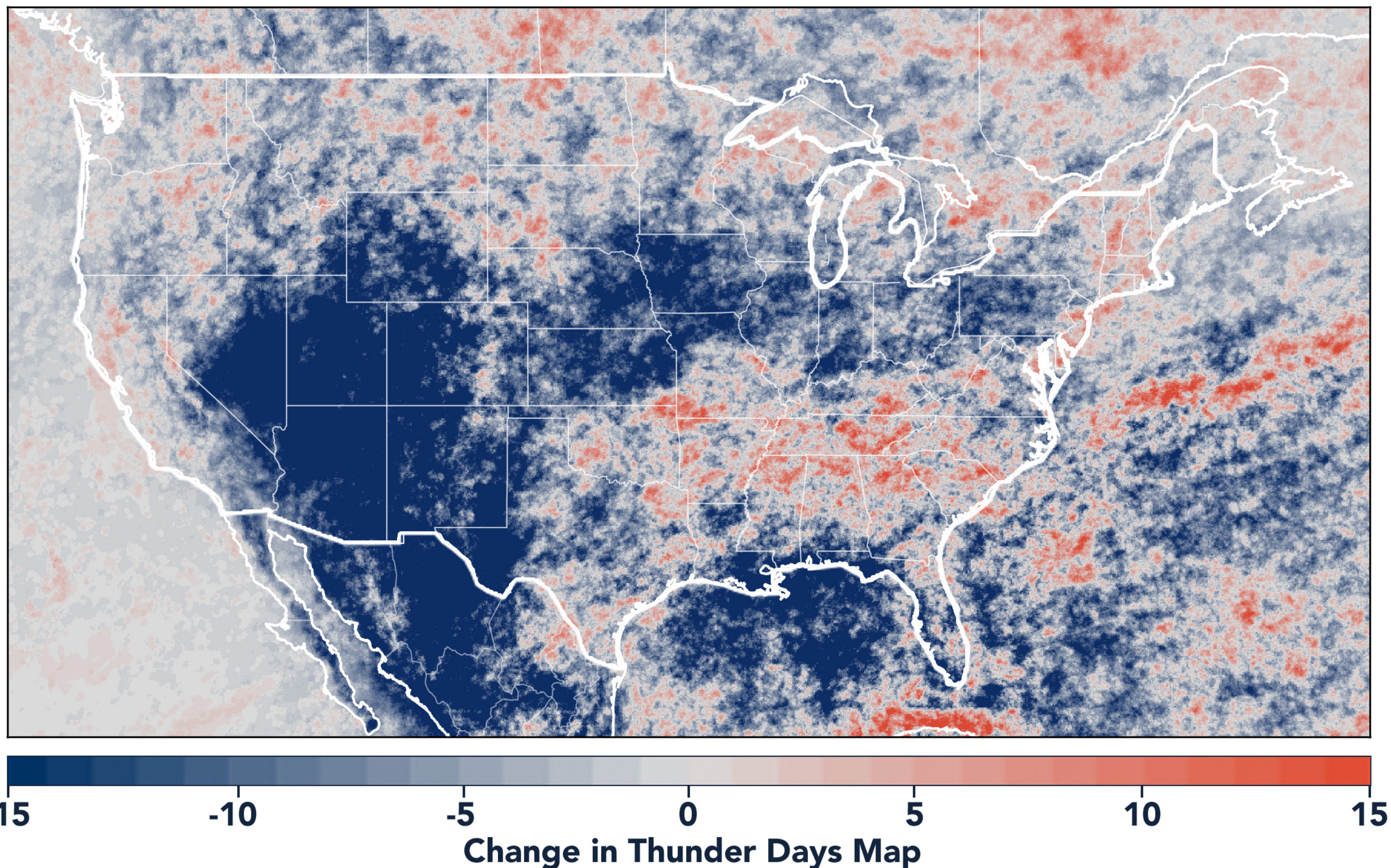
# DANGEROUS THUNDERSTORM ALERTS BY MONTH

Earth Networks issued 523 Dangerous Thunderstorm Alerts for the state in 2020.





## TOTAL STATE THUNDER DAYS: 159



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

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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.

COUNTY	TOTAL LIGHTNING PULSES	TOTAL THUNDER DAYS
Allegan County	316,485	58
Berrien County	308,941	56
Ottawa County	250,264	54
Sanilac County	244,881	41
Huron County	214,190	53
Leelanau County	198,905	50
Washtenaw County	196,931	49
Lenawee County	182,104	49
Muskegon County	170,374	53
Van Buren County	169,388	57
Wayne County	164,185	49
Ontonagon County	154,839	59
Marquette County	142,942	49
Kent County	141,638	47
Jackson County	127,809	44
Presque Isle County	124,335	43
Mason County	122,900	49
Oakland County	122,793	48
Kalamazoo County	115,980	49
Calhoun County	114,942	44
St. Clair County	111,759	45
Oceana County	108,827	52
Eaton County	108,699	41
Hillsdale County	107,618	50
Alger County	103,333	45
Monroe County	101,086	48
Manistee County	100,118	47
Barry County	98,757	44
Delta County	97,520	47
Tuscola County	97,018	47
Newaygo County	94,428	46
Gratiot County	93,140	42
Cass County	93,020	47
Ingham County	92,716	45
Saginaw County	91,338	44
Ionia County	89,571	42
Gogebic County	87,740	53
Montcalm County	86,598	42
St. Joseph County	86,392	52
Livingston County	86,248	43
Keweenaw County	83,735	49
Menominee County	82,390	43
Iron County	81,025	42
Genesee County	80,042	47
Macomb County	80,019	38
Benzie County	77,469	39
Branch County	77,358	49

COUNTY	TOTAL LIGHTNING PULSES	TOTAL THUNDER DAYS
Bay County	75,532	37
Schoolcraft County	71,494	44
Grand Traverse County	71,374	39
Shiawassee County	69,551	43
Cheboygan County	69,479	45
Clinton County	68,798	43
Iosco County	66,533	45
Isabella County	66,383	42
Lapeer County	64,185	41
Mecosta County	63,015	42
Houghton County	62,789	47
Alcona County	58,846	48
Wexford County	57,050	40
Dickinson County	56,362	38
Clare County	53,773	41
Midland County	53,141	35
Emmet County	52,474	33
Lake County	50,743	42
Alpena County	49,726	46
Charlevoix County	47,371	41
Baraga County	46,558	39
Osceola County	41,179	43
Antrim County	38,076	37
Mackinac County	37,557	38
Gladwin County	37,542	36
Oscoda County	37,394	35
Chippewa County	29,616	40
Arenac County	26,324	35
Montmorency County	25,350	32
Kalkaska County	24,902	43
Otsego County	23,500	41
Ogemaw County	22,099	37
Luce County	19,962	33
Missaukee County	18,400	41
Crawford County	16,984	41
Roscommon County	12,367	38