

# **Tornado Statistics for the WFO San Joaquin Valley-Hanford County Warning Area**

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## **Abstract**

This document is designed to be a quick reference for the staff at the NOAA National Weather Service, San Joaquin Valley-Hanford, CA Weather Forecast Office (WFO) as well as Media and Emergency Manager partners and the General Public. It summarizes climatological statistics about the tornadoes that have occurred within the seven county warning and forecast area (CWFA) of WFO Hanford (locally referred to as the central California interior). Data used in this analysis covered the period January 1, 1943 to July 1, 2014, inclusively.

## **Background**

### *Areal Coverage*

The WFO Hanford CWFA comprises the seven counties of Fresno, Kern, Kings, Madera, Mariposa, Merced and Tulare, as well as the portion of Yosemite National Park in Tuolumne County (Fig. 1).

### *Tornado History*

Tornado climatological data from the National Climatic Data Center are available from January 1, 1950; data for the period 1943-1949 were obtained from the *United States Meteorological Yearbook 1943-1949* (US Department of Commerce, 1952). The first confirmed tornado to occur since the 1943 start of data for the central California interior was on May 17, 1949. Since then, there have been 89 confirmed tornadoes, the majority of which (66) are rated at F0 or EF0<sup>1</sup> (Table 1). The strongest tornadoes to date have been rated at F2; there have only been a total of two tornadoes rated F2/EF2 in the central California interior since records have been collected. The first occurred on March 22, 1962, in central Fresno County. The other occurred on April 5, 1980, and crossed from northern Kings County into northwestern Tulare County. This tornado is counted as a single event, but with two county segments, one for each county.

All of the 90 tornado events are individually listed in the Appendix, along with maps detailing the aerial and spatial occurrence of them. As of July 1, 2014, there have been no reported deaths from the tornadoes in the WFO Hanford CWFA. However, several tornadoes have caused appreciable damage, including tornadoes which struck the Fresno Air Terminal (February 19, 1980) and Naval Air Station Lemoore (November 22, 1996, when two tornadoes struck the base 38 minutes apart).

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<sup>1</sup> The Enhanced Fujita (EF) scale was implemented in January 2007. Tornadoes which occurred prior to that date were not reclassified and continued using the older Fujita (F) scale.

Tornadoes have been reported in all seven counties of the central California interior. Fresno County has had the most tornadoes (28), while Mariposa County has had the least (1). One tornado touched down in the Tuolumne County portion of Yosemite National Park in 1972, north of Crane Flat. Tornadoes have occurred in every month except August, with March having the most tornadoes (24). The majority of tornadoes have occurred in the February-April period, which corresponds to the wettest months (February and March), as well as the start of the spring storm season (March and April) for the San Joaquin Valley and Southern Sierra Nevada. A secondary maximum in tornadic activity occurs in October-November, the start of the winter storm season (Fig. 2).

Two dates (November 22, 1996 and February 27, 2000) have had four confirmed tornadoes. Three tornadoes occurred on March 28, 2006, all in Merced County. Eight dates had two touchdowns.

Although the majority of tornadoes have occurred in the central and southern San Joaquin Valley, they also have occurred in the Kern County portion of the Mojave Desert, the Indian Wells Valley, the Southern Sierra Nevada and the Tehachapi Mountains.

The decade with the greatest number of tornadoes was the 1990s, with 42 tornadoes (Table 2). While it is tempting to attribute this to an increase in population, and resulting larger reporting base in the central California interior, only 17 tornadoes were reported in the first decade of the 21<sup>st</sup> century, and three tornadoes have been reported so far in the second decade despite the continued population growth and the proliferation of cell phone cameras and electronic media (Table 3). The apparent uniqueness of the 1990s for tornadoes also is evident when tornado outbreaks are considered. A tornado outbreak is defined as multiple tornadoes on a single day. As mentioned above, there were eleven days with multiple tornadoes. These 27 tornadoes account for 30.3 % of all confirmed tornadoes to date. Of the eleven days with multiple confirmed tornadoes, eight occurred during the decade 1991-2000. The decades 1961-70, 1971-80 and 2001-2010 each had one day with multiple tornadoes; March 26, 2006 had three confirmed tornadoes, the other decades each had one day with two tornadoes. Both days with four confirmed tornadoes were in the decade 1991-2000. It remains uncertain why the 1990s saw such a large number of tornadoes, accounting for nearly half (44.9 percent) of all the tornadoes reported during the past 64 years.

Four tornadoes were listed as unknown intensity in Storm Data Reports. These were:

1. April 18, 1955      Merced County
2. February 28, 1958      Madera County
3. November 1, 1964      Kings County
4. March 14, 1979      Fresno County

Damage estimates for the Fresno County tornado were consistent with other F0 reports. No damage was reported for the other three tornadoes. For statistical purposes, these tornadoes are included with F0/EF0 tornadoes.

**Table 1.** Tornado statistics for the WFO Hanford CWFA since 1943

County	Fresno	Kern	Kings	Madera	Mariposa	Merced	Tulare	YNP <sup>1</sup>	Total
Total	28	13	8	9	1	17	13 <sup>2</sup>	1	90 <sup>2</sup>
F2/EF2	1	-	1	-	-	-	1 <sup>2</sup>		3 <sup>2</sup>
F1/EF1	6	1	1	2	-	4	1		15
F0/EF0	21	12	6	7	1	13	11	1	72
January	2	-	-	1	1	-	2	-	6
February	5	3	-	2	-	3	4	-	17
March	7	4	3	4	-	5	1	-	24
April	4	2	1	1	-	5	2 <sup>2</sup>	-	15 <sup>2</sup>
May	5	1	-	1	-	-	1	-	8
June	1	1	-	-	-	-	-	-	2
July	-	-	-	-	-	-	1	-	1
August	-	-	-	-	-	-	-	-	0
September	-	1	-	-	-	-	-	-	1
October	1	-	1	-	-	-	1	1	4
November	2	1	3	-	-	2	1	-	9
December	1	-	-	-	-	2	-	-	3

<sup>1</sup> Yosemite National Park (portion in Tuolumne County)<sup>2</sup> Includes the Tulare County segment of the April 5, 1980 tornado**Table 2.** Tornadoes by decade

County	Fresno	Kern	Kings	Madera	Mariposa	Merced	Tulare	YNP <sup>1</sup>	Total
1943-50	1	-	-	-	-	-	-	-	1
1951-60	1	-	-	2	-	1	-	-	4
1961-70	3	-	1	1	-	1	-	-	6
1971-80	4	-	1	-	-	2	2 <sup>2</sup>	1	10 <sup>2</sup>
1981-90	3	1	-	-	-	1	2	-	7
1991-00	12	9	6	5	-	5	5	-	42
2001-10	3	2	-	1	1	7	3	-	17
2011-14 <sup>3</sup>	1	1	-	-	-	-	1	-	3

<sup>1</sup> Yosemite National Park (portion in Tuolumne County)<sup>2</sup> Includes the Tulare County segment of the April 5, 1980 tornado<sup>3</sup> Data goes through June 2014

**Table 3.** Tornadoes by decade normalized per 1000 people

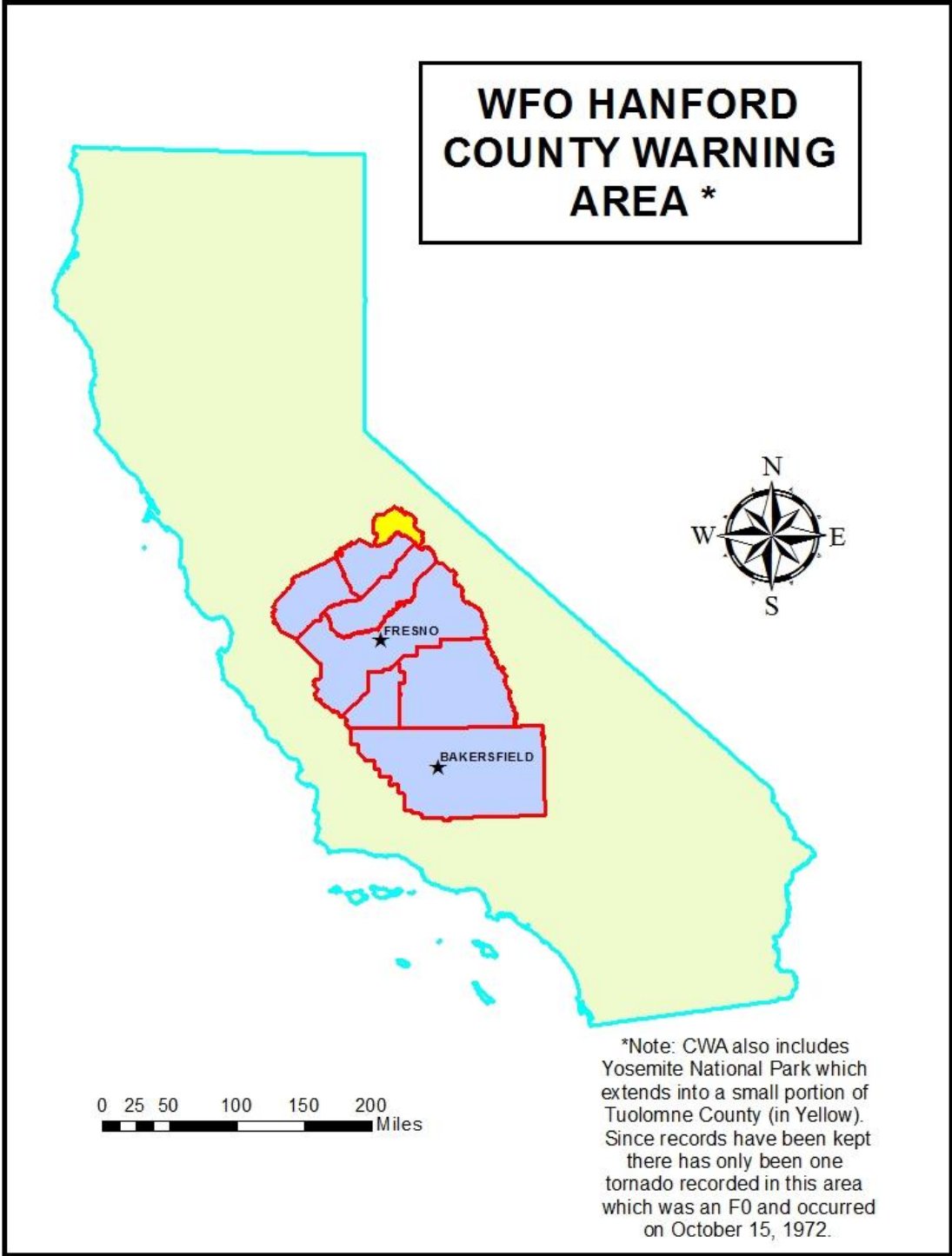
<b>County</b>	<b>Fresno</b>	<b>Kern</b>	<b>Kings</b>	<b>Madera</b>	<b>Mariposa</b>	<b>Merced</b>	<b>Tulare</b>	<b>YNP<sup>1</sup></b>	<b>Total</b>
1943-50	0.004 <sup>2</sup>	0	0	0	0	0	0	n/a	n/a
1951-60	0.003	0	0	0.052	0	0.012	0	n/a	0.004
1961-70	0.008	0	0.017	0.024	0	0.010	0	n/a	0.006
1971-80	0.009	0	0.014	0	0	0.017	0.011 <sup>3</sup>	n/a	0.008 <sup>3</sup>
1981-90	0.005	0.002	0	0	0	0.006	0.007	n/a	0.004
1991-00	0.016	0.015	0.052	0.047	0	0.026	0.015	n/a	0.020
2001-10	0.003	0.003	0	0.007	0.057	0.030	0.007	n/a	0.007
2011-14 <sup>4</sup>	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

<sup>1</sup> Yosemite National Park (portion in Tuolumne County)

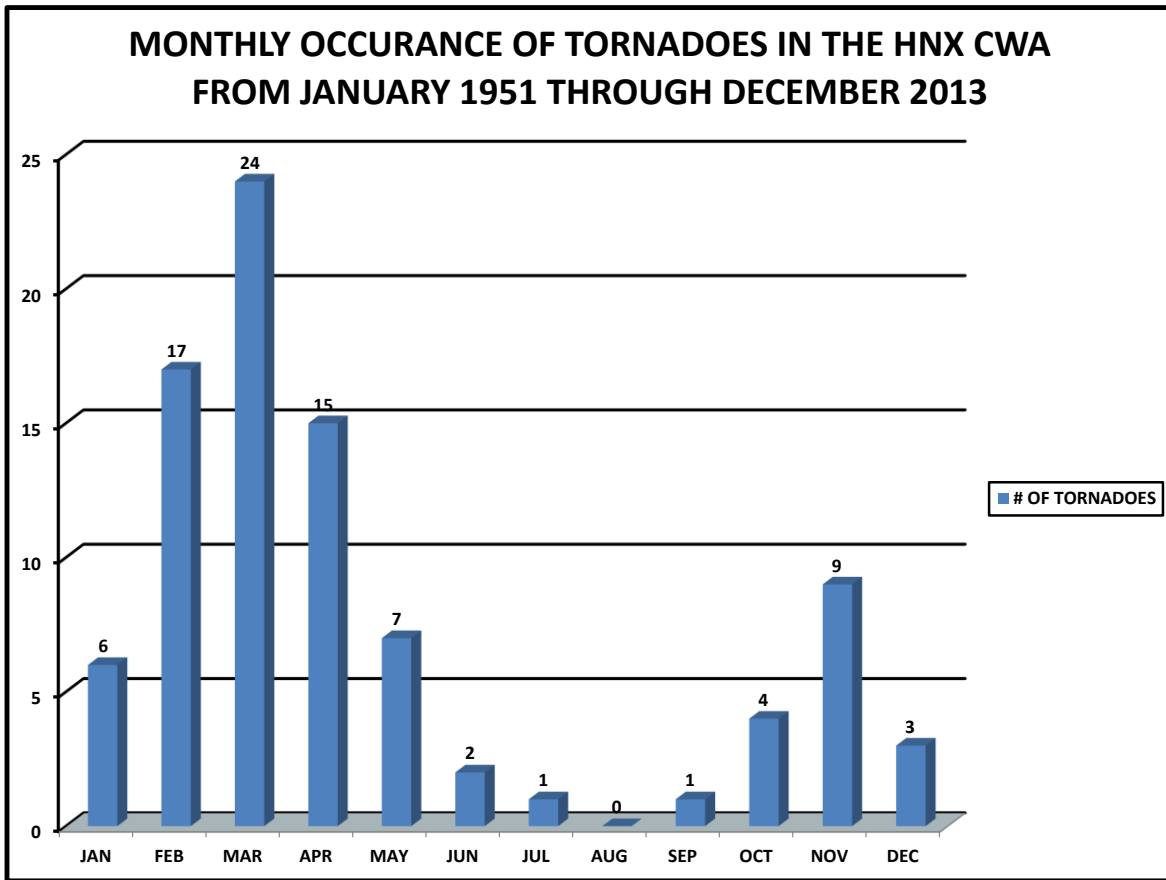
<sup>2</sup> Normalized against the 1940-1950 mean population

<sup>3</sup> Includes the Tulare County segment of the April 5, 1980 tornado

<sup>4</sup> Data goes through June 2014



**Figure 1.** The WFO San Joaquin Valley-Hanford CWFA.



**Figure 2.** Tornadoes of the WFO San Joaquin-Hanford CWA by month

**APPENDIX  
TORNADOES OF THE WFO HANFORD, CA,  
COUNTY FORECAST AND WARNING AREA<sup>2</sup>**

	<b>DATE</b>	<b>TIME</b>	<b>COUNTY</b>	<b>LOCATION</b>	<b>CLASS</b>
01	17 May 1949	n/a	Fresno	10 miles northwest of Fresno	<b>F1</b>
02	18 April 1955	1200 PST	Merced	4 miles east of Planada	F?
03	19 May 1957	0822 PST	Fresno	13 miles southwest of Fresno	<b>F1</b>
04	28 February 1958	0500 PST	Madera	10 miles north of Millerton Lake	F?
05	12 March 1958	1100 PST	Madera	downtown Madera	F0
<b>06</b>	<b>22 March 1962</b>	<b>1200 PST</b>	<b>Fresno</b>	<b>Northwest Fresno</b>	<b>F2</b>
07	21 January 1964	0200 PST	Fresno	Northwest Fresno	F0
08	01 November 1964	1520 PST	Kings	2 miles west southwest of Alpaugh	F?
09	21 April 1967	1645 PST	Madera	downtown Madera	F0
10	22 April 1967	1707 PST	Fresno	23 miles southwest of Mendota	<b>F1</b>
11	22 April 1967	1815 PST	Merced	5 miles northeast of Los Banos	<b>F1</b>
12	15 October 1972	1224 PST	Yosemite National Pk	25 miles northwest of Yosemite Valley	F0
13	13 March 1975	1517 PST	Fresno	7 miles west of Kingsburg	F0
14	05 April 1975	1000 PST	Merced	downtown Los Banos	F0
15	05 April 1975	1632 PST	Fresno	12 miles west of Fresno	F0
16	04 March 1978	1435 PST	Merced	1 mile northeast of Hilmar	<b>F1</b>
17	14 March 1979	1250 PST	Fresno	3 miles south-southeast of Fowler	F?
18	15 February 1980	1500 PST	Tulare	1 mile northeast of Dinuba	F0
19	19 February 1980	1405 PST	Fresno	Fresno Air Terminal	<b>F1</b>
<b>20</b>	<b>05 April 1980</b>	<b>0940 PST</b>	<b>Kings</b>	<b>4 miles northwest of Hanford</b>	<b>F2</b>

<sup>2</sup> Includes the portion of Yosemite National Park in Tuolumne County

20a	<b>05 April 1980<sup>3</sup></b>	<b>1030 PST</b>	<b>Tulare</b>	<b>7 miles east of Hanford</b>	<b>F2</b>
21	28 March 1982	1700 PST	Fresno	Selma	<b>F1</b>
22	15 February 1986	1450 PST	Tulare	1 mile southeast of Dinuba	F0
23	19 February 1986	1430 PST	Merced	1 mile north of LeGrand	F0
24	08 March 1986	1800 PST	Fresno	Kingsburg	F0
25	01 March 1988	1640 PST	Tulare	Orosi	F0
26	20 April 1988	1140 PST	Kern	2 miles south of Stallion Springs	F0
27	02 March 1989	1420 PST	Fresno	southeast Fresno	F0
28	28 February 1991	1615 PST	Tulare	2 miles west of Goshen	<b>F1</b>
29	17 March 1991	1930 PST	Kern	1 mile west of Taft Heights	<b>F1</b>
30	20 March 1991	1430 PST	Madera	9 miles southwest of Chowchilla	F0
31	25 March 1991	1420 PST	Kern	China Lake NWTC	F0
32	26 March 1991	1407 PST	Kern	1 mile north-northwest of Ridgecrest	F0
33	26 March 1991	1740 PST	Merced	1 mile east of Plainsburg	F0
34	12 October 1991	0015 PST	Kings	12 miles south of Hanford	F0
35	11 December 1992	1650 PST	Fresno	3 miles southwest of Malaga	F0
36	19 February 1993	1715 PST	Tulare	Tipton	F0
37	23 February 1993	1405 PST	Kern	McFarland	F0
38	05 June 1993	1605 PST	Fresno	Southwest Fresno	F0
39	05 March 1994	1445 PST	Kings	Lemoore	F0
40	14 January 1995	1915 PST	Madera	Chowchilla	F1
41	01 May 1995	1645 PST	Fresno	2 miles east of Fresno	F0
42	13 May 1995	1100 PST	Tulare	Porterville	F0
43	13 May 1995	1415 PST	Fresno	14 miles west-southwest of Fresno	F0
44	26 June 1995	1550 PST	Kern	Edwards AFB	F0
45	12 March 1996	1407 PST	Kings	2 miles northwest of Hanford	F0
46	12 March 1996	1425 PST	Kings	3 miles north of Hanford	F0

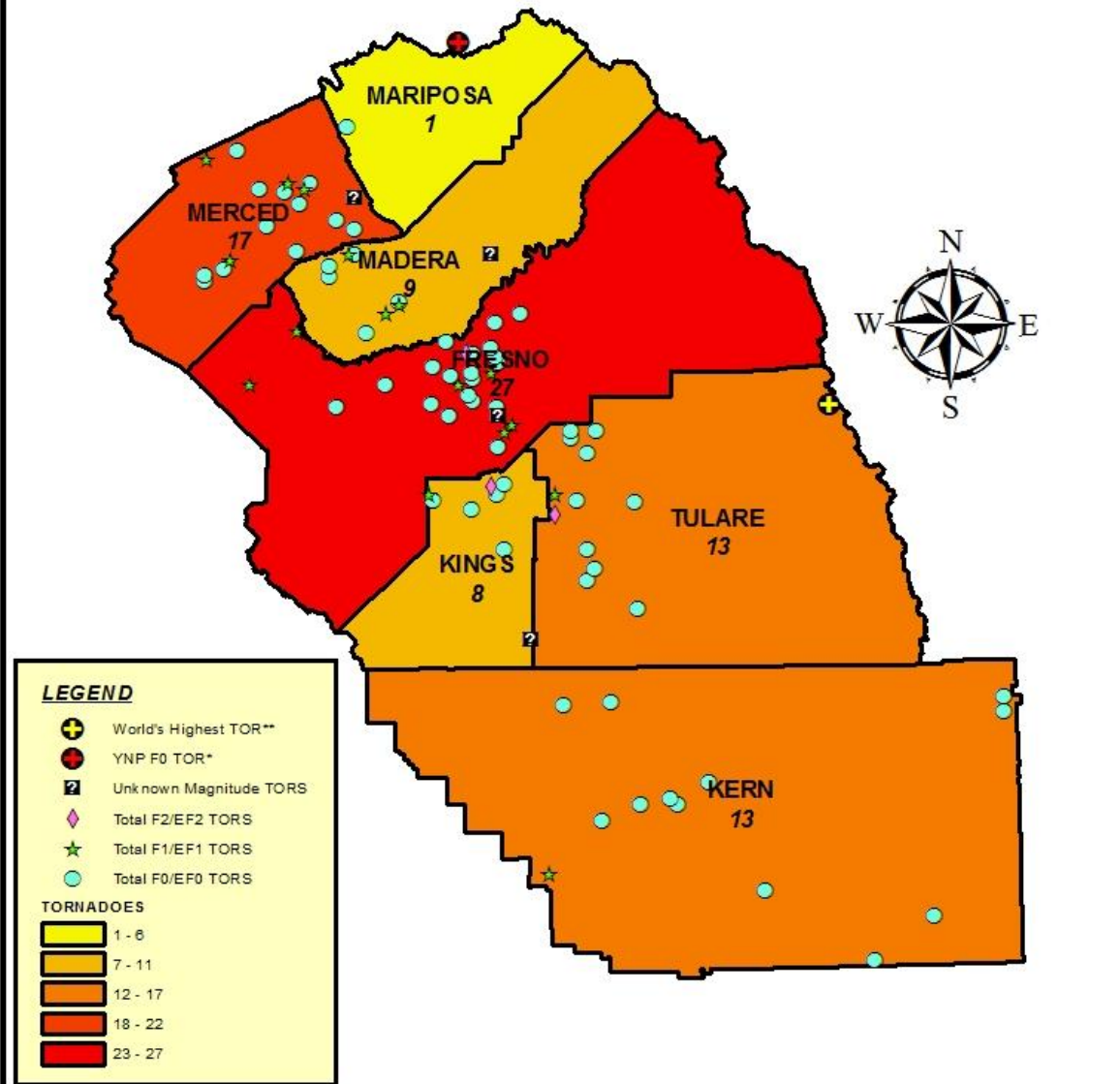
<sup>3</sup> This tornado began in Kings County, crossed into Tulare County 50 minutes later and dissipated southwest of Visalia. It counts as a single tornado with two county segments.



47	01 April 1996	1545 PST	Merced	12 miles south of Merced	F0
48	01 April 1996	1630 PST	Tulare	4 miles south southeast of Tulare	F0
49	16 April 1996	1350 PST	Fresno	10 miles northwest of Fresno	F0
50	30 October 1996	1250 PST	Fresno	1 mile southwest of Fresno	F0
51	22 November 1996	1427 PST	Kings	NAS Lemoore	F0
52	22 November 1996	1505 PST	Kings	NAS Lemoore	<b>F1</b>
53	22 November 1996	1350 PST	Merced	3 miles northeast of Merced	<b>F1</b>
54	22 November 1996	1543 PST	Kern	9 miles east northeast of Bakersfield	F0
55	20 January 1997	1535 PST	Tulare	1 mile north of Exeter	F0
56	17 February 1997	1415 PST	Kern	1 mile east southeast of Bakersfield	F0
57	22 March 1997	1637 PST	Kern	10 miles west of McFarland	F0
58	13 November 1997	1530 PST	Merced	2 miles south of Los Banos	F0
59	16 November 1997	1300 PST	Fresno	11 miles north-northeast of Fresno	F0
60	16 November 1997	1410 PST	Fresno	14 miles northeast of Fresno	F0
61	14 February 1998	1325 PST	Merced	5 miles east of Los Banos	F0
62	14 February 1998	1421 PST	Fresno	Firebaugh	<b>F1</b>
63	24 March 1998	1346 PST	Madera	5 miles west southwest of Chowchilla	F0
64	28 March 1998	1635 PST	Madera	Chowchilla Airport	F0
65	03 April 1999	1630 PST	Kern	2 miles southeast of Bakersfield	F0
66	27 February 2000	1337 PST	Madera	10 miles SW of Madera	F0
67	27 February 2000	1359 PST	Fresno	3 miles WSW of Kerman	F0
68	27 February 2000	1410 PST	Fresno	5 miles NNW of Carruthers	F0
69	27 February 2000	1517 PST	Fresno	2 miles SW of Calwa	F0
70	07 April 2001	1943 PST	Fresno	Clovis	F0
71	20 May 2002	1459 PST	Madera	Madera Municipal Airport	<b>F1</b>
72	16 December 2002	1240 PST	Merced	4 miles north of Merced Regional Airport	<b>F1</b>

73	16 December 2002	1250 PST	Merced	6 miles northeast of Merced Regional Airport	F0
74	07 July 2004	1532 PST	Tulare	18 miles northeast of Mineral King	F0
75	20 October 2004	1305 PST	Tulare	5 miles southeast of Dinuba	F0
76	08 April 2005	1732 PST	Merced	Ballico	F0
77	09 May 2005	1018 PST	Fresno	1 mile west of Fowler	F0
78	14 January 2006	1425 PST	Mariposa	Hornitos	F0
79	28 March 2006	1442 PST	Merced	2 miles west southwest of Atwater	F0
80	28 March 2006	1448 PST	Merced	1 mile southeast of Merced	F0
81	28 March 2006	1517 PST	Merced	2 miles north northwest of Merced Regional Airport	F0
82	01 September 2007	1530 PST	Kern	Rosamond	EF0
83	27 January 2008	1305 PST	Tulare	1 mile east of Goshen Junction	EF0
84	09 February 2009	1132 PST	Merced	10 miles south of Castle Airport	EF0
85	18 January 2010	1523 PST	Fresno	5 miles southwest of Fresno	EF0
86	27 February 2010	1645 PST	Kern	Tupman	EF0
87	17 March 2012	1430 PST	Fresno	4 miles southwest Tranquility	EF0
88	09 November 2012	1255 PST	Tulare	4 miles north northeast of Tipton	EF0
89	06 May 2013	1810 PST	Kern	5 miles west southwest of Bakersfield	EF0

# NUMBER OF TORNADES BY COUNTY IN THE CENTRAL CALIFORNIA INTERIOR FROM 1/1/1950 TO 12/31/2013

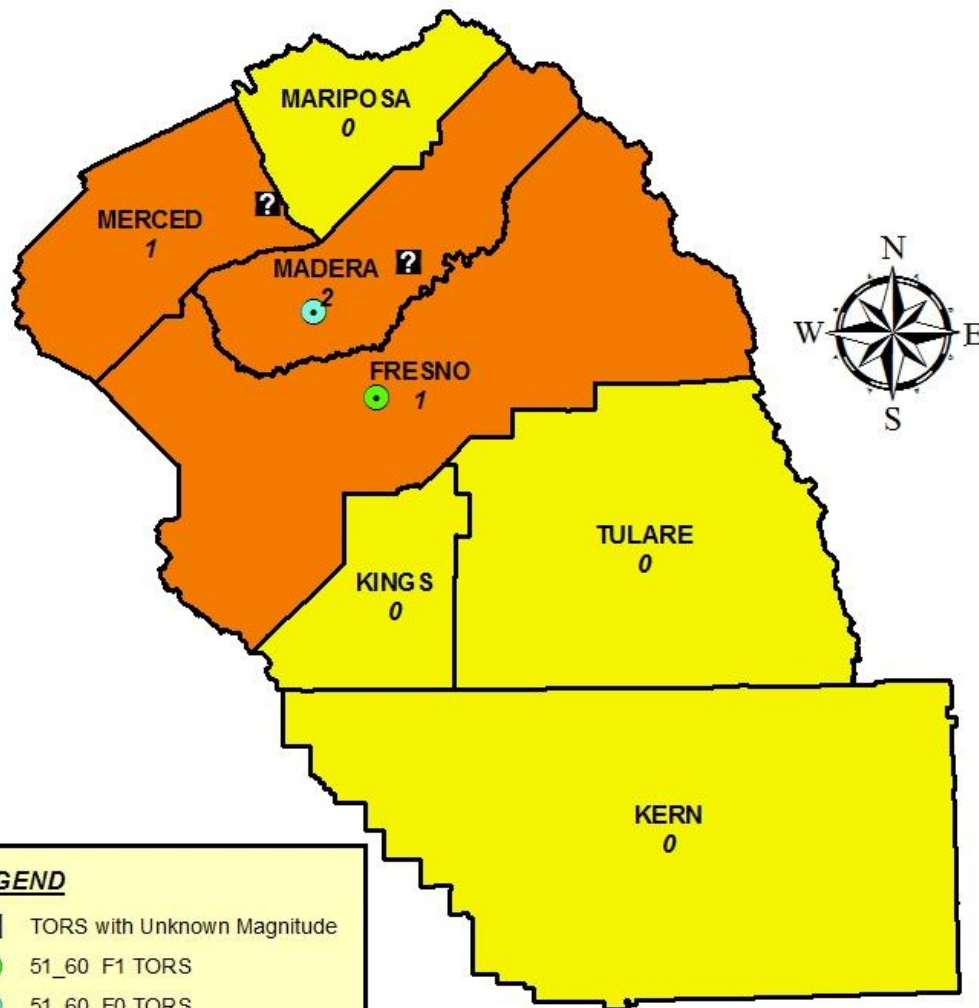


\*October 15, 1972 F0 Tornado within Yosemite National Park  
Tuolumne County portion of HNX CWA

\*\*July 7, 2004 World's Highest Elevation Tornado with an  
Elevation of 12,000 ft and an Estimated Strength of F0

Sources: National Climatic Data Center (NCDC)  
and Storm Prediction Center (SPC)

## NUMBER OF TORNADOES BY COUNTY IN THE CENTRAL CALIFORNIA INTERIOR FOR 1951 TO 1960



**LEGEND**

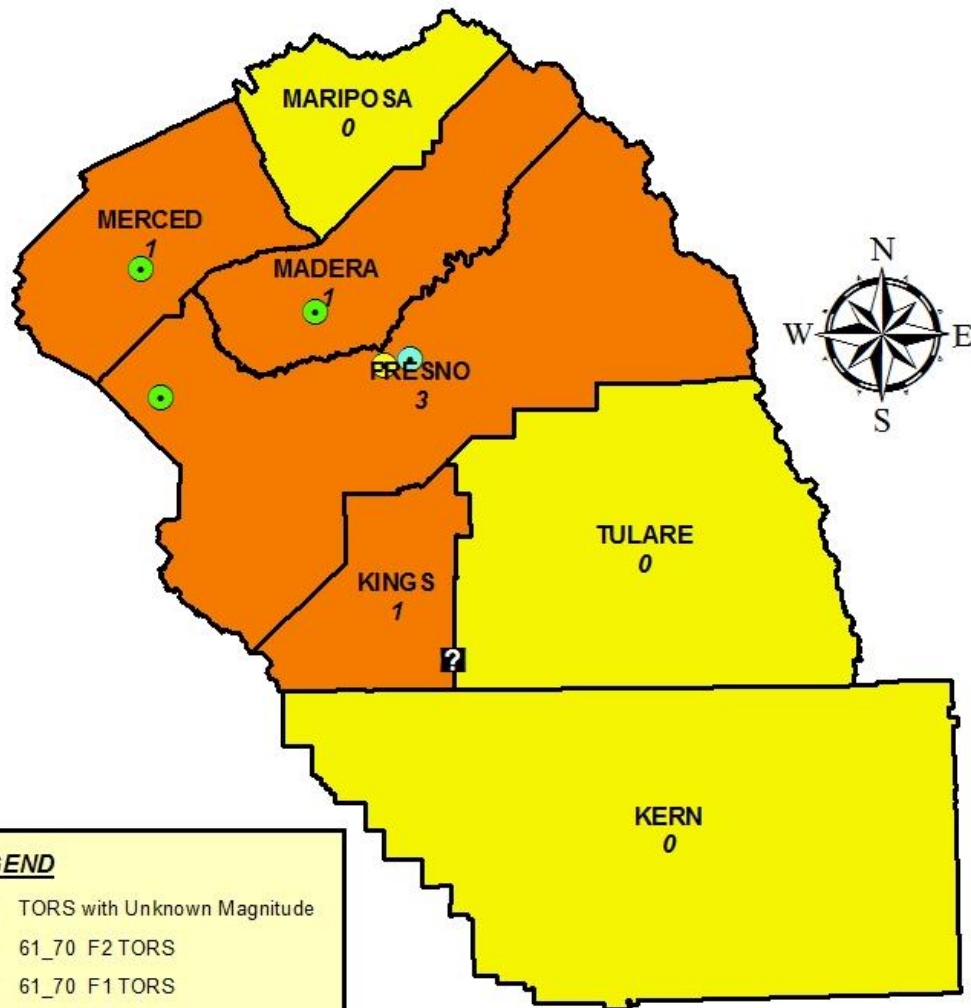
- ? TORS with Unknown Magnitude
- 51\_60 F1 TORS
- 51\_60 F0 TORS

**51\_60\_TORS**

- 0
- 1 - 6
- 7 - 12

Sources: National Climatic Data Center (NCDC)  
and Storm Prediction Center (SPC)

## NUMBER OF TORNADES BY COUNTY IN THE CENTRAL CALIFORNIA INTERIOR FOR 1961 TO 1970



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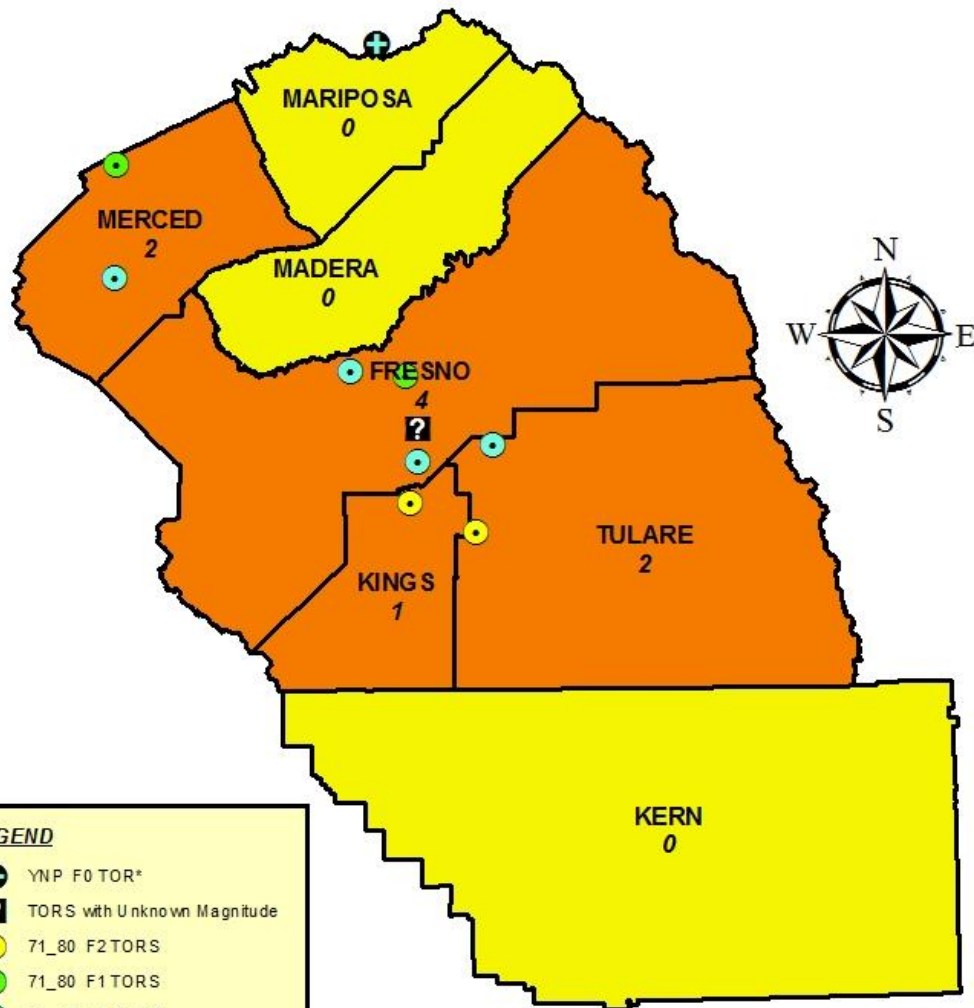
- ? TORS with Unknown Magnitude
- 61\_70 F2 TORS
- 61\_70 F1 TORS
- 61\_70 F0 TORS

**61\_70\_TORS**

- 0
- 1 - 6
- 7 - 12

Sources: National Climatic Data Center (NCDC) and Storm Prediction Center (SPC)

# NUMBER OF TORNADOES BY COUNTY IN THE CENTRAL CALIFORNIA INTERIOR FOR 1971 TO 1980



**LEGEND**

- + YNP F0 TOR\*
- ? TORS with Unknown Magnitude
- 71\_80 F2 TORS
- 71\_80 F1 TORS
- 71\_80 F0 TORS

71\_80\_TORS

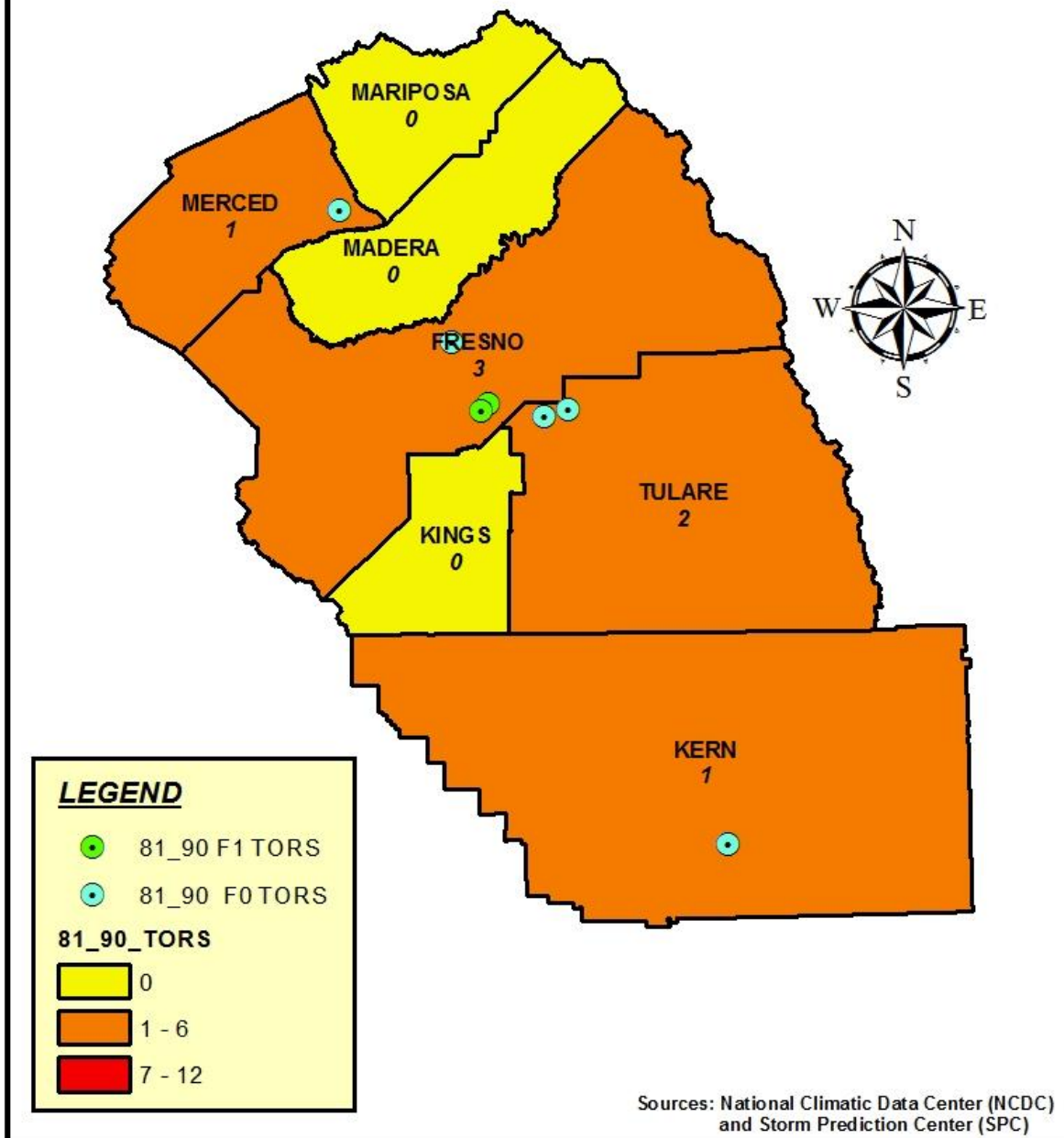
- 0
- 1-6
- 7-12

\* October 15, 1972 F0 Tornado within Yosemite National Park  
Tuolumne County portion of HNX CWA

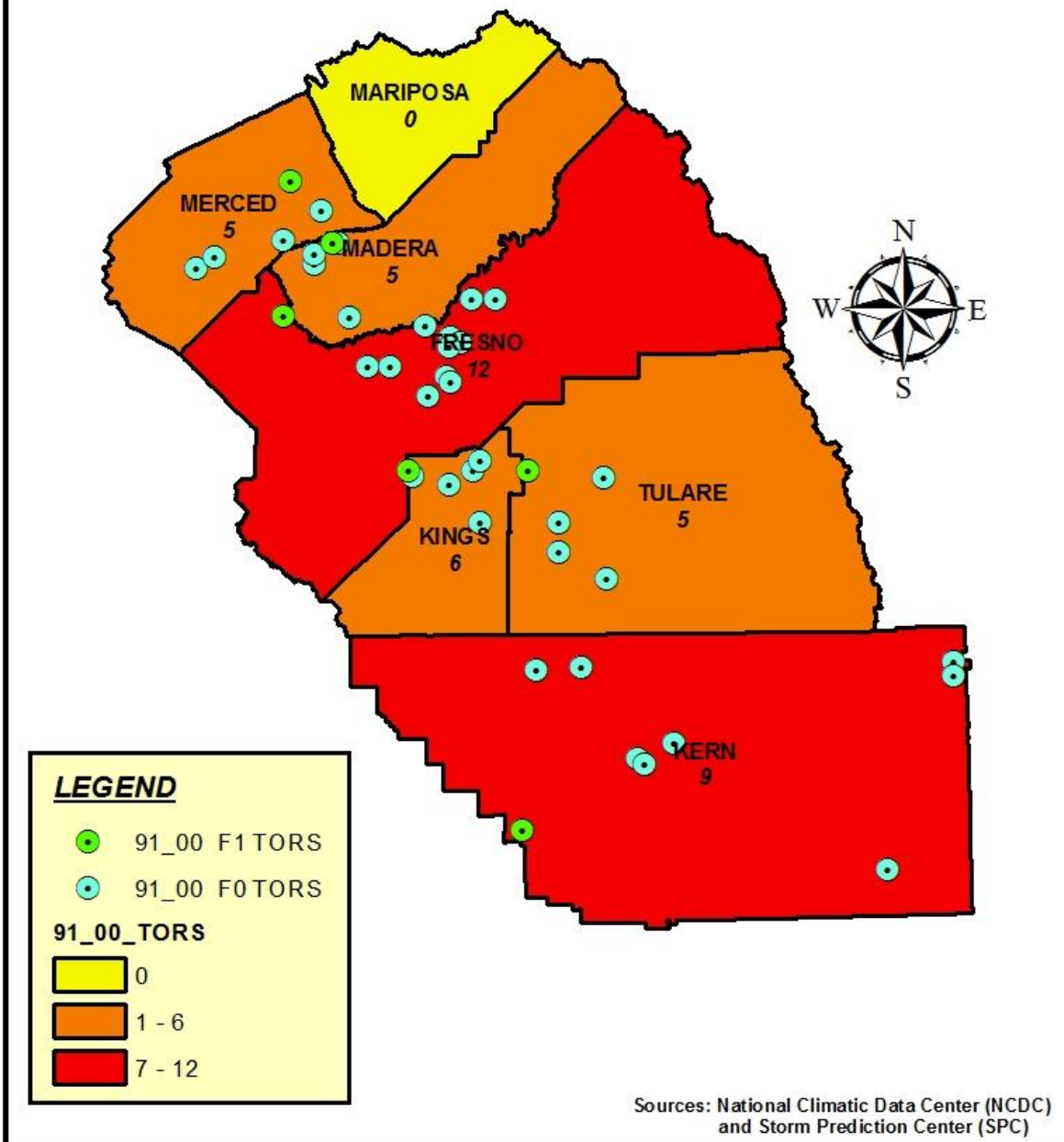
Sources: National Climatic Data Center (NCDC)  
and Storm Prediction Center (SPC)



## NUMBER OF TORNADES BY COUNTY IN THE CENTRAL CALIFORNIA INTERIOR FOR 1981 TO 1990

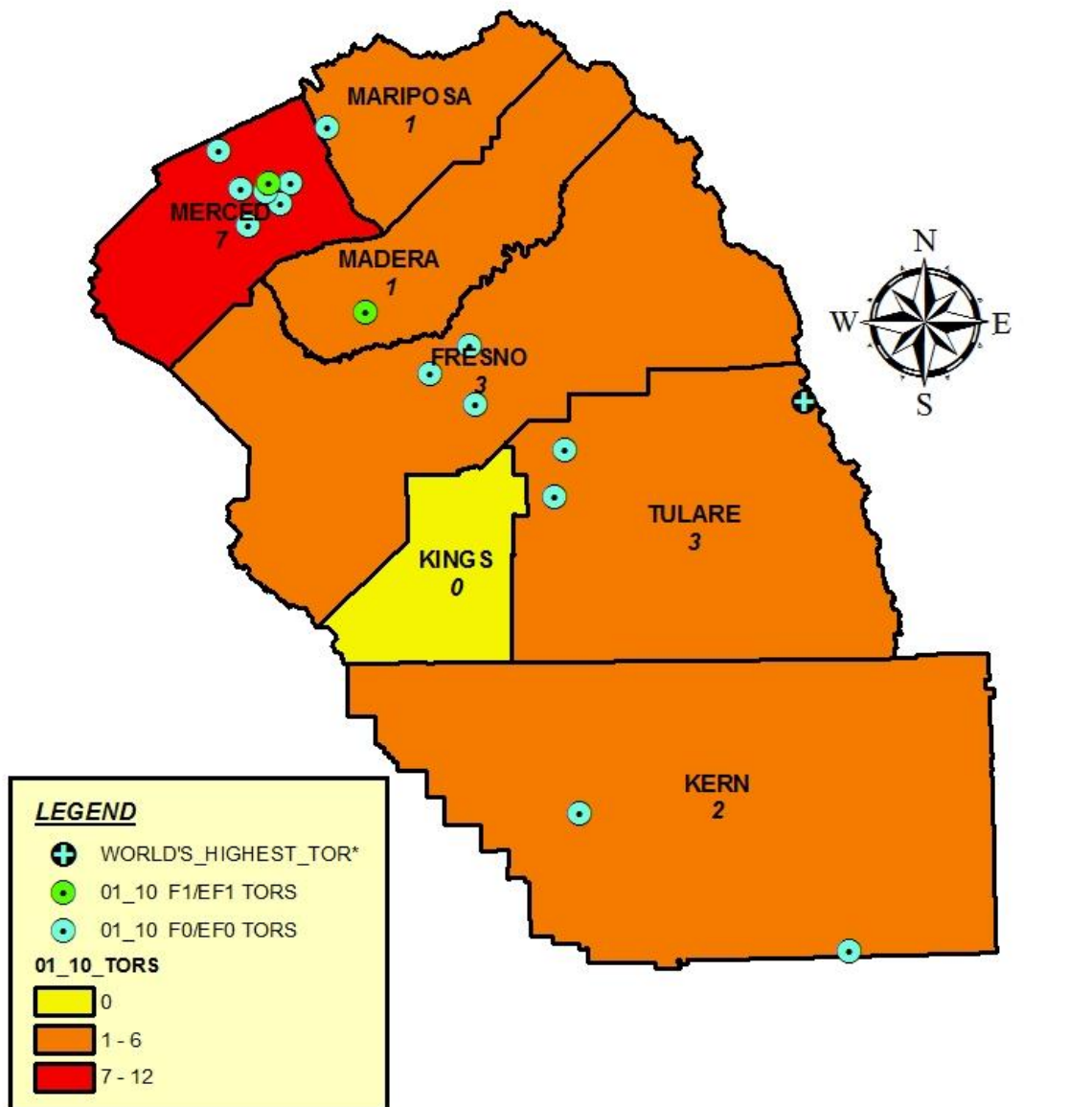


## NUMBER OF TORNADES BY COUNTY IN THE CENTRAL CALIFORNIA INTERIOR FOR 1991 TO 2000





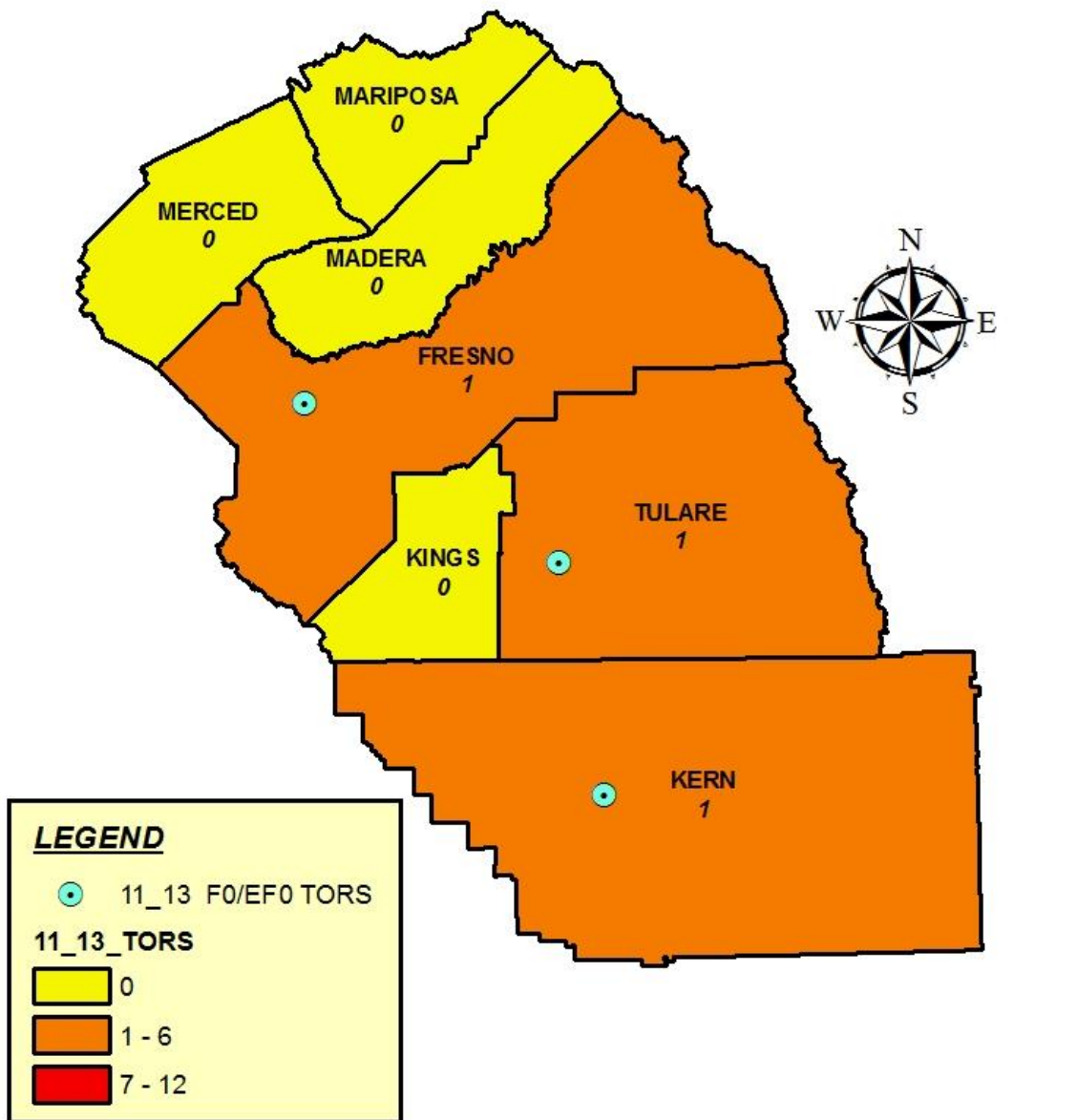
## NUMBER OF TORNADES BY COUNTY IN THE CENTRAL CALIFORNIA INTERIOR FOR 2001 TO 2010



\* JULY 7, 2004 World's Highest Elevation Tornado with an Elevation of 12,000 ft and an Estimated Strength of F0.

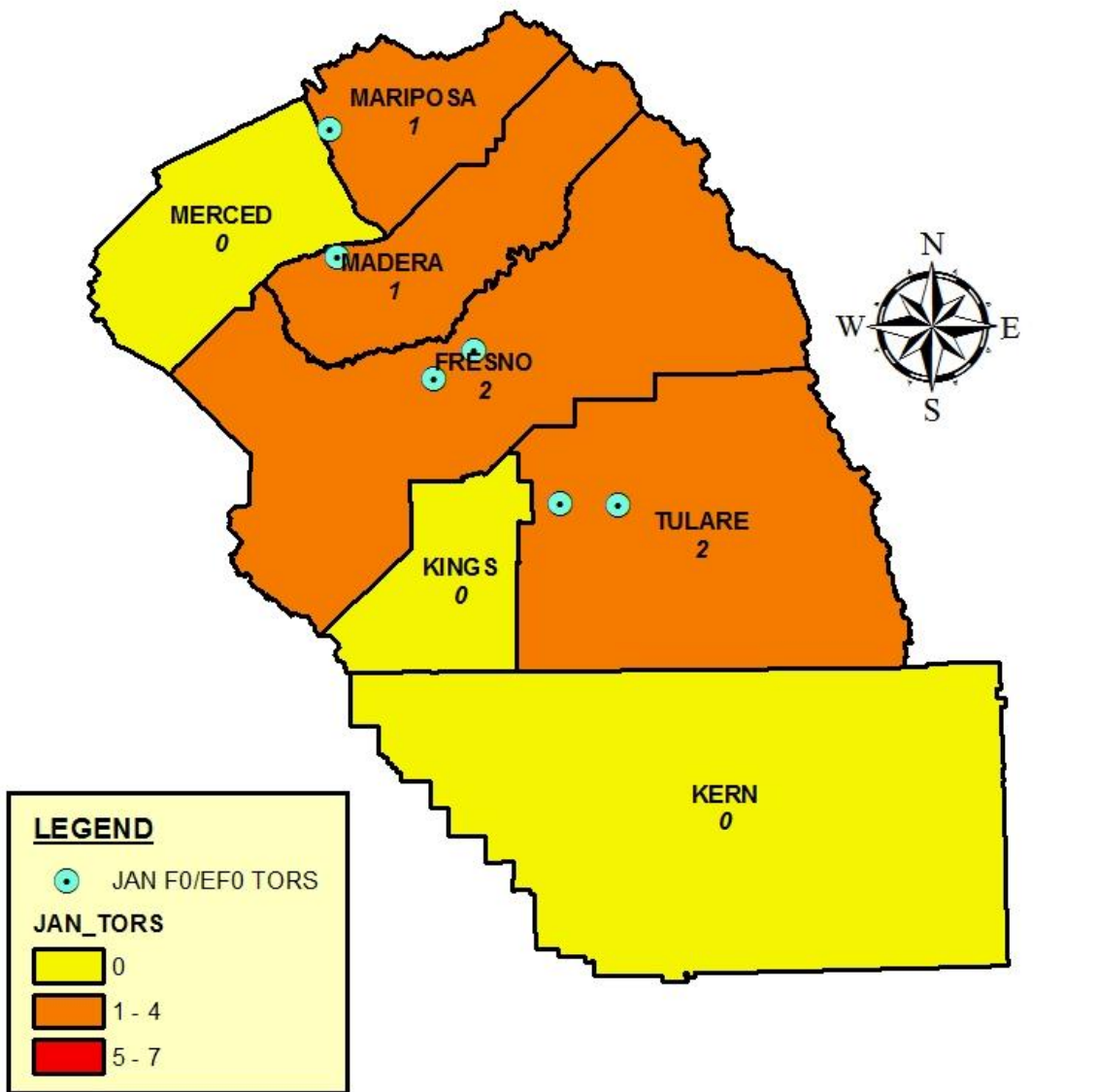
Source: National Climatic Data Center NCDC and Storm Prediction Center (SPC)

# NUMBER OF TORNADES BY COUNTY IN THE CENTRAL CALIFORNIA INTERIOR FOR 2011 THROUGH 2013



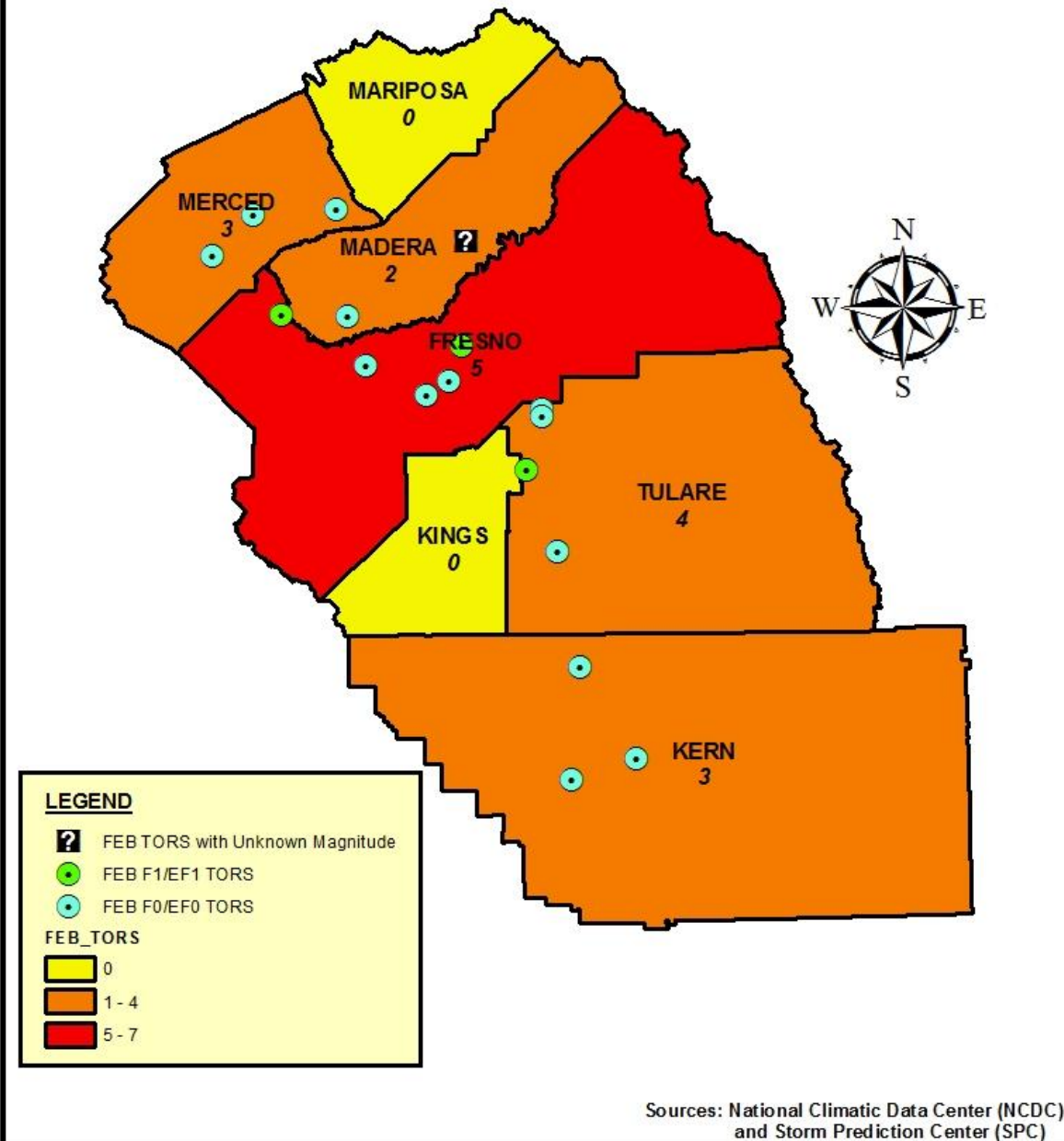
Sources: National Climatic Data Center (NCDC)  
and Storm Prediction Center (SPC)

# NUMBER OF JANUARY TORNADOES BY COUNTY IN THE CENTRAL CALIFORNIA INTERIOR FROM 1950 TO 2013

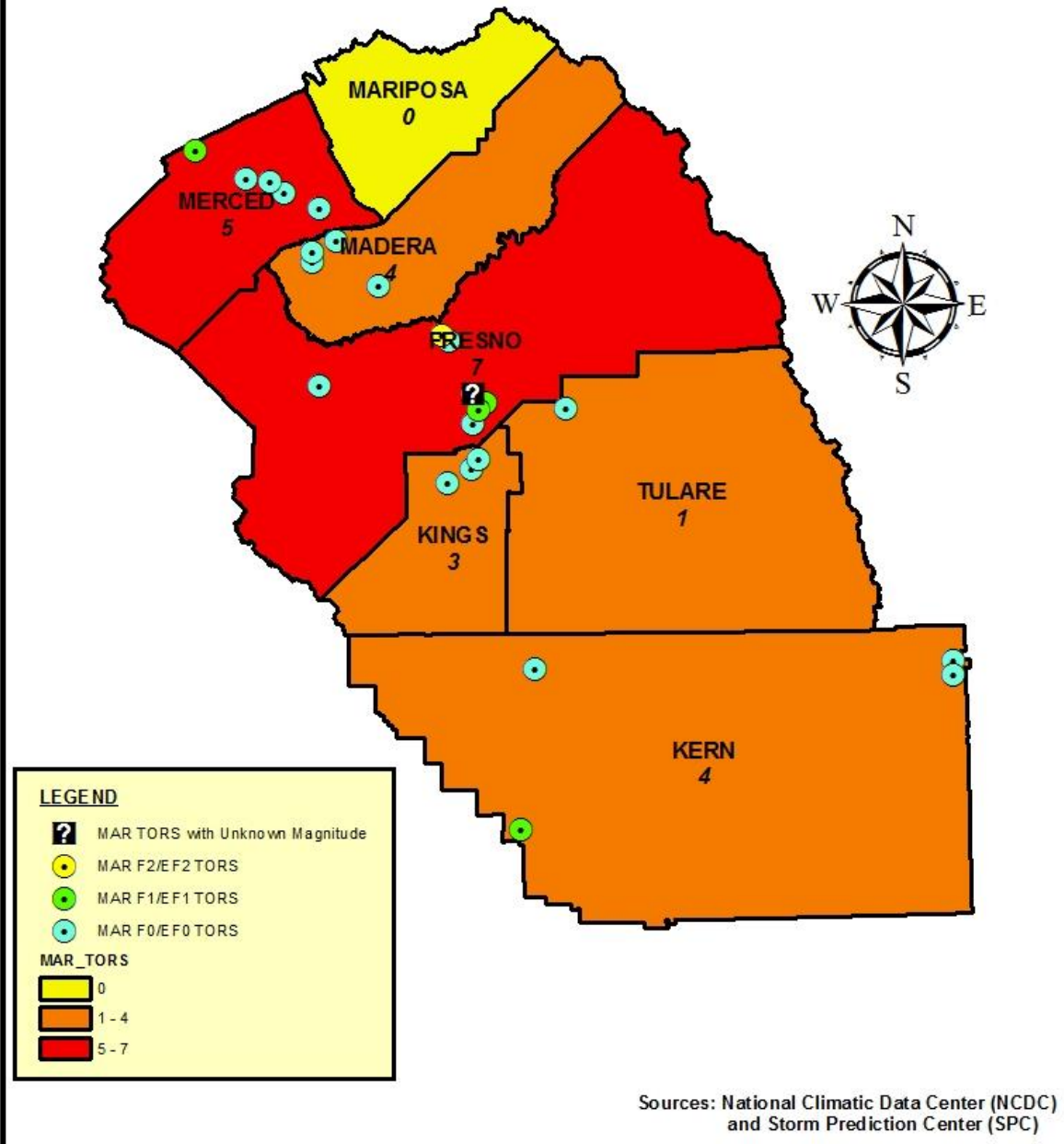


Sources: National Climatic Data Center (NCDC)  
and Storm Prediction Center (SPC)

## NUMBER OF FEBRUARY TORNADOES BY COUNTY IN THE CENTRAL CALIFORNIA INTERIOR FROM 1950 TO 2013

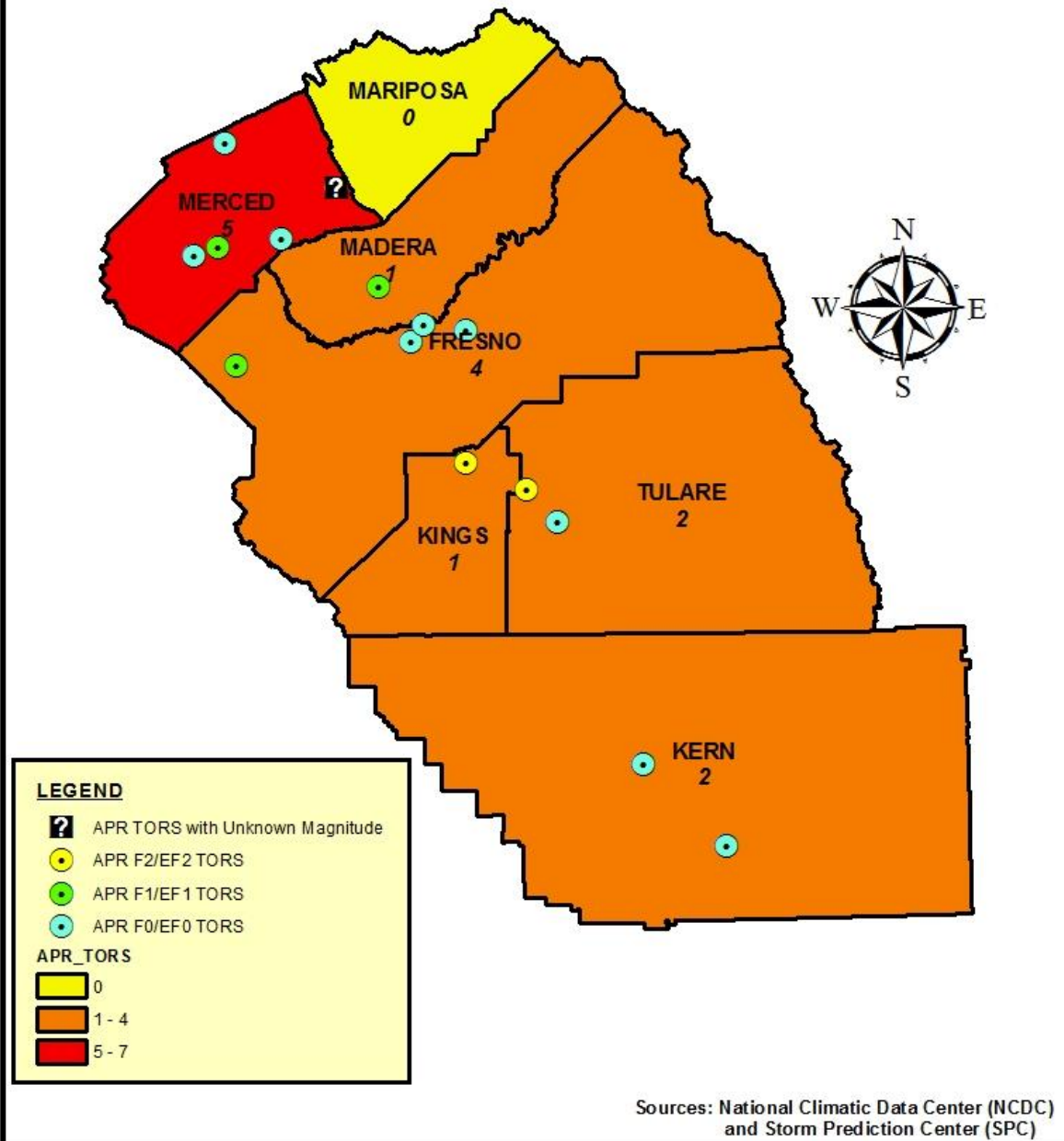


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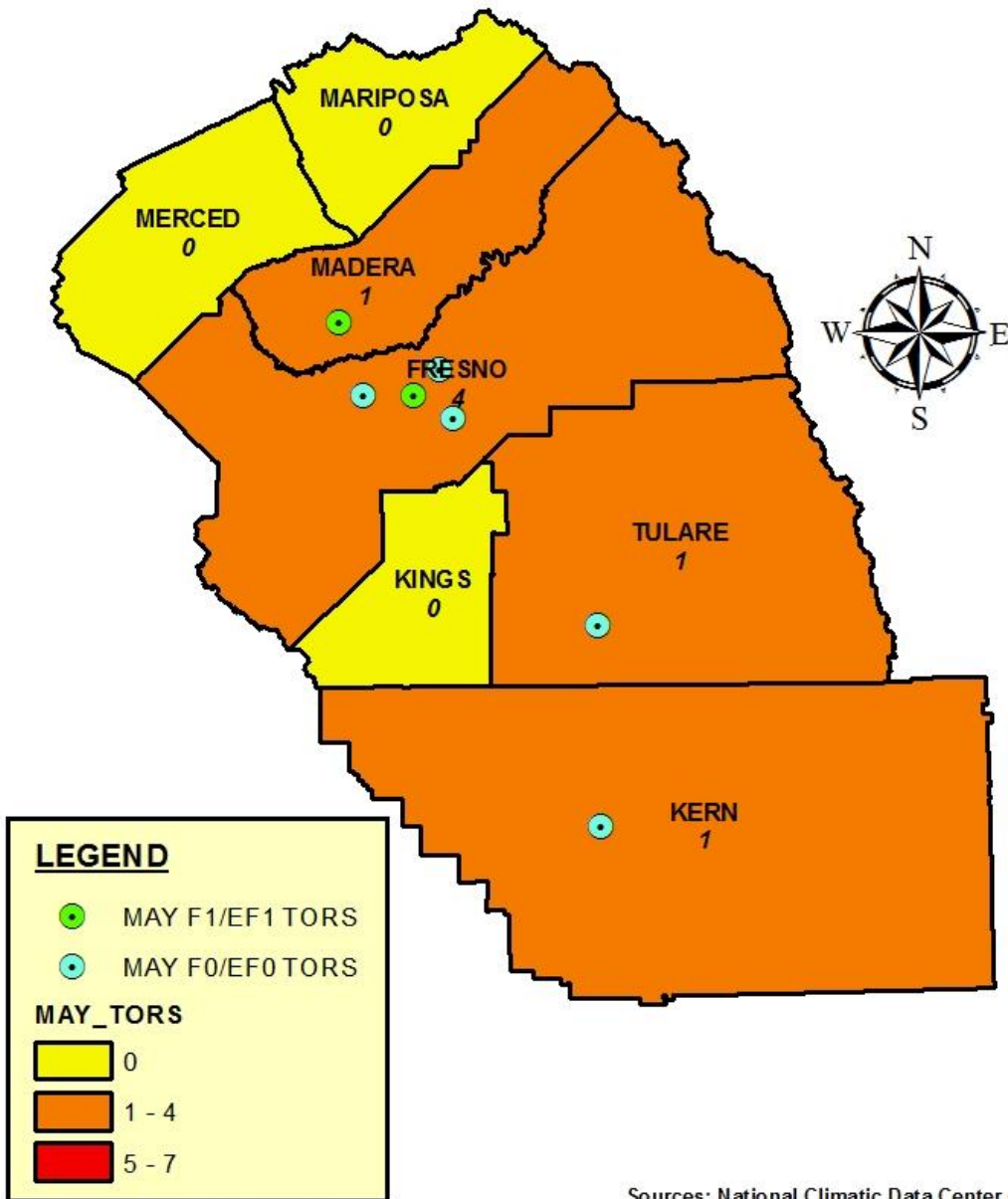




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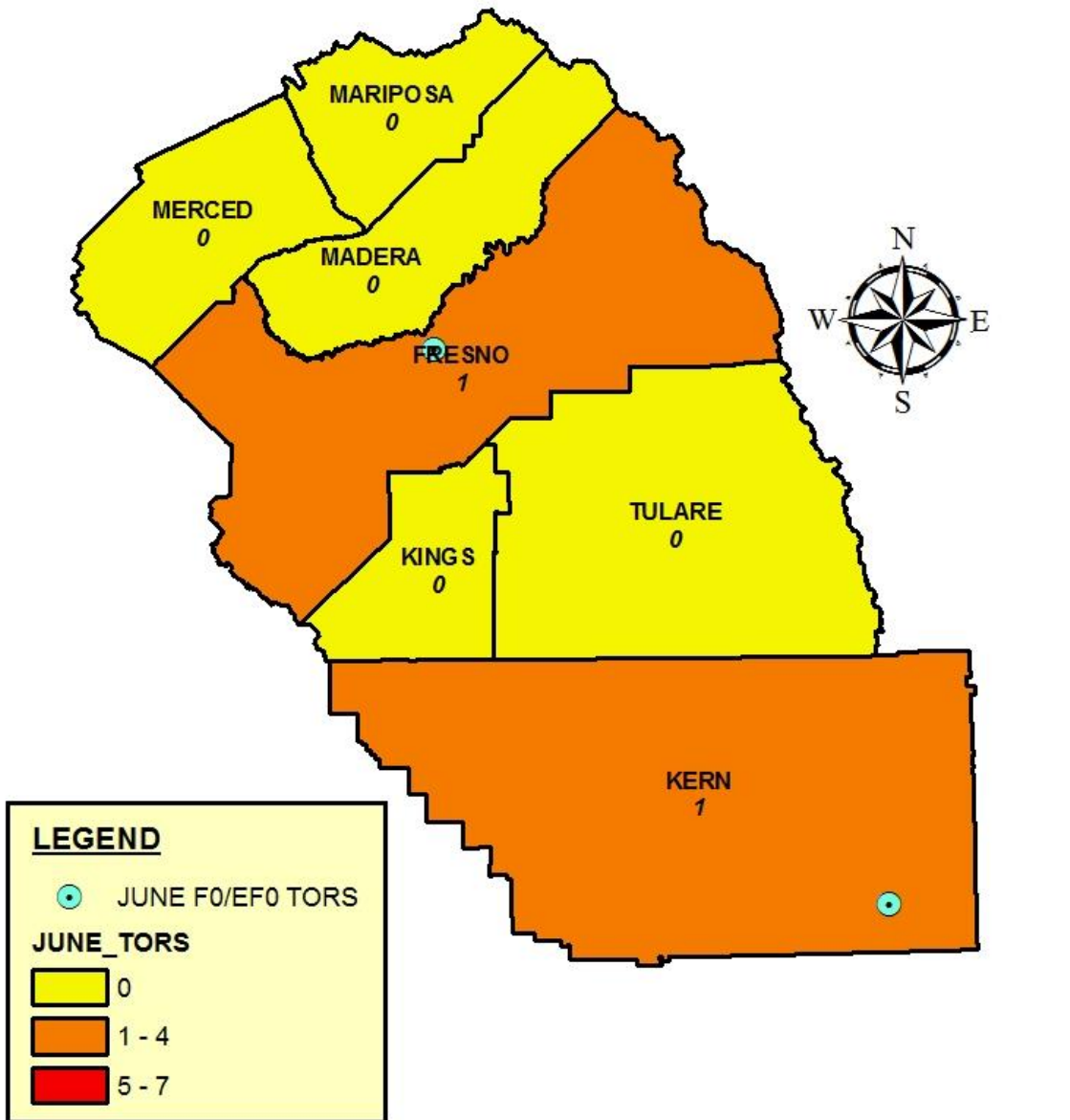


# NUMBER OF MAY TORNADOES BY COUNTY IN THE CENTRAL CALIFORNIA INTERIOR FROM 1950 TO 2013



Sources: National Climatic Data Center (NCDC)  
and Storm Prediction Center (SPC)

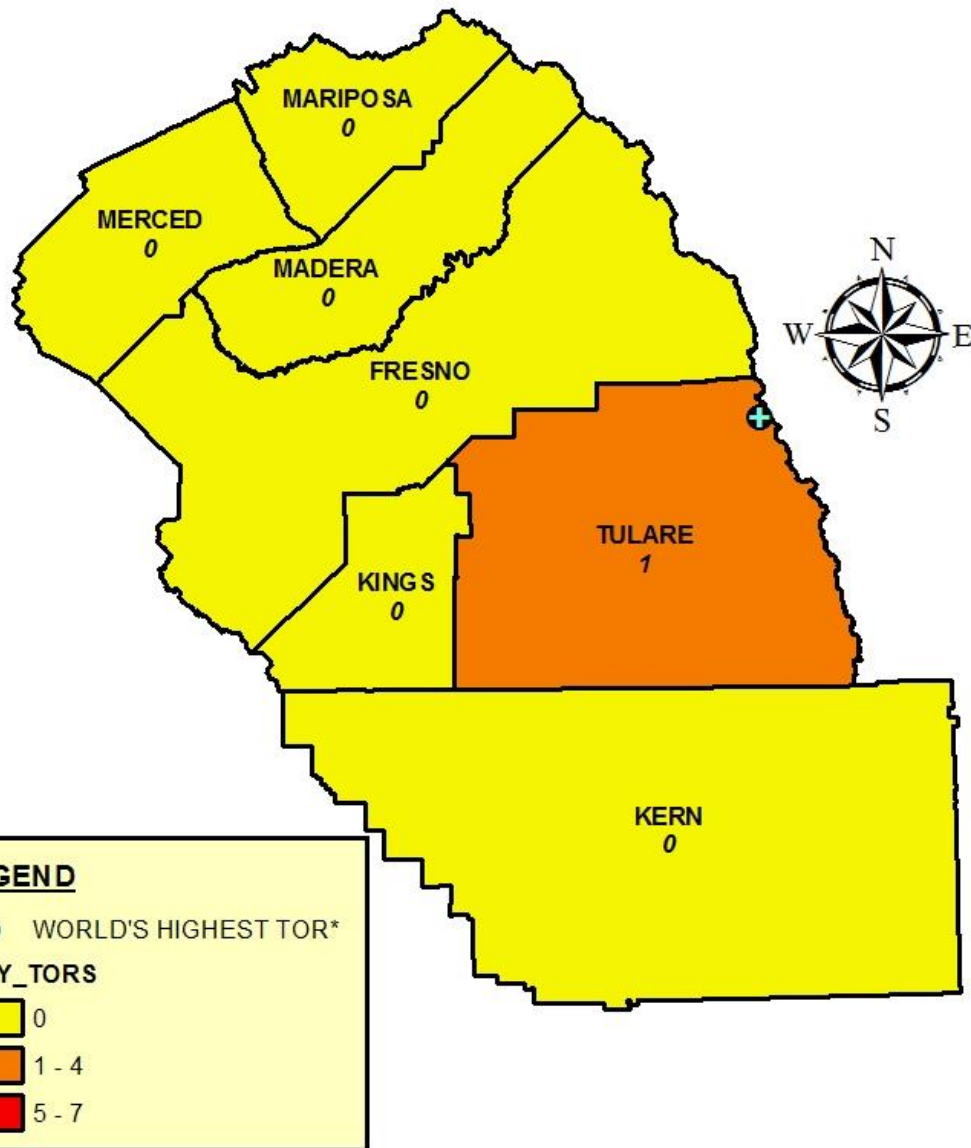
# NUMBER OF JUNE TORNADES BY COUNTY IN THE CENTRAL CALIFORNIA INTERIOR FROM 1950 TO 2013



Sources: National Climatic Data Center (NCDC)  
and Storm Prediction Center (SPC)



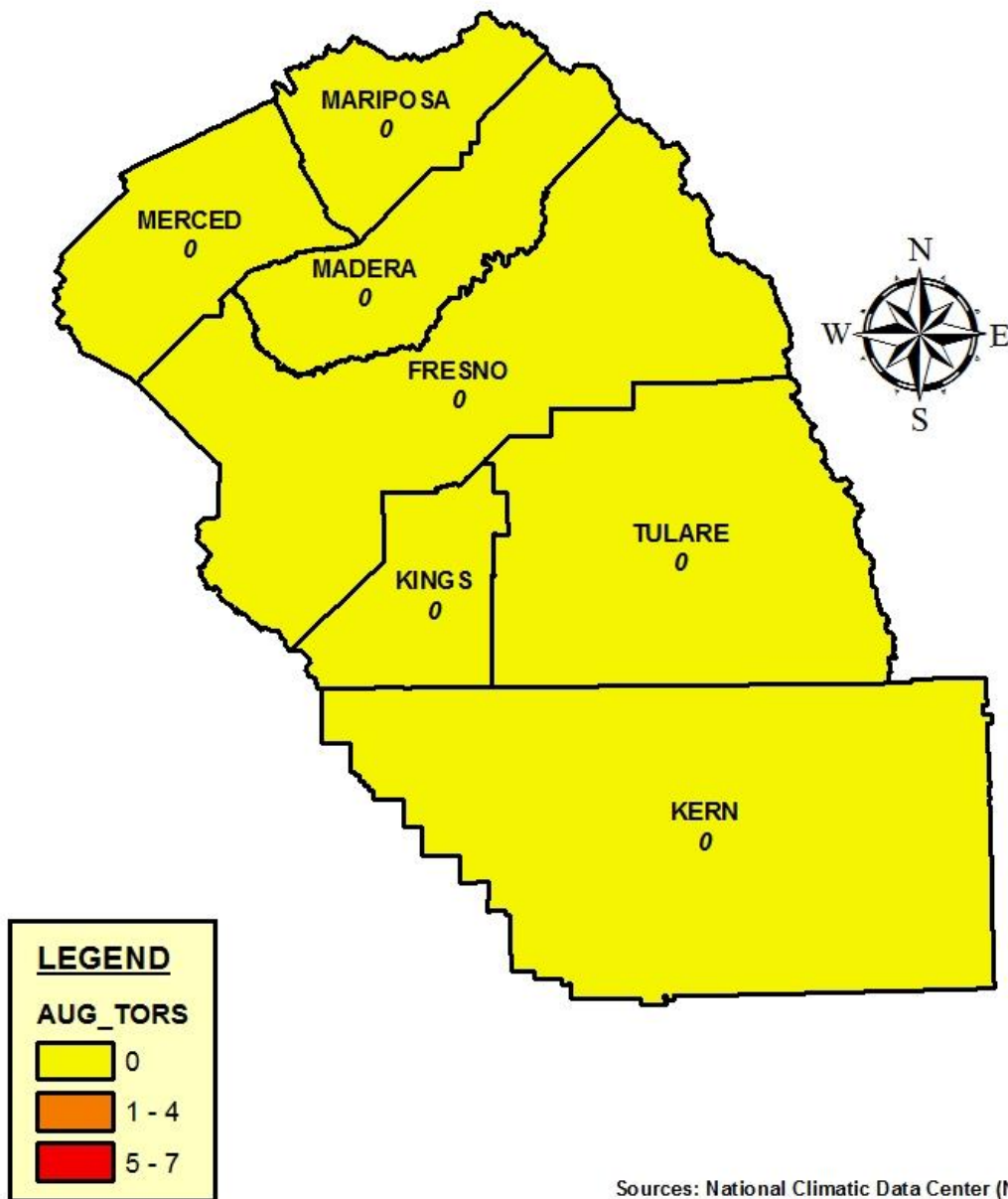
# NUMBER OF JULY TORNADES BY COUNTY IN THE CENTRAL CALIFORNIA INTERIOR FROM 1950 TO 2013



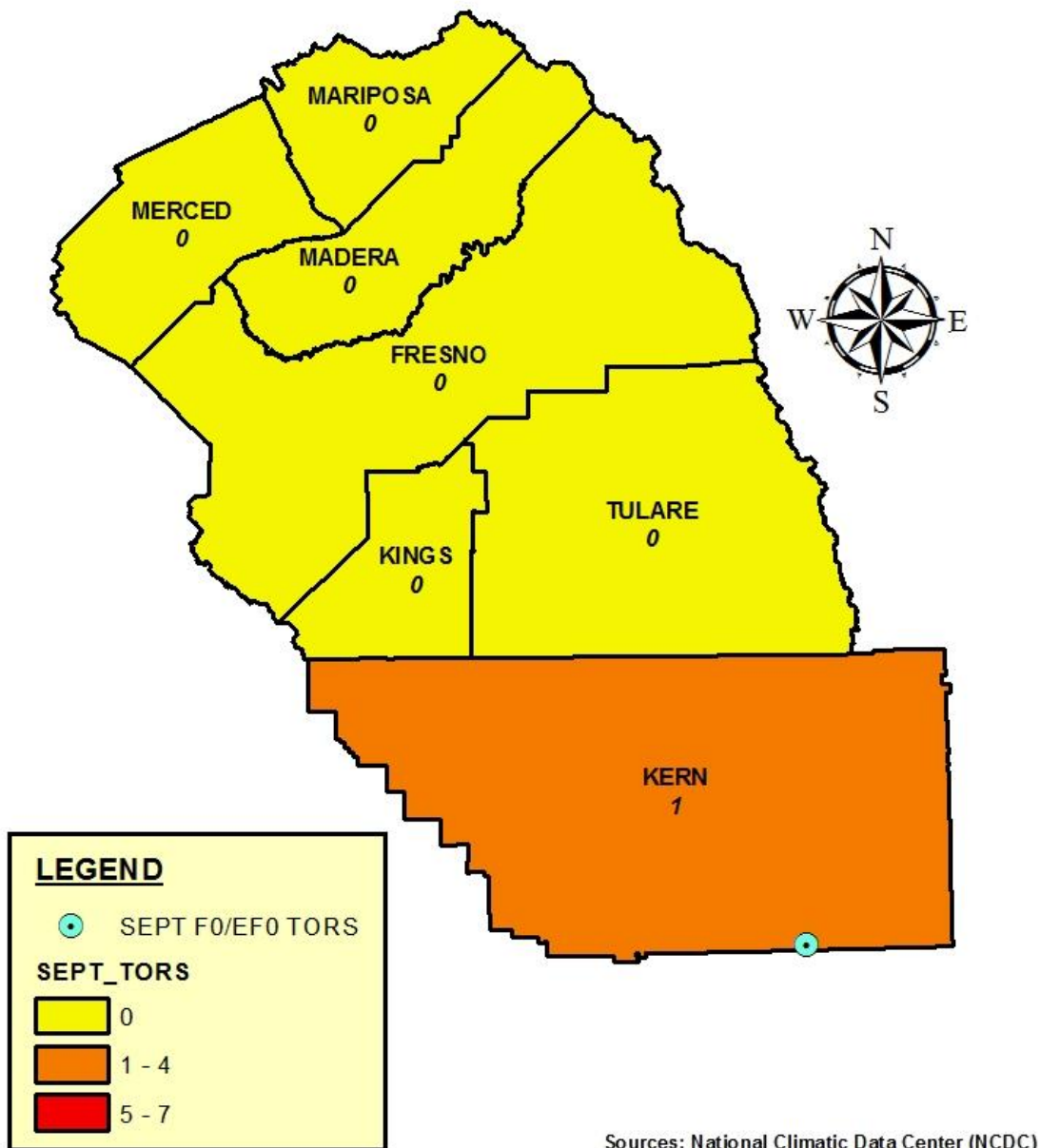
\*JULY 7, 2004 World's Highest Elevation Tornado with an Elevation of 12,000 ft and an Estimated Strength of F0.

Sources: National Climatic Data Center (NCDC) and Storm Prediction Center (SPC)

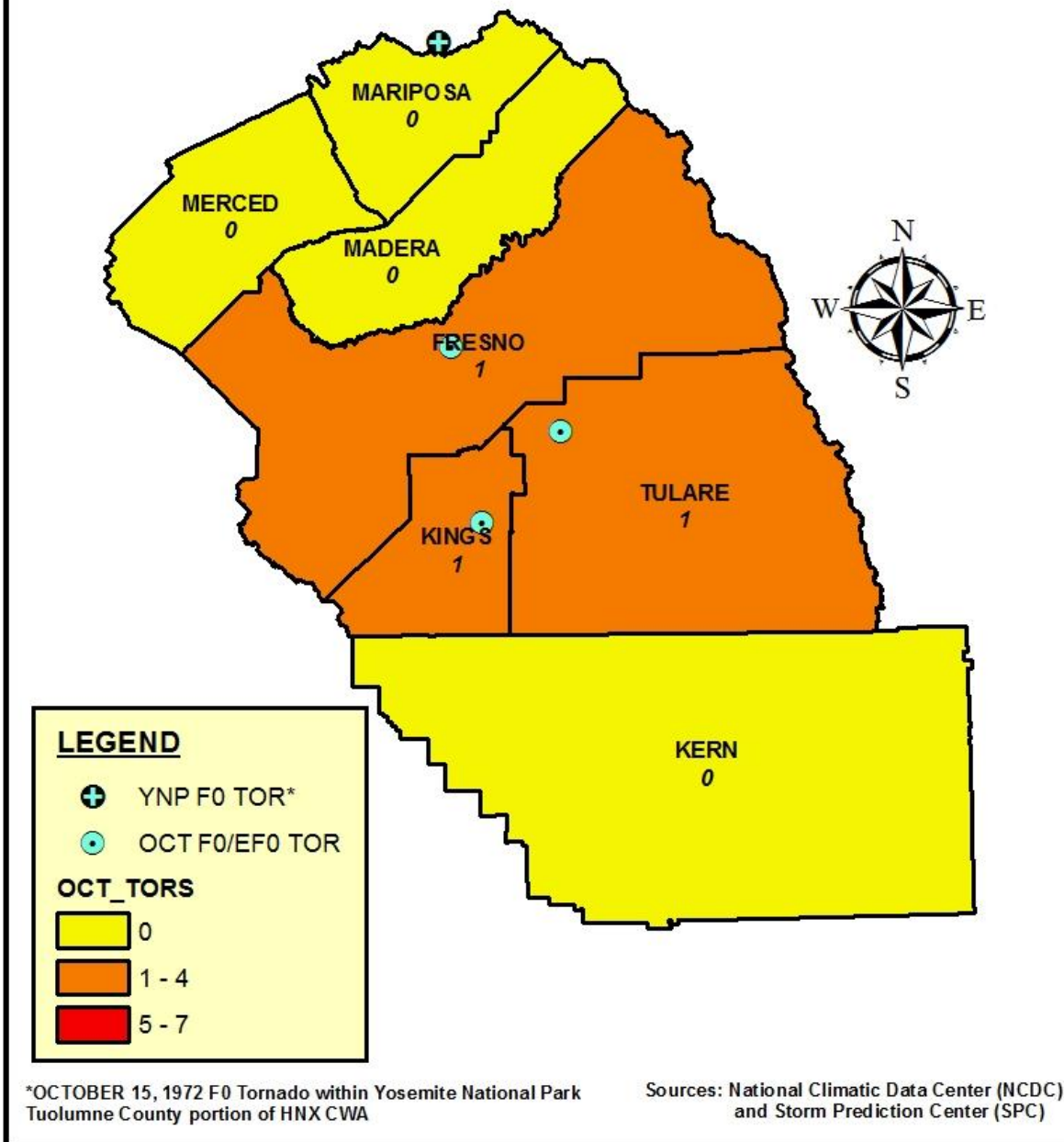
# NUMBER OF AUGUST TORNADOES BY COUNTY IN THE CENTRAL CALIFORNIA INTERIOR FROM 1950 TO 2013



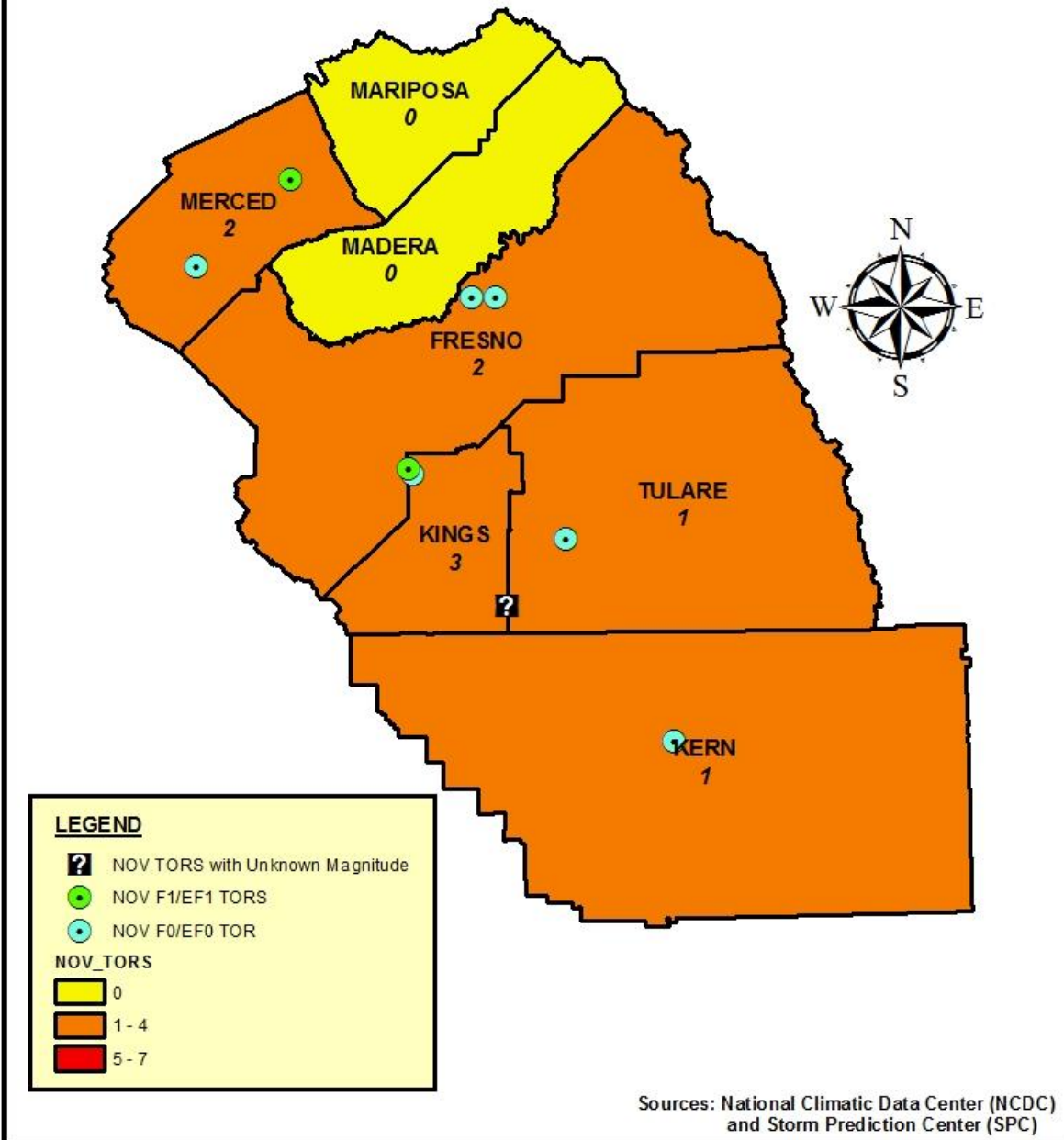
# NUMBER OF SEPTEMBER TORNADOES BY COUNTY IN THE CENTRAL CALIFORNIA INTERIOR FROM 1950 TO 2013



## NUMBER OF OCTOBER TORNADOES BY COUNTY IN THE CENTRAL CALIFORNIA INTERIOR FROM 1950 TO 2013

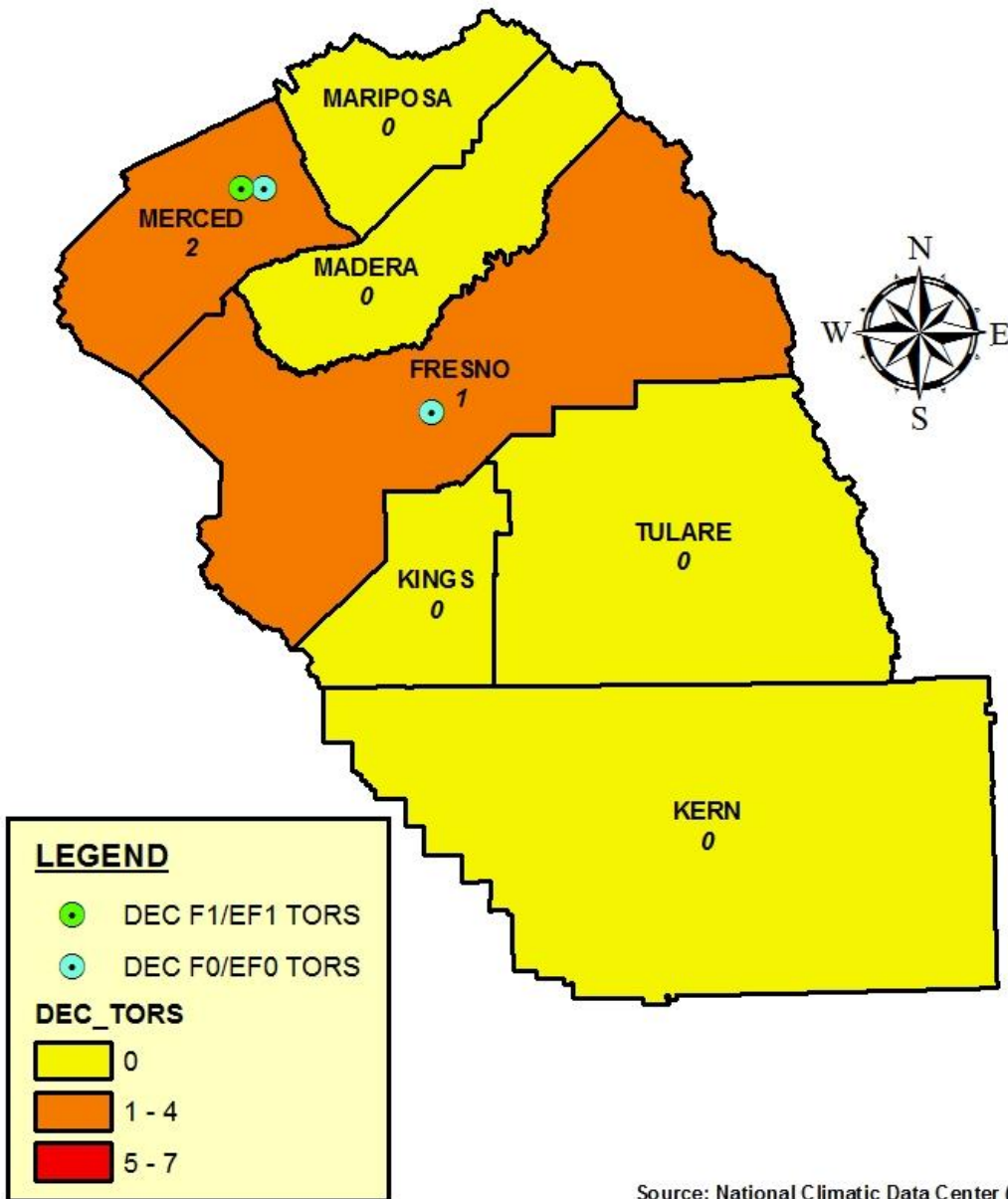


# NUMBER OF NOVEMBER TORNADOES BY COUNTY IN THE CENTRAL CALIFORNIA INTERIOR FROM 1950 TO 2013





# NUMBER OF DECEMBER TORNADOES BY COUNTY IN THE CENTRAL CALIFORNIA INTERIOR FROM 1950 TO 2013



Source: National Climatic Data Center (NCDC)  
and Storm Prediction Center (SPC)