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NOAA TECHNICAL MEMORANDUM NWS NSSFC-41



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SEVERE LOCAL STORM WARNING VERIFICATION: 1994

Hugh G. Crowther and John T. Halmstad  
National Severe Storms Forecast Center  
Kansas City, Missouri 64106-2877

June 1995

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U.S. DEPARTMENT OF  
COMMERCE

National Oceanic and  
Atmospheric Administration

National Weather  
Service

National Weather Service  
National Severe Storms Forecast Center

The National Severe Storms Forecast Center (NSSFC) has the responsibility for the issuance of tornado and severe thunderstorm watches for the contiguous 48 states. Watches are issued for those areas where thunderstorms are forecast to produce one or more of the following: (1) hailstones of 3/4 inch diameter or greater, (2) surface wind gusts of 50 knots or greater, or (3) tornadoes.

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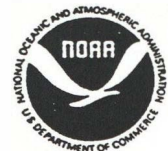
June 1995



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**SEVERE LOCAL STORM**

**WARNING VERIFICATION FOR 1994**

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JUNE 1995

# SEVERE LOCAL STORM WARNING VERIFICATION: 1994

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## ABSTRACT

Tornado and severe thunderstorm warnings are issued by local offices of the National Weather Service. Routine verification of these warnings is accomplished at the National Severe Storms Forecast Center. This report highlights verification procedures and summarizes national, regional and local verification results for the year 1994.

In the past, offices in Southern Region and Central Region have issued most of the warnings and experienced most of the severe local storm events. In 1994, local offices in those two regions accounted for more than 75 percent of the warnings and severe local storm events.

Verification scores for 1994 showed a slight drop from those in 1993, but were still significantly higher than those of any year prior to 1992.

## INTRODUCTION

Severe local storm warnings are issued to the public by more than 200 local offices of the National Weather Service (NWS). These warnings, which are typically based on radar information and/or storm spotter reports, alert the public to an imminent or existing severe thunderstorm or tornado.

Each designated area of warning responsibility is composed of counties in the vicinity of the local office. Locations of these offices are contained in "National Weather Service Offices and Stations" (NWS 1990). Areas of responsibility are defined in Chapter C-47 of the "Weather Service Operations Manual" (1986), with included revisions by the Office of Meteorology (OM).

Routine verification of all tornado and severe thunderstorm warnings issued by offices is accomplished at the National Severe Storms Forecast Center (NSSFC) in Kansas City, Missouri. This report summarizes these verification results for the year 1994. Detailed evaluation of the results, such as comparisons among individual offices, is beyond the scope of this report.

## VERIFICATION PROCEDURES

Severe local storm warning verification began in 1979. Pearson and David (1979), and Kelly and Schaefer (1982), analyzed warning verification statistics back to 1976, and in 1982 a National Verification Plan (NWS 1982) was formulated to provide guidelines for verification of all products issued to the public. The severe local storm warning verification effort at NSSFC is an integral part of this national program. Monthly and year-to-date summaries are routinely provided to national headquarters, regional headquarters, and local offices.

The two elements necessary for verification are: (1) issued warnings, and (2) event reports. Initially, both warnings and event reports are collected in real time from the Automation of Field Operations and Services (AFOS) computer system. Event information is extracted from surface observations, warning messages, local storm reports (LSR'S), statements, pilot reports, and state weather summaries. Additional reports may be received via newspaper articles and telephone conversations. These reports form a "rough log" of severe local storm events.

Each week, listings of warnings that have been logged and processed at the National Severe Storms Forecast Center, and the "rough log", are transmitted via the AFOS system to local offices for review. The role of these warning and event summaries in the verification process is discussed in detail by Leftwich and Lee (1984), and updated by Grenier and Halmstad (1986).

After reviewing warning lists, local offices send any warning corrections to the Verification Section. The "rough log" is an aid for the Warning Coordination Meteorologist (WCM), Warning Preparedness Meteorologist (WPM), or severe weather focal point at each forecast office to use in preparing "Storm Data and Unusual Weather Phenomena" (FORM F-8). These F-8 reports are the sole source of event reports used in the "smooth log" for official verification. After all sources of information have been compiled, the resulting "smooth log" and warning file become the data bases for official verification.



## VERIFICATION PROCEDURES

To qualify as a severe local storm event, a report must satisfy one of the criteria listed in Table 1. General guidelines on event reporting may be found in Grenier and Halmstad (1986). For verification purposes, multiple reports of severe local storm events occurring within ten statute miles and fifteen minutes of each other, and in the same county, are recorded as one event, with the following exceptions:

- (1) all distinct tornadoes are retained as separate events
- (2) all wind events of 65 knots or greater are retained
- (3) all reports of hail with a diameter of two inches or greater are retained
- (4) all reports containing deaths, injuries, or more than half a million dollars damage are retained (Damage Category 6, or above)

Originally, a severe event was identified as a duplicate if it met the following criteria: (1) it was in the same county, (2) it was within ten statute miles and/or fifteen minutes of another report, and (3) it was the same type of non-tornadic phenomena, i.e. wind or hail (Leftwich and Lee, 1984). It was later noted that a severe wind and severe hail report from the same thunderstorm caused the storm to be counted twice. In an effort to focus on the thunderstorm cell, the "same type" requirement was dropped at the start of the 1986 severe weather year (Grenier and Halmstad, 1986).

# CRITERIA FOR SEVERE LOCAL STORM EVENTS USED IN WARNING VERIFICATION

- A. **TORNADO** - a rotating circulation touching the ground and associated with a convective cloud.
- B. **HAIL** equal or greater than 3/4 inch (1.9 cm) in diameter.
- C. **THUNDERSTORM WIND GUST** of 50 knots (93 km/h) or greater.
- D. **THUNDERSTORM WIND DAMAGE** which implies the occurrence of a severe thunderstorm.

Any event that occurs within a county for which a warning was issued, and during the valid period of the warning, is considered a "warned event". Thus, there can be multiple "warned events" during the valid time of a given warning. Also, any type of severe event can verify either a tornado warning or a severe thunderstorm warning.

In current verification procedures, the county is the basic unit of area. A warning in effect for three counties is counted as three "warned counties". At least one severe local storm event occurring during the valid period of a warning in a warned county produces a "verified county warning". In order to obtain perfect verification, at least one severe local storm event must occur in each warned county.

Sparseness of population can decrease the chances that a severe weather event is reported. Schaefer and Galway (1982) addressed biases reflected in the tornado climatology across the United States, and Hales and Kelly (1985) discussed possible effects of variations in reporting of hail and thunderstorm wind gust events upon verification results. More recently, Doswell and Burgess (1988) noted several problems relating to the F-scale tornado intensity rating system and the occurrence of very long track tornado events. Results of these studies demand that caution be exercised in comparing verification results among local offices, and among regions that have different population densities or different meteorological regimes.

## VERIFICATION MEASURES

### FALSE ALARM RATIO

The False Alarm Ratio (**FAR**) is the number of unverified county warnings (**UCW**) divided by the total number of county warnings issued (**TCW**).

UNVERIFIED COUNTY WARNINGS

TOTAL COUNTY WARNINGS

### PROBABILITY OF DETECTION

The Probability of Detection (**POD**) is the number of warned severe local storm events (**WSE**) divided by the total number of severe local storm events reported (**TSE**).

WARNED SEVERE EVENTS

TOTAL SEVERE EVENTS

### CRITICAL SUCCESS INDEX

The Critical Success Index (**CSI**) is the number of warned severe local storm events (**WSE**) divided by the sum of the total number of severe local storm events (**TSE**) and the number of unverified county warnings (**UCW**).

WARNED SEVERE EVENTS

TOTAL SEVERE EVENTS + UNVERIFIED COUNTY WARNINGS

**NOTE:** The CSI values which appear in this report for each region, and for the nation as a whole, were computed according to the formula shown above. The CSI values for each individual station, which were transcribed from the annual printouts, were computed according to the following formula:

$$CSI = [ POD^{-1} + (1 - FAR)^{-1} - 1 ]^{-1}$$

## VERIFICATION MEASURES

### VERIFICATION EFFICIENCY

The Verification Efficiency (**VE**) is the sum of the verified county warnings (**VCW**) and the number of warned severe local storm events (**WSE**), divided by the sum of the total number of county warnings (**TCW**) and the total number of severe local storm events (**TSE**).

$$\frac{\text{VERIFIED COUNTY WARNINGS} + \text{WARNED SEVERE EVENTS}}{\text{TOTAL COUNTY WARNINGS} + \text{TOTAL SEVERE EVENTS}}$$

### PERCENTAGE OF VERIFIED COUNTY WARNINGS

The Percentage of Verified county warnings (**PV**) is the number of verified county warnings (**VCW**) divided by the total number of county warnings issued (**TCW**). The sum of the False Alarm Ratio (**FAR**) and the Percentage of Verified county warnings (**PV**) is equal to one.

$$\frac{\text{VERIFIED COUNTY WARNINGS}}{\text{TOTAL COUNTY WARNINGS}}$$

# NATIONAL VERIFICATION STATISTICS

1994

There were 15,199 severe local storm events reported across contiguous United States in 1994. The previous highest total for the nation since records began in 1979 was 14,020 reports, in 1993.

The total of 15,199 severe local storm events was 1,179 more than that for 1993 (an 8.4 percent increase), and marked the sixth consecutive year with an increase in the total number of severe local storm events reported across the nation. Forty-three percent of the severe local storm events in 1994 were in the Southern Region states, and 33 percent were in the Central Region states.

Of the 15,199 severe local storm events in 1994, there were 10,900 within a severe thunderstorm warning or a tornado warning. It marked a 10.8 percent increase over the 9,835 verified severe local storm events in 1993.

The Probability of Detection (POD) of severe weather events thus improved between 1993 and 1994, increasing from .701 to .717 (i.e. the number of severe weather events within tornado warnings and severe thunderstorm warnings improved from 70 percent to nearly 72 percent).

The total of 19,108 county warnings was nearly three thousand more than the previous record of 16,125 set in 1993. It was an 18.5 percent increase over 1993, and marked the sixth consecutive year with an increase.

There were 9,322 verified county warnings across the nation in 1994, compared to the previous record of 8,436 in 1992, an increase of 886 verified warnings (10.5 percent).

Although the number of verified county warnings increased from 8,436 in 1993 to 9,322 in 1994, the much greater increase in total number of county warnings issued (from 16,125 in 1993 to 19,108 in 1994) resulted in an overall increase in the False Alarm Ratio (FAR) from .477 in 1993 to .512 in 1994 (i.e. the number of severe thunderstorm warnings and tornado warnings without a verifying severe local storm event increased from nearly 48 percent to slightly more than 51 percent). And, the Critical Success Index (CSI), a blend of the False Alarm Ratio (FAR) and the Probability of Detection (POD), thus also dipped slightly, from .453 in 1993 to .436 in 1994.

Although there was a slight drop off in the Critical Success Index between 1993 and 1994, the score was still significantly above that for any year prior to 1992. The False Alarm Ratio for 1994 also was better than that for any year prior to 1992.

Year	CSI	ARI	POD	POD - 1994	ARI - 1994
1990	0.45	0.15	0.85	0.40	0.20
1991	0.50	0.10	0.90	0.45	0.15
1992	0.55	0.05	0.95	0.50	0.10
1993	0.52	0.08	0.92	0.47	0.13
1994	0.50	0.05	0.90	0.45	0.10

# NATIONAL AND REGIONAL VERIFICATION STATISTICS

1994

REGION	ERN	SRN	CEN	WRN	U.S.
NUMBER OF OFFICES	53	55	67	35	210
TOTAL COUNTY WARNINGS	4082	8282	6334	410	19,108
PERCENTAGE OF TOTAL	21.4	43.3	33.1	2.2	100.0
AVERAGE PER OFFICE	77	151	95	12	91
VERIFIED COUNTY WARNINGS	1914	4435	2872	101	9,322
PERCENTAGE OF TOTAL	20.5	47.6	30.8	1.1	100.0
AVERAGE PER OFFICE	36	81	43	3	44
UNVERIFIED WARNINGS	2168	3847	3462	309	9,786
PERCENTAGE OF TOTAL	22.2	39.3	35.4	3.1	100.0
AVERAGE PER OFFICE	41	70	52	9	47
TOTAL SEVERE EVENTS	3212	6573	5036	378	15,199
PERCENTAGE OF TOTAL	21.1	43.3	33.1	2.5	100.0
AVERAGE PER OFFICE	61	120	75	11	72
WARNED SEVERE EVENTS	2199	5185	3395	121	10,900
PERCENTAGE OF TOTAL	20.2	47.5	31.2	1.1	100.0
AVERAGE PER OFFICE	42	94	51	4	52
FALSE ALARM RATIO	.531	.465	.547	.754	.512
PROBABILITY OF DETECTION	.685	.789	.674	.320	.717
CRITICAL SUCCESS INDEX	.409	.498	.400	.176	.436
VERIFICATION EFFICIENCY	.564	.648	.551	.282	.589
PERCENT VERIFIED	.469	.535	.453	.246	.488

# NATIONAL VERIFICATION STATISTICS

(1984-1994)

YEAR	TCW	VCW	TSE	WSE	FAR	POD	CSI	VE	PV
1984	12498	3316	7357	4095	.730	.560	.220	.410	.270
1985	10957	3607	7997	4555	.670	.570	.260	.450	.330
1986	10789	4155	8725	5118	.610	.590	.300	.490	.390
1987	9409	3739	7367	4228	.600	.570	.310	.490	.400
1988	8593	3675	7253	4232	.570	.580	.330	.510	.430
1989	11956	5459	10408	6468	.530	.620	.370	.550	.470
1990	13696	6085	10956	7085	.560	.650	.360	.550	.440
1991	14920	7097	12523	8358	.520	.670	.390	.560	.480
1992	15124	8168	13534	9730	.460	.719	.475	.624	.540
1993	16125	8436	14020	9835	.477	.701	.453	.606	.523
1994	19108	9322	15199	10900	.512	.717	.436	.589	.488
<b>TOTAL</b>	143175	63059	115339	74604					
<b>AVERAGE</b>	12407	5374	10014	6370	.560	.647	.382	.533	.440

## KEY TO ABBREVIATIONS

- ST = STATE
- WSO = WEATHER SERVICE OFFICE
- TCW = TOTAL COUNTY WARNINGS
- VCW = VERIFIED COUNTY WARNINGS
- UCW = UNVERIFIED COUNTY WARNINGS
- TSE = TOTAL SEVERE (LOCAL STORM) EVENTS
- WSE = WARNED SEVERE (LOCAL STORM) EVENTS
- FAR = FALSE ALARM RATIO
- POD = PROBABILITY OF DETECTION
- CSI = CRITICAL SUCCESS INDEX
- VE = VERIFICATION EFFICIENCY
- PV = PERCENTAGE OF VERIFIED COUNTY WARNINGS



# REGIONAL VERIFICATION STATISTICS

(1984-1994)

## ...EASTERN REGION...

YEAR	TCW	VCW	TSE	WSE	FAR	POD	CSI	VE	PV
1984	1022	344	988	505	.660	.510	.250	.420	.340
1985	1387	658	1528	906	.530	.590	.360	.530	.470
1986	1445	793	1627	952	.450	.590	.400	.570	.550
1987	1029	611	1291	722	.410	.560	.400	.580	.590
1988	1452	861	1752	1082	.410	.620	.430	.610	.590
1989	1983	1004	2171	1261	.490	.580	.370	.540	.510
1990	2488	1319	2412	1568	.470	.650	.410	.590	.530
1991	2046	1162	2237	1475	.432	.659	.439	.616	.568
1992	2377	1359	2314	1609	.425	.699	.486	.636	.575
1993	2833	1622	2792	1886	.427	.676	.471	.624	.573
1994	4082	1914	3212	2199	.531	.685	.409	.564	.469
<b>TOTAL</b>	22144	11647	22324	14165					
<b>AVERAGE</b>	2013	1059	2029	1288	.474	.635	.432	.581	.526

## ...SOUTHERN REGION...

YEAR	TCW	VCW	TSE	WSE	FAR	POD	CSI	VE	PV
1984	5938	1628	3272	2005	.730	.610	.230	.440	.270
1985	4625	1596	3361	2066	.660	.600	.280	.470	.340
1986	4212	1715	3494	2195	.590	.630	.330	.520	.410
1987	3883	1486	2712	1630	.620	.600	.310	.490	.380
1988	4007	1848	3019	2040	.540	.680	.380	.570	.460
1989	6057	3088	5173	3608	.490	.700	.420	.600	.510
1990	5839	3062	4938	3552	.480	.720	.440	.620	.520
1991	6735	3476	5406	3978	.484	.736	.435	.614	.516
1992	7304	4360	6602	5169	.403	.783	.542	.685	.597
1993	6253	3636	5526	4237	.419	.767	.520	.668	.581
1994	8282	4435	6573	5185	.465	.789	.498	.648	.535
<b>TOTAL</b>	63135	30330	50076	35665					
<b>AVERAGE</b>	5740	2757	4552	3242	.520	.712	.430	.583	.480

# REGIONAL VERIFICATION STATISTICS

(1984-1994)

## ...CENTRAL REGION...

YEAR	TCW	VCW	TSE	WSE	FAR	POD	CSI	VE	PV
1984	5293	1319	2908	1553	.750	.530	.200	.390	.250
1985	4794	1324	2975	1612	.720	.540	.220	.410	.280
1986	4868	1623	3427	1948	.670	.570	.270	.450	.330
1987	4331	1614	3156	1847	.630	.590	.300	.480	.370
1988	2862	928	2235	1069	.680	.480	.240	.400	.320
1989	3694	1321	2845	1551	.640	.550	.280	.450	.360
1990	4987	1645	3375	1902	.670	.560	.260	.450	.330
1991	5690	2387	4558	2837	.580	.623	.334	.510	.420
1992	5029	2352	4266	2849	.532	.668	.410	.560	.468
1993	6571	3062	5309	3578	.534	.674	.406	.559	.466
1994	6334	2872	5036	3395	.547	.674	.400	.551	.453
<b>TOTAL</b>	54363	20447	40090	24141					
<b>AVERAGE</b>	4942	1859	3645	2195	.624	.602	.326	.472	.376

## ...WESTERN REGION...

YEAR	TCW	VCW	TSE	WSE	FAR	POD	CSI	VE	PV
1984	245	25	189	32	.900	.170	.070	.140	.100
1985	151	29	133	31	.810	.230	.210	.120	.190
1986	264	24	177	23	.910	.130	.060	.110	.090
1987	166	28	208	29	.830	.140	.080	.150	.170
1988	272	38	245	41	.860	.170	.080	.150	.140
1989	222	46	218	48	.790	.220	.120	.210	.210
1990	382	59	231	63	.850	.270	.110	.210	.150
1991	449	72	324	68	.840	.210	.100	.181	.160
1992	397	80	346	91	.798	.263	.137	.230	.202
1993	468	116	352	134	.752	.341	.180	.290	.248
1994	410	101	378	121	.512	.717	.436	.589	.488
<b>TOTAL</b>	3426	618	2801	681					
<b>AVERAGE</b>	311	56	255	62	.820	.243	.121	.209	.180

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# APPENDIX A

## 1994 VERIFICATION STATISTICS

### ...EASTERN REGION STATIONS...

WSO	ST	TCW	VCW	UCW	TSE	WSE	FAR	POD	CSI	VE	PV
ABE	PA	18	16	2	27	18	.111	.667	.615	.756	.889
ACY	NJ	35	15	20	19	16	.571	.842	.397	.574	.429
ALB	NY	169	103	66	207	154	.391	.744	.504	.684	.609
AVL	NC	75	5	70	18	5	.933	.278	.057	.108	.067
AVP	PA	34	17	17	25	14	.500	.560	.359	.525	.500
BDL	CT	26	14	12	27	15	.462	.556	.376	.547	.538
BDR	CT	12	7	5	12	9	.417	.750	.488	.667	.583
BGM	NY	117	74	43	152	104	.368	.684	.490	.662	.632
BKW	WV	38	19	19	26	22	.500	.846	.458	.641	.500
BOS	MA	56	25	31	50	31	.554	.620	.351	.528	.446
BTV	VT	64	37	27	49	40	.422	.816	.512	.681	.578
BUF	NY	120	62	58	58	52	.483	.897	.488	.640	.517
BWI	MD	35	9	26	11	8	.743	.727	.235	.370	.257
CAE	SC	173	109	64	137	112	.370	.818	.552	.713	.630
CAK	OH	162	67	95	106	73	.586	.689	.348	.522	.414
CAR	ME	14	8	6	15	10	.429	.667	.444	.621	.571
CHS	SC	52	31	21	48	40	.404	.833	.533	.710	.596
CLE	OH	195	98	97	94	66	.497	.702	.414	.567	.503
CLT	NC	88	17	71	25	16	.807	.640	.174	.292	.193
CMH	OH	195	122	73	156	128	.374	.821	.550	.712	.626
CON	NH	25	14	11	36	20	.440	.556	.387	.557	.560
CRW	WV	93	43	50	63	53	.538	.841	.425	.615	.462
CTP	PA	79	40	39	48	39	.494	.812	.453	.622	.506
CVG	OH	151	69	82	104	70	.543	.673	.374	.545	.457
DAY	OH	82	42	40	66	45	.488	.682	.413	.588	.512
EKN	WV	58	37	21	48	37	.362	.771	.536	.698	.638
ERI	PA	51	13	38	35	18	.745	.514	.205	.360	.255
GSO	NC	105	19	86	58	20	.819	.345	.135	.239	.181
GSP	SC	99	63	36	112	78	.364	.696	.498	.668	.636
HAR	PA	88	43	45	92	60	.511	.652	.388	.572	.489
HAT	NC	55	30	25	46	33	.455	.717	.449	.624	.545
HTS	WV	82	47	35	56	46	.427	.821	.510	.674	.573
ILG	DE	22	5	17	12	4	.773	.333	.156	.265	.227
ILM	NC	95	32	63	57	37	.663	.649	.285	.454	.337
ILN	OH	5	1	4	2	1	.800	.500	.167	.286	.200
IPT	PA	31	19	12	41	26	.387	.634	.453	.625	.613
LYH	VA	21	0	21	10	4	1.000	.400	.000	.129	.000
MFD	OH	48	15	33	42	31	.687	.738	.281	.523	.313
NYC	NY	138	68	70	106	70	.507	.660	.393	.566	.493

# APPENDIX A

## 1994 VERIFICATION STATISTICS

### ...EASTERN REGION STATIONS...

WSO	ST	TCW	VCW	UCW	TSE	WSE	FAR	POD	CSI	VE	PV
ORF	VA	35	0	35	16	0	1.000	.000	.000	.000	.000
ORH	MA	2	1	1	5	3	.500	.600	.375	.571	.500
PHL	PA	140	76	64	157	110	.457	.701	.441	.626	.543
PIT	PA	238	116	122	147	118	.513	.803	.435	.608	.487
PVD	RI	10	3	7	7	2	.700	.286	.171	.294	.300
PWM	ME	48	21	27	50	31	.562	.620	.345	.531	.438
RDU	NC	193	81	112	126	87	.580	.690	.353	.527	.420
RIC	VA	70	17	53	54	20	.757	.370	.172	.298	.243
ROA	VA	24	8	16	12	3	.667	.250	.167	.306	.333
ROC	NY	1	0	1	10	8	1.000	.800	.000	.727	.000
SYR	NY	7	3	4	36	28	.571	.778	.382	.721	.429
TOL	OH	26	7	19	30	12	.731	.400	.192	.339	.269
WBC	DC	244	114	130	238	134	.533	.563	.343	.515	.467
YNG	OH	38	12	26	28	18	.684	.643	.269	.455	.316
<b>RGNL AVG</b>		77	36	41	61	42	.531	.685	.409	.564	.469
<b>U.S. AVG</b>		91	44	47	72	52	.512	.717	.436	.589	.488

#### KEY TO ABBREVIATIONS

ST	=	STATE
WSO	=	WEATHER SERVICE OFFICE
TCW	=	TOTAL COUNTY WARNINGS
VCW	=	VERIFIED COUNTY WARNINGS
UCW	=	UNVERIFIED COUNTY WARNINGS
TSE	=	TOTAL SEVERE (LOCAL STORM) EVENTS
WSE	=	WARNED SEVERE (LOCAL STORM) EVENTS
FAR	=	FALSE ALARM RATIO
POD	=	PROBABILITY OF DETECTION
CSI	=	CRITICAL SUCCESS INDEX
VE	=	VERIFICATION EFFICIENCY
PV	=	PERCENTAGE OF VERIFIED COUNTY WARNINGS

# APPENDIX A

## 1994 VERIFICATION STATISTICS

### ...SOUTHERN REGION STATIONS...

WSO	ST	TCW	VCW	UCW	TSE	WSE	FAR	POD	CSI	VE	PV
ABI	TX	162	87	75	117	102	.463	.872	.498	.677	.537
ABQ	NM	73	2	71	18	1	.973	.056	.019	.033	.027
ACT	TX	86	58	28	85	68	.326	.800	.577	.737	.674
AGS	GA	72	28	44	45	29	.611	.644	.320	.487	.389
AHN	GA	134	43	91	65	44	.679	.677	.278	.437	.321
AMA	TX	325	242	83	323	293	.255	.907	.692	.826	.745
AQQ	FL	13	2	11	4	3	.846	.750	.146	.294	.154
ATL	GA	203	72	131	86	58	.645	.597	.286	.450	.355
AUS	TX	95	27	68	50	29	.716	.580	.236	.386	.284
BHM	AL	274	78	196	117	79	.715	.675	.250	.402	.285
BNA	TN	103	50	53	67	49	.515	.731	.412	.582	.485
BPT	TX	63	22	41	34	24	.651	.706	.305	.474	.349
BRO	TX	16	2	14	10	2	.875	.200	.083	.154	.125
BTR	LA	60	12	48	31	14	.800	.452	.161	.286	.200
CHA	TN	64	34	30	72	37	.469	.514	.354	.522	.531
CRP	TX	43	11	32	27	14	.744	.519	.207	.357	.256
CSG	GA	82	44	38	68	46	.463	.676	.427	.600	.537
DAB	FL	39	7	32	19	8	.821	.421	.144	.259	.179
DRT	TX	14	7	7	11	9	.500	.818	.450	.640	.500
ELP	TX	4	1	3	7	1	.750	.143	.100	.182	.250
EYW	FL	1	0	1	5	0	1.000	.000	.000	.000	.000
FMY	FL	0	0	0	24	12	.000	.500	.500	.500	.000
FSM	AR	169	85	84	96	91	.497	.948	.489	.664	.503
FTW	TX	579	412	167	704	596	.288	.847	.630	.786	.712
GLS	TX	0	0	0	0	0	.000	.000	.000	.000	.000
HOU	TX	179	86	93	137	98	.520	.715	.403	.582	.480
HSV	AL	106	24	82	74	30	.774	.405	.170	.300	.226
JAN	MS	393	170	193	196	176	.567	.898	.412	.587	.433
JAX	FL	153	21	132	52	20	.863	.385	.113	.200	.137
LBB	TX	121	51	70	67	53	.579	.791	.379	.553	.421
LCH	LA	127	48	79	70	53	.622	.757	.337	.513	.378
LIT	AR	401	344	57	425	392	.142	.922	.800	.891	.858
MAF	TX	151	88	63	140	104	.417	.743	.485	.660	.583
MCN	GA	80	41	39	58	44	.488	.759	.441	.616	.512
MEI	MS	159	90	69	94	80	.566	.851	.403	.672	.434
MEM	TN	232	122	110	158	124	.474	.785	.460	.631	.526
MGM	AL	58	4	54	30	4	.931	.133	.048	.091	.069
MIA	FL	73	18	55	37	17	.753	.459	.191	.318	.247
MLB	FL	103	37	66	72	41	.641	.569	.282	.446	.359
MOB	AL	117	17	100	45	17	.855	.378	.117	.210	.145

# APPENDIX A

## 1994 VERIFICATION STATISTICS

### ...SOUTHERN REGION STATIONS...

WSO	ST	TCW	VCW	UCW	TSE	WSE	FAR	POD	CSI	VE	PV
NEW	LA	103	13	90	28	16	.874	.571	.115	.221	.126
OKC	OK	1022	822	200	1105	960	.196	.869	.717	.838	.804
PBI	FL	19	7	12	21	8	.632	.381	.230	.375	.368
PNS	FL	33	9	24	20	10	.727	.500	.214	.358	.273
ROW	NM	22	9	13	31	11	.591	.355	.235	.377	.409
SAT	TX	133	27	106	45	28	.797	.622	.181	.309	.203
SAV	GA	99	45	54	79	58	.545	.734	.390	.579	.455
SHV	LA	702	474	228	642	578	.325	.900	.628	.783	.675
SJT	TX	65	21	44	34	20	.677	.588	.263	.414	.323
TBW	FL	211	72	139	63	56	.659	.529	.262	.467	.341
TLH	FL	48	19	29	40	21	.604	.525	.291	.455	.396
TRI	TN	16	3	13	13	3	.812	.231	.115	.207	.188
TUL	OK	502	379	123	477	441	.245	.925	.711	.838	.755
TUP	MS	129	43	86	64	47	.667	.734	.297	.466	.333
TYS	TN	17	3	14	18	3	.824	.167	.094	.171	.176
VCT	TX	34	23	11	39	28	.324	.718	.534	.699	.676
<b>RGNL AVG</b>		151	81	70	120	94	.465	.789	.498	.648	.535
<b>U.S. AVG</b>		91	44	47	72	52	.512	.717	.436	.589	.488

#### KEY TO ABBREVIATIONS

ST	=	STATE
WSO	=	WEATHER SERVICE OFFICE
TCW	=	TOTAL COUNTY WARNINGS
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FAR	=	FALSE ALARM RATIO
POD	=	PROBABILITY OF DETECTION
CSI	=	CRITICAL SUCCESS INDEX
VE	=	VERIFICATION EFFICIENCY
PV	=	PERCENTAGE OF VERIFIED COUNTY WARNINGS



# APPENDIX A

## 1994 VERIFICATION STATISTICS

### ...CENTRAL REGION STATIONS...

WSO	ST	TCW	VCW	UCW	TSE	WSE	FAR	POD	CSI	VE	PV
ABR	SD	77	39	38	67	47	.494	.701	.417	.597	.506
ALO	IA	0	0	0	4	0	.000	.000	.000	.000	.000
ALS	CO	0	0	0	0	0	.000	.000	.000	.000	.000
APN	MI	34	21	13	27	25	.382	.926	.589	.754	.618
BFF	NE	105	24	81	53	34	.771	.642	.203	.367	.229
BIS	ND	151	45	106	113	54	.702	.478	.225	.375	.298
CNK	KS	91	53	38	88	73	.418	.830	.520	.704	.582
COS	CO	68	25	43	39	26	.632	.667	.311	.477	.368
COU	MO	140	67	53	102	85	.521	.833	.437	.603	.479
CPR	WY	25	4	21	11	6	.840	.545	.141	.278	.160
CYS	WY	63	25	38	63	29	.603	.460	.271	.429	.397
DBQ	IA	52	36	16	62	49	.308	.790	.585	.746	.692
DDC	KS	254	151	103	219	178	.406	.813	.523	.696	.594
DEN	CO	263	78	185	151	90	.703	.596	.247	.406	.297
DLH	MN	52	36	16	69	43	.308	.623	.488	.653	.692
DSM	IA	189	90	99	193	102	.524	.528	.334	.503	.476
DTW	MI	58	27	31	45	25	.534	.556	.339	.505	.466
DTX	MI	11	3	8	8	3	.727	.375	.187	.316	.273
EVV	IN	97	49	48	71	51	.495	.718	.422	.595	.505
FAR	ND	145	43	102	109	60	.703	.550	.239	.406	.297
FNT	MI	44	29	15	54	40	.341	.741	.536	.704	.659
FSD	SD	132	54	78	114	68	.591	.596	.320	.496	.409
FWA	IN	64	37	27	49	40	.422	.816	.512	.681	.578
GJT	CO	8	0	8	5	0	1.000	.000	.000	.000	.000
GLD	KS	346	216	130	321	273	.376	.850	.563	.733	.624
GRB	MI	56	17	39	48	23	.696	.479	.228	.385	.304
GRI	NE	190	89	101	167	119	.532	.713	.394	.583	.468
GRR	MI	54	33	21	58	37	.389	.638	.454	.625	.611
HON	SD	112	33	79	71	35	.705	.493	.226	.372	.295
HTL	MI	26	10	16	16	11	.615	.687	.327	.500	.385
ICT	KS	262	168	94	265	209	.359	.789	.547	.715	.641
IND	IN	165	72	93	141	76	.564	.539	.318	.484	.436
INL	MN	20	11	9	18	10	.450	.556	.382	.553	.550
ISN	ND	13	9	4	13	10	.308	.769	.573	.731	.692
JKL	KY	35	11	24	21	11	.686	.524	.244	.393	.314
LAN	MI	44	17	27	45	16	.614	.356	.227	.371	.386
LBF	NE	147	50	97	86	56	.660	.651	.288	.455	.340
LEX	KY	24	7	17	31	8	.708	.258	.159	.273	.292
LND	WY	1	0	1	9	0	1.000	.000	.000	.000	.000

# APPENDIX A

## 1994 VERIFICATION STATISTICS

### ...CENTRAL REGION STATIONS...

WSO	ST	TCW	VCW	UCW	TSE	WSE	FAR	POD	CSI	VE	PV
LNK	NE	30	14	16	25	14	.533	.560	.341	.509	.467
LOT	IL	89	26	63	61	32	.708	.525	.231	.387	.292
LSE	WI	38	23	15	38	29	.395	.763	.510	.684	.605
MCI	MO	125	77	48	111	88	.384	.793	.531	.699	.616
MKX	WI	106	35	71	82	46	.670	.561	.262	.431	.330
MKG	MI	42	28	14	39	33	.333	.846	.595	.753	.667
MLI	IL	40	19	21	54	28	.525	.519	.330	.500	.475
MQT	MI	9	3	6	6	3	.667	.500	.250	.400	.333
MSN	WI	147	73	74	101	74	.503	.733	.420	.593	.497
MSP	MN	175	81	94	126	95	.537	.754	.402	.585	.463
OFK	NE	99	43	56	83	61	.566	.735	.376	.571	.434
OMA	NE	74	35	39	63	38	.527	.603	.361	.533	.473
PAH	KY	90	48	42	78	51	.467	.654	.416	.589	.533
PIA	IL	55	27	28	42	32	.509	.762	.426	.608	.491
PUB	CO	105	25	80	36	25	.762	.694	.216	.355	.238
RAP	SD	138	36	102	74	43	.739	.581	.220	.373	.261
RFD	IL	35	5	30	11	5	.857	.455	.122	.217	.143
RST	MN	114	38	76	67	44	.667	.657	.284	.453	.333
SBN	IN	74	30	44	48	34	.595	.708	.347	.525	.405
SDF	KY	120	33	87	60	30	.725	.500	.216	.350	.275
SGF	MO	332	136	196	187	144	.590	.770	.365	.539	.410
SHR	WY	0	0	0	5	0	.000	.000	.000	.000	.000
SPI	IL	104	36	68	69	37	.654	.536	.266	.422	.346
SSM	MI	4	0	0	1	0	1.000	.000	.000	.000	.000
STC	MN	84	39	45	66	50	.536	.758	.404	.593	.464
STL	MO	190	114	76	164	139	.400	.848	.542	.715	.600
SUX	IA	79	35	44	91	43	.557	.473	.296	.459	.443
TOP	KS	124	92	32	114	104	.258	.912	.693	.824	.742
VTN	NE	1	0	1	1	0	1.000	.000	.000	.000	.000
<b>RGNL</b>	<b>AVG</b>	95	43	52	75	51	.547	.674	.400	.551	.453
<b>U.S.</b>	<b>AVG</b>	91	44	47	72	52	.512	.717	.436	.589	.488

# APPENDIX A

## 1994 VERIFICATION STATISTICS

### ...WESTERN REGION STATIONS...

WSO	ST	TCW	VCW	UCW	TSE	WSE	FAR	POD	CSI	VE	PV
AST	OR	0	0	0	1	0	.000	.000	.000	.000	.000
BFL	CA	2	0	2	0	0	1.000	.000	.000	.000	.000
BIL	MT	41	15	26	45	19	.634	.422	.244	.395	.366
BOI	ID	47	5	42	14	5	.894	.357	.089	.164	.106
EKO	NV	1	0	1	4	0	1.000	.000	.000	.000	.000
FAT	CA	3	1	2	4	1	.667	.250	.167	.286	.333
FCA	MT	1	1	0	4	2	.000	.500	.500	.600	1.000
FLG	AZ	1	1	0	3	1	.000	.333	.333	.500	1.000
GEG	WA	10	2	8	9	2	.800	.222	.118	.211	.200
GGW	MT	17	4	13	21	4	.765	.190	.118	.211	.235
GTF	MT	19	5	14	34	6	.737	.176	.118	.208	.263
HLN	MT	2	1	1	16	1	.500	.063	.059	.111	.500
HVR	MT	1	1	0	4	1	.000	.250	.250	.400	1.000
INW	AZ	0	0	0	0	0	.000	.000	.000	.000	.000
LAS	NV	7	4	3	5	5	.429	1.000	.571	.750	.571
LAX	CA	22	1	21	13	1	.955	.077	.029	.057	.045
LWS	ID	0	0	0	1	0	.000	.000	.000	.000	.000
MFR	OR	2	0	2	2	0	1.000	.000	.000	.000	.000
MSO	MT	2	2	0	5	3	.000	.600	.600	.714	1.000
OLM	WA	0	0	0	1	0	.000	.000	.000	.000	.000
PDT	OR	7	1	6	7	3	.857	.429	.120	.286	.143
PDX	OR	4	2	2	1	1	.500	1.000	.500	.600	.500
PHX	AZ	78	25	53	59	27	.679	.458	.232	.380	.321
PIH	ID	15	0	15	16	0	1.000	.000	.000	.000	.000
RDD	CA	3	2	1	6	3	.333	.500	.400	.555	.667
RNO	NV	10	1	9	7	3	.900	.429	.088	.235	.100
SAC	CA	3	0	3	5	0	1.000	.000	.000	.000	.000
SAN	CA	0	0	0	1	0	.000	.000	.000	.000	.000
SEA	WA	6	1	5	2	1	.833	.500	.143	.250	.167
SFO	CA	0	0	0	1	0	.000	.000	.000	.000	.000
SLC	UT	61	17	44	52	22	.721	.423	.202	.345	.279
SLE	OR	1	0	1	1	0	1.000	.000	.000	.000	.000
SMX	CA	2	0	2	3	0	1.000	.000	.000	.000	.000
TUS	AZ	39	8	31	22	7	.795	.318	.142	.246	.205
YKM	WA	3	1	2	2	1	.667	.500	.250	.400	.333
YUM	AZ	0	0	0	7	2	.000	.286	.286	.286	.000
<b>RGNL AVG</b>		12	3	9	11	4	.754	.320	.176	.282	.246
<b>U.S. AVG</b>		91	44	47	72	52	.512	.717	.436	.589	.488

# APPENDIX B

## SEVERE WEATHER IN 1994

### ...TORNADOES...

There were 1,085 tornadoes reported across the nation in 1994, the lowest total for any year in this decade, but a total higher than any year prior to 1990.

There were twenty-two killer tornadoes, which claimed the lives of sixty-nine persons. It was the highest death total since 1985. The twenty-two killer tornadoes injured 609 other persons, and caused 181 million dollar damage. They accounted for more than half of the 1,139 tornado-related injuries across the nation in 1994, and for more than a third of the 481 million dollars property damage.

Forty persons were killed in northern Alabama and northern Georgia during the "Palm Sunday" tornado outbreak" on Sunday, the 27th of March. Tornadoes in northern Alabama and northern Georgia also injured more than 500 persons, and caused more than 200 million dollars property damage.

The most deadly tornado of the outbreak was one which struck the Goshen United Methodist Church in Piedmont, Alabama. It killed twenty-two persons, injured 150 others, and caused more than fifty million dollars damage. In Georgia, the "Henderson Mountain" tornado killed nine persons and injured 70 others.

There were just five violent (F-4) tornadoes in 1994, but those five tornadoes killed thirty-one persons, injured 290 others, and caused 123 million dollars property damage. The five violent tornadoes thus accounted for nearly half the tornado-related deaths for the year, one fourth of the tornado-related injuries, and one fourth of the property damage inflicted by tornadoes in 1994.

As has been the case in previous years, nearly ninety percent of the tornadoes were weak (F-0 or F-1) in intensity. There were 707 weak (F-0) tornadoes (65.2 percent), 263 weak (F-1) tornadoes (24.2 percent), eighty strong (F-2) tornadoes (7.4 percent), and thirty strong (F-3) tornadoes (2.8 percent).

# APPENDIX B

## SEVERE WEATHER IN 1994

### ...TORNADOES...

No monthly records were established in 1994, as far as the total number of tornadoes across the nation. However, the total of 233 tornadoes in July was second only to the record of 242 tornadoes, established in 1993, and the total of 52 tornadoes in October was second only to the record of 55 tornadoes, also established in 1993. The total of 119 tornadoes for August was second only to the record of 126 tornadoes set in 1979, and the total of 208 tornadoes in April was the third highest of record.

The three winter months were relatively quiet. There were just thirteen tornadoes in January, nine in February, and four in December, a total of twenty-six tornadoes for the three months combined.

In 1994, the 27th of the month was perhaps a good day to spend in the storm cellar. Besides the "Palm Sunday" tornado outbreak on the 27th of March, killer tornadoes were reported on June 27th, August 27th, and November 27th. Four of the six most deadly severe weather outbreaks of the year occurred on the 27th of the month, accounting for fifty-four of the sixty-nine tornado-related deaths.

There was shift in the region of peak tornado activity between 1993 and 1994, from the central U.S. to the southeastern states, as 1994 was a record year for tornadoes in Georgia, South Carolina and Maryland.

There were a fifty-two tornadoes in Georgia, surpassing their previous record of forty-six tornadoes which was established in 1961, and equalled in 1971. There were a record nineteen tornadoes during the month of March, and a record twenty-nine tornadoes in June. Eighteen persons were killed in the March 27th "Palm Sunday" tornado outbreak, and there were two more tornado deaths in June. The total of twenty tornado-related deaths for the year was just two shy of the state record.

In South Carolina, there were forty tornadoes, nearly double their previous record of twenty-three tornadoes, which was established in 1973. There were, in fact, two dozen tornadoes in the month of August alone, of which twenty-three touched down between 11 AM and 7 PM on the 16th, courtesy of Tropical Storm Beryl. There were also a record five tornadoes in June.

# APPENDIX B

## SEVERE WEATHER IN 1994

### ...TORNADOES...

There were a record twenty-one tornadoes in Maryland, easily surpassing their previous record of thirteen tornadoes which was established in 1992. There were fifteen tornadoes in the month of July alone, including fourteen on the 27th of the month. There were also a record five tornadoes in November, all on the first day of the month. There were more tornadoes in Maryland that one day than in the previous forty-four Novembers combined.

There were 187 tornadoes in Texas in 1994, including fifty-one in April, and ninety in May. There were seventy-six tornadoes in Florida, fifty-five in Nebraska, and forty-nine in Iowa. There were a twenty-six tornadoes in Missouri during April, a state record for that month of the year.

There were just eight tornadoes in Alabama in 1994, but the "Piedmont" tornado on March 27th killed twenty-two persons, nearly equalling the number of tornadoes deaths in March in Alabama over the previous forty-four years.

Between 1990 and 1993, the state of Kansas averaged more than one hundred tornadoes, but in 1994 there were just forty-two tornadoes in Kansas. The total of eight tornadoes in Louisiana was their lowest since 1958.

### ...STATE RECORDS...

STATE	1994 TOTAL	AVERAGE (1950-1994)	OLD RECORD AND THE YEAR
GEORGIA	52 TORNADOES	20 TORNADOES	46 IN 1961
MARYLAND	21 TORNADOES	3 TORNADOES	13 IN 1992
SOUTH CAROLINA	40 TORNADOES	9 TORNADOES	23 IN 1973

# APPENDIX B

## SEVERE WEATHER IN 1994

### ...LARGE HAIL AND DAMAGING WINDS...

There were a total 15,126 reports of severe weather in 1994, including 14,041 reports of large hail or damaging winds. Severe thunderstorms and tornadoes claimed the lives of eighty-three persons in 1994, injured 1517 others, and caused more than 650 million dollars damage.

June was, by a considerable margin, the stormiest month of the year with 3,952 severe weather reports. There were 233 tornadoes, 2,366 reports of damaging winds and 1,353 reports of large hail.

There were 2,834 reports of severe weather in July, including 1,840 reports of damaging winds, and there were 2,704 reports of severe weather in April, including 1,543 reports of large hail. There were 12,200 reports of large hail or damaging winds during the five month period between April and August, nearly 87 percent of the total for the year.

### ...DAMAGING WINDS...

There were 7,954 reports of damaging winds in 1994, including 770 in Texas, 559 in Oklahoma, 427 in Ohio, 414 in New York, 398 in Pennsylvania, 376 in Kansas, and 368 in Arkansas. Those seven states accounted for more than forty percent of the reports of damaging winds across the nation.

Damaging straight line winds claimed the lives of fourteen persons, injured 359 others, and caused more than 107 million dollars damage.

There were 2,366 reports of damaging winds in June, and another 1,840 reports of damaging winds in July. Those two months thus accounted for more than half the total for the year, and more than 87 percent of the reports of damaging winds occurred during the five month period between April and August. There were just eight reports of damaging winds across the nation during December.

Straight line thunderstorm winds injured 95 persons and caused more than 36 million dollars damage in July, much of which occurred the first day of the month. There were another 74 wind-related injuries in June, 62 in May, and 50 in April, and there was another twenty-three million dollars damage reported in April.

# APPENDIX B

## SEVERE WEATHER IN 1994

### ...DAMAGING WINDS...

There were 1,040 reports of winds estimated at 65 mph or greater in 1994, including 350 in July, and there were 403 reports of winds estimated at 75 mph or greater, including 147 in July.

There were 248 reports of damaging winds in Texas during May, 193 in New York during July, 178 in Ohio during June, 165 in Kansas during July, 164 in Georgia during June, and 153 in Arkansas during June. There were 312 reports of damaging winds in Oklahoma during June and July.

### ...LARGE HAIL...

There were 6,087 reports of large hail in 1994, with a major percentage of those reports in the south central U.S. There were 1,088 reports of large hail in Texas, 863 in Oklahoma, 542 in Kansas, and 353 in Arkansas. Those four states accounted for nearly half the reports of large hail across the nation.

Large hail injured nineteen persons (between March and August) and caused more than 62 million dollars damage to property and crops during the course of the year.

There were 1,543 reports of large hail in April, and another 1,353 reports of large hail in June. There were 4,766 reports of large hail during the four month period between April and July, more than 78 percent of the total for the year. There were just thirteen reports of large hail during December.

Of the 6,087 reports of large hail, more than 55 percent were nickel or dime size. There were 438 reports of hail two inches in diameter or larger (7.2 percent), nearly half of which occurred in April and June.

There were 391 reports of large hail in Oklahoma during the month of April, nearly half their total for the year. There were 339 reports of large hail in Texas during May, and 327 reports of large hail in Texas during April, accounting for more than sixty percent of their total for the year.

There were 164 reports of large hail in Kansas during June, 139 reports of large hail in Missouri during April, and another 131 reports of large hail in Texas during June.



# APPENDIX B

## SEVERE WEATHER IN 1994

### ...JANUARY...

There were 151 reports of severe weather across the nation in January, including thirteen tornadoes, 73 reports of large hail, and 65 reports of damaging winds. Nearly eighty percent of the severe weather reports in January occurred on the 26th and 27th of the month.

Tornadoes injured eight persons and caused more than a million dollars damage. There were six tornadoes in Florida on the 3rd of January, the first tornadoes of the year, and four tornadoes were reported in Mississippi the evening of the 27th. One tornado in Mississippi injured seven persons near Brookhaven.

### ...FEBRUARY...

February was relatively quiet in respect to severe weather across the nation. There were just 72 reports of severe weather, including nine tornadoes, 24 reports of large hail, and 39 reports of damaging winds. More than sixty percent of the reports of severe weather occurred in Oklahoma and Texas.

### ...MARCH...

The weather turned volatile in March, a month that featured the "Palm Sunday Outbreak" in Alabama and Georgia, the most deadly outbreak of tornadoes in nearly nine years. There were a total of 429 reports of severe weather in March, including 59 tornadoes, 223 reports of large hail, and 148 reports of damaging winds.

There were nineteen tornadoes in Georgia, a record for any month of the year for that state. Fifteen of those tornadoes occurred on "Palm Sunday". Severe thunderstorms over northern Georgia that day also produced softball size hail near the town of Cave Springs. Severe thunderstorms over extreme southeastern Texas very early in the morning on the ninth of the month produced damaging winds clocked as high as 102 mph on Galveston Island.

The "Palm Sunday" outbreak accounted for half the tornadoes in the month, and a third of the reports of large hail and damaging winds. It accounted for all the tornado-related fatalities, nearly all of the injuries, and nearly all the property damage associated with severe weather in March.

# APPENDIX B

## SEVERE WEATHER IN 1994

### ...MARCH...

#### ...THE "PALM SUNDAY" TORNADO OUTBREAK...

Tornadoes on Sunday, the 27th, killed forty persons in northern Alabama and northern Georgia. The first tornado of the outbreak was the most deadly, killing twenty persons and injuring 92 others at the Goshen United Methodist Church near Piedmont, Alabama. The tornado struck just as children performing in a special Palm Sunday drama had finished singing "Jehovah Jireh". The tornado caused a total of more than fifty million dollars damage in northern Alabama.

The severe thunderstorms, repeatedly forming along a slow moving cold front, spawned some monstrous tornadoes in northern Georgia during the afternoon, as much as a mile and a half in width. There were several eye-witness accounts of continuous lightning and a greenish black color to the clouds in the sky prior to tornadoes. There was one observation that dogs barked profusely and hyper-ventilated just prior to a severe storm.

Tornadoes killed eighteen persons in Georgia. The "Henderson Mountain" tornado killed nine persons, including six members of a family in a mobile home which was tossed one hundred yards.

Tornadoes injured more than 500 persons in northern Alabama and northern Georgia, and caused more than 200 million dollars property damage. Millions of chickens were killed, and hundreds of thousands of trees were downed or uprooted.

There were two violent (F-4) tornadoes that Palm Sunday: the "Piedmont" tornado in Alabama, and the "Indian Springs" tornado in Georgia, both of which were spawned by the same parent thunderstorm. Five strong (F-3) tornadoes were also reported in northern Georgia.

# APPENDIX B

## SEVERE WEATHER IN 1994

### ...APRIL...

April was a stormy month. A total of 208 tornadoes were reported across the nation, more than double the forty-five year average for the month. Tornadoes killed a dozen persons, injured 210 others, and caused 137 million dollars property damage.

There were 2,701 reports of severe weather in the month, including 1,543 reports of large hail, and 953 reports of damaging winds. Damaging straight-line thunderstorm winds killed three persons, injured fifty others, and caused twenty-three million dollars damage. Large hail injured four persons and caused sixteen million dollars damage to property and crops.

There were a total of 472 reports of severe weather in Oklahoma, 441 in Texas, and 250 in Missouri. There were twenty-six tornadoes in Missouri, an April record for that state, and a total of 51 tornadoes were reported in Texas.

The 15th was the biggest severe weather day of the month, and the year. There were 464 reports of severe weather, from the western Gulf coast to the Lower Great Lakes, including thirty-two tornadoes.

A total of 104 tornadoes were reported between the 25th and the 27th of the month. There were also more than one thousand reports of large hail or damaging winds in that three day period.

There were 62 tornadoes from northern Texas to Ohio and Lower Michigan on the 26th, and nearly 400 reports of large hail and damaging winds. The most deadly tornado of the day was a violent (F-4) tornado which touched down near Lafayette, in west central Indiana, just prior to midnight killing three persons and injuring seventy others.

There were twenty-eight tornadoes on the 25th of the month, including a violent (F-4) tornado which hit the town of Lancaster in north central Texas killing three persons, injuring 48 others, and causing more than fifty million dollars property damage.

On the 30th, evening thunderstorms over Franklin County in south central Pennsylvania produced high winds which downed a power line onto a nearby fence killing fifteen cows. An eye-witness noted "the fence illuminated like a heating element in a toaster".

# APPENDIX B

## SEVERE WEATHER IN 1994

### ...MAY...

There were 2,026 reports of severe weather during the month of May, including 161 tornadoes, 1,031 reports of large hail, and 834 reports of damaging winds. Severe weather was reported every day of the month, and in every state except Connecticut and Wyoming. There were 372 reports of severe weather between the 13th and the 15th of the month, 461 between the 24th and the 26th, and 272 on the 29th and 30th.

Tornadoes injured nine persons during the month, and caused more than thirteen million dollars damage. There were a total of eighty-eight tornadoes reported in the state of Texas, their second highest total of record for May. There were twenty-nine tornadoes in south Texas on the 13th of the month, and there were nineteen tornadoes in northern Texas on the 29th.

Damaging straight line thunderstorm winds killed one person, injured 62 others, and caused more than fourteen million dollars property damage during May. Large hail injured four persons and caused another two million dollars damage to property and crops.

There were 339 reports of large hail in Texas, and another 248 reports of damaging winds in the state, nearly a third of the total for the nation.

### ...JUNE...

June was the biggest severe weather of the year. There were 3,952 reports of severe weather, a thousand more than either April or July. There were 233 tornadoes, 1,353 reports of large hail, and 2,366 reports of damaging winds. Severe weather was reported every day of the month, and in every state except Utah.

Tornadoes killed three persons, injured 74 others, and caused more than sixteen million dollars property damage. There were twenty-nine tornadoes in Georgia, more than three times their previous record for June. It was also a record for any month of the year, surpassing the record of nineteen tornadoes which was established just three months earlier. There were eighteen tornadoes in Tennessee, more than twice their previous record for June.

# APPENDIX B

## SEVERE WEATHER IN 1994

### ...JUNE...

There were twenty days in the month with at least one hundred reports of large hail or damaging winds. There were 1,419 reports of large hail or damaging winds between the 5th and the 13th of the month (an average of nearly 160 per day), including 198 on the 7th, and 258 on the 9th. There were also more than a hundred tornadoes in that nine day period, including 71 between the 6th and the 10th.

The last week of the month was another stormy one. While parts of the southwestern U.S. baked in 120 degree heat, a rather spring-like weather prevailed over the southeastern states. There were 1,300 reports of large hail or damaging winds (an average of more than 185 per day), including 347 on the 29th. There were also 96 tornadoes, including twenty-seven in Georgia and fourteen in Tennessee. Forty tornadoes were reported on the 26th, and there were another twenty-three tornadoes on the 27th of the month.

On the 27th, early morning thunderstorms over north central Georgia spawned a tornado which reduced to rubble a large two-story brick house near Grayson. The tornado threw the second story of the house fifty feet off the foundation while the first floor disintegrated killing one person. Ironically, upon inspection of the dislodged second floor of the home, stuffed animals remained intact and undisturbed on a bedroom window sill.

Early morning thunderstorms over northwest Georgia spawned a tornado south of Adairsville. One double-wide trailer, occupied by a five-year-old girl, was tossed 125 feet and disintegrated upon impact. The little girl was found in the rubble, uninjured and still asleep.

Evening thunderstorms over Plymouth County of northwestern Iowa on the 12th of the month spawned a strong (F-2) tornado which picked up a dog house in the town of Le Mars, with the dog inside. The dog house was deposited several blocks away, upside down, with the dog still inside, dazed but not injured.

# APPENDIX B

## SEVERE WEATHER IN 1994

### ...JULY...

There were 155 tornadoes reported in twenty-six states across the nation during the month of July. Leading the way was Iowa with nineteen tornadoes, a July record for that state.

There were fifteen tornadoes reported in Maryland, a total greater than their previous record for any given year. In fact, there were thirteen tornadoes between 7 PM and 10 PM on the 27th of the month, equalling the previous record yearly total for Maryland of thirteen tornadoes which was established in 1992.

Tornadoes in July killed three persons, injured forty-seven others, and caused more than twenty million dollars damage.

Severe thunderstorms associated with a stationary front spawned two dozen tornadoes in the Middle Atlantic Coast Region during the evening of the 27th. There were thirteen tornadoes in Maryland, five in northern Virginia, three in Delaware, and three in eastern Pennsylvania.

A severe storm crossing Chester County of southeastern Pennsylvania late that evening spawned a strong (F-3) tornado, and also produced destructive downburst winds, causing three and a half million dollars damage. As the storm moved northward out of the county toward midnight it spawned another strong (F-3) tornado northwest of Philadelphia which leveled four homes and severely damaged sixteen others in a new housing development of Limerick, called "The Hamlet".

A family of three, asleep at the time of the tornado, was blown out of their home and killed. Twenty-five other persons were injured, and damage in the housing development was estimated at two million dollars. A man was blown through the second story window of his house fifty feet into the family room of his neighbor's home, and survived. A five-month-old infant sailed out of his crib onto the front lawn of his home and survived. Total damage around the community of Limerick was more than five million dollars.

Interestingly, the tornado occurred just a few days after the television daytime soap opera, "All My Children", had featured a tornado in the Philadelphia area.

# APPENDIX B

## SEVERE WEATHER IN 1994

### ...JULY...

There were 1,840 reports of damaging winds in July, and another 839 reports of large hail. Damaging straight line winds killed one person, injured 95 others, and caused more than thirty-six million dollars damage. Large hail injured two persons, and caused more than twenty-three million dollars damage.

There were 281 reports of severe weather on the 1st, 230 on the 7th, and 100 or more severe weather reports on eight other days during the month. There were 264 reports of severe weather in Kansas, 239 in Oklahoma, and 215 in New York. Tornadoes were reported on twenty-seven days of the month.

Damaging straight line winds were reported in every one of the lower forty-eight states. There were 193 reports of damaging winds in New York, 165 in Kansas, and 155 in Oklahoma.

On the first day of the month, thunderstorms developing along and ahead of a slow moving cold front produced severe weather in the central U.S., between early afternoon and early the following morning. Eight tornadoes were reported, and there were 256 reports of large hail or damaging winds, including 95 reports of damaging winds in Kansas, and 66 reports of damaging winds in Nebraska.

Straight line thunderstorm winds in Kansas injured seventeen persons, and caused more than six million dollars damage, while thunderstorm winds in Nebraska caused another ten million dollars property damage.

Thunderstorms in northeast Kansas produced wind gusts clocked as high as 99 mph near Emmett, causing five million dollars damage in Pottawatomie County. Thunderstorms in south central Kansas produced wind gusts to 101 mph at Goddard, and wind gusts as high as 115 mph around Burden.

Thunderstorms in south central Nebraska produced wind gusts to 100 mph in Clay County causing more than five million dollars damage to crops. Thunderstorms in Nebraska also produced baseball size hail.

# APPENDIX B

## SEVERE WEATHER IN 1994

### ...AUGUST...

There were 119 tornadoes reported across the nation in August, more than double than forty-four year average for the month. Tornadoes were reported in twenty-six states, and on twenty-four days of the month.

The two dozen tornadoes in South Carolina more than tripled their previous record for August, and surpassed their previous record for any given year of twenty-three tornadoes. In fact, on the 16th, thunderstorms associated with Tropical Storm Beryl spawned twenty-three tornadoes in South Carolina in just eight hours, between 11 AM and 7 PM.

Eight of those twenty-three tornadoes were strong (F-2 or F-3) ones. Early afternoon thunderstorms over central South Carolina spawned a strong (F-3) tornado south of Lexington which injured forty persons and caused more than five million dollars damage.

Thunderstorms associated with Beryl, or its remnants, spawned a total of thirty-six tornadoes from Florida to New Jersey between the 15th and the 18th of August. The thunderstorms also produced torrential rains, drenching the piedmont area of South Carolina with four to five inches of rain, and deluging the South Carolina mountains with up to a foot of rain. Five to nine inch rains were reported in North Carolina.

There were seven tornadoes in New York State, equalling their record for the month, and the total of six tornadoes in New Jersey doubled their previous August record. Nine tornadoes were reported in Minnesota in two hours, between 6:30 PM and 8:30 PM on the 7th.

August tornadoes killed four persons, injured eighty-eight others, and caused more than 25 million dollars property damage.

Thunderstorms developing along and ahead of a cold front spawned nine tornadoes in Wisconsin during the evening of the 27th. Around 8:30 PM, a strong (F-3) tornado touched down south of the town of Cleghorn, in Eau Claire County of west central Wisconsin. The twister, nearly half a mile in width, killed two persons, injured 25 others, and caused more than 2.5 million dollars damage.





# APPENDIX B

## SEVERE WEATHER IN 1994

### ...AUGUST...

There were a total of 1,557 reports of damaging winds during the month of August, and another 469 reports of large hail. There were 198 reports of large hail or damaging winds on the 19th, 148 on the 7th, 128 on the 25th, and 117 on the 17th.

Large hail injured two persons and caused more than six million dollars damage. Strong straight line thunderstorm winds killed one person, injured 22 others, and caused more than fourteen million dollars property damage.

Damaging winds were reported in every state except California, Delaware and Nevada. There were more than 100 reports of large hail or damaging winds in Kansas, Oklahoma, Texas and Wisconsin.

There were 85 reports of damaging winds in Texas, 79 in Ohio, and 78 in Wisconsin. There were fifty reports of large hail in North Dakota, 49 in Oklahoma, and 47 in Kansas.

### ...SEPTEMBER...

There were just thirty tornadoes reported across the nation during the month of September, with only one strong (F-2) tornado reported, in Pennsylvania. There were no tornado deaths, and just a dozen injuries related to tornadoes, eleven of which were in South Dakota.

There were just 238 reports of large hail, and 184 reports of damaging winds. The biggest severe weather day, by a considerable margin, was the 25th. There were 118 severe weather reports from South Carolina to Ohio and southern Lower Michigan, with the greatest concentration of reports in West Virginia and Ohio. There were eighty reports of large hail, with hail nearly four inches in diameter reported at Little Corners PA.

On the 14th, evening thunderstorms over west central Texas produced strong downburst winds which gusted to 120 mph at Reese Air Force Base in Lubbock.

# APPENDIX B

## SEVERE WEATHER IN 1994

### ...OCTOBER...

There were fifty-two tornadoes reported across the nation during October, the second highest total of record for the month. There were fifteen tornadoes in Texas, ten in Nebraska, and nine in Florida. The total of ten tornadoes in Nebraska was an October record for that state. Eleven tornadoes were reported on the 17th of the month, including eight in Nebraska.

Tornadoes injured five persons, and caused more than a million dollars damage. Strong (F-2) tornadoes were reported in Colorado, Georgia, and Nebraska.

There were 199 reports of large hail, including 84 in Texas, and 58 in Oklahoma. There were 160 reports of damaging winds, including 61 in Texas. There were 57 reports of large hail or damaging winds on the 20th, and another 67 reports on the 21st.

### ...NOVEMBER...

There were forty-two tornadoes reported across the nation in November, including four strong (F-3) tornadoes and seven strong (F-2) tornadoes. There were eight tornadoes in Mississippi, eight in Texas, seven in Arkansas, six in Florida, five in Maryland, and five in Tennessee. Eighteen tornadoes were reported on the 27th of the month. Tornadoes killed a total of ten persons, injured 118 others, and caused more than thirty-nine million dollars property damage.

On the first day of the month, afternoon thunderstorms spawned five tornadoes in Maryland, establishing a November record for that state. The total of five tornadoes in Tennessee was also a November record.

There were 82 reports of large hail, including 25 in Texas, and 24 in Oklahoma. There were 389 reports of damaging winds during the month, including 99 in Texas, 59 in Louisiana, and 52 in Arkansas. Straight line thunderstorm winds killed three persons, injured 31 others, and caused more than four million dollars property damage.

There were 115 reports of severe weather on the 5th, including 111 reports of damaging winds. There were 113 reports of severe weather on the 27th, including 84 reports of damaging winds.

NOVEMBER

Tropical Storm Gordon affected parts of Florida from 11th and the 12th of the month, killing eight persons, forty-three others, and causing more than fifty million dollars damage. On the 13th, thunderstorms scattered over Florida and a strong (F-2) storm at Miami which killed one person, forty others, and caused ten million dollars property damage. ... THE TRANSFORMING DAY NARRATED IN THE FOLLOWING...

The present severe weather outbreak in November, 1952, marks the autumn season, one of the most active periods in the year. Thunderstorms developing along and ahead of a cold front system crossing the central U.S. produced heavy rain from Alaska and the lower Mississippi Valley in a series of days.

Severe thunderstorms spawned widespread damage on the 14th and 15th of the month, including five deaths and five injuries in Tennessee, and five in Alabama. Killed six persons, injured twenty-six others, and caused five million dollars damage.

Late afternoon thunderstorms over western Tennessee resulted in three deaths (F-2) tornadoes. The first of the three large tornadoes killed one person and injured three others in Tennessee. The final tornado struck Germantown, Tenn. on the 15th, resulting in twenty-five others, and causing more than five million dollars damage. The three deaths occurred near the Nashville area, from where extensive damage had extended for a fairly common.

Late evening thunderstorms over the central Mississippi spawned a strong (F-3) storm which killed a large number of people and caused more than five million dollars damage.

DECEMBER

December, like January and February, had a relatively quiet month in regard to severe weather. Just four tornadoes were reported across the nation and there were just thirteen reports of large hail and eight reports of damaging winds.

# APPENDIX B

## SEVERE WEATHER IN 1994

### ...NOVEMBER...

Tropical Storm Gordon affected parts of Florida between the 13th and the 16th of the month, killing eight persons, injuring forty-three others, and causing more than fifty million dollars damage. On the 15th, thunderstorms associated with Gordon spawned a strong (F-2) tornado at Micco which killed one person, injured forty others, and caused ten million dollars property damage.

### ...THE THANKSGIVING DAY WEEKEND TORNADO OUTBREAK...

The biggest severe weather outbreak of November, and the entire autumn season, came at the end of the Thanksgiving holiday weekend. Thunderstorms developing along and ahead of a powerful storm system crossing the central U.S. produced severe weather from Alabama and the Lower Mississippi Valley into central Indiana.

Severe thunderstorms spawned eighteen tornadoes between mid afternoon Sunday and late Sunday night, including seven in Mississippi, five in Tennessee, and five in Arkansas. Tornadoes killed six persons, injured twenty-six others, and caused more than ten million dollars damage.

Late afternoon thunderstorms over western Tennessee spawned three strong (F-3) tornadoes. The first of the three strong tornadoes killed one person and injured three others at Friendship. The third tornado struck Germantown killing three persons, injuring twenty-five others, and causing more than five million dollars damage. The three deaths occurred when the tornado struck a home where sixteen persons had gathered for a family reunion.

Late evening thunderstorms over south central Mississippi spawned a strong (F-3) tornado which knocked a large tree onto a mobile home at Magee killing two persons.

### ...DECEMBER...

December, like January and February, was a relatively quiet month in regard to severe weather. Just four tornadoes were reported across the nation, and there were just thirteen reports of large hail and eight reports of damaging winds.

The last reports of severe weather came on the 31st of the month, as pre-dawn thunderstorms over the Middle Coastal Region of Texas produced baseball size hail north of Refugio.

DATE	TIME	LOCATION	WIND	TEMP	REL. HUM.	SEA	WAVE	WIND	TEMP	REL. HUM.	SEA	WAVE
MAR 31	1100	Refugio, TX	W-10	60	80	10	10	W-10	60	80	10	10
MAR 31	1200	Refugio, TX	W-10	60	80	10	10	W-10	60	80	10	10
MAR 31	1300	Refugio, TX	W-10	60	80	10	10	W-10	60	80	10	10
MAR 31	1400	Refugio, TX	W-10	60	80	10	10	W-10	60	80	10	10
MAR 31	1500	Refugio, TX	W-10	60	80	10	10	W-10	60	80	10	10
MAR 31	1600	Refugio, TX	W-10	60	80	10	10	W-10	60	80	10	10
MAR 31	1700	Refugio, TX	W-10	60	80	10	10	W-10	60	80	10	10
MAR 31	1800	Refugio, TX	W-10	60	80	10	10	W-10	60	80	10	10
MAR 31	1900	Refugio, TX	W-10	60	80	10	10	W-10	60	80	10	10
MAR 31	2000	Refugio, TX	W-10	60	80	10	10	W-10	60	80	10	10
MAR 31	2100	Refugio, TX	W-10	60	80	10	10	W-10	60	80	10	10
MAR 31	2200	Refugio, TX	W-10	60	80	10	10	W-10	60	80	10	10
MAR 31	2300	Refugio, TX	W-10	60	80	10	10	W-10	60	80	10	10
MAR 31	2400	Refugio, TX	W-10	60	80	10	10	W-10	60	80	10	10
MAR 31	2500	Refugio, TX	W-10	60	80	10	10	W-10	60	80	10	10
MAR 31	2600	Refugio, TX	W-10	60	80	10	10	W-10	60	80	10	10
MAR 31	2700	Refugio, TX	W-10	60	80	10	10	W-10	60	80	10	10
MAR 31	2800	Refugio, TX	W-10	60	80	10	10	W-10	60	80	10	10
MAR 31	2900	Refugio, TX	W-10	60	80	10	10	W-10	60	80	10	10
MAR 31	3000	Refugio, TX	W-10	60	80	10	10	W-10	60	80	10	10
MAR 31	3100	Refugio, TX	W-10	60	80	10	10	W-10	60	80	10	10

# APPENDIX C

## SEVERE WEATHER STATISTICS FOR 1994

### ...KILLER TORNADOES...

DATE	TIME	LOCATION	MAG	KIL	INJ	DAMAGE
MAR 27	1055	Piedmont AL	F-4	22	150	\$50 MIL
MAR 27	1214	Indian Springs GA	F-4	3	20	\$17 MIL
MAR 27	1317	Dahlonega GA	F-3	3	45	\$17 MIL
MAR 27	1401	Henderson Mtn GA	F-3	9	70	\$12 MIL
MAR 27	1423	Cleveland GA	F-3	3	15	\$3 MIL
APR 11	1715	Seligman MO	F-1	1	--	-----
APR 12	1820	Woolmarket MO	F-2	2	15	\$1 MIL
APR 15	1030	Birchwood TN	F-3	1	7	\$1 MIL
APR 15	1656	Lake Houston TX	F-2	1	20	-----
APR 16	0015	Lowrys SC	F-2	1	4	\$1 MIL
APR 25	2030	Lancaster TX	F-4	3	48	\$50 MIL
APR 26	2258	Lafayette IN	F-4	3	70	\$3 MIL
JUN 25	1930	Whitesville MO	F-2	1	2	\$1 MIL
JUN 27	0115	Grayson GA	F-2	1	-	\$1 MIL
JUN 27	0535	Farmington GA	F-1	1	3	-----
JUL 27	2145	Limerick PA	F-3	3	25	\$5 MIL
AUG 27	1930	Foster WI	F-3	2	25	\$2 MIL
AUG 27	2041	Big Flats WI	F-3	2	22	\$4 MIL
NOV 15	1753	Micco FL	F-2	1	40	\$5 MIL
NOV 27	1430	Friendship TN	F-3	1	3	\$1 MIL
NOV 27	1515	Germantown TN	F-3	3	25	\$5 MIL
NOV 27	2220	Magee MS	F-3	2	-	\$2 MIL

# APPENDIX C

## SEVERE WEATHER STATISTICS FOR 1994

### ...TORNADOES...

MONTH	F-0	F-1	F-2	F-3	F-4	SUM	KIL	INJ	DMG
JANUARY	9	3	1	-	-	13	-	8	1 M
FEBRUARY	6	1	2	-	-	9	-	2	1 M
MARCH	31	13	6	7	2	59	40	519	217 M
APRIL	131	52	21	2	2	208	12	210	137 M
MAY	130	23	5	3	-	161	-	75	29 M
JUNE	146	67	16	4	-	233	3	74	16 M
JULY	105	35	10	4	1	155	3	47	20 M
AUGUST	67	34	12	6	-	119	4	108	30 M
SEPTEMBER	23	6	1	-	-	30	-	12	1 M
OCTOBER	39	10	3	-	-	52	-	5	2 M
NOVEMBER	16	19	3	4	-	42	7	79	27 M
DECEMBER	4	-	-	-	-	4	-	-	---
<b>TOTAL</b>	<b>707</b>	<b>263</b>	<b>80</b>	<b>30</b>	<b>5</b>	<b>1085</b>	<b>69</b>	<b>1139</b>	<b>481 M</b>

### ...VIOLENT (F-4) TORNADOES...

DATE	TIME	LOCATION	KIL	INJ	DAMAGE
APR 27	1055	Piedmont AL	22	150	\$50 MIL
MAR 27	1214	Indian Springs GA	3	20	\$17 MIL
APR 25	2030	Lancaster TX	3	48	\$50 MIL
APR 26	2258	Lafayette IN	3	70	\$4 MIL
JUL 05	1543	Cooperstown WI	-	2	\$2 MIL



# APPENDIX C

## SEVERE WEATHER STATISTICS FOR 1994

### ...TORNADO TOTALS BY STATE (1950-1994)...

STATE	1994	TOTAL	AVERAGE	RECORD AND YEAR
ALABAMA	19	886	19.7	45 IN 1957
ARIZONA	5	155	3.4	17 IN 1972
ARKANSAS	16	854	19.0	78 IN 1982
CALIFORNIA	9	214	4.8	20 IN 1992
COLORADO	46	1113	24.7	81 IN 1992
CONNECTICUT	1	61	1.4	8 IN 1973
DELAWARE	4	52	1.2	6 IN 1992
FLORIDA	76	2008	44.6	97 IN 1975
<b>GEORGIA</b>	<b>52</b>	<b>888</b>	<b>19.7</b>	<b>46 IN 1961</b>
IDAHO	3	115	2.6	11 IN 1993
ILLINOIS	20	1137	25.3	107 IN 1974
INDIANA	17	886	19.7	49 IN 1990
IOWA	49	1374	30.5	71 IN 1990
KANSAS	42	2110	46.9	116 IN 1991
KENTUCKY	13	363	8.1	34 IN 1974
LOUISIANA	8	1086	24.1	79 IN 1992
MAINE	3	82	1.8	11 IN 1971
<b>MARYLAND</b>	<b>21</b>	<b>145</b>	<b>3.2</b>	<b>13 IN 1992</b>
MASSACHUSETTS	-	134	3.0	12 IN 1958
MICHIGAN	11	712	15.8	39 IN 1974
MINNESOTA	34	832	18.5	47 IN 1993
MISSISSIPPI	34	1039	23.1	62 IN 1988
MISSOURI	35	1167	25.9	79 IN 1973
MONTANA	8	238	5.3	30 IN 1991
<b>U.S. TOTAL</b>	<b>1085</b>	<b>34205</b>	<b>760.1</b>	<b>1297 IN 1992</b>

# APPENDIX C

## SEVERE WEATHER STATISTICS FOR 1994

### ...TORNADO TOTALS BY STATE (1950-1994)...

STATE	1994	TOTAL	AVERAGE	RECORD AND YEAR
NEBRASKA	55	1673	37.2	88 IN 1990
NEVADA	2	48	1.1	8 IN 1987
NEW HAMPSHIRE	1	72	1.6	9 IN 1963
NEW JERSEY	8	112	2.5	17 IN 1989
NEW MEXICO	13	390	8.7	31 IN 1991
NEW YORK	13	249	5.5	25 IN 1992
NORTH CAROLINA	25	593	13.2	38 IN 1973
NORTH DAKOTA	20	799	17.8	52 IN 1976
OHIO	9	648	14.4	61 IN 1992
OKLAHOMA	42	2301	51.1	101 IN 1982
OREGON	2	44	1.0	5 IN 1991
PENNSYLVANIA	27	451	10.0	33 IN 1985
RHODE ISLAND	1	8	0.2	3 IN 1986
<b>SOUTH CAROLINA</b>	<b>40</b>	<b>423</b>	<b>9.4</b>	<b>23 IN 1973</b>
SOUTH DAKOTA	36	1139	25.3	85 IN 1993
TENNESSEE	28	502	11.2	44 IN 1974
TEXAS	187	5490	122.0	232 IN 1967
UTAH	-	76	1.7	6 IN 1984
VERMONT	-	32	0.7	5 IN 1962
VIRGINIA	8	251	5.6	28 IN 1993
WASHINGTON	2	55	1.2	4 IN 1972
WEST VIRGINIA	2	83	1.8	6 IN 1974
WISCONSIN	36	844	18.8	43 IN 1980
WYOMING	7	434	9.6	42 IN 1979
<b>U.S. TOTAL</b>	<b>1085</b>	<b>34205</b>	<b>760.1</b>	<b>1297 IN 1992</b>

# APPENDIX C

## SEVERE WEATHER STATISTICS FOR 1994

### ...SEVERE WEATHER EVENT TOTALS...

MONTH	TORN	HAIL	WIND	TOTAL	KIL	INJ	DAMAGE
JANUARY	13	73	65	151	-	8	\$1 MIL
FEBRUARY	9	24	39	72	-	4	\$3 MIL
MARCH	59	223	148	430	40	531	\$224 MIL
APRIL	208	1543	953	2704	15	264	\$176 MIL
MAY	161	1031	834	2026	1	141	\$45 MIL
JUNE	233	1353	2366	3952	8	153	\$34 MIL
JULY	155	839	1840	2834	4	144	\$79 MIL
AUGUST	119	469	968	1556	5	132	\$50 MIL
SEPTEMBER	30	238	184	452	-	24	\$4 MIL
OCTOBER	52	199	160	411	-	6	\$3 MIL
NOVEMBER	42	82	389	513	10	110	\$31 MIL
DECEMBER	4	13	8	25	-	-	-----
<b>TOTAL</b>	<b>1085</b>	<b>6087</b>	<b>7954</b>	<b>15126</b>	<b>83</b>	<b>1517</b>	<b>\$650 MIL</b>

# APPENDIX C

## SEVERE WEATHER STATISTICS FOR 1994

### ...REPORTS OF LARGE HAIL...

	NUMBER OF REPORTS				MONTHLY TOTALS	
	0.75 INCH HAIL	1.00 INCH HAIL	2.00 INCH HAIL	3.00 INCH HAIL	INJ	DAMAGE
JANUARY	73	46	6	-	-	-----
FEBRUARY	24	9	1	-	-	-----
MARCH	223	114	20	4	2	\$4 MIL
APRIL	1543	757	102	18	4	\$16 MIL
MAY	1031	350	76	6	4	\$2 MIL
JUNE	1353	442	97	10	5	\$8 MIL
JULY	839	465	55	5	2	\$23 MIL
AUGUST	469	269	49	7	2	\$6 MIL
SEPTEMBER	238	141	11	1	-	\$2 MIL
OCTOBER	199	104	20	1	-	\$1 MIL
NOVEMBER	82	23	-	-	-	-----
DECEMBER	13	6	1	-	-	-----
<b>TOTAL</b>	<b>6087</b>	<b>2726</b>	<b>438</b>	<b>52</b>	<b>19</b>	<b>\$62 MIL</b>

# APPENDIX C

## SEVERE WEATHER STATISTICS FOR 1994

### ...REPORTS OF DAMAGING WINDS...

	NUMBER OF REPORTS			MONTHLY TOTALS		
	58+ MPH GUSTS	65+ MPH GUSTS	75+ MPH GUSTS	KIL	INJ	DAMAGE
JANUARY	65	3	1	-	-	-----
FEBRUARY	39	5	2	-	2	\$2 MIL
MARCH	148	8	3	-	10	\$3 MIL
APRIL	953	95	41	3	50	\$23 MIL
MAY	834	100	30	1	62	\$14 MIL
JUNE	2366	222	85	5	74	\$10 MIL
JULY	1840	350	147	1	95	\$36 MIL
AUGUST	968	162	66	1	22	\$14 MIL
SEPTEMBER	184	27	8	-	12	\$1 MIL
OCTOBER	160	24	9	-	1	-----
NOVEMBER	389	43	11	3	31	\$4 MIL
DECEMBER	8	1	-	-	-	-----
<b>TOTAL</b>	<b>7954</b>	<b>1040</b>	<b>403</b>	<b>14</b>	<b>359</b>	<b>\$107 MIL</b>

# APPENDIX C

## SEVERE WEATHER STATISTICS FOR 1994

### ...TORNADO TOTALS BY MONTH AND STATE...

ST	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	ST
	13	9	61	209	161	235	155	119	30	52	42	4	1090	
BC	-	-	2	1	-	2	-	-	-	-	-	-	5	BC
ALL	13	9	59	208	161	233	155	119	30	52	42	4	1085	ALL

ST	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	ST
AL	1	-	8	2	-	5	-	1	-	-	1	1	19	AL
AZ	-	1	2	1	-	-	1	-	-	-	-	-	5	AZ
AR	-	-	-	3	-	2	4	-	-	-	7	-	16	AR
CA	-	3	3	2	-	-	-	1	-	-	-	-	9	CA
CO	-	-	-	4	-	16	17	3	-	6	-	-	46	CO
CT	-	-	-	-	-	1	-	-	-	-	-	-	1	CT
DE	-	-	-	-	-	1	3	-	-	-	-	-	4	DE
DC	-	-	-	-	-	-	-	-	-	-	-	-	-	DC
FL	6	-	5	7	10	12	6	9	5	9	6	1	76	FL
GA	-	-	19	-	-	29	-	3	-	1	-	-	52	GA
ID	-	-	1	-	1	-	-	-	1	-	-	-	3	ID
IL	-	-	-	13	1	1	2	3	-	-	-	-	20	IL
IN	-	-	-	12	-	2	1	1	-	1	-	-	17	IN
IA	-	-	-	4	2	20	19	3	-	1	-	-	49	IA
KS	-	-	-	6	2	22	5	4	3	-	-	-	42	KS
KY	-	-	-	10	-	2	-	1	-	-	-	-	13	KY
LA	1	-	2	2	2	-	-	-	-	-	1	-	8	LA
ME	-	-	-	-	-	2	1	-	-	-	-	-	3	ME
MD	-	-	-	-	-	-	15	1	-	-	5	-	21	MD
MA	-	-	-	-	-	-	-	-	-	-	-	-	-	MA
MI	-	-	-	-	-	4	7	-	-	-	-	-	11	MI
MN	-	-	-	3	1	14	3	11	-	2	-	-	34	MN
MS	4	-	5	7	1	6	1	-	1	-	8	1	34	MS
MO	-	-	-	26	1	4	-	-	4	-	-	-	35	MO
MT	-	-	-	2	1	5	-	-	-	-	-	-	8	MT

NOTE: "ALL" is the total for all forty-eight states, minus "BC", which is the number of "Border Crossers"

# APPENDIX C

## SEVERE WEATHER STATISTICS FOR 1994

### ...TORNADO TOTALS BY MONTH AND STATE...

ST	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	ST
	13	9	61	209	161	235	155	119	30	52	42	4	1090	
BC	-	-	2	1	-	2	-	-	-	-	-	-	5	BC
ALL	13	9	59	208	161	233	155	119	30	52	42	4	1085	ALL

ST	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	ST
NE	-	-	-	6	14	14	10	-	1	10	-	-	55	NE
NV	-	-	-	-	2	-	-	-	-	-	-	-	2	NV
NH	-	-	-	-	-	-	1	-	-	-	-	-	1	NH
NJ	-	-	-	1	1	1	2	2	-	-	1	-	8	NJ
NM	-	-	-	-	8	1	3	-	1	-	-	-	13	NM
NY	-	-	-	1	2	3	-	7	-	-	-	-	13	NY
NC	1	-	6	1	1	5	2	7	2	-	-	-	25	NC
ND	-	-	-	1	3	3	2	8	2	1	-	-	20	ND
OH	-	-	-	3	1	3	-	1	1	-	-	-	9	OH
OK	-	-	1	17	11	2	6	2	-	3	-	-	42	OK
OR	-	1	1	-	-	-	-	-	-	-	-	-	2	OR
PA	-	-	-	6	-	7	6	5	3	-	-	-	27	PA
RI	-	-	-	-	-	-	-	1	-	-	-	-	1	RI
SC	-	-	6	1	-	5	-	24	2	1	-	1	40	SC
SD	-	-	-	5	-	12	13	4	-	2	-	-	36	SD
TN	-	-	-	3	1	18	-	1	-	-	5	-	28	TN
TX	-	4	2	51	90	9	1	4	3	15	8	-	187	TX
UT	-	-	-	-	-	-	-	-	-	-	-	-	-	UT
VT	-	-	-	-	-	-	-	-	-	-	-	-	-	VT
VA	-	-	-	1	1	-	5	1	-	-	-	-	8	VA
WA	-	-	-	2	-	-	-	-	-	-	-	-	2	WA
WV	-	-	-	-	-	-	-	2	-	-	-	-	2	WV
WI	-	-	-	6	2	4	14	9	1	-	-	-	36	WI
WY	-	-	-	-	2	-	5	-	-	-	-	-	7	WY

NOTE: "ALL" is the total for all forty-eight states, minus "BC", which is the number of "Border Crossers"

# APPENDIX C

## SEVERE WEATHER STATISTICS FOR 1994

### ...REPORTS OF LARGE HAIL BY MONTH AND STATE...

ST	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	ST
AL	-	-	17	17	12	17	-	1	-	-	3	-	67	AL
AZ	-	1	3	-	-	2	3	4	5	-	-	-	18	AZ
AR	18	-	20	111	46	81	63	2	-	1	8	3	353	AR
CA	-	-	5	2	5	-	-	-	-	1	-	-	13	CA
CO	-	-	-	6	23	72	38	17	6	16	-	-	178	CO
CT	-	-	-	-	6	1	3	1	-	-	-	-	11	CT
DE	-	-	-	1	-	1	-	1	-	-	-	-	3	DE
DC	-	-	-	-	-	-	-	-	-	-	1	-	1	DC
FL	-	1	7	14	28	15	13	9	6	2	1	-	96	FL
GA	1	-	20	13	14	32	1	2	1	1	-	-	85	GA
ID	-	-	-	-	4	-	-	3	1	-	-	-	8	ID
IL	-	-	2	44	4	20	9	11	1	-	-	-	91	IL
IN	-	-	6	10	8	36	12	5	2	-	-	-	79	IN
IA	-	-	-	43	16	61	23	33	11	9	-	-	196	IA
KS	5	2	4	109	80	164	94	47	29	8	-	-	542	KS
KY	-	-	-	37	3	9	6	2	3	2	-	-	62	KY
LA	9	-	3	38	52	11	1	7	2	3	1	-	127	LA
ME	-	-	-	-	1	10	9	-	-	-	-	-	20	ME
MD	-	-	-	6	3	6	-	2	1	-	2	-	20	MD
MA	-	-	-	-	8	2	14	-	3	-	1	-	28	MA
MI	-	-	1	45	15	18	29	4	16	-	-	-	128	MI
MN	-	-	-	3	22	42	47	37	7	-	-	-	158	MN
MS	2	-	24	29	20	34	10	-	1	3	3	-	126	MS
MO	-	-	11	139	26	50	8	4	-	2	-	-	240	MO
MT	-	-	-	4	16	19	10	5	-	-	-	-	54	MT



# APPENDIX C

## SEVERE WEATHER STATISTICS FOR 1994

### ...REPORTS OF LARGE HAIL BY MONTH AND STATE...

ST	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	ST
NE	-	-	-	10	24	67	66	17	18	2	-	-	204	NE
NV	-	-	-	-	2	1	-	-	2	-	-	-	5	NV
NH	-	-	-	-	-	-	1	-	-	-	-	-	1	NH
NJ	-	-	-	2	8	5	4	-	-	-	-	-	19	NJ
NM	-	-	-	1	33	21	15	1	3	-	-	-	74	NM
NY	-	-	-	1	17	17	22	5	1	-	-	-	63	NY
NC	-	-	-	6	15	40	7	23	7	1	-	-	99	NC
ND	-	-	-	-	17	14	31	50	9	-	-	-	121	ND
OH	-	-	8	26	9	60	32	9	22	-	3	-	169	OH
OK	7	5	51	391	90	100	78	49	4	58	25	5	863	OK
OR	-	-	-	-	-	-	-	2	1	-	-	-	3	OR
PA	-	-	-	9	8	25	15	18	11	-	-	-	86	PA
RI	-	-	-	-	3	-	-	-	-	-	-	-	3	RI
SC	-	-	8	7	10	21	8	6	11	-	1	-	72	SC
SD	-	-	-	8	14	62	27	19	-	3	-	-	133	SD
TN	-	-	5	42	2	25	2	-	3	-	2	-	81	TN
TX	31	14	26	327	339	131	65	33	9	84	24	5	1088	TX
UT	-	-	-	-	-	-	-	2	-	3	-	-	5	UT
VT	-	-	-	1	1	1	2	-	-	-	-	-	5	VT
VA	-	-	-	5	5	21	6	2	7	-	7	-	53	VA
WA	-	-	-	-	1	-	-	-	-	-	-	-	1	WA
WV	-	-	-	11	4	23	12	2	16	-	-	-	68	WV
WI	-	1	2	25	13	10	22	32	19	-	-	-	124	WI
WY	-	-	-	-	4	6	31	2	-	-	-	-	43	WY

# APPENDIX C

## SEVERE WEATHER STATISTICS FOR 1994

### ...REPORTS OF DAMAGING WINDS BY MONTH AND STATE...

ST	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	ST
AL	11	4	16	19	25	60	4	4	2	-	16	1	162	AL
AZ	-	1	3	1	2	8	11	28	12	2	-	-	68	AZ
AR	4	-	-	48	25	153	72	9	1	4	52	-	368	AR
CA	-	1	1	2	1	5	1	-	-	-	-	-	11	CA
CO	-	-	1	-	31	17	23	7	2	1	-	-	82	CO
CT	-	-	-	-	6	8	10	3	2	-	-	-	29	CT
DE	-	-	-	1	-	3	1	-	-	-	2	-	7	DE
DC	-	-	-	1	-	2	-	-	-	-	-	-	3	DC
FL	4	1	6	17	18	74	43	40	9	12	3	3	230	FL
GA	3	2	16	19	42	164	39	22	5	4	-	2	318	GA
ID	-	-	-	7	5	4	2	3	1	1	-	-	23	ID
IL	-	-	-	70	9	29	41	34	-	-	13	-	196	IL
IN	-	-	-	60	17	47	25	8	-	1	10	-	168	IN
IA	-	-	-	53	13	74	69	25	1	9	2	-	246	IA
KS	2	-	-	34	17	73	165	64	17	3	1	-	376	KS
KY	-	1	-	71	5	30	15	2	1	-	5	-	130	KY
LA	18	-	30	28	62	37	41	19	3	12	59	-	309	LA
ME	-	-	-	5	1	25	10	1	-	-	-	-	42	ME
MD	-	-	-	8	12	24	23	5	-	1	10	-	83	MD
MA	-	-	-	1	-	3	25	11	-	-	-	-	40	MA
MI	-	-	-	19	-	35	86	24	2	-	-	-	166	MI
MN	-	-	-	7	21	54	31	36	1	2	-	-	152	MN
MS	14	2	33	17	13	93	23	-	4	2	30	-	231	MS
MO	-	-	-	85	3	90	22	10	-	-	10	-	220	MO
MT	1	-	-	2	18	20	14	8	4	-	-	-	67	MT

# APPENDIX C

## SEVERE WEATHER STATISTICS FOR 1994

### ...REPORTS OF DAMAGING WINDS BY MONTH AND STATE...

ST	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	ST
NE	-	1	-	32	5	28	110	27	1	4	-	-	208	NE
NV	-	-	-	2	-	1	5	-	1	-	-	-	9	NV
NH	-	-	-	1	-	6	25	2	-	-	-	-	34	NH
NJ	-	-	-	13	17	40	23	12	3	-	8	-	116	NJ
NM	-	-	-	-	8	2	6	4	-	-	-	-	20	NM
NY	-	-	-	17	17	120	193	64	2	-	1	-	414	NY
NC	3	-	6	-	9	115	30	26	9	2	-	-	200	NC
ND	-	-	-	1	5	15	9	22	3	-	-	-	55	ND
OH	-	2	-	54	17	178	79	79	16	-	2	-	427	OH
OK	-	12	2	65	35	157	155	70	11	29	23	-	559	OK
OR	-	-	-	-	4	1	2	2	-	-	-	-	9	OR
PA	-	2	7	42	29	112	98	68	15	2	23	-	398	PA
RI	-	-	-	-	-	-	1	2	-	-	-	-	3	RI
SC	-	-	6	5	14	122	15	16	6	4	1	2	191	SC
SD	-	-	-	9	6	17	57	11	2	4	-	-	106	SD
TN	-	1	4	16	10	67	9	4	-	-	11	-	122	TN
TX	5	9	10	63	248	108	73	85	9	61	99	-	770	TX
UT	-	-	-	3	19	-	16	5	4	-	-	-	47	UT
VT	-	-	-	5	4	6	24	2	-	-	-	-	41	VT
VA	-	-	7	8	11	55	30	13	10	-	7	-	141	VA
WA	-	-	-	-	-	2	2	1	1	-	-	-	6	WA
WV	-	-	-	11	5	58	17	8	5	-	1	-	105	WV
WI	-	-	-	31	15	12	54	78	18	-	-	-	208	WI
WY	-	-	-	-	10	12	11	4	1	-	-	-	38	WY

# APPENDIX C

## SEVERE WEATHER STATISTICS FOR 1994

### ...SEVERE WEATHER EVENTS BY STATE...

STATE					AVG PER SQ MI	AVG PER CAPITA
ALABAMA	19	67	162	248	.0049	.000061
ARIZONA	5	18	68	91	.0008	.000025
ARKANSAS	16	353	368	737	.0142	.000312
CALIFORNIA	9	13	11	33	.0002	.000001
COLORADO	46	178	82	306	.0030	.000093
CONNECTICUT	1	11	29	41	.0084	.000012
DELAWARE	4	3	7	14	.0072	.000021
FLORIDA	76	96	230	402	.0074	.000031
GEORGIA	52	85	318	455	.0078	.000070
IDAHO	3	8	23	34	.0004	.000034
ILLINOIS	20	91	196	307	.0055	.000027
INDIANA	17	79	168	264	.0074	.000047
IOWA	49	196	246	491	.0088	.000176
KANSAS	42	542	376	960	.0117	.000386
KENTUCKY	13	62	130	205	.0052	.000055
LOUISIANA	8	127	309	444	.0100	.000105
MAINE	3	20	42	65	.0021	.000053
MARYLAND	21	20	83	124	.0126	.000026
MASSACHUSETTS	-	28	40	68	.0087	.000011
MICHIGAN	11	128	166	305	.0054	.000033
MINNESOTA	34	158	152	344	.0043	.000078
MISSISSIPPI	34	126	231	391	.0083	.000151
MISSOURI	35	240	220	495	.0072	.000096
MONTANA	8	54	67	129	.0009	.000161
<b>U. S. TOTAL</b>	<b>1085</b>	<b>6087</b>	<b>7954</b>	<b>15126</b>	<b>.0043</b>	<b>.000061</b>

# APPENDIX C

## SEVERE WEATHER STATISTICS FOR 1994 ...SEVERE WEATHER EVENTS BY STATE...

STATE	TORN	HAIL	WIND	TOTAL	AVG PER SQ MI	AVG PER CAPITA
NEBRASKA	55	204	208	467	.0061	.000295
NEVADA	2	5	9	16	.0002	.000013
NEW HAMPSHIRE	1	1	34	36	.0040	.000032
NEW JERSEY	8	19	116	143	.0192	.000018
NEW MEXICO	13	74	20	107	.0009	.000070
NEW YORK	13	63	414	490	.0103	.000027
NORTH CAROLINA	25	99	200	324	.0067	.000049
NORTH DAKOTA	20	121	55	196	.0028	.000306
OHIO	9	169	427	605	.0148	.000056
OKLAHOMA	42	863	559	1464	.0213	.000464
OREGON	2	3	9	14	.0002	.000005
PENNSYLVANIA	27	86	398	511	.0114	.000043
RHODE ISLAND	1	3	3	7	.0066	.000007
SOUTH CAROLINA	40	72	191	303	.0100	.000086
SOUTH DAKOTA	36	133	106	275	.0036	.000393
TENNESSEE	28	81	122	231	.0056	.000047
TEXAS	187	1088	770	2045	.0078	.000120
UTAH	-	5	47	52	.0006	.000030
VERMONT	-	5	41	46	.0050	.000081
VIRGINIA	8	53	141	202	.0051	.000032
WASHINGTON	2	1	6	9	.0001	.000002
WEST VIRGINIA	2	68	105	175	.0073	.000097
WISCONSIN	36	124	208	368	.0068	.000075
WYOMING	7	43	38	88	.0009	.000193
<b>U.S. TOTAL</b>	<b>1085</b>	<b>6087</b>	<b>7954</b>	<b>15126</b>	<b>.0043</b>	<b>.000061</b>

# APPENDIX C

## SEVERE WEATHER STATISTICS FOR 1994

### ...RANKING OF TORNADO TOTALS...

RANK	STATE	TOTAL
1	TEXAS	187
2	FLORIDA	76
3	NEBRASKA	55
4	GEORGIA	52
5	IOWA	49
6	COLORADO	46
7	KANSAS	42
8	OKLAHOMA	42
9	SOUTH DAKOTA	36
11	WISCONSIN	36

### ...RANKING FOR REPORTS OF LARGE HAIL...

RANK	STATE	TOTAL
1	TEXAS	1088
2	OKLAHOMA	863
3	KANSAS	542
4	ARKANSAS	353
5	MISSOURI	240
6	NEBRASKA	204
7	IOWA	196
8	COLORADO	178
9	OHIO	169
10	MINNESOTA	158

### ...RANKING FOR REPORTS OF DAMAGING WINDS...

RANK	STATE	TOTAL
1	TEXAS	770
2	OKLAHOMA	559
3	OHIO	427
4	NEW YORK	414
5	PENNSYLVANIA	398
6	KANSAS	376
7	ARKANSAS	368
8	GEORGIA	318
9	LOUISIANA	309
10	IOWA	246

- No. 8 A Minimum Assumption Tornado Hazard Probability Model. Joseph T. Schaefer, Donald L. Kelly, and Robert F. Abbey, May 1985, 30 p., (PB85-20692/AS).
- No. 9 Verification of Severe Local Storm Forecasts Issued by the National Severe Storms Forecast Center: 1984. Preston W. Leftwich, Jr., November 1985, 23 p., (PB86-128105/AS).
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- No. 40 Severe Local Storm Warning Verification: 1993. Hugh C. Crowther and John T. Halmstad, June 1994, 38 p. (PB94-215811)

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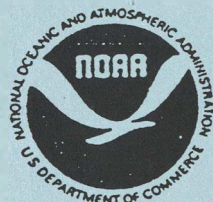
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