

AN UPPER MIDWEST TORNADO OUTBREAK
ON 28 JUNE 1979

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1. INTRODUCTION

In less than nine hours during the afternoon and evening of 28 June 1979 a 27-tornado outbreak in a northwest flow set a number of records. The tornadoes were associated with a severe thunderstorm pattern moving south-southeastward from near Fargo, North Dakota across southern Minnesota into south central Iowa that caused some fifty severe weather events (1). The first small tornado was reported at 12:45 PM, 8 miles south of Fargo, North Dakota; when the last of the 27 tornadoes died away at 9:01 PM near DeSota, Iowa the loss of human lives was tallied at five, in addition to seventy-one injuries and some 40 million dollars in property losses (3, 4). It was estimated that if the tornado warning system had not worked effectively this could have been one of Iowa's most costly tornadoes in terms of human lives since the early 1890s.

The count of 15 tornadoes on 28 June 1979 was the greatest number ever recorded on any date in Minnesota (2). In Iowa the count of ten south-to southeastward-moving tornadoes was the greatest number of record on any date other than family outbreaks moving northeastward. In the past century, only on eight dates have more than 10 tornadoes been reported in Iowa - all of which moved northeastward (5, 6). From preliminary examination, it appears likely that the swarm of 27

south-southeasterly moving tornadoes was the greatest outbreak of all record, at least in the Upper Midwest.

2. TORNADO EVENTS

The first tornado struck briefly at 12:45 PM, 8 miles south of Fargo, North Dakota and was soon followed by the only other tornado reported in North Dakota, at 1:25 PM about 5 miles south of Wahpeton. The tornadoes quickly spread south and southeastward across southern Minnesota with the last funnel clouds being observed between 8:15 and 8:30 PM CST in Dakota and Washington Counties in east-central Minnesota. The 15 Minnesota tornadoes were relatively small and only one injury was reported, that near Lambertton. See Table 1 for a complete tornado listing in this outbreak; or Storm Data, June 1979.

In less than four hours, between 5:12 PM and 9:01 PM CST, ten Iowa tornadoes caused major destruction, death to five and injury to 70 persons. Without adequate warning the death toll could easily have been as many as forty or more; the worst day for tornadoes since September 21, 1894.

The first Iowa tornado, at 5:12 PM, was relatively uneventful; the second was somewhat more destructive to Emmet and Kossuth Counties, and the third was a savagely destructive storm. Its path took it from 3SW

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Bancroft through Algona to Irvington, a distance of 20 miles, in the hour from 5:38 PM to 6:38 PM CST. Two persons were killed and 34 injured in Algona. It was estimated by insurance representatives that the five-minute warning given by an Algona volunteer fireman saved at least 20 lives, since the Hy-Vee Store used that time to direct people to safety in predesignated areas before the tornado scored a direct hit. The local spotter networks and law enforcement officials had already been alerted well ahead of time by the National Severe Storms Forecast Center's tornado watch issued at 1:50 PM CST (1950 Z) and at later times prior to tornado occurrences.

The fourth tornado in the first hour of Iowa tornado activity struck briefly with only light damage near Mallard in Pocahontas County. Twenty minutes later the second very destructive Iowa tornado of the evening began its 50 minutes of terror along a southeastward path from 6 miles west of Palmer in Pocahontas County into Manson in Calhoun County. There 134 homes, a school and several businesses were destroyed, three people were killed and 26 were injured. The tornado finally ended on the east side of Calhoun County near Kneirim. Property losses in the Manson (No. 5) and Algona (No. 3) tornadoes were estimated by the Iowa Disaster Service to total about 40 million dollars.

Because the coordinator of the Iowa Office of Disaster Services for Pocahontas County spotted the tornado formation near Pocahontas at 6:20 PM, the residents of Manson had up to thirty minutes warning before its arrival. No doubt several lives were saved and the number of injuries reduced by the active warning system.

The next two tornadoes originated in southern Kossuth County; the first ended shortly at the border and the latter traversed a 24-mile-long path across Humboldt County into Wright County with moderate damages. The eighth tornado of the evening injured 10 persons as it destroyed five farmsteads and damaged others in its

eleven-mile-long path from near Webster City to Kamrar in Hamilton County. The tornado split into two along the latter portion of its path.

The final tornado of the 27 began at 8:40 PM CST north of Redfield and ended its 12-mile path at 9:01 PM at DeSota, Iowa. Again, because of the Dallas County Sheriff's report of the tornado as it passed near Adel, residents of a mobile trailer court were safely evacuated to a nearby church basement minutes before the court had 14 mobile homes destroyed and several others damaged. Undoubtedly several lives were saved and injuries prevented by the timely trailer evacuation.

The records about Iowa tornadoes suggest a substantial saving of lives due to a number of factors including tornado education and tornado warnings. During the 41-year period from 1878 through 1918 a total of 381 persons lost their lives to tornadoes, while in the following period of 60 years (1919-1978) only 103 lives were reported lost because of tornadoes. The average yearly tornado death rate dropped from 9.3 from 1878-1918 to 1.7 persons since 1918. This suggests the positive results of 20th Century tornado education to Iowans and the usefulness of tornado warnings, as available in recent decades and so effectively used on the evening of 28 June 1979.

3. SYNOPTIC SITUATION

Johns (1) described the 28 June morning analysis as complicated with weak frontal structures and several trough lines. The limited fine mesh model (LFM) at 500 millibars indicated vorticity maxima moving southeastward through central USA. Thunderstorms from south central Kansas into western Kansas were associated with the southern maximum. The northern maximum was associated with a surface low in North Dakota and scattered thunderstorms in eastern North Dakota. During the morning the low pressure system intensified with increasing pressure falls to the southeast and rises to the west. The intensifying low and influx of upper 60s (F) dewpoints in

Table 1

Chronological list of the 27 Upper Midwest tornadoes of June 28, 1979

Place (County)	Time CST/PM	Length miles	Width yards	No. of Persons		Property	Crops
				Killed	Injured		
North Dakota							
Fargo 8S (Cass)	12:45	?	?	0	0	3	0
Wahpeton 5SW (Richland)	1:25	4.2	100	0	0	2	0
Minnesota							
Nashua (Wilkin)	2:00	2.5	300	0	0	5	0
Norcross (Grant)	2:30	6	10	0	0	5	4
1/2NW Benson (Swift)	3:00	1/60	10	0	0	0	0
Lamberton (Red Wood)	3:30	1/2	100	0	1	4	4
Mountain Lake (Cottonwood and Watawon)	3:55	9.5	100	0	0	6	4
2N Lake Andrew (Kandiyohi)	4:15	7	575	0	0	5	4
2E Roseland (Kandiyohi)	4:30	5	30	0	0	5	3
Annadale (Wright)	4:30	1/5	30	0	0	5	0
2E Stewart (McLeod)	5:00	1/4	200	0	0	5	2
6W Winthrop (Sibley)	6:00	7	30	0	0	5	0
SW Janesville (Waseca)	6:10	3	60	0	0	5	3
Maple Grove (Hennepin)	6:15	0.1	15	0	0	5	0
6N Nicollet (Nicollet)	6:24	6	20	0	0	5	3
Maplewood (Ramsey)	7:40	1/5	35	0	0	5	0
Apple Valley (Dakota)	7:40	0.1	10	0	0	4	0
Iowa							
1E Armstrong (Emmet)	5:12	0.5	30	0	0	0	3
2E Ringsted to 1W Fenton	5:25- 5:36	6	40	0	0	4	5
(Emmet and Kossuth)							
3SW Bancroft to Algona to Irving- ton (Kossuth)	5:38- 6:38	20	300	2	34	7	5

Table 1 Continued

Chronological list of the 27 Upper Midwest tornadoes of June 28, 1979

Place (County)	Time CST/PM	Length miles	Width yards	No. of Persons Killed Injured		Property	Crops
3SW Mallard (Pocahontas)	6:00	0.5	40	0	0	4	2
6W Palmer (Pocahontas)	6:20- 7:10	30	350	3	26	7	5
thru Manson to 1/2NW Knierim (Calhoun)							
St. Joseph (Kossuth)	6:30- 6:45	4	35	0	0	5	5
Luverne (Kossuth, Humboldt and Wright)	6:40- 7:28	24	300	0	0	5	5
(2) Webster City (Hamilton)	8:01- 8:22	11	350	0	10	5	5
Redfield (Dallas)	8:40- 9:01	12	40	0	0	5	4

a narrow band implied strong lifting of an unstable air mass. This condition caused the National Severe Storms Forecast Center (NSSFC) to issue a tornado watch at 1:50 PM CST with other watches following as conditions developed.

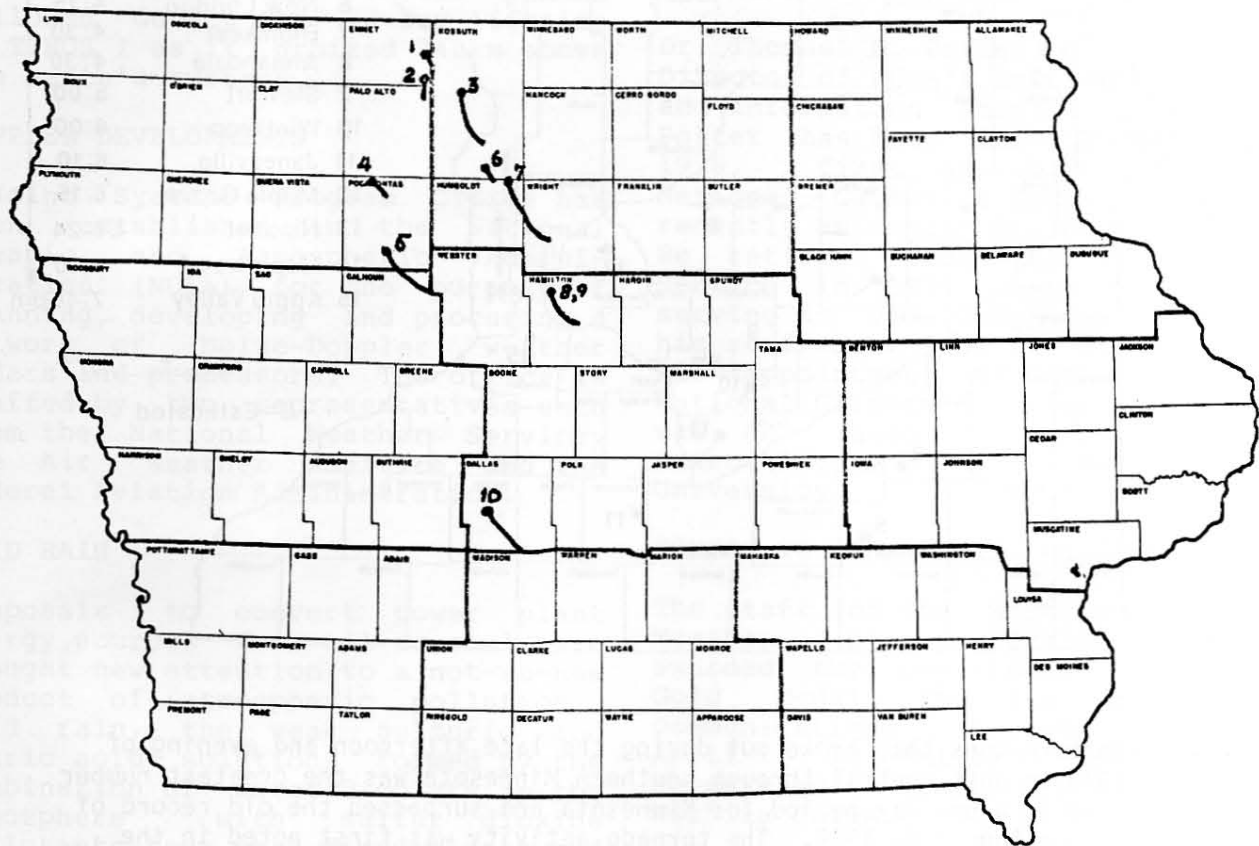
4. CONCLUSIONS

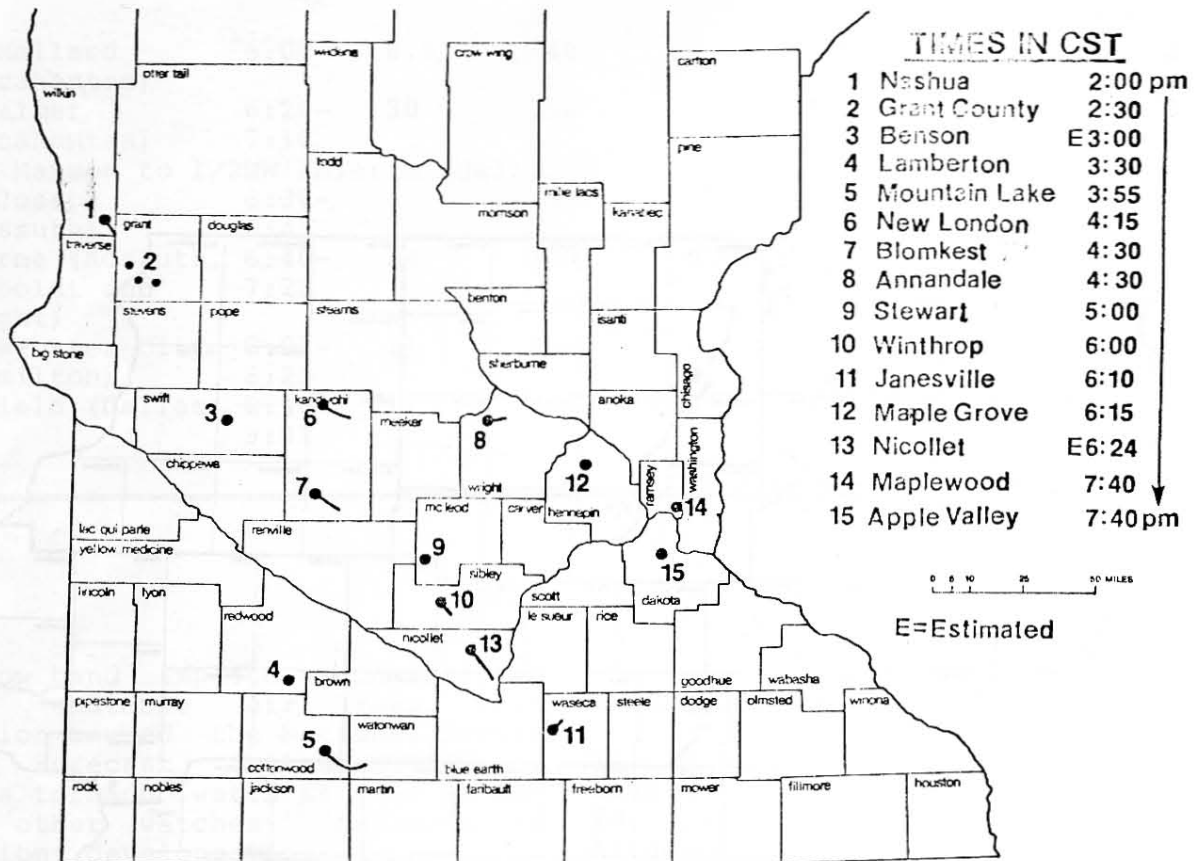
This was undoubtedly the greatest number of tornadoes originating any date under a northwest flow in the Upper Midwest. Its potential as one of the worst killer evenings in Iowa is evident from the locations struck and the damage reported. Yet the timely warnings by spotters, the NSSFC and NWS offices averted perhaps the worst tornado tragedy of the 20th Century in Iowa. The number of tornadoes was a record for any date in Minnesota and the most of record of this class of (south to southeastward moving) storms in Iowa. The tornadoes occurred during the climatologically favored evening hours during one of the most favored months, June.

REFERENCES AND FOOTNOTES

- (1) Johns, Robert H., 1979: The Severe Thunderstorm Outbreak of June 28 and 29, 1979. Technical Attachment 79-10, CRH-SSD NOAA News and Views, Kansas City, MO.
- (2) Kuehnast, E. 1979: Minnesota Tornado Touchdowns, June 28, 1979. Climatological Data, Minnesota.
- (3) Iowa Disaster Service, 1979: Personal communication concerning property losses in two major Iowa Tornadoes of June 28.
- (4) National Oceanic and Atmospheric Administration, EDIS/NCC, 1979: Storm Data, Vol. 21, No. 6.
- (5) Spohn, H.R. and P.J. Waite, 1962: Iowa Tornadoes. Monthly Weather Review, Vol. 90, No. 9, pp. 398-406.
- (6) Waite, Paul, 1972: 19th-Century Iowa Tornadoes, unpublished manuscript.

NEWSLINE





The fifteen tornadoes that broke out during the late afternoon and evening of June 28, 1979 in west central through southern Minnesota was the greatest number ever recorded in a one day period for Minnesota and surpassed the old record of 13 tornadoes on August 6, 1969. The tornado activity was first noted in the Breckenridge vicinity around 1:00 PM CST and then spread southeastward into the southern one-third of Minnesota for the next seven hours with some of the last reports of funnel clouds logged between 8:15 and 8:30 PM CST in Dakota and Washington counties in east central Minnesota. The southeasterly movement of the tornadoes was unusual for this large an outbreak. Fortunately, the tornadoes that did touch down were relatively small and no deaths or major injuries occurred. Each tornado will be separately described in June Storm Data.

State Climatology Office
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Weather Service Forecast Office
National Weather Service