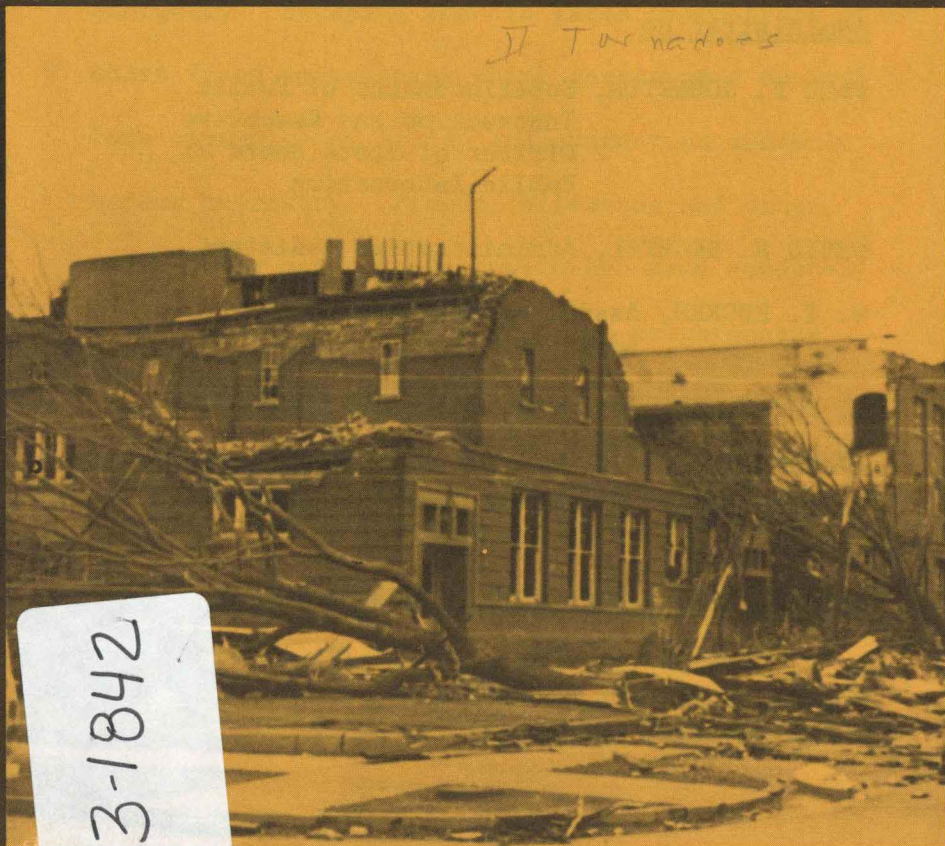


ARE  
YOU  
TORNADO  
READY ??

II Tornadoes



3-1842

State of Iowa  
DEPARTMENT OF PUBLIC INSTRUCTION  
Des Moines 50319

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## I N T R O D U C T I O N

A community struck by a disastrous tornado, the explosion of volatile gases, fire, flood or nuclear radiation are realities that school administrators must face. The damage sustained by the schools and the communities of Charles City, Maynard, and Oelwein provide evidence of the necessary advanced planning that school administrators, city and county officials must conduct prior to an emergency. Escaping ammonia gases demonstrate other short fused emergencies which enveloped a central Iowa community of Kelley and evacuation suddenly became necessary. Floods, blizzards and other emergencies may not erupt with the same suddenness but demonstrate the need for preparedness.

Just as these disasters became realities, a school plan "preparing for emergencies" should be a reality for your school. Such a plan serves the school and pupils in an emergency and has, too, an educational goal. Understanding and placing disasters in their proper perspective is

a continuing educational process that dispels the panic that can cause unnecessary injury and death.

School authorities are morally and legally responsible for the health, safety and well-being of students and personnel while in their care. It is then doubly important that the school board and administrator put an emergency plan on paper, delegate responsibilities, notify parents, and hold regular drills so all persons concerned know what is expected of them in an emergency.

This guideline is furnished by the Civil Defense Education section of the Department of Public Instruction to help you develop this segment of an "Emergency Readiness" Plan. The school officials should coordinate their plan with the County/Municipal Civil Defense director, to tie in with an overall county plan.

The scope of this guideline deals primarily with tornadoes. While portions of the guideline may be adapted to other types of emergencies, it is recommended that school officials contact

the Department of Public Instruction, Civil  
Defense Director or other responsible officials  
when developing other areas of their total  
"Emergency Readiness" Plan.

## WARNING SYSTEM

Time is of the greatest importance in implementing an "Emergency Readiness" Plan. For this reason consideration must be given to the Iowa State Warning System and how it can be utilized for warning of severe weather, nuclear radiation or other pending emergencies. The general warning system is for state, county, and community needs, and the school, as a part of these units, should be an important link in the system. Not only should the school be a recipient of emergency information from the system, but it should act to provide classroom instruction to the elementary, junior high, and high school student on the nature of various emergencies and how the individual may cope with them.

The National Severe Storm Forecast Center, ESSA Weather Bureau, Kansas City, Missouri, has the main responsibility for issuing tornado and severe thunderstorm watches for Iowa as well as the entire nation. These watches (forecasts) are released to the public, police services and Civil Defense offices by the Weather Bureau stations in Iowa: Des Moines, Sioux City, Waterloo, and Dubuque; as well as stations in cities bordering Iowa: Sioux Falls, Omaha, Rochester, and Moline. The Iowa Weather Bureau stations are directly connected with the National Warning System (NAWAS) for Iowa. A tornado warning (actual sighting) or severe thunderstorm warning (actual sighting) is issued by each Weather Bureau for its specific county responsibility area. Information is disseminated by NAWAS, State Highway Police Communications, press wires, amateur radio and telephones. Des Moines, Sioux Falls, Omaha and Rochester Weather Bureaus are equipped with radar tracking equipment.

The National Warning System (NAWAS for Iowa) is a direct communication link by the Iowa Department of Public Safety in Des Moines to twenty-two NAWAS points located geographically in Iowa and manned twenty-four hours a day. A fan-out system from these points connects each Sheriff Office,

Civil Defense officials, and local police to the warning system. A tie-in by the Superintendent of Schools should be made with the County Sheriff, City Police Department or Civil Defense Agency.

#### SEVERE WEATHER

Severe thunderstorm watch: Forecast within or near a definite area of the possibility of severe thunderstorms, hail and damaging wind.

Severe thunderstorm warning: A severe thunderstorm is approaching.

Tornado watch: Forecast of the possibility of severe thunderstorms with hail, damaging winds, and the possibility of one or more tornadoes.

Tornado warning: Actual sighting of a tornado, the direction headed and the approximate speed of a tornado reported by a reliable tornado spotter.

#### TORNADO WARNING PERSONNEL

State Highway Patrol, Highway Maintenance personnel, Conservation Officers, local law enforcement officers, firemen, amateur and citizens band radio operators and volunteer spotters function to spot severe weather threats. Many of these groups are equipped with rapid two-way radio communication or they may rely upon telephone to relay information to the Weather Bureau for NAWAS and mass dissemination.

Volunteer spotters are designated trained private citizens who frequently live in rural areas. They often provide our first indications of a tornado traveling toward a city or town. A tornado could form in the immediate vicinity of the school. Therefore, a severe weather patrol unit should be organized to function as



## PROTECTED AREAS

The protection and safety of the students is a community endeavor. The school board should accept the responsibility for the schools, and provide the building principal or an emergency planning committee with consulting architects or engineers, if necessary, to find the safest places. Techniques should be employed in new construction to provide protective areas. Iowa State University offers a free Professional Development Service which provides a professional architectural consultant to assist school boards in providing shelter spaces in new school construction at little or no additional cost. Requests for this service should be made in writing to your local or county Civil Defense Director.

Fallout protection areas in schools often provides tornado protection as well. With a short stay time, many more students can be placed in a fallout shelter area than the listed capacity of the fallout shelter.

## THE FACULTY

The faculty must understand the nature of the plan, the specific assigned location they are to take their students, the route to follow, and the course of action required for maximum protection. One or more faculty should be designated to act for the Principal in the event that he is out of the building.

## STUDENT MOVEMENT

Departmental block area movement is suggested to keep a teacher's movement pattern and assigned area basically the same. Student traffic should flow in one direction only. Drills in September and early February or March are good preparation. If major changes occur in a teacher's room assignment more than one location for tornado protection should be given that teacher.

Special consideration should be given to handicapped children, noon lunch periods and assemblies, and evening events.



## PARENTS

To properly inform parents, a form letter describing the school "Emergency Readiness" Plan should be sent to the parents of each child.

PTA and any other organizations with school affiliations should be included in drafting the school plan.

## EDUCATION OF STUDENTS

To alleviate any fears students may have of weather phenomena, and to develop a basic understanding of weather, a unit on weather should be taught in the elementary grades. In junior high school a more comprehensive unit on meteorology may be taught in an earth science or general science course. Medical self-help should be included to instruct students on the life saving techniques that inevitably occur in conjunction with a disaster. For a broad understanding of the sociological implications of disaster, the functions and responsibilities of governmental agencies, and knowledge for family and personal survival techniques, a civil defense education unit is recommended in the high school government or social studies course.

## COOPERATION WITH GOVERNMENTAL AGENCIES

The close cooperation of your local and/or county Civil Defense Director is required to insure that plans for school are included in local and county emergency plans. It is essential for the purposes of unified planning that sheriffs departments, police departments, the fire service and other governmental agencies must operate with coordinated emergency readiness plans for the political or geographical areas involved. As it relates to schools this would include warning systems, search and rescue operations, transportation problems and other developments where interaction between these agencies becomes necessary.







## TORNADO FACTS

1. 69 percent of Iowa's tornadoes occur in April, May, and June.
2. Tornadoes occur most frequently from 3:00 to 7:00 p.m.
3. Iowa ranks 4th nationally in overall tornado frequency.
4. During the last ten years, Iowa has averaged 30 tornadoes per year.
5. Tornadoes generally move eastward from a westerly or southwesterly direction. In Iowa, 75 percent of all tornadoes approach from the west or southwest.
6. A tornado path can vary from a brief touch-down to 200 miles in length.
7. An average ground speed of 25 to 40 m.p.h. They may vary from less than 5 m.p.h. to 139 m.p.h.
8. The average width of a tornado path is about 400 yards. They may extend to more than a mile on occasion.
9. The major causes of injuries in a tornado are flying glass and debris.
10. Tornadoes would rarely last more than a couple of minutes over a spot (such as a school) or more than 15-30 minutes in a 10-mile area. They are often preceeded or accompanied by hail. The accompanying rain would, of course, last longer, but the total threat from a tornado warning should be over within 45 minutes.

#### POSSIBLE PROTECTED AREAS

1. Community fallout shelter area in school
2. Underground basements or tunnels
3. Interior corridors and hallways
  - a. North and east interior corridors of building
  - b. Lowest floors possible
  - c. Beneath desks, and tables if necessary
  - d. Open windows away from storm direction if time permits
4. Consider protection, if time allows, in nearby buildings if school has little protective area

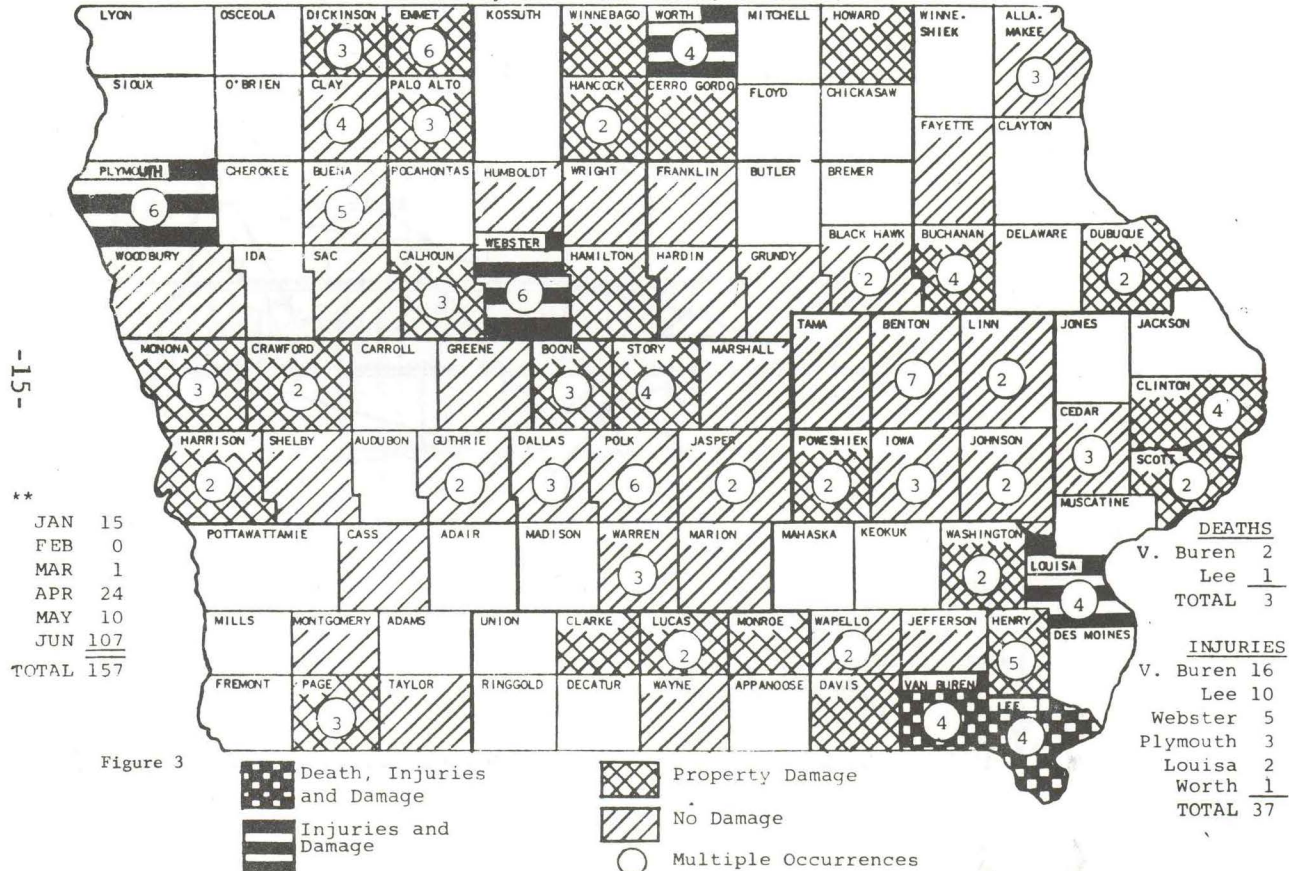
#### UNPROTECTED AREAS

1. Gymnasiums and auditoriums (they usually lack the necessary supporting walls to provide suitable protection)
2. South and west upper sections of building
3. Portable classrooms
4. Glassed-in areas





TORNADOES (53) FUNNEL CLOUDS (104)  
 January 1, 1967 through June 30, 1967  
 Recorded by U.S. Weather Bureau, Des Moines, Iowa



SOME SIGNIFICANT TORNADO PATHS IN IOWA FROM 1918 - JUNE 29, 1948

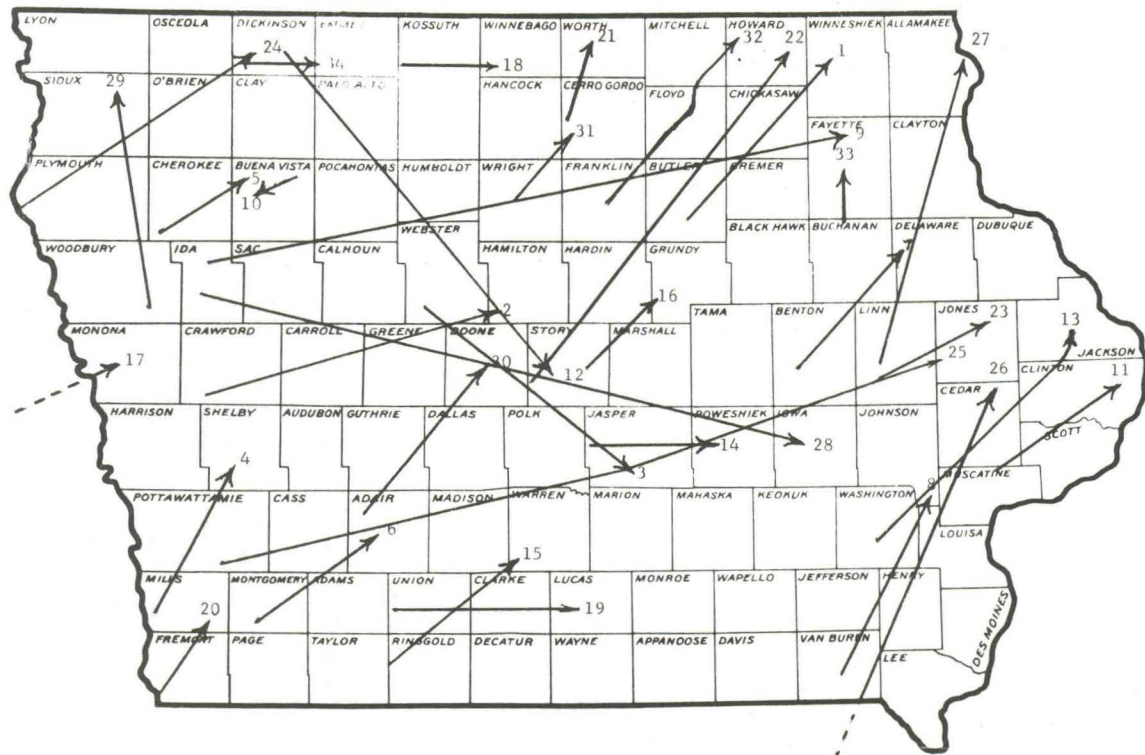


Figure 4 (The numbers at the arrowheads correspond to the sequence of numbers in table on next page.)

Some Significant Tornado Paths and Damage Resulting

1916 - June 30, 1968

NUMBER	DATE	LOCATION	LENGTH (Miles)	LOSS IF GREATER THAN \$250,000
1	1918, May 9	Pearl Rock to Calmar	54	\$500,000
2	1918, May 21	Denison to Stanhope	69	492,000
3	1922, July 16	Gourie to Newton	76	500,000
4	1925, June 2	Glenwood through Silver City into Shelby Co.	45	
5	1928, May 2	SW Cherokee Co. to NW Buena Vista Co.	40	350,000
6	1928, Aug. 26	Red Oak to Greenfield	45	400,000
7	1928, Nov. 14	Vinton to Manchester	33	
8	1931, Sept. 21	Lick Creek Twp. (Van Buren Co.) to Oregon Twp. (Louisa Co.)	50	
9	1932, July 6	Galva to Douglas	180	
10	1933, July 7	Buena Vista Co.	25	
11	1936, June 29	Wilton Junction to Clinton Co.	40	
12	1937, May 18	East of Spirit Lake to SE of Roland	125	
13	1941, April 19	Washington to Andrew	80	
14	1941, Sept. 7	NE Prairie City to Ewart	30	
15	1941, Oct. 6	Near Bedford to near Osceola	60	
16	1943, May 5	East of Colo to Grundy Co.	28	
17	1944, May 18	From Nebraska into Monona Co.	28	1,000,000
18	1944, July 14	SE Swea Twp. (Kossuth Co.) to Winnebago Co.	25	
19	1946, May 30	Creston to Lucas Co.	40	450,000
20	1948, June 22	Fremont and Mills Co.	30-35	250,000
21	1953, May 10	5 SW Ventura to 8 W Northwood	28	1,000,000
22	1953, May 20	NW Gilbert to Lime Springs	120	
23	1953, May 20	Cedar Rapids to Wyoming	72	300,000
24	1953, June 7	Westfield (Family of 5 tornadoes)	70	1,350,000
25	1953, June 7	Carson to SE Linn Co.	200	
26	1954, Apr. 30	From vicinity Sturgeon, Mo. to 3SW Lowden	180	1,240,000
27	1954, Apr. 30	Linn Co. to Wine's Landing	85	
28	1957, July 4	Ida Co. to Iowa Co.	150	
29	1958, April 5	Near Oto to beyond Hospers	50	
30	1959, May 10	Adair and Boone Co.	50	685,000
31	1966, Oct. 14	Belmond	12	11,000,000
32	1968, May 15	NE Hansel to S Chester	65	32,000,000
33	1968, May 15	S Oelwein to NE Maynard	15	21,000,000
34	1968, June 13	Arnolds Park	5	2,750,000

TABLE 1



NUMBER OF TORNADOES REPORTED IN IOWA BY MONTHS  
 1916 - JUNE 30, 1968

Top Number - Tornadoes  
 Bottom Number - Tornado Days

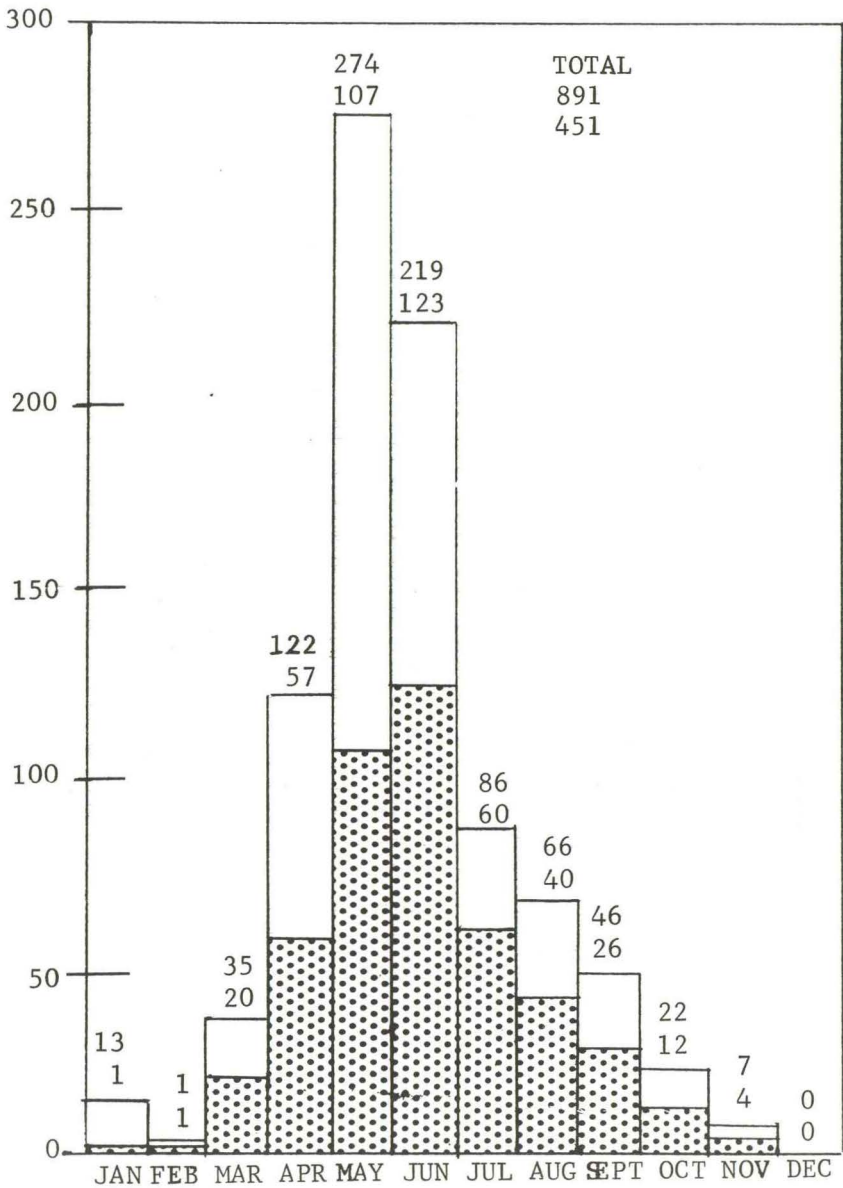


Figure 5

NUMBER OF TORNAOES REPORTED IN IOWA BY TIME OF DAY

1916 - JUNE 30, 1968

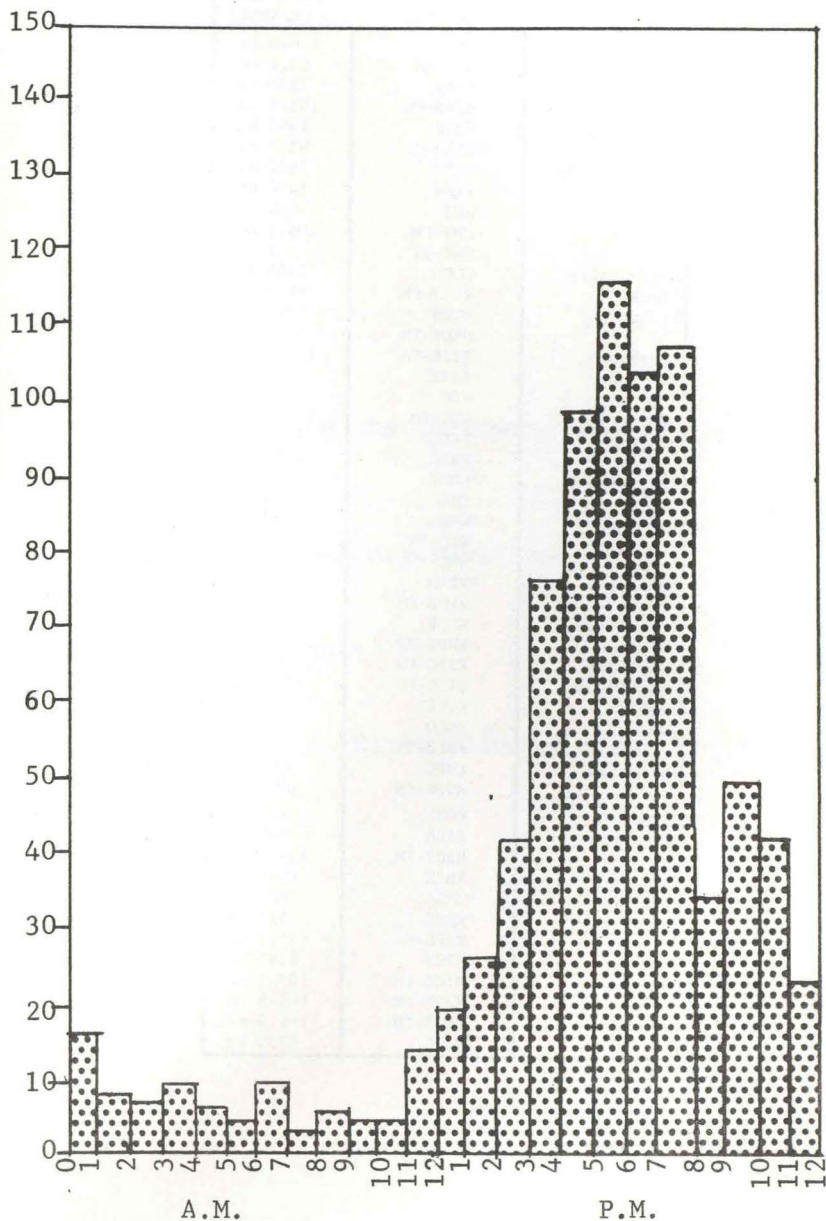


Figure 6

CENTRAL STANDARD TIME

IOWA  
EBS RADIO STATIONS

TOWN	CALL LETTERS	FREQUENCY CHANNEL
Ames	WOI	640 kc
	WOI-FM	90.1 mc
Atlantic	KJAN	1220 kc
	KJAN-FM	103.7 mc
Burlington	KBUR	1490 kc
Carroll	KCIM-FM	93.7 mc
Cedar Rapids	KCRG	1600 kc
	KLWW	1450 kc
	*WMT	600 kc
	WMT-FM	104.5 mc
	WMT-TV	2
Centerville	KCOG	1400 kc
Clarion	KRIT-FM	96.9 mc
Clinton	KROS	1340 kc
	KROS-FM	96.1 mc
Creston	KSIB-FM	101.7 mc
Davenport	KSTT	1170 kc
	WOC	1420 kc
	WOC-FM	103.7 mc
Decorah	KDEC	1240 kc
	*KWLC	1240 kc
Des Moines	*KRNT	1350 kc
	KSO	1460 kc
	*WHO	1040 kc
	WHO-FM	100.3 mc
	WHO-TV	13
Dubuque	*KDTH	1370 kc
	KFMD-FM	92.3 mc
Fort Dodge	KVFD	1400 kc
	KWMT-FM	94.5 mc
	KXIC-FM	100.7 mc
Iowa City	KIFG-FM	95.3 mc
Keokuk	KOKX	1310 kc
Mason City	KGLO	1300 kc
	KGLO-TV	3
Muscatine	KWPC	860 kc
	KWPC-FM	99.7 mc
Oelwein	KOEL	950 kc
Oskaloosa	KBOE	740 kc
	KBOE-FM	104.9 mc
Ottumwa	KBIZ	1240 kc
Shenandoah	*KMA	960 kc
Sioux City	*KMNS	620 kc
	KTFC-FM	103.3 mc
Spencer	*KICD	1240 kc
	KICD-FM	107.7 mc
Storm Lake	KAYL-FM	101.5 mc
Waterloo	KNWS-FM	101.9 mc
	*KWVL	1330 kc

Table 2

\* Hardened sites

1. Emergency Power
2. Fallout Protection
3. Programming from Emergency Operating Center

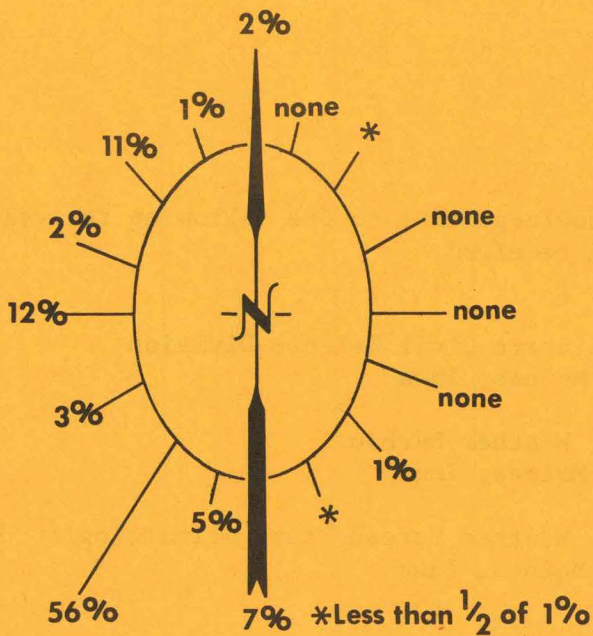
Acknowledgements to the following for valuable data received.

Iowa State Civil Defense Division  
Des Moines, Iowa

U.S. Weather Bureau  
Des Moines, Iowa

U.S. Weather Bureau State Climatologist Office  
Des Moines, Iowa





1916-1960 Direction of Movement  
667 Tornadoes in Iowa

*S W corner of b in home  
low + NE in large bldg -  
small or supporting walls close -  
restrooms dressing rooms*

STATE LIBRARY OF IOWA



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