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U.S. DEPARTMENT OF COMMERCE / National Oceanic and Atmospheric Administration

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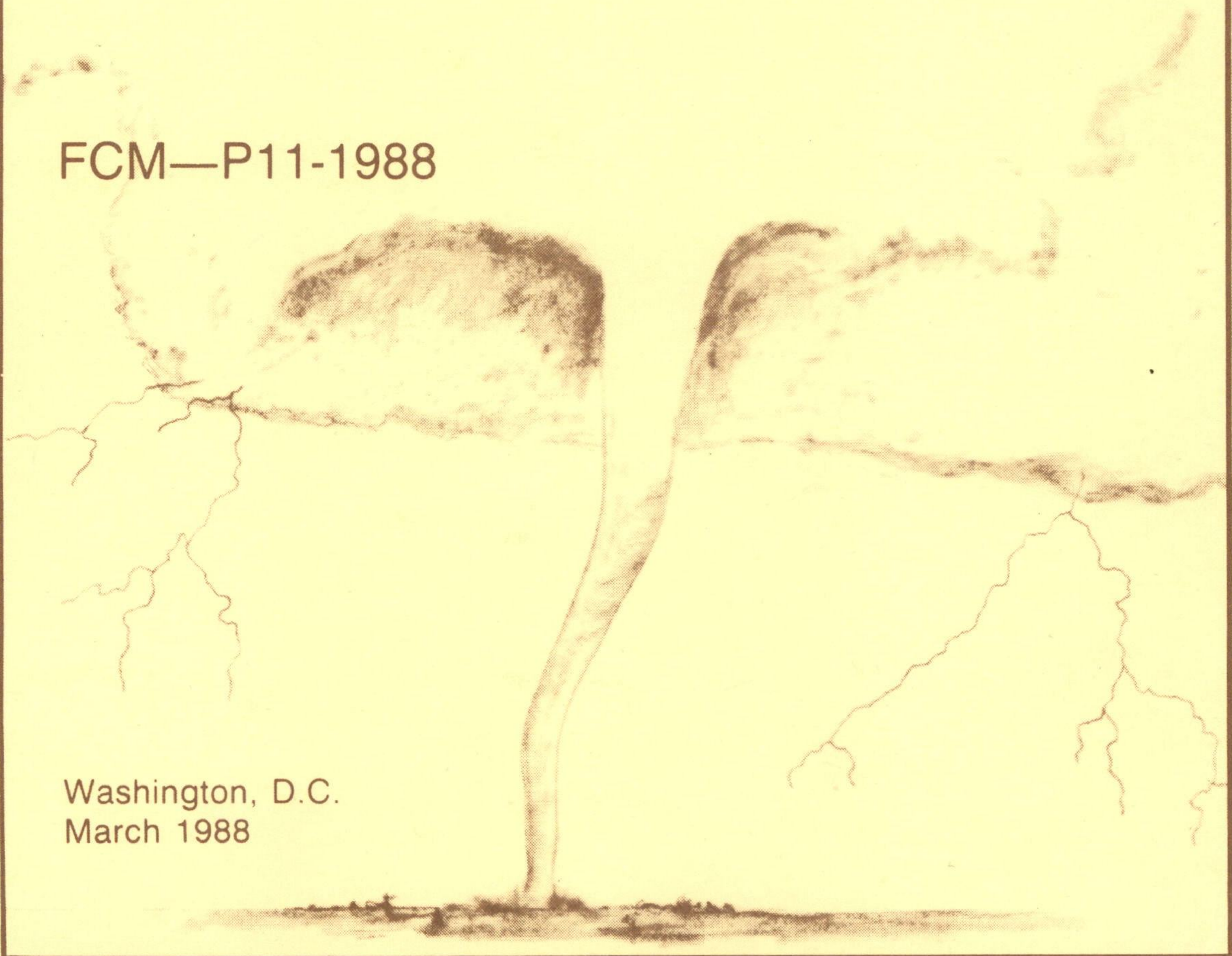


OFFICE OF THE FEDERAL COORDINATOR FOR
METEOROLOGICAL SERVICES AND SUPPORTING RESEARCH

National Severe Local Storms Operations Plan

FCM—P11-1988

Washington, D.C.
March 1988



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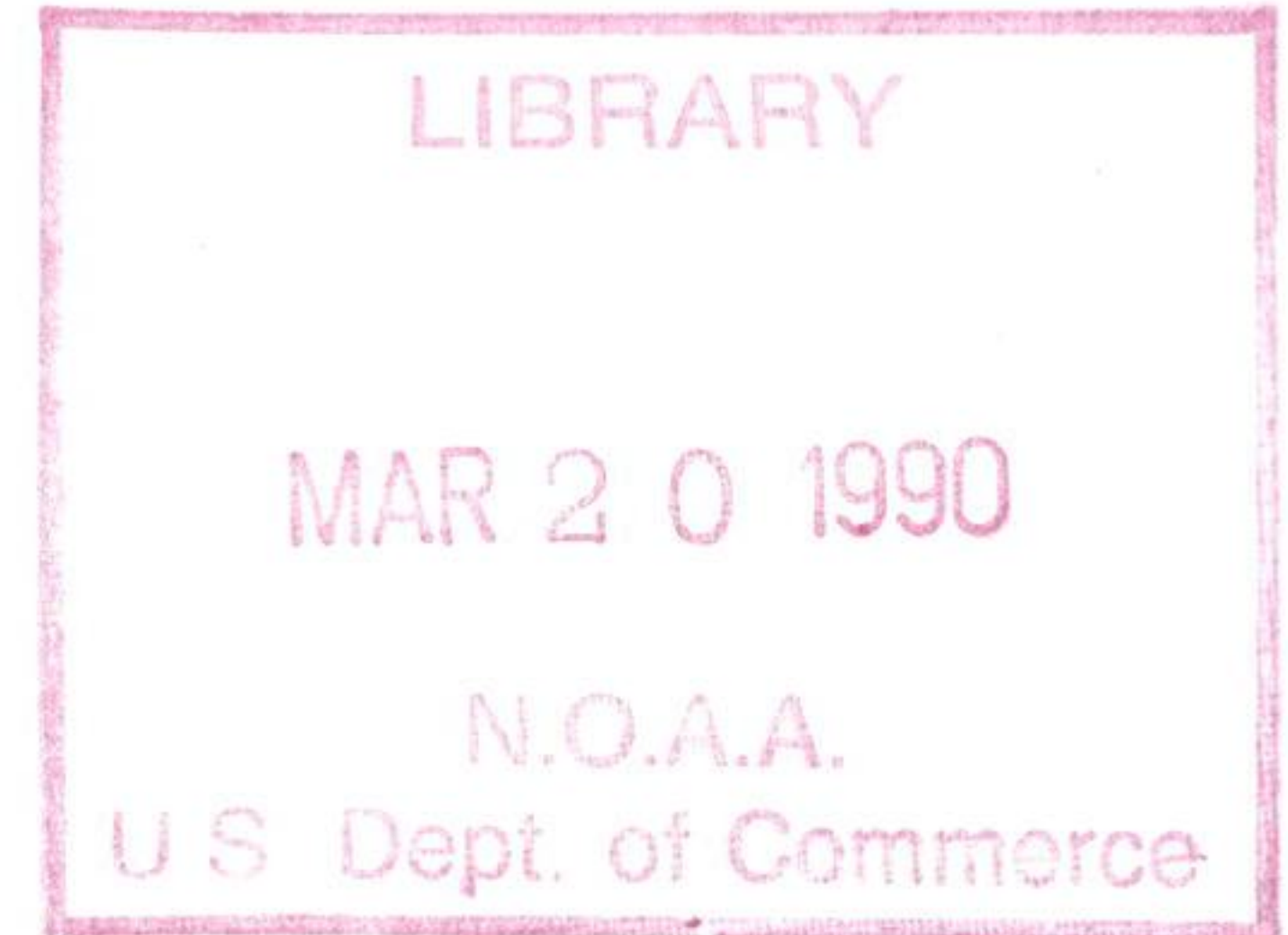
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FEDERAL COORDINATOR
FOR
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NATIONAL SEVERE LOCAL STORMS OPERATIONS PLAN

FCM-P11-1988

Washington, D.C.
March 1988

CHANGE AND REVIEW LOG

Use this page to record changes and notices of reviews.

Change Number	Page Numbers	Date Posted	Initial
1			
2			
3			
4			
5			
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8			
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Changes are indicated by a vertical line in the margin next to the change.

Review Date	Comments	Initial

FOREWORD

This is the twentieth of a series of National Severe Local Storms Operations Plans that was developed after a 1967 request by the Federal Coordinator for Meteorological Services and Supporting Research. This plan is one of several operations plans produced under the auspices of the Federal Coordinator. It outlines the responsibilities of the various United States agencies which provide meteorological services in observing and forecasting severe local storms. It also defines meteorological terms used by agencies preparing severe local storms forecasts and warnings, identifies differing operational warning criteria, and discusses communications, observations, and some public release aspects of severe-storms' warnings.

This plan supersedes the 1986 version and incorporates changes recommended by the concerned agencies through their representatives on the Committee for Basic Services (CBS) Working Group for Severe Local Storms Operations.

Additional information describing the warning programs of the participating agencies can be found in Air Weather Service Regulation 105-8, Meteorological Watch Program; National Weather Service Operations Manual, Chapter C-40, Severe Local Storm Warnings; and Operations of the National Weather Service.



Robert L. Carnahan
Federal Coordinator for
Meteorological Services and
Supporting Research

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1. RESPONSIBILITIES OF COOPERATING AGENCIES

1.1 National Weather Service (NWS).

The NWS shall provide:

a. Basic surface, upper air, and radar observations from its network of stations making such observations.

b. Additional observations, when required. These observations will be transmitted to any requesting agency on the appropriate communication circuits.

c. Basic analyses, forecast charts, and radar facsimile charts through the National Meteorological Center (NMC), Camp Springs, Maryland.

d. Severe Weather Watch Bulletins through the National Severe Storms Forecast Center (NSSFC) at Kansas City, Missouri.

e. Dissemination of severe weather statements and warnings issued by Weather Service Forecast Offices (WSFOs) and Weather Service Offices (WSOs) throughout the United States.

f. Aviation Inflight Weather Advisories through the National Severe Storms Forecast Center (NSSFC) with aviation responsibilities for periods up to 6 hours for aircraft (civilian and military) and amendments to appropriate aviation forecasts whenever severe local storm(s) are possible or are in existence.

g. A concerted effort to collect and relay Pilot Reports (PIREPs).

h. Appropriate public educational materials concerning the severe local storms warning service and development of community preparedness plans in accordance with the Federal Emergency Management Agency (FEMA), National Oceanic and Atmospheric Administration (NOAA) Memorandum of Understanding Concerning the Coordination of Emergency Responsibilities.

1.2 National Environmental Satellite, Data, and Information Service (NESDIS).

The NESDIS shall:

a. Operate satellite systems capable of providing coverage of selected portions of the United States and adjoining coastal areas during the severe storms season.

b. Receive and respond to requirements for coverage of specific areas and times from the NSSFC.

c. Provide appropriate satellite data to authorized research facilities.

d. Coordinate with the National Aeronautics and Space Administration (NASA) on providing data from its Research and Development (R&D) satellites to NOAA operational units for use on an as required basis.

1.3 U. S. Air Force (USAF).

The Air Weather Service (AWS) is responsible for weather warning support to USAF and U.S. Army units throughout the world. It shall provide:

a. Basic surface, upper air, and radar observations from its network of stations making such observations.

b. Additional observations, when required, making all such reports available to civil agencies through existing communications with Federal Aviation Administration (FAA) or, with prior DOD approval, directly.

c. A concerted effort to collect and relay PIREPs.

d. Through Air Force Global Weather Central (AFGWC), Offutt Air Force Base, Nebraska:

(1) Weather warning support in the conterminous United States and 200 miles (322 km) offshore to:

(a) U. S. Air Force, U. S. Army, and selected U. S. Navy installations.

(b) Air Force and Army Reserve, and National Guard Units.

(c) Plant sites and facilities operated under Department of Defense (DOD) contracts.

(d) Airborne military aircraft when under military control.

(2) Via the USAF communications system:

(a) Military Weather Advisories for general areas of severe weather potential. Advisories will be issued daily in graphic and alphanumeric format valid for 12-hour periods beginning at 0300Z plus every 6 hours.

(b) Point Warnings in plain language, as required, whenever weather is expected to meet warning criteria. These Point Warnings are issued to about 500 locations in the conterminous United States.

(c) Summaries of severe convective weather occurrences.

(d) Military Weather Advisory Further Outlooks for general areas of severe weather potential. Further Outlooks will be issued twice daily in graphic and teletype format valid for the 12-hour periods beyond the 0900Z and 2100Z Military Weather Advisories.

(e) A continuous meteorological watch (METWATCH) of meteorological parameters for possible severe weather developments and of other weather phenomena for which AFGWC has warning responsibility.

(f) Critical backup to NSSFC and NMC.

1.4 U. S. Army (USA).

The Army operates a regional weather warning dissemination program with Weather Warning Regions and Centers. Point weather warnings are prepared at the Air Force Global Weather Central and disseminated to the Army Weather Warning Centers via the U. S. Air Force CONUS Meteorological Data System (COMEDS) or AUTODIN. Army units or activities request weather warning support in their Statement of Requirement. Weather warning support is revalidated annually during the Statement of Requirement review process.

The centers disseminate the Point Weather Warnings to Army installations and activities within the warning region when the Army installation or activity is not on the COMEDS net or receiving the warning via AUTODIN, or it is not feasible during non-duty hours for the installation or activity to staff the weather facility containing the COMEDS net.

Army Weather Warning Centers have established local procedures to ensure that the Point Weather Warnings are disseminated to the applicable installation or activity within 10 minutes of receipt of the warning.

1.5 U. S. Navy (USN) and U. S. Marine Corps (USMC).

Neither the Navy nor the Marine Corps operates a centralized Severe Local Storms Warning Service. Within the conterminous United States and offshore waters, requirements for early warnings of hazardous flying conditions and local destructive phenomena are primarily met by NSSFC/AFGWC products interpreted locally by personnel of the Naval Oceanography Command and the Marine Corps Aviation Weather Service units. Full use is made of information received on the Digital Facsimile System (DIFAX) and the National Facsimile Network (NAFAX), as well as other military and civil weather circuits.

Basic surface weather observations are taken worldwide, including at sea, by assigned military personnel. A concerted effort is made by both services to collect and relay Pilot Reports (PIREPS).

1.6 Federal Aviation Administration (FAA).

The FAA shall provide:

a. Communication services and observations in accordance with the January 24, 1977, MEMORANDUM OF AGREEMENT between NOAA and FAA to support the Severe Local Storms Operations Plan.

b. Dissemination/Broadcasting of Airmen's Meteorological Information (AIRMETs), Significant Meteorological Information (SIGMETs), and convective SIGMETs by Flight Service Stations (FSSs) during preflight briefings and to aircraft in flight.

1.7 Exchange of Data Between Agencies.

There shall be a mutual exchange of relevant data on the part of all concerned agencies outlined in Section 1. Because NSSFC and AFGWC are the units responsible for preparing centralized severe weather forecasts, data concerning such forecasts will be exchanged between these units. Direct telephone communications between AFGWC and NSSFC is currently made over the Federal Telecommunications Service (FTS).

The coordination channel for exchange of data between NSSFC and AFGWC shall be between the Commander, AFGWC, and the Director, NSSFC. Unresolved differences will be referred to the Severe Weather Branch, Operations Division, National Weather Service Headquarters, and to the Headquarters, Air Weather Service.

The National Weather Service, National Environmental Satellite, Data, and Information Service (NESDIS), Environmental Research Laboratories' National Severe Storms Laboratory (NSSL), Air Force Geophysical Laboratory (AFGL), and Air Weather Service are actively engaged in developing objective severe weather forecasting and analysis techniques. These organizations will engage, whenever possible, in a joint technique development program and will exchange any objective techniques developed.

1.8 Requests for Special Observations.

Any special rawinsonde (RAWIN) or pilot balloon (PIBAL) observations needed during the continuous weather monitoring underway at NSSFC and at AFGWC are authorized and will be requested when needed.

When special upper air network soundings are required, the requests should normally be made for 0600Z or 1800Z. The lead forecaster, NSSFC, will initiate the request to the National Weather Service and National Aeronautics and Space Administration stations, and the Commander, AFGWC, will similarly request soundings from DOD stations. Although WSFOs have the authority to request special upper air observations during periods of potentially severe storms of all types, requests for special soundings during periods of potentially severe local storms should be made by NSSFC. The agency taking the special sounding is responsible for funding.

Air Weather Service requests for National Weather Service or NASA soundings should be made to the lead forecaster at NSSFC. National Weather Service requests for USAF soundings should be made to the AFGWC duty officer (402-294-2586 or FTS 866-2586).

NSSFC may also request special limited scan Geostationary Operational Environmental Satellite (GOES) data on critical severe storm days. Requirements for special products are coordinated through NESDIS, Satellite Services Division, and described in the VAS Operations Plans (provided by the Satellite Services Division, by calling FTS 763-8051).

1.9 Backup Plan for NSSFC.

In the event that NSSFC is unable to discharge its severe weather forecasting functions, AFGWC will provide backup. Backup procedures are documented in FCM-P14-1985, Federal Plans for Mutual Support and Cooperative Backup Among Operational Processing Centers. The AFGWC severe storms forecaster can be reached at FTS 864-3613.

1.10 Notification of Military Installations.

Selected military installations, whose AWS detachments are not staffed by forecasters or whose radars are inoperative, will be notified by the NWS when severe convective weather is expected to affect them. The notification will be performed by selected NWS offices which have radar and/or other information available. Notification will be via NOAA Weather Radio Warning Alarms for those sites within the receiving area. This is the most rapid notification available. Otherwise, notifications will be according to "alerting agreements" between the AWS/NWS offices concerned. [Such written agreements are initiated by the AWS units, but require approval of the Meteorologist-in-Charge or Hydrologist-in-Charge and the Detachment Commander before they can go into effect. See Appendix B.]

The service to be provided is a wakeup/alerting service to cover severe convective weather occurrences with short lead times, i.e., those developments that the AWS' normal alerting system may miss. No other service will normally be required. As appropriate, radar data may be exchanged. Severe convective weather is defined as thunderstorms with winds 50 knots (25 m/s) or more, hail 3/4-inch (20 mm) in diameter or larger, and/or tornadoes.

If NWR services are not available, telephone notification is authorized. Notification will be made to only one telephone number. Only one call will be made; however, if the line is busy, one additional call will be made. The notification will be made after the news media and Civil Defense authorities have been notified according to the NWS' present warning dissemination procedures and priorities. The agreement will specify the hours during which the alerting service is to be provided.

1.10.1 Military/NWS Locations Involved. Agreements for providing the alerting service have been signed between the following locations. Changes may be made to this list at any time.

<u>Military Location</u>	<u>NWS Office</u>
Barksdale AFB	WSO Shreveport, LA
Beale AFB	WSO Sacramento, CA
Bergstrom AFB	WSO Austin, TX
Blytheville AFB	WSFO Memphis, TN
Buckley ANGB	WSFO Denver, CO
Cannon AFB	WSO Amarillo, TX
Castle AFB	WSO Sacramento, CA
Charleston AFB	WSO Charleston, SC
Columbus AFB	WSO Tupelo, MS

Davis-Monthan AFB
Dobbins AFB
Dover AFB
Dyess AFB
Edwards AFB
Ellsworth AFB
Fairchild AFB
Francis E. Warren AFB
Ft. Campbell
Ft. Hood
Ft. Knox
Ft. Riley
George AFB
Grand Forks AFB
Grissom AFB
Holloman AFB
Homestead AFB
Hunter AAF
Kelly AFB
Keesler AFB
Kirtland AFB
Laughlin AFB
Little Rock AFB
Luke AFB
Maxwell AFB
McClellan AFB
McConnel AFB
McGuire AFB
Minot AFB
Moody AFB
Myrtle Beach AFB
Nellis AFB
Offutt AFB
Pease AFB
Plattsburgh AFB
Randolph AFB
Reese AFB
Richards-Gebaur AFB
Rickenbacker AFB
Robins AFB
Scott AFB
Selfridge ANGB
Shaw AFB
Sheppard AFB
Tinker AFB
Travis AFB
Whiteman AFB
Wurtsmith AFB

WSO Tucson, AZ
WSFO Atlanta, GA
WSO Atlantic City, NJ
WSO Abilene, TX
WSO Palmdale, CA
WSO Rapid City, SD
WSO Spokane, WA
WSFO Cheyenne, WY
WSO Nashville, TN
WSO Waco, TX
WSFO Louisville, KY
WSFO Topeka, KS
WSO Palmdale, CA
WSO Fargo, ND
WSFO Indianapolis, IN
WSO El Paso, TX
NHC Miami, FL
WSO Savannah, GA
WSFO San Antonio, TX
WSO Mobile, AL
WSFO Albuquerque, NM
WSO Del Rio, TX
WSFO Little Rock, AR
WSO Phoenix, AZ
WSO Montgomery, AL
WSO Sacramento, CA
WSO Wichita, KA
WSO Atlantic City, NJ
WSFO Bismarck, ND
WSO Savannah, GA
WSO Charleston, SC
WSO Las Vegas, NV
WSO Omaha, NE
WSMO Brunswick, ME
WSO Burlington, VT
WSFO San Antonio, TX
WSFO Lubbock, TX
WSO Kansas City, MO
WSO Port Columbus, OH
WSO Macon, GA
WSFO St. Louis, MO
WSFO Detroit, MI
WSO Charleston, SC
WSO Wichita Falls, TX
WSFO Oklahoma City, OK
WSO Sacramento, CA
WSO Kansas City, MO
WSO Houghton Lake, MI

2. DEFINITIONS

This section defines those common meteorological terms, subject to multiple interpretations, which are used by agencies preparing severe local storms forecasts and warnings.

2.1 Funnel Cloud.

A rotating column of air forming a pendant from a cumulus or cumulonimbus cloud whose circulation does not reach the ground or water.

2.2 Severe Local Storms.

Dangerous storms that usually cover relatively small geographical areas or move in narrow paths and are of sufficient intensity to threaten life and property. For the purpose of this plan, a severe local storm is a tornado, funnel cloud, waterspout, or a thunderstorm with winds of 50 knots (25 m/s) or greater and/or hail 3/4-inch (20 mm) in diameter or greater at the surface. Wind damage may be used to infer the occurrence/existence of a severe local storm.

2.3 Severe Local Storms Season.

Although the center of maximum frequency shifts during the year, tornadoes and severe thunderstorms may occur anywhere in the United States at anytime during the year. The months of greatest total frequency are April, May, and June.

2.4 Squall Line.

A line of active thunderstorms or squalls which may extend over several hundred miles. It is the phenomenon of the mature or active stage of "instability-line" development and may be either a solid or broken line of thunderstorms.

2.5 Density/Risk of Severe Thunderstorms.

The following adjectives describe the possible density/risk of severe thunderstorms in an outlook area:

a. Slight risk - 2 to 5 percent coverage or 4-10 Manually Digitized Radar (MDR) blocks with severe thunderstorms per 100,000 square miles (259,000 km²).

b. Moderate risk - 6 to 10 percent coverage or 11-21 MDR blocks with severe thunderstorms per 100,000 square miles (259,000 km²).

c. High risk - greater than 10 percent coverage or more than 21 MDR blocks with severe thunderstorms per 100,000 square miles (259,000 km²).

d. MIC (Maximum Instantaneous Coverage) - the percentage of the area that will be covered by cumulonimbus cells at the time of maximum activity. (Military Weather Advisories only.)

e. TAA (Total Area Affected) - the percentage of the area that will experience one or more thunderstorms during the applicable valid period. (Military Weather Advisories only.)

Adjectives such as the above will not be used to indicate the possible density of tornadoes in a watch. The Tornado Watch Bulletin will only state that the threat of tornadoes exists in and close to the designated watch area.

2.6 Thunderstorm Intensity Categories.

Only the following thunderstorm intensity classes will be used in the forecasting and warning functions of concerned agencies:

a. Thunderstorm - Wind gusts less than 50 knots (25 m/s) and hail, if any, of less than 3/4-inch diameter (20 mm) at the surface.

b. Severe Thunderstorm - Wind gusts of 50 knots (25 m/s) or greater or hail of diameter 3/4-inch (20 mm) or greater at the surface. Wind damage may be used to infer the occurrence/existence of a severe thunderstorm.

2.7 Tornado.

A violent, rotating column of air usually forming a pendant from a cumulonimbus cloud, whose circulation reaches the ground. It nearly always starts as a funnel cloud and is accompanied by a loud roaring noise. On a local scale, it is the most destructive of all atmospheric phenomena.

2.8 Waterspout.

A rotating column of air usually pendant from a cumulus or cumulonimbus cloud which forms over a body of water and whose circulation touches the water.

3. FORECASTS AND WARNINGS

3.1 General.

Every effort has been made to standardize terminology, adopt common definitions, and adjust criteria to a common base, however, each agency has differing operational warning criteria that must be met. Although standardization will be used wherever possible in forecasts and warnings, each agency retains the right to specify the forecast and warning criteria that are needed to carry out the mission of its service.

3.2 Other Warning Criteria.

All phenomena (other than those classified as severe storms, paragraph 2.2) described in the various warnings, bulletins, and advisories should be categorized as "other warning criteria" and are not called severe weather phenomena. Such other warning criteria will be listed separately in the appropriate National Oceanic and Atmospheric Administration-National Weather Service publications.

3.3. National Weather Service Watch/Warning Procedures.

3.3.1 General. The National Weather Service has statutory responsibility for providing a Severe Local Storms Watch and Warning Service for all 50 States. NSSFC does not issue watches for Alaska or Hawaii. Instead the WSFOs at Anchorage and Honolulu have the responsibility for maintaining weather watches and issuing warnings as needed for their respective States. Procedures described in this plan are followed to the extent that they are applicable.

This Watch and Warning Service is available to the general public and to aviation and is provided through the National Severe Storms Forecast Center at Kansas City, Weather Service Forecast Offices, and Weather Service Offices.

3.3.2 Watch/Warning Criteria. Any or all of the categories listed below may be mentioned in severe weather watches/warnings to indicate more fully the severe weather that is expected.

3.3.2.1 Severe Thunderstorm:

a. Wind: Thunderstorm related surface winds (sustained or gusts) of 50 knots (25 m/s) or greater;

b. Hail: Surface hail 3/4-inch (20 mm) or larger. The word hail in a watch bulletin implies hail at the surface as well as aloft unless a qualifying phrase such as "hail aloft" is used.

(Heavy rainfall when a significant threat of flash floods exists and lightning when expected to have a significant impact on the general public may also be mentioned in severe weather watches/warnings.)

3.3.2.2 Tornado: Severe weather watches/warnings that mention tornadoes imply that thunderstorm activity, usually severe, is also expected/occurring. Severe weather watches will not refer to funnel clouds.

3.3.3 National Meteorological Center (NMC). NMC is the central data processing center for the NWS. NMC issues prognostic charts, discussions, and other forecast materials.

3.3.4 National Severe Storms Forecast Center (NSSFC). NSSFC is responsible for issuing and cancelling severe local storm watches, convective SIGMETS (Significant Meteorological Information) and nonconvective SIGMETS, and for preparing other appropriate material essential to the Severe Local Storms Warning Service.

3.3.4.1 Combined Public and Aviation Watch Bulletins. Although a warning service is provided for public and aviation interests, separate watches are not issued for these interests, but are combined into one bulletin. Each combined watch bulletin (see example below) contains information for the general public (sections A and B) and aviation interests in discrete, alphabetical, sequential sections. When a section is not applicable, it will be omitted. The text will begin with the most serious type of severe weather expected - "Tornado Watch" or "Severe Thunderstorm Watch." The location of the area affected and the valid period of the watch which are common to both public and aviation sections are given in Section A. Combined watches are numbered serially beginning with number 1 for the first issuance of each calendar year. NSSFC will issue an unnumbered watch cancellation message whenever it cancels a watch.

3.3.4.2 Convective SIGMETs. NSSFC issues hourly at H+55 and as required Special Convective SIGMET bulletins over the conterminous United States. These bulletins contain descriptions and trends of current significant thunderstorms and an outlook for periods of up to six hours based on these criteria:

- a. Tornadoes;
- b. Lines of thunderstorms;
- c. Embedded thunderstorms;
- d. Thunderstorm areas greater than or equal to Video Integrated Processor (VIP) Level 4 (LVL 4) with areal coverage of 4/10 (40 percent) or more; and
- e. Hail greater than or equal to 3/4-inch (20 mm) diameter.

Negative bulletins are issued if none of the criteria are met.

3.3.4.3 Nonconvective SIGMETS. NSSFC issues nonconvective SIGMETS in the conterminous United States for severe or extreme turbulence, severe icing, and widespread dust/sand storms/volcanic ash lowering visibilities to below 3 miles (5 km).

Example of Watch Bulletin

BULLETIN IMMEDIATE BROADCAST REQUESTED
TORNADO WATCH NUMBER 392
NATIONAL WEATHER SERVICE KANSAS CITY MO
620 PM CDT SAT MAY 12 1984
A ... THE NATIONAL SEVERE STORMS FORECAST CENTER HAS ISSUED A
TORNADO WATCH FOR

MUCH OF WESTERN AND CENTRAL OKLAHOMA
PARTS OF CENTRAL AND SOUTHEASTERN KANSAS

FROM 7 PM CDT UNTIL 12 MIDNIGHT CDT THIS SATURDAY EVENING.

TORNADOES ... LARGE HAIL ... DANGEROUS LIGHTNING ... AND DAMAGING
THUNDERSTORM WINDS ARE POSSIBLE FOR THESE AREAS.

THE TORNADO WATCH AREA IS ALONG AND 70 STATUTE MILES EITHER
SIDE OF A LINE FROM 50 MILES SOUTH SOUTHEAST OF HOBART
OKLAHOMA TO 50 MILES EAST OF SALINA KANSAS.

REMEMBER ... A TORNADO WATCH MEANS CONDITIONS ARE
FAVORABLE FOR TORNADOES AND SEVERE THUNDERSTORMS
IN AND CLOSE TO THE WATCH AREA ... PERSONS IN THESE AREAS
SHOULD BE ON THE LOOKOUT FOR THREATENING WEATHER CONDITIONS
AND LISTEN FOR LATER STATEMENTS AND POSSIBLE WARNINGS.

B ... THIS TORNADO WATCH REPLACES TORNADO WATCH
NUMBER 389. WATCH NUMBER 389 WILL NOT BE IN EFFECT AFTER
7PM CDT.

C ... TORNADOES AND A FEW SVR TSTMS WITH HAIL SFC AND
ALF TO 3 IN. EXTRM TURBC AND SFC WND GUSTS TO 80 KT.
A FEW CBS WITH MAX TOPS TO 650. MEAN WIND VECTOR 25030.

D ... TSTMS EXPCTD TO INTNSFY IN PVA AREA AHD OF STG
VORT CNTR. UNSTBL AMS AND STG LO LVL WINDS ALSO FAVORABLE.

E ... OTR TSTMS .. CONT WW NR 391. UPDATE AC TO INCL FEW
SVR TSTMS ERN AR BY MRNG.

..WILSON..

Examples of Convective SIGMET Bulletins

MKCC WST 231855
CONVECTIVE SIGMET 20C
VALID UNTIL 2055Z
ND SD
FROM 90W MOT-GFK-ABR-90W MOT

INTSFYG AREA SVR TSTMS MOVG FROM 2445. TOPS ABV 450.
WIND GUSTS TO 60 KT RPRTD.
TORNADOES...HAIL TO 2 IN...WIND GUSTS TO 65 KT PSBL ND
PTN.

CONVECTIVE SIGMET 21C
VALID UNTIL 2055C

TX

50SE CDS

ISOLD SVR TSTM D30 MOVG FROM 2420. TOP ABV 450.
HAIL TO 1 1/2 IN...WIND GUSTS TO 60 KT RPRTD.
HAIL TO 2 IN...WIND GUSTS TO 65 KT PSBL.

OUTLOOK VALID UNTIL 0255Z

AREA 1...FROM INL-MSP-ABR-MOT-INL
SVR TSTMS CONT TO DVLP IN AREA OVR ND. AREA IS EXPCD TO
RMN SVR AND SPREAD INTO MN AS STG PVA MOVES OVR VERY
UNSTBL AMS CHARACTERIZED BY -12 LIFTED INDEX.

AREA 2...FROM CDS-DFW-LRD-ELP-CDS

ISOLD STG TSTMS WILL DVLP OVR SWRN AND WRN TX THRUT FCST
PD AS UPR LVL TROF MOVES NEWD OVR VERY UNSTBL AMS.
LIFTED INDEX RMNS IN THE -8 TO -10 RANGE. DRY LINE WILL
BE THE FOCUS OF TSTM DVLPMT.

3.3.5 Weather Service Forecast Offices (WSFOs) and Weather Service Offices (WSOs).

3.3.5.1 WSFOs and WSOs release to the public information contained only in sections A and B of watches. However, to help the public visualize which areas are affected by watches, designated offices prepare redefining statements (areal outlines) for those parts of their States within each public severe weather watch. They also may discontinue watches for those portions of their areas no longer threatened.

3.3.5.2 WSFOs and WSOs with county warning responsibilities are responsible for warning the general public. Severe weather warnings are based on reports of actual, suspected, or imminent severe weather in or near an Office's area of responsibility. Each warning is identified as either a Tornado Warning or a Severe Thunderstorm Warning. When radar evidence is sufficient in the judgement of the responsible official to identify a dangerous storm, warnings are issued immediately.

3.3.5.3 Offices issue frequent statements to keep the public informed of weather developments during a severe weather watch.

3.3.6 Satellite Field Service Stations (SFSS). The SFSSs receive and analyze satellite imagery in near real time and assist collocated units, WSFOs, and WSOs in applying these data to their weather forecasting and warning programs.

3.4 U. S. Air Force (USAF) Warning Procedures.

3.4.1 General. Air Force Global Weather Central (AFGWC) provides, by means of USAF communications system, warnings for Military installations for:

- a. Tornadoes;
- b. Thunderstorms;
- c. Strong surface winds of 35 knots (65 km/h) or more that are not associated with thunderstorms;
- d. Heavy rain or snow (2 inches (50 mm) or more in a 12-hour period); and
- e. Freezing precipitation.

The criteria for severe thunderstorm warnings are the same as those of the NWS.

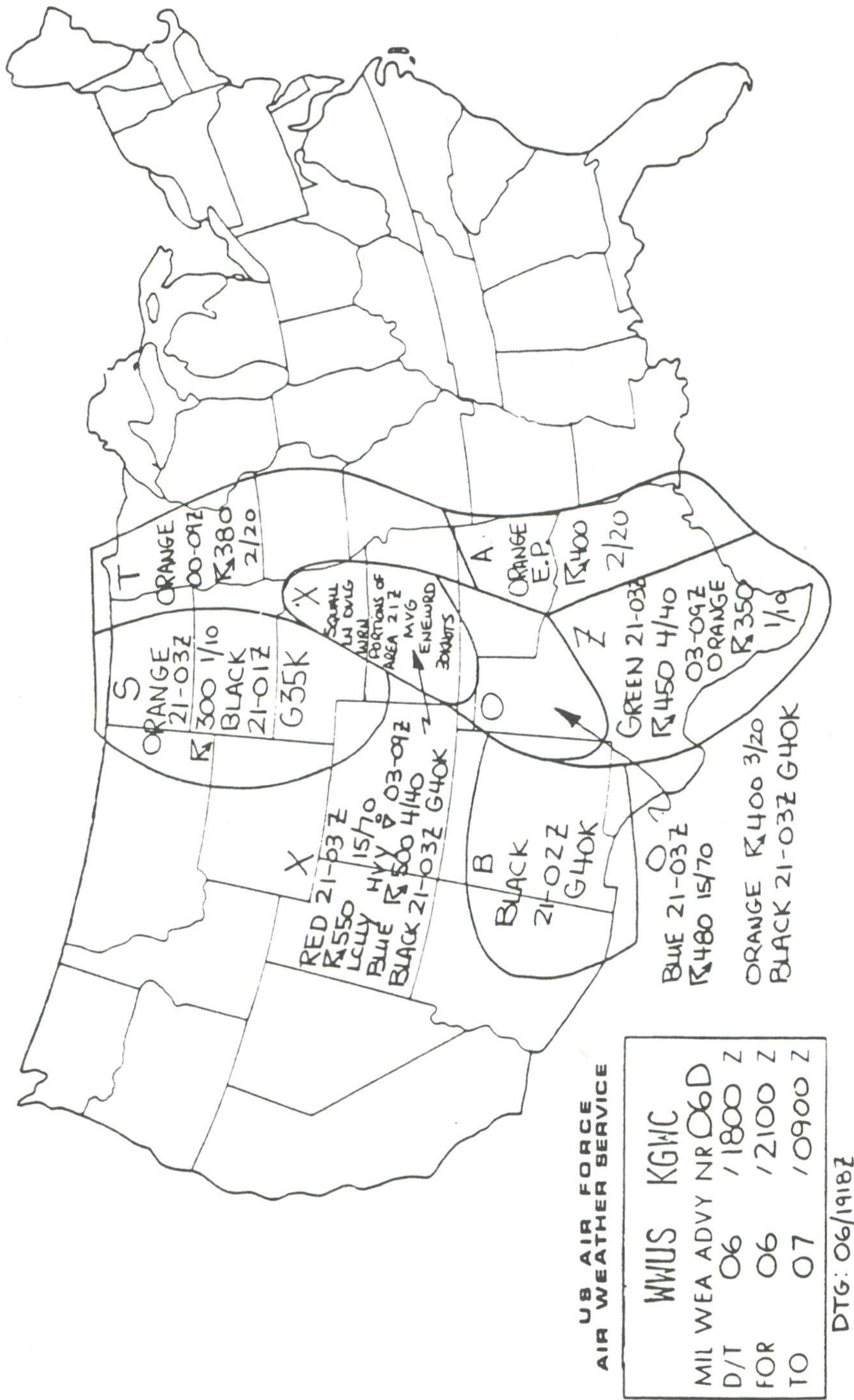


FIGURE 3-1. Example of Graphic Military Weather Advisory

3.4.2 Military Weather Advisories (MWA). AFGWC issues both graphic (Figure 3-1) and teletypewriter (Figure 3-2) Military Weather Advisories (MWAs) and Military Weather Advisory Further Outlooks (FO). Military Weather Advisories are issued four times daily, valid for 12-hour periods beginning at 0300Z plus every 6 hours. Further Outlooks are issued twice daily valid for 12-hour periods beyond the 0900Z and 2100Z MWAs. Each product gives the area where any of the weather elements listed in Table 3-1 are expected to occur during the valid period.

Table 3-1

Military Weather Advisory (MWA) Weather Elements

<u>COLOR</u>	<u>WEATHER ELEMENT(S)</u>
RED	Tornado
BLUE	Severe Thunderstorm
GREEN	Moderate Thunderstorm <ul style="list-style-type: none"> o Winds between 35 and 49 knots (18-25 m/s) inclusive or o Hail greater than or equal to 1/2 inch (13 mm) but less than 3/4 inch (20 mm) in diameter
ORANGE	Thunderstorm with winds less than 35 knots (18 m/s) and hail less than 1/2 inch (13 mm) in diameter
BLACK	Surface winds greater than or equal to 35 knots (18 m/s) not associated with a thunderstorm
PURPLE	Heavy rains greater than or equal to 2 inches (50 mm) in 12 hours
HATCHED PURPLE	Heavy snow greater than or equal to 2 inches (50 mm) in 12 hours
BROWN	Freezing Precipitation

3.4.2.1 Purpose and Use. The Military Weather Advisories are designed to provide basic guidance to both the field forecaster and to the point warning forecasters at AFGWC. These Advisories are issued at fixed times; preparation time is limited by data availability and presentation format. Advisories may cover fairly large areas as in the case of thunderstorms, snow, and strong gradient winds, but the areas of more severe weather--such as tornadoes and severe thunderstorms--are usually more limited in time and space.

3.4.2.2 Amendment. Advisories are amended when an unforecast criterion is observed and expected to continue or when an advisory no longer adequately describes the severity or valid times of a forecast criterion.

3.4.2.3 Geographical Interpretation. A clear plastic overlay containing a scaled outline of the conterminous States, placed on the teletypewriter message containing the Military Weather Advisory, will provide geographical orientation.

3.4.3 AFGWC Point Warnings. AFGWC Point Warnings are issued in plain language (see example below) for the same phenomena as Advisories. While Advisories provide general guidance to all military forecasters in terms of large and intermediate scale synoptic developments, AFGWC Point Warnings are issued for and to specific locations in the smallest scale of space and time consistent with the availability of data and the state-of-the-art. An effort is made to tailor the size of the points to the requirements of the using agency. The locations for which AFGWC has warning responsibility are listed in Volume III, Air Weather Service Pamphlet 105-52; the number of installations is approximately 500. Approximately 50 percent of these locations are U. S. Air Force, 45 percent are U. S. Army, and 5 percent are U. S. Navy. In addition to active military installations, AFGWC Point Warnings are issued for National Guard units, arsenals, ammunition plants, and other civilian activities under contract to the Department of Defense (DOD). AFGWC Point Warnings are issued for specific locations as the situation warrants in contrast to Advisories which are issued at scheduled intervals for fixed valid periods. AFGWC Point Warnings can be amended, extended, or cancelled as necessary.

AFGWC Point Weather Warnings:

- a. Provide specific warning to an installation where a forecaster is not assigned.
- b. Alert a responsible individual at locations with a limited forecast service.
- c. Alert and guide the field forecaster who has final responsibility for warning the agency supported.

EXAMPLE OF AFGWC POINT WARNING

.KOFF 17 12/0658Z
PWFL8 KGWC 1206554
C. MODERATE THUNDERSTORMS WITH 1/2 INCH HAIL AND SE GUSTS TO 45 KTS
VALID 120900Z TO 121100Z

D. THUNDERSTORMS WITH 1/4 INCH HAIL AND SE GUSTS TO LESS THAN 35 KTS
VALID 121100Z RO 121400Z
13

.KOFF 17 12/1453Z
PWND2 KGWC 121455
E. SURFACE WINDS SW AT 25 KNOTS WITH GUSTS TO 40 KNOTS
VALID 121700Z TO 130000Z
13

.KOFF 17 12/2335Z

PWNE3 KGWC 12233Z

A. TORNADO WARNING...TORNADOES AND SEVERE THUNDERSTORMS WITH 1 3/4 INCH
HAIL AND SSW GUSTS TO 55 KNOTS
VALID 130000Z TO 130130Z

G. HEAVY RAINS ACCUMULATING TO 2 INCHES
VALID CURRENT TO 130400Z

13

3.4.4 Local Air Weather Service (AWS) Unit Warning. At those locations where an Air Weather Service forecaster is on duty, the forecaster has final responsibility for warning those agencies being supported. The criteria and lead time for such local warnings are established locally based on customer needs.

3.5 Distribution of Watches, Warnings, and Severe Weather Reports by Flight Service Stations.

This Plan does not provide for the distribution of severe weather information by FSSs. However, these stations occasionally receive requests for such information or are given a severe weather report by an observer. Such information or requests will be referred to the WSO associated with the FSS receiving the information. That WSO will issue the warning or pass the information to the WSO which has the warning responsibility for the county in which the requestor or phenomenon is located. The Federal Aviation Administration, Air Traffic Service, FSS Procedures Branch (ATT-360), and the National Weather Service will include, with their agency directives, the communication methods for assuring that these requests and reports reach the appropriate WSO.

4. COMMUNICATIONS

4.1 National Weather Service Systems.

4.1.1 Automation of Field Operations and Services (AFOS). AFOS is an automated communications system that permits data, forecasts, warnings, and other meteorological products to be distributed faster than conventional teletypewriter or facsimile. The communications system for the contiguous United States consists of two types of circuits: Regional Distribution Circuits (RDCs) and State Distribution Circuits (SDCs). Minicomputers transmit data between most offices on dedicated telephone circuits. Each message transmitted is automatically assigned a transmission priority ranging from one (highest) to five (lowest). Warning messages and watches have the highest priorities.

4.1.2. NOAA Weather Wire Service (NWWS). The NWWS consists of local loops serving metropolitan areas and Statewide intrastate/interstate circuits. The purpose of NWWS is to transmit consumer-oriented forecasts, watches, weather warning, and meteorological data to the mass news media for broadcast to the public. Various specialized users also obtain drops on NWWS to meet their requirements.

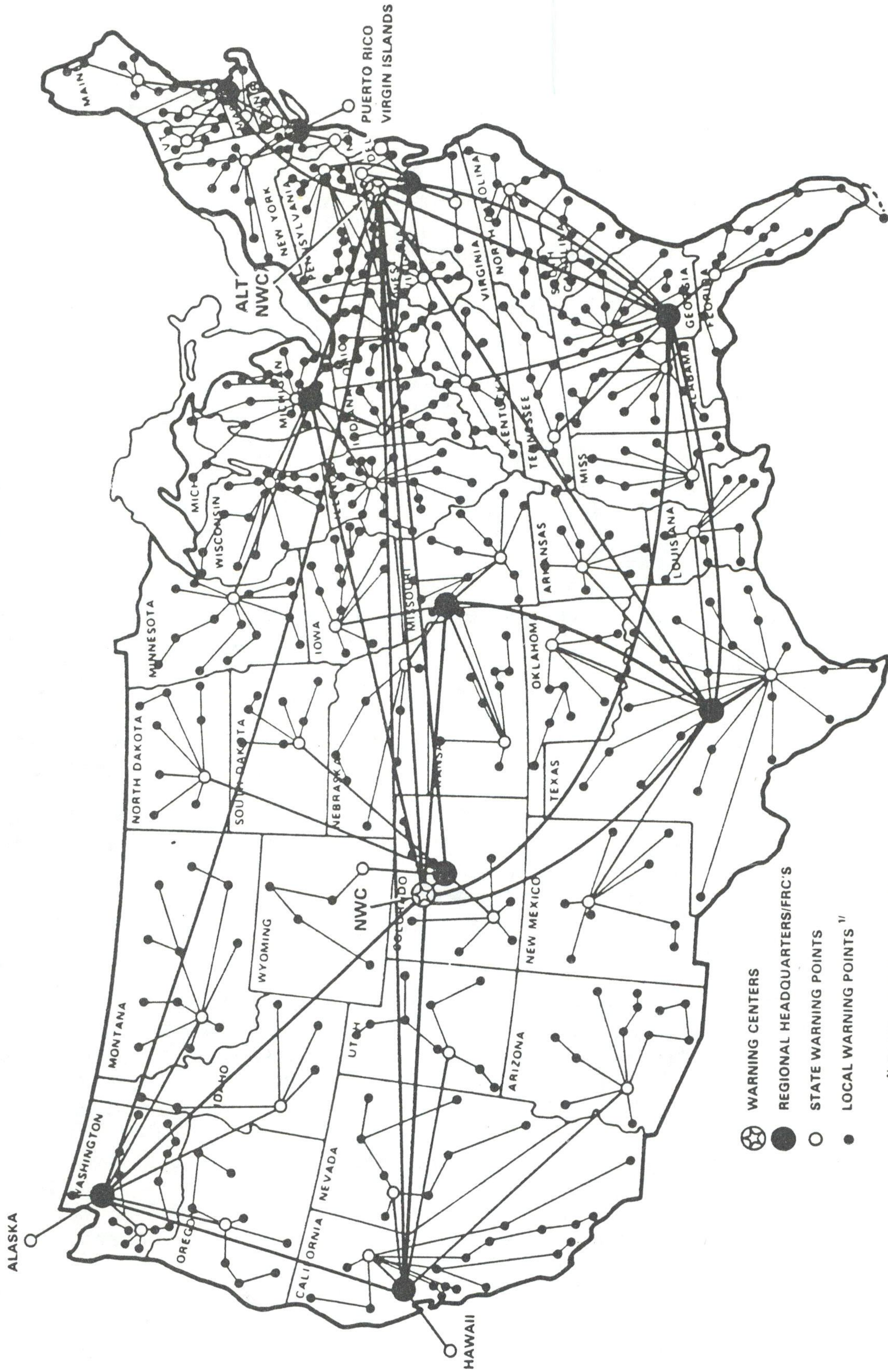
Only WSFOs and WSOs (or certain other authorized offices) have direct entry on these circuits. The Weather Service Forecast Offices furnish broad-scale information and both WSFOs and WSOs enter local information. Relays via AFOS are established as necessary to meet the requirements of the National Weather Service's Severe Local Storms Warning Service and of subscribers located along State or area borders. When urgent material such as a warning is transmitted, a prearranged bell signal is used to attract the attention of users to the transmission.

4.1.3. National Warning System (NAWAS). This is the Federal Emergency Management Agency (FEMA) operated hot line interstate telephone system which connects FEMA Warning Points, WSFOs, WSOs, and WSMOs (Weather Service Meteorological Observatory) within each State and between States. Figure 4-1 gives the location of FEMA warning points.

4.1.4. Emergency Broadcast System (EBS). EBS activation is requested for only tornado and flash flood warnings. Since EBS use is voluntary for individual radio and television stations, arrangements for its use are made prior to the severe local storm season, unless such use is a continuing agreement. EBS activation is not requested for severe thunderstorm warnings.

4.1.5 NOAA Weather Radio. WSOs/WSFOs equipped with NOAA Weather Radio can transmit continuous weather information on one of following frequencies: 162.400, 162.425, 162.450, 162.475, 162.500, 162.525, and 162.550 MHz. These radio transmitters provide continuous weather information to an area of about 40-mile (65 km) radius. Local radio and TV stations can record and rebroadcast the material even though land lines in the area may be disrupted. These transmitters have a tone signal alert capability which can be used to activate specially designed receivers. Figure 4-2 shows locations of NOAA Weather Radio transmitters, and Appendix C lists the stations and their frequencies.

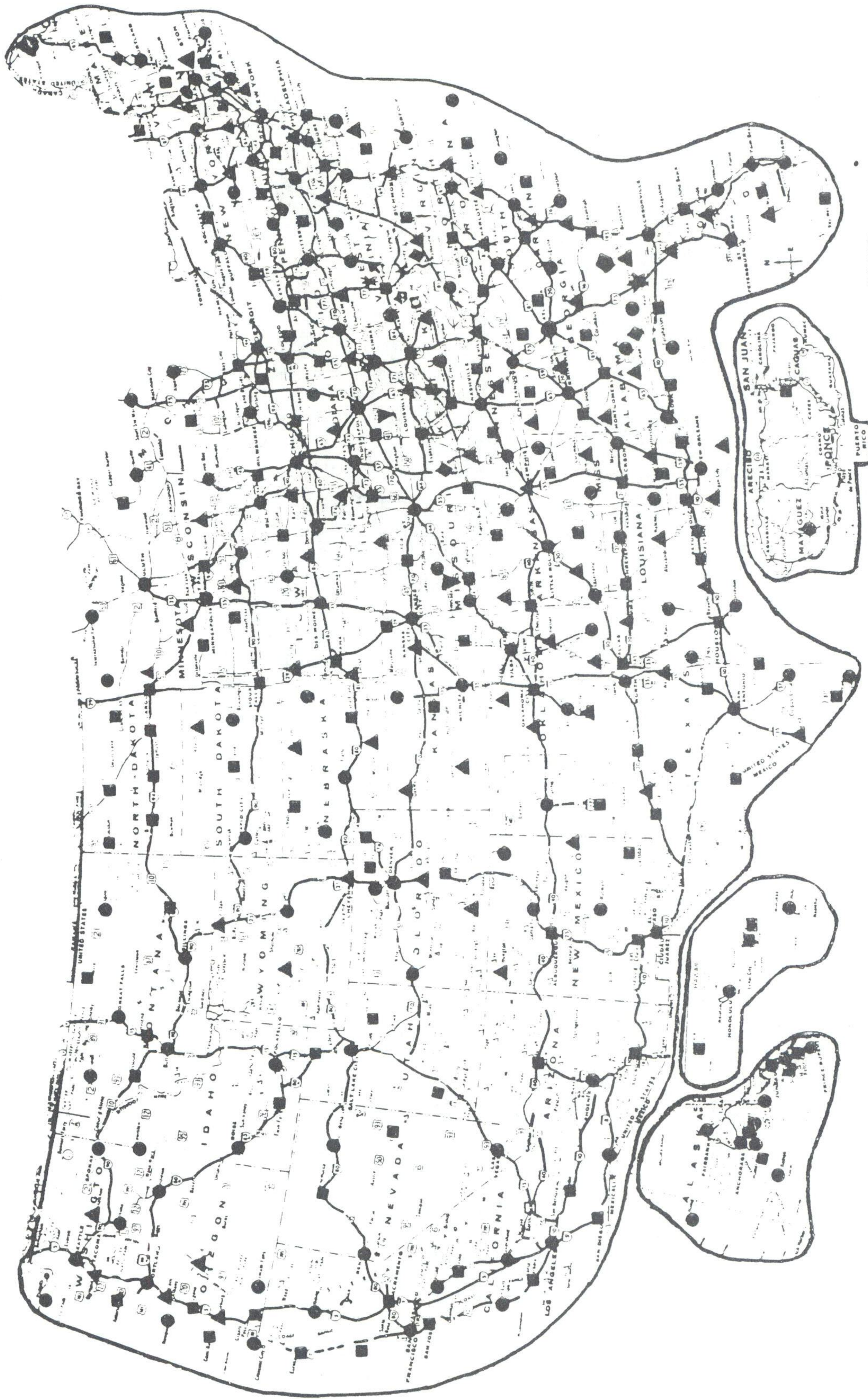
NATIONAL WARNING SYSTEM



1' SAMPLE REPRESENTATION OF TOTAL NUMBERS

July 1980

FIGURE 4-1. Federal Emergency Management Agency - NATIONAL WARNING SYSTEM.



LEGEND

BROADCAST FREQUENCIES (MHz)

Primary	Supplemental
● 162.550	● 162.525
■ 162.400	★ 162.500
▲ 162.475	◆ 162.450
	◆ 162.425

372 locations as of 1983-12-01

Figure 4-2. NOAA Weather Radio Network.

4.1.6 Miscellaneous. Other types of distribution methods are used, as appropriate, to make warnings available to other WSOs/WSFOs and to the public as rapidly as possible.

4.1.7 Distribution of Severe Weather Watch and Warning Bulletins. The distribution of Public Severe Weather Watch and Warning bulletins is shown in Figures 4-3 and 4-4. The distribution of In-Flight Weather Advisories is outlined in Figure 4-4.

4.2 U. S. Air Force (USAF) Systems.

4.2.1 Within the conterminous United States, USAF radar weather observations are collected by means of the Continental U.S. (CONUS) Meteorological Data System (COMEDS). Collected reports are transmitted from the Carswell Automatic Digital Weather Switch (ADWS) to Air Force Global Weather Central, the FAA Weather Message Switching Center (WMSC), and to the National Meteorological Center through computer-to-computer links. Severe radar reports are available to NSSFC/Radar Analysis and Development Unit in the bulletin that has the heading WOUS1 KAWN. Routine radar reports are transmitted from WMSC to NSSFC.

4.2.2 The COMEDS is divided into 20 geographic areas, with a single collecting and disseminating circuit covering each area (Figure 4-5).

4.2.3 The COMEDS is used to disseminate all Military Weather Advisories and Point Warnings issued by AFGWC.

4.3 Federal Aviation Administration (FAA) Systems.

4.3.1 Collection. Service "A" will be used for the collection and distribution of severe local storms information as follows:

- a. Hourly and Special Aviation Observations; and
- b. Special Aviation Observations.

4.3.2. Distribution. Service "A" will be used for the distribution of severe local storms information as follows:

- a. Preliminary notification of a forthcoming watch;
- b. Severe Weather Watch; and
- c. Airmen's Meteorological Information (AIRMETs), Significant Meteorological Information (SIGMETs), and Convective SIGMETs.

4.4 U. S. Navy.

COMEDS is used to collect and disseminate U. S. NAVY weather reports.

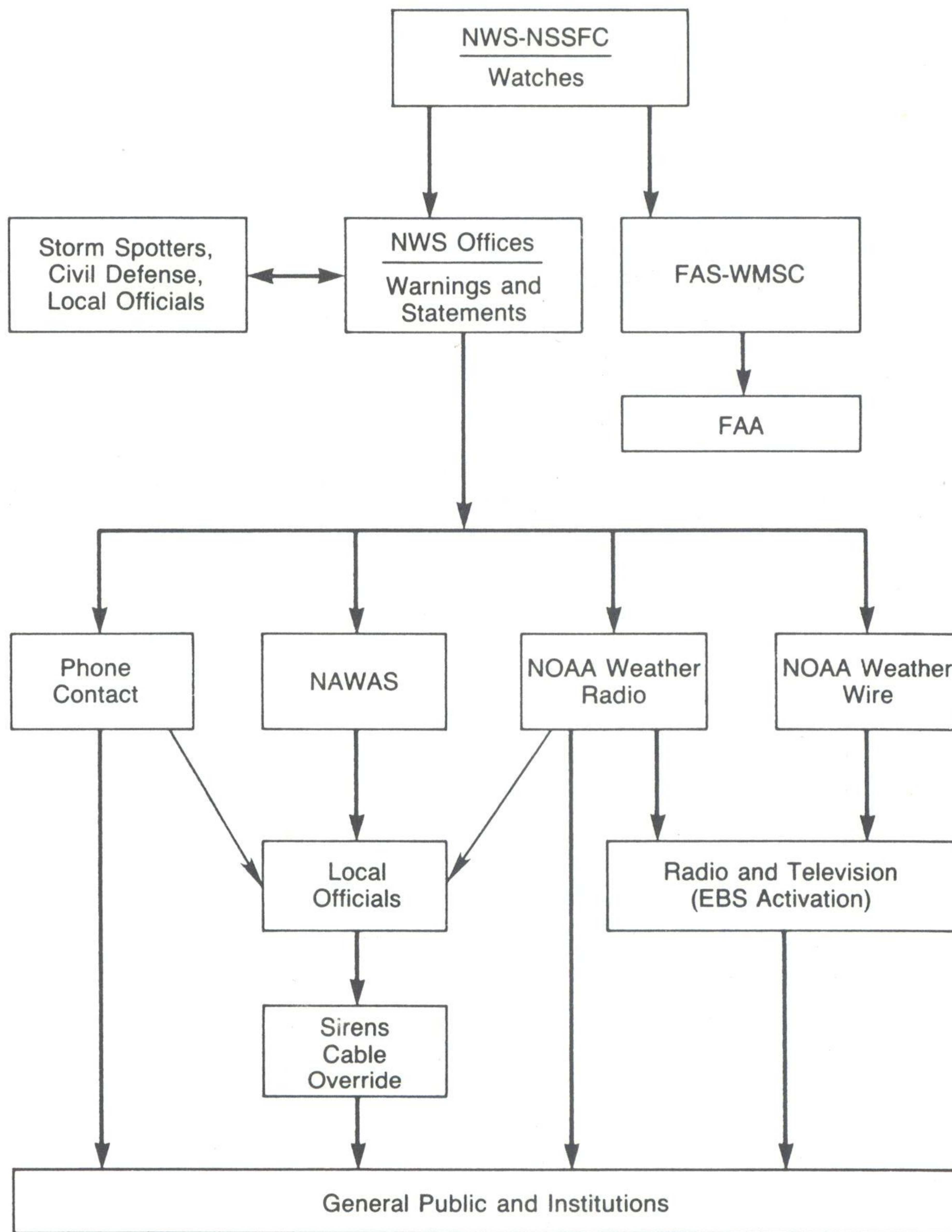


Figure 4-3. Distribution of Combined Severe Weather Watch and Warning Bulletins.

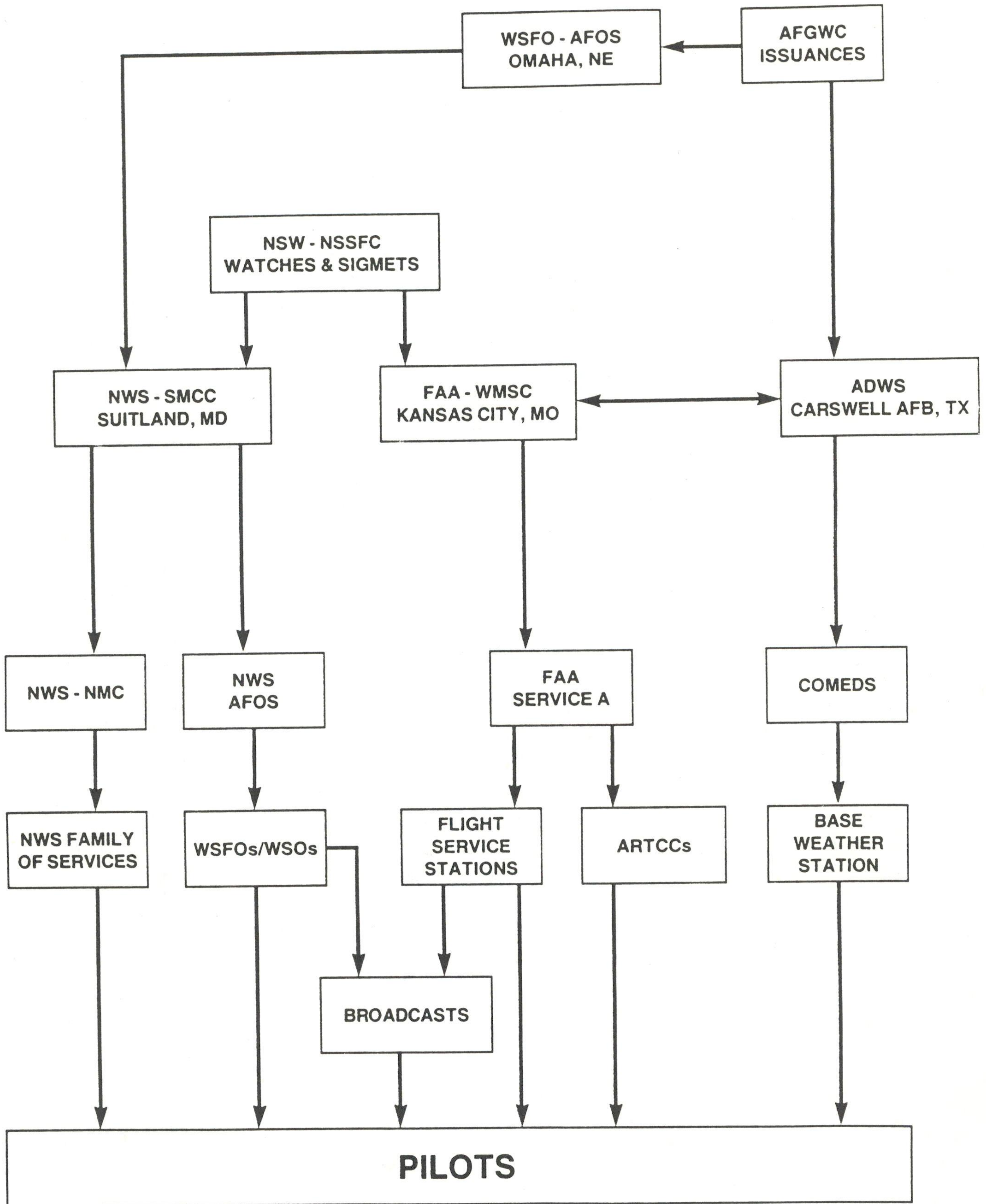


Figure 4-4. Distribution of Aviation Severe Weather Forecasts.

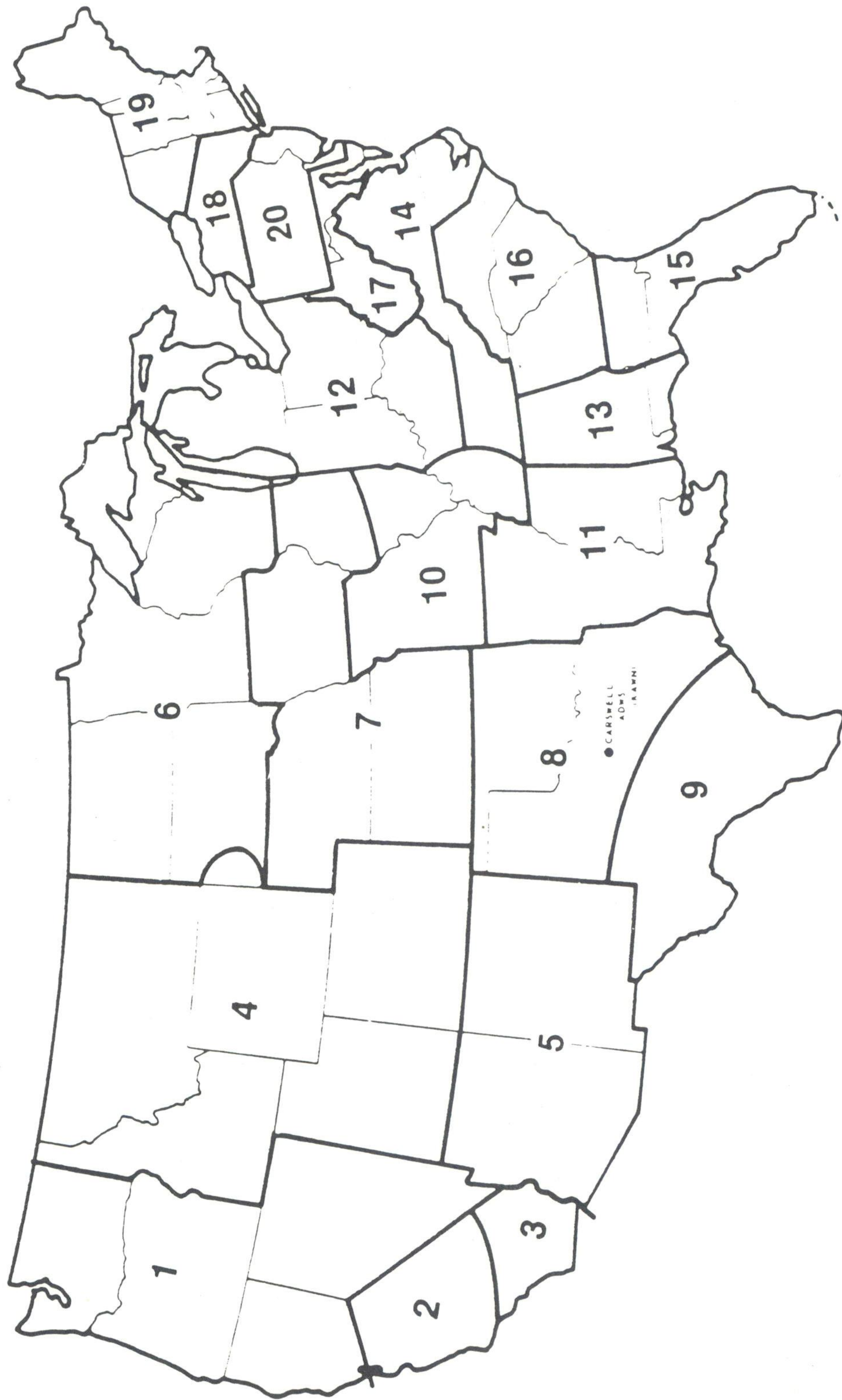


Figure 4-5. Geographical Areas of USAF CONUS Meteorological Data System.

5. OBSERVATIONS

5.1 Radar Observing and Reporting Plans.

5.1.1 Radar data, which are routinely used in the support of this Plan and in the preparation of National Severe Storms Forecast Center and Air Force Global Weather Central products, are available from radars of the U.S. Basic Weather Radar Network. This Network is composed of NWS radars, U.S. Air Force weather radars, and in the western United States, air route traffic control radars. The air route traffic control radars are connected to the Air Route Traffic Control Centers (ARTCC) at Salt Lake City, UT; Palmdale, CA; Albuquerque, NM; and Auburn, WA. NWS local warning radars supplement the network radars. National Weather Service personnel at Palmdale, Albuquerque, and Auburn develop a composite of the radar data from radars connected to these sites and transmit the data on the Radar Facsimile Circuit (RAFAX) to the National Weather Service Radar Unit at the Salt Lake City ARTCC. These data are then collated with the Salt Lake City radar data and transmitted on RAFAX to users throughout the West.

5.1.1.1 National Weather Service coded radar observations, including those from these four ARTCCs, are transmitted hourly on AFOS at H+35. More frequent observations are taken and transmitted on AFOS in severe weather situations. Hourly composites from ARTCCs are transmitted to a number of offices in the western intermountain region on the RAFAX circuit. Each ARTCC Radar Unit prepares a narrative summary of its composite and transmits the summary on AFOS. These summaries and selected hourly radar observations are transmitted hourly on selected Service A circuits by the Modernized Weather Teletypewriter Communications System in Kansas City.

5.1.1.2 At H+35, coded radar reports from the Air Weather Service (AWS) radar stations assigned to the U.S. Basic Weather Radar Network are forwarded to AFGWC from the Automated Digital Weather Switch (ADWS) at Carswell AFB by means of the data link. The NSSFC receives routine military radar weather observations from the ADWS through the FAA Weather Message Switching Center. Severe military RAREPs (those describing tornadoes, severe thunderstorms, or hail observations and carrying the bulletin heading WOUS) are obtained by dual means: (1) a drop on the COMEDS; and (2) through the FAA WMSC.

5.1.1.3 The National Weather Service, Air Force, and Navy operate a number of non-network radar facilities. Used primarily for local forecasting and warning and for immediate service to local agencies, these radars also provide selected information on severe storms. For example, all USAF weather radar facilities in the conterminous United States, whether or not they are assigned Network responsibilities, report radar-detected hailstorms, severe thunderstorms, and tornadoes on COMEDS and, when so requested, by telephone to the nearest WSFO or WSO (in accordance with Federal Meteorological Handbook No. 7).

5.1.2 The USAF air defense radar sites are capable of limited detection and interpretation of weather echoes. Appendix A lists the radar sites supporting each NORAD Region (NR). Operational commitments permitting, the radar sites within each region can provide limited supplementary weather data upon request. Contact by either AFGWC or NSSFC should be made by calling the appropriate AWS unit (see Appendix A).

5.1.3 If a WSO needs radar data from a nearby military radar (network, air defense, or local use), such data can be obtained by local arrangements between the National Weather Service Meteorologist-in-Charge/Official-in-Charge and the AWS Detachment Commander or the Naval Oceanography Command Commanding Officer/Officer-in-Charge of the activity operating the radar facility. Authorizations for such arrangements have been completed between the National Weather Service and the military agencies in prior agreements. These data will be supplied on a non-interference basis and should usually be limited to severe weather situations.

5.2 Rawinsonde-Observing Stations.

5.2.1 Network Stations. Rawinsonde observations are scheduled twice daily, 0000Z and 1200Z, at the 71 stations in the National Weather Service and Military Upper Air Network. These stations also take special observations whenever required and requested by the agency concerned.

Transponder capability is available at most stations to permit more accurate measurement of upper winds under strong wind conditions. Evaluated data from the routine soundings are transmitted over the Service C and COMEDS teletypewriter systems in the radiosonde code. Data from special soundings requested for potential or existing severe weather situations are transmitted by means of AFOS and other appropriate communications circuits to NSSFC and AFGWC. Special soundings transmitted on AFOS will use the standard upper air message heading to assure their relay to AFGWC.

5.2.2 Non-network Stations. The DOD takes unscheduled observations at a number of schools, at mobile locations, and at research, development, test, and evaluation facilities. However, because of the irregular scheduling of these observations, the military agencies concerned do not deem it advisable to include all of the observations in this Plan. Non-network upper air stations which might be sources of data are given in Table 5-1.

During the months of April, May, and June when the National Severe Storms Laboratory at Norman, Oklahoma, and other agencies are usually engaged in an intensive severe local storms data collection program in central Oklahoma, upper air soundings are taken at a number of locations in support of this program. However, these data are processed by computer and are not available for real-time use.

Table 5-1
 Non-Network Upper Air Stations Which Might be Sources of Data

<u>STATION</u>	<u>OPERATED BY</u>	<u>TIME OF OBSERVATIONS</u>	<u>DISTRIBUTION</u>	<u>AGENCY CONTACT</u>	<u>WILL TAKE REQUESTED SPECIALS</u>
Edwards AFB, CA	USAF	Unscheduled	COMEDS	Commander, Det. 21, 2nd Wea. Sq. AUTOVON 350-4318 COM 805-277-4318	Yes
Fort Benning, GA	USA	Unscheduled	COMEDS	Commander, Det. 10, 5th Wea. Sq. AUTOVON 835-7313 COM 404-545-7313	No
Fort Bragg, NC	USA	Unscheduled	COMEDS	Commander, Det. 3, 5th Wea. Sq. AUTOVON 236-3914 COM 919-396-3914	No
Fort Carson, CO	USA	Unscheduled	COMEDS	Commander, Det. 58, 5th Wea. Sq. AUTOVON 691-3651 COM 303-579-3620	No
Fort Hood, TX	USA	Unscheduled	COMEDS	Commander, Det. 14, 5th Wea. Sq. AUTOVON 737-9819 COM 817-532-9327	No
Fort Sill, OK	USA	Unscheduled	COMEDS	Commander, Det. 11, 5th Wea. Sq. AUTOVON 639-3200 COM 405-351-3200	No
Fort Polk, LA	USA	Unscheduled	COMEDS	Commander, Det. 31, 5th Wea. Sq. AUTOVON 863-2015 COM 318-537-2015	No
Fort Stewart, GA	USA	Unscheduled	COMEDS	Commander, Det 21, 5th Wea. Sq. AUTOVON 971-5432 COM 912-352-5207	No

Table 5-1 (continued)
 Non-Network Upper Air Stations Which Might be Sources of Data

<u>STATION</u>	<u>OPERATED BY</u>	<u>TIME OF OBSERVATIONS</u>	<u>DISTRIBUTION</u>	<u>AGENCY CONTACT</u>	<u>WILL TAKE REQUESTED SPECIALS</u>
Fort Riley, KS	USA	Unscheduled	COMEDS	Commander, Det 8, 5th Wea. Sq. AUTOVON 856-3327 COM 913-239-3327	No
Fort Campbell, KY	USA	Unscheduled	COMEDS	Commander, Det 1, 5th Wea. Sq. AUTOVON 635-2519 COM 502-798-2519	No
Fort Lewis, WA	USA	Unscheduled	COMEDS	Commander, Det 6, 5th Wea. Sq. AUTOVON 357-5967 COM 206-967-5967	No
Elgin AFB, FL	USAF	Unscheduled	COMEDS	Commander, Det 10, 2nd Wea. Sq. AUTOVON 872-5710 COM 904-882-5452	Yes
Marshall Space Flight Center, Huntsville, AL	NASA	Unscheduled, dependent upon operations	Local loop to WSO Huntsville, AL then to RAWARC	Bob Turner FTS 453-3109	Yes
Navy Pacific Missile Test Center, Point Mugu, CA	USN	Monday-Friday, 1300Z, 1800Z, and 2300Z	COMEDS	Mr. Hickson or Mr. Lee AUTOVON 351-8748 COM 805-982-8748	Yes
Navy Pacific Missile Test Center, San Nicolas Isl., CA	USN	Monday-Friday, 1800Z and 2300Z	COMEDS	Mr. Hickson or Mr. Lee AUTOVON 351-8748 COM 805-982-8748	Yes
White Sands Missile Range, NM	USA	Unscheduled	COMEDS	Chief, Forecast Section White Sands Met Team AUTOVON 258-2605/1032 COM 505-678-2605/1932	Yes

5.3 Surface Weather Observational Network.

To provide the basic weather data needed for the analyses performed by the National Meteorological Center, NSSFC, and AFGWC, all available surface data are used. The following stations provide data:

- a. WSFOs/WSOs/WSMOs and Automatic Meteorological Observing Stations;
- b. Federal Aviation Administration weather reporting stations--flight service stations, towers, and contract observer aviation weather reporting stations;
- c. DOD weather reporting stations.

These stations take observations and transmit coded observational data at regularly scheduled intervals. Transmissions are made hourly and even more frequently for aviation purposes, every 3 and 6 hours for synoptic map preparation, and daily for climatological purposes.

5.4 Pilot Reports (PIREPs).

a. The present FAA Instrument Flight Rules regulation (91.125, radio communications, section b) requires pilots to report, "(b) Any unforecast weather conditions encountered; and"

b. Pilots should report any weather condition they encounter which is hazardous to aviation.

c. FSSs, ARTCCs, and ATCTs accept, solicit and broadcast PIREPs. Additionally, ARTCCs and ATCTs pass PIREPs to FSSs for dissemination on the Service A teletypewriter circuit.

5.5 Severe Storm Surveillance by Meteorological Satellites.

5.5.1 Geostationary Operational Environmental Satellite (GOES). The GOES system currently consists of two operational spacecraft: GOES-6 at 135 degrees west longitude and GOES-7 at 75 degrees west longitude. The principal GOES products are half-hourly pictures with implanted grids automatically applied to all sectors. During daylight hours, approximately 1, 2, and 4 km resolution fixed standard sectors are produced. During the night (also available in daylight), the same geographical coverage standard sectors are produced with 7 km resolution infrared (IR). The IR data may be enhanced to emphasize various features. Floating sectors which are scheduled by the NWS Satellite Field Services Stations (SFSSs) are produced to augment the standard sector coverage support. Special products from GOES in support of NSSFC are described in the VAS Operation Plan developed by NESDIS Satellite Services Division. All products are delivered in near real time to the National Environmental Satellite, Data, and Information Service (NESDIS) Synoptic Analysis Branch (SAB), the NWS SFSSs and Weather Service Forecast Offices (WSFOs). (See GOES Operational Data Flow, Figure 5-1, and Satellite Data Availability, Table 5-2).

5.5.2 NOAA Polar-Orbiting Satellites. These satellites cross the U.S. twice daily near the equatorial crossing times as indicated in Table 5-2. Data are available via direct read-out (HRPT and APT) or central processing. AVHRR data are available on a limited basis through the GOES distribution system.

5.5.3 National Weather Service Satellite Field Services Stations (SFSS).

5.5.3.1 Support Concept. Under the NESDIS support concept, GOES imagery in support of the severe weather warning services is distributed by the Central Data Distribution Facility (CDDF) at Camp Springs, MD, to the SFSSs in Miami, San Francisco, Kansas City, Washington, Anchorage, and Honolulu. The Kansas City SFSS is an operational unit of the National Severe Storms Forecast Center (NSSFC) and is responsible for satellite support to collocated NSSFC units and field offices in the central U.S. from Canada to Mexico. Each SFSS, except Anchorage, has floating sectors which can be centered over significant weather areas at 1, 2, and 4 km resolutions for visible data and the same geographical coverage in 7 km IR data. In addition, Kansas City uniquely receives data via the NESDIS Rapid Interval Scan Operation Plan (RISOP) which provides data over the severe storm area every fifteen (15) minutes.

5.5.3.2 Station Contact. NWS satellite meteorologists can be contacted as follows:

Miami	Between 0630-1630 EDST and 2000-0400 EDST at 305-665-4704 and 4460	(FTS 350-4460)
San Francisco	24 h/day at 415-876-9122/23	(FTS 470-9122/23)
Washington	24 h/day at 301-763-8425	(FTS 763-8425)
Kansas City	24 h/day at 816-374-5395	(FTS 758-5395)
Honolulu	24 h/day at 808-836-2776 San Francisco FTS 556-0220, HNL 836-2776	(FTS-551-1698)
Anchorage	24 h/day at 907-271-3473 Seattle FTS 399-0150, ANC 271-3173	(907-271-3801)

Table 5-2

Satellite and Satellite Data Availability for Severe Local Storms Season

SATELLITE	TYPE OF DATA	LOCAL TIME	REMARKS
GOES-6 - 135°W	VISSR/VAS	Every 30 min. (24/day) (Limited scan for short- interval viewing available)	1. 1, 2 and 4 km resolution visible standard sectors (daylight). 2. 7 km resolution equivalent IR geographic standard sectors (night). 3. Equivalent IR-enhanced imagery. 4. Floating sectors at 1, 2 and 4 km resolution (visible) (equivalent IR 7 km). 5. Full disc IR (day and night).
GOES-7 - 75°W	VISSR/VAS	Same as GOES-6	Same as GOES-6
NOAA-9	AVHRR GAC and LAC (recorded) HRPT and APT (direct) TOVS	1526/0326	1. Composite non-real-time imagery. 2. Sea-surface temperatures. 3. Moisture analysis. 4. Soundings.
NOAA-10	AVHRR GAC and LAC (recorded) HRPT and APT (direct) TOVS	1936/0736	Same as NOAA-9

VISSR - Visible Infrared Spin Scan Radiometer
VAS - VISSR Atmospheric Sounder
GAC - Global Area Coverage (recorded reduced resolution for central processing)
LAC - Local Area Coverage (recorded high-resolution data, limited amount)
TOVS - TIROS Operational Vertical Sounder
HRPT - High Resolution Picture Transmission
APT - Automated Picture Transmission (4 km)
AVHRR - Advanced Very High Resolution Radiometer

5.5.4 DOD Defense Meteorological Satellite Program (DMSP) Polar-Orbiting System. These satellites cross the equator at local sunrise and near noon. Data are processed by AFGWC and are available to NESDIS through the shared METSAT program for further distribution to civilian agencies. DMSP data are currently archived by NESDIS at the University of Colorado and are available for use in severe weather research.

5.6 Severe Local Storm Actions of Nonmeteorological Agencies and Individuals.

The National Weather Service uses observations of severe local storms, particularly tornadoes, from many nonmeteorological agencies and personnel such as: utility companies, State Highway Patrols, local police departments, road maintenance patrols, citizen spotters (network), cooperative National Weather Service climatological observers, amateur radio groups, local Civil Defense organizations, radio and television station mobile units, city employees (for example, the Chicago Sanitary District), and individual citizens.

Reports are received by various means and are not uniform at each office. The means include amateur radio or Civil Defense radio facilities with a transceiver often located in the WSO and operated by local cooperators, police radio, direct telephone lines involving unlisted numbers, the National Warning System (NAWAS), State Highway Patrols, teletypewriter circuits by means of telephone or a teletypewriter on statewide NOAA Weather Wire Service (NWWS) circuits, and Service A teletypewriter circuits.

Reports are disseminated to mass news disseminators, to other WSOs, and to safety agencies by NWS circuits (first priority, except for a more expedient means in some local areas), NAWAS, telephones (hotlines and commercial), and Civil Defense radio facilities. The "fan-out" principle is used wherever practical.

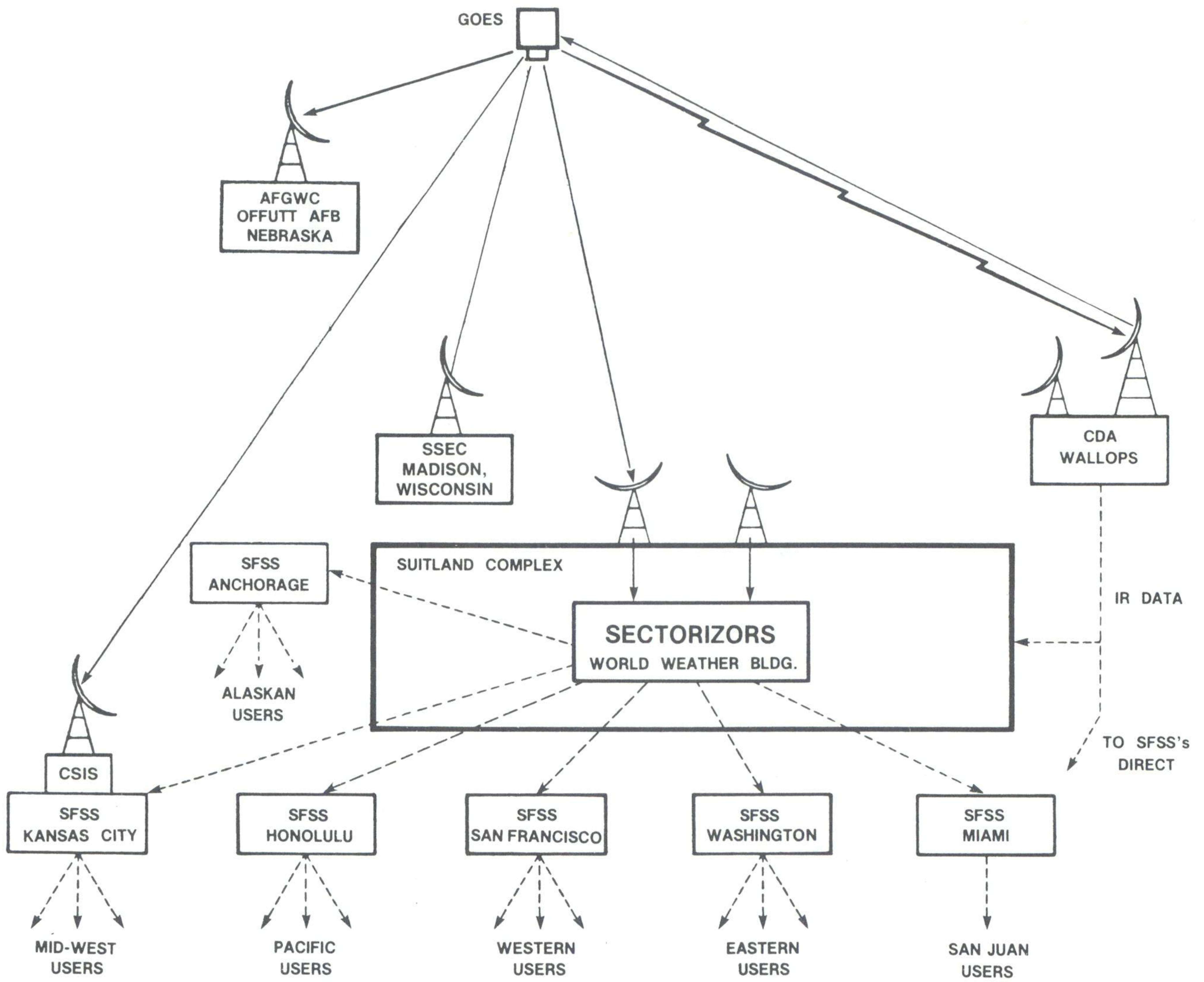


Figure 5-1. GOES Operational Data Flow

6. NEWS RELEASES

The Military Weather Advisories and Point Warnings of the Air Force Global Weather Central (AFGWC) are designed for specialized military users and shall not be released to the public. News media releases that concern the cooperative efforts in severe storms activities of the Department of Defense, NOAA weather services, and other agencies should reflect the joint nature of these efforts by giving due credit to participating agencies. Copies of these releases should be forwarded to:

Environmental Services Division
OJCS
Washington, D.C. 20301

Director of Operations and Readiness
Airspace and Air Traffic Service Division
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APPENDIX A
NORAD REGION (NR) JOINT USE AND MILITARY ONLY RADAR SITES

The supporting AWS units of each of the listed NORAD Regions (NR) can obtain appropriate operational permission, contact military/civilian controllers at the NR radar sites within each region's area of responsibility, and obtain limited radar weather data.

<u>NR</u>	<u>SECTOR</u>	<u>AWS UNIT</u>	<u>TELEPHONE NUMBERS</u>	<u>RADAR SITE</u>
24	NE US	Det 8, 26 WS Griffis AFB, NY	AUTOVON 587-3444 COM 315-330-3444	N. Truro AFS, MA Bucks Harbor, ME Empire, MI Calumet AFS, MI Port Austin AFS, MI Nashwauk, MN Gibbsboro AFS, NY Dansville, NY Remsen (Utica), NY Riverhead (Suffolk), NY Washington, DC
	SE US	Det 9, 3 WS Tyndall AFB, FL	AUTOVON 970-2856 COM 904-283-2856	Grand Bay, AL Cape Canaveral, FL Cross City, FL Cudjoe Key, FL Ft. Lonesome, FL Key West, FL Patrick AFB, FL Richmond, FL Tyndall AFB, FL Whitehouse, FL Lake Charles, LA Slidell, LA Ft. Fisher, NC Jedburg, SC Ellington AFB, TX Oilton, TX Oceana, VA
25	NW US	Det 11, 17 WS McChord AFB, WA	AUTOVON 976-3434 COM 206-984-3434	Crescent City, CA Kalispell, MT Malmstrom AFB, MT Finley AFS, ND Watford City, ND Keno, OR Salem, OR Makah AFS, WA Mica Peak, WA
	SW US	Det 7, 9 WS March AFB, CA	AUTOVON 947-2463 COM 714-655-2463	Phoenix, AZ Mill Valley AFS, CA Mt Laguna AFS, CA Paso Robles, CA Point Arena AFS, CA San Pedro, CA Silver City, NM El Paso, TX Odessa, TX Sonora, TX

APPENDIX B

RECOMMENDED LETTER OF AGREEMENT BETWEEN LOCAL UNITS OF NWS AND USAF

FROM: DET X, X WW, _____ AFB _____
SUBJECT: Letter of Agreement (LOA) - Notification of Severe Convective Weather
TO: (Appropriate NWS Office)

1. Introduction.

a. Purpose. To establish responsibilities and procedures for (Appropriate NWS office) to notify (Det X, X WW or military installation) when severe convective weather is expected to affect (military installation or site) and the supporting AWS detachment, Det X, X WW, is not staffed by a forecaster or the detachment's radar is inoperative.

b. Severe convective weather is defined as thunderstorms with winds of 50 knots (25 m/s) or more, hail 3/4 inch (20 mm) in diameter or larger, or tornadoes.

c. This LOA supersedes LOA dated _____ which should be destroyed.

2. Specific Terms of the Agreement.

a. Det X, X WW, will:

(1) Notify (appropriate NWS office) when Det X is not staffed by a forecaster. Normal forecaster duty hours are as follows:

(Describe normal forecaster duty hours)

(2) Notify (appropriate NWS office) when Det X's radar is inoperative except for normal preventive maintenance. Additionally, Det X will notify (appropriate NWS office) when their radar becomes operational again.

(3) Provide (appropriate NWS office) a single point of contact for notification. Telephone number for this point of contact is XXX-XXXX. Det X will inform (Appropriate NWS office) of changes in this point of contact or telephone number.

b. The (appropriate NWS office) will:

(1) Notify (appropriate military installation) by calling (single point of contact/telephone number) whenever a severe local storm warning is issued for the area including (military installation or site), when Det X, X WW is not staffed by a forecaster or Det X's radar is inoperative.

(2) Provide notification by telephone. This notification will be made only after dissemination commitments are completed and only when doing so will not impact public warning operations. Only one telephone call will be made; however, if line is busy, one additional call will be made.

(3) Notify Det X, X WW when its radar is inoperative except for normal maintenance.

c. Detachment X and (appropriate NWS office) will, as workload permits, pass to each other, by telephone, local severe weather information of mutual benefit to both agencies. Such information will include, but will not be limited to, reported hail, damaging winds, tornadoes, or radar observations indicating severe thunderstorms or tornadoes.

Signature
Meteorologist in Charge
or Official in Charge

Signature
Detachment Commander

Date _____

Date _____

APPENDIX C

NOAA WEATHER RADIO NETWORK

Legend-Frequencies are identified as follows:

- (1)-162.550 MHz
- (2)-162.400 MHz
- (3)-162.475 MHz
- (4)-162.425 MHz
- (5)-162.450 MHz
- (6)-162.500 MHz
- (7)-162.525 MHz

Location	Frequency
Alabama	
Anniston	3
Birmingham	1
Demopolis	3
Dozier	1
Florence	3
Huntsville	2
Louisville	3
Mobile	1
Montgomery	2
Tuscaloosa	2
Alaska	
Anchorage	1
Cordova	1
Fairbanks	1
Homer	2
Juneau	1
Ketchikan	1
Kodiak	1
Nome	1
Petersburg	1
Seward	1
Sitka	1
Valdez	1
Wrangell	2
Yakutat	2
Arizona	
Flagstaff	2
Lake Powell	1
Phoenix	1
Tucson	2
Yuma	1

Location	Frequency
Arkansas	
Fayetteville	3
Fort Smith	2
Gurdon	3
Jonesboro	1
Little Rock	1
Mountain View	2
Star-City	2
Texarkana	1
California	
Bakersfield	1
Coachella	2
Eureka	2
Fresno	2
Los Angeles	1
Lindsay	6
Monterey	2
Point Arena	2
Redding	1
Sacramento	1
San Diego	2
San Francisco	2
San Luis Obispo	1
Santa Barbara	2
Colorado	
Alamosa	3
Colorado Springs	3
Denver	1
Grand Junction	1
Greeley	2
Longmont	1
Pueblo	2
Sterling	2

Location	Frequency
Connecticut	
Hartford	3
Meriden	2
New London	1
Delaware	
Lewes	1
District of Columbia	
Washington, D.C.	1
Florida	
Clewiston	2
Daytona Beach	2
Fort Myers	3
Gainesville	3
Jacksonville	1
Key West	2
Melbourne	1
Miami	1
Orlando	3
Panama City	1
Pensacola	2
Tallahassee	2
Tampa	1
West Palm Beach	3
Georgia	
Athens	2
Atlanta	1
Augusta	1
Baxley	7
Chatsworth	2
Columbus	2
Macon	3
Pelham	1
Savannah	2
Valdosta	6
Waycross	3
Waynesboro	4
Hawaii	
Hilo	1
Honolulu	1
Kokee	2
Mt. Haleakala	2
Waimanalo	2

Location	Frequency
Idaho	
Boise	1
Lewiston	1
Pocatello	1
Twin Falls	2
Illinois	
Champaign	1
Chicago	1
Marion	4
Moline	1
Peoria	3
Rockford	3
Springfield	2
Indiana	
Bloomington	5
Evansville	1
Fort Wayne	1
Indianapolis	1
Lafayette	3
South Bend	2
Terre Haute	2
Iowa	
Cedar Rapids	3
Des Moines	1
Dubuque	2
Sioux City	3
Waterloo	1
Kansas	
Chanute	2
Colby	3
Concordia	1
Dodge City	3
Ellsworth	2
Topeka	3
Witchita	1

Location	Frequency
Kentucky	
Ashland	1
Bowling Green	2
Covington	1
Elizabethtown	2
Hazard	3
Lexington	2
Louisville	3
Mayfield	3
Pikeville	2
Somerset	1
Louisiana	
Alexandria	3
Baton Rouge	2
Buras	3
Lafayette	1
Lake Charles	2
Monroe	1
Morgan City	3
New Orleans	1
Shreveport	2
Maine	
Caribou	7
Dresden	3
Ellsworth	2
Portland	1
Maryland	
Baltimore	2
Hagerstown	3
Salisbury	3
Massachusetts	
Boston	3
Hyannis	1
Worcester	1

Location	Frequency
Michigan	
Alpena	1
Detroit	1
Flint	2
Grand Rapids	1
Houghton	2
Marquette	1
Onondaga	2
Sault Sainte Marie	1
Traverse City	2
Minnesota	
Detroit Lakes	3
Duluth	1
International Falls	1
Mankato	2
Minneapolis	1
Rochester	3
Saint Cloud	3
Thief River Falls	1
Willmar	2
Mississippi	
Ackerman	3
Booneville	1
Bude	1
Columbia	2
Gulfport	2
Hattiesburg	3
Inverness	1
Jackson	2
Meridian	1
Oxford	2
Missouri	
Columbia	2
Camdenton	1
Hannibal	3
Hermitage	5
Joplin/Carthage	1
Kansas City	1
St. Joseph	2
St. Louis	1
Sikeston	2
Springfield	2

Location	Frequency
Montana	
Billings	1
Butte	1
Glasgow	1
Great Falls	1
Havre	2
Helena	2
Kalispell	1
Miles City	2
Missoula	2
Nebraska	
Bassett	3
Grand Island	2
Holdrege	3
Lincoln	3
Merriman	2
Norfolk	1
North Platte	1
Omaha	2
Scottsbluff	1
Nevada	
Elko	1
Ely	2
Las Vegas	1
Reno	1
Winnemucca	2
New Hampshire	
Concord	2
New Jersey	
Atlantic City	2
New Mexico	
Albuquerque	2
Clovis	3
Des Moines	1
Farmington	3
Hobbs	2
Las Cruces	2
Ruidoso	1
Santa Fe	1

Location	Frequency
New York	
Albany	1
Binghamton	3
Buffalo	1
Elmira	2
Kingston	3
New York City	1
Riverhead	3
Rochester	2
Syracuse	1
North Carolina	
Asheville	2
Cape Hatteras	3
Charlotte	3
Fayetteville	3
New Bern	2
Raleigh/Durham	1
Rocky Mount	3
Wilmington	1
Winston-Salem	2
North Dakota	
Bismarck	2
Dickinson	2
Fargo	2
Jamestown	2
Minot	2
Petersburg	2
Williston	2
Ohio	
Akron	2
Cambridge	3
Cleveland	1
Columbus	1
Dayton	3
Lima	2
Sandusky	2
Toledo	1

Location	Frequency
Oklahoma	
Clinton	3
Enid	3
Lawton	1
McAlester	3
Oklahoma City	2
Tulsa	1
Oregon	
Astoria	2
Brookings	1
Coos Bay	2
Eugene	2
Klamath Falls	1
Medford	2
Newport	1
Pendleton	2
Portland	1
Roseburg	3
Salem	3
Pennsylvania	
Allentown	2
Clearfield	1
Erie	2
Harrisburg	1
Johnstown	2
Philadelphia	3
Pittsburgh	1
State College	3
Towanda	3
Wellsboro	1
Wilkes-Barre	1
Williamsport	2
Puerto Rico	
Maricao	1
San Juan	2
Rhode Island	
Providence	2

Location	Frequency
South Carolina	
Beaufort	3
Charleston	1
Columbia	2
Cross	3
Florence	1
Greenville	1
Myrtle Beach	2
Sumter	3
South Dakota	
Aberdeen	3
Huron	1
Pierre	2
Rapid City	1
Sioux Falls	2
Tennessee	
Bristol	1
Chattanooga	1
Cookeville	2
Jackson	1
Knoxville	3
Memphis	3
Nashville	1
Shelbyville	3
Waverly	2

Location	Frequency
Texas	
Abilene	2
Amarillo	1
Austin	2
Beaumont	3
Big Spring	3
Brownsville	1
Bryan	1
Corpus Christi	1
Dallas	2
Del Rio	2
El Paso	3
Fort Worth	1
Galveston	1
Houston	2
Laredo	3
Lubbock	2
Lufkin	1
Midland	2
Paris	1
Pharr	2
San Angelo	1
San Antonio	1
Sherman	3
Tyler	3
Victoria	2
Waco	3
Wichita Falls	3
Utah	
Logan	2
Cedar City	2
Vernal	2
Salt Lake City	1
Vermont	
Burlington	3
Marlboro	4
Windsor	3
Virginia	
Heathsville	2
Lynchburg	1
Norfolk	1
Richmond	3
Roanoke	3

Location	Frequency
Washington	
Neah Bay	1
Olympia	3
Seattle	1
Spokane	2
Wenatchee	3
Yakima	1
West Virginia	
Beckley	6
Charleston	2
Clarksburg	1
Gilbert	7
Hinton	4
Romney	7
Spencer	6
Sutton	5
Wisconsin	
La Crosse	1
Green Bay	1
Madison	1
Menomonie	2
Milwaukee	2
Park Falls	6
Wausau	3
Wyoming	
Casper	1
Cheyenne	3
Lander	3
Sheridan	3
U. S. Virgin Islands	
St. Thomas	3

APPENDIX D

ABBREVIATIONS AND ACRONYMS

AAT	Air Traffic Service (FAA)
AD	Air Division
ADWS	Automatic Digital Weather Switch
AFB	Air Force Base
AFGL	Air Force Geophysical Laboratory
AFGWC	Air Force Global Weather Central
AFOS	Automation of Field Operations and Services
AFS	Air Force Station
AIRMET	Airmen's Meteorological Information
AM	Amplitude Modulation
ANGB	Air National Guard Base
APT	Automatic Picture Transmission
ARTCC	Air Route Traffic Control Center
ATCT	Air Traffic Control Tower
AWS	Air Weather Service
AW	Aviation Tornado Watch
AVHRR	Advanced Very High Resolution Radiometer
CDDF	Central Data Distribution Facility
CONUS	Continental United States
COMEDS	CONUS Meteorological Data System
DMSP	Defense Meteorological Satellite Program
DOD	Department of Defense
EBS	Emergency Broadcast System
FAA	Federal Aviation Administration
FCMSSR	Federal Committee for Meteorological Services and Supporting Research
FCM	Federal Coordinator for Meteorology
FEMA	Federal Emergency Management Agency
FM	Frequency Modulation
FO	Military Weather Advisory Future Outlooks
FSS	Flight Service Station
FTS	Federal Telecommunications Service
GAC	Global Area Coverage 4 km Resolution
GOES	Geostationary Operational Environmental Satellite
HRPT	High Resolution Picture Transmission
IAP	International Airport
ICMSSR	Interdepartmental Committee for Meteorological Services and Supporting Research
IR	Infrared

LAC	Local Area Coverage 1.1 km resolution
LF	Light Fine Video Data (1/3 nm (0.6 km))
LOA	Letter of Agreement
LS	Light Smooth Video Data (1.5 - 2.0 nm (2.8 - 3.7 km))
LVL	Level
MDR	Manually Digitized Radar
METWATCH	Meteorological Watch
MIC	Maximum Instantaneous Coverage
MKC	Kansas City
MSU	Microwave Sounding Unit
MWA	Military Weather Advisory
NAFAX	National Facsimile Network
NASA	National Aeronautics and Space Administration
NAWAS	National Warning System
NESDIS	National Environmental Satellite, Data, and Information Service
NHC	National Hurricane Center
NMC	National Meteorological Center
NOAA	National Oceanic and Atmospheric Administration
NR	NORAD Region
NRC	Nuclear Regulatory Commission
NSSFC	National Severe Storms Forecast Center
NSSL	National Severe Storms Laboratory
NWS	National Weather Service
NWWS	NOAA Weather Wire Service
OJCS	Organization of the Joint Chiefs of Staff
PATWAS	Pilots Automatic Telephone Weather Advisory Service
PIBAL	Pilot Balloon
PIREP	Pilot Report
R&D	Research and Development
RAREP	Radar Report
RAWIN	Rawinsonde
SAB	Synoptic Analysis Branch
SD	Circuit Heading for Radar Reports
SFSS	Satellite Field Service Station
SIGRAD	Significant Radar Message
SIGMET	Significant Meteorological Information
SR	Stored Data
SRC	State Relay Center
SSU	Stratospheric Sounding Unit
TAA	Total Area Affected
TF	Thermal Fine Data (1/3 nmi (0.6 km))
TIROS	Television Infrared Observation Satellite
TOVS	TIROS Operational Vertical Sounders
TS	Thermal Smooth Data (1.5 - 2.0 nm (2.8 - 3.7 km))
TWEB	Transcribed Weather Broadcast

USA	United States Army
USAF	United States Air Force
USMC	United States Marine Corps
USN	United States Navy
UTC	Universal Coordinated Time
VAS	VISSR Atmospheric Sounder
VHRR	Very High Resolution Radiometer
VIP	Video Integrated Processor
VISSR	Visible Infrared Spin Scan Radiometer
VOR	VHF Omni-Directional Radio Range
WIBIS	Severe Weather Watch Will Be Issued
WMSC	Weather Message Switching Center
WSFO	Weather Service Forecast Office
WSMO	Weather Service Meteorological Observatory
WSO	Weather Service Office
WSOM	Weather Service Operations Manual

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