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

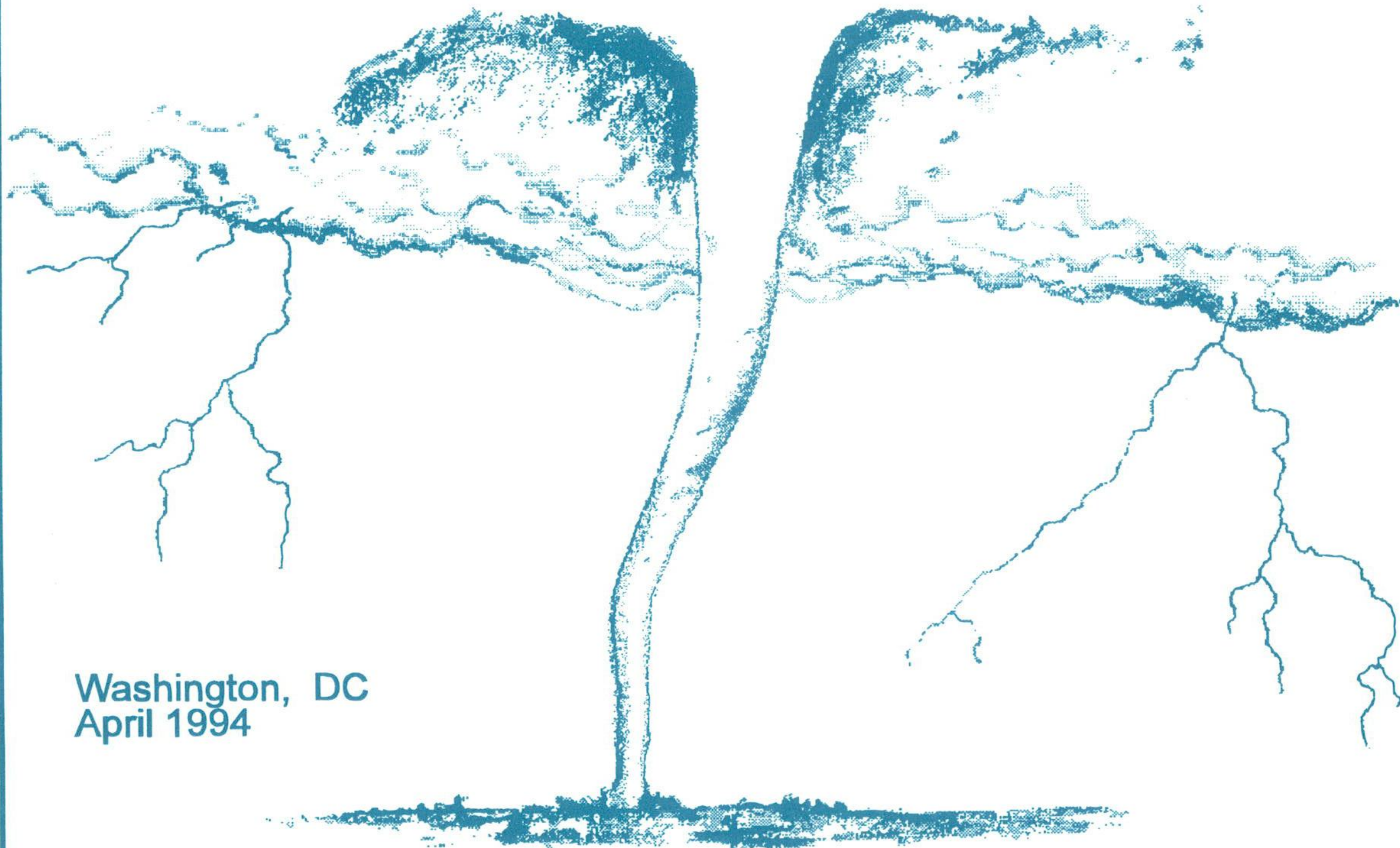
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OFFICE OF THE FEDERAL COORDINATOR FOR
METEOROLOGICAL SERVICES AND SUPPORTING RESEARCH

National Severe Local Storms Operations Plan

FCM-P11-1994



Washington, DC
April 1994

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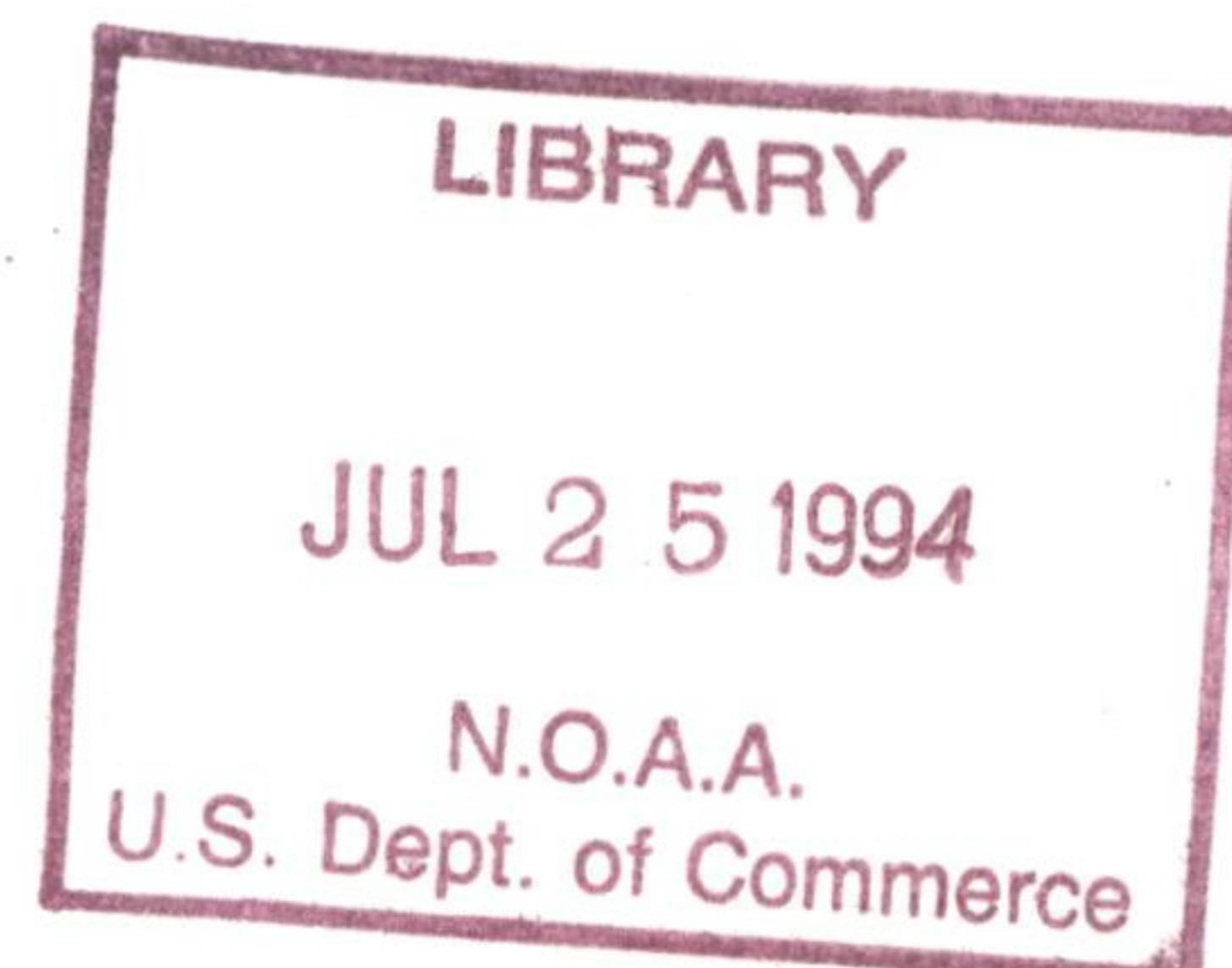
1994

**FEDERAL COORDINATOR
FOR
METEOROLOGICAL SERVICES AND SUPPORTING RESEARCH**

6010 EXECUTIVE BOULEVARD, SUITE 900
Rockville, Maryland 20852

NATIONAL SEVERE LOCAL STORMS OPERATIONS PLAN

Washington, DC
April 1994



CHANGE AND REVIEW LOG

Use this page to record changes and notices and reviews.

Change Number	Page Numbers	Date Posted	Initials
1			
2			
3			
4			
5			
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7			
8			
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10			

Changes are indicated by a vertical line in the margin next to the change.

Review Date	Comments	Initials

FOREWORD

This is the twenty-second 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 1990 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.

The National Weather Service (NWS) is now undergoing a major modernization and associated restructuring effort. As a result, a wide variety of warning and forecasting operations including severe local storms will be significantly affected. The transition to this new NWS is expected to extend well into the decade. In view of this, the present plan can be expected to require frequent and possibly major revision over the next several years.

Additional information describing the warning programs of the participating agencies can be found in Air Force Pamphlet 105-30, Weather Station Operations Guide; National Weather Service Operations Manual, Chapter C-40, Severe Local Storm Warnings; and Operations of the National Weather Service.



Julian M. Wright, Jr.
Federal Coordinator for
Meteorological Services and
Supporting Research



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CHAPTER 1

1. RESPONSIBILITIES OF COOPERATING AGENCIES

Cooperation and communication among agencies which provide essential meteorological data, information, and dissemination services is the basis for ensuring that users receive the best possible warnings and forecasts of severe local storms. This coordination is achieved through the activities of the Committee for Basic Services (CBS) and the Working Group for Severe Local Storms Operations in the Office of the Federal Coordinator for Meteorological Services and Supporting Research (OFCM). The agencies represented in this Plan, the National Weather Service, the National Environmental Satellite, Data, and Information Service, U.S. Air Force, U.S. Army, U.S. Navy, U.S. Marine Corps, and the Federal Aviation Administration, have agreed to arrangements which promote the most effective use of their weather-related assets with respect to severe local storm operations.

1.1 National Weather Service (NWS).

The NWS shall provide:

- a. Basic surface, upper air, and radar observations from its network of observing sites.
- b. Additional observations, when required. These observations will be transmitted to any requesting agency on the appropriate communications 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, flash flood statements, and severe weather/flash flood warnings issued by Weather Service Forecast Offices/NEXRAD Weather Service Forecast Offices (WSFOs/NWSFOs) and Weather Service Offices/NEXRAD Weather Service Offices (WSOs/NWSOs) throughout the United States.
- f. Aviation In-flight Weather Advisories issued 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

g. A concerted effort to collect and relay Pilot Reports (PIREPs) in conjunction with the FAA.

h. Appropriate public educational materials concerning the severe local storms/flash flood watch/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.

b. Receive and respond to requests 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 Force Weather Support System (AFWSS) is responsible for weather 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 and make all such reports available to civil agencies through existing communications with Federal Aviation Administration (FAA) or, with prior Department of Defense (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 for Joint exercises and outside the conterminous United States to deployed units of the Armed Forces upon request.

(2) NWS products for severe weather will be transmitted to conterminous United States DOD agencies via the USAF communication system.

(a) Limited backup to NSSFC and NMC.

1.4 U. S. Army (USA).

The Army within the conterminous United States will rely on NSSFC and NWS severe weather products for weather warning support. NOAA radio can also be used for weather warning support.

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:

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 shall be exchanged between these units. Direct telephone communication 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 Warning and Forecast Branch, Operations Division, National Weather Service Headquarters, and to the Headquarters, Air Weather Service (AWS).

The National Weather Service, National Environmental Satellite, Data, and Information Service (NESDIS), National Severe Storms Laboratory (NSSL), Phillips Laboratory (PL), 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 (RAOB) 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.

Military requests for National Weather Service or NASA soundings should be made to the lead forecaster at NSSFC (816-426-3646). National Weather Service requests for USAF soundings should be made to the AFGWC duty officer (402-294-2586 or FTS 866-2586).

NSSFC also may request special rapid 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 Notification of Military Installations.

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

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 normal alerting system may miss. No other service normally will be required. As appropriate, radar data may be exchanged. Severe convective weather is defined as thunderstorms with winds of at least 50 knots (25 m/s) or more, and/or hail at least 3/4-inch (20 mm) in diameter, or tornadoes.

If NWR services are not available, telephone notification is authorized. Notification will be made to one telephone number only. 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.

1.9.1 **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.

Military Location

Barksdale AFB
Beale AFB
Bergstrom AFB
Buckley ANGB
Cannon AFB
Castle AFB (close FY 95)
Charleston AFB
Columbus AFB
Davis-Monthan AFB
Dobbins AF B
Dover AFB
Dyess AFB
Edwards AFB
Ellsworth AFB
Fairchild AFB
Francis E. Warren AFB
Ft. Campbell
Ft. Hood
Ft. Knox
Ft. Riley
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
Nellis AFB
Offutt AFB
Plattsburgh AFB
Randolph AFB
Reese AFB

NWS Office

WSO Shreveport, LA
WSO Sacramento, CA
WSO Austin, TX
WSFO Denver, CO
WSO Amarillo, TX
WSO Sacramento, CA
WSO Charleston, SC
WSO Tupelo, MS
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 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 Las Vegas, NV
WSO Omaha, NE
WSO Burlington, VT
WSFO San Antonio, TX
WSFO Lubbock, TX

Richards-Gebaur AFB
(close FY 94)
Rickenbacker AFB
Robins AFB
Scott AFB
Selfridge ANGB
Shaw AFB
Sheppard AFB
Tinker AFB
Travis AFB
Whiteman AFB

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

CHAPTER 2

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 Severe Local Storms.

Dangerous convective 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, waterspout, or a thunderstorm with winds of at least 50 knots (25 m/s) and/or hail at least 3/4-inch (20 mm) in diameter at the surface. Wind damage or evidence of large hail or a tornado may be used to infer the occurrence/existence of a severe local storm.

2.2 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 any time during the year. The months of greatest frequency are April, May, and June.

2.3 Squall Line.

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

2.4 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).

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

2.5 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 or hail damage may be used to infer the occurrence/existence of a severe thunderstorm.

2.6 Funnel Cloud.

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

2.7 Tornado.

A violently rotating column of air, usually forming a pendant, and generally from a cumulonimbus cloud, the circulation of which reaches the ground. It usually starts as a funnel cloud and is frequently accompanied by a loud roaring noise.

2.8 Waterspout.

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

CHAPTER 3

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 different 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 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 NOAA/NWS publications.

3.3 National Weather Service Watch/Warning Procedures.

3.3.1 General. The NWS 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 interests 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, also may 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, also is expected/occurring. Severe weather watches will not refer to funnel clouds.

3.3.3 NMC. NMC is the central data processing center for the NWS. NMC issues prognostic charts, discussions, and other forecast data and information.

3.3.4 NSSFC. NSSFC is responsible for issuing and cancelling severe local storm watches, convective SIGMETS (Significant Meteorological Information) and non-convective 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.

Example of Watch Bulletin

BULLETIN - IMMEDIATE BROADCAST REQUESTED
TORNADO WATCH NUMBER 392
NATIONAL WEATHER SERVICE KANSAS CITY MO
620 PM CDT SAT MAY 12 1990
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

THIS SATURDAY EVENING UNTIL 12 MIDNIGHT CDT

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..

3.3.4.2 Convective SIGMETs. NSSFC issues hourly, at H+55, and as required Special Convective SIGMET bulletins over the conterminous United States and adjacent coastal waters. These bulletins contain descriptions and trends of current significant thunderstorms and an outlook for periods of up to 6 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.

Example of Convective SIGMET Bulletin

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 2055Z
 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 232055-230055
 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.

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

3.3.4.4 AIRMETS. NSSFC issues AIRMETS in the conterminous United States and adjacent coastal waters for moderate turbulence, moderate icing, extensive cloud ceilings below 1,000 feet or visibilities below 3 miles (5km), extensive mountain obscuration, and sustained surface winds of 30 knots or more.

3.3.5 WSFOs and WSOs.

3.3.5.1 WSFOs and WSOs release to the public all severe weather watch bulletin information 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 severe weather watch. Also, they 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 judgment of the responsible official to identify a severe storm, warnings are issued immediately.

3.3.5.3 Offices issue frequent special weather statements or short-term forecasts to keep the public informed of weather developments during a severe weather watch.

3.4 Local DOD Unit Warning. At those locations where a DOD 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 (FSS).

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/WSFO associated with the FSS receiving the information. That WSO/WSFO will issue the warning or pass the information to the WSO/WSFO 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/WSFO.

CHAPTER 4

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 to other mass communications technologies. 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 is the primary NWS medium for disseminating warning and forecasts to the media, emergency management agencies, and other users in the public and private sectors. It is a leased satellite communications system operated for the NWS by a private sector contractor. The NWWS will accept messages simultaneously entered from all NWS data entry nodes, primarily WSFOs and the National Centers. WSOs relay warnings and forecasts to the parent WSFO via AFOS for automatic transmission on the NWWS. The system delivers the information to subscribers through satellite broadcast at 1200 bits per second in ASCII format.

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, and Appendix D contains a list of state contacts.

4.1.4 Emergency Broadcast System (EBS). EBS activation is requested only for 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 usually 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 when land lines in the area have been disrupted. These transmitters have a tone alert capability used to activate specially designed receivers. Figure 4-2 shows locations of NOAA Weather Radio transmitters, and Appendix B lists the stations and their frequencies.

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 combined severe weather watch and warning bulletins is shown in Figures 4-3 and 4-4. The distribution of aviation severe weather forecasts are 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 United States (CONUS) Meteorological Data System (COMEDS/AWDS). Collected reports are transmitted from the Tinker 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/AWDS is divided into 10 geographic areas (Figure 4-5).

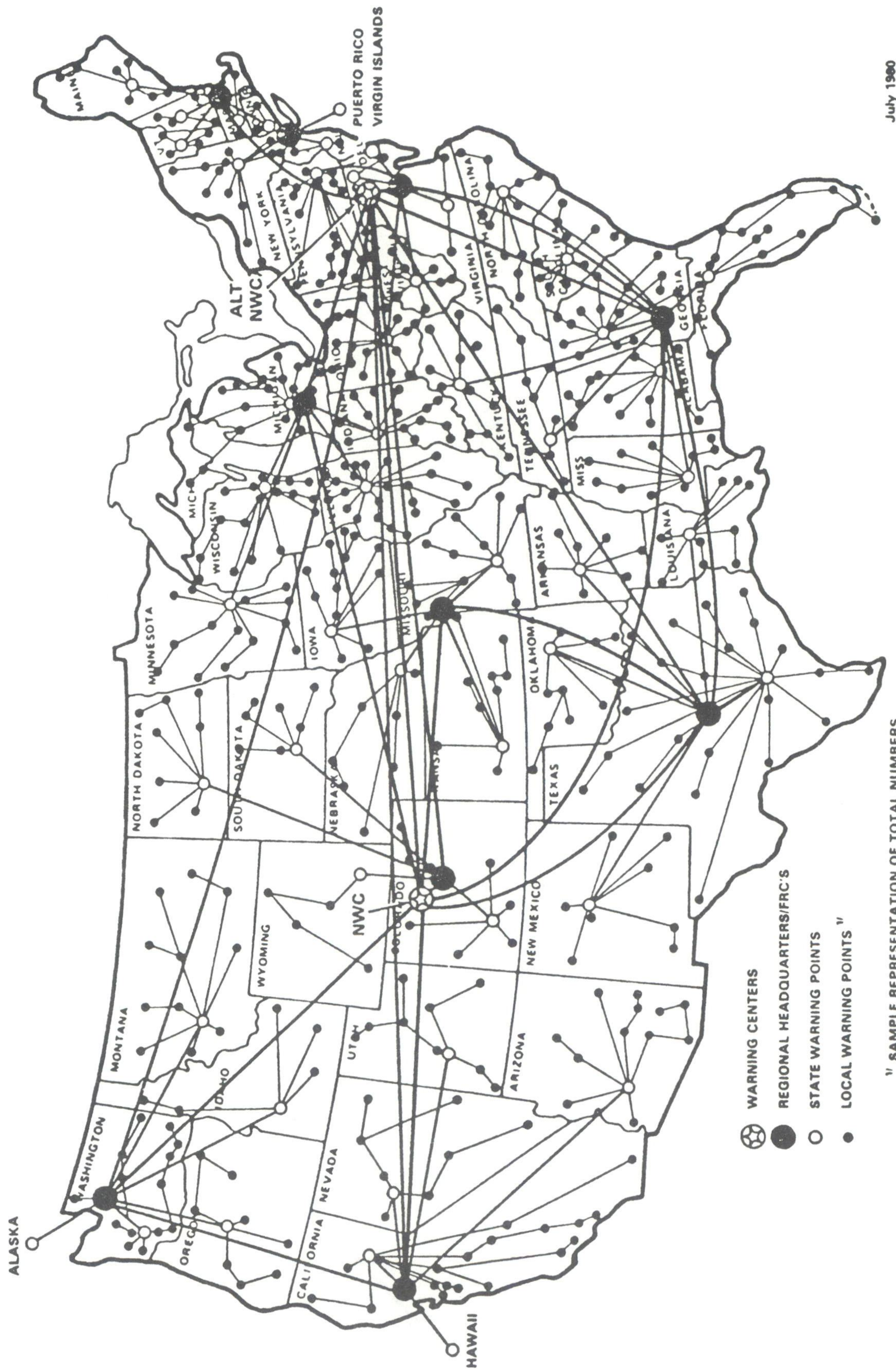
4.2.3 The COMEDS/AWDS is used to disseminate all requested military weather warnings issued by AFGWC.

4.3 Federal Aviation Administration (FAA) Systems.

4.3.1 Collection. Leased Service A/B (LABS) will be used for the collection and distribution of severe local storms information as follows:

- a. Hourly and Special Aviation Observations;
- b. Special Aviation Observations; and
- c. Pilot reports.

NATIONAL WARNING SYSTEM



July 1960

FIGURE 4-1 Federal Emergency Management Agency - National Warning System

NOAA WEATHER RADIO LOCATIONS

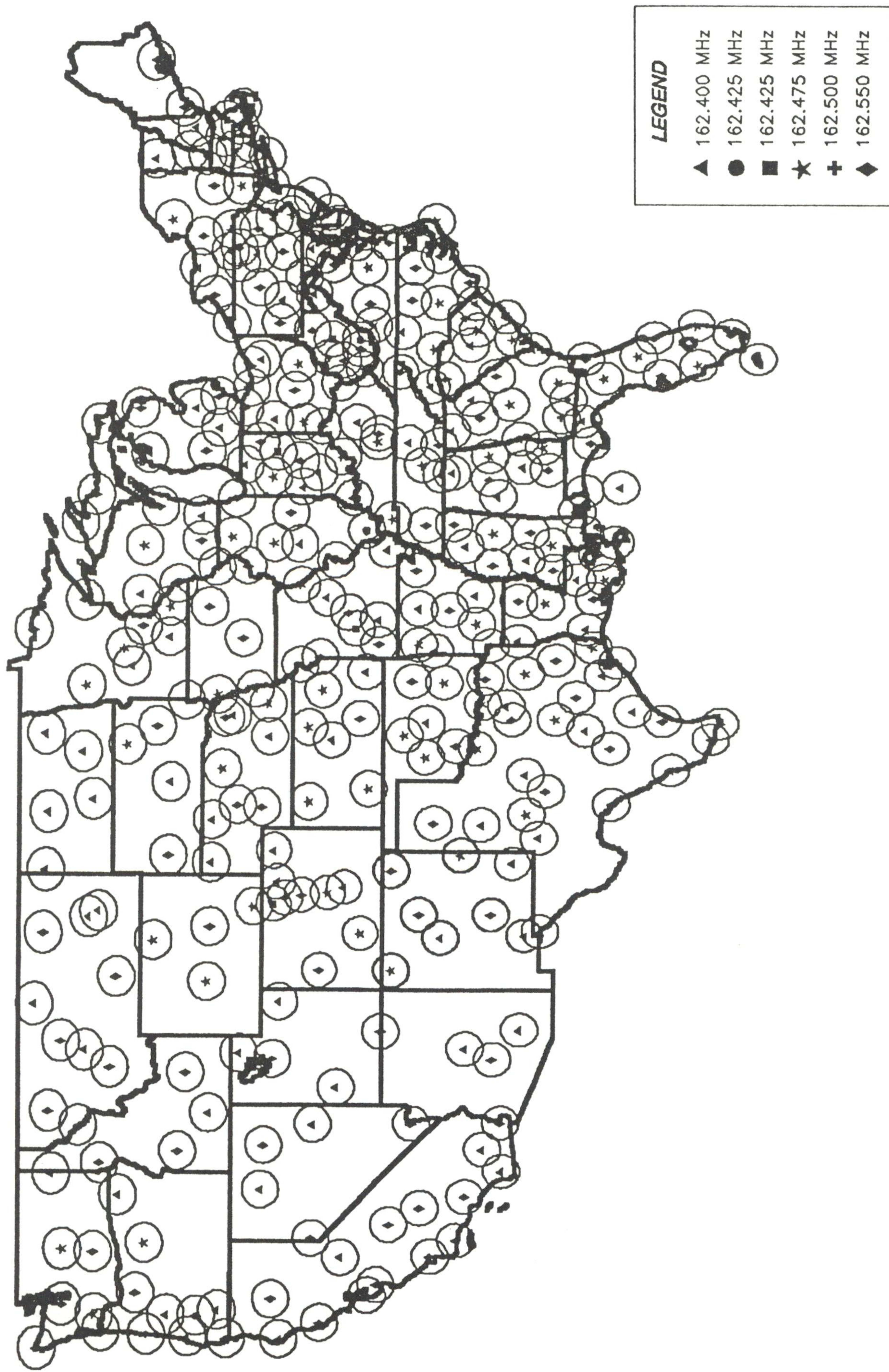


FIGURE 4-2 NOAA Weather Radio Locations

ALASKA NWR LOCATIONS

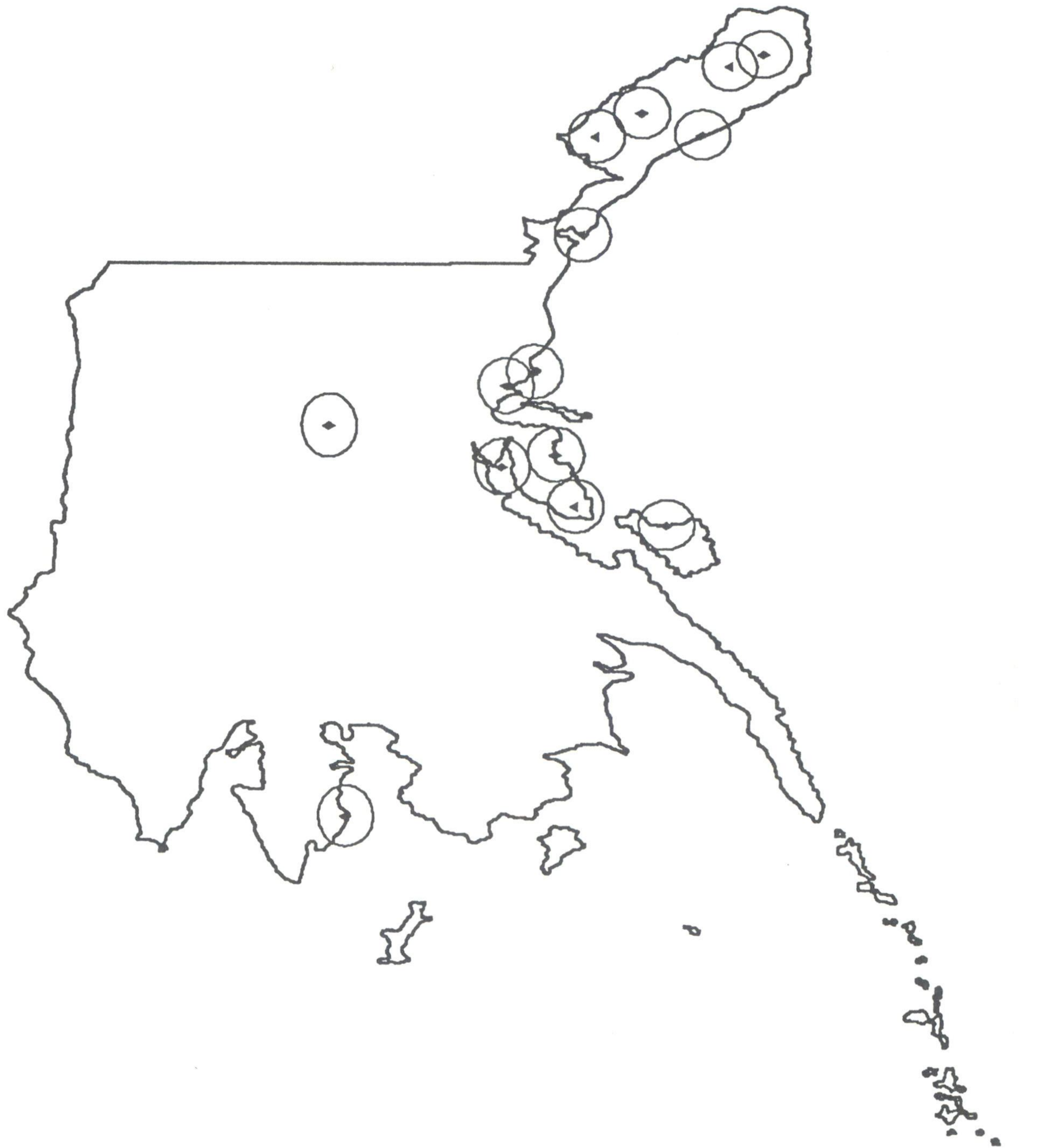
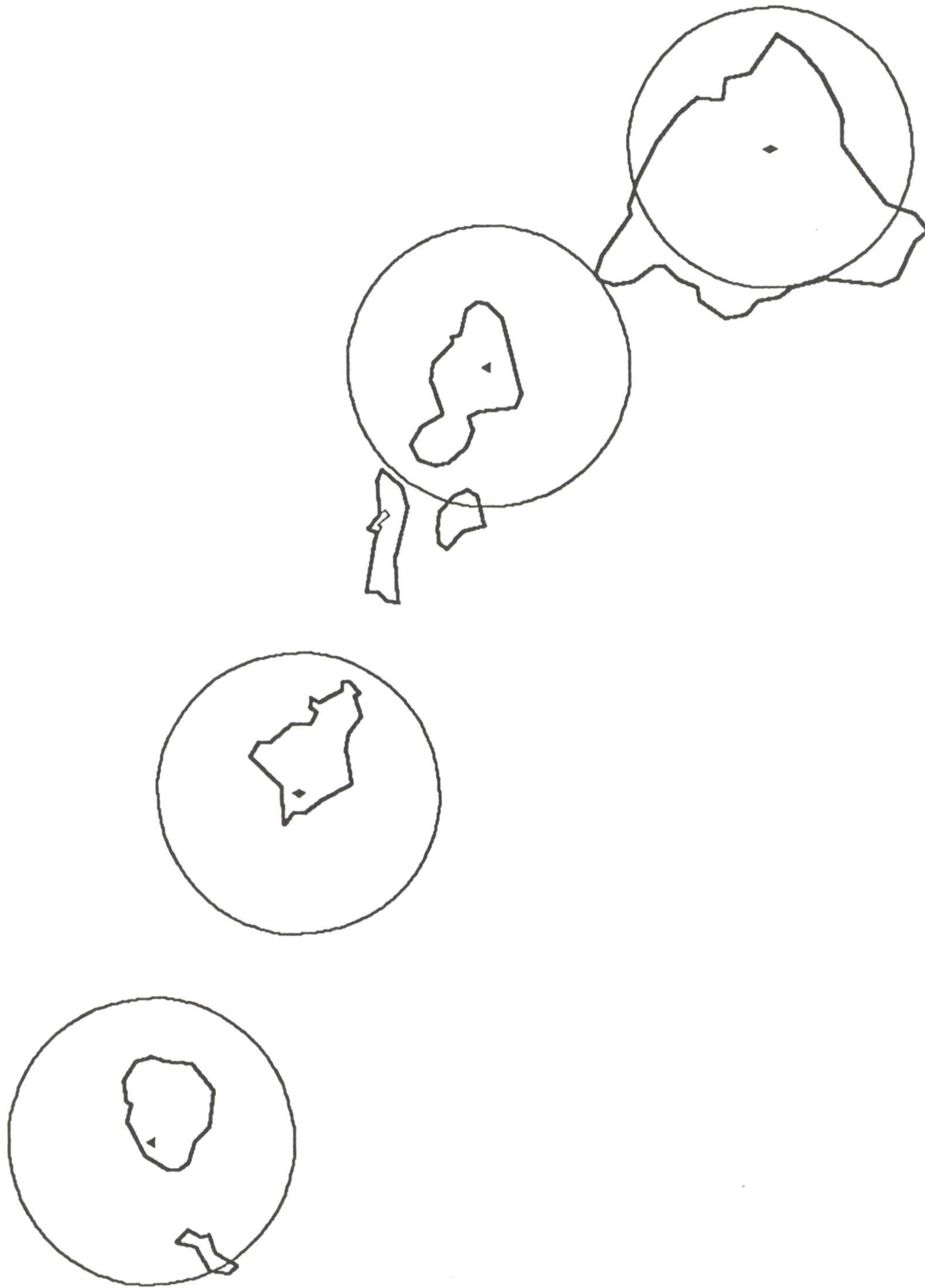


FIGURE 4-2a Alaska NOAA Weather Radio Locations

HAWAII NWR LOCATIONS



LEGEND	
▲	162.400 MHZ
◆	162.550 MHZ

FIGURE 4-2b Hawaii NOAA Weather Radio Locations

PUERTO RICO NWR LOCATIONS

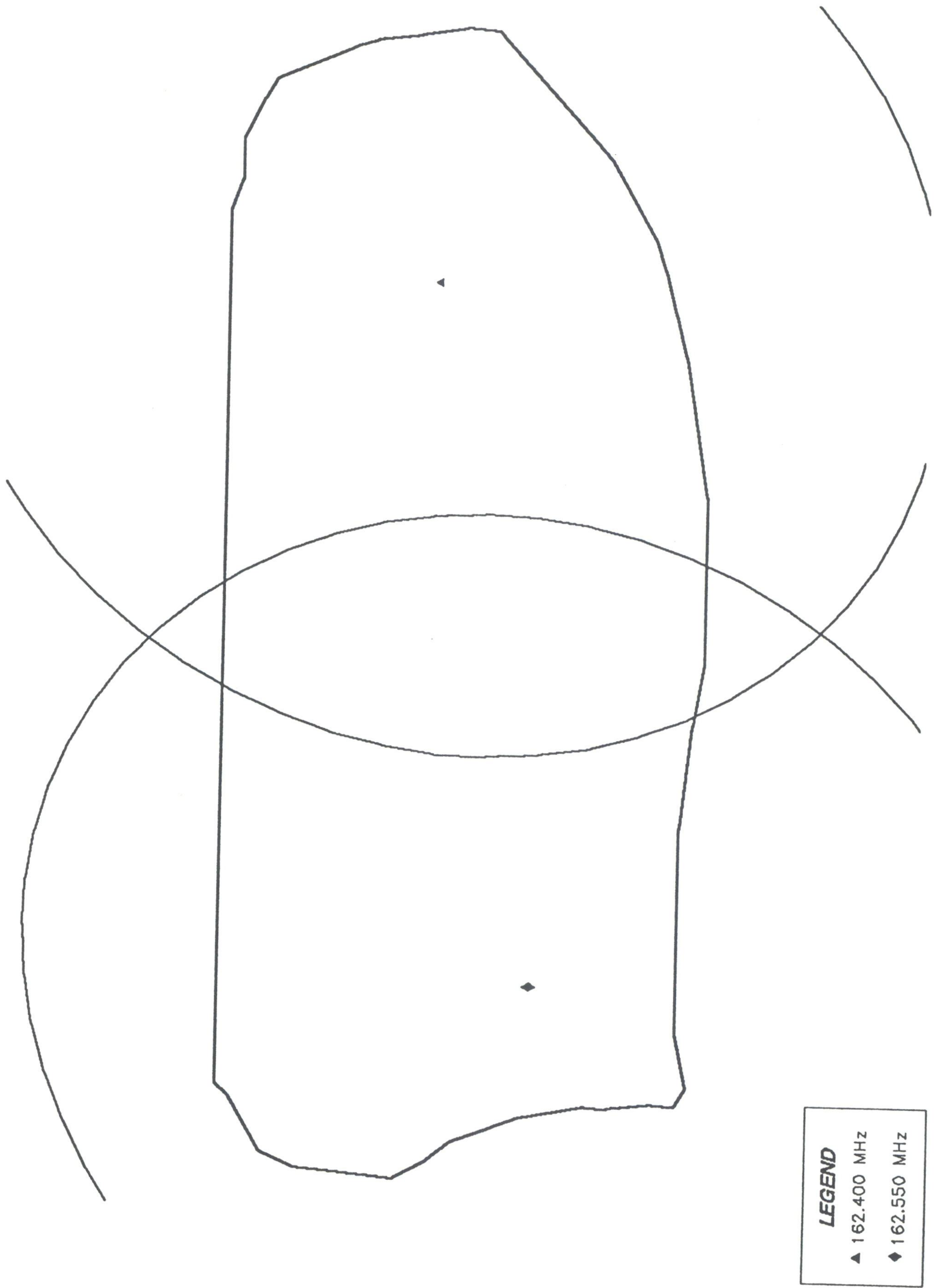


FIGURE 4-2c Puerto Rico NOAA Weather Radio Locations

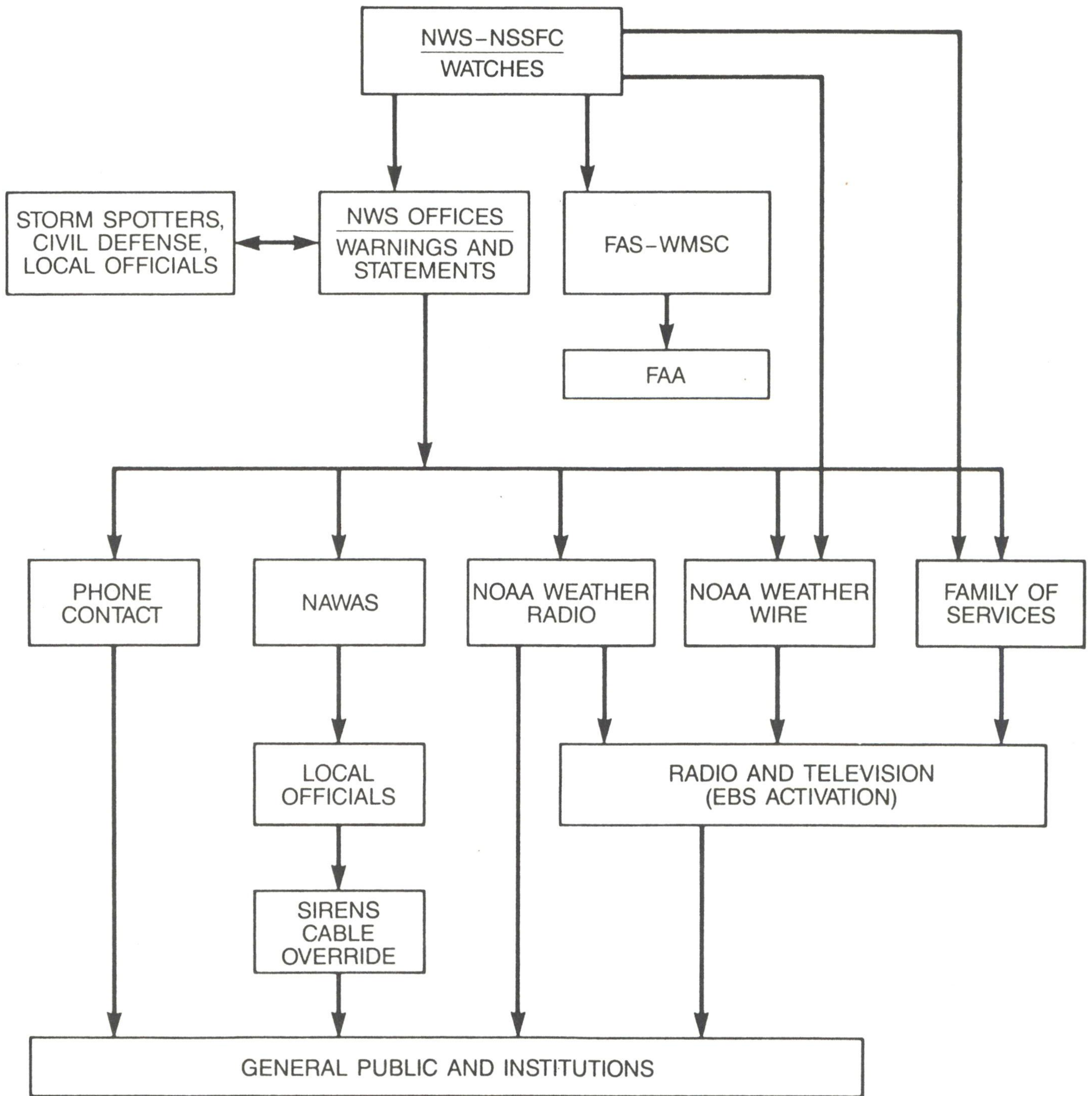


FIGURE 4-3 Distribution of Combined Severe Weather Watch and Warning Bulletins

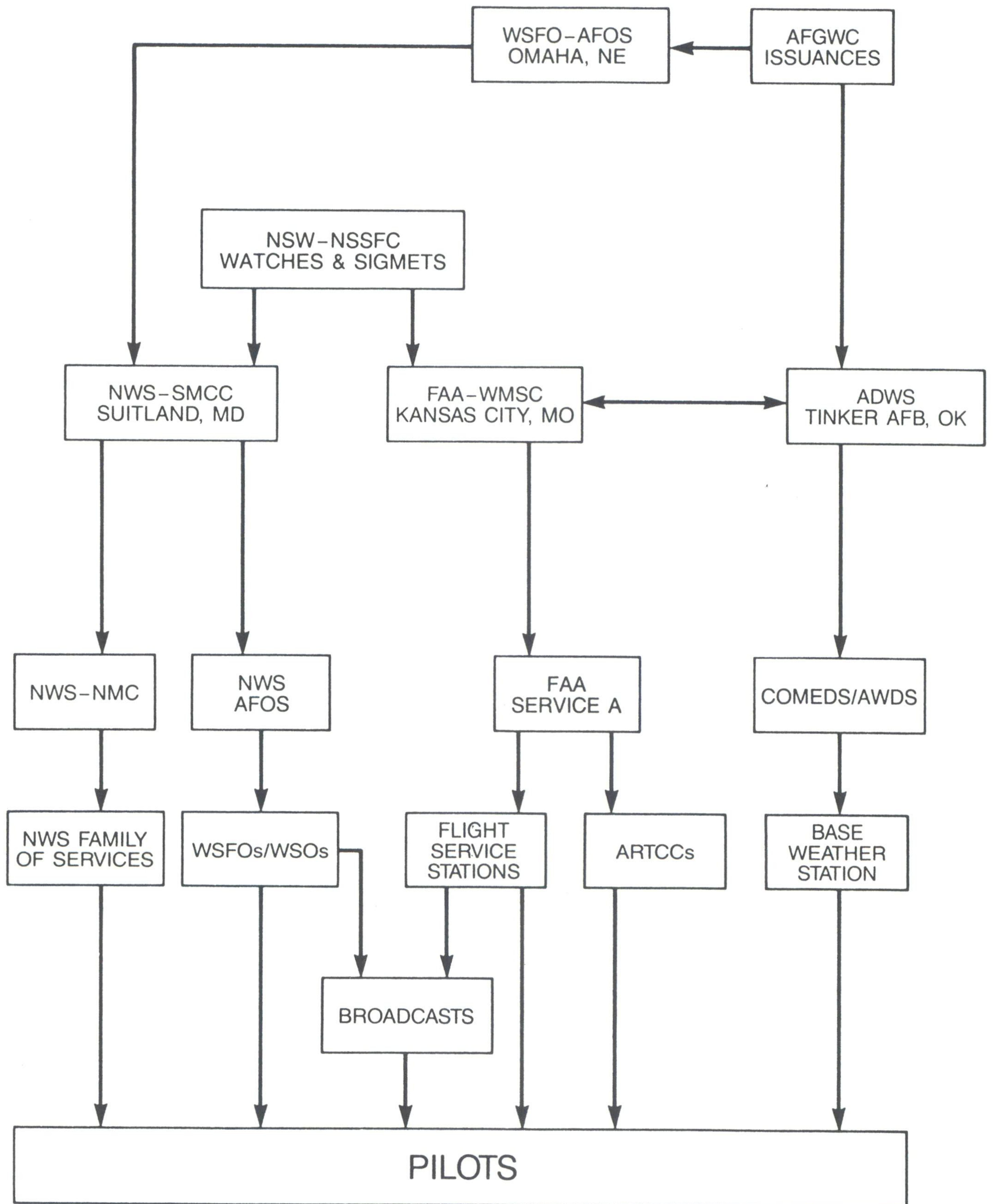


FIGURE 4-4 Distribution of Aviation Severe Weather Forecasts

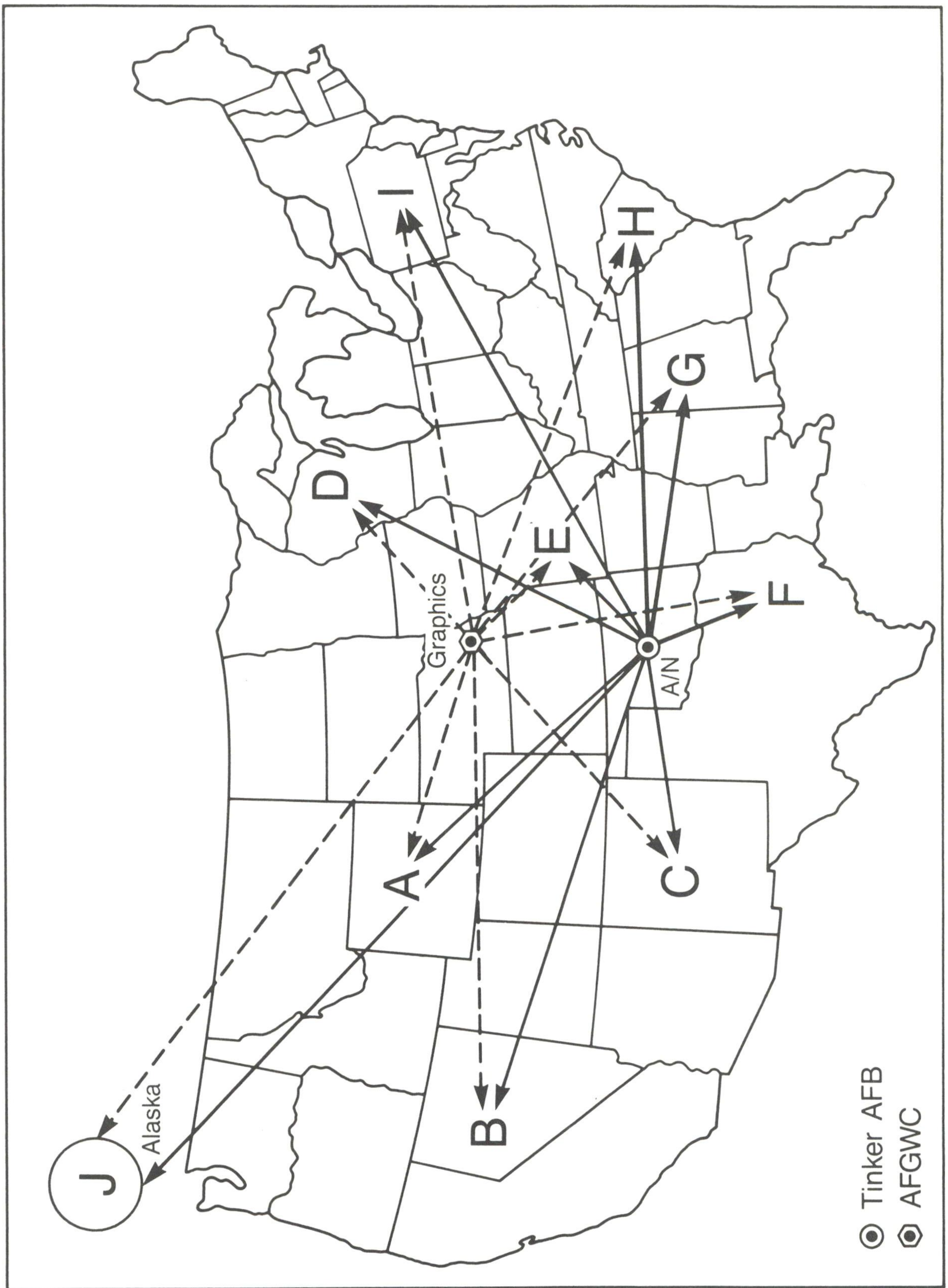


FIGURE 4-5 AWDS Communications Circuits
 Solid lines for alphanumeric (A/N) product
 communications; dashed lines for graphic product
 communications.

4.3.2 Distribution. Leased Service A/B (LABS) 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. AIRMETS, SIGMETs, and Convective SIGMETs.

4.4 U. S. Navy Systems.

TESS (Tactical Environmental Support System) (3) is used to collect, process, and disseminate environmental products and data. TESS (3) is a modular, interactive, computer-based system that can ingest and process gridded numerical data, AWN data, high-resolution satellite imagery, and raw meteorological data. This system is found only on major US Navy combatants (CV/CVN/LPH/LHA/LHD), command-and-control ships, and at selected shore sites.

CHAPTER 5

5. OBSERVATIONS

5.1 Radar Observing and Reporting Plans.

5.1.1 General Description. The Basic Weather Radar Network is the first line of defense against severe local storms. It consists of 55 S-band radars from the NWS, 1 C-band from the USAF and 24 L-band FAA Air Route Traffic Control radars in the western U.S. Information from the FAA radars is collected, analyzed and distributed by the NWS Forecast Offices at Salt Lake City, Albuquerque, Los Angeles and Seattle. The NWS also operates 73 local warning radars throughout the continental U.S. to supplement the network system.

The Departments of Defense, Commerce, and Transportation joined forces under the Next Generation Weather Radar (NEXRAD) Program to develop and implement a national network of advanced Doppler weather surveillance radars. The Weather Surveillance Radar-88 Doppler (WSR-88D) network is currently in its installation phase and, upon completion, will replace the aging radars that comprise the National Radar Network. Air Force WSR-88D sites in the conterminous United States will supplement the National Weather Service WSR-88Ds that make up the Basic Weather Radar Network.

5.1.1.1 Observing and Reporting. The WSR-88D automatically generates a product called the Radar Coded Message (RCM). The RCM is sent from the WSR-88D to the National Severe Storms Forecast Center (NSSFC) in Kansas City, Missouri, via the NWS Automation of Field Operations and Services (AFOS) communications system. NSSFC produces and edits a national grid composite of RCMs and derives Radar Observations (ROB), which includes the Storm Detection (SD) and Manually Digitized Radar (MDR) sections, for WSR-88D sites. NOTE: Because the RCMs are not quality controlled, they are directed to NSSFC where quality checks are applied and the ROBs derived. The derived ROB products then are distributed.

The NSSFC uses a sophisticated two-step computer editing program to produce the "derived ROBs." The first step involves a comparison of five data sets, while the second uses three data sets. Once the ROBs are generated with the "AUTO" appended, they are sent to the NWS Telecommunication Gateway in Silver Spring, Maryland. The derived radar observations (ROBs) are then distributed to all users.

Derived ROBs are generated for commissioned WSR-88D radars only. Existing WSR-57 and WSR-74S network radar sites still will manually produce ROBs at H+35. At sites where WSR-57s and WSR-74Ss have to be shut down in order to facilitate installation and operation of WSR-88D radars prior to commissioning, existing backup procedures will be followed, i.e., backup radars will take observations and produce ROBs.

5.1.1.2 At H+35, coded radar reports from the Air Force Weather Support System (AFWSS) radar stations assigned to the U.S. Basic Weather Radar Network are forwarded to AFGWC from the Automated Digital Weather Switch (ADWS) at Tinker 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/AWDS 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/AWDS and, when so requested, by telephone to the nearest WSFO or WSO (in accordance with Federal Meteorological Handbook No. 7).

5.1.2 If a WSO needs radar data from a nearby military radar (network or local use), such data can be obtained by local arrangements between the National Weather Service Meteorologist-in-Charge/Official-in-Charge and the military unit commander/Officer-in Charge or the Naval Meteorology and 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 or 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/AWDS 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>
Aberdeen Proving Ground	USA	Mon-Fri 1100Z and as required	COMEDS	Charles Clough STECs-PO-OM DSN 298-7908 COM 410-278-7908	Yes
Cold Regions Test Center	USA	Unscheduled	COMEDS	Craig Eglund DSN 317-873-4326 COM 907-873-4326	Yes
Dugway Proving Ground, UT	USA	Unscheduled	COMEDS	Chris Biltoft STEDP-MT-M DSN 789-5101 COM 801-831-5101	Yes
Edwards AFB, CA	USAF	Unscheduled	AWDS	Commander 412, OSS/WE DSN 527-4318 COM 805-277-4318	Yes
Eglin AFB, FL	USAF	Unscheduled	AWDS	46 WF/CC DSN 872-5324 COM 904-882-5324	Yes
Fort Bragg, NC	USA	Unscheduled	COMEDS/(AWDS)	Commander Det. 3, 1 WXG DSN 236-3914 COM 919-396-3914	No
Fort Campbell, KY	USA	Mon-Fri 1100Z-1500Z	AWDS	Commander Det 1, 1 WXG DSN 635-2519 COM 502-798-2519	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>WIL TAKE REQUESTED SPECIALS</u>
Fort Carson, CO	USA	Mon-Fri 1200Z-1500Z	AWDS	Commander Det. 58, 1 WXG DSN 691-3651 COM 719-579-3620	No
Fort Hood, TX	USA	Unscheduled	COMEDS/(AWDS)	Commander Det. 14, 1 WXG DSN 738-9819 COM 817-532-9620	No
Fort Huachuca, AZ	USA	Mon-Fri 1200Z	COMEDS	Art Trapp AMSTE-TC-AM DSN 879-3906 COM 602-538-3906	Yes
Fort Lewis, WA	USA	Unscheduled	AWDS	Commander Det 6, 1 WXG DSN 357-5967 COM 206-967-5967	No
Fort Polk, LA	USA	Unscheduled	AWDS	Commander Det 31, 1 WXG DSN 863-2015 COM 318-537-2015	No
Fort Riley, KS	USA	Unscheduled	COMEDS/(AWDS)	Commander Det 8, 1 WXG DSN 856-3327 COM 913-239-3327	No
Fort Sill, OK	USA	Mon-Fri 1100Z-1500Z	AWDS	Commander Det 11, 1 WXG DSN 639-3200 COM 405-351-3200	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 Stewart, GA	USA	Unscheduled	AWDS	Commander Det. 21, 1 WXG DSN 870-4090 COM 912-352-5207	No
Marshall Space Flight Center, Huntsville, AL	NASA	Unscheduled	Local loop to WSO Huntsville, AL, then to RAWARC	Bob Turner COM 205-961-4614	Yes
Naval Air Weapons Station China Lake, CA	USN	Monday-Friday 1230Z and as required	COMEDS/(AWDS)	Lloyd Corbett DSN 437-5058 COM 619-939-6058	Yes
Navy Pacific Missile Test Center Point Mugu, CA	USN	Monday-Friday 1300Z, 1800Z, and 2200Z	COMEDS/(AWDS)	Darwin Tolzin DSN 351-8508 COM 805-982-8508	Yes
Navy Pacific Missile Test Center San Nicolas Is., CA	USN	Monday-Friday 1400Z and 2000Z	COMEDS/(AWDS)	Darwin Tolzin DSN 351-8508 COM 805-982-8508	Yes
Redstone Arsenal	USA	Unscheduled	COMEDS	James Young DSN 746-2449 COM 205-876-2441	Yes
White Sands Missile Range, NM	USA	Unscheduled	COMEDS/(AWDS)	Chief, Forecast Section White Sands Met Team DSN 258-2605/1032 COM 505-678-2605/1932	Yes
Yuma Proving Ground, AZ	USA	Mon-Fri 1200Z and as required	COMEDS	Dean Weingarten STEYP-RS-TS-W DSN 899-6070 COM 602-328-6070	Yes

5.3 Surface Weather Observational Network.

To provide the basic weather data needed for the analyses performed by the NMC, 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;
- d. Automated Surface Observing System (ASOS) and Automated Weather Observing System (AWOS).

During the 1990s the NWS and FAA will replace many manual observations with automated observations, and add many additional observations at airports that presently do not report weather observations, through deployment of ASOS and AWOS. The DOD (USN/USMC) will use ASOS to replace aging equipment, and to augment observing personnel. These observations will greatly increase the temporal and spatial resolution of the U.S. surface observation network.

Augmentation of ASOS data is done in certain situations. Augmentation is defined as the process of manually observing and adding weather information to an ASOS observation which ASOS is not designed to provide. The NWS is directed to augment ASOS observations to report:

- tornadic activity
- hail
- virga
- volcanic ash

as long as staff are available and certified in surface observing. In addition, NWS staff are directed to back up ASOS, provided there exists available staff certified in surface observations. In addition, until the ASOS freezing rain sensor is operationally implemented, available certified staff are directed to augment ASOS reports for freezing rain.

ASOS sites collocated with NWS offices are directed to augment ASOS observations when applicable criteria are met for:

- snow increasing rapidly (SNOINCR)
- water equivalent of snow on the ground

To support daily climatological applications, all NWS staffed sites collocated with ASOS are directed to augment ASOS observations for:

daily snowfall amounts and daily snow depth

Finally, all NWS staffed sites collocated with ASOS are directed to back up ASOS during periods of snow, ice pellets, and freezing rain to supply:

3-, 6- and 24-hour precipitation amounts
liquid equivalent of precipitation in ASOS Daily and
Monthly Summary products

These stations take observations and transmit coded observational data at regularly scheduled intervals. Transmissions are made hourly, 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 Leased Service A/B (LABS) circuit.

5.5 Severe Storm Surveillance by Meteorological Satellites.

5.5.1 Geostationary Operational Environmental Satellite (GOES). The GOES system currently consists of one operational spacecraft: GOES-7 at 112 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 Distribution Facilities (SFDFs) 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 NESDIS Synoptic Analysis Branch (SAB), the NWS (SFDFs) and WSFOs. (See GOES Operational Data Flow, Figure 5-1, and Satellite Data Availability, Table 5-2).

5.5.1.1 European Space Agency (ESA) Geostationary Meteorological Satellite (Meteosat). ESA/EUMETSAT relocated Meteosat-3 to 50°W during the summer of 1991 to assist United States' meteorological operations. In early 1993, Meteosat-3 was moved further west to 75°W, to provide full coverage of the CONUS in the event GOES-7 fails prior to the launch of additional NOAA GOES spacecraft. Meteosat data, including applied grid information, are generated and transmitted every half hour. Full disc IR, visible, and water vapor have a 5-km resolution, whereas specialized visible sectors have a 2.5-km resolution. Meteosat WEFAX data also are available and distributed on GOES-Tap circuits.

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 Distribution Facilities (SFDF).

5.5.3.1 Support Concept. Under the NESDIS support concept, GOES/Meteosat imagery in support of the severe weather warning services is distributed by the Central Data Distribution Facility (CDDF) at Camp Springs, Maryland, to the SFDFs in Miami, San Francisco, Kansas City, Washington, Anchorage, and Honolulu. The Kansas City SFDF is an operational unit of the National Severe Storms Forecast Center (NSSFC) and is responsible for satellite data interpretation support to collocated NSSFC units and field offices in the conterminous United States except Florida. Each SFDF, 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, the VAS Data Utilization Center (VDUC) system at the three National Centers (NMC, NSSFC, and NHC) ingest the GOES digital data. This provides access to all GOES information in real-time including the NESDIS Rapid Interval Scan Operation Plan (RISOP) which provides data over the severe storm area every 5 to 15 minutes.

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

Miami	24 hrs/day at 305-536-4460	(305-536-4460)
San Francisco	24 hrs/day at 415-876-9122	(415-876-9122)
Washington /NESDIS/SAB	24 hrs/day at 301-763-8444	(301-763-8444)
Kansas City	24 hrs/day at 816-426-5395	(816-426-5395)
Honolulu	24 hrs/day at 808-836-2776	(808-836-1698)
Anchorage	24 hrs/day at 907-271-5105	(907-271-3801)

Table 5-2
Satellite and Satellite Data Availability for Severe Local Storms Season

SATELLITE	TYPE OF DATA	LOCAL TIME	REMARKS
GOES- 7- 112°W	VISSR/VAS	Every 30 min (24/day) (limited scan for short- interval viewing)	<ol style="list-style-type: none"> 1. 1, 2 and 4 km resolution visible. 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).
Meteosat-3 75°W	Multi-spectral Spin-scan radiometer	Every 30 min (24/day)	<ol style="list-style-type: none"> 1. 5 km resolution visible, IR, and water vapor. 2. 5 km resolution visible, IR WEFAX imagery. 3. 1.25 and 2.5 km res. equivalent IR/WV sectors (proposed).
NOAA- 11	AVHRR GAC and LAC (recorded) HRPT and APT (direct) TOVS	1528/0328	<ol style="list-style-type: none"> 1. Composite non-real-time imagery. 2. Sea-surface temperatures. 3. Moisture analysis. 4. Soundings.
NOAA- 12	AVHRR GAC and LAC (recorded) HRPT and APT (direct) TOVS	1933/0733	Same as NOAA- 11
<p>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</p>			

5.5.4 Defense Meteorological Satellite Program (DMSP) Polar-Orbiting System.

The DMSP constellation consists of at least two spacecraft placed in sun-synchronous orbits best suited to support military operations. In addition to the very high resolution visible and infrared imagery, DMSP provides a variety of remotely sensed terrestrial and space environmental data. A suite of microwave radiometers provides microwave imagery as well as surface characteristics and upper air temperature and moisture soundings. Data are processed and exploited by AFGWC to meet DOD requirements and are forwarded to NESDIS through the shared METSAT processing program for further distribution to civilian agencies. DMSP data tapes are passed to the National Geophysical Data Center (NGDC) at the University of Colorado for permanent archive.

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 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/WSFO and operated by local cooperators, police radio, direct telephone lines involving unlisted numbers, the National Warning System (NAWAS), State Highway Patrols, teletypewriter circuits.

Reports are disseminated to mass news disseminators, to other WSOs, WSFOs, NSSFC, 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.

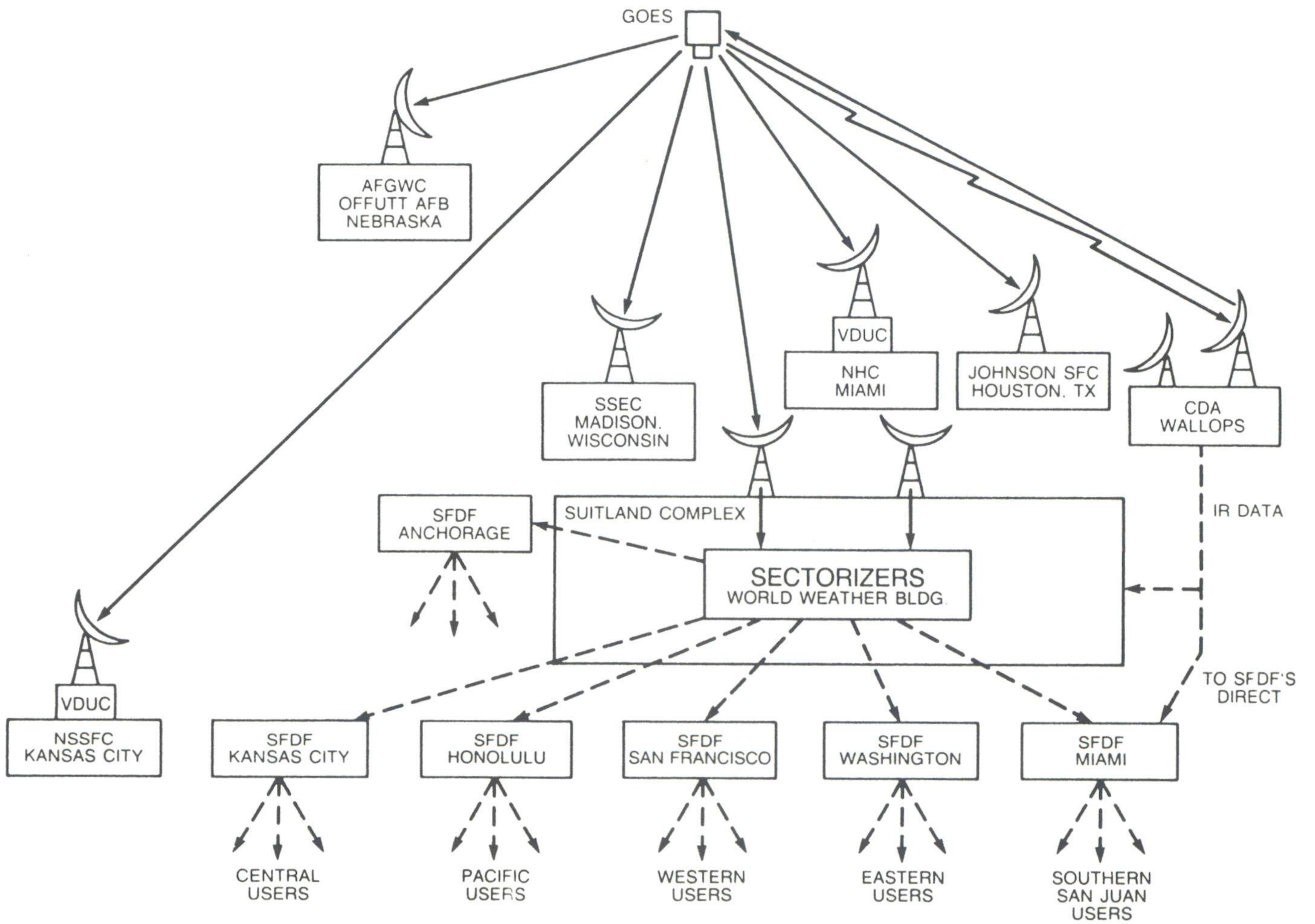


Figure 5-1. GOES Operational Data Flow

CHAPTER 6

6. NEWS RELEASES

The weather warnings of the 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
Airspace and Air Traffic Service Division
USAF/XOOSA
Washington, D. C. 20330

Assistant Chief of Staff for Intelligence
Department of the Army
Attention: DAMI- POI
Washington, D. C. 20310

Commander, Naval Meteorology and Oceanography Command
1020 Balch Blvd
Stennis Space Center, Mississippi 39529-5001

Headquarters, Air Weather Service
102 W. Losey Street, Room 105
Scott Air Force Base, Illinois 62225

NOAA Public Affairs Office
Herbert C. Hoover Building
14th & Constitution Avenue, N.W.
Washington, D.C. 20230

Commandant, United States Marine Corps
Headquarters, United States Marine Corps
Code ASL-44
Washington, D. C. 20380-3001

APPENDIX A

RECOMMENDED LETTER OF AGREEMENT
BETWEEN LOCAL UNITS OF NWS AND USAF

FROM: XX OSS/XXX or 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 (military installation) when severe convective weather is expected to affect (military installation or site) and the supporting weather flight/unit is not staffed by a forecaster or the unit'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. XX OSS/XXX or Det X, X WW, will:

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

(Describe normal forecaster duty hours)

(2) Notify (appropriate NWS office) when XX's base weather radar is inoperative except for normal preventive maintenance. Additionally, XX's base weather 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. XX base weather 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 XX OSS/XXX or 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 XX OSS/XXX or Det X, X WW when its radar is inoperative except for normal maintenance.

c. XX base weather 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
Weather Flight/
Detachment
Commander/Officer in
Charge

Signature
Chief, Meteorological
Services Division
Regional Headquarters

Date

Date

Date

APPENDIX B

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	Location	Frequency
Alabama		Arizona	
Anniston	3	Flagstaff	2
Birmingham	1	Lake Powell	1
Demopolis	3	Phoenix	1
Dozier	1	Tucson	2
Florence	3	Yuma	1
Huntsville	2		
Louisville	3	Arkansas	
Mobile	1	Fayetteville	3
Montgomery	2	Fort Smith	2
Tuscaloosa	2	Gurdon	3
		Jonesboro	1
Alaska		Little Rock	1
Anchorage	1	Mountain View	2
Cordova	1	Star-City	2
Fairbanks	1	Texarkana	1
Homer	2		
Juneau	1		
Ketchikan	1		
Kodiak	1		
Nome	1		
Petersburg	1		
Seward	1		
Sitka	1		
Valdez	1		

Wrangell 2
Yakutat 2

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

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

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
Wichita	1

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

Michigan

Alpena	1
Detroit	1
Flint	2
Grand Rapids	1
Houghton	2
Marquette	1
Onondaga	2
Sault Sante 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
Iversness	1
Jackson	2
Meridian	1
Oxford	2

Nevada

Elko	1
Ely	2
Las Vegas	1
Reno	1
Winnemucca	2

New Hampshire

Concord	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

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

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

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

New York
Albany 1
Binghamton 3
Buffalo 1
Elmira 2
Kingston 3
New York City 1
Riverhead 3
Rochester 2
Syracuse 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

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
Dyton 3
Lima 2
Sandusky 2
Toledo 1

Oklahoma
Clinton 3
Enid 3
Lawton 1
McAlester 3
Oklahoma City 2
Tulsa 1

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

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
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

Tennessee	
Bristol	1
Chattanooga	1
Cookeville	2
Jackson	1
Knoxville	3
Memphis	3
Nashville	1
Shelbyville	3
Waverly	2

Virginia	
Heathsville	2
Lynchburg	1
Norfolk	1
Richmond	3
Roanoke	3

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

Utah

Logan	2
Cedar City	2
Vernal	2
Salt Lake City	1

U.S. Virgin Islands
St. Thomas

3

Vermont

Burlington	3
Marlboro	4
Windsor	3

Wyoming

Casper	1
Cheyenne	3
Lander	3
Sheridan	3

APPENDIX C

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
AFWSS	Air Force Weather Support System
AIRMET	Airmen's Meteorological Information
AM	Amplitude Modulation
ANGB	Air National Guard Base
APT	Automatic Picture Transmission
ARTCC	Air Route Traffic Control Center
AWDS	Automated Weather Distribution System
ATCT	Air Traffic Control Tower
ASOS	Automated Surface Observing System
AWS	Air Weather Service
AWOS	Automated Weather Observing System
AVHRR	Advanced Very High Resolution Radiometer
CDDF	Central Data Distribution Facility
CONUS	Continental United States
COMEDS/AWDS	CONUS Meteorological Data System/Automated Weather Distribution 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
NEXRAD	Next Generation Radar (WSR-88D)
NGDC	National Geophysical Data Center
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
SFDF	Satellite Field Distribution Facility
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

APPENDIX D

STATE CONTACTS FOR NAWAS NETWORK *

<u>STATE</u>	<u>CONTACT/PHONE/ADDRESS</u>
Alabama	Fred Springall 205-834-1375 Alabama Emergency Management Agency 5898 County Road 41 Clanton, AL 35045-5160
Arizona	Harry E. Border, Program Director 602-231-6214 Arizona Division of Emergency Services 5626 East McDowell Road Phoenix, AZ 85008
Arkansas	Jim Stalnaker 501-329-5601 Arkansas Office of Emergency Services P.O. Box 758 Conway, AK 72032
California	Lloyd Darrington 916-427-4375 Fax: 916-427-1677 California Warning Center State Office of Emergency Services 2800 Meadowview Road Sacramento, CA 95832

* See also list of state contacts for NAWAS network and associated circuit numbers by FEMA region at the end of this appendix.

STATE**CONTACT/PHONE/ADDRESS**

Colorado

Dave Holms
303-273-1619
Colorado Disaster Emergency Services
1500 Golden Road
Camp George West
Basement Room D-18
Golden, CO 80401

Connecticut

Ken Lappe
203-566-4737
Office of Emergency Management
360 Broad Street
Hartford, Connecticut 06105

Delaware

Alan McClements
302-834-4531
State Of Delaware
Department of Public Safety
Emergency Planning and Operations Division
P.O. Box 527
Delaware City, Delaware 19706

Florida

John Fleming
904-448-1900
FAX: 904-448-6250
(to get updated records: 904-448-1320)
Division of Emergency Management
2740 Centerview Drive
Rhyne Building - Room #175
Tallahassee, FL 32399

Georgia

Dick Garrett
404-624-7222
Georgia Emergency Management Agency
P.O. Box 18055
Atlanta, GA 30316-0055

STATE**CONTACT/PHONE/ADDRESS**

Idaho Gary Davis, Communications & Resource Officer
208-334-3460
Idaho Bureau of Disaster Services
650 West State Street
Boise, Idaho 83720

Illinois Don Kauerauf
217-782-7860
Illinois Emergency Management Agency
110 East Adams Street
Springfield, IL 62706

Indiana Harold Medley
317-899-8260
Indiana State Police
Indiana State Office Building
100 North Senate Avenue
Indianapolis, IN 46204

Iowa Ellen Gordon
515-281-3231
Iowa Office of Disaster Service
Hoover State Office Building
Level A
Des Moines, Iowa 50319

Kansas Les Peterson, Communications Operator II
913-266-1400
State of Kansas
The Adjutant General
Division of Emergency Preparedness
P.O. Box C-300
Topeka, Kansas 66601-0300

Kentucky Gaylen Kiezer
502-564-8617
Kentucky Emergency Management Agency
Boone Center
Frankfort, KY 40601-6168

STATE**CONTACT/PHONE/ADDRESS**

Louisiana John Buie
504-342-5470
State of Louisiana Military Department
Office of Civil Defense & Emergency Preparedness
P.O. Box 44217
Baton Rouge, LA 70804

Maine Joe Grimmig
207-289-4080
State Civil Defense Control Center
State House
72 State Office Building
Augusta, Maine 04333

Maryland Hank Black, Communications Officer
301-486-4422
Maryland Emergency Management Agency
2 Sudbrook Lane East
Pikesville, MD 21208

Massachusetts Steve Finks
508-820-2000
Massachusetts Emergency Management Agency
400 Worcester Road
Framingham, MA 01701

Michigan Delynn Rice
517-334-5130
Michigan State Police
Emergency Management Division
Knapps Center
Suite 300
300 South Washington Square
Lansing, Michigan 48913

Minnesota Sharon Kelly
612-296-0458
Division of Emergency Management
B-5 State Capital
St. Paul, Minnesota 55155

STATE**CONTACT/PHONE/ADDRESS**

Mississippi Alvin Reynold/Gary Hall
601-352-9100
Mississippi Emergency Management Agency
P.O. Box 4501
Jackson, Mississippi 39296-4501

Missouri Cathy Andres
314-751-9746
Missouri Emergency Management Agency
Communications Center
1717 Industrial Drive
Jefferson City, MO 65101

Montana Homer Young, Communications Officer
406-444-6911
Emergency Management Agency
P.O. Box 4789
Helena, Montana 59604

Nebraska Bob Eastwood, Communications Manager
402-471-3241
Nebraska State Civil Defense Agency
State Emergency Operating Center
1300 Military Road
Lincoln, NE 68508-1070

Nevada Joe Quinn, Chief Communications Engineer
702-687-4240
Nevada Division of Emergency Management
2525 South Carson Street
Carson City, NV 89710

New Hampshire Dave Maydwell
603-271-2231
Office of Emergency Management
State Office Park South
107 Pleasant Street
Concord, NH 03301

STATE**CONTACT/PHONE/ADDRESS**

New Jersey	John Keitle 609-530-4823 Division of State Police Emergency Management Section P.O. Box 7068 West Trenton, NJ 08628-0068
New Mexico	Larry Austin 505-827-9285 New Mexico State Police Headquarters 4491 Cerillus Road P.O. Box 1628 Santa Fe, NM 87504
New York	Earl Dressel 518-457-2200 Communications Section NY State Emergency Management Office Building 22 - State Campus Albany, NY 12226-5000
North Dakota	Jerry Schempp, Program Specialist 701-224-2116 Division of Emergency Management P.O. Box 5511 Bismarck, ND 58502-5511
North Carolina	Steve Riddle 919-733-3867 North Carolina State EOC 116 West Jones Street Raleigh, NC 27603
Ohio	Mark Patchen, Chief, Support Services 614-889-7155 Emergency Management Agency 2825 West Granville Road Columbus, Ohio 43235-2712

STATECONTACT/PHONE/ADDRESS

Oklahoma	Ken Fields, Communications Officer 405-521-2481 Oklahoma Civil Emergency Management Agency P.O. Box 53365 Oklahoma City, OK 73152
Oregon	Larry Raaf, Coordinator 503-378-2911 Oregon Emergency Management 595 Cottage Street N.E. Salem, OR 97310
Pennsylvania	Brian Greenway 717-783-8150 Pennsylvania State Council of Civil Defense Foster and Commonwealth Harrisburg, PA 17105-3321
Rhode Island	Dick Bouchard 401-421-7333 Emergency Management Agency State House Room 27 Providence, RI 02903-1197
South Dakota	Tamrid Gatje, Director of Operation 605-773-3231 Department of Military & Veterans Affairs 500 East Capitol Pierre, SD 57501
South Carolina	Tom Gardner 803-734-8030 South Carolina EOC 1429 Senate Street Columbia, SC 29200

STATE**CONTACT/PHONE/ADDRESS**

Tennessee
John White, Assistant State Director
615-741-0001
Tennessee Emergency Management Agency
Emergency Operations Center
3041 Sidco Drive
P.O. Box 41502
Nashville, TN 37204-1502

Texas
Bill Roder
512-465-2138
Texas Department of Public Safety
5805 North Lamar Blvd.
P.O. Box 4087
Austin, TX 78773-0001

Utah
Jim Brown
801-538-3400
State of Utah
Department of Public Safety
Division of Comprehensive Emergency Management
State Office Building, Room 1110
Salt Lake City, UT 84114

Vermont
Chris Fuhrmeister
802-244-8721
Emergency Management Department
103 South Main Street
Waterbury, VT 05671

Virginia
Dennis Kelleher, Communications Maintenance
Officer
804-674-2400
Commonwealth of Virginia
Department of Emergency Services
310 Turner Road
Richmond, VA 23225

STATE

CONTACT/PHONE/ADDRESS

Washington

Jimmie Hocutt, Communications Officer
206-459-9191
State of Washington
4220 East Martin Way
Olympia, WA 98504

West Virginia

Clay Carney, Communications Officer
304-348-5380
State of West Virginia
Office of Emergency Service
Main Capitol, Room EB-80
Charleston, WV 25305

Wisconsin

Alan Wohlfred, Director, Communications & Warning
608-266-3232
Wisconsin Division of Emergency Government
4802 Sheboygan Ave, Room 99A
P.O. Box 7865
Madison, WI 53707-3232

Wyoming

Willis Larson
307-777-7566
Wyoming Emergency Management Agency
Basement Emergency Operations Center
5500 Bishop Blvd
P.O. Box 1709
Cheyenne, WY 82003

CIRCUIT	ABR	REG/STATE	CONTACT PERSON	PHONE NUMBER
GP-2286-067		REGION 1	TIM MCCOY	617-223-4564
GP-2286-005	CT	CONNECTICUT	KEN LAPPE	203-566-4737
GP-2286-006	ME	MAINE	JOE GRIMMING	207-289-4080
GP-2286-004	MA	MASSACHUSETTS	STEVE FINKS	508-820-2000
GP-2286-002	NH	NEW HAMPSHIRE	DAVE MAYDWELL	603-271-2231
GP-2286-007	RI	RHODE ISLAND	DICK BOUCHARD	401-421-7333
GP-2286-003	VT	VERMONT	CHRIS FUHRMEISTER	802-244-8721
GP-2285-001		REGION 2	ED SMITH	212-238-8223
GP-2285-007	NJ	NEW JERSEY	JOHN KEITLE	609-530-4823
GP-2285-006	NY	NEW YORK	EARL DRESSEL	518-457-2200
GP-2285-601	NY	NEW YORK	EARL DRESSEL	518-457-2200
GP-2285-602	NY	NEW YORK	EARL DRESSEL	518-457-2200
GP-2285-603	NY	NEW YORK	EARL DRESSEL	518-457-2200
GP-4285-067		REGION 3	DUG SALLEY	215-931-5571
GP-4285-011	DE	DELAWARE	AL MCCLEMENTS	302-834-4531
GP-4285-014	MD	MARYLAND	HANK BLACK	301-486-4422
GP-4285-008	PA	PENNSYLVANIA	BRIAN GREENWAY	717-783-8150
GP-4285-013	VA	VIRGINIA	DENNIS KELLEHER	804-674-2400
GP-4285-012	WV	WEST VIRGINIA	CLAY CARNEY	304-348-5380

CIRCUIT	ABR	REG/STATE	CONTACT PERSON	PHONE NUMBER
GP-4275-566		REGION 4	JOHN JOHNSON	912-225-4627
GP-4275-534	AL	ALABAMA	FRED SPRINGALL	205-834-1375
GP-4275-535	FLS	FLORIDA SOUTH	JOHN FLEMING	904-448-1900
GP-4275-542	FLW	FLORIDA WEST	JOHN FLEMING	904-448-1900
GP-4275-543	FLN	FLORIDA NORTH	JOHN FLEMING	904-448-1900
GP-4275-544	FLC	FLA CENTRAL	JOHN FLEMING	904-448-1900
GP-4275-536	GA	GEORGIA	DICK GARRETT	404-624-7222
GP-4275-537	KY	KENTUCKY	GAYLEN KIEZER	502-564-8617
GP-4275-538	MS	MISSISSIPPI	ALVIN REYNOLDS	601-352-9100
GP-4275-539	NC	NO. CAROLINA	STEVE RIDDLE	919-733-3867
GP-4275-540	SC	SOUTH CAROLINA	TOM GARDNER	803-734-8030
GP-4275-541	TN	TENNESSEE	JOHN WHITE	615-741-0001
GP-8230-067		REGION 5	JIM WOOTON	616-961-7743
GP-8230-069	IL	ILLINOIS	DON KAUEAUF	217-782-7860
GP-8230-036	IN	INDIANA	HAROLD MEDLEY	317-899-8260
GP-8230-035	MI	MICHIGAN	DELYNN RICE	517-334-5130
GP-8230-076	MN	MINNESOTA	SHARON KELLY	612-296-0458
GP-8230-034	OH	OHIO	MARK PALCHEN	614-889-7155
GP-8230-068	WI	WISCONSIN	ALLAN WOHLFERD	608-266-3232
GP-8228-067		REGION 6	TOM THWEAT	817-898-9208
GP-8228-068	AR	ARKANSAS	JIM STALNAKER	501-329-5601
GP-8228-037	LA	LOUISIANA	JOHN BUIE	504-342-5470
GP-8228-069	NM	NEW MEXICO	LARRY AUSTIN	505-827-9285
GP-8228-070	OK	OKLAHOMA	KEN FIELDS	405-521-2481
GP-8228-711	TX	TEXAS E	BILL RODER	512-465-2138
GP-8228-712	TX	TEXAS W	BILL RODER	512-465-2138

CIRCUIT	ABR	REG/STATE	CONTACT PERSON	PHONE NUMBER
GP-8234-067		REGION 7	LEE CLARK	816-374-5912
GP-8234-075	IA	IOWA	ELLEN GORDON	515-281-3231
GP-8234-073	KS	KANSAS	LES PETERSON	913-266-1400
GP-8234-070	MO	MISSOURI	CATHY ANDRES	314-751-9746
GP-8234-074	NE	NEBRASKA	BOB EASTWOOD	402-741-3241
GP-8232-067		REGION 8	WALLY MOORE	303-235-4940
GP-8232-081	CO	COLORADO	DAVE HOMS	303-273-1619
GP-8232-068	MT	MONTANA	HOMER YOUNG	406-444-6911
GP-8232-078	ND	NORTH DAKOTA	JERRY SHEMPP	701-224-2116
GP-8232-077	SD	SOUTH DAKOTA	TAM GATJE	605-773-3231
GP-8232-072	UT	UTAH	JIM BROWN	801-538-3400
GP-8232-082	WY	WYOMING	WILLIS LARSON	307-777-7566
GP-8233-067		REGION 9	PAT HALLAHAN	415-923-7140
GP-8233-072	AZ	ARIZONA	HARRY BORDER	602-231-6214
GP-8233-070	CA	CALIFORNIA	LLOYD DARRINGTON	916-427-4375
GP-8233-071	NV	NEVADA	JOE QUINN	702-687-4240
GP-8229-067		REGION 10	AL KUSAKA	206-487-4512
GP-8229-071	ID	IDAHO	GARY DAVIS	208-334-3460
GP-8229-069	OR	OREGON	LARRY RAAF	503-378-2911
GP-8229-068	WA	WASHINGTON	JIMMY HOCUTT	206-459-9191
HADZ P R2210	HI	HAWAII		
RCAA P 3400	AK	ALASKA		
GP 2200		NAWAS		
GP 8246		CIRCUIT CONTROL		

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