RTMENT OF COMMERCE / National Oceanic and Atmospheric Administration

FEDERAL COORDINATOR FOR METEOROLOGICAL SERVICES AND SUPPORTING RESEARCH

National Severe Local Storms Operations Plan

FCM 73-1

Washington, D.C.
January 1973

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
FEDERAL COORDINATOR FOR METEOROLOGICAL
SERVICES AND SUPPORTING RESEARCH

NATIONAL SEVERE LOCAL STORMS OPERATIONS PLAN

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Supersedes National Severe Local Storms
Operations Plan - 1972

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PREFACE

This is the sixth of an annual 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 outlines the responsibilities of the various United States agencies which provide meteorological services in observing and forecasting severe local storms.

Interdepartmental Severe Local Storm Conferences, of which there have been four, bring together cognizant Federal agencies to resolve problems of mutual concern related to the National Severe Local Storms Warning Service. Such conferences are now held biennially. This Plan supersedes the 1971 version and reflects the recommendations of the 1972 Interdepartmental Conference. National Weather Service Severe Local Storm Conferences are held annually, and any changes in National Weather Service procedures are reflected in the annual revision of appropriate sections of this Plan.

Richard E. Hallgren
Federal Coordinator for Meteorological
Services and Supporting Research

NATIONAL SEVERE LOCAL STORMS

OPERATIONS PLAN

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RESPONSIBILITIES OF COOPERATING AGENCIES

1. The National Weather Service (NWS). 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 any requesting agency on the appropriate teletypewriter communication circuits. Where feasible, standardized message headings and endings will be used when transmitting regular or special observations on teletypewriter circuits, especially the Radar Report and Warning Coordination (RAWARC) circuit.

c. Basic analyses and forecast charts through the National Meteorological Center (NMC), Suitland, Md.

d. Special Severe Weather Watch Bulletins and radar facsimile charts to the general public, aviation, and all concerned interests through the Severe Local Storms (SELS) Unit and the Radar Analysis and Development Unit (RADU) of the National Severe Storms Forecast Center (NSSFC) at Kansas City, Mo.

e. Statements, local warnings, and clearing bulletins through Weather Service Forecast Offices (WSFOs) and local Weather Service Offices (WSOs) throughout the United States.

f. Aviation In-flight Weather Advisories through WSFO Aviation Units for periods up to 4 hours for aircraft (civilian and military) and amendments to appropriate aviation forecasts whenever a severe local storm or storms are expected 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 conjunction with Defense Civil Preparedness Agency's (DCPA) "On-Site Assistance Program."

2. The National Environmental Satellite Service (NESS). It shall:

a. Operate satellite systems capable of providing coverage of selected portions of the United States during the severe weather storms season.

b. Receive and respond to requirements for coverage of specific areas and times from NSSFC at Kansas City.

c. Provide data in the form of pictures for selected stations to authorized research facilities.

d. Be available for conferences with personnel of NSSFC and other WSFOs, either in person or by telephone.

3. U.S. Air Force (USAF). The Air Weather Service 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 any requesting agency on the appropriate teletypewriter communication circuits.

c. A concerted effort to collect and relay PIREPS.

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

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

(a) USAF and U.S. Army installations.

(b) Air National Guard and Air Force Reserve 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 in graphic form, four times daily, at 0300Z plus every 6 hours, covering 12 hours.

(b) Point Warnings in plain language, as required, whenever weather is expected to meet warning criteria. These Point Warnings are issued to about 600 locations in the conterminous United States.

(c) Severe weather summaries of occurrences of severe convection activity.

(d) Further weather outlooks in plain language, twice daily, for the 6-hour period beyond the 0300Z and 1500Z advisories.

(e) A continuous meteorological watch on the possibilities of severe weather developments and of other weather phenomena for which AFGWC has warning responsibility.

4. The U.S. Navy. It shall provide for:

One full-time Synoptic Weather Radar Reporting Network station at the Naval Air Station (NAS), Pensacola, Fla.

The Navy does not operate a centralized Severe Local Storms Warning Service. Requirements for early warnings of hazardous flying conditions and local destructive phenomena are met by NSSFC/AFGWC products interpreted locally by Naval Weather Service Command personnel. Full use is made of information displayed on the National Facsimile Network (NAFAX), military, and civil weather circuits.

5. The Federal Aviation Administration (FAA). It shall provide:

a. Communication services in support of the Severe Local Storms Operations Program (Service A and Service C).

b. The PIREPS for use in Severe Local Storms Operations Program.

c. The Flight Service Station (FSS) and tower surface observations.

d. Distribution of Airmen's Meteorological Information (AIRMETS) and Significant Meteorological Information (SIGMETS) by FSS.

6. Exchange of Data Between Agencies.

a. There shall be a mutual exchange of relevant data on the part of all concerned agencies outlined in chapter 1. Because NSSFC and AFGWC are the units responsible for preparing severe weather forecasts, data concerning such forecasts will be exchanged between these units. Direct telephone communications between AFGWC and NSSFC may be made by Automatic Voice Network (AUTOVON) through the operators at Richards-Gebaur AFB, Mo.

b. 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 Emergency Warnings Branch, Weather Analysis and Prediction (WXAP) Division, National Weather Service Headquarters, and to the Headquarters, Air Weather Service.

c. At the present time, only the National Weather Service, National Environmental Satellite Service, Environmental Research Laboratories' National Severe Storms Laboratory (NSSL), and the Air Weather Service are actively engaged in developing objective severe weather forecasting techniques. These agencies will engage, whenever possible, in a joint technique development program and will exchange any objective techniques developed by either agency.

7. Requests for Special Observations.

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

When special upper air network soundings are required, they should normally be made at 1800Z. The Director, NSSFC, will initiate the request to the National Weather Service and National Aeronautics and Space Administration (NASA) stations, and the Commander, AFGWC, will similarly request soundings from DOD stations. Although other 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 SELS. Any cost involved in these special soundings will be borne by the agency making the sounding.

Air Weather Service requests for National Weather Service or NASA soundings should be made to the duty forecaster at NSSFC. National Weather Service requests for USAF soundings should be made to the duty forecaster at AFGWC.

CHAPTER 2

DEFINITIONS

One of the aims of this Plan is to list and define those common meteorological terms, subject to multiple interpretations, which are used by agencies preparing severe local storms forecasts and warnings. For the purpose of this Plan and its appendixes, the following definitions will be used:

1. Aviation Severe Weather Watch Bulletin (WW). That portion of the combined severe weather watch bulletins prepared by NSSFC to assist WSOs and Flight Service Stations (FSSs) in providing service to aviation. This portion is tailored to meet aviation's needs.

2. Combined Severe Weather Watch Bulletin. The severe local storm watch bulletin prepared by NSSFC. Each bulletin contains information for the general public and aviation interests in discrete, sequential sections. The public section contains the watch information for tornadoes and/or severe thunderstorms which is common to both sections, including a designation of the areas where their probability is high during a specified time period. The bulletin will be designated as either a severe thunderstorm or a tornado watch bulletin, depending upon the phenomena expected.

3. Funnel Cloud. A violent, rotating column of air which does not touch the ground and is usually pendant from a cumulonimbus cloud.

4. Instability Line. A line of incipient, active, or dissipating nonfrontal instability conditions that is transitory in character, usually developing to maximum intensity within a period of 12 hours or less, and then dissipating in about the same length of time.

5. Severe Local Storms. Dangerous storms that usually cover relatively small geographical areas and periods of time and are of sufficient intensity to threaten life or property. Examples are tornadoes or thunderstorms accompanied by frequent lightning, large hail, and/or damaging winds.

6. Severe Local Storms Season. Although the center of maximum frequency shifts during the year, tornadoes and severe thunderstorms occur somewhere in the United States every month of the year. The months of greatest total frequency are April, May, and June.

7. Severe Thunderstorm. A severe thunderstorm is defined by wind gusts of 50 knots or greater or by hail of 3/4-inch diameter or larger at the surface.

8. 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 numerous thunderstorms.

9. Tornado. A violent, rotating column of air which forms a pendant, usually from a cumulonimbus cloud, and touches 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.

10. Waterspout. A funnel cloud which forms over a body of water--such as a bay, lake, or gulf--and touches the water.

CHAPTER 3

FORECASTS AND WARNINGS

1. General. Athough every effort has been made to standardize terminology, adopt common definitions, and adjust criteria to a common base, each agency has differing operational warning criteria that must be met. Therefore, standardization will be used wherever possible in forecasts and warnings. Each agency, however, retains the right to specify the forecast and warning criteria that are needed to carry out the mission of its service. The common criteria and differences will be discussed in the following sections.

2. Severe Local Storms. To qualify as a severe local storm, at least one of the following conditions must be present:

a. Tornado.

b. Funnel cloud.

c. Severe thunderstorms with either or both:

(1) Surface winds with gusts equal to or greater than 50 knots.

(2) Hail of diameter 3/4 inch or greater at the surface.

d. Waterspout.

3. Other Warning Criteria. All other phenomena 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 appropriate National Oceanic and Atmospheric Administration (NOAA)/National Weather Service and U.S. Air Force (USAF)/Air Weather Service publications.

4. Thunderstorm Intensity Categories. Only the following thunderstorm intensity classes will be used in the forecasting and warning functions of the agencies listed in chapter 1.

a. Thunderstorm. Wind gusts of less than 50 knots and hail, if any, of less than 3/4-inch diameter.

b. Severe thunderstorm. Wind gusts of 50 knots or greater or hail of diameter 3/4-inch or greater at the surface.

5. Thunderstorm Density Categories. The following adjectives may be used to describe the expected density of severe thunderstorms in a severe weather watch area. They may be used to indicate the expected density in an instability line moving through a watch area.

a. Isolated--an extremely small number are expected.

b. Few--up to 15-percent coverage.

c. Scattered--16- to 45-percent coverage.

d. Numerous--more than 45-percent coverage.

e. MIC (Maximum Instantaneous Coverage)--the percentage of the area that will be covered by cumulonimbus cells at the time of maximum activity.

f. TAA (Total Area Affected)--the percentage of the area that will experience one or more thunderstorms during the applicable valid period. The last two terms are used in Military Weather Advisories.

Adjectives such as the above will not be used to indicate the expected density of tornadoes. The Tornado Watch Bulletin will simply state that the threat of tornadoes exists in the designated watch area.

6. National Weather Service Warning Procedures

a. General. Although the National Weather Service has statutory responsibility for providing a Severe Local Storms Warning Service for all 50 States, the extremely low frequency of severe local storms in Alaska and Hawaii does not justify a similar service for these States.

This Warning Service is available to the general public and to general and commercial aviation and is provided through the National Severe Storms Forecast Center (NSSFC) at Kansas City, the National Meteorological Center (NMC) at Suitland, the Weather Service Forecast Offices (WSFOs), and the local Weather Service Offices (WSOs).

b. NMC. The NMC is the central data processing center responsible for the issuance of prognostic charts, discussions, and other material that may be helpful in calling the attention of NSSFC and WSFOs to situations which require issuances of watches.

c. NSSFC. The NSSFC, through its SELS unit, is responsible for issuing and canceling severe local storm watches and for preparing other appropriate material essential to the Severe Local Storms Warning Service.

(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. Each combined watch bulletin (fig. 3-1) will contain information for the general public (sections A and B) and aviation interests (sections C to E) in discrete, alphabetical, sequential sections. When a section is not applicable, it is left out. 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. Such bulletins will be numbered serially beginning with number 1 for the first issuance of each calendar year.

CHAPTER 3

BULLETIN
TORNADO WATCH NUMBER 451
ISSUED 455 PM CDT SEPT 29 1972

A...THE NATIONAL WEATHER SERVICE HAS ISSUED A TORNADO WATCH FOR...

NORTHERN MISSISSIPPI
SOUTHEASTERN ARKANSAS
NORTHEAST LOUISIANA

THE THREAT OF TORNADOES AND SEVERE THUNDERSTORMS WITH LARGE HAIL AND DAMAGING WINDS WILL EXIST IN THESE AREAS FROM 5 PM CDT UNTIL 9 PM CDT THIS FRIDAY EVENING.

THE GREATEST THREAT OF TORNADOES AND SEVERE THUNDERSTORMS IS IN AN AREA ALONG AND 70 MILES...60 NAUTICAL...EITHER SIDE OF A LINE FROM 30 MILES...25 NAUTICAL...NORTH OF COLUMBUS MISSISSIPPI TO EL DORADO ARKANSAS.

PERSONS IN OR CLOSE TO THE TORNADO WATCH AREA ARE ADVISED TO BE ON THE WATCH FOR LOCAL WEATHER DEVELOPMENTS AND FOR LATER STATEMENTS AND WARNINGS.

B...OTHER WATCH INFORMATION...

THIS TORNADO WATCH REPLACES TORNADO WATCH NUMBER 449 ISSUED AT 130 PM CDT...WATCH NUMBER 440 WILL NOT BE EFFECTIVE AFTER 5 PM CDT.

C...TORNADOES AND A FEW SVR TSTMS WITH HAIL SFC AND ALF TO 1 IN. EXTRM TURBC AND SFC WND GUSTS TO 65 K. SCTD CBS WITH MAX TOPS TO 550. MEAN WIND VECTOR 24035.

D...INSTBLTY LN NOW FM WRN TENN ACRS CNTRL ARK INTO NE TEX MOVG SEWD ABT 25 K.

E...OTHER TSTMS. CONTD RMNDR AC.

Figure 3-1.

EXAMPLE OF COMBINED SEVERE WEATHER WATCH BULLETIN.

(2) Separate Aviation Watch Bulletins. Separate aviation severe weather watch bulletins (fig. 3-2) will be issued only when a Hurricane Warning Office (HWO) is issuing advisories or bulletins calling for tornadoes, or when extreme turbulence and hail aloft are expected along the air routes from Tampa to New Orleans and from New Orleans to Brownsville. Such information is contained in appropriate Hurricane and Tropical Storm Advisories or Bulletins. For these bulletins, a numbering system which is compatible with that of the combined watches will be used. Alphanumeric numbers which consist of capital letters alphabetically appended to the last assigned combined watch number will be used. For example, 404A, 404B, etc.

(3) Criteria for Severe Weather Watch Bulletins. The criteria for the public and aviation sections of watch bulletins are the same. Any or all of the following criteria must be expected to be equaled or exceeded before severe weather bulletins are issued.

(4) Wind and Hail Criteria

a. Severe thunderstorm. One or more of the following:

(1). Damaging wind--sustained or gusty surface winds of 50 knots or greater.

(2) Hail--diameter 3/4 inch or larger at the surface. The word hail in a bulletin implies hail at the surface as well as aloft unless qualifying phrases such as "hail aloft" are used.

b. Tornado

(1) Severe weather watches that mention expected tornadoes imply that thunderstorm activity, usually severe, is also expected. Funnel clouds are not forecast in Severe Weather Watch Bulletins.

(2) Distances from reference points in combined watch bulletins will be expressed in both statute and nautical miles (to the nearest 5 miles), and specified in section A whenever 20 nautical miles or greater. No specification will be used when distances are 15 nautical miles or less.

(3) On those rare occasions when aviation severe weather watch bulletins are issued, distances will be expressed in nautical miles.

(5) Functions of the Radar Analysis and Development Unit (RADU). An important adjunct of NSSFC is RADU. The Radar Facsimile Charts transmitted on the National Weather Facsimile Network (NAFAX) are prepared by this Unit. Although RADU prepares a Radar Summary Chart hourly, only those Charts required by the NAFAX schedule are transmitted on NAFAX. Every hour, insofar as practicable, RADU utilizes all available radar data. In the event that it is necessary to omit some reports, the areas of minimum significance will be omitted and this fact indicated on the Radar Facsimile Chart.

BULLETIN
AVIATION SEVERE WEATHER WATCH NUMBER 290A
TORNADO WATCH VALID 1200Z TO 1800Z

A...ALG AND 80 NM EITHER SIDE OF A LN FM 80 NM NORTH NORTHEAST
OF ORLANDO FLORIDA TO DOTHAN ALABAMA.

B...TORNADOES AND A FEW SVR TSTMS. EXTRM TURBC AND SFC WND GUSTS
TO 65K. SCTD CBS WITH MAX TOPS TO 500.

C...SVR TSTMS OR TORNADOES ASSOCIATED WITH HURRICANE AGNES. SEE
LATEST HURR ADVSY.

D...CONT 288A UNTIL EXPIRATION AT 12Z.

Figure 3-2.

EXAMPLE OF AVIATION SEVERE WEATHER WATCH BULLETIN.

The military service weather radars in the intermountain area are acceptable substitutes for S-band radar and can furnish data, routinely and as requested, for the Radar Summary Charts. However, the National Weather Service prefers to use the radar composite (page 30), prepared by its radar unit at the Salt Lake City, Utah, Air Route Traffic Control Center (ARTCC), as the western portion of these Charts to avoid duplication. In addition, more radar data are available from the ARTCC radars as the result of their location on mountain peaks and the method of tracing the data from individual radarscopes. As additional military or National Weather Service radars are added to the U.S. Synoptic Weather Radar Network, data from these radars will be used as required by RADU and by the National Weather Service radar unit at the Salt Lake City ARTCC site.

(6) Severe Weather Releases

a. Watch Bulletins. Severe Thunderstorm and Tornado Watch Bulletins will be prepared and released as required to the press, radio, and television by SELS. These bulletins alert the public and aviation interests to the possibilities of tornadoes or severe thunderstorms, including a designation of areas where their probability is high during a specified time period.

b. Other SELS Guidance Material. Guidance material such as the Severe Weather Outlook Narrative, Severe Weather Outlook Graphic, Status Reports and All-Clear Information on Weather Watches (WW), Advance Information on Watch Area, and Watch Cancellation Bulletins will be released as appropriate.

d. Weather Service Offices (WSO)

(1) That portion, sections A and B, of the combined Severe Weather Watch Bulletins of general interest to the public is distributed immediately to the public in accordance with the County Responsibility Plan of each WSO whenever a threat to any part of the area of county responsibility is indicated by the Bulletin. To help the public visualize which areas are affected by the watch, the affected areas are restated in terms of counties, geographical areas, or prominent cities in a release called a redefining statement. Publications and distribution of various types of material have made the public aware of the National Weather Service's Severe Local Storms Warning Service and its terminology.

(2) Warning responsibility for the general public is vested in local WSOs.

(3) The WSOs are authorized to issue clearing bulletins for all or parts of their areas of county responsibility whenever the threat of severe weather has ended.

(4) Severe weather statements are issued, as appropriate, to provide information on developing severe weather, on lack of such development, or on severe weather which has occurred or is in existence.

(5) Statements concerning severe local storms which are expected to develop during a period covered by severe weather watches will be included, as appropriate, in regularly scheduled and revised local, State, and zone forecasts.

(6) Severe weather warnings will be issued immediately by the appropriate WSO whenever reports of actual or suspected severe weather in or near an Office's area of responsibility indicate an imminent threat. Each warning will be identified as a Severe Thunderstorm Warning Bulletin or Tornado Warning Bulletin. Full advantage is taken of radar observations in issuing Tornado and Severe Thunderstorm Warning Bulletins. When radar evidence is sufficient in the judgment of the responsible official to identify a dangerous storm, Warning Bulletins based on these data are issued immediately.

e. Weather Service Forecast Offices (WSFO)

(1) Those portions of the combined Severe Weather Watch Bulletins pertinent to aviation interests are reflected as Significant Meteorological Information (SIGMETS) and Airmen's Meteorological Information (AIRMETS) as soon as appropriate after issuance. These issuances are called In-Flight Weather Advisories. However, potentially hazardous flight conditions specified in WWs, which are adequately covered in an aviation area forecast, will not be the subject of an AIRMET issuance.

The WSFO Aviation Units will advise the ARTCCs of any SIGMETS that WSFOs issue which affect the respective ARTCC areas. Appropriate reference is also made to expected severe weather in scheduled and amended aviation forecasts, Pilots Automatic Telephone Weather Answering Service (PATWAS), and Transcribed Weather Broadcast (TWEB) scripts.

(2) Criteria for the issuance of SIGMETS associated with severe local storms include:

a. Tornadoes.

b. Lines of thunderstorms (squall lines).

c. Embedded thunderstorms.

d. Hail of 3/4 inch or greater in diameter.

e. Severe or extreme turbulence.

f. Severe icing.

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

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

(1) Tornadoes.

(2) Thunderstorms.

(3) Strong surface winds of 35 knots or more that are not associated with thunderstorms.

(4) Heavy rain or snow (2 inches or more in a 12-hour period).

(5) Freezing precipitation.

b. Military Weather Advisories. The AFGWC issues Graphic Military Weather Advisories in teletypewriter format (figs. 3-3 and 3-4) four times daily at 0300Z, plus every 6 hours. Similar Advisories are issued in facsimile format on circuit AFX109. Each Advisory gives the areas where any of the weather elements listed above are expected to occur in the following 12-hour period. An Advisory is an estimate of the weather-producing potential of the existing synoptic pattern and airmasses, based on the assumption that subsequent changes in these features occur as forecast.

(1) Purpose and Use. The Graphic 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. Field forecasters should use the Graphic Advisories:

a. To alert themselves and users to potential areas of significant weather.

b. To use as ready-made briefing aids.

c. To indicate the probability of their stations being directly affected during the advisory period.

(2) Amendment. Advisories are amended whenever the elements describe change, or are expected to change, by one category or more and whenever area boundaries change, or are expected to change, by 60 miles or more.

(3) Geographical Interpretation. A clear plastic overlay containing a scaled outline of the conterminous States, placed on the teletypewriter message containing the Graphic Advisory, will provide geographical orientation.

c. Point Warnings. Point Warnings are issued in plain language (fig. 3-5) for the same phenomena as Advisories. While Advisories provide general guidance to all military forecasters in terms of large- and intermediate-scale synoptic developments, 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. The locations for which AFGWC has warning responsibility are listed in Volume II, Air Weather Service Manual 105.2. Some of these locations include two, three, or four

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WWXX WWXX WWXX KGWC 061945
MILITARY WEATHER ADVISORY/MWA/NR 023
FOR THE PERIOD 062100Z TO 070900Z
GRAPHIC BULLETIN

X...RED AND BLACK...
    VALID 2100Z TO 0300Z...TORNADOES AND LOCALLY DAMAGING WINDSTORMS
    ...SEVERE THUNDERSTORMS...MAX INSTANTANEOUS COVERAGE 15 PCT...
    TOTAL AREA AFFECTED 70 PCT...2 INCH HAIL...WSW GUSTS TO 65 KNOTS
    ...MAX TOPS 550...LOCALLY HEAVY RAIN SHOWERS.
    VALID 0300Z TO 0900Z...LOCALLY DAMAGING WINDSTORMS..SEVERE
    THUNDERSTORMS..MAX INSTANTANEOUS COVERAGE 4 PCT...TOTAL AREA
    AFFECTED 40 PCT... 1 1/2 INCH HAIL...WSW GUSTS TO 65 KNOTS...
    MAX TOPS 500.
    VALID 2100Z TO 0300Z...SURFACE WINDS SW 25 KNOTS GUSTS TO 40
    KNOTS...SQUALL LINE DEVELOPING THRU WESTERN PORTIONS OF AREA
    2100Z MOVING ENEWARD 30 KNOTS.

O...BLUE AND BLACK...
    VALID 2100Z TO 0300Z...LOCALLY DAMAGING WINDSTORMS...SEVERE
    THUNDERSTORMS...MAX INSTANTANEOUS COVERAGE 15 PCT...TOTAL AREA
    AFFECTED 70 PCT...2 INCH HAIL...WSW GUSTS TO 65 KNOTS...MAX TOPS
    480...LOCALLY HEAVY RAIN SHOWERS.
    VALID 0300Z TO 0900Z...THUNDERSTORMS...MAX INSTANTANEOUS COVERAGE
    3 PCT...TOTAL AREA AFFECTED 20 PCT...1/4 INCH HAIL...WSW GUSTS
    TO LESS THAN 35 KNOTS...MAX TOPS 400.
    VALID 2100Z TO 0300Z...SURFACE WINDS SW 25 KNOTS GUSTS TO 40 KNOTS.

Z...GREEN...
    VALID 2100Z TO 0300Z...THUNDERSTORMS...MAX INSTANTANEOUS COVERAGE
    4 PCT...TOTAL AREA AFFECTED 40 PCT...1/2 INCH HAIL...SW GUSTS TO
    45 KNOTS...MAX TOPS 450.
    VALID 0300Z TO 0900Z...THUNDERSTORMS...MAX INSTANTANEOUS COVERAGE
    1 PCT...TOTAL AREA AFFECTED 10 PCT...1/4 INCH HAIL...SW GUSTS TO
    LESS THAN 35 KNOTS...MAX TOPS 350.

A...ORANGE...
    VALID ENTIRE PERIOD...THUNDERSTORMS...MAX INSTANTANEOUS COVERAGE
    2 PCT...TOTAL AREA AFFECTED 20 PCT...1/4 INCH HAIL...SW GUSTS TO
    LESS THAN 35 KNOTS...MAX TOPS 400.

S...ORANGE AND BLACK...
    VALID 2100Z TO 0300Z...THUNDERSTORMS...MAX INSTANTANEOUS COVERAGE
    1 PCT...TOTAL AREA AFFECTED 10 PCT...1/4 INCH HAIL...NW GUSTS TO
    LESS THAN 35 KNOTS...MAX TOPS 300.
    VALID 2100Z TO 0100Z...SURFACE WINDS NW 20 KNOTS GUSTS TO 35 KNOTS.

T...ORANGE...
    VALID 0000Z TO 0900Z...THUNDERSTORMS...MAX INSTANTANEOUS COVERAGE
    2 PCT...TOTAL AREA AFFECTED 20 PCT...1/4 INCH HAIL...WSW GUSTS
    TO LESS THAN 35 KNOTS...MAX TOPS 380.
B.  BLACK...
    VALID 2100Z TO 0200Z...SURFACE WINDS WSW 25 KNOTS GUSTS TO 40 KNOTS.
```

Figure 3-3.

EXAMPLE OF DESCRIPTION PORTION OF A MILITARY WEATHER ADVISORY.

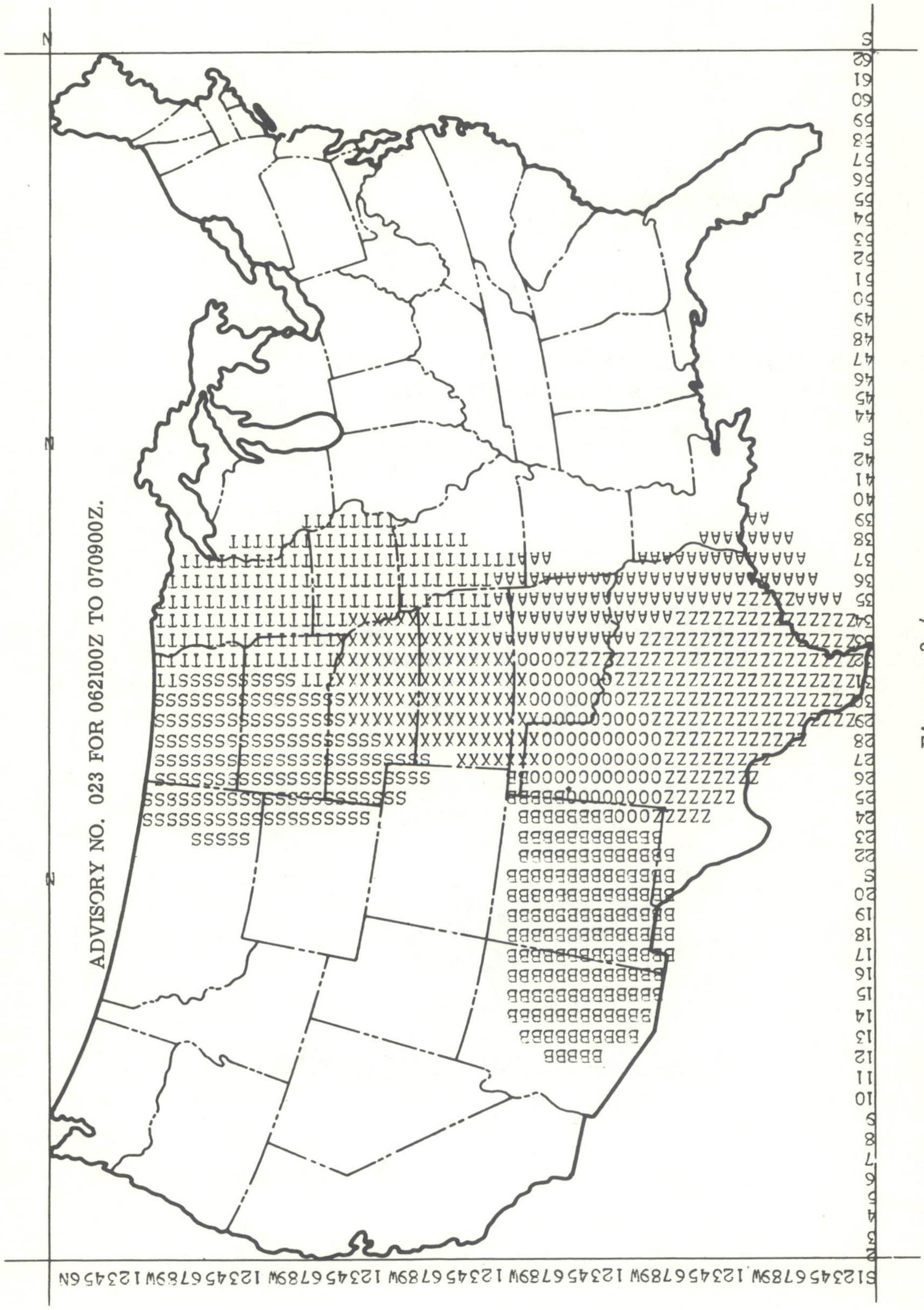


Figure 3-4.

EXAMPLE OF GRAPHIC PORTION OF MILITARY WEATHER WARNING ADVISORY.

```
Ø Ø32Ø1ØZ
WWXX WWXX WWXX 3 KGWC Ø32Ø1ØZ
TX 18-19

THUNDERSTORMS WITH 1 1/2 INCH HAIL AND SW GUSTS TO
65 KNOTS VALID Ø322ØØZ TO Ø4Ø2ØØZ TORNADO VALID
Ø322ØØZ TO Ø4Ø1ØØZ.

OK 7-8

THUNDERSTORMS WITH NO HAIL AND SW GUSTS TO LESS THAN
35 KNOTS EXPECTED BETWEEN Ø319ØØZ AND Ø4Ø3ØØZ.
```

Figure 3-5.

EXAMPLE OF MILITARY POINT WARNING.

installations in one locality; the total number of installations is approximately 600. 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, Point Warnings are issued for National Guard units, arsenals, ammunition plants, and other civilian activities under contract to the Department of Defense (DOD).

(1) Purpose and Use. 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. Point Warnings are amended, extended, or cancelled as necessary. For accuracy, the optimum leadtime is that just long enough to permit necessary protective action.

Point Weather Warnings:

a. Provide specific warning to an installation where a forecast unit 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 he supports.

(2) Interpretation

Area Extent. Point Warnings are issued whenever specific phenomena are expected within a 10-mile radius of a specific installation, with the following exceptions:

a. A Point Warning for a tornado is issued for a 25-mile radius of the installation.

b. A Point Warning for thunderstorms with surface wind gusts greater than 50 knots and/or hail exceeding 1-inch diameter is issued for a 25-mile radius of the installation.

8. 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 having jurisdiction over the county in which the requester or phenomenon is located. Appendix 1 illustrates, by region, the WSOs and their warning responsibility areas; the FSSs should refer the requester or information to these Offices. The Federal Aviation Administration (FAA) and National Weather Service will develop the communication methods for assuring that these requests and reports reach the appropriate WSO.

CHAPTER 4

COMMUNICATIONS

1. National Weather Service Systems

a. RAREP (Radar Report) and Warning Coordination (RAWARC). The National Weather Service internal teletypewriter system is a landline teletypewriter network consisting of five circuits, which terminates at the National Severe Storms Forecast Center (NSSFC) in Kansas City, the network relay and monitoring office (fig. 4-1). Traffic on RAWARC is basically unscheduled and is handled according to a priority system, with severe weather information having the highest priority. The only regularly scheduled material entered on RAWARC is an hourly collection (H+40) of radar reports (SD). Special radar reports and other material can be transmitted at any time the circuits are not in use.

b. NOAA Weather Wire Service (NWWS). The NWWS consists of local loops serving metropolitan areas, Statewide intrastate circuits, and overlay circuits. The purpose of NWWS is to transmit consumer-oriented forecasts, watches, weather warnings, 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.

Each intrastate circuit has one Weather Service Office (WSO) designated as the State Relay Center (SRC). The SRC is connected to the regional overlay interstate circuit and serves as the State relay point for transmissions over this regional circuit to other States through their SRCs. Washington, D.C., is the Overlay Relay Center and is responsible for relaying traffic between regional overlay circuits.

Only WSOs (or certain other authorized offices) have direct entry on these circuits. The Weather Service Forecast Offices (WSFO) furnish broad-scale information and local WSOs enter local information. Relays between adjacent circuits 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.

Figure 4-2 shows the areas covered, the SRCs, the regional overlay circuits, and the Washington Overlay Relay Center.

c. National Warning System (NAWAS). This is the Defense Civil Preparedness Agency (DCPA)-operated hot line interstate telephone system which connects DCPA Warning Points and WSOs within each State and between States. Figure 4-3 gives the location of DCPA warning points. The NWS's 180 intrastate and 41 interstate drops are shown in figure 4-4.

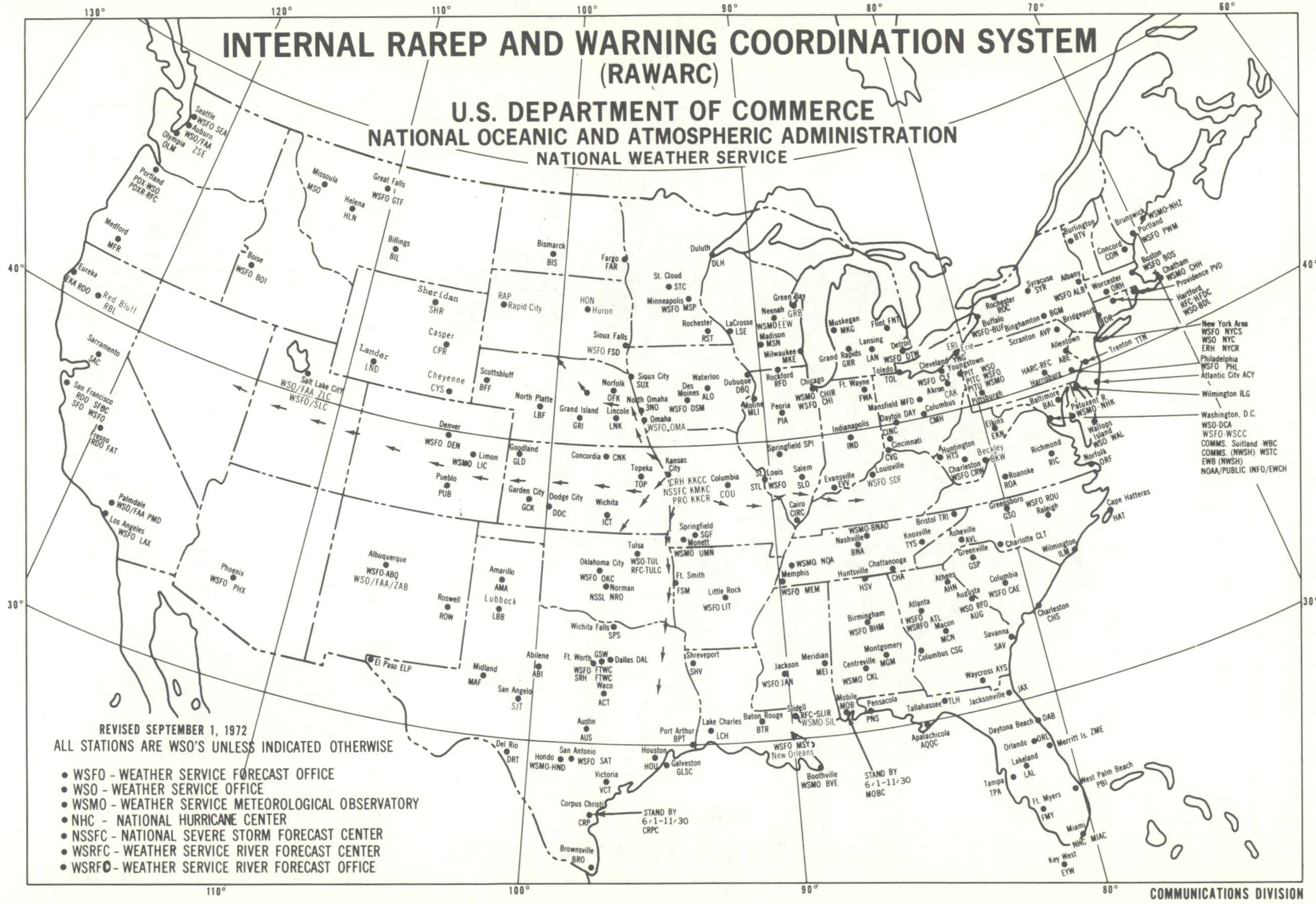


Figure 4-1.

RAWARC TELETYPEWRITER SYSTEM.

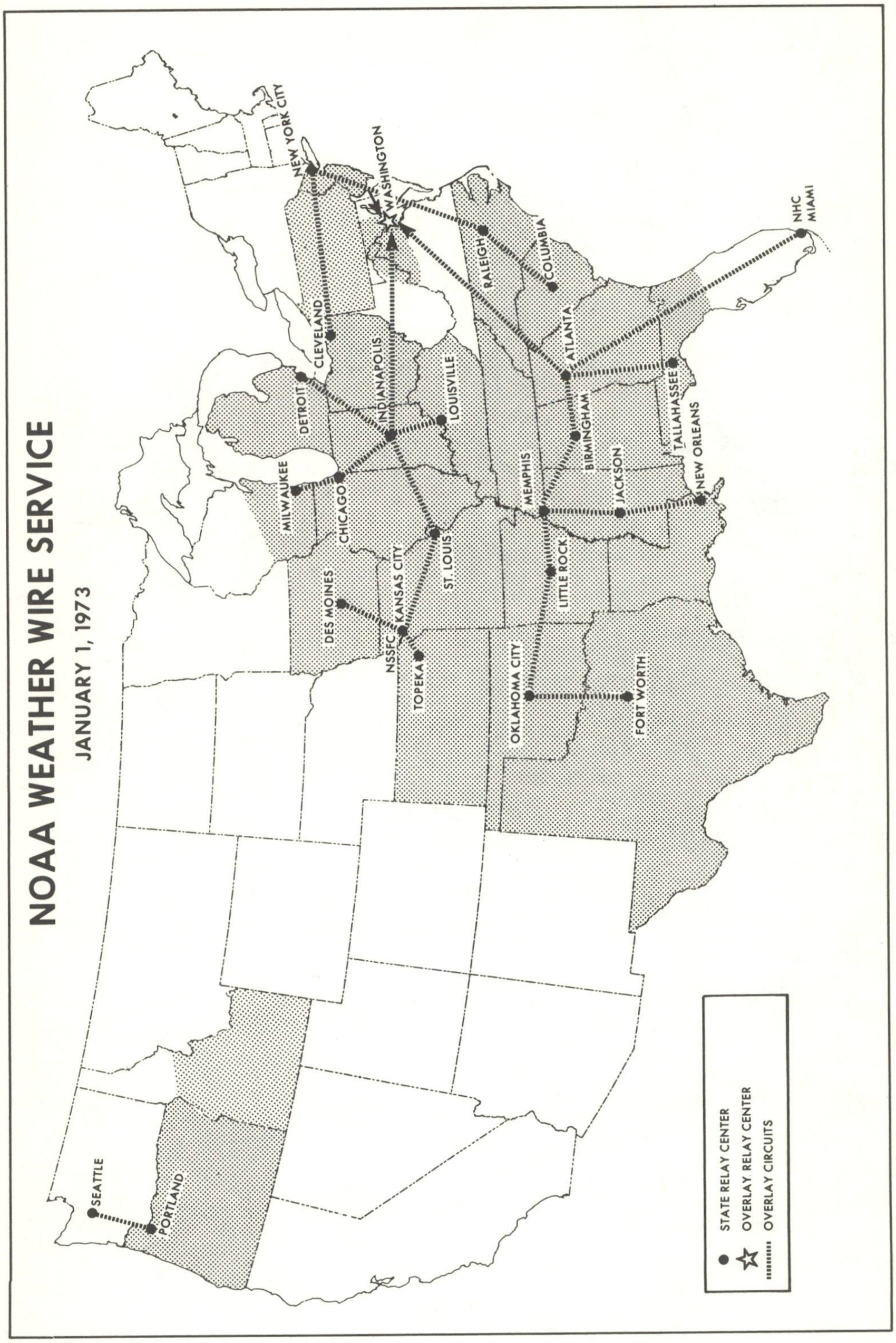


Figure 4-2. NOAA Weather Wire Service.

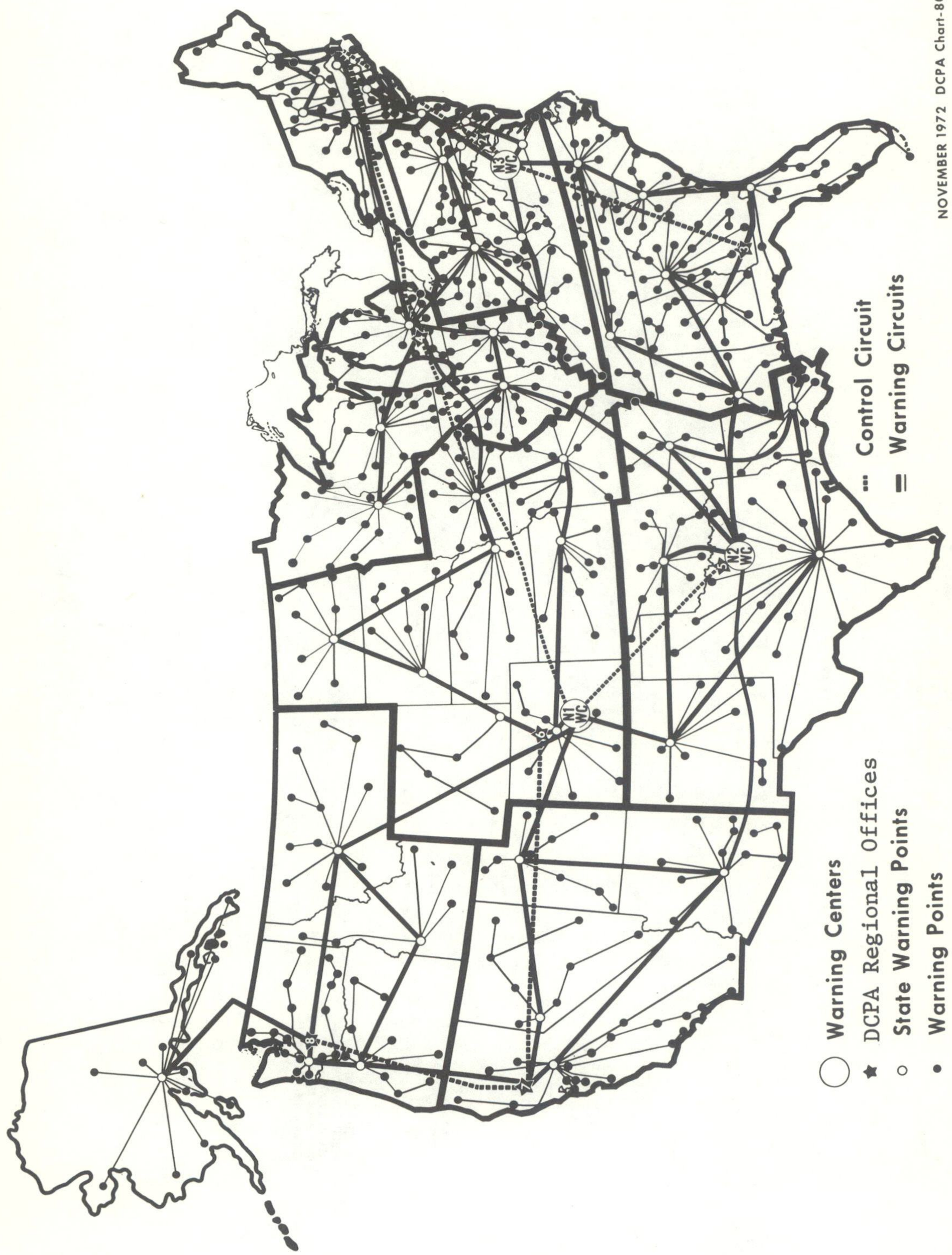


Figure 4-3.

DEFENSE CIVIL PREPAREDNESS AGENCY
NATIONAL WARNING SYSTEM

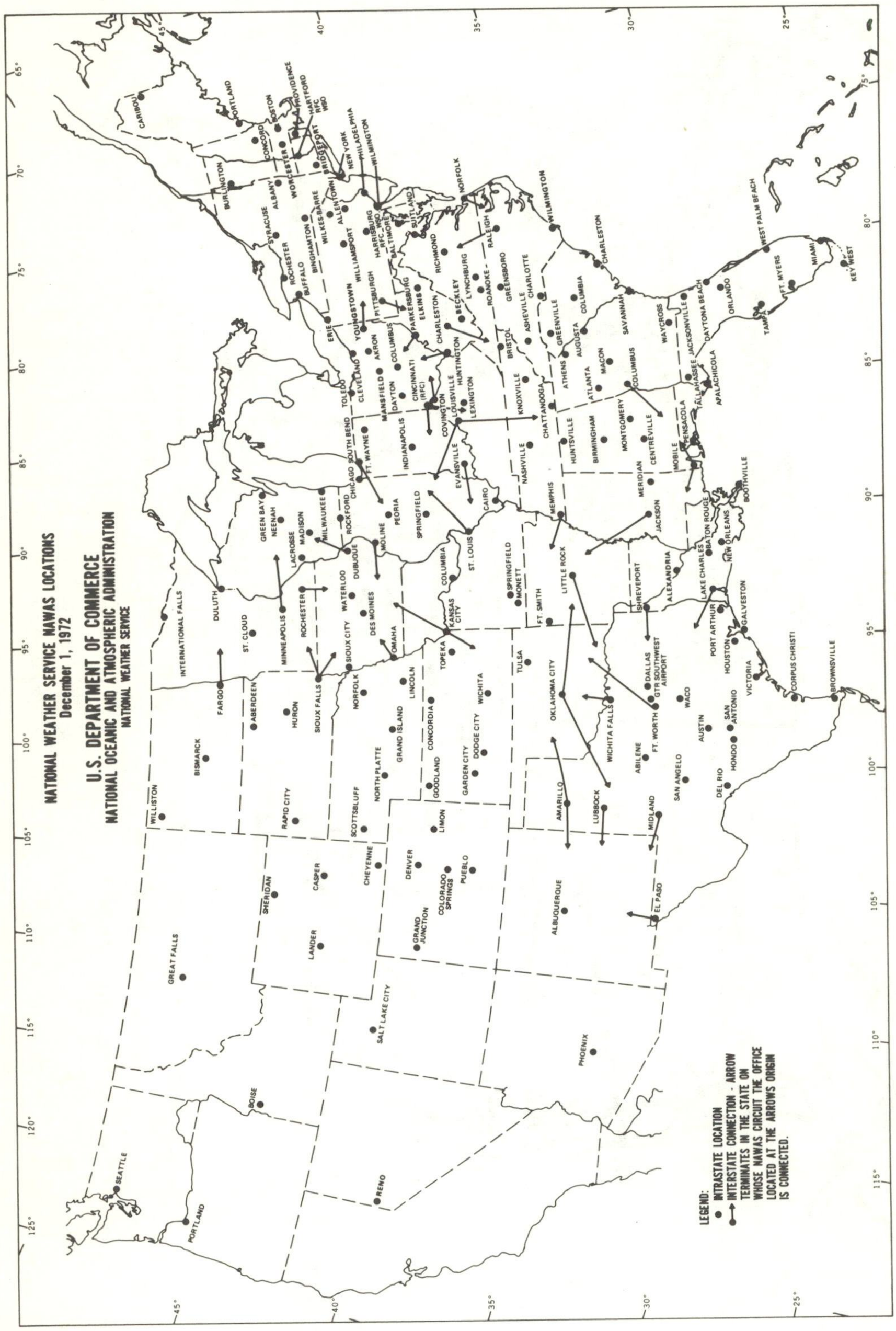


Figure 4-4. NWS NAWAS Drops.

d. Emergency Action Notification Signal (EANS). When an urgent need arises to inform all concerned of existing dangerous weather conditions, radio and television stations which cover a threatened area are requested to use the EANS. Use of EANS attracts radio and television listeners' attention to a warning and also makes it possible for anyone with a special receiver, or with a special attachment to a conventional radio receiver, to receive the information. The use of EANS for this purpose is at the discretion of the individual radio and television stations.

e. Very High Frequency (VHF) Radio Weather. The WSOs equipped with VHF radio can transmit continuous weather warnings cver a frequency of 162.55 MHz or 162.40 MHz (fig. 4-5). These radio transmitters provide continuous weather information over an area of about 40-mile radius. Local radio and TV stations can copy and rebroadcast the material even though land lines in the area may be disrupted. These transmitters have a tone-alert capability which can be used to activate specially designed muted receivers. This signal is transmitted at 1050 Hertz for 3-5 seconds before announcements of hazardous weather conditions.

f. Miscellaneous. Other types of distribution methods are used, as appropriate, to make warnings available to other WSOs and to the public as rapidly as possible. In a severe weather situation, the NWWS is given first priority and others are contacted as time is available. These other methods include:

(1) Telephone (including NAWAS).

(2) Radio and Teleprinter Networks.

(3) Public Service Teleprinter Networks.

(4) Press associations and news services.

(5) Amateur radio.

(6) State Police and Highway Radio and Teleprinter Networks.

(7) State Civil Defense Teleprinter Networks.

(8) Sirens.

g. Distribution of Severe Weather Watch and Warning Bulletins. The communication systems used for distributing Public Severe Weather Watch and Warning Bulletins are shown in figure 4-6. The communication systems used for distribution of Aviation Severe Weather Watch Bulletins and In-Flight Weather Advisories are outlined in figure 4-7.

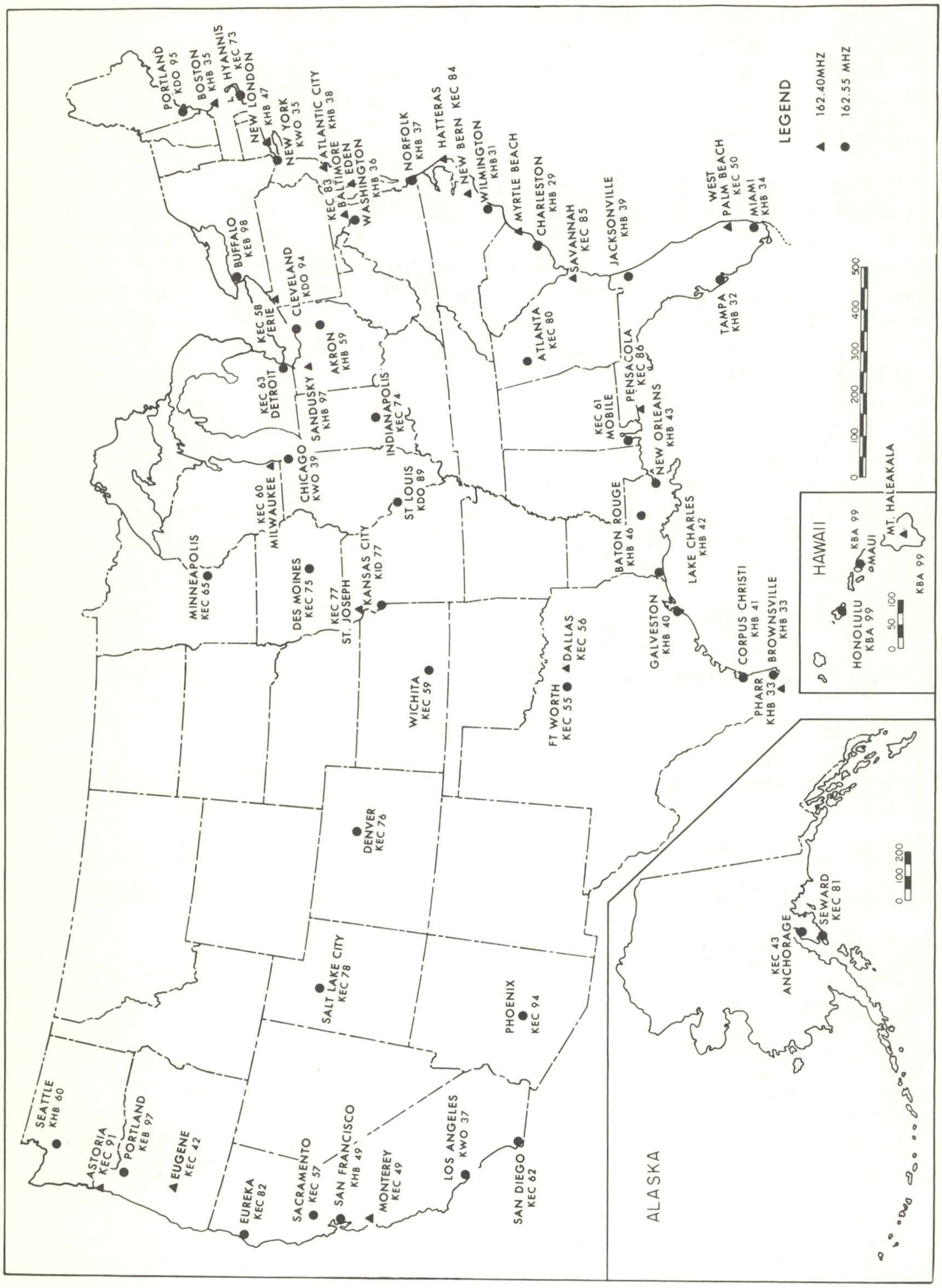


Figure 4-5.

VHF Continuous Transmission System.

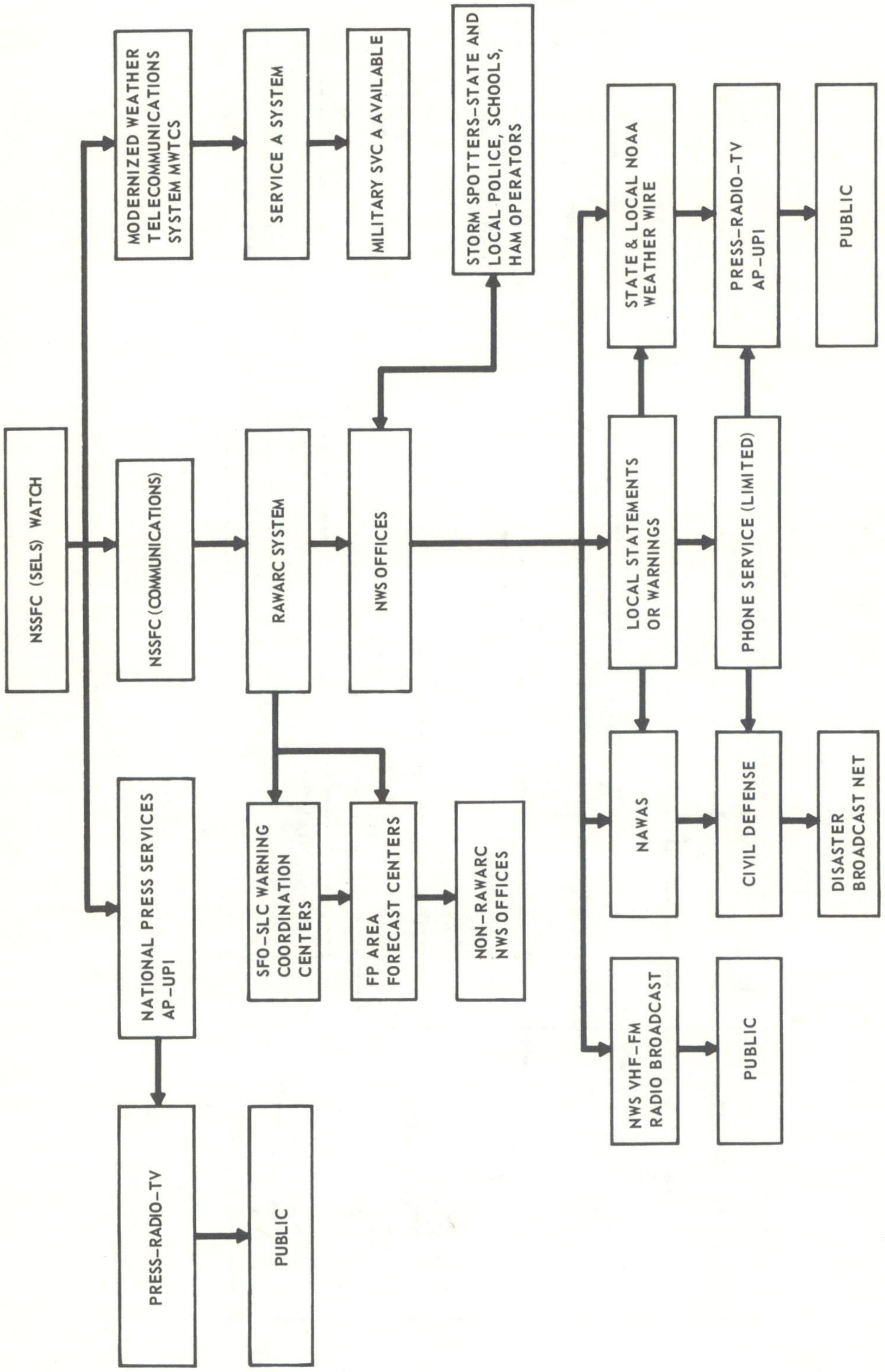


Figure 4–6.

DISTRIBUTION OF COMBINED SEVERE WEATHER WATCH AND WARNING BULLETINS.

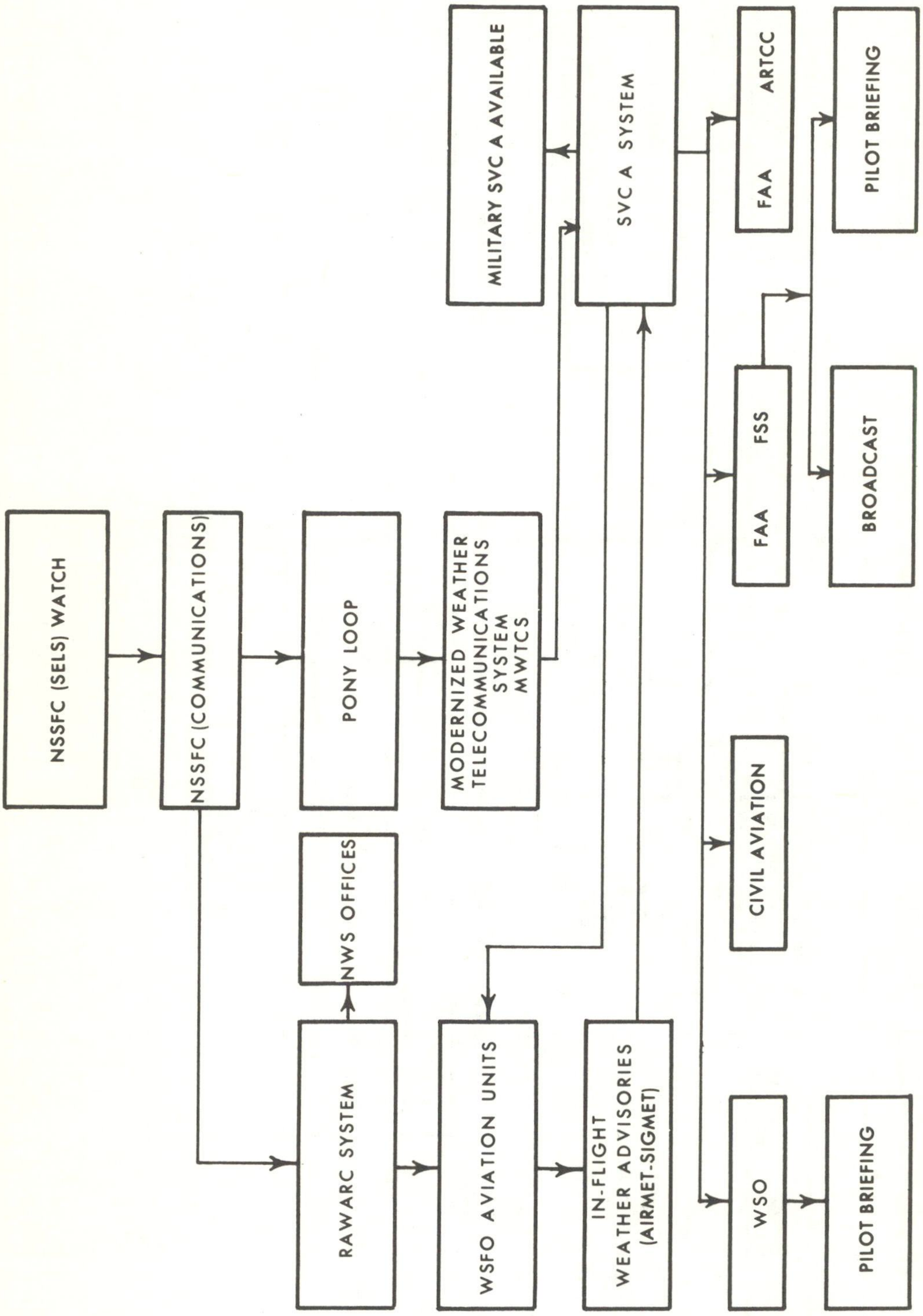


Figure 4-7.

DISTRIBUTION OF AVIATION SEVERE WEATHER WATCH BULLETINS - AIRMET AND SIGMET.

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

a. Within the conterminous United States, USAF radar weather observations are collected by means of the Continental U.S. Meteorological (COMET) IIA System and disseminated by the COMET IIB System. Reports collected by means of COMET IIA are transmitted from the Carswell Automated Digital Weather Switch (CADWS) to the Air Force Global Weather Central (AFGWC) and to the National Meteorological Center (NMC) through a computer-to-computer link; and reports to NSSFC/Radar Analysis and Development Unit (RADU) are sent by means of COMET IIB.

b. The COMET II System is divided into eight geographic areas, with a collecting and disseminating circuit covering each area (fig. 4-8).

c. The COMET II System is used to disseminate Military Weather Advisories and Point Warnings issued by AFGWC.

3. Federal Aviation Administration (FAA) Systems

a. Service A (fig. 4-9) will be used for the collection and distribution of severe local storms information as follows:

(1) Hourly and Special Airway Observations.

(2) Airmen's Meteorological Information (AIRMETS) and Significant Meteorological Information (SIGMETS).

(3) Hourly Radar Summaries from National Weather Service radar units at Air Route Traffic Control Centers (ARTCC).

(4) Hourly Radar Reports.

b. Service A will be used for distribution of Pilot Reports (PIREPS) from Flight Service Stations (FSS) to WSFO Aviation Units.

4. U.S. Navy.

U.S. Navy weather reports are collected by means of the USAF COMET IIA System and are disseminated by the COMET IIB System.

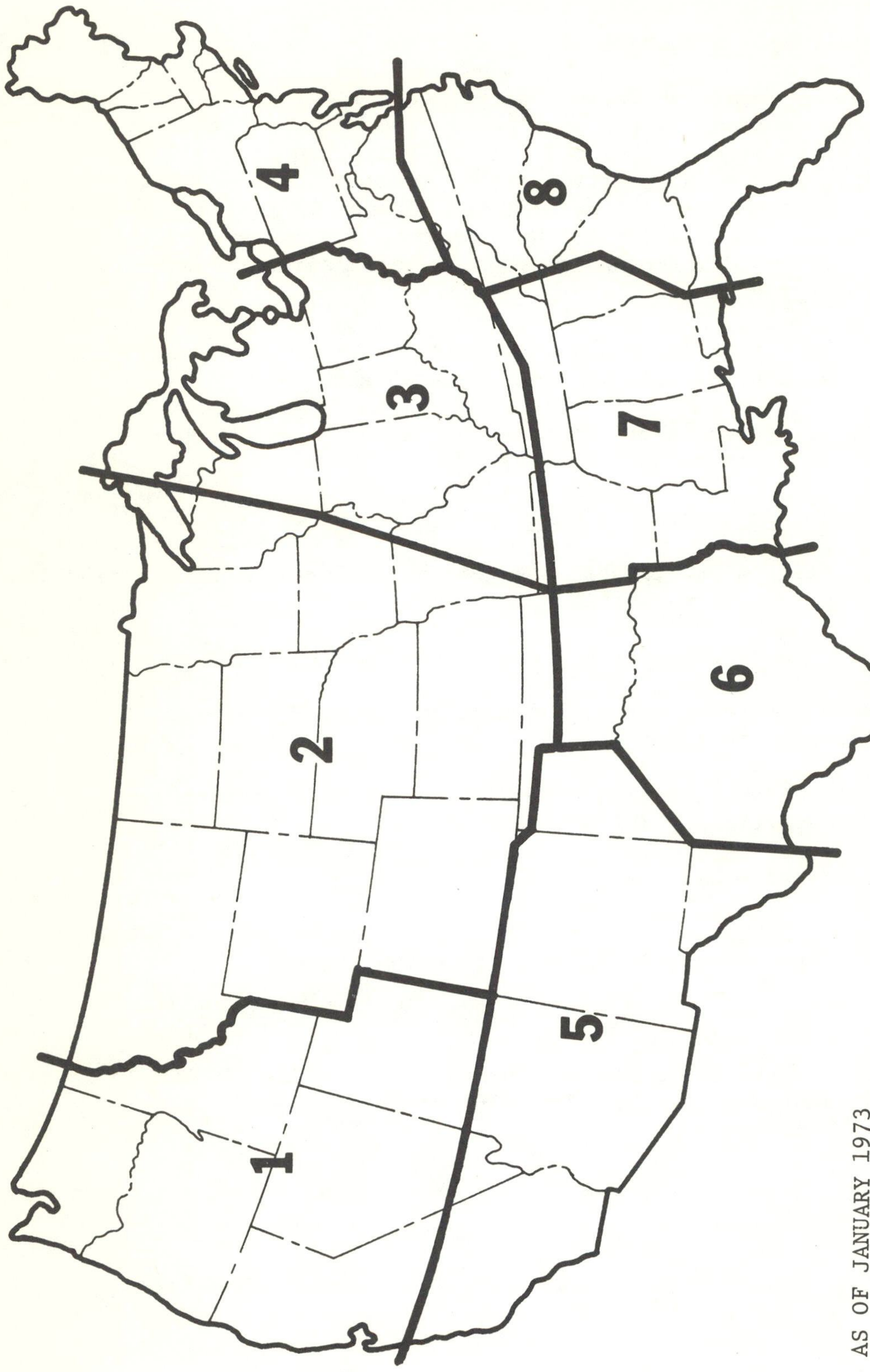


Figure 4-8.

COMET COLLECTING AND DISSEMINATING SYSTEM.

AS OF JANUARY 1973

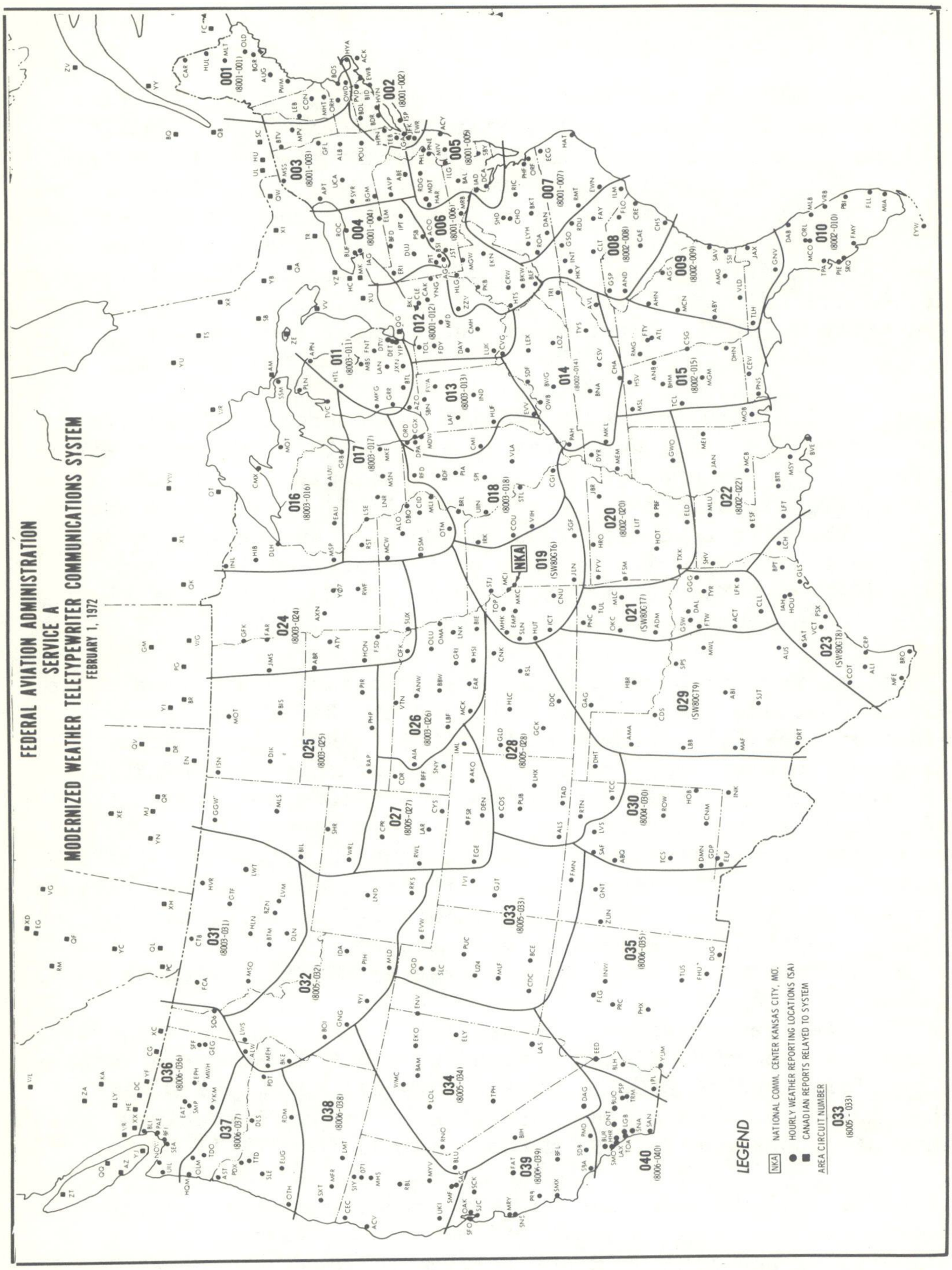


Figure 4-9. SERVICE A TELETYPEWRITER SYSTEM.

CHAPTER 5

OBSERVATIONS

1. Radar Observing and Reporting Plans

a. Radar data, which are routinely used in the support of this Plan and in the preparation of National Severe Storms Forecast Center (NSSFC) and Air Force Global Weather Central (AFGWC) products, are available from radars of the U.S. Synoptic Weather Radar Network (fig. 5-1). This Network is composed mainly of National Weather Service WSR-57 radars, supplemented by U.S. Navy and U.S. Air Force weather radars. In the western intermountain region, air traffic control radars remoted into the Salt Lake City, Utah, Palmdale, Calif., Albuquerque, N. Mex., and Auburn, Wash., Air Route Traffic Control Centers (ARTCC) are used as substitutes for weather-dedicated radars.

National Weather Service personnel at Palmdale, Albuquerque, and Auburn develop a composite of the radar data from radars remoted into these sites and transmit the data on an interagency facsimile circuit 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, by means of a data-telephone link, the final composite is sent to the Radar Analysis and Development Unit (RADU) at Kansas City for use in the Radar Summary Chart, and to AFGWC for use in meeting AWS requirements.

(1) National Weather Service radar observations, other than those from these four ARTCCs, are transmitted hourly on the Radar Report and Warning Coordination (RAWARC) circuits at H + 40 in RAREP (Radar Report) code. More frequent observations are taken and transmitted on RAWARC in severe weather situations. Hourly composites from ARTCCs are transmitted to a number of offices in the western intermountain region on the interagency (Atomic Energy Commission and National Weather Service) facsimile circuit. Each ARTCC Radar Unit prepares a narrative summary of its composite and transmits the summary on RAWARC. These summaries and selected hourly radar observations are transmitted hourly on selected Service A circuits by the Modernized Weather Telecommunications System (MWTCS) in Kansas City.

(2) At H + 40, radar reports in the RAREP code from the Air Weather Service (AWS) and Navy radar stations assigned to the U.S. Synoptic Weather Radar Network are forwarded to AFGWC from the Carswell Automated Digital Weather Switch (CADWS) by means of the data link. The NSSFC receives these reports by means of a Continental U.S. Meteorological (COMET) II System drop.

(3) The National Weather Service, Air Force, and Navy operate a number of non-network weather radar facilities. Used primarily for local forecasting and warning and for immediate service to local agencies, these

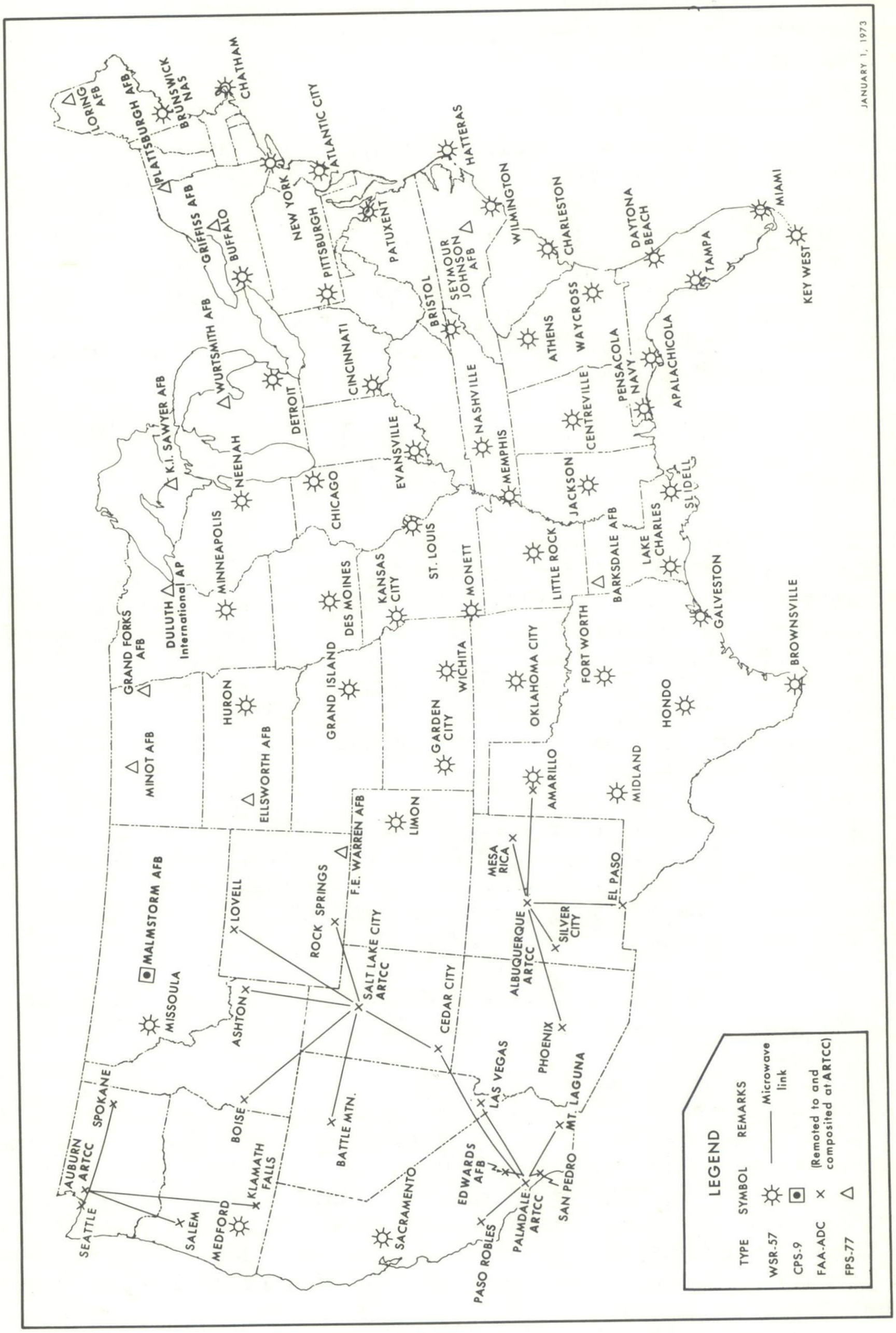


Figure 5-1.

U.S. SYNOPTIC WEATHER RADAR NETWORK.

radars also provide selected information on severe storms. For example, all USAF radar facilities in the conterminous United States, whether or not they are assigned Network responsibilities, report radar-detected hailstorms, severe thunderstorms, and tornadoes both on COMET IIA communications and by telephone to the nearest Weather Service Office (WSO) of the National Weather Service, when so requested.

b. There are a number of Aerospace Defense Command (ADC) radar sites capable of detecting and interpreting weather echoes. Appendix 2 lists all such sites, together with their associated AWS Air Division (AD) weather stations. Operational commitments permitting, these sites may provide supplementary reports upon request. However, contacts by a number of different agencies to a particular site must be held to a minimum. In general, either AFGWC or the supervising forecaster of the Severe Local Storms (SELS) Unit or RADU should attempt to contact a particular site through its associated AD weather station.

c. Whenever radar data from stations of the U.S. Synoptic Weather Radar Network are missing or appear to be in error, the military agencies and the National Weather Service have authorized the following:

(1) The RADU will telephone the military station and AFGWC will telephone (if necessary) the WSO for the missing data or clarification. Because RADU does not have the capability for obtaining such data through the COMET II System, the telephone must be utilized. In most cases where radar data from a WSO are missing or in error, RADU will usually obtain corrected data from that Office by means of RAWARC. Clarification of missing data will usually be available to AFGWC through this means. If such data are not forthcoming after a reasonable wait, AFGWC should contact the Radar Unit at the WSO by telephone.

(2) The Air Force and Navy shall provide NSSFC with telephone numbers of stations in the U.S. Synoptic Weather Radar Network. Telephone numbers of local-use radar stations will also be provided for use in emergency situations. The National Weather Service shall provide AFGWC with similar telephone numbers for its radar stations.

(3) If Federal Telecommunications System (FTS) or Department of Defense (DOD) telephone lines are not available, commercial telephone shall be used.

d. If a WSO needs radar data from a nearby military radar (Network, ADC, or local use), such data can be obtained by local arrangements between the National Weather Service Meteorologist-in-Charge and the AWS Detachment Commander or the Commanding Officer of 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 noninterference basis and should usually be limited to severe weather situations.

2. Rawinsonde-Observing Stations

a. Rawinsonde observations are scheduled twice daily, 0000Z and 1200Z, at the 70 stations in the National Weather Service and Military Upper Air Network (fig. 5-2). These stations also take special observations whenever required and requested by the agency concerned. The National Weather Service has part-time upper air stations located at Abilene, Tex., and Huron, S. Dak. From February 1 to May 31, the Abilene station is in operation; between June 1 and September 30, the Huron station is in operation. When these two stations are operating, observations are taken twice daily at 0000Z and 1200Z. Transponder capability is available at 34 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 COMET II teletypewriter systems in the radiosonde code. Data from special soundings requested for potential or existing severe weather situations are transmitted by means of RAWARC and other appropriate communications circuits to NSSFC and AFGWC. Special soundings transmitted on RAWARC will use the standard upper air message heading to assure their relay to AFGWC.

b. Low-level soundings in support of the Air Pollution Control Meteorological Services program are taken at the 19 stations shown in figure 5-3. These stations take observations to 700 millibars near sunrise and around noon, Monday through Friday. During critical air pollution situations, observations are taken 7 days a week. Data for the sounding taken near sunrise are transmitted on the Service C circuit at 1424Z and relayed, as necessary, to NSSFC and AFGWC. Data for the noon soundings are transmitted as above on an unscheduled basis.

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 1.

During the months of April, May, and June when the National Severe Storms Laboratory (NSSL) at Norman, Okla., 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. Except for the Army unit at Fort Sill, Okla., these data are processed by computer and are not available for real-time use. Data from Fort Sill are transmitted to NSSFC by means of COMET II. Such soundings are usually terminated at 400 millibars.

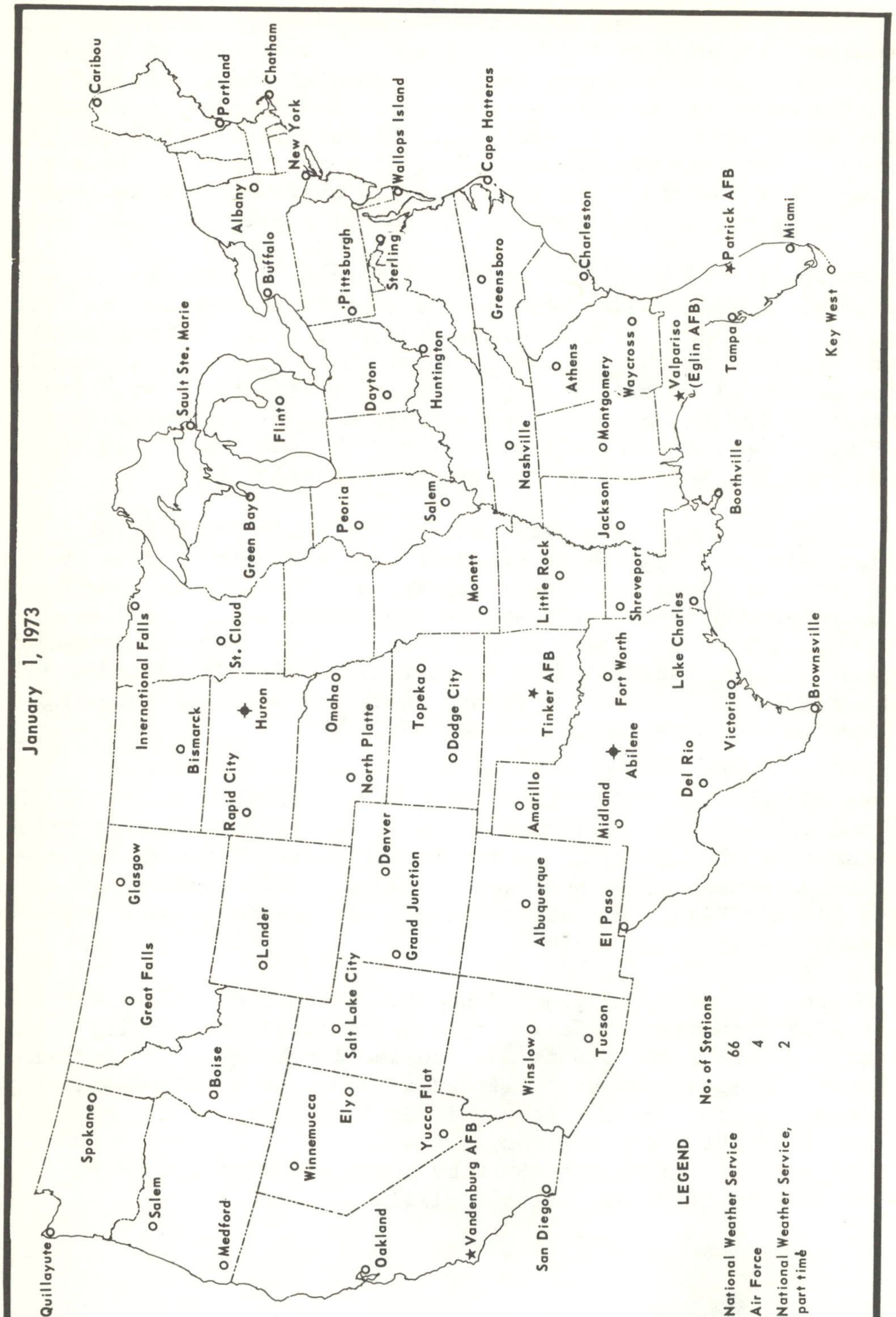


Figure 5-2.

NATIONAL WEATHER SERVICE AND MILITARY UPPER AIR NETWORK.

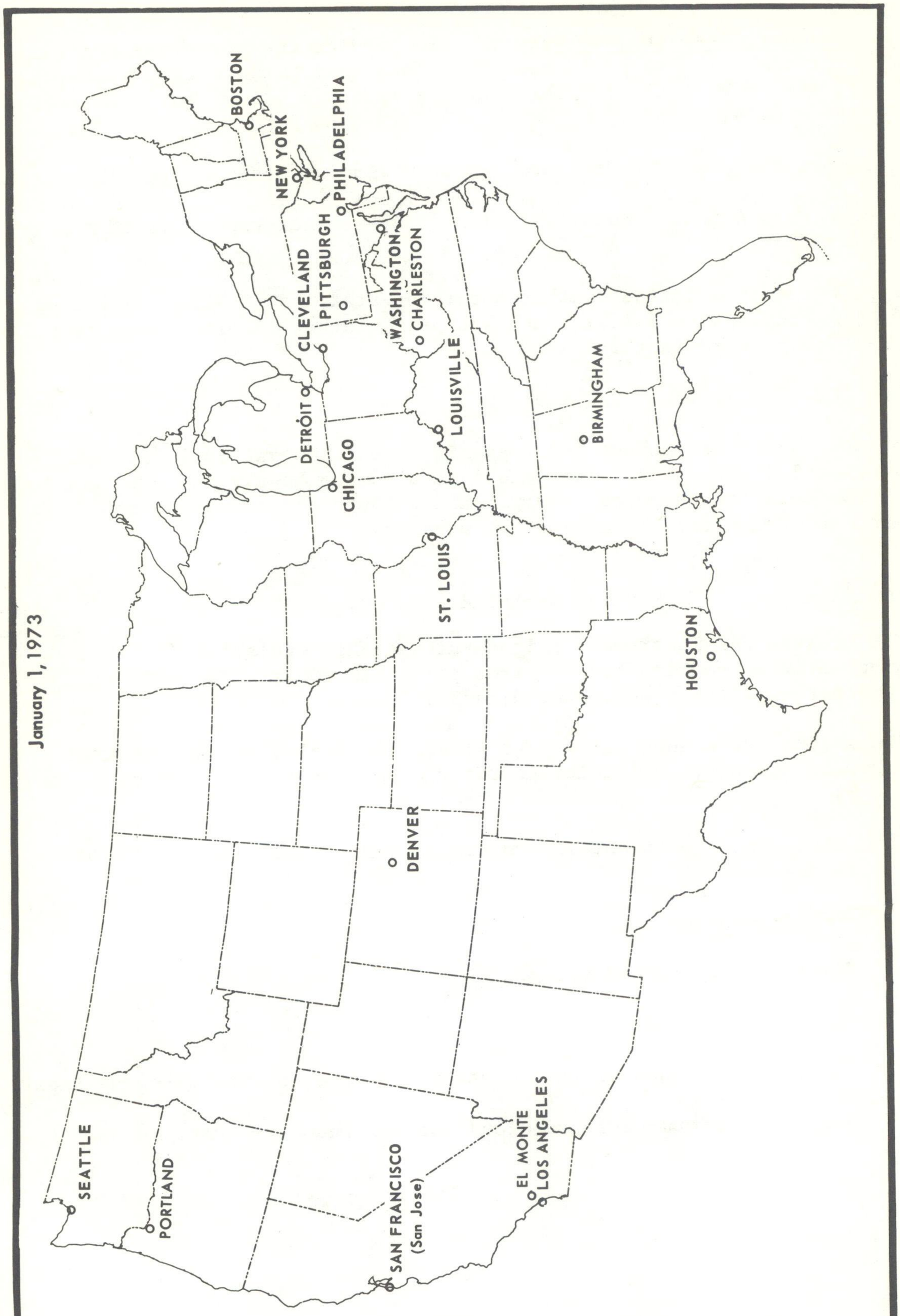


Figure 5-3. Environmental Meteorological Support Units--Low Level Soundings.

3. Surface Weather Observational Network. To provide the basic weather data needed for the analyses performed by the National Meteorological Center (NMC), NSSFC, and AFGWC, all available surface data are used. The following stations provide data:

a. The WSOs and Automatic Meteorological Observing Stations (AMOS).

b. The Federal Aviation Administration (FAA) weather-reporting stations--Flight Service Stations (FSS) and Towers.

c. Supplementary Aviation Weather Reporting Stations (SAWRS), including part-time paid, cooperative aviation and synoptic weather-reporting stations, and the U.S. Coast Guard facilities.

d. The 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.

4. The FAA Aircraft Pilot Reports (PIREPS).

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

b. The ARTCCs are requested to pass PIREPS to FSSs which are required to place them on the Service A teletypewriter circuit for distribution (see fig. 4-9).

c. The following significant information should be included in PIREPS whenever it is observed:

(1) Moderate or greater turbulence.

(2) Moderate or greater icing.

(3) Hail encountered.

(4) Location of lines of thunderstorms observed on the airborne radar.

(5) Related maximum-observed cloud tops of thunderstorms.

5. Severe Storm Surveillance by Meteorological Satellites. Several types of data will be available from the various operating meteorological satellites during the severe local storms season. A brief description is given below.

a. Automatic Picture Transmission (APT). APT service will be provided from the NOAA-2 satellite two-channel Scanning Radiometer (SR). NOAA-2 coverage will be twice daily at about 9:00 p.m. and 9:00 a.m. local sun time. In the daytime, the APT transmission consists of time-multiplexed visible and infrared images. At night, the infrared channel of the SR provides the image. Locations equipped with an APT ground station may acquire and display the images in real time as the satellite passes within range. The APT observations will continue to be distributed within the conterminous 48 States by means of the FOFAX. These will consist of mapped visible channel data for the daytime product and the mapped infrared data for the nighttime service. These APT products are usually on the circuit within 30 minutes after observation time.

b. Stored-Data Images. Stored data from the SR on NOAA-2 are acquired and mapped to provide global coverage. Time of observation is the same as the APT observation; acquisition is usually one revolution of the satellite--about 2 hours--later. These stored data are processed by NESS to produce cloud cover maps on polar stereographic and mercator projections and on a scale that match commonly used weather charts. These are available in NESS, NMC, and the Washington WSFO about 1-3 hours after data have been acquired (3-5 hours after observation time). These maps are transmitted on all facsimile circuits. Stored-data imagery are also made available to AFGWC for interpretation and 3-hourly computerized cloud analyses.

c. Applications Technology Satellite (ATS). This is a NASA research and development satellite program. ATS-3, launched in November 1967, is now located over the equator at about 70°W. longitude, at geosynchronous altitude and provides daytime cloud cover pictures of the Americas and the Atlantic Basin at about 30 minute intervals.

Observations are acquired from the satellite at NESS Command and Data Acquisition station at Wallops, Va., and relayed in real time to NESS and the Satellite Field Service Stations (SFSSs) located in the National Hurricane Center, Miami; the National Severe Storms Forecast Center in Kansas City; the Weather Service Forecast Office in Washington, D.C.; and the Weather Service Forecast Office in Redwood City, Calif. Assuming that the ATS-3 will continue to operate during the 1973 severe storms season, the staff at the SFSSs will receive and analyze the pictures in near real time and assist in applying these data to the severe storm advisory and warning program.

6. Severe Local Storm Actions of Nonmeteorological Agencies and Individuals. The National Weather Service uses observations of severe local storms activity, 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, Citizen Band radio groups, local Civil Defense Organizations, radio and television station mobile units, city employees (for example, the Chicago Sanitary District), FAA, and individual citizens.

Reports are received by various means--which are not uniform at each WSO--including Citizen Band or Civil Defense radio facilities (with a transceiver often located in the WSO and manned 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 sending "drop" 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 NWWS circuits (first priority, except for a more expedient means in some local areas), RAWARC, NAWAS, telephones (hotlines and commercial), very high frequency-frequency modulation (VHF-FM) installations of the National Weather Service, direct radio broadcasts, telephone recordings, and Civil Defense radio facilities. The "fan-out" principle is utilized wherever practical.

7. Aircraft Reconnaissance Data from the Gulf of Mexico. Because observational data are lacking in the Gulf of Mexico, use is made of the daily Air Force Reconnaissance Flight Gull Echo track (fig. 5-4). This track was designed by NSSFC and AFGWC as the one which would yield the maximum amount of data pertinent to the severe local storms program. On alternate days, the reverse of this flight is flown. Data from these flights are entered on RAWARC by NHC at Miami, Fla. AFGWC has the option of specifying tracks other than Gull Echo when necessitated by operational requirements and the synoptic situation.

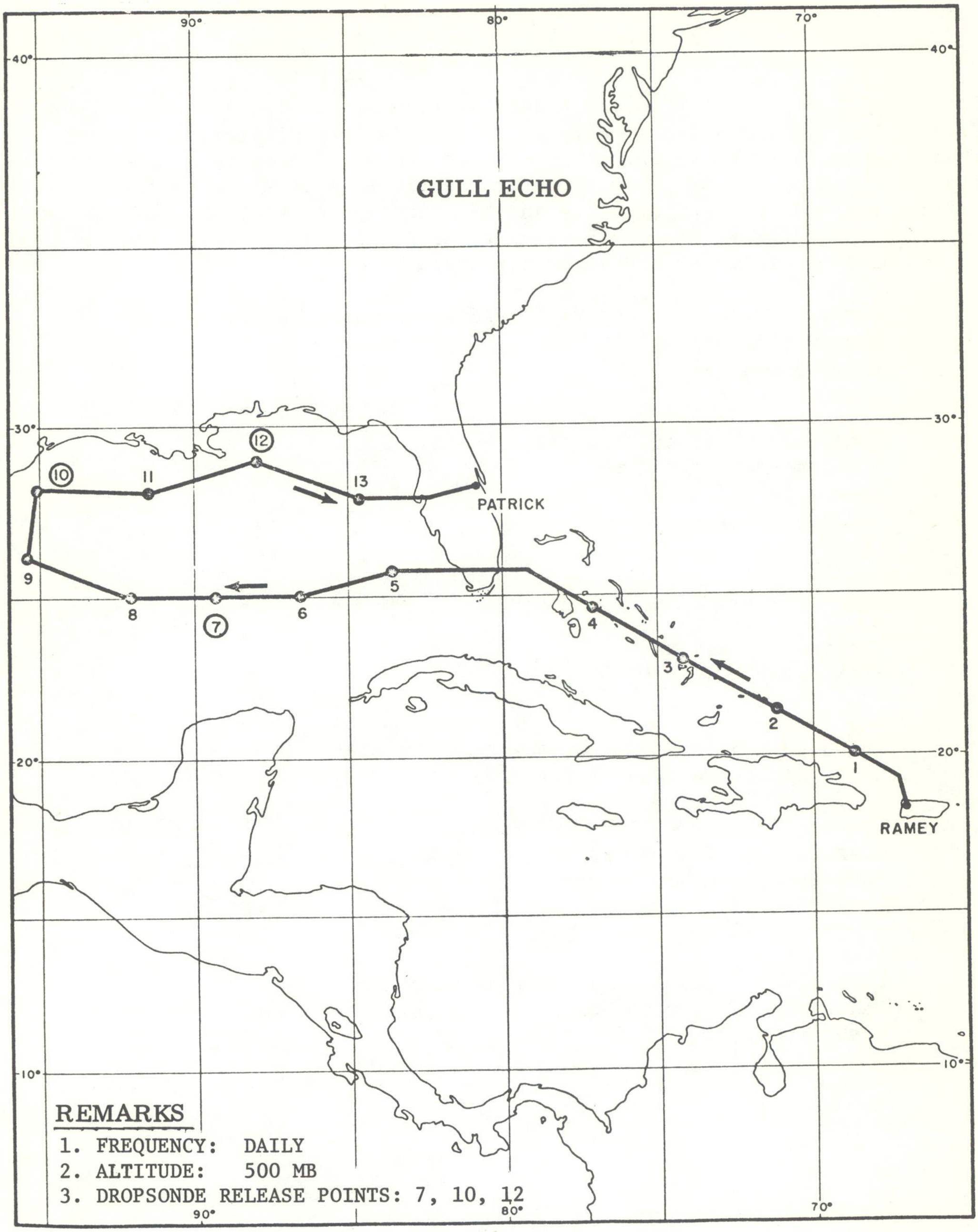


Figure 5-4.

WEATHER RECONNAISSANCE FLIGHT GULL ECHO TRACK.

CHAPTER 6

PUBLICITY

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 and NOAA weather services and of 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:

Deputy Director for Operations/Environmental Services
The Joint Chiefs of Staff
Washington, D.C. 20301

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

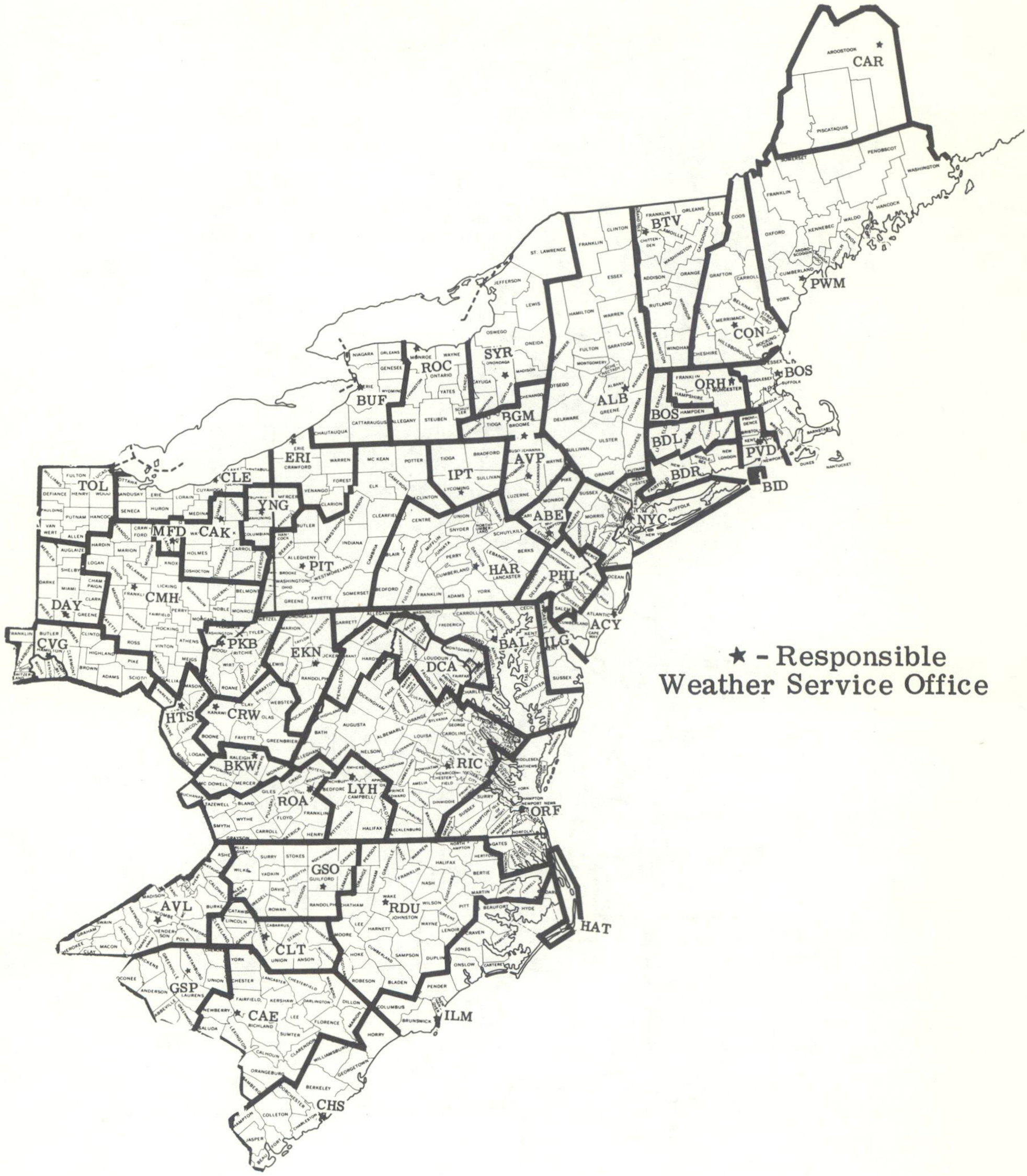
Headquarters, Naval Weather Service Command
Building 200
Washington Navy Yard
Washington, D.C. 20390

Headquarters, Air Weather Service (AWS/OI)
Scott Air Force Base, Ill. 62225

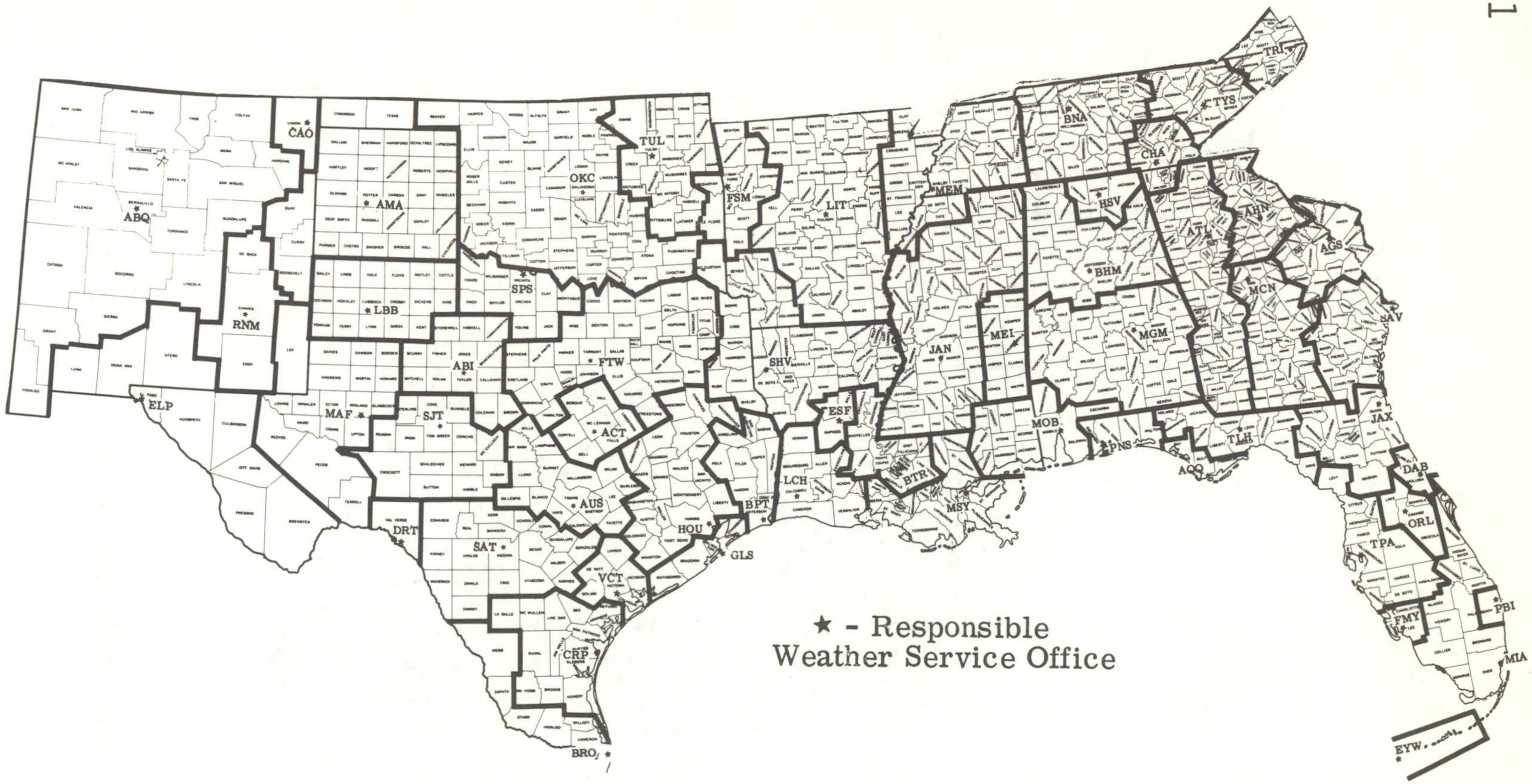
NOAA Public Affairs Office
6010 Executive Boulevard
Rockville, Md. 20852

Commandant, United States Marine Corps
Headquarters, United States Marine Corps
Washington, D.C. 20380

APPENDIX 1



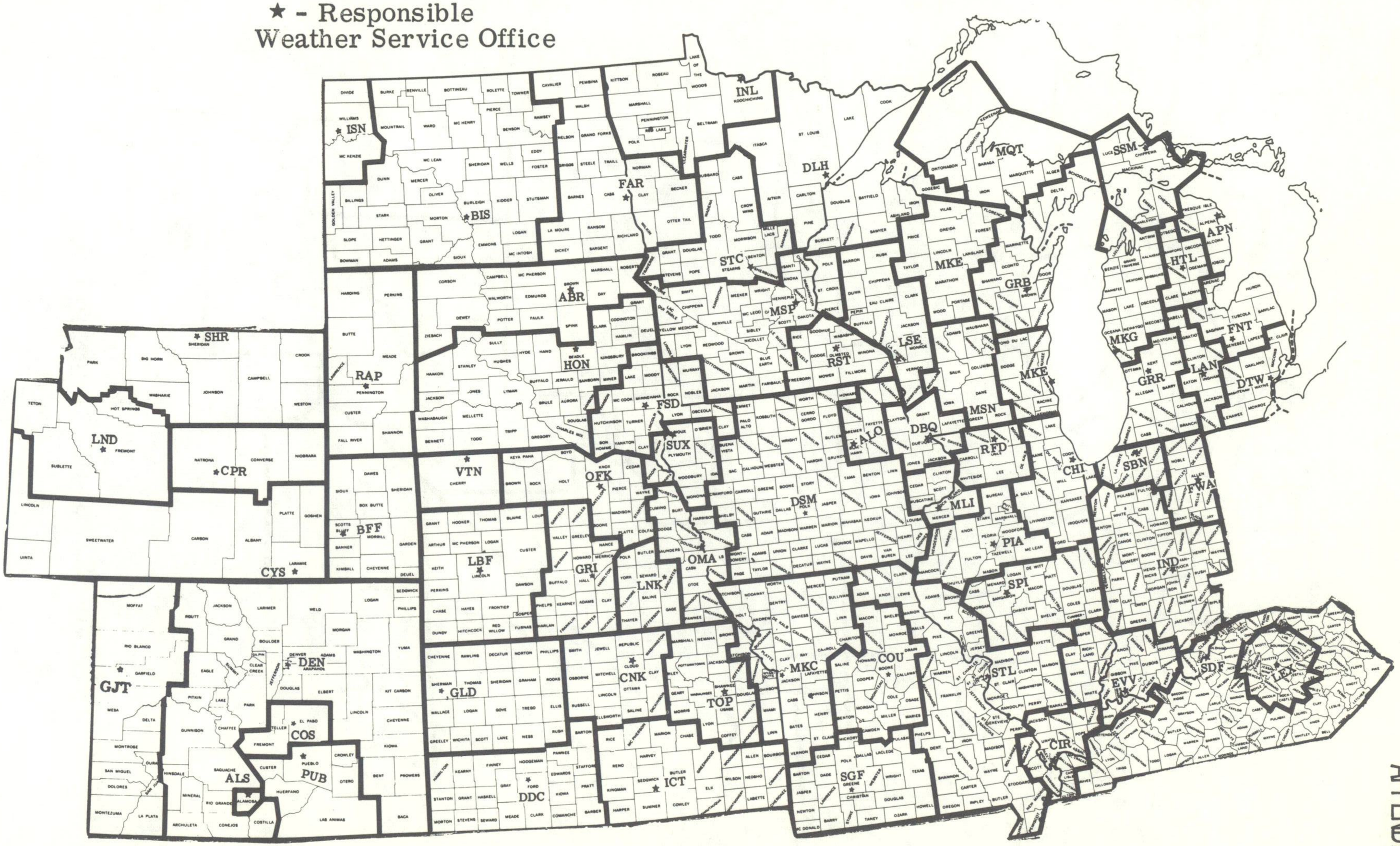
COUNTY WARNING AREAS - EASTERN REGION



★ - Responsible
Weather Service Office

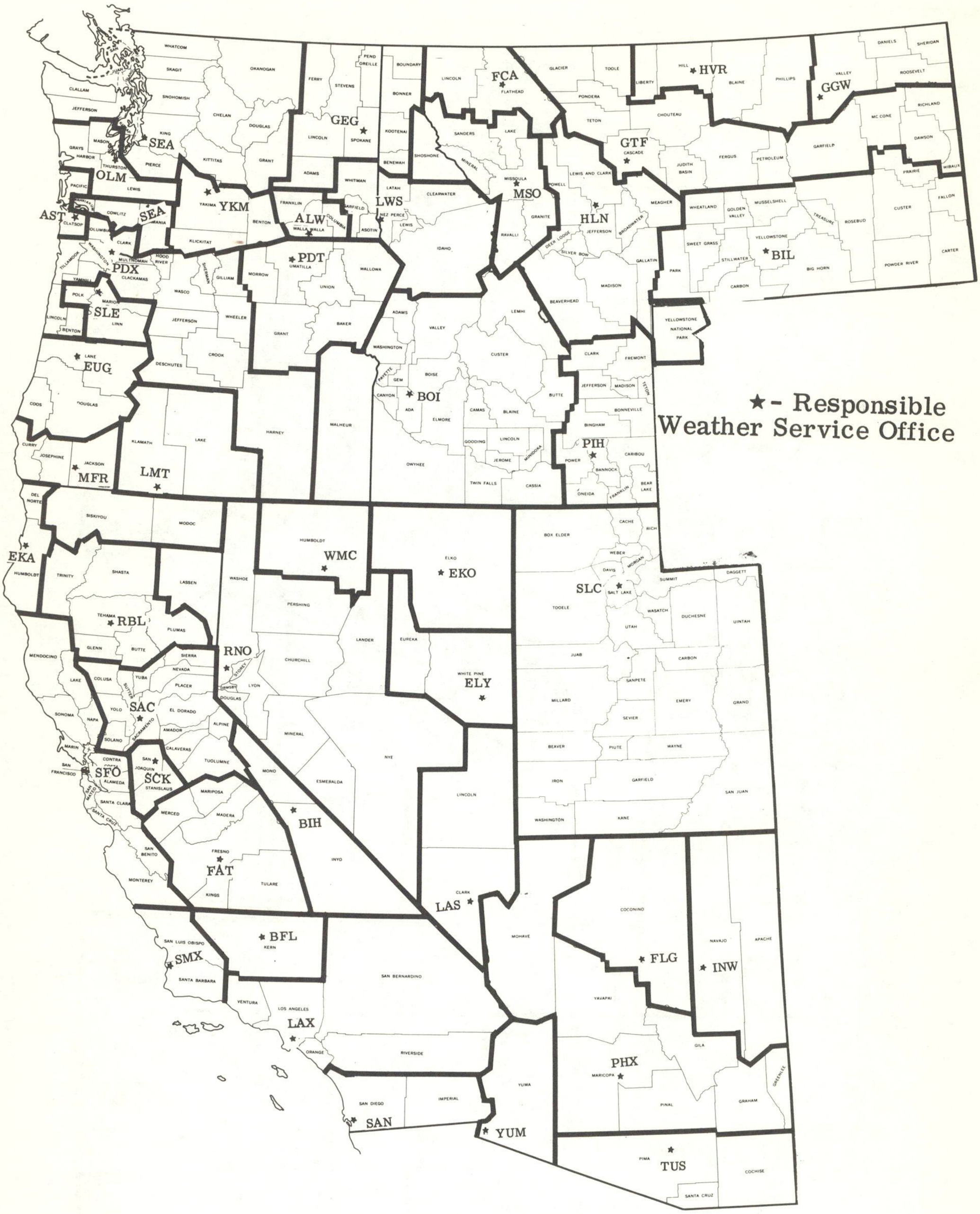
COUNTY WARNING AREAS - SOUTHERN REGION

★ - Responsible
Weather Service Office



COUNTY WARNING AREAS - CENTRAL REGION

APPENDIX 1



★ - Responsible Weather Service Office

COUNTY WARNING AREAS - WESTERN REGION

AEROSPACE DEFENSE COMMAND (ADC) RADAR SITES AND ASSOCIATED AIR DIVISION (AD) WEATHER STATIONS

1.	Baudette AFS, Minn. 48° 40'N. 94° 37'W.	23AD, Duluth, Minn.
2.	Blaine AFS, Wash. 48° 55'N. 122° 44'W.	25AD, McChord AFB, Wash.
3.	Calumet AFS, Mich. 47° 22'N. 88° 10'W.	23AD, Duluth, Minn.
4.	Cape Charles AFS, Va. 37° 08'N. 75° 57'W.	20AD, Ft. Lee AFS, Va.
5.	Charleston AFS, Maine 45° 05'N. 69° 06'W.	21AD, Hancock Field, N.Y.
6.	Fallon AFS, Nev. 39° 24'N. 118° 43'W.	26AD, Luke AFB, Ariz.
7.	Finland AFS, Minn. 47° 27'N. 91° 14'W.	23AD, Duluth, Minn.
8.	Fort Fisher AFS, N.C. 33° 59'N. 77° 55'W.	20AD, Ft. Lee AFS, Va.
9.	Fortuna AFS, N.Dak. 48° 54'N. 103° 52'W.	24AD, Malmstrom AFB, Mont.
10.	Havre AFS, Mont. 48° 53'N. 109° 57'W.	24AD, Malmstrom AFB, Mont.
11.	Keno AFS, Oreg. 42° 04'N. 121° 58'W.	25AD, McChord AFB, Wash.
12.	Mt. Laguna AFS, Calif. 32° 53'N. 116° 25'W.	26AD, Luke AFB, Ariz.
13.	North Truro AFS, Mass. 42° 02'N. 70° 03'W.	21AD, Hancock Field, N.Y.
14.	Othello AFS, Wash. 46° 43'N. 119° 11'W.	25AD, McChord AFB, Wash.

APPENDIX 2

15. Palermo AFS, N.J.
    39° 13'N. 74° 41'W.
    21AD, Hancock Field, N.Y.

16. Port Austin AFS, Mich.
    44° 02'N. 83° 00'W.
    23AD, Duluth, Minn.

17. Tyndall AFB, Fla.
    30° 05'N. 85° 37'W.
    20AD, Ft. Lee AFS, Va.

The AFGWC can contact all AD weather stations by calling the 10AF Switchboard, Richards-Gebaur AFB, Mo., and asking for the appropriate AD. After getting the desired AD, ask for 765 or 766, which will give the forecaster at all AD stations, with the exception of the 31AD, Oklahoma City AFS, Okla., whose extension is 721.

TABLE 1. Non-Network Upper Air Stations Which Might be Sources of Data

STATION	OPERATED BY	TIME OF OBSERVATIONS	DISTRIBUTION	AGENCY CONTACT	WILL TAKE REQUESTED SPECIALS
Marshall Space Flight Center, Huntsville, Ala.	NASA	*See note.	Local loop to WSO Huntsville, Ala., then to RAWARC.	Bob Turner, FTS 205-453-3109.	Yes
Navy Pacific Missile Range Facility, San Nicolas Island, Calif.	USN Pacific Missile Range	Monday-Friday, 0000Z and 1800Z.	Routinely on Service C.	Tom Carr, commercial 805-982-7173 or 8508; AUTOVON 8-873-1750-7173 or 8508.	No
Navy Pacific Missile Range Facility, Point Mugu, Calif.	USN Pacific Missile Range	Daily, 1200Z. Unscheduled frequent soundings during missions.	None.	Same as above.	No. Will furnish unscheduled or 1200Z upon request.
Chico, Calif.	USAF	Unscheduled.	COMET II.	Commander, Det. 58, 6th Wea. Wg.; AUTOVON 730-1450.	No
Naval Air Technical Training Center, Lakehurst, N.J.	USN	Unscheduled.	None.	Supt. of AG Schools; commercial 201-323-2228; AUTOVON 8-624-2228.	Yes

*Observations are made on an unscheduled basis, dependent upon operations.

TABLE 1. Non-Network Upper Air Stations Which Might be Sources of Data--Continued

STATION	OPERATED BY	TIME OF OBSERVATIONS	DISTRIBUTION	AGENCY CONTACT	WILL TAKE REQUESTED SPECIALS
El Centro, Calif.	USAF	Unscheduled.	COMET II.	Commander, OLA, Det. 21, 6th Wea. Wg.; AUTOVON 958-8680.	No
Edwards AFB, Calif.	USAF	Unscheduled.	COMET II.	Commander, Det. 21, 6th Wea. Wg. AUTOVON 350-4318.	No
Cape San Blas, Fla.	USAF	Unscheduled.	COMET II.	Commander, Det. 10, 6th Wea. Wg. (Eglin AFB); AUTOVON 872-5323.	No
White Sands Missile Range, N. Mex.	USA	Unscheduled.	COMET II.	CO, Met. Team, USA Electronics Command; AUTOVON 258-2211, ask for Met. Team.	No

TABLE 1. Non-Network Upper Air Stations Which Might be Sources of Data--Continued

STATION	OPERATED BY	TIME OF OBSERVATIONS	DISTRIBUTION	AGENCY CONTACT	WILL TAKE REQUESTED SPECIALS
Fort Bragg, N.C.	USA	Unscheduled.	COMET II.	Commander, Det. 3, 16th Wea. Sq.; AUTOVON 935-3350, ask for Wea. Facility.	No
Fort Benning, Ga	USA	Unscheduled.	COMET II.	Commander, Det. 10, 16th Wea. Sq.; AUTOVON 431-1410, ask for Wea. Facility.	No
Fort Sill, Okla.	USA	Unscheduled.	COMET II.	Commander, Det. 11, 16th Wea. Sq.; AUTOVON 883-1400, ask for Wea. Facility.	No
Fort Hood, Tex.	USA	Unscheduled.	COMET II.	Commander, Det. 14, 16th Wea. Sq.; AUTOVON 737-2131, ask for Wea. Facility.	No
Fort Carson, Colo.	USA	Unscheduled.	COMET II.	Commander, Det. 58, 16th Wea. Sq.; AUTOVON 691-5811, ask for Wea. Facility.	No

TABLE 1. Non-Network Upper Air Stations Which Might be Sources of Data--Continued

STATION	OPERATED BY	TIME OF OBSERVATIONS	DISTRIBUTION	AGENCY CONTACT	WILL TAKE REQUESTED SPECIALS
Fort Huachuca, Ariz.	USA	Unscheduled.	COMET II.	CO, Met. Team, USA Electronics Command; AUTOVON 879-1110, ask for Met. Team.	No
Yuma Proving Ground, Ariz.	USA	Unscheduled.	COMET II.	CO, Met. Team, USA Electronics Command; AUTOVON 727-1450, ask for Met. Team.	No