

# Aware

Winter 1995/96  
Spring 1996

## NATIONAL WEATHER SERVICE

Modernization .....	2
Operations and Services .....	8
WCM Program .....	14
NOAA Weather Radio Initiatives .....	15
Hazards Community Forum .....	16
International Decade for Natural Disaster Reduction .....	21
Publications and Audiovisuals .....	21

### Attachments:

- A — Update on OM's WSOM Chapters A-1
- B — *Aware Report* WCM Roster ..... B-1

### Published by:

## Office of Meteorology



National Weather Service, NOAA  
Office of Meteorology  
1325 East-West Hwy, Rm. 14370  
Silver Spring, MD 20910  
Tel: (301) 713-0090  
Fax: (301) 713-1598  
Linda Kremkau, Editor  
cc:Mail: Linda.Kremkau@W-OM14  
Internet: L.Kremkau@smtpgate.ssmc.noaa.gov  
<http://www.nws.noaa.gov/om/ombome.htm>

Louis W. Uccellini ..... Director

Richard Przywarty ... Chief, Service Division  
Donald Wernly ..... Chief, Customer Service  
Therese Pierce . Chief, Integr. Hydromet. Serv.

Gregory Mandt (Actg) Chief, Science Division  
Joseph Bocchieri .. Chief, Science & Training  
Fred Zbar ..... Chief, Tech. & Fcst. Sys.

The *Aware Report* is available on the web at:  
<http://www.nws.noaa.gov/om/aware.htm>



*Aware Report* is an administrative document issued by the National Oceanic and Atmospheric Administration for the information and use of the Agency and the natural hazard community.

## The Crucible

1996 has been an incredible year so far! The budget battle continued unabated until the last week in April when the ongoing Continuing Resolution for select government departments, including the Department of Commerce, finally came to an end. The longest government shutdown in history was met with a monster east coast blizzard that kept most of the government from opening, while bringing major eastern metropolitan areas to a standstill. Questions concerning the role of government saw the end to the Agricultural Weather Program, while the National Weather Service (NWS) weather support was eliminated at the Federal Aviation Administration's (FAA) Central Flow Control Facility.

During this period, the east coast blizzard was followed by record flooding, high winds and flooding buffeted the Pacific Northwest, drought intensified over the Great Plains and desert southwest, and tornadoes pummeled the south and portions of the Midwest. Through the uncertainties of the budget and the ravages of nature, NWS employees kept going. Not knowing when they would be paid, personnel broke out sleeping bags in snowbound offices and kept alive the flow of critical information that saved lives and property. Short-term forecasts from the Next Generation Weather Radar (NEXRAD) Weather Service Forecast Office (NWSFO) Portland, Oregon, were of such quality that they were read on television by the mayor to highlight the areas of greatest risk from high winds. This year could be likened to a crucible for government workers. But in the process, we have gained strength, steeled our resolve, and put even a stronger focus on our mission.

Tragically, an aircraft accident in the mountains of Bosnia claimed the lives of Secretary of Commerce Ron Brown as well as 35 other government and private sector individuals, including 11 of his Commerce colleagues. Secretary Brown is remembered as an energetic and positive individual who lived life to the fullest, never shirked a challenge, and always set his goals high. Many said that he could work with anyone and through his enthusiasm get people to achieve what they never dreamed was possible. Ron Brown believed in Commerce, the National Oceanic and Atmospheric Administration (NOAA), and the NWS. The actions of our people demonstrate the same commitment to excellence and service. Great challenges lie ahead. Facing the future, as Ron Brown faced life, will enable us to transcend our own expectations. We owe it to ourselves and our customers to do nothing less.

Donald R. Wernly  
Chief, Customer Service

# Modernization

## The Storm Prediction Center (SPC) Relocates to Norman, Oklahoma

The spin-up of the new SPC in Norman, Oklahoma, is well underway.

All of the present Severe Local Storms Unit (SELS) forecasters from the former National Severe Storms Forecast Center (NSSFC) have agreed to relocate to Norman. This will allow us to maintain our expertise in forecasting severe convective storms. Initially, the SPC will be housed on the National Severe Storms Laboratory (NSSL) property. Construction and renovation currently is underway. The forecast area is slated to be completed by May 1. Long-range facilities plans call for the development of a "NOAA campus" in Norman. This complex will house significant portions of the NOAA organizations that are now in Norman. These are the SPC, NSSL, the Weather Surveillance Radar-1988 Doppler (WSR-88D) Operational Support Facility (OSF), and the Oklahoma City Weather Forecast Office (WFO). The possibility of collocating the NOAA facility with the University of Oklahoma's School of Meteorology is being explored.

Along with the construction of our facility, the workstations, data feeds, and communications that are necessary for a National Center to operate are being installed. T1 telephone lines between the SPC and both Washington and Kansas City were connected in March. A Geostationary Operational Environmental Satellite (GOES)-East satellite antenna will be placed on the roof of the University of Oklahoma's School of Meteorology building in late April. The data will be relayed to the SPC via a microwave line. State of the art UNIX-based workstations for the forecasters are either in hand or scheduled for delivery in May. With the delivery of an Automation of Field Operations and Services (AFOS) computer system in early June, all of this will come together and an operational readiness test of the SPC Operations Center will be held in June.

A major SPC milestone will be achieved in late June. An 11-month operational test of the SPC's first Norman product, the Hazardous Weather Update (HWU), will begin. The HWU will be equivalent to a national forecast of major storm systems, covering areas larger than several WFO areas of responsibility. Its intent is to depict storm systems as a whole to complement issuances from individual offices for their county warning areas (CWA). The HWU will highlight where the weather is going, provide a broad outline of warnings and watches in effect, and underscore the most important hydrometeorological impacts of the storm. This product is for people requiring information about an entire storm system rather than just their local area. Accordingly, we expect the HWU to free our field offices from distilling information from multiple WFOs to answer questions concerning events outside of their CWA. Also, we anticipate benefiting national and regional media; national organizations involved in the warning response, such as the Federal Emergency Management Agency (FEMA) and the American Red Cross (ARC); state emergency managers, and local emergency managers who want to put their local events in context with larger situations.

Immediately following the start of the HWU test, a 2-week test of the SPC Operations Center's capability to support severe thunderstorm forecasting will begin. The robustness of the systems in the Norman facility will be explored. Also, since we cannot stop issuing forecasts in order to move and since we do not have enough equipment to duplicate the Kansas City forecast operation in Norman, we need to test various schemes for issuing some SPC Severe Convective products from Norman and others from Kansas City. This temporary division of responsibility will allow us to stage the move and make it transparent to the SPC customers. In late September and October of this year, the first five forecasters will move from Kansas City to Norman. We will then begin a period of split operations, while some of the forecaster workstations are relocated to our new facility. Beginning in January 1997, the remainder of the Kansas City staff will transfer to Oklahoma. On February 7, 1997, the move will be completed, and the entire SPC forecast operation will be in Norman.

While these activities represent a major accomplishment, the SPC spin-up has only begun. For the past two winters, the SPC has collaborated with NSSL in developing potential experimental winter weather guidance products. The scientific validity of these products will be evaluated during the winter of 1996-97, and their content will be specified by an extensive coordination with the Weather Service Forecast Offices (WSFO), Regions, Weather Service Headquarters (WSH), and the Hydrometeorological Prediction Center (HPC). The goal is for the SPC's winter weather program to become operational in late fall of 1997. Excessive precipitation products will be developed via a process analogous to the one used for winter products. The excessive precipitation program should become operational during the summer of 1998. The last element in the initial SPC suite of products is national fire weather guidance. These products should start flowing the year after the excessive precipitation guidance.

Parallel to these efforts, the SPC will play a significant role in the Convective Watch Decentralization Program. With all this activity, the SPC will be an exciting place for the foreseeable future. The change from NSSFC to the SPC is not change for change's sake but rather is part of a carefully crafted program to allow the NWS and its forecast offices to capitalize on the investments made in the modernization by improving the quality and timeliness of weather services it provides to the American public. If any of you are in central Oklahoma, I invite you to stop in and visit the SPC. Our telephone number is (405) 579-0701.

—Joseph T. Schaefer, Director, SPC

## NWS Conducted Customer Workshop on March 15, 1996

A Customer Workshop, hosted by the Office of Meteorology (OM), WSH, on March 15, 1996, addressed, primarily, the Convective Watch Decentralization and proposed changes to the Universal Geographic Code (UGC). The Workshop also addressed a proposed Hazardous Weather Update (Product Category HWU) from the SPC and implementation of new METAR (Aviation Routine

Weather Report) and TAF (aerodrome forecasts) codes. About 30 NWS customers participated, representing state and local emergency management, Family of Services subscribers, national news agencies, the electronic media, the National Weather Association (NWA), providers of commercial weather services, and the aviation and marine communities.

The Customer Workshop achieved its prime objective to review progress on the Convective Watch Decentralization and to solicit involvement of NWS customers as active members of the Decentralization process. Customers provided valuable information regarding their needs for product format, content, coding, and speed of delivery of watch-related products. In general, customers considered the Convective Watch Decentralization as a positive step. While the draft Plan was considered comprehensive, detailed, and well thought out, customers have concerns about some products depicted in the Plan. There was consensus for relocating watch polygon end point latitude/longitudes to the end of products to make it more easily computer readable. More development is needed to format and encode the Watch Clearance Notification since UGCs otherwise may not serve their intended purpose when received by existing customer technologies. More attention needs to be given to formatting Phase I watches as they co-exist with Phase II products during Phase II operations. Customers indicated the desire to segregate technical from non-technical information in the public watch product. Finally, as software is developed to allow the SPC to supply products associated with the watch, customers need functional design specifications and software source codes to expedite their efforts to implement needed change. OM and SPC are addressing these concerns at this time.

A significant amount of the Workshop addressed concerns regarding proposed changes in UGCs. The proposal was in response to emergency managers and others who wanted the NWS to use the Federal Information Processing Standards (FIPS) county identifiers in the UGC for all NWS products. Currently, the UGC uses the "C," or county FIPS, form for short-fuse warnings and the "Z," or NWS-unique zone, form for all other products that use UGCs. Now that most zones have been downsized to county size, it makes sense to use one code. Because the proposal will cause significant reprogramming of customer databases, including the NOAA Weather Wire Service (NWWS), as well as modifications to NWS applications software, implementation will not occur until all of these issues can be accommodated.

At the close of the meeting, approximately a dozen customers volunteered to serve on a Customer Advisory Panel. The Panel will represent a cross section of NWS customers (i.e., emergency management, commercial weather service providers, electronic media, other Federal agencies, aviation and marine interests, etc.) by providing input to OM throughout the Decentralization process. The Advisory Panel also may be asked to interact with the NWS during the development of other products and services during the Modernization.

—Bill Alexander, Mesoscale Manager, Customer Service, WSH

## NWS Reviews Convective Watch Decentralization

The latest version of the Plan to decentralize convective watches is being reviewed this spring. The Plan describes how the NWS

proposes to migrate the responsibility for issuing severe thunderstorm and tornado watches from the SPC to WFOs.

### Overview

In 1995, NSSFCC was administratively partitioned into the Aviation Weather Center and the SPC, both components of the National Centers for Environmental Prediction (NCEP). The convective watch responsibility resides with the SPC. Migrating the convective watch responsibility from the SPC to WFOs will be complex due to changes occurring both in the NCEPs and field offices. NWS field office structure is changing from its two-tiered arrangement, NWSFO and NEXRAD Weather Service Offices (NWSO), to a single tiered structure, WFOs. Because of the complexity of reassigning convective watch responsibility amid such dramatic changes, the watch program transfer will be performed incrementally. Each Phase will be preceded by a field test involving the SPC, field offices, National and Regional Headquarters, and NWS customers. The program to shift convective watch responsibility, called the Convective Watch Decentralization, will begin in 1997 and will be completed late in 2000. Upon its completion, WFOs will be issuing convective watches for their County Warning and Forecast Area (CWFA) using guidance from the SPC in conjunction with locally acquired information.

The primary purpose of the SPC is to serve the WFOs. The SPC will serve WFOs by interacting with forecasters using their experience and expertise on specific types of events, some of which may be rare at any individual locale. Also, SPC forecasters will keep WFO forecasters advised on areas of potential weather hazards through narrative alerting messages. In addition to WFOs, the suite of products and services from SPC will be useful to other National Centers, to River Forecast Centers (RFC), and to a wide variety of agencies outside the NWS. SPC products under development will include a suite of guidance narratives and graphics and later gridded data. Many products will be non-technical or semi-technical, others will be highly technical in nature (as with gridded data).

### Incremental Phases

The Convective Watch Decentralization will be accomplished over four Phases. Each Phase of the Decentralization is designed with largely the same progression of events. Each Phase involves: (1) field testing, (2) service evaluation, (3) operations, and (4) service evaluation. Each operational Phase serves as a risk reduction for the subsequent Phase. By the end of the Decentralization, risk is minimized. Prior to each Phase is a period of planning and development, including preparation of training plans, field test plans, operational plans, and service evaluation plans.

Once plans for field testing have been approved, needed training completed, software/hardware developed, and communications enabled, a field test will assess the usefulness of equipment, products and communications. Service evaluation will parallel the field test, during which time needed adjustments can be made. On the basis of a favorable service evaluation report at the conclusion of the field test, a decision can be made to proceed with operations.

Once plans for operations have been approved and necessary administrative procedures taken (Weather Service Operations Manual [WSOM] Chapter updates, product change requests, customer notifications, etc.), operations for the Phase may proceed. Again, service evaluation parallels operations, and changes may be made to operational procedures should conditions warrant. A service

evaluation report will be made 6 months after the commencement of each operational Phase. Based on a favorable report, a recommendation would be made to the Assistant Administrator for Weather Services for proceeding with the subsequent Phase.

*Phase I* changes the convective watch geometry from a parallelogram to a polygon of not more than six sides. The watch usually covers CWFAs of multiple NWSFOs and NWSOs. Phase I also introduces a product issued by future WFOs (NWSFOs and NWSOs) to clear watches, called the Watch Clearance Notification (WCN). It allows both external customers and the SPC to update their watch information based on UGCs. Successful implementation of Phase I is predicated on the hardware to update the National Warning System (NAWAS) at SPC and future WFOs as well as computer software at the SPC, NCEP Central Operations (NCO), and future WFOs to transmit and process watch information. Service evaluation of Phase I operations will enable NWS senior management to make a determination on proceeding with Phase II.

*Phase II* is the risk reduction for the initial decentralized environment. A subset of contiguous future WFOs (possessing AWIPS capabilities needed for performing convective watches) will participate. These offices will generate actual watches in real-time, supported by narrative, graphical, probabilistic guidance information, and guidance watches from the SPC. Evaluation of Phase II will supply information needed for NWS senior management to make a determination about proceeding with the initial decentralized environment (Phase III).

*Phase III* is the initial decentralized environment. WFOs generate convective watches based on graphical and/or narrative, probabilistic guidance from the SPC, a guidance watch product from the SPC, NCEP model guidance, and locally-generated diagnostic and observational information. Phase III (as with Phase II) is predicated on the availability of graphical and/or narrative, probabilistic convective watch guidance (including the guidance watch) from the SPC. Again as with Phase II, it is predicated also on the successful implementation of AWIPS at each WFO with sufficient power to process data sets from multiple sources, to ingest and display graphical, probabilistic convective watch information from the SPC, to ingest and process a guidance watch from the SPC, and to communicate the WFO watch product externally. Further, it is predicated on the successful completion by WFO forecasters of specific training modules that address how severe local storms develop, intensify, and generate weather hazards (a detailed Training Plan will be released by the OM later in 1996). Finally, it is predicated on the assurance of the meteorologist in charge (MIC) of each WFO that the office's forecasters are ready to assume watch responsibility. Service evaluation of Phase III operations will enable NWS senior management to make a determination on proceeding with Phase IV.

*Phase IV* is the full implementation of the decentralized environment, using gridded, graphical, probabilistic guidance from SPC. The gridded information flows into the WFO AWIPS, where product generators using locally adaptable parameters will be used to create draft watch products. Phase IV is predicated on SPC developing appropriate gridded products on their NCEP AWIPS (N-AWIPS) platform that can be transmitted for processing by all AWIPS sites. Service evaluation will be ongoing, and iterative improvements in the convective watch program are expected in Phase IV and beyond.

## Decentralization Teams

Teams of subject matter experts will address specific tasks associated with the Decentralization. Those teams address the following concepts:

- Science Application:* training, field testing/assessing, risk reduction/operations.
- Service Evaluation:* coordination with Customer Advisory Panel and the Director's Advisory Committee on Forecast Operations (DACFO), service evaluation methodology.
- Product Formatting:* development of products for AWIPS, internal/external needs for coding and product content/structure.

### 1. Science Application Team

A major aspect of creating a Decentralization plan that is scientifically credible is to ensure that it includes sound mechanisms for training staff, conducting field tests, and conducting operations that serve as risk reductions for subsequent Phases. A team consisting mainly of Science and Operations Officers (SOO) will fill this role. Also part of this team is a representative from the Cooperative Program for Operational Meteorology, Education and Training (COMET), the creator of the mesoscale Distance Learning Modules field forecasters will use as a part of their training for Decentralization. The team will meet in May 1996 to begin structuring a Convective Watch Decentralization forecaster training plan and generic field test plans and operations plans. More specific plans focused on the unique needs of each Phase will follow.

### 2. Service Evaluation Team

Another critical aspect to providing the best convective watch products and services is how we evaluate and react to information on quality. A service evaluation team will generate a plan for collecting, analyzing, and responding to comments and suggestions from future WFOs, RFCs, NCEPs, WSH, and our external customers. This team will consist partly of Warning Coordination Meteorologists (WCMs) and others who have demonstrated expertise in customer service. This team will work dynamically with the Customer Advisory Panel, NWS Regions, and the DACFO to ensure internal and external input into the process of enhancing product and service quality/usefulness of convective watch products. The Service Evaluation and Science Application Teams will work closely on developing scientifically sound evaluation methodologies.

### 3. Product Format

Product assembly, including both content and format, is a concern that requires specific treatment. Based partly on information obtained from the Service Evaluation Team and partly on knowledge of hardware/software needs, the Product Format Team will ensure convective watch products are transmitted, received, and used effectively both internally and externally. Team members are people who are recognized for their efforts in the area of product format and delivery. Specific concerns include the relationship of convective watch products to AWIPS, UGC, needs of customers regarding presentation of information, and communications technologies.

## Preliminary Coordination

In addition to NWS participation, wholesale involvement of NWS customers is planned in order to provide feedback that will optimize the usefulness of NWS products. To facilitate such involvement and to ensure successful operations, OM has been coordinating the Decentralization with customers since the middle of 1994. Such coordination efforts include:

- organizing a Customer Advisory Panel to work with OM directly and provide ongoing feedback throughout field testing and operations;
- developing a working relationship with the American Meteorological Society (AMS) Board of Radio and Television Broadcasters through a working group that addresses media concerns, regarding the NWS modernization and restructuring (MAR);
- presenting plans to decentralize the Convective Watch Program at national annual meetings of the AMS, the NWA, the Air Transport Association (ATA), a National Emergency Managers' Workshop, the State Association of Flood Plain Managers, the State Association of Automated Local Evaluation in Real-Time (ALERT) Systems, and at NWS Vendor and Customer Workshops;
- publishing OM manuscripts that describe the Convective Watch Decentralization in national emergency management newsletters, commercial vendor newsletters, *The Critical Path*, the *Aware Report*, and in the *Bulletin* of the AMS; and
- developing product formats with national electronic media.

Internal coordination efforts have included:

- discussing the Convective Watch Decentralization concept at national WCM conferences and at Regional WCM workshops;
- discussing the Decentralization concept at WCM training classes;
- discussing the Decentralization concept with the staff of the NSSFC (now SPC); and
- including Regional representatives, NCEP representatives, WCMs, SOOs, and MICs in the NWS Internal Watch Decentralization Working Group.

## Service Evaluation

A comprehensive Service Evaluation Plan will be generated by the Service Evaluation Team before fall 1996. Service evaluation will address both field tests and operations. The specific nature of that evaluation will be expressed by the Service Evaluation Plan. In general, evaluation will be both objective and subjective and will involve information supplied both by internal and external customers. External customers include:

- the media: national network and cable weather providers, local electronic media, media weather consultants;
- private sector weather service providers;
- state and local emergency management;
- the aviation community;
- marine customers, such as commercial fishing and travel/recreation associations; and
- other Federal agencies.

Internal customers include:

- Future WFOs,
- RFCs, and
- National Centers.

A service evaluation report will be prepared 6 months after the beginning of each Phase's operations. A favorable summary report will be needed to recommend to the Assistant Administrator for Weather Services that the next Phase may begin.

—Bill Alexander, Mesoscale Manager, Customer Service, WSH

## Unification of the Universal Geographic Code (UGC)

Along with watch Decentralization, a proposal to unify the UGC (a communications code that indicates the affected area) was a major topic for discussion at the Customer Workshop (see page 3). Audience reaction was favorable, and the NWS intends to meet this requirement. As we go to press, however, limitations in GTE/Contel's firmware for the NWWS will probably not allow cost-effective implementation. If this holds true, implementation couldn't occur until mid 1998, when the new NWWS is deployed. It should be understood that implementation will require extensive reprogramming of customer databases and NWS applications software. So the NWS will provide many months advance notice of any changes.

The NOAA Weather Radio (NWR) Console Replacement System requires UGCs using the proposed format, beginning about a year from now, for appropriate entry to the new Emergency Alert System (EAS). This will occur before hard copy from the NWWS or Family of Services will use the new UGCs. It is appropriate, therefore, to explain the new format at this time.

The centerpiece of the proposal is to modify the UGC by eliminating the separate "C" (county) and "Z" (NWS zone) forms of the UGC and replacing them with a specialized part of county ("P") form. This form would continue to use the Census Bureau's FIPS to identify not only counties for short-fuse warnings but also NWS county/zones (which in a majority of cases are identical to counties) for all other products that use the UGC. If the UGC identified an entire county, then the "P" would be zero (0); if it identified a (predetermined) part of county, the "P" would be from one (1) up to nine (9), the maximum permissible number of county subdivisions.

The format of the proposed code is:

SSPNNN-PNNN-SSPNNN-PNNN-DDHHMM-

where:

SS	= State ID
P	= Part of county indicator (0 = all; or 1 up to 9)
NNN	= County FIPS #
DDHHMM	= Exp. date/time (UTC)
-	= County/zone separator/end of code
(> not used)	

Note that in this format, each whole county or part of county will always be designated with a four-digit number: ONNN- to indicate a whole county, and P(1-9)NNN for a part of county. NWS offices, in coordination with local customers, will decide on sub-county boundaries, where necessary. For the majority of counties, especially east of the Rockies, counties won't need to be subdivided. Where county subdivisions would be necessary under this proposal would be in topographically diverse areas because NWS homogeneous weather zones in those areas often cross county boundaries. In effect, these zones are comprised of parts of several

counties and must be identified by the new four-digit FIPS designations. A side effect of this proposal is that it will lengthen UGC strings. ■

—Rod Becker, Dissemination Services Manager, Customer Service, WSH

## New Integrated MAR Operations and Services Team (IMOST) Meets

The IMOST conducted its initial meeting in April 1995. The team's mission is to support the OM-lead effort to implement NWS modernized field operations and services by:

- developing a consensus definition of the NWS "End-to-End Forecast Process,"
- facilitating convergence of the various NCEP and field office modernized operations plans to achieve that process, and
- developing a plan for implementing integrated operations and services based on an incremental AWIPS capabilities strategy.

The team's charter is to bring knowledge of operational, technological, and scientific planning and implementation activities together and identify any planning inconsistencies in stated NWS-component goals, service integration/implementation support requirements, and NCEP or field office science integration/implementation support requirements. The team is also charged with issuing an update to the OM Integrated Operations and Services Plan (IOSP) and providing information, as needed, to top NWS managers, the Modernization Systems Manager, and the Integrated Operations and Services Committee (IOSC). The IMOST reports to the director of OM.

At its first meeting, the IMOST ratified its charter, and then participated in panel sessions on the operations concepts and plans for operational transition and MAR implementation of most of the NCEP centers and all of the NWS meteorological service programs. The team then addressed the definition and implications of the MAR end-to-end forecast process, including product and service coordination. Finally, a list of major issues, regarding the integration of MAR operations and services plans, was reviewed, updated, and addressed. Unresolved issues were discussed, tasks leading to resolution were identified, and task teams assigned to accomplish and/or facilitate, monitor, and report on the progress of those tasks.

Major team tasks included planning and coordinating an OM/NCEP MAR Planners' Workshop and a MAR integrated operations Table-Top Exercise (TTE) to examine the complex interactions and coordination processes being planned, and examining the projected evolutions of NWS data flows and the technological solutions for display and forecaster interaction.

The MAR Operations Planning Workshop was conducted from July 25 to 27, 1995, at the NOAA campus in Silver Spring, Maryland. Participants included MAR operations and services planners from the Offices of Meteorology and Hydrology, and from most of the planned NCEP. Also participating were field office managers and forecasters from each region.

Participants prepared for the Workshop by completing draft updates to their own Program Services Transition or NCEP Center Operations Plans, and/or reviewing and preparing comments on all

other plans relating to one of four program focus areas. They then participated in focus areas and joint panel sessions during the Workshop. The exchange of information and ideas and the critical review of operations concepts, details, and rationales by the field office representatives were exceptional and very useful. In addition, several key action items and consensus recommendations were developed at the Workshop.

IMOST then arranged for and hosted a MAR Operations TTE in Silver Spring, Maryland. Facility role-players, exercise observers, and MAR operational planning staff from NWS field offices, NCEP, and the WSH OM and the Office of Hydrology (OH) participated in the 4-day activity.

The purpose of the TTE was to provide operational program managers and planners with information on the validity of key planning assumptions regarding the MAR integrated end-to-end forecast process. Exercise objectives included:

- providing plan writers with feedback on the clarity and accuracy of draft plans.
- providing a qualitative sense of the demands generated by the various coordination plans and assumptions in terms of both time and number of contacts.
- providing a qualitative sense of the validity of current workload assumptions for the various field office operations phases and the adequacy of staff augmentation and tasking assumptions.
- providing a qualitative demonstration of NCEP guidance product content and flow in conjunction with the planned flow of information back to centers from WFOs and RFCs.

The directors of the NCEP and OM welcomed the participants and provided overviews of the NCEP and end-to-end forecast process concepts. The exercise players contributed their extensive expertise and experience to the realism of the exercise. Both players and observers provided valuable and insightful comments on NCEP operations, the role of the NCEP Principal Forecaster, the end-to-end forecast process, as planned, and the operational details necessary for successful implementation.

The exercise participants produced a consensus list of planning questions and management issues, and recommendations that were reviewed by the OM and NCEP directors and forwarded for action.

IMOST is currently preparing a status report on its remaining issue resolution tasks. The second IMOST meeting will be held in late April 1996. At that time, current team issues and tasks will be reviewed and updated. New IMOST issues identified during the TTE and/or related to the impending AWIPS production decision, subsequent systems deployment, and implementation of AWIPS field office operations will be reviewed. Team members will provide consensus recommendations or suggest actions to resolve issues as appropriate. As necessary, IMOST task teams will be assigned to implement, monitor, and/or facilitate those recommendations and actions approved by the Integrated Operations and Services Committee and the OM director. In addition, the team members will assess the performance and effectiveness of the IMOST concept and develop recommendations for any required changes. ■

—Mike Tomlinson, Transition Meteorologist, Technology/Forecast Systems, WSH

## Improving Quantitative Precipitation Forecasts (QPF)—A High Priority for the NWS

Improved QPF will be a high priority in the modernized NWS. Critical QPF applications include flood forecasting, water resource management, and the prediction of heavy snowfall. In an average year, the number of fatalities and amount of property damage due to flash and river flooding exceeds that of all weather-related natural phenomena. Since flooding and heavy snow events often cripple transportation systems and can have a major impact on the economy for prolonged periods, timely and accurate flood and winter storm forecasts are of paramount importance.

Progress in QPF will require a better understanding of cloud microphysical processes and surface-atmospheric interactions, improved measurements of atmospheric water vapor and precipitation, a better understanding of the dynamics of mesoscale convective systems, better parameterizations of cloud turbulent and microphysical processes, advances in data assimilation, the continued development of mesoscale numerical models, and an exploration of the utility of ensemble model prediction. The NWS is actively engaged in collaborative research and development efforts with the research community.

To contribute further improvements to the QPF process, we must also continue to improve the methods by which we estimate the amount of precipitation that actually falls, a value known as the quantitative precipitation estimate (QPE). Stage I, II, and III precipitation processing provides gridded, multisensor precipitation estimates based on integration of radar, rain gauge, and basic satellite precipitation information. Research is already underway to improve the basic algorithms used to convert reflectivity data to precipitation, to use satellites to estimate precipitation intensity, and to address especially difficult estimation problems introduced by mountainous terrain.

A key component of our QPF program will be the development of a national QPF verification system. To successfully improve the accuracy and extend the range of QPF, forecasters will need timely feedback. This feedback must objectively assess the value added to QPF at each stage of the "end-to-end" forecast process: (1) raw numerical model guidance and guidance from model output statistics (MOS) developed at the Techniques Development Laboratory; (2) QPF guidance issued by the forecasters at the HPC; (3) QPFs issued by local WFOs, and (4) QPF mosaics, issued by the RFCs, which are directly used in river stage forecast models. Also, the effect of QPFs on river forecasts is part of a hydrologic verification system.

Finally, the NWS will begin to move towards a probabilistic approach for predicting precipitation amounts and floods. Probabilistic QPF (PQPF) began in 1990 at the Pittsburgh forecast office, through a collaborative effort between the Eastern Region of the NWS and the University of Virginia. The Advanced Hydrologic Prediction System (AHPS), to be implemented at RFCs, will account for probabilistic QPF information in an ensemble hydrologic forecast process, which uses the Extended Streamflow Prediction (ESP) model. The goal of these approaches is to issue probabilistic forecasts that enable end users to account for risk in evacuation

decisions, reservoir operation, navigation scheduling, water resource management, and other river-related activities. ■

—Chuck Kluepfel, Meteorologist, Customer Service, WSH

—Tim Helble, Hydrologist, Office of Hydrology, WSH

## Marine Weather Services

An article has been written describing future changes in the coastal areas for which marine warnings and forecasts are issued. These changes apply to the NWS offices in the coastal and Great Lakes states and will be made as part of NWS modernization and restructuring. They involve the reconfiguration of coastal warning and forecast areas to match the overwater coverage of the WSR-88D weather radar. The reconfiguration is planned in three phases.

- Phase 1, which is underway for issuance of short-fuse (2 hours or less) local marine warnings (Special Marine Warnings), realigns coastal boundaries with the radar coverage and extends the seaward boundary out to 100 nautical miles (or specified distance over the Great lakes). This is the corollary to changes in WSFO and WSO county warning areas for public severe local storm warnings over land as the WSR-88Ds are commissioned. On the Great Lakes, coastal boundary realignment also changes the areas for issuance of nearshore forecasts and long-fuse warnings (out to 5 nautical miles).
- Phase 2, planned for implementation in the spring of 1997, uniformly reconfigures the oceanic coastal marine forecasts and long-fuse warnings and advisories (Small Craft, Gale, Storm) to the new boundaries set in Phase 1 after all the coastal radars are commissioned. However, along the oceans, the new forecast/long-fuse warning areas remain assigned to the present WSFOs even though all coastal offices issue short-fuse Special Marine Warnings for their respective WSR-88D coverage areas. On the Great Lakes, open lake services remain assigned to the current WSFOs.
- In Phase 3, when offices become WFOs, the number of coastal offices with marine responsibility will increase and the marine warning and forecast areas will be redistributed similar to the redistribution of public and aviation services. It is in this phase that all marine warnings and forecasts will be issued finally by each office for its Doppler radar coverage area. On the Great Lakes, the open lake forecasts and long-fuse warnings remain assigned to current offices except for the transfer of Lake Superior from Chicago to Marquette.

To begin educating marine users on these changes, the article was sent to about 500 organizations and companies, including about a dozen maritime trade journals for further dissemination. The article was also provided to the NWS Regions for distribution to the field offices to aid in local marine community outreach programs. Future user education efforts will include follow-up articles on the details regarding the reconfigured coastal marine areas. ■


—Paul Jacobs, NWS Marine Weather Services Manager, Integrated Hydrometeorology Services, WSH

# Operations and Services

## Office of Meteorology Home Page Online!

The OM World Wide Web home page is now officially available at:

<http://www.nws.noaa.gov/om/omhome.htm>.

The home page gives interested parties information concerning the NWS modernization, OM programs, hot topics, the forecast process, OM publications and resources, frequently asked questions (FAQs), and links to other interesting web pages. 

—Joan Von Ahn, Customer Education Met., Customer Service, WSH

## Emergency Managers Weather Information Network (EMWIN) Becomes Operational

The EMWIN datastream was officially ushered into operational permanence by Dr. Friday, Director of the NWS, in an announcement before the combined FEMA and NEMA (National State Emergency Management Association) forum on February 26, 1996, in the Washington area. The NWS will work closely with public/private entities to ensure reliable access to the datastream.

EMWIN (formerly called WWIN during its successful test phase) was primarily designed to provide emergency managers and other users low-cost access to real-time NWS warnings, watches, forecasts, a sub-set of non-value added AFOS graphics and limited satellite imagery using a simple but effective graphical-user interface. Alarm/print capability is included, and special devices may be connected to the display computer for alerting visually-impaired and hearing-impaired populations. Even at the relatively low speed of 1,200 bits per second, 5,000 pages of information can be transmitted. In all, the network contains about 6,500 products.

To receive the EMWIN datastream from an audio transmission, such as that emanating from a VHF broadcast atop WSH, a user must be in acceptable signal range and need, at a minimum, a 80386 Personal Computer (PC) running DOS 5.0 or greater and Windows 3.1 or greater; a relatively inexpensive portable receiver with antenna based on NWR modified to receive the transmitted frequency (or on FM through a somewhat more expensive sub-carrier decoder); and a custom built but inexpensive demodulator that receives the signal from the receiver and feeds it to the serial port of the PC. The NWS can supply basic software for free, and it also can be downloaded from the Internet. Low cost, supported commercial software with more features is available.

Current approximate one-time costs of a receiver and demodulator for a terrestrial broadcast is around \$200 per user site. There will be no recurring costs for the data.

Both FEMA and the Public Broadcast System (PBS) currently are capturing the EMWIN VHF broadcast from WSH. PBS is then uplinking the signal to the Telstar 401 satellite and downlinking it


to its local facilities across the country. Some of these facilities are making the datastream widely available to state emergency management agencies and others through sub-carrier technology and repeaters. FEMA also is considering making the signal available to the nationwide emergency management community. NWS will work with both entities to provide each with a dedicated telephone link to ensure a higher rate of success of signal access. At the same time, the datastream is being transmitted on NOAA's GOES-8 and -9 satellites, providing coverage from the Mid-Atlantic to the Pacific Islands and from Canada to Brazil. Assuming successful completion of all testing, NWS expects the National Environmental Satellite, Data, and Information Service (NESDIS) to make the datastream an operational part of GOES. User capture of the GOES signal will cost a little more than the VHF broadcast but be more reliable. EMWIN data is also available on KU-band from Galaxy 4 Satellite from certain vendors for a little less money than from GOES. In addition, the EMWIN datastream, along with detailed information on the system and how to get started, is available on the Internet.

The EMWIN home page address is:

<http://www.nws.noaa.gov/oso/oso1/oso12/document/emwin.htm>.

The IWIN home page address for online EMWIN data and references to other sources is:

<http://iwin.nws.noaa.gov>.

While EMWIN cannot replicate the Family of Services, the NEXRAD Information Dissemination Service, or NWWS, it is a very cost-effective method of providing users with critical NWS products. This multi-layered approach to dissemination provides NWS products to a variety of users with varying levels of sophistication and resources. 

—Rod Becker, Dissemination Services Manager, Customer Service, WSH

## PBS Downlinks EMWIN in Oklahoma/North Texas

The local PBS in Oklahoma is known as OETA (Oklahoma Educational Television Authority). OETA has agreed to downlink the EMWIN signal and help make it available to emergency managers across the state. The data signal is sent to the Oklahoma State Regents Telecommunications Network, which has links to colleges, universities, and vocational-technical schools across the state.

Two broadcast systems are currently in place. In Norman, the NWSFO receives the signal via dedicated phone line from the University of Oklahoma, who in turn receive it from the Regent's Telecommunication Network. The signal is then broadcast on a test basis on a frequency of 169.025 MHz. The system is on a low antenna and is low power (approximately 25 watts). The Norman EMWIN broadcast system will transmit data within a 5- to 8-mile radius of the NWSFO. In Tulsa, the signal arrives at Tulsa Junior



College via the Regent's Telecommunication Network and is rebroadcast on a frequency of 165.0125 MHz, using a 100-watt transmitter on a 400-ft tower. The signal can be received across much of the Tulsa Metropolitan area.

Expansion plans for EMWIN include citywide coverage of the Oklahoma City metro area as well as planned systems in Tonkawa, Stillwater, and Altus.

In north Texas, EMWIN is now being broadcast on the 92 KHZ sub-carrier of FM radio station KTEO in Wichita Falls. (Sub-carrier decoder equipment, including the FM radio is available for under \$175. This will be required in addition to the software and demodulator.) This will allow all of Wichita Falls and much of the surrounding counties of Wichita, Archer, and Clay in Texas and Tillman and Cotton Counties in southwest Oklahoma to be covered by the EMWIN signal.

For more information, contact the following.

PHIL WEIGANT, SENIOR HYDROLOGIST  
TULSA RIVER FORECAST CENTER  
TULSA, OKLAHOMA  
pnw@awips1.abrfc.noaa.gov

JIM PURPURA, WARNING COORDINATION MET.  
NEXRAD WEATHER SERVICE FORECAST OFFICE  
NORMAN, OKLAHOMA  
jpurpura@smtgate.ssmc.noaa.gov

—Jim Purpura, WCM, NWSFO Norman, OK

## METAR/TAF Codes to be Implemented

Beginning in July 1996, the United States will undergo the most significant change for observing, reporting, and coding surface weather observations and terminal forecasts in the past 40 years. Not since the early 50s, when the present airways code (commonly known as Surface Aviation Observation or SA code), and Terminal Forecast (FT) codes were adopted, has there been such a major code change for weather observations and forecasts.

On July 1, 1996, at 0800 Coordinated Universal Time (UTC), the NWS, FAA, and Department of Defense will implement, for domestic dissemination, the international standard code for hourly and special surface weather observations, METAR/SPECI. The METAR acronym stands for Aviation Routine Weather Report. A special report, SPECI, is merely a METAR formatted report which is issued on a non-routine basis as dictated by changing meteorological conditions. The SPECI acronym stands for Aviation Selected Special Weather Report. Meanwhile, the international standard code format for terminal forecasts issued for airports, TAF, will fully take effect at that time. TAF stands for Aerodrome Forecast.

The U.S. METAR code is described in Federal Meteorological Handbook (FMH) No. 1 "Surface Observations and Reports," while the U.S. TAF code used by the NWS is described in WSOM Chapter D-31. Both of these standards are tailored to reflect existing longstanding U.S. national practices. For example, in order to lessen the burden on the U.S. aviation community, a number of exceptions to metric reporting units have been filed by the United

States. Winds will continue to be reported in knots (as opposed to meters per second), cloud layer heights, and runway visual range (RVR) will continue to be reported in feet (as opposed to meters), visibility will continue to be reported in statute miles (as opposed to meters), and altimeter settings will continue to be reported in inches of mercury (as opposed to hectoPascals).

The only METAR element that will be converted to metric units is the temperature/dewpoint field which will be reported in whole degrees Celsius. In order to facilitate the conversion between Celsius and Fahrenheit for climatological and public forecasting purposes, the hourly temperature/dewpoint will be in tenths of degrees Celsius in the additive data remarks section of the METAR report from selected stations in the United States. All public and climatological products that are issued by the NWS will continue to use the Fahrenheit scale for reporting temperatures and dewpoints.

Some of the significant changes in METAR from the SA code are as follows:

- (1) the order of elements has been changed;
- (2) changes in the codes for reporting present weather (e.g., RA for rain, TS for thunderstorm, FG for fog, and SQ for squalls);
- (3) individual elements shall not be reported if they are missing;
- (4) METAR requires the use of four-letter International Civil Aviation Organization (ICAO) station identifiers (e.g., KBOS-Boston, Massachusetts; PAFA-Fairbanks, Alaska; and PHTO-Hilo, Hawaii);
- (5) METAR has no explicit ceiling designator; the first broken or overcast layer aloft is inferred to be the ceiling;
- (6) the reporting and evaluating units for sky cover will be in eighths or oktas rather than tenths; and
- (7) sea-level pressure in hectoPascals will move from the body of the report to the remarks section.

For more detailed information, please reference the FMH-1 standard.

A sample observation in the SA code would appear as follows:

```
IAD SA 1055 A02A 11 SCT E15 OVC 1/2S-F  
045/33/29/2119G27/945/R04VVR30 PK WND  
1929/16
```

The same observation in the 1996 U.S. METAR code would appear as follows:

```
METAR KIAD 081055Z COR1 21019G27KT 1/2SM  
R04R/3000FT -SN FG SCT011 OVC015 01/M02  
A2945 RMK A02 PK WND 19029/16 SLP045  
T00081016
```

The changes to the TAF code are not significantly different from the current FT format. However, the NWS currently issues TAFs for 102 airports, and there is some more user familiarity with TAFs than with the hourly METAR reports.

<sup>1</sup> This field is new and indicates one of two things. If it has AUTO, this indicates that the data is from an automated station with no human signed on; if it is blank, it can indicate either a manual station or an automated station with an observer signed on. COR indicates a corrected observation.

In addition to changes to the hourly surface observations (METAR) and aerodrome forecasts (TAFs), several aviation weather products prepared by the NWS will also be impacted on July 1, 1996. They are:

- Area Forecasts (FAs),
- Significant Meteorological Information (SIGMETs),
- Airmen's Meteorological Information (AIRMETs),
- Pilot Reports (PIREPS),
- Transcribed Weather Route Forecasts (TWEBs),
- Meteorological Impact Statements, and
- Center Weather Advisories.

The changes to these products, which are fairly minor, include:

- (1) the use of new METAR weather coding conventions (e.g., "-TSRA" rather than "TRW-" to forecast thunderstorms with light rain; and cloud heights following the sky cover contraction rather than preceding it);
- (2) the use of four-letter ICAO identifiers for airports used in the main portion, or body, of the forecast; and
- (3) the use of standardized ICAO and FAA contractions.

A quick reference card summarizing the main features of the METAR and TAF codes has been finalized and is currently being printed. We estimate the card will be widely available by the end of May 1996. It will be a 5" x 8" light blue card, with holes punched across the top and down the left side to fit into flight planners. The NOAA PA number for the card will be "NOAA PA 96052." The light blue card will replace the current green or beige METAR/TAF quick reference card (NOAA PA 93054) and the yellow Key to Manual Aviation Weather Observations (NOAA PA 93055). A white paper copy of the blue card is located below.

For more information on the METAR/TAF implementation, the NWS has established a web page on the Internet. The address is:

<http://www.nws.noaa.gov/oso/oso1/oso12/metar.htm>

Any questions regarding this implementation can be addressed to Howard Diamond, the NWS METAR/TAF Implementation Manager, via e-mail at: [hdiamond@smtpgate.ssmc.noaa.gov](mailto:hdiamond@smtpgate.ssmc.noaa.gov).

—Howard Diamond, NWS METAR/TAF Implementation Manager, Office of Systems Operations (OSO), WSH

—Chris Alex, Aviation Weather Services, Integrated Hydrometeorological Services, WSH



KEY to AERODROME FORECAST (TAF) and AVIATION ROUTINE WEATHER REPORT (METAR)

TAF KPIT 091730Z 091818 15005KT 5SM HZ FEW020 WSO10/31022KT  
FM1830 30015G25KT 3SM SHRA OVC015 TEMPO 2022 1/2SM +TSRA  
OVC008CB  
FM0100 27008KT 5SM SHRA BKN020 OVC040 PROB40 0407 1SM -RA BR  
FM1015 18005KT 8SM -SHRA OVC020 BECMG 1315 P6SM NSW SKC

METAR KPIT 091955Z COR 22015G25KT 3/4SM R28L/2600FT TSRA OVC010CB  
18/16 A2992 RMK SLP045 T01820159

Forecast	Explanation	Report
TAF	Message type: TAF-routine or TAF AMD-amended forecast, METAR-hourly, SPECI-special or TESTM-non-commissioned ASOS report	METAR
KPIT	ICAO location indicator	KPIT
091730Z	Issuance time: ALL times in UTC "Z", 2-digit date, 4-digit time	091955Z
091818	Valid period: 2-digit date, 2-digit beginning, 2-digit ending times In U.S. METAR: CORrected ob; or AUTOMated ob for automated report with no human intervention; omitted when observer logs on	COR
15005KT	Wind: 3 digit true-north direction, nearest 10 degrees (or Variable); next 2-3 digits for speed and unit, KT (KMH or MPS); as needed, Gust and maximum speed; 0000KT for calm; for METAR, if direction varies 60 degrees or more, Variability appended, e.g. 180V260	22015G25KT
SSM	Prevailing visibility: in U.S., Statute Miles & fractions; above 6 miles in TAF Plus8SM. (Or, 4-digit minimum visibility in meters and as required, lowest value with direction)	3/4SM
	Runway Visual Range: R; 2-digit runway designator Left, Center, or Right as needed; "L"; Minus or Plus in U.S., 4-digit value, Feet in U.S., (usually meters elsewhere); 4-digit value Variability 4-digit value (and tendency Down, Up or No change)	R28L/2600FT
HZ	Significant present, forecast and recent weather: see table (on back)	TSRA
FEW020	Cloud amount, height and type: Sky Clear 0/8, FEW >0/8-2/8, Scattered 3/8-4/8, Broken 5/8-7/8, Overcast 8/8; 3-digit height in hundreds of ft; Towing Cumulus or Cumulonimbus in METAR; in TAF, only CB. Vertical Visibility for obscured sky and height "VV004". More than 1 layer may be reported or forecast. In automated METAR reports only, Clear for "clear below 12,000 feet"	OVC010CB
	Temperature: degrees Celsius; first 2 digits, temperature "T" last 2 digits, dew-point temperature; Minus for below zero, e.g., M06	18/16
	Altimeter setting: Indicator and 4 digits; in U.S., A-inches and hundredths; Q-hectoPascals, e.g., Q1013	A2992



KEY to AERODROME FORECAST (TAF) and AVIATION ROUTINE WEATHER REPORT (METAR)

Forecast	Explanation	Report
WSO10/31022KT	In U.S. TAF, non-convective low-level (<=2,000 ft) Wind Shear; 3-digit height (hundreds of ft); "T"; 3-digit wind direction and 2-3 digit wind speed above the indicated height, and unit, KT	RMK SLP045 T01820159
FM1830	In METAR, ReMark indicator & remarks. For example: Sea-Level Pressure in hectoPascals & tenths, as shown: 1004.5 hPa; Temp/dew-point in tenths °C, as shown: temp. 18.2°C, dew-point 15.9°C	
TEMPO 2022	From and 2-digit hour and 2-digit minute beginning time: indicates significant change. Each FM starts on new line, indented 5 spaces.	
PROB40 0407	TEMPOrary: changes expected for < 1 hour and in total, < half of 2-digit hour beginning and 2-digit hour ending time period	
BECMG 1315	PROBability and 2-digit percent (30 or 40): probable condition during 2-digit hour beginning and 2-digit hour ending time period	
	BECominG: change expected during 2-digit hour beginning and 2-digit hour ending time period	

Table of Significant Present, Forecast and Recent Weather - Grouped in categories and used in the order listed below; or as needed in TAF, No Significant Weather.

QUALIFIER			
Intensity or Proximity			
- Light	*no sign*	Moderate	+ Heavy
VC Vicinity; but not at aerodrome; in U.S. METAR, between 5 and 10SM of the point(s) of observation; in U.S. TAF, 5 to 10SM from center of runway complex (elsewhere within 8000m)			
Descriptor			
MI Shallow	BC Patches	PR Partial	TS Thunderstorm
BL Blowing	SH Showers	DR Drifting	FZ Freezing
WEATHER PHENOMENA			
Precipitation			
DZ Drizzle	RA Rain	SN Snow	SG Snow grains
IC Ice crystals	PE Ice pellets	GR Hall	GS Small hail/snow pellets
UP Unknown precipitation in automated observations			
Obscuration			
BR Mist (>=8SM)	FG Fog (<5/8SM)	FU Smoke	VA Volcanic ash
SA Sand	HZ Haze	PY Spray	DU Widespread dust
Other			
SQ Squall	SS Sandstorm	DS Duststorm	PO Well developed dust/sand whirls
FC Funnel cloud	+FC tornado/waterspout		

- Explanations in parentheses "( )" indicate different worldwide practices.
- Ceiling is not specified; defined as the lowest broken or overcast layer, or the vertical visibility.
- NWS TAFs exclude turbulence, icing & temperature forecasts; NWS METARs exclude trend icsts
- Although not used in US, Ceiling And Visibility OK replaces visibility, weather and clouds if: visibility >= 10 km; no cloud below 5000 ft (1500 m) or below the highest minimum sector altitude, whichever is greater and no CB; and no precipitation, TS, DS, SS, MIFG, DRDU, DRSA or DRSN.

March 1996 UNITED STATES DEPARTMENT OF COMMERCE  
NOAA/PA 96052 National Oceanic and Atmospheric Administration—National Weather Service

## Severe Weather Verification Unit Phased Out

As part of the formation of NCEP, the severe weather verification unit in Kansas City, Missouri, is being phased out. This unit is responsible for the verification of tornado and severe thunderstorm watches issued by the SELS—currently part of the Aviation Weather Center—and the verification of locally issued tornado and severe thunderstorm warnings, flash flood warnings and watches, winter storm warnings and watches, and high wind warnings.

Responsibility for verification of the locally-issued warnings and watches will be handled by OM's Customer Service, WSH, in Silver Spring, Maryland. The verification process, which has been characterized by manual data entry and mainframe computer programs, will become a PC-based system that uses much more automation.

The key component of severe weather verification is the efficient collection of warnings, watches, and severe weather event information. A program is under development at WSH to collect severe weather warnings and watches and to input the data to a relational database. The software package for the program is Paradox®. As for event information, beginning with the January 1996 monthly Storm Data Report prepared by local offices, all severe weather events will be entered into a relational database via a new program known as Paradox Storm II. The Storm Data Reports should be sent directly to WSH via electronic mail.

To complete the verification process, another program is under development to produce statistical summaries similar to those that have been generated by the verification unit in Kansas City. The ensemble of severe weather verification programs at WSH should be fully operational by the end of June 1996. Until then, the severe weather verification unit in Kansas City will continue to collect warnings and watches, complete the statistical summaries for 1995, and ensure that severe weather verification continues without interruption.

—Paul Polger, Verification Manager, Customer Service, WSH

## NWS/FEMA Joint Training Project Successfully Tested

We just finished pilot testing the "Hazardous Weather and Flooding Preparedness" Course, March 11-13, 1996, at the Emergency Management Institute (EMI) at FEMA's National Emergency Training Center in Emmitsburg, Maryland. John Peabody of FEMA's EMI training staff provided leadership and constant coordination to make this course a reality. Many kudos to Bill Sammler, WCM Wakefield, Virginia; Tom Dunham, WCM, and Gregg Rishel, Service Hydrologist, at State College, Pennsylvania, for the great job they did as course instructors. Rick Watling, Deputy Chief of Meteorological Services Division (MSD) in Eastern Region evaluated and critiqued the course as well. The overall response from the emergency managers in attendance for the 2-day course was extremely positive. We are revising the course to improve the flow of materials based on the student and evaluators comments.

The final pilot course will be May 21-23 in Kansas City, Missouri. Bill Bunting, WCM Kansas City, Missouri; Noreen Schwein, Central Region Staff Hydrologist; and Jim Kramper, WCM, St. Louis, Missouri, will be the NWS instructors. Regional and office staff have agreed to help evaluate this pilot program. We are projecting a late summer/early fall release of the course in the field.

Many thanks to Jim Kramper, WCM St. Louis, Missouri; Bill Bunting, WCM Kansas City, Missouri; Curt Barrett, OH; and all the OM program leaders for their hard work in reviewing and revising the materials for the course. Thanks goes to Brian Peters, WCM, Birmingham, Alabama; Jim Stefkovich, WCM, Fort Worth, Texas; Jim Allsopp, WCM Chicago, Illinois; Rusty Kapela, WCM, Milwaukee, Wisconsin; Todd Heitkamp, WCM, Sioux Falls, South Dakota; John Ogren, WCM, Wichita, Kansas; Bob Glancy, WCM, Denver, Colorado, and all the others who contributed to and helped review the course materials. Special thanks goes to Joan Von Ahn and Rainer Dombrowsky for their long hours of editing.

The next course in this series of tools for the WCMs is "Warning Coordination and Communication." It will focus on the social process of warning including detection, decision making, warning coordination among agencies and the media, and effective warning messages. The course will also address new and existing warning communications technologies. Work has already started on the course. We are scheduling to have the first draft ready by the end of the summer. Stay tuned.

—Chris Adams, Senior Social Scientist, Customer Service, WSH

## GOES-8 Experienced Data Outage

On April 18, 1996, the GOES-8 spacecraft experienced a data outage event from 2:18 a.m. to approximately 9 a.m., Eastern Daylight Time (EDT). The primary Attitude and Orbit Control Electronics (AOCE) experienced an electrical discharge event. A similar event happened in February 1995. NOAA engineers decided to take the AOCE-1 unit off-line and use the back-up system—AOCE-2. This would enable engineers to study the problem more carefully while still providing routine operations to the user community. The switch between AOCE units was made on Wednesday, April 24. The switch resulted in another GOES-8 data loss period from April 24 at 5:45 p.m. to April 25 at 1:45 a.m., EDT. Normal operations were resumed on April 25 at 7:45 p.m., EDT. This new configuration may result in less stable GOES image animation/loops used by meteorologists to track weather systems.

—Ron Gird, Satellite Project Leader, Technical and Forecast Systems, WSH

## Customer Service to Review Disaster Survey Changes

During the next several months, the Customer Service of WSH hopes to implement changes in the disaster survey program. Changes are anticipated in three areas: (1) adjusting criteria that trigger national surveys, (2) modifying the report format and content, and (3) tracking survey recommendations.

## Criteria

Although top-level NWS management determines when a weather-related event is of such importance or magnitude that a national disaster survey and subsequent report is required, we hope to limit these surveys to those few events that are truly catastrophic. This is necessary because of shrinking staff levels and budgets. Examples are Hurricane Andrew, the 1974 tornado super outbreak, the 1993 superstorm, the 1993 flood, and the 1995 heat wave. Other major events will be handled at the regional or local level.

## Format and Content

In recent years, disaster survey reports have grown to include sophisticated meteorological and hydrological analyses, large numbers of maps and tables, exhaustive listings of warnings, watches, statements, and forecasts, etc. They regularly exceed 100 pages. To reduce workload and costs and shorten event-to-publication time, surveys will be reconfigured to:

- briefly tell what happened,
- assess internal operations,
- solicit customer feedback on NWS performance, and
- develop recommendations for improvement.

Detailed scientific analyses, case studies, lists of products issued, etc., would be left to the research community or for other publications.

## Tracking

One troubling aspect of disaster surveys has been inadequate tracking of recommendations contained within the reports. It was found that, in most cases, failure to track resulted in essentially identical recommendations appearing in subsequent reports. In addition, it is difficult to determine which, if any, recommendations are currently being studied or instituted.

A database for logging and tracking disaster survey report recommendations will be developed. Customer Service staff will maintain the database and work with other Headquarter's offices to assign action responsibility. Follow-up reports will be required until the recommendation is adopted and implemented or rejected.

—Bill Lerner, *Confirmation of Services Manager, Customer Service, WSH*

## The July 1995 Heat Wave Disaster Survey Report Released

Chicago experienced its worst weather-related disaster with 465 heat-related deaths recorded during the period from July 11-27, 1995. Milwaukee was also severely affected, with 85 heat-related deaths recorded during the same time period.

Despite NWS warnings and advisories and effective media coverage, people who could have prevented some of the deaths either did not receive, comprehend, or effectively use the information. These people include the victims themselves and their caretakers.

The report recommends that the NWS focus preparedness efforts towards people who are most vulnerable to the dangers of heat. The

report also recommends that emergency response organizations at the Federal, state, and local levels recognize severe heat waves as potential natural disasters, and areas at risk should be prompted to develop emergency response plans for severe heat waves. A follow-up workshop on heat waves is being planned by the Office of the NOAA Chief Scientist.

The team's report on the July 1995 Heat Wave is available by contacting the OM's Customer Service at (301) 713-0090, or through the NWS home page on the Internet at:

<http://www.nws.noaa.gov/om/heatwave.pdf>

—Chris Adams, *Senior Social Scientist, Customer Service, WSH*

## Hurricane Marilyn Disaster Survey Report Released

Hurricane Marilyn struck the U.S. Virgin Islands and Puerto Rico on September 15-16, 1995, causing eight deaths and \$2.1 billion in damage. The National Hurricane Center (NHC) and WSFO San Juan provided excellent service to the emergency management community, the media, and general public for this storm as evidenced by the low death toll. The disaster survey report was released in April.

The Hurricane Marilyn Disaster Survey Report is available by contacting OM's Customer Service at (301) 713-0090 or through the NWS home page on the Internet at:

<http://www.nws.noaa.gov/om/marilyn.pdf>

—Kevin McCarthy, *Tropical Cyclone Program Leader, Integrated Hydrometeorological Services, WSH*

## Hurricane Opal Service Assessment Report Completed

A Service Assessment Report has been completed on Hurricane Opal to document the NWS performance in fulfilling its mission of providing timely warnings and accurate forecasts during this storm. Each local office, regional office, and National Center involved in providing support for Hurricane Opal was directed to conduct its own survey of the damage and of the service they provided. WSH staff then compiled the information to create this Assessment. The report should be available by early June 1996.

—Laura Cook, *Marine Weather Services, Integrated Hydrometeorological Services, WSH*

## Interdepartmental Hurricane Conference (IHC) Held in Late March

The Office of the Federal Coordinator (OFCM) for Meteorology conducted the 50th IHC at the Hyatt Regency Hotel in Miami, Florida, March 25-29, 1996. Over 150 representatives from OFCM, NOAA, Air Force, Navy, the academic community, and others attended the conference for presentations on the latest in hurricane operations and research. Some items for NOAA will be carried

forward to the World Meteorological Organization (WMO) meeting in San Juan, Puerto Rico, in April. Other items were incorporated into the draft of WSOM C-41, Tropical Cyclone Program, for the 1996 season. [4]

—Kevin McCarthy, Tropical Cyclone Program Leader, Integrated Hydrometeorological Services, WSH

## Marine Customer Service Team Founded

Beginning in March of 1996, the WSFO Houston commenced an effort called the Marine Customer Service Team (MCST). The purpose of this concept is to extend the services of the Port Meteorological Officers (PMOs) and the Voluntary Observing Ship (VOS) Program and to expand maritime outreach efforts and marine user interaction into geographic areas outside of the normal range of PMO activities. This should result in more offshore marine data availability and improved marine products. The initial implementation of this plan in the Houston area is being closely followed by an expansion southwest to Corpus Christi and Brownsville, Texas.

Currently, the PMO program maintains a system of contacts with the marine community at 17 locations around the country in order to support the VOS program. These contacts result in shipboard observations for use in marine product generation. Since there are a limited number of PMO's operating under this international program, assistance in contacting marine data sources is becoming increasingly important to improve marine warning and forecast services. Other NWS personnel at Houston, Corpus Christi, and Brownsville have been trained to provide basic PMO duties especially concerning ship recruitment and outreach services. Selected personnel will vary from office to office, but generally the plan uses the resident PMO as the team leader, the Data Acquisition Program Manager and Hydrometeorological Technicians in PMO/VOS activities, and the WCM in areas of marine user requirements and service evaluation.

This MCST concept will bring the PMO and VOS programs into closer association with other observing technologies and marine user requirements resulting in more offshore data and improved marine products. An evaluation on the effectiveness of this effort will take place by the end of 1996. [4]

—Vince Zegowitz, Marine Observations Program Leader, Integrated Hydrometeorological Services, WSH

## NWS to Issue Forecasts in Support of the 1996 Olympic Games and the 1996 Paralympic Games

Forty-three new NWS forecasts will be operationally issued in support of the 1996 Olympic and Paralympic Games in and around Atlanta, Georgia, from July 6 to August 27, 1996. These new products will be prepared by two specially-created WSOs—one in Peachtree City, Georgia (the Olympic Support Weather Office) and the other in Savannah, Georgia (the Olympic Marine Support Weather Office).

In addition, products will be issued by NWS offices in Birmingham, Alabama (BHM); Miami, Florida (MIA); Melbourne, Florida (MLB); and Washington, D.C. (WBC) in support of Olympic preliminary soccer events held in those cities.

Weather support for the Olympic Games will take place from July 6 to August 5, 1996. Weather support for the Paralympic Games, an international competition for the physically challenged, will occur from August 12-27.

For further information, including a list of the AFOS/NWWS and WMO headers of the 43 Olympic forecasts, contact one of the following individuals listed below or visit the Olympic Weather Support home page at:

<http://www.nws.noaa.gov/olympics/Olympics.html>.

Lans P. Rothfusz  
Meteorologist in Charge  
Olympic Weather Support Office  
770-486-1133  
lrothfusz@smtpgate.ssmc.noaa.gov

Steve Rinard  
Meteorologist in Charge  
Olympic Marine Weather Support Office  
817-334-2655  
srinard@smtpgate.ssmc.noaa.gov

Chris Smith  
NWS Southern Region Public Affairs  
csmith@smtpgate.ssmc.noaa.gov  
817-334-2654 [4]

—Lans P. Rothfusz, Meteorologist in Charge, NWS Olympic Weather Support Office

—Steven Rinard, Meteorologist in Charge, NWS Olympic Marine Weather Support Office

# WCM Program

## Planning Begins for the National WCM Conference

Work has started on the development of the National WCM Conference agenda to be held in 1997. A team of WCMs, led by David Runyan (Central Region Headquarters), will submit recommendations for the conference location, establish a date, provide a statement of conference goals, establish a conference agenda, and provide recommendations for guest lecturers. The following individuals have volunteered to assist David with this task.

- Richard Westergard, NWSFO Albany, NY
- Todd Heitkamp, NWSFO Sioux Falls, SD
- Joe Sullivan, NWSFO Cheyenne, WY
- Fred Johnson, NWSO Jacksonville, FL
- Larry Vannozzi, NWSFO Lubbock, TX
- Ted Buehner, NWSFO Seattle, WA
- Ed Clark, NWSO Elko, NV
- Robert Kanan, NWSFO Juneau, AK
- Tom Heffner, NWSFO Honolulu, HI

—Rainer Dombrowsky, National WCM Program Manager, Customer Service, WSH

## NAWAS Upgrade Status

The deployment of the upgraded NAWAS continues to proceed but at a much slower pace than earlier projected. Budget uncertainties continue to control the speed at which the upgraded NAWAS is deployed. Without supplemental funding, few additional sites, other than the targeted 57 sites and limited number of NCEP sites, will be converted or upgraded this fiscal year. Both FEMA and OM are investigating options for funding that would bring the conversion/upgrade process back on track. During this period of uncertainty, OM will provide periodic updates through the Regions to the WCMs.

—Rainer Dombrowsky, National WCM Program Manager, Customer Service, WSH

## WCM Job Aid Guide Near Final

This "HOW TO" document has been useful to many WCMs. The intent of OM is to maintain a living document that accurately reflects the evolution of the WCM program. The Job Aid will be reviewed semiannually. The authors of the original document will be detailed to WSH for a week in early June. The goal of OM is to have the updated Job Aid ready for distribution in early August. If you have any last minute suggestions, please forward them to Customer Service by May 31.

—Rainer Dombrowsky, WCM Program Leader, Customer Service, WSH

## Final Input for Multimedia Laptop Demonstration Needed

OM will be soliciting final input from the 10 laptop demonstration sites during May. Based upon this field assessment, OM will forward its recommendation to senior staff for consideration. OM will provide a detailed article in the summer edition of the *Aware Report*.

—Rainer Dombrowsky, WCM Program Leader, Customer Service, WSH

## Tropical Prediction Center (TPC)/FEMA Video-teleconferencing Operational

Since the NOAA Hurricane Conference, OM and FEMA have been working with the TPC's NHC in establishing a video-teleconferencing briefing capability. During potential landfall situations, NHC will have the capability for providing FEMA Headquarters, both National and regional, and Mobile Emergency Response Systems with the latest hurricane forecast guidance reasoning and storm impact information. The video-teleconference link between FEMA Headquarters was tested and made operational in February. PC interface and briefing protocols are currently being developed and should be in place for the 1996 tropical cyclone season.

—Rainer Dombrowsky, Customer Service, WSH

## Guam Selects New WCM

Following Malcolm Hargrave's unfortunate health problems and subsequent retirement, a new WCM—John Miller—has been selected to replace Malcolm. John is currently with the North Central River Forecast Center (NCRFC) Minneapolis, Minnesota. John will bring a wealth of programmatic experience to the job. John served as Warning Preparedness Meteorologist (WPM) for NWSFO Minneapolis from the late 70s through a good portion of the 80s before transferring to the NCRFC. The breath of his experience in the hydrometeorological arena, coupled with his tenure as WPM, makes John an excellent addition to NWSO Tynan, Guam. John, welcome to the WCM community!

—Rainer Dombrowsky, WCM Program Manager, Customer Service, WSH

# NOAA Weather Radio Initiatives

## Remote Off Air Monitoring System (ROAMS) Successfully Tested

The NWR Program Office, with the help of Southern Region Headquarters (SRH) and INH Technologies in Fort Worth, Texas, recently concluded field testing of the enhanced version of the ROAMS. ROAMS is a system that interfaces with the NWR transmitter and provides a means to remotely diagnose transmitter problems, or allows the transmitter site to call the field office and report a problem.

ROAMS performed well during the tests at 10 NWS locations around the country. The early version of ROAMS did not measure up and consequently saw limited use. The enhanced version of ROAMS has been completely re-engineered and features synthetic voice. All known problems encountered in the earlier ROAMS have been eliminated.

One significant problem became apparent during the test that was not related to the functionality of ROAMS. The lack of acceptance of ROAMS as a vital front-line system in forecast offices is the problem. In some instances during ROAMS testing, the system was deactivated because it was felt that the alarms (telephone calls from the transmitter) were either false or had become a nuisance. Follow-up investigation of each alarm received indicated that ROAMS had accurately reported abnormal conditions.

Training is required to provide field personnel with the knowledge necessary to respond to ROAMS indicators and alarms. It is also necessary to instill a level of confidence in the capabilities of ROAMS. These are the goals of the NWR Program Office as they prepare to field ROAMS on an NWS-wide basis.

There are currently 146 ROAMS units being assembled and prepared for shipment to various field offices. As quickly as funds become available, additional ROAMS will be shipped to field offices for implementation. The NWR Program Office is also preparing a training video and documentation for each ROAMS location. Field offices should prepare for the arrival of ROAMS and ensure that procedures and/or policies are in place to facilitate immediate operation of this diagnostic system. OSO and OM are working together on this initiative to provide for as smooth an implementation and transition as possible.

The importance of field personnel to become familiar with ROAMS and its capabilities cannot be overstated. Simply put, ROAMS is the heart beat of the dissemination efforts of the forecast office. If the transmitter system is sick, ROAMS will know. If ROAMS is ignored, the transmitter may fail. If the transmitter fails, the forecast office is "off the air."

Questions pertaining to ROAMS should be forwarded to Darryl Modracek (OSO31) at (301) 713-1847 or Stan Johnson (OSO153) at (301) 713-1736.

—Stan Johnson, NWR Program Manager, WSH

## NWR Specific Area Message Encoder (SAME) Implementation on Schedule

The national implementation of NWR SAME is well underway and proceeding on schedule. The plan calls for all NWR consoles to be equipped with NWR SAME by the end of this calendar year (1996). This implementation is planned to coincide with the Federal Communication Commission's mandated activation of the new EAS in January 1997. In addition to the more than 80 NWR SAME systems already deployed around the NWS, 140 new systems have been shipped to forecast offices in each region. Another 140 systems are being assembled and are scheduled to be delivered by the end of July 1996.

The forecast offices are encouraged to install the systems upon receipt and integrate its use with the normal office operations policy. Many forecast offices have already established policies and procedures with state and local emergency management agencies, many of which have NWR SAME decoders, for operational use of the system. This practice is encouraged and may well be required in the future of EAS.

—Stan Johnson, NWR Program Manager, WSH

## NOAA Weather Radio (NWR)— A Unique Expansion Succeeds

On December 28, 1995, NWR in Central Region began a unique expansion project test at the U.S. Army installation, Lexington Blue Grass Depot, in Madison County, Kentucky. The U.S. Congress directed the Chemical Stockpile Emergency Preparedness Program (CSEP), of which the Lexington depot is one of eight sites in the Nation, to begin disposal of chemical weapons. In the event of a chemical spill, they (Congress) deemed it necessary to utilize all existing public warnings systems to warn the local population of the accident. NWR, the all hazards radio, was a natural choice.


What makes this a unique expansion for Central Region is that since late December, Madison County has been served by two NWR systems, operating at different frequencies. The first frequency is our routine transmitter, while the second frequency is operated by the Madison County Emergency Management Agency under the auspices of the CSEP initiative. CSEP is also distributing 10,000 weather radios, specifically designed for the second frequency (operated by Madison emergency management), to people living within a certain distance of the Blue Grass Depot. During normal and severe weather operation, residents will receive the routine NWR programming, tone alarm, and NWR SAME signals on both frequencies. In the event of a chemical accident spill at the depot, those residents in the vicinity of the depot will be alarmed on the second frequency, with additional information included in the broadcast provided by the Madison County Emergency Management Agency.

—Marvin Maddox, MIC, NWSFO Louisville, KY

## NWR in Mississippi Public Schools

The governor of Mississippi has signed House Bill 433, which requires each public school district to provide for the purchase and installation, before July 1997, of a NWR receiver for each school in the district.


I met with representatives of the Mississippi Department of Education and representatives from Mississippi Emergency Management Agency to discuss the school's minimum NWR requirements. These include a NWR receiver with adjustable frequencies, a battery backup, and a tone alarm feature. In addition, an external antenna is recommended for schools on the fringe of NWR reception areas. I explained to the representatives where NWR towers were located across the state and the coverage areas of each. I discussed how signal strength can vary with atmospheric conditions and location of receiver.

I believe this will be a very good program for our schools in Mississippi as long as each school that has a NWR receiver will have an appointed person to monitor it. 

—Jim Butch, WCM, NWSFO Jackson, MS

## Early Warning Pays Off

I received this story from a farmer near Smithville in Lawrence County, Arkansas. The farmer said he saw a tornado warning for Lawrence County on a local TV station, with Smithville specifically mentioned as being in the tornado's path. He then listened to NWR to confirm the warning. At that point, he alerted all of the farm hands on the property to take shelter.

Everyone took shelter in the farmer's basement. He estimated that 10 minutes passed from the time he heard the warning until the tornado struck. Eight buildings on the farm were destroyed, and the farmer's son's house received roof and window damage. The farmer said that the TV station and the NWS saved their lives as they likely would have been in the farm buildings when the storm struck. 

—Jim Duke, Deputy MIC, NWSFO Memphis, TN

---



# Hazards Community Forum


## All Hazards Guide for Florida Underway

In the spirit of encouraging, establishing, and participating in the NWS "Outreach Program" and "Private Sector-Government Partnership" initiatives, I would like to report on the progress and success of a program near completion in the Tampa Bay, Florida, metropolitan area that involves our local NWS field office.

The Tampa Bay Regional Planning Council, a six-county consortium of emergency management and other county officials from the Tampa Bay metropolitan area, with technical support from the NWSO in Ruskin, have collaborated to develop and print an "All Hazards Guide" for distribution throughout west-central Florida. The guide will provide information (much of it borrowed from NWS color brochures) and weather slide photography (courtesy of WSH, NHC, and NWS personnel) on meteorological phenomena and associated hazards. The meteorological hazards will vary from the destructive forces of hurricanes and tornadoes to flash floods and lightning.

The guide will also provide information on severe weather preparedness actions, including a segment on NWR. Each guide will also contain a fold-out map, detailing shelters, storm tides, and evacuation routes of the particular west-central Florida county of distribution. Total distribution expected in the Tampa metro area—800,000 copies!

Funding for this ambitious public service project was provided by state of Florida grants and corporate sponsorship.

Completion of the "All Hazards Guide" first printing is expected by mid-April 1996. If you have any questions pertaining to this project, please call me at (813) 645-2323. 

—Walt Zaleski, Jr., WCM, NWSFO Tampa, FL

## Public-Private Partnerships Enhance Severe Weather Preparedness in Iowa

The NWSFO Des Moines External Team has made it a top priority since 1994 to forge public-private partnerships with a wide range of businesses, media outlets, and local governments. Combining our resources, we have made severe weather preparedness a joint effort, and as a result have made Iowans safer during severe weather emergencies.

### Spotter Training on the Iowa Communications Network

The Iowa Communications Network, or ICN, is a statewide fiberoptic network which can transport interactive, two-way audio, video, voice, and data signals. The ICN reaches over 100 locations spread across the 99 counties in Iowa. Endpoints are located at



universities, community colleges, local school districts, and National Guard Armories.

Each interactive classroom is equipped with cameras, TV monitors, microphones, a touchscreen control monitor and other equipment. This creates a fully interactive learning environment between presenter and participant with up to 10 remote sites capable of participating simultaneously. Students can receive immediate feedback because the presenter can see and hear the participants from every site connected to the session. Interaction is as simple as "push and talk" with the fiberoptic technology, system configuration, and complex switching functions transparent to both student and lecturer. The ICN has the capacity to present material in many different formats, like video, still photographs, and computer generated graphics.

The NWSFO Des Moines has joined a consortium with Iowa Public Television (IPTV), the Iowa Communications Network, and the Iowa Office of Emergency Management to produce severe weather spotter courses on the ICN. Thanks to funding from the state of Iowa, 35 of 51 counties in our county warning area received training on the network in the spring of 1996.

The first-year response was overwhelmingly positive. Nearly all of the county emergency managers were highly supportive of this new medium. The cost benefits were also enormous. By training our counties remotely, we saved over 150 personnel hours and six thousand travel miles, while also improving the quality of the spotter training.

#### **Preparedness Video Production**

As resources are reallocated for the MAR, the requests for public severe weather preparedness talks have increased in Iowa, while time resources have decreased. Responding to the needs of local emergency managers, the External Team recently produced a home-grown, production-quality preparedness video. Because the video was produced under NWS auspices, it can be copied and used by county and state emergency managers in their preparedness efforts and, in turn, help us keep our obligation to provide preparedness information to the public.

During the fall of 1995, coop student Noelle Runyan (currently an intern at NWSO Wichita) and the External Team arranged a cooperative agreement with Iowa State University broadcast major Scott Lind (now a TV weathercaster at WHO-TV in Des Moines). His senior project became "*Caution: Storms Ahead*," an 18-minute video covering all the bases of severe weather safety procedures in homes, schools, businesses, and for outdoor activities. Editing assistance was provided by KIMT-TV in Mason City, Iowa, and KCCI-TV in Des Moines, Iowa. We also filmed at several on-location sites thanks to permission from Ankeny High School, Wallace Elementary School in Johnston, Otter Creek Golf Course, WAL-MART, and Lead Forecaster Gary Forster (who allowed us to film in his house). Video narration was provided by Lead Forecaster Dan Smith. The cooperative arrangements kept the production cost to around \$500, compared to the initial cost estimate of \$50,000 provided by IPTV.

Since the original production, the Iowa State Office of Emergency Management has funded 104 copies of "*Caution: Storms Ahead*," one for each county in the state and several state-level agencies. Tapes have also been sent to several local cable companies for public airing and may eventually be aired on Iowa Public Television.

#### **Partnership with WAL-MART**

NWSFO Des Moines has worked with WAL-MART stores in Iowa for 3 years. The partnership began in late 1994 during WAL-MART's nationwide safety week campaign. Our office provided locally generated weather safety and NWR information to three Des Moines stores. Building on that initial success, we reached out to 44 Iowa stores to promote Iowa's NWR Awareness Week in February 1995. The WSFO Des Moines Creative Team produced a weather radio flier, detailing the coverage areas of the weather radios serving Iowa. After mass-printed by the WAL-MART stores, about 40,000 fliers were distributed. Des Moines area WAL-MARTs also began selling tone-alert weather radios following this project.

The NWS/WAL-MART partnership continued as we participated in their 1995 safety week and during the 1996 Iowa Severe Weather Awareness Week. New severe thunderstorm, tornado, lightning, flash flood, and weather radio leaflets were prepared by our Creative Team and distributed by WAL-MART. We also provided copies of "*Caution: Storms Ahead*," which they played for their patrons. The Loss/Prevention Supervisor of central Iowa WAL-MARTs plans to present the video to national associates of WAL-MART. The video may be included in a loss-prevention video shown to WAL-MART employees nationwide. There are also plans to incorporate WAL-MART stores into our Spotter Verification Network.

#### **Hy-Vee Grocery Bags**

Like several other offices who have forged alliances with supermarkets, we also reached out to Hy-Vee Foods, a large Midwest grocery chain based in West Des Moines. Using layouts produced by Kim Schafer, Hy-Vee printed tornado and thunderstorm safety information on their shopping bags during late March and April of 1996. Because Hy-Vee operates hundreds of stores, mostly in rural areas, the safety information will eventually reach hundreds of thousands of people in several Midwest states.

—Jeff Johnson, Karl Jungbluth, Andy Kula, Erik Pytlak, Kim Schafer, and Brad Small, NWSFO Des Moines/Johnston, IA

#### **Green Bay Office Participating in DataStreme Project**

Gene Brusky, SOO, and I (Jeff Last, WCM), NWSO Green Bay, Wisconsin, are serving on one of only two pilot groups in the Nation (the other is in Buffalo, New York) as Local Implementation Team (LIT) members for the DataStreme Project. The DataStreme Project will allow science teachers to use real-time weather data to investigate and learn about the weather from their home or school.

The teachers will obtain weather data via the Internet and complete activities outlined in a comprehensive study guide, which is based on the weather text book "*Essentials of Weather*" by Joseph M. Moran and Michael D. Morgan. Topics covered in the study guide closely resemble those that would be discussed in an introductory college course in meteorology.

As LIT members, Gene and I evaluated software and training material and provided suggestions to improve the Project. They will also serve as mentors to the teachers during the one semester program. We will assist the participants in their weekly projects

and be available to answer questions the teachers may have. The other Wisconsin LIT members are Bruce Smith, Appleton North High School, and Dr. Jim Brey, University of Wisconsin-Fox Valley.

On January 20, the Wisconsin LIT met at the Green Bay NWS Office with the five Wisconsin teachers who were selected to participate in the pilot program. The purpose of the meeting was to introduce the teachers to the LIT members, discuss the course, and tour the NWS facility.

What is unique about the DataStreme Project is that the "distance learning" enables the teacher to enhance his or her own education, while continuing to instruct their students. It is hoped that what the teachers learn about weather will be passed along to the students in their classrooms.

Improvements and suggestions from the two pilot groups will help mold the national DataStreme Project, which will be implemented in September 1996. The DataStreme Project is funded by the National Science Foundation.

—Jeff Last, WCM, Green Bay, WI

## NWS Green Bay Hosts Weather Education Workshop

For the second year in a row, SOO Gene Brusky and I (Jeff Last, WCM) hosted science teachers from across eastern Wisconsin for a day-long education workshop on thunderstorms. The two-part seminar, sponsored by the AMS's Project ATMOSPHERE and the University of Wisconsin (UW)-Green Bay, dealt with the morphology, hazards, and forecasting of thunderstorms.

Gene and I have discovered that having a major hotel across the street from the weather office is a big advantage when hosting large groups of people! The teachers gathered at 8:30 a.m. on Saturday, March 16, in one of the conference rooms at the Radisson Hotel. After an introduction to thunderstorms by Professor Joe Moran, of UW-Green Bay, the science teachers were divided into two groups. One group remained at the Radisson and participated in hands-on experiments on thunderstorms and lightning, given by Bruce Smith, Atmospheric Education Resource Agent for eastern Wisconsin. The second group went to the NWS office and learned about thunderstorm development, how the storms are viewed with the WSR-88D, and hazards associated with thunderstorms. Gene and Jeff shared duties at the office, presenting several case studies using data from the Green Bay radar. After enjoying lunch at the Radisson, the groups were "swapped," and the instruction was repeated.

Gene and I have been very active with Project ATMOSPHERE and the new DataStreme Project, a teacher enhancement program which will deliver meteorological lessons along with "real-time" data via the Internet to teach basic meteorology. The participation of science teachers will, in the long run, give their students a better understanding of and appreciation for the weather.

—Jeff Last, WCM, NWSFO Green Bay, WI

## Weather Wonders—The Putnam Museum's Weather Exhibit in Davenport, Iowa

A special weather exhibit at the Davenport, Iowa, Putnam Museum came to fruition this year. "Weather Wonders" officially opened on February 23, 1996, and will continue to be on display for a minimum of 6 months. The idea for this project was first conceived in 1990 or 1991 during a meeting between Museum officials, me (Jim Meyer), and two local television meteorologists, Terry Swails (KWQC-TV) and Neil Kastor (WQAD-TV).

The "future" dawned for the Putnam staff when the new office was very much entrenched in the "now." It proved challenging to coordinate a project of this size and depth while dealing with the logistics of new equipment and new staff. The most apparent MAR asset surfaced immediately in the person of the new SOO, Ray Wolf. Ray and I met with members of the museum staff at the new office in November 1995 and again in January and February of 1996. Material was gathered to be used in the exhibit; e.g., satellite material, pictures, and slides provided by Ray and safety material handouts from me. Pictures included shots of the new radar and an upper air balloon launch.

NWR became an integral part of the project. Chris Lyons, project manager of the weather exhibit, came to the weather office and participated in a taped interview conducted by me. The interview tape was incorporated into three tapes played periodically during the week in an effort to promote the exhibit. Ms. Lyons mentioned several items on display, named the guest speakers and when they would appear, and provided detailed information on the location of the Putnam, along with phone numbers to respond to questions. On Saturday, March 23, as the guest speaker, I used NWR to promote not only the museum program, but Severe Weather Awareness Week which was to begin the following Monday. My presentation, "Tornado Safety and You," was mentioned several times on NWR prior to the talk.

The Putnam Museum tracks attendance for each of its exhibits and has reported literally thousands of visitors to "Weather Wonders." This experience is an outstanding example of how the NWS can benefit from interaction with the community and other agencies.


—James Meyer, WCM, NWSFO Davenport, IA

## Children's Museums in Austin and San Antonio, Texas

Our staff has been involved in planning the initial concepts as well as individual project details for a multi-faceted weather exhibit at the Children's Museum in Austin, Texas. Included within this large exhibit (a room around 20 by 30 feet) are:

- ❑ a severe thunderstorm demonstration that knocks over a tree when the wind begins blowing (a button on a fan is pushed). A digital counter attached to this demonstration has already exceeded the half-million mark.
- ❑ the hydrologic circle, as demonstrated by a pump that draws water from a lake into a model thunderstorm above the lake (and town diorama). When sufficient water has been drawn into the storm, a switch is automatically activated, lightning is heard, and rain begins to pour down on the town below.
- ❑ a mock TV studio in another part of the exhibit which features a working TV camera, a weather backdrop with selective film footage, and all the equipment for a full weather program. Students have the option of working behind the camera or in front of it.
- ❑ and finally on May 18, 1996, the Museum will unveil its live tornado. This is housed in a cylinder 4 feet by 5 feet, in which a vortex is created in a saturated semi-vacuum.

All exhibits feature signs in both English and Spanish that explain the weather terms and weather principals. These exhibits also explain the local weather threats and safety rules to counter these threats.

In addition, our office is also currently working with the Children's Museum in San Antonio, preparing activities to go along with an aviation exhibit. The museum has obtained an aircraft fuselage from a local manufacturer and have turned this into a 12-passenger/2-crew aircraft, positioned on a runway, and next a 4-person control tower. Our suggested activities so far have included several weather coloring sheets, maze puzzles, and quiz pages, interactive computers (some of which were tied to the Internet). 

—Larry Eblen, WCM, Austin/San Antonio, TX

## Wyoming's Outreach Activities

One of the advantages of living in a sparsely populated area is that people tend to eagerly pull together in times of need. The apparent attitude is that, with fewer people and resources available, EVERYONE has to lend a hand to help their neighbors, most of which they know by name.

Although Wyoming is the 9th largest state in the United States, in regard to size, it ranks 50th in population. With only 460,000 people in the entire state, Wyoming is, in a way, a small town on a state-size scale.


With this in mind, last fall I decided to test an idea for increasing awareness of winter weather dangers in the state. I developed colorful material (and a suggested layout) for a winter weather exhibit

to be displayed in retail stores. Aided by Chris Jones, Met Intern in Casper, and Cathy King, head of the Albany County (Wyoming) chapter of the ARC, seven large stores in Cheyenne, Laramie, and Casper were provided with the material. The suggested layout incorporated the store's own merchandise on a table accompanying the awareness material. The intention was to create a motivational display for prompting the development of a winter safety kit in a location where the materials were readily available. The appeal of this marketing strategy, in addition to the community-minded spirit of the stores, secured the participation of all stores contacted.

Each of the participating stores use the photos and graphics provided to varying degrees in developing their displays. Several merchandisers reported brisk sales from their exhibits, and at least one store was so pleased with the associated sales that their display was kept in tact through the busy Christmas shopping season.

Despite the success of this effort, the latitude given the retailers resulted in the sponsors of the awareness campaign—the NWS, ARC, and the Wyoming Emergency Management Agency (WEMA)—being somewhat unclear. The solution to this problem was attained by Cathy King of the ARC. She had the material I had given her dry-mounted on foam boards to create a free-standing, tri-fold display. This display had the most polished look and convinced the three agencies to pursue similar action on a statewide scale for Severe Weather/Hazards Awareness Week.

Since the ARC has chapter offices in several locations in the state, they were tasked with identifying possible stores for participation. WEMA provided several Wyoming photos for the display, and I designed the display. Fifty stores across the state agreed to participate, and the three agencies shared the cost of production for the display boards. WEMA and the ARC oversaw the distribution of the boards throughout the state and will be responsible for retrieving them for storage after SWAW.

The success of this project illustrates the achievements that can be obtained by building effective relationships with not only other hazard-minded agencies, like the ARC and state emergency management agencies, but with civic-minded retailers as well. Since preparing for severe weather and other emergencies often involves making a number of minor purchases, it makes sense to include retailers in the preparedness program. Too often, people see a preparedness display and intend to follow its suggestions, but fail to follow through after they walk away. By placing the displays adjacent to the material that may need to be purchased, it is anticipated that more people will follow through with the actions needed to be truly prepared for hazards. This results in a win-win situation for both retailers and the hazards community as well. 

—Joe Sullivan, WCM, WSFO Cheyenne, WY

## Milk Carton Promotion in North Dakota

As everyone knows, milk cartons are not just for containing milk anymore. They have become a medium to advertise. NWSFO Bismarck, North Dakota, is taking advantage of this fact to increase the visibility of the NWS and its NWR.

The Cass-Clay Creamery, a milk distributor in North Dakota, northwest Minnesota, and northeast South Dakota has reserved a milk carton side panel for 2 weeks in April and again in November. During each 2-week period, Cass-Clay estimates 300,000 milk cartons will be stamped with the artwork created by the NWSFO Bismarck External Customer Team. While the spring milk carton promotion will concentrate on NWR, the fall promotion will feature the Severe Winter Weather Awareness Day in North Dakota. [E]

—Dan Noah, WCM, NWSFO Bismarck, ND

## Montana Flood Fliers

During late March and April 1996, Bob's Pizza in Great Falls, Montana, handed out fliers containing Montana flood information. These fliers offer a coupon with a discount on the next purchase and so provide the incentive to keep them. Given the history of flooding in Montana this past winter and the potential for further flooding this spring, this information is timely and very valuable. Basically, it was a reprint of NWS safety rules for flooding.

Kudos go to Gina Loss (Warning Coordination Officer at WSO Helena) and Larry Akers (Montana Disaster and Emergency Services) for successfully coordinating this project. [E]

—Lynn Valtinson, WCM, NWSFO Great Falls, MT

## Hawaii Statewide Hurricane Exercise—Makani Pahili '96

The Central Pacific Hurricane Center (CPHC)/WSFO Honolulu and Hawaii State Civil Defense will sponsor a statewide hurricane exercise to be held from May 3-9, 1996. "Makani Pahili" (Hawaiian for hurricane/tropical cyclone), will mark the first exercise with full participation by the civilian and military communities in Hawaii. Initial plans for the forecast phase of the exercise were developed by the CPHC, and the Naval Pacific Meteorology and Oceanography Center at Pearl Harbor. Forecasts and advisories for the exercise will be issued by the CPHC and disseminated via the State Civil Defense Interisland Data System connecting the CPHC, WSOs, county civil defense agencies, and police warning points throughout Hawaii.

Participants will include all branches of the military, FEMA, FAA, Hawaii WSOs, the state of Hawaii, SKYWARN, the Civil Air Patrol, the ARC, Hawaii Voluntary Organizations Active in Disaster, the Healthcare Association of Hawaii, the media, all major utility companies, and the Hotel Security Association. The response phase will provide a mass casualty exercise, initial damage assessments, requests for state and Federal disaster declarations, and the opening of Disaster Field Offices and Disaster Applications Centers. [E]

—Tom Heffner, WCM, CPHC/WSFO Honolulu, HI

## Federal Agencies Conduct Joint Communications Exercise

A joint communications exercise was held on Fort Richardson on March 12, 1996. The purpose of the exercise was to test emergency communication capabilities of Federal agencies based in the Municipality of Anchorage. The exercise backdrop involved the

testing of agency communications equipment that would be used during the first 24 hours following a major earthquake based in the Anchorage Bowl. They demonstrated the new Alaska Incident Response System, which is a satellite-based, stand-alone weather communication system. Dave reported the exercise went well by all standards. The results of the exercise will be used to examine the draft State/Federal Natural Disaster Plan. [E]

—Dave Goldstein, WCM, NWSFO Anchorage, AK

## Alaska Division of Emergency Services (ADES) Demonstrated "First Class" Communication System

Brian Fisher, Computer Specialist with the ADES, demonstrated "First Class" electronic mail software used on the state's two-way emergency services communications system. The demonstration was conducted at the NWS Regional Office. Emergency management offices, fire stations, and others are becoming part of this state-wide, two-way communications system. The system serves routine ADES communications needs as well as emergency needs during natural disasters and human-caused mishaps. The NWS Alaska Region is working with the ADES in becoming part of the two-way communications system with particular interest in assisting ADES efforts during emergencies. Special products (graphic and text) are expected to provide assistance to Federal and state agencies during emergencies. Plus, the NWS would have access to valuable and vital on scene reports that would assist Regional service offices in providing better support during hazardous events. [E]

—Greg Matzen, Regional WPM, Alaska Region Headquarters, AK

## NWS Participated in Cruise Ship 96-2 Exercise

The U.S. Coast Guard (USCG), the ADES, the cruise line industry, the ARC, the NWS Alaska Region, and other Federal and state agencies participated in a joint exercise during March 19-20. The simulated exercise scenario featured a large cruise ship going aground during the month of August near Wrangell, Alaska. The grounding of the ship resulted in an oil spill, fire on board with fatalities and injuries. Evacuation of nearly 1,000 passengers and crew was required to the towns of Wrangell and Petersburg. The USCG Rescue Coordination Center in Juneau coordinated the search, rescue, evacuation, and oil spill response. The State Emergency Coordination Center on Fort Richardson also assisted in coordination efforts from the state level. Bob Kanan, WCM from the Juneau WSFO, provided a very complete and comprehensive package of "canned" weather for the exercise. [E]

—Bob Kanan, WCM, WSFO Juneau, AK

# International Decade for Natural Disaster Reduction

## “ACT NOW: Disaster Preparedness and Fire Prevention” Videoconference Coming Up in June

The FEMA Family Preparedness Program is gearing up for the second in a series of “Act Now: Disaster Preparedness and Fire Prevention” videoconferences on June 20, 1996, from 1 to 3 p.m., EDT. As you may remember, last October 11, 1995 (Disaster Awareness Day), FEMA introduced the videoconference series and, through help from various organizations like yours across the country, the program was a huge success.

As a major extension of the videoconference, a 2-hour online conference is scheduled on the World Wide Web to allow further interaction with preparedness experts and others in the field, including an introduction by Vice President Al Gore and FEMA Director James Lee Witt. The online conference, also on June 20, is scheduled for 7 to 9 p.m., EDT. All of the online resources, including bulletin boards, a disaster preparedness database, and other preparedness materials, will be available through the site for at least 4 weeks following the scheduled conference.

FEMA's Family Preparedness Program, the U.S. Fire Administration, the ARC, and the NWS are working together to let their members and communities know about these events. Any help you could provide us in getting the word out would greatly be appreciated.

It will be broadcast by FEMA's Emergency Education Network and carried simultaneously by the ARC's Business Television Network, the Fire Emergency Television Network, and the Law Enforcement Television Network. Select local fire houses, community colleges, and television and cable stations around the country will also air the program. Satellite coordinates are as follows.

### C-Band

Telstar 401  
Channel 16  
Downlink Freq: 4020 MHz  
Audio Freq: 6.2/6.8  
Location: 97° West  
Polarity: Horizontal

### KU-Band

Galaxy 4 (K4)  
Transponder 12  
Downlink Freq: 11930 MHz  
Audio Freq: 6.2/6.8  
Location: 99° West  
Polarity: Horizontal

For further information about the:

- ✓ **videoconference** — call FEMA's Emergency Education Network at 301-447-1068 or e-mail Sue Downin at [sdowin@fema.gov](mailto:sdowin@fema.gov).
- ✓ **online conference** — call or e-mail Heather Wurthman at (202) 452-9448; [heather\\_wurthman@oar-wash.com](mailto:heather_wurthman@oar-wash.com).

Thank you in advance for your support and assistance with these upcoming programs.

—Ralph Swisher, FEMA, Washington, D.C.

---

## Publications and Audiovisuals

### What's New!

#### ■ New Name for the Hurricane Brochure

OM wishes to thank all the WCMs for their participation in the selection of a new title for the NWS hurricane publication, "Hurricanes...The Greatest Storms on Earth" (NOAA PA 94050). As many of you know, because of the copyright issue of having a similar title to the Ringling Bros.-Barnum & Bailey Combined Shows, Inc., "GREATEST SHOW ON EARTH," the title had to be changed. After polling the WCMs to gather new titles, we selected three that would relate to the hurricane brochure. They were:

*Hurricanes...The Incredible Fury*  
*Hurricanes...Unleashing Nature's Fury*  
*Hurricanes...Nature's Ultimate Fury.*

We again approached the WCMs to choose from the three titles the one they liked the best. So it is with pleasure that we announce the new title for the hurricane brochure.

#### Hurricanes...Unleashing Nature's Fury!

Our thanks go to Mary Jo Parker, WCM, Wilmington, Ohio, who submitted the winning title. We appreciate all the support and especially the comments concerning this selection.

Furthermore, both the ARC and FEMA approved of the new title. Once all the changes and updates were made to the hurricane brochure, the ARC was provided with a set of negatives that included the new title page. They were able to print copies for the upcoming hurricane liaison trip in May. We are eternally grateful for ARC's support and cooperation in this endeavor.

In addition, we sent our negatives to the printer in April for distribution to the National Logistics Supply Center (NLSC) in Kansas City, Missouri, by early June...just in time for the 1996 hurricane season.

Mary Jo Parker continues to work on the corresponding hurricane slide series reflecting the new title. Unfortunately, the slide set will not be available for this hurricane season. Mary Jo will be detailed for 1 week in July to complete the presenter's guide. Both will be reproduced in the fall using FY 97 funds.

—Linda Kremkau, Editor, Customer Service, WSH

## ■ Basic Spotter Training Materials

### ☛ "Concepts of Severe Storm Spotting" Slide Set with Presenter's Guide

At long last, the basic severe storm spotter training slides are available from WSH and will be distributed to the Regions the first part of May. The Regions will forward a set to each of their field offices. The package contains 139 slides and a printed script, but each field office is encouraged to substitute and add to the set with slides from their local area. Anyone wishing to borrow this slide set, please contact Customer Service, WSH, at 301-713-0090.

### ☛ Basic Severe Storms Spotter's Field Guide

After several months on the back burner, preparations are beginning again for a basic spotter's guide to accompany the new slide set "Concepts of Severe Storm Spotting." Newton Skiles (NWSFO Little Rock, AR) and Gary Woodall (Meteorological Services Division, SRH) prepared a draft version of the guide last summer. Several field offices participated in a review of the first and second drafts of the guide. WSH has indicated a willingness to print the guide in FY 97 so we hope to have the guide ready for printing by late summer.

—Gary Woodall, WCM, SRH

## ■ Atlantic and Pacific Hurricane Tracking Maps

The ARC, FEMA, and the NWS have three tri-logo hurricane tracking maps: two Atlantic maps (8-1/2 by 11 inches for public distribution and 17 by 22 inches for office and planning use), and one Pacific map (12 by 24 inches). OM is in the process of making a few changes to the Pacific hurricane tracking map, corrections submitted by the NWS Pacific Region Headquarters. Once these changes are completed by the ARC's contractor, a set of negatives for all three hurricane tracking maps will be supplied to WSH for printing as soon as possible. We hope to have these hurricane tracking maps by late June 1996.

—Linda Kremkau, Editor, Customer Service, WSH

## ■ The Hidden Danger—Low Water Crossing Video

Nearly half of all flood-related deaths occur in vehicles. Most of these deaths take place when people drive into flooded highway dips or low drainage areas. Road-bed erosion, nighttime driving, and over-confidence in a vehicle's capabilities contribute heavily to the number of fatalities in these situations. The NWS's Office of

Hydrology has developed an 8-1/2 minute video that graphically depicts the hidden dangers of low water crossings and includes safety rules. The video, which will be released this spring, stresses how as little as 6 inches of water can cause a driver to lose control of the vehicle.

VHS copies of the video cost \$3.50 and may be obtained by sending a check or money order, payable to National Weather Service/NOAA, to Larry Wenzel at Office of Hydrology, SSMC2, Rm. 8115, 1325 East-West Highway, Silver Spring, MD, 20910, Tel: (301) 713-0006.

—Larry Wenzel, Hydrotech, Office of Hydrology, WSH

## ■ "Mark Trail" Comic Strips to Feature Thunder (June 2) and Lightning (July 21)

Thunder will be the subject of the Sunday, June 2, Mark Trail comic strip. This will be the fourth weather-related subject highlighted in the strip since NOAA began a relationship with Mark Trail author, Jack Elrod. On Sunday, July 21, lightning will be featured. Three previous Sunday strips, August 6 and 13, 1995, highlighted flash floods and NWR, and more recently, on May 5, featured tornado safety. Mark Trail is syndicated by King Features in more than 175 newspapers nationwide, with a readership of about 35 million people.

—Barry Reichenbaugh, Public Affair Officer, NWS

## ■ New NWR Brochure under Development

Once again, WSH will detail Todd Heitkamp, WCM, NWSFO Sioux Falls, South Dakota, to WSH for the purpose of developing a new NWR 8-page, 4-color brochure. Todd expects to spend the first week of June working with Stan Johnson (NWR Program Manager) and Ken Putkovich (Dissemination Systems Manager) of OSO and also Rod Becker and Ron Berger of OM's Customer Service. In addition, I will work with Todd to assist in the layout of the publication. It's our hope to have camera-ready artwork by the end of August for printing in FY 97.

—Linda Kremkau, Editor, Customer Service, WSH

## What's Being Reprinted!

Below is a list of brochures that have been out of print for many months now but are fully restocked at NLSC. They are:

- Tornadoes...Nature's Most Violent Storms
- Thunderstorms and Lightning...The Underrated Killers
- Flash Floods and Floods...The Awesome Power
- Heat Wave

In addition, as previously mentioned, the hurricane brochure is expected to be fully stocked at NLSC by early June.

—Linda Kremkau, Editor, Customer Service, WSH

## "Twister" Leads Wave of Tornado Media Productions

Tornadoes are the hot media topic for the spring, with a wave of tornado media productions about to storm across America's newsstands, movie theaters, and television screens. Over the past year, the Office of Public and Constituent Affairs, the NSSL, and the NWS have provided many of these media with considerable assistance in their portrayals of the destructive powers of tornadoes, the threat to the public, and the real-life role tornado researchers play in improving warnings and forecasts. These NOAA offices are also taking advantage of the increased interest in tornadoes generated by these media productions to deliver tornado safety messages to the public, including updated tornado safety flyers and a planned tornado public service announcement by the stars of the soon-to-be release motion picture "Twister."

- ▼ First up: "Savage Skies," a four-part series featuring an assortment of NOAA weather researchers and forecasters, premiers on PBS the week of May 6.
- ▼ "Tornado," a Fox made-for-TV movie about tornado chasers, airs May 7. Fox will also air an hour-long companion report on the real scientists who study tornadoes, including Chuck Doswell and other tornado researchers at NSSL and pioneering scientific chaser Joe Golden.
- ▼ "Twister" premiers May 8 in Los Angeles, May 9 in Oklahoma City, and May 10 in Atlanta. This likely blockbuster from Warner Brothers is a fanciful story of tornado intercept scientists, starring Helen Hunt and Bill Paxton, from the pen of Michael Crichton and produced by Steven Spielberg and Kathleen Kennedy. While the portrayal of scientific tornado intercepts is fantastic, the depictions of the destructive power of tornadoes and their threat to public safety are only too real.
- ▼ An HBO special on the "Making of Twister," including a profile of VORTEX, will air in conjunction with the "Twister" national release.
- ▼ A new Simon & Schuster book on tornadoes by San Francisco Examiner science writer Kea Davidson and featuring an historical look at NOAA-pioneered advances in our understanding of tornadoes.
- ▼ Upcoming network and documentary productions on tornadoes include NBC's "Real Life," Pioneer Productions' "Violent Earth," and the Discovery Channel's "World of Wonder."
- ▼ A variety of local television stations plan special tornado reports, featuring NOAA research, warnings, and forecasts, including Channels 2 and 8 in Tulsa; ABC affiliate WFAA in Dallas; KSNW Wichita; KDNL in St. Louis; WHDH in Boston; "On the Weather Front" on WLS in Chicago, May 11; WSIL TV in Caterville, Illinois; KAMR TV in Amarillo; and WJW TV in Cleveland.
- ▼ A *Time* magazine report on tornado research and researchers by senior science correspondent Madeleine Nash, based largely on VORTEX and interviews at NSSL.

—Dane Konop, Public Affairs Officer, Office of Atmospheric Research

## StormWatch Wins NWA Media Award

*StormWatch*, the advanced storm spotter video produced for the NWS by the Texas Severe Storms Association (TESSA), won the NWA's 1995 Media Award. The Media Award is annually presented to the audio-video production that had (or is expected to have) the most significant impact on operational forecasting. The award was given at the NWA's national conference held in Houston.

*StormWatch* was recognized as "a significant tool for the WCMs at all NWS offices to help train emergency managers, amateur radio operators, and other spotters." It was produced during the spring of 1995 and distributed to all NWS offices nationwide in early June.

"A good warning program requires a complete team effort to ensure that accurate information is received at National Weather Service offices as part of the storm analysis and forecasting process," said Andy Horvitz, NWA Awards Committee Chairman. "The new storm spotter video will significantly help in this regard," he said.

*StormWatch* was written and produced by Martin Lisius, Alan Moller, and Gary Woodall. It was directed by Martin Lisius. Also producing was Kurt Ugland. *StormWatch* is narrated by KRLD Radio staff meteorologist Brad Barton. TESSA and KRLD are both based in Arlington, Texas.

—Gary Woodall, WCM, SRH

## FEMA's Good Ideas Book

FEMA's Good Ideas Book is filled with good ideas and information for Family Preparedness Program organizers. Inside this packet you will find ideas, materials, and "how to" steps for a variety of outreach activities. The tools include examples of activities and case studies of successful programs to help you plan events, form partnerships and work with special populations. Also included is ready-to-use artwork that can be adapted easily to include your own disaster preparedness messages and your group's or sponsor's logo.

There are phone numbers of organizations that have provided the good ideas in this book.

The Good Ideas Book is intended to be a "living document," which will be supplemented periodically with additional ideas and information. Feel free to adapt anything you see in the book to meet your own objectives—and the needs of your community.

To obtain a copy of the Good Ideas Book, you can call at 1-800-480-2520, or fax at 301-4997-6378, or write to FEMA, P.O. Box 2012, Jessup, Maryland, 20794-2012—ask for item 8-1108, *The Good Ideas Book*, or download individual items from FEMA's World Wide Web "www.fema.gov" (look under preparedness).

—Ralph Swisher, FEMA, Washington, D.C.

## Red Cross Budget Cuts Affect Availability of NWS Brochures

Due to a projected \$7.3M shortfall in revenue over projected expenses for the fiscal year ending June 30, 1996, the Red Cross has implemented budget restrictions that will affect the availability of the 12-page NWS brochures on winter storms, flash floods/floods, thunderstorms, tornadoes, and hurricanes.

The Red Cross has used donated dollars to fund reproduction of these brochures. The primary purpose of reproducing these materials is to enable Red Cross chapters to conduct public education activities that they are required to accomplish in their areas.

We have discovered though that several NWS offices have turned to the Red Cross to get these materials because the NOAA warehouse in Kansas City was not able to provide these materials in either the quantity desired or by a certain date.

However, because of severe budget limitations, the Red Cross can no longer fulfill requests from third parties (including NWS offices) to provide these materials at no charge. We DO want to work closely with our NWS partners in public education activities. However, we cannot afford to use our donated dollars to reproduce materials for NWS offices that the NWS should be supplying.

Your cooperation and assistance in not placing a demand for these materials upon your local Red Cross would be appreciated.

—Rocky Lopes, The American Red Cross National Headquarters Disaster Services

## The Weather Channel's "On-Air Schedule"

This is a continuing part of the *Aware Report* to provide you with an "On-Air Schedule" from The Weather Channel for live and current forecast weather programs (see below). The Weather Classroom 10-minute program airs Monday-Friday at 1 p.m., ET.

### On-Air Schedule

Mon. 13	May	Fronts
Tue. 14	May	Jet Stream
Wed. 15	May	Water Cycle
Thu. 16	May	Satellite Photos
Fri. 17	May	Sundogs/Rainbows
Mon. 20	May	Thunderstorms
Tue. 21	May	Flooding
Wed. 22	May	Lightning
Thu. 23	May	Tornadoes
Fri. 24	May	Doppler Radar
Mon. 27	May	<u>Careers in Meteorology</u>
Tue. 28	May	<u>Meteorology Field Trip</u>
Wed. 29	May	<u>Aviation Weather</u>
Thu. 30	May	<u>NASA Part 1</u>
Fri. 31	May	<u>NASA Part 2</u>

### Tropical Awareness Week:

Mon. 03	Jun.	Hurricanes
Tue. 04	Jun.	Hurricane Preparedness
Wed. 05	Jun.	Path of Hurricanes
Thu. 06	Jun.	Hurricane Aftermath
Fri. 07	Jun.	Historical Hurricanes

Mon. 10	Jun.	Pearl to Nagasaki
Tue. 11	Jun.	D-Day
Wed. 12	Jun.	Battle of the Bulge
Thu. 13	Jun.	Historical Tornadoes
Fri. 14	Jun.	Great Weather Catastrophes
Mon. 17	Jun.	Great Weather Catastrophes
Tue. 18	Jun.	Atmosphere
Wed. 19	Jun.	Weather Basics
Thu. 20	Jun.	El Niño
Fri. 21	Jun.	Seasons
Mon. 24	Jun.	Heavenly Skies
Tue. 25	Jun.	Sundogs/Rainbows
Wed. 26	Jun.	Weather and Human Behavior
Thu. 27	Jun.	Alternate Energy
Fri. 28	Jun.	Meteorology Field Trip
Mon. 01	Jul.	Sun and your Skin
Tue. 02	Jul.	Atmosphere
Wed. 03	Jul.	Clouds
Thu. 04	Jul.	The Chase
Fri. 05	Jul.	Heat Index
Mon. 08	Jul.	Volcanoes
Tue. 09	Jul.	Earthquakes
Wed. 10	Jul.	Fires
Thu. 11	Jul.	Aviation Weather
Fri. 12	Jul.	Meteorology Field Trip

### Tropical Awareness Week:

Mon. 15	Jul.	Hurricanes
Tue. 16	Jul.	Hurricane Preparedness
Wed. 17	Jul.	Path of Hurricanes
Thu. 18	Jul.	Hurricane Aftermath
Fri. 19	Jul.	Hurricane Season '95
Mon. 22	Jul.	Careers in Meteorology
Tue. 23	Jul.	El Niño
Wed. 24	Jul.	Sundogs/Rainbows
Thu. 25	Jul.	Heavenly Skies
Fri. 26	Jul.	City Weather
Mon. 29	Jul.	Weather Basics
Tue. 30	Jul.	Highs/Lows
Wed. 31	Jul.	Fronts

—Education Services Department, The Weather Channel

## Aware Report Roster

Attachment B is the *Aware Report* Roster which lists all the WCMs in each of the NWS Regions. The telephone numbers are listed numbers for that office and not the WCM's direct telephone number. If there are any changes, please notify me at (301) 713-0090. The Roster is placed at the back of the *Aware Report* for anyone wishing to detach and use separately.

Also, if you know of someone who would like to be placed on the *Aware Report* distribution list, please have him or her contact OM's Customer Service at (301) 713-0090.

—Linda Kremkau, Editor, Customer Service, WSH



<b>WSOM Chapters</b>	<b>Status</b>
B-16, Marine Reporting Station	To be updated in 1996.
B-18, Agricultural Weather Observations	Will be updated or cancelled in 1996.
B-19, Fire Weather Stations	Will be updated and consolidated with D-06 in 1996.
B-30, Voluntary Observing Ship Program	To be updated in 1996.
B-55, Distribution and Use of Satellite Data	Requires a total update; earliest draft early to mid-1996.
B-90, Special Warning Program Observations	To be updated in 1996.
C-10, State Forecast	Update for 7-day state forecast expected in fall 1996.
C-11, Zone and Local Forecasts (main section)	To be updated by late 1996.
C-11, Zone and Local Forecasts, Appendix A (Zone Forecast Maps)	Replacement pages issued December 1995 and May 1996. Next appendix update expected in the fall of 1996.
C-12, 6- to 10-Day, 30-Day, and 90-Day Outlooks	OML for 8- to 14-day Outlook expected in fall 1996.
C-40, Severe Local Storm Warnings	The chapter was released and implemented during March 1995. While it does not include aspects of the convective watch decentralization (scheduled to begin August 1996), it does feature a focus on Short-Term Forecast (Nowcast) concepts. The introduction of the Nowcast affects other products, including warnings and statements.  In addition, an OML to C-40 has been released. It modifies the Local Storm Report (LSR) to conform with the WMO's 69 character-per-line limit in text products.
C-41, Tropical Cyclone Program	C-41 has been sent to the printer for delivery to the field in May 1996.
C-45, Meteorological Discussions and Forecast Coordination	OML expected in fall 1996 for guidance products on days 6 and 7 and 8- to 14-day Outlook. Begin rewrite of chapter late in 1996.
C-47, County Warning Areas, Appendix A	Ongoing public information statements are updates. Next appendix issuance expected by fall 1996.
C-43, Coastal Flood Program	OML to be issued describing NOS NGWLMS and real-time tide water level access.
C-49, Warning Coordination and Hazard Awareness	The Customer Service of OM will begin the review and update process for C-49 in early June 1996. The first draft should reach the field for review late in 1996. Our goal is to have the chapter updated in early 1997. Evaluate option for merging Chapters C-45 and C-49.
C-60, Radio/TV Dissemination; C-61, Telephone Dissemination; C-62, Newspaper Dissemination; and C-67, News Wire Dissemination	Work will begin on updating and probably consolidating these chapters late in 1996.
C-66, Dissemination of Public Warnings	Consolidate into chapter C-49 by early 1997.
C-72, National Watch/Warning Verification Program C-73, Public/Aviation Forecast Verification	These chapters will be updated and consolidated into a single chapter during FY 97.
D-05, Agricultural Weather Services	Will be updated or cancelled in 1996.
D-06, Fire Weather Services	Will be updated in 1996 and consolidated with B-19.
OML to D-06, Duties of IR Mets Requiring Exposure to Hazardous Situations	Has been approved; due out very soon.
D-07, Fire Weather Services	To be updated in 1996.
D-20, Area Forecasts (OML)	First draft coordinated with FA offices; finalized by end of April 1996.
D-22, Domestic SIGMET (OML)	First draft being prepared; finalized in May 1996.
D-38, International SIGMET (OML)	First draft being prepared; finalized in May 1996.
D-21, Aviation Terminal Forecasts D-37, International Aviation Aerodrome Forecasts	Second draft of D-31 (merge of D-21 and D-37) incorporating the field comments from first draft. On July 1, 1996, D-21 and D-37 become obsolete and will be replaced by D-31.
D-31, Aviation Terminal Forecasts	See D-21 and D-37.

## WSOM Chapters

## Status

D-23, Special Aviation Forecasts and Events  
D-91, Aviation Liaison and User Support Program

Preliminary work to update, adjust, and reassign the contents of these chapters has been completed. Awaiting ASB resources to complete the job.

D-25, Air Traffic Operations Support

Comms header changes to FAA for coordination awaiting OM approval prior to sending to regions for comments. Updated and revised. Due out June 1996.

D-30, Transcribed Weather Broadcast Text Products

Draft of D-30 is currently being reviewed by the field for comments (comments due May 1, 1996).

D-40, Agricultural Weather Products

Will be updated or canceled in 1996.

D-51, Marine Services for Coastal, Offshore, and High Seas

Appendices C - H, dealing with USCG broadcasts of Marine Weather Products, are being consolidated into a separate Marine Dissemination Guide.

Appendix B on reconfigured coastal marine forecast areas will be updated, and maps will be added showing boundary demarcations.

D-52, Marine Services for the Great Lakes

To be updated in 1996.

OML to D-52, Marine Services for the Great Lakes

OML 1-96 was issued on April 2, 1996, with an effective date of April 8, 1996, to subdivide and renumber the Great Lakes marine forecast zones.

D-80, Familiarization Flights

Due out late summer 1996. The substantive change will be for the met to add their D-11 card number to the D-27 Report form so that the list of those that have the card can be actively updated and the flights tracked more efficiently. Revised air carrier list.

D-90, Support for Accident Investigation and Litigation

Initial draft of revision being reviewed by NWS regions.

F-42, Storm Data and Related Reports

An OML has been released to accommodate changes associated with Paradox II, the new software for Storm Data. Other minor changes also have been included.

F-60, Tsunami Warning Service

Chapter issued January 25, 1996.

F-61, Earthquake Reporting Program

Chapter issued March 6, 1996.

**Eastern Region**

<u>Rick Watling</u> . . . . .	Regional (Focal) . . . . .	516-244-0123	Larry Gabric . . . . .	Cleveland, OH . . . . .	216-265-2370
Solomon Summer . . . . .	HSD Chief . . . . .	516-244-0111	Steve Naglic . . . . .	Columbia, SC . . . . .	803-765-5501
Dick Westergard . . . . .	Albany, NY . . . . .	518-869-6394	Sam Baker . . . . .	Greenville-Spartanburg, SC . . . . .	803-848-1332
Herb White . . . . .	Binghamton, NY . . . . .	607-729-7629	Dan Bartholf . . . . .	Newport, NC . . . . .	919-223-5122
Mike Emlaw . . . . .	Blacksburg, VA . . . . .	504-552-0084	Gary Conte . . . . .	New York City (Upton), NY . . . . .	516-924-0037
Glenn Field . . . . .	Boston (Taunton), MA . . . . .	508-823-1900	Joe Miketta . . . . .	Philadelphia, PA . . . . .	609-261-6600
Stan Levine . . . . .	Buffalo, NY . . . . .	716-565-0204	James Weyman . . . . .	Pittsburgh, PA . . . . .	412-262-1591
Steve Hogan . . . . .	Burlington, VT . . . . .	802-862-2475	John Jensenius . . . . .	Portland (Gray), ME . . . . .	207-688-3210
Tom Dunham . . . . .	Central PA (State College) . . . . .	814-234-9412	George Lemons . . . . .	Raleigh, NC . . . . .	919-860-1234
Jerry Harrison . . . . .	Charleston, SC . . . . .	803-744-3207	Bill Sammler . . . . .	Wakefield, VA . . . . .	804-899-4200
Mike Washington . . . . .	Charleston, WV . . . . .	304-746-0180	Barbara Watson . . . . .	Washington, DC . . . . .	703-260-0107
Mary Jo Parker . . . . .	Cincinnati, OH . . . . .	513-383-0031	Tom Matheson . . . . .	Wilmington, NC . . . . .	910-762-4289

**Southern Region**

<u>Gary Woodall</u> . . . . .	Regional . . . . .	817-334-2812	Larry Vannozzi . . . . .	Lubbock, TX . . . . .	806-745-4260
Ed May . . . . .	HSD Chief . . . . .	817-334-2674	Dennis Decker . . . . .	Melbourne, FL . . . . .	407-255-0212
Keith Hayes . . . . .	Albuquerque, NM . . . . .	505-243-0702	John White . . . . .	Memphis, TN . . . . .	901-757-6400
Douglas Crowley . . . . .	Amarillo, TX . . . . .	806-335-1121	Jim Lushine . . . . .	Miami, FL . . . . .	305-229-4522
Barry Gooden . . . . .	Atlanta, GA . . . . .	770-486-1333	George Mathews . . . . .	Midland/Odessa, TX . . . . .	915-563-5006
Larry Eblen . . . . .	Austin/San Antonio, TX . . . . .	210-629-0130	Gary Beeler . . . . .	Mobile, AL . . . . .	334-639-6625
Brian Peters . . . . .	Birmingham, AL . . . . .	205-664-7828	Howard Waldron . . . . .	Morristown, TN . . . . .	615-586-3771
Don Ocker . . . . .	Brownsville, TX . . . . .	210-504-1432	Jerry Orchanian . . . . .	Nashville, TN . . . . .	615-754-4633
John Cole . . . . .	Corpus Christi, TX . . . . .	512-289-0959	Frank Revitte . . . . .	New Orleans, LA . . . . .	504-522-7330
Jack Mercer . . . . .	El Paso, TX . . . . .	505-589-4088	Jim Purpura . . . . .	Norman, OK . . . . .	405-366-6583
Jim Stefkovich . . . . .	Fort Worth, TX . . . . .	817-429-2631	Richard May . . . . .	San Angelo, TX . . . . .	915-944-9445
Gene Hafele . . . . .	Houston/Galveston, TX . . . . .	713-337-5074	Rafael Mojica . . . . .	San Juan, PR . . . . .	809-253-4586
James Butch . . . . .	Jackson, MS . . . . .	601-936-2189	Bruce Burkman . . . . .	Shreveport, LA . . . . .	318-631-3669
Fred Johnson . . . . .	Jacksonville, FL . . . . .	904-741-4370	Bob Goree . . . . .	Tallahassee, FL . . . . .	904-576-6318
Roger Erickson . . . . .	Lake Charles, LA . . . . .	318-477-5285	Walt Zaleski . . . . .	Tampa, FL . . . . .	813-645-2323
Renee Fair . . . . .	Little Rock, AR . . . . .	501-834-9102	Steve Piltz . . . . .	Tulsa, OK . . . . .	918-832-4115

**Central Region**

<u>David Runyan</u> . . . . .	Regional . . . . .	816-426-3239	Shawn Harley . . . . .	Jackson, KY . . . . .	606-666-4856
Ken King . . . . .	Actg. HSD Chief . . . . .	816-426-3220	Bill Bunting . . . . .	Kansas City, MO . . . . .	816-540-5147
Hector Guerrero . . . . .	Aberdeen, SD . . . . .	605-225-5547	Todd Shea . . . . .	LaCrosse, WI . . . . .	608-784-8275
Kathy Hoxsie . . . . .	Alpena, MI . . . . .	517-354-8733	Norman Reitmeyer . . . . .	Louisville, KY . . . . .	502-969-8842
Daniel Noah . . . . .	Bismarck, ND . . . . .	701-250-4224	Jack Pellett . . . . .	Marquette, MI . . . . .	906-475-5782
Joseph Sullivan . . . . .	Cheyenne, WY . . . . .	307-772-2468	Rusty Kapela . . . . .	Milwaukee/Sullivan, WI . . . . .	414-297-3243
Jim Allsopp . . . . .	Chicago, IL . . . . .	815-834-0600	Todd Krause . . . . .	Minneapolis, MN . . . . .	612-725-3741
James Meyer . . . . .	Davenport, IA . . . . .	319-391-6729	Gene Bowman . . . . .	North Platte, NE . . . . .	308-532-4936
Robert Glancy . . . . .	Denver, CO . . . . .	303-361-0661	Brian Smith . . . . .	Omaha, NE . . . . .	402-359-2394
Jeffrey Johnson . . . . .	Des Moines, IA . . . . .	515-270-4501	Ricky Shanklin . . . . .	Paducah, KY . . . . .	502-744-6440
Gary Campbell . . . . .	Detroit/White Lake, MI . . . . .	313-625-3309	Tom Magnuson . . . . .	Pueblo, CO . . . . .	719-948-9429
Jeff Hutton . . . . .	Dodge City, KS . . . . .	316-227-7140	Susan Anderson . . . . .	Rapid City, SD . . . . .	605-341-9271
Carol Christenson . . . . .	Duluth, MN . . . . .	218-720-5255	Donald Noll . . . . .	Riverton, WY . . . . .	307-857-3898
Dennis Hull . . . . .	Goodland, KS . . . . .	913-899-2360	Todd Heitkamp . . . . .	Sioux Falls, SD . . . . .	605-330-4247
Jim Belles . . . . .	Grand Forks, ND . . . . .	701-772-0720	Rod Palmer . . . . .	Springfield, IL . . . . .	217-732-4029
James Pringle . . . . .	Grand Junction, CO . . . . .	970-243-7007	Steve Runnels . . . . .	Springfield, MO . . . . .	417-863-1456
John Kottke . . . . .	Grand Rapids, MI . . . . .	616-956-5922	Jim Kramper . . . . .	St. Louis, MO . . . . .	314-447-1876
Jeff Last . . . . .	Green Bay, WI . . . . .	414-494-5845	Mike Akulow . . . . .	Topeka, KS . . . . .	913-232-1493
Steve Kisner . . . . .	Hastings, NE . . . . .	402-462-2127	John Ogren . . . . .	Wichita, KS . . . . .	316-942-8483
David Tucek . . . . .	Indianapolis, IN . . . . .	317-856-0361			

## Western Region

Richard Douglas . . . . Deputy MSD Chief . . . . . 801-524-4000  
Bob Tibi . . . . . HSD Chief . . . . . 801-524-5137  
Chuck Bikle . . . . . Billings, MT . . . . . 406-657-6988  
Carl Weinbrecht . . . . Boise, ID . . . . . 208-334-9860  
Ed Clark . . . . . Elko, NV . . . . . 702-738-3018  
John Lovegrove . . . . Eureka, CA . . . . . 707-443-6484  
Chris Cuoco . . . . . Flagstaff, AR . . . . . 520-556-9161  
Dan Gudgel . . . . . Fresno, CA . . . . . 209-584-0583  
Kimberly Bailey . . . . Glasgow, MT . . . . . 406-228-2850  
Lynn Valtinson . . . . Great Falls, MT . . . . . 406-453-2081  
Ron McQueen . . . . . Las Vegas, NV . . . . . 702-263-9744  
Tim McClung . . . . . Los Angeles, CA . . . . . 805-988-6610  
John Casad . . . . . Medford, OR . . . . . 503-773-1067

Peter Felsch . . . . . Missoula, MT . . . . . 406-329-4841  
Rob Doherty . . . . . Pendleton, OR . . . . . 503-276-4493  
Mike Franjevic . . . . Phoenix, AZ . . . . . 602-379-4611  
Bruce Bauck . . . . . Pocatello, ID . . . . . 208-233-0834  
Dan Keeton . . . . . Portland, OR . . . . . 503-261-9247  
Roger Lamoni . . . . . Reno, NV . . . . . 702-673-8107  
Roger Pappas . . . . . Sacramento, CA . . . . . 916-442-1468  
Dave Toronto . . . . . Salt Lake City, UT . . . . . 801-524-5113  
Wilbur Shigehara . . . San Diego, CA . . . . . 619-297-2107  
Charles Morrill . . . . San Francisco, CA . . . . . 408-656-1725  
Ted Buehner . . . . . Seattle, WA . . . . . 206-526-6095  
Ken Holmes . . . . . Spokane, WA . . . . . 509-353-2368  
Paul Flatt . . . . . Tucson, AZ . . . . . 502-889-2402

## Alaska Region

Greg Matzen . . . . . Regional . . . . . 907-271-3507  
David Goldstein . . . . Anchorage . . . . . 907-266-5117  
John Lingaas . . . . . Fairbanks . . . . . 907-456-0435  
Robert Kanan . . . . . Juneau . . . . . 907-586-7493  
George Carte . . . . . Palmer (ATWC) . . . . . 907-745-4212

## Pacific Region

James Partain . . . . . Regional . . . . . 808-541-1671  
Thomas Heffner . . . . Honolulu, HI . . . . . 808-973-5270  
John Miller . . . . . Guam . . . . . (011) 671-344-4160  
Akapo Akapo . . . . . Pago Pago (Focal) . . . . (011) 684-699-9130

## NCDC - Storm Data

William Angel . . . . . Asheville, NC . . . . . 704-271-4459



