

Aware

*Aware's purpose is to enhance communications
within the National Weather Service
and with the natural hazards community*

Fall 2001/Winter 2002

Climate, Water, Weather

The Corporate Weather Service

More and more you are hearing the National Weather Service (NWS) should run like a business. Many of us are not used to this. For years we have prided ourselves on providing services not for monetary gain but to fulfill a mission. It has sustained us through our careers and given us focus and identity. As I travel to regional and field offices and meet our people, I am struck with their sense of duty and pride in the NWS mission. For this we should all be thankful, but it is no longer sufficient to define success.

All levels of government are being challenged to deliver more, be accountable and be efficient. More and more government leaders are business oriented.

Secretary of Commerce Don Evans and his Deputy, Sam Bodman, are businessmen. Admiral Lautenbacher defines himself as a past naval officer and resource manager; all past accountability first.

NWS has been blessed with improved budgets because our performance goals are well defined, demonstrate a profound impact on the Nation and are being achieved through excellent science and service delivery. Now we are formulating our fiscal year 2004 budget. The Secretary and the Admiral are asking tough questions about our budget:

- Is it within our mission?
- What authorities support our proposals?
- What improvements do we expect?
- Do improvements justify costs?

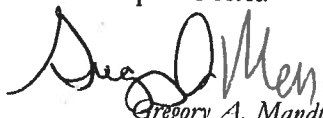
Our budget is tied to our performance. Do well, deliver, keep costs reasonable and our budget will be supported. If we cannot

quantify success, our past budgetary experiences can resurface.

In the Office of Climate, Water, and Weather Services (OCWWS), I have asked service leaders to manage our performance goals. This means reviewing performance, identifying successes, targeting ways to improve performance and setting long-term goals that reflect new science and capabilities. The regions and the National Centers for Environmental Prediction (NCEP) monitor each of their offices' performance to ensure continuous performance improvement.

In my travels I have been told the Weather Service is like a family. This is a good metaphor. It implies a supportive, caring environment. We need to nurture these ideas. We also need to consider the NWS as a team.

As this issue goes to press, we are in the throes of March Madness. The teams who will make it to the Final Four are simply that—a team. Each player is proud to be on the team. Each player has a responsibility to the team, transcending the individual. Each player is out to win. This is the spirit I see in the Weather Service. This is the spirit we need to nurture. Are we a team? Yes! Are we a business? Yes! Our profit motive is doing our best in an accountable way easily identifiable to the public and to the Department. Our customers and stake holders expect no less. Our future depends on it.



Gregory A. Mandt

Director, Office of Climate, Water,
and Weather Services

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Climate

New Drought Outlook To Be Judged by Users

The Climate Services Division (CSD) will hold a workshop at the NWS Training Center in Kansas City, MO, on April 3 to solicit customer input on an experimental Drought Outlook product. The 1-day meeting is targeted to agricultural customers. NWS is requesting feedback on the uses, strengths and weaknesses of the drought outlook product. The workshop is the second in a series of CSD-sponsored meetings to enlist customers in the design and modification of climate products. The informal setting of the meeting is intended to stimulate open discussion.

Doug LeComte, U.S. Drought Specialist at the Climate Prediction Center (CPC), and Stan Changnon, Climate Specialist at the University of Illinois, will be key speakers. Participants will include representatives from the American Association of State Climatologists, the Regional Climate Centers, U.S. Department of Agriculture, representatives from the commodities and futures markets, agricultural customer intermediaries and policy makers.

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CSD Partnership Program Fully Funded for FY 02

The good news is the CSD Partnership Program, formerly the Visitor Program, is fully funded for FY 2002. This means that CSD has the resources to cover all expenses for program participants. The program name was changed from the Visitor Program to more accurately reflect the program's intent.

The 2-week program, split between the CPC and the CSD, provides the Headquarters vision and the operational background needed to develop proposals for climate services. This mutually beneficial arrangement provides important feedback to CSD on customer needs.

The program officially kicked off in August 2001 with the first participant, Andrea Bair, from the Western Region Headquarters. The Western Region designated one of its positions as a Climate Services Program

Manager; Andrea is the first appointee to that position. Edward Berry, the Science Operations Officer at Dodge City, took part in October 2001, and Ryan Boyles, Associate State Climatologist for North Carolina, joined in February 2002. Four slots are still available for potential participants.

For more information on the Partner's Program, please contact me at the e:mail address below.

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CSD Expands Outreach Program to Weather Risk Management Industry

NWS reached out to a broader segment of climate users last October through a 2-day meeting. The session provided an opportunity for users of NOAA forecast and data products to interact directly with the National Oceanic and Atmospheric Administration (NOAA) scientists who produce these products. This was the first in a series of such outreach efforts geared to respond to customer needs.

Aware

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Aware in PDF—www.nws.noaa.gov/om/aware.pdf
AwareNow: Latest news in HTML format:
www.nws.noaa.gov/om/awarenow.htm

The Workshop for the Weather Risk Management Industry and NOAA: Climate Data and Forecast Needs was cosponsored by NWS and the National Environmental Satellite and Data Information Service, the Risk Prediction Initiative of the Bermuda Biological Station for Research, and the Weather Risk Management Association.

More than 30 industry representatives engaged in a vigorous technical exchange with NOAA climate data/forecast providers. NOAA benefited from the presentation of weather risk industry requirements for climate data and forecast products. Industry participants also resolved to explore ways to support NOAA surface observing system modernization efforts. CSD will make the results of the meeting available in an upcoming *Bulletin of the AMS*. NWS has already implemented one recommendation from the workshop: providing public access to tools used by CPC scientists to produce climate outlooks.

NWS is planning similar opportunities for dialogue with other climate-sensitive industries.

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NWS Key Player in Long-Term Climate Strategic Planning

In January, NWS served as a key player in NOAA's first Climate Observations and Services Program (COSP) workshop. The workshop goal was to jump-start the strategic planning process for NOAA's climate services for the next 5-10 years. The meeting drew nearly 90 participants from across the country.

The COSP Office has been designated the lead to develop NOAA-wide plans, including budget initiatives, for expanding and improving the nation's climate services. Representatives from NWS, OAR and NESDIS formed the principal working staff for Dr. David Goodrich, COSP Office Director.

The workshop developed priorities for the FY04 climate services budget process. CSD worked with NWS Headquarters, NCEP, regional and local NWS staff to ensure the following programs received high priority:

- Maintaining data continuity in the upper air and Cooperative Observer Programs (COOP)
- Modernizing the COOP program
- Delivering climate services to regional and field offices.

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Water

NWS Introduces New Flood Outlook

Last November 1, NWS began issuing 5-day flood outlooks to identify areas at risk of significant river flooding. This new graphical product provides a longer term outlook that will better prepare the public for potential flooding.

Significant flooding is defined as adversely affecting roads, residential, commercial, industrial and/or agricultural areas and possibly requiring evacuation of people and livestock. The outlook focuses on flooding along rivers; it does not address the potential for flash flooding.

The flood outlook is developed by each of the 13 regional River Forecast Centers (RFCs) throughout the United States. It is available on the Web as a graphical display. An additional map, produced by the NWS Hydrometeorological Prediction Center (HPC) in collaboration with the RFCs, shows flood potential for the contiguous 48 states and is available through the Emergency Managers Weather Information Network, NOAA Port, Family of Services, and on the Web at www.hpc.ncep.noaa.gov/nationalfloodoutlook/.

The national product is available daily at 4 p.m. This outlook provides an entry point for users seeking more detailed hydrologic information provided by RFCs and Weather Forecast Offices (WFOs). Official flood forecasts and warnings will continue to be issued by WFOs.

A prototype for this product was developed by the Southeast RFC to help warn communities of major flooding that resulted from Hurricane Floyd. NWS began the first operational testing stage of this product for the coastal states from Texas to New Jersey in September 2001. In October, all 13 RFCs took part in the test, providing 5-day flood outlooks for their areas of responsibility on the Web.

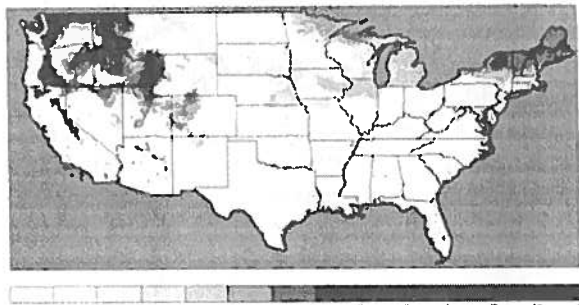
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NOHRSC Uses Airborne and Satellite Data to Measure Snow Cover

The National Operational Hydrologic Remote Sensing Center (NOHRSC) in Chanhassen, MN, uses airborne and satellite data collection technology to monitor the Nation's snow water equivalent and areal extent of snow cover.

EXPERIMENTAL

Snow Water Equivalent



The data are used by the RFCs when they issue spring flood outlooks and water supply forecasts. The data and products are also sent to other federal, state and local agencies and the public for use in operational and research hydrologic programs. All of the NOHRSC image and alphanumeric products and data sets are shipped to the NOHRSC Web site (www.nohrsc.nws.gov) in near real-time.

Additionally, NOHRSC has developed an energy-and-mass-balance snow accumulation and ablation model to simulate a variety of snow pack state variables. The snow model, run for the conterminous United States, is forced by RUC2 model output and runs at hourly time-steps with a 1 km resolution. State variables for simulated snow model include snow water equivalent, snow depth, sublimation and condensation, and snow pack temperature. The variables are all generated in near real-time.

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Record-Breaking Year for HPC QPF Forecasters

Quantitative Precipitation Forecast (QPF) forecasters in the Hydrologic Prediction Center (HPC) have been breaking records for their day 1 through day 3 forecast skill scores.

Records have been kept by HPC for more than 40 years. For the calendar year 2001, HPC broke its yearly 24-hour threat scores for day 1 at the 1-inch and 2-inch thresholds. In addition, HPC broke the yearly records for its 24-hour threat scores for day 2 at the half- and 1-inch amounts. The previous yearly records were set in 1996. In breaking these annual records, HPC broke 14 monthly records during the calendar year.

The records continue to fall in 2002. January was another record-setting month for day 1 and day 2 threat scores. For the 1-inch amount for both day 1 and day 2, HPC's scores for January were the highest monthly scores in 40 years of record keeping. Only 2 years of day 3 scores are available (HPC began day 3 QPFs in December 1999), but the half- and 1-inch amounts beat the January 2000 and 2001 records by nearly a factor of two. Of all the records set the past 13 months, the day 3 increase in skill is the largest documented for any day and for any precipitation category. HPC is evaluating the reasons for these record-breaking performances. Initial indications point to recent improvements in the NCEP Eta and AVN models and increased focus on improving HPC threat scores given its role of providing QPFs to the RFCs.

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Online Sources for NWS Spring Flooding Information

Flooding is one of the most economically devastating and deadly weather-related hazards. On average, over the last 50 years, floods have taken 106 lives and cost the Nation more than \$3.6 billion per year. More than 75 percent of all Presidential Disaster Declarations are related to flooding. While flooding occurs in all 50 states and in any month of the year, in many parts of the country it is most likely in spring. Snow melt flooding is common in the northern Plains and portions of the Midwest in March

and April. Even without snow, northern states can experience ice jam flooding with the onset of warmer spring temperatures. Alaskan rivers are particularly susceptible to ice jam flooding during spring break up of thick river ice, typically between April and June.

Flash Flooding

Twice daily, the Hydrometeorological Prediction Center issues an excessive rainfall potential outlook (www.hpc.ncep.noaa.gov/qpf/6hrqpfall.html). Areas identified on this map indicate locations where rainfall rates are forecast to exceed flash flood guidance. Flash flood guidance values are calculated by NWS River Forecast Centers (RFCs). They take into account soil moisture and the rate at which water can infiltrate into the soil. Precipitation amounts exceeding flash flood guidance values will cause in ponding of water in low-lying areas and also often results in rapid rises on small streams.

When conditions indicate the possibility of flooding, but the flooding is neither certain nor imminent, Weather Forecast Offices (WFOs) serving the threatened areas issue Flood Watches. If flash flooding is imminent, WFOs issue Flash Flood Warnings.

General Flooding

Because of the heightened threat for spring flooding, NWS assesses conditions that could lead to flooding in February and March (www.nws.noaa.gov/oh/hic/nho/index.shtml). Locations identified with above average risk of flooding include those with one or more of the following: deep snow, frozen or saturated soils, stream levels that are unusually high, thick river ice, or less than normal storage capacity in flood control reservoirs.

On a year-round basis, NWS provides a daily Significant River Flood Outlook (www.hpc.ncep.noaa.gov/nationalfloodoutlook/). This product provides a generalized assessment that identifies areas where significant river flooding is possible within 5 days. Because of the extended lead time, it involves a degree of uncertainty. It is intended to provide advanced notice identifying areas where significant flooding could occur.

WFOs complement the Significant River Flood Outlook by issuing a series of products that progress from general outlooks to watches and finally flood warnings. As product lead time decreases, the confidence in each product increases. As the flood threat becomes more likely, WFOs issue Flood Potential Outlooks. This product is issued when precipitation forecasts or snow melt potential indicate the possibility of flooding beyond 36 hours. Flood Watches are issued by WFOs when flooding seems likely but is neither certain nor imminent (typical lead time or 12-36 hours). Once it is clear flooding is imminent, Flood Warnings are issued by WFOs. Flood Warnings provide

information on the location and expected severity of flooding. Flood Warnings may also include river level forecasts for specific locations, including when the river will rise above flood stage, when it is expected to crest and the forecast crest height.

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State Budget Problems Affect River Forecasts

NWS relies heavily on partners for much of the river and stream data that are integral to its river forecast function. Most of the nation's stream gauges are managed by the U.S. Geological Survey (USGS), a component of the Department of the Interior. While the USGS manages river gauges, it relies on cooperators to share funding for these observation platforms. For example, see:

- water.usgs.gov/wid/FS_209-95/mason-weiger.html
- water.usgs.gov/osw/programs/streamgaging.html
- water.usgs.gov/pubs/FS/fs-128-01/

One significant source of funding comes from contributions made by state and local governments. In the last year or so, tax revenues have not kept pace with spending in a number of states. Within the last few months, state funding for river gauges in Vermont, Indiana and Massachusetts has been reduced. When gauges used by NWS in its river forecast activities are eliminated, NWS can not provide quantitative forecasting, e.g., forecasts of specific river stages, flood crest levels and information on when flooding will start, when the river will crest and when it will fall back below flood stage. Under these circumstances, NWS is forced to provide less precise forecasts about the general nature of the flooding.

NWS works closely with the USGS to identify critical gauges. Together they attempt to find alternate funding for locations critical to the NWS river forecast mission. Although some gauges have been terminated, so far, efforts to maintain gauges critical to the NWS river forecast function have been successful.

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Weather

Marine Services

Marine and Coastal Services Branch Establishes Advisory Team

Is the NWS marine program meeting the needs of our customers? That is a question often asked within the Marine and Coastal Services Branch. One forum to better answer that question has recently been established.

Eight focus group meetings are being held across the country to include recreational boaters, high seas operators, tug and barge operators, commercial fishing and mariners, and the U.S. Coast Guard, these people will help the branch plan for future graphical products and ensure that suggested innovations actually will serve boaters needs.

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Verifying Special Marine Warnings

Last October, NWS began verifying Special Marine Warnings (SMW) issued by coastal and Great Lakes WFOs. The change complies with Operations Manual Letter 09-01 filed with WSOM Chapters C-75 (National Verification Program) and F-42 (*Storm Data*).

Verifying SMWs is intended to identify weak areas, such as the possible need for more observing sites or for modernized verification. NWS chose Probability of Detection and Lead Time as the best measures of performance.

To begin reliably measuring SMW performance, marine forecast and warning zones were finalized last summer. These marine zone boundaries are now fixed, enabling staff to compare SMW performance over the long term and measure improvement toward the marine strategic goals.

To prepare for the change, the branch collected more than 1,000 marine and coastal locations from coastal and Great Lakes WFOs. These locations were programmed into the *Storm Data Windows* location database. This programming will be key during severe marine events such as waterspouts, convective winds of 34 knots or greater, and hail 3/4 inch or greater.

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Aviation Services

SkySpotter Program Aims to Improve Weather Flight Safety

The Aircraft Owners and Pilots Association (AOPA) Air Safety Foundation (ASF) announced an online education program designed to improve the quality and quantity of pilot reports (PIREPs) by providing interactive training to general aviation (GA) pilots. This program, called "SkySpotter" and co-sponsored by NWS and Federal Aviation Administration (FAA). The program is intended to improve weather information for pilots and the accuracy of NWS aviation forecasts.

SkySpotter is available on the ASF Web site at www.aopa.org/asf/skyspotter/. The interactive training program teaches pilots which critical weather conditions to look for and how to report them accurately and efficiently.

Upon completion of training, the pilot agrees to provide at least one PIREP on every cross-country flight, whether it merely confirms forecast conditions (reports of good weather included) or helps amend an erroneous forecast.

Within NWS, the Aviation Weather Center (AWC) will be a major benefactor of improved PIREPs. The improvements in quality and quantity of reports should lead to enhanced aviation forecasts. A link to the SkySpotter program can be found on the AWC Web site.

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FAM Flight Program Rescinded Due to Security Concerns

On September 27, WSOM Chapter D-80, Forecaster Familiarization Flights (Aviation), was rescinded. This action was taken after the FAA terminated all familiarization (FAM) flights aboard commercial airlines until further notice.

All NWS employees with Meteorologist Identification cards, WS Form D-11, must return these cards to their FAM Flight Program Manager. The policy contained in WSOM Chapter D-80 will be reissued under the new NWS Directive System when and if the NWS is authorized to take part in the updated familiarization program.

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EAA AirVenture Oshkosh 2001

NWS and NOAA Corps staff took part in the Experimental Aircraft Association's (EAA) AirVenture Oshkosh 2001 in Oshkosh, WI, last summer. NWS was once again part of the Canadian-American Government Partnership, comprised of 14 Canadian and American government agencies.

Employees from NWS Headquarters; Central Region Headquarters; the Aviation Weather Center; WFO Green Bay, WI; WFO Milwaukee/Sullivan, WI; and the Indianapolis Center Weather Service Unit staffed the NWS booth in the Federal Pavilion. WFOs Green Bay and Milwaukee/Sullivan also staffed a booth at KidVenture.

EAA's KidVenture is designed for young people and their families with hands-on activities related to aviation. The EAA estimated 750,000 people attended AirVenture Oshkosh 2001. The National Parks Service estimated 60,000 people visited the Federal Pavilion during the AirVenture.

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Fire & Public Weather

NWS Implements Improved Wind Chill Temperature Index

On November 1, NWS implemented an improved Wind Chill Temperature (WCT) Index for the 2001/2002 winter season. The index is designed to more accurately measure how wind and cold feel on human skin. The former wind chill index used by the United States and Canada was based on 1945 research of Antarctic explorers Siple and Passel. They were the first researchers to measure the combined impact of wind speed and cold temperatures on exposed skin. Their research determined heat loss from water as it froze in a plastic container suspended from a tall pole. The new index accounts for the wind effects at face level and more accurately portrays body heat loss estimates.

Last summer, the new index was tested on human subjects in a wind tunnel at the Defense and Civil Institute of Environmental Medicine (DCIEM) in Toronto, Canada. During these tests, the faces of six men and six women were exposed to various temperatures and wind speeds to determine how fast skin temperature dropped. Results of those trials were used to improve the new formula's accuracy.

Index Much Warmer

The new index is significantly warmer than the previous index, especially when wind speed exceeds 15 mph. For example under the old index, an air temperature of 10 degrees, with 25 mph winds, translated to 29 degrees below zero. The new calculation would translate the same conditions to 11 degrees below zero.

Based on the human study, researchers at DCIEM developed a time-dependent model. The work was done in conjunction with Dr. P. Tikuisis, an internationally recognized expert in the prediction of body cooling and survival times in cold conditions. The output from this model provided "time to frostbite" information. The new chart includes frostbite time information, showing the points where temperature, wind speed and exposure time produce frostbite. For example, a temperature of 0° Fahrenheit (F) and a wind speed of 15 mph equals a wind chill of -19°F, producing frostbite in 30 minutes. The chart also shows how frostbite will occur sooner if the temperature is lower or the wind speed higher.

NWS regions dealing with the threat of wind chill have adjusted their Wind Chill Warning/ Advisory criteria to reflect the new formula. The wind chill formula being implemented this year is based on clear night sky conditions. Further research is being done on the effects of sunlight. If the research shows that solar radiation has a significant impact on wind chill, we will adjust the wind chill formula for the winter season 2002-2003.

For more information, go to www.nws.noaa.gov/om/windchill/index.shtml.

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Winter Weather Experiment For 2001-2002

The HPC is testing and evaluating an enhanced suite of winter weather products and services for this winter. The plan was developed in conjunction with the OCWWS Fire and Public Services Branch and Eastern Region Headquarters. Eastern Seaboard WFOs from Maine through Virginia took part in the experiment. Two key issues addressed were:

- Applying the new NCEP Short Range Ensembles for improved forecasts and means of quantifying uncertainty
- Developing new coordination tools to facilitate a fully coordinated short- and medium-range forecast product suite. Over the next 2 years, this suite will become the National Digital Forecast Database.

HPC and the WFOs are using Web-based chat room technology to streamline the collaboration process. The new process uses interactive watch and warning maps at county resolution. HPC also offers 12-, 24-, 36-, and 48-hour probabilities of critical snow/ice thresholds for amounts, axis of rain/snow line, as well as expected and window of potential storm tracks.

HPC is collaborating via chat room with the Storm Prediction Center, Aviation Weather Center and Climate Prediction Center. This collaboration should ensure consistency with mesoscale discussions of hazardous winter weather in the short term and for threats assessment in the 3- to 10-day period. The experiment began November 1, 2001, and will continue until the threat of winter weather ends.

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Training

SOO Science Applications Computer Program Renamed, Redefined

The National Science Operations Officer (SOO) Science Applications Computer (SOO/SAC) Program was renamed the SOO Science and Training Resource Coordination (STRC) program in October. The SOO/STRC program provides the SOO at each WFO with tools for on-station research, training and professional development. The SAC name referred to the Hewlett-Packard 715 computers issued to each NWS office in the early 1990s. Over the last few years, these machines have been replaced by faster, Linux-based workstations needing less centrally-based support. Consequently, the SAC was replaced in the program name to reflect its decreasing role in the forecast office.

STRC was reorganized and updated to better serve SOOs and to reflect the changing direction of the STRC program. The SOO/STRC facilitates the long-term goals of providing cutting-edge technical tools and resources for on-station research, training and professional development. The Web site contains support information on computer hardware, software, access to scientific data sets and pathways for collaboration and feedback: www.comet.ucar.edu/strc.

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Case Studies Support Weather Event Simulator

Three new cases in the NWS/COMET Case Study Library include two that directly support the NWS Weather Event Simulator (WES).

- **Birmingham Tornado, August 8, 1998**, covers a day with widespread severe weather in Mississippi, Alabama and Georgia. Reports of 11 tornadoes, including an F5 tornado in the Birmingham metropolitan area, were recorded. Also, there were numerous re-

ports of hail of more than 1 inch in diameter and several reports of hail up to 2.75 inches in diameter. During this event, there were 36 fatalities, 273 injuries and more than \$300 million in property damage. This case can be used with the WES. It has a Birmingham, AL, localization.

- **Iowa Bow Echo**, June 29, 1998, follows the evolution of a Mesoscale Convective System from a supercell thunderstorm as it crossed Iowa and later moved into Illinois. This system produced very strong straight-line winds, hail, numerous tornadoes, microbursts and flooding. The event caused one death, 171 injuries and more than \$165 million in damage. This case also supports WES with a Des Moines, IA, localization.
- **Seattle Snowstorm**, February 16, 2001, provides an example of a major snowstorm in the Pacific Northwest. This storm system hit the Seattle area as an Arctic front moved from Canada into Washington state, where it interacted with warmer, moist, Pacific air. Accumulations generally ranged from 4 to 8 inches across most of the lowlands of western Washington, with a foot of snow over the hills around Seattle.

For detailed information on each case, please visit the COMET Case Study Web page: www.comet.ucar.edu/resources/cases/.

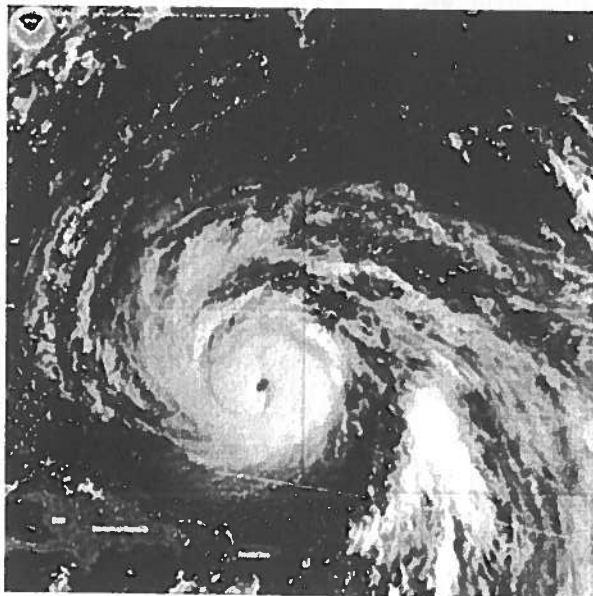
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Teens Learn Hurricane Safety from Computer Game

FEMA, NWS and COMET have teamed together to produce a new computer module that focuses on teaching students, primarily middle school age, about hurricane science and preparedness. Based on the Community Hurricane Preparedness module (meted.ucar.edu/hurricane/chp/index.htm) for emergency managers, Hurricane Strike! is designed to be highly interactive and entertaining. The format is an unfolding story in which the student takes the role of a visitor to a Fort Walton Beach, FL, home. Just as he or she arrives at the virtual front door, Steve

Lyons of the Weather Channel announces the approach of Tropical Storm Erin on the TV set in the living room.

The storm intensifies over a 6-day period (as seen in subsequent weather reports by Dr. Lyons) and on each day the student must perform various tasks to prepare for the hurricane. These include investigating activities in which the student learns about hurricanes and their hazards from a scientific perspective on the family's laptop computer. Safety activities involve the student in helping the virtual host family in its hurricane preparations. For example, one of the science pieces allows the student to explore the three-dimensional structure of a hurricane by "moving" around and through the storm. One of the safety



Hurricane Floyd, 1999: Photo courtesy of NOAA/NCEP

activities requires the student to choose items at the grocery store that the family might need if the hurricane hits its area.

The module will be published on CD-ROM in early 2002 and will also be available on the COMET Program's Web site. A teacher's guide is included, along with printable worksheets that can be used to test a student's knowledge at various points. The content is tied to the Red Cross' Masters of Disaster curriculum.

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Performance, Awareness

National Hurricane Awareness Week: May 19-25, 2002

This year's Hurricane Awareness Week will be May 19-25. Numerous activities are underway. Partnering with the state of Florida and the Federal Emergency Management Agency (FEMA), NWS is once again seeking a presidential proclamation.

In partnership with the National Emergency Management Association, NWS will invite each hurricane impacted state governor and the state emergency manager director to take part in the awareness week. The Tropical Prediction Center (TPC) is working hard on updating its Hurricane Awareness Week Web page. One new addition to the Web site is a section for viewing historical tracks of tropical cyclones. Users can sort by Zip code, then by time of year and category of storm.

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NWS Promotes Lightning Safety April 28-May 4

National Lightning Safety Week for 2002 will be held April 28 to May 4. The goal of the week-long event is to draw attention to the danger of lightning and the availability of a large range of resources.

The week will feature safety tips indoors and outdoors during a thunderstorm, as well as new scientific and medical innovations in the field.

Partners in the event include NWS, FEMA, the American Red Cross, the Institute for Business Safety, Global Atmospheric, The National Institute for Lightning Safety Lightning Strike/Electric Shock Survivors International and the Lightning Injury Research.

The joint Web site has been condensed and updated to better support educators and other groups. New educators products are also being developed. For more information, go to www.lightningsafety.noaa.gov/index.htm.

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Anticipating Hazardous Weather and Community Risk Course

A new computer-based course offers emergency managers and other officials a solid understanding of hazardous weather and community risks. The course, entitled, "Anticipating Hazardous Weather and Community Risk" was jointly developed by NWS and FEMA. The class is offered as an Independent Study IS271 offered through FEMA's Emergency Management Institute.

The goal of the course is to help users communicate effectively with their NWS offices and community. The class is available at www.meted.ucar.edu/hazwx/.

*John Ogren, Former National WCM Program Manager
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AMS WeatherFest 2002

The NWS Awareness Branch and the National Disaster Education Coalition (NDEC) shared a booth at the first AMS WeatherFest event. This special event was held during the AMS annual meeting, January 13-17, in Orlando, FL.

WeatherFest was an afternoon event designed to promote public science literacy and enrich the science experiences of area families, teachers and students. NDEC participants included the Red Cross and the Institute for Business and Home Safety. More than 500 visitors took part in the event designed to raise public awareness of the atmospheric sciences. WeatherFest had three parts:

- Science presentations
- Hands-on experiments
- Exhibit hall with hand-outs.

The NASA Kennedy Space Center, Universal Studios and Disney gave presentations on the impact of weather on the shuttle and park operations. Based on the many positive comments received and the large number of visitors, the AMS plans to hold a WeatherFest event at the 2003 AMS annual meeting, February 9-13, 2003, in Long Beach, CA.

*Ron Gird, Outreach Program Manager
ron.gird@noaa.gov*

National Fire Protection Association Drafts Risk Watch Curriculum

The National Fire Protection Association (NFPA) Steering Committee has completed draft chapters on hurricanes, floods, tornadoes, wildfires, earthquakes and winter storms. The chapters will be combined with other material to create teaching modules on Risk Watch Disaster Preparedness.

Risk Watch is a safety education curriculum for preschool through Grade 8 students. The program began in 1998. After several evaluation periods, the NFPA decided to add this new component to the program. The modules are expected to be completed by fall 2002.

*Ron Gird, Outreach Program Manager,
ron.gird@noaa.gov*

NWS Annual Partners Meeting

NWS is making plans for its 2002 Annual Partners Meeting. The 2002 meeting will be held in conjunction with the American Meteorological Society's 31st Conference on Broadcaster Meteorology, June 23-28, 2002, in Williamsburg, VA.

This year major topics will include the Interactive Forecast Preparation System and the National Digital Forecast Database, the new 5-Day River Flood Potential Outlooks, NOAA Weather Radio (NWR) Voice Improvements and several improvements to the NWS/FAA Aviation Program.

*Ron Gird, Outreach Program Manager
ron.gird@noaa.gov*

EPA/NWS SunWise Program

In February, representatives from NOAA and the Environmental Protection Agency (EPA) met to discuss updating and expanding the EPA SunWise School Program.

NOAA representatives included Craig Long and me from NWS and Joyce Gross from NOAA Education Office. Jason Samenow, Climate Scientist, Office of Atmospheric Programs, was the principal representative for EPA.

The meeting's focus was to provide an expanded and updated SunWise program information package for WCMs. The SunWise Tool Kit for teachers includes a UV Frisbee, UV Meter, students activities and several publications. Teachers are provided a free kit when they register with EPA.

Craig Long agreed to review and update the science material, UV Radiation and Ozone Depletion, in the EPA publication, *The Sun, UV and You-A Guide to SunWise Behavior*.

NWS will work with Jason Samenow to develop a list of material for the WCM Information Package. The WCMs will be a part of this process. The group then discussed future partner venues where NOAA and EPA could promote the SunWise Program such as:

- AMS Broadcast Conference
- NOAA Bring-A-Child-To-Work-Day Program
- National Science Teachers Association annual meeting
- AMS 2003 annual meeting.

EPA has contacted the American Meteorological Society's Education Office requesting its support and participation. A follow-up meeting was held in March to complete the WCM Information Package and develop an outreach plan to promote the program at future venues.

*Ron Gird, Outreach Program Manager
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StormReady Going Strong: Tops 340 Counties and Communities

From small townships to large, metropolitan counties, the number of StormReady communities is growing fast. As of March 27, 2002, there were 336 StormReady communities in 39 states. . . and more are coming! Idaho alone has almost 80 StormReady designations.

The NWS goal is to have at least one StormReady community in each state by the end of FY2002. The StormReady program relies entirely on the local WCMs. They are the ones that work closely with local officials to establish advisory boards and establish StormReady communities. Keep up the great work!

*Donna Franklin, WCM Program Staff
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National Centers

Space Weather Adapts To Seasonal Change

When the sun sinks lower in the northern skies bringing colder weather, Space Environment Center (SEC) staff begin to lose access to vital ACE satellite data. Located 1.4 million km towards the sun and orbiting at L1, the ACE satellite is tracked by a collection of antennas on Earth.

SEC tracks the ACE satellite to capture real-time solar wind data. During fall and winter, staff cannot get full coverage using the Wallops Island, VA, and the Japanese CRL stations. To fill the short early evening gap in data coverage, antennas near Boulder, CO, began tracking ACE as of October 15. A set of antennas, owned by partners in India, provide coverage for an early morning gap.

In addition to full coverage of vital real-time solar wind data (customers call within minutes of an ACE data outage), SEC staff now receive space environment monitoring data from all four GOES satellites (8, 9, 10 and 12). This data set is rare and exciting because it measures four geosync locations at once, fueling research on the space environment. Although terrestrial weather models are replete with measurements, this is a rich data set for the space environment. For more information, go to sec.noaa.gov/ace/acetrack_48h.html.

*Barbara Poppe, NOAA Space Environment Center
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TPC Keeps Everyone in Loop

Whenever advisories are being generated for Atlantic tropical cyclones, the Tropical Prediction Center (TPC) coordinates calls with various NWS National Centers such as the HPC and WFOs. TPC conducts additional coordination when the potential exists for tropical cyclone or hybrid-low pressure development close to the U.S. mainland.

One example occurred during the week of September 23-30, 2001. By Sunday of that week, various computer models were suggesting that a significant low pressure system could develop late in the week over the southeast Gulf of Mexico and move northeast across the southern

Florida peninsula. Beginning that Wednesday, the TPC coordinated calls to assess the potential for tropical cyclone or hybrid-low pressure development. In the loop were the Florida State Emergency Operations Center (EOC), county EOCs, the Southeast RFC, and WFOs Miami, Tampa, Key West and Melbourne, FL. The consensus was that even if a tropical cyclone did not form, heavy rainfall and possible flooding were likely to occur.

The TPC continued to take part in the conference calls through Friday and Saturday because there was the possibility of at least a hybrid-low developing with near gale force/tropical storm winds. It's hard to get people's attention on flood problems unless there is a named tropical storm or hurricane.

In addition to heavy rainfall over south Florida, TPC staff coordinated calls during Hurricane Gabrielle's development and eventual traverse across central Florida. These are excellent examples of how effective teamwork produces a seamless and accurate forecast that better serves the public and other users.

*Stacy R. Stewart, WCM, TPC
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National Severe Weather Workshop Held March 1-3, 2002

The NWS Storm Prediction Center (SPC) and WFO Norman, OK, hosted the second annual National Severe Weather Workshop, March 1-3, 2002, in Norman, OK. This year presentations were made by meteorologists active in broadcast media and emergency managers as well as NWS meteorologists.

The 2002 version of the workshop was open to broadcast meteorologists and emergency managers as well as NWS meteorologists. Vendors were invited to make short product presentations. Topics included situation awareness, last fall's tornadoes in the Washington, DC, area, FEMA and storm chasing.

*Daniel McCarthy, WCM, SPC
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Community Outreach

First Automated Storm Shelter?

On July 18, I took part in a press conference for a state-of-the-art new storm shelter for an apartment complex in Rochester, MN. The Bear Creek Apartments on the south-east side of Rochester recently added a Federal Emergency Management Agency (FEMA) specified storm shelter to the parking lot of its complex. I believe the shelter is 720 sq. feet. One of the first problems was how they could unlock the shelter in times of severe weather.

Dave Carr, Olmsted County Emergency Management, Premier Security, and Federal Warning Systems developed a plan to use an Emergency Alert System (EAS) Radio receiver to automatically unlock the door when a warning is issued for Olmsted County. The receiver is tuned to a local frequency so the EAS message has to be sent via local emergency management. I am not aware of any backup plans in case a EAS alert is not sent. Once activated, the radio sounds an alert, unlocks the doors and can then be used to monitor radio traffic among spotters, local NWS offices and emergency management. As far as we researched, this is the only "Automated Storm Shelter" of this type in the United States.

The press conference was attended by local and state Emergency Management, myself, owners of the apartment complex, representatives from Premier Security and various media outlets. I expressed our support of this type of effort and storm shelter and noted that Rochester was recently determined to be "StormReady."

*Todd Shea, WCM, WFO La Crosse, WI
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WFO Caribou, ME, Enters StormReady Program With Congressional Boost

On November 17, Fort Fairfield, ME, was recognized as New England's first StormReady community. The ceremony recognized both StormReady and Project Impact designation.



WCM Hendricus Lulofs, StormReady Project Impact Coordinator Mike Eisensmith, U.S. Rep. John Baldacci and MIC Larry Gabric

On hand were local, state and national dignitaries, including the town manager, the director of Maine's Emergency Management Agency and FEMA representatives.

Representing NWS were WFO Caribou MIC Larry Gabric and WCM Hendricus Lulofs. The highlight of the festivities was an appearance by US Representative John Baldacci. The congressman addressed the audience, commending the community for its proactive planning. Rep. Baldacci later posed for a picture holding the NWS Storm-Ready sign.

*Hendricus Lulofs, WCM, WFO Caribou, ME
hendricus.lulofs@noaa.gov*

Monroe County, FL, Recognized as StormReady

On January 17, WFO Key West, FL, presented two road signs to the Monroe County Board of Commissioners and Monroe County Emergency Management in recognition of the county becoming StormReady. WFO Key West worked with Billy Wagner, Irene Toner and Jerry O'Cathey from Monroe County Emergency Management and Linda Brown, Area 7 coordinator for the Florida Department of Emergency Management to make sure that Monroe County met all the requirements. NWS Key West would like to

thank each of these people for making the process as smooth as possible.

MIC Bobby McDaniel and I also presented the road signs to the Monroe County Board Of Commissioners, Mayor Sonny McCoy, Mayor Pro Tem Dixie Spehar and Commissioners Nora William, George Neugent and Murray Nelson.

*Wayne Presnell, Former WCM, WFO Key West, FL
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NWR in Every Home in Columbia, SD

Hydrometeorological Technician Glenn Nielsen worked with the Mayor and City Council of Columbia, SD, to get 100 percent NWR coverage in town. This spring and early summer, this community purchased sufficient Midland NWR receivers (Model 74-200) for every business and home in the town.

These radios were provided to people in the community at no cost. Additional radios have been provided to people outside the community at cost. The community chose to use NWR rather than install a new siren system after comparing costs and benefits of the two systems.

*George Marshall, WCM, WFO Aberdeen, SD
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UPS and NWS Exchange Seats

WFO Louisville, KY, has developed a forecaster exchange program with United Parcel Service (UPS). UPS's largest air hub is located in Louisville and its meteorological staff is stationed there. Once a month an NWS forecaster spends half a day working with a UPS meteorologist. A UPS forecaster will visit the Louisville office.

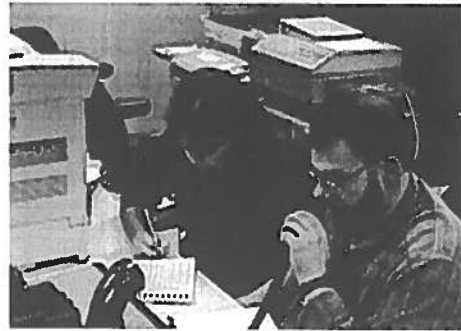
The purpose of the program is to better define our aviation users and how our TAFs affect their operations. Actually seeing TAFs determining fuel loads and possible alternate landing sites improves our insight into the need for the best product possible. Sometimes we feel like we are in a vacuum and any feedback we receive from our users will help. UPS meteorologists have gained a better understanding into NWS operations and what goes into writing a TAF.

*Joseph Ammerman, Meteorologist, WFO Louisville, KY
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Red River Valley HAMS Pool Resources for SKYWARN

SKYWARN Recognition Day 2001, held December 1, brought together Amateur Radio Operators (HAMs) from across the WFO Grand Forks, ND, warning area. More than a dozen HAMs from four area clubs operated from the Grand Forks office during the 24-hour period.

Meteorologist Jonathan Brazzell and I contacted clubs in the Grand Forks CWA last October and November to



Ham operators working at WFO Grand Forks office

encourage outlying club members to check-out the NWS facilities. The weather didn't cooperate, however. Two clubs in distant portions of the Red River Valley were unable to come because of icy roads.

The WFO has taken part in these annual HAM Special Events since they began in 1999.

*Greg Gust, WCM, WFO Grand Forks, ND
gregory.gust@noaa.gov*

Weather Safety Course For EM Goes Online

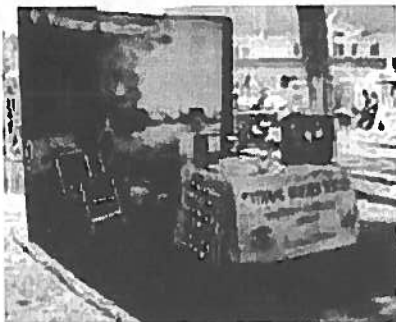
WFO Bismarck, ND, has partnered with the North Dakota Department of Health to create online weather safety training. This distance learning training was developed for emergency care and rescue professionals to satisfy their continuing education requirements. Distance learning through the Internet is a more efficient use of time and budget compared to physically driving to

multiple communities. The training involves watching the video and passing an exam. The streaming video comes in two sizes, one for dial-up connections to the Web and the other for broadband connections. View the training online at www.health.state.nd.us/ndhd. Click on the "EMS Today" icon on the right side of the screen.

*Daniel Noab, WCM, WFO Bismarck, ND
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Wheel of Weather Makes Learning a Game

WFO Amarillo manned a booth at the Tri-State Fair last fall. The booth theme was "Having Fun With Weather." Booth visitors got to spin for a prize on the "wheel of weather," and then were asked a weather question. Correct responses received the corresponding prize or were entered into a prize drawing, as designated by the weather wheel. Local businesses donated more than 100 prizes for



the NWS giveaway. Fair officials estimated nearly 207,000 people visited the fair, with hundreds of people visiting the NWS booth.

*Steve Drillete, WCM, WFO Amarillo, TX
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NWR Giveaway Draws Crowds

Administrative Assistant (AA) Joy Hayden and I attended the 30th annual McCook, NE, Heritage Days in September. This was the first time NWS was on hand for the event. Because NOAA Weather Radio (NWR) expansion has been a hot topic in southwest Nebraska over the past year, we set up a display of weather radios backed by a dramatic oversized lightning poster. We included a special drawing for a weather radio and 4-inch rain gage at the end of the day. We also gave out cloud posters and preparedness guides.

*Kevin Lynott, Former WCM, WFO Goodland, KS
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Lightning Posters Get Wide Play

In late September, WFO Wakefield, VA, distributed NWS Lightning Safety posters to all 135 golf courses in our county warning area. I obtained the names and addresses of golf courses via the Web last spring as part of a project intended to use golf courses as an information source during and after severe thunderstorm and heavy rain events. About half the courses received two Rocco Mediate posters, the other half received one Rocco poster and one Vijay Singh poster. We will try to send posters to new courses as they open for play.

*Bill Sammler, WCM, WFO Wakefield, VA
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Houston EMWIN Wins Public Service Award

On October 17, at the Annual Meeting of the National Weather Association, the Houston Emergency management Weather Information Network (EMWIN) team was awarded the Walter J. Bennett Public Service Award. This award is presented to an individual or organization directly assisting the meteorological community in providing weather-related information to the public.

Currently, the Houston EMWIN team downloads the EMWIN data stream via satellite and rebroadcasts the data stream on 150.435 MHz at 1200 baud and 163.325 MHz at 9600 baud from antennas located atop the Exxon USA building in downtown Houston. Exxon USA provides the space atop its building for \$1 a year. In addition to the rebroadcast on VHF, Houston EMWIN has a Web page for weather in Southeast Texas at <http://emwin.hcad.org>. Houston EMWIN also provides e:mail notification of weather warnings and watches issued by the Houston/Galveston WFO to any Emergency Management Office that requests this service.

In addition to providing all of the above features for the Houston area, the team also has made many contributions to the national EMWIN program. In November 1998, the EMWIN team hosted the first National EMWIN conference. More than 100 participants from across the country attended this conference where ideas and accomplishments were shared among the EMWIN users, broadcasters and vendors. The team provided the space for the conference free of charge. Local industry provided refreshments.

EMWIN is an NWS initiative to provide weather information to the emergency management community in a timely and cost-effective method.

*Gene Hafele, WCM, WFO Houston/Galveston, TX
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ArcView® and Street Atlas USA® Helps WFO Wakefield Plot Spotters

Last fall, a routine was developed to plot SKYWARN spotters on AWIPS using ArcView mapping software. To facilitate this project, the county warning area was split into groups of two to three counties. I then imported the spotter address database into each of these segments in ArcView and plotted the addresses onto the appropriate geographical background. The database output by ArcView contained the latitude and longitude values necessary for input into AWIPS.

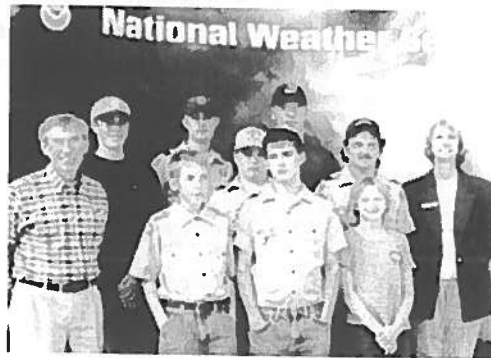
You can also use the popular Street Atlas USA® software to obtain latitude and longitude values of plotted objects. Import address files into Street Atlas USA® as comma delimited files (.CSV file extension), then plot them onto the program's base map. Once plotted, you can obtain the latitude/longitude values using the program's "Export Draw Objects Info" command from the "File" menu.

*Bill Sammler, WCM, WFO Wakefield, VA
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Goodland Organizes Nationwide SKYWARN Recognition Day

WFO Goodland, KS, coordinated SKYWARN Recognition Day with amateur radio groups across the United States on Nov. 30-Dec 1. The 24-hour event commemorated the efforts of amateur radio operators and other NWS SKYWARN volunteers during times of severe weather. Their ability to report timely and accurate information to NWS offices throughout the country demonstrates their dedication to preserving life and property.

For the third straight year, the event was a big success. MIC Scott Mentzer did an outstanding job convincing NWS field offices and National Centers to take part in the fun. Mettzer also provided updates to everyone involved. In all, 96 NWS stations took part in the 2001 event—many operated for the entire 24 hours. Our thanks go out to numerous amateur radio clubs for bringing in experienced operators and making thousands of radio contacts.



Even some non-licensed NWS employees hit the airwaves for the first time, resulting in a more successful event.

Overall, WFO Goodland exchanged more than 700 weather reports, including several from Canada and Mexico. For additional SKYWARN Recognition Day station statistics and certificate information, go to: <http://hamradio.noaa.gov/>.

*Kevin Lynott, Former WCM, WFO Goodland, KS
kevin.lynott@noaa.gov*

Open House Draws Crowd with Scouts, Red Cross and Treats

Several months of planning by numerous staff members of the State College WFO and Mid-Atlantic RFC culminated in a highly successful and memorable open house for visitors from all corners of central Pennsylvania last fall. A few of the approximately 300 adults and children at the event traveled from as far away as northern Maryland.

The staff was assisted by Boy Scout Troop #46 of Port Royal, PA, who helped with the initial setup, manned the refreshment table, passed out weather brochures and escorted visitors to the many tours of the Forecast Operations Areas.

Representatives of the American Red Cross answered questions about disaster relief and passed out numerous brochures on weather safety. In addition to viewing severe weather videos played at several locations within the offices, visitors were treated to punch and a variety of home baked goods, along with ice scrapers and balloons with the NWS logo.

Barry Lambert, Lead Forecaster, WFO State College, PA
Kathy Christ, Administrative Assistant,
WFO State College, PA
katherine.christ@noaa.gov

NWR Promoters Recognized With Mark Trail Awards

Communication Services for the Deaf of Aberdeen, SD, was honored for arranging the purchase and donation of NWR receivers with strobe lights and bed shakers for deaf and hard of hearing residents of Aberdeen and Brown County. The group arranged contributions from local businesses and purchased 19 of the special NWR sets. Recipients of the radios were invited to come to the Aberdeen WFO office where they were taught how to program and use the radios. The staff also provided information on NWR programming and watch and warning products.



Boy Scout Explorers get the inside view of TV meteorology, courtesy of WFO Grand Forks staff and local TV personalities

Northern Electrical Cooperative of Bath, SD, won a Mark Trail Award for promoting the use of NWRs during severe weather and for making receivers available at cost to its members. In the spring of 2000, two new NWR transmitters were installed in the Aberdeen WFO county warning area. To help promote the new transmitters and NWRs, the Northern Electric Cooperative convinced the East River Cooperative Association to purchase 500 weather radios.

The East River Cooperative Association comprises rural electric coops in the eastern half of South Dakota and western Minnesota. Association members offered the NWRs to their customers at cost. To help encourage customers to buy an NWR, the Northern Electric Cooperative ran articles in its monthly publication and advertised the discounted NWRs.

George Marshall, WCM, WFO Aberdeen, SD
george.marshall@noaa.gov

Grand Forks Explorers Check the Weathercast

Last November, WFO Grand Forks, ND, sponsored a tour of the broadcast facilities of WDAY-TV, in Fargo ND, for members of Explorer Post 111 Boy Scouts. WFO staff Mark Ewens, Priscilla Bridenstine and I escorted five students to the studio on November 30. The Explorers, three high school and two college students, were given a tour of

the facility, watched the production of the evening news and weather segments and interviewed the WDAY News Team.

News Anchor Kerstin Kealy and Chief Meteorologist John Wheeler demonstrated the use of green screens, robot cameras and teleprompters to the students. After his broadcast, Wheeler spent considerable time showing students how he assembles his broadcast materials and discussing his role in contributing to hazardous weather awareness. Wheeler also discussed the growing trend in broadcast circles to move away from having meteorologists on-air. He encouraged the students to consider summer internships with the area TV stations to provide them with critical broadcast media experience. WFO Grand Forks has sponsored Explorer Post 111 since 1997.

*Greg Gust, WCM, WFO Grand Forks, ND
gregory.gust@noaa.gov*

Administrative Assistant Helps Hearing Impaired Customers Program NWR

Administrative Assistant Lisa Johnsen, WFO Aberdeen, SD, became interested in sign language at a previous employment. Because of an office project to provide NWRs with special enhancements to hearing impaired residents in the Aberdeen area, she pursued



Missoula MIC Kim Bailey and Great Falls MIC Ken Mielke staff the NWS booth at the 35th Annual Governor's Conference in Kalispell.

training in sign language. She has used her new language skills to help several hearing impaired people program their weather radios.

*George Marshall, WCM, WFO Aberdeen, SD
george.marshall@noaa.gov*

Congressman Promotes NWR in Guam

On August 22, U.S. Rep. Robert Underwood, Delegate to the Territory of Guam, visited WFO Guam to record an NWR Public Service Announcement. This announcement was simultaneously recorded to a file for later distribution to the local media. Rep. Underwood is a ranking mem-



ber of the House Resources Subcommittee on Fisheries Conservation, Wildlife and Oceans, which has oversight over NOAA.

WFO Glasgow, MT, WCM Tanja Fransen leads a session at a Montana Fire Weather Workshop.

*Genevieve Miller, WCM, WFO Guam
genevieve.miller@noaa.gov*

NWS Speaks Loudly at Governor's Conference

The four Montana NWS offices supported the 35th Annual Governor's Conference for Emergency Management in Kalispell, MT, February 11-15. In addition to staffing the NWS booth, staff gave presentations on the Advanced Hydrologic Prediction Service, the new NWS corporate Web page, Ewarn (an electronic method for emergency managers to receive NWS warnings), IFPS, and services for all hazards "weather or not." Presentations were made by Missoula MIC Kim Bailey and WCM Peter Felsch, Glasgow WCM Tanja Fransen and myself.

*Rick Dittmann, WCM, WFO Great Falls, MT
rick.dittmann@noaa.gov*

Fire Weather Targeted at Montana NWS Workshop

The 2002 Northeast Montana Fire Weather Workshop, held in cooperation with WFO Glasgow, MT, and local and state disaster and emergency services, attracted nearly 60 people from around the region.

The workshop focused on the products and services that NWS provides. The meeting featured a thought provoking discussion lead by Montana District 6 Department of Emergency Services Coordinator Mark Gruener about standard operating procedures during critical fire weather conditions.

MIC Julie Adolphson kicked off the workshop with an overview of the Halloween Fires of 1999 in which more than 100,000 acres burned in less than 5 hours. Fire Weather Program Manager Greg Forrester discussed our basic services and products and went over the Northern Rockies Fire Weather Operating Plan. SOO Tom Salem discussed Web access for fire information and the Web spot request program. He also gave the crowd a taste of future products available with the IFPS.

I coordinated the workshop and discussed Fire Weather Watches, Red Flag Warnings and NWS training opportunities NWS. Many different groups were represented at the workshop, including volunteer firefighters and fire chiefs, law enforcement, Fort Peck Indian Reservation Office of Environmental Preparedness representatives, Montana Fire Training Officer, dispatchers, a county commissioner and several federal agencies including U.S. Fish and Wildlife and the Bureau of Indian Affairs.

*Tanja Fransen, WCM, WFO Glasgow, MT
tanja.fransen@noaa.gov*

NWS Green Bay Greets 40 Classrooms of Students at EAA Aviation Days

The entire NWS Green Bay office contributed to making the Experimental Aircraft Association's "Aviation Days" a success, according to organizers of the aviation education event in Oshkosh, WI.



WCM Rick Dittmann, WFO Great Falls, MT, outlines the NWS role in developing an effective community warning process at the FEMA/NWS "Warning Coordination" course in Billings on March 19.

Aviation Days, which ran from February 25-March 1, featured activities in aviation and related sciences for 4th Grade students to explore and study.

Every 20 minutes, from 9 a.m. to noon, a new group of students came to the NWS booth for a presentation on how weather is measured and forecast and how it affects flight. Students came from all over east-central Wisconsin. Reaching this many students at the event was the equivalent of visiting 40 classrooms!

Senior Forecaster Rich Mamrosh organized the office's participation. The Electronics Technicians staff, Lance Stockinger, Kolly Mars and Rob Hoag, built hands-on wind and tipping bucket displays. Data Acquisitions Program Manager Al Lagree and Hydrometeorological Technician Pat Hein refurbished an old cotton region shelter. Forecasters Roy Eckberg and Mike Gorczany, Administrative Assistant Linda Karman, WCM Jeff Last, MIC Gary Austin, along with Rich, Al and Pat, gave presentations to nearly 850 students during the 5-day event.

This was the second year that WFO Green Bay took part in this exciting outreach activity.

*Jeff Last, WCM, WFO Green Bay, WI
jeff.last@noaa.gov*

FEMA/NWS Offer Warning Preparedness Course

Steve Kuhl and Rick Dittmann, WCMs WFO Billings and Great Falls, MT, conducted a FEMA/NWS "Warning Preparedness" Course in Billings on March 19. The course was held at the United States Armed Forces Reserve Center's training facility in Billings and focused on:

- Social dimensions of the warning response
- Writing clear and consistent warning messages
- Developing an effective community warning process
- Weather warning partnership.

We conducted a table top exercise at the end of the course to give students the opportunity to apply what they had just learned.

Some 22 people from across Montana and Wyoming attended the course, including representatives from the local media, county and state emergency managers, hospital safety coordinators, outdoor event producers, the American Red Cross, Fort Peck tribes and the Montana Department of Natural Resources and Conservation.

*Steve Kuhl, WCM, WFO Billings, MT
steve.kuhl@noaa.gov*

New Aviation Model Parses ETA Data

I created an alphanumeric model from the ETA's raw data parsed through NCEP that is proving extremely helpful in the aviation field. The model has been available since mid October 2001 but I have only recently set the fire weather parameters to the output. Fire weather officials seem excited about having another tool at their disposal.

If you would like to see the model, e-mail me for the source code. The code is in PERL and uses the data for Bufkit which has not been smoothed. To see the actual run along with a description of how to interpret the output, to www.crh.noaa.gov/dlh/locmodel.htm.

*Tim Erickson, Meteorologist, WFO Duluth, MN
tim.erickson@noaa.gov*

Women In Science Conference Nudges Girls into Science Careers

On March 11, WFO Aberdeen, SD, in conjunction with several state and local agencies and businesses, sponsored its first Women in Science Conference on the campus of Northern State University in Aberdeen. Administrative Support Assistant Lisa Johnsen and Meteorologist Amy Parkin were the project leaders and primary architects of the conference. The meeting was designed to address the important issue of why girls and young women lose interest in science and technological careers.

The conference drew 17 teachers and 215 students from as far away as 150 miles. The goal was to provide opportunities for young women and girls to learn about the endless opportunities available in science-related career fields and to create personal connections with professional women scientist. The conference featured eight female scientists with careers that span from meteorology and electrical engineering to pharmacy and veterinary medicine.

Pre- and post-conference surveys were conducted to assess the effectiveness of the conference. Based on the 199 received, attendees considering science related careers increased from 134 prior to the conference to 174 after the conference.

It is significant that those considering meteorology as a career increased from 6 to 22. Based on these results, the conference was successful and should help enhance the recruitment of women in the NWS.

For more information about the Women In Science Conference, please contact Lisa Johnsen or Amy Parkin via phone (605-225-0519) or e-mail Lisa.Johnsen@noaa.gov or Amy.Parkin@noaa.gov

Or check the WIS Web site at www.crh.noaa.gov/abr/women_in_science_conference.htm.

*George Marshall, WCM, WFO Aberdeen, SD
george.marshall@noaa.gov*

Publications, Audiovisuals, Events

Now in Print: Revised "Winter Storms . . . The Deceptive Killers"

The "Winter Storms . . . The Deceptive Killers" (NOAA PA 200160) is the latest in a series of NWS in-depth brochures to be updated. This publication replaces NOAA PA 91002 with the same title.

This full color preparedness guide explains the dangers of winter weather and suggests life-saving actions you can take. It includes the improved wind chill chart, a map detailing the winter storm hazards across the United



States, and updated graphics, photographs and safety information.

The initial printing was 200,000 copies. You can request up to 300 copies from the National Logistics Supply Center (NLSC) in Kansas City, MO.

NWS offices can order copies by faxing a Stores Requisition Form 37-4 to NLSC at 816-926-7901. You also can download the brochure at 205.156.54.206/om/brochures.shtml.

Our thanks to the American Red Cross and the Federal Emergency Management Agency for their assistance in preparing this publication. For those outside the government, the American Red Cross will print the winter storms publication and have it available at local Red Cross chapters for a small fee.

Linda Kremkau, Managing Editor
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New Hurricane Brochure, Other NWS Brochures in Stock

Last fall, the full color brochure "Hurricanes . . . Unleashing Nature's Fury" was revised and expanded from 12 to 16 pages. The information added includes an Atlantic Hurricane Tracking Map, a Saffir-Simpson Hurricane Scale, and inland/freshwater flooding impacts. Safety rules and Internet information was also updated.

In addition, NWS has reprinted the following publications. You can order a maximum of 300 copies each of the severe weather publications and 100 copies each of the field guides from NLSC.

NOAA PA #	Name	Printed
82004	Watch Out, Storms Ahead	75,000
92051	SKYWARN Decal	100,000
92055	Advanced Spotters' Field Guide	100,000
94050	Hurricanes . . . Unleashing Nature's Fury	200,000
96072	Atlantic Hurricane Tracking Map	100,000
97050	Basic Spotters' Field Guide	100,000
99050	Thunderstorms, Tornadoes, Lightning . . . Nature's Most Violent Storms	200,000

If you need more than the allotted amount from NLSC, please contact me at 301-713-0090 x 118 or Debbie Greeley at 301-713-0090 x137.

Linda Kremkau, Managing Editor
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MSC Chart to See Updates

The Marine Branch is working with the FAA National Aeronautical Charting Office to update the following Marine Service Charts (MSC) charts this year:

- MSC-8 and MSC-9: California coastal waters
- MSC-15: Alaska waters
- MSC-16: Guam and the northern Marianas
- MSC-2: Montauk Pt, NY, to Manasquan, NJ.

When printed, these charts will be available for ordering from the NLSC in Kansas City. The updated charts will also be posted on the Web site at www.nws.noaa.gov/om/marine/pub.htm.

*Richard May, Marine Services Branch
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American Red Cross Terrorism Brochure Now Available

After the tragic events of September 11, the American Red Cross (ARC) created a publication dealing with terrorism entitled, *Terrorism, Preparing for the Unexpected*. This brochure helps you to prepare for the unexpected and reduce stress when an emergency such as this arises again.

ARC provided 10,000 copies to NWS which were distributed to NWS Headquarters and Regions, NOAA Headquarters and other line offices within NOAA.

For information about your community's specific plans for response to disaster and other emergencies, contact your local office of emergency management. For more information on how to get ready for disaster and be safe when disaster strikes, contact your local Red Cross chapter or see the ARC home page at www.redcross.org.

*Linda Kremkau, Managing Editor
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Severe Weather Events Calendar

Listed below are Severe Weather Awareness Event Schedules for 2002.

Alabama	Severe	Feb. 18-22
Arkansas	Severe	Feb. 18-22
Colorado	Severe	April 21-27
Florida	Severe	Feb. 18-22
Georgia	Severe	Feb. 17-23
Illinois	Severe	March 3-19
Indiana	Severe	March 3-19
Iowa	Severe	March 25-29
Kansas	Tornado	March 11-15
Kentucky	Severe	All of March
Louisiana	Severe	March 4-8
Michigan	Severe	March 31-April 6
Minnesota	Severe	April 15-19
Missouri	Severe	March 11-15
Montana	Severe	April 1-5

Nebraska	Severe	April 1-5
New Jersey	Severe	March 17-23
New York	Severe	March 17-23
North Dakota	Severe	April 29-May 3
Ohio	Severe	March 17-23
Pennsylvania	Severe	March 17-23
South Carolina	Severe	Feb. 17-23
South Dakota	Severe	April 22-26
Tennessee	Severe	Feb. 17-23
Texas	Severe	March 3-9
Vermont	Severe	March 17-23
Virginia	Tornado	March 26
West Virginia	Severe	March 24-30
Washington	All Hazards	April
Wisconsin	Severe	April 15-19
Wyoming	Severe	April 15-19

For the most up-to-date calendar, go to www.nws.noaa.gov/om/severeweather/severewxcal.shtml.

Hurricane Awareness Calendar

Hawaii	May 19-25
New York	May 19-25
South Carolina	May 26-June 1
Virginia	May 19-25

Find the most up-to-date calendar, at 205.156.54.206/om/hurricane/calendar.shtml.

*Linda Kremkau, Managing Editor
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NWS Publications, WSOM Chapter Updates, Roster Now Online

Attachment A is an updated list of NWS publications. Attachment B is a list of WCMs and SOOs in each NWS Region. Telephone numbers are *listed* numbers, *NOT* the direct number. If you have an update, please notify melody.magnus@noaa.gov. If you know someone who would like to receive the *Aware*, please contact linda.kremkau@noaa.gov.

You can find the most up-to-date version of the WCM/SOO Roster at www.nws.noaa.gov/om/wcm-soo.pdf.

*Melody Magnus, Editor
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Attachment A: NWS Publications

<u>NOAA PA</u>	<u>NAME</u>	<u>NOAA PA</u>	<u>NAME</u>
70027	Survival in a Hurricane (Wallet Card)	99053	MSC-5, Savannah, GA, to Apalachicola, FL
77014	Flash Flood (Wallet Card)	96061	MSC-8, Mexican Border to Point Conception, CA
82002	Dust Storm Driving Safety (Wallet Card)	96062	MSC-9, Point Conception, CA, to Point St. George, CA
82004	Watch Out Storms Ahead	99060	MSC-10, Point St. George, CA, to Canadian Border
85001	Heat Wave (Out of print)	96064	MSC-11/12, Great Lakes
85002	Hawaiian Hurricane Safety Measures with Central Pacific Tracking Chart	96065	MSC-13, Hawaiian Waters
85005	Tornado Safety Tips (Como Protegerse En Caso De Tornado) (WC)	96066	MSC-14, Puerto Rico and Virgin Islands
85006	Survival in a Hurricane (Como Sobrevivir En Un Huracan) (Spanish 70027) (WC)	99064	MSC-15, Alaska Waters
86001	Natural Hazard Watch & Warning Poster (English/Spanish)	96068	MSC-16, Guam and the Northern Mariana Islands
91003*	Red Cross - Are You Ready for a Winter Storm? (Out of print)	96070+	NOAA Weather Radio Brochure
91004	Red Cross - Are You Ready for a Winter Storm? (Spanish Version)	96071	Atlantic Hurricane Tracking Map—8-1/2" x 11"
91005*	Red Cross Poster - Are You Ready for a Winter Storm? (English/Spanish)	96072	Atlantic Hurricane Tracking Map—17" x 22"
92050+	Flash Floods and Floods...The Awesome Power!	96073	Pacific Hurricane Tracking Map—12" x 24"
92051	SKYWARN Decal	96074E	The Hidden Danger—Low Water Crossing (English)
92052+	Tornadoes...Nature's Most Violent Storms	96074S	The Hidden Danger—Low Water Crossing (Spanish)
92055	Advanced Spotter's Field Guide	96076	ASOS Guide for Pilots (Booklet)
92057*	Red Cross - Are You Ready for a Tornado? (Out of print)	97050	Basic Spotters' Field Guide
92058	Red Cross - Are You Ready for a Tornado? (Spanish)	98053	A Mariner's Guide to Marine Weather Services—Great Lakes
92059*	Red Cross - Are You Ready for a Flood or Flash Flood? (Out of print)	98054	A Mariner's Guide to Marine Weather Services—Coastal, Offshore and High Seas
92060	Red Cross—Are You Ready for a Flood or a Flash Flood? (Spanish)	99050	Thunderstorms, Tornadoes, Lightning
92061*	Red Cross Poster—Are You Ready for a Tornado? (English/Spanish)	20050	Saving Lives With an All-Hazards Warning Network
93051*	Red Cross Poster—Are You Ready for a Thunderstorm? (Out of print)	20051a	NWR Decal (3" x 3")
93052	Red Cross—Are You Ready for a Thunderstorm? (Spanish)	20051b	NWR Decal (5" x 5")
93053*	Red Cross Poster—Are You Ready for a Thunderstorm? (English/Spanish)	20051c	NWR Decal (7" x 7")
94050	Hurricanes...Unleashing Nature's Fury (Revised 3/96)	20052	Hurricane Flooding: Inland's Real Danger
94052*	Red Cross—Are You Ready for a Heat Wave?	20053	StormReady
94053*	Red Cross—Are You Ready for a Hurricane?	0002	NOAA Brochure
94054	Red Cross—Are You Ready for a Hurricane? Spanish	200151	StormReady Community Signs
94055*	Red Cross Poster—Are You Ready for a Hurricane? (English/Spanish)	200152	StormReady County Signs
94056	Red Cross—Are You Ready for a Heat Wave? Spanish	200153	TsunamiReady Signs
94057*	Red Cross Poster—Are You Ready for a Heat Wave? (English/Spanish)	200154	Lightning Poster: Rocco Mediate
94058	Safe Boating Weather Tips (Revised July 1998)	200159	Anticipating Hazardous Weather & Community Risk CD
94059	River and Flood Program (Hydrologic Services)	200160	Winter Storms . . . The Deceptive Killers
96051	National Centers for Environmental Prediction	200164	A Pilot's Guide to NWS Aviation Weather Services and Products
96052	Key to New International Aerodrome Forecast (TAF) and New Aviation Routine Weather Report (METAR)(Card)	200254	StormReady Stickers (2002-2005)
96054	MSC-1, Eastport, ME, to Montauk Point, NY		
99054	MSC-4, Cape Hatteras, NC, to Savannah, GA		

+ Available in Braille. Contact your local NWS Office, Region, or Weather Service Headquarters.
* Available from your local Red Cross chapter only.

Marine Weather Service Charts (MSCs) can be found at:
www.nws.noaa.gov/om/marine/pub.htm
You can download most of these publications from:
www.nws.noaa.gov/om/nwspub

Attachment B: WCM/SOO Roster

WCM	SOO	SID	Location	Telephone
NWS Headquarters				
Vacant, National WCM Program Manager				301-713-0090 x140
Eli Jacks, National SOO Program Manager				301-713-1970 x188

Eastern Region

Rick Watling, Regional (Focal) WCM Program Manager				631-244-0123
Kenneth Johnson, Regional SOO/DOH Program Manager				631-244-0136
Solomon Summer, HSD Chief				631-244-0111
Dick Westergard	Warren Snyder	ALY	Albany, NY	518-435-9568
Barbara Watson-McNaught	Steve Zubrick	LWX	Baltimore, MD/Washington, DC	703-260-0107
Dave Nicosia	Jeff Waldstreicher	BGM	Binghamton, NY	607-770-9531
Glenn Field	Dave Vallee	BOX	Boston, MA	508-823-1900
Stan Levin	Thomas Niziol	BUF	Buffalo, NY	716-565-0204
Stephen Hogan	Paul Sisson	BTV	Burlington, VT	802-862-2475
Hendricus Lulofs	Dan Cobb	CAR	Caribou, ME	207-496-8931
Dave Ondrejik	Rich Grumm	CTP	Central Pennsylvania, PA	814-234-9412
Jerry Harrison	Steven Brueske	CHS	Charleston, SC	843-744-3207
Dan Bartholf	Jeff Hovis	RLX	Charleston, WV	304-746-0173
Mary Jo Parker	John DiStefano	ILN	Cincinnati, OH	937-383-0031
Gary Garnet	Robert LaPlante	CLE	Cleveland, OH	216-265-2370
Steve Naglic	Michael Cammarata	CAE	Columbia, SC	803-765-5501
Vince DiCarlo	Larry Lee	GSP	Greenville-Spartanburg, SC	864-848-1332
Jeff Orrock	Carin Goodall	MHX	Newport, NC	919-223-5122
Gary Conte	Jeff Tongue	OKX	New York City, NY	631-924-0037
Joe Miketta	Alan Cope	PHI	Philadelphia, PA	609-261-6600
Rich Kane	Josh Korotky	PBZ	Pittsburgh, PA	412-262-1591
John Jensenius	Joseph Fred Ronco	GYX	Portland, ME	207-688-3216
George Lemons	Kermit Keeter	RAH	Raleigh/Durham, NC	919-515-8209
Mike Emlaw	Steve Keighton	RNK	Roanoke, VA	540-552-0084
Bill Sammler	Hugh Cobb	AKQ	Wakefield, VA	757-899-4200
Tom Matheson	Reid Hawkins	ILM	Wilmington, NC	910-762-4289

Southern Region

Walt Zaleski, Regional WCM Program Manager				817-978-2812 x106
Bernard Meisner, Regional SOO Program Manager				817-978-2671
Steven Cooper, HSD Chief				817-978-2674
Keith Hayes	Deirdre Kann	ABQ	Albuquerque, NM	505-243-0702
Steve Drillette	Richard Wynne	AMA	Amarillo, TX	806-335-1121
Barry Gooden	Gary Beeley	FFC	Atlanta, GA	770-486-1333
Larry Eblen	Jim Ward	EWX	Austin/San Antonio, TX	830-629-0130
Brian Peters	Kevin Pence	BMX	Birmingham, AL	205-664-3010
Jesse Haro	Shawn Bennett	BRO	Brownsville, TX	956-504-1432
Donell Woods	Andy Patrick	CRP	Corpus Christi, TX	361-289-0959
Gary Woodall	Michael Vescio	FWD	Dallas/Fort Worth, TX	817-429-2631
John Fausett	Val MacBlain	EPZ	El Paso, TX	505-589-4088
Gene Hafele	Steve Allen	HGX	Houston/Galveston, TX	281-337-5074
James Butch	Alan Gerard	JAN	Jackson, MS	601-936-2189
Fred Johnson	Pat Welsh	JAX	Jacksonville, FL	904-741-4370
Howard Waldron	Steve Parker	MRX	Knoxville/Tri-Cities, TN	423-586-9040
Vacant	Jack Settelmaier	EYX	Key West, FL	305-295-1316
Roger Erickson	Felix Navejar	LCH	Lake Charles, LA	337-477-5285
John Robinson	George Wilken	LZK	Little Rock, AR	501-834-9102
Ed Calianese	Loren Phillips	LUB	Lubbock, TX	806-745-4260
Dennis Decker	Dave Sharp	MLB	Melbourne, FL	407-255-0212

WCM	SOO	SID	Location	Telephone
Jim Belles	Jerry Rigdon	MEG	Memphis, TN	901-544-0399
Jim Lushine	Pablo Santos	MFL	Miami, FL	305-229-4522
Pat Vesper	Brian Francis	MAF	Midland/Odessa, TX	915-563-5006
Gary Beeler	Jeff Medlin	MOB	Mobile, AL	334-633-6443
Jerry Orchanian	Henry Steigerwaldt	OHX	Nashville, TN	615-754-8506
Frank Revitte	Mike Koziara	LIX	New Orleans/Baton Rouge, LA	504-522-7330
Rick Smith	Dave Andra	OUN	Oklahoma City, OK	405-366-6583
Hector Guerrero	Greg Jackson	SJT	San Angelo, TX	915-944-9445
Rafael Mojica	Rachel Gross	SJU	San Juan, PR	787-253-4586
Bruce Burkman	Ken Falk	SHV	Shreveport, LA	318-631-3669
Bob Goree	Irv Watson	TAE	Tallahassee, FL	904-942-8999
Vacant	Charles Paxton	TBW	Tampa Bay Area, FL	813-645-2323
George Matthews	Steve Amburn	TSA	Tulsa, OK	918-832-4115

Central Region

Jim Keeney, Regional WCM Program Manager				816-426-3239 x703
Preston Leftwich, Regional SOO Program Manager				816-426-5672
Ken King, HSD Chief				816-426-3220
George Marshall	Ken Harding	ABR	Aberdeen, SD	605-225-5547
Daniel Noah	Viggo Jensen	BIS	Bismarck, ND	701-250-4224
John Griffith	David Copley	CYS	Cheyenne, WY	307-772-2468
Jim Allsopp	Ken Labas	LOT	Chicago, IL	815-834-0600
James Meyer	Ray Wolf	DVN	Davenport, IA	319-391-6729
Robert Giancy	Eric Thaler	BOU	Denver/Boulder, CO	303-494-3210
Jeffrey Johnson	Karl Jungbluth	DMX	Des Moines, IA	515-270-4501
Vacant	Greg Mann	DTX	Detroit, MI	248-625-3309
Jeff Hutton	Ed Berry	DDC	Dodge City, KS	316-227-7140
Carol Christenson	Ed Shimon	DLH	Duluth, MN	218-729-0651
Greg Gust	Brad Bramer	FGF	Eastern North Dakota, ND	701-772-0720
David Floyd	Llyle Barker	GLD	Goodland, KS	785-899-7119
James Pringle	Michael Meyers	GJT	Grand Junction, CO	970-243-7007
Mike Heathfield	Randall Graham	GRR	Grand Rapids, MI	616-956-5922
Jeff Last	Eugene Brusky	GRB	Green Bay, WI	920-494-5845
Steve Kisner	Rick Ewald	GID	Hastings, NE	402-462-2127
David Tucek	John Kwiatkowski	IND	Indianapolis, IN	317-856-0361
Vacant	Michael Lewis	JKL	Jackson, KY	606-666-4856
Mike Hudson	Peter Browning	EAX	Kansas City/Pleasant Hill, MO	816-540-5147
Todd Shea	Dan Baumgardt	ARX	LaCrosse, WI	608-784-8275
Rod Palmer	Jeff Hedges	ILX	Lincoln, IL	217-732-4029
Norman Reitmeyer	Ted Funk	LMK	Louisville, KY	502-969-8842
Robin Turner	Tom Hultquist	MQT	Marquette, MI	906-475-5782
Rusty Kapela	John Eise	MKX	Milwaukee/Sullivan, WI	414-297-3243
Todd Krause	Richard Naistat	MPX	Minneapolis, MN	612-361-6670
Deb Blondin	John Stoppkotte	LBF	North Platte, NE	308-532-4936
Brian Hirsch	Bruce Smith	APX	North Central Lower Michigan	989-731-3384
Steve Eddy	Jeff Logsdon	IWX	Northern Indiana	219-834-5178
Brian Smith	Steve Nietfeld	OAX	Omaha, NE	402-359-2394
Ricky Shanklin	Pat Spoden	PAH	Paducah, KY	502-744-6440
Tom Magnuson	Paul Wolyn	PUB	Pueblo, CO	719-948-9429
Susan Sanders	Brian Klimowski	UNR	Rapid City, SD	605-341-9271
Chris Jones	Bret McDonald	RIW	Riverton, WY	307-857-3898
Todd Heitkamp	Phil Schumacher	FSD	Sioux Falls, SD	605-330-4247
Steve Runnels	David Gaede	SGF	Springfield, MO	417-863-1456
Jim Kremper	Ron Przybylinski	LSX	St. Louis, MO	636-447-1876
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Chance Hayes	Peter Wolf	ICT	Wichita, KS	316-942-8483

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Dennis Hull Jon Mittelstadt PDT .. Pendleton, OR 541-276-7832
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Tyree Wilde Bill Schneider PQR .. Portland, OR 503-261-9247
Roger Lamoni Mary Cairns REV .. Reno, NV 775-673-8107
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Ron Olson Fred Mosher AWC .. Kansas City, MO 816-584-7237
Dan McCarthy Steve Weiss SPC .. Norman, OK 405-579-0771