

Aware

Volume 1, April 2009

Climate, Water, Weather

New Severe Thunderstorm Hail Criterion Being Implemented Experimentally in NWS Central Region

On April 1, 2009, the NWS Central Region forecast offices began a segmented transition to experimentally use 1-inch diameter as the hail criterion for designating severe thunderstorms rather than the historical $\frac{3}{4}$ -inch measurement. The wind criterion to merit severe thunderstorm designation remains at 58 mph.

NWS partners and customers agree the change could have a beneficial impact on getting the public to pay more attention to severe thunderstorm warnings. A 4-year demonstration project, conducted by offices in and around Kansas, has proven that assessment to be correct.

"Research has shown it takes hail stones at least an inch in diameter to cause significant property damage," said NWS Central Region Director Lynn Maximuk. "The Kansas demonstration project began as a result of media partners and members of the emergency management community suggesting the change. Using this criterion, there is stronger confidence that when a severe thunderstorm warning is issued, there is a genuine threat of damage to roofs, cars and other property. Another benefit is that there is less of a chance of desensitizing the public, which sometimes happens as a result of numerous warnings being issued for marginal storms containing smaller hail sizes that do not pose a substantive damage threat."

References to hail size will continue to use comparisons to U.S. coins and other common objects (see table).

Hail Diameter (Inches)	Reference Object
0.25	Pea
0.50	Mothball
0.75	Penny
0.88	Nickel
1.00	Quarter
1.25	Half Dollar
1.50	Ping Pong Ball
1.75	Golfball
2.00	Hen Egg
2.50	Tennis Ball
2.75	Baseball
3.00	Teacup
4.00	Grapefruit
4.50	Softball

Red indicates severe criteria

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Customer response to the Kansas demonstration has been overwhelmingly positive. As a result, the initiative is being expanded this severe weather season. The 38 forecast offices in the 14-state Central Region began using the 1-inch hail criterion April 1. Central Region states include Colorado, Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Nebraska, North Dakota, South Dakota, Wisconsin and Wyoming.

Beginning June 1, the 1-inch hail criterion will also be



implemented experimentally into operations at the 24 weather offices across Western Region. Southern and Eastern Regions are in the process of polling core partners and customers to gauge interest and support for future expansion of this initiative into their areas of responsibility.

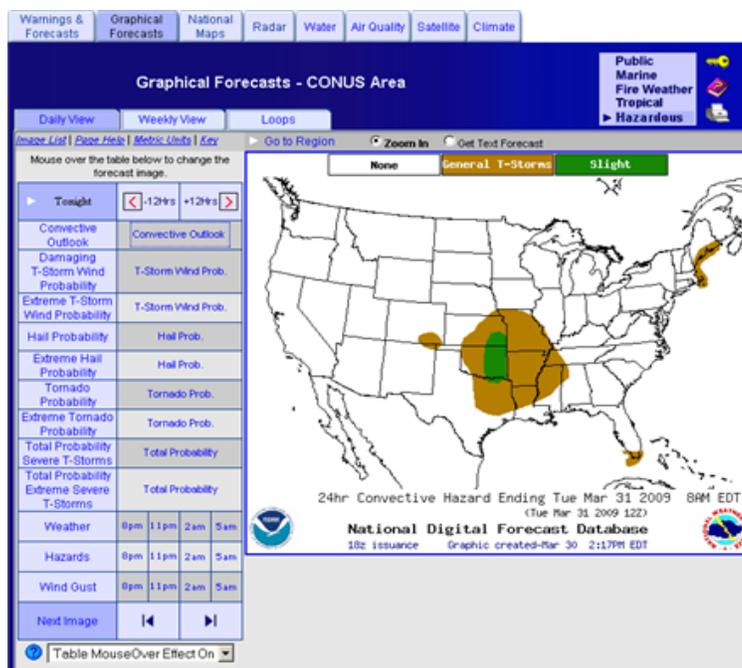
For more details on this change, see the [NWS Service Change Notice](#) issued before this change was made or contact [Kim Runk](#), NWS Central Region Headquarter. ❄

Digital Services

Convective Outlook Probability Elements Go Operational in NDFD

On April 30, NWS upgraded nine convective outlook hazard probability elements to operational status in the National Digital Forecast Database (NDFD). All nine elements are generated by the Storm Prediction Center in Norman, OK. These elements are available in NDFD for the contiguous U.S. (CONUS) and for the 16 predefined NDFD CONUS subsectors. The nine elements are:

- ◆ Convective Hazard Outlook for Days 1-3
- ◆ Tornado Probability for Day 1
- ◆ Probability of Hail for Day 1
- ◆ Probability of Damaging Thunderstorm Winds for Day 1
- ◆ Probability of Extreme Tornadoes for Day 1
- ◆ Probability of Extreme Hail for Day 1
- ◆ Probability of Extreme Thunderstorm Winds for Day 1
- ◆ Total Probability of Severe Thunderstorms for Days 2 and 3
- ◆ Total Probability of Extreme Severe Thunderstorms for Days 2 and 3.



CONUS Convective Outlook Grid from Tuesday, March 31, 2009. This map is found under the "Hazardous" menu in the upper right corner.

The Categorical Convective Outlook elements specify the perceived level of threat via the descriptive wording: Slight, Moderate and High Risk.

The individual probabilistic elements provide a more detailed look at the individual severe weather hazards through the use of probabilities (i.e., percent likelihood of occurrence). In the Day 1 period, forecaster expectations of large hail, damaging winds and tornadoes are explicitly conveyed in separate forecasts. By producing forecasts of each hazard individually, users who are sensitive to one particular threat (e.g., car dealers and large hail) can make more informed decisions.

For more information, contact [John Ferree](#). Details of these elements are provided on the [Storm Prediction Center \(SPC\) Website](#). ❄

Aware

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HazCollect to Phase-In Availability in Late April

HazCollect, the NWS All-Hazards Emergency Message Collection System, is a comprehensive national solution for the centralized collection and efficient distribution of Non-Weather Emergency Messages (NWEM) that are created by official emergency management organizations and other government agencies across the nation, to the public through the NWS dissemination infrastructure, NOAA Weather Radio All-Hazards (NWR), other national systems and the Emergency Alert System (EAS). HazCollect is Common Alerting Protocol (CAP)-based and interfaces with the Federal Emergency Management Agency's (FEMA) Disaster Management Open Platform for Emergency Networks (DM-OPEN) interoperability infrastructure. This interface enables secure data exchange for sharing emergency alerts between government and private vendor systems through the use of standards-based messages.

HazCollect Status and Timeline

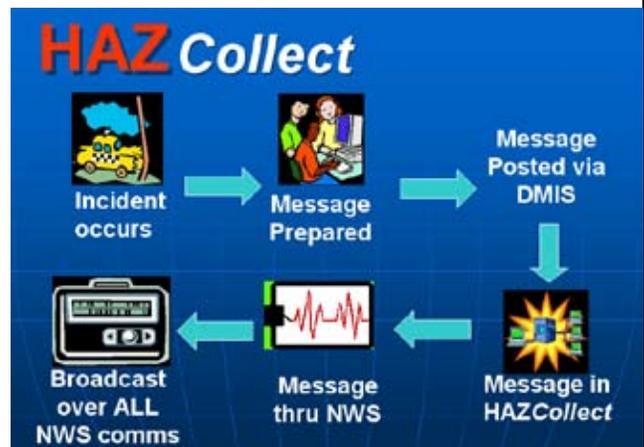
- ◆ HazCollect will phase into operation in late April with national availability to all warning authorities this summer. Registration and training are required.
- ◆ From April to June, FEMA and NWS will pilot a jointly developed, required training module for warning authorities (e.g., emergency managers) on non-weather emergency messages best practices and HazCollect. The NWEM best practices online training will take about 2 hours to complete.

Alaska, Hawaii, Florida, Kentucky, Wisconsin and portions of Idaho and eastern Washington will lead the HazCollect phase-in this spring; however, no emergency manager will be turned away because of their location. Registration for HazCollect by warning authorities is a two-step process:

- ◆ Required: Register with Disaster Management Interoperability Services (DMIS) to obtain your Collaborative Operations Group (COG) identity.
- ◆ Required: Register with HazCollect to receive approval to use the HazCollect system. You can find updated project information and registration at the NWS HazCollect Website.

NWS Warning Coordination Meteorologists (WCM) are serving as points of contact for state and local warning authorities to facilitate HazCollect registration and training. The FEMA Disaster Management Program enables and supports the implementation of HazCollect.

- ◆ DM-OPEN is the delivery mechanism that routes NWEM messages to the HazCollect server. During the COG registration process, applicant identity is vetted. The HazCollect part of the application process confirms the COG is authorized to issue public warning and reviews the geographic extent of that authorization.
- ◆ The DMIS Desktop Tools application provides an NWEM authoring tool, used to compose warning messages, free to authorized organizations. The tool is not accessible until the user has registered with HazCollect.
- ◆ The DM Program supports the development and implementation of third party NWEM applications by providing Application Programming Interfaces to DM-OPEN.



- ◆ Third party NWEM authoring applications are being developed. Any vendor or emergency management agency developer is allowed to build one. See the Developer section of the [Disaster Help](#) Website. Contact [Gary Ham](#) with specific questions.
- ◆ Interoperability of third party applications (NWEM authoring or general incident management) tools is ensured through conformance with Organization for the Advancement of Structured Information Standards standards, and the NWEM and other standards-based DM-OPEN Application Programming Interfaces. Additionally, the [National Incident Management System Supporting Technology Evaluation Program](#) (NIMS STEP) evaluates third party applications for conformance with Common Alerting Protocol, Emergency Data Exchange Language and NIMS principles.

Further information is provided in the HazCollect section of the [Disaster Management](#) Website. ✱

Weather Radio Improvement Project Completes Phase I

NWS provides weather forecasts, watches, warnings and other emergency messages to the public and emergency managers via dissemination networks including NOAA Weather Radio All-Hazards (NWR) system and NOAA Weather Wire Service (NWWS).

NWR is a nationwide network of approximately 1,000 Very High Frequency (VHF) broadcast transmitters covering all 50 states, Guam, Northern Mariana Islands, Puerto Rico, Virgin Islands, Samoa and associated maritime coastal areas.

NWWS is a satellite-based service delivering text messages of weather and all-hazards messages to approximately 400 subscribers representing media outlets, emergency managers, and others for redistribution to the general public. Both NWR and NWWS networks operate 24 hours a day, 7 days a week, 365 days a year.

NWR Network and Current Operations

Where appropriate agreements are in place, NWR broadcasts non-weather emergency messages originating from local, state, regional and national emergency managers. NWR receivers equipped with the Specific Area Message Encoding (SAME) feature can be programmed to automatically activate, when certain weather or emergency conditions occur in specific areas, counties, or portions of counties, to provide immediate information about life-threatening situations.

NWR also provides a continuous source of day-to-day weather information and marine forecasts. Text-to-speech audio for NWR is generated by the Console Replacement System (CRS) at each of the 122 Weather Forecast Offices (WFO) and delivered to their local NWR transmitter stations using leased analog line telephone circuits or ultra high frequency (UHF) microwave links where terrestrial leased line facilities are not available.

The monitor and control function from the WFO to the NWR station uses dial-up telephone facilities. The Remote Off-Air Monitoring System (ROAMS) at the NWR station interfaces with the CRS to perform basic control functions and to monitor the station performance and operation. ROAMS initiates a call to the WFO when the station malfunctions and reports the problem to WFO staff in an audible message or electronically to the CRS. ROAMS also can be accessed via telephone for remote troubleshooting from non-WFO locations.

Current NWWS Operations

NWWS is a nationwide C-band satellite data dissemination system that provides state and federal government, commercial users and private citizens with timely delivery of meteorological, hydrological, climatological and geophysical information. NWWS Priority 1 warning text messages are delivered to users within 10 seconds, making it the fastest delivery method available for these critical products. The full suite of NWWS broadcasts include text

products issued by WFOs, National Centers for Environmental Prediction (NCEP), Tsunami Warning Centers and the National Earthquake Center.

NWWS products include weather, water and climate warnings, watches and forecasts, as well as plain language observation summaries, "All Hazards" warnings, guidance information, and Amber Alerts. Text messages are collected at 20 sites nationwide and uplinked to a contractor's master ground station in Virginia. Each message is uplinked by two sites, with warning messages also sent by a third site to ensure reception. Duplicate messages are filtered, and then uplinked for broadcast via a master ground station to satellite subscribers. NWS supplies an NWWS satellite terminal to every state at no cost and makes NWWS information available to the public via the Internet for a nominal one-time set-up fee.

NWWS also implements connectivity with the International Justice and Public Safety Network Operations Center in Phoenix, AZ, to allow exchange of information with local public safety officials. NWWS collects information from approximately 140 NWS offices and National Centers and distributes that information as text-based messages to media, emergency managers, resellers and other users.

Weather Radio Improvement Project

The Weather Radio Improvement Project (WRIP) will achieve three major goals:

- ◆ Replace the existing Console Replacement System
- ◆ Provide Department of Homeland Security Federal Emergency Management Agency (DHS/FEMA) a capability to broadcast national and local audio emergency messages via the NWR transmitters
- ◆ Consolidate NWR and NWWS communications infrastructure to improve overall system reliability and performance.

WRIP is being developed and deployed using a phased procurement approach. NWS completed the WRIP Phase I Design and Prototype effort in late 2008. Phase I resulted in a system design for the communications and processing systems to replace the existing CRS, NWWS processing system, and telecommunications infrastructure. The new system is a more reliable, scalable and maintainable alternative that runs through a centralized Master Processing Center (MPC) serving both NWR and NWWS.

The WRIP Phase I prototype system demonstrates initial capability to send local and national emergency voice alerts via the NWR transmitter stations, meeting DHS/FEMA requirements. Phase I also offered the ability to evaluate, model and demonstrate selected high risk areas of the WRIP design.

In Phase II, WRIP staff will test and deploy system components and transition those systems to operations. The WRIP Phase I design satisfies the complete functional and operational requirements of the WRIP system and defines the overall system architecture, concept of operation, communication network infrastructure, operational data flows, Information Technology (IT) Security Plan and Operational Availability (OA) calculations. It also provides an initial development and implementation plan.

Phase II defers portions of the Phase I design that address immediate replacement of the analog telecommunication connectivity and dedicated equipment serving NWR transmitter stations. In Phase II, the WRIP team will develop and deploy a design with test-to-speech functionality remaining at the WFOs. A Phase II contract award is anticipated in late 2009, with completion in approximately 3 years. The WFO-centric design will use the existing telecommunications via the WFOs. The WRIP Program Office is currently evaluating follow-on Phase III initiatives to complete transition of WRIP components to the NWR transmitter sites and replace the current analog communication infrastructure with NOAAnet connectivity.

For more information, see future editions of *Aware* or contact [Ronald Vaillant](#), NWR Program Manager, NWS Dissemination Systems Branch. *



GOES O to Launch May 20

NOAA plans to place Geostationary Satellite (GOES) 13 (formerly GOES-N) in storage on April 15 to prepare for the launch of GOES O scheduled for April 28. After a successful launch and check out, GOES O will be renamed GOES 14 and become the second of the GOES-N series in orbit awaiting full-time operations. GOES 13 has provided excellent long-term testing since it was taken out of storage. It has been broadcasting the EMWIN-N data stream since early August 2008. The Emergency Managers Weather Information Network (EMWIN) team encourages users to test EMWIN-N capable systems available for sale by EMWIN vendors. Based on the remaining fuel of the current generation satellites, expect a GOES-N series to be in operation by 2011, sooner in the event of a major failure of either GOES-East (12) or GOES-West (11). All users should consider migrating to EMWIN-N capable systems.



The Future of EMWIN

The GOES R EMWIN prototype receiver is nearing completion. The EMWIN team hopes to formally test the prototype this summer. In the GOES R era, the EMWIN broadcast data rate will greatly increase, allowing for a much larger product set. The prototype receiver handles the increased data rate and will be backward compatible to the present generation to provide transition flexibility.

For more information, contact [Robert Wagner](#). To keep informed of new developments in the EMWIN transition, please visit the [NWS EMWIN Website](#). ✨

Call-To-Action Markers Begin Appearing in Products

In February, NWS Weather Forecast Offices (WFO) began a phased implementation of [Call-To-Action \(CTA\) markers](#) in all hydrometeorological Watch/Warning/Advisory products and follow-up Statements (W/W/A/S). The CTA markers identify the beginning and end of the CTA statement(s). Insertion of CTA markers enables specialized use of CTA statements by NWS, partners and other users. The addition also allows the CAP file production software to delineate the “Instruction” or Call-to-Action statement. For example, these statements will populate the Instruction element in the CAP/XML file generated for posting on the [NWS website](#). The change also should improve response to weather watches, warnings and advisories by highlighting the Call-to-Action portion of the messages

The CTA markers will be inserted into the WMO-formatted text product output automatically by the Advanced Weather Interactive Processing System (AWIPS) product generation software applications, left justified, with no other printable characters on the same line as the markers. Below is the template:

```
(blank line)
PRECAUTIONARY/PREPAREDNESS ACTIONS...
(blank line)
(text of call-to-action, instructions, etc.)
(blank line)
&&
```

A Call-to-Action and associated CTA markers will be inserted into each product segment or only in the Overview/Synopsis section of the product, but not in both for the same WMO-formatted text product. There will be only one set of CTA markers in a given product segment or Overview/Synopsis section, even if multiple CTAs are used. If there is no CTA in a W/W/A/S product, markers normally will not be included in the product, for example, in cancellation

or expiration follow-up statements. Individual Product Specification documents (see [section 10, Operations and Services](#)) will describe the specific use of the CTA and the location of the CTA and CTA markers within a given product category or product type.

The phased implementation of CTA markers should be complete by approximately May 15, 2009, at which time all WFOs will be issuing W/W/A/S products with CTA markers. The CTA markers implementation is part of AWIPS Operational Build 9 software installation at each WFO. ✱

Education

NOAA Releases Education Strategic Plan for 2009-2029

NOAA staff recently completed the [Education Strategic Plan](#), a summary of NOAA's educational goals and objectives. The Education Strategic Plan focuses on two main goals: environmental literacy and workforce development.

NWS has always been committed to education. Our Warning Coordination Meteorologists make nearly 2,500 school visits each year. Recently, NWS has added a Service Coordination Hydrologist position at the 13 river forecast centers to enhance community outreach and education activities. NWS joins NOAA in promoting education by supporting the NOAA Exhibit at the National Science Teachers Association annual meeting and regional conferences, and the American Meteorological Society's WeatherFest event. Partnerships at all levels are key to successful education strategy. If you have questions, please email [Ron Gird](#) or call Ron at 301-713-0090x154. ✱



New Education and Outreach Resource

The NWS Outreach Office has put together a [comprehensive collection of education and outreach resources](#) for students of all ages and levels, educators and anyone else interested in learning more about weather, climate, oceans, the Earth and the environment. Links are provided to numerous educational Websites as well as links to many other Earth, ocean and atmospheric sites. This listing also connects users to organizations devoted to science education or the use of new technologies to facilitate teaching and learning. The resources are broken down into three sections:

- ◆ NWS Resources
- ◆ NOAA Resources
- ◆ NOAA/NWS Partners and Affiliates Resources

If you are aware of additional Websites, now or in the future, please contact us. Your help and participation would be greatly appreciated. Please provide updates, revisions or additions to [Mary Fairbanks](#) and [Ron Gird](#). ✱

Hurricane Safety

Tropical Program Offers Product Improvements

NWS will implement numerous changes and improvements to products from the National Hurricane Center (NHC) and the Central Pacific Hurricane Center (CPHC) for the 2009 hurricane season. The Eastern Pacific hurricane season begins on May 15. The Atlantic and Central Pacific hurricane seasons begin on June 1. This year's National Hurricane Preparedness Week is May 24-30, 2009. All Service Change Notices and Public Information Statements will be posted on [NWS](#), [NHC](#) and [CPHC](#) Websites no later than late April.



Tropical Cyclone Track Forecast Cone and Watches/Warnings

Service Change Notices

- ◆ Series of Probabilistic Hurricane Storm Surge products become operational and expand in thresholds for the Atlantic basin
- ◆ NHC storm surge information now included in Tropical Cyclone Public Advisories
- ◆ Atlantic and Eastern Pacific Tropical Cyclone Wind Field graphics become operational
- ◆ Atlantic and Eastern Pacific Tropical Cyclone Graphical Tropical Weather Outlooks become operational
- ◆ Format changes take effect for the Tropical Cyclone Public Advisory products in the Atlantic, Eastern Pacific and Central Pacific basins
- ◆ Format change takes effect for the monthly Tropical Weather Summary product
- ◆ Change to format takes effect in the Tropical Cyclone Discussion for the Atlantic Hurricane Basin
- ◆ Special Tropical Disturbance Statements cease; Special Tropical Weather Outlooks commence

Public Information Statements

- ◆ Comments requested on Experimental Central Pacific Tropical Cyclone Wind Field Graphics for 2009
- ◆ Comments requested on Experimental Central Pacific Tropical Cyclone Graphical Tropical Weather Outlook for 2009
- ◆ Comments requested on Probabilistic Tropical Cyclone Surface Wind Speed Elements for the North Pacific Ocean remaining experimental for 2009 in the NDFD
- ◆ Comments requested on Experimental Tropical Cyclone Hazards Graphics for 2009—includes all coastal WFOs along the Atlantic and Gulf coasts

As a followup to last year's effort, in 2009 all 22 coastal WFOs serving the Gulf and Atlantic coasts will provide experimental tropical cyclone hazards graphics when any portion of the WFO forecast area is under an NHC tropical cyclone watch or warning. This suite of four graphics will summarize the expected impacts for each of the following four hazards associated with tropical cyclones: coastal flooding (surge), inland flooding, wind and tornadoes

Each WFO will highlight impacts specific to its area. These are cumulative graphics summarizing the expected impacts for the entire storm and should be useful for including in emergency management briefings to officials. NWS will send a national Public Information Statement requesting comments and feedback by late April. The [hazards graphics](#) will be available online.

Please email [Timothy Schott](#), Marine and Coastal Services Branch, if you have any questions or comments about the national hurricane program or call Tim at 301-713-1677 x122. *

Free Online Hurricane Preparedness Training

Two free online training modules from the Cooperative Program for Operational Meteorology, Education and Training (COMET) program can help emergency managers stay on top of hurricane training and spread the word to their communities:

[Community Hurricane Preparedness](#) and [Hurricane Strike!](#).

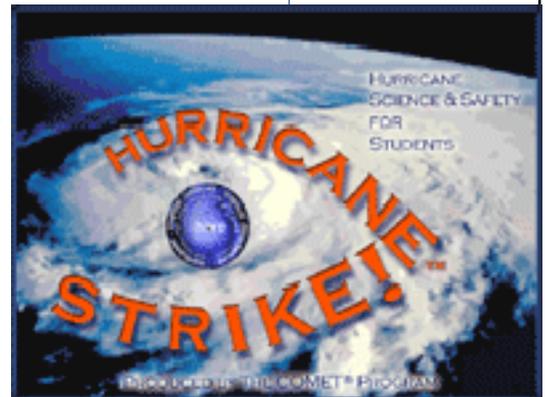
The first helps emergency managers and community decision makers understand hurricanes and how forecast products and other tools can be used to help make good decisions during these events. The second can be used to educate the youth of their community, who, it is hoped, will help spread what they learn.

Community Hurricane Preparedness was launched in 1999 at the request of FEMA and NWS, in response to a need to reach a larger audience than the small fraction of emergency managers able to attend classroom training. The course also provides background material for those who can attend the training and frees up class time for activities better suited for face-to-face interaction.

This course counts for credit as an Independent Study Course (IS 324) in the FEMA Emergency Management Institute's system. Since its launch, 21,422 people have completed the course, 3,098 in fiscal year 2008 alone, making it the most used module COMET offers. The course is being updated with help from Brandon Bolinski and Rebecca Jennings at FEMA Region IV and Chris Landsea, Robbie Berg, and Dan Brown of NHC to include more graphical forecasting products and more recent examples. COMET plans to finish the update before next hurricane season.

Hurricane Strike! was created for middle school students to reach both students and a larger audience. The module's designer at COMET, Vickie Johnson, explained that these students are interested in science and likely to encourage their parents to practice what they learn. In addition, today's children are tomorrow's adults, and lessons learned now, we hope will stick. Emergency managers, TV meteorologists and fire departments have taken advantage of *Hurricane Strike!* by making CD copies and distributing them to students and to the public at presentations or booths. Teachers have used the module by having students visit the Website or by downloading their own copies. Emergency managers can encourage this by telling teachers in their community who may be interested.

To access [Community Hurricane Preparedness](#) and [Hurricane Strike!](#), you must first register on the host Website. For more information, contact [Vickie Johnson](#). *



Outreach Innovations

NWS Asks for Input to Next Strategic Plan

What will America look like in 2025? How will climate change affect us? What should we be doing to prepare? How will forecasting for weather, water and climate events evolve? These are some of the questions NWS is grappling with as an agency. To prepare for the future, NWS recently began a public dialogue to learn more about the challenges facing its customers and partners. The dialogue is part of the agency's effort to develop its next strategic plan.

In an email to hundreds of agency stakeholders announcing the opportunity to participate in the discussion, NWS Director Jack Hayes said, "Just as our forecasts require input, the strategic planning process depends on high quality input from all NWS stakeholders, including our valued partners and customers. You are invited to be part of the process. Your ideas on where we should be going and what we should be doing are vital to developing a comprehensive and realistic NWS Strategic Plan."

The email directs recipients to an interactive [Strategic Plan Web page](#) where they can learn more about the process and submit comments. The opportunity is open to anyone interested in participating. The deadline for submission is May 1, 2009. ❄

NWS Scores Touchdown at Super Bowl XLIII



NWS Forecasters Mike Cantin (left) and Paul Close (second from left) monitor radar and lightning detection systems at Tampa Emergency Operations Center during Super Bowl Week.

NWS Tampa Bay Area provided onsite, decision support services for Super Bowl XLIII—a National Special Security Event. NWS routinely provides support to these types of [special events](#). The NWS team of emergency response meteorologists served as technical specialists in the Tampa, FL, Super Bowl XLIII Emergency Operations Center (EOC). In an effort to maximize participation, the NWS team operated a rotating schedule in the EOC from January 26 through February 1, 2009. During emergency response activities, operations are executed following FEMA's Incident Command System (ICS) structure. As part of an extensive office training plan, the NWS team completed a rigorous set of ICS courses enabling the office to secure a significant role in Super Bowl XLIII EOC. The FEMA sponsored courses included ICS 100, 200, 700 and 800.

In addition to the onsite decision support services provided by the team, daily and event-driven Incident Action Plans were developed that included weather forecast information and graphical HYSPLIT dispersion forecasts in the event of a hazardous chemical release

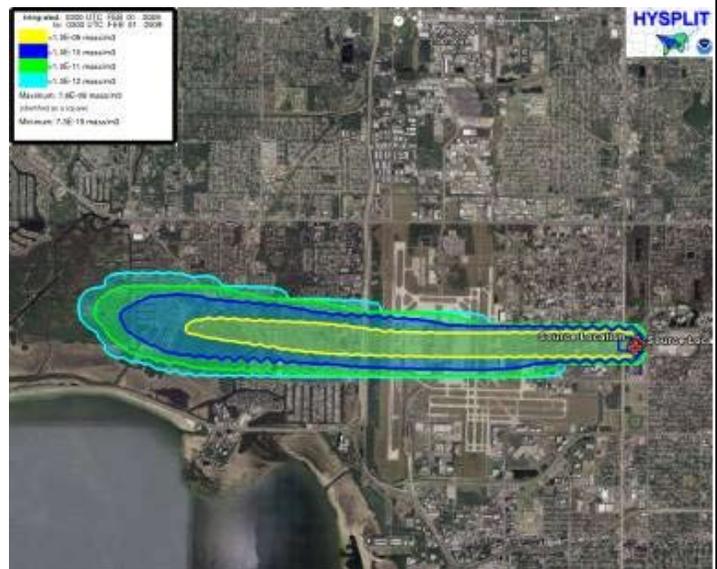
or other high-impact event. The HYSPLIT dispersion model runs were provided in close collaboration with NOAA's Air Resources Laboratory, NOAA's National Operations Center, and the Interagency Modeling and Atmospheric Advisory Center.

"This was an excellent opportunity for the National Weather Service to collaborate with emergency management officials in support of the Super Bowl," said Brian LaMarre, Meteorologist-in-Charge (MIC) in Tampa. "The onsite decision-support services provided by our team of meteorologists helped ensure the safety of all those involved in this prestigious national event."

The population of the Tampa Bay region is about 2.7 million residents, with more than 330,000 of them living in Tampa. On February 1, Super Bowl XLIII was held in Tampa's Raymond James Stadium, which has a maximum capacity of just over 74,000. As this year's event was expected to draw more than 100,000 visitors to the area, the need for accurate, up-to-the-minute weather information became crucial to local decision makers.

"Tampa Fire-Rescue was glad to help the Bay area prepare for a safe and successful Super Bowl experience," said Tampa Fire Chief/Emergency Manager Dennis W. Jones. "Working with all our partners in the emergency management and public safety community, we were hoping and working for the best, but planning for the unwelcome and unexpected."

The Tampa team included MIC Brian LaMarre; WCM Dan Noah; Science and Operations Officer Charlie Paxton; Senior Forecasters Rick Davis, John McMichael, Michael Cantin, Paul Close, Nick Petro; and Forecasters Jennifer Colson and Ernie Jillson. *



Example of HySplit dispersion forecast created by NWS Tampa Bay. This planning forecast was for a large scale release near the stadium beginning at 9 pm Saturday and lasting 30 minutes.

WFO Memphis Hosts All Hazards Decision Support Workshop

NWS's service to decision makers is driven by relationships. Relationships are built on trust, being a team player, understanding our partner's business, being able to provide information at the right time, and giving our best estimate and level of confidence.

In keeping with this philosophy, NWS Memphis, TN, hosted a 2-day workshop February 3-4, 2009. Presenters included NWS Southern Region Director Bill Proenza, Mississippi Emergency Management Agency Deputy Director Kent Buckley, and Madison County, Tennessee Deputy Director Chris Brazzell.

Other participants included meteorologists and hydrologists from WFOs in three regions, emergency managers from three states, fire departments and the U.S. Coast Guard. In addition, 20 WFOs and three regions took part via a simulcast Webinar.

Presenters raised the fact that relationships are cultivated long before high impact events through listening, following through on solutions to new requirements, and practicing in local and state exercises. Technology is an enhancer to these relationships. It is crucial that meteorologists and hydrologists communicate concisely in non technical terms, understand a customer's specific needs, adapt well to changeable working environments, and realize that weather is just information to a decision maker.

[The presentations from this workshop are online.](#) For more information, contact [Rich Okulski](#), WCM, NWS Memphis, TN. *

Developing True Collaboration with NWS Core Partners

NWS forecast offices provide information that enables decision makers to make optimal choices about how best to protect life and property; however, many times products or briefings are provided by meteorologists with little or no knowledge of how the information affected the decisions made. True collaboration is when NWS staff build an intimate two-way relationship with an NWS core partner. NWS meteorologists need to understand what decisions are made and when, how operations centers function, and on whom they depend. The following is an example of true collaboration in NWS.



Florida EM Academy Team Road to Recovery: From left front, Sumter County EM Coordinator Diane Surratt, Jacksonville Sheriff's Office Kevin Guthrie, and American Red Cross Charles Parker. From left back, American Red Cross Shelly Riggall, Polk County Fire Rescue Chris Costine, and NWS Meteorologist Dan Noah. Photo by Billy Abernathy, Polk County EM.

Dan Noah, WCM, from NWS Tampa Bay, was given an opportunity in February to enter the world of emergency management few meteorologists get to experience. Dan completed the Basic Emergency Management Academy provided by the Florida Emergency Preparedness Association. The 9-day emergency management course provides the fundamental, practical and basic principles of emergency management. The days were intense and included a mixture of classroom, hands-on and field experiences. Class days were 12-14 hours long to simulate managing an actual event. Students also conducted team projects and delivered presentations on their findings. Attendees packed for this training as if they were on deployment for 9 days: rain gear, boots, tennis shoes, sleeping bags, hats, gloves, comfortable clothing and laptops were required.

Graduates of the program received their FEMA Professional Development Series certification. In addition, several of the courses are required for the Advanced Professional Series certification. The training provided the opportunity for a meteorologist to work as the Operations, Planning, Logistics and Finance Chief during table top and full scale exercises.

Completing the Basic Emergency Management Academy with NWS core partners was another step

toward true collaboration with NWS. As a participant in the Academy, Dan gained knowledge and understanding of the day-to-day challenges NWS partners face and the intricacies of the environment in which they operate. Dan is now a certified Florida Professional Emergency Manager. For more information about this program, contact NWS Tampa WCM [Dan Noah](#). ✨

Severe Weather

Changes to Thunderstorm Forecast Guidance from SPC

The Storm Prediction Center (SPC) recently changed the forecast discussion portion of the afternoon Day 1 Convective Outlook update, issued at 2000 UTC daily. For three months, ending May 31, 2009, the outlook will include the earlier discussion from the previous Day 1 Convective Outlook issued at 1630 UTC. This approach is similar to the way Area Forecast Discussions are updated by NWS forecast offices.

The change will allow users to easily review the last forecast product while looking at the current forecast. The change in the 2000 UTC Outlook is expected to result in a more succinct 2000 UTC update because there will be no need to review the earlier forecast. This change may also provide SPC forecasters more time for mesoscale analysis and evaluation of sounding/profiler data, satellite/radar imagery and other diagnostic information before issuing the 2000 UTC update.

Because the text of the 1630 UTC Day 1 Convective Outlook will now be appended to the bottom of the 2000 UTC Outlook, any additional text in the update will focus on changes from the previous forecast reasoning. These changes could include:

- ◆ Modifications to the severe risk areas
- ◆ Timing changes
- ◆ Increase or decrease in forecaster confidence based on the latest available observational and numerical information

Another change for SPC customers coming in May is an increase in the temporal resolution of the Experimental Enhanced Thunder Probability Outlooks. For several years, the SPC has issued Enhanced Thunder Probability Outlooks for two periods: 1200-0300 UTC and 0300-1200 UTC. These time periods separated the expected diurnal thunderstorm threat from the overnight period. SPC used thunderstorm probability intervals of 10%, 40% and 70% in this nationwide and offshore flight areas product.

The new forecasts will retain the probability contours of 10%, 40% and 70%; however, the temporal resolution will change to 4 hours each during most daylight hours across the nation and expand from two to as many as three outlooks depending on issuance time. The following table shows the new Experimental Enhanced Thunder Probability Outlook product issuance and valid times:

Issue Time (UTC)	Valid Period (UTC)			
0600	1600-2000	2000-0000	0000-0400	---
1300	1600-2000	2000-0000	0000-0400	---
1700	---	2000-0000	0000-0400	0400-1200
2030	---	---	0000-0400	0400-1200
0130	---	---	---	0400-1200

This SPC product is designed to provide valuable guidance to NWS customers sensitive to thunderstorm formation and evolution. For example, the FAA may find this forecast useful for air traffic management planning when a higher probability of thunderstorms is forecast across busy air routes, such as in the Northeast corridor. The product may also prove useful to those concerned with thunderstorm initiation as the smaller time window of the forecast could be used by decision makers to better plan for upcoming events.

NWS customers and others are encouraged to [provide feedback to the SPC](#) on the effectiveness of these changes. For more information, contact [David Imy](#), Operations Branch Chief, or [Greg Carbin](#), Warning Coordination Meteorologist, SPC. ✨

Service Assessment Released for Super Tuesday Tornado Outbreak

In March 9, NWS released its Service Assessment for the [Super Tuesday Tornado Outbreak](#) of February 5-6, 2008. This event was one of the largest tornado outbreaks in recorded history. The report marks the first time NWS has analyzed the societal impacts of NWS products and services in a Service Assessment.

The event began on the afternoon of February 5, 2008, while many states were holding presidential primary elections (Super Tuesday) and continued into the early morning of February 6. In all, 87 tornadoes occurred in nine states, resulting in 59 fatalities in Arkansas, Tennessee, Kentucky and Alabama during a 12-hour period (There were 57 known fatalities when the statistics of the report were finalized.) There were five violent Enhanced Fujita (EF) Scale Level 4 tornadoes: two each in Tennessee and Alabama, and one in Arkansas. The EF4 tornado in Arkansas had a 122-mile continuous damage path. A 158 mph wind gust was observed along the path of this tornado at a home weather station in Zion, AR. An EF3 tornado, which claimed 22 lives, left a 51-mile path of destruction from just northeast of Nashville, TN, to near the Kentucky border. This tornado is the deadliest in the United States since November 2005, when a twister in Evansville, IN, killed 25 people. Early damage estimates from the Tennessee event were \$520 million.

This tornado outbreak in the mid-South and Tennessee Valley caused nearly half of the 126 tornado related deaths in the United States in 2008, killing 57 people. That total is the second highest in February on record and the largest tornado fatality total since May 31, 1985 (official tornado database begins in 1950). The Super Tuesday event also highlights a trend of tornado

fatalities over the last 10 years. From 1999 to 2008, Tennessee had the most tornado related fatalities, 110. During this event, Tennessee also had the most tornado related fatalities, 31 victims. There were 14 deaths in Arkansas, seven in Kentucky and five in Alabama.

Another trend exemplified by this tornado outbreak is the increase in fatalities, especially in the winter, across the mid-South.

From 1950-2004, most of the tornado fatalities in the United States occurred in an area whose four corners roughly include Little Rock, AR, Memphis, TN, Tupelo, MS, and Birmingham, AL. Western Kentucky, western Georgia and southeastern Missouri are also areas with a high frequency of tornado related fatalities in the winter.

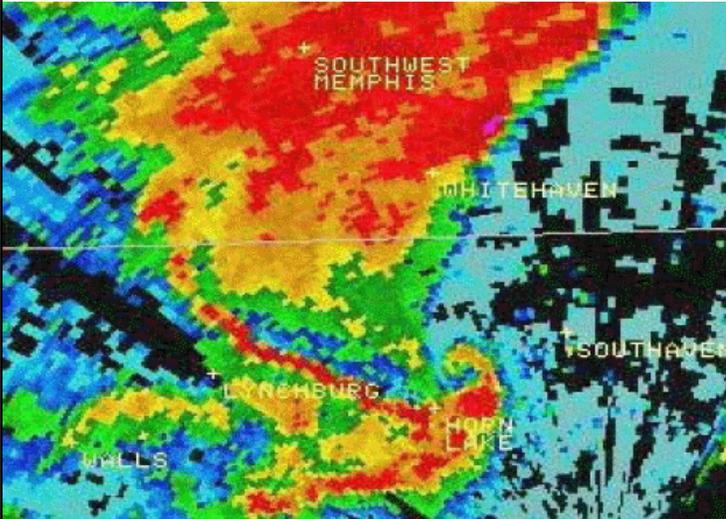
This tornado outbreak was forecast days in advance by NWS offices. WFOs and the SPC advised the public as much as 4 days in advance of the potential for a widespread tornado outbreak. All of the tornado fatalities occurred within the boundaries of NWS tornado watches and were preceded by NWS tornado warnings. The average SPC tornado watch lead time to the first tornado within the watch was 2 hours. The mean lead time for tornado warnings covering fatalities was 17 minutes. The 2008 Government Performance Results Act (GPRA) goal for tornado warning lead time was 11 minutes.

There were several stories of successful emergency response during this event. Parts of Union University in Jackson, TN, were devastated by an EF4 tornado, including some of the dormitories, but thanks to excellent planning and preparedness efforts, there were no fatalities. A tornado struck a high school in Muhlenberg County, KY, during a basketball game. Because a good shelter-in-place plan was in effect, there were no fatalities. Schools were dismissed early in the Memphis City district that Tuesday afternoon. School buses would have been on the streets when the tornadoes struck the area around 5:30 pm Central Standard Time.

The previous information indicates NWS performance before and during this event was excellent. Still, one question lingers: Why were there so many fatalities when NWS performance was so good? The Super Tuesday Tornado Outbreak Service Assessment Report attempts to answer that question. The findings in the report indicate six important factors:

- ◆ Sixty-three percent of the fatalities occurred in manufactured homes.
- ◆ Most of the fatalities in this outbreak occurred at night.
- ◆ Most of the areas affected by the deadly tornadoes were heavily forested.
- ◆ More than 50 percent of the people interviewed acknowledged that they associate tornado outbreaks with spring or summer months. Many of them minimized the threat because they felt it was too early in the year.
- ◆ Many interviewed required multiple sources of information throughout their decision-making process to assess their personal risk. A single source of information did not necessarily spur protective action.
- ◆ Most of the victims did not have safe shelter, such as a basement, storm cellar or safe room available.

NWS plans to continue gathering societal impacts information in future Service Assessments. The information will be used to improve severe weather products and services, allowing officials to make better decisions regarding their safety. For more information, contact [Wayne Presnell](#), Meteorologist, NWS Performance Branch. *



Super Tuesday Tornadoes: The Federal Aviation Administration's Terminal Doppler Weather Radar reflectivity image from Memphis, TN, taken at 5:30 p.m. CST, on February 5, 2008. The "hook echo" in the bottom of the image represents a tornado which affected the southern suburbs of Memphis, including the Memphis International Airport and the NWS Memphis Office.

Shopping for Severe Weather Safety at the Mall

The Springfield, MO, NWS office, in coordination with Springfield-Greene County Emergency Management, local TV and radio stations and Battlefield Mall, hosted a Severe Weather Awareness Day at the mall on March 14, 2009. Nearly 60,000 shoppers were exposed to severe weather awareness and preparedness information to mitigate the hazards of severe thunderstorms, tornadoes, flash flooding and lightning.

“Now is the time to plan and prepare for the impacts of severe weather. It’s not a matter of if severe weather will occur, it’s a matter of when,” said Springfield WCM Steve Runnels. The booth offered a variety of educational information and interactive booths including the following:

- ◆ NWS meteorologists conducted severe weather safety presentations and discussed the dangers of tornadoes via a tornado simulator and booth.
- ◆ The American Red Cross provided lifesaving medical information and sold NOAA All Hazards Weather Radios.
- ◆ Springfield-Greene County Emergency Management discussed the Hometown Ready and Community Emergency Response Team programs.
- ◆ Amateur Radio Operators demonstrated the importance and usefulness of communication during severe weather and in disaster recovery efforts.
- ◆ KTTS 94.7 FM distributed Storm Alert maps and interviewed NWS meteorologists about the hazards of severe weather.
- ◆ KOLR 10-TV and KSFY-TV conducted a Kidcast contest where kids were recorded presenting a weather forecast and featured on a morning newscast.
- ◆ Battlefield Mall hosted the Kidgits Kids Club and a weather coloring contest.



WCM Springfield Steve Runnels discusses severe weather safety information with a shopper.

“Fostering partnerships with these diverse stakeholders, integrated with the visibility of mall traffic, led to a successful event with thousands going home with lifesaving information,” said Kelsey Angle, NWS Meteorologist.

In 2008, 64 tornadoes occurred in Southeast Kansas and Southwest Missouri resulting in 19 fatalities. Missouri also recorded more than 230 tornado related injuries in 2008. Flash flooding resulted in nine deaths. Lightning strikes from thunderstorms caused 17 injuries in Missouri last year. For more information, contact NWS Springfield Meteorologist [Kelsey Angle](#). ❄

PRiMO Helps Navigate Tsunamis, Typhoons and Other Pacific Threats

The [Pacific Risk Management `Ohana \(PRiMO\)](#) is a coalition of organizations with a role in hazard risk management in the Pacific Ocean Region. The agencies, institutions, organizations and companies that comprise PRiMO recognize the value of collective action and are committed to enhancing cooperation, coordination and collaboration to strengthen and sustain hazard resilient communities. FEMA Region 9, NOAA’s Coastal Services Center and NWS play prominent roles in leading the PRiMO effort.



Governor's Office at the PRiMO Workshop in Guam

On March 18-19, 2009, PRiMO conducted its latest partners' workshop in Tumon on the island of Guam. Governor Felix P. Camacho provided the keynote address. The Guam meeting location allowed emergency management officials from many of the Western Pacific territories and island nations to take part.

The PRiMO workshop focused on identifying unique coastal inundation hazards (storm surge, typhoon, coastal erosion, tsunami, sea level rise, etc.), their current and potential impacts and ways to mitigate these impacts. An action plan was developed that will help continue to build community hazard resilience in the Pacific region. For more information on [PRiMO](#), contact [Timothy Hendricks](#), NWS Pacific Region. ❄

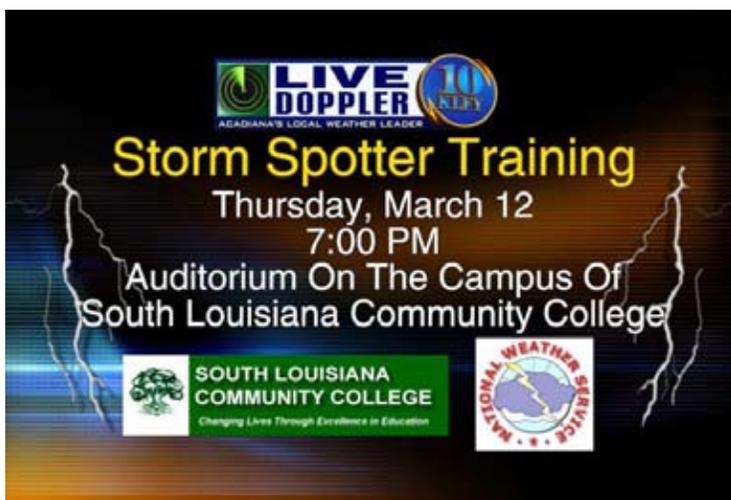
Media Partnership Increases SKYWARN® Participation on Gulf Coast

People living on the Gulf coast tend to focus on tropical cyclone hazards and after the past several hurricane seasons, who can blame them? NWS hurricane workshops and seminars are in hot demand each spring and summer by local and state emergency management agencies.

Tornadoes and other severe weather also are a major threat to health and safety. Getting people focused on the NWS SKYWARN® program is more challenging in this area when hurricanes dominate the media. To recruit storm spotters, NWS Lake Charles needed a new tact.

Last year, NWS Lake Charles partnered with KLFY, a TV station in Lafayette, LA, to put on a SKYWARN® storm spotter program. After being heavily publicized during the daily newscasts, over 200 people attended this workshop. This was the largest participation for a single SKYWARN® class in southwest Louisiana ever!

After this successful venture, the program was expanded in 2009 to include two workshops: one in Lafayette with KLFY, and the second in Lake Charles with KPLC TV. For more information contact [Roger Erickson](#), WCM, NWS Lake Charles, LA. ❄



StormReady/TsunamiReady

South Carolina Becomes Fourth State with All Counties StormReady

This winter, South Carolina became the fourth state with all counties StormReady. To achieve this distinction, all 46 of the counties had to meet the requirements of the StormReady program. In addition, seven South Carolina cities are also StormReady. South Carolina also has three TsunamiReady counties and two TsunamiReady sites.



South Carolina become fourth state with all counties StormReady. From left: Ron Osborne, Director, South Carolina Emergency Management; Columbia, SC, MIC Kim Campbell, and Andre Bauer, South Carolina Lieutenant Governor

Other states with all counties StormReady include Florida and Delaware. Hawaii and the Northern Mariana Islands are StormReady and TsunamiReady. The Northern Marianas just gained this distinction this winter when the island of Rota joined Saipan, Tinian and Guam on the StormReady/TsunamiReady roster.

StormReady also gained two major airports since January, Indianapolis and San Francisco. Detroit Metropolitan Wayne County Airport was the first airport to join the program. The last few months brought a bumper crop of higher education gains as well. Colleges joining the program since January include the University of South Alabama, Idaho State, Brigham Young, East Carolina and the University of West Florida. In all, the StormReady program gained 22 new sites in locations from New Mexico to Maryland.

Gains in the StormReady Supporter program include the first StormReady TV station, KIFI TV Channel 8 in Idaho; a second high school, Hortonville High School in Wisconsin; the U.S. Forest Service Sawtooth National Avalanche Center in Idaho; and the Estill County Extension Office in Kentucky.

For more information on the benefits of the [StormReady](#) or [TsunamiReady](#) program, contact your local NWS office. ✨



Rota, in the Commonwealth of the Northern Mariana Islands, became TsunamiReady and StormReady in March 2009. From left: Chris Maier, NWS National WCM; Genevieve Miller, WFO Guam MIC; Senator Paterno Hocog; and, Mayor Joseph Inos.

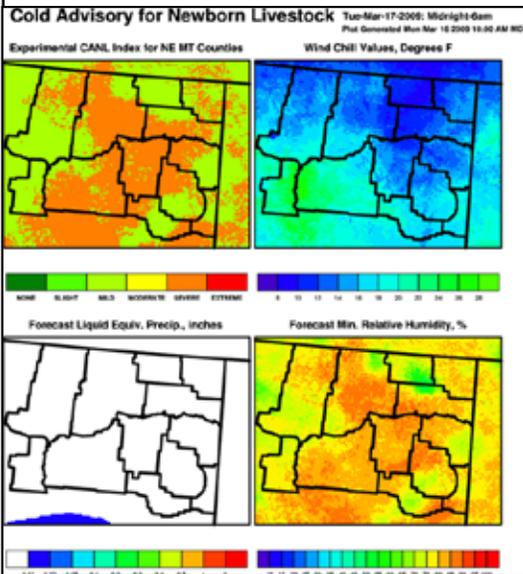
Winter Weather

Experimental Cold Advisory for Newborn Livestock

Through a COMET Partnership Grant, the NWS Glasgow, MT, office has developed a system alerting livestock producers to conditions that could result in newborn livestock losses. Research done on the system, developed in conjunction with Dr. Larry Kalkstein, University of Miami, and Dr. Katrina Frank, University of Delaware, shows that approximately 95,000 calves die each year nationwide due to weather related stress, resulting in nearly \$40 million in economic losses. In 2005, the Montana Agriculture Statistics Service reported the cost of those weather related mortality losses totaled \$6.3 million in the state.

The Cold Advisory for Newborn Livestock (CANL) system resulted from published animal science research, as well as discussion with ranchers throughout northeastern Montana. After a preliminary system was developed, a workshop for users was held to get feedback from the ranching community. The system includes 10 years of climatological data and statistics on known events where there were widespread livestock losses. The experimental advisory system is a color-coded system that ranges from “Green or No Advisory” to “Red or Extreme.” The output, based off of the National Digital Forecast Database, is a graphic that will be available on the NWS Glasgow Webpage. After receiving input from the ranching community, NWS determined the system will run annually from January 15 through May 31.

The science behind the system allows it to be used anywhere in the United States, with minor tweaks if needed. It can be used at other NWS offices or within the livestock community. The **CANL system** displays information in 6-hour intervals out to 36 hours, four times a day. For more information, contact [Tanja Fransen](#), WCM, NWS Glasgow, MT. ❄



Sample of Cold Advisory for Newborn Livestock

Online Spring and Summer Awareness Resources

Spring and summer are [thunderstorm](#), [tornado](#), [lightning](#), [flood](#) and [hurricane](#) seasons. Check out the following sites for posters, videos, animations, photos, survivor stories, children’s and teacher resources, policy statements and much more. If you know of additional resources, please contact the editor, [Melody Magnus](#). ❄

Climate, Water and Weather Links

- [Aviation Weather, Information and Resources](#)
- [Weather Safety and Awareness Brochures, Booklets, Posters](#)
- [Education and Outreach Videos, Multimedia, and more](#)
- [NWS Field Key Contact List](#)
- [National Weather Service home page](#)
- [NOAA Weather Radio All Hazards](#)
- [Past Weather and Climate from the National Climatic Data Center](#)
- [StormReady Home page](#)
- [TsunamiReady Home page](#)
- [Weather Fatality and Injury Statistics](#)