Aware

Aware is published by NOAA's National Weather Service to enhance communications within the Agency and with the emergency management community.

January 2012

Saving Lives and Livelihoods: A Vital Conversation

By Dr. Jack Hayes, NWS Director

NWS Director Dr. Jack Hayes at "Weather-Ready Nation: A Vital Conversation" a symposium in Norman, OK

The NWS recently took part in a "Weather-Ready Nation: A Vital Conversation" symposium in Norman, OK. Key stakeholders came together with the singular purpose of saving lives and livelihoods.

At the symposium, I talked about the great strides NWS has made in predicting both quickly developing weather events and longer-range climate issues, and how we are increasing the lead times for tornadoes, floods and hurricanes. But people are still dying, and many of these fatalities were avoidable. According to one analysis, 99 percent of all tornado fatalities in 2011 happened in a warned area. This reality is why our initiative to create a Weather-Ready Nation is so critical.

The symposium provided a great opportunity to learn more about the challenges each of us faces and to identify ways our joint work could save more lives. Through this national dialogue, we created a concrete strategy and some actions.

NOAA Administrator Dr. Jane Lubchenco said in her remarks before symposium participants, "The success of NOAA's mission should not just be measured by the accuracy of its information, but by the effectiveness of its application."

During the symposium, Dr. Russ Schneider, Director of the NWS Storm Prediction Center, recounted the 2011 tornado season, saying there were about 1,450 tornadoes in 2011, compared with the average of 1,300 tornadoes. It is a tragic statistic that 2011 ties with 1936 as the second deadliest tornado year in history with 552 fatalities.

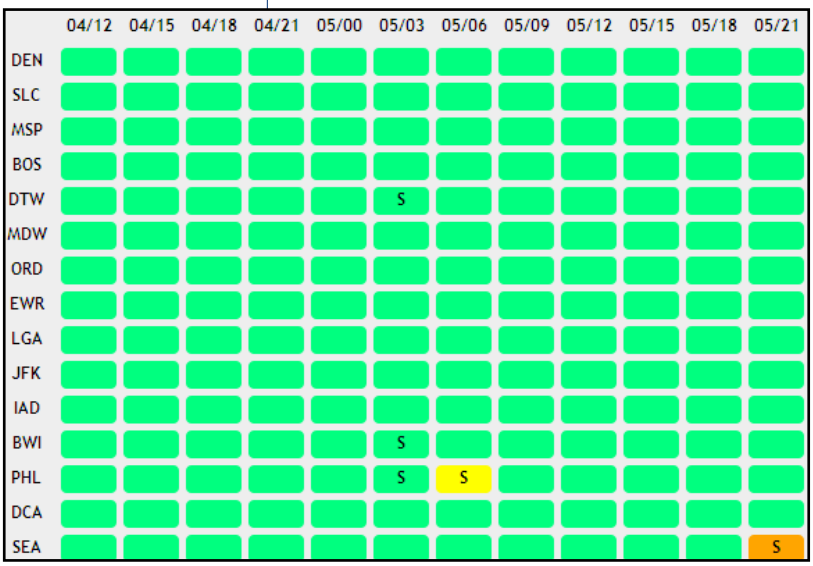
This has been a rough year in terms of severe weather. Sadly, more than 1,000 lives were lost this year to extreme weather. In addition to loss of life and physical injury, there have been 10 disasters, each causing at least $1 billion in economic losses. Total weather-related losses for 2011 are about $50 billion.

I know you are passionate about saving lives and protecting people. We share this passion. We look forward to partnering with emergency management to build a nation prepared for and resilient to high-impact weather.

You can join the conversation by reading what is happening on our Weather-Ready Nation Web page, our Facebook page, or Tweeting with the hashtag #WRN. ❄

Inside

Aviation Safety



Experimental Aviation Winter Weather Dashboard. "S" refers to snow.

NWS Testing Experimental Aviation Winter Weather Dashboard

By Michael Pat Murphy, WCM, Aviation Weather Center, Kansas City, MO

NWS is soliciting comments on its Experimental Aviation Winter Weather Dashboard through April 15, 2012. The Experimental Aviation Winter Weather Dashboard (AWWD) depicts potential winter weather impacts at 30 major airports. The AWWD, updated 4 times per day on the Web, shows the potential impact to each of the 30 airports through color coded boxes depicting impact through 87 forecast hours:

- Nominal, green
- Slight, yellow
- Moderate, orange
- High, red

The impact information is calculated using the operational Short-Range Ensemble Forecast numerical weather prediction system and climatology. The AWWD supports the Command Center of the Federal Aviation Administration Air Traffic Control System. AWWD coordinates long-range strategic winter weather planning by providing guidance on winter weather impacts.

AWWD renders the potential impact to each airport, at 3-hour forecast interval, based on specific thresholds for forecasted winter weather conditions. The category assigned to each airport is calculated using the probability of the accumulated snowfall, ice pellets and freezing rain, and visibility. Airports are split into four impact groups based on the their ability to operate during winter weather conditions, determined by annual snowfall climatology. ❄

Find Aviation Weather Tips in *The Front*

By Melody Magnus, Managing Editor, The Front

In November, the NWS Aviation Branch released the latest edition of its aviation safety newsletter, *The Front*. This free resource offers aviation weather tips to pilots of private and commercial planes, balloons and other aircraft. Articles in the latest edition include:

- The Hidden Dangers of Mountain Wave Turbulence
- Here Comes the Sun! There Goes Your Communications!
- Flying in the Void, PIREPS Vital to Flight Safety

If you would like an email when *The Front* is released, write the Editor, Melody Magnus. If you have suggestions or comments related to content, contact Mike Graf, NWS Aviation Branch. ❄

Aware

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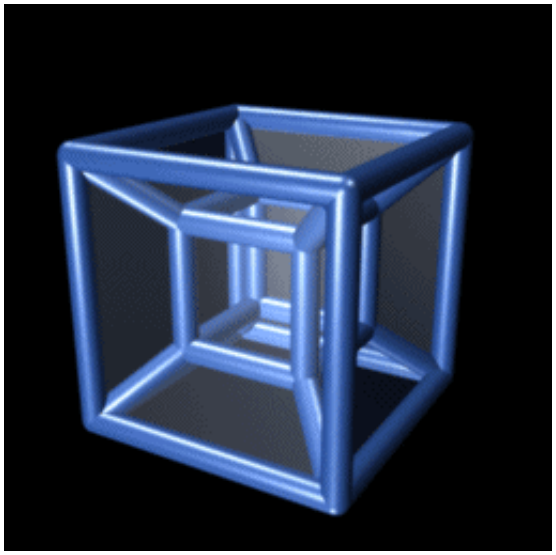
Decision Support

NWS Steps Up Demand-Driven Decision Support Services

By National Weather Service News Staff

The Weather-Ready Nation vision is to help people make better decisions with better information. The NWS job is not done when products are issued. The measure of success is not solely based on accuracy or lead time metrics.

"Currently, NWS decision support services during high-impact events sometimes require an extraordinary response in terms of planning, personnel and technology," said Mike Hudson, Central Region Chief Operations officer and Roadmap team member. "Our goal is to make extraordinary responses become ordinary, regardless of the severity of the event. We want to contribute so much to our partners' operations that they would not consider making a weather-sensitive decision without our input."



NOAA NextGen Weather 4-D Cube

To achieve this goal, NWS is shifting to digital services through two datasets: the **data cube** and the **common operating picture**. These tools will let NWS employees and customers assemble products and services in whatever format they need. An Impacts Catalog will alert forecasters and partners of important events in their region. This information, in turn, will streamline collaboration and enable warnings and forecasts based on societal impacts. The catalog concept reflects the reality that high-impact events vary in scope, but are generally determined at the community level. For each impact area, users would supply what the impact is to them as well as key details such as geography, hazard type and hazard magnitude.

NWS also is trying new methods of on-scene decision support during emergencies. To better serve emergency managers, NWS is testing the use of Emergency Response Specialists (ERS) groups to evaluate the Incident Meteorologist program. The ERSs are National Incident Management System-certified staff members who will work directly with emergency managers, at times in their offices, to provide decision support services. The concept is being tested in Fort Worth, TX.

NWS will integrate social science into operations to improve product and service delivery. Applying what we know about social science will help improve how we communicate information so the public will take appropriate action to stay safe. For instance, because cities like New York City are not often affected by hurricanes, NWS Social Scientist Vankita Brown and her team are examining the local population's perception of risk as compared to those living in North Carolina, where Hurricane Irene made landfall. Brown's team is assessing what kind of influence NWS forecasts and warnings, and the media's portrayal of the threat, had on the public's perception of risk perception and their response.

NWS understands how important it is to evaluate the effectiveness of our new efforts. That is why we will develop an Operations and Services Proving Ground at the NWS Training Center to serve as a testing environment. Taking real life events and situations and using tools and technology in our testing center, we can discover what technologies and strategies worked and begin to make improvements and implement effective strategies. ❄

Tornado Spurs Enhanced Preparedness at Sun-N-Fun Airshow

By Logan Johnson, Senior Forecaster, NWS Tampa, FL

The Sun-n-Fun Airshow in Lakeland, FL, is the second largest U.S. airshow event, attracting thousands of visitors daily with aircraft from all across the United States and dozens of foreign countries. Throughout the week-long event, set for its 38th annual staging in March 2012, the participants, visitors, exhibitors and staff are at risk from hazardous weather in southwest Florida.

Damage caused by EF-0 tornado on March 31, 2011, at the Sun in Fun Airshow.

This vulnerability was underscored during last year's Airshow when an EF-1 tornado touched down during the morning hours of March 31, 2011, on the airshow's grounds. Some aircraft and tents incurred extensive damage.

In response, NWS Tampa Bay has partnered with the Sun-n-Fun organization and the Polk County Florida EM office to increase weather preparedness and integrate NWS products and expertise as part of a comprehensive package of Decision Support Services. The partnerships should make this year's event even safer from hazardous weather.

In November, NWS Tampa Senior Forecaster Logan Johnson presented decision support information to event organizers, Polk County EM staff, and numerous local and state emergency responders, who will form the core safety and EM personnel. This meeting also facilitated a severe weather tabletop module for the Sun-n-Fun organization to help develop preparedness plans. As a part of the Weather-Ready Nation pilot program, NWS Tampa Bay will deploy Emergency Response Meteorologists to the Sun-n-Fun Emergency Operations Center during the event and develop daily briefing and dissemination strategies.

NWS Tampa is working closely with these key partners to develop and promote weather safety and preparedness for the hundreds of staff and volunteers who will help keep attendees safe in March 2012. To further enhance weather safety, NWS staff is helping the Sun-n-Fun organization complete requirements for StormReady Supporter status. ❄

Dissemination News

NWS Readying CAP v1.2; Details Emerge on Rollout of Mobile Alerts

By Mike Gerber, NWS Emerging Dissemination Technologies Lead

If you read our Hazard Alert Interoperability Update in the Fall 2011 Aware Report, you know about the exciting work underway to improve public response to NWS alerts through three key programs:

- Common Alerting Protocol (CAP)
- FEMA's Integrated Public Alert and Warning System (IPAWS)
- Personal Localized Alert Network(PLAN)/Commercial Mobile Alert System(CMAS)

NWS has been working hard to ready CAP v1.2, which supports IPAWS, in time for the nationwide rollout of PLAN/CMAS in April 2012. CAP v1.2 and IPAWS are critical because PLAN/CMAS messages will be generated from information in NWS CAP messages posted to IPAWS.

In the fall 2011 *Aware*, we reported November 2011 as the planned time frame for NWS to produce CAP v1.2. This date was to align with the early rollout of PLAN/CMAS in New York City and Washington, DC, scheduled for January 2012. While the updated NWS timeline reflects a minor slippage, NWS has made substantial progress on software to produce weather related CAP v1.2 messages. NWS has been testing the CAP transport mechanism to IPAWS and performing CAP/XML validation with IPAWS. Between now and the national rollout, NWS will:

- Continue coordination with FEMA IPAWS
- Complete operational testing of NWS CAP v1.2 and achieve initial operating capability for the transmission of weather related CAP v1.2 from NWS to IPAWS.
- Explore the use of traditional NWS dissemination systems as additional mechanisms for dissemination of NWS produced CAP.

In the mean time, we encourage you to **take a look at the documentation and take part in the discussion on the NWS production of CAP 1.2.**

New Details on the Rollout of Mobile Alerts through PLAN/CMAS

Commercial wireless carriers have begun releasing information to consumers regarding PLAN/CMAS, also being called Wireless Emergency Alerts (WEA) in these new outreach materials. Be on the lookout for updates and additional information from other carriers as the rollout of WEA approaches. Links to resources on WEA follow:

- Sprint's **WEA web page** and list of **FAQs**
- **Verizon's WEA FAQ web page**
- **AT&Ts Guide to WEA**

Below are highlights from these resources. Look for updates and more information from other carriers as the WEA rollout approaches.

- WEA service is free to cell customers with a WEA capable phone.
- Acronym soup: CMAS, PLAN and WEA are all names for the same service.
- Major commercial carriers are committed to offering WEA capable phones. Sprint now offers 12 WEA capable phones and Verizon, 7. ATT also is starting to offer CMAS capable phones.
- WEA does not pose a privacy issue since it does not track you. WEA is merely a radio broadcast from a nearby cell tower to the threat area.
- WEA is not subscription based, so you only receive the alert if you are in the threat area.
- If you travel into an alert area after the alert was originally sent, you may still receive it. Sprint says the alert is resent every 5 minutes until the WEA has expired.
- Each WEA is only displayed once, so you don't receive duplicates.
- If you are in a voice or data session when a WEA is transmitted from your nearby cell tower, you will not receive the alert until after the voice or data session has concluded.
- WEA alerts have a distinct vibration cadence to differentiate from other types of notifications produced by mobile devices.

Look for another update on these programs in the spring 2012 edition of *Aware*. ❄

EMWIN N Transition Completed in December; Next Steps

*By **Robert Wagner**, IT Specialist, NWS Dissemination Systems Branch*

The Emergency Managers Weather Information Network-N (EMWIN-N) successfully moved to Geostationary Satellite (GOES) West on December 14, 2011. GOES 15, which replaced the aging GOES 11 satellite, is now transmitting the EMWIN-N broadcast along with GOES East.

User responses to the new broadcast have been good. There were minimal problems reported. GOES 12, which supports the Caribbean and South America at 60 degrees west, will continue to broadcast the legacy EMWIN-I broadcast.

If you have legacy EMWIN-I equipment and can receive the GOES 12 broadcast, you may continue to use this service until you are able to upgrade to EMWIN-N capable systems; however, the end is coming—GOES 12 is scheduled to be removed from service in May 2013. Legacy users unable to receive the GOES 12 broadcast can continue to receive EMWIN via the Web through the EMWIN byteblaster network.

GOES R

EMWIN at GOES User Conference

The EMWIN team provided support for the 7th GOES Users Conference and the GOES Data Collection System (DCS) Technical Working Group and Satellite Telemetry Interagency Working Group in Birmingham, AL, October 18-21, 2011.

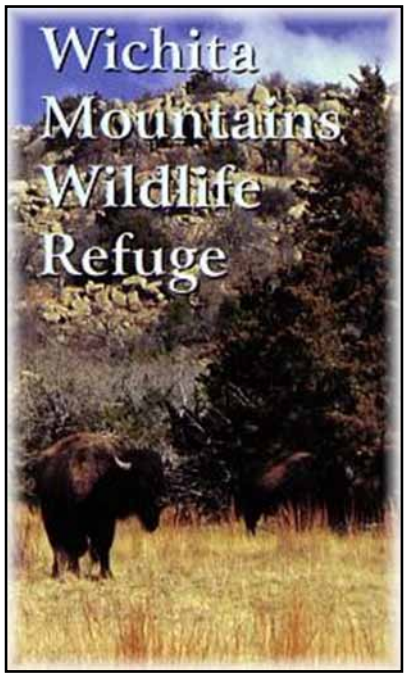
Working in collaboration with key NESDIS and outside staff, the team provided support for the meetings and presented information on the future plans for the High Rate Information Transmission /EMWIN broadcast being developed for the GOES R series of satellites.

In the GOES R era, the EMWIN broadcast will combine with LRIT and DCS to create the HRIT/EMWIN broadcast. The data rate will greatly increase, to 400 kbps, allowing for a much larger product set. To keep informed of new developments in the EMWIN service, visit the NWS **EMWIN Website**. ❄

Outreach Innovations

Hazardous Weather Information Project at National Wildlife Refuge

*By **Melissa Hurlbut**, Meteorologist, Storm Prediction Center*



Oklahoma is prone to natural disasters. In 2011 alone, the state experienced EF-5 tornadoes, flash floods, raging wildfires, drought, record-breaking heat and cold, and a 5.6 magnitude earthquake!

Despite this extreme weather, the Wichita Mountain Wildlife Refuge in southwestern Oklahoma gets almost 2 million visitors annually. In 2011, this park was hit by a tornado and experienced a wildfire that burned more than 59,000 acres. Park officials recalled tour buses to the Refuge Visitor Center during the November tornado warnings and told them to return another day as "today is not a good day to hike."

So how weather aware are individuals when they set out for a long hike, especially in state and federal parks? That's what a team of meteorologists at the Storm Prediction Center (SPC) and Weather Forecast Office (WFO) Norman hope to discover. If nearly 2 million individuals visit just one park in Oklahoma annually, imagine how many visit the hundreds of state and federal parks across the country.

In early December, a team of SPC and WFO Norman meteorologists met with park officials from the U.S. Fish & Wildlife Service. They brought a prototype weather awareness bulletin board to be displayed in the Visitor's Center. The reaction from park officials was overwhelmingly positive, especially given their knowledge of vulnerable campsites and trails, and of weather-related rescues in the past year.

At the meeting, officials agreed to place a magnetic bulletin board in the entryway of the Refuge Visitor Center and an additional weather-proof board placed at a popular campsite within the park. The bulletin boards will display weather hazard icons park officials can change daily based on NWS information.

For example, a simple headline such as "Will there be thunderstorms today?" would include a YES or NO magnet, with a YES magnet showing which of the following threats existed that day: lightning, hail, severe winds or tornadoes. Additionally, WFO Norman will provide a NOAA Weather Radio at the campsite so campers can check for the latest hazardous weather information without stopping in at the Visitor's Center.

Officials will place the bulletin boards in the park by early March, prior to Spring Break when the number of visitors soars. If the pilot project is successful, additional bulletin boards may be added at the head of the other popular trails and the program will likely be expanded to other parks in Oklahoma. ❄

Partnership Earns Local Media Partner Regional Emmy Award

By Jim Kramper, WCM, NWS St. Louis, MO

WFO St. Louis worked with meteorologists from FOX and CW television stations as well as St. Louis University to host a severe weather education event last March. Little did organizers know they were about to create TV celebrities.

It started in the fall 2010 when WFO St. Louis staff pitched an idea to local media outlets for a weather education venture to be called Gateway StormFest 2011. "The idea was really well received," St. Louis MIC Wes Browning said. "It fit everybody's ideas of how to best educate people about severe weather safety. All the participants grasped the concept and took on various assignments to make it a success."

Meteorologists from KTVI FOX 2, KPLR News 11 (CW Network), Saint Louis University and the NWS made the idea a reality March 12, 2011. More than 800 people attended the first Gateway StormFest. Presentations included an array of subjects covering specifics about the WFO and severe weather safety.

- Wes Browning provided an overview of historical tornadoes in St. Louis.
- WCM Jim Kramper covered lightning safety.
- FOX 2 meteorologist Chris Higgins gave a preview of dual-pol radar.
- FOX 2 meteorologist Glenn Zimmerman provided a recap of the collaborative effort between WFO St. Louis and FOX during the New Year's Eve EF-3 tornado that hit St. Louis County.

NWS staff members show the Emmy Award they helped KTVI Fox 2 win for support of the NWS StormFest concept.

Two weeks later, the TV stations simultaneously broadcast an hour-long Gateway StormFest 2011 special to an audience of about 200,000. Less than 6 weeks later, a violent EF-4 tornado tore through St. Louis. Remarkably, there were no serious injuries or deaths.

The National Academy of Television Arts and Sciences recognized the efforts of StormFest organizers on October 22 when it presented KTVI FOX 2 with a Regional Emmy Award for the Gateway StormFest 2011 broadcast.

"This first StormFest was so successful, more people want to be involved and the TV stations are pushing to make it an even bigger event next year," Browning said. "Plans now are to hold Gateway StormFest 2012 on Feb 16. Both television stations plan to do a live, prime time broadcast of the event during a time that typically has up to 300,000 viewers. ❄

Tell 'em, Tell 'em and Tell 'em Again: Hazards Literacy

By Pamela Szatanek, Meteorologist, WFO Elko, NV

The Elko Forecast Office is implementing a Hazards Literacy Program in northeastern Nevada. NWS is partnering with local secondary education health teachers to promote individual risk assessment. The four basic themes focus on:

Dunphy Complex: site of a raging wildfire in northeastern Nevada during the 2011 fire season

- Navigating the Weather.gov Website
- Understanding the differences amongst watches, warnings and advisories
- Improving knowledge of surface weather
- Preparing for an evacuation

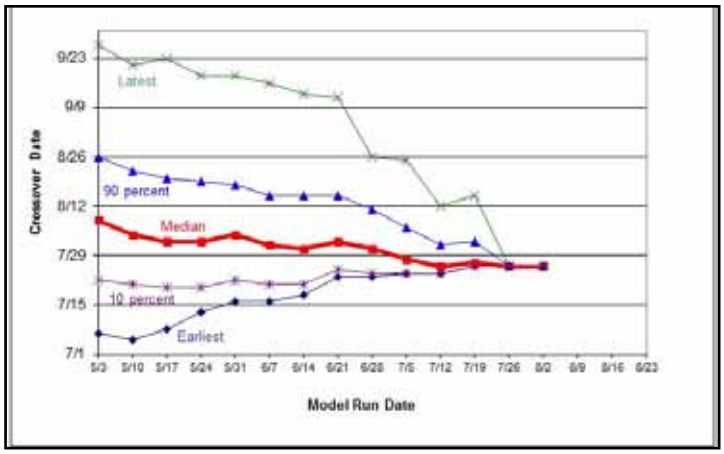
The literacy format opens an inclusive, highly interactive dialog in which each participating high school student is asked to answer a basic question, "If an evacuation order was given for your neighborhood, what would you take?"

The program uses multiple forms of media to teach, including a Smart Board that gives students hands-on experience with the weather.gov Website. So far, 367 sophomore to senior students have taken part in the program. ❄

NWS Helps Forecast Onset of West Nile Virus

By Bob Glahn, Techniques Development Laboratory, NWS

The Meteorological Development Laboratory (MDL) is helping the University of Illinois and other organizations predict the seasonal shift in mosquito populations preceding the onset of the West Nile Virus in central Illinois. The virus was first identified in the United States in 1999. The virus has spread throughout much of North America. Every year there are new victims.



The crossover point is shown for the model using only climatological values. The crossover point is the same, but predicted 11 days earlier when forecasts are used (Westcott, N. E., et al., 2011: Predicting the seasonal shift in mosquito populations preceding the onset of the west Nile virus in central Illinois. Bul. Meteor. Soc.*, 92. 1173-1180).*

The mosquito species transmitting the virus varies regionally. In the north-central and eastern United States, two mosquito species, one dominant in early summer and one in mid-summer, are believed to be important to the transition cycle. The time when the relative proportion of the two species becomes equal is termed the crossover point and usually precedes the peak infection rate by 2 to 3 weeks.

Temperature is key in predicting the transmission dynamics of the virus, impacting both the mosquito population and the virus itself. We are using a model built by Kenneth Kunkel and others to predict the crossover of species, with the input being the recent history of temperature and future expected values.

Before MDL became involved, forecasted temperatures were climatological values. MDL has been providing Model Output Statistics (MOS) 10-day forecasts. Climatological values in the model gave no lead time in the predicted crossover date, but the use of MOS forecasts improved the forecast lead time to 6 to 8 days. This improvement helps to optimize the timing and application of abatement treatments to reduce the transmission of the virus and, we hope, to save lives. ❄

Lights, Cameras, Action!
NWS Tampa Bay Unveils Its First PSA Video Production

*By **Anthony Reynes**, Meteorologist and Multimedia Focal Point, NWS Tampa Bay Area, FL*

NWS Tampa Bay unveiled its new multimedia program featuring its first, locally made Public Service Announcement (PSA) video. The PSA capitalizes on the commemoration of the 90th anniversary of the last great hurricane to hit the Tampa area.

Meteorologist and Web-Media and Video Program Coordinator Anthony Reynes planned, wrote, filmed and handled post-production for the 9 minute documentary showcasing the history, impacts and lessons learned from this historical cyclone. The video is available on the NWS Tampa Facebook page and through the dedicated 1921 **Hurricane Commemoration Webpage**.

"The first challenge to overcome in any project of this nature is resources," Reynes said. "With the current budget crunch, the only way to move forward is to get creative and improvise solutions." To capture the best video quality, staff used a combination of a high definition photographic/video camera and a standard high-definition camcorder, which provided a good alternative for the cinematic look and quality of a professional video camera.

Lights and sound had to be improvised since professional lights and expensive recording gear were not an option. Instead, NWS Tampa staff used a combination of fluorescent soft box lights and shareware audio recording software to bring the video to life. Staff even built a camera dolly to add fluid motion to several panoramic shots.

Of course, the most important element of any video documentary is the people on the screen, and luckily, the NWS Tampa Bay staff did not disappoint. Meteorologist Jennifer Colson acted as host with narration by Data Acquisition Program Manager Colleen Rhea. The video demonstrated there is a large pool of talent across our agency, ready and willing to contribute to our mission of educating the public and our partners about awareness and preparedness.

"We are excited about the great potential this new multimedia program offers, especially during times when the National Weather Service needs proactive outreach and self-promoting venues," added Reynes.

Title shot and filming setup for the NWS Tampa Bay PSA video, "1921 Hurricane: the Forgotten Nightmare," locally produced in its entirety.

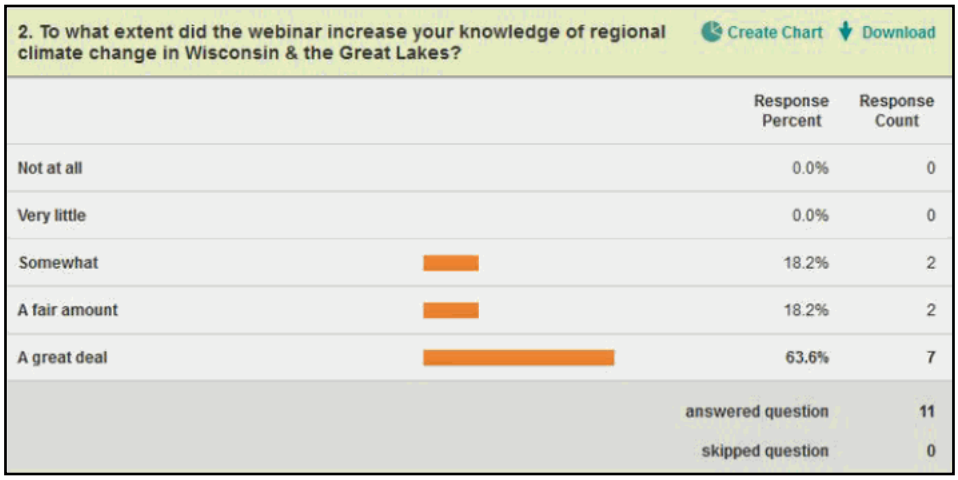
To serve a global audience with interest in the NWS, the use of social media applications and platforms will continue to expand, enabling NWS to engage partners and the public in new ways. WFO Tampa has great expectations on the virtually endless possibilities video productions like this one have to further serve the public. . . and we're rolling! ❄

Severe Weather

Storm Spotters Help Validate Climate Study

By Margaret Mooney, CIMSS, University of Wisconsin at Madison

To address regional impacts of climate change, the Cooperative Institute for Meteorological Satellite Studies (CIMSS) hosted a web seminar on climate change, climate mitigation and emerging applications to access weather and climate data with mobile devices.



2. To what extent did the webinar increase your knowledge of regional climate change in Wisconsin & the Great Lakes?

Create Chart | Download

	Response Percent	Response Count
Not at all	0.0%	0
Very little	0.0%	0
Somewhat	18.2%	2
A fair amount	18.2%	2
A great deal	63.6%	7
answered question		11
skipped question		0

CIMSS asked 19 storm spotters to take part in the study, of which 11 provided feedback via a follow-up survey. A third of the respondents chose to minimize their carbon footprint, a large majority (90%) indicated their likelihood to take action in the near future and more than two-thirds said they would like to learn more about climate mitigation and sustainability in the Great Lakes Region. The Webinar is available online. ❄

National Severe Weather Workshop Scheduled for March 1-3, 2012

By Greg Carbin, WCM, and Jared Guyer, Meteorologist, SPC

The theme for 2012 National Severe Weather Workshop is: "*Weather-Ready Nation: Helping Communities Prepare.*" This year will be the 12th anniversary for this growing national workshop dedicated to effectively transmitting messages about meteorological risk. EMs, weather enthusiasts, teachers, students, meteorologists, broadcasters and vendors in threat alerting, sheltering and communications will gather, present and discuss weather hazards topics. The featured speaker at the Friday night, March 2 banquet will be Keith Stammer, Director of the Joplin/Jasper County, MO, Emergency Management Agency. After 2 days of general sessions, the workshop will conclude Saturday morning with a half-day session related to storm spotter training. Some of the general session presentations planned include:

- Reviews of the intense 2011 severe weather season
- Social science assessments from 2011 tornado events
- Impacts of hazardous weather events from a response and recovery perspective
- Progress in storm prediction technology and approaches to information dissemination

The seminar will include an exhibit hall with information kiosks. The Website will feature participating vendors.

- For more information about the workshop agenda, contact Gregory.Carbin@noaa.gov.
- For registration and accommodation information, contact Brenda.Gomez@noaa.gov.
- For vendor and sponsorship opportunities, contact Keith Brewster kbrewster@ou.edu.

Check the Conference Website for a list of exhibit hall vendors and other updates in the weeks ahead. ❄

Service Assessments

NWS Releases Assessment for Spring 2011 Tornadoes, Floods and Hurricane, More Coming...

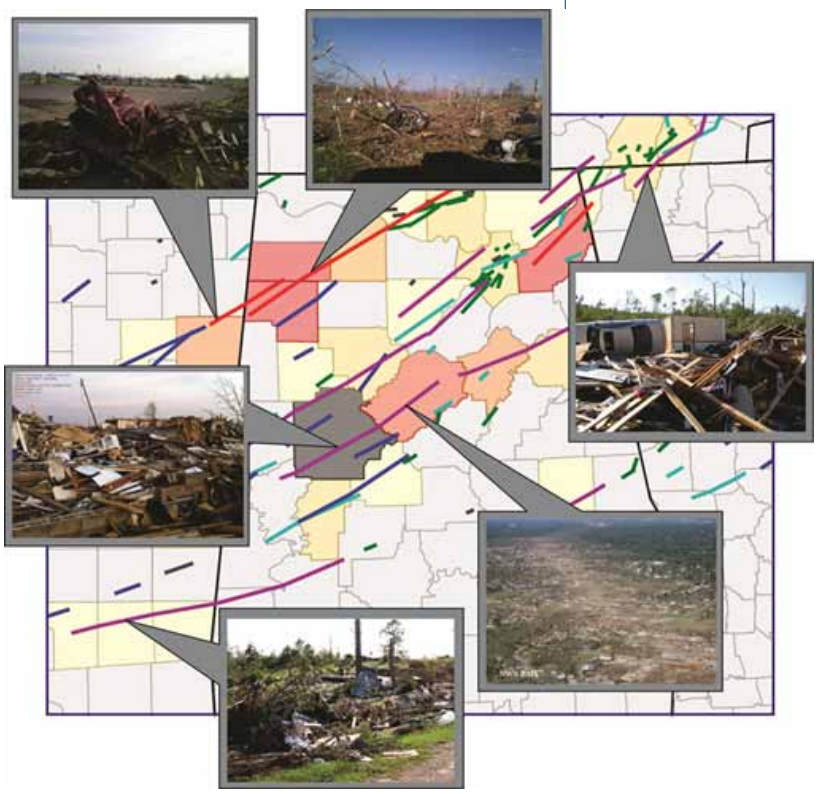
By Sal Romano, Meteorologist, NWS Performance Branch

NWS released a service assessment in December on the Historic Tornadoes of April 2011 and is working on two additional assessments. A summary of these service assessments follows:

The Historic Tornadoes of April 2011

During a 4-day period from April 25-28, 2011, more than 200 tornadoes occurred in five southeastern states. The deadliest part of the event occurred on the afternoon and evening of April 27, when a total of 122 tornadoes resulted in 313 deaths across central and northern Mississippi, central and northern Alabama, eastern Tennessee, southwestern Virginia, and northern Georgia.

Three additional lives were claimed earlier by tornadoes in the pre-dawn hours of April 27, bringing the total for that day to 316. NWS confirmed reports of 15 violent, Enhanced Fujita Scale 4 or 5, tornadoes. Eight of the tornadoes had path lengths in excess of 50 miles. Two of the tornadoes—one in northern Alabama and another that struck the Tuscaloosa and Birmingham areas of Alabama—each claimed more than 60 lives.



Tornado tracks and damage pictures from eastern Mississippi, central and northern Alabama, and northern Georgia. Map: National Severe Storms Laboratory. Photos: NWS Birmingham, AL; NWS Huntsville, AL; NWS Peachtree City, GA; Richard Okulski; Kevin Scharfenberg; Gary Woodall

To see if there were ways to prevent that tragic loss of life in the future, NWS deployed a Service Assessment Team to evaluate NWS performance. To strengthen relationships with other federal agencies involved with disaster work, the team, for the first time, included a coleader from the Federal Emergency Management Agency. One of the team's tasks was to assess societal impacts of this event. The assessment document included 24 recommendations to address NWS performance, safety and outreach programs. In addition, the team identified 14 best practices.

Significant tornado events also impacted portions of the southeast United States on April 15 and the St. Louis, MO, area on April 22. A devastating tornado struck Joplin, MO, on May 22. NWS conducted regional service reviews following each of these three events. The NWS regional reviews for two of the events are included in this assessment:

- North Carolina/South Carolina/Virginia U.S. Tornado Outbreak
- St. Louis Metropolitan Area Tornado Event

The regional review for the Joplin, Missouri, Tornado - May 22, 2011, was released in September 2011 and is referenced but not included in this assessment.

Spring 2011 Mississippi River Valley Floods

This draft Service Assessment presents findings and recommendations regarding NWS performance during the historic river flooding that occurred in the Mississippi River Valley during the spring of 2011. The areas most impacted were the lower reaches of the Ohio River and associated tributaries and areas from the confluence of the Mississippi River and Ohio Rivers at Cairo, IL, downstream to the Gulf of Mexico. A combination of runoff from upstream snowmelt and excessive spring rainfall combined to adversely impact property and commerce over a broad geographic area. This assessment is scheduled to be briefed by the team leader to the NWS Corporate Board in January 2012.

Hurricane Irene, August 2011

On Saturday, August 20, 2011, Hurricane Irene was a tropical wave east of the Lesser Antilles. Irene impacted the U.S. Virgin Islands and Puerto Rico, first as a tropical storm and then strengthening into a Category 1 hurricane late Sunday night and again on Monday morning. The storm continued to strengthen into a Category 2 hurricane and then began to weaken before making landfall near Cape Lookout, NC, on the morning of August 27 as a Category 1 hurricane.

After moving across the Outer Banks of North Carolina and extreme southeastern Virginia, Irene traveled off the Eastern Seaboard until reaching Little Egg Inlet on the New Jersey Coast where it made landfall early Sunday morning, still as a Category 1 hurricane. By 9 am, Sunday morning, Irene, now a tropical storm with 65 mph winds, was centered over New York City. Irene continued to travel northeast through New England and reached the Canadian border as an extra-tropical cyclone, with sustained winds of 50 mph, around midnight Sunday. Irene traveled through eastern Canada on Monday, August 29. In addition to producing strong, damaging winds along its path, Irene dropped copious amounts of rain, and produced damaging storm surges.

The assessment team is focusing on those locations most severely affected by the weather-related impacts of Irene: the U.S. Virgin Islands, Puerto Rico, and North Carolina north to southeastern Canada. ❄

StormReady/TsunamiReady

StormReady Topples L.A., Wins Korea, Storms Caribbean

By Melody Magnus, Aware Managing Editor

In October, Los Angeles became the largest TsunamiReady and StormReady site in the nation. The program also gained its first U.S. site abroad, U.S. Army Garrison Humphreys in South Korea. Though outside the United States, as a military installation, this site is considered part of the United States, not Korea. Humphreys is home to Desiderio Army Airfield, one of the busiest overseas airfields with over 60,000 movements annually. Thunderstorms and dense fog are just some of the weather hazards facing this military base.

In all, StormReady gained 35 sites so far this fiscal year, including 5 new universities and 1 college: Purdue University, Calumet, IN; University of Texas, Austin; University of Michigan; Flint University; Appalachian State University, NC; and Wiley College.

New military sites took arms as well. In Hawaii, Joint Air Force Base Hickam-Pearl Harbor and Marine Base Hawaii are both StormReady and TsunamiReady. Back on the mainland, Ft. Bragg, NC; the 114 Fighter Wing, South Dakota Air National Guard; and Columbus Air Force

Base, MS, are now StormReady. StormReady also gained Grand Canyon National Park in Arizona as well as numerous other cities, towns and counties across the nation.

TsunamiReady Goes International; Protects Paradise

TsunamiReady gained its first international site, the British island of Anguilla in the Caribbean. NWS worked with the Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization to start, what we hope will be the first of many recognitions for the Caribbean and Central America. This area is regularly threatened by hurricanes, tropical storms, floods, rip currents, tsunamis, and other weather hazards. StormReady offers the potential to save thousands of lives.

Dream of a vacation in Hawaii or Puerto Rico? You can rest easy knowing both are increasingly TsunamiReady. In addition to the two new military sites, Hawaii added the city of Kailua. All the Hawaiian islands have been recognized as TsunamiReady. These added sites add an even higher level of assurance to its residents. Puerto Rico added the towns of Arroyo, Quebradillas and Toa Baja, to bring its total of TsunamiReady sites to 19. Prefer California for a getaway? Orange County Sanitation District also achieved StormReady and TsunamiReady status.

Grand Canyon National Park is subject to blizzards, high winds and numerous other weather hazards; now it's StormReady. From left: Sean Fielding, GCNP Regional Communications Center Supervisor; Brian Klimowski, MIC, NWS Flagstaff; George Howard, WCM, NWS Flagstaff; Ken Phillips, Park Emergency Services Chief.

To be recognized as StormReady, a community must commit to specific levels of emergency preparedness, including 24/7 communications and an active outreach and education program. For more information, contact your local NWS office or go to the StormReady Website. ❄

Local StormReady Commendation Award

By Jim Maczko, WCM, WFO Grand Rapids, MI

The 2011 Memorial Day weekend in Battle Creek was certainly memorable. On Sunday, May 29, 2011, severe thunderstorms moved through the Battle Creek area, producing up to 100 mph winds and resulting in significant damage in Battle Creek.

Fortunately, there were only a few injuries. Special actions taken by EM staff of Battle Creek likely saved many more people from injuries, and possibly even death.

To recognize the exemplary efforts to protect lives and property, NWS awarded the town a Local StormReady Commendation Award. This award was presented to Battle Creek Mayor Susan Baldwin at the Battle Creek Commissioners Meeting on December 6 at City Hall. ❄

Split level anyone? Severe weather caused this distruction to a Battle Creek, MI, home.

Winter Weather

Generating Socioeconomic Impact Forecasts for Winter Storms

By Brian Cerruti, NWS Meteorological Development Laboratory

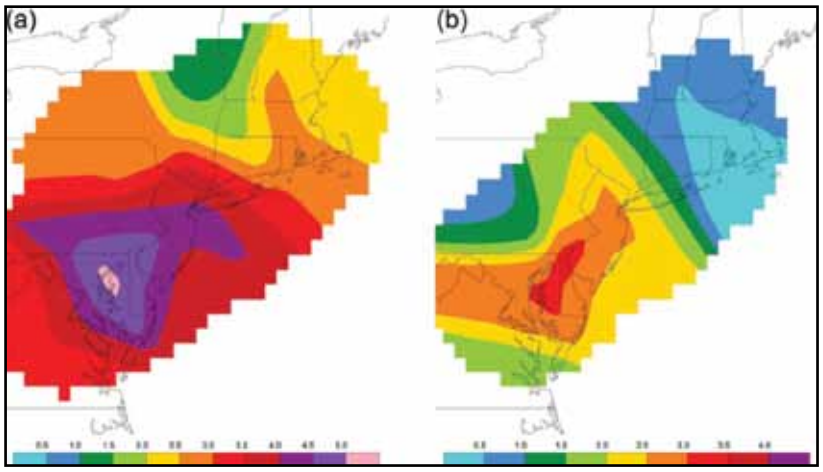
The NWS needs to consider societal-based impact forecasts to more efficiently allocate its resources and provide enhanced decision support services for core partners such as the Federal Aviation Administration and Department of Transportation.

Winter storms cause billions of dollars in cleanup per storm, mainly from snow removal,

and often result in snow-clogged roads, railways and airports. Strong winds can lead to power outages and lost productivity.

Forecasting winter storms can be difficult due to the many variables that must be considered such as precipitation type and amount, wind speed, temperature, precipitation rate, time of day, and time of year. In response, NWS has developed a tool to simplify the process of impact-based forecasting, the Local Winter Weather Prediction System (LWWPS). LWWPS consists of two independent classification scales:

- Local Winter Storm Scale (LWSS): a meteorological severity scale
- Rooney Disruption Index (RDI) scale: local socioeconomic impact



Map of observed (a) LWSS and (b) RDI values calculated for the Feb. 9–10, 2010, winter storm, shaded on a scale from 0 to 5 according to the legend.

This winter, the following NWS forecast offices are developing their own LWWPS as part of a beta test:

- Juneau, AK
- Northern Indiana
- Goodland, KS
- Boston, MA
- New York, NY
- Rapid City, SD
- Memphis, TN
- Charleston, WV
- Cheyenne, WY

These offices will develop an RDI based on socioeconomic data from past storms and will have the ability to forecast LWSS values. For example, Greg Guillot of WFO Goodland developed a tool that calculates LWSS within the NWS Graphical Forecast Editor used to produce NWS forecast products.

NWS will evaluate the LWSS forecast product this winter. Once each WFO develops its own RDI, NWS will produce a new forecast graphic for decision makers that will show potential socioeconomic impact from winter storms by combining the LWSS and RDI.

A sample post storm analysis graphic from the winter storm of February 9–10, 2010, is shown in Figure 1. The observed meteorological intensity of the storm measured by the LWSS scale (left) matches the observed pattern of socioeconomic impact as measured by the RDI scale (right). Specifically, the maximum in observed LWSS values closely matches the observed maximum observed RDI values, meaning that the LWSS successfully identified where the worst of the storm occurred in terms of socioeconomic impact.

The graphic illustrates it is possible for an accurate meteorological forecast to produce a reasonable forecast of socioeconomic impact for decision makers during high-impact events. A more indepth look at these scales is available online. ❄

NWS Offices Continue Test of Extreme Cold Products

By Sean Potter, NWS Communications

When it comes to winter weather, there's cold, and then there's extreme cold. As part of its effort to build a Weather-Ready Nation, NWS wants to ensure the public is prepared when extreme cold episodes are forecast. Traditionally, Wind Chill Watches, Warnings and Advisories have been the product of choice when combinations of low temperatures and high winds posed a serious threat to human safety and health.

As WCM Greg Gust, WFO Grand Forks, ND, points out, "In the northern Plains, as the wind

drops off behind a departing storm system, the coldest part of an Arctic air mass usually settles in. At that point, the actual air temperature will quite often drop into the realm of what had previously been the wind chill—30, 40 even 50 below zero."

In the past, NWS offices in the region would cancel a Wind Chill Warning when a deadly part of the storm—the extreme cold—was still present because winds had stilled. "We call it the insidious cold because most people just don't realize how deadly a prolonged exposure can be at those extremely low temperatures," said WCM J.P. Martin, WFO Bismarck, ND.

Several offices in the NWS Central Region, which typically experiences some of the coldest air in the lower 48, are taking a new approach to streamline the process and clarify the message to the public. For the second year, the following NWS forecast offices will issue experimental Extreme Cold products for the winter season:

- Sioux Falls, Rapid City and Aberdeen, SD
- Bismarck and Grand Forks, ND
- Twin Cities and Duluth, MN

Most of these offices will consider issuing these products when conditions are expected to produce equivalent temperatures of -30 to -35 degrees or below. Within this range, forecasters will issue the Extreme Cold products when several forecast zones serviced by the office will be affected for at least several hours.

The Duluth office will issue this product when it is -40 degrees, for temperatures warmer than this (-25 to -39) the office will use a Special Weather Statement to advertise the cold.

Babbitt, MN, where a frigid morning. low temperature of -46 degrees. was recorded on January 21, 2011. Courtesy of Ryan Scharber, NWS Cooperative Observer.

Collaborating with surrounding offices is a key component in deciding to issue this product. Since offices will issue the Extreme Cold products for temperatures with either windy or no-wind conditions, the product will include explanatory comments in the first paragraph or bullet items.

The Weather-Ready Nation initiative focuses on helping people make better decisions with better information. The end goal of better decisions represents the best attributes of the NWS culture, a focus on demand-driven support services. The initiative will require improvements in the science and technology of the modernization era as well as better integration of social sciences and improved partnerships with other government agencies, researchers, and the private sector. Learn more at www.weather.gov/news/weatherready. ❄

Climate, Water and Weather Links

- National Oceanic and Atmospheric Administration Home Page
- National Weather Service Home Page
- Aviation Weather, Information and Resources
- Weather Safety and Awareness Brochures, Booklets, Posters
- Education and Outreach Videos, Multimedia and More
- NWS Local Office Key Contact List
- 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