The Southern Plains Cyclone

A Weather Newsletter for the Residents of western and central Oklahoma and western north Texas

Volume 1 Winter 2003 Issue 1

Meet Your Weatherman Mike Foster

Hello! I am Mike Foster, the Meteorologist-in-Charge (MIC) at the National Weather Service (NWS) Weather Forecast Office in Norman. Welcome to the first issue of the newsletter from your Forecast Office. In each issue, we will use this space to profile an individual who is active in the field of meteorology.

My interest in meteorology began in 1956 when I experienced Hurricane Betsy in Puerto Rico. I was always awed by the spectacle of thunderstorms, and I saw my first tornado while living in Topeka, Kansas. I was sidetracked from a weather career for a few years after high school while serving in the United States Air Force and later while obtaining a degree in economics from the University of California-Riverside. After a few years in local government and business jobs in California, I began looking for a change of pace. The solution came on the morning of April 11, 1979, when I saw headlines and photographs detailing the devastating Wichita Falls, Texas, tornado. From that moment on, I was committed to a career in meteorology. By the fall of 1979, I was enrolled in the University of Oklahoma in Norman where I was awarded a Master of Science in Meteorology in 1984.

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History of Your National Weather Service

By Rick Smith, Warning Coordination Meteorologist

Did you know the National Weather Service has been serving the American public with warnings and forecasts for over 130 years? Did you know there has been a National Weather Service office in central Oklahoma since 1890?

What we now call the National Weather Service began way back in 1870, when Congress passed a resolution that put the U.S. Army Signal Corps in the weather business. We have come a long way since then – from just a few observations scattered across the country and national forecasts prepared from one central location, to a highly technical and scientific organization, using the latest technology and the best trained forecasters in the world to provide life-saving warnings, advisories, and watches to the American public. Today, forecasters at 122 local weather forecast offices provide local communities with the most specific warnings and forecasts available.

The National Weather Service actually began its life with a different name. The Division of Telegrams and Reports for the Benefit of Commerce issued its first public forecasts in 1871. At that time, all forecasts came from the national headquarters in Washington, D.C. This continued until 1886, when more specific forecasts were issued for states or parts of states. The forecasts were issued three times daily and covered only a 24-hour period. This was eventually expanded to 48 hours by 1898. Today, the NWS issues forecasts for areas smaller than the size of counties for seven days.

The way we disseminate weather information has also changed dramatically. In the earliest days of the weather service, observations from a dozen locations

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The National Weather Service Cooperative Observer Program

By Karen Trammell, Student Meteorologist

The Cooperative Observer (Coop) Program is a very important aspect of the National Weather Service organization. Despite its significance, much of the public remains unaware of its purpose or its lengthy history.

The Coop Program is a network of official weather observers who take precipitation, temperature, evaporation, soil temperature, and river level measurements. Comprised of almost 12,000 stations in the United States, Puerto Rico, and Guam, the Coop Program forms the backbone of the national climatological database and serves as a valuable source of ground truth information for forecast offices during hazardous weather. Many of the individuals and institutions that participate in the program are volunteers.

In the Norman warning area, about 175 observers participate in the program. Most of the stations measure only precipitation, while about a quarter take precipitation and high and low temperature measurements. Only a few sites record pan evaporation in addition to precipitation and temperatures. A wide array of equipment is used by a cooperative observer, including both recording and non-recording rain gages, electronic temperature sensors, and evaporation pans.

The Coop Program has an extensive history in the United States, with its seeds planted by some of the most prominent

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Your Weather Radio: National Weather Service Radio and Its Many Voices

By Kevin Brown, Senior Forecaster

The Radio. For those of you who do not have a weather radio, let me begin by explaining what weather radio is and why you should own one. National Weather Service Radio provides continuous and comprehensive weather information to over 750 stations nationwide direct from a nearby National Weather Service Forecast Office 24 hours a day, 365 days a year. The programming includes watches, warnings, advisories, forecasts, current weather conditions, climatological information, and other hazardous weather information. Weather radio is considered an "all hazards" radio network, which also includes environmental emergencies such as chemical releases and oil spills. Because weather radio provides the fastest possible hazardous weather warning system, owning one could mean the difference between life and death during a tornado, severe thunderstorm, or flash flood.

Locally, National Weather Service Radio currently transmits from a network of 14 stations covering western, central, and southeast Oklahoma and western north Texas.

During an emergency, routine weather programming is interrupted, and special tones are sent that active weather radios in the listening area. If you have a weather radio that can interpret the Specific Area Message Encoder (SAME) signal, your radio can be programmed to alert only if a watch or warning is issued for your county instead of alerting for all watches and warnings in the listening area. This type of weather radio can be found at many electronics and department stores.

The Norman Forecast Office conducts an alert test each Wednesday around noon, unless there is ongoing severe or hazardous weather. If the test is canceled, a statement stating such will be included in the broadcast program, and the test will be planned for the next Wednesday. This weekly test is provided to allow radio owners to verify that their radios are functioning correctly.

Additional details about National Weather Service radio can be found on the web at *www.srh.noaa.gov/oun/nwr* and *www.nws.noaa.gov/nwr*.

The Voices. Originally, National Weather Service Radio broadcasts were recorded entirely by humans. However, in 1998, the National Weather Service introduced computer-synthesized voice technology to the broadcasts, thereby automating the programming. As a result, multiple independent weather warnings could be sent over multiple transmitters simultaneously, allowing for speedier delivery of the warnings and increased lead time for the public. However, listener feedback showed that the synthesized voice left much to be desired. This voice, locally known as Ned, can still be heard on a few of the products delivered over weather radio.

With advances in artificial speech technology, a new computer voice program, known as the Voice Improvement Project (VIP), was added to the weather radio programming this summer to provide more life-like male and female voices. As a result of continued programming limitations, you will hear the male version of the computer voice much more frequently than the female version. By 2004, new computer systems will allow the female voice to be used on a more frequent basis and will also allow the introduction of more advanced voices.

As the VIP continues to be customized for our region at the NWS office in Norman, feedback from you, our listeners, is very important! If you hear any mispronounced words, please contact us by calling 405-360-5928 or visiting our website at *www.srh.noaa.gov/oun*.

Local Weather Radio Transmitters And Frequencies

Oklahoma City	162.400 MHz
Altus	162.425 MHz
Ponca City	162.450 MHz
Enid	162.475 MHz
McAlester	162.475 MHz
Sherman	162.475 MHz
Wichita Falls	162.475 MHz
Atoka	162.500 MHz
Haviland	162.500 MHz
Woodward	162.500 MHz
Ardmore	162.525 MHz
Clinton	162.525 MHz
Lawton	162.550 MHz
Paris	162.550 MHz

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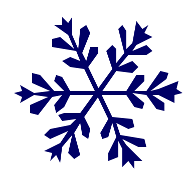
names from our nation's early history. The first weather observations in the U.S. were taken in 1644 by John Campanius Holm near present-day Wilmington, Delaware. Many other famous individuals, namely Ben Franklin, kept weather records on their own as well. However, it was not until the 1770s, when Thomas Jefferson first envisioned the idea, that a concerted effort was made to establish a permanent observing network on U.S. soil. Between 1776 and 1816, Jefferson recruited observers for every county in Virginia and helped create a similar program in Massachusetts, Pennsylvania, Connecticut, New York, and North Carolina. For his work in the Coop Program's formation, a prestigious award was established in his name in 1959 to honor the work of outstanding observers.

Following the East's lead, observing networks expanded across many different regions of the U.S. during the early and middle 1800s. The invention of the telegraph around this same time allowed observers to share their observations with others across the country. The Smithsonian Institution promoted the practice of weather observing in 1849 by supplying instruments to telegraph offices. The offices then sent the measurements back to them in order to create weather maps. Initially, 150 observers participated in the program with the number blossoming to 500 by 1860. Following the Civil War, the Smithsonian's program gradually absorbed several state networks. By 1891, 2,000 stations comprised the national network. As the current numbers show, the cooperative observer network continued its steady growth throughout the 20th Century, reaching the present-day total of 12,000 stations.

The Cooperative Observer Program serves a vital role in everyday operations in the National Weather Service, as well as in providing data that is used for important climatological research. Additional information about the Cooperative Observer Program in the Norman forecast office can be found on the web at *www.srh.noaa.gov/oun/coop*.

Winter Officially Began on December 22nd at 7:14 a.m. CST.



Weather in Review: The Widespread Severe Wind Event of August 27, 2002

By Doug Speheger, Forecaster

The most damaging outbreak of severe thunderstorms across Oklahoma and western north Texas in the late summer and fall months occurred during the overnight hours of August 26 and the early morning hours of August 27. In the late afternoon on Monday, August 26, thunderstorms developed over extreme northwest Kansas and southwest Nebraska and moved to the southeast through western Kansas before entering northwestern Oklahoma just before midnight. As these storms swept through Oklahoma and north Texas during the early morning hours of August 27, widespread strong winds and wind damage were reported. Despite the early hour of these storms, meteorologists at the National Weather Service received valuable information about what these storms were doing thanks to information from spotters and the Oklahoma Mesonet.

Several key ingredients came together across the Plains to cause the night's severe weather. An upper level trough positioned over eastern Colorado provided a lifting mechanism. Southerly low level winds on the eastern side of the Rockies transported ample moisture from the Gulf of Mexico into western Oklahoma and Kansas and the Oklahoma and Texas Panhandles.

The first severe thunderstorm warning in the Norman county warning area was issued for Harper County at 10:49 p.m., as these thunderstorms moved into extreme northwest Oklahoma. Winds of 68 mph were recorded by the Oklahoma Mesonet station near Buffalo. As the storms moved to the southeast, spotters in Woodward County relayed reports of strong winds and wind damage in Fort Supply and Woodward through the northwest Oklahoma amateur radio network (147.36 MHz in Sharon and 146.745 MHz in Watonga linked to 443.425 MHz in Edmond).

The storms continued to move southeast toward the Oklahoma City metro area. The initial area of thunderstorms in Oklahoma City moved across the northwest portion of the city where a peak wind of 59 mph was reported at Wiley Post airport near Bethany. Near the same time, NWS meteorologists noticed a strengthening of thunderstorms in south Oklahoma City, moving into Cleveland County, and issued a severe thunderstorm warning. The Emergency Operations Center in Moore quickly confirmed the strengthening by reporting a measured wind gust of 65 mph to the NWS through the central Oklahoma amateur radio network (145.210 MHz). Winds up to 80 mph continued with these storms as they moved through Cleveland and McClain Counties. The city of Norman experienced considerable damage, with many power outages and downed tree limbs.

As these storms were moving through the Oklahoma City area, additional thunderstorms continued to move south and southeast through southwest Oklahoma and into western section of north Texas. The southwest Oklahoma amateur radio network (147.045 MHz) also became very active with spotter reports of severe thunderstorm winds measured in Duncan (67 mph), Burkburnett (74 mph), Wichita Falls (65 mph), Iowa Park (60 mph), and near Henrietta (61 mph).

These real-time reports from spotters were a valuable tool to help NWS meteorologists confirm the threats evident on radar and to prepare residents of adjacent communities for the strong winds. Thanks to everyone who helped us during this event.

Selected Severe Wind Gusts

88 mph	4 NNW Piedmont
80 mph	4 WSW Weatherford
76 mph	Frederick
74 mph	Burkburnett
73 mph	Norman
73 mph	7 W Lawton
72 mph	2 SW Gage
70 mph	7 WNW Seiling
70 mph	2 S Putnam
70 mph	1 E Angora
70 mph	Vici
68 mph	1 SW Buffalo
68 mph	Woodward
67 mph	Duncan
67 mph	6 SSW Washington
66 mph	4 WNW Camargo
66 mph	4 NW Chickasha
66 mph	3 SW Lawton
65 mph	Moore
65 mph	Wichita Falls

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around the United States were fed via telegraph to a central forecast office in Washington. There, forecasters prepared general forecasts and sent them via telegraph to various users. These forecasts were displayed in the form of Farmer's Bulletins in local post offices. By the early 1880's, local signal flags replaced the bulletins, allowing people to get some idea of upcoming weather by the color of a flag flown in a central location.

In 1870, only 24 weather observers covered the United States, and this number grew to almost 300 by 1878. Compare this with the National Weather Service's observation network of today, which includes thousands of cooperative observers and storm spotters, in addition to the automated observing systems, satellite, wind profilers, and radar systems in place.

In 1890, weather services were transferred by Congress to the Department of Agriculture, and in 1891, the United States Weather Bureau was born. This became a common name with many people, and in fact, a lot of people still refer to us as the Weather Bureau! In 1940, the Weather Bureau was transferred to the Department of Commerce, where it remains today. The structure that many of us are most familiar with came into being in 1970, when President Richard Nixon signed an order, changing the name to the National Weather Service.

Your local National Weather Service office has been in the Oklahoma City area since 1890, starting out in an office in the Overholser Opera House in Oklahoma City, moving to the Culbertson Building in 1902 and the Weather Bureau Observatory in 1906. In 1932, the Weather Bureau established its first office at Will Rogers Airport in Oklahoma City. The office remained here until 1987 when the National Weather Service moved into its current facilities in Norman. The next big move will take place sometime in 2005, when the forecast office will take its place in the National Weather Center building on the University of Oklahoma south campus.

Through all the years, the name changes and the incredible leaps in technology and science, the National Weather Service has provided the citizens of Oklahoma and western north Texas with the highest quality weather services available. We look forward to working with you as we continue the trend into the 21st Century.

Getting Ready for the Storm — An Introduction To the StormReady Program

By Rick Smith, Warning Coordination Meteorologist

Is your community prepared to handle hazardous weather situations? It is absolutely critical that each person, each family, and each community have a plan for what they will do when severe weather threatens. The National Weather Service has developed a program to help communities be better prepared to handle what is sure to happen every year in Oklahoma and western north Texas. That program is called StormReady.

StormReady gives emergency managers and community leaders a way to organize their hazardous weather operations by emphasizing important components of a preparedness plan. This includes receiving and disseminating warnings, monitoring and reporting local weather conditions, and educating the public about the dangers of weather and ways to be safe. The overall goal of the program is to do everything possible to reduce the injuries and loss of life from hazardous weather events.

StormReady was born in Oklahoma, when Steve Piltz (former Warning Coordination Meteorologist and now Meteorologist-in-Charge) and Lans Rothfusz (former Meteorologist-in-Charge) at the Tulsa forecast office developed the idea as a way to help emergency managers be better prepared and organized when it comes to severe weather operations. From Tulsa, the program spread across the nation like wildfire. Today, there are over 500 communities in 43 states that have been officially recognized, with over 200 of those achieving StormReady status in the last 12 months alone. It is interesting to note that, by far, Idaho has more StormReady communities than any other state.

Many different types and sizes of municipalities are recognized by StormReady. Large cities, small towns, counties, tribal nations, and even universities are all eligible for recognition. In western and central Oklahoma and western north Texas, eight communities have achieved StormReady status. Ponca City, Moore, and Ardmore, Oklahoma, and Burkburnett, Texas all reached StormReady status in 2001, and this past summer, Atoka, Cordell, Elk City, and Seminole, Oklahoma, and Wichita County, Texas joined the StormReady ranks.

Given the frequency of severe weather in this area, there is no question that a large number of communities in Oklahoma and western north Texas are adequately prepared to deal with hazardous weather and would qualify for StormReady status. Many of these just have not gone through the formal process of applying to become StormReady. The NWS in Norman would like to see many more communities receive the recognition they deserve!

There are three basic steps in becoming a StormReady community. First, the emergency manager must complete a simple application detailing how they meet the following requirements:

- how many ways do you have to receive warnings;
- how many ways do you have to send those warnings to the public;
- how many ways do you have to monitor the weather;
- do you have a detailed hazardous weather operations plan;
- do you help people be better prepared through public education;
- do you work closely with the NWS to relay reports during an event.

Second, an advisory board, comprised of NWS and emergency management representatives, reviews the application and visits the community to discuss the application and verify that the requirements are met. Based on the application and the site visit, the board either approves the recognition or informs the community of what is needed to qualify for recognition.

Finally, upon recognition, the NWS formally and publicly recognizes the community's dedication to public safety and preparedness in a ceremony and presents a plaque and road signs to community officials. This recognition lasts for three years.

For more details and information on the program and how you can apply, visit the national StormReady website at *www.stormready.noaa.gov*. If your community is interested in learning more about StormReady, or if you need help with the application process, contact Rick Smith at the forecast office in Norman.

Spotter Training

With cold weather and the holidays approaching, severe thunderstorms and tornadoes are the last things on the minds of most people. However, NOW is the time to plan and get ready for the 2003 severe weather season.

To help communities be better prepared to handle severe weather, the National Weather Service office in Norman will once again offer storm spotter training sessions to interested communities. As in the past, the sessions should be organized through the local emergency manager, preferably in coordination with the county emergency manager.

We have many sessions scheduled already, but dates still remain open on the calendar. We will conduct training from around mid January through the end of March.

To reserve your spot on the calendar, contact Rick Smith by phone at 405-360-5928 or by e-mail at Richard.Smith@noaa.gov.

National Severe Weather Workshop

The 2003 National Severe Weather Workshop (NSWW) will be held February 27 through March 1 at the Marriott Convention Center in Norman, Oklahoma. Workshop registration can be done online at *www.nssl.noaa.gov/nsww2003/workshop.html*. The cost of registration prior to February 10 is $50 and $65 thereafter.

Organized primarily for emergency management, media, spotters, and others with weather interests, the NSWW provides an opportunity for forecasters and severe weather experts to present and discuss safety and preparedness issues, new research, forecasting techniques, and severe weather awareness programs, such as StormReady. Besides the typical conference-type presentations, spotter training will also be available at the workshop. Additional information about the NSWW can be found online at *www.nssl.noaa.gov/nsww2003*.

Forecaster Forum:
Snow, Sleet, and Freezing Rain — The 'Other' Severe Weather

By Dan Miller, Forecaster

When it comes to weather, Oklahoma and western north Texas are most commonly associated with severe thunderstorms and tornadoes. That association is certainly warranted, as the southern plains region typically receives its fair share of severe thunderstorms each year. However, Oklahoma and western north Texas are also prone to severe winter weather.

Although the southern plains region of the United States does not receive winter type precipitation with the frequency of locations farther north and east, Oklahoma and western north Texas usually experience precipitation in the form of snow, sleet, or freezing rain at least a few times each winter season. In fact, two of the most damaging ice storms in Oklahoma history occurred during the past two years on December 25th-27th, 2000 and January 29th-31st, 2002.

Winter storms pose a significant threat to life and property, and the southern plains are no exception. The impacts of winter storms may be even more severe in this part of the country because they occur less frequently. Many people in this area are not accustomed to driving on snow and ice, which often leads to traffic accidents. In addition, severe ice storms can render areas without power for one to two weeks and can cost power companies millions of dollars in labor and materials to restore service.

Accurately forecasting winter precipitation events is every bit as challenging as forecasting severe thunderstorms. The primary challenges are figuring out what is the most likely type of precipitation and once precipitation type is determined, how much snow or sleet will accumulate on the ground or how much ice will accumulate on trees, power lines, and just about any other exposed surface.

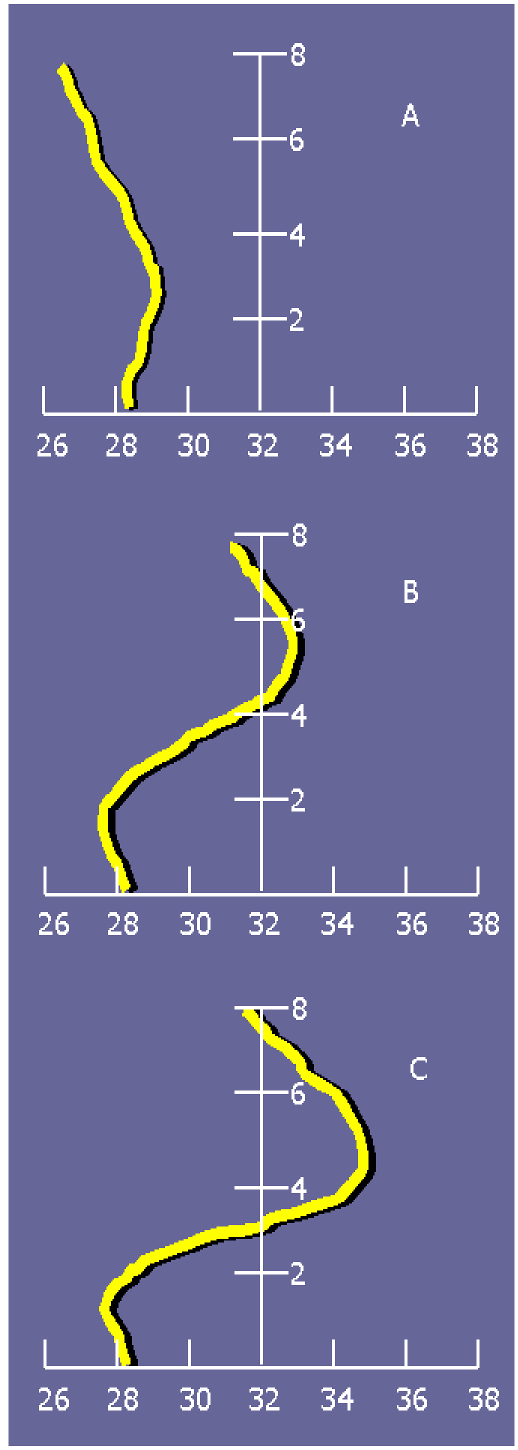
In order to determine the most likely precipitation type, forecasters need to know the temperature and moisture content of the atmosphere from the surface to around 20,000 feet above ground. To do this, forecasters rely on a combination of observed data from weather balloons and computer model forecasts of temperature and moisture up to several days into the future. So why is forecasting precipitation type still so challenging in this day of high technology?

Winter precipitation type is often determined by the presence or lack of a warm layer of air, where temperatures are above freezing, somewhere between three and eight thousand feet above the ground. The characteristics of this warm layer, such as its depth and its maximum temperature, are important factors in precipitation type.

For precipitation to fall as snow, the temperature typically must be below freezing at all heights in the atmosphere, and there must be some source of ice crystals in the mid and upper levels of the atmosphere. In this case, there is either no warm layer present or it is very small. Sleet forms when frozen particles fall through a warm layer, melt, and refreeze before reaching the ground. For sleet to occur, the warm layer must be relatively shallow and be several thousand feet above the ground. Freezing rain occurs when these frozen particles fall through the warm layer, melt, and freeze on contact with objects on the ground. For freezing rain, the warm layer is generally several thousands of feet deep and relatively close to the ground.

Forecasting this warm air poses several problems. Actual observations at levels above the surface are obtained from weather balloons, and the balloons are only released every 12 hours under normal circumstances or every 6 hours on special request. Also, there are generally 2 to 3 hundred miles between each upper air observation site. However, conditions in the warm layer can change substantially in times and distances much less than this. Computer models are used to fill in these holes, but many times, the models have difficulty in determining the magnitude and depth of this warm layer.

Precipitation type is very sensitive to the subtle changes in temperature within the layer of warm air aloft, and that is what makes forecasting precipitation type and amount so difficult. A difference in temperature of only a degree or two in the warm layer aloft, can make the difference between a foot of snow, 2 inches of ice pellets, or an inch of ice at a particular geographic location. A slightly incorrect model forecast of temperatures aloft may result in the freezing rain falling where snow was forecasted.



Vertical temperature profiles associated with the winter precipitation types of (A) snow, (B) sleet, and (C) freezing rain, are depicted by the yellow lines. The horizontal axis shows temperature in degrees Fahrenheit. The vertical axis shows height above the ground in thousands of feet.

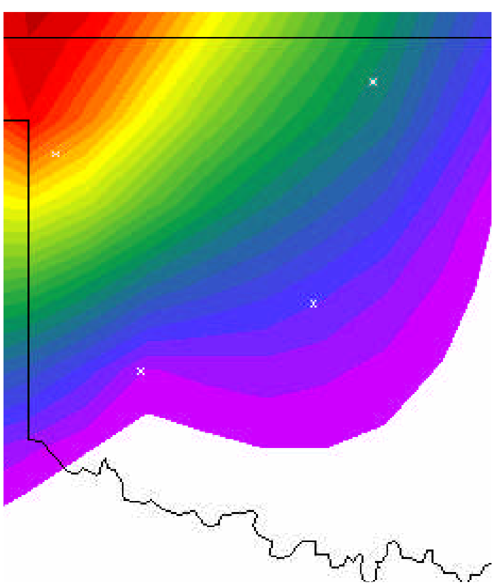
In Weather History: The Great Snowstorm of February 20-22, 1971

By Karen Trammell, Student Meteorologist

One of the most damaging snowstorms in Oklahoma history occurred across northwest Oklahoma on February 20th, 21st, and 22nd, 1971. During these three days, more than 30 inches of snow fell across much of Harper and Woodward Counties. Buffalo recorded 36 inches of snow on the ground on the morning of the 22nd, a record for the state of Oklahoma. Strong winds, at speeds approaching 50 miles per hour, caused snow to drift as high as 20 feet in some areas. This event made headlines in newspapers nationwide, including the *Los Angeles Times*.

Light snow began falling across much of northwest Oklahoma on the evening of the 20th, increasing to a heavy snow and blizzard conditions into the morning of the 21st. The snow finally ended for much of the area on the morning of the 22nd, although the hardships caused by the storm did not end with the fall of the last snowflake.

The storm hampered everyday life in the small communities of northwest Oklahoma. City streets, county roads, and state highways were closed not only during the storm, but also for many days afterward. Many people who were away from home and in other towns when the snow began were unable to return home before roads became impassable. As a result, many were stranded in cars or in rural farmhouses. Most were not able to return to their homes until roads opened on the 24th.



Depth of snow on the ground on the morning of February 23rd. Purple indicates a depth of 1 inch, green shows a 15 inch depth, and red signifies 25 or more inches.

Closed roads caused hardships for those who were fortunate enough to be at home when the storm struck as well. Many were without basic provisions because milk and grocery delivery trucks could not make it to the towns. In rural areas, the National Guard used army helicopters to deliver medicines and other supplies to families.

The storm crippled many businesses. This was not only due to the depth of the snow and the inability for customers to get to them, but also because the weight of the snow caused damage to rooftops and awnings on the buildings. In Laverne, an awning on a grocery store buckled and broke a plate glass window in the store. Schools in the area were also closed for much of the following week.

Despite the hardships faced by residents of the area, livestock and other wild animals may have suffered the most from the storm. Cattle and hogs were buried under the snow for many days. Remarkably, some of them were found alive by rescuers after the storm was over. Those who were not buried were still without a food source. After the storm, the National Guard searched for stranded herds from the air and dropped hay to them. In all, 11,000 cattle, 3,500 hogs, and 1,000 sheep were lost to the storm.

What caused this record-setting event? A very active weather pattern was responsible for this winter storm, with the most important features being a cold front and an upper level low pressure system. A relatively weak cold front moved through the Southern Plains states overnight on the 18th and early morning on the 19th, bringing slightly cooler temperatures and strong westerly and northwesterly winds. As the front approached the Gulf Coast, its progress slowed, with its southern end eventually becoming stationary on the 20th. Arctic high pressure slipped into the northern United States on the 21st, dropping temperatures across southern Kansas and northern Oklahoma into the upper 20s and low 30s.

At the same time, a very strong upper level low pressure system, originating in the southwestern United States, moved toward Oklahoma and Texas from the west. With temperatures already below freezing, this upper level low pressure helped initiate the first snowfall across northern and western Oklahoma overnight on the 20th. As it moved into eastern New Mexico and west Texas on the morning of the 21st, its proximity to the lingering Gulf Coast stationary front caused weak surface low pressure to develop on the front in east Texas. Over the next 24 hours, this surface low pressure deepened and moved to the north-northeast across eastern Oklahoma and into Missouri. This strengthened low pressure center increased wind speeds and snowfall across northern Oklahoma, leading to the blizzard conditions in the northwest on the 22nd.

A car and about half of a home are buried by snow in Laverne. Scenes such as this were commonplace across much of northwest Oklahoma following this winter storm. Photo Courtesy of Mr. George Armor, Laverne cooperative observer.

Officials estimated that this devastating snow storm caused 2.1 million dollars in property losses, most of which were agriculturally related. This storm continues to be the worst snow storm in Oklahoma history, and with any luck, will remain that way for many years to come.

Special thanks go to Mr. George Armor for his help in researching this event.

Cooperative Observer Notes

Measuring and Reporting Frozen Precipitation

By Forrest Mitchell, Hydrometeorological Technician

One of the more challenging tasks of weather observing in Oklahoma and Texas is the measurement of frozen precipitation. Snow and ice do not occur very often in this area, allowing observers little opportunity to gain experience measuring and reporting it. In addition, the snow is usually accompanied by wind, resulting in a variable snow cover on the ground. Due to these difficulties, the following guidelines have been developed to assist observers with frozen precipitation measurement and reporting.

Prior to snow and ice events, the funnel and measuring tube must be removed from the outer can and taken inside until the end of the event. It is generally a good idea to do this before the beginning of the winter precipitation season to avoid not remembering. If this is not done, the measuring tube may crack, resulting in leaks.

The daily snowfall is the amount of snow that has fallen in the 24 hours since the last measurement, while the snow depth is the total depth of snow on the ground at the observation time. If there have been several consecutive days of snow, these two amounts may not be the same.

Forrest Mitchell demonstrates the procedure for measuring snowfall as Erin Maxwell watches. Photo Courtesy of Steve Kruckenberg, Service Hydrologist.

The snowfall and snow depth are measured with the metal snow sticks that were mailed last spring. Take several measurements around the property in areas where the snow cover is fairly uniform. Make sure to avoid snow drifts, as they are never representative of the true amount. Also, try not to include the depth of grass below the snow in the measurement. Determine an average measurement to the nearest tenth (0.1) of an inch, and enter the average on your B-91 form in the column to the immediate right of the rainfall column. In the column to the right of the snowfall, enter the total snow depth to the nearest whole inch.

In addition to the amount of snowfall and snow depth, the amount of liquid equivalent precipitation must also be measured and reported. The liquid equivalent is essentially the amount of rainfall that would have been measured had the precipitation fallen as a liquid rather than in a frozen state. The snow that accumulates in the overflow can is melted down and poured through the funnel into the measuring tube. The liquid is measured with the rainfall measurement stick, to the nearest hundredth (0.01) of an inch, and entered in the rainfall column of the B-91 form.

As with rainfall, the snowfall, snow depth, and liquid equivalent must be phoned in each day via ROSA. When reporting snowfall, the code 69 should be used. For example, 3.1 inches of snowfall would be entered as 693*1#. The code 68 should be used for snow depth. A snow depth of 3 inches would be entered as 683#. The liquid equivalent is phoned into ROSA in the same manner as rainfall using the code 10.

Rainfall Totals

With three-fourths of this year in the books, rainfall totals across much of Oklahoma and western north Texas have varied substantially from region to region. Many locations in the central third of Oklahoma have received above normal precipitation, while the remainder of the area has generally seen below normal rainfall.

The following observing sites have received the most precipitation in their respective regions through the month of September.

Northwest OK: Arnett, 18.60”
North Central OK: Blackwell, 35.14”
West Central OK: Watonga, 26.30”
Central OK: Guthrie 5 S, 33.39”
Southwest OK: Walters, 28.37”
South Central OK: Coleman, 40.40”
Western North TX: Henrietta, 28.26”

Climatological normals for many of the cooperative observer sites can be found on the web at *www.srh.noaa.gov/oun/climate/point-n-click.html*.

First Freezes

Although winter had not yet begun, many locations across northern and west central Oklahoma experienced freezing temperatures early in the season. Freedom experienced the earliest freeze this season on October 12th with a low temperature of 30 degrees. Fort Supply 3 SE has recorded the lowest temperature as of the end of October with a low temperature of 28 degrees on October 14th and 26th.

Remember to mail the previous month’s cooperative observer forms and recording rain gage tapes by the 5th of the month!

South Central and Southeast Oklahoma
Daryl Williams

Northern Oklahoma
Forrest Mitchell

Southwest Oklahoma and Western North Texas
Steve Smart

Current Cooperative Weather Observers

The staff at the National Weather Service in Norman would like to recognize and thank the 175 individuals and institutions that serve as cooperative weather observers in western and central Oklahoma and western north Texas. The data they collect is valuable not only to daily operations in the forecast office but also to future meteorological, hydrological, and climatological research. Thank you for the hard work you all have invested. We look forward to working with each of you for many years to come.

Altus Irrigation Research Station
Chandler Police Department
Cherokee Police Department
Chickasaw National Recreation Area
City of Durant
City of Oklahoma City
City of Ponca City
Copper Breaks State Park
Cushing Police Department
Duncan Airport
Duncan Banner
Edmond Fire Department
El Reno Water Works
Great Salt Plains State Park
Lahoma Research Station
Lawton Fire Department
Lugert Altus Irrigation District Office
Madill Fire Department
McGee Creek Authority
Oklahoma City Airport
Oklahoma State University
Perry Fire Department
Seminole Fire Department
South Central Research Station
Tishomingo National Wildlife Refuge
Vernon State Hospital
Wichita Mountain National Wildlife Refuge
Yukon Police Department

Morene Adams
Gary Adkins
Tony Albers, Jr.
Cookie Anderson

Mike Foster presents a 2001 Thomas Jefferson Award to Mr. Grover Bayless, observer from Arnett, and his wife,

George Armor
Joan Arnold
Imogene Bacon
Sue Barnes
Gene Barry
Mel Basgall
Gary Baustert
Grover Bayless
Susan and R A Bentley
Jon Lee Black
Kenneth Blassingame
Jim Bradshaw
Bob Bratton
Norma Braxton
Joe Britton
Clifford Buellesfeld
Eugene Buxton
Charles Canida
John Carpenter
Joe Carter
Steve Chapman
Bill Clark
Keith Claybrook
Clemon Clewell
Ruth Clymer
Ruby Coats
Jeanie Coffman
Harold Cole
Charles Conaghan
C. Lowell Cooper
Barbara Cotten
Letha Crispin
Lewis Croom
Virginia Crouse
Phillip Culbreath
Elaine Cunningham
Eugenie Daniel
Emory Davidson
Dillon Davis
Darren Dutton
James Dyer
Pam Earhart
Harold Ebers
Diana Ehlers
Charles Eisenhauer
Rod Elston
Jewell Evans
Vinson Fite
Alvin Freeman
Edith Freeman
Oscar Garrett, Jr.
Roy Germany
Amber Guy
Jean Hadley
Dora Hammond

Pat Hancock
Sonny Harjo
J. W. Hastings
Fred Hatter
Lonnie Helderman
Gary Henson
Linda Hibbard
William Hill
H. R. Hinds
Ron Hoff
Peggy Howell
Bonnie Jantz
Garland Jones
Robert Jones
Larry Kauk
Lillian Kidwell
John Kimbrough
Kara King
LaDonna Kleuser
Shirley Koehn
Cecil Labude
Betty Lach
George Leist
John Lewis
Elmer Linville
David Litzenberger
Steve Loftis
Marty Logan
Bill Lott
Joyce Loughmiller
Cindy Lundy
Cliff Lyon
Don Marsh
Lynn and Marion Martin
Tammy Mathis
Cherryle and Billy McGlothlin
Verlin Melton
Carly and Micki Metcalf
Ernesteen Michels
Marvin Moore
James Morgan
Ron Mullins
Ernest Muncrief
Andy Nickel
George Oller
Mazie Parker
Leroy Patton
Emma Paxton
Christine Payne
Richard Perry
J. R. Phillips
Morris Poe
Wayne Poyner
Kenneth Reed

Mr. Clemon Clewell, observer from Watonga, and his wife, Rita, pose with his 2001 Thomas Jefferson Award.

Arnold Rice
Ethel Roberson
Wayne Robinson
Ricky Roggon
James Rozell
Nancy Rozzell
Anita Sawyer
Mary Schlabs
Merle Schwartz
Jack Shaffer
Johnny Shepherd
Jim Stafford
Leeman and Frankia Story
Donna Stottman
Jay Stout
Lindell Stowers
Nolan Tanner
Archie Thomas
Harry Thomas
Joe Thompson
Jeff Vanderpol
Alfred Vanschuyver
Liz Welch
Alene Williams
Don Wilson
Skip Wise
Gorden Worden
Bill Wyatt
Elvin Zeman

Weatherman: From Page 1

In 1985, I began my meteorology career at the United States Army Atmospheric Sciences Laboratory in White Sands, New Mexico. Later in the same year, I started working for the NWS as a member of the Scientific Services Division at the NWS's Southern Region Headquarters in Fort Worth, Texas. In 1988, I returned to Norman as the Techniques Development/Technology Transfer specialist at the Norman forecast office. For the following four years, I was able to participate in many of the activities that led to the modernization of the NWS. These activities included testing the NEXRAD radar and managing the prototype of the modern computer and workstation system. I returned to Fort Worth in 1992 as the Deputy MIC at the forecast office serving north Texas. In 1994, I became the Science and Operations Officer for the Fort Worth office.

I returned to the Norman Weather Forecast Office in the fall of 2000 as the MIC. For me, this new assignment is like a dream come true. The Norman office is staffed by some of the best professionals in the field who have built a well-earned reputation for extraordinary service to the residents of western and central Oklahoma and western north Texas. Over the years, through extreme tornado and severe weather outbreaks, winter snow and ice storms, and devastating floods, the Norman staff set high standards for excellent warnings and forecasts and for public service to all the residents of our area. It is truly a privilege for me to be associated with such an outstanding group of people. Everyday we look forward to the opportunities the weather brings to set even higher standards.

Canton Weather Observer Passes Away

Mr. Leo Peil, Canton cooperative weather observer, passed away November 20th. Mr. Peil had taken daily temperature and precipitation measurements for the Norman weather forecast office for almost 5 years. In addition to his work with the cooperative observer program, Mr. Peil also made significant contributions to the amateur radio spotter network in the area. Mr. Peil will truly be missed.

Winter Weather Safety Tips

It's that time of year again, when the temperatures begin to fall and the threat of winter storms becomes all too real. Although this area is more widely known for its rough springtime weather, the past couple of years have brought particularly dangerous and damaging winter storms to Oklahoma and western north Texas. As a result, it pays to be prepared in the event another winter storm affects the area. Here are a few safety and preparedness tips to help families accomplish this.

If a Winter Storm WATCH is in effect for your area, hazardous winter weather conditions are expected in the next 12 to 36 hours.

In preparation, you should have the following at home or work:

- Flashlight
- Battery-Powered Weather Radio
- Extra Food and Water
- Extra Baby Items
- First Aid Kit
- Heating Fuel
- Emergency Heat Source
- Fire Extinguisher

When it comes to your vehicles, they should be fully checked and winterized. Also, the gas tank should be kept near full. It is best to not travel alone, and always let someone know your travel timetable and route. If you own a cellular phone, always keep it with you. In addition, the following should be kept in your vehicle in the event you become stranded:

- Blankets or Sleeping Bags
- Flashlight and Extra Batteries
- Knife
- High Calorie, Non-Perishable Food
- Sand or Cat Litter
- Shovel
- Windshield Scraper
- Tool Kit
- Tow Rope
- Jumper Cables
- Water Container
- Compass
- Road Maps

For those living on farms, animals should be moved to sheltered areas so that they will be less affected by inclement weather. Extra feed should be hauled to feeding areas. A ready water supply should also be available.

If a Winter Storm WARNING is in effect for your area, hazardous winter weather conditions are either presently occurring or are expected within the next 12 hours.

If you are caught outside in the storm, you should attempt to find a dry shelter immediately, and cover all exposed areas on your body. This is important in order to avoid hypothermia and frostbite. If shelter is not readily available, prepare a lean-to, wind break, or snow cave for protection from the wind. Build a fire for heat, making sure to place rocks around it in order to absorb and reflect the heat. It is important that you do not eat snow, as it will lower your body temperature. Be sure to melt it first.

If you are stranded in a vehicle, do not leave your vehicle! You should run the vehicle only ten minutes each hour so that you do not use all the fuel quickly. While running the vehicle, open windows slightly to avoid carbon monoxide poisoning. Also, make sure the tail pipe is not blocked. Always try to make yourself visible to rescuers. Some suggestions include turning on the dome light at night when running the engine, tying a cloth to the antenna or door, and raising the hood after snow stops falling. To keep blood circulating and to keep warm, exercise periodically.

If you are at home or another building, stay inside! If there is no heat, close off unneeded rooms to avoid sharing warm air unnecessarily. Stuff towels or rags under doors, and cover windows at night. Make sure to eat and drink plenty of fluids, as food provides your body with heat and fluids prevent dehydration. Wear layers of loose-fitting, light-weight, warm clothing in order to minimize body heat loss.

Always stay tuned to your local National Weather Service Radio station for the latest information!

In This Issue:

National Weather Service
Forecast Office
Norman, OK

Phone Number:
405-360-5928

Web Page:
www.srh.noaa.gov/oun

Meteorologist-in-Charge:
Mike Foster

Warning Coordination Meteorologist:
Rick Smith

Science and Operations Officer:
David Andra

Editor:
Karen Trammell

National Weather Service Forecast Office
1200 Westheimer Drive, Room 101
Norman, OK 73069

Check out our text-based and graphical forecasts for your county at *www.srh.noaa.gov/oun*.

Please share this with friends, relatives, and colleagues. Comments and suggestions are always appreciated, by phone at 405-360-5928 or by e-mail at Karen.Trammell@noaa.gov.