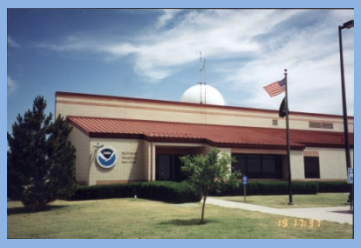

High Plains Wind

(Weather Information News Data)

September 30, 2009
Volume 3 Issue 3

National Weather Service, 920 Armory Road, Goodland, KS 67735
http://www.weather.gov/gld/ w-gld.webmaster@noaa.gov 785-899-7119

INSIDE THIS ISSUE

"It is estimated over 900 homes in Sherman County suffered broken windows, damaged roofs, dented siding, or a combination of the three."

A Message from the Meteorologist-in-Charge

By Scott A. Mentzer

Western Kansas Supercell Thunderstorm July 20, 2009

On July 20, 2009, a supercell thunderstorm developed over Dundy County, Nebraska, and then moved south over far western Kansas. Supercell thunderstorms contain deep rotating updrafts which are not present in non-supercells.

This storm produced four tornadoes, damaging winds, and large hail. Reports of golf ball sized hail were common across Cheyenne and Sherman counties. Property damage in Sherman County alone was approximately 25 million dollars. It is estimated that over 900 homes in Sherman County suffered broken windows, damaged roofs, dented siding, or a combination of the three.

The National Weather Service (NWS) office in Goodland itself sustained damage. Several vehicles parked in the office parking lot sustained broken windshields. Satellite dishes, used to receive meteorological data, were dented.

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What's in the Soccer Ball?

by Grady Bonsall, ESA

This is a question often asked by visitors who come to our office. The big white "soccer ball" is more correctly identified as the radome which houses the S-Band WSR-88D Weather Radar antenna and pedestal.

The sole purpose of the radome is to protect the dish and antenna from weather and wildlife, such as wind, rain, snow, birds and other hazards. The radome is made of a fiberglass material sandwich that is frequency tuned. This means the radome two way loss is approximately .6 dB at 2800 MHz. The radome sphere diameter is 39 feet. Inside the radome is where our huge 28 foot diameter parabolic dish is housed. This dish is attached to the antenna pedestal.

The pedestal houses two drive motors, one for the azimuth and one for elevation compartments. The antenna spins around in a full 360 degrees and its elevation range is from +.5 degrees to +19.5 degrees. Without going into too much detail, the antenna rotates 360 degrees in one elevation. Once that elevation completes then it goes to the next elevation level and rotates another 360 degrees. This rotation resembles a cork screw until it reaches its last elevation level. When this is complete this is known as a volume scan. When the volume scan completes, the antenna goes back to the +.5 degree elevation and 0 degree azimuth and begins another volume scan.

The speed of each volume scan varies on the weather scenario. For example, when there is minimum weather, such as light precipitation or clear air, the antenna is scanning slowly. When there is more intense weather, such as severe thunderstorms, then it is scanning faster. The maximum scan rate in azimuth is 30 degrees per second.

Now you know "what's in the big white soccer ball." On the next page you will find pictures of the radome and its contents from the Goodland and Rapid City National Weather Service offices.

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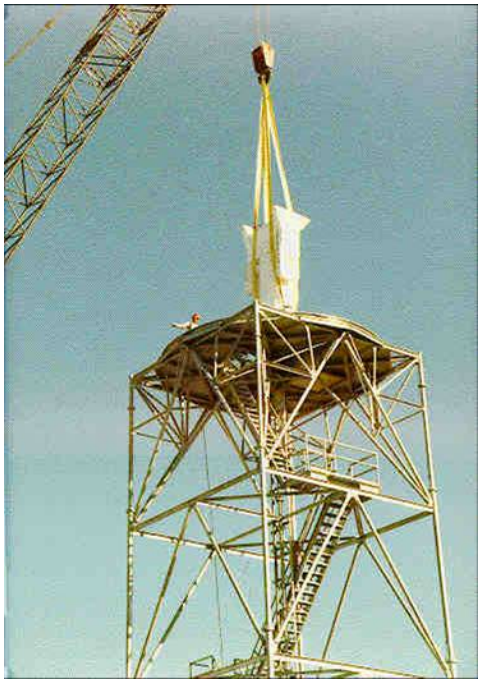
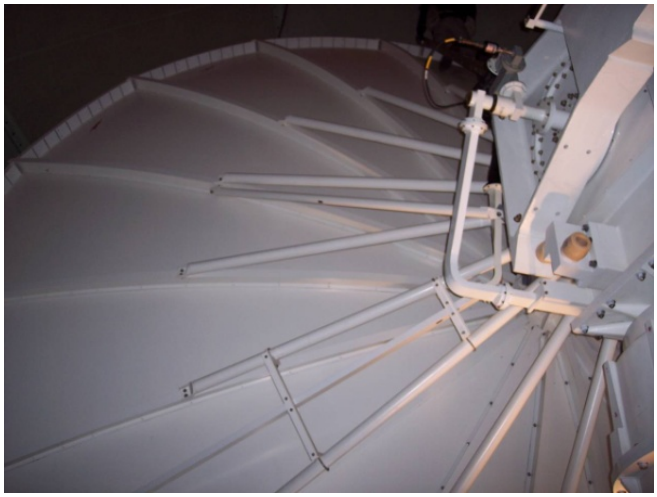


Installation of the pedestal. A crane hoists the 18,000 lb. pedestal to the platform of the tower. Once the pedestal is mounted the Radome is then hoisted and mounted. The dish is constructed and mounted inside the Radome.

Pivot and mount of the dish to the pedestal.



Backside of the 28 foot dish.
Photo from Goodland, KS WSR-88D.

The antenna feed horn is mounted in the center front of the dish. The feed horn is used to convey radio waves (rf energy) between the transceiver and the reflector.

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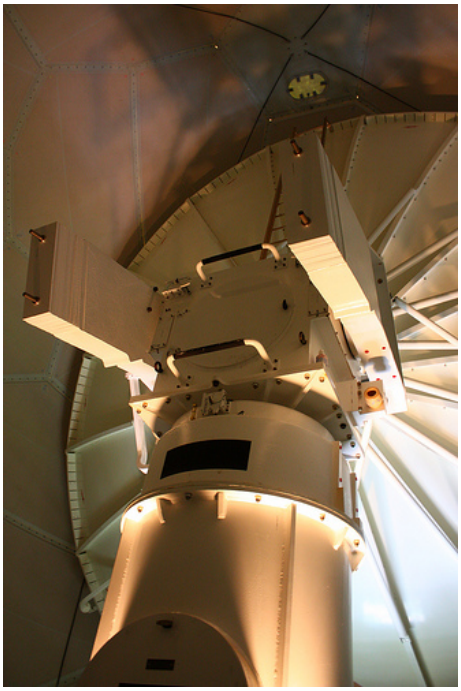

Pedestal which houses the antenna drive motors, azimuth and elevation. The counterweights shown in the middle of the picture is used to balance the dish for less wear on the motors.

Backside of the 28 foot dish.
Photo from Rapid City, SD WSR-88D.

Don't forget to set your clocks back at 2 A.M. on November 1, 2009

Calculating Sun Angle

by David L. Floyd, WCM

The fall season is upon us. It is becoming increasingly apparent that, compared to June, the sun is setting earlier each evening and rising later each morning. It's getting more difficult to work on those outdoor projects after dinner. In addition to the length of daylight shrinking each day, the sun is also not climbing as high in the sky at noon as it did in mid-summer. The shorter days and lower sun angles this time of year result in less energy reaching the earth's surface in the Northern Hemisphere. As a result, we begin to cool.

You are likely more interested in sun angles if you are installing solar panels on your home, since that will affect how the panels are mounted. When planting a garden, knowing the sun angle might help determine how much shade will be present from a nearby building. Or maybe you just want to know when you need to start taking precautions to protect yourself from the sun's harmful rays. Whatever your reason, take comfort in knowing that calculating the angle of the sun's rays (angle above the southern horizon) at noon is relatively straight-forward. Two things are needed: latitude, and solar declination. Once you know these facts, simply plug in the values according to the formula: **90 – Latitude + Declination.**

Date	Declination	Noon Solar Angle
Jan 21	-20	31
Feb 21	-11	40
Mar 21	0	51
Apr 21	+12	63
May 21	+20	71
Jun 21	23.5	74.5
Jul 21	+21	72
Aug 21	+12	63
Sep 21	+1	52
Oct 21	-10	41
Nov 21	-20	31
Dec 21	-23.5	27.5

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In the 19 counties served by the Goodland National Weather Service office, latitude varies by only a couple degrees from north to south. For example, the latitude is a little over 40 degrees for folks living along highway 34 in Yuma and Wray in Colorado, and Benkelman, Trenton and McCook in Nebraska. The latitude is about 39 degrees for people living along Interstate 70. For those along highway 96 in Tribune and Leoti in Kansas, the latitude is a bit over 38 degrees.

The solar declination is the latitude where the sun is directly overhead at noon. This varies quite a bit during the course of a year. The extremes occur on June 21 when the declination is +23.5°, and on December 21 when it is -23.5°.

The chart on the previous page gives the solar declination on the 21st of each month as well as the solar angle at noon. To calculate the solar angle I used the latitude of Interstate 70 which is within about a degree of latitude for everyone in the area. So taking January 21 as an example, the equation is 90-39+(-20), which is 31 degrees. In other words, at noon on January 21st, the sun is only 31 degrees above the southern horizon. The colors in the table correspond to times when the sun is south of the equator (blue) and north of the equator (red).

Photo courtesy of Lem Marsh

Cooperative Observer Awards

by Christina Henderson, HMT

From left, Gary Aumiller, of Lenora, KS, Katie Burtis (NWS), and Evelyn Aumiller, of Lenora, KS. The Aumillers are pictured accepting a 10 year Length of Service Award. This award was presented by Katie Burtis, Meteorologist.

The National Weather Service in Goodland, Kansas had the privilege of presenting a 15 year Length of Service Award to father and son observers, Don and Dan Wasson of Selden, Kansas. The award was presented by Christina Henderson, Hydro-meteorological Technician, and Brad Mickelson, Meteorologist, of the National Weather Service in Goodland, Kansas.

Cloyd F. Hoyt of rural McCook was presented with an award for 35 years of service providing depth measurements along the Republican River. Scott Mentzer, Meteorologist in Charge, of the Goodland, Kansas National Weather Service office was on hand to present Mr. Hoyt a certificate and lapel pin for his years of service. He was assisted in the presentation by Mike Lammers, Observation Program Leader, and Christina Henderson, Hydrometeorological Technician.

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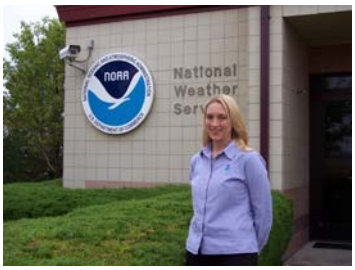
Scott Mentzer, Meteorologist in Charge, had the privilege of presenting a 40 year Length of Service Award to Marvin Orth. The award was presented to Marvin (right) and his wife, Veda for their years of faithful service to the St. Francis, Kansas, area. Also in attendance were Joy Hayden, ASA, Albert Pietrycha, SOO, Mike Lammers, OPL, Christina Henderson, HMT, and Brad Mickelson, MIT

Patricia Hackert, pictured above with Scott Mentzer, MIC, was recently awarded the coveted Holm Award on August 15th, 2009. Patricia was one of 25 across the country to receive this second most prestigious award. She was one of only 15 observers in Central Region who was awarded. Patricia has been recording the precipitation and snowfall since her husband Donald passed away in 1986. Donald took over the observations in Palisade, which then included river gage reporting on the Frenchman Creek and Stinking Water Creek, in 1958.

Cooperative Observer News

Mike Lammers, OPL



Christina Henderson, HMT

"As long as your clock is offset to midnight, your MAX and MIN temperatures will be good."

Memory on Nimbus

by Christina Henderson

In the annual station visits this year, we have come across several sites that have the newer temperature display, pictured on the bottom left. These displays, called Nimbus displays, have the ability to remember the MAX and MIN temperatures for the previous 34 days. This feature is good for those observers who are gone on the weekends or for a short trip.

There has been an issue that has come up about the time the internal memory resets the MAX and MIN temperatures. There is an internal clock that the display uses to figure out the MAX and MIN for the day. This clock records from midnight to midnight, but each observer takes the recorded MAX and MIN in the morning, usually at 7 am local time.

If you want to use the memory on the Nimbus, this internal clock MUST be offset from midnight, so at the time you take our observation, the internal clock reads midnight (or 00:00). If you would like to see what time your clock reads, Hold down the **MAX/MIN Recall** button for about 2 seconds and simultaneously flip the **Memory** toggle switch to **On**. The screen will momentarily blank and **E3E.3** will be displayed, then the time. This time should be 7 hours slower from the current time if your observation time is at 7 am.

As long as your clock is offset to midnight, your MAX and MIN temperatures will be good. If this clock reads what your kitchen clock reads, the MAX and MIN temperatures will be off at certain times of the year.

If you decided to use the memory function, remember to adjust the clock back an hour in the fall or ahead an hour in the spring!

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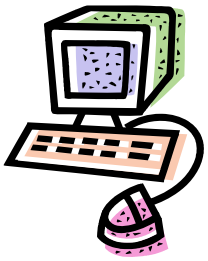
"Paperless" Transition

All National Weather Service offices have been transitioning to "paperless" cooperative observations. This means a station that is documented as "paperless" uses WxCoder 3 or IV-ROCS to enter their daily weather reports, and at the end of the month, their data is mailed electronically to the National Climatic Data Center (NCDC) to be archived.

With nearly 11,000 cooperative weather observers across the country, having paperless stations will help NCDC archive the data sooner. Currently there is a three month turn-around from the time a cooperative weather observer mails the paper B91 to a local office to the time the public can view the quality controlled data from NCDC. When the paper copy is mailed to NCDC, folks have to key stroke in each record, for the nearly 11,000 weather sites.

In March, an initiative was started at NCDC to have all the cooperative weather observers become "paperless". Within the Central Region weather services offices, through July 2009, 792 out of 1350 sites have transitioned to "paperless". If an observer uses WxCoder3, the station is considered completely paperless.

There are exceptions. If an observer does not have access to the internet to use WxCoder 3, an observer can call the office daily and the National Weather Service staff enters the data into WxCoder3. These observers then mail their forms to the office and the electronic form is sent to be archived. If you would like to become a paperless station, please contact Christina or Mike to get set up.



Moving Equipment?

If you think your temperature sensor or standard rain gage is in a less than ideal location, please contact Christina or Mike to have it relocated. There are guidelines we need to follow when moving equipment as well as documenting the changes. We will be glad to assist you!

May 30, 2010 will be the 75th anniversary of the *Republican River Flood* in Nebraska, Kansas, and Colorado. The National Weather Service is planning special programs to commemorate this event. Watch our website for a new link to the history of the dramatic story of the flood. Perhaps you would like to have such a program in your area, or have a story about the flood you would be willing to share. If so, please contact Joy Hayden at 785-899-6412 or by email at joy.hayden@noaa.gov

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Panoramic View of July 20, 2009, supercell thunderstorm taken approximately three miles east of Goodland, Kansas. Photo courtesy of Doug Whitson.

Vehicle Damage at the National Weather Service office in Goodland, Kansas.

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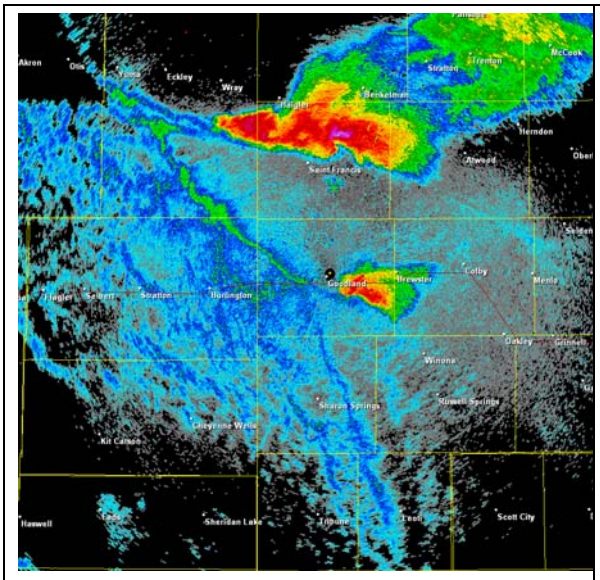
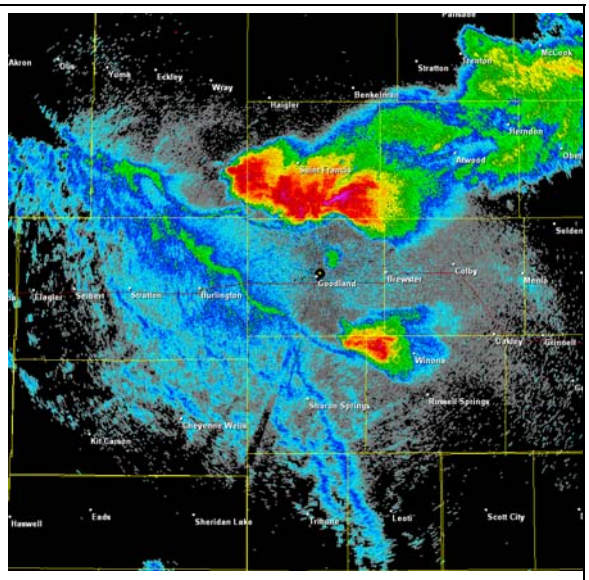
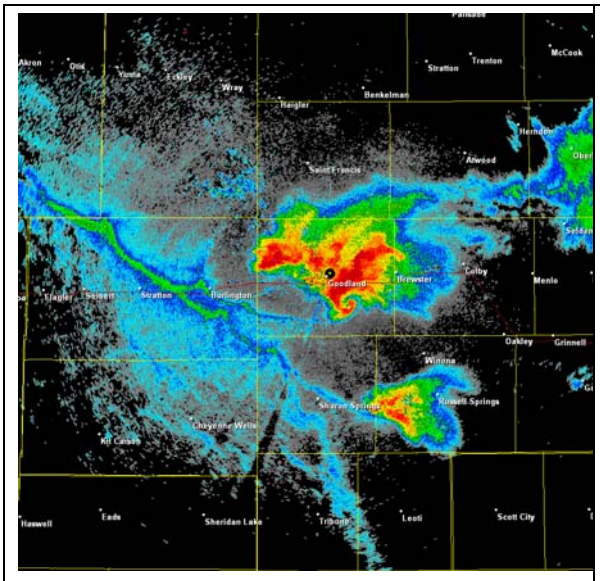
The radar images below show the progression of the supercell from a radar vantage. The center of each image is the Goodland radar. Note the "hook echo" just south of Goodland at 649 PM MDT. Hook echoes are indicative of very strong rotation in the storm and possible tornadoes.



Radar Reflectivity (601 PM MDT)



Radar Reflectivity (624 PM MDT)



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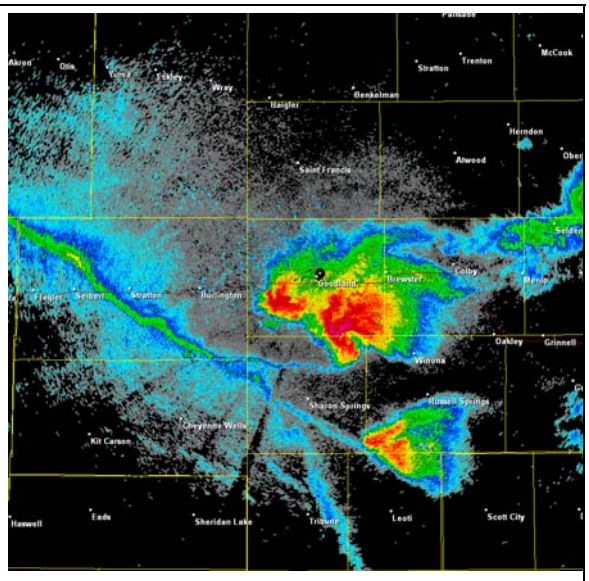

Radar Reflectivity (703 PM MDT)

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Locations of severe weather reports received on July 20, 2009. H denotes hail one inch or larger in diameter. W denotes wind reports equal or greater than 58 mph. T denotes tornado reports.

All tornadoes were rated EF0 on the enhanced Fujita scale. The tornado in Cheyenne County blew over a semi truck on Highway 36. The largest hail reported was softball sized which occurred at several locations: 15 miles north of Parks, Nebraska; 6 miles east of Haigler, Nebraska; 12 miles north of Goodland; and, 9 miles northeast of Wallace.

At 639 PM MDT the storm produced a peak wind gust of 72 MPH at Goodland Renner Field, the tenth strongest wind gust recorded at the airport. The strongest wind gust ever recorded at the airport was 96 MPH on May 24, 1994.

This storm was one of the most significant across the Tri-State area in 2009. Further information about the storm, including an animated radar loop, can be found at:

http://www.crh.noaa.gov/news/display_cmsstory.php?wfo=gld&storyid=29801&source=2

Voice of the National Weather Service

by Kelly James

Katie Burtis, Meteorologist, monitors NOAA Weather Radio

During severe weather or a winter storm have you ever heard the sound of your NOAA Weather Radio going off? Have you ever wondered where that warning is originating from and where that "funny" voice is coming from?

From the introduction of NOAA Weather Radio until the late 1990s, nearly all the voices heard in the broadcasts were those of the staff at local National Weather Service (NWS) offices. The messages were manually recorded, first on tape cartridges and later digitally, and placed in the broadcast cycle.

As part of the NWS Modernization during the 1990s, many local offices were closed and their NOAA Weather Radio consoles were moved to the new or enhanced Weather Forecast Offices. This was also the start of a period of rapid expansion of the Weather Radio network. What had been about 400 transmitters in 1990 grew to near 600 by the end of 2000 and is now (in 2009) over 1000 transmitters across the 50 states, Puerto Rico, Guam, and American Samoa.

To cope with the increasing number of transmitters at each office, and to speed the overall delivery of warning messages to the public, the Console Replacement System (CRS) was deployed at NWS Weather Forecast Offices in the late 1990s. CRS introduced a computerized voice nicknamed "Paul" using

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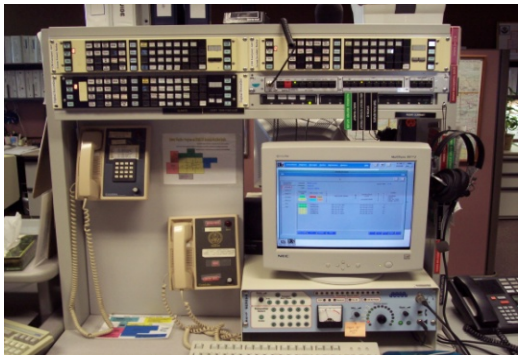
the DECTalk text-to-speech system. DECTalk grew out of research by the late Dr. Dennis Klatt of MIT. While CRS greatly enhanced the speed of delivery and scheduling of Weather Radio messages, there was some dissatisfaction with Paul's voice.



CRS Console at National Weather Service, Goodland, KS

The National Weather Service embarked on a Voice Improvement Processor (VIP) program in late 2000, and implemented newer text-to-speech voices nationwide in 2002, nicknamed "Donna" and "Craig". A year later, further updates were made. The "Donna" voice was improved, "Craig" was replaced by "Tom", and a Spanish voice "Javier" was added at a few sites.

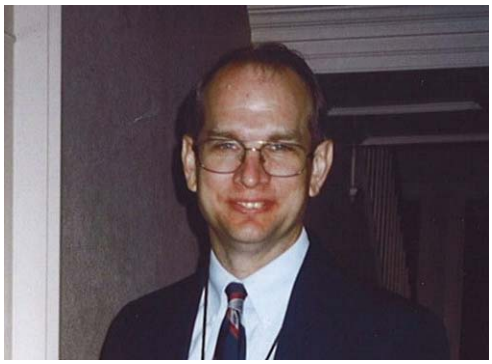
All of the VIP voices have been produced using the Speechify text-to-speech system. (The official Speechify name for our "Donna" voice is "Mara".) Speechify was originally a product of the Speechworks company, based on technology developed by AT&T. Speechworks was purchased by Scansoft in 2003, and Scansoft merged with Nuance in 2005.

The VIP voices generally have been better received by the public than "Paul" was. There is a better capability to fine-tune the pronunciation of words and phrases along with controls to adjust the volume and rate of speech. These all help to make the voices more understandable when it really counts - in warning situations.

For more information on NOAA Weather Radio please visit:
http://www.nws.noaa.gov/nwr/

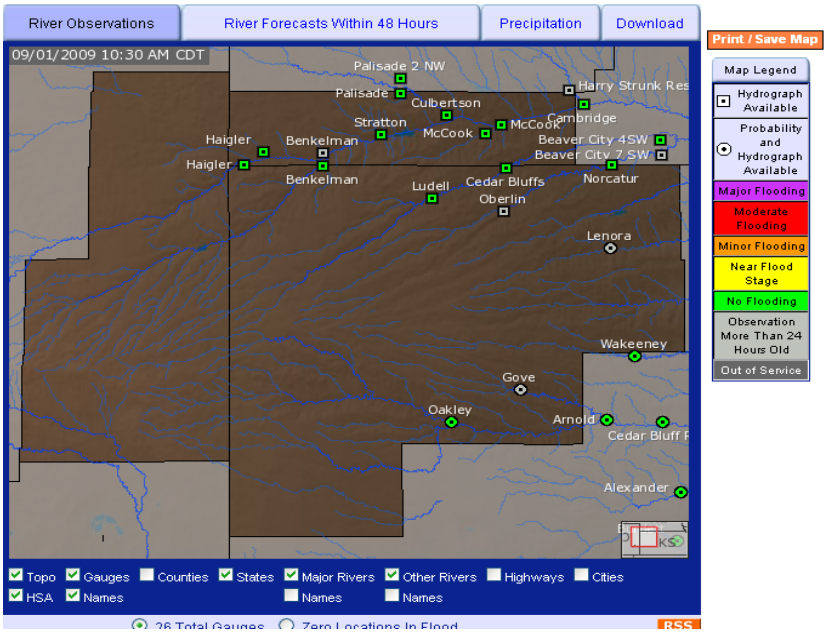
Advanced Hydrologic Prediction Service

featuring Mark Buller, Hydrologic Focal Point



I am a Senior Forecaster and the Hydrologic Focal Point at Goodland. My duties involve making sure the computer programs the forecasters use to monitor heavy rainfall and river stage levels and to issue warnings and statements are working properly. I also keep the staff updated on the latest procedures, and work with the customers of our hydrologic products so their various needs can be met.

I would like to tell you about some expansion of the hydrologic information we provide on our web page. This involves the Advanced Hydrologic Prediction Service or AHPS. AHPS is the modernization of hydrologic services to improve forecasts and water resources information. On the left hand menu of the Goodland web page, http://www.weather.gov/gld/, underneath **Hydrology**, click on Rivers & Lakes. The following map will appear.



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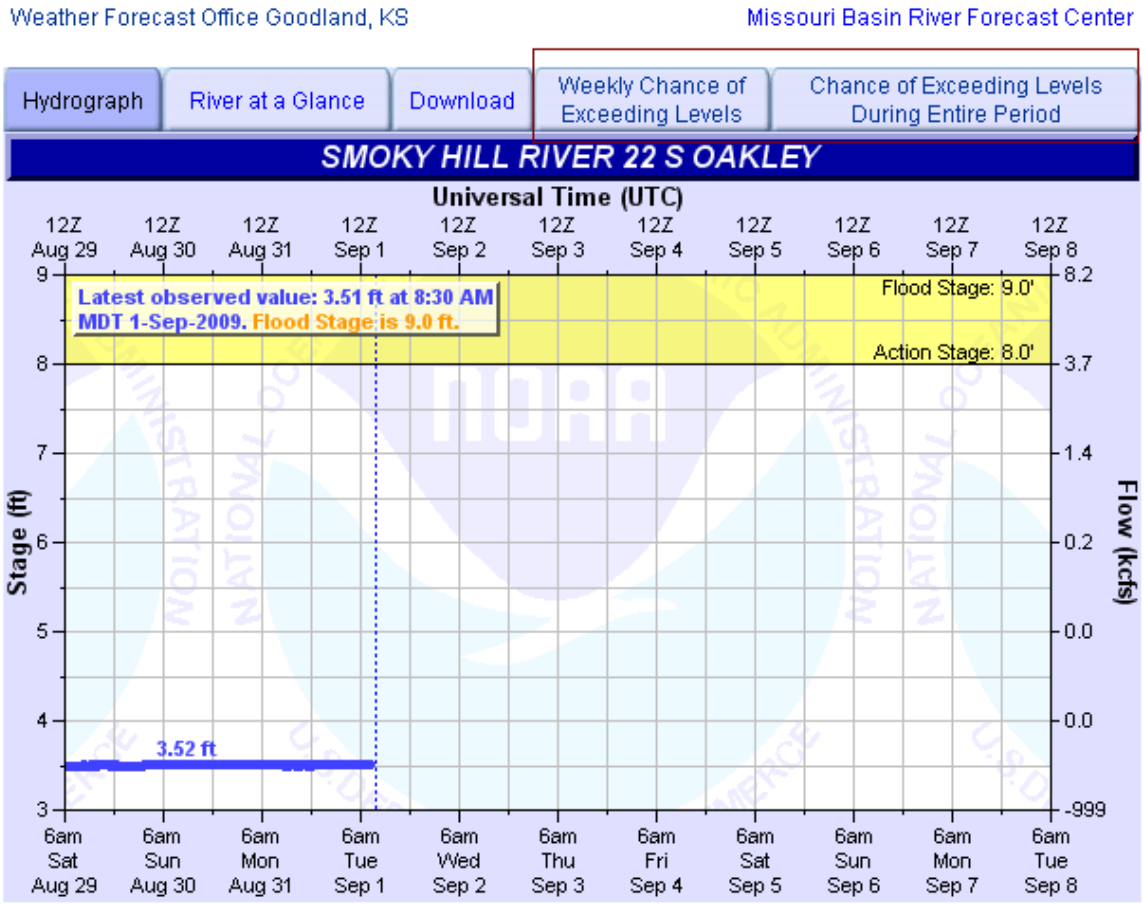
This shows the river gauge sites in our area of responsibility. If you click on one of these points you will get a graph of the latest river stage height, and if any stage forecasts have been issued for that site by the river forecast center. Notice that the icons underneath Lenora, Gove, and Oakley look different than the others. Clicking on one of these sites will guide you to the expanded information I mentioned above.

Between the third and fourth Thursdays of the month, the river forecast center in Pleasant Hill, MO issues 90 day outlooks for certain sites. These outlooks provide the probabilities for exceeding certain river stages during the entire 90 day period, and for individual weeks during the 90 day period. Beginning in September, the site 22 miles south of Oakley will have these forecasts issued for it in addition to the forecasts already issued for Lenora and Gove.
So once you get to a page with a graph, notice the two tabs in the upper right hand corner of the screen. In the following image, I have highlighted these tabs with a red rectangle.



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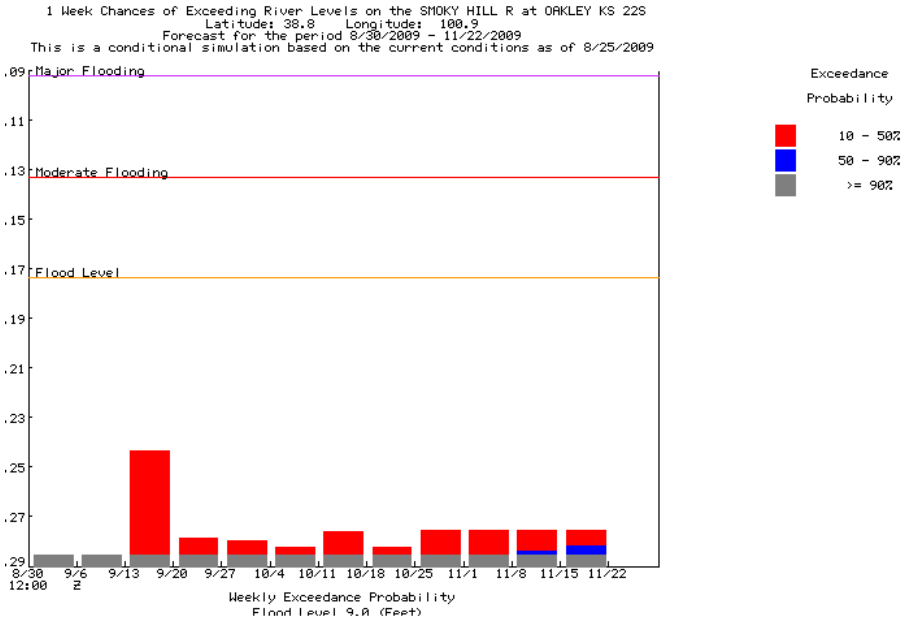
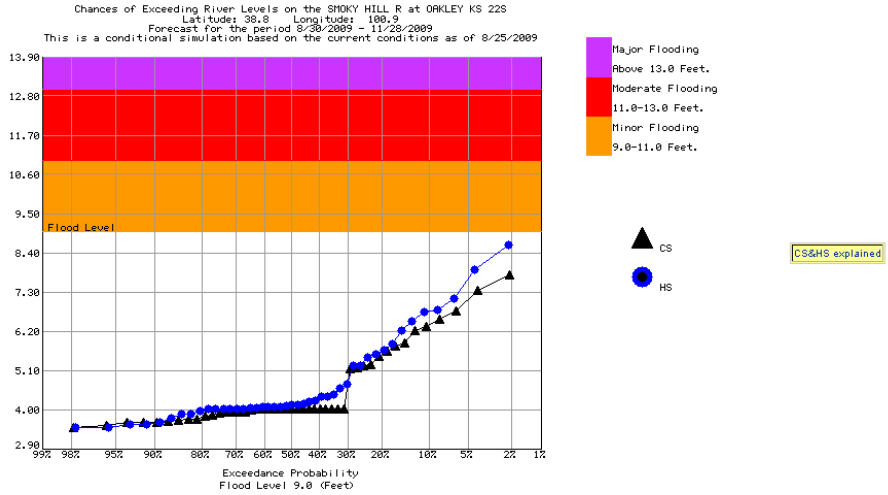
Clicking on the tab for the weekly chance, you will get the following image.



Clicking on the next tab will get the probabilities for the 90 day period.



Explanations on what these graphs are showing are given above, and to the right of these graphs. In the future, these 90 day outlooks will be developed for the remaining river forecast points in our area of responsibility.

If you have any questions on these graphs, feel free to contact me at: **mark.buller@noaa.gov**

Don't forget to remove your inner tube and funnel before winter!!

For the summer season For the winter season

Leaving the inner measuring tube & funnel in place after it freezes could lead to a cracked tube & inaccurate readings.

Do you need a program for your school, club or business? The National Weather Service can provide you with a variety of programs on many weather related topics. Please contact us for more information!

National Weather Service
920 Armory Road
Goodland, KS 67735

Phone:
785-899-7119

Fax:
785-899-3501

E-mail:
w-gld.webmaster@noaa.gov

Please don't forget, if you have pictures or video to share of any severe weather events that take place this year, please contact ***david.l.floyd@noaa.gov***

With your permission, your pictures and video will provide information and training materials for future storm spotters and meteorologists!

The National Weather Service provides weather, hydrologic, and climate forecasts and warnings for the United States, its territories, adjacent waters and ocean areas, for the protection of life and property and the enhancement of the national economy. NWS data and products form a national information database and infrastructure which can be used by other governmental agencies, the private sector, the public, and the global community. It is accomplished by providing warnings and forecasts of hazardous weather, including thunderstorms, flooding, hurricanes, tornadoes, winter weather, tsunamis, and climate events. The NWS is the sole United States OFFICIAL voice for issuing warnings during life-threatening weather situations.