High Plains Wind

(Weather Information News Data)

July 21, 2014
Volume 8 Issue 2

Inside This Issue

1 Severe Weather Season

2 Viewing Radar Data

10 CoCoRaHS Corner

11 Ever Wonder

13 Cooperative Observer News

17 Climate Corner

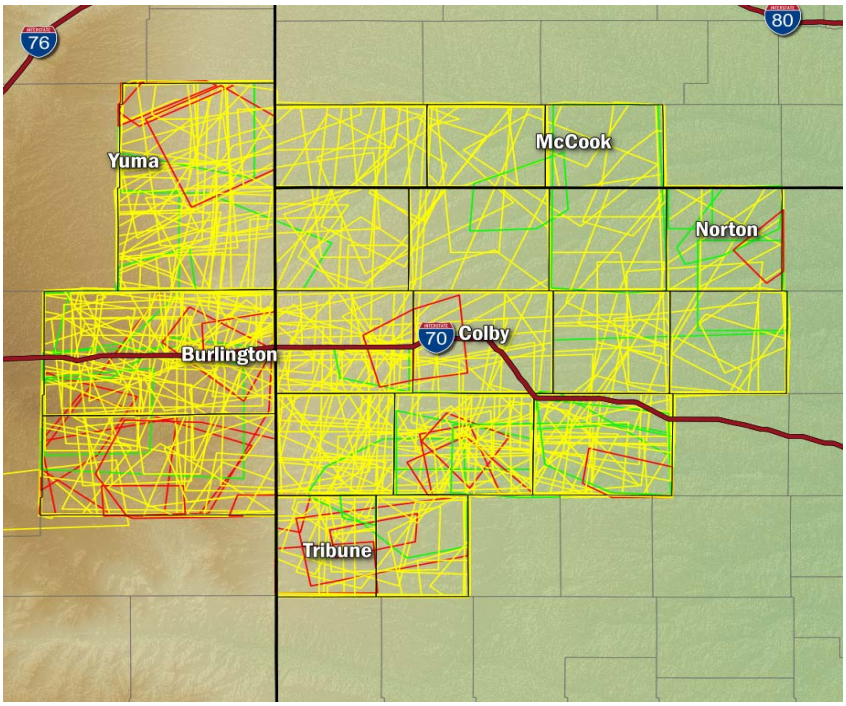
Photo Courtesy of
Nancy Vap

A Message from the Meteorologist-in-Charge

Severe Weather Season 2014

By Scott A. Mentzer

After a slow start to the 2014 severe weather season, severe thunderstorms increased in June. Since May 1, 2014, the National Weather Service office in Goodland, Kansas, issued 229 severe weather warnings (tornado, severe thunderstorm, and flash flood warnings).



Warnings issued by the National Weather Service office in Goodland, Kansas, since May 1, 2014
Red – Tornado Warnings Yellow – Severe Thunderstorm Warnings Green – Flash Flood Warnings

Continued on page 8

Viewing National Weather Service Radar Data Online

By Mike Kochasic

The National Weather Service (NWS) provides plenty of weather data to users of all kinds, including the public. Although all the weather information is important to us, some data seem to have a higher importance in the public's eye. One such weather variable is precipitation. Rainfall affects nearly everyone, and it is of great interest to know whether or not rain is occurring at a given moment. The best tool for tracking real-time precipitation for meteorologists is the use of radar.

Radar stands for "Radio Detection and Ranging", and is used to not only locate precipitation, but to also track precipitation movement and help determine precipitation type. Most people are probably familiar with viewing radar images from smart phone applications or from watching the weather report on television. Radar images are also available from the NWS on our website. The purpose of this article is to help you locate the data online for your own use, as well as explaining some differences in the available data.

The first step to viewing our radar images is to navigate to the NWS Goodland homepage (www.weather.gov/gld). Once on our webpage, there are two places that you can click to view current radar images (Figure 1). You can either click on the "Radar" link on the menu along the left part of the screen, or click on the radar image below the "point and click" forecast map. Both locations will take you to the same radar image page.

After clicking one of the radar links, you will be moved to the Goodland radar image page (Figure 2). At the time of this radar image, there was no significant precipitation occurring across the region. However, you will notice that there is still some "speckles" of reflectivity indicated on the radar image. These areas of very light reflectivity (10 dBZ or less) are known to meteorologists as clutter. Radar can pick up faint returns from different sources, such as ground objects like trees, buildings, clouds, birds, and other objects. Using the legend on the right side of the radar image, a general rule of thumb is to consider areas of 10 dBZ or less as not being associated with precipitation.

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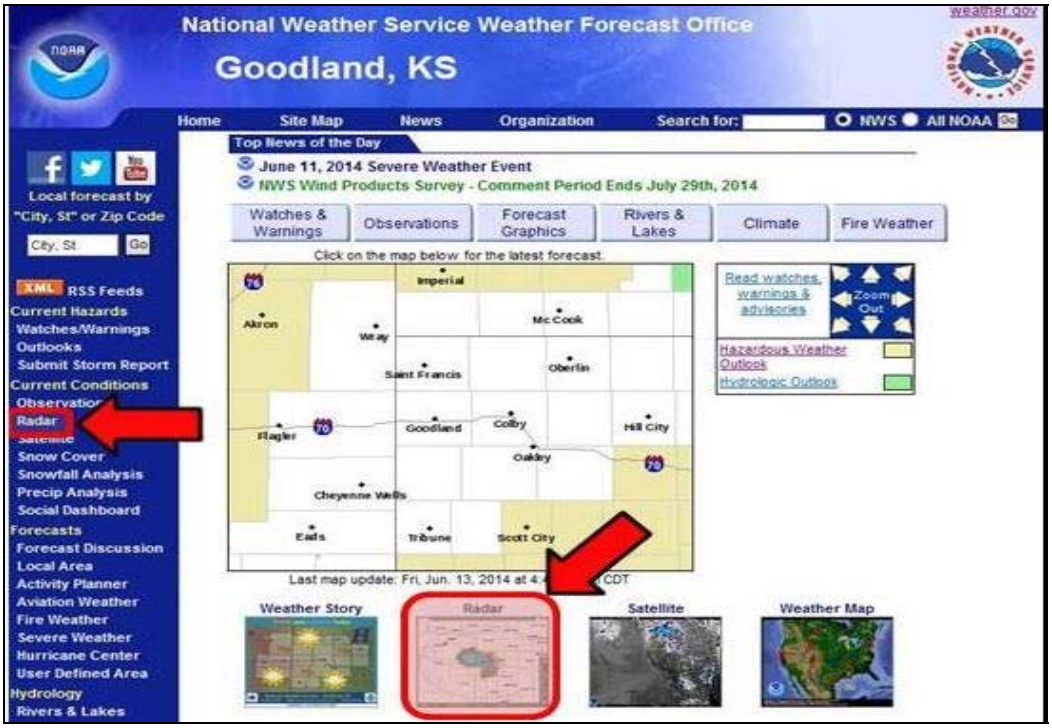

Figure 1. The NWS homepage at www.weather.gov/gld. You can navigate to the radar images by clicking the area highlighted in red.

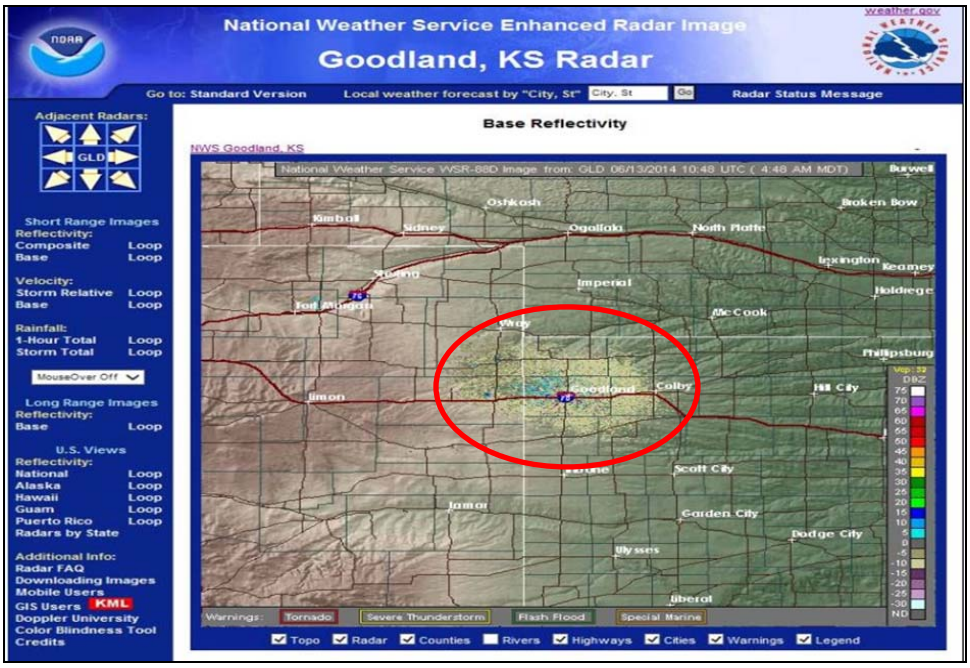

Figure 2. The Goodland radar page with some light areas of reflectivity (clutter) shown on the Base reflectivity image inside the red circle.

Continued on page 4

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Because there was no precipitation occurring in the tri-state area at the time this article was written, images from the NWS radar in Jackson, MS provide some storm examples. Although the images are from Jackson, NWS internet pages are all set up similarly to the Goodland page. When you first visit the radar page, you should first see the radar imagery for "Base Reflectivity" (Figure 3). Another option to view radar reflectivity is "Composite Reflectivity" (Figure 4) along the left column of the page. But what is the difference between the two images?

Figure 3. Example of Base Reflectivity Image from the NWS Radar in for Jackson, MS. The image can be obtained by clicking on the "Base" link in red.

When there are storms in an area of the radar, meteorologists switch the radar into precipitation mode. Precipitation mode allows the radar to view storms at multiple elevations (Figure 5). When looking at the "Base Reflectivity" image, only the 0.5° angle reflectivity is shown. However, many times storms are considered severe by meteorologists when areas of higher reflectivity are shown by

Continued on page 5

Continued from page 4

radar at heights above freezing because of hail potential. Although you cannot see each individual angle of reflectivity on our website, the highest areas of reflectivity for all the angles are depicted in the "Composite Reflectivity" image. The composite image will give the user a quick look at the highest reflectivity through the entire radar angle profile, giving yet another dimension to assess the severity of storm development. You may notice that the composite reflectivity image in Figure 4 has more red (higher) areas of reflectivity than the base image in Figure 3, which may indicate heavy rain or hail stones at higher radar viewing angles.

Figure 4. Same as Figure 3, but for the Composite Reflectivity Image. The image can be obtained by clicking on the "Composite" link in red.

Another option available to online users is the velocity of the winds as seen by radar, including "Storm Relative" or "Base" (Figure 6). The public may not be as familiar with these images as compared to reflectivity. In the imagery, the green areas indicate air that is moving towards the radar, while the red areas indicate air that is moving away from the radar. Now, what is the difference between

Continued on page 6

Continued from page 5

the storm relative and base images? Like the base reflectivity image, the base velocity image shows the 0.5° wind field. However, the storm relative image takes the same base velocity image, but subtracts the motion of the storms. This is beneficial to see circulations inside the storm itself, which helps meteorologists determine if a thunderstorm has rotation or may produce a tornado.

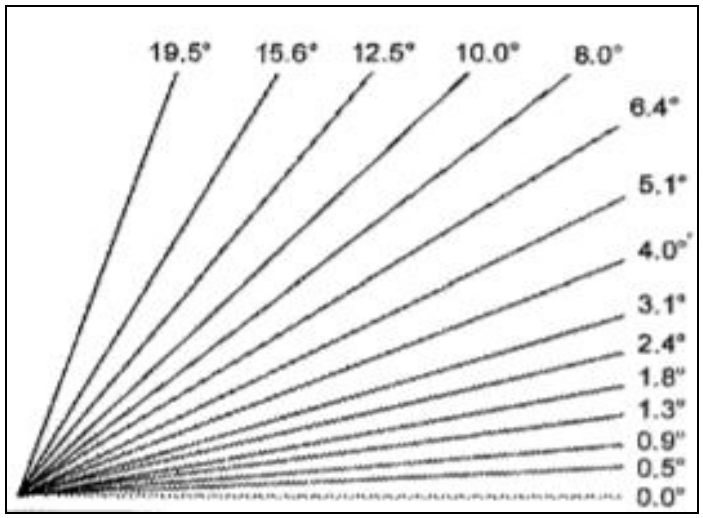

Figure 5. An example of the different Radar tilts used in Radar precipitation mode to see different sections of storms.

Another section of radar data on the page is for precipitation estimations, which includes the estimation for a one hour time period (1-Hour Total) or for the duration of a storm event (Storm Total). These images give meteorologists an idea of how much rain has fallen over a particular area in order to determine if there is flooding or flash flooding potential.

These are a few other different images on the Goodland radar page, but the radar imagery data described in this article are the basics. Next time you visit the NWS Goodland radar page, you will know a bit more about the differences between the radar images. To learn more about radar and the data it can provide, you can click on “Radar FAQ” or the “Doppler University” link (Figure 7).

Continued on page 7

Continued from page 6

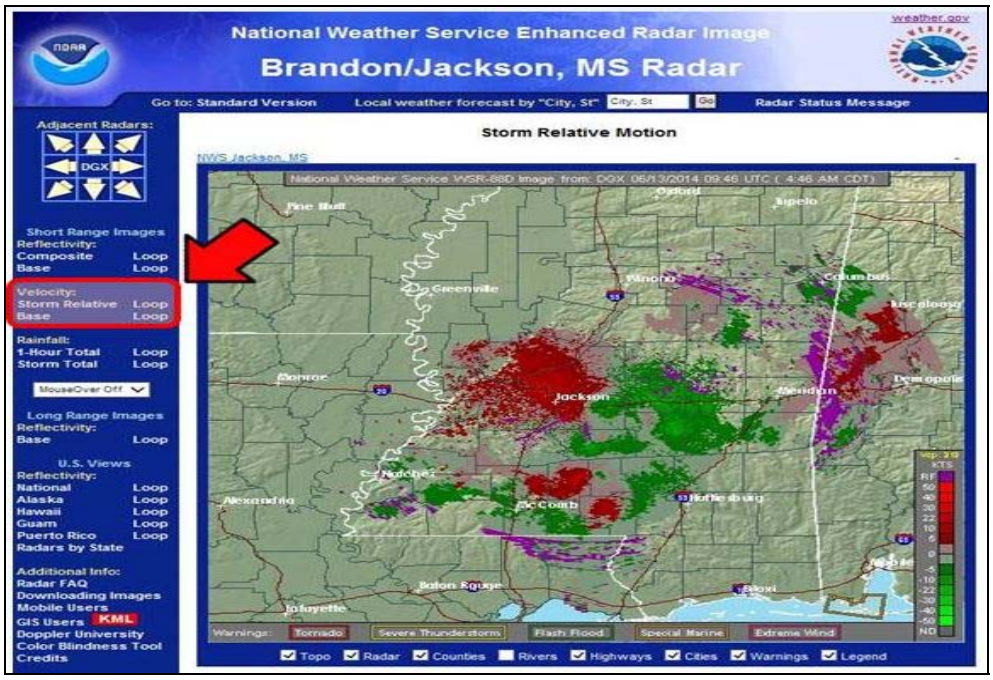

Figure 6. Example of Radar Storm Relative Velocity Data. Velocity images can be seen by clicking on the link of interest in the area shown in red.

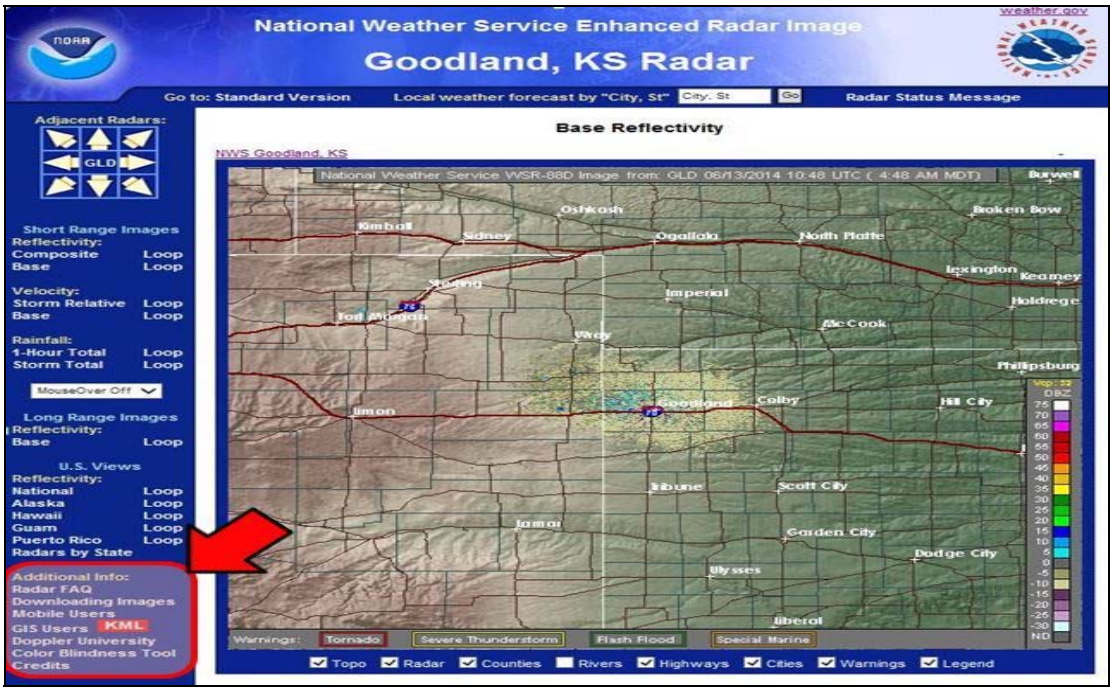

Figure 7. Additional information about radar images and data can be found by clicking on links inside the red box.

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Approximately 10 tornadoes have occurred so far this year. All of the tornadoes have been rated either EF0 or EF1 on the Enhanced Fujita Scale. The two most significant tornadoes moved across the far southern part of the forecast area. On June 11, 2014, an EF1 tornado occurred 13 miles south southeast of Russell Springs. On June 29, 2014, an early morning tornado produced EF1 damage 11 miles south southwest of Gove.

Tornado south southeast of Russell Springs blew 2x4 boards into house on June 11, 2014

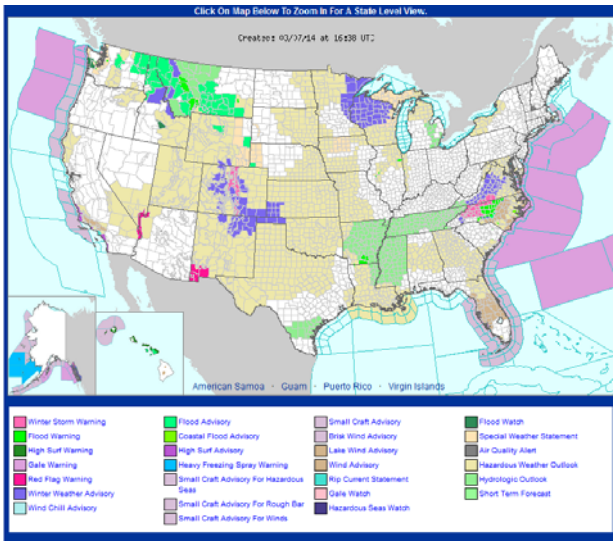
Severe thunderstorms produced wind gusts to 78 mph across eastern Colorado and western Kansas on June 15, 2014. These storms produced widespread power outages across Kit Carson and Yuma counties.

Trained storm spotters provided NWS meteorologists with timely and critical information during these high impact events. If you observe severe weather, please inform the NWS office in Goodland by calling 785-899-7119.

continued on page 9

continued from page 8

Funnel cloud north of Tribune on June 11, 2014
Photo by Leonard McDonald forwarded by KWCH



Click on the photo above or go to our website www.weather.gov for all the latest Watches and Warnings.

CoCoRaHS Corner

By David Thede

We need more observers! Watch this video to find out why:

http://youtu.be/pgDkbEDOtHU

If you would like to volunteer contact the Northwest Kansas/East Central Colorado and Southwest Nebraska CoCoRaHS Coordinator, David Thede of the National Weather Service in Goodland. He can be reached at (785) 899-7119 or at david.thede@noaa.gov. You might be eligible to receive a free rain gauge if you live in a sparsely populated area.

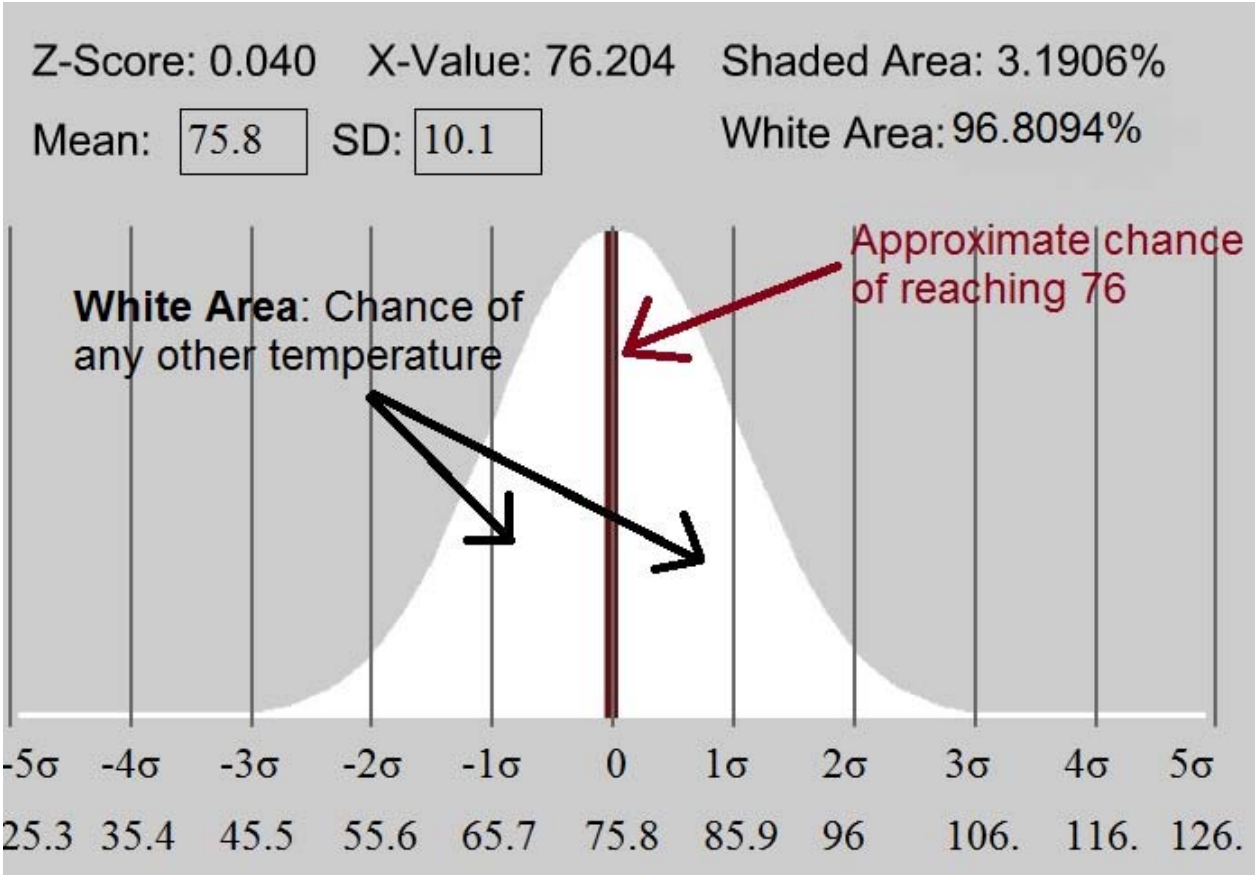
To learn even more visit the website below:

http://www.cocorahs.org/

Ever Wonder?

By Dave Thede with Joe Moore

Ever wonder how often the temperature (maximum or minimum) reaches exactly the value that is also the average for the day? I did back on May 25 when the high temperature in Goodland reached 76 degrees. This also happened to be the average for the day based on the 30 year average from 1981-2010. That got me to thinking "just how often does the temperature reach the exact average value for that day"?



Graphic courtesy of this website: http://www.measuringusability.com

Continued on page 12

Continued from page 11

A fellow meteorologist at our office, Joe Moore, did the legwork and crunched the numbers. Here is what he found:

To figure out how often the recorded high temperature would reach the normal high temperature, we first must define normal. For weather statistics, the World Meteorological Organization (WMO) defines 30 years as the typical period to use when determining the climate, or average weather, for a location. In the US, NOAA's National Climatic Data Center (NCDC) calculates the 30-year averages every decade. The latest is the normal period from 1981-2010, and on May 25th the normal high temperature was 75.8, which rounds to 76. (We report temperature in whole numbers, but the normal high temperature is calculated to the tenth of degree.)

Now that we've defined normal, there are two ways to answer the question: we could calculate the statistical probability of hitting 75.8 degrees given the standard deviation of temperatures in the 30-year normal period, or we could simply look back at the ~102 years of records for Goodland's weather. We'll cover both here briefly.

To calculate the statistical probability, we must assume that the temperature for any given day in the 30-year period has a normal distribution. This means that half of the values will be greater and half of them less, with the shape based on the standard deviation of the values. For this example (mean 75.8, standard deviation 10.3), I calculated the cumulative probability of reaching 75.5 and 76.4 - the upper and lower bounds of 76 degrees. I found the cumulative probability to be 4.88% and 5.23%, respectively. The area in between these two values [see graphic], the difference, was 3.3%. So, using the latest 30-year climatology, the statistical chance of the temperature reaching the average of 76 degrees on May 25 is 3.3%!

Another way to calculate this statistic is simply to look back in our 102-year history and see how often we reach 76. Before May 25, 2014, we hit 76 degree 4 times in 101 years of records, or 3.9% of the time. However, if we add 2014 to the record, we've hit 76 degrees 4.9% of the time!

So, for this day, the probability of reaching the exact average temperature was 3.3%, with the climatological (historical) occurrence slightly more often at 4.9%. I've calculated both the statistical and climatological (historical) chances for a few other dates below:

January 26: 2.4% (when our standard deviation, or variability, is greatest)
July 11: 4.6% (hottest time of the year, lowest standard deviation)

Cooperative Observer News

Our office has been busy in the past few weeks presenting awards to many of our wonderful observers. Pictured below are some of the recent award winners.

Scott Mentzer, Meteorologist in Charge, presented a 100 Year Institutional Award to the staff currently responsible for taking and disseminating observations at the Northwest Research-Extension Center in Colby, Kansas, on July 17, 2014. Pictured in the photo above are Dan Foster, Vicki Brown, Mentzer, Rodney Zimmerman and Marvin Farmer.

Established in 1914, the Colby Agricultural Experiment Station, as it was called then, became the depository of all official weather records for Colby. The observations recorded daily from Colby provide a wealth of weather information for the area.

Continued on page 14

Continued from page 13

We had the privilege of presenting a 45 Year Length of Service Award to Marvin Orth on June 24, 2014 in St. Francis, Kansas. Pictured are Scott Mentzer, Marvin and his wife Veda, and Joy Hayden.

Keith Wood, pictured above, reports precipitation north of Parks, Nebraska. He was recently presented with a 15 Year Length of Service Award.

Mike Peters, below, of McCook, Nebraska, reports temperature and precipitation. He was recently presented with a 10 year length of service award.

Continued on page 15

Continued from page 14

Rick McDonald, above, was recently presented a 10 Year Length of Service Award for his reports from Culbertson, Nebraska.

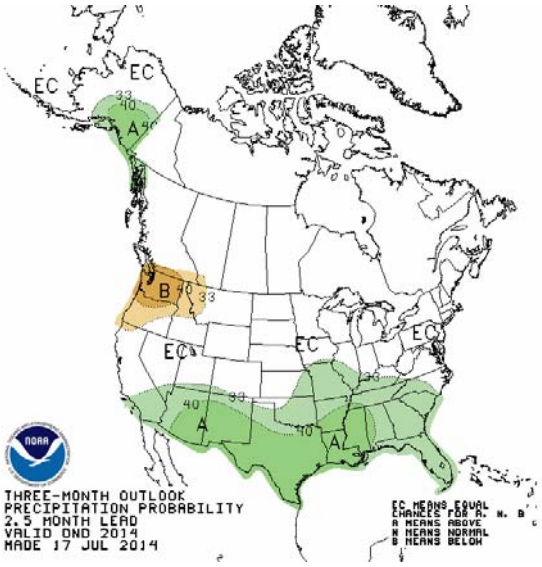
Jerry Guy, pictured below, was recently presented a 10 Year Length of Service Award for his reports from Seibert, Colorado.

Allen and Luanna Naugle, pictured at left with their granddaughter received a 10 Year Length of Service Award for their reports from north of Wild Horse, Colorado.

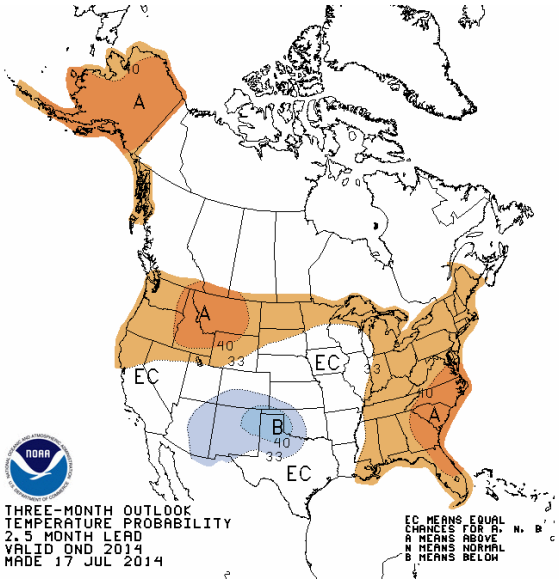
Climate Corner

Current Weather Information for Our Area

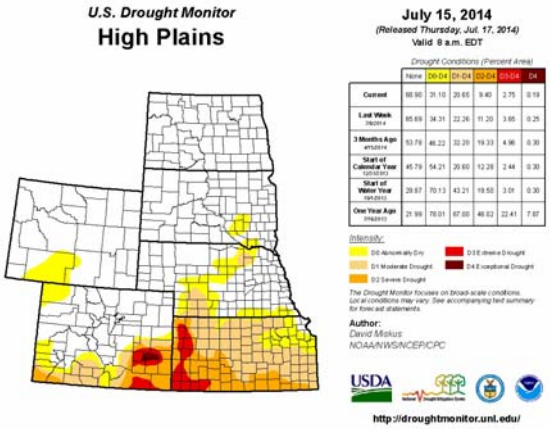
Latest Extended Outlooks



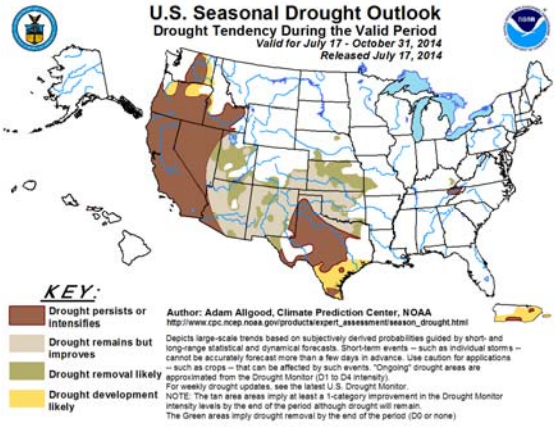
Precipitation Outlook (October - December 2014)



Temperature Outlook (October - December 2014)



Current Drought Monitor



Drought Outlook

Need more information? Check out the U.S. Drought Monitor website: http://droughtmonitor.unl.edu/

Site	Year-to-Date Precipitation*	Departure from Normal
Burlington	7.39	-3.04
Goodland	10.49	-1.02
Hill City	13.42	+.27
McCook	14.73	+1.70

*As of July 16, 2014

National Weather Service
920 Armory Road
Goodland, KS 67735

Phone:
785-899-7119

Fax:
785-899-3501

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

Facebook:
http://www.facebook.com/US.NationalWeatherService.Goodland.gov

Twitter:
https://twitter.com/NWSGoodland

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.