High Plains Wind

(Weather Information News Data)

July 18, 2012
Volume 6 Issue 2

Special Drought Edition

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"High temperature records were broken on a daily basis."

June Heat Wave

A Message from the Meteorologist-in-Charge

By Scott A. Mentzer

Temperatures across the Tri-State area were extremely hot in mid and late June. High temperature records were broken on a daily basis. McCook, Nebraska, set their all-time temperature record and Goodland, Kansas, reported the second highest reading since 1885. Hill City, Kansas, routinely reported high temperatures around 115 degrees and was the warmest place in the country for four days.

Location	All Time High Temperature Record	Date
Burlington, Colorado	112	June 15, 1952
Goodland, Kansas	111	July 25, 1940
Hill City, Kansas	117	July 24, 1936
McCook, Nebraska	115	June 26, 2012

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A Warm Start to the Year…

-Chris Foltz, Meteorologist

Through the first six months of 2012, temperatures across the Tri-State region have been consistently above normal. In fact, this year ranks as one of the warmest, if not the warmest, first six months to start the year since records have been kept across the central High Plains. Across the 19-county area served by your National Weather Service office in Goodland, official records are kept at four Automated Surface Observing System (ASOS) sites. Here are a few highlights of just how warm it has been.

Location	Normal Average Temperature (Jan 1 – June 30)	Record Average Temperature (Jan 1 – June 30)	2012 Average Temperature (Jan 1 – June 30)
Goodland, KS	**46.9º**	**52.8º (1934)**	**52.3º (2nd warmest)**
Burlington, CO	**46.1º**	**51.3º (1986)**	**51.0º (2nd warmest)**
Hill City, KS	**48.6º**	**53.7º (1946)**	**54.5º (New record)**
McCook, NE	**46.2º**	**49.9º (1946)**	**52.9º (New record)**

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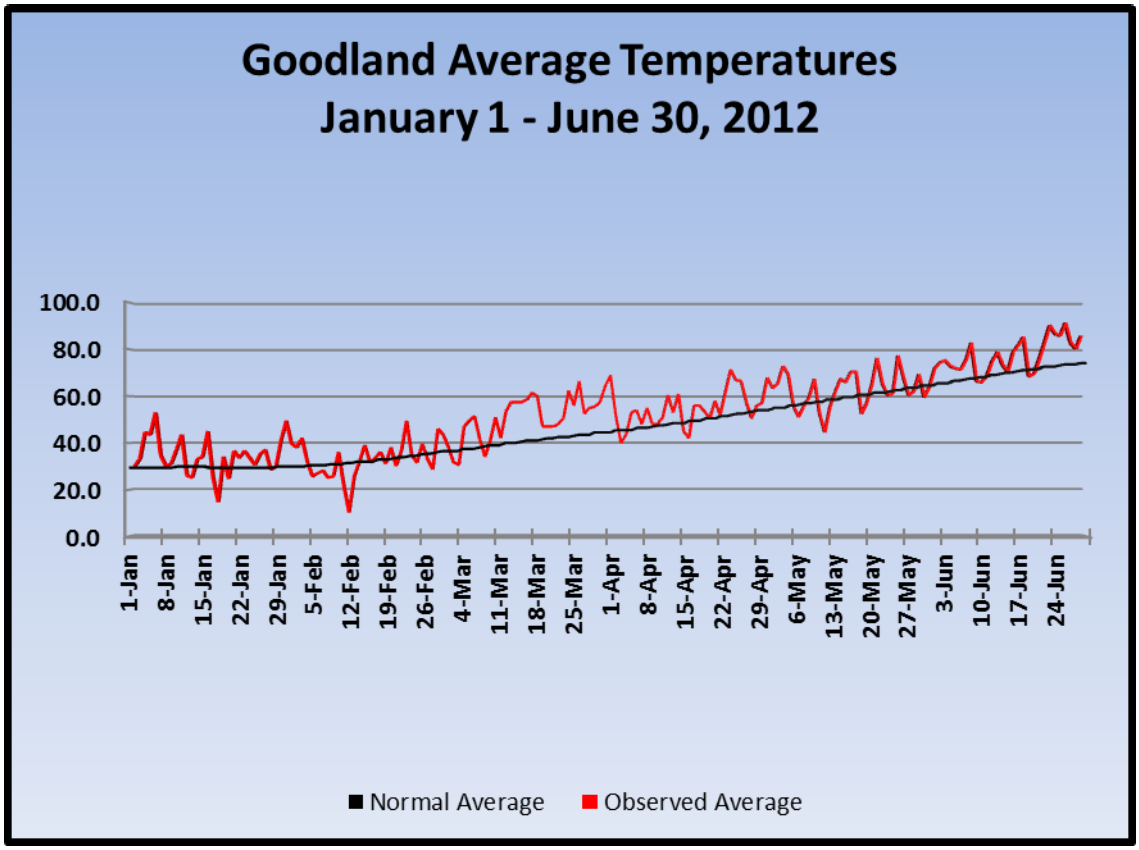
Below are images depicting the average daily temperatures from January 1 through June 30, 2012, for each of these four sites. The solid black line for each site depicts the normal average daily temperature which gradually increases as the year progresses. The red line depicts the observed average daily temperature. As you can see, there was a brief period in early to mid-February where temperatures were consistently below normal. However, a vast majority of days so far this year has averaged above normal with a few days approaching 30 degrees above normal. While it remains to be seen if this trend will be sustained through the remainder of the year, it has certainly been one for the record books thus far.



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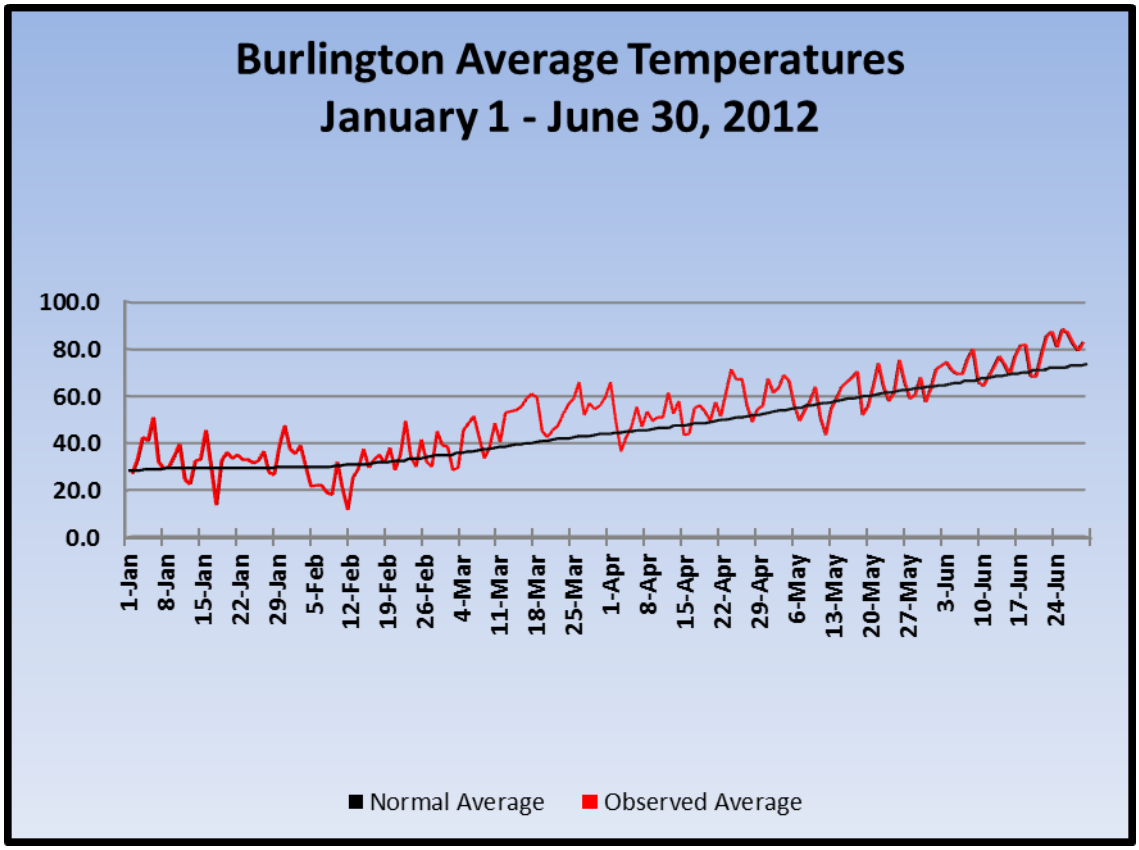

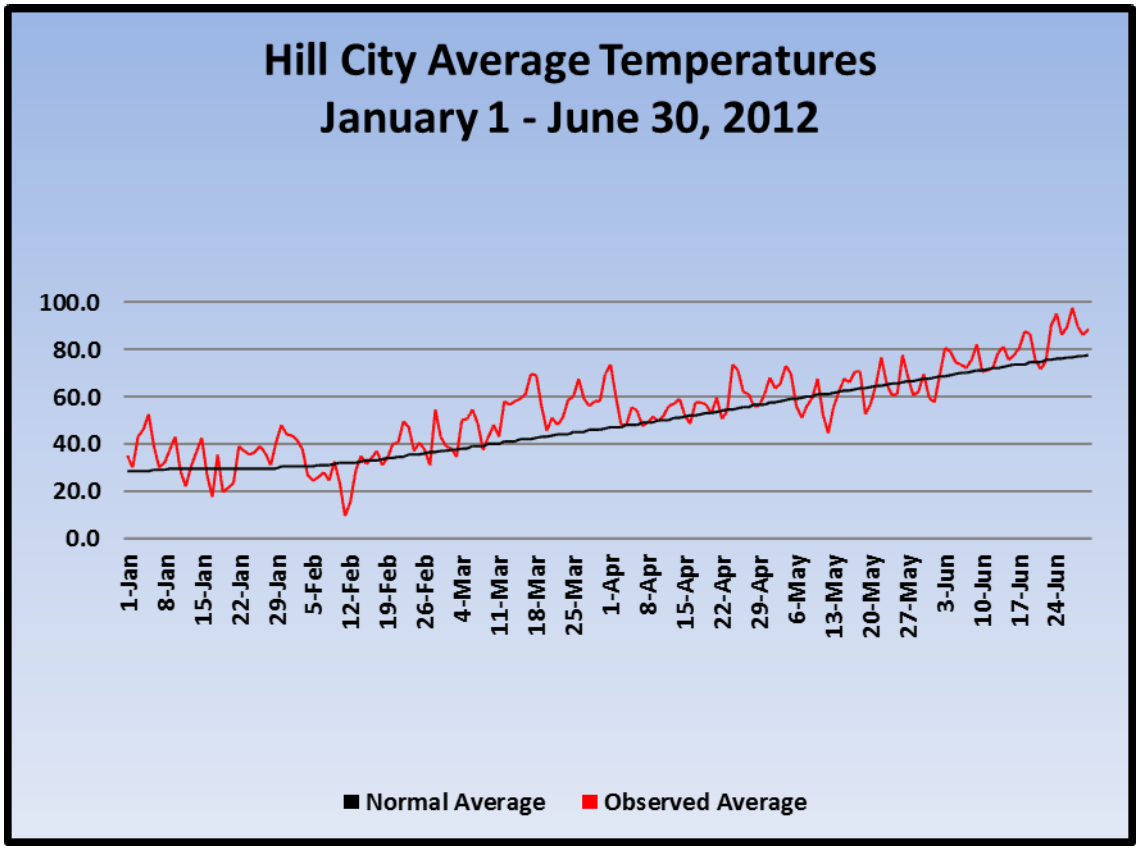

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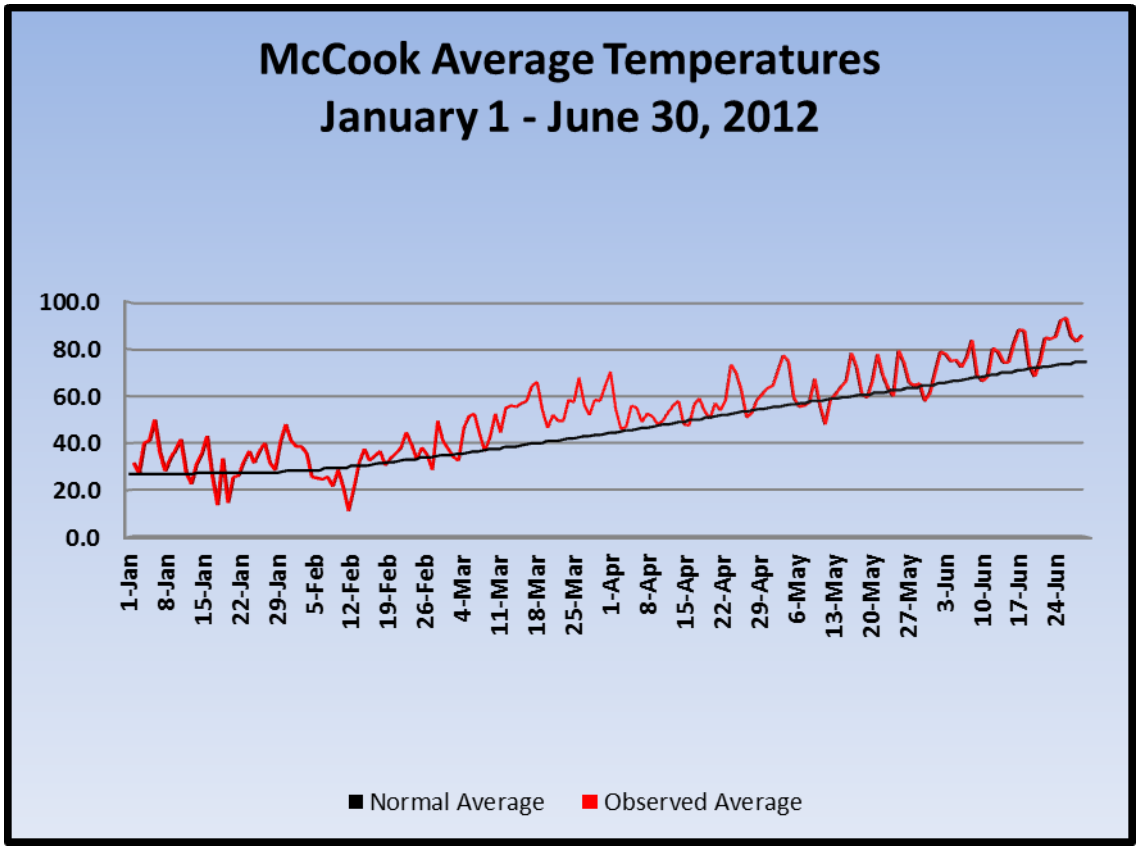

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Load the page using your phone's camera and a QR code reader.
Scan the code above and take the latest weather bulletins with you when you are on the go!

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Station	June 23, 2012	June 24, 2012	June 25, 2012	June 26, 2012	June 27, 2012
Goodland KS	**106 F** Tied daily record (106 in 1954)	**109 F** New daily record(107 in 1971)	**107 F** New daily record (104 in 1990)	**110 F** New daily record (107 in 1971) New monthly record (109 in 1936)	**110 F** New daily record (106 in 1940) Tied monthly record (110 in 2012)
Hill City KS	**111 F** New daily record (107 in 1952)	**114 F** New daily record (108 in 1971)	**111 F** New daily record (108 in 1911)	**115 F** New daily record (110 in 1980) New monthly record (113 in 1946)	**115 F** New daily record (107 in 1940) Tied monthly record (115 in 2012)
McCook NE	**103 F**	**105 F**	**103 F**	**115 F** New daily record (103 in 1998) New monthly record (112 in 1933) New all-time record (114 in 1932)	**109 F** New daily record (107 in 1980)
Burlington CO	**103 F**	**105 F**	**103 F**	**106 F** New daily record (102 in 1990)	**106 F** New daily record (104 in 1963)

Hot weather is deadly. Each year, heat kills 120 people on average in the United States — more than tornadoes, hurricanes, floods, lightning, or any other weather event. On a personal note, heat related fatalities hit home for me. I lost my brother-in-law to heat stroke several years ago. Please take the heat seriously, and remember these safety rules:

- **DO** - Slow down, and reduce strenuous activity. Mow the lawn or garden in the early morning or late evening instead of midday.
- **DO** - Dress in lightweight, nonrestrictive, light-colored clothing.
- **DO** - Drink plenty of water or other nonalcoholic fluids.
- **DO** - Eat light, easy-to-digest foods.
- **DO** - Seek out shade if you have to be outdoors for extended periods. Spend more time in air-conditioned places.
- **DO** - Check on elderly neighbors, friends and relatives to make sure they are okay.

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- **DO** - When outside, take frequent dips in the ocean or pool, or mist yourself with a water bottle. When inside, take frequent cool baths or showers and use cold compresses to cool off.
- **DO** - Apply high-SPF sunscreen frequently when outdoors.
- **DO** - Seek immediate medical attention if you experience symptoms of **heat illness**.

- **DO NOT** leave children, the elderly, or pets **in the car** for any reason, for any length of time. A dark dashboard or seat can easily reach temperatures in the range of 180 to more than 200 degrees F!
- **DO NOT** stay in the sun for long periods.
- **DO NOT** take salt tablets unless directed by a physician.
- **AVOID** alcoholic beverages; they can dehydrate you and increase your risk of heat stroke and other potentially fatal heat-related illnesses.

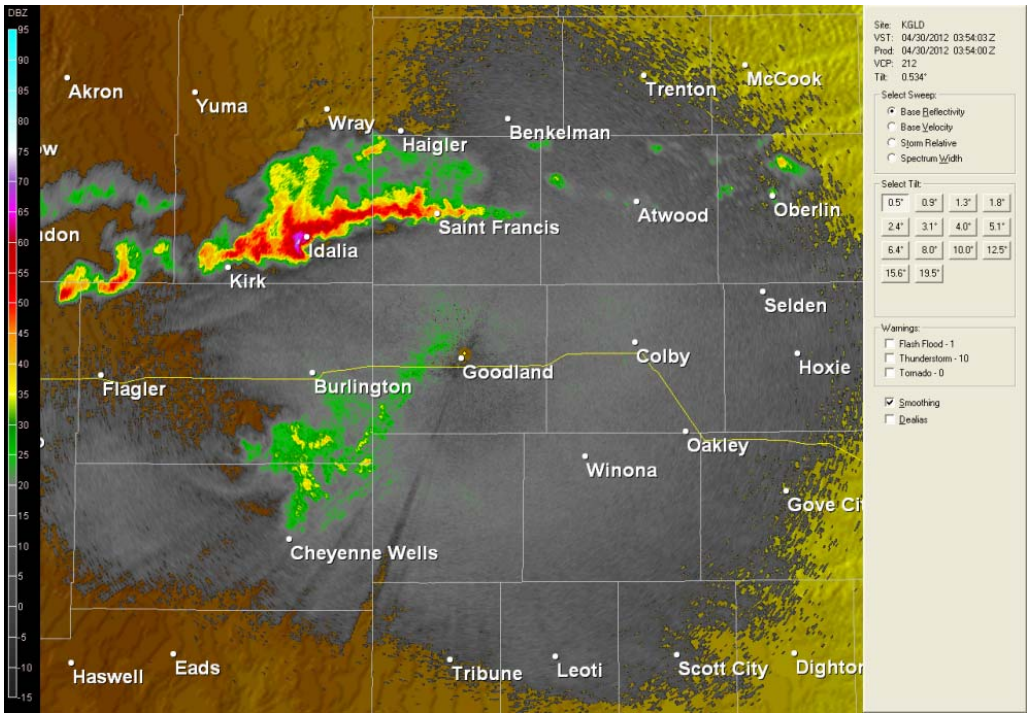
We still have several months of hot weather to come. Don't let the heat have you beat!

Yuma County Fire – July 2012

The April 29, 2012 Idalia, Colorado Hail Event

By David L. Floyd, WCM

During the evening of April 29th, a line of showers and thunderstorms developed from Kirk, Colorado to St Francis, Kansas. Most of the precipitation was uneventful and produced beneficial rainfall, but one thunderstorm in particular would prove to be a prolific hail producer, noted not so much for hail size but for hail accumulation. Law enforcement and highway maintenance crews stated that hail accumulated to depths ranging anywhere from six to eighteen inches! Two vehicles ultimately became stuck in the hail drifts, with the scene resembling more of a winter snowstorm than a spring thunderstorm.



The radar image above provides an overview of the precipitation at 954 pm MDT (1054 pm CDT). The gray areas indicate insignificant activity, so focus on the green, yellow and red areas. The band of red extending across southern Yuma County, Colorado depicts heavy rain and hail.

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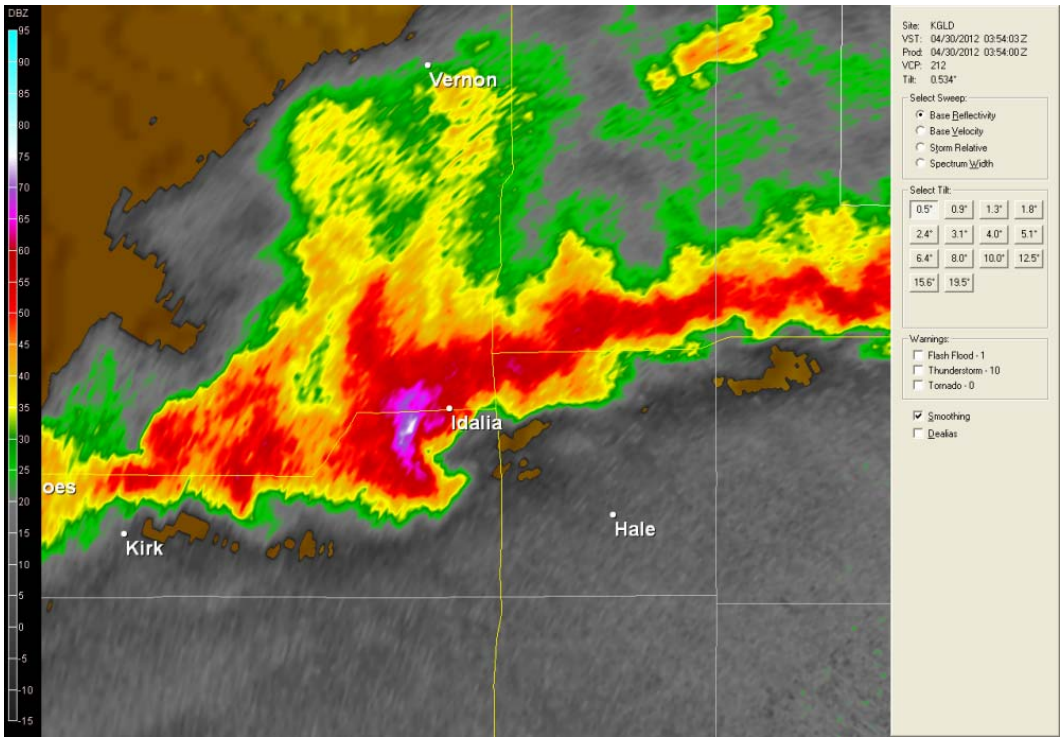

A close-up of the precipitation is shown in the radar image above. Note the purple and white area just west of Idalia. This is the location of the hail core which crossed Highway 36 just west of town. It is sometimes difficult to determine from radar whether an intense region of precipitation is heavy rain, hail, or a combination of the two. Fortunately, a radar upgrade installed in Goodland last December is providing some assistance.

National Weather Service Doppler radars across the country are in the process of being upgraded to what is known as "Dual Polarization" technology. The Goodland radar happened to be on the front end of the list of scheduled installs, and our radar was on line with this new technology last December 8th.

In a nutshell, before the upgrade, the radar was horizontally polarized radar, meaning that pulses of radio energy were sent with the electric field oriented horizontally. This was intentional, because large raindrops tend to flatten out into a "hamburger" shape as they fall, so radars sending out pulses with a horizontal electric field will better detect areas of heavy precipitation.

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Now, with dual polarization technology, the radar essentially sends out pulses with the electric field oriented horizontally as well as vertically. What this allows us to do is better determine the shape of precipitation targets. Heavy rain with large, flattened drops will give one signature, while a round hail stone will give another. Rain, snow, sleet, birds and smoke all have their unique signatures, which will assist us in determining what is out there. While beyond the scope of this article, dual polarization will be explained in more detail in future newsletters.

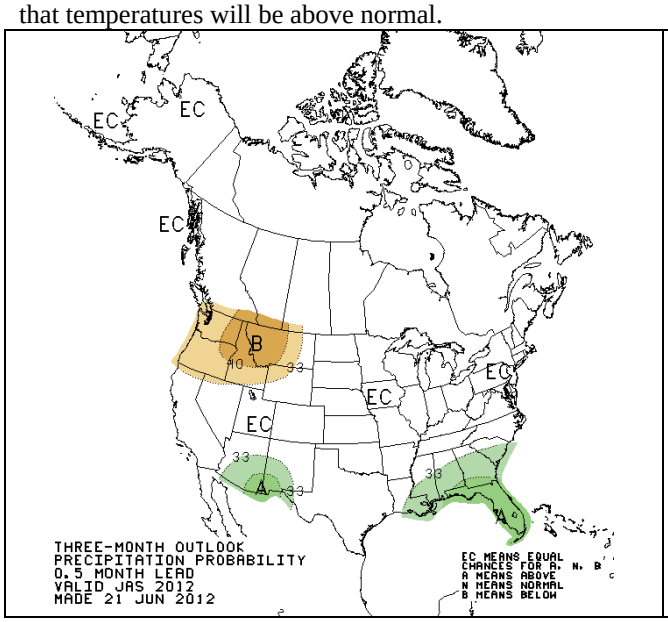
So, how did the area look after the hail fell? Check out these images! Most of the hail was between one quarter and one half inch in diameter. The image below-left was taken by deputy sheriff Evan Schiel just after the storm moved through the area. The image below-right was taken by John Osmus the following morning.

Climate Corner

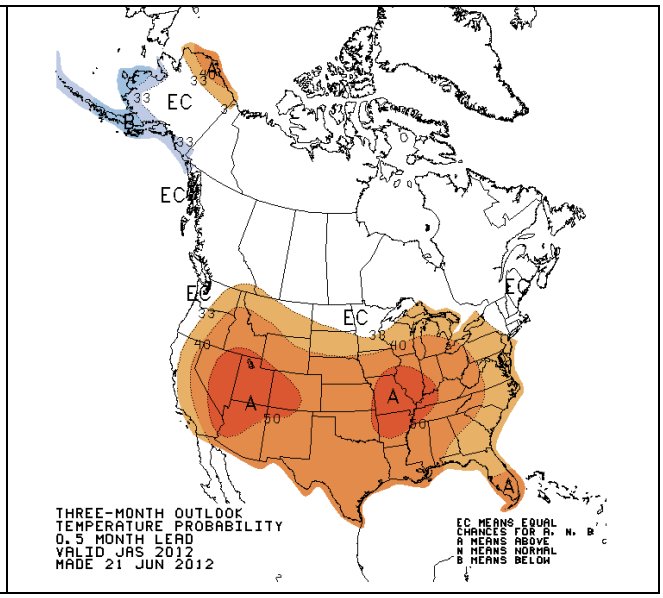
Current Weather Information for Our Area

Latest Extended Outlooks

Here are the latest precipitation and temperature outlooks from July through September, 2012. For the Tri-State area there is an equal chance of precipitation being above or below normal through the period while there is a greater chance that temperatures will be above normal.

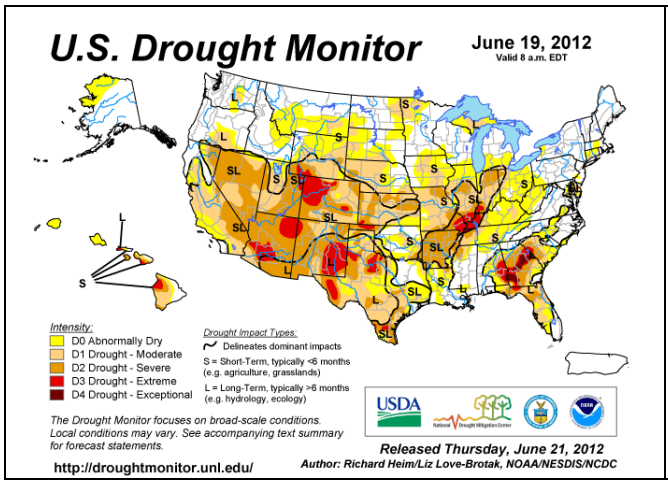


Precipitation Outlook (Jul - Sep)

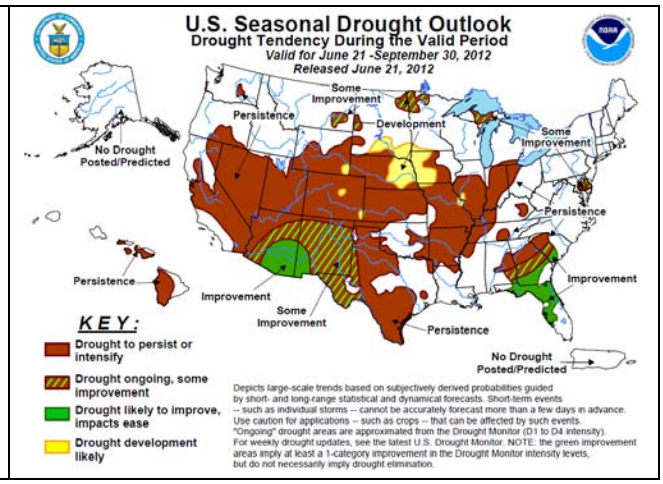


Temperature Outlook (Jul – Sep)

The Tri-State area is currently under the moderate or severe drought classification. Drought conditions will likely persist or intensify during the summer.



Current Drought Monitor



Drought Outlook (Jul – Sep)

Further information about the extended outlooks and drought conditions are found at the Climate Prediction Center (http://www.cpc.ncep.noaa.gov/).

What is Fire Weather?

By Pam Murray, Meteorologist Intern

The term “fire weather” is used to describe the conditions necessary to promote or sustain fire behavior and growth. There are certain weather variables that tend to influence fire weather ignition and growth more than others. The most important of these variables include wind, relative humidity, fuels, and indirectly temperature.

The most significant of these variables is considered to be the wind. Wind allows more oxygen to be delivered to help fuel the fire while also influencing the speed and direction the fire will move. Strong winds can help spread embers quite a distance downstream of the fire, causing spot fires. The next important variable is a measure of the moisture in the atmosphere, or relative humidity (RH). The lower the RH, the drier the air, which in turn dries fuels. Fuels can include anything that will burn: grass, stubble fields, shrubs and trees, and even your house. Low humidity helps to dry these fuels, but drying times may vary depending on size of the fuel. For example, large trees will take much longer to dry than an area of grass. Combined with wind, the low RH helps to increase the rate at which area fuels dry.

While thunderstorms are perceived to improve critical fire weather conditions, they may actually make a serious fire situation worse or ignite new fires. Even a light rain may muddy roads and fields, making it difficult to get resources to a fire, or make challenging terrain even more difficult to maneuver. Thunderstorms can also produce quite a bit of cloud-to-ground lightning strikes which may ignite multiple fires across the area, especially if fuels are dry. Strong, gusty thunderstorm winds help to push the fire in multiple directions at the same time, and can create erratic fire behavior.

The National Weather Service provides land management agencies and local fire departments routine fire weather forecasts and tools to help in the planning of resources for firefighting deployment. The National Weather Service also provides a Fire Weather Watch or Red Flag Warning when conditions are forecast that will increase the threat for critical fire weather behavior.

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So what is the difference between a Fire Weather Watch and a Red Flag Warning?

- Fire Weather Watch - issued 12 -72 hours in advance of the forecast fire weather event, or during the first 12 hours of a forecast for dry thunderstorm activity.
- Red Flag Warning- issued within 24 hours of expected conditions, or issued if current conditions are meeting criteria and are expected to continue for 3 accumulative hours.

How do we determine when to issue a Fire Weather Watch or Red Flag Warning? Every office may have different wind and RH criteria with the location and climate of the area determining what thresholds will be used. For the Goodland office, a wind speed to RH matrix is used to help with our warning decision process.

A Fire Weather Watch or Red Flag Warning will be issued when we have a relatively high degree of confidences that critical fire weather, or red flag, conditions will be met based on the matrix. For example, we will issue if we believe that the winds will increase to 25 mph (sustained or gusts) and the RH will fall to 15%. We would also issue if we think that wind speeds will increase to 30 mph or higher with an RH of 20%. These conditions must also be expected to last for an accumulated time period of 3 hours or more.

Relative Humidity vs. Wind

	15	20	25	≥ 30	Wind (mph)
20%				W	
15%			W	W	
10%		W	W	W	
≤ 5%	W	W	W	W	
RH%					

In the figure above, “W” indicates a red flag watch or warning may be needed given the different wind speeds and RH’s. As you can see, the lower the RH, the lower the wind speed needed for issuance of a Fire Weather Watch or Red Flag Warning.

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If the region has been hot and/or dry for a significant amount of time, a Fire Weather Watch or Red Flag Warning may be issued for any thunderstorm activity, wet or dry. Lightning from thunderstorms that produce little to no rain are especially dangerous for igniting fires. If multiple fires are ignited, local resources may be stretched thin which may make fighting the fires particularly difficult.

Fire Weather Watches and Red Flag Warnings are issued by county, with many counties often being included on critical fire weather days. So far, this year has seen a much higher number of warnings being issued due to below normal precipitation and above normal temperatures. Normally, we see a peak in the number of warnings issued during the spring, and again in the fall. This is attributed to the changing of the large-scale weather pattern which has a tendency to produce gusty to strong winds and low RH values across the High Plains, in addition to dry fuels. The warnings normally drop off as we head into the summer weather pattern, as winds slacken and the local area vegetation increases the RH through cropland evapotranspiration processes. Warnings also drop off during the winter season as the area receives precipitation in the form of snow and much colder temperatures.

The graph below shows the number of Red Flag Warnings issued from January 2010 through the end of June 2012. The typical peaks can be seen for years 2010 and 2011 with a noticeably higher number of warnings issued in the spring compared to the fall season. Both years also have a significant decrease to near zero warnings issued during the summer season, before an increase heading into the fall season with another drop off during the winter months.

While 2010 and 2011 are very similar, we do notice that there were more warnings issued during 2011 than 2010. This may be due to several factors, including more precipitation in 2010 leading to higher RH values across the region as green-up began, relatively light winds during the fire weather season, or a combination of both higher RH and lower wind speeds. More precipitation also leads to greener and less burnable fuels across the region.

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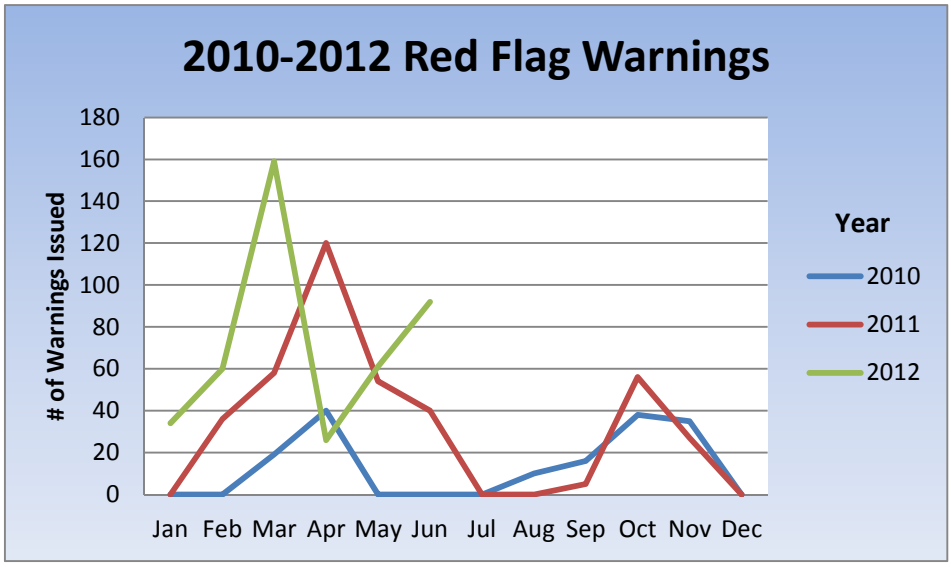

So why does 2012 look so different? The winter of 2012 was relatively mild with below normal snowfall during the colder months. This allowed fuels to remain dry across the region, and combined with the strong winds and low RH from the changing weather patterns, critical fire weather conditions prevailed. The decrease of warnings in April is most likely attributed to above normal precipitation during the month of April for Burlington, CO, and Goodland, KS, with near normal precipitation for Hill City, KS, and just below normal precipitation for McCook, NE.

The mild spring temperatures allowed the winter wheat to begin its spring growth early, thus increasing the evapotranspiration rate in April which would help to increase RH values over the region. Precipitation totals throughout the region dropped drastically in May and June and have led to extreme drought conditions across much of Colorado, western Kansas, and parts of southwest Nebraska. With drought conditions expected to persist this summer, there is a good chance critical fire weather conditions will also persist across the region.

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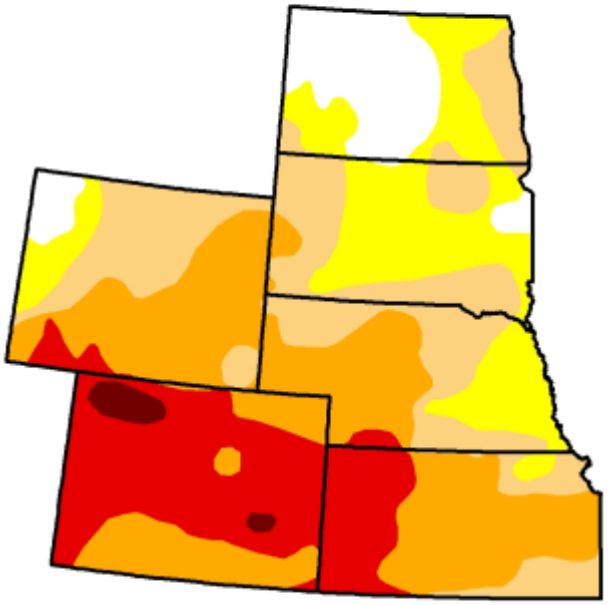
U.S. Drought Monitor

July 3, 2012
Valid 7 a.m. EST

High Plains

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	8.72	91.28	73.87	49.96	20.25	1.13
Last Week (06/26/2012 map)	16.07	83.93	66.51	46.80	13.10	0.00
3 Months Ago (04/03/2012 map)	33.45	66.55	23.17	5.92	0.09	0.00
Start of Calendar Year (12/27/2011 map)	61.66	38.34	18.12	7.22	2.07	0.04
Start of Water Year (09/27/2011 map)	70.09	29.91	17.44	11.97	6.22	2.96
One Year Ago (06/28/2011 map)	77.12	22.88	15.47	11.38	5.63	0.50



Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

http://droughtmonitor.unl.edu

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Rich Tinker, Climate Prediction Center/NOAA

National Weather Service
920 Armory Road
Goodland, KS 67735

Phone:
785-899-7119

Fax:
785-899-3501

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

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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!