# High Plains Wind

(Weather Information News Data)

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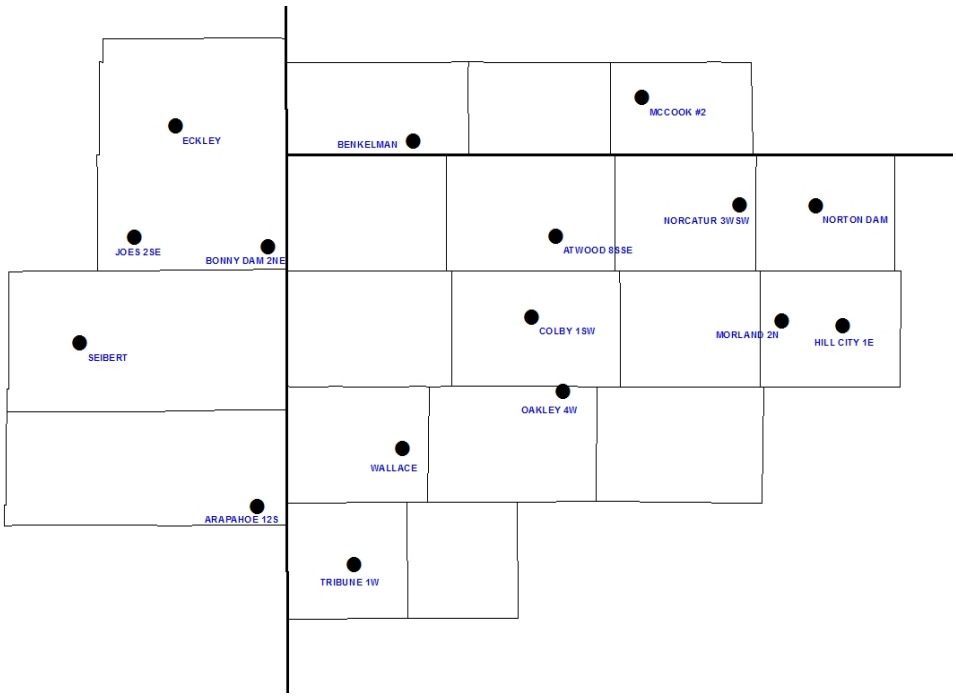
*"The FP gauge is designed to work for many years in remote and harsh environments."*

## A Message from the Meteorologist-in-Charge

*By Scott A. Mentzer*

## Fischer Porter Rain Gauge Updates

The National Weather Service in Goodland is currently upgrading Fischer-Porter (FP) rain gauges across the Tri-State area. The FP gauge is designed to work for many years in remote and harsh environments. The gauge weighs the precipitation it collects in a large metal bucket. The bucket sits atop a mechanism which converts the weight of the water into the measuring unit of inches. The precipitation data is sent to the National Climatic Data Center each month and becomes part of the national climatic database.




**There are 16 FP gauges across the Tri-State area (Figure 1 above).**

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# Characterizing Overnight Conditions

**-Chris Schaffer, Meteorologist Intern**

Many factors impact how much temperatures cool during the overnight hours, including cloud cover and wind speed. Clear skies allow the earth's surface to radiate energy more efficiently into space, and light winds limit how much cool air near the surface mixes with warmer air aloft.

Considering the past two winters and summers at five locations indicated in Fig. 1 (Goodland and Wichita, KS, North Platte and Omaha, NE, and Sioux Falls, SD), temperatures on average dropped about 20 degrees from the late afternoon into the overnight hours. There were typically between 7 and 8 hours of clear skies (or only high clouds) associated with these nights, and winds on average were less than 10 mph for between 8 and 9 hours.

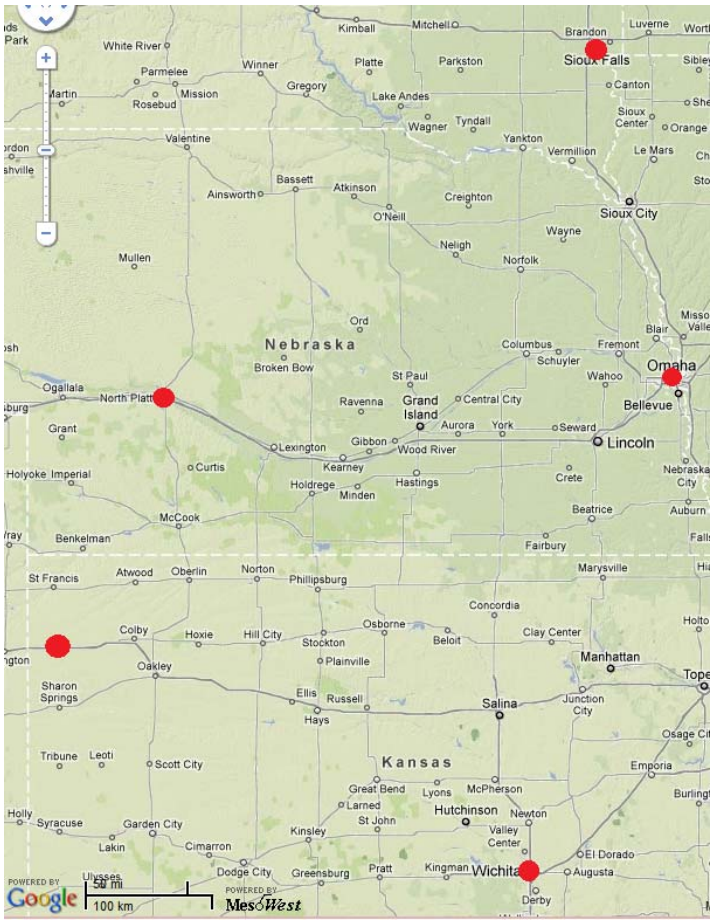


Fig. 1. The five locations where nights were examined.

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How often do these locations see nights with “good” cooling, clear skies, and light winds? If we consider only nights that had temperatures drop more than 20 degrees and had several hours of light winds and clear skies, we find that most nights do not see all three conditions met. An average of about 25 nights per season fall into this category (less than one month of a three-month season), and temperatures on these nights fell an additional 7 degrees compared to the average from all nights. These nights that cooled efficiently also had about 4 more hours per night of clear skies and 3 more hours of light winds compared to nights overall.

While these findings were determined by averaging over season and location, there are seasonal and local differences that are also important to consider. For example, those nights associated with mainly light winds, clear skies, and over 20 degrees of cooling tended to occur more often during the summer than winter at Goodland, North Platte, and Sioux Falls, but were more evenly distributed between seasons at Wichita and Omaha. Goodland and North Platte also had more of these nights than the other three locations, which isn’t apparent from the overall average of 25 nights per season.

By identifying different weather regimes using past observations, we can find seasonal and local trends like these, and use this information to improve future forecasts. The daily observations provided by cooperative observers can help us identify temperature and precipitation trends at many locations where we would not otherwise have observations, making local studies possible.

## NWS Goodland Is On Facebook

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

This page is available for anyone to view even if you don’t have a Facebook account.

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

# Spotter Training Class Schedule

***By David L. Floyd, WCM***

It's time for all of us to begin preparing for the upcoming severe weather season. Typically, the first severe thunderstorms rumble across the Tri-State area in late March or early April. It won't be long before milder weather arrives and brings the threat of large hail, damaging winds and tornadoes. **The picture below was taken June 20, 2011 by Darrell Skrdlant of Norton County.** It is a supercell thunderstorm that produced numerous tornadoes. Storm spotters, law enforcement and first responders were extremely helpful that day in passing along information to the National Weather Service regarding the location and progress of the storm.

The National Weather Service Forecast Office in Goodland, KS, working with county emergency managers, offers storm spotter classes at many locations in the Tri-State area. Classes will begin Thursday, March 1st and will continue through the month of March. Everyone is invited to attend, no prior knowledge is needed, the classes are free of charge, there are no age limits and no pre-registration is necessary. It just doesn't get any easier than that! If you would like to assist your local community by becoming a volunteer storm spotter and reporting severe weather to the National Weather Service, or if you simply want to learn more about severe weather on the High Plains, consider attending one of our classes. Classes are held in the evening at 6:30 pm local time and will last approximately 2 1/4 hours. Topics will include storm structure and evolution, important cloud types, weather safety and how to report severe weather events.

Check out the list below for the location of a spotter talk near you!

| March, 2012 - Upcoming | | | |
|---|---|---|---|
| **Day** | **City, State** | **Time** | **Location** |
| **01** | **Hill City, KS** (Graham County) | **6:30pm CST** | Frontier Stage 321 E Main St |
| **05** | **Leoti, KS** (Wichita County) | **6:30pm CST** | Firehouse 4th Street (Hwy 25) 2 blocks north of Hwy 96 |
| **06** | **Colby, KS** (Thomas County) | **6:30pm CST** | Community Building Downstairs 285 E 5th |
| **07** | **Goodland, KS** (Sherman County) | **6:30pm MST** | Murray Center Northwest Tech College 1315 Eustis |
| **08** | **Oakley, KS** (Logan County) | **6:30pm CST** | Courthouse Downstairs 710 W 2nd |

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| | | | |
|---|---|---|---|
| **09** | **Norton, KS**<br>(Norton County) | **6:30pm CST** | Prairie Land Electric Coop Downstairs - 1101 W Hwy 36 |
| **13** | **Idalia, CO**<br>(Yuma County) | **10:00am MDT** | St Johns United Church of Christ 28592 Cty Rd 7 Idalia |
| **13** | **Hoxie, KS**<br>(Sheridan County) | **6:30pm CDT** | Bowen Scout House 1041 Sheridan St |
| **14** | **Oberlin, KS**<br>(Decatur County) | **6:30pm CDT** | Gateway Building 1 Morgan Drive |
| **15** | **Grainfield, KS**<br>(Gove County) | **6:30pm CDT** | 4-H Building, West of town on 3rd St |
| **16** | **Tribune, KS**<br>(Greeley County) | **6:30pm MDT** | EMS Building 219 W Greeley Ave |
| **20** | **Yuma, CO**<br>(Yuma County) | **6:30pm MDT** | Ambulance Building E 2nd Street |
| **21** | **St Francis, KS**<br>(Cheyenne County) | **6:30pm CDT** | High School Cafeteria 100 S College |
| **22** | **Benkelman, NE**<br>(Dundy County) | **6:30pm MDT** | High School Distance Learning Room - 400 9th Ave W |
| **23** | **Sharon Springs, KS**<br>(Wallace County) | **6:30pm MDT** | CAB Building at fairgrounds south of town |
| **26** | **McCook, NE**<br>(Red Willow County) | **6:30pm CDT** | McCook Senior Center 1400 W 5th St |
| **27** | **Atwood, KS**<br>(Rawlins County) | **6:30pm CDT** | Rawlins County Courthouse 607 Main St |
| | ***Contact Information:*** New location from previous years | | |
| **28** | **Trenton, NE**<br>(Hitchcock County) | **6:30pm CDT** | EMS Building 333 Main St |
| **29** | **Kit Carson, CO**<br>(Cheyenne County) | **6:30pm MDT** | Kit Carson School Cafeteria 102 5th Ave |
| **30** | **Burlington, CO**<br>(Kit Carson County) | **6:30pm MDT** | Burlington Community & Education Center<br>340 S 14th Street |

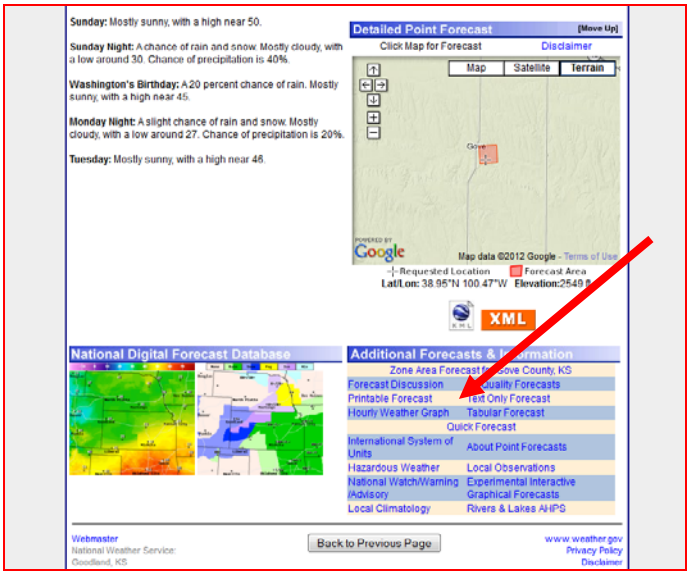
# Hourly Weather Graphs Available Customized Just For You

## By David Thede, Meteorologist

*Did you know the National Weather Service provides an hourly weather graph, also known as a meteogram, for any location in the United States?*

A meteogram is a graphical depiction of forecast trends in meteorological variables including, but not limited to, temperature, dew point, wind speed and direction, pressure, depicted as a graph over period of time divided in hourly segments.

- On the main page of your National Weather Service Goodland website or any other NWS website, click on any point on the point and click map, or enter a city and state or zip code into the box at the upper left of the main page where you see "Local forecast by "City,St" or Zip Code".
- Scroll down to the bottom of the page and select the "Hourly Weather Graph" link from the "Additional Forecasts & Information" section.
- Once there, you can select or unselect various weather elements that you wish to see or not see, including temperature, dew point, wind chill, wind, precipitation potential, precipitation type, sky cover, etc. This is available in a graphical and tabular format.

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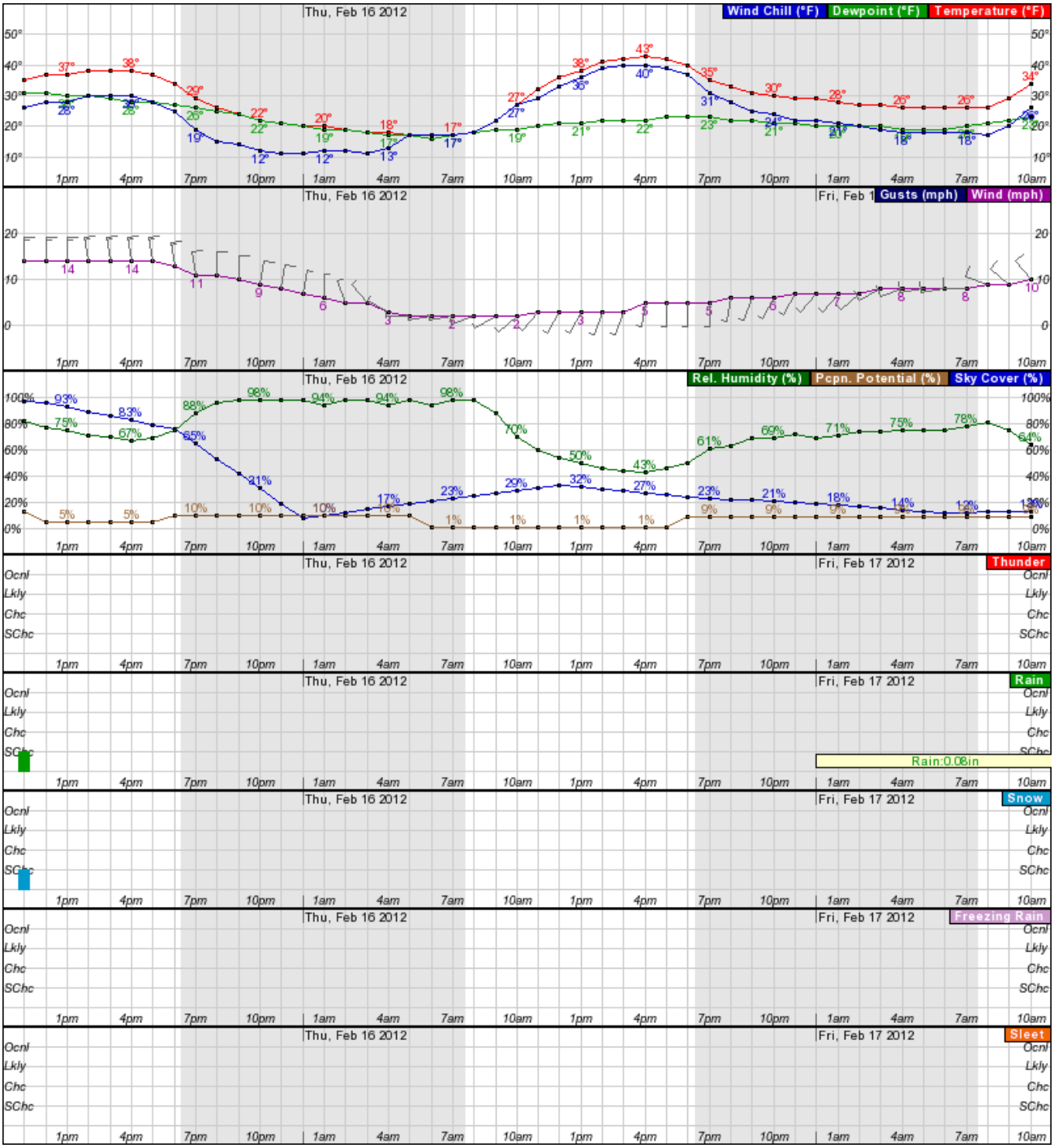
The example below is for Gove, KS.



# Goodland NWS Staff Talks With Local Users

**By David L. Floyd, WCM**

On December 8, 2011, a half-day workshop was held for local partners to learn how high impact weather events affect their daily operations. Topics included how best to relay confidence in forecasts and warnings, use of social media to exchange information, introduction of the Weather-Ready Nation concept, and the ability of the NWS to provide on and off-site decision support.

Approximately 40 users attended the workshop which included members of the media, hospitals, emergency managers, dispatchers, school superintendents, city officials and the department of transportation.

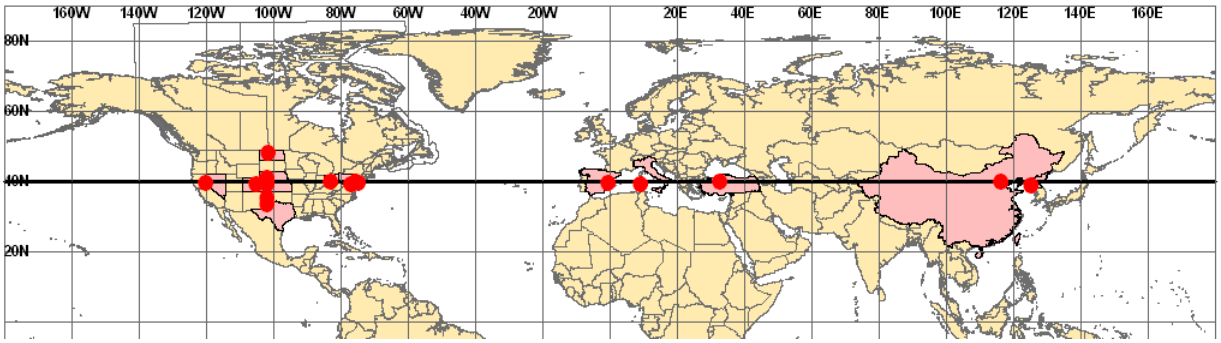
The purpose of the event was twofold: each participant had the opportunity to learn about the daily operations of NWS as well as those of partner agencies, but just as important, each user established or enhanced their working relationship with one another which is so vital during actual response and recovery efforts. Audience feedback was uniformly positive at the end of the session with one partner stating “We need more meetings like this!”

NWS staff gained insight at the workshop and came away with a clearer understanding of specific weather needs of its customers. “Building relationships and understanding the needs of the people you serve are crucial”, stated Scott Mentzer, Meteorologist-In-Charge at WFO Goodland. “This workshop served us very well in that regard”.

Action items include the office hosting quarterly meetings with specific user groups to discuss how they can best be served, developing a calendar of large venue events, and participation in planning and implementation of county disaster exercises.

# Ever Wonder?

*By David Thede, Lead Forecaster*




In the October edition of the *High Plains Wind* I examined climatic temperature data for cities that have the same latitude or longitude as Goodland, Kansas. I'll do the same thing in this edition but will look at precipitation data. I'll review rainfall data for 11 locations with similar latitude as Goodland and four locations with a similar longitude to Goodland (Table 1).

| Location | Latitude/Longitude | Elevation (feet) |
|---|---|---|
| Goodland, Kansas | 39.35/-101.71 | 3681 |
| Reno, Nevada | 39.53/-119.81 | 4505 |
| Baltimore MD/Washington DC | 39.18/-76.67 | 146 |
| Columbus, Ohio | 39.99/-82.89 | 815 |
| Philadelphia, Pennsylvania | 39.87/-75.24 | 36 |
| Atlantic City, New Jersey | 39.46/-74.58 | 75 |
| Castle Rock, Colorado | 39.37/-104.86 | 6224 |
| Beijing, China | 39.93/116.39 | 143 |
| Pyongyang, North Korea | 39.0/125.30 | 89 |
| Ankara, Turkey | 39.93/32.86 | 3077 |
| Valencia, Spain | 39.47/-0.37 | 49 |
| Cagliari, Italy | 39.22/9.12 | 13 |
| Amarillo, Texas | 35.22/-101.83 | 3607 |
| Lubbock, Texas | 33.58/-101.85 | 3282 |
| Minot, North Dakota | 48.23/-101.30 | 1716 |
| Ogallala, Nebraska | 41.13/-101.72 | 3222 |

**Table 1 – Locations of Compared Stations**

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Despite being at similar latitude to Goodland, both monthly average precipitation (Table 2) and annual total precipitation (Table 3) varied greatly between the 12 sites studied with annual amounts ranging from 7.48 inches in Reno, Nevada to 42.05 inches in Philadelphia, Pennsylvania. The mean average was 26.52 inches. Goodland's 19.76 inches ranks as the 6th driest with Valencia, Spain slightly drier at 17.85 inches and Beijing, China slightly wetter at 22.53 inches. Goodland recorded the 2nd driest period from December through February with an average precipitation total of 1.27 inches, the driest being Beijing, China with 0.41 inches. The wettest was 3.43 inches in the Baltimore-Washington DC area.

Large differences show up during the summer months, especially in July and August where the bulk of the annual total precipitation is measured for some and not for others. In Goodland the July through August average precipitation is 6.03 inches, 30.5% of our annual total. This ranks 3rd amongst stations studied during the two month period. The highest two month amount is 19.22 inches in Pyongyang, North Korea but ranks 2nd (51.9%) to Beijing, China who's 13.58 inches ranks 1st (60.2%). The lowest two month total and percent of annual total is Cagliari, Italy at 0.47 inches and (0.04%) respectively. As we move into Fall and early Winter precipitation amounts decrease most significantly in Beijing, China (2.94 inches or 13.0% of annual total) followed by Goodland in 2nd with 2.99 inches and 15.1% respectively. Valencia, Spain ranks 1st with 6.93 inches and 38.8% of their annual precipitation falling during this 3 month period (September through November), followed by Cagliari, Italy in 2nd with 5.61 inches and 33.4% respectively.

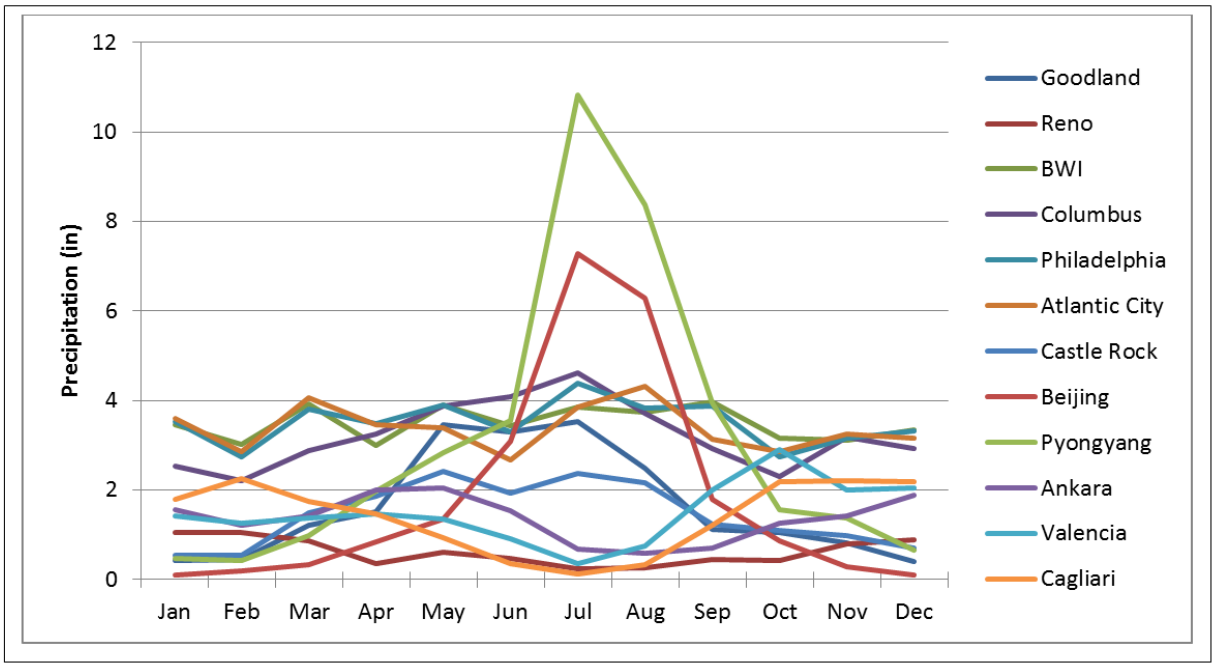


**Table 2 – Monthly Average Precipitation for Sites Similar to Goodland's Latitude**

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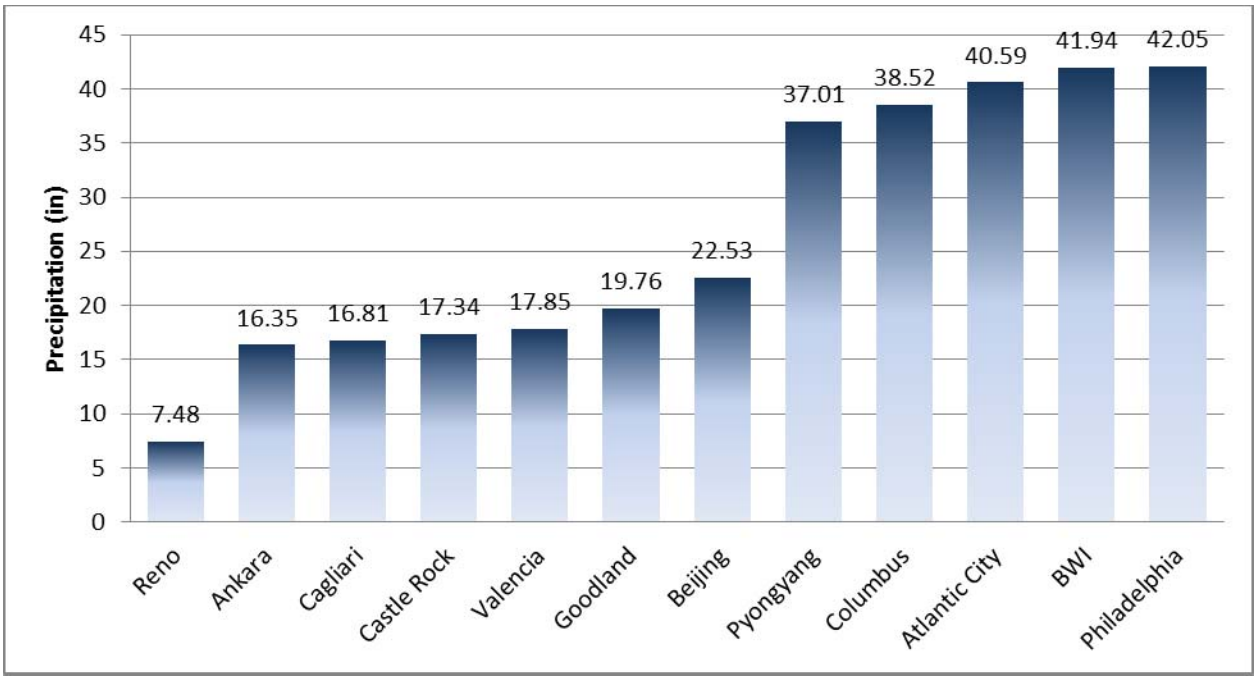


**Table 3 – Annual Average Precipitation for Sites Similar to Goodland's Latitude**

For locations along a similar longitude to Goodland both monthly average precipitation (Table 4) and annual total precipitation (Table 5) for the five sites studied were within 1.32 inches of each other, or within about 7%. Minot, North Dakota, had the lowest amount at 18.44 inches while Goodland received the highest amount of 19.76 inches. Goodland recorded the driest period from December through February with 1.27 inches total precipitation or 6.4% of the annual total. Lubbock, Texas, had both the highest three month amount (1.81 inches) and percentage of annual precipitation with 10.1%. During the July through August period the average for the five sites is 5.11 inches with a range of 4.48 inches in Lubbock, Texas to 6.03 inches in Goodland, Kansas. The July-August percentage of annual total precipitation ranges from 24.0% in Lubbock, Texas, to 30.5% in Goodland, Kansas. For September through November Goodland averages 2.99 inches of precipitation or 15.1% of the yearly annual total. This ranks first as the least amount and lowest percentage of annual total. Ogallala was a close 2$^{nd}$ with 3.06 inches and 16.3% respectively. Lubbock, Texas, had the highest average three month precipitation amount with 4.98 inches and also the largest percentage of annual yearly total with 26.7%.

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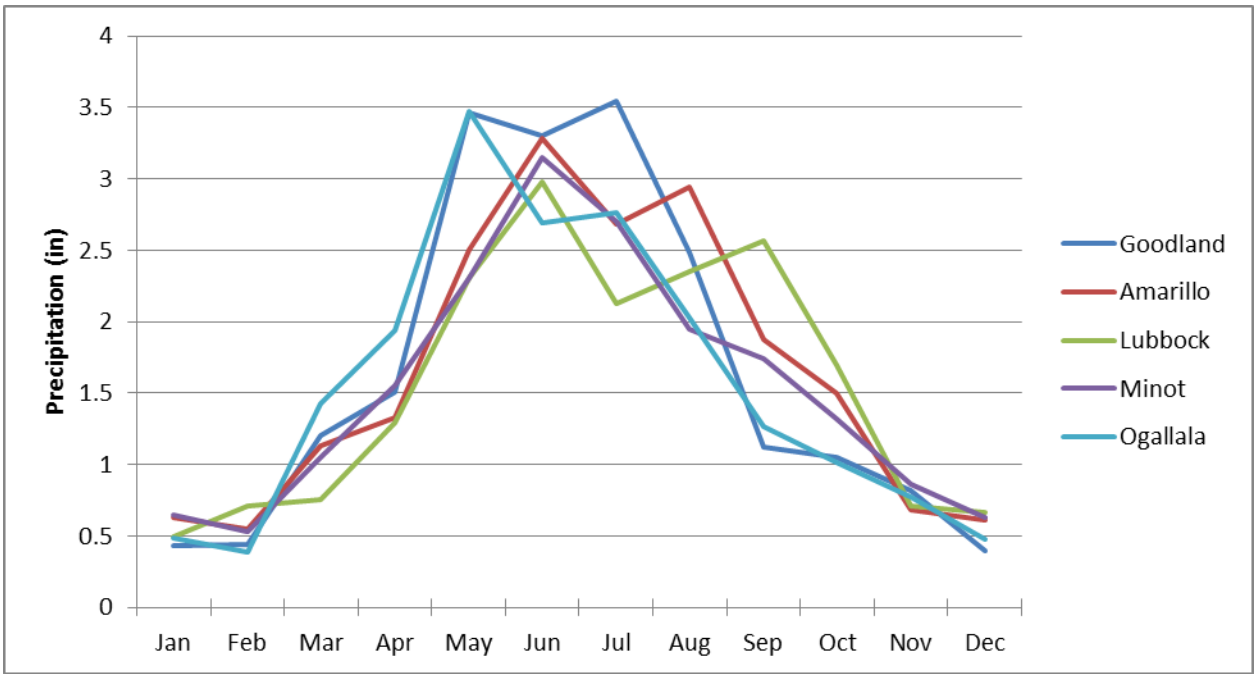


**Table 4 - Annual Monthly Precipitation for Sites Similar to Goodland's Longitude**

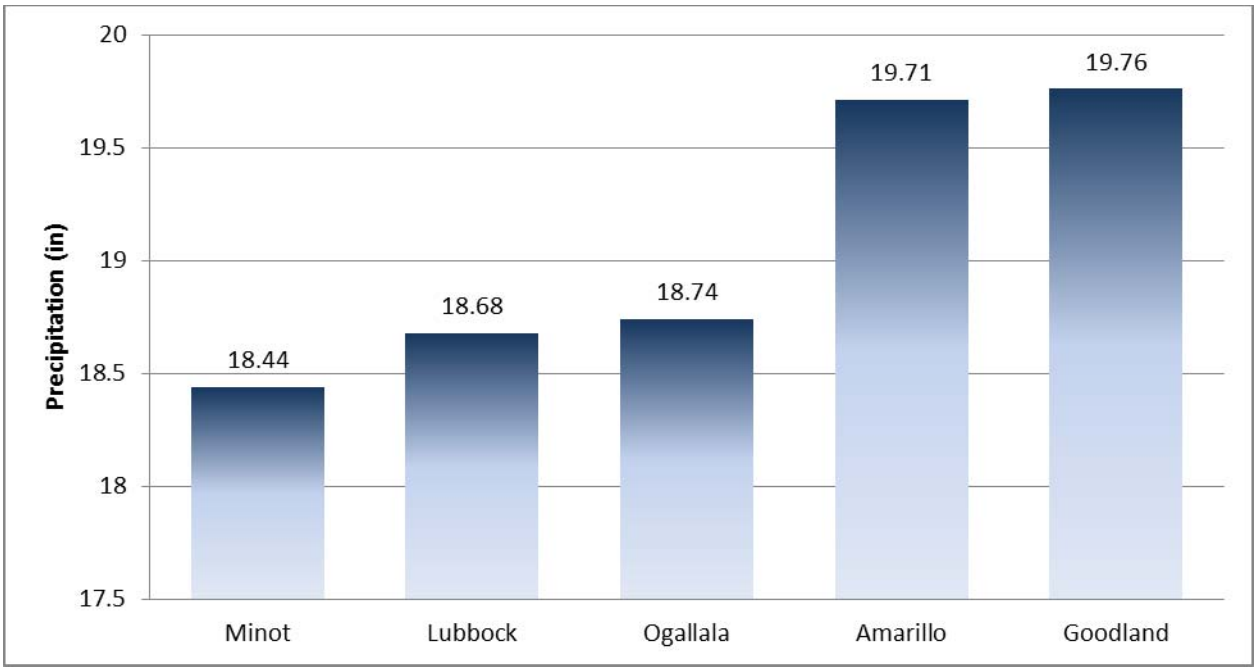


**Table 5 -Annual Average Precipitation for Sites Similar to Goodland's Longitude**

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Using these results with the temperature results from the last newsletter, a comparison can be made that combines both parameters. Goodland is assigned zero because its the baseline on which other sites will be compared. If a site is wetter or warmer than Goodland, we'll add the difference, and if the site is drier or cooler than Goodland we'll subtract the difference. An example would be Pyongyang, North Korea. Its average temperature is +0.9 degrees warmer when compared to Goodland and its annual yearly precipitation is +17.25 inches wetter then Goodland. Their score would be 0.9+17.25=18.15. Reno, Nevada on the other hand has an average temperature +1.2 degrees warmer when compared to Goodland but their precipitation is -12.28 inches drier then Goodland. Their score would be 1.2-12.28=-11.08.

The site that is most similar to Goodland is Ogallala, Nebraska, with a score of -4.62 (average temperature is -3.6 degrees compared to Goodland with precipitation -1.02 inches compared to Goodland). Ankara, Turkey, scores 2$^{nd}$ place with a score of -6.51. Castle Rock, Colorado, is 3$^{rd}$ with a -9.22 followed by Beijing, China, in 4$^{th}$ with a +10.47. Reno, Nevada, rounds out the top 5 with a score of -11.08 (average temperature is +1.2 degrees but precipitation is -12.28 inches compared to Goodland). Valencia, Spain is the least like Goodland with a score of +24.89 (average temperature is +26.8 degrees with precipitation -1.91 inches less then Goodland).

Norton County dispatcher Jane Engelhardt, pictured at left, displays her Public Service Award for providing outstanding service during the June 20, 2011 tornado outbreak.

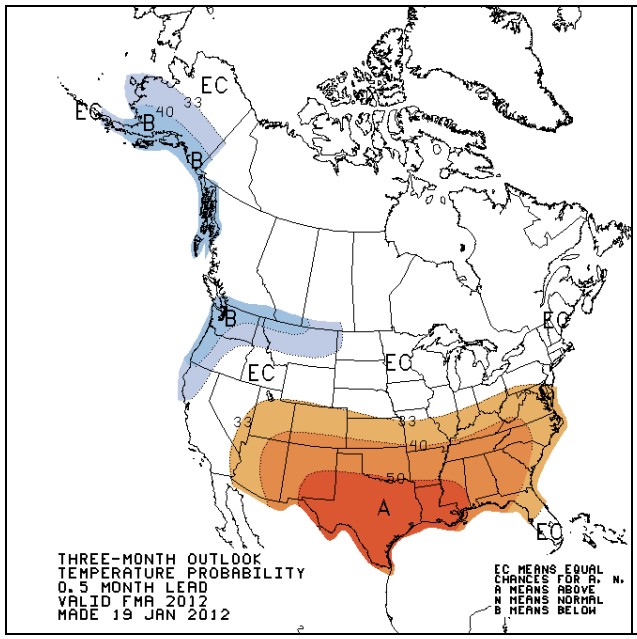
# Climate Corner

## Current Weather Information for Our Area

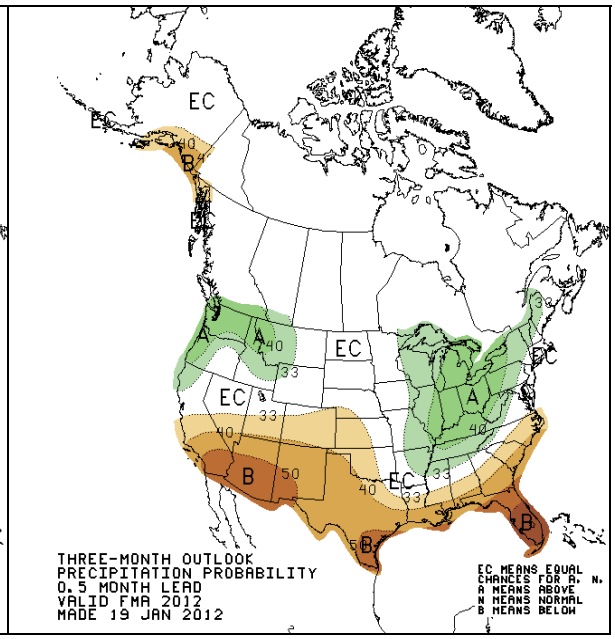
### Current Precipitation Data

| Site | Year-to-Date Precipitation (through February 13, 2012) | Departure from Normal |
|---|---|---|
| Burlington, Colorado | 0.41 Inches | -0.13 Inches |
| Goodland, Kansas | 0.47 Inches | -0.11 Inches |
| Hill City, Kansas | 0.67 Inches | -0.02 Inches |
| McCook, Nebraska | 0.32 Inches | -0.44 Inches |

### Climate Outlooks




**Temperature Outlook through April**
A – Chance of Above Normal Temperatures
B – Chance of Below Normal Temperatures




**Precipitation Outlook through April**
A – Chance of Above Normal Precipitation
B – Chance of Below Normal Precipitation

The latest climatic forecasts can be viewed at the Climate Prediction Center web page at: http://www.cpc.ncep.noaa.gov/.

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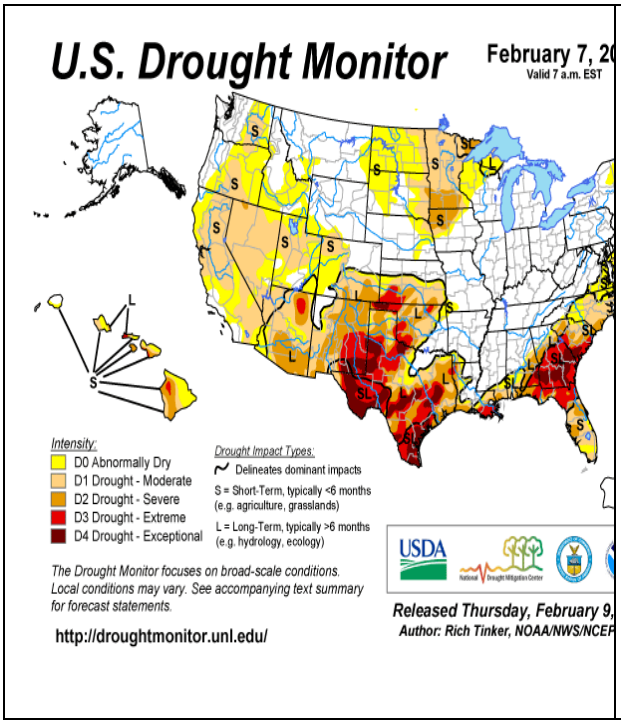
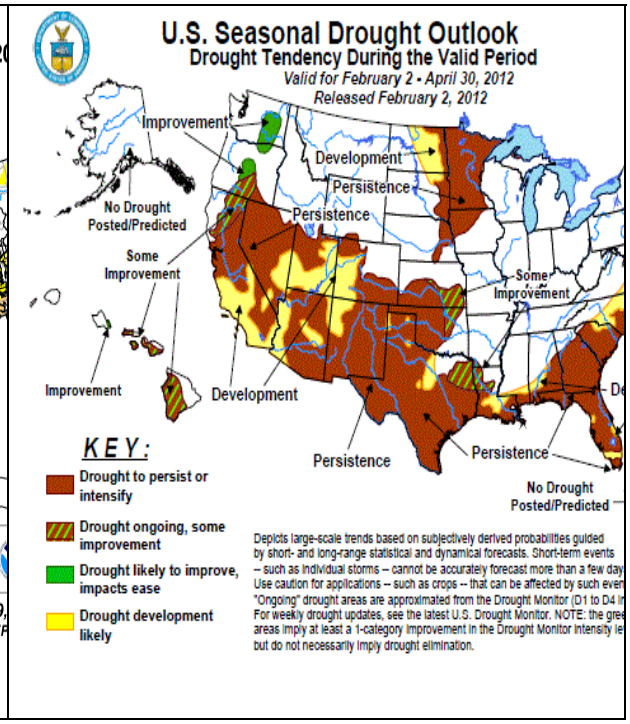
# Drought Monitor




**Current Drought Monitor**




**Current Drought Outlook**

The latest information about drought can be viewed at the National Drought Monitor web page at:
http://droughtmonitor.unl.edu/.

WCM Dave Floyd, pictured on right, presents a Public Service Award to Graham County dispatcher Jim Keith for the outstanding service he provided during the June 20, 2011 tornado outbreak.

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After weighing the water every 15 minutes, the old FP gauges would punch a hole in a paper tape, recording the amount of precipitation. The amount of mechanical equipment needed for this process included a timer, a punching mechanism, and a drive that would forward a tape (Figure 2). Although these gauges served 20 years or more in the field, the mechanical equipment increasingly malfunctioned and needed repairs.

Beginning in December 2011, the FP gauges were upgraded with electronic components (Figure 3). The tapes were replaced with an electronic medium recorder. The new components will record precipitation data more accurately and will prolong the life of the gauge. The new components will also make any subsequent repairs easier to make.

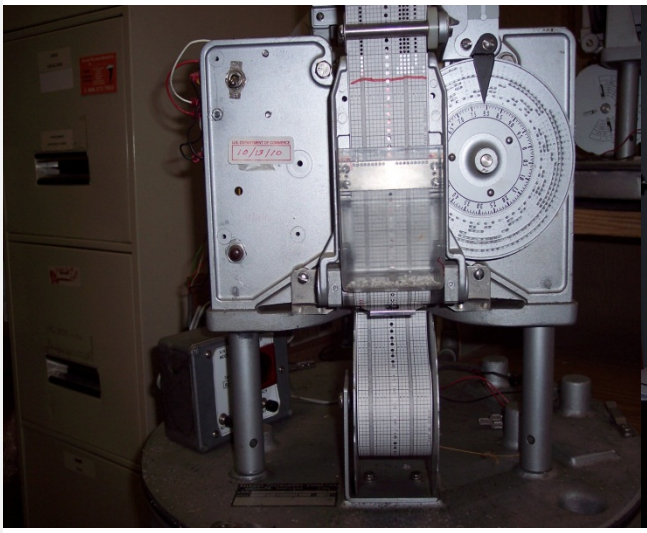

**Figure 2 – Old FP Gauge**

**Figure 3 – New FP Gauge**

The final FP gauge upgrade will occur in late February. The data is then checked for 30 days to ensure the equipment is functioning correctly. Once that is completed, the equipment becomes operational. In addition to providing more accurate readings, these new gauges will save money since they will need repairs much less frequently. The data will be sent electronically which will save mailing costs.

*Planning a visit to Goodland? We welcome visitors and tours.*
*Please call to schedule, especially during the summer months,*
*as severe weather often keeps us very busy!*

**Recently the employees at WFO Goodland participated in a local "Pink Out" helping to raise awareness and provide support for women with breast cancer. Employees wore pink shirts and contributed to the American Cancer Society to aid in the fight against this disease.**

Graham County dispatcher Dawnell Taylor, pictured at left, shows off the Public Service Award she received for providing outstanding service during the June 20, 2011 tornado outbreak.

# Cooperative Observer News

*by Mike Lammers, OPL*

Pictured at left is Robert Richmeier recipient of a 20 year length of service award. Bob reports from 1 mile east of Hill City, Kansas.

Pictured at right is Archie Cloud. He reports from nine miles north/northeast of Kit Carson, Colorado. He was recently presented with a 15 year length of service award.

**National Weather Service**
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Goodland, KS 67735

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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!*

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.