

Spring 2012

The Quarterly Hail

National Weather Service - Hastings, Nebraska

Volume 2, Issue 1

Notes From the Meteorologist In Charge

We are in the home stretch of winter. Most would say it has been a relatively mild and easy winter to survive. Keep in mind we still have March and April to get through before we are out of the woods in terms of a big spring snow storm.

The good news is, the daytime hours are getting longer and the sun is getting higher in the sky with each passing day. These are all very optimistic signs that spring is not far off.

This is the time of year when we often get storm systems that start out as thunderstorms and transition quickly to heavy snow and strong winds. At the office, spring is often our busiest weather time all year. As you might imagine, it is quite a complex process to be thinking about thunderstorms and tornadoes and winter storms within the same 12 to 24 hour period. I assure you, this staff has many years of experience and I am confident they will do their normal great job in recognizing the greatest potential threats and then effectively relaying that message to you and our other partners.

We have already had a tornado event in the area. As a matter of fact, it was the first tornado reported in Nebraska in February since we began tracking them in 1950! The staff performed very well and is already completing their annual training to refresh their memories on weather patterns related to severe weather associated with tornadoes and thunderstorms. On that note, now is your opportunity to refresh your spotting skills and think about your safety in the event of severe weather associated with thunderstorms. The office is in the midst of presenting severe weather spotter classes all across our area. Please try to attend this course. It is very educational and gives you a chance to interact with a real human being from the NWS.

Enjoy getting out and enjoying the warmer weather, but please renew your vigilance in monitoring the weather for your safety and the safety of your loved ones.

Steve Eddy

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Special Points of Interest:

- *What's the difference between a Watch, Warning and Advisory?*
- *Find out the schedule for area Spotter Presentations.*
- *How do tornadoes form?*
- *Find out when the Kansas and Nebraska Tornado Safety Drills will be conducted.*

Spring Flood Outlook - *Jeremy Wesely, Lead Forecaster*

What a difference a year makes! The winter of 2010/2011 made numerous headlines when it came to ice jam flooding, which included evacuations of several homes near the Platte River across portions of Hall and Buffalo Counties. The ice jams on the Platte River were a recurring theme with ice jam induced flooding over south central Nebraska reported each month from December 2010 through early March 2011. There were many factors that ultimately led to the active ice jamming year - including: Periods of extreme cold conducive for thick ice development and then a subsequent thaw/refreezing cycle that broke up the ice and then froze it into large ice dams.



The winter of 2011/2012 has been a vastly different winter with most of the winter being very mild. The brief cold spells this winter have not been of sufficient duration or severity to allow for the formation of thick river ice. Consequently, there were no significant ice jams or ice jam related flooding reported.

Spring flood outlooks are routinely issued in February and March to give advanced notice of possible flooding. They are based on soil moisture...snowpack magnitude...stream flow conditions...and the long range forecast of future temperature and precipitation patterns.

The long range spring precipitation outlook indicates fairly equal chances of seeing above normal or below normal precipitation across most of our outlook area. At this time, there are no strong climatological signals that would point more towards above or more towards below normal precipitation, thus the long range precipitation forecast of “equal chances”.

Our early February rain/snow storm dropped significant enough precipitation to end the drought conditions that had crept into areas east of Highway 281. Current soil moisture conditions are generally running near normal across the area.



Ice Jam on the Platte River in Polk County, March 2011

The only river within the Hastings hydrological service area that originates deep in the Rocky Mountains and is fed by spring snow melt is the Platte River. Last year the Platte River ran very full and much above normal all spring and summer due to the significant mountain snow melt. However, this year the current mountain snowpack over the Platte Basin is running below normal at 70 to 95 percent of normal. The reservoirs along the Platte River are still above normal due to last year’s heavy runoff. These two factors will somewhat cancel each other out with slightly more weight going towards the lack of snow cover resulting in near normal to below normal flows expected across the Platte River Basin in Colorado and Wyoming. The Rocky Mountain snow season is still not over and this forecast could certainly be adjusted should heavy mountain snows fall over the next few months. However, based on the current conditions and forecast it can be expected that the Platte River will be running much lower this spring than last year. The overall probability of flooding along the Platte River across south central Nebraska will be near average this spring.

After considering all of the above mentioned factors, the overall forecast for a majority of our hydrological service area is to expect an average chance of seeing spring flooding. However, it is also important to remember that even in dry periods, localized flooding and especially flash flooding are still possible from locally heavy rainfall generated by strong thunderstorms.

We Say Farewell To A Few Cooperative Observers

Mike Reed, Hydro-Meteorologist Technician

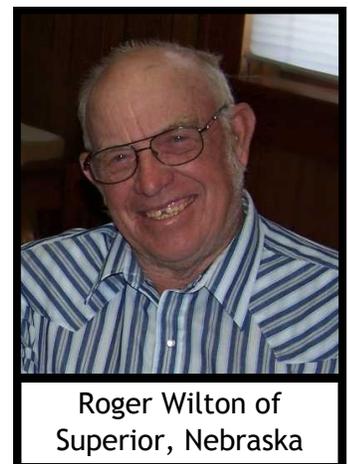
We are especially proud of the contributions our Cooperative Observers make to the National Weather Service. They are among an elite group of over ten thousand cooperative observers throughout the nation who volunteer their time to record precipitation every day. The 120-year old Cooperative Observer Program is a unique partnership between the National Weather Service and citizen volunteers in every U.S. state and territory. It is an effective way to collect weather data for immediate forecasting needs as well as longer-term national, regional and local climate outlooks. It is one of the few sources of measuring snow and its water equivalency in the United States. Climate data are used in every aspect of our national economy. Just a few of the many users are transportation companies, the insurance industry, agriculture, water resource and manufacturing, in addition to government agencies from local to national levels.

Unfortunately, a couple of our observers have recently passed away. We appreciate their years of faithful service they provided to the National Weather Service and the government of the United States of America. They were special people and will be missed.



George Thompson, our observer at Fairmont, Nebraska, passed away on December 16, 2011. He was the observer at Fairmont since April 1999, providing daily observations of temperatures, precipitation, snowfall and snow depth. George called in his observation to the office daily, and was always pleasant to talk to. He often offered a bit more than just the observation when he called. His wife Donna called in the observation when George was not able to call. Since April 1999, George measured over 327 inches of precipitation, as well as over 20 feet of snow.

Roger Wilton, our observer at Superior, Nebraska, passed away December 30, 2011. Roger and his wife Lynn have been the observers at Superior since August 2004, providing daily observations of temperatures, precipitation, snowfall and snow depth. The Superior observation faithfully arrived electronically each morning, sometimes with a comment about the weather at observation time. Since August 2004, Roger and Lynn measured over 198 inches of precipitation, as well as over 10 feet of snow.



In other news, the observation station at Gibbon, Nebraska, will be retired effective March 1, 2012. **Jim Applegate** had been the observer for Gibbon since August 1, 1966, providing precipitation data recorded by the Fisher Porter rain gauge. This device has recently entered the electronic age, with reports sent in monthly using a digital memory card. Prior to this, the gauge used a paper tape which was punched every 15 minutes. Jim had to remove the tape each month and mail it to the National Weather Service office for processing. During his service, he has measured over 74 feet of precipitation! His efforts for over 45 years are greatly appreciated by the National Weather Service.

Did you Know



Frequently Asked Questions

With the spring convective season rapidly approaching, the National Weather Service in Hastings will be keeping an eye on the skies for potentially life threatening weather across our region - issuing advisories, watches and warnings when conditions warrant.



So what is the difference between an **advisory**, **watch** and **warning**?

An **advisory** is issued when conditions are expected to cause a significant inconvenience, but not serious enough to warrant a warning.

A **watch** is issued when a particular threat is possible in or near the watch area. It does not mean that the threat will actually occur. It only means that the threat is possible.

A **warning** is issued when a particular threat is either already occurring or imminent in the warning area.

Depending on the weather conditions, the National Weather Service issues numerous different types of advisories, watches and warnings. These include products for: **Winter Weather, Severe Weather, Fire Weather, Visibility (Fog and Dust), Winds and Excessive Heat/Cold.**

Tips For Reporting Hail and Wind Speed

The National Weather Service will issue a Severe Thunderstorm Warning when hail is expected to be 1” (quarter size) or larger and/or when winds are expected to be 58 MPH or greater.

When reporting hail, it is best to measure the hail when safe to do so. If you are not equipped with a ruler or other measuring instrument, hail size can be related loosely to coins or athletic balls, as in the table below (right).

It’s often difficult to estimate wind speed, especially in the plains where there are few physical indicators to observe damage. Below (left) is the Beaufort Wind Force Scale for estimating wind speeds. This is only a rough guide. Actual damage may occur at weaker or stronger speeds.

Wind Speed (mph)	Effects		
25-31	Large branches in motion	BB	Less than 1/4"
32-38	Whole trees in motion	Pea	1/4"
39-54	Twigs break off trees, wind impedes walking	Dime	7/10"
55-72	Damage to TV antennas, large branches break off trees	Penny	3/4"
73-112	Surfaces off roofs peeled off, windows broken, trailer homes overturned	Nickel	7/8"
113+	Roofs blown from houses, weak buildings and trailer homes destroyed, large trees uprooted, train cars blown off tracks	Quarter	1"
		Half Dollar	1 1/4"
		Walnut or Ping-Pong Ball	1 1/2"
		Golf Ball	1 3/4"
		Lime	2"
		Tennis Ball	2 1/2"
		Baseball	2 3/4"
		Large Apple	3"
		Softball	4"
		Grapefruit	4 1/2"

Spring Time is Severe Weather Awareness Time!

Each year, every National Weather Service (NWS) office in the nation makes educating the public about the natural weather related hazards in their area one of the highest priorities. Along the Gulf Coast, hurricanes may be the focus, or the Rocky Mountains, it may be wildfires. Here in south central Nebraska and north central Kansas our focus is severe spring weather, primarily on high winds, large hail, heavy rain and tornadoes.

With an array of weather information sources available, it's important to reach directly to each of our 30 counties of warning responsibility.

One of the main methods we use is conducting severe weather awareness and storm spotter presentations in every county. We will discuss a variety of topics, including storm structure, proper reporting, radar and many others. All of the presentations begin at 6:30 P.M. and last 75 to 90 minutes and it's your opportunity to learn and ask questions of a NWS warning and forecast meteorologist.

A schedule of presentations is included in this newsletter on the following pages. Look it over and find the talk near your home. We hope you stop by and say "Hello."



Do you know the proper name of this cloud feature? If not, come to one of severe weather awareness presentations to learn more.

How Strong is a Tornado?



A tornado spins southwest of Hastings, NE on June 15, 2009.

Rating a tornado is both an art and a science. Ratings are rooted in the Enhanced Fujita (EF) Scale (right). NWS meteorologists base the rating on the damage done by the tornado to various types of structures. Based upon structural tests, a wind speed estimate can be made from the degree of damage done (superficial, total devastation, etc).

Look for the EF-Scale the next time you want to know how strong a tornado was.

EF 0	65-85 mph
EF 1	86-110 mph
EF 2	111-135 mph
EF 3	136-165 mph
EF 4	166-200 mph
EF 5	Over 200 mph

Severe Weather Awareness Weeks and Tornado Drill Information

Kansas Severe Weather Awareness Week

March 12 - 16th

The Tornado Drill will be held Tuesday, March 13th at 1:30 p.m. CDT

More information can be found at http://www.crh.noaa.gov/Image/ict/pdf/SWAW_2012.pdf

Nebraska Severe Weather Awareness Week

March 19 - 23rd

The Tornado Drill will be held Wednesday, March 21st between 10 & 11 a.m. CDT

More information can be found at <http://www.crh.noaa.gov/gid/?n=severeawareness>

<http://www.crh.noaa.gov/images/gid/WCM/SWAW2012.pdf>

The purpose of the drill is to ensure everyone can adequately receive a tornado watch and warning, and to practice any actions which would be taken to protect your life in the event of a real tornado. This tornado drill presents an excellent opportunity for everyone at work, school, or home to practice their safety measures.

2012 Spring Severe Weather Awareness Presentations

All presentations begin at 6:30 P.M. and last 75 to 90 minutes.

Date	County	City	Location
February 28	Fillmore	Geneva, NE	Geneva, Public Library
February 29	Adams	Hastings, NE	Hastings Police Station
March 1	Thayer	Bruning, NE	Bruning Opera House
March 5	Sherman	Loup City, NE	Loup City Community Center
March 5	Osborne	Osborne, KS	Osborne Public Library
March 6	Valley	North Loup, NE	North Loup Fire Hall
March 7	Jewel	Mankato, KS	City Building
March 7	Gosper	Elwood, NE	Elwood Fire Hall
March 8	Buffalo	Kearney, NE	Ockinga Seminar Center, UNK Campus
March 12	York	York, NE	4-H Building, Fairgrounds
March 13	Rooks	Stockton, KS	Stockton City Hall
March 14	Phillips	Phillipsburg, KS	Phillipsburg Fire Station
March 14	Phelps	Loomis, NE	Loomis Community Building
March 15	Smith	Smith Center, KS	Srader Center
March 15	Merrick	Central City, NE	TBD
March 19	Howard	Farwell, NE	Farwell Fire Hall
March 20	Dawson	Gothenburg, NE	Gothenburg Fire Hall
March 21	Kearney	Axtell, NE	Axtell Fire Hall
March 22	Clay	Clay Center, NE	Clay County Fairgrounds

2012 Spring Severe Weather Awareness Presentations

All presentations begin at 6:30 P.M. and last 75 to 90 minutes.

Date	County	City	Location
March 26	Hamilton	Aurora, NE	Aurora Fire Hall
March 27	Furnas	Arapahoe, NE	Ella Missing Center
March 28	Hall	Grand Island, NE	City Hall - Council Chambers
April 2	Greeley	Wolbach, NE	Wolbach Fire Hall
April 3	Mitchell	Beloit, KS	Conference Room, NCK Technical College
April 4	Nance	Fullerton, NE	Fullerton Fire Station
April 5	Webster	Blue Hill, NE	Blue Hill Community Center
April 9	Nuckolls	Superior, NE	Superior Fire Hall
April 11	Polk	Osceola, NE	Osceola Fire Hall
April 16	Harlan	Alma, NE	Johnson Center
April 17	Franklin	Hildreth, NE	Hildreth Fire Hall

True or False? Test Your Tornado Knowledge!

1 - Highway and interstate overpasses are safe shelters against a tornado.

False! Overpasses can concentrate the tornado winds, causing them to be significantly stronger. People under them are in an even more dangerous situation, and some have been killed or severely injured. Being above ground level during a tornado is dangerous.

2 - Low pressure with a tornado causes buildings to explode. Opening the windows will equalize the pressure.

False! Opening the windows in an attempt to equalize pressure will have no effect, it is the violent winds and debris that cause most structural damage. It is more important for you to move to a safe area away from windows and exterior walls. With a tornado, every second counts, so use your time wisely and take cover!

3 - You may not always see a tornado coming.

True! While most tornadoes do have a visible funnel, it is not always the case. Tornadoes can be hidden by trees, terrain, or even be wrapped in rain.

4 - Areas near rivers, lakes, and mountains are safe from tornadoes.

False! No terrain is safe from tornadoes and they can cross bodies of water. In the late 1980's, a tornado swept through Yellowstone National Park leaving a path of destruction up and down a 10,000 ft. mountain.

Employee Spotlight - Science & Operations Officer Rick Ewald

I grew up in eastern South Dakota where I experienced my first tornado at the age of five at my Grandparent's farm. Since I didn't possess a 98 mph fastball and had trouble hitting a curve ball, I decided to pursue a career in meteorology rather than professional baseball, earning a Bachelor's degree from Dakota State University and a Master's from the South Dakota School of Mines & Technology.



Early in my career, I was able to see the world, as different job opportunities took me to Houston, the Utah desert, Kansas City, as well as a 6 month assignment in Thessaloniki, Greece. In 1993, I was selected for the initial Science & Operations Officer position here in Hastings.

I've been married to my High School sweetheart and the love of my life for 31 years, and we have three beautiful daughters (a bit of an adjustment since I grew up with three brothers). The oldest one is pursuing a Master's degree in Divinity at the Denver Seminary, the middle one is married and lives in Des Moines, while the youngest one is in her first year at the University of Nebraska at Omaha.

I still enjoy competitive sports and play tennis and softball on a regular basis. Having grown up half a farm kid, I like to work in my vegetable garden. We are very active members of First Presbyterian Church in Grand Island. Over the past few years I have served as an adult sponsor for our high school youth group mission trips with one excursion to the Boundary Waters of Minnesota, and the other to the south side of Chicago.

If a person wants to experience diverse weather, there is no place better than south central Nebraska and north central Kansas. From blizzards to tornadoes, I have seen and worked it all. I suppose my 15 minutes of fame came back in June of 2003 when I issued severe weather warnings for the Aurora area, and then the next day went over to measure the largest hailstone (7 inches in diameter) ever recorded in the U.S. at that time.

We Want to Hear from You!

Want to know how a tornado forms? Are you interested in how a rainbow is made? Or you just want more information about the Christmas Blizzard of 2009? Let us know!!

Every edition of the Quarterly Hail is published for you, our fans and customers. We want to write about things that **YOU** are interested in. Send us an email or drop us a line in the mail and let us know what you would like to see in each edition of the Quarterly Hail. Whether you are a weather fan like us, or just have a few weather questions you want answered, we want to hear from you! In the next editions of the Quarterly Hail, we will try to provide articles that reflect the interests of our customers. Each newsletter we will choose two or three customer questions to answer in the new Frequently Asked Questions section.

Even if you're not sure what you want to see in the newsletter, we appreciate any feedback! Let us know how we are doing. Did we have a typo in the last newsletter? Was the newsletter informative?



Send an email to Michael.Moritz@noaa.gov, or write or call:

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Thunderstorm Ingredients and Its Life Cycle

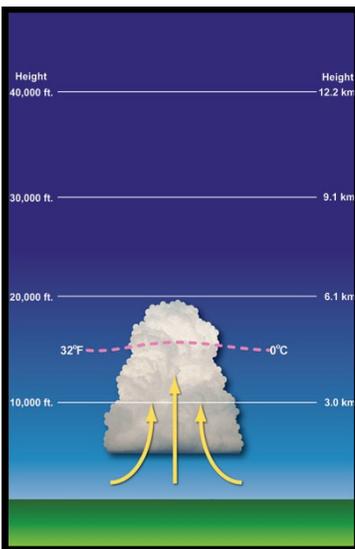
Part of the fascination many people have with thunderstorms is the mystery that surrounds them. Leading researchers are still learning about many of the phenomena associated with thunderstorms. In order to understand thunderstorm-related spectacles like tornadoes, lightning, and hail you must have a basic knowledge of thunderstorm characteristics. At any given moment, there are thousands of thunderstorms occurring worldwide. Most of these storms are beneficial, bringing needed rainfall. A small percentage of the storms become severe, producing large hail - 1 inch in diameter or larger - wind gusts of 58 mph or greater, or tornadoes. Although the area stretching from Texas to Minnesota has the greatest known occurrences of U.S. severe thunderstorms, no place is immune.

All thunderstorms require the following three ingredients: moisture, instability, and lift. Organized severe thunderstorm events also require vertical wind shear.

Moisture forms the clouds and precipitation in thunderstorms. Primary moisture sources include the Atlantic and Pacific Oceans and the Gulf of Mexico. The Great Lakes also can provide moisture for thunderstorms. In the Midwest, evaporation from farmlands can enhance low-level moisture.

Atmospheric stability is a measure of the atmosphere's tendency to enhance or deter vertical motion. In unstable conditions, a lifted parcel of air will be warmer than the surrounding air at that altitude. Because it is warmer, it is less dense and can rise more. Thus instability favors a storm's updrafts and downdrafts.

Lift provides the mechanism for the air to rise, starting the thunderstorm process. Sources of lift include cold fronts, warm fronts, drylines, thunderstorm outflow boundaries, and flow up the slopes of topography.



Developing Stage

(Cumulus or Towering Cumulus)

- Updraft, upward moving column of air, develops.
- Storm begins to produce precipitation within the upper portion of the cloud.

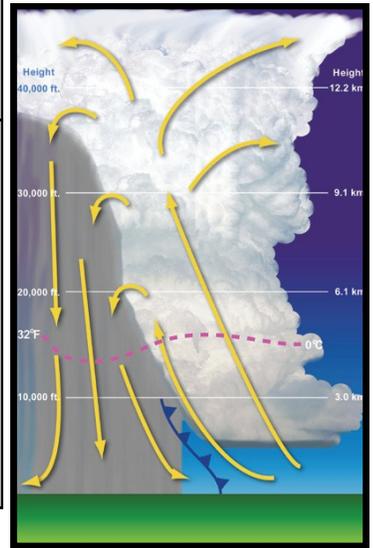
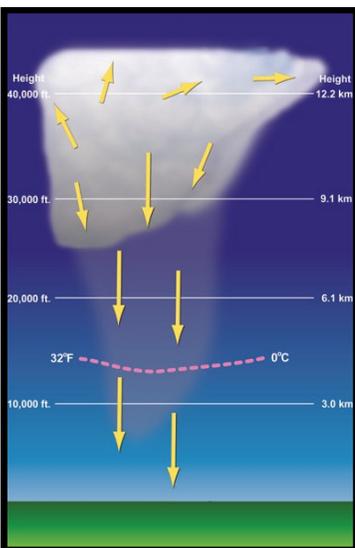
Mature Stage

- Updraft and downdraft coexist.
- Downdraft reaches the ground as a spreading of rain cooled air called the cold pool. The leading edge of the cold pool is called the gust front.
- Top of updraft forms an anvil-shaped cloud as air spreads outward.

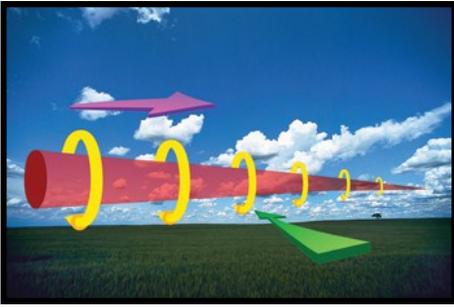
Dissipation Stage

- Downdraft is dominating.
- Loses favorable inflow as the gust front moves out a long distance from the storm.
- Sometimes shows an "orphaned anvil," the remnants of an anvil with the storm dissipated below.

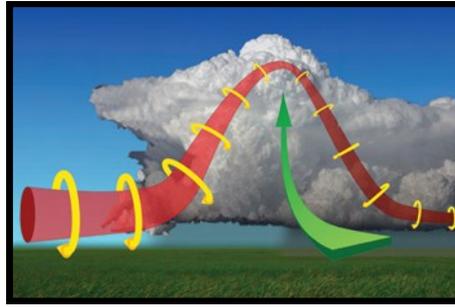
Vertical wind shear is the change in wind speed and direction with height. This effect is typically strongest near the surface, though it can be very strong at higher levels in the atmosphere near upper level jets and fronts. Generally, the greater the instability, the stronger the updrafts and downdrafts may become. The greater the vertical wind shear, the better the chance of storms becoming organized and long-lived.



How Do Tornadoes Form?



Before thunderstorms develop, winds change direction and increase in speed with altitude. This creates an invisible, horizontal spinning effect in the lower atmosphere.



Rising air within the thunderstorm updraft tilts the rotating air from horizontal to vertical.



An area of rotation, 2-6 miles wide, now extends through much of the storm. Most tornadoes form within this area of strong rotation.

More information can be found at:

<http://www.nws.noaa.gov/os/brochures/SGJune6-11.pdf>



Weak Tornadoes

- 88% of all tornadoes
- Less than 5% of tornado deaths
- Lifetime 1 - 10+ minutes
- Winds less than 110 mph
- Produces EF0 or EF1 damage

Photo courtesy of Chuck Doswell II



Strong Tornadoes

- 11% of all tornadoes
- Near 30% of all tornado deaths
- May last 20 minutes or longer
- Winds 111-165 mph
- Produces EF2 or EF3 damage

Photo courtesy of Wikimedia/Justin Hobson



Violent Tornadoes

- Less than 1% of all tornadoes
- 70% of all tornado deaths
- Can exceed 1 hour
- Winds greater than 166 mph
- Produces EF4 or EF5 damage

Photo courtesy of Wikimedia/Joshua Jans

More information on the EF-scale can be found at:

<http://www.spc.noaa.gov/efscale/>

This Table Reflects Various Spring “Normals” Across The Local Area...

	Normal High/Low March 15	Normal High/Low April 15	Normal High/Low May 15	3-Month Total Normal Rainfall (March-May)	Average Date of Last Freeze (32°)
Loup City	50° /25°	62° /34°	71° /46°	9.06”	May 3
Osceola	49° /25°	62° /36°	72° /50°	9.42”	April 26
Gothenburg	52° /26°	63° /36°	72° /48°	7.46”	May 5
York	49° /25°	64° /36°	73° /50°	9.77”	April 22
Franklin	53° /26°	64° /36°	73° /48°	8.25”	April 28
Smith Center, KS	55° /27°	67° /38°	76° /51°	8.70”	April 22
Beloit, KS	55° /29°	66° /41°	75° /52°	8.54”	April 20

Spring Climate Outlook Detailed Below...

The latest Spring Outlook from the Climate Prediction Center slightly favors above normal temperatures, but assigns equal chances of above normal, below normal, or near normal precipitation to South Central Nebraska and North Central Kansas.

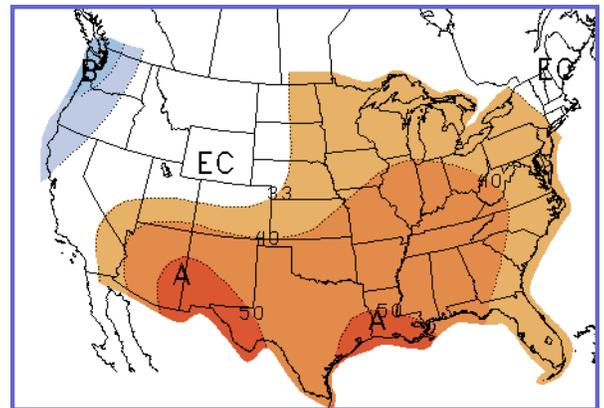
Time Frame: The NWS considers the “Spring” season to be all of March, April and May.

Temperature: The outlook on the right reflects a forecast for the 3-month period as a whole. We tend to view temperatures in the context of a daily or monthly average, but the 3-month outlook accounts for the entire season. **Red/Orange** colors represent “warmer” than normal and **Blue** colors represent “cooler” than normal. The white area labeled “EC” designates regions with Equal Chances of having above, near or below normal temperatures. This means there is no clear trend in the forecast analysis to support one of these outcomes over another. As the image shows, the forecast for South Central Nebraska and North Central Kansas slightly favors above normal temperatures this spring. However, the outlook doesn’t indicate *how much* above normal the seasonal temperature might be.

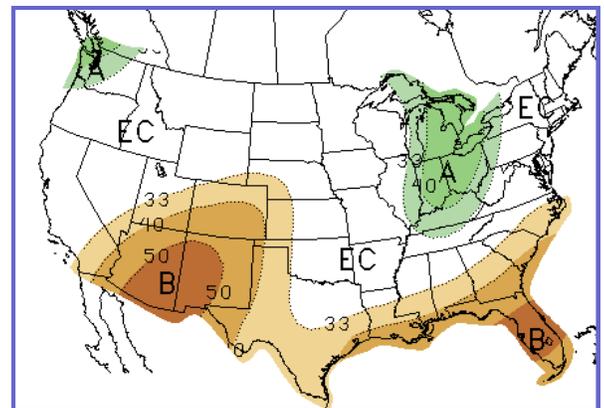
Precipitation: Similar to temperatures, the precipitation outlook depicts the total precipitation for the entire 3-month period, and is independent of individual days or months. **Green** colors represent “wetter” than normal and **brown** colors represent “drier” than normal. The white “Equal Chances” area is also present and covers nearly the entire local area. This reflects equal chances of experiencing above, near or below normal precipitation. Again, this outlook does not forecast *how much* above (below) normal precipitation might be.

To recap, the outlook for Spring 2012 (March-April-May) slightly favors above normal temperatures, with equal chances of above, near or below normal precipitation.

Temperature Outlook for Spring 2012
(March-May)



Precipitation Outlook for Spring 2012
(March-May)



To view these and other Climate Prediction Center outlooks visit <http://www.cpc.ncep.noaa.gov/>

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