Fall/Winter 2011
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National Weather Service Quad Cities IA/IL

Weather Home Companion

Inside This Issue:

Weather Home Companion is a semiannual publication of the National Weather Service office in the Quad Cities.

The Dubuque/Galena Historic Flash Flood of July 27-28, 2011

John Haase

Tremendous rains fell in a relatively small area of northeast Iowa and extreme northwest Illinois during the evening of July 27, 2011 and into the morning hours of July 28. Supercell thunderstorms began to erupt about 6 pm and for the next several hours produced a variety of severe weather.

These storms formed along and just north of a slow moving warm front and a moisture laden air mass. Flash flooding, damaging winds, large hail and even a couple of tornadoes pounded the area.

As the night wore on, back-building thunderstorms dumped excessive rains that caused severe flash flooding, turning quiet

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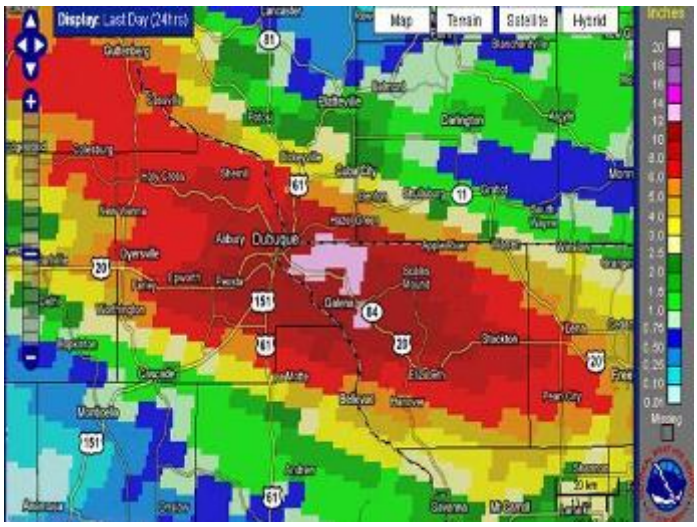


24 hour rainfall estimates from NWS Doppler radar over portions of northeastern Iowa and extreme northwest Illinois from July 27-28, 2011.

What is a Weather-Ready Nation?

Steve Kuhl

2011 has been a year of weather extremes. The National Weather Service (NWS) is launching a new national campaign called "Weather-Ready Nation" to generate public interest and understanding of the nation's increased vulnerability to extreme weather, wildfires, and flooding.

This campaign will explain how the NWS is striving to equip the nation with the necessary tools to adapt to these weather extremes. Part of the campaign will be for NWS personnel to describe what a "Weather-Ready Nation" is at all spotter training classes, school safety talks, civic club presentations, etc. They will also discuss how people can take appropriate actions to remain safe and reduce the impacts of extreme weather.

Another part of the campaign will be to provide increased decision support information by training new Emergency Response Specialists that can be embedded in Emergency Operations Centers and with first responders in the field before, during, and after natural disasters.

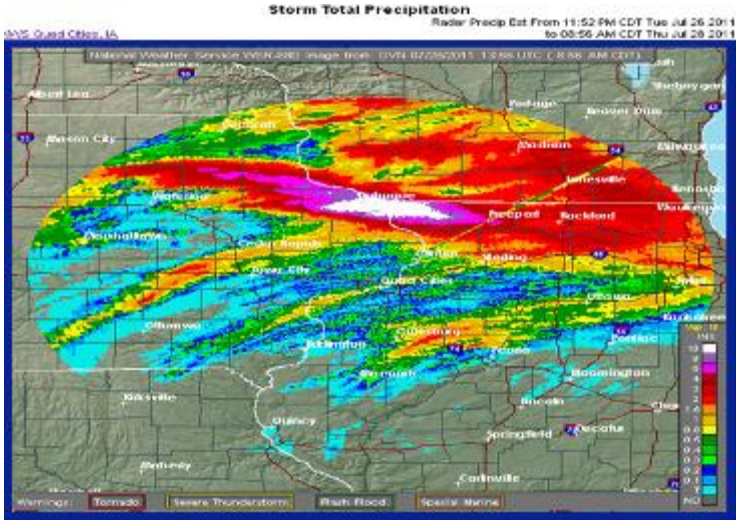
The Dubuque/Galena Historic Flash Flood of July 27-28, 2011

(Continued from page 1)

streets into raging rivers. Two weather-related deaths were reported, one from a lightning strike and another in a vehicle found submerged in the water.

Record Breaking Rainfall

At 11:37 am on July 28, it stopped raining at the Dubuque Regional Airport. The 24 hour total at this time was 10.62 inches, which actually fell within 18 hours! This set a new 24 hour rainfall record for Dubuque. The previous record was 8.96 inches set on August 21 and 22, 2002. In addition, a new daily rainfall record of 3.27 inches was established for July 28. The previous record was 2.30 inches set in 1990. This 24 hour total of 10.62 inches pushed the July total to a record 16.01 inches! The previous July record was 12.68 inches set just last year in 2010. In addition, the 16.01 inch rainfall total for July 2011 also broke the all time monthly rainfall record! The previous record was 15.46 inches set in September 1965.



Rainfall totals as estimated from NWS Doppler radar for the event of July 27 through 28, 2011 over eastern Iowa, southeast Wisconsin and northwest Illinois.

Due to the extremely heavy rainfall in portions of northeast Iowa, northwest Illinois and southwest Wisconsin on July 27-28, the Mississippi River experienced minor flooding. The flooding was observed from Dubuque to Burlington with the river falling below flood stage in the Gladstone/Burlington area by August 2.

Record Rainfall in Dubuque:

New 24 hour rainfall total:

10.62 inches

Previous record:

8.96 inches, set August 21-22, 2002

July 28 daily record:

3.27 inches

Previous record:

2.30, set in 1990

July monthly total rainfall:

16.01 inches

Previous record:

12.58 set in 2010

All time wettest month:

16.01 inches

Previous record:

15.46 set in September 1965

Have You Read the AFD?

David Sheets

If you have ever wondered what goes into the making of a weather forecast, or what forecasters are thinking on a given day, you should read the AFD.

What is the AFD?

The AFD, or Area Forecast Discussion, is a text product written by National Weather Service forecasters. These narrative, somewhat technical, discussions are created several times a day. They are written by the specific meteorologists who put together the latest forecast.

At the NWS Quad Cities, AFDs are typically written and sent out six or more times per day. The largest, and most detailed discussions are sent out twice daily, typically around 3 AM and 3 PM. These describe the most significant weather over the region, and the specific, unique challenges for the day. They may also describe which forecast models are preferred, and how they are utilized in the forecast. Updated discussions, typically tailored to NWS aviation weather forecasts, are also created nearly every six hours.

Where to Find the AFD

The AFD can be found on your local NWS internet home page, in the left blue margin by clicking on “Forecast Discussion”, under “Forecasts”.

Next time a forecast leaves you pondering “what were they thinking?”, you’ll know where to go for answers.

NWS Quad Cities is on Facebook:

www.facebook.com/US.NationalWeatherService.QuadCities.gov

Flood Inundation Maps: *Visualizing Flood Impacts*

Maren Stoflet

The National Weather Service, the Iowa Flood Center at The University of Iowa, and the City of Iowa City recently joined efforts to make flood inundation maps more accessible. Through this partnership, Iowa River flood inundation maps for the Iowa City area are now available on the NWS web site.

Flood inundation maps can be a helpful tool to visualize the potential extent of flooding at various river levels. These detailed maps provide information that can assist in planning and mitigation decisions, as well as enable communities and individuals to make informed decisions about their flood risks.

The Iowa River at Iowa City, Iowa (IOWI4) flood inundation maps depict the area and depth of flood inundation from bankfull to beyond the flood of record. The Iowa River at Iowa City flood inundation maps can be viewed at the following web address:

http://water.weather.gov/ahps2/inundation/inundation.php?gage=iowi4

Flood inundation map of the Iowa River in Iowa City.

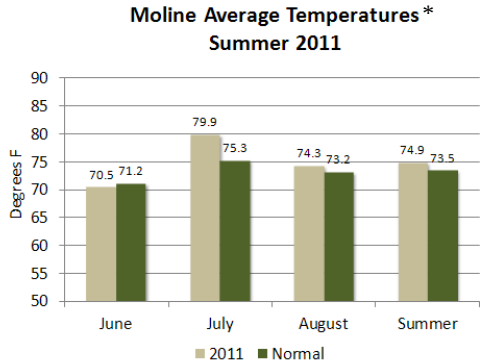
On the Web:

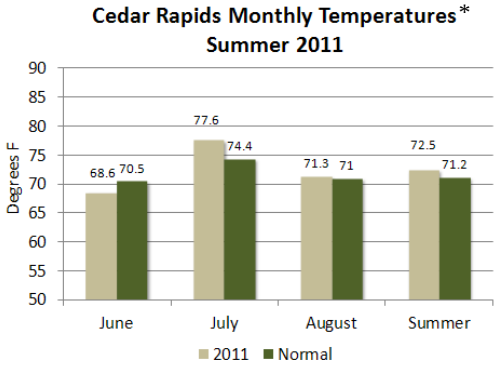
All NWS inundation mapping locations are available on the internet at:

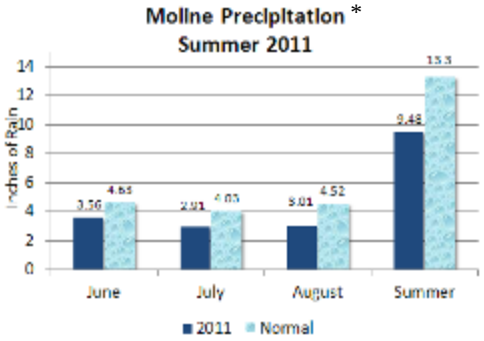
http://water.weather.gov/ahps/inundation.php

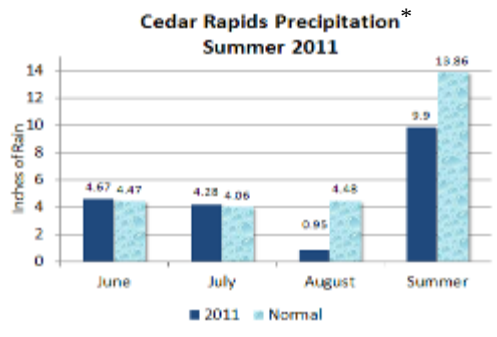
Looking Back at the Summer of 2011

David Sheets









*August and Summer normals are based on new updated climate normal period of 1981 to 2010. June and July normals were based on the 1971 to 2000 period.

Warm and Dry

Summer 2011 rainfall totals averaged well below normal across much of eastern Iowa and northwest Illinois. At Moline and Cedar Rapids, rainfall totals were several inches below normal, ending a five year stretch of wetter than normal summers.

Temperatures averaged above normal at both Cedar Rapids and Moline. The summer began with slightly below normal temperatures in June, but this was followed by stretches of hot weather in July and August.

Moline
Average temp: 74.9 (+1.4)
Rainfall: 9.48 inches (-3.82)

Cedar Rapids
Average temp: 72.5 (+1.3)
Rainfall: 9.90 inches (-3.96)

Snow: Oh the Depths, Falls, and Water Equivalents We Face

Thomas Olsen

Ever wonder where cooperative weather observations are taken?

Here is the breakdown for the **71** active COOP sites in the NWS Quad Cities office's area of responsibility:

33 - Private residences
22 - Waste Water, Water Treatment Plants, or Municipal Utilities
10 - Lock and Dam sites along the Mississippi River
2 - Businesses
2 - Fire Stations
1 - State Park
1 - University Research Center

Where has the time gone? It was not too long ago we were experiencing close to record heat. By the middle of September we saw our first frost across the area. The "S" word, snow will soon follow. To prepare for the winter season, this is an excellent time to do a leak test on your standard rain gauge and the inner tube. Pour water into these gauges and check to see if any water leaks out from the seams. It is best to sit the gauges on a dry surface while checking for leaks. If you note any leaks, let us know so we can get a replacement out to you. It is getting close to that time of year when ***snow*** is the predominant form of precipitation!

Don't forget to remove your funnel and inner tube when snow is expected. Let the snow fall directly into your rain gauge. When it is time for your observation and if snow has fallen during the past 24 hours, bring the gauge inside, melt down the contents, and then pour the liquid into the inner tube to measure for the water equivalent. If it happens to be snowing during your observation, some of you will have an extra standard rain gauge to swap out to not miss any of the snow.

Snow Measurement Guide:
Many of you, after years of taking weather observations, know what to do, but a little refresher training never hurts.

Measuring snow is typically more difficult than measuring rain, since snow is rarely uniform in coverage and because windy conditions may make it difficult to report a representative amount.

(Continued on page 5)

Snow: Oh the Depths, Falls, and Water Equivalents We Face

(Continued from page 4)

There are four different types of measurements for snow, The accumulation of new snow is *snowfall*. The amount of liquid that results when new snow is melted is the *liquid equivalent.* The combined total of new snow, old snow, and ice at observation time is *snow depth*. The amount of water in a snow core sample is the *snow water equivalent.*

A video of how to take snow measurements is available on the following web site:

www.cocorahs.org/Content.aspx?page=TrainingVideo

Reporting Your Observations:
Rainfall, melted precipitation, and snow core samples are measured in hundredths of an inch:
Example: **0.23**
Snowfall is measured in tenths of an inch:
Example: **4.7**
Snow depth is measured to the nearest whole inch:
Example: **5**

Snow Observation Example:
It is Tuesday, November 27th and snow has fallen during the past 24 hours. At your 7 am observation you note that **2.3 inches** of new snow fell. After melting the snow catch from your standard rain gauge, you measure a water equivalent of **0.17** inches. The snow has settled and the snow depth on the ground is **.6** inches.

On your B91 form for Tuesday, November 27th you will note the following in the precipitation fields:

Rain melted (water equivalent) : .17
Snow fall: 2.3
Snow on Ground (depth): 1
Snow core: not required because snow depth is less than 2”

End of the Month:
Please make sure all applicable B91 blocks are filled in and the form is signed in the lower right hand corner. Forward the original to our office. Please send your B91s (and other monthly forms) to the weather office by the 5th of the following month. Your B91s (and other monthly forms) are checked, packaged, and sent to the National Climate Data Center (NCDC) to be included in the climate history for the Nation. So if you get your B91s to us by the 5th, that will give us time to process and quality control the forms before sending them off to NCDC. Thanks for helping to keep your data timely and available!

Snow Quiz:
If precipitation falls as freezing rain and at the end of the day and the depth of clear ice on your snow board or other measurement surface has reached 1.0”, what should you report as your daily snowfall?
a) 0.0 “
b) T
c) 1.0”
d) 10.0”
e) none of these choices.

Answer can be found on page 8

NWS Quad Cities Welcomes David Cousins

David Cousins, a new employee at the NWS in the Quad Cities, began work on June 6, 2011 and is currently working as a Meteorological Intern.

David grew up in southwestern Pennsylvania where his fascination with the weather got its start. David graduated with a B.S in Meteorology in May 2002. He worked as a weather forecaster in the private sector for fifteen months in North Dakota and Texas. In December of 2006 he completed a M.S. in Meteorology at the South Dakota School of Mines and Technology. His first assignment in the National Weather Service was in Williston North Dakota.

Another La Niña This Winter!

John Haase

One of the strongest La Niña's on record occurred last winter, bringing our area colder and snowier than normal conditions. La Niña has re-developed and is expected to strengthen through this upcoming winter season.

ENSO

El Niño and La Niña are extreme phases of a naturally occurring climate cycle referred to as El Niño/Southern Oscillation (ENSO). Both El Niño and La Niña refer to large-scale changes in sea-surface temperatures (SSTs) across the central and eastern tropical Pacific Ocean.

La Niña

During the negative phase of ENSO, known as La Niña, upwelling is stronger than normal, causing below normal SSTs to expand westward into the central equatorial Pacific Ocean. During La Niña events, colder than normal water exists over the central and eastern portions of the Pacific Ocean. This reduces the temperature difference of the ocean in this region which makes the likelihood of a persistent jet stream over the eastern portion of the Pacific Ocean less likely.

As can be seen in the diagram below, high pressure typically builds over the Gulf of Alaska. This sends the jet stream well north into Alaska and then southward into the Midwest of the United States. This results in frequent arctic air intrusions and with the jet stream across the Midwest, a higher potential for ice and snow storms, along with colder than normal temperatures.

A La Niña event often, but not always, follows an El Niño and vice versa. Once developed, both El Niño and La Niña events tend to last for roughly a year although occasionally they may persist for 18 months or more. El Niño's usually occur every 3 to 7 years. Both of these phenomena usually have their greatest influence during the November through March time frame.

There have been 23 La Niña events since reliable records began in 1949.

La Niña is not the only influence on the global weather pattern due to the complex interaction between the Earth's oceans, land and atmosphere. It is not as simple as it seems! Other factors such as the PDO, AO, and NAO all dictate what kind of winter we will have. What in the world does that all mean? These are all discussed further in the following paragraphs.

Pacific Decadal Oscillation

The Pacific Decadal Oscillation (PDO) is a pattern of Pacific climate variability that shifts phases on a decadal time scale, usually about every 20 to 30 years. The PDO is detected as warm or cool surface waters in the Pacific Ocean, north of 20° N.

(Continued on page 8)

NOAA Outlook for Winter 2011-2012

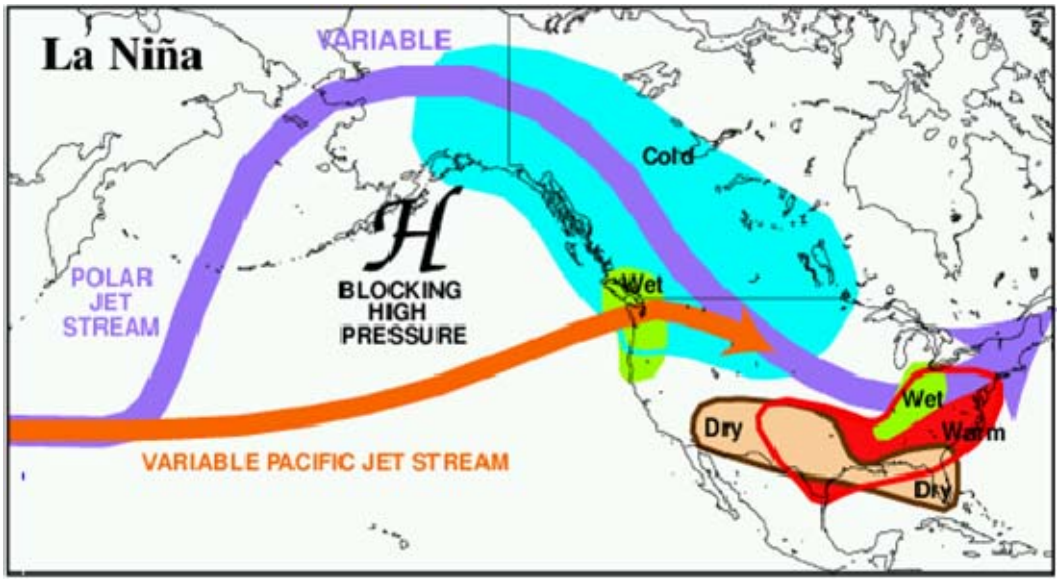
Temperature Probability Dec. 2011 - Feb. 2012

Upper Midwest and Great Lakes Below Normal:

> 33 % > 40 %

Southern U.S. Above Normal:

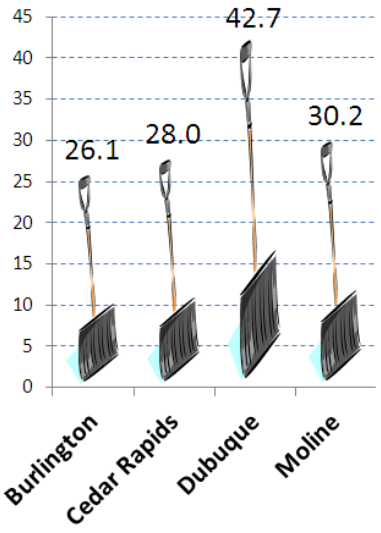
> 33 % > 40 %

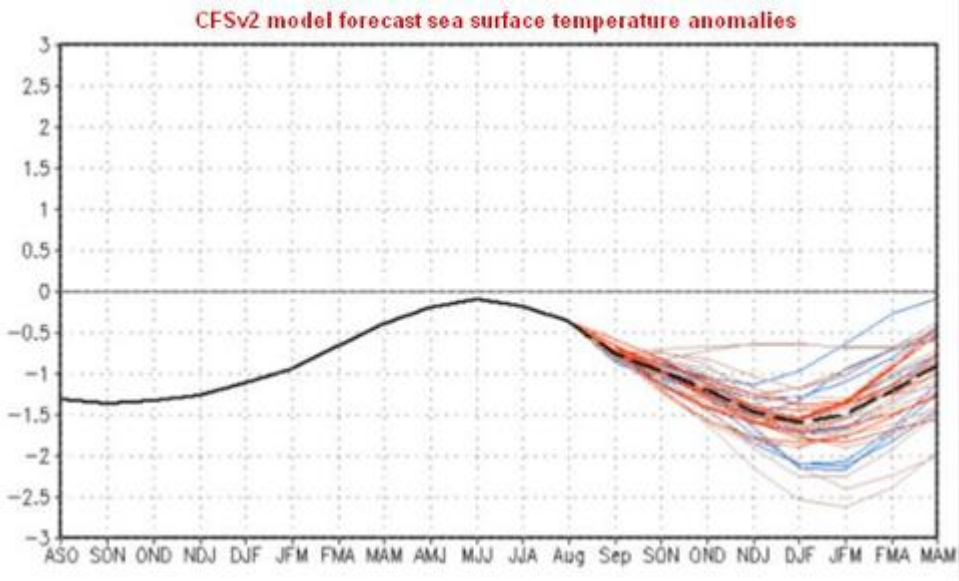


Successive La Niña Events Since 1949 and Snowfall Amounts in the November to March Winter Season

	Burlington	Cedar Rapids	Dubuque	Moline
1949-50	11.2	26.4	38.6	14.9
1950-51	37.6	58.8	59.1	38.4
1954-55	28.8	25.0	29.0	46.0
1955-56	18.3	15.9	22.6	15.3
1956-57	29.8	22.3	32.3	28.0
1970-71	17.9	23.2	46.5	30.5
1971-72	31.5	29.5	49.9	51.5
1973-74	20.9	22.8	32.4	34.5
1974-75	48.8	51.1	66.3	63.5
1975-76	18.0	12.4	27.4	21.7
1983-84	35.3	39.8	42.8	45.2
1984-85	20.6	22.8	43.4	30.4
1999-00	19.4	24.5	38.0	39.1
2000-01	60.9	40.8	52.7	46.0
2007-08	42.7	59.9	76.2	51.5
2008-09	31.4	39.4	53.1	46.2
2010-11	missing	32.2	62.5	46.6
2011-12	??	??	??	??

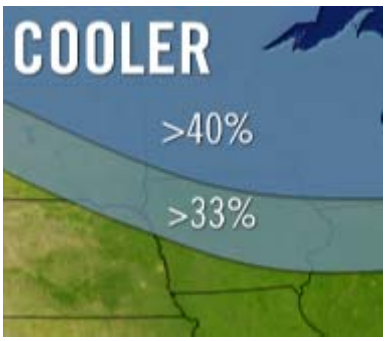
Average Winter Snowfall 1949-2011





The Climate Forecast System version 2 model (black dashed line) predicts La Niña conditions to strengthen and continue into the Northern Hemisphere in winter 2011-12. An anomaly of -0.5 or colder indicates La Niña conditions while -1.0 or colder indicates a moderate to strong La Niña.

Winter Outlook: A Closer Look



The NOAA winter outlook indicates a greater than 33 percent probability of below normal temperatures across most of eastern Iowa and northern Illinois.

Another La Niña This Winter!

(Continued from page 6)

During a "warm" or "positive" phase, the western Pacific becomes cool and part of the eastern ocean warms; during a "cool" or "negative" phase, the opposite occurs. That is, the western Pacific warms and the eastern part of the ocean cools.

The "negative" phase of the PDO began in 2008 and the SSTs in the eastern Pacific are currently the 4th coldest on record. The "negative" phase also contributes to a colder and snowier pattern for the Midwest.

Arctic Oscillation

The Arctic Oscillation (AO) is an index which varies over time with no particular periodicity. The degree to which Arctic air penetrates into middle latitudes is related to the AO index, which is defined by surface atmospheric pressure patterns.

When the AO index is positive, surface pressure is low in the polar region. This helps the middle latitude jet stream to blow strongly and consistently from west to east (zonal), thus keeping cold Arctic air locked in the polar region.

When the AO index is negative, there tends to be high pressure in the polar region, weaker zonal winds, and greater movement of frigid polar air into middle latitudes, including the Midwest.

The oscillation fluctuates stochastically between negative and positive values on daily, monthly, seasonal and annual time scales, although, despite its stochastic nature, meteorologists have attained high levels of predictive accuracy in recent times, at least 7 to 10 days into the future. The North Atlantic Oscillation (NAO) is a close relative of the AO.

Snow Quiz Answer from Page 5:

Answer: a) 0.0

Freezing rain is liquid precipitation that freezes on contact with the ground. It is not a form of "frozen precipitation".

Winter Weather: Health and Safety

Sara Schultz

The winter season is just around the corner and it is never too early to start planning. Weather plays an important role in our health and being prepared will help in minimizing the risks this winter.

Two of the biggest risks associated with colder temperatures are frostbite and hypothermia. However, even in winter, caution needs to be taken not to over stress the body. Activities, such as shoveling snow, can raise heart rate and blood pressure which may lead to heart attacks.

Overexertion

Steps to minimize the risk include:

- Bundle up before heading outdoors
- Ease into any outdoor activity
- Stay hydrated
- Take frequent breaks
- Listen to your body's signals – if you start to feel winded or overexerted, take a break!

It is recommended that persons with heart health issues talk to their physician before heading out to shovel snow.

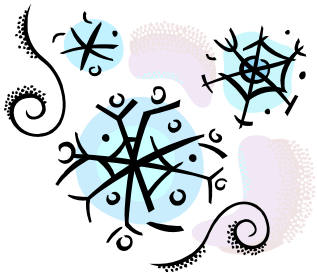
Hypothermia

- Occurs when the body's core temperature drops to less than 95□F
- Symptoms: uncontrollable shivering, weakness, slurred speech, disorientation, loss of consciousness

If you or another person shows any sign of frostbite or hypothermia, seek medical attention immediately!

Frostbite

- Occurs in just 30 minutes with wind chills of -20□F
- Symptoms: loss of feeling and white or pale appearance in extremities, skin may appear waxy and is cold to the touch.



On the Web:

Winter Weather Preparedness:

www.weather.gov/dvn?n=winterpreparedness

American Red Cross

www.redcross.org

Stay up to date on the latest winter weather conditions by visiting:

NWS's Winter Weather Safety and Awareness:

www.nws.noaa.gov/om/winter/index.shtml

Quad Cities Winter Monitor:

www.weather.gov/dvn/winter_monitor.php

Damaging Wind Storm on July 11, 2011

Andy Ervin

During the early morning hours on July 11th, a fast moving line of severe thunderstorms, called a "Derecho", moved through Iowa and Illinois, on its way to the East Coast of the United States. This line of storms produced widespread wind gusts of 60 to 75 mph across Eastern Iowa and Northern Illinois, with several enhanced damaging wind tracks, where straight line wind gusts reached up to 130 mph.

Extensive damage to trees, power lines, crops, and structures occurred across a large part of the region, with exceptionally extensive damage found in portions of Tama and Benton counties in Iowa.

Numerous buildings were damaged across Benton County, with sections of Garrison and Vinton Iowa seeing entire homes destroyed. Damage estimates in Benton County alone, are well into the millions of dollars.

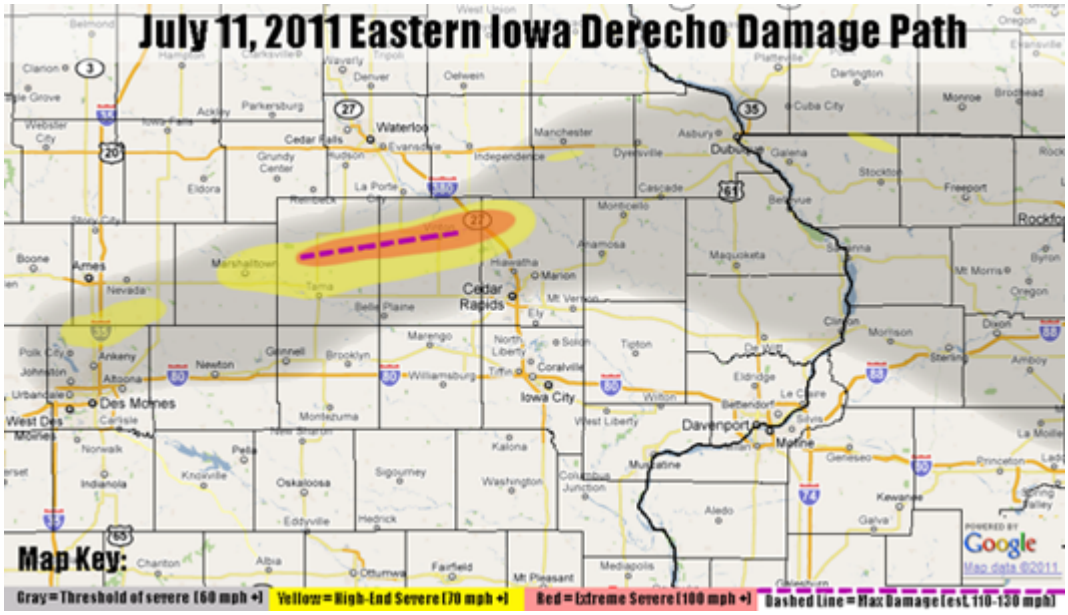
Homes and businesses in Benton County were also without power through July 20th, during a period of intense summer heat.

Remnants of a single story house near Garrison, Iowa destroyed by high winds in the early morning hours of July 11, 2011. (photo credit: NWS storm damage survey)

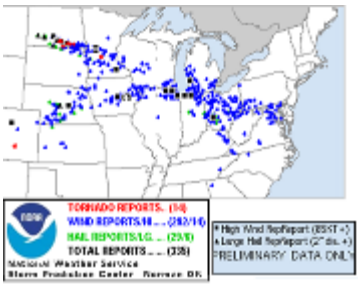
What is a Derecho?

A derecho (pronounced similar to "deh-REY-cho" in English) is a widespread, long-lived windstorm that is associated with a band of rapidly moving showers or thunderstorms.

Source: Derecho Facts Page, NWS NOAA-NWS-NCEP Storm Prediction Center web site.



Coverage and estimated wind speeds from the early morning Derecho of July 11, 2011 across eastern Iowa and northwest Illinois. Damage from the wind storm was first reported in the early morning hours in central Iowa and continued through eastern Iowa and northwest Illinois into the early daylight hours. The most extensive and severe wind damage occurred in east central Iowa, from north of Tama to near Urbana, which is located northwest of Cedar Rapids. As can be seen in the graphic on the right, this wind storm continued eastward, producing wind damage from Chicago through the lower Great Lakes into the northeast United States over the course of the day.



Map of storm reports from July 11, 2011. Blue dots represent winds greater than 60 mph, while black dots show locations of winds over 75 mph.

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Inside This Issue: