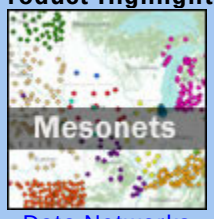
THE CLIMATE OBSERVER

December 10, 2012

MRCC Product Highlight:



Data Networks

Climate Cool Tool:

NCDC State of the Climate

Quick Links:

Temp & Precip
Growing Degree Days
Drought
CPC-Climate Prediction Ctr.
Natl. State of the Climate

MRCC Midwestern Regional Climate Center

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Impacts of Climate on Christmas Tree Farming

Molly Woloszyn, MRCC Extension Climatologist

Bob Moulds standing next to a ready-to-sell Fraser Fir, the most popular tree.

Bob Moulds began his Christmas Tree farm, Wapsie Pines Tree Farm, in 1980. The tree farm, located just west of the Wapsipinicon River in Iowa, now has between 30,000-35,000 trees consisting of Fraser Fir (abies fraseri), Canaan Fir (abies balamea), Concolor Fir (abies concolor), Red Pine (pinus resinosa), Scotch Pine (pinus sylvestris), and White Pine (pinus strobus). The farm is operated as a "choose and cut" Christmas Tree farm, selling approximately 2,000 trees per year. Four thousand seedlings are planted each year, with expected maturity occurring in 7-9 years. Bob is currently the President of the Iowa Christmas Tree Growers Association and a retired engineer.

***MRCC*: In general, how does climate influence Christmas Tree farming?**

BM: The climate affects Christmas tree farming in several ways. This year with the severe drought, it was very difficult for newly planted trees to survive because they had not yet established a good root system. In Iowa, reports from growers were from 50% to 100% loss of newly planted seedlings. The average loss was probably closer to 80-90%. In addition, some farms had high losses of trees planted the previous year. In some cases, trees up to four years were lost. Some mature trees were lost, but not significant.

Another climate issue is being too wet. In wet years such as two years ago, some seedling and larger trees were lost due to soil that was too wet, resulting in root

On the Road:
TX - Annual Meeting of the American Meteorological Society

failure. This particularly affected the popular Fraser Fir trees, which cannot tolerate wet soils.

In addition, the wet summer of two years ago provided an environment for needle fungus diseases and certain insect pests to proliferate. These can be controlled if closely monitored and timely application of pesticides is rigorously followed.

***MRCC*: What are the vulnerabilities (e.g. dry spells, pests, high heat, etc.) that affect Christmas Tree farming and how do these vulnerabilities vary by season?**

BM: When trees such as Christmas Trees are grown in dense populations repeatedly on the same ground, there are many pests that have to be managed, just like any other crop. Certain varieties are susceptible to needle fungus diseases, which require careful monitoring and multiple timely applications of fungicides. Again, wet weather will promote fungus issues. In addition, there are some specific insects such as pine needle scale and spider mites that can be difficult to control and can ultimately destroy the trees.

Photo of pine needle scale, which attacks all pine as well as other evergreens. *Photo courtesy of J. Hahn, University of Minnesota Extension.*

The only conifer native to Iowa is the white pine. This tree is used to some degree for Christmas Trees. It is very tolerant to the weather extremes of Iowa. The most popular tree, the Fraser Fir, is not native to Iowa, but rather native to the higher elevations of the Appalachian Mountains. This means that they are not particularly tolerant to specifically the high temperatures, which compounded the problem caused by the drought this summer. Young Fraser Firs cannot tolerate temperatures that are consistently over 100°F, especially if it is dry. In addition, more mature trees do not grow as well in these conditions.

Vulnerability is high when we have a severe winter with heavy snow cover. This results in heavy deer browsing damage since their normal sources of food are buried too deep in the snow. One tree farm close to my farm lost nearly all of their trees to deer damage two winters ago. It essentially put them out of business.

***MRCC*: Tell us about how the current drought has affected your operation and your concerns for next year.**

BM: Our operation lost about 50% of the new plantings, specifically the fir trees which are not native to Iowa type climate extremes. We have always planted every year two

times the number of trees that we will ultimately harvest. This is required to cover weather, insect, fungus, deer damage, poor genetics, and other losses over the 7-9 year growing period. So our operation will compensate for this loss reasonably well by planting extra seedlings next year. The problem will be much more serious if 2013 is another problem weather year. Some farms in Iowa that have lost second year plantings will result in a serious problem in 6-8 years when they will have a shortage.

MRCC Extension Climatologist Molly Woloszyn may be reached via email at mollyw@illinois.edu ^Top

Volunteers Provide Valuable Snowfall Measurements

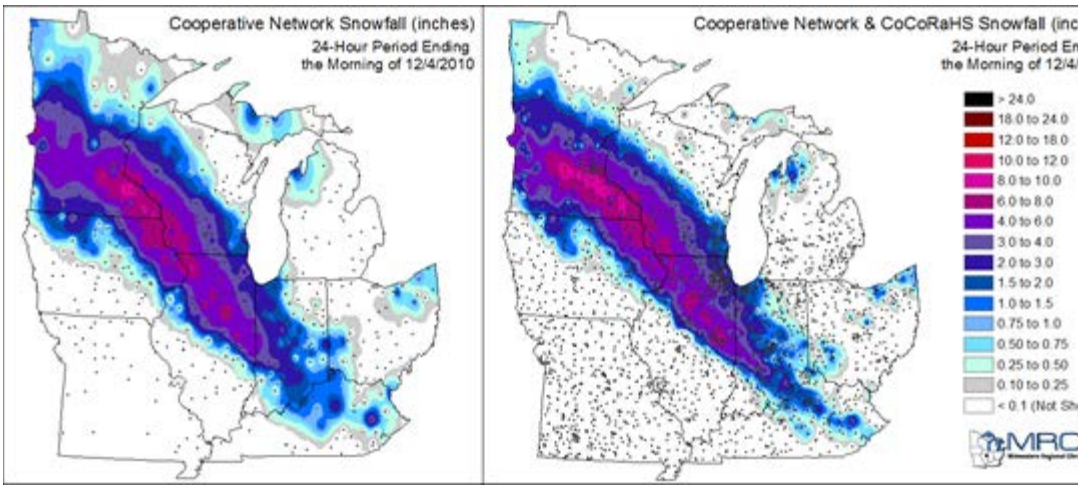
Steve Hilberg, CoCoRaHS Illinois State Coordinator

For the past five years, a dedicated group of volunteer precipitation observers has been contributing valuable snowfall and snow depth observations from around the country. More than 10,000 volunteer observers with the Community Collaborative Rain, Hail, and Snow Network (CoCoRaHS) measure precipitation each day and report their observations to a central web site where the data is freely available. Many of these observers report new snowfall, daily snow depth, and the water content of the snow on the ground. These observations supplement those collected by the National Weather Service observers.

A CoCoRaHS observer and snowfall measuring equipment. *Photo by H. Reges, CoCoRaHS*

Measurements of daily snowfall and snow depth are used by municipalities, snow removal businesses, the National Weather Service and many others. While many of us don't look forward to snow, snow is an important part of the water cycle and the economy. Melting snow fills reservoirs, providing water for drinking, farming, and industrial uses. Billions of dollars are gained from snow-related recreation and tourism, while billions of dollars are spent to remove snow from roads and runways. Some degree of snowmelt-related flooding occurs every year in the United States, with the severity of flooding dependent upon many factors such as snow accumulation, fall soil moisture, and the rate and timing of spring snow melt.

The automation of the airport observations stations beginning in the 1990s resulted in fewer snowfall measurements. Human observers had taken the snow measurements at these sites, and with no human observer, snowfall measurements at many of these sites were discontinued. That left a significant reduction in the amount of snowfall measurements available. Many of the observers in the U.S. Cooperative Network (National Weather Service) measure snowfall, but the density of stations isn't ideal in many areas. Within a particular snowstorm, snowfall amounts can vary by a large amount, just like rainstorms. The additional observations from CoCoRaHS observers add valuable data to the depiction of snowfall from a storm or the snow accumulation over a season (See figure below - click for full-size version).



Measuring snow is not quite as simple as just sticking a ruler into the snow and measuring the depth. Snow rarely just falls straight down producing a nice, uniform blanket of white. Wind, in particular, can make snowfall measurement challenging. Sleet, freezing rain, and rain falling with the snow add additional measurement challenges. Observers with CoCoRaHS and the U.S. Cooperative Network are trained on how to measure and report snow.

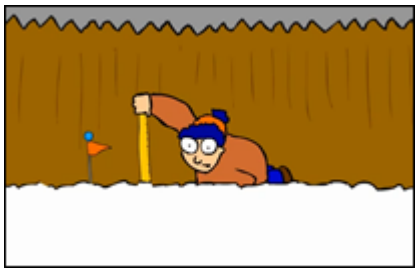
Photo of the National Weather Service Office in Lincoln, IL on December 2, 2006 following a snow and ice storm in the Midwest.
Photo by Mike Hardiman, NWS Lincoln, IL

When it snows, observers typically report different types of snowfall measurements. **New snowfall** is the maximum depth of new snow that has fallen in the past 24 hours (since the last observation). **Liquid water equivalent** is the amount of water measured when the new snow is melted, either from the rain gauge or from a snow core. **Total depth of snow and ice on the ground** is the total of both new and old snow and ice that is on the ground at observation time. This measurement is typically made every day there is snow on the ground. The last measurement is **snow water equivalent (SWE)** of the total snow on the ground. The observer takes a core of snow from the snow pack and melts the core to get the water equivalent. This measurement is especially important to river and flood forecasting, as it essentially tells the hydrologist how much water is "sitting on the ground" in frozen form. This can be factored in with expected precipitation to determine how much runoff might go into rivers and streams.

A CoCoRaHS observer takes a snow core. The snow in the rain gauge is melted to determine the liquid water equivalent.

Anyone with an interest in precipitation and weather can become a CoCoRaHS observer. To learn more about this program, visit http://www.cocorahs.org.

Resources for Measuring Snowfall:

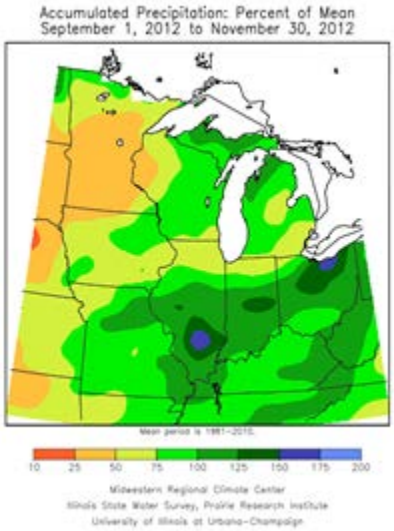


CoCoRaHS just released a series of five snow measurement animations. View the videos here: http://www.youtube.com/cocorahs/.

The Midwestern Regional Climate Center has a How-To Guide for measuring snowfall. View the How-To Guide here: http://mrcc.isws.illinois.edu/resources_links/downloads/howto_precip_instruments.pdf

For more information on this article or CoCoRaHS, please contact Steve Hilberg via email at hberg@illinois.edu. ^Top

Midwest Climate at a Glance - November



November was a dry month across most of the country, and the Midwest was no exception. A few northern locations were near normal but most of the region received less than half their normal November precipitation. Areas with less than 25% of normal touched all nine Midwest states. Ohio and Indiana ranked as the 4th driest November on record, while Kentucky (5th) and Michigan (7th) were also among the top-ten driest. Year-to-date totals in Iowa (8th) and Missouri (9th) were among the driest years on record.

Temperatures ranged from a couple degrees above normal to 5°F below normal in November. Severe weather was only recorded on the 10th. It was noteworthy because tornadoes touched down in Minnesota in November for only the 4th time. The November 10 tornadoes in Minnesota were the second latest in the state, trailing only November 16, 1931. The Midwest was cooler than normal for the fall as a whole, with Kentucky recording its 6th coolest fall. Despite the cooler weather this fall, all nine states rank among the five warmest January to November periods on record. Read more...

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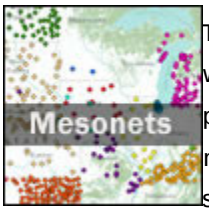

The Data Networks page from the MRCC highlights a myriad of surface weather data networks from across the United States. This page provides a summary table that makes it easy to see which variables are measured by each network, as well as an interactive GIS map to easily search for stations and networks across the country. While the data is not provided through the MRCC, this page provides links to each of the networks where archived data can be obtained. Special attention is given to state and regional networks with measurements of relative humidity, solar radiation, solar moisture, and estimates of potential evapotranspiration.

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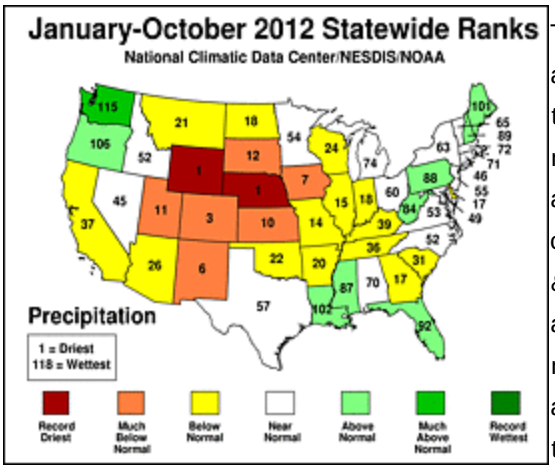
Climate Cool Tool



The National Climatic Data Center prepares an extensive report each month detailing the State of the Climate both globally and nationally. The reports are made available about a week into the following month and cover everything from “Wildfires” to “Snow & Ice” to “Hurricanes & Tropical Storms” among others. Significant events are noted and temperature and precipitation are ranked for various scales from global to national to state and even down to climate divisions. Rankings for the past month, season, and year are all available. The Regional Climate Centers each contribute reports for their own areas describing the recent climate and highlighting significant events.

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MRCC On The Road

Austin, TX (Jan. 6-11) - Annual Meeting of the American Meteorological Society

Mike Timlin and Nancy Westcott will be attending the annual AMS meeting which includes the Applied Climatology conference. Dr. Westcott will be presenting a paper on weather conditions associated with West Nile Virus in the Central United States.

Former MRCC student intern, Bryce O'Neill, will also be presenting his research on Chicago Heat Waves that was done during the summer at the MRCC.

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The MRCC is a partner in a national climate service program that includes the NOAA National Climatic Data Center, Regional Climate Centers, and State Climate Offices.
MRCC is based at the Illinois State Water Survey, a division of the Prairie Research Institute at University of Illinois Urbana-Champaign.