



Prairie State Precip

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The average date of the last spring freeze in Illinois ranges from April 7 in far southwestern Illinois to April 28 in northern Illinois.

Spring Info for Green Thumbers

Spring got off to a somewhat slow start here in Illinois this year, but we're making up for it recently. Although March temperatures were near normal for the month, that doesn't quite do it justice. March was characterized by three cold weeks and one very warm week. When you average it all, you get, well, average. The first ten days of April have been much warmer than average, no doubt an encouraging sign to the many, many gardeners we have amongst our CoCoRaHS volunteers.

March was a drier than normal month, with statewide precipitation running almost a half inch below normal. We have already had some good rain in April, and as of April 10 most of the state has received more than the average amount of rain for this time in the month.

Although we have already seen days at or above 80°F this season, we have also had some cold mornings. That's a good reminder that we aren't past the danger for frost, and a signal to not get too far ahead of yourself in planting this year's garden. The average date of the last spring freeze in Illinois ranges from April 7 in far southwestern Illinois to April 28 in northern Illinois. This of course varies from year to year.



This is a map of the date of the average date of the last occurrence of 32 degrees in the spring.



This is a map of the maximum 4-inch soil temperature under sod on April 7, 2011

Another measurement to consider in the spring is soil temperature. Soil temperature is important to the germination of seeds and the growth of plants. Few, if any, of us have a means to measure soil temperature. Fortunately, soil temperatures are measured by 19 automated weather stations in the Illinois Climate Network. The soil temperature is measured at the 4-inch and 8

Spring (continued)

-inch levels under both sod and bare soil. Maps of the soil temperature in Illinois are produced each morning and are available on the web. Soil temperatures can vary quite a bit day to day, depending on the amount of sunshine and the air temperature. These changes are more readily seen at the 4-inch level. The soil temperatures at the 8-inch level exhibit a lag from the daily changes you see closer to the surface.

You can view the soil temperature maps on the Illinois State Water Survey's Water and Atmospheric Resources Monitoring web site. The web address is <http://www.isws.illinois.edu/warm/soiltemp.asp>

'Tis the Season...Measuring and Reporting Hail

As we move into the heart of severe weather season in April and May, it is time to review measurement and reporting of hail. Hail is usually a very localized phenomenon. Radar can detect the potential for hail but not the actual occurrence and size, so reports from observers are critical.

Hail is formed when the strong updrafts in thunderstorms carry raindrops high into the cloud, where they freeze. The frozen drops can repeatedly be carried high into the storm until they become large enough to overcome the updraft or are ejected from the storm. The size of hail is directly related to the intensity of the storm, and this is one reason hail reports are so important.

Hail (and the thunderstorm that produces it) is considered severe when it is one inch in diameter or larger - about the size of a quarter. However, we would like to receive reports of hail (as would the National Weather Service) of any size. Often there will be a range of hail sizes falling, perhaps starting out as pea size (1/4 inch) but then reach a size of one inch or larger. When observing hail, remember to note the range of sizes that fall.

To measure hail size, measure the diameter of the hail stone. Occasionally, larger hail stones may be oblong in shape, looking more like a russet potato. In these cases, measure along the longest axis. If you are going to actually measure hail stones, do not retrieve hail stones until after the storm has passed and it is safe to go outside! You can estimate the size of hail safely from indoors by comparing it to common objects. Below is a hail size measuring guide that you can print and laminate. This is also available for download from the Illinois CoCoRaHS web page [<http://www.cocorahs.org/state.aspx?state=il>]. Please take some time to review the information requested on the CoCoRaHS hail form so that you are familiar with it.

Please take some time to review the information requested on the CoCoRaHS hail form so that you are familiar with it. You may want to print a blank form to have it for easy reference.

Do not retrieve hail stones until after the storm has passed and it is safe to go outside! Your safety is most important.

Hail Size Guide

Measure hail along the longest axis

Pea		1/4"
Mothball		1/2"
Penny		3/4"
Nickel		7/8"
Quarter	S E V E R E	1"
Half Dollar		1 1/4"
Ping Pong Ball		1 1/2"
Golf Ball		1 3/4"
Tennis Ball		2 1/2"
Baseball		2 3/4"
Grapefruit		4"
Softball		4 1/2"

If you observe hail, report it to the nearest National Weather Service Office. Complete a CoCoRaHS Hail Report on the web as soon as possible. Hail => 1" is criteria for a severe thunderstorm.



www.cocorahs.org

CoCoRaHS Assists with Lake Michigan Water Diversion Monitoring

by Nancy Westcott, Weather and Climate Researcher, Center for Atmospheric Science, Illinois State Water Survey

Precipitation observations from CoCoRaHS observers in Cook County have proven to be a valuable asset to the accounting of precipitation for the Lake Michigan Diversion for Illinois.

Some History

Water from Lake Michigan is a valuable resource, in particular to Illinois, Wisconsin, Indiana and Michigan. In the Chicago region, water had been diverted from the lake since the mid-1800s with the completion of the Illinois and Michigan Canal, and later the diversion increased with the flow reversal of the Chicago River and completion of the Chicago Sanitary and Ship Canal in 1900. Water is diverted from the lake for use in shipping and public water supplies. The diversion is composed of water pumped from Lake Michigan, water from the lake entering directly into the river and canal systems, and storm runoff from the diverted watershed area of Lake Michigan that drains into the river and canal system. The volume of water diverted from Lake Michigan into the State of Illinois is monitored to ensure that this diversion does not exceed a long-term average of 3,200 cubic feet per second (cfs), as imposed by 1967 and 1980 U.S. Supreme Court consent decrees. One of the key components of the monitoring procedure is the accurate representation of the precipitation that falls over portions of Cook County.

Measuring Rain in Cook County

The Cook County Precipitation Network (CCPN) is operated by the Illinois State Water Survey (ISWS) under contract to the U. S. Army Corps of Engineers. This dense network of 25 gauges has been in operation year-round since September 1989 to help compute the amount of water diverted from Lake Michigan and the Lake Michigan watershed into Illinois waterways. The network is located in the Lake Michigan and Des Plaines River watersheds of Cook County to provide accurate precipitation measurements for modeling storm runoff used in the diversion calculation.

Weighing bucket rain gauges have been used in the network because of the need for year-round hourly data. Initially, data were recorded on analog charts that were retrieved weekly, sent to the ISWS where the data were

electronically digitized, ingested into a computer program that computed hourly amounts, and then quality-controlled. In 2010, the rain gauges were outfitted with new data loggers and modems for remote communication.

Quality control of the data is still an important task because these gauges are located in remote settings away from the ISWS and only visited occasionally by ISWS technicians. Heavy winds, lightning, hail, and flooding rains overflowing buckets have occasionally impacted the measurements. Instrument issues (e.g. stuck or dried out pen tips, broken wires, and battery problems) have also affected data collection. Additionally, gauges have been subjected to other ills, such as birds trapped below the evaporation shield, an occasional arrow or bullet, snow plows burying gauges, and vandalism. All of these events have at one time affected the rain gauge measurements. The CoCoRaHS network has been invaluable in verifying gauge measurements or in helping us to estimate missing measurements.

A notable example of the use of CoCoRaHS observations occurred when the remnants of Hurricane Gustav and then a week later, Hurricane Ike, soaked Chicago in September 2008. During the second event the buckets in two of our gauges, which hold 12 inches of precipitation, overflowed. There was also tremendous variability in the amount of rainfall between gauges, ranging

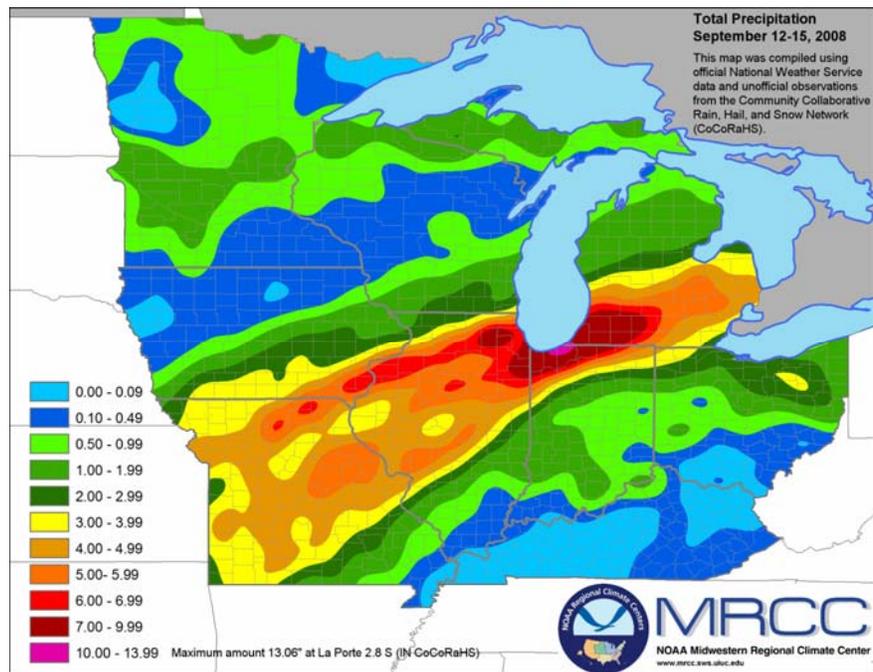
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Weighing bucket rain gauge

Lake Michigan Diversion (continued)

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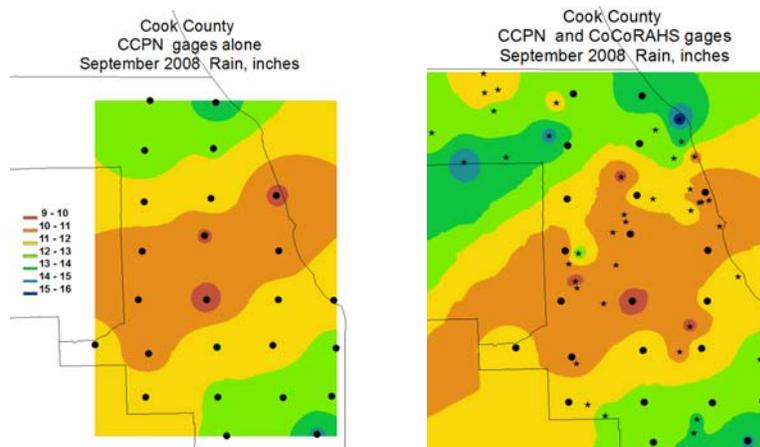


Precipitation associated with the remnants of Hurricane Ike in September 2008

from 5.5 to 8.8 inches for Hurricane Ike and from 10 to 14 inches for the month. Here is an excerpt from the monthly report to the U.S.A.C.E.:

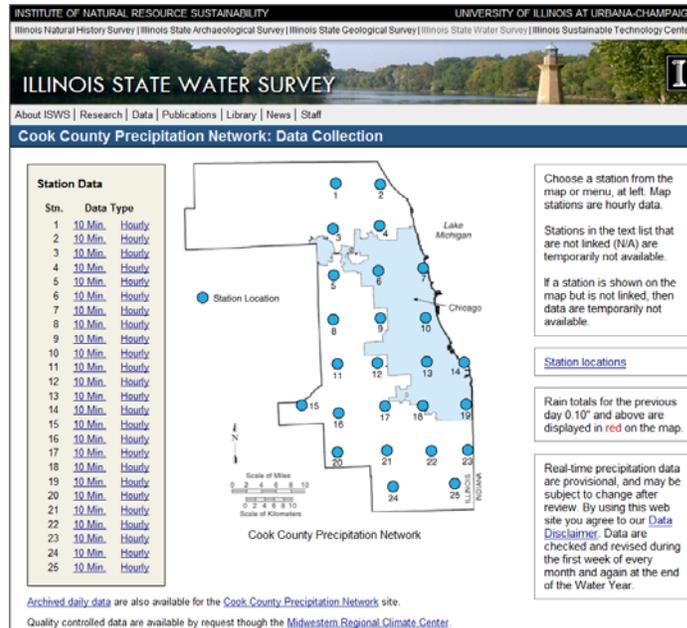
The data loggers failed at Sites #18 and #20. Chart data were used for a portion of the month at Site #20. The pen was off the chart for Site #18....During the September 12-14, 2008 event, the data loggers at Sites #2 and #25 began recording zeros prematurely compared to the other sites, suggesting that these buckets filled completely... The gridded interpolated values can be erratic at the edges of the grid when gradients are large, so some interpolated values were modified to bring the amounts into line with neighboring gauges. Overall, the CCPN gauges compared well with nearby NWS and CoCoRaHS gauges.

The figures below are maps of the monthly precipitation for the CCPN gauges alone and for the combined CCPN (black dots) and CoCoRaHS (black stars) data. In general, both maps show a band of lower precipitation through the central region of the network with higher values to the north and south. Gauge 2 and Gauge 25 were the gauges which probably overflowed their buckets. Gauge 2, in the far northeast corner, and gauge 25 in the far southeast corner values are higher than their neighboring gauges, but are supported by CoCoRaHS gauges.



Lake Michigan Diversion (continued)

Real-time, provisional, hourly or 10-minute data can now be viewed online at <http://www.isws.illinois.edu/data/ccprecipnet/livedata.asp>. The data are quality controlled at the ISWS on a monthly basis, and hourly data are provided to the U.S. Army Corps of Engineers for computation of the diversion. Archived quality-controlled 10-minute and hourly data are available at <http://www.isws.illinois.edu/atmos/ccprecipnet/>.



The web page for the Cook County Precipitation Network.

Keeping Birds at Bay

Ahhh spring.....when flowers bloom, gardens are planted, and birds sometimes decide to use the 4-inch rain gauge for a perch and/or a porta-potty. Although a properly perched bird or two can be a great photographic opportunity (such as the excellent March photo in the CoCoRaHS calendar), more often than not they leave a mess. What can you do to discourage our feathered friends from perching on the gauge, while at the same time not affecting the catch of the rain gauge? A few years ago Nolan Doesken, CoCoRaHS founder, put out an appeal for suggestions on how to deal with this problem. He received quite a range of ideas. Here are a few of them.

- Use tape to attach tooth picks or thin, rigid wires to the rim of the gauge about 1 ½ to 2 inches and sticking up about 2 inches above the rim.
- Place "Tanglefoot" along the rim of the gauge. This is a name brand for a sticky, non-drying substance that is a proven commercial bird deterrent. There are likely other brands as well.
- Mount a ring of stakes with flags or streamers or shiny stuff around your gauge making sure they stick up a bit higher than the gauge. You can now even purchase holographic ribbon tape that is claimed to scare away birds.
- Real cats
- Stuffed cats

Here are some suggestions for keeping birds from messing up your rain gauge

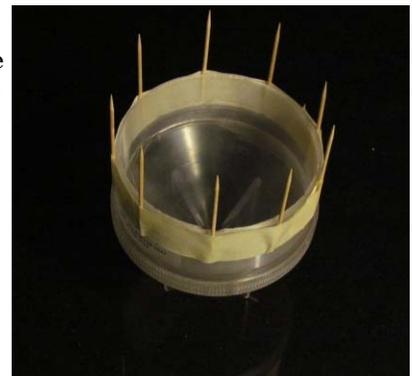
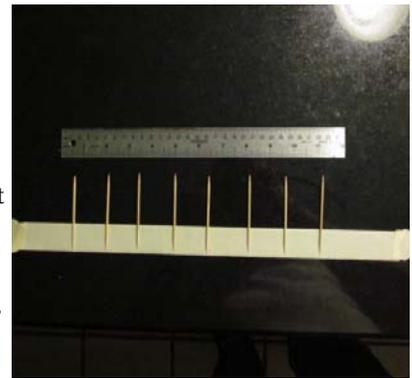
Keeping Birds at Bay (continued)

- Rubber snakes
- Real snakes
- Plastic owls
- Electronic owls
- WD-40 or similar smelly solvent/lubricant applied to the outside of the funnel. The only problem with this is that it will likely have to be reapplied often.

Making a Toothpick Anti-Perch Fence

The toothpick/wire idea is probably the easiest. Here are some instructions on making the toothpick deterrent.

- 1) Get about a 14-inch long piece of $\frac{3}{4}$ -inch duct tape. Lay it adhesive side up on a flat surface, and fasten down each end with a small piece of tape.
- 2) Arrange toothpicks on the tape about one to one and a half inches apart. Round toothpicks are best – they have a little more heft to them. Press the toothpicks on to the tape so they adhere.
- 3) When you have arranged all the toothpicks, cut the strip free on both ends, inside of where you taped it down.
- 4) Wrap the tape with the toothpicks around the edge of the funnel, keeping the top edge of the tape at or just below the edge of the funnel. Overlap the ends, and then press firmly all around the funnel.



For the photos on the right, I used masking tape, but that will not hold up very long in wet weather. Duct tape or some other moisture resistant tape is best. Since you won't find duct tape in a $\frac{3}{4}$ " width, you will need to rip a strip approximately that wide from a wider strip. This is easy to do. Just snip the end of the wide piece of tape with a scissors, and then rip the narrower piece off.

A More Durable Alternative

Here is a photo of a somewhat more elaborate wire anti-perch device. This was designed by a CoCoRaHS observer in Texas (TX-TV-81). He used 16 gauge soft brass wire available at most hardware stores. You could also use #14 copper electrical wire if you have some extra lying around, with or without the plastic insulation removed.



Round toothpicks and some water resistant tape are all you need to deter birds from perching on your rain gauge



**Community Collaborative
Rain, Hail, and Snow Network**

www.cocorahs.org

Illinois web page
<http://www.cocorahs.org/state.aspx?state=il>

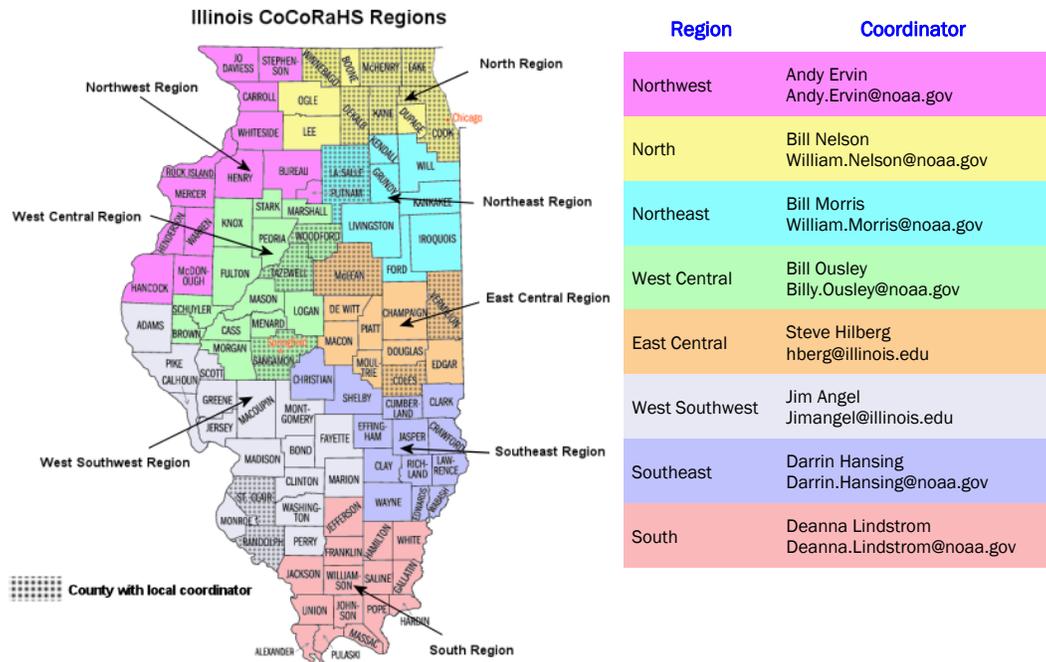
"Because Every Drop Counts!"

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We're on
Facebook!

Join the group
Illinois CoCoRaHS



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