ILLINOIS CoCoRaHS Volume 1, Issue 1 - Spring 2010

Prairie State Precip

The Community Collaborative Rain, Hail and Snow Network *www.cocorahs.org*

Welcome to the New Illinois CoCoRaHS Quarterly Newsletter

Inside this issue:

This is the inaugural issue of a new quarterly newsletter for CoCoRaHs in Illinois. Although we send out a monthly newsletter via email each month, there are many things we cannot include in it because of the mailing list nature of distribution. This quarterly newsletter will be more feature-oriented and will include photographs and color graphics where appropriate. Among the things we hope to include in the newsletter are features on how CoCoRaHS data is used, observing tips from our observers, features on our volunteer coordinators and participants, and interesting weather and climate facts and stories. If there is something you would like to see in this newsletter, or would like to write and contribute, please let us know. The newsletter will be published in March, June, September, and December and will be available for download in PDF (Adobe Acrobat) format. When an issue is ready for distribution we will let everyone know via the mailing list. We will still continue the monthly email newsletters

As always, thanks for your participation in and support of CoCoRaHS. We look forward to hearing from you!

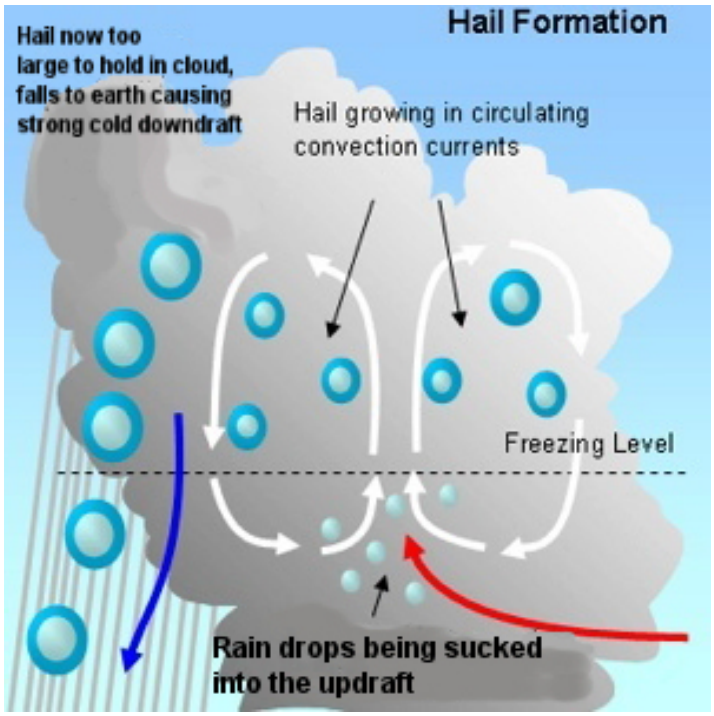
The Illinois CoCoRaHS Team

Measuring and Reporting Hail

Hail Notes

- Be sure to report the largest and smallest hail stones
- Hail should be measured along the longest axis
- Report hail size comparing it to common objects
- Hail 1 inch or more in size is considered severe

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 phenomena. Radar can detect the potential for hail but not the actually 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

Measuring Hail continued

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 of any size (as would the National Weather Service). Often there will be a range of hail sizes falling, perhaps starting out as pea size (1/4 inch) but then reaching 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 the hail 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 at 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. You may want to print a blank form to have it for easy reference.

Learn more about hail at the NOAA/NWS JetStream - Online School for Weather: http://oceanservice.noaa.gov/education/yos/resource/J

Baseball-size hail that fell in Texas in June 1995. Note the oblong shape of the hail stone. NOAA/NSSL photo.

Clip and save this handy hail size guide. Keep it with your CoCoRaHS records.

Hail Size Guide

Measure hail along the longest axis

Pea		1/4"
Mothball		1/2"
Penny		3/4"
Nickel		7/8"
Quarter	S	1"
Half Dollar	E	1 ¼"
Ping Pong Ball	V	1 ½"
Golf Ball	E	1 ¾"
Tennis Ball	R	2 ½"
Baseball	E	2 ¾"
Grapefruit		4"
Softball		4 ½"

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.

CoCoRaHS

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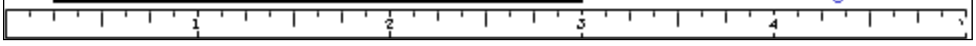


Lightning Safety Week is June 20-26, 2010

Severe Weather Safety

Your safety while participating in CoCoRaHs is paramount. In addition to not retrieving hail stones while they are falling (that can be bad for your head), there other severe weather safety rules to keep in mind. If a thunderstorm is in progress at observation time, stay indoors and either postpone your observation until after the storm has passed, or report a two-day total the next day. April and May is the peak of the severe weather season in Illinois, so it's a good idea to review safety rules before the season starts.

Know the difference between a Watch and a Warning. When a severe thunderstorm threatens or a warning is issued get inside and take cover. Remember that severe thunderstorms are dangerous. They can produce winds in excess of 60 miles per hour, and thunderstorm downbursts can cause as much or more damage than a weak tornado. Stay inside, away from windows.

Lightning is not just limited to severe storms. It can occur with any thunderstorm and can occur year around. Remember these lightning safety rules for the home:

- Stay OFF corded phones. You can use cellular or cordless phones. Phone use is the leading cause of indoor lightning injuries in the United States.
- Don't touch electrical equipment or cords. Unplug electronic equipment well before the storm arrives.
- Avoid plumbing. Do not wash your hands, take a shower or wash dishes.
- Stay away from windows and doors, and stay off porches. Do not lie on concrete floors and do not lean against concrete walls.

For more information on lightning safety, check out the NOAA Lightning Safety page at http://www.lightningsafety.noaa.gov/. The National Weather Service has produced a two-page brochure on lightning safety that you can download at http://www.weather.gov/os/lightning/resources/lightning-safety.pdf

River Flood Forecasting and CoCoRaHS Data

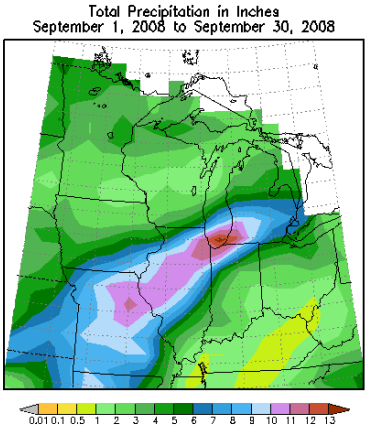
Bill Morris - Hydrologist
National Weather Service Chicago Forecast Office Romeoville, IL
IL-GY-1

The mission of the National Weather Service (NWS) is to provide 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. The flood warning and river forecast program is an important component of that mission.

Illinois has certainly seen its share of significant flooding in recent years with the most recent widespread record flooding occurring as a result of tropical systems dumping torrential rainfall during September 2008.

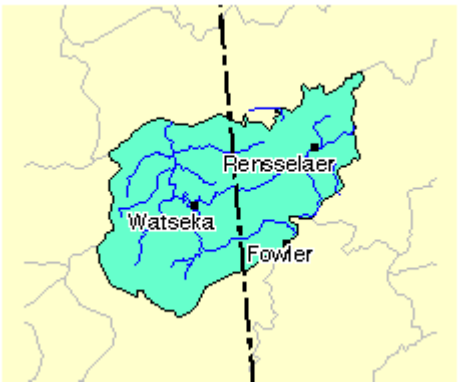
River Basins

Hydrologists think in terms of river basins,



River Flood Forecasting continued

also referred to as watersheds, when creating a river forecast. The following images depict the Iroquois River basin.



The outlined area is the watershed for the Iroquois River. Note that this basin straddles two states, Illinois and Indiana with the headwaters located in Indiana. Any precipitation that falls within this boundary, will contribute to flows on the Iroquois River or its tributaries. We all reside in some river basin or watershed even though you may not be physically located along the stream itself.

Data Used in River Forecasts

A considerable amount of data is used in order to create a river forecast. Some of the important inputs include:

- Soil moisture
- Current streamflow conditions
- Precipitation during the last 24 hours
- Forecast precipitation

In addition, frost depth, snowfall, snow depth, and snow water equivalent data are important in the cold months. Snow water equivalent of the existing snow pack (also referred to as snow core data) is especially critical. The snow water equivalent provides a snapshot of the water content of the snow that will eventually be released as runoff when the snow begins to melt. Daily precipitation reports from CoCoRaHS observers have proven to be an extremely valuable source of data for the river forecast program. CoCoRaHS reports, along with precipitation reports from the existing NWS Cooperative Observer Network, are used by hydrologist to compute basin average precipitation. Let's look at an example of why daily reports are so critical to the river forecast system.

"Daily precipitation reports from CoCoRaHS observers have proven to be an extremely valuable source of data for the river forecast program."

The red lines on the map in Figure 1 (next page) indicate the individual river basins or sub basins defined in the hydrologic model. The horizontal black line is the Illinois/Wisconsin border. Remember, water does not follow geopolitical boundaries. In order to determine a mean areal precipitation for each of these basins, we need daily reports from all the defined locations. Each defined location also has a set of "estimators". In other words, if a daily report is not available from one of these predefined sites, the algorithm used in the hydrologic model will attempt to find the next closest precipitation report. An example of this can be seen in Figure 2 on the next page.

You can see that in some instances, precipitation reports outside of the basin itself may be used to com-

River Flood Forecasting continued

pute rainfall within the basin. Obviously, this is not an ideal solution and it underscores the importance of daily observations for river forecast operations. Also, a zero report is just as important as a non-zero report. If no observation is received, we cannot simply assume that no precipitation was recorded. Your daily reports are extremely useful and very much appreciated!

Radar precipitation estimates are also utilized in addition to the actual observed precipitation from the NWS Cooperative Observer and CoCoRaHS networks. Radar does have some limitations . When hail is detected, rainfall calculations can be overestimated. Also, melting snow aloft during the fall and late winter/early spring can result in overestimation. Having actual reports from CoCoRaHS and NWS cooperative observers enable us to track the performance of radar estimations and adjust the radar estimates accordingly.

"A zero report is just as important as a non-zero report. If no observation is received, we cannot simply assume that no precipitation was recorded."

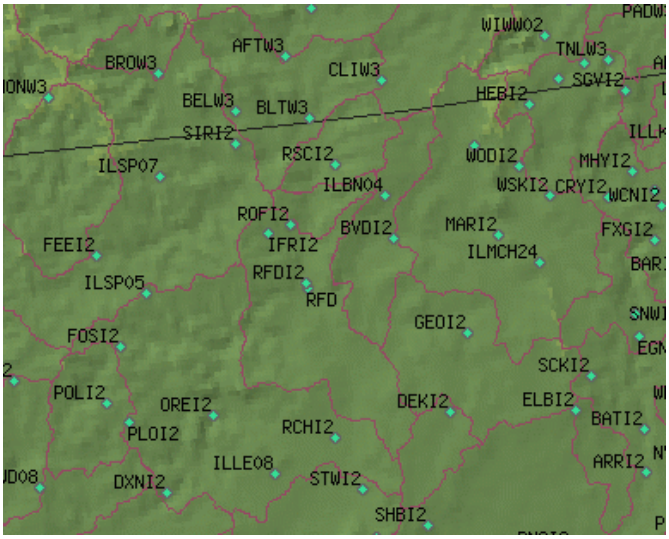


Figure 1. This image shows precipitation sites defined in the hydrologic models for north central Illinois near the Wisconsin state line. You can see a mix of CoCoRaHS locations and NWS Cooperative Observing sites.

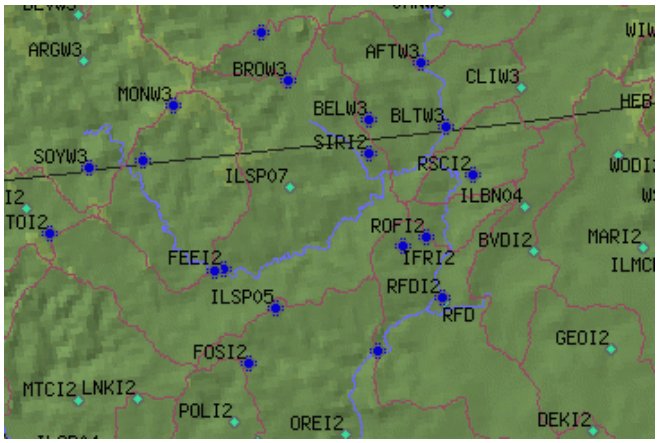


Figure 2. This image illustrates all the estimators (in dark blue) used for the IL-SP-07 location. If a report from IL-SP -07 is unavailable, one or more of the other estimators will be used to determine the average precipitation for that basin, in this case, the Pecatonica River basin.

Converting Rainfall to Runoff

Once an average basin precipitation has been computed, that data is used as input to a runoff model to determine how much of that rain (or snowmelt) will runoff into area streams. Many factors affect runoff including existing soil moisture conditions, rainfall intensity, land use, vegetation, and slope. In the winter, the extent of frost in the soil affects how much infiltration vs. runoff will occur.

Finally, a Forecast

Once the runoff is determined, a forecast is created for select river forecast points indicating how much flow is expected. Any water from upstream locations is then added to the total forecast flow and adjusted by NWS hydrologists. The flow values are converted to a more familiar river stage value using a rating curve. A rating curve is developed for river locations by the US Geological Survey and indicates the relationship between stage and discharge at a cross section of a river. These curves are deter-

River Flood Forecasting continued

mined by frequent measurements at river gage locations by USGS hydrologic technicians.

Current river stage readings are obtained from a river gage network operated primarily by the USGS although some gages are operated by the Corps of Engineers and other agencies.

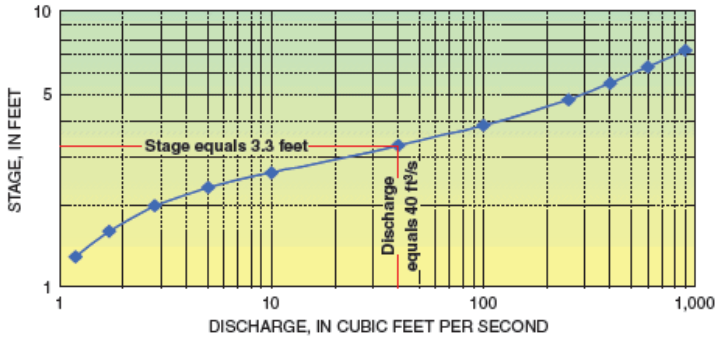
Getting the Word Out

NWS offices include river forecast information in flood warnings, statements, and advisories. This information is broadcast over the NOAA Weather Radio network. In addition, detailed information on river forecasts is available via the NWS Advanced Hydrologic Prediction Service (AHPS) available by clicking on the Rivers & Lakes link on any NWS web page.

"Daily reports – including zero values, are critical for accurate basin average rainfall estimates, and ultimately accurate river forecasts."

Summary

Your CoCoRaHS reports are a valuable source of precipitation information and are used operationally in river flood forecasting. Daily reports – including zero values, are critical for accurate basin average rainfall estimates, and ultimately accurate river forecasts. In addition, supplemental snow water equivalent information (snow cores) from CoCoRaHS observers has provided additional information useful in determining the potential for flooding due to snowmelt.



Example of a typical stage-discharge relation; here, the discharge of the river is 40 cubic feet per second (ft³/s) when the stage is 3.30 feet (ft). The dots on the curve represent concurrent measurement of stage and discharge.

Figure 3. An example of a rating curve.

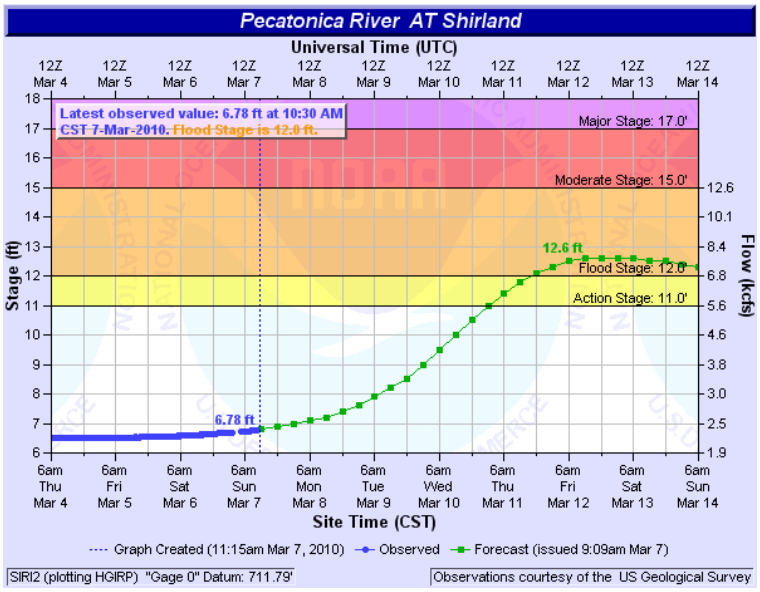


Figure 4. This is an image from the AHPS page for the Pecatonica River near Shirland, IL. The observed values from a USGS river gage are indicated by the blue line. The green line is the 7 day forecast based on precipitation that fell over that basin during the previous 24 hrs, forecast precipitation in the next 24 hrs, and in this case, anticipated snowmelt.

Patricia Rod, LaSalle County Coordinator

CoCoRaHS would not be nearly as successful as it is without the efforts of our volunteer coordinators. Patricia Rod has been our coordinator for LaSalle County for more than two years, and she does a terrific job keeping her observers motivated and active. We asked a very busy Patricia to tell us a little about her and how she got started in CoCoRaHS.

Patricia Rod, LaSalle County Coordinator

"I totally love working with the wonderful volunteers of LaSalle County."

How did you get started in CoCoRaHS?

"I have, for as long as I can remember, measured rainfall and watch the changes in the sky and weather. My father did this before me, so I come by it naturally. A problem that I could not solve was why he always had more rain than me when we were only one and a half block apart. On a farm in Ashton IL I could watch the rainfall, sundogs and a tornado pass by. I had looked into becoming an Official Weather Observer with the National Weather Service, however having to report everyday was a problem.

In March 2007 I saw a newspaper article about a presentation on becoming a volunteer weather watcher. It was conducted by William Morris (Illinois Northeast Region Coordinator). I thought, I'll just go and listen and get literature. I went, but instead signed up and received my Station IL-LS-11 on March 22, 2007. On April 1, 2007 I did my first report." *(Patricia has <u>no</u> missing days since then! Ed.)*

What do you like about CoCoRaHS?

"Being a CoCoRaHS volunteer is contagious. I just wanted to learn, do, and report more. I found Jet Stream on-line classes that opened a new horizon for me. I can read any state observer's report to see what is going on plus follow storms for the totals. I attended the 2007 National Weather Service open house and was caught up in the excitement. It was a wonderful experience watching the states come on line. I think we only had 14-16 states back then [when Illinois started]. My dream is to have a complete weather station to read wind speed etc, which most likely will not happen, but I can dream.

Like everyone else the most challenging aspect is SNOW! By the time I have a handle on it, spring comes. Then by winter's return I have to restudy again.

How has your experience been as a Coordinator?

I became a CoCoRaHS Coordinator for LaSalle County the end of 2008. I totally love working with the wonderful volunteers of LaSalle County. They are a great group of observers always going the extra mile. Dependable is their middle name because no matter what the weather is, they are out in it. When I need a spokesperson for a newspaper article, they are there for me. Their reports are very informative and helpful, when I review a report it is like being on the spot. They are the BEST.

Tell us a little more about yourself

I moved to Mendota at age two, as an adult I moved to four places including Round Rock TX then came home to care for my parents. Things I love to do: I am a CoCoRaHS volunteer, church Librarian, Angel Food program volunteer, Registered Nurse working clinics during Spring and Fall, Kids Klub volunteer, Mendota Area Senior Services volunteer, 13 year cancer survivor, avid gardener, raise my own tomato and pepper plants plus I can and freeze the vegetables, love working in my big yard and caring for the house, bird watcher that talks to the birds and animals, pet sitter for traveling owners.

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!"

Illinois State Coordinator

Steve Hilberg
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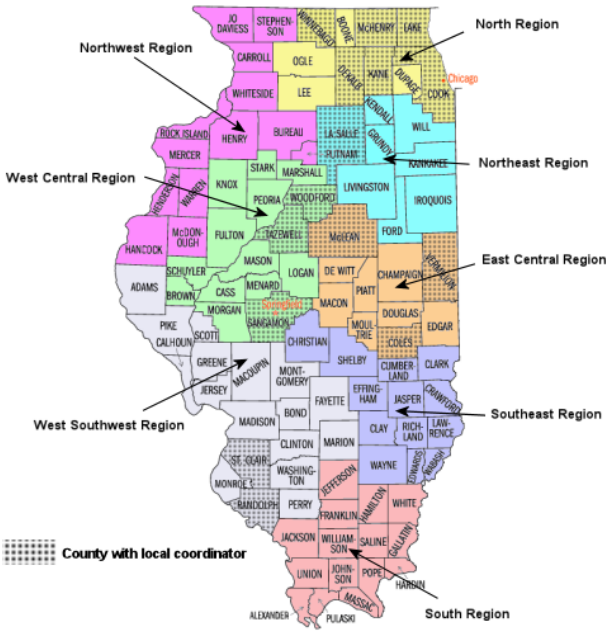
Illinois CoCoRaHS Regions



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