

# The Catch

## **COCORAHS—IT'S SNOW TIME**

FORT COLLINS, CO — Wednesday, November 21, 2007

Dear CoCoRaHS participants, family and friends:

It is almost Thanksgiving. This is a wonderful holiday, and I have many fond memories. Thanksgiving was one of the few times each year when we actually had some relatives come to our house. We had very few nearby relatives, but my grandma and grandpa almost always came over -- and my grandpa was always enthusiastic about Thanksgiving Dinner. We would clear the dining room table (Much of the year that table was covered by all the teacher resources that my mother used as a 7th and 8th grade teacher). My favorite part of the Thanksgiving meal was my mother's two-layered green and white jello salad. I couldn't stand sweet potatoes, I could live without the turkey, the stuffing, and the cranberry relish -- but the centerpiece of the dinner (from my youthful perspective) was that luscious two-toned "green" salad. The fruit salad, potatoes, gravy and pie were great too -- and the turkey smelled fine and was fun to look at -- but the jello was best.

Times have changed now. Our own kids hate jello, and now I love yams, cranberries and turkey.

The other thing that I remember well is SNOW. The first snow of the season in my central Illinois home town often arrived on or near Thanksgiving. It's usually different here in Colorado. We have snow in October and sometimes even in September. But in Illinois it took until late November for the first good chance of snow. Watching and waiting for that snow was an annual ritual, and the first snow was a true delight. It was almost always a wet snow, too -- perfect for making snowballs.

### **Speaking of snow:**

As anticipated, the weather patterns across the U.S. have been changing. Yesterday (Monday) we had an amazing Colorado day with temperatures in the mid 70s (Yes, here in Fort Collins) with bright sun and light winds. I canceled my afternoon appointments, went home from work early and had a delightful

afternoon up on a ladder cleaning the gutters and raking the last leaves. Honest, it really was fun! Today, the temperature is almost 50 degrees colder, the sky is gray, the clouds low and thick, and the wind is blowing out of the east. The first flakes are beginning to fall. I find myself peering out the window just like when I was a kid. It feels great -- watching, waiting, wondering. But then I realize that it's nearly Thanksgiving and my grandparents won't be here this year. My parents are long gone, too. My wife and I are now the oldest generation in our family (bummer). Thanksgiving isn't quite the same. We have to do the cooking. Even our daughter won't be able to make it home for Thanksgiving this year. But yet there are those many fond memories -- and the prospect of fresh snow.

### **The snow season has begun**

Snows have been arriving elsewhere in the country. Wisconsin and New York CoCoRaHS observers have had several doses of snow. Parts of Pennsylvania were surprised by substantial snowfall on Sunday. Monday morning, our volunteers around Missoula, MT reported double-digit snowfalls. Today (Tuesday), other parts of Montana and South Dakota reported snow. Tomorrow morning will be our turn to dust off the snow rulers and find the old snow board.

### **Measuring snow**

There are hundreds of new CoCoRaHS volunteers this winter measuring snow for the first time. It's not as easy as rain, but don't be intimidated. It's kind of fun in an odd sort of way. There is something that sets us winter weather observers apart from our neighbors -- our willingness to trudge out almost before dark at the coldest time of the day -- ruler in one hand, gauge in another -- searching for the illusive measurement of snowfall and water content.

Three major elements that we try to measure.

1) The water content of the new snow (measured like rain to the nearest 0.01") -- PLEASE REMEMBER TO TAKE OUT THE FUNNEL WHEN SNOW IS EXPECTED OR FREEZING TEMPERATURES ARE COMING. A funnel overflowing with snow doesn't get us where we need to go. The snow must be melted and poured into the inner cylinder to measure. A few of you have figured out an easier method using precision kitchen scales to measure the weight. That works too!

2) The accumulation of new snow that has fallen in the past 24 hours measured to the nearest 0.1" This is the maximum accumulation of new snow that is reached prior to melting or settling. That maximum depth may occur prior to your 7 AM observation time.

3) The total depth of new and old snow remaining on the ground at your observation time (measured to the nearest whole or half inch, depending on your confidence).

For those who are interested and able, we also appreciate core samples of the water content of the new snowfall and also the core samples of total water content of the combined old and new snow (we call this Snow Water Equivalent or SWE). There is a place for each of these measurements on our "Daily Precipitation" report form.

If you are new to measuring snow, I strongly suggest you take a few moments to review some of the written instructions.

<http://www.cocorahs.org/Content.aspx?page=snow>

If you have high speed internet, take a look at the Snow Measurement Training Video and also the Power Point training presentation.

When snow flies, there are many folks looking at the CoCoRaHS website checking our snow data. Do the best you can, and ask questions if you need some help.

Reporting Heavy Snow!!! Our colleagues at the National Weather Service would really appreciate hearing from us when we are receiving heavy snow. The definitions vary from place to place across the country, but please use our "Intense Precipitation" report form to submit heavy snow reports. You do not have to measure the water content to submit a report of heavy snow. Also, you can report as often as you feel necessary as heavy snow accumulates. Remember, however, that if you are using a snow board to measure incremental snow accumulation, you may not clear that surface more than once every hours.

<http://www.cocorahs.org/Admin/MyDataEntry/IntensePrecipReport.aspx>

## **Common Problems and Challenges in measuring snow**

### Measuring the water content of snow

1) Melting the snow: Before you can measure the water content of snow, you must melt it. I recommend pouring a measured amount (from your inner cylinder) of warm water into the snow-filled out tube to melt the snow. Then pour it back into the inner cylinder for measurement making sure you remember to subtract the amount of warm water you added from the total.

An alternative approach that a handful of you are trying is weighing the snow without melting it. The weight of snow is, indeed, equivalent to the amount of

water content. So if you happen to have a precision kitchen scales that reads to the nearest 1 G, you can create a weight to depth conversion and then just weigh the sample. One of our observers got one of these scales on e-Bay for \$25 -- not bad.

2) Windblown snow: Wind driven snow tends to blow around our gauges and not into them. That is why it is important to try to find an open but protected area to install it. Our gauge catch is almost always unrepresentatively low when wind accompanies snow. Make note of this in your comments, and then take a core sample of the fresh snow from a representative level location to get a more accurate measure of the water content.

3) Snow stuck to the rim of the gauge: Wet snow will pile up on the rim of your gauge. Should you put all of that rim snow in the tube? Should you knock it all out? Half and half? Only the snow that would have landed inside the beveled rim or your gauge belongs inside. So use a clip board, a snow swatter (large fly swatter or spatula) and stand above the gauge. Push straight down gently on the rim. Some snow will fall in, and some will fall out, but at least this is a fair and objective way to decide.

4) Missing snow while futzing around melting it: Yes, measuring snow takes time. If it happens to be snowing hard at 7 AM you might miss some while your tube is indoors melting. If you can splurge (early Christmas present :-), it is great to have a spare outer cylinder so you can just relax and take your time. Bring in one cylinder and set out the new one. I highly recommend that for observers in areas with fairly frequent snowfall or prolonged snow cover.

### Measuring the new snowfall

1) Finding a good place to measure: A key to a good observation of new snowfall is finding a good place to measure. That may be a white board laid out in your yard or it may be a picnic table in an open but wind-protected area. In some light-wind situations, even the roof of a car works. Don't measure too close to your house, though. Snow comes off the roof and blows about such that the snow is often deeper close to the house (on your deck, for example).

2) Melting and settling: Sometimes, the depth of new snow reaches a maximum and then decreases prior to your observation time. Ideally if you are able, go out and measure as soon as the snow stops falling so you can catch the maximum accumulation before it settles or starts melting. You don't have to wait for your scheduled observation.

Sometimes it snows, accumulates, melts and is completely gone by the time of observation. What should you report? Ideally, measure or estimate the amount of snow that had accumulated when it reached its peak. That should be your

new snow amount. But report 0.0 as the "Depth of snow on ground" since that's what's left at the observation time.

3) Blowing and drifting: This is arguably the greatest challenge we face. Wind-blown snow doesn't land in our gauges nor does it stay uniformly on the ground. Some places blow clear, while others pile up in drifts. Old snow and new snow mix together making measurement even harder. The wise observer takes an average of several measurements -- and also accounts for any old snow that may have blown in with the new. There is no perfect solution here, but do make note in your remarks that you are dealing with a difficult wind-blown situation. We'll understand. We have several volunteers in villages in Alaska near the Yukon Delta who are trying to measure snow this winter. This is arguably one of the hardest areas on earth to measure accurately, but we are so pleased that they are trying!!!

4) Can't find my snow board: Yes, this happens. You may think you know exactly where you set your snow measurement board, but when that surprise one-foot snow arrives, you may tromp all over your yard and still have trouble finding it. We recommend setting a flag or reflector near to your snow measurement surface so that you find it when you need it the most.

5) Freezing rain does not count as snowfall. Do not include the depth of freezing rain layers in your measurement of new snowfall.

### Total Depth

1) Icy: Old snow can get hard and crusty. Your ruler may not penetrate. One approach is to mount a "snow stake" in the ground prior to the snow season making sure it is in a representative location. Then you'll at least have a reasonable first guess of the snow depth.

2) Freezing rain: The depth of accumulated ice on the ground IS included in your measurement of snow depth. If you had 1" of freezing rain but NO snow, you would report 0.0 for your snowfall but you would report 1.0 as your depth of snow/ice on the ground.

3) Uneven snow: As snow ages, settles, and melts, it gets increasingly uneven. Shaded areas may stay soft and deep, while sunny, open and south-facing areas may melt completely. A representative measure of total snow depth takes all areas into account in a regional average. For example, if half your yard is covered with 4" of snow, and the other half is bare, you should report 2" as your average snowdepth and then mention "depth varies from 0 to 4" in your remarks. When the ground is less than half snow covered, then you should report T for your snowdepth (trace) but mention the depth of remaining patches in your remarks.

4) What if you have no idea? Then just report M or NA for your "Total Depth" -- but if you can make some descriptive comments about the snow, it will be appreciated.

If, by chance, you measure one but not all of these elements, then be sure to enter NA or M for the element(s) that you didn't measure. After each storm, we see lots of Zeros on the snowfall maps which really weren't zeros.

What about Freezing Rain? That is a part of winter that some of you love and some of you hate. We had lot's of freezing rain back in Illinois, but here in Colorado it is rare to non-existent. But if you are having freezing rain your reports are VERY IMPORTANT. Here is a link to a message about freezing rain we wrote last year.

[http://www.cocorahs.org/Content.aspx?page=Catch\\_Archive06](http://www.cocorahs.org/Content.aspx?page=Catch_Archive06)

Click on the message for "*November 30, 2006 -- Ode to Freezing Rain*"

### **Wrapping up -- and shoveling out**

Sorry for all these words. It is so much easier to just demonstrate how to measure snow rather than describe it in so many words. Pictures and video really help.

Yikes! In the 90 minutes that it took me to write about the challenges of measuring snow -- we just picked up a quick 2 ½" -- our first measurable snow of the season. I quickly got on the CoCoRaHS website and submitted an "Intense Precipitation Report"

By the way, in the 119 years that we have been measuring here in Fort Collins, this is the 107th earliest snow (i.e. only 12 times since 1889 did our first snow wait this late.) Back in 1933 our first snow didn't come until December 16th -- latest on record.

Happy Thanksgiving to all of you. Please don't spend the holiday worrying about how to measure snow. Enjoy your friends, your family or just being alone and unannoyed. And remember a few things to be thankful for.

Thanks for your help, now and throughout the year,

*Nolan Doesken*  
CoCoRaHS  
Colorado State University