Jet Stream Jargon

National Weather Service
Billings, MT

October 2015 Fall Issue

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Special points of interest:

- 2015 Severe Weather Season
- Fire Season Severity
- Winter Weather Safety Tips

From the Desk of the Meteorologist in Charge

Watching the weather across the Nation over the summer, it was quite apparent that we fared extremely well in the Northern Rockies. The frequency and magnitude of our Severe Weather (i.e. thunderstorms) was limited, and although we had some small wildfires across southern Montana and northern Wyoming we did not see anything near the magnitude of those in California, the Pacific Northwest or even western Montana. The lull in our Wildfire season allowed our Incident Meteorologist to travel to both California and Washington to support firefighting efforts with weather forecast information. As I've mentioned in previous editions of Jetstream Jargon, this forecast support is critical to Incident Commanders as they make plans to attack the wildfire, but more importantly to keep those firefighters safe. So, keep in mind, that even though the weather may be quiet locally, our staff is working to support the National Weather Service's mission elsewhere through a variety of efforts.

This past spring I mentioned we were hoping to fill a couple of vacancies that we had since last summer/fall. We welcomed two new staff members to the office in June; Wright Dobbs and Mason Rowell.

Wright joins us after receiving his Master's degree from Florida State University, where he also obtained his Bachelor's degree. Prior to joining us, Wright had worked extensively with the NWS office in Tallahassee as a student volunteer.

Mason joins us from the Cooperative Institute for Mesoscale Meteorological Studies - Warning Decision Training Branch in Norman, Oklahoma. Mason received both his Master's and Bachelor degrees from the University of Oklahoma.

For both Wright and Mason, moving to Montana was a vast new adventure taking them from their native states of Florida and Oklahoma, respectively. We are excited to have both of these professionals as part of our team.

Additionally, we were able to bring on a student in our new Pathways program. Bob Setzenfand joined us in late July as he finishes up his PhD dissertation at the State University of New York at Albany. Since Bob has completed all his coursework he will be working with us extensively while the scenery of Montana inspires the writing of his dissertation (and it's eventual defense). Bob is a native of Pittsburgh, so moving to Montana has been a new adventure for him as well.

Recently we promoted General Forecaster Joe Lester to the previous vacant Lead Forecaster position. Joe has been part of Team Billings for over 11 years and brings over 17 years of NWS experience to his new position. Additionally, General Forecaster Chauncy Schultz will be departing WFO Billings in the very near future to take the position of Lead Forecaster at the NWS office in Bismarck, ND. In the four years Chauncy has been part of our team, he has had a tremendous impact on the office and its services, and will be greatly missed. However, we are excited for his promotion and that he will still be close by at a neighboring Weather Forecast Office.

For those that are keeping score from last spring, we've gone from 3 vacant positions to 2, so we are at a net gain of 1 (plus our student). I am anticipating that these two vacant positions will be filled within the next 6-9 months (Fiscal Year 2016 budget dependent).

As we head into Fall and Winter, this issue of the Jetstream Jargon will discuss a number of interesting topics, including what all this talk about a strong El Nino may mean for our Winter. I hope you enjoy what we've put together in this issue!

Keith W. Meier

WCM Notes

Tom Frieders—Warning Coordination Meteorologist

Weather-Ready Nation

We can all do our part in becoming a nation resilient in the face of increasing vulnerability to extreme weather events. We need your help in making us a Weather-Ready Nation. Don't let dangerous weather catch you off guard as we head into the upcoming winter season. Here are some things you can do now.

1. Know Your Risk. Don't be caught off guard and check the weather forecast each morning before leaving home. Weather can change quickly in our part of the country. Warm and sunny conditions can change to a raging snowstorm within hours.

2. Take Action! Now is the time to make an emergency supply kit for your home and vehicle. Make a family communications plan.

3. Be a Force of Nature. Inspire others to take action by showing your friends and family how you are prepared. A great way to inspire others is to talk about it on social media.

Visit our Winter Weather Awareness Webpage to better understand our local risks and help prepare yourself for the harsh winter weather ahead.

Social Media: A Picture is Worth a Thousand Words!

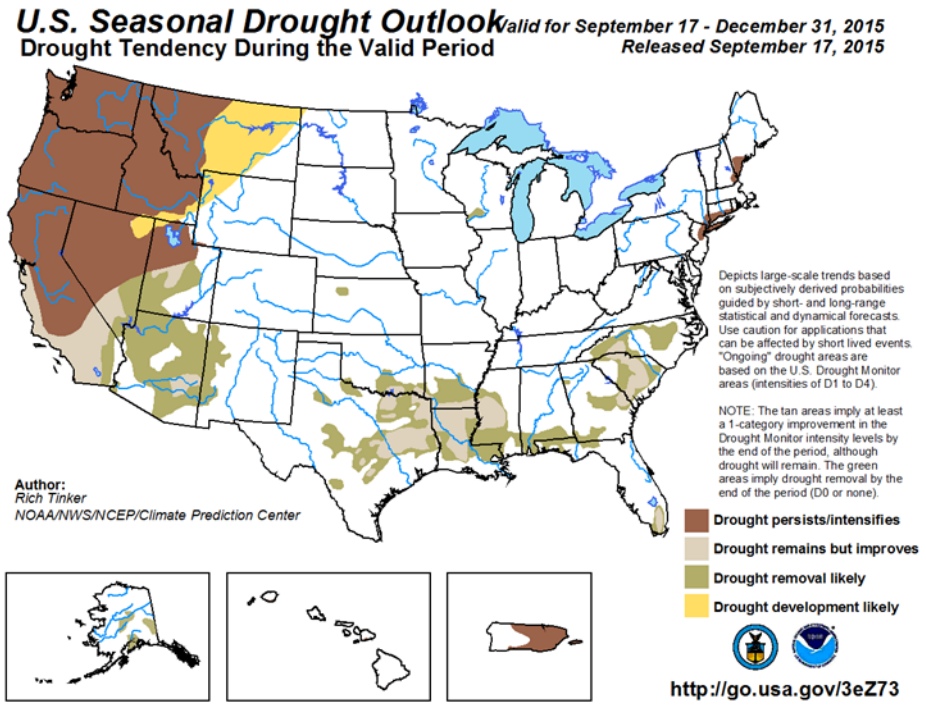
We all know the phrase, "A picture is worth a thousand words." It certainly holds true for the National Weather Service. Our Billings office provides forecasts, watches and warnings for 16 counties in southern Montana and northern Wyoming, covering over 40 thousand square miles. Since our office sits in Billings, we are continuously monitoring various networks across this region to provide us information on the true impacts of the weather in every corner of our forecast area. The reports of severe weather are invaluable, but if you can add a photo, even better! As long as you can do so and remain safe, take a snapshot and sent it to us. One of the easiest ways to share your photos is to post to our Facebook or Twitter pages.

Hydrological Summary

Todd Chambers – Senior Forecaster

2014-2015 Winter

Coming out of 2014-15 winter, concerns were raised about a potential drought developing across the area. Mountain snowpack was at or below normal across the area, though our area fared much better than areas west of the divide, and projections showed that this lack of snowpack would lead to a below normal runoff season with little threat of flooding. An abnormally warm and dry March and April only enhanced those concerns heading into May and June, the wettest months in the northern Rockies. Fortunately, the weather pattern changed in May and brought above normal precipitation to much of the area including the mountains. Cooler temperatures over the mountains in May also helped to slow snowmelt and prolong runoff into area waterways into the summer months. High water was noted on some waterways this spring, and warnings were issued for some, including the Boulder River, Powder River, Musselshell River, Tongue River, and Goose Creek near Sheridan from late May into June. For the most part, flooding was very minor and confined to agricultural areas along the streams. The foothills of the Bighorn Mountains were an exception, as this area saw 200 to 300 percent of normal May/June precipitation which resulted in more significant flooding along Little Goose Creek, Big Goose Creek, Goose Creek, and Prairie Dog Creek. The timely precipitation in May and June, combined with periodic wet thunderstorms through much of the summer, kept our area out of drought conditions up until now. With the coming winter dominated by strong El-Nino conditions in the Pacific, the latest drought outlook indicates drought conditions will likely develop over our area in the coming months.



Summer Review

Below Average Severe Weather Season for the Region

Tom Frieders—Warning Coordination Meteorologist

In an average year across southeast Montana and northern Wyoming, the NWS Office in Billings issues approximately 130 Severe Thunderstorm and Tornado Warnings. Remember, warnings are issued for storms that are capable of producing tornadoes, hail one inch in diameter or larger, and wind gusts 58 mph or greater. The total number of warnings issued for this 2015 season stands at 91. While 2015 saw a below average severe weather season, it still left its mark on many areas. A total of 134 reports of severe weather were obtained from our local spotters and observers this year.

Figure 1: Flood waters rush over Pleasant Hollow Trail. Photo courtesy of Mike Smith

On June 10th, a slow moving thunderstorm produced torrential rainfall and hail near Shepherd. Subsequent water rushed over Pleasant Hollow Trail (Figure 1)…washing out the road. The combination of the running water and hail left behind mounds of hail in area washes, looking like small glaciers (Figure 2).

On June 19th, Billings residents remember a quick hitting storm that produced high winds, hail and street flooding. Our National Weather Service Office recorded a wind gust of 78 mph. Later in June, storms commonly produced large and damaging hail, especially across portions of southeast Montana. One particular event on June 21st produced hail to the size of baseballs across portions of Custer and Fallon Counties. Hail this size driven by 70 mph winds, left behind broken windshields (Figure 3).

Figure 2: Deep hail left behind in area washes. Photo courtesy of Mike Smith

The most damaging event occurred on July 27th when a severe thunderstorm drifted northeast into the Bighorn Mountains from central Wyoming. Microburst winds, estimated in excess of 90 mph, impacted a campground along Highway 14A in extreme western Sheridan County. Two camper trailers were completely destroyed (Figure 4) and two others severely damaged. Numerous large trees were snapped off as well (Figure 5).

Figure 3: Broken windshield from one of our spotters. Photo courtesy of Matt Hanvold

Figure 4: One of the camper trailers destroyed. Photo courtesy of National Weather Service Riverton

Figure 5: Numerous large trees snapped off. Photo courtesy of National Weather Service Riverton

Thankfully, unlike last season's EF-3 tornado in Carter County, only two weak tornadoes touched down. One each was reported in Fallon and Carter Counties. These were brief touchdowns that remained over unpopulated areas causing little or no damage.

2015 Summer Statistics: *Temperature and Precipitation*

Joe Lester – General Forecaster

Overall, summer 2015 was slightly warmer and drier than normal. June was a particularly warm month with departures above normal ranging from 4 to 8 degrees. With an average temperature of 66.3 degrees, Livingston experienced its 3rd warmest June on record. Billings's average of 70.0 degrees was 4th warmest. July and August saw temperatures that were close to normal across the region. In terms of precipitation, Livingston was over an inch and a half below normal for the 3-month period, ranking 14th driest on record. Central and eastern locations had closer to normal rainfall.

Billings failed to reach 100 degrees for the 2nd time in the past three years...average is 2 or 3 times per summer. Miles City reached the century mark on nine days, including six in August.

Thunderstorm activity was frequent early in the summer, with the first severe storm of the season occurring on May 16th near Hardin. Severe weather tapered off in July and August as temperatures turned hotter and grasses dried out. See earlier article on some noteworthy severe weather events for this past season.

A couple other noteworthy events occurred during the summer. On **July 28th**, strong post-frontal westerly winds impacted the region. With an average wind speed of 21.9 mph, this was the windiest July day on record at Billings. A chilly airmass settled over the region on the morning of **August 23rd**. Livingston and Sheridan dropped to 30 degrees, daily record lows for each site. This was the earliest in the season that Sheridan has ever dropped as cold as 30 degrees.

The following table summarizes temperature and precipitation statistics at our four official climate sites. Records go back to 1934 at Billings, 1937 at Miles City, 1907 at Sheridan and 1948 at Livingston. Normals are calculated from the 1981-2010 period.

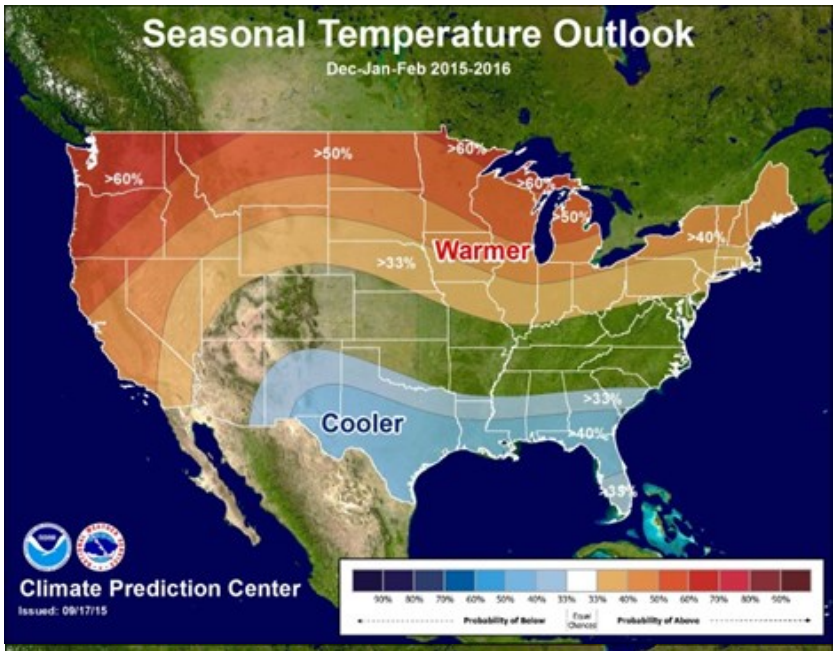
Jun - Aug Stats	Average Temp (deg F)	Departure from Normal	Precipitation (inches)	Departure from Normal
Billings	**71.1 (16th warmest)**	**+1.4**	**4.17 (32nd wettest)**	**- 0.02**
Miles City	**72.1 (22nd warmest)**	**+0.6**	**4.34 (25th driest)**	**-0.72**
Sheridan	**68.0 (31st warmest)**	**+0.6**	**4.49 (42nd wettest)**	**+ 0.44**
Livingston	**67.1 (7th warmest)**	**+ 2.2**	**3.34 (14th driest)**	**-1.63**

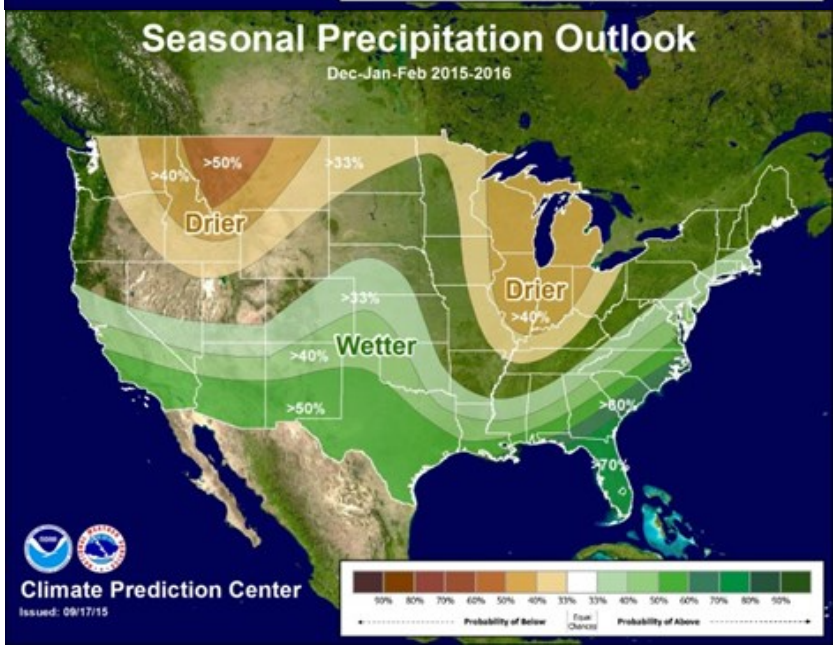
Winter Outlook

Joe Lester – General Forecaster

2015-2016 Winter

The official December-January-February outlook from the Climate Prediction Center, issued on September 17th, calls for an increased likelihood of warmer and drier than normal conditions across our region. The reason for this is the development of a strong El Nino in the equatorial Pacific Ocean (warmer than normal sea surface temperatures exist in the eastern Pacific), which generally favors increased storminess across the southern tier states and a weaker polar jet stream across the north. However, other factors play a role during the winter, and we sometimes see colder and wetter conditions during El Nino. Due to our location on the eastern slopes of the Rocky Mountains, our winters are characterized by alternating periods of cold and snowy Canadian air, and warm and dry chinook winds. As always, be prepared for both extremes during the upcoming winter.





Fall and Winter Data Tables

Tom Frieders– Warning Coordination Meteorologist

Fall Normals

Meteorological fall is considered the months of September, October and November. Here are the normal temperatures and precipitation for Billings, Miles City and Sheridan for the fall season. Normals are 30 year averages calculated from 1981 to 2010. All temperatures are in degrees Fahrenheit and all precipitation amounts are in inches.

Billings					
Date	**High**	**Low**	**Average**	**Precipitation**	**Snowfall**
9/1 – 9/30	73.1	47.5	60.3	1.30	1.1
10/1 – 10/31	59.4	37.1	48.2	1.18	4.1
11/1 – 11/30	45.3	26.3	35.8	0.63	6.5
9/1 – 11/30	59.3	37.0	48.2	3.11	11.7

Miles City				
Date	**High**	**Low**	**Average**	**Precipitation**
9/1 – 9/30	74.2	46.1	60.1	1.08
10/1 – 10/31	59.2	33.8	46.5	0.92
11/1 – 11/30	43.2	20.9	32.0	0.39
9/1 – 11/30	59.3	34.7	47.0	2.39

Sheridan				
Date	**High**	**Low**	**Average**	**Precipitation**
9/1 – 9/30	74.2	41.6	57.9	1.43
10/1 – 10/31	60.1	30.9	45.5	1.41
11/1 – 11/30	45.9	19.4	32.7	0.71
9/1 – 11/30	59.9	31.5	45.7	3.55

Winter Normals

Meteorological winter is considered the months of December, January and February. Here are the normal temperatures and precipitation for Billings, Miles City and Sheridan for the winter season. Normals are 30 year averages calculated from 1981 to 2010. All temperatures are in degrees Fahrenheit and all precipitation amounts are in inches.

Billings					
Date	**High**	**Low**	**Average**	**Precipitation**	**Snowfall**
12/1-12/31	35.2	17.8	26.5	0.50	8.2
1/1-1/31	36.4	17.8	27.1	0.48	8.4
2/1-2/28	40.2	20.6	30.4	0.48	6.2
12/1-2/28	37.2	18.7	28.0	1.46	22.8

Miles City				
Date	**High**	**Low**	**Average**	**Precipitation**
12/1-12/31	30.9	9.7	20.3	0.29
1/1-1/31	30.0	8.9	19.5	0.32
2/1-2/28	35.5	13.2	24.4	0.23
12/1-2/28	32.4	11.5	22.0	0.84

Sheridan				
Date	**High**	**Low**	**Average**	**Precipitation**
12/1-12/31	35.2	10.6	22.9	0.56
1/1-1/31	36.2	11.4	23.8	0.56
2/1-2/28	39.0	14.2	26.6	0.54
12/1-2/28	36.7	12.9	24.8	1.66

Average Frost and Freeze Dates

The following are the normal first frost, freeze and hard freeze dates for Billings, Miles City and Sheridan. The frost temperature is based on 36 degrees Fahrenheit, the freezing temperature is based on 32 degrees Fahrenheit and the hard freeze temperature is based on 28 degrees Fahrenheit. The normal dates are based on a 30 year average from 1981 to 2010. The first frost, freeze and hard freeze dates are based on a period of record. Recordkeeping began for the Billings Airport in 1934, the Miles City Airport in 1937 and at the Sheridan Airport in 1907.

City	Normal First Frost	Earliest Frost on Record	Normal First Freeze	Earliest Freeze on Record	Normal First Hard Freeze	Earliest Hard Freeze
Billings	Sep 24	Aug 24	Oct 4	Sep 4	Oct 11	Sep 11
Miles City	Sep 21	Aug 22	Sep 29	Sep 2	Oct 7	Sep 11
Sheridan	Sep 11	Jul 2	Sep 20	Aug 17	Oct 3	Aug 25

Gauging Fire Season Severity

Dan Borsum- Incident Meteorologist/Senior Forecaster

While our local fire season in southern Montana and northern Wyoming may have been quiet, 2015 has been a very active year elsewhere. One way to assess fire activity is to monitor the National Preparedness Level found on the National Incident Management Situation Report at this link: http://www.nifc.gov/nicc/sitreprt.pdf

Here is a quick description of each Preparedness Level

Preparedness Level 1 Description: Minimal large fire activity nationally.

Preparedness Level 2 Description: Wildland fire activity is increasing, and large fires are occurring in one (1) or more Geographic Areas (http:/gacc.nifc.gov). There is moderate commitment of National Resources with the potential to mobilize additional resources from other Geographic Areas.

Preparedness Level 3 Description: Type 1 and 2 Incident Management Teams are committed in two (2) or more Geographic Areas and crew commitment nationally is at 50%.

Preparedness Level 4 Description: Competition exists for resources between Geographic Areas. Nationally, 60% of Type 1 and 2 Incident Management Teams and crews are committed.

Preparedness Level 5 Description: Geographic Areas are experiencing major incidents which have the potential to exhaust all agency fire resources. Eighty percent (80%) of Type 1 and Type 2 Incident Management Teams and crews are committed, as well as the majority of other National Resources.

Fire season 2015 has seen the National Preparedness Level (PL) elevated to 5 on August 13th and it remained there until September 4th for 22 consecutive days. This is the most days at PL5 since 2008 and nearly twice the normal ten year average of 12 days. The key phrase under the PL5 description is “exhaust all agency fire resources” and that’s why this year you had not only resources from Canada but also Australia and New Zealand along with active duty military personnel become involved with the firefighting efforts.

The National Weather Service supports firefighting efforts from the local offices and it sends Incident Meteorologists (IMETs) to join the teams onsite. 2015 saw the daily record for IMETs supporting fires get broken multiple times with a maximum of 44 IMETs deployed at the same time which is 9 higher than the record before this season of 35.

COOP Corner

Larry Dooley—Observing Program Leader

Snow is About to Fly

Well, believe it or not, it is that time of year when we need to begin to think about snow. Everyone always has that question, "How much snow did you get?"

There are two key terms we use in regards to snow measurements; Snowfall and Snow Depth. So, what's the difference?

Snowfall is the accumulation of new snow, prior to melting or settling. This new snowfall is measured to the nearest tenth of an inch (0.1). The measurement should be made as soon as possible after the snow ends in order to capture how much accumulated before melting or settling occurs.

While snowfall is considered the new snow that has fallen, Snow Depth is another type of snow measurement that indicates the total snow on the ground, or the depth of the new snow and old snow. This measurement is recorded to the nearest whole inch.

What is the proper way to measure this snowfall and snow depth? It is essential to measure snowfall in locations where the effects of blowing and drifting are minimized. Measuring in a location where snow accumulates uniformly simplifies all other aspects of the observation and reduces opportunities for error. Once you find this most representative area, the most accurate snowfall measurements utilize a Snow Measurement Board placed in this location. A Snow Measurement Board is typically a white board approximately 16 x 24 inches. The Snow Measuring Board should be cleared at the end of the 24-hour period in preparation for measuring snowfall during the next observing period.

In open areas where windblown snow cannot be avoided, take a number of measurements in different locations to report an average (typically 3 or more measurements). These measurements should not include the largest drifts or areas that have had snowfall drastically reduced by the wind. In heavily forested locations, try to find a clearing where snow is free to fall without being caught in the tree canopy.

Here are a few tips:

* Measurements beneath trees are inaccurate because snow can accumulate on tree branches and never reach the ground.
* Areas that are shaded from the sun (e.g., on the north side of building) are acceptable sites for measuring snowfall if winds are not blowing in a direction likely to blow snow off of roofs and artificially inflate the snowfall total.
* If a Snow Measurement Board is not available, snowfall can be measured on the ground. Note that measurements taken on grass can leave air space below the bottom layer of snow, particularly early in the season and when there was no previous snow on the ground. Measuring all the way to the ground can inaccurately inflate the snow depth amount.
* As a last resort, measurements can be made on surfaces such as a picnic table or a wooden deck as long as the observing location is not near a building where snow blowing off the roof is likely to accumulate and artificially inflate the amount of snow that fell.

CoCoRaHS

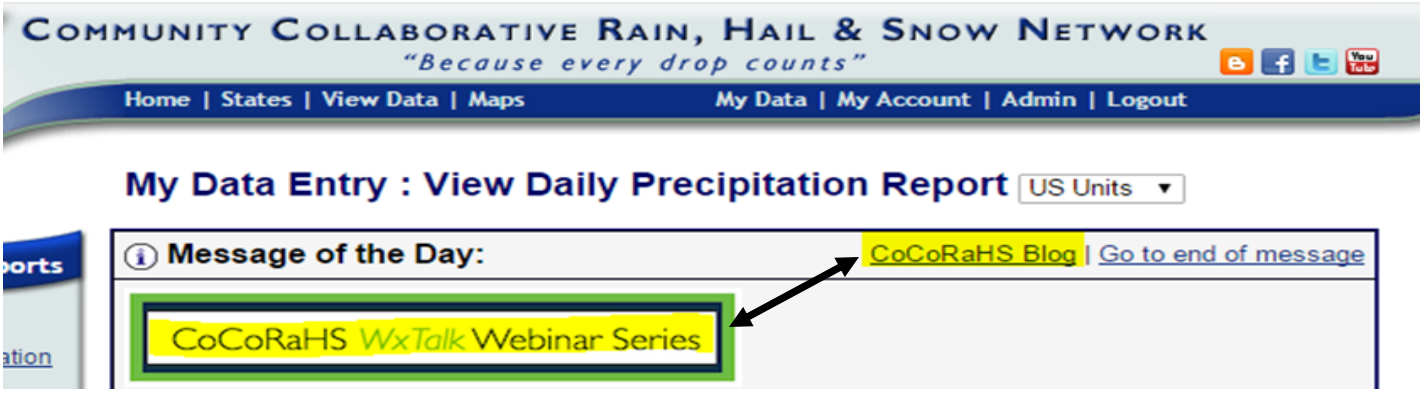
Vickie Stephenson– CoCoRaHS Coordinator

Hello Fellow CoCo Observers!

Another summer has come and gone! I would like to thank you all for your tireless efforts in reporting your precipitation every day. I am happy to say that our CoCoRaHS Network in southeast Montana continues to have the best reporting record across the state and you are all most appreciated!

It's time to prepare for the winter season by setting out your snowboards, and removing your tubes and funnels from your rain gauges, especially when you learn that the first snowfall is on the way. It won't be long now! Remember, for a quick refresher on measuring snow, the snow measuring video is on the CoCo website.

Our CoCoRaHS Administrators continue to offer "WxTalk Webinar Series" on the website in case there is one that catches your eye! They are free, so register and enjoy! You might also like to check out the CoCoRaHS Blog.



THANKS AGAIN FOR ALL YOU DO!

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Did You Know....

Winter Solstice

Kurt Hooley– General Forecaster

Winter brings a variety of emotions. Some people can't wait for the cooler weather that brings snow, skiing, ice skating, curling up by a fire, and the holiday spirit. Other people dislike the frigid temperatures, blizzards, and dangerous road conditions.

The word solstice comes from the Latin words for "sun" and "to stand still." In the Northern Hemisphere, as summer advances to winter, the points on the horizon where the Sun rises and sets advance southward each day; the high point in the Sun's daily path across the sky, which occurs at local noon, also moves southward each day. At the winter solstice, the Sun's path has reached its southernmost position. The next day, the path will advance northward. However, a few days before and after the winter solstice, the change is so slight that the Sun's path seems to stay the same, or stand still. The Sun is directly overhead at "high-noon" on Winter Solstice at the latitude called the Tropic of Capricorn. In the Northern Hemisphere, the solstice days are the days with the fewest hours of sunlight during the whole year.

It is important to note that the Earth does not move at a constant speed in its elliptical orbit. Therefore the seasons are not of equal length: the times taken for the sun to move from the vernal equinox to the summer solstice, to the autumnal equinox, to the winter solstice, and back to the vernal equinox are roughly 92.8, 93.6, 89.8 and 89.0 days respectively. The consolation in the northern hemisphere is that spring and summer last longer than autumn and winter (when the December solstice occurs).

You may ask, "Why is there such a time lag between the shortest day of the year and the lowest average daily temperature of the year?" Although the winter solstice is the time of the year when the Sun reaches its southernmost point in the sky, the earth is still cooling as its great thermal mass still retains some heat from the summer and fall. As the gradual cooling process continues over the next two months, temperatures will continue to fall, and the coldest temperatures will be recorded. The same pattern holds true for the summer solstice in June, as the warmest temperatures are recorded later, in July and August.

Winter Folklore

Kurt Hooley– General Forecaster

The larvae of Isabella Tiger Moths--more commonly known as woolly worms, or woolly bear caterpillars--are easily recognized by their short, stiff bristles of reddish-brown and black hair. According to legend, the width of the middle brown band judges the severity of the upcoming winter. If the brown band is narrow, the winter will be cold and long. However, if the band is wide, then the winter will be a mild and short one.

Some consider the woolly's hair thickness to be another indicator, with a thicker coat signaling a harsher, and sparse hairs a milder, winter season. (What's more, the woolly has exactly 13 segments to the length of his body--the same number of weeks there are of winter.)

The woolly worm's talent was first discovered in the late 1940s by Dr. Charles Curran, former curator of insects at New York City's Museum of Natural History. By observing caterpillar markings and comparing these to winter weather forecasts (provided by a reporter at the New York Herald Tribune), Curran found that the width of reddish-brown hair correctly matched the winter type with 80% accuracy. Since then, researchers haven't been able to replicate Dr. Curran's success (coloration is said to have less to do with weather and more to do with a caterpillar's development stage and genetics), but this hasn't seemed to influence the woolly worm's popularity. In fact, annual festivals are held in its honor in the cities of Banner Elk, NC, Beattyville, KY, Vermilion, OH, and Lewisburg, PA.

Weather Watch

Make sure you understand Winter Weather Alerts:

Winter Storm Warning means Take Action!

Winter Storm Warnings are issued for a significant Winter weather event including snow, ice, sleet or blowing snow or a combination of these hazards. Travel will become difficult and impossible in some situations.
-Delay your travel plans until conditions improve.
-If you must travel, bring a winter survival kit with you.
-Wear warm, protective clothing.

Winter Storm Watch means Be Prepared

Winter Storm Watches are issued when conditions are favorable for a significant winter storm event (Heavy Snow, Heavy Sleet, Ice Storm, Heavy Snow and Blowing Snow or a combination of events.)

Winter Weather Advisories mean Be Aware

Winter Weather Advisories are issued when snow, snow and blowing snow, snow and ice, snow and sleet, or snow, ice and sleet is expected but should not meet warning criteria. Be prepared for winter driving conditions and possible travel difficulties. Use caution when driving.

Sources for Winter Weather Alerts include NOAA Weather Radio All-Hazards, National Weather Service Forecast Office Billings, MT website, local television and radio stations, and your mobile phone.

Winter Weather Safety Tips:

* Slow down when driving, and leave early to give yourself plenty of time to reach your destination.
* If outside with no shelter, build a lean-to, windbreak or snow cave for protection from the wind. Build a fire for heat, and to attract attention.
* Melt snow for drinking water. Eating unmelted snow will lower your body temperature.
* Avoid overexertion such as shoveling heavy snow, pushing a car or walking in deep snow if you are not in good health.
* If you are stuck in your vehicle, stay there. Be visible to rescuers by tying a brightly colored cloth to you're antenna or door, or raising the vehicle's hood.
* Run the motor about 10 minutes each hour for heat.
* While running the motor, open the window a little for fresh air to avoid carbon monoxide poisoning.
* Clear snow from the exhaust pipe to avoid gas poisoning.
* If dealing with a power outage, never use a portable generator inside your home or garage.
* Avoid downed power lines.

Information Stop

Weather-Ready Nation: Fall Weather Hazards
http://www.nws.noaa.gov/com/weatherreadynation/fall_safety.html

Winter Weather Preparedness
http://www.wrh.noaa.gov/byz/winter/index.php?wfo=byz

Red Cross Winter Storm Safety Checklist
http://www.redcross.org/images/MEDIA_CustomProductCatalog/m4240231_WinterStorms.pdf

Wind Chill Resources
http://www.nws.noaa.gov/om/winter/windchill.shtml

Local Climate Records
http://www.nws.noaa.gov/climate/index.php?wfo=byz

Learn Science and Safety with Owlie Skywarn
http://www.weather.gov/owlie/