VOLUME VII
ISSUE 2, WINTER 2014-2015

Sage Winds

NATIONAL WEATHER SERVICE BOISE

Season in Review

Joel Tannenholz

November started out deceptively mild. But the stage was set for winter when modified arctic air crossed the mountains from Montana on the 11th and dropped temperatures below freezing on the 12th. On the 13th and 14th a Pacific weather system dumped several inches of snow as moist air lifted over the cold air.

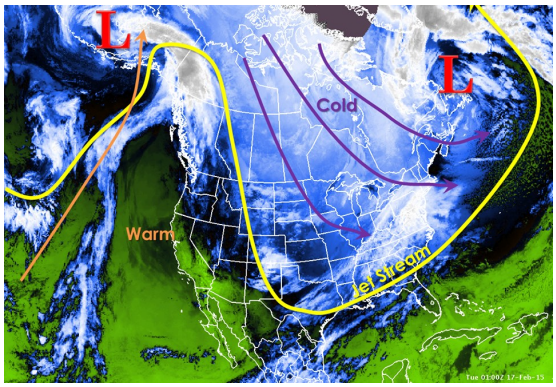
The real arctic invasion arrived by way of British Columbia on the 15th. With fresh deep snow cover and clearing skies, conditions were ideal for radiational cooling and some of the coldest temperatures of the season.

In the western half of the U.S. (excluding Alaska, Hawaii and a few high mountain locations), it is not unusual for the coldest day of the year to occur early in the season. At Boise the normal date is December 19, but this winter the lowest temperature occurred on November 15.

The cold siege was short-lived. Westerly flow brought mild Pacific air, raising temperatures above freezing on November 21st. By the 23rd most of the snow in the lower valleys had melted.

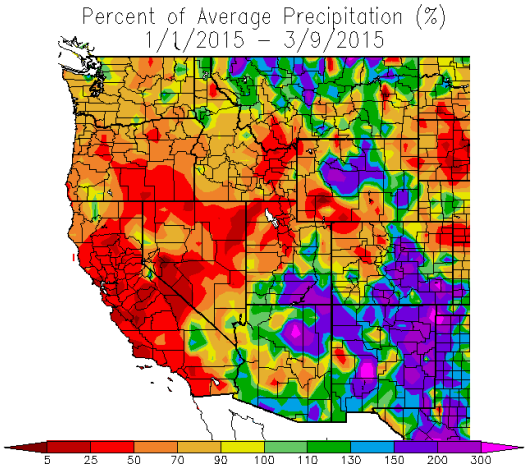
The second and last arctic outbreak of the season arrived on December 29th. In the Treasure Valley, thanks to persistent cloud cover, temperatures stayed above December's normal lows. But it was even colder than December's normals in the central Idaho mountains, the Magic Valley, and parts of eastern Oregon.

By January 5th the arctic air had departed, and a pattern was in place which would prevail over North America for a better part of the remaining winter. A warm upper level ridge established itself near the west coast as a cold upper level trough became entrenched over eastern Canada and the northeastern U.S.

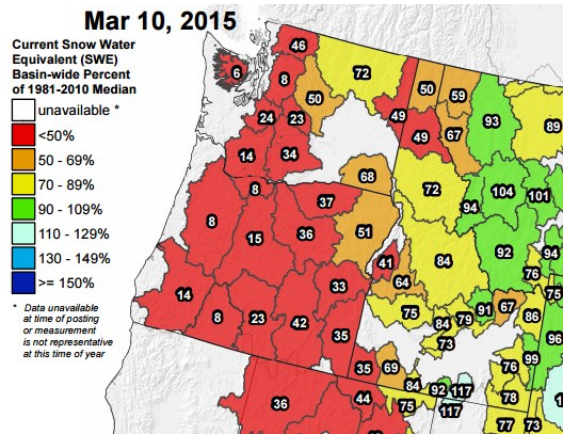


The ridge has kept our area unseasonably warm and relatively dry through early March. A few Pacific weather systems were able to punch through, but precipitation totals for January through the first part of March were less than 50% of normal across most of southwest Idaho and southeast Oregon, and less than 25% of normal in a few areas.

The warm dry air at higher elevations trapped cooler moist air in the valleys, establishing a persistent temperature inversion. Fog and low clouds plagued the valleys through most of January and early February. Boise fog was observed on all but three days between January 1 and February 5.



In the mountains above the fog and stratus, bright sunshine and mild temperatures were melting the snow. As of March 10, snow water equivalents at survey sites were below median in most basins, but especially low in Oregon and the Weiser and Owyhee basins in Idaho.



In February the temperature inversions were shallower and less persistent from lack of snow cover, so the full impact of the warmer air could be felt in the lower valleys. Temperatures were above normal every day through mid month, with a few days more typical of late April or early May.

During the first ten days of February the west coast ridge relented enough to allow a conveyer belt of very moist and warm Pacific air (sometimes called the "pineapple express") to bring periods of locally heavy rain to our area. Rain even fell in the mountains at elevations where it should have been snowing, eroding snow cover which had already been depleted by unusually warm temperatures.

SPRING Spotter Checklist

When should you call us?

HAIL: pea size or larger.

SNOW: 1" per hour or greater OR storm total 4"+ OR snow causing road closures.

REDUCED VISIBILITY: Less than ¼ mile for any reason.

WIND: Greater than 40 mph or damage.

HEAVY RAIN: 1/2"+ in 1 hour

FREEZING RAIN: Any amount.

FLOODING: Any water where it shouldn't be, or overflowing river.

TORNADO or **FUNNEL CLOUD**

ANY WEATHER RELATED DAMAGE, DEATH, OR INJURY

How to contact us:

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Severe Weather Training Workshop

Everyone is Invited!

Thursday, March 19, 2015

7:00-9:00 pm
1326 W. Cherry Ln
Meridian, ID 83642

Spring Outlook

Aviva Braun

Here in southern Idaho and eastern Oregon, we expect the spring to bring a hodge-podge of temperatures and weather. We'll see a beautiful sunny day turn into a convective rainstorm and then into a wintry mix. The National Weather Service Climate Prediction Center's (CPC) predictions can shed some light on the type of weather we'll be seeing here this upcoming spring.

The CPC's spring outlook favors above normal temperatures (Fig. 1) across southwest Idaho and eastern Oregon. As for precipitation, the CPC has predicted equal chances of above, near, or below normal precipitation (Fig. 2). If you recall the winter outlook printed in the Fall Edition, we predicted the same thing.

So what does that mean? Above normal temperatures and equal chances of above or below normal precipitation. This means less of a wintry mix in our expected hodge-podge! I guess we'll have to see what Mother Nature brings...but so far, the CPC outlook looks right on track.

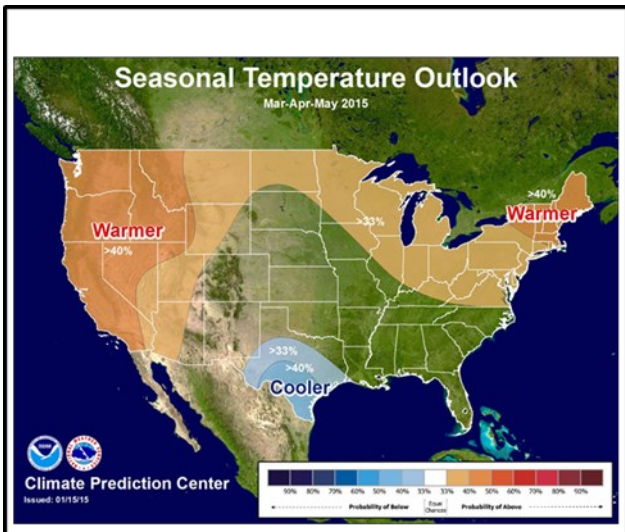


Figure 1. Three-month temperature outlook for Spring 2015, March-April-May.

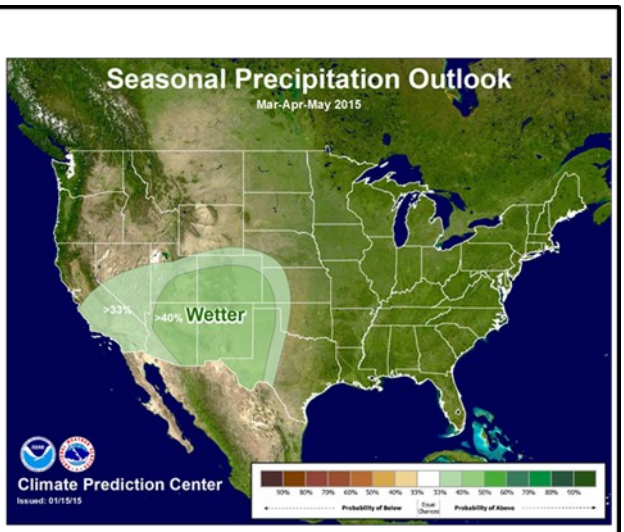
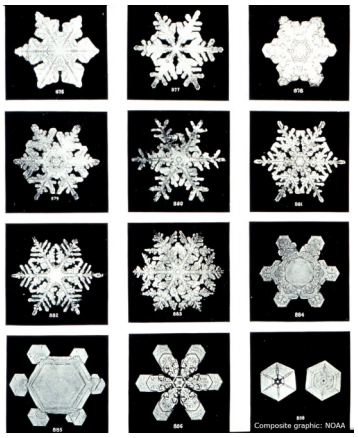


Figure 2. Three-month precipitation outlook For Spring 2015, March-April-May.

Winter Precipitation Types

Les Colin



Most people can recognize rain, sleet, and snow when they see it. Or can they? Actually, understanding and distinguishing between the various types of precipitation is not that simple! Let's bring up a few points that are often misunderstood:

Snow : Snow is not frozen rain. Snow crystals form when tiny supercooled cloud droplets freeze (supercooled means liquid below 32° F). The crystals grow into six-sided patterns (always six, never eight!) and fall individually or in collections called flakes. Snow can melt on its way down and become rain but rain cannot turn back into snow. Rain does not actually "change" to snow when it gets cold enough; it is replaced by snow, but it is convenient to say that "rain changes to snow". If the surface air is dry enough snow can reach the ground at temperatures as high as 45° F.

Sleet: The technical term for sleet is ice pellets. Sleet IS frozen rain (except in the British Commonwealth where sleet is defined as mixed rain and snow). In the US sleet is hard frozen raindrops, caused when rain freezes on its way down but before it hits the surface. It bounces when it strikes hard objects. Sleet is NOT hail. Sleet can occur even when the surface temperature is above freezing, when rain aloft freezes on the way down but hits the surface before it has time to melt.

Freezing rain: Freezing rain occurs when liquid rain freezes after hitting the surface. Note the difference from sleet, which freezes before hitting the surface. Sleet and freezing rain can occur together, but freezing rain and plain rain cannot. At a given point and time rain either freezes or it doesn't. However, a forecast can have both freezing rain and rain. How is that possible? The answer is that a forecast covers a time period and/or geographical area. Freezing rain might fall in the early part of the forecast period, and rain in the latter part of the forecast period. Or, freezing rain might fall in the cold valleys of the forecast area, while rain falls on the warmer mountain slopes. But freezing rain and rain cannot fall at exactly the same place and time.

Graupel (soft hail, or snow pellets): This weather type occurs when supercooled water droplets freeze on falling snowflakes. It is most common in early spring and often in thunderstorms. Graupel bounces on the ground but it is not hard like sleet. It can be crushed in one's fingers.

Hail: Hail is not sleet. It consists of balls or irregular lumps of ice, each of which is called a hailstone, which can become large enough to damage objects and cause injury or even death. Hail falls from thunderstorms and often during summer, unlike sleet, which never falls during summer (except in polar regions). Hail forms in thunderstorms that have high liquid water content, large water droplets, and where a large portion of the cloud is below freezing. The developing hailstones are circulated up and down within the cloud where they gain layers of liquid water and ice but are prevented from falling out of the cloud by an intense updraft. Eventually they either escape the updraft or become too heavy to remain suspended, and then fall to the ground at speeds that can exceed 100 mph. Imagine an updraft so strong that it can support baseballs or softballs in the sky, and then imagine being hit by them at speeds of 100 mph!

What is the "CoCoRaHS Network"?

Valerie J. Mills

CoCoRaHS, the Community Collaborative Rain, Hail and Snow Network, is a unique, non-profit, community-based, high density network of volunteers of all ages and backgrounds, who take daily measurements of rain and snow in their yards.

Why is the CoCoRaHS Network useful in Southwest Idaho and Southeast Oregon?

Reports from our CoCoRaHS community partners (including students, weather hobbyists, retirees, and working professionals) provide ground truth for National Weather Service (NWS) radar, satellite, and models of weather, rivers, and snow. CoCoRaHS measurements give us important facts about weather hazards, such as large hail, heavy rain, snowfall, snow depth and snow water equivalent. Snow data can aid NWS Boise-based temperature forecasting due to cooling effects of fresh new snow, as well as support water supply and river forecasting.

How are Idaho and Oregon CoCoRaHS snow reports used?

CoCoRaHS reports are used in aiding in verification of precipitation forecasts. "It's fun to compare the amount of rain or snow I measure to what was forecast to fall" said ID-AD-18. "It's exciting to melt a snow core sample and measure its water content" said ID-CY-14. CoCoRaHS and other snowfall reports of new snow cover may be used to adjust temperature forecasts colder due to cooling effects of fresh snow. CoCoRaHS reports also aid in NOAA snow analysis and computer modeling across the Nation. Reports of snow water equivalent (SWE) help nudge the model toward reality. This measurement is taken by melting a core sample of snow and measuring its liquid equivalent.

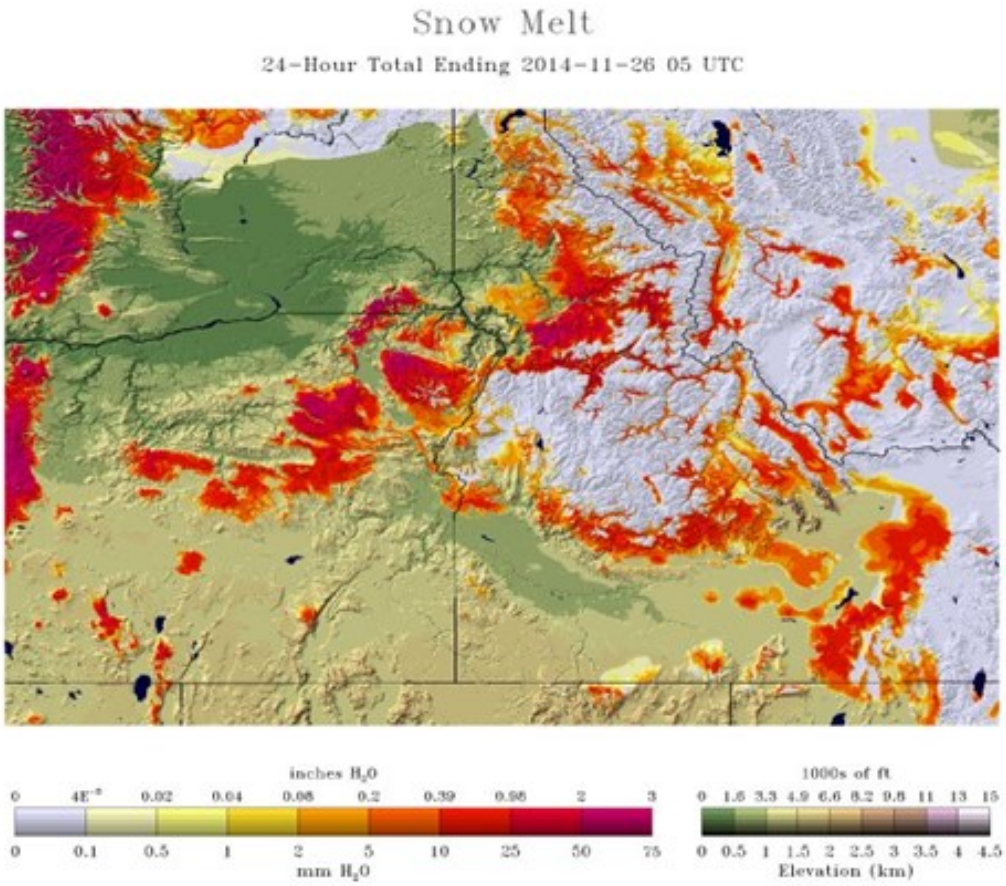
What do volunteers do when the snow melts off and there is no new rain or snow to report?

Even reports of no new snow or rain, just a change in your yard's snow core sample SWE can be highly useful. Forecasted and observed snowmelt can be used to aid hydrologic outlooks for rapid river rises.

For example, a warm up from record setting single digit lows in mid-November 2014, to a record setting high of 65 degrees November 28th, resulted in several inches of snow melt.

In the image, notice (up to) one inch of snow melt along the foothills of the Treasure and Magic Valleys, to 3 inches of snowmelt (in 24 hours!) across parts of Oregon's Blue Mountains on November 26, 2014.

Nationally, as of November 2014, CoCoRaHS reports made up 58% of the Snow Water Equivalent reports used for snow modeling at National Operational Hydrologic Remote Sensing Center. This is up from only 13% of reports being from CoCoRaHS a few years ago.



To see an animation of this, follow the following link: http://www.nohrsc.noaa.gov/nsa/js_animate.html?nsteps=135&year=2015&month=2&day=13&type=nsm_swe&region=Intermountains&ts=24&large=1

Does participation in this program "tie you down?"

Every raindrop still counts, even when observers go on vacation. Instead of entering the data in a daily format, accumulations can be entered in a multi-day accumulation format for whatever period you were out of town. It's simple! "It's convenient to let my standard 4-inch rain gage do the measuring while I go about my active lifestyle with friends and family. I enter multi-day data after I've been out of town" said Tim Barker, ID-AD-26, Science and Operations Officer, at the NWS Boise, Idaho.

"The CoCoRaHS data are a valuable source of weather and water information to help fill in the observation gaps for southeast Oregon and southwest Idaho. These reports can be valuable in all types of weather" said Jay Breidenbach, Warning and Coordination Meteorologist, at the NWS Boise, Idaho.

"On behalf of the National Weather Service, I thank all the CoCoRaHS observers for their time and effort to voluntarily provide this important data to the people and businesses of southwest Idaho and southeast Oregon - Thank You!" said Robert Diaz, Meteorologist-in-Charge at the NWS Boise, Idaho.

National Weather Service Boise Staff

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Warning Coordination Meteorologist

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Fire Weather Meteorologists

Chuck Redman
Megan Thimmesch

Hydrometeorlogical Technician

Wasyl Hewko

Meteorologist Interns

Aviva Braun
Vacant

Want to help NOAA weather scientists with research?

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How Does Fog Affect Your Air Travel?

David Groenert

Whether you pilot a plane or fly as a passenger, chances are fog has affected your flight plans at one point in time. Across the interior Pacific Northwest, fog most commonly occurs between late Fall and early Spring and is typically associated with the dreaded inversion. Along the coast, cold ocean currents support fog development throughout the year. And when fog forms in the vicinity of an airport, travel delays can quickly follow.

Where's my Plane?

Most commercial aircraft don't shuttle back and forth between two cities – instead, they connect the dots by traveling to several destinations during the day. Thus fog at one destination could delay the aircraft from reaching subsequent airports on time. At large airports, fog can cause a 'ground stop'. A ground stop is when an airport requires all inbound aircraft be stopped from departing from other airports, or if already enroute, they are slowed down or diverted. This is usually due to weather conditions limiting the number of planes an airport can safely land over a period of time. So a passenger in Boise may be waiting on a plane from San Francisco which is stuck in Phoenix because San Francisco is blanketed in fog and has thus declared a ground stop.

Why Haven't we Boarded?

The previous example can also be related to those passengers in Phoenix. They're being told about a departure delay because of a 'ground stop' in San Francisco due to weather. With Boise being a medium sized airport it will likely not issue a 'ground stop', however what will happen is an individual airline might have to hold its departures to Boise should current, or forecast conditions at the airport be too low to safely land.

Bound for Boise but Diverted to Where?!

You may also have experienced an in-flight diversion (and by that we don't mean a movie or the talkative passenger next to you). A diversion is when you take off for a destination but somewhere along the way the aircraft is routed to a different airport. There are many reasons for a flight to be diverted, but weather is the most frequent. If the visibility at Boise is too low for an aircraft to land it will typically end up circling in hopes that conditions will improve. And if not? Well, then it's either back to your departure airport or a nearby airport like Twin Falls, Salt Lake City or Portland, if you want to call those last two nearby.

How Does the National Weather Service (NWS) Fit in?

Well, we obviously control the weather. Ok, maybe not. Instead the NWS issues forecasts specifically for an airport and its numerous customers. The forecasts highlight changes in flight conditions, winds and weather that will affect aircraft operations over the next 24 hours at six airports across southeast Oregon and southwest Idaho. The biggest effect these forecasts have is on flight planning, as once a flight is airborne decisions are usually made from the current observations. Forecast weather conditions can drive requirements for extra fuel, the type of aircraft and who will pilot the aircraft. At the airport, the NWS forecasts are used in ground delay decisions (at the bigger airports) along with winter operations such as staffing for snow removal.

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SPRING is HERE!

Friendly reminders on keeping you and your family safe

Springtime weather to start preparing for:

- **Flooding**: Snow melt combined with rainfall can create sheet flooding, but some thunderstorms can produce heavy rainfall in a short period of time and create flash flooding. Both of these scenarios can threaten life and property.
- **Thunderstorms**: Hail, lightning, gusty winds, and flooding are all possible with thunderstorms, and can be dangerous. If you hear thunder, it is time to go indoors.

SPOTTERS! When do we want to hear from you?

- Hail is occurring – note the size in diameter (Use familiar items such as the size of a: pea? quarter? golfball?)
- Heavy rainfall that is causing flooding of any kind.
- ANY property damage caused by wind, hail or rain.
- Funnel Cloud or Tornado

Questions? Comments? Suggestions?

Email:
boi.spotter@noaa.gov

Meet and Greet

Aviva Braun

With all of the snowstorms and fog events earlier this winter, we thought it would be fun to speak to the Deputy Director of Operations and Security at the Boise Airport, Sarah Demory. With her help, we'll be able to understand the inner workings of the Boise Airport and how they were able to successfully stay open throughout the season – never once shutting down!

Sarah Demory

NWS: Could you introduce yourself to our readers?

Sarah: Technically I'm the Deputy Director for Operations and Security, but I like to say that I wear a lot of hats. I oversee the Operations Department and team, whom you guys work with, the Airport Maintenance Specialists and team, who work out on the airfield, and lastly the Airport Technology Specialist who oversees the security system at the airport. Of course, emergency preparedness is also a big part of my job. But really, I work where I'm needed to keep operations running smoothly.

NWS: What impacts does the weather have on the Boise Operations team during the winter?

Sarah: Whatever the weather may be, we are the central information point to the airlines and airport tenants, advising on potential impacts. If we have a high impact event like heavy rain event, a thunderstorm, or a snowstorm…the type of weather that will actually impact the airfield or the physical airport, that's when we really take action and when we communicate with NWS the most. We then communicate with the airlines in the same fashion as airlines do with passengers – as in, we'll know more in 30 minutes. We'll then huddle, plan next steps, take action and then make the update.

NWS: What winter weather type has the greatest impact on the Operations team and why?

Sarah: The biggest impacts affecting the airfield come with ice events and graupel. When we have warm air aloft but the surface is still cold. When we get into a situation like that, the most effective method is to utilize FAA approved chemicals and sand. We have a special kind of sand that is FAA approved since certain types of sand can cause damage if ingested by a plane's engine. Any snow event will have an impact as well, but in the heavier events of over 3 inches, we call an all-hands on deck response; we staff like an emergency. We can handle these events, be it 3 or 8 inches, but we staff them the same. The response also depends on if it's heavy, wet snow, or light, dry snow. Light, dry snow is easier to handle.

NWS: That brings me to my next question – how did the Operations team fair during the November snow event?

Sarah: Let me just say that the team was awesome! The November event was challenging – it probably was for your office as well, because the forecast kept changing. We got a plan together, but had to update it numerous times, even during the event. It started out as a forecasted 2 inch snowstorm, to which we called an orange alert, which is for anything between 1-3 inches, and put a staffing plan together. But about 2 hours in it became apparent that we would be getting much more, so we upped it to a red alert and changed our staffing plan. We booked hotel rooms for everyone so no one could get stuck at home for the event's duration. Of course, this was a challenge, since no one had planned on this, but our team was dedicated and rolled with it; they made it work. We ended up getting over 8 inches total, but we never closed!

NWS: So how does the communication between our two offices contribute to your team's success?

Sarah: It's really great how connected we are, literally through our chat system (PASSUR), which makes it really easy to communicate and monitor each situation. It's really great to have that mutual understanding and connection between our offices and therefore, we can really help each other. I can't stress enough that our unique relationship is a key component to our situational awareness and response success.

NWS: Well, Sarah that is all of the questions I have. Thank you! **Sarah**: Thank you for having me.

WATCH/WARNING/ADVISORY What is the Difference?

WATCH – Conditions are favorable for a severe weather event in the near future.

WARNING – Weather is occurring or imminent and is threatening life or property

ADVISORY – Weather is occurring or imminent that will cause a significant inconvenience, and if caution is not taken, may be threatening to life or property.