VOLUME X
ISSUE 4, AUTUMN 2017

Sage Winds

NATIONAL WEATHER SERVICE BOISE

Season in Review

Joel Tannenholz

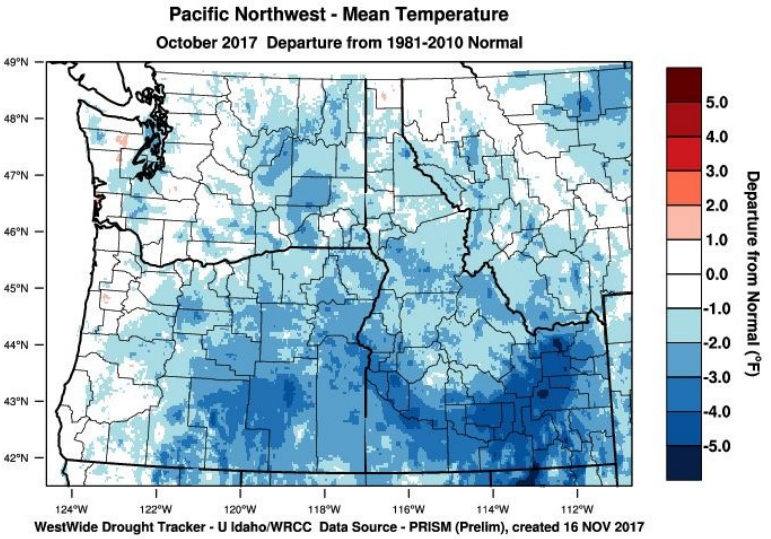
Typical of fall, the pattern was active, with passing weather systems bringing showery periods and changing temperatures.

September's temperatures were split between summer and fall.

It was drier than normal in eastern Oregon, but wetter than normal in central and southwest Idaho, especially in the mountains.

A very warm high pressure ridge kept temperatures above normal for the first two weeks of September. But smoke from numerous fires plagued the region, preventing daytime temperatures from climbing even higher.

Summer weather ended abruptly on the 14th following a cold front from British Columbia. The change was made even more dramatic by west to northwest winds gusting into the 40 to 45 mph range at Baker City Oregon and through Idaho's Snake River Valley.



A second cold front, this time from the Gulf of Alaska, crossed our area on the 18th. It was followed by a low pressure trough which was responsible for most of the rain during an otherwise dry month, along with unseasonably cool temperatures. The trough hung over the region through the 24th.

A high pressure ridge returned temperatures to near or slightly above normal at most locations from the 26th through the 29th, although the Magic Valley remained cool.

On the 29th and 30th another low pressure trough from the Gulf of Alaska brought cooler air and generally light precipitation. One exception was McCall, where .6 inch of rain fell on the 30th.

October's temperatures averaged below or much below normal.

It was wetter than normal in northern Harney County, Baker County, and the central Idaho mountains, but drier than normal elsewhere.

Late September's low pressure trough continued to reside over the northern Intermountain Region through the 5th, keeping our area cool, but providing little if any precipitation.

After one day of seasonable weather on the 6th, a series of low pressure troughs from the Gulf of Alaska kept temperatures cool through the 14th.

By the 16th the storm track had moved north into Canada, leaving our area under relatively warm southwest flow aloft through the 19th. Most of the region experienced the last summerlike weather of the year on the 18th and 19th, ahead of a Pacific cold front. High temperatures were in the 70s at lower elevations. Rome Oregon warmed to 80 degrees on the 18th.

The cold front crossed eastern Oregon and southwest Idaho on the 19th, and high temperatures on the 20th were as much as 20 degrees lower.

The radical temperature contrast across the front caused strong gusty winds at many locations. Ahead of the front in Oregon, Baker City recorded a gust of 41 mph from the south on the 19th, and a gust of 44 mph from the south was measured at Rome. As the front crossed southern Idaho on the 20th, Jerome experienced a gust of 50 mph from the southwest. Strong winds followed the front as well. A gust of 50 mph from the northwest was reported at Mountain Home, and gusts exceeding 40 mph were common elsewhere.

From a quarter to a half inch of rain fell at several places. McCall measured over two-thirds of an inch of precipitation, falling mainly as snow from the 20th through the 22nd.

After a frosty morning and a cool day on the 21st, temperatures warmed to above normal from the 22nd through the 29th under a ridge of high pressure.

By the 30th the ridge had shifted to off the west coast, putting our area under northwest flow aloft. This allowed cooler air from British Columbia to spread south across the northern Intermountain Region, lowering temperatures to near normal.

In contrast to the cool October, most of November was warmer than normal.

It was wetter than normal across much of our area, notably along the Snake River and in the southern half of Malheur County Oregon, areas which ordinarily receive the least precipitation.

The only notable cool spell was initiated on the 3rd by a low pressure trough from British Columbia, which was responsible for the coolest weather since last winter. **Continued next page...**

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: from fog, blowing dust, rain, snow.

WIND: 40+ mph or damage.

HEAVY RAIN: ½" or greater.

FREEZING RAIN: Any amount.

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

TORNADO or **FUNNEL CLOUD**

ANY WEATHER RELATED DAMAGE, DEATH, OR INJURY.

How to contact us:

1-800-882-1428

@NWSBoise

/NWSBoise

boise.weather@noaa.gov

Questions? Comments? Suggestions?

Email:

boi.spotter@noaa.gov

Temperatures remained below normal through the 8th.

Most locations received light to moderate precipitation during that period, mainly in the form of rain at lower elevations. Moderate to heavy snow fell over the mountains. Snow totals were not reported, but the McCall airport measured a storm total of 1.4 inches of water equivalent by the time precipitation ended on the 5th.

Warmer more seasonable weather returned on the 9th. A weak high pressure ridge over the western U.S. and a persistent low pressure trough off the northwest coast kept us under southwest flow aloft, maintaining near normal or slightly above normal temperatures through the 20th.

Weather disturbances moving inland weakened as they traversed the ridge, but they retained enough moisture for light to moderate amounts of rain, mainly on the 9th and 10th, and again from the 15th through the 17th. A few places received heavier amounts, including Ontario with .72 inch, and Jerome with .80 inch.

On the 21st a very strong and unseasonably warm high pressure ridge built over the Desert Southwest and northwest Mexico, creating a source of warm air for the northern Intermountain Region. Average daily temperature departures from normal ranged from +6 to +20 degrees around the region from the 20th through the 28th. But in eastern Oregon at both Baker and Rome, temperatures on the 23rd averaged 28 degrees above normal, with highs of 70 and 71 respectively.

Moist weather systems moving through the north portion of the ridge generated nearly daily showers as far south as northern Nevada. Precipitation was generally light, but the west central Idaho mountains received heavier amounts as the moist air was lifted over the higher terrain. McCall measured 1.46 inches of

NWS Boise Hosts Event with Media Partners

Katy Branham

When it comes to delivering its message, NWS Boise heavily relies on our media partners. This is a group of partners that act on the frontlines with much higher personal visibility when it comes to conveying weather information. Regardless of avenue, we all work to protect lives and property and realize the strong need to have consistent messaging during weather events. With this primary goal in mind, around 12 media representatives from newspaper, radio, and TV gathered on the campus of the National Interagency Fire Center in Boise on the morning of November 9th to meet with NWS meteorologists.

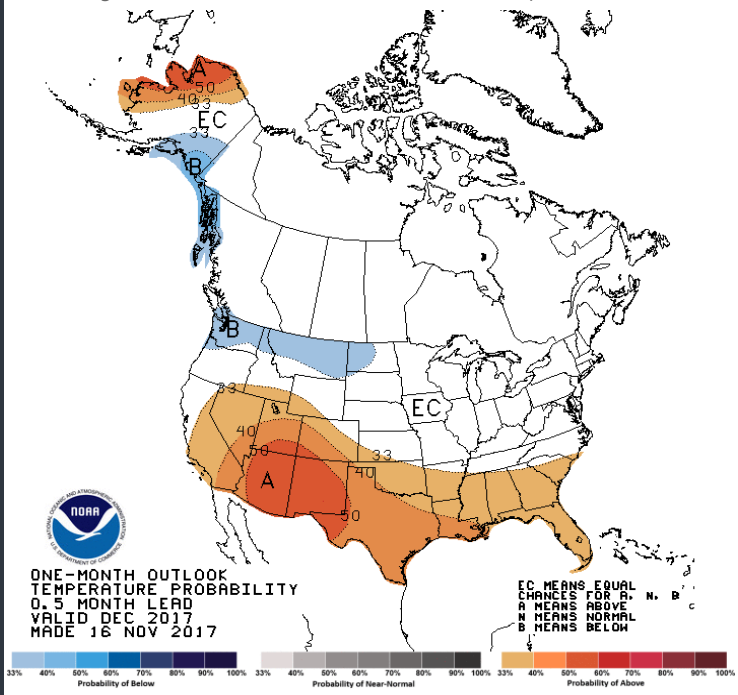
Cornerstone topics for this Media Day event included the outlook for winter 2017/2018, products and services provided by the NWS, and how to better improve our communication with our critical media partners. After a group of informational talks, an open forum was hosted to receive necessary feedback to help NWS Boise move forward, and also address any outstanding topics and/or concerns. Both the National Weather Service and its media partners left with goals to work on in the coming months. Following the event, members of the media were invited to take a tour of the NWS office to see how we functioned. Feedback from the event was positive, and another conference in the future is favorable.

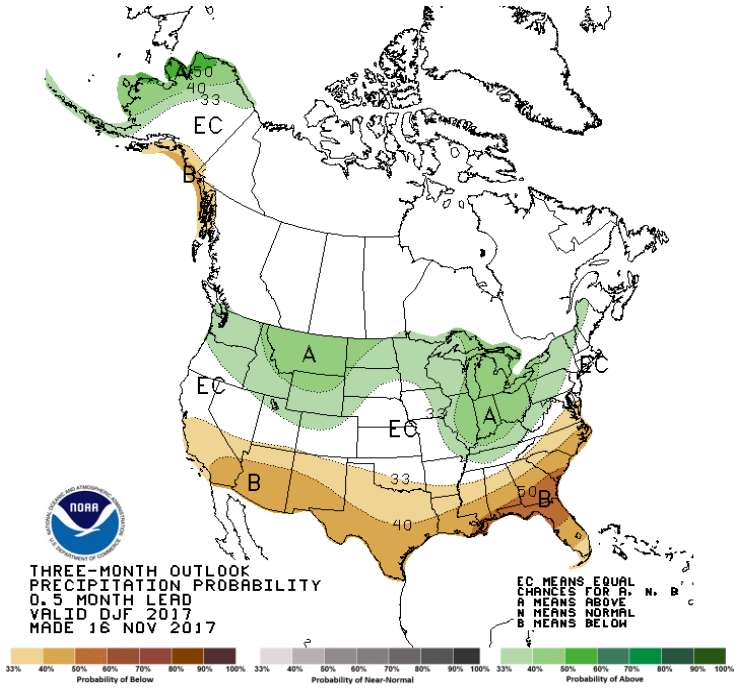
Winter Outlook 2017–2018

Stephen Parker

Over the last several decades, the primary forecasting tool for seasonal global weather forecasting has become the state of El Nino/La Nina. This fall we entered a weak La Nina, which means temperatures in the equatorial eastern Pacific are above normal. There is now a 70% chance that La Nina conditions will persist through the winter of 2017-2018.

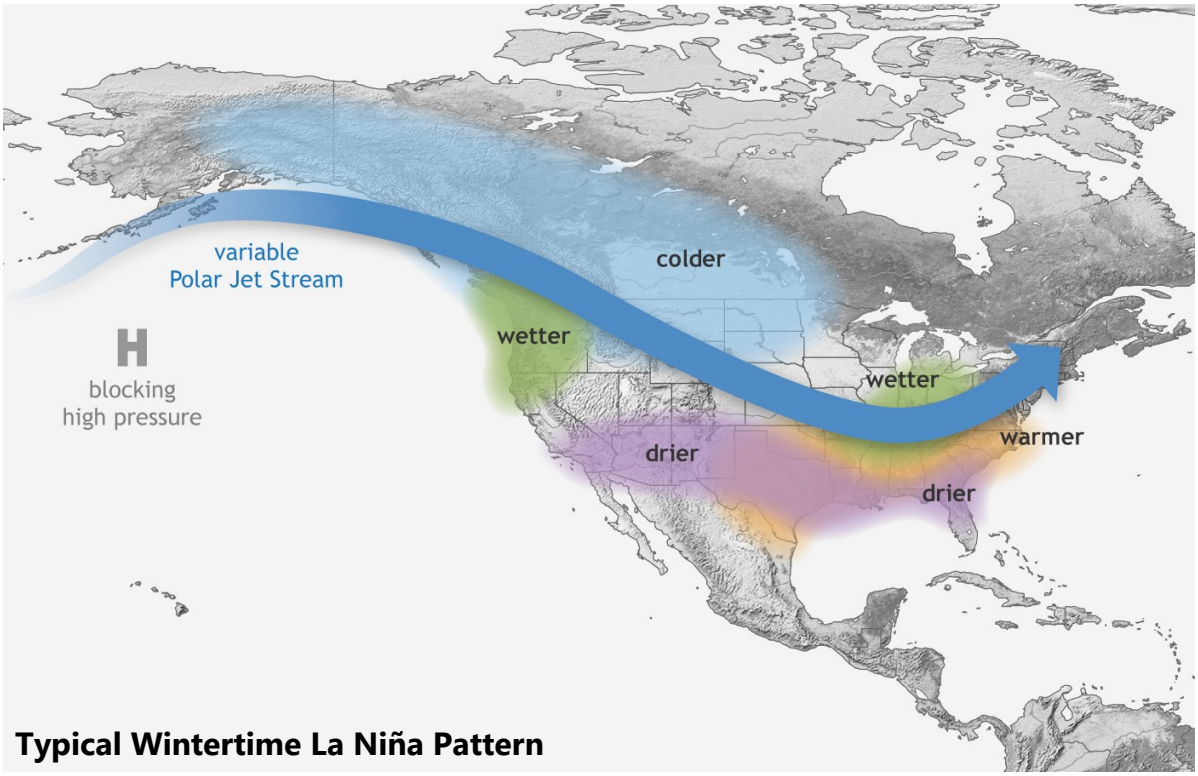
The following graphics show the official three-month outlook for the winter of 2017-18 (Dec-Jan-Feb). Consistent with La Nina conditions, the country's temperature outlook is for a better chance of above-normal temperatures across the south and much of the west. Only a small area from southeast Alaska to Washington/northern Idaho/Montana is forecast to experience below-normal temperatures.





The country's precipitation outlook is for above-normal precipitation in much of the north and Midwest, with below-normal precipitation in the south. A considerable area of equal chances of above- and below-normal exists between these two areas.

For southeast Oregon and southwest Idaho, these charts show mostly equal chances on temperatures, and favor above-normal precipitation. As warm as November was, it is not too hard to believe that we will experience an above-normal temperature pattern this coming winter. An active La Nina pattern could also bring more storm systems than normal, leading to above-normal precipitation amounts. Please remember, these outlooks are indications based on past correlations. They are not as accurate as short-term forecasts.



Typical Wintertime La Niña Pattern

Meet & Greet

Aviva Braun

The National Weather Service (NWS) partners with many local, state and national organizations to ensure our mission, the protection of life and property. One such organization is the Northwest River Forecast Center (NWRFC) located in Portland, Oregon and a fellow NWS organization. Without their help and expertise, forecasting river flooding would be more difficult. In order to learn more about their work and their organization as a whole, we sat down with their Development and Operations Hydrologist, Taylor Dixon.

NWS: Many of our readers are not familiar with your office or your mission; can you describe this to us?

Taylor: The NWRFC is one of 13 hydrologic centers within the NWS. Our mission is two pronged: to save lives and decrease property damage through the issuance of flood forecasts, and to provide hydrologic forecast information to support the Nation's economic and environmental well-being. We issue short-range streamflow forecasts, notably to support local flood warning programs but also for reservoir operations, navigation, recreation, etc. Additionally, the NWRFC issues longer range water supply-focused forecasts. In the western US, water can be somewhat scarce and needs to be managed across the board to ensure everyone has adequate supply. So those are really our two focal points, the short-range flood forecasting and the mid-to-long range water supply forecasting.

From the left: Jay Briedenbach of NWS Boise, and Kevin Berghoff, Steve King, and Taylor Dixon of the NWRFC in Portland.

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NWS: That goes along really well with what we do at the Weather Forecast Offices (WFOs), which is why we work so well together. Moving on, some of our readers are familiar with the Advanced Hydrologic Prediction Service (AHPS) page. Can you describe the process of forecasting river levels and how this data ends up online?

Taylor: The main engine in our office is a suite of regional models that we developed in house. The software and model components are nationally supported but we take these nationally supported pieces and put them together in a way that makes sense for each of the individual forecast points that we support. The goal is to translate the weather forecasts (that we largely get from the WFOs in the short range) into stream flows. Precipitation and temperature are the two primary inputs to our models. We run that information, the forcings, through our models and to provide simulations of stream flow. We then disseminate this data to our website and to AHPS, the official source of our forecast.

NWS: Last winter, we had a record snowpack and subsequent flooding that lasted for months. How challenging was this last season and why?

Taylor: Very challenging. I think it stands out as one of the most difficult years we've had in recent memory. The NWRFC domain covers all of Idaho, Oregon, and Washington, and parts of Montana, Wyoming, and British Columbia -- a fairly large area of responsibility. In a year like 2017, it's challenging because almost every corner of our region experienced significant stream flows. Some of it happened at the same time, some not, but when you look at the year as a whole, it was quite a year. Here and around Boise, record low elevation snow was difficult to assess. It's actually tough to call it "record snow" because there are not that many measurement stations at low elevations and therefore no real historical record to compare against. However, anecdotally, it was apparent that we were experiencing record conditions, at least according to people's memories.

We input an array of data into our models, including the weather forecasts and observed data, with the goal of simulating current conditions to be representative of what's on the ground, and this includes the snowpack. Well, it's tough to know how representative your models are when there are not that many physical measurements to verify against. Coordinating with all of our partners, including the WFOs, the Bureau of Reclamation, the Corps of Engineers, the State of Idaho, and many private utility companies was key. It boiled down to coordination because a year like 2017 was exceptional in so many ways that no single entity had the full picture and we really had to lean on each other to put it all together.

NWS: Many of the rivers in Idaho have dams that are meant to prevent flooding and to provide for irrigation needs. How do you coordinate with reservoir managers and how do your forecasts affect their decisions?

Taylor: We regularly coordinate with the federal water management agencies across our area, namely the Corps of Engineers and Bureau of Reclamation, to provide river forecasts that support the best possible management of the Columbia River system. We typically collaborate with the Corps of Engineers twice or more per week; we provide them with inflow forecasts for their managed systems, and they provide regulated outflow forecasts which we then put back into our models and carry downstream. Our coordination with the Bureau of Reclamation is approached in a similar manner.

NWS: Not all of our rivers have dams or are managed by humans or are even impacted by humans, e.g., the Weiser or Salmon Rivers versus the Boise or Snake Rivers which are highly regulated. How does a naturally flowing river versus a well-regulated river forecast differ in its forecast challenges?

Taylor: In terms of flood risks, forecasting unregulated systems can be problematic because there is no way to mitigate high flows. Thus, people downstream could be impacted immediately by high flows. This places a lot of pressure on those forecasts during heavy runoff events.

Continued on Page 6...

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Aviva Braun
Jessica Caubre

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However, regulated systems are also challenging because they are typically more complex and require strong coordination with the water management agencies. In science, uncertainty grows as more components are added because nobody knows everything about every particular process. Thus, in managed systems, there's additional uncertainty in the external agency-provided regulations that compounds the inherent uncertainty in our hydrologic forecasts (which is largely dictated by the uncertainty in the weather forecasts. However, when there is room in the system, the folks that live downstream of a dam are more protected. Although unregulated river forecasts may be structurally simpler to produce (i.e. fewer steps in the process), they're not necessarily any easier to "get right". Both managed and more natural systems are challenging to forecast, and a lot of it has to do with the risks for those living downstream.

NWS: Can you describe the relationship you have with the Boise office in terms of river forecasts and the safety messages we issue?

Taylor: We are one and the same; we are a team. In years past, prior to the age of the internet, WFOs were our "voice". We were very much behind the scenes providing the hydrologic forecasts and the WFOs distributed all of that information. Now, in the age of the internet, we have more exposure through our own webpage. However, the official hydrologic forecasts for locations within your Hydrologic Service Area (HAS) are still routed through your office, through the AHPS site. We just happen to serve more than just your office; we serve 10 WFOs across our domain. It's not that we have defined roles, we just work together. You guys lean on us for hydrologic expertise and the bigger picture, and we lean on you for the finer resolution and local knowledge; your office has the network of people to talk to and you can get boots on the ground. I should add that WFOs are the official source of watches and warnings, but our forecasts are largely what drive them. You are the arm to the public and we provide the information to you so that you can make local assessments and provide local service.

NWS: I definitely agree with you that our missions are intertwined and that we are really one and the same. Thanks for saying so! So, one last question: what is the future of river forecasting? What will river forecasts look like in 10 years and how will the science of it change?

Taylor: Great question. The River Forecast Centers (RFCs) have been around for a long time (some date back to the 1940s), and many were spurred by historic flooding events. The RFCs will likely be around for a long time to come, but, just like the WFOs, our roles may change with time. As a whole, the NWS has strength in its local presence. That's something that the private industry cannot compete with. They may have impressive technologies, money, and new developments, but what they don't have is a local presence and the ability to connect with people and communities. The same can be said for the RFCs; even though we operate more on a regional scale, it's good to have that regional expertise coupled with the local presence that the WFOs provide. Hydrologic science is evolving rapidly right now. NOAA is in the midst of building a cutting edge, fully automated national hydrologic modeling framework called the National Water Model (NWM). As it evolves, through collaboration with the RFCs, it may begin to produce hydrologic forecast that are more accurate and/or more useful than those currently provided by the RFCs. However, although the NWM is designed to be centralized and hands-off, rather than regionalized and hands-on it will always operate with uncertainties. Thus, it's likely that the hydrologists at the RFCs will be responsible for accurately interpreting and conveying the information provided by the NWM (and potentially other forecast sources). . In addition, working with water managers is another key component of the forecasts that we currently issue, and it's unlikely that a fully automated model will be able to incorporate the level of partner coordination that we do now. In short, our role in the future will likely revolve around working with our partners to interpret, process, and convey hydrologic information and uncertainty appropriately and effectively.

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WINTER is HERE!

Friendly reminders on keeping you and your family safe

- Prepare a **Disaster Supply Kit** with a week's worth of food and water.
- Create a **Family Emergency Plan**, so you know how to communicate to your family and others when disaster strikes.
- Check **weather.gov** everyday so you aren't caught off guard.
- Inspire others to **take action** by showing your friends and family how you are prepared.

Visit **www.ready.gov** for more information.

Keeping Pets Safe

- If possible, keep pets indoors.
- Routinely check outdoor water dishes to make sure they don't freeze.
- Keep food dishes well stocked; it takes lots of energy to stay warm.
- Keep antifreeze where pets cannot access it.
- Protect paws from salt and other anti-icing chemicals, or wipe paws with damp towel to remove these irritating compounds.

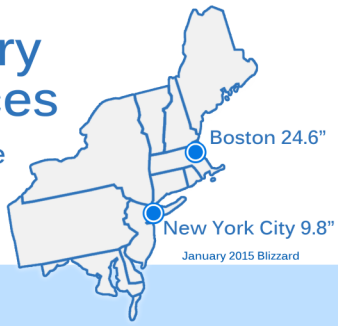
CoCoRAHS observers needed!

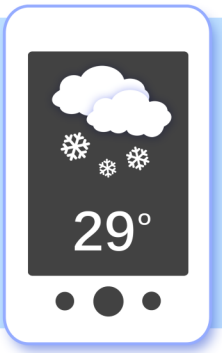
Calling all weather enthusiasts in Oregon and Idaho! We need more weather observers interested in taking daily measurements of precipitation or snowfall. If you would like to participate in CoCoRaHS, please contact us at: **boise.weather@noaa.gov** or visit **http://www.cocorahs.org/**

5 Things to Know about Winter Weather Forecasts

1 Snow or ice totals can vary greatly over short distances

A heavy snow band may form, dropping more snow in one location while significantly less snow falls just a few miles away.





2 Winter forecasts can change frequently

Forecasts may change as new model data becomes available. Always check weather.gov for the latest information.

3 Focus more on the winter storm's impacts

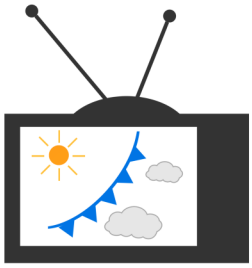
Don't focus too much on exact numbers, and consider the full range of possibilities.

4 Know your winter weather terminology

If a Watch is issued, get prepared for hazardous weather. If a Warning or Advisory is issued, take action – hazardous weather is occurring or will occur soon.

5 Rely on a dependable source for weather info

Choose your information sources wisely, and follow a name or organization you know and trust.



For more information on winter weather safety, visit:
weather.gov/winter