

Remember your Winter Spotter Checklist

Snow—2"+ in valleys
6"+ in mountains

Any **mixed or freezing** precipitation

Reduced Visibility — under a mile due to snow, fog, rain, etc.

Any **Flooding**

Strong Winds—30 mph+ or damage

Hail—pea size or larger

Heavy Rain—Showery— 1/2+" an hour
Steady Rain- 1" in 12 hrs or 1.5"+ in 24 hrs

Travel Problems or Any Damage due to hazardous weather.

How the Weather Works

This is a new feature where Meteorologist in Charge John Livingston writes an article explaining some of the weather terms and concepts you might see in an Area Forecast Discussion or other weather presentations.

The Jet Stream

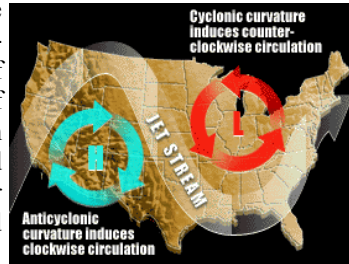
The jet stream is described as a river of strong wind in the atmosphere about 20,000 feet above sea level. The term is often used in descriptions of where the storms are and where they are going by saying the jet stream steers the storms.

The American Meteorological Society's Glossary of Weather and Climate, defines a jet stream as "a relatively narrow river of very strong horizontal winds (usually 50 knots or greater) embedded in the planetary winds aloft." The NWS has a number of ways of measuring and locating the jet stream. We launch a weather balloon twice a day at the NWS Spokane office. By tracking the instrument as it ascends through the atmosphere we measure the winds, including the jet stream. Weather balloons are launched at about the same time from many locations around the world, giving meteorologists a "snap shot" of the state of the atmosphere and the location of the jet stream. In the winter months it is not unusual to measure winds in

excess of 100 knots when the jet stream is overhead.

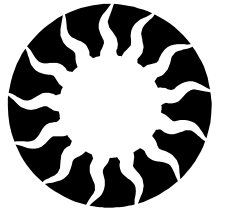
Satellite pictures and data, and even information from doppler radar can help locate the jet stream. Meteorologists, forecasters and weather watchers use "conceptual models" to understand how storms work. These are idealized plans or "blue prints" that explain how the high and low pressure areas, cold fronts, warm fronts, land and water masses and other components fit together to cause the weather we see at the surface. The jet stream is a key part of these models because its location can give us clues on where the cold and warm air is located, where rain or snow will fall, where the strong surface winds will occur or where the thunderstorms will form.

Forecasting is based in the science of meteorology, yet it often includes a fair dose of experience and intuition. A good forecaster uses all available tools to formulate the forecast. This includes the use of idealized models of how the jet stream fits into and "steers" the weather that affects you and me. ☀



The Weather Watcher
of the Inland Northwest

www.weather.gov/Spokane



INSIDE THIS ISSUE:

Tribute to Hams Operators	2
Staff News	2
Co-op Corner	2
Fall Review	3
What Happened to the Snow	3
How Weather Works	4

A Look Back at a Winter to Remember

Seems like whenever folks get together, the conversation inevitably turns to talk of the weather. At this time of year, the weather topic is often of winter. After digging through the weather records, we found a winter that was easy to recall, but difficult to forget.

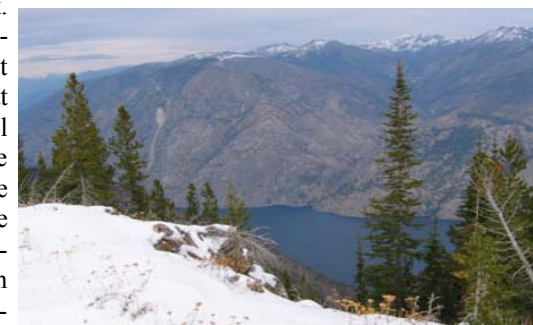
December 1949 was pretty much your garden variety winter month, but all changed by January 1950. The day after New Year's Day, a cold front dropped down from Canada causing temperatures to plummet. Temperatures fell below zero, with high temperatures only in the single digits. Then a strong and moist Pacific storm moved into the area, overrunning the frigid arctic air. This resulted in heavy snow, and lots of it. Spokane picked up over 16" during the 6th and 7th. The little town of Porthill on the Canadian/Idaho border received 45" of snow from the 6th through the 9th, while Priest River picked up 37" during the same period. Snow depths in the northern Panhandle were nearly 4 feet, and it was only early January!

A bonafide blizzard started across the region on the night of the 12th and continued on the 13th. Spokane city traffic was virtually paralyzed as visibilities dropped to less than a city block. Department stores closed up early, and the airport at Geiger Field was forced to shut down at 2 pm. State highway officials declared that nearly every road in eastern Washington as well as north Idaho was closed. In the wake of the blizzard, more arctic air dropped down into the area from Canada. This one was colder than the previous, with low temperatures dropping below 0°F six nights in a row at Spokane. Even the high temperature on the 14th remained below zero. Meanwhile in Lewiston, 8.7" of snow fell on the 15th, setting a record for the greatest one day snowfall.

Once again, the arctic air retreated in the face of another onslaught of warm Pacific air. And again, the price to pay for the warm up was snow and freezing rain. The ice storm resulted in what the Spokesman-Review called "the worst driving conditions of the winter." Eventually, the surface air warmed. The rain and warm wind melted away about a foot of the snow pack. The rapid melt caused concerns for flooding.

The warm-up was once again short-lived as a third frigid air mass moved down from Canada with more sub-zero temperatures. Another 6" of snow blanketed the area on the 26th as temperatures hovered around 0°F. But by this point, additional snow and cold had ceased to become news. Perhaps Mother Nature took offense at this, as temperatures dropped even further following the latest round of snow. Many locations set their all-time record low temperatures. At Chewelah, the mercury dropped to -38°F on both the 29th and 30th, with a high of only -7°F! The paper responded with a front page headline of "Inland Empire Flinches at Coldest Weather in 62 Years" as the low at Spokane dropped to -24°F, the lowest temperature since 1888!

January 1950 mercifully came to an end, but easily went down in the record books as one of the coldest and snowiest months ever in the Inland Northwest. The average temperatures were about 20 degrees below normal, an unbelievable feat! For more on the coldest and snowiest winters of the Inland Northwest, visit <http://www.weather.gov/spokane>. ☀ Ron Miller & Charles Ross



Outlook for early 2005

A return of January 1950 would be difficult to repeat, especially this year. The latest winter outlook issued by the Climate Prediction Center indicated that a weak El Niño event is expected to continue through early 2005. Its influence will impact the weather for the Inland Northwest with a greater chance of above normal temperatures and a greater chance of below normal precipitation. For more information on the El Niño and the winter outlooks, please visit <http://www.cpc.ncep.noaa.gov> ☀ John Werner

Editor's Notes

This is a busy time of year, not only for holiday festivities, but for winter weather. Most would agree, much more snow would be appreciated especially in the mountains.

If you don't already know, the Weather Watcher is available on our web page. If any of you are interested in not receiving a paper copy in the mail and would rather read it online, please email me at robin.fox@noaa.gov. I would then take you off the newsletter mailing list.

If there is something you would like to see in the next newsletter or if you have comments about a past issue of the Weather Watcher, please contact Robin Fox or Ken Holmes (509) 244-0110 extension 223.

The main purpose of this publication is to keep our readers informed about our services and programs, and to recognize those who help us accomplish our mission, including weather spotters, coop observers, media and emergency management.

All articles are written by the NWS staff and close contacts. A special thanks to John Livingston, Ron Miller, Charles Ross, Bob Bonner, Ken Holmes and John Werner for their contributions.

The Weather Watcher
Of the Inland Northwest



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Seasons Greetings
from NWS Spokane

Trivia: What was the coldest month on record for the Inland NW?

A Tribute to Ham Radio Operators

When the skies darken or thunder begins to rumble, most people move indoors to safety. But a select group of people have a different reaction. When severe weather threatens, they are often called into service. These people are known as storm spotters, many of which are amateur radio operators.

Amateur radio operators have existed since radio began, and anyone can become a "ham". While one can listen "to the world" with only a modest radio, some hams invest hundreds or even thousands of dollars in radio and electronic equipment, and spend years honing their communications skills. So when a ham becomes trained in severe weather reporting, it puts them in a unique position to provide valuable information directly to the National Weather Service.

On December 3rd and 4th 2004, thousands of hams across the country operated radio equipment to participate in Skywarn Recognition Day. Co-sponsored by the American Radio Relay League and the National Weather Service, this event pays tribute to amateur radio operators for the vital public service they perform. Amateur radio operators set up radio equipment in the local National Weather Service (NWS) office and work as a team to contact other hams across the world, performing this task during a 24 hour period. During last year's event, over 19,000 contacts were made throughout the world. This is the sixth year for Skywarn Recognition Day.

Ham radio operators are a tremendous resource for the National Weather Service. The dedication these volunteers show is inspirational, and their assistance during the year is invaluable. Skywarn Recognition Day is our way of saying thank you. To learn more about Skywarn Recognition Day, check out the web site <http://hamradio.noaa.gov>. ☼ Ken Holmes

Co-op Observer Corner

ROSA is gone as of December 13th and IVROCS (Interactive Voice-Remote Observation Collection System) is here. WXCODER, an internet based system to transmit observations to the National Weather Service, remains in use and is quite popular. However, you do need a computer with access to the internet. WXCODER users can use the IVROCS system as a backup.

Once past the newness and the different way to enter data, most observers prefer IVROCS to ROSA and find it faster and easier. IVROCS can be accessed via any home telephone and you will be prompted for your data.

Any cooperative observers that would like to send their observations to the National Weather Service real-time, please contact the Spokane office. ☼ Robert Bonner

Staff News



An era is coming to an end on January 2nd, when Forecaster Lyle Hammer will be retiring from the National Weather Service after more than 30 years of federal service. Lyle has had a richly diverse career in weather. He starting out doing snow research at Montana State University back in the late 60s. In 1972, he found his first assignment with the Weather Bureau in Alaska, transferring from Juneau to Anchorage. He quickly worked up the ranks from forecaster to a Meteorologist in Charge and moved back to the western U.S. He spent time in Boise, Eureka and Fresno, CA, before moving to Spokane in 1995. His future plans include: fishing, outdoor activities and spending more time with his family, including his granddaughter. Good Luck to Lyle in future retirement. ☼ Robin Fox



Call IV-ROCS
 • Select language (1 - English, 2- Spanish) **1-877-266-7627**
 • Identify location (6 digit station number) WFO Spokane, WA—1-800-483-4532
 • Observation time
 • Current, maximum, and minimum temperatures **Shaded entries must be followed by the '#' key**
 • Precipitation amount
 • Precipitation types during 24 hr period
 • 24 hour snowfall
 • Current snow depth
 Enter red fields only if prompted

Notes:	Precip Types
Do NOT use decimals	1 -Rain
Precipitation amount is entered in 0.01 inch increments (0.01 is entered as 01 and 0.47 as 47)	2 -Freezing Rain
Snowfall entered in 0.1 inch increments (0.1 entered as 1)	3 -Drizzle
Snow depth is entered in whole inches	4 -Freezing Drizzle
Trace is always entered as '*'	5 -Snow
Negative numbers are preceded by '*'	6 -Snow Pellets
	7 -Snow Grains
	8 -Ice Pellets
	9 -Hail

The Fall of 2004 in Review

After a rather warm summer, the Inland Northwest was treated to a cool September. This wasn't due to a big cold snap, but rather due to consistently mild temperatures. Typically we'll see a few days in the 90s during the first week of September. This year, Spokane didn't even reach 80° during September, while Wenatchee and Lewiston could only reach the mid 80s. Conversely, the coldest September day this year at Spokane was only 59°. So if 60s and 70s are your cup of tea, this was your month. Overall the month was also on the dry side. A few fronts in the middle of the month produced the entire rainfall for September. The last week of the month was beautiful with temperatures still in the 70s and lower 80s.

Technically though, this wasn't Indian Summer weather. By definition, Indian Summer is a period of warm fall weather after the first freeze. And while September was cool, it remained well above the freezing mark. In fact, Spokane didn't see freezing temperatures until the last week of October. Meanwhile, Lewiston remained above 32° until the 1st of November, well beyond the normal end of the growing season.

The mild fall weather continued into October. The first half of the month was warmer than normal, with temperatures remaining in the 70s and even lower 80s in Lewiston. A rainy front in the middle of the month changed all that. Most sites picked up about a half inch of rain as temperatures dropped into the 40s and 50s, which is normal for that time of year.

A strong ridge of high pressure dominated the area for the first 2 weeks of November, bringing extensive fog and low clouds to the region. This weather pattern isn't unusual for the middle of winter, but it is a bit atypical for early November. Spokane Airport observed dense fog (1/4 mile or less visibility) on 10 of the first 17 days of the month. The high pressure moved west a bit and took up residence offshore for the remainder of the month. This allowed a few weak storms to move into the Inland Northwest, bringing only light amounts of rain. Spokane received its first inch of snow on the last day of November, nearly three weeks late. Overall, November was very dry. The 0.08" at the Wenatchee Airport was the 3rd driest November since 1959. At Wenatchee Water Plant, only 0.15" fell, which was the 3rd driest November since 1931. ☼ Ron Miller

Autumn Weather Statistics

Wenatchee Airport	Sept	Oct	Nov	Total
Avg High Temp	73.3	62.1	45.9	60.4
Departure from Norm	-3.2	+0.4	+2.0	-0.3
Avg Low Temp	50.7	42.5	30.7	41.3
Departure from Norm	-0.3	+2.4	+0.3	+0.8
Total Precip	0.21	0.54	0.08	0.83
Departure from Norm	-0.22	0.09	-1.07	-1.20
Lewiston Airport	Sept	Oct	Nov	Total
Avg High Temp	75.6	63.5	48.2	62.4
Departure from Norm	-1.1	+1.5	+1.4	+0.6
Avg Low Temp	51.4	43.2	35.0	43.2
Departure from Norm	+0.5	+2.0	+0.9	+1.1
Total Precip	0.33	1.42	1.00	2.75
Departure from Norm	-0.67	+0.46	-0.21	-0.42
Spokane Airport	Sept	Oct	Nov	Total
Avg High Temp	68.6	58.7	42.4	56.6
Departure from Norm	-3.9	+0.2	+1.3	-0.8
Avg Low Temp	47.4	39.9	30.0	39.1
Departure from Norm	+1.5	+4.1	+1.3	+2.3
Total Precip	0.69	1.06	1.13	2.88
Departure from Norm	-0.07	0	-1.11	-1.18
Total Snow	0	0	1.5	1.5
Departure from Norm	0	0	-4.5	-4.5

Answer: January 1949
 Based on average low temperatures for the month:
 Spokane -1°F, Wenatchee 2°F, Lewiston 6°F

What Happened to the Snow??

The sunrise on Saturday December 4, 2004 was obscured by clouds over much of Eastern Washington and North Idaho. Yet something was missing because when folks looked out their windows that morning there was a collective question, "what happened to the big storm?" Starting early in the previous week the Spokane National Weather Service forecasts were calling for a significant low elevation snowfall. We issued an Outlook by mid week, then a Watch on Thursday and a Warning on Friday, yet when all was said and done the storm missed the area and we missed the forecast. What happened?

The staff at the Spokane NWS watched the evolution of this storm closely. Through the work week, all indications were that early Saturday morning we would have a significant low elevation snowfall over the area. But by Friday evening, the information started to change and so did our forecasts and warnings.

The bottom line is that "Mother Nature" has the only correct solution to what the weather will do. This storm split unexpectedly with the stronger part moving down the coast and a weaker part moving into Southern British Columbia. The cold front finally came through early on Sunday bringing a light snowfall to the area. We have many refined and sophisticated tools for observing and forecasting the weather, but this time we were off the mark.

We received a lot of feedback about our performance for this storm. We do appreciate all comments and try to use them to improve our services. We know that many people depend on our forecasts and warnings and we take this responsibility very seriously. In retrospect, we did almost everything correctly during this event. Nevertheless "Mother Nature" taught us a valuable lesson about how these types of winter storms evolve and what to look for next time. ☼ John Livingston