

# The Weather Watcher

## of the Inland Northwest

[www.weather.gov/Spokane](http://www.weather.gov/Spokane)



### Northern Lights captured over the Spokane



Northern Lights seen the night of 10/8/12 by Jon Fox

During the late evening hours on October 8th, much of the Inland Northwest was treated to a spectacular atmospheric show of light. The nighttime sky which would typically be filled with little other than stars, was dramatically enhanced by pulsing curtains and waves of green and red light. These lights, referred to as Aurora Borealis or the Northern Lights, are the direct result of the collision between charged particles in the upper atmosphere or energy originating from the sun. The solar energy in this case is tied to a Coronal Mass Ejection (CMEs), which is simply a huge bubble of gas discharged from the sun toward the earth via the solar wind. Typically this light producing interaction takes place near the Earth's poles, or generally between 60° and 70° latitude. However during intense CMEs, this light show can be seen in temperate latitudes such as those in Washington and north Idaho. The strength of the CME is measured by something called the Kp index. Kp index values can range from 0 (calm energy) to 9 (intense energy). For the Northern Lights to be visible at our latitude in the Inland Northwest, we need to

have a Kp Index of 6 or greater. Indeed on the evening of October 8th, the Kp Index did peak with a magnitude of 6 over Spokane!

So how rare is a Kp index of 6? According to NOAA's Space Weather Prediction Center, they occur around 9% of the time during an 11-year solar cycle with a disproportionate amount taking place near the peak of the cycle. The peak of the latest solar cycle is expected around May 2013 so there should be more potential displays in the near future. However to see the Northern Lights you want the Kp Index to peak during the nighttime hours, preferably without a full moon, and you need a cloud-free sky (a rarity in the Inland Northwest during the winter). To increase your odds of seeing the Northern Lights the next time they occur in our region, take a look at our NWS forecast for sky cover and consult the latest forecasts from the Space Weather Prediction Center <http://www.swpc.noaa.gov/Aurora/>. ☀ Jon Fox

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#### Editor's Notes

With the shorter days and snow dusting the ground, it's time to embrace winter's arrival. This year's winter solstice, marking the shortest day of the year, will be 3:12 am PST on December 21st.

Anticipate snow covered roads for the next couple of months, especially when traveling in the mountains. Remember to keep your vehicle ready for cold and snowy conditions. Pack extra supplies in your trunk including your emergency kit with blankets & snacks. Also make sure your tires (and chains) are in good condition.

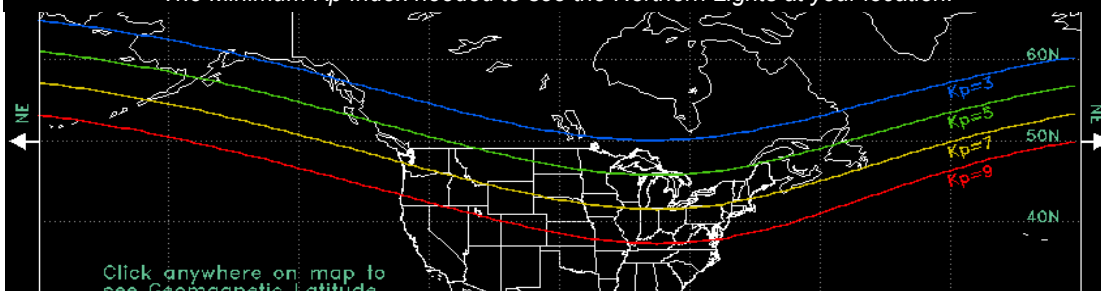
We are always looking for new ideas, pictures and stories for our publication. If you have any to share, please contact us at (509) 244-0110 or email [nws.spokane@noaa.gov](mailto:nws.spokane@noaa.gov).

This newsletter and past issues are available online on our NWS Spokane web page. If you would like a paper copy, please contact us and we will put you on the mailing list.

The main purpose of this publication is to keep our readers informed about NWS services and programs, and recognize those who help us with our mission, including weather spotters, observers, media, emergency managers, and government agencies.

All articles are written by the NWS staff. A special thanks to Jon Fox, Ron Miller, Steven Van Horn, Jeremy Wolf and Katherine Rowden for their contributions.

The Minimum Kp Index needed to see the Northern Lights at your location.



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## Autumn 2012 in Review

Some folks would argue that autumn in the Inland Northwest may be the best season weather-wise. And in 2012, their argument was strengthened a bit.

**September** was one of the driest and sunniest on record. Spokane, Lewiston, and Wenatchee airports only had a trace of precipitation for the month. For Spokane, this had happened only twice before (1990 and 1999), while in Lewiston this had only happened in 1975 and 1999. While September is often a dry month in the Inland Northwest, we typically get at least a few events of light rain. Throughout this dry month, skies were typically sunny and temperatures were warmer than normal. But since we were so dry, the nighttime lows still dropped into the 30s and 40s. In fact, Pullman-Moscow airport dropped to 28° on the 12<sup>th</sup>, a record for the day. The main weather event for this month was a dry lightning episode on the evening of the 8<sup>th</sup> and morning of the 9<sup>th</sup>, which ignited a number of wildfires. These storms were mainly focused across north central Washington. Strong winds on the 9<sup>th</sup> and 10<sup>th</sup> fanned these flames into larger fires. After the winds subsided, dense smoke from the wildfires settled into the valleys resulting in very unhealthy air quality. The strong inversions that are typical in the Fall trapped the smoke in the valleys and did not allow it to mix out during the day. Some of the worst conditions were noted in Wenatchee where the visibility was less than 1 mile on several days.

For early **October**, the dry and sunny weather continued. A cool front on the 2<sup>nd</sup> allowed nighttime temperatures to drop below normal. Nez Perce, ID had a low of 15° on the 7<sup>th</sup>, which was the earliest in the Fall ever that they had reached that cold temperature. The dry weather set up was eerily similar to the conditions that led to the Spokane fire-storm in 1991. The period from August 1<sup>st</sup> through October 11<sup>th</sup> was the driest on record at Wenatchee, Ephrata, Omak, and Quincy. Wenatchee Airport recorded 84 consecutive days without measureable rain through October 12<sup>th</sup>. But in 1991, an extremely strong cold front moved into the region with winds gusting in excess of 60 mph. Thankfully, this year the rains came before the winds. As a result, the fire threat was greatly diminished. The first light rains arrived on the 12<sup>th</sup> and 13<sup>th</sup>, with a wetter system on the 14<sup>th</sup> and 15<sup>th</sup>. The Panhandle and the Palouse received from a quarter to a half inch of rain from the first front. For the second front, every location received measurable rain, with many locations receiving from a third to a half an inch of rain. Winds behind the second cold front gusted as high as 66 mph near Moses Lake and 60 mph at Uniontown. The recent rains prevented the winds from causing a widespread dust storm or causing existing wildfires to grow much. The remainder of October was markedly different than the previous 85 days. Cool fronts with measurable rain pushed through the area on a regular basis. A particularly cold weather system on the 23<sup>rd</sup> brought some light snow amounts to a few valley locations, including 2.3" outside of Winthrop, WA. More low-elevation snow fell on the morning of the 25<sup>th</sup>. A spotter outside of Kettle Falls received 5"

of snow. **Answer: 505 minutes (8 hours 25 min) of daylight are available on the Winter Solstice in Spokane.**

During this period, some locations struggled to reach 40° for a daytime high. A more notable event took place at Wenatchee Airport. On the 26<sup>th</sup> the high was only 43°, which was a record cold day. Just three days later, the temperature warmed to 68°, a record high for the day!

**November** turned out to be a rather active weather month. Numerous waves of precipitation moved through the Inland Northwest with very few dry spells. Spokane Airport measured precipitation on 17 of the 30 days. The month started with mild temperatures. Low temperatures

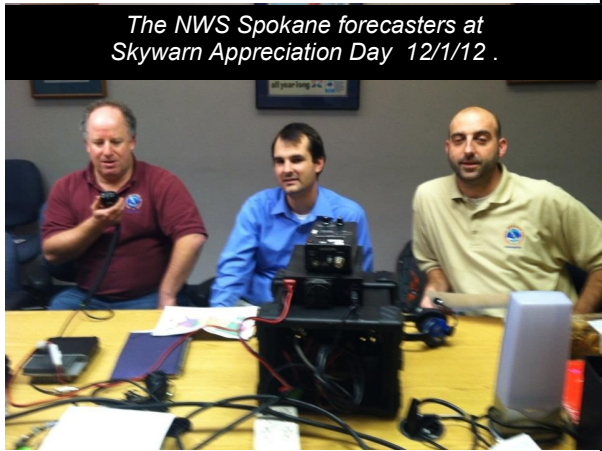


Fall Funnel clouds spotted over St. John, WA 11/19/12.

on the morning of the 4<sup>th</sup> were equal to what would be a normal high temperature for that day. A low pressure system that developed over Oregon on the 8<sup>th</sup>, moved into eastern Washington, bringing the first low-land snowfall to many locations. Spokane received 3" of snow, while Spirit Lake, ID picked up 6.5". Temperatures behind this storm dropped well-below freezing. Deer Park reached 11° while La Crosse dropped to 15°. A second system moved into the area on the 12<sup>th</sup> for more snow across the region. Ephrata received 5" and Colville picked up 4" of snow. This storm ushered in a change in the weather pattern. Pacific storms moved into the area from the southwest bringing warm and wet weather. This pattern favored precipitation in northeast Washington and the Panhandle, with drier conditions in north-central Washington and the L-C valley. On the 19<sup>th</sup> and 20<sup>th</sup> Spokane Airport recorded 1.25" of rain. Snow levels were typically around pass levels so ski resorts picked up some snow, allowing for a few resorts to open on the Thanksgiving weekend. The month finished as it had started, with very mild temperatures. ☺ Ron Miller

# Huge Success at Skywarn Appreciation Day

The radios were buzzing on December 1st, marking the 14th annual Skywarn Appreciation Day, when the Spokane local ARES/RACES group set up their equipment at the NWS office. With a total of 10 amateur radio operators, they made countless contacts across the western U.S. and collected weather information. At least 6 ham-qualified meteorologists participated, a few brought in their own radios to join in on the fun while a couple forecasters made breakfast for the group. The NWS Spokane call sign of



The NWS Spokane forecasters at Skywarn Appreciation Day 12/1/12 .



The Spokane ARES/RACES group at Skywarn Appreciation Day 12/1/12 .

WX7OTX was used for the event. A big thanks Spokane ARES/RACES ham group for their service and dedication. ☀  
Steven Van Horn



## Winter Outlook

The Inland Northwest may see a more normal winter? The El Niño Watch has been cancelled, and the latest Winter Outlook released by the Climate Prediction Center shows equal chance of getting above, below or near normal precipitation and temperature. Forecasters with Climate Prediction Center say that a wavering El Niño makes this winter's outlook look less certain than experienced in past years.

"This is one of the most challenging outlooks we've produced in recent years because El Niño decided not to show up as expected," said Mike Halpert, deputy director of the Climate Prediction Center. "In fact, it stalled out this fall, leaving neutral conditions in place in the tropical Pacific Ocean."

When El Niño is present, warmer ocean water in the equatorial Pacific shifts the patterns of tropical rainfall that in turn influence the strength and position of the jet stream and storms over the Pacific Ocean and United States. This climate pattern gives seasonal forecasters confidence in how the U.S. winter will unfold. The signs of an emerging El Niño have vanished and the ENSO state remains in a neutral position. ☀ *Jeremy Wolf*

## Autumn Weather Statistics

Wenatchee Water Plant	Sept	Oct	Nov	Total
Avg High Temp	80.1	63.1	47.6	63.6
Departure from Norm	+1.8	-0.4	+1.1	+0.8
Avg Low Temp	52.1	41.5	35.9	43.2
Departure from Norm	+0.4	+0.3	+3.7	+1.5
Total Precip	0.09	1.73	0.91	2.73
Departure from Norm	-0.21	+1.21	-0.47	+0.53
Total Snowfall	0.0	0.0	0.0	0.0
Departure from Norm	0.0	0.0	-1.9	-1.9
Lewiston Airport	Sept	Oct	Nov	Total
Avg High Temp	83.9	63.3	51.9	66.4
Departure from Norm	+5.7	+0.7	+3.7	+3.4
Avg Low Temp	52.8	42.2	38.6	44.5
Departure from Norm	+1.9	+1.1	+4.5	+2.5
Total Precip	T	2.15	1.15	3.30
Departure from Norm	-0.67	+1.19	-0.03	+0.49
Total Snowfall	0.0	0.0	T	T
Departure from Norm	0.0	0.0	-1.8	-1.8
Spokane Airport	Sept	Oct	Nov	Total
Avg High Temp	77.7	58.0	44.4	60.0
Departure from Norm	+4.8	+0.1	+2.8	+2.5
Avg Low Temp	49.1	39.0	33.4	40.5
Departure from Norm	+1.7	+1.8	+3.6	+2.4
Total Precip	T	1.54	3.24	4.78
Departure from Norm	-0.67	+0.36	+0.94	+0.63
Total snowfall	0.0	T	5.9	5.9
Departure from Norm	0.0	-0.1	-1.5	-1.6

## Remember your Winter Spotter Checklist

<b>Snow:</b> 2"+ valleys & 4"+ mountains
<b>Strong Winds:</b> 30mph+ or damage
<b>Hail:</b> pea size or larger
<b>Heavy Rain:</b> Showery: 1/2" + in 1 hr Steady Rain: 1"+ in 12 hrs or 1.5"+ in 24 hrs
<b>Any Flooding</b>
<b>Any Mixed Precipitation!</b>
<b>Reduced Visibility:</b> under a mile due to rain, dust...
<b>Travel Problems or Any Damage:</b> due to severe or hazardous weather.

## Increased Risk of Flooding and Debris Flows due to the Wenatchee Complex Fires

Floods are the most common and costly natural hazard in the nation. Whether caused by heavy rain, snow melt or thunderstorms, the results of flooding can be devastating. While some floods develop over time, flash floods, particularly common after wildfires, can occur within minutes after the onset of a rainstorm. Even areas that are not traditionally flood prone are at risk due to changes to the landscape caused by fire.

In the aftermath of the Wenatchee Complex Fires, locations near the burned areas will be more susceptible to flash flooding and debris flows especially during the extended winter rain events. These fires burned in several of the areas steep canyons and in steep, mountainous terrain in Chelan and Okanogan Counties. Areas at a high risk of flash flooding and debris flows during rainfall include Mission Creek, No. 1 and No. 2 Canyons above Wenatchee, Highway 97 below the Byrd Canyon Fire, Crum Canyon up the Entiat River, and First Creek above Lake Chelan State Park.

The Spokane National Weather Service, in partnership with local, county, and state officials, has developed a list of weather resources

for those affected by the September 2012 Wenatchee Complex wildfires. These resources include current radar data, rainfall amounts and watch/warning information and can be found on the NWS Spokane web page at <http://goo.gl/evJEh>

Remember—Be Prepared! In the event of moderate to heavy rainfall, do not wait for a flash flood warning in order to take steps to protect life and property. There may be very little time to react once the rain starts. ☀

*Katherine Rowden*



Mudslide on 7/17/12 near Cashmere, WA

## The Weather Watcher Of the Inland Northwest



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**Trivia: How many minutes of daylight are available during the Winter Solstice in Spokane?**

