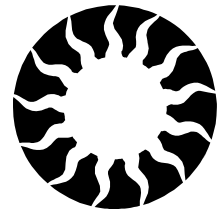


The Weather Watcher of the Inland Northwest

www.weather.gov/Spokane



The Wind and Dust Event of August 12th

This event was unusual in many ways. The weather pattern that led to this event was more typical of January rather than mid-August. A ridge of high pressure had built over the Gulf of Alaska and amplified northward into Alaska, bringing record warm temperatures to the region. In response, the jet stream over western Canada dug to the south, dragging a cool air mass into the Northwest U.S. The hot temperatures of early August began to slowly moderate by the 10th as the Canadian jet gradually sagged into the area. By the afternoon of the 12th, a cold front was forecast to sweep south from the Canadian Rockies into north-east Washington, the northern panhandle of Idaho, and northwest Montana.

A complex of thunderstorms developed ahead of the cold front by mid afternoon on the 12th, and moved into the Spokane area after 3:30 pm, producing winds to 50 mph, dime-sized hail, and over 25 fire starts from lightning and downed power lines. The storms lost much of their strength as they passed south of the Spokane area; however the event was far from over. This thunderstorm cluster, combined with a push of cooler air from the cold front, generated what appeared to be a massive outflow boundary that affected most of eastern Washington later that afternoon.

While the occurrence of outflow boundaries is not unusual, the longevity and persistent strength of this boundary was remarkable. This boundary was initially detected by the Spokane Doppler radar with speeds of 30-40 mph, which matched speeds reported from spotter reports and weather sensors. On satellite, the boundary was spotted spreading radially west and south away from the thunderstorms. By 8 pm, the boundary had progressed all the way to Walla Walla to the south, and Ellensburg to the west, more than four hours after its inception with wind gusts equal to the speeds that had moved through Spokane!

Typically, an outflow boundary is formed as cooler air from the mid-levels of a thunderstorm is mixed down to the ground. This cool and subsequently heavier air mass then spreads out ahead of the thunderstorms and can potentially spawn additional storms. As the gust front spreads out, the supply

slows as it undergoes a mixing process with the environment and experiences friction.

The boundary on August 12th did have a couple of things working in its favor. The pre-existing flow was already from the northeast. So the boundary moving to the south didn't have a head wind to



The view near Moses Lake, courtesy of David Dorman, Grant #18H

"fight". Also, the topography from Spokane to the Tri-Cities is a gradual down-slope, changing in elevation from about 2500' to around 400' above sea level. Thus, gravity would have been assisting the boundary as well.

There is a problem with assigning the thunderstorm outflow as the cause of this boundary. It is due to the fact that the computer generated weather models did predict the strong cold front with gusty winds to drop through the area at that time, well before any thunderstorms has formed. Instability and dynamics aloft were powerful enough ahead of the front to sustain the convection under this weather pattern.

There are conflicting viewpoints on the cause of this boundary. Was it an outflow boundary or was it a cold front? While radar and satellite maintain the idea of an outflow boundary, there is additional information to support the cold front as the boundary marching across the region. The jury is still out on this event, even with the forecasters. One thing is for certain, it was a unforgettable weather event that captured the attention of most people in the Inland Northwest. For more details, see www.wrh.noaa.gov/otx/photo_gallery/august12_story_m.php ☀ Jon Fox & Ron Miller

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Editor's Notes

Thanks for all of your valuable reports and pictures of our wild weather this summer. We appreciate and welcome all the information we receive!

If you are interested in stopping the mailed paper copy of this newsletter and would rather read it online, or if there is something you would like to see or comment on the newsletter, please contact us. You can call Robin or Ken at (509) 244-0110 extension 223 or send an email to the webmaster account.

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. A special thanks to Ron Miller, Laurie Koch, Charles Ross, Jon Fox, Bob Tobin, and Ken Holmes for their contributions.

Mark your calendars!

**NWS OPEN HOUSE
Saturday, Oct. 1st
10 am-4pm**

of cold outflow air becomes increasingly shallower and its progress

The Summer of 2005 was more typical

The summers of 2003 and 2004 in the Inland Northwest were notable for their warm temperatures. In both of these years, all three summer months were warmer than normal, in some cases much warmer than normal. The summer of 2005 was in many ways, a prototypical Inland Northwest summer.

The wet May had helped to mitigate some drought concerns after our very dry winter. Hopes were high that this would continue into June. For the Idaho Panhandle and extreme eastern Washington, June did bring more than the normal amount of rainfall. Unfortunately, the area that needed it the most received the least: the Cascades. While June isn't typically a wet month for Wenatchee, they only received a tenth of their normal June rainfall, all of which fell on one day. The first half of June saw persistent cool and showery weather. Temperatures were consistently in the 60s and 70s. In fact, Spokane didn't even reach the 60° mark on the 5th and 14th. A sudden warm-up on the 20th and 21st made it feel like summer was finally here. But in typical spring-like fashion, the warm spell was short lived. This one came to a very dramatic end. A large thunderstorm which developed over southeast Washington produced a large gust front. This strong gust front moved northward across the Palouse toward Spokane, resulting in a 77 mph gust at the Spokane Airport. This is especially impressive when one considers that this is the highest wind speed ever measured at an official observation site in Spokane! The gust front also brought

with it an impressive cloud of dust.

At our office, we often say that summer in the Inland Northwest lasts from the 4th of July to Labor Day. Once again this generally held true. The holiday weekend of the fourth saw 90° temperatures throughout the area. One last spring-like system managed to move into the region on the 9th and 10th, but temperatures quickly rebounded into the 90s and triple digits for the remainder of July. Lewiston's thermometer reached 105° on the 21st for their hottest day of the summer. But the hottest period was the last few days of the month, where Lewiston hit the century mark 4 of the last 5 days. Once again, little if any rainfall occurred along the east slopes of the Cascades. By the end of July, the Wenatchee Airport had totaled only 3.97" of precipitation for the water year (beginning Oct 1st, 2004). This was the 4th driest ever since 1959.

The hot weather continued into the first part of August, but the heat finally broke as cooler air from Canada began to slowly move into the area. By the 12th, temperatures were back to more normal readings. It was on this day that a cold front from British Columbia moved down from the north. This was a rather rare event for mid-August. What made it even more interesting was that this boundary was visible on radar even though there were only scattered thunderstorms accompanying it. Strong gusty winds developed that formed an impressive dust cloud which enveloped much of the Columbia Basin with near-zero visibilities. In addition, downed power lines and lightning also caused a number of fires especially in the Spokane area.

After this event, the weather was decidedly different. Hot spells were once again short lived, and brief wet periods brought small amounts of rain to some locations. A few of the more common cold spots (Priest Lake, Deer Park, Springdale) saw their thermometers drop into the lower 30s during the last few mornings of August.

While it's not unusual to have hot weather in late August and September, climatologically the hottest period is mid-July to mid-August, with August 1st the hottest day of the summer. In the Inland Northwest, the length of daylight decreases from 16 hours at the start of summer to less than 13.5 hours by the end of August. Additionally, the angle of the sun has decreased from a high point of 66 degrees at noon on June 22nd to only 50 degrees at the end of August. While these are the only some of the factors which determine how hot it gets, it does show that it becomes increasingly difficult to have hot weather after Labor Day. ☼ Ron Miller

Summer Weather Statistics

Wenatchee Airport	June	July	Aug.	Total
Avg High Temp	77.1	88.0	89.0	84.7
Departure from Norm	-1.6	+1.3	+2.9	+0.9
Avg Low Temp	54.4	61.5	61.8	59.2
Departure from Norm	+0.5	+1.8	+2.1	+1.5
Total Precip	0.06	0.06	0.02	0.14
Departure from Norm	-0.58	-0.24	-0.33	-1.15
Lewiston Airport	June	July	Aug.	Total
Avg High Temp	75.8	92.2	90.9	86.3
Departure from Norm	-2.0	+4.6	+3.3	+2.0
Avg Low Temp	52.9	61.0	59.4	57.8
Departure from Norm	-0.7	+1.7	+0.1	+0.4
Total Precip	1.3	0.26	0.05	1.61
Departure from Norm	+0.14	-0.46	-0.70	-1.02
Spokane Airport	June	July	Aug.	Total
Avg High Temp	70.7	83.7	83.9	79.4
Departure from Norm	-3.2	+1.2	+1.3	-0.2
Avg Low Temp	49.7	56.5	55.2	53.8
Departure from Norm	+0.8	+1.9	+0.7	+1.3
Total Precip	1.38	1.10	0.46	2.94
Departure from Norm	+0.20	+0.34	-0.22	+0.32

Answer: In the last 150 years, Florida has received over 110 hits and Texas has had over 59 hits.

**NWS
Spokane**

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John Werner
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Robert Sumpter

Facilities Technician
Mike Belarde

September is National Preparedness Month

Being prepared is the theme as we observe National Preparedness and Weather Radio Awareness Month this September, in addition to 9-1-1 day. This will be the time for all citizens to review emergency response plans. Washington state will participate in a statewide earthquake drill on the morning of Sept. 14th.

The weather radio has been nicknamed "the voice of the National Weather Service" with its broadcast of the latest area weather forecasts and conditions 24-hours a day, but a weather radio has other uses. It is part of an ALL-HAZARDS warning system, used not only for flood and weather events, but also for hazards such as tsunamis, volcanic activity, AMBER child abduction alerts, and secondary hazards such as those from terrorism and earthquakes. Weather radios are an important component of all disaster preparedness plans and kits, especially with the winter season fast approaching. Samples of preparedness plans can be found through the Federal Emergency Management Agency or the American Red Cross. For more information, please visit: <http://www.emd.wa.gov/5-prog/prgms/pubed/weather/wxradio-idx.htm>. ☀ Robin Fox

A Glance at 2005 Fire Season

Through late April 2005, it appeared as if this would be a record setting fire year for the Pacific Northwest. Last spring, the snow pack across the region was one of the lowest on record, precipitation totals were well below normal, and it appeared as if the fire season would start several weeks ahead of normal. May and June brought cooler temperatures and for the most part above normal rainfall to the region. Late spring/early summer precipitation and cooler temperatures can be a mixed blessing however. While cool moist spring weather can delay the onset of fire season, it also allows the annual and perennial fine fuels to grow lush and thick. This was the case for 2005. The important aspect of a fire season is the number of fire starts, or who gets the lightning. While eastern Washington and north Idaho got a fair share of lightning, it was only a small percentage of what our neighbors received. Most of the lightning was usually accompanied by moderate to heavy rain. A lightning outbreak in mid July started numerous project fires in Oregon and Idaho. This was followed by another round of active thunderstorms in early August across central Idaho and southwest Montana, where the majority of large fires were this year.

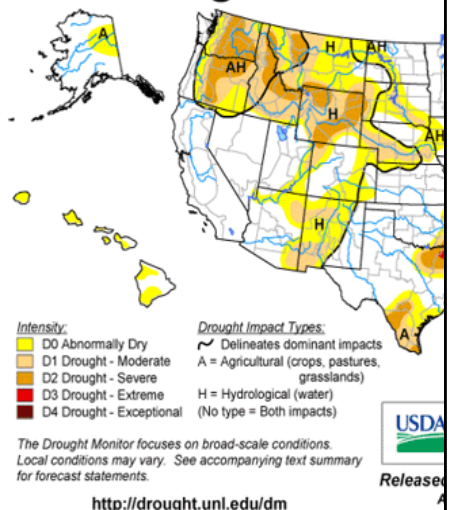
Through the first week of September 833 wildfires were reported for 94,839 acres in Washington. This compares to the 10 year average of 966 wildfires for 101,374 acres. By comparison the state of Oregon had 1532 fires for 146,922 acres this year. For the nation 46,447 wildfires were reported for 7,849,821 acres. Over 4 million acres of this total were in Alaska where the 10 year average is 63,520 fires for 4,310,031 acres. For more information, visit <http://www.nwccweb.us/> or <http://www.nifc.gov/fireinfo/nfn.html>. ☀ Bob Tobin

Spotter training will be held in the Spokane area on Tuesday, October 18th at noon at Agilent Corp. Also an online spotter training presentation is available on the NWS Spokane web page. Please visit <http://www.weather.gov/spokane/spotter/train.php> for details.

Drought Status and Outlook

Drought conditions will persist through much of the Inland Northwest as summer comes to a close. Warm and rather dry conditions were seen across the region in August. Many rivers and streams reported record low flows in early September, with many water rights holders facing hardships. Groundwater levels were affected with reports of wells running at very low outputs. Forest fire danger remained high all summer long. While an increase in storms systems is common across the Inland Northwest in September and October, stream flows usually are very slow to recover. While the official winter outlook will not be released until the middle of September, the weather patterns responsible for last years dry winter have decreased. At this point there are equal chances that the upcoming winter will be wetter or drier than average. It is however highly unlikely that we will see a winter quite as warm and dry as last winter. The next long range weather outlook will be released by the National Weather Service Climate Prediction Center on September 15th. For the latest information on long range outlooks, see <http://www.cpc.ncep.noaa.gov/products/predictions/30day/> for details. ☀ Charles Ross

U.S. Drought Monitor



Please call the NWS with spotter reports at (509) 244-0435

**Remember your
Fall Spotter
Checklist**

First snow of the year

**Strong Winds—
30 mph+ or damage**

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

**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.**

The Wrath of Katrina

Hurricane Katrina was one of the strongest storms to impact the coast of the United States during the last 100 years. With sustained winds during landfall of 140 mph (a strong category 4 hurricane on the Saffir-Simpson scale) and minimum central pressure the third lowest on record at landfall (920 mb), Katrina caused widespread devastation along the central Gulf Coast states of the US.

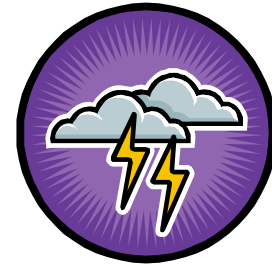
There have been only 3 storms with stronger sustained winds when they made landfall in the U.S. They include the Labor Day Hurricane in the Florida Keys on Sept. 9,1935, Hurricane Camille in Mississippi on Aug. 17,1969, and Hurricane Andrew in southeast Florida on Aug. Aug. 24, 1992. The record for highest wind speed at landfall goes to Hurricane Camille with estimated sustained wind speeds of 190 mph!

Katrina has proven to be a national disaster, leaving untold numbers dead, thousands of homes destroyed and hundreds of thousands of households damaged or without power. Major economic impacts for the nation include disruptions to the oil and travel industries. Although the Inland Northwest is far removed from the wrath and destruction of Katrina, the personnel of the NWS office in Spokane sends thoughts and prayers to the people in areas devastated by this horrific storm. For valuable links on Katrina, visit http://www.firstgov.gov/Citizen/Topics/PublicSafety/Hurricane_Katrina_Recovery.shtml ☀ Robin Fox

NWS OPEN HOUSE

On Saturday October 1, 2005 the National Weather Service office in Spokane will be opening its doors to the public for tours. Please stop by between 10 am and 4 pm, and see how your weather forecast is determined. Watch a weather balloon launch! There will be information about fire weather, hydrology, aviation weather, the winter weather outlook, and how we do our job. From 2 to 4pm, we will be hosting an Appreciation Party for all our weather spotters, observers, and partners due to their hard work over the years. Please stop by and see us. Staff will be on hand to answer any questions. Hope to see you there!

For more details, please visit our <http://www.wrh.noaa.gov/otx/> or call the office at 244-6395. ☀ Laurie Koch



**The Weather
Watcher
Of the Inland Northwest**



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**Trivia: What states
have received the most
direct hurricane hits?**

NWS Open House - October 1st !