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Warnings.

NWS warnings: Severe Thunderstorm Warning – 5:35 PM PDT

PDXSVRPDT

WUUS56 KPDT 160035

ORC049-059-WAC005-071-160130-

/O.NEW.KPDT.SV.W.0044.130916T0035Z-130916T0130Z/

BULLETIN - EAS ACTIVATION REQUESTED

SEVERE THUNDERSTORM WARNING

NATIONAL WEATHER SERVICE PENDLETON OR

535 PM PDT SUN SEP 15 2013

THE NATIONAL WEATHER SERVICE IN PENDLETON HAS ISSUED A

* SEVERE THUNDERSTORM WARNING FOR...

NORTHERN MORROW COUNTY IN NORTHEAST OREGON...

NORTHWESTERN UMATILLA COUNTY IN NORTHEAST OREGON...

THIS INCLUDES THE CITIES OF...**PENDLETON...HERMISTON...**

SOUTHERN BENTON COUNTY IN SOUTH CENTRAL WASHINGTON...

THIS INCLUDES THE CITY OF KENNEWICK...

SOUTHWESTERN WALLA WALLA COUNTY IN SOUTH CENTRAL WASHINGTON...

* **UNTIL 630 PM PDT**

* AT 530 PM PDT...**THE PUBLIC REPORTED A SEVERE THUNDERSTORM PRODUCING QUARTER SIZE HAIL...AND DESTRUCTIVE WINDS IN EXCESS OF 70 MPH.**

THIS STORM WAS LOCATED 12 MILES SOUTHWEST OF HERMISTON...AND MOVING NORTHEAST AT 25 MPH.

* OTHER LOCATIONS IN THE WARNING INCLUDE BUT ARE NOT LIMITED TO PILOT

ROCK...PATERSON...STANFIELD...UMATILLA...PLYMOUTH...PROSSER...

HOLDMAN...TOUCHET...WALLULA...HIGHLAND AND FINLEY

IF YOU EXPERIENCE SEVERE WEATHER PLEASE CONTACT THE NATIONAL WEATHER

SERVICE IN PENDLETON AT 1...8...0...0...2...4...0...4...5...2...7.

LAT...LON 4632 11984 4609 11850 4540 11880 4563 11984

TIME...MOT...LOC 0035Z 214DEG 24KT 4575 11946

ZCZC PDXSVRPDT

WUUS56 KPDT 160112

ORC059-WAC005-021-071-160215-

/O.NEW.KPDT.SV.W.0045.130916T0112Z-130916T0215Z/

NWS warnings: Severe Thunderstorm Warning – 6:12 PM PDT

BULLETIN - **EAS ACTIVATION REQUESTED**

SEVERE THUNDERSTORM WARNING

NATIONAL WEATHER SERVICE PENDLETON OR

612 PM PDT SUN SEP 15 2013

THE NATIONAL WEATHER SERVICE IN PENDLETON HAS ISSUED A

* **SEVERE THUNDERSTORM WARNING FOR...**
UMATILLA COUNTY IN NORTHEAST OREGON...
**THIS INCLUDES THE CITIES OF...PENDLETON...MILTON-FREEWATER...
HERMISTON...**
BENTON COUNTY IN SOUTH CENTRAL WASHINGTON...
THIS INCLUDES THE CITIES OF...RICHLAND...KENNEWICK...
FRANKLIN COUNTY IN SOUTH CENTRAL WASHINGTON...
THIS INCLUDES THE CITIES OF...WEST PASCO...PASCO...
WALLA WALLA COUNTY IN SOUTH CENTRAL WASHINGTON...
THIS INCLUDES THE CITIES OF...WALLA WALLA...COLLEGE PLACE...

* UNTIL 715 PM PDT

* AT 606 PM PDT...**NATIONAL WEATHER SERVICE DOPPLER RADAR INDICATED A
LINE OF SEVERE THUNDERSTORMS PRODUCING DESTRUCTIVE WINDS IN EXCESS
OF 70 MPH. THESE STORMS WERE LOCATED ALONG A LINE EXTENDING FROM
23 MILES NORTHWEST OF BENTON CITY TO 11 MILES NORTHWEST OF PILOT
ROCK...OR ALONG A LINE EXTENDING FROM 7 MILES NORTHEAST OF
SUNNYSIDE TO 12 MILES SOUTHWEST OF PENDLETON...AND MOVING NORTHEAST
AT 30 MPH.**

* OTHER LOCATIONS IN THE WARNING INCLUDE BUT ARE NOT LIMITED TO
HOLDMAN...WEST RICHLAND...HIGHLAND...MEACHAM...CAYUSE...FINLEY...
WALLULA...THORN HOLLOW...BURBANK...ATHENA...UMAPINE...TOLLGATE...
BINGHAM SPRINGS...DIXIE...EUREKA...BASIN CITY...ELTOPIA...WALLA
WALLA EAST...CONNELL AND TOUCHET

IF YOU EXPERIENCE SEVERE WEATHER PLEASE CONTACT THE NATIONAL WEATHER
SERVICE IN PENDLETON AT 1...8...0...0...2...4...0...4...5...2...7.

LAT...LON 4661 11819 4656 11824 4631 11825 4629 11811
4621 11811 4620 11799 4582 11797 4581 11804
4570 11807 4522 11885 4637 11982 4663 11983
4665 11962 4674 11952 4669 11939 4674 11936
4675 11824

TIME...MOT...LOC 0112Z 233DEG 25KT 4644 11989 4560 11898

Hanford Weather Station, Adverse Weather Advisory - September 15, 2013:

From: ^Hanford Weather Station [mailto:Hanford_Weather_Station@rl.gov]

Sent: Sunday, September 15, 2013 12:45 PM

Subject: SPECIAL ADVERSE WEATHER ADVISORY - HANFORD SITE

Importance: High

ADVERSE WEATHER ADVISORY FOR HANFORD SITE

This advisory is for the official use of the Department of Energy and its Hanford Site Contractors.

Date: September 15, 2013

Time Period: 1600-2400 PDT

Message: Conditions are developing this afternoon that will cause thunderstorms to occur throughout the Hanford Site. Currently, thunderstorms are producing lightning in south central Oregon. This initial area of storms may impact us as early as 4 PM. However, the main threat of lightning will occur in the area from 6-10PM. Strong thunderstorms are possible with gusty winds to 35 mph. Localized, heavy rain is a good possibility with any of these showers. The threat diminishes as we approach midnight tonight, but lightning within 50 miles will still be possible.

A Safety Reminder: Please be aware that lightning associated with thunderstorms can cause serious (even fatal) injuries, and may occur up to 10 miles from the edge of a storm. Remember that lightning hazards may exist as much as one hour after thunderstorm activity has apparently ceased, and remain alert to the possible formation of additional thunderstorm cells. Please call the Weather Station at 373-2716 for updated information about thunderstorm activity in the area.

This advisory is for the official use of the
Department of Energy and its Hanford Site Contractors.
Other use is not authorized.

Duty Forecaster Hours

10:00 pm Sunday - 6:00 pm Friday (7:00 pm - 10:00 pm daily not staffed)
6:00 am - 2:00 pm Weekends and Holidays

~~~~~  
email: [hms@rl.gov](mailto:hms@rl.gov)  
<http://www.hanford.gov/hms>  
(509) 373-2716 Forecaster  
(509) 373-2875 Recorded Forecast  
Hanford Meteorological Station (HMS)

# Event Narrative: NOAA storm event database- September 15

National Climatic Data Center

<http://www.ncdc.noaa.gov/stormevents/eventdetails.jsp?id=474400>

Event Details \*\*\* *please note: in Pacific Standard Time* \*\*\*

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Event                    | Dust Storm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| State                    | WASHINGTON                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| County/Area              | UPPER COLUMBIA BASIN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| WFO                      | OTX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Report Source            | Trained Spotter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| NCDC Data Source         | CSV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Begin Date               | 2013-09-15 18:35:00.0 PST-8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| End Date                 | 2013-09-15 18:50:00.0 PST-8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Deaths Direct/Indirect   | 0/0 (fatality details below, when available...)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Injuries Direct/Indirect | 0/0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Property Damage          | 0.00K                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Crop Damage              | 0.00K                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Episode Narrative        | <b>A negatively tilted shortwave trough of lower pressure interacted with some surface based instability of near 1,000 J/KG in northern Oregon to spawn a squall line that traversed northward across eastern Washington. Strong winds mixed down to the surface along the squall line to created widespread damaging wind gusts. The squall line could be classified as a Haboob as the strongest winds occurred out ahead of the thunderstorms that kicked up a massive dust cloud. The Haboob hit the Moses Lake area and Upper Columbia Basin the hardest with widespread wind damage reported. The dust cloud resulted in a rapid reduction in visibility to near zero in places. Impacts from the Haboob were felt as far north as Coulee City eastward into Spokane and into Deer Park. Strong damaging winds and reduced visibility due to dust were reported across these areas as well.</b> |
| Event Narrative          | <b>A large dust cloud engulfed the area reducing visibility to near zero.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

All events for this episode:

| <u>Location</u>                                    | <u>County/Zone</u>          | <u>St.</u> | <u>Date</u> | <u>Time</u> | <u>T.Z.</u> | <u>Type</u>       | <u>Mag</u>    | <u>Dth</u> | <u>Inj</u> | <u>PrD</u> | <u>CrD</u> |
|----------------------------------------------------|-----------------------------|------------|-------------|-------------|-------------|-------------------|---------------|------------|------------|------------|------------|
| <b>Totals:</b>                                     |                             |            |             |             |             |                   |               | 0          | 0          | 0.00<br>K  | 0.00<br>K  |
| <a href="#"><u>MOSES LAKE AREA (ZONE)</u></a>      | MOSES LAKE AREA (ZONE)      | WA         | 09/15/2013  | 18:15       | PST-8       | Dust Storm        |               | 0          | 0          | 0.00<br>K  | 0.00<br>K  |
| <a href="#"><u>ADAMS CO.</u></a>                   | ADAMS CO.                   | WA         | 09/15/2013  | 18:23       | PST-8       | Thunderstorm Wind | 50 kts.<br>MG | 0          | 0          | 0.00<br>K  | 0.00<br>K  |
| <a href="#"><u>UPPER COLUMBIA BASIN (ZONE)</u></a> | UPPER COLUMBIA BASIN (ZONE) | WA         | 09/15/2013  | 18:35       | PST-8       | Dust Storm        |               | 0          | 0          | 0.00<br>K  | 0.00<br>K  |
| <a href="#"><u>GRANT CO.</u></a>                   | GRANT CO.                   | WA         | 09/15/2013  | 18:35       | PST-8       | Thunderstorm Wind | 50 kts.<br>MG | 0          | 0          | 0.00<br>K  | 0.00<br>K  |
| <a href="#"><u>ADAMS CO.</u></a>                   | ADAMS CO.                   | WA         | 09/15/2013  | 18:40       | PST-8       | Thunderstorm Wind | 52 kts.<br>EG | 0          | 0          | 0.00<br>K  | 0.00<br>K  |
| <a href="#"><u>WHITMAN CO.</u></a>                 | WHITMAN CO.                 | WA         | 09/15/2013  | 18:55       | PST-8       | Thunderstorm Wind | 52 kts.<br>MG | 0          | 0          | 0.00<br>K  | 0.00<br>K  |
| <a href="#"><u>ADAMS CO.</u></a>                   | ADAMS CO.                   | WA         | 09/15/2013  | 19:00       | PST-8       | Thunderstorm Wind | 51 kts.<br>EG | 0          | 0          | 0.00<br>K  | 0.00<br>K  |
| <a href="#"><u>LINCOLN CO.</u></a>                 | LINCOLN CO.                 | WA         | 09/15/2013  | 19:10       | PST-8       | Thunderstorm Wind | 51 kts.<br>MG | 0          | 0          | 0.00<br>K  | 0.00<br>K  |
| <a href="#"><u>LINCOLN CO.</u></a>                 | LINCOLN CO.                 | WA         | 09/15/2013  | 19:20       | PST-8       | Thunderstorm Wind | 51 kts.<br>EG | 0          | 0          | 0.00<br>K  | 0.00<br>K  |
| <a href="#"><u>SPOKANE CO.</u></a>                 | SPOKANE CO.                 | WA         | 09/15/2013  | 19:50       | PST-8       | Thunderstorm Wind | 52 kts.<br>MG | 0          | 0          | 0.00<br>K  | 0.00<br>K  |
| <a href="#"><u>SPOKANE AREA</u></a>                | SPOKANE AREA                | WA         | 09/15/2013  | 20:00       | PST-8       | Dust Storm        |               | 0          | 0          | 0.00<br>K  | 0.00<br>K  |

| <u>Location</u>             | <u>County/Zone</u> | <u>St.</u> | <u>Date</u> | <u>Time</u> | <u>T.Z.</u> | <u>Type</u>       | <u>Mag</u> | <u>Dth</u> | <u>Inj</u> | <u>PrD</u> | <u>CrD</u> |
|-----------------------------|--------------------|------------|-------------|-------------|-------------|-------------------|------------|------------|------------|------------|------------|
| <a href="#">(ZONE)</a>      | (ZONE)             |            |             |             |             |                   |            |            |            |            |            |
| <a href="#">LINCOLN CO.</a> | LINCOLN CO.        | WA         | 09/15/2013  | 20:00       | PST-8       | Thunderstorm Wind | 50 kts. EG | 0          | 0          | 0.00 K     | 0.00 K     |
| <a href="#">LINCOLN CO.</a> | LINCOLN CO.        | WA         | 09/15/2013  | 20:25       | PST-8       | Thunderstorm Wind | 51 kts. EG | 0          | 0          | 0.00 K     | 0.00 K     |
| <a href="#">WHITMAN CO.</a> | WHITMAN CO.        | WA         | 09/15/2013  | 20:25       | PST-8       | Thunderstorm Wind | 50 kts. EG | 0          | 0          | 0.00 K     | 0.00 K     |
| <a href="#">GRANT CO.</a>   | GRANT CO.          | WA         | 09/15/2013  | 21:00       | PST-8       | Thunderstorm Wind | 50 kts. EG | 0          | 0          | 0.00 K     | 0.00 K     |
| <b>Totals:</b>              |                    |            |             |             |             |                   |            | 0          | 0          | 0.00 K     | 0.00 K     |

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**Event Details Spokane Area reported:**

**Visibilities down to below one quarter of a mile in North Spokane due to blowing dust. One indirect injury reported as a pedestrian was struck by a vehicle due to the poor visibility.**

|                          |                                                        |
|--------------------------|--------------------------------------------------------|
| Event                    | <b>Dust Storm</b>                                      |
| State                    | <b>WASHINGTON</b>                                      |
| County/Area              | <b>SPOKANE AREA</b>                                    |
| WFO                      | <b>OTX</b>                                             |
| Report Source            | <b>Law Enforcement</b>                                 |
| NCDC Data Source         | <b>CSV</b>                                             |
| Begin Date               | <b>2013-09-15 20:00:00.0 PST-8</b>                     |
| End Date                 | <b>2013-09-15 20:30:00.0 PST-8</b>                     |
| Deaths Direct/Indirect   | <b>0/0 (fatality details below, when available...)</b> |
| Injuries Direct/Indirect | <b>0/1</b>                                             |

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Property Damage   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Crop Damage       | <b>0.00K</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Episode Narrative | <b>A negatively tilted shortwave trough of lower pressure interacted with some surface based instability of near 1,000 J/KG in northern Oregon to spawn a squall line that traversed northward across eastern Washington. Strong winds mixed down to the surface along the squall line to created widespread damaging wind gusts. The squall line could be classified as a Haboob as the strongest winds occurred out ahead of the thunderstorms that kicked up a massive dust cloud. The Haboob hit the Moses Lake area and Upper Columbia Basin the hardest with widespread wind damage reported. The dust cloud resulted in a rapid reduction in visibility to near zero in places. Impacts from the Haboob were felt as far north as Coulee City eastward into Spokane and into Deer Park. Strong damaging winds and reduced visibility due to dust were reported across these areas as well.</b> |
| Event Narrative   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

#### Event Details

|                  |                                                     |
|------------------|-----------------------------------------------------|
| Event            | <b>Dust Storm</b>                                   |
| State            | <b>WASHINGTON</b>                                   |
| County/Area      | <b>MOSES LAKE AREA</b>                              |
| WFO              | <b>OTX</b>                                          |
| Report Source    | <b>Trained Spotter</b>                              |
| NCDC Data Source | <b>CSV</b>                                          |
| Begin Date       | <b>2013-09-15 18:15:00.0 PST-8</b>                  |
| End Date         | <b>2013-09-15 18:40:00.0 PST-8</b>                  |
| Event Narrative  | <b>Visibility was reduced to 50 feet in Warden.</b> |

# Cliff Mass Blog – Haboob Hits Eastern Washington September 17, 2013

[http://cliffmass.blogspot.com/2013\\_09\\_01\\_archive.html](http://cliffmass.blogspot.com/2013_09_01_archive.html)

Cliff Mass Weather Blog: Haboob Hits Eastern Washington

## Cliff Mass Weather Blog

This blog provides updated forecasts and comments on current weather or other topics

Tuesday, September 17, 2013

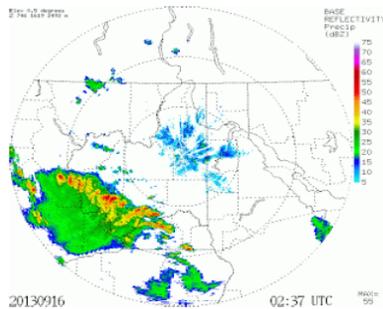
### Haboob Hits Eastern Washington



Picture by Robert Ames on Highway 12 around 7 PM Sunday.

**Haboob.** An exotic name for an exotic weather feature. Haboobs are dramatic dust storms produced by strong winds that are generally associated with thunderstorm gust fronts or very strong cold fronts. Early Sunday evening the characteristic wall of dust was seen over a number of locations of eastern Washington as strong outflow winds from thunderstorms pushed northward over the inland empire.

An intense line of convection was moving northeastward into eastern Washington at 7:37 PM as seen by the Spokane NWS radar. Reds are intense rain and hail.

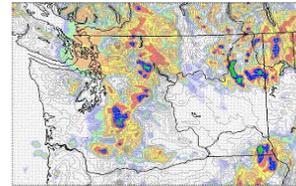


Two hours later it had push northward in a line extending from Wenatchee to Spokane.

#### Help Support Study of Seismic Hazards at Proposed Coal Terminal

*Research Now*, a local non-profit research organization, is now using crowdfunding to support a detailed study of the seismic hazards for the proposed major coal terminal at Cheney Point. For more information go [here](#).

#### Help Support UW Weather Modeling, Local Weather Prediction Research, and Undergraduate Research



Click on picture to help.

#### Total Pageviews



17,000,794

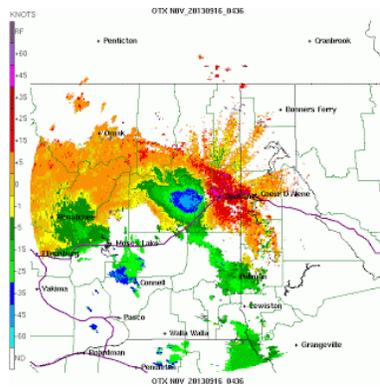
#### My Book on Northwest Weather

<http://cliffmass.blogspot.com/2013/09/haboob-hits-eastern-washington.html>[1/7/2015 8:22:35 AM]



If you look carefully on the radar image you will see a thin line preceding the main echo...that is the gust front, the leading edge of the strong winds.

Since the NWS radars have Doppler capability, we can view winds from them as well. Here is the Doppler winds at 9:26 PM. Remember these are the components of the wind toward or away from the radar, not the total wind. Wow. At least 45 knots.



Take a look at a plot of the highest gusts for the 24 h period ending 7 PM Monday. Virtually all the max winds occurred during the thunderstorms. Plenty of gusts between 45 and 55 mph. (Ignore the 159s....something is wrong at those stations).



[Click on Picture for More Info](#)

**Subscribe To**

**My Weather Segment is on KPLU!**

Fridays at 9 AM right after Birdnote. 88.5 in the Puget Sound area. [KPLU Web Site](#). Want to ask a question I can answer during the show? [Click here](#)

**Click on image for more information**

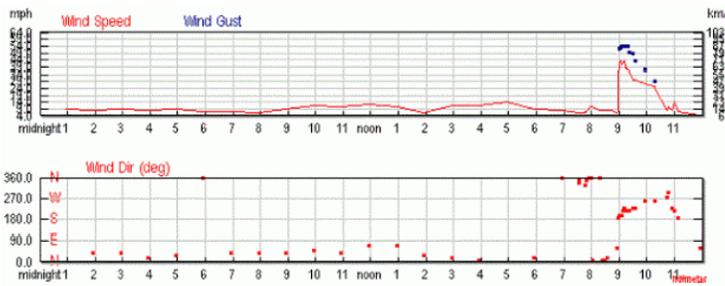
[Click on image for more information](#)



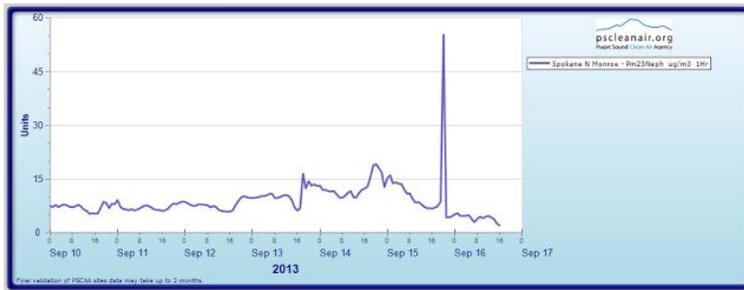
**Some of My Presentations on Video**

- [Climate Talk-1](#)
- [Climate Talk-2](#)
- [NW Windstorms-Science Cafe-1](#)

As a sample of the strong winds, here is what happened at Spokane's Fairchild AFB. Strong gusts (in the 50s mph) and a wind shift to the south. Several thousand homes lost power in areas of eastern Washington and a number of trees were toppled.



With a dust storm going on, you would expect some deterioration in air quality, right? Check out the measurements from the nephelometer (measures the particles in the air) at Spokane. A very well defined spike before midnight Sunday. That's the Haboob.



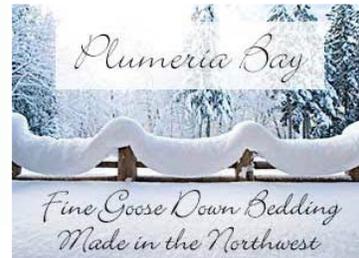
Haboobs are getting less frequent in eastern Washington as farmer's practice better soil conservation approaches, but it is hard not to get one after a parching summer and such strong winds.

By the way, Haboob or Arabic *habūb* means violent storm or strong winds. Let me end with a video of the Haboob from Corey Spencer at the Wine Valley Golf Cours.

- [NW Windstorms-Science Cafe-2](#)
- [NW Windstorms-Science Cafe-3](#)
- [Windstorm Talk at City Hall](#)

**Favorite Weather Websites**

- [Seattle Weather Forecast](#)
- [UW Radar Viewer](#)
- [Scott Sistik Weather Blog](#)
- [National Weather Service, Seattle](#)
- [Probcast Probabilistic Forecasts](#)



[Click image for info](#)

**Blog Archive**

- ▶ [2015 \(4\)](#)
- ▶ [2014 \(193\)](#)
- ▼ [2013 \(203\)](#)
  - ▶ [December \(22\)](#)



Picture courtesy of Andrew Brown / National Weather Service  
A dust storm approaches Highway 195 in eastern Washington on Sunday night.

**Update.**

Here is a sample of the storm reports accumulated by the National Weather Service Spokane office. Large number of trees down. When power poles are being taken down, you know you have a serious problem!

0723 PM TSTM WND DMG OTHELLO 46.82N 119.17W  
09/15/2013 ADAMS WA UTILITY COMPANY

NUMEROUS TREES AND POWER LINES DOWN. TREES DOWN ON HOMES AND FENCES. ESTIMATED 40 POWER POLES SNAPPED OFF.

0725 PM TSTM WND DMG OTHELLO 46.82N 119.17W  
09/15/2013 ADAMS WA TRAINED SPOTTER

PORTABLE SHELTER BLOWN 50 TO 60 FT. VISIBILITY REDUCED TO LESS THAN A QUARTER MILE IN BLOWING DUST.

0730 PM TSTM WND GST WARDEN 46.97N 119.05W  
09/15/2013 M58.00 MPH GRANT WA TRAINED SPOTTER

VISIBILITY REDUCED TO 50 FT IN BLOWING DUST

0740 PM TSTM WND GST 22 SW RITZVILLE 46.90N 118.71W  
09/15/2013 M50.00 MPH ADAMS WA TRAINED SPOTTER

VISIBILITY REDUCED TO ZERO IN BLOWING DUST.

0745 PM TSTM WND DMG MOSES LAKE 47.12N 119.29W  
09/15/2013 GRANT WA BROADCAST MEDIA

NUMEROUS TREES AND POWER LINES WERE BLOWN DOWN. SOME TREES FELL ON HOUSES AND VEHICLES.

<http://cliffmass.blogspot.com/2013/09/haboob-hits-eastern-washington.html>[1/7/2015 8:22:35 AM]

- ▶ November (18)
- ▶ October (19)
- ▼ September (23)
  - Brief Post Mortem
  - And now the winds...
  - September Storm: Nowcast Sunday 10AM
  - Weekend's Big Weather Event
  - Heavy Precipitation Update
  - Unusual Early Season Heavy Rainfall Event Heading ...
  - A Corrugated Cold Front
  - Wealthy Folks Try to Take Over the Seattle School ...
  - First Day of Fall, First Big Storm
  - Haboob Hits Eastern Washington
  - Thunderstorms are Back
  - Super-Inversion and the Return of Thunderstorms
  - Low Cloud Forecast Failure
  - Temperature Surge and Thermal Trough
  - The Banana Belt Ripens
  - Mega Bird Migration
  - Impressive Rain Totals
  - 10 PM Update
  - 4 PM NOWCAST for the Heavy Precipitation Event
  - 11 AM Heavy Rain NOWCAST
  - Unusual Heavy Rain Event to Hit the Northwest
  - Critical Aircraft Weather Data Unused By NOAA
  - The Meteorology of Husky Stadium

- ▶ August (15)
- ▶ July (16)
- ▶ June (16)
- ▶ May (15)
- ▶ April (14)
- ▶ March (15)
- ▶ February (12)
- ▶ January (18)

- ▶ 2012 (218)
- ▶ 2011 (211)
- ▶ 2010 (212)
- ▶ 2009 (270)
- ▶ 2008 (99)

Access the blog using your iPhone/iPod



Statistics

**15886292**

Cliff Mass Weather Blog: Haboob Hits Eastern Washington

0745 PM TSTM WND GST LIND 46.97N 118.61W  
 09/15/2013 M55.00 MPH ADAMS WA MESONET

0753 PM TSTM WND DMG WASHTUCNA 46.75N 118.31W  
 09/15/2013 ADAMS WA UTILITY COMPANY

POWER OUTAGE AFFECTING 40 CUSTOMERS. COMBINE SHED WAS DESTROYED. UPROOTED 5 TREES. ROOF BLOWN OFF OF A BARN.

0756 PM TSTM WND DMG 3 ESE GRAND COULEE 47.92N 118.94W  
 09/15/2013 LINCOLN WA TRAINED SPOTTER

LARGE TREE LIMB DOWN. ESTIMATED 10 TO 12 INCHES IN DIAMETER. NUMEROUS OTHER 3 TO 4 INCH DIAMETER BRANCHES DOWN ALONG ROUTE FROM HOME TO DOWNTOWN. MEASURED 47 MPH ON HOME WEATHER STATION.

0800 PM TSTM WND DMG 4 NNW RUFF 47.22N 119.04W  
 09/15/2013 GRANT WA PUBLIC

OUTBUILDING DESTROYED. FENCE DAMAGED BY FLYING DEBRIS.

0815 PM TSTM WND DMG 6 NNE SOAP LAKE 47.46N 119.45W  
 09/15/2013 GRANT WA BROADCAST MEDIA

AT LEAST 6 POWER POLES WERE SNAPPED OFF.

0815 PM TSTM WND GST ODESSA 47.33N 118.69W  
 09/15/2013 M59.00 MPH LINCOLN WA MESONET

ODESSA AGRIMET STATION MEASURED 59 MPH WIND GUST.

0845 PM TSTM WND DMG 8 SE HARRINGTON 47.40N 118.13W  
 09/15/2013 LINCOLN WA PUBLIC

ROOF BLOWN OFF OF A BARN. TIME IS ESTIMATED FROM RADAR.

0910 PM TSTM WND GST 3 N AIRWAY HEIGHTS 47.69N 117.58W  
 09/15/2013 M60.00 MPH SPOKANE WA OFFICIAL NWS OBS

60 MPH WIND GUST AT NWS OFFICE.

0920 PM TSTM WND DMG 3 ESE SPOKANE 47.66N 117.34W  
 09/15/2013 SPOKANE WA BROADCAST MEDIA

SEVERAL TENTS AT THE SPOKANE FAIRGROUNDS WERE DAMAGED AND FLIPPED DUE TO HIGH WINDS FROM THUNDERSTORMS BETWEEN 915 AND 945 PM PDT.

0925 PM TSTM WND DMG 13 SW IRBY 47.22N 119.04W  
 09/15/2013 GRANT WA PUBLIC

PERSON REPORTED SHOP DOORS BLOWN OFF AND SHOP BLOWN DOWN AND POWER POLES DOWN ON WHEELER RD

1049 PM TSTM WND GST 12 N WAHA 46.38N 116.85W  
 09/15/2013 M61.00 MPH NEZ PERCE ID MESONET

THE WIND GUST WAS MEASURED AT THE CORRAL CREEK RAMS STATION AND LIKELY OCCURRED DURING THE PREVIOUS HOUR.

1050 PM TSTM WND DMG PRIEST RIVER 48.19N 116.91W  
 09/15/2013 BONNER ID LAW ENFORCEMENT

LAW ENFORCEMENT STATED SEVERAL POWER LINES DOWN ACROSS

Click on image to access this app from the iTunes store.

<http://cliffmass.blogspot.com/2013/09/haboob-hits-eastern-washington.html>[1/7/2015 8:22:35 AM]

AREAS OF SOUTHWESTERN BONNER COUNTY. EXACT LOCATIONS UNKNOWN AT TIME OF REPORT AND NOT SURE IF IT WAS FROM DOWNED TREES OR LIMES.



Picture by Skyking3286 at Kadlec Hospital in Richland

Posted by Cliff Mass at 12:30 AM

## 8 comments:

**Bob said...**

On the 0436 radar image, you can see what looks like the gust front as a darker blue line along the northern edge of the storms.

I remember seeing a few of these as a small child in Saudi Arabia back in the early 1960s. I think they were a formative event in my interest in weather. Well, that, and Dr Seuss' *Bartholomew and the Oobleck*...

[September 17, 2013 at 2:46 AM](#)

**Unknown said...**

The stations reporting erroneous measurements are all reporting the same value -- 159. Why is that?

[September 17, 2013 at 8:00 AM](#)

**Mark said...**

<http://www.flickr.com/photos/43207034@N00/9787262335/>

View for Kadlec Hospital on Saturday in Richland, WA, as the dust cloud over takes the TriCities, WA

[September 17, 2013 at 10:09 AM](#)

**metannoying said...**

What is the difference between a *haboob* and a *derecho*?

[September 17, 2013 at 3:15 PM](#)

**Ansel said...**

I was in it! A friend and I were climbing in the Entiat Mountains Friday through Monday. We had quite a thunderstorm late Sunday night. Almost a midwest style storm.

September 17, 2013 at 6:02 PM

**mjgrota said...**  
Boy you guy's are having quite the week!

when do the Frogs and locust arrive!  
September 17, 2013 at 10:48 PM

**DRYSIDECOUG said...**  
This storm hit Connell, Washington at around 7:30PM. It blew in with such force that it felled a 16 inch pine tree that fell across a home and with electrical sparks or lightning burned the home to the ground.  
A fellow I work with lost power in Othello for the better part of a full day. Highway 17 was closed because of the dozens of downed power poles laying everywhere.  
Unless you go through one of these storms you don't have a real appreciation of the power they possess and your total helplessness when it hits.  
September 17, 2013 at 11:17 PM

**Eric Moss said...**  
Please don't refer to Eastern Washington as the Inland Empire, its an incorrect usage of a term used for the urban area to the east of Los Angeles. Us Pacific Northwesters don't want any affiliation with that...  
September 28, 2013 at 2:14 PM

Post a Comment

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Subscribe to: [Post Comments \(Atom\)](#)

Simple template. Powered by [Blogger](#).

<http://cliffmass.blogspot.com/2013/09/haboob-hits-eastern-washington.html>[1/7/2015 8:22:35 AM]

See also, Cliff Mass Blog spot September 15, 2013 entry, "Thunderstorms are back" for early report for this storm.

<http://cliffmass.blogspot.com/2013/09/thunderstorms-are-back.html>

# Meteorological Data

## Pasco Airport Met Data – September 16, 2013

Following is information for Pasco airport (KPSC), GMT/UTC

### Past Weather Conditions for KPSC

Observations prior to selected time: September 16, 2013 -- 02:00 GMT

Weather Conditions at September 16, 2013 -- 2:00 GMT

| Graphical Links                      | With Prior Obs                       | 2:00             | 24-Hour Max    | 24-Hour Min   |
|--------------------------------------|--------------------------------------|------------------|----------------|---------------|
| <a href="#">Temperature</a>          | <a href="#">Temperature</a>          | 69.8° F          | 93.0 at 21:53  | 59.0 at 12:53 |
| <a href="#">Dew Point</a>            | <a href="#">Dew Point</a>            | 62.6° F          | 63.0 at 0:53   | 54.0 at 17:53 |
| <a href="#">Wet Bulb Temperature</a> | <a href="#">Wet Bulb Temperature</a> | 65.1° F          | 71.2 at 21:53  | 57.1 at 13:53 |
| <a href="#">Relative Humidity</a>    | <a href="#">Relative Humidity</a>    | 78%              | 90 at 9:53     | 34 at 20:53   |
| <a href="#">Wind Speed</a>           | <a href="#">Wind Speed</a>           | 24° mph from WSW | 36 at 1:35     | 0 at 2:53     |
| <a href="#">Wind Gust</a>            | <a href="#">Wind Gust</a>            | 36° mph          | 49 at 1:35     | 36 at 2:00    |
| <a href="#">Pressure</a>             | <a href="#">Pressure</a>             | 29.24 in         | 29.28 at 13:53 | 29.06 at 0:53 |
| <a href="#">Sea level pressure</a>   | <a href="#">Sea level pressure</a>   | --               | 29.70 at 13:53 | 29.49 at 0:53 |
| <a href="#">Altimeter</a>            | <a href="#">Altimeter</a>            | 29.67 in         | 29.71 at 13:53 | 29.49 at 0:53 |
| <a href="#">1500 m Pressure</a>      | <a href="#">1500 m Pressure</a>      | 24.76 in         | 24.79 at 13:53 | 24.61 at 0:53 |
| <a href="#">Weather conditions</a>   | <a href="#">Weather conditions</a>   | mod thunder shwr | --             | --            |
| <a href="#">Visibility</a>           | <a href="#">Visibility</a>           | 9.00° miles      | 10.00 at 2:53  | 1.00 at 1:35  |
| <a href="#">Ceiling</a>              | <a href="#">Ceiling</a>              | 12000° feet      | 12000 at 2:00  | 1300 at 1:53  |

| Precipitation variable accumulated | Since Midnight | In 24 Hours |
|------------------------------------|----------------|-------------|
| Precipitation 1hr                  | 0.031"         | 0.031"      |

Tabular Listing: September 15, 2013 -- 2:00 through September 16, 2013 -- 02:00 GMT

| Time(GMT) | Temperature | Dew-Point | Wet-Bulb | Relative Humidity | Wind-Speed | Wind-Direction | Wind-Peak | Wind-Speed | Quality | Pressure | Sea-level | Altimeter | 1500-m                | Weather-conditions | Visibility | Precipitation | Ceiling |
|-----------|-------------|-----------|----------|-------------------|------------|----------------|-----------|------------|---------|----------|-----------|-----------|-----------------------|--------------------|------------|---------------|---------|
|           | °F          | °F        | °F       | %                 | mph        | °mph           | °mph      | °mph       | check   | in       | in        | in        | in                    |                    | miles      | in            | feet    |
| 2:00      | 69.8        | 62.6      | 65.1     | 78                | 24         | 36             | WSW       | 36         | OK      | 29.24    | 29.67     | 24.76     | mod thunder-shwr      | 9.00               | 0.030      | 12000         |         |
| 1:53      | 73.0        | 60.1      | 64.6     | 64                | 28         | 45             | WSW       |            | OK      | 29.21    | 29.63     | 24.73     | mod thunder-shwr      | 9.00               | 0.001      | 1300          |         |
| 1:49      | 75.2        | 59.0      | 64.7     | 57                | 35         | 48             | W         |            | OK      | 29.18    | 29.61     | 24.71     | lt rain thunder-shwr  | 1.00               | 0.001      |               |         |
| 1:40      | 80.6        | 57.2      | 65.5     | 45                | 31         | 49             | WSW       |            | OK      | 29.17    | 29.60     | 24.70     | blowing dust, squalls | 1.00               |            |               |         |
| 1:35      | 80.6        | 57.2      | 65.5     | 45                | 36         | 49             | WSW       | 49         | OK      | 29.15    | 29.58     | 24.68     | blowing dust, squalls | 1.00               |            | 3000          |         |
| 1:29      | 84.2        | 59.0      | 67.5     | 43                | 16         | 37             | SSW       | 37         | OK      | 29.15    | 29.58     | 24.68     | blowing dust          | 2.00               |            | 3000          |         |
| 0:53      | 81.0        | 63.0      | 68.7     | 54                | 10         |                | NNW       |            | OK      | 29.06    | 29.49     | 24.61     | mostly cloudy         | 10.00              |            | 10000         |         |
| 23:53     | 88.0        | 62.1      | 70.3     | 42                | 10         |                | N         |            | OK      | 29.08    | 29.49     | 24.63     | clear                 | 10.00              |            |               |         |
| 22:53     | 89.1        | 63.0      | 71.1     | 42                | 8          |                | NNW       |            | OK      | 29.13    | 29.55     | 24.67     | clear                 | 10.00              |            |               |         |
| 21:53     | 93.0        | 61.0      | 71.2     | 35                | 8          |                | NW        |            | OK      | 29.16    | 29.57     | 24.69     | clear                 | 10.00              |            |               |         |
| 20:53     | 91.0        | 59.0      | 69.6     | 34                | 10         |                | NNW       |            | OK      | 29.18    | 29.60     | 24.71     | clear                 | 10.00              |            |               |         |
| 19:53     | 84.9        | 60.1      | 68.3     | 43                | 7          |                | NNW       |            | OK      | 29.21    | 29.63     | 24.73     | clear                 | 10.00              |            |               |         |
| 18:53     | 86.0        | 57.0      | 67.1     | 37                | 6          |                | NW        |            | OK      | 29.23    | 29.65     | 24.75     | clear                 | 10.00              |            |               |         |
| 17:53     | 81.0        | 54.0      | 64.0     | 39                | 5          |                | NNW       |            | OK      | 29.25    | 29.67     | 24.77     | clear                 | 10.00              |            |               |         |
| 16:53     | 73.9        | 55.9      | 62.6     | 53                | 0          |                |           |            | OK      | 29.27    | 29.69     | 24.78     | clear                 | 10.00              |            |               |         |
| 15:53     | 69.1        | 55.9      | 60.9     | 63                | 0          |                |           |            | OK      | 29.27    | 29.70     | 24.78     | clear                 | 10.00              |            |               |         |
| 14:53     | 64.0        | 55.9      | 59.1     | 75                | 6          |                | N         |            | OK      | 29.28    | 29.70     | 24.79     | clear                 | 10.00              |            |               |         |
| 13:53     | 60.1        | 55.0      | 57.1     | 83                | 0          |                |           |            | OK      | 29.28    | 29.70     | 24.79     | clear                 | 10.00              |            |               |         |
| 12:53     | 59.0        | 55.9      | 57.2     | 90                | 3          |                | NW        |            | OK      | 29.27    | 29.69     | 24.78     | clear                 | 10.00              |            |               |         |
| 11:53     | 60.1        | 55.9      | 57.6     | 86                | 3          |                | N         |            | OK      | 29.27    | 29.68     | 24.78     | clear                 | 10.00              |            |               |         |
| 10:53     | 61.0        | 57.0      | 58.6     | 87                | 0          |                |           |            | OK      | 29.26    | 29.68     | 24.78     | clear                 | 10.00              |            |               |         |
| 9:53      | 61.0        | 57.9      | 59.1     | 90                | 0          |                |           |            | OK      | 29.26    | 29.68     | 24.78     | clear                 | 10.00              |            |               |         |
| 8:53      | 62.1        | 57.9      | 59.5     | 86                | 5          |                | NNW       |            | OK      | 29.25    | 29.67     | 24.77     | clear                 | 10.00              |            |               |         |
| 7:53      | 63.0        | 59.0      | 60.5     | 87                | 0          |                |           |            | OK      | 29.25    | 29.67     | 24.77     | clear                 | 10.00              |            |               |         |
| 6:53      | 66.9        | 60.1      | 62.5     | 79                | 3          |                | N         |            | OK      | 29.25    | 29.67     | 24.77     | clear                 | 10.00              |            |               |         |
| 5:53      | 71.1        | 60.1      | 63.9     | 68                | 3          |                | NNE       |            | OK      | 29.25    | 29.67     | 24.77     | clear                 | 10.00              |            |               |         |
| 4:53      | 72.0        | 61.0      | 64.8     | 68                | 3          |                | W         |            | OK      | 29.25    | 29.67     | 24.77     | clear                 | 10.00              |            |               |         |
| 3:53      | 75.9        | 60.1      | 65.5     | 58                | 0          |                |           |            | OK      | 29.25    | 29.67     | 24.77     | clear                 | 10.00              |            |               |         |
| 2:53      | 78.1        | 60.1      | 66.2     | 54                | 0          |                |           |            | OK      | 29.25    | 29.67     | 24.77     | clear                 | 10.00              |            |               |         |
| 1:53      | 82.0        | 62.1      | 68.6     | 51                | 7          |                | NNW       |            | OK      | 29.24    | 29.66     | 24.76     | clear                 | 10.00              |            |               |         |

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[http://mesowest.utah.edu/cgi-bin/droman/meso\\_base.cgi?stn=KPSC&year1=2013&month1=9&day1=16&hour1=2&past=1&time=GMT](http://mesowest.utah.edu/cgi-bin/droman/meso_base.cgi?stn=KPSC&year1=2013&month1=9&day1=16&hour1=2&past=1&time=GMT)

## Hermiston Airport Met Data – September 15

Following is information for Hermiston airport (KGEG), Coordinated Universal Time (UTC)

| hour            | KHRI_wind_speed |
|-----------------|-----------------|
| 9/15/2013 0:53  | 6.9             |
| 9/15/2013 1:53  | 0               |
| 9/15/2013 2:53  | 0               |
| 9/15/2013 3:53  | 3.5             |
| 9/15/2013 4:53  | 3.5             |
| 9/15/2013 5:53  | 3.5             |
| 9/15/2013 6:53  | 0               |
| 9/15/2013 7:53  | 0               |
| 9/15/2013 8:53  | 8.1             |
| 9/15/2013 9:53  | 10.4            |
| 9/15/2013 10:53 | 10.4            |
| 9/15/2013 11:53 | 9.2             |
| 9/15/2013 12:53 | 11.5            |
| 9/15/2013 13:53 | 6.9             |
| 9/15/2013 14:53 | 12.7            |
| 9/15/2013 15:53 | 13.8            |
| 9/15/2013 16:53 | 24.2            |
| 9/15/2013 17:05 | 32.2            |
| 9/15/2013 17:14 | 21.9            |
| 9/15/2013 17:21 | 15              |
| 9/15/2013 17:53 | 19.6            |
| 9/15/2013 18:53 | 12.7            |
| 9/15/2013 19:04 | 13.8            |
| 9/15/2013 19:53 | 13.8            |
| 9/15/2013 20:53 | 12.7            |
| 9/15/2013 21:53 | 13.8            |
| 9/15/2013 22:53 | 19.6            |
| 9/15/2013 23:53 | 13.8            |

There was one hour with speeds over 25 mph at the Hermiston airport during this event. Coordinated Universal Time (UTC) is eight hours ahead of Pacific Standard Time.

[http://mesowest.utah.edu/cgi-bin/droman/meso\\_base.cgi?stn=KPSC&year1=2013&month1=9&day1=16&hour1=2&past=1&time=GMT](http://mesowest.utah.edu/cgi-bin/droman/meso_base.cgi?stn=KPSC&year1=2013&month1=9&day1=16&hour1=2&past=1&time=GMT)

## BPHOR, 5-minute data, 16:00 to 23:55 PDT

| <b>ID = BPHOR</b>   | <b>TMP<br/>° F</b> | <b>RELH<br/>%</b> | <b>SKNT<br/>mph</b> | <b>GUST<br/>mph</b> | <b>DRCT °</b> |
|---------------------|--------------------|-------------------|---------------------|---------------------|---------------|
| 9-15-2013 16:00 PDT | 95.3               | 22                | 12                  | 17.3                | 35            |
| 9-15-2013 16:05 PDT | 94.9               | 22                | 13.3                | 16.2                | 31            |
| 9-15-2013 16:10 PDT | 94.6               | 22                | 14.3                | 18.6                | 30            |
| 9-15-2013 16:15 PDT | 94.1               | 23                | 13.3                | 17.1                | 28            |
| 9-15-2013 16:20 PDT | 93.4               | 24                | 11.2                | 14                  | 20            |
| 9-15-2013 16:25 PDT | 93                 | 25                | 11.2                | 13.4                | 15            |
| 9-15-2013 16:30 PDT | 92.8               | 25                | 8.4                 | 12.3                | 26            |
| 9-15-2013 16:35 PDT | 92.3               | 26                | 9.1                 | 10.5                | 28            |
| 9-15-2013 16:40 PDT | 91.8               | 26                | 8.4                 | 10.5                | 21            |
| 9-15-2013 16:45 PDT | 91.3               | 26                | 9                   | 12.5                | 22            |
| 9-15-2013 16:50 PDT | 90.9               | 27                | 11.1                | 13.6                | 24            |
| 9-15-2013 16:55 PDT | 90.4               | 27                | 12.3                | 14                  | 26            |
| 9-15-2013 17:00 PDT | 90                 | 28                | 11.5                | 13.8                | 27            |
| 9-15-2013 17:05 PDT | 89.4               | 29                | 10.4                | 12.8                | 29            |
| 9-15-2013 17:10 PDT | 89.5               | 29                | 13.1                | 14.9                | 29            |
| 9-15-2013 17:15 PDT | 89.2               | 30                | 13.1                | 14.9                | 26            |
| 9-15-2013 17:20 PDT | 88.8               | 31                | 9.9                 | 13.2                | 16            |
| 9-15-2013 17:25 PDT | 88.4               | 32                | 7.1                 | 10.5                | 348           |
| 9-15-2013 17:30 PDT | 87.4               | 35                | 19                  | 30.5                | 243           |
| 9-15-2013 17:35 PDT | 86.1               | 34                | 28.3                | 46                  | 251           |
| 9-15-2013 17:40 PDT | 83.8               | 41                | 37.8                | 58.5                | 235           |
| 9-15-2013 17:45 PDT | 76.3               | 69                | 40.3                | 57.6                | 215           |
| 9-15-2013 17:50 PDT | 71.1               | 81                | 34.4                | 45.1                | 226           |
| 9-15-2013 17:55 PDT | 69.4               | 84                | 19                  | 28                  | 220           |
| 9-15-2013 18:00 PDT | 69.4               | 85                | 13.7                | 21.9                | 199           |
| 9-15-2013 18:05 PDT | 69.4               | 85                | 7.9                 | 15.8                | 193           |
| 9-15-2013 18:10 PDT | 69.4               | 82                | 7.6                 | 18.2                | 98            |
| 9-15-2013 18:15 PDT | 69.7               | 85                | 26.1                | 30.5                | 75            |
| 9-15-2013 18:20 PDT | 69.9               | 85                | 24.8                | 29.4                | 65            |
| 9-15-2013 18:25 PDT | 70.1               | 83                | 20.3                | 26.7                | 61            |
| 9-15-2013 18:30 PDT | 70.2               | 78                | 6.7                 | 16.2                | 93            |
| 9-15-2013 18:35 PDT | 70.2               | 81                | 5.2                 | 11.8                | 254           |
| 9-15-2013 18:40 PDT | 70.4               | 83                | 7                   | 9.9                 | 211           |
| 9-15-2013 18:45 PDT | 70.4               | 83                | 3.9                 | 7.9                 | 194           |
| 9-15-2013 18:50 PDT | 70.5               | 78                | 5.7                 | 10.3                | 96            |
| 9-15-2013 18:55 PDT | 70.4               | 78                | 8.6                 | 13.4                | 110           |
| 9-15-2013 19:00 PDT | 70.3               | 80                | 11.8                | 22.8                | 60            |
| 9-15-2013 19:05 PDT | 70.4               | 79                | 9.3                 | 21.5                | 46            |
| 9-15-2013 19:10 PDT | 70.1               | 80                | 1.9                 | 5.5                 | 265           |
| 9-15-2013 19:15 PDT | 69.7               | 78                | 3.7                 | 9.9                 | 193           |
| 9-15-2013 19:20 PDT | 69.6               | 82                | 12.9                | 14.8                | 214           |
| 9-15-2013 19:25 PDT | 69.7               | 84                | 14.7                | 17.5                | 230           |
| 9-15-2013 19:30 PDT | 69.6               | 85                | 14.6                | 16.7                | 233           |
| 9-15-2013 19:35 PDT | 69.7               | 84                | 13.9                | 17.7                | 236           |

**ID = BPHOR**

|                     | <b>TMP</b><br>° F | <b>RELH</b><br>% | <b>SKNT</b><br>mph | <b>GUST</b><br>mph | <b>DRCT</b> ° |
|---------------------|-------------------|------------------|--------------------|--------------------|---------------|
| 9-15-2013 19:40 PDT | 69.8              | 83               | 12.5               | 14.5               | 240           |
| 9-15-2013 19:45 PDT | 69.8              | 83               | 13                 | 14.7               | 250           |
| 9-15-2013 19:50 PDT | 69.7              | 83               | 13.4               | 16                 | 252           |
| 9-15-2013 19:55 PDT | 69.7              | 82               | 14.1               | 18                 | 246           |
| 9-15-2013 20:00 PDT | 69.7              | 82               | 14.5               | 21.3               | 248           |
| 9-15-2013 20:05 PDT | 69.8              | 80               | 20                 | 26.5               | 252           |
| 9-15-2013 20:10 PDT | 69.8              | 77               | 17                 | 24.3               | 269           |
| 9-15-2013 20:15 PDT | 69.9              | 77               | 16.8               | 24.5               | 277           |
| 9-15-2013 20:20 PDT | 70                | 77               | 15.7               | 25.9               | 273           |
| 9-15-2013 20:25 PDT | 70.1              | 78               | 17.9               | 25.9               | 280           |
| 9-15-2013 20:30 PDT | 70.2              | 78               | 15.9               | 26.3               | 283           |
| 9-15-2013 20:35 PDT | 70.1              | 78               | 10.9               | 16.4               | 312           |
| 9-15-2013 20:40 PDT | 70.1              | 78               | 6.8                | 11.8               | 315           |
| 9-15-2013 20:45 PDT | 70                | 78               | 12                 | 21.5               | 201           |
| 9-15-2013 20:50 PDT | 69.4              | 77               | 13.1               | 22.1               | 179           |
| 9-15-2013 20:55 PDT | 68.8              | 76               | 19.9               | 29.1               | 209           |
| 9-15-2013 21:00 PDT | 68.3              | 76               | 20.2               | 26.1               | 220           |
| 9-15-2013 21:05 PDT | 68.1              | 79               | 17.7               | 22.6               | 224           |
| 9-15-2013 21:10 PDT | 67.7              | 80               | 16.8               | 21.5               | 217           |
| 9-15-2013 21:15 PDT | 67.3              | 80               | 17.7               | 23.7               | 214           |
| 9-15-2013 21:20 PDT | 66.9              | 81               | 18.3               | 24.5               | 218           |
| 9-15-2013 21:25 PDT | 66.7              | 81               | 17.3               | 23.7               | 228           |
| 9-15-2013 21:30 PDT | 66.6              | 83               | 16.7               | 22.8               | 220           |
| 9-15-2013 21:35 PDT | 66.8              | 83               | 16.3               | 21.7               | 214           |
| 9-15-2013 21:40 PDT | 67.1              | 82               | 20.4               | 27.8               | 227           |
| 9-15-2013 21:45 PDT | 67.1              | 81               | 19                 | 25                 | 224           |
| 9-15-2013 21:50 PDT | 67.1              | 79               | 17.5               | 25                 | 230           |
| 9-15-2013 21:55 PDT | 66.8              | 79               | 16.2               | 23.4               | 227           |
| 9-15-2013 22:00 PDT | 66.6              | 80               | 16.2               | 23.4               | 230           |
| 9-15-2013 22:05 PDT | 66.4              | 80               | 15.4               | 22.6               | 225           |
| 9-15-2013 22:10 PDT | 66.3              | 81               | 15.4               | 21                 | 218           |
| 9-15-2013 22:15 PDT | 66.2              | 81               | 14.2               | 18.6               | 220           |
| 9-15-2013 22:20 PDT | 66.2              | 81               | 15.2               | 18.8               | 215           |
| 9-15-2013 22:25 PDT | 66.2              | 81               | 16.8               | 21.5               | 218           |
| 9-15-2013 22:30 PDT | 66.2              | 81               | 14.9               | 20.8               | 215           |
| 9-15-2013 22:35 PDT | 66                | 80               | 15.1               | 19.7               | 220           |
| 9-15-2013 22:40 PDT | 65.9              | 79               | 14.7               | 19.7               | 212           |
| 9-15-2013 22:45 PDT | 66                | 79               | 13.4               | 18.4               | 211           |
| 9-15-2013 22:50 PDT | 65.9              | 79               | 13.4               | 17.1               | 217           |
| 9-15-2013 22:55 PDT | 65.8              | 78               | 9.7                | 14.2               | 211           |
| 9-15-2013 23:00 PDT | 65.8              | 78               | 7.7                | 10.3               | 211           |
| 9-15-2013 23:05 PDT | 65.8              | 78               | 6.8                | 10.1               | 220           |
| 9-15-2013 23:10 PDT | 65.8              | 77               | 7.7                | 12.1               | 233           |
| 9-15-2013 23:15 PDT | 65.7              | 77               | 8.6                | 12.1               | 229           |
| 9-15-2013 23:20 PDT | 65.4              | 76               | 9                  | 13.6               | 228           |
| 9-15-2013 23:25 PDT | 65.5              | 76               | 11.6               | 17.3               | 227           |
| 9-15-2013 23:30 PDT | 65.4              | 76               | 12.5               | 18.4               | 222           |

**ID = BPHOR**

|                     | <b>TMP</b><br>° F | <b>RELH</b><br>% | <b>SKNT</b><br>mph | <b>GUST</b><br>mph | <b>DRCT</b> ° |
|---------------------|-------------------|------------------|--------------------|--------------------|---------------|
| 9-15-2013 23:35 PDT | 65.5              | 76               | 11.6               | 17.1               | 227           |
| 9-15-2013 23:40 PDT | 65.8              | 76               | 13.5               | 18.6               | 229           |
| 9-15-2013 23:45 PDT | 65.5              | 76               | 14.4               | 18.6               | 235           |
| 9-15-2013 23:50 PDT | 65.4              | 76               | 14.4               | 20.2               | 233           |
| 9-15-2013 23:55 PDT | 65.5              | 75               | 12.4               | 18                 | 235           |

From: [Utah's MesoWest](#)

## BPKEN, 5-minute data, 15:00 to 19:55 PDT

| <b>ID = BPKEN</b>   | <b>TMP ° F</b> | <b>RELH %</b> | <b>SKNT mph</b> | <b>GUST mph</b> | <b>DRCT °</b> |     |
|---------------------|----------------|---------------|-----------------|-----------------|---------------|-----|
| 9-15-2013 15:00 PDT | 83.2           | 32            | 9.5             | 12.1            | 357           | N   |
| 9-15-2013 15:05 PDT | 83.2           | 32            | 8.6             | 10.3            | 351           | N   |
| 9-15-2013 15:10 PDT | 83.2           | 32            | 9               | 11.2            | 341           | NNW |
| 9-15-2013 15:15 PDT | 83.1           | 32            | 10.3            | 12.7            | 340           | NNW |
| 9-15-2013 15:20 PDT | 83             | 32            | 11.1            | 12.5            | 336           | NNW |
| 9-15-2013 15:25 PDT | 83             | 32            | 11              | 12.7            | 335           | NNW |
| 9-15-2013 15:30 PDT | 83.2           | 32            | 10.4            | 13.6            | 327           | NNW |
| 9-15-2013 15:35 PDT | 83.6           | 32            | 9.2             | 9.9             | 329           | NNW |
| 9-15-2013 15:40 PDT | 83.8           | 32            | 9.8             | 11.6            | 335           | NNW |
| 9-15-2013 15:45 PDT | 83.6           | 32            | 9               | 10.7            | 345           | NNW |
| 9-15-2013 15:50 PDT | 83.6           | 32            | 8.7             | 10.5            | 343           | NNW |
| 9-15-2013 15:55 PDT | 83.5           | 32            | 8.3             | 10.3            | 353           | N   |
| 9-15-2013 16:00 PDT | 84.2           | 32            | 10.3            | 12.7            | 5             | N   |
| 9-15-2013 16:05 PDT | 84.2           | 31            | 8.7             | 11.2            | 4             | N   |
| 9-15-2013 16:10 PDT | 84.3           | 31            | 8.5             | 11.4            | 358           | N   |
| 9-15-2013 16:15 PDT | 84.4           | 31            | 10.6            | 14.7            | 3             | N   |
| 9-15-2013 16:20 PDT | 84.6           | 31            | 11.8            | 15.1            | 17            | NNE |
| 9-15-2013 16:25 PDT | 84.6           | 31            | 13.2            | 15.6            | 21            | NNE |
| 9-15-2013 16:30 PDT | 84.3           | 30            | 13.8            | 16.4            | 20            | NNE |
| 9-15-2013 16:35 PDT | 84.1           | 30            | 14.6            | 17.7            | 17            | NNE |
| 9-15-2013 16:40 PDT | 84             | 31            | 13.8            | 16.7            | 13            | NNE |
| 9-15-2013 16:45 PDT | 83.8           | 31            | 13.3            | 15.8            | 3             | N   |
| 9-15-2013 16:50 PDT | 83.7           | 32            | 12.5            | 14.5            | 1             | N   |
| 9-15-2013 16:55 PDT | 83.7           | 33            | 11.7            | 14              | 359           | N   |
| 9-15-2013 17:00 PDT | 83.5           | 33            | 11.2            | 12.7            | 7             | N   |
| 9-15-2013 17:05 PDT | 83.3           | 34            | 9.9             | 11.6            | 356           | N   |
| 9-15-2013 17:10 PDT | 83.2           | 34            | 11              | 12.3            | 7             | N   |
| 9-15-2013 17:15 PDT | 83.1           | 35            | 10.2            | 11              | 8             | N   |
| 9-15-2013 17:20 PDT | 82.9           | 35            | 11.1            | 12.8            | 9             | N   |
| 9-15-2013 17:25 PDT | 82.8           | 35            | 13              | 14.2            | 5             | N   |
| 9-15-2013 17:30 PDT | 82.5           | 35            | 13.9            | 16              | 4             | N   |
| 9-15-2013 17:35 PDT | 82.3           | 35            | 16              | 18.6            | 6             | N   |
| 9-15-2013 17:40 PDT | 82.2           | 35            | 17              | 18.6            | 4             | N   |
| 9-15-2013 17:45 PDT | 82.1           | 35            | 17.6            | 18.2            | 5             | N   |
| 9-15-2013 17:50 PDT | 82.2           | 36            | 17.8            | 18.6            | 4             | N   |
| 9-15-2013 17:55 PDT | 81.4           | 36            | 17.2            | 18.6            | 5             | N   |
| 9-15-2013 18:00 PDT | 81.2           | 36            | 13.4            | 16.9            | 4             | N   |
| 9-15-2013 18:05 PDT | 80.9           | 38            | 12.4            | 51.7            | 213           | SSW |
| 9-15-2013 18:10 PDT | 74.7           | 53            | 58.6            | 82.1            | 222           | SW  |
| 9-15-2013 18:15 PDT | 70.9           | 62            | 64.6            | 91.8            | 220           | SW  |
| 9-15-2013 18:20 PDT | 67.9           | 74            | 76.8            | 94.4            | 218           | SW  |
| 9-15-2013 18:25 PDT | 64.9           | 90            | 77.3            | 88.3            | 216           | SW  |
| 9-15-2013 18:30 PDT | 62.8           | 100           | 68.3            | 76.4            | 221           | SW  |
| 9-15-2013 18:35 PDT | 62.6           | 100           | 64.2            | 74              | 219           | SW  |

**ID = BPKEN**

|                     | TMP ° F | RELH % | SKNT mph | GUST mph | DRCT ° |     |
|---------------------|---------|--------|----------|----------|--------|-----|
| 9-15-2013 18:40 PDT | 62.3    | 100    | 67.2     | 73.4     | 203    | SSW |
| 9-15-2013 18:45 PDT | 62.2    | 106    | 63.7     | 69.4     | 197    | SSW |
| 9-15-2013 18:50 PDT | 62.1    | 107    | 53.4     | 60.8     | 185    | S   |
| 9-15-2013 18:55 PDT | 62.4    | 17     | 48.4     | 53.4     | 183    | S   |
| 9-15-2013 19:00 PDT | 62.6    | 0      | 41.6     | 46.4     | 182    | S   |
| 9-15-2013 19:05 PDT | 62.5    | 65     | 38.9     | 46.9     | 192    | SSW |
| 9-15-2013 19:10 PDT | 63.1    | 89     | 24.7     | 35.7     | 231    | SW  |
| 9-15-2013 19:15 PDT | 65.6    | 73     | 18.7     | 26.3     | 253    | WSW |
| 9-15-2013 19:20 PDT | 66.7    | 69     | 19.5     | 24.8     | 248    | WSW |
| 9-15-2013 19:25 PDT | 67.5    | 64     | 15.4     | 19.9     | 265    | W   |
| 9-15-2013 19:30 PDT | 68.3    | 61     | 16.6     | 20.2     | 283    | WNW |
| 9-15-2013 19:35 PDT | 68.5    | 59     | 16.6     | 18.2     | 294    | WNW |
| 9-15-2013 19:40 PDT | 69.1    | 55     | 15.2     | 16.2     | 298    | WNW |
| 9-15-2013 19:45 PDT | 69.5    | 59     | 14.9     | 23.2     | 313    | NW  |
| 9-15-2013 19:50 PDT | 68.5    | 58     | 15.2     | 17.7     | 298    | WNW |
| 9-15-2013 19:55 PDT | 69.7    | 53     | 12.1     | 14.7     | 301    | WNW |

## BPKEN, 1-hour data, PST, September 15

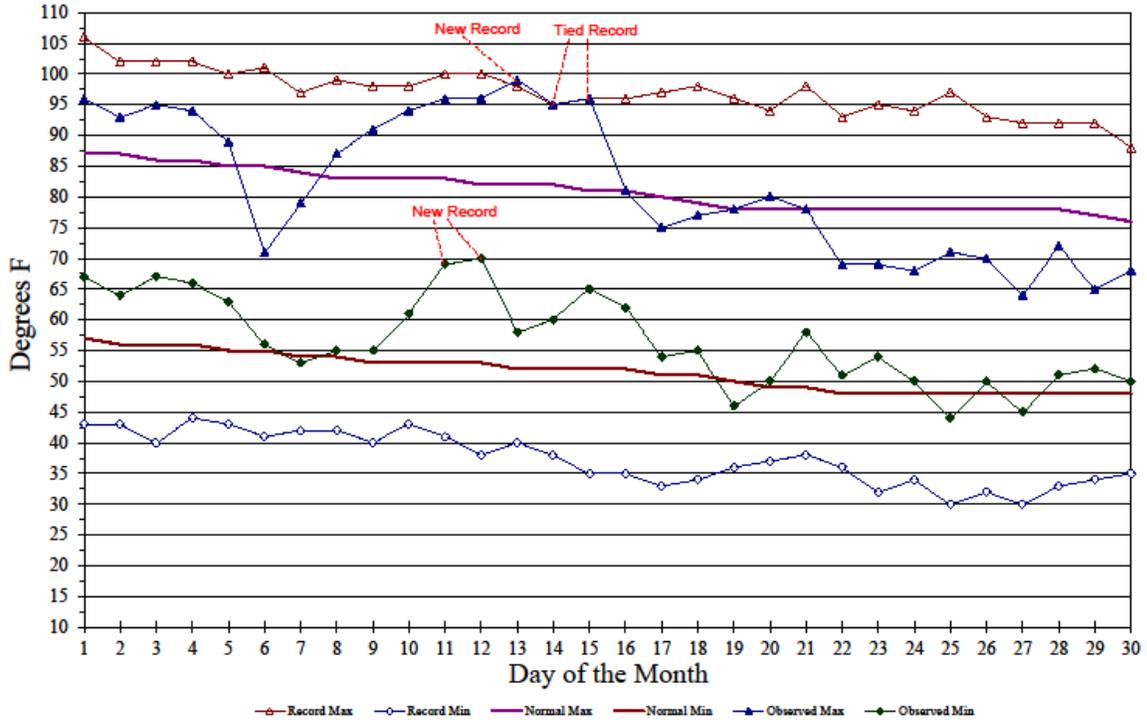
| Hour            | Wind speed |
|-----------------|------------|
| 9/15/2013 0:00  | 10.3       |
| 9/15/2013 1:00  | 4.5        |
| 9/15/2013 2:00  | 6.5        |
| 9/15/2013 3:00  | 9.8        |
| 9/15/2013 4:00  | 8.7        |
| 9/15/2013 5:00  | 6.7        |
| 9/15/2013 6:00  | 5.0        |
| 9/15/2013 7:00  | 6.9        |
| 9/15/2013 8:00  | 8.0        |
| 9/15/2013 9:00  | 10.2       |
| 9/15/2013 10:00 | 11.6       |
| 9/15/2013 11:00 | 10.8       |
| 9/15/2013 12:00 | 9.8        |
| 9/15/2013 13:00 | 10.5       |
| 9/15/2013 14:00 | 9.6        |
| 9/15/2013 15:00 | 11.9       |
| 9/15/2013 16:00 | 13.8       |
| 9/15/2013 17:00 | 55.7       |
| 9/15/2013 18:00 | 20.8       |
| 9/15/2013 19:00 | 21.0       |
| 9/15/2013 20:00 | 24.4       |
| 9/15/2013 21:00 | 33.9       |
| 9/15/2013 22:00 | 28.5       |
| 9/15/2013 23:00 | 30.7       |

4 > 25 mph

From [Utah's MesoWest](#) website.

# Hanford Met Data for September 2013

## Daily Temperatures - September 2013 Hanford Meteorological Station



Narrative Summary – September 2013

September 2013 was warmer than normal, averaging 69.3°F, 2.9° above normal (66.4°F). The hottest September (1990) averaged 72.4°F, while the coolest (1985) averaged 58.8°F. There were 11 days in September with maximum temperatures  $\geq 90^\circ\text{F}$  compared to a normal of 6. There were 76 days this year with maximum temperatures  $\geq 90^\circ\text{F}$  compared to a normal of 56 days. That was the third highest total on record, and only the fifth time with 70 or more days  $\geq 90^\circ\text{F}$ . The greatest number was 79 days in 1967. There were 0 days in September with maximum temperatures  $\geq 100^\circ\text{F}$  compared to a normal of <1, and a record of 3 on numerous occasions. There were 13 days this year with maximum temperatures  $\geq 100^\circ\text{F}$  compared to a normal of 14. The following daily temperature records were established in September 2013:

| Date | Category     | New Record | Old Record | Year        |
|------|--------------|------------|------------|-------------|
| 11   | High Minimum | 69         | 66         | 1969        |
| 12   | High Minimum | 70         | 67         | 1953        |
| 13   | High Maximum | 99         | 98         | 1948        |
| 14   | High Maximum | 95         | 95         | 2001 (Tie)  |
| 15   | High Maximum | 96         | 96         | 1979+ (Tie) |

Note: + most recent of multiple occurrences

Precipitation for September 2013 totaled 0.42 inches, 135% of normal (0.31 inch). The wettest September (1947) received 1.34 inches, while the driest (1991 and 1999) received no precipitation. Total precipitation for 2013 (through September) is 4.57 inches, 102% of normal (4.50 inches).

The average wind speed for September 2013 was 8.5 miles per hour (mph), which is above normal ( 7.3). The windiest September (1961) averaged 9.2 mph, while the September with the lightest winds (1957) averaged 5.4 mph. The peak gust for September 2013 was 58 mph on September 15. The record wind gust for September was 65 mph in 1953.

The monthly climatological data summaries, as well as other information, are available on the Internet. Address: <http://www.hanford.gov/HMS>

Ken Burk      373-3215  
HMS Staff    373-2716

**Note:** The data in this summary pertain specifically to the Hanford Meteorology Station (HMS), which is located approximately 25 miles northwest of Richland, WA. No attempt should be made to infer meteorological conditions at other locations from these data.

| CLIMATOLOGICAL DATA                                                                                                                                                                                                                                    |                               | HANFORD METEOROLOGY STATION<br>25 MILES N.W. OF RICHLAND, WASHINGTON<br>LATITUDE 46° 34' N, LONGITUDE 119° 36' W, ELEVATION (GROUND) 733 FEET |         |                       |                                 |                                 |                                                                                                                       |                                 |                                                          |                      |                                                                                                                                                                                                                                           |                       |                     |                     |                    | MONTH<br><b>September 2013</b>            |                                                                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------------------|---------------------------------|---------------------------------|-----------------------------------------------------------------------------------------------------------------------|---------------------------------|----------------------------------------------------------|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------------|---------------------|--------------------|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| DATE                                                                                                                                                                                                                                                   | TEMPERATURE (°F) (3-FT LEVEL) |                                                                                                                                               |         |                       |                                 |                                 | PRECIPITATION                                                                                                         |                                 |                                                          | WIND (50-FT LEVEL)   |                                                                                                                                                                                                                                           |                       |                     | AVERAGE REL. HUM. % | SOLRAD (LANGLEY'S) | SKY COVER (TENTHS FROM SUNRISE TO SUNSET) | FRONTS AND MISC. PHENOMENA<br>NOTE:<br>TIMES OF FRONTAL PASSAGES ARE GIVEN AFTER THE NOTATIONS "KFR" (COLD FRONT) AND "WFR" (WARM FRONT) |
|                                                                                                                                                                                                                                                        | MAXIMUM                       | MINIMUM                                                                                                                                       | AVERAGE | DEPARTURE FROM NORMAL | HEATING DEGREE DAYS (BASE 65°F) | COOLING DEGREE DAYS (BASE 65°F) | TOTAL (WATER EQUIVALENT IN IN.)                                                                                       | SNOW, ICE PELLETS (SLEET) (IN.) | SNOW, ICE PELLETS (SLEET) OR ICE ON GROUND AT 0600 (IN.) | PREVAILING DIRECTION | AVERAGE SPEED (MPH)                                                                                                                                                                                                                       | PEAK GUST SPEED (MPH) | PEAK GUST DIRECTION |                     |                    |                                           |                                                                                                                                          |
| 1                                                                                                                                                                                                                                                      | 2                             | 3                                                                                                                                             | 4       | 5                     | 6A                              | 6B                              | 7                                                                                                                     | 8                               | 9                                                        | 10                   | 11                                                                                                                                                                                                                                        | 12                    | 13                  | 14                  | 15                 | 16                                        | 17                                                                                                                                       |
| 1                                                                                                                                                                                                                                                      | 96                            | 67                                                                                                                                            | 82      | +10                   | 0                               | 17                              |                                                                                                                       |                                 |                                                          | NW                   | 7.5                                                                                                                                                                                                                                       | 21                    | WNW                 | 29.5                | 528.0              | 0                                         |                                                                                                                                          |
| 2                                                                                                                                                                                                                                                      | 93                            | 64                                                                                                                                            | 78      | +7                    | 0                               | 13                              | T                                                                                                                     |                                 |                                                          | SE                   | 7.1                                                                                                                                                                                                                                       | 25                    | E                   | 40.2                | 459.6              | 8                                         | T, DL                                                                                                                                    |
| 3                                                                                                                                                                                                                                                      | 95                            | 67                                                                                                                                            | 81      | +10                   | 0                               | 16                              | T                                                                                                                     |                                 |                                                          | W                    | 7.5                                                                                                                                                                                                                                       | 25                    | SSE                 | 38.5                | 496.8              | 2                                         |                                                                                                                                          |
| 4                                                                                                                                                                                                                                                      | 94                            | 66                                                                                                                                            | 80      | +9                    | 0                               | 15                              |                                                                                                                       |                                 |                                                          | NE                   | 6.0                                                                                                                                                                                                                                       | 20                    | ESE                 | 39.2                | 469.2              | 1                                         | DL                                                                                                                                       |
| 5                                                                                                                                                                                                                                                      | 89                            | 63                                                                                                                                            | 76      | +6                    | 0                               | 11                              | 0.07                                                                                                                  |                                 |                                                          | NE                   | 7.3                                                                                                                                                                                                                                       | 35                    | SSE                 | 56.5                | 364.2              | 8                                         | T, DL                                                                                                                                    |
| 6                                                                                                                                                                                                                                                      | 71                            | 56                                                                                                                                            | 64      | -6                    | 1                               | 0                               | 0.07                                                                                                                  |                                 |                                                          | W                    | 5.1                                                                                                                                                                                                                                       | 15                    | SW                  | 77.0                | 171.6              | 9                                         |                                                                                                                                          |
| 7                                                                                                                                                                                                                                                      | 79                            | 53                                                                                                                                            | 66      | -3                    | 0                               | 1                               |                                                                                                                       |                                 |                                                          | NW                   | 5.9                                                                                                                                                                                                                                       | 21                    | NW                  | 73.5                | 393.6              | 4                                         |                                                                                                                                          |
| 8                                                                                                                                                                                                                                                      | 87                            | 55                                                                                                                                            | 71      | +2                    | 0                               | 6                               |                                                                                                                       |                                 |                                                          | W                    | 6.1                                                                                                                                                                                                                                       | 13                    | SW                  | 54.0                | 486.6              | 0                                         |                                                                                                                                          |
| 9                                                                                                                                                                                                                                                      | 91                            | 55                                                                                                                                            | 73      | +8                    | 0                               | 8                               |                                                                                                                       |                                 |                                                          | W                    | 4.8                                                                                                                                                                                                                                       | 13                    | E                   | 47.1                | 481.8              | 0                                         |                                                                                                                                          |
| 10                                                                                                                                                                                                                                                     | 94                            | 61                                                                                                                                            | 78      | +10                   | 0                               | 13                              |                                                                                                                       |                                 |                                                          | NW                   | 8.1                                                                                                                                                                                                                                       | 18                    | NW                  | 41.0                | 474.6              | 0                                         |                                                                                                                                          |
| 11                                                                                                                                                                                                                                                     | 96                            | 69                                                                                                                                            | 82      | +14                   | 0                               | 17                              |                                                                                                                       |                                 |                                                          | NW                   | 9.0                                                                                                                                                                                                                                       | 17                    | N                   | 31.0                | 469.2              | 0                                         |                                                                                                                                          |
| 12                                                                                                                                                                                                                                                     | 96                            | 70                                                                                                                                            | 83      | +15                   | 0                               | 18                              |                                                                                                                       |                                 |                                                          | N                    | 7.0                                                                                                                                                                                                                                       | 23                    | NW                  | 31.3                | 400.2              | 4                                         |                                                                                                                                          |
| 13                                                                                                                                                                                                                                                     | 99                            | 58                                                                                                                                            | 78      | +11                   | 0                               | 13                              |                                                                                                                       |                                 |                                                          | NW                   | 4.8                                                                                                                                                                                                                                       | 14                    | WNW                 | 39.8                | 445.2              | 1                                         |                                                                                                                                          |
| 14                                                                                                                                                                                                                                                     | 95                            | 60                                                                                                                                            | 78      | +11                   | 0                               | 13                              |                                                                                                                       |                                 |                                                          | NW                   | 5.8                                                                                                                                                                                                                                       | 14                    | NNW                 | 40.3                | 385.8              | 6                                         |                                                                                                                                          |
| 15                                                                                                                                                                                                                                                     | 96                            | 65                                                                                                                                            | 80      | +13                   | 0                               | 15                              | 0.18                                                                                                                  |                                 |                                                          | W                    | 7.5                                                                                                                                                                                                                                       | 58                    | W                   | 42.4                | 390.0              | 3                                         | T, DL, BD                                                                                                                                |
| 16                                                                                                                                                                                                                                                     | 81                            | 62                                                                                                                                            | 72      | +6                    | 0                               | 7                               |                                                                                                                       |                                 |                                                          | S                    | 6.3                                                                                                                                                                                                                                       | 23                    | WNW                 | 60.4                | 316.2              | 5                                         |                                                                                                                                          |
| 17                                                                                                                                                                                                                                                     | 75                            | 54                                                                                                                                            | 64      | -2                    | 1                               | 0                               |                                                                                                                       |                                 |                                                          | W                    | 8.9                                                                                                                                                                                                                                       | 30                    | WNW                 | 54.5                | 244.2              | 10                                        |                                                                                                                                          |
| 18                                                                                                                                                                                                                                                     | 77                            | 55                                                                                                                                            | 66      | +1                    | 0                               | 1                               |                                                                                                                       |                                 |                                                          | W                    | 9.8                                                                                                                                                                                                                                       | 25                    | NW                  | 37.9                | 397.8              | 1                                         |                                                                                                                                          |
| 19                                                                                                                                                                                                                                                     | 78                            | 46                                                                                                                                            | 62      | -2                    | 3                               | 0                               |                                                                                                                       |                                 |                                                          | NW                   | 5.6                                                                                                                                                                                                                                       | 13                    | NE                  | 45.0                | 433.8              | 4                                         |                                                                                                                                          |
| 20                                                                                                                                                                                                                                                     | 80                            | 50                                                                                                                                            | 65      | +1                    | 0                               | 0                               |                                                                                                                       |                                 |                                                          | NW                   | 8.9                                                                                                                                                                                                                                       | 26                    | W                   | 40.1                | 399.6              | 6                                         |                                                                                                                                          |
| 21                                                                                                                                                                                                                                                     | 78                            | 58                                                                                                                                            | 68      | +5                    | 0                               | 3                               | T                                                                                                                     |                                 |                                                          | W                    | 8.5                                                                                                                                                                                                                                       | 26                    | WSW                 | 44.5                | 348.0              | 8                                         |                                                                                                                                          |
| 22                                                                                                                                                                                                                                                     | 69                            | 51                                                                                                                                            | 60      | -3                    | 5                               | 0                               | T                                                                                                                     |                                 |                                                          | SW                   | 11.6                                                                                                                                                                                                                                      | 31                    | WSW                 | 57.0                | 145.2              | 9                                         | KFR 1930                                                                                                                                 |
| 23                                                                                                                                                                                                                                                     | 69                            | 54                                                                                                                                            | 62      | -1                    | 3                               | 0                               | T                                                                                                                     |                                 |                                                          | SW                   | 14.5                                                                                                                                                                                                                                      | 40                    | SW                  | 51.4                | 217.8              | 9                                         |                                                                                                                                          |
| 24                                                                                                                                                                                                                                                     | 68                            | 50                                                                                                                                            | 59      | -4                    | 6                               | 0                               |                                                                                                                       |                                 |                                                          | W                    | 6.9                                                                                                                                                                                                                                       | 20                    | NNW                 | 46.4                | 262.2              | 9                                         |                                                                                                                                          |
| 25                                                                                                                                                                                                                                                     | 71                            | 44                                                                                                                                            | 58      | -5                    | 7                               | 0                               |                                                                                                                       |                                 |                                                          | NW                   | 8.2                                                                                                                                                                                                                                       | 28                    | NW                  | 50.9                | 296.4              | 7                                         |                                                                                                                                          |
| 26                                                                                                                                                                                                                                                     | 70                            | 50                                                                                                                                            | 60      | -3                    | 5                               | 0                               | T                                                                                                                     |                                 |                                                          | NW                   | 9.9                                                                                                                                                                                                                                       | 22                    | NW                  | 49.0                | 283.8              | 7                                         |                                                                                                                                          |
| 27                                                                                                                                                                                                                                                     | 64                            | 45                                                                                                                                            | 54      | -9                    | 11                              | 0                               | 0.02                                                                                                                  |                                 |                                                          | SW                   | 7.4                                                                                                                                                                                                                                       | 25                    | SW                  | 64.4                | 152.4              | 10                                        | KFR 1115                                                                                                                                 |
| 28                                                                                                                                                                                                                                                     | 72                            | 51                                                                                                                                            | 62      | -1                    | 3                               | 0                               | 0.08                                                                                                                  |                                 |                                                          | S                    | 15.7                                                                                                                                                                                                                                      | 41                    | SSW                 | 69.6                | 102.6              | 10                                        |                                                                                                                                          |
| 29                                                                                                                                                                                                                                                     | 65                            | 52                                                                                                                                            | 58      | -6                    | 7                               | 0                               | T                                                                                                                     |                                 |                                                          | S                    | 17.3                                                                                                                                                                                                                                      | 45                    | S                   | 57.6                | 175.8              | 9                                         | KFR 0200, KFR 2300                                                                                                                       |
| 30                                                                                                                                                                                                                                                     | 68                            | 50                                                                                                                                            | 59      | -3                    | 6                               | 0                               |                                                                                                                       |                                 |                                                          | SW                   | 16.6                                                                                                                                                                                                                                      | 41                    | WSW                 | 47.2                | 360.0              | 3                                         |                                                                                                                                          |
| 31                                                                                                                                                                                                                                                     |                               |                                                                                                                                               |         |                       |                                 |                                 |                                                                                                                       |                                 |                                                          |                      |                                                                                                                                                                                                                                           |                       |                     |                     |                    |                                           |                                                                                                                                          |
| SUM                                                                                                                                                                                                                                                    |                               |                                                                                                                                               |         |                       | 58                              | 187                             | 0.42                                                                                                                  |                                 |                                                          |                      |                                                                                                                                                                                                                                           |                       |                     |                     |                    |                                           |                                                                                                                                          |
| AVG                                                                                                                                                                                                                                                    | 81.9                          | 56.7                                                                                                                                          |         |                       |                                 |                                 |                                                                                                                       |                                 |                                                          |                      | 8.5                                                                                                                                                                                                                                       |                       |                     |                     |                    |                                           | 5.1                                                                                                                                      |
| <b>NOTES:</b><br>(1) Unless otherwise specified, the daily summary period is from midnight to midnight Pacific Standard Time.<br>(2) "T" in Columns 7-9 denotes a trace.<br>(3) The Langley (Col. 15) is the unit used to denote one gram calorie/cm². |                               |                                                                                                                                               |         |                       |                                 |                                 | <b>PRECIPITATION (IN.)</b><br>TOTAL FOR THE MONTH 0.42<br>DEPARTURE FROM NORMAL +0.11<br>GREATEST IN 24 HR 0.18 ON 15 |                                 |                                                          |                      | <b>MISC. PHENOMENA NOTATIONS USED IN COL. 17</b><br>A - Hail AU - Aurora BD - Blowing Dust<br>BB - Blowing Snow D - Dust DL - Distant Lightning<br>DB - Drifting Snow F - Fog GL - Glaze<br>IC - Ice Crystals K - Smokes T - Thunderstorm |                       |                     |                     |                    |                                           |                                                                                                                                          |
| <b>TEMPERATURE (°F) (3-FT LEVEL)</b><br>AVERAGE FOR THE MONTH 69.3<br>DEPARTURE FROM NORMAL +2.9<br>HIGHEST 99 ON 13<br>LOWEST 44 ON 25                                                                                                                |                               |                                                                                                                                               |         |                       |                                 |                                 | <b>TRACE OR MORE</b> 12 0.25 OR MORE 0<br>0.01 OR MORE 5 0.50 OR MORE 0<br>0.10 OR MORE 1 1.00 OR MORE 0              |                                 |                                                          |                      | <b>BAROMETRIC PRESSURE (IN.)</b><br>AVERAGE STATION 29.049<br>HIGHEST SEA LEVEL 30.109 ON 7<br>LOWEST SEA LEVEL 29.353 ON 29                                                                                                              |                       |                     |                     |                    |                                           |                                                                                                                                          |
| <b>NUMBER OF DAYS WITH:</b><br>MAXIMUM 32 OR BELOW 0<br>MAXIMUM 50 OR ABOVE 11<br>MINIMUM 32 OR BELOW 0<br>MINIMUM 0 OR BELOW 0                                                                                                                        |                               |                                                                                                                                               |         |                       |                                 |                                 | <b>TOTAL FOR THE MONTH</b> 0<br>GREATEST IN 24 HOURS NA ON NA<br>GREATEST ON GROUND NA ON NA                          |                                 |                                                          |                      | <b>SOLAR RADIATION (LANGLEY'S)</b><br>AVERAGE DAILY TOTAL 351.74<br>GREATEST DAILY 528.0 ON 1<br>LEAST DAILY 102.6 ON 28                                                                                                                  |                       |                     |                     |                    |                                           |                                                                                                                                          |
| <b>HEATING DEGREE DAYS (BASE 65°F)</b><br>TOTAL FOR THE MONTH 58<br>DEPARTURE FROM NORMAL -10<br>SEASONAL TOTAL (SINCE JULY 1) 58<br>SEASONAL DEPARTURE FROM NORMAL -16                                                                                |                               |                                                                                                                                               |         |                       |                                 |                                 | <b>WIND (50-FT LEVEL)</b><br>AVERAGE SPEED (MPH) 8.5<br>DEPARTURE FROM NORMAL +1.2<br>PEAK GUST W @ 58 ON 15          |                                 |                                                          |                      | <b>MISCELLANEOUS NUMBER OF DAYS</b><br>CLEAR 11 FOG 0<br>PARTLY CLOUDY 8 THUNDER 3<br>CLOUDY 11 DUST 1                                                                                                                                    |                       |                     |                     |                    |                                           |                                                                                                                                          |
| <b>AVERAGE PSYCHROMETRIC DATA</b><br>DEPARTURE FROM NORMAL DRY BULB (°F) 69.2 WET BULB (°F) 56.5<br>REL. HUM. (%) 48.6 DEW PT. (°F) 47.0                                                                                                               |                               |                                                                                                                                               |         |                       |                                 |                                 | <b>RELATIVE HUMIDITY EXTREMES (%)</b><br>HIGHEST 97 ON 7<br>LOWEST 12 ON 3                                            |                                 |                                                          |                      |                                                                                                                                                                                                                                           |                       |                     |                     |                    |                                           |                                                                                                                                          |
| +DENOTES LATEST OF SEVERAL DATES                                                                                                                                                                                                                       |                               |                                                                                                                                               |         |                       |                                 |                                 |                                                                                                                       |                                 |                                                          |                      |                                                                                                                                                                                                                                           |                       |                     |                     |                    |                                           |                                                                                                                                          |



# Washington State Climatologist, September Event Summary



## September Event Summary

If the September weather across WA State needed to be summarized in only one word it would be "wet". Average temperatures were warmer than normal statewide, mostly due to higher than normal overnight temperatures. Total September precipitation set records in some locations around the state, particularly in the Puget Sound and the east slopes of the Cascade Mountains. The record 2013 September precipitation, the year and amount of the previous record, and the year that records began is

shown in Table 1 for some of the locations that ranked as the record wettest September. Note that this September was not the record wettest for the coastal locations; Quillayute and Hoquiam, for example, came in as the 4th and 3rd wettest, respectively. Still, it is interesting that this record precipitation was not foreseen last month at this time. In the beginning of the September, the Climate Prediction Center precipitation outlook had equal chances of below, equal to, or above normal precipitation, with no indication that the month would turn out this wet. More often than not, these monthly outlooks are reasonably good, but in some cases, like

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| Climate Summary.....      | 6 |
| Climate Outlook.....      | 8 |

this one, the prediction is simply wrong.

| Station        | Sept 2013 Precipitation | Previous Record; Year | Records Began |
|----------------|-------------------------|-----------------------|---------------|
| Olympia        | 9.36"                   | 7.89"; 1978           | 1948          |
| SeaTac Airport | 6.17"                   | 6.96"; 1978           | 1948          |
| Holden Village | 6.89"                   | 4.91"; 1978           | 1930          |
| Stehekin       | 6.02"                   | 4.66"; 1969           | 1906          |
| Boundary Dam   | 4.69"                   | 3.92"; 1997           | 1966          |
| Leavenworth    | 4.04"                   | 3.66"; 1962           | 1907          |
| Mazama         | 3.36"                   | 2.44"; 1986           | 1948          |

**Table 1: Record September 2013 precipitation, the previous record and year of occurrence, and the year that records began at each station.**

The wet month was mostly a result of a few very powerful storm systems that impacted the state. The first of these occurred between Sept 4 and Sept 6, bringing heavy rain and a great deal of lightning to the state. Record daily maximum rainfall records were set on Sept 6 at the Seattle Weather Forecasting Office (WFO) (1.38"), SeaTac Airport (1.09"), Olympia (1.01"), and Wenatchee (0.27") with other locations

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around western WA recording between 1.50" and 3.50" of precipitation (from CoCoRaHS observers).

There was a break from the autumn-like weather during the 2nd week of September, when a ridge of high pressure settled over the state and brought unseasonably warm temperatures for several days. For example, on Sept 11, high temperature records were set at Moses Lake (98°F), SeaTac (93°F), Olympia (91°F), and the Seattle WFO (89°F). The warm temperatures continued for eastern WA, setting daytime high temperature records in Moses Lake (99°F), Ellensburg (98°F), Ephrata (97°F), and Quincy (96°F) on Sept 12, for example, and in Ephrata (98°F), Wenatchee (97°F), Chief Joseph Dam (95°F), and Walla Walla (94°F) on Sept 13, for example. Daily high temperature records continued to be set on Sept 14 and 15 in eastern WA as well. The warmest weather in WA is generally during July or August. A quirk of the past summer for western WA is that its hottest days were in late June and September. For SeaTac, for example, the warmest summer temperature of 93°F was recorded on June 30 and Sept 11.

Right on cue, however, the first day of fall (Sept 22) was wet and windy around the state. In western WA, wind gusts were between 25 and 45 mph throughout the interior Puget Sound region and up to 50 mph on the coast. Hoquiam Airport received a record daily amount of rainfall on Sept 22 (2.04") which actually ranks as the 3rd wettest September day since records began there (the wettest September day was in 1997 with 2.55").

Arguably, the most interesting storm of the month was the remarkable system that moved in on Sept 28 and 29 - quite a powerful storm for this early in the season. Strong winds were reported as of mid-morning on Sept 29 for the previous 36 hours; some examples include 74 mph at Hurricane Ridge, 53 mph at Hoquiam, 44 mph at Quillayute, 43 mph at Paine Field, 38 mph at Olympia, 36 mph at SeaTac, and 34 mph at Packwood. Record daily maximum precipitation records were set on Sept 28 for Olympia Airport (2.93"), Quillayute (1.93"), Hoquiam (1.78"), SeaTac Airport (1.71"), Vancouver (1.36"), and Seattle WFO (1.31"). For both Olympia and SeaTac, the precipitation on Sept 28 ranks as the wettest September day since records began at each station (1948). For SeaTac, the previous wettest September day occurred in 1978 and 1953 with 1.65"; for Olympia, it occurred in 2010 with 1.67". Precipitation continued into Sept 29 and 30 (see Fig. 1 for 24-hr precipitation totals ending the morning of Sept 30), and the 1.52" that fell in Olympia on Sept 30 ranks as the 4th wettest September day. In eastern WA, some 24-hr precipitation records were set for Sept 29 into Sept 30 at Leavenworth (0.76"), Mazama (0.37"), and Chelan (0.29"), for example. Finally, an EF1 tornado (winds estimated at 110 mph) touched down near Frederickson (located southeast of Tacoma in Pierce County) on Sept 30. No injuries were reported, but there was roof damage, as well as damage to cars, trees, and lamp posts in the area.

# Monitoring and Met Data

## Spokane, Augusta Avenue, hourly data

Station: Spokane-Augusta Ave Daily: 9/15/2013 Type: AVG  
1 Hr. [1 Hr.]

| Date & Time        | TPM10                    | Wind Spd S | Wind Dir S |
|--------------------|--------------------------|------------|------------|
|                    | ug/m <sup>3</sup><br>(s) | MPH        | Deg        |
| 9/15/2013 12:00 AM | 39                       | 1.8        | 72         |
| 9/15/2013 1:00 AM  | 44                       | 2.1        | 280        |
| 9/15/2013 2:00 AM  | 30                       | 1.9        | 30         |
| 9/15/2013 3:00 AM  | 27                       | 2.1        | 308        |
| 9/15/2013 4:00 AM  | 30                       | 1.6        | 277        |
| 9/15/2013 5:00 AM  | 30                       | 1.4        | 234        |
| 9/15/2013 6:00 AM  | 29                       | 0.9        | 293        |
| 9/15/2013 7:00 AM  | 23                       | 2.1        | 10         |
| 9/15/2013 8:00 AM  | 24                       | 3          | 346        |
| 9/15/2013 9:00 AM  | 23                       | 10.7       | 78         |
| 9/15/2013 10:00 AM | 24                       | 10.1       | 78         |
| 9/15/2013 11:00 AM | 22                       | 9.6        | 73         |
| 9/15/2013 12:00 PM | 21                       | 6.7        | 65         |
| 9/15/2013 1:00 PM  | 18                       | 5.5        | 49         |
| 9/15/2013 2:00 PM  | 11                       | 6.3        | 44         |
| 9/15/2013 3:00 PM  | 16                       | 5          | 43         |
| 9/15/2013 4:00 PM  | 20                       | 5.9        | 56         |
| 9/15/2013 5:00 PM  | 17                       | 5.9        | 59         |
| 9/15/2013 6:00 PM  | 32                       | 2.8        | 72         |
| 9/15/2013 7:00 PM  | 30                       | 3          | 59         |
| 9/15/2013 8:00 PM  | 6472                     | 15.5       | 263        |
| 9/15/2013 9:00 PM  | 257                      | 8.8        | 282        |
| 9/15/2013 10:00 PM | 42                       | 3.1        | 257        |
| 9/15/2013 11:00 PM | 26                       | 4.4        | 74         |
| Minimum            | 11                       | 0.9        | 10         |
| MinDate            | 2:00 PM                  | 6:00 AM    | 1:00 AM    |
| Maximum            | 6472                     | 15.5       | 346        |
| MaxDate            | 8:00 PM                  | 8:00 PM    | 1:00 AM    |
| Avg                | 304                      | 5          | 26         |
| Num                | 24                       | 24         | 24         |
| Data[%]            | 100                      | 100        | 100        |
| STD                | 1286.9                   | 3.6        | 178.5      |

## Kennewick-Metaline, hourly data

Pacific Standard Time

| Date | Time (Hour) | Visibility (Miles) | PM <sub>10</sub> (µg/m <sup>3</sup> ) | Wind Speed (mph)* | Wind Direction* |           |
|------|-------------|--------------------|---------------------------------------|-------------------|-----------------|-----------|
|      |             |                    |                                       |                   | Degree          | Direction |
| 9/15 | 00:00       | 48                 | 36                                    | 2.9               | 284             | WNW       |
| 9/15 | 01:00       | 51                 | 37                                    | 2.2               | 265             | W         |
| 9/15 | 02:00       | 52                 | 27                                    | 2.5               | 245             | WSW       |
| 9/15 | 03:00       | 53                 | 18                                    | 3.7               | 255             | WSW       |
| 9/15 | 04:00       | 52                 | 24                                    | 3.8               | 275             | W         |
| 9/15 | 05:00       | 51                 | 28                                    | 3.4               | 253             | WSW       |
| 9/15 | 06:00       | 50                 | 33                                    | 3.1               | 281             | W         |
| 9/15 | 07:00       | 49                 | 36                                    | 4.5               | 292             | WNW       |
| 9/15 | 08:00       | 48                 | 45                                    | 4.8               | 322             | NW        |
| 9/15 | 09:00       | 49                 | 31                                    | 5.2               | 321             | NW        |
| 9/15 | 10:00       | 50                 | 50                                    | 6.8               | 346             | NNW       |
| 9/15 | 11:00       | 56                 | 57                                    | 5.4               | 1               | N         |
| 9/15 | 12:00       | 69                 | 42                                    | 5.9               | 344             | NNW       |
| 9/15 | 13:00       | 77                 | 41                                    | 6.1               | 330             | NNW       |
| 9/15 | 14:00       | 81                 | 25                                    | 5.7               | 321             | NW        |
| 9/15 | 15:00       | 88                 | 51                                    | 5.7               | 3               | N         |
| 9/15 | 16:00       | 79                 | 61                                    | 5.5               | 349             | N         |
| 9/15 | 17:00       | 57                 | 4037                                  | 20.6              | 251             | WSW       |
| 9/15 | 18:00       | 75                 | 7                                     | 9.9               | 327             | NNW       |
| 9/15 | 19:00       | 78                 | 24                                    | 10                | 247             | WSW       |
| 9/15 | 20:00       | 58                 | 48                                    | 7.3               | 153             | SSE       |
| 9/15 | 21:00       | 77                 | InVld                                 | 10.9              | 201             | SSW       |
| 9/15 | 22:00       | 103                | InVld                                 | 9.5               | 214             | SW        |
| 9/15 | 23:00       | 122                | InVld                                 | 9                 | 195             | SSW       |

*\*Note: the wind direction and speed data were invalidated for the whole day because they did not meet QA/QC (there was evidence of baseline drift (zero offset ~0.6 mph) for the anemometer).*

## KENMETA, 1-minute data

Note: the wind direction and speed data were invalidated for the whole day because they did not meet QA/QC (there was evidence of baseline drift (zero offset ~0.6 mph) for the anemometer).

Station: Kennewick-Metaline Periodically: 09/15/2013 16:30-10/15/2013 19:00 Type: AVG 1 Min. [1 Min.], *PST*

| KENMETA Date &<br>Time | TPM10<br>ug/m <sup>3</sup><br>(s) | Wind Spd* S<br>MPH | Wind<br>Dir S*<br>Deg |
|------------------------|-----------------------------------|--------------------|-----------------------|
| 9/15/2013 16:30        | 123                               | 4.5                | 354                   |
| 9/15/2013 16:31        | 119                               | 4.7                | 359                   |
| 9/15/2013 16:32        | 114                               | 3.4                | 353                   |
| 9/15/2013 16:33        | 115                               | 4.2                | 346                   |
| 9/15/2013 16:34        | 121                               | 4.5                | 343                   |
| 9/15/2013 16:35        | 120                               | 5.3                | 343                   |
| 9/15/2013 16:36        | 114                               | 6.1                | 344                   |
| 9/15/2013 16:37        | 101                               | 4.6                | 328                   |
| 9/15/2013 16:38        | 94                                | 5.5                | 338                   |
| 9/15/2013 16:39        | 97                                | 5.4                | 339                   |
| 9/15/2013 16:40        | 70                                | 5                  | 337                   |
| 9/15/2013 16:41        | 45                                | 5.6                | 351                   |
| 9/15/2013 16:42        | 29                                | 5.5                | 339                   |
| 9/15/2013 16:43        | 15                                | 5.9                | 345                   |
| 9/15/2013 16:44        | 1                                 | 5.4                | 341                   |
| 9/15/2013 16:45        | -6                                | 5.8                | 347                   |
| 9/15/2013 16:46        | -16                               | 5.9                | 336                   |
| 9/15/2013 16:47        | -15                               | 6.2                | 344                   |
| 9/15/2013 16:48        | -17                               | 5.8                | 338                   |
| 9/15/2013 16:49        | -12                               | 5.7                | 342                   |
| 9/15/2013 16:50        | -12                               | 7.2                | 342                   |
| 9/15/2013 16:51        | -13                               | 5.4                | 350                   |
| 9/15/2013 16:52        | -1                                | 6.1                | 350                   |
| 9/15/2013 16:53        | 6                                 | 5.9                | 346                   |
| 9/15/2013 16:54        | 12                                | 6                  | 344                   |
| 9/15/2013 16:55        | 17                                | 5.6                | 349                   |
| 9/15/2013 16:56        | 19                                | 4.8                | 347                   |
| 9/15/2013 16:57        | 24                                | 5.2                | 347                   |
| 9/15/2013 16:58        | 27                                | 5.6                | 350                   |
| 9/15/2013 16:59        | 27                                | 4.9                | 347                   |
| 9/15/2013 17:00        | 29                                | 7.5                | 344                   |
| 9/15/2013 17:01        | 21                                | 5.7                | 349                   |

| KENMETA Date &<br>Time | TPM10                    | Wind Spd* S | Wind<br>Dir S* |
|------------------------|--------------------------|-------------|----------------|
|                        | ug/m <sup>3</sup><br>(s) | MPH         | Deg            |
| 9/15/2013 17:02        | 18                       | 5.2         | 347            |
| 9/15/2013 17:03        | 16                       | 4.3         | 345            |
| 9/15/2013 17:04        | 14                       | 4.3         | 338            |
| 9/15/2013 17:05        | 16                       | 5.1         | 331            |
| 9/15/2013 17:06        | 17                       | 3.7         | 321            |
| 9/15/2013 17:07        | 16                       | 4.2         | 332            |
| 9/15/2013 17:08        | 16                       | 3.3         | 322            |
| 9/15/2013 17:09        | 20                       | 4.5         | 313            |
| 9/15/2013 17:10        | 21                       | 3.4         | 294            |
| 9/15/2013 17:11        | 24                       | 4.2         | 282            |
| 9/15/2013 17:12        | 25                       | 5.3         | 271            |
| 9/15/2013 17:13        | 29                       | 6.5         | 261            |
| 9/15/2013 17:14        | 34                       | 9.3         | 249            |
| 9/15/2013 17:15        | 36                       | 13.1        | 247            |
| 9/15/2013 17:16        | 40                       | 17.9        | 237            |
| 9/15/2013 17:17        | 58                       | 25.4        | 233            |
| 9/15/2013 17:18        | 130                      | 26.8        | 246            |
| 9/15/2013 17:19        | 320                      | 18.1        | 220            |
| 9/15/2013 17:20        | 739                      | 27.7        | 224            |
| 9/15/2013 17:21        | 1449                     | 28.1        | 240            |
| 9/15/2013 17:22        | 2476                     | 28.9        | 234            |
| 9/15/2013 17:23        | 3894                     | 28.7        | 238            |
| 9/15/2013 17:24        | 5125                     | 43.3        | 232            |
| 9/15/2013 17:25        | 6524                     | 39.8        | 232            |
| 9/15/2013 17:26        | 9156                     | 33          | 241            |
| 9/15/2013 17:27        | 13078                    | 38.4        | 228            |
| 9/15/2013 17:28        | 16314                    | 37.9        | 230            |
| 9/15/2013 17:29        | 18512                    | 32.6        | 239            |
| 9/15/2013 17:30        | 19088                    | 24.5        | 231            |
| 9/15/2013 17:31        | 18488                    | 27.3        | 234            |
| 9/15/2013 17:32        | 17264                    | 26.9        | 238            |
| 9/15/2013 17:33        | 15678                    | 33.6        | 230            |
| 9/15/2013 17:34        | 13912                    | 25.9        | 234            |
| 9/15/2013 17:35        | 12166                    | 22          | 231            |
| 9/15/2013 17:36        | 10512                    | 34.4        | 226            |
| 9/15/2013 17:37        | 9010                     | 31.5        | 231            |
| 9/15/2013 17:38        | 7688                     | 26.4        | 238            |
| 9/15/2013 17:39        | 6537                     | 19.7        | 240            |
| 9/15/2013 17:40        | 5543                     | 24.8        | 240            |

| KENMETA Date &<br>Time | TPM10         | Wind Spd* S | Wind<br>Dir S* |
|------------------------|---------------|-------------|----------------|
|                        | ug/m^3<br>(s) | MPH         | Deg            |
| 9/15/2013 17:41        | 4681          | 29          | 243            |
| 9/15/2013 17:42        | 3952          | 29.2        | 247            |
| 9/15/2013 17:43        | 3343          | 25.1        | 244            |
| 9/15/2013 17:44        | 2833          | 21.2        | 238            |
| 9/15/2013 17:45        | 2401          | 20.9        | 231            |
| 9/15/2013 17:46        | 2021          | 25.4        | 232            |
| 9/15/2013 17:47        | 1695          | 21.9        | 239            |
| 9/15/2013 17:48        | 1431          | 19.4        | 240            |
| 9/15/2013 17:49        | 1213          | 18.8        | 238            |
| 9/15/2013 17:50        | 1017          | 22.6        | 230            |
| 9/15/2013 17:51        | 828           | 20.8        | 240            |
| 9/15/2013 17:52        | 665           | 20.6        | 243            |
| 9/15/2013 17:53        | 551           | 21.2        | 240            |
| 9/15/2013 17:54        | 461           | 22.4        | 238            |
| 9/15/2013 17:55        | 382           | 22.3        | 234            |
| 9/15/2013 17:56        | 293           | 21.9        | 237            |
| 9/15/2013 17:57        | 203           | 21.9        | 241            |
| 9/15/2013 17:58        | 127           | 23.8        | 242            |
| 9/15/2013 17:59        | 72            | 15.7        | 239            |
| 9/15/2013 18:00        | 53            | 16.3        | 243            |
| 9/15/2013 18:01        | 50            | 13.9        | 245            |
| 9/15/2013 18:02        | 60            | 12.7        | 247            |
| 9/15/2013 18:03        | 69            | 15.4        | 259            |
| 9/15/2013 18:04        | 68            | 15.3        | 269            |
| 9/15/2013 18:05        | 44            | 12          | 247            |
| 9/15/2013 18:06        | 21            | 13.2        | 229            |
| 9/15/2013 18:07        | 4             | 14.7        | 231            |
| 9/15/2013 18:08        | -19           | 12.6        | 236            |
| 9/15/2013 18:09        | -35           | 11.2        | 240            |
| 9/15/2013 18:10        | -31           | 8.8         | 217            |
| 9/15/2013 18:11        | -24           | 7.5         | 222            |
| 9/15/2013 18:12        | -10           | 6.8         | 237            |
| 9/15/2013 18:13        | 5             | 6.1         | 223            |
| 9/15/2013 18:14        | 16            | 5.9         | 210            |
| 9/15/2013 18:15        | 32            | 4.8         | 225            |
| 9/15/2013 18:16        | 54            | 2           | 248            |
| 9/15/2013 18:17        | 76            | 1.1         | 257            |
| 9/15/2013 18:18        | 94            | 0.7         | 158            |
| 9/15/2013 18:19        | 110           | 1.5         | 221            |

| KENMETA Date &<br>Time | TPM10<br>ug/m <sup>3</sup><br>(s) | Wind Spd* S<br>MPH | Wind<br>Dir S*<br>Deg |
|------------------------|-----------------------------------|--------------------|-----------------------|
| 9/15/2013 18:20        | 118                               | 1.4                | 331                   |
| 9/15/2013 18:21        | 112                               | 3.4                | 20                    |
| 9/15/2013 18:22        | 110                               | 4.2                | 43                    |
| 9/15/2013 18:23        | 116                               | 5.3                | 62                    |
| 9/15/2013 18:24        | 119                               | 4.2                | 44                    |
| 9/15/2013 18:25        | 123                               | 8.3                | 25                    |
| 9/15/2013 18:26        | 121                               | 12.9               | 15                    |
| 9/15/2013 18:27        | 114                               | 17.6               | 13                    |
| 9/15/2013 18:28        | 99                                | 15.7               | 358                   |
| 9/15/2013 18:29        | 92                                | 14.4               | 338                   |
| 9/15/2013 18:30        | 84                                | 13.7               | 313                   |
| 9/15/2013 18:31        | 77                                | 15.1               | 330                   |
| 9/15/2013 18:32        | 43                                | 14                 | 337                   |
| 9/15/2013 18:33        | -8                                | 13.7               | 328                   |
| 9/15/2013 18:34        | -35                               | 14.7               | 337                   |
| 9/15/2013 18:35        | -52                               | 14.7               | 337                   |
| 9/15/2013 18:36        | -56                               | 12.6               | 336                   |
| 9/15/2013 18:37        | -72                               | 13.5               | 341                   |
| 9/15/2013 18:38        | -108                              | 14                 | 354                   |
| 9/15/2013 18:39        | -127                              | 13.6               | 359                   |
| 9/15/2013 18:40        | -117                              | 13.4               | 358                   |
| 9/15/2013 18:41        | -93                               | 13.1               | 354                   |
| 9/15/2013 18:42        | -80                               | 11.1               | 2                     |
| 9/15/2013 18:43        | -81                               | 11.4               | 3                     |
| 9/15/2013 18:44        | -81                               | 9.3                | 5                     |
| 9/15/2013 18:45        | -70                               | 8.9                | 357                   |
| 9/15/2013 18:46        | -75                               | 9.4                | 356                   |
| 9/15/2013 18:47        | -86                               | 8.7                | 360                   |
| 9/15/2013 18:48        | -92                               | 8.5                | 0                     |
| 9/15/2013 18:49        | -93                               | 8.7                | 356                   |
| 9/15/2013 18:50        | -92                               | 7.5                | 351                   |
| 9/15/2013 18:51        | -79                               | 9                  | 347                   |
| 9/15/2013 18:52        | -55                               | 9.7                | 340                   |
| 9/15/2013 18:53        | -24                               | 8.8                | 343                   |
| 9/15/2013 18:54        | 3                                 | 9.8                | 348                   |
| 9/15/2013 18:55        | 7                                 | 8.3                | 350                   |
| 9/15/2013 18:56        | 4                                 | 7.5                | 344                   |
| 9/15/2013 18:57        | 4                                 | 6.3                | 342                   |
| 9/15/2013 18:58        | 7                                 | 6.6                | 337                   |

| KENMETA Date &<br>Time | TPM10<br>ug/m <sup>3</sup><br>(s) | Wind Spd* S<br>MPH | Wind<br>Dir S*<br>Deg |
|------------------------|-----------------------------------|--------------------|-----------------------|
| 9/15/2013 18:59        | 17                                | 7.2                | 340                   |
| 9/15/2013 19:00        | 17                                | 7.8                | 343                   |

*\*Note: the wind direction and speed data were invalidated for the whole day because they did not meet QA/QC (there was evidence of baseline drift (zero offset ~0.6 mph) for the anemometer).*

## Spokane, Ritzville, Rosalia Hourly Monitoring Data, 9/15/2013

MultiStation: Periodically: 9/15/2013 12:00 AM-9/15/2013 11:59 PM Type:  
AVG 1 Hr.*PST*

| Date & Time        | Pullman-Dexter SE | Rosalia-Josephine St | Ritzville-Alder St | Spokane-Augusta Ave   | Spokane-Augusta Ave | Spokane-Monroe St |
|--------------------|-------------------|----------------------|--------------------|-----------------------|---------------------|-------------------|
|                    | NPM25             | NPM25                | NPM25              | TPM10                 | WIND GUST           | NPM25             |
|                    | ug/m <sup>3</sup> | ug/m <sup>3</sup>    | ug/m <sup>3</sup>  | ug/m <sup>3</sup> (s) | ppb                 | ug/m <sup>3</sup> |
| 9/15/2013 12:00 AM | 9.3               | 8.9                  | 8.8                | 39                    | 5.15                | 15.2              |
| 9/15/2013 1:00 AM  | 8.4               | 8.7                  | 8.5                | 44                    | 3.94                | 16.1              |
| 9/15/2013 2:00 AM  | 8.4               | 8.1                  | 8.5                | 30                    | 5.32                | 13.9              |
| 9/15/2013 3:00 AM  | 8.6               | 7.6                  | 8                  | 27                    | 4.92                | 14.2              |
| 9/15/2013 4:00 AM  | 8.8               | 7.6                  | 8                  | 30                    | 4.21                | 13.7              |
| 9/15/2013 5:00 AM  | 9                 | 7.8                  | 7.7                | 30                    | 3.49                | 13.7              |
| 9/15/2013 6:00 AM  | 8.9               | 7.8                  | 7.7                | 29                    | 2.55                | 12.2              |
| 9/15/2013 7:00 AM  | 8.8               | 8                    | 7.7                | 23                    | 4.79                | 11                |
| 9/15/2013 8:00 AM  | 8.9               | 8                    | 7.5                | 24                    | 8.86                | 11                |
| 9/15/2013 9:00 AM  | 8.8               | 7.3                  | 7.6                | 23                    | 19.33               | 9.5               |
| 9/15/2013 10:00 AM | 7.2               | 7                    | 7.1                | 24                    | 19.46               | 8.5               |
| 9/15/2013 11:00 AM | 5.8               | 6.7                  | 6.3                | 22                    | 17.14               | 8.6               |
| 9/15/2013 12:00 PM | 5.5               | 6.1                  | 5.7                | 21                    | 12.75               | 8.1               |
| 9/15/2013 1:00 PM  | 5.4               | 5.7                  | 5.6                | 18                    | 11.19               | 7.4               |
| 9/15/2013 2:00 PM  | 5.2               | 5.2                  | 5.3                | 11                    | 11.86               | 6.9               |
| 9/15/2013 3:00 PM  | 5                 | 4.4                  | 5.3                | 16                    | 9.53                | 6.9               |
| 9/15/2013 4:00 PM  | 4.9               | 4.4                  | 6.3                | 20                    | 11.63               | 6.8               |
| 9/15/2013 5:00 PM  | 5.5               | 4.5                  | 6.3                | 17                    | 12.35               | 7                 |
| 9/15/2013 6:00 PM  | 6.4               | 4.4                  | 5.7                | 32                    | 6.76                | 7.5               |
| 9/15/2013 7:00 PM  | 24.2              | 16.9                 | 24.3               | 30                    | 5.55                | 8.8               |
| 9/15/2013 8:00 PM  | 21.6              | 31.8                 | 3                  | 6472                  | 42.19               | 55.4              |
| 9/15/2013 9:00 PM  | 16.9              | 7.8                  | 3.3                | 257                   | 27.43               | 4.3               |
| 9/15/2013 10:00 PM | 14.5              | 8.3                  | 3.5                | 42                    | 8.72                | 4.3               |
| 9/15/2013 11:00 PM | 13                | 5.9                  | 4                  | 26                    | 8.1                 | 4.6               |
| Minimum            | 4.9               | 4.4                  | 3                  | 11                    | 2.55                | 4.3               |
| MinDate            | 4:00 PM           | 3:00 PM              | 8:00 PM            | 2:00 PM               | 6:00 AM             | 9:00 PM           |
| Maximum            | 24.2              | 31.8                 | 24.3               | 6472                  | 42.19               | 55.4              |

| MaxDate | 7:00 PM | 8:00 PM | 7:00 PM | 8:00 PM | 8:00 PM | 8:00 PM |
|---------|---------|---------|---------|---------|---------|---------|
| Avg     | 9.5     | 8.3     | 7.2     | 304     | 11.13   | 11.5    |
| Num     | 24      | 24      | 24      | 24      | 24      | 24      |
| Data[%] | 100     | 100     | 100     | 100     | 100     | 100     |
| STD     | 5       | 5.5     | 3.9     | 1286.9  | 8.8     | 9.8     |

# Cliff Mass Weather Blog, Tuesday September 17, 2013

Cliff Mass Weather Blog: Haboob Hits Eastern Washington

Page 1 of 6

## Cliff Mass Weather Blog

This blog provides updated forecasts and comments on current weather or other topics

Tuesday, September 17, 2013

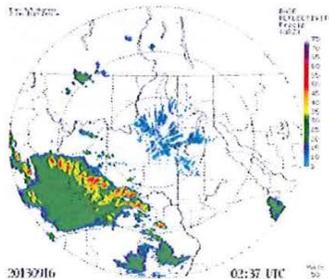
### Haboob Hits Eastern Washington



Picture by Robert Ames on Highway 12 around 7 PM Sunday.

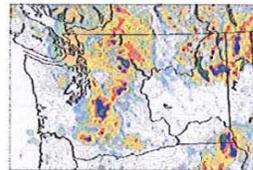
**Haboob.** An exotic name for an exotic weather feature. Haboobs are dramatic dust storms produced by strong winds that are generally associated with thunderstorm gust fronts or very strong cold fronts. Early Sunday evening the characteristic wall of dust was seen over a number of locations of eastern Washington as strong outflow winds from thunderstorms pushed northward over the inland empire.

An intense line of convection was moving northeastward into eastern Washington at 7:37 PM as seen by the Spokane NWS radar. Reds are intense rain and hail.



Two hours later it had push northward in a line extending from Wenatchee to Spokane.

Help Support UW Weather Modeling, Undergraduate Scholarships and Local Weather Prediction Research

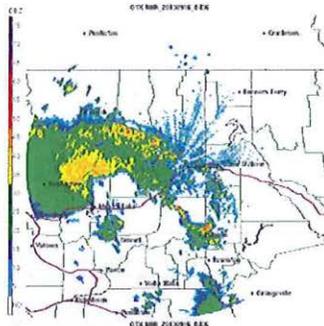


Contributions provide needed support for the weather prediction research and studies of Northwest weather that make this blog possible. Your help has funded critical hardware needs for the regional weather modeling effort. Last year I also provided an undergraduate scholarship to a student interested in weather prediction. You can help by clicking on the image or going to <https://www.washington.edu/giving/make-a-gift/?page=make&code=ATMWEA>

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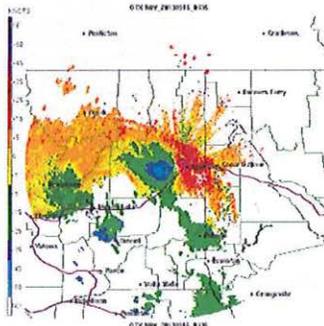
My Book on Northwest Weather

mhtml:file:///Z:/My Documents/ExceptionalEventsDemonstrations/Cliff Mass Weather Blo... 5/29/2014

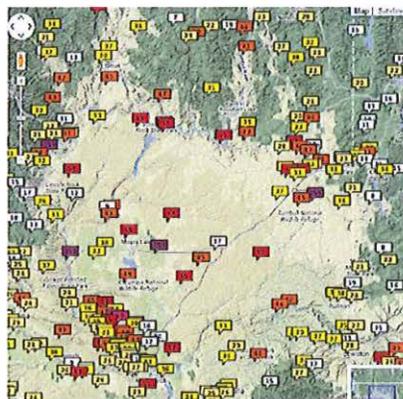


If you look carefully on the radar image you will see a thin line preceding the main echo....that is the gust front, the leading edge of the strong winds.

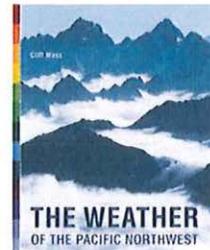
Since the NWS radars have Doppler capability, we can view winds from them as well. Here is the Doppler winds at 9:26 PM. Remember these are the components of the wind toward or away from the radar, not the total wind. Wow. At least 45 knots.



Take a look at a plot of the highest gusts for the 24 h period ending 7 PM Monday. Virtually all the max winds occurred during the thunderstorms. Plenty of gusts between 45 and 55 mph. (Ignore the 159s....something is wrong at those stations).



As a sample of the strong winds, here is what happened at Spokane's Fairchild AFB. Strong gusts (in the 50s mph) and a wind shift to the south. Several thousand homes lost power in areas of eastern Washington and a number of trees were toppled.



Click on Picture for More Info

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Posts

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My Weather Segment is on KPLUI

Fridays at 9 AM right after Birdnote. 88.5 in the Puget Sound area. [KPLU Web Site](#). Want to ask a question I can answer during the show? [Click here](#)



Click image for info

Some of My Presentations on Video

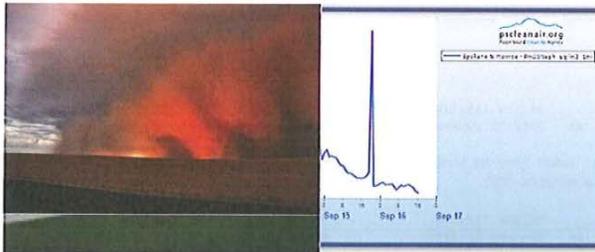
- Climate Talk-1
- Climate Talk-2
- NW Windstorms-Science Cafe-1
- NW Windstorms-Science Cafe-2
- NW Windstorms-Science Cafe-3
- Windstorm Talk at City Hall

Favorite Weather Websites

- Seattle Weather Forecast
- UW Radar Viewer
- Scott Sistik Weather Blog
- National Weather Service, Seattle
- Probcast Probabilistic Forecasts

Blog Archive

- ▶ 2014 (58)
- ▼ 2013 (203)
  - ▶ December (22)



With a dust storm going on, you would expect some deterioration in air quality, right? Check out the measurements from the nephelometer (measures the particles in the air) at Spokane. A very well defined spike before midnight Sunday. That's the Haboob.

Haboobs are getting less frequent in eastern Washington as farmer's practice better soil conservation approaches, but it is hard not to get one after a parching summer and such strong winds.

By the way, Haboob or Arabic *habūb* means violent storm or strong winds. Let me end with a video of the Haboob from Corey Spencer at the Wine Valley Golf Cours.

Picture courtesy of Andrew Brown / National Weather Service  
A dust storm approaches Highway 195 in eastern Washington on Sunday night.

Update.

Here is a sample of the storm reports accumulated by the National Weather Service Spokane office.

- ▶ November (16)
- ▶ October (19)
- ▼ September (23)
  - Brief Post Mortem
  - And now the winds...
  - September Storm: Nowcast Sunday 10AM
  - Weekend's Big Weather Event
  - Heavy Precipitation Update
  - Unusual Early Season Heavy Rainfall Event Heading ...
  - A Conjugated Cold Front
  - Wealthy Folks Try to Take Over the Seattle School ...
  - First Day of Fall, First Big Storm
  - Haboob Hits Eastern Washington
  - Thunderstorms are Back
  - Super-Inversion and the Return of Thunderstorms
  - Low Cloud Forecast Failure
  - Temperature Surge and Thermal Trough
  - The Banana Belt Ripens
  - Mega Bird Migration
  - Impressive Rain Totals
  - 10 PM Update
  - 4 PM NOWCAST for the Heavy Precipitation Event
  - 11 AM Heavy Rain NOWCAST
  - Unusual Heavy Rain Event to Hit the Northwest
  - Critical Aircraft Weather Data Unused By NOAA
  - The Meteorology of Husky Stadium

- ▶ August(15)
- ▶ July(16)
- ▶ June(16)
- ▶ May(15)
- ▶ April(14)
- ▶ March(15)
- ▶ February (12)
- ▶ January (18)

- ▶ 2012 (218)
- ▶ 2011 (211)
- ▶ 2010 (212)
- ▶ 2009 (270)
- ▶ 2008 (99)

Access the blog using your iPhone/iPod



Click on image to access this app from the iTunes store.

Statistics

13794127

Large number of trees down. When power poles are being taken down, you know you have a serious problem!

0723 PM TSTM WND DMG OTHELLO 46.82N 119.17W  
09/15/2013 ADAMS WA UTILITY COMPANY

NUMEROUS TREES AND POWER LINES DOWN. TREES DOWN ON HOMES AND FENCES. ESTIMATED 40 POWER POLES SNAPPED OFF.

0725 PM TSTM WND DMG OTHELLO 46.82N 119.17W  
09/15/2013 ADAMS WA TRAINED SPOTTER

PORTABLE SHELTER BLOWN 50 TO 60 FT. VISIBILITY REDUCED TO LESS THAN A QUARTER MILE IN BLOWING DUST.

0730 PM TSTM WND GST WARDEN 46.97N 119.05W  
09/15/2013 H58.00 MPH GRANT WA TRAINED SPOTTER

VISIBILITY REDUCED TO 50 FT IN BLOWING DUST

0743 PM TSTM WND GST 22 SW RITZVILLE 46.90N 118.71W  
09/15/2013 H50.00 MPH ADAMS WA TRAINED SPOTTER

VISIBILITY REDUCED TO ZERO IN BLOWING DUST.

0745 PM TSTM WND DMG MOSES LAKE 47.12N 119.29W  
09/15/2013 GRANT WA BROADCAST MEDIA

NUMEROUS TREES AND POWER LINES WERE BLOWN DOWN. SOME TREES FELL ON HOUSES AND VEHICLES.

0745 PM TSTM WND GST LIND 46.97N 118.61W  
09/15/2013 H55.00 MPH ADAMS WA MESONET

0753 PM TSTM WND DMG WASHTUCHA 46.75N 118.31W  
09/15/2013 ADAMS WA UTILITY COMPANY

POWER OUTAGE AFFECTING 40 CUSTOMERS. COMBINE SHED WAS DESTROYED. UPROOTED 5 TREES. ROOF BLOWN OFF OF A BARN.

0756 PM TSTM WND DMG 3 ESE GRAND COULEE 47.92N 118.94W  
09/15/2013 LINCOLN WA TRAINED SPOTTER

LARGE TREE LIMB DOWN. ESTIMATED 10 TO 12 INCHES IN DIAMETER. NUMEROUS OTHER 3 TO 4 INCH DIAMETER BRANCHES DOWN ALONG ROUTE FROM HOME TO DOWNTOWN. MEASURED 47 MPH ON HOME WEATHER STATION.

0800 PM TSTM WND DMG 4 INM RUFF 47.22N 119.04W  
09/15/2013 GRANT WA PUBLIC

OUTBUILDING DESTROYED. FENCE DAMAGED BY FLYING DEBRIS.

0815 PM TSTM WND DMG 6 NNE SOAP LAKE 47.46N 119.45W  
09/15/2013 GRANT WA BROADCAST MEDIA

AT LEAST 6 POWER POLES WERE SHAPPED OFF.

0815 PM TSTM WND GST ODESSA 47.33N 118.69W  
09/15/2013 H59.00 MPH LINCOLN WA MESONET

ODESSA AGRIMET STATION MEASURED 59 MPH WIND GUST.

0845 PM TSTM WND DMG 8 SE HARRINGTON 47.40N 118.13W  
09/15/2013 LINCOLN WA PUBLIC

ROOF BLOWN OFF OF A BARN. TIME IS ESTIMATED FROM RADAR.

mhtml:file:///Z:/My Documents/ExceptionalEventsDemonstrations/Cliff Mass Weather Blo... 5/29/2014

0910 PM TSTM WND GST 3 N AIRWAY HEIGHTS 47.69N 117.58W  
 09/15/2013 -M60.00 MPH SPOKANE WA OFFICIAL NWS OBS

60 MPH WIND GUST AT NWS OFFICE.

0920 PM TSTM WND IMG 3 ESE SPOKANE 47.66N 117.34W  
 09/15/2013 SPOKANE WA BROADCAST MEDIA

SEVERAL TENTS AT THE SPOKANE FAIRGROUNDS WERE DAMAGED AND FLIPPED DUE TO HIGH WINDS FROM THUNDERSTORMS BETWEEN 915 AND 945 PM PDT.

0925 PM TSTM WND IMG 13 SW IRBY 47.22N 119.04W  
 09/15/2013 GRANT WA PUBLIC

PERSON REPORTED SHOP DOORS BLOWN OFF AND SHOP BLOWN DOWN AND POWER POLES DOWN ON WHEELER RD

1049 PM TSTM WND GST 12 N WAHA 46.38N 116.85W  
 09/15/2013 M61.00 MPH NEZ PERCE ID MESONET

THE WIND GUST WAS MEASURED AT THE CORRAL CREEK RAWS STATION AND LIKELY OCCURRED DURING THE PREVIOUS HOUR.

1050 PM TSTM WND IMG PRIEST RIVER 48.19N 116.91W  
 09/15/2013 BONNER ID LAW ENFORCEMENT

LAW ENFORCEMENT STATED SEVERAL POWER LINES DOWN ACROSS AREAS OF SOUTHWESTERN BONNER COUNTY. EXACT LOCATIONS UNKNOWN AT TIME OF REPORT AND NOT SURE IF IT WAS FROM DOWNED TREES OR LIMBS.



Picture by Skyking3286 at Radlec Hospital in Richland

Posted by Cliff Mass at 12:30 AM

8 comments:

**Bobsaid...**  
 On the 0436 radar image, you can see what looks like the gust front as a darker blue line along the northern edge of the storms.  
 I remember seeing a few of these as a small child in Saudi Arabia back in the early 1960s. I think

mhtml:file:///Z:/My Documents/ExceptionalEventsDemonstrations/Cliff Mass Weather Blo... 5/29/2014

<http://cliffmass.blogspot.com/2013/09/haboob-hits-eastern-washington.html>

they were a formative event in my interest in weather. Well, that, and Dr Seuss' *Bartholomew and the Oobleck*...

September 17, 2013 at 2:46 AM

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**Unknownsaid...**

The stations reporting erroneous measurements are all reporting the same value -- 159. Why is that?

September 17, 2013 at 8:00 AM

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**Marksaid...**

<http://www.flickr.com/photos/43207034@N06/9787262335/>

View for Kadtec Hospital on Saturday in Richland, WA, as the dust cloud over takes the TriCities, WA

September 17, 2013 at 10:09 AM

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**metannoyingsaid...**

What is the difference between a *haboob* and a *derecho*?

September 17, 2013 at 3:15 PM

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**Ansetsaid...**

I was in it! A friend and I were climbing in the Entiat Mountains Friday through Monday. We had quite a thunderstorm late Sunday night. Almost a midwest style storm.

September 17, 2013 at 6:02 PM

---

**mjgrotasaid...**

Boy you guy's are having quite the week!

when do the Frogs and locust arrive!

September 17, 2013 at 10:48 PM

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**DRYSIDECOUGSaid...**

This storm hit Connell, Washington at around 7:30PM. It blew in with such force that it felled a 16 inch pine tree that fell across a home and with electrical sparks or lightning burned the home to the ground.

A fellow I work with lost power in Othello for the better part of a full day. Highway 17 was closed because of the dozens of downed power poles laying everywhere.

Unless you go through one of these storms you don't have a real appreciation of the power they possess and your total helplessness when it hits.

September 17, 2013 at 11:17 PM

---

**Eric Mosssaid...**

Please don't refer to Eastern Washington as the Inland Empire, its an incorrect usage of a term used for the urban area to the east of Los Angeles. Us Pacific Northwesterners don't want any affiliation with that...

September 28, 2013 at 2:14 PM

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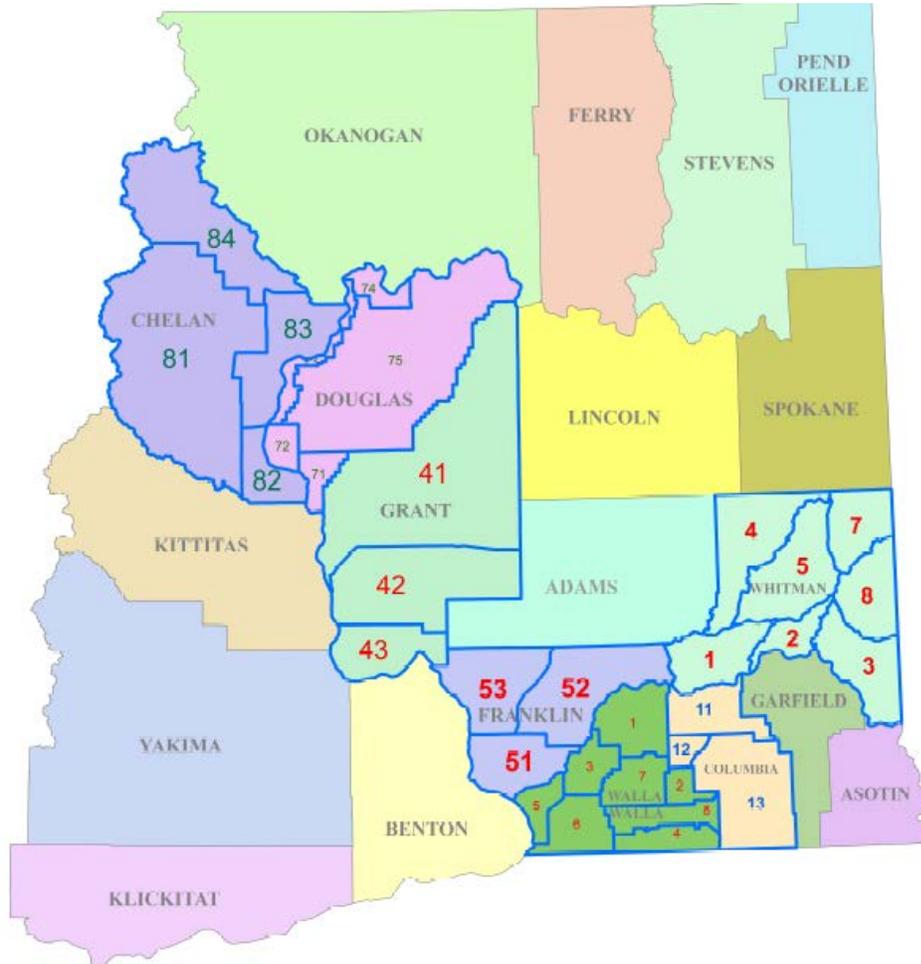
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# Ecology Burn Decision

## Zone Map



## Daily Burn Decision – 9/15/2013

[Burn call for 9/15 - corrected](#)

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**Decision For:** Sunday, September 15, 2013

**Daily Notes:** Only burn if conditions are right in your area smoke must not have impacts

Please Note: If a recording is listed as CALL IN, growers need to contact Ecology in Spokane at 509-329-3400 Mon-Fri from 8-5 to get scheduled for a burn decision (NOTE: calling 509-329-3400 outside of M-F 8-5 will reach WA DEM who cannot help with burn call issues). Calling in the afternoon is preferred. It is very unlikely a grower will get permission the same day they first call Ecology - plan ahead.

The daily burn decision for Ecology regulated by Eastern Washington counties is determined by the regional office responsible for the county in question. If you have questions about the daily burn decision please call the correct office. If you wish to subscribe or unsubscribe from the listserv used to distribute the daily burn decisions see the links under "ERO listserv" and "CRO listserv" below.

The Eastern Regional Office (ERO) in Spokane is responsible for the following counties: Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Stevens, Walla Walla and Whitman. Call (509) 329-3400 for questions concerning these counties.

**ERO listserv:** <http://listserv.wa.gov/cgi-bin/wa?SUBED1=ag-burn-decision-ero&A=1>

The Central Regional Office (CRO) in Yakima is responsible for the following counties: Chelan, Douglas, Kittitas, Klickitat and Okanogan. Call (509) 575-2490 for questions concerning these counties.

**CRO listserv:** <http://listserv.wa.gov/cgi-bin/wa?SUBED1=BURN-DECISION-CRO&A=1>

The three remaining counties (Benton, Spokane and Yakima) have local air authorities. See the listings below for phone numbers.

Winds are indicated by direction the wind is coming from (i.e.: if you face in the direction listed, the wind would be blowing in your face)

**Air authorities:** <http://www.ecy.wa.gov/programs/air/local.html>

**Zone map:** [http://www.ecy.wa.gov/programs/air/aginfo/research\\_pdf\\_files/ZoneMap.pdf](http://www.ecy.wa.gov/programs/air/aginfo/research_pdf_files/ZoneMap.pdf)

Ag & outdoor burning questions in:

Spokane (509) 477-4727, Benton (509) 783-1304 or Yakima (509) 834-2050 (all local air authorities)

Okanogan, Chelan, Douglas, Kittitas, or Klickitat: (509) 575-2490 (Ecology, Yakima office)

Eastern Washington counties not listed: (509) 329-3400 (Ecology, Spokane office)

**FORECAST:** Expect limited burning tomorrow

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**Adams** Start at 12:00 PM Fires out by 3:00 PM winds E am SE pm

notes: 200 acre limit

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**Asotin** NO BURN

notes:

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**Columbia** By zone today, see zone information

notes:

**Zone 11:** Start at 12:00 PM Fires out by 3:00 PM winds SE am SE pm

**notes:** 200 acre limit

**Zone 12:** Start at 12:00 PM Fires out by 3:00 PM winds SE am SE pm

**notes:** 200 acre limit

**Zone 13:** NO BURN

**notes:**

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**Franklin** By zone today, see zone information

notes:

**Zone 51:** NO BURN

**notes:**

**Zone 52:** NO BURN

**notes:**

**Zone 53:** Start at 12:00 PM Fires out by 3:00 PM winds SE am SE pm

**notes:** 160 acre limit

---

**Garfield** NO BURN

notes:

---

**Grant** Start at 12:00 PM Fires out by 3:00 PM winds variable am SE pm

notes:

**Zone 41:**

**notes:**

**Zone 42:**

**notes:**

**Zone 43:**

**notes:**

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**Lincoln** Start at 12:00 PM Fires out by 3:00 PM winds SE am SE pm

notes:

---

**Stevens** NO BURN

notes:

---

**& P. Oreille** NO BURN

notes:

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**Walla Walla** By zone today, see zone information

notes:

**Zone 01:** Start at 11:00 AM Fires out by 2:00 PM winds SE am SE pm

**notes:** 200 acre limit

**Zone02:** Start at 12:00 PM Fires out by 3:00 PM winds SE am SE pm

**notes:** 160 acre limit

**Zone 03:** NO BURN

**notes:**

**Zone 04:** NO BURN

**notes:**

**Zone 05:** NO BURN

|                                                                              |
|------------------------------------------------------------------------------|
| <b>notes:</b>                                                                |
| <b>Zone 06:</b> NO BURN                                                      |
| <b>notes:</b>                                                                |
| <b>Zone 07:</b> Start at 12:00 PM Fires out by 3:00 PM winds SE am SE pm     |
| <b>notes:</b> 200 acre limit                                                 |
| <b>Zone 08:</b> Start at 12:00 PM No burning today 3:00 PM winds SE am SE pm |
| <b>notes:</b>                                                                |

**Whitman** By zone today, see zone information  
notes:

|                                                                         |
|-------------------------------------------------------------------------|
| <b>Zone 1:</b> NO BURN                                                  |
| <b>notes:</b>                                                           |
| <b>Zone 2:</b> Start at 12:00 PM Fires out by 3:00 PM winds SE am SE pm |
| <b>notes:</b>                                                           |
| <b>Zone 3:</b> NO BURN                                                  |
| <b>notes:</b>                                                           |
| <b>Zone 4:</b> Start at 12:00 PM Fires out by 3:00 PM winds SE am SE pm |
| <b>notes:</b>                                                           |
| <b>Zone 5:</b> Start at 12:00 PM Fires out by 3:00 PM winds SE am SE pm |
| <b>notes:</b>                                                           |
| <b>Zone 7:</b> NO BURN                                                  |
| <b>notes:</b>                                                           |
| <b>Zone 8:</b> NO BURN                                                  |
| <b>notes:</b>                                                           |

Not routinely called (does not have mailbox, ag burning in this area is almost exclusively on Indian lands)

**Ferry** NO BURN  
notes:

# Media

NWS Spokane includes 9/15 event as one of the top weather events of the month.

**National Weather Service Spokane**

**September 15, 2013**  
Sunday Night Football Thunderstorms

Wall of Dust: Highway 17 Near Othello

Qwest Field Seattle Photo from BleacherReport.com

Arbor Crest Winery Spokane Photo by OneMindCreations.com

Ritzville

Spokane Fair Grounds

Thunderstorms caused problems over much of the state of Washington on September 15th. Lightning delayed the much anticipated Sunday Night game between the Seahawks and 49ers. East of the Cascades, a line of thunderstorms produced wind damage from Othello to Moses Lake to Coulee City to Spokane.

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

## AgWeatherNet September 2013 Weather Review for Washington

### Eventful September Ends with an Historic Storm

[Nic Loyd](#), Meteorologist, 509-786-9357

[Gerrit Hoogenboom](#), Director, 509-786-9371

[http://weather.wsu.edu/awn.php?page=AWN\\_September\\_2013\\_Weather\\_Review&menu\\_item=news](http://weather.wsu.edu/awn.php?page=AWN_September_2013_Weather_Review&menu_item=news)

## AgWeatherNet September 2013 Weather Review for Washington

### Eventful September Ends with an Historic Storm

[Nic Loyd](#), Meteorologist, 509-786-9357

[Gerrit Hoogenboom](#), Director, 509-786-9371

#### *Overview*

The September 28 to 30 superstorm was impressive even by mid-winter standards. The fact that it struck Washington before October 1<sup>st</sup> makes it truly remarkable. From heavy rain and high winds to heavy snow, the last 3 days of September featured a plethora of extreme weather. On September 28<sup>th</sup>, the Olympia area experienced nearly 3 inches of rain, while winds gusted as high as 71 mph in eastern Washington. Well over a foot of snowfall accumulated on the 29<sup>th</sup> and 30<sup>th</sup> at higher elevation locations places like Paradise, Mt. Rainier. The cause of the inclement weather was a unique atmospheric setup and a convergence of critical factors. As cold air from Alaska poured into the North Pacific Ocean, a strong jet stream interacted with remnants of a tropical typhoon to create the massive cold core low pressure system. Following a weak weather system passage on September 27<sup>th</sup>, a stronger cold front plowed through Washington on the 28<sup>th</sup>, and delivered the first round of heavy rain and wind to western Washington. However, as surface low pressure rapidly strengthened off the coast, an even stronger front swept through Washington on the night of the 29<sup>th</sup>, and ushered in round two of the wind and rain. Heavy rain showers continued in western areas into September 30<sup>th</sup>, and strong wind persisted east of the Cascades. Thanks to a sizable contribution from the superstorm, September was very wet in western Washington. [East Olympia's](#) monthly rainfall total was nearly 10 inches, of which almost 5 inches fell during the final three days of September.

In addition to the superstorm, the active weather month of September featured several other noteworthy events. The severe weather in central Washington on the evening of the 15<sup>th</sup> included heavy rain squalls, lightning, hail, and strong winds, and was undoubtedly one of the region's latest thunderstorms outbreaks in recent history. Some corn fields in the Tri-Cities area were flattened by winds of over 60 mph, while many other crops were damaged by the harsh conditions that occurred all across central Washington. Several sites in central Washington reported station record 15 minute rain totals of up to one inch during the storms. It is interesting to note that the outbreak was preceded earlier in the day by [College Place](#) reaching 101 degrees, which was the latest date that the network has ever reached 100 degrees. Stormy weather earlier in the month had also caused several debris flows and road closures on the 5<sup>th</sup>.

Overall, the trend for the month can be characterized by a transition from very warm conditions early to cloudy and much cooler days later in the month. In fact, the combination of early heat, active conditions,

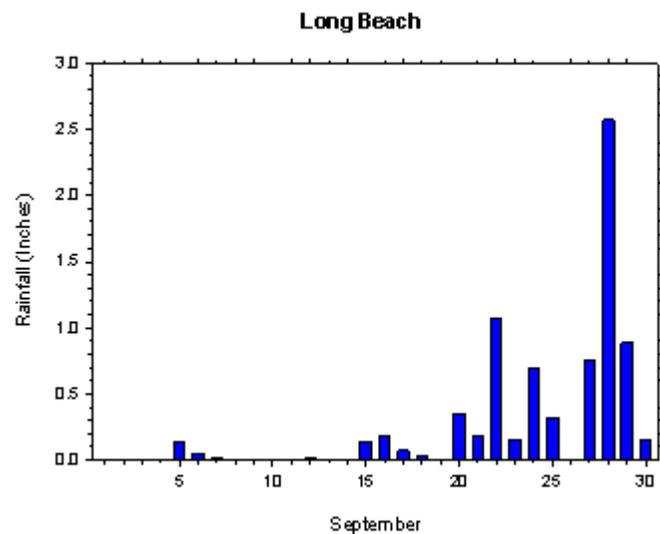
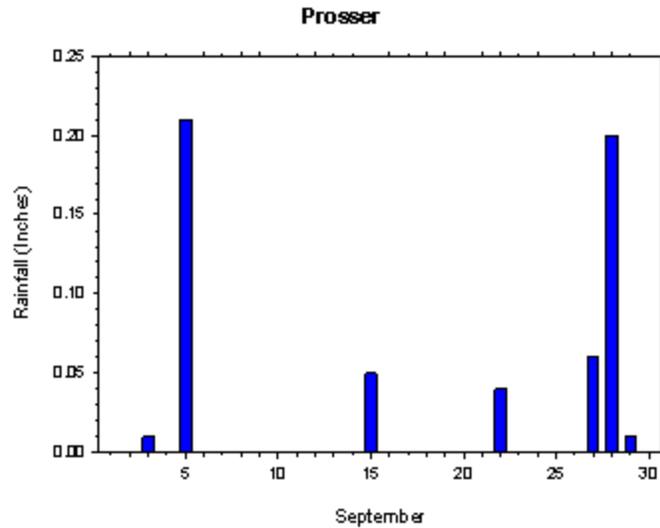
and poor radiational cooling later in the month resulted in record warm monthly mean low temperatures around the state. Prosser's average low temperature was 52.4 degrees, or 4.5 degrees above average, which is a record (1989 to present). This breaks the old record of 51.5 degrees, set in 1990, by nearly one degree. It is also the first time that Prosser's average September low temperature has been above 50 degrees since 1998. In fact, September 2013 marks the second consecutive month of record warm night-time temperatures. The last time that a larger (positive or negative) monthly temperature anomaly (high, low, or mean) was recorded at [Prosser](#) was May of 2011. The most recent occurrence of a larger positive monthly temperature anomaly was February of 2010. By contrast, September high temperatures were around average, which resulted in mean temperatures that were only somewhat (around 2 degrees) above average.

| September 2013 Average Temperatures (°F) |                |                |                |                |             |                |                         |
|------------------------------------------|----------------|----------------|----------------|----------------|-------------|----------------|-------------------------|
| <i>Location (Period of Record)</i>       | <i>Maximum</i> | <i>Anomaly</i> | <i>Minimum</i> | <i>Anomaly</i> | <i>Mean</i> | <i>Anomaly</i> | <i>Soil Temperature</i> |
|                                          |                |                |                |                |             |                | <i>8 inches</i>         |
| Prosser (WSU IAREC; 1989-2013)           | 78.0           | -0.3           | 52.4           | 4.5            | 64.6        | 2.1            | 68.1                    |
| Moxee (1989-2013)                        | 78.7           | -0.5           | 47.7           | 5.7            | 62.1        | 2.3            | 68.4                    |
| Mt Vernon (WSU NWREC; 1994-2013)         | 67.9           | -0.2           | 52.8           | 3.9            | 59.7        | 1.6            | 62.2                    |
| Wenatchee (WSU TFREC; 1994-2013)         | 78.6           | -0.2           | 53.7           | 4.6            | 65.4        | 2.1            | 70.2                    |
| Tri-Cities (1995-2013)                   | 80.7           | -0.3           | 55.6           | 4.1            | 67.8        | 2.0            | 75.3                    |
| Walla Walla (1993-2013)                  | 77.6           | 0.2            | 55.4           | 4.0            | 65.4        | 1.4            | 72.9                    |
| Moses Lake (1989-2013)                   | 77.8           | -0.6           | 51.9           | 4.9            | 64.2        | 1.7            | 71.1                    |
| Omak (Pogue Flat; 2005-2013)             | 76.2           | NA             | 52.4           | NA             | 63.5        | NA             | 68.2                    |
| Royal City East (2008-2013)              | 76.7           | NA             | 54.4           | NA             | 64.7        | NA             | 70.5                    |
| Pullman (2008-2013)                      | 71.8           | NA             | 47.7           | NA             | 59.9        | NA             | 62.4                    |
| Long Beach (WSU Long Beach; 2005-2013)   | 66.5           | NA             | 52.0           | NA             | 58.8        | NA             | 61.0                    |

| September 2013 Average Temperatures (°F) |                |                |                |                |             |                |                         |
|------------------------------------------|----------------|----------------|----------------|----------------|-------------|----------------|-------------------------|
| <i>Location (Period of Record)</i>       | <i>Maximum</i> | <i>Anomaly</i> | <i>Minimum</i> | <i>Anomaly</i> | <i>Mean</i> | <i>Anomaly</i> | <i>Soil Temperature</i> |
|                                          |                |                |                |                |             |                | <i>8 inches</i>         |
| Sequim (2008-2013)                       | 66.9           | NA             | 48.4           | NA             | 57.5        | NA             | 59.7                    |
| Seattle (2011-2013)                      | 70.3           | NA             | 55.6           | NA             | 61.8        | NA             | 66.9                    |
| Vancouver (WSU RE; 2008-2013)            | 71.4           | NA             | 53.9           | NA             | 62.1        | NA             | 65.3                    |

| 2013 Rainfall and Evapotranspiration (ET) (inches) |                 |             |              |                    |
|----------------------------------------------------|-----------------|-------------|--------------|--------------------|
| <i>Location (Period of Record)</i>                 | <i>Rainfall</i> |             | <i>ET</i>    | <i>Net</i>         |
|                                                    | <i>Sept.</i>    | <i>2013</i> | <i>Sept.</i> | <i>(Rain - ET)</i> |
| Prosser (WSU IAREC; 1989-2013)                     | 0.58            | 4.66        | 5.46         | -4.88              |
| Moxee (1989-2013)                                  | 0.12            | 3.62        | 4.66         | -4.54              |
| Mt. Vernon (WSU NWREC; 1994-2013)                  | 4.10            | 23.18       | 2.29         | 1.81               |
| Wenatchee (WSU TFREC; 1994-2013)                   | 1.21            | 6.85        | 4.09         | -2.88              |
| Tri-Cities (1995-2013)                             | 0.46            | 3.25        | 5.98         | -5.52              |
| Walla Walla (1993-2013)                            | 1.79            | 9.28        | 4.46         | -2.67              |
| Moses Lake (1989-2013)                             | 0.95            | 4.94        | 5.41         | -4.46              |
| Omak (Pogue Flat; 2005-2013)                       | 1.10            | 7.32        | 4.67         | -3.57              |
| Royal City East (2008-2013)                        | 0.52            | 3.59        | 4.95         | -4.43              |

| 2013 Rainfall and Evapotranspiration (ET) (inches) |          |       |       |             |
|----------------------------------------------------|----------|-------|-------|-------------|
| Location (Period of Record)                        | Rainfall |       | ET    | Net         |
|                                                    | Sept.    | 2013  | Sept. | (Rain - ET) |
| Pullman (2008-2013)                                | 2.17     | 10.13 | 5.59  | -3.42       |
| Long Beach (WSU Long Beach; 2005-2013)             | 7.77     | 39.75 | 2.22  | 5.55        |
| Sequim (2008-2013)                                 | 2.62     | 9.09  | 2.60  | 0.02        |
| Seattle (2011-2013)                                | 4.87     | 18.03 | 2.73  | 2.14        |
| Vancouver (WSU RE; 2008-2013)                      | 5.61     | 22.02 | 3.32  | 2.29        |



***September Weather***

*Early September—Warm But Stormy*

September began with temperatures as warm as the mid-90s and southerly flow aloft. Highs on the 2<sup>nd</sup> were as warm as 94 degrees in central Washington, although a late evening squall dumped nearly three-quarters of an inch of rain at [McNary](#) (east of Plymouth). Showers and storms affected mainly western areas on the 3<sup>rd</sup>, as the Olympia area recorded rain values in excess of 0.6 inches. Storms increased late on September 4<sup>th</sup>, as a moist and dynamic upper low approached the Northwest.

September 5<sup>th</sup> was a very stormy day, as there were several reports of severe weather across Washington. Heavy rain yielded flash flooding, debris flows, and road delays/closures in some spots. On the evening of the 5<sup>th</sup>, SR 410 west of Naches was closed due to a landslide, while debris flows also closed the North Cascades Highway. Much of the Puget Sound region received rainfall in excess of one inch. [WSU Sunrise](#) (near Wenatchee) registered an impressive daily total of 1.4 inches, while [Thorp](#) received 1.1 inches. An additional 1.86 inches fell at Puyallup on the 6<sup>th</sup>, as storm totals reached 5 inches in parts of the Cascades. Many locations received 15 minute downpours of over 0.3 inches, including 0.44 inches during

the evening of the 5<sup>th</sup> at [Thorp](#). Concurrent temperature drops of greater than 10 degrees in 15 minutes were common. Also, the wind gusts at [Mesa SE](#) peaked at 49 mph during the stormy period. Strong wind and even hail were observed in thunderstorms, as temperatures dropped quickly. Some rain lingered into the 6<sup>th</sup>, along with clouds and much cooler temperatures. Some areas that had been in the upper 80s on September 5<sup>th</sup> failed to reach 70 degrees on the 6<sup>th</sup>.

#### *Mid September–From Hot and Dry to Cool and Unsettled*

Lingering showers on the 7<sup>th</sup> gave way to sunny and warmer conditions on the 8<sup>th</sup>, with highs climbing back into the 80s in central Washington. Hot and dry weather commenced on the 9<sup>th</sup>, as [Maryhill](#) reached 92 degrees, while [College Place](#) reached 95 degrees on the 10<sup>th</sup>. Several locations east of the Cascades reached 98 degrees on the 11<sup>th</sup>, while Vancouver and [Lynden](#) (north of Bellingham) reached 96 and 95 degrees, respectively. More hot weather on September 12<sup>th</sup> sent [Maryhill](#) up to 98 degrees.

High temperatures reached 101 degrees at [College Place](#) on September 15<sup>th</sup>, which is the latest that the AWN network has ever recorded a 100+ degree temperature. However, cooling finally arrived in the west, as rain developed and winds increased. Severe weather late on the 15<sup>th</sup> led to significant rain totals during numerous heavy downpours. Station records were set at [Wheeler](#) (1.02 inches) and [Eby](#) (0.96 inches) for 15 minute rainfall values. Winds gusted above 60 mph in several spots, and temperatures dropped quickly in rain squalls. Unsettled and cool conditions continued for September 16<sup>th</sup> to 18<sup>th</sup>, and then milder and drier weather returned for the 19<sup>th</sup> and 20<sup>th</sup>.

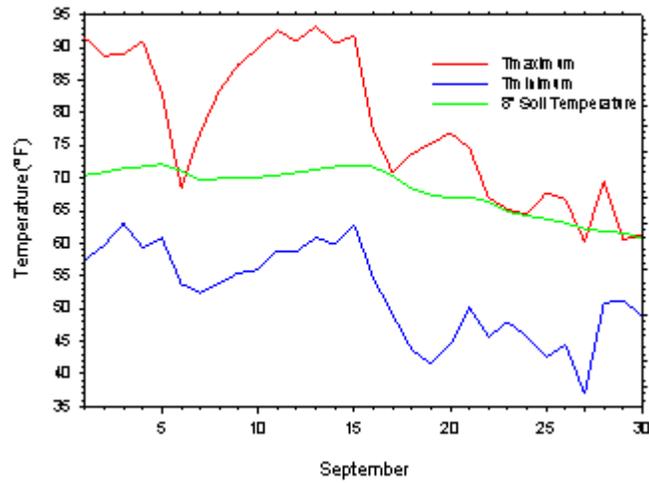
#### *Late September–Historic Storm to End the Month*

The arrival of a weak system on the 20<sup>th</sup> initiated another pattern change to more unsettled weather. A stronger storm followed on the 22<sup>nd</sup>, and delivered heavy rain, wind, and cool air to Washington. The high temperature was only 57 degrees at [Underwood](#), while [East Olympia](#) recorded 1.4 inches of rain. Highs were as low as the upper 50s again on the 23<sup>rd</sup>, while 0.71 inches of rain fell at Silverton North, OR. On September 24<sup>th</sup>, many areas reached the 60s, although Anatone topped out at just 51 degrees, thanks in part to 0.9 inches of rainfall. An additional 0.46 inches fell at Anatone on the 25<sup>th</sup>, as cool weather continued. Conditions dried a bit on the 26<sup>th</sup>, and low temperatures cooled into the mid-30s around [Pullman](#), as well as the Whatcom County area. Rain arrived early on the 27<sup>th</sup> in the west, although dry conditions in eastern areas allowed [Moxee](#) to drop below 33 degrees.

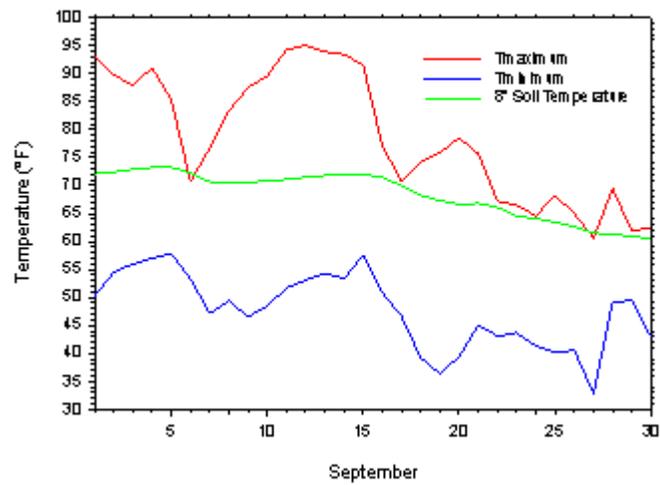
Wet and windy weather quickly returned, and September ended on a stormy note. As remnants of a tropical system became entrained in the westerlies, several strong fronts crossed Washington on the 28<sup>th</sup> and 29<sup>th</sup>. Nearly 3 inches of rain fell at [East Olympia](#) on the 28<sup>th</sup>, and winds gusted to 71 mph at [Huntsville](#), while a couple of feet of snow fell in the high Cascades over the last two days of September! On the 30<sup>th</sup>, strong wind returned to [Huntsville](#), where sustained speeds of 48 mph were recorded. Meanwhile, [Montesano](#) received 1.71 inches of rain, and Olympia and Puyallup recorded around 1.5 inches. Highs across the state topped out in the mid-50s to mid-60s on the final day of September.

## September 2013 Daily Temperatures

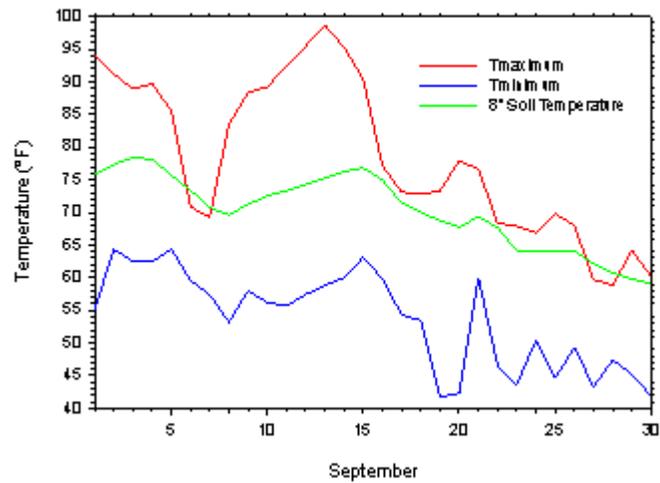
### Prosser

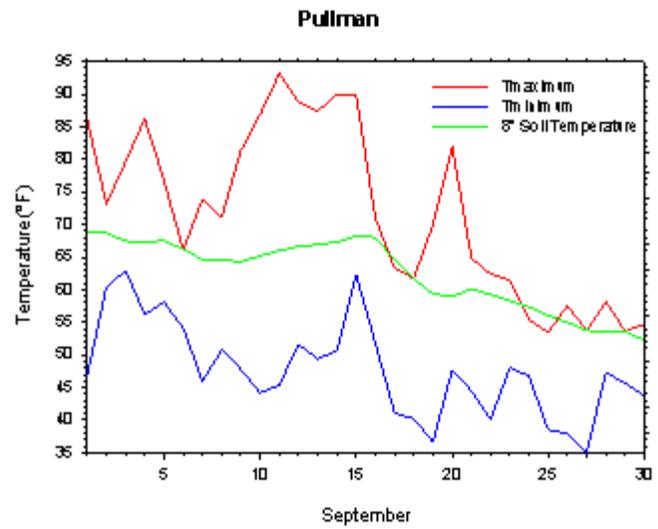
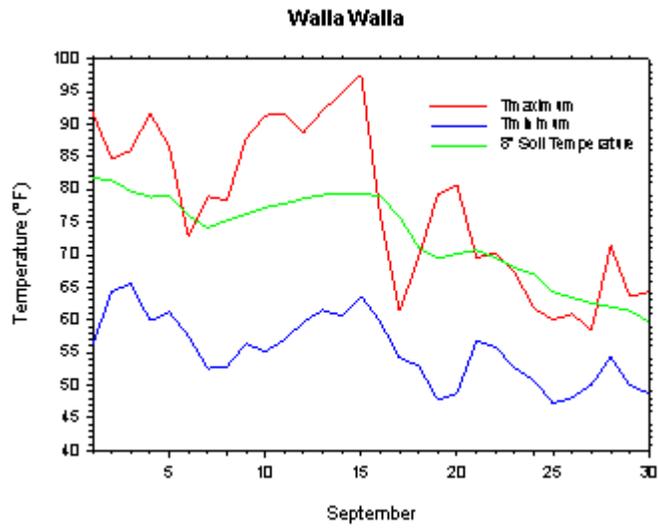
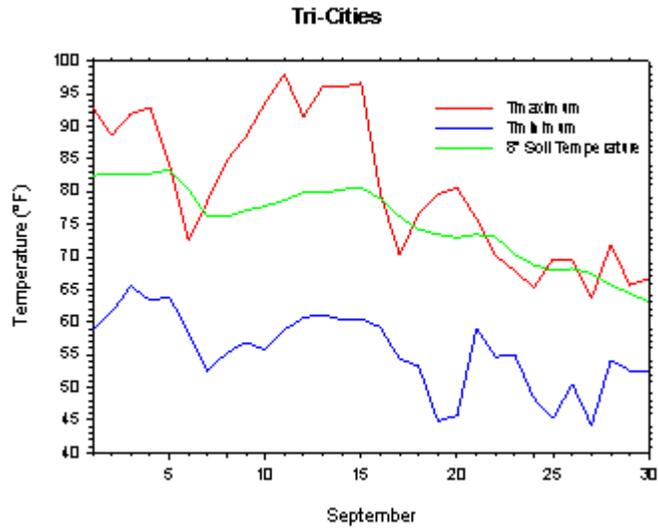


### Moxee

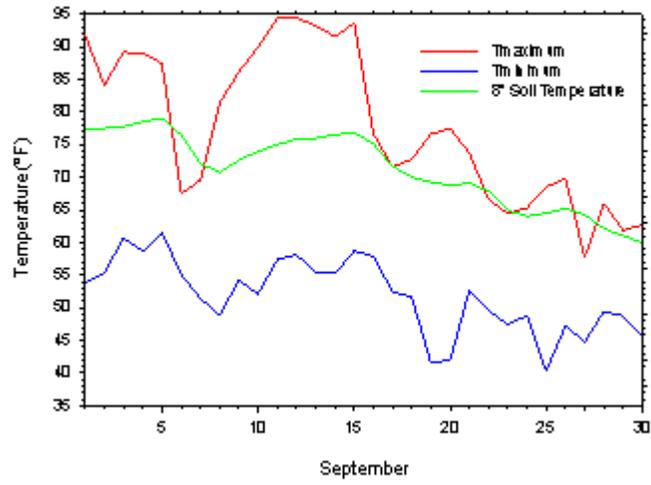


### Wenatchee

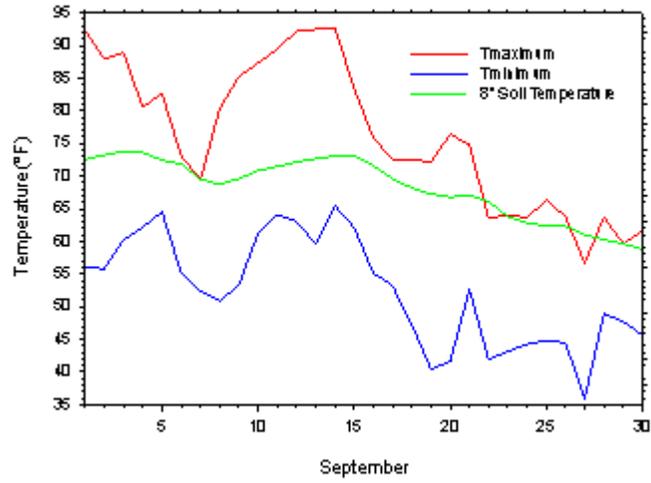


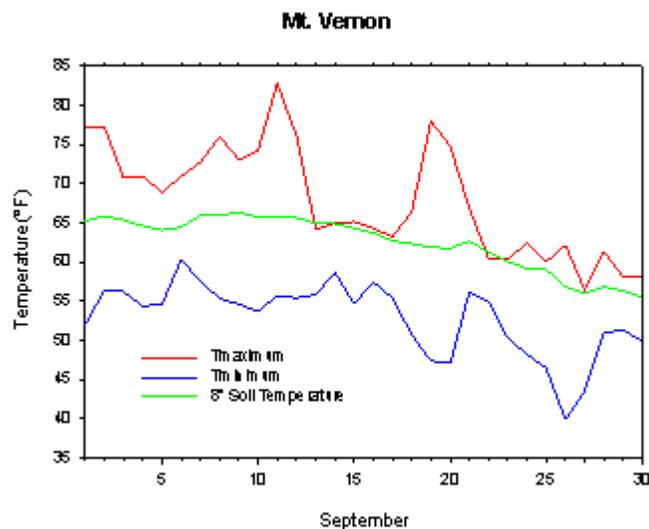
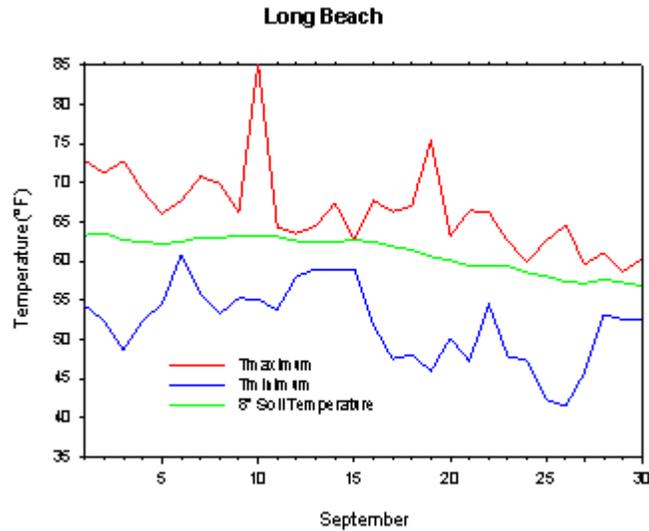


### Moses Lake



### Omak

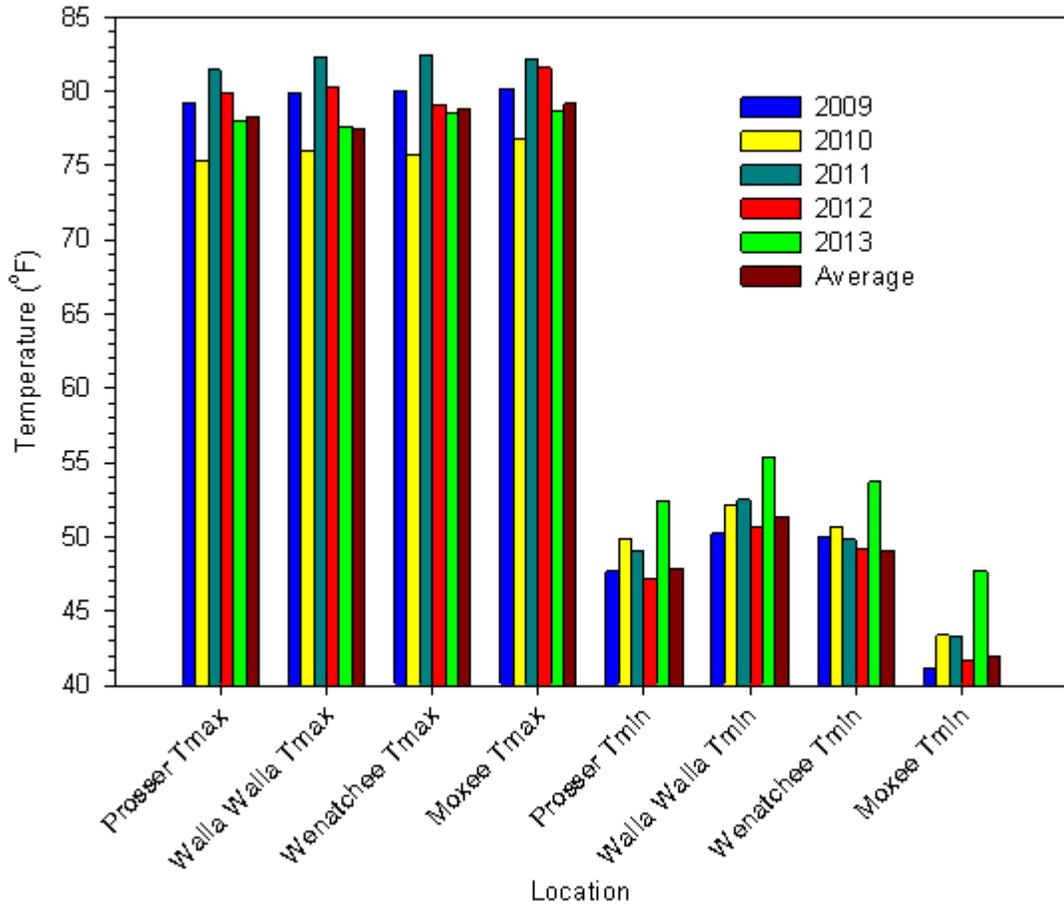




*September-By The Numbers*

The average September temperature at [Prosser \(WSU IAREC\)](#) was 64.6°F, which is 2.1 degrees (1.1 standard deviations) above average. The average high temperature was 78.0°F, which is 0.3 degrees below average. The average low temperature was 52.4°F, which is 4.5 degrees (1.9 standard deviations) above average. The maximum temperature recorded last month was 93.2°F on September 13<sup>th</sup>, while the coolest daily high was 60.2°F on September 27<sup>th</sup>. Low temperatures ranged from 63.1°F on September 3<sup>rd</sup> to 37.0°F on September 27<sup>th</sup>. Daily average temperatures ranged from 75.2°F on the 13<sup>th</sup> to 49.3°F on the 27<sup>th</sup>. The monthly precipitation total was 0.58 inches. The average wind speed was 4.6 mph, and the average 8 inch soil temperature was 68.1°F. [Wenatchee \(WSU TFREC\)](#) recorded an average temperature of 65.4°F, which is 2.1 degrees above average, while [Walla Walla's](#) average monthly temperature of 65.4°F was 1.4 degrees above average. [Pullman](#) was one of the cooler spots in eastern Washington, with an average September temperature of 59.9°F. In western Washington, Mt. Vernon's average temperature was 59.7°F, which is 1.6 degrees above average.

Recent Washington September Temperatures



Notable September Events

- September 6<sup>th</sup>: 1.6 inches of rain fell at [WSU Puyallup](#).
- September 15<sup>th</sup>: The high temperature soared to 101 degrees at [College Place](#).
- September 15<sup>th</sup>: 1.02 inches of rain fell at [Wheeler](#) in only 15 minutes during a severe thunderstorm.
- September 15<sup>th</sup>: The wind at [Fourmile](#) gusted to 61 mph.
- September 22<sup>nd</sup>: The high temperature at [Underwood](#) rose to only 57 degrees.
- September 28<sup>th</sup>: The wind at [Huntsville](#) gusted to over 71 mph.
- September 28<sup>th</sup>: 2.85 inches of rain fell at [East Olympia](#).

|                         |         | Observed in 2013 |         |      | Record Monthly Extremes |      |         |      |
|-------------------------|---------|------------------|---------|------|-------------------------|------|---------|------|
| Site (Period of Record) | Warmest | Date             | Coldest | Date | Warmest                 | Date | Coldest | Date |
|                         |         |                  |         |      |                         |      |         |      |

|                                   | Observed in 2013 |             |                |             | Record Monthly Extremes |             |                |             |
|-----------------------------------|------------------|-------------|----------------|-------------|-------------------------|-------------|----------------|-------------|
| <i>Site (Period of Record)</i>    | <i>Warmest</i>   | <i>Date</i> | <i>Coldest</i> | <i>Date</i> | <i>Warmest</i>          | <i>Date</i> | <i>Coldest</i> | <i>Date</i> |
| Prosser (WSU IAREC; 1989-2013)    | 93.2             | 9/13/2013   | 37.0           | 9/27/2013   | 97.0                    | 9/2/1998    | 30.7           | 9/23/2000   |
| Moxee (1989-2013)                 | 95.0             | 9/12/2013   | 32.9           | 9/27/2013   | 98.3                    | 9/5/2003    | 23.5           | 9/23/2000   |
| Mt. Vernon (WSU NWREC; 1994-2013) | 82.8             | 9/11/2013   | 39.8           | 9/26/2013   | 83.0                    | 9/3/2003    | 35.8           | 9/23/2000   |
| Wenatchee (WSU TFREC; 1994-2013)  | 98.7             | 9/13/2013   | 41.7           | 9/19/2013   | 98.9                    | 9/1/1998    | 29.6           | 9/23/2000   |
| Tri-Cities (1995-2013)            | 97.9             | 9/11/2013   | 44.2           | 9/27/2013   | 98.3                    | 9/1/1998    | 32.8           | 9/23/1996   |
| Walla Walla (1992-2013)           | 97.6             | 9/15/2013   | 47.2           | 9/25/2013   | 97.6                    | 9/15/2013   | 30.6           | 9/23/2000   |
| Moses Lake (1989-2013)            | 94.4             | 9/12/2013   | 40.3           | 9/25/2013   | 98.3                    | 9/3/2006    | 27.6           | 9/28/1999   |
| Omak (Pogue Flat; 2005-2013)      | 92.6             | 9/14/2013   | 35.8           | 9/27/2013   | 97.3                    | 9/9/2011    | 30.6           | 9/29/2007   |
| Royal City East (2008-2013)       | 93.3             | 9/12/2013   | 42.3           | 9/27/2013   | 93.3                    | 9/12/2013   | 36.9           | 9/30/2009   |
| Pullman (2008-2013)               | 93.2             | 9/11/2013   | 35.0           | 9/27/2013   | 94.7                    | 9/24/2011   | 25.3           | 9/12/2012   |
| Long Beach (WSU Long Beach; 2005- | 85.2             | 9/10/2013   | 41.4           | 9/26/2013   | 96.0                    | 9/22/2009   | 30.2           | 9/17/2010   |

|                               | Observed in 2013 |           |         |           | Record Monthly Extremes |           |         |           |
|-------------------------------|------------------|-----------|---------|-----------|-------------------------|-----------|---------|-----------|
| Site (Period of Record)       | Warmest          | Date      | Coldest | Date      | Warmest                 | Date      | Coldest | Date      |
| 2013)                         |                  |           |         |           |                         |           |         |           |
| Sequim (2008-2013)            | 80.6             | 9/11/2013 | 37.6    | 9/26/2013 | 80.9                    | 9/8/2011  | 33.0    | 9/29/2011 |
| Seattle (2011-2013)           | 91.7             | 9/11/2013 | 44.7    | 9/26/2013 | NA                      | NA        | NA      | NA        |
| Vancouver (WSU RE; 2008-2013) | 95.9             | 9/11/2013 | 41.3    | 9/19/2013 | 95.9                    | 9/11/2013 | 35.8    | 9/23/2008 |

***Agriculture Report***

Variable weather was the rule in September, as the state experienced hot and somewhat dry weather early, and then cool and wet conditions later the month. The powerful storm at the end of the month brought heavy rain to western areas and strong winds to the entire state. Strong thunderstorms on September 15<sup>th</sup> led to significant crop damage in some areas around the lower Columbia Basin. Powerful winds flattened some corn fields in Franklin County, while also blowing apples off of trees (Tri-City Herald). Heavy rain and hail were also observed, with some areas reporting upwards of one inch of rain in just 15 minutes. Otherwise, harvest ramped up for one of the largest apple crops ever, as quality was reported to be very good as well. As of the 23<sup>rd</sup>, grape harvest had begun early in Klickitat County due to the warm weather during recent months, with reports of average yield and good quality ([National Agricultural Statistics Service](#)).

| April 1 to September 30 Accumulated Growing Degree Days |                       |            |            |      |            |            |      |            |            |
|---------------------------------------------------------|-----------------------|------------|------------|------|------------|------------|------|------------|------------|
|                                                         | Base Temperature (°F) |            |            |      |            |            |      |            |            |
|                                                         | 32                    |            |            | 43   |            |            | 50   |            |            |
| Location                                                | 2013                  | 5 Year Avg | Difference | 2013 | 5 Year Avg | Difference | 2013 | 5 Year Avg | Difference |
| Prosser (WSU IAREC)                                     | 6053                  | 5680       | 373        | 4041 | 3674       | 367        | 2814 | 2470       | 344        |

| April 1 to September 30 Accumulated Growing Degree Days |                       |            |            |      |            |            |      |            |            |
|---------------------------------------------------------|-----------------------|------------|------------|------|------------|------------|------|------------|------------|
|                                                         | Base Temperature (°F) |            |            |      |            |            |      |            |            |
|                                                         | 32                    |            |            | 43   |            |            | 50   |            |            |
| Location                                                | 2013                  | 5 Year Avg | Difference | 2013 | 5 Year Avg | Difference | 2013 | 5 Year Avg | Difference |
| Tri-Cities                                              | 6537                  | 6224       | 313        | 4524 | 4212       | 312        | 3283 | 2976       | 307        |
| Walla Walla                                             | 6230                  | 5884       | 346        | 4220 | 3875       | 345        | 2999 | 2661       | 338        |
| Wenatchee (WSU TFREC)                                   | 6346                  | 6006       | 340        | 4333 | 3998       | 335        | 3106 | 2784       | 322        |
| Moxee                                                   | 5574                  | 5176       | 398        | 3582 | 3194       | 388        | 2415 | 2056       | 359        |
| Omak (Pogue Flat)                                       | 5965                  | 5680       | 285        | 3957 | 3680       | 277        | 2768 | 2506       | 262        |
| Moses Lake                                              | 5951                  | 5717       | 234        | 3945 | 3713       | 232        | 2735 | 2512       | 223        |
| Pullman                                                 | 4749                  | 4515       | 234        | 2807 | 2570       | 237        | 1714 | 1508       | 206        |
| Royal City East                                         | 6066                  | 5732       | 334        | 4054 | 3724       | 330        | 2833 | 2524       | 309        |
| Mt. Vernon (WSU NWREC)                                  | 4945                  | 4630       | 315        | 2934 | 2619       | 315        | 1714 | 1423       | 291        |
| Long Beach (WSU Long Beach)                             | 4387                  | 4123       | 264        | 2374 | 2123       | 251        | 1184 | 983        | 201        |
| Sequim                                                  | 4481                  | 4155       | 326        | 2473 | 2162       | 311        | 1301 | 1049       | 252        |

GDD are calculated by subtracting a base temperature from the average daily temperature (°F). If the resulting value is less than 0, then it is set to 0. Thus GDD are always 0 or greater.

$$GDD = (T_{max} + T_{min}) / 2 - T_{base}$$

#### *This Month in History*

On September 23, 2000, the temperature at [Moxee](#) plunged to a monthly record low of 23.5 degrees.

#### *Climate Outlook*

According to the [Climate Prediction Center \(CPC\)](#), near average temperatures and above average precipitation are expected in October. Later in the fall and into the winter season, above average

temperatures and near average precipitation are anticipated. ENSO Neutral conditions are most likely this winter, with the odds tilted toward being on the warm side of neutral.

[AgWeatherNet](#), 24106 N. Bunn Rd., Washington State University, Prosser, WA 99350, 509-786-9367, [Contact Us](#)

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# Spokane Regional Clean Air Agency News Release, September 16, 2013



September 16, 2013

News Release -- For Immediate Release  
From -- Spokane Regional Clean Air  
Agency (Spokane Clean Air)

Contacts:  
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## **Sunday night's dust storm resulted in an exceedance of National, Health-Based Air Quality Standards for Particulate Matter**

Last night's dust storm resulted in an exceedance of the National Ambient Air Quality Standard (NAAQS) for Particulate Matter (PM<sub>10</sub>), announced the Spokane Regional Clean Air Agency (Spokane Clean Air).

The standard is 150 micrograms per cubic meter of air, averaged over 24 hours. The highest 24-hour concentration recorded (midnight to midnight) was 304 micrograms per cubic meter of air, which translates to an Air Quality Index value of 175/unhealthy.

"It isn't unusual for our area to be impacted by dust storms. This is why we encourage individuals who have pre-existing heart and lung conditions to have a plan in place with their doctors prior to dust and wildfire seasons," said Lisa Woodard, Spokane Clean Air.

The exceedance shouldn't affect Spokane's "clean air" attainment status for the federal air quality standards. The U.S. Environmental Protection Agency has an Exceptional Events Rule to address situations where particulate matter standards are violated due to such natural events as wildland fires, volcanic and seismic activity and high wind events. The rule states that, under certain circumstances, it is appropriate to exclude air quality data that is attributable to uncontrolled natural events from the decisions regarding an area's attainment status.

-end-

## NW News Network September 16, 2013 - 3:46 pm

Inland Northwest Shakes Off Dust In The Wake Of Desert-Style 'Haboob'

<http://nwnewsnetwork.org/post/inland-northwest-shakes-dust-wake-desert-style-haboob>

Residents of the inland Northwest are cleaning wheat field dirt off their furniture. It's the fallout from an unusually large, desert-style dust storm that carried a wall of dirt across eastern Washington Sunday night.

In Spokane, air quality monitors that track particulates went from 30 micrograms to 6,000 in an hour's time.

Greg Koch of the National Weather Service says the eerie, dusty storm is known by a Middle Eastern term: "haboob."

"To get a haboob, you need to have a clash between very hot air, very dry air and a pretty vigorous storm system," Koch explains. "We had that collision. And it happened at just the time of year where a lot of agricultural activity has worked the ground, so that dust was ready to blow in the dry wheat country."

Sixty-mile-per-hour wind gusts knocked out power to several thousand people in eastern Washington. Schools in Moses Lake and Othello closed for the day.

A spokeswoman for the Washington Department of Ecology says these kinds of storms have become much less common in the region as more wheat farmers switch to a "no-till" method of seeding.

More thunderstorms are in the forecast this week. But the National Weather Service predicts they'll be of the cooler, wetter, dust-free variety the region is used to.

On the Web:

[Haboobs: The weather phenomena with an unusual name](#) - NOAA

Tags:

[dust storms](#)

[thunderstorms](#)

[InlandNW](#)

## Tri-CityHerald.com - Dust, thunderstorm hit Mid-Columbia, September 15, 2013

<http://www.tri-cityherald.com/2013/09/15/2575783/dust-thunderstorm-hits-mid-columbia.html>

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Sharon Fitzpatrick of West Richland took this photo of a haboob coming across Badger Mountain on Sunday before a thunderstorm struck the Mid-Columbia.



A thunderstorm swept through the Tri-Cities on Sunday night, causing lightning and gusty winds. A large dust cloud came over the west side of Badger Mountain and rolled north through the Tri-Cities. The storm started about 5:30 p.m. and a thunderstorm warning was effect in Benton County until 7:15 p.m. Winds of almost 50 mph were recorded at the Tri-Cities Airport in Pasco. The lightning sparked several small fires, fire officials said.

Downed power lines and trees also were reported in Benton and Franklin counties. Crews worked into the night to remove branches from power lines and to keep the roadways clear. Benton Fire District 1 responded to reports of small fires, but they were quickly put out by the rain. No injuries were reported.

Today, expect mostly sunny skies with a high near 80 and 17 mph winds with gusts as high as 28 mph, the National Weather Service reported.

There is a chance of showers Tuesday, according to the weather service.

<http://www.tri-cityherald.com/>