Request for EPA Concurrence as Exceptional Events for 2012 Wildfire Impacts on $PM_{2.5}$ Monitor Values at Salmon and Pinehurst Idaho

Final

State of Idaho
Department of Environmental Quality

December 6, 2013

Printed on recycled paper, DEQ, December 2013, PID MPOB, CA code 81630. Costs associated with this publication are available from the State of Idaho Department of Environmental Quality in accordance with Section 60-202, Idaho Code.

Table of Contents

List of Tables

List of Figures

Executive Summary

The 2012 wildfire season was exceptionally severe in Idaho and surrounding states. Idaho and its neighboring states experienced the greatest land area burned by wildfires since before 2000. Idaho itself experienced the greatest acreage of burned land in the nation, and the next 5 states nationwide are all adjacent to Idaho.

The smoke from these fires was ubiquitous throughout the Pacific Northwest from August through early-October and Salmon, Idaho was severely impacted as a result of its proximity to the Mustang Complex and Halstead fire, as well as, the large number of other fires in the central Idaho Region. During the 2012 wildfire season, Salmon experienced 16 "Moderate" AQI days, 11 "Unhealthy for Sensitive Groups," 21 "Unhealthy," 6 "Very Unhealthy," and 1 "Hazardous." Pinehurst experienced 22 "Moderate" days and 1 "Unhealthy for Sensitive Groups" day.

To address high monitor values that result from natural exceptional events that are not reasonably controllable or preventable, the United States Environmental Protection Agency (EPA) promulgated the Exceptional Events Rule (EER) in 40 CFR 50 and 51 (72 FR 13560) on March 22, 2007. The EER allows for states to *flag* air quality data as *exceptional* and exclude those data from use in determining compliance with the National Ambient Air Quality Standards (NAAQS), if EPA concurs with the state's demonstration that it satisfies the rule requirements.

As required in *Final Rule for the National Ambient Air Quality Standards for Particulate Matter* (Federal Register Vol. 78, No. 10, pp.3086 – 3287 1/15/2013), DEQ will be submitting a letter recommending designation status for the $PM_{2.5}$ annual NAAQS for all areas in Idaho, outside the five Indian Reservation Boundaries. In order to designate both Salmon and Pinehurst as attainment/unclassifiable for the annual $PM_{2.5}$ NAAQS, monitor values during the 2012 wildfire season that meet the criteria for exceptional events, must be excluded.

In accordance with the EER procedures, DEQ flagged many values at the Salmon, and Pinehurst $PM_{2.5}$ monitors and is requesting concurrence that certain flagged values, as indicated in Table A, are exceptional events. The flagged values over 35 $\mu g/m^3$ affect Idaho's compliance with 24-hour NAAQS and the flagged values over 12 $\mu g/m^3$ affect Idaho's compliance with the annual NAAQS. DEQ demonstrates in this report, and requests EPA concurrence, that these exceptional concentration values occurred as a result of primarily natural wildfires, that they were not reasonably controllable or preventable by the State of Idaho, and that they fully meet the criteria of the EER for excluding monitor values from the data used to determine compliance with the NAAQS.

The monitor values for Salmon and Pinehurst for which DEQ is requesting EPA concurrence as caused by an exceptional event, are summarized in Table A. A complete listing of monitor values from July 20 through October 25 is provided in Appendix A with an indication of which ones are included in this request and which DEQ believes meet the criteria for exceptional events, but are not included in the current request due to time constraints.

Table A. Monitor values for which DEQ is requesting EPA concurrence (EPA 2013b).

Salmon, Lemhi County Idaho Monitor Site AQS 16-059-0004		
Date	**POC**	**Daily Mean $PM_{2.5}$ Concentration, µg/m^3**
Primary, BAM 1020 Monitor Values		
8/10/2012	3	33.7
8/11/2012	3	37.2
8/12/2012	3	49.2
8/13/2012	3	96.5
8/14/2012	3	147
8/15/2012	3	67.3
8/16/2012	3	106.5
8/17/2012	3	96.6
8/18/2012	3	30.4
8/19/2012	3	34.5
8/20/2012	3	37.7
8/23/2012	3	35.9
8/24/2012	3	108.2
8/25/2012	3	91.3
8/26/2012	3	45.5
8/28/2012	3	58.2
8/29/2012	3	78.1
8/30/2012	3	132
8/31/2012	3	49.8
9/1/2012	3	69.4
9/2/2012	3	145.2
9/3/2012	3	186.9
9/4/2012	3	182.7
9/5/2012	3	97.8
9/6/2012	3	48.4
9/7/2012	3	53.1
9/10/2012	3	136.4
9/11/2012	3	214.3
9/12/2012	3	194.4
9/13/2012	3	153.7
9/14/2012	3	70.2
9/15/2012	3	162.1
9/16/2012	3	162.5
9/17/2012	3	112.3
9/18/2012	3	130.3
9/19/2012	3	135.5
9/20/2012	3	159.8
9/21/2012	3	153.5
9/22/2012	3	86.6
9/23/2012	3	44.3
9/25/2012	3	62.7
9/26/2012	3	37.4
9/27/2012	3	39.3

Salmon, Lemhi County Idaho Monitor Site AQS 16-059-0004		
Date	**POC**	**Daily Mean $PM_{2.5}$ Concentration, µg/m^3**
Co-located, FRM Monitor Values		
8/13/2012	1	85
8/19/2012	1	31.2
8/25/2012	1	77.8
8/31/2012	1	45.1

Pinehurst, Shoshone County Idaho Monitor Site AQS 16-079-0017		
Primary, FDMS Monitor Values		
9/14/2012	4	31.3
9/15/2012	4	43.6
9/22/2012	4	20.8
9/25/2012	4	18.4

(No co-located monitor values on these 4 days)

Many of the monitor values on days included in Appendix A but not listed in Table A were also affected by smoke based on DEQ analysis, however the values included in this request are focused only on lowering the annual design values (DVs) for Salmon and Pinehurst below 12 $\mu g/m^3$, the level of the annual NAAQS so that these two areas are designated attainment/unclassifiable in EPA's review of areas subject to the annual standard. DEQ reserves the right to request concurrence on the additional days in the future, within the regulatory 3-year time frame, in the event that future regulatory actions appear to be adversely affected.

Required Elements of the Exceptional Events Rule

The EER requires that demonstrations to justify data exclusion as exceptional events shall provide evidence that the event (a) affects air quality (AAQ); (b) is not reasonably controllable or preventable (nRCP), (c) is a natural event or is an event caused by human activity that is unlikely to recur at a particular location (NE/HAURL); (d) that there is a clear causal relationship (CCR) between the identified source and measurement under consideration; (e) that the event is associated with measured concentrations in excess of normal historical fluctuations (HF), including background; and (f) that there would have been no exceedance or violation of the standard but for the event (NEBF). In addition, the state must document that prompt public notification procedures and measures to reduce public exposure were followed and that the public comment process was followed in reviewing the demonstration.

Organization of this Report

The organization of this report is outlined in Table B, in which the report section and in some cases, the appendix which addresses each element of the EER demonstration is identified.

An Exceptional Events documentation package will typically include detailed descriptions of the weather conditions, source and transport conditions and impact patterns for each monitor value/day in which concurrence is requested. Due to the magnitude of the 2012 wildfires and the large number of affected days, this approach is not feasible; however, DEQ observed that a number of transport scenarios occurred repeatedly in Salmon and Pinehurst throughout the period affected by wildfires. DEQ therefore describes the types of transport scenarios that occurred in detail with an example of each (Section 4), then in Appendices B (Salmon) and C (Pinehurst), detailed data is provided specific to each day being requested and the transport discussion is supplemented by identifying the type of scenario or scenarios involved for each day followed by a brief but complete description of the evidence for that day.

In addition to the complete listing of monitor values in Appendix A and summary information for each day in Appendices B and C, Appendix D contains crop residue burn decision summaries and prescribed fire data that relate to potential alternate sources of smoke. Appendix E provides information on days in which a Stage 1 Forecast and Caution was in effect in both Salmon and Pinehurst, prohibiting all open burning and advising residents of protective actions, example of a Stage 1 notification, State of Idaho press releases, and an example of the daily monitoring, modeling and satellite summary report provided by DEQ to federal, state and local agencies, including local health districts to assure they had appropriate information to assist residents in taking protective actions. Finally, Appendix F contains news articles for Lemhi County and Shoshone and Kootenai Counties regarding the fires, suppression activities, smoke advisories and other news about the fires.

Table B. Summary of DEQ demonstration in this report meeting EER elements.

EER Element	Sect.	Summary
Conceptual Model (EPA guidance, not an EER Element)	1	The conceptual model generally describes the wildfires and their origin and summarizes sources, the different kinds of weather systems, transport flows and valley-flow dynamics combining to transport smoke from the wildfires to the affected monitors.
Not Reasonably Controllable or Preventable (nRCP)	2	Discussion of wildfire causes (mostly lightning) and the fact that they are not reasonably controllable or preventable.
Exceeds Historical Fluctuations (HF)	3	Data provided includes: 1)Time series plots for multiple years, including the 2012 events. 2) Concentration frequency distribution charts for 2012 in comparison to 2008-2011. 3) Table of percentile values for each requested day at each monitor, in comparison to annual data and fire season data for previous 4 years, 2008–2011. 4) 24-hour temporal charts for each day (in Appendices B and C) showing hourly 2012 data affected by wildfire smoke versus 2009–2011 average and 95th percentile hourly values.
Clear Causal Relationship (CCR)	4	For each transport scenario, a detailed example for one day is described in Section 4 of the report. Then in Appendices B and C, data for each day is provided, including: 1) Description of how the specific data/images for the day support the scenario and explain how $PM_{2.5}$ travelled to the monitor. 2) Time series of $PM_{2.5}$, wind speed and direction at the monitor. 3) MODIS satellite images with HYSPLIT back trajectories showing paths from fires to monitors for every day requested. 4) Region-wide speciation data is provided in Section 1.6, showing ubiquitous fine carbon aerosol throughout region in this period. 5) Alternate hypotheses are addressed by identifying open burn bans and lack of nearby prescribed fires and crop residue burning. 6) News stories for some days are included in Appendix F.
Natural Event or Human Activity Unlikely to Recur at the same location (NE/HAURL)	5	The NE/HAURL criterion is met by previous discussions that the fires are *natural events*, *not reasonably controllable or preventable (nRCP)* and the demonstration that there is a Clear Causal Relationship between monitors and wildfire source areas (CCR).
Affects Air Quality (AAQ)	6	The AAQ element is met by demonstrating $PM_{2.5}$ in excess of historical fluctuations (HF) and a Clear Causal Relationship (CCR).
No Exceedance “But For” Event (NEBF)	7	A quantitative NEBF analysis is provided for each city/monitor/day, in tables comparing the observed values to the average and 95th percentile values expected for this time of year. The estimated concentration “But For” the fires is computed by subtracting the observed value from the average and the 95th percentile.
Mitigation	8	Complete information on Air Quality Advisories, press releases and daily informational reports are in Appendix E. In addition DEQ initiated the purchase of 43 air filters for Salmon schools (Sect 8.5)
EER Procedures	9	DEQ met EER procedural requirements for flagging, demonstration and public comment as summarized in this section.

1 Conceptual Model

This section describes the unusual severity of wildfires in Idaho in 2012 and how they affected most of the state for much of the August to early October period. The weather conditions antecedent to the fire season and during the fires are discussed as well as conceptual models for transport pathways between the wildfire sources and the monitors in Salmon and Pinehurst.

1.1 Overview

Wildfires occur every year in the Western United States, primarily in the summer and fall seasons. The 2012 wildfire season was the most active in the western United States in recent years as a result of unusually hot, dry summertime conditions. Over 7 million acres burned in the Geographic Area Coordinating Centers (GACCs) surrounding and affecting Idaho in 2012. Typically, the same area experiences less than 2 million acres burned (NIFC, 2013). This was the largest annual wildfire acreage for this area in the past 12 years, as shown in Figure 1. Of the 7.2 million acres burned in 2012, 83% of them were lightning caused.

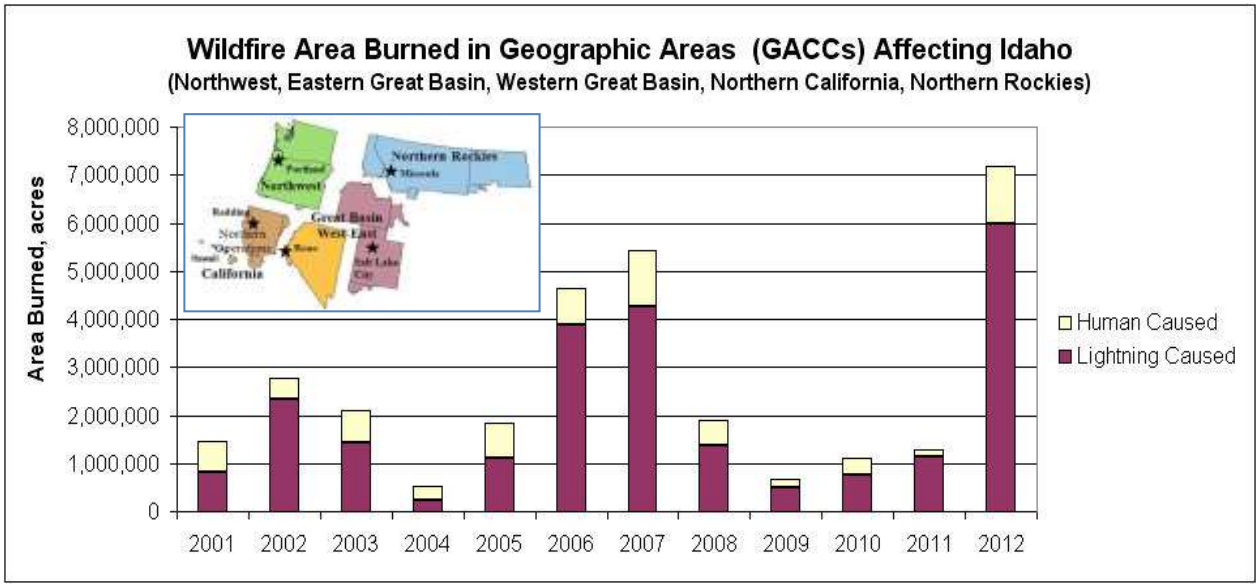


Figure 1. Area burned by wildfires in the geographic areas affecting Idaho, 2001–2012 (NIFC 2013).

Looking at the 2012 fire season across the entire nation, over 67,000 fires burned more than 9.3 million wildland acres. More acres were burned in Idaho wild land fires (1.67 million acres) than any other state as shown in Figure 2. The next 5 states in acres burned after Idaho are all adjacent to Idaho (Oregon, Montana, California, Nevada, and Utah) and combine to add another 4.7 million wildland acres. The prescribed burning in these top 6 states amounted to 200,000 acres or only 3% of their total burned area indicating very little or no contribution from prescribed burning (none in Idaho during the affected days as shown in Appendix D). Together the fire statistics clearly show that 2012 was the most active fire season, and likely smokiest period, for Idaho and the region surrounding Idaho since 2000 or earlier. In addition, very little of it resulted from prescribed burning.

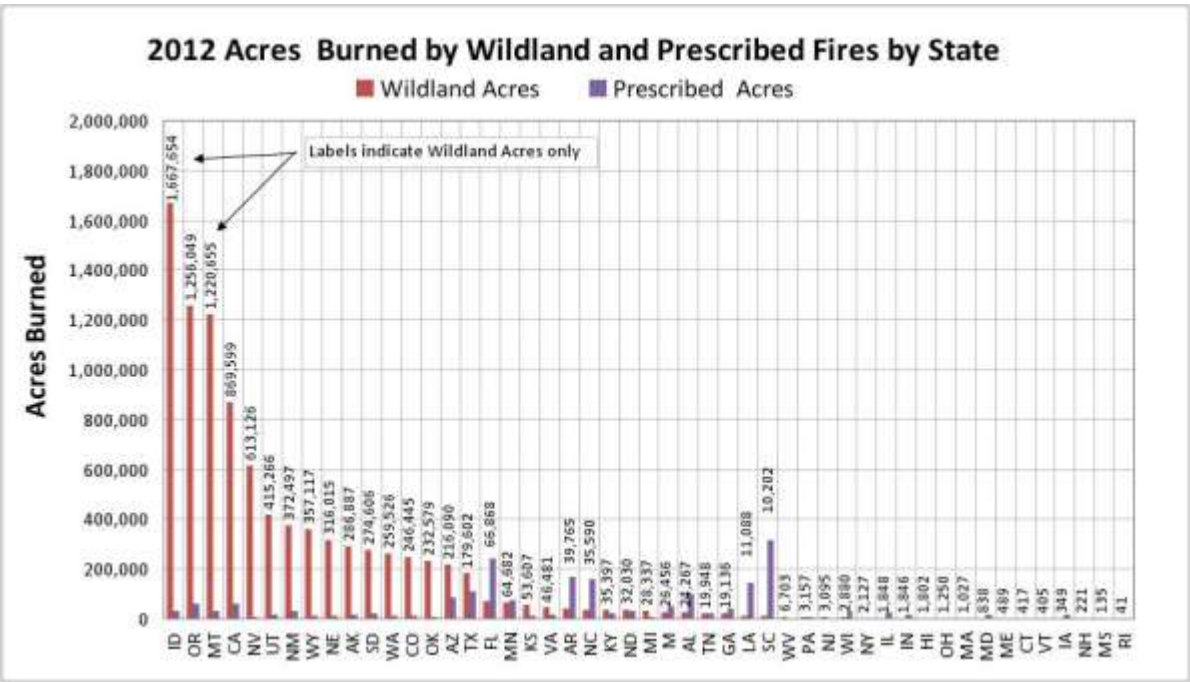


Figure 2. Area burned in 2012 by state (NIFC 2013).

1.2 Source Area and Affected Region

The fires most directly influencing Idaho during the period when exceptional events affected Idaho monitors are shown in Figure 3, a map of the satellite fire detects in the region. The greatest smoke impacts and duration of smoky conditions occurred closest to the largest fires, primarily in and near Salmon, Idaho, although every monitor in and around Idaho experienced higher levels of $PM_{2.5}$ fine particulate matter from August through September 2012 (see Section 1.6). Small isolated fire detects in agricultural areas may result from crop residue burning; however, for most of the period of severe wildland fire impacts in Salmon and Pinehurst, Idaho Lemhi and Shoshone counties were under a *Stage1 Forecast and Caution* notification and all open burning, including crop residue burning, was not allowed under the Rules for the Control of Air Pollution in Idaho. The entire region including Idaho and surrounding states was affected by smoke from the widespread fires; however, as can be seen in Section 1.6, Salmon, Idaho, Selway-Bitterroot Wilderness Area, and Ravalli, Montana were the most severely affected areas due to their location adjacent to the Mustang and Powell SBW fire complexes.

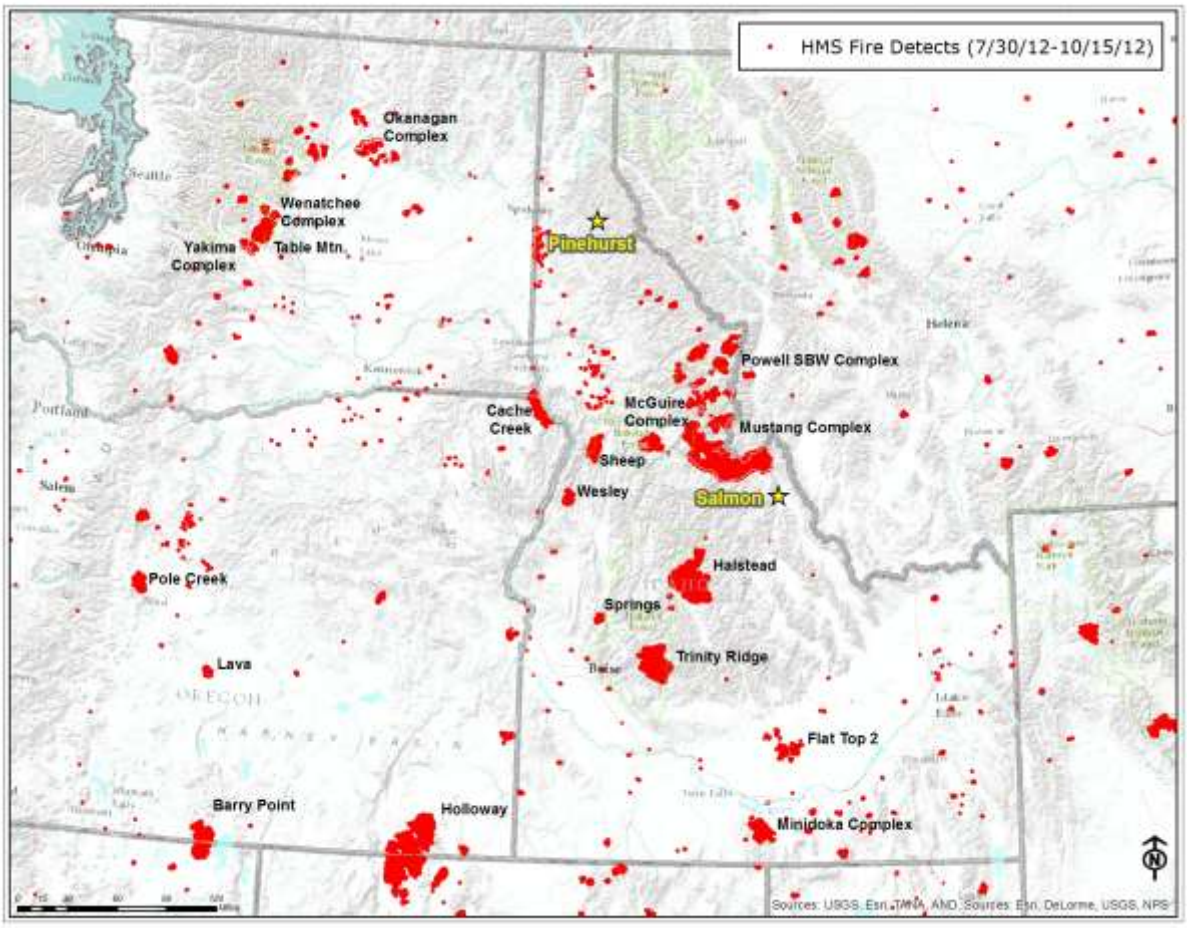


Figure 3. Fires active in the Northwest during the approximate period of exceptional events, July 30, 2012 to October 15, 2012. Significant fires are labeled and the Salmon and Pinehurst monitor locations are denoted by yellow stars.

1.3 Emissions

Wildfires produce very significant quantities of smoke and while it is difficult to determine exact quantities, wildfire emissions can be approximated. In addition, emissions from all other sources in the state of Idaho have been recently estimated as part of the 2011 National Emissions Inventory (NEI) (EPA 2013c). Wildfire $PM_{2.5}$ emissions for the state of Idaho were estimated using EPA and WRAP emission factors (EPA 2013, WRAP 2002) to total 76,300 tons in 2012 based on 1.67 million acres burned, most of it occurring from July through October. If the 2012 annual wildfire emissions are averaged over the period July 7 through October 18 to estimate a period-average daily $PM_{2.5}$ emission quantity, we arrive at an average of 734 tons per day. This daily average wildfire emission estimate is shown in Figure 4, in comparison to all other normal emission source categories in the state of Idaho from the 2011 NEI. Each value shown is an annual average divided by an approximate number of days that the source may occur. This approach allows an approximate comparison, although from different years. The comparison in Figure 4 makes it clear that 2012 wildfires produced many times more $PM_{2.5}$ on a daily basis than all anthropogenic source categories in a typical year. Furthermore, for any fires located in the same river valley as a monitor, such as portions of the Mustang Complex north of the Salmon

$PM_{2.5}$ monitor, the potential exists for wildfire smoke to cause extreme concentrations well in excess of any man-caused emissions. These fires can be identified with certainty as the only possible contributor to the extremely high $PM_{2.5}$ observed in Salmon, as well as the abnormally high $PM_{2.5}$ and organic carbon levels observed near Salmon, Pinehurst, and throughout Idaho, and neighboring states in 2012 (Section 1.6, Concentration Patterns.)

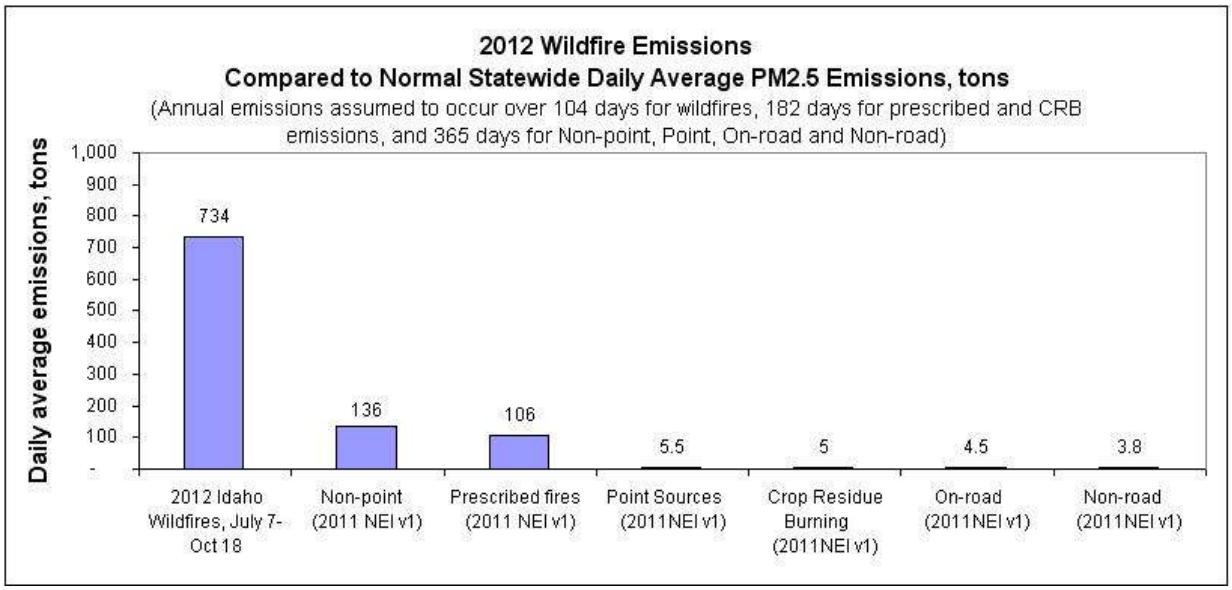


Figure 4. The 2012 average daily wildfire emissions for the period July 7 through October 18, compared to other source categories from all anthropogenic emissions for 2011 from the 2011 National Emission Inventory (EPA 2013c).

1.4 Weather Phenomena Contributing

1.4.1 Temperatures

Beginning June 2012, a ridge of high pressure persisted over the western United States which led to a much warmer than normal summer for most of the country. Nationally, the summer (June–August) was the third warmest on record and included the warmest July on record. Worsening drought conditions across the West led to below normal live and dead fuel moisture and above normal Energy Release Component indices. Most of the West also saw increased fine fuel loading and below normal snowpack. The autumn (September–December) saw a continuation of the ridge of high pressure over the West which kept the heat in place over much of the western half of the nation with temperatures ranging from 2 to 6 degrees above normal and with mountain states experiencing temperatures 6–8 degrees above normal (Figure 5 through Figure 8). This ridge continued to suppress precipitation to the region during that time. (NIFC 2013).

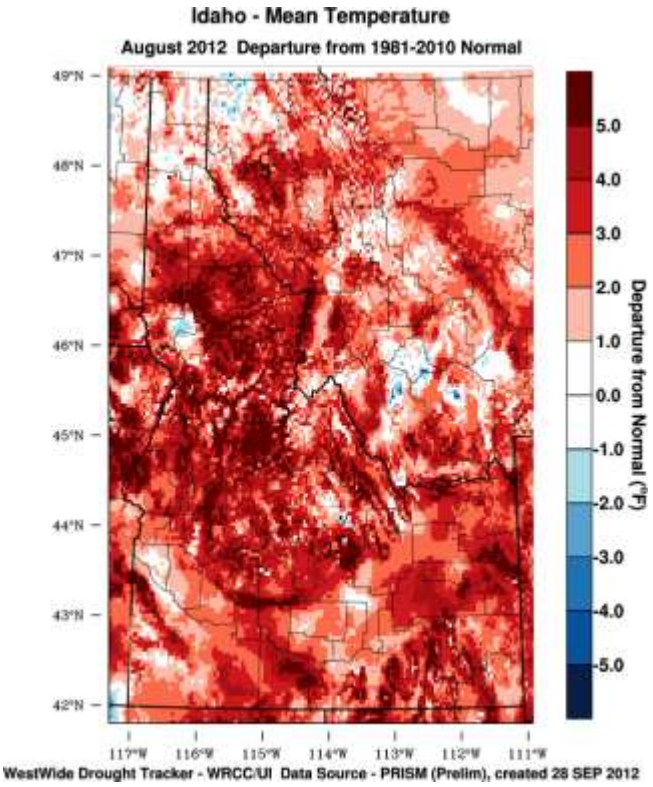


Figure 5. Idaho mean temperature anomaly, August 2012—departure from 1981–2010 normal *http://www.wrcc.dri.edu/wwdt/archive.php?region=id* (*WRCC* 2013).

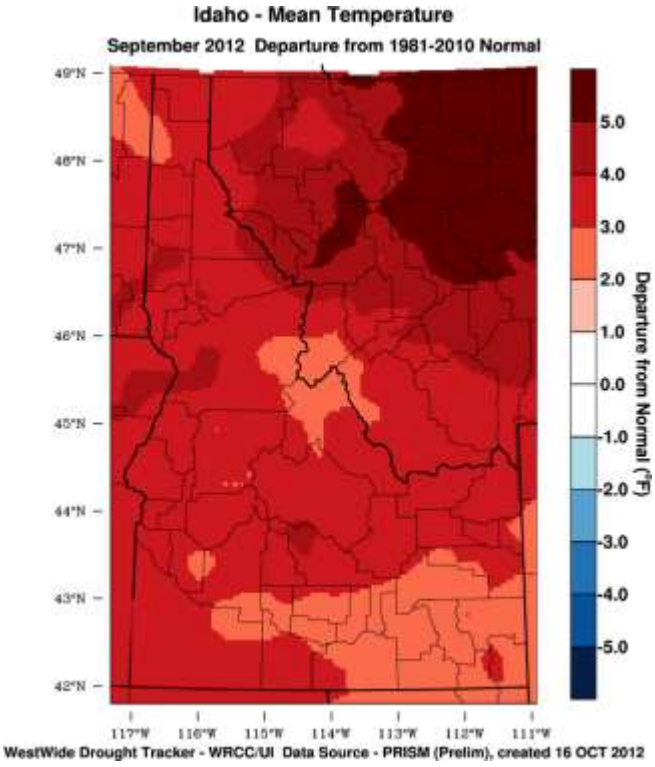


Figure 6. Idaho mean temperature anomaly, September 2012—departure from 1981–2010 normal *http://www.wrcc.dri.edu/wwdt/archive.php?region=id* (*WRCC* 2013).

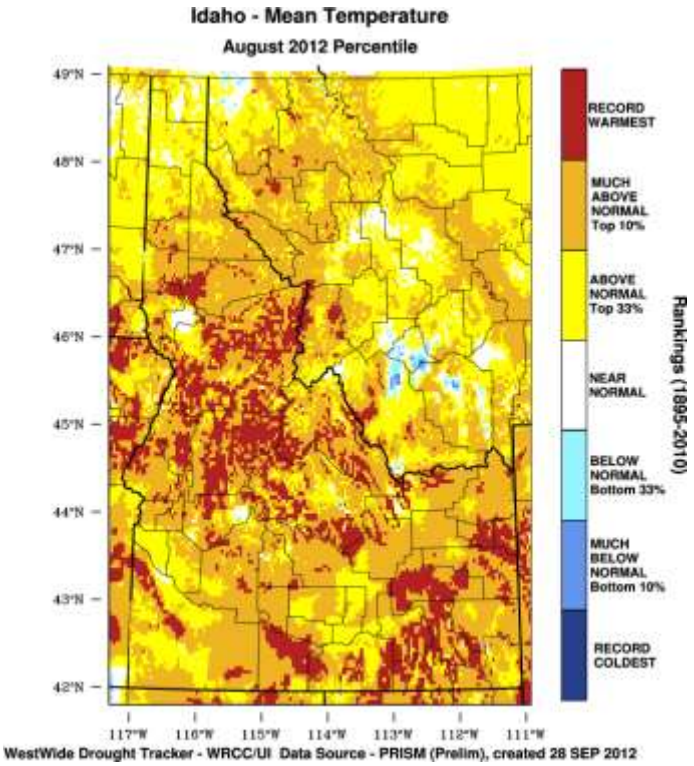


Figure 7. Idaho mean temperature percentile, August 2012 *http://www.wrcc.dri.edu/wwdt/archive.php?folder=mdn1per* (WRCC 2013).

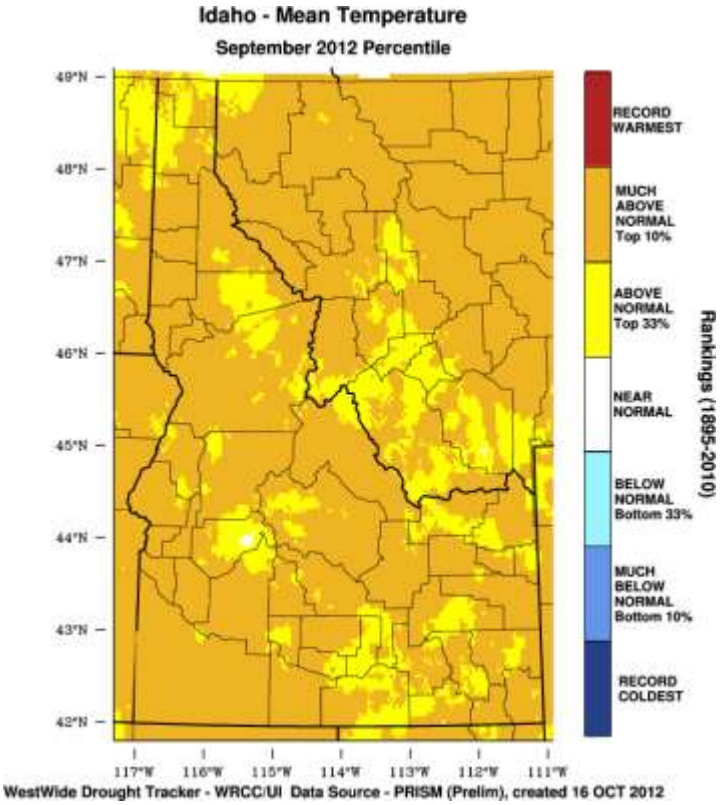


Figure 8. Idaho mean temperature percentile, September 2012 *http://www.wrcc.dri.edu/wwdt/archive.php?folder=mdn1per* (WRCC 2013).

1.4.2 Precipitation

Precipitation patterns across Idaho are quite complex, but generally, the north and west regions of Idaho experience precipitation maximums in winter and minimums in summer while eastern Idaho (particularly the Northeastern Valleys and Eastern Highlands) receive more than 50% of their annual precipitation during the months of April and September (WRCC 2013). Most of Idaho experiences less than 25% of normal monthly precipitation in August (Figure 9) and September (Figure 10). It should be noted that the monthly average precipitation values for southwestern Idaho are 0.36" in August and 0.62" in September, and 25% of this represents a loss of 0.09125" and 0.1555" in each month, respectively, so minute deviations can have large impacts (WRCC, 2013). The greater impact of this loss occurred in the southeast regions where, as mentioned previously, most of the precipitation is received during the summer months. As such, 25% represents a larger quantifiable value of moisture lost.

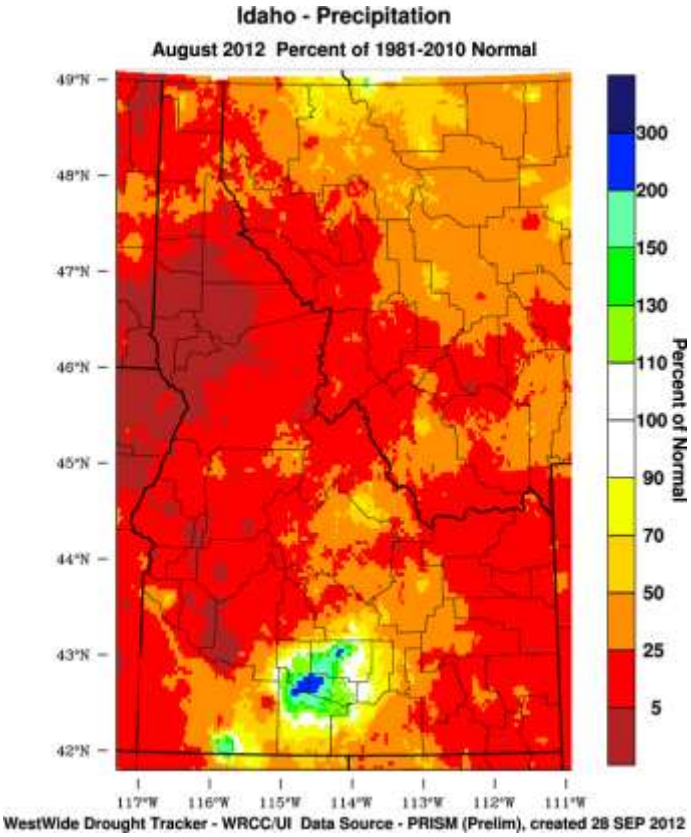


Figure 9. Idaho precipitation anomaly, August 2012—percent of 1981–2010 normal *http://www.wrcc.dri.edu/wwdt/archive.php?folder=pon1* (WRCC 2013).

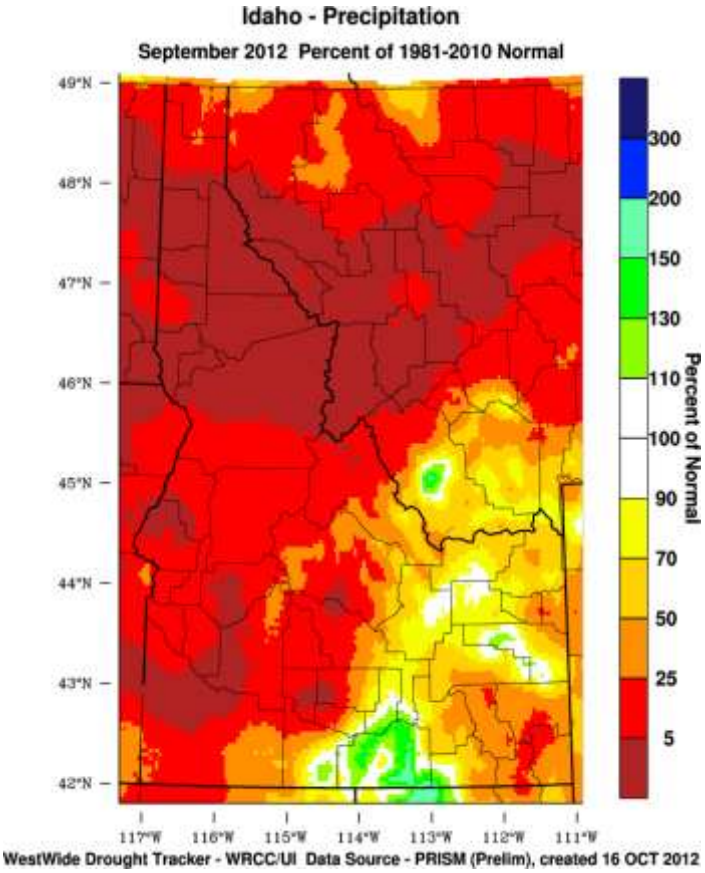


Figure 10. Idaho precipitation anomaly, September 2012—percent of 1981–2010 normal *http://www.wrcc.dri.edu/wwdt/archive.php?folder=pon1* (WRCC 2013).

1.4.3 Drought Conditions

The National Seasonal Significant Wildland Fire Potential Outlook (NIFC 2013) issued for June through August called for above-normal significant fire potential through much of Arizona, western New Mexico, western Colorado, south central Wyoming, the mountains of central Utah, southwestern Idaho, southeastern Oregon, western and northern Nevada, and the southern mountains of California. Worsening drought conditions in the West led to below normal live and dead fuel moisture. September began with a ridge of high pressure over the West and a trough of low pressure over the East. This kept high temperatures in place over much of the western half of the nation, while the eastern half remained relatively cool. As mentioned earlier, temperatures in the West ranged from two to six degrees above normal from California to the northern Rockies and into the northern Plains. The strong ridge in the West not only sent temperatures soaring, it suppressed rainfall over most of the region. The West Coast, the northern Great Basin, the northern Rockies and the northern Plains all had less than a quarter of normal precipitation for September. Northern Idaho experienced wetter-than-normal conditions for much of the summer, as storms from the Gulf of Alaska traveled along the Polar Jet and passed along the United States-Canadian border and traveled over the persistent ridge. This is evident in the Palmer Drought Severity Index (PDSI) metric for August through October as shown in Figure 11, 12, and 13. The northern and central Panhandle experienced consistent PDSI values of +2 or higher while the rest of the state experienced varying levels of moderate to severe to extreme drought conditions.

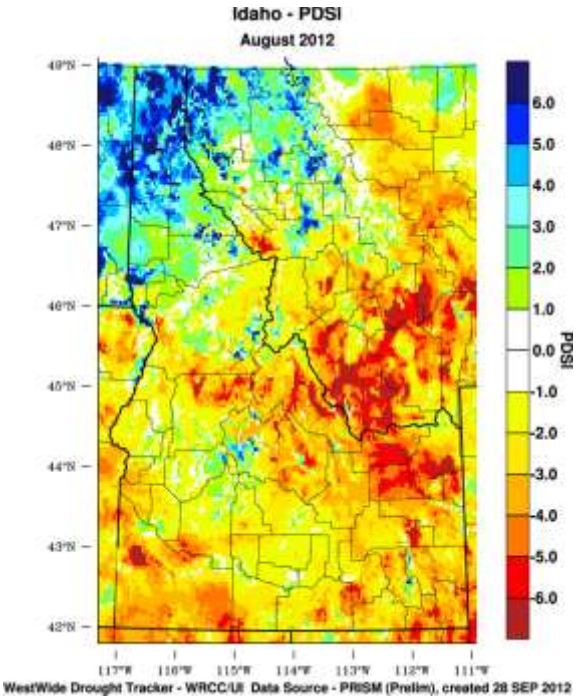


Figure 11. Idaho Palmer Drought Severity Index (PDSI), August 2012 *http://www.wrcc.dri.edu/wwdt/archive.php?folder=pdsi* (WRCC 2013).

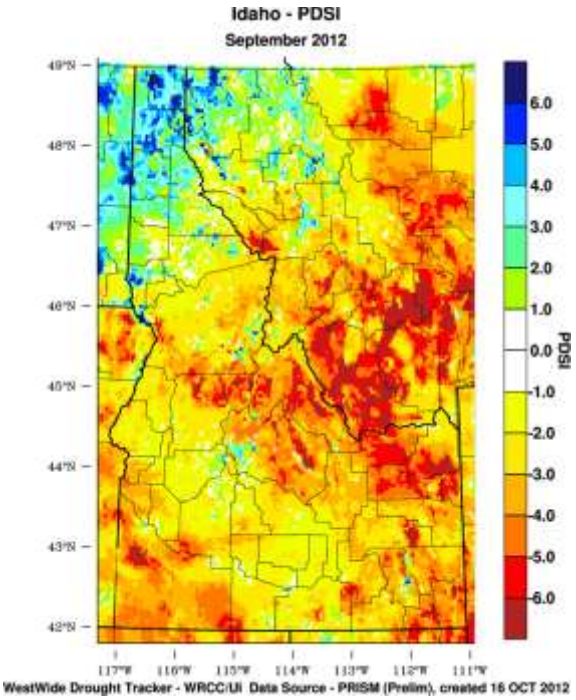


Figure 12. Idaho Palmer Drought Severity Index (PDSI), September 2012. http://www.wrcc.dri.edu/wwdt/archive.php?folder=pdsi (WRCC 2013).

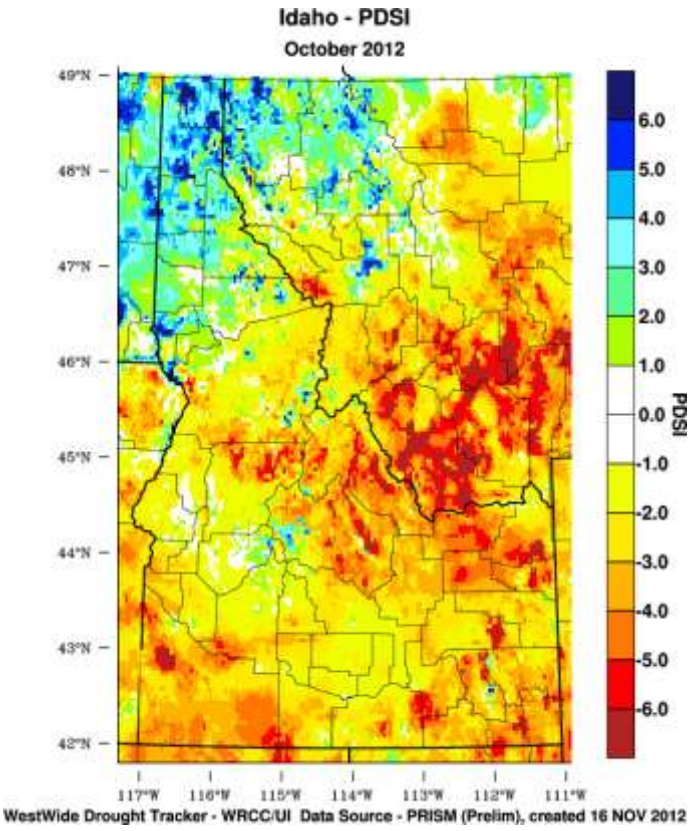


Figure 13. Idaho Palmer Drought Severity Index (PDSI), October 2012 *http://www.wrcc.dri.edu/wwdt/archive.php?folder=pdsi* (WRCC 2013).

1.4.4 Transport Weather Conditions

During the summer months in the northeast Pacific Ocean, a semi-permanent high pressure system, known as the North Pacific High, reaches its apex of strength and forces the polar jet to the north of the continental United States (CONUS) and the tropical jet to the south. During the fire season of 2012 (August, September, and part of October), this quasi-stationary high pressure system provided Idaho with consistent stagnant ridges of high pressure or blocking patterns (most common were the Rex block and Omega block) that limited zonal transport of the mid- and upper-level air masses. Typical patterns that affected Idaho during the summer of 2012 included the amplification of shortwave ridges by Aleutian low pressure systems tracking south along the eastern Pacific coast where they would then become cut off from the jet stream and either retrograde or remain quasi-stationary along the region from California to Washington. On occasion, this sequence of events would align with an upper level low over Hudson Bay, which would then create an Omega block with Idaho under or near the ridge axis. Another sequence of events that occurred several times over the summer was the development of a Rex block along the eastern Pacific, which would create a region of low level divergence over Idaho, and limit winds, vertical mixing, and zonal transport. The aforementioned blocking patterns limit vertical and zonal wind transport and are generally associated with subsidence, which is known for the warming properties that limit vertical mixing. Also notable was the potential role of the incumbent smoke in limiting daytime heating from insolation, and by proxy, the ultimate height of the transport layer which is driven by thermal mixing under such stagnant regimes. Figure 14 through Figure 16 represent examples of the upper-level (500 mb) atmosphere across the

CONUS at three separate dates during the summer of 2012, these were selected for their illustration of the blocking patterns that frequently impact the Pacific Northwest and Intermountain West in the summer. It is possible to see the developed Omega block with ridge axis slightly east of Idaho in Figure 14 while this same type of blocking pattern is more centrally located over Idaho in Figure 15. Finally, Figure 16 represents a Rex block pattern located offshore which forces strong ridging over Idaho. Such blocking patterns create stagnant atmospheric conditions with light wind speeds through the mixed layer and low mixing heights. As such, diurnal wind regimes typically become the primary wind direction mechanism.

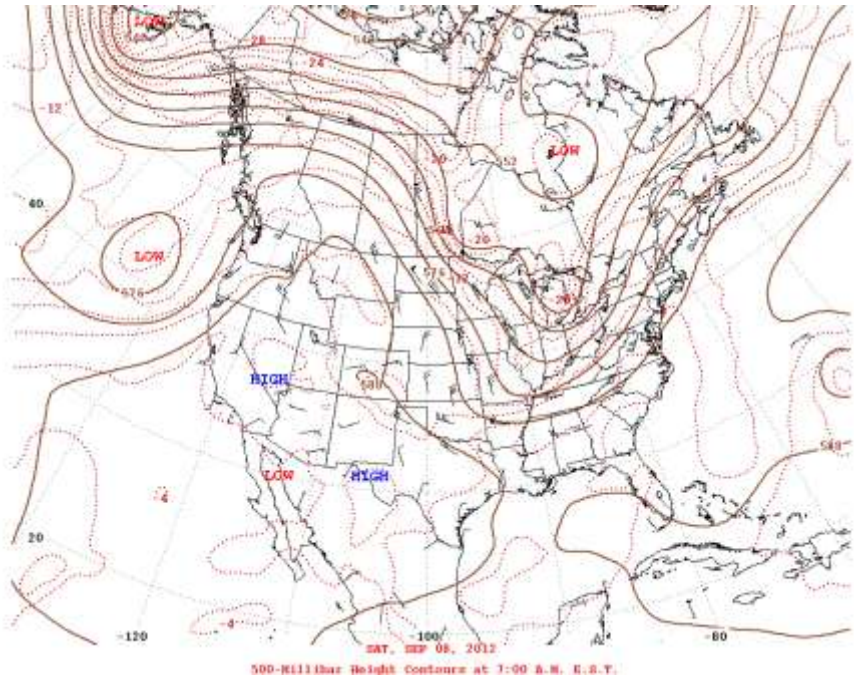


Figure 14. September 8, 2012, 500-millibar height contours showing an Omega block and associated high pressure ridge over Idaho *http://www.hpc.ncep.noaa.gov/dailywxmap/* (HPC 2013).

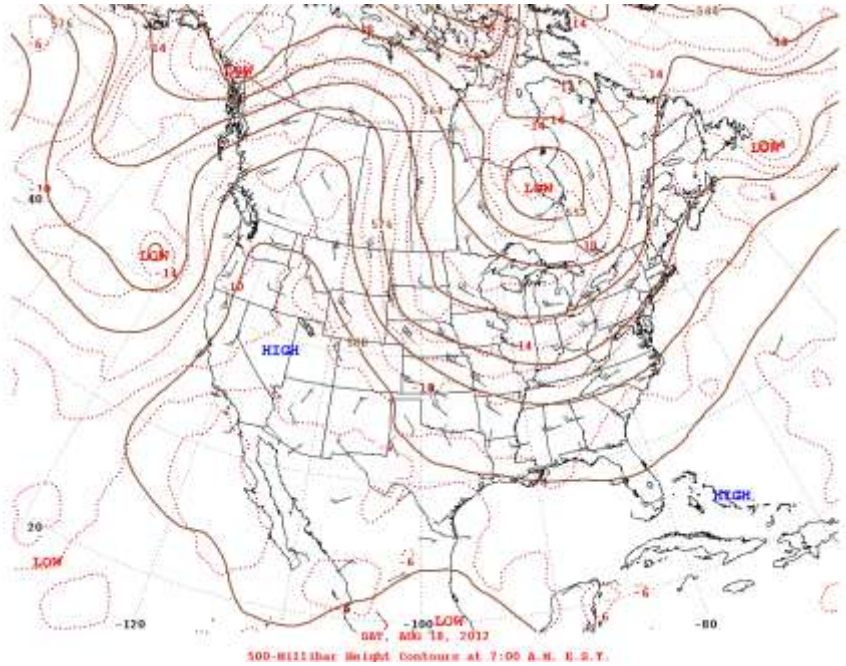


Figure 15. August 18, 2012, 500-millibar height contours showing an Omega block and associated high-pressure ridge over Idaho *http://www.hpc.ncep.noaa.gov/dailywxmap/* (HPC 2013).

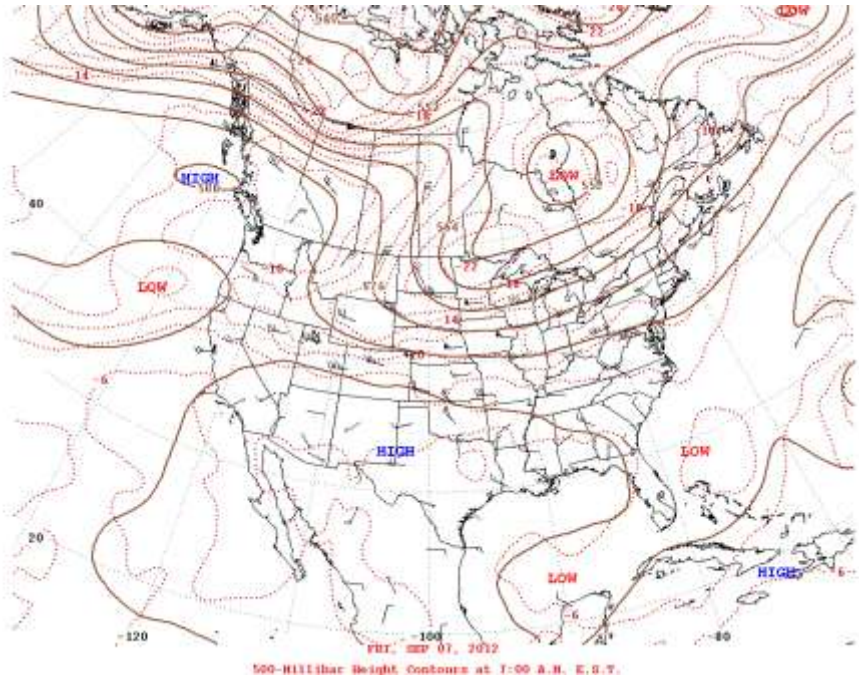


Figure 16. September 7, 2012, 500-millibar height contours showing a typical Rex block offshore and the associated amplified shortwave ridge over Idaho *http://www.hpc.ncep.noaa.gov/dailywxmap/* (HPC 2013).

1.5 Path and Timeline from Source Area to Monitors

There were many wildfires burning in Idaho during the July–October 2012 wildfire season, and the monitors at Salmon and Pinehurst were impacted by wildfire smoke on a multitude of days. Many paths and timelines contributed to the exceptional $PM_{2.5}$ values described in this document. At a conceptual level, the types of transport patterns observed by DEQ can be categorized into three essential conceptual models:

(1) direct plume advection from the wildfire source areas to the monitors, generally aligned along the daytime synoptic transport directions,

(2) terrain-mediated diurnal valley flows within the enclosed valleys containing Salmon and Pinehurst after the interception of advecting smoke plumes within some portion of the valleys. Of the second category, the valley flows may occur during either (a) up-valley daytime flows, or (b) nighttime/early morning drainage flows in the down-slope and/or down-valley directions, and

(3) regional transport from more distant fires, often in combination, making the entire region so smoky that individual contributors cannot be identified.

1.5.1 Analysis of Winds and $PM_{2.5}$ Frequencies

Hourly meteorological and $PM_{2.5}$ concentration data (DEQ, 2013) from Salmon and Pinehurst were analyzed for the general period of wildfire impacts to better characterize the conceptual models identified above and to understand the temporal patterns of wind direction frequencies and $PM_{2.5}$ concentrations. The hourly meteorological and $PM_{2.5}$ data were segregated into 60^o wind direction sectors to broadly capture the potential terrain-influenced wind directions that may carry smoke into Salmon (Figure 17):

1. North or N (330^o to 29.9^o) is selected to capture any daytime up-valley flows coming from the North end of the valley where the Mustang Complex frequently filled the valley with smoke as a result of advection across or into the upper valley, which is adjacent to the eastern end of the Mustang fire perimeter;
2. Northeast or NE (30^o–89.9^o) is intended to capture any down-slope flow descending from the west slope of the ~ 10,000 foot Continental Divide down to the valley floor;
3. Southeast or SE (90^o–149.9^o) is set to include any winds and trapped smoke that may flow down the Lemhi Valley into Salmon, presumably during night-time/morning drainage flow conditions;
4. South or S (150^o–209.9^o) is intended to capture any down-valley flows that may bring smoke from the south, down the Salmon River Valley;
5. Southwest or SW (210^o–269.9^o) is the approximate direction of any direct advection from the Halstead Fire to Salmon, or potentially during the night, any drainage flow from the direction of the mountain slopes to the west and southwest of Salmon.
6. Northwest, or NW (270^o–329.9^o) is the approximate direction of any direct advection from the western end of the Mustang Fire or McGuire Complex Fire toward Salmon, or potentially if during the night, a down-slope, drainage flow direction from the mountain slopes to the west and northwest of Salmon.

It should be noted that all easterly flows fall into the NE or SE sectors, as there is no "East" sector with this sector arrangement; similarly for the westerly flows, all flows are categorized as

either NW or SW. Pinehurst also sits in a north-south trending valley so the same sectors were utilized to analyze the hourly winds and $PM_{2.5}$ diurnal patterns there as well. (Figure 18).

Salmon analysis. The wind direction/$PM_{2.5}$ temporal analysis for Salmon is shown in Table 1. The left-hand chart shows the frequency of wind directions by sector and hour of day, with frequencies normalized to 100% for each hour. The data set analyzed includes all data from July 20 through October 25, so many unaffected days are included. The left-hand table shows predominant up-valley flow from the north during the hours of strong solar heating from1000 through 1900, while the nighttime/early morning winds approach Salmon primarily from the NE, the direction of the foothills which slope gradually up to the Continental Divide to the NE. These NE down-slope drainage flows (~30%–48%) appear to predominate over the less frequent down-valley flows from the Salmon River valley to the south (~10%) and the Lemhi River valley to the SE (~20%–29%). Finally, there are some (~20%) night/morning flows from the north, presumably part of the NE sector down-slope flows, or perhaps side canyon low level jet flows from a more northerly direction that may push into a fairly stagnant valley just north of Salmon. Approximately 15 to 20% of the daytime wind directions and $PM_{2.5}$ approach Salmon from the NW and SW, and these flows are believed to include direct plume advection and impacts from the Mustang Complex and Halsted fire respectively. The right-hand table shows the normalized product of the wind direction frequency times the average $PM_{2.5}$ concentration. This table indicates by percent for each hour, the direction from which the most $PM_{2.5}$ arrives at the monitor. The pattern is remarkably similar to the wind direction frequencies on the left-hand side, suggesting that the valley was most typically filled with smoke in all directions from Salmon and the smoke approached the monitor from the same direction from which the wind approached. Any hour-direction combination (cell) in the right-hand table that exceeds its parallel cell in the left-hand wind direction frequency table, indicates that higher than average $PM_{2.5}$ concentrations arrived from that hour/direction than others (at hours 1100 and 1500–2000 from north, for example, both reflecting high $PM_{2.5}$ in up-valley flows from the northern end of the valley.)

Pinehurst analysis. The wind direction/$PM_{2.5}$ temporal analysis for Pinehurst is shown in Table 2. Pinehurst is situated in a very small south to north trending valley with Pine Creek entering on the south end of the valley, flowing northward to exit the valley in a narrow outlet where the valley meets the east-west trending Silver Valley of the Coeur d'Alene River (see terrain and wind sectors in Figure 18). As a result of the Coeur d'Alene river intersecting the north end of the valley, Pinehurst experiences virtually no flow from the N and NE nor from the NW in the morning hours. The predominant daytime wind directions are from the NW and SW, the direction of the prevailing westerly synoptic flows. The nighttime drainage flows are almost exclusively from the south (~ 90%) until about 0800 in the morning when winds from the SE dominate. The right-hand chart, as before, shows the relative contribution of $PM_{2.5}$, as a product of the wind direction frequency times the average concentration for that hour-sector cell. For Pinehurst, the $PM_{2.5}$ contributions also closely reflect the wind direction frequencies, suggesting a uniformly mixed valley with $PM_{2.5}$ arriving in conjunction with most of the valley flows, but being enhanced in the afternoon NW winds (1500–1600) and morning SE winds (0800–1000). This probably reflects smoke advected from regional fires to the west (Washington State fires) and SE (Powell SBW and Mustang fires).

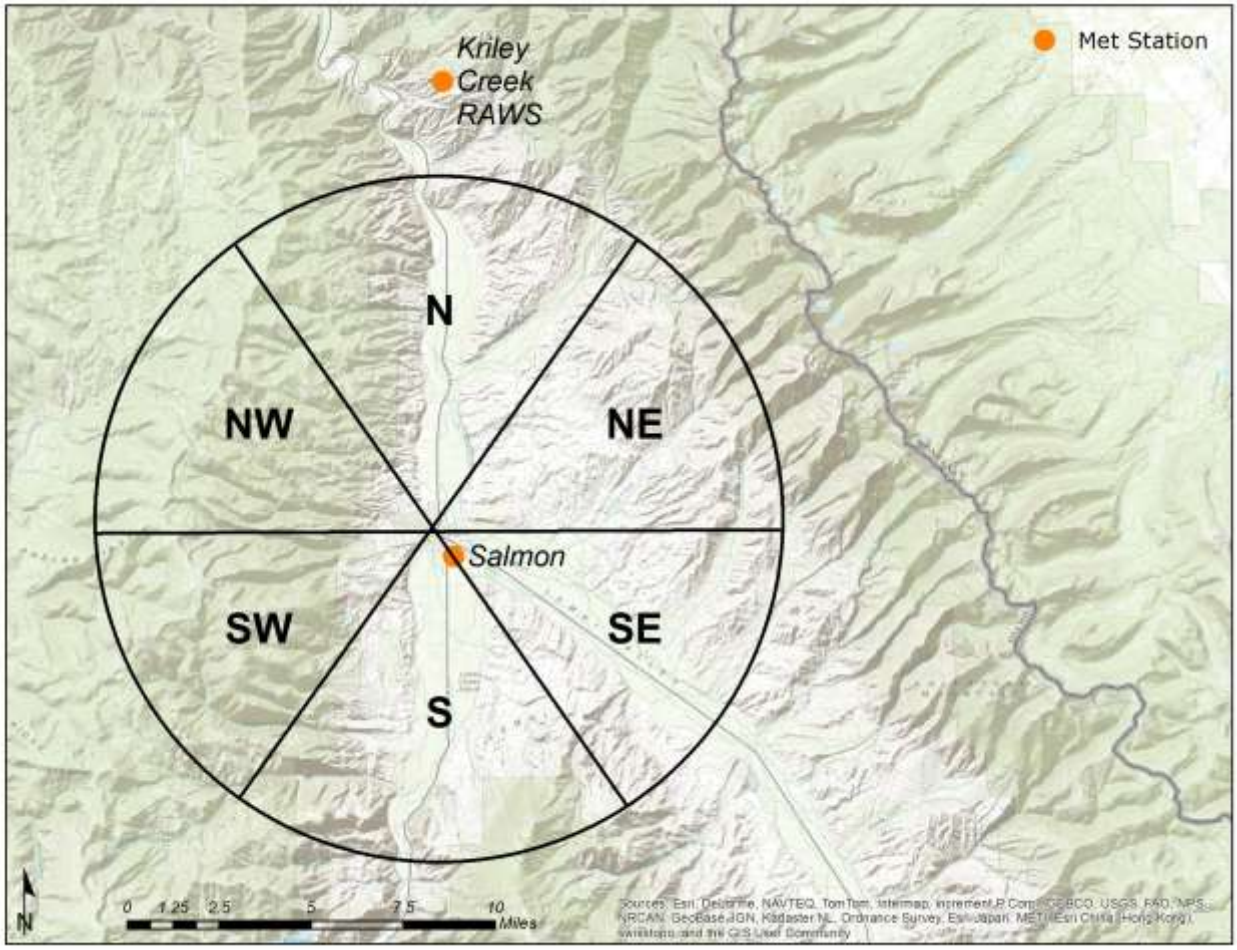


Figure 17. Salmon area meteorological stations and wind direction sectors used in analysis along with local terrain.

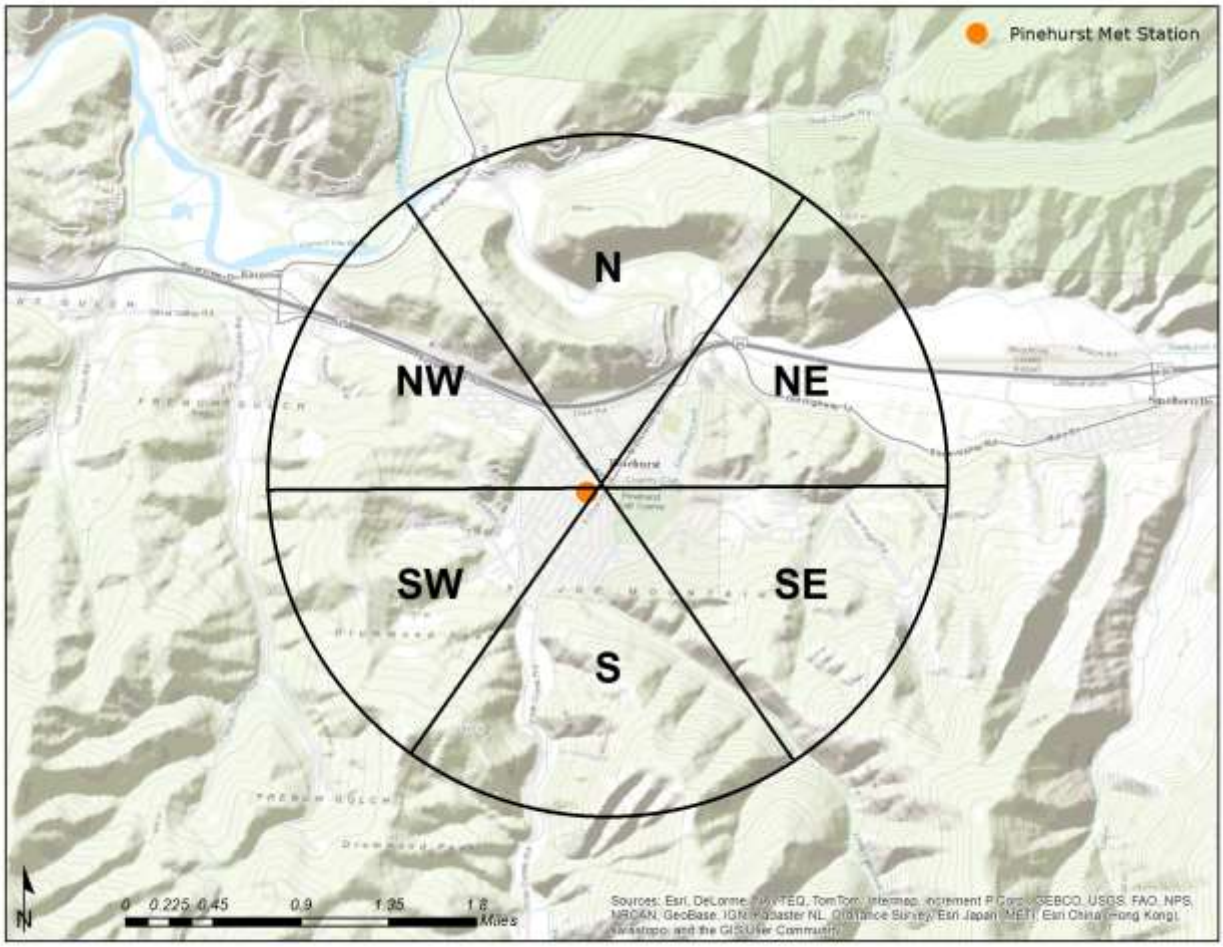


Figure 18. Pinehurst meteorological station and wind sectors used in analysis along with local terrain.

Table 1. Salmon wind direction frequency by hour of day (left block) and relative contributions to $PM_{2.5}$ concentration by sector and hour of day (right block).

Percent Frequency of Wind Directions by Sector (Shows the Wind Direction Frequency Only)							Percent Contribution to $PM_{2.5}$ (= Count x Average $PM_{2.5}$ (Shows where most of the PM is coming from by hour)						
Hour	N	NE	NW	S	SE	SW	Hour	N	NE	NW	S	SE	SW
1	22%	34%	5%	8%	21%	9%	1	19%	35%	6%	5%	25%	10%
2	21%	33%	7%	9%	24%	5%	2	24%	30%	6%	10%	28%	2%
3	16%	48%	5%	9%	16%	5%	3	9%	59%	6%	7%	11%	9%
4	16%	34%	4%	10%	29%	7%	4	13%	38%	8%	12%	22%	7%
5	20%	45%	4%	5%	21%	4%	5	18%	36%	7%	3%	31%	4%
6	23%	41%	3%	11%	20%	1%	6	16%	37%	7%	9%	30%	0%
7	23%	36%	2%	12%	23%	3%	7	20%	41%	6%	16%	17%	1%
8	20%	47%	4%	9%	17%	2%	8	25%	42%	7%	11%	14%	1%
9	26%	28%	9%	14%	17%	6%	9	25%	27%	11%	16%	17%	3%
10	42%	23%	13%	6%	11%	4%	10	43%	21%	13%	7%	9%	6%
11	48%	12%	17%	6%	10%	6%	11	59%	6%	17%	1%	11%	6%
12	46%	13%	22%	7%	7%	4%	12	51%	16%	15%	11%	6%	2%
13	57%	12%	13%	6%	4%	7%	13	57%	9%	14%	10%	1%	9%
14	48%	6%	14%	7%	8%	16%	14	48%	10%	19%	5%	3%	14%
15	39%	7%	14%	19%	3%	17%	15	49%	8%	11%	10%	5%	18%
16	37%	2%	18%	16%	11%	15%	16	45%	1%	14%	12%	12%	15%
17	35%	6%	14%	17%	9%	18%	17	43%	4%	11%	15%	6%	20%
18	36%	8%	16%	19%	5%	15%	18	43%	17%	9%	11%	3%	16%
19	32%	9%	16%	13%	20%	9%	19	39%	8%	26%	8%	8%	12%
20	30%	31%	13%	5%	15%	6%	20	50%	20%	9%	6%	13%	2%
21	31%	39%	6%	6%	16%	2%	21	33%	33%	3%	12%	18%	1%
22	27%	29%	6%	13%	20%	5%	22	25%	26%	12%	17%	19%	1%
23	29%	28%	5%	10%	21%	7%	23	29%	31%	7%	8%	18%	8%
24	17%	40%	8%	16%	10%	8%	24	19%	44%	3%	13%	13%	9%
Avg	31%	25%	10%	11%	15%	8%	Avg	33%	25%	10%	10%	14%	7%

Table 2. Pinehurst wind direction frequency by hour of day (left block) and relative contributions to $PM_{2.5}$ concentration by sector and hour of day (right block).

Percent Frequency of Wind Directions by Sector (Shows the Wind Direction Frequency Only)							Percent Contribution to PM2.5 (= Count x Average $PM_{2.5}$) (Shows where most of the PM is coming from by hour)						
Hour	NE	N	NW	SE	S	SW	Hour	NE	N	NW	SE	S	SW
1	0%	0%	0%	7%	87%	7%	1	0%	0%	0%	9%	85%	7%
2	0%	0%	0%	10%	77%	13%	2	0%	0%	0%	8%	85%	7%
3	0%	0%	0%	7%	90%	3%	3	0%	0%	0%	6%	93%	1%
4	0%	0%	0%	10%	87%	3%	4	0%	0%	0%	9%	89%	2%
5	0%	0%	0%	7%	80%	13%	5	0%	0%	0%	7%	86%	7%
6	0%	0%	0%	7%	90%	3%	6	0%	0%	0%	11%	88%	1%
7	0%	0%	0%	17%	77%	7%	7	0%	0%	0%	9%	83%	8%
8	0%	0%	0%	63%	37%	0%	8	0%	0%	0%	67%	33%	0%
9	7%	0%	0%	63%	30%	0%	9	10%	0%	0%	67%	23%	0%
10	0%	0%	0%	59%	34%	7%	10	0%	0%	0%	63%	30%	7%
11	0%	0%	7%	45%	28%	21%	11	0%	0%	4%	48%	24%	23%
12	0%	0%	14%	14%	24%	48%	12	0%	0%	12%	12%	26%	50%
13	0%	0%	28%	3%	10%	59%	13	0%	0%	25%	2%	10%	63%
14	0%	0%	59%	3%	0%	38%	14	0%	0%	60%	4%	0%	36%
15	0%	0%	59%	3%	0%	38%	15	0%	0%	67%	3%	0%	30%
16	0%	0%	59%	0%	3%	38%	16	0%	0%	65%	0%	4%	31%
17	0%	0%	17%	0%	10%	73%	17	0%	0%	17%	0%	18%	65%
18	0%	0%	7%	3%	43%	47%	18	0%	0%	3%	4%	36%	57%
19	0%	0%	0%	33%	57%	10%	19	0%	0%	0%	38%	56%	6%
20	0%	0%	3%	13%	80%	3%	20	0%	0%	1%	13%	85%	1%
21	0%	0%	3%	0%	93%	3%	21	0%	0%	0%	0%	95%	5%
22	0%	0%	0%	3%	90%	7%	22	0%	0%	0%	3%	96%	1%
23	0%	0%	3%	7%	87%	3%	23	0%	0%	1%	12%	86%	1%
24	0%	0%	0%	3%	93%	3%	24	0%	0%	0%	2%	97%	1%
Avg	0%	0%	11%	16%	55%	19%	Avg	0%	0%	11%	17%	55%	17%

1.5.2 Direct Advection from Source to Monitors Conceptual Model Description

The simplest conceptual model for transport of smoke from wildfires to affected monitors results when hot wildfire smoke plumes rise above the surrounding ridges and become entrained in the transport winds that are defined by the synoptic pressure gradient rather than by terrain-influences. When this occurs, typically during the daytime when the fires burn their hottest, the plumes may rise well above the terrain, transporting smoke for hundreds of miles, sometimes filling any valleys beneath their path with dense smoke. If it happens during the daytime, this type of impact may be characterized by a sharply rising then sharply descending concentration peak as the plume sweeps through a range of directions with the shifting winds. If it happens during the late afternoon or evening, the smoke from a direct impact event such as this may become trapped in the valley by the nocturnal radiation inversion, where it will subsequently participate in the valley-flow dynamics. While direct plume impacts can often be clearly seen travelling directly from fire to monitor in the twice daily MODIS satellite images, it is important to realize that synoptic winds shift and a direct plume impact may not be captured in the twice daily MODIS (Terra or Aqua) satellite "snapshots." NOAA's Ready-HYSPLIT model (Draxler 2003) was utilized for every day having a monitor impact to visualize the model-estimated air flow paths approaching the monitors for each hour of the day. Back-trajectories were initiated every hour beginning at 2300 for 3 levels (surface, 500 m AGL and 1000 m AGL) and extended back in time for 24 hours prior to their endpoint at the monitor location. The back trajectories typically parallel the visible smoke plumes observed by satellite imagery approaching a monitor; however, not always. In some cases, clouds obscure the smoke plume or a thick haze from multiple fires blankets the area, thereby obscuring specific plumes. Nevertheless, if a HYSPLIT back trajectory extending out from the monitor location passes over a fire detect area, or over visible smoke plumes from a fire, it is inferred that the smoke likely travelled along the path of the back trajectory to reach the monitor, or to intersect the valley containing the monitor, where it is subject to the diurnal valley flow patterns as described in the next sections. Thus satellite imagery, back-trajectories, and hourly time series of wind and $PM_{2.5}$ concentrations, provided in Appendix B and C may each provide some evidence of this type of source-monitor path.

1.5.3 Salmon Valley Flows Conceptual Model Description

As described in the Salmon wind direction and $PM_{2.5}$ analysis above, the valley flows observed in Salmon occur in two predominant regimes: (a) nighttime drainage flow, primarily down-slope flows from the NE, and, to a lesser extent, down-valley flow from the Lemhi River valley to the SE and the Salmon River valley to the south, and (b) up-valley northerly flow from the North Fork region south to Salmon. While stagnant valley conditions and direct advection from the fires (Section 1.5.2) brought smoke into Salmon from all directions, the highest concentrations generally occurred during the up-valley flow patterns from the north. This conclusion is demonstrated in Figure 19, where the average and the maximum $PM_{2.5}$ concentration for each hour are shown to peak around hours 10–12 (1000–1200) and again around 1800–2000 when the most prevalent wind direction is from the north. In specific day scenarios, this model is recognized by the wind and $PM_{2.5}$ time series charts. In addition, satellite images may show dense smoke in the valley and surface level back trajectories may indicate flows up and down along the valley axis (but not always).

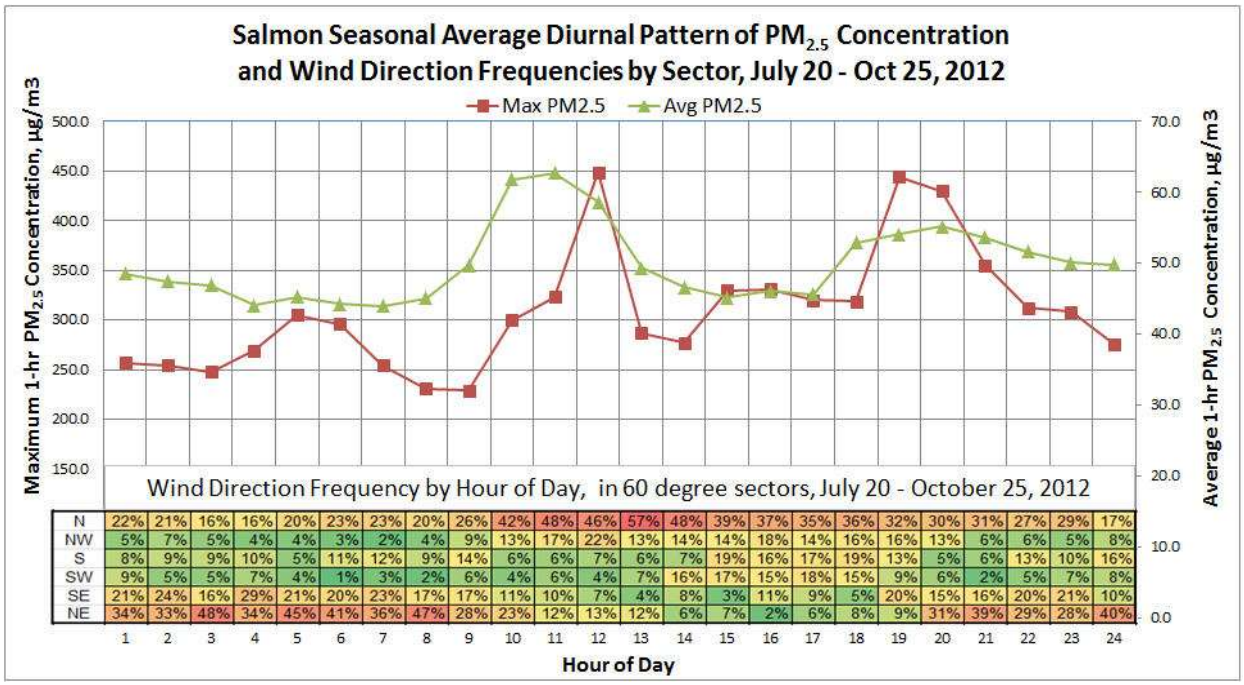


Figure 19. Salmon seasonal average and maximum $PM_{2.5}$ concentration by hour of day, with wind direction frequencies, showing that up-valley flows from the North brought the highest $PM_{2.5}$ levels to Salmon.

1.5.4 Pinehurst Valley Flows Conceptual Model Description

The conceptual model for wildfire impacts in Pinehurst are somewhat different than those in Salmon in that none of the wildfires were located in or near the same valley as the monitor. As a result, the wildfire impacts in Pinehurst, while conceptually similar, were much lower in magnitude and somewhat more difficult to distinguish from the normal patterns. The average and maximum values for each hour during the wildfire period of impact, and during late summer before the wildfire impacts are shown in Figure 20. For reference, the wind sector frequencies are repeated at the bottom of this chart in the same colored scheme, in which the most frequent directions are red and orange while the least frequent directions are green. Since the Pinehurst impacts are lower than Salmon impacts and not as clearly "exceptional" the average and maximum values for 40 days prior to the period of fire activity are also shown, to better demonstrate the influence of the fires in comparison to the "during fires" $PM_{2.5}$ average and maximum diurnal patterns. The chart in Figure 20 clearly shows that the average and maximum values for each hour are elevated over the "prefire" values, and the additional wildfire contribution appears to arrive (a) during nighttime drainage flow from the south where wildfire smoke was likely trapped each day, and (b) during the afternoon hours when flow from NW bring additional $PM_{2.5}$ during the afternoon (~ 1500–1700). These patterns support a conceptual model of regional transport from distant fires and valley flow transporting trapped smoke that persisted as a result of stagnant conditions.

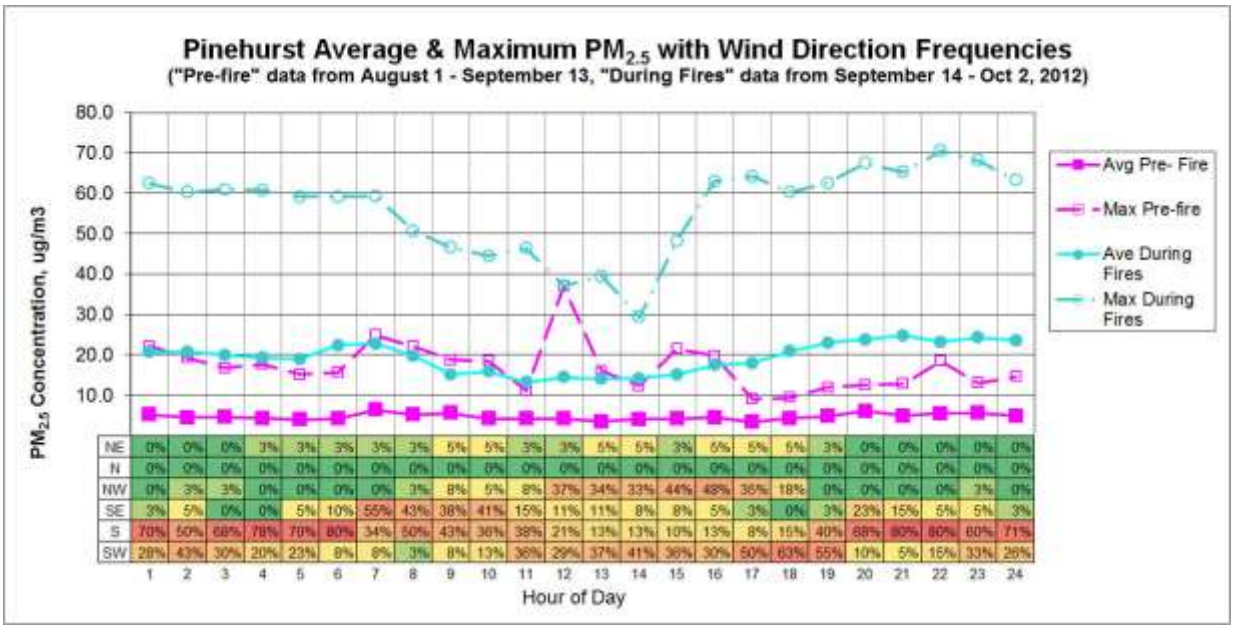


Figure 20. Average and maximum monitor values at Pinehurst, before and during the period of wildfire contributions, with wind sector frequencies by hour.

1.6 Concentration Patterns

Temporal and spatial concentration patterns serve to characterize the increases in monitor values during the event and provide additional information regarding the source of the elevated $PM_{2.5}$ concentrations.

1.6.1 Temporal Patterns

The general diurnal concentration patterns for the days affected by the wildfires are characterized by the average and maximum concentration charts Figure 19 and Figure 20 shown in the previous section. The specific diurnal concentration patterns for each day proposed as "Exceptional Events" are shown in hourly time series charts in Appendix B (Salmon) and Appendix C (Pinehurst).

All daily mean $PM_{2.5}$ concentration values, including the co-located monitor values for the year 2012 are shown in Figure 21 and Figure 22 for Salmon and in Figure 23 for Pinehurst. Figure 22 is simply an expanded view of the elevated concentrations during the period of wildfire influence and includes approximately the two week period of unaffected values before and after the season. These charts refer to the monitors by their "POC" or "parameter occurrence code" which merely identifies unique monitors co-located at the same monitoring site.

These figures show the specific monitor values included in this request, and other values which also appear to be affected by the wildfires, but are not included in this request due to time constraints. Together, the figures demonstrate that the temporal concentration pattern in the year 2012 was dramatically altered by the wildfires.

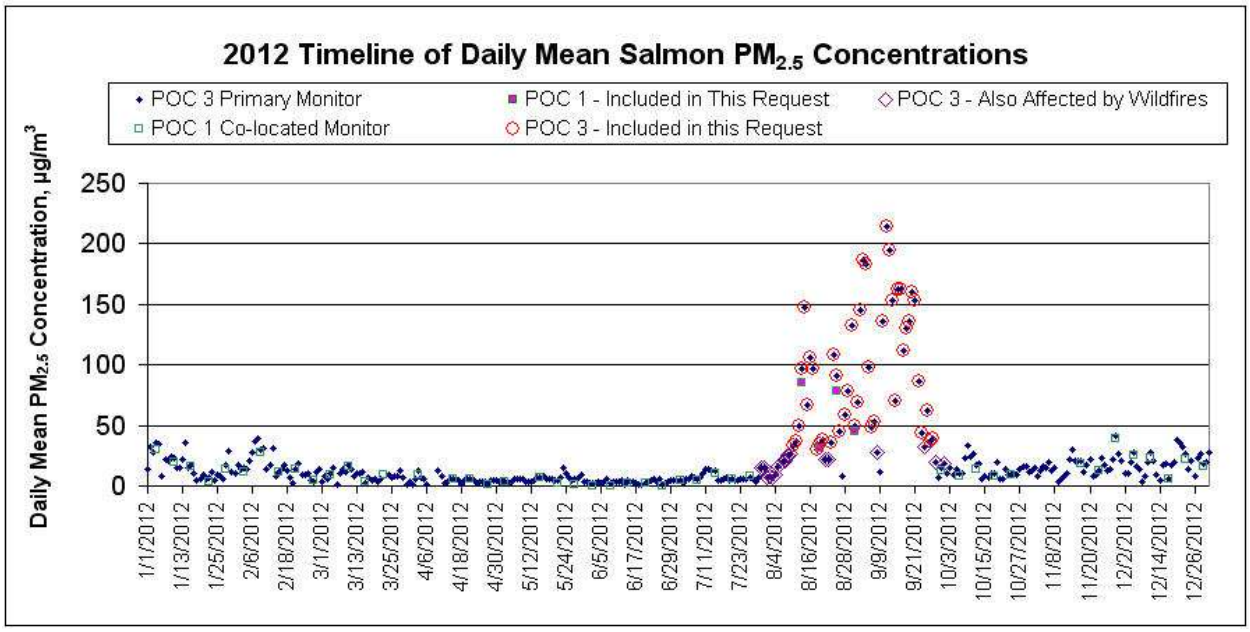


Figure 21 Timeline of Daily Mean $PM_{2.5}$ Concentrations in Salmon, Idaho, 2012

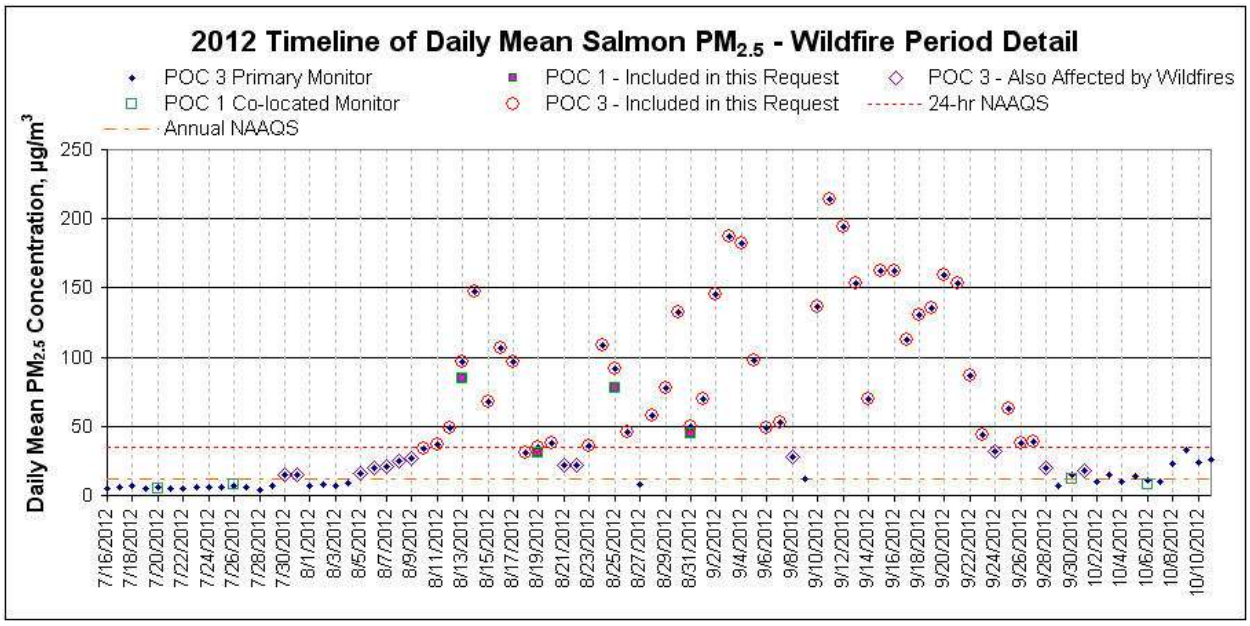


Figure 22 Detail during Wildfire Period in Timeline of Daily Mean $PM_{2.5}$ Concentrations in Salmon, Idaho, 2012

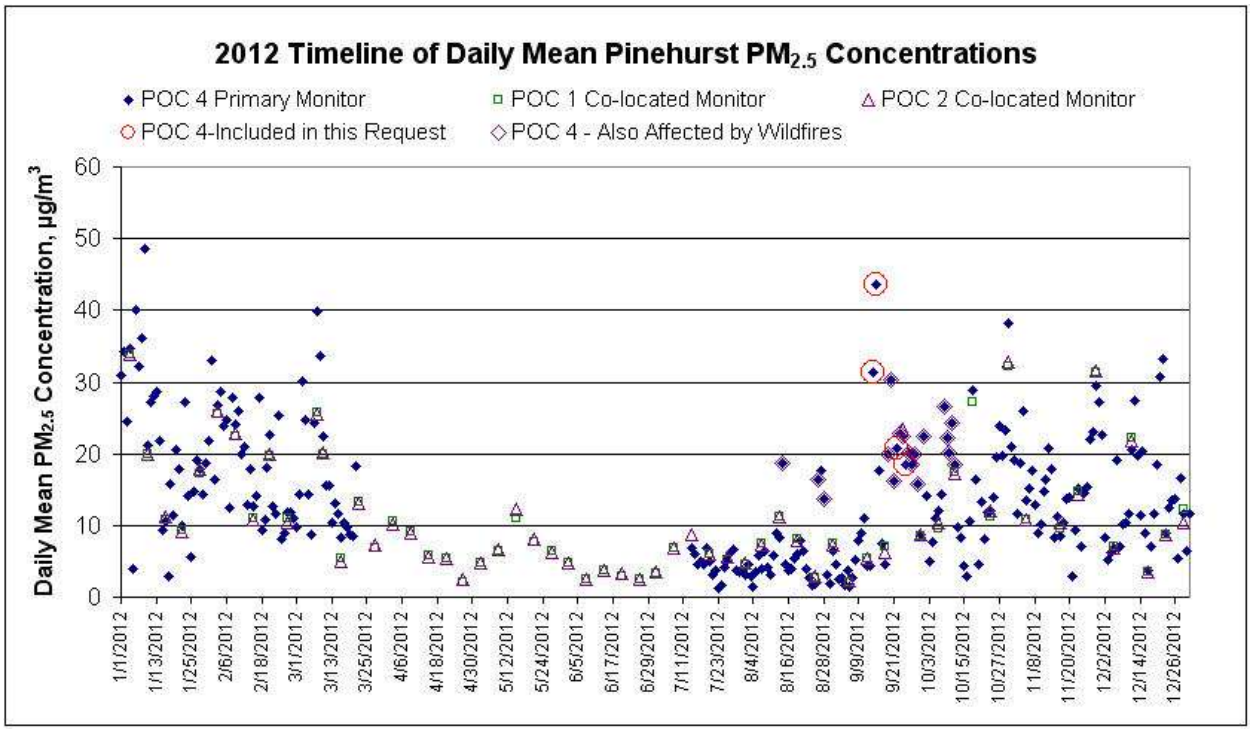


Figure 23 Timeline of Daily Mean $PM_{2.5}$ Concentrations in Pinehurst, Idaho, 2012

1.6.2 Spatial Patterns

The spatial concentration patterns during the 2012 wildfire season were higher than normal throughout the region, with particularly extreme increases in the east-central area of Idaho along the border with Montana. This pattern is clear in Figure 24, where the $PM_{2.5}$ at Salmon, Selway-Bitterroot, and Ravalli, Montana are many times higher than the wildfire period average for the preceding four years, and at most sites in the region were the 2012 concentrations are at least 2–3 times higher. To confirm that the $PM_{2.5}$ increase is due to smoke, the organic carbon (OC) and $PM_{2.5}$ concentrations were obtained from the IMPROVE visibility monitoring stations throughout the region (IMPROVE 2013). The OC and OC/$PM_{2.5}$ ratios based on the IMPROVE speciation data are shown in Figure 25. The similarity of the OC temporal/spatial pattern is very similar to the $PM_{2.5}$ across the region, confirming that the regional increase in $PM_{2.5}$ is due to combustion sources. The broad regional pattern, along with the emissions comparison in Figure 4, demonstrates that typical crop residue burning, wildland prescribed burning, industrial point sources, and nonpoint sources including residential wood combustion and all other forms of open burning are very small in comparison to the 2012 wildfire emissions and not capable of producing such a region-wide increase in the level of $PM_{2.5}$. Thus, we may conclude that the huge region-wide increase in $PM_{2.5}$ parallels the increase in carbon at all sites, and therefore can only be explained by the unusually severe and region-wide wildfires.

Finally, Figure 26 shows the comparison of the 2012 wildfire period averages for $PM_{2.5}$ sites across Idaho to the mean of period (2008-0211) averages (over the same time domain) and the 95th percentile upper confidence bound (UCB) on the annual values. The 2012 data were well above the 2008-2011 UCB, demonstrating that the result is statistically significant at all sites across the state.

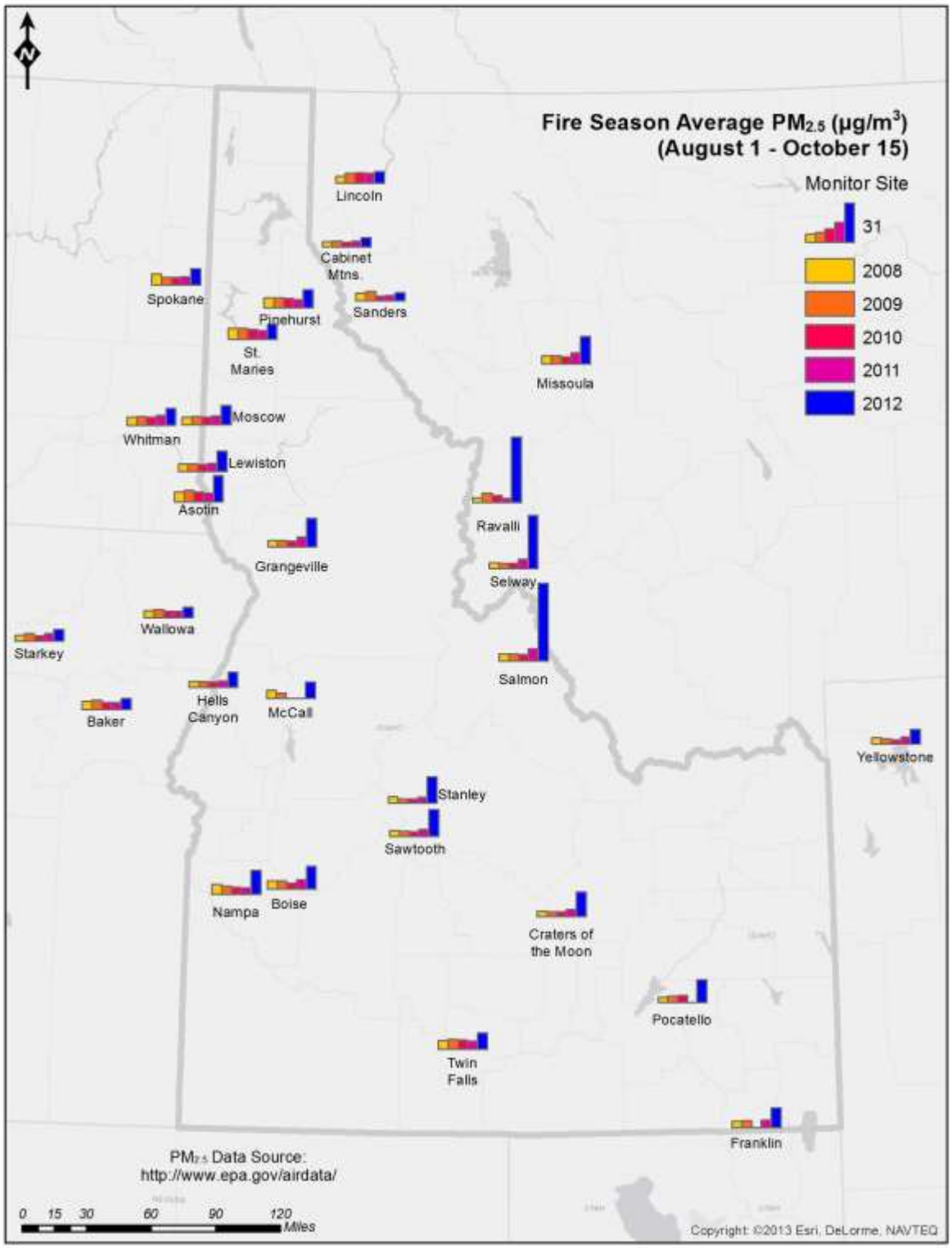


Figure 24. Fire season (August 1–October 15) period average $PM_{2.5}$ concentrations for 2012 and the previous 4 years showing concentrations throughout the region much higher in 2012 than in normal years (sources: EPA 2013b for cities; IMPROVE 2013 for Class I areas).

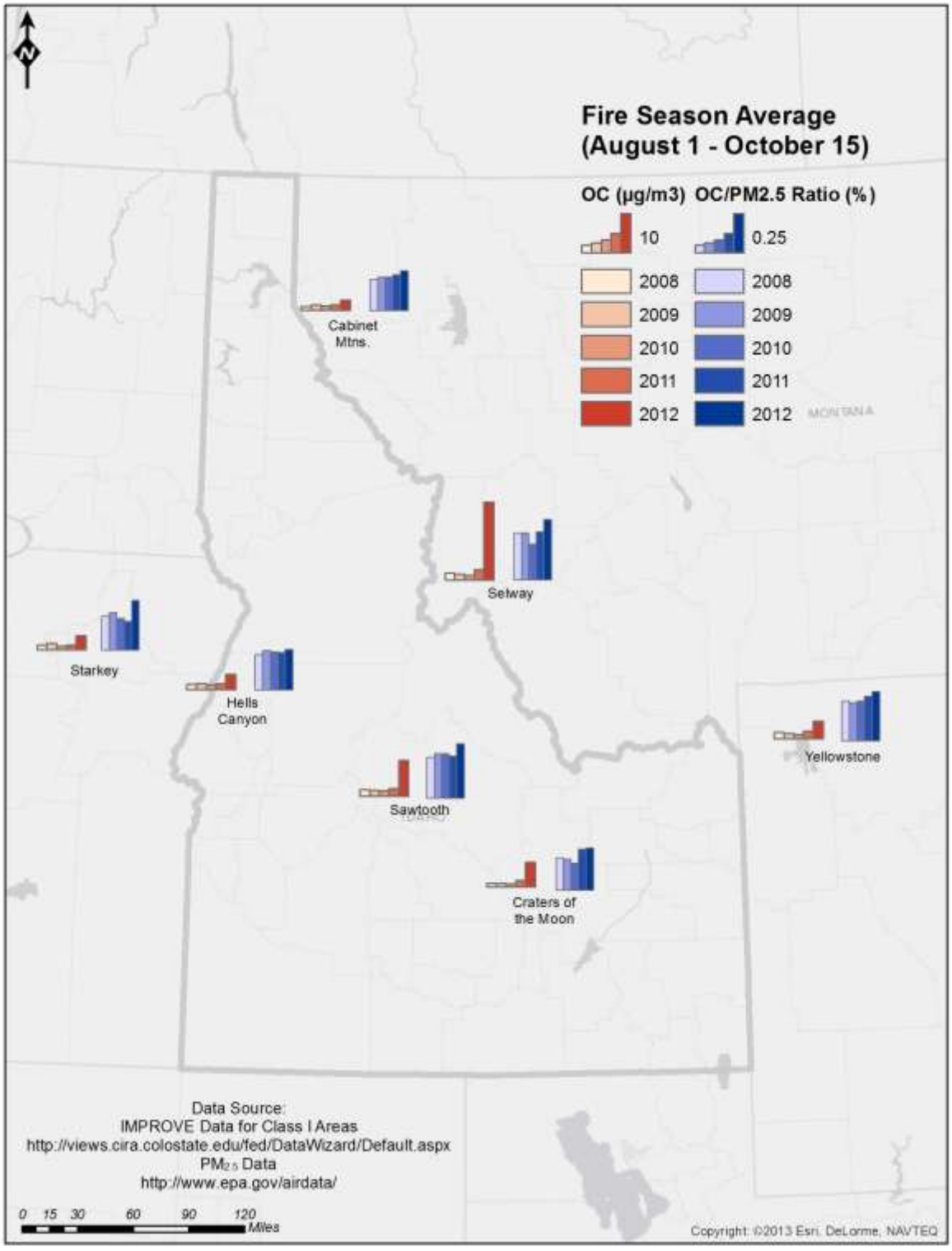


Figure 25. Fire season organic carbon (OC) and organic carbon to $PM_{2.5}$ ratio at IMPROVE sites in the Idaho region (IMPROVE 2013) for 2012 and 4 previous years showing that organic carbon, a species identifying smoke was unusually high throughout the Idaho region in 2012, compared to the previous years.

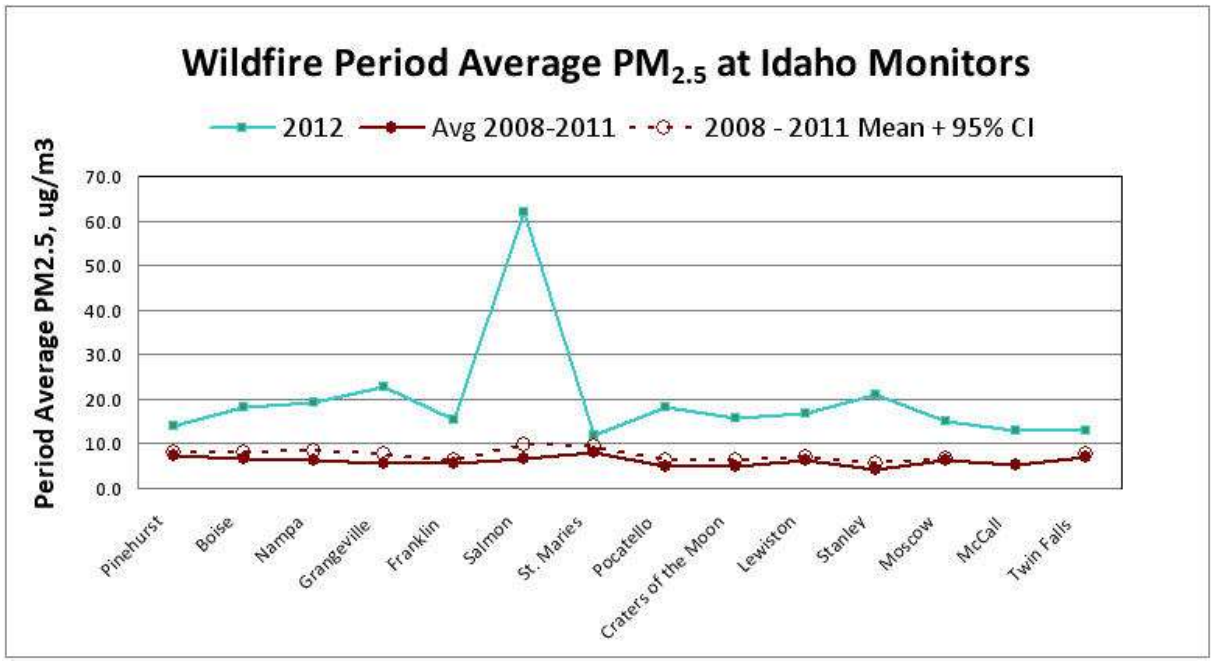


Figure 26. The 2012 wildfire period average $PM_{2.5}$ in comparison to the mean and 95th percentile upper confidence interval for the 2008–2011 period means, showing statistically significant increases in 2012 at every monitor in the region (EPA 2013b).

2 Not Reasonably Controllable or Preventable (nRCP)

2.1 Source Areas Contributing to the Event

This section demonstrates that the exceptional event, the primarily lightning-caused wildfires, was not reasonably controllable or preventable. The primary wildfires impacting Pinehurst and Salmon were lightning caused and managed under suppression strategies, either full suppression or point zone protection consistent with each specific forest's Fire Management Plan (e.g. see SCNF, 2012). This section only addresses the question of whether or not the wildfires were reasonably controllable or preventable. Section 4.3 of this document evaluates whether other types of $PM_{2.5}$ sources, such as prescribed burning, could have caused or contributed significantly to the elevated concentrations on the requested days. Section 8 of this document discusses the mitigation measures DEQ implemented to notify the public of deteriorating air quality as well as to control other sources of $PM_{2.5}$ emissions.

The primary wildfires influencing Salmon, Idaho $PM_{2.5}$ concentrations were the Halstead fire north of Stanley, Idaho, and the Mustang Complex northwest of Salmon. The primary fires influencing the Pinehurst, Idaho $PM_{2.5}$ concentrations were the Wenatchee Complex and Table Mountain Fires in Washington; the Cache Creek fire in Oregon; and the Powell SBW Complex in Idaho, although many other fires in the region likely contributed at various times. The start and end dates for each fire are shown in Table 3 (NIFC 2013). Additional fires over 40,000 acres are also listed in Table 3 because they all contributed to regional smoke and are also considered as partial contributors. The management strategy applied to each fire by the incident command teams is also included in Table 3.

Table 3. July 30–October 13, 2012, wildfires greater than 40,000 acres contributing to Idaho smoke (NIFC 2013).

Name	Manage-ment Strategy[c]	State	Start Date	Contain or Control Date	Size (Acres)	Cause Estimated	Cost of Resources Spent to Suppress
Mustang Complex[a]	FS/M[d]	ID	30-Jul	18-Oct	341,488	Lightning	$38,323,413
Halstead[a]	FS/PZP[e]	ID	27-Jul	18-Oct	181,948	Lightning	$1,625,000
Trinity Ridge	FS	ID	3-Aug	18-Oct	146,832	Human	$26,413,932
Flat Top 2	FS	ID	5-Aug	13-Aug	140,954	Lightning	$41,228,912
Minidoka Complex	FS	ID	8-Aug	23-Aug	97,616	Lightning	$600,000
Powell SBW Complex[b]	PZP	ID	20-Jul	5-Nov	67,611	Lightning	$5,801,271
Sheep	FS	ID	6-Sep	6-Nov	48,626	Human	$4,882,375
McGuire Complex	FS	ID	27-Aug	29-Oct	43,621	Lightning	$300,000
Miller Homestead	FS	OR	8-Jul	21-Sep	160,853	Lightning	$24,741,628
Barry Point	FS	OR	6-Aug	17-Sep	93,071	Lightning	$4,360,000
Cache Creek[b]	FS	OR	20-Aug	23-Oct	73,697	Lightning	$6,000,000
Holloway	FS	OR/NV	5-Aug	23-Aug	460,850	Lightning	$23,247,235
Barker Canyon Complex	FS	WA	8-Sep	15-Sep	81,155	Lightning	$11,250,000
Wenatchee Complex[b]	FS	WA	9-Sep	30-Oct	56,478	Lightning	$9,166,719
Table Mountain[b]	FS	WA	8-Sep	19-Oct	42,312	Lightning	$2,290,268
Rush	FS	CA	12-Aug	4-Sep	315,577	Lightning	$32,394,876
Chips	FS	CA	29-Jul	8-Sep	75,431	Unknown	$195,000
Lost	FS	CA	5-Aug	12-Aug	61,541	Lightning	$15,170,000
Bagley	FS	CA	18-Aug	22-Sep	46,011	Lightning	$53,300,000
North Pass	FS	CA	18-Aug	17-Sep	41,983	Lightning	$3,700,000

a. Primary fires affecting the Salmon Monitor, although other fires in the region contributed at times.
b. Primary fires affecting the Pinehurst Monitor, although other fires in the region contributed at times.
c. FS = Full Suppression; PZP = Point Zone Protection; M = Monitor
d. Mustang Complex was managed under FS 7/30 – 10/6, and under PZP from 10/6 to date of control.
e. Halstead Fire was managed under FS 7/30 – 8/11, and under PZP from 8/12 – 10/18.

The temporal progression of the fires and the smoke produced by them between the start date and the containment or "control" date are of interest to better understand how the source strength varied throughout the season. The daily "Situation Reports" (NIFC 2013b) provide operational estimates of the approximate fire perimeter sizes and personnel committed to each fire by the responsible federal land management agencies. Figure 27 demonstrates, for the two fires primarily influencing the Salmon, Idaho $PM_{2.5}$ concentrations, that these fires grew continuously throughout the wildfire season, and that considerable personnel resources were dedicated to suppressing the fires throughout the entire period until each fire stopped growing, around the end of September.

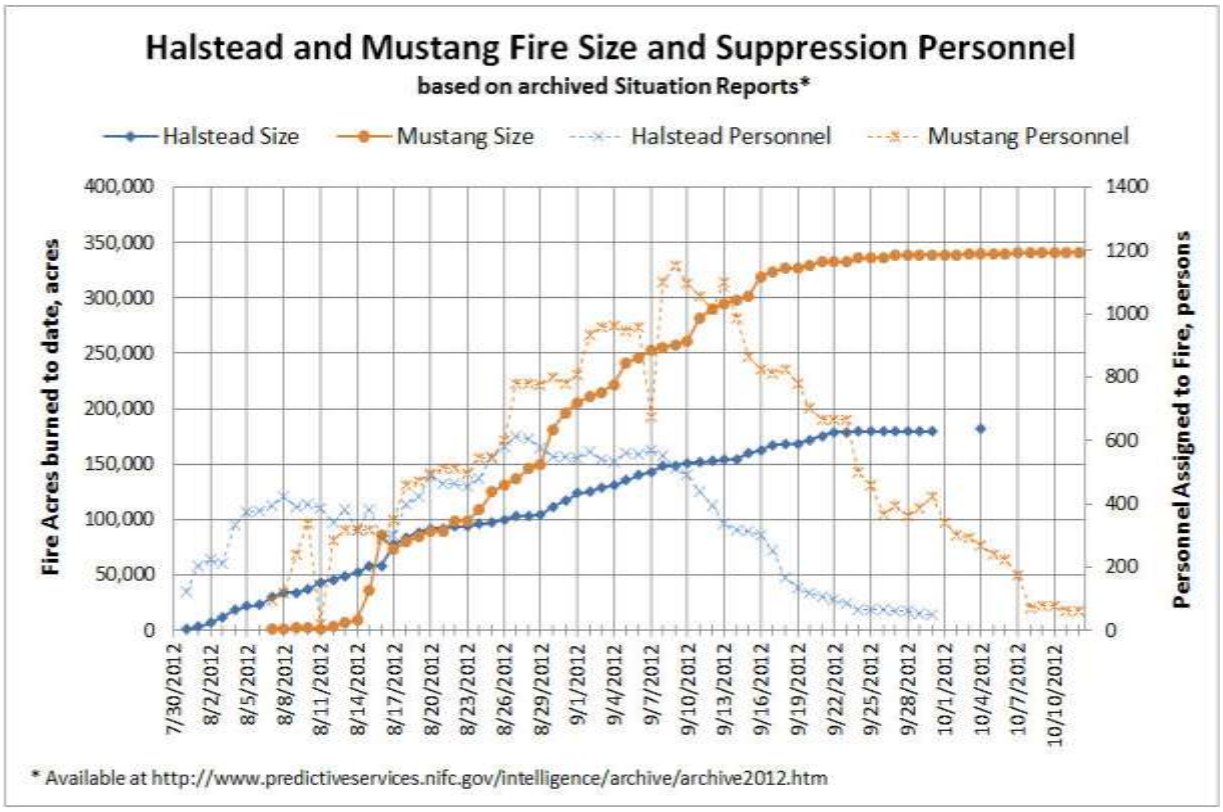


Figure 27. Fire size progression and personnel assigned to the Halstead and Mustang Complex, the major fires most affecting the Salmon, Idaho monitor (NIFC 2013b).

2.2 Basic Controls Analysis

Based on the information provided in Table 3 of this submittal, lightning caused the Halstead and Mustang Complex fires that contributed the vast majority of smoke influencing the Salmon, Idaho monitor. The Halstead fire was managed under full suppression until August 11, at which time it was managed under point zone protection until controlled. The Mustang Complex was managed as point zone protection until October 6, at which time the fire was under a monitor status. The responsible agencies did their reasonable best to control the extent of these fires, as indicated by the funds spent to fight these fires (Table 3) and the personnel resources assigned to the two fires primarily affecting Salmon. As shown in Figure 27, at their peak staffing levels, 607 people were fighting the Halstead fire and 1152 were fighting the Mustang Complex. The Halstead effort utilized up to 10 crews, 40 engines and 10 helicopters at its peak, while the Mustang Complex effort utilized up to 20 crews, 100 engines and 7 helicopters at its peak. In addition up to 4 large C-130 aircraft from two different Airlift Wings operated out of the National Interagency Fire Center located in Boise, ID, in support of suppression efforts on the Halstead, Mustang, and Trinity Ridge Fires (NIFC 2013).

The primary fires affecting Pinehurst on the days requested as "exceptional" are the Wenatchee Complex, and Table Mountain fire in Washington, the Cache Creek fire in Oregon, and the Powell SWB Complex in Idaho. With the exception of the Powell SBW Complex, these fires were managed under the full suppression strategy. The Powell SBW Complex was managed under the point zone protection strategy. Many other fires in the region, included Table 3, also

likely contributed to the regional smoke conditions, and all these other fires were managed under full suppression strategy.

Therefore, in view of the fact that lightning caused the primary fires affecting Salmon and Pinehurst, the fact that all the fires were managed by Federal Land Managers under a form of suppression strategy (full suppression or point zone protection) and that a tremendous amount of human and material resources were spent to control or contain these fires, it is clear that emissions from these wildfires were not reasonably controllable or preventable.

3 In Excess of Historical Fluctuations (HF)

3.1 Salmon Historical Fluctuations

The $PM_{2.5}$ concentrations measured at Salmon during May through October, from 2008 through 2011 are presented in Figure 28. The data (EPA 2013b) shows that the $PM_{2.5}$ concentration could be elevated in different periods. The impact is often influenced by mixed emission sources; however, it can be seen that the overall $PM_{2.5}$ level more or less is evenly distributed from May through October with an average below 10 $\mu g/m^3$ and few peaks higher than 15 $\mu g/m^3$. It is believed that while $PM_{2.5}$ concentrations were also influenced by wildfires in these years, the impact was not significant. Using these data as the background to represent the normal historical fluctuations would therefore be a somewhat conservative approach since they likely include some wildfire smoke, which may also have been considered "exceptional." The higher levels in later October are believed to reflect primarily the emissions from residential wood combustion as the heating season started, although some minor prescribed fire activity may be present in October.

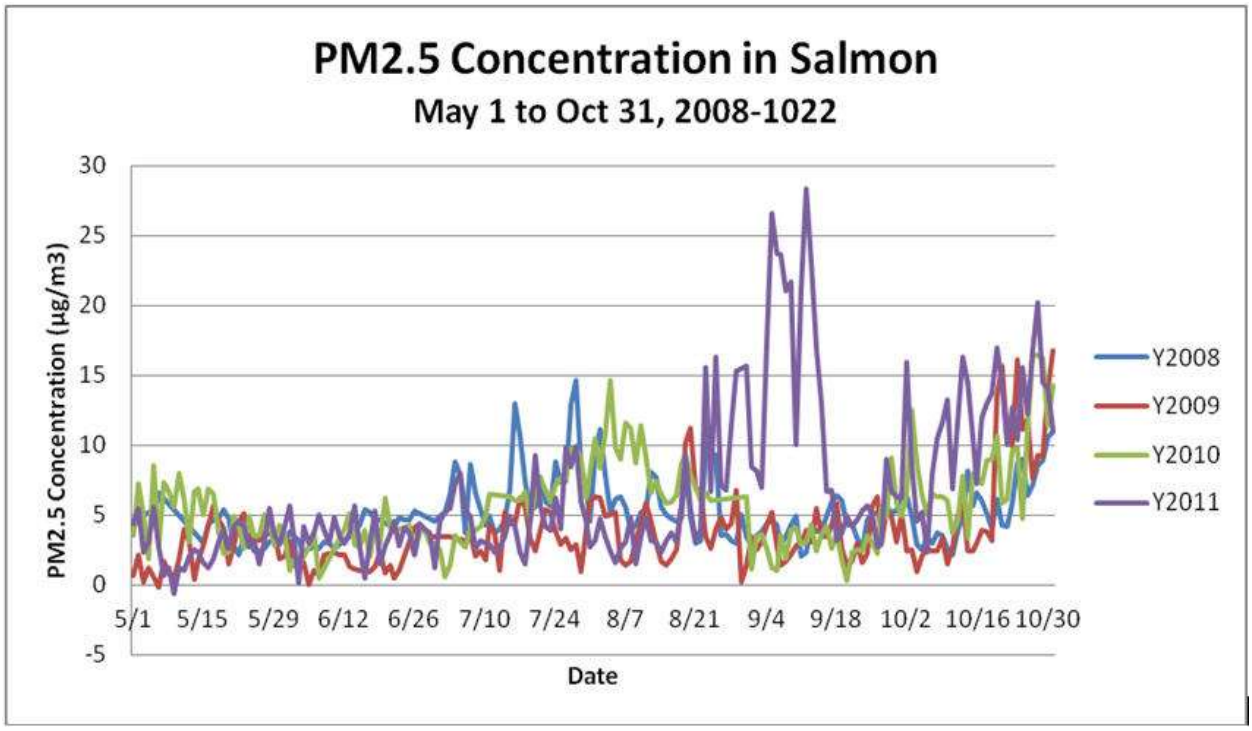


Figure 28. $PM_{2.5}$ historical fluctuations in Salmon, Idaho, 2008–2011.

Table 4 shows the statistics of $PM_{2.5}$ concentrations measured during the wildfire period from 2008–2011 and the same period in 2012. The statistics show clearly all key values are shifted greatly to higher levels in 2012 indicating $PM_{2.5}$ concentrations during this period in 2012 were influenced by the additional emissions.

Table 4. Statistics of $PM_{2.5}$ concentrations during fire period.

Statistics	2008–2011	2012
Mean	5.9	61.6
Standard Error	0.3	6.4
Median	4.8	37.2
Mode	3.0	10.5
Standard Deviation	4.5	56.5
Minimum	0.2	5.4
Maximum	28.4	214.3

Figure 29 shows the distribution of $PM_{2.5}$ concentrations from July 30–October 12 during 2008–2011 and during the same period in 2012. The 2012 distribution is a dual-mode distribution with the second mode of a much higher value (50–100 µg/m^3) compared to the mode of 2008–2011 distribution (0–5 µg/m^3). This pattern provides strong evidence that the period was impacted by an emissions source with a unique distribution.

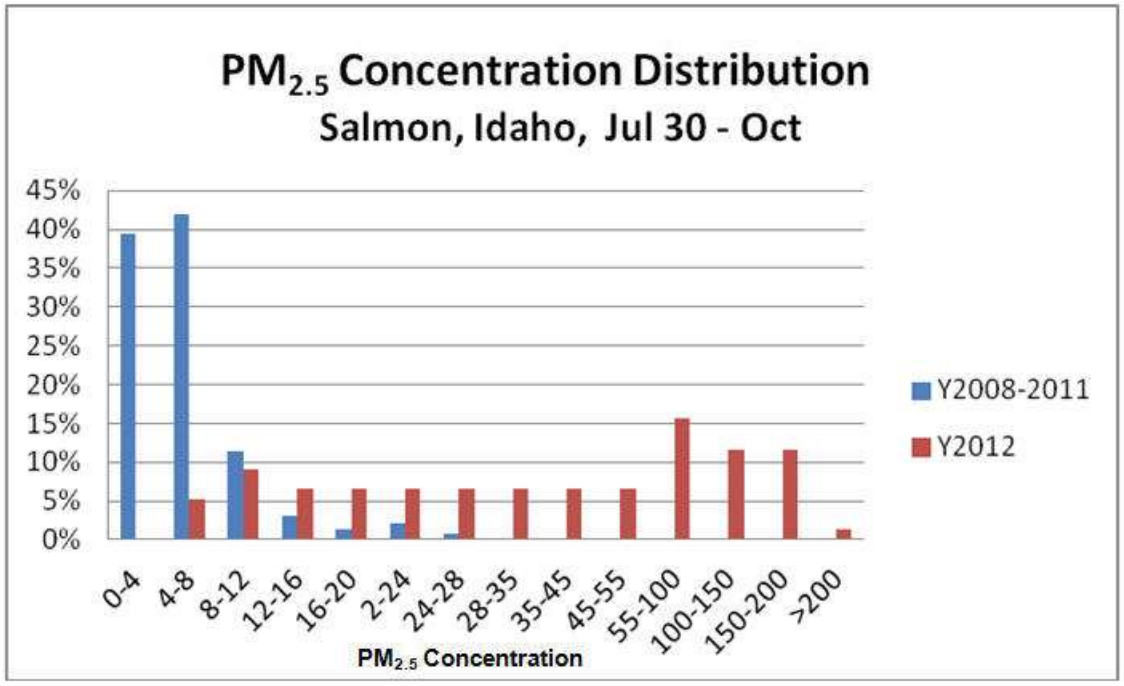


Figure 29. $PM_{2.5}$ concentration distribution for 2012 versus the previous 4 years, during the period July 30–October 12. Percent of days in each concentration range are depicted.

Table 5 shows the average $PM_{2.5}$ concentration and 95th and 99th percentile of concentrations at the Salmon monitor for 2008 through 2011 for the approximate period of the 2012 wildfire season July 30 – October 12. The range of "normal historical fluctuations above the mean" is considered to be represented by the range from the average value to the 95th percentile value, in this case, 5.8 to 15.9 µg/m^3.

Table 5. Average, 95th and 99th percentile values for Salmon monitor, July 30 – October 20, 2008–2011.

Average (µg/m^3)	95 percentile	99 percentile
5.8	15.9	23.7

The percentile ranking for the $PM_{2.5}$ concentrations at Salmon are listed in Table 6 in comparison to the 2008–2011 seasonal and annual datasets. All days higher than 15.9 µg/m^3 surpass the 95th percentile relative to the fire season average. The 2012 data set is not used to represent the historical fluctuations because there exist so many affected days, it would not provide a clear picture of the normal conditions.

Table 6. Percentile rankings for Salmon $PM_{2.5}$ monitor values (99% indicates 99% or above).

Date	2012 $PM_{2.5}$ ($\mu g/m^3$)	Percentile (Fire Season)	Percentile (Annual)
8/10/2012	33.7	99%	97%
8/11/2012	37.2	99%	98%
8/12/2012	49.2	99%	99%
8/13/2012	96.5	99%	99%
8/14/2012	147	99%	99%
8/15/2012	67.3	99%	99%
8/16/2012	106.5	99%	99%
8/17/2012	96.6	99%	99%
8/18/2012	30.4	99%	95%
8/19/2012	34.5	99%	97%
8/20/2012	37.7	99%	98%
8/23/2012	35.9	99%	98%
8/24/2012	108.2	99%	99%
8/25/2012	91.3	99%	99%
8/26/2012	45.5	99%	99%
8/28/2012	58.2	99%	99%
8/29/2012	78.1	99%	99%
8/30/2012	132	99%	99%
8/31/2012	49.8	99%	99%
9/1/2012	69.4	99%	99%
9/2/2012	145.2	99%	99%
9/3/2012	186.9	99%	99%
9/4/2012	182.7	99%	99%
9/5/2012	97.8	99%	99%
9/6/2012	48.4	99%	99%
9/7/2012	53.1	99%	99%
9/10/2012	136.4	99%	99%
9/11/2012	214.3	99%	99%
9/12/2012	194.4	99%	99%
9/13/2012	153.7	99%	99%
9/14/2012	70.2	99%	99%
9/15/2012	162.1	99%	99%
9/16/2012	162.5	99%	99%
9/17/2012	112.3	99%	99%
9/18/2012	130.3	99%	99%
9/19/2012	135.5	99%	99%
9/20/2012	159.8	99%	99%
9/21/2012	153.5	99%	99%

9/22/2012	86.6	99%	99%
9/23/2012	44.3	99%	99%
9/25/2012	62.7	99%	99%
9/26/2012	37.4	99%	98%
9/27/2012	39.3	99%	98%

Figure 30 shows the $PM_{2.5}$ concentrations during the 2012 fire period (yellow circles) compared to the concentrations for the same days in the years 2008 through 2011 (colored bars.) The historical (2008–2011) average and 95th percentile values (from Table 5) are also shown as dotted lines. Based on EPA guidance (EPA 2013), the $PM_{2.5}$ concentrations above the average to 95th percentile range, may be generally attributed to the wildfires (if other EER elements support that conclusion).

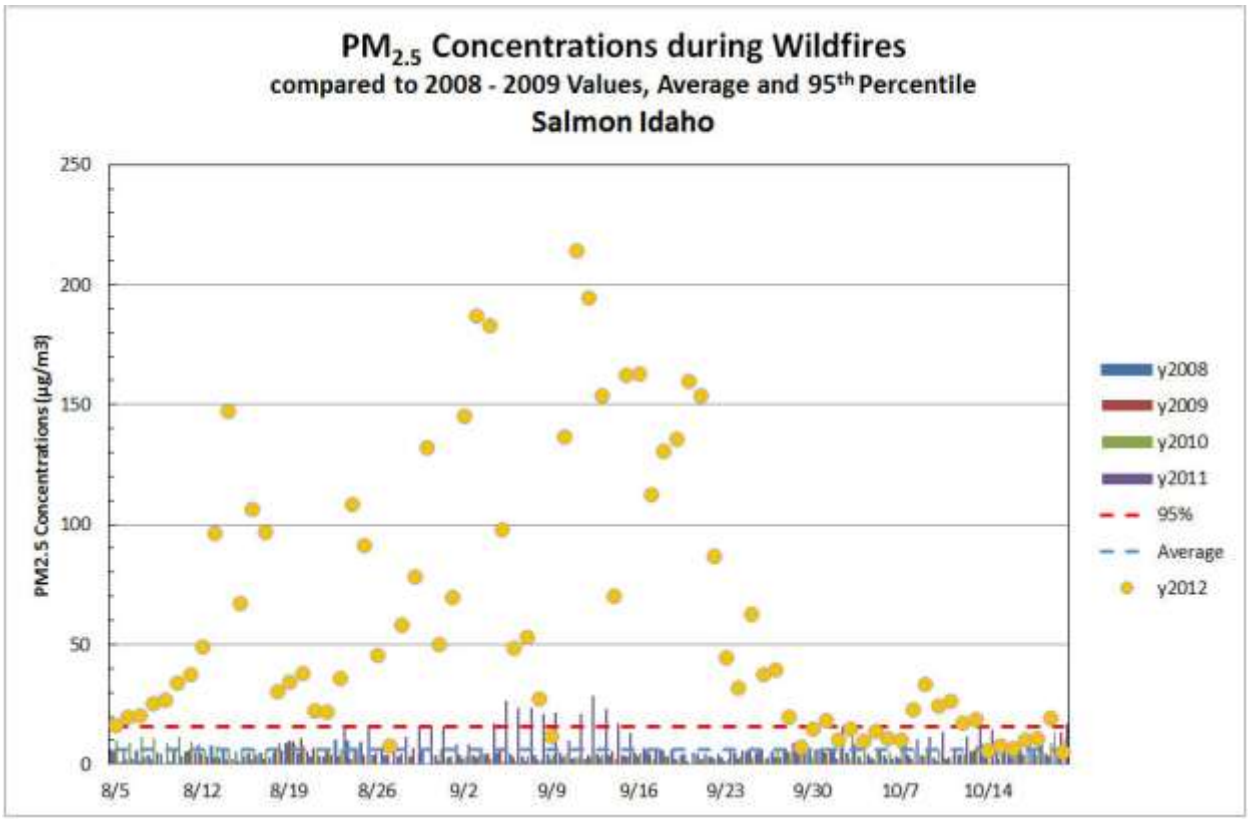


Figure 30. Salmon time series chart for the 2012 wildfire season (yellow circles) in comparison to the previous 4 years, 2008–2011 (colored bars). Days before and after the wildfire period are also included.

3.2 Pinehurst Historical Fluctuations

In Figure 31, the $PM_{2.5}$ concentrations measured at Pinehurst during May through October are shown for the years 2008 through 2011. The data shows that the $PM_{2.5}$ concentration could be elevated at different periods. The impact is often influenced by mixed emission sources; however, it can be seen that the overall $PM_{2.5}$ levels more or less are evenly distributed from June through mid-October with the average below 10 µg/m^3 and few peaks in the low 20s. It is

believed that although $PM_{2.5}$ concentrations were also influenced by wildfires in these years, the impact was not significant. Using these data as a background would be a conservative approach. The higher levels in later October may reflect the emissions of wood burning as the heating season starts and/or fall prescribed burning.

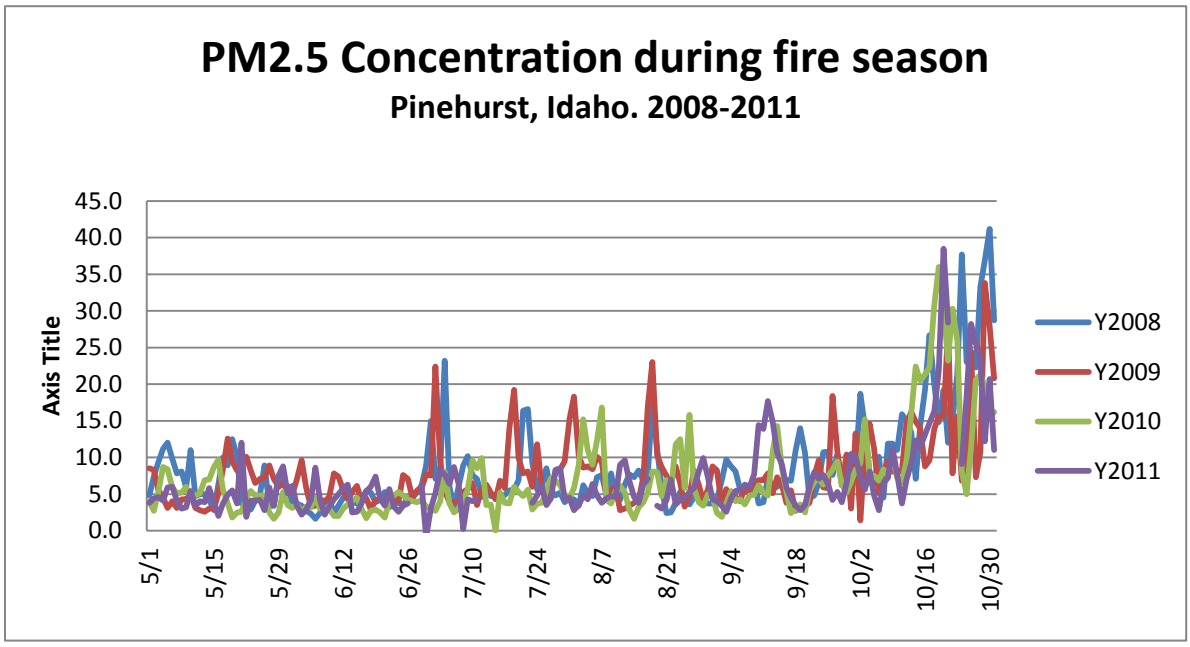


Figure 31. $PM_{2.5}$ historical fluctuations in Pinehurst, Idaho, 2008–2011.

Table 7 shows the statistics of $PM_{2.5}$ concentrations measured during the fire period from 2008-2011 and 2012. The statistics show clearly that all key values are shifted to higher levels in 2012 indicating $PM_{2.5}$ concentrations during this period in 2012 were influenced by additional emissions.

Table 7. Statistics of 24-hour $PM_{2.5}$ concentrations recorded in Pinehurst during the wildfire season in 2008–2011 and 2012.

Statistic	2008–2011	2012
Mean	7.0	11.1
Median	6.3	7.8
Mode	3.8	4.6
Standard Deviation	3.5	8.9
Minimum	1.4	1.5
Maximum	23	43.6

Figure 32 shows the distribution of $PM_{2.5}$ concentrations during 2008–2011 period and 2012. The 2012 distribution is a dual-mode distribution with the second mode of a much higher value (16–20 µg/m^3) compared to the mode of 2008–2011 distribution (4–8 µg/m^3). This pattern provides strong evidence that the period was impacted by the emissions with a unique source mixture.

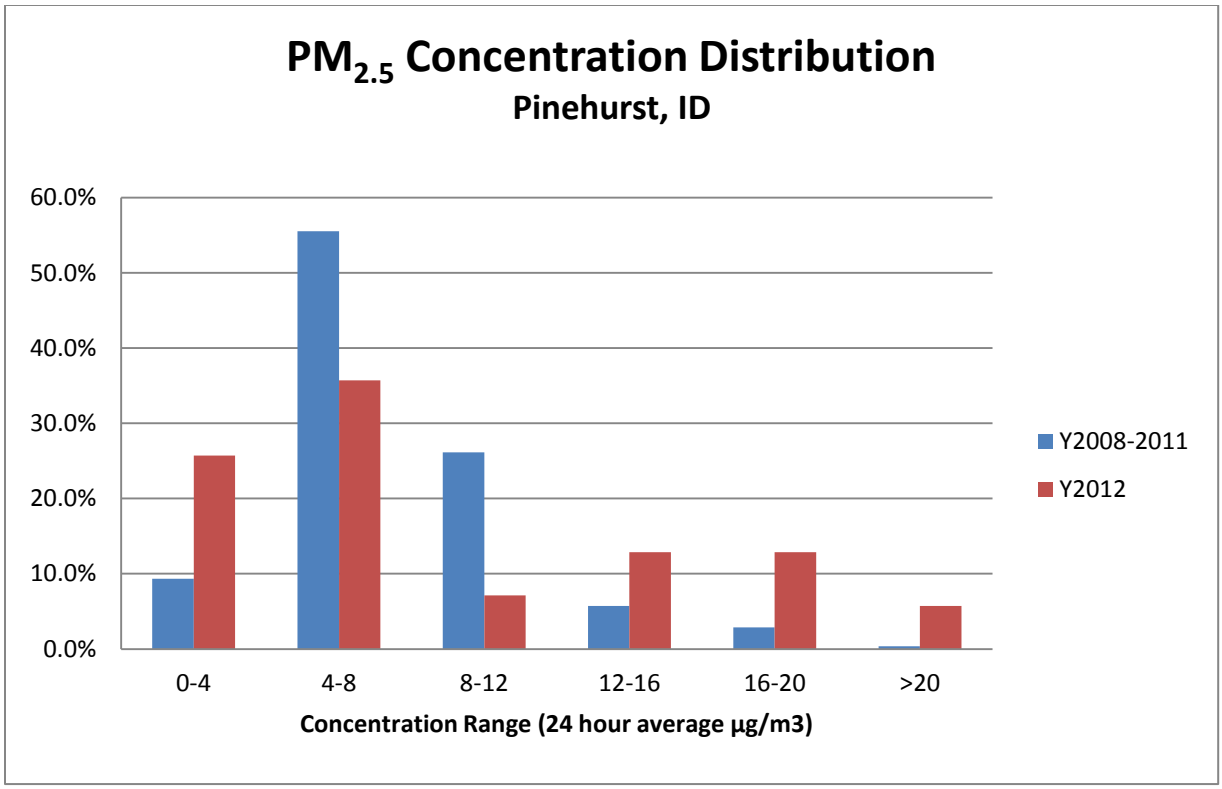


Figure 32. $PM_{2.5}$ concentration distributions.

Table 8 shows the average $PM_{2.5}$ concentration and 95 and 99 percentile of concentrations monitored in Pinehurst during the fire period in 2008 through 2011.

Table 8. Average, 95th, and 99th percentile of $PM_{2.5}$ during the wildfire period, from 2008–2011 data.

Average (µg/m^3)	95 percentile	99 percentile
7	15	18

Table 9 shows the percentile ranking for the $PM_{2.5}$ concentrations at the Pinehurst monitor for the days included in this request. All days requested are higher than 15 µg/m^3 and therefore are above the 95th percentile relative to the fire season average.

Table 9. Percentile ranking for the monitor values requested in this demonstration, relative to unaffected days in the same period from 2008–2011 (99% indicates 99% or above).

Date	$PM_{2.5}$	Percentile (Annual)	Percentile (Season)
9/15	43.6	99%	99%
9/14	31.3	95%	99%
9/22	20.8	83%	99%
9/25	18.4	78%	98%

Figure 33 shows the $PM_{2.5}$ concentrations during the 2012 fire period compared to the concentrations in the same period in years 2008 through 2011. The dashed lines indicate the average value and 95th percentile of the normal years during the same period (Table 8). There

were a total of 23 days in which the $PM_{2.5}$ concentrations were greater than 15 µg/m^3, the value of 95th percentile. Based on the EPA guidance, the excess of $PM_{2.5}$ concentrations above the range 7 -15 µg/m^3 would not be observed "but for" the regional wildfires.

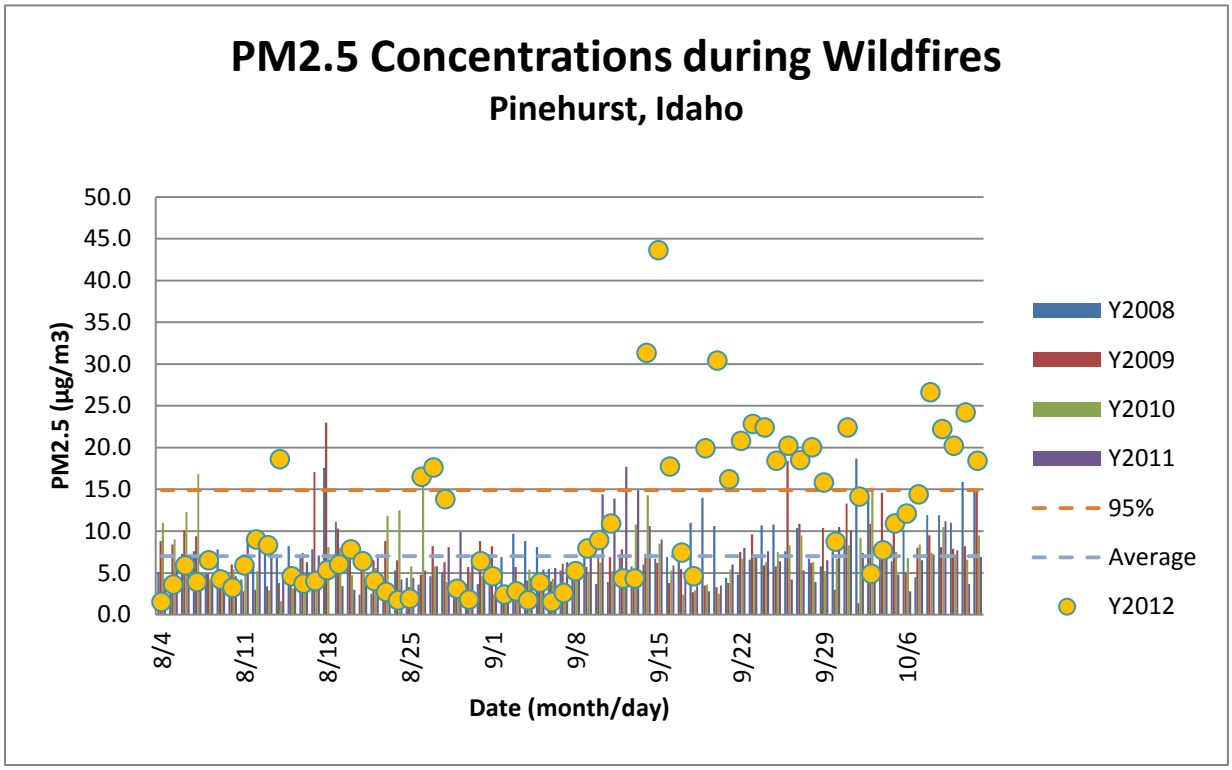


Figure 33. $PM_{2.5}$ concentrations during wildfires in 2012 compared to normal years.

4 Clear Causal Relationship (CCR)

A demonstration of a clear causal relationship between a source and monitor is generally a weight of evidence demonstration involving several elements. These elements will be covered in detail for a number of "scenarios" that DEQ found to recur periodically throughout the wildfire season, then in the Appendices, the CCR evidence for each day refers to the scenario or scenarios likely to have contributed on that day. In addition, in Appendix B (for Salmon) and C (for Pinehurst), DEQ will provide a concise description of how the evidence for that day demonstrates the clear causal relationship, along with a summary of each EER element for that day.

4.1 Similarity of Chemical Composition of Measured Pollution with that Expected from Sources Identified as Upwind

Chemical speciation data is not available from either Salmon, Idaho nor Pinehurst, Idaho during the 2012 wild fire monitoring days included in this request. However the IMPROVE aerosol speciation data collected in wilderness areas (IMPROVE 2013) provides information on the organic carbon levels across the region. Figure 25 shows the regional pattern of organic carbon and suggests that the source is regionally widespread, even if such data is not available directly in Salmon or Pinehurst. However, the many news stories in these cities (samples of which are provided in Appendix F) revolve around the wildfires and smoke that affected these towns, strongly supporting the fact that the high $PM_{2.5}$ concentrations in Salmon and Pinehurst were due to wildfire smoke. The satellite images shown later in this section as well as in Appendices B and C, many of which show dense smoke plumes blowing from the fire-detects or source locations to Salmon and Pinehurst also leave no doubt where the high concentrations of $PM_{2.5}$ originated. Thus DEQ believes the regional pattern of high organic carbon shown previously in Figure 25 demonstrates that the unusually elevated, region-wide $PM_{2.5}$ in 2012 has a composition consistent with wildfire smoke and that along with the other weight of evidence discussed above provides sufficient evidence to demonstrate that high organic carbon and high $PM_{2.5}$ levels in Salmon and Pinehurst resulted from wildfires.

4.2 Occurrence and Geographic Extent of the Event

Wildfires impacting the Salmon and Pinehurst airsheds during the 2012 wildfire season are shown in Figure 3. The major fires are numerous and well distributed around the northwest. The increased fine particulate matter, in terms of $PM_{2.5}$ and the organic carbon that composed much of it were also observed throughout the region, as shown in Figure 24 and Figure 25. These three figures define the geographic extent of the 2012 wildfire events in and around Idaho. The extent of the event each day was often very complex due to the large number of source fires, however, MODIS satellite snapshot images are available to show the extent of smoke occurrence, at least during the morning Terra satellite pass (~ 1045 local time) and afternoon Aqua satellite pass (~ 1345 local time).

4.3 Alternative Hypotheses

One important element of the Clear Causal Relationship demonstration is to explore alternate hypotheses for potential sources. The discussion of composition and geographic extent in Section 1.6 make it very clear that the high $PM_{2.5}$ concentrations resulted from a source of biomass combustion due to the widespread, elevated organic carbon levels. While wildfires clearly caused most or virtually all the smoke, it is important to discuss potential alternative source hypotheses. The other sources of organic carbon are discussed in this section, then more briefly in each scenario within the CCR portion of the table for each day (in Appendix B and C).

The potential alternative sources described in this section include the normally expected anthropogenic sources of smoke. These sources are shown in Figure 4 to all be very small, on a statewide basis compared to the 2012 wildfire emissions. In addition, these routine sources of $PM_{2.5}$ occur at more or less similar levels from year to year and are therefore inherently included in the historical monitor values. Thus, the average and 95^{th} percentile values of $PM_{2.5}$ during the period of wildfire impacts (see Historical Fluctuations, Section 3) already incorporate the contributions from these anthropogenic sources and any concentration above 15.9 $\mu g/m^3$ at the Salmon monitor, or 15.0 $\mu g/m^3$ at the Pinehurst monitor most probably cannot be significantly attributed to any of these potential alternative sources. Finally, since prescribed fires, crop residue burning and other open burning were restricted by burn managers and by the nearly constant Stage 1 Forecast and Caution in effect on all but 3 requested days throughout the period of affected days (see Appendix D) it is likely that far less than the "normal" contribution of $PM_{2.5}$ occurred from these anthropogenic sources.

4.3.1 Prescribed Fires

The magnitude of elevated smoke-related $PM_{2.5}$ concentrations suggests that only major wildfires can generate so much smoke or significantly contribute to such levels across an entire region. The emissions comparison in Figure 4 suggests that prescribed burning is very small in comparison to the 2012 wildfires in terms of $PM_{2.5}$ emissions. Prescribed burning in Idaho is regulated under IDAPA 58.01.01.614. All federal and state prescribed burners, as well as most large private prescribed burners, are members of the Montana/Idaho Airshed Group (Airshed Group). The Airshed Group members follow an operating guide that is based on basic smoke management techniques. Only two prescribed burns, on September 26, 2012, occurred during the wildfire season, August 1 through October 1 (Appendix D). Both prescribed burns occurred in the Hagerman/Balanced rock area identified as Blue Gulch Wildlife tracts of south-central Idaho. These prescribed fires were relatively small (100 acre and 80 acre broadcast burns) and are located sufficiently far from Salmon and Pinehurst to have negligible contribution to those monitors. The prescribed fires during the wildfire period are listed in Appendix D. All prescribed burning is prohibited when DEQ issues a Stage 1 Forecast and Caution.

4.3.2 Crop Residue Burning

Crop residue burning was severely restricted in the burn management areas near active wildfires. The Burn Decision Summary for the months of July through October is also provided in Appendix D. The summaries show that all crop residue burning was halted in the counties near Salmon and Pinehurst. Shoshone County and Lemhi County are not listed on the burn decision summaries because these are largely mountainous counties and no burns were approved in those

counties for July through October. In addition, the estimated crop residue burning emissions are typically around 850 tons per year or ~ 5 tons per day, over 100 times lower than the 2012 wildfire emissions on a daily basis, as shown in Figure 4. All crop residue burning is prohibited when DEQ issues a Stage 1 Forecast and Caution.

4.3.3 Residential Wood Combustion

Both Salmon and Pinehurst are subject to the influence of residential wood combustion in the cold seasons. Residential wood combustion typically does not commence until the evening temperatures dip below about 40 ^{o}F, typically in October. Temperatures are shown in the hourly time series chart for each day included in Appendix B and C so it can be verified that none of the days included in this request dropped below these temperatures in the evening and therefore no significant residential wood combustion is likely to have contributed any significant emissions to any of these events. The latest monitor value included in this request was observed on September 25, 2012.

4.3.4 Other Forms of Open Burning

All open burning in Idaho, outside the five Indian Reservation boundaries, is regulated by DEQ under the Rules for Control of Open Burning (IDAPA 58.01.01.600). Open burning is included in the "Nonpoint" source category in the 2011 NEI emissions for Idaho (along with many other sources), and it can be seen from Figure 4 that no sources in that category come close to the average daily emission rate for wildfires that was estimated for the 2012 wildfire season. In addition, a Stage 1 Forecast and Caution, which prohibits all open burning, was in effect for all days for Pinehurst included in this request and all but 3 days for Salmon (see Appendix E). On those days in Salmon that open burning was not prohibited, the maximum amount of open burning expected to occur was the amount that typically occurs during the same period in a low-wildfire year; as discussed above, the normal level of open burning is already captured within the 95th percentile statistics for the four years prior to 2012. During the 2012 wildfire season, many members of the public did not burn due to the high fire danger risk. Therefore, it is not likely that open burning contributed to the elevated concentrations on the 3 requested days when a Stage 1 was not in effect. All open burning is prohibited when a DEQ Stage 1 Forecast and Caution is in effect, as was the case on 44 of the 47 days requested.

4.3.5 On-Road Mobile Sources

Finally, on-road mobile sources can often be a significant source category in large cities, but primarily for exhaust gases. Road dust and some exhaust emissions contain $PM_{2.5;}$ however, as shown in Figure 4, on-road mobile particulate emissions are extremely low compared to wildfires in 2012. It is not likely that on-road mobile emissions contribute any significant $PM_{2.5}$ in Salmon and Pinehurst to the $PM_{2.5}$ concentrations observed during the wildfire season.

4.4 Scenarios

Transport scenarios were developed from analysis and observation of the data as a way to group the daily events and to formulate the conceptual models described in Section 1. The Salmon events followed a limited number of typical behaviors for transporting smoke to the monitor, depending on prevailing winds and vertical stability. The location of the major fires, Halstead and the Mustang Complex, dominated within the transport patterns and created an environment where local conditions were paramount. The Salmon scenarios are shown in Figure 34. The Pinehurst scenarios were less obvious, but two were developed to delineate the days when long-range transport, as opposed to local stagnation, were the main drivers of smoke transport to the monitor. The scenarios are described in detail below with examples. In Appendix B (for Salmon) and Appendix C (for Pinehurst), each day is assigned one or more scenarios to describe DEQ's best judgment of the contributing transport conditions. It should be noted that on most days, multiple scenarios may contribute. Some uncertainty in the contributing transport paths for all parts of the day is not an indication that smoke did not impact the monitor. Please refer back to this section when reviewing the scenarios identified in Appendices B and C.

In the following examples, satellite images are all MODIS satellite products (NOAA 2013). Back trajectories superimposed on the MODIS images are produced using the Ready HYSPLIT model (Draxler 2003). Time series charts are based on Idaho DEQ $PM_{2.5}$ monitoring data obtained from AirData (EPA 2013b), and DEQ meteorological monitoring (DEQ 2013). In addition, MESOWEST data were used to obtain temperatures from the Kriley Creek meteorological station (Horel et al. 2000).

Notes on Satellite images and time series charts included in the CCR evidence below.

Hysplit Back-trajectories / MODIS Satellite Images

Daily satellite images are overlaid with HYSPLIT (Draxler 2003) back trajectories and HMS fire detects. Terra (morning) or Aqua (afternoon) RGB True Color images show a snapshot of the smoke at the time of the satellite pass. HYSPLIT back trajectories were run for the 24-hour period ending at 23:59 on each day. New trajectories start hourly and have starting positions at the source of 0 m AGL, 500 m AGL, and 1000 m AGL. HMS fire detects are all those identified by the MODIS satellites during the 24-hour period.

Terra and Aqua MODIS data for the MODIS Today website are acquired and processed at the *Space Science and Engineering Center* (SSEC) at the *University of Wisconsin-Madison*. Additional Terra MODIS data are acquired courtesy of the *Center for Rapid Environmental Assessment and Terrain Evaluation* at the University of New Mexico; the *Remote Sensing Applications Center* at the USDA Forest Service; the *Center for Space Research* at the University of Texas-Austin; and the *Direct Readout Laboratory* at NASA GSFC. Terra and Aqua MODIS data are obtained in real time via free and unrestricted direct broadcast courtesy of *NASA*. Software for converting MODIS data from raw telemetry to calibrated radiances provided courtesy of the NASA *MODIS Science Team*, the NASA *Ocean Biology Processing Group*, the NASA GSFC *Direct Readout Laboratory*, and the SSEC *IMAPP Project*. The Terra and Aqua direct broadcast processing system at SSEC was designed and implemented by Liam Gumley, Kathy Strabala, Steve Dutcher, Jerry Robaidek, Rosie Spangler, Janean Hill, and Doug

Ratcliff. The direct broadcast ground station at SSEC is a *SeaSpace TeraScan* 4.5 meter X-band system. MODIS True Color Images created by Liam Gumley, in collaboration with Jacques Descloitres and Jeff Schmaltz (*NASA Rapid Response*).

Time Series Charts for each "Date" Requested

Twenty-four hour time series charts are provided to depict the temporal pattern of hourly $PM_{2.5}$ concentration and meteorological parameters associated with each day. In addition, typical $PM_{2.5}$ concentrations during the same month in previous years when wildfires were not impacting Salmon are characterized by including their average and 95th percentile hourly values for comparison.

Top chart: "***Date" PM2.5 with Average and 95th Percentile for Month (2009-2011)***

2012 $PM_{2.5}$ – The orange circles and line indicate the hourly $PM_{2.5}$ concentration for each hour for each day affected by wildfires in 2012.

August/September/October Average – The blue line with filled blue triangle markers represents the average for the month for the three years prior to 2012. So each value represents 90 or 93 values averaged together. The October average only represents the days prior to October 15, to better represent the wildfire period (45 days averaged over 3 years).

August/September/October 95th percentile – The open blue triangles and dotted line represent the 95th percentile value for the identified month from the 2009 – 2011 data set. The 95th percentile is used to represent the upper limit of the normal historical fluctuations for each hour for the 24-hour normal range between "average" and 95th percentile. Hourly values above this line indicate an "exceptional" hourly value that is beyond normal for that hour and month.

Middle Chart: **"Date" Wind Speed and Wind Direction.**

Wind Speed – The purple diamonds and solid line represent the wind speed in meters per second (m/s) recorded at the DEQ met station on Highway 93 approximately 500 m south of US 28 in Salmon. The wind sensor is at 10 meters above ground level.

Wind Direction, deg – The blue open squares represent the wind direction for the hour, at the DEQ met station.

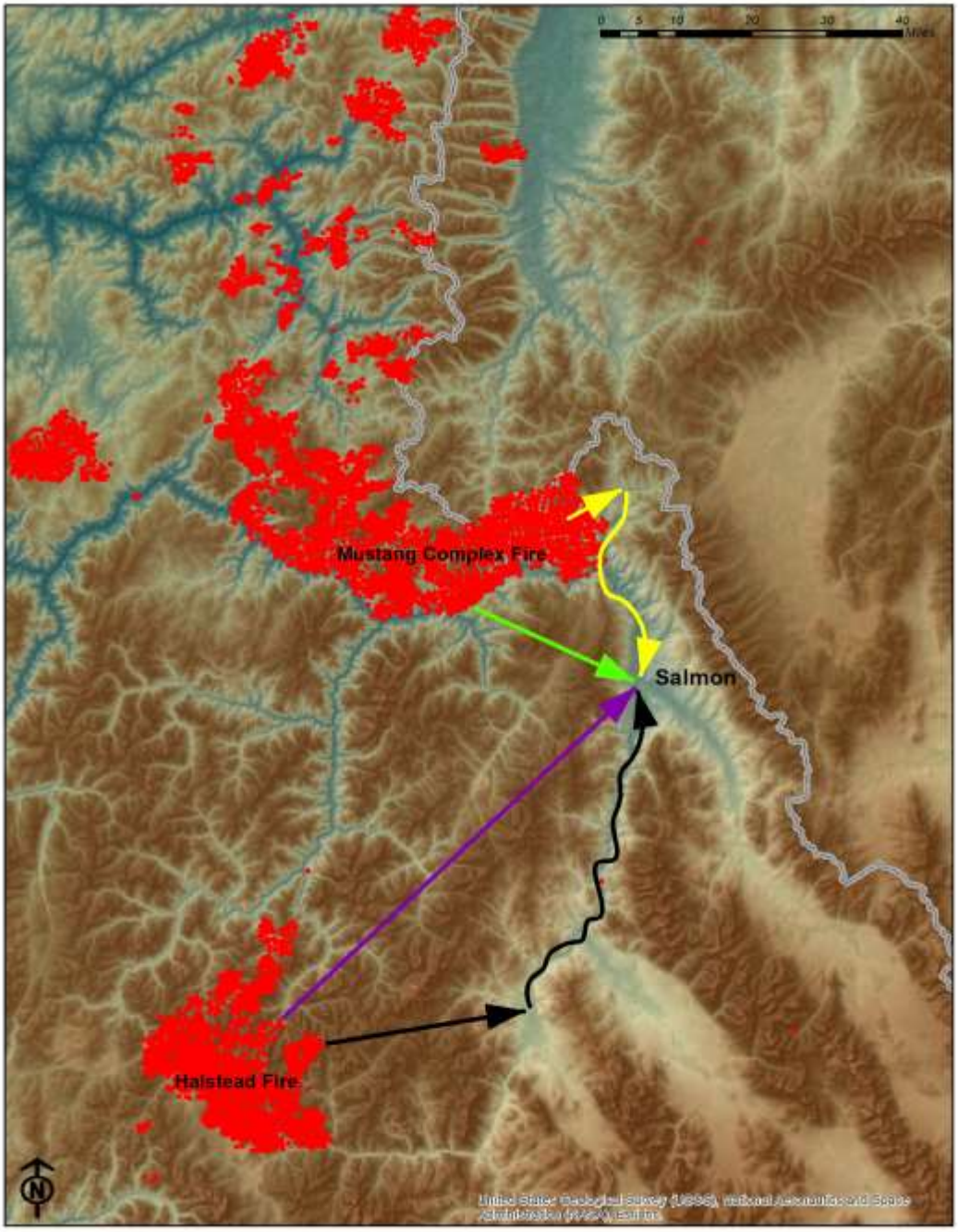
Bottom Chart: ***"Date" Solar Radiation, Temperature and Vert. Temp. Gradient***

V. Temp Gradient, K/km (Salmon only) – The open rust colored diamonds represent the vertical temperature gradient between the DEQ met station in Salmon at 3960 ft above sea level and the Kriley Creek RAWS met station located in the foothills north of Salmon at 5200 ft above sea level, downloaded from MESOWEST (Horel, 2002). Its location is show in Figure 17. The temperature gradient based on these two met stations is used to approximate a vertical temperature gradient- an indicator of atmospheric stability. A gradient greater than the environmental lapse rate, -6.5 K/km (degrees Kelvin per kilometer) is considered stable while a gradient lower than -6.5 K/km is considered unstable. This parameter can be used to identify days in which the surface temperature inversion does not break.

-dT/dZ = -6.5K/km (Salmon Only) – The black dotted line at -6.5 indicates the fixed environmental lapse rate, the vertical temperature gradient above which the atmosphere remains stable.

Temp. F – The green triangles and green line represent the temperature at 2 meters above ground as measured at the DEQ met station. It is included to indicate when the temperature dips below 40 degrees F, the point at which residential wood combustion is beginning to be used.

Solar Radiation, W/m2 – the larger blue filled circles represent the solar radiation, in Watts per square meter (W/m2) measured at the DEQ met station. The solar intensity and cycle indicates when solar driven up-valley flows may be expected and when gravity driven down-slope and down-valley flows may be prevalent before sunrise and after sunset.



.

Figure 34. Salmon smoke transport scenarios. This conceptual figure illustrates the general source and movement of smoke from the fire source to the Salmon monitor. The yellow arrows describe Scenario 1: smoke blows into the valley north of Salmon and then is carried by up-valley daytime flows to Salmon during the evening. This "valley-flow" scenario may also include nighttime down-slope drainage flows from the NE where the smoke was often trapped. The green arrows describe Scenario 2: smoke produced by the Mustang Complex fire blows in a plume directly toward Salmon. The black arrows describe Scenario 3: smoke produced by the Halstead fire blows towards the Salmon River valley to the south of Salmon or the Lemhi Valley further east and is then channeled by the valley terrain towards the monitor. The purple arrows describe Scenario 4: smoke produced by the Halstead fire blows in a plume directly toward Salmon. Scenario 5, regional transport, is not depicted in this figure.

Salmon Scenarios

4.5 Scenario 1: Valley Flows from North and Northeast—Mustang Complex

Scenario 1 describes the conditions that occur when smoke produced by the Mustang Complex to the north of Salmon travels via terrain-driven valley flow to reach Salmon, often in fairly high concentrations. Two types of valley flows were identified: (a) up-valley daytime flows driven by differential solar heating, or (b) nighttime/early morning drainage flows along the down-slope (NE) direction. An enormous amount of smoke was produced from the Mustang Complex due to the multiple fires burning across a large area and the dense smoke that filled the north end of the valley often flowed up-valley arriving in Salmon in the late morning (1000–noon) or around 1700–2000 in the evening. In addition, when the Mustang smoke was trapped against the peaks and foothills NE of Salmon it then became part of the nighttime drainage flow documented in the conceptual model to approach Salmon throughout the nighttime and early morning hours (~2100 through 0900).

Scenario Summary

- Smoke from the Mustang fire is pushed into the north end of the valley around North Fork and flows up-slope toward Salmon arriving in the afternoon or evening where it is trapped by the night time inversion.
- Characterized by high sustained concentrations overnight on the hourly trace and switch to local northerly winds at 1700 or 1800, corresponding with a sharp rise in concentrations.
- Satellite imagery from the morning pass often shows valleys filled with smoke.
- Back trajectories often do not contribute to identifying this scenario.

4.5.1 Description of Typical Weather Conditions and Transport Winds

The date September 11, 2012, was selected as an example for Scenario 1. Figure 35 shows the observationally-driven modeled output (500 mb height chart) and Figure 36 shows the observed surface chart for September 11, 2012. Aloft, a long wave trough is located over the Idaho air shed. The trough axis runs from the northern Panhandle southwest to the Monterey area of California. This produces south-southwest flow at the mid- to upper-levels of the atmosphere over Idaho. Note that the jet maximum is located well north of Idaho, somewhere over Manitoba and Saskatchewan. As such, the wind speed in the upper atmosphere over Idaho is relatively light, with speeds between 20–30 mph. The semi-permanent Four-Corners high pressure system is located to the east, downstream of Idaho and therefore has no influence on the weather in the western US on this particular day. At the surface, a high pressure located over Vancouver Island, coupled with a surface low over the Teton National Park-Yellowstone National Park creates a west-northwest surface wind. This mean flow is quite evident via the HYSPLIT back trajectories in the following satellite imagery. It is also possible to note that the complex terrain dictates the movement of the smoke, and in places, aides the transport as the valleys align with the mean flow where forced channeling can create accelerated or gusty wind conditions (Whiteman 2000).

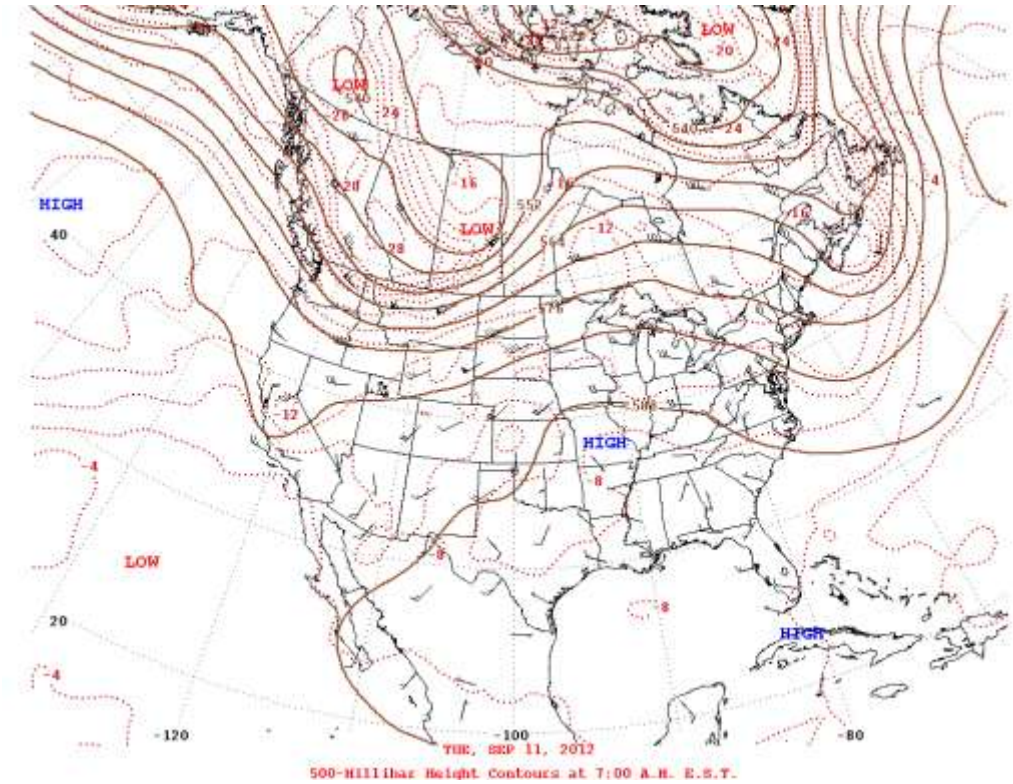


Figure 35. September 11, 2012, 500-millibar height contours and wind barbs at 0500 MST *http://www.hpc.ncep.noaa.gov/dailywxmap/* (HPC 2013).

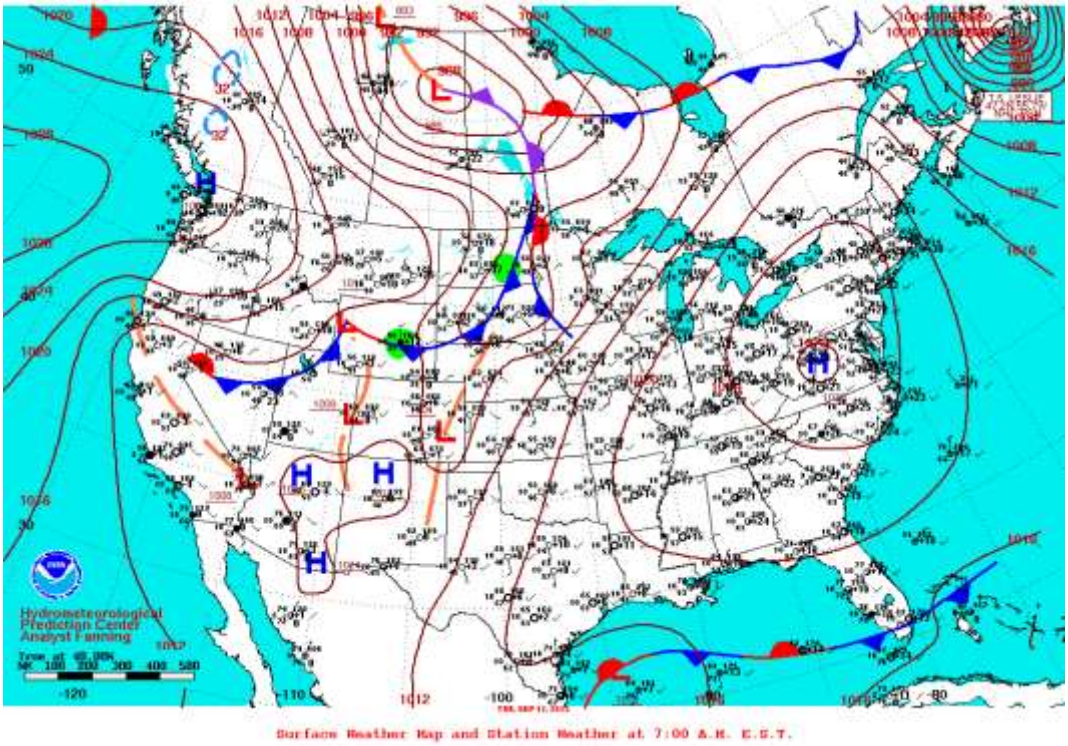


Figure 36. Surface weather analysis and station weather at 0500 MST, September 11, 2012 *http://www.hpc.ncep.noaa.gov/dailywxmap/* (HPC 2013).

4.5.2 Transport of Typical Emissions/Spatial Relationship between Sources and the Monitor(s) Where Measurements Were Recorded

In this example, the afternoon satellite image (Figure 37) shows the Salmon Valley filled with smoke and the Mustang Complex to the north producing dense smoke that occupied the lower valley around North Fork due north of Salmon. Some back trajectories intersect the smoke and fire detects from the Mustang Complex, but the transport winds are predominantly northwest. This evidence points to the source regions of smoke in this scenario. The temporal variability of the 24-hour $PM_{2.5}$ concentrations and the wind direction provide evidence for the timing and direction of the smoke transport.

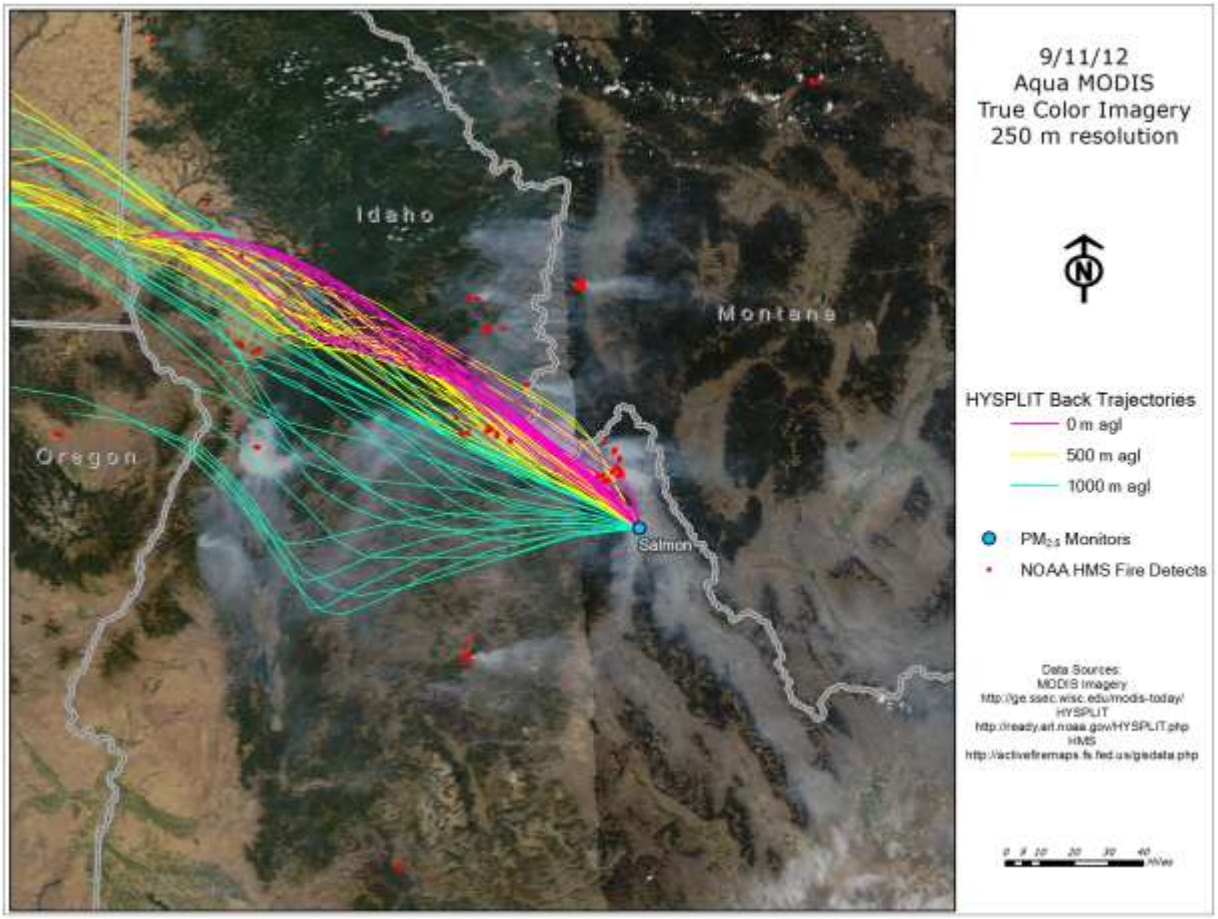
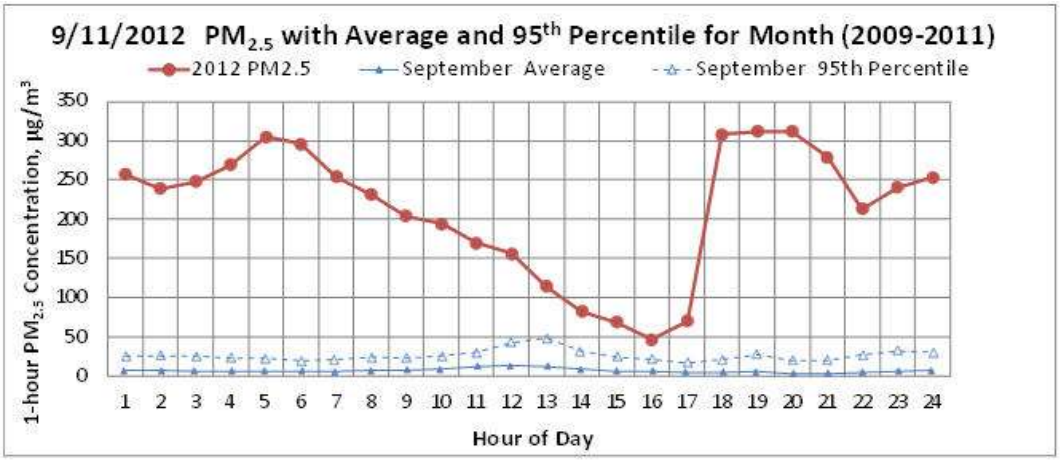


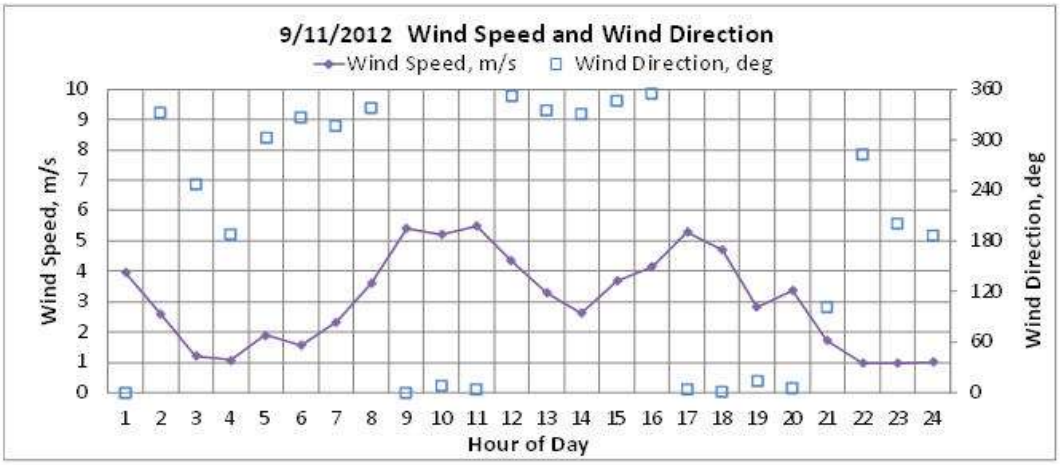
Figure 37. Aqua MODIS satellite image showing fire detects and smoke filling the Salmon valley. HYSPLIT model back trajectories show transport winds for all 24 hours on September 11, 2012.

4.5.3 Typical Temporal Relationship Between the Wildfires and Elevated PM Concentrations at the Monitor(s) in Question

The top chart in Figure 38 shows that the $PM_{2.5}$ hourly trace spikes significantly at 1800 local standard time (LST), increasing to over 300 $\mu g/m^3$ in an hour. The concentrations then remain high throughout the night. The mechanism for this massive smoke advection to the monitor is the afternoon advection of dense Mustang Complex smoke into the northern end of the valley, followed by an up-valley daytime northerly flow bringing the Mustang Complex smoke south

into Salmon. The nocturnal inversion then traps the smoke in the valley overnight. The wind direction data supports this hypothesis, showing northerly winds preceding and concurrent with the spike and the elevated evening concentrations through 2000 LST.





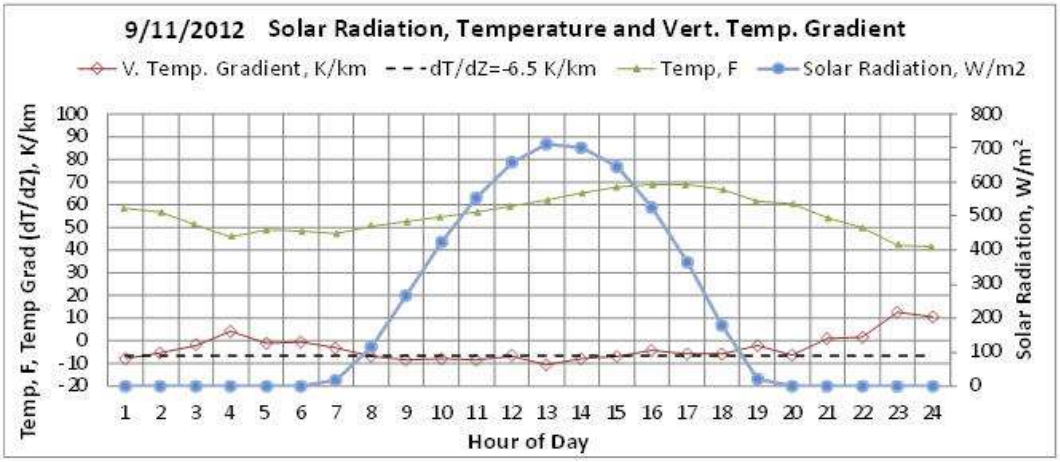


Figure 38. Time series charts for September 11, 2012, showing 2012 $PM_{2.5}$ concentrations versus historical (2009–2011) average and 95th percentile values for September days (top chart); wind speed and wind direction (middle chart); and temperature, solar radiation, and vertical temperature gradient (bottom chart). Temperature gradients above -6.5 K/km, the environmental lapse rate (dotted line) indicates stable/stagnant conditions in the valley.

4.5.4 Comparison of Event-Affected Days to Specific Nonevent Days

As shown in Figure 38, top chart, the $PM_{2.5}$ time series chart for each day will include the typical "non-event" daily pattern for that day in 2011, 2010, and 2009 in terms of the monthly average and the monthly 95th percentile value for each hour. This will replace the normal approach of showing the 7 non-affected days before and after a 1 day event—we cannot do this because nearly all the days are affected. Any hourly $PM_{2.5}$ concentration value around or above the 95th percentile line are generally attributed to wildfire smoke.

4.5.5 Alternative Hypotheses

Residential wood combustion (RWC) does not occur during September but rather typically begins in October. The daytime temperature on September 11 ranged from 50 ^{o}F in the evening to 70 ^{o}F during the day. Although the night-time lows reach ~ 40 °F, RWC does not typically begin until the daytime/evening temperatures are below 35 ^{o}F–40 ^{o}F. In addition, crop residue burning did not occur in the Salmon vicinity, and was not allowed for most of the period in Idaho. Prescribed burning did not occur on this day. No other source of smoke/PM2.5 is large enough to cause the levels exceeding 300 μg/m^3 observed September 11, 2012, in Salmon. Specific information on days when a Stage 1 Forecast and Caution was in effect and all open burning was prohibited, including crop residue burning, is provided in Appendix E.

4.6 Scenario 2 : Direct Plume Impact—Mustang Complex

Scenario 2 describes the conditions wherein the transport of smoke to the monitor is direct: the Mustang Complex fire produced smoke and the plume blew in the direction of the monitor. This type of scenario is easily observed and multiple pieces of evidence are provided to support it. The evidence for August 13 is described below as an example of this scenario.

Scenario Summary

- Smoke from Mustang Complex plume blows directly over Salmon.
- Characterized by a spike in concentration on the hourly trace (spike defined as at least a 15 μg/m^3 rise in an hour, with a corresponding fall).
- Spikes typically occur during the afternoon, when the fires are most active, smoke production is highest and transport winds are usually strongest.
- Satellite imagery shows a plume striking or pointing directly from fire to Salmon.
- Back trajectories align with plume direction and intersect visible smoke.

4.6.1 Description of Typical Weather Conditions and Transport Winds

This scenario is characterized by weak surface winds and nearly zonal transport flow, creating a situation in which impacts in Salmon are dictated by a direct interaction with the source fire and its plume. As indicated by the 500 mb height chart shown in Figure 39, one can see the nearly zonal winds aloft as a high pressure build over the Four-Corners region of the US. The surface chart, shown in Figure 40 indicates that a thermal low has developed over southeast Idaho and north Nevada; however, pressure gradients across the area (gradient is less than 1 mb/100 mi) are very lax, and observed winds in the Pocatello region are listed as calm (less than 5 mph). As

such, the zonal transport flow becomes the primary wind regime impacting Salmon on this day. This is also indicated in the visible satellite imagery in the figure below.

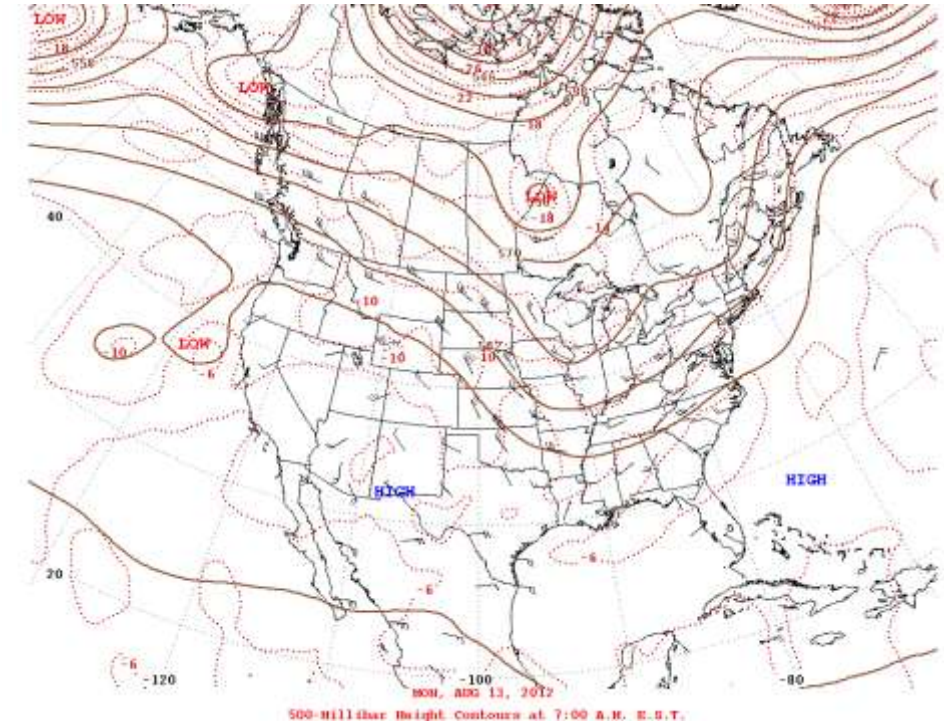


Figure 39. August 12, 2012, 500-millibar height contours and wind barbs at 0500 MST *http://www.hpc.ncep.noaa.gov/dailywxmap/* (HPC 2013).

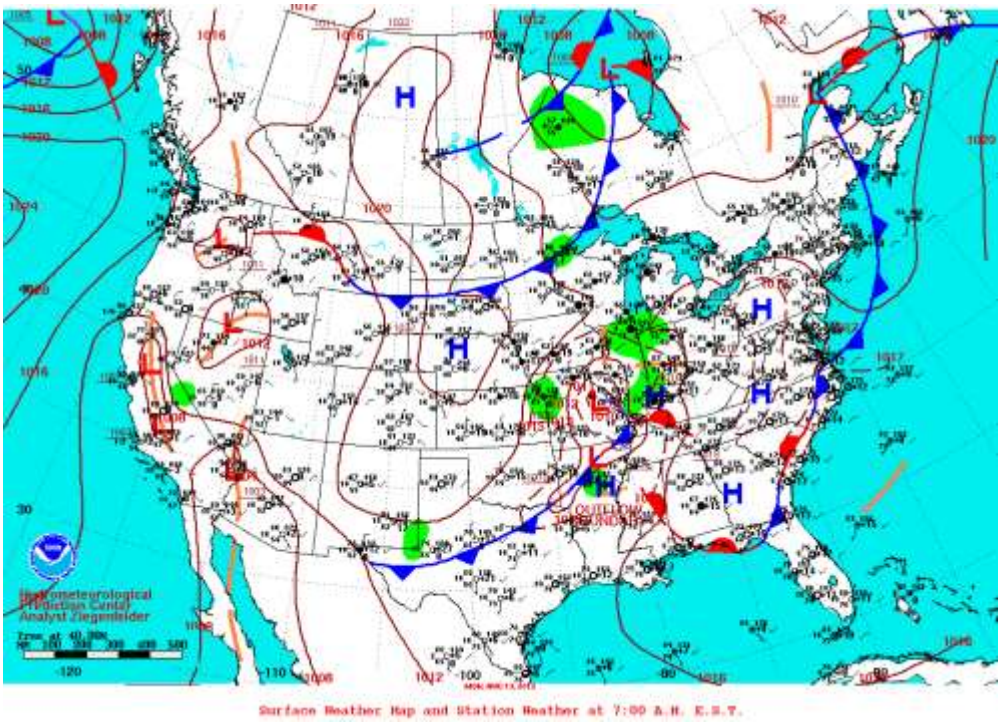


Figure 40. Surface weather analysis and station weather at 0500 MST, August 13, 2012 *http://www.hpc.ncep.noaa.gov/dailywxmap/* (HPC 2013).

4.6.2 Transport of Typical Emissions/Spatial Relationship between Sources and the Monitor(s) Where Measurements Were Recorded

In this example, the afternoon satellite image (Figure 41) depicts a dense plume of smoke originating from the Mustang Complex angled towards and blowing straight across Salmon. Multiple back trajectories, at origin heights of 0 m AGL, 500 m AGL, and 1000 m AGL, intersect the plume and the source fire detects, demonstrating again that the air parcels arriving in Salmon moved directly from the Mustang Complex, thereby bringing smoke to the monitor.

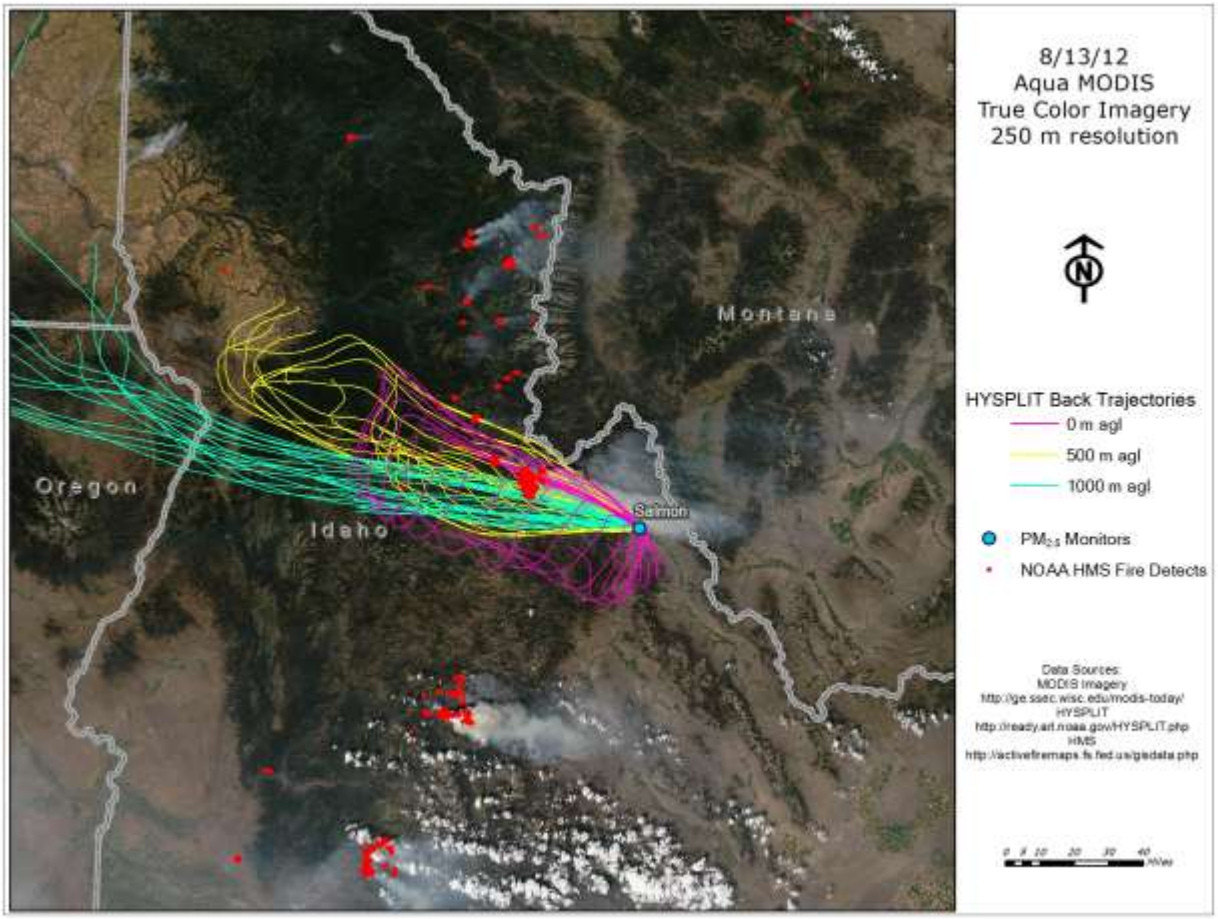


Figure 41. Aqua MODIS satellite image showing fire detects and smoke blowing toward the southeast, directly impacting the Salmon area. HYSPLIT model back trajectories show transport winds for all 24 hours on August 13, 2012.

4.6.3 Typical Temporal Relationship Between the Wildfires and Elevated PM Concentrations at the Monitor(s) in Question

The 24-hour $PM_{2.5}$ concentrations show the classic signature of a direct plume impact on a monitor: a large spike between 1300 and 1800, rising about 300 µg/m^3 in two hours then decreasing. The wind speeds increase concurrently with the concentration spike.

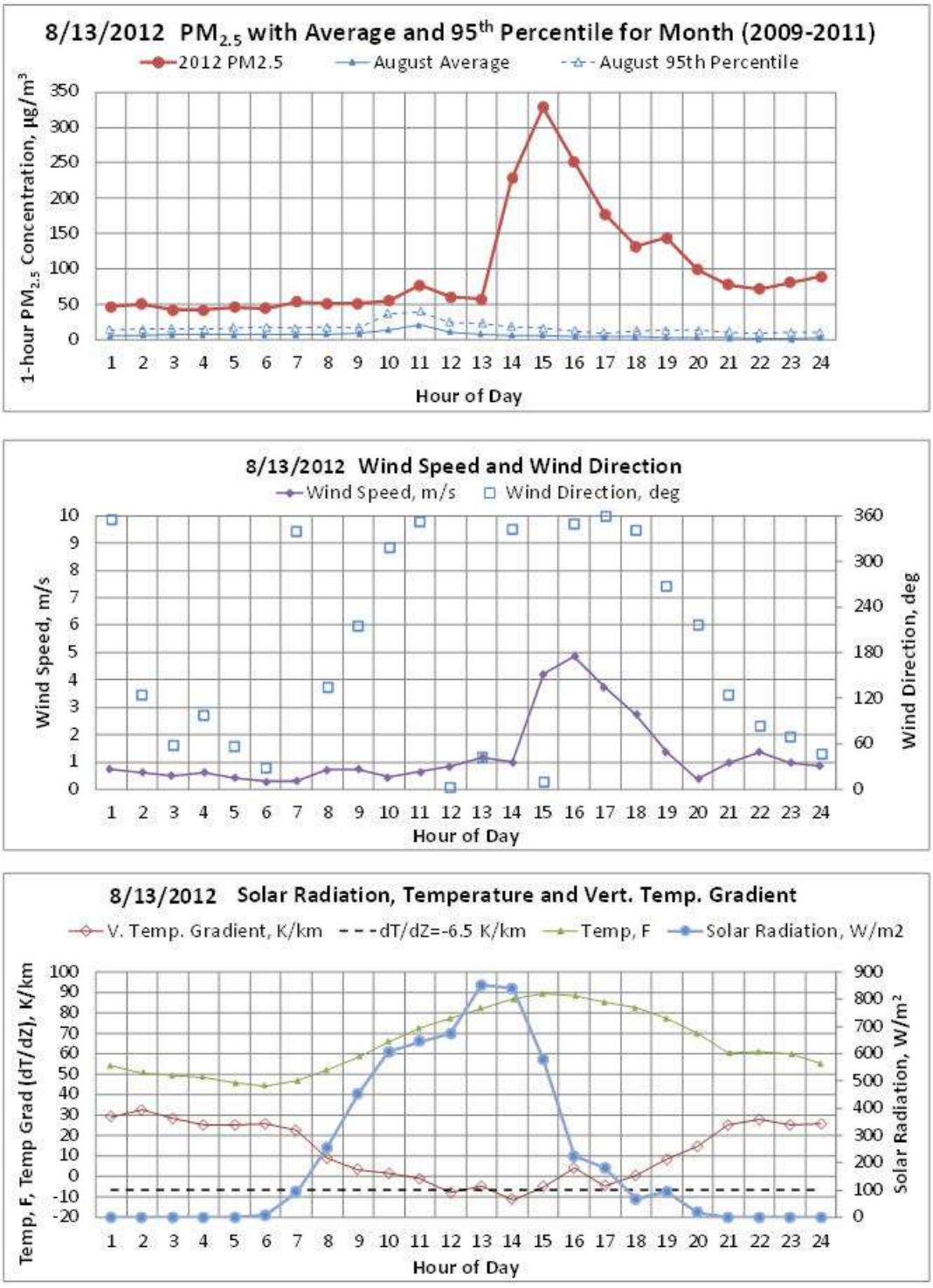


Figure 42. Time series charts for August 13, 2012, showing 2012 $PM_{2.5}$ concentrations versus historical (2009–2011) average and 95th percentile values for August days (top chart); wind speed and wind direction (middle chart); and temperature, solar radiation, and vertical temperature gradient (bottom chart). Temperature gradients above -6.5 K/km (dotted line) indicates stable/stagnant conditions in the valley.

4.6.4 Comparison of Event-Affected Days to Specific Nonevent Days

As shown in Figure 42, top chart, the $PM_{2.5}$ time series chart for each day will include the typical "non-event" daily pattern for that day in 2011, 2010, and 2009 in terms of the monthly average for each hour, and the monthly 95th percentile value. This will replace the normal approach of showing the 7 days before and after a one day event—we cannot do this because nearly all the days are affected.

4.6.5 Alternative Hypotheses

Residential wood combustion (RWC) does not occur during in August nor in most of the wildfire season but rather begins in October. The daytime temperature on August 13 ranged from 60 °F in the evening to 90 °F during the day. Although the night-time lows reach ~ 45 °F, RWC does not typically begin until the daytime/evening temperatures are below 35 °F– 40 °F. In addition, crop residue burning did not occur in the Salmon vicinity, and was not allowed for most of the period in Idaho areas near Salmon and Pinehurst and prescribed burning did not occur (Appendix D). No other source of smoke/$PM_{2.5}$ is large enough to cause the levels exceeding 300 $\mu g/m^3$ observed on August 13, 2012, in Salmon (Figure 42). Specific information on days when a Stage 1 Forecast and Caution was in effect, thus prohibiting open burning provided in Appendix E.

4.7 Scenario 3: Drainage From South or Southeast—Halstead

Scenario 3 describes the conditions wherein smoke produced by the Halstead fire intercepts the upper Salmon River and/or Lemhi River valleys and is channeled by topography down-valley to the Salmon monitor. This scenario is not necessarily supported by back trajectories, due to model grid resolution, but the weight of evidence provided by satellite imagery.

Scenario Summary

- Smoke from Halstead fire is pushed eastward towards the Salmon River/Hwy 75 corridor that runs northeast from Challis to Salmon and/or towards the Lemhi valley further to the east.
- Smoke sinks into valley and is channeled by terrain to Salmon
- Not a primary scenario, e.g., this scenario only seems to occur in combination with other scenarios
- Characterized by high sustained concentrations overnight on the hourly trace and a switch to southerly or southeasterly local winds in the evening or overnight, corresponding with a sharp rise in concentrations
- Satellite imagery shows smoke from Halstead hitting the upper part of the valley and smoke visible in the valley going north towards Salmon
- Back trajectories are not a good indicator of this scenario, but the 0 m AGL trajectories may show surface air travelling north and south of Salmon, aligned with the valley

4.7.1 Description of Typical Weather Conditions and Transport Winds

This scenario is indicative of a situation where local diurnal forcing is the primary mechanism. In this event, the weather pattern is in a transitory phase into a strong upper level ridge over Idaho. In the 500 mb heights chart (Figure 43), an upper level ridge pattern is developing from zonal

flow over the Pacific Ocean. The ridge axis is located through the center of Idaho and runs due north into the Northwest Territories. Upper level winds are weak (at 15–20 mph) and from the west-northwest on this day. The Four-Corners high pressure system is located to the south and east of its usual geographic placement, but wind barbs indicate that it is growing to the north and west via south-southwest winds over Arizona and California. Given the light surface winds and lack of strong upper level flow, diurnal wind patterns typical for complex terrain (as theorized earlier) bring smoke generally to the east and into Salmon via several valley and basin channels that make up eastern Idaho. While difficult to relate the upper level and surface chart directly to smoke dispersion and transport, it is quite clear to see how the conditions of stagnation and limited vertical development associated with this type of weather pattern coincide with the visible satellite imagery below. HYSPLIT model surface trajectories (0 m AGL) in Figure 45 indicate strong influences from the diurnal wind regime in eastern Idaho to the north and south of Salmon.

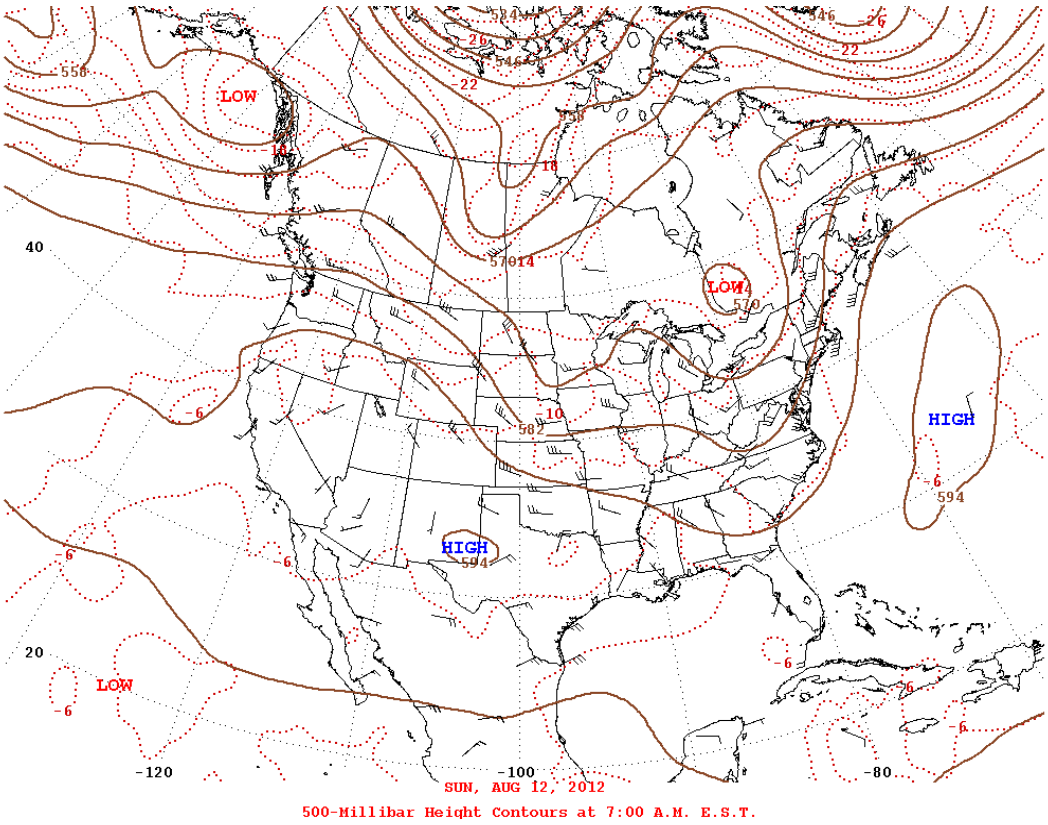


Figure 43. August 12, 2012, 500-millibar height contours and wind barbs at 0500 MST *http://www.hpc.ncep.noaa.gov/dailywxmap/* (HPC 2013).

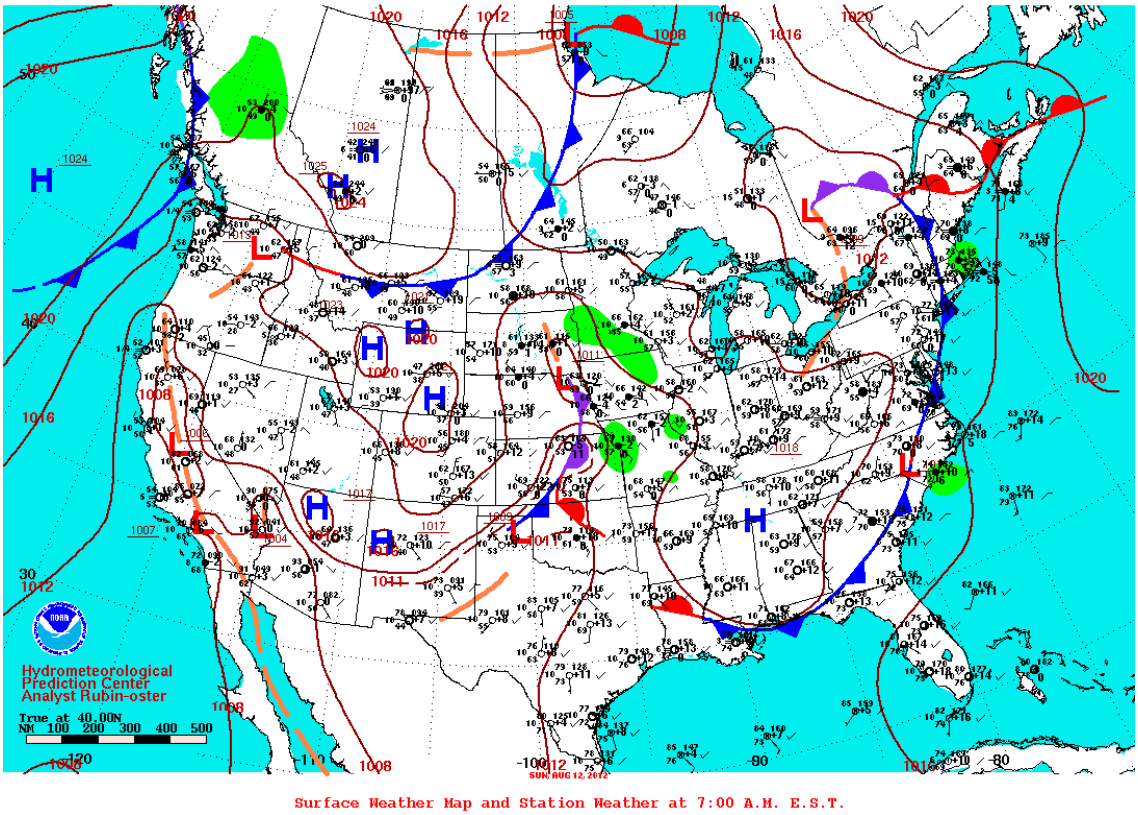


Figure 44. Surface weather analysis and station weather at 0500 MST, August 12, 2012 *http://www.hpc.ncep.noaa.gov/dailywxmap/* (HPC 2013).

4.7.2 Transport of Typical Emissions/Spatial Relationship between Sources and the Monitor(s) Where Measurements Were Recorded

In this example, the afternoon satellite image (Figure 45) shows thick smoke plumes proceeding due east from the Halstead fire, intercepting the upper reaches of the Salmon River Valley. Light smoke is also visible in the Lemhi Valley, parallel and further to the east. The widespread smoke throughout southern Idaho, combined with the low wind speeds, indicates regional stagnation that allows local topographic and diurnal influences on smoke movement to dominate. The surface back trajectories (pink–0 m AGL) move north and south along the valley floor towards the monitor, suggesting that diurnal up-valley and down-valley flows occur during the 24-hour period.

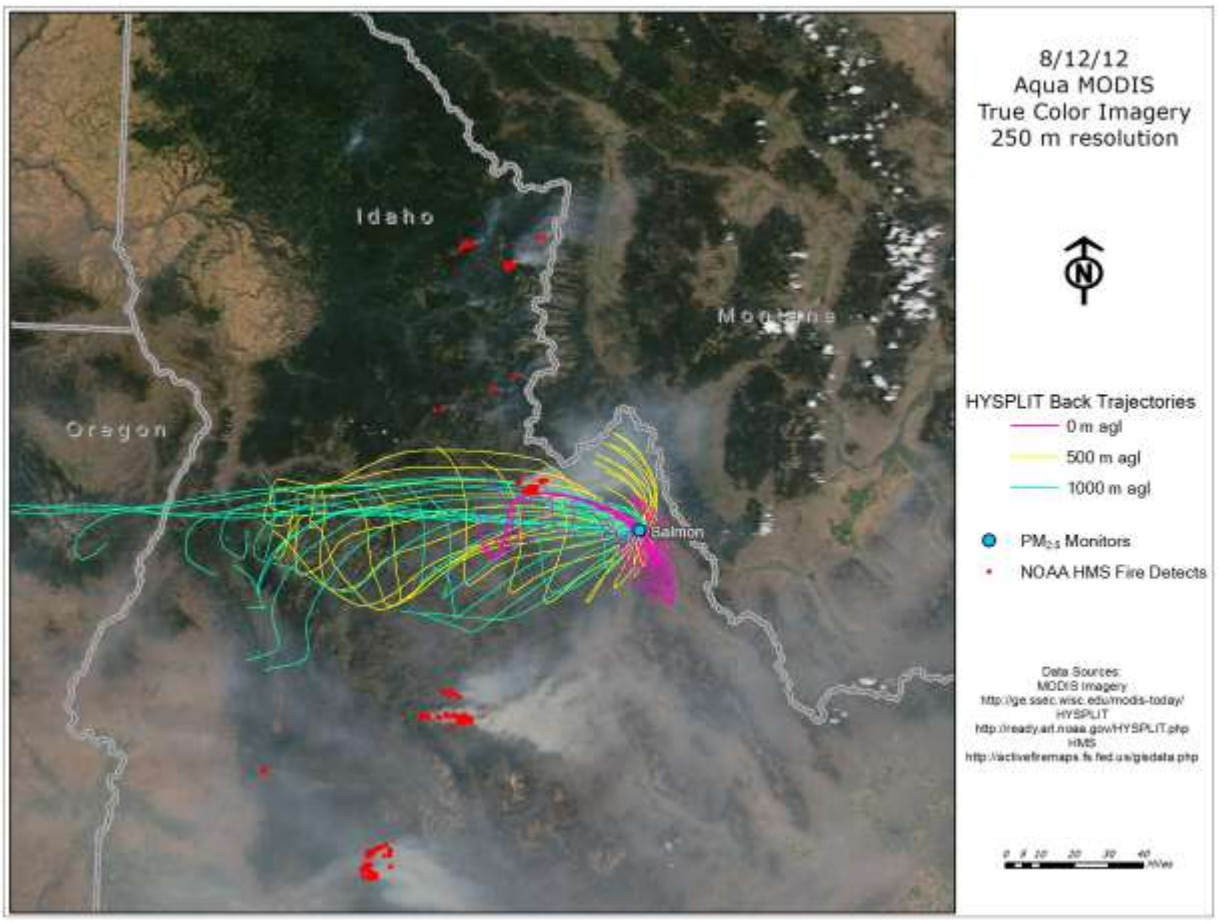


Figure 45. Aqua MODIS satellite image showing fire detects and smoke blowing eastward from the Halstead fire, filling the Salmon and Lemhi valleys south of Salmon. HYSPLIT model back trajectories indicate valley flows from the south, August 12, 2012.

4.7.3 Typical Temporal Relationship Between the Wildfires and Elevated PM Concentrations at the Monitor(s) in Question

The $PM_{2.5}$ time series chart shown in Figure 46 shows that the concentrations were elevated throughout the day, dropping just below the hourly 95th percentile concentration at 1300 then rising to over 80 µg/m^3 in the late afternoon.

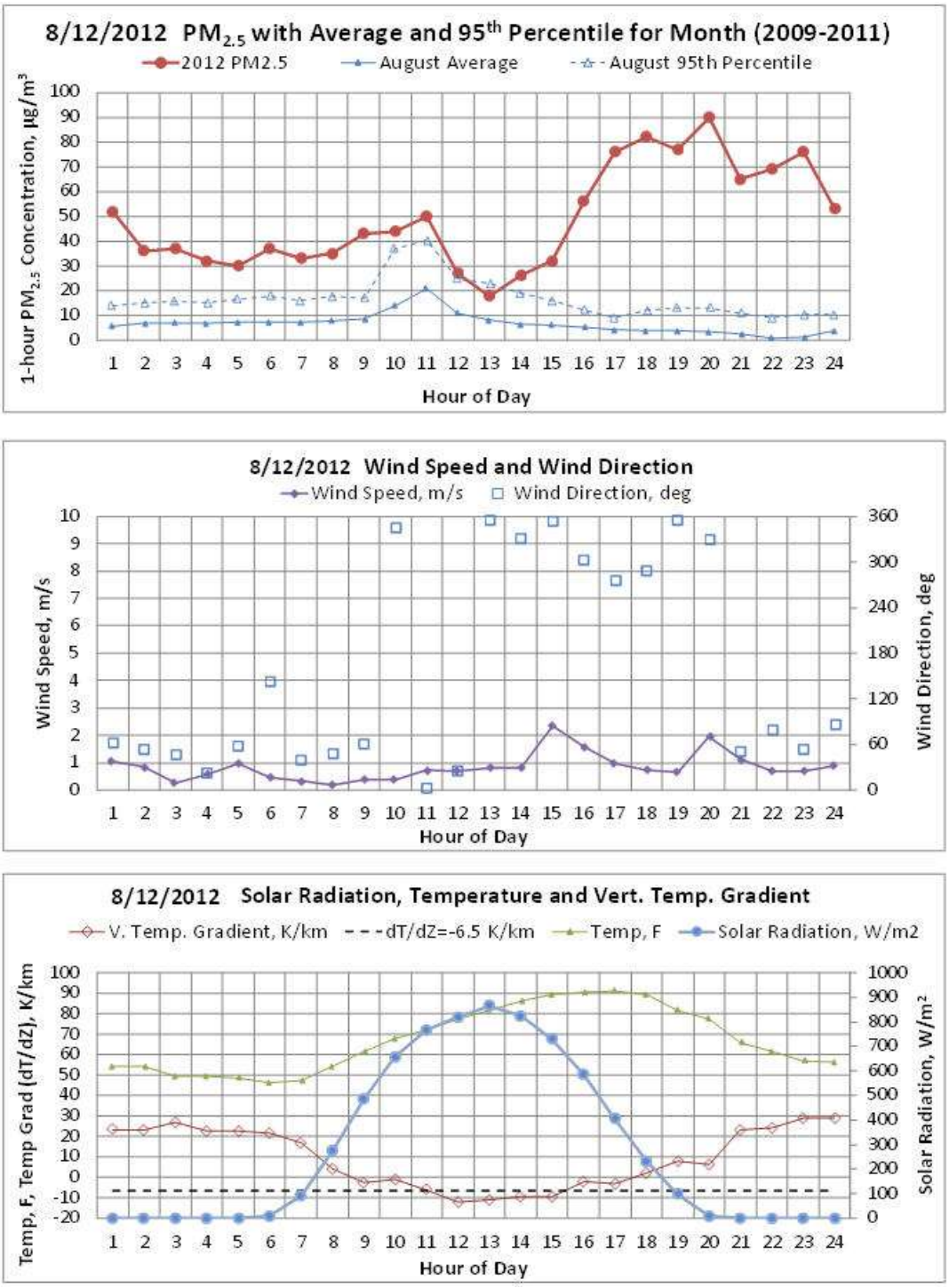


Figure 46 Time series charts for August 12, 2012, showing 2012 $PM_{2.5}$ concentrations versus historical (2009–2011) average and 95th percentile values for August days (top chart); wind speed and wind direction (middle chart); and temperature, solar radiation, and vertical temperature gradient (bottom chart). Temperature gradients above -6.5 K/km (dotted line) indicates stable/stagnant conditions in the valley.

4.7.4 Comparison of Event-Affected Days to Specific Nonevent Days

As shown in Figure 46, top chart, the $PM_{2.5}$ time series chart for each day will include the typical "non-event" daily pattern for that day in 2011, 2010, and 2009 in terms of the monthly average for each hour, and the monthly 95th percentile value. This will replace the normal approach of showing the 7 non-affected days before and after a 1 day event—we cannot do this because nearly all the days are affected.

4.7.5 Alternative Hypotheses

Residential wood combustion (RWC) does not occur during in August nor in most of the wildfire season but rather begins in October. The daytime temperature on August 12 ranged from ~ 46 °F in the evening to 90 °F during the day. Although the night-time lows nearly reach 45 °F, RWC does not typically begin until the daytime/evening temperatures are below 35 °F–40 °F. In addition, crop residue burning did not occur in the Salmon vicinity, and was not allowed for most of the period in Idaho and prescribed burning did not occur (Appendix D). No other source of smoke/$PM_{2.5}$ is large enough to cause the levels exceeding 90 $\mu g/m^3$ observed on August 12, 2012, in Salmon. Specific information on days when a Stage 1 Forecast and Caution was in effect, thus prohibiting open burning provided in Appendix E.

4.8 Scenario 4: Direct Plume Impact—Halstead

Scenario 4 is similar to Scenario 2 in that smoke advects directly from the source to the monitor, in this case, from the Halstead fire. This type of scenario is easily observed and multiple pieces of evidence support it.

Scenario Summary

- Smoke from Halstead plume blows directly over Salmon.
- Characterized by a spike in concentration on the hourly trace (spike defined as at least a 15 $\mu g/m^3$ rise in an hour, with a corresponding fall).
- Spikes typically occur during the afternoon, when the fires are most active and smoke production is highest and transport winds are strongest.
- Satellite imagery shows a plume striking Salmon or pointing directly from fire to Salmon.
- Back trajectories align with plume direction and intersect visible smoke and/or fire detects.

4.8.1 Description of Typical Weather Conditions and Transport Winds

In this scenario, transport winds from the southwest advect smoke directly into the Salmon area. The upper level chart (Figure 47) indicates a typical summer wind pattern across the western US with an established upper level high pressure system over the Four-Corners with southwesterly flow and a ridge axis located to the east of Idaho. The August 28, 2012, surface chart (Figure 48) indicates a thermal low located over the Snake River Basin and the Nevada-Idaho-Utah border; however, again, surface winds across the region are very light with observations in Salmon, ID and Pocatello, ID indicated calm wind conditions. In this situation, vertical mixing during the afternoon is likely the primary driver in wind direction. This can be seen in the visible satellite

imagery below which also indicates that the HYSPLIT back trajectory follows this same southwesterly path (Figure 49).

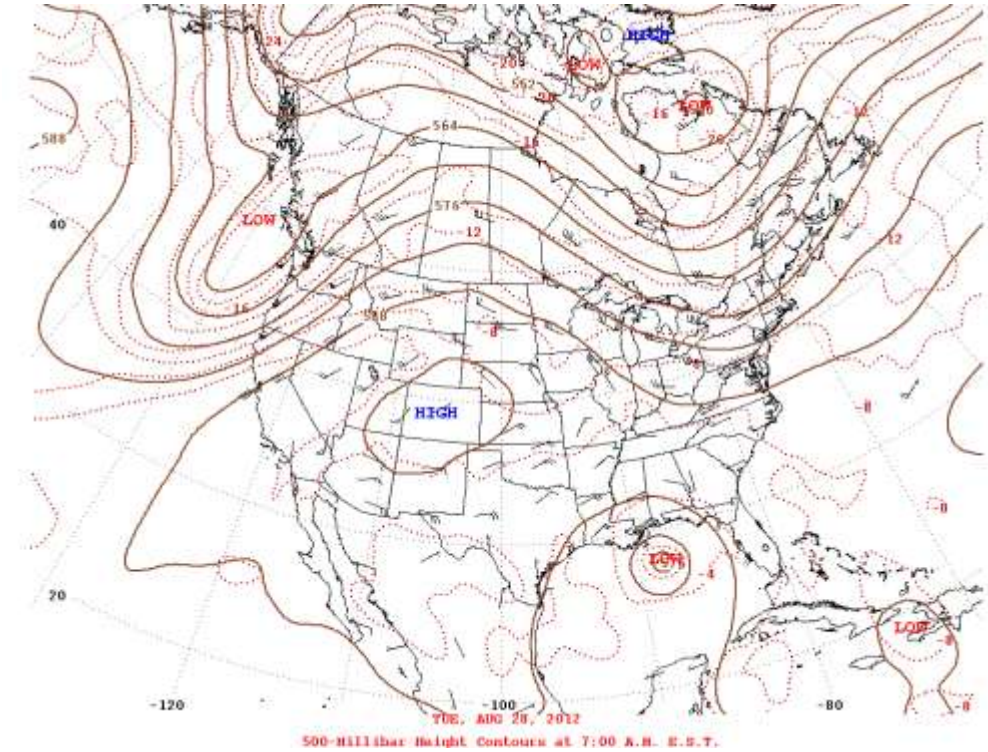


Figure 47. August 28, 2012, 500-millibar height contours and wind barbs at 0500 MST *http://www.hpc.ncep.noaa.gov/dailywxmap/* (HPC 2013).

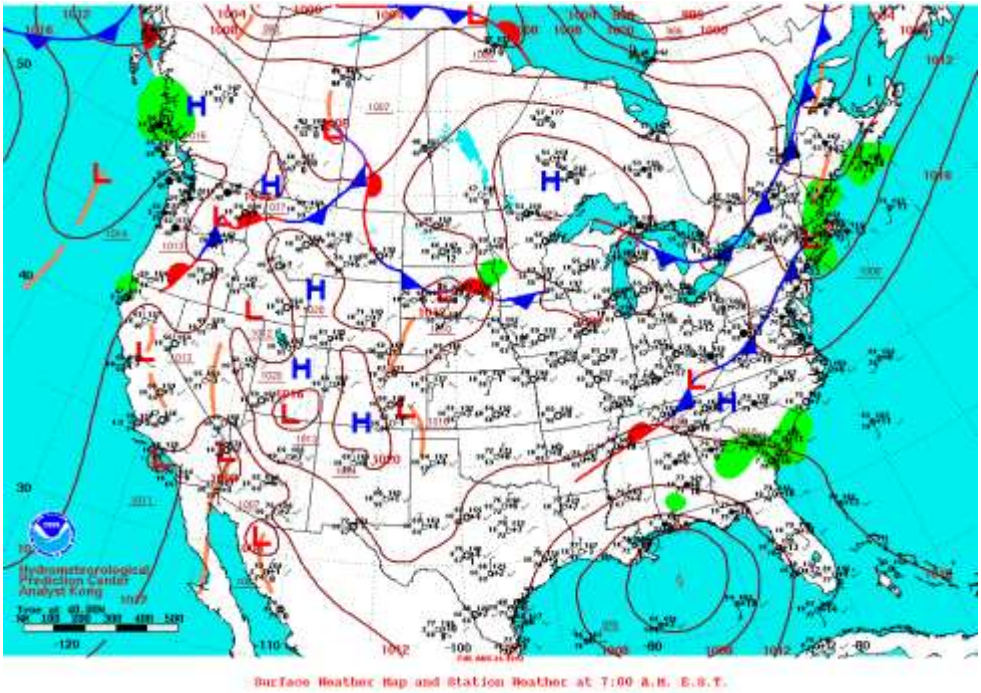


Figure 48. Surface weather analysis and station weather at 0500 MST, August 28, 2012 *http://www.hpc.ncep.noaa.gov/dailywxmap/* (HPC 2013).

4.8.2 Transport of Typical Emissions/Spatial Relationship between Sources and the Monitor(s) Where Measurements Were Recorded

In this example, (Figure 49) the afternoon satellite image depicts many large plumes travelling north-northeast from their source fires. The Halstead plume is aligned to the west of Salmon in this snapshot, but there is visible smoke in Salmon and back trajectories align with Halstead smoke, signifying that the plume struck Salmon directly during the 24-hour period.

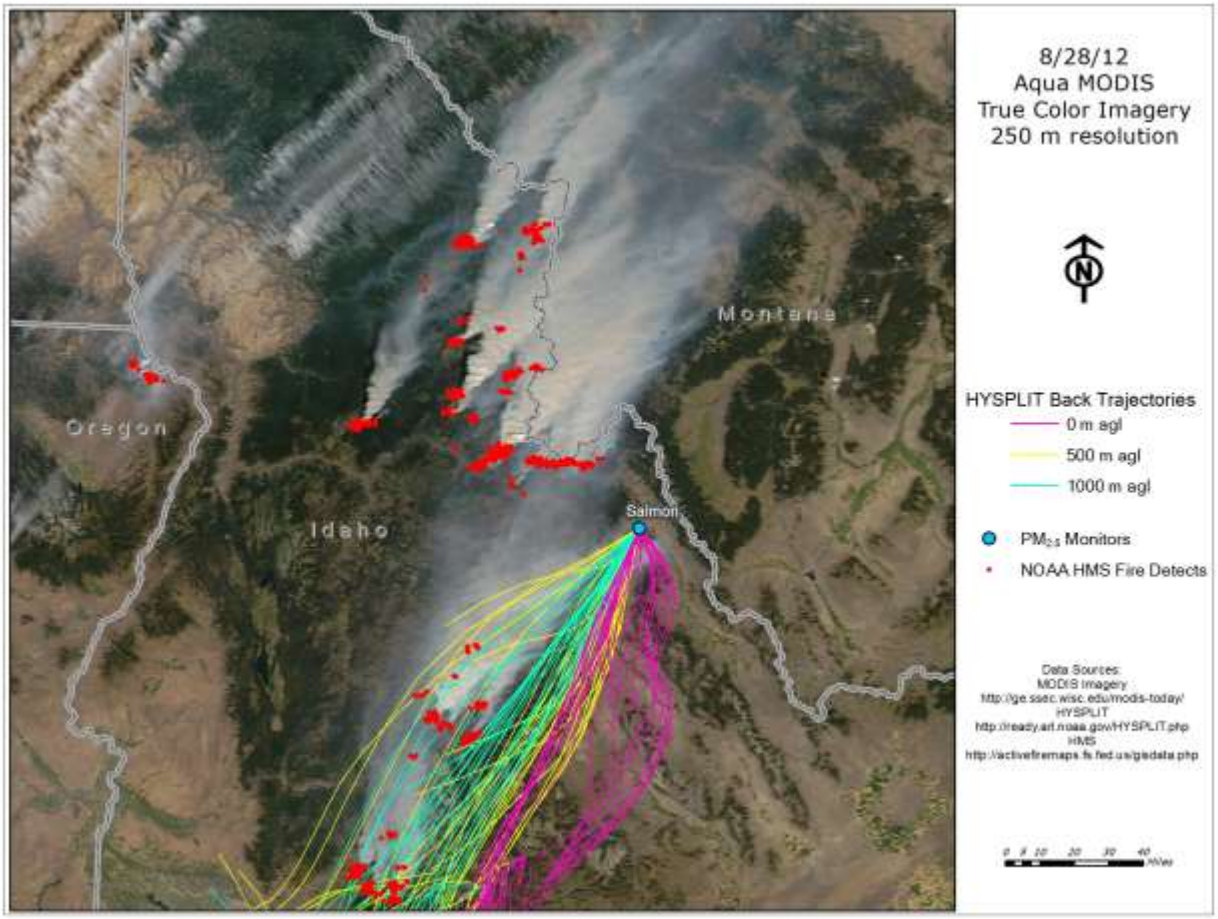
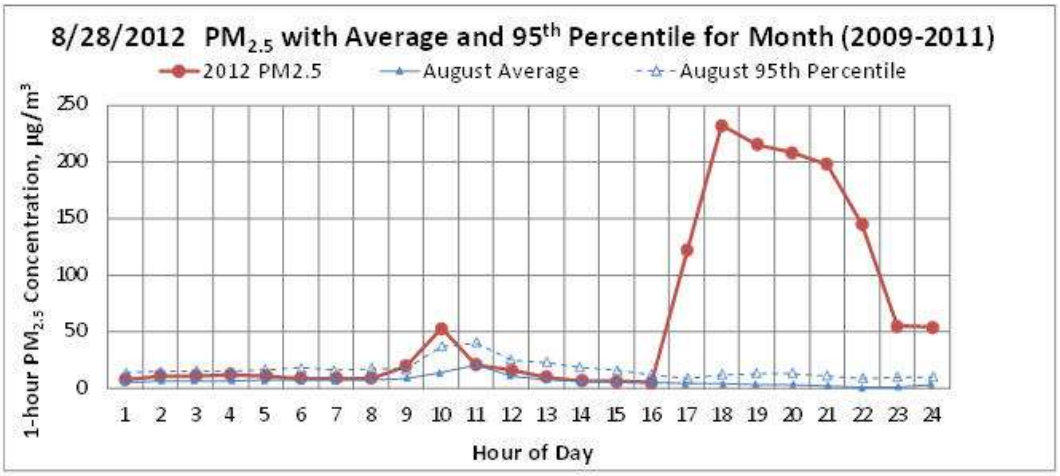
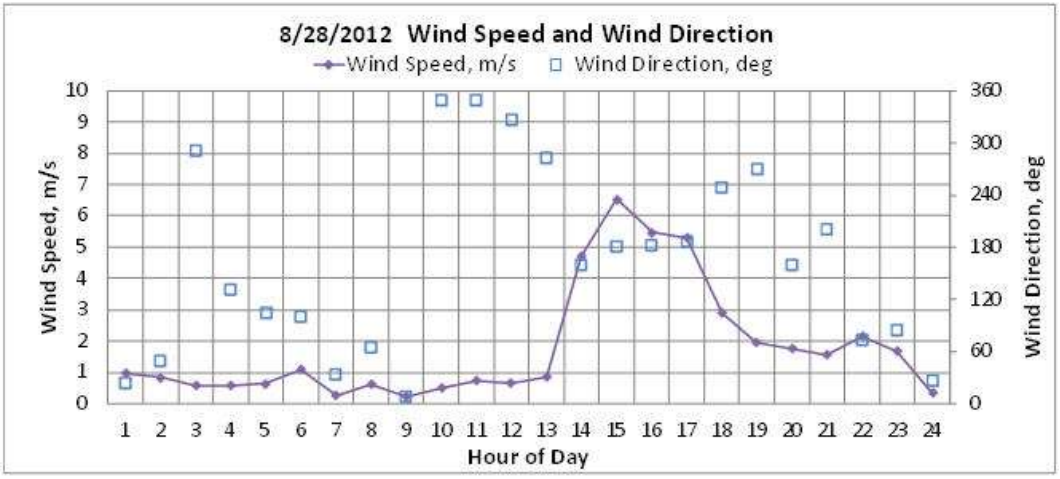


Figure 49. Aqua MODIS satellite image showing fire detects and smoke blowing north-northeastward from the Halstead fire, directly impacting the Salmon area, with HYSPLIT model back trajectories showing similar tracks for most hours on August 28, 2012.

4.8.3 Typical Temporal Relationship Between the Wildfires and Elevated PM Concentrations at the Monitor(s) in Question

The 24-hour $PM_{2.5}$ trace spiked at 1800 and 1900, two hours after the winds had shifted south and then southwest, coinciding with the rapid rise in concentrations and an increase in wind speed.





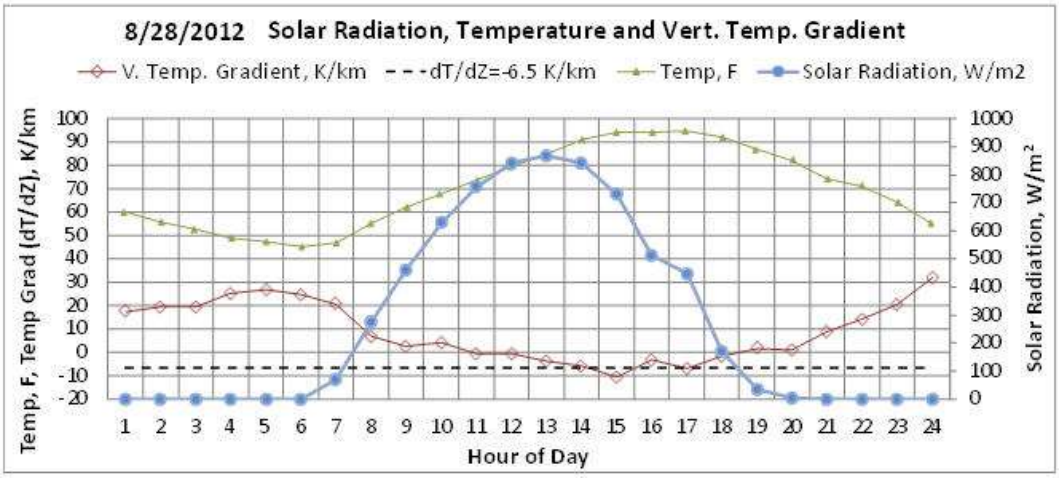


Figure 50. Time series charts for August 28, 2012, showing 2012 $PM_{2.5}$ concentrations versus historical (2009–2011) average and 95th percentile values for August days (top chart); wind speed and wind direction (middle chart); and temperature, solar radiation, and vertical temperature gradient (bottom chart). Temperature gradients above -6.5 K/km (dotted line) indicates stable/stagnant conditions in the valley.

4.8.4 Comparison of Event-Affected Days to Specific Nonevent Days

As shown in Figure 50, top chart, the $PM_{2.5}$ time series chart for each day will include the typical "non-event" daily pattern for that day in 2011, 2010, and 2009 in terms of the monthly average for each hour, and the monthly 95th percentile value. As seen in Figure 50, the large evening peak resulting from the Halsted plume exceeds 200 $\mu g/m^3$ for four hours in the evening on August 28, many times over the hourly 95th percentile values for those hours, 15.9 $\mu g/m^3$.

4.8.5 Alternative Hypotheses

Residential wood combustion (RWC) does not occur during in August nor in most of the wildfire season but rather begins in October. The daytime temperature on August 28 ranged from over 50 °F in the evening to over 90 °F during the day (Figure 50, bottom chart). Although the night-time lows nearly reach 45 °F, RWC does not typically begin until the daytime/evening temperatures are below 35 °F–40 °F. In addition, crop residue burning did not occur in the Salmon vicinity, and was not allowed for most of the period in Idaho and prescribed burning did not occur (Appendix D). No other source of smoke/$PM_{2.5}$ is large enough to cause the levels exceeding 200 $\mu g/m^3$ observed on August 28, 2012, in Salmon. Specific information on days when a Stage 1 Forecast and Caution was in effect, thus prohibiting open burning provided in Appendix E.

4.9 Scenario 5: Regional Transport

Scenario 5 can be described as a regional transport scenario, in contrast to the more prevalent local scenarios that afflict Salmon. This scenario occurs in combination with other, more local, scenarios. It occurs when there is smoke available across the region (e.g., covering half of the state or originating in different states) and the synoptic winds are strong enough to transport smoke long distances.

Scenario Summary

- Smoke from fires located farther away than Halstead and Mustang Complex advect into Salmon.
- Fire sources can be within Idaho or from neighboring states.
- Not a primary scenario, e.g., this scenario only seems to occur in combination with other scenarios.
- Characterized by sustained, elevated concentrations on the hourly trace.
- Satellite imagery shows multiple fires in the region and a generally smoky area where contributions from individual fires are not obvious (or smoke is obscured by cloud).
- Back trajectories intersect multiple fires (or HMS fire detects).

4.9.1 Description of Typical Weather Conditions and Transport Winds

In this final scenario, several meteorological phenomena affect the transport of smoke from non-local sources into Idaho. First, the 500 mb height chart (Figure 51) indicates a high-amplitude ridge with the center of the high pressure extending into the Upper Snake River Basin, the Central and Southern Highlands in Idaho. The ridge axis is slightly to the east of Idaho. Given the intensity in amplitude of this ridge and the proximity of the ridge axis to Salmon, Idaho,

southerly flow is the primary transport component. As indicated in the HYSPLIT back trajectories (Figure 53), it is possible to note that both transport wind and local diurnal winds played a role in advecting smoke into the Salmon area. Due to cloud cover, it is difficult to definitely identify smoke source in the satellite imagery.

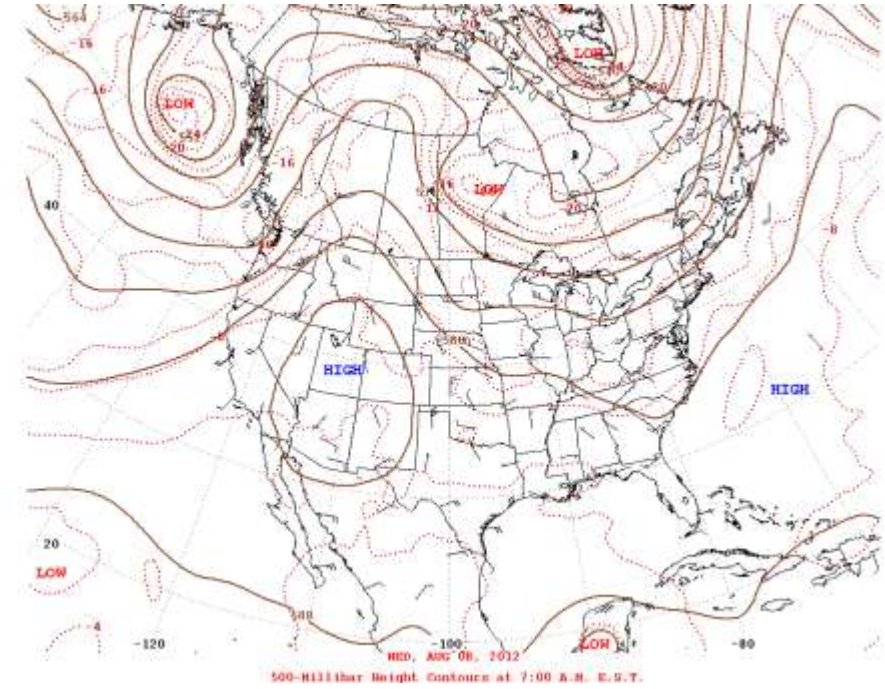


Figure 51. August 8, 2012, 500-millibar height contours and wind barbs at 0500 MST *http://www.hpc.ncep.noaa.gov/dailywxmap/* (HPC 2013).

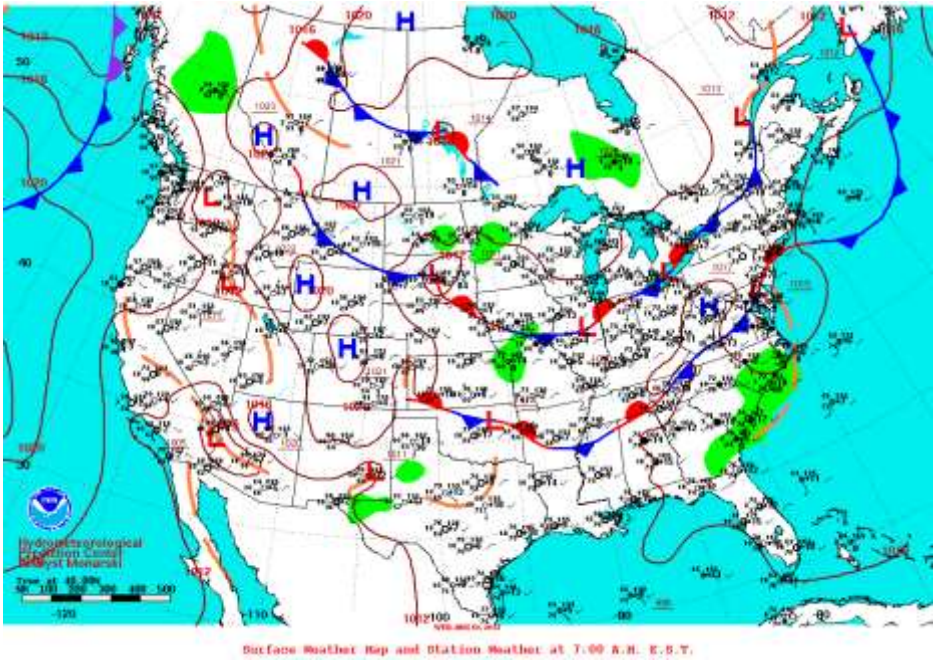


Figure 52. Surface weather analysis and station weather at 0500 MST, August 8, 2012 *http://www.hpc.ncep.noaa.gov/dailywxmap/* (HPC 2013).

4.9.2 Transport of Typical Emissions/Spatial Relationship between Sources and the Monitor(s) Where Measurements Were Recorded

In this example, (Figure 53) it is the back trajectories that provide the strongest evidence for the scenario. The trajectories travel long distances and intersect multiple fire detects in southern Idaho and beyond. Cloud obscures much of the visible smoke, but we can deduce that there may be smoke located underneath the cloud because thick smoke is visible in a line trending southwest from the Mustang Complex and due west of Salmon.

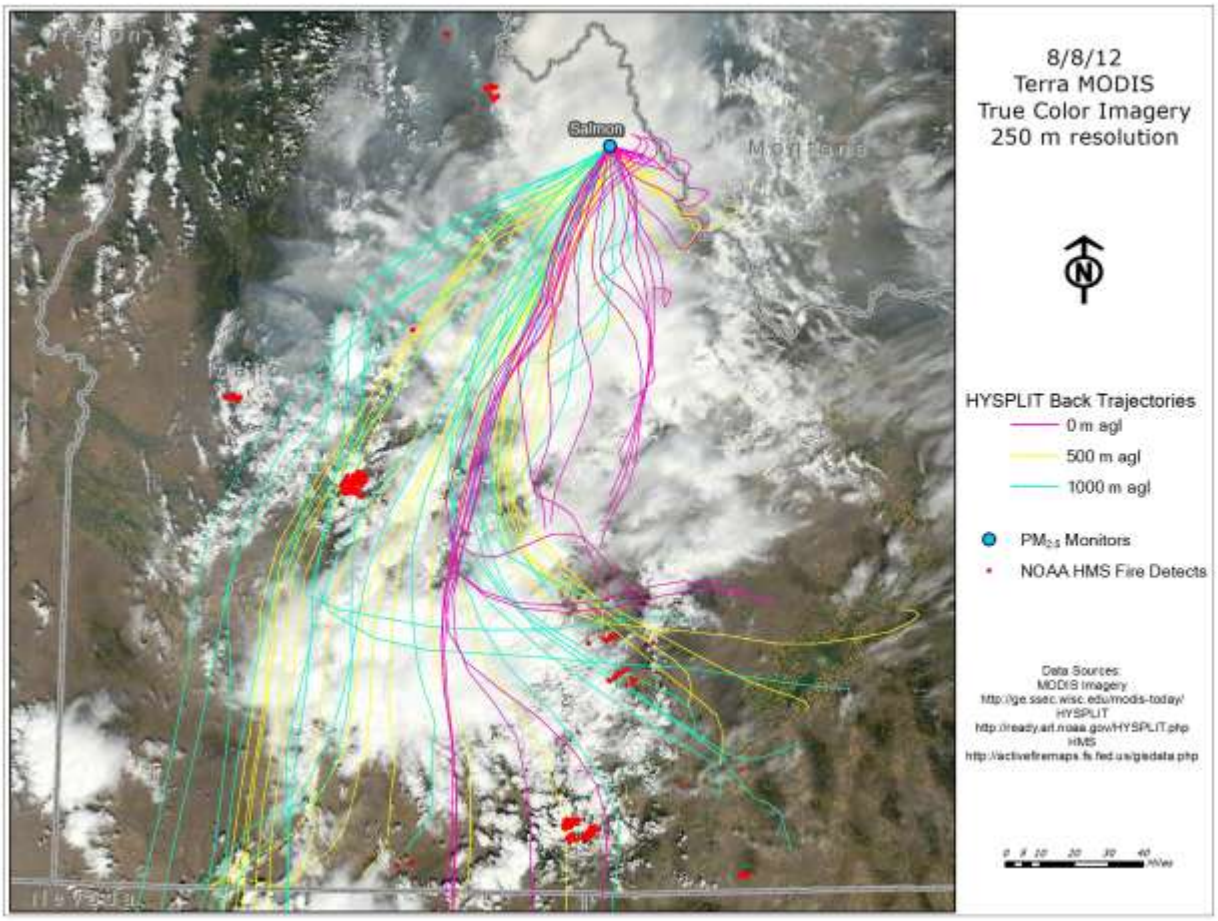


Figure 53. Terra MODIS satellite image shows ground surfaces obscured by cloud and HYSPLIT model back trajectories approaching Salmon from the south and southwest, August 8, 2012.

4.9.3 Typical Temporal Relationship Between the Wildfires and Elevated PM Concentrations at the Monitor(s) in Question

The evidence from the hourly $PM_{2.5}$ trace and the local wind data is not definitive for this scenario. The concentrations are generally elevated throughout the day, which could be a result of continued advection of long-range, dispersed smoke or it could be a result of local smoke from fires whose production is decreased due to cloud cover and potentially increased relative humidities. The local wind data is influenced by valley terrain and does not necessarily reflect regional transport winds.

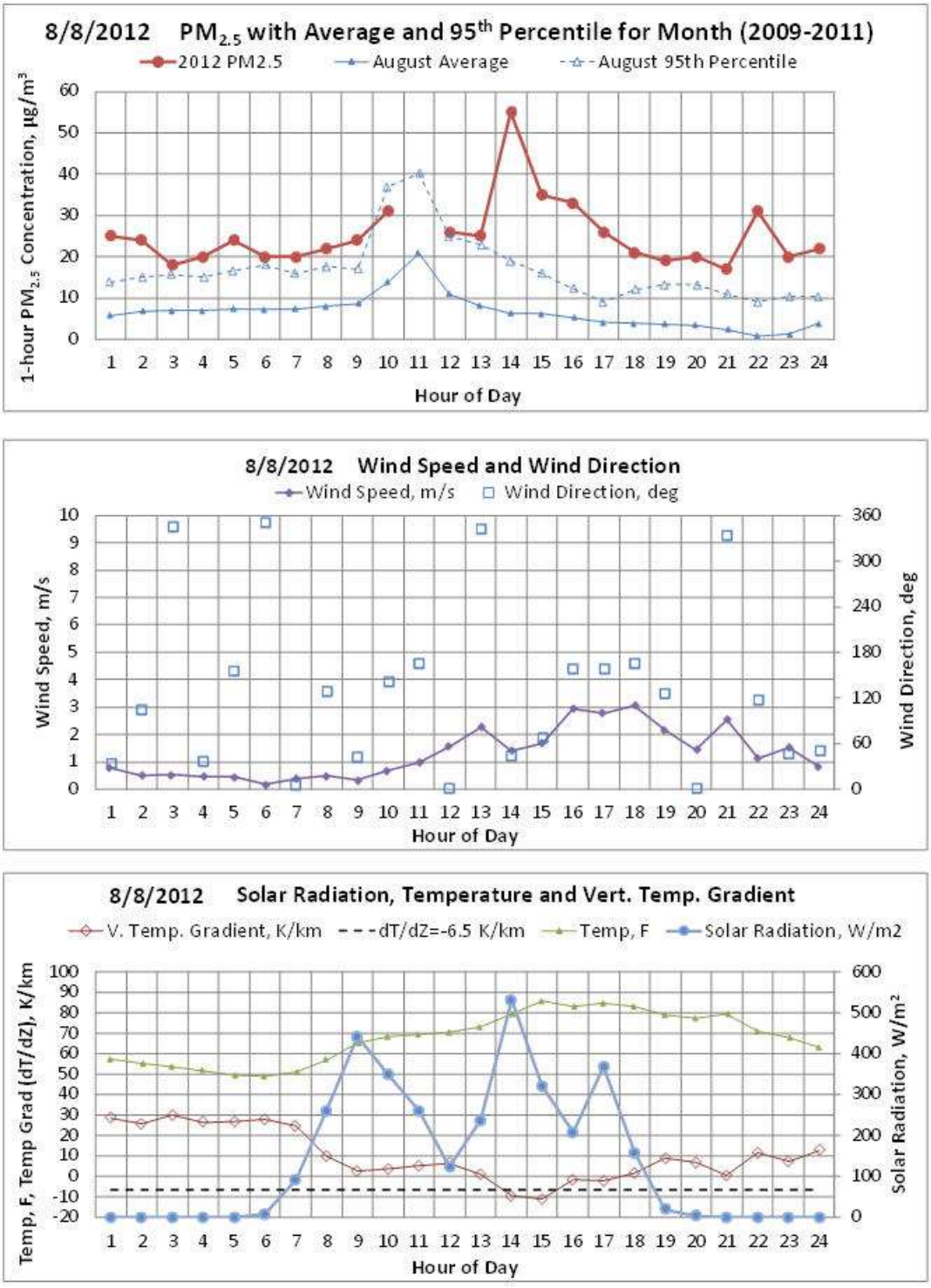


Figure 54. Time series charts for August 8, 2012, showing 2012 $PM_{2.5}$ concentrations versus historical (2009–2011) average and 95th percentile values for August days (top chart); wind speed and wind direction (middle chart); and temperature, solar radiation, and vertical temperature gradient (bottom chart). Temperature gradients above -6.5 K/km (dotted line) indicates stable/stagnant conditions in the valley.

4.9.4 Comparison of Event-Affected Days to Specific Nonevent Days

As shown in Figure 54, top chart, the $PM_{2.5}$ time series chart for each day will include the typical "non-event" daily pattern for that day in 2011, 2010, and 2009 in terms of the monthly average for each hour, and the monthly 95th percentile value. As seen in Figure 54, the hourly $PM_{2.5}$ concentrations exceed the hourly 95th percentile value for most of the day and are twice as high for 5 hours during the day.

4.9.5 Alternative Hypotheses

Residential wood combustion (RWC) does not occur during in August nor in most of the wildfire season but rather begins in October. The daytime temperature on August 28 ranged from ~50 °F at night to over 80 °F during the day. RWC does not typically begin until the daytime/evening temperatures are below about 35 °F–40 °F. In addition, crop residue burning did not occur in the Salmon vicinity, and was not allowed for most of the period in Idaho and prescribed burning did not occur (Appendix D). No other source of smoke/$PM_{2.5}$ is large enough to cause the levels exceeding the 95th percentile values for nearly the entire day as observed on August 8, 2012, in Salmon, and the day long elevated levels reflect the region-wide smoke that approached the monitor from every wind direction during the day. Specific information on days when a Stage 1 Forecast and Caution was in effect, thus prohibiting open burning provided in Appendix E.

Pinehurst Scenarios

4.10 Pinehurst Scenario 1: Regional Transport

Scenario 1 describes the conditions that occur when long-range smoke advects to the monitor in Pinehurst. During the 2012 fire season, there were no large fires burning near Pinehurst like the Salmon case, however, many large fires burned to the south of Pinehurst in central Idaho, and, during September, there were a number of large fires burning in central and eastern Washington. Smoke from these fires affected the air quality in Pinehurst. Since the smoke travelled longer distances, it was more dispersed and therefore, concentrations in Pinehurst increased less dramatically than in Salmon.

Scenario Summary

- Smoke from regional fires advect into Pinehurst.
- Fire sources can be within Idaho or from neighboring states.
- Characterized by sustained, elevated concentrations on the hourly trace.
- Satellite imagery shows multiple fires in the region.
- Back trajectories intersect fires (or HMS fire detects).

4.10.1 Description of Typical Weather Conditions and Transport Winds

The date September 25, 2012, was selected as an example for Scenario 1. The observationally driven modeled output of the 500 mb height contours are shown in Figure 55 and the surface chart is shown in Figure 56. Aloft, a weak Rex block became established over Idaho. This created very weak wind speeds and variable direction, as well as an area of weak or split flow. At the surface, there is a very weak pressure gradient which allows for diurnally driven mountain-

valley wind regimes to become the primary contributor to local wind patterns in the Silver Valley. This mean flow is quite evident via the HYSPLIT back trajectories in Figure 57. It is also possible to note that the complex terrain dictates the movement of the smoke, and in places, aides the transport as the valleys align with the mean flow where forced channeling can create accelerated or gusty wind conditions (Whiteman 2000).

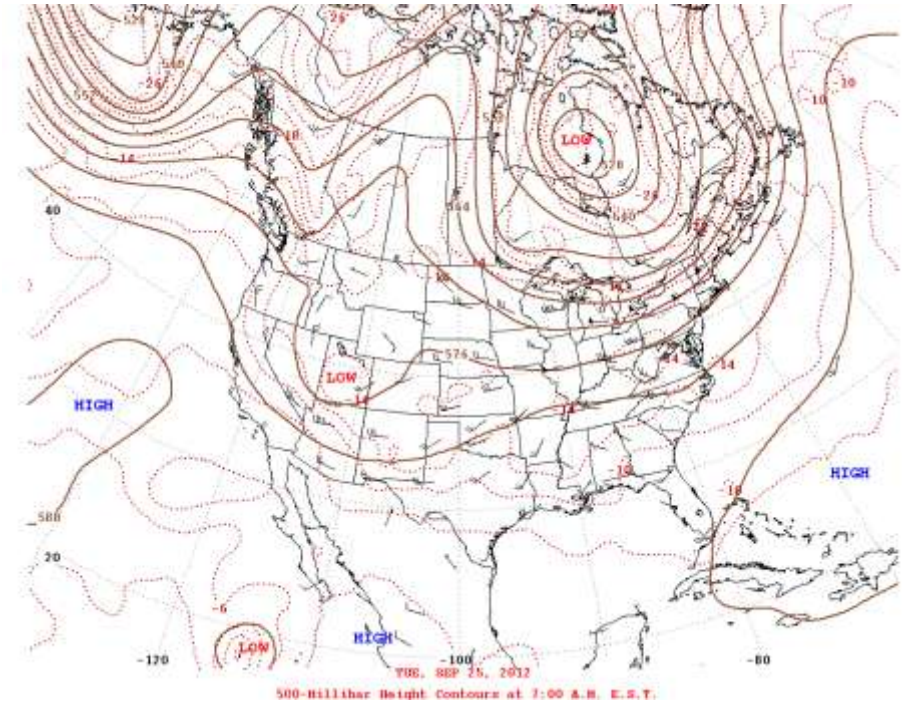


Figure 55. September 25, 2012, 500-millibar height contours and wind barbs at 0500 MST *http://www.hpc.ncep.noaa.gov/dailywxmap/* (HPC 2013).

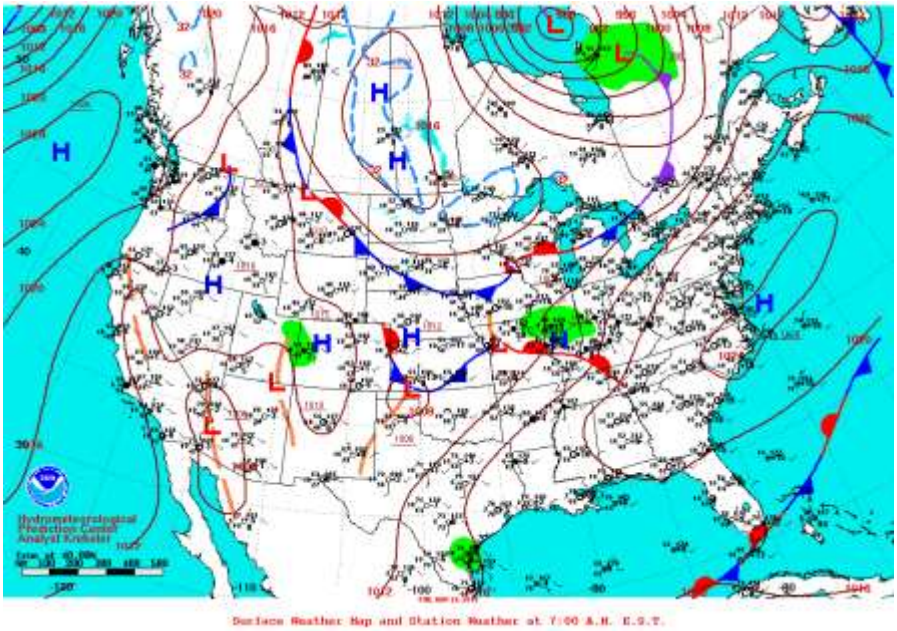


Figure 56. Surface weather analysis and station weather at 0500 MST, September 25, 2012 *http://www.hpc.ncep.noaa.gov/dailywxmap/* (HPC 2013).

4.10.2 Transport of Typical Emissions/Spatial Relationship between Sources and the Monitor(s) Where Measurements Were Recorded

In this example, (Figure 57) the morning satellite image shows light smoke across the Panhandle, including in the Pinehurst area, and 1000 m AGL back trajectories intersecting multiple fire detects in central Washington and smoke in northern Oregon. Clouds obscure much of the smoke arising from the Washington fires, but examination of satellite images from previous days reveals significant smoke production at these fires.

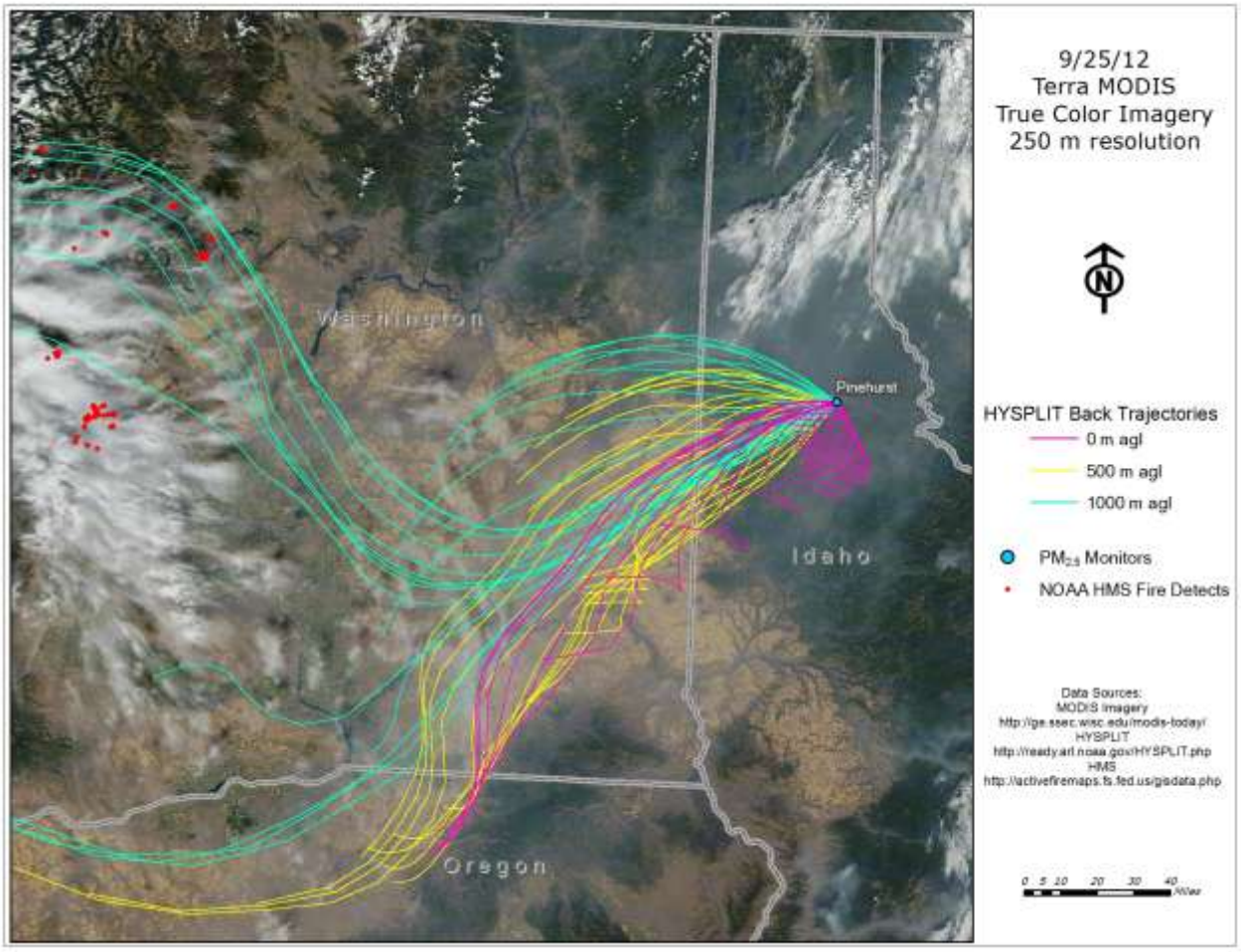
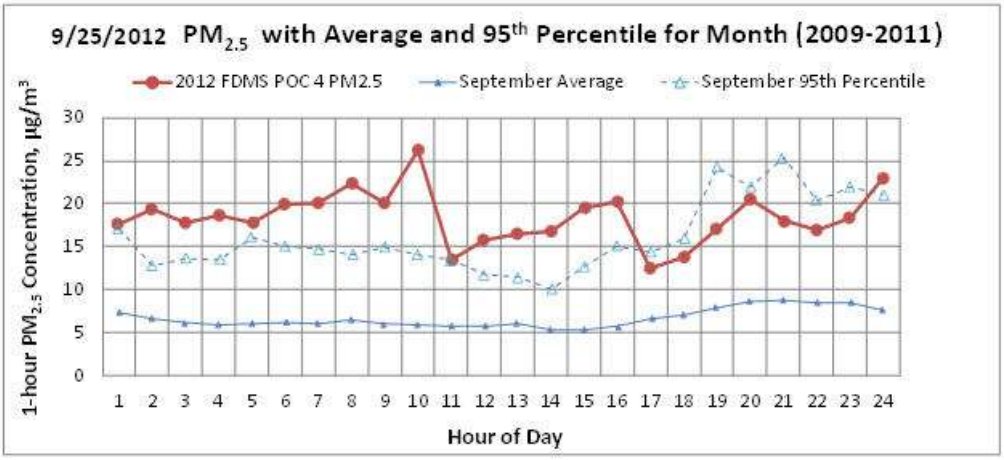
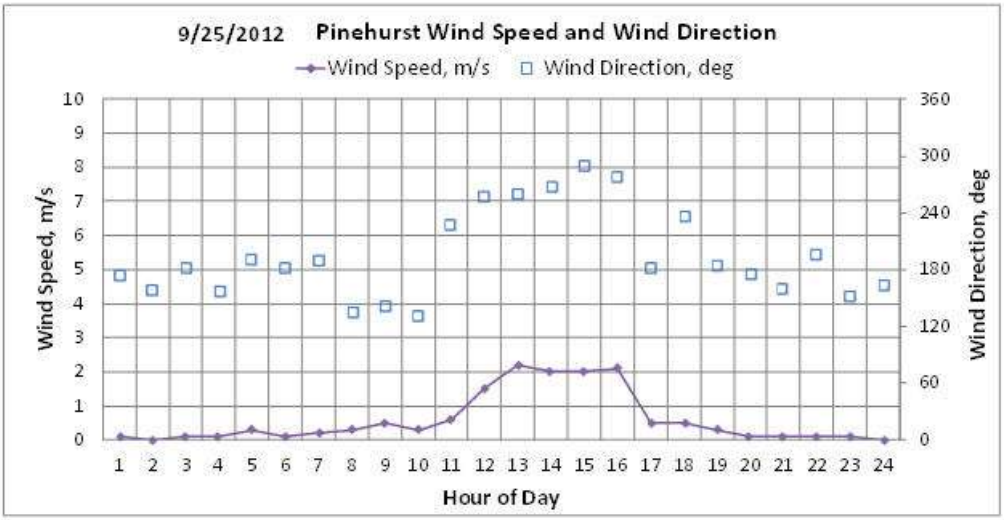


Figure 57. Terra MODIS satellite image shows light smoke throughout the region, with HYSPLIT model back trajectories intersecting smoke and/or HMS fire detects from fires in Washington and Oregon.

4.10.3 Typical Temporal Relationship Between the Wildfires and Elevated PM Concentrations at the Monitor(s) in Question

The evidence from the hourly $PM_{2.5}$ trace and the local wind data indicate elevated levels overnight, clearing somewhat ~ 1100 then the midday concentrations rise again as the winds increase and approach from the west in agreement with the back trajectories.





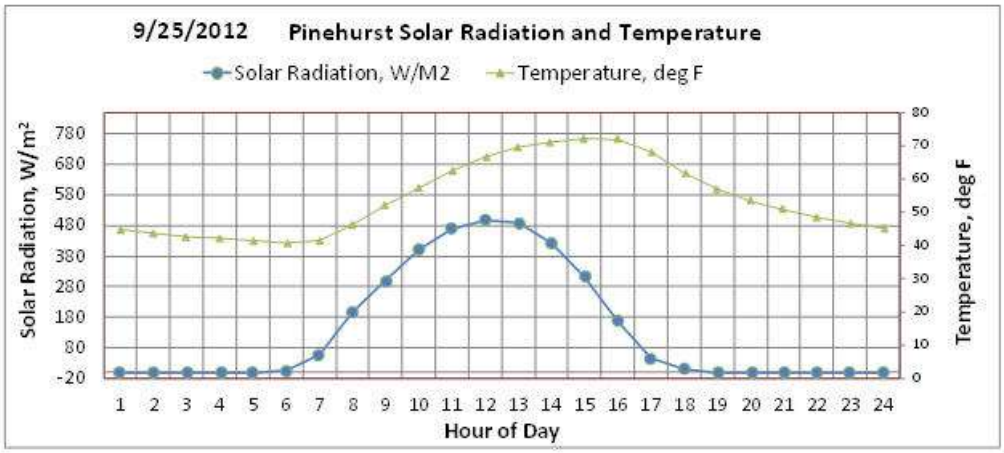


Figure 58. Time series charts for September 25, 2012, showing 2012 $PM_{2.5}$ concentrations versus historical (2009–2011) average and 95th percentile values for September days (top chart); wind speed and wind direction (middle chart); and temperature and solar radiation.

4.10.4 Comparison of Event-Affected Days to Specific Nonevent Days

As shown in Figure 58, top chart, the $PM_{2.5}$ time series chart for each day includes the typical "non-event" daily pattern for that day in 2011, 2010, and 2009 in terms of the monthly average for each hour, and the monthly 95th percentile value. The hourly $PM_{2.5}$ concentrations in Figure 58 exceed the hourly 95th percentile value for most of the day including the overnight and daytime hours prior to 1700.

4.10.5 Alternative Hypotheses

Residential wood combustion does not occur to any great extent during September but rather typically begins for most people in October. The daytime Pinehurst temperature on September 25 ranged from the low 40s overnight to over 70 °F in the afternoon while RWC does not typically begin until the daytime/evening temperatures are below 35 °F–40 °F. In addition, crop residue burning did not occur in Shoshone County, near Pinehurst, and was not allowed by the State of Idaho for most of the period of regional wildfire smoke in most of northern Idaho and prescribed burning did not occur (Appendix D). No other source of smoke/$PM_{2.5}$ is large enough to cause the levels exceeding the 95th percentile values for nearly the entire day as observed on September 25, 2012, in Pinehurst and we must conclude that the day long elevated levels reflect the region-wide smoke that approached the monitor from the west and southwest directions during midday. Specific information on days when a Stage 1 Forecast and Caution was in effect, thus prohibiting open burning provided in Appendix E.

4.11 Scenario 2: Local Stagnation

Scenario 2 describes the conditions that occur when smoke advected to Pinehurst from wildfires remains trapped in the valley due to stagnant atmospheric conditions. Pinehurst's location in a small valley less than 2 km in diameter, and surrounded by mountains, causes smoke to become trapped in local nocturnal inversions which sometimes don't break for several days at a time due to the strength of the cold air pool.

Scenario Summary

- Smoke from regional fires advect into Pinehurst and is trapped in the small valley.
- Atmospheric conditions are stable.
- Pinehurst is too small to detect visible smoke from satellite imagery, but regional clues to stagnation include smoke trapped in river valleys
- Back trajectories do not travel far during 24-hour period, suggesting low wind speeds

4.11.1 Description of Typical Weather Conditions and Transport Winds

The date September 22, 2012, was selected to represent the second Pinehurst scenario of local stagnation. Below are the 500 mb chart (Figure 59) and observational surface chart (Figure 60). At the 500 mb level, it is evident that a highly amplified, strong (582 dm or higher) ridge pattern (driven by the strong embedded low pressure system upstream) with the ridge axis centered near Idaho contributed to stagnant conditions with light winds that inhibited horizontal and vertical mixing. The semi-permanent Four-Corners high pressure system, while on this specific date is relatively small, intruded into Idaho several times, reaching north of the Salmon River. At the

surface, a very weak pressure gradient existed which promoted weak winds that were driven by local topographic forcing, such as mountain-valley and mountain-plain diurnal wind patterns.

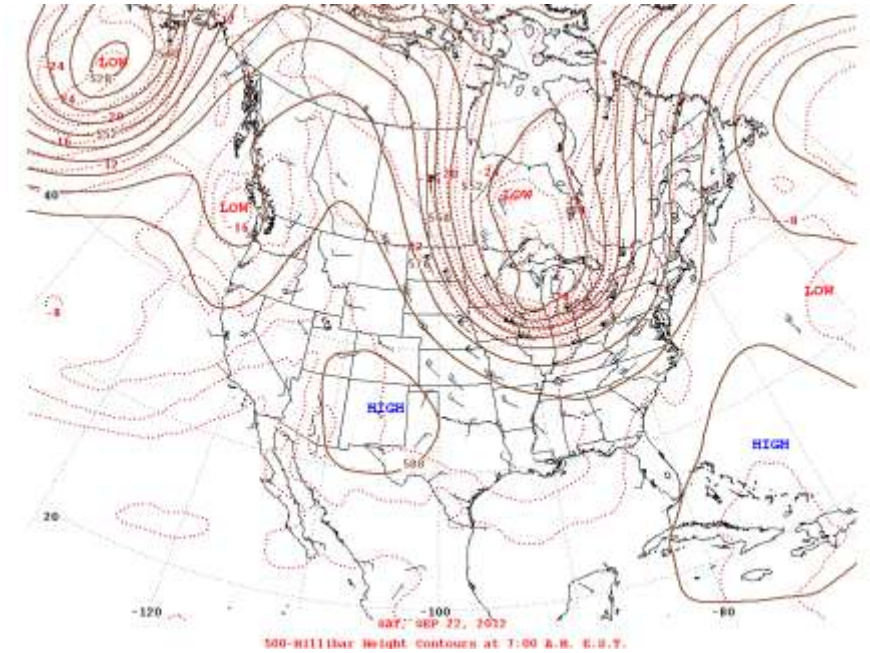


Figure 59. September 22, 2012, 500-millibar height contours and wind barbs at 0500 MST *http://www.hpc.ncep.noaa.gov/dailywxmap/* (HPC 2013).

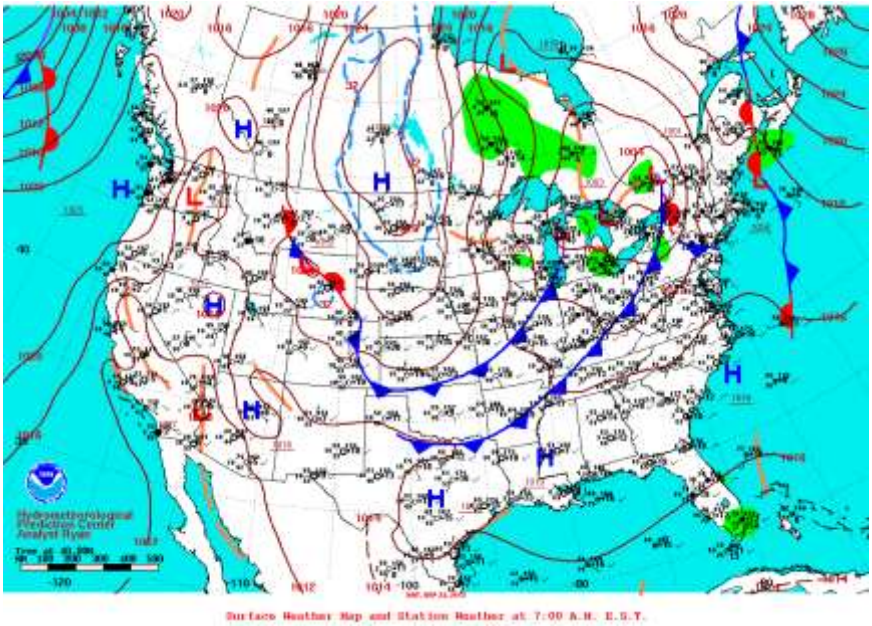


Figure 60. Surface weather analysis and station weather at 0500 MST, September 22, 2012 *http://www.hpc.ncep.noaa.gov/dailywxmap/* (HPC 2013).

4.11.2 Transport of Typical Emissions/Spatial Relationship between Sources and the Monitor(s) Where Measurements Were Recorded

In this example, the morning satellite image (Figure 61) shows dense smoke obscuring surface features throughout Idaho and Montana. South of Pinehurst, thick smoke can be seen trapped in the river drainages, implying the strength of the stagnant atmosphere. Back trajectories do not travel more than 50 miles during the 24-hour period, adding evidence of the low wind speeds and the generally stagnant conditions.

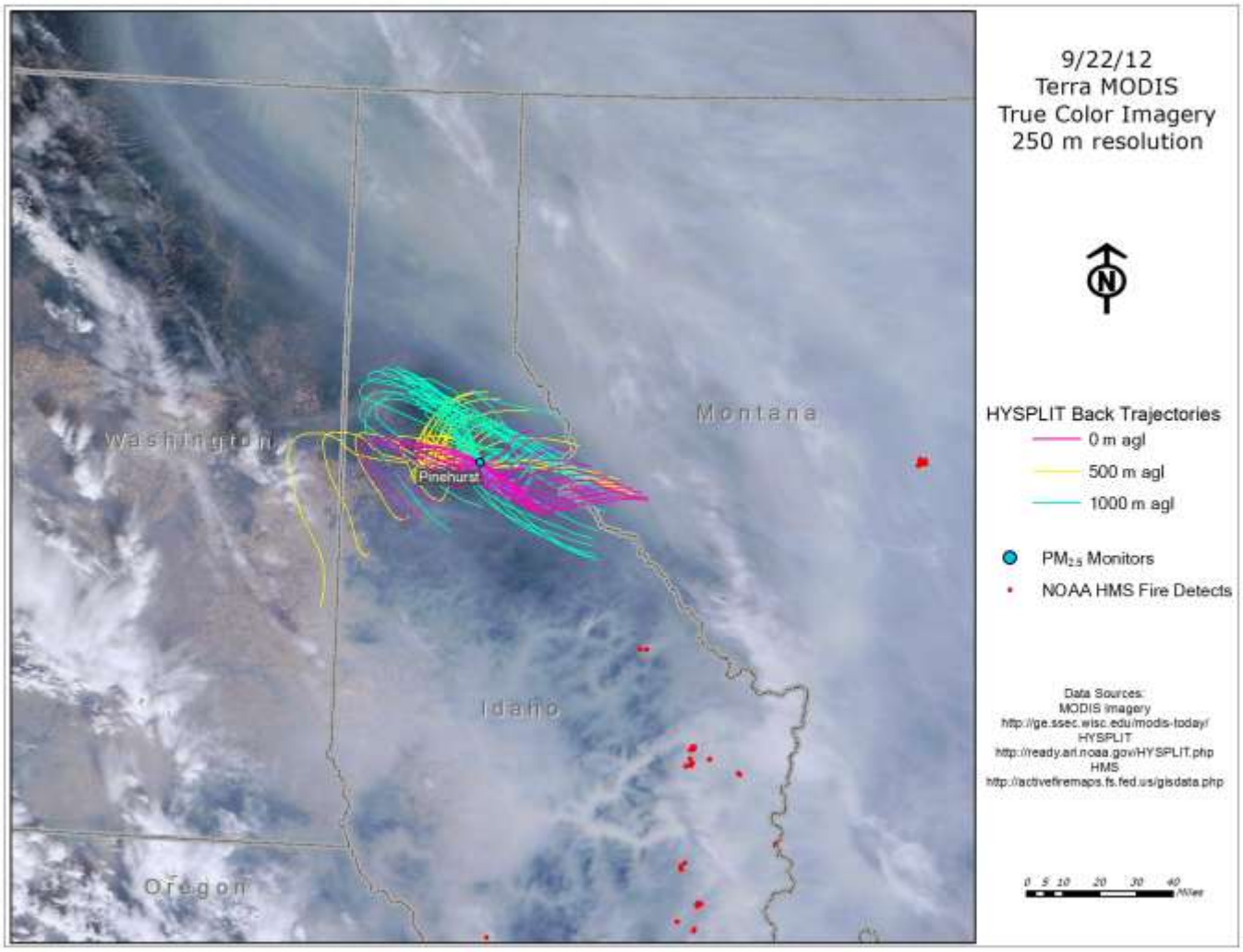


Figure 61. Terra MODIS satellite image showing fire detects and dense smoke blanketing northern Idaho and trapped in the river valleys of central Idaho. HYSPLIT model back trajectories are very short indicating stagnant air.

4.11.3 Typical Temporal Relationship Between the Wildfires and Elevated PM Concentrations at the Monitor(s) in Question

The hourly $PM_{2.5}$ trace (Figure 62) shows generally elevated and sustained concentrations above the hourly 95th percentile levels throughout the day, with an upwards trend. The very low wind speeds indicate why the valley does not clear out during the day.

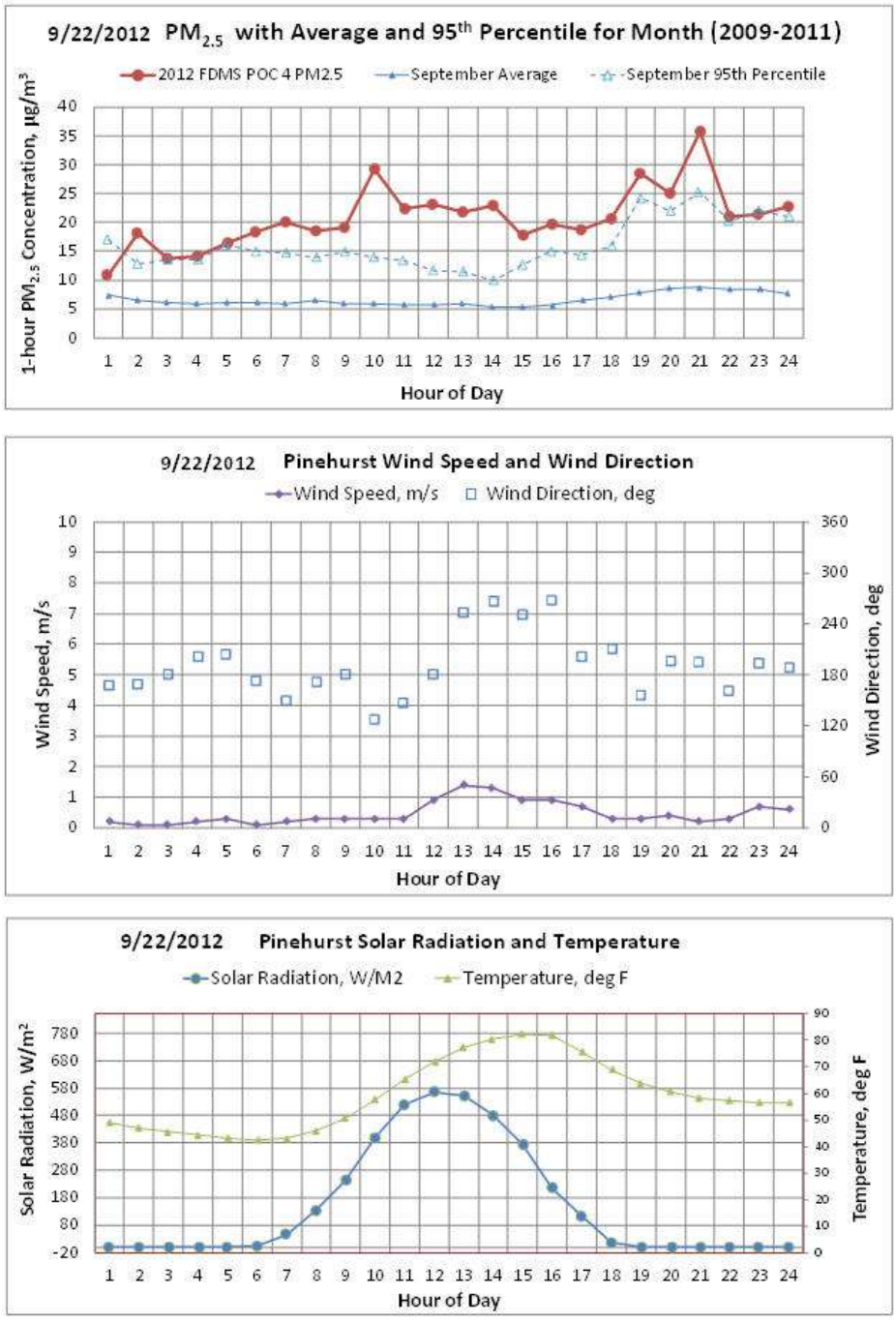


Figure 62. Time series charts for September 22, 2012, showing 2012 $PM_{2.5}$ concentrations versus historical (2009–2011) average and 95th percentile values for September days (top chart); wind speed and wind direction (middle chart); and temperature and solar radiation (bottom chart).

4.11.4 Comparison of Event-Affected Days to Specific Nonevent Days

As shown in Figure 62, top chart, the $PM_{2.5}$ time series chart for each day will include the typical "non-event" daily pattern for that day in 2011, 2010, and 2009 in terms of the monthly average for each hour, and the monthly 95th percentile value. The hourly $PM_{2.5}$ concentrations exceed the hourly 95th percentile values most of the day.

4.11.5 Alternative Hypotheses

Residential wood combustion (RWC) does not occur during in September nor in most of the wildfire season but rather typically begins in October. The daytime temperature on September 22 ranged from the low 40s overnight to over 80 °F during the day. DEQ believes the RWC does typically begin to pick up when the daytime/evening temperatures are below 35 °F–40 °F so there may be some minor RWC contribution on this day, but woodburning is believed to be limited in September as many people will likely conserver their wood supply until the cooler months. In addition, crop residue burning did not occur in Shoshone County and fire detects were not seen west of there in the traditional farming areas of Benewah and Latah counties. CRB activity was not allowed by the State of Idaho on this day and prescribed burning did not occur (Appendix D). No other source of smoke/$PM_{2.5}$ is large enough to cause the levels exceeding the 95th percentile values for the entire day as observed on September 22, 2012, in Pinehurst, and the day-long elevated levels reflect the region-wide smoke that filled the valley and remained trapped by stagnant conditions throughout the day. Specific information on days when open burning was prohibited, including crop residue burning, is provided in Appendix E.

5 Affects Air Quality (AAQ)

The EER requires that agencies must document that the identified source of an exceptional event truly affected air quality (AAQ) at the location of the monitor in question. EPA's Interim High Wind Guidance (EPA 2013) indicates that if Historical Fluctuations (in Section 3) and a Clear Causal Relationship (in Section 4) have been adequately demonstrated, then the AAQ element will have been met. DEQ believes that the Historical Fluctuations and Clear Causal Relationship evidence has been fully demonstrated and is very strong, and therefore the AAQ requirement is also met.

6 Human Activity Unlikely to Recur or a Natural Event (HAURL/NE)

The EER requires that agencies must document that the identified source of an exceptional event is either a natural event (NE) or a human activity unlikely to recur at the same location (HAURL) such as to affect the monitors in question again. EPA's Interim High Wind Guidance (EPA 2013) indicates that if an agency has adequately demonstrated that the source is a *natural event* or, if not natural, is a human activity unlikely recur at the same location and that there is a *clear causal relationship* between the identified source (s) and the affected monitor, then the HAURL/Natural Event criterion is also satisfied.

This primary fires affecting Salmon, Idaho (Halstead and Mustang Complex) as well as the majority of the other fires in the region were caused by lightning and are therefore of natural origin. Similarly, the Wenatchee Complex and Table Mountain in Washington and the Powell SBW Complex in Idaho, as well as several other fires which primarily affected the Pinehurst monitor were all lightning caused. Furthermore, the few human caused fires in the region are unlikely to recur for many years in the same location because the fuel is exhausted in their fire scars. Finally, the detailed data included in Appendix B for Salmon and Appendix C for

Pinehurst, demonstrate a clear causal relationship between source and monitor for each day that DEQ requests concurrence. Thus, the NE/HAURL criterion is also satisfied.

7 No Exceedance "But For" this Event (NEBF)

The EER, 40 CFR 50.14(b)(1), directs EPA to exclude data only when an agency demonstrates an "exceptional event" caused a concentration in excess of a NAAQS. It must generally be shown that the concentrations at the monitor would have been below the standard if the event had not occurred (i.e., "but for" the event.) The clear causal relationship information establishes the connection between the wildfires and the monitored value, and demonstrates that due to the burn bans in effect, and lack of crop residue burning and prescribed burning in these areas, no other significant source is capable of causing the high monitor values. Finally, the analysis of Historical Fluctuations in Section 3 demonstrates, in accordance with EPA "High Wind guidance" (EPA 2013) that these events exceed the normal range of historical fluctuations above the mean value. The difference between the monitored values at the Salmon and Pinehurst monitors and the normal range of historical fluctuations, bracketed by the historical average values and the historical 95th percentile values is assumed to represent the contributions of these wildfire events to the monitored value.

Table 10 below provides the quantitative NEBF for each monitored concentration at Salmon for which we seek concurrence. Table 11 provides the quantitative NEBF for each requested monitor concentration at Pinehurst. The range of concentrations in the right-most two columns of Table 10 and Table 11 demonstrate that the values above the 24-hour NAAQS of 35 $\mu g/m^3$ or the annual NAAQS of 12 $\mu g/m^3$ would not have occurred "but for" the regional wildfire event. If the NEBF evidence is uncertain, the weight of evidence including a lack of alternative sources that could cause such levels and smoke visible in satellite images covering the region is relied upon to make the case.

Table 10. Estimated contribution of Salmon values that would not have occurred "But For" the 2012 wildfires. The two right-hand columns represent the range of concentration contributed by wildfires.

Date	$PM_{2.5}$ Value at Monitor ($\mu g/m^3$)	Value–95th Percentile ($\mu g/m^3$)	Value–Average ($\mu g/m^3$)
8/10/2012	33.7	17.8	27.9
8/11/2012	37.2	21.3	31.4
8/12/2012	49.2	33.3	43.4
8/13/2012	96.5	80.6	90.7
8/14/2012	147	131.1	141.2
8/15/2012	67.3	51.4	61.5
8/16/2012	106.5	90.6	100.7
8/17/2012	96.6	80.7	90.8
8/18/2012	30.4	14.5	24.6
8/19/2012	34.5	18.6	28.7
8/20/2012	37.7	21.8	31.9
8/23/2012	35.9	20.0	30.1
8/24/2012	108.2	92.3	102.4
8/25/2012	91.3	75.4	85.5
8/26/2012	45.5	29.6	39.7
8/28/2012	58.2	42.3	52.4
8/29/2012	78.1	62.2	72.3
8/30/2012	132	116.1	126.2
8/31/2012	49.8	33.9	44.0
9/1/2012	69.4	53.5	63.6
9/2/2012	145.2	129.3	139.4
9/3/2012	186.9	171.0	181.1
9/4/2012	182.7	166.8	176.9
9/5/2012	97.8	81.9	92.0
9/6/2012	48.4	32.5	42.6
9/7/2012	53.1	37.2	47.3
9/10/2012	136.4	120.5	130.6
9/11/2012	214.3	198.4	208.5
9/12/2012	194.4	178.5	188.6
9/13/2012	153.7	137.8	147.9
9/14/2012	70.2	54.3	64.4
9/15/2012	162.1	146.2	156.3
9/16/2012	162.5	146.6	156.7
9/17/2012	112.3	96.4	106.5
9/18/2012	130.3	114.4	124.5
9/19/2012	135.5	119.6	129.7
9/20/2012	159.8	143.9	154.0
9/21/2012	153.5	137.6	147.7

9/22/2012	86.6	70.7	80.8
9/23/2012	44.3	28.4	38.5
9/25/2012	62.7	46.8	56.9
9/26/2012	37.4	21.5	31.6
9/27/2012	39.3	23.4	33.5

Table 11. Estimated contribution of Pinehurst values that would not have occurred "But For" the 2012 wildfires. The two right-hand columns represent the range of concentration contributed by wildfires.

Date	$PM_{2.5}$ Value at Monitor ($\mu g/m^3$)	Value–95th Percentile ($\mu g/m^3$)	Value–Average ($\mu g/m^3$)
9/14/2012	31.3	16.3	24.3
9/15/2012	43.6	28.6	36.6
9/22/2012	20.8	5.8	13.8
9/25/2012	18.4	3.4	11.4

8 Mitigation

8.1 EER Mitigation Requirement

The mitigation provisions of the EER (40 CFR§51.930) require that (EPA 2013):

(a) A State requesting to exclude air quality data due to exceptional events must take appropriate and reasonable actions to protect public health from exceedances or violations of the national ambient air quality standards. At a minimum, the State must:

(1) Provide for prompt public notification whenever air quality concentrations exceed or are expected to exceed an applicable ambient air quality standard;

(2) Provide for public education concerning actions that individuals may take to reduce exposures to unhealthy levels of air quality during and following an exceptional event; and

(3) Provide for the implementation of appropriate measures to protect public health from exceedances or violations of ambient air quality standards caused by exceptional events.

8.2 Air Pollution Emergency Rule

DEQ implements the Air Pollution Emergency Rule (IDAPA 58.01.01.550) which helps mitigate air pollution emergency episodes by prohibiting open burning and notifying the public of deteriorating air quality. DEQ provides daily air quality forecasts in each of its regions and issues a Stage 1 Forecast and Caution (Stage 1) when necessary to protect public health. A Stage 1 notification, which prohibits all open burning, includes information concerning actions that individuals may take to reduce exposures to unhealthy levels of air quality. A Stage 1, indicating deteriorating air quality and providing information to help citizens take actions to mitigate their exposure, were issued in every county in Idaho during the 2012 wildfire season, as shown in Table 12. The dates for which a Stage 1 was in effect for Shoshone and Lemhi Counties are shown in Appendix E, along with an example of the Stage 1 notification content.

Table 12. Number of days under a DEQ-issued Stage 1 Air Pollution Forecast and Caution

County	Number of days	County	Number of days
Ada	15	Gem	15
Adams	6	Gooding	3
Bannock	4	Idaho	36
Bear Lake	3	Jefferson	4
Benewah	8	Jerome	3
Bingham	3	Kootenai	8
Blaine	31	Latah	21
Boise	18	Lemhi (Salmon)	50
Bonner	8	Lewis	27
Bonneville	4	Lincoln	3
Boundary	8	Madison	4
Butte	4	Minidoka	3
Camas	22	Nez Perce	25
Canyon	15	Oneida	3
Caribou	3	Owyhee	15
Cassia	3	Payette	15
Clark	4	Power	3
Clearwater	29	Shoshone (Pinehurst)	8
Custer	31	Teton	4
Elmore	18	Twin Falls	3
Franklin	3	Valley	6
Fremont	4	Washington	15

8.3 Press Releases

In addition to the Stage 1 Forecast and Cautions, DEQ and the Idaho Department of Health and Welfare (IDHW), Division of Health both issued press releases periodically, which provided additional health protection information. Health protection information included a Centers for Disease Control (CDC 2013) fact sheet on protecting yourself from wildfire smoke and information relating wildfire smoke concentration and the AQI color scale to visual range that citizens can observe for themself to determine if they should take additional protective actions. The DEQ and IDHW press releases and the CDC information are also included in Appendix E.

8.4 Daily Inter-agency Update Reports

When the severity of the wildfire impact began to be understood, DEQ quickly began holding daily phone calls to provide a forum for gathering fire information from the federal agencies such as the US Forest Service (USFS) and the National Weather Service (NWS) with the intent of passing all available information on to other state and local agencies charged with more direct health protection such as the IDHW state office and the local health districts. The daily

interagency update reports provided during the daily conference calls were designed to disseminate monitoring data, forecasts, and satellite information to the other agencies so that all the agencies could have the best available information to pass on to affected persons. An example of the daily DEQ update reports is also included in Appendix E.

8.5 Air Filters

In addition to Stage 1 Forecast and Cautions, press releases, and Interagency updates, DEQ acted expeditiously to help the Salmon School District to mitigate student's health risk by assisting the Salmon School District with indoor air quality issues in the elementary and middle schools. DEQ purchased 43 HEPA filters for the Salmon School District. These filters helped improve the air quality inside the schools. During this time, Salmon experienced 1 day in the *Hazardous*, 6 days in the *Very Unhealthy*, and 21 days in the *Unhealthy* category for air quality.

9 Procedural Requirements

The EER establishes specific procedural requirements that an air agency must follow to request data exclusion (EPA 2013). Those requirements and DEQ's actions to meet them are summarized in Table 13.

Table 13. DEQ compliance with procedural requirements of the Exceptional Events Rule.

Exceptional Event Rule Procedural Requirements	DEQ Action/Intended Action
A State shall notify EPA of its intent to exclude one or more measured exceedances of an applicable ambient air quality standard as being due to an exceptional event by placing a flag in the appropriate field for the data record of concern which has been submitted to the AQS database... 40 CFR § 50.14(c)(2)(i).	DEQ notified EPA that it placed flags on numerous the monitor values originally thought to be affected by wildfires above the level of the annual $PM_{2.5}$ standard, 12 $\mu g/m^3$ and that we intended to request EPA concurrence to exclude some or all of them from the AQS database.
The placement of the flags and the submittal of an initial event description must be done *not later than July 1st of the calendar year following the year in which the flagged measurement occurred.* 40 CFR § 50.14(c)(2)(iii).	DEQ placed flags on all the monitor values described in this report in prior to July 2013.
A State that has flagged data as being due to an exceptional event and is requesting exclusion of the affected measurement data shall, after notice and opportunity for public comment, submit a demonstration to justify data exclusion to EPA not later than the lesser of, 3 years following the end of the calendar quarter in which the flagged concentration was recorded or, 12 months prior to the date that a regulatory decision must be made by EPA. A State must submit the public comments it received along with its demonstration to EPA. 40 CFR § (50.14(c)(3)(i)).	DEQ submitted this package for public comment and intends to subsequently submit it to EPA by December 12, 2013 so that it is considered during the $PM_{2.5}$ designation process for the annual $PM_{2.5}$ NAAQS.
With the submission of the demonstration, the air agency *must document that the public comment process was followed.* 40 CFR § (50.14(c)(3)(iv)).	This document was available for public comment from November 5, 2013 – December 5, 2013; see Appendix G for legal notifications. No comments were received.

10 References

Draxler, R.R. and G.D. Rolph. 2003. *HYSPLIT (HYbrid Single-Particle Lagrangian Integrated Trajectory) Model Access via NOAA ARL READY Website*. National Oceanic and Atmospheric Administration, Air Resources Laboratory. *http://ready.arl.noaa.gov/HYSPLIT_traj.php*

DEQ (Department of Environmental Quality, State of Idaho) 2013. Meteorological data from DEQ's Envista data acquisition and database system, Salmon Idaho and Pinehurst Idaho stations, accessed September 2013.

EPA (United States Environmental Protection Agency) 2013. *Interim Guidance on the Preparation of Demonstrations in Support of Requests to Exclude Ambient Air Quality Data Affected by High Winds Under the Exceptional Events Rule*. Washington, DC, May 2013.

EPA (United States Environmental Protection Agency) 2013b. *Airdata-Access to monitored air quality data from EPA's Air Quality System (AQS) Data Mart, accessed 2013 from http://www.epa.gov/airdata/*

EPA (United States Environmental Protection Agency) 1996. Wildfires and Prescribed Burning, in *Compilation of Air Pollutant Emission Factors (AP-42)*, Fifth edition. Section 13.1, October 1996.

HPC 2013. Daily Weather Maps, Hydrometeorological Prediction Center, National Centers for Environmental Prediction, National Oceanic and Atmospheric Administration, 2013. Accessed 30 October 2013 from: *http://www.hpc.ncep.noaa.gov/dailywxmap/*

Horel, J. et al. 2002. "Mesowest: Cooperative Mesonets in the Western United States." *Bulletin of the American Meteorlogical Society* 83: 211–225. *http://mesowest.utah.edu/*

IMPROVE (Interagency Monitoring of Protected Visual Environments). 2013. "IMPROVE Aerosol Data.". *http://vista.cira.colostate.edu/improve/Data/IMPROVE/AsciiData.aspx*

NIFC (National Interagency Fire Center) 2013. *Wildland Fire Summary and Statistics: Annual Report* 2012. Accessed from *http://www.nifc.gov/*.

NIFC (National Interagency Fire Center) 2013b Situation Reports. Accessed August 2013 from: *http://www.nifc.gov/nicc/admin/site_map.htm*.

NOAA (National Oceanic and Atmospheric Administration). 2013. "MODIS Satellite Images." Accessed April 2013. *http://ge.ssec.wisc.edu/modis-today/*

SCNF (Salmon-Challis National Forest) 2012. *Salmon/Challis National Forest 2012 Fire Management Plan*, United States Forest Service, Salmon/Challis National Forest, Reviewed and updated 2/16/2012. Accessed from: *http://gacc.nifc.gov/egbc/dispatch/id-cic/Documents/Reports/SCNF_FMP.pdf*

Whiteman, David C. 2000. *Mountain Meteorology*. New York: Oxford University Press, 185.

WRAP (Western Regional Air Partnership) 2005. *2002 Fire Emission Inventory for the WRAP Region – Phase II*. Prepared by Air Sciences, Inc. Project no. 178, July 22, 2005.

WRCC, 2013a. WestWide Drought Tracker Time Series Generator, Western Regional Climate Center, 2013. Accessed 30 October 2013 from: *http://www.wrcc.dri.edu/wwdt/time/*

Appendix A. Monitor Values

Appendix A-1 Salmon Monitor Values for all Days AQS16-059-0004

Date	Salmon POC 3 (Primary) $PM_{2.5}$	Salmon POC 1 (Co-located) $PM_{2.5}$	Values included in this Request	Value not included but believed to be also affected by Wildfires
7/30/2012	15.1			Yes
7/31/2012	15.4			Yes
8/5/2012	16.3			Yes
8/6/2012	19.7			Yes
8/7/2012	20.5			Yes
8/8/2012	25.1			Yes
8/9/2012	27			Yes
8/10/2012	33.7		Yes	
8/11/2012	37.2		Yes	
8/12/2012	49.2		Yes	
8/13/2012	96.5	85	Yes	
8/14/2012	147		Yes	
8/15/2012	67.3		Yes	
8/16/2012	106.5		Yes	
8/17/2012	96.6		Yes	
8/18/2012	30.4		Yes	
8/19/2012	34.5	31.2	Yes	
8/20/2012	37.7		Yes	
8/21/2012	22.2			Yes
8/22/2012	21.8			Yes
8/23/2012	35.9		Yes	
8/24/2012	108.2		Yes	
8/25/2012	91.3	77.8	Yes	
8/26/2012	45.5		Yes	
8/27/2012	7.9			
8/28/2012	58.2		Yes	
8/29/2012	78.1		Yes	
8/30/2012	132		Yes	
8/31/2012	49.8		Yes	

Appendix A-1. Salmon Monitor Values for all Days, AQS16-059-0004 (cont.)

Date	Salmon POC 3 (Primary) $PM_{2.5}$ ($\mu g/m^3$)	Salmon POC 1 (Co-located) $PM_{2.5}$ ($\mu g/m^3$)	Values included in this Request	Value not included but believed to be also affected by Wildfires
9/1/2012	69.4		Yes	
9/2/2012	145.2		Yes	
9/3/2012	186.9		Yes	
9/4/2012	182.7		Yes	
9/5/2012	97.8		Yes	
9/6/2012	48.4		Yes	
9/7/2012	53.1		Yes	
9/8/2012	27.5			Yes
9/9/2012	11.5			
9/10/2012	136.4		Yes	
9/11/2012	214.3		Yes	
9/12/2012	194.4		Yes	
9/13/2012	153.7		Yes	
9/14/2012	70.2		Yes	
9/15/2012	162.1		Yes	
9/16/2012	162.5		Yes	
9/17/2012	112.3		Yes	
9/18/2012	130.3		Yes	
9/19/2012	135.5		Yes	
9/20/2012	159.8		Yes	
9/21/2012	153.5		Yes	
9/22/2012	86.6		Yes	
9/23/2012	44.3		Yes	
9/24/2012	31.8			Yes
9/25/2012	62.7		Yes	
9/26/2012	37.4		Yes	
9/27/2012	39.3		Yes	
9/28/2012	20			Yes
9/29/2012	7			
9/30/2012	14.5	12.1		
10/1/2012	18.2			Yes

Appendix A-2. Pinehurst Monitor Values for all Days, AQS 16-079-0017

Date	Pinehurst POC 4 (Primary) $PM_{2.5}$ ($\mu g/m^3$)	Pinehurst POC 1 (Co-located) $PM_{2.5}$ ($\mu g/m^3$)	Pinehurst POC 2 (Co-located) $PM_{2.5}$ ($\mu g/m^3$)	Values included in this Request	Value not included but believed to be also affected by Wildfires
8/14/2012	18.6				Yes
8/15/2012	4.6				
8/16/2012	3.7				
8/17/2012	4				
8/18/2012	5.3				
8/19/2012	6	8	7.9		
8/20/2012	7.8				
8/21/2012	6.4				
8/22/2012	4				
8/23/2012	2.7				
8/24/2012	1.7				
8/25/2012	1.9	2.6	2.9		
8/26/2012	16.5				Yes
8/27/2012	17.6				
8/28/2012	13.8				Yes
8/29/2012	3.1				
8/30/2012	1.8				
8/31/2012	6.4	7.5	7.3		
9/1/2012	4.6				
9/2/2012	2.4				
9/3/2012	2.8				
9/4/2012	1.7				
9/5/2012	3.8				
9/6/2012	1.5	2	2.2		
9/7/2012	2.6				
9/8/2012	5.2				
9/9/2012	7.9				
9/10/2012	8.9				

Appendix A-2. Pinehurst Monitor Values for all Days AQS 16-079-0017 (cont.)

Date	Pinehurst POC 4 (Primary) $PM_{2.5}$ ($\mu g/m^3$)	Pinehurst POC 1 (Co-located) $PM_{2.5}$ ($\mu g/m^3$)	Pinehurst POC 2 (Co-located) $PM_{2.5}$ ($\mu g/m^3$)	Values included in this Request	Value not included but believed to be also affected by Wildfires
9/11/2012	10.9				
9/12/2012	4.3	5.5	5.5		
9/13/2012	4.3				
9/14/2012	31.3			Yes	
9/15/2012	43.6			Yes	
9/16/2012	17.7				
9/17/2012	7.4				
9/18/2012	4.6	7	6.3		
9/19/2012	19.9				Yes
9/20/2012	30.8				Yes
9/21/2012	16.2				Yes
9/22/2012	20.8			Yes	
9/23/2012	22.8				Yes
9/24/2012	22.4				Yes
9/25/2012	18.4			Yes	
9/26/2012	20.3				Yes
9/27/2012	18.8				Yes
9/28/2012	20				Yes
9/29/2012	15.8				Yes
9/30/2012	8.7	8.6	8.7		
10/1/2012	22.4				Yes
10/2/2012	14.1				Yes
10/3/2012	4.9				
10/4/2012	7.7				
10/5/2012	10.9				
10/6/2012	12.1	9.5	10.3		
10/7/2012	14.4				Yes
10/8/2012	26.6				Yes
10/9/2012	22.2				Yes
10/10/2012	20.2				Yes
10/11/2012	24.2				Yes
10/12/2012	18.4	17.4	17.3		Yes

Appendix B: Salmon EER Daily Summaries

For each day, July 30–October 13, 2012, Appendix B includes a summary of all EER elements along with a satellite/back trajectory map, $PM_{2.5}$ and wind time series charts. The summary is a table which provides succinct information addressing all 7 EER criteria, or referencing other locations in this document where additional information may be found.

Appendix B: Salmon EER Information by Day

Information for This Appendix

This appendix contains day-by-day detailed information in support of the Exceptional Events request for each day requested, including the monitor values, AQS number and POC for each value on which DEQ is requesting concurrence. Explanations follow for the information contained in this appendix.

Summary of EER Evidence Tables

These tables contain concise, yet complete information supporting each Exceptional Event Rule (EER) element for each day in which EER concurrence is requested, along with reference to the main report section containing more complete explanations of the transport scenarios involved, alternative hypotheses and other EER elements.

Hysplit Back-trajectories / MODIS Satellite Images

Daily satellite images are overlaid with HYSPLIT back trajectories and HMS fire detects. Terra (morning) or Aqua (afternoon) RGB True Color images show a snapshot of the smoke at the time of the satellite pass. HYSPLIT back trajectories were run for the 24-hour period ending at 2359 on each day. New trajectories start hourly and have starting positions at the source of 0 m AGL, 500 m AGL, and 1000 m AGL. HMS fire detects are all those identified by the MODIS satellites during the 24-hour period.

Time Series Charts for each "Date" Requested

Twenty-four hour time series charts are provided to depict the temporal pattern of hourly $PM_{2.5}$ concentration and meteorological parameters associated with each day. In addition, typical $PM_{2.5}$ concentrations during the same month in previous years when wildfires were not impacting Salmon are characterized for comparison.

Top chart: "***Date" PM2.5 with Average and 95th Percentile for Month (2009-2011)***

2012 $PM_{2.5}$ – The orange circles and line indicate the hourly $PM_{2.5}$ concentration for each hour for each day affected by wildfires in 2012.

August/September/October Average. The blue line with filled blue triangle markers represents the average for the month for the three years prior to 2012. So each value represents 90 or 93 values averaged together. The October average only represents the days prior to October 15, to better represent the wildfire period.

August/September/October 95th percentile. The open blue triangles and dotted line represent the 95th percentile value for the identified month from the 2009 – 2011 data set. The 95th percentile is used to represent the upper limit of the normal historical fluctuations for each hour, based on EPA guidance for the 24-hour normal range between "average" and 95th percentile. Hourly values above this line indicate an "exceptional" hourly value that is beyond normal for that hour and month.

Middle Chart: **"Date" Wind Speed and Wind Direction.**

Wind Speed - The purple diamonds and solid line represent the wind speed in meters per second (m/s) recorded at the DEQ met station on Highway 93 approximately 500 m south of US 28 in Salmon. The wind sensor is at 10 meters above ground level.

Wind Direction, deg – The blue open squares represent the wind direction for the hour, at the DEQ met station.

Bottom Chart: ***"Date" Solar Radiation, Temperature and Vert. Temp. Gradient***

V. Temp Gradient, K/km – The open rust colored diamonds represent the vertical temperature gradient between the DEQ met station in Salmon at 3960 ft above sea level and the Kriley Creek RAWS met station located in the foothills north of Salmon at 5200 ft above sea level, downloaded from MESOWEST (Horel, 2002). Its location is shown in Figure 17. The temperature gradient based on these two met stations is used to approximate a vertical temperature gradient- an indicator of atmospheric stability. A gradient greater than the environmental lapse rate, -6.5 K/km (degrees Kelvin per kilometer) is considered stable while a gradient lower than -6.5 K/km is considered unstable. This parameter can be used to identify days in which the surface temperature inversion does not break.

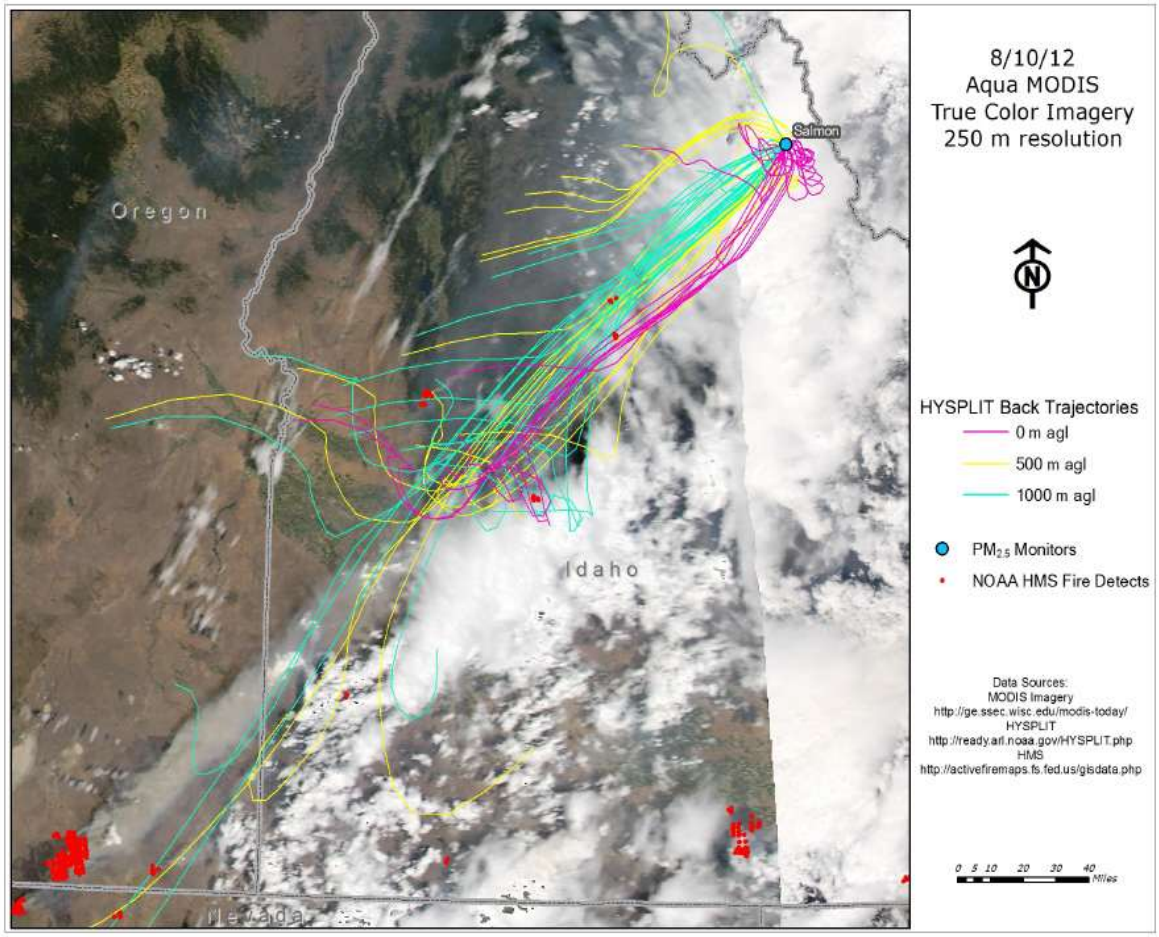
-dT/dZ = -6.5K/km – The black dotted line at -6.5 indicates the fixed environmental lapse rate, the vertical temperature gradient above which the atmosphere remains stable.

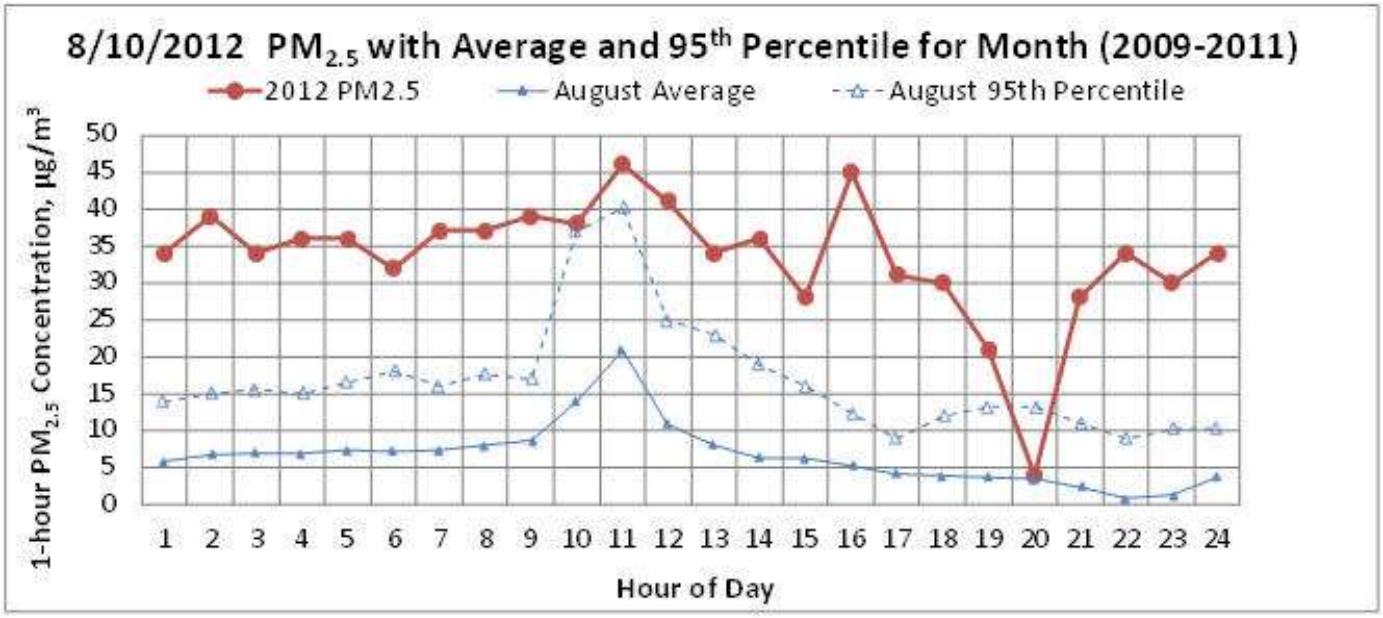
Temp. F – The green triangles and green line represent the temperature at 2 meters above ground as measured at the DEQ met station. It is included to indicate when the evening temperature dips below 40 degrees F, the point at which DEQ believes residential wood combustion is beginning to be used.

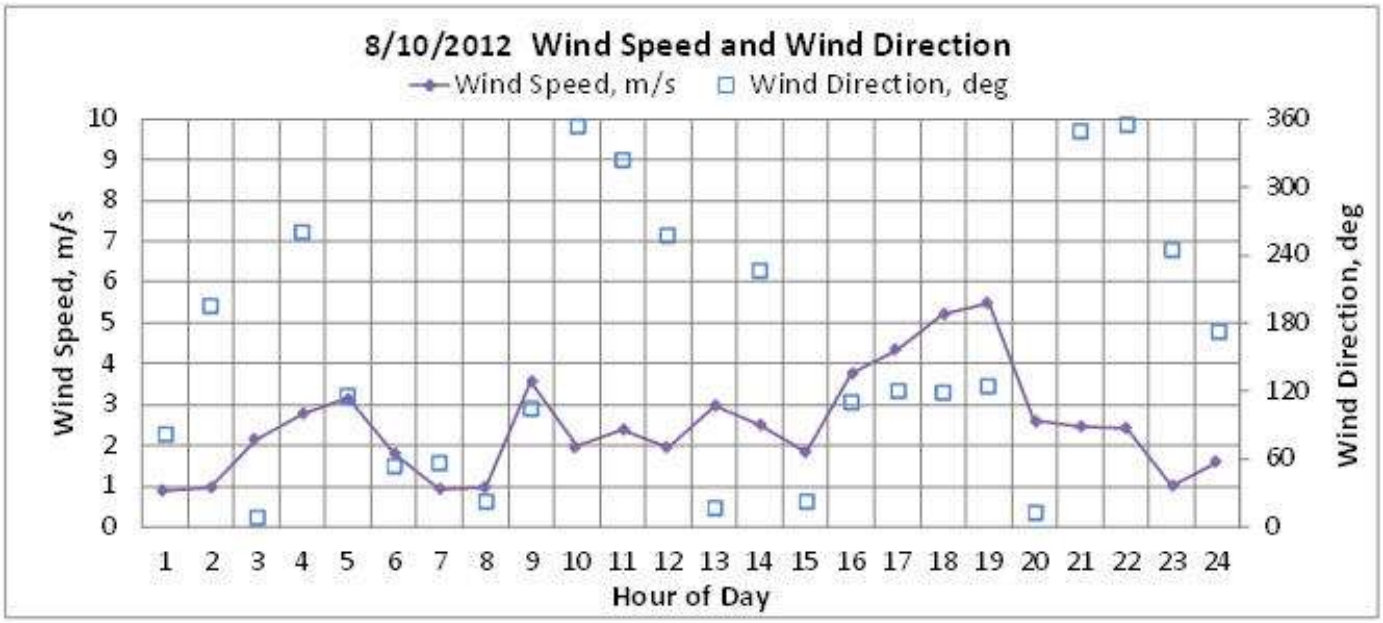
Solar Radiation, W/m2 – the larger blue filled circles represent the solar radiation, in Watts per square meter (W/m2) measured at the DEQ met station. The solar intensity and cycle indicates when solar driven up-valley flows may be expected and when gravity driven down-slope and down-valley flows may be prevalent before sunrise and after sunset.

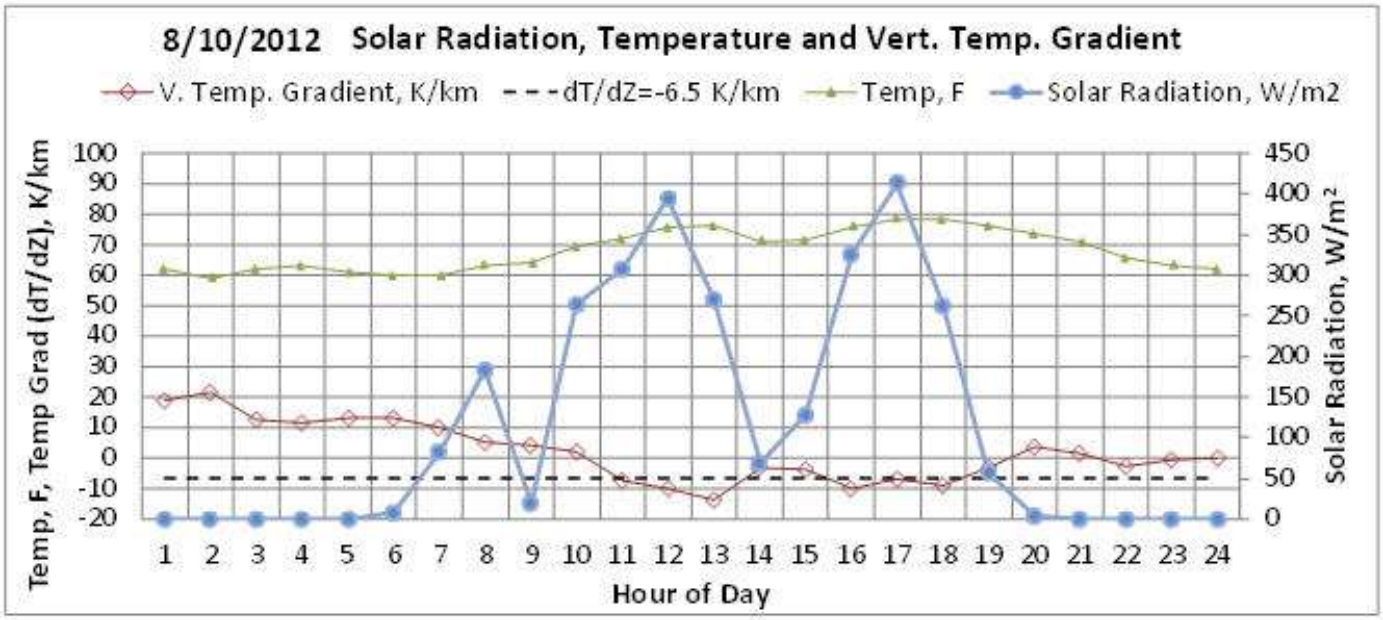
This page intentionally left blank for correct double-sided printing.

Summary of EER Evidence for Salmon Monitor Value, 33.7 µg/m^3 on 8-10-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; 97th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, 4, 5 (See Sec. 4)
	Weather Conditions:	4-Corners High weakens and retreats while long wave ridge remains over the US west of the Mississippi providing light winds.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Afternoon satellite image shows visible smoke throughout the region. Back trajectories intersect smoke and/or fire detects from Halstead, Mustang, Trinity, and Springs fires in Idaho and the Holloway fire in Oregon. Hourly trace remains above 30 µg/m^3 between 0100 and 1400, indicating smoke trapped in the valley overnight. A spike at 1600 suggests a possible direct plume impact.
	Alternative Hypotheses:	No prescribed or crop residue burning occurred in Lemhi Co. (See Sec. 4)
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 17.8 to 27.9 µg/m^3 and we conclude that there would not have been concentrations above the Annual NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	DEQ issued air quality forecast notifying public of possible wildfire smoke impacts.

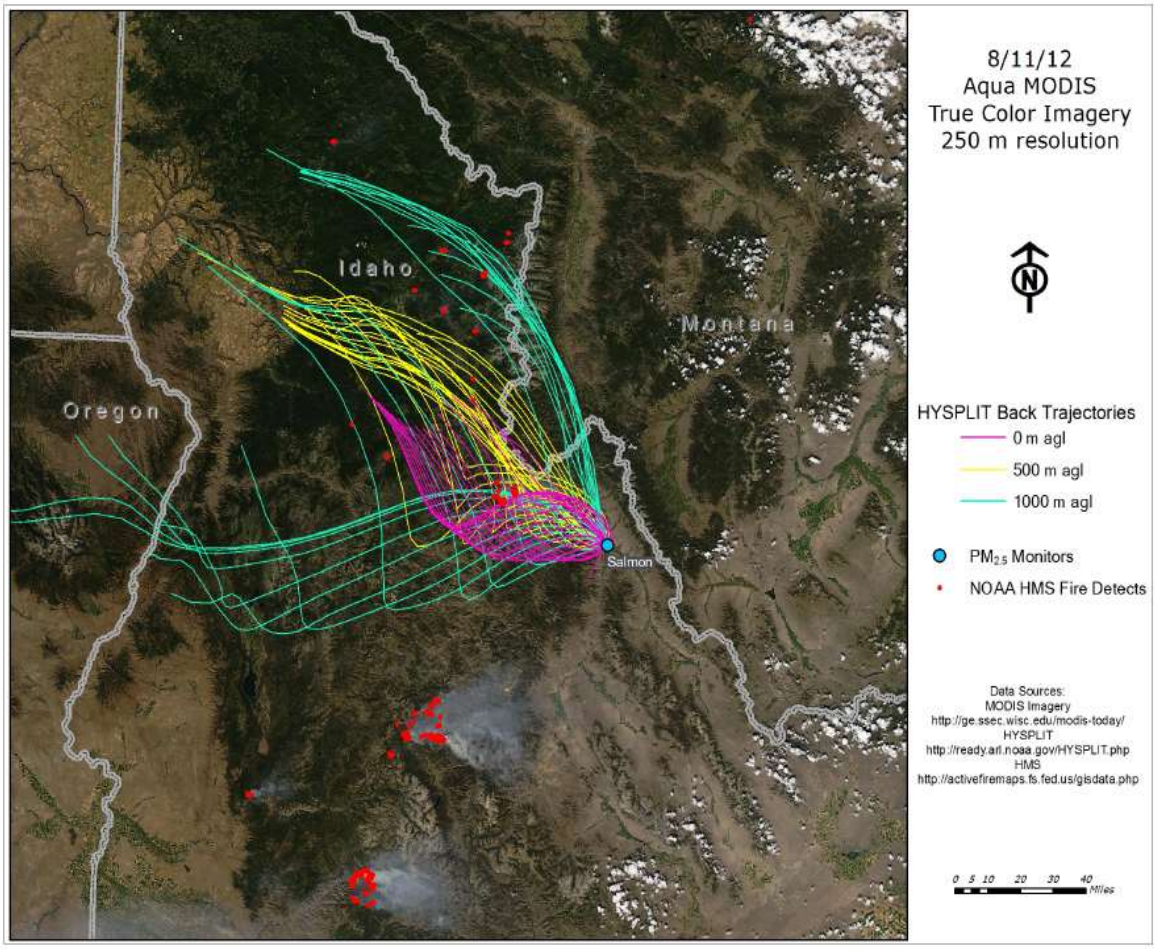


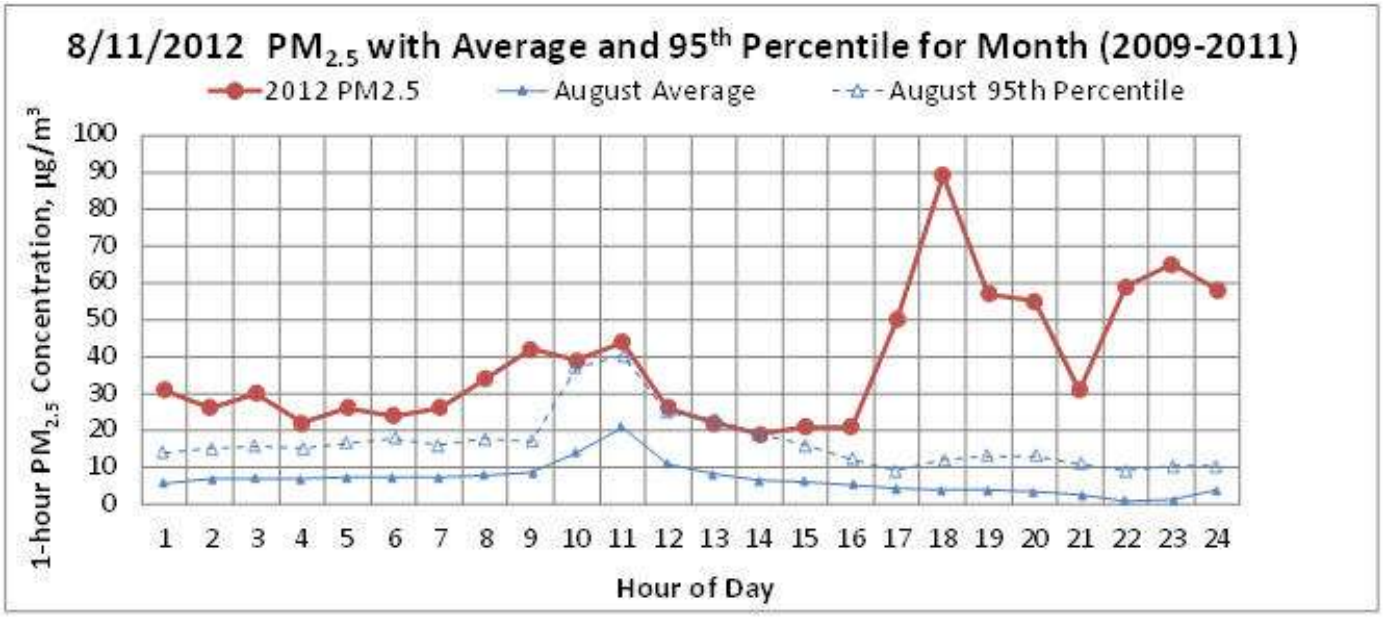

8/10/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
August Average
August 95th Percentile
1-hour PM2.5 Concentration, µg/m3
Hour of Day

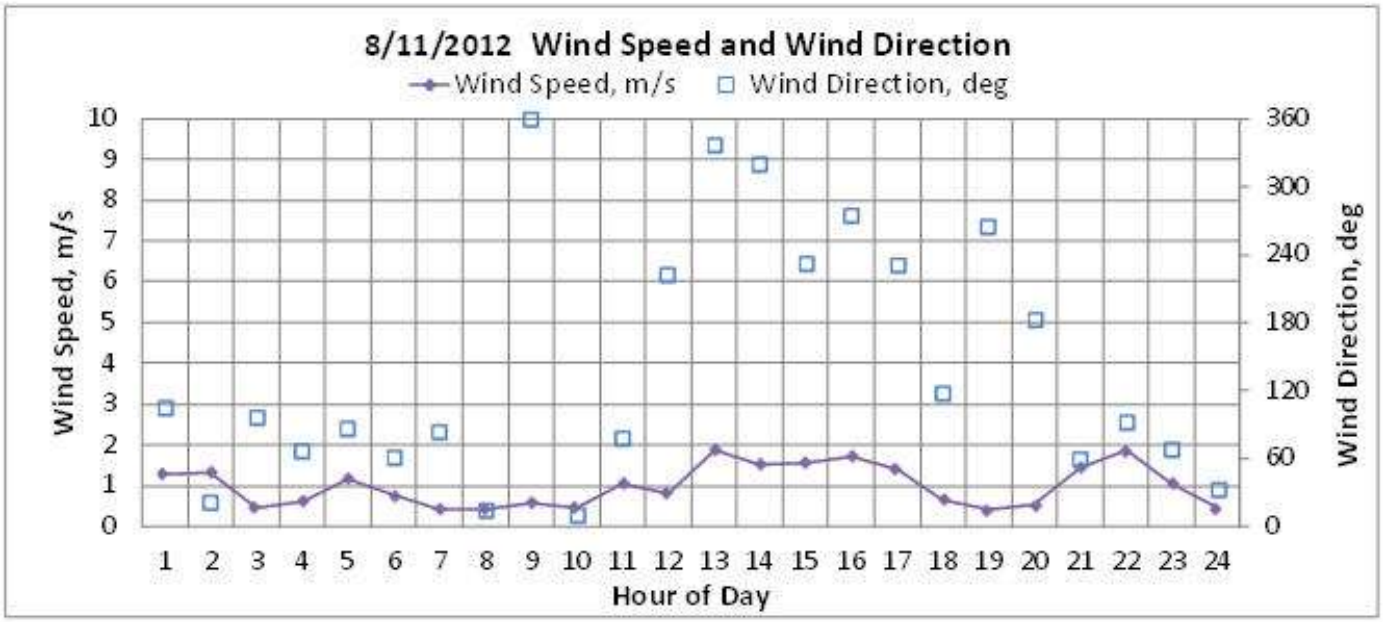

8/10/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Hour of Day

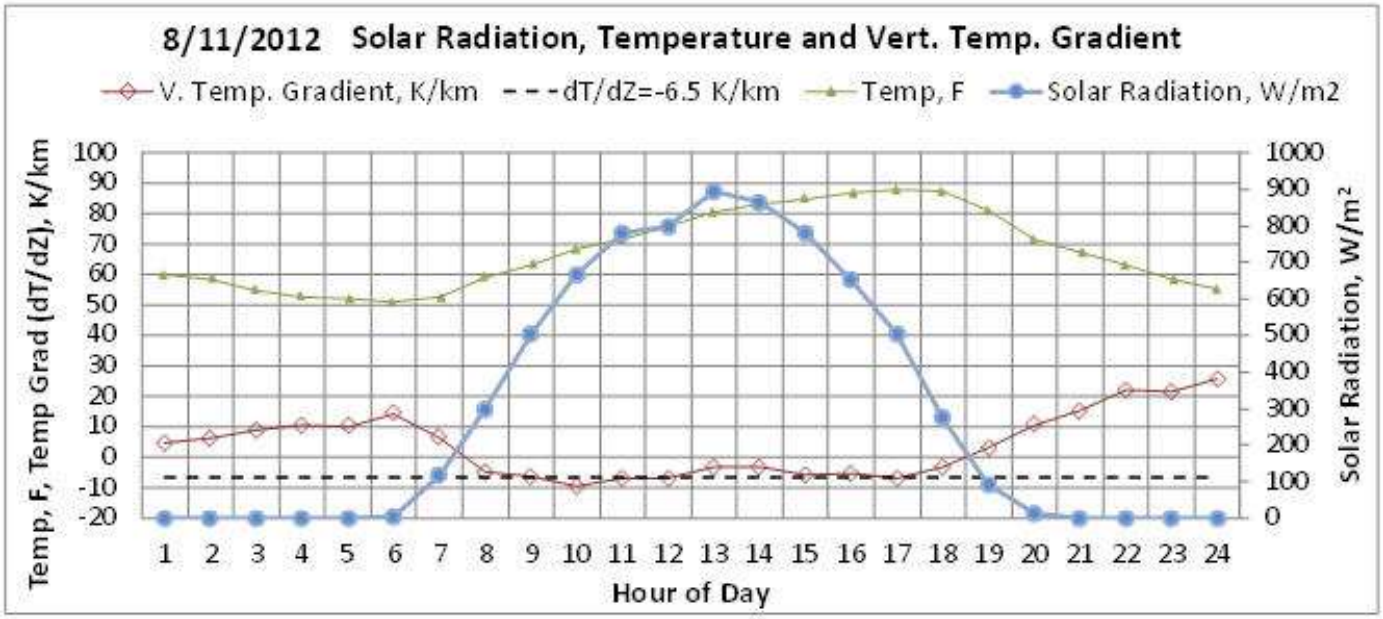

8/10/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m²
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 37.2 µg/m^3 on 8-11-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; 98th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, 2 (See Sec. 4)
	Weather Conditions:	Embedded shortwave decays long wave ridge over Idaho and provides NW-W flow aloft.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Afternoon satellite image shows visible smoke blowing east from Mustang, Halstead, Trinity, and Springs fires. Back trajectories intersect smoke and/or fire detects from Mustang and Powell SBW Complexes. Hourly trace shows sustained values above 20 µg/m^3 throughout the day and a sudden rise to 50 – 90 ug/m3 from 1700 - 1800. Values remain elevated at night.
	Alternative Hypotheses:	No prescribed or crop residue burning occurred in Lemhi Co. Temperature too warm for RWC. (See Sec. 4)
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 21.3 to 31.4 µg/m^3 and we conclude that there would not have been concentrations above the Annual NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	DEQ issued air quality forecast notifying public of possible wildfire smoke impacts.

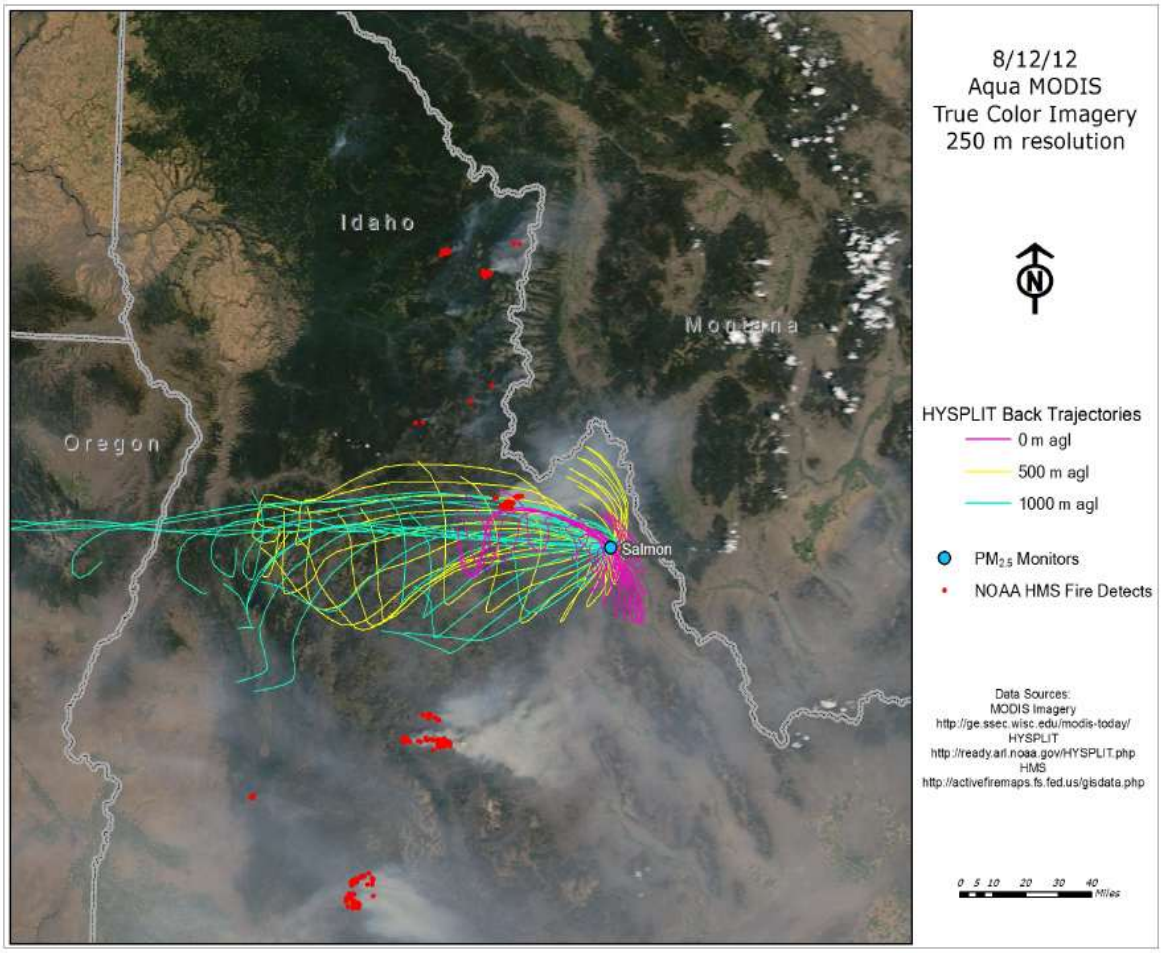


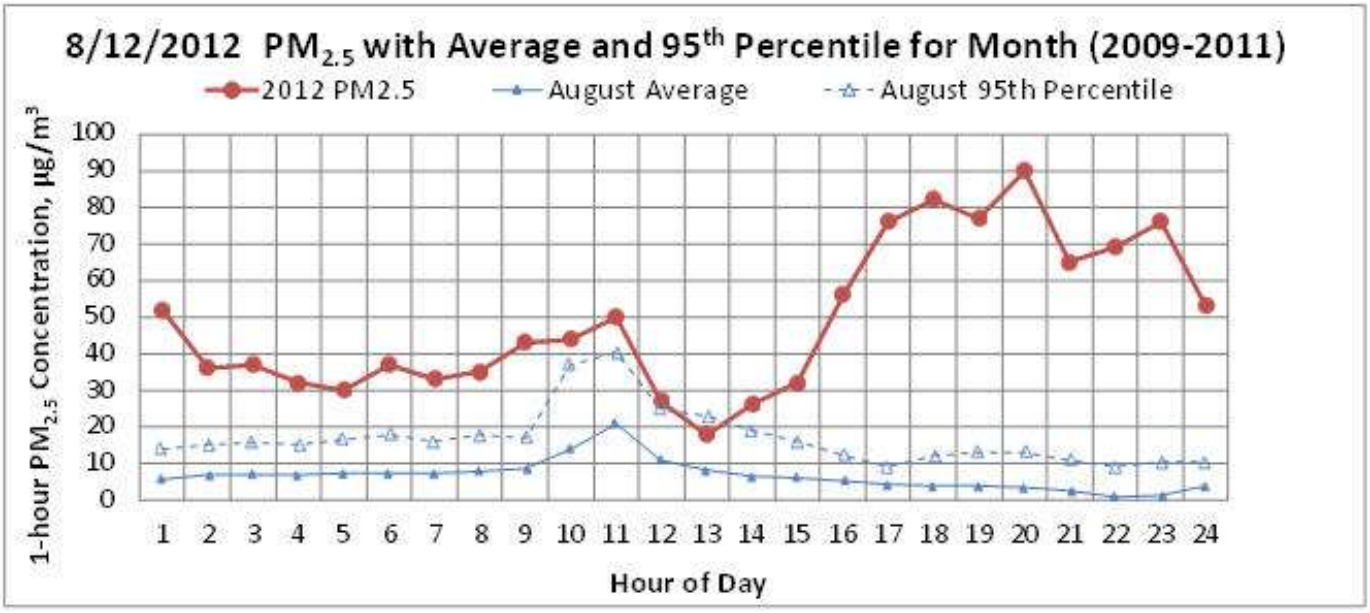

8/11/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
August Average
August 95th Percentile
1-hour PM2.5 Concentration, µg/m3
Hour of Day

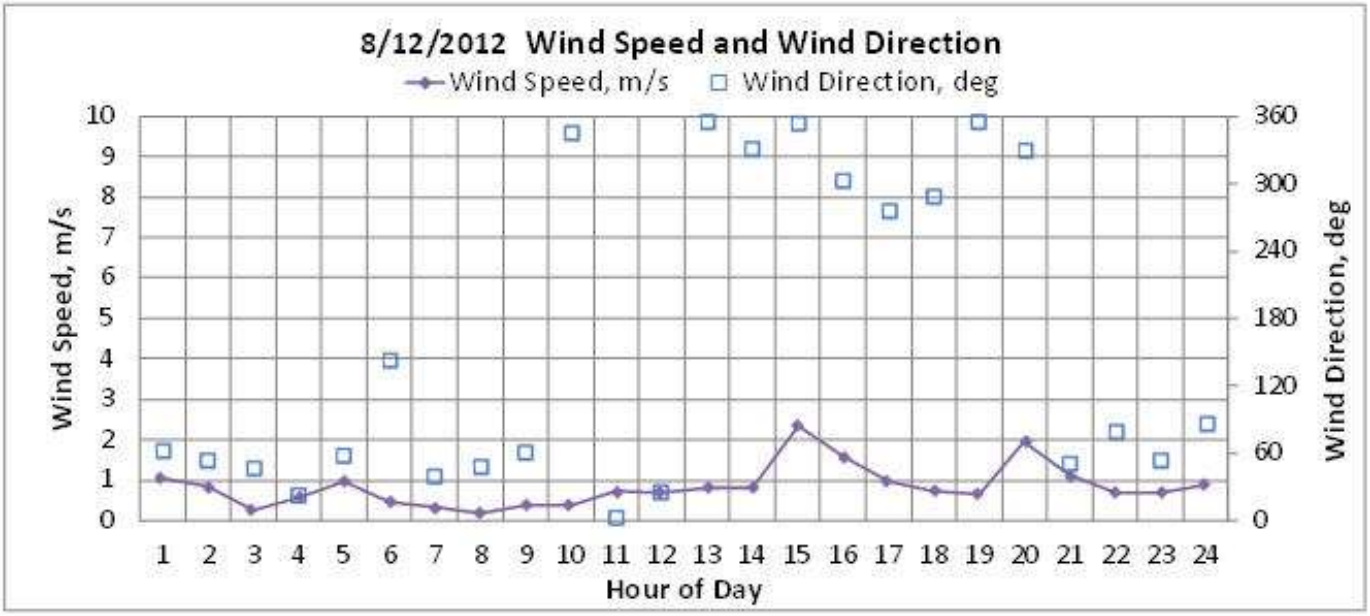

8/11/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Hour of Day

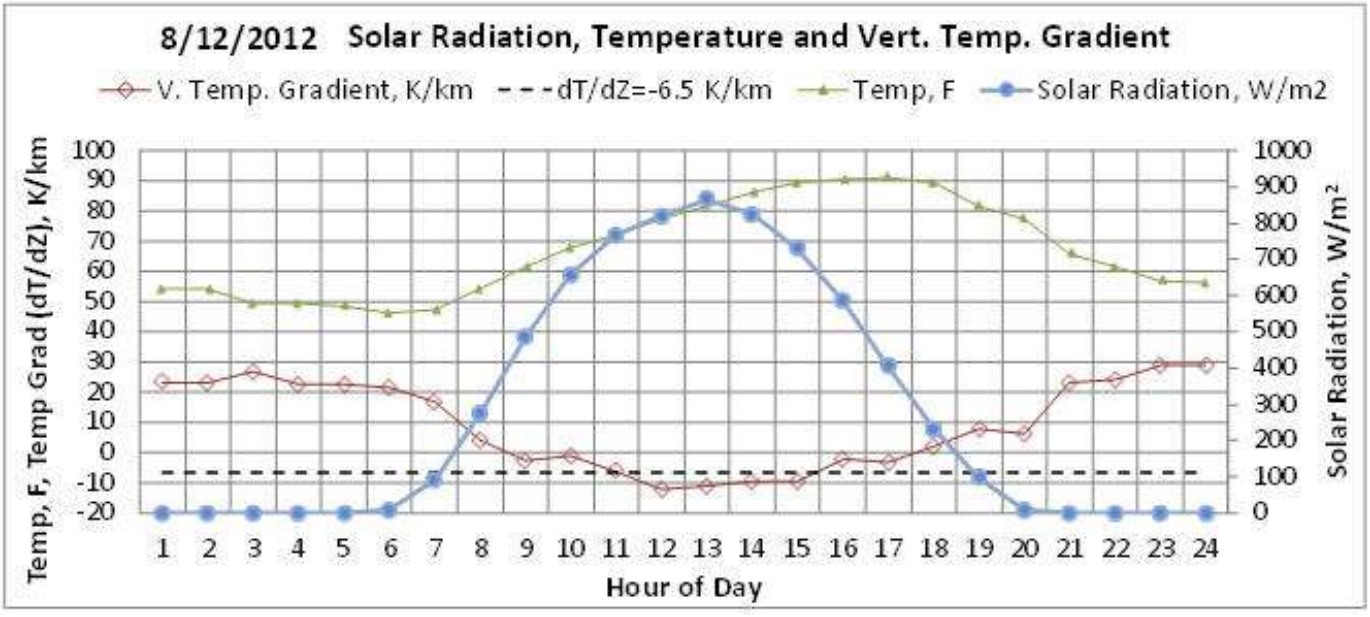

8/11/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m²
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 49.2 µg/m^3 on 8-12-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario1, 2, 3 (See Sec. 4)
	Weather Conditions:	Shortwave progresses east, amplification of ridge upstream as low off CA coast strengthens. Ridge axis located near Central Idaho, generating zonal flow.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Afternoon satellite image shows visible smoke throughout the region. Thick smoke plumes come from fires and thinner smoke occupies the Salmon and surrounding valleys. Back trajectories intersect smoke and/or fire detects from Mustang and Halstead fires. Surface trajectories indicate advection from the valleys to the south of Salmon, while the 500 m trajectories intersect smoke in the highlands to the north of Salmon. Hourly trace shows sustained elevated concentrations from early to late morning and a significant rise with winds from the NW and N 1500 – 1700 and stable conditions by 1600 trap the smoke so that values remain high overnight.
	Alternative Hypotheses:	No prescribed or crop residue burning occurred in Lemhi Co. Temperature too warm for RWC. (See Sec. 4)
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 33.3 to 43.4 µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	DEQ issued air quality forecast notifying public of possible wildfire smoke impacts.

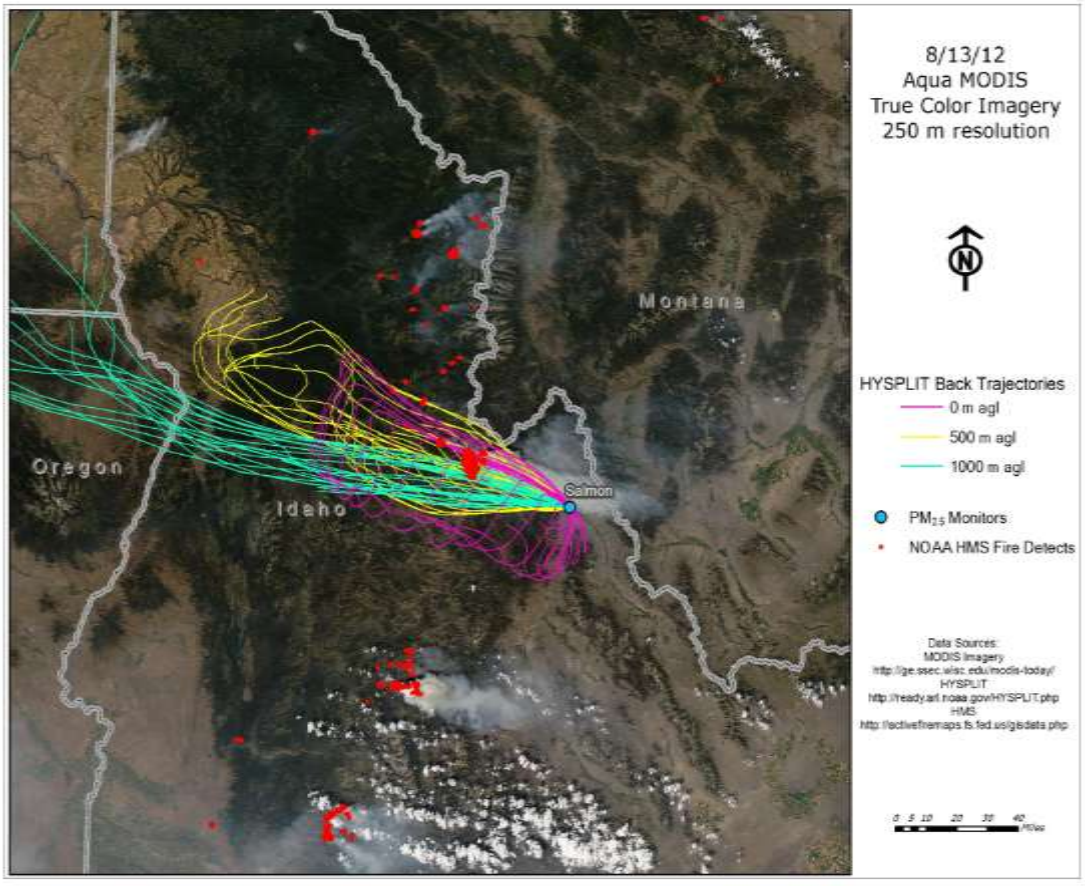


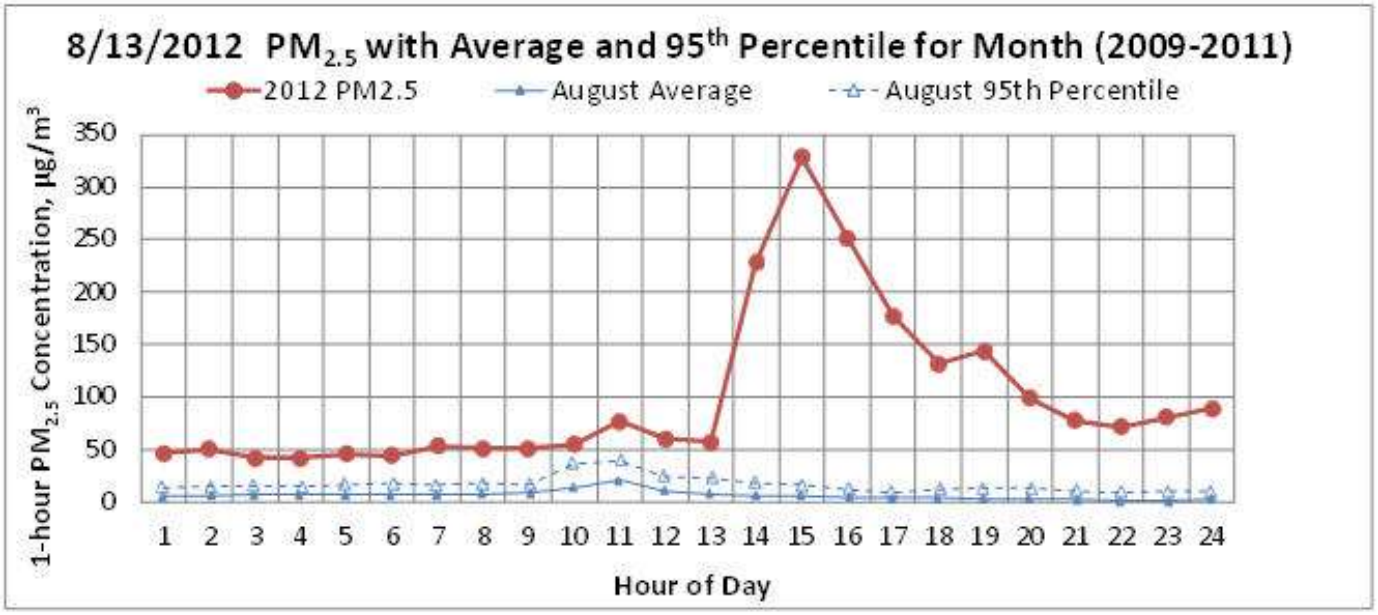

8/12/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
August Average
August 95th Percentile
1-hour PM2.5 Concentration, µg/m3
Hour of Day

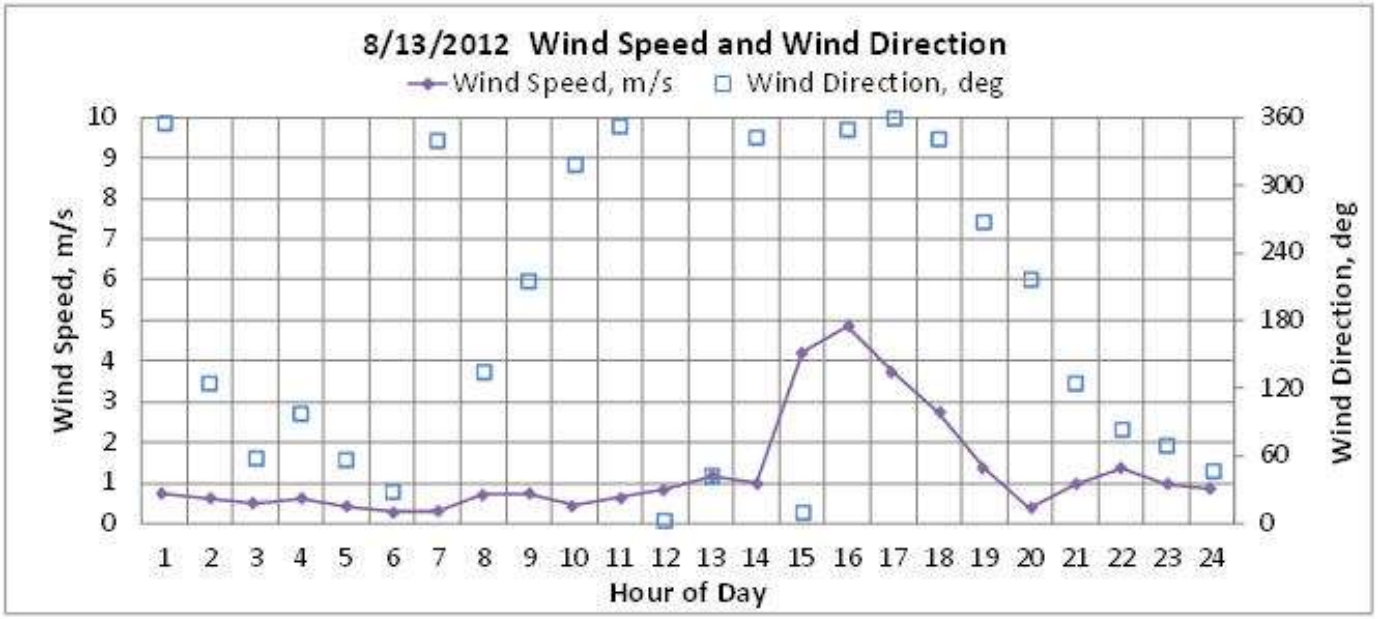

8/12/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Wind Speed, m/s
Wind Direction, deg
Hour of Day

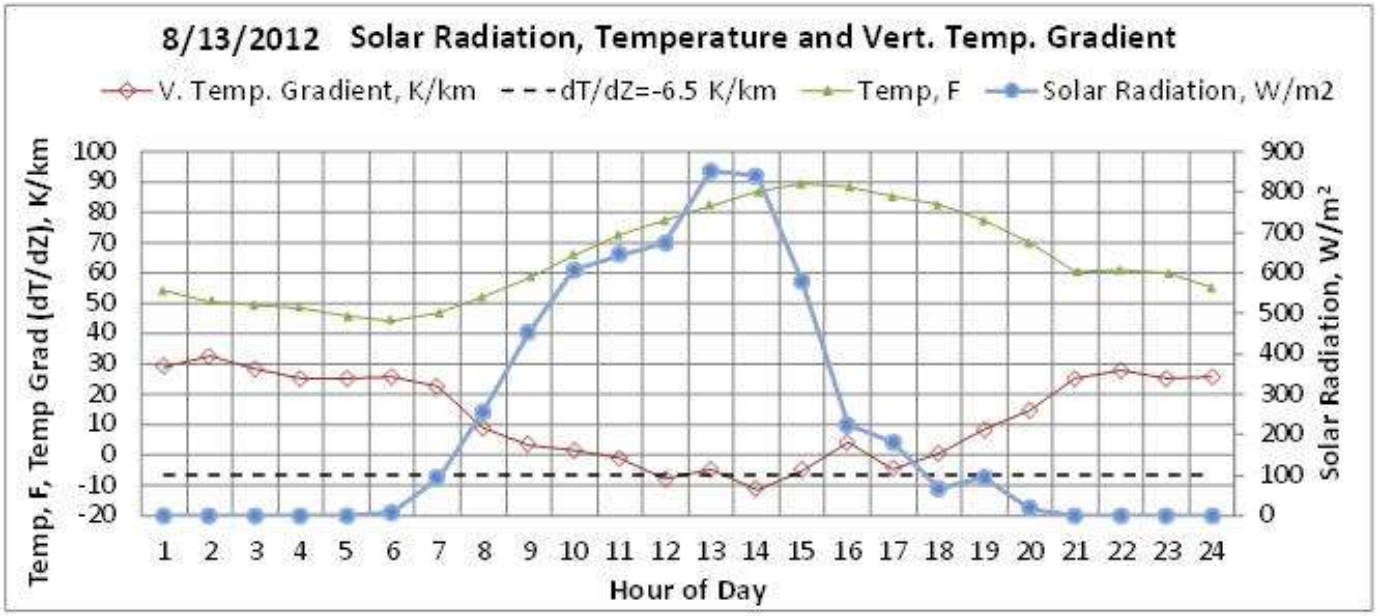

8/12/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m²
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 96.5 µg/m^3 on 8-13-2012, AQS #16-059-0004 POC 3		
Also included in this request, 24-hour FRM Value (filter based): 85 µg/m^3, AQS #16-059-0004 POC 1		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1 and 2 (See Sec. 4)
	Weather Conditions:	CA low progresses north and brings west-northwest flow over Idaho.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Afternoon satellite image shows the Mustang Complex plume directly intersecting the Salmon area and valley north of Salmon. Thick smoke occupies the mountains to the north of Salmon. Back trajectories intersect smoke and/or fire detects from the Mustang Complex. Hourly trace shows sustained elevated concentrations around 50 µg/m^3 from early morning to midday and a massive ~325 µg/m^3 spike starting at 1 pm (satellite photo taken at 1:30 pm local time). Values remain high at night. Wind speed rises in concert with spike in concentrations and valley floor wind directions are northerly and northwesterly carrying trapped smoke into Salmon all afternoon.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 80.6 to 90.7 µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

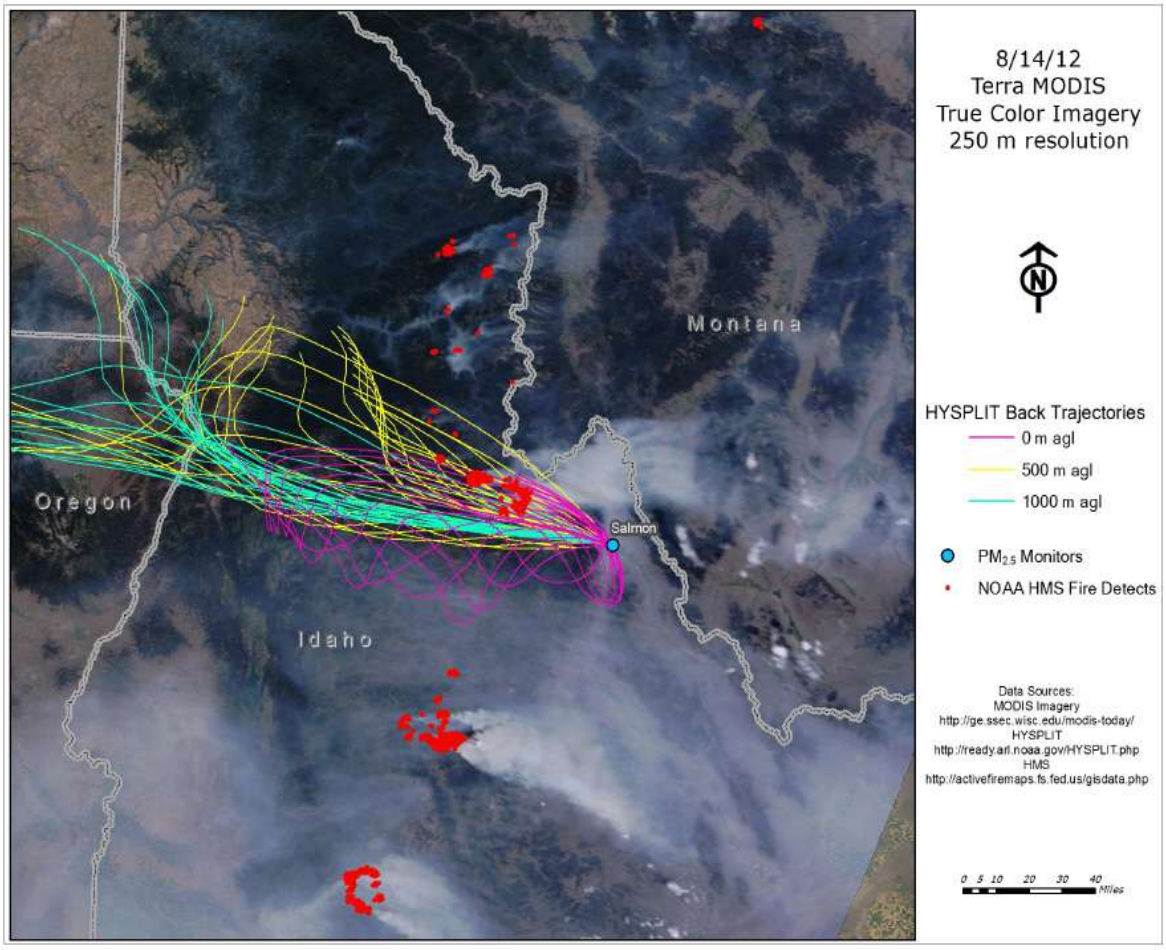


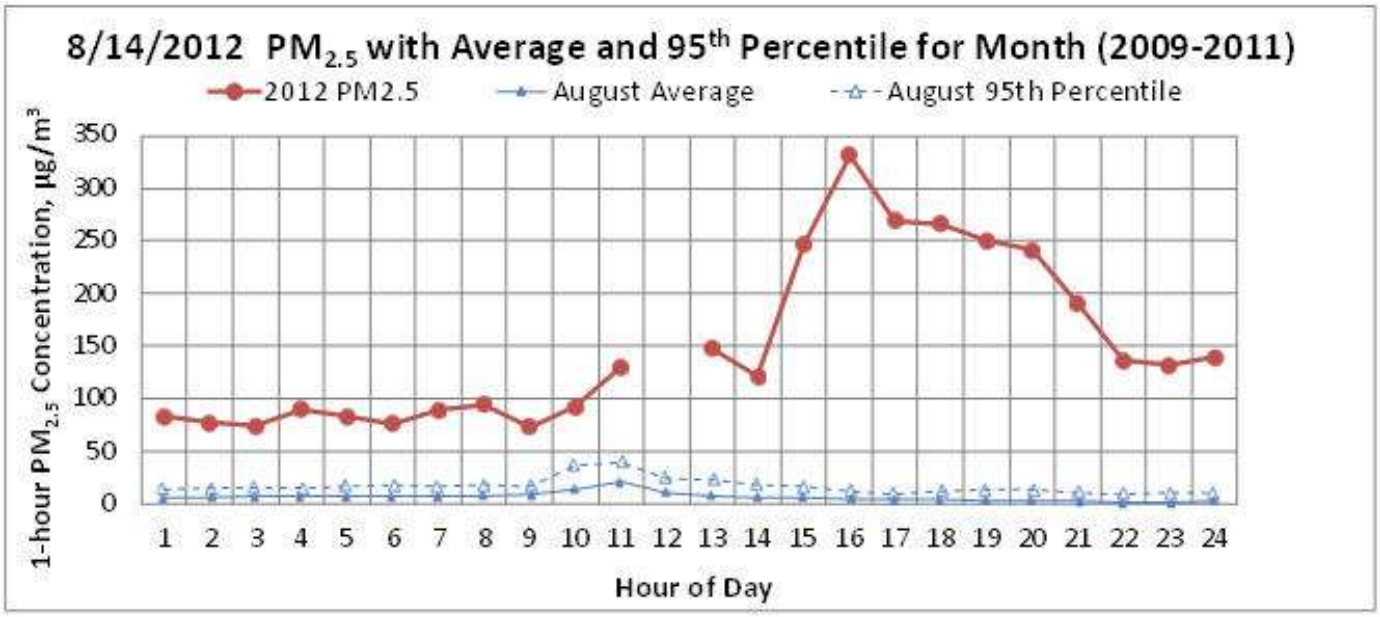

8/13/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
August Average
August 95th Percentile
1-hour PM2.5 Concentration, µg/m3
Hour of Day

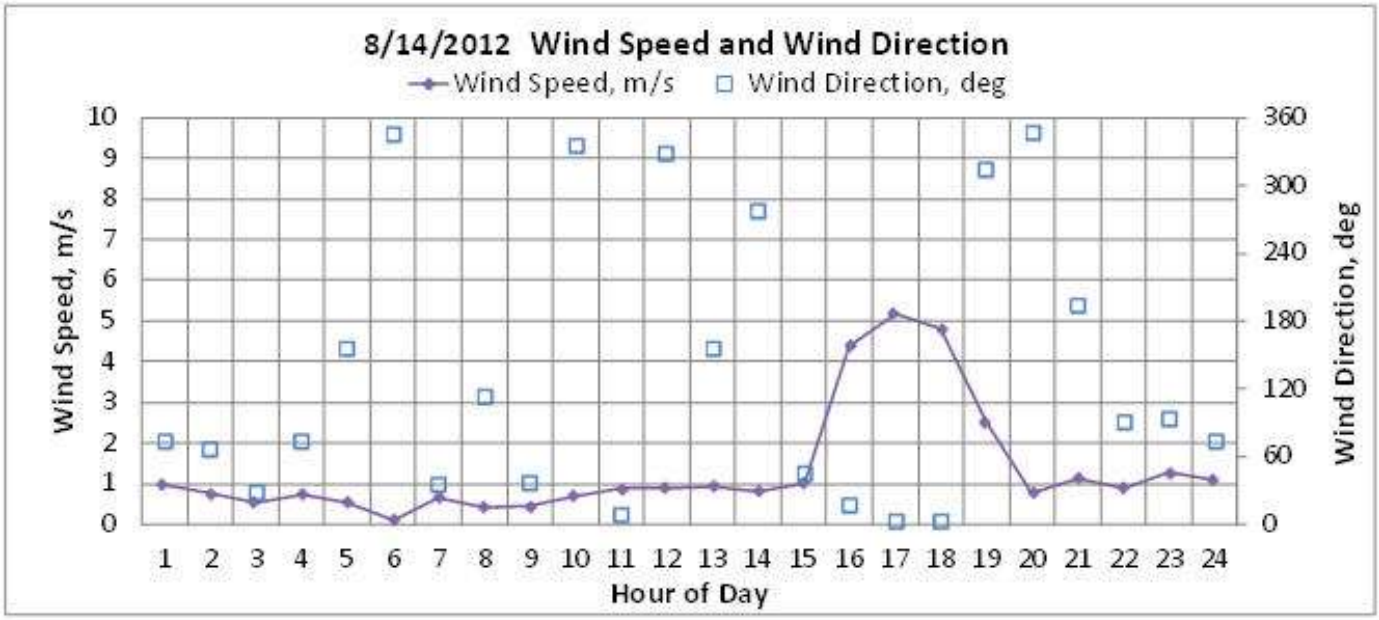

8/13/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Hour of Day

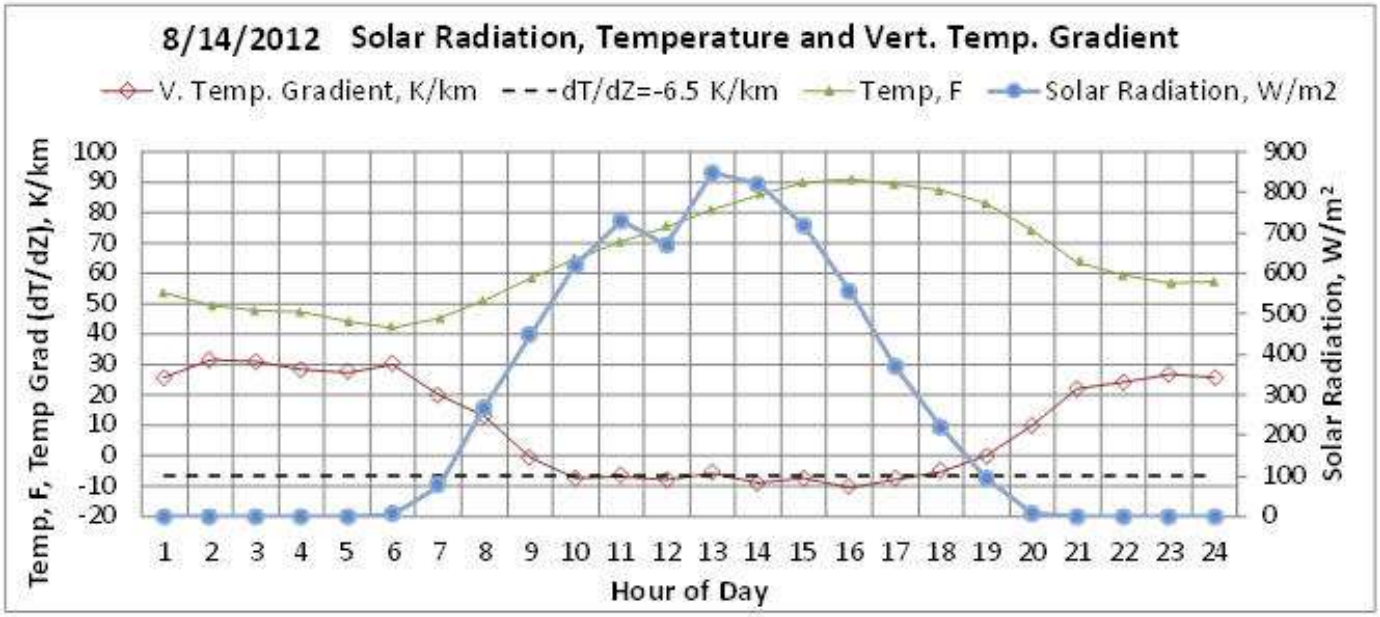

8/13/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m²
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 147 µg/m^3 on 8-14-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, 2, 3 (See Sec. 4)
	Weather Conditions:	Slight weakening of ridge provides zonal flow across Idaho.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Afternoon satellite image shows thick smoke north and south of Salmon and throughout southern Idaho. Smoke is visible in Salmon. Back trajectories intersect smoke and/or fire detects from the Mustang Complex. Hourly trace is similar to previous day, showing sustained elevated concentrations from early morning to midday and a massive spike in the afternoon. Values remain high at night. Wind speed rises in concert with spike to ~340 µg/m^3. Wind directions are northerly, indicating smoke in the valley flow from the heavily impacted valley to the north.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 131.1 to 141.2 µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

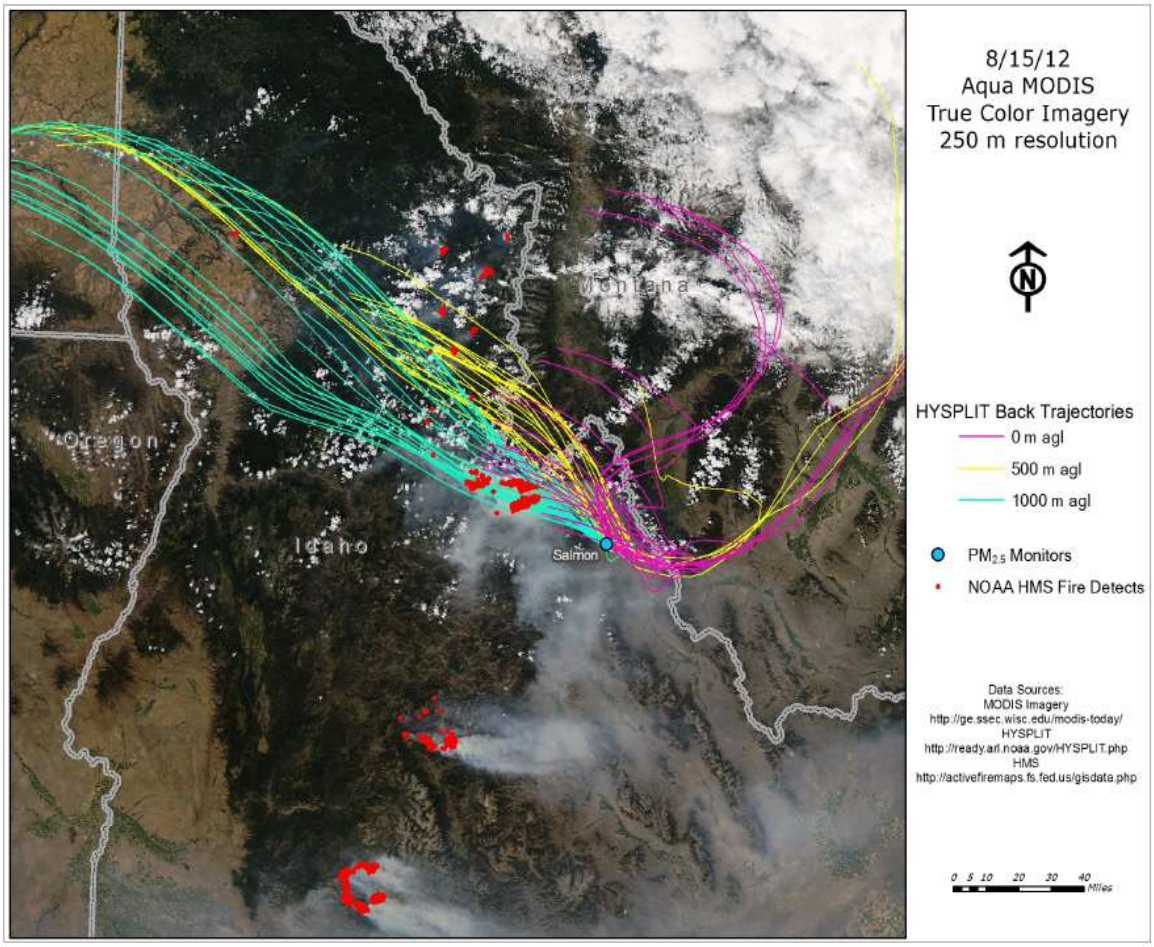


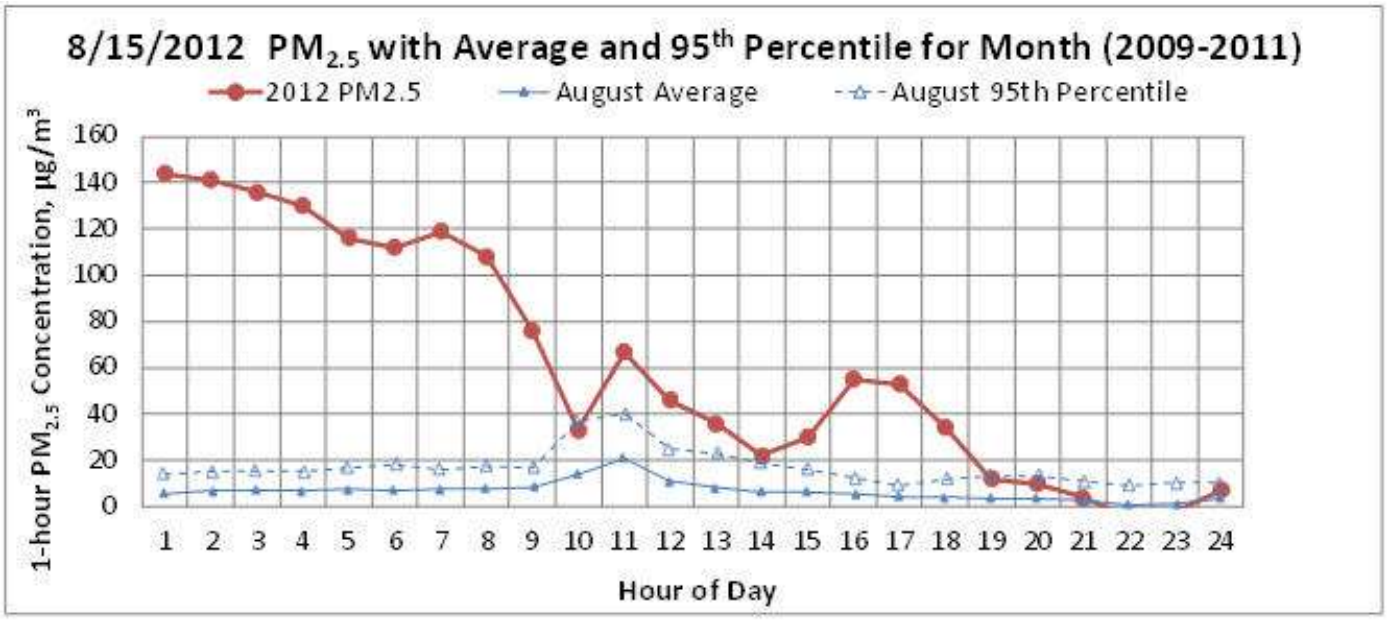

8/14/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
August Average
August 95th Percentile
1-hour PM2.5 Concentration, µg/m3
Hour of Day

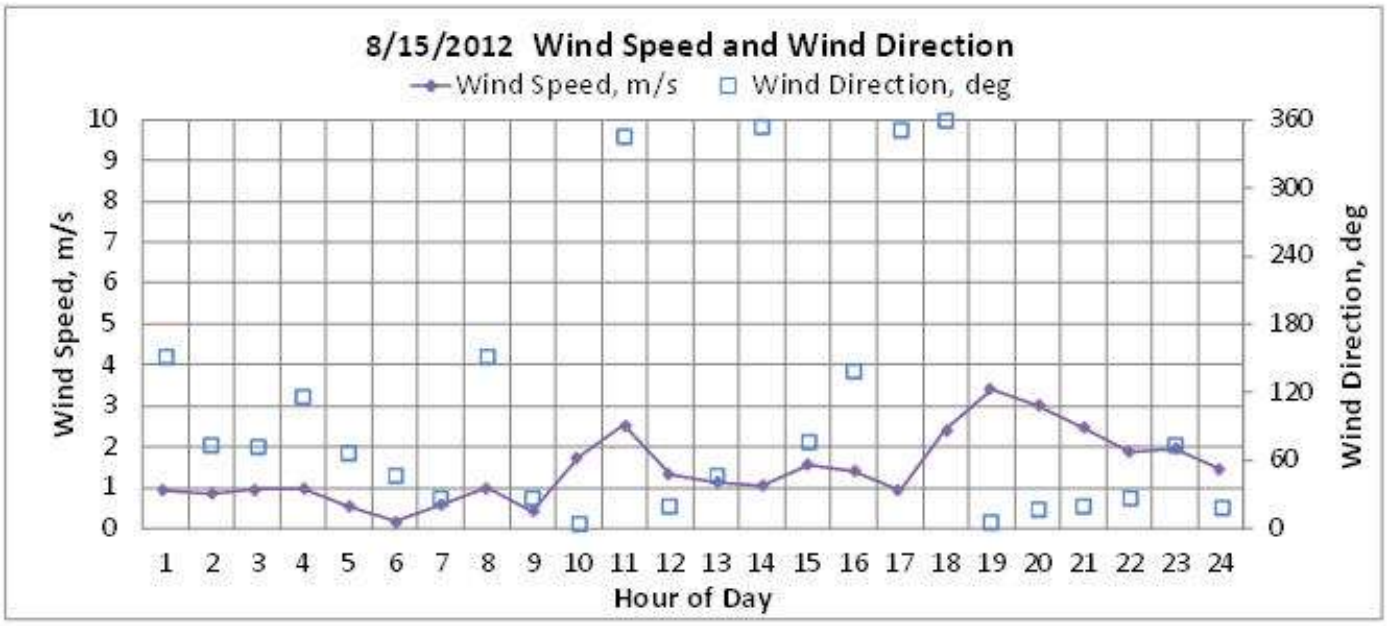

8/14/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Hour of Day

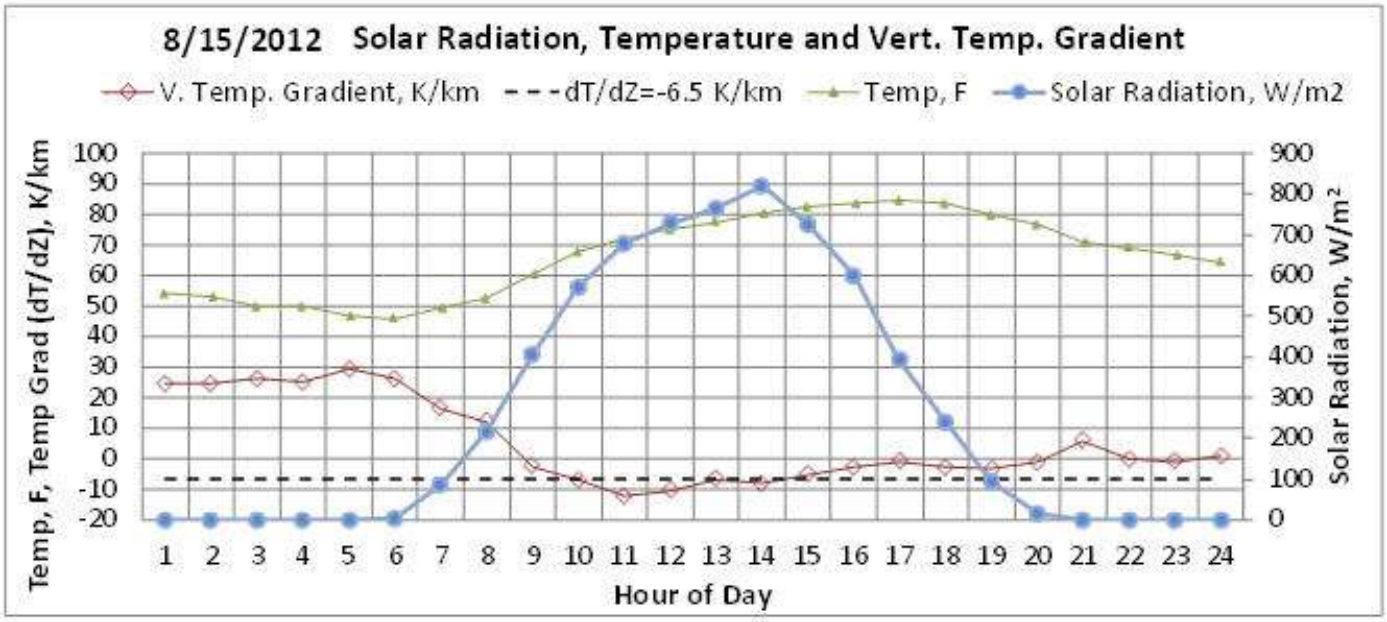

8/14/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m²
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 67.3 µg/m^3 on 8-15-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, 2, 3 (See Sec. 4)
	Weather Conditions:	Weak Rex block develops offshore with minimal confluence over Idaho while ridge provides greater influence and northwest flow.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Afternoon satellite image shows thick smoke in Salmon and surrounding valleys. Back trajectories intersect smoke and/or fire detects from the Mustang and Powell SBW Complexes. Hourly trace shows very high $PM_{2.5}$ in the early morning, trapped by stable air, from the previous day, declining throughout the day, interrupted by two spikes at 1100 and 1600 - 1700.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 51.4 to 61.5 µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and App D	Notification of Stage 1 AQA advises residents of protective actions.

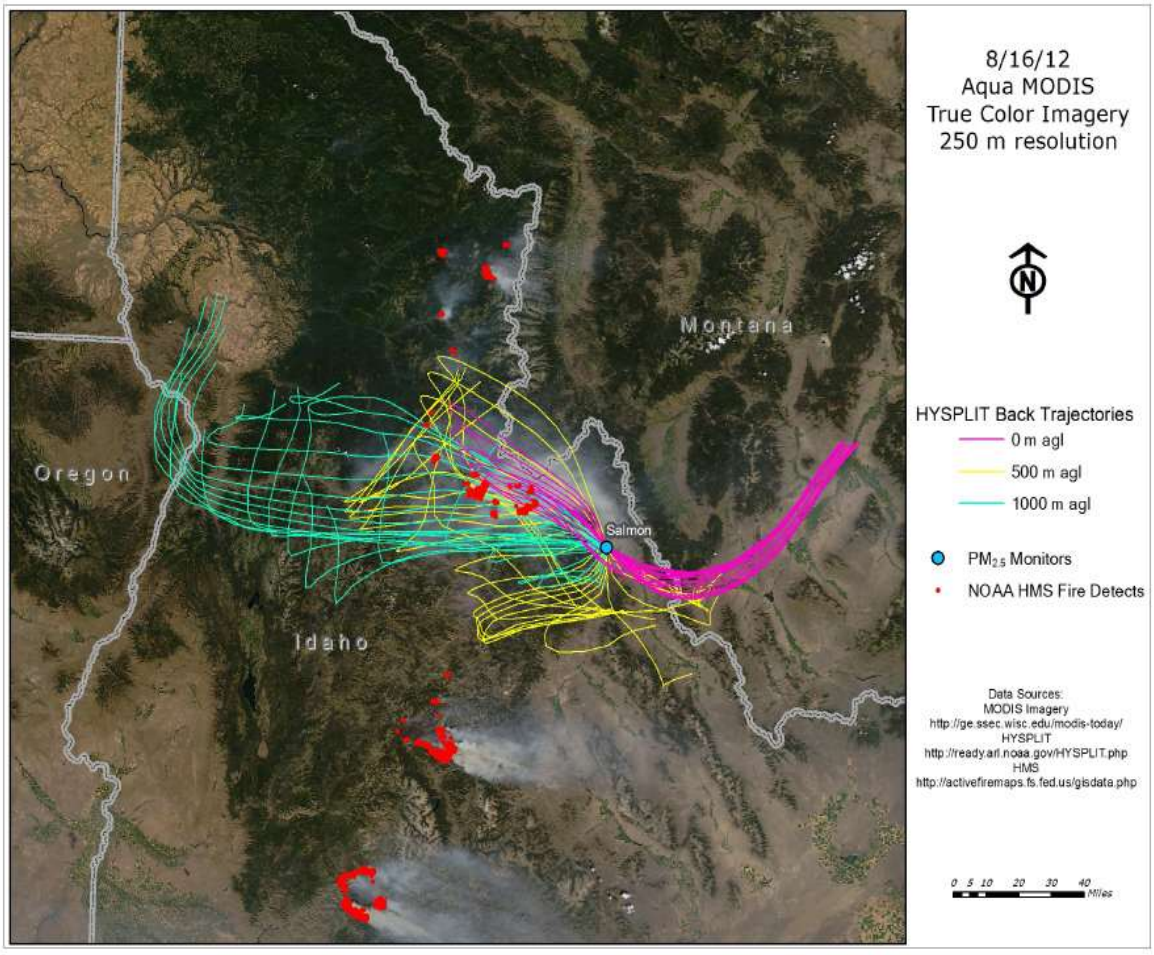


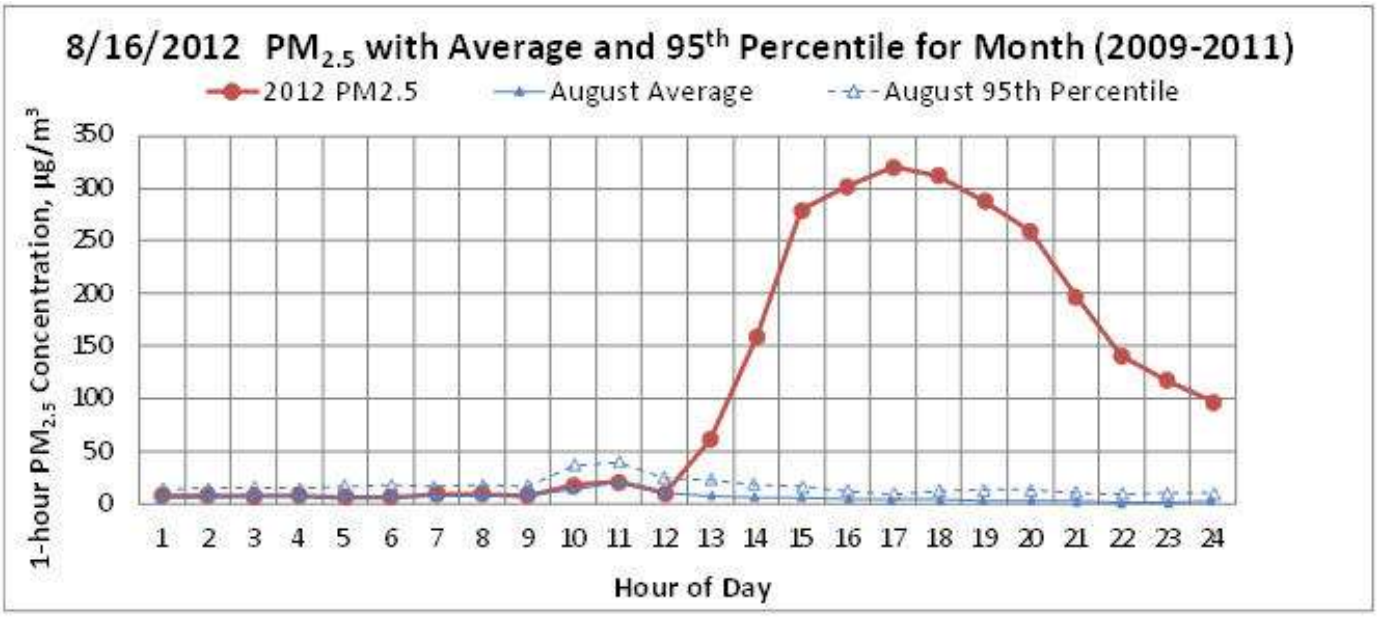

8/15/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
August Average
August 95th Percentile
1-hour PM2.5 Concentration, µg/m3
Hour of Day

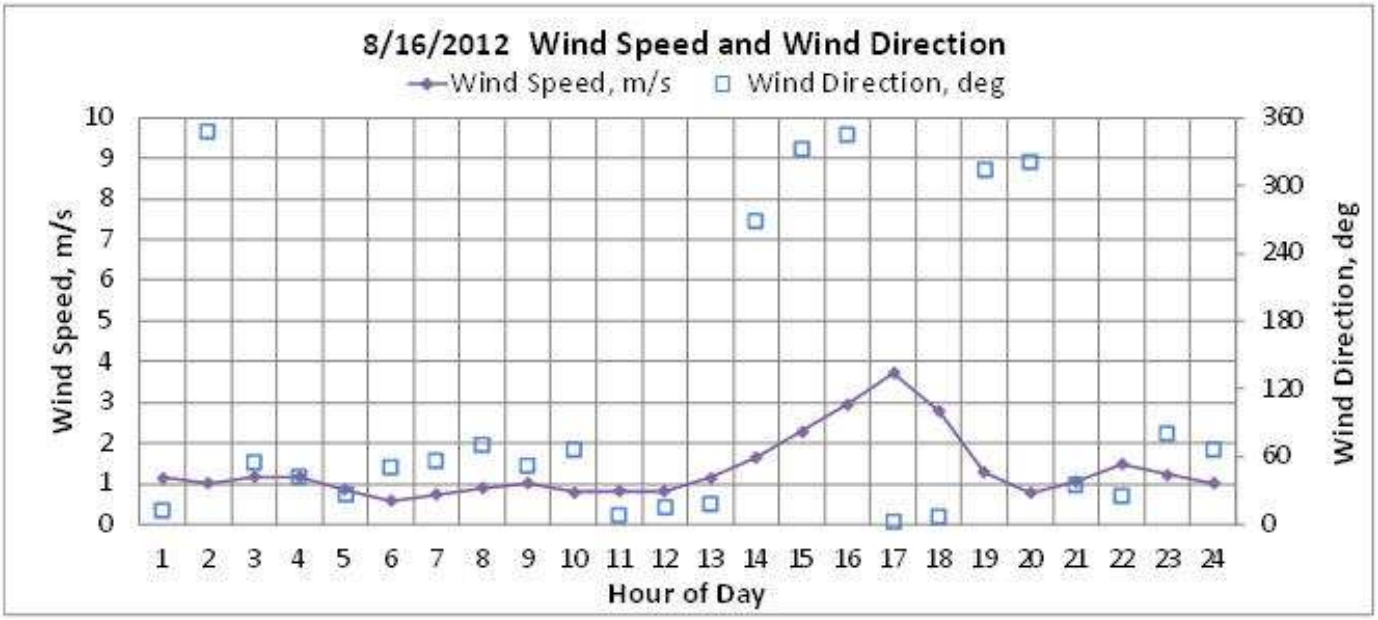

8/15/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Hour of Day

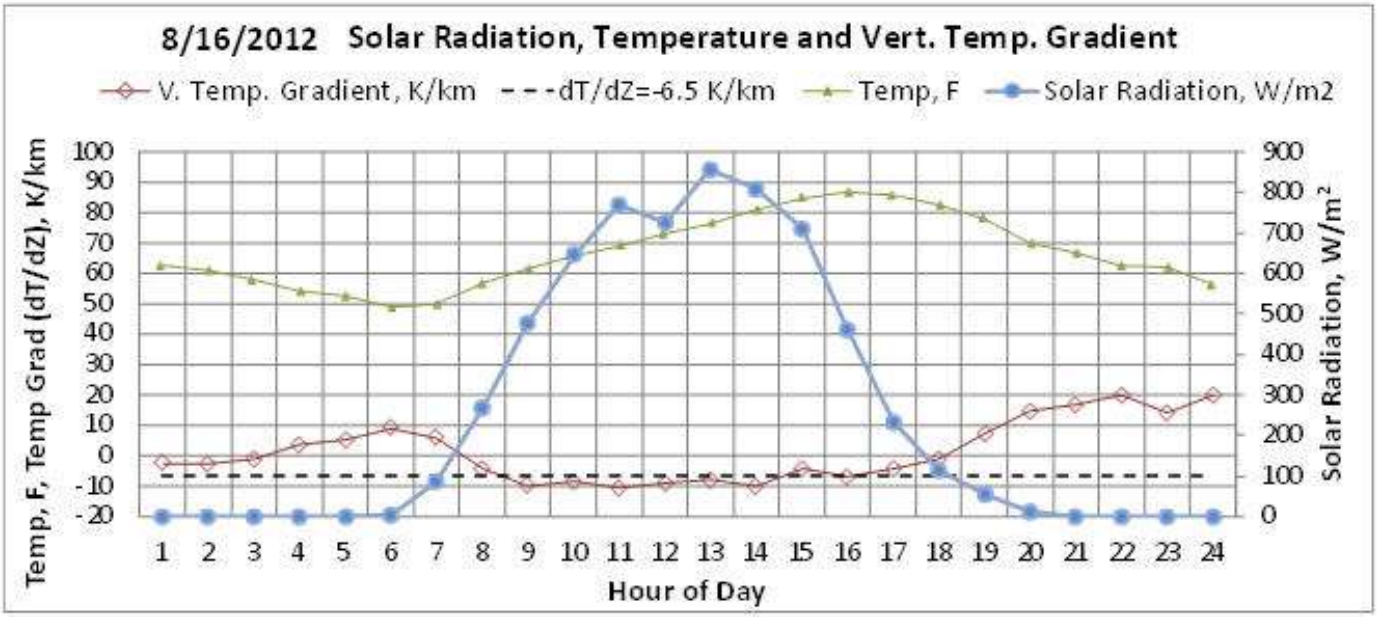

8/15/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m²
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 106.5 µg/m^3 on 8-16-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, 2 (See Sec. 4)
	Weather Conditions:	Low offshore low forces ridge to amplify and generate weak northwest winds over Idaho.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Afternoon satellite image shows heavy smoke plumes from Mustang and Halstead blowing southeast. Back trajectories intersect smoke and/or fire detects from the Mustang and Powell SBW Complexes. Hourly trace shows Salmon inundated with smoke after noon, when the wind switches to a northwesterly flow. Concentrations each 300 µg/m^3 and remain above 100 µg/m^3 for the rest of the day.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 90.6 to 100.7µg/m^3. We conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

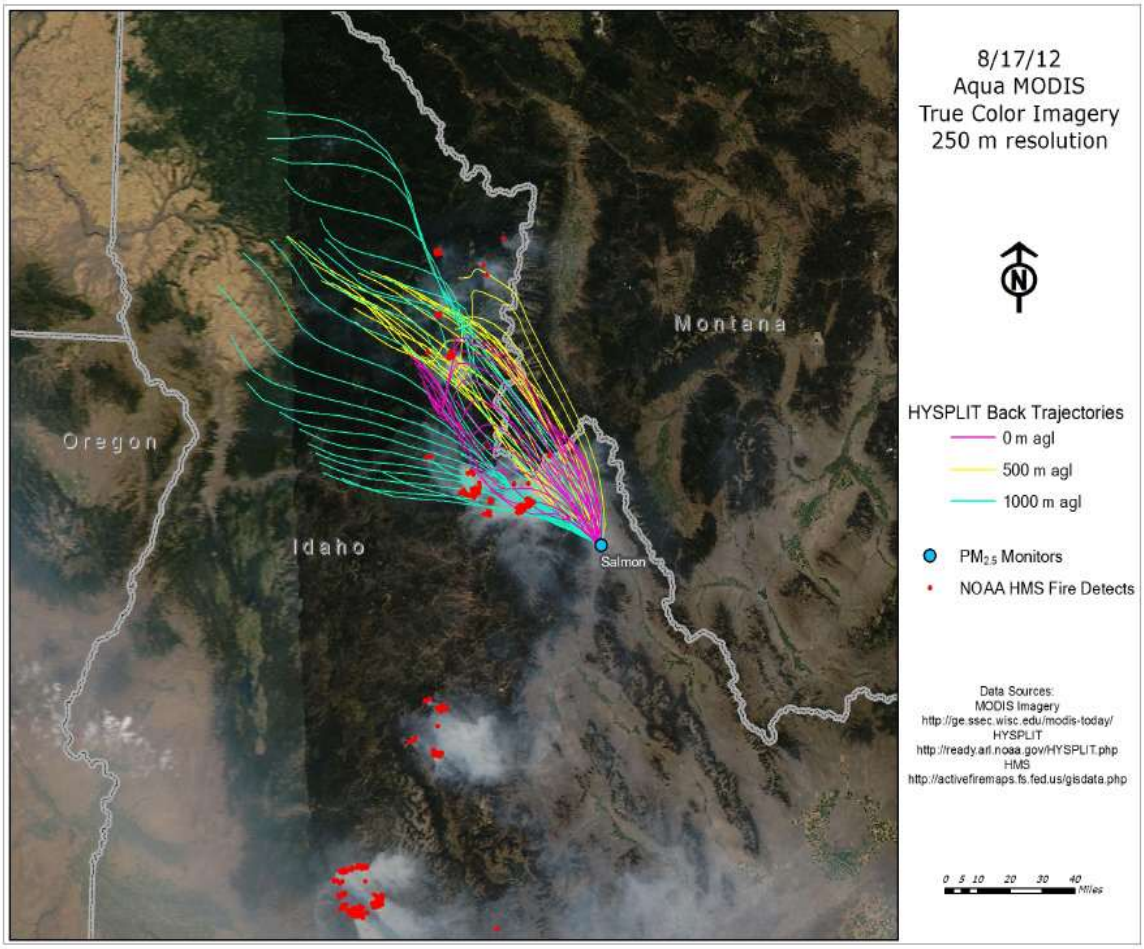


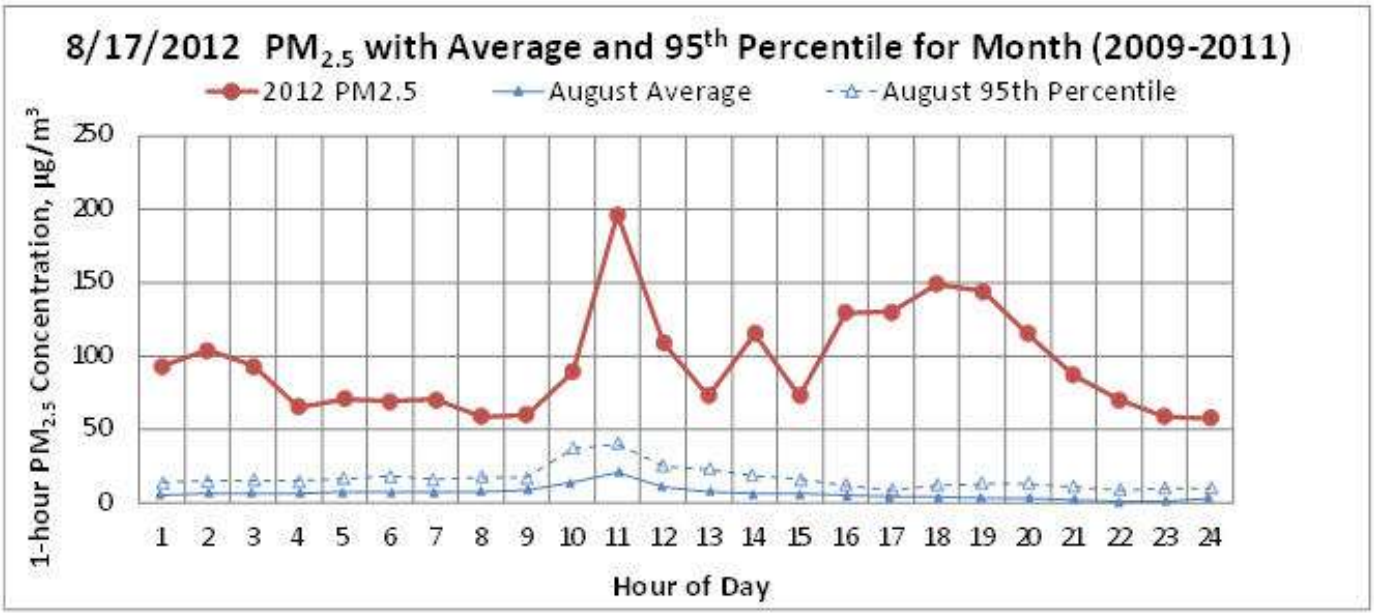

8/16/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
August Average
August 95th Percentile
1-hour PM2.5 Concentration, µg/m3
Hour of Day

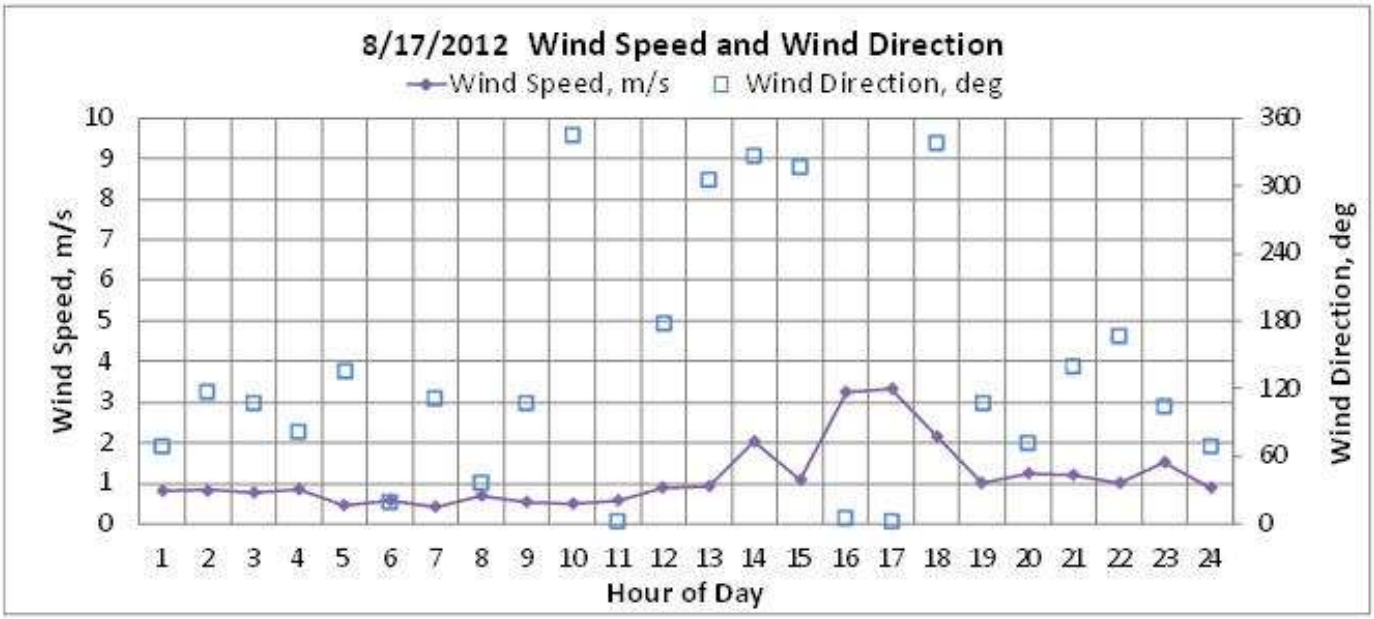

8/16/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Hour of Day

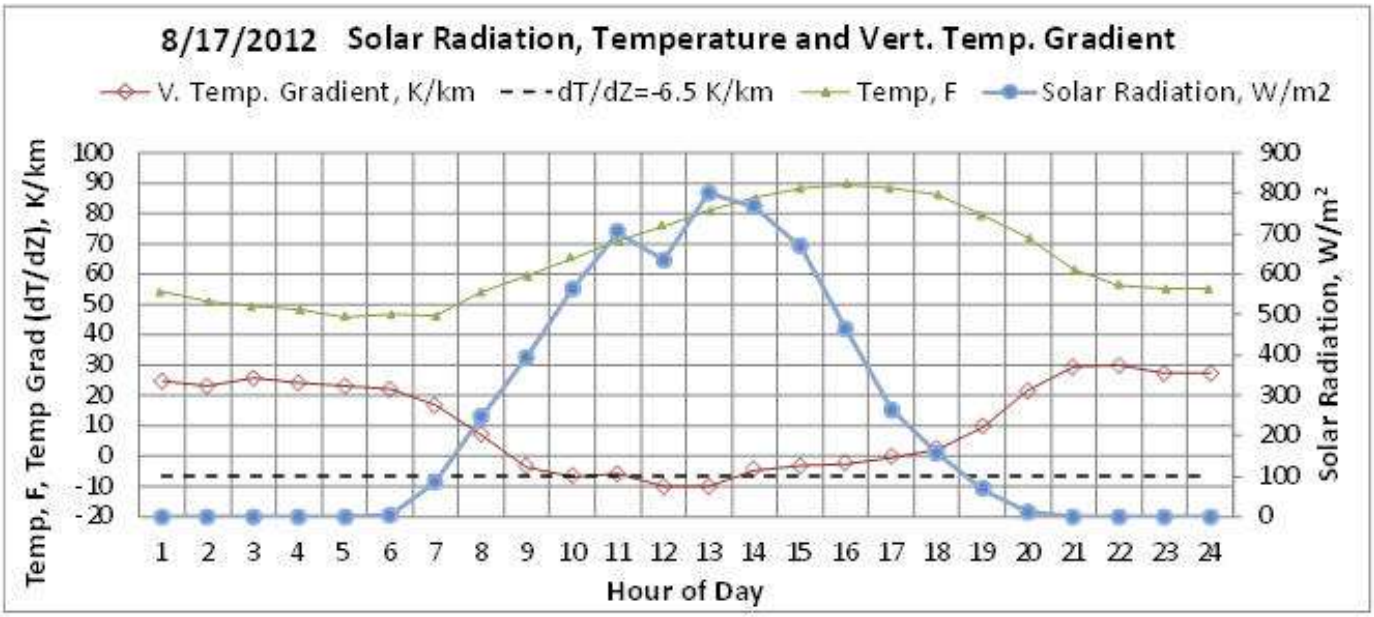

8/16/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m2
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 96.6 µg/m^3 on 8-17-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, 2 (See Sec. 4)
	Weather Conditions:	High develops over S. NV with ridge axes located along the Canadian Rockies and Cascade Crest, which generates NW flow over Idaho.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Afternoon satellite image shows visible smoke emanating from all local fires and present in the valley north and south of Salmon. Back trajectories intersect smoke and/or fire detects from the Mustang and Powell SBW Complexes. Hourly trace shows sustained high values at night (am and pm) and a spike ~200 µg/m^3 at 1100 and a broader peak ~150 µg/m^3 1800 - 1900 both beginning with winds from the north. Concentrations remain above 50 µg/m^3 for the 24-hour period.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 80.7 to 90.8µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

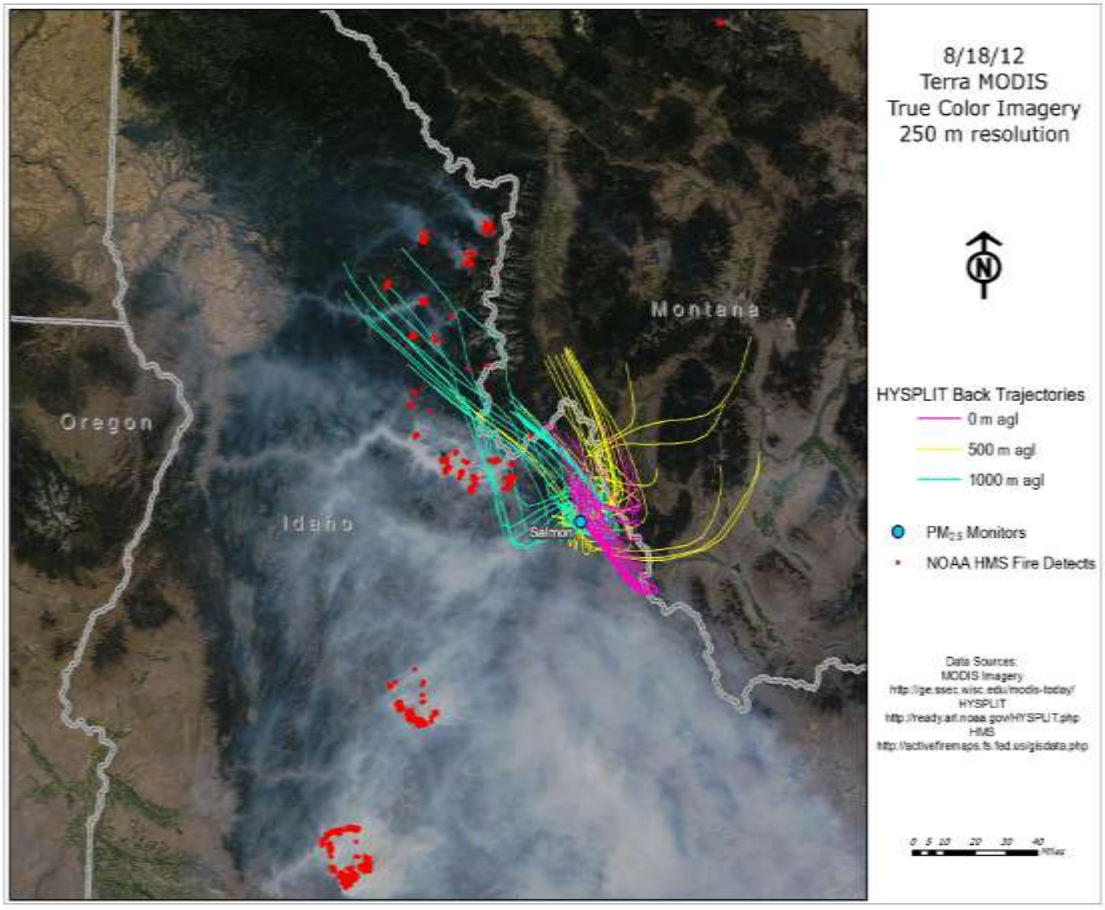


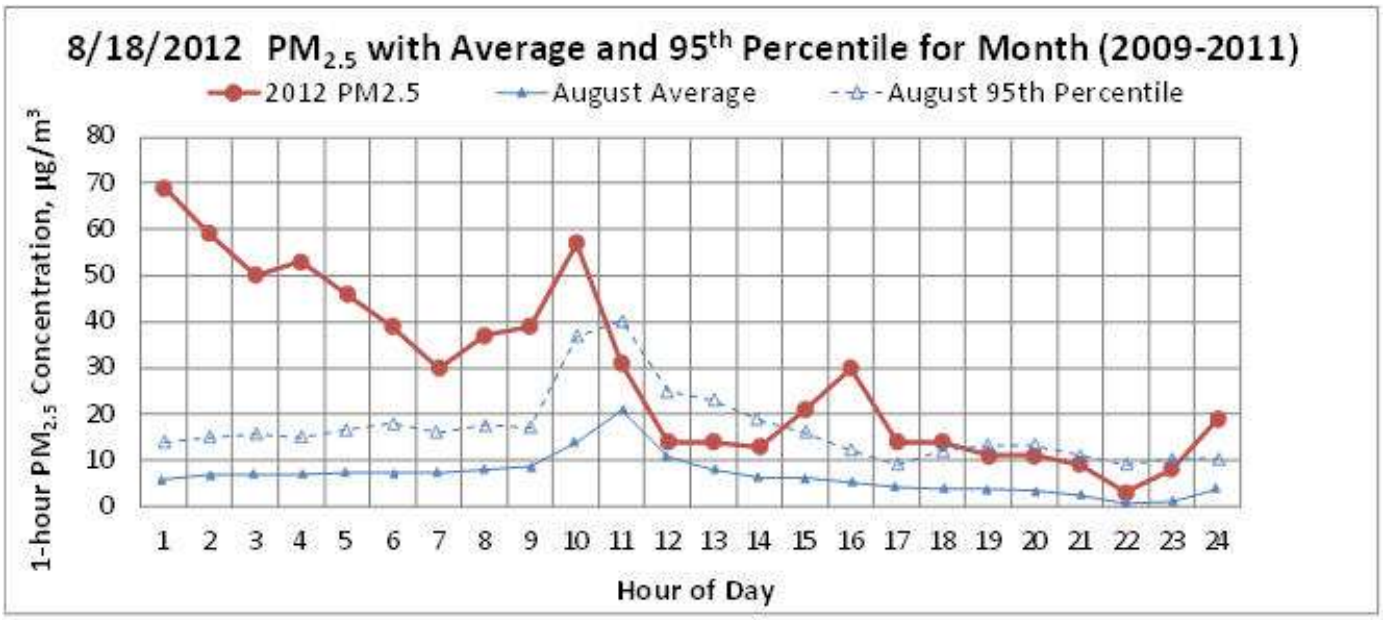

8/17/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
August Average
August 95th Percentile
1-hour PM2.5 Concentration, µg/m3
Hour of Day

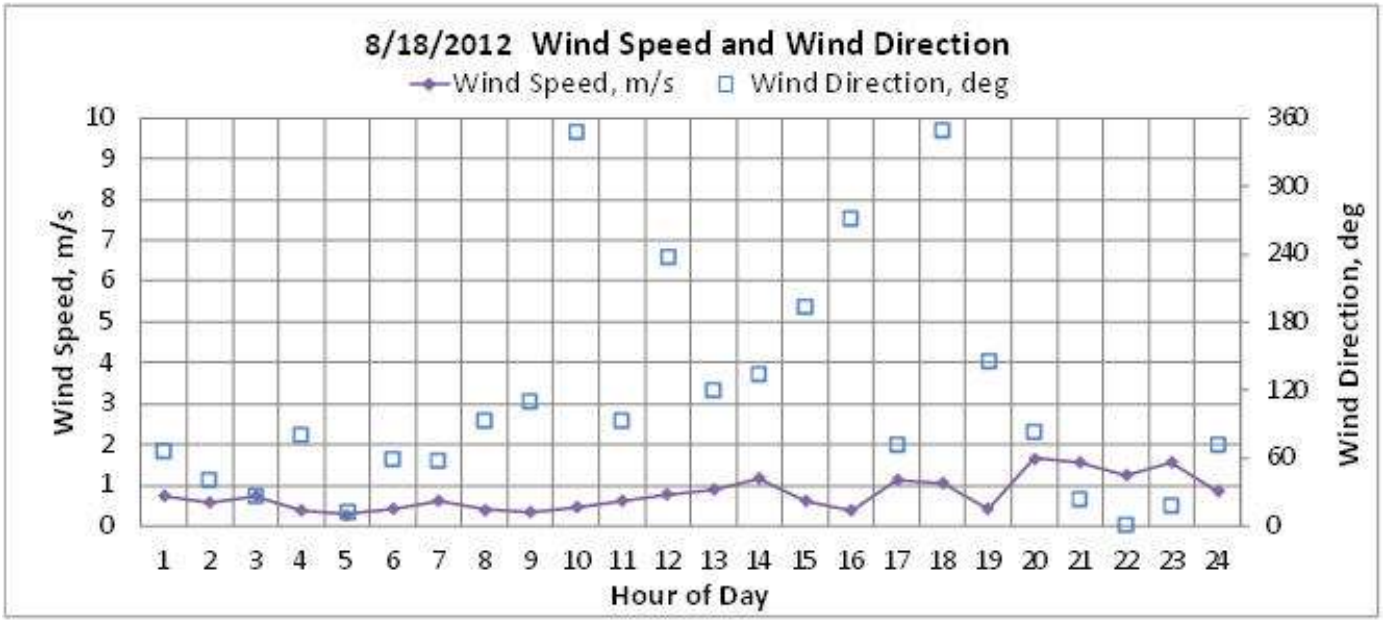

8/17/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Hour of Day

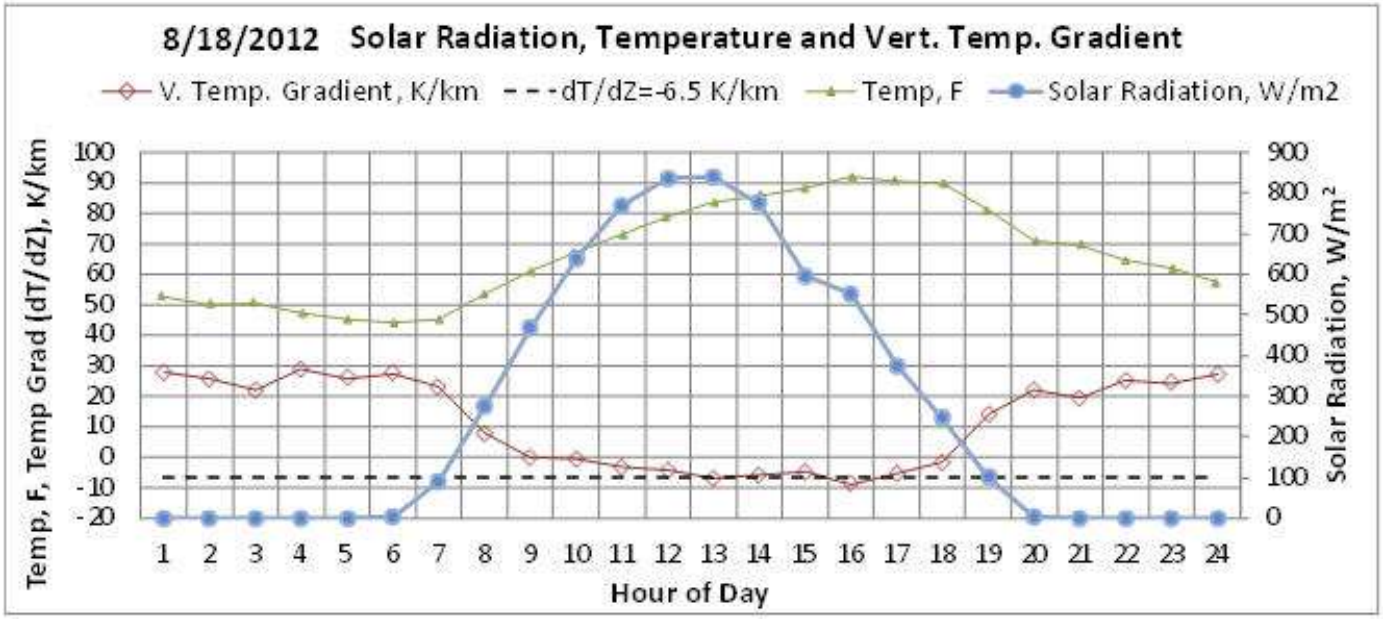

8/17/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m²
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 30.4 µg/m^3 on 8-18-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; 95th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, 2, 3 (See Sec. 4)
	Weather Conditions:	High strengthens and extends north to the Idaho Panhandle. Low wind speeds throughout atmosphere over most of Idaho with 500mb wind speeds under 10 kts.
		Morning satellite image shows thick smoke obscuring surface details throughout central and southern Idaho. Smoke has drained into the Middle Fork of the Salmon River and the Clearwater River valleys. Back trajectories intersect smoke and/or fire detects from the Mustang and Powell SBW Complexes. Back trajectories travel short distances in 24-hour period, indicating a stagnant atmosphere. Hourly trace shows declining values from a high of 70 µg/m^3 at 0100, interspersed with spikes at 1000 and 1500 when winds are from the north and west to southwest, respectively.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 14.5 to 24.6 µg/m^3 and we conclude that there would not have been concentrations above the Annual NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

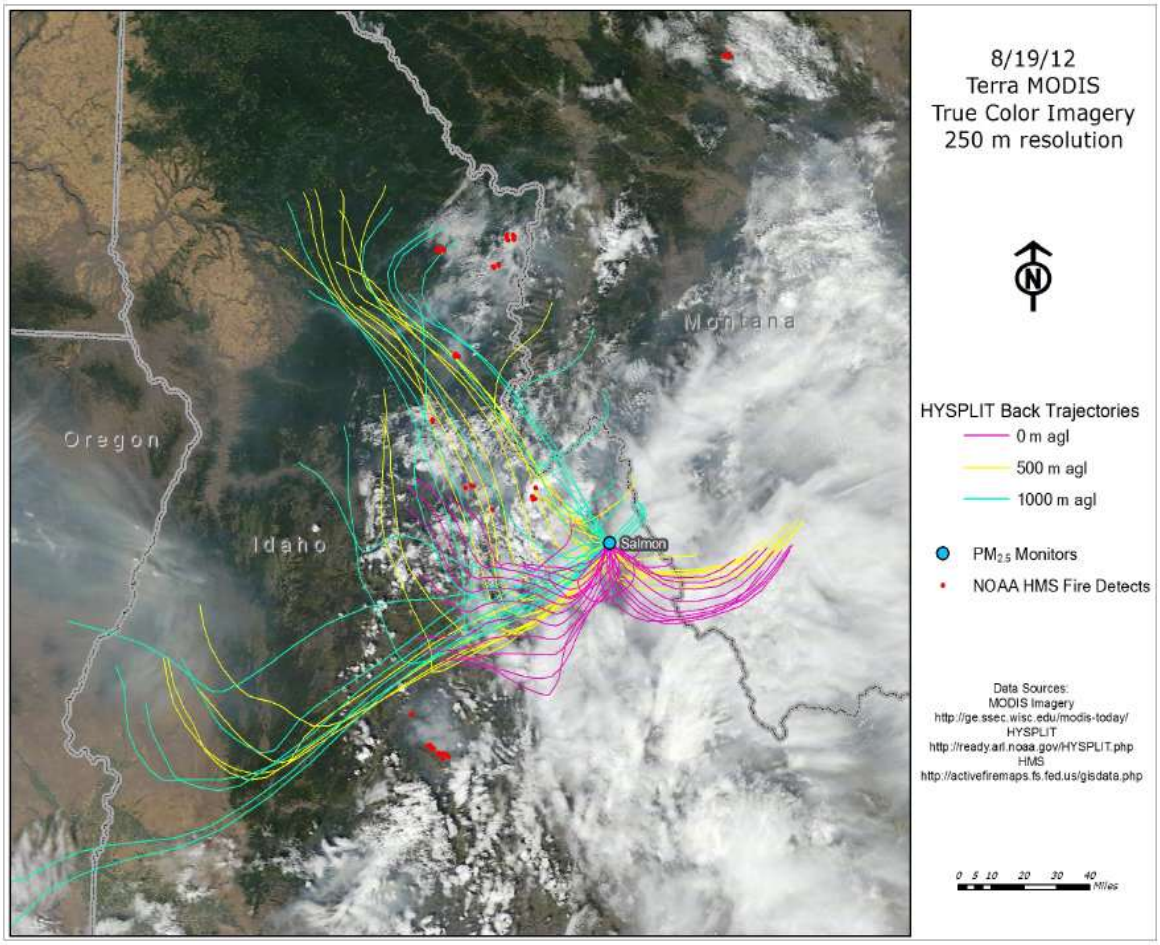


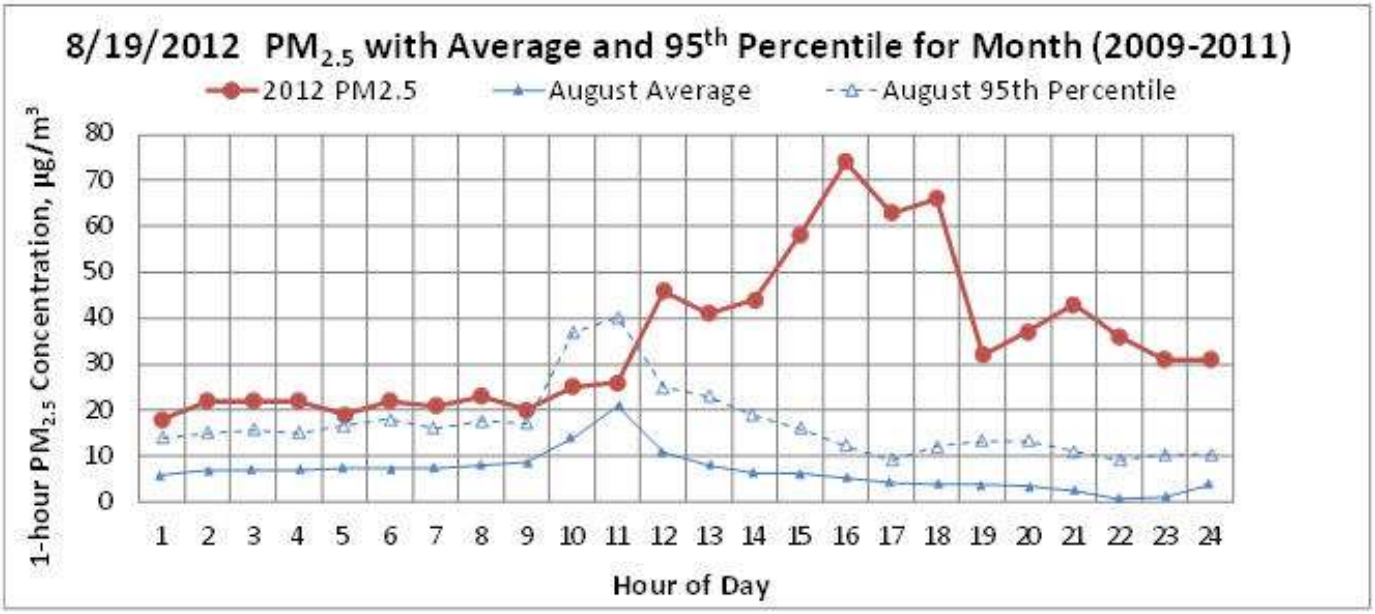

8/18/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
August Average
August 95th Percentile
1-hour PM2.5 Concentration, µg/m³
Hour of Day

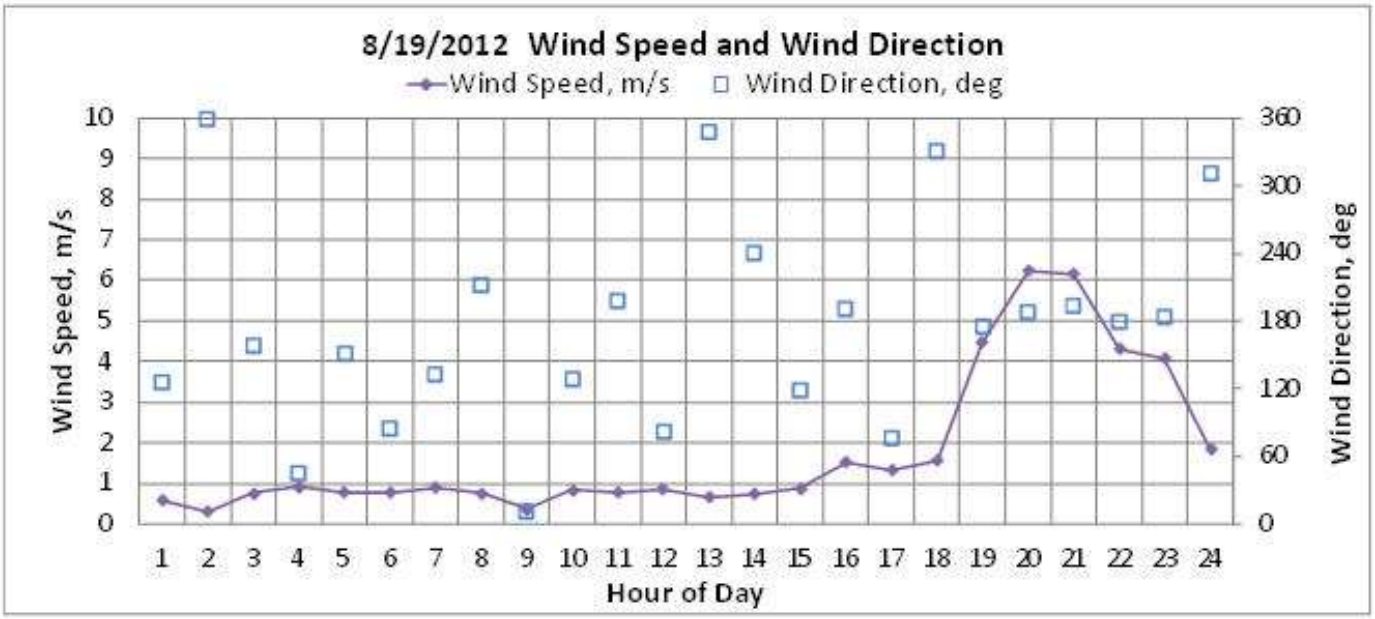

8/18/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Hour of Day

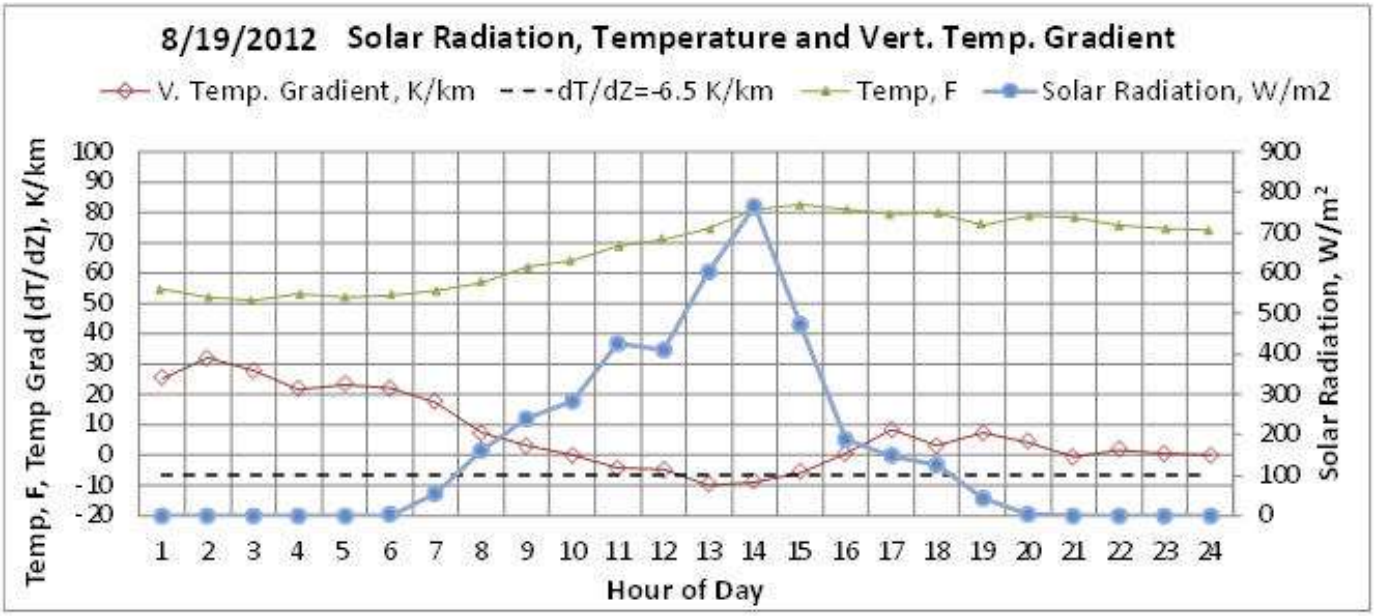

8/18/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m²
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 34.5 µg/m^3 on 8-19-2012, AQS #16-059-0004 POC 3		
Also included in this request, 24-hour FRM Value (filter based): 31.2 µg/m^3, AQS #16-059-0004 POC 1		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; 97th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, 2 (See Sec. 4)
	Weather Conditions:	High retreats slightly and ridge axis shifts to become centered over SE ID running from UT through the SE Highlands of Idaho and into Alberta.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Morning satellite image shows smoke mixed with cloud in the area of interest. Back trajectories intersect smoke and/or fire detects from the Halstead, Mustang, and Powell SBW fires. Hourly trace rises considerably, starting at noon with light and variable winds and concentrations remain above 30 µg/m^3 at midnight even though winds freshen to 6 m/s from the south, indicating a smoke filled valley that brings smoke from multiple directions.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 18.6 to 28.7µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.



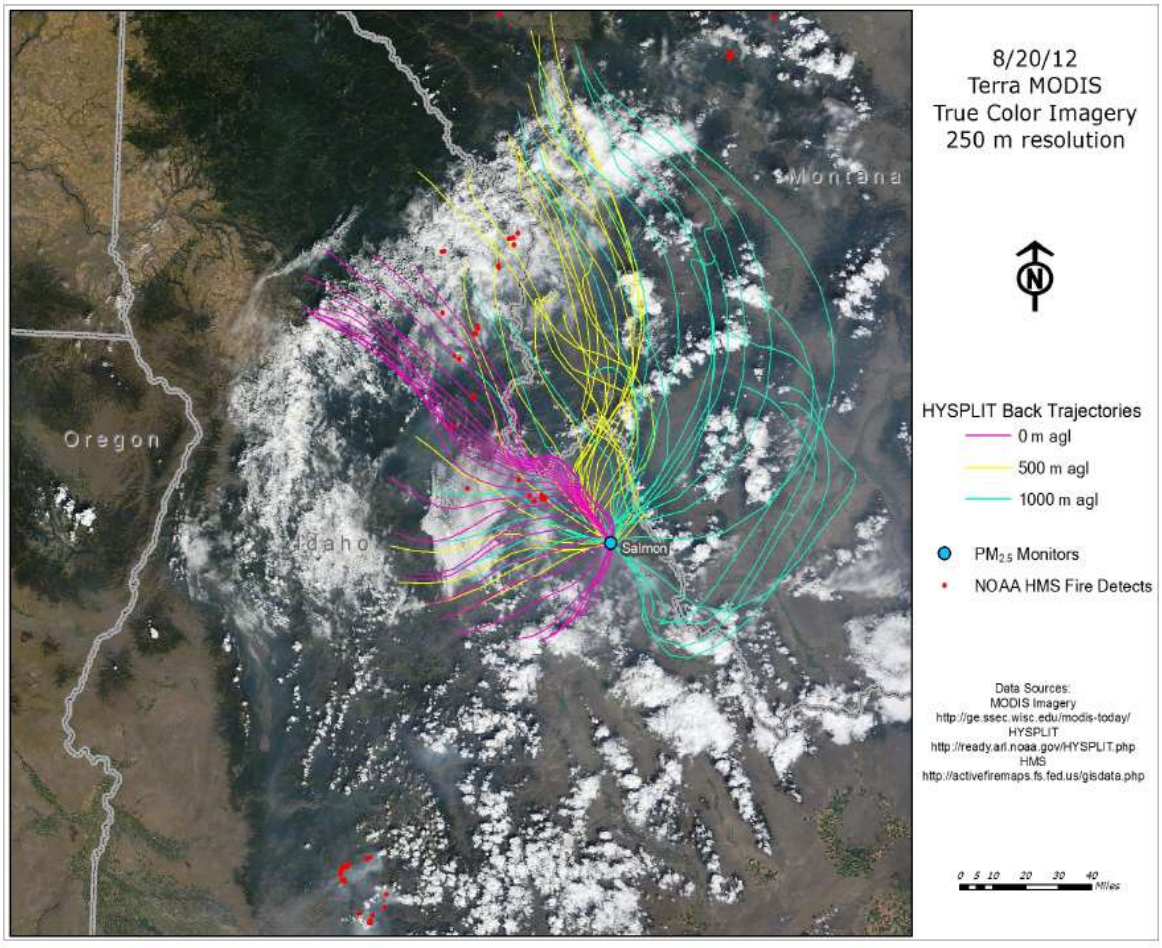

8/19/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
August Average
August 95th Percentile
1-hour PM2.5 Concentration, µg/m3
Hour of Day

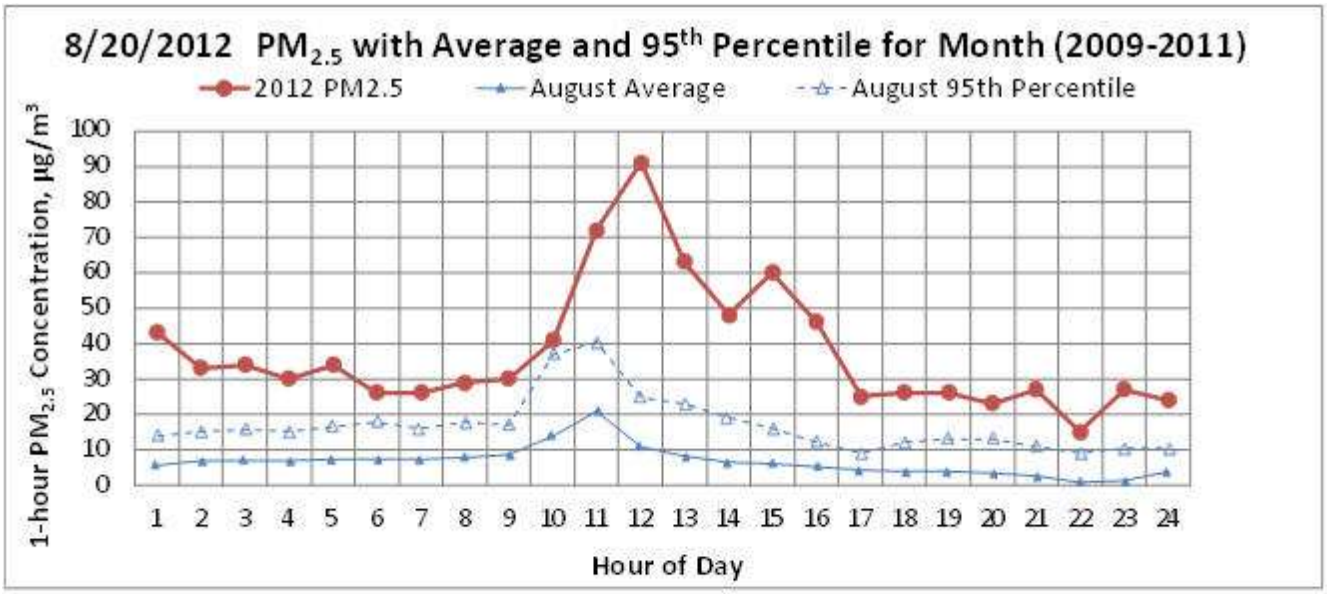

8/19/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Hour of Day

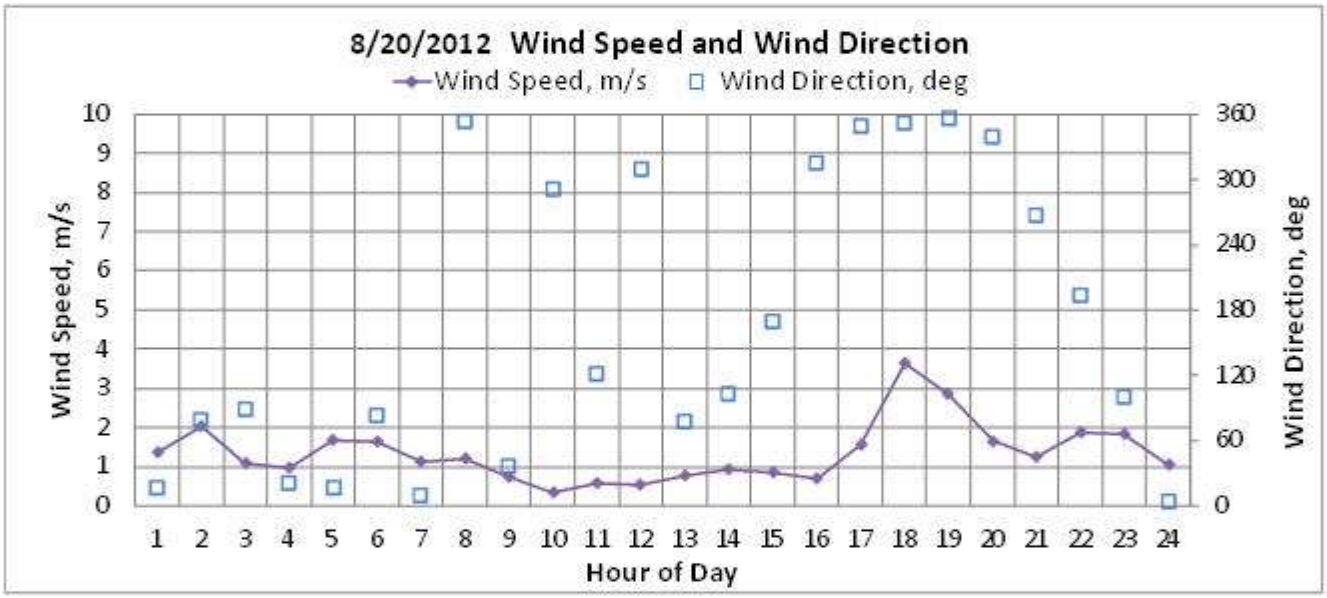

8/19/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m2
Hour of Day

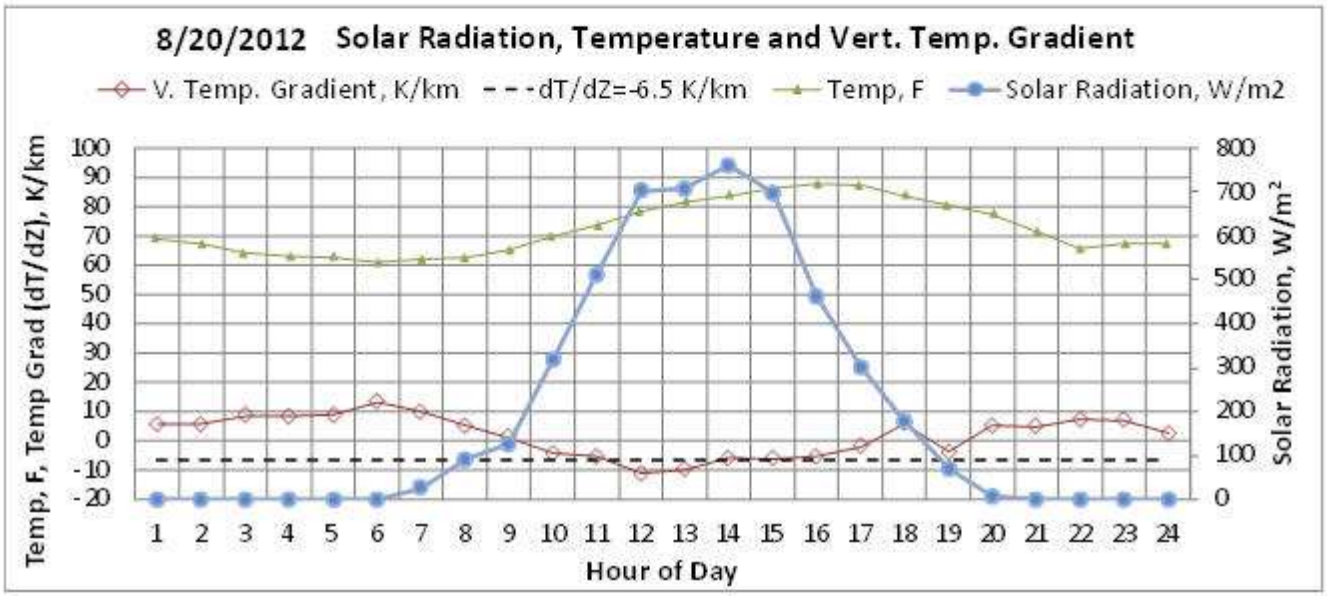
August 20, 2012

Summary of EER Evidence for Salmon Monitor Value, 37.7 µg/m^3 on 8-20-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; 98th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, 2 (See Sec. 4)
	Weather Conditions:	Weak pressure gradients over ID as ridge strengthens with variable wind direction, but downstream of ridge axis and thus, contains a northerly component.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Morning and afternoon satellite images show light smoke mixed with cloud in the valley around Salmon. Back trajectories intersect smoke and/or fire detects from the Mustang and Powell SBW fires. Hourly trace shows elevated concentrations through the day, with a significant rise midday.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 21.8 to 31.9 µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

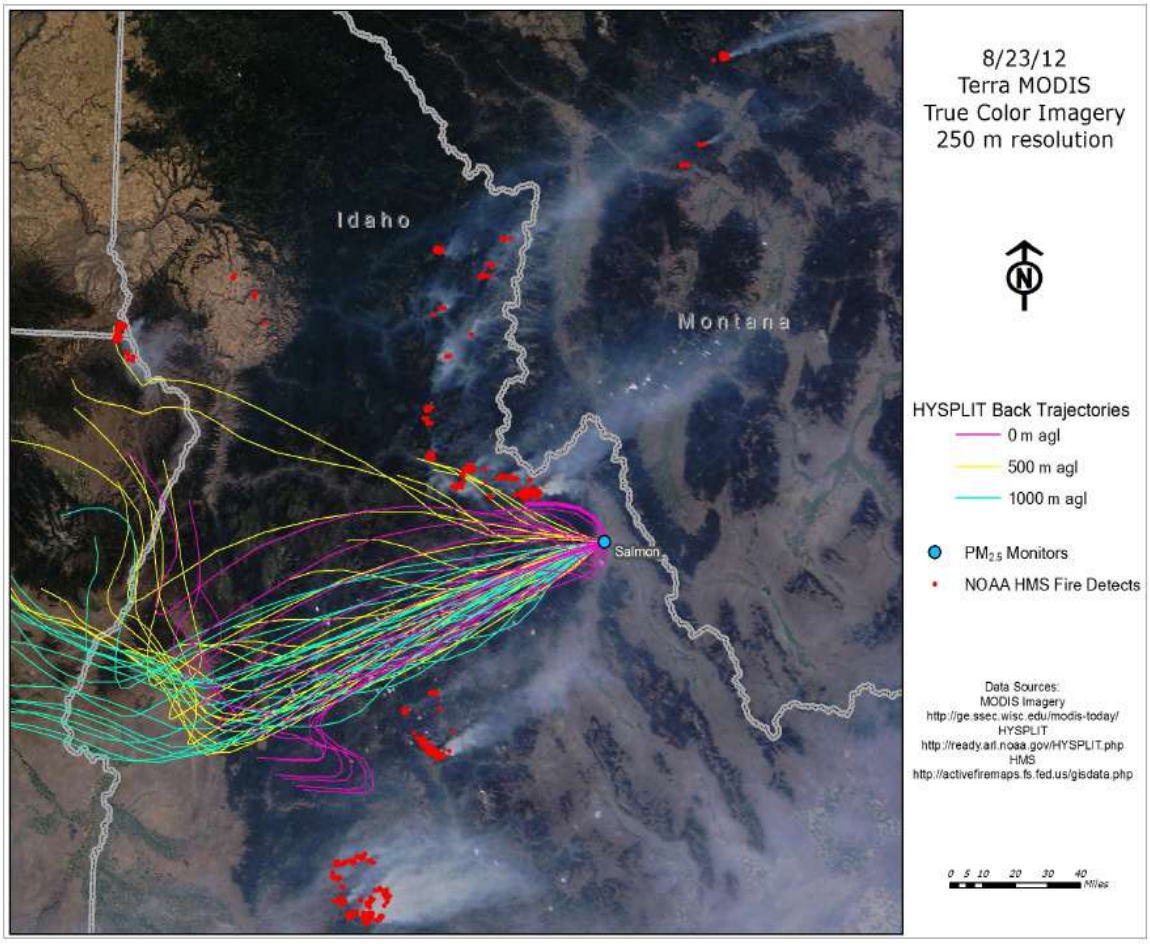


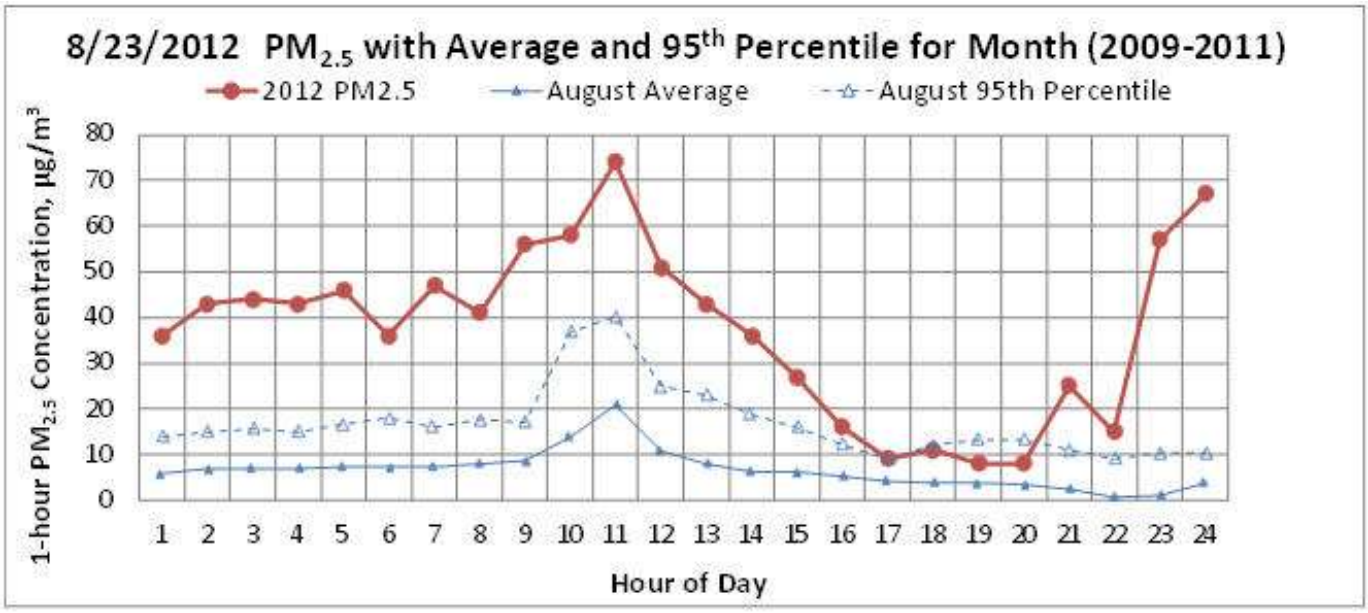

8/20/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
August Average
August 95th Percentile
1-hour PM2.5 Concentration, µg/m3
Hour of Day

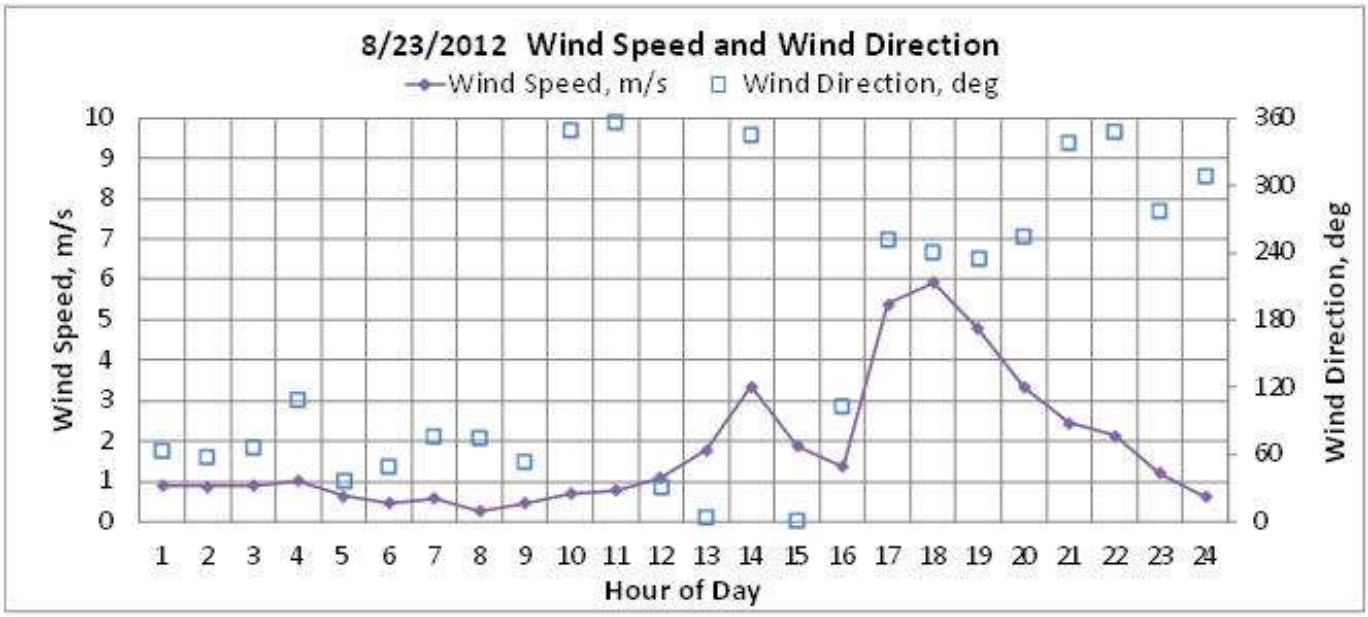

8/20/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Wind Speed, m/s
Wind Direction, deg
Hour of Day

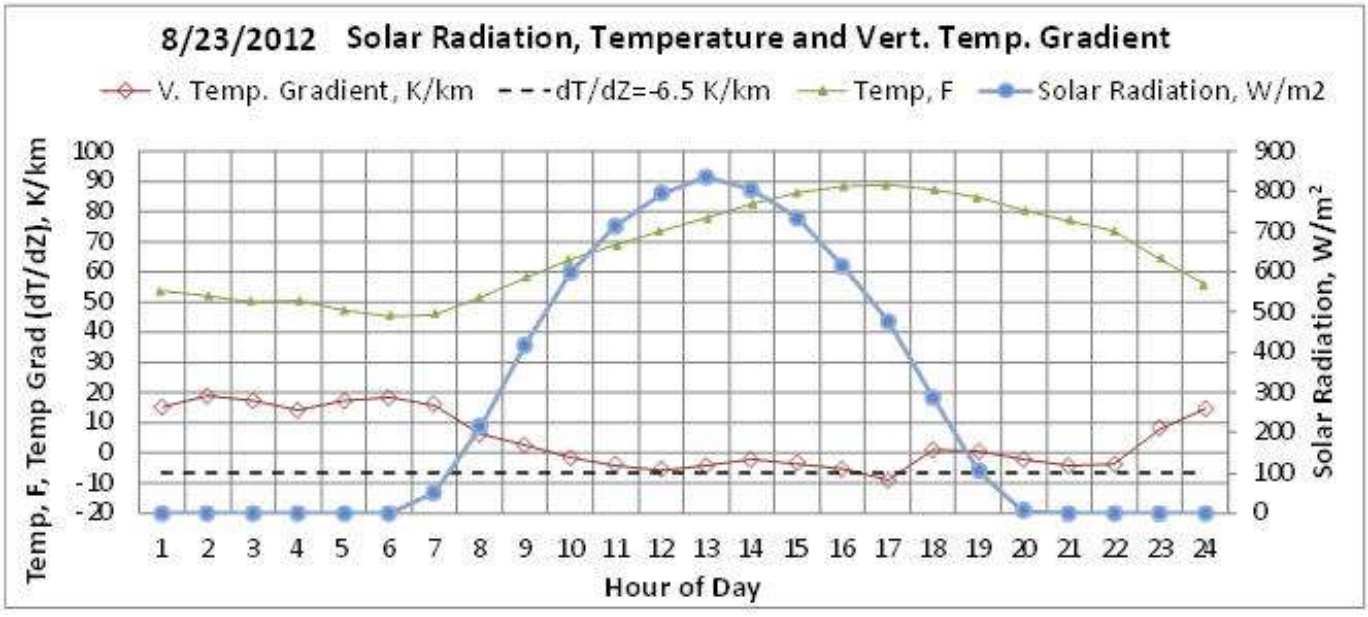

8/20/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m2
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 35.9 µg/m^3 on 8-23-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; 98th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, 2, 3 (See Sec. 4)
	Weather Conditions:	Shortwave further suppresses ridge and promotes west-southwest flow.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Morning satellite image shows fire plumes blowing northeast. Smoke from Halstead fumigates the upper Salmon River valley, and Mustang smoke fumigates the valley to the north of Salmon. Back trajectories intersect smoke and/or fire detects from the Mustang Complex. Hourly trace shows high and steady morning concentrations, peaking above 70 µg/m^3 at 1100 with northerly valley winds. The valley clears in the afternoon, but smoke moves in again after 2000 with NW winds.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 20 to 30.1 µg/m^3 and we conclude that there would not have been concentrations above the Annual NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

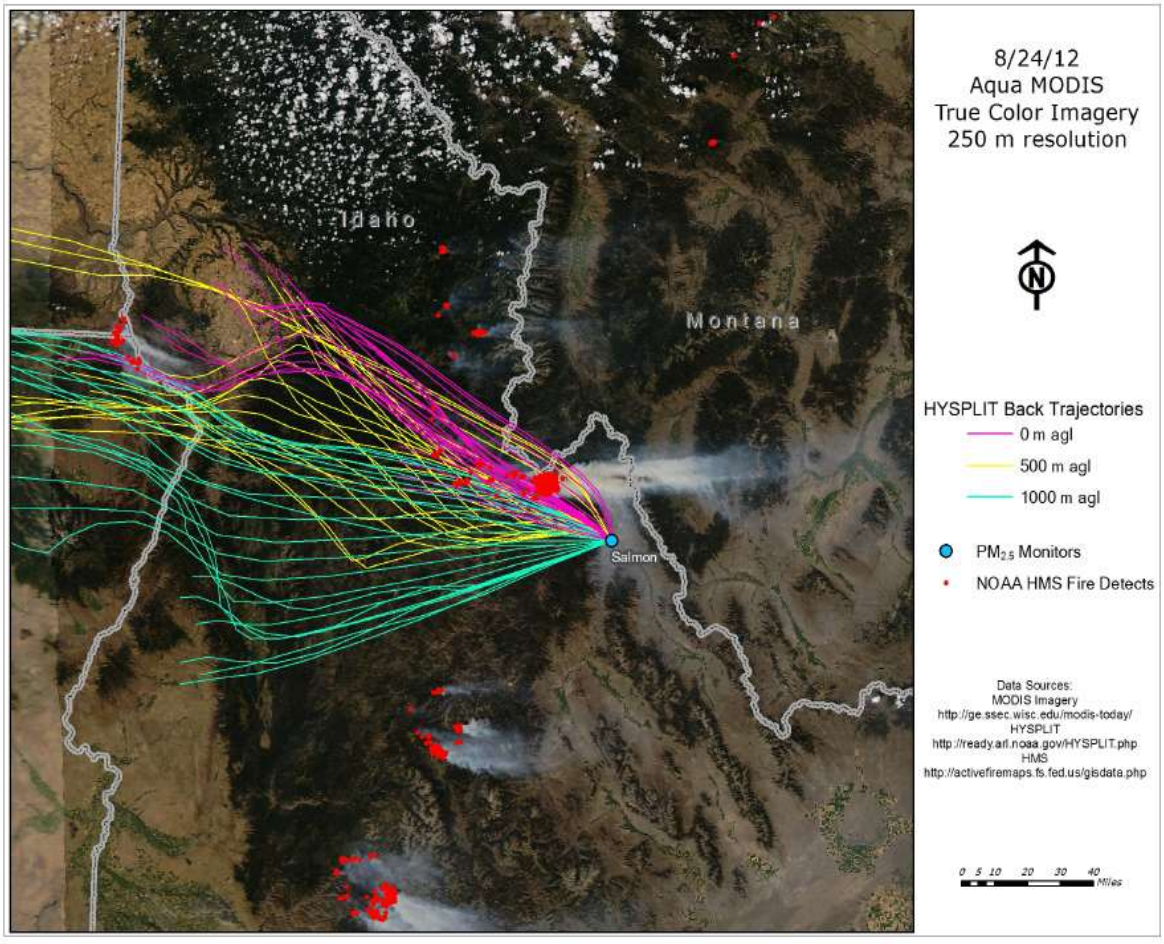


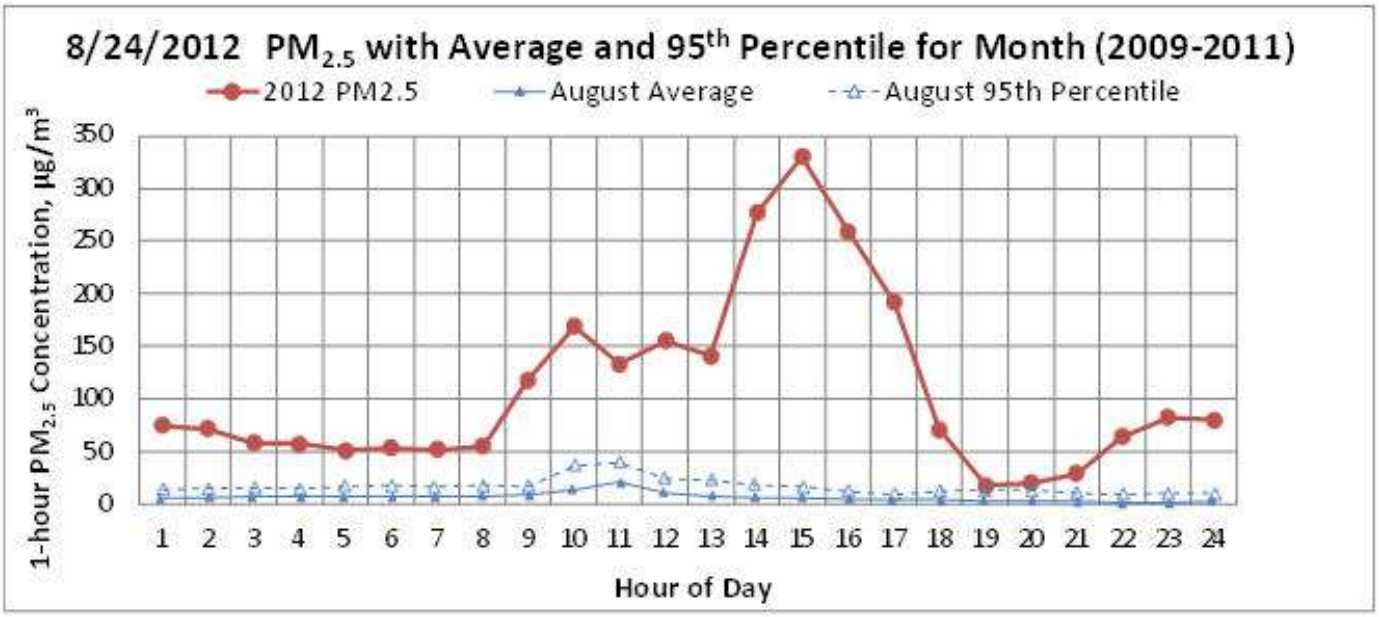

8/23/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
August Average
August 95th Percentile
1-hour PM2.5 Concentration, µg/m3
Hour of Day

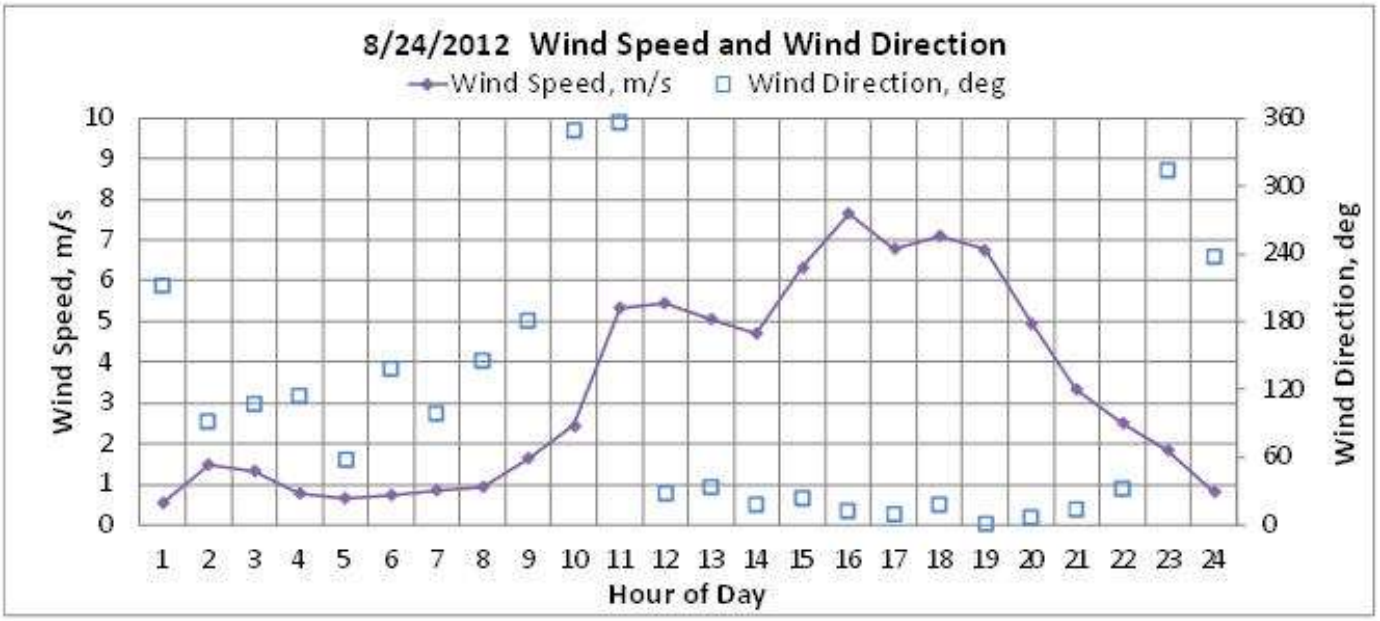

8/23/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Hour of Day

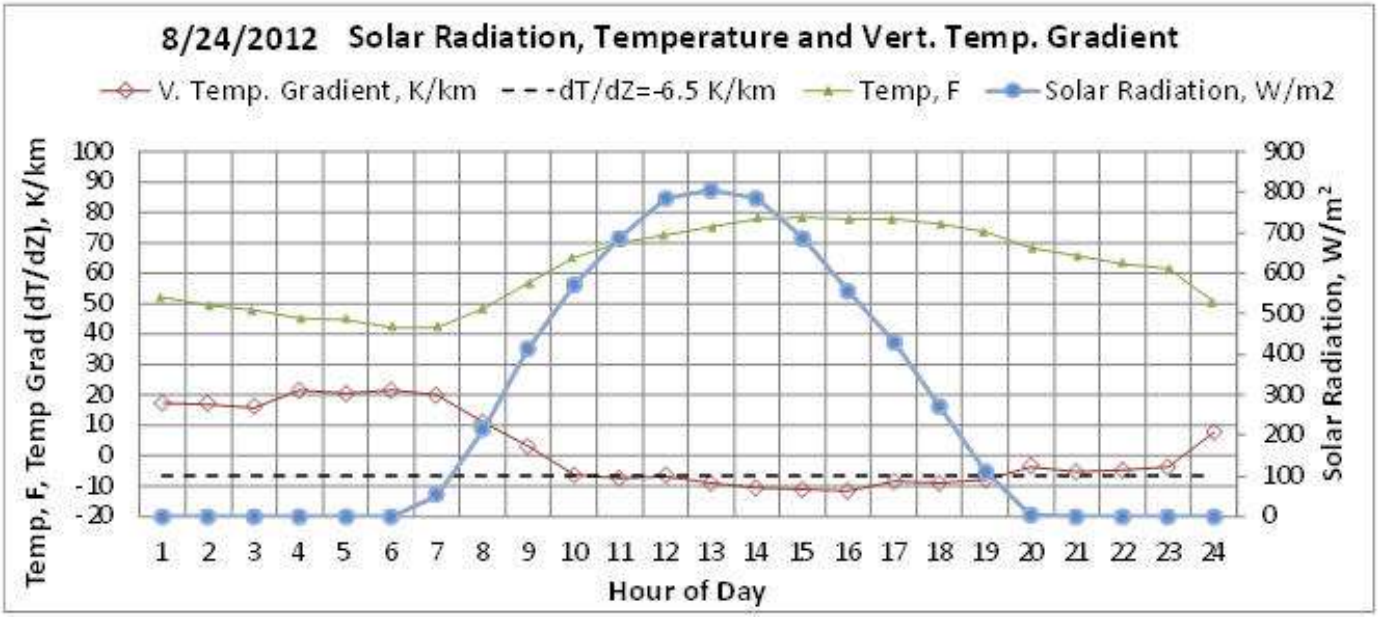

8/23/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m2
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 108.2 µg/m^3 on 8-24-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, 2 (See Sec. 4)
	Weather Conditions:	Low weakens and fills, but still suppresses ridge and zonal flow results.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Afternoon satellite image shows dense Mustang plume blowing east filling the northern end of the valley. Light smoke is visible in Salmon. Back trajectories intersect smoke and/or fire detects from the Mustang Complex and Cache Creek fire in Oregon. Hourly trace shows high and steady morning concentrations rising to extraordinarily high levels over 300 µg/m^3 in the afternoon with N winds, clearing in the evening, then rising again after 2100.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 92.3 to 102.4 µg/m^3 and we conclude there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

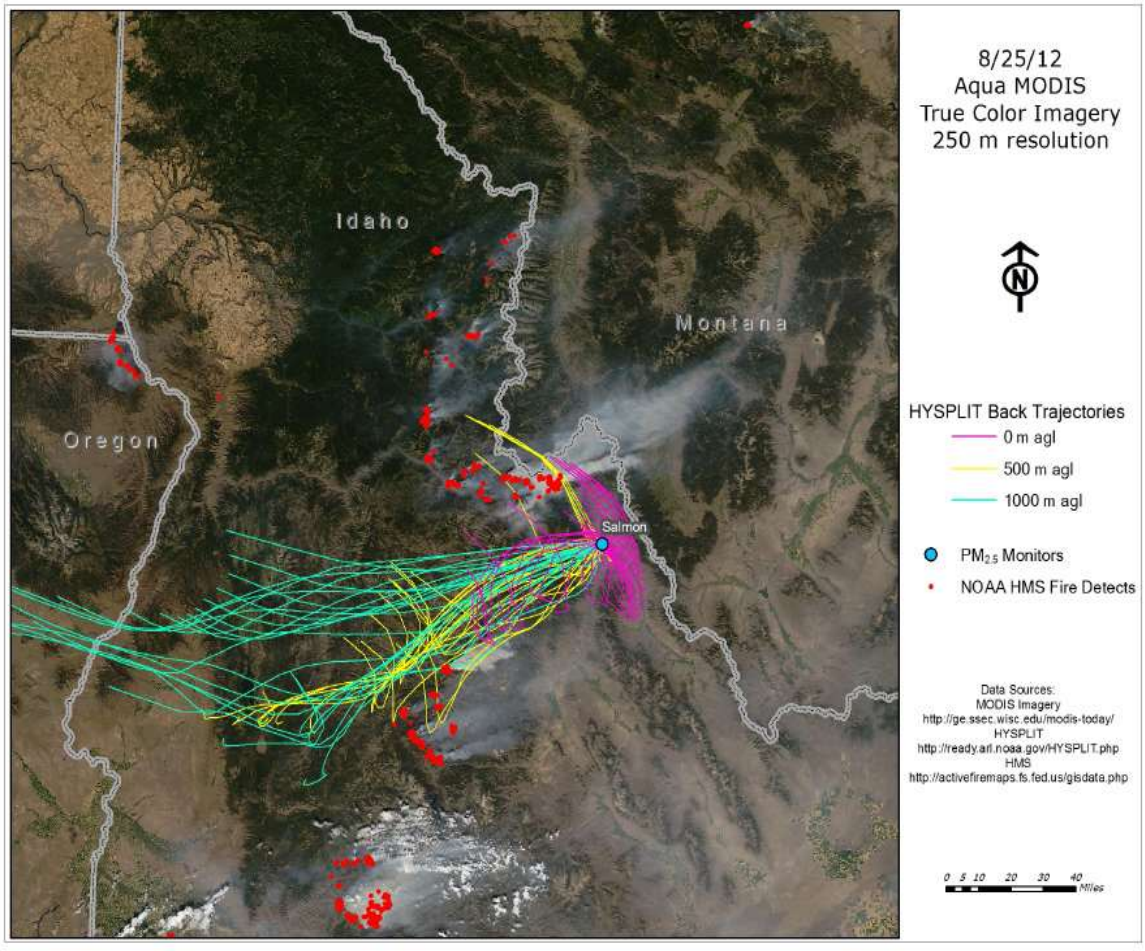


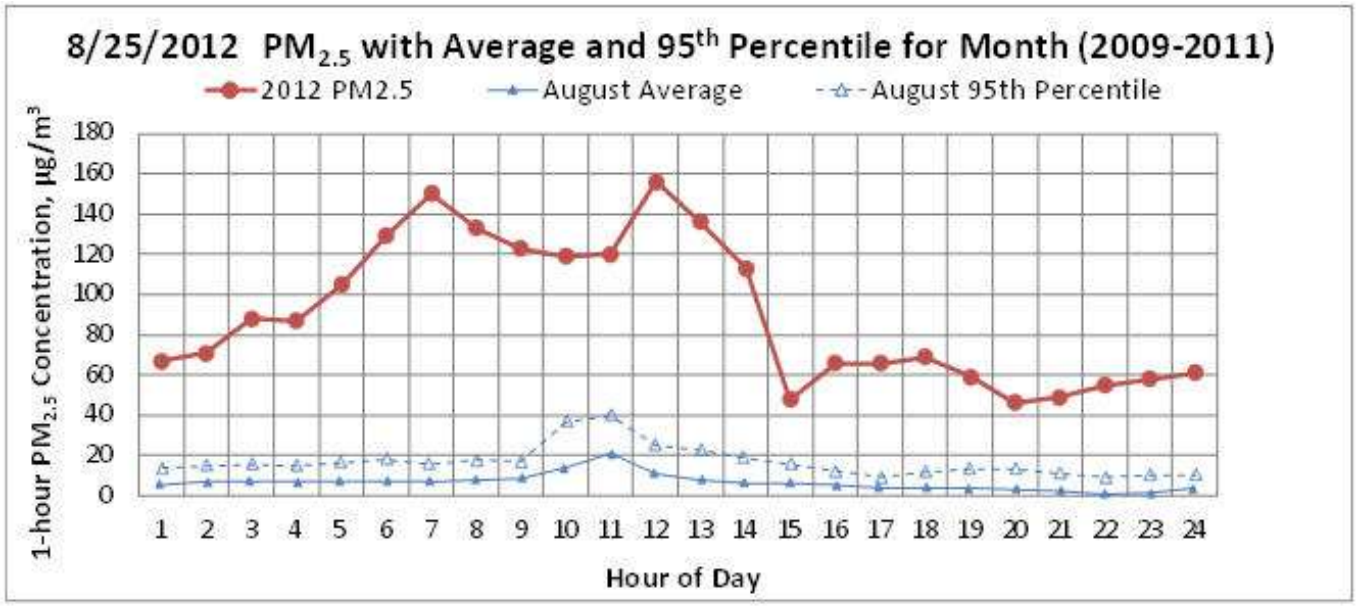

8/24/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
August Average
August 95th Percentile
1-hour PM2.5 Concentration, µg/m3
Hour of Day

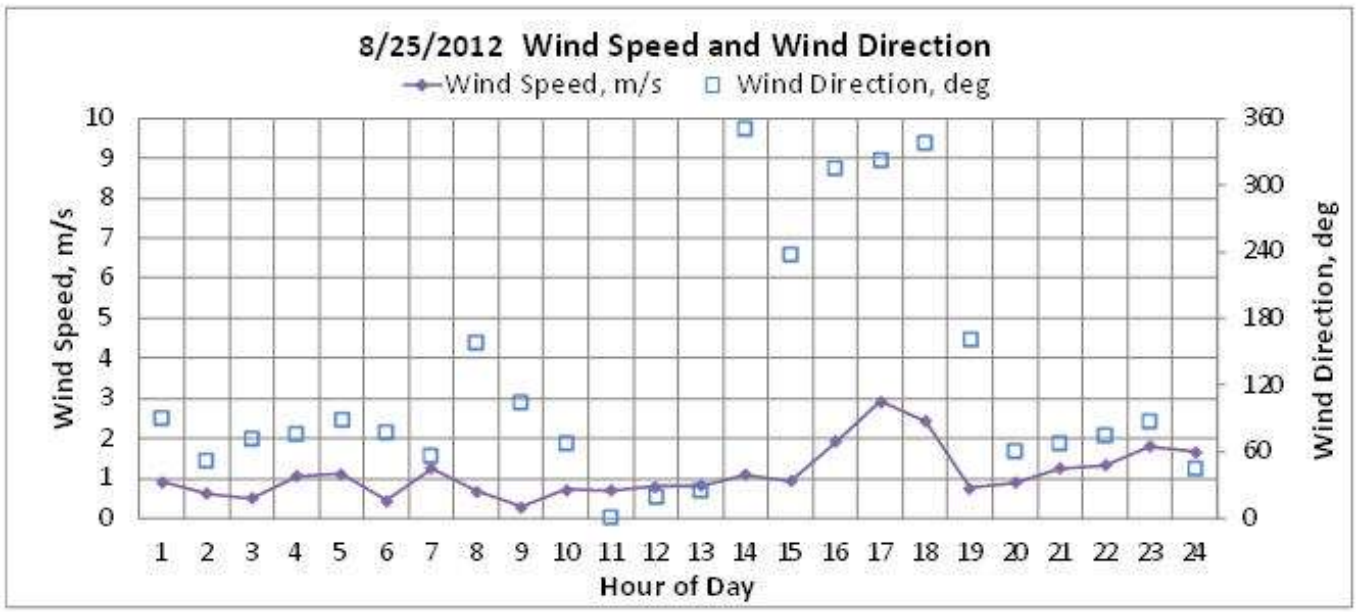

8/24/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Hour of Day

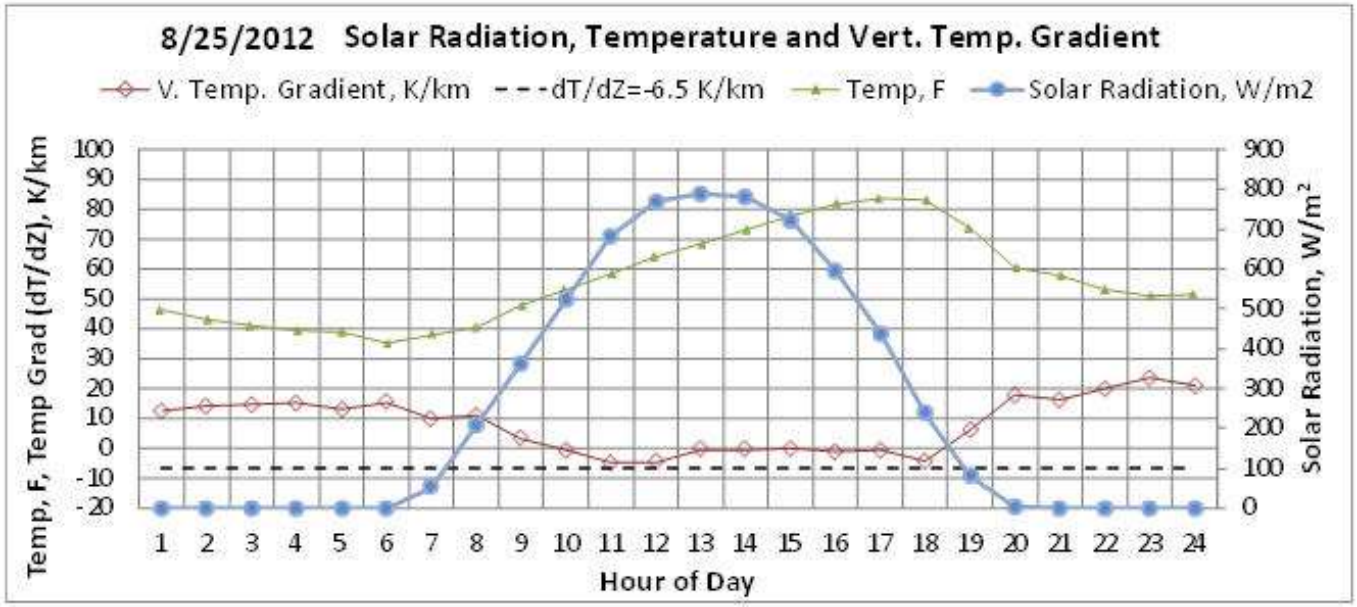

8/24/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m2
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 91.3 µg/m^3 on 8-25-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, 2, 3, 4 (See Sec. 4)
	Weather Conditions:	Upper level gradients relax substantially allowing weak zonal flow and local orographic dynamics to dominate.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Afternoon satellite image shows local fire plumes blowing northeast. Back trajectories intersect smoke and/or fire detects from the Mustang Complex and Halstead fire. Surface trajectories indicate both southerly and northerly wind direction within the Salmon valley, suggesting advection of drainage flow from both the Mustang and Halstead fires. Hourly trace shows rising and sustained morning concentrations, a spike at 0700 and 1200 with N and NE drainage winds, clearing in the afternoon. However, concentrations never drop below 40 µg/m^3 during the 24-hour period. Wind speeds are low, pointing to slow drainage flow as the overriding smoke advection process for the day.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 75.4 to 85.5 µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

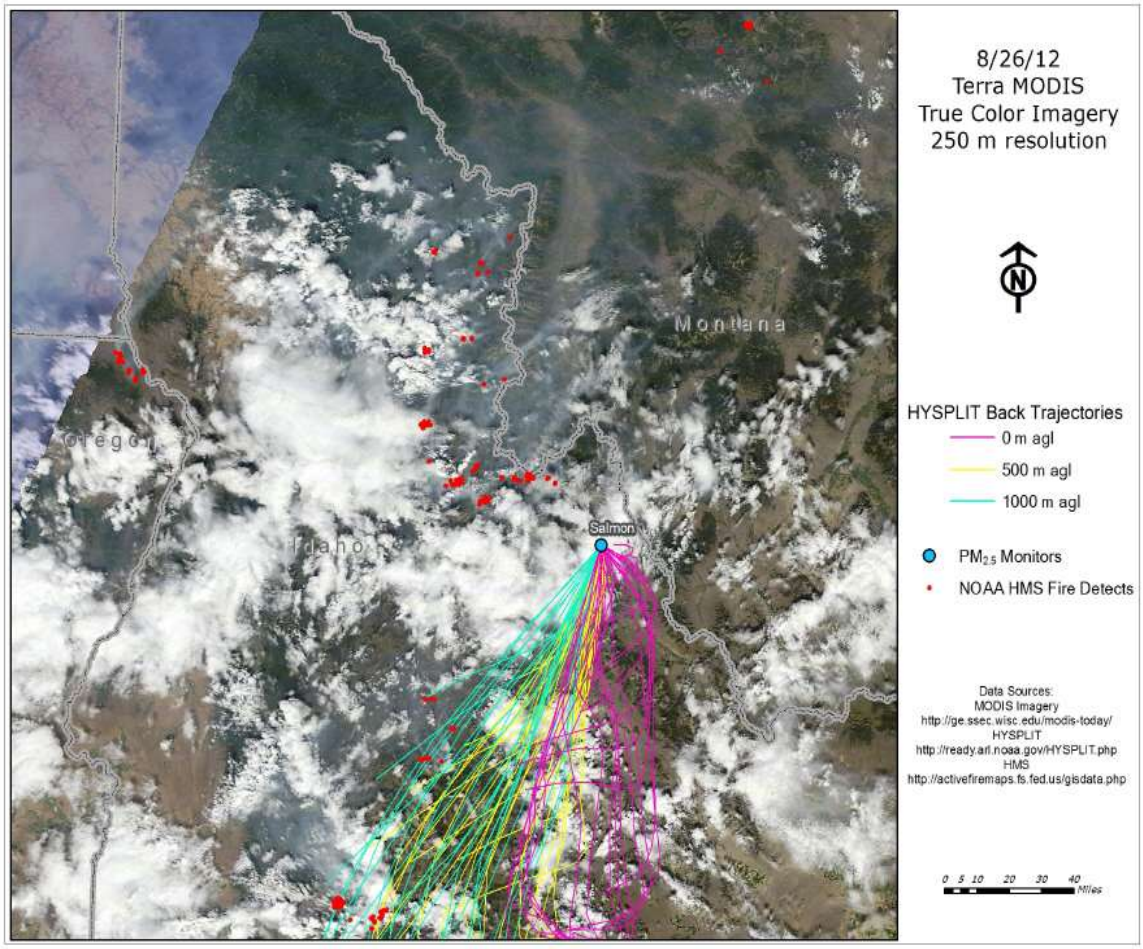


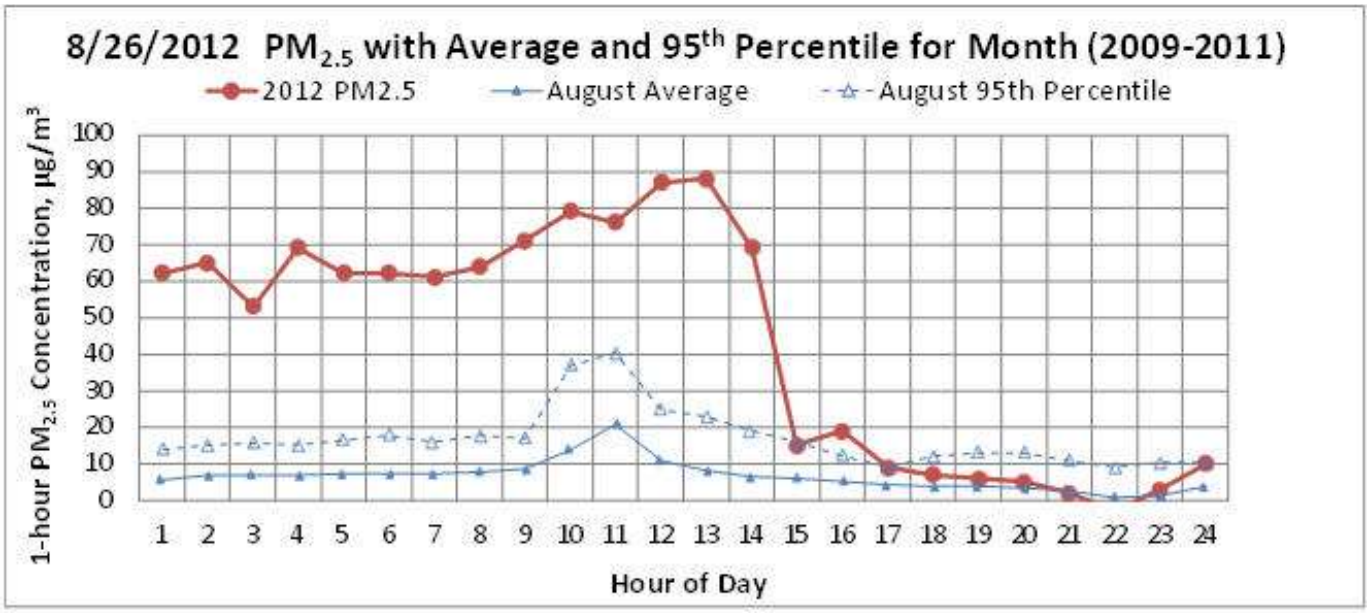

8/25/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
August Average
August 95th Percentile
1-hour PM2.5 Concentration, µg/m³
Hour of Day

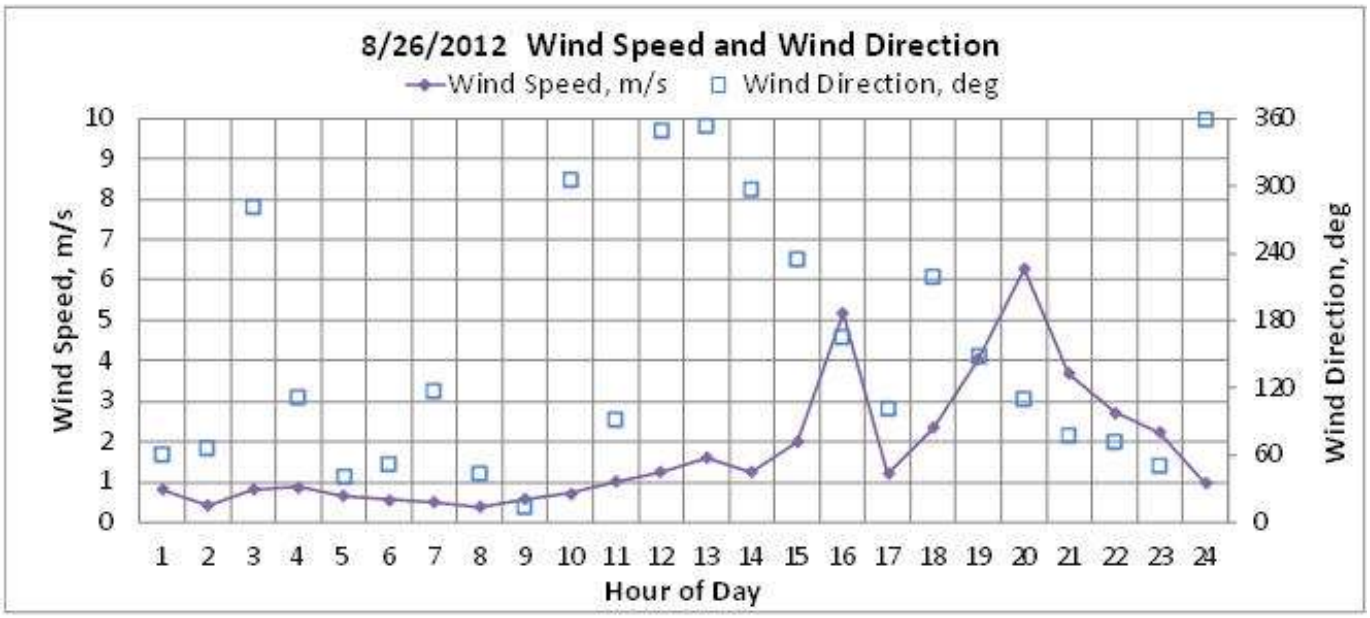

8/25/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Hour of Day

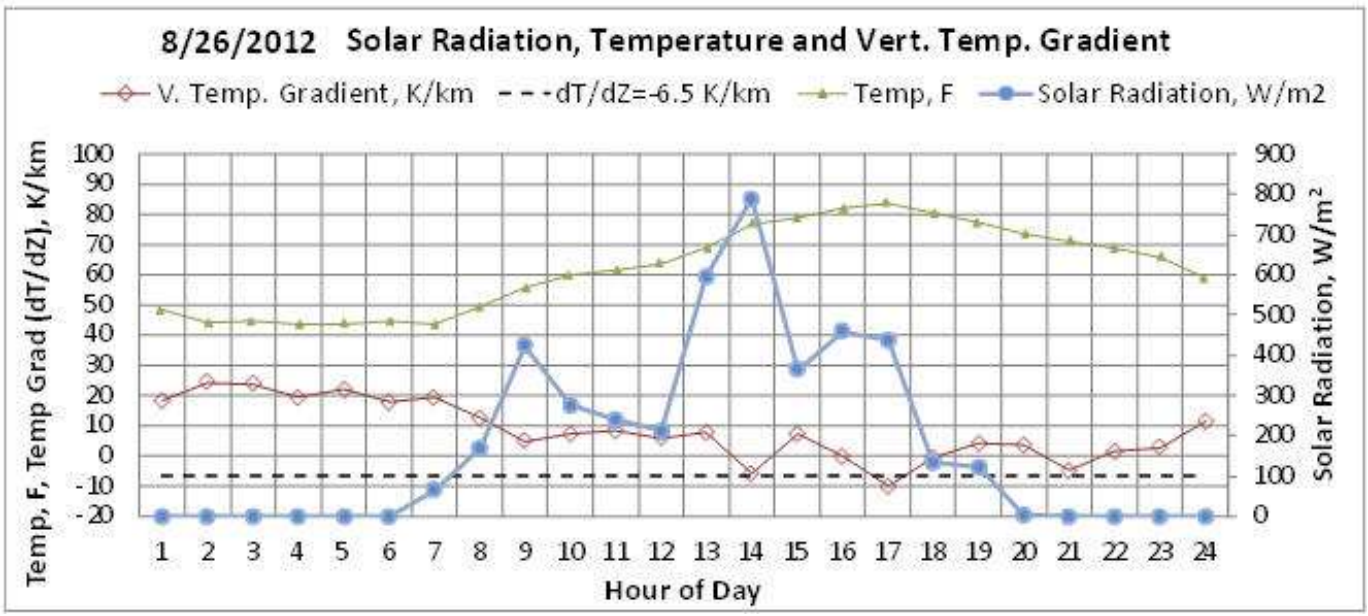

8/25/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m²
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 45.5 µg/m^3 on 8-26-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 4 (See Sec. 4), with probable valley flow from north, Scenario 1.
	Weather Conditions:	4-Corners High begins to strengthen and move into the Southwest. Coupled with offshore low, southwest flow develops across Idaho.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Morning satellite image shows light smoke in valley interspersed with clouds. Back trajectories intersect smoke and/or fire detects from the Halstead and Trinity Ridge fires. Hourly trace shows sustained high concentrations reaching over 80 µg/m^3 with northerly valley winds around 1200 - 1300, followed by wind increases during which valley is scoured out.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 29.6 to 39.7 µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

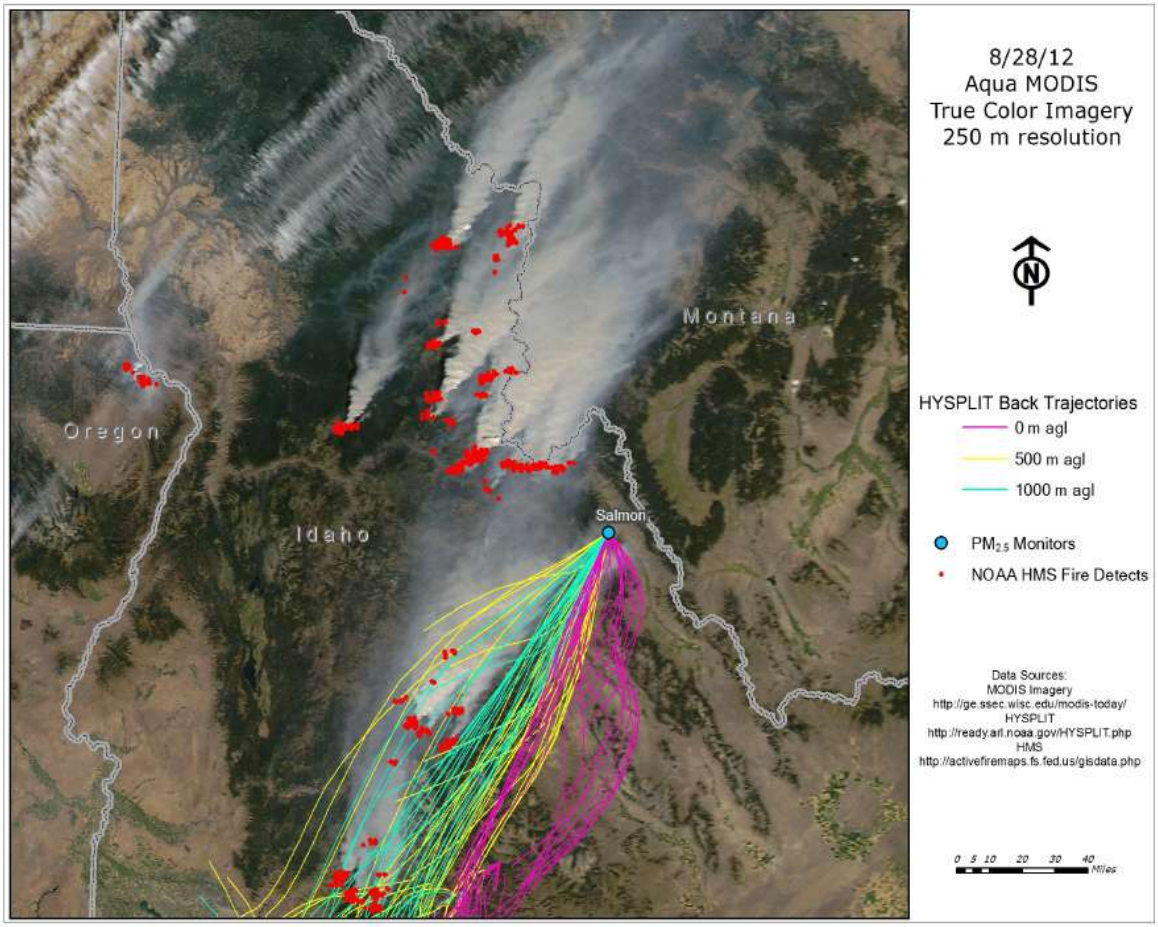


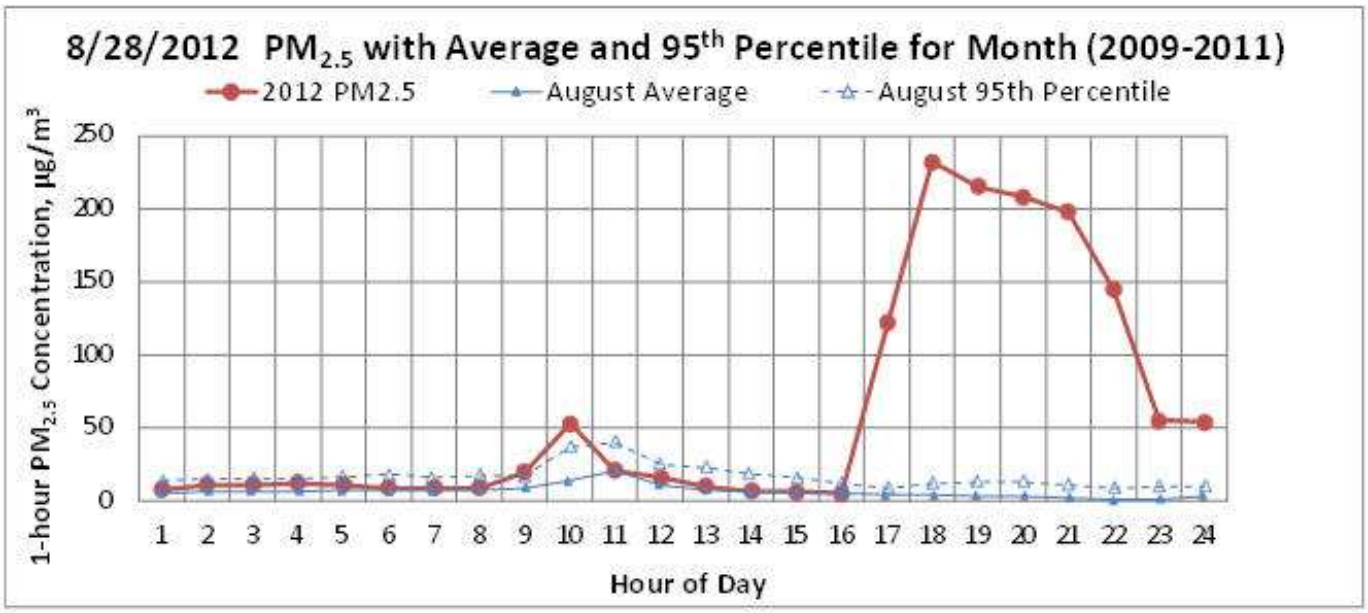

8/26/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
August Average
August 95th Percentile
1-hour PM2.5 Concentration, µg/m3
Hour of Day

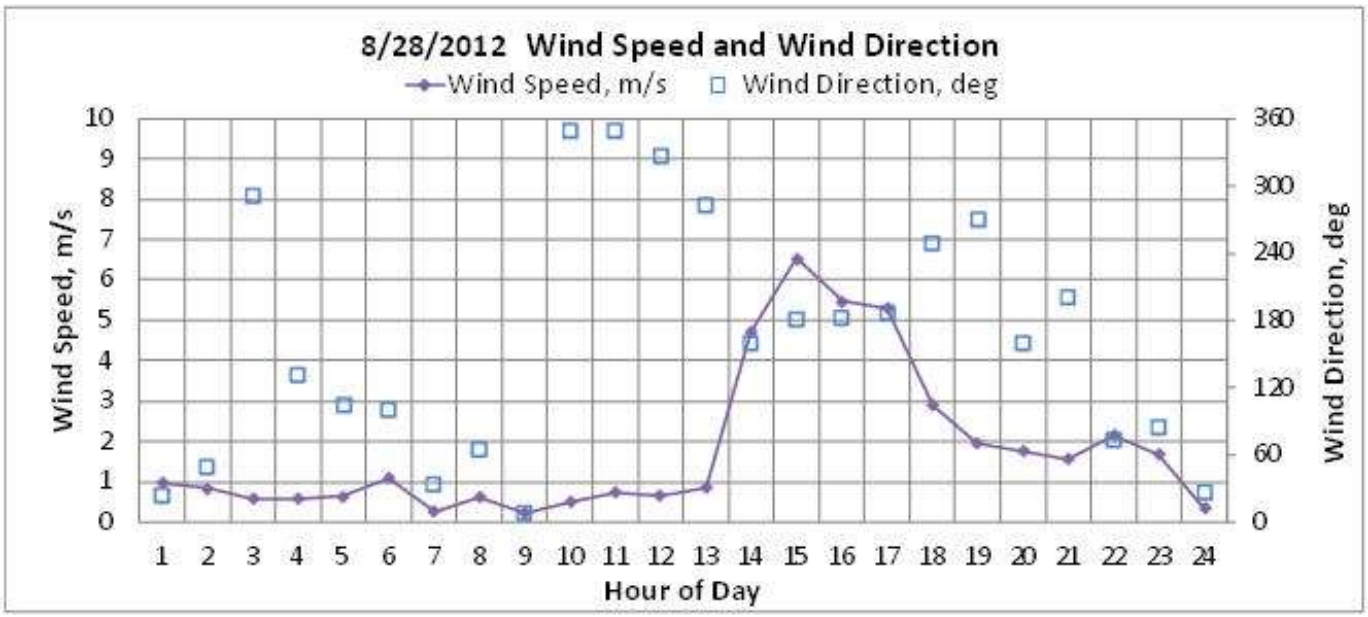

8/26/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Wind Speed, m/s
Wind Direction, deg
Hour of Day

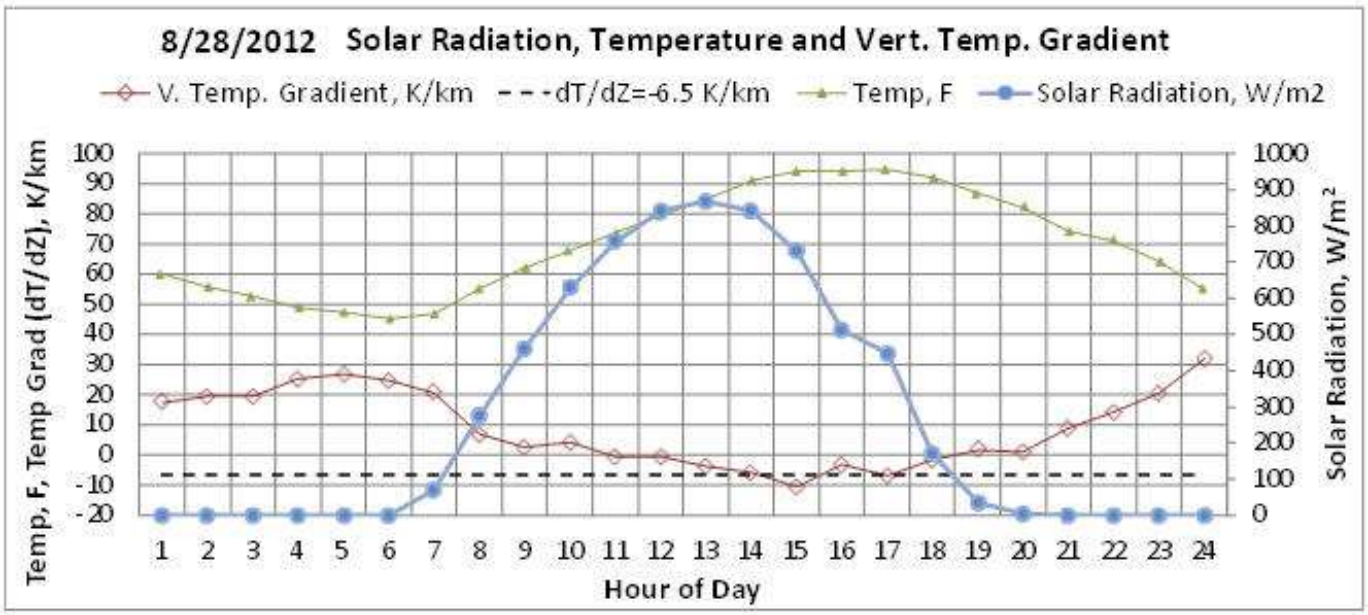

8/26/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m2
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 58.2 µg/m^3 on 8-28-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 4 (See Sec. 4)
	Weather Conditions:	4-Corners High shifts the ridge axis east of Idaho providing southwest flow as off shore low weakens into an open wave trough.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Afternoon satellite image shows thick, vigorous plumes streaming northeast from all local fires. The Halstead plume aims directly at Salmon. Back trajectories intersect smoke and/or fire detects from the Halstead and Trinity Ridge fires. Hourly trace shows concentrations below 95th percentile until 1700 pm, when concentrations rise rapidly up 200 µg/m^3 in two hours. The spike occurs after wind speeds increase to 5 – 6 m/s and the wind direction switches to the south then SW.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 42.3 to 52.4 µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

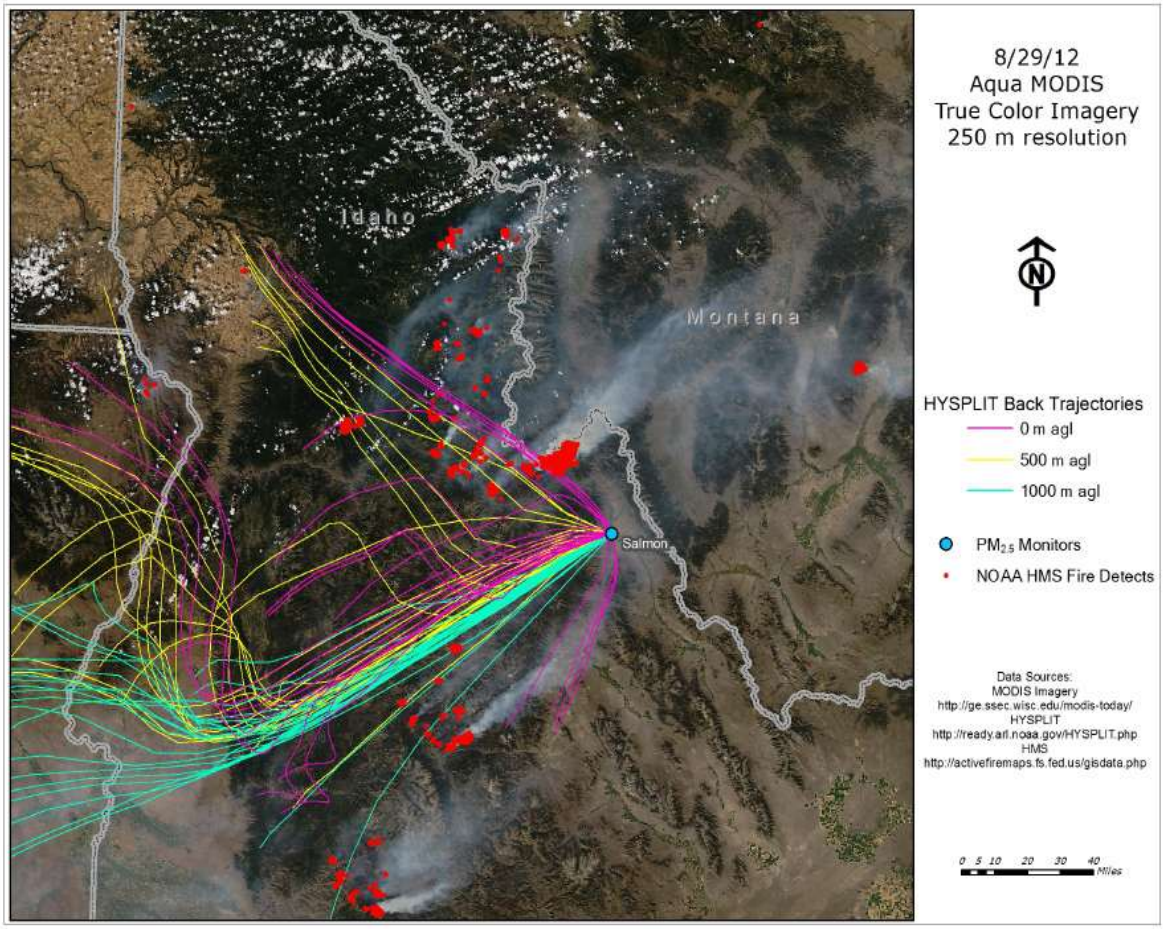


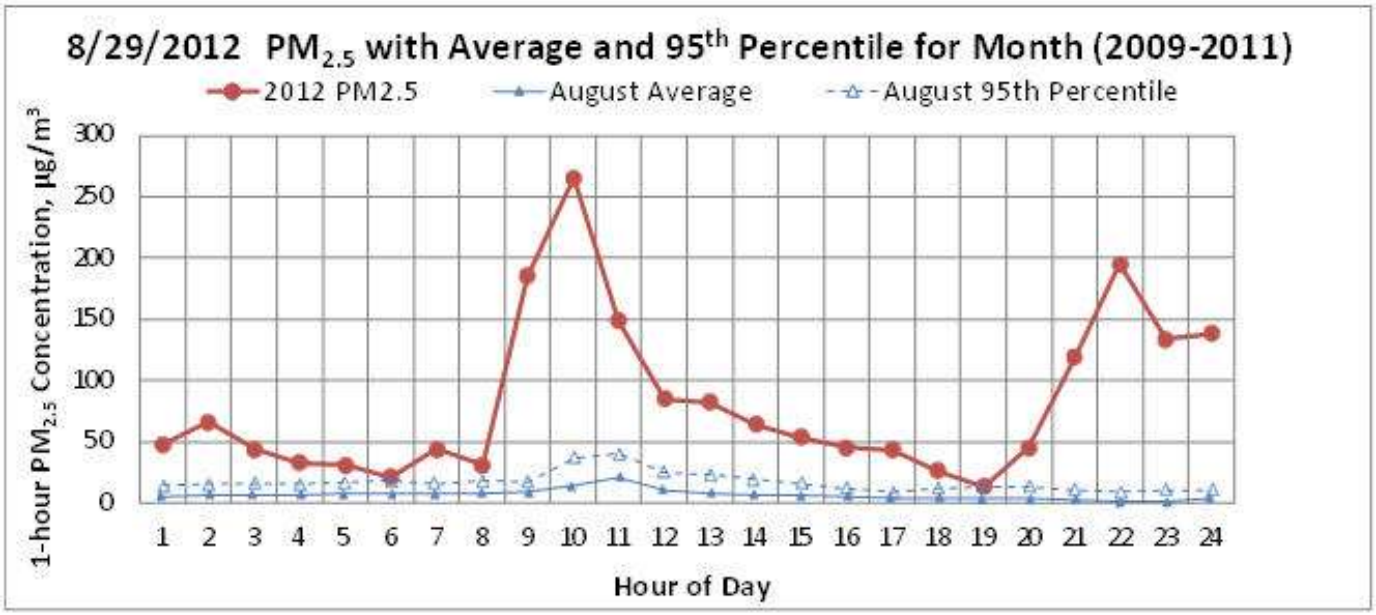

8/28/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
August Average
August 95th Percentile
1-hour PM2.5 Concentration, µg/m³
Hour of Day

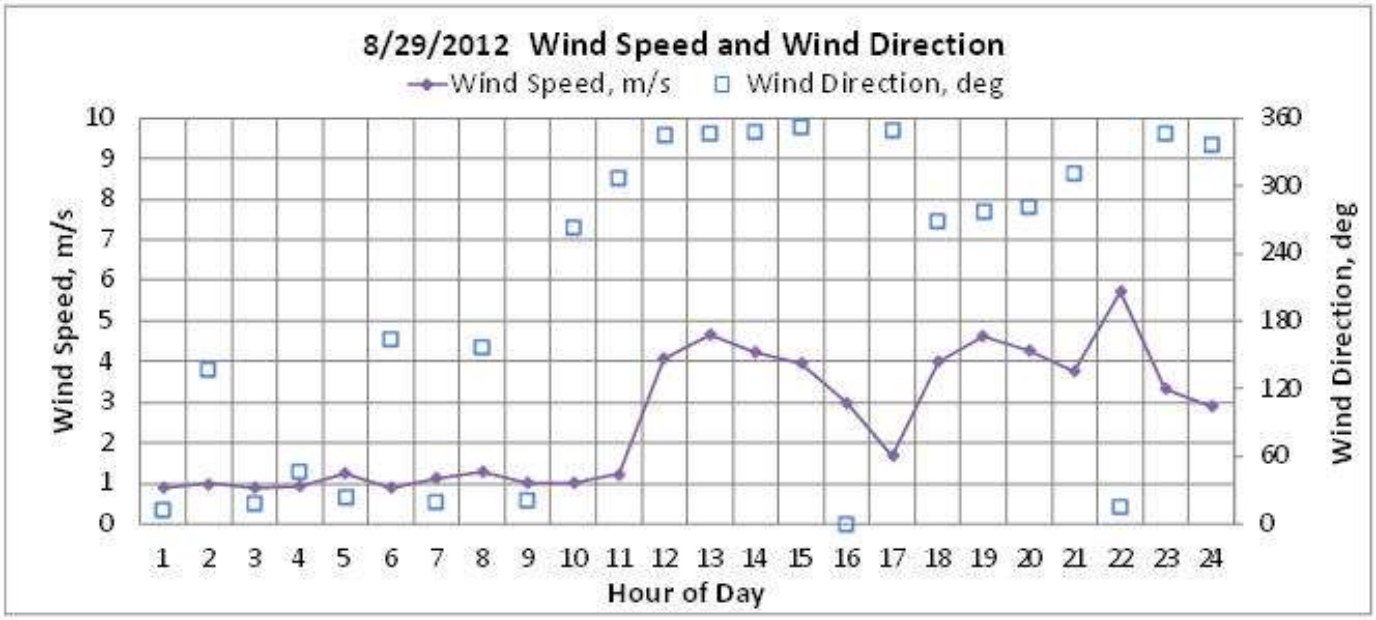

8/28/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Wind Speed, m/s
Wind Direction, deg
Hour of Day

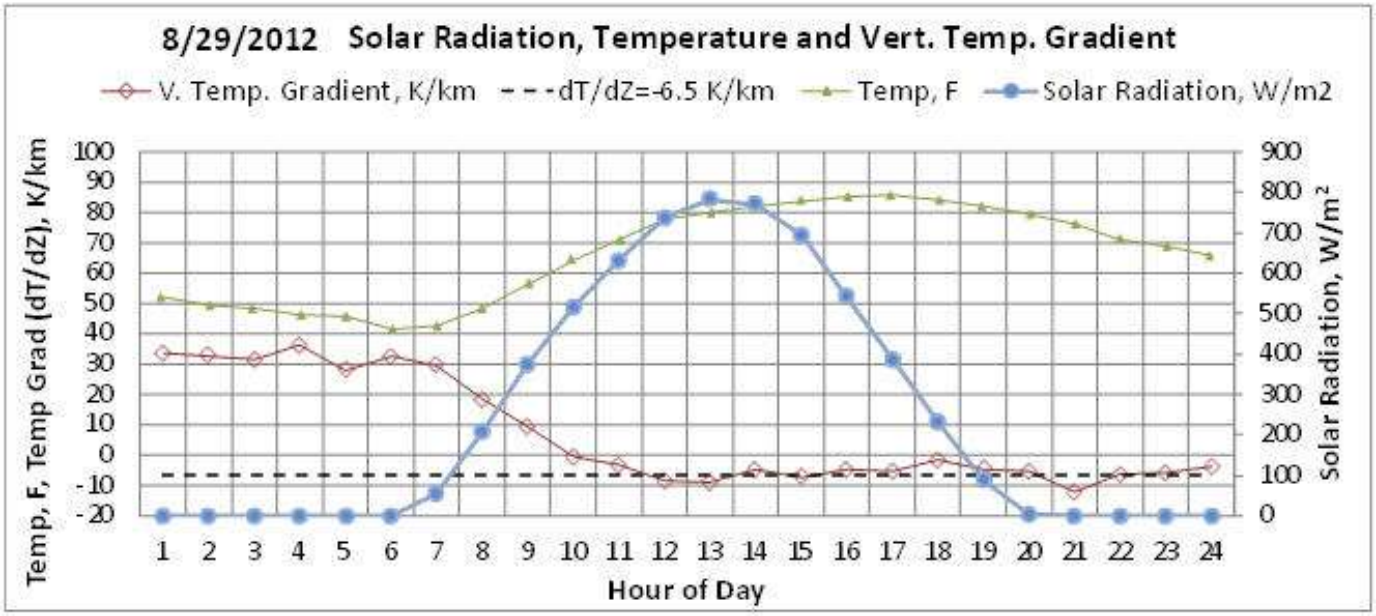

8/28/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m²
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 78.1 µg/m^3 on 8-29-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, 2, 3, 4 (See Sec. 4)
	Weather Conditions:	Open wave trough produces more westerly component across Idaho as 4-Corners high is marginally suppressed.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Afternoon satellite image shows smoke blowing northeast from all local fires. Smoke is visible in the Salmon valley. Back trajectories intersect smoke and/or fire detects from the Halstead, Mustang, and McGuire Complex fires. Hourly $PM_{2.5}$ trace shows two large spikes peaking at 1000 with winds from the W and 2200 with valley flows from the north end of the valley where heavy smoke is visible. Concentrations remain above 100 µg/m^3 at midnight.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 62.2 to 72.3 µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

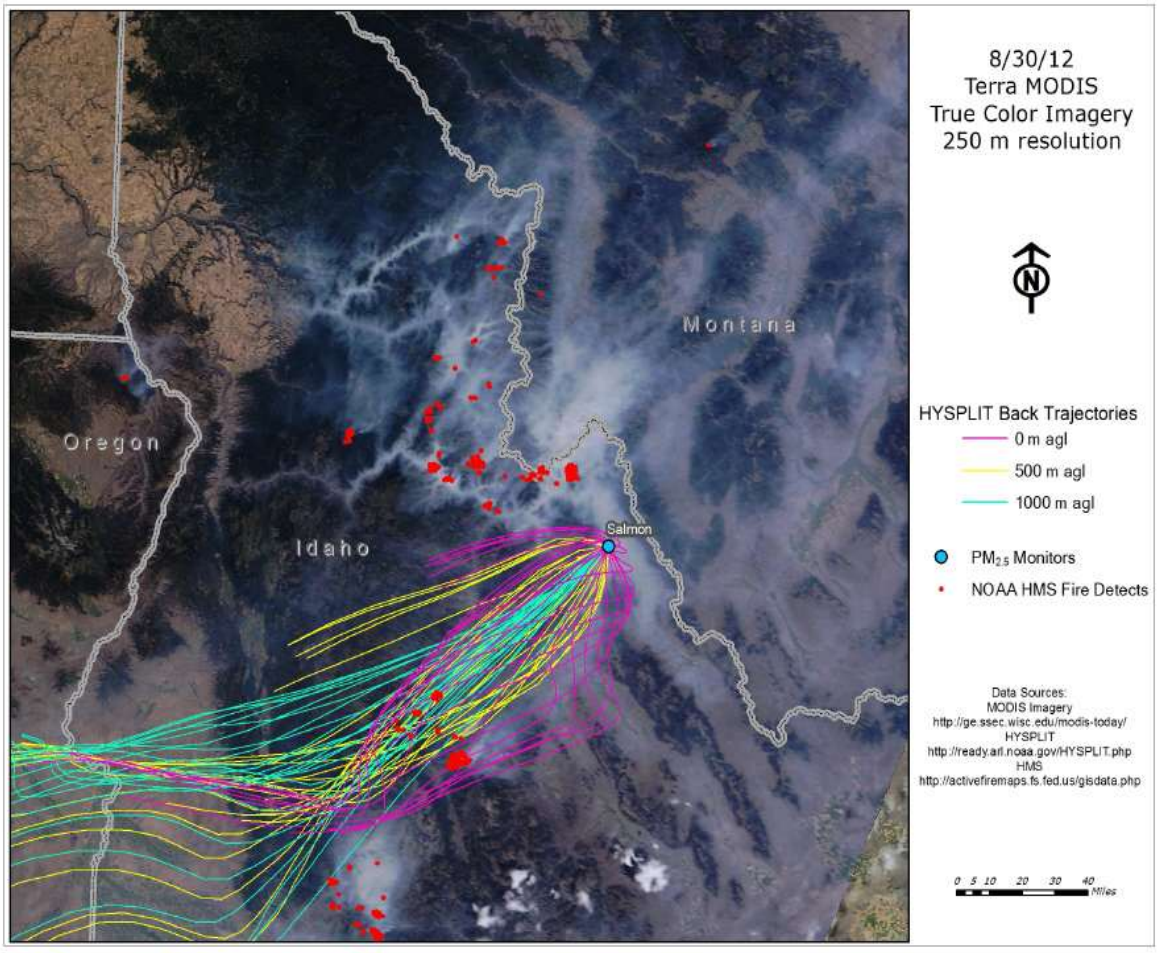


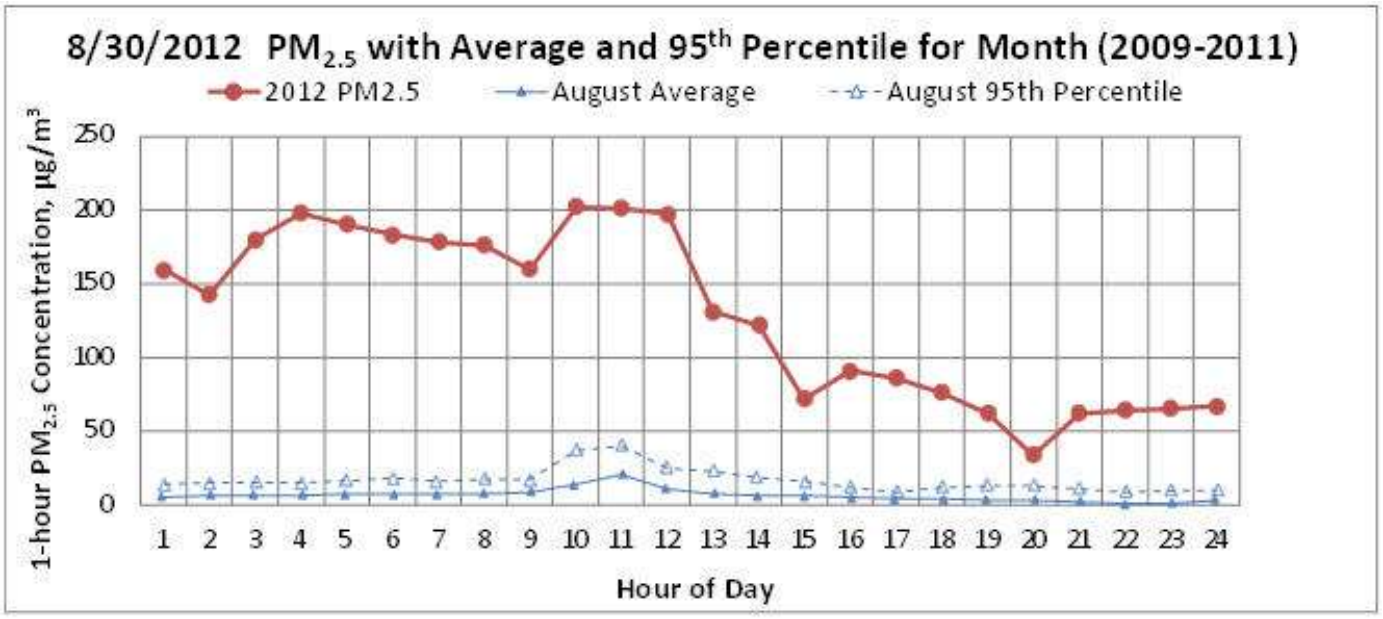

8/29/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
August Average
August 95th Percentile
1-hour PM2.5 Concentration, µg/m3
Hour of Day

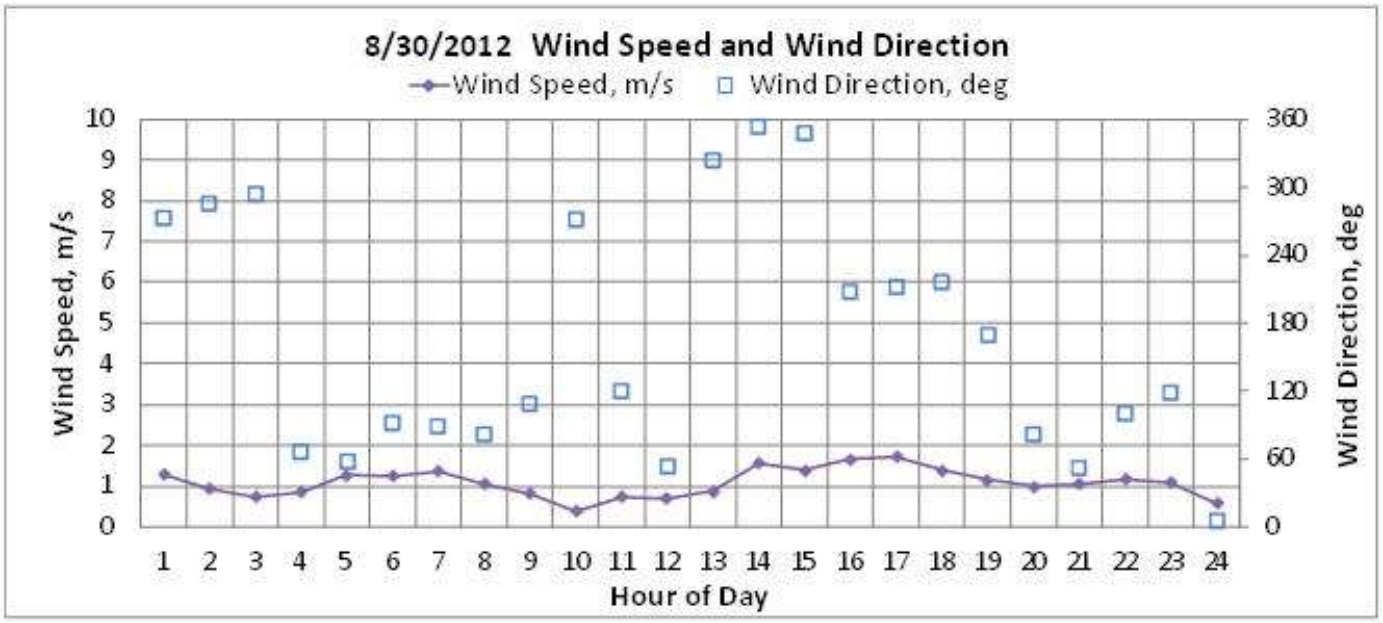

8/29/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Hour of Day

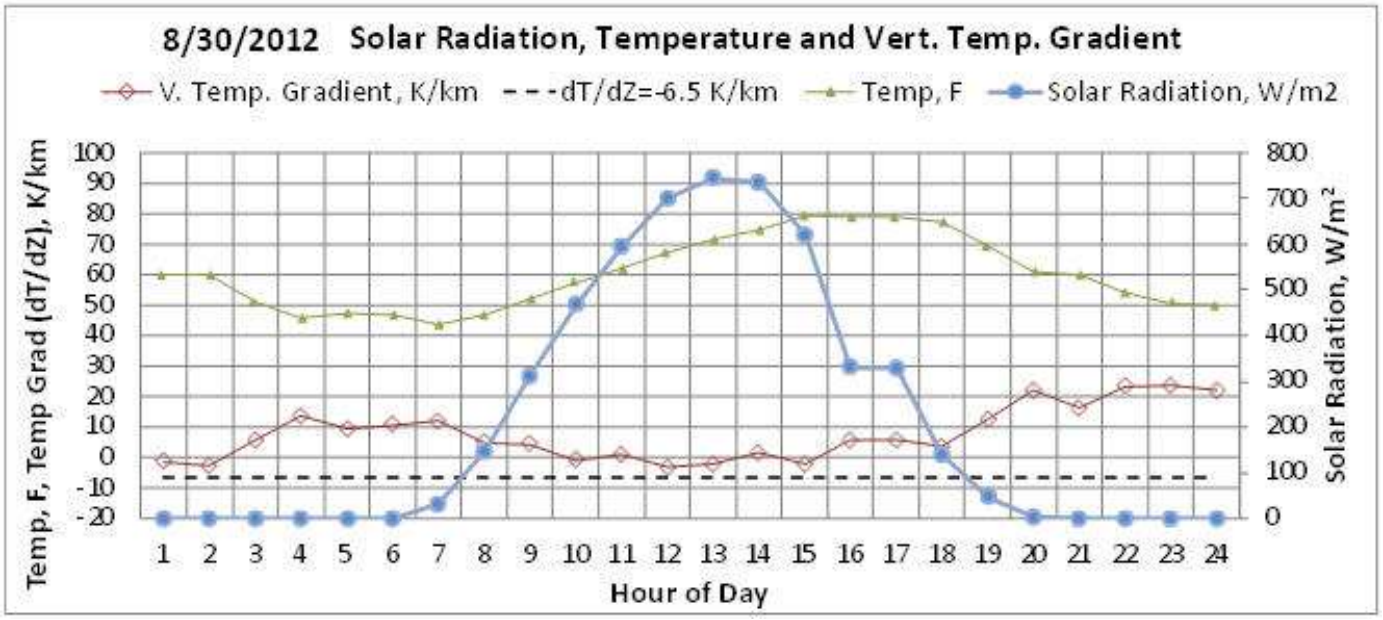

8/29/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m²
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 132 µg/m^3 on 8-30-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, 3, 4 (See Sec. 4)
	Weather Conditions:	Low pressure system in Central British Columbia and associated trough axis further suppresses 4-Corners High and shifts Idaho flow to a southwest direction.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Morning satellite image shows thick smoke occupying the Salmon valley and within the Middle Fork, Clearwater, and Lochsa drainages. Back trajectories intersect smoke and/or fire detects from the Halstead and Trinity Ridge fires. Hourly trace shows sustained high values all morning, trapped from the previous day, then some clearing in the afternoon, though concentrations drop below 50 µg/m^3 for only one hour during the 24-hour period.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 116 to 126 µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

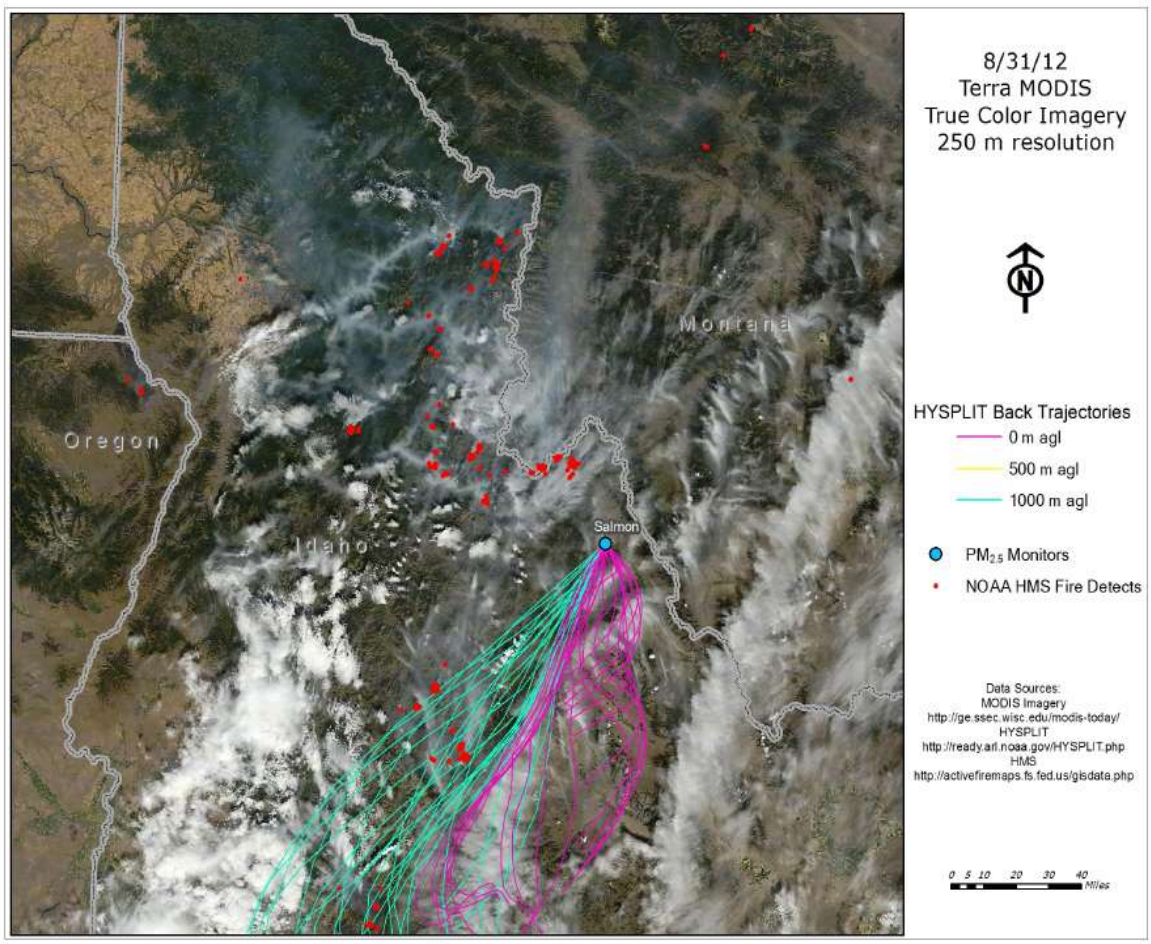


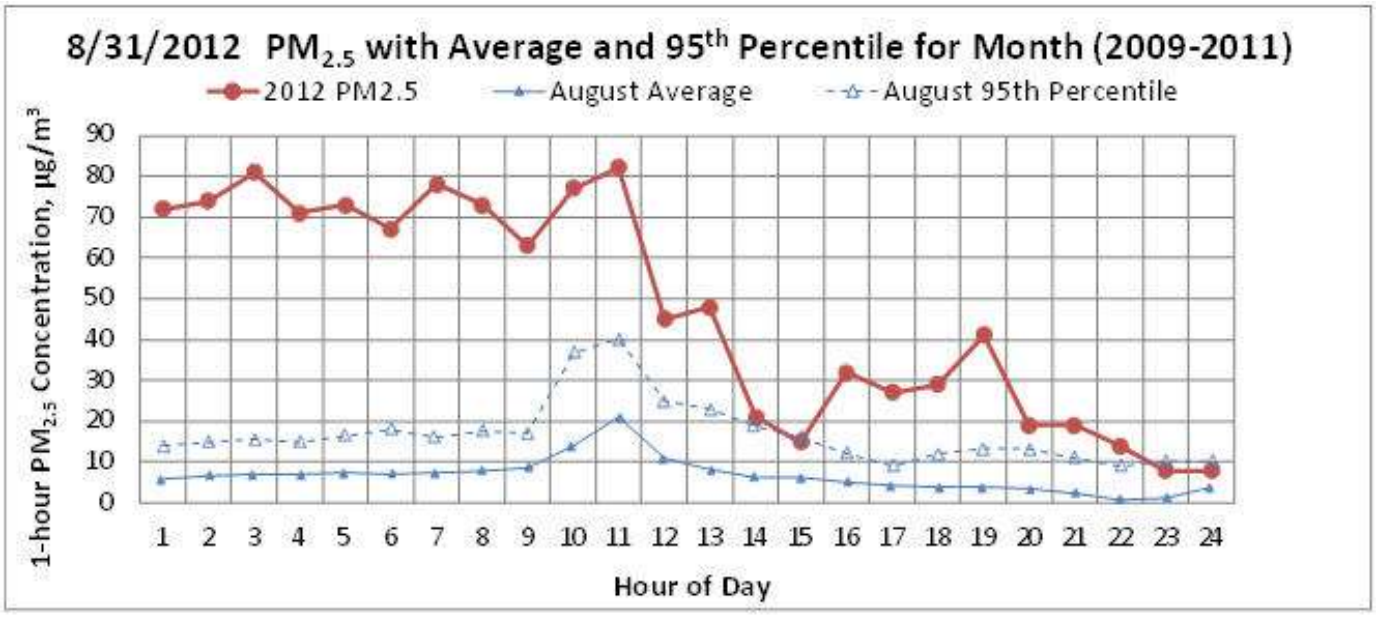

8/30/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
August Average
August 95th Percentile
1-hour PM2.5 Concentration, µg/m3
250
200
150
100
50
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Hour of Day

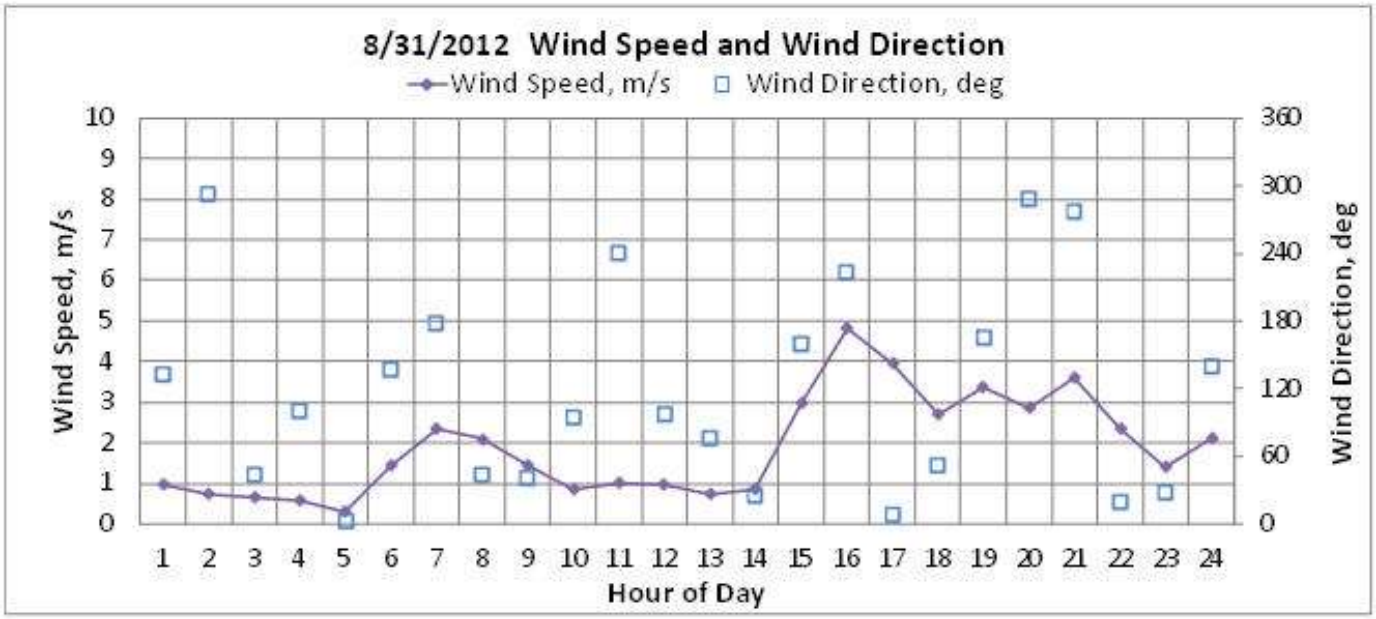

8/30/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Wind Speed, m/s
10
9
8
7
6
5
4
3
2
1
0
Wind Direction, deg
360
300
240
180
120
60
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Hour of Day

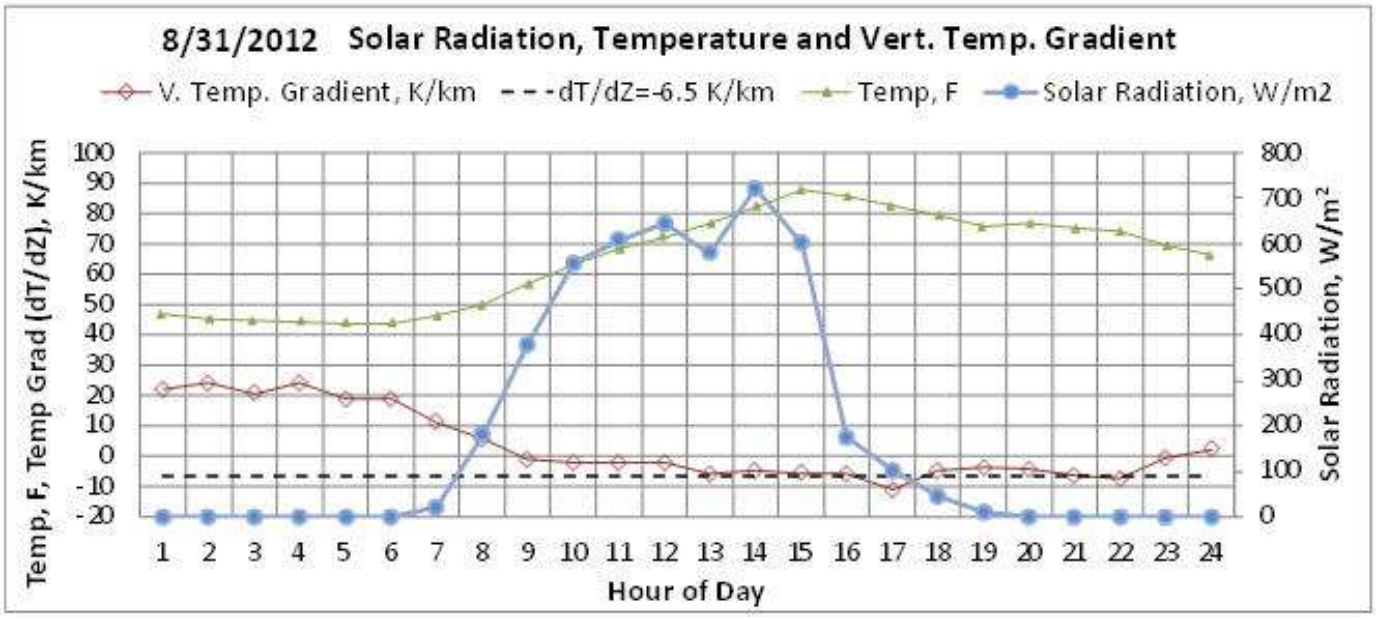

8/30/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
100
90
80
70
60
50
40
30
20
10
0
-10
-20
Solar Radiation, W/m2
800
700
600
500
400
300
200
100
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 49.8 µg/m^3 on 8-31-2012, AQS #16-059-0004 POC 3		
Also included in this request, 24-hour FRM Value (filter based): 45.1 µg/m^3, AQS #16-059-0004 POC 1		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, 3, 4 (See Sec. 4)
	Weather Conditions:	Offshore trough axis intensifies and provides stronger southerly component to flow over Idaho.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Morning satellite image shows smoke interspersed with cloud. Visible smoke in the river valleys reflect a strong overnight temperature inversion trapping smoke overnight at ~70 – 80 µg/m^3. Back trajectories intersect smoke and/or fire detects from the Halstead and Trinity Ridge fires. Hourly trace shows sustained high values during the morning, then clearing in the afternoon when the wind speeds pick up.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 33.9 to 44.0 µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

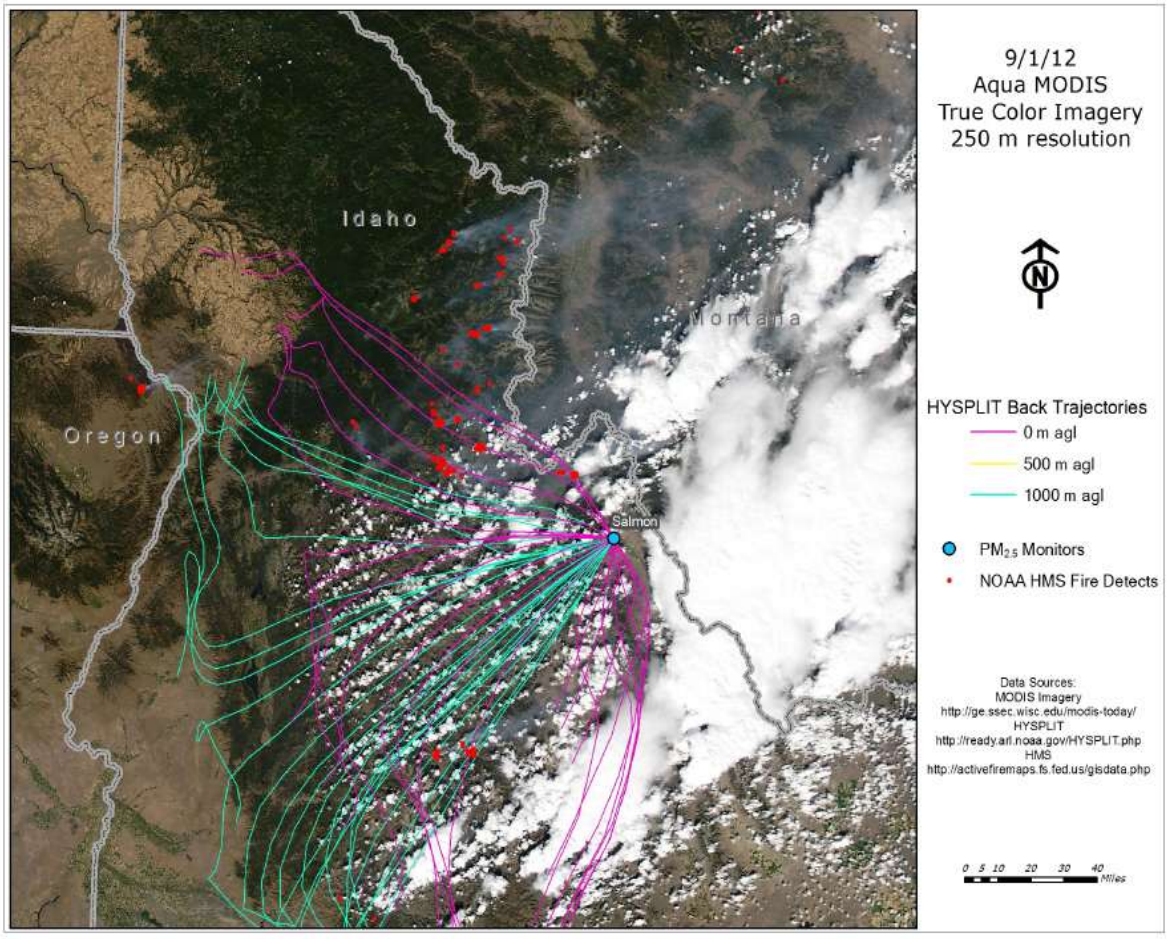


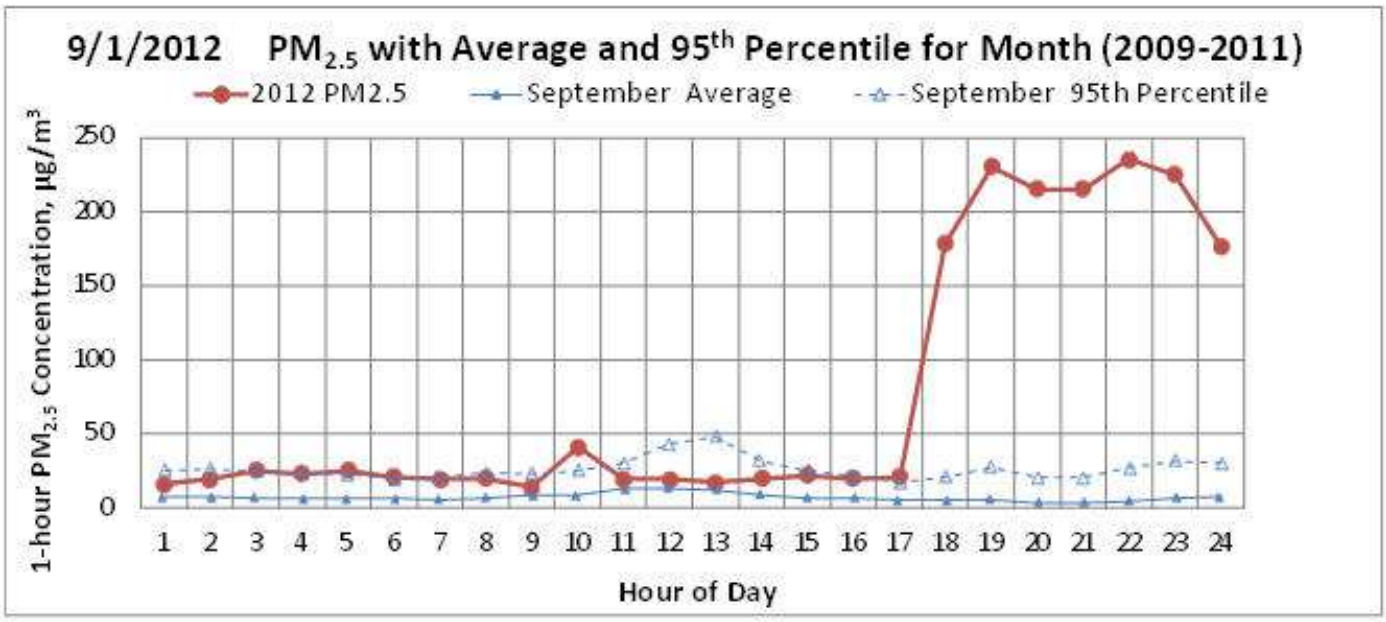

8/31/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
August Average
August 95th Percentile
1-hour PM2.5 Concentration, µg/m³
Hour of Day

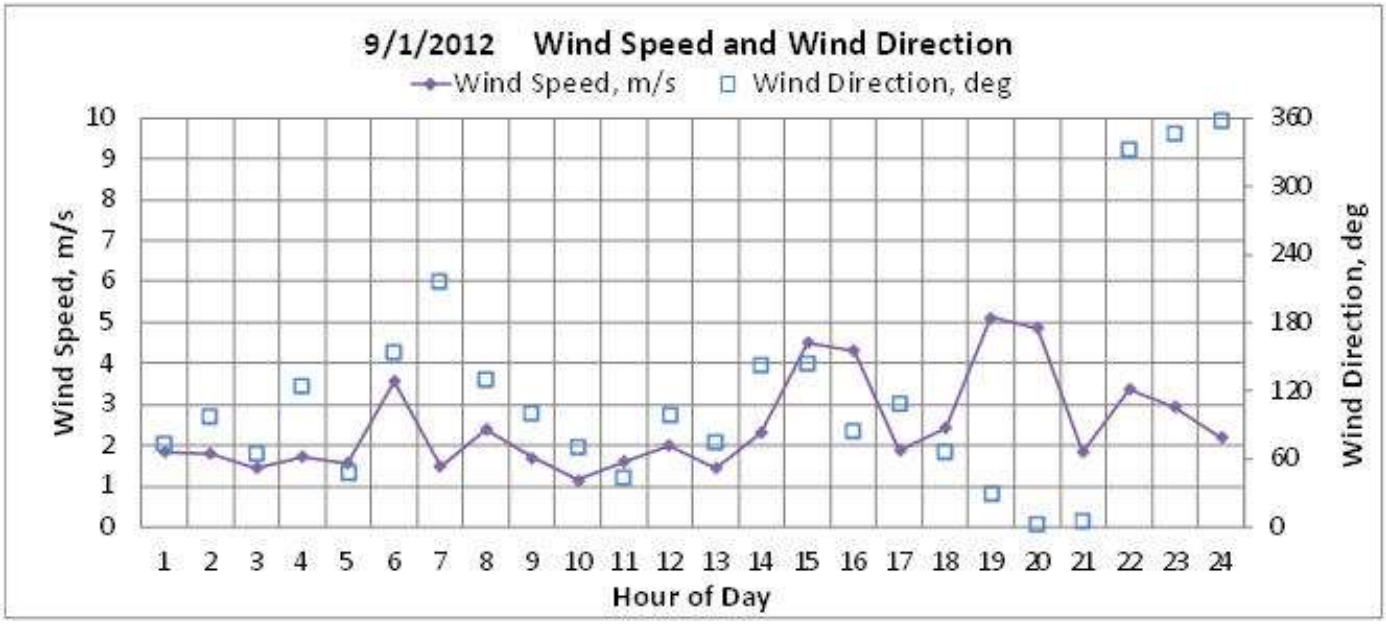

8/31/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Hour of Day

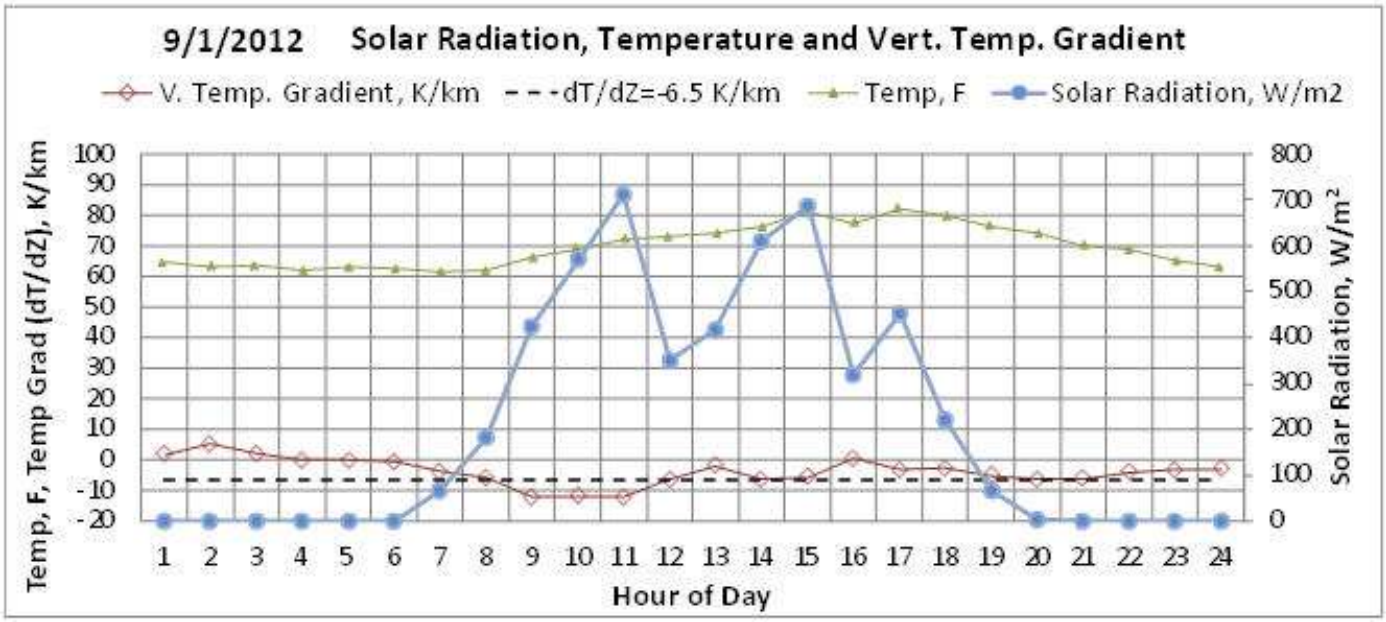

8/31/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m²
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 69.4 µg/m^3 on 9-1-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1 with Scenarios 2, 3, 4 also probably contributing. (See Sec. 4)
	Weather Conditions:	Weak embedded shortwave with baroclinic trough shifts flow from southerly to westerly as trough axis approaches from the Pacific Coast.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Afternoon satellite image shows smoke filling the valley north of Salmon with smoke as it blows eastward from Mustang Complex. Back trajectories intersect smoke and/or fire detects from the Halstead, Mustang, and Cache Creek fires. Hourly trace shows sustained low values until 1700, with a small spike at 1000. Concentrations rise rapidly at 1800 with NW and N valley flows and stay above 150 µg/m^3 through midnight. Higher concentrations correspond to more northerly wind directions, suggesting valley flows from the Mustang Complex.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 53.5 to 63.6 µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

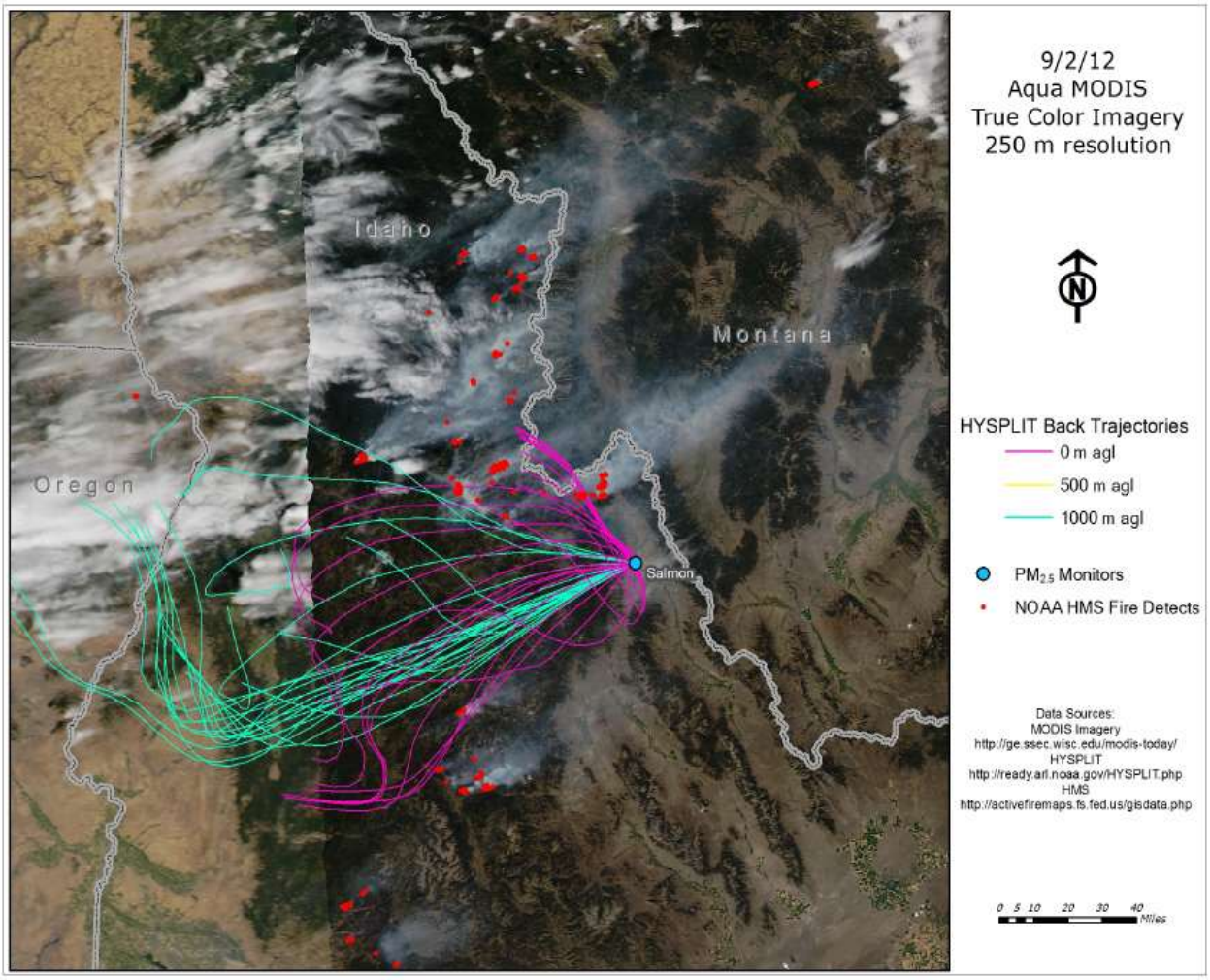


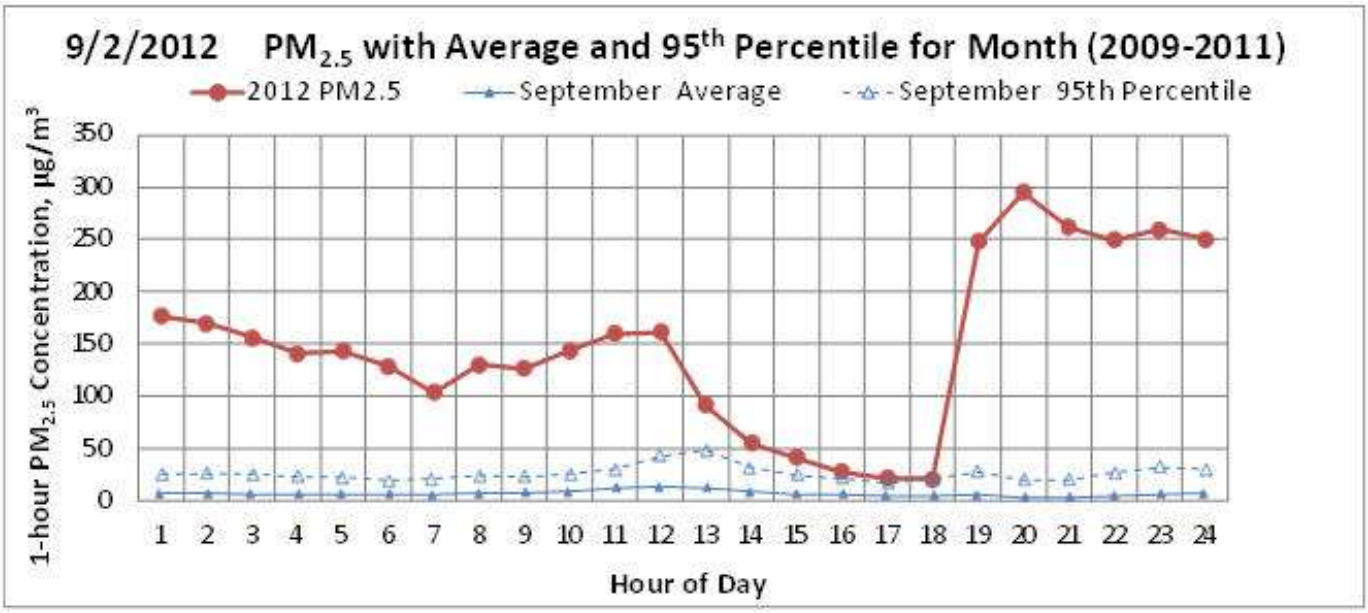

9/1/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
September Average
September 95th Percentile
1-hour PM2.5 Concentration, µg/m³
Hour of Day

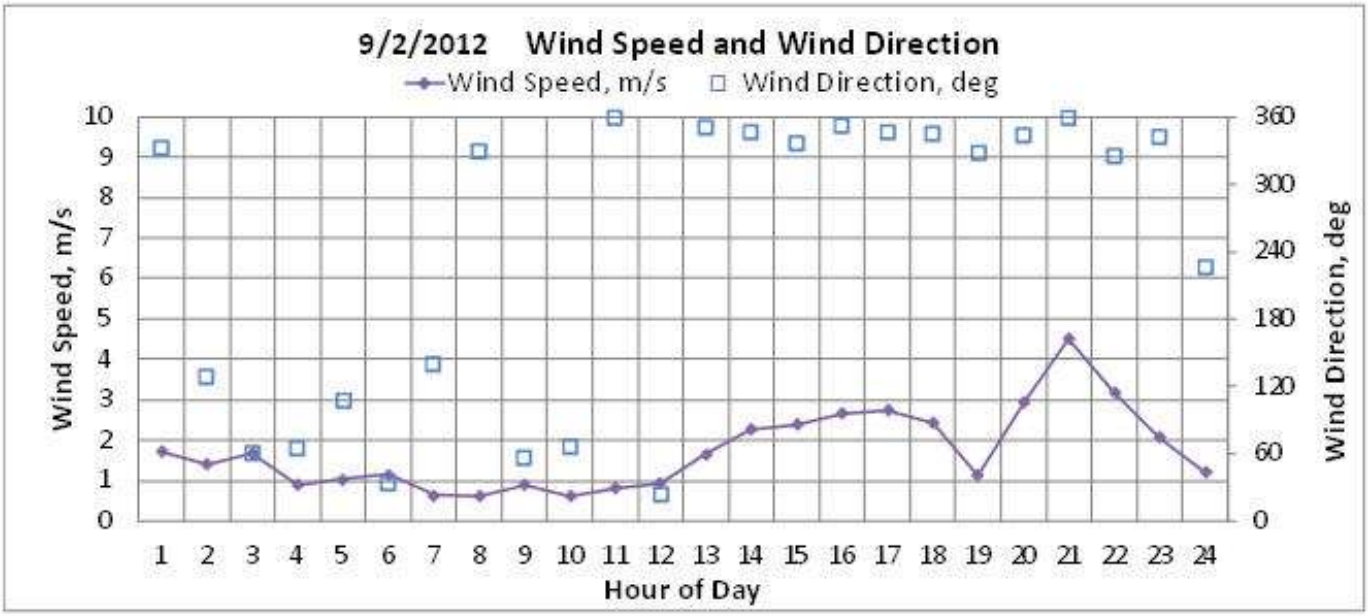

9/1/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Wind Speed, m/s
Wind Direction, deg
Hour of Day

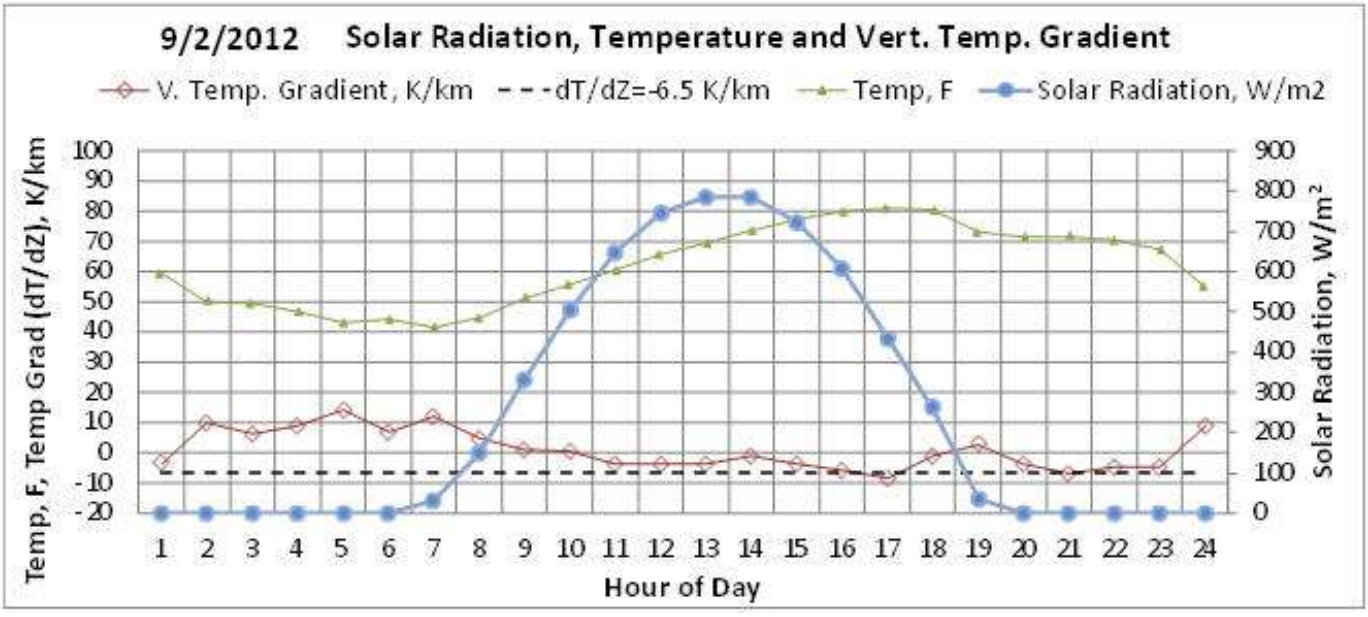

9/1/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m²
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 145.2 µg/m^3 on 9-2-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1 with Scenarios 2, 3, 4 also probably contributing. (See Sec. 4)
	Weather Conditions:	Embedded shortwave provides zonal flow aloft.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Afternoon satellite image shows smoke production from all local fires. Light smoke is visible in Salmon and heavy smoke fills the north end of the valley. Back trajectories intersect smoke and/or fire detects from the Halstead, Mustang, and McGuire Complex fires. Hourly trace shows sustained high values during the morning above 100 µg/m^3, with some clearing in the afternoon. Concentrations rise rapidly to ~ 300 µg/m^3 between1800 and 1900 with northerly valley flow bringing smoke from the Mustang Complex up valley where it remains ~250 µg/m^3 through midnight.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 129 to 139 µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

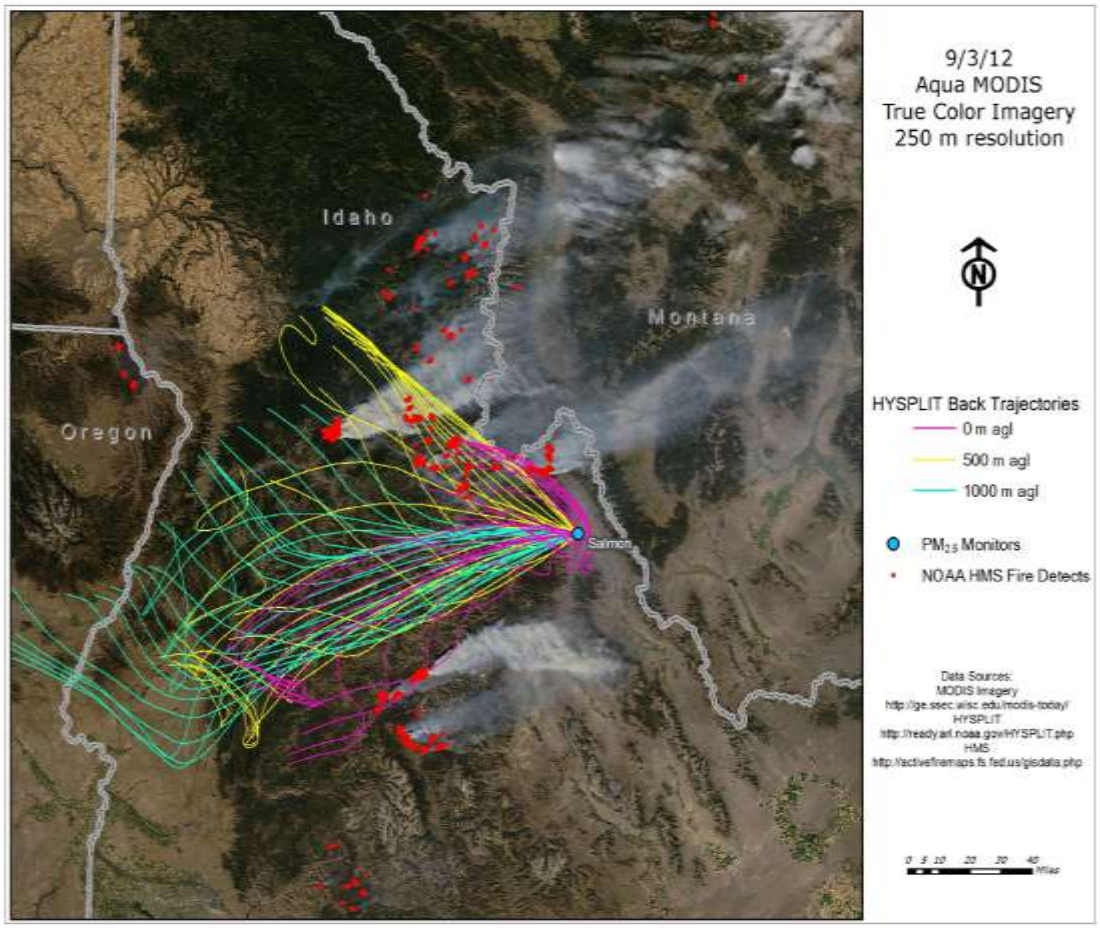


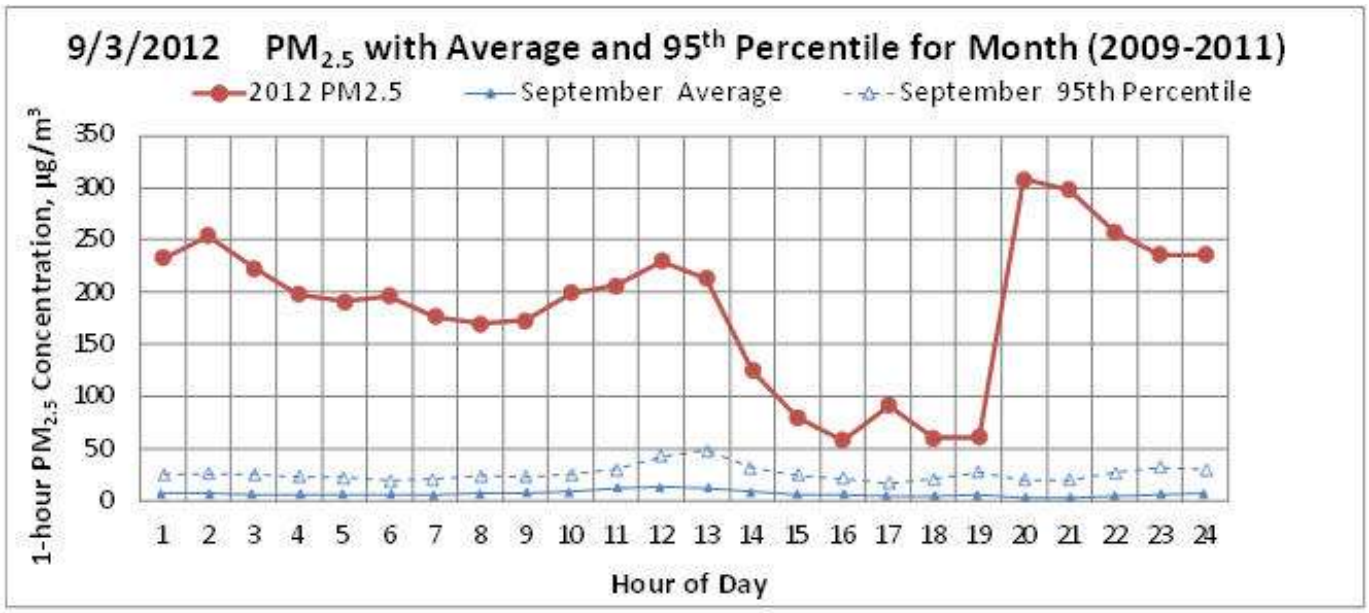

9/2/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
September Average
September 95th Percentile
1-hour PM2.5 Concentration, µg/m³
Hour of Day

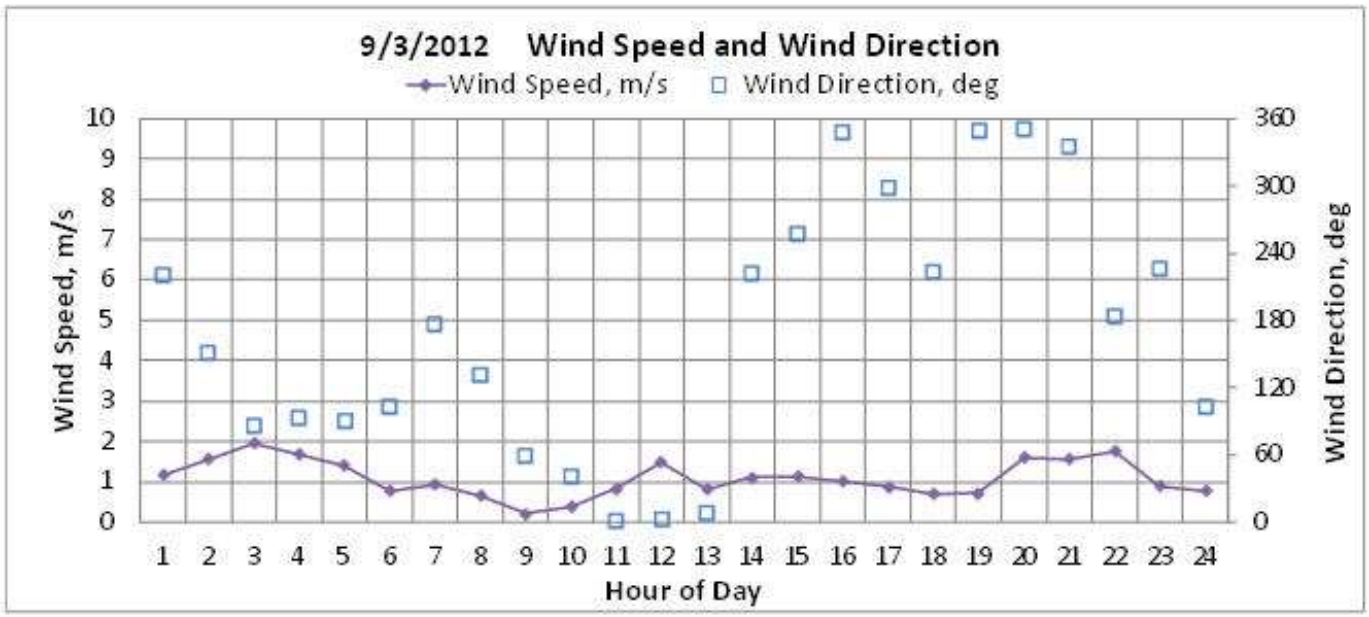

9/2/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Wind Speed, m/s
Wind Direction, deg
Hour of Day

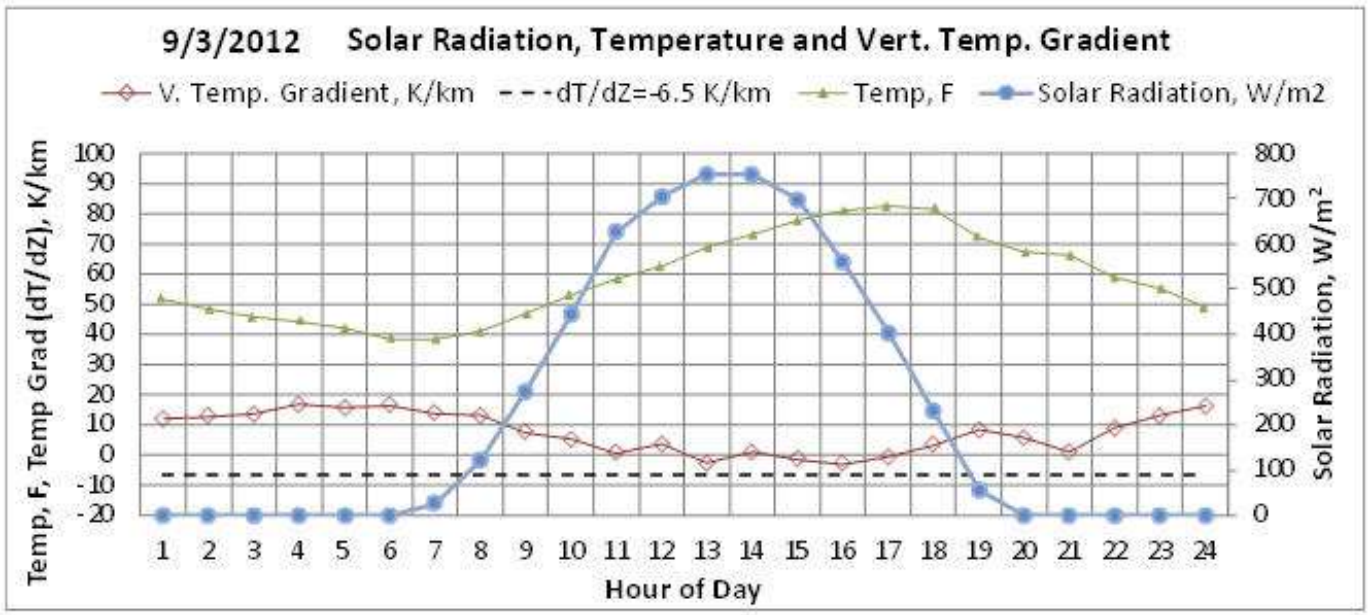

9/2/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m²
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 186.9 µg/m^3 on 9-3-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1 with Scenarios 2, 3, 4 also probably contributing. (See Sec. 4)
	Weather Conditions:	Low pressures in northern Alberta and Saskatchewan suppress ridge across Idaho providing S-SW flow.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Afternoon satellite image shows dense smoke plumes blowing east from all local fires. Light smoke is visible in Salmon and dense smoke in the north end of the valley. Back trajectories intersect smoke and/or fire detects from the Halstead, Mustang, and McGuire Complex fires. Hourly trace shows sustained high values during the morning trapped from the previous day, with some clearing in the afternoon. Concentrations rise rapidly at 2000 with north winds and stay above 200 µg/m^3 through midnight, indicating valley flow from the Mustang Complex.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 171 to 181 µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

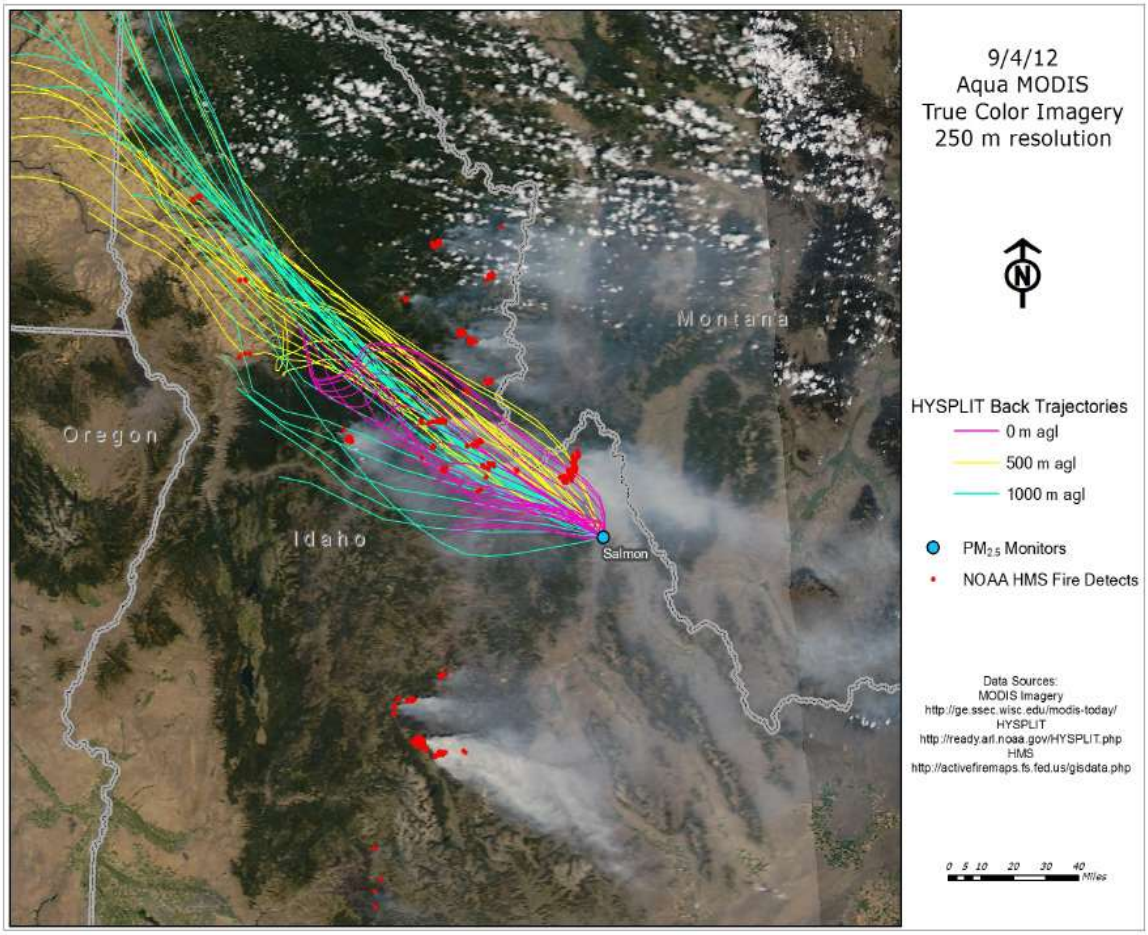


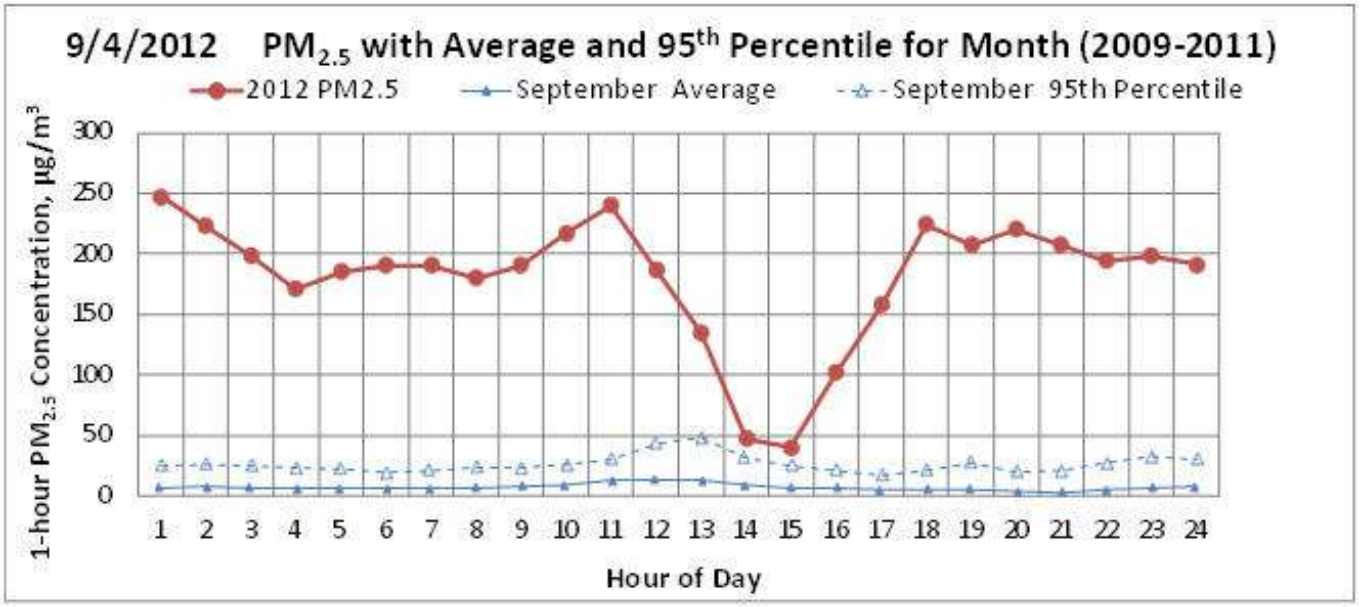

9/3/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
September Average
September 95th Percentile
1-hour PM2.5 Concentration, µg/m3
Hour of Day

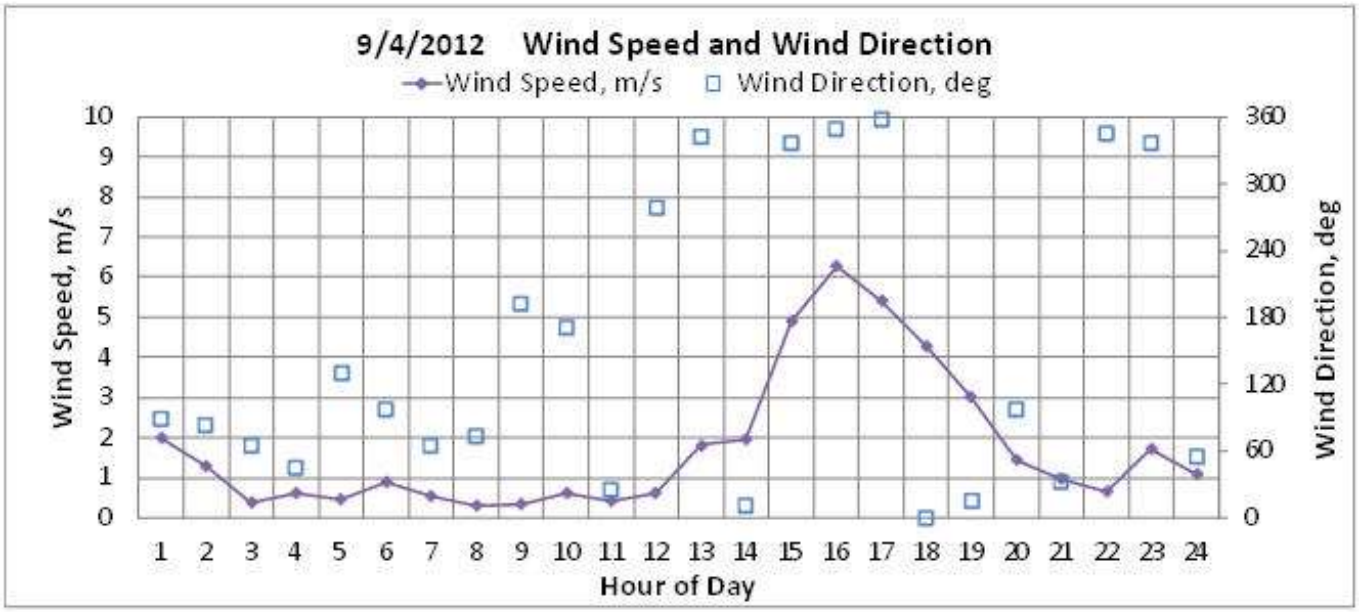

9/3/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Wind Speed, m/s
Wind Direction, deg
Hour of Day

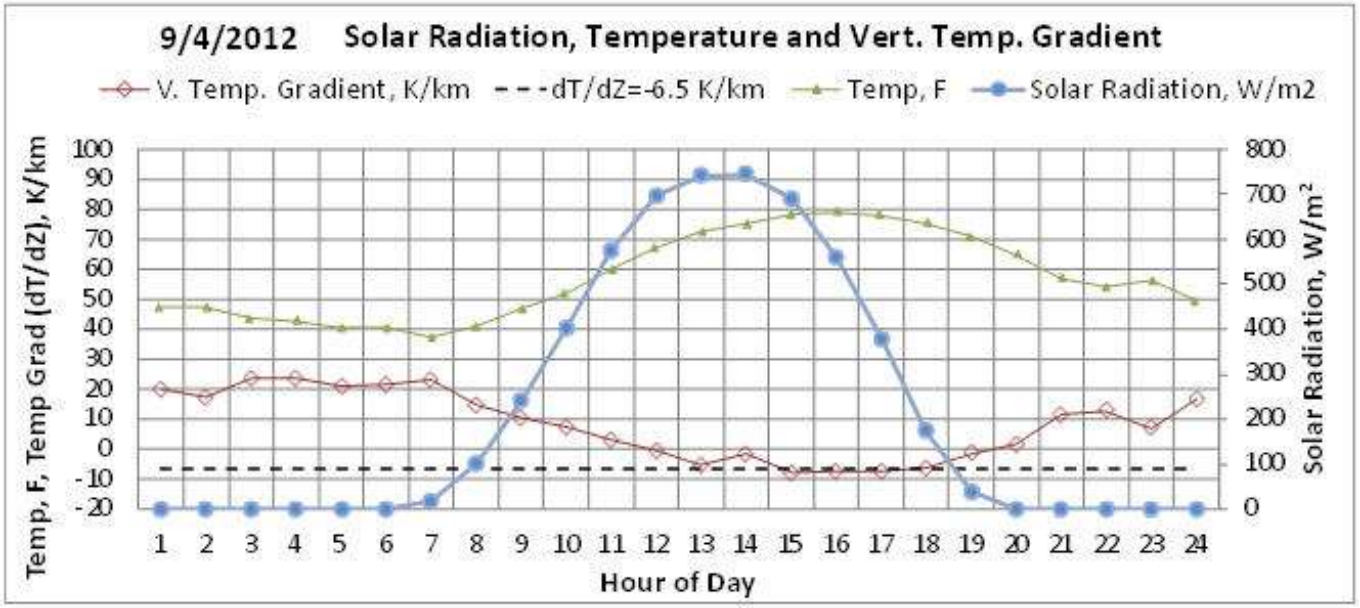

9/3/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m2
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 182.7 µg/m^3 on 9-4-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, 2, 3 (See Sec. 4)
	Weather Conditions:	Low pressure in northern Saskatchewan and Manitoba suppress ridge over Idaho with ridging upstream promoting west-northwest flow.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Smoke fills the Lemhi and southern Salmon River Valleys in the morning satellite image. Afternoon satellite image shows thick smoke engulfing Salmon from the north and northwest. Back trajectories intersect smoke and/or fire detects from the Mustang and McGuire Complex fires. Hourly trace shows sustained high values with light winds during the morning, with some clearing between 1400 and 1500. Concentrations rise rapidly again starting at 1600 with north winds and stay close to 200 µg/m^3 through midnight, suggesting up-valley flow from the Mustang Complex.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 167 to 177 µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

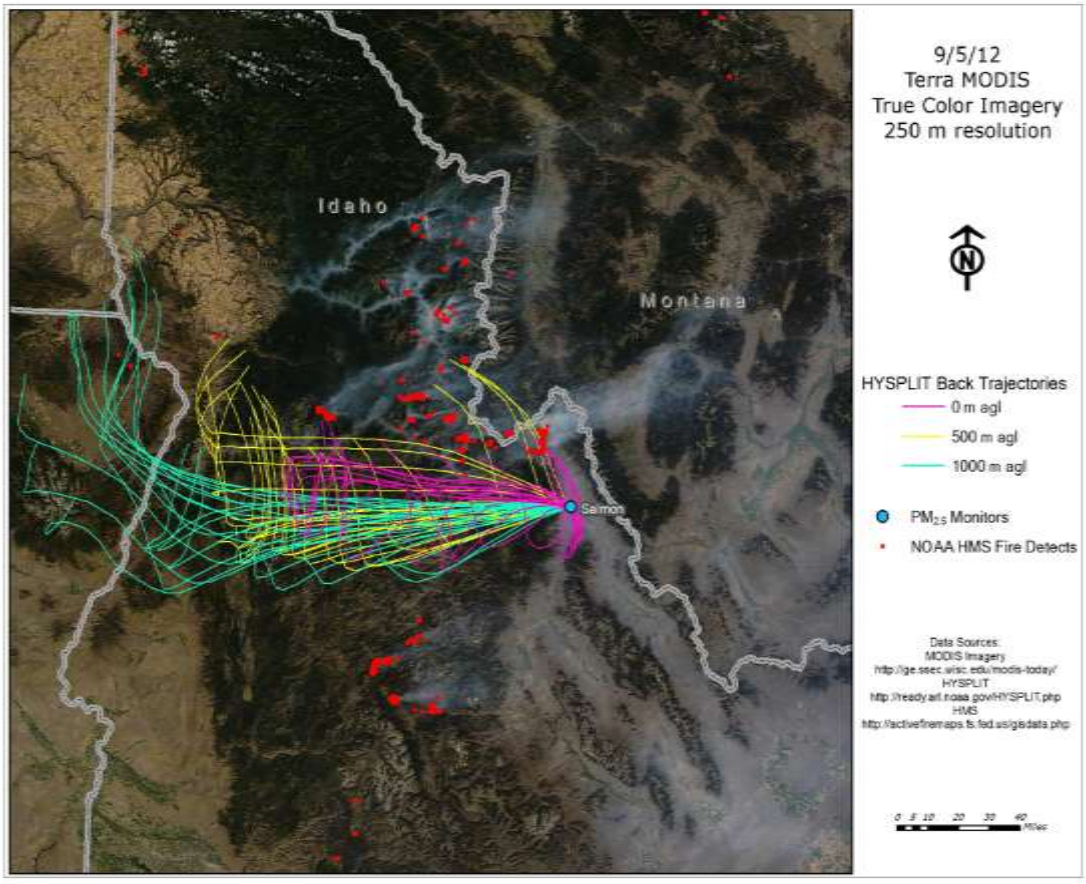


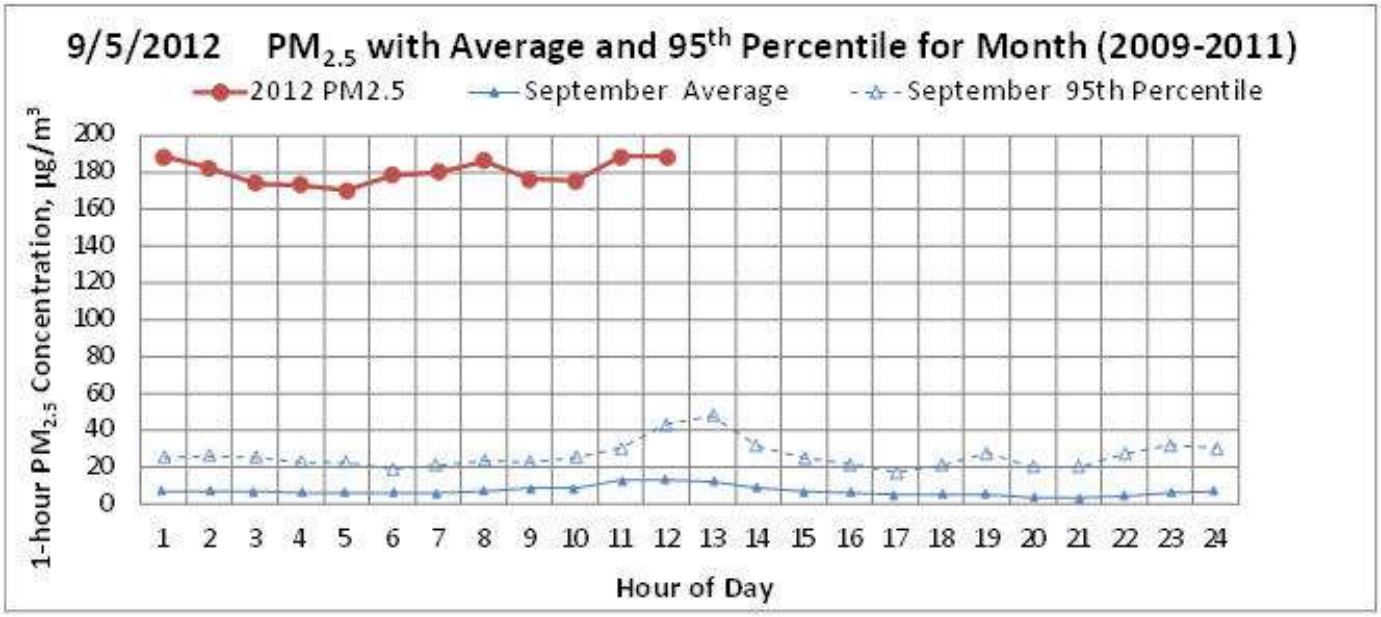

9/4/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
September Average
September 95th Percentile
1-hour PM2.5 Concentration, µg/m³
Hour of Day

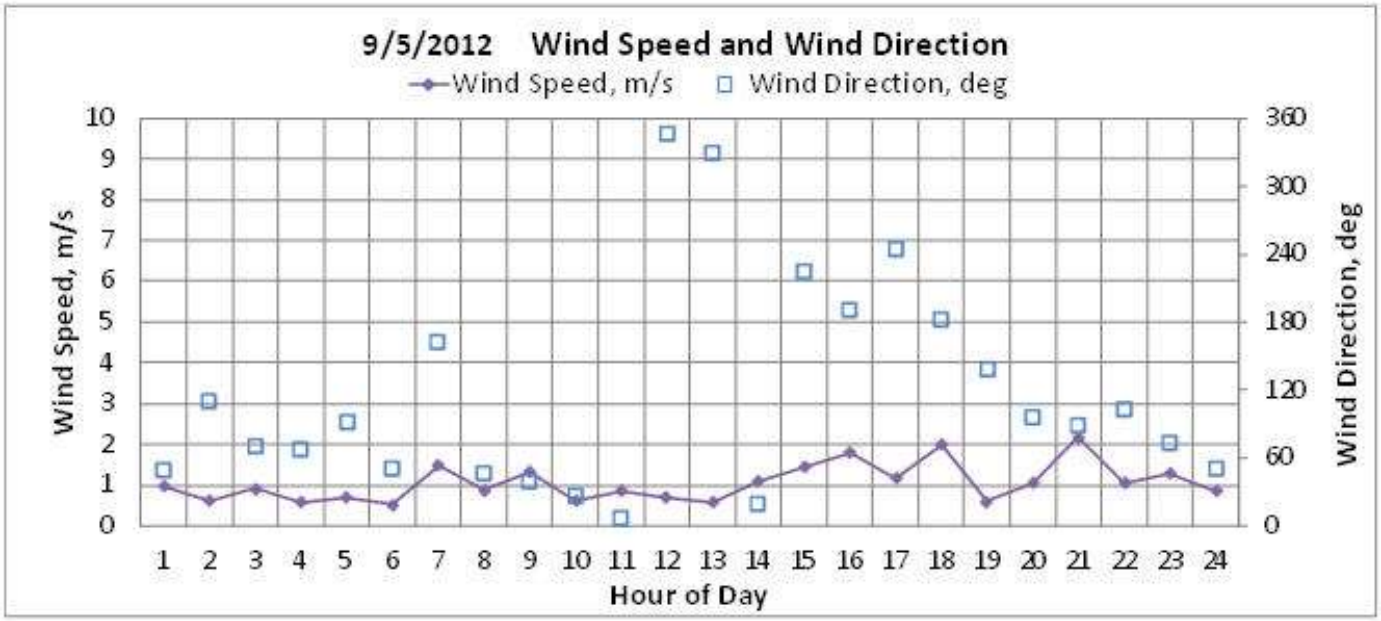

9/4/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Hour of Day

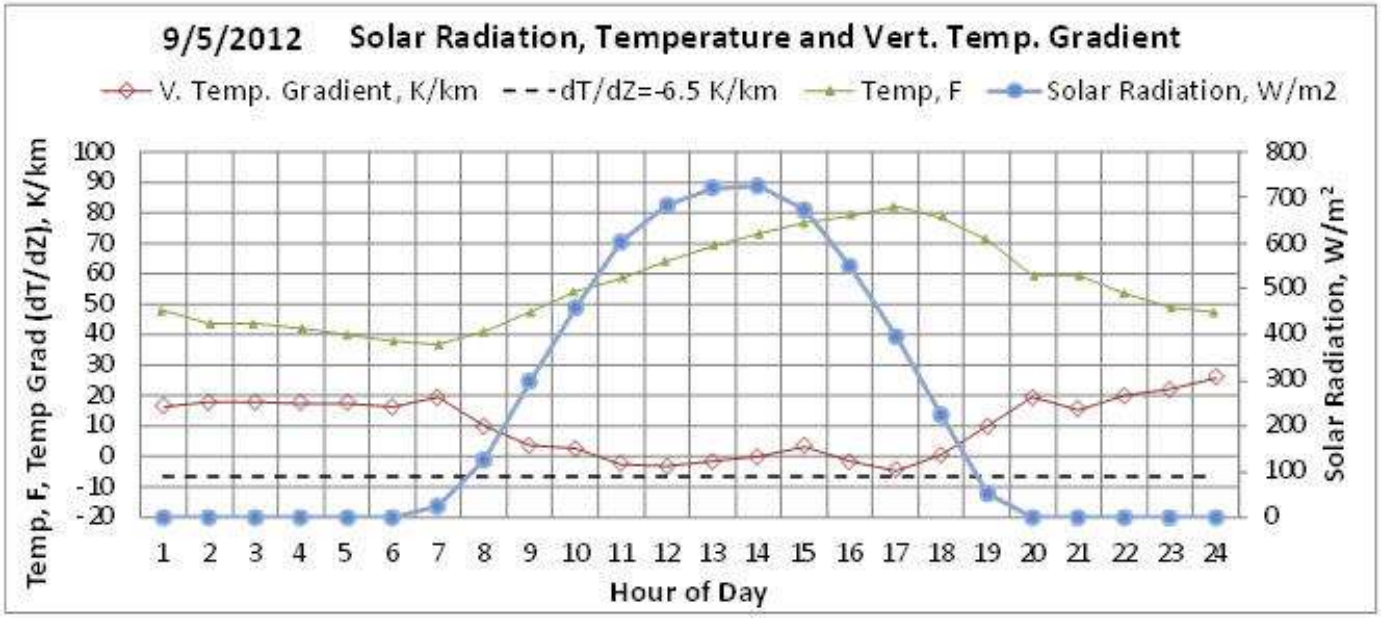

9/4/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m²
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 97.8 µg/m^3 on 9-5-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, 2, 3 (See Sec. 4)
	Weather Conditions:	Low pressure in northern Manitoba suppresses ridge over Idaho with ridging upstream promoting west-northwest flow.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Morning satellite image shows plumes blowing east from Halstead and Mustang and smoke filling valleys and river drainages. Back trajectories intersect smoke and/or fire detects from the Mustang and McGuire Complex fires. Surface trajectories travel north and south along the Salmon Valley, bringing drainage smoke from Halstead and Mustang to the monitor. Hourly trace shows sustained high values around 180 µg/m^3 until noon indicating Salmon remains socked in from the previous day. Wind speeds are low during the period and the inversion never breaks. Monitor data is not available after 1200 but the 24-hour concentration is at least 97.8 µg/m^3 by noon.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 81.9 to 92 µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

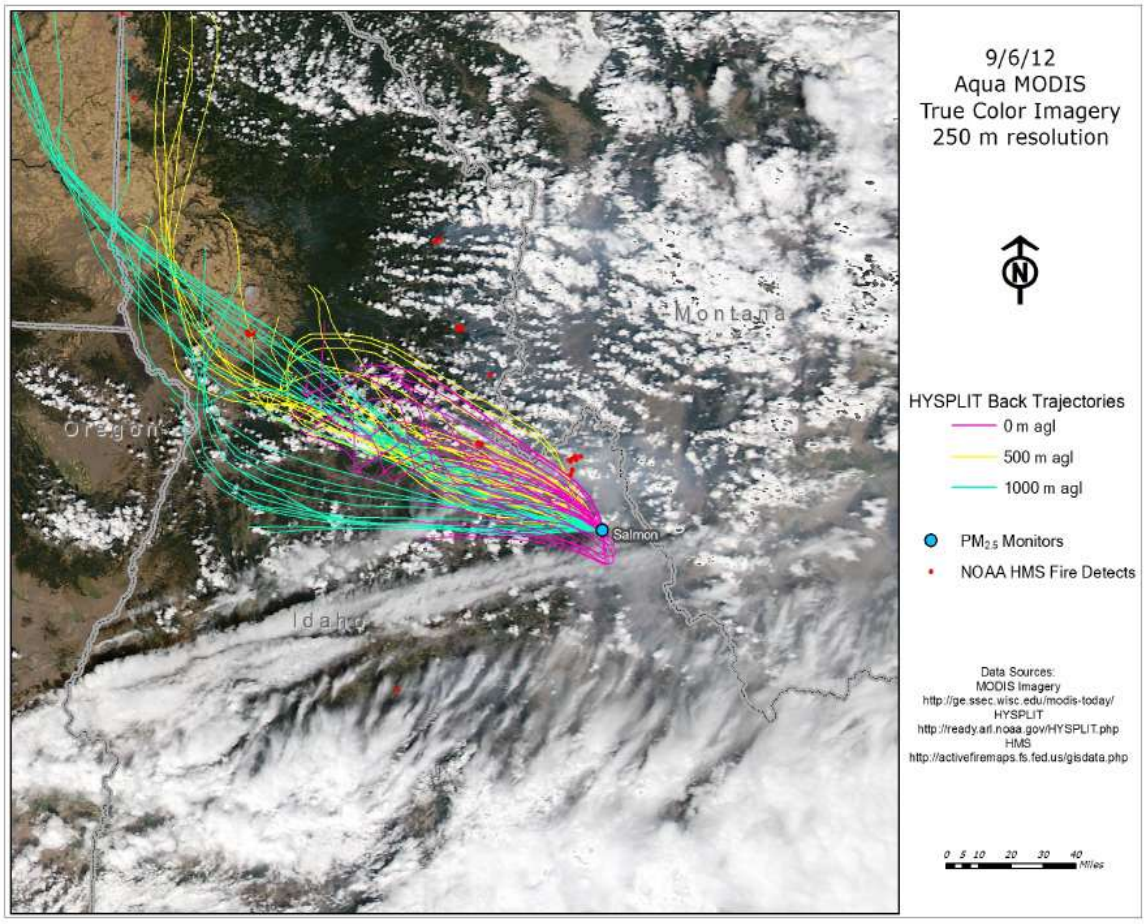


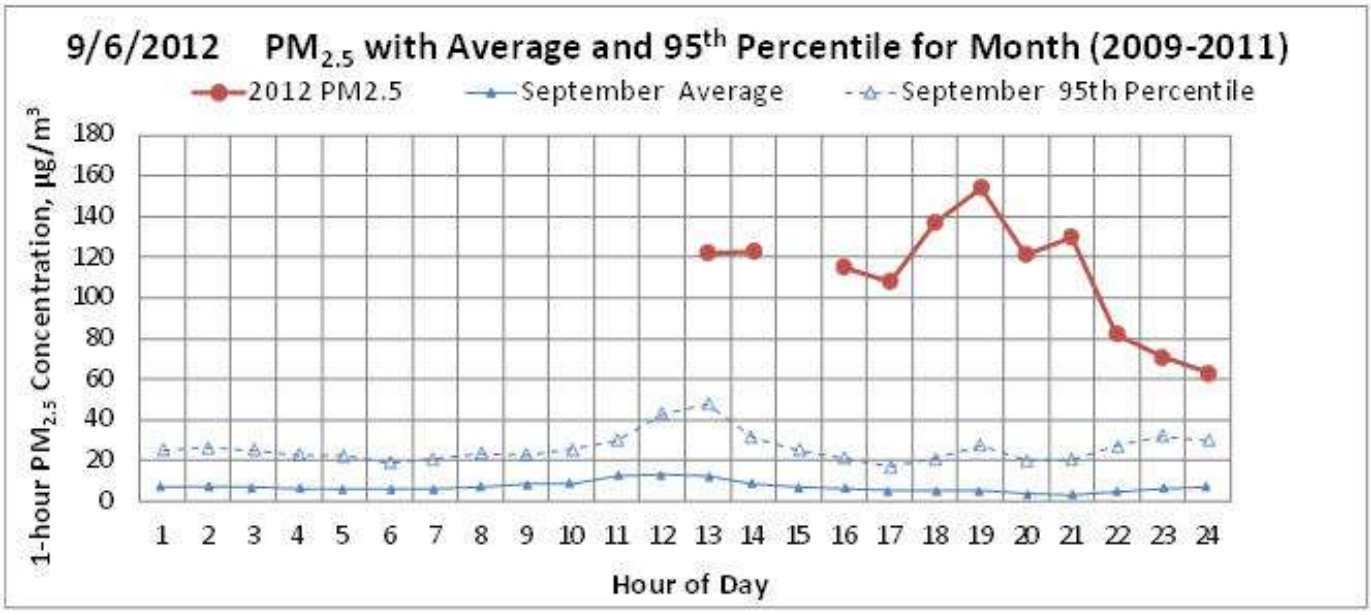

9/5/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
September Average
September 95th Percentile
1-hour PM2.5 Concentration, µg/m3
Hour of Day

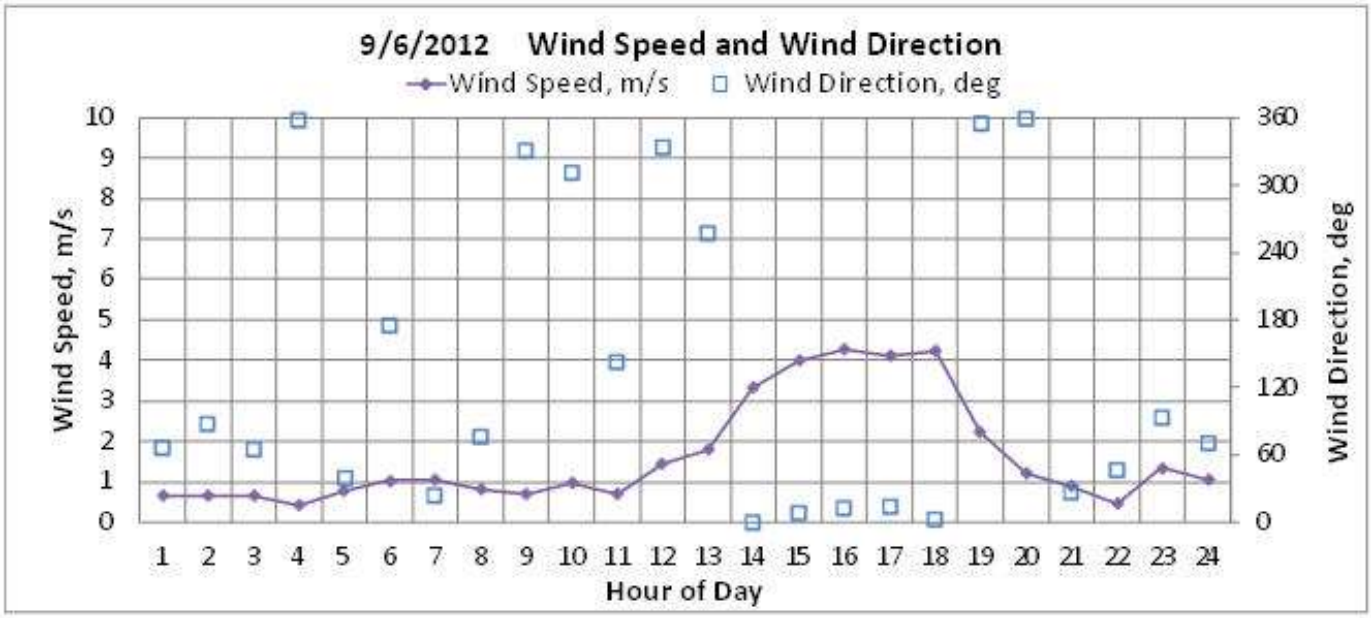

9/5/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Wind Speed, m/s
Wind Direction, deg
Hour of Day

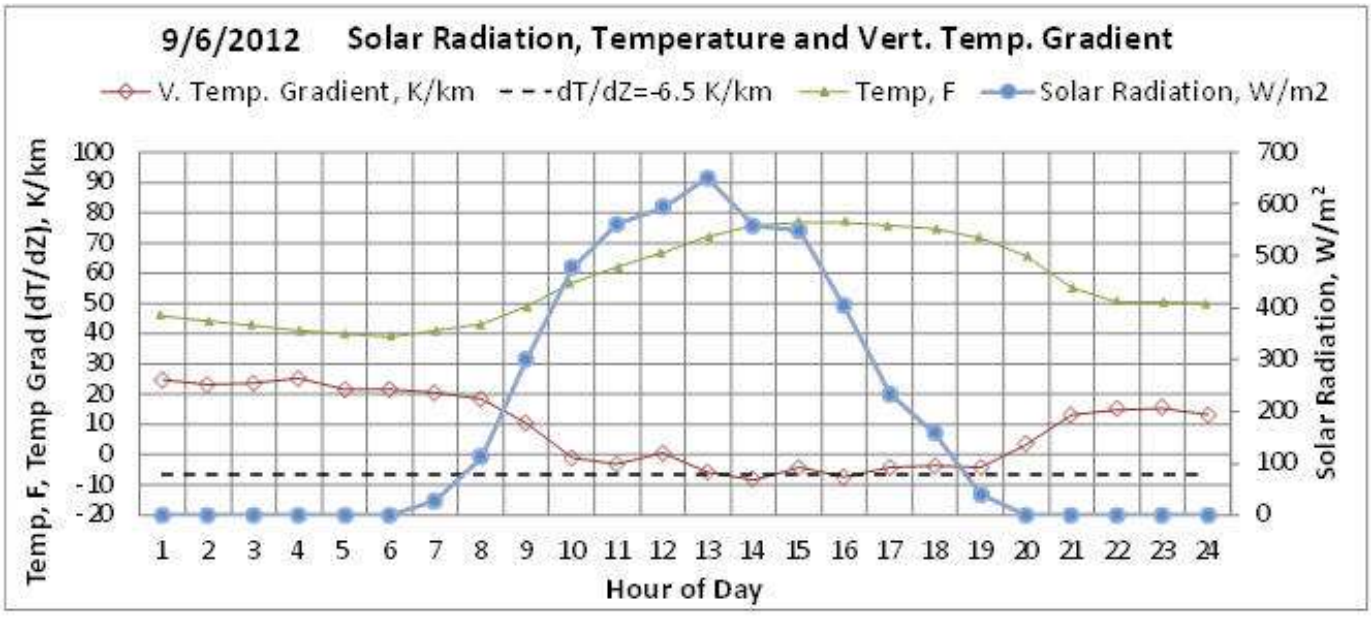

9/5/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m2
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 48.4 µg/m^3 on 9-6-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, 2 (See Sec. 4)
	Weather Conditions:	Off shore low weakens into open wave and forces strong steering of meridional to zonal flow across central Idaho.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Morning and afternoon satellite images show smoke mixed with clouds. Back trajectories intersect smoke and/or fire detects from the Mustang Complex. Smoke is visible in Salmon. Hourly trace is missing data for half the day, the recorded hours are all above the 24-hour NAAQS. Afternoon winds from the north bring elevated concentrations to Salmon 1800 to 2100.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 32.5 to 42.6 µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

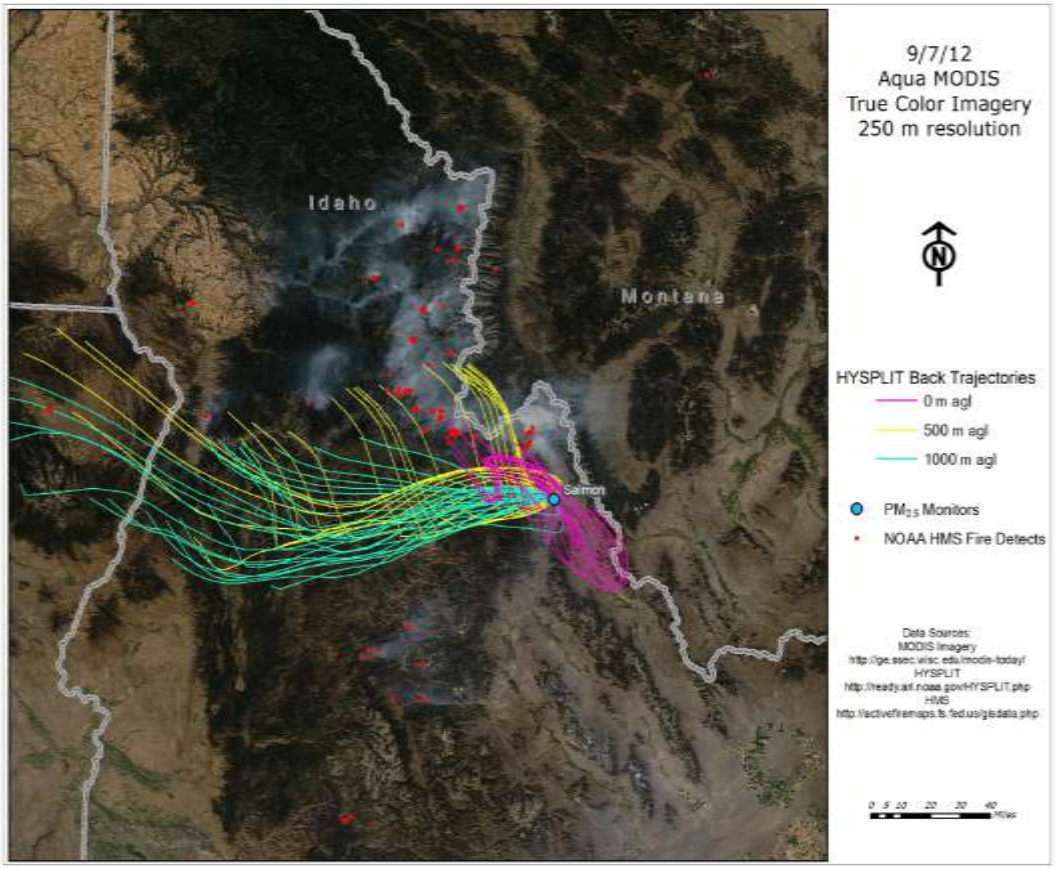


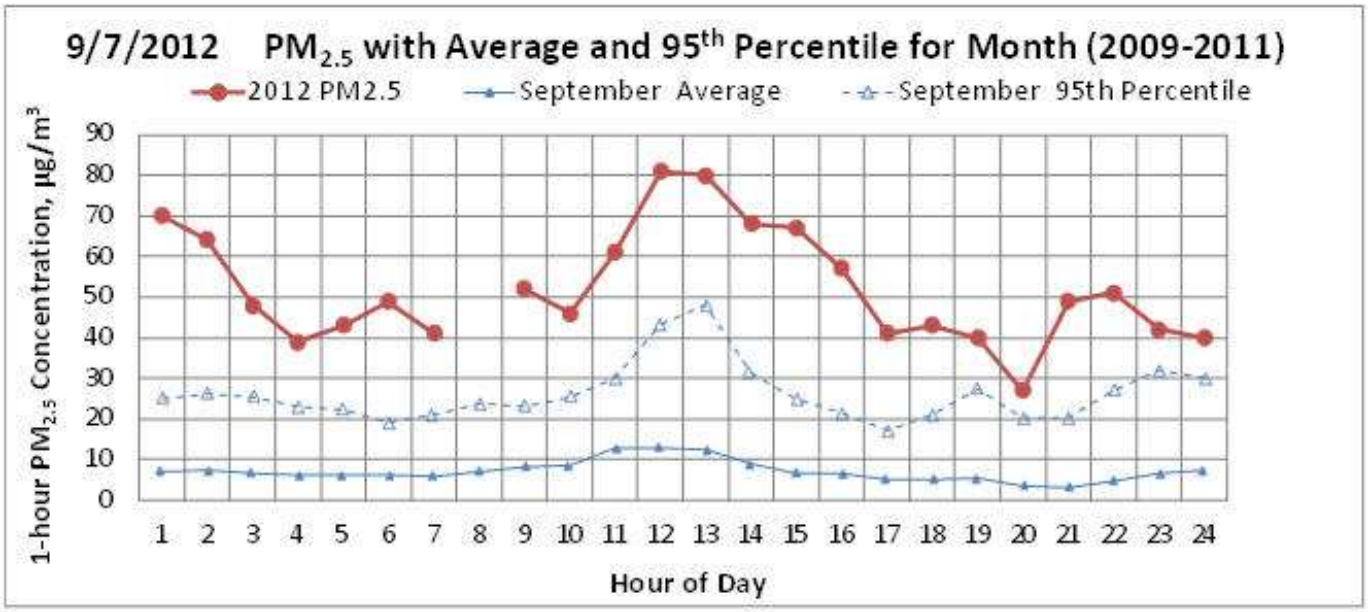

9/6/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
September Average
September 95th Percentile
1-hour PM2.5 Concentration, µg/m3
Hour of Day

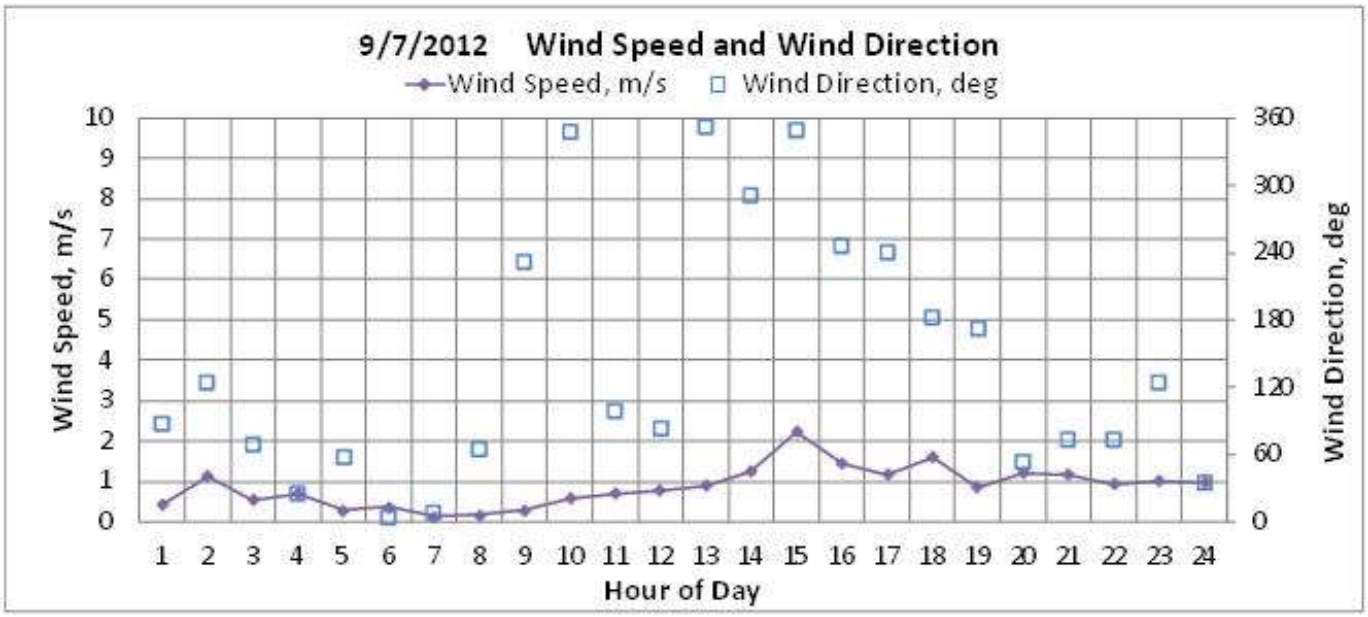

9/6/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Hour of Day

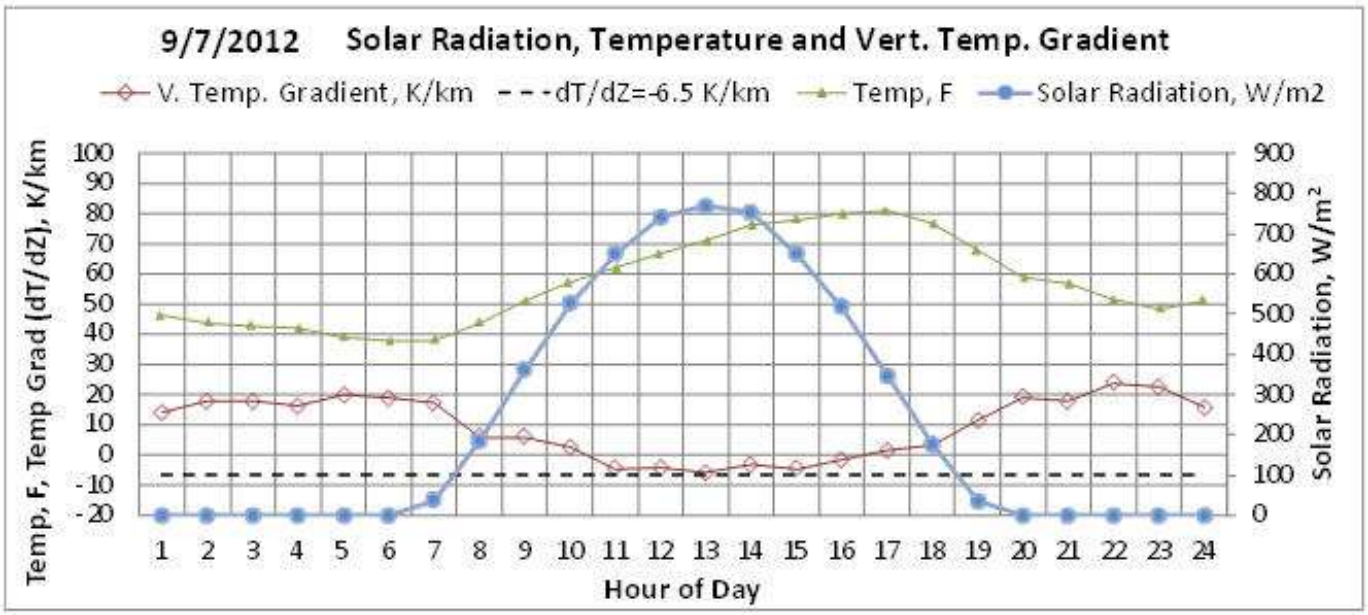

9/6/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m2
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 53.1 µg/m^3 on 9-7-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, 2 (See Sec. 4)
	Weather Conditions:	Weak Rex block develops offshore limiting wind speeds aloft and generally allowing orographically-driven dynamics to thrive.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Afternoon satellite image shows smoke organized not into plumes but displaying seep and creep behavior that occurs with low winds. Back trajectories intersect smoke and/or fire detects from the Mustang, McGuire, and Sheep fires. Surface trajectory does not travel far during the period and wanders in various directions, providing further evidence of stagnant conditions. Temperature inversion never breaks. Hourly trace is generally elevated throughout the day.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 37.2 to 47.3 µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

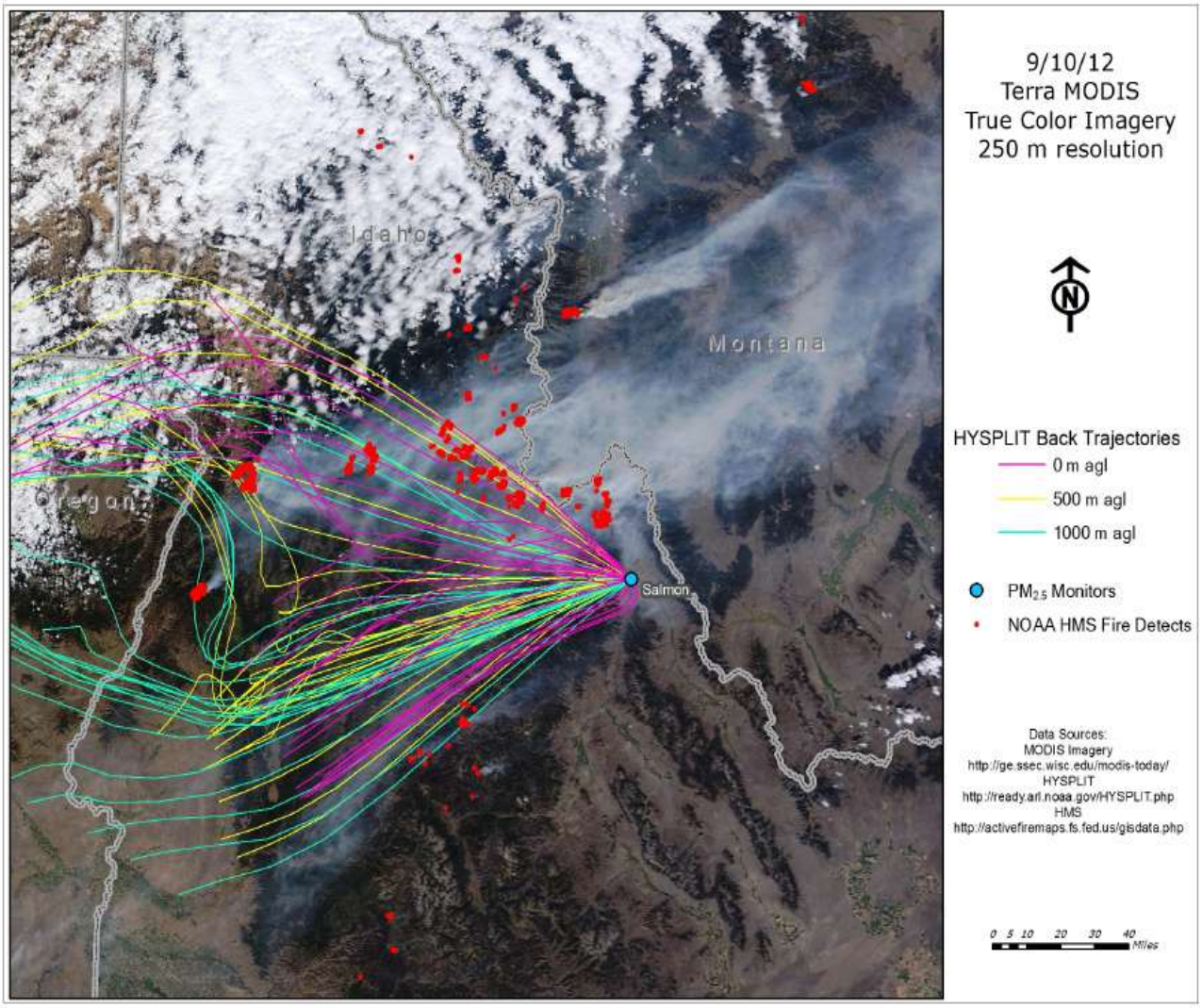


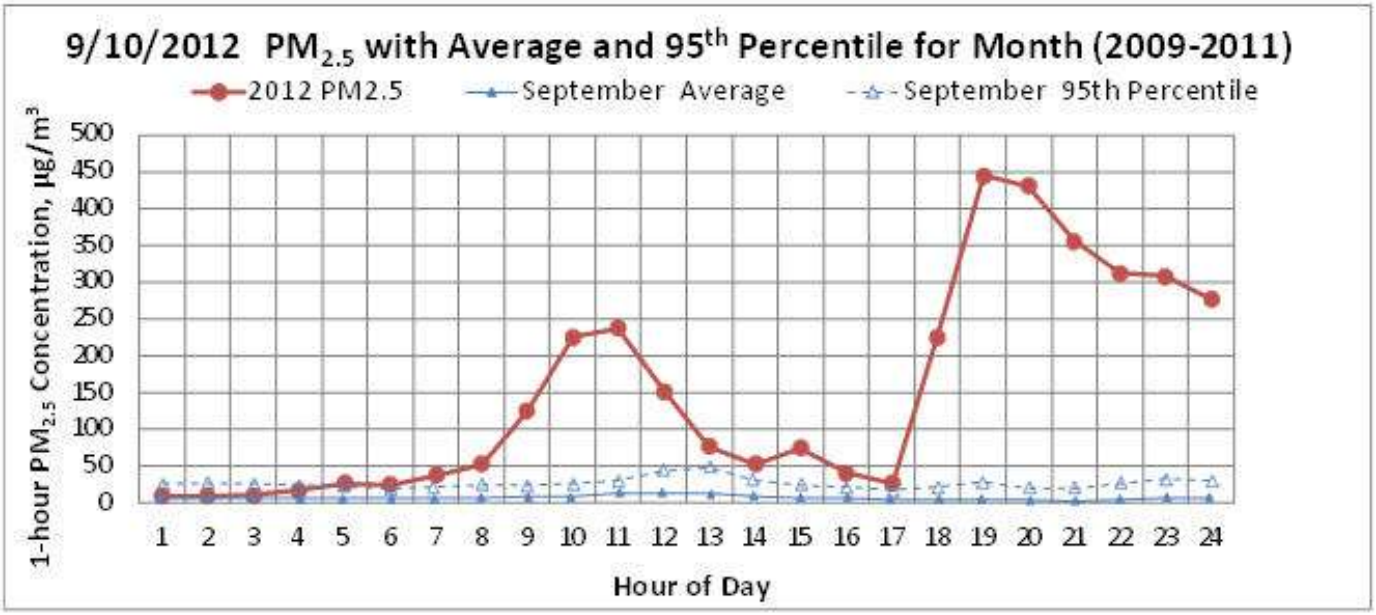

9/7/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
September Average
September 95th Percentile
1-hour PM2.5 Concentration, µg/m3
Hour of Day

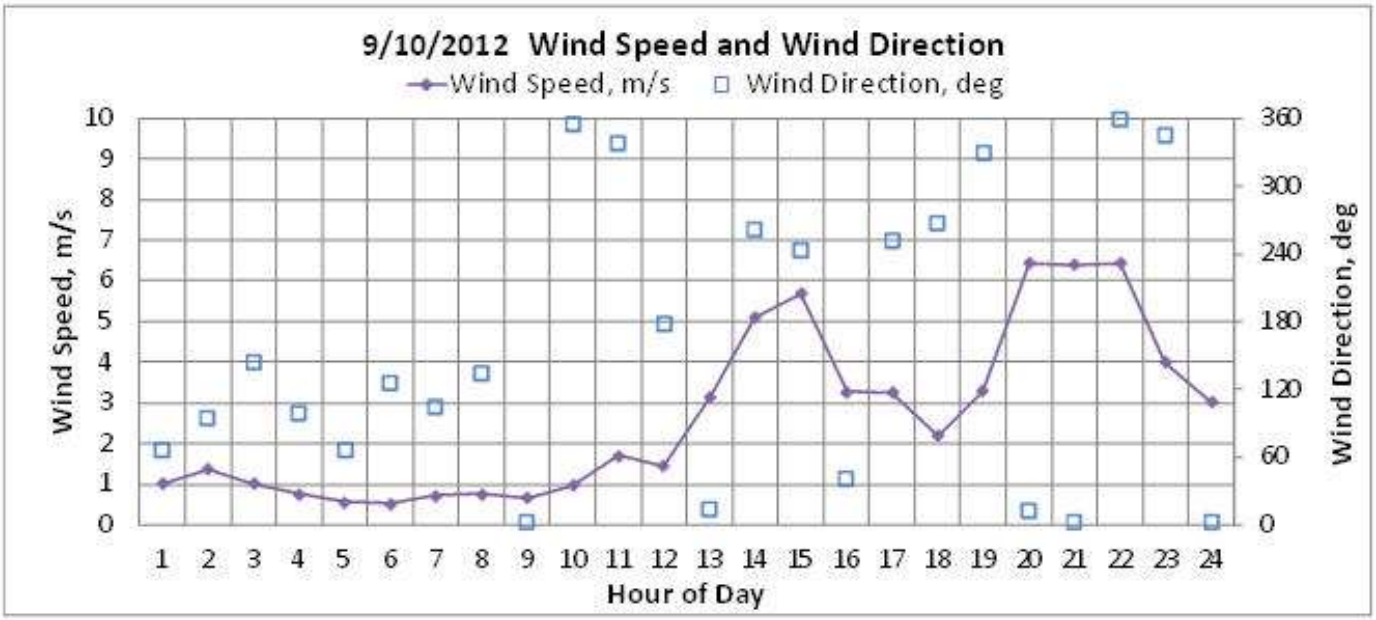

9/7/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Wind Speed, m/s
Wind Direction, deg
Hour of Day

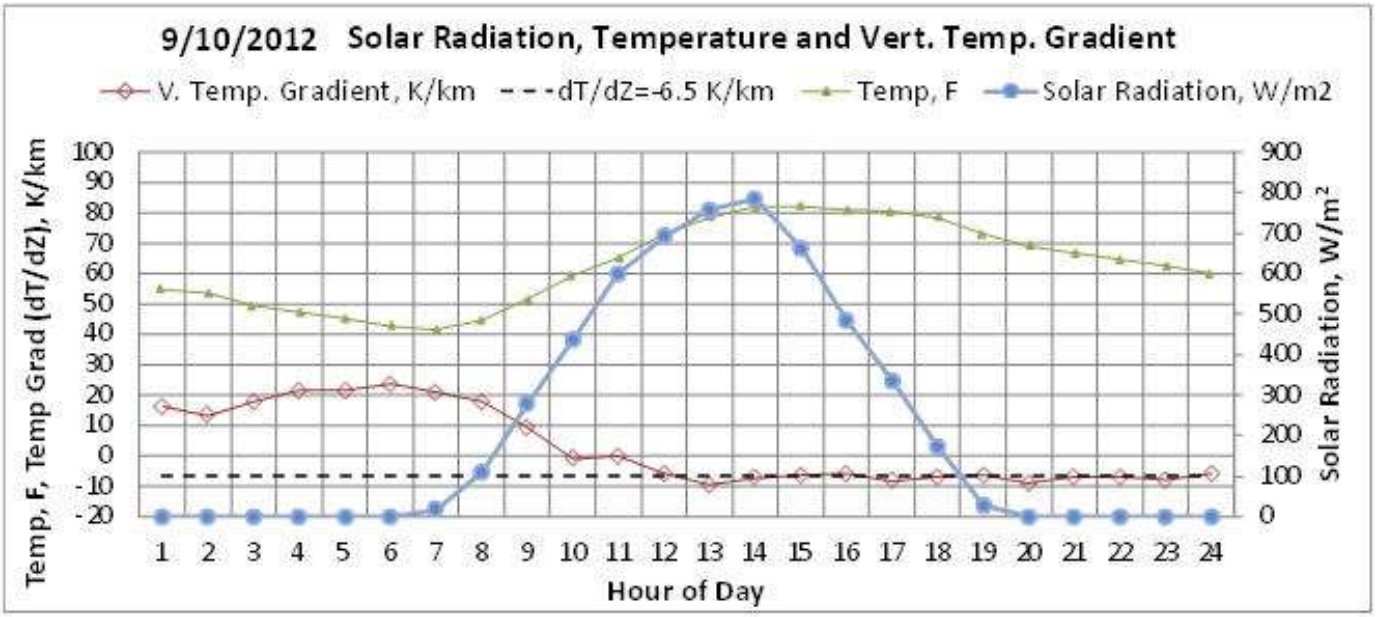

9/7/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m2
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 136.4 µg/m^3 on 9-10-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1 with potential contributions from Scenarios 2, 3, 4 (See Sec. 4)
	Weather Conditions:	Trough axis along the Pacific NW coast provides southwest-west flow.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Morning satellite image shows dense smoke from the Mustang fire fumigating the end of the valley north of Salmon. Light smoke is visible in Salmon. Back trajectories intersect smoke and/or fire detects from the Mustang, McGuire, Sheep, Wesley, and Halstead fires. Hourly trace indicates a possible plume hit during the late morning and up valley flow from the north after 1700.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 120 to 131 µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

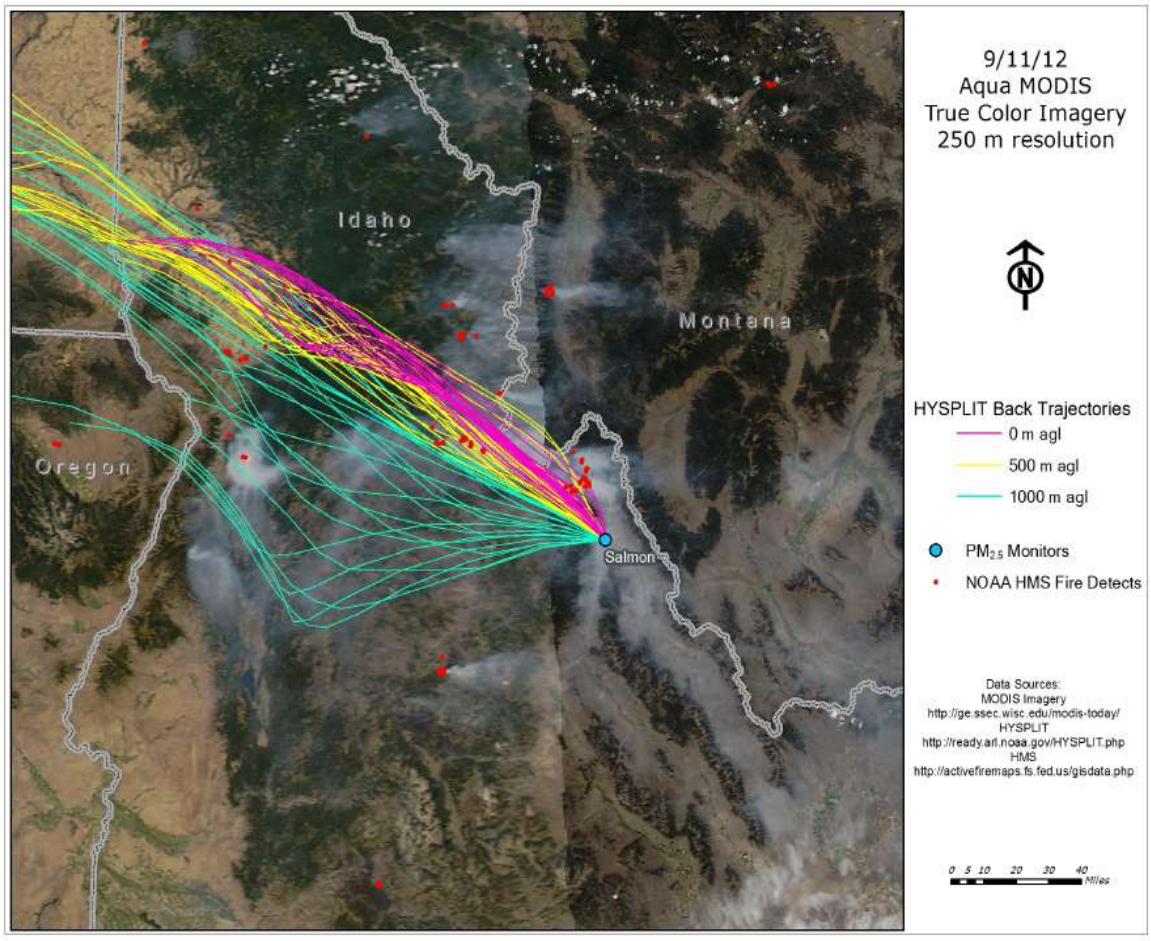


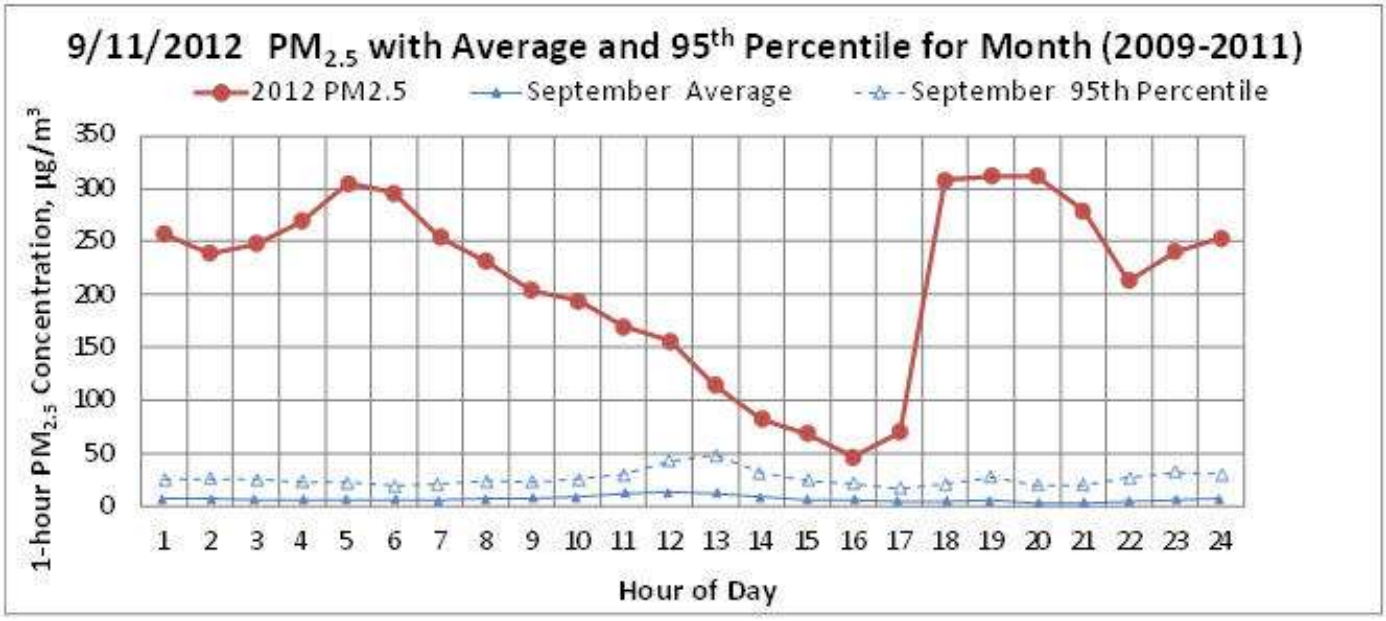

9/10/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
September Average
September 95th Percentile
1-hour PM2.5 Concentration, µg/m3
Hour of Day

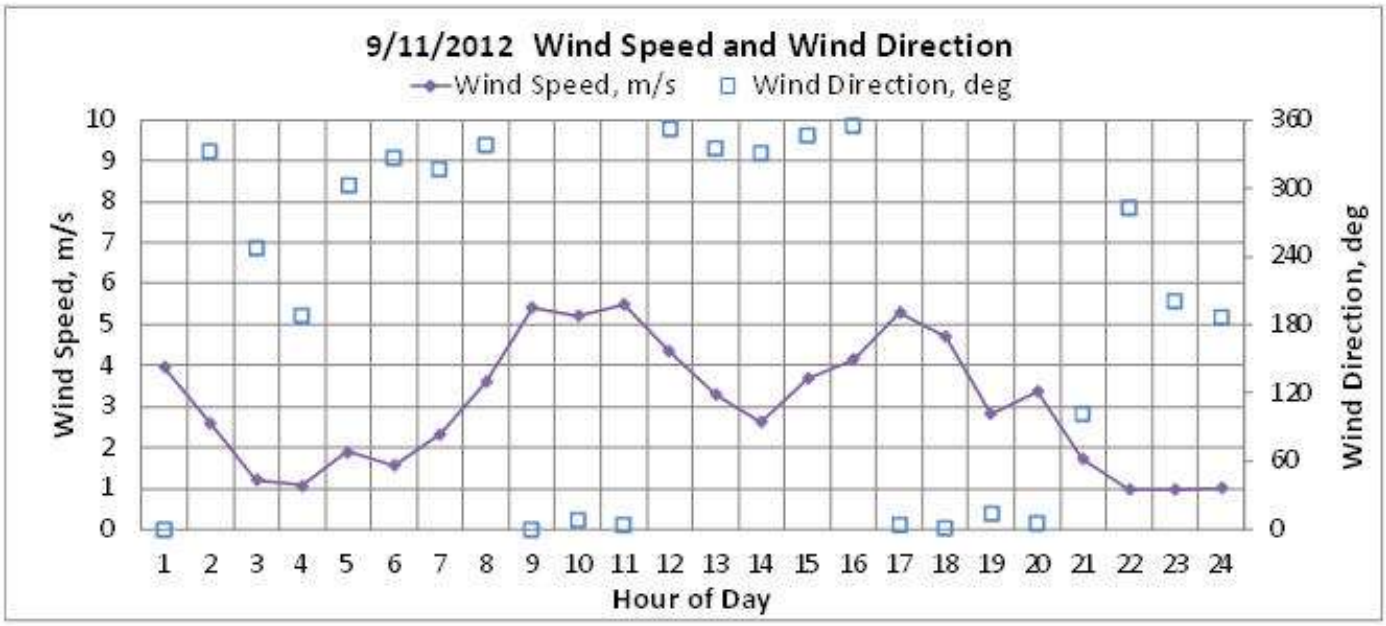

9/10/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Hour of Day

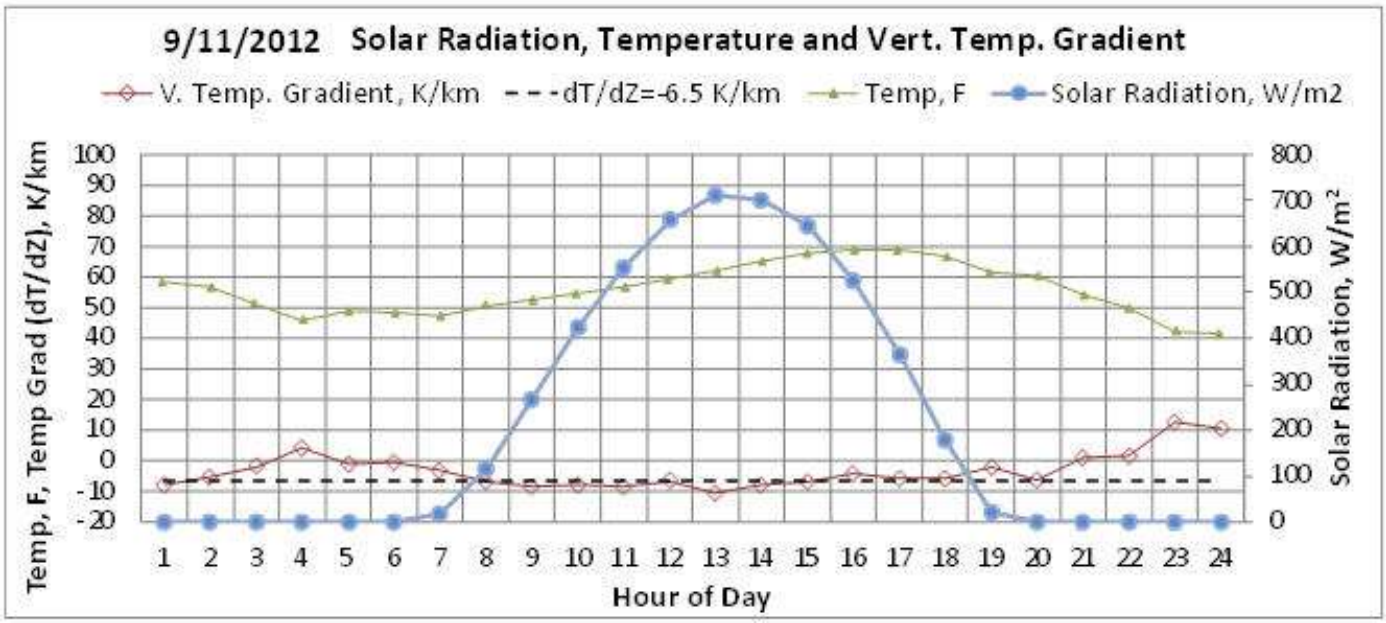

9/10/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m²
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 214.3 µg/m^3 on 9-11-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, 2, 3, 4 (See Sec. 4)
	Weather Conditions:	Trough axis moves onshore bringing west-northwest transport flow.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Morning satellite shows smoke trapped in Salmon from the previous day. Afternoon satellite image shows smoke in Salmon and surrounding valleys, most dense in the north end of the valley. Back trajectories intersect smoke and/or fire detects from the Mustang, McGuire, Sheep, and Wesley fires. Hourly trace shows extremely high values in the morning, declining throughout the day until north valley flows bring the dense smoke back into Salmon around 1800 where it again becomes trapped.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 198 to 208 µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

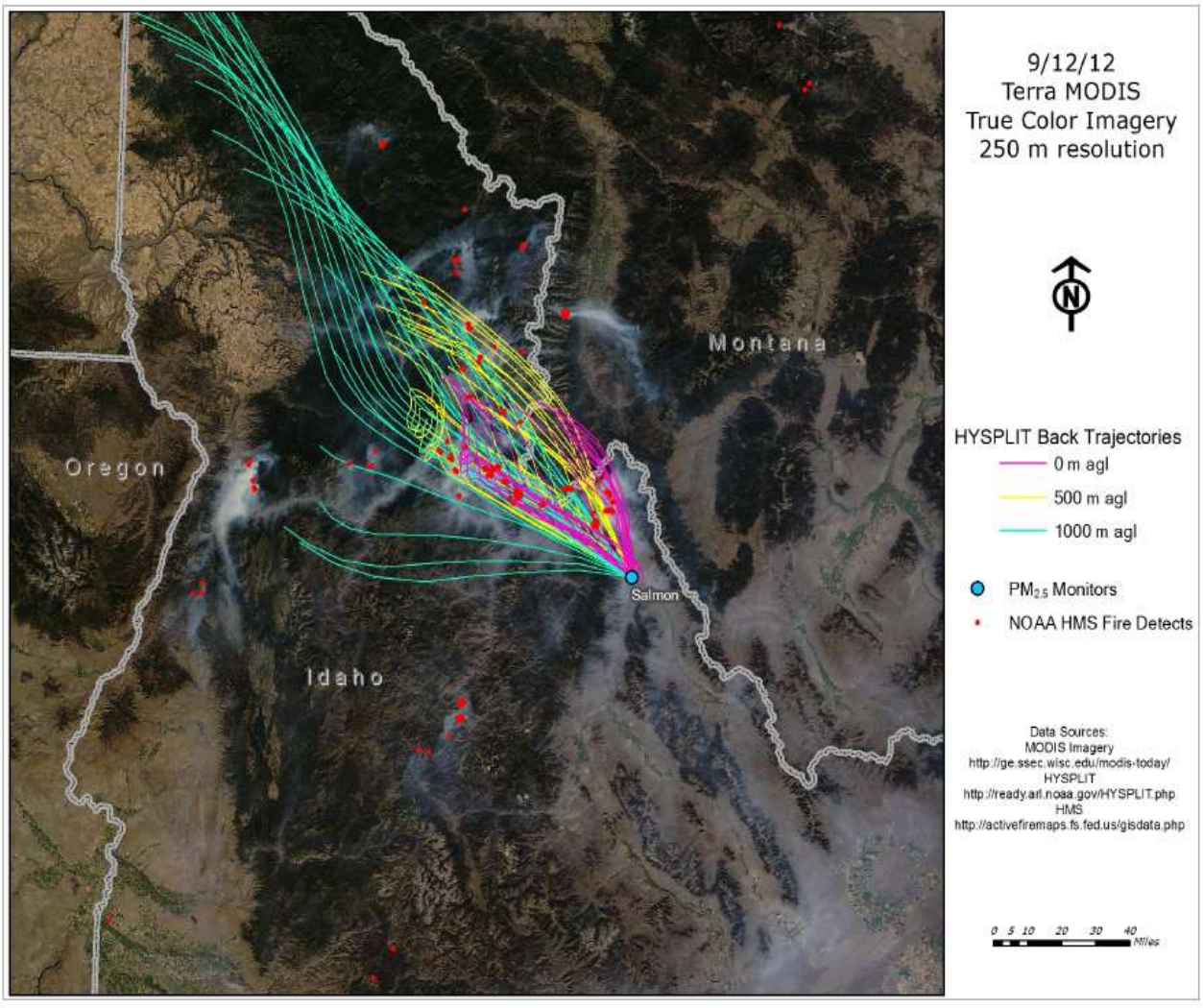


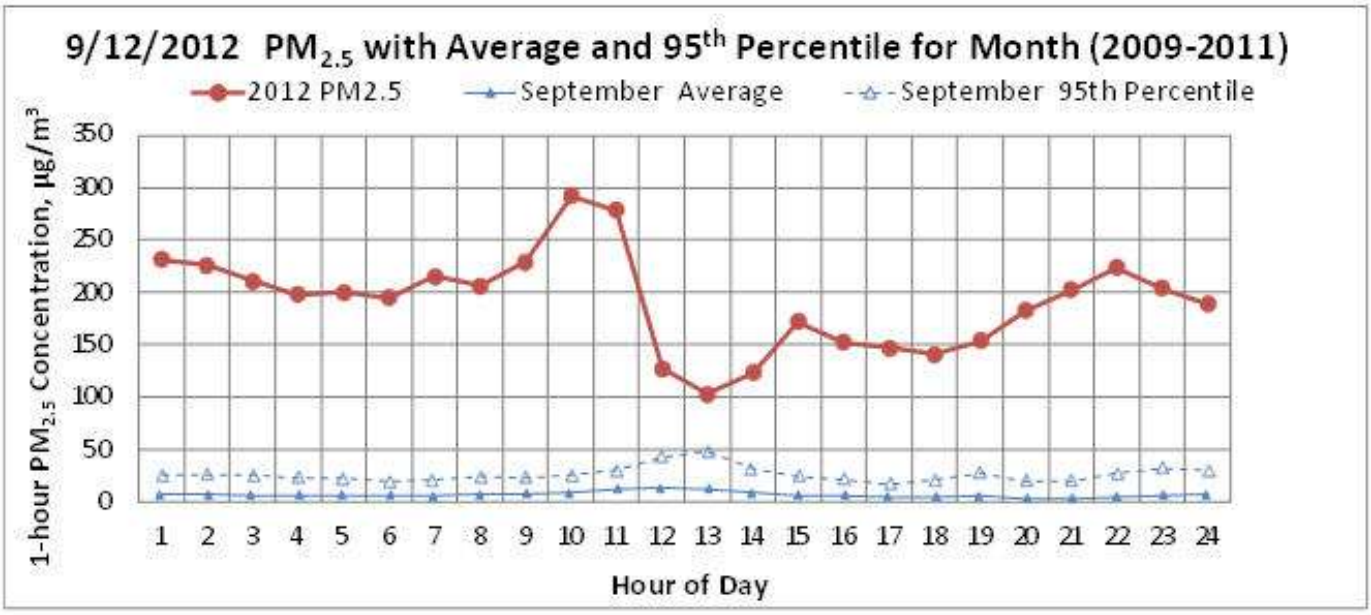

9/11/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
September Average
September 95th Percentile
1-hour PM2.5 Concentration, µg/m³
Hour of Day

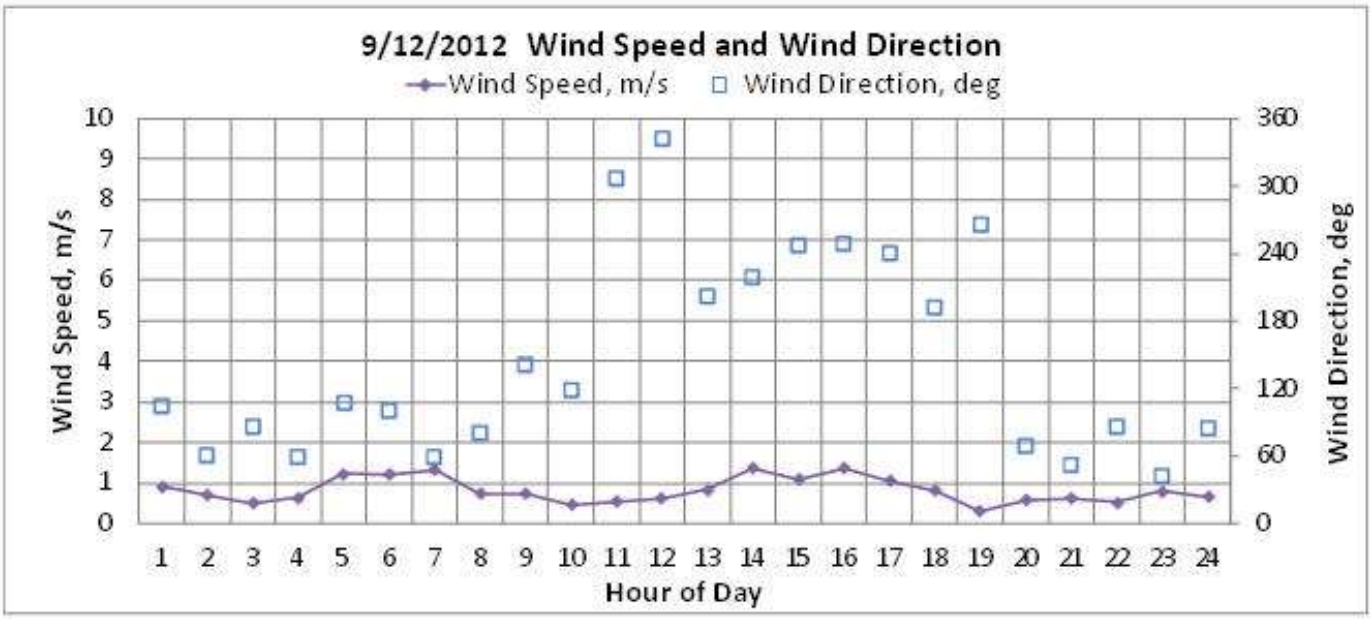

9/11/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Hour of Day

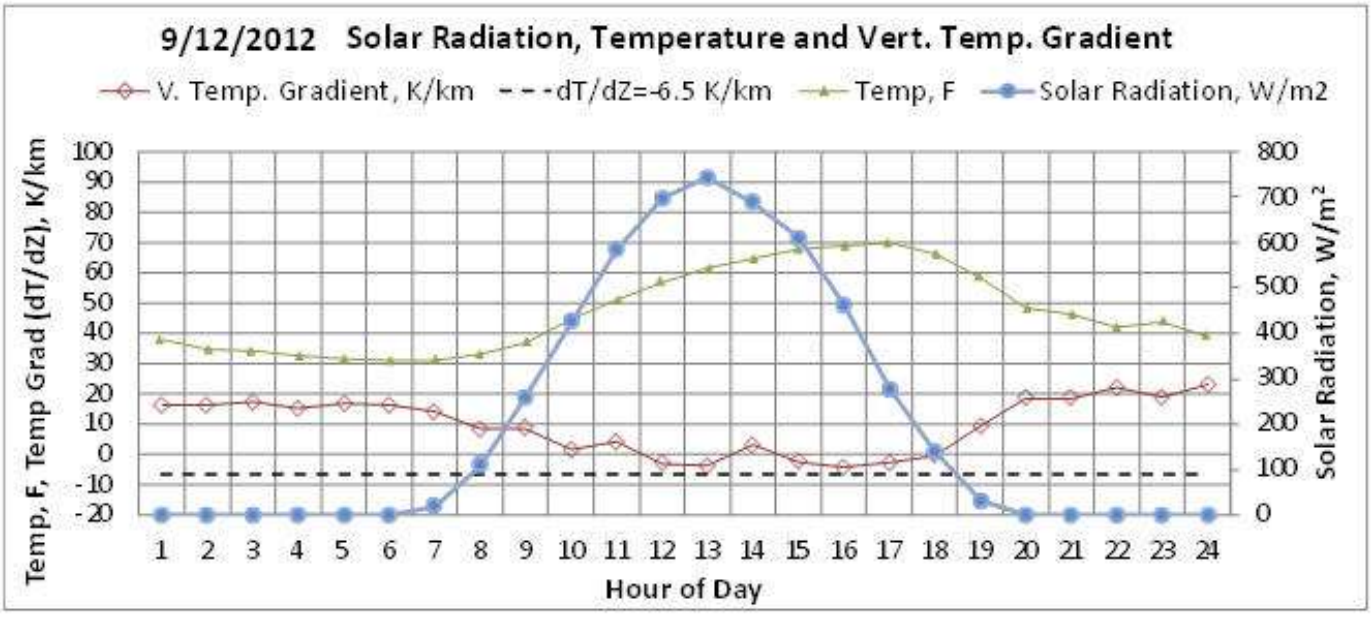

9/11/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m²
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 194.4 µg/m^3 on 9-12-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, 2 (See Sec. 4)
	Weather Conditions:	Trough axis now located east of Idaho bringing northwest flow.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Morning satellite image shows smoke in Salmon and surrounding valleys. Back trajectories intersect smoke and/or fire detects from the Mustang, McGuire, and Powell SBW fires. Hourly trace shows typical pattern on days that drainage flow dominates, high in morning and night, with some clearing midday. Plume hit is evident at 1000.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 178 to 189 µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

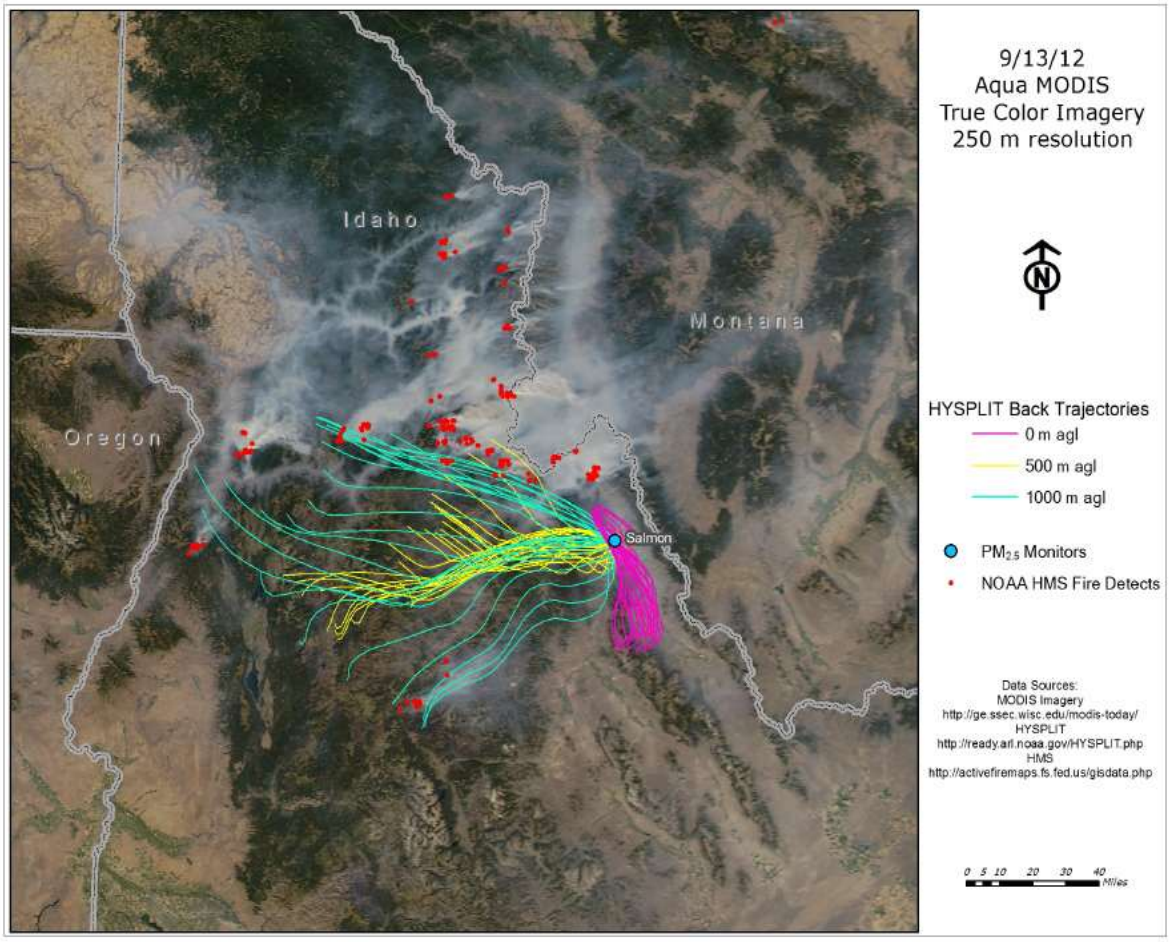


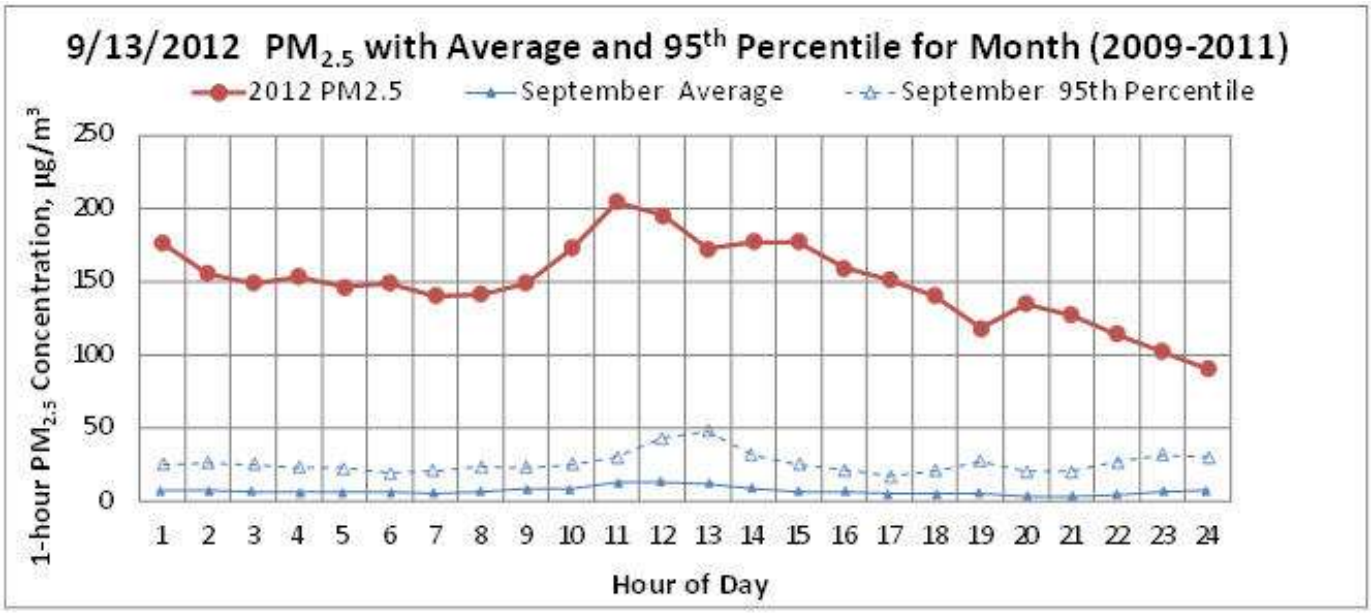

9/12/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
September Average
September 95th Percentile
1-hour PM2.5 Concentration, µg/m3
Hour of Day

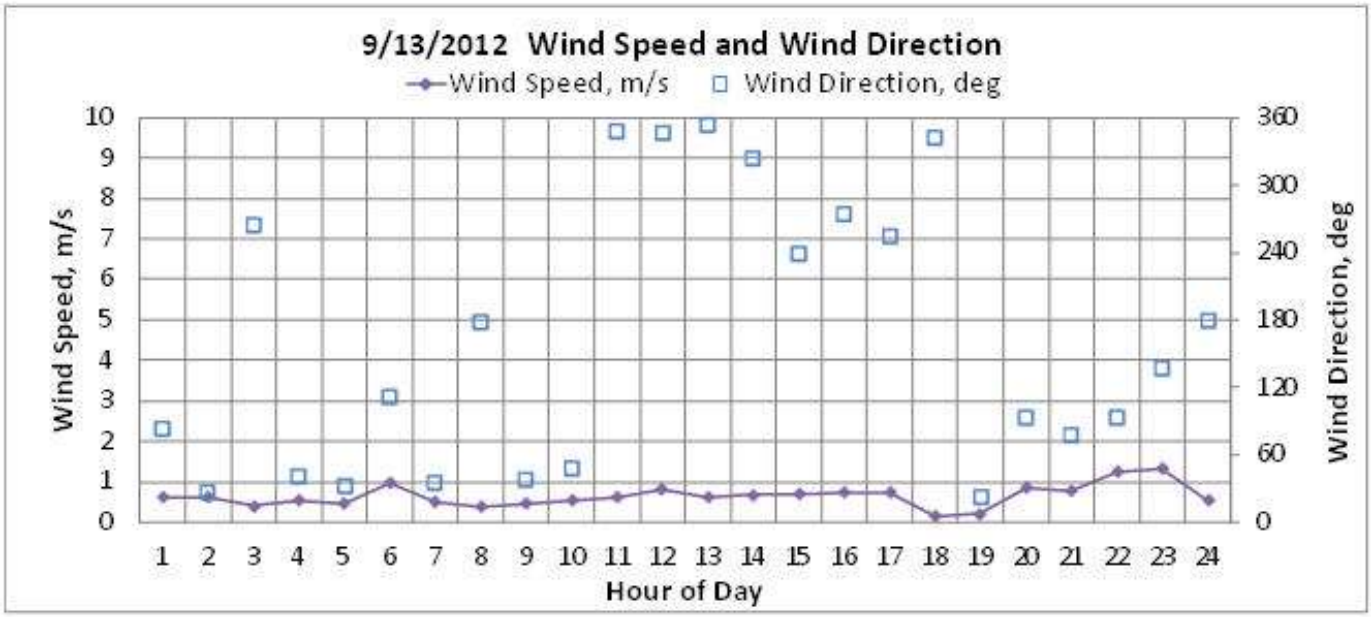

9/12/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Hour of Day

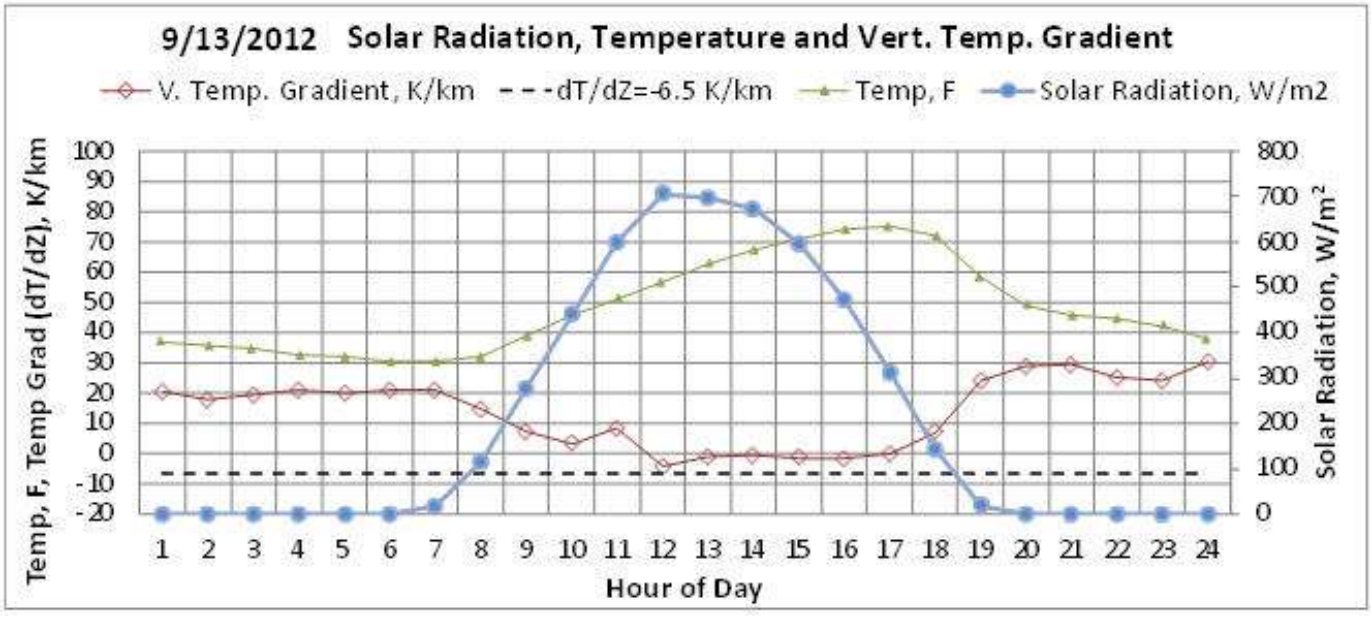

9/12/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m2
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 153.7 µg/m^3 on 9-13-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, 2, 3, 4 (See Sec. 4)
	Weather Conditions:	High pressure develops over NV and most of ID causing low wind speeds and allowing oropgrahically-driven dynamics to dominate.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Afternoon satellite image looks more like typical morning image. Inversion does not break and stagnant conditions trap smoke in valleys. Trajectories do not travel far in 24-hour period. Back trajectories intersect smoke and/or fire detects from the Halstead, Mustang, McGuire, and Wesley fires. Surface trajectory swings north and south in Salmon Valley. Hourly trace shows sustained high concentrations throughout the day, with little clearing.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 138 to 148 µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

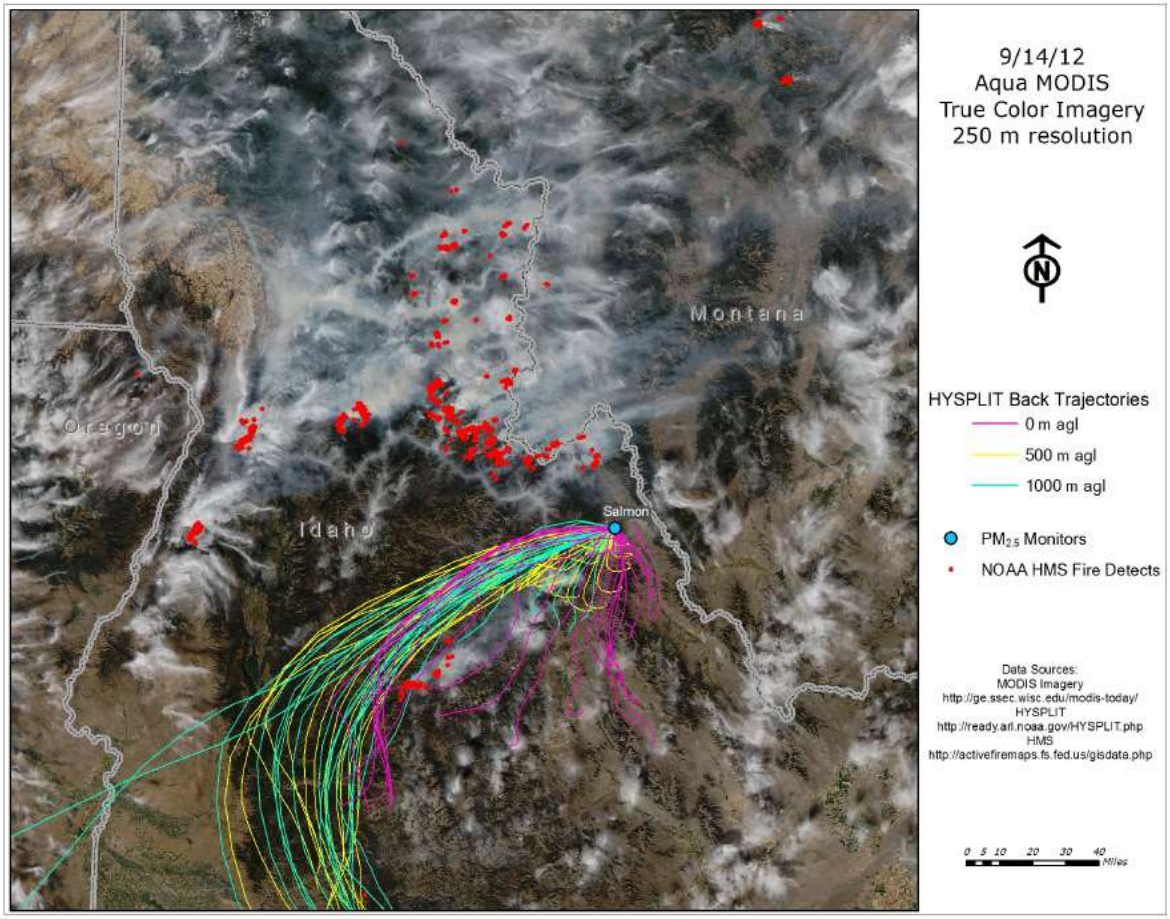


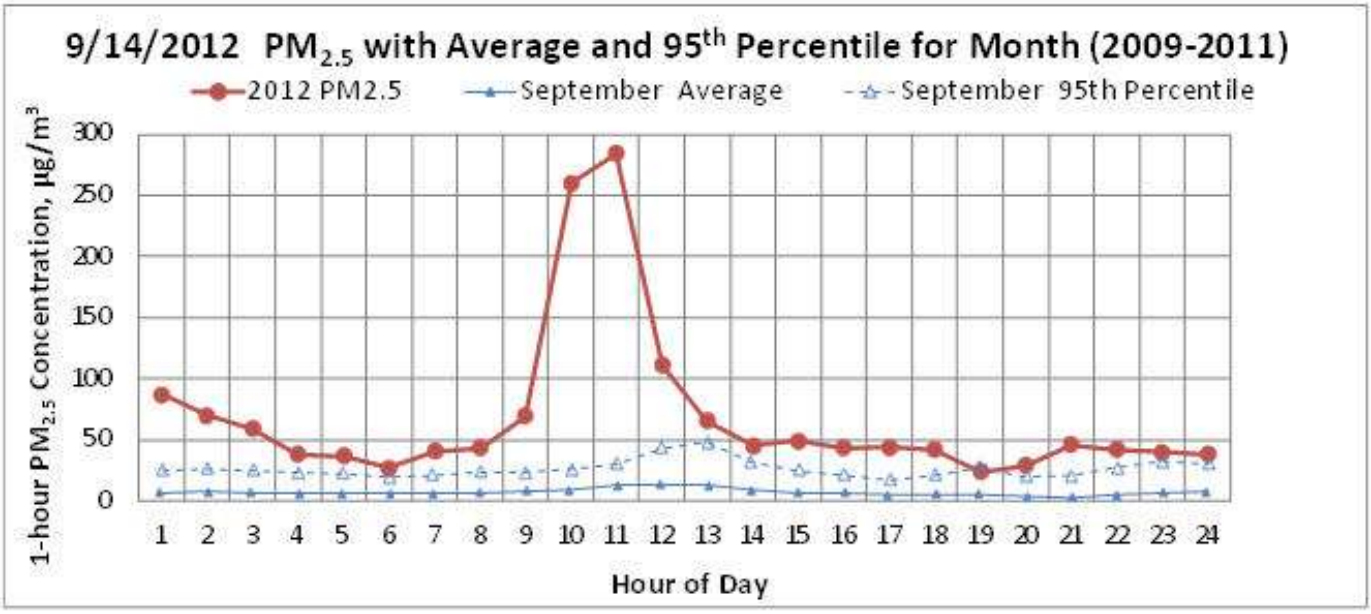

9/13/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
September Average
September 95th Percentile
1-hour PM2.5 Concentration, µg/m3
250
200
150
100
50
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Hour of Day

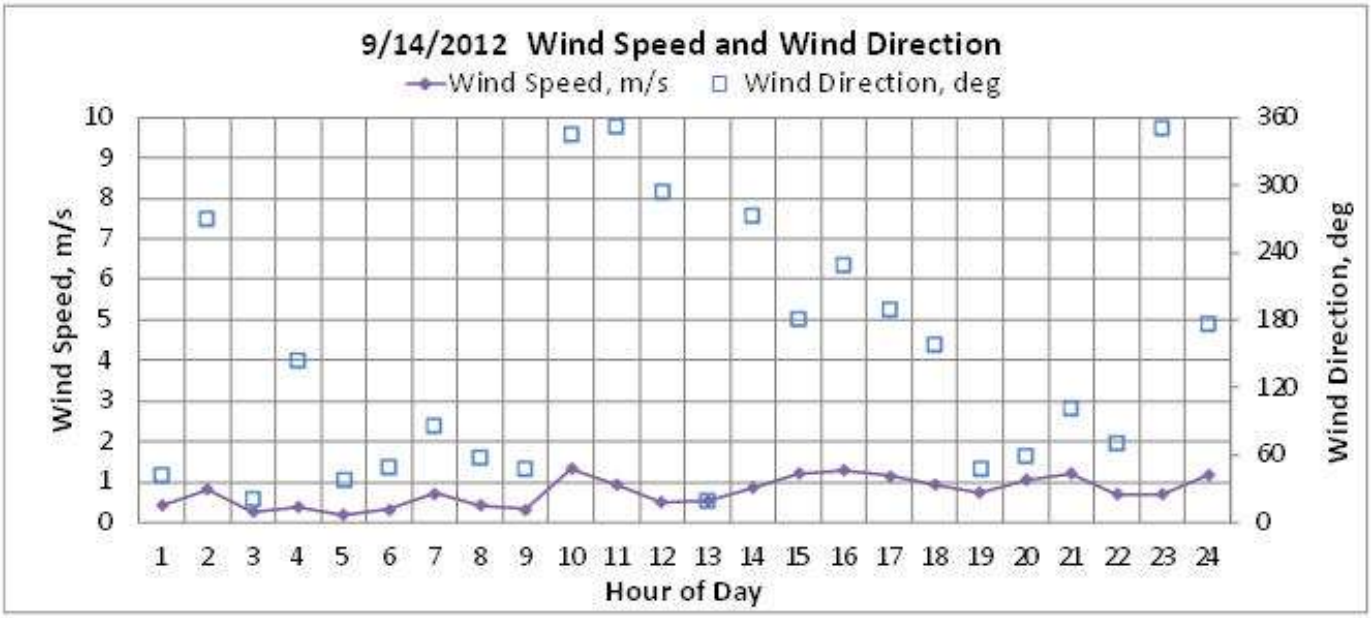

9/13/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Wind Speed, m/s
10
9
8
7
6
5
4
3
2
1
0
Wind Direction, deg
360
300
240
180
120
60
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Hour of Day

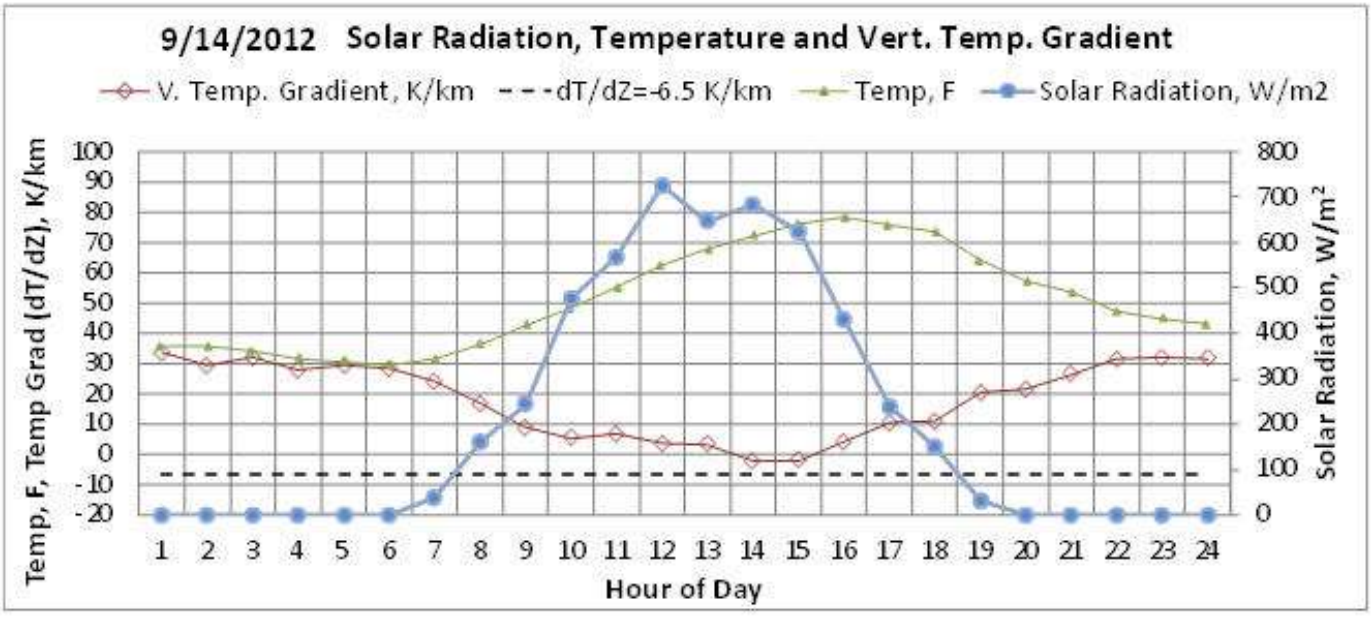

9/13/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
100
90
80
70
60
50
40
30
20
10
0
-10
-20
Solar Radiation, W/m2
800
700
600
500
400
300
200
100
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 70.2 µg/m^3 on 9-14-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, 3, 4 (See Sec. 4)
	Weather Conditions:	High pressure extends to the southwest, causing transport flow to become south-southwest across Idaho.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Afternoon satellite image shows clouds obscuring smoke sunk in valleys. Back trajectories intersect smoke and/or fire detects from the Halstead fire. Hourly trace shows concentrations hovering around 50 µg/m^3 throughout the day, with north winds bringing a very large (>250 µg/m^3) plume impact at 1000 and 1100.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 54.3 to 64.4 µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

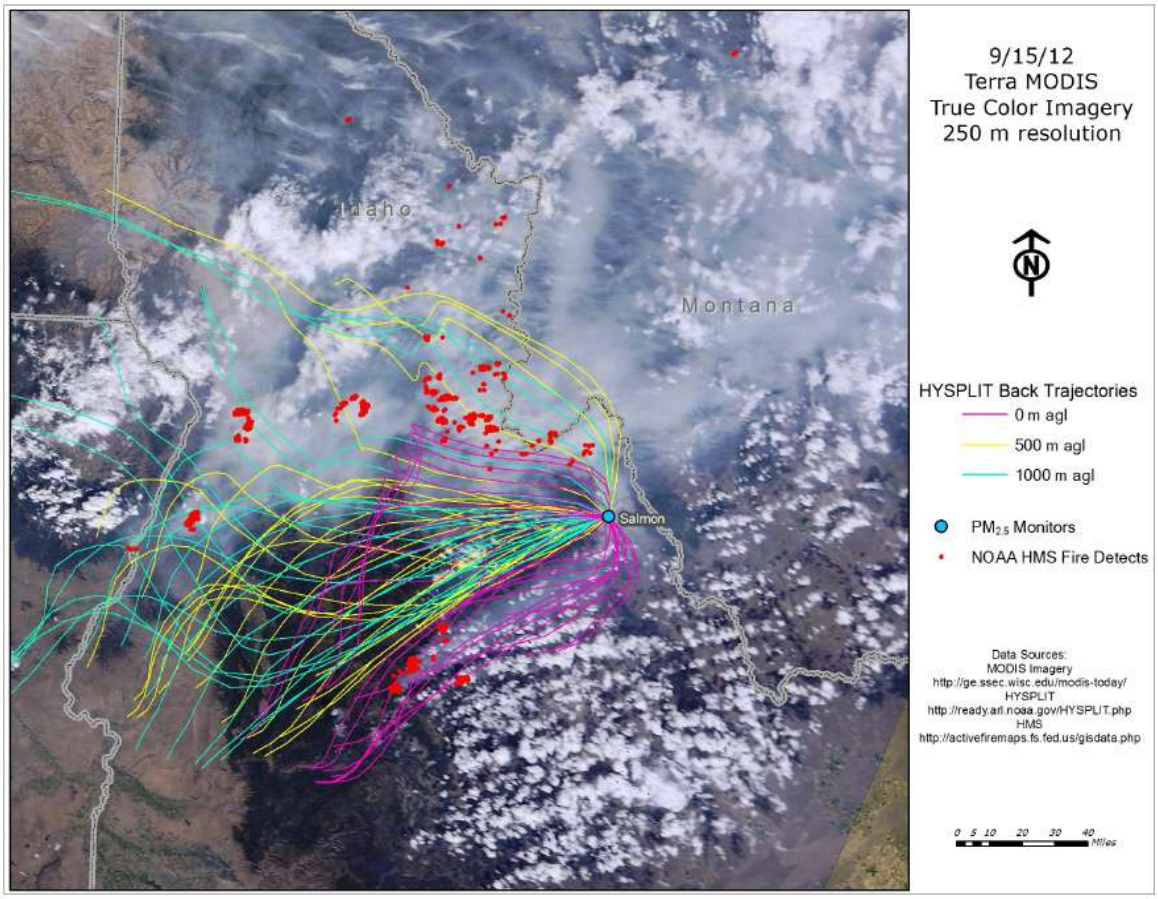


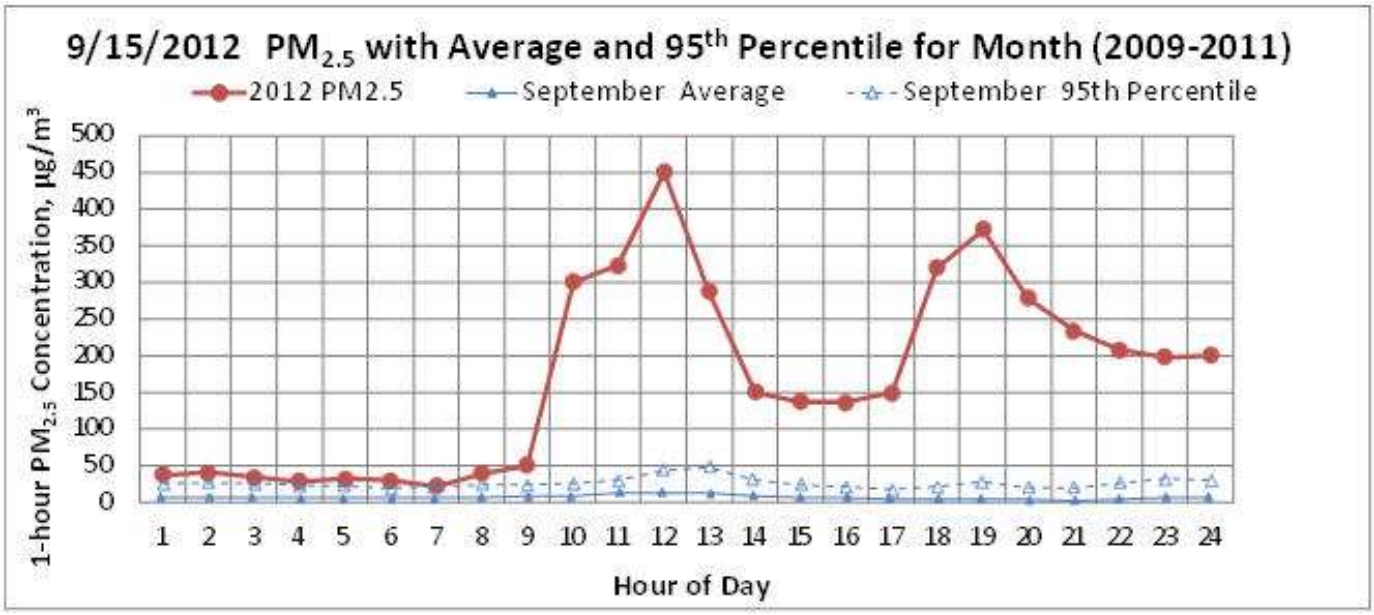

9/14/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
September Average
September 95th Percentile
1-hour PM2.5 Concentration, µg/m3
Hour of Day

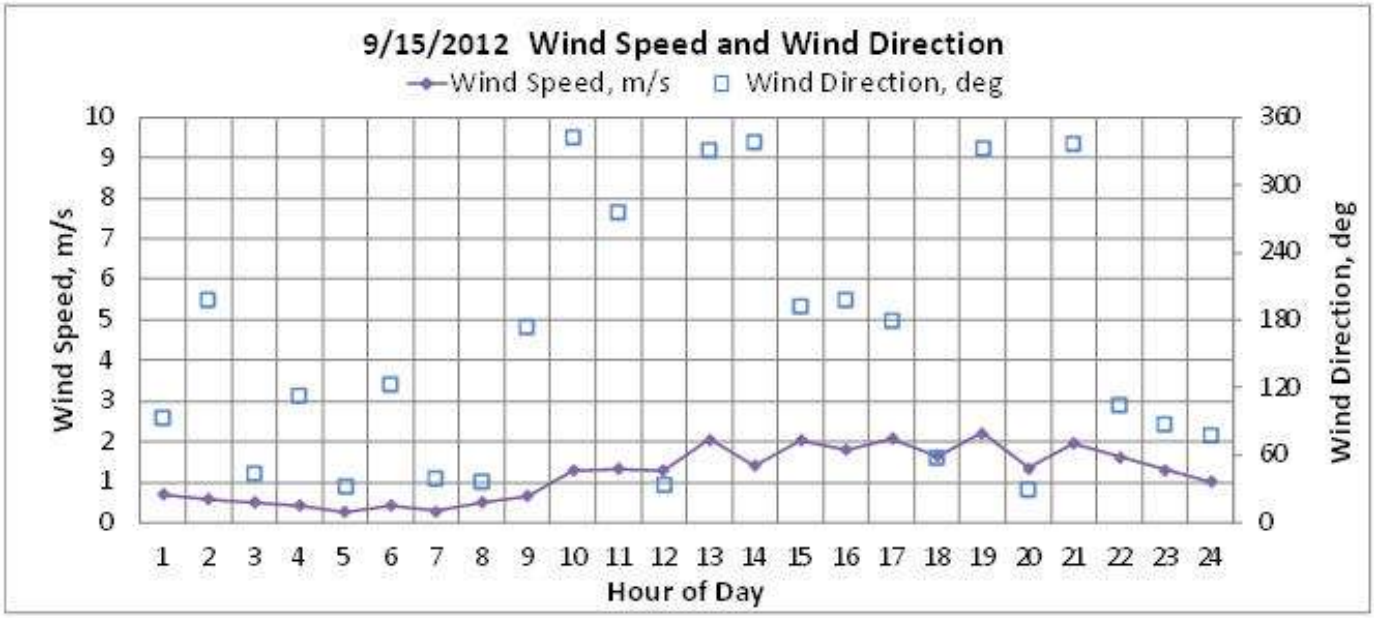

9/14/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Hour of Day

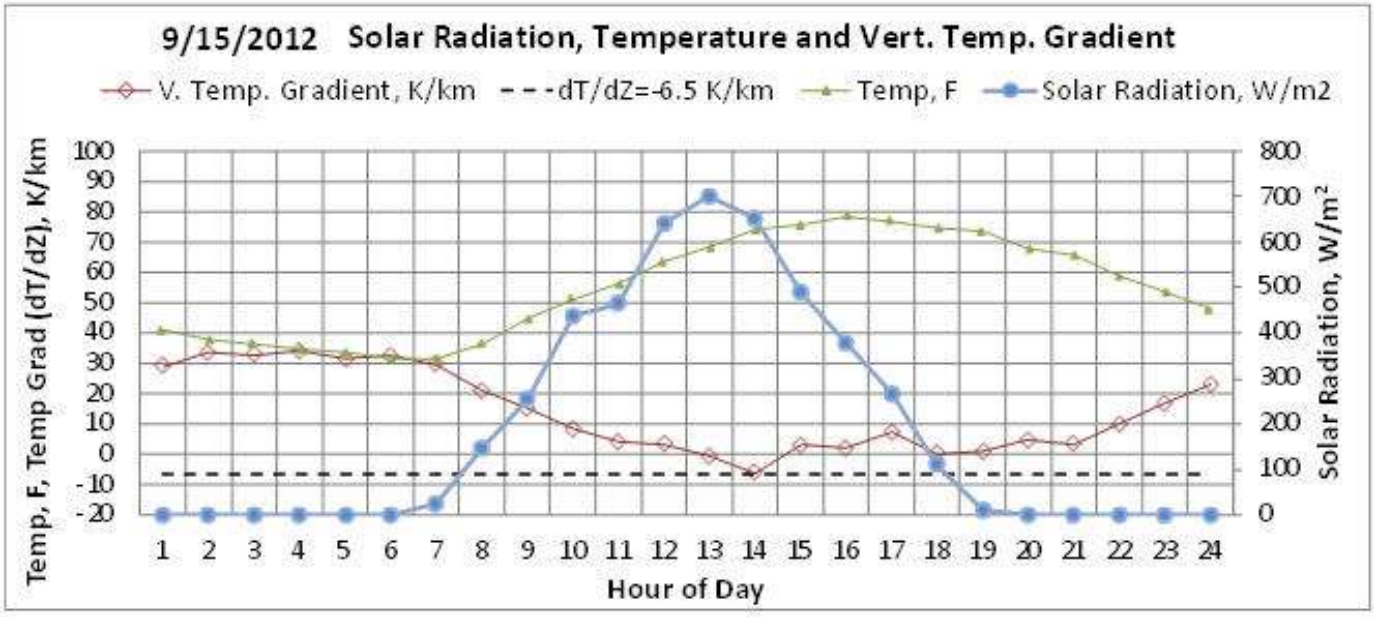

9/14/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m2
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 162.1 µg/m^3 on 9-15-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, 2, 3, 4 (See Sec. 4)
	Weather Conditions:	Weak embedded trough suppresses ridge and forces more westerly flow.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Morning satellite image shows thick, widespread smoke in Salmon and north-central Idaho obscuring land features. Back trajectories intersect smoke and/or fire detects from the Halstead, Mustang, McGuire, Sheep, Wesley, and Powell SBW fires. Hourly trace shows two massive plume impacts with NW to NE winds, exceeding 350 µg/m^3 followed by sustained concentrations above 200 µg/m^3 at night.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 146 to 156 µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

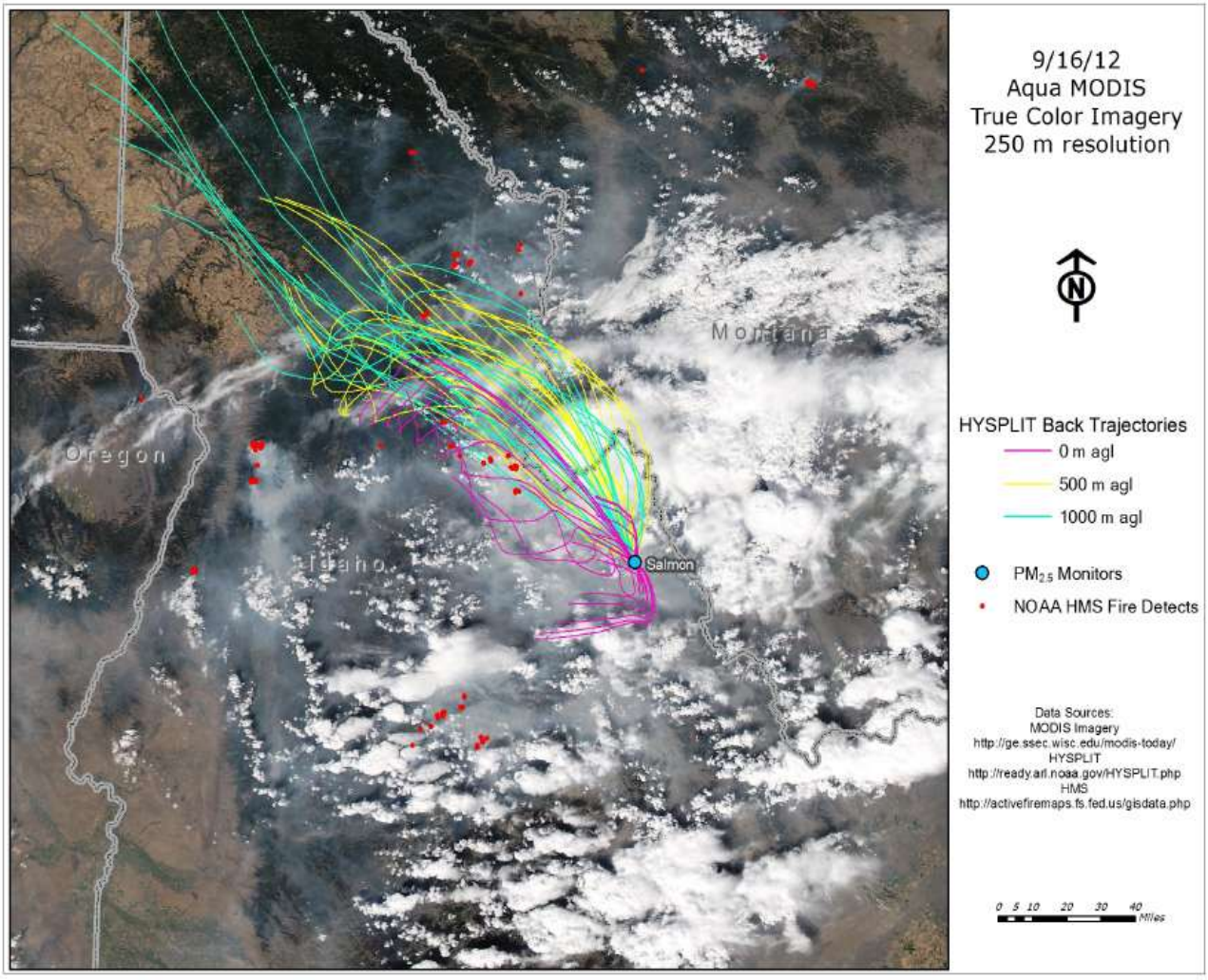


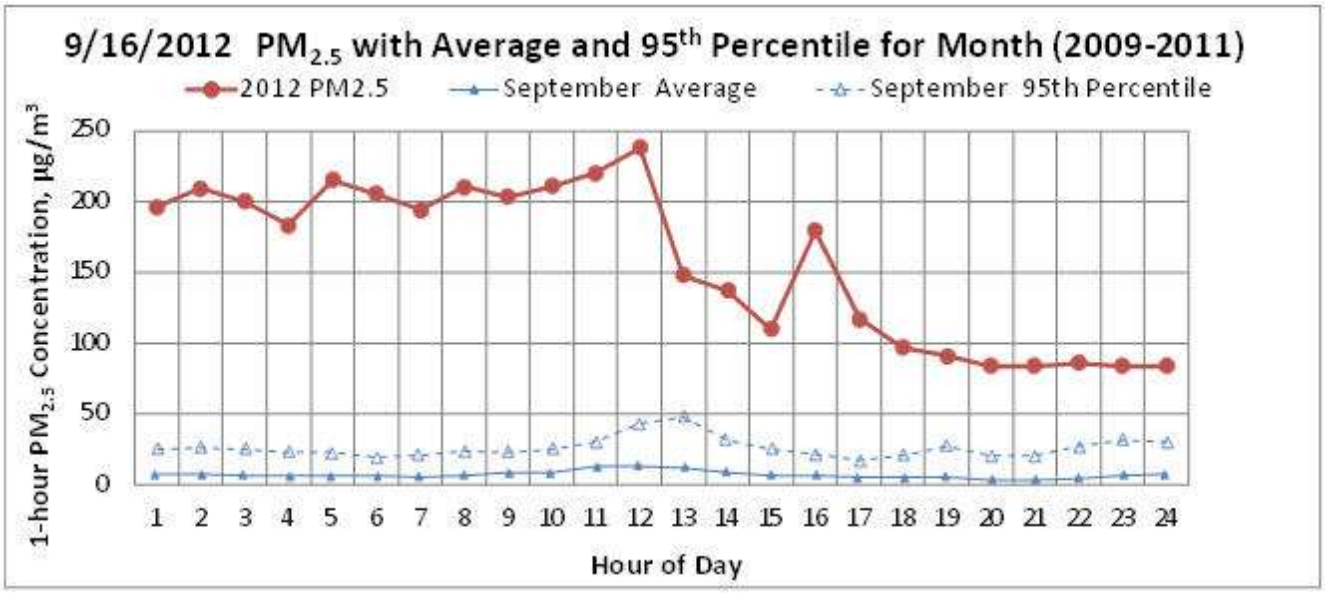

9/15/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
September Average
September 95th Percentile
1-hour PM2.5 Concentration, µg/m3
Hour of Day

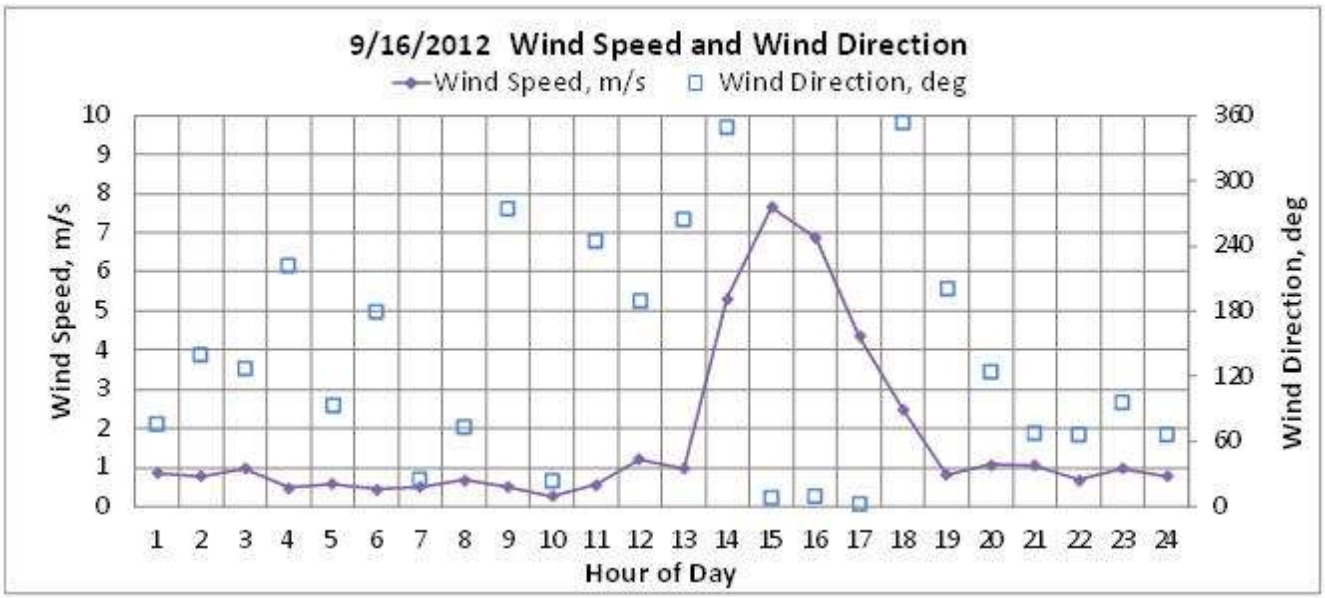

9/15/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Hour of Day

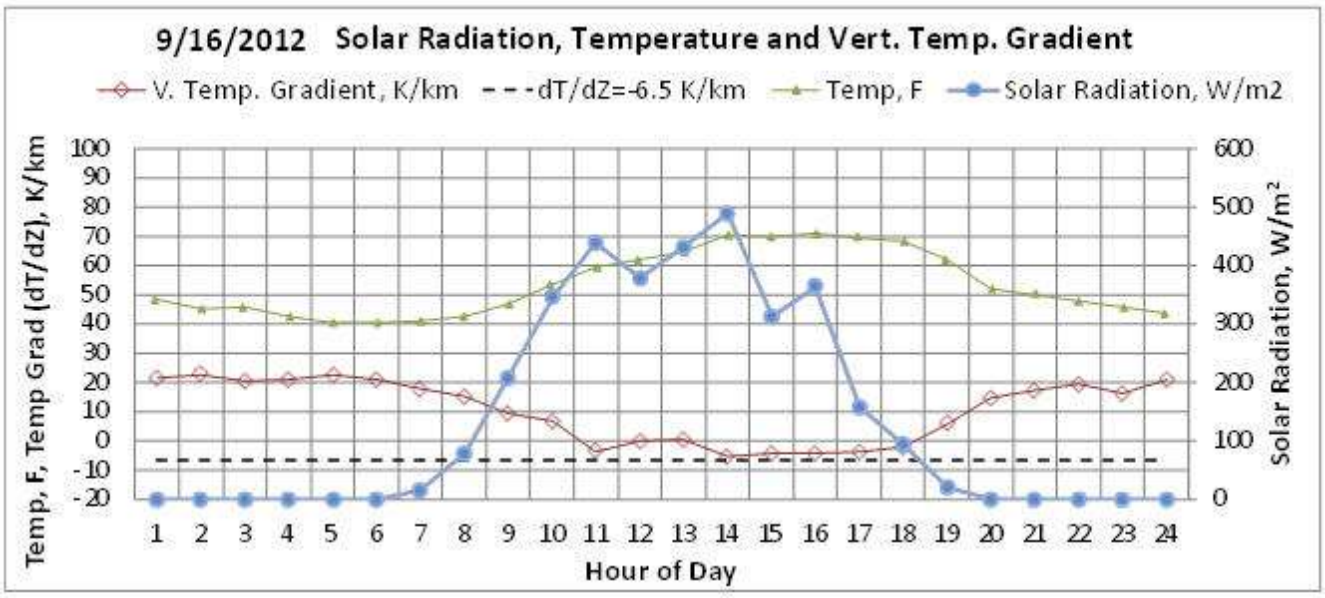

9/15/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m²
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 162.5 µg/m^3 on 9-16-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, and potentially Scenarios 2 and 3 (See Sec. 4)
	Weather Conditions:	Embedded shortwave begins to retrograde allowing northwesterly flow into region.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Afternoon satellite image shows thick, widespread smoke overtopped by clouds. Back trajectories intersect smoke and/or fire detects from the Mustang, McGuire, and Powell SBW fires. Hourly trace shows very high concentrations ~200 µg/m^3 until noon, slight clearing, a spike at 1600, then concentrations remaining at ~75 µg/m^3 until end of day. Temperature inversion does not break all day in spite of windy conditions in the afternoon.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 147 to 157µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

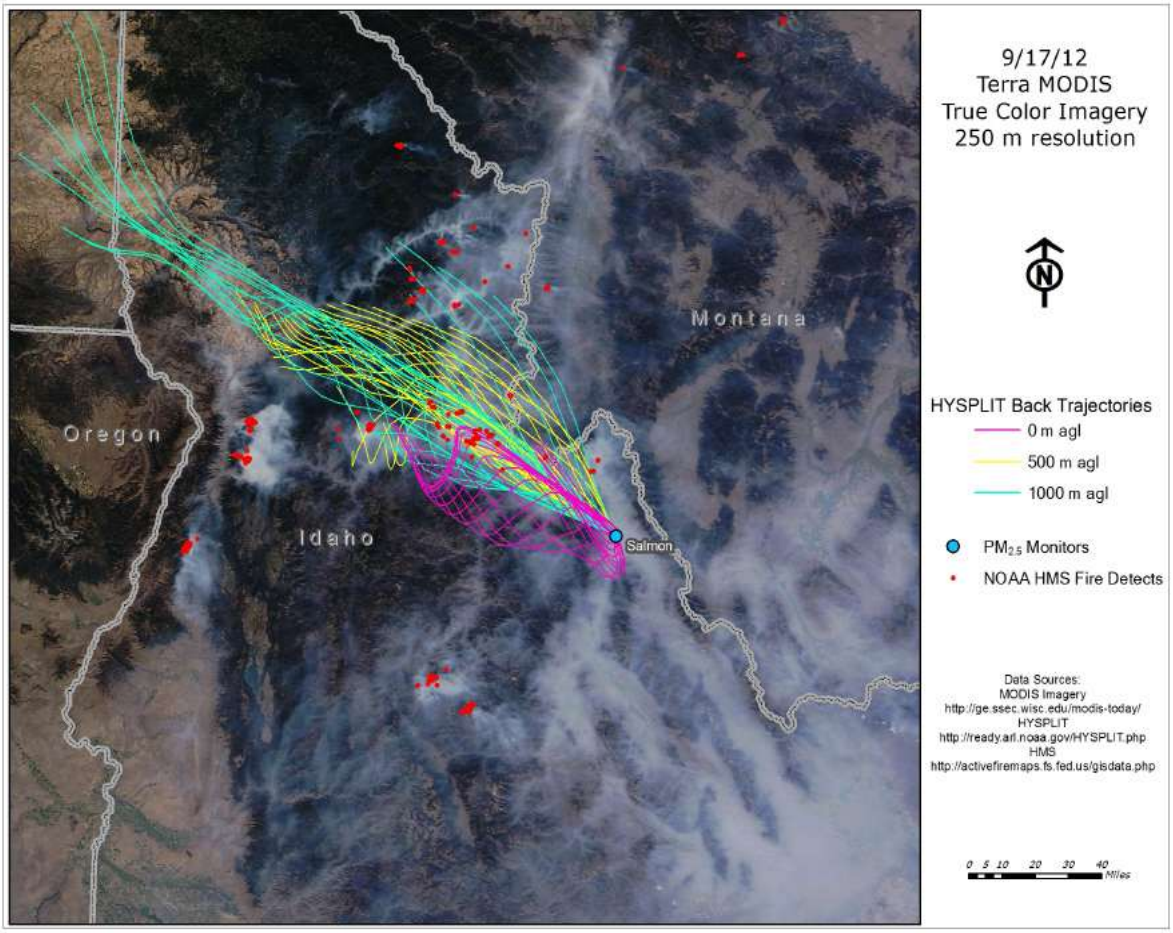


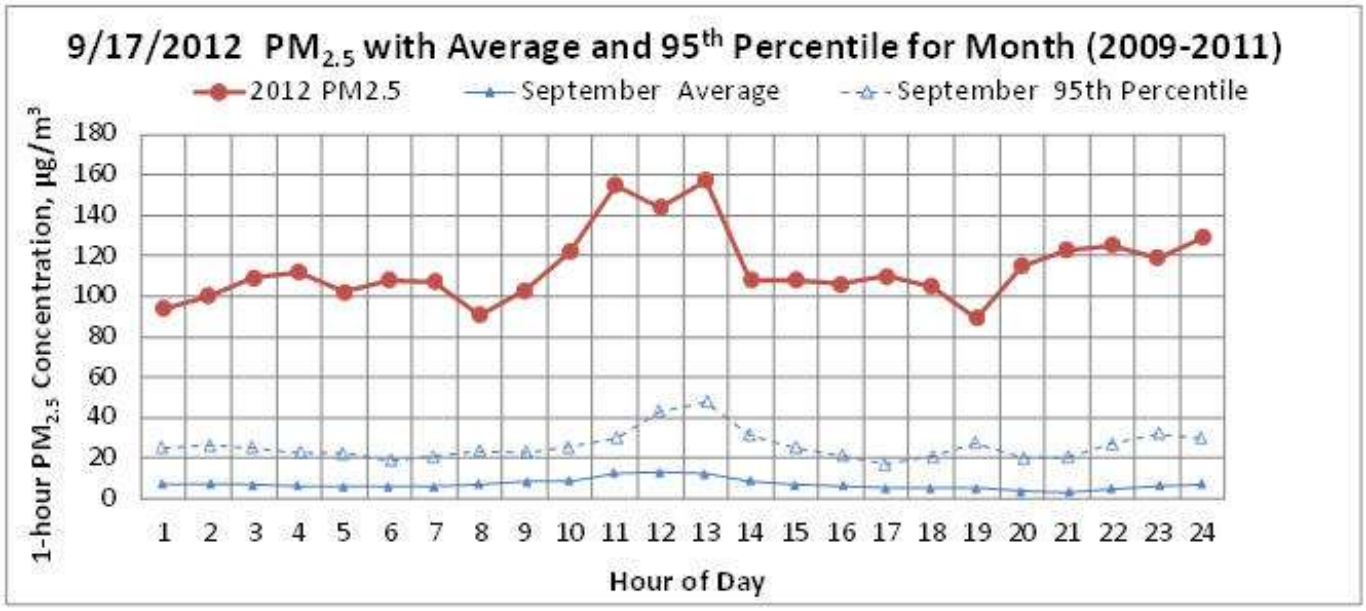

9/16/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
September Average
September 95th Percentile
1-hour PM2.5 Concentration, µg/m³
Hour of Day

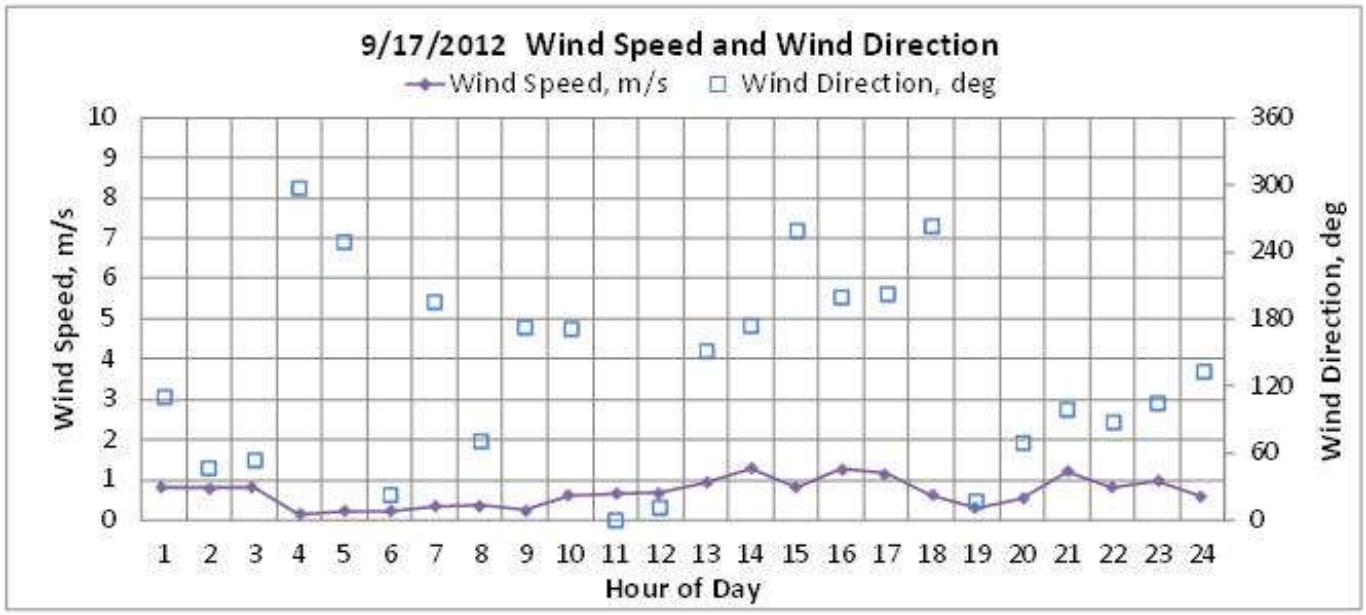

9/16/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Hour of Day

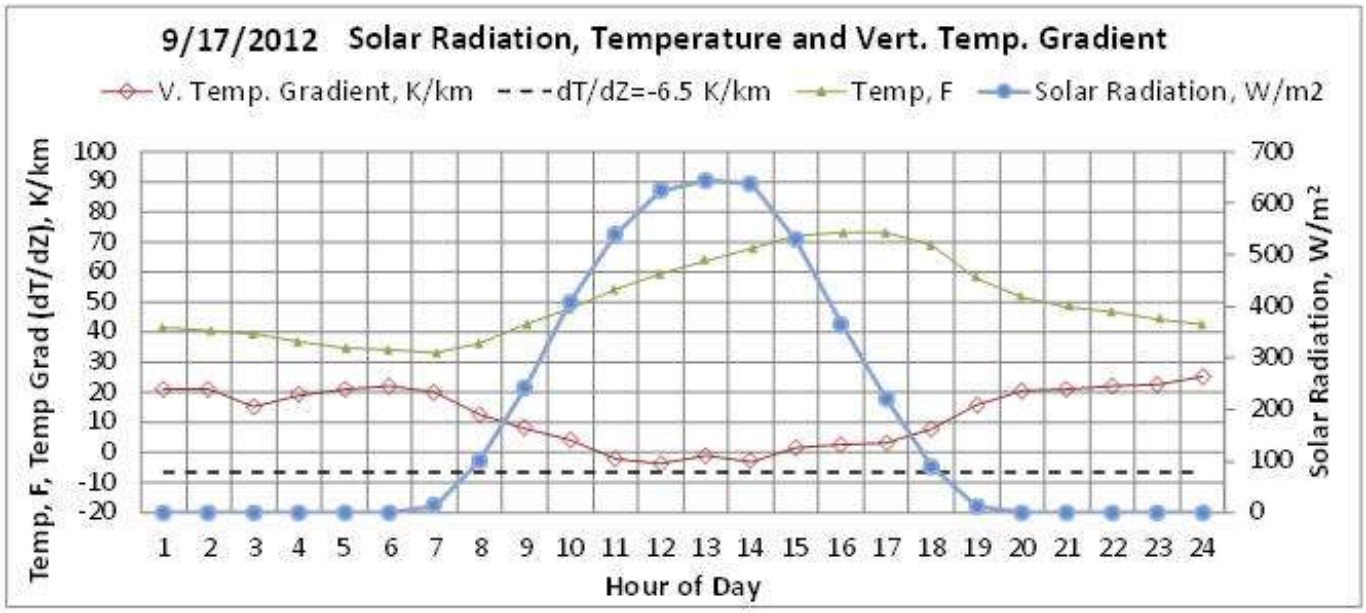

9/16/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m²
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 112.3 µg/m^3 on 9-17-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, 2, 3 (See Sec. 4)
	Weather Conditions:	Weak Rex block sets up along Pacific Coast causing light winds and north-northwesterly flow.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Morning satellite image shows Salmon and surrounding valleys choked with thick smoke. Back trajectories intersect smoke and/or fire detects from the Mustang, McGuire, and Powell SBW fires. Hourly trace shows sustained high concentrations with midday increases as the valley flow turns northerly. Temperature inversion did not break all day.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 96.4 to 106 µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

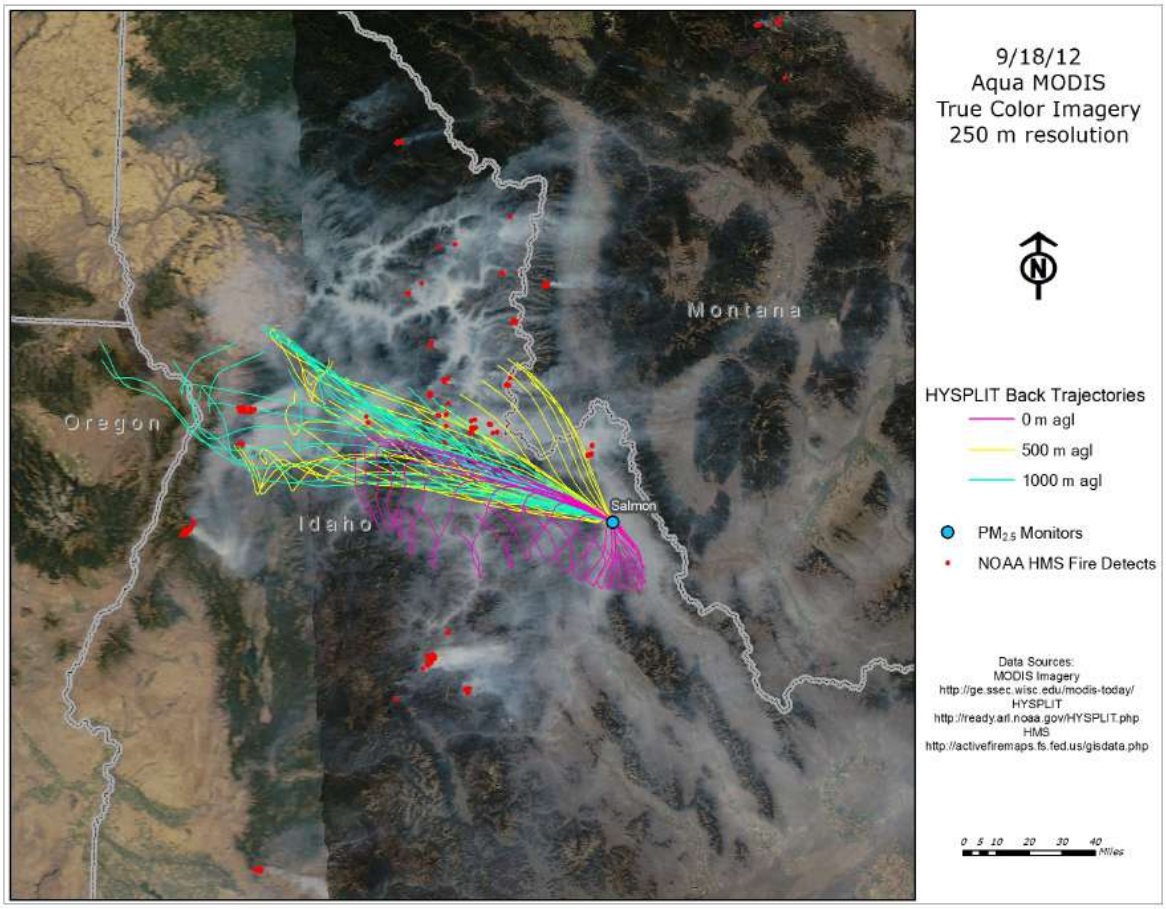


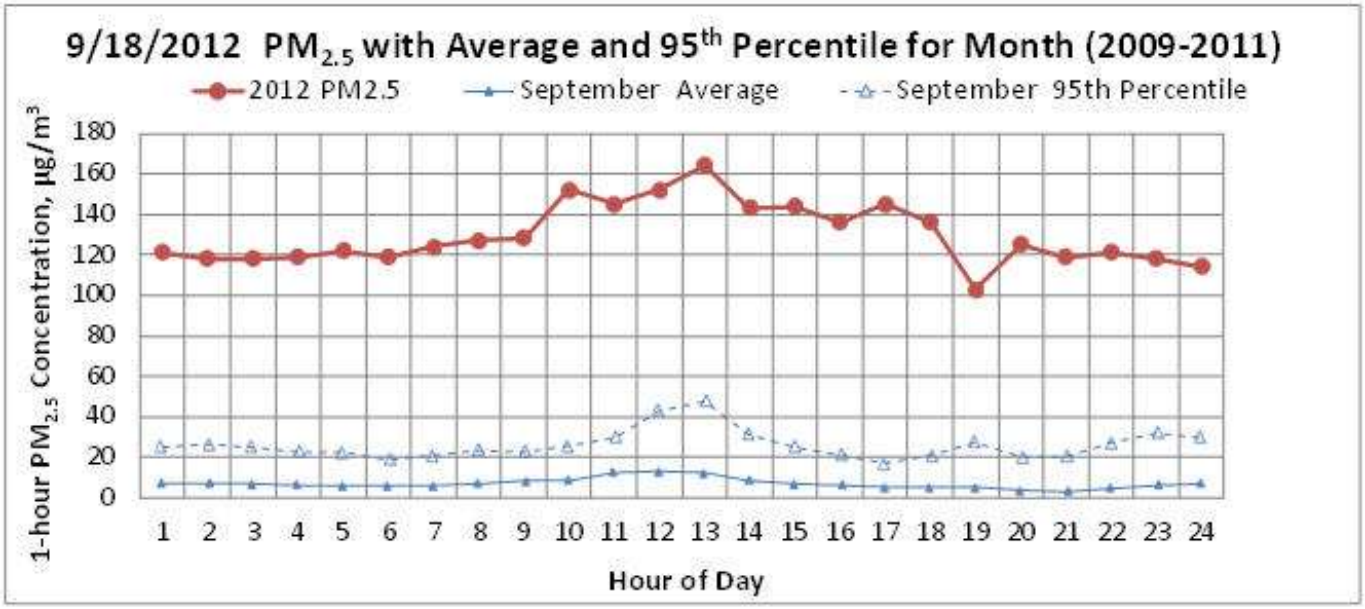

9/17/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
September Average
September 95th Percentile
1-hour PM2.5 Concentration, µg/m3
Hour of Day

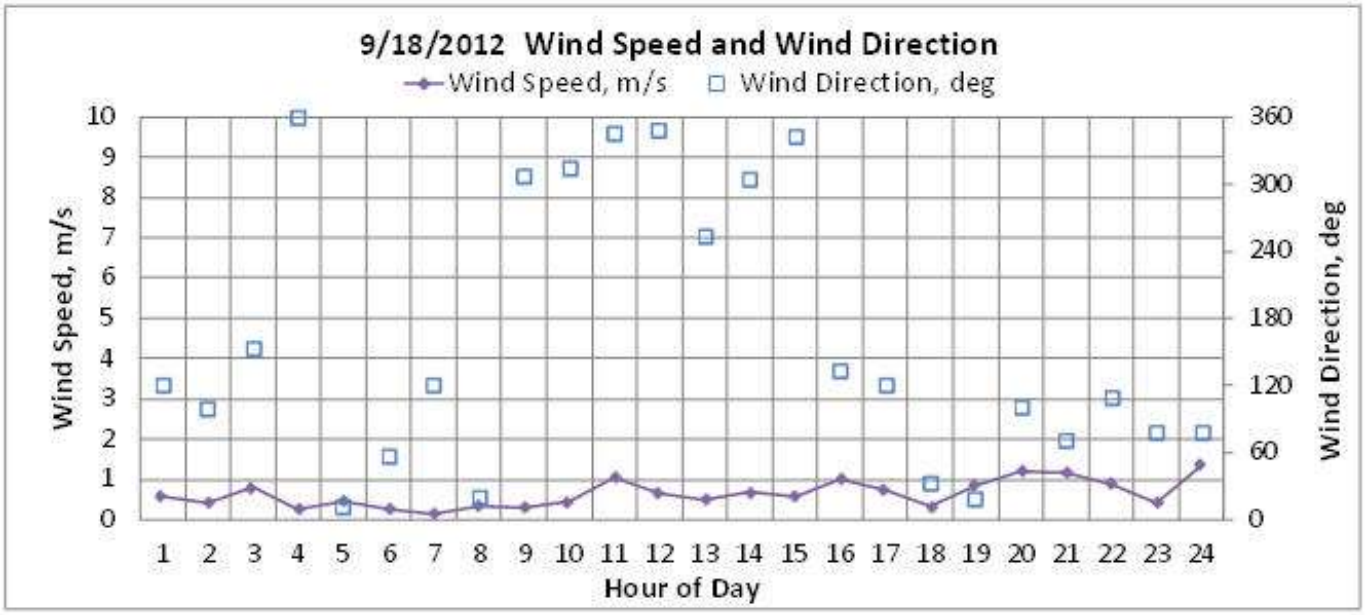

9/17/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Wind Speed, m/s
Wind Direction, deg
Hour of Day

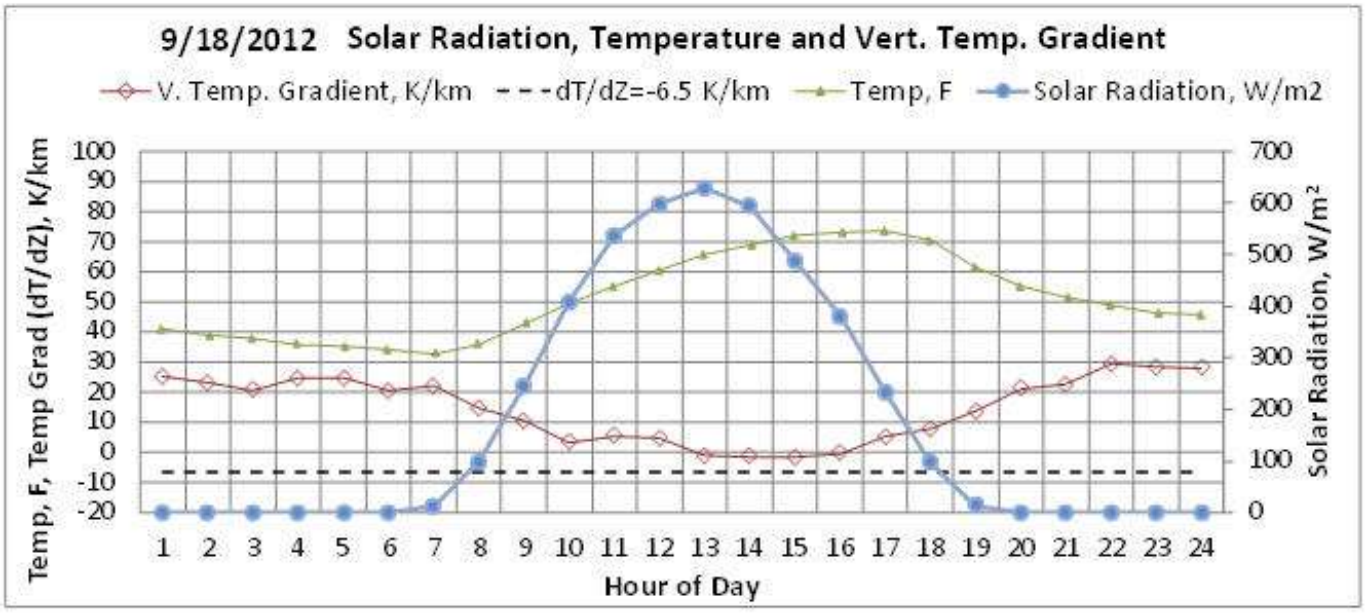

9/17/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m²
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 130.3 µg/m^3 on 9-18-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, 2, 3 (See Sec. 4)
	Weather Conditions:	Low pressure builds offshore and deteriorates Rex block allowing weak zonal flow to establish over Idaho.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Afternoon satellite image shows Salmon and surrounding valleys choked with thick smoke. Back trajectories intersect smoke and/or fire detects from the Mustang, McGuire, Sheep, and Powell SBW fires. Light winds and stable temperature inversion persists all day so hourly $PM_{2.5}$ trace shows concentrations never drop below 100 µg/m^3 during the 24-hour period.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 114 to 124 µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

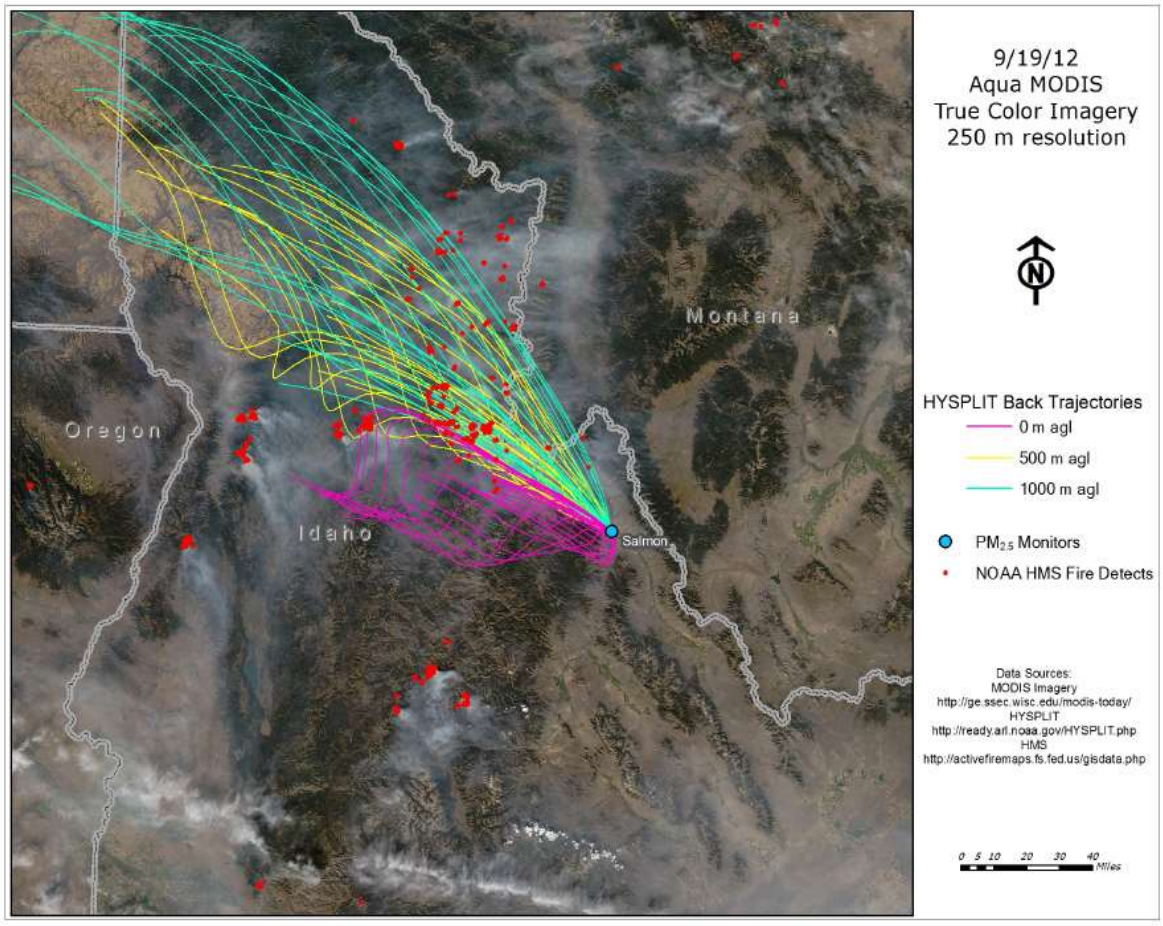


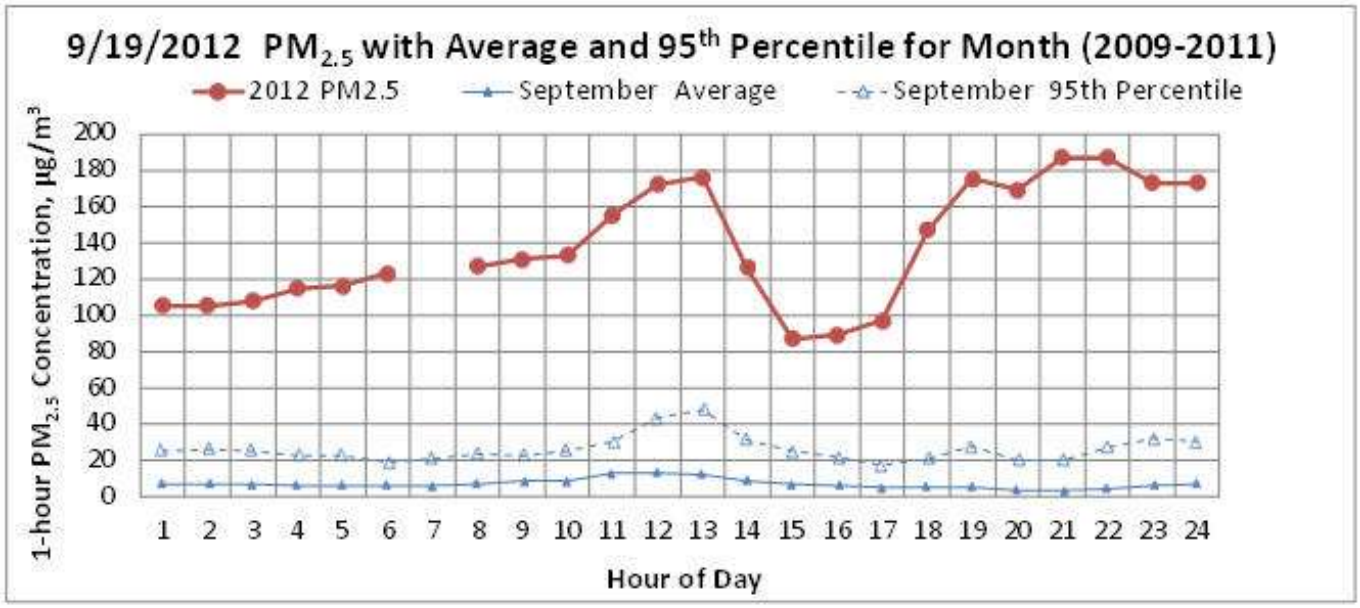

9/18/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
September Average
September 95th Percentile
1-hour PM2.5 Concentration, µg/m3
Hour of Day

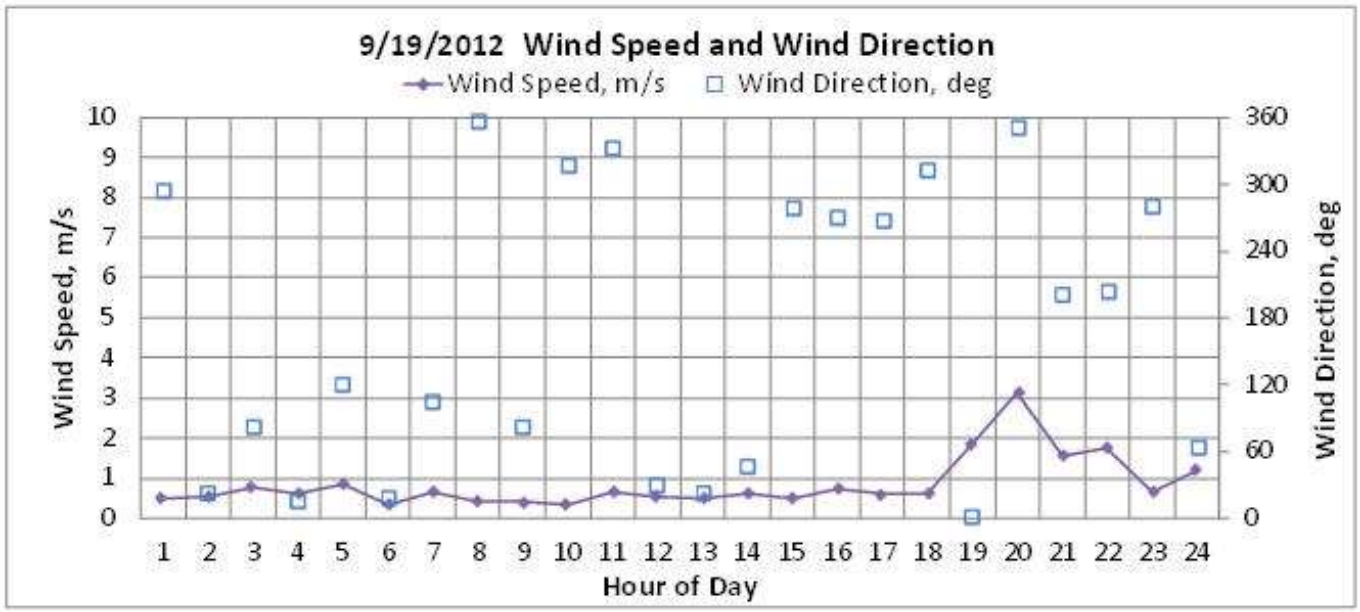

9/18/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Wind Speed, m/s
Wind Direction, deg
Hour of Day

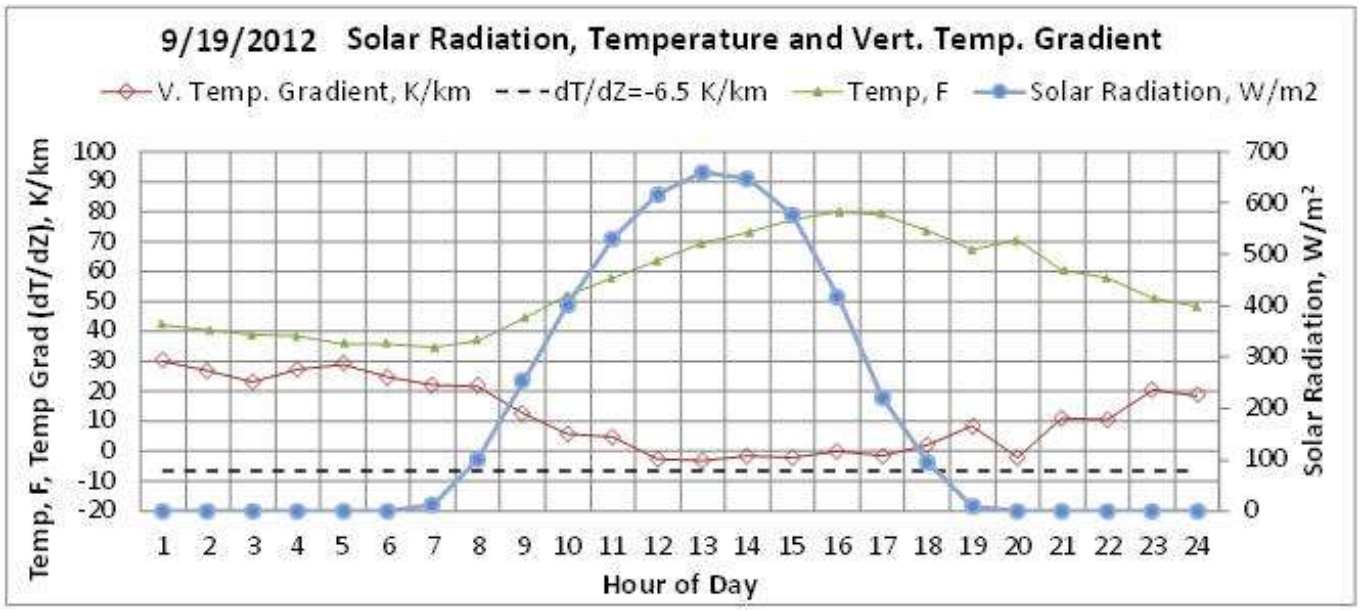

9/18/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m2
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 135.5 µg/m^3 on 9-19-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, 2 (See Sec. 4)
	Weather Conditions:	Low pressure shifts further west off shore allowing high to slightly strengthen and steer winds from the northwest.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Afternoon satellite image shows visible smoke throughout Idaho. Back trajectories intersect smoke and/or fire detects from the Mustang, McGuire, and Powell SBW fires. Light winds and stable air/temperature inversion persists all day resulting in high morning values peaking at 1300 followed by some clearing with westerly winds to 80 µg/m^3. Smoke moves back into Salmon in the evening with up-valley winds reaching over 180 µg/m^3 where it persists through the evening.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 120 to 130 µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

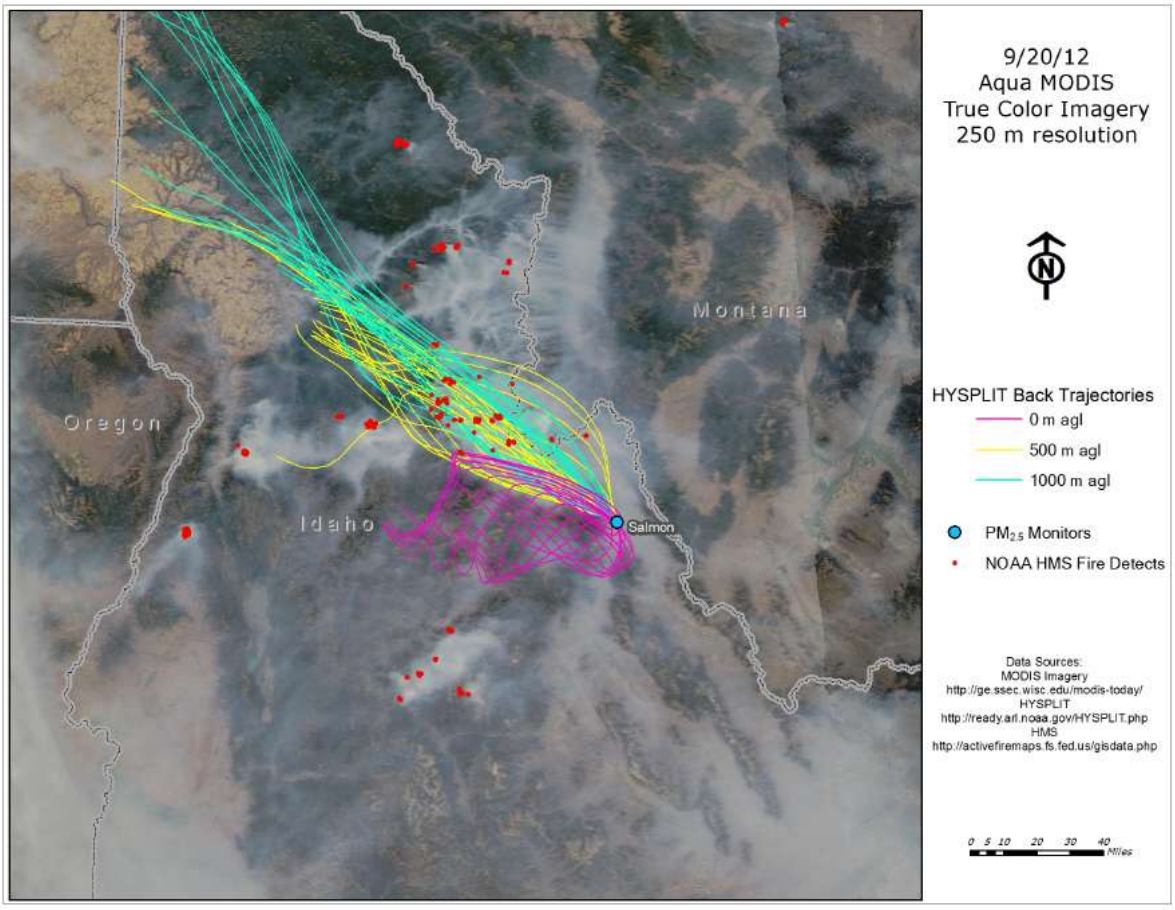


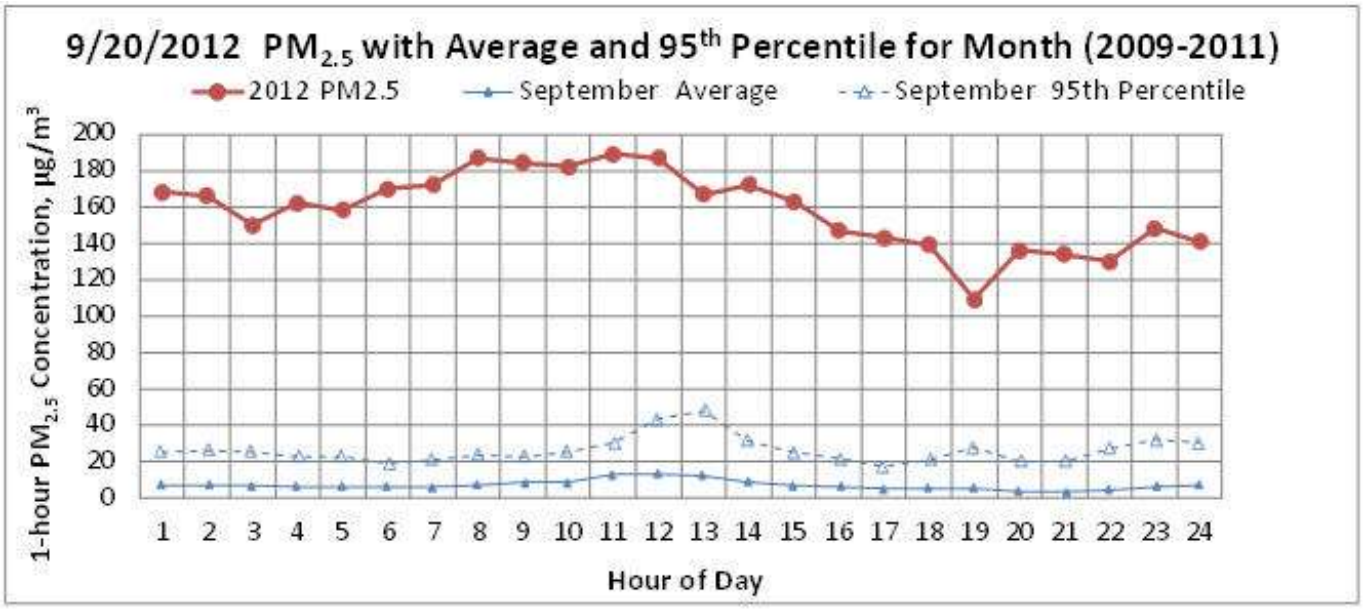

9/19/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
September Average
September 95th Percentile
1-hour PM2.5 Concentration, µg/m3
Hour of Day

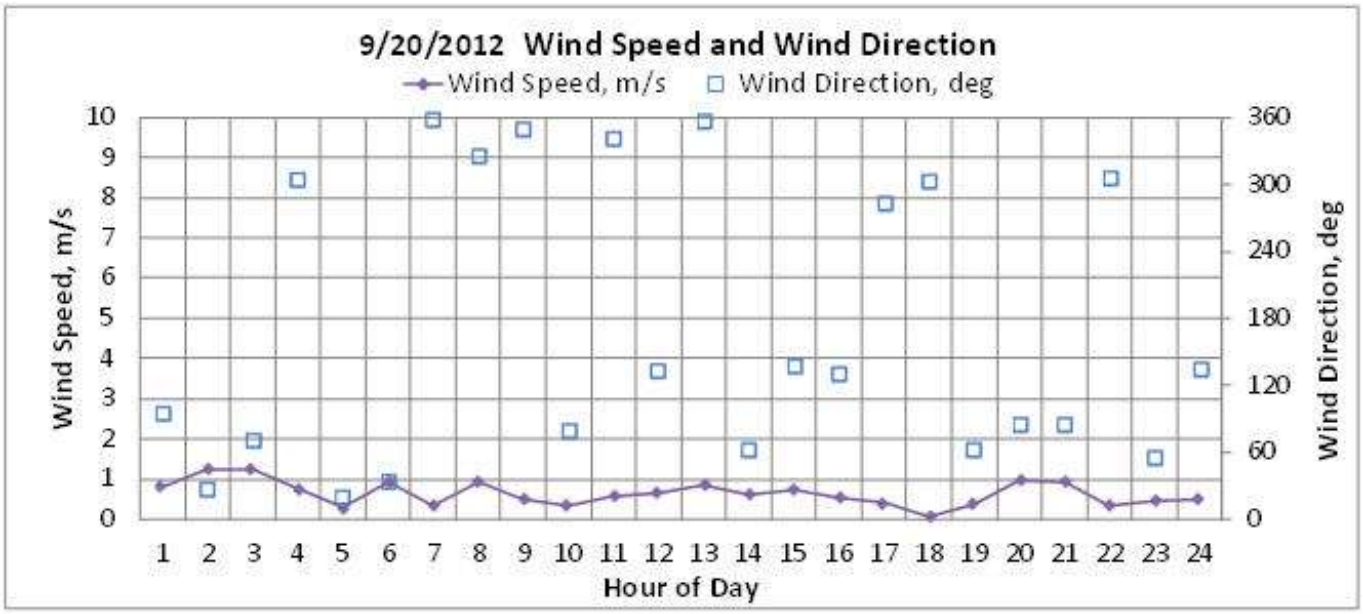

9/19/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Hour of Day

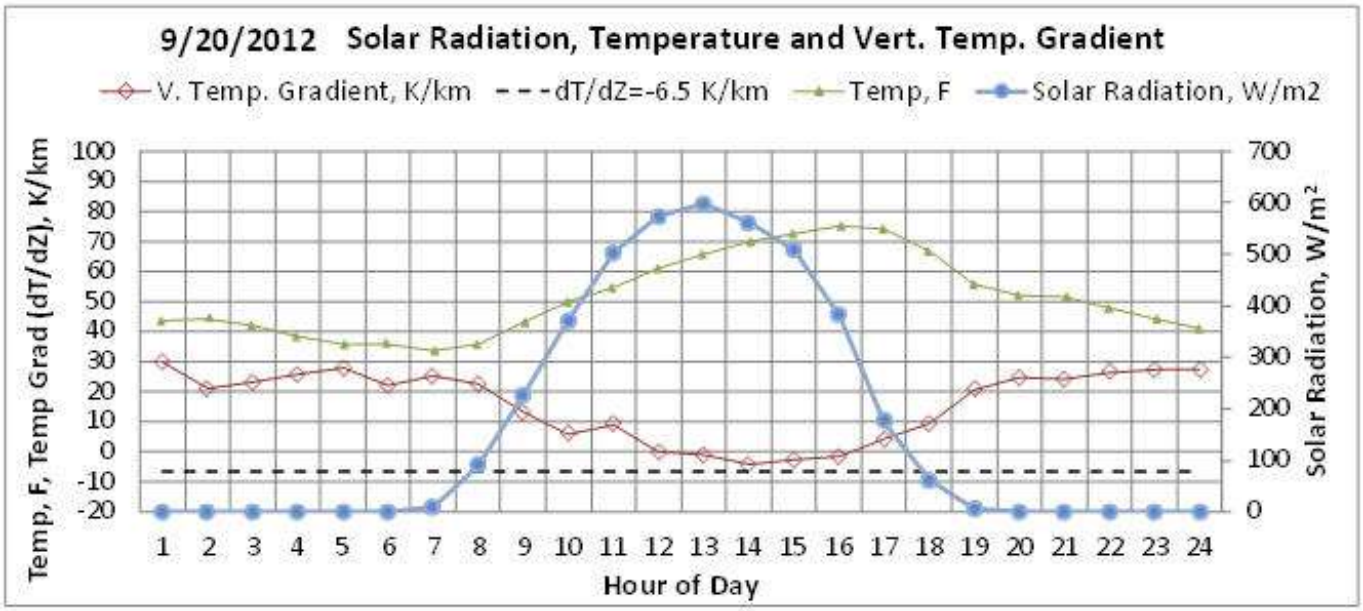

9/19/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m²
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 159.8 µg/m^3 on 9-20-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, 2, 3 (See Sec. 4)
	Weather Conditions:	Highly amplified ridge develops with axis running through Idaho limiting winds (500mb winds <5kts) and maintaining generally northwesterly flow.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Afternoon satellite image shows thick smoke throughout Idaho, filling valleys and concealing surface features. Back trajectories intersect smoke and/or fire detects from the Mustang and McGuire fires. Light winds and temperature inversion persists all day trapping smoke at levels between 100 to 190 µg/m^3 all day.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 144 to 154 µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

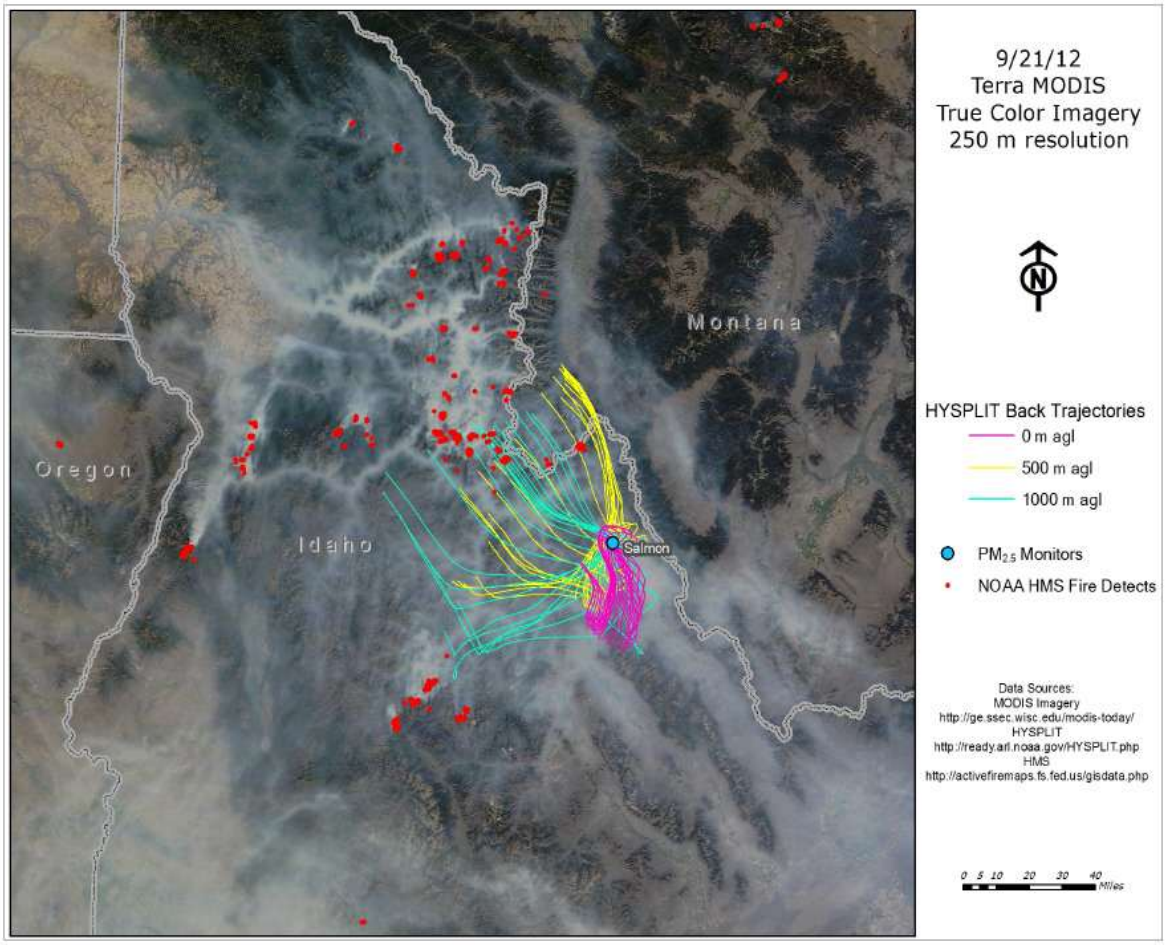


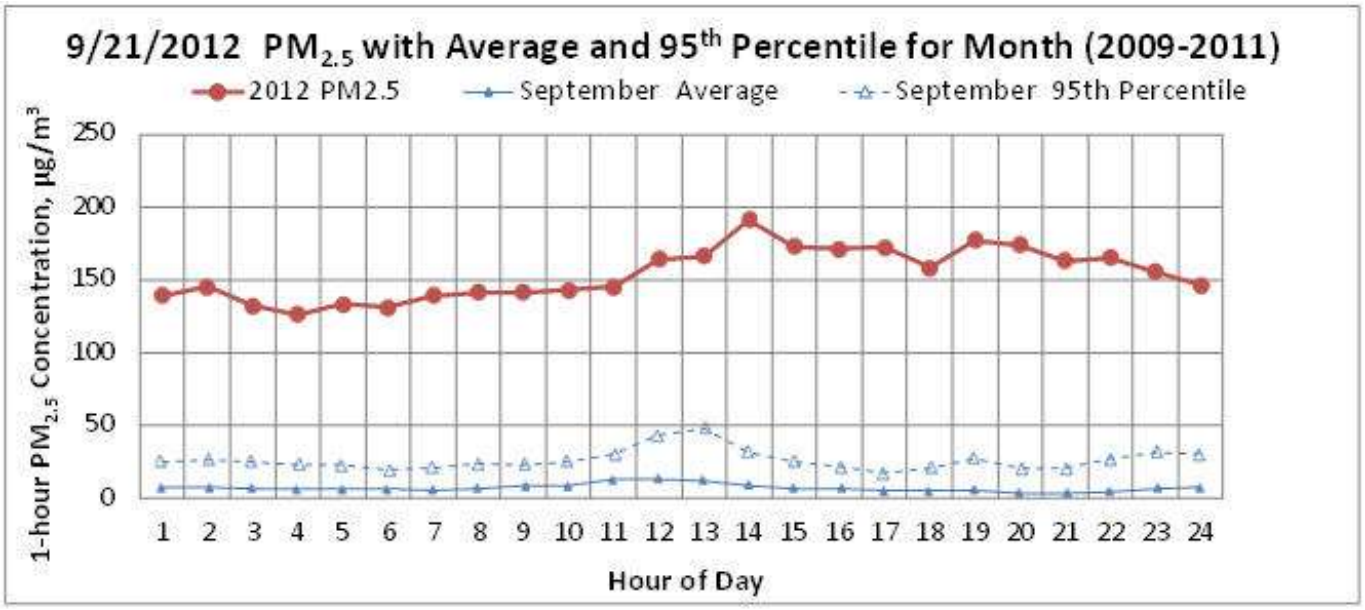

9/20/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
September Average
September 95th Percentile
1-hour PM2.5 Concentration, µg/m3
Hour of Day

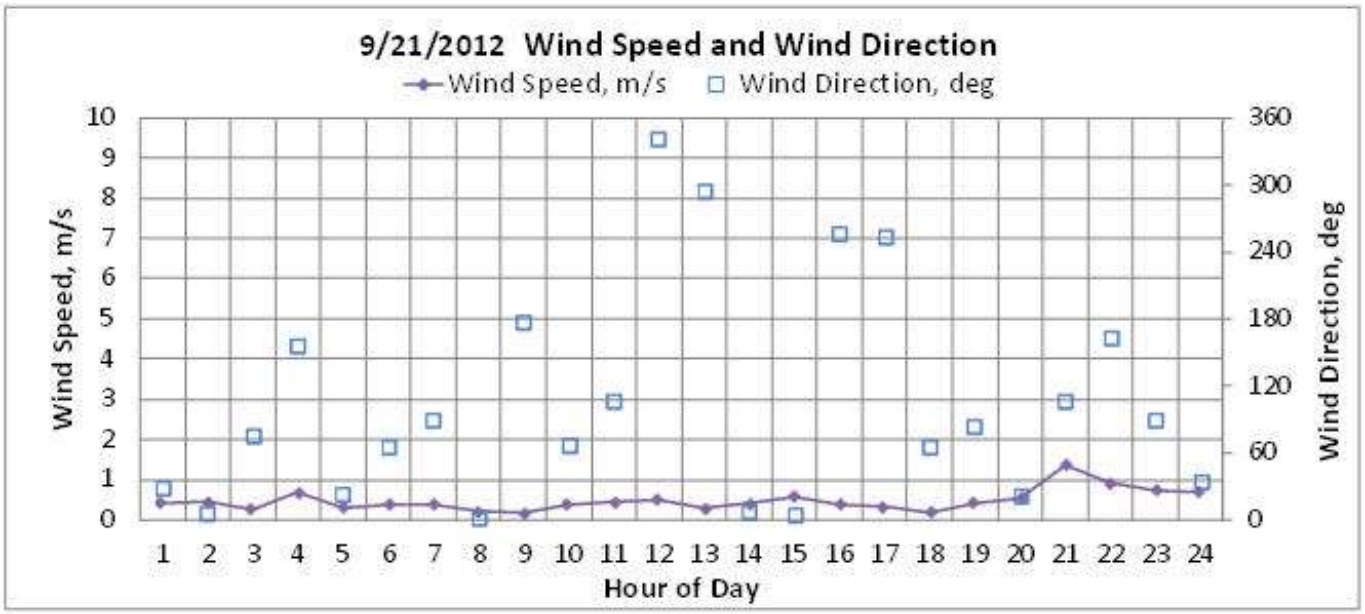

9/20/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Hour of Day

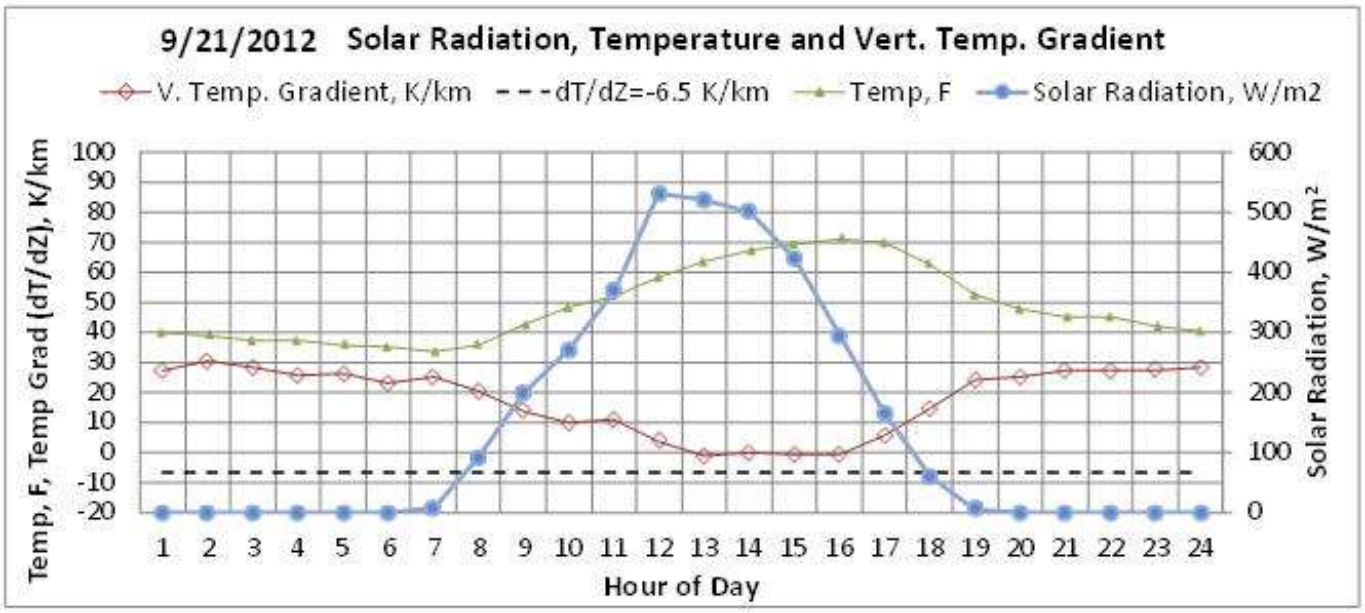

9/20/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m²
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 153.5 µg/m^3 on 9-21-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, 2, 3, 4 (See Sec. 4)
	Weather Conditions:	Ridge axis remains over Idaho with light upper level winds and stagnant conditions.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Morning satellite image shows all valleys completely full of smoke. The lack of air movement and general stagnation is demonstrated by the short distances the back trajectories travel during the 24-hour period. Back trajectories intersect smoke and/or fire detects from the Mustang and Halstead fires. Again, light winds and a persistent temperature inversion results in hourly $PM_{2.5}$ concentrations remaining between 100 and 200 µg/m^3 in Salmon all day.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 138 to 148 µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

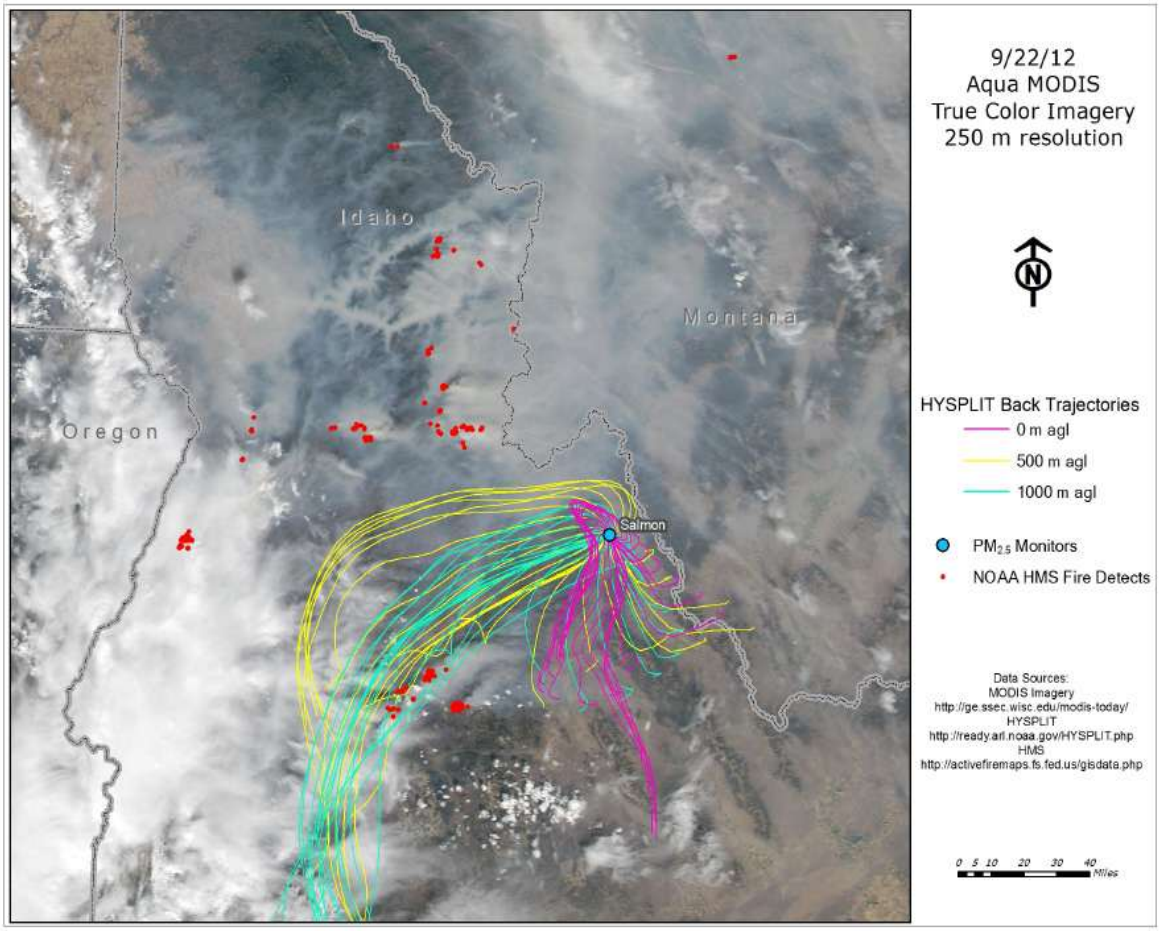


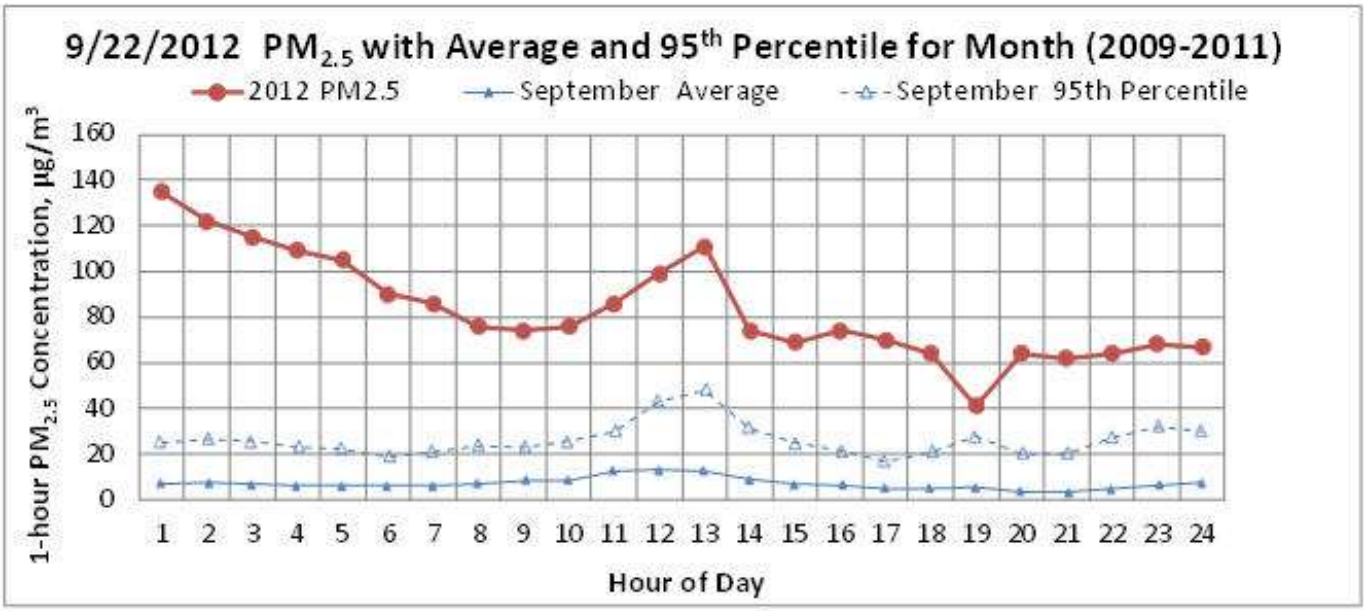

9/21/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
September Average
September 95th Percentile
1-hour PM2.5 Concentration, µg/m³
Hour of Day

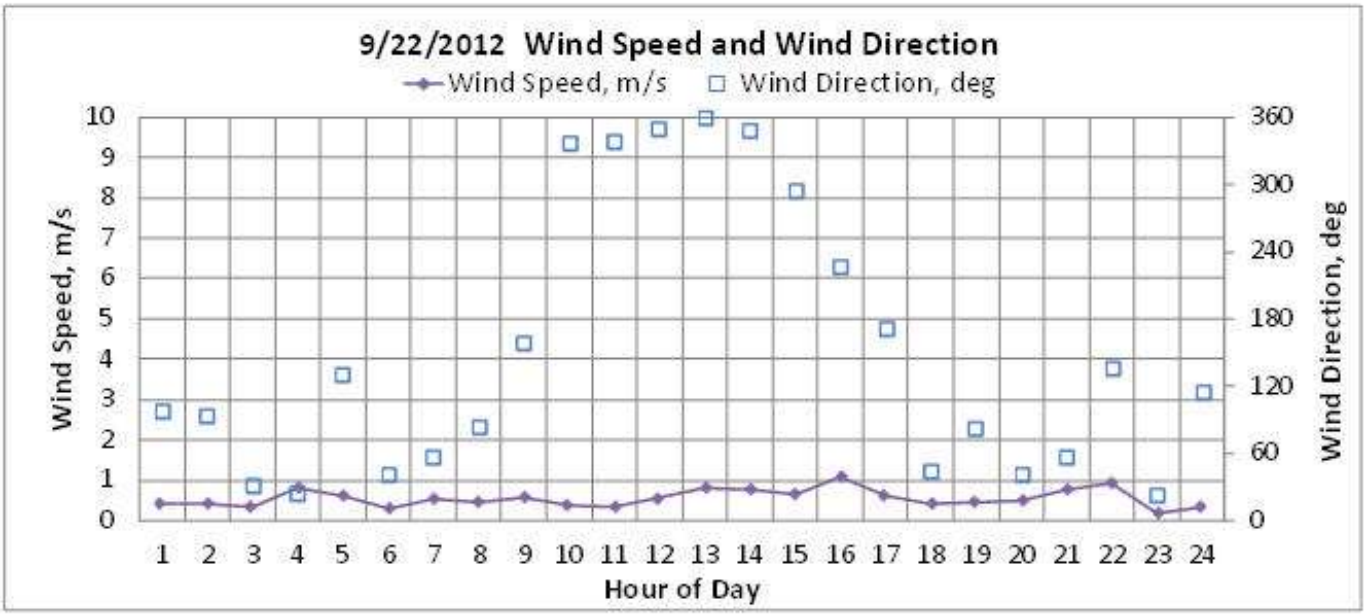

9/21/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Hour of Day

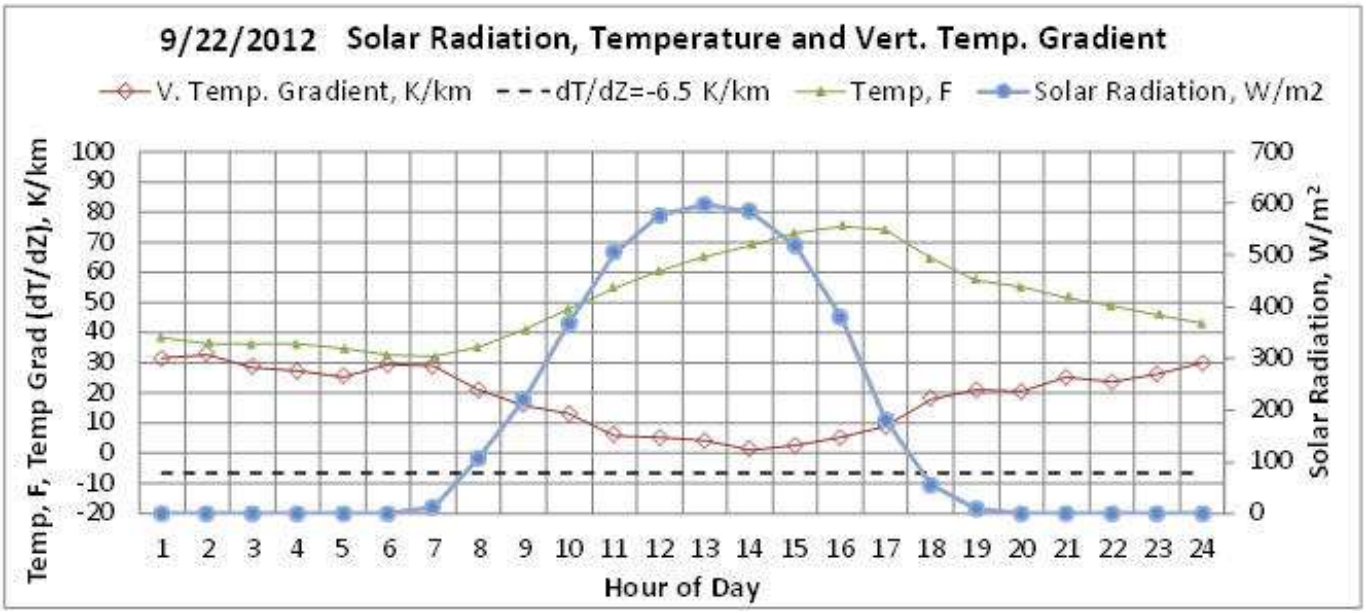

9/21/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m²
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 86.6 µg/m^3 on 9-22-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, 3, 4 (See Sec. 4)
	Weather Conditions:	Ridge axis shifts to the Continental Divide as low moves onshore over extreme western Washington allowing west-southwest flow to develop.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Afternoon satellite image shows thick smoke still persisting throughout the region. Back trajectories intersect smoke and/or fire detects from the Mustang and Halstead fires. Hourly trace shows high concentrations slowly trending down, with a spike at 1300 when winds swing around from the north. Light winds and a temperature inversion again persist in the valley throughout the day.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 70.7 to 80.8 µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

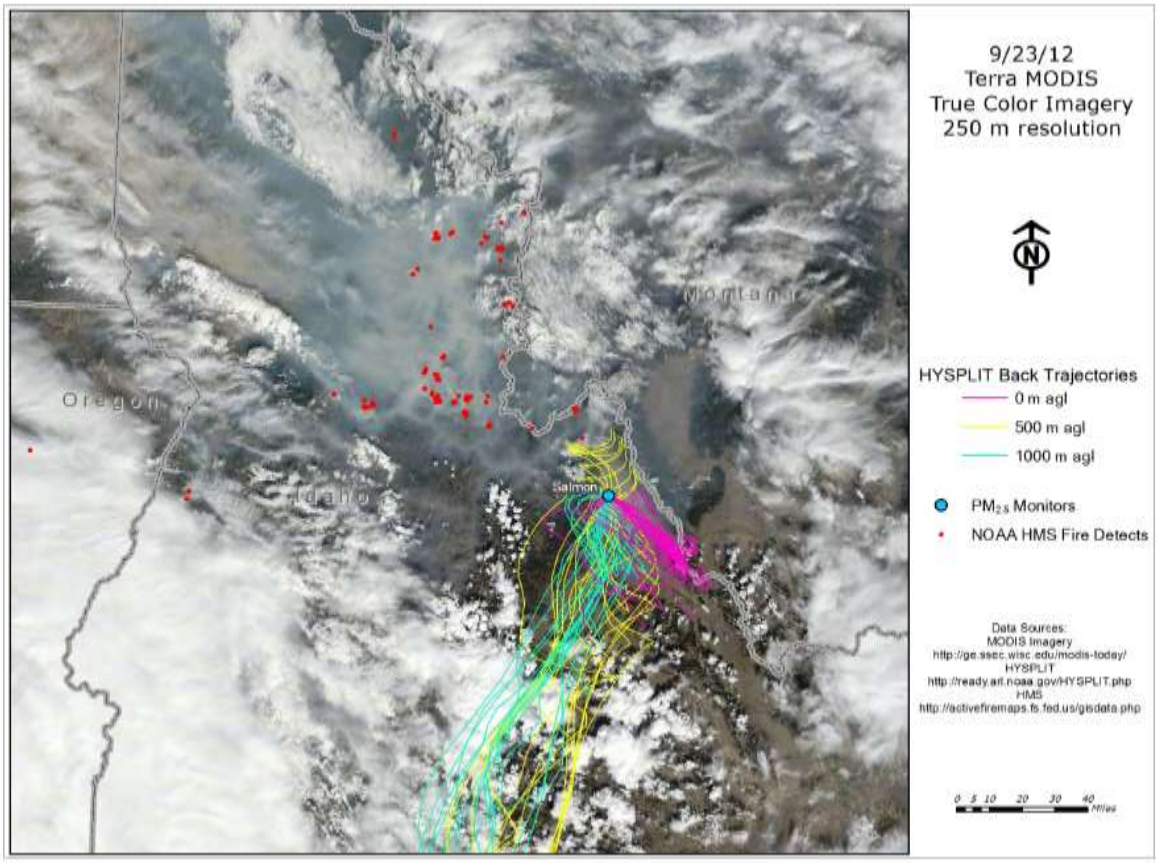


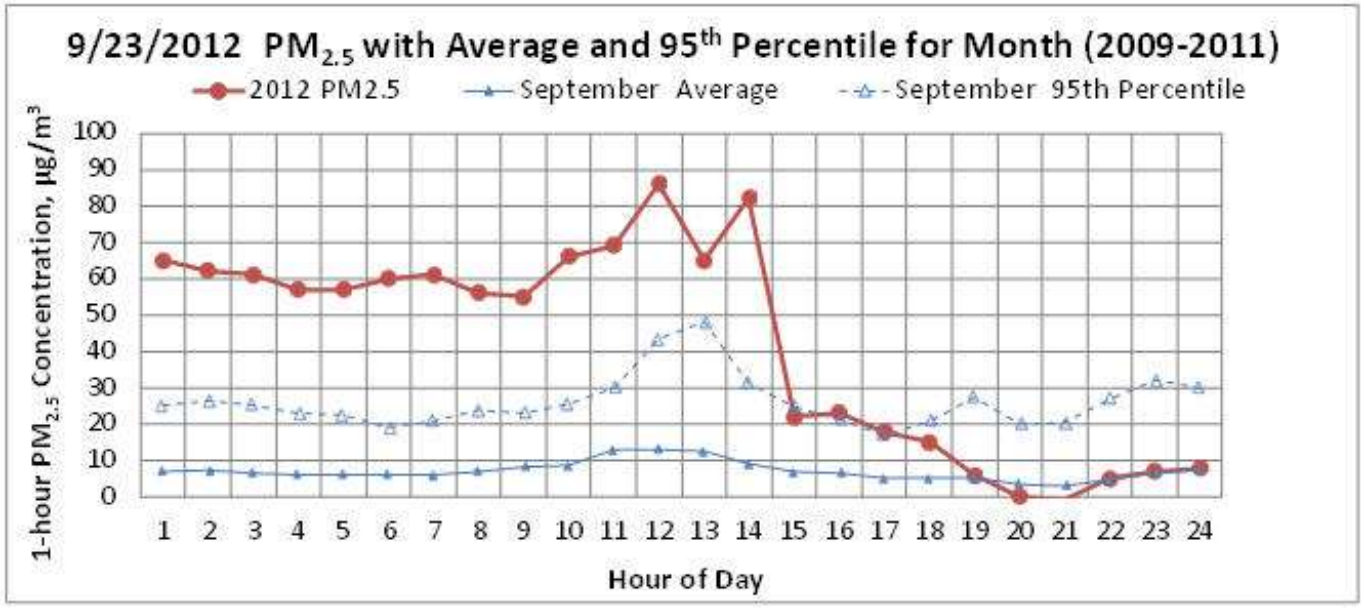

9/22/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
September Average
September 95th Percentile
1-hour PM2.5 Concentration, µg/m³
Hour of Day

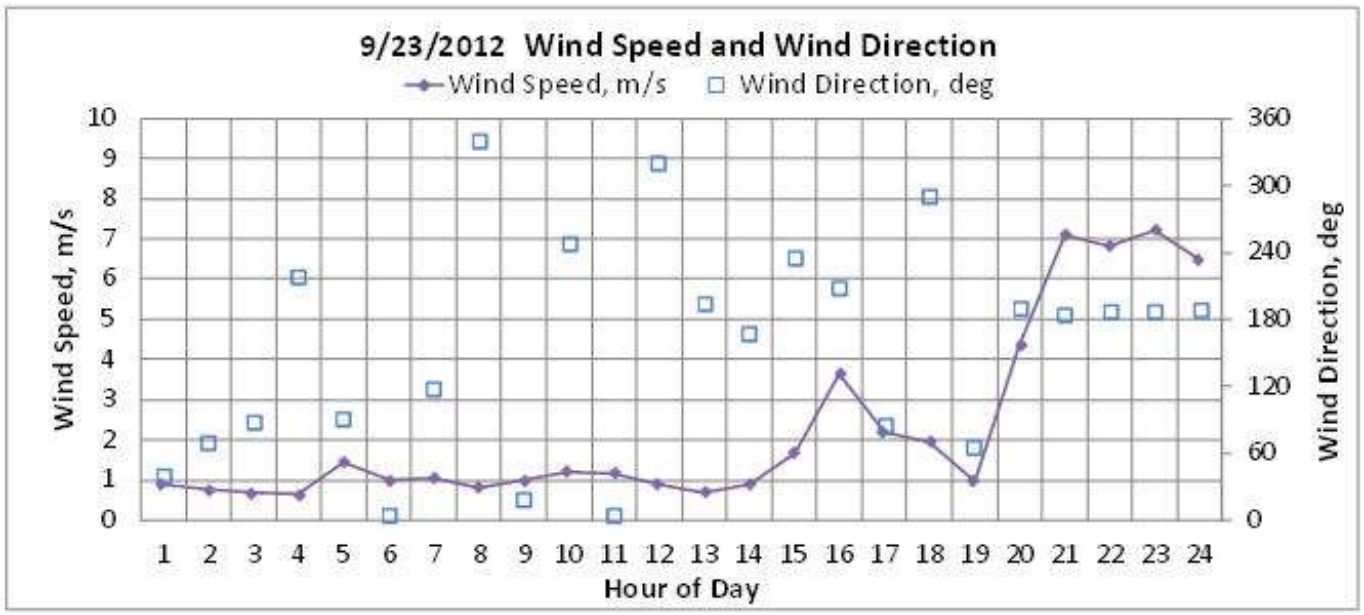

9/22/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Wind Speed, m/s
Wind Direction, deg
Hour of Day

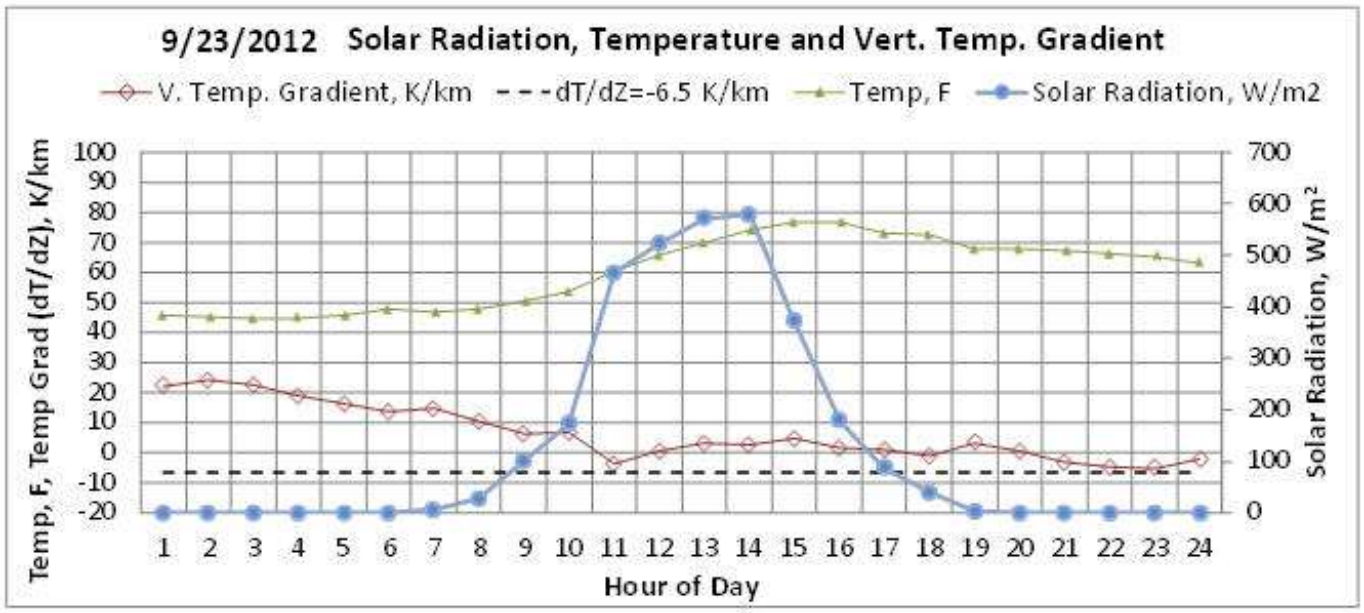

9/22/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m²
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 44.3 µg/m^3 on 9-23-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, 2 (See Sec. 4)
	Weather Conditions:	Low drops south along WA/OR border bringing southwesterly winds into Idaho.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Morning satellite image shows thick smoke surrounding the Mustang and Powell fire detects and visible smoke in Salmon. Back trajectories intersect smoke and/or fire detects from the Mustang and Halstead fires. Hourly trace shows sustained high concentrations ~ 60 µg/m^3 in the morning, punctuated by two midday spikes over 80 µg/m^3. Winds from the south increase to 7 m/s in the evening, flushing out the smoky air and returning the $PM_{2.5}$ to normal levels after 1900.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 28.4 to 38.5 µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

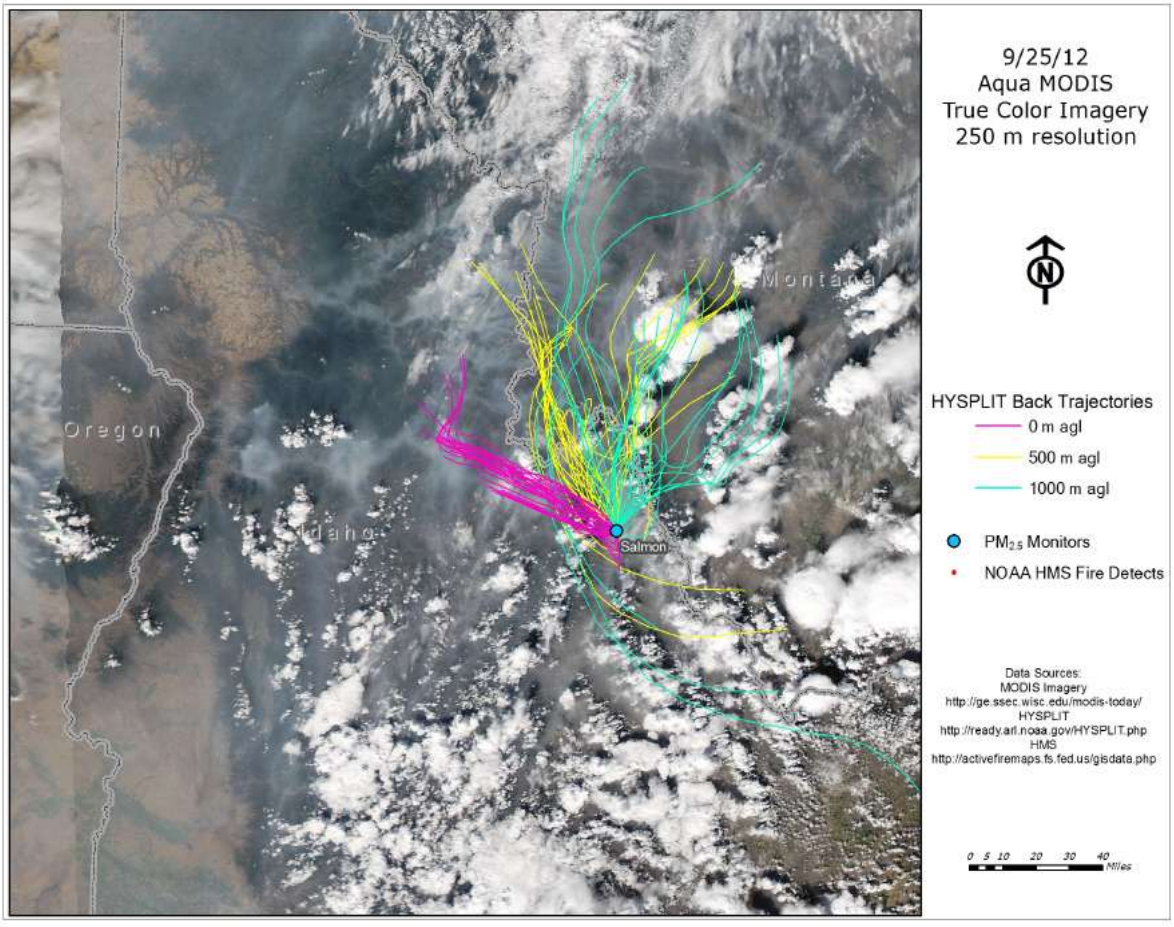


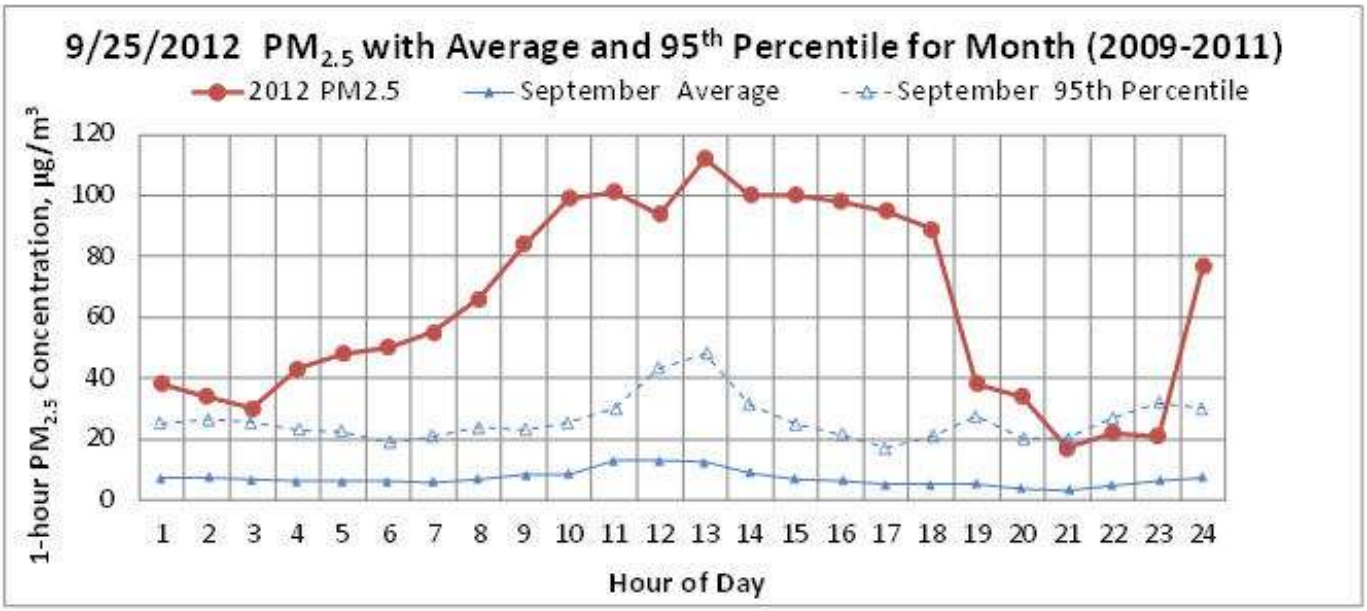

9/23/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
September Average
September 95th Percentile
1-hour PM2.5 Concentration, µg/m³
Hour of Day

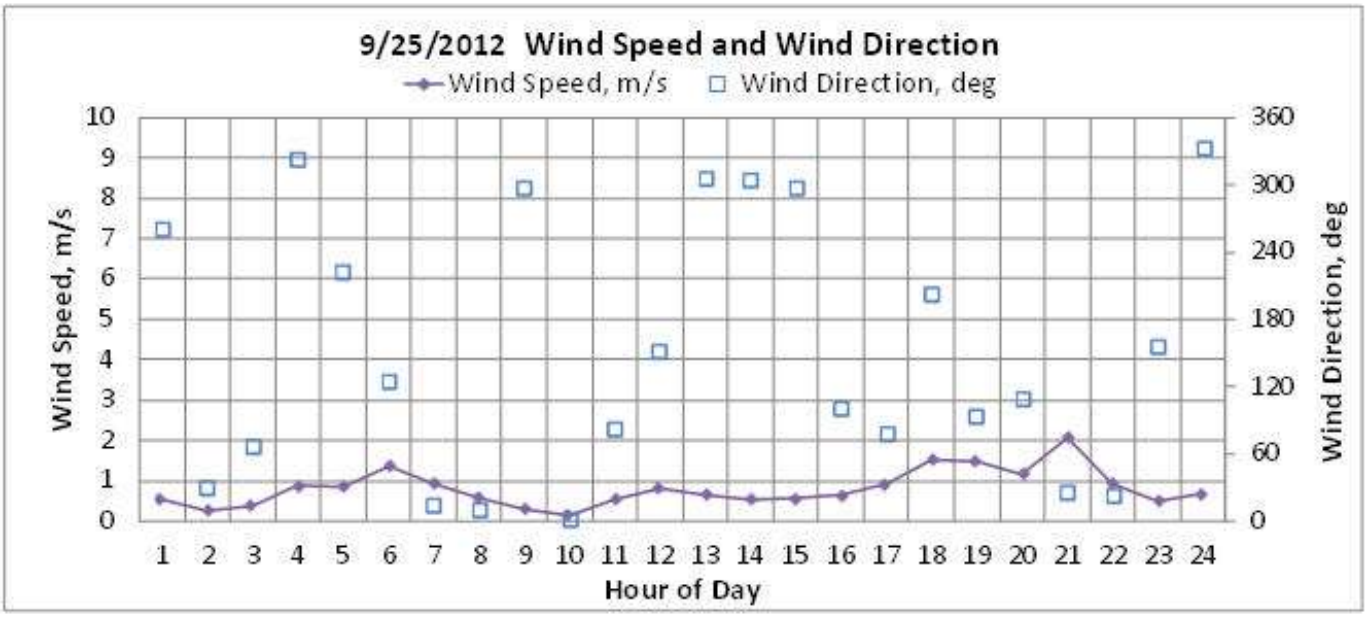

9/23/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Wind Speed, m/s
Wind Direction, deg
Hour of Day

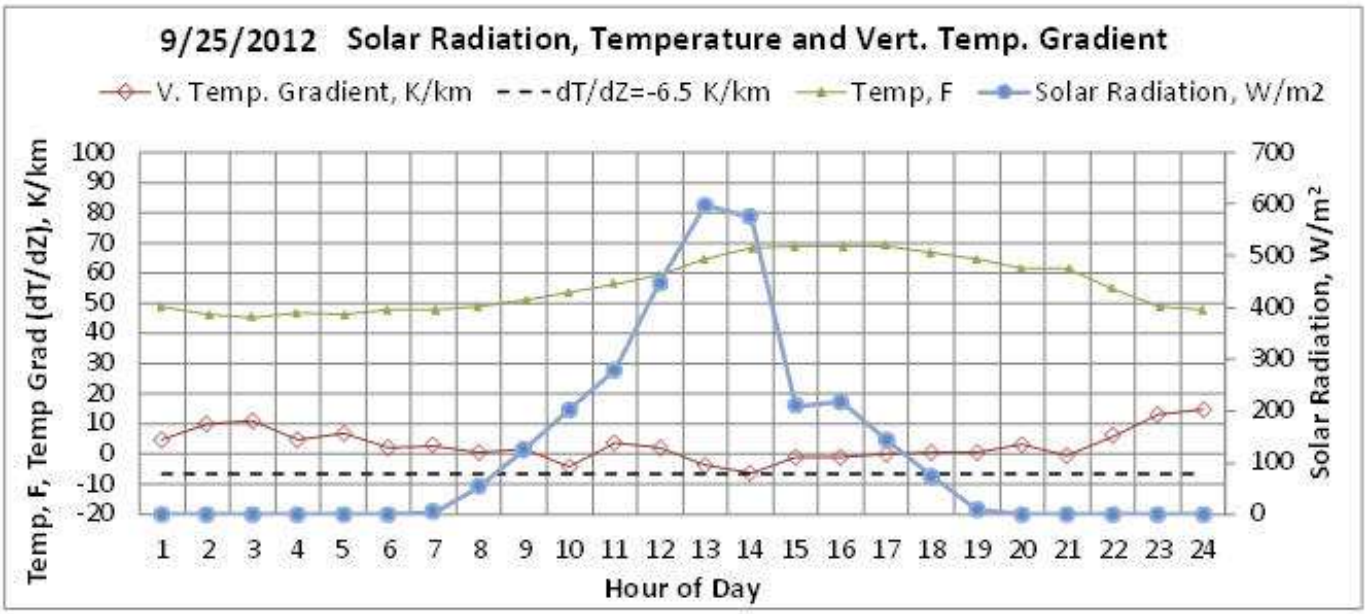

9/23/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m²
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 62.7 µg/m^3 on 9-25-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, 2 (See Sec. 4)
	Weather Conditions:	Pattern shifts together along the Continental Divide and develops into generally northerly flow.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Afternoon satellite image shows thick smoke in Salmon and surrounding areas. Back trajectories intersect smoke and/or fire detects from the Mustang fire. Hourly trace shows high concentrations ~100 µg/m^3 during the day with very light northerly and northwest winds, followed by a drop as winds turn easterly. Winds return to northerly around midnight and concentrations spike to over 70 µg/m^3.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 46.8 to 56.9 µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

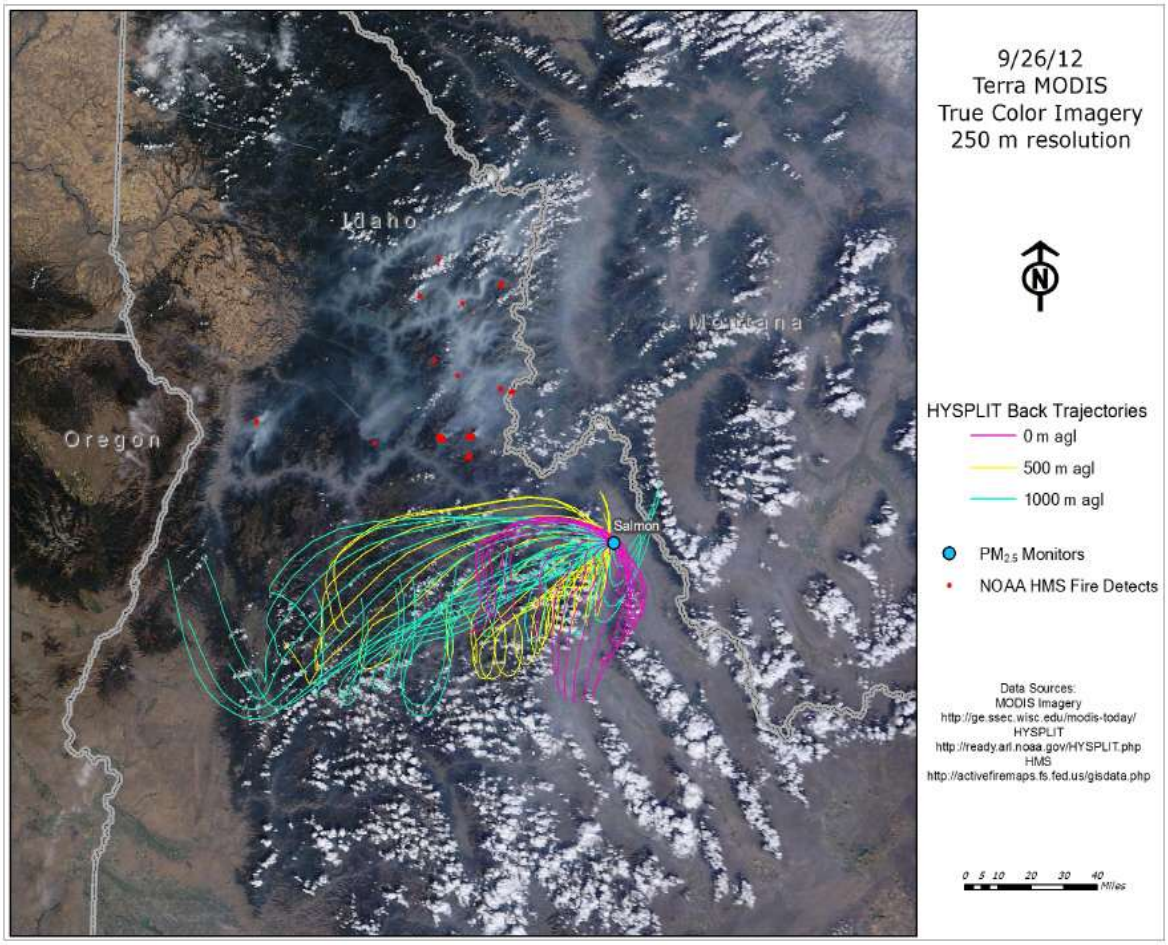


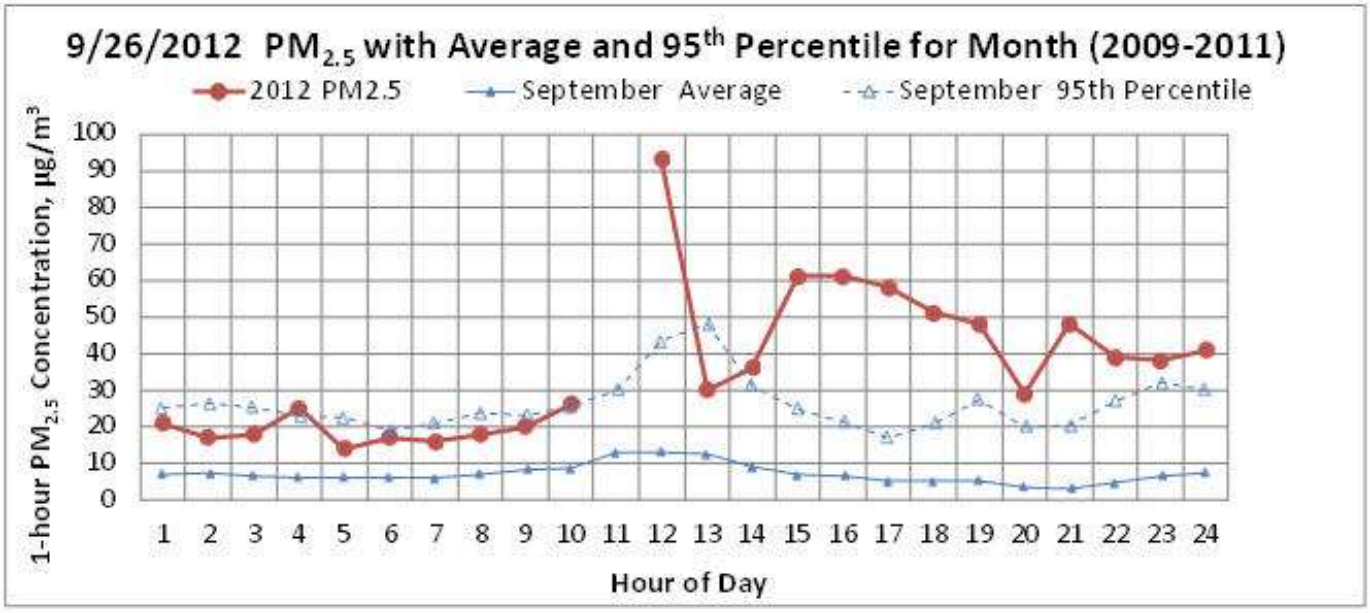

9/25/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
September Average
September 95th Percentile
1-hour PM2.5 Concentration, µg/m³
Hour of Day

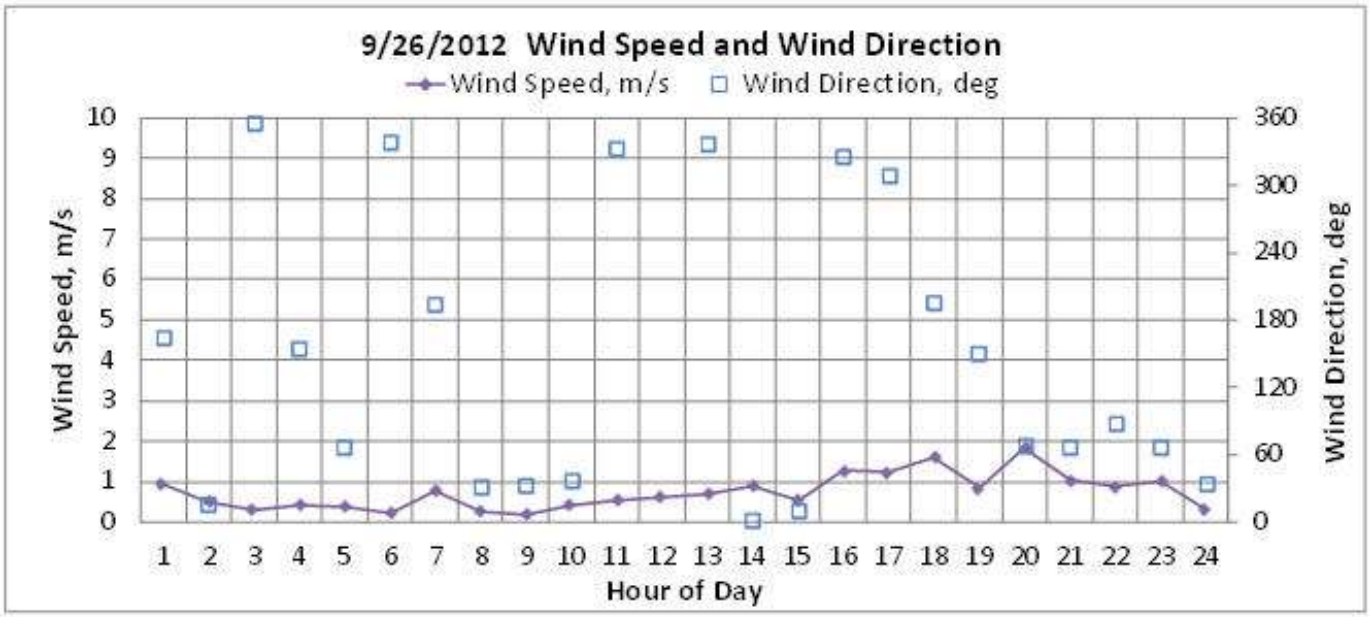

9/25/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Hour of Day

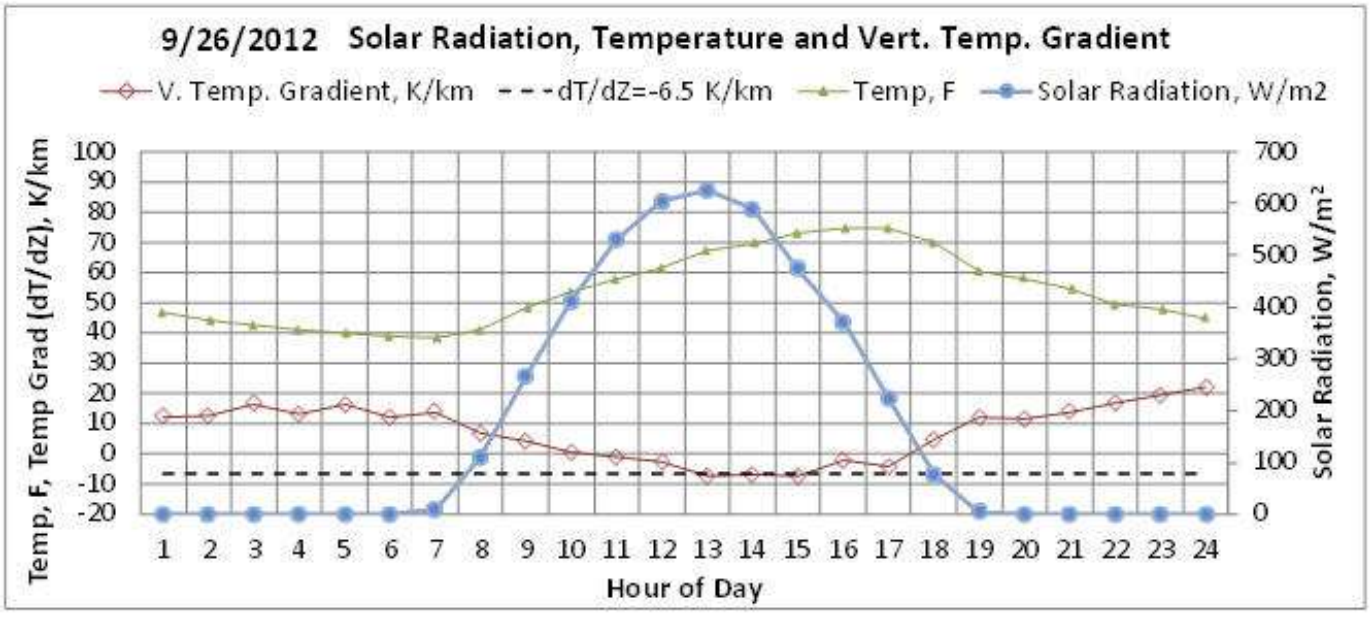

9/25/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m²
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 37.4 µg/m^3 on 9-26-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; 98th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, 4 (See Sec. 4)
	Weather Conditions:	Split flow develops over Idaho limiting transport speed while providing generally westerly flow.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Morning satellite image shows light smoke in Salmon and valleys to the south; thick smoke visible to the north. Back trajectories intersect smoke and/or fire detects from the Halstead fire. Hourly trace shows PM2.5 levels between the average and 95th percentile hourly values in the morning hours, followed by a one hour data loss and then a sharp rise to over 90 µg/m^3 at noon. Generally higher values from 30 to 60 µg/m^3 persist during the second half of the day.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 21.5 to 31.6 µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

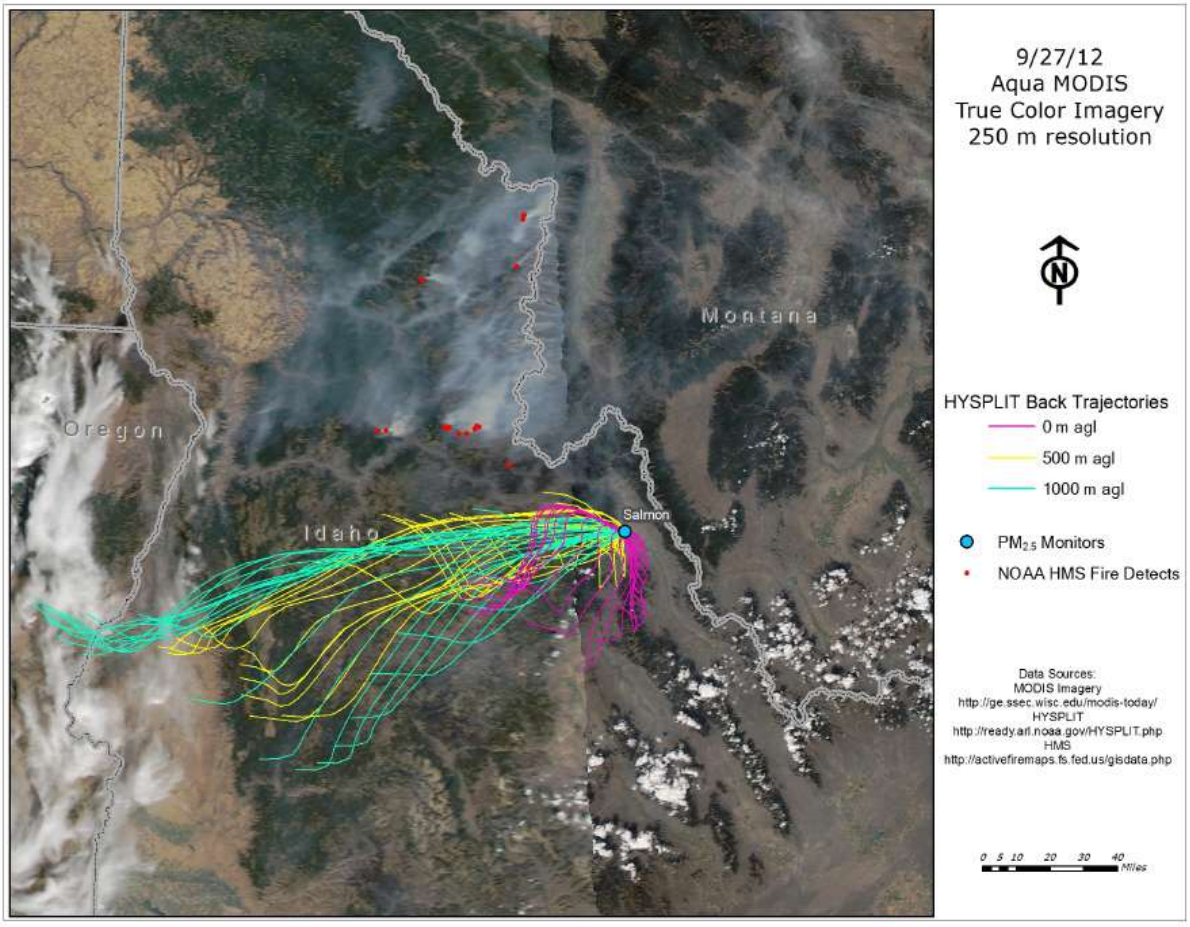


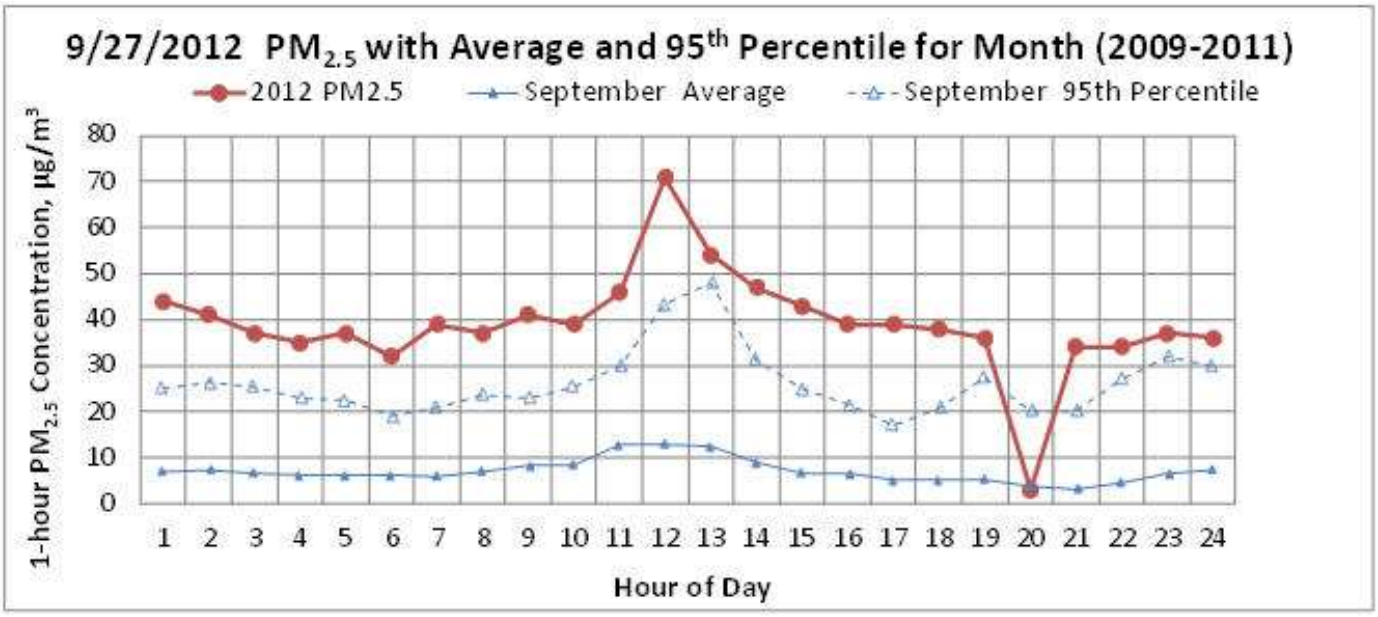

9/26/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
September Average
September 95th Percentile
1-hour PM2.5 Concentration, µg/m3
Hour of Day

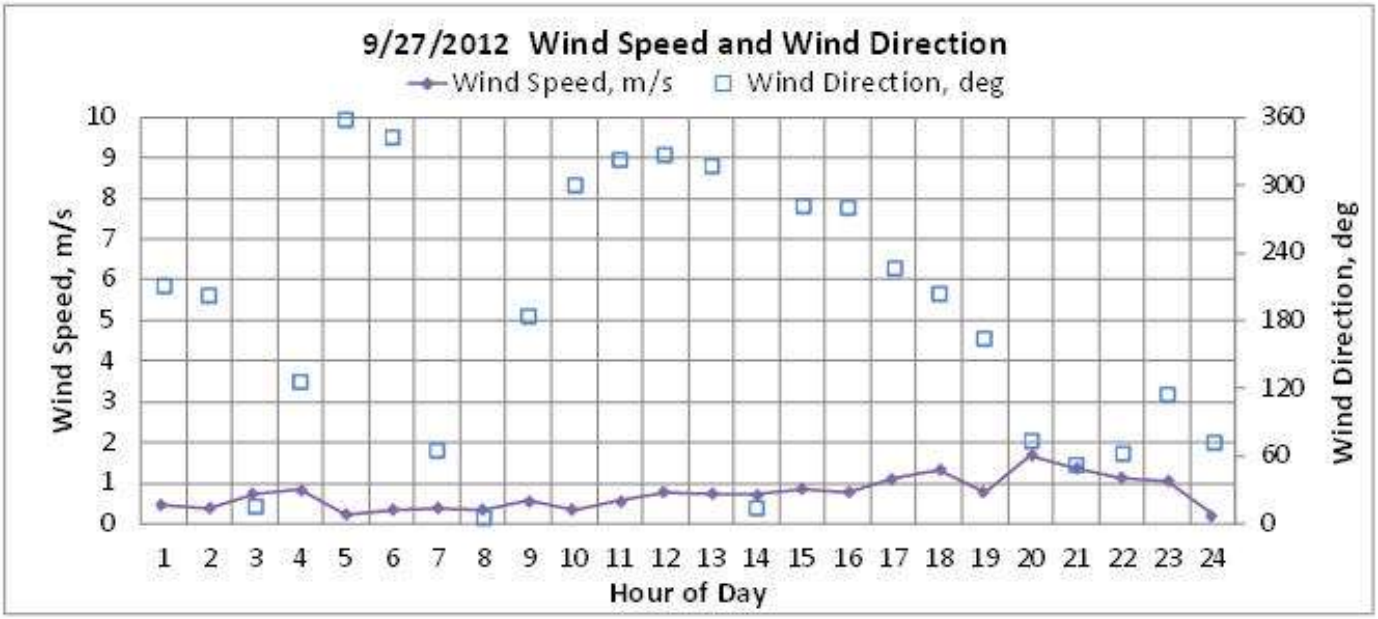

9/26/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Hour of Day

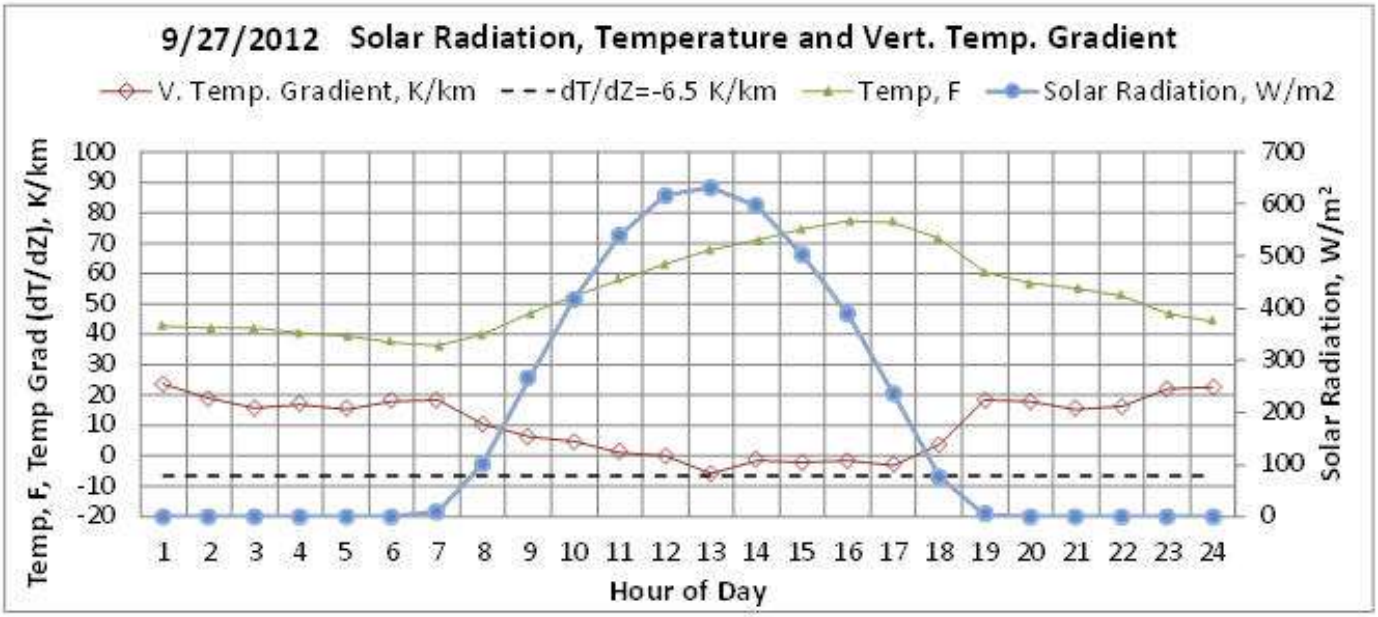

9/26/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m²
Hour of Day

Summary of EER Evidence for Salmon Monitor Value, 39.3 µg/m^3 on 9-27-2012, AQS #16-059-0004 POC 3		
(No additional Monitor Values were recorded on this day)		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; 98th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, 2, 3, 4 (See Sec. 4)
	Weather Conditions:	Strong meridional steering component over Idaho limits wind speeds while local dynamics dominate Idaho air sheds.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Afternoon satellite image shows thick smoke surrounding Mustang, McGuire, and Powell SBW Complexes. Back trajectories intersect no visible smoke and/or fire detects. Hourly trace shows a concentration peak ~ 70 µg/m^3 at noon with light north to northwesterly winds bringing Mustang smoke up valley. Concentrations hover around 40 µg/m^3 for most of the day, well above the hourly 95th percentile level. Light winds and a mild temperature inversion persists all day helping to trap the smoke in the valley.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Too warm for RWC. See Sec 4.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was elevated from Aug thru Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 5.8 to 15.9 µg/m^3 (Avg-to-95%tile), thus, this event contributed 23.4 to 33.5 µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.




9/27/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 PM2.5
September Average
September 95th Percentile
1-hour PM2.5 Concentration, µg/m3
Hour of Day


9/27/2012 Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Hour of Day


9/27/2012 Solar Radiation, Temperature and Vert. Temp. Gradient
V. Temp. Gradient, K/km
dT/dZ=-6.5 K/km
Temp, F
Solar Radiation, W/m2
Temp, F, Temp Grad (dT/dZ), K/km
Solar Radiation, W/m2
Hour of Day

Appendix C: Pinehurst EER Daily Summaries

For each Pinehurst monitor value requested for Exceptional Events concurrence, Appendix C includes a summary of all EER elements along with a satellite/back trajectory map, $PM_{2.5}$ and wind time series charts. The summary is a table which provides succinct information addressing all 7 EER criteria, or referencing other locations in this document where additional information may be found.

Appendix C: Pinehurst EER Information by Day

Information for This Appendix

This appendix contains day-by-day detailed information in support of the Exceptional Events request for each day requested, including the monitor values, AQS number and POC for each value on which DEQ is requesting concurrence. Explanations follow for the information contained in this appendix.

Summary of EER Evidence Tables

These tables contain concise, yet complete information supporting each EER element for each day in which EER concurrence is requested, along with reference to the main report section containing more complete explanations of the transport scenarios involved, alternative hypotheses and other EER elements.

Hysplit Back-trajectories / MODIS Satellite Images

Daily satellite images are overlaid with HYSPLIT back trajectories and HMS fire detects. Terra (morning) or Aqua (afternoon) RGB True Color images show a snapshot of the smoke at the time of the satellite pass. HYSPLIT back trajectories were run for the 24-hour period ending at 23:59 on each day. New trajectories start hourly and have starting positions at the source of 0 m agl, 500 m agl, and 1000 m agl. HMS fire detects are all those identified by the MODIS satellites during the 24-hour period.

Time Series Charts for each "Date" Requested

Twenty-four hour time series charts are provided to depict the temporal pattern of hourly $PM_{2.5}$ concentration and meteorological parameters associated with each day. In addition, typical $PM_{2.5}$ concentrations during the same month in previous years when wildfires were not impacting Pinehurst are characterized for comparison.

Top chart: ***"Date" PM2.5 with Average and 95th Percentile for Month (2009-2011)***

2012 $PM_{2.5}$ – The orange circles and line indicate the hourly $PM_{2.5}$ concentration for each hour for each day affected by wildfires in 2012.

August/September/October Average. The blue line with filled blue triangle markers represents the average for the month for the three years prior to 2012. So each value represents 90 or 93 values averaged together. The October average only represents the days prior to October 15, to better represent the wildfire period.

August/September/October 95th percentile. The open blue triangles and dotted line represent the 95th percentile value for the identified month from the 2009 – 2011 data set. The 95th percentile is used to represent the upper limit of the normal historical fluctuations for each hour, based on EPA guidance for the 24-hour normal range between "average" and 95th percentile. Hourly values above this line indicate an "exceptional" hourly value that is beyond normal for that hour and month.

Middle Chart: **"Date" Wind Speed and Wind Direction.**

Wind Speed - The purple diamonds and solid line represent the wind speed in meters per second (m/s) recorded at the DEQ met station in Pinehurst. The wind sensor is at 10 meters above ground level.

Wind Direction, deg – The blue open squares represent the wind direction for the hour, at the DEQ met station.

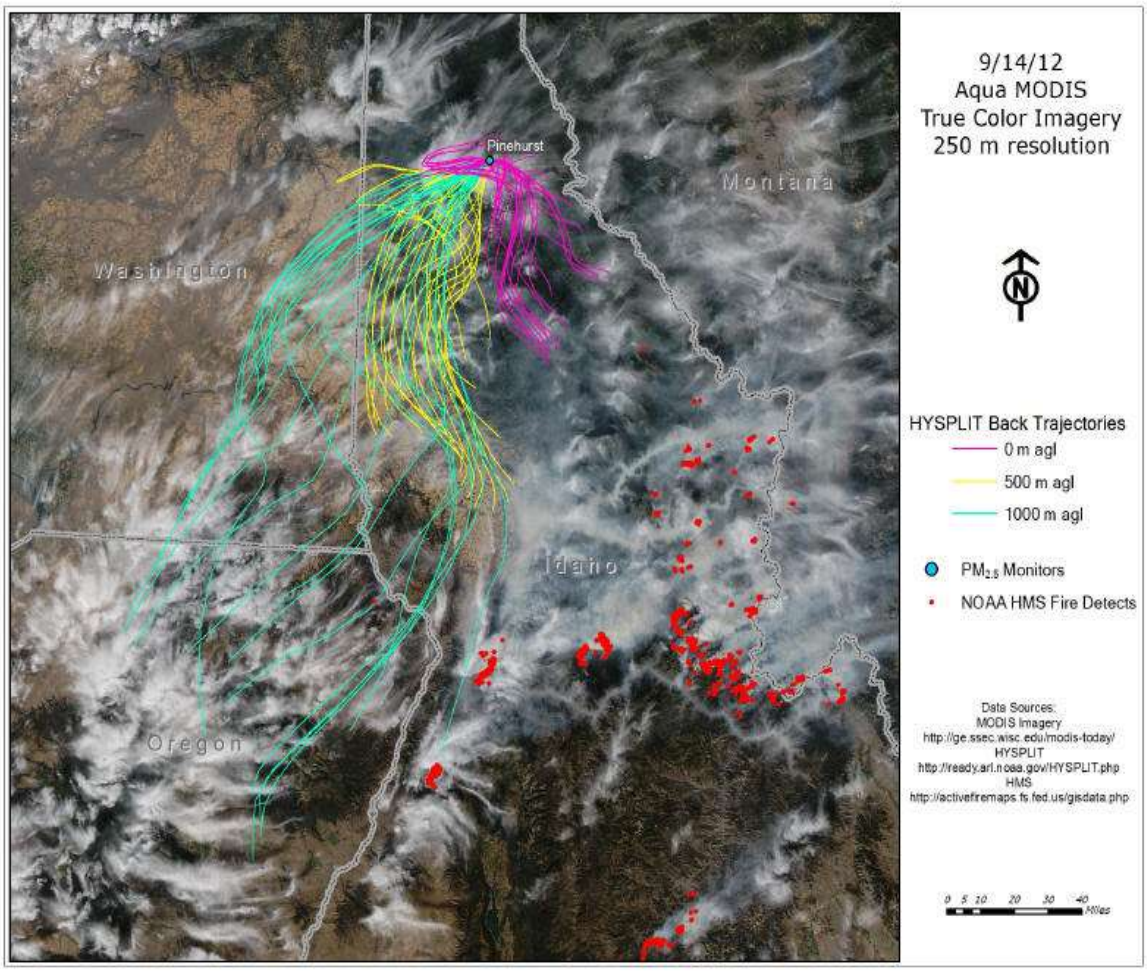
Bottom Chart: ***"Date" Solar Radiation and Temperature***

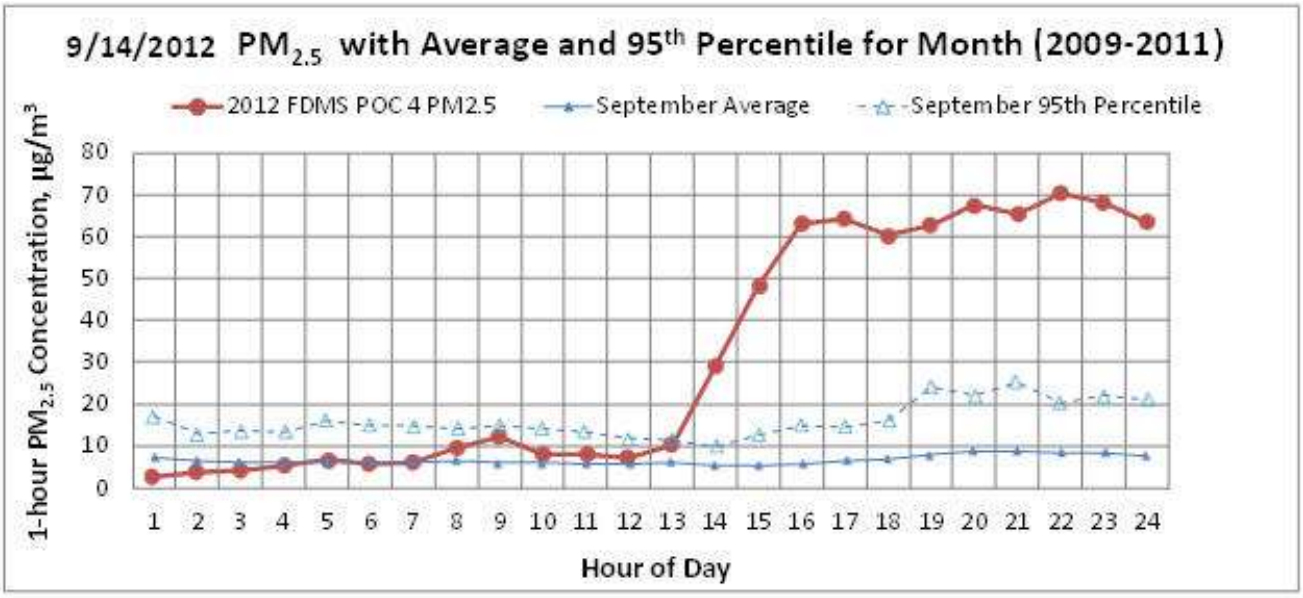
Temp. F – The green triangles and green line represent the temperature at 2 meters above ground as measured at the DEQ met station. It is included to indicate when the temperature dips below 40 degrees F, the point at which residential wood combustion is beginning to be used.

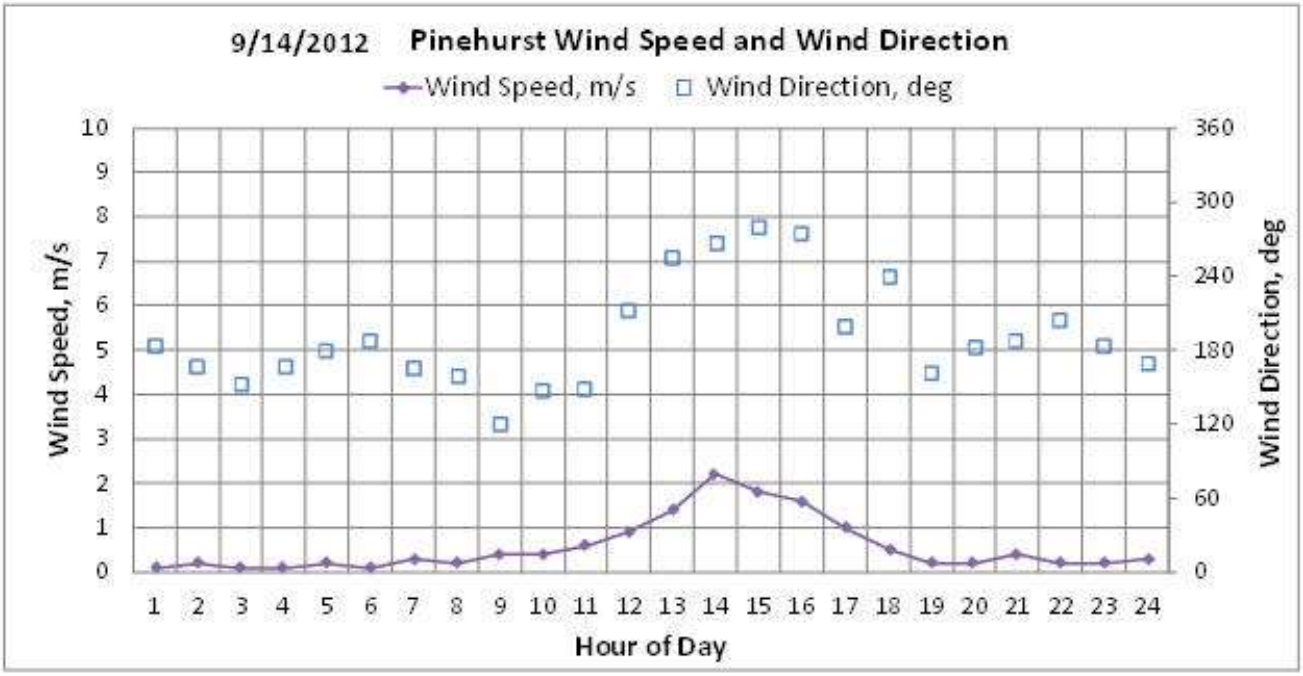
Solar Radiation, W/m2 – the larger blue filled circles represent the solar radiation, in Watts per square meter (W/m2) measured at the DEQ met station. The solar intensity and cycle indicates when solar driven up-valley flows may be expected and when gravity driven down-slope and down-valley flows may be prevalent before sunrise and after sunset.

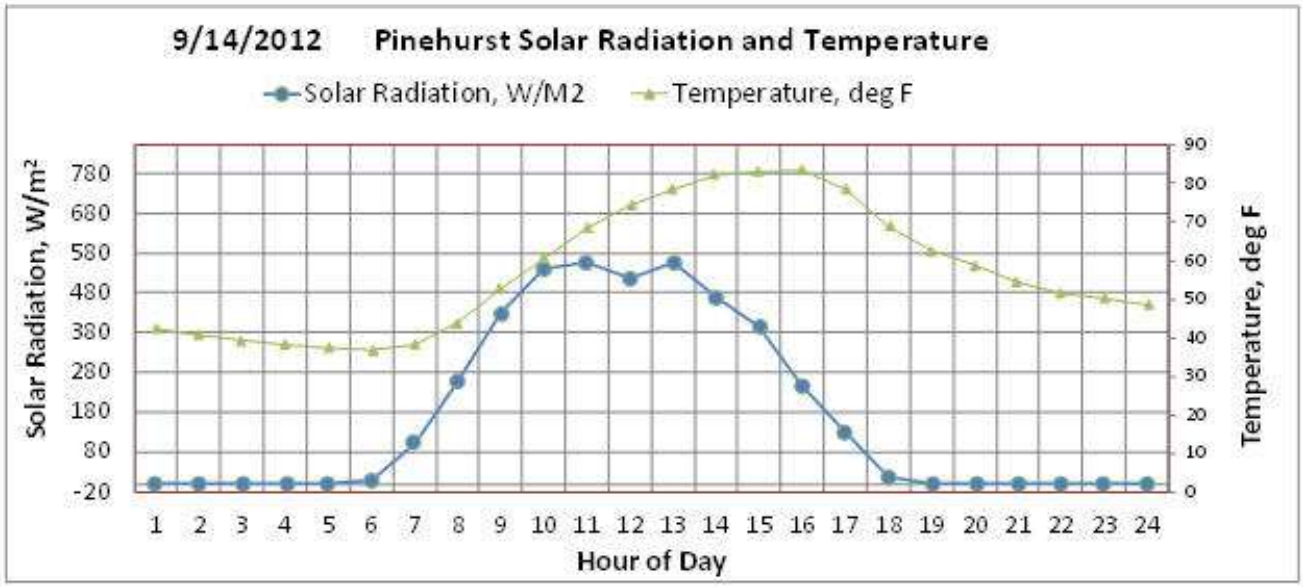
This page intentionally left blank for correct double-sided printing.

Summary of EER Evidence for Pinehurst Monitor Value, 31.3 µg/m^3 on 9-14-2012, AQS #16-079-0017 POC 4		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec.2)
HF	Percentile Rankings:	>99th percentile seasonally; >95th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, 2 (See Sec. 4)
	Weather Conditions:	High pressure over Great Basin extends north of Salmon River limits wind speeds. Resulting flat ridge axis over central MT provides S/SW flow over northern ID.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Afternoon satellite image shows dense smoke sunk in drainages in central Idaho overlaid by light cloud cover. Back trajectories intersect smoke and/or fire detects from the Sheep, Wesley (ID), and Cache Creek (OR) fires. Trajectories may also pick up smoke from the Mustang Complex that has drained west down the Clearwater River. Hourly trace shows concentrations rising rapidly in the afternoon and then remaining above 60 µg/m^3.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Evening temp > 50F so RWC is likely limited. See Sec. 4, Appendix D & E.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was higher in region from Aug – Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 7 to 15 µg/m^3 (Avg-to-95th %tile), thus, this event contributed 16 to 24 µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.



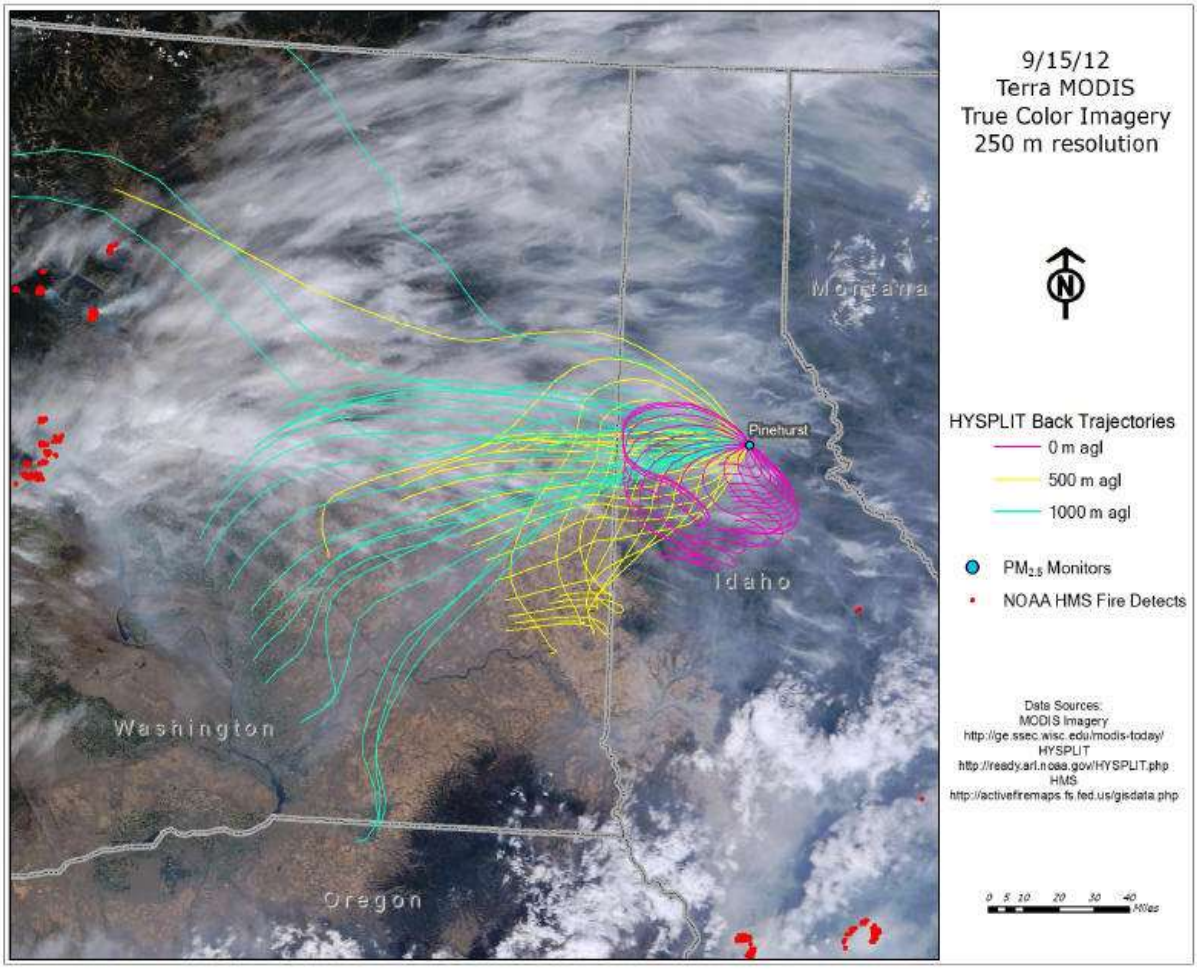

9/14/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 FDMS POC 4 PM2.5
September Average
September 95th Percentile
1-hour PM2.5 Concentration, µg/m³
Hour of Day

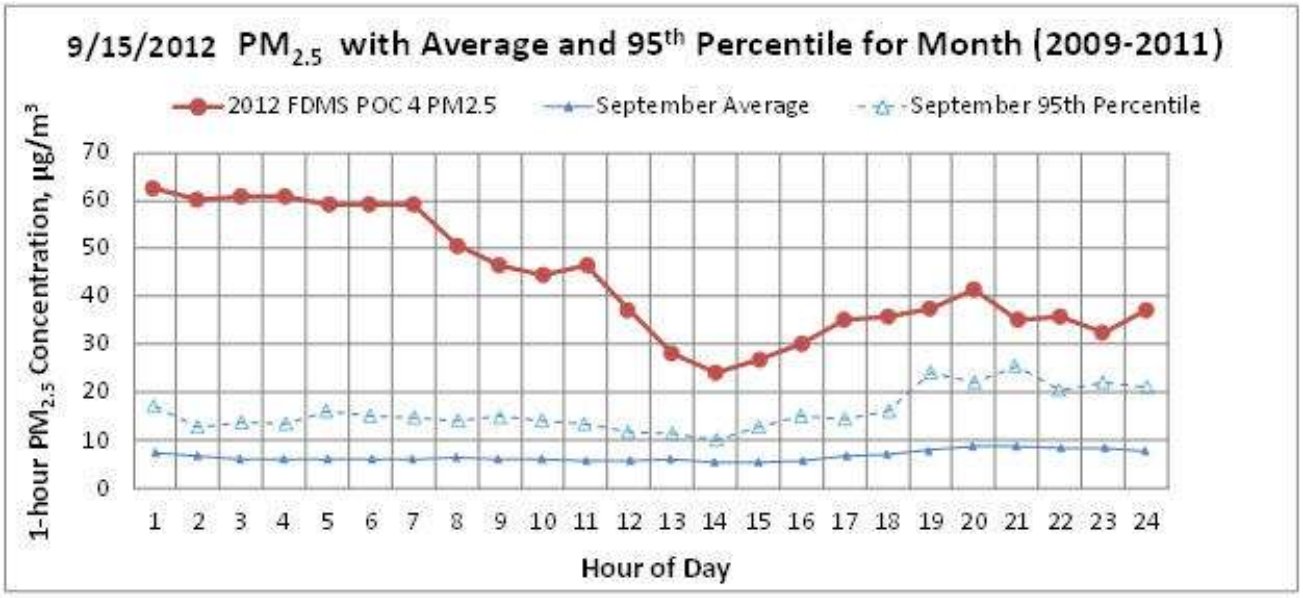

9/14/2012 Pinehurst Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Wind Speed, m/s
Wind Direction, deg
Hour of Day

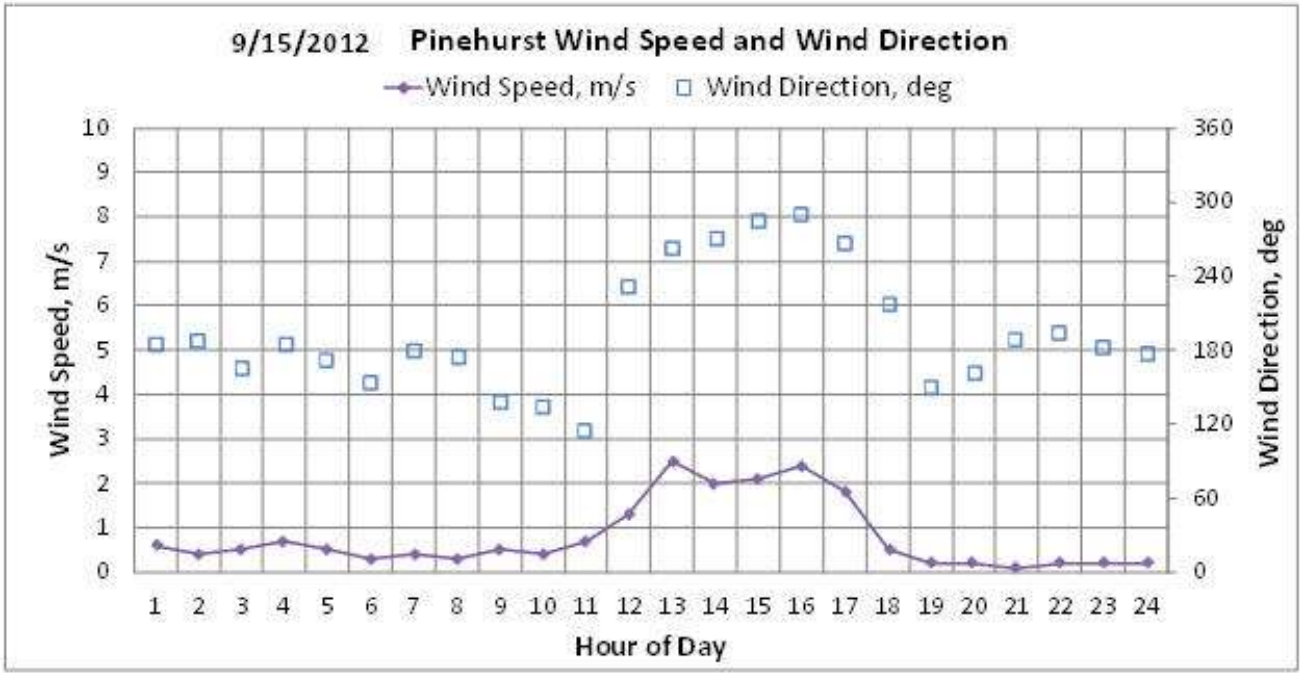

9/14/2012 Pinehurst Solar Radiation and Temperature
Solar Radiation, W/M2
Temperature, deg F
Solar Radiation, W/m²
Temperature, deg F
Hour of Day

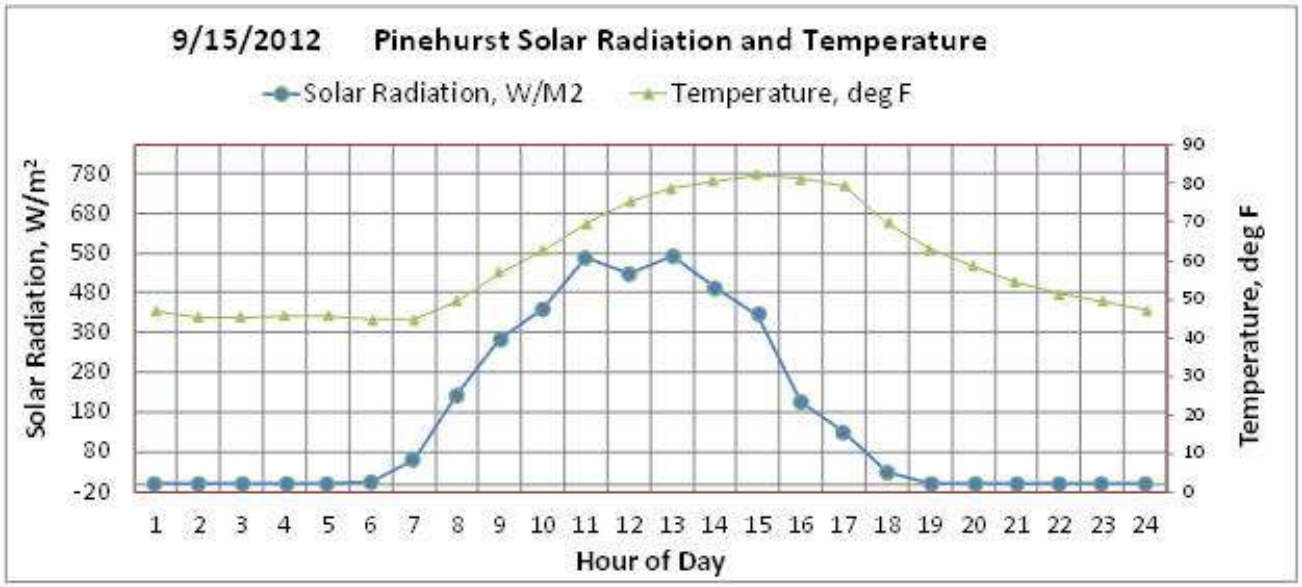
September 15, 2012

Summary of EER Evidence for Pinehurst Monitor Value, 43.6 µg/m^3 on 9-15-2012, AQS #16-079-0017 POC 4		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1, 2 (See Sec. 4)
	Weather Conditions:	Minor embedded shortwave trough located along the Pacific Coast provides zonal flow from WA into north Idaho.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Morning satellite image shows smoke covering the region and some clouds. Back trajectories intersect smoke and/or fire detects from the Yakima, Wenatchee, and Okanagan Complexes in WA. Surface trajectory recirculates local smoky air. Hourly trace shows high morning concentrations with some clearing in the afternoon. However, values do not drop below 20 µg/m^3 all day.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Evening temp ~50F so RWC is likely limited. See Sec. 4, Appendix D & E.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was higher in region from Aug – Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 7 to 15 µg/m^3 (Avg-to-95%tile), thus this event contributed 28.6 to 36.6 µg/m^3 and we conclude that there would not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.



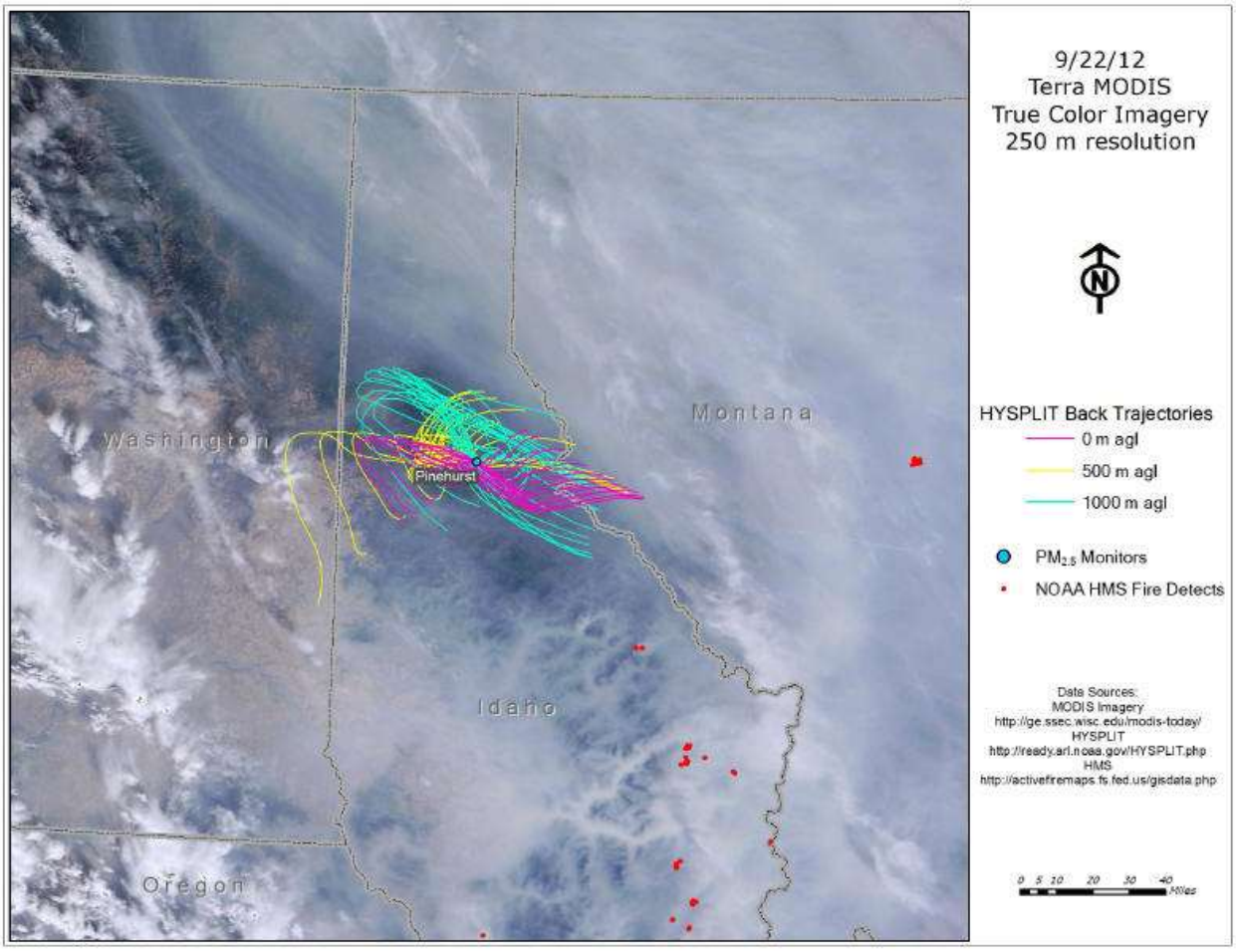

9/15/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 FDMS POC 4 PM2.5
September Average
September 95th Percentile
1-hour PM2.5 Concentration, µg/m³
Hour of Day

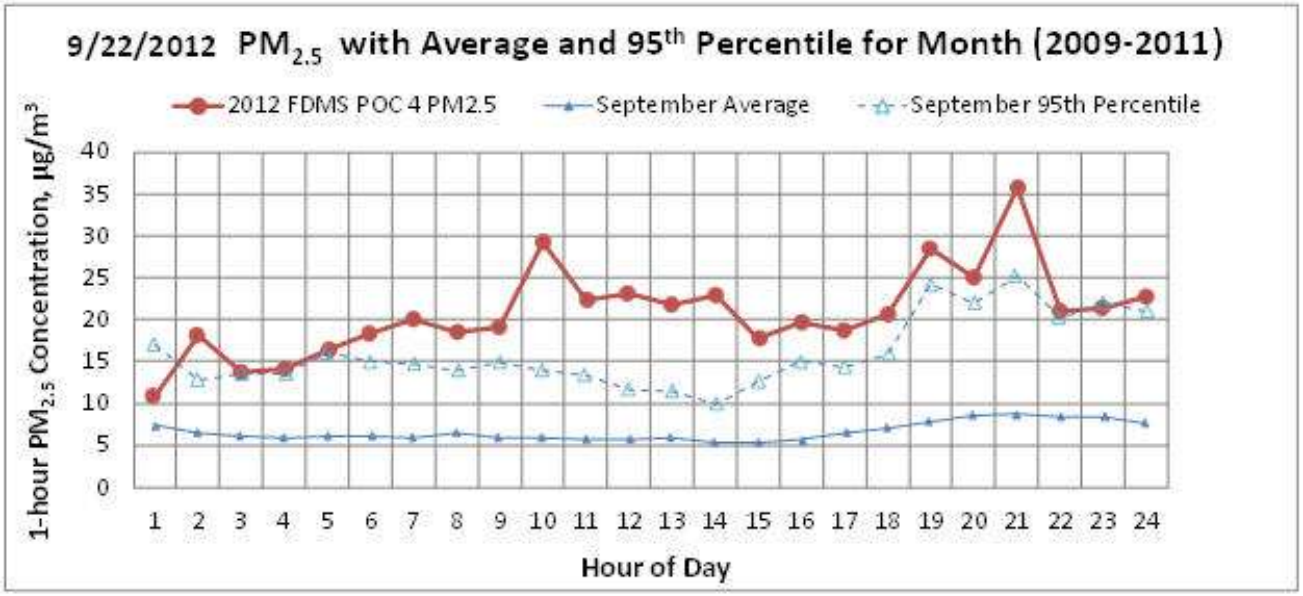

9/15/2012 Pinehurst Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Hour of Day

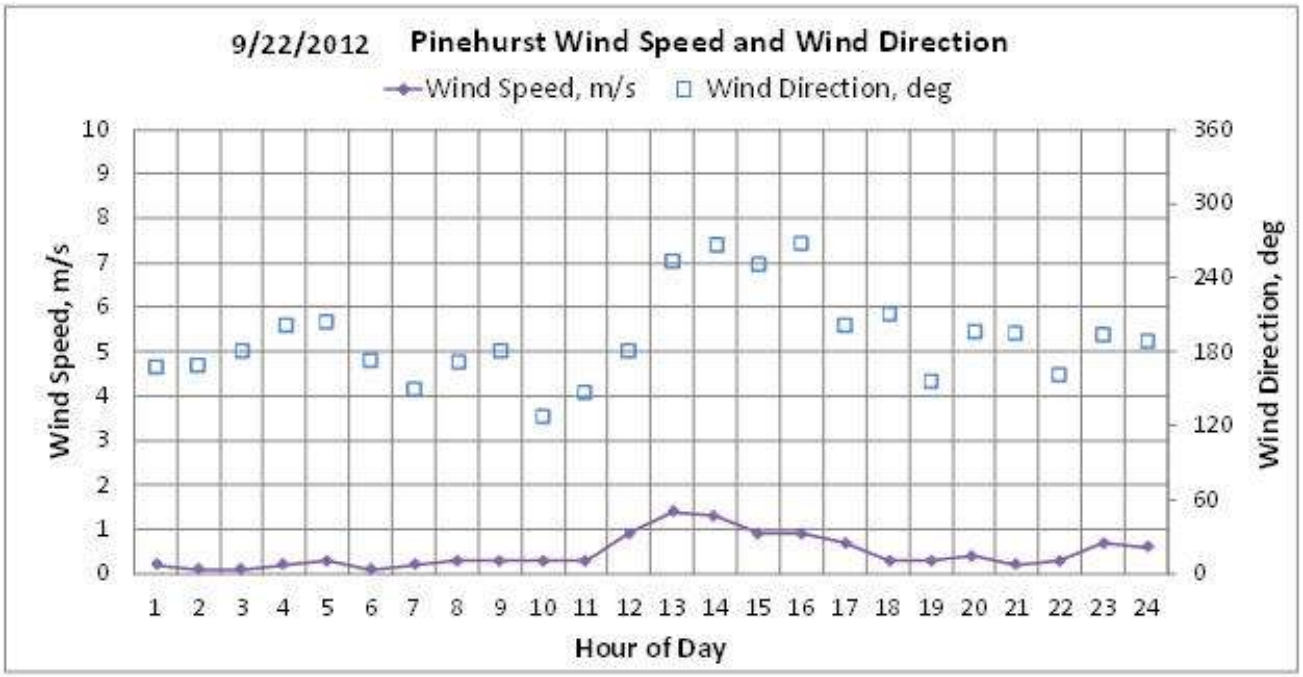

9/15/2012 Pinehurst Solar Radiation and Temperature
Solar Radiation, W/M2
Temperature, deg F
Solar Radiation, W/m²
Temperature, deg F
Hour of Day

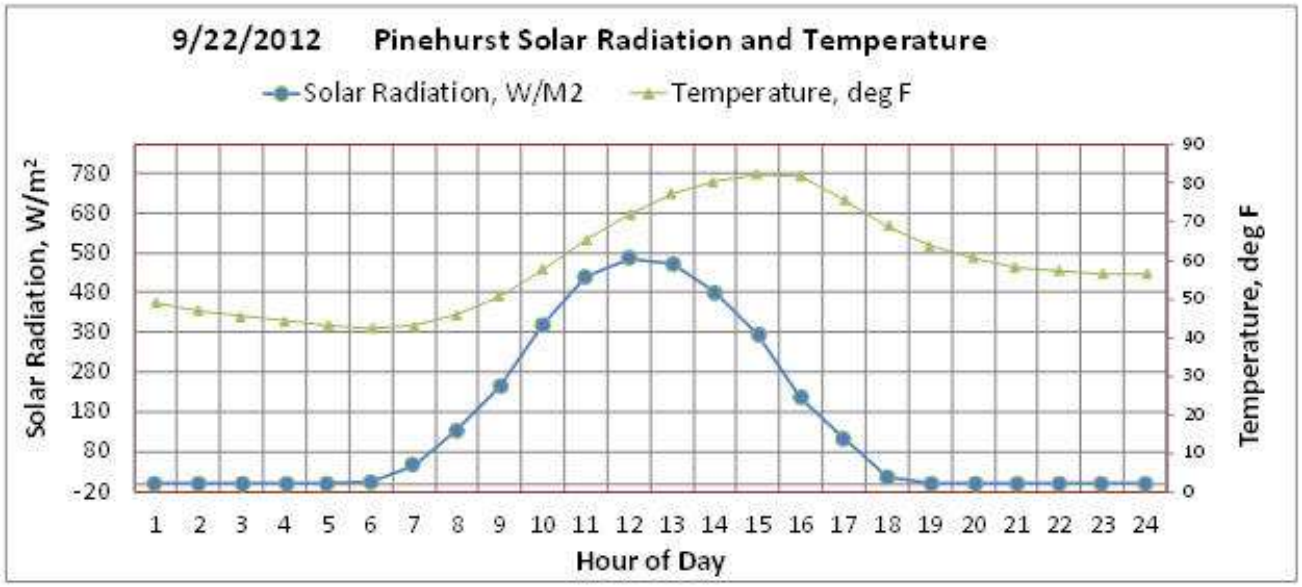
September 22, 2012

Summary of EER Evidence for Pinehurst Monitor Value, 20.8 µg/m^3 on 9-22-2012, AQS #16-079-0017 POC 4		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; 93th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 2 (See Sec. 4)
	Weather Conditions:	Ridge axis shifts over the Rockies and provides weak pressure gradient and low wind speeds while terrain-driven winds are primary driver.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Morning satellite image shows dense smoke hiding surface features across the field of view. Back trajectories recirculate local smoke and cover little ground during the 24-hour period, suggesting stagnant conditions. Hourly trace exhibits a slowly rising trend. Wind speeds are extremely low.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Evening temp >50F so RWC is likely limited. See Sec. 4, Appendix D & E
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was higher in region from Aug – Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 7 to 15 µg/m^3 (Avg-to-95%tile), thus, this event contributed 5.8 to 13.8 µg/m^3 and we conclude that there may not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.

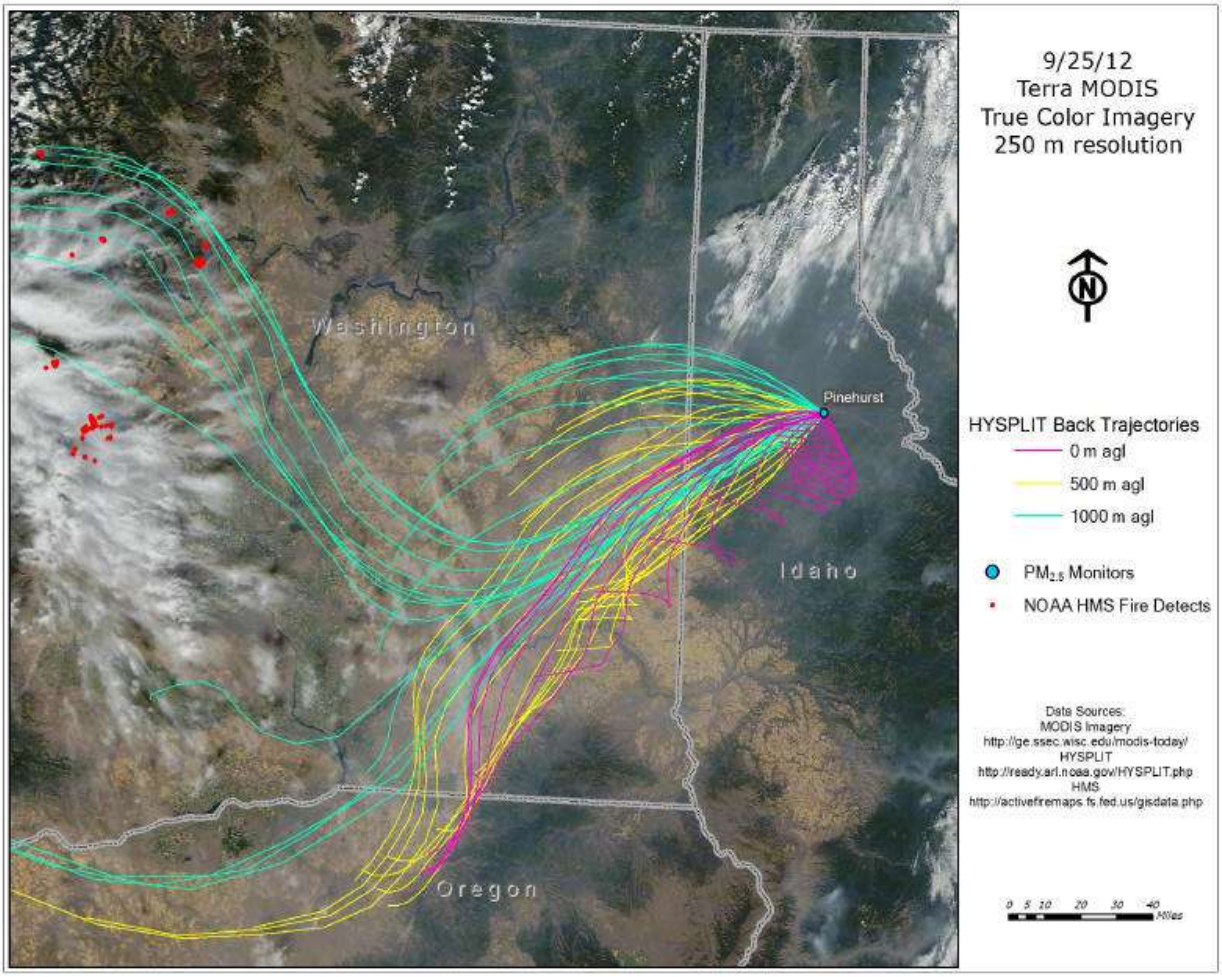


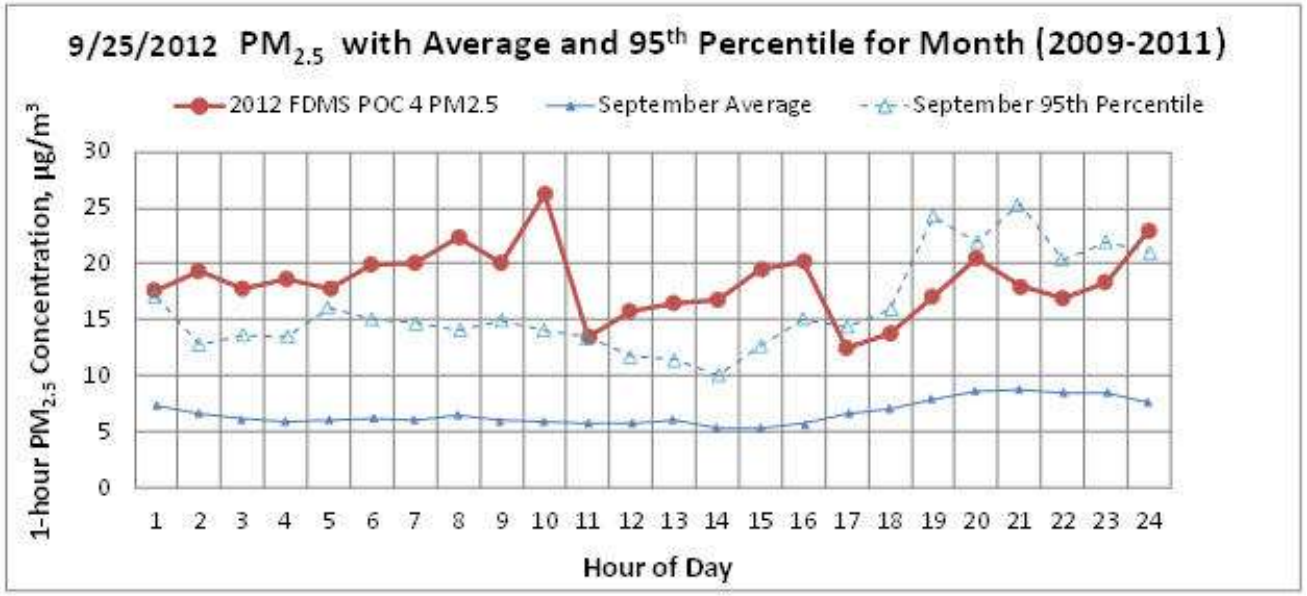

9/22/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 FDMS POC 4 PM2.5
September Average
September 95th Percentile
1-hour PM2.5 Concentration, µg/m3
Hour of Day

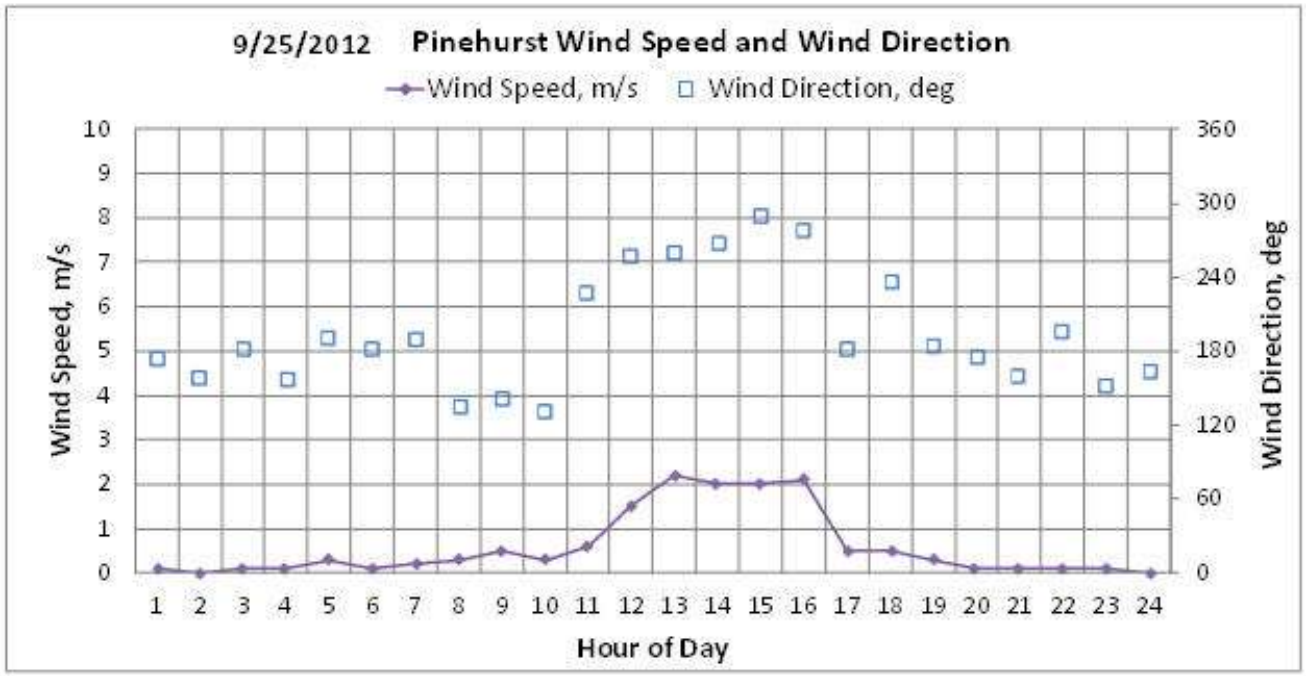

9/22/2012 Pinehurst Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Wind Speed, m/s
Wind Direction, deg
Hour of Day

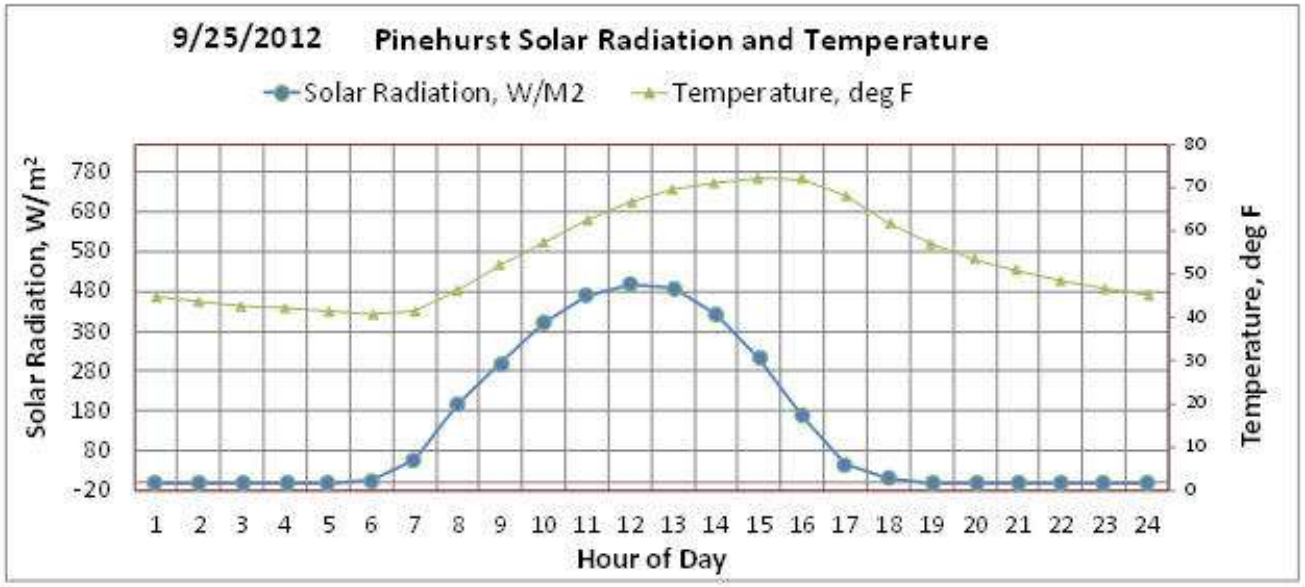

9/22/2012 Pinehurst Solar Radiation and Temperature
Solar Radiation, W/M2
Temperature, deg F
Solar Radiation, W/m2
Temperature, deg F
Hour of Day

Summary of EER Evidence for Pinehurst Monitor Value, 18.4 µg/m^3 on 9-25-2012, AQS #16-079-0017 POC 4		
Criterion	**Supporting Information**	**Evidence for this Day**
nRCP	Source/Controllability:	Source is wildfires which are not reasonably controllable or preventable (See Sec..2)
HF	Percentile Rankings:	>99th percentile seasonally; >99th percentile annually (vs 2008-2011). (See Sec. 3)
CCR	Conceptual Model:	Scenario 1 (See Sec. 4)
	Weather Conditions:	Embedded shortwave trough behind upper level ridge accounts for SW flow with weak winds due to decaying rex block located over MT/WY/UT.
	Transport Conditions and $PM_{2.5}$ /wind information: (See satellite image w/ back-trajectories and time series).	Morning satellite image shows light smoke across the region. Back trajectories intersect smoke and/or fire detects from the Cascade Creek, Table Mountain, Goat, Okanagan, and Wenatchee (WA) fires. Hourly trace is variable, mostly staying above 15 µg/m^3 all day.
	Alternative Hypotheses:	Stage 1 Forecast and Caution prohibits all open burning. Evening temp >45F so RWC is likely limited. See Sec. 4, Appendix D & E.
	Speciation:	IMPROVE data show carbon $PM_{2.5}$ was higher in region from Aug - Sept (Sec 1.6)
AAQ	See discussion, Sec 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/ HAURL	See discussion, Sec 6.	Natural event-lightning caused wildfires. Per (EPA 2013) guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria is also met.
NEBF	See discussion, Sec. 7 for explanation of NEBF	Normal Fluctuations above the average are 7 to 15 µg/m^3 (Avg-to-95%tile), thus, this event contributed 3.4 to 11.4 µg/m^3 and we conclude that there may not have been concentrations above the Annual or 24-hour NAAQS "but for" this contribution.
Mitigation:	See Sec 8 and Appendix D	Stage 1 Forecast and Caution in effect, advised residents of protective actions.




9/25/2012 PM2.5 with Average and 95th Percentile for Month (2009-2011)
2012 FDMS POC 4 PM2.5
September Average
September 95th Percentile
1-hour PM2.5 Concentration, µg/m3
Hour of Day


9/25/2012 Pinehurst Wind Speed and Wind Direction
Wind Speed, m/s
Wind Direction, deg
Hour of Day


9/25/2012 Pinehurst Solar Radiation and Temperature
Solar Radiation, W/M2
Temperature, deg F
Solar Radiation, W/m2
Hour of Day

Appendix D: Alternative Sources

1. Crop Residue Burning Burn Decision Summaries
2. Prescribed Fires from September 1–October 12 in Idaho
3. Prescribed Fires from September 1–October 12 in Montana

Appendix D

D-1 Crop Residue Burning – Burn Decision Summaries for the 2012 Period of Wildfire Impacts

Source: Idaho DEQ at *http://www.deq.idaho.gov/air-quality/burning/crop-residue-burning.aspx*

Note, Crop Residue burns were not requested or approved for Shoshone County or Lemhi during this period, so those counties are excluded from the following Burn Decision Summary Tables, originally published in the 2012 Crop Residue Burning Annual Report (see link above)

D-2 Prescribed fire database entries from the Montana/Idaho Airshed database for Idaho, August 1 through October 12.

Source: Montana/Idaho Airshed Group; Airshed Management System at *http://www.smokemu.org*

Most prescribed fire burns occur after the beginning of October. None occurred in August and only two in south-central Idaho occurred in late September, as shown in the tables.

D-3 Prescribed fire database entries from the Montana/Idaho Airshed database for Western Montana, August 1 through October 12.

Source: Montana/Idaho Airshed Group; Airshed Management System at *http://www.smokemu.org*

Most prescribed fire burns occur after the beginning of October. None occurred in August and only two in south-central Idaho occurred in late September, as shown in the tables.

D-1 Crop Residue Burning – Burn Decision Summaries for the 2012 Period of Wildfire Impacts

Table A6. August burn decisions—southern Idaho.

		Burn Decsions by Smoke Management Area -Southern Idaho						
Date		Southwest Idaho	Southern Magic Valley	Northern Magic Valley	Southeast Idaho	Eastern Idaho	Weiser and Lower Payette Valleys	Blaine and Camas Counties
August 1, 2012		Burn	NR	NR	Burn	NR	NR	NR
August 2, 2012		Burn	NR	Red Flag	Red Flag	NR	NR	NR
August 3, 2012		NR	Burn	Burn	NR	NR	NR	NR
August 4, 2012	Weekend							
August 5, 2012	Weekend							
August 6, 2012		Dust Storm/Ozone	Ozone	NR	NR	NR	NR	NR
August 7, 2012		Smoke/Ozone	Smoke/Ozone	NR	NR	NR	Smoke/Ozone	NR
August 8, 2012		Red Flag	Red Flag	Red Flag	NR	Red Flag	Red Flag	NR
August 9, 2012		Smoke/Ozone	Smoke/Ozone	Smoke/Ozone	Smoke/Ozone	Smoke/Ozone	Smoke/Ozone	NR
August 10, 2012		Red Flag	Red Flag	Red Flag	Red Flag	Red Flag	Red Flag	Red Flag
August 11, 2012	Weekend							
August 12, 2012	Weekend							
August 13, 2012		Smoke/Ozone	Smoke/Ozone	Smoke/Ozone	Smoke/Ozone	Smoke/Ozone	Smoke/Ozone	Smoke/Ozone
August 14, 2012		Smoke/Ozone	Smoke/Ozone	Smoke/Ozone	Smoke/Ozone	Smoke/Ozone	Smoke/Ozone	NR
August 15, 2012		Smoke/Ozone	Smoke/Ozone	Smoke/Ozone	Smoke/Ozone	Smoke/Ozone	Smoke/Ozone	NR
August 16, 2012		Smoke/Ozone	Smoke/Ozone	Smoke/Ozone	Smoke/Ozone	Smoke/Ozone	Smoke/Ozone	NR
August 17, 2012		Smoke/Ozone	Smoke/Ozone	Smoke/Ozone	Smoke/Ozone	Smoke/Ozone	Smoke/Ozone	NR
August 18, 2012	Weekend							
August 19, 2012	Weekend							
August 20, 2012		Smoke	Smoke	Smoke	Smoke	Smoke	Smoke	NR
August 21, 2012		Smoke	Smoke	Smoke	Smoke	Smoke	Smoke	NR
August 22, 2012		Smoke	Smoke	Smoke	Smoke	Smoke	Smoke	NR
August 23, 2012		Smoke	Smoke	Smoke	Smoke	Smoke	Smoke	NR
August 24, 2012		Red Flag	Red flag	Red flag	Red flag	Red flag	Red flag	NR
August 25, 2012	Weekend							
August 26, 2012	Weekend							
August 27, 2012		Smoke	Burn	Burn	Burn	Burn	Smoke	NR
August 28, 2012		Smoke	Burn	Burn	Burn	Burn	Smoke	NR
August 29, 2012		Smoke	NR	Red Flag	Red Flag	Red Flag	NR	NR
August 30, 2012		Smoke	Smoke	Smoke	Burn	Smoke	NR	NR
August 31, 2012		Smoke	Red Flag	Red Flag	Red Flag	Red Flag	Red Flag	NR

Note: NR = no requests to burn or a fire-safety burn ban was in place that prohibited crop residue burning
Ozone = ambient ozone concentrations were above, or were forecasted to be above, allowable limits"
Red Flag = the National Weather Service issued a red-flag warning for high fire risk
Smoke/Ozone = both wildfire smoke and ambient ozone concentrations led to a no-burn decision
Smoke = wildfire smoke led to a no-burn decision

Table A7. September burn decisions—southern Idaho.

		Burn Decsions by Smoke Management Area - Southern Idaho						
Date		Southwest Idaho	Southern Magic Valley	Northern Magic Valley	Southeast Idaho	Eastern Idaho	Weiser and Lower Payette Valleys	Blaine and Camas Counties
September 1, 2012	Weekend							
September 2, 2012	Weekend							
September 3, 2012	Holiday							
September 4, 2012		Burn	Burn	Burn	Burn	Burn	NR	NR
September 5, 2012		Burn	Burn	Burn	Burn	Burn	NR	NR
September 6, 2012		NR	Burn	Burn	Burn	Burn	NR	NR
September 7, 2012		NR	Burn	NR	Burn	Burn	NR	NR
September 8, 2012	Weekend							
September 9, 2012	Weekend							
September 10, 2012		Red Flag	Red Flag	Red Flag	Red Flag	Red Flag	NR	NR
September 11, 2012		Burn	Burn	Burn	Wind	Burn	Burn	NR
September 12, 2012		Burn	Burn	Burn	Burn	Burn	NR	NR
September 13, 2012		Smoke	Burn	Burn	Burn	Smoke	NR	NR
September 14, 2012		Smoke	Burn	Burn	Burn	Burn	NR	NR
September 15, 2012	Weekend							
September 16, 2012	Weekend							
September 17, 2012		Smoke	Smoke	NR	Smoke	Smoke	NR	NR
September 18, 2012		Smoke	Smoke	NR	Smoke	Smoke	NR	NR
September 19, 2012		Smoke	Smoke	NR	Smoke	Smoke	NR	NR
September 20, 2012		Smoke	Smoke	NR	Smoke	Smoke	NR	NR
September 21, 2012		Smoke	Smoke	NR	Smoke	Smoke	NR	NR
September 22, 2012	Weekend							
September 23, 2012	Weekend							
September 24, 2012		Burn	NR	NR	NR	Burn	NR	NR
September 25, 2012		Burn	Burn	NR	Burn	Burn	NR	NR
September 26, 2012		Smoke	Smoke	Burn	Burn	Burn	NR	NR
September 27, 2012		Smoke	Smoke	NR	Burn	Burn	NR	NR
September 28, 2012		Smoke	Smoke	Burn	NR	Burn	NR	NR
September 29, 2012	Weekend							
September 30, 2012	Weekend							

Note: NR = no requests to burn or a fire-safety burn ban was in place that prohibited crop residue burning
Ozone = ambient ozone concentrations were above, or were forecasted to be above, allowable limits"
Red Flag = the National Weather Service issued a red-flag warning for high fire risk
Wind = wind velocity was too high for good smoke dispersion but red-flag criteria were not met
Smoke/Ozone = both wildfire smoke and ambient ozone concentrations led to a no-burn decision
Smoke = wildfire smoke led to a no-burn decision

Table A8. October burn decisions—southern Idaho.

		Burn Decsions by Smoke Management Area - Southern Idaho						
Date		Southwest Idaho	Southern Magic Valley	Northern Magic Valley	Southeast Idaho	Eastern Idaho	Weiser and Lower Payette Valleys	Blaine and Camas Counties
October 1, 2012		Burn	Burn	NR	Burn	Burn	NR	NR
October 2, 2012		Burn	Wind	Red Flag	NR	Red Flag	NR	Wind
October 3, 2012		NR	Wind	Wind	NR	Burn	NR	Wind
October 4, 2012		Burn	Burn	Burn	NR	Burn	NR	NR
October 5, 2012		NR	Burn	NR	Burn	Burn	NR	Burn
October 6, 2012	Weekend							
October 7, 2012	Weekend							
October 8, 2012	Holiday							
October 9, 2012		NR	Burn	NR	Burn	Burn	NR	Burn
October 10, 2012		NR	Burn	NR	NR	Burn	NR	Burn
October 11, 2012		NR	Burn	NR	Burn	Burn	NR	Burn
October 12, 2012		NR	Burn	NR	Burn	Burn	NR	Burn
October 13, 2012	Weekend							
October 14, 2012	Weekend							
October 15, 2012		Moisture	Wind	NR	NR	Wind	Moisture	NR
October 16, 2012		Moisture	Moisture	NR	Moisture	Moisture	Moisture	NR
October 17, 2012		Moisture	Moisture	NR	Moisture	Moisture	Moisture	NR
October 18, 2012		NR	Burn	Burn	Burn	Burn	Moisture	NR
October 19, 2012		Burn	Burn	Burn	Burn	Burn	Moisture	NR
October 20, 2012	Weekend							
October 21, 2012	Weekend							
October 22, 2012		NR	Burn	NR	Burn	NR	NR	Burn
October 23, 2012		NR	Moisture	Moisture	Moisture	Moisture	Moisture	Moisture
October 24, 2012		NR	Moisture	Moisture	Moisture	Moisture	Moisture	Moisture
October 25, 2012		NR	Moisture	Moisture	Moisture	Moisture	Moisture	Moisture
October 26, 2012		NR	Burn	Moisture	Moisture	Moisture	NR	Moisture
October 27, 2012	Weekend							
October 28, 2012	Weekend							
October 29, 2012		NR	Burn	Burn	Moisture	Moisture	NR	Moisture
October 30, 2012		NR	Burn	Moisture	Burn	Moisture	NR	Moisture
October 31, 2012		Burn	Burn	NR	Burn	Moisture	NR	Burn

Note: NR = no requests to burn or a fire-safety burn ban was in place that prohibited crop residue burning
Ozone = ambient ozone concentrations were above, or were forecasted to be above, allowable limits"
Red Flag = the National Weather Service issued a red-flag warning for high fire risk
Wind = wind velocity was too high for good smoke dispersion but red-flag criteria were not met
Smoke/Ozone = both wildfire smoke and ambient ozone concentrations led to a no-burn decision
Smoke = wildfire smoke led to a no-burn decision
Moisture = fuel or soil moisture levels were too high for good smoke dispersion

Table A2. August burn decisions—northern Idaho.

		Burn Decsions by Smoke Management Area -Northern Idaho						
Date		Boundary SMA (County)	Kootenai SMA (County)	Central SMA	Clearwater County	Idaho County	Latah County	Nez Perce County
August 1, 2012		NR	NR	Burn	NR	NR	Burn	Burn
August 2, 2012		NR	NR	NR	NR	NR	NR	NR
August 3, 2012		NR	NR	NR	NR	NR	NR	NR
August 4, 2012	Weekend							
August 5, 2012	Weekend							
August 6, 2012		Red Flag	Red Flag	Red Flag	Red Flag	Red Flag	Red Flag	Red Flag
August 7, 2012		NR	NR	Burn	NR	Burn	Burn	NR
August 8, 2012		NR	NR	Burn	NR	NR	Burn	NR
August 9, 2012		NR	NR	Poor Ventilation	NR	NR	Poor Ventilation	NR
August 10, 2012		NR	NR	Burn	NR	NR	Burn	NR
August 11, 2012	Weekend							
August 12, 2012	Weekend							
August 13, 2012		NR	Poor Ventilation	NR	NR	NR	NR	NR
August 14, 2012		NR	Poor Ventilation	NR	NR	NR	NR	NR
August 15, 2012		NR	Wind	NR	NR	NR	NR	NR
August 16, 2012		Burn	Poor Ventilation	NR	NR	NR	NR	NR
August 17, 2012		Poor Ventilation	Poor Ventilation	NR	NR	NR	NR	NR
August 18, 2012	Weekend							
August 19, 2012	Weekend							
August 20, 2012		Burn	Poor Ventilation	NR	NR	NR	NR	NR
August 21, 2012		Red Flag	Red Flag	Red Flag	NR	Red Flag	Red Flag	NR
August 22, 2012		Moisture	Moisture	NR	NR	Burn	NR	NR
August 23, 2012		Wind	Wind	NR	NR	NR	NR	NR
August 24, 2012		Wind	Wind	NR	NR	NR	NR	NR
August 25, 2012	Weekend							
August 26, 2012	Weekend							
August 27, 2012		Smoke	Smoke	Poor Ventilation	NR	Poor Ventilation	Poor Ventilation	Poor Ventilation
August 28, 2012		Burn	Burn	Smoke	NR	Smoke	Smoke	Smoke
August 29, 2012		Poor Ventilation	Smoke	Burn	NR	Burn	Burn	Burn
August 30, 2012		Poor Ventilation	Smoke	Poor Ventilation	NR	Poor Ventilation	Poor Ventilation	Poor Ventilation
August 31, 2012		Poor Ventilation	Poor Ventilation	Smoke	NR	Smoke	Poor Ventilation	Burn

Note: NR = no requests to burn or a fire-safety burn ban was in place that prohibited crop residue burning
Ozone = ambient ozone concentrations were above, or were forecasted to be above, allowable limits"
Red Flag = the National Weather Service issued a red-flag warning for high fire risk
Smoke/Ozone = both wildfire smoke and ambient ozone concentrations led to a no-burn decision
Smoke = wildfire smoke led to a no-burn decision

Table A3. September burn decisions—northern Idaho.

		Burn Decsions by Smoke Management Area -Northern Idaho						
Date		Boundary SMA (County)	Kootenai SMA (County)	Central SMA	Clearwater County	Idaho County	Latah County	Nez Perce County
September 1, 2012	Weekend							
September 2, 2012	Weekend							
September 3, 2012	Holiday							
September 4, 2012		Burn	Wind	Burn	NR	Burn	Burn	Burn
September 5, 2012		Burn	Burn	Burn	Burn	Burn	Poor Ventilation	Burn
September 6, 2012		Burn	Poor Ventilation	Burn	Burn	Burn	Burn	NR
September 7, 2012		Wind	Poor Ventilation	Burn	Poor Ventilation	Burn	Poor Ventilation	Poor Ventilation
September 8, 2012	Weekend							
September 9, 2012	Weekend							
September 10, 2012		Red Flag	Red Flag	Red Flag	Red Flag	Red Flag	Red Flag	Red Flag
September 11, 2012		Burn	Poor Ventilation	Burn	NR	Burn	Burn	Burn
September 12, 2012		Burn	Poor Ventilation	Smoke	Poor Ventilation	Smoke	Poor Ventilation	Poor Ventilation
September 13, 2012		Burn	Poor Ventilation	Smoke	Poor Ventilation	Smoke	Poor Ventilation	Poor Ventilation
September 14, 2012		Burn	Poor Ventilation	Smoke	Smoke	Smoke	Smoke	Smoke
September 15, 2012	Weekend							
September 16, 2012	Weekend							
September 17, 2012		Poor Ventilation	Poor Ventilation	Smoke	Smoke	Smoke	Smoke	Smoke
September 18, 2012		Burn	Poor Ventilation	Smoke	Smoke	Smoke	Poor Ventilation	Poor Ventilation
September 19, 2012		Poor Ventilation	Poor Ventilation	Smoke	Smoke	Smoke	Smoke	SMoke
September 20, 2012		Poor Ventilation	Poor Ventilation	Smoke	Smoke	Smoke	Smoke	Smoke
September 21, 2012		Poor Ventilation	Poor Ventilation	Smoke	Smoke	Smoke	Smoke	Smoke
September 22, 2012	Weekend							
September 23, 2012	Weekend							
September 24, 2012		Smoke	Smoke	Smoke	Smoke	Smoke	Smoke	Smoke
September 25, 2012		Smoke	Smoke	Smoke	Smoke	Smoke	Smoke	Smoke
September 26, 2012		Smoke	Smoke	Smoke	Smoke	Smoke	Smoke	Smoke
September 27, 2012		Smoke	Smoke	Smoke	Smoke	Smoke	Smoke	Smoke
September 28, 2012		Smoke	SMoke	Smoke	Smoke	Smoke	Smoke	Smoke
September 29, 2012	Weekend							
September 30, 2012	Weekend							

Note: NR = no requests to burn or a fire-safety burn ban was in place that prohibited crop residue burning
Ozone = ambient ozone concentrations were above, or were forecasted to be above, allowable limits"
Red Flag = the National Weather Service issued a red-flag warning for high fire risk
Wind = wind velocity was too high for good smoke dispersion but red-flag criteria were not met
Smoke/Ozone = both wildfire smoke and ambient ozone concentrations led to a no-burn decision
Smoke = wildfire smoke led to a no-burn decision

Table A4. October burn decisions—northern Idaho.

		Burn Decsions by Smoke Management Area -Northern Idaho						
Date		Boundary SMA (County)	Kootenai SMA (County)	Central SMA	Clearwater County	Idaho County	Latah County	Nez Perce County
October 1, 2012		Burn	Poor Ventilation	Poor Ventilation	Poor Ventilation	Poor Ventilation	Poor Ventilation	Poor Ventilation
October 2, 2012		Red Flag	Red Flag	Burn	Burn	Burn	Burn	Burn
October 3, 2012		Burn	Poor Ventilation	Burn	Burn	Burn	Burn	Burn
October 4, 2012		Burn	Poor Ventilation	Smoke	Smoke	Smoke	Smoke	Burn
October 5, 2012		Burn	Poor Ventilation	Smoke	Smoke	Smoke	Smoke	Burn
October 6, 2012	Weekend							
October 7, 2012	Weekend							
October 8, 2012	Holiday							
October 9, 2012		Poor Ventilation	Poor Ventilation	Smoke	Smoke	Smoke	Smoke	Smoke
October 10, 2012		Burn	Burn	Smoke	Smoke	Smoke	Smoke	Smoke
October 11, 2012		Poor Ventilation	Wind	Smoke	Smoke	Smoke	Smoke	Smoke
October 12, 2012		Burn	Burn	Smoke	Smoke	Smoke	Smoke	Smoke
October 13, 2012	Weekend							
October 14, 2012	Weekend							
October 15, 2012		Moisture	NR	Moisture	Moisture	Moisture	Moisture	Moisture
October 16, 2012		NR	NR	Moisture	Moisture	Moisture	Moisture	Moisture
October 17, 2012		NR	NR	Burn	Burn	Burn	Burn	Burn
October 18, 2012		NR	NR	Burn	Burn	Burn	Burn	Smoke
October 19, 2012		NR	NR	Moisture	NR	NR	Moisture	Moisture
October 20, 2012	Weekend							
October 21, 2012	Weekend							
October 22, 2012		NR	NR	Burn	NR	NR	Burn	Burn
October 23, 2012		NR	NR	Moisture	NR	NR	Moisture	Moisture
October 24, 2012		NR	NR	Moisture	NR	NR	Moisture	Moisture
October 25, 2012		NR	NR	Moisture	NR	NR	Moisture	Moisture
October 26, 2012		NR	NR	Moisture	NR	NR	Moisture	Moisture
October 27, 2012	Weekend							
October 28, 2012	Weekend							
October 29, 2012		NR	NR	Moisture	NR	NR	Moisture	Moisture
October 30, 2012		NR	NR	Moisture	NR	NR	Moisture	Moisture
October 31, 2012		NR	NR	Burn	NR	NR	Burn	Burn

Note: NR = no requests to burn or a fire-safety burn ban was in place that prohibited crop residue burning
Ozone = ambient ozone concentrations were above, or were forecasted to be above, allowable limits"
Red Flag = the National Weather Service issued a red-flag warning for high fire risk
Wind = wind velocity was too high for good smoke dispersion but red-flag criteria were not met
Smoke/Ozone = both wildfire smoke and ambient ozone concentrations led to a no-burn decision
Smoke = wildfire smoke led to a no-burn decision
Moisture = fuel or soil moisture levels were too high for good smoke dispersion

D-2 Prescribed fire database entries from the Montana/Idaho Airshed database for Idaho, August 1 through October 12.

No burns occurred prior to 9/26/12. The two burns on 9/26 occurred in south-central Idaho over 150 miles from Salmon.

Date	Burn Type	Burned Acres	Latitude	Longitude
9/26/2012	Broadcast	80	42.64400101	-114.9120026
9/26/2012	Broadcast	120	42.59780121	-115.0220032
10/4/2012	Broadcast	200	43.25	-111.4209976
10/5/2012	Broadcast	400	43.25	-111.4209976
10/11/2012	Broadcast	10	47.86759949	-116.9680023
10/11/2012	Broadcast	46	47.86759949	-116.9680023
10/12/2012	Broadcast	80	42.64400101	-114.9120026

D-3 Prescribed fire database entries from the Montana/Idaho Airshed database for Western Montana, August 1 through October 12.

No burns prior to Oct 10.

Date	Burn Type	Burned Acres	Latitude	Longitude
10/10/2012	Understory	15	48.66699982	-115.3799973
10/12/2012	Understory	10	48.66699982	-115.3799973

Appendix E: Mitigation—Stage 1 Forecast and Cautions, Daily Monitor Summary and Press Releases

1. Stage 1 Forecast and Caution – Days in effect for Lemhi and Shoshone counties
2. Stage 1 Forecast and Caution notification – example
3. DEQ daily wildfire update report—example
4. Department of Environmental Quality press releases
5. Idaho Department of Health and Welfare press releases

Appendix E-1 Dates of Stage 1 Forecast and Caution was in effect, with example Stage 1 notices.

Table 14 Dates during 2012 Wildfire period when Stage 1 Forecast and Caution was in effect, imposing a ban on all forms of open burning. Example Stage 1 Forecast and Caution alerts follow the table.

Date	Stage 1 Forecast and Caution, Lemhi County	Stage 1 Forecast and Caution, Shoshone County	Date	Stage 1 Forecast and Caution, Lemhi County	Stage 1 Forecast and Caution, Shoshone County
7/30/2012			9/1/2012	In Effect	
7/31/2012			9/2/2012	In Effect	
8/5/2012			9/3/2012	In Effect	
8/6/2012			9/4/2012	In Effect	
8/7/2012			9/5/2012	In Effect	
8/8/2012			9/6/2012	In Effect	
8/9/2012			9/7/2012	In Effect	
8/10/2012			9/8/2012	In Effect	
8/11/2012			9/9/2012	In Effect	
8/12/2012			9/10/2012	In Effect	
8/13/2012	In Effect		9/11/2012	In Effect	
8/14/2012	In Effect		9/12/2012	In Effect	
8/15/2012	In Effect		9/13/2012	In Effect	
8/16/2012	In Effect		9/14/2012	In Effect	In Effect
8/17/2012	In Effect		9/15/2012	In Effect	In Effect
8/18/2012	In Effect		9/16/2012	In Effect	In Effect
8/19/2012	In Effect		9/17/2012	In Effect	
8/20/2012	In Effect		9/18/2012	In Effect	
8/21/2012	In Effect		9/19/2012	In Effect	
8/22/2012	In Effect		9/20/2012	In Effect	In Effect
8/23/2012	In Effect		9/21/2012	In Effect	In Effect
8/24/2012	In Effect		9/22/2012	In Effect	In Effect
8/25/2012	In Effect		9/23/2012	In Effect	In Effect
8/26/2012	In Effect		9/24/2012	In Effect	In Effect
8/27/2012	In Effect		9/25/2012	In Effect	In Effect
8/28/2012	In Effect		9/26/2012	In Effect	In Effect
8/29/2012	In Effect		9/27/2012	In Effect	In Effect
8/30/2012	In Effect		9/28/2012	In Effect	
8/31/2012	In Effect		9/29/2012	In Effect	
			9/30/2012	In Effect	
			10/1/2012	In Effect	

Example Stage 1 Forecast and Caution notice (example)

Idaho Department of Environmental Quality • 09/14/12 • For Immediate Release

Air Quality Advisory- Issue

Time / Date:	09/14/12, 3:30 pm
Location:	Bonner, Kootenai, Shoshone, Benewah Counties
Action:	**Stage 1 Forecast and Caution ….Mandatory Burn Ban on Open Outdoor Burning. All open burning is prohibited by Idaho State AQ Rules (IDAPA 58.01.01.550).** **Health Advisory**
Cause of Air Pollution:	Wildfire smoke from numerous wildfires south of us has migrated into Benewah, Kootenai, Shoshone Bonner and Boundary Counties. Smoky skies are expected to continue through Saturday before a surface wind shift is expected which could help keep additional smoke from transporting into our region. Residents of the listed counties should consider limiting physical exertion.
AQI and AQI Category:	Current Conditions: AQI = **Benewah County is experiencing UNHEALTHY air quality. Air quality is listed as UNHEALTHY for SENSITIVE GROUPS in most other areas. Poor air quality is expected to persist through most of Saturday**
Pollutant (s):	Fine Particulate (PM2.5)
Restrictions in Effect Until:	**Caution and Restrictions are in effect through Sunday morning.**
Next Update:	This notice will expire at 10am on Sunday September 16 unless conditions merit extending this notice.
Contact:	Mark Boyle @ 208-769-1422

What is the Air Quality Index?

AQI	Category	Cautionary Statement
0-50	Good	None
51-100	Moderate	Sensitive* people should consider limiting prolonged outdoor exertion.
101-150	Unhealthy for Sensitive Groups	Everyone should limit exertion outdoors.
151-200	Unhealthy	Everyone should limit exertion.
201-300	Very Unhealthy	Limit any exertion.
301-500	Hazardous	Stay indoors and avoid any exertion.

* Sensitive groups include children, the elderly, those with existing health conditions, and people who have high exposure (those who work, exercise, or spend extensive time out of doors).

For more detailed information about the AQI, visit: http://www.airnow.gov/

For more information on Idaho's Air Quality, visit:
http://www.deq.idaho.gov/air-quality/monitoring/daily-reports-and-forecasts.aspx

E-2 Idaho Department of Environmental Quality, and Idaho Department of Health and Welfare, Division of Health press releases, posted on the web August through October.

Idaho Department of Environmental Quality New Releases Posted on Web

Department of Environmental Quality

State agencies offer tips on reducing exposure to wildfire smoke

Thursday, July 12, 2012

Idahoans are advised by the Idaho Department of Health and Welfare (IDHW) and Department of Environmental Quality (DEQ) to protect their health by avoiding unnecessary exposure to smoke from wildfires burning throughout Idaho and surrounding states.

Most areas in southwest Idaho are experiencing air quality in the *unhealthy for sensitive groups* category, as defined by the U.S. Environmental Protection Agency's Air Quality Index (AQI). Although air quality in most other areas in Idaho remains in the good to moderate range, areas closer to the wildfires may experience air quality in the *unhealthy for sensitive groups category* or even in the *unhealthy* category affecting everyone at times.

People exposed to smoke may experience symptoms such as coughing and shortness of breath. Older adults, infants, children and people with medical conditions such as asthma, chronic obstructive pulmonary disease, and congestive heart disease are more affected. Those who use inhalers for asthma or other conditions should keep them close at hand. People are advised to seek medical treatment for uncontrolled coughing, wheezing, choking, or if breathing difficulty continues once they are indoors.

IDHW provides these tips for people to reduce their exposure to smoke and protect their health:

- Limit outdoor activity, especially for older adults, small children, and those with respiratory or heart disease.
- If the weather is warm, run your air conditioner to re-circulate air. Turn the fan blower on manually so it continuously filters the air in your home.
- Wash or change filters on air conditioners and/or furnaces frequently. Use high efficiency filters when possible.
- For homes without a central heating and/or cooling system , use portable air purifiers to remove particles (air purifiers that utilize HEPA filters are best, avoid using air purifiers that produce ozone).
- Do not run or engage in heavy work or exercise when the air quality index reaches 'unhealthy' levels.
- Stay well-hydrated by drinking plenty of water. Remaining hydrated helps dilute phlegm in the respiratory tract making it easier to cough smoke particles out. Plan on coughing, it

is nature's way of clearing your lungs. Avoid caffeine products, sugary drinks and alcohol as they have a dehydrating effect.
- If you wear contact lenses, switch to eyeglasses in a smoky environment.

Daily updates on air quality conditions at various locations in Idaho is available on DEQ's Air Quality Reports and Forecasts webpage. For areas where air quality monitors are not available, the Visibility Range and AQI Table can help determine the necessary precautions to take.

For more information on how to protect against wildfire smoke, read the Centers for Disease Control and Prevention Wildfires Factsheet.

Source: *http://www.deq.idaho.gov/news-archives/2012/july/air-wildfire-smoke-advisory-071212.aspx*

Department of Environmental Quality

Citizens reminded to avoid smoke exposure as new round of wildfires afflicts Idaho

Thursday, August 09, 2012

Idahoans are advised by the Idaho Department of Health and Welfare (IDHW) and Department of Environmental Quality (DEQ) to protect their health by avoiding unnecessary exposure to smoke from wildfires burning throughout Idaho and surrounding states.

Most areas in southwest Idaho are experiencing air quality in the *unhealthy for sensitive groups* category, as defined by the U.S. Environmental Protection Agency's Air Quality Index (AQI). Although air quality in most other areas in Idaho remains in the good to moderate range, areas closer to the wildfires may experience air quality in the *unhealthy for sensitive groups category* or even in the *unhealthy* category affecting everyone at times.

People exposed to smoke may experience symptoms such as coughing and shortness of breath. Older adults, infants, children and people with medical conditions such as asthma, chronic obstructive pulmonary disease, and congestive heart disease are more affected. Those who use inhalers for asthma or other conditions should keep them close at hand. People are advised to seek medical treatment for uncontrolled coughing, wheezing, choking, or if breathing difficulty continues once they are indoors.

IDHW provides these tips for people to reduce their exposure to smoke and protect their health:

- Limit outdoor activity, especially for older adults, small children, and those with respiratory or heart disease.
- If the weather is warm, run your air conditioner to re-circulate air. Turn the fan blower on manually so it continuously filters the air in your home.
- Wash or change filters on air conditioners and/or furnaces frequently. Use high efficiency filters when possible.
- For homes without a central heating and/or cooling system , use portable air purifiers to remove particles (air purifiers that utilize HEPA filters are best, avoid using air purifiers that produce ozone).
- Do not run or engage in heavy work or exercise when the air quality index reaches 'unhealthy' levels.
- Stay well-hydrated by drinking plenty of water. Remaining hydrated helps dilute phlegm in the respiratory tract making it easier to cough smoke particles out. Plan on coughing, it is nature's way of clearing your lungs. Avoid caffeine products, sugary drinks and alcohol as they have a dehydrating effect.
- If you wear contact lenses, switch to eyeglasses in a smoky environment.

Daily updates on air quality conditions at various locations in Idaho is available on DEQ's Air Quality Reports and Forecasts webpage. For areas where air quality monitors are not available, the Visibility Range and AQI Table can help determine the necessary precautions to take.

For more information on how to protect against wildfire smoke, read the Centers for Disease Control and Prevention Wildfires Factsheet. Information on the fires in your area is available on www.inciweb.org.

Source: *http://www.deq.idaho.gov/news-archives/2012/august/air-wildfire-smoke-advisory-080912.aspx*

Department of Environmental Quality

DEQ declares statewide air quality alert; all outdoor burning prohibited

Friday, September 21, 2012

BOISE — Smoke impacts from wildfires and poor atmospheric conditions have prompted the Idaho Department of Environmental Quality (DEQ) to issue a statewide Stage 1 air quality alert, invoking a ban on all outdoor burning.

This advisory is in effect through the weekend until Monday morning where conditions will be evaluated on a county-by-county basis.

The advisory does not apply to lands within Indian reservation boundaries.

“Air quality is generally in the Unhealthy for Sensitive Groups to Unhealthy categories throughout the central and southern parts of the state,” said DEQ’s Smoke Management Program Coordinator Mary Anderson. "Air quality in the northern Idaho Panhandle is forecasted to be in the good to moderate range; however, stagnate conditions will likely cause smoke from open burning to remain at ground level."

“Areas may experience some clearing, but generally, smoke will remain throughout the weekend,” she said.

Under a Stage 1 alert, open burning is prohibited. This includes, but not limited to, campfires, recreational, warming, weed control, cooking, and residential fires.

Daily updates on air quality conditions at various locations in Idaho are available on DEQ's Air Quality Reports and Forecasts and Current Wildfire Smoke Information webpages. For areas where air quality monitors are not available, the Visibility Range and AQI Table can help determine the necessary precautions to take.

For information on how to avoid unnecessary exposure to wildfire smoke, visit the Idaho Department of Health and Welfare's website.

Source: *http://www.deq.idaho.gov/news-archives/2012/august/air-central-idaho-air-quality-alert-081012.aspx*

DEQ declares air quality alert in Ketchum area; outdoor burning prohibited

Friday, August 10, 2012

BOISE — A Stage 1 air quality alert has been issued by the Idaho Department of Environmental Quality (DEQ) for the Ketchum area, invoking a ban on outdoor burning. This alert will be reevaluated Saturday morning and may be expanded to cover the entire Blaine County areas.

No new fires may be ignited and, where practicable, existing fires should be extinguished.

Heavy smoke from wildfires is contributing to high levels of particulate matter (PM2.5) in the Ketchum area.

"Sensitive" individuals, including children, the elderly, those with asthma or any other lung or heart condition and those who work, exercise, or spend extensive time outdoors, are advised to avoid prolonged outdoor exertion. Everyone else should limit outdoor activities. Anyone experiencing shortness of breath or chest discomfort should consult a physician. Learn more from the Idaho Department of Health and Welfare.

DEQ will continue to monitor and evaluate PM2.5 levels and will issue updates as conditions warrant.

Source: *http://www.deq.idaho.gov/news-archives/2012/august/air-central-idaho-air-quality-alert-081012.aspx*

CDC Fact Sheet included in DEQ News Release of July 12, 2012 (above)

Wildfires

FACT SHEET

Health Threat From Wildfire Smoke

Smoke from wildfires is a mixture of gases and fine particles from burning trees and other plant materials. Smoke can hurt your eyes, irritate your respiratory system, and worsen chronic heart and lung diseases.

How to tell if smoke is affecting you

Smoke can cause—

- Coughing
- A scratchy throat
- Irritated sinuses
- Shortness of breath
- Chest pain
- Headaches
- Stinging eyes
- A runny nose
- Asthma exacerbations

If you have heart or lung disease, smoke might make your symptoms worse.

People who have heart disease might experience—

- Chest pain
- Rapid heartbeat
- Shortness of breath
- Fatigue

Smoke may worsen symptoms for people who have pre-existing respiratory conditions, such as respiratory allergies, asthma, and chronic obstructive pulmonary disease (COPD), in the following ways:

- Inability to breathe normally
- Cough with or without mucus
- Chest discomfort
- Wheezing and shortness of breath

When smoke levels are high enough, even healthy people may experience some of these symptoms.

Know whether you are at risk

If you have heart or lung disease, such as congestive heart failure, angina, COPD, emphysema, or asthma, you are at higher risk of having health problems than healthy people.

Older adults are more likely to be affected by smoke, possibly because they are more likely to have heart or lung diseases than younger people.

Children are more likely to be affected by health threats from smoke because their airways are still developing and because they breathe more air per pound of body weight than adults. Children also are more likely to be active outdoors.

Protect yourself

Limit your exposure to smoke. Following are ways to protect your health:

Pay attention to local air quality reports. Listen and watch for news or health warnings about smoke. Find out if your community provides reports about the Environmental Protection Agency's Air Quality Index (AQI). Also pay attention to public health messages about taking additional safety measures.

Refer to visibility guides if they are available. Not every community has a monitor that measures the amount of particles that are in the air. In the western part of the United States, some communities have guidelines to help people estimate AQI based on how far they can see.

If you are advised to stay indoors, keep indoor air as clean as possible. Keep windows and doors closed unless it is extremely hot outside. Run an air conditioner if you have one, but keep the fresh-air intake closed and the filter clean to prevent outdoor smoke from getting inside. If you do not have an air conditioner and it is too warm to stay inside with the windows closed, seek shelter elsewhere.

Do not add to indoor pollution. When smoke levels are high, do not use anything that burns, such as candles, fireplaces, or gas stoves. Do not vacuum, because vacuuming stirs up particles already inside your home. Do not smoke, because smoking puts even more pollution into the air.

Follow your doctor's advice about medicines and about your respiratory management plan if you have asthma or another lung disease, Call your doctor if your symptoms worsen.

Do not rely on dust masks for protection. Paper "comfort" or "dust" masks commonly found at hardware stores are designed to trap large particles, such as sawdust. These masks will not protect your lungs from smoke. An "N95" mask, *properly worn*, will offer some protection. For more information about effective masks, see the *Respirator Fact Sheet* provided by CDC's National Institute for Occupational Safety and Health.

Safe evacuation

As you evacuate and then return home, be cautious and take the same safety measures you would when there is no emergency: buckle up and do not drink and drive. See CDC's *Impaired Driving* and *Seat Belts* fact sheets for more information on these hazards.

Also, make sure that children are properly buckled up and in the rear seat. See CDC's *Child Passenger Safety* fact sheet for more information.

Power outages

Power outages can be more than an inconvenience. Click on the *What You Need to Know When the Power Goes Out* page for more information about carbon monoxide poisoning, food safety, safe drinking water, power line hazards and more.

Source: *http://www.bt.cdc.gov/disasters/wildfires/facts.asp*

Visibility Range and AQI Table sent with DEQ News Releases (above)

Visibility Range & Air Quality Index (AQI)

If you can clearly see or if the AQI is…	The Air Quality is likely…	You should take the following precautions:	Health effects may include:
10 miles or better or AQI: 0-50	GOOD	None	None likely
5-10 miles or AQI: 51-100	MODERATE	None	People with preexisting heart and lung diseases may experience some discomfort. Consult with your physician.
3-5 miles or AQI: 101-150	UNHEALTHY FOR SENSITIVE GROUPS	People with pre-existing heart and lung diseases, the elderly, and children should limit outdoor exertion.	Aggravation of pre-existing heart and lung disease symptoms are likely.
1.5-3 miles or AQI: 151-200	UNHEALTHY	People with pre-existing heart and lung diseases, the elderly, and children should avoid outdoor exertion. All population segments should limit outdoor exertion.	Respiratory effects in all population segments likely. Increased aggravation of pre-existing heart and lung disease symptoms. Premature mortality (death) among the most sensitive populations.
1 mile or AQI: 201-300	VERY UNHEALTHY	People with pre-existing heart and lung diseases, the elderly, and children should consider relocating to a "clean air" area. Everyone else should avoid outdoor exertion.	Significant increase of adverse respiratory effects in all population segments likely. Significantly increased aggravation of pre-existing heart and lung disease symptoms. Premature mortality (death) among sensitive populations.
Less than 1 mile or AQI: 301-500	HAZARDOUS	Everyone should avoid any outdoor exertion. Remain indoors if possible. Relocate to a "clean air" area if necessary.	Serious risk of adverse respiratory effects in the general population. Serious aggravation of preexisting heart and lung disease symptoms. Increased premature mortality (death) among sensitive populations.

Idaho Department of Health and Welfare New Releases

Idaho Issues Stage 1 Air Quality Alert for Southwest and Central Counties

posted on August 13, 2012 08:44

The Idaho Department of Environmental Quality (DEQ) has issued a **Stage 1 Air Quality Advisory** that prohibits all open burning. The mandatory burn ban is in effect for Ada, Boise, Canyon, Elmore, Gem, Owyhee, Payette, and Washington counties in southwest Idaho, and Lemhi and Custer counties in central Idaho.

Poor air quality due to smoke from western wildfires plagued parts of Idaho over the weekend and is forecast to continue; DEQ projects the air quality to remain unhealthy for sensitive groups on Tuesday. There is concern that the cumulative impact of continued poor air quality during the week could cause serious health problems for people with chronic health conditions such as respiratory or heart conditions.

ADVISORY
St. Alphonsus Regional Medical Center will have a physician available for media interviews today, Monday, August 13th. Please contact Director of Public Relations Elizabeth Duncan at 367-8121 for information.

Most areas of the state do not have air quality monitors, so people are encouraged to be cautious if visibility is affected by smoke and particulates from wildfires. If visibility is reduced to less than eight miles, sensitive groups should limit activity. If visibility is reduced to less than three miles, air quality is considered unhealthy for everyone and people should avoid heavy work or exercise outdoors.

People exposed to smoke may experience symptoms such as coughing and shortness of breath. Older adults, infants, children and people with medical conditions such as asthma, chronic obstructive pulmonary disease, and heart disease are more affected. People who use inhalers for asthma or other conditions should keep them close at hand. People are advised to seek medical treatment for uncontrolled coughing, wheezing, choking, or if breathing difficulty continues once they are indoors.

To reduce their exposure to smoke and protect their health, public health officials advise:

- Stay well-hydrated by drinking plenty of water. Staying hydrated helps dilute phlegm in the respiratory tract making it easier to cough smoke particles out. Plan on coughing, it is nature's way of clearing your lungs. Avoid caffeine products, sugary drinks and alcohol because they have a dehydrating effect.
- Stay cool if the weather is warm. Run your air conditioner to re-circulate air. Turn the fan blower on manually so it continuously filters the air in your home.
- Use portable air purifiers to remove particles in the air in homes without a central heating and/or cooling system. Air purifiers that utilize HEPA filters are best; avoid using air purifiers that produce ozone. Visit areas in your community that have air conditioning, such as a library.
- Exercise indoors if possible.
- If you wear contact lenses, switch to eyeglasses in a smoky environment.

Daily updates on air quality conditions at various locations in Idaho are available on DEQ's ***Air Quality Reports and Forecasts webpage***. For areas where air quality monitors are not available, the ***Visibility Range and AQI Table*** can help determine the necessary precautions to take.

For more information on how to protect against wildfire smoke, read the ***Centers for Disease Control and Prevention Wildfires Factsheet***. Information on the fires in your area is available on ***www.inciweb.org***.

Source:

http://www.healthandwelfare.idaho.gov/AboutUs/Newsroom/tabid/130/ctl/ArticleView/mid/3061/articleId/1663/Idaho-Issues-Stage-1-Air-Quality-Alert-for-Southwest-and-Central-Counties.aspx

Air quality in Lemhi, Custer counties considered 'very unhealthy'

posted on September 04, 2012 15:02

Public health officials are alerting people in those counties to stay inside as much as possible to protect themselves from the very unhealthy air.

The Department of Environmental Quality is forecasting very unhealthy levels for the Central Mountain areas of Idaho, particularly the Salmon area. Because of wildfire activity and weather patterns, air quality conditions are not expected to significantly improve in the next few days.

People exposed to smoke may experience coughing and shortness of breath. Older adults, infants, children and people with medical conditions such as asthma, chronic obstructive pulmonary disease, and heart disease are more affected. People who use inhalers for asthma or other conditions should keep them close at hand. Everyone is advised to seek medical treatment for uncontrolled coughing, wheezing, choking, or if breathing difficulty continues once they are indoors. To reduce their exposure to smoke and protect their health, public health officials advise:

Everyone should avoid heavy work or exercising outdoors when the air quality index reaches unhealthy levels.

Older adults, small children, and those with respiratory conditions or heart disease may be more sensitive to poor air quality and should stay indoors and avoid heavy work when air quality reaches unhealthy levels.

Stay well-hydrated by drinking plenty of water. Staying hydrated helps dilute phlegm in the respiratory tract, making it easier to cough out smoke particles. Plan to cough; it is nature's way of clearing your lungs. Avoid caffeine products, sugary drinks and alcohol because they have a dehydrating effect.

Stay cool if the weather is warm. Run your air conditioner to re-circulate air. Turn the fan blower to manual so it continuously filters the air in your home.

For homes without a central heating and/or cooling system, use portable air purifiers to remove particles (air purifiers that utilize HEPA filters are best, avoid using air purifiers that produce ozone). Visit areas in your community that have air conditioning, such as a library. In Salmon, residents are encouraged to go to the Salmon Public Library, 204 Main St., or to the Salmon Valley Baptist Church, 1140 N. Cemetery Lane.

If you wear contact lenses, switch to eyeglasses in a smoky environment**.**

Not all areas of the state have air quality monitors, so people are encouraged to be cautious if visibility is affected because of smoke and particulates from wildfires. If visibility is reduced to less than eight miles, sensitive groups should limit activity. If visibility is reduced to less than three miles, air quality is considered unhealthy for everyone. Visibility of less than one mile is considered hazardous and everyone should avoid all physical activity outdoors.

Link to air quality guidelines for schools and community event organizers **here**.

Daily updates on air quality conditions at various locations in Idaho are available on DEQ's **Air Quality Reports and Forecasts webpage**. For areas where air quality monitors are not available, the ***Visibility Range and AQI Table*** can help determine the necessary precautions to take. Read current ***wildfire smoke information*** and more tips.

For more information on how to protect against wildfire smoke, read the Centers for Disease Control and Prevention Wildfires Factsheet.
Information on the fires in your area is available on **www.inciweb.org**

Source:
http://www.healthandwelfare.idaho.gov/AboutUs/Newsroom/tabid/130/ctl/ArticleView/mid/3061/articleId/1669/Air-quality-in-Lemhi-Custer-counties-considered-very-unhealthy.aspx

Planning to be outside this weekend? Reduce your exposure to smoke from wildfires

posted on September 21, 2012 15:14

Air quality continues to be problematic for most of the state, and public health officials are reminding Idaho residents to take precautions this weekend when they are outside. Most communities are experiencing air quality in the "unhealthy for sensitive groups" range, and several are in the "unhealthy for everyone" range. Conditions are not expected to change significantly through the weekend.

"It's getting more difficult to escape areas with poor air quality because it's so widespread, so it's important to be aware and adjust your level of exertion if you're outdoors this weekend," said Jim Vannoy, health program manager for the Department of Health and Welfare.

People exposed to smoke may experience coughing and shortness of breath. Older adults, infants, children and people with medical conditions such as asthma, chronic obstructive pulmonary disease, and heart disease are more affected. People who use inhalers for asthma or other conditions should keep them nearby. Everyone is advised to seek medical treatment for uncontrolled coughing, wheezing, choking, or if breathing difficulty continues once they are indoors.

To reduce exposure to smoke to protect people's health, public health officials advise:

- Everyone should avoid heavy work or exercise outdoors when the air quality index reaches unhealthy levels.
- Older adults, small children, and those with respiratory conditions or heart disease may be more sensitive to poor air quality and should stay indoors and avoid heavy work when air quality reaches unhealthy levels.
- Stay well-hydrated by drinking plenty of water. Staying hydrated helps dilute phlegm in the respiratory tract, making it easier to cough out smoke particles. Plan to cough; it is nature's way of clearing your lungs. Avoid caffeine products, sugary drinks and alcohol because they have a dehydrating effect.
- Stay cool if the weather is warm. Run your air conditioner to re-circulate air. Turn the fan blower to manual so it continuously filters the air in your home.
- For homes without a central heating and/or cooling system, use portable air purifiers to remove particles (air purifiers that utilize HEPA filters are best; avoid using air purifiers that produce ozone). Visit places in your community that have air conditioning, such as a library.
- If you wear contact lenses, switch to eyeglasses in a smoky environment.

Not all areas of the state have air quality monitors, so people are encouraged to be cautious if visibility is affected because of smoke and particulates from wildfires. If visibility is reduced to

less than eight miles, sensitive groups should limit activity. If visibility is reduced to less than three miles, air quality is considered unhealthy for everyone. Visibility of less than one mile is considered hazardous and everyone should avoid all physical activity outdoors.

The departments of Health and Welfare and Environmental Quality have issued guidelines for schools and community event organizers, which are available **here**.

Daily updates on air quality conditions at various locations in Idaho are available on Department of Environmental Quality's **Air Quality Reports and Forecasts webpage**. For areas where air quality monitors are not available, the ***Visibility Range and AQI Table*** can help determine the necessary precautions to take. Read current ***wildfire smoke information*** and find more tips.

Find out more about how smoke might be affecting your children at
http://www.healthandwelfare.idaho.gov/Health/EnvironmentalHealth/tabid/95/Default.aspx

More information on how to protect against wildfire smoke and other tips from the Centers for Disease Control is available on ***http://emergency.cdc.gov/disasters/wildfires/***.

Information on the fires in your area is available on **www.inciweb.org.**

Source:
http://www.healthandwelfare.idaho.gov/AboutUs/Newsroom/tabid/130/ctl/ArticleView/mid/3061/articleId/1673/Planning-to-be-outside-this-weekend-Reduce-your-exposure-to-smoke-from-wildfires.aspx

E-3 Idaho Daily Smoke Monitoring Summary – Example for 9-21-2012.

Daily "Smoke Monitoring Summaries" were sent to FLMs, State Agencies and Local Health Districts to provide monitoring and modeled smoke forecast information, usually in conjunction with a near-daily coordination conference call. This effort helped to advise citizens in affected areas of the current and expected future $PM_{2.5}$ conditions so they could take protective actions.

Summary

Idaho DEQ has issued a Stage 1 Air Quality Alert for all counties, for areas outside reservation boundaries. Currently, all areas south of Potlatch area are in the unhealthy for senstive groups or unhealthy AQI categories. Areas from Potlatch north are currently in the good to moderate categories. Certain areas of the state may experience some periods of clearing, however, overall smoke will remain the dominant factor throughout the State. The Stage 1 Air Quality Alert will be re-evaluated by DEQ on Monday morning. At this time, the Alert may be lifted or continued based on air quality and forecasted conditions.

Bluesky is forecasting smoke to move into North Idaho on Saturday and Sunday. Wildfires in Western Wyoming are also forecasted to cause smoke impacts in the Rexburg area.

Idaho Fires Update (Descriptive information is copied from Inciweb, fire size, containment and increase in acres taken from National Interagency Coordination Center Incident Management Situation Report)

Mustang Complex – Inciweb 9/21/2012 morning update

332,301 acres, no estimated containment (an increase of ~ 2,655 acres)

Hazards: Concern was expressed by a few North Fork residents at a recent public meeting over the potential release of radioactive contaminants into the air from fire activity near abandoned mines in the Salmon River corridor, west of the community of North Fork, Idaho. Fire officials with the Mustang Complex have been conferring with the Idaho Department of Environmental Quality (IDEQ) to address these concerns. IDEQ considers the risk of potential radioactive airborne contaminants to be low. These contaminants do not pose any significant risk to public health and safety. Poor air quality, due to particulate matter in smoke, is the main health concern of public health officials. IDEQ is in the process of setting up equipment in the North Fork area to monitor air quality.

Firefighters are trained to stay away from mining sites because of the multiple hazards they present. Salmon Challis Forest officials provided fire managers information about abandoned mines and the locations prior to suppression efforts.

Idaho: Light fire activity occurred between Allan Mountain and the Montana border on Thursday. The fire did progress slightly northward from some short range spotting. Hotshot crews have connected hose lays and pumps in this area to help with mop up. There was no further growth in the Hughes Creek and Hull Creek areas. Firefighters continued mop up activities in these locations to cool any hot spots near the fire edge. The spot fire east of Highway

93 has cooled significantly due to mop up actions there. A forest rehabilitation plan is in place and crews will focus efforts on the Butcher Knife Ridge today, to restore dozer lines that were built to slow the fire spread.

Montana: Weather prevented firefighters from completing a burnout in Johnson Creek on Thursday. Firefighters will try again today to finish this burnout; mop up work will also continue. Fire activity picked up in Mine Creek and areas to the east Thursday. Road grading work has been completed in this area.

Halstead Fire - Inciweb 9/21/2012 morning update

175,710 acres, no estimated containment (an increase of ~ 3,582 acres)

Smoky conditions throughout the fire area kept burning activity to a minimum. Noticeable fire behavior was smoldering, creeping and isolated single and group tree torching. Today will bring a wind shift with winds coming out of the south. Winds will be light, however the direction change should clear some of the smoke from the Sawtooth Valley.

What happened yesterday: The Type 1 helicopter continued to work all day in the Jordan Creek area dropping water to cool the fire edge, extinguishing hotspots, checking fire spread. China Creek drainage was monitored for any signs of growth. An engine crew was flown to the lightning caused fire called Blue Bunch on Blue Bunch Mtn., ultimately controlling that fire. A handcrew and an engine crew worked hard to nearly complete suppression work in the Marsh and Lola Creek Campground area. In Duffield Creek and around Mountain King Mine, which were the hot spots the day before, the fire was not noticeably moving. Suppression repair work was also nearing completion. The Nip & Tuck Rd. (Forest Rd. 033) opened for non-motorized traffic. All spur roads leading to the north of the main road are still closed.

The Plan for Today: The area of concentration will be Loon Creek Summit and Jordan Creek. The Type 1 helicopter will continue with water drops to check any advance of the fire in the headwaters of Jordan and China Creeks. A handcrew and engine will work to complete mop up and secure the Marsh Creek, Lola Creek Campground area. Four engines, spiked at Loon Creek Guard Station, are still monitoring fire activity along the Loon Creek drainage. Three excavators, a road grader, water tender and engine will continue with suppression repair work, as well as grading the dirt roads along the Hwy 21 corridor.

Fire Weather: Winds will be from the south, along with an increase in temperatures nearly 14 degrees above normal for this time of year. Air quality below 7500-foot elevation may remain stagnant until the inversion lifts about noon. The Stage I air quality advisory for Lemhi and Custer Counties remains in effect.

Trinity Ridge Fire – Inciweb 9/21/2012 morning update

146,832 acres, 75% contained (an increase of 0 acres)

No update available

Mcguire Compex – Inciweb 9/21/2012 morning update

5 miles W of Dixie, ID

64,263 acres, 3% contained, 10/31 estimated containment (an increase of ~ 5,122 acres)

No update available

Wesley Fire – Inciweb 9/21/2012 morning update

Approximately 12 miles NNE of New Meadows

11,429 acres, 8% contained (an increase of ~ 550 acres)

The Wesley Fire is burning in the headwaters of upper Lick Creek, upper Rapid River and the headwaters of upper Boulder Creek. The fire is currently 11,429 acres.

It was a calm day on the fire yesterday with little movement along the perimeter and less spot fires outside the perimeter. Fire crews were able to improve containment lines while helicopters made good progress with water drops on the southwest portion of the fire. Additional resources were moved to the southwest edge of the fire to concentrate efforts where most needed. Firefighters continue to guard against fire spotting across fire lines and extinguish them when found. In the Rapid River Corridor a number of bridges were wrapped with fire resistant material as an extra precaution against potential fire advancement.

Objectives today are to hold existing containment lines and extinguish any heat still remaining around the northeast and the east side of the fire. Line construction and locating spot fires to extinguish on the southeastern edge is progressing steadily. Fire managers will continue to place additional resources into the southwest portion of the fire to secure the area.

The forecast for Friday calls for temperatures in the 70s and 80s with light winds out of the North to Northeast with tree torching and spotting predicted along the fire perimeter. Air resources will continue to assist fire fighters with water drops as needed.

Sheep Fire - *Inciweb 9/21/2012 morning update*

7 miles north of Riggins, near Lucile, ID

43,760 acres, 23% contained (an increase of ~ 2,724 acres)

No update available

Karney Fire – Inciweb 9/21/2012 morning update

8 miles NE of Boise

440 acres, 40% contained (an increase of ~90 acres)

Firefighters reported very little fire activity on the 440-acre Karney Fire Thursday night. Today crews will continue to mop-up hotspots within 200 feet of the fireline and to secure areas adjacent to structures.

Interior smoke will persist as the fire continues to burn logs and other pockets of unburned vegetation inside the fire perimeter. The fire is 40 percent contained. Full containment is estimated for September 23 at the end of the day.

Crews also will continue work on fireline repair in areas where dozer line was constructed. This is done to help prevent erosion when rain returns.

More than 300 personnel are assigned to the incident including 8 hand crews, 10 engines, 3 water tenders, and 1 dozer.

Because fire managers and crews are moving toward further containment of the Karney Fire, the plan now is to start downsizing the organization in the next 24 hours.

Other fires in Idaho

Fire Name (location)	Total size (acres)	Size Change last 24 hrs
Powell SBW Complex (45 miles SW of Lolo, MT)	51,000	1,075

Idaho DEQ monitoring data summary

Today's Trends (most recent hour taken is 10 am MDT)

Location/ Monitor	1- hour peak ($\mu g/m^3$)	Rolling 8- hour ($\mu g/m^3$) (ending 10 am MDT) and trend	Rolling 24-hour ($\mu g/m^3$) (ending 10 am MDT) and trend	Today's AQI forecast
Coeur d'Alene Regional Office				
Boundary County				
Mt. Hall		15	13	Good
Porthill		10	9	Good
Kootenai County				

Location/ Monitor	1- hour peak ($\mu g/m^3$)	Rolling 8- hour ($\mu g/m^3$) (ending 10 am MDT) and trend	Rolling 24-hour ($\mu g/m^3$) (ending 10 am MDT) and trend	Today's AQI forecast
Lancaster		19	24	Moderate
Garwood school		25	27	Moderate
Athol		22	25	Moderate
Sandpoint		16	18	Moderate
St. Maries		19	26	USG
Pinehurst		20	23	USG
Lewiston Regional Office				
Latah County				
Genesee		70	57	USG
Kendrick		36	54	USG
Moscow		38	42	USG
Potlatch		24	31	USG
Nez Perce County (Lewiston)		40	43	USG
Idaho County (Grangeville)		73	63	Unhealthy
Boise Regional Office				
McCall		161	110	USG
Idaho City		53	62	USG
Garden Valley		53	59	USG
Weiser		48	46	USG

Location/ Monitor	1- hour peak ($\mu g/m^3$)	Rolling 8- hour ($\mu g/m^3$) (ending 10 am MDT) and trend	Rolling 24-hour ($\mu g/m^3$) (ending 10 am MDT) and trend	Today's AQI forecast
Nampa		52	36	USG
Meridian		59	46	USG
Twin Falls Regional Office				
Ketchum		38	43	USG
Twin Falls		78	50	USG
Paul		42	39	USG
Pocatello Regional Office				
Pocatello		56	75	Unhealthy
Soda Springs		87	73	Unhealthy
Franklin		39	29	Moderate
Idaho Falls Regional Office				
Idaho Falls		81	81	USG
Salmon		136	148	**Unhealthy (could approach Very Unhealthy)**
Rexburg		64	66	USG
Emergency Monitors (PM2.5, North Fork is e-sampler, all others are EBAM)				
North Fork				
Fairfield		53	47	USG
Challis, ID		187	119	Unhealthy
Mountain Home		61	50	USG

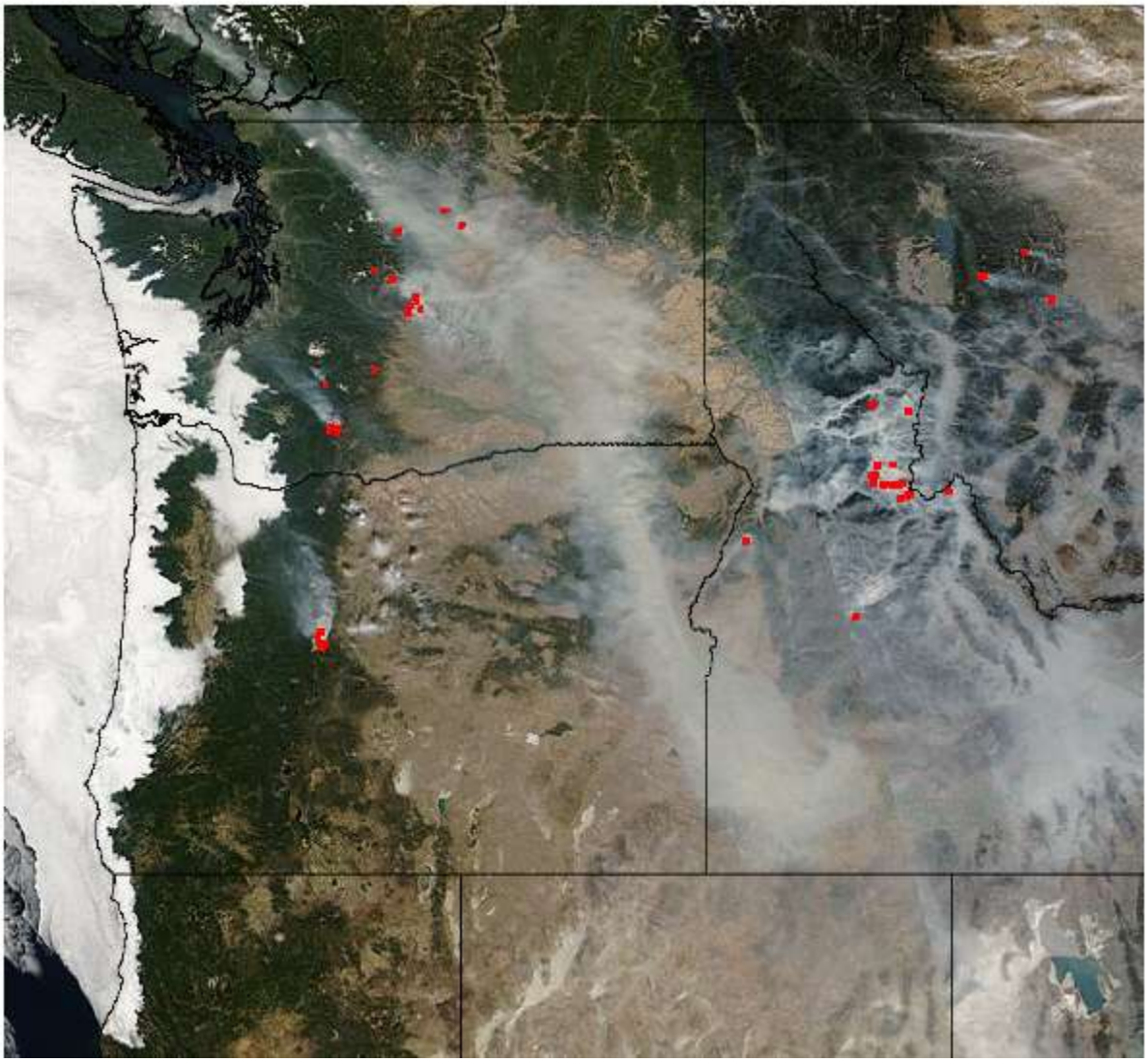
Yesterday's data for 9/20/2012

Location/ Monitor	1- hour peak ($\mu g/m^3$)	8- hour peak ($\mu g/m^3$)	Yesterday's 24-hr ($\mu g/m^3$)	Air Quality Index
Coeur d'Alene Regional Office				
Boundary County				
Mt. Hall	19	13	12	Good
Porthill	12.8	9	8	Good
Kootenai County				
Lancaster	40.2	37	30	Moderate
Garwood school	47.6	39	32	Moderate
Athol	38.3	37	30	Moderate
Sandpoint	33.4	24	20	Moderate
St. Maries	42.9	42	32	Moderate
Pinehurst	41.5	41	30	Moderate
Lewiston Regional Office				
Latah County				
Genesee	100.4	84	55	USG
Kendrick	124.9	85	57	Unhealthy (based on 8-hour)
Moscow	96.8	71	46	USG
Potlatch	72.8	49	36	USG
Nez Perce County (Lewiston)	62.2	52	43	USG
Idaho County	97.3	88	56	Unhealthy (based

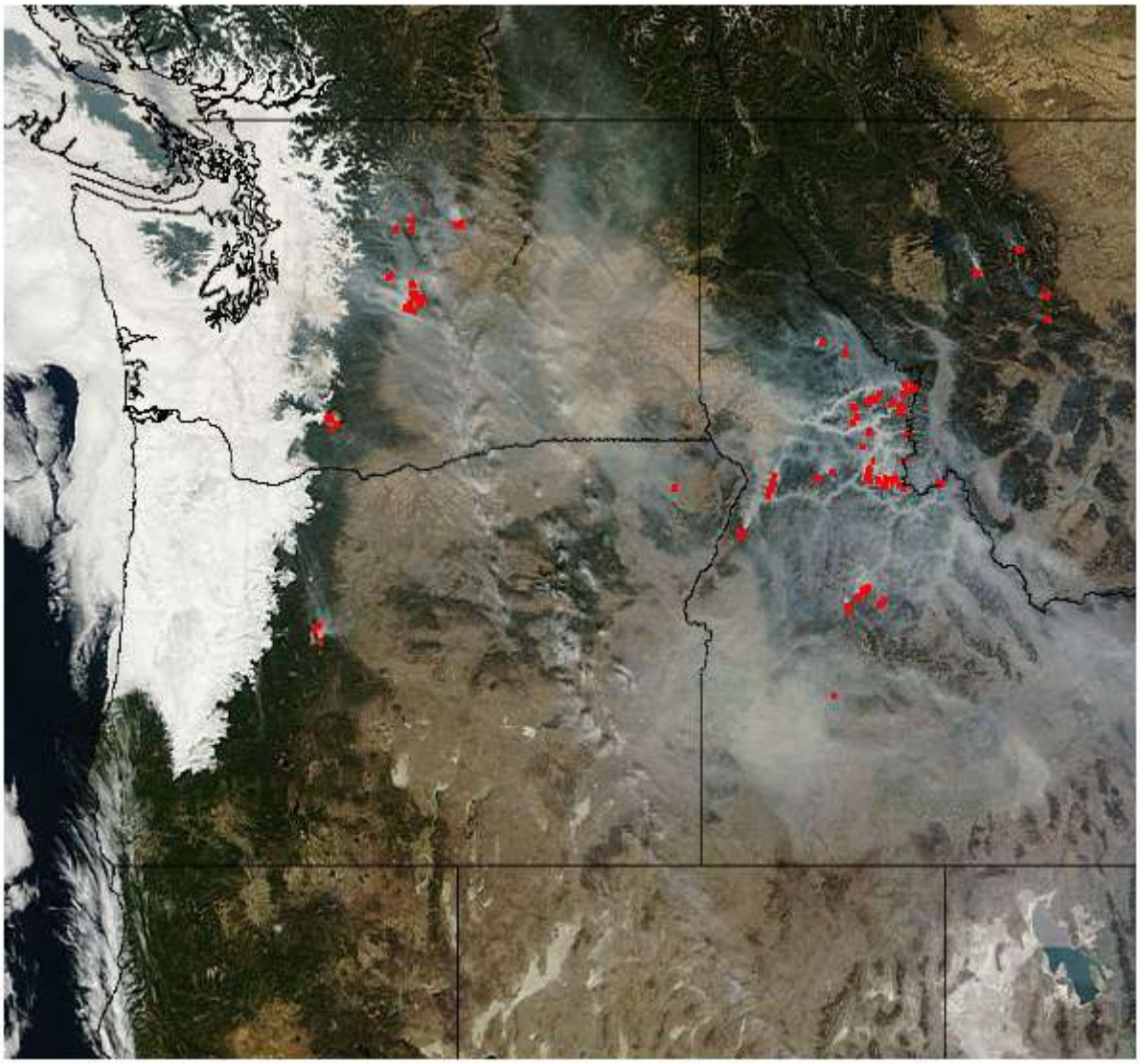
Location/ Monitor	1- hour peak ($\mu g/m^3$)	8- hour peak ($\mu g/m^3$)	Yesterday's 24-hr ($\mu g/m^3$)	Air Quality Index
(Grangeville)				on 8-hr)
Boise Regional Office				
McCall	198.4	111	88	USG
Idaho City	84.3	76	62	USG
Garden Valley	83.2	70	55	USG
Weiser	64.4	51	37	USG
Nampa	40.2	30	26	Moderate
Meridian	45.7	41	36	USG
Twin Falls Regional Office				
Ketchum	69.1	58	44	USG
Twin Falls	59	39	34	Moderate
Paul	46.4	42	35	Moderate
Pocatello Regional Office				
Pocatello	114.8	106	63	Unhealthy (based on 8-hour)
Soda Springs	115.3	99	46	Unhealthy (based on 8-hour)
Franklin	40	25	22	Moderate
Idaho Falls Regional Office				
Idaho Falls	122.4	105	60	Unhealthy (based on 8-hr)
Salmon	189	180	160	**Very Unhealthy**
Rexburg	95.1	87	65	Unhealthy (based on 8-hr)

Location/ Monitor	1- hour peak ($\mu g/m^3$)	8- hour peak ($\mu g/m^3$)	Yesterday's 24-hr ($\mu g/m^3$)	Air Quality Index
Emergency Monitors (PM2.5, North Fork is e-sampler, all others are EBAM)				
North Fork				
Fairfield	56	44	38	USG
Challis, ID	121	94	85	Unhealthy
Mountain Home	89	57	41	USG

Aqua Modis (afternoon) imagery for 9/20/2012



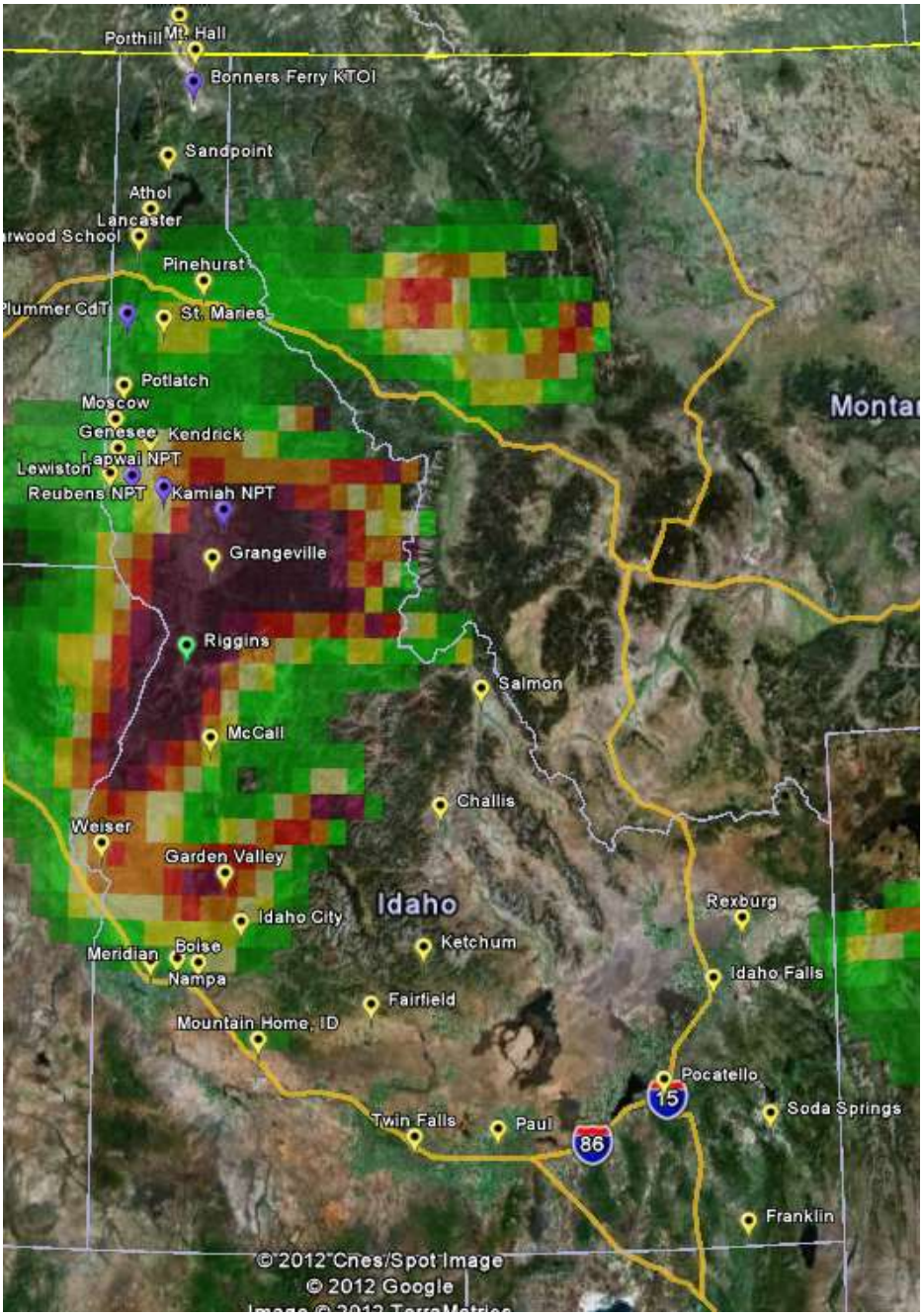
Terra Modis (morning) imagery for 9/21/2012



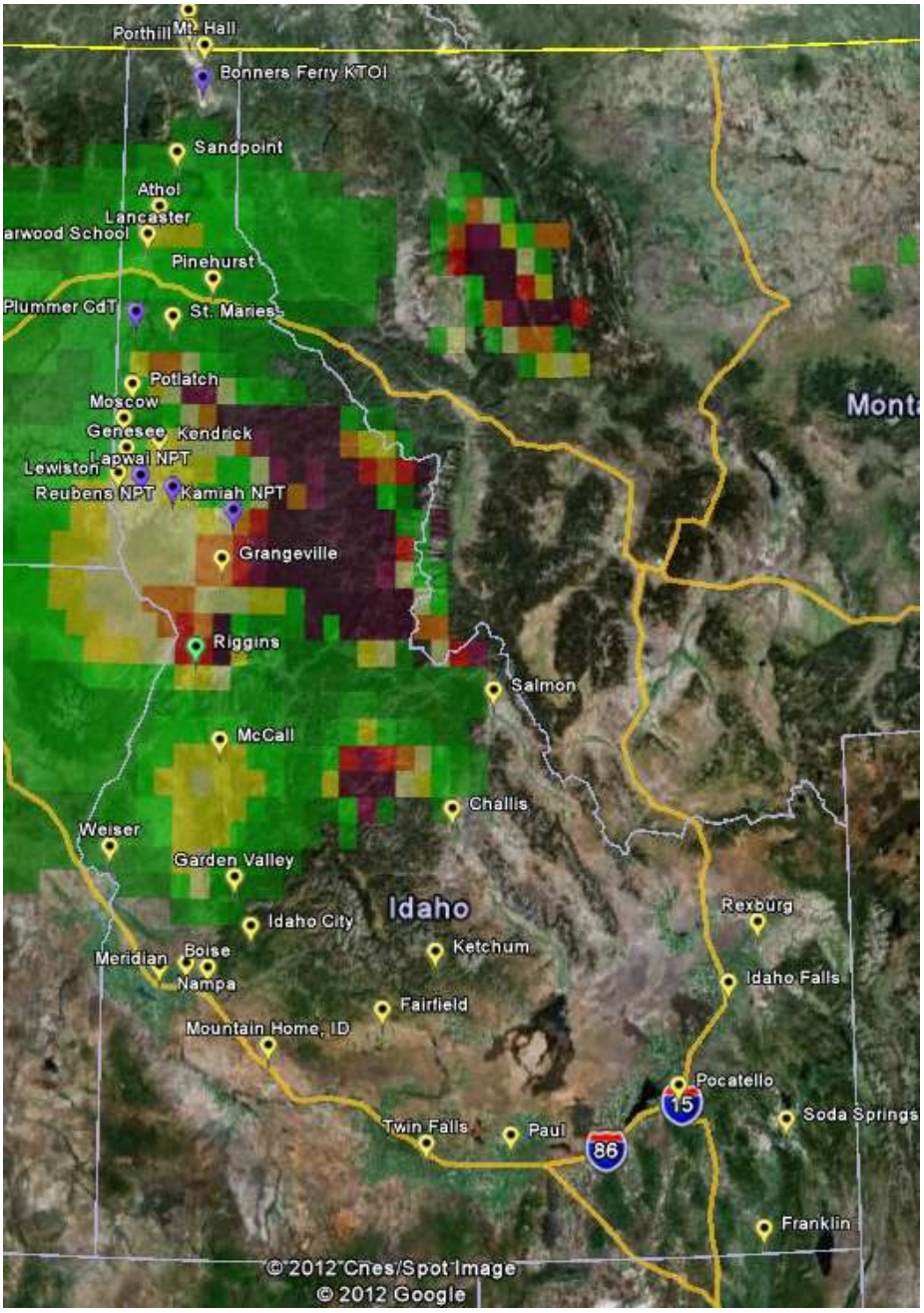
Bluesky model runs (9/21/2012 morning)

Note: The Bluesky model runs start from zero. This means that any smoke in the area from the day before is not included in the model run. That is why southern Idaho and the Grangeville area start clean in the model runs; however, in reality, these areas are experiencing smoke impacts.

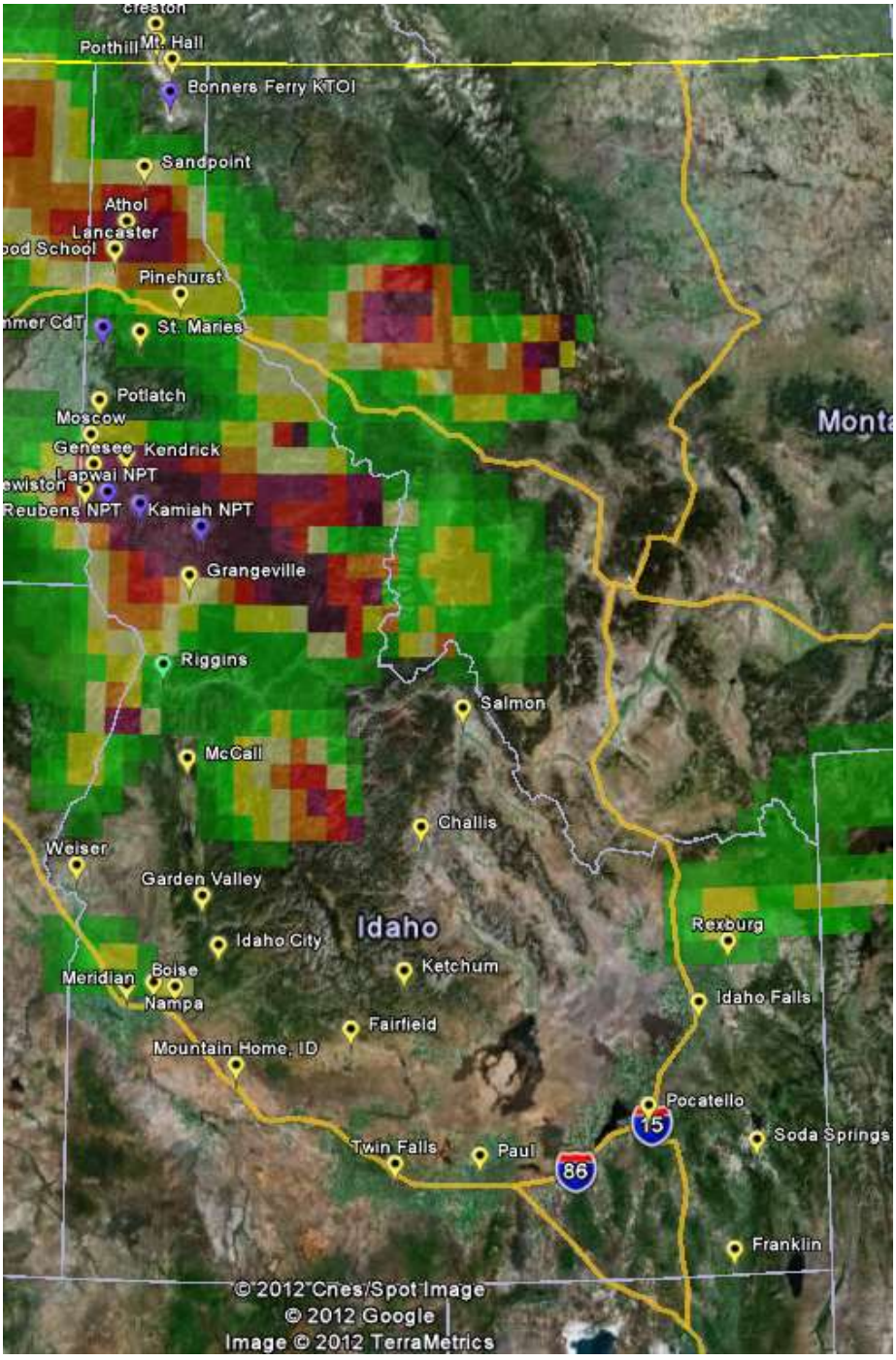
9/21/2012 morning



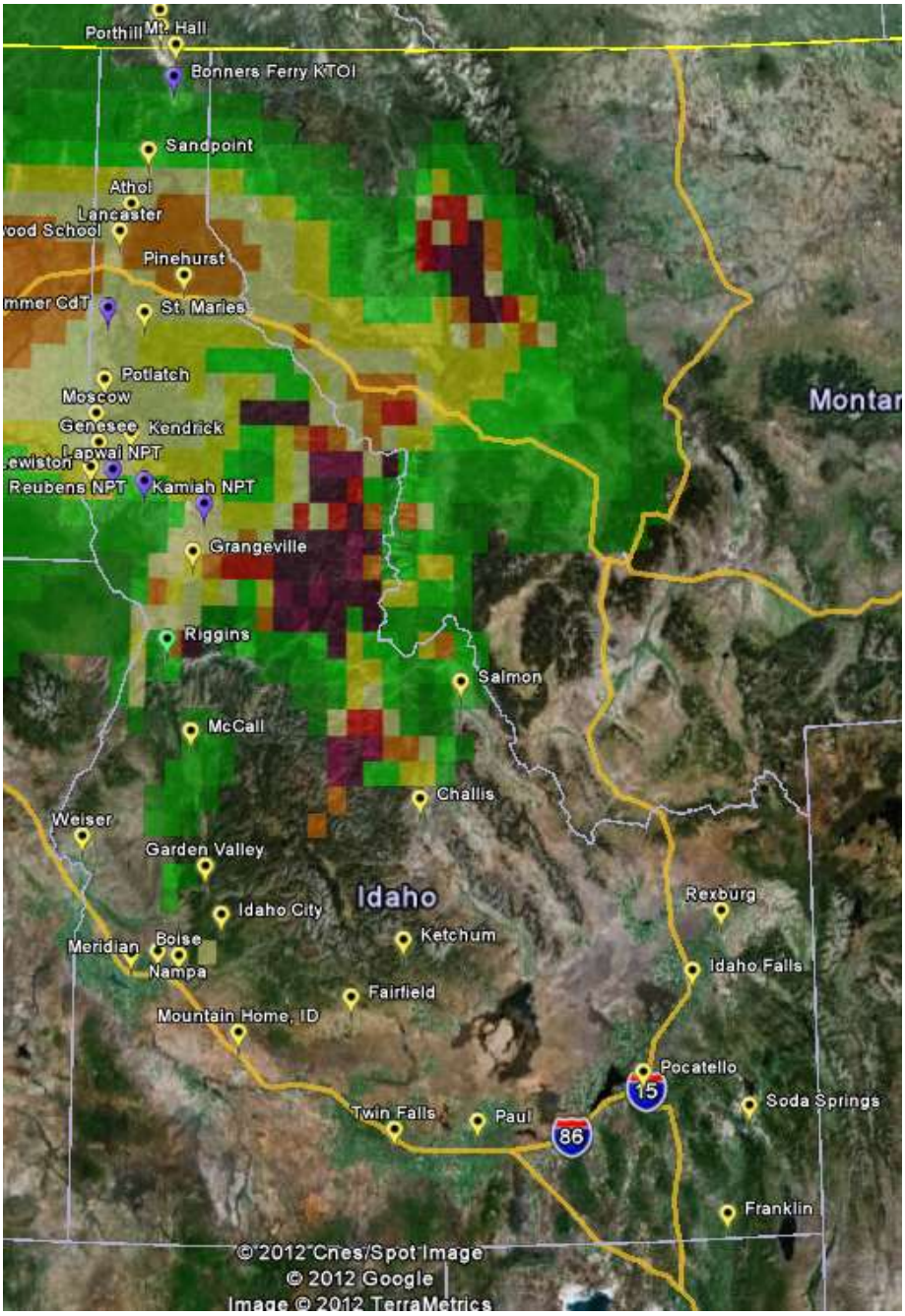
9/21/2012 evening



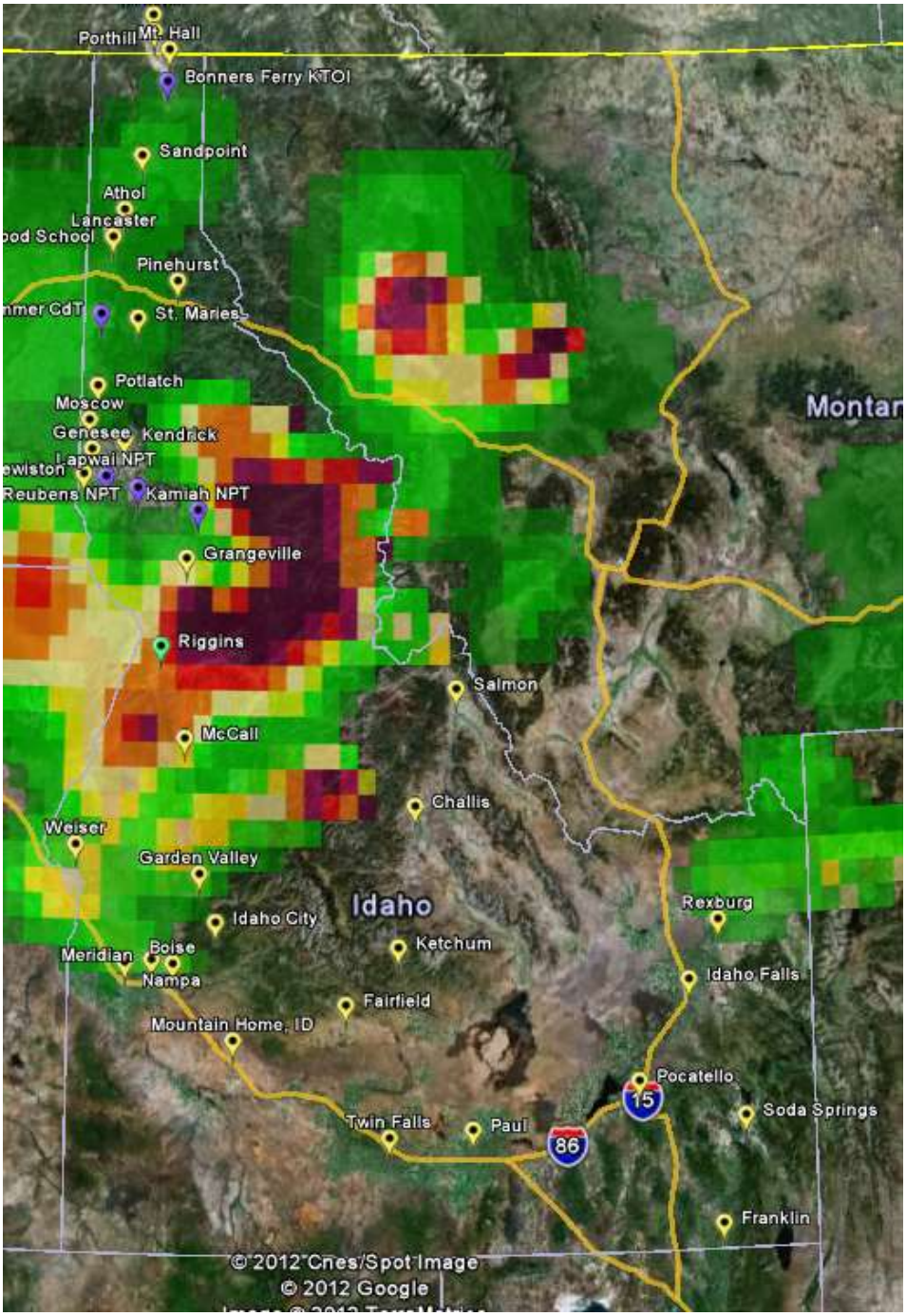
9/22/2012 morning



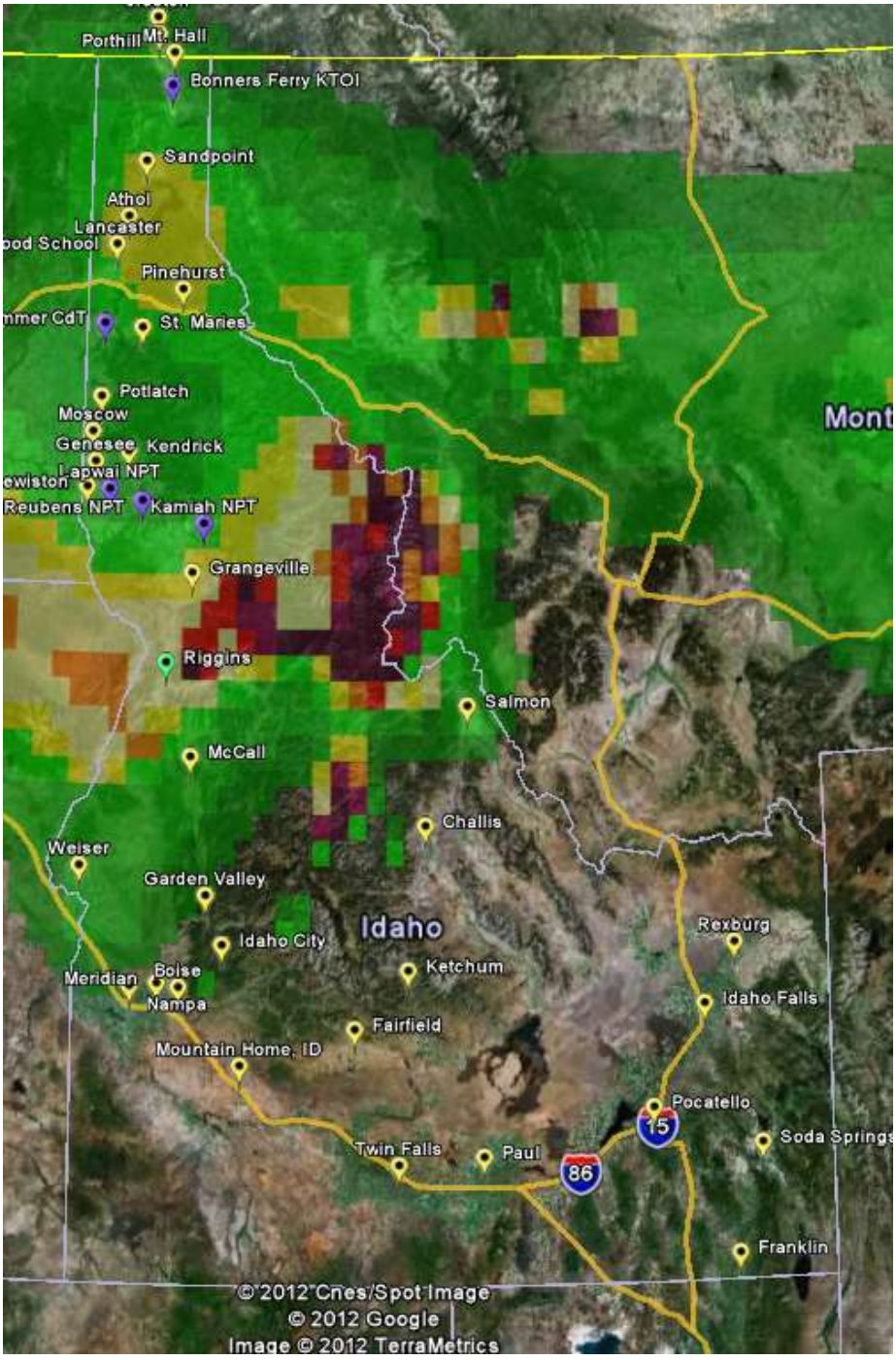
9/22/2012 evening



9/23/2012 morning



9/23/2012 evening



Appendix F: News Stories

F-1. Salmon-related news articles
F-2. Pinehurst-related news articles

Appendix F-1 Salmon-related News Articles

8-15-12 Post Register

Halstead Fire moves south; evacuations are advised

■ A community meeting is set for today at the Stanley Community Center.

POST REGISTER

A northwest wind that arrived a day early pushed the Halstead Fire about two miles south Wednesday, putting it on a path that threatened an unknown number of structures, the U.S. Forest Service reported.

The fire, burning in the Salmon-Challis National Forest 18 miles northwest of Stanley, had consumed 58,269 acres as of 10 p.m. Wednesday.

"It got pretty active today," fire information officer Bruce Palmer said.

Earlier Wednesday, the Halstead Fire Incident Management Team — working with the Custer County Sheriff's Office — recommended the evacuation of homes along Highway 75, from roughly Joe's Gulch to Sunbeam.

The threatened area did not include lower Stanley, Palmer said.

People living in the area were advised to leave within the next 48 hours, Palmer said. He wasn't sure exactly how many structures or people were threatened.

Paul Lambert / plambert@postregister.com

Jefferson County fire crews and local residents respond to a wildfire in a wheat field northeast of Highway 26 less than 500 yards from the Hillview Sinclair gas station near Ririe High School just before 8 p.m. Tuesday. The fire threatened nearby powerlines, though volunteer crews contained the fire in less than 40 minutes.

On the **INTERNET**

Latest info on wildfires:

■ www.idahofireinfo.blm.gov/

■ www.nifc.gov/fireInfo/nfn.htm

■ http://gacc.nifc.gov/egbc/dispatch/id-cic/

Extreme fire behavior and downhill runs Wednesday pushed the Halstead Fire into the upper reaches of Basin Creek, the Forest Service reported.

A community meeting was scheduled for 7 p.m. today at the Stanley Community Center.

A new fire erupted Tuesday on Bureau of Land Management land west of Idaho Falls. Dubbed the Gun Range Fire, BLM spokesman Jason Fallon said the blaze had burned about 75 acres Wednesday evening and remained active. BLM and Bonneville County firefighters were battling the blaze that erupted along U.S. Highway 20. The fire may have been human caused, Fallon said, and an investigation was continuing.

A smaller fire erupted Wednesday evening in a farm field in Bonneville County, just outside Ririe and near the border with Jefferson County. By 9:30 p.m., firefighters had left the scene at 300 Swan Valley Highway and the fire was out, officials said.

8-15-12 Post Register

Farmers could get burn ban exception

By RUTH BROWN
rbrown@postregister.com

As of Aug. 27, farmers in the region will be allowed to burn agricultural waste, atmospheric conditions and the Department of Environmental Quality permitting.

Agricultural field burners in the Central and Roberts fire districts will be allowed to burn their field stubble, Central Fire District Chief Jim Deuel said. Those areas include the Rigby, Ririe, Lewisville and Menan areas, as well as portions of Bonneville and Madison counties and the Roberts area.

The burn-ban exemption applies only to farmers who have registered their fields with the DEQ and conduct the burn under DEQ guidelines. A burn ban remains in effect for other residents.

Farmers use fire to burn stalks left behind after harvesting crops such as wheat and barley, Deuel said.

This summer marks the first burn ban the Central Fire District has ever put in place, Deuel said. It was necessary because of the region's especially dry conditions.

All registered farmers must still get DEQ approval before burning a field, Deuel said.

DEQ smoke management program coordinator Mary Anderson said burn requests will be evaluated on a daily basis. The department looks at air quality, wind direction and how well the smoke will disperse when approving a burn day for farmers.

Those days have been rare this summer due to all of the wildfire smoke in the air, Anderson said.

"I don't foresee a burn day for a while," she said.

8-16-12 Post Register

Smoke is likely to linger

■ The smoky conditions could last until at least Sunday — or even weeks.

By RUTH BROWN
rbrown@postregister.com
AND ZACH KYLE
zkyle@postregister.com

The smoke from wildfires shrouding eastern Idaho isn't going anywhere.

Weather conditions won't help the Snake River Plain until at least Sunday, when wind might push out smoke that's been settling over Idaho Falls and the surrounding area, said Dean Hazen, science officer at the National Weather Service Office in Pocatello.

INSIDE
■ Gov. Otter declares a disaster / **A3**
■ Two Idaho towns evacuate / **B4**

Wind won't help Salmon and mountainous central Idaho anytime soon.

■ Health advisory similar to one in Salmon is expected to be issued in I.F. today.

SMOKE, *Continued on Page A3*

SMOKE

From Page A1

The growing Mustang Complex and Halstead fires in the Salmon-Challis National Forest will keep Salmon in a haze for some time, said Mary Anderson, smoke management program coordinator for the Idaho Department for Environmental Quality.

"Where they are, even if the wind shifts, it just changes which fire is affecting them," Anderson said.

Northwest winds condensed smoke over Idaho Falls on Wednesday and promised to do the same today, DEQ representative Rensay Owen said. Owen is the regional manager for air, waste and remediation in the Idaho Falls-region DEQ office.

Any relief for Idaho Falls could be short-term. Both fires are only marginally contained and are expected to burn into the fall, so smoke conditions likely will fluctuate with the weather.

"It's more of a week-to-week, day-to-day thing," Hazen said. "Certainly, we can expect to see a change in the fall as we always do. It's a matter of when, and this has been an unusual year."

The Salmon area remained under a health advisory issued Monday by the Idaho Department of Health and Welfare. The advisory declared the air was unsafe to breathe for sensitive groups. Those groups include children, the elderly and anyone with respiratory or heart conditions.

Anderson anticipated a similar advisory would be issued for Idaho Falls today.

The smoke was affecting daily life in Salmon, said Shanda Fitte, owner of Precious Cargo Early Learning Center/Daycare and Preschool. Fitte could see the mountains Wednesday for the first time in four days, she said, but ash and soot continued falling and piling up in the play area outside.

Fitte allows the children to play outside only in the morning before the smoke intensifies. They still come in covered in ash and soot, she said.

"They look like little coal miners because they are covered with soot from the ground," Fitte said. "We use lots of baby wipes."

Salmonites have tried to stay inside and away from the smoke, she said.

"Everybody is talking about it, hacking and stuff," she said. "It's brought on more seasonal allergies, coughing, sore throats."

Two patients who were coughing and wheezing were admitted to Eastern Idaho Regional Medical Center on Wednesday, emergency room doctor Andrew Garrity said. Garrity said he expected more patients with similar conditions if the smoke worsened today, though in Idaho Falls he didn't anticipate anyone without pre-existing respiratory issues to have problems.

"Probably most of us aren't bothered by it," he said.

8-17-12 Post Register

INSIDE
■ Fire stalls near Idaho towns of Featherville, Pine / **Wildfire update, Page C6**

Custer urges evacuations

■ The growing Halstead Fire, now at 77,251 acres, is menacing structures and campgrounds.

On the **INTERNET**

Latest info on wildfires:
■ www.idahofireinfo.blm.gov/
■ www.nifc.gov/fireInfo/nfn.htm
■ http://gacc.nifc.gov/egbc/dispatch/id-cic/

By MIKE MOONEY
mmooney@postregister.com

Custer County officials Thursday night urged residents and campers to leave an area from Sunbeam Store to the Loon Creek Summit, including Custer Town and Jordan Creek.

Residents and campers were asked to be out of the area by 5 p.m. today.

"If you fail to evacuate as instructed we CAN NOT guarantee your safety. Emergency Services or a Rescue may not be available to you if you do not evacuate as requested," the county's evacuation notice said.

It was not clear Thursday night how many people or structures were threatened by the advancing Halstead Fire, which as of 10 p.m. had burned an estimated 77,251 acres.

Stanley and Lower Stanley were not included in the evacuation notice.

Those living in the threatened area were asked to call the Custer County Sheriff's Office at (208) 879-2232 for further information or assistance.

Information also was available at Stanley City Hall or the Custer County Courthouse in Challis.

Burning about 18 miles northwest of Stanley, the Halstead Fire's southeast flank expanded Thursday as it moved into the bug-killed trees below Basin Butte. The fire was expected to meet the boundary of the 2006 Potato Fire burn area.

It was hoped that would take some of the energy out of the fire as the fuels change, fire officials said.

"On average, this fire has spread approximately one mile per day, which is the equivalent of around 10,000 acres per day," fire officials

■ A new fire erupted Thursday southeast of Blackfoot

CUSTER, *Continued on Page A4*

8-20-12 Post Register

Smoke-choked air keeping people indoors in Salmon

■ Weather forecasts indicate the air will stay unhealthy throughout the weekend.

By LAURA ZUCKERMAN
news@postregister.com

SALMON — Doris Davis spent much of the week indoors to avoid coughing fits brought on by wildfire-driven smoke and ash that began pouring into Salmon last weekend.

"I have allergies. The air is choking me up to the point I can't breathe," the 61-year-old Davis said.

Wildfires that have been burning for weeks in the backcountry northwest of Salmon and central Idaho forests have blanketed the community in smoke and haze.

On the **INTERNET**

Salmon air quality report and forecast:
■ http://tinyurl.com/cvplew2

Salmon's air quality has been rated unhealthy for days, according to preliminary figures from the Idaho Department of Environmental Quality.

As a result, state health officials advise residents to limit — or even avoid — extended outdoor exertion, especially children, the elderly and those with heart or lung conditions.

Asthmatic Juanita Grkovic, 84, hasn't ventured outside much since Monday.

"I've stayed inside except to go to the grocery store," she said. "Even then, coming out of the grocery, (the smoke-filled air) hits you all of the sudden."

Weather forecasts indicate the air in Salmon will remain in the unhealthy range throughout the weekend.

Health officials advise residents to drink plenty of water and use air purifiers or air conditioners with freshly cleaned or replaced filters. Medical treatment should be sought for symptoms such as uncontrolled coughing, wheezing or prolonged breathing difficulties.

Problems caused by wildfire smoke can range from eye and respiratory tract irritations to reduced lung function and premature death, according to the Idaho Department of Health and Welfare.

Stephanie Orr, chief nursing officer at Steele Memorial Hospital in Salmon, said the hospital and its sister clinic have not noticed an increase in the number of patients with respiratory complaints.

"We have seen a number of people experiencing a flare-up of allergies that is possibly related to smoke," Orr said.

Grkovic compared the smoke-filled air to the haze that hovered in the valley for weeks during the Clear Creek Fire, which erupted in 2000 in the Salmon-Challis National Forest.

"I think the air is worse now, but I didn't have asthma back then," Grkovic said.

Steve Lish, administrator of Discovery Care Center in Salmon, said many of the facility's elderly residents — concerned about the effects of the smoke pollution — have no desire to venture outdoors.

Similar concerns have been voiced at recent meetings of state and federal agencies, including the Department of Environmental Quality, U.S. Forest Service and Idaho Department of Health and Welfare.

"Salmon is right now the worst-hit area, but we're seeing a very widespread smoke impact to varying degrees across Idaho," said Mary Anderson, the DEQ's smoke management program coordinator.

And with some wildfires predicted to burn for weeks to come, air quality issues likely will linger.

Davis, who described herself as an "outdoorsy type," said too many days indoors are bringing on another problem for her.

"I'm going stir crazy," she said.

■ DEQ officials say the smoke is worse in Salmon than any where else in the state

AIR, *Continued on Page A5*

AIR From Page A1

8-20-12 Post Register

Halstead wildfire takes a breather

■ Some Custer County residents evacuated; others remained with their homes.

By MIKE MOONEY
mmooney@postregister.com

At least 41 Custer County residents evacuated their homes Friday at Yankee Fork and Casino Creek, two areas threatened by the Halstead Fire.

Chief Deputy Mike Talbot of the Custer County Sheriff's Office said the evacuations went smoothly, though some residents decided to stay with their homes.

In other wildfire developments:

■ The Mustang Complex Fire northwest of Salmon expanded to 79,807 acres burned as of 10 p.m. Friday.

■ The Fox Hill Fire burning southeast of Blackfoot had charred 364 acres. Firefighters hoped to contain the blaze Friday night.

Earlier Friday at Yankee Fork, 31 residents were evacuated while seven decided to stay with their homes, Talbot said. A total of 10 Casino Creek residents left their homes, while three others elected to remain despite the fire threat.

Operations at Hecla Mine continued Friday, Talbot said. Employees were logging in and out to make it easier for officials to keep track of them. The mine is located in a rocky area with little vegetation.

When all was said and done, however, Friday was a relatively uneventful day for the 83,857-acre Halstead Fire, which is burning in the west of Mustang in the Frank Church River of No Return Wilderness, moved south toward Corn Creek on Friday.

Fire officials said protection work around Salmon River homes and businesses has prevented the loss of any buildings. No residents or firefighters have been injured. Firefighters also are working to protect homes at Gattin Ranch in the event the fire continues north from Cayuse Point.

Managers of the Mustang Complex Fire, meanwhile, were keeping Salmon River Road open to Colson Creek residents, as well as jet boaters leaving Corn Creek and Middle Fork river rafters taking out at Stoddard, Cache Bar and Corn Creek.

Generally, the fire was moving east toward Spring Creek Road and northeast toward the border with Montana.

"It didn't move much today," fire information officer Brian Harris said.

At the nearby Bench Fire, firefighters reported 70 percent containment Friday night.

"It was a relatively quiet day today," fire information officer Bruce Palmer said. "We didn't get the fire spread we earlier anticipated. The wind is still mainly from the northwest and continues to push the fire to the southeast. There's a lot of smoke."

INSIDE
■ Forest Service's response to wildfires questioned / **A5**

■ Fire officials say the wind continues to push the fire to the southeast

FIRES, *Continued on Page A5*

FIRES
From Page A1

On the **INTERNET**

Latest info on wildfires:
■ www.idahofireinfo.blm.gov/
■ www.nifc.gov/fireinfo/nfn.htm
■ http://gacc.nifc.gov/egbc/dispatch/id-cic/

9-1-12 Post Register

Residents near Yankee Fork urged to evacuate

■ A growing Halstead Fire is threatening at least 31 homes in the area.

By MIKE MOONEY
mmooney@postregister.com

Deputies from the Custer County Sheriff's Office went door-to-door Friday, urging Yankee Fork residents to leave their homes as quickly as possible.

By mid-afternoon, the 123,893-acre Halstead Fire had reached the ridge of Yankee Fork. At least 31 homes are scattered throughout that area, as well as seven campgrounds, the Hecla Mine and a couple of U.S. Forest Service lookout stations.

"So far, the fire had not spotted over Yankee Fork Road," Forest Service spokeswoman Mary Cernicek said.

In fact, a controlled burning operation — to remove vegetation that might fuel the fire — was underway late Friday. The idea was to create a "black area" to try and stop the fire from moving through Sunbeam and into the Highway 75 area.

INSIDE

■ Montana fires could be danger into the weekend / B7

On the **INTERNET**

For the latest fire information visit::

■ http://www.idahofirein fo.blm.gov/

■ www.nifc.gov/fireInfo/ nfn.htm

■ http://gacc.nifc.gov/eg bc /dispatc vid-cic/

A 15-mile stretch of Highway 75 remained closed Friday between Lower Stanley and Gardner Creek.

As of 9:30 p.m., no homes — or structures of any kind — had been damaged or destroyed by the fire, Forest Service spokesman Eric Mosley said.

Mosley pointed out that areas within Yankee Fork have been closed for the past two weeks.

"We just want people to understand there is a threat," he said.

Firefighters were concentrating their efforts Friday on Stanley Creek Road and establishing an anchor point — a spot along the fire line that is secure — to keep the fire from burning around the perimeter, according to fire managers.

■ Three structures were reported destroyed by fire Friday in the upper Spring Creek area

FIRES, Continued on Page A3

FIRES

From Page A1

"The fire was most active (Friday) on the north boundary," Cernicek said.

A lot of burning was reported around Pinyon Peak.

Sprinklers also were put in place to protect structures related to mining operations, as well as the Seafoam Guard Station, Cernicek said.

In the 205,481-acre Mustang Complex Fire, a Level 1 evacuation notice was issued Friday for the Highway 93 corridor and the community of Gibbonsville. Under a Level 1 alert, residents are advised to make preparations for a possible evacuation.

A Level 3 alert (mandatory evacuation) remained in effect Friday for those living in the Hull, Hughes, Idaho and Sheep creek areas.

Extensive structure assessment and protection measures, including laying sprinkler lines, was under way along the Highway 93 corridor.

Although three structures were reported destroyed by fire Friday in the upper Spring Creek area, Forest Service officials said no homes or businesses were damaged by the flames.

More than 800 firefighters and support personnel are battling the Mustang Fire, which was reported 16 percent contained.

Lightning ignited the fires that form the Mustang Complex during the weekend of July 29. Five of the fires, the Mustang, Broomtail, Roan, Cayuse and East Butte, eventually burned together over the next four weeks, Forest Service officials have said.

Today, the Mustang Complex is the largest of three major fires burning in Idaho.

Mike Mooney can be reached at 542-6764. Comment on this story on Post Talk at www.postregister.com/posttalk/.

9-2-12 Post Register

Massive crew battles the Mustang Complex fire

Roger Harlow (rharlow@postregister.com)

A meadow near North Fork serves as the temporary home for personnel fighting the Mustang Complex fire.

■ Hundreds work behind the scenes in support roles to keep the firefighters on the frontlines.

By ZACH KYLE
zkyle@postregister.com

NORTH FORK — The bigger the wildfire, the more shovels, vehicles and food needed to fight it.

That also means more computers, more paperwork, more planning, and hundreds of other items and personnel critical to the effort.

As the growing Mustang Complex topped the 200,000-acre mark, the incident center that sprang up in North Fork grew with it.

About 800 people were in camp Thursday. Many will never see the Mustang. Their jobs — security, parking, technical support, shower maintenance and everything else — keep firefighters digging fire lines and defending homes, U.S. Forest Service spokesman Lynn Ballard said.

"You basically create a small town and try to take care of all those needs of the firefighters you put on the ground," he said.

A U.S. map posted in the incident center was full of pushpins representing the hometowns of the transient campers.

Colorful dots spread across the map. Nearly every state boasted a pushpin.

Perhaps one was for Tim Marshall, 38, who runs the 19-person food crew.

They work for Stewart's Firefighter Food Catering, which is based in Pendleton, Ore. Stewart's contracts with the federal government. Sometimes, Stewart's heads to natural disasters such as Hurricane Katrina.

During fire season, Marshall's and other crews head to fires. This summer, his crew fed personnel at fire incident centers in Rockerville and Edgemont, S.D.

He said the team was home for four hours before getting orders to head to McCall.

The Mustang is the crew's fourth fire. They've been in North

■ Firefighters need to eat about 7,000 calories a day

SUPPORT, Continued on Page 14

9-2-12 Post Register

The Cost of Fire

As Idaho wildfires get bigger, so does the price of fighting them

By ALEX STUCKEY
astuckey@postregister.com

Federal agencies have spent an estimated $55.5 million fighting the three fires — Mustang Complex, Trinity Ridge and Halstead — that have combined to torch more than 466,000 acres.

And with fire season only halfway over, it seems it won't be man that stops this year's fires, but winter's first snow.

All told, the fires searing through Idaho have surpassed 1.1 million acres, or about 1,700 square miles. That's about 200 square miles larger than Rhode Island.

It's the largest fire season since 2007, when 2.3 million acres burned statewide, said Emily Anderson, Idaho Department of Lands spokeswoman.

> "We've been on a trend toward increasing fires and increasing severities for quite some time. That is a result of not just the drought and climate change, but also because of fire suppression."
>
> **ADAM SOWARDS**
> **A University of Idaho professor**

But with a fire season that could reach well into October, this year's fires could surpass that acreage, Anderson said.

"We've been on a trend toward increasing fires and increasing severities for quite some time," said Adam Sowards, a University of Idaho professor. "That is a result of not just the drought and climate change, but also because of fire suppression."

State fire officials don't see it coming to an end any time soon.

"The bigger the fire gets, the longer

■ Congress gave about $2.29 billion to the U.S. Forest Service for fires

COST, Continued on Page A6

9-2-12 Post Register Continued

COST

From Page A1

it goes, (it) just increases in multitude," said Jennifer Jones, spokeswoman for the Forest Service's National Interagency Fire Center in Boise.

About $55.5 million has been spent fighting the three big fires in Idaho across various agencies, such as the Bureau of Land Management and the U.S. Forest Service.

Congress appropriated about $2.29 billion to the U.S. Forest Service this year to train for, and fight, such fires, said Lynn Ballard, Eastern Idaho Interagency Fire Center spokesman.

Ballard said the amount of money appropriated across the nation purely for fire suppression — $448 million in 2012 — is tapped into by all states when they need it.

If the budget for the Forest Service's fight against wildfires is depleted, officials can tap into other monies in the service's budget, which the forest service has started to do this year, he said.

The Bureau of Land Management could not provide budget information by press time.

Roger Plothow / rplothow@postregister.com

A helicopter refills near Stanley. The Mustang Complex fire has 59 fire engines, 800 people and two helicopters working to extinguish the blaze. About 550 personnel, 35 fire engines and seven helicopters are working to extinguish the Halstead Fire. More than 1,200 personnel, 66 fire engines and nine helicopters are battling the Trinity Ridge Fire.

Mustang Complex

The red and orange flames associated with the Mustang Complex fire have charred more than 205,000 acres, scorching a path through timber on the northern end of the Salmon-Challis National Forest. To date, federal agencies have spent $13 million fighting it.

Fifty-nine fire engines, 800 people and two helicopters are working to extinguish the ever-growing blaze, according to the fire center.

The fire is 11 percent contained, and evacuation notices have been issued for Hull, Hughes and Sheep creeks. Residents in the U.S. Highway 93 corridor between Copper Gulch and Sheep Creek and the Highway 93 corridor just north of Sheep Creek through the Lost Trail Pass and along Dahlonega Road for Gibbonsville are also on alert.

The fire is in steep, inaccessible terrain, making firefighting difficult.

Officials hope to have the fire contained by Sept. 30.

Firefighters and other personnel hope to suppress the fire and prevent loss of homes, businesses and natural resources, according to the fire center.

Halstead

Lightning struck July 27 in an area of the Salmon-Challis National Forest, incinerating nearly 117,000 acres of timber. Beetles had previously killed many of the trees that went up in smoke.

Federal agencies have spent $15.5 million fighting the fire, which is now 7 percent contained.

About 550 personnel, 35 fire engines and seven helicopters are working to extinguish the fire.

Officials estimate the fire will be contained Oct. 16.

Firefighters and other personnel will work to keep the fire from spreading onto private land in the Valley Creek area and hope to complete burnouts in the coming days, weather permitting. Another goal is to keep the fire from crossing state Highway 75 or the Salmon River, according to the Incident Information System.

Trinity Ridge

On Aug. 3, a utility vehicle ignited a blaze that has burned 144,000 acres across the Boise National Forest. Since the fire began just a month ago, 12 structures have been torched, including four Forest Service cabins and four outbuildings.

Federal agencies have spent $27.4 million fighting the blaze with more than 1,200 personnel, 66 fire engines and nine helicopters.

Residents of Pine and Featherville have been evacuated, and officials estimate the fire will be contained Oct. 1.

Firefighters and other personnel plan to complete a series of burnouts from Forest Road 357 to Rabbit Creek Summit and south to Thorn Creek Butte. They are also trying to contain the 30-acre spot fire north of the North Fork of the Boise River.

Despite efforts to control the fires, Anderson said this season's fires will only continue to burn until the snow flies.

"There will absolutely be more fires before October," Anderson said. "This has absolutely been a more active fire season than the past three years."

Alex Stuckey can be reached at 542-6755. Comment on this story on Post Talk at www.postregister.com/posttalk/.

9-4-12 Post Register

Mustang Complex and Halstead Fire grow

POST REGISTER

The two large fires in the Post Register readership continue to grow.

The Mustang Complex fire grew to nearly 222,000 acres Monday.

On Monday evening, the Lemhi County Sheriff's Office elevated evacuation levels on U.S. Highway 93 between North Fork and Hull Creek.

The area is now under a level 2 evacuation notice, which means "residents must be fully prepared to leave at a moment's notice," according to a Forest Service news release.

"This may be the only notice residents receive — every attempt will be made to advise residents and businesses as conditions change," the news release said.

On the **INTERNET**

Latest info on wildfires:

- www.idahofireinfo.blm.gov/
- www.nifc.gov/fireInfo/nfn.htm
- http://gacc.nifc.gov/egbc/dispatch/id-cic/

The fire is 16 percent contained.

Fire officials believe it will be contained Sept. 30.

The Halstead Fire reached 128,830 acres Monday night, but the threat to people and property eased.

Officials lifted the road closure on the lower two miles of Yankee Fork. Property owners and mine workers can now access Yankee Fork via Sunbeam. A forest area closure is still in effect, which prohibits entry by the general public.

Custer County has lifted the mandatory evacuation order for Yankee Fork. Residents in the area are now under a 48-hour, pre-evacuation notice.

The pilot car is still operating on state Highway 75 between Lower Stanley and Peach Creek. Motorists are asked to not stop at any of the pull-outs through this 14-mile stretch. Pilot car operations will be evaluated on a daily basis depending on fire conditions.

The fire is 7 percent contained.

Officials believe it will be contained Oct. 16.

9-5-12 Post Register

Wednesday, September 5, 2012 NATION

Wildfire smoke, ash plague Salmon

■ The air quality dropped into the 'very unhealthy' range on Tuesday.

By LAURA ZUCKERMAN
news@postregister.com

SALMON — Idaho health officials advised Salmon area residents to stay indoors Tuesday and protect themselves from air polluted with wildfire smoke.

Notice that the air in the Salmon area had dipped into the "very unhealthy" range came as a thick haze blanketed the city and small flakes of ash fell from the sky.

Dense smoke has plagued portions of Lemhi County for nearly a month, periodically triggering air-quality warnings that sometimes empty Salmon streets.

State environmental officials said wildfire activity and weather patterns suggested the air may remain at very unhealthy levels for the next several days. The warning came as Salmon hospital and clinic officials reported an increase Tuesday in the number of people seeking treatment for respiratory problems.

"We're seeing more people presenting with allergy-like symptoms exacerbated by the smoke," said CEO Jeff Hill of Steele Memorial Medical Center.

The uptick focused on patients with lung ailments, such as chronic obstructive pulmonary disease, Hill said. Symptoms ranged from breathing difficulties to congestion. Asthma sufferer Shawn Brownlee, an assistant chef at Bertram's Brewery in Salmon, said the smoke-polluted air had impaired his breathing for weeks.

"I've had to go home and hit the inhaler," he said.

Idaho Department of Health and Welfare officials recommended that residents — especially the elderly, very young and those with respiratory issues — avoid heavy work or exercising outdoors when air pollution reaches unhealthy levels.

Those exposed to smoke may experience coughing and shortness of breath, according to state health officials. People experiencing uncontrolled coughing, wheezing or choking should seek immediate medical treatment.

Such recommendations have been taken to heart in the community, where scores of residents have complained of irritated eyes, runny noses and coughing spells in recent days.

"The smoke is all people talk about all day long," Burger King employee Steven Abrams said.

On the **INTERNET**

To see a forecast of air quality conditions and see the current status, visit:

■ www.deq.idaho.gov/air-quality/monitoring/dailyreports-and-forecasts.aspx

9-7-12 Post Register

Roger Plothow / rplothow@postregister.com

The skies over Salmon were quite smoky last week.

Smoke continues to plague Salmon area

BY LAURA ZUCKERMAN
news@postregister.com

SALMON — Idaho Department of Environmental Quality officials scrambled Thursday to repair an air monitor in Salmon that stopped transmitting pollution readings Wednesday afternoon, when dense smoke from area wildfires settled over the valley.

Rensay Owen, regional manager for air quality with the DEQ office in Idaho Falls, said the malfunction was unfortunate but had no bearing on a recommendation already in place — advising Salmon-area residents stay

■ A thick haze has covered Salmon off and on since late July

SMOKE, *Continued on Page C6*

9-7-12 Post Register Continued

SMOKE

From Page C1

indoors to avoid unhealthy air.

Owen said anecdotal reports the agency received Wednesday about diminished visibility, including near white-out conditions southeast of Salmon, underscored what already was known.

"The air is in the very unhealthy range and it is not likely to improve much for any length of time any time soon," he said.

A thick haze has blanketed the area off and on since late July, when lightning ignited the Mustang Complex fire north of Salmon and the Halstead Fire near Stanley.

Air quality has steadily deteriorated, periodically triggering warnings from Idaho environmental and health officials for Lemhi County and neighboring Custer County.

Air pollution in North Fork — the center of firefighter operations for the Mustang blaze — soared into the hazardous zone Wednesday, according to monitoring by the U.S. Forest Service, Owen said.

Readings in the hazardous zone range from 301 to 500. The reading at North Fork was 370.

Bob Worrell, fire information officer, said air pollution also is a concern for fire managers, who seek to limit exposure of firefighters by rotating crews every 14 days.

The fine particles found in smoke and haze pose a health threat because they can enter lungs and even the bloodstream, according to the U.S. Environmental Protection Agency.

Studies have linked particle pollution to everything from premature death in people with heart or lung disease to aggravated asthma, according to an EPA report.

Smoky conditions Wednesday caused a medical helicopter to cancel a planned flight to Salmon to ferry a patient to a hospital in Montana.

Janet Nelson, Lemhi County emergency services coordinator, said that was the first smoke-caused cancellation this season.

Nelson said local and state officials are responding to requests for help by schools in Salmon, as well as the nursing home. Air-purifying filters are under consideration to improve conditions at those facilities.

The Salmon VA clinic, meanwhile, has ordered 95 masks for its clients and the county is offering masks to people who meet certain criteria, including elderly residents with respiratory ailments.

Those seeking masks from the county can contact Nelson at (208) 756-2815, ext. 266.

The DEQ's Owen said the air quality forecast for Saturday morning, when the Salmon Marathon gets under way, is poor.

will be expanded to allow other school professionals to compete. Also, teachers will be rewarded not only for raising student achievement, but also for taking on hard-to-fill positions or leadership roles.

Luna's budget also includes an $8.4 million increase in funding for laptops that will start going to high school students next year. The state is already spending $2.5 million to give teachers the devices this year under the reforms, which go before voters in November.

Critics succeeded last summer in getting repeal measures on the ballot, decrying the sweeping changes that limited teacher collective bargaining and introduced merit pay while phasing in laptops and making online courses a graduation requirement.

The state Department of Education and other state agencies typically submit budget proposals in September for the next fiscal year, which doesn't start until July 1.

TAPP

From Page C1

came to their apartment.

Goff's story matches Browning's. During a July 31 interview, Goff also was shown a photograph of a man, named Jeff Smith, who she identified as the man who came to their apartment in 1996, according to the petition submitted by defense attorneys.

Tapp's charges came

9-8-12 Post Register

Saturday, September 8, 2012 NATION

Firefighters struggle with Mustang, Halstead fires

POST REGISTER

The Mustang Complex Fire spread overnight Thursday and Friday morning, creating a fire line parallel to U.S. Highway 93 on the fire's east flank, fire managers reported.

Average distance from the fire to the highway was 2 miles and evacuation notices remained in effect.

The northwest corner of the fire, located in the River of No Return Wilderness, continued to advance slowly toward the northeast. The southeast corner still was moving toward the Salmon River, as well as the Incident Command Post in North Fork.

As of 10 p.m., the blaze had consumed 255,560 acres as of 10 p.m. Friday.

In the 148,021-acre Halstead Fire, crews continued to keep the flames from crossing sate Highway 75 on Friday. They worked to protect power lines, infrastructure and the community of Sunbeam, fire managers reported.

Fire managers estimated the probability of success in the battle at 80 percent.

"We had a really good day today," Salmon-Challis National Forest spokeswoman Mary Swinney said. "The good news is (the fire) is 30 percent contained."

Finally, the Flint Canyon Fire, which erupted Thursday southwest of Pocatello, was reported 80 percent contained Friday night. The fire had burned 650 acres and the cause still had not been determined.

On the **INTERNET**

Latest info on wildfires:

- www.idahofireinfo.blm.gov/
- www.nifc.gov/fireInfo/nfn.htm
- http://gacc.nifc.gov/egbc/dispatch/id-cic/

9-11-12 Post Register

Mustang Complex fire continues to grow

POST REGISTER

The Mustang Complex fire continues to grow, but luckily, the growth has been away from populated areas.

The fire reached 281,000 acres Monday with steady winds blowing the flames to the northwest toward the wilderness.

While the bulk of fire growth has been away from North Fork, the fire crested the hill above North Fork and can be seen from Highway 93.

The fire is 16 percent contained.

To date, no homes have been destroyed by the fire.

Because of rough, rocky terrain, containment of the fire will be difficult in the absence of substantial precipitation, a press release said.

Firefighters continue to be challenged by exceptionally dry fuels, rugged terrain and frequent adverse fire weather conditions.

Nearly 1,100 personal are fighting the fire.

Conditions are quieter on central Idaho's other large fire, the Halstead Fire. It is 40 percent contained and growth is slower because the fire is largely hemmed in by older blazes.

Closer to Idaho Falls, fire managers are working on the West Menan Fire, which started Sunday. It is at 434 acres. The human-caused blaze is 25 percent contained.

On the **INTERNET**

Latest info on wildfires:

- www.idahofireinfo.blm.gov/
- www.nifc.gov/fireInfo/nfn.htm
- http://gacc.nifc.gov/egbc/dispatch/id-cic/

9-11-12 Post Register

Photo courtesy of Tam Ambrose

Tam Ambrose, owner of The Village at North Fork, took this photo around 9 p.m. Sunday. The fire was burning about a half-mile downriver from the resort property.

Mustang fire leaves people living in limbo

■ Residents, ready to leave at a moment's notice, grow tired of the stressful situation.

BY LAURA ZUCKERMAN
For the Post Register

NORTH FORK — Like many of her neighbors, Scheri Blackburn is staying put.

The Mustang Complex fire sent smoke and flames across a ridge above North Fork on Monday, but in the face of evacuation orders, the retired educator decided she was going to stay on her beloved property that is north of North Fork.

INSIDE

■ Jackson, Wyo., residents warned of wildfire danger / **B4**

Predicted high winds, erratic fire behavior and concerns about access along the U.S. Highway 93 corridor north of Salmon prompt-

■ Salmon residents are being generous in helping out evacuees

MUSTANG, *Continued on Page A3*

9-11-12 Post Register Continued

MUSTANG

From Page A1

ed an evacuation order Sunday for 400 properties on a 21-mile stretch that included areas north of North Fork and Gibbonsville.

It is unclear how many people heeded the call to leave and how many, like Blackburn, stayed put.

"I'm taking it in stride," she said.

As the 281,000-acre blaze enters its seventh week, owners of properties threatened by the fire say they have occasionally been worn by worry even as they have been buoyed by offers of aid.

Blackburn last July permanently moved to the property she and her family began building in 1989. It is her home and she is ready for the battle. Still, weeks of thick smoke and uncertainties about the fire have taken their toll. Blackburn said she has had difficulties with breathing and sleeping.

"It's exhausting; I'm dragging," she said, echoing an overall sentiment in the area. Blackburn has cat carriers — she calls them "apartments" — for her three cats within arm's reach and her vehicle is primed for travel if conditions worsen. In the meantime, she hopes to stay in place like many of her neighbors.

"I love this place so much that it would break my heart if it burns," she said.

Blackburn said her sense of security has been bolstered by firefighters, members of the Lemhi County Sheriff's Office and other officials.

"I feel they have been keeping a very careful eye on things and they have kept us informed," she said.

Red Cross volunteer Tommie Palmer said just a few of the evacuated have taken advantage of private rooms, free meals and shower facilities offered at the Salmon Valley Baptist Church.

Instead of using the shelter, Palmer said evacuees are bunking with friends in Salmon. Blackburn and Palmer described an outpouring of support.

"We've seen a wonderful response from the community," said Palmer, adding that some residents have offered their homes as shelters, garages as storage facilities and pastures for displaced horses.

She said Bertram's Brewery provided food during a critical period and many other restaurants are standing by.

"All I have to do is call," Palmer said.

Lemhi County Sheriff Lynn Bowerman said late Monday afternoon that planning and actions taken to manage the fire may prevent any structures from being destroyed, but authorities will always err on the side of caution.

Lemhi County deputies and Idaho National Guard troops continue to patrol neighborhoods where residents have been asked to evacuate.

9-12-12 Post Register

Plan of attack

Salmon residents get help to cope with smoke

Laura McConnell / Courtesy of the USFS

Vehicles negotiate exiting the parking lot during 'rush hour' Friday at the Incident Command Post for the Mustang Complex fire at North Fork.

■ Air purifiers will be installed in schools and libraries as air quality continues to suffer.

By LAURA ZUCKERMAN
news@postregister.com

SALMON — State environmental and local emergency officials refined a plan Tuesday to stem the effects of smoke pollution in Salmon.

They moved closer to installing air purifiers in Salmon schools, identified so-called clean air zones and dispensed masks.

INSIDE

■ Jackson residents wary as wildfire nears resort town / C5

The Salmon area has been plagued by poor air quality for weeks as the Mustang Complex fire in the Salmon-Challis National Forest and other area wildfires have pumped smoke — and sometimes ash — into the valley.

After a weekend of mostly clear skies and fresh air, Salmon residents hunkered down Monday night as a thick haze settled across the horizon and triggered air quality readings that remained in the hazardous zone for hours.

"The air smelled and my eyes started to burn," Stephanie Orr said.

Orr and her husband unsuccessfully sought to prevent the outdoor air from seeping into their home and exposing their infant son.

Officials with the Idaho Department of Environmental Quality are tapping the expertise of agencies from the Environmental Protection Agency to Idaho National Laboratory to determine how best to create areas of clean air for Salmon residents in need, acting air quality administrator Mike Simon said.

"We're at a stage where it constitutes a kind of crisis; we're looking for anything and everything," he said.

The department is coordinating with the school district and state Bureau of Homeland Security to provide air purifying systems for the elementary and middle schools.

Carl Brown, air toxics coordinator for the department, renewed a call for residents to avoid the outdoors amid smoky conditions.

Smoke, which contains such chemicals as carbon monoxide, emits small particles that can irritate the eyes, lodge in the lungs and aggravate existing respiratory or heart conditions.

Environmental officials suggested they were breaking new ground with a pollution event that has spanned weeks.

"I don't quite know what the best term is to describe the incident, but I do know we don't want anyone exposed to that air

■ Residents are advised to keep children indoors and use masks when going out

SMOKE, Continued on Page A4

On the **INTERNET**

For air quality reports and forecasts:

■ http://tinyurl.com/8ctfgru

Latest info on wildfires:

■ www.idahofireinfo.blm.gov/

■ www.nifc.gov/fireInfo/nfn.htm

■ http://gacc.nifc.gov/egbc/dispatch/id-cic/

SMOKE

From Page A1

quality," Brown said.

Amy Berasi, developmental specialist for the Child Development Center in Salmon, which focuses on infants and toddlers requ ring speech and occupational therapy, said workers have done all they can to keep children indoors and provide them with masks when outings are necessary.

A young client was forced to go on a mild allergy medication because of the smoke, she said, and two medically fragile children are sequestered.

Janet Nelson, Lemhi County emergency services coordinator, said her office has distributed 300 masks and scores more were available free-of-charge at the Salmon Public Library.

The library and Salmon Valley Baptist Church had volunteered to act as havens of clean air for those seeking escape from the smoke.

Nelson pledged to respond to needs wherever they arise.

"We're ready to do all we can," she said.

9-13-12 Post Register

Thursday, September 13, 2012

Fire crews have productive day

■ The Halstead Fire is now 50 percent contained, making it the least dangerous it's been since it started.

By MIKE MOONEY
mmooney@postregister.com

Fire crews battling the Halstead Fire in the Salmon-Challis National Forest reached a significant milestone Wednesday — 50 percent containment.

"We're halfway there; how about that?" spokesman Bernie Pineda said.

As of 9:30 p.m. Wednesday, the fire had burned 153,995 acres but progress was continuing in the fight to keep the blaze from consuming homes and businesses.

"The fire is less threatening now than at any point (since it started)," Pineda said.

A July 27 lightning strike ignited the blaze, which was still burning about three miles northwest of Stanley late Wednesday.

Fire crews battling the Mustang Complex fire also reported a "very successful day" spokeswoman Annaleasa Winter said.

But an inversion layer, which held down the flames, continued to spread heavy smoke, Winter said.

While the 294,760-acre fire remained just 16 percent contained, firefighters were able to take advantage of Wednesday's favorable weather conditions. They completed a number of successful "burnout" operations — getting rid of dried brush and other potential fuels, Winter said.

Earlier Wednesday, the Lemhi County Sheriff's Office downgraded an evacuation warning for the Indian Creek area.

Those returning to their homes were warned to watch for possible hazards, including weakened trees, smoldering debris around property and possibly damaged power lines.

The U.S. Highway 93 corridor remained under a Level 3 (mandatory) evacuation notice from the North Fork Fire Station to Quartz Creek, just north of Gibbonsville.

In the Hull and Hughes Creek drainages, a slow backing fire continued to work toward Highway 93 on Wednesday night, Winter said.

But the favorable weather forecast may allow firefighters to use a direct-attack approach in those areas today, she said.

In the Halstead Fire, crews will continue to monitor the fire's progression today near the Loon Creek Guard Station, Diamond D Ranch, Bonanza and Marsh Creek drainage.

Additionally, structure protection will continue along state Highway 75, Yankee Fork, Sunbeam, Lost Packer Mine and Seafoam Guard Station.

"I wouldn't say we've turned the corner (on the Halstead Fire), but we're getting pretty close to that corner," Pineda said.

On the **INTERNET**

Latest info on wildfires:

- www.idahofireinfo.blm.gov/
- www.nifc.gov/fireInfo/nfn.htm
- http://gacc.nifc.gov/egbc/dispatch/id-cic/

INSIDE

- Stubborn fires continue to vex crews in Northwest / B4

9-15-12 Post Register

Halstead Fire expands, smoke still a problem

POST REGISTER

Smoke was a problem Friday for crews battling both the Mustang Complex and Halstead fires.

But no structures were lost and firefighters were hoping for improved weather conditions today and a lifting of the inversion that was responsible for all the smoke in the air.

The 159,980-acre Halstead Fire expanded Friday but it won't be known until later this morning exactly how much it grew due to the smoky conditions.

With record dry conditions and gusty winds, firefighters had their hands full keeping both fires in check, a U.S. Forest Service spokesmen said.

Custer County law enforcement reported heavy smoke in the air Friday night.

Fire managers said residents in Challis, as well as Salmon in Lemhi County, could expect to awaken today to a "pretty good blanket of haze and smoke." But it was expected to begin lifting about noon today.

The Mustang Complex fire grew to 301,825 acres Friday and was reported 18 percent contained. But no major problems were reported, other than a thick blanket of acrid smoke.

Motorists were warned to expect intermittent road closures and delays along U.S. Highway 93 this morning due to smoke from the Mustang Complex fire. Evacuation notices remain in effect.

"Visibility and smoke conditions will be closely monitored and escorts or (road) closures may occur at any time," according to a U.S. Forest Service news release.

Additionally, the Forest Service urged the public to "avoid unnecessary travel along Highway 93, as firefighter personnel and equipment will be staged roadside and in adjacent neighborhoods."

On the **INTERNET**

Latest info on wildfires:

- www.idahofireinfo.blm.gov/
- www.nifc.gov/fireInfo/nfn.htm
- http://gacc.nifc.gov/egbc/dispatch/id-cic/

9-16-12 Post Register

Hamilton and Mustang fires burn into each other

POST REGISTER

A fire has started on the east side of U.S. Highway 93 near North Fork, prompting officials to reconsider easing evacuation levels around the popular highway.

Pending suppression efforts, the change to the evacuation levels along the Highway 93 corridor may be delayed, a press release said Saturday.

Three hotshot crews and North Fork Fire District personnel are fighting the blaze, which may be an extension of the Mustang Complex Fire or a new start. It is roughly 50 to 60 acres in size.

The Mustang Complex Fire also burned into the Hamilton Fire on Saturday, adding another 18,000 acres of destroyed timber and brush, the U.S. Forest Service reported.

Early Saturday evening, however, the fire's official acreage still remained at 301,825.

Despite the merging of the two fires, which happened in a wilderness area, no new structures were threatened Saturday evening, fire information officer Arlene Perea said.

"The fire is pretty much status quo," she said.

Highway 93 was open Saturday evening, but the public was warned to expect intermittent delays from North Fork to south of Gibbonsville, due to decreased visibility from smoke.

The Halstead Fire, also burning in the Salmon-Challis National Forest had grown to 162,800 acres by Saturday evening.

The Horsethief Canyon fire near Jackson, Wyo., has burned 3,330 acres. It is 42 percent contained.

On the **INTERNET**

Latest info on wildfires:

- www.idahofireinfo.blm.gov/
- www.nifc.gov/fireInfo/nfn.htm
- http://gacc.nifc.gov/egbc/dispatch/id-cic/

9-21-12 Post Register

Mustang evacuation notices ratcheted down

POST REGISTER

Lemhi County Sheriff Lynn Bowerman continued to ratchet down evacuation orders for the Mustang Complex fire Thursday.

The affected areas included: Indian Creek, Sage Creek, a portion of the U.S. Highway 93 corridor — from North Fork to Quartz Creek (just north of Gibbonsville), Ditch Creek, Hughes Creek and Hull Creek.

Despite the reduced threat, hazards remain.

"As a precaution, persons with special needs, as well as residents with mobile property, and (under certain circumstances) pets and livestock are further warned against reoccupying the evacuation area," a news release said.

The fire had burned 332,301 acres as of 9:30 p.m. Thursday and was 20 percent contained. Full containment was projected for Sept. 30.

Removal of equipment and supplies from the fire area also is under way, the news release said, including backhauling of trash, port-a-potties, hose and water handling equipment.

On the **INTERNET**

- www.idahofireinfo.blm.gov/
- www.nifc.gov/fireInfo/nfn.htm
- http://gacc.nifc.gov/egbc/dispatch/id-cic/

Highway 93 was open Thursday, but travelers were advised to drive with headlights on and reduce speed due to increased fire traffic from backhauling operations and smoky conditions, according to the news release.

The 175,710-acre Halstead Fire remained 59 percent contained Thursday night. Full containment of the fire burning 18 miles northwest of Stanley was not expected until Oct. 16.

Fire spread was reduced and checked in Jordan Creek near Loon Creek Summit on Thursday, according to a news release.

Structure protection continued along Yankee Fork and around Lost Packer Mine, but an inversion and smoke-caused "shading" decreased the fire's behavior.

9-21-12 Post Register

Radiation threat is latest fire concern

■ Experts said the risk from burned-over contamination sites is minimal as tensions begin to flare up over the Mustang Complex fire.

By LAURA ZUCKERMAN
news@postregister.com

SALMON — State environmental officials began taking air samples near North Fork on Thursday after learning that sites contaminated by radiation either were burned over or still threatened by the Mustang Complex fire.

INSIDE
■ Evacuation notices ramped down for Mustang fire / A4

But Erick Neher, regional administrator of the Idaho Department of Environmental Quality, said the potential health threat is believed to be minimal.

A more significant and known risk to area residents, Neher said, is the dense smoke that has cloaked Salmon and surrounding communities since the fire erupted July 30.

"There may be some minor increase in background levels of radioactivity — which we're exposed to every day — but that is nothing compared to fine particulates from smoke," he said.

Earlier this week, residents near North Fork raised concerns about the sites contaminated by uranium or thorium, both radioactive elements.

Cindy Hallen, who lives just miles from a former uranium mine that underwent an EPA cleanup, said she is running an air purifier and staying indoors.

"I don't want to be sounding alarms, but we're dealing with radioactive materials," she said.

Air-quality specialists at Idaho National Laboratory said the risk of radiation exposure from wildfires burning over previously contaminated soils is low because the soil itself doesn't burn. As a result, the radiation cannot escape into the air.

Salmon-Challis National Forest Supervisor Frank Guzman did not return a telephone call Thursday seeking comment.

A Forest Service spokeswoman said she was unable to provide information on the radiological deposits or their status.

News about the radioactive materials in the fire zone came as an evacuation order was lifted for residences north of Salmon once believed to be threatened by the fire.

In a sign that tempers are fraying in the fire zone, the informal and friendly atmosphere of earlier public meetings has faded.

At a Tuesday night public meeting, there was a visible law enforcement pres-

■ The cause of a Saturday fire east of the U.S. Highway 93 fire line remains unclear

RADIATION, Continued on Page A4

RADIATION

From Page A1

ence and fire officials required those with questions to wait until the end of the meeting to line up and ask questions one at a time.

Jon Cummings, co-owner of 100 Acre Wood Lodge near North Fork, was among those who elected not to wait.

Instead, Cummings joined a letter-writing campaign directed at Gov. C.L. "Butch" Otter and other state leaders.

"We need to see this wrapped up," he said. "People aren't going to take much more of it."

Cummings and other residents are frustrated by the fire's long duration, all the smoke and the disruption to daily life.

Those frustrations seemed to peak Saturday when a spot fire burned more than 150 acres on the east side of U.S. Highway 93 — once a fire line — opposite 100 Acre Wood Lodge.

Mike Tibbetts, who lives 35 miles downriver of North Fork, said people are weary of the fire, which has damaged recreation areas, destroyed habitat and killed wildlife.

"It's been terrible," he said.

Earlier this week, Salmon-Challis Forest officials said the cause of the Highway 93 blaze, which since has been extinguished, was due to spotting — burning embers spewed from the fire's main body.

Deputy District Ranger Ingrid Drieling said Wednesday that officials could not say with certainty whether the spot fire resulted from embers from the fire's main body or burnout operations conducted in the area last week.

"We'll never really know the answer to that, but we do know it was not (arson)," she said.

Drieling acknowledged that tensions are rising in the fire zone and attributed the phenomenon to smoke.

"People are tired of the smoke," she said. "It's oppressive — more oppressive than anyone could have imagined — and people are feeling the effects of it."

9-22-12 Post Register

Photo courtesy U.S. Forest Service

Thick smoke fills the sky from the Mustang Complex fire.

Growth of Mustang Complex, Halstead fires starting to slow

POST REGISTER

The Mustang Complex Fire was reported "pretty well buttoned up" along the U.S. Highway 93 corridor Friday.

"It's looking good. We've pulled all the hose and pumps along the ... corridor," fire information officer Peter D'Aquanni said.

There was no further growth in the Hughes Creek and Hull Creek areas of the Mustang Complex fire on Friday.

Fire crews continued mop up activities in both locations to cool any hot spots near the fire's edge, according to a U.S. Forest Service news release.

The spot fire that erupted Sept. 15 east of Highway 93 had cooled significantly as of Friday due to mop up actions.

On the **INTERNET**

Latest info on wildfires:

- www.idahofireinfo.blm.gov/
- www.nifc.gov/fireInfo/nfn.htm
- http://gacc.nifc.gov/egbc/dispatch/id-cic/

As of 9 p.m. Friday, the Mustang Complex Fire had burned 332,301 acres and remained 20 percent contained. A total of 665 fire crews and support personnel were battling the blaze.

The 179,035-acre Halstead Fire was reported 62 percent contained Friday night.

Smoke continued to plague the Sawtooth Valley on Friday, a news release said, and the fire showed more activity in localized areas.

A total of 97 firefighters and support personnel are assigned to the blaze.

Fire managers were hopeful that beginning Sunday, a predicted storm would start dropping as much as three-quarters of an inch rain over the Salmon-Challis National Forest where both fires are burning.

9-23-12 Post Register

Mustang Fire 'behaves itself' Saturday

POST REGISTER

The aggressive behavior fire crews battling the Mustang Complex fire expected Saturday failed to materialize.

No one was complaining.

"We didn't get the fire activity we thought we would," fire information officer Arlene Perea said. "It's behaving itself. All (operations) are normal."

Acreage burned in the blaze held at 332,301 as of 10 p.m. Saturday, largely because fire managers haven't been able to get new infrared pictures.

Fire crews were hoping the rainfall predicted for the next several days actually materializes. A total of 664 firefighters and support personnel remain on the fire, which remained at 20 percent contained.

The Halstead Fire, meanwhile, had burned 179,055 acres as of Saturday night. The blaze was reported 62 percent contained.

In localized areas, according to a news release, the fire was more active — particularly in the Marsh and Bear Valley creeks.

Additionally, southwest winds did begin to clear some smoke from the Sawtooth Valley.

Of the 86 personnel still assigned to the blaze, 63 are firefighters.

On the **INTERNET**

Latest info on wildfires:

- www.idahofireinfo.blm.gov/
- www.nifc.gov/fireInfo/nfn.htm
- http://gacc.nifc.gov/egbc/dispatch/id-cic/

9-23-12 Post Register

A pall over Salmon

■ Smoke-weary residents in Lemhi County are worried about their health.

By LAURA ZUCKERMAN
news@postregister.com

SALMON — Pam Davis is the first to admit she's not herself.

As Lemhi County marks its eighth week of smoke, mixed with occasional ash, from the massive Mustang Complex fire, residents are growing restless.

"Every morning, it's the same thing over and over again: I wake up and look out and there's the haze. I definitely get upset. It's depressing," Davis said.

Davis, a chef at a Salmon restaurant, blames the unhealthy air for a trend she has observed: fewer people frequenting local eateries, downtown shops and the movie theater.

"For the people I do see in the public eye, they seem irritated," she said. "And then there's the people who won't go out in it. And what is this stuff doing to our health?"

Exposure to smoke, which emits noxious gases and fine particles, can irritate the eyes and throat and worsen lung and heart ailments, according to the Idaho Department of Health and Welfare

State health officials advise residents affected by smoke pollution to limit outdoor activities.

■ The long-term effect of smoke exposure are unknown

SMOKE

From Page C1

In Salmon, it's not unusual to see people wearing respirator masks while walking or cycling. The masks are considered a first line of defense but do not filter the fine particles that can lodge deep in the lungs, in some instances triggering asthma attacks and bronchitis.

The long-term health effects of smoke exposure are mostly unknown because episodes typically happen in isolated areas with small populations, according to medical experts.

Beth McDonald of North Fork doesn't need peer-reviewed studies to understand the consequences of chronic smoke exposure.

Her husband, Fred, remains on oxygen after a weeks-long battle that began late last month with double pneumonia. His Montana doctor said her husband's condition was brought on by smoke, McDonald said.

The 56-year-old manager of Lemhi Lumber takes medication for rheumatoid arthritis that leaves him vulnerable to infection.

> "It's like what happens here in the winter; People go indoors and get a little stir crazy."
>
> CHRIS RECKARDS
> Nature's Pantry clerk

But Beth McDonald said nothing could have prepared them for the sudden and severe illness that hospitalized her husband for two weeks.

"The smoke put him over the edge," she said.

More than a month ago, customers at Nature's Pantry, a Salmon health food store, began requesting remedies and supplements to clear and protect their lungs, clerk Chris Reckards said.

Some customers also are seeking natural treatments for increased irritability, Reckards said.

"It's like what happens here in the winter; People go indoors and get a little stir crazy," he said. "But this is summer and we're already confined. That will make this winter especially tough."

Russell Jones, professor of psychology at Virginia Tech, said his decades of study of how people respond to fires shows varying degrees of stress reactions, including depression and increased anxiety.

The severity of loss — including life and property — is linked to symptoms associated with post-traumatic stress disorder, he said.

"Not everyone develops that. From 60 to 80 percent of individuals in the United States experience a negative event that could lead to PTSD but only 8 to 15 percent develop it," Jones said.

Vannoy, health program manager for the Idaho Department of Health and Welfare, said state officials expect to design a future program to better respond to the smoke inundation events of the kind that has plagued Lemhi County.

"It kind of caught us all off guard," he said. "But we know it will happen again in Idaho, it's 'when,' not 'if.'"

9-26-12 Post Register

Wednesday, September 26, 2012

Crews wind down on the Mustang and Halstead fires

■ 367 firefighters and support people remain at the Mustang Complex fire.

POST REGISTER

Although both the Mustang Complex and Halstead fires continue to burn in the Salmon-Challis National Forest, firefighting efforts are winding down.

A total of 367 firefighters and support personnel remained on the scene at the Mustang Complex, which had burned 336,744 acres as of Tuesday night. It was reported 25 percent contained.

Creeping and smoldering was reported throughout the fire's area Tuesday, according to a Forest Service news release. Although clear skies allowed some warming, there was only minimal increase in fire behavior, the news release said.

In the Halstead Fire, 66 firefighters and support personnel remained on the scene. The blaze had burned 179,308 acres as of Tuesday night and was 62 percent contained.

Fire behavior reportedly moderated on localized areas of the fire.

The Indian Springs Guard Station survived an aggressive attack by the fire a couple of days ago, fire managers reported. And despite a lack of moisture, green plants are starting to return to burned areas of the fire.

On the **INTERNET**

Latest info on wildfires:

■ www.idahofireinfo.blm.gov/

■ www.nifc.gov/fireInfo/nfn.htm

■ http://gacc.nifc.gov/egbc/dispatch/id-cic/

Appendix F-2 Pinehurst-related News Articles

No local fires, but plenty of haze

Stage 1 Fire Restrictions expanded

Posted: Tuesday, August 28, 2012 10:15 am | *Updated: 11:18 am, Tue Aug 28, 2012.*

No local fires, but plenty of haze By BOBBY ATKINSON Staff writer

The smoky haze that filled the skies across Shoshone County Sunday weren't from any fires in the Silver Valley, but from the fires raging to the east, west and south. The rampant fires in the Northwest are a constant reminder of the danger fires pose to the area.

The Silver Valley has been fortunate this year to see only small fires no larger than a couple of acres, but in Washington, Oregon, Montana and central Idaho, forest fires have caused much destruction. The threat of fires spreading rises even more with Labor Day weekend as residents across the Silver Valley are likely to take to the outdoors to celebrate the symbolic last weekend of summer.

To help prevent any fires from breaking out, local wild land fire protection agencies expanded Stage 1 Fire Restrictions today at midnight. The newly expanded area now includes parts of southernmost Shoshone County until further notice.

Under Stage 1 Restrictions, it is prohibited to build a fire, campfire or stove fire except within a designated recreational site or on their own land; it is prohibited to smoke on public lands except within an enclosed vehicle, building or designated recreation site, or in an area 3 feet in diameter barren or clear of flammable materials.

There are a few exemptions from the restrictions, such as people with a permit, using fire solely by liquid petroleum, conducting activities authorized by written notice, or firefighters and personnel working on official duty.

Those who aren't in southernmost Shoshone County under Stage 1 Fire Restrictions are still under "Very High" threat according to Idaho Forest Service. With such a high threat, residents planning to venture outdoors are asked to be extremely careful and call for help if you see any fires.

http://shoshonenewspress.com/content/tncms/live/

DEQ lifts North Idaho burn ban as air quality improves

Posted: Tuesday, September 18, 2012 12:00 am | *Updated: 12:51 am, Tue Sep 18, 2012.*

DEQ lifts North Idaho burn ban as air quality improves

Idaho Department of Environmental Quality said Monday a burn ban has been lifted and air quality is improving in North Idaho. However, that could change.

DEQ said that wildfire smoke has dispersed, but stagnant conditions will persist through the work week.

"The high pressure system over the area will continue to strengthen and bring dry and mainly clear conditions," DEQ said in a press release. "Smoke from wildfires around the western U.S. can move into the area and degrade air quality."

Anyone planning open burning should check with their local fire district first. Several districts still have fire safety burn bans in place.

Air quality is forecast to be in the good range for most of North Idaho today, DEQ said.

On Friday, it was moderate in Kootenai County and the Silver Valley. It was "unhealthy for sensitive groups" in St. Maries.

Smoke from Eastern Washington wildfires will continue to affect communities near the fires over the next several days. Some light southwesterly winds will develop today, but they may not be strong enough to blow air pollution away.

Regional fires send air quality south

Posted: Friday, September 21, 2012 10:19 am

Regional fires send air quality south **By KELSEY SAINTZ**

Taking in the Silver Valley's beautiful mountain views has been more difficult than usual lately due to hazy, lingering dirty air.

"It's kind of pouring in from all directions," said Mark Boyle, the Department of Environmental Quality's air quality manager, especially from wildfires in central Washington, and somewhat from southern Idaho.

As of press time, there were eight fires burning in Idaho totaling about 800,000 acres. Washington had six fires at about 66,000 acres. Up-to-date information on wildfires can be found online at the National Interagency Fire Center's website, www.nifc.gov.

Due to the low air quality, there is an open outdoor burning and woodstove ban effective immediately in the counties of Shoshone, Kootenai, Bonner and Benewah.

As of Thursday afternoon, the DEQ has rated the air to be unhealthy for sensitive groups, such as young children, the elderly and people with heart or lung disease. It can cause various symptoms, such as shortness of breath, tightness in chest, coughing or other minor irritations. Some people are more susceptible than others. Sensitive people should avoid prolonged or heavy exertion outdoors.

"The way things look, it's going to last probably into the weekend," Boyle said. " ... We're monitoring the situation and hopefully things will change for us."

However, expect periods of smoke, then a day of clearing with the high possibility of it returning.

http://shoshonenewspress.com/content/tncms/live/

Panhandle fire danger remains 'very high'

Posted: Friday, September 21, 2012 12:00 am | *Updated: 1:18 am, Fri Sep 21, 2012.*

Panhandle fire danger remains 'very high'

COEUR d'ALENE - A lack of rain and persistent warm and dry weather across the Idaho Panhandle are combining to keep much of the forest in "very high" fire danger.

Forest visitors are being urged to exercise extreme caution with campfires, cigarettes and other sources of ignition as they venture into the woods for hunting, camping, firewood gathering and other recreational pursuits.

"We are very concerned about the dry conditions throughout the forest and the occurrence of human-caused fires," said Forest Supervisor Mary Farnsworth. "We need the public's help in preventing wildfire."

Current long-term weather outlooks indicate no break in the weather pattern in the foreseeable future, which means the fire danger is likely to remain very high for at least a few more weeks.

During this year's fire season, firefighters across the Idaho Panhandle National Forests have suppressed all of the 12 human-caused and 42 lightning-caused fires.

"However, in these conditions it only takes one smoldering campfire or cigarette carelessly tossed out a window to cause the kind of devastating wildfires we have witnessed throughout the West this year," according to a press release.

No breathing room

Haze leads to burn ban, bad-air advisories

SHAWN GUST/Press

No breathing room

SHAWN GUST/Press Carlos Venzor, of Coeur d'Alene, rides on the Centennial Trail Thursday as hazy skies diffuse the landscape around him.

Posted: Friday, September 21, 2012 12:00 am | *Updated: 1:18 am, Fri Sep 21, 2012.*

No breathing room **By ALECIA WARREN/Staff writer**

As smoke from southern wildfires continues to clog the Panhandle skies, most of the five northern counties have been issued air quality advisories and Stage One burn bans through this afternoon.

"Some of it's a little surprising," said Mark Boyle with the Department of Environmental Quality, about the wildfires' pollution. "The lower level winds migrate it up here."

Kootenai County, still hosting patches of gray overhead on Thursday afternoon, has a Moderate air quality forecast and a ban against any outdoor burning today, according to the DEQ.

Areas of Benewah and Shoshone counties have the same burn ban, and an air quality status of Unhealthy for Sensitive Groups. Bonner County has the burn ban and a Moderate air quality advisory.

Poor atmospheric mixing is expected throughout the day, Boyle confirmed. "Any ground-level smoke generated from wildfires is likely to persist at the low levels, at or just above our breathing level," he said.

Kootenai County's air quality forecast advises that individuals unusually sensitive to smoke should reduce prolonged or heavy exertion outdoors.

The Unhealthy for Sensitive Groups status in other areas recommends that the elderly, children and anyone with heart or lung disease should reduce long or active outdoor exercise. "It's pretty common sense right now," Boyle said. "If you are feeling impacts, get ahold of your healthcare provider. Don't delay."

Prestige Senior Living in Coeur d'Alene has taken the precautionary route, said RN Debbie Brouillette. Staff ensures residents on oxygen or with other health issues aren't going out or sitting outside for long periods of time, Brouillette said. "For an extended length of time, you get more concerned," she said of the smoky haze. "When it's just a day here or there with the field burning, that's one thing, but now I'm getting more concerned."

The burn ban could have benefits beyond air quality. Glenn Lauper with the Coeur d'Alene Fire Department said there haven't been any notable fires in the region - yet. But "historically, October is the month we go into pretty extreme (fire hazard) if we don't get any moisture," Lauper said, adding that the district is meeting with organizations about emergency preparedness.

The air quality advisories and the burn ban are in effect through 4:30 p.m.

DEQ expects pollutants to build through the weekend, as low level winds herd the smoke back toward North Idaho and Eastern Washington. Boyle said the wildfire smoke has been lingering in North Idaho since about Sept. 14.

"If you're susceptible to the pollutants, they're likely to come and go over the next few days," Boyle said.

Haze leads to burn ban, air advisories

Posted: Saturday, September 22, 2012 10:00 am

Haze leads to burn ban, air advisories By CAMERON RASMUSSON and ALECIA WARREN Staff writers

SANDPOINT — Despite concerns about the the smoky air, the Idaho Department of Environmental Quality hasn't yet upgraded Sandpoint's status.

With sporting events being canceled in Washington and Montana, local athletic organization associates are keeping a close eye on air quality reports. However, DEQ still places Sandpoint's air quality at the moderate level.

As of 4:26 p.m. on Friday, the department assigned the region an air quality index of 51. For comparison, Treasure Valley currently bears a status of "unhealthy for sensitive groups" and has an air quality index of 115. On DEQ's scale of air quality, conditions degrade from good to moderate before progressing to unhealthy for sensitive groups, unhealthy, very unhealthy and hazardous.

Similar air quality advisories and Stage One burn bans were in effect in Kootenai, Shoshone, Boundary and Benewah counties. "Some of it's a little surprising," said Mark Boyle with the Department of Environmental Quality, about the wildfires' pollution. "The lower level winds migrate it up here."

Sandpoint also has a particulate matter level of 2.5. That means that any particles in the air are 2.5 microns or less in size. As one might expect, these fine particles usually exist when environmental conditions create smoke or haze.

According to the DEQ's air quality forecast, wildfire smoke still lingers throughout the five northern counties. There are no recommended limitations for short spans of physical activity in moderate conditions, according to government guidelines. However, those with respiratory conditions or other disorders should exhibit some caution when undertaking strenuous or prolonged activities.

"It's pretty common sense right now," Boyle said. "If you are feeling impacts, get a hold of your healthcare provider. Don't delay."

The burn ban could have benefits beyond air quality. Glenn Lauper with the Coeur d'Alene Fire Department said there haven't been any notable fires in the region — yet. But "historically, October is the month we go into pretty extreme (fire hazard) if we don't get any moisture," Lauper said, adding that the district is meeting with organizations about emergency preparedness.

The air quality advisories and the burn ban are in effect through 4:30 p.m.

DEQ expects pollutants to build through the weekend, as low level winds herd the smoke back toward North Idaho and Eastern Washington. Boyle said the wildfire smoke has been lingering in North Idaho since about Sept. 14.

"If you're susceptible to the pollutants, they're likely to come and go over the next few days," Boyle said.

Stuck in smoke

Posted: Tuesday, September 25, 2012 12:00 am | *Updated: 8:36 am, Tue Sep 25, 2012.*

Stuck in smoke **By BRIAN WALKER/Staff writer**

We're stuck in a "pot dome" and Ma Nature won't lift the lid on us and the wildfire smoke for a while, says Cliff Harris. Without much precipitation expected for the next week, the climatologist said it may be next week at the earliest before the area is completely relieved of the smoke.

"We need to have a storm, and I think we'll get one in early October," Harris said. "We're just not there yet."

Harris said it could be worse. We could still be in the 80s and there could be high winds, fanning the flames of the regional wildfires. Highs in the mid-70s and lows in the 40s are in the forecast.

Ralph Paul, airshed coordinator with the Idaho Department of Environmental Quality, said the air quality throughout North Idaho remains "Moderate" - one stage above "Unhealthy for Sensitive Groups." "The air quality hasn't changed much since things got bad on Friday," Paul said. "It's been consistently bad because of the high pressure over the area." Paul said the smoke in North Idaho can't be pinpointed on any particular wildfire over another, but just wildfires throughout the region in general.

People sensitive to poor air quality should consider reducing prolonged or heavy exertion outdoors.

A burn ban remained in effect on Monday and conditions will be re-evaluated today, Paul said.

Harris said this area has only had 0.23 of an inch of rain since July 20, making it even drier than the 0.37 of an inch recorded during the Dust Bowl of 1934. The dry spell comes on the heels on the wettest spring on record.

Kenneth Wakefield, an asthma and allergy specialist at Asthma and Allergy of Idaho in Coeur d'Alene, said more patients are complaining about breathing, eye or nasal issues due to the smoke, but they're not necessarily coming in specifically for those reasons.

"What I'm mostly hearing from people is that they have scratchy throats or eyes," Wakefield said. "You can't prove that it's from the bad air quality, but I suspect it is."

Wakefield said many people like to keep their windows open at night this time of year, but they may have to stop that or reduce outdoor exercising if their breathing is affected. He said he may also increase asthma medication dosages for some patients.

"Other than that, there's not a lot you can do," he said.

Most other areas of the region have worse air quality than the Panhandle.

Some areas in Central Washington on Monday ranged from "Unhealthy" to "Hazardous." In most of eastern Washington, the air was "Unhealthy for Sensitive Groups."

In the Orofino area, some residents are wearing dust masks to help with breathing.

Bone dry: fire danger still high

Posted: Thursday, September 27, 2012 9:45 am | *Updated: 10:50 am, Thu Sep 27, 2012.*

Bone dry: fire danger still high By BOBBY ATKINSON | **0 comments**

The Silver Valley's wildfire threat and smoky, hazy air look as though they will be sticking around for the foreseeable future or until the dry, warm conditions finally make way for some rain.

The smoky haze has been plaguing the Silver Valley for weeks now, and with so many fires still raging across the region — six across Idaho, seven in Washington and four in Montana — the air quality probably won't be improving anytime soon.

Ralph Paul of the Idaho Department of Environmental Quality, which has been extending burn bans daily, said such poor air quality is unusual for this time of the year and burn bans typically are more common in the winter. "We've had some burn bans go into effect in winters, but it's not very common this time of the year," Paul said.

Paul added that this year marks some of the worst lingering air quality in recent memory. The burn ban would be lifted just as soon as air quality shows some kind of improvement, but with so many fires still burning out of control across the Northwest, it's very difficult to make a guess as to when the air might clear up.

U.S. Forest Service public affairs officer Jason Kirchner said that while the air quality and conditions across Shoshone County have been very poor this year and lasting longer than in years past, the Silver Valley has been fortunate this year to have not had any wildfires break out in such a forested area.

"[Shoshone County has] been very lucky so far," Kirchner said. "There have only been small fires — no bigger than an acre. But all it takes is one fire to get out of control and we have a disaster on our hands with such dry conditions."

Kirchner said the fire threat will continue to hang around "high" to "very high" for the time being, at least until the weather decides it's fall and some rain returns to the Silver Valley. With the conditions, the Forest Service has law enforcement patrolling in the area to watch out for fires with many people hitting the forest for hunting season.

Kirchner added that residents across Shoshone County need to be aware of the conditions and should always report fires of any size to Forest Service.

http://shoshonenewspress.com/content/tncms/live/

Appendix G: Legal Notification of Public Comment Period

This document was available a 30-day public comment period from November 5, 2013 – December 5, 2013. Legal notification of the public comment period was included in the local newspapers for Pinehurst and Salmon, Idaho; as well as the Idaho Statesman.

AFFIDAVIT OF PUBLICATION

STATE OF IDAHO, County of Shoshone } ss.

Jen Jeffers being first duly sworn upon oath deposes and says:

1. I am now and at all times hereinafter mentioned was a citizen of the United States, resident of the State of Idaho, over the age of twenty-one years and not a party of the above entitled action.

2. I am now and at all times hereinafter mentioned was the printer (principal clerk) of the "Shoshone News Press", a newspaper printed and published daily except Sunday and Monday in Kellogg, Shoshone County, Idaho, and having a general circulation in said county.

3. The Legal Notice

of which the annexed is a printed copy, was published in the regular Tuesday issue of said newspaper for One ~~consecutive~~ Day commencing on the 5 day of November, 2013, and such publication was made as often during said period as said Daily newspaper was regularly issued.

4. That said newspaper has been continuously and uninterruptedly published in said Shoshone County, during a period of more then seventy-eight consecutive weeks immediately prior to the first publication of said notice Jen Jeffers.

On this 5 day of November in the year of 2013, before me, a Notary Public, personally appeared Jen Jeffers, known or identified to me to be the person whose name subscribed to the within instrument, and being by me first duly sworn, declared that the statements therein are true, and acknowledged to me that he executed the same.

Katrina George

Notary Public for the State of Idaho residing in Coeur d'Alene, Idaho

KATRINA GEORGE NOTARY PUBLIC STATE OF IDAHO

MY CO 17

NOTICE OF 30-DAY PUBLIC COMMENT PERIOD ON REQUEST TO EXCLUDE SEVERAL DAYS OF AIR QUALITY MONITORING DATA FROM PM2.5 CALCULATIONS FOR SALMON AND PINEHURST PROPOSED ACTION: The Department of Environmental Quality (DEQ) is requesting concurrence from the US Environmental Protection Agency to exclude high concentrations of fine particulate matter (PM2.5) recorded during the 2012 wildfire season in Pinehurst and Salmon from calculations used to designate attainment status with the annual National Ambient Air Quality Standard (NAAQS) for PM2.5. The report "Request for EPA Concurrence as Exceptional Events for the 2012 Wildfire Impacts on PM2.5 Monitor Values at Salmon and Pinehurst Idaho" demonstrates applicability of the federal Exceptional Events Rule (40 CFR 50 and 51 [72 FR 13560]) promulgated on March 22, 2007, due to natural causes. The rule allows states to flag air quality data as exceptional and exclude those data from use in determining compliance with the NAAQS due to events that are not reasonably controllable or preventable – pending EPA concurrence. The exclusion is necessary to allow Pinehurst and Salmon to be designated as attainment for the annual NAAQS for PM2.5. The 30-day comment period begins November 5, 2013, and concludes December 5, 2013. AVAILABILITY OF MATERIALS: The document is available for public review on the DEQ's website at www.deq.idaho.gov/public-comment-opportunities and upon request to the Department's State Office in Boise. SUBMISSION OF WRITTEN COMMENTS–ASSISTANCE ON TECHNICAL QUESTIONS: Anyone may submit written comments regarding this proposed request on DEQ's website or by mail or email to Tessa Stevens, Department of Environmental Quality, 1410 N. Hilton, Boise, ID 83706, tessa.stevens@deq.idaho.gov. For technical assistance or questions concerning this proposal, contact Mary Anderson at mary.anderson@deq.idaho.gov or (208) 373-0202. When sending comments or requesting information, please reference the plan title listed above. Comments should focus on whether Idaho has properly characterized the demonstration that the days impacted by the 2012 wildfire season should be excluded as exceptional events. All written comments concerning this proposal must be received on or before 5 p.m., MST, December 5, 2013. Legal 458

NOTICE OF 30-DAY PUBLIC COMMENT PERIOD ON REQUEST TO EXCLUDE SEVERAL DAYS OF AIR QUALITY MONITORING DATA FROM PM2.5 CALCULATIONS FOR SALMON AND PINEHURST

PROPOSED ACTION: The Department of Environmental Quality (DEQ) is requesting concurrence from the US Environmental Protection Agency to exclude high concentrations of fine particulate matter (PM2.5) recorded during the 2012 wildfire season in Pinehurst and Salmon from calculations used to designate attainment status with the annual National Ambient Air Quality Standard (NAAQS) for PM2.5.

The report "Request for EPA Concurrence as Exceptional Events for the 2012 Wildfire Impacts on PM2.5 Monitor Values at Salmon and Pinehurst Idaho" demonstrates applicability of the federal Exceptional Events Rule (40 CFR 50 and 51 [72 FR 13560]) promulgated on March 22, 2007, due to natural causes. The rule allows states to flag air quality data as exceptional and exclude those data from use in determining compliance with the NAAQS due to events that are not reasonably controllable or preventable – pending EPA concurrence.

The exclusion is necessary to allow Pinehurst and Salmon to be designated as attainment for the annual NAAQS for PM2.5.

The 30-day comment period begins November 5, 2013, and concludes December 5, 2013.

AVAILABILITY OF MATERIALS: The document will available for public review on the DEQ's website at www.deq.idaho.gov/public-comment-opportunities and upon request to the Department's State Office in Boise on November 5, 2013.

SUBMISSION OF WRITTEN COMMENTS–ASSISTANCE ON TECHNICAL QUESTIONS: Anyone may submit written comments regarding this proposed request on DEQ's website or by mail or email to Tessa Stevens, Department of Environmental Quality, 1410 N. Hilton, Boise, ID 83706, tessa.stevens@deq.idaho.gov. For technical assistance or questions concerning this proposal, contact Mary Anderson at mary.anderson@deq.idaho.gov or (208) 373-0202.

When sending comments or requesting information, please reference the plan title listed above. Comments should focus on whether Idaho has properly characterized the demonstration that the

SKT

Affidavit of Publication

STATE OF IDAHO } ss.
County of Lemhi }

RICKY G. HODGES being first duly sworn, deposes and says he is one of the publishers (printers) of The Recorder Herald, a newspaper published weekly at Salmon, Lemhi County, Idaho, and of general circulation therein. That the **AIR QUALITY - SALMON AND PINEHURST**, a true printed copy of which is attached to the margin hereof, has been and was correctly printed and published in the regular and entire issue of every number of said newspaper and not in any supplement thereof or thereto for **ONE (1)** consecutive issue(s), commencing with the issue dated **10-31-2013** and ending with the issue dated **10-31-2013.**

STATE OF IDAHO } ss.
County of Lemhi }

On this **1st day of November** in this year of 2013 before me, A Notary Public, personally appeared RICKY G. HODGES, known or identified to me to be the person whose name subscribed to the within instrument, and being by me first duly sworn, declared that the statements therein are true, and acknowledged to me that he executed the same.

Sheila Johnson
Notary Public for Idaho

Residing At Salmon, Idaho

My Commission expires: 01-16-2019

SHEILA JOHNSON NOTARY PUBLIC STATE OF IDAHO

Publication Fee $79.88

Idaho Statesman
The Newspaper of the Treasure Valley
IDAHOSTATESMAN.COM
PO Box 40, Boise, ID 83707-0040

RECEIVED
NOV 08 2013
DEPARTMENT OF ENVIRONMENTAL QUALITY
STATE AO PROGRAM

LEGAL PROOF OF PUBLICATION

Account #	Ad Number	Identification	PO	Amount	Cols	Lines
263916	0000751555	LEGAL NOTICE NOTICE OF 30-DAY PUBL	WILDFIRE EE	$88.32	2	47

Attention:

IDAHO DEPT OF ENVIRONMENTAL QUALITY
1410 N HILTON ST
BOISE, ID 837061253

LEGAL NOTICE
NOTICE OF 30-DAY PUBLIC COMMENT PERIOD ON REQUEST TO EXCLUDE SEVERAL DAYS OF AIR QUALITY MONITORING DATA FROM PM2.5 CALCULATIONS FOR SALMON AND PINEHURST

PROPOSED ACTION: The Department of Environmental Quality (DEQ) is requesting concurrence from the US Environmental Protection Agency to exclude high concentrations of fine particulate matter (PM2.5) recorded during the 2012 wildfire season in Pinehurst and Salmon from calculations used to designate attainment status with the annual National Ambient Air Quality Standard (NAAQS) for PM2.5.

The report "Request for EPA Concurrence as Exceptional Events for the 2012 Wildfire Impacts on PM2.5 Monitor Values at Salmon and Pinehurst Idaho" demonstrates applicability of the federal Exceptional Events Rule (40 CFR 50 and 51 (72 FR 13560)) promulgated on March 22, 2007, due to natural causes. The rule allows states to flag air quality data as exceptional and exclude those data from use in determining compliance with the NAAQS due to events that are not reasonably controllable or preventable - pending EPA concurrence.

The exclusion is necessary to allow Pinehurst and Salmon to be designated as attainment for the annual NAAQS for PM2.5.

The 30-day comment period begins November 5, 2013, and concludes December 5, 2013.

AVAILABILITY OF MATERIALS: The document is available for public review on the DEQ's website at www.deq.idaho.gov/public-comment-opportunities and upon request to the Department's State Office in Boise.

SUBMISSION OF WRITTEN COMMENTS-ASSISTANCE ON TECHNICAL QUESTIONS: Anyone may submit written comments regarding this proposed request on DEQ's website or by mail or email to Tessa Stevens, Department of Environmental Quality, 1410 N. Hilton, Boise, ID 83706, tessa.stevens@deq.idaho.gov. For technical assistance or questions concerning this proposal, contact Mary Anderson at mary.anderson@deq.idaho.gov or (208) 373-0202.

When sending comments or requesting information, please reference the plan title listed above. Comments should focus on whether Idaho has properly characterized the demonstration that the days impacted by the 2012 wildfire season should be excluded as exceptional events.

All written comments concerning this proposal must be received on or before 5 p.m., MST, December 5, 2013.

Pub. Nov. 5, 2013

0000751555-01

JANICE HILDRETH, being duly sworn, deposes and says: That she is the Principal Clerk of The Idaho Statesman, a daily newspaper printed and published at Boise, Ada County, State of Idaho, and having a general circulation therein, and which said newspaper has been continuously and uninterruptedly published in said County during a period of twelve consecutive months prior to the first publication of the notice, a copy of which is attached hereto: that said notice was published in The Idaho Statesman, in conformity with Section 60-108, Idaho Code, as amended, for:

1 Insertions

Beginning issue of: 11/05/2013

Ending issue of: 11/05/2013

Janice Hildreth
(Legals Clerk)

STATE OF IDAHO)
.SS
COUNTY OF ADA)

On this 5th day of November in the year of 2013 before me, a Notary Public, personally appeared before me Janice Hildreth known or identified to me to be the person whose name subscribed to the within instrument, and being by first duly sworn, declared that the statements therein are true, and acknowledged to me that she executed the same.

Heather Harradine
Notary Public FOR Idaho
Residing at: Boise, Idaho

My Commission expires: 2/08/2014

HEATHER HARRADINE NOTARY PUBLIC STATE OF IDAHO