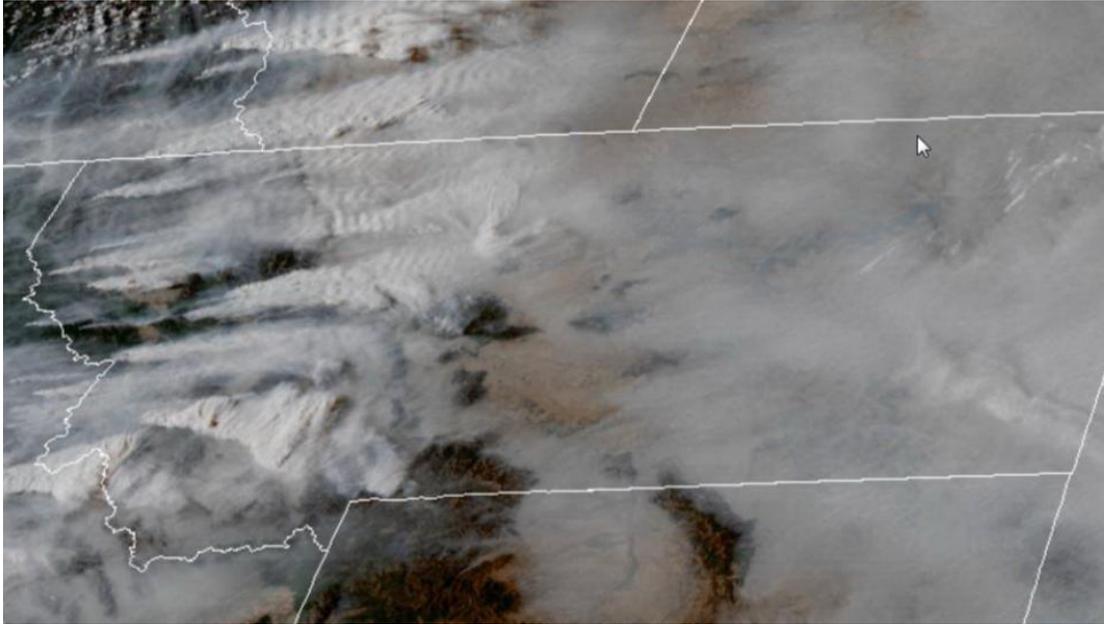


# PM<sub>10</sub> 2017 Exceptional Events in Montana due to Wildfires



[Source: CIRA and NOAA. These data are preliminary and not operational.](#)

**Prepared by:**  
Montana DEQ  
May 2018



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# 1. Summary

Montana DEQ is requesting the following wildfire exceptional events dates be considered for concurrence. This request is due to an effort to redesignate PM<sub>10</sub> nonattainment areas in the state. Wildfire impacts leading to 24-hour values above 98 µg/m<sup>3</sup> are included in this package to allow for the submission of a limited maintenance plan (LMP) if all other criteria are met. The LMP policy memo states that data greater than 98 µg/m<sup>3</sup> that has been impacted by exceptional or natural events could be discounted in design value calculations consistent with policies in place in 2001<sup>1</sup>. With the promulgation of the exceptional events rule in 2001, a subsequent policy memo<sup>2</sup> stated that

“In determining eligibility for the limited maintenance plan option EPA will treat 24-hour average air quality data between 98 µg/m<sup>3</sup> and 155 µg/m<sup>3</sup> in a manner analogous to the treatment of exceedance data under the exceptional events rule, provided the impacted data meet the general definition and criteria for exceptional events (natural event, or exceptional event that is not reasonably controllable or expected to recur).”

Table 1 summarized the PM<sub>10</sub> data that DEQ would like EPA to evaluate for the exclusion from design value calculations in Montana PM<sub>10</sub> nonattainment areas for the purposes of determining eligibility for the PM<sub>10</sub> LMP option.

*Table 1. 2017 PM<sub>10</sub> Summary of Data to be Evaluated.*

| Date         | Site            | AQS #              | 24-hour PM <sub>10</sub> (µg/m <sup>3</sup> ) |
|--------------|-----------------|--------------------|---|
| 12-Aug       | Missoula        | 30-063-0024        | 105   |
| 23-Aug       | Missoula        | 30-063-0024        | 129   |
| 29-Aug       | Missoula        | 30-063-0024        | 105   |
| 30-Aug       | Missoula        | 30-063-0024        | 108   |
| 2-Sep        | Butte           | 30-093-0005        | 111   |
| 3-Sep        | Butte           | 30-093-0005        | 144   |
| <b>4-Sep</b> | <b>Missoula</b> | <b>30-063-0024</b> | <b>233</b>                                    |

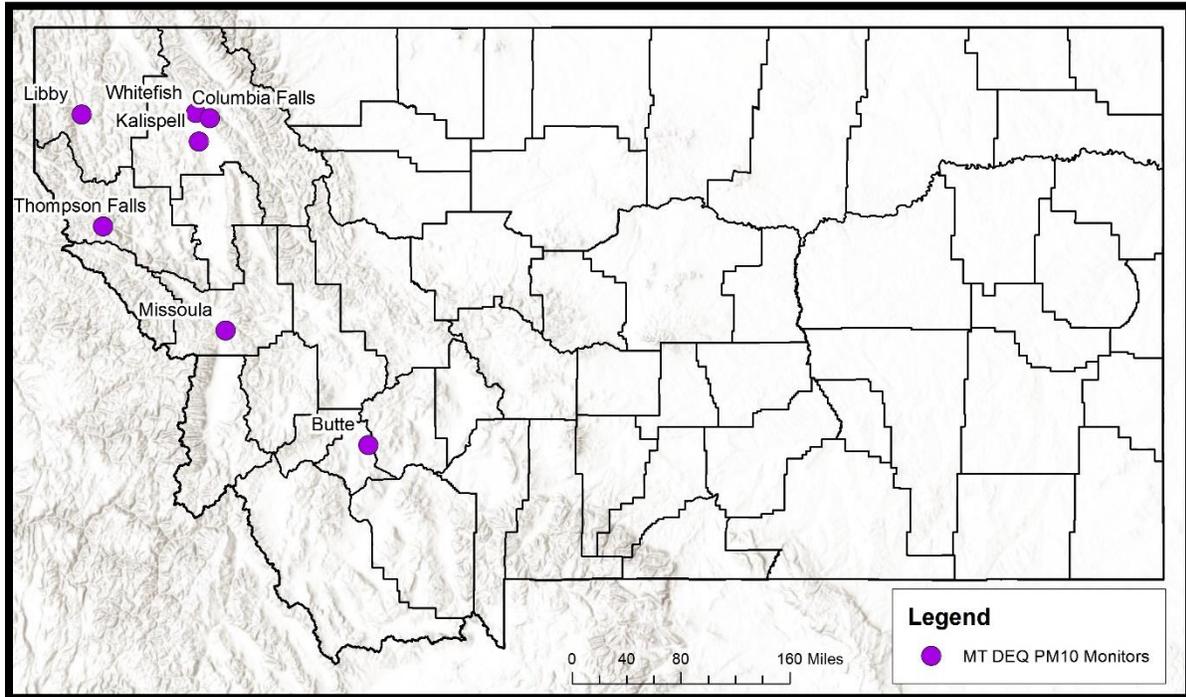
<sup>1</sup> Limited Maintenance Plan Option for Moderate PM<sub>10</sub> Nonattainment Areas, US EPA, US EPA, Lydia Wegman, Director, AQSSD, OAQPS, August 21, 2001, <https://www.epa.gov/sites/production/files/2016-06/documents/2001lmp-pm10.pdf>

<sup>2</sup> Update on Application of the Exceptional Events Rule to the PM<sub>10</sub> Limited Maintenance Plan Option, US EPA, William Harnett, Director, AQPD, OAQPS, May 9, 2009, [https://www3.epa.gov/ttn/naaqs/aqmguide/collection/cp2/20090507\\_harnett\\_lmp\\_pm10\\_update\\_exc\\_event.pdf](https://www3.epa.gov/ttn/naaqs/aqmguide/collection/cp2/20090507_harnett_lmp_pm10_update_exc_event.pdf)

| Date   | Site                  | AQS #              | 24-hour PM <sub>10</sub> (µg/m <sup>3</sup> ) |
|--------|-----------------------|--------------------|---|
|        | <b>Whitefish</b>      | <b>30-029-0009</b> | <b>153</b>                                    |
| 5-Sep  | Kalispell             | 30-029-0047        | 131   |
|        | Libby                 | 30-053-0018        | 104   |
|        | Missoula              | 30-063-0024        | 107   |
|        | Whitefish             | 30-029-0009        | 122   |
| 6-Sep  | <b>Columbia Falls</b> | <b>30-029-0049</b> | <b>182</b>                                    |
|        | <b>Kalispell</b>      | <b>30-029-0047</b> | <b>171</b>                                    |
|        | Libby                 | 30-053-0018        | 101   |
|        | <b>Missoula</b>       | <b>30-063-0024</b> | <b>158</b>                                    |
|        | <b>Thompson Falls</b> | <b>30-089-0007</b> | <b>251</b>                                    |
|        | Whitefish             | 30-029-0009        | 143   |
| 7-Sep  | <b>Columbia Falls</b> | <b>30-029-0049</b> | <b>228</b>                                    |
|        | <b>Kalispell</b>      | <b>30-029-0047</b> | <b>194</b>                                    |
|        | Libby                 | 30-053-0018        | 134   |
|        | <b>Missoula</b>       | <b>30-063-0024</b> | <b>201</b>                                    |
|        | <b>Thompson Falls</b> | <b>30-089-0007</b> | <b>231</b>                                    |
|        | <b>Whitefish</b>      | <b>30-029-0009</b> | <b>212</b>                                    |
| 8-Sep  | <b>Columbia Falls</b> | <b>30-029-0049</b> | <b>225</b>                                    |
|        | <b>Kalispell</b>      | <b>30-029-0047</b> | <b>228</b>                                    |
|        | <b>Libby</b>          | <b>30-053-0018</b> | <b>158</b>                                    |
|        | <b>Missoula</b>       | <b>30-063-0024</b> | <b>193</b>                                    |
|        | <b>Thompson Falls</b> | <b>30-089-0007</b> | <b>249</b>                                    |
|        | <b>Whitefish</b>      | <b>30-029-0009</b> | <b>215</b>                                    |
| 9-Sep  | Columbia Falls        | 30-029-0049        | 126   |
|        | <b>Kalispell</b>      | <b>30-029-0047</b> | <b>154</b>                                    |
|        | Missoula              | 30-063-0024        | 103   |
|        | Thompson Falls        | 30-089-0007        | 100   |
|        | Whitefish             | 30-029-0009        | 130   |
| 13-Sep | Columbia Falls        | 30-029-0049        | 102   |
|        | <b>Kalispell</b>      | <b>30-029-0047</b> | <b>158</b>                                    |

All of the locations included in this submission are located in western Montana valleys. Three monitors (Whitefish, Columbia Falls, and Kalispell) are in the Flathead Valley. All three locations are roughly 3,000 ft above seas level, with steep mountains to the east (Glacier National Park and the Swan Mountain Range) and the Salish Mountain Range to the west. The large Flathead lake sits at the southern end of the valley. Libby sits in a small valley surrounded by mountains in the northwest corner of the state. The elevation in Libby is 2,100 feet above sea level. Thompson Falls sits along the Highway 200 corridor with tall mountains to the north and south.

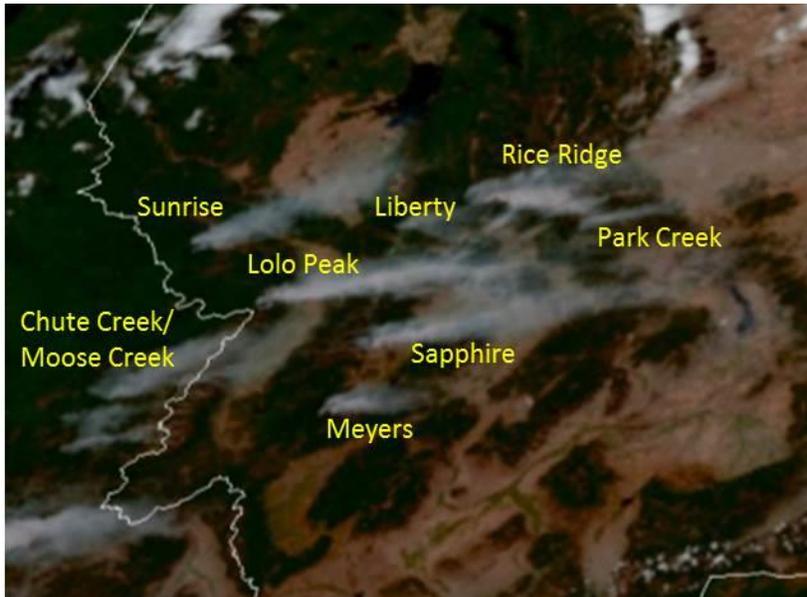
The elevation of Thompson Falls is 2,500 ft above sea level. Missoula is in a mountain valley along the Clark Fork River with an elevation of 3,200 ft. Butte sits in a bowl surrounded by mountains at 5,500 feet. The relative location of the monitors in Montana are shown below.



The 2017 wildfire season was defined by numerous fires in Montana causing significant smoke impacts to nearby communities. In addition to the high levels of smoke near active fires, many red flag days caused smoke from these fires to fan out across the state, impacting central and eastern Montana as well. Towards the end of the season, fire activity in the Pacific Northwest picked up, sending additional smoke into Montana. Numerous strong high pressure ridges acted to trap smoke over Montana for days at a time, bringing little relief throughout August and the start of September. The following sections of this document walk through the conceptual model that will be used to demonstrate compliance with the exceptional event rule, a comparison to historical data, evidence of a clear causal relationship. In addition, there is an overview of the major fires in Montana that contributed to the numerous exceptional events. Example satellite images are included below to show the scale of the smoke impacts to western Montana. Similar satellite images are included in this document for all the impacted days.

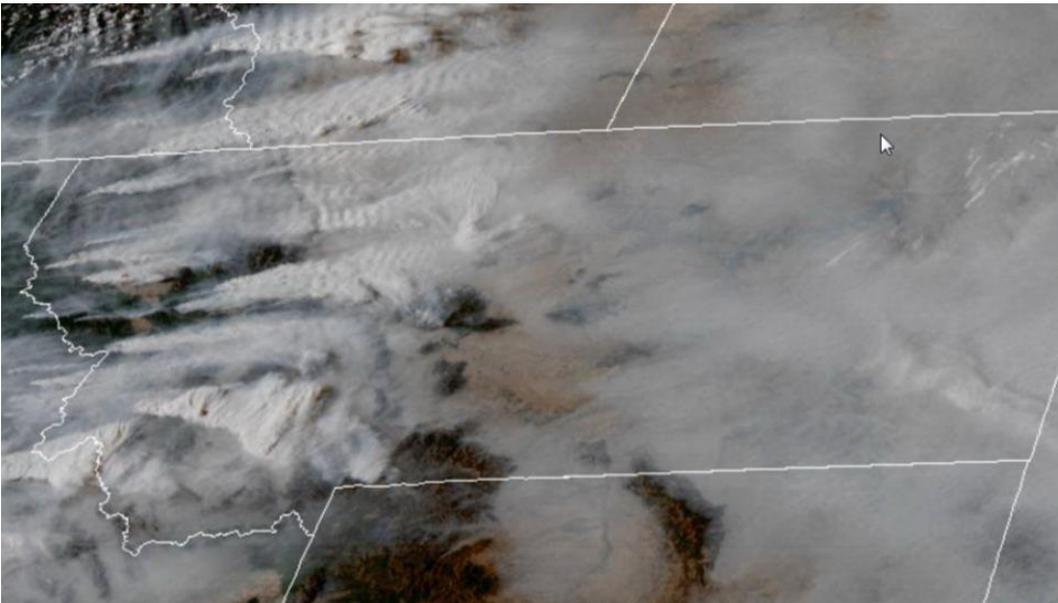
Individual smoke plumes can be seen on multiple days, below is an example of when the plumes were starting to ramp up in intensity.

Figure 1. Individual smoke plumes from August 18, 2017 labeled over southwest Montana.



Below shows the satellite in the late afternoon when the fires are at peak intensity. The plumes extended far into Montana, with smoke from the Pacific Northwest also impacting the area. Somewhat amazingly, there are almost no clouds in the picture below, with smoke from fires fanning out across the state.

Figure 2. Smoke from numerous fires impacting Montana on September 2, 2017.

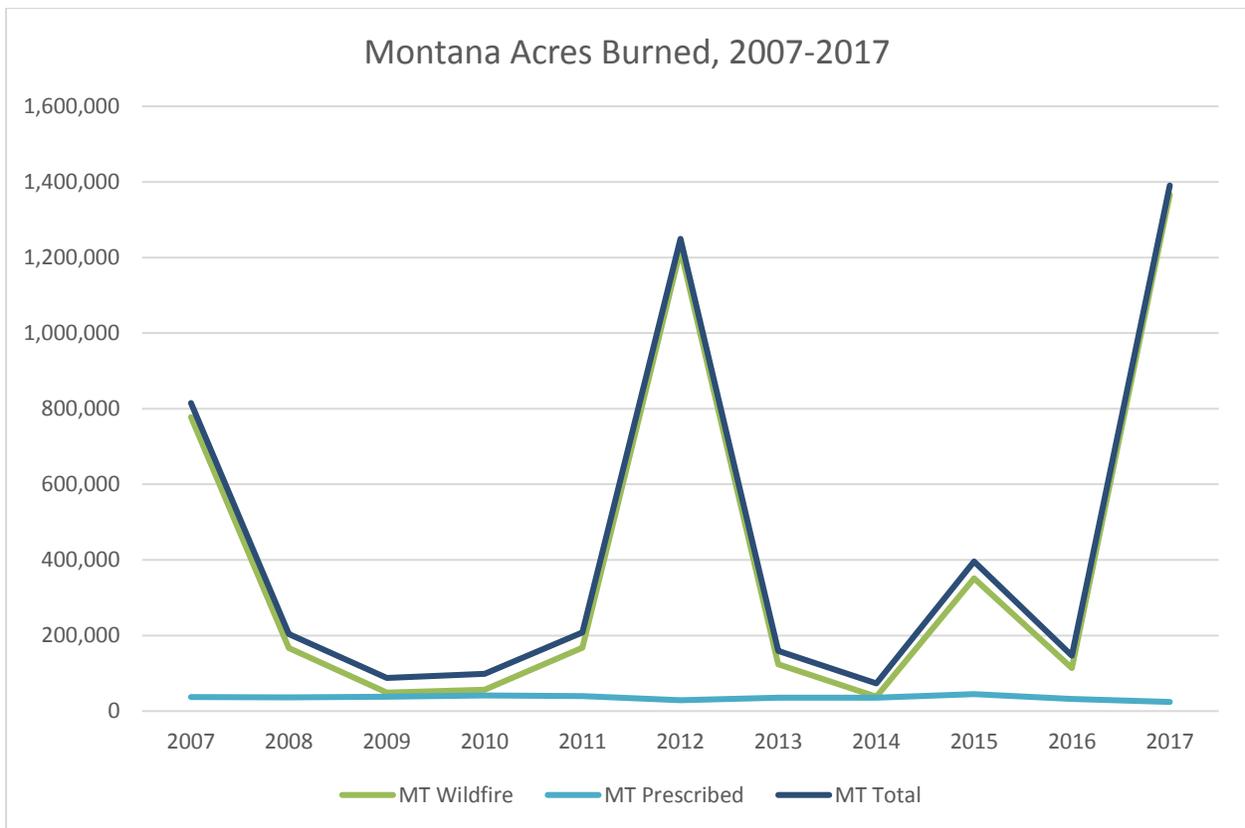


[Source: CIRA and NOAA. These data are preliminary and not operational.](#)

## 2. Conceptual Model

Without the influence of wildfires, PM<sub>10</sub> values in western Montana would be highest in the winter due to temperatures inversions. In the spring, summer, and fall, PM<sub>10</sub> values are generally low due to good dispersion from strong solar heating. Unfortunately, summer months can be significantly impacted by wildfires. The graphs included in this section show the average concentration over the past five years without wildfire impacts, as well as the average daily value, super imposed on this data are the 2017 flagged days.

2017 saw significant acreage burned here in Montana, similar to the 2012 season. The proximity of these fires to populated areas lead to numerous exceedances of the national ambient air quality standards. Below is a table of acres burned in Montana since 2007. As can be seen, 2017 was the worst year in terms of acreage burned during this period.



The Montana fires of 2017 impacted air quality values from July through September, including days in August and September when PM<sub>10</sub> data greater than 98 µg/m<sup>3</sup> were recorded in western Montana. The conceptual model presented in this demonstration relies on three key areas of evidence. First, a comparison to historical data indicating PM<sub>10</sub> values less than 98 µg/m<sup>3</sup> when smoke is not present. Second, the evidence of smoke over monitoring locations on satellite imagery on the flagged days. Third, a discussion of the meteorological and fire conditions on each day noting the causes of smoke throughout western Montana. The state of

Montana believes this information shows that data from each site would have been well below 98  $\mu\text{g}/\text{m}^3$  had the smoke not been present. The remaining sections will provide evidence for this conceptual model.

### 3. Comparison to Historical Data

The historical data comparisons for each site in which PM<sub>10</sub> data was submitted in this package are provided below. These graphs show the average and 95%-ile between 2012-2016, along with the daily average for unflagged PM<sub>10</sub> data. This year's PM<sub>10</sub> flagged days are super imposed in red to show the historical significance of the flagged days. It should be noted that Montana DEQ only flags PM<sub>10</sub> data above 98 µg/m<sup>3</sup> for wildfire impacts. There are days when the daily average is below 98 µg/m<sup>3</sup> that are impacted by wildfires, causing the daily average to be elevated.

Figure 3. Historical PM<sub>10</sub> Data Comparison for Butte.

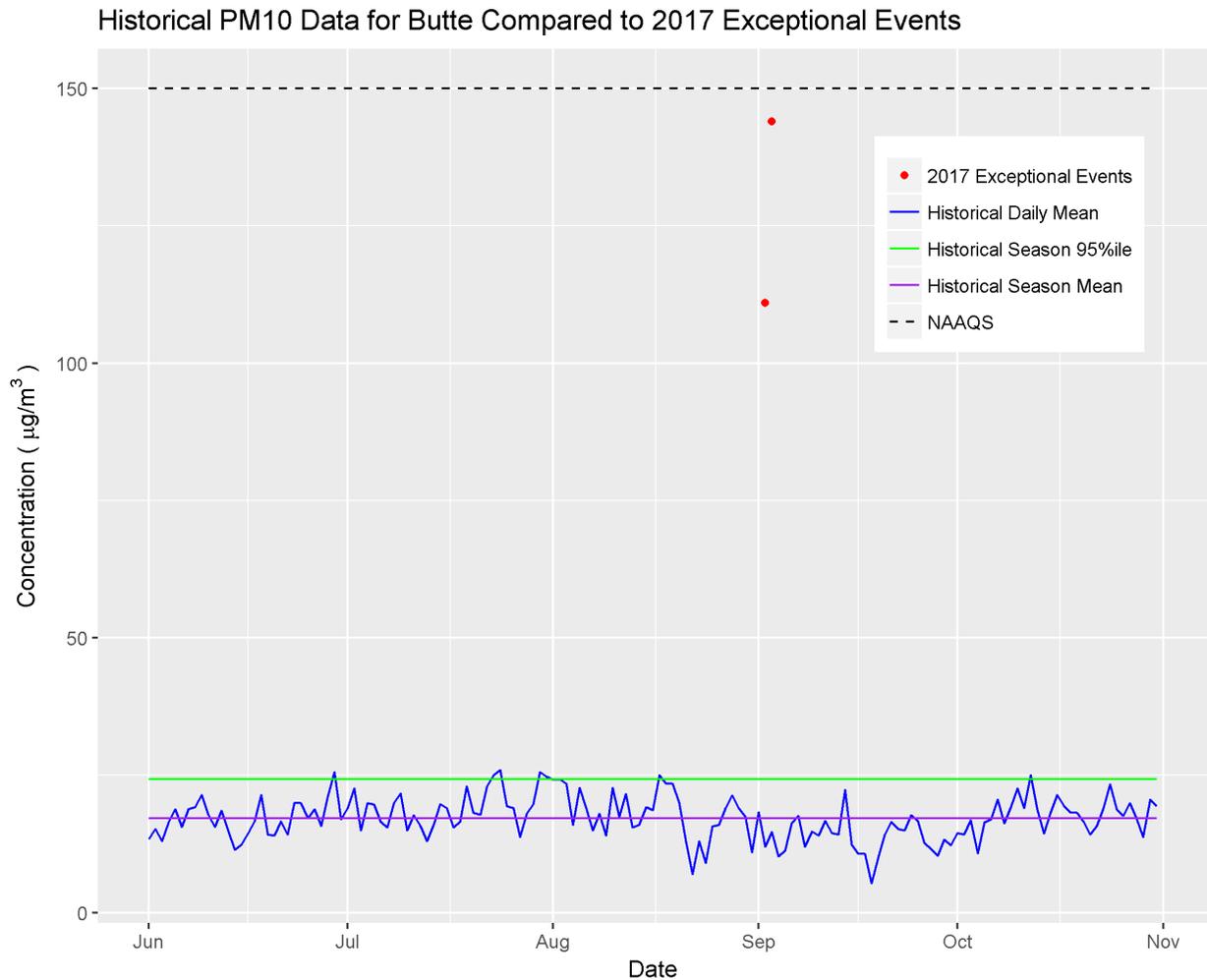


Figure 4. Historical PM<sub>10</sub> Data Comparison for Columbia Falls.

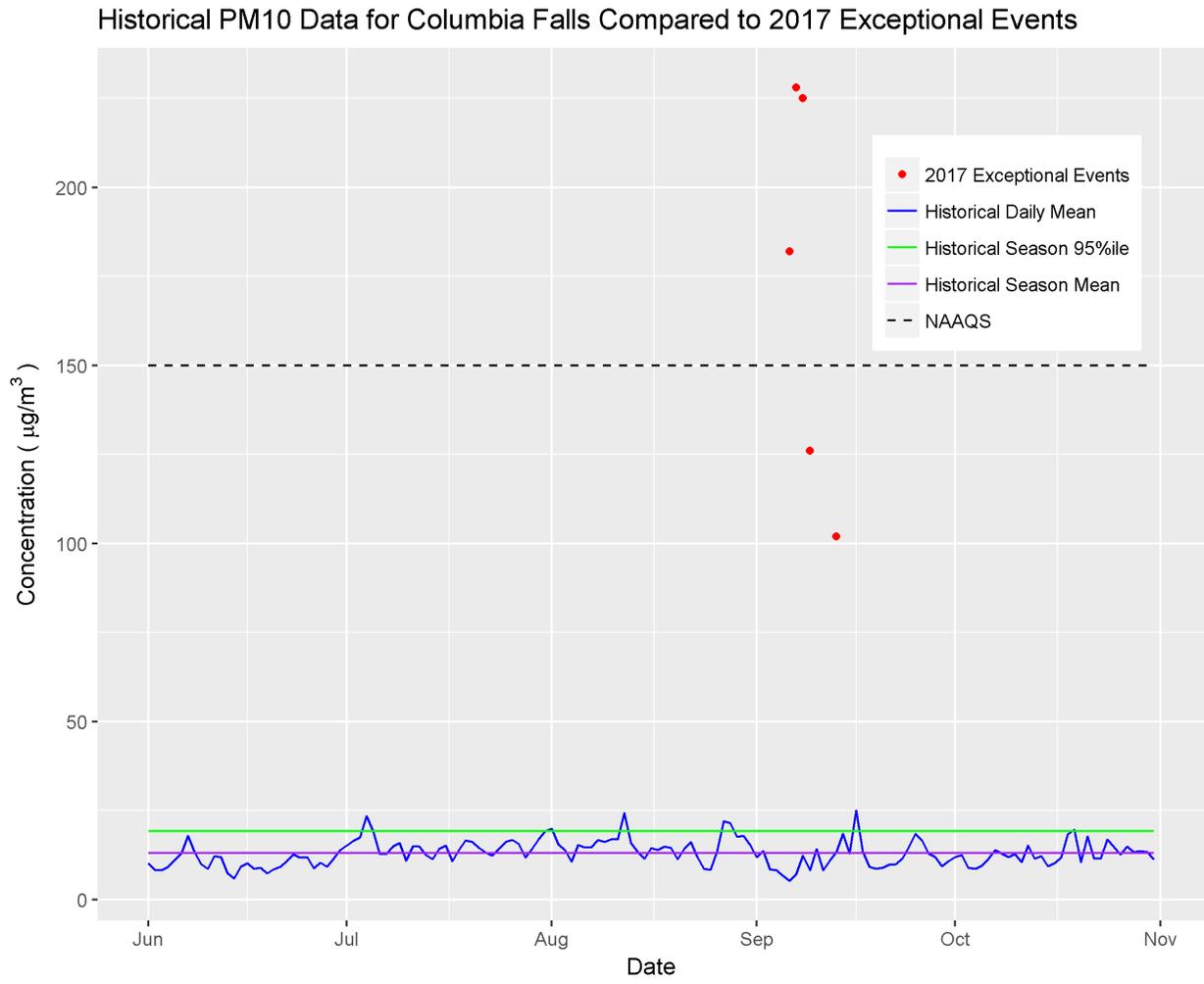


Figure 5. Historical PM<sub>10</sub> Data Comparison for Kalispell

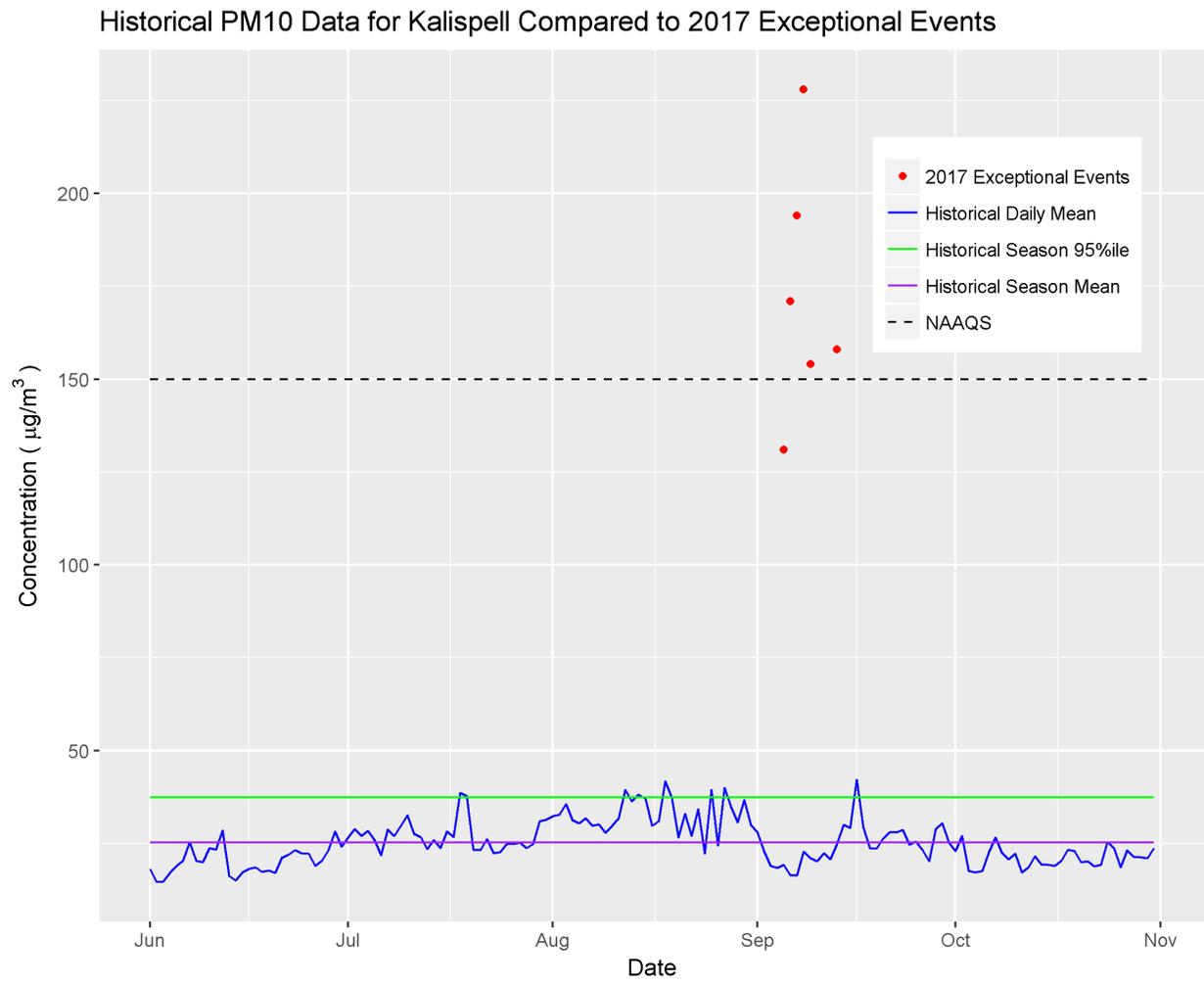


Figure 6. Historical PM<sub>10</sub> Data Comparison for Libby

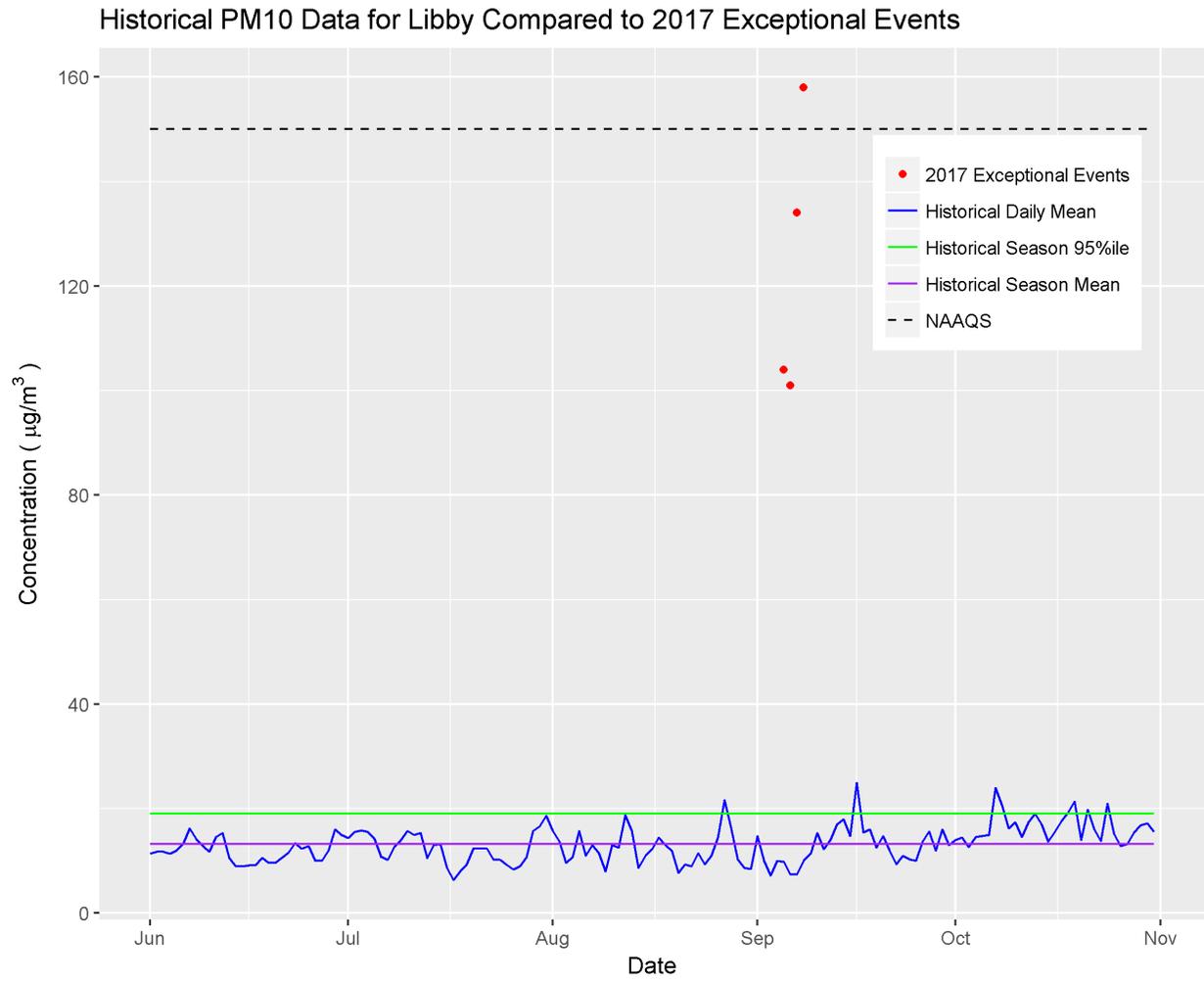


Figure 7. Historical PM<sub>10</sub> Data Comparison for Missoula

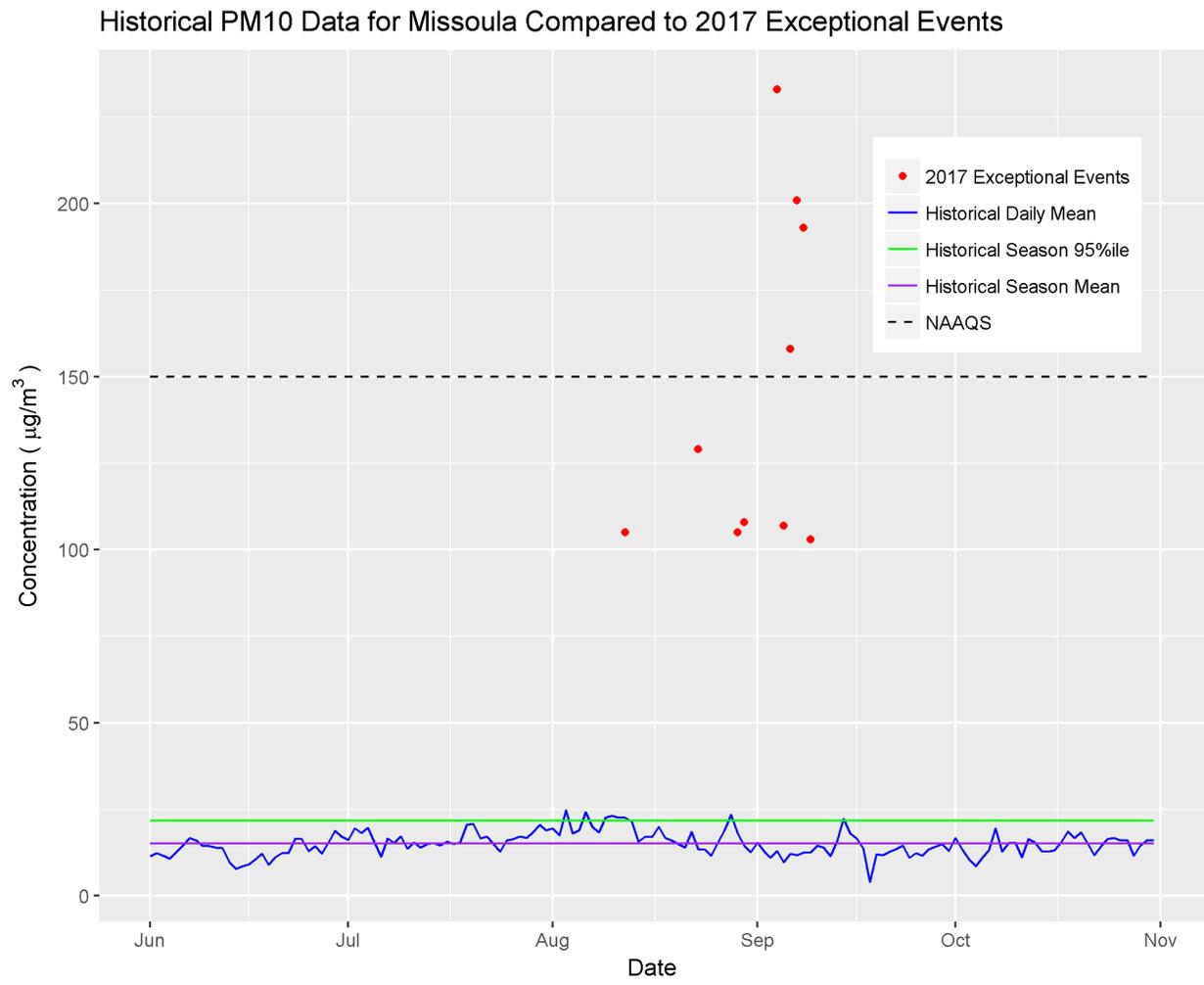


Figure 8. Historical PM<sub>10</sub> Data Comparison for Thompson Falls

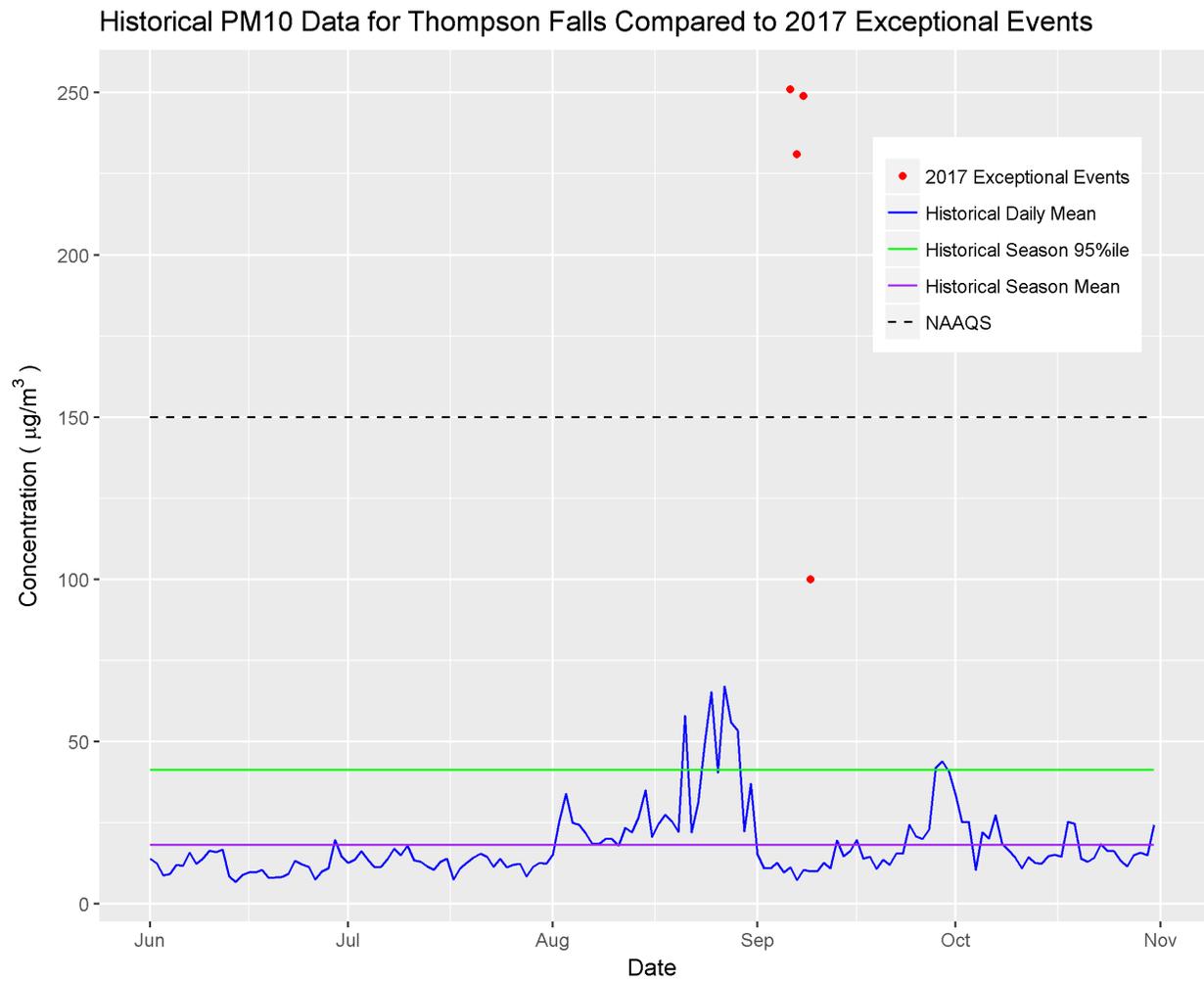
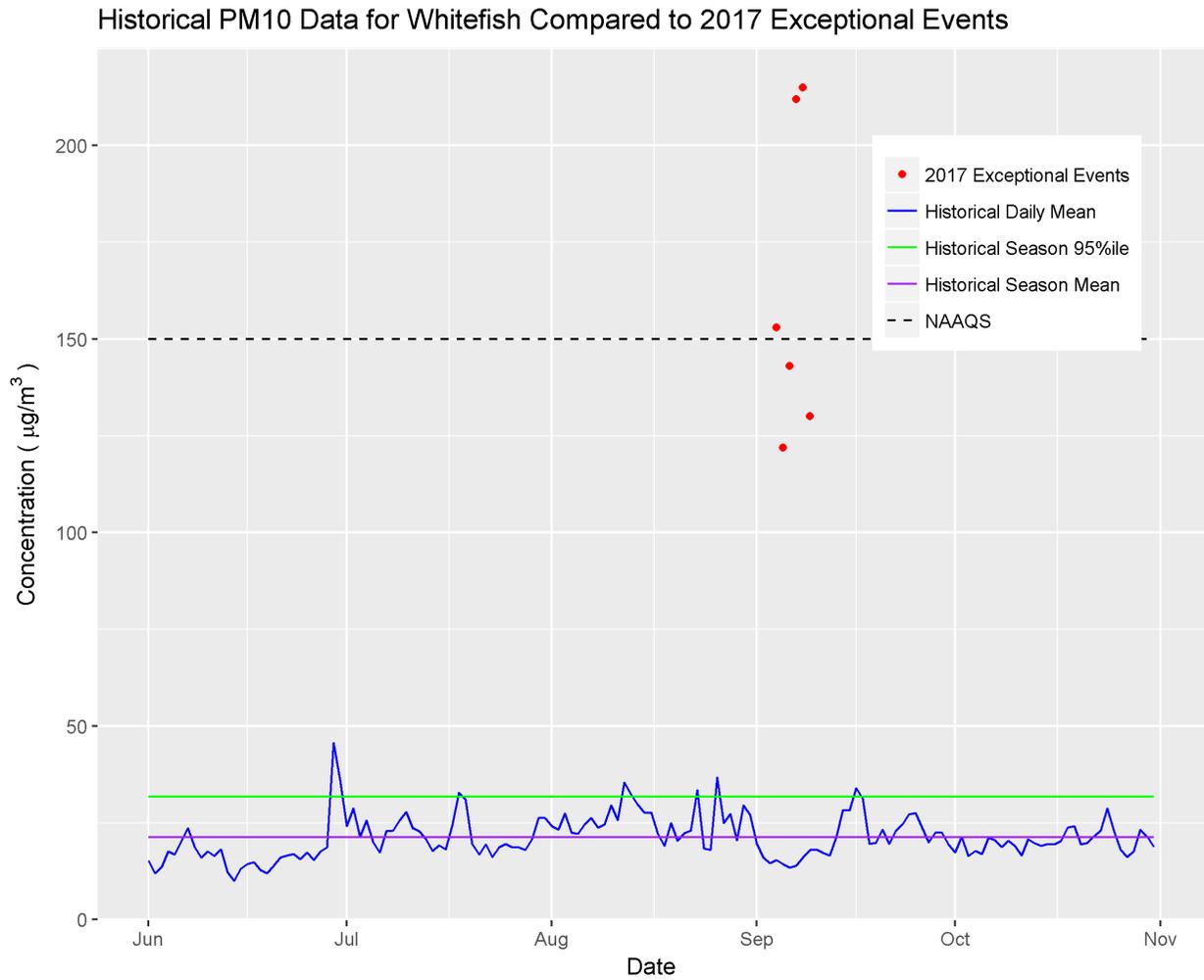


Figure 9. Historical PM<sub>10</sub> Data Comparison for Whitefish



The 2016 exception events guidance includes additional instruction on how to show the comparison to historical data. In keeping with those recommendations, a historical data summary is included below. This includes the number of exceedances and seasonal maximum values each year that monitoring data is available, dating back to the 1980s.

Table 2. Butte PM<sub>10</sub> Exceedances per Year and Seasonal Max.

| Butte |                          |                         |                         |                         |                       |
|-------|--------------------------|-------------------------|-------------------------|-------------------------|-----------------------|
| Year  | Exceedances,<br>All Data | Max Winter<br>(Dec-Feb) | Max Spring<br>(Mar-May) | Max Summer<br>(Jun-Aug) | Max Fall<br>(Sep-Nov) |
| 1985  | 8                        | 302                     |                         | 34                      | 204                   |
| 1986  | 6                        | 213                     | 82                      | 61                      | 95                    |
| 1987  | 6                        | 225                     | 80                      | 31                      | 174                   |
| 1988  | 11                       | 283                     | 63                      | 75                      | 124                   |
| 1989  | 1                        | 158                     | 75                      | 49                      | 119                   |
| 1990  | 0                        | 92                      | 50                      | 38                      | 68                    |
| 1991  | 0                        | 125                     | 46                      | 39                      | 89                    |
| 1992  | 0                        | 132                     | 58                      | 29                      | 61                    |
| 1993  | 0                        | 92                      | 56                      | 21                      | 76                    |
| 1994  | 0                        | 64                      | 60                      | 34                      | 57                    |
| 1995  | 0                        | 96                      | 42                      | 29                      | 44                    |
| 1996  | 0                        | 55                      | 41                      | 60                      | 60                    |
| 1997  | 0                        | 53                      | 55                      | 40                      | 59                    |
| 1998  | 1                        | 66                      | 172                     | 43                      | 97                    |
| 1999  | 0                        | 43                      | 60                      | 59                      | 91                    |
| 2000  | 2*                       | 40                      | 38                      | 155*                    | 46                    |
| 2001  | 0                        | 54                      | 78                      | 62                      | 49                    |
| 2002  | 0                        | 39                      | 42                      | 31                      | 38                    |
| 2003  | 0                        | 47                      | 39                      | 82*                     | 60*                   |
| 2004  | 0                        | 62                      | 55                      | 39                      | 60                    |
| 2005  | 0                        | 69                      | 63                      | 73*                     | 74*                   |
| 2006  | 0                        | 76                      | 62                      | 97*                     | 126*                  |
| 2007  | 3*                       | 74                      | 51                      | 195*                    | 90*                   |
| 2008  | 0                        | 93                      | 82                      | 67                      | 71                    |
| 2009  | 0                        | 110                     | 63                      | 115                     | 91*                   |
| 2010  | 0                        | 82                      | 60                      | 113*                    | 55                    |
| 2011  | 0                        | 75                      | 57                      | 65                      | 73*                   |
| 2012  | 1*                       | 64                      | 61                      | 73*                     | 162*                  |
| 2013  | 0                        | 81                      | 52                      | 47                      | 68                    |
| 2014  | 0                        | 60                      | 40                      | 57*                     | 46                    |
| 2015  | 0                        | 49                      | 65                      | 118*                    | 39                    |
| 2016  | 0                        | 52                      | 30                      | 51*                     | 40                    |
| 2017  | 0                        | 99*                     | 23                      | 94*                     | 144*                  |

\*Data flagged as exceptional events

Table 3. Columbia Falls PM<sub>10</sub> Exceedances per Year and Seasonal Max.

| Columbia Falls |                       |                      |                      |                      |                    |
|----------------|-----------------------|----------------------|----------------------|----------------------|--------------------|
| Year           | Exceedances, All Data | Max Winter (Dec-Feb) | Max Spring (Mar-May) | Max Summer (Jun-Aug) | Max Fall (Sep-Nov) |
| 1985           | 0                     |                      | 69                   | 70                   | 77                 |
| 1986           | 0                     | 146                  | 68                   | 86                   | 115                |
| 1987           | 2                     | 115                  | 103                  | 50                   | 186                |
| 1988           | 1*                    | 125                  | 83                   | 99                   | 188*               |
| 1989           | 0                     | 86                   | 67                   | 86                   | 129                |
| 1990           | 0                     | 74                   | 77                   | 43                   | 88                 |
| 1991           | 1*                    | 88                   | 83                   | 42                   | 172*               |
| 1992           | 0                     | 75                   | 44                   | 31                   | 58                 |
| 1993           | 0                     | 64                   | 46                   | 30                   | 49                 |
| 1994           | 0                     | 82                   | 46                   | 65                   | 70                 |
| 1995           | 0                     | 53                   | 35                   | 26                   | 45                 |
| 1996           | 0                     | 50                   | 56                   | 23                   | 43                 |
| 1997           | 0                     | 50                   | 37                   | 22                   | 42                 |
| 1998           | 0                     | 32                   | 83                   | 28                   | 48                 |
| 1999           | 0                     | 30                   | 30                   | 21                   | 29                 |
| 2000           | 0                     | 24                   | 30                   | 43*                  | 45                 |
| 2001           | 0                     | 25                   | 32                   | 45                   | 74                 |
| 2002           | 0                     | 25                   | 29                   | 31                   | 61                 |
| 2003           | 2*                    | 33                   | 46                   | 163*                 | 269*               |
| 2004           | 0                     | 37                   | 55                   | 39                   | 46                 |
| 2005           | 0                     | 59                   | 35                   | 39                   | 34                 |
| 2006           | 0                     | 47                   | 53                   | 42                   | 50                 |
| 2007           | 0                     | 31                   | 48                   | 105*                 | 53                 |
| 2008           | 0                     | 42                   | 37                   | 24                   | 33                 |
| 2009           | 0                     | 33                   | 40                   | 28                   | 45                 |
| 2010           | 0                     | 28                   | 46                   | 18                   | 42                 |
| 2011           | 0                     | 49                   | 20                   | 29                   | 47*                |
| 2012           | 0                     | 35                   | 46                   | 46*                  | 46*                |
| 2013           | 0                     | 46                   | 41                   | 35*                  | 46                 |
| 2014           | 0                     | 36                   | 40                   | 91*                  | 43                 |
| 2015           | 0                     | 56                   | 97                   | 140*                 | 59                 |
| 2016           | 0                     | 45                   | 31                   | 31*                  | 32                 |
| 2017           | 3*                    | 37                   | 42                   | 57*                  | 228*               |

\*Data flagged as exceptional events

Note: 1985 through December 2002 the data was obtained from site AQS# 30-029-0003. January 2003 through August 2011 the data was obtained from site AQS# 30-029-0007. August 2011-present the data was obtained from site AQS# 30-029-0049.

Table 4. Kalispell PM<sub>10</sub> Exceedances per Year and Seasonal Max.

| Kalispell |                          |                         |                         |                            |                       |
|-----------|--------------------------|-------------------------|-------------------------|----------------------------|-----------------------|
| Year      | Exceedances,<br>All Data | Max Winter<br>(Dec-Feb) | Max Spring<br>(Mar-May) | Max<br>Summer<br>(Jun-Aug) | Max Fall<br>(Sep-Nov) |
| 1985      | 0                        | 65                      |                         | 48                         | 77                    |
| 1986      | 3                        | 159                     | 198                     | 260                        | 95                    |
| 1987      | 0                        | 119                     | 105                     | 41                         | 102                   |
| 1988      | 3*                       | 154                     | 65                      | 393*                       | 127*                  |
| 1989      | 3*                       | 218                     | 99                      | 52                         | 103                   |
| 1990      | 0                        | 111                     | 109                     | 51                         | 79                    |
| 1991      | 2                        | 195                     | 120                     | 45                         | 149*                  |
| 1992      | 0                        | 107                     | 73                      | 45                         | 102                   |
| 1993      | 0                        | 55                      | 69                      | 33                         | 54                    |
| 1994      | 0                        | 122                     | 71                      | 85                         | 78                    |
| 1995      | 0                        | 104                     | 45                      | 36                         | 56                    |
| 1996      | 0                        | 75                      | 74                      | 64                         | 56                    |
| 1997      | 0                        | 73                      | 89                      | 47                         | 59                    |
| 1998      | 1                        | 68                      | 152                     | 45                         | 39                    |
| 1999      | 0                        | 75                      | 44                      | 34                         | 51                    |
| 2000      | 0                        | 52                      | 51                      | 95*                        | 49                    |
| 2001      | 0                        | 36                      | 53                      | 51                         | 103                   |
| 2002      | 0                        | 44                      | 43                      | 78                         | 68                    |
| 2003      | 0                        | 41                      | 43                      | 121*                       | 119*                  |
| 2004      | 0                        | 64                      | 71                      | 61                         | 56                    |
| 2005      | 0                        | 83                      | 48                      | 76                         | 54                    |
| 2006      | 0                        | 74                      | 57                      | 52*                        | 57*                   |
| 2007      | 0                        | 43                      | 79                      | 147*                       | 57*                   |
| 2008      | 0                        | 61                      | 46                      | 31                         | 37                    |
| 2009      | 0                        | 27                      | 58                      | 55                         | 42*                   |
| 2010      | 0                        | 31                      | 59                      | 31                         | 37                    |
| 2011      | 0                        | 42                      | 21                      | 20                         | 50*                   |
| 2012      | 0                        | 51                      | 63                      | 56                         | 56                    |
| 2013      | 0                        | 53                      | 52                      | 42                         | 87                    |
| 2014      | 0                        | 45                      | 73                      | 108                        | 55                    |
| 2015      | 0                        | 70                      | 102                     | 146*                       | 49                    |
| 2016      | 0                        | 87                      | 46                      | 84                         | 53                    |
| 2017      | 5*                       | 55                      | 78                      | 81                         | 228*                  |

\*Data flagged as exceptional events

Note: 1986 through June 1999 the data was obtained from site AQS# 30-029-1015. July 1999-present the data was obtained from site AQS# 30-029-0047.

Table 5. Libby PM<sub>10</sub> Exceedances per Year and Seasonal Max.

| Libby |                          |                         |                         |                            |                       |
|-------|--------------------------|-------------------------|-------------------------|----------------------------|-----------------------|
| Year  | Exceedances,<br>All Data | Max Winter<br>(Dec-Feb) | Max Spring<br>(Mar-May) | Max<br>Summer<br>(Jun-Aug) | Max Fall<br>(Sep-Nov) |
| 1985  | 0                        | 98                      | 65                      | 114                        | 114                   |
| 1986  | 4                        | 171                     | 154                     | 81                         | 165                   |
| 1987  | 7                        | 234                     | 149                     | 61                         | 187                   |
| 1988  | 16*                      | 256                     | 215                     | 75                         | 186*                  |
| 1989  | 8                        | 253                     | 158                     | 60                         | 146                   |
| 1990  | 12                       | 254                     | 221                     | 68                         | 115                   |
| 1991  | 8*                       | 226                     | 140                     | 67                         | 211*                  |
| 1992  | 0                        | 139                     | 106                     | 40                         | 89                    |
| 1993  | 0                        | 89                      | 84                      | 32                         | 104                   |
| 1994  | 0                        | 105                     | 79                      | 99                         | 69                    |
| 1995  | 0                        | 93                      | 79                      | 45                         | 81                    |
| 1996  | 0                        | 90                      | 113                     | 63                         | 71                    |
| 1997  | 0                        | 57                      | 86                      | 45                         | 81                    |
| 1998  | 0                        | 121                     | 82                      | 45                         | 81                    |
| 1999  | 0                        | 82                      | 74                      | 56                         | 40                    |
| 2000  | 0                        | 68                      | 93                      | 57                         | 63                    |
| 2001  | 0                        | 95                      | 107                     | 55                         | 89                    |
| 2002  | 0                        | 73                      | 67                      | 48                         | 53                    |
| 2003  | 0                        | 72                      | 53                      | 91*                        | 74                    |
| 2004  | 0                        | 81                      | 73                      | 45                         | 64                    |
| 2005  | 0                        | 126                     | 83                      | 42*                        | 71                    |
| 2006  | 0                        | 100                     | 64                      | 51                         | 59                    |
| 2007  | 0                        | 104                     | 69                      | 77*                        | 56                    |
| 2008  | 0                        | 79                      | 86                      | 77*                        | 65                    |
| 2009  | 0                        | 47                      | 47                      | 43*                        | 62                    |
| 2010  | 0                        | 89                      | 88*                     | 90*                        | 44                    |
| 2011  | 0                        | 51                      | 61                      | 83                         | 51*                   |
| 2012  | 0                        | 58                      | 80                      | 34*                        | 53                    |
| 2013  | 0                        | 76                      | 66                      | 21                         | 57                    |
| 2014  | 0                        | 47                      | 45                      | 44*                        | 36                    |
| 2015  | 1*                       | 80                      | 65                      | 180*                       | 94*                   |
| 2016  | 0                        | 45                      | 32                      | 58*                        | 37                    |
| 2017  | 1*                       | 47                      | 51                      | 60*                        | 158*                  |

\*Data flagged as exceptional events

Note: 1985 through March 1995 the data was obtained from site AQS# 30-053-0012. April 1995-present the data was obtained from site AQS# 30-053-0018.

Table 6. Missoula PM<sub>10</sub> Exceedances per Year and Seasonal Max.

| Missoula |                          |                         |                         |                            |                       |
|----------|--------------------------|-------------------------|-------------------------|----------------------------|-----------------------|
| Year     | Exceedances,<br>All Data | Max Winter<br>(Dec-Feb) | Max Spring<br>(Mar-May) | Max<br>Summer<br>(Jun-Aug) | Max Fall<br>(Sep-Nov) |
| 1984     | 0                        | 138                     |                         |                            | 103                   |
| 1985     | 0                        | 90                      |                         |                            |                       |
| 1986     | 7                        | 238                     | 227                     | 88                         | 126                   |
| 1987     | 3                        | 200                     | 103                     | 51                         | 142                   |
| 1988     | 1                        | 158                     | 59                      | 97                         | 103                   |
| 1989     | 2                        | 194                     | 73                      | 47                         | 83                    |
| 1990     | 0                        | 134                     | 95                      | 54                         | 69                    |
| 1991     | 1*                       | 143                     | 41                      | 42                         | 160*                  |
| 1992     | 0                        | 89                      | 52                      | 55                         | 69                    |
| 1993     | 0                        | 91                      | 74                      | 31                         | 73                    |
| 1994     | 0                        | 82                      | 56                      | 37                         | 79                    |
| 1995     | 0                        | 83                      | 50                      | 38                         | 44                    |
| 1996     | 0                        | 113                     | 47                      | 50                         | 69                    |
| 1997     | 0                        | 70                      | 88                      | 35                         | 55                    |
| 1998     | 0                        | 73                      | 126                     | 33                         | 64                    |
| 1999     | 0                        | 55                      | 42                      | 31                         | 60                    |
| 2000     | 3*                       | 62                      | 37                      | 219*                       | 43                    |
| 2001     | 0                        | 68                      | 91                      | 46                         | 59                    |
| 2002     | 0                        | 46                      | 40                      | 35                         | 44                    |
| 2003     | 0                        | 41                      | 35                      | 109*                       | 54                    |
| 2004     | 0                        | 86                      | 42                      | 31                         | 44                    |
| 2005     | 0                        | 85                      | 37                      | 54*                        | 47                    |
| 2006     | 0                        | 85                      | 40                      | 64*                        | 68*                   |
| 2007     | 0                        | 47                      | 50                      | 138*                       | 73*                   |
| 2008     | 0                        | 79                      | 44                      | 104*                       | 40*                   |
| 2009     | 0                        | 63                      | 65                      | 33                         | 39                    |
| 2010     | 0                        | 56                      | 49                      | 55*                        | 50                    |
| 2011     | 0                        | 58                      | 44                      | 31*                        | 58*                   |
| 2012     | 0                        | 46                      | 62                      | 70*                        | 139*                  |
| 2013     | 0                        | 45                      | 49                      | 59*                        | 50                    |
| 2014     | 0                        | 52                      | 52                      | 92*                        | 45                    |
| 2015     | 2*                       | 78                      | 54                      | 276*                       | 39                    |
| 2016     | 0                        | 73                      | 41                      | 63*                        | 42*                   |
| 2017     | 4*                       | 50                      | 34                      | 129*                       | 233*                  |

\*Data flagged as exceptional events

Table 7. Thompson Falls PM<sub>10</sub> Exceedances per Year and Seasonal Max.

| Thompson Falls |                          |                         |                         |                            |                       |
|----------------|--------------------------|-------------------------|-------------------------|----------------------------|-----------------------|
| Year           | Exceedances,<br>All Data | Max Winter<br>(Dec-Feb) | Max Spring<br>(Mar-May) | Max<br>Summer<br>(Jun-Aug) | Max Fall<br>(Sep-Nov) |
| 1985           | 0                        | 85                      | 57                      | 78                         | 89                    |
| 1986           | 0                        | 83                      | 113                     | 71                         | 113                   |
| 1987           | 0                        | 128                     | 105                     | 54                         | 125                   |
| 1988           | 1                        | 160                     | 142                     | 67                         | 110                   |
| 1989           | 2                        | 152                     | 136                     | 53                         | 219                   |
| 1990           | 8                        | 261                     | 194                     | 72                         | 82                    |
| 1991           | 3*                       | 185                     | 93                      | 39                         | 240*                  |
| 1992           | 0                        | 149                     | 88                      | 40                         | 84                    |
| 1993           | 0                        | 107                     | 112                     | 28                         | 71                    |
| 1994           | 0                        | 102                     | 140                     | 46                         | 51                    |
| 1995           | 0                        | 103                     | 47                      | 35                         | 66                    |
| 1996           | 0                        | 99                      | 150                     | 30                         | 66                    |
| 1997           | 0                        | 89                      | 66                      | 31                         | 41                    |
| 1998           | 0                        | 71                      | 53                      | 35                         | 45                    |
| 1999           | 0                        | 47                      | 63                      | 41                         | 25                    |
| 2000           | 0                        | 29                      | 41                      | 75                         | 33                    |
| 2001           | 0                        | 26                      | 39                      | 39                         | 51                    |
| 2002           | 0                        | 38                      | 69                      | 43                         | 37                    |
| 2003           | 0                        | 24                      | 21                      | 48                         | 33                    |
| 2004           | 0                        | 32                      | 31                      | 26                         | 24                    |
| 2005           | 0                        | 21                      | 23                      | 20                         | 19                    |
| 2006           | 0                        | 31                      | 22                      | 38                         | 24                    |
| 2007           | 0                        | 16                      | 72                      | 104*                       | 29*                   |
| 2008           | 0                        | 26                      | 57                      | 17                         | 23                    |
| 2009           | 0                        | 16                      | 18                      | 19                         | 23*                   |
| 2010           | 0                        | 20                      | 19                      | 19                         | 24                    |
| 2011           | 0                        | 57                      | 28                      | 24                         | 38*                   |
| 2012           | 0                        | 37                      | 33                      | 22                         | 42                    |
| 2013           | 0                        | 32                      | 57                      | 21                         | 39                    |
| 2014           | 0                        | 62                      | 56                      | 45                         | 39                    |
| 2015           | 0                        | 63                      | 54                      | 143*                       | 135                   |
| 2016           | 0                        | 72                      | 53                      | 135*                       | 29                    |
| 2017           | 3*                       | 40                      | 48                      | 63*                        | 251*                  |

\*Data flagged as exceptional events

Note: 1985 through July 1999 the data was obtained from site AQS# 30-089-0003. October 1999-present the data was obtained from site AQS# 30-089-0007.

Table 8. Whitefish PM<sub>10</sub> Exceedances per Year and Seasonal Max.

| Whitefish |                          |                         |                         |                            |                       |
|-----------|--------------------------|-------------------------|-------------------------|----------------------------|-----------------------|
| Year      | Exceedances,<br>All Data | Max Winter<br>(Dec-Feb) | Max Spring<br>(Mar-May) | Max<br>Summer<br>(Jun-Aug) | Max Fall<br>(Sep-Nov) |
| 1991      | 0                        | 126                     | 71                      | 72                         | 143                   |
| 1992      | 8                        | 333                     | 254                     | 52                         | 150                   |
| 1993      | 0                        | 115                     | 138                     | 46                         | 82                    |
| 1994      | 5                        | 151                     | 174                     | 121                        | 170                   |
| 1995      | 0                        | 114                     | 140                     | 39                         | 104                   |
| 1996      | 0                        | 73                      | 90                      | 90                         | 104                   |
| 1997      | 1                        | 62                      | 177                     | 57                         | 135                   |
| 1998      | 0                        | 105                     | 137                     | 53                         | 64                    |
| 1999      | 0                        | 60                      | 98                      | 40                         | 90                    |
| 2000      | 0                        | 59                      | 97                      | 107                        | 50                    |
| 2001      | 0                        | 58                      | 57                      |                            | 105                   |
| 2002      | 0                        | 56                      | 100                     | 42                         | 62                    |
| 2003      | 0                        | 63                      | 69                      | 129*                       | 109*                  |
| 2004      | 0                        | 64                      | 90                      | 60                         | 75                    |
| 2005      | 0                        | 105                     | 97                      | 48                         | 49                    |
| 2006      | 1                        | 163                     | 73                      | 63*                        | 84                    |
| 2007      | 0                        | 77                      | 90                      | 132*                       | 71                    |
| 2008      | 0                        | 106                     | 76                      | 41                         | 54                    |
| 2009      | 0                        | 37                      | 69                      | 35                         | 44                    |
| 2010      | 0                        | 94                      | 96                      | 24                         | 52                    |
| 2011      | 0                        | 57                      | 34                      | 26                         | 52                    |
| 2012      | 0                        | 51                      | 138                     | 136                        | 61                    |
| 2013      | 0                        | 61                      | 82                      | 34                         | 77                    |
| 2014      | 0                        | 49                      | 63                      | 104                        | 63                    |
| 2015      | 0                        | 135                     | 89                      | 131*                       | 91                    |
| 2016      | 0                        | 105                     | 68                      | 43                         | 51                    |
| 2017      | 3*                       | 63                      | 90                      | 65                         | 215*                  |

\*Data flagged as exceptional events

Note: 1991 through March 2001 data was obtained from site AQS# 30-029-0039. September 2001-present the data was obtained from site AQS# 30-029-0009.

The 2017 flagged data are compared to 2012-2017 (six years) in the figures below for each site presented in this demonstration. Generally, PM<sub>10</sub> peaks in the winter due to inversions, summer due to wildfire, and occasionally in the spring due to road dust. The highest values are associated with wildfire activity in the summer at all locations. In the figures below, the green dots represent the 2017 wildfire flags and the brown dots represent data flagged with wildfire activity, either from previous years or below the 98 µg/m<sup>3</sup> threshold in 2017. The purple dots represent other flags such as fireworks, prescribed fires, or structure fires. The tan dots are all unflagged data. Please note, prior to a policy change in recent years, only data above the NAAQS was flagged for exceptional events. There are some days impacted by wildfire that were not flagged.

Figure 10. Butte Historical PM<sub>10</sub> Data, 2012-2017

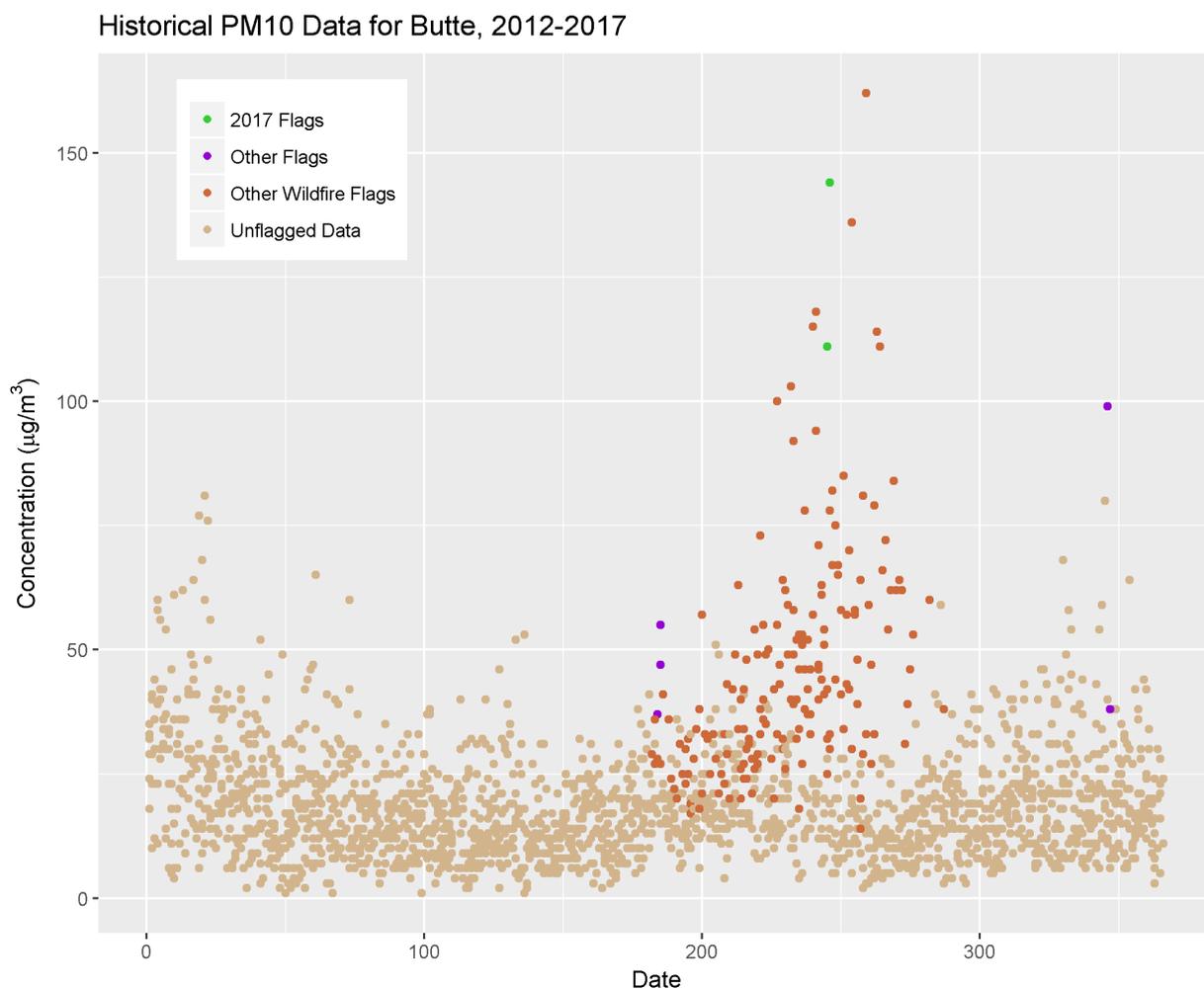


Figure 11. Columbia Falls Historical PM<sub>10</sub> Data, 2012-2017

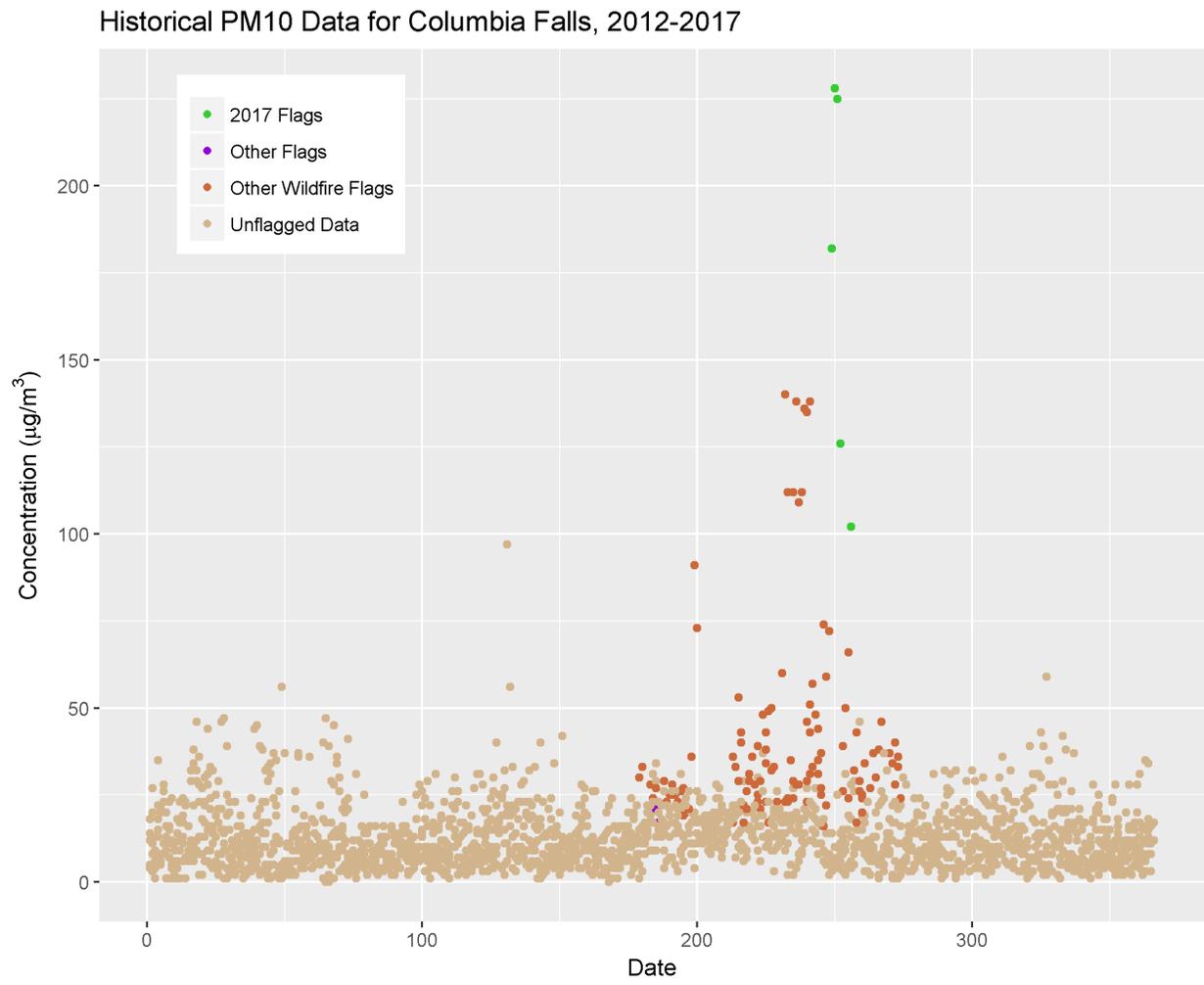


Figure 12. Kalispell Historical PM<sub>10</sub> Data, 2012-2017

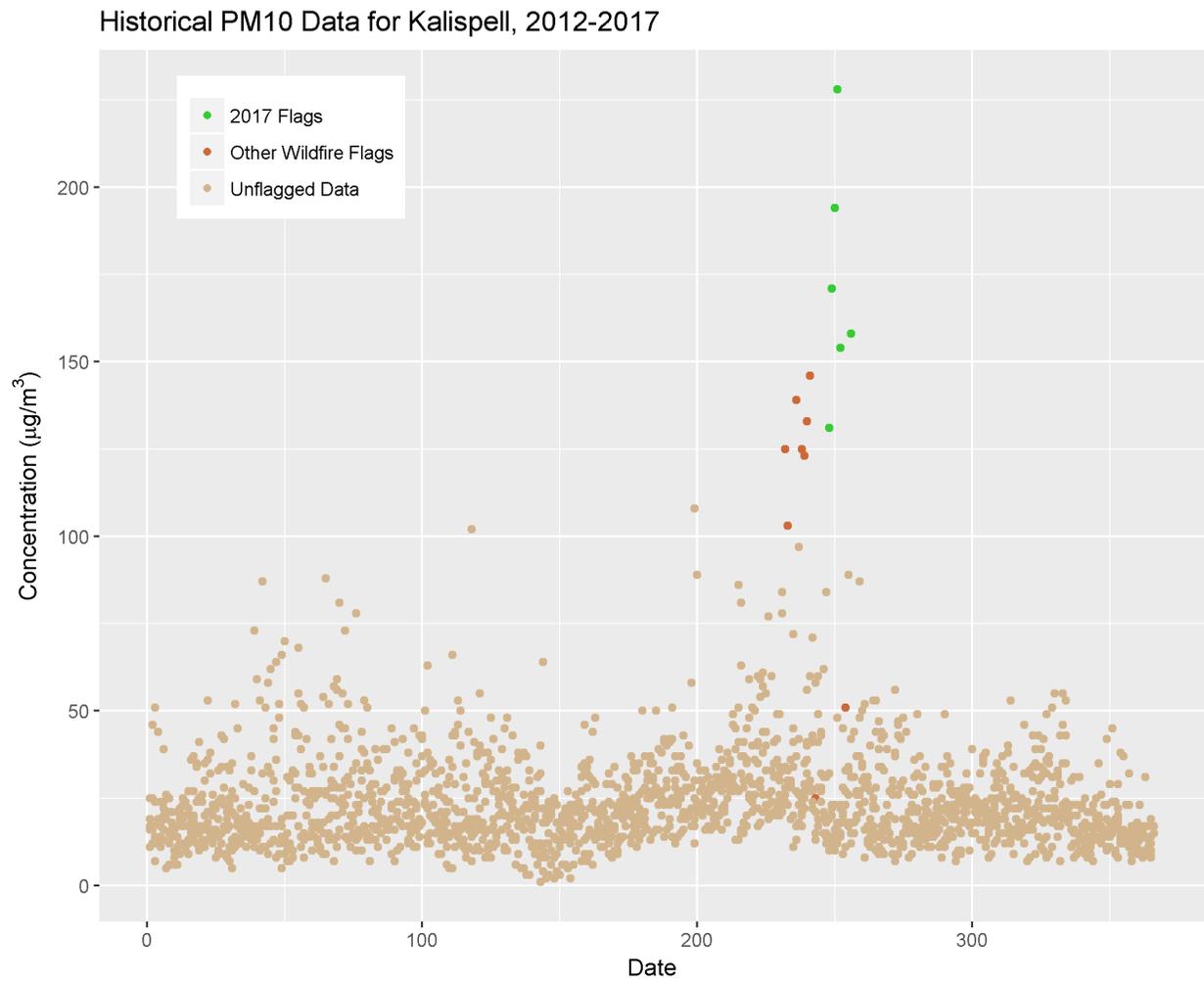


Figure 13. Libby Historical PM<sub>10</sub> Data, 2012-2017

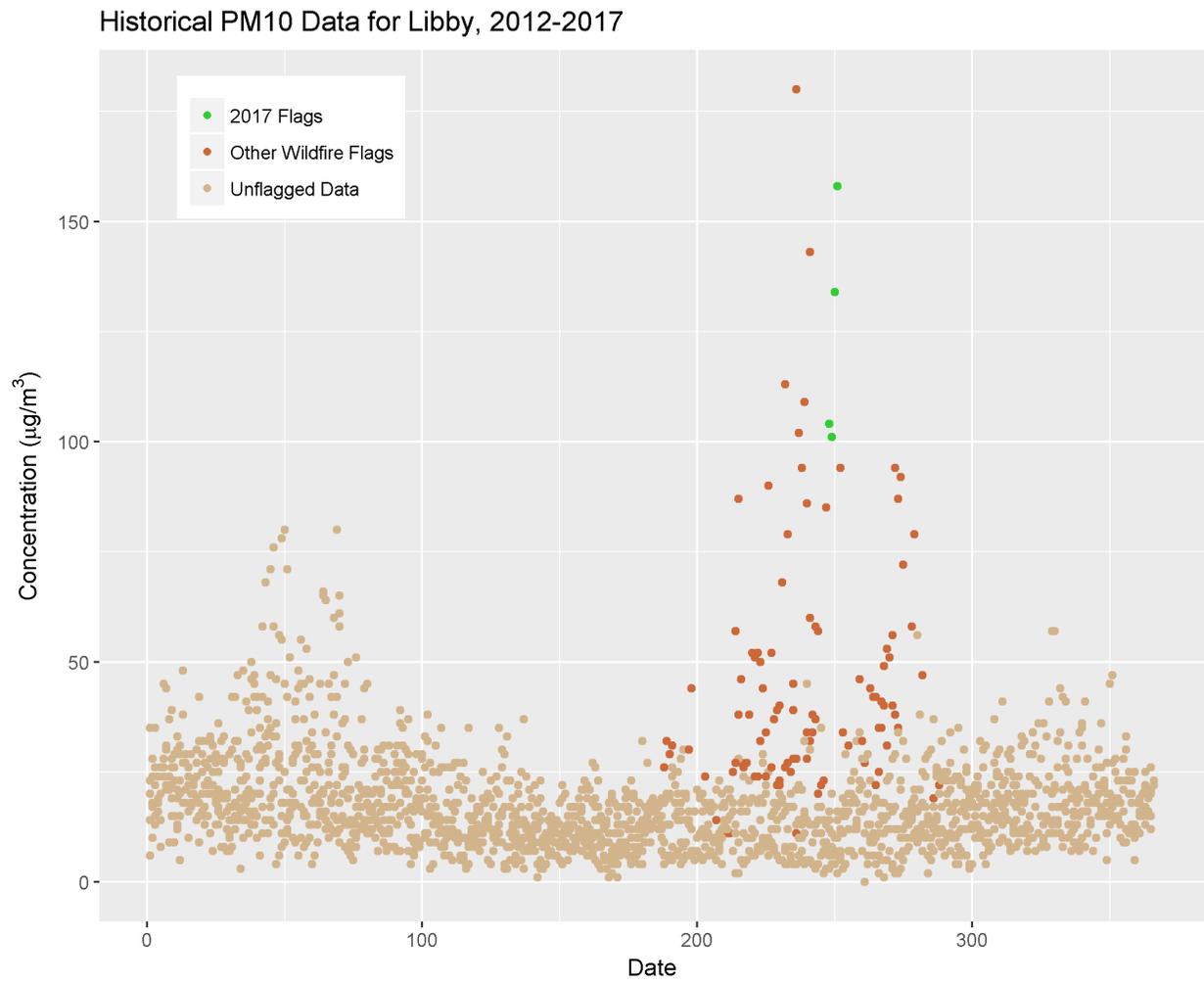


Figure 14. Missoula Historical PM<sub>10</sub> Data, 2012-2017

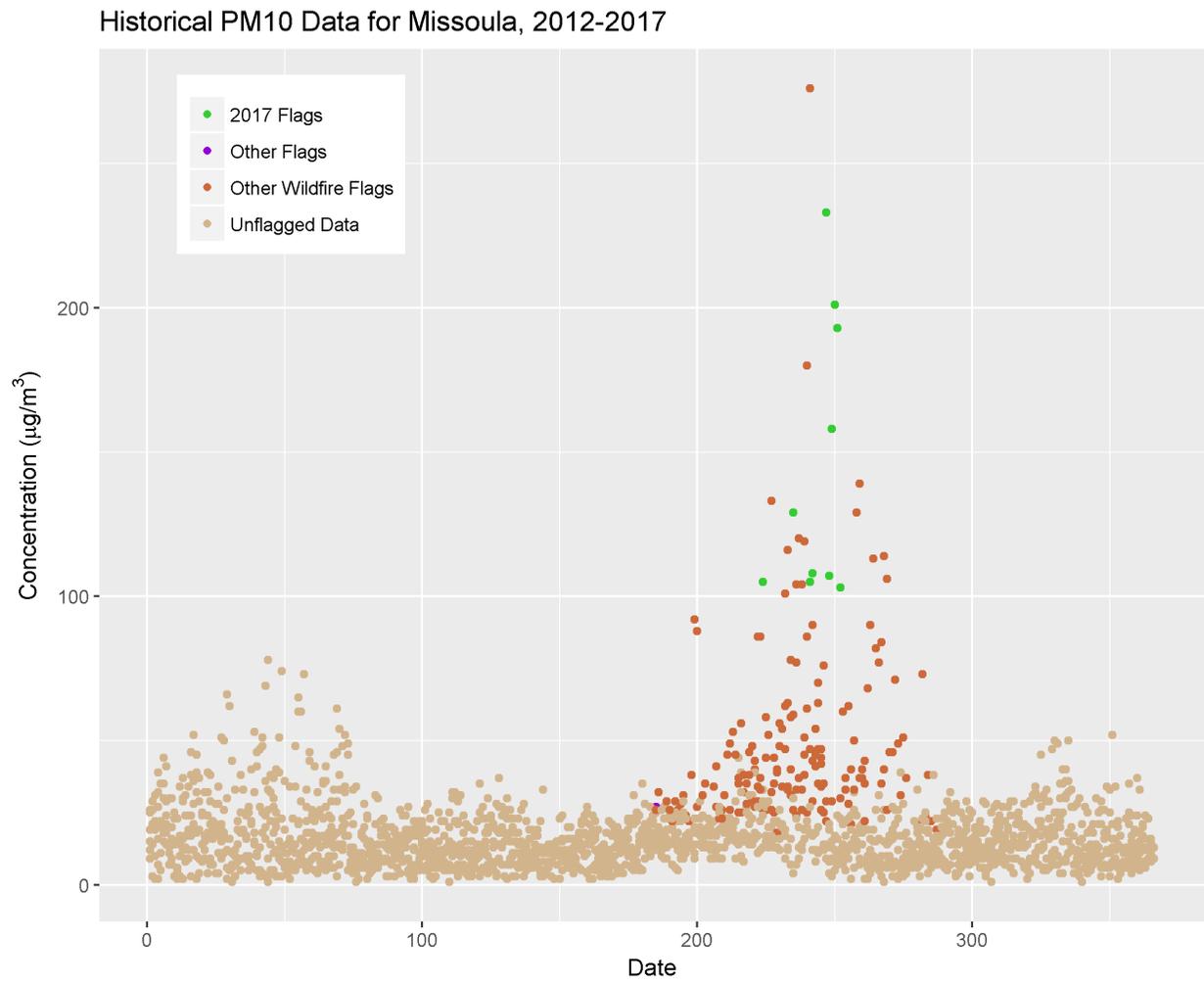


Figure 15. Thompson Falls Historical PM<sub>10</sub> Data, 2012-2017

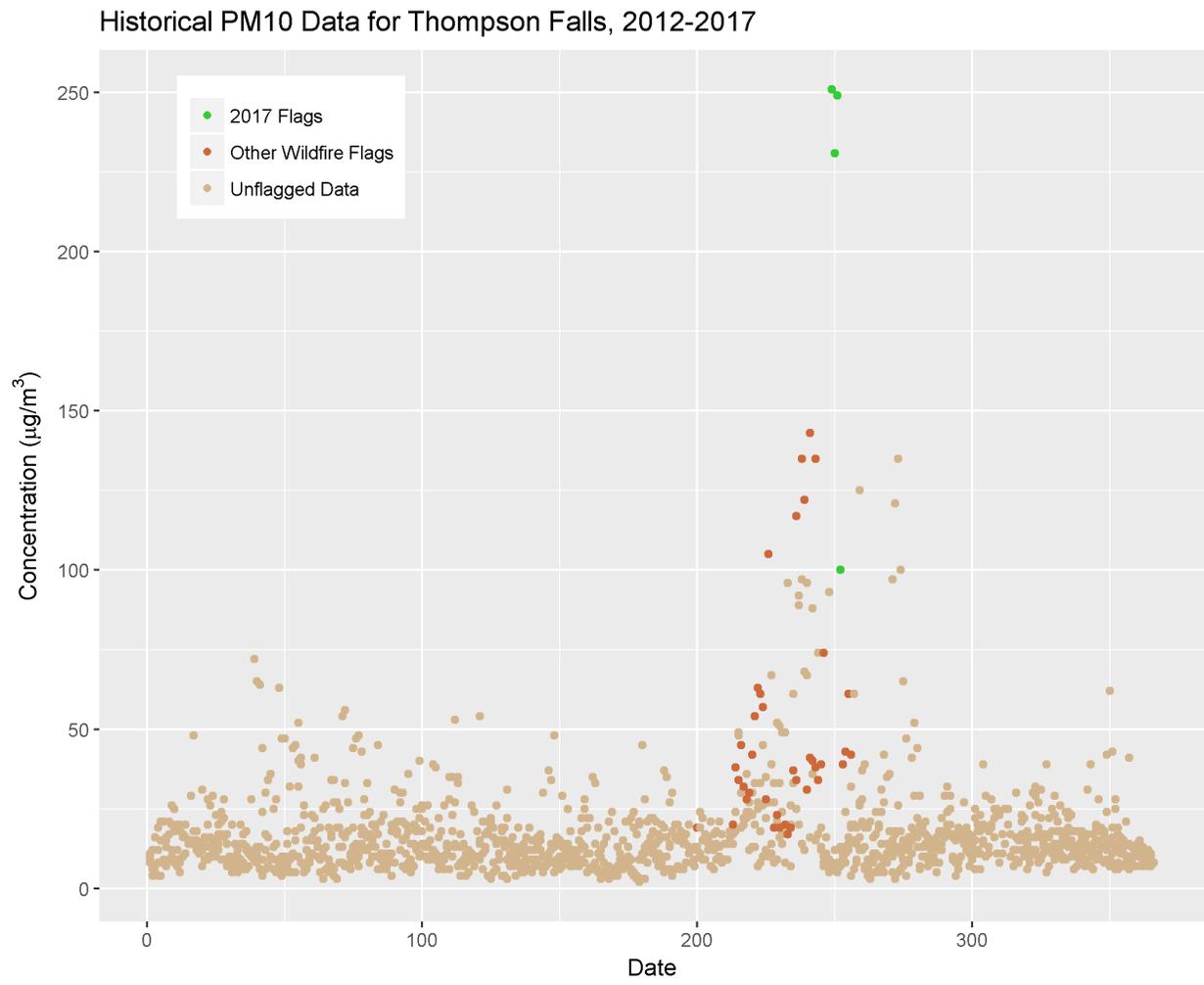
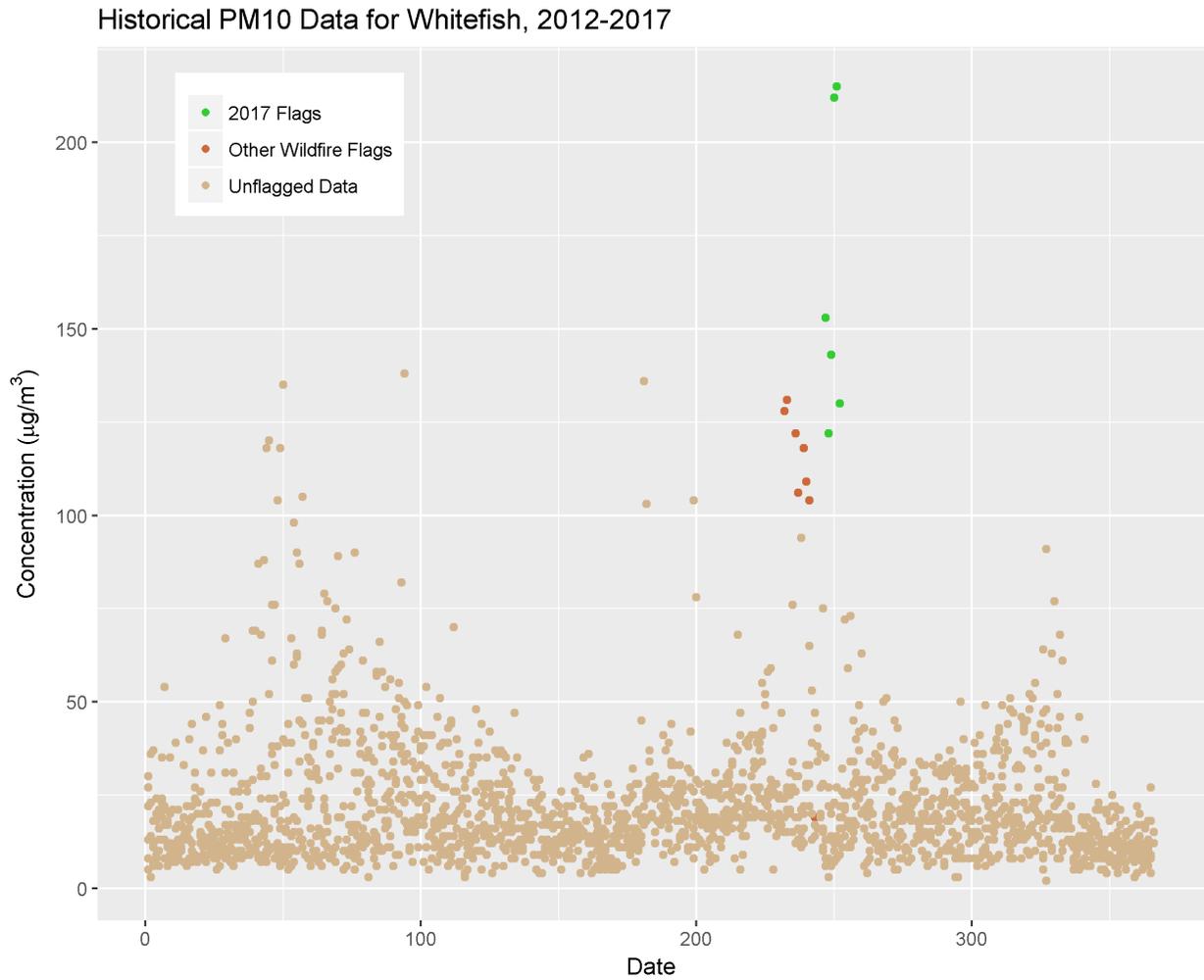


Figure 16. Whitefish Historical PM<sub>10</sub> Data, 2012-2017



Summary statistics for 2012-2016 data are shown below. Statistics for the high flagged days in 2017 compared to this period are shown in Table 4. These tables are for the entire year, not just the wildfire season.

Table 9. Summary Statistics for PM<sub>10</sub>, 2012-2017

| Site                            | Count | Maximum (µg/m <sup>3</sup> ) | Mean (µg/m <sup>3</sup> ) | Standard Deviation (µg/m <sup>3</sup> ) | 95 <sup>th</sup> Percentile (µg/m <sup>3</sup> ) |
|---------------------------------|-------|------------------------------|---------------------------|---|--|
| Butte, All Data                 | 2122  | 162                          | 20.8                      | 14.9                                    | 47   |
| Butte, No Flagged Data          | 1933  | 81                           | 18.3                      | 10.6                                    | 38   |
| Columbia Falls, All Data        | 2131  | 228                          | 14.6                      | 14.7                                    | 33   |
| Columbia Falls, No Flagged Data | 2003  | 97                           | 12.7                      | 8.5                                     | 29   |
| Kalispell, All Data             | 2102  | 228                          | 24.3                      | 16.0                                    | 48   |

| Site                            | Count | Maximum<br>( $\mu\text{g}/\text{m}^3$ ) | Mean<br>( $\mu\text{g}/\text{m}^3$ ) | Standard<br>Deviation<br>( $\mu\text{g}/\text{m}^3$ ) | 95 <sup>th</sup><br>Percentile<br>( $\mu\text{g}/\text{m}^3$ ) |
|---------------------------------|-------|---|--------------------------------------|---|--|
| Kalispell, No Flagged Data      | 2087  | 108                                     | 23.5                                 | 12.5  | 46   |
| Libby, All Data                 | 2041  | 180                                     | 18.9                                 | 14.2  | 42   |
| Libby, No Flagged Data          | 1933  | 80                                      | 17.3                                 | 10.3  | 36   |
| Missoula, All Data              | 2149  | 276                                     | 18.9                                 | 18.3  | 45   |
| Missoula, No Flagged Data       | 1969  | 78                                      | 15.6                                 | 9.7   | 33   |
| Thompson Falls, All Data        | 1526  | 251                                     | 17.3                                 | 17.6  | 41   |
| Thompson Falls, No Flagged Data | 1483  | 135                                     | 15.9                                 | 12.1  | 36   |
| Whitefish, All Data             | 2106  | 215                                     | 22.4                                 | 17.7  | 50   |
| Whitefish, No Flagged Data      | 2092  | 138                                     | 21.7                                 | 15.0  | 48   |

Table 10. Statistics Characterizing 2017 Flagged Data Greater than 98  $\mu\text{g}/\text{m}^3$

| Date              | Site           | PM <sub>10</sub><br>Conc.<br>( $\mu\text{g}/\text{m}^3$ ) | Rank,<br>2012-<br>2017 | Percentile,<br>2012-2017 |
|-------------------|----------------|---|------------------------|--------------------------|
| August 12, 2017   | Missoula       | 105   | 19                     | 99.16                    |
| August 23, 2017   | Missoula       | 129   | 10                     | 99.63                    |
| August 29, 2017   | Missoula       | 105   | 20                     | 99.16                    |
| August 30, 2017   | Missoula       | 108   | 16                     | 99.30                    |
| September 2, 2017 | Butte          | 111   | 8                      | 99.72                    |
| September 3, 2017 | Butte          | 144   | 2                      | 99.95                    |
| September 4, 2017 | Missoula       | 233   | 2                      | 99.95                    |
| September 4, 2017 | Whitefish      | 153   | 3                      | 99.91                    |
| September 5, 2017 | Kalispell      | 131   | 9                      | 99.62                    |
| September 5, 2017 | Libby          | 104   | 7                      | 99.71                    |
| September 5, 2017 | Missoula       | 107   | 17                     | 99.26                    |
| September 5, 2017 | Whitefish      | 122   | 12                     | 99.53                    |
| September 6, 2017 | Columbia Falls | 182   | 3                      | 99.91                    |
| September 6, 2017 | Kalispell      | 171   | 3                      | 99.90                    |
| September 6, 2017 | Libby          | 101   | 9                      | 99.61                    |
| September 6, 2017 | Missoula       | 158   | 6                      | 99.77                    |
| September 6, 2017 | Thompson Falls | 251   | 1                      | 100.00                   |
| September 6, 2017 | Whitefish      | 143   | 4                      | 99.86                    |
| September 7, 2017 | Columbia Falls | 228   | 1                      | 100.00                   |
| September 7, 2017 | Kalispell      | 194   | 2                      | 99.95                    |
| September 7, 2017 | Libby          | 134   | 4                      | 99.85                    |
| September 7, 2017 | Missoula       | 201   | 3                      | 99.91                    |
| September 7, 2017 | Thompson Falls | 231   | 3                      | 99.87                    |

| <b>Date</b>           | <b>Site</b>    | <b>PM<sub>10</sub><br/>Conc.<br/>(µg/m<sup>3</sup>)</b> | <b>Rank,<br/>2012-<br/>2017</b> | <b>Percentile,<br/>2012-2017</b> |
|-----------------------|----------------|---|---------------------------------|----------------------------------|
| September 7, 2017     | Whitefish      | 212   | 2                               | 99.95                            |
| September 8, 2017     | Columbia Falls | 225   | 2                               | 99.95                            |
| September 8, 2017     | Kalispell      | 228   | 1                               | 100.00                           |
| September 8, 2017     | Libby          | 158   | 2                               | 99.95                            |
| September 8, 2017     | Missoula       | 193   | 4                               | 99.86                            |
| September 8, 2017     | Thompson Falls | 249   | 2                               | 99.93                            |
| September 8, 2017     | Whitefish      | 215   | 1                               | 100.00                           |
| September 9, 2017     | Columbia Falls | 126   | 9                               | 99.62                            |
| September 9, 2017     | Kalispell      | 154   | 5                               | 99.81                            |
| September 9, 2017     | Missoula       | 103   | 23                              | 98.98                            |
| September 9, 2017     | Thompson Falls | 100   | 13                              | 99.28                            |
| September 9, 2017     | Whitefish      | 130   | 9                               | 99.62                            |
| September 13,<br>2017 | Columbia Falls | 102   | 14                              | 99.39                            |
| September 13,<br>2017 | Kalispell      | 158   | 4                               | 99.86                            |

In conclusion, the comparison to historical data shows that the flagged values in 2017 were all above the 98<sup>th</sup> percentile between 2012-2017. The concentrations seen during wildfire season are among the highest values recorded over the six years evaluated.

## 4. Clear Causal Relationship

The comparison to historical data shows that the flagged data in the summer of 2017 are unseasonably high and among the highest values over a six-year period. Values that high would have been extremely unusual in the absence of smoke. For each flagged day, an assessment of the meteorology and upwind smoke sources showing that the elevated levels were the result of transported wildfire smoke. Each day is addressed below in turn. All of the daily assessments are available online here:

<http://svc.mt.gov/deq/todaysair/smokereport/SmokeList.aspx?smokeYear=2017>

Saturday, August 12, 2017

### **Current Situation**

A ridge of high pressure moved directly over Montana yesterday, bringing a significant amount of smoke from Canadian fires over western Montana. Southwest Montana was impacted by a dense plume, with air quality reaching unhealthy levels in Butte and Dillon in the afternoon. West-central Montana was also impacted by this smoke, with levels reaching UNHEALTHY in Frenchtown, Missoula, Thompson Falls, and throughout the Bitterroot Valley. Elsewhere, air quality reached UNHEALTHY FOR SENSITIVE GROUPS in much of western Montana, with MODERATE levels in central and southern Montana.

There is one little piece of good news this morning. Air quality in Seeley Lake only reached UNHEALTHY levels last night after a week of HAZARDOUS air quality in the morning. Quartz Creek and the I-90 corridor in Mineral County did not benefit. Air quality in Quartz Creek was VERY UNHEALTHY this morning, with conditions UNHEALTHY in Superior. Elsewhere, the ridge of high pressure has trapped smoke in many valleys this morning. Air quality throughout the Bitterroot and Missoula valleys is UNHEALTHY. Elsewhere across western Montana, air quality is UNHEALTHY FOR SENSITIVE GROUPS, with the exception of Columbia Falls and Clearwater, where the air quality is currently MODERATE. Air quality is also MODERATE in Helena, Bozeman, West Yellowstone, Birney and Broadus as smoke from the Canadian fires continues to cause hazy skies in many locations.

### **Forecast**

The stable atmosphere meant fires were fairly quiet yesterday in Montana. That is unlikely to be the case today, with an approaching cold front setting off strong winds and low humidity through Sunday evening. A red flag warning is in effect this afternoon through Sunday night for all of western Montana, with a chance of showers and thunderstorms both days. Fires here in Montana are expected to be active throughout the afternoon. The increased winds may help some valleys see a little improvement this afternoon once inversions lift, but the increased activity will add more haze to the skies and likely cause more significant impacts this evening as smoke settles down to the surface once again. Of course, we will still have to contend with the large amount of smoke from Canada. This will likely inhibit most areas from seeing a huge amount of improvement, with most parts of western Montana seeing air quality remaining between UNHEALTHY FOR SENSITIVE GROUPS and UNHEALTHY levels throughout the day.

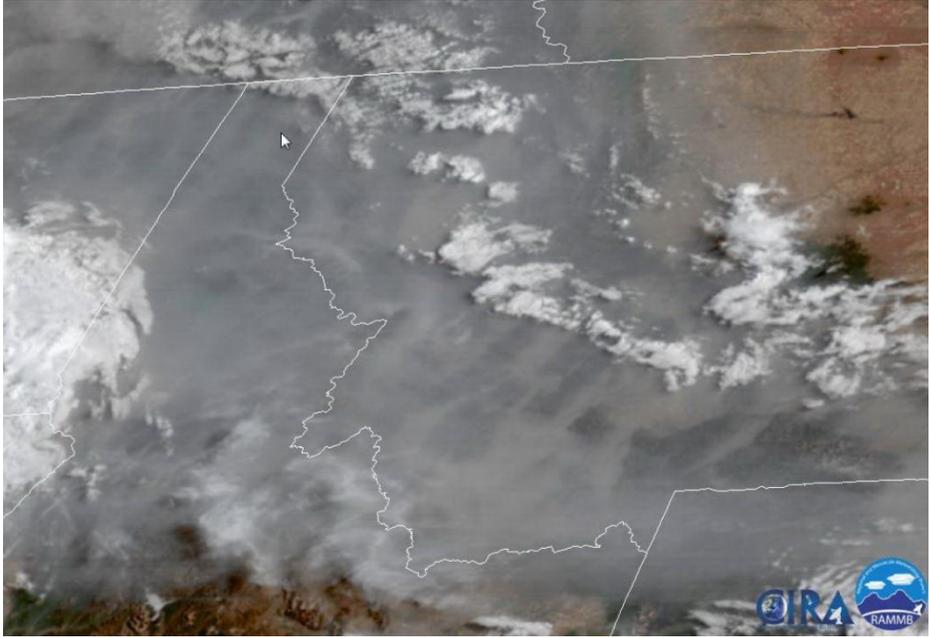
On Sunday, a cold front will sweep through the state. This should help clear out some of the built up smoke from Canada. It is looking like we will get a break from Canadian smoke for a little while once this front passes through, with smoke from those fires being temporarily redirected away from Montana as a low pressure center moves over southern Canada. I'm hopeful that we will see improvement in air quality by Sunday afternoon, especially in areas of

northwest Montana. Unfortunately, we still need to contend with fires burning here in Montana, and directly west of us in Idaho and Washington. The changing weather pattern will bring Montana under westerly flow aloft with southwest surface winds. This will bring smoke from the increasing number of fires in Idaho into southwest Montana. I would expect the Bitterroot Valley to see smoke impacts from Idaho fires throughout much of next week. In addition, new fire starts are likely under these conditions.

Overall, air quality will likely remain poor today in much of western Montana due to all the smoke that has moved over us from Canada and the red flag warning in place here. We may start to see improvement in some areas tomorrow as a cold front moves through the state. Unfortunately, this will cause fire activity to remain high on fires here in Montana and Idaho, which will likely continue to impact air quality, especially in Southwest and west-central Montana. We will remain under this westerly flow aloft throughout the week, with a likely return of Canadian smoke by mid-week.

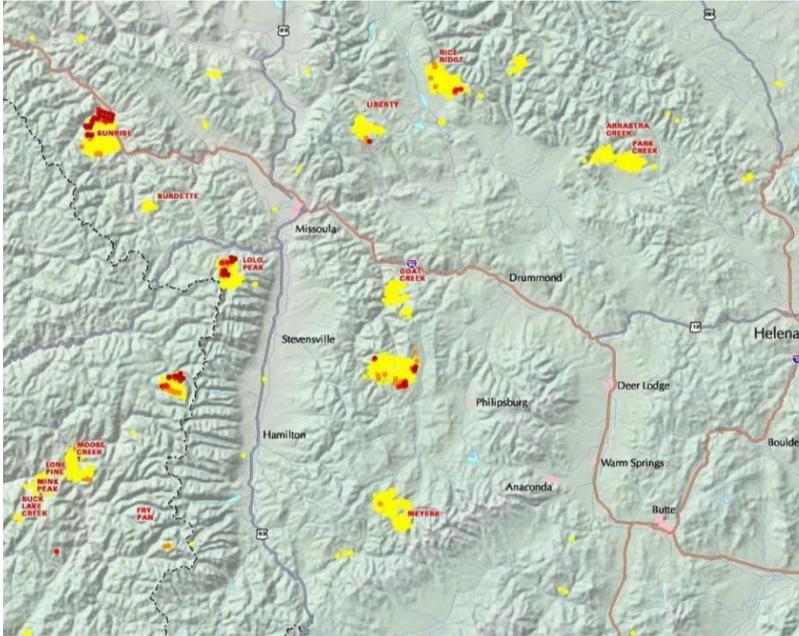
The Montana Department of Environmental Quality has issued an air quality alert for Beaverhead, Deer Lodge, Flathead, Granite, Lake, Lincoln, Mineral, Missoula, Ravalli, Sanders, and Silver Bow counties in effect until further notice due to smoke from fires in Canada and western Montana. Fires in Montana are causing severe localized impacts near active fires. This includes Mineral County along I-90 corridor near the Sunrise fire and Seeley Lake near the Rice Ridge fire. Smoke from these fires is draining into the nearby valleys at night, causing severe air quality impacts from midnight through midday. The Missoula City-County Health Department has issued a recommendation that residents of Seeley Lake spend as little overnight time in the area as possible due to the hazardous air quality. This alert will be updated again at 900AM 8/13/2017.

Satellite imagery this morning shows smoke over all of western Montana and much of central Montana.



Source: CIRA and NOAA. This data is preliminary and not operational.

Fire detection from last night is shown below in red.



Source: USFS

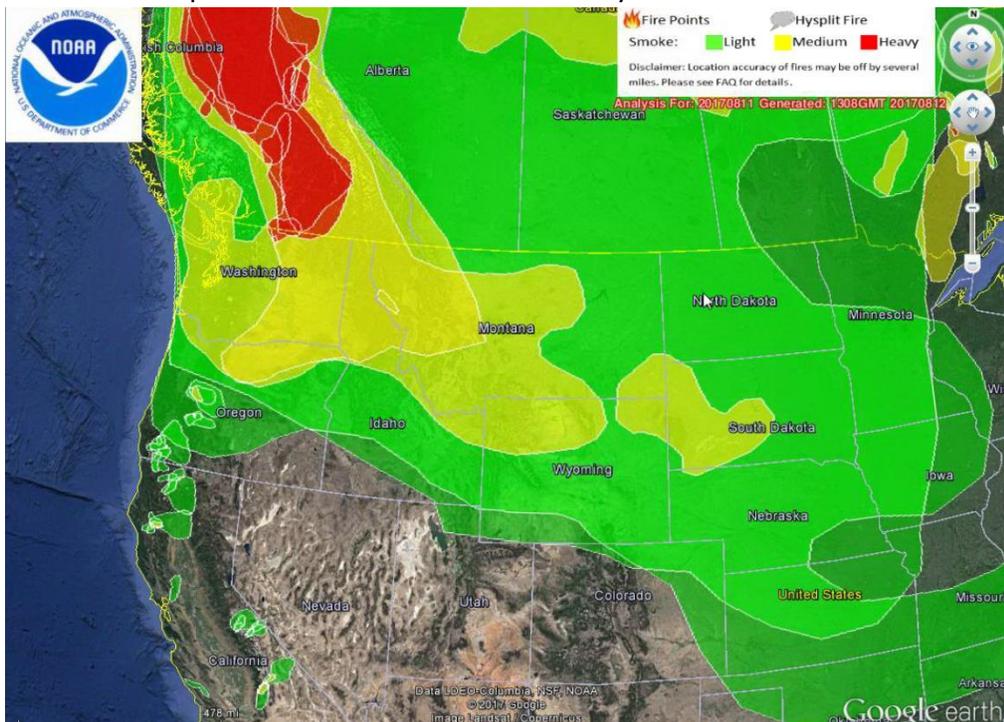
Unhealthy air quality is present in the Bitterroot Valley today on the left. On the right is what

the view looks like on a good day.



Source: [USFS](#)

There is widespread smoke over Montana today.



Source: [NOAA](#)

**NOAA Text Description:**

Saturday, August 12, 2017

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY THROUGH 1600 August 12, 2017

Remnant smoke from the Canadian fires has mixed with smoke from the numerous fires in Oregon, Washington, Idaho, northern California and western Montana and covers a large swath of the US. The smoke extends from most of Washington and central Oregon eastward across northern and central Idaho, western and southern Montana and into the northern and central Plains, the Midwest and upper Tennessee valley. The most dense smoke was seen over northern Washington, northern Idaho and western Montana.

<http://www.ssd.noaa.gov/PS/FIRE/DATA/SMOKE/2017/2017H121954.html>

Wednesday, August 23, 2017

### **Morning Update**

Air quality deteriorated overnight in many valleys due to the stable conditions under a ridge of high pressure. We are seeing widespread UNHEALTHY air in west-central Montana – extending areas just east of the Divide. Air quality impacts are most significant close to the Lolo Peak and Rice Ridge fires where air quality is currently HAZARDOUS in Lolo, Florence, and Seeley Lake. Satellite imagery this morning is showing widespread smoke over Montana. This is causing widespread MODERATE air quality in northern and eastern Montana. Air quality in Eureka is UNHEALTHY FOR SENSITIVE GROUPS due to the Gibraltar Ridge fire. In addition to smoke from the fires here in Montana and Idaho, yesterday afternoon brought smoke over from Oregon and Northern California along southwest winds. This smoke is adding to the haze and air quality impacts across the state.

Air quality impacts throughout the day are expected to remain UNHEALTHY to VERY UNHEALTHY in west-central Montana due to the stable atmospheric conditions. Daytime heating will struggle to lift the smoke off the valley floors until late in the afternoon, if at all. Areas of Missoula and Ravalli counties will likely see the worst impacts, although air quality will likely be UNHEALTHY or worse across the whole area. Elsewhere, skies are expected to be hazy with air quality ranging from MODERATE to UNHEALTHY FOR SENSITIVE GROUPS throughout the day.

There is good and bad news on the horizon. A cold front will be moving through the state on Thursday. The increased erratic winds and possible thunderstorms should help clear out the smoke that has built up in many valleys over the past few days. Air quality should improve from west to east on Thursday, at least briefly. Unfortunately, as the smoke moves out of western valleys, eastern Montana will likely see a period of decreased air quality as the smoke moves through. More significantly, the increased winds will likely lead to a very active day on area fires. By Thursday afternoon, we will likely see dense plumes spreading west across Montana. Any improvement that does occur due to the increased winds will likely be short lived as smoke production is increased. Areas a little further downwind of areas fires will likely see impacts first as smoke drops into valleys near the Divide. Areas closer to active fires may see GOOD to MODERATE air quality by Thursday evening as smoke is lifted up and over the nearby valleys. Winds are expected to remain elevated through Thursday night, possibly helping Seeley Lake, Lolo and Florence avoid hazardous air quality for one morning.

Another ridge of high pressure is expected to build in for the weekend and remain over the area for at least the first half of next week. This means a return to hot and dry conditions with strong overnight inversions. Air quality impacts will once again become widespread with the

most significant impacts down drainage from local fires.

The Montana Department of Environmental Quality has issued an air quality alert for Deer Lodge, Granite, Jefferson, Lake, Lewis and Clark, Mineral, Missoula, Powell, Ravalli, and Silver Bow counties in effect until 900AM 8/24/2017 due to fire activity in west-central Montana and transported smoke from the Pacific Northwest. Air quality is expected to remain poor throughout the day. A cold front should allow air quality to improve in some valleys tonight into Thursday but increased fire activity will inhibit long term improvement. Smoke impacts are most significant near the Lolo Peak and Rice Ridge fires. The Missoula City-County Health Department recommends residents spend as little night time as possible in Seeley Lake due to the dangerous overnight pollution levels. This alert will be updated again at 900AM 8/24/2017.

### **Afternoon Update**

Air quality has remained poor across west-central Montana this afternoon. Air quality is UNHEALTHY in most locations in west-central Montana including Superior, Alberton, Lolo, Missoula, Frenchtown, Seeley Lake, Condon, Hamilton, Rock Creek, Drummond, Philipsburg, and Lincoln. Conditions in Florence have remained VERY UNHEALTHY this afternoon while levels have improved from UNHEALTHY to UNHEALTHY FOR SENSITIVE GROUPS in Helena, Rainy Lake, and Condon and to MODERATE levels in Butte. The reason conditions have not improved very much this afternoon is the strong ridge of high pressure that is over the area. These stable conditions are inhibiting mixing and causing smoke to linger near the surface. The air quality impacts are not only in west-central Montana. Air quality is UNHEALTHY FOR SENSITIVE GROUPS in Lewistown, Billings, and Eureka and MODERATE in Dillon, Great Falls, White Sulphur Springs, Bozeman, Columbia Falls, Thompson Falls, and Broadus. Another reason for the increased impacts today is the addition of smoke from fires in Oregon and northern California. The Gibraltar Ridge fire is also putting up a fairly large plume and impacting areas along the Canadian border in Glacier National Park.

Impacts are expected to remain UNHEALTHY in most locations through the evening hours. Some areas may see a couple hours of improvement later this evening, but widespread improvement is not expected. Starting late tonight into tomorrow morning, we should start to see clearing when winds increase with a passing disturbance. I don't expect most places to see conditions improve too much until the cold front arrives later on Thursday, which is discussed in the extended forecast.

### **Fires**

- The Lolo Peak fire, near Lolo, is 33,031 acres and 14% contained with active fire behavior. The fire is causing significant smoke impacts to the Bitterroot Valley, especially near Florence and Lolo.
- The Rice Ridge fire, near Seeley Lake is currently 16,117 acres and 9% contained with moderate

fire behavior. This fire continues to cause impacts throughout the Seeley-Swan Valley with the most significant impacts in the Seeley Lake community during the morning hours.

-The Liberty fire, near Arlee, is 8,426 acres and 10% contained with active fire behavior. This fire is causing smoke impacts in the Potomac Valley and Arlee areas.

-The Sunrise fire, near Superior, is 25,321 acres and 50% contained with active fire behavior.

-The Sapphire Complex, south of Clinton, is 38,616 acres and 49% contained with active fire behavior.

- The Meyers fire, near Philipsburg, is currently 16,052 acres and 5% contained with moderate fire behavior.

- The Park Creek fire, near Lincoln, is currently 6,765 acres and 56% contained with moderate fire behavior. The nearby Arrastra fire is 5,985 acres.

-The Blue Bay fire, near Polson, is 490 acres and 40% contained with active fire behavior.

-The Sprague fire on the west side of Glacier National Park is 1,364 acres. This fire is likely causing overnight impacts in the Lake McDonald area.

-The Gibraltar Ridge fire, located east of Eureka, is 3,624 acres and 52% contained with minimal fire behavior. This fire is causing occasional impacts in the Eureka area.

- In Idaho, the Chute Creek fire (2,162 acres), Hidden fire (4,754 acres), Lone Pine fire (6,385 acres), and Moose Creek 1 fire(11,383 acres) in the Selway-Bitterroot will likely be sending smoke into the Bitterroot Valley for the foreseeable future.

-The Highline fire (24,334 acres) and the Hanover fire (16,774 acres) in Idaho will continue to send smoke into southwest Montana.

-The Indian Creek (293 acres), the Milli (12,457 acres), and the Chetco Bar (99,944 acres) fires are among numerous fires burning in Oregon and northern California that have started sending smoke into Montana, causing an increase in hazy skies and air quality impacts. More information about these fires can be found here and here.

## **Extended Forecast**

There is good and bad news on the horizon. A cold front will be moving through the state on Thursday. The strong winds and thunderstorms should help clear out smoke that has built up in many valleys over the past few days. Air quality should improve from west to east on Thursday, at least briefly. Unfortunately, as the smoke moves out of western valleys, eastern Montana will likely see a period of decreased air quality as the smoke moves through. More significantly, the increased winds will lead to a very active day on area fires. By Thursday afternoon, we will likely see dense plumes spreading west across Montana. Any improvement that does occur due to the increased winds will likely be short lived as smoke production is increased. Areas a little further downwind of areas fires may see impacts first as smoke drops into valleys near the Divide. Areas closer to active fires may see GOOD to MODERATE air quality by Thursday evening as smoke is lifted up and over the nearby valleys. Winds are expected to remain elevated through Thursday night, possibly helping Seeley Lake, Lolo and Florence avoid hazardous air quality for one morning. We will likely have to deal with smoke from increased fire activity in

Oregon during this period, although the increased haze and air quality impacts should remain in the southern half of the state.

One big question mark as this system moves through is the possibility of new fires. With significant lightning expected and strong winds, new fire starts are possible on Thursday and Friday. New areas of concern may pop up in the next several days as new fires are discovered.

Another ridge of high pressure is expected to build in for the weekend and remain over the area for at least the first half of next week. This means a return to hot and dry conditions with strong overnight inversions. Smoke is expected to pool near active fires each evening, with HAZARDOUS air quality likely in areas down drainage, such as Lolo, Florence, Lake McDonald, and Seeley Lake. Elsewhere, air quality will likely range from UNHEALTHY FOR SENSITIVE GROUPS to VERY UNHEALTHY at times. Right now these impacts are expected to be most significant in the Bitterroot and Missoula valleys and in close proximity to active fires. Air quality impacts will once again become widespread as the ridge build over the area and smoke from Oregon and California is added to the smoke being generated here in Montana. Overall, expect air quality impacts to persist for almost all of Montana next week.

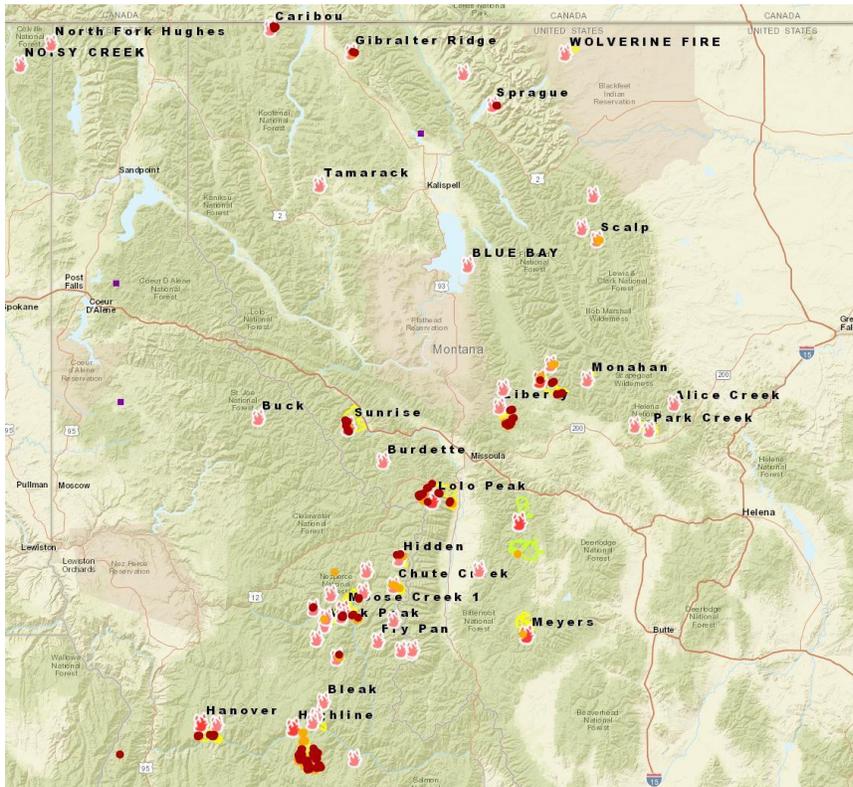
The Montana Department of Environmental Quality has issued an air quality alert for Deer Lodge, Granite, Jefferson, Lake, Lewis and Clark, Mineral, Missoula, Powell, Ravalli, and Silver Bow counties in effect until 900AM 8/24/2017 due to fire activity in west-central Montana and transported smoke from the Pacific Northwest. Air quality is expected to remain poor throughout the day. A cold front should allow air quality to improve in some valleys tonight into Thursday but increased fire activity will inhibit long term improvement. Smoke impacts are most significant near the Lolo Peak and Rice Ridge fires. The Missoula City-County Health Department recommends residents spend as little night time as possible in Seeley Lake due to the dangerous overnight pollution levels. This alert will be updated again at 900AM 8/24/2017.

This morning's satellite shows smoke over most of Montana, with dense plumes near area fires.



Source: CIRA and NOAA. These data are preliminary and not operational.

Recent fire activity is shown in red below.



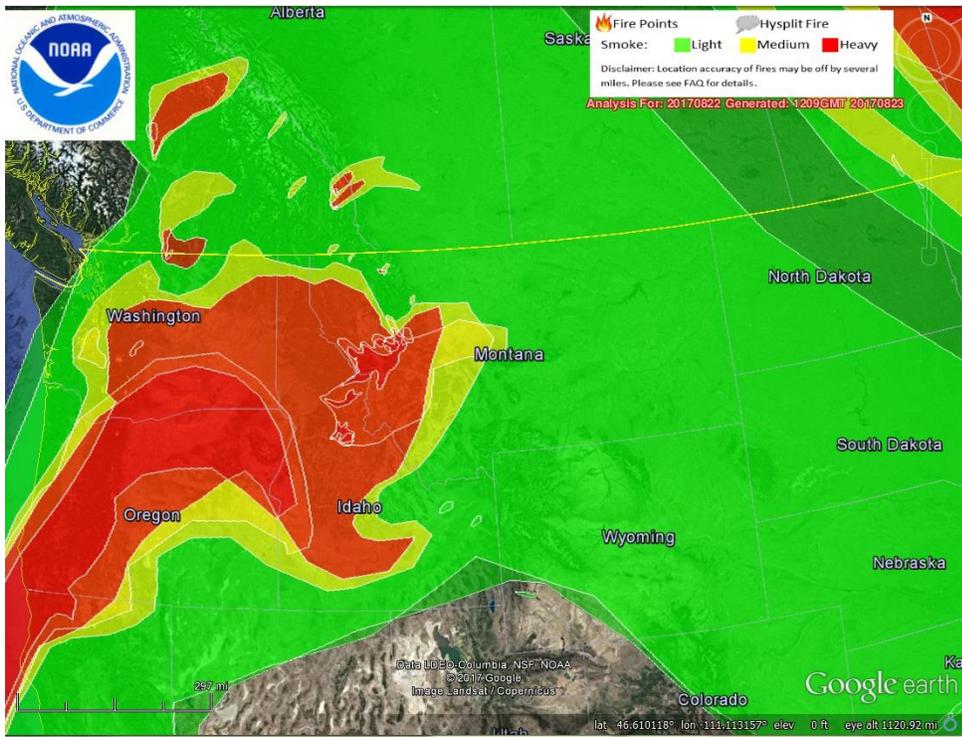
Source: NWCG

On the left, smoke is visible on almost all webcams this morning. Below, the smoke in Arlee is causing unhealthy air quality. On the right, the view on a good day.



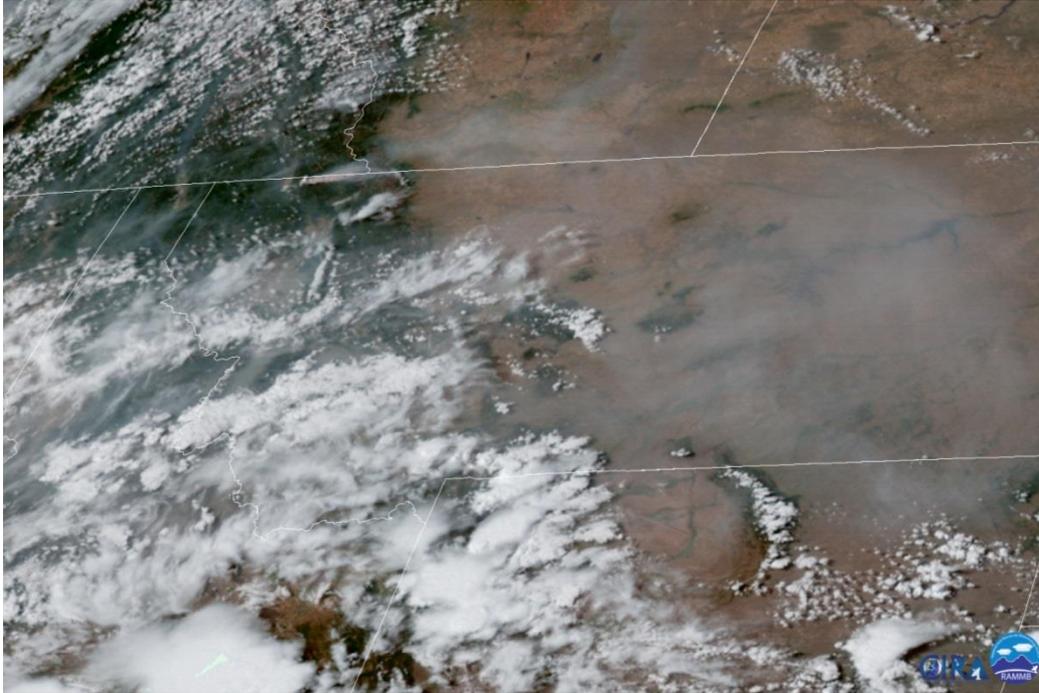
Source: [Arlee Montana](#)

Yesterday's smoke analysis shows smoke from Oregon heading our way and dense smoke around area fires.



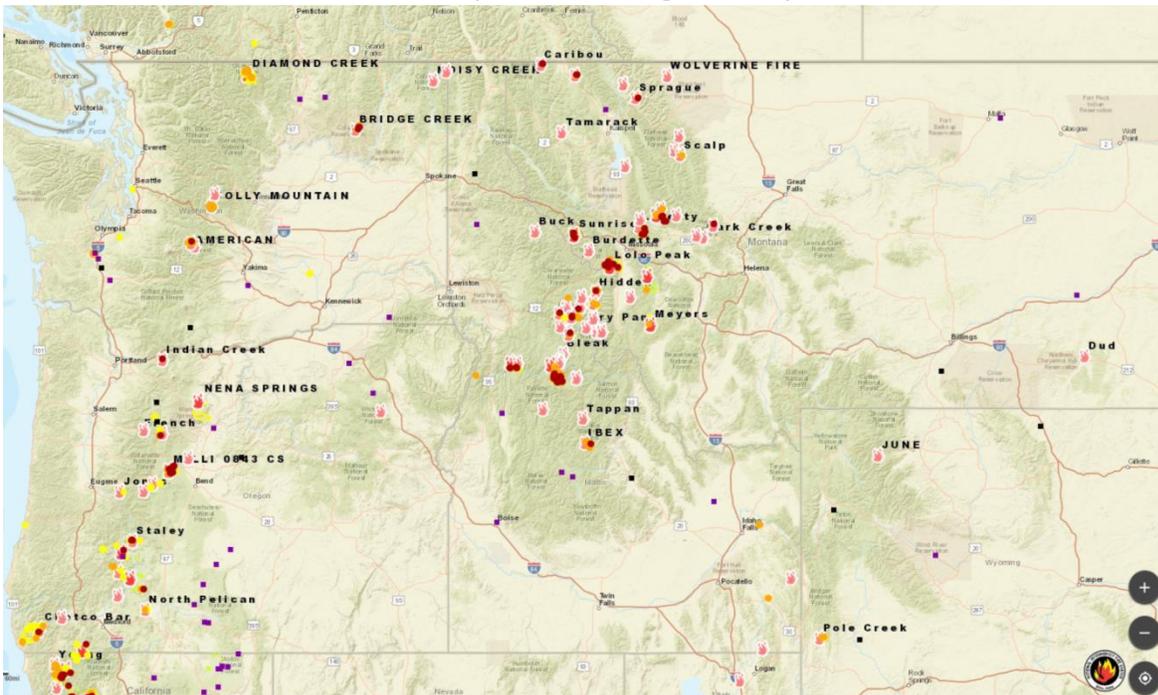
Source: [NOAA](#)

Smoke is visible across most of Montana this afternoon. A dense plume can be seen coming off the Gibraltar Ridge fire.



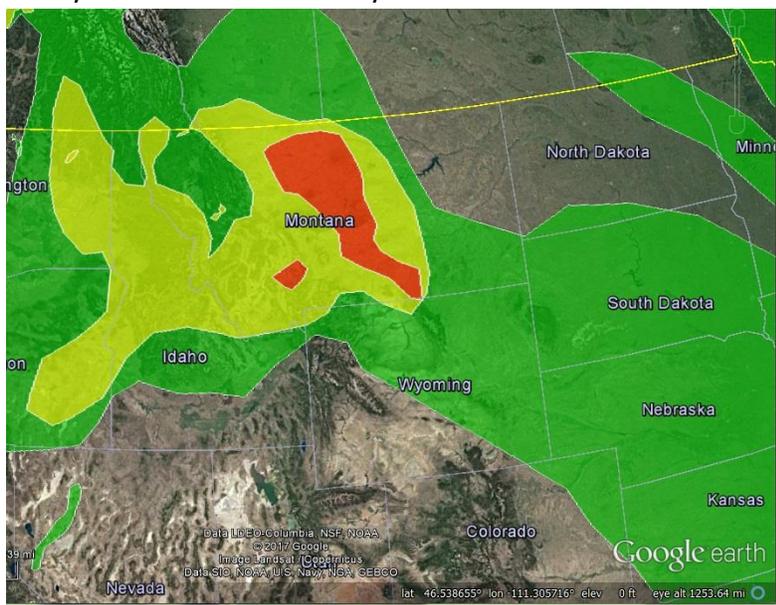
Source: CIRA and NOAA. These data are preliminary and not operational.

Here is a broader view of fire activity across the region today.



Source: NWCG

Today's satellite smoke analysis shows smoke over much of Montana.



Source: [NOAA](#)

#### **NOAA Text Description:**

Wednesday, August 23, 2017

#### **DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY THROUGH 1630Z August 23, 2017**

##### **SMOKE:**

Northwest US into the Plains and British Columbia into Alberta Canada... Smoke from the continuing wildfires in northern California, western Oregon, Washington, Idaho, western Montana and southern British Columbia covers much of the region. The smoke covers far northern California, most of Oregon, eastern Washington, most of Idaho and most of Montana. There are large patches of moderately dense and dense smoke within this area. Mostly light smoke is seen extending to the southeast across north Wyoming, South Dakota, Nebraska and Kansas into northern Oklahoma. Smoke also covers southeast British Columbia and much of Alberta. Clouds over this area make the full extent of the smoke and the density difficult to assess. Smoke from the fires in northwest California and southwest Oregon is also seen streaming to the southwest off the coast where it extends to the latitude of the middle of the Baja peninsula.

<http://www.ssd.noaa.gov/PS/FIRE/DATA/SMOKE/2017/2017H232020.html>

Tuesday, August 29, 2017

### **Current Situation**

Significant air quality impacts are continuing today for many parts of Montana. Air quality is currently UNHEALTHY in Alberton, Arlee, Superior, Seeley Lake, Rainy Lake, Columbia Falls, Clearwater, Potomac, Missoula, Frenchtown, Hamilton, Stevensville, Lolo, Florence, Philipsburg, Lincoln, Helena, and Butte. Air quality is UNHEALTHY FOR SENSITIVE GROUPS in Condon, Eureka, Drummond, Rock Creek, Bozeman, and White Sulphur Springs and MODERATE in Dillon, Libby, Thompson Falls, West Yellowstone, Billings, Birney, Broadus, Great Falls, Malta, and Lewistown. The cause of all this smoke is a large, stable high pressure system trapping smoke from fires here in Montana and across the Pacific Northwest.

Air quality impacts are expected to continue into the evening with minimal improvement across the region. By tomorrow morning, severe air quality impacts, reaching HAZARDOUS levels, are expected in close proximity to active fires, particularly Seeley Lake, Florence, and Lake McDonald. Widespread UNHEALTHY to VERY UNHEALTHY air quality is expected across west-central Montana due to the combination of smoke from area fires and the influence of smoke from the Pacific Northwest. Elsewhere, air quality impacts reaching UNHEALTHY FOR SENSITIVE GROUPS are likely in most other parts of Montana as the wildfire smoke continues to build up under this ridge.

### **Fires**

Fires have been very active this week with the hot and dry weather.

- The Lolo Peak fire, near Lolo, is 38,878 acres and 31% contained with active fire behavior. The fire is causing significant smoke impacts to the Bitterroot Valley, especially near Florence and Lolo.

-The Rice Ridge fire, near Seeley Lake is currently 30,662 acres and 22% contained with active fire behavior. This fire continues to cause impacts throughout the Seeley-Swan Valley with the most significant impacts in the Seeley Lake community during the morning hours.

-The Meyers fire, near Philipsburg, which had been fairly quiet lately, had significant growth yesterday. The fire is currently 22,308 acres and 5% contained. This fire is causing significant overnight impacts in Granite County.

-The Liberty fire, near Arlee, is 13,284 acres and 18% contained with active fire behavior. This fire is causing smoke impacts in the Potomac Valley and Arlee areas.

-The Alice Creek fire, near Lincoln, is currently 5,741 acres with 0% contained with active fire behavior.

-The Sprague fire on the west side of Glacier National Park is 1,575 acres. This fire is causing significant overnight impacts in the Lake McDonald area. Also in Northwest Montana the Caribou fire, west of Eureka, is 1,300 acres and the Gibraltar ridge fire, east of Eureka, is 5,112 acres. These fires are causing impacts near Eureka.

-The Highline [fire](#) (32,010 acres), the Hanover [fire](#) (17,603 acres), and the Hidden [fire](#) (7,657 acres), and the Moose Creek [fire](#)(14,344 acres) in Idaho, will continue to send smoke into southwest Montana.

-Numerous fires burning in Oregon and northern California are sending smoke into Montana, causing an increase in hazy skies and air quality impacts across the southern portion of the state. More information about these fires can be found [here](#) and [here](#).

-Satellite imagery this afternoon is showing two very active fires in Washington State that are also sending smoke up into Canada and then down into Montana. These are the Norse Peak [fire](#)(5,712 acres), near Cliffdell, WA and the Diamond Creek [fire](#) (32,728 acres) near the Canadian border.

-Infrared imaging is also showing a new fire in the southern Bitterroot this morning. More information on this fire will likely be available tomorrow.

### **Extended Forecast**

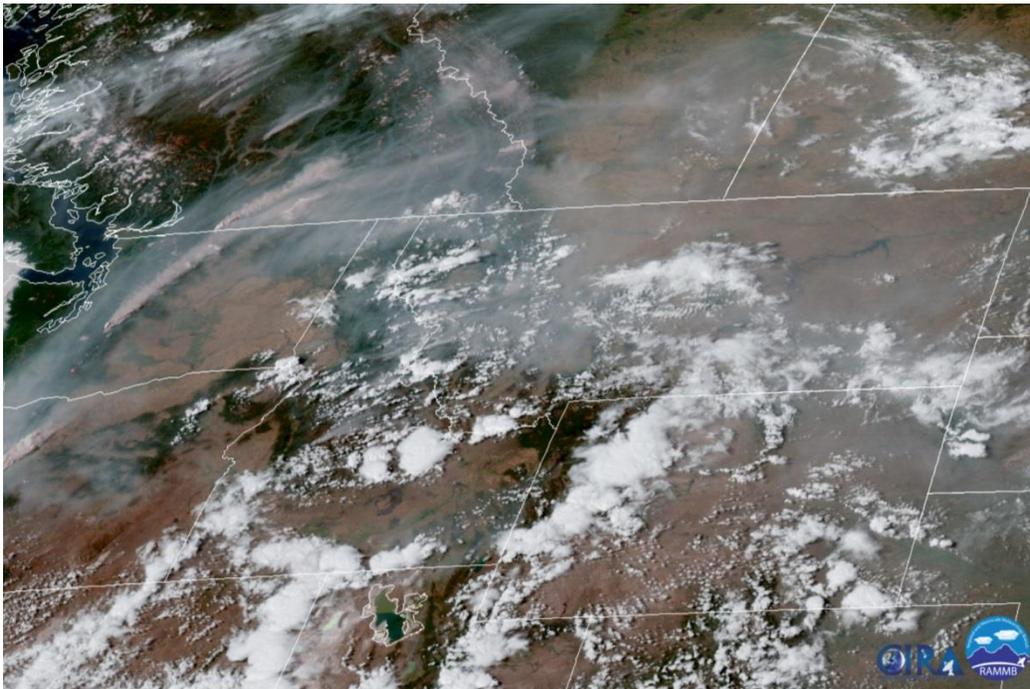
There is not much good news for air quality over the next week. The ridge of high pressure will remain over the area through most of tomorrow, trapping smoke from fires here in Montana, as well as Idaho, Washington, Oregon, and northern California. Air quality impacts in west-central Montana will likely range from [UNHEALTHY](#) to [VERY UNHEALTHY](#) tomorrow, with morning impacts reaching [HAZARDOUS](#) levels in Seeley Lake, Florence, and Lake McDonald due to the nearby fire activity.

Starting overnight Wednesday into Thursday, the ridge of high pressure is expected to break down with a cold front moving through. This will cause increased winds and possible thunderstorms through Thursday evening. The National Weather Service has issued a red flag warning for all of western Montana beginning at 1pm tomorrow and lasting until 9pm on Thursday. The increased winds may help clear out some of the built up smoke that has accumulated in valleys over the past week. Unfortunately, any improvement will likely be brief due to the increased fire behavior here in Montana and smoke being transported in from Washington and Oregon. We will likely see large plumes of smoke moving through Montana with air quality ranging from [MODERATE](#) to [VERY UNHEALTHY](#) on Thursday.

After the disturbance passes through, a ridge of high pressure will build back into the area on Friday and Saturday. This will once again cause widespread hazy skies and air quality impacts. Smoke will be trapped in valleys overnight, with impacts reaching [HAZARDOUS](#) levels near active fires. Transported smoke from the Pacific Northwest will continue to impact the area, causing impacts to reach far across the state. Early next week, the ridge is expected to slide a little west, with Montana under northwest winds aloft. This may provide a break from the transported smoke, especially in northwest Montana. With limited precipitation in the forecast, the impacts in west-central Montana are expected to continue for the foreseeable future.

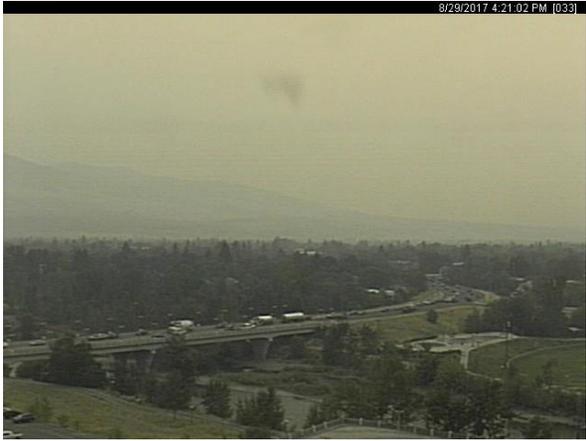
The Montana Department of Environmental Quality has issued an air quality alert for Deer Lodge, Flathead, Granite, Jefferson, Lewis and Clark, Missoula, Powell, and Ravalli counties in effect until further notice due to fire activity in west-central Montana and the Pacific Northwest. Widespread air quality impacts are expected through at least Wednesday. The most significant impacts are occurring near the Rice Ridge, Sprague, and Lolo Peak fires in Seeley Lake, Lake McDonald, and Florence. This alert will be updated again at 900AM 8/30/2017.

This afternoon's satellite shows smoke over all of Montana and dense plumes coming off fires in Washington and Oregon.



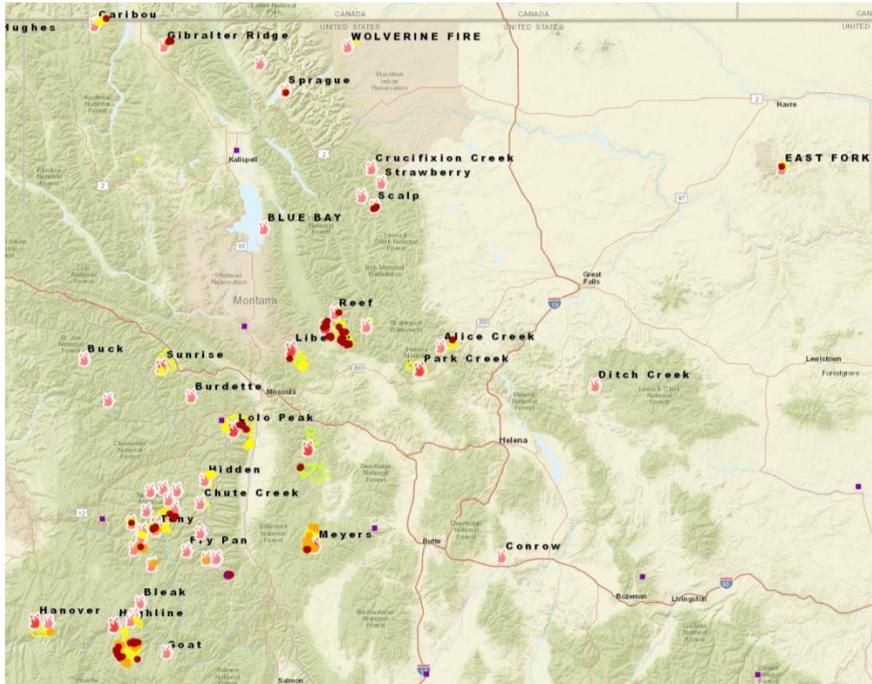
Source: CIRA and NOAA. These data are preliminary and not operational.

On the left, the view in Missoula is a typical scene today in western Montana, with widespread unhealthy air quality. On the right, the view on a good day (note, this is a slightly different camera angle)



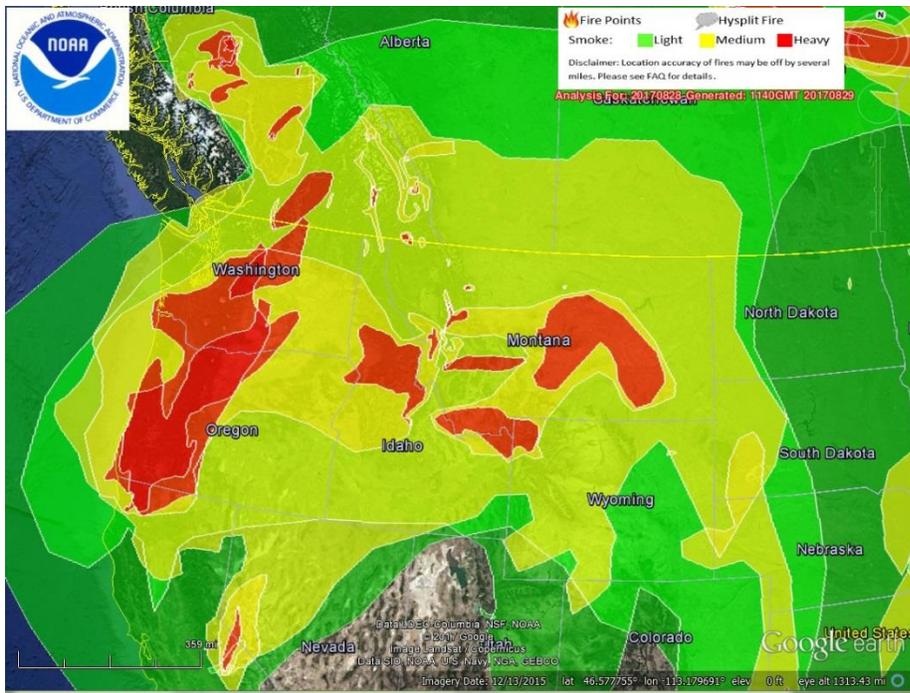
Source: [KTVQ](#)

Regional recent fire activity, in red, shows fires burning throughout Montana and the Pacific Northwest.



Source: [NWCG](#)

Today's satellite smoke analysis shows smoke over all of Montana.



Source: [NOAA](#)

**NOAA Text Description:**

Tuesday, August 29, 2017

**DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY THROUGH 1900Z August 29, 2017**

The Rockies...

Numerous wildfires over Montana and Idaho are producing a large area of moderate to dense smoke. This smoke is generally moving eastward toward the Dakotas. Another cluster of wildfires in eastern Saskatchewan are producing moderate to dense smoke in a band extending eastward toward Ontario.

<http://www.ssd.noaa.gov/PS/FIRE/DATA/SMOKE/2017/2017H291846.html>

Wednesday, August 30, 2017

## Current Situation

Significant air quality impacts are continuing today for many parts of Montana. Air quality is currently HAZARDOUS in Seeley Lake. Air quality is VERY UNHEALTHY in Arlee, Rainy Lake, Lincoln, Lolo and Florence. Air quality is currently UNHEALTHY in Eureka, Lake McDonald, Superior, Condon, Clearwater, Missoula, Stevensville, Rock Creek, and Helena. Air quality is UNHEALTHY FOR SENSITIVE GROUPS in Alberton, Frenchtown, Hamilton, Drummond, Philipsburg, Butte and White Sulphur Springs and MODERATE in Dillon, Libby, Thompson Falls, Flathead Valley, Bozeman, Billings, Broadus, Great Falls, Malta, Lewistown and Sidney.

Widespread air quality impacts are expected to remain UNHEALTHY FOR SENSITIVE GROUPS to VERY UNHEALTHY throughout the day across west-central Montana due to the combination of smoke from area fires and the influence of smoke from the Pacific Northwest. Dry thunderstorms are expected in western Montana today with gusty, erratic winds causing variable smoke impacts near fires as well as possible new fire starts. Overnight tonight and into tomorrow, increased winds will help to disperse the built-up smoke from the area; however, fire growth will be a major concern.

## Fires

- The infrared image from yesterday showed a new fire in the southern Bitterroot. This is the Nelson Creek fire and was estimated at 80 acres.
- The Lolo Peak fire, near Lolo, is 38,878 acres and 31% contained with active fire behavior. The fire is causing significant smoke impacts to the Bitterroot Valley, especially near Florence and Lolo.
- The Rice Ridge fire, near Seeley Lake is currently 32,222 acres and 18% contained with active fire behavior. This fire continues to cause impacts throughout the Seeley-Swan Valley with the most significant impacts in the Seeley Lake community during the morning hours.
- The Meyers fire, near Philipsburg, which had been fairly quiet lately, had significant growth yesterday. The fire is currently 23,337 acres and 5% contained. This fire is causing significant overnight impacts in Granite County.
- The Liberty fire, near Arlee, is 13,813 acres and 20% contained with active fire behavior. This fire is causing smoke impacts in the Potomac Valley and Arlee areas.
- The Alice Creek fire, near Lincoln, is currently 6,171 acres with 0% contained with active fire behavior.
- The Sprague fire on the west side of Glacier National Park is 2,097 acres. This fire is causing significant overnight impacts in the Lake McDonald area. Also in Northwest Montana the Caribou fire, west of Eureka, is 1,600 acres and the Gibraltar ridge fire, east of Eureka, is 5,947

acres. These fires are causing impacts near Eureka.

-The Highline [fire](#) (34,937 acres), the Hanover [fire](#) (17,603 acres), the Hidden [fire](#) (7,657 acres), and the Moose Creek [fire](#) (14,344 acres) in Idaho, will continue to send smoke into southwest Montana.

-Numerous fires burning in Oregon and northern California are sending smoke into Montana, causing an increase in hazy skies and air quality impacts across the southern portion of the state. More information about these fires can be found [here](#) and [here](#).

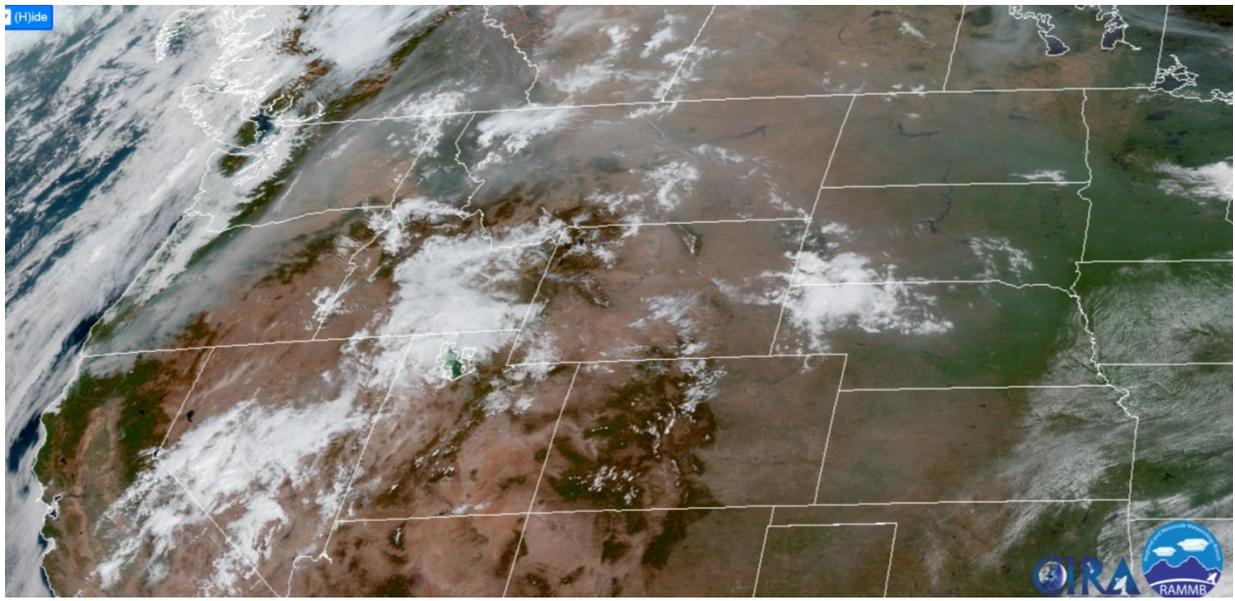
## **Extended Forecast**

Dry thunderstorms and erratic winds will impact western Montana today, causing variable air quality near fires. Widespread impacts are likely to remain through most of today with the best chance for improving air quality starting tomorrow. Overnight tonight and into tomorrow, the ridge of high pressure is expected to break down with a cold front moving through, helping to clear built-up smoke. However, fire growth over existing fires and new fire starts remains a concern with the passage of this front. The National Weather Service has issued a red flag warning for all of western Montana beginning at 1pm today and lasting until 9pm on Thursday. The pattern is very familiar this fire season: the increased winds may help clear out some of the built-up smoke that has accumulated in valleys; unfortunately, any improvement will likely be brief due to the increased fire behavior here in Montana and smoke being transported in from Washington, Oregon and California.

After the disturbance passes through a ridge of high pressure will build back into central Idaho, leaving Montana in a westerly flow, bringing afternoon breezes Friday and Saturday. This pattern might help to clear built-up smoke from the overnight and early morning inversions, however expect transported smoke from the Pacific Northwest to be affecting Montana. Early morning impacts will reach HAZARDOUS levels near active fires. West-central Montana is likely to see impacts ranging from MODERATE to UNHEALTHY tomorrow.

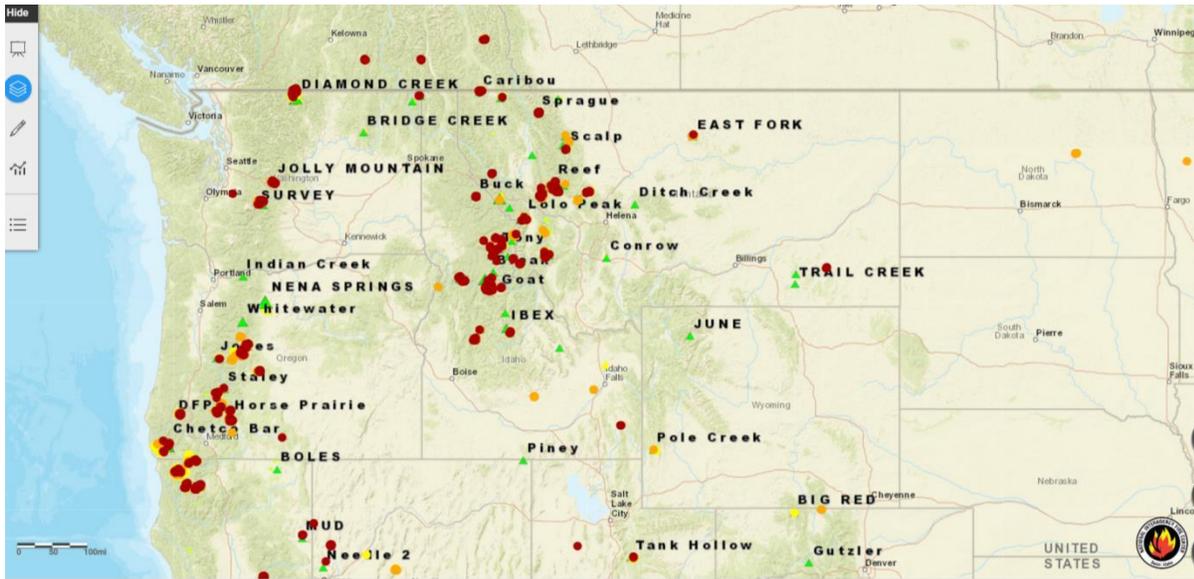
The Montana Department of Environmental Quality has issued an air quality alert for Deer Lodge, Flathead, Granite, Jefferson, Lake, Lewis and Clark, Missoula, Mineral, Powell, and Ravalli counties in effect until further notice due to fire activity in west-central Montana and the Pacific Northwest. Widespread air quality impacts are expected through tonight, with brief improvement possible on Thursday. The most significant impacts are occurring near the Rice Ridge, Sprague, and Lolo Peak fires in Seeley Lake, Lake McDonald, and Florence. This alert will be updated again at 900AM 8/31/2017.

Today's satellite shows smoke over the entire state, caused by fires here in western Montana as well as throughout the Pacific Northwest.



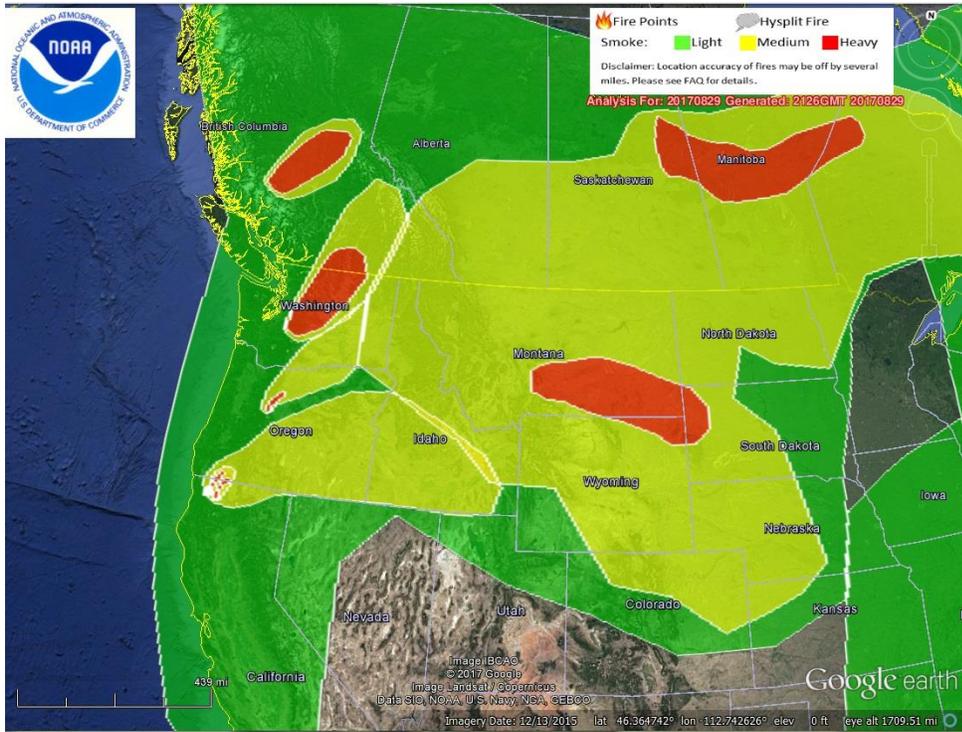
Source: CIRA and NOAA. These data are preliminary and not operational.

Regional recent fire activity, in red, shows fires burning throughout Montana and the Pacific Northwest.



Source: NWCG

Yesterday's satellite smoke analysis shows smoke over all of Montana.



Source: NOAA

**NOAA Text Description:**

Wednesday, August 30, 2017

**DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY THROUGH 1700Z August 30, 2017**

**SMOKE:**

Western North America...

Wildfires throughout California, Oregon, Washington, Idaho, Montana and British Columbia have been observed producing a large smoke plume of varying density. This large smoke plume is riding around the periphery of a ridge over the western CONUS, traveling over eastern Montana and south along the eastern edge of the Rocky Mountains. Some of this smoke has also drifted northward across western Canada. Many of the smoke plumes emanating from individual wildfires are of moderate to heavy density, which is contributing to the moderately thick smoke plume that exists from northern and central California into the Dakotas. This plume then extends eastward into the upper peninsula of Michigan and south into east-central New Mexico, Oklahoma, and Missouri.

<http://www.ssd.noaa.gov/PS/FIRE/DATA/SMOKE/2017/2017H302050.html>

Saturday, September 2, 2017

Smoke continues to sit over eastern Montana today, causing air quality concentrations to range from MODERATE up north to UNHEALTHY in the central and southeast parts of the state. This smoke is due to a combination of increased activity on fires in Montana sending smoke out over the state and significant smoke from fires in Washington curving up and over the ridge of high pressure and coming down over eastern Montana. The ridge of high pressure is trapping the smoke over the state, causing the widespread impacts.

Over in western Montana, we continue to see HAZARDOUS air quality in Seeley Lake due to the Rice Ridge fire. Air quality is also HAZARDOUS in Lake McDonald, due to the Sprague fire, and VERY UNHEALTHY in Florence, due to the Lolo Peak fire. Elsewhere, air quality is UNHEALTHY in Lolo, Arlee, Clearwater, Lincoln, Butte, and White Sulphur Springs; UNHEALTHY FOR SENSITIVE GROUPS in Stevensville, Hamilton, Lincoln, Missoula, and Bozeman; and MODERATE in all other locations.

Due to the stable air under the ridge of high pressure, air quality impacts in eastern Montana are expected to persist through Sunday night, ranging from MODERATE to UNHEALTHY. In western Montana, air quality impacts will likely worsen over the next couple of hours in many valleys as smoke sitting above the valleys mixes with ground level air. Most places should see improvement this afternoon for a few hours before smoke settles into the valleys tonight. A cold front is expected to move through the state on Monday as a strong low pressure trough digs into the eastern U.S. This will bring Montana under northwest winds aloft and easterly surface winds. The ridge will migrate back over Montana starting on Tuesday and will likely remain over the area until late next week. This unsettled weather will have varying impacts on the state depending on the location. Below is a rundown of the impacts by region.

### **Northwest Montana**

Fire activity remains high in Montana, with the new fire activity in northwest Montana sending smoke plumes out over the Flathead Valley. So far, a lot of this smoke has stayed aloft, but hazy skies and occasional air quality impacts are expected. Smoke from Washington will also contribute to the hazy skies in northwest Montana. Overall, air quality is expected to range from MODERATE to UNHEALTHY FOR SENSITIVE GROUPS, with possible UNHEALTHY impacts near active fires. Lake McDonald can expect to see Hazardous air quality once again on Sunday morning due to the Sprague fire. On Monday, easterly winds will redirect smoke, but with fires burning in Glacier and the Bob Marshall, air quality impacts are expected to persist throughout the day. Once the ridge moves back over the area starting on Tuesday, expect more smoke to impact the area from the Pacific Northwest, as well as more widespread impacts under the stable conditions.

### **West-Central Montana**

Active fire behavior is expected on area fires today and tomorrow with high smoke production due to hot temperatures and breezy conditions. The increased activity will likely cause smoke to lift up and over many western valleys, with most of the smoke settling into eastern Montana. The stable air will cause smoke to settle down into the valleys at night. Seeley Lake can expect HAZARDOUS air quality once again Sunday morning, with air quality ranging from UNHEALTHY FOR SENSITIVE GROUPS to VERY UNHEALTHY in other west-central valleys. When the front comes in on Monday, the easterly surface winds will direct much of the smoke from area fires into western valleys, with hazy skies and continued smoke impacts expected. We will hopefully get a break from the Pacific Northwest smoke for a day or two before it moves back over the area when the ridge migrates back over Montana by mid-week. Air quality impacts are expected through the end of next week, with the worst impacts expected in the mornings near active fires, followed by brief clearing in the afternoons, and then smoke settling back in each night.

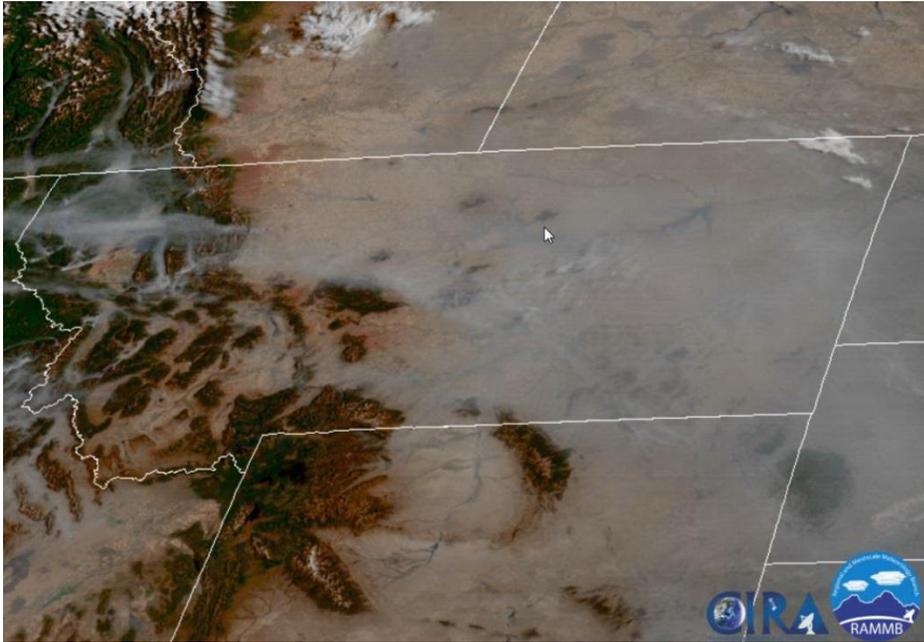
### **Central and eastern Montana**

Smoke from the fires out in eastern Montana, particularly the Sartin Draw, Tidwell, and Cold Smoke fires will continue to cause impacts ranging from MODERATE to UNHEALTHY, with the worst impacts in the southeast part of the state. Smoke from the high fire activity in western Montana will also send large plumes of smoke into eastern Montana each evening. Finally, smoke from the Washington fires is arcing over the ridge and coming back down in eastern Montana. The result is widespread hazy skies and air quality impacts, continuing through Sunday. When the easterly winds kick in on Monday, eastern Montana will likely see the biggest improvement, with smoke being redirected away from the area. More widespread smoke impacts will return for the second half of next week as the ridge establishes itself over the area.

**Bottom line:** western Montana will likely see some improvement this afternoon before impacts become more significant on Sunday and continue for most of next week. Eastern Montana will see impacts persist through Sunday night, air quality improving on Monday, and then a slow deterioration of the air quality during the latter half of next week.

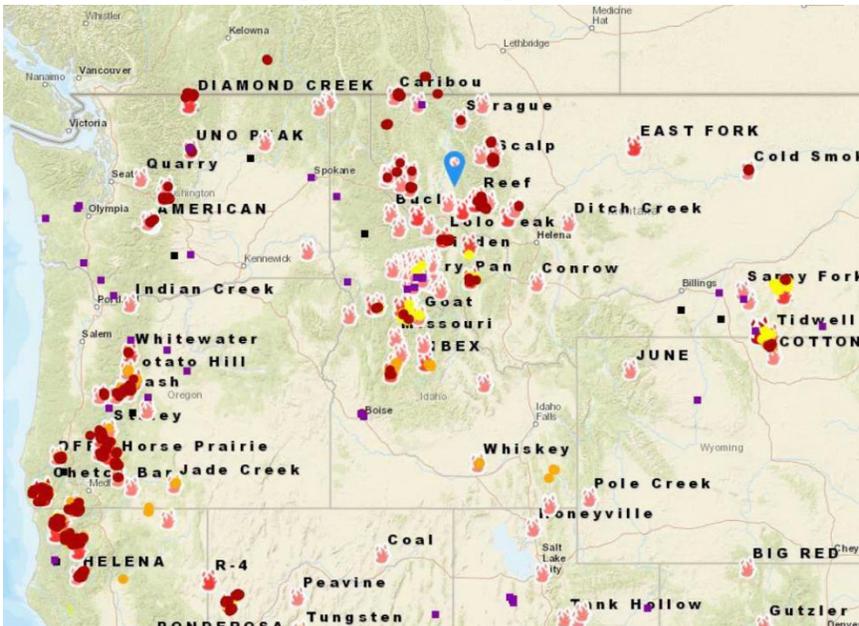
The Montana Department of Environmental Quality has issued an air quality alert for Big Horn, Broadwater, Carbon, Carter, Custer, Deer Lodge, Fallon, Fergus, Gallatin, Golden Valley, Granite, Jefferson, Judith Basin, Lake, Lewis and Clark, Meagher, Missoula, Musselshell, Park, Petroleum, Powder River, Powell, Ravalli, Rosebud, Silver Bow, Stillwater, Sweet Grass, Treasure, Wheatland, and Yellowstone counties in effect until further notice due to wildfire smoke from fires in Montana and the Pacific Northwest. Air quality impacts are expected to persist through Sunday due to a ridge of high pressure over the area. Eastern Montana should see some improvement on Monday when a cold front moves through. This alert will be updated again at 900AM 9/03/2017.

Satellite this morning shows a significant amount of smoke over eastern Montana, with more localized impacts in western Montana.



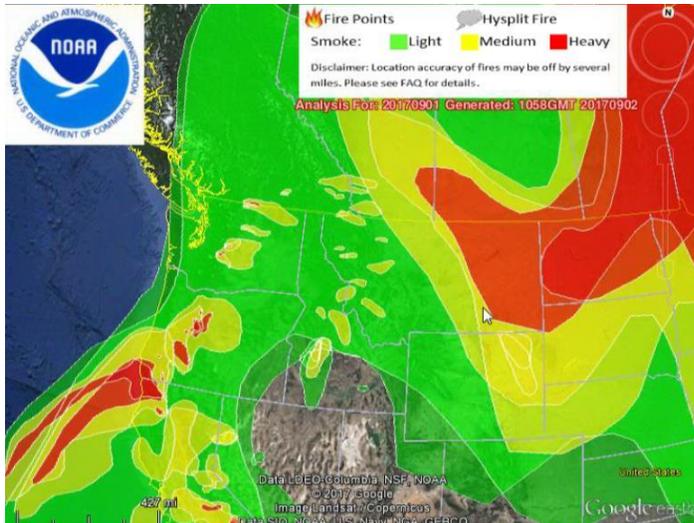
Source: CIRA and NOAA. These data are preliminary and not operational.

Fire activity remains high across the region, with recent activity shown in red.



Source: NWCC

Yesterday's smoke analysis shows smoke over the entire state, with dense smoke over eastern Montana.



Source: NOAA

**NOAA Text Description:**

Saturday, September 2, 2017

**DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY THROUGH 0100Z September 3, 2017**

SMOKE:

Southwest Canada/Western/Central US:

Smoke stretches across a very large area of the western/central US with smoke moving into the Plains and Mississippi Valley. Residual smoke stretches as far south as southern Arizona/New Mexico and central Texas and as far east as western Wisconsin, Illinois and central Missouri. Fires burning across California, western Oregon, central/eastern Washington, northern/central Idaho, western Montana and southern British Columbia/Alberta are producing large pockets of dense to very dense smoke. Smoke from wildfires in California and Oregon are moving north while fires across Washington, southern Canada and Idaho/Montana is moving west in direction. A very large pocket of heavy smoke stretches into the Pacific Ocean and through western/central Oregon then into central/eastern Washington State and across Idaho, southern Alberta and into western Montana.

Some small pockets of residual medium smoke is seen over southeast Montana, western/southern South Dakota and south central Nebraska.

<http://www.ssd.noaa.gov/PS/FIRE/DATA/SMOKE/2017/2017I030401.html>

Sunday, September 3, 2017

### **Current Situation and Today's Forecast**

The smoke is widespread across Montana today after an afternoon of very active fire behavior sent large plumes of smoke out across the state. Smoke from Oregon and Washington is also impacting the state, adding to the significant smoke in the air. There are no monitored locations reporting good air quality this morning. Most places are ranging between UNHEALTHY FOR SENSITIVE GROUPS and UNHEALTHY, with Seeley Lake, Lake McDonald, and Florence reporting VERY UNHEALTHY to HAZARDOUS levels once again.

The poor air quality is expected to continue throughout the day today. Fires are expected to be very active once again, with significant smoke being produced on most area fires. Smoke from the large fires in Washington and Oregon will continue to send smoke into Montana. On top of all that, a large area of high pressure is keeping smoke near the surface for most of the day. Some areas may see a brief period of MODERATE air quality, but overall, expect the poor air quality to linger throughout the day. Check out the Visual Smoke Blog and Today's Air throughout the day to see what the air quality is in your area. If you live in a location without an air quality monitor, use the VISIBILITY RANGES to assess the severity of the impacts to your area.

As mentioned, fires were extremely active yesterday, which can be seen on the satellite image below. This caused a tremendous amount of smoke to settle over the state last night, as can be seen on the satellite imagery from this morning. Recent fire activity (third picture below), shows lots of activity on all area fires. We also have new fires to report, especially in northwest Montana. The West Fork fire, near Libby, is currently 1,600 acres and burning to the north of town. The fires near Thompson Falls continue to gain momentum with five distinct hot spots surrounding the town. The largest of these fires is the Sheep Gap fire at over 4,600 acres. These are in addition to the fires that have been burning throughout the month of August. The Rice Ridge fire grew over 12,000 acres yesterday and large increases in acreage were seen on almost all known fires in western Montana. This caused large plumes to spread out across the state. More of the same is expected today.

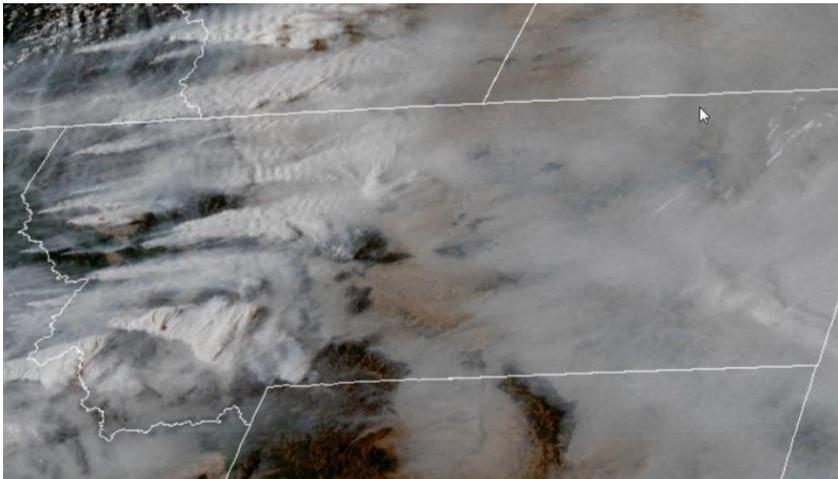
The ridge of high pressure will start to break down late tonight, with a cold front expected to move through the state on Monday. This has triggered red flag warnings across the state due to increased winds and anticipated high fire activity over the next 48 hours. The big change with this approaching system will be a shift to easterly surface winds. While this shift should allow parts of eastern Montana to get a break from the significant smoke impacts, western Montana is expected to remain under the smoke throughout this period.

By Monday afternoon, I expect far eastern Montana to have generally GOOD to MODERATE air

quality, with conditions becoming more significant as you move westward. Western Montana valleys will likely see air quality ranging from UNHEALTHY FOR SENSITIVE GROUPS to VERY UNHEALTHY, with potential HAZARDOUS conditions at times as smoke gets sandwiched between a ridge of high pressure to our west and a trough of low pressure to the east. The easterly surface winds will continue through Tuesday, with continued impacts to western Montana. On Wednesday, the ridge of high pressure is expected to migrate back over Montana, bringing air quality impacts back to eastern Montana for the latter half of the week. Smoke is expected to persist throughout western Montana, with the most significant impacts occurring in the mornings near active fires.

The Montana Department of Environmental Quality has issued an air quality alert for the entire state of Montana in effect until 900AM 9/4/2017 due to wildfire smoke from fires in Montana and the Pacific Northwest. Air quality impacts are expected to persist throughout the day due to a ridge of high pressure over the area. Eastern Montana may see some improvement on Monday when a cold front moves through. Impacts in western Montana are expected to persist through next week. This alert will be updated again at 900AM 9/4/2017.

The satellite yesterday afternoon shows plumes coming off almost all area fires. There are no clouds in this picture... just smoke.



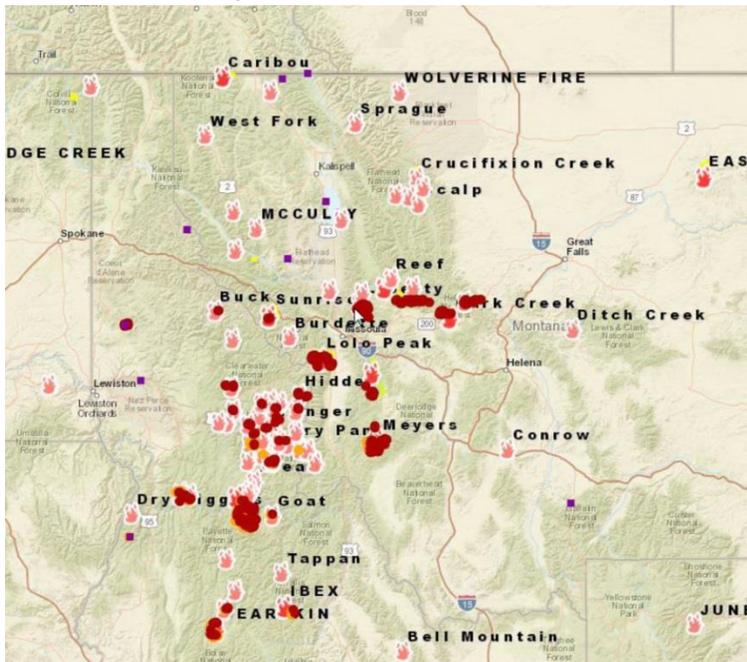
Source: CIRA and NOAA. These data are preliminary and not operational.

This morning's satellite imagery shows smoke over the entire state.



Source: CIRA and NOAA. These data are preliminary and not operational.

Recent fire activity is shown in red.



Source: NWCG

Monday, September 4, 2017

There is a LOT of smoke hanging above the state this morning, but air quality on the ground in eastern Montana is currently GOOD to MODERATE as most of that smoke is staying aloft as it is pushed to the south and west. Western Montana is a different story, with significant smoke impacts present this morning. The concentrations are jumping around quite a bit this morning, but the overall theme is – the air quality is very bad. Air quality has reached HAZARDOUS levels at times in Lolo, Potomac, Missoula, Seeley Lake and Florence. While air quality has reached VERY UNHEALTHY levels in Drummond, Eureka, Frenchtown, Lolo, Missoula, Rainy Lake, Seeley Lake, and Stevensville and UNHEALTHY levels in Arlee, Butte, Clearwater, Condon, Hamilton, Rock Creek, and Thompson Falls. Air quality is UNHEALTHY FOR SENSITIVE GROUPS in Superior. Air quality is MODERATE in Libby, Lincoln, and Columbia Falls this morning, but with a large amount of smoke hovering above western Montana, these concentrations will likely rise soon.

As the day continues, the smoke from area fires will not be able to lift and spread into eastern Montana, as it has done the past few days. Instead smoke will linger over western Montana due to easterly surface winds. A ridge of high pressure to our west will keep the smoke from spreading too far into Idaho and Washington, with much of the smoke remaining over western Montana. Fires are expected to have another active day. Western Montana valleys will likely see smoke impacts persist throughout the day today, with levels varying between UNHEALTHY and HAZARDOUS. There may be brief improvement this afternoon as smoke lifts off the valley floors, but given the large number of fires burning in the vicinity of the Continental Divide, I'm not expecting much improvement for the valleys to the west. Places to the east of the Divide, such as Great Falls and Helena are already seeing improvement as the easterly winds keep new smoke from active fires away and the significant smoke produced yesterday is staying aloft as it moves to the southwest.

### **Fires**

There is nothing but bad news to report on fire activity from yesterday. Rice Ridge doubled in size, going on a run to the east. The fire is now over 100,000 acres. The smoke from this fire can be seen in a denser plume among the dense smoke on satellite, making its way back towards western Montana due to the wind shift. Almost all other fires had significant growth yesterday under the red flag conditions. The Alice Creek fire near Lincoln, MT grew 6,000 acres and will likely cause impacts to the Lincoln area throughout the day and tonight. The Liberty fire grew 4,500 acres. These three fires together are contributing a large amount of smoke to the Potomac/Upper Blackfoot area today. The Highway 200 Complex, made up of the fires surrounding Thompson Falls, had an active day. The largest fire in that complex, the Sheep Gap fire, grew 14,000 acres. Further south, the Meyers fire grew 16,000 acres and the Lolo Peak fire grew 2,700 acres. Fires in far northwest Montana, from Libby to Glacier, also had a very active

day. For up to date information on all Montana fires, see [Inciweb](#). New fires in the Selway-Bitterroot in Idaho continue to pop up as well. Smoke from these fires should stay away from Montana for the next couple days due to easterly winds, but they will likely impact the Bitterroot Valley on and off throughout September.

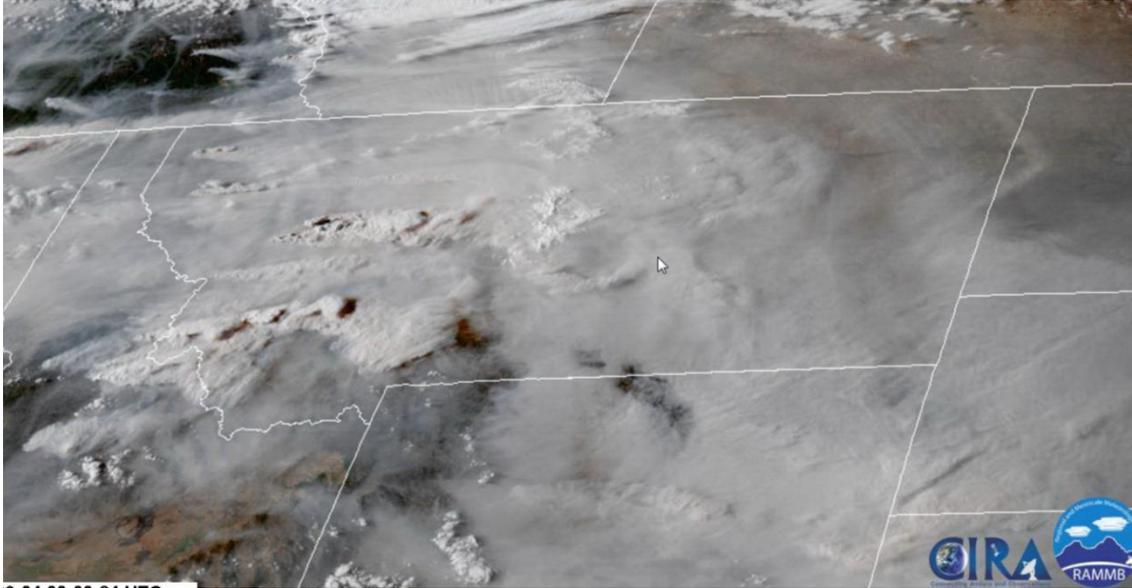
### **Extended Forecast**

Western Montana is expected to see smoke impacts throughout the week, with surface winds from the east today and tomorrow. This will keep smoke from area fires over western Montana. Some of this smoke will make its way into Idaho and Washington, but with a strong ridge over that area, most of the smoke will likely remain in western Montana. By mid-week, the ridge will slowly migrate to the east, bringing Montana under generally light and variable winds. This will not help clear out any smoke, with overnight and morning impacts likely becoming more severe and fires to the west of Montana beginning to send smoke our way once again. Smoke impacts will drift back into eastern Montana as the week progresses. The next chance of improvement looks to be the end of the week, when another round of thunderstorms and increased wind moves through. As has been the case for the past several weeks, this system will likely set off another round of critical fire weather without providing significant precipitation.

Expect air quality in western-Montana to range from UNHEALTHY to HAZARDOUS, with only brief periods of improvement over the next week. Eastern Montana should see GOOD to MODERATE air quality for the first half of this week, with concentrations increasing again starting around mid-week.

The Montana Department of Environmental Quality has issued an air quality alert for Deer Lodge, Flathead, Granite, Lake, Lewis and Clark, Lincoln, Mineral, Missoula, Powell, Ravalli, Sanders, and Silver Bow counties in effect until 900AM 9/5/2017 due to wildfire smoke from fires in Montana. Easterly winds will trap smoke over western Montana throughout the day with significant valley impacts expected tonight. This alert will be updated again at 900AM 9/5/2017.

Yesterday's satellite imagery shows a tremendous amount of smoke coming off area fires and moving in from the Pacific Northwest.



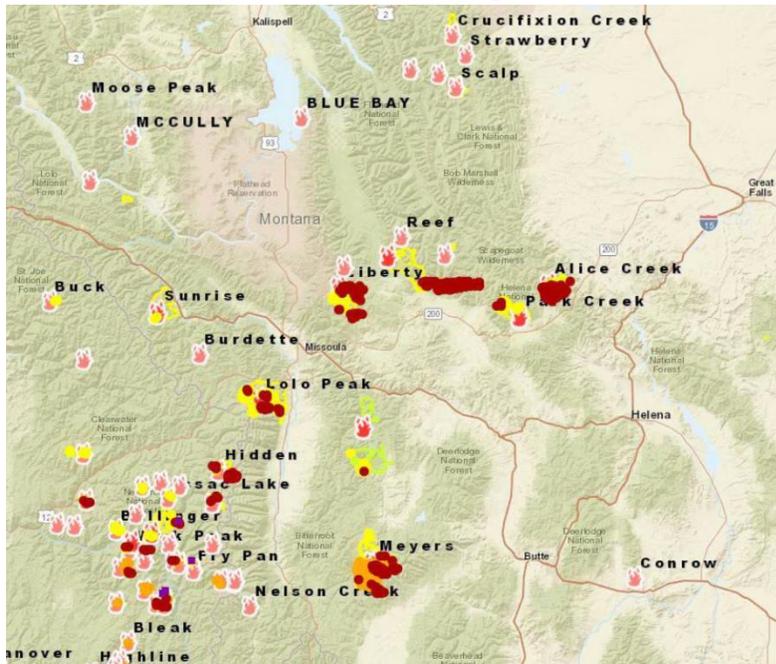
Source: CIRA and NOAA. These data are preliminary and not operational.

The cleaner air is coming for eastern Montana but impacts are expected to persist in western Montana.



Source: CIRA and NOAA. These data are preliminary and not operational.

Fires remain very active under red flag conditions.



Source: [NWCG](#)

On the left, air quality in Missoula is ranging between very unhealthy and hazardous this morning. On the right, the view on a good day.



Source: [KTVQ](#)

**NOAA Text Description:**

Sunday, September 3, 2017

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY THROUGH 2015Z September 3, 2017

SMOKE :

Continental US/Southern Canada...

Large swaths of smoke both active and remnant were observed originating from fires in Northern California, Oregon, Washington, Idaho, Montana, and British Columbia. This smoke was seen as far east as Ohio.

Idaho/Montana/British Columbia...

Large fires burning near the borders of these states and provinces were seen producing large quantities of thick smoke plumes traveling south east.

<http://www.ssd.noaa.gov/PS/FIRE/DATA/SMOKE/2017/2017I032131.html>

Tuesday, September 5, 2017

Air quality is drastically different in eastern and western Montana today. The good news is that eastern Montana is seeing generally GOOD to MODERATE air quality from the Continental Divide to North Dakota. The bad news is the air quality in western Montana is very, very bad.

Air quality reached HAZARDOUS levels in Florence, Seeley Lake, Superior, Thompson Falls, and Trout Creek. Air quality is VERY UNHEALTHY in Arlee and Florence and UNHEALTHY in Clearwater, Eureka, Hamilton, Libby, Lincoln, Lolo, Missoula, Rainy Lake, and Stevensville. Air quality is UNHEALTHY FOR SENSITIVE GROUPS in Columbia Falls and MODERATE in Butte, Dillon, Drummond, Potomac, Rock Creek, and West Yellowstone. Please be very cautious of current conditions when spending time outdoors in west-central and northwest Montana. Check out the Visual Smoke Blog and Today's Air throughout the day to see what the air quality is in your area. If you live in a location without an air quality monitor, use the VISIBILITY RANGES to assess the severity of the impacts to your area.

The cause of the poor air quality in western Montana continues to be a ridge of high pressure to our west and trough to our east. Easterly surface winds are trapping smoke from area fires in western Montana. The smoke has few places to go, so it is just sitting over western Montana. We are also seeing smoke from the Pacific Northwest travel up along the ridge of high pressure and come back down through western Montana along northwest winds aloft. For the most part this smoke is staying aloft, especially in southwest Montana. In the rest of western Montana, this smoke is mixing throughout the day with the smoke near the surface. This caused air quality in west-central and northwest Montana to remain between UNHEALTHY and HAZARDOUS throughout the day yesterday.

More of the same is expected today, with significant air quality impacts ranging from UNHEALTHY to HAZARDOUS expected in western Montana. If we do see some improvement this afternoon, it will be brief, with strong inversions expected tonight and significant pooling of smoke expected in the valleys tomorrow morning. Southwest Montana will likely see better conditions, with dense smoke aloft but generally MODERATE to UNHEALTHY FOR SENSITIVE GROUPS air quality at the surface. If this smoke does mix down, concentrations in southwest Montana could reach UNHEALTHY levels at times. Areas east of the Divide should continue to see generally good conditions for at least another day.

The ridge will slowly move to the east throughout the week. This will cause strong overnight inversions and significant air quality impacts in western Montana each morning. As the ridge slides east, impacts will return to eastern Montana as smoke spreads out over a larger area. A full extended forecast will be included in this afternoon's report.

Yesterday was another busy day for fires. A full report will be posted this afternoon with current acreage on area fires.

The Montana Department of Environmental Quality has issued an air quality alert for Deer Lodge, Flathead, Granite, Lake, Lincoln, Mineral, Missoula, Powell, Ravalli, and Sanders counties in effect until further notice due to wildfire smoke from fires in Montana and the Pacific Northwest. Easterly surface winds will trap smoke over western Montana throughout the day with significant valley impacts expected tonight. Little improvement is expected throughout the week. This alert will be updated again at 900AM 9/6/2017.

### **Afternoon Update**

#### **Current Situation**

Significant air quality impacts are continuing across west-central and northwest Montana today as light easterly winds trap smoke from area fires into the western valleys. Air quality is HAZARDOUS in Eureka and Trout Creek, VERY UNHEALTHY in Condon, Seeley Lake and Thompson Falls, UNHEALTHY in Arlee, Clearwater, Columbia Falls, Florence, Hamilton, Libby, Lolo, Missoula, Rainy Lake, Stevensville, and West Yellowstone, UNHEALTHY FOR SENSITIVE GROUPS in Frenchtown and Potomac, and MODERATE in Butte, Dillon, Drummond, Lincoln, Rock Creek, and White Sulphur Springs. Air quality continues to be GOOD to MODERATE in eastern Montana today with generally clear skies. We are also seeing a large amount of smoke from Washington and Oregon drifting over towards Montana. This smoke is first heading north when it leaves the fires, then curving around the high pressure ridge, before moving down to the southeast over Idaho and western Montana. This smoke will remain aloft, at least for this evening, but could start to cause mix in with our smoke tomorrow.

#### **Fires**

It's been awhile since I reviewed the fires, here is a rundown of the big smoke producers impacting the state.

-The Highway 200 Complex, comprised of several fires burning around Thompson Falls, is currently 16,362 acres. The largest of these fires is the Sheep Gap fire at almost 9,000 acres. This fire is causing smoke impacts along the Highway 200 corridor including Plains, Thompson Falls and Trout Creek

-The Rice Ridge fire, near Seeley Lake, grew significantly over the long weekend, merging with the Reef fire to the north and going on a run to the east. The fire is currently 108,126 acres. The nearby Liberty fire (21,400 acres) near Arlee, and the Park Creek(16,146 acres) and Alice Creek fires (21,393 acres) near Lincoln are all contributing to a large amount of smoke in the Seeley-Swan, Potomac Valley, Upper Blackfoot and southern Flathead areas.

- The Lolo Peak fire, near Lolo, is 45,012 acres. This fire continues to cause severe air quality impacts to the northern Bitterroot Valley, as well as occasionally the Missoula and Hamilton

areas.

-The Meyers [fire](#), near Philipsburg, is currently 53,737 acres. This fire is causing significant overnight impacts in Granite County and was sending out huge smoke plumes across Montana over the weekend.

-The West Fork [fire](#) (800 acres), near Libby, the Sprague [fire](#) (13,343 acres), on the west side of Glacier National Park, the Gibraltar Ridge [fire](#) (7,195 acres), east of Eureka, and the Caribou [fire](#) (17,089 acres), west of Eureka, are causing smoke throughout Lincoln and Flathead counties.

-In the Bob Marshall Wilderness Area, the Crucifixion Creek [fire](#) (7,604 acres) and the Scalp [fire](#) (10,138 acres) are likely to cause smoke impacts to areas east of Glacier National Park later this week when the winds shift to be from the southwest.

-Numerous fires are being reported in Idaho throughout the Selway-Bitterroot. These fires will send smoke into the Bitterroot Valley on and off throughout the month of September. Some of the big players are the Hidden (10,529 acres), Moose Creek (16,801 acres), and Highline (67,942 acres) fires, as well as many, many others. Find information about Idaho fires [here](#).

-The fires burning in Washington, Oregon and northern California are producing a tremendous amount of smoke. Some of this smoke is making its way into far western Montana today, with more expected in the coming days. More information about these fires can be found [here](#), [here](#) and [here](#).

### **Extended Forecast**

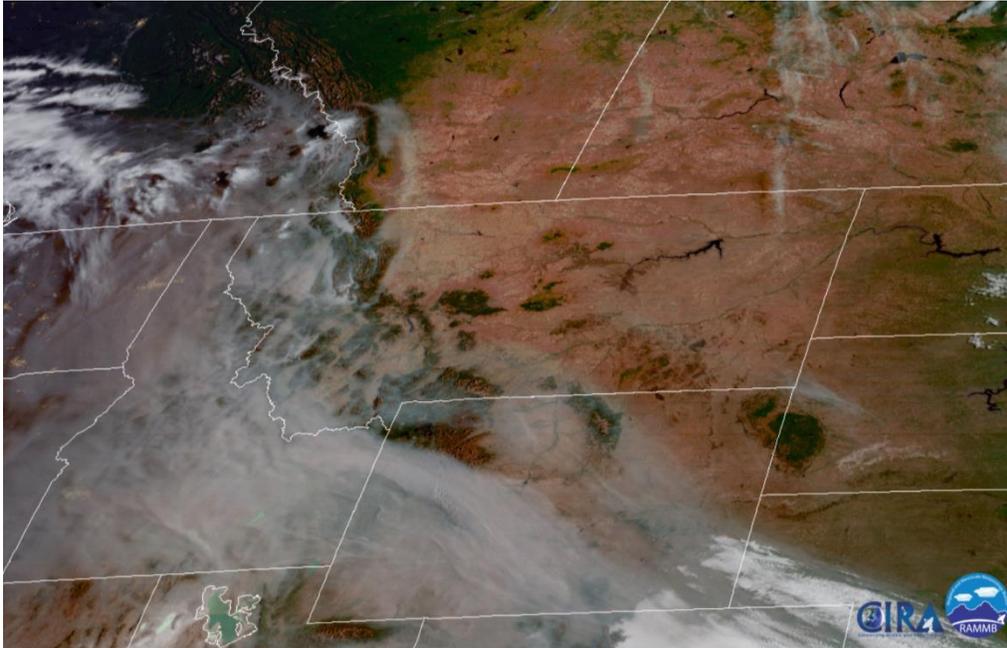
A ridge of high pressure will be building over Montana today through Thursday. This will cause generally light winds and stable air. On the one hand, the light winds combined with dense smoke coverage should help avoid the extreme fire activity we saw over the weekend. But with warm temperatures and very dry fuels, the fires will still remain active throughout this period. The stable air will also cause smoke to settle into western valleys each evening, causing significant air quality impacts through the morning hours in western Montana. This smoke will be stubborn to lift, with only brief improvement each afternoon.

We will also see increasing smoke from the Pacific Northwest throughout this period, with skies becoming hazy in eastern Montana and smoke impacts becoming more significant across the state. Air quality between now and Friday morning is expected to range from UNHEALTHY to HAZARDOUS in west-central and northwest Montana, with the most severe impacts in the vicinity of active fires. Impacts ranging from MODERATE to UNHEALTHY FOR SENSITIVE GROUPS will spread into eastern Montana throughout the week, likely getting worse as the week progresses.

The ridge looks to break down starting Friday afternoon and through the weekend. Before the ridge breaks down, surface winds and winds aloft will shift to be from the southwest, likely carrying a significant amount of smoke from Oregon into Montana by Friday. Winds turn more westerly for the weekend as zonal flow takes over. Throughout this period smoke impacts are expected to persist. Increased fire activity is expected at the end of the week as winds increase

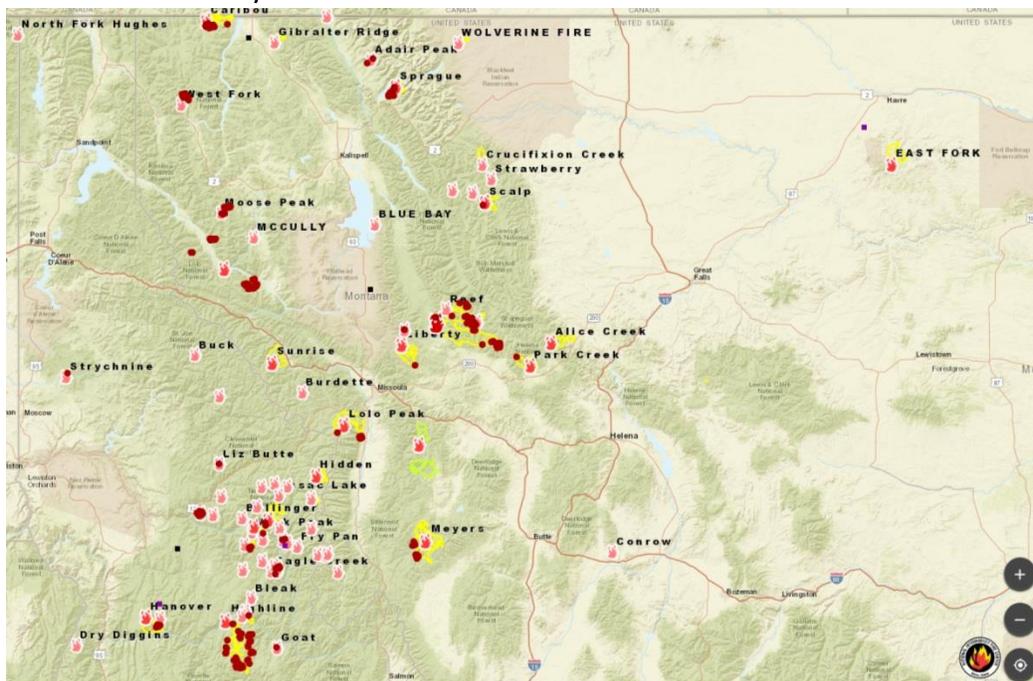
and the atmosphere becomes more unstable. Unfortunately, little substantial precipitation is expected with this system and high pressure ridging is expected to return for next week. This means the smoke impacts will continue for the foreseeable future.

Unhealthy to hazardous air quality is present western Montana this morning, with generally good air quality in eastern Montana.



Source: CIRA and NOAA. These data are preliminary and not operational.

Current fire activity is shown below in red.



Source: [NWCG](#)

On the top, there is dense smoke in Eureka this morning, as well as most of northwest and west-central Montana. On the bottom, the view on a good day.

2017-09-05 08:12:26 AM  
WildernessClub

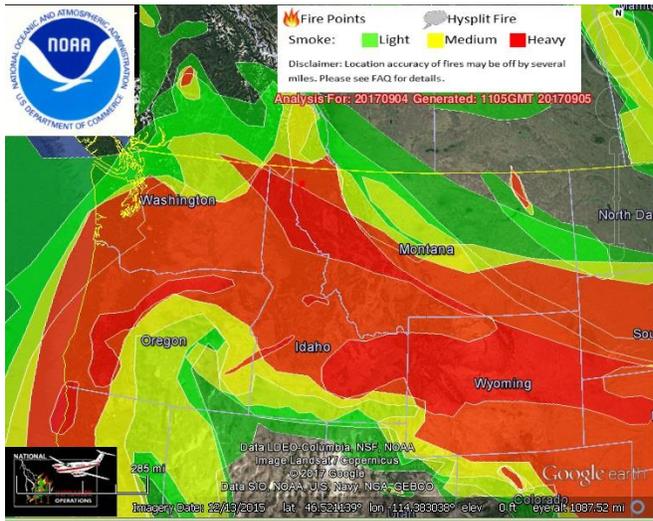


2018-03-13 09:40:38 AM  
WildernessClub



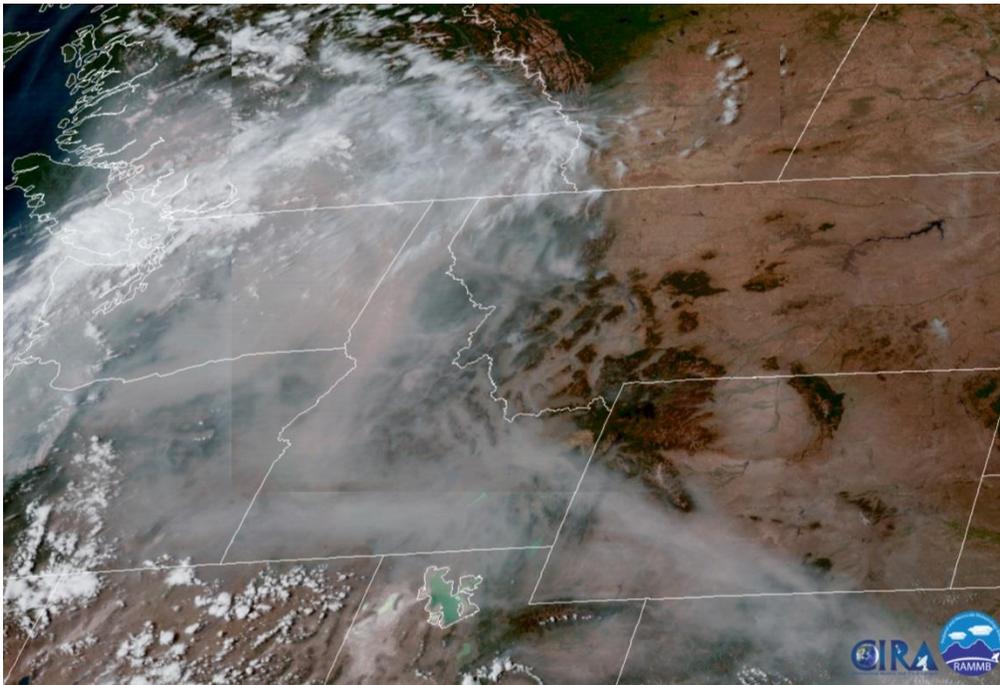
Source: [Weather Underground](#)

Yesterday's satellite analysis shows the dense smoke moving out of eastern Montana and remaining over western Montana.



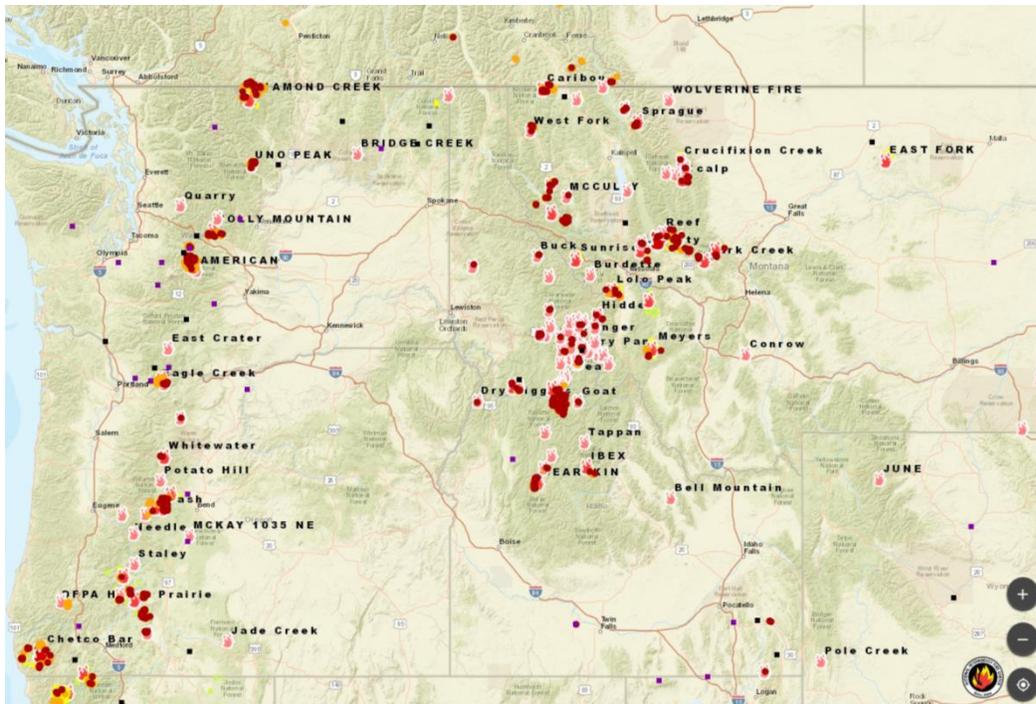
Source: [NOAA](#)

Northwest and west-central Montana remains under lots of smoke today, along with Washington, Oregon, and Idaho.



Source: [CIRA and NOAA](#). These data are preliminary and not operational.

Recent fire activity across the region is shown in red.



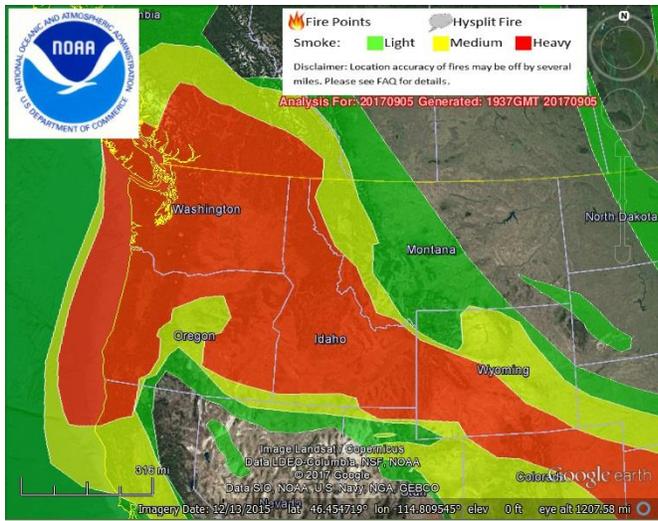
Source: [NWCG](#)

On the left, the unhealthy or worse air quality continues for western Montana. In the Bitterroot air quality is unhealthy. On the right, the view on a good day.



Source: [USFS](#)

Smoke impacts in western Montana are being shared with Idaho, Washington, and Oregon, while eastern Montana continues to see good air.



Source: NOAA

**NOAA Text Description:**

Tuesday, September 5, 2017

**DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY THROUGH 1630Z September 5, 2017**

**SMOKE:**

Continental US/Southeastern Canada/Southern British Columbia...  
 An expansive area of mostly moderate to dense smoke was seen spanning much of the CONUS and southeastern Canada from the Pacific Coast to New England and the Maritime Provinces. The smoke covers most of the Pacific Northwest and southern British Columbia and extends east-southeastward across Wyoming, Colorado, and central and southern Great Plains. The region of smoke continues east through the Ozarks then east-northeast through the Ohio River Valley and New England. The source of this plume is the ongoing wildfire activity throughout the western CONUS and southern British Columbia. This region of smoke was also seen to be sagging southward at the time of analysis.

Pacific Ocean/Northern British Columbia...  
 An area of varying density smoke from wildfires throughout Washington, Oregon, and California extends off the coast to about 135W. Closer to the coast and nearest the wildfires, thick smoke is being drawn out over the Pacific by a cyclone off the California coast. Most of this dense smoke is being blown off to the north, but some is forming a less dense region of smoke incorporated within the cyclone. Further offshore, remnant smoke can be seen covering an expansive area from a weak cyclonic feature around 27N, 132W north into northern British Columbia around the western periphery of the cyclone off the coast of California.

<http://www.ssd.noaa.gov/PS/FIRE/DATA/SMOKE/2017/20171052012.html>

Wednesday, September 6, 2017

Air quality remains very poor in west-central and northwest Montana this morning, with levels ranging from UNHEALTHY to HAZARDOUS across the area. The smoke is also spreading east and south today, with smoke moving into southwest Montana and across the Divide.

Air quality reached HAZARDOUS in Arlee, Clearwater, Seeley Lake, and Trout Creek; VERY UNHEALTHY in Columbia Falls, Eureka, Florence, Lincoln, Lolo, Rainy Lake, and Thompson Falls; UNHEALTHY in Condon, Frenchtown, Hamilton, Heart Butte, Libby, Potomac, Stevensville, and Superior; and UNHEALTHY FOR SENSITIVE GROUPS in Drummond and Rock Creek. Please be very cautious of current air quality when spending time outdoors in west-central and northwest Montana. Check out the Visual Smoke Blog and Today's Air throughout the day to see what the air quality is in your area. If you live in a location without an air quality monitor, use the VISIBILITY RANGES to assess the severity of the impacts to your area. Air quality is MODERATE in Billings, Bozeman, Butte, Cut Bank, Dillon, Great Falls, Helena, Lewistown, West Yellowstone, and White Sulphur Springs.

As mentioned above, satellite is showing smoke spreading farther east into central Montana this morning as the ridge of high pressure slowly moves over the state. This is bringing hazy skies and moderate air quality to more areas this morning. The source of this widespread smoke are the fires in the Pacific Northwest, which is being carried eastward under the ridge. There is now dense smoke covering all of Oregon, Washington, Idaho, and half of Montana. So far, much of this smoke has remained above the surface, causing the sky to appear overcast in many places. This smoke is expected to start mixing down to the ground level over the next 24 hours.

The main cause of the severe impacts in western Montana is the fire activity here in the state. The stable air under the ridge of high pressure is trapping this smoke near the ground, with limited vertical movement to help lift it up and away. The thick layer of smoke from the Pacific Northwest is making this situation worse by block the usual solar heating that helps create instability and lift the smoke. Any mixing between these two layers of smoke will be slow, but I would expect by tomorrow morning we start seeing smoke impacts ranging from UNHEALTHY FOR SENSITIVE GROUPS to UNHEALTHY spreading into southwest and central Montana as well.

Local fire activity is expected to be calmer today and tomorrow, at least compared to last weekend, due to calmer winds. That doesn't mean area fires will not be producing smoke. With the dry conditions and hot temperatures, fires are expected to continue to grow, but with smoke remaining fairly localized in nearby drainages. Information on area fires can be found here.

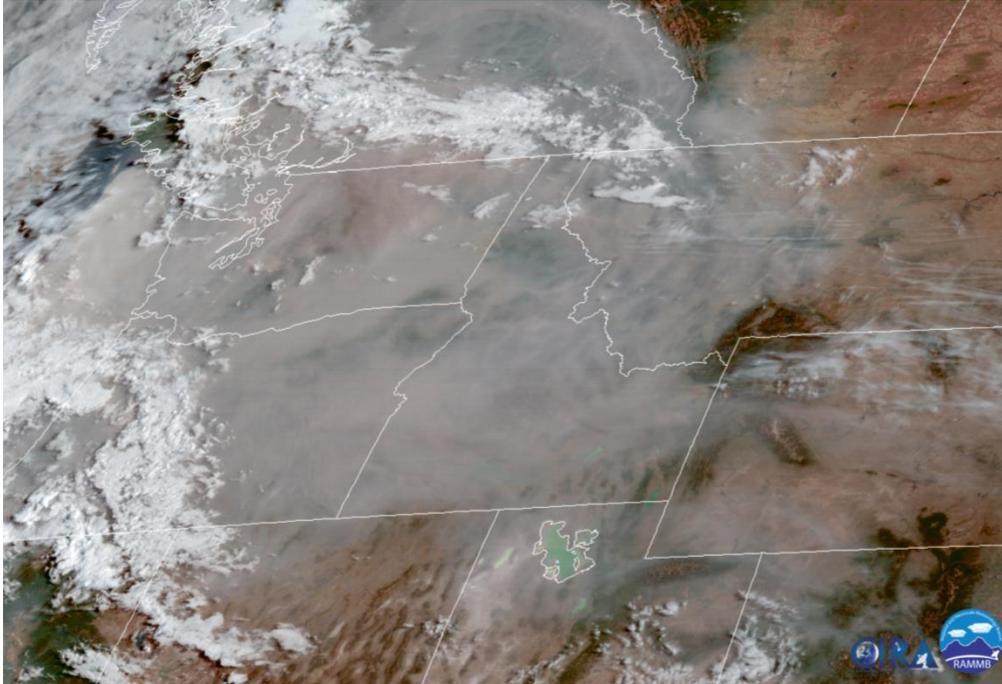
The ridge will continue to impact the state through Friday afternoon with widespread air quality impacts. Impacts in western Montana will continue to range from UNHEALTHY to HAZARDOUS throughout the day. Conditions east of the Divide will deteriorate over the next 48 hours, with widespread UNHEALTHY air possible by Friday morning in much of the state.

The ridge will flatten on Friday afternoon, bringing westerly winds for the weekend. This should help improve air quality in some locations, as the dense smoke can finally lift off the valley floors. Unfortunately, the westerly winds will continue to carry smoke over from the Pacific Northwest. Increased winds and the chance of thunderstorms on Friday through Sunday will also keep fires active here in Montana. While we should see some improvement, I would still expect air quality impacts to persist in most locations through the weekend.

Right now it is unclear if the westerly flow will persist through the middle of next week or if another ridge of high pressure builds over the area. Both situations will result in smoke impacts for the region, although if the westerly winds persist we may avoid the widespread VERY UNHEALTHY to HAZARDOUS air quality that has been plaguing western Montana this week.

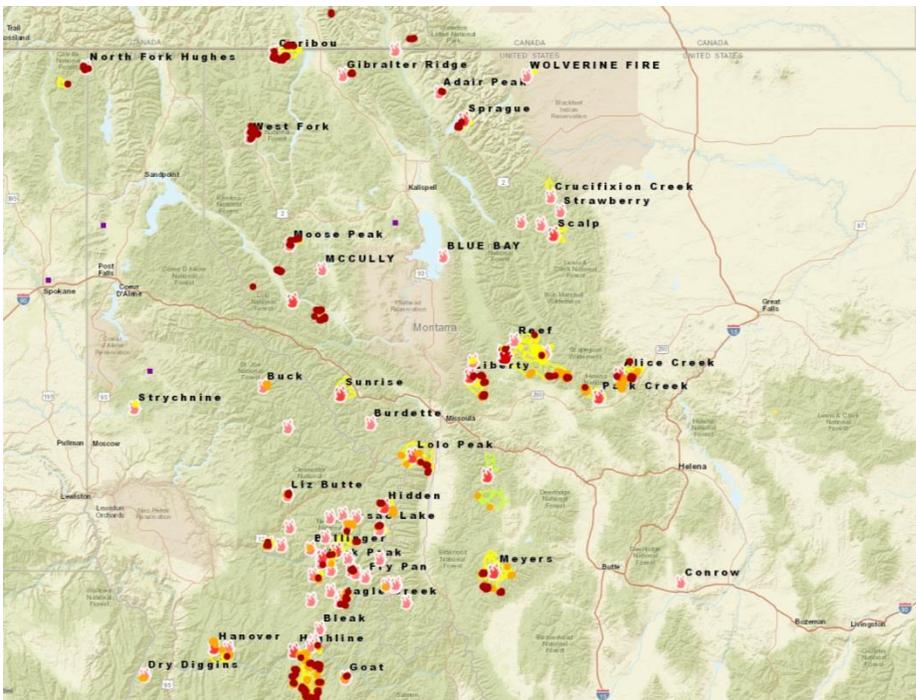
The Montana Department of Environmental Quality has issued an air quality alert for Beaverhead, Deer Lodge, Flathead, Granite, Jefferson, Lake, Lewis and Clark, Lincoln, Madison, Mineral, Missoula, Pondera, Powell, Ravalli, Sanders, Silver Bow, and Teton counties in effect until further notice due to wildfire smoke from fires in Montana and the Pacific Northwest. Little improvement is expected through Friday with stable air present under a ridge of high pressure. This alert will be updated again at 900AM 9/7/2017.

Smoke is everywhere from central Montana westward today due to a ridge of high pressure. Only the bright white areas are clouds, all the grey is smoke.



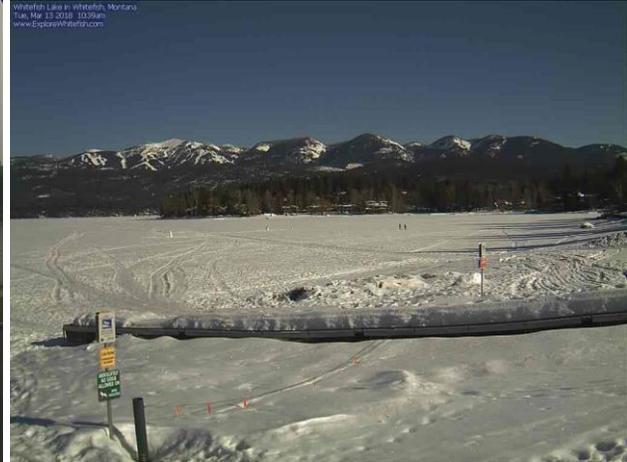
Source: CIRA and NOAA. These data are preliminary and not operational.

Fires here in Montana have remained active, with most impacts remaining localized in western Montana.



Source: NWCG

On the left, dense smoke is over Whitefish Lake this morning, as well as most of western Montana. On the right, the view on a good day.



Source: [Explore Whitefish](http://www.ExploreWhitefish.com)

On the top, nothing but smoke is visible at Lake McDonald today. On the bottom, the view on a better day.





Source: NPS

**NOAA Text Description:**

Wednesday, September 6, 2017

**DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE  
IMAGERY THROUGH 1915Z September 6, 2017**

**SMOKE:**

**Pacific Northwest:**

Fires in Washington, Oregon, Idaho, Montana, and southern British Columbia were seen producing large quantities of smoke that was caught in a clockwise circulation back into British Columbia. The smoke reaches as far south as Colorado.

<http://www.ssd.noaa.gov/PS/FIRE/DATA/SMOKE/2017/2017I061936.html>

Thursday, September 7, 2017

Air quality remains very poor in western Montana today, with impacts spreading further east each day. The stable air under the ridge of high pressure continues to trap smoke from area fires in western valleys. This situation remains very serious, with air quality levels reaching VERY UNHEALTHY to HAZARDOUS in many western communities. Air quality has reached HAZARDOUS in Arlee, Clearwater, Condon, Lolo, Potomac, Rainy Lake, Seeley Lake, and Trout Creek; VERY UNHEALTHY in Columbia Falls, Eureka, Florence, Missoula, Stevensville, and Thompson Falls; UNHEALTHY in Cut Bank, Darby, Frenchtown, Hamilton, Heart Butte, Libby, Lincoln, Rock Creek, and Superior; and UNHEALTHY FOR SENSITIVE GROUPS in Bozeman, Broadus, Butte, Dillon, Drummond, Great Falls, Helena, and White Sulphur Springs. Air quality is MODERATE in Billings, Lewistown, and West Yellowstone. Please check the Visual Smoke Blog and VISIBILITY RANGES to assess the severity of the impacts to your area.

Conditions are not expected to improve until Friday evening, at the earliest. Over the next 36 hours smoke from area fires is expected to remain trapped under the ridge of high pressure, and continue to impact nearby valleys. This situation is being exacerbated by the significant smoke from the Pacific Northwest that continues to move over the area. Smoke is causing the sky to appear overcast in all of western Montana, and extending into central Montana. This smoke is blocking the usual solar heating that helps break morning inversions and lift smoke off the valley floors each afternoon. The result is the UNHEALTHY to HAZARDOUS air quality persisting through Friday in western valleys.

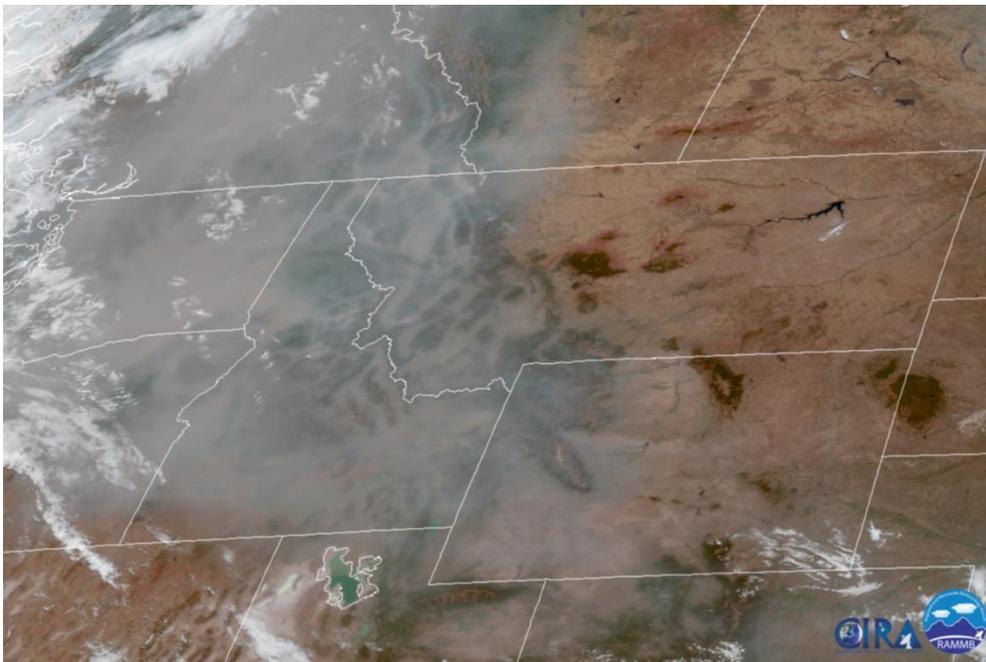
The ridge of high pressure will continue to expand further into eastern Montana, carrying smoke from the Pacific Northwest with it. Air quality impacts in areas east of the Divide will likely range from MODERATE to UNHEALTHY, improving as you move east. This will cause increasingly hazy skies and air quality impacts in eastern Montana over the next day or so.

By Friday evening, winds should begin to increase and become more southwest to westerly. This shift should allow smoke to finally move off the valley floors, with air quality improving in many locations on Saturday. That isn't to say that air quality will be good. The increased winds will likely bring another round of active fire behavior, with large plumes sending significant smoke into the air on Saturday and Sunday. This smoke will likely cause worsening air quality impacts further downwind of area fires, in central and eastern Montana, starting on Saturday. Unfortunately, we will also still need to contend with smoke from fires in Oregon, Washington and Northern California during this period. What does this all mean? Air quality will likely improve to MODERATE to UNHEALTHY levels in western Montana during the day on Saturday and Sunday. Air quality east of the Divide will likely range from MODERATE to UNHEALTHY FOR SENSITIVE GROUPS, with UNHEALTHY levels possible closer to the Divide.

At best, the increased winds may help avoid HAZARDOUS air quality on Saturday night in places like Seeley Lake, Thompson Falls, and Florence, although impacts reaching these levels are still possible. If avoided, the HAZARDOUS levels will likely return by Monday morning and persist through at least the first half of next week as a ridge of high pressure returns to the area. It is looking like afternoon winds will be fairly breezy next week, so we should see some decent improvement each day, although smoke from the Pacific Northwest could inhibit this improvement once again.

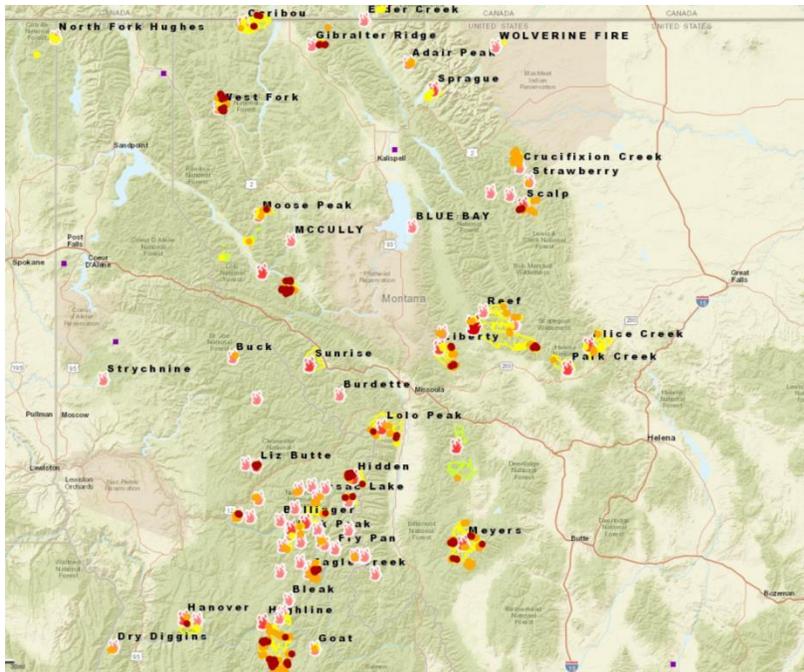
The Montana Department of Environmental Quality has issued an air quality alert for Beaverhead, Broadwater, Cascade, Deer Lodge, Flathead, Gallatin, Glacier, Granite, Jefferson, Lake, Lewis and Clark, Lincoln, Madison, Meagher, Mineral, Missoula, Park, Pondera, Powell, Ravalli, Sanders, Silver Bow, Teton, and Toole counties in effect until further notice due to wildfire smoke from fires in Montana and the Pacific Northwest. Little improvement is expected through Friday with stable air present under a ridge of high pressure. This alert will be updated again at 900AM 9/8/2017.

The huge area of dense smoke covers half of Montana this morning.



Source: CIRA and NOAA. These data are preliminary and not operational.

Current fire activity is shown in red below.



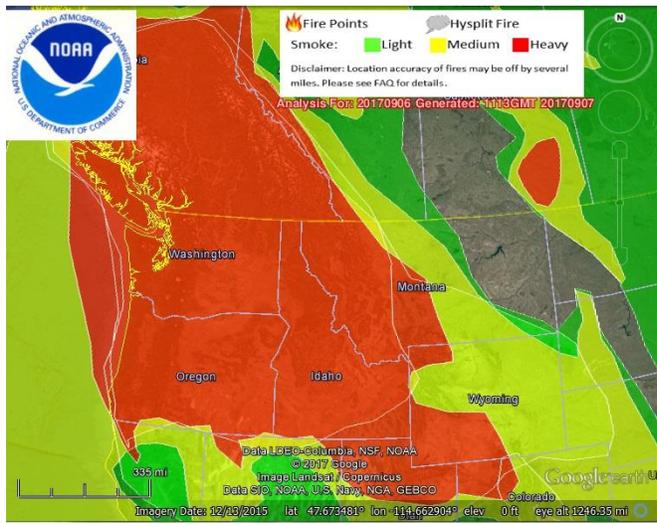
Source: [NWCG](#)

On the left, air quality in Arlee is hazardous this morning, as is the case in many other areas. On the right, the view on a good day.



Source: [Arlee Montana](#)

The large area of dense smoke covers all of the Pacific Northwest and half of Montana today.



Source: NOAA

**NOAA Text Description:**

Thursday, September 7, 2017

**DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY THROUGH 1845Z September 7, 2017**

**SMOKE:**

Western North America/Northeastern Pacific:

Wildfires throughout Washington, Oregon, Idaho, Montana, and southern British Columbia were seen contributing to an expansive layer of smoke extending from the Yukon and Northwest Territories to eastern Kansas. The most dense smoke blanketed the Pacific Northwest and southern British Columbia. Wildfires over central Utah and northern Colorado contribute to the southwestern extent of moderate density smoke into eastern Texas

<http://www.ssd.noaa.gov/PS/FIRE/DATA/SMOKE/2017/20171071850.html>

Friday, September 8, 2017

Air quality remains very poor in western Montana today as smoke has remained trapped under a ridge of high pressure throughout this week. Air quality is ranging from UNHEALTHY to HAZARDOUS across northwest and west-central Montana. Air quality is HAZARDOUS in Eureka, Lolo, Seeley Lake, and Thompson Falls; VERY UNHEALTHY in Arlee, Clearwater, Columbia Falls, Condon, Heart Butte, Philipsburg, Rainy Lake, Stevensville, Superior, and Trout Creek; and UNHEALTHY in Darby, Frenchtown, Hamilton, Libby, Lincoln, and Potomac. Conditions are better further south and east, with air quality at UNHEALTHY FOR SENSITIVE GROUPS in Dillon, Rock Creek, West Yellowstone, and White Sulphur Springs and MODERATE in Birney, Bozeman, Butte, Drummond, Helena, Lewistown, and Sidney.

At the risk of sounding like a broken record, the cause of this smoke is from a large area of high pressure over the western U.S. This high pressure is inhibiting vertical movement in the atmosphere, causing smoke from area fires to linger near the surface. Usually, strong solar heating helps lift the smoke off the valley floors each afternoon, allowing for a few hours of improved air quality. This week, dense smoke from the Pacific Northwest fires has remained overhead, blocking some of the sunlight and further inhibiting vertical movement in the afternoons. We did see some increased fire activity yesterday afternoon, with plumes visible off many area fires. Information about area fires can be found [here](#). Further away from active fires, we continue to see widespread smoke cover due to the Pacific Northwest fires, with air quality ranging from MODERATE to UNHEALTHY FOR SENSITIVE GROUPS in southwest and central Montana. Far eastern Montana has had clearer skies and generally GOOD air quality, with occasional MODERATE impacts.

The significant impacts are expected to continue throughout the day today, with air quality in northwest and west-central Montana continuing to range from UNHEALTHY to HAZARDOUS. Please check the [Visual Smoke Blog](#) and [Today's Air](#) throughout the day to see what the air quality is in your area. If you live in a location without an air quality monitor, use the [VISIBILITY RANGES](#) to assess the severity of the impacts to your area.

There are a few pieces of good news to share this morning. First, many of the fires in Oregon received precipitation yesterday. Smoke production off those fires may slow over the short-term, reducing the amount of smoke moving into Montana over the weekend. Second, we are expecting the ridge of high pressure to break down this weekend, with increased southwest to westerly winds moving in starting this evening and continuing through Sunday. The increased winds should finally help move smoke off the valley floors in western Montana. We should see a break from the VERY UNHEALTHY and HAZARDOUS levels for the weekend, at least during the day. Overnight impacts reaching HAZARDOUS levels are still possible tonight and tomorrow

night in close proximity to active fires – places like Seeley Lake, Trout Creek, and Florence but I don't expect impacts to linger throughout the day like we have seen this week. We may also see some scattered thunderstorms moving through today and tomorrow, with a small chance of precipitation for a few lucky locations. As the increased winds move in, it may take some time to see improvement, due to the large amount of smoke still remaining to our west that will move over the area along with the wind.

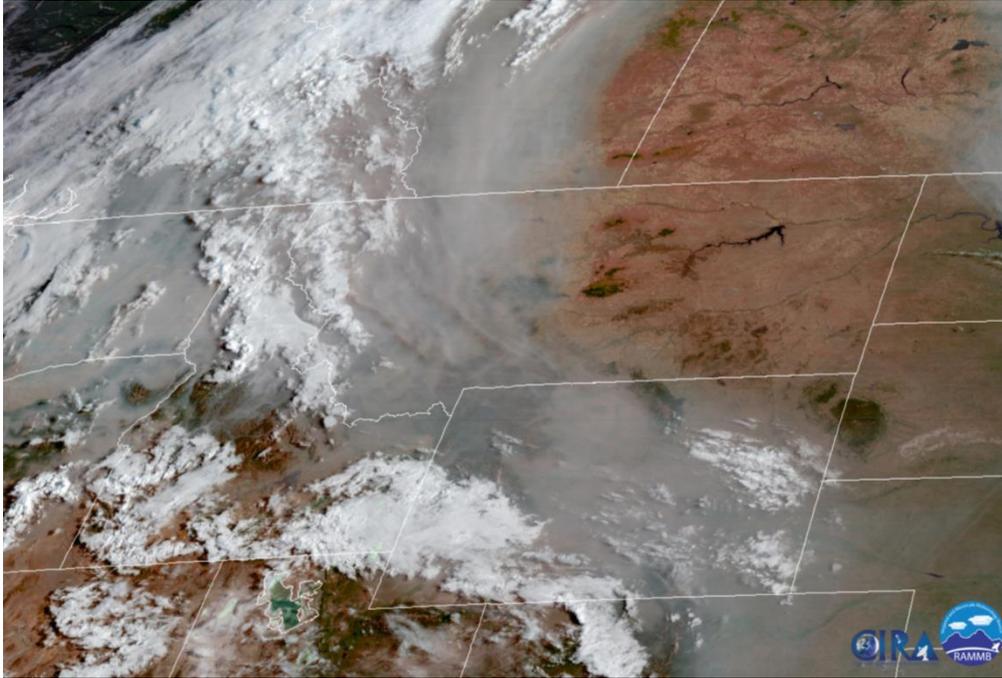
Now the bad news, the increased winds will increase fire behavior. Fire weather watches or red flag warnings are in place for most of Montana on Saturday. Fires are expected to be very active on Saturday and Sunday, with dense plumes expected to extend far out into eastern Montana. For most of the afternoon and evening, much of this smoke should stay aloft, with air quality near the surface ranging from MODERATE to UNHEALTHY FOR SENSITIVE GROUPS in most places on Saturday and Sunday afternoon. Throughout this period, we will continue to be downwind of fire activity in the Pacific Northwest.

Starting early next week, another ridge of high pressure will build over the area. This ridge does not look to be as strong as the one that has plagued us this week. Even so, we will likely see significant pooling of smoke in the valleys each morning. Hopefully, breezier afternoons should help bring about improvement each afternoon. This ridge will remain over the area through Wednesday. Throughout this period, we have to deal with smoke from the Pacific Northwest, with likely widespread hazy skies. Air quality in northwest and western Montana will likely range from UNHEALTHY to HAZARDOUS overnight through the morning hours, improving to MODERATE to UNHEALTHY FOR SENSITIVE GROUPS in the afternoons. Similar air quality trends are also likely for areas east of the Divide, downwind of active fires. Eastern Montana will likely see MODERATE air quality and hazy skies.

I don't want to get too excited yet about the end of next week, but there is a chance we could see widespread rain on Thursday or Friday as a low pressure center moves through southern Canada. It is too soon to say if this will help mitigate our wildfire situation, but there is hope we could see real improvement at the end of next week.

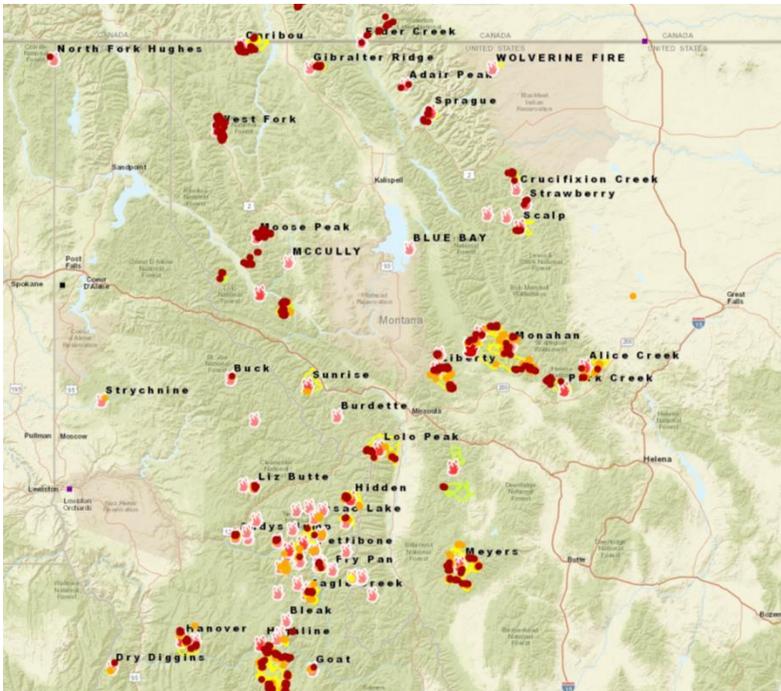
The Montana Department of Environmental Quality has issued an air quality alert for Beaverhead, Broadwater, Cascade, Deer Lodge, Flathead, Gallatin, Glacier, Granite, Jefferson, Lake, Lewis and Clark, Lincoln, Madison, Meagher, Mineral, Missoula, Park, Pondera, Powell, Ravalli, Sanders, Silver Bow, Teton, and Toole counties in effect until further notice due to wildfire smoke from fires in Montana and the Pacific Northwest. Air quality is expected to improve in western valleys over the weekend due to increased winds, but significant smoke impacts are still expected due to increased fire activity. This alert will be updated again at 900AM 9/9/2017.

We have a large amount of smoke remaining over the area this morning. One piece of good news is the smoke has decreased in Oregon, with precipitation over many fires yesterday.



Source: CIRA and NOAA. These data are preliminary and not operational.

Fire activity increased yesterday on area fires. Recent activity is shown in red.



Source: NWCG

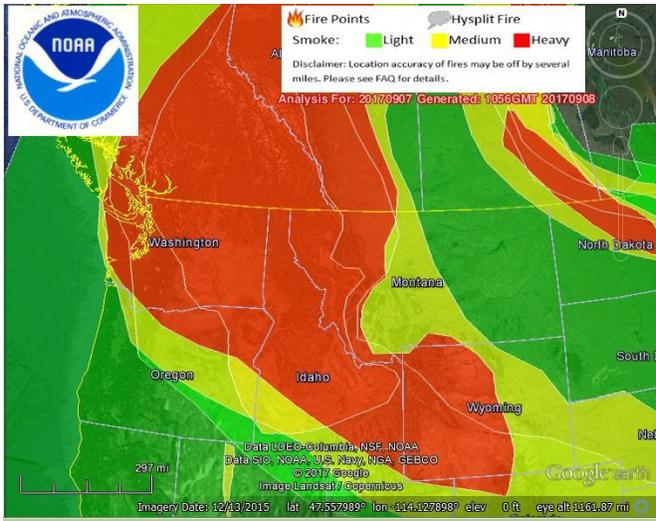
This is likely a common picture in much of western Montana today. Below is a picture taken

from Seeley Lake yesterday, where air quality has been hazardous throughout the week.



Source: MT DEQ

NOAA satellite smoke analysis continues to show dense smoke over the region.



Source: NOAA

**NOAA Text Description:**

Thursday, September 7, 2017

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY THROUGH 0130Z September 8, 2017

Updated for correct date and time...

SMOKE:

Western North America/Northeastern Pacific:

Wildfires throughout Washington, Oregon, Idaho, Montana, and southern British Columbia were seen contributing to an expansive layer of dense smoke extending from northern Alberta into western Wyoming. Moderately dense smoke was observed extending into the Northwestern Territories and Nunavut, as well as southeastward into western Texas around the ridge and into northwestern Mississippi. The thinnest density smoke extends westward off the Pacific coast, northward into northern Canada, southward into northern Mexico and the Revillagigedo Islands, and eastward into Alabama.

<http://www.ssd.noaa.gov/PS/FIRE/DATA/SMOKE/2017/2017I080526.html>

Saturday, September 9, 2017

Smoke is starting to move in Montana for the first time in several days. So far, this improvement is most noticeable in southwest Montana, where satellite is showing much clearer air moving into the region. Unfortunately, as this smoke starts to move, it is impacting areas further into eastern Montana, where a dense plume is currently moving through. In western Montana, there is widespread UNHEALTHY air quality, which is actually an improvement to the past several days. We are still seeing some pockets of HAZARDOUS air quality this morning in Seeley Lake and Arlee, and possibly Florence. Air quality is also VERY UNHEALTHY in Columbia Falls. Air quality is UNHEALTHY in Butte, Clearwater, Condon, Cut Bank, Darby, Frenchtown, Great Falls, Hamilton, Helena, Lewistown, Libby, Lincoln, Missoula, Philipsburg, Potomac, Rainy Lake, Rock Creek, Stevensville, Thompson Falls, Trout Creek, and White Sulphur Springs. Air quality is UNHEALTHY FOR SENSITIVE GROUPS in Drummond. Air quality is MODERATE across southern Montana in Billings, Birney, Bozeman, Broadus, Dillon, and West Yellowstone.

The ridge of high pressure that has caused the severe air quality impacts each day this week is finally moving away. Strong southwest to westerly surface winds are expected to move into the region today, with the strongest winds likely in northwest Montana. These winds should finally help move smoke off the valley floors today, hopefully allowing for brief periods of MODERATE air quality in western Montana. There are two large caveats to go along with this good news. First, there is still a significant amount of smoke from the Pacific Northwest and over Montana that needs to clear before we see a real improvement in air quality. As the winds increase and the atmosphere becomes more unstable, this smoke will mix down to the surface in some areas, causing air quality to deteriorate briefly before it improves. Second, with the increased winds comes red flag warnings and increased fire activity. Most fires are expected to be very active this afternoon and Sunday, sending large plumes out over the state. Due to the variable conditions expected today and tomorrow, I've broken the forecast down by location.

#### **Northwest and west-central Montana**

Improvement in air quality will be slow today, due to the significant smoke still overhead and moving in from the west. Expect air quality to remain UNHEALTHY to VERY UNHEALTHY through the morning hours and into early afternoon. By late afternoon you should start to see concentrations dropping and improved air quality for a few hours. Winds should keep smoke from pooling in the valleys tonight with generally MODERATE to UNHEALTHY FOR SENSITIVE GROUPS air quality expected. Areas close to active fires, such as Seeley Lake, Florence, and Thompson Falls could still see levels reach VERY UNHEALTHY to HAZARDOUS for a time tomorrow morning. On Sunday, air quality should improve sooner in the afternoon, with hopefully a longer period of MODERATE air quality for western valleys. Fires will remain active on Sunday, so expect plumes to be visible in many valleys during the afternoon. This smoke

should generally lift up and away from nearby valleys. By Monday, a ridge of high pressure will build in over the region once again. Overnight and morning impacts will likely reach VERY UNHEALTHY to HAZARDOUS levels once again in many western Montana valleys, with slow improvement each afternoon through Wednesday.

### **Southwest Montana**

Smoke has already cleared from many areas of southwest Montana, Overall, air quality in this area should range from GOOD to MODERATE today as the increased winds keeps smoke aloft. With the increased fire activity expected this afternoon, dense smoke plumes from fires in Idaho will likely become visible, with possible impacts overnight tonight if some of this smoke settles towards the surface. Conditions should improve on Sunday as smoke is lifted up once again. More widespread impacts are likely to return early next week under the ridge of high pressure.

### **Along the Divide**

Areas along the Divide, such as east of Glacier National Park, Great Falls, and Helena are harder to predict for smoke impacts this weekend. As the smoke is pushed out of western valleys later today, smoke will move to the east. Most of this smoke should remain aloft, but there may be periods of poor air quality this afternoon. Once that smoke moves eastward, dense plumes will likely be visible due to the increase in fire activity to the west. Some of this smoke may settle to the surface tonight, causing air quality to reach UNHEALTHY FOR SENSITIVE GROUPS to UNHEALTHY at times. Tomorrow, conditions should improve by early afternoon with a few hours of GOOD to MODERATE conditions before smoke from the active fires settles back down on Sunday night. Widespread impacts reaching UNHEALTHY FOR SENSITIVE GROUPS is expected early next week when the stable air moves back in, with more significant impacts in areas near active fires along the Rocky Mountain Front.

### **Eastern Montana**

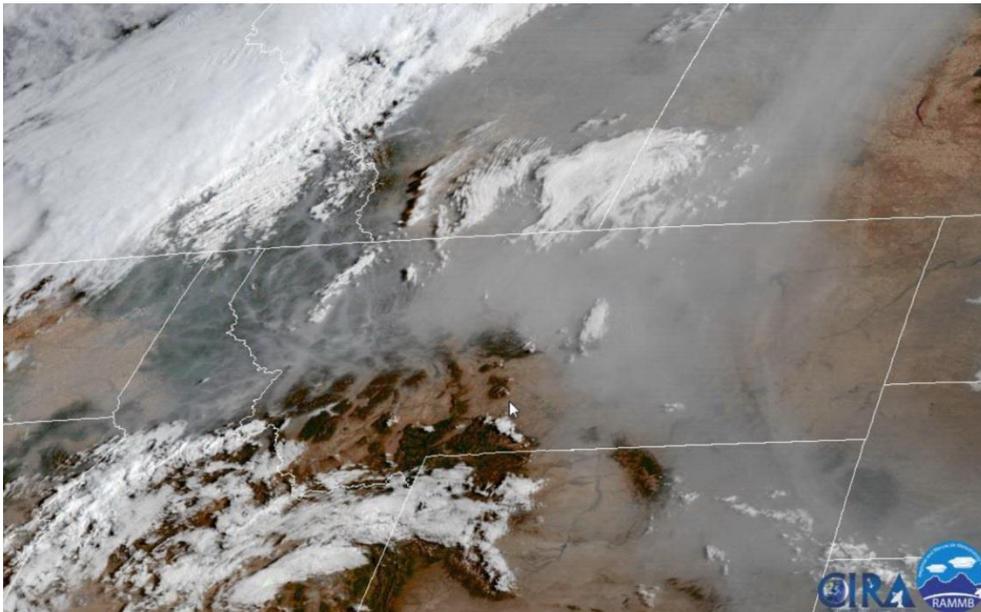
Smoke will move through the state today as it clears from western Montana, causing periods of deteriorated air quality possibly reaching UNHEALTHY levels at times. By tomorrow, most smoke moving through should remain aloft, causing hazy conditions but GOOD to MODERATE air quality at the surface. Impacts will slowly become more widespread next week as high pressure builds over the region and smoke becomes spread out over a large area.

### **Late next week**

As I mentioned yesterday, a weather system moving through on Thursday and Friday next week has the potential to bring widespread rain to the region. This system continues to look promising, and if it plays out, could bring some real improvement to the air quality across the state by late next week.

The Montana Department of Environmental Quality has issued an air quality alert for Broadwater, Cascade, Deer Lodge, Flathead, Glacier, Granite, Jefferson, Lake, Lewis and Clark, Lincoln, Meagher, Mineral, Missoula, Pondera, Powell, Ravalli, Sanders, Silver Bow, Teton, and Toole counties in effect until further notice due to wildfire smoke from fires in Montana and the Pacific Northwest. Air quality is expected to improve in western valleys today due to increased winds, but significant smoke impacts are still expected due to increased fire activity. This alert will be updated again at 900AM 9/10/2017.

Dense smoke is continuing to impact northwest and west-central Montana, while southwest Montana is seeing improvement. A dense plume is also moving through eastern Montana this morning.



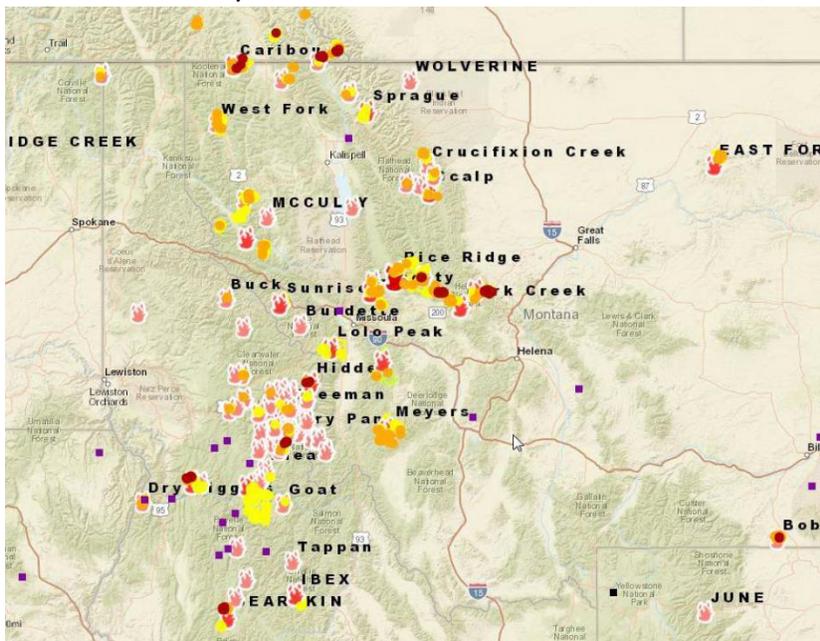
Source: CIRA and NOAA. These data are preliminary and not operational.

On the left, While air quality is starting to improve in southwest Montana, much of western Montana remains under thick smoke this morning. Below, the Bitterroot Valley is seeing unhealthy to hazardous air quality. On the right, the view on a good day.



Source: [USFS](#)

Recent fire activity is shown in red below.



Source: [NWCG](#)

**NOAA Text Description:**

Saturday, September 9, 2017

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY THROUGH 1715Z September 9, 2017

SMOKE:

United States...

A large area of light density smoke covered almost all of the Northern Intermountain, the Northern Rockies, and the central United States from the Rocky Mountains to the Appalachian Mountains. Medium density smoke covered all of the Middle Mississippi Valley, Northern and Central Plains, and the Northern Intermountain. Medium density smoke also covered a good portion of the Ohio Valley, the Tennessee Valley, the Southern Plains, and the Upper and Lower Mississippi Valley. Heavy density smoke covered portions of the Northern and Central Plains, and all of the Northern Rockies. All of the smoke described above is mainly from the wildfires burning in the Northern Rockies and central Canada. Another area of light remnant smoke from the same wildfires mentioned above is seen on the back end of a frontal boundary offshore of the East Coast.

Canada...

Light to medium density smoke was observed from southeastern British Columbia and over most of Alberta, Saskatchewan, Manitoba, Ontario, and Quebec. Heavy density smoke covered portions of Alberta, Saskatchewan, Manitoba, central Ontario, and northwestern Quebec. All of the smoke described above is mainly from the wildfires burning in the Northern Rockies and central Canada.

<http://www.ssd.noaa.gov/PS/FIRE/DATA/SMOKE/2017/2017I091836.html>

Wednesday, September 13, 2017

Air quality didn't improve as much as expected yesterday afternoon, causing the UNHEALTHY FOR SENSITIVE GROUPS to UNHEALTHY air quality to linger in many parts of Montana throughout the day. We are dealing with a large amount of smoke over the state this morning, with much of that smoke at the ground level. Air quality in Seeley Lake and Florence is VERY UNHEALTHY this morning due to the nearby fire activity. Air quality is UNHEALTHY in much of Montana today, including Arlee, Billings, Birney, Broadus, Columbia Falls, Dillon, and White Sulphur Springs. Air quality is UNHEALTHY FOR SENSITIVE GROUPS in Butte, Clearwater, Darby, Drummond, Helena, Lewistown, Malta, Philipsburg, Rock Creek, Sidney, and Trout Creek. Air quality is MODERATE in Bozeman, Condon, Eureka, Libby, Lincoln, Missoula, Potomac, Rainy Lake, Stevensville, Superior, and Thompson Falls. We are seeing the best air quality off the Rocky Mountain Front this morning, where air quality is GOOD in Cut Bank, Great Falls, and Heart Butte.

Fires were active yesterday once again due to breezy and dry conditions. The Highway 200 Complex (24,225 acres), near Thompson Falls; the Rice Ridge (155,900 acres) and Liberty fires, near Seeley Lake; and Lolo Peak fire (52,160 acres) all had significant growth yesterday. More information about area fires can be found [here](#).

Significant air quality impacts are expected to continue for one more day before we finally see widespread improvement. Smoke will struggle to lift today in many areas with UNHEALTHY impacts expected through much of the day. Fires are also expected to be active with increased winds and dry conditions. There will be pockets with improved conditions, but overall air quality will range from MODERATE to UNHEALTHY across the state, with more significant impacts lingering near active fires in the Seeley-Swan and the Bitterroot Valley.

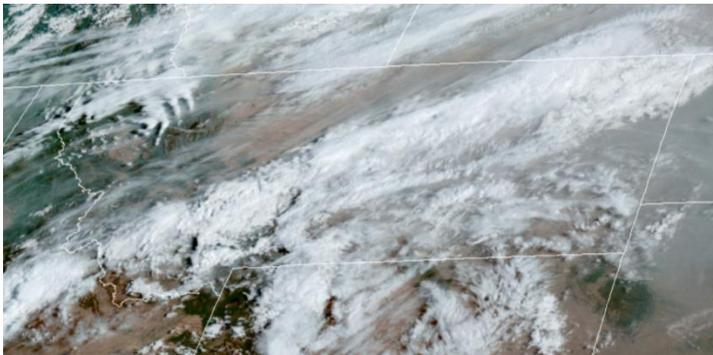
The good news is that improvement is on the way for most locations. A large trough of low pressure will be impacting Montana on Thursday and Friday. Cooler temperatures and widespread precipitation is expected, especially for mountains along the Continental Divide. As this system moves through, air quality should improve in most areas as fire activity is slowed. It may take a while on Thursday to see significant improvement, with some areas seeing MODERATE to UNHEALTHY air quality linger into the early afternoon. While precipitation is expected to be widespread, northwest Montana may receive less precipitation than other areas. The cooler temperatures should help calm fires in that area, but lingering smoke impacts may continue for parts of Lincoln and Flathead counties.

Air quality is expected to be GOOD in most areas over the weekend, with possible localized impacts in close proximity to area fires. Smoke impacts in northwest Montana are more questionable, depending on fire activity in that area. Another low pressure trough will move in

on Monday night and linger over the area for much of next week. This will continue to bring cool temperatures and precipitation to the area, further helping to calm area fires and mitigate air quality impacts around the area.

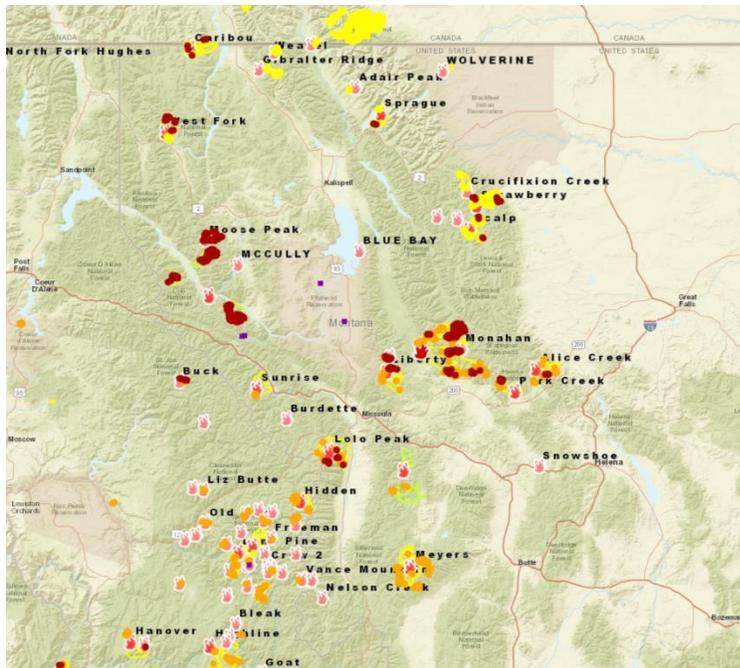
The Montana Department of Environmental Quality has issued an air quality alert for the entire state in effect until 900AM 9/14/2017 due to wildfire smoke from nearby fires. Widespread smoke is expected today through midday Thursday. Air quality is expected to range from moderate to unhealthy with pockets of very unhealthy near active fires. Conditions are expected to improve when widespread rain moves into the area on Thursday. This alert will be updated again at 900AM 9/14/2017.

Smoke is present over much of eastern Montana this morning, with localized impacts in western Montana.



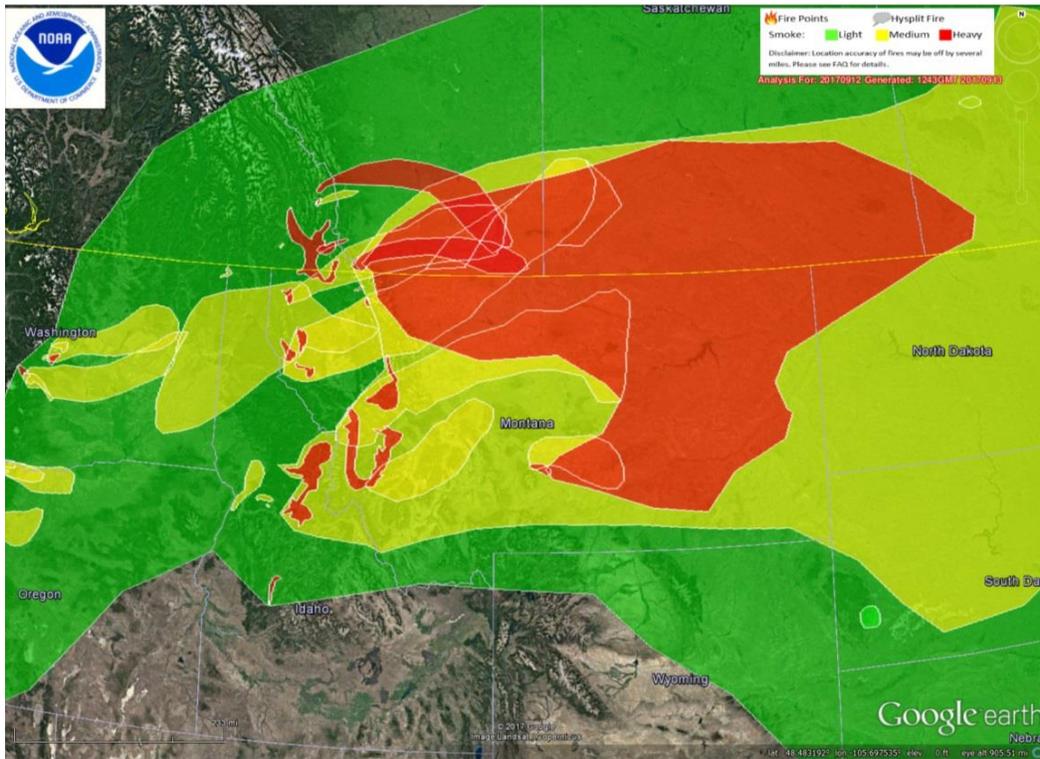
Source: CIRA and NOAA. These data are preliminary and not operational.

Recent fire activity is shown in red below.



Source: [NWCG](#)

Yesterday's smoke analysis shows widespread smoke over the state.



Source: [NOAA](#)

### NOAA Text Description:

Wednesday, September 13, 2017

### DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY THROUGH 1630Z September 13, 2017

#### SMOKE:

Northwestern US/Central US/Northeastern US/Southwestern to Southeastern Canada/Western Atlantic...

The extensive area of thin density smoke continues to be visible this time stretching from off the northern California coast and the Pacific Northwest eastward over Montana to the North Central US, across the Great Lakes region to the Northeast and from there well off the Northeast and Middle Atlantic coast over the open Atlantic. The thin density smoke also extended from the North Central US southward over much of Texas, northern Mexico, and the western Gulf of Mexico. Over Canada, the smoke extended from far southern British Columbia eastward all the way to southeastern Quebec and New Brunswick. Thicker smoke within the large mass of thin density smoke stretched from the numerous wildfires burning in central and northern Idaho and western Montana eastward across the far North Central US and South Central Canada. A narrow ribbon of moderately dense smoke also arced from northern Michigan to eastern Kansas. Farther

to the west, patches of moderately dense to locally thicker smoke were located across portions of Oregon and northern California. The primary sources for virtually all of this smoke described above were wildfires burning in central Canada, portions of Washington, Oregon, and northern California and especially the significant wildfire activity in western Montana and central and northern Idaho.

<http://www.ssd.noaa.gov/PS/FIRE/DATA/SMOKE/2017/2017I131655.html>

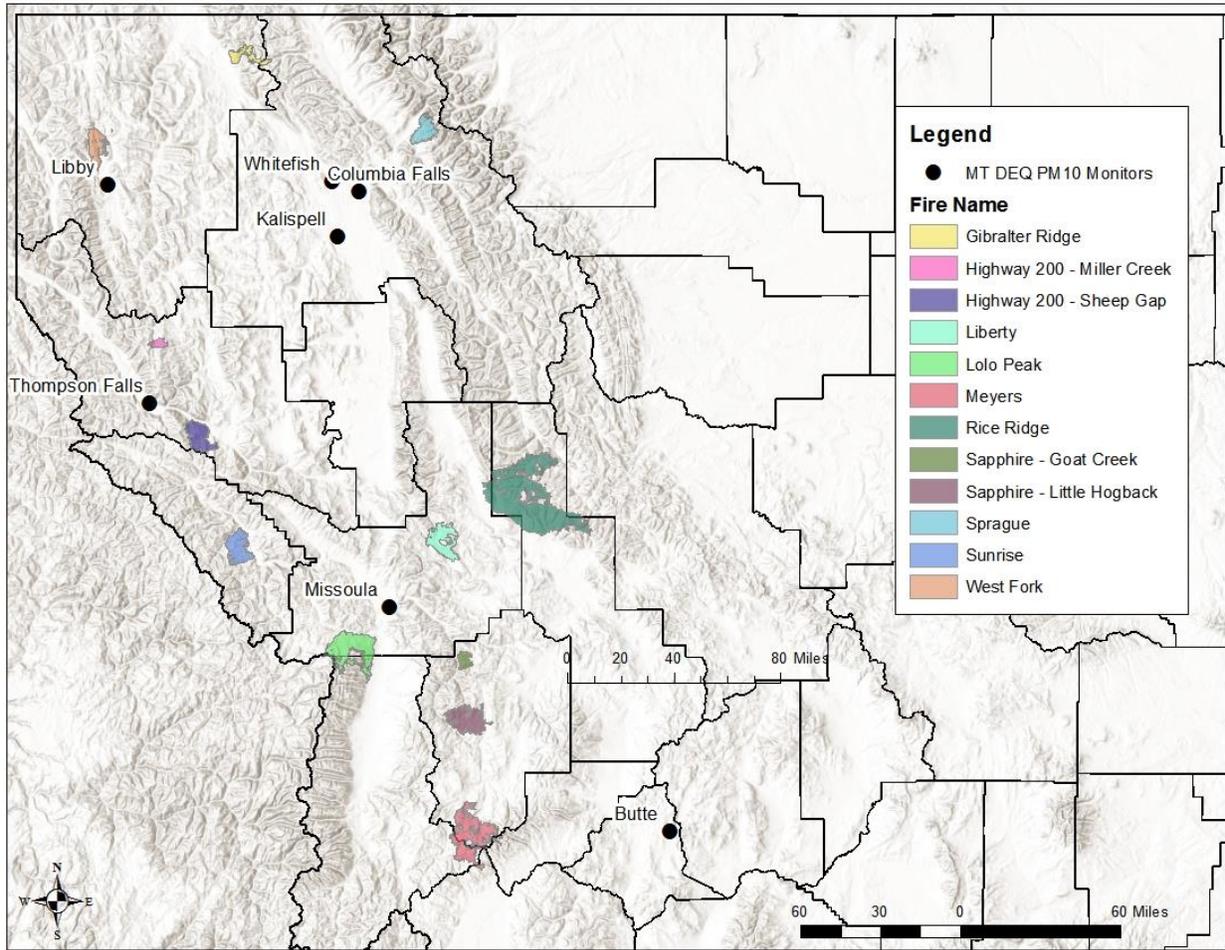
## 5. Not Reasonably Controllable or Preventable

40 CFR 50.14(b)(4), regarding wildfires, states:

*The Administrator shall exclude data from use in determinations of exceedances and violations where a State demonstrates to the Administrator's satisfaction that emissions from wildfires caused a specific air pollution concentration in excess of one or more national ambient air quality standard at a particular air quality monitoring location and otherwise satisfies the requirements of this section. Provided the Administrator determines that there is no compelling evidence to the contrary in the record, the Administrator will determine every wildfire occurring predominantly on wildland to have met the requirements in paragraph (c)(3)(iv)(D) of this section regard in the not reasonably controllable or preventable criterion.*

While fires from outside of Montana contributed to the exceptional events during the 2017 season, the fire activity in Montana played a substantial role. The location of the notable fires in relation to the PM<sup>10</sup> monitors is shown in the figure below. The table below outlines the location, size, start and end date, and cause of each of these fires, as well as a summary.

Figure 17. Western Montana 2017 Notable Fires.



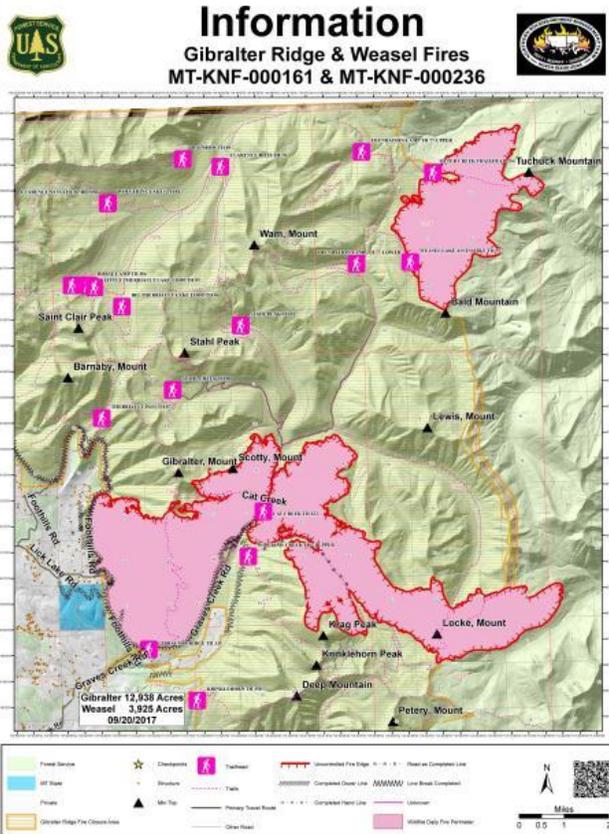
| Fire Name                       | Location                       | Total Acres | Start Date and Cause  | Containment Date | Summary  |
|---------------------------------|--------------------------------|-------------|-----------------------|------------------|--|
| <a href="#">Gibraltar Ridge</a> | 35 miles NW of Whitefish       | 24,753      | 8/7/2018 – Lightning  | 11/13/2017       | Fire burning along the Canadian border in northwest Montana.   |
| <a href="#">Highway 200</a>     | Surrounding Thompson Falls, MT | 48,417      | 8/28/2017 – Lightning | 10/15/2017       | Multiple fires burning in the vicinity of Thompson Falls, MT. Impacts to the Flathead Valley and Thompson Falls. |
| <a href="#">Liberty</a>         | 15 miles NE of Missoula, MT    | 28,689      | 7/15/2017 – Lightning | 10/11/2017       | Long-duration event that caused intermittent impacts to Missoula, MT and Seeley Lake, MT                         |

| <b>Fire Name</b>           | <b>Location</b>   | <b>Total Acres</b> | <b>Start Date and Cause</b> | <b>Containment Date</b> | <b>Summary</b>   |
|----------------------------|---|--------------------|-----------------------------|-------------------------|--|
| <a href="#">Lolo Peak</a>  | 13 miles SW of Missoula, MT                                     | 53,902             | 7/15/2017<br>- Lightning    | 10/31/2017              | Long-duration event that impacted the Bitterroot Valley and Missoula throughout the wildfire season. |
| <a href="#">Meyers</a>     | 42 miles W of Butte, MT   | 62,034             | 7/14/2017<br>– Lightning    | 11/6/2017               | Long-duration event impacting Butte, MT during westerly winds.                                       |
| <a href="#">Rice Ridge</a> | 2 miles N and E of Seeley Lake, MT                              | 160,187            | 7/24/2017<br>– Lightning    | 10/15/2017              | High Priority fire impacting Seeley Lake, MT and sending smoke far into the state.                   |
| <a href="#">Sapphire</a>   | 25 miles east of Missoula, MT                                   | 43,733             | 7/24/2017<br>– Unknown      | 10/31/2017              | Fire burning near I-90, a main thoroughfare between Missoula and Butte.                              |
| <a href="#">Sprague</a>    | Inside Glacier National Park, 17 miles NE of Columbia Falls, MT | 16,982             | 8/10/2017<br>- Lightning    | 11/1/2017               | Significant impacts in Glacier NP, with occasional impacts to the Flathead Valley.                   |
| <a href="#">Sunrise</a>    | 38 miles W of Missoula, MT                                      | 26,310             | 7/16/2017-<br>Lightning     | 9/30/2017               | Impacts along the I-90 corridor west of Missoula, frequently send smoke into Missoula.               |
| <a href="#">West Fork</a>  | 7 miles NW of Libby, MT   | 20,072             | 8/30/2017<br>– Lightning    | 10/1/2017               | Significant impacts to Libby, MT   |

In the absence of compelling evidence to the contrary, wildfires on wildlands are considered not reasonably controllable or preventable for purposes of the Exceptional Events Rule, and the available evidence indicates that the fires impacting the PM10 monitors in 2017 were in fact wildfires on wildlands, with no evidence indicating that they could have been controlled or prevented, the exceptional events are found to be not reasonably controllable or preventable.

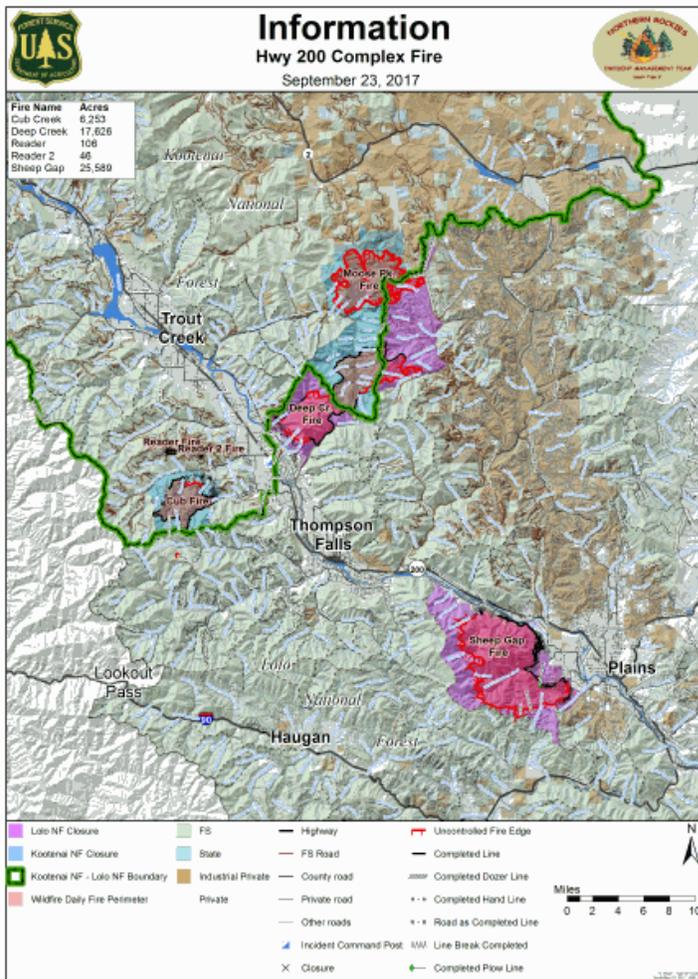
Below are additional photographs, fire perimeters, and news articles about the fire activity in Montana. All photographs and maps are from InciWeb (<https://inciweb.nwcg.gov/>).

# Gibraltar Ridge



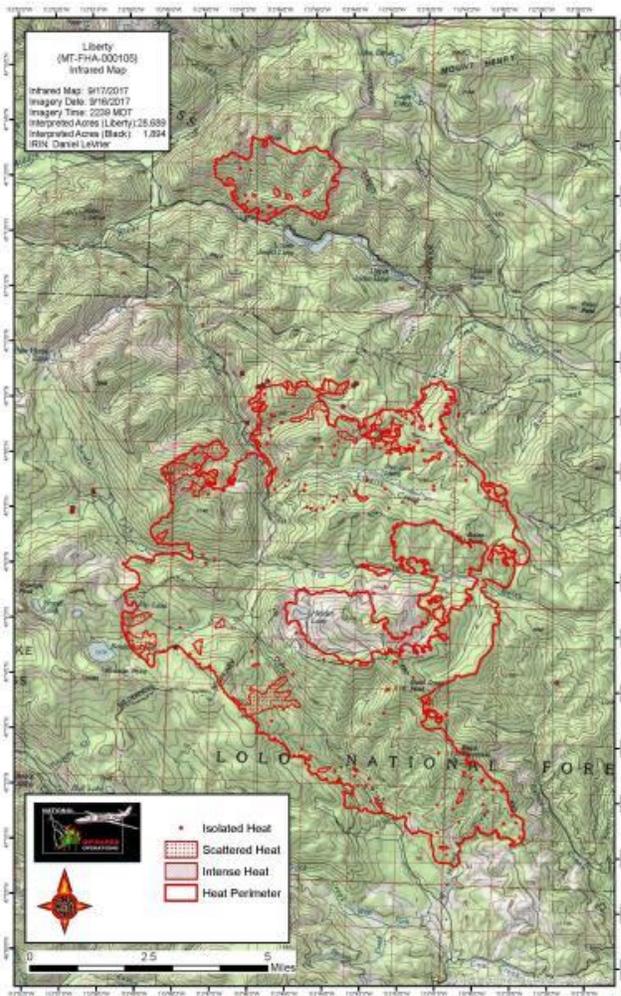
News articles: <http://flatheadbeacon.com/2017/08/09/public-meeting-discuss-gibraltar-ridge-fire-near-eureka/>

## Highway 200 Complex



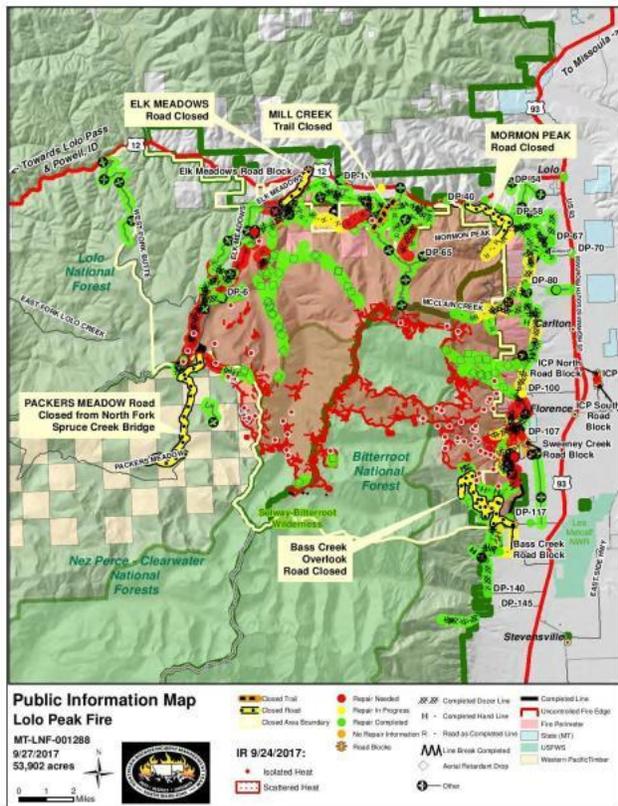
News articles: <http://www.kpax.com/story/36352106/growth-at-highway-200-complex-fire-prompts-evacuations>

# Liberty



News articles: <http://cordilleramontana.worldnow.com/story/36279756/firefighters-okay-after-sudden-change-at-liberty-fire>

## Lolo Peak Fire

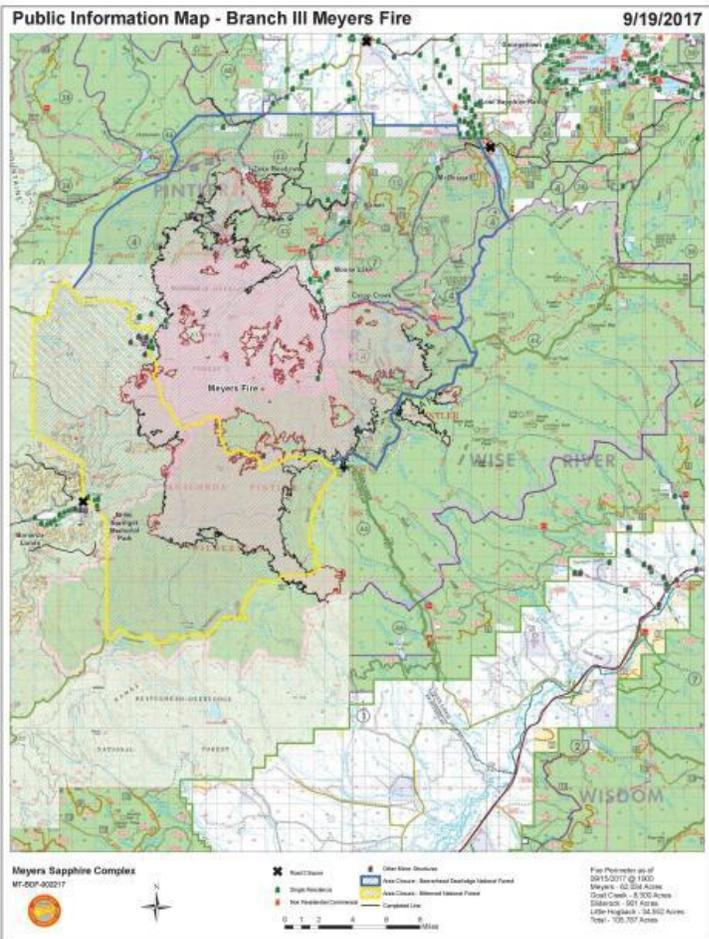


News articles: [http://missoulian.com/news/state-and-regional/updated-lolo-peak-fire---trying-to-take-control/article\\_d0356a3a-8f66-549b-acba-55968b596807.html](http://missoulian.com/news/state-and-regional/updated-lolo-peak-fire---trying-to-take-control/article_d0356a3a-8f66-549b-acba-55968b596807.html)

<http://www.kpax.com/story/36302155/lolo-peak-fire-at-48300-acres>

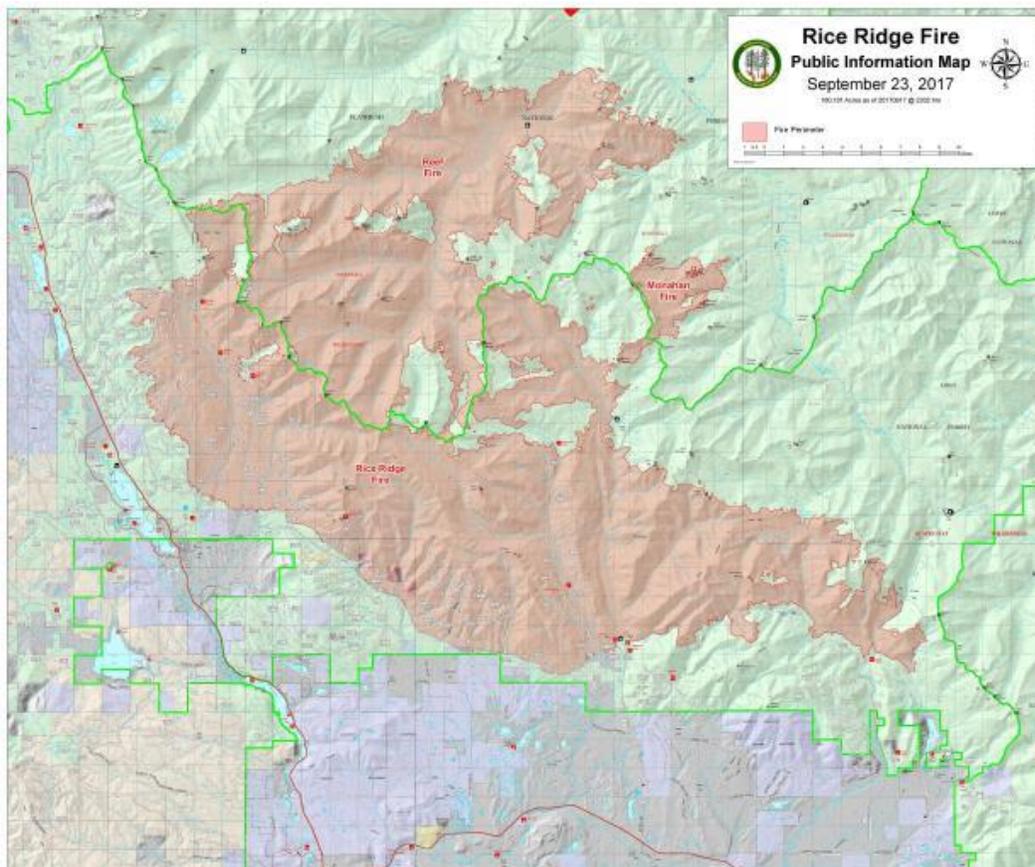


# Meyers Fire



News articles: <http://www.kpax.com/story/36327628/meyers-fire-grows-to-nearly-60000-acres>

## Rice Ridge Fire

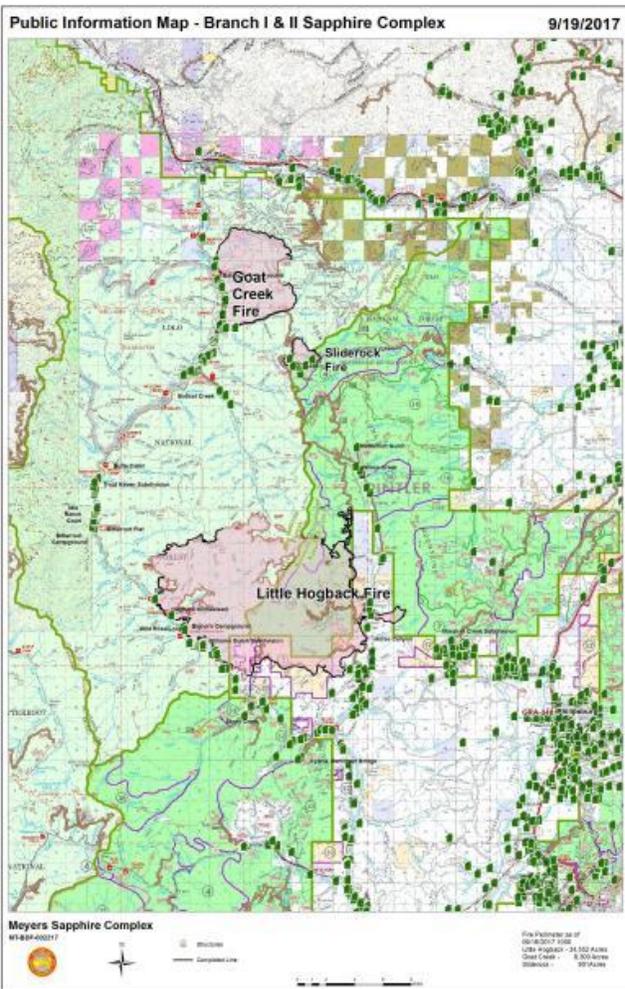


## News Articles

[http://missoulian.com/news/local/rice-ridge-fire-balloons-to-over-acres-and-growing/article\\_a877fc5b-6e5a-55d2-bcf2-296115ac5241.html](http://missoulian.com/news/local/rice-ridge-fire-balloons-to-over-acres-and-growing/article_a877fc5b-6e5a-55d2-bcf2-296115ac5241.html)

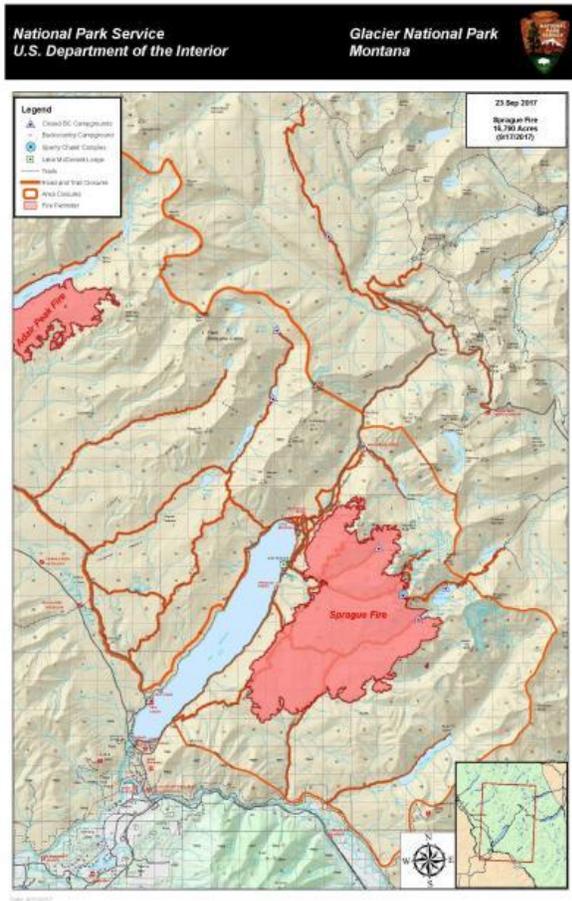
<http://nbcmontana.com/archive/rice-ridge-fire-outside-seeley-lake-grows-to-over-100000-acres>

# Sapphire Fire



News articles: <http://www.kpax.com/story/36226812/sapphire-complex-fire-nears-39000-acres>

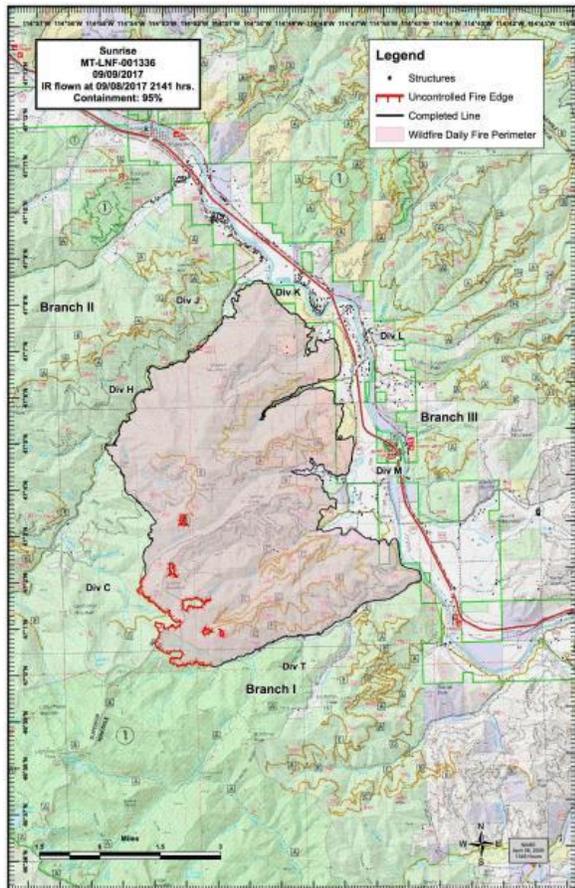
## Sprague Fire



News articles: <http://nbcmontana.com/news/local/sprague-fire-alters-glacier-visitors-travel-plans>

<http://www.kpax.com/story/36327288/efforts-to-protect-lake-mcdonald-lodge-from-sprague-fire-continue>

## Sunrise Fire



News Articles:

<http://nbcmontana.com/news/local/sunrise-fire-approaches-trout-creek-rd-evacuation-orders-remain>

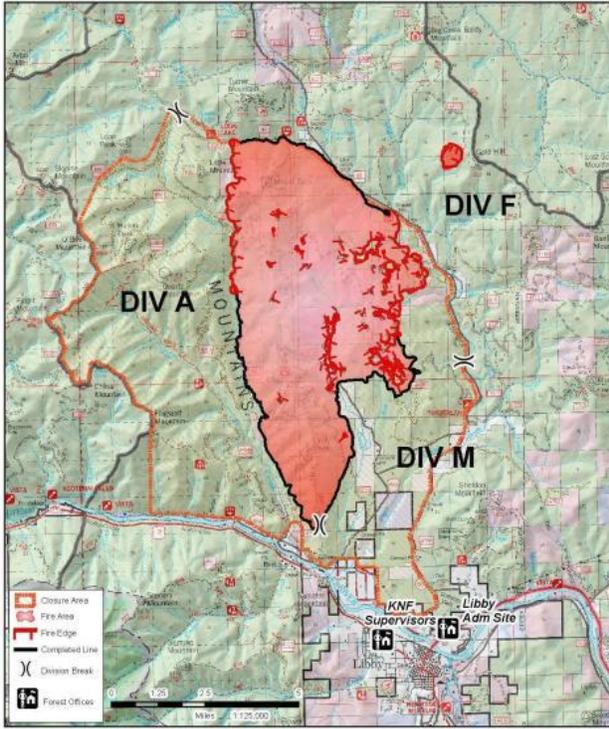
[http://missoulian.com/news/state-and-regional/sunrise-fire-near-superior-commands-national-attention/article\\_cd1cf3ef-09ec-525f-a496-5ec92f335e20.html](http://missoulian.com/news/state-and-regional/sunrise-fire-near-superior-commands-national-attention/article_cd1cf3ef-09ec-525f-a496-5ec92f335e20.html)

## West Fork Fire





**West Fork Fire**  
Public Information Map  
09/24/2017  
20,072 acres



## 6. Natural Event

40 CFR 50.1 defines a wildfire as "any fire started by an unplanned ignition caused by lightning; volcanoes; other acts of nature; unauthorized activity; or accidental, human-caused actions, or a prescribed fire that has developed into a wildfire. A wildfire that predominantly occurs on wildland is a natural event." Since the fires impacting the PM<sub>10</sub> monitors in 2017 were fires largely on wildlands with unplanned ignitions, the exceptional events are natural events.