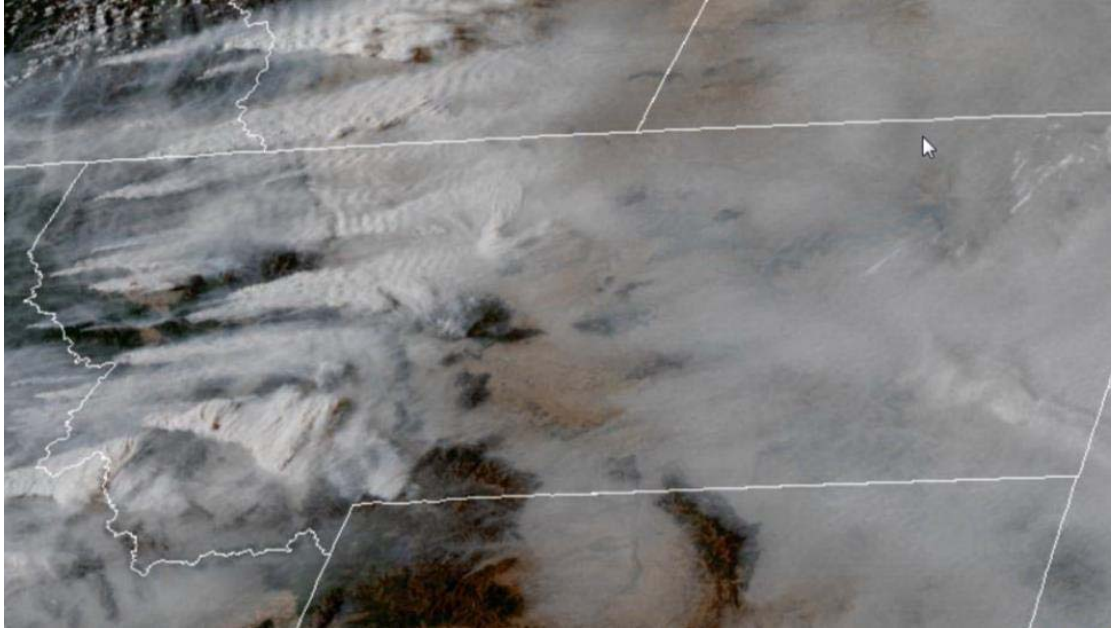


# PM<sub>2.5</sub> 2017 Exceptional Events in Libby due to Wildfires

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

**Prepared by:**  
Montana DEQ  
February 2019



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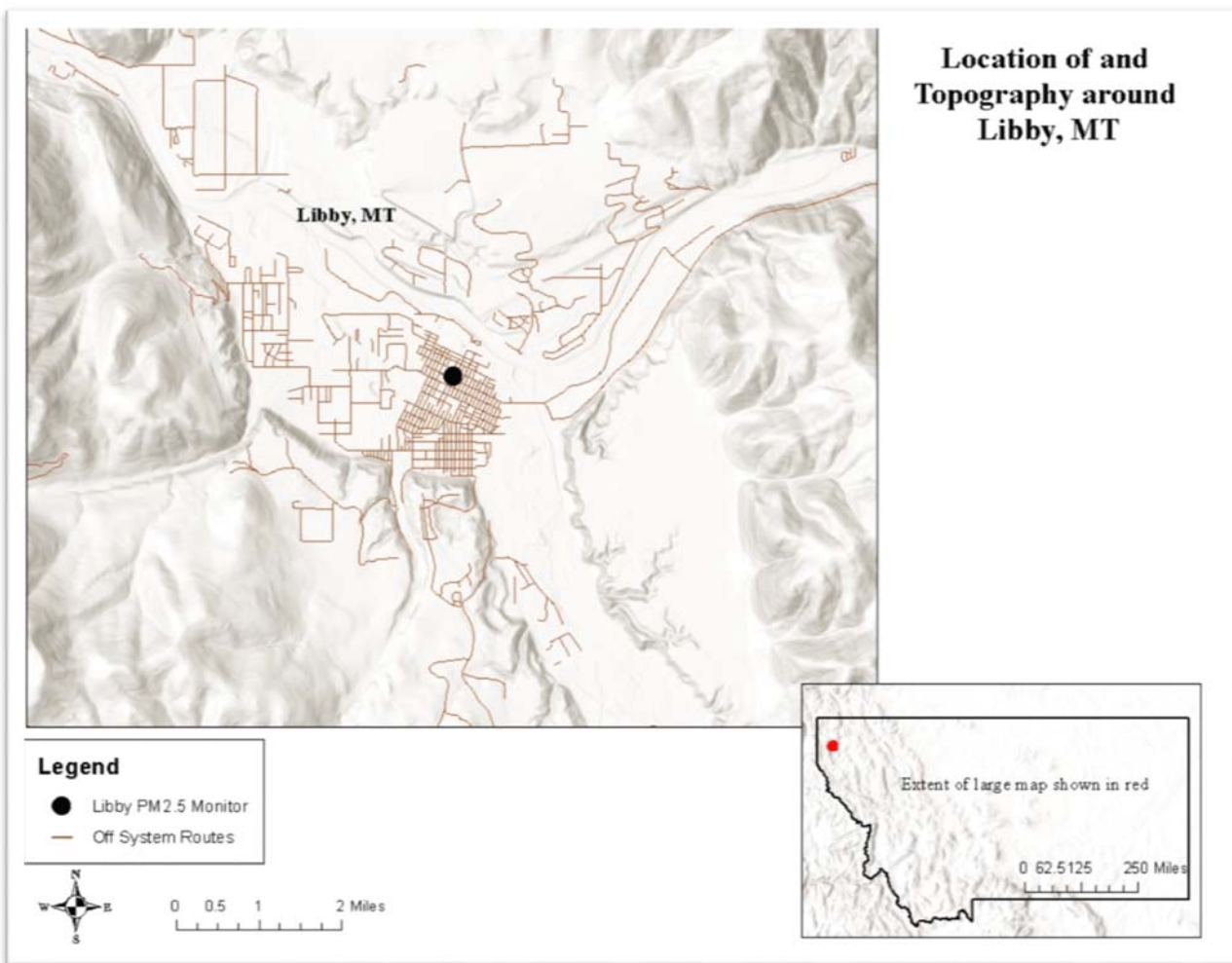
## 1. Summary

Montana's Department of Environmental Quality (DEQ) is requesting the following wildfire exceptional events in Libby be considered for concurrence. This request is due to an effort to redesignate the Libby PM<sub>2.5</sub> nonattainment area. Wildfire impacts leading to 24-hour values above 35 µg/m<sup>3</sup> are included in this package. Table 1 summarizes the PM<sub>2.5</sub> data that DEQ would like EPA to evaluate for the exclusion from design value calculations in the Libby PM<sub>2.5</sub> nonattainment area for the purposes of redesignation. Removing these data, and acting on previous years exceptional event demonstrations, will allow Libby to qualify for a limited maintenance plan after applying a regional motor vehicle growth analysis. Without concurrence on these dates, Libby will not qualify for a limited maintenance plan.

**Table 1. 2017 PM<sub>2.5</sub> Summary of Libby Data to be Evaluated.**

<b>Date</b>	<b>Site</b>	<b>AQS #</b>	<b>24-hour PM<sub>2.5</sub> (µg/m<sup>3</sup>)</b>
8/8/2017	Libby	30-053-0018	37.8
8/9/2017	Libby	30-053-0018	35.8
8/10/2017	Libby	30-053-0018	39.5
8/11/2017	Libby	30-053-0018	37.8
9/4/2017	Libby	30-053-0018	90.2
9/5/2017	Libby	30-053-0018	109.6
9/6/2017	Libby	30-053-0018	103.8
9/7/2017	Libby	30-053-0018	126.9
9/8/2017	Libby	30-053-0018	165.7
9/9/2017	Libby	30-053-0018	85.5
9/14/2017	Libby	30-053-0018	50.7
9/15/2017	Libby	30-053-0018	94.1

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. The surrounding mountains extend up to 7,000 ft. over a short distance. Winds are historically light, with the high mountains inhibiting mixing down to the valley surface. Inversions are common in Libby, especially in the fall and winter months.

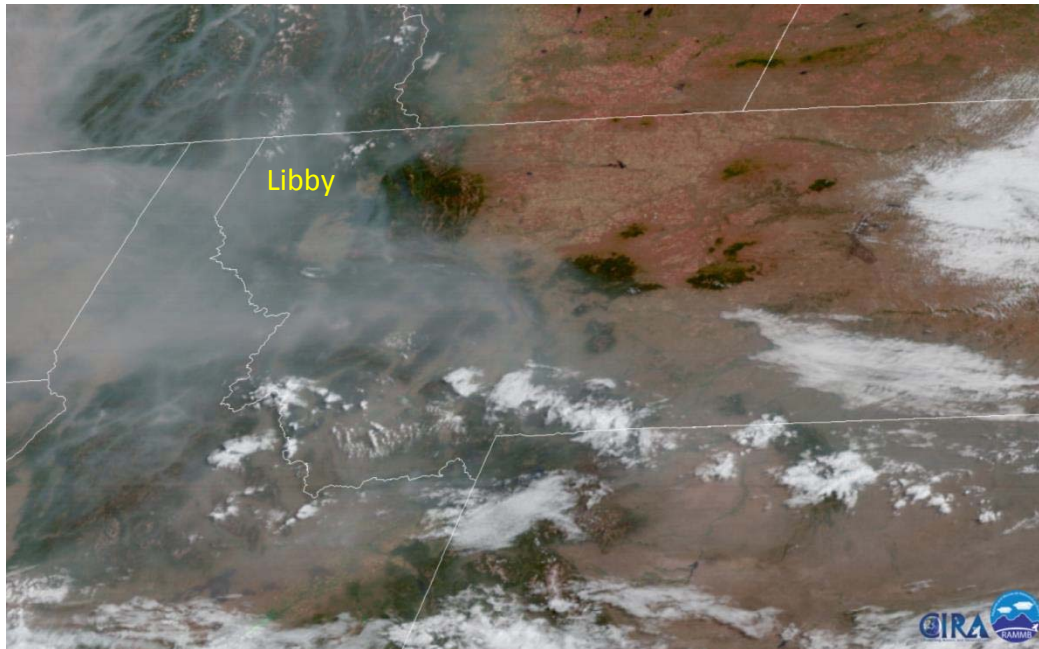


The 2017 wildfire season was defined by numerous fires in Montana causing significant smoke impacts to nearby communities. In addition to the high levels of smoke near active fires, many red flag days caused smoke from these fires to fan out across the state, impacting central and eastern Montana as well. In Libby, smoke caused exceedances of the National Ambient Air Quality Standards (NAAQS) in mid-August, due to smoke from fires in British Columbia. While fires in the central part of Montana caused continual smoke impacts to other parts of western Montana, Libby experienced a reprieve for the rest of August. It wasn't until the West Fork Fire erupted just north of town that significant smoke returned to the community in September.



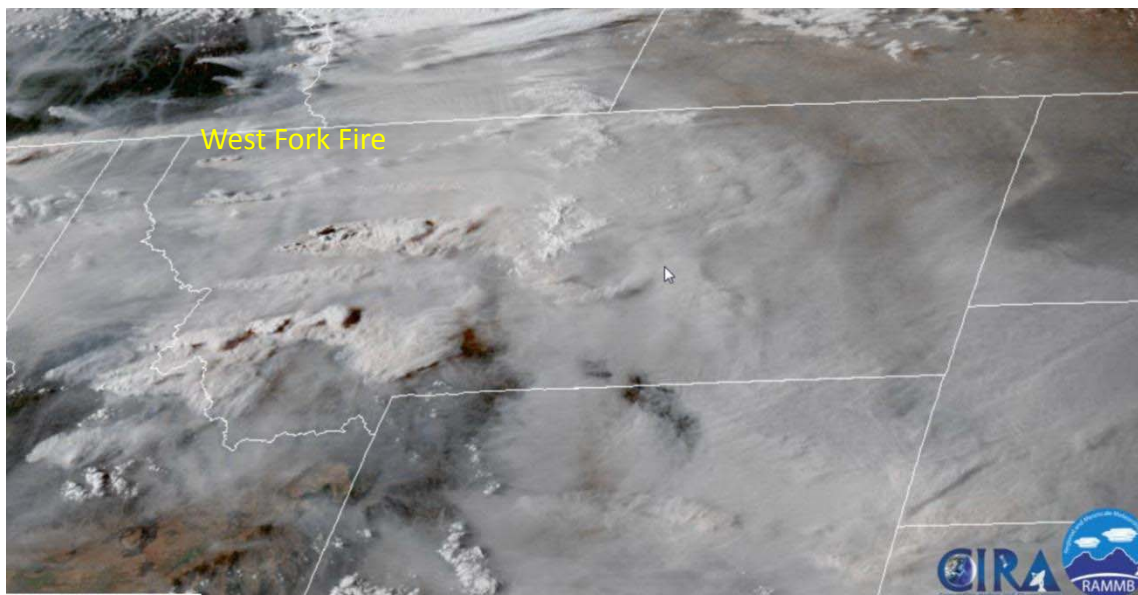
Figure 1 shows smoke from British Columbia impacting Libby in August 2017.

**Figure 1. Smoke over Montana on August 9, 2017.**



Below shows the satellite in the late afternoon on September 3, 2017. The West Fork fire, which impacted Libby for the first half of September, is highlighted.

**Figure 2. Smoke from numerous fires impacting Montana on September 3, 2017.**

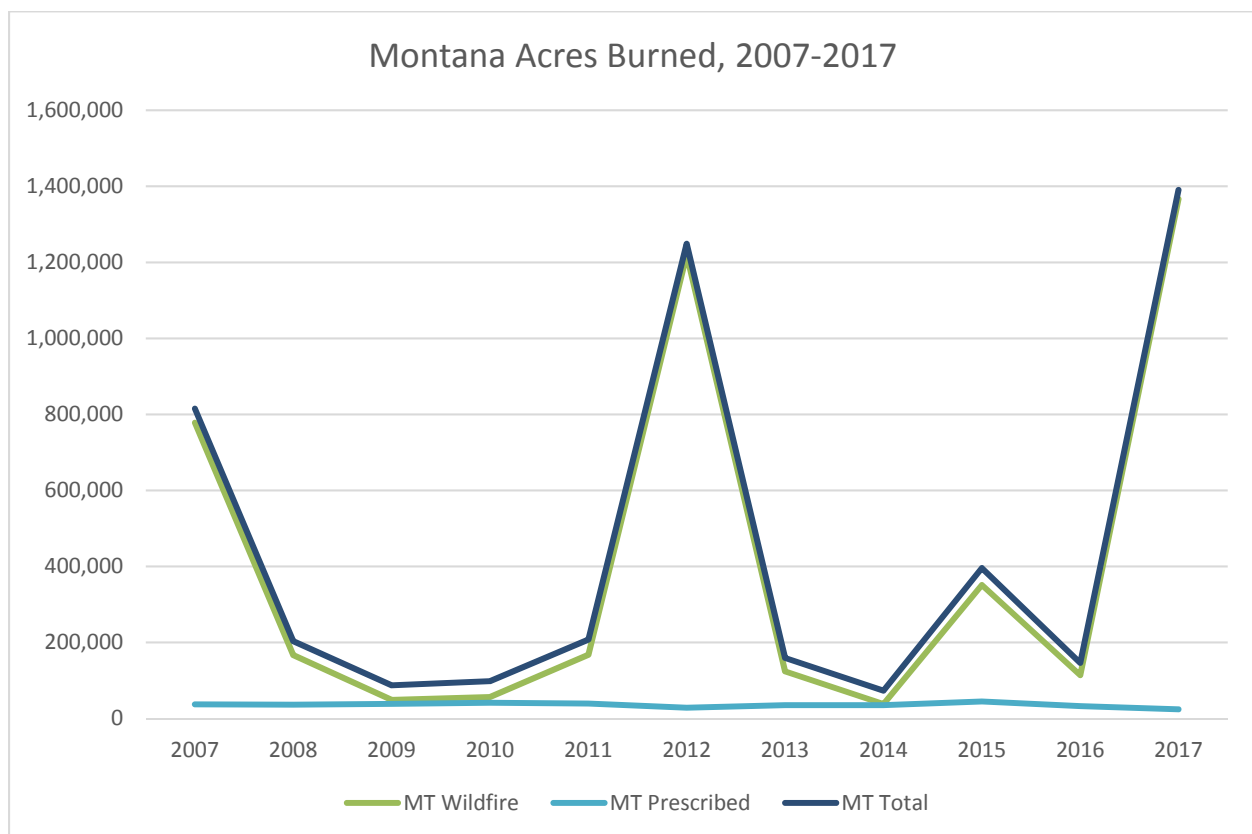


## 2. Conceptual Model

Without the influence of wildfires, PM<sub>2.5</sub> values in western Montana would be highest in the winter due to temperatures inversions. In the spring, summer, and fall, PM<sub>2.5</sub> values are generally low due to good dispersion from strong solar heating. Unfortunately, summer months can be significantly impacted by wildfires. The graph included in the following 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 exceedance of the national ambient air quality standards. Below is a table of acres burned in Montana since 2007. As you can see, 2017 was the worst year in terms of acreage burned during this period.

**Figure 3. Acres Burned in Montana, 2007-2017.**



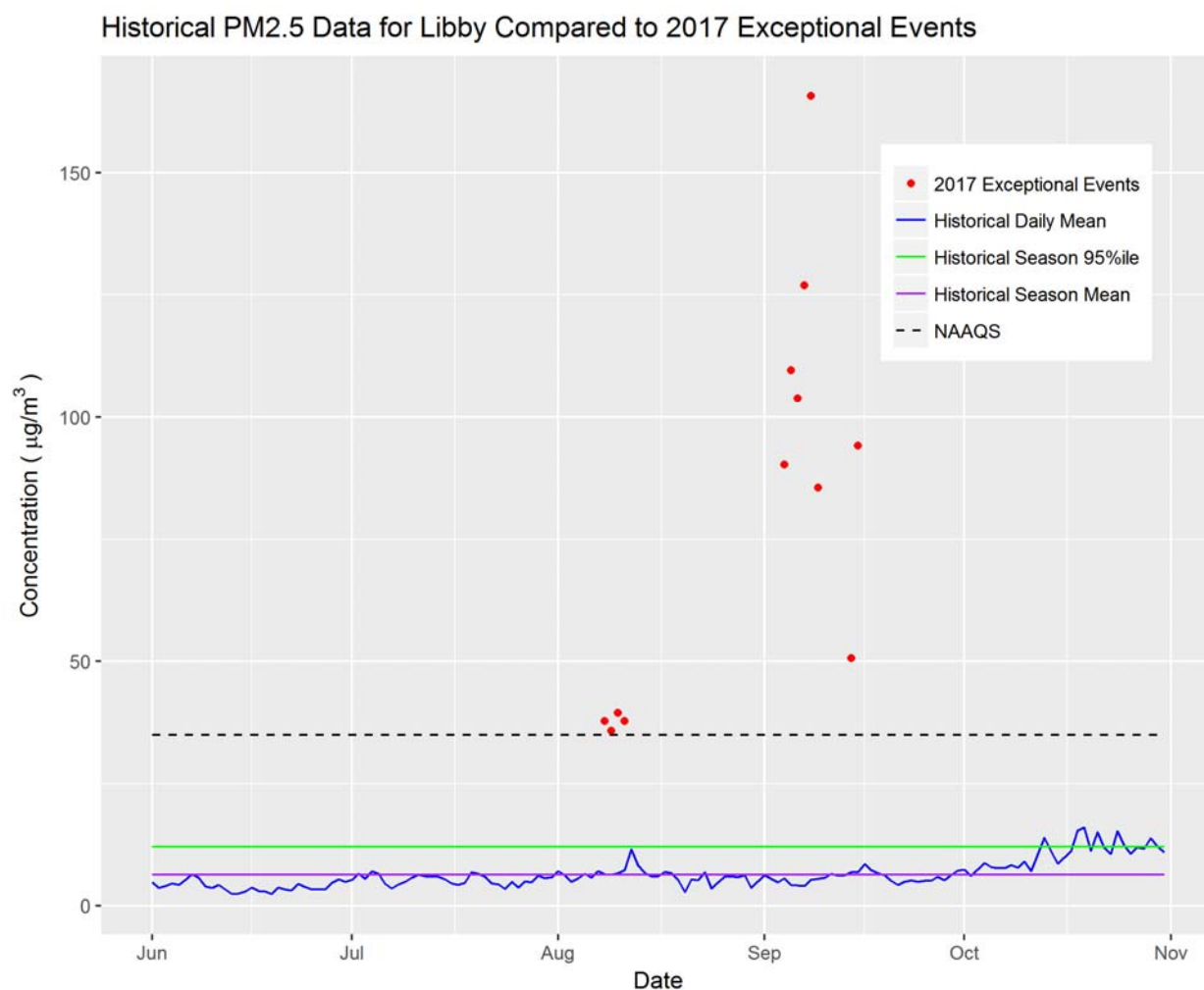
The Montana fires of 2017 impacted air quality values from July through September, including days in August and September when PM<sub>2.5</sub> data exceeded the NAAQS in Libby. The conceptual model presented in this demonstration relies on three key areas of evidence. First, a comparison to historical data indicating PM<sub>2.5</sub> values less than 35 µg/m<sup>3</sup> when wildfire 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  $35 \mu\text{g}/\text{m}^3$  had the smoke not been present. The remaining sections will provide evidence for this conceptual model.

### 3. Comparison to Historical Data

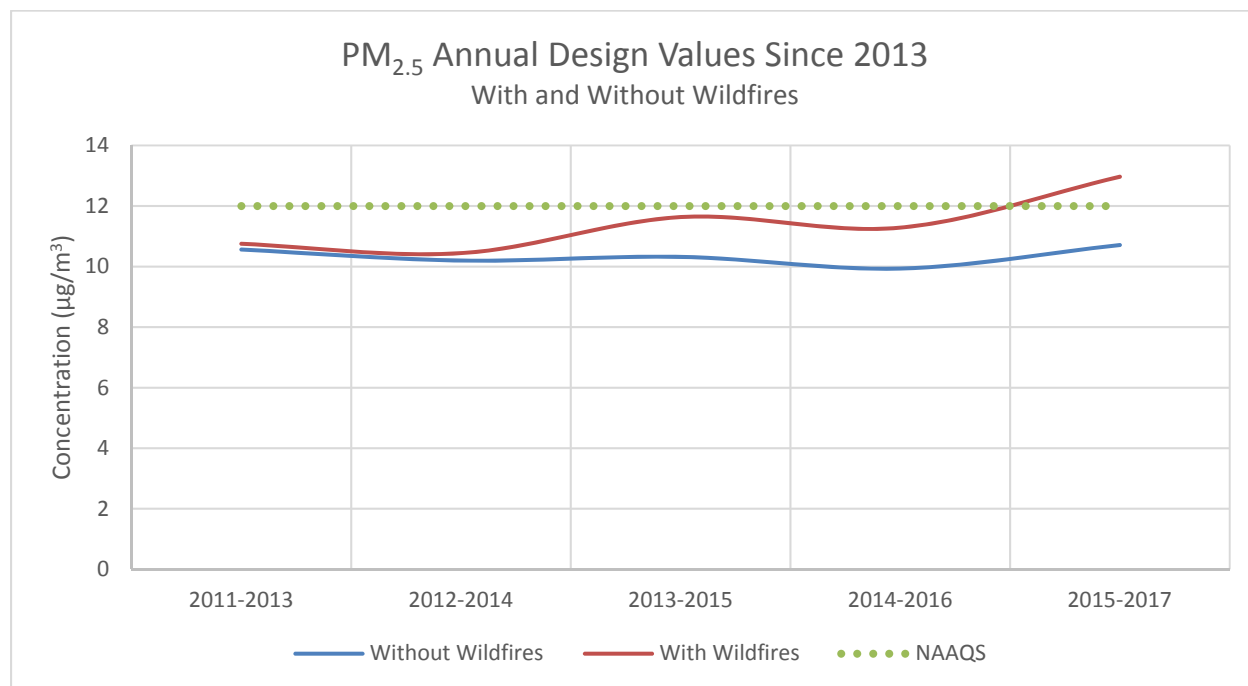
The historical data comparisons Libby are provided below. These graphs show the average and 95th percentile between 2012-2016, along with the daily average for unflagged  $\text{PM}_{2.5}$  data. This year's  $\text{PM}_{2.5}$  flagged days are super imposed in red to show the historical significance of the flagged days.

**Figure 4. Historical  $\text{PM}_{2.5}$  Data Comparison for Libby.**



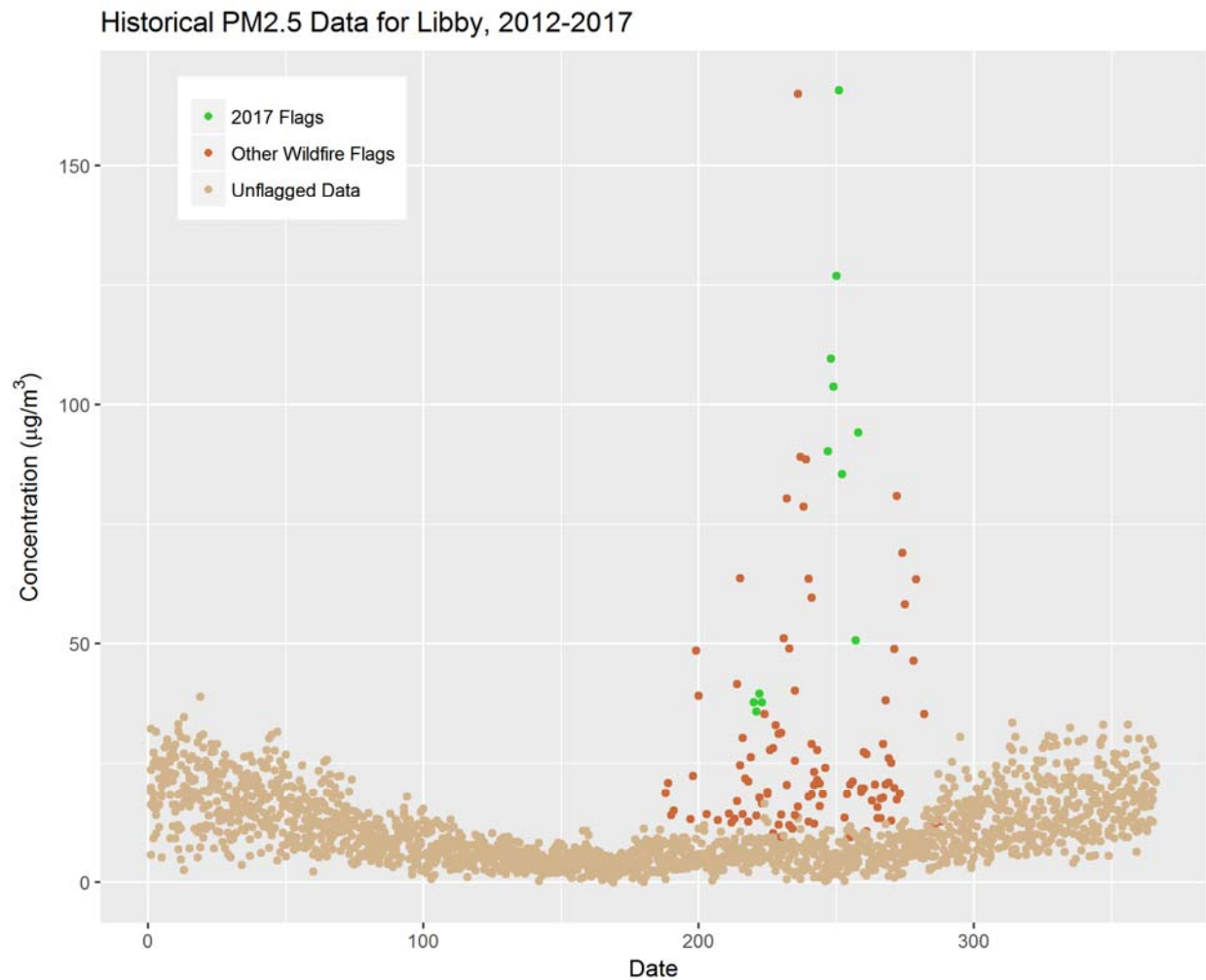
The graph below shows the differences in annual design value calculations with and without wildfire impacts. When wildfire impacts are included, the design values have been steadily increasing over the past 5 years. With wildfire impacts removed, the design values have remains steady at around  $10.5 \mu\text{g}/\text{m}^3$ .

Figure 5. Annual Design Values Over Time, With and Without Wildfire Impacts



The 2017 flagged data are compared to 2012-2017 (six years) in the figures below for Libby. Generally, PM<sub>2.5</sub> peaks in the winter due to inversions and summer due to wildfire. The highest values are associated with wildfire activity in the summer. 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 35 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.

Figure 6. Libby Historical PM<sub>2.5</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 2. Summary Statistics for Libby PM<sub>2.5</sub>, 2012-2017

Site	Count	Maximum ( $\mu\text{g}/\text{m}^3$ )	Mean ( $\mu\text{g}/\text{m}^3$ )	Standard Deviation ( $\mu\text{g}/\text{m}^3$ )	95 <sup>th</sup> Percentile ( $\mu\text{g}/\text{m}^3$ )
Libby, All Data	2170	165.7	11.7	11.0	26.5
Libby, No Flagged Data	2053	38.9	10.5	7.0	24.6

**Table 3. Statistics Characterizing Libby 2017 Flagged Data Greater than 35 µg/m<sup>3</sup>**

<b>Date</b>	<b>Site</b>	<b>PM<sub>2.5</sub> Conc. (µg/m<sup>3</sup>)</b>	<b>Rank, 2012-2017</b>	<b>Percentile, 2012-2017</b>
8/8/2017	Libby	37.8	32	98.57%
8/9/2017	Libby	35.8	34	98.48%
8/10/2017	Libby	39.5	28	98.76%
8/11/2017	Libby	37.8	33	98.57%
8/12/2017	Libby	35.3	36	98.43%
9/4/2017	Libby	90.2	7	99.72%
9/5/2017	Libby	109.6	4	99.86%
9/6/2017	Libby	103.8	5	99.82%
9/7/2017	Libby	126.9	3	99.91%
9/8/2017	Libby	165.7	1	100.00%
9/9/2017	Libby	85.5	10	99.59%
9/14/2017	Libby	50.7	21	99.08%
9/15/2017	Libby	94.1	6	99.77%

In conclusion, the comparison to historical data shows that the flagged values in 2017 were at or 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>

#### **Tuesday, August 08, 2017**

Severe air quality impacts continue this morning near active fires. As of 10AM, air quality is once again HAZARDOUS in Seeley Lake due to the nearby Rice Ridge fire. Air quality in Seeley Lake has been hazardous five out of the last seven mornings due to smoke draining down from the fire and getting trapped under an inversion. Air quality in Quartz Creek and Superior is currently VERY UNHEALTHY as smoke from the Sunrise fire spreads out over the I-90 corridor, these levels have improved the past hour. Conditions improve to the east in Frenchtown and Missoula, where air quality is MODERATE. Down the Bitterroot Valley and to the east, air quality is UNHEALTHY in Lolo, UNHEALTHY FOR SENSITIVE GROUPS in Hamilton and Philipsburg, and MODERATE in Florence. North of Missoula in Arlee, air quality is UNHEALTHY this morning due to the nearby Liberty fire.



Outside of west-central Montana we are seeing air quality impacts from Canadian smoke. Satellite shows a wide area of smoke moving in from the northwest. Air quality is currently UNHEALTHY FOR SENSITIVE GROUPS in Libby and MODERATE in Flathead Valley, Thompson Falls, Clearwater, Dillon, Butte, West Yellowstone, Helena, and Great Falls.

Here is a review of current fire activity:

- The Rice Ridge fire near Seeley Lake is 8,209 acres and 10% 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. For more information on smoke impacts from this fire, see here.
- The Sunrise fire near Superior is 14,009 acres and 20% contained with active fire behavior. This fire is causing significant smoke impacts along the I-90 corridor between Albion and Superior during the overnight and morning hours. here.
- The Lolo Peak fire near Lolo is 7,292 acres and 0% contained with moderate fire behavior. This fire is causing occasional impacts to the northern Bitterroot Valley. For more information on smoke impacts from this fire, see here.
- The Sapphire Complex south of Clinton is 24,491 acres and 29% contained with active fire behavior. This fire is causing impacts to the Bitterroot Valley during the day due to northeasterly winds. For more information on smoke impacts from this fire, see here.
- The Meyers fire near Philipsburg is currently 13, 097 acres and 4% contained with moderate fire behavior. This fire is expected to cause smoke impacts in the southern Bitterroot Valley and Philipsburg today. For more information on smoke impacts from this fire, see here.
- The Liberty fire near Arlee, is currently 3,971 acres and 90% contained with minimal fire behavior. For more information on smoke impacts from this fire, see here.
- The Park Creek (5,189 acres) and Arrastra Creek (4,002 acres) fires near Lincoln are 30-40% contained with minimal fire behavior. For more information on smoke impacts from this fire, see here.
- Extreme fire behavior continues in British Columbia with numerous fires burning and sending smoke to the south and east over Idaho, Washington, and Montana. Fire activity is also increasing in Washington and Oregon where there are currently 9 large, uncontrolled fires burning.



## **Today**

Fire activity is expected to increase today when a weak cold front moves through the area. This cold front isn't expected to bring any significant precipitation but it is likely to create erratic winds on active fires, sending more smoke into the air than we have seen in recent days. Surface winds are expected from the north and east, keeping most smoke from active fires contained to Lake, Mineral, Missoula, Ravalli, and Granite counties. Air quality is expected to range from MODERATE to UNHEALTHY FOR SENSITIVE GROUPS this morning, improving briefly in the afternoon before ranging from UNHEALTHY FOR SENSITIVE GROUPS to UNHEALTHY by late afternoon/evening. Increased winds overnight tonight may help keep smoke from pooling quite as severely near active fires. I still expect air quality to reach UNHEALTHY to VERY UNHEALTHY levels near the Sunrise and Rice Ridge fires, but it's possible the HAZARDOUS air quality will be kept at bay for one morning.

As mentioned in previous updates, the surface winds driving smoke impacts for fires in Montana are only part of the smoke equation in western Montana. Northwest winds aloft continue to carry smoke from fires in British Columbia over to western Montana. This smoke is expected to extend further into eastern Montana, bringing hazy skies to Helena, Great Falls, Bozeman, and possibly as far east as Billings and Lewistown. Air quality is expected to range from MODERATE to UNHEALTHY FOR SENSITIVE GROUPS in areas impacting by Canadian smoke.

## **Wednesday and Thursday**

The ridge of high pressure that has been sitting over the west coast, causing record breaking temperatures and significant smoke impacts to Washington and Idaho, will be slowly drifting our way beginning tomorrow. Surface winds will stay northeasterly on Wednesday and Thursday, keeping most of the local smoke confined to west central Montana. Fire activity will likely be high each day, with air quality ranging from MODERATE to UNHEALTHY in west-central Montana. The significant pooling of smoke near active fires is expected each morning, with HAZARDOUS air quality likely in Seeley Lake and Quartz Creek. Elsewhere, smoke from fires in Canada and Washington will continue to move over western and central Montana, causing hazy skies and MODERATE to UNHEALTHY FOR SENSITIVE GROUPS air quality.

## **Friday through Sunday**

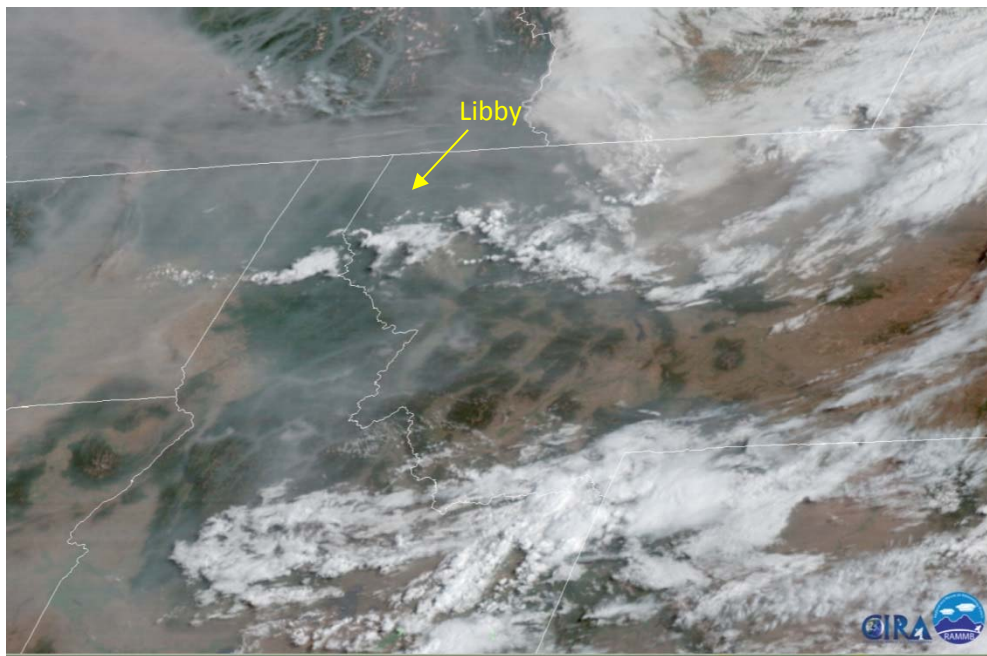
As the ridge moves over Montana on Friday and Saturday, surface winds will become light and more smoke will become trapped near the surface. Much of Montana will likely be under hazy skies from smoke originating both here in Montana and from fires in Canada, Washington, and Idaho. Morning inversions will be strong, with significant pooling of smoke expected near the active fires. Seeley Lake and Quartz Creek can expect HAZARDOUS air quality each morning, with levels in Missoula and the Bitterroot likely ranging from UNHEALTHY FOR SENSITIVE GROUPS to UNHEALTHY. Depending on how much smoke from Pacific Northwest fires moves over us, we could see widespread UNHEALTHY air quality across much of Montana.

## Next week

The ridge is expected to break down early next week when a low pressure trough is expected to swing through southern Canada/northern Montana. There is a lot of uncertainty regarding this system right now. The most likely scenario is this system carries a significant amount of smoke into Montana from the fires in British Columbia, triggers red flag warnings across Montana, and doesn't bring any significant precipitation to the area. If this occurs, we will be looking at continued significant smoke impacts into next week and beyond. If the system does manage to provide much needed precipitation, we could see a brief improvement in air quality for some communities.

The Montana Department of Environmental Quality has issued an air quality alert for Mineral, Missoula, and Ravalli counties in effect until further notice. The Mineral County alert is for the I-90 corridor near the Sunrise fire. The Missoula County alert is for the Seeley Lake area 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 alert for Ravalli County is for the entire Bitterroot Valley where air quality has been impacted by fires surrounding the area. Concentrations in Ravalli County have been highest in the afternoon and evening due to increased fire activity. This alert will be updated again at 900AM 8/9/2017.

This morning's satellite imagery shows smoke from Canada causing hazy skies into central Montana.



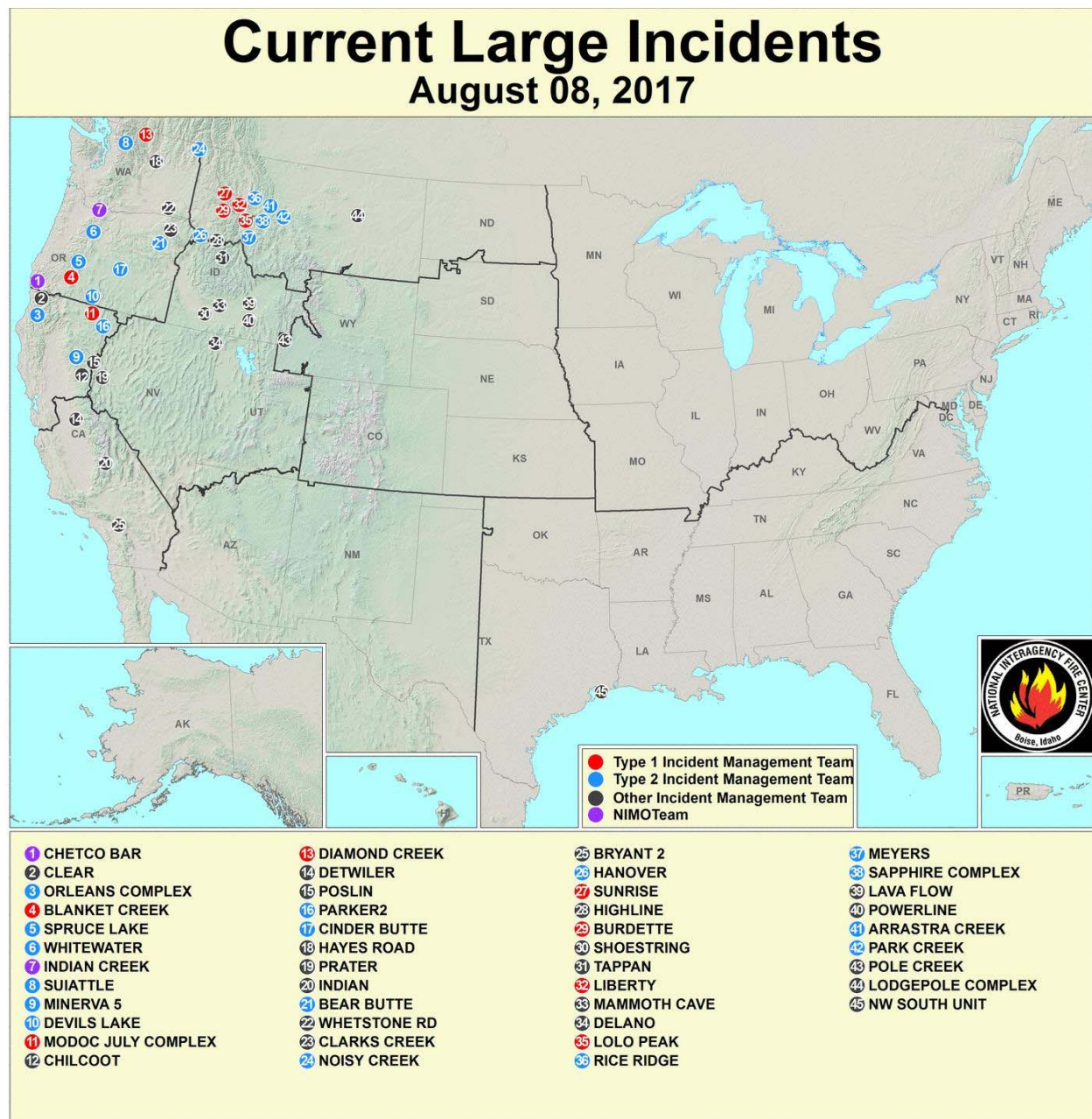
Source: CIRA and NOAA. These data are preliminary and not operational.

On the left, Stevensville is hazy this morning, with air quality averaging UNHEALTHY FOR SENSITIVE GROUPS in the Bitterroot Valley. On the right, the view on a sunny spring day.



Source: Bitterroot River BB

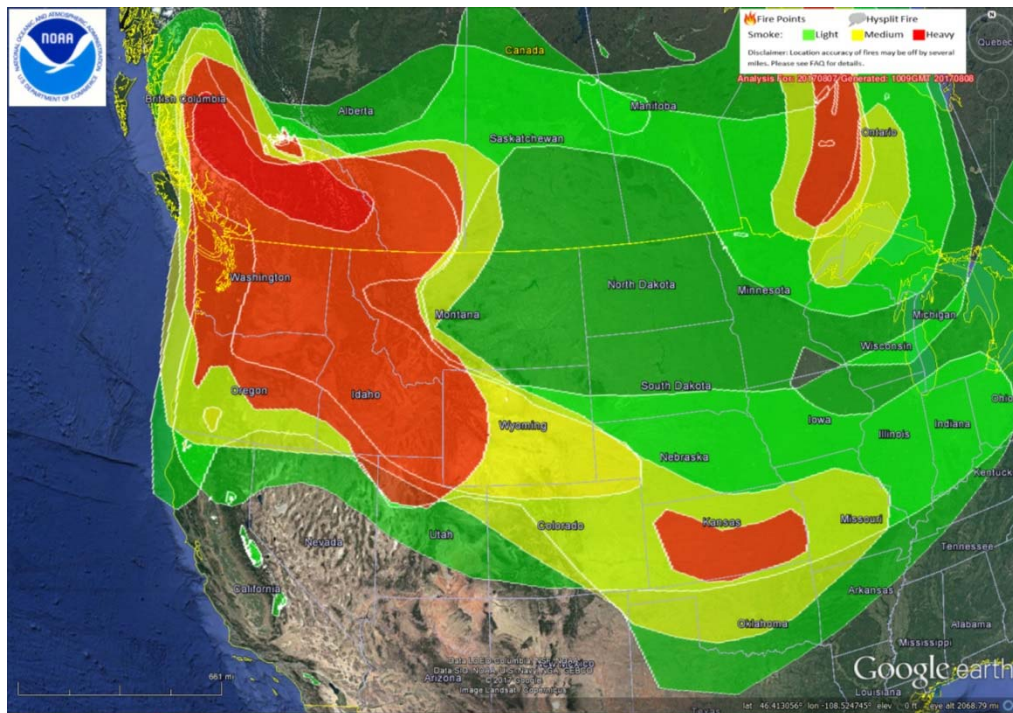
Current large fire locations are shown below.



Source: USFS



Yesterday's smoke analysis shows heavy smoke over western Montana.



Source: NOAA

### NOAA Text Description:

**Tuesday, August 8, 2017**

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY  
THROUGH 1815Z August 8, 2017

SMOKE:

Continental US....

Remnant smoke predominantly originating from wildfires located in British Columbia combine with smoke produced from wildfires in the Northern Rockies and others near the California-Oregon border. This morning the large mass of smoke was seen to move eastward across the Plains, blanketing the area from central Canada and extending as far south as central Texas while leaving the majority of the Southwest clear. Areas of eastern Washington state, northern Idaho, and northern Montana are effected by moderate to heavy smoke. Extending farther towards the east the light density smoke covered the Upper and Middle Mississippi Valley, the Great Lakes Region, much of Arkansas, the Ohio Valley while stretching towards the northeast across Tennessee, West Virginia, Pennsylvania, and into central New York state. An area of concentrated heavily dense smoke was visible over northern Michigan.

<http://www.ssd.noaa.gov/PS/FIRE/DATA/SMOKE/2017/2017H081905.html>

## Wednesday, August 09, 2017

Air quality impacts are more widespread today due to continued influence from fires in Canada and the Pacific Northwest. Air quality reached UNHEALTHY FOR SENSITIVE GROUPS in Libby, Eureka, Thompson Falls, Arlee, and Hamilton earlier this morning. We are once again seeing significant air quality impacts near the Rice Ridge and Sunrise fires, with air quality reached HAZARDOUS levels in Seeley Lake and VERY UNHEALTHY in Quartz Creek earlier this morning. It looked like we might only get VERY UNHEALTHY levels in Seeley Lake for a little while this morning, with stronger overnight winds helping to delay the pooling. But as of 6am, concentrations started to spike and we hit HAZARDOUS levels between 7 and 8am before they dropped back to VERY UNHEALTHY levels at 10am. Elsewhere, air quality reached UNHEALTHY levels this morning in Lolo and Superior. Air quality and has been MODERATE in Flathead Valley, Missoula, Philipsburg, Clearwater, Butte, Dillon, Bozeman, West Yellowstone, and Broadus. Air quality has been ranging from GOOD to MODERATE in Great Falls, Helena, Lewistown, and Billings.

In addition to the smoke from Canada, northwest Montana is also dealing with a new fire. The Gibraltar Ridge fire, located east of Eureka grew rapidly yesterday under extreme fire behavior. This fire is currently 1,133 acres and 0% contained. This fire is causing smoke impacts in northern Flathead County, which is also being impacted by the smoke from Canada.

In west-central Montana, the Park Creek, Arrastra, and Liberty fire have been reporting minimal fire behavior, while the Sunrise, Rice Ridge, Lolo Peak, Meyers, and Sapphire Complex remain active.

--The Rice Ridge fire near Seeley Lake is 8,423 acres and 10% 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 Sunrise fire near Superior is 14,591 acres and 20% contained with active fire behavior. This fire is causing significant smoke impacts along the I-90 corridor between Alberton and Superior during the overnight and morning hours.

- The Lolo Peak fire near Lolo is 7,453 acres and 0% contained with active fire behavior. This fire is causing occasional impacts to the northern Bitterroot Valley.

-The Sapphire Complex south of Clinton is 25,949 acres and 32% contained with active fire behavior. The majority of growth on this Complex is on the Little Hogback fire (18,612 acres), located on the southern end of the Complex.

- The Meyers fire near Philipsburg is currently 13, 236 acres and 4% contained with active fire behavior. This fire is expected to cause smoke impacts in the southern Bitterroot Valley and Philipsburg today.

The much discussed Canadian fires can be seen here.

It looks like a change is on the way starting at the end of the weekend. Unfortunately, it doesn't look like this change will be an improvement for air quality in Montana. But first, here is where things look for the remainder of this week.

### **Today through Saturday**

The ridge of high pressure that has been over the west coast will slowly make its way east over Montana by Saturday. Between now and then a number of weak disturbances will move through, bringing a chance of scattered showers and thunderstorms. We can expect active fire behavior on the fires here in Montana in the afternoon, followed by significant pooling of smoke in nearby valleys at night. Surface winds will remain northeasterly, keeping impacts from local fires contained to western Montana. Expect Seeley Lake and the I-90 corridor in Mineral County to see air quality between midnight and noon reach HAZARDOUS levels. Elsewhere, air quality is expected to range from UNHEALTHY FOR SENSITIVE GROUPS to UNHEALTHY in west-central Montana and also near the Gibraltar fire.

In addition to smoke impacts from fires here in Montana, smoke from fires in Canada and the Pacific Northwest will have an increasingly significant impact on Montana in the coming days as smoke remains trapped under the ridge. Widespread hazy skies are expected for everywhere but northeast Montana, with air quality at UNHEALTHY FOR SENSITIVE GROUPS in western Montana, becoming MODERATE as you move to the south and east. By the end of the week, the widespread impacts from this smoke will likely dominate air quality in most locations, with most parts of western Montana seeing air quality reach UNHEALTHY FOR SENSITIVE GROUPS to UNHEALTHY levels.

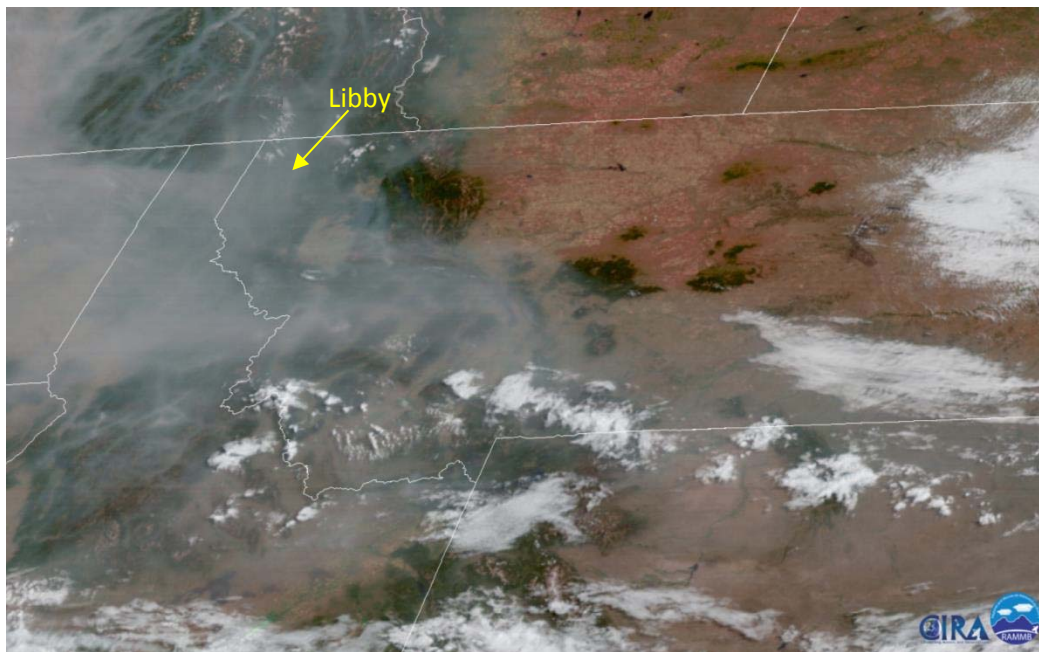
### **Next week**

It is looking more and more likely that we will see a significant change to the weather pattern beginning early next week. The ridge is expected to break down, with westerly flow aloft setting up over the region. This westerly flow aloft is bad news for keeping smoke from Canada and the Pacific Northwest out of the state. Montana will be directly down wind of any active fires in Washington, northern Idaho and British Columbia throughout next week. Some of these fires may receive precipitation at the start of the week, possibly mitigating smoke impacts in Montana. However, it is likely all of Montana will have to deal with widespread hazy skies and smoke impacts throughout most of next week.

The Montana Department of Environmental Quality has issued an air quality alert for Flathead, Lake, Lincoln, Mineral, Missoula, Ravalli, and Sanders 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, Seeley Lake near the Rice Ridge fire, and northern Flathead Valley near the Gibraltar Ridge fire. Smoke from these fires is draining into the nearby valleys at night, causing severe air quality impacts from midnight through midday. Canadian fires are causing widespread haze and air quality impacts. This alert will be updated again at 900AM 8/10/2017.



Widespread smoke from fires to our north and west is impacting western and southern Montana this morning.



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

The view is smoky in Eureka where a nearby fire and smoke from Canada are causing air quality impacts. Below, the view on a good day.

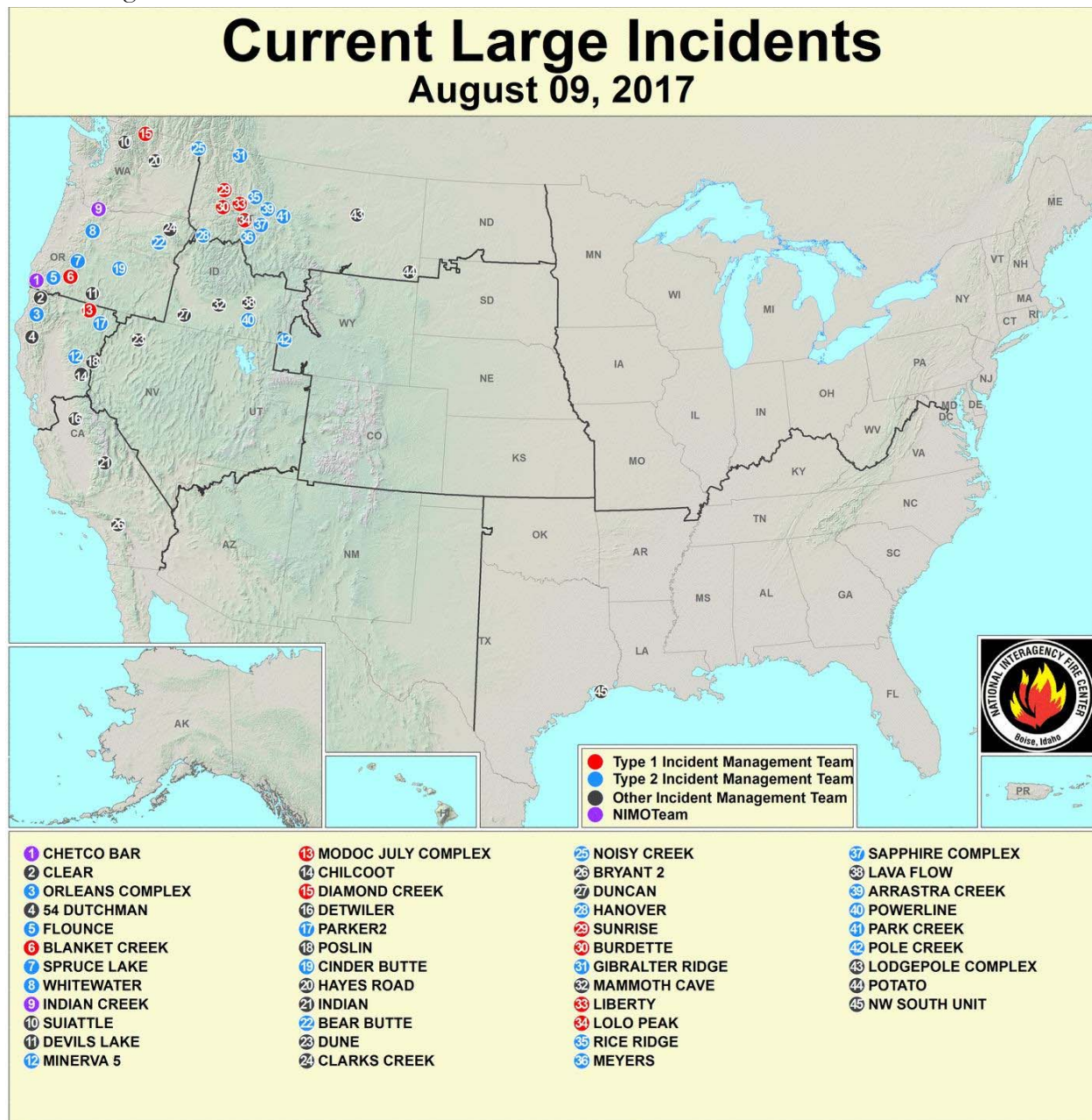


2018-05-15 02:24:49 PM  
WildernessClub



Source: [Weather Underground](#)

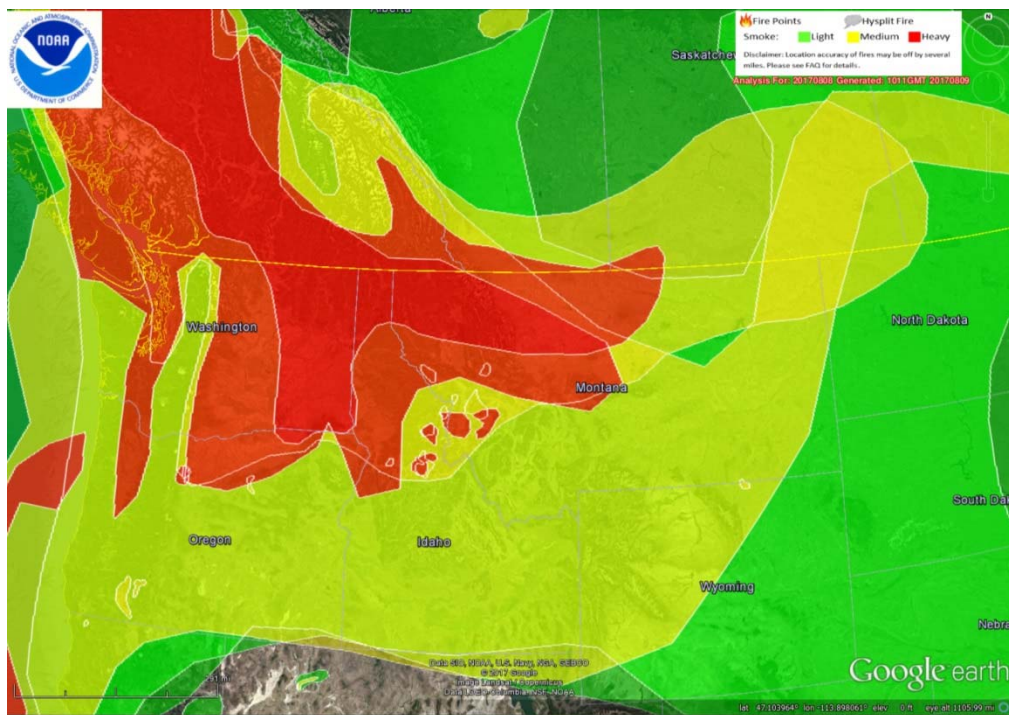
Current large fire locations are shown below.



Source: USFS



Heavy smoke from Canada and local fires were detected by NOAA yesterday.



Source: NOAA

## NOAA Text Description:

**Wednesday, August 9, 2017**

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY  
THROUGH 1815Z August 9, 2017

### SMOKE:

British Columbia, Northwest US, and Central US...

Wildfires located in south-central British Columbia continued to burn throughout the morning producing light to heavily dense smoke. Heavy smoke was predominantly confined to the central portion of the province while extending towards the southeast into western Washington state, northern Idaho, and eastern Montana. Moderately dense smoke extended farther east into northwestern Wyoming. Light density smoke covered much of British Columbia, most of Northwestern US, and the Northern and Central Plains region including Oklahoma. The smoke mass extended as far east as western Michigan and blanketed Minnesota and a portion of southern Manitoba.

<http://www.ssd.noaa.gov/PS/FIRE/DATA/SMOKE/2017/2017H091847.html>

**Thursday, August 10, 2017**

We are once again seeing HAZARDOUS air quality in Seeley Lake this morning due to smoke draining down from the Rice Ridge fire. This marks the fifth consecutive morning that air quality has reached HAZARDOUS levels in Seeley Lake and the eighth day out of the last ten. **The Missoula City-County Health Department has issued recommendations for the Seeley Lake area due to the persistent exposure to these dangerous levels.**

We are also seeing persistent overnight impacts along the I-90 corridor between Alberton and Superior due to the Sunrise fire. Air quality levels in Quartz Creek reached VERY UNHEALTHY levels once again this morning. Conditions improved slightly in Superior, where air quality is currently UNHEALTHY. Air quality has been UNHEALTHY in Lolo, Missoula, and Arlee, while air quality in Eureka, Libby, Thompson Falls, Hamilton, Frenchtown, Florence, and Philipsburg is UNHEALTHY FOR SENSITIVE GROUPS. Conditions are MODERATE in Columbia Falls, Clearwater, Butte, Helena, Dillon, Bozeman, and West Yellowstone.

What is the cause of this worsening air quality? As has been the case for the past several days, we are dealing with smoke impacts from both local fires around western Montana and an increasing amount of smoke moving in from very active Canadian fires. Most of this Canadian smoke is remaining above ground level but the widespread smoke cover is causing inversions to linger longer into the day and to bring some of that Canadian smoke down to the surface once the inversions do break. Over time, this is causing baseline ground level concentrations in places like Missoula and the Bitterroot Valley to increase. The localized impacts near Seeley Lake and Quartz Creek are still being dominated by the nearby Rice Ridge and Sunrise fires, but we are starting to see more widespread impacts from Canada.

- The Gibraltar Ridge fire, located east of Eureka grew rapidly yesterday under extreme fire behavior. This fire is currently 1,280 acres and 0% contained. This fire is causing smoke impacts near Eureka.
- The Rice Ridge fire near Seeley Lake is 9,286 acres and 10% 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 Sunrise fire near Superior is 15,203 acres and 20% contained with active fire behavior. This fire is causing significant smoke impacts along the I-90 corridor between Alberton and Superior during the overnight and morning hours.
- The Lolo Peak fire near Lolo is 7,644 acres and 0% contained with active fire behavior. This fire is causing impacts to the Bitterroot Valley.
- The Sapphire Complex south of Clinton is 27,528 acres and 32% contained with active fire behavior. The majority of growth on this Complex is on the Little Hogback fire (18,612 acres), located on the southern end of the Complex.
- The Meyers fire near Philipsburg is currently 13,359 acres and 5% contained with active fire behavior.

-Canadian fire locations can be seen here. These fires continue to send significant amounts of smoke into Washington, Idaho, and Montana.

## Forecast

The ridge of high pressure to our west continues to migrate towards Montana, bringing a chance of showers and thunderstorms each afternoon from now through the weekend. It will also continue to bring a large area of smoke along with it. This will cause the Canadian smoke to be an increasingly important factor in our air quality as we move towards the weekend and into next week. The fires here in Montana will continue to cause impacts throughout this period as well. Essentially, the smoke isn't going anywhere.

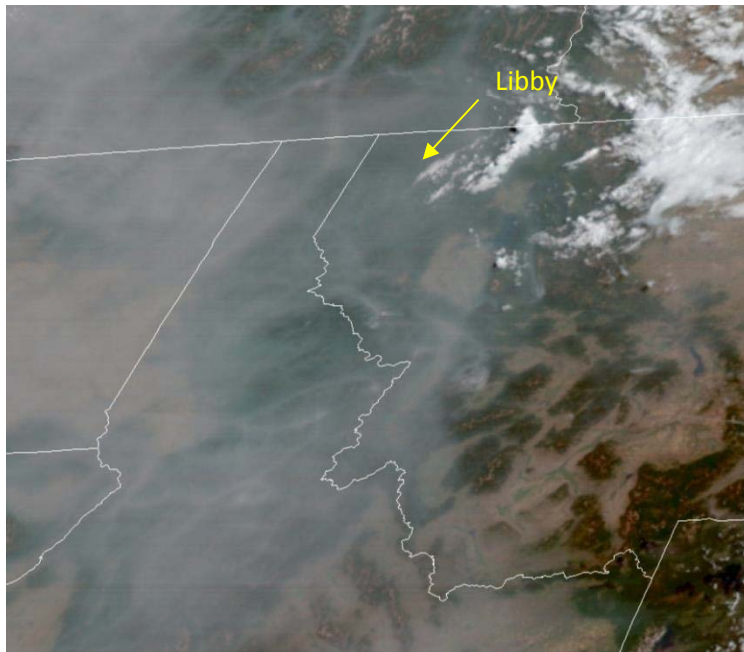
We may see conditions improve a little this afternoon, but overall I would expect air quality to range from MODERATE to UNHEALTHY across western Montana. Granite, Missoula, Mineral and Ravalli counties will likely see air quality from UNHEALTHY FOR SENSITIVE GROUPS to UNHEALTHY levels persist throughout the day. Lincoln, Flathead, and Sanders Counties will likely see air quality at UNHEALTHY FOR SENSITIVE GROUPS with occasional improvement to MODERATE levels. In close proximity to the Gibraltar Ridge fire, air quality is expected to be UNHEALTHY. Elsewhere, air quality in southwest Montana and areas directly east of the Divide will likely see MODERATE air quality impacts continue, with occasional hours reaching UNHEALTHY FOR SENSITIVE GROUPS. In Seeley Lake and Quartz Creek, the VERY UNHEALTHY to HAZARDOUS air quality is expected to continue between midnight and noon each day, with improvement to MODERATE or UNHEALTHY FOR SENSITIVE GROUPS levels each afternoon.

I would expect tomorrow and Saturday to slowly get worse, with levels generally between UNHEALTHY FOR SENSITIVE GROUPS and UNHEALTHY in most of western Montana by Saturday.

A weather pattern change is expected next week as westerly winds aloft are expected over the state. To start the week a low pressure center will move through Southern Canada, bringing increased winds to Montana. This low pressure trough may help bring precipitation to the fires in British Columbia, which may help mitigate the smoke impacts in Montana. If we do see precipitation on those fires, we could get a break from the Canadian smoke for a brief time next week. Unfortunately, the gusty winds here in Montana could cause fire activity to increase, with smoke impacts in western Montana likely to continue.

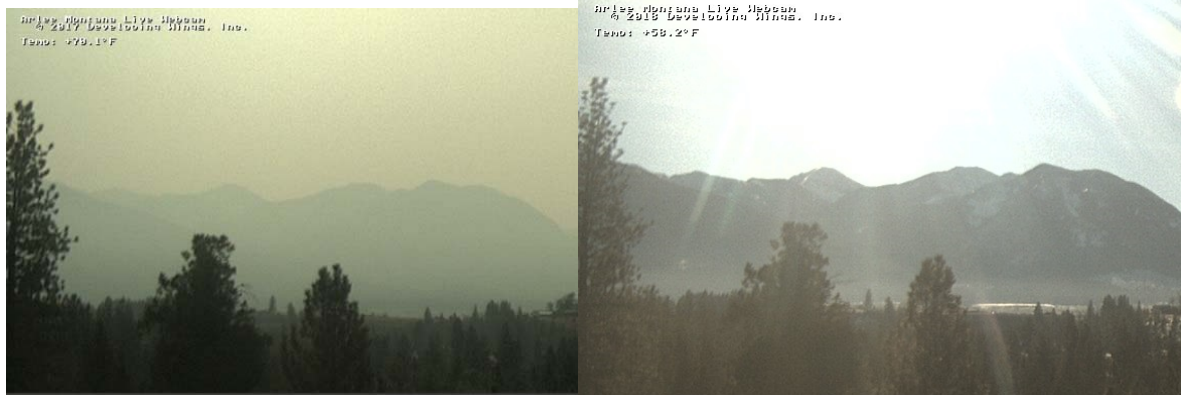
The Montana Department of Environmental Quality has issued an air quality alert for Granite, Flathead, Lake, Lincoln, Mineral, Missoula, Ravalli, and Sanders counties in effect until further notice due to smoke from fires in Canada and western Montana. Fires in Montana are causing severe localized impacts 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 time in the area as possible due to the hazardous air quality. This alert will be updated again at 900AM 8/11/2017.

This morning's satellite is showing widespread impacts from Canadian smoke this morning, as well as localized impacts near the Rice Ridge, Sunrise and Sapphire Complex fires.



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

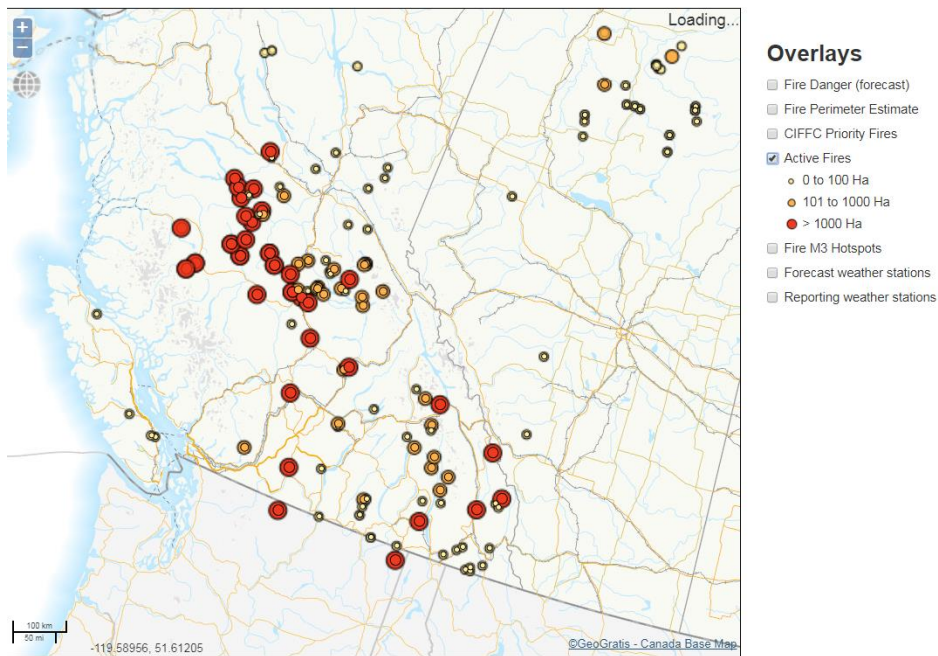
Conditions were unhealthy in Arlee this morning. On the right, the view on a good day.



Source: Arlee Montana

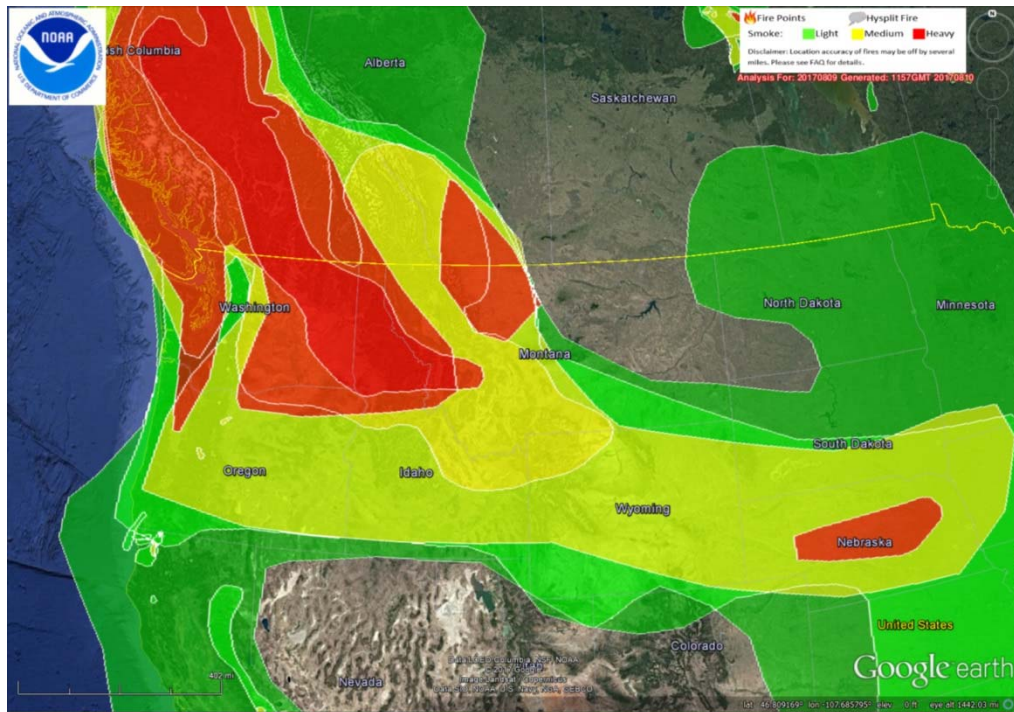


A look at the large numbers of fires burning in British Columbia



Source: CWFIS

Yesterday's satellite smoke analysis shows smoke throughout western and central Montana.



Source: NOAA

## NOAA Text Description:

**Thursday, August 10, 2017**

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY  
THROUGH 1730Z August 10, 2017

### SMOKE:

Wildfires continue to burn in three distinct regions/areas:

- 1) Eastern Alaska, Yukon Territory, and western Northwest Territories. Remnant light density smoke blankets the aforementioned areas, with embedded plumes of moderate density smoke located closer to the fires.
  - 2) Southeastern Northwest Territories and parts of Saskatchewan and Manitoba. An expansive area of light smoke stretches over those regions plus farther north into Nunavut and farther east into Ontario.
  - 3) British Columbia, southwestern Alberta, and the U.S. Pacific Northwest. This area of remnant smoke is the largest and heaviest. Thin smoke covers nearly all of British Columbia and moves southeast over the Pacific Northwest, the Intermountain West, the central plains, the Midwest and the Great Lakes Region. Moderate smoke was observed over British Columbia, Washington, northern Oregon, northern Idaho, and western Montana, while dense smoke remained confined to central British Columbia.
- <http://www.ssd.noaa.gov/PS/FIRE/DATA/SMOKE/2017/2017H101945.html>

## Friday, August 11, 2017

Conditions this morning across western Montana are similar to yesterday morning. We continue to see HAZARDOUS air quality in Seeley Lake due to smoke from the Rice Ridge fire draining down into the community overnight. The afternoon clearing, while still substantial, only improved to UNHEALTHY FOR SENSITIVE GROUPS levels yesterday. **Just as a reminder, the Missoula City-County Health Department has issued recommendations for the Seeley Lake area due to the persistent exposure to these dangerous air quality levels.**

The I-90 corridor between Alberton and Superior continues to see smoke settle in overnight. Conditions this morning were VERY UNHEALTHY in Quartz Creek and UNHEALTHY in Superior. In west-central Montana, where fires remain active, air quality is currently UNHEALTHY in Arlee, Lolo, and Missoula, and UNHEALTHY FOR SENSITIVE GROUPS in Hamilton, Florence, Frenchtown, Philipsburg, and Eureka. Elsewhere, we are seeing the influence from Canada continue to cause widespread hazy skies and smoke impacts. Air quality is UNHEALTHY FOR SENSITIVE GROUPS in Libby and Thompson Falls, and MODERATE in Clearwater, Columbia Falls, Butte, Dillon, Helena, Bozeman, Great Falls, and Lewistown. Satellite imagery this morning once again shows a large amount of smoke from Canada and the Pacific Northwest coming over western Montana, with lighter smoke over eastern Montana.

We have a number of new fires in the Selway-Bitterroot being reported this morning.

- The Mine Peak (642 acres) and Buck Lake Creek (364 acres) fires are both located in close proximity to the existing Lone Pine and Moose Creek 1 fires. These are located to the west of Hamilton in Idaho. The Moose Creek 1 fire is 90% contained while the Lone Pine, Mine Peak, and Buck Lake Creek fires are all 0% contained.
- The Vance Mountain fire, located to the southwest of Darby, MT is currently 256 acres and 0% contained with moderate fire behavior.
- The Plummer (150 acres) and Bleak (166 acres) fires are located near Dixie, ID. These fires are 0% contained with minimal fire behavior.
- The Gibraltar Ridge fire, located east of Eureka is currently 1,493 acres and 0% contained. This fire is causing smoke impacts near Eureka.
- The Rice Ridge fire, near Seeley Lake, is 10,194 acres and 10% 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 Sunrise fire, near Superior, is 16,200 acres and 20% contained with active fire behavior. This fire is causing significant smoke impacts along the I-90 corridor between Alberton and Superior during the overnight and morning hours.
- The Lolo Peak fire, near Lolo, is 7,644 acres and 0% contained with active fire behavior. This fire is causing impacts to the Bitterroot Valley and Missoula.
- The Sapphire Complex, south of Clinton, is 27,528 acres and 32% contained with moderate fire behavior.
- The Meyers fire, near Philipsburg, is currently 13,450 acres and 5% contained with moderate fire behavior.

-Canadian fire locations can be seen here. These fires continue to send significant amounts of smoke into Washington, Idaho, and Montana.

## Forecast

Today is expected to be similar to yesterday with the chance of scattered showers and thunderstorms. Air quality impacts will be worst near active fires, where the VERY UNHEALTHY and HAZARDOUS conditions of this morning should improve this afternoon, but only to UNHEALTHY FOR SENSITIVE GROUPS or UNHEALTHY levels. In the rest of west-central and northwest Montana, where both Canadian smoke and local fires are causing impacts, air quality will generally be UNHEALTHY FOR SENSITIVE GROUPS to UNHEALTHY, with the worst impacts around the Missoula area. Elsewhere, the widespread hazy skies and MODERATE air quality will continue for the rest of western and central Montana. Saturday morning will likely see another round of VERY UNHEALTHY to HAZARDOUS air quality in Seeley Lake and Quartz Creek.

A significant change is still expected for the weekend and next week. The details of this are becoming clearer. A low pressure trough will move through southern Canada, with an associated cold front moving through Montana on Sunday. This will usher in a shift to a breezier, unsettled, westerly flow for next week. Ahead of this low pressure trough, we will see a hot and breezy Saturday across Montana. This is bad news for the active fires here. The erratic winds will likely cause increased fire behavior and consequently add more smoke into the air. Air quality in western and central Montana may get worse on Saturday evening due to these conditions. A piece of good news, the increased winds associated with the cold front Saturday night into Sunday will likely inhibit the severe pooling of smoke in the Seeley Lake area on Sunday morning that we have seen all week.

The big question mark through all of this is the smoke from the fires in Canada, Washington, and Idaho. This smoke will likely continue to cause hazy skies and widespread air quality impacts through Saturday afternoon, with MODERATE to UNHEALTHY FOR SENSITIVE GROUPS air quality expected in areas not impacted by fires here in Montana. On Sunday, precipitation is possible over the fires in British Columbia as the low pressure moves through. This may cause a brief break in the smoke production off those fires, resulting in improved air quality in northwest and central Montana. The shift to westerly winds will put Montana squarely downwind of the fires in Idaho and Washington, which will likely send smoke into the Bitterroot Valley and southwest Montana beginning on Sunday. Given the size and scale of the fires burning in Canada, any break we get from smoke will likely be short lived.

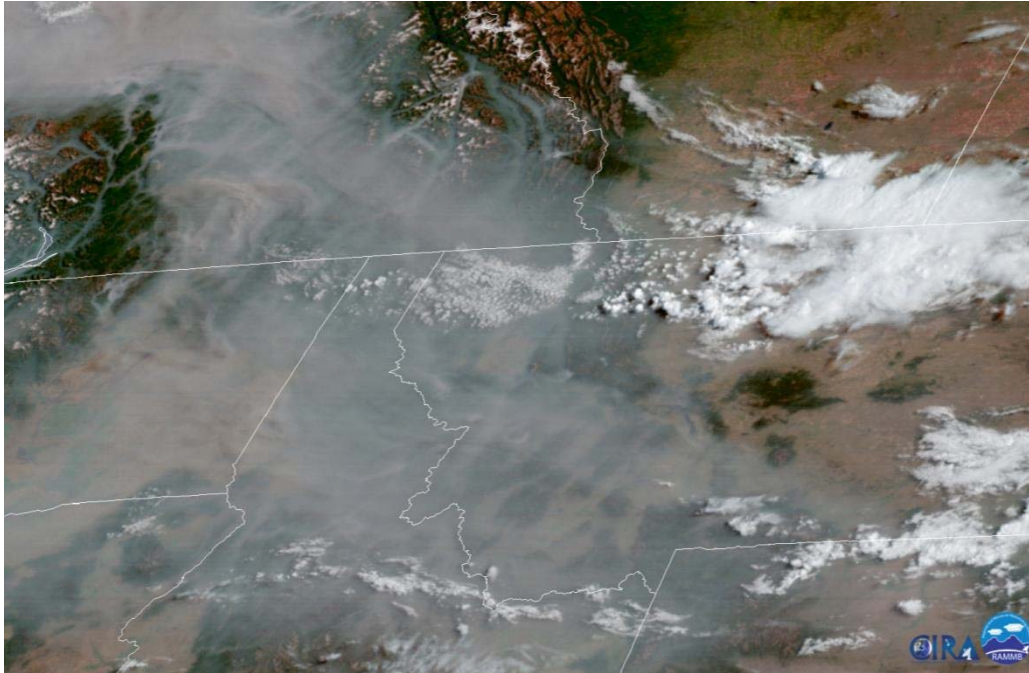
Overall, it looks like we will still be dealing with smoke throughout next week, but with the more unsettled weather pattern setting up, we will hopefully have more frequent periods of improvement, unlike the persistent smoke impacts we have seen the past two weeks.

The Montana Department of Environmental Quality has issued an air quality alert for Granite, Flathead, Lake, Lincoln, Mineral, Missoula, Ravalli, and Sanders counties in effect until further notice due to smoke from fires in Canada and western Montana. Fires in Montana are causing severe



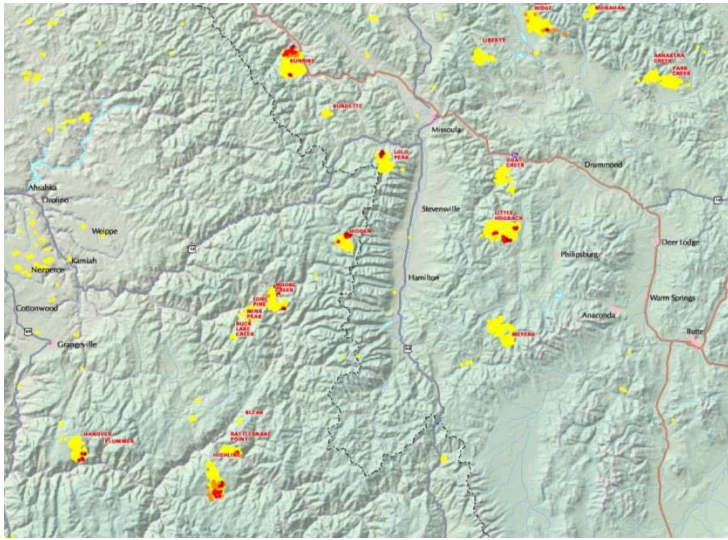
localized impacts near active fires. This includes Mineral County along I-90 corridor near the Sunrise fire and Seeley Lake near the Rice Ridge fire. Smoke from these fires is draining into the nearby valleys at night, causing severe air quality impacts from midnight through midday. The Missoula City-County 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 8/12/2017.

This morning's satellite shows significant smoke over the region. The localized impacts from fires in Montana can also be seen.



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

New fires are being reported in Idaho today. These fires will likely cause increasing impacts to southwest Montana next week.



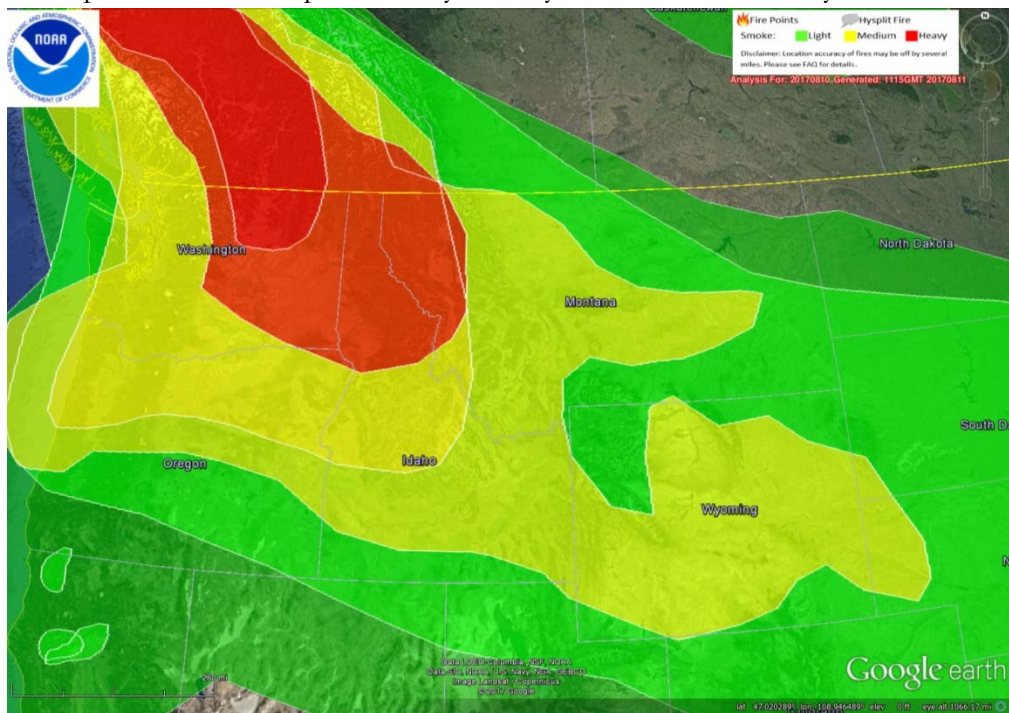
Source: USFS

While the worst impacts remain near the active fires, the Canadian smoke is causing widespread haze and moderate to unhealthy for sensitive groups air quality. Below is the view in Butte this morning.



Source: KTVQ

Widespread smoke was present on yesterday's satellite smoke analysis.



Source: NOAA

## NOAA Text Description:

**Friday, August 11, 2017**

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY  
THROUGH 1730Z August 11, 2017

### SMOKE:

Western and Central Canada/Northwest US/Inter-mountain/North and Central Rockies/Plains.

Wildfires burning across southern/central British Columbia and across the southern sections of the Northwest Territories are producing a large area of dense to very dense smoke over Western/Central Canada and the northern US. Very thick smoke spreads across the central sections of the entire British Columbia province and into the southwest regions of the Northwest Territories. Dense smoke from the wildfires extend into almost all of British Columbia, into central sections of Northwest Territories and northwestern Alberta. The smoke is combining with the smoke in the northwest/northern sections of the US. Smoke is seen coming from wildfires burning over northern California, Oregon, parts of Washington state, northern Idaho and western Montana. The second region of heavy dense smoke is from wildfires burning over the southern Northwest Territories. The heavy smoke spreads south from the wildfires into northeast Alberta and northern Saskatchewan. Moderate smoke stretches farther south into central sections of Alberta and Saskatchewan and into northern/central Manitoba. Light smoke can be seen as far east as parts of western/central Ontario and south into the Great Lakes region.

<http://www.ssd.noaa.gov/PS/FIRE/DATA/SMOKE/2017/H111826.html>



## Monday, September 04, 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.

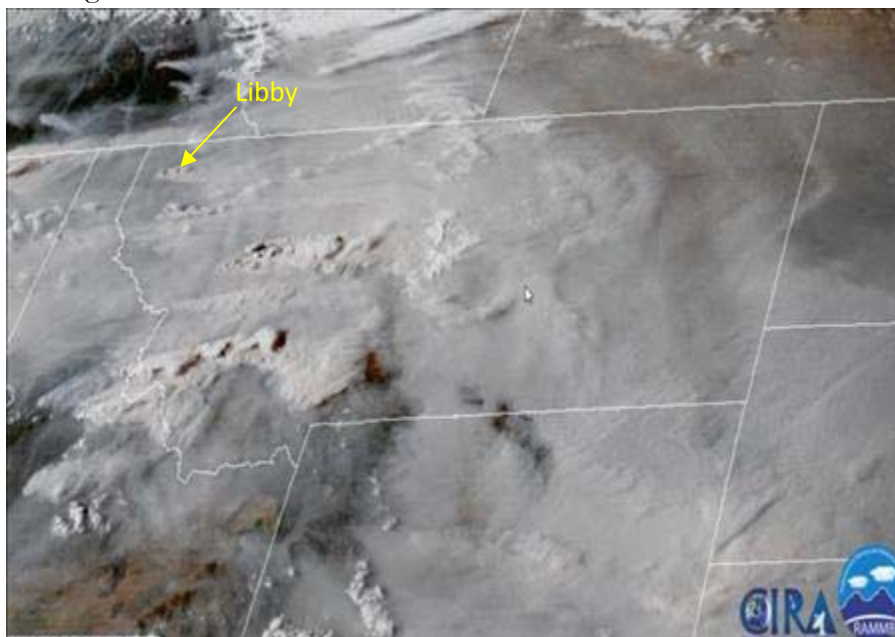
## Extended Forecast

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.



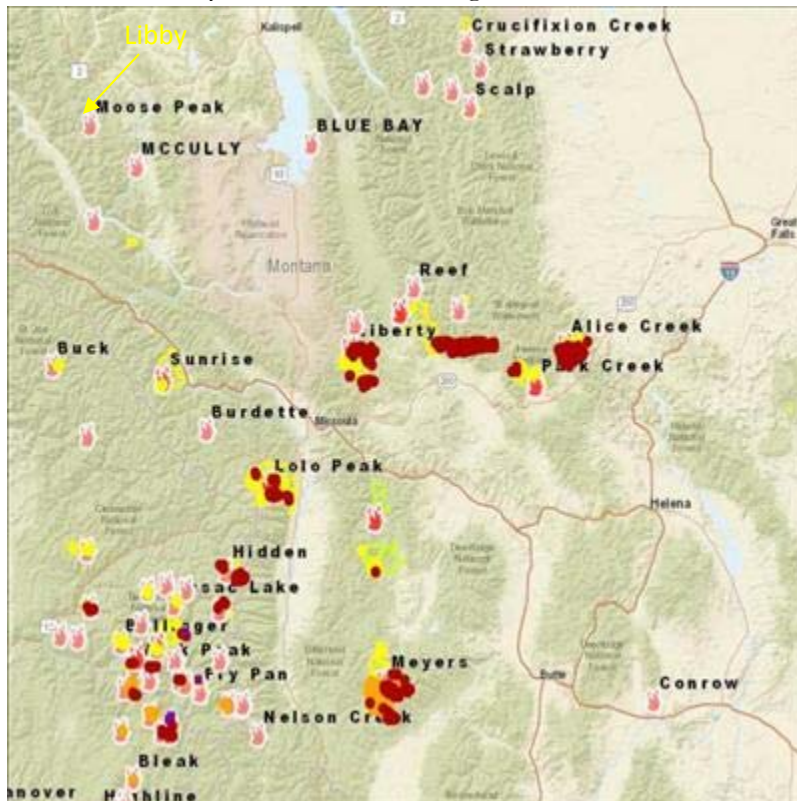
Source: CIRA and NOAA. These data are preliminary and not operational.

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



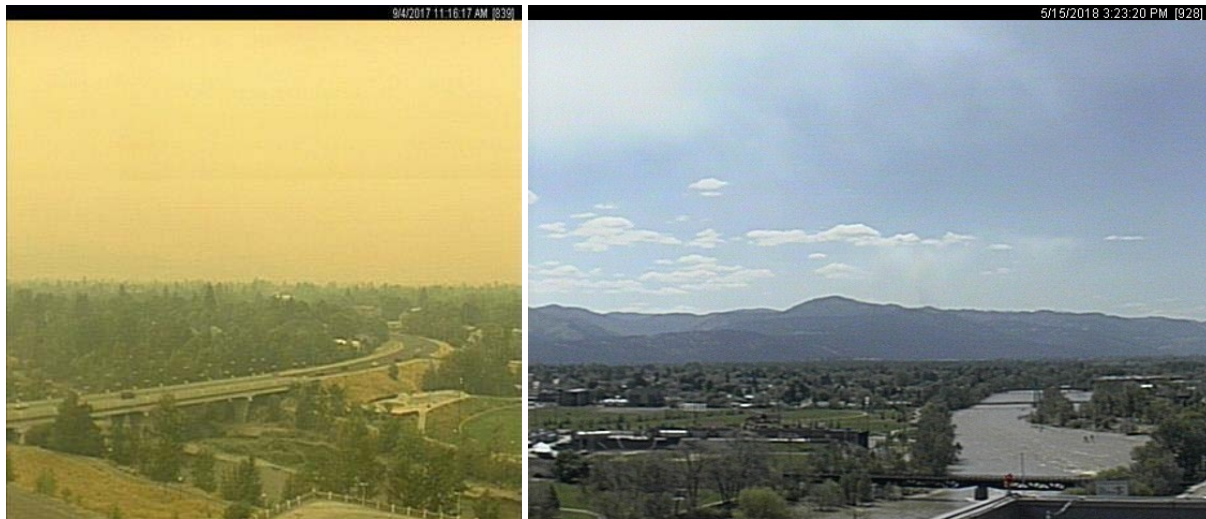
Source: CIRA and NOAA. These data are preliminary and not operational.

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, Missoula on a good day.



Source: KTVQ

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

**Monday, September 4, 2017**

#### **DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY THROUGH 1630Z September 4, 2017**

##### **SMOKE:**

Continental US/Southern Canada...

An expansive area of varying density smoke is seen spanning most of the northern and central US and southern Canada from the Pacific Coast to the St. Lawrence River Valley. The smoke covers most of coastal California northward into southern British Columbia. From there, the smoke crosses Idaho, Montana and Wyoming into the northern and central Plains reaching as far south as Oklahoma and the Texas Panhandle. It continues east through the Great Lakes with a narrow swath extending northeast across the St. Lawrence River. Two minor features to point out regarding this plume are a feature that is oriented transverse to the flow that moves across western Pennsylvania and a remnant feature over northeastern Texas, Arkansas, Mississippi, and northern Louisiana. The thickest smoke covered a large area from far northeastern Washington across northern Idaho, Montana, northern Wyoming, South Dakota, southern Minnesota, much of Wisconsin and Iowa, and southern Nebraska. The parent wildfires for this smoke plume are those across the western CONUS and southern British Columbia

<http://www.ssd.noaa.gov/PS/FIRE/DATA/SMOKE/2017/2017I042029.html>



**Tuesday, September 05, 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](#).

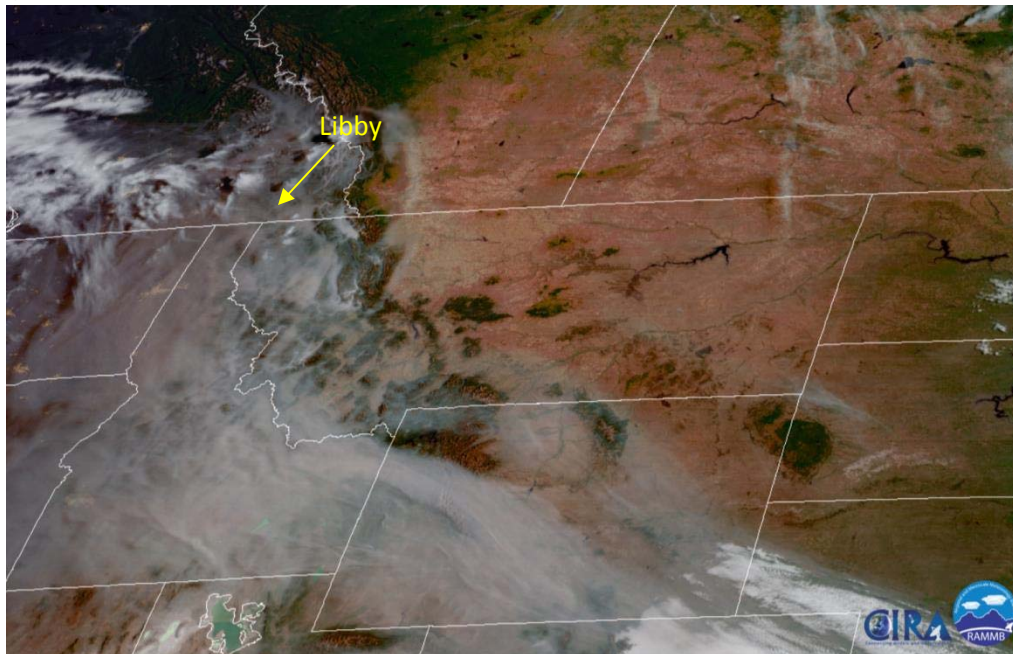
### **Extended Forecast**

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.

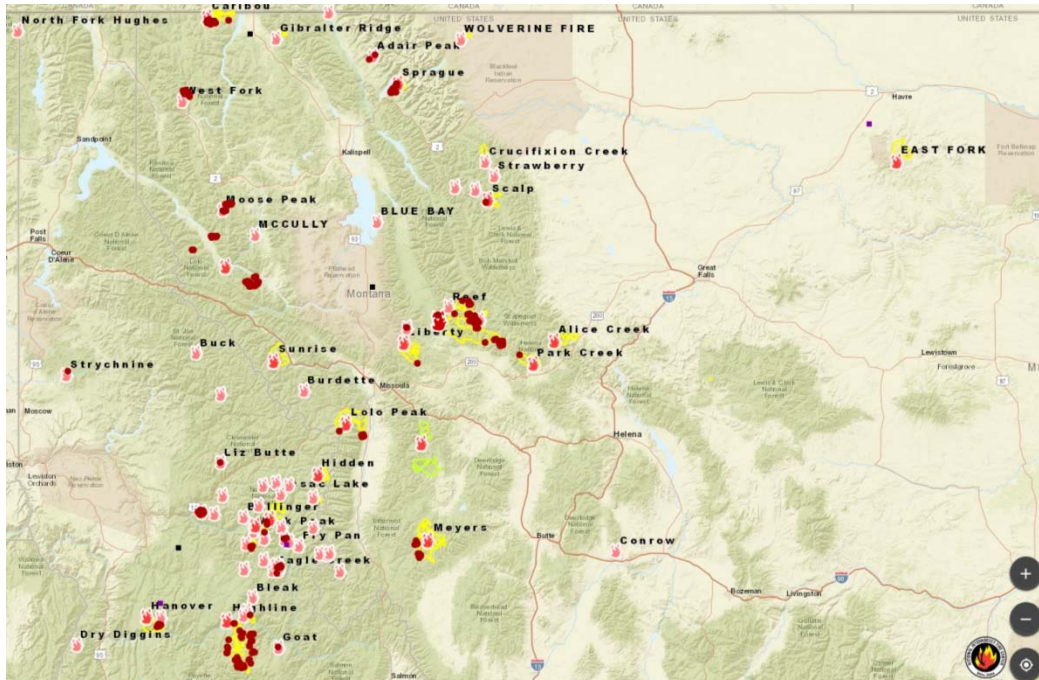
The ridge looks to break down starting Friday afternoon and through the weekend. Before the ridge breaks down, surface winds and winds aloft will shift to be from the southwest, likely carrying a significant amount of smoke from Oregon into Montana by Friday. Winds turn more westerly for the weekend 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

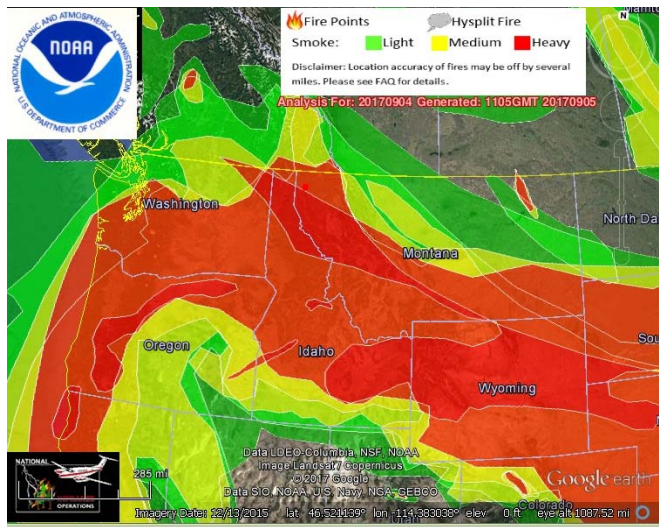


2018-05-15 02:24:49 PM  
WildernessClub



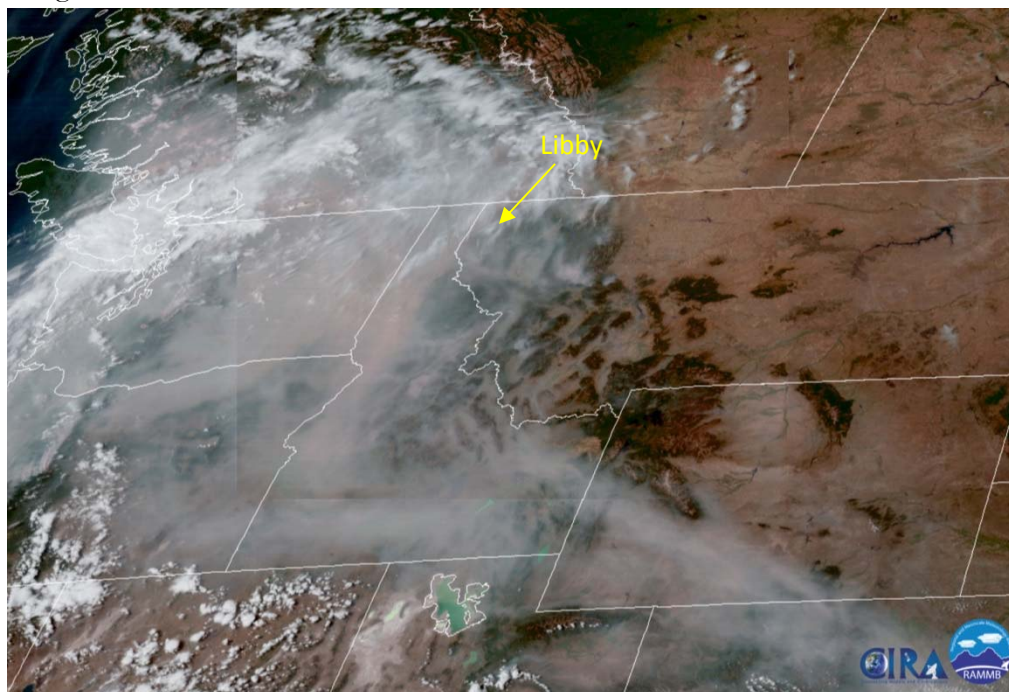
Source: [Weather Underground](#)

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



Source: NOAA

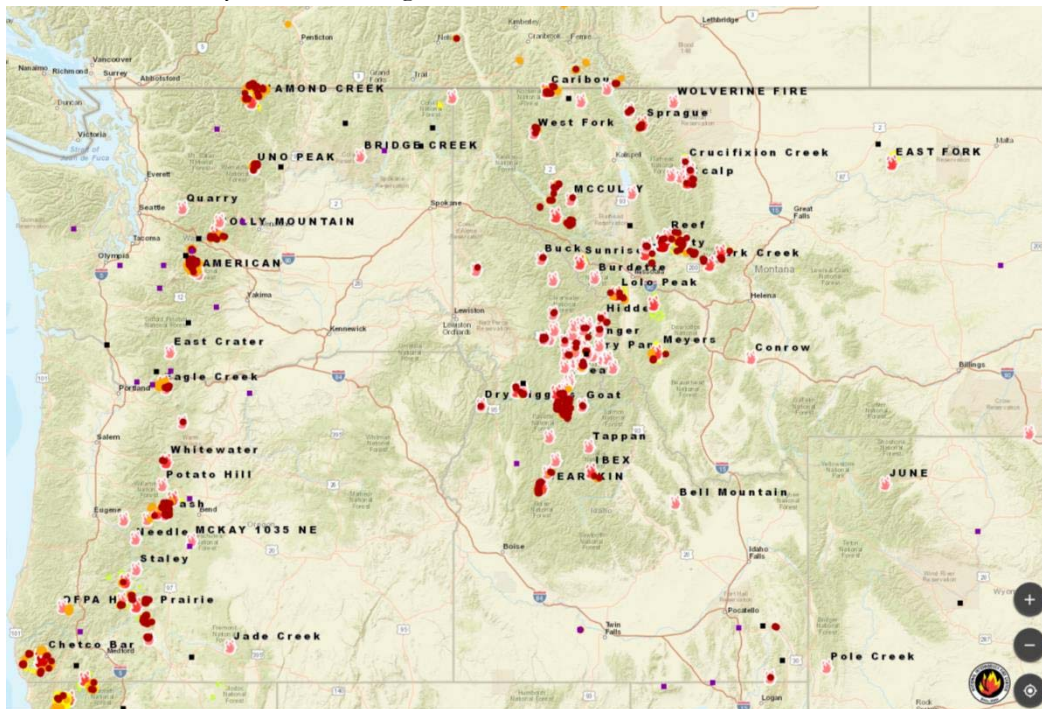
Northwest and west-central Montana remains under lots of smoke today, along with Washington, Oregon, and Idaho.



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



Recent fire activity across the region is shown in red.



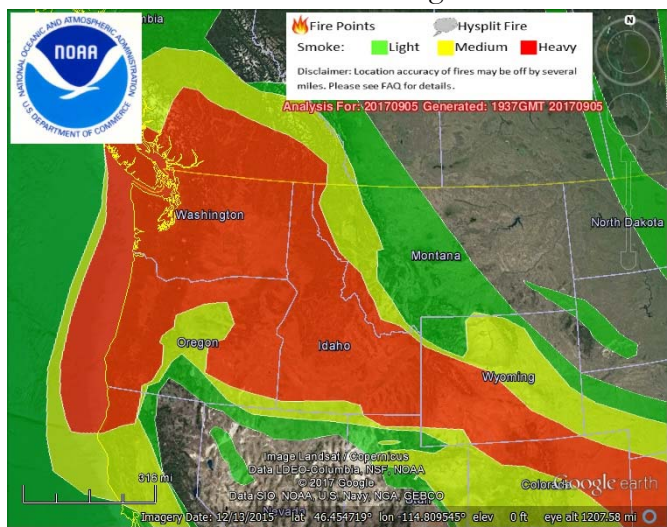
Source: [NWCG](#)

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/2017/2017I052012.html>

## Wednesday, September 06, 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.

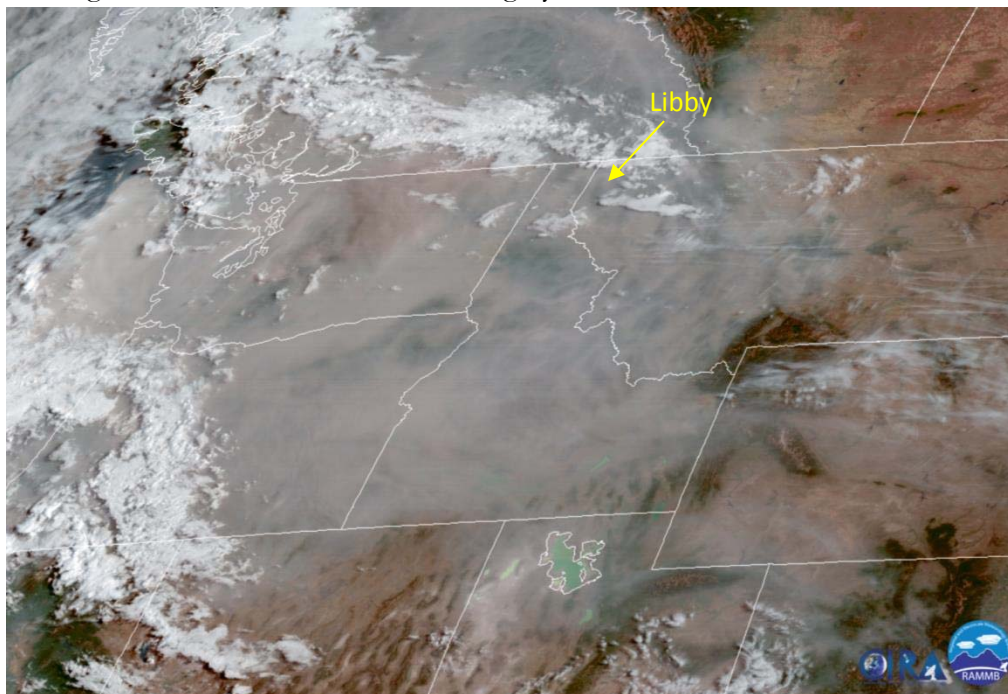


The ridge will flatten on Friday afternoon, bringing westerly winds for the weekend. This should help improve air quality in some locations, as the dense smoke can finally lift off the valley floors. Unfortunately, the westerly winds will continue to carry smoke over from the Pacific Northwest. Increased 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.

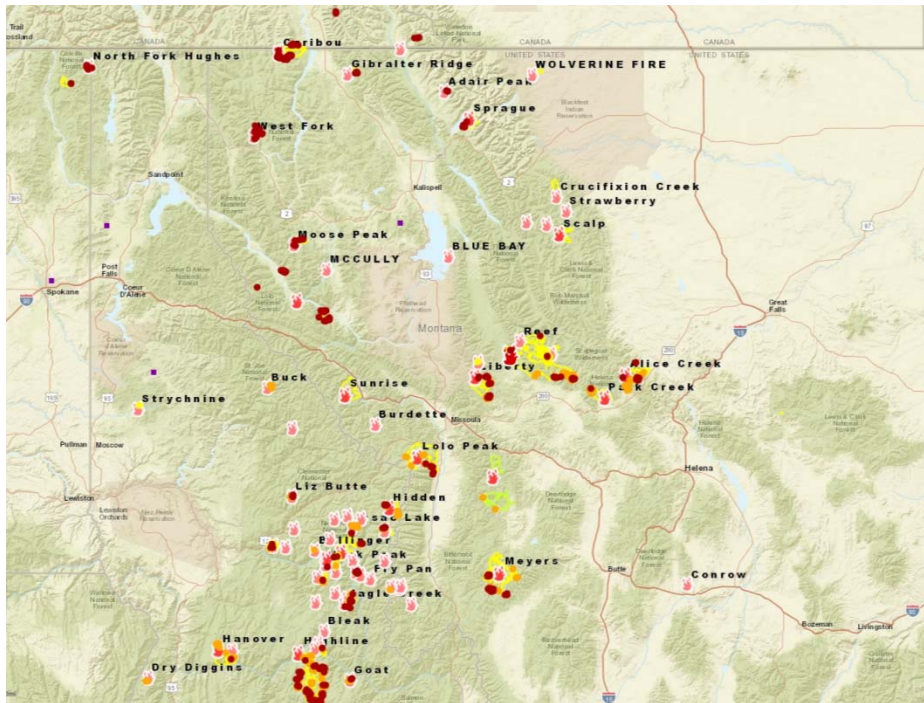
The Montana Department of Environmental Quality has issued an air quality alert for Beaverhead, Deer Lodge, Flathead, Granite, Jefferson, Lake, Lewis and Clark, Lincoln, Madison, Mineral, Missoula, Pondera, Powell, Ravalli, Sanders, Silver Bow, and Teton counties in effect until further notice due to 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](#)



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 07, 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.

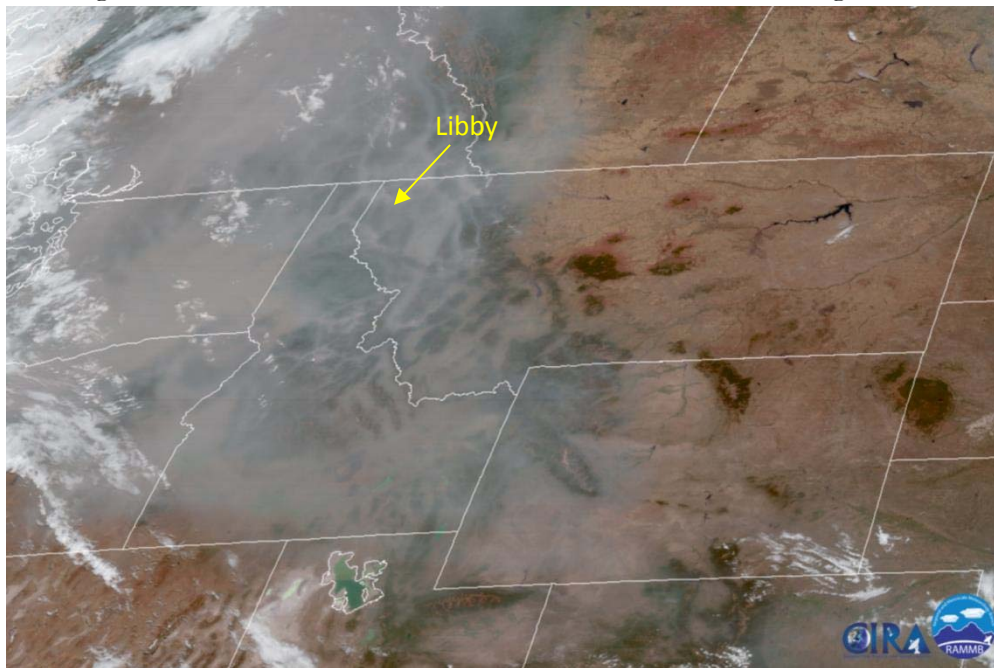
By Friday evening, winds should begin to increase and become more southwest to westerly. This shift should allow smoke to finally move off the valley floors, with air quality improving in many locations on Saturday. That isn't to say that air quality will be good. The increased winds will likely bring 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.

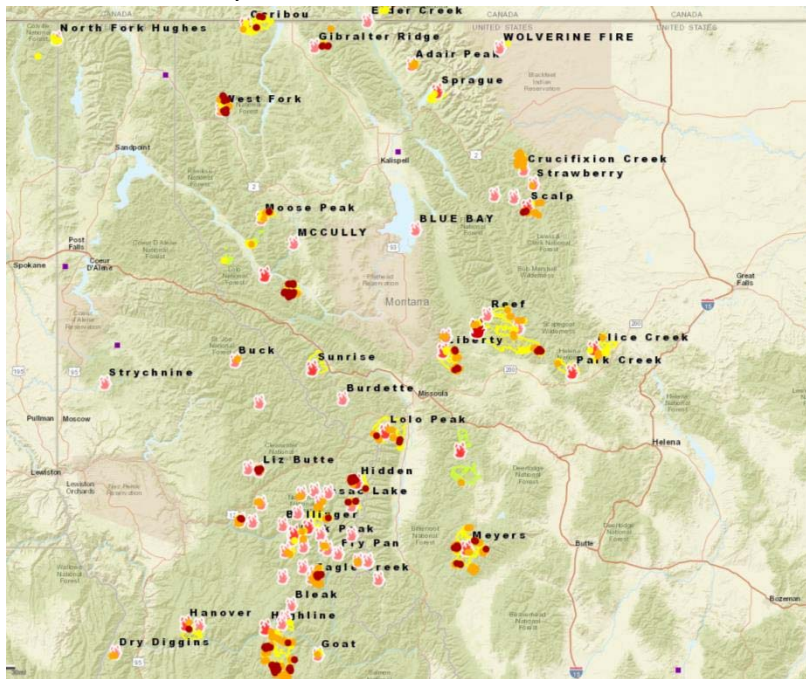
The huge area of dense smoke covers half of Montana this morning.



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



Current fire activity is shown in red below.



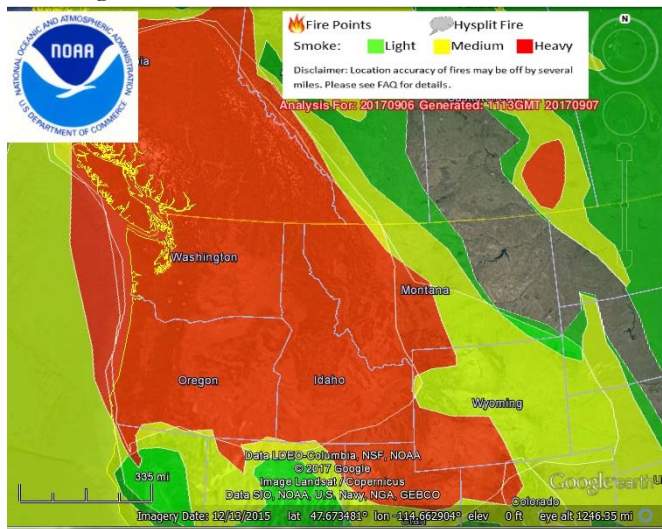
Source: [NWCG](#)

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/2017/2017I071850.html>

## Friday, September 08, 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.

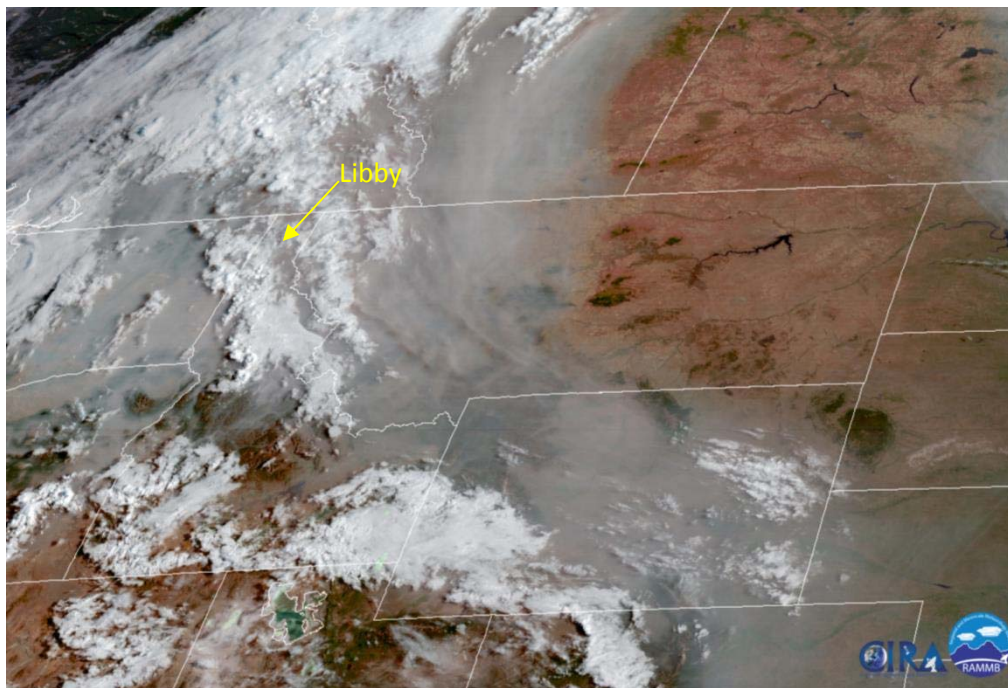
Starting early next week, another ridge of high pressure will build over the area. This ridge does not look to be as strong as the one that has plagued us this week. Even so, we will likely see significant pooling of smoke in the valleys each morning. Hopefully, breezier afternoons should help bring 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.

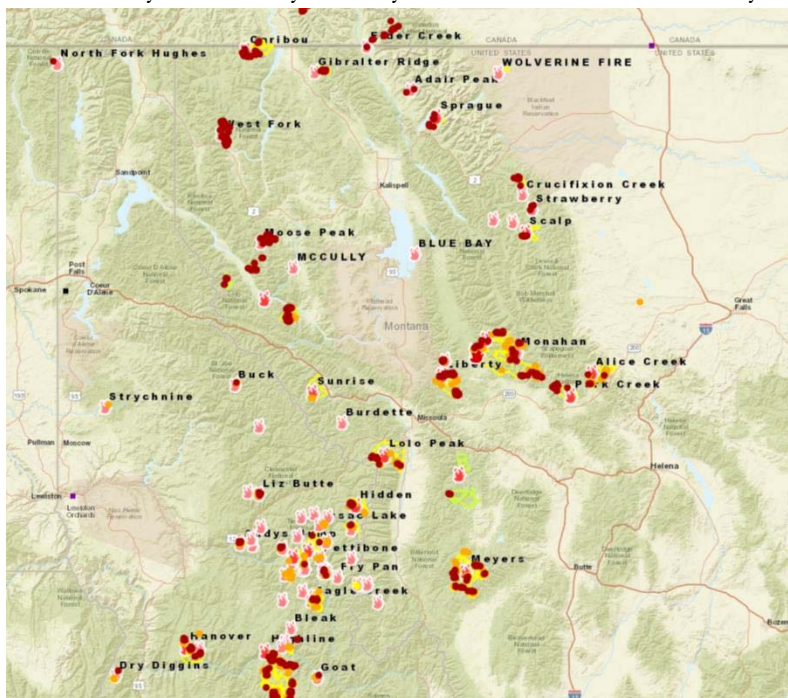


We have a large amount of smoke remaining over the area this morning. One piece of good news is the smoke has decreased in Oregon, with precipitation over many fires yesterday.



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

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



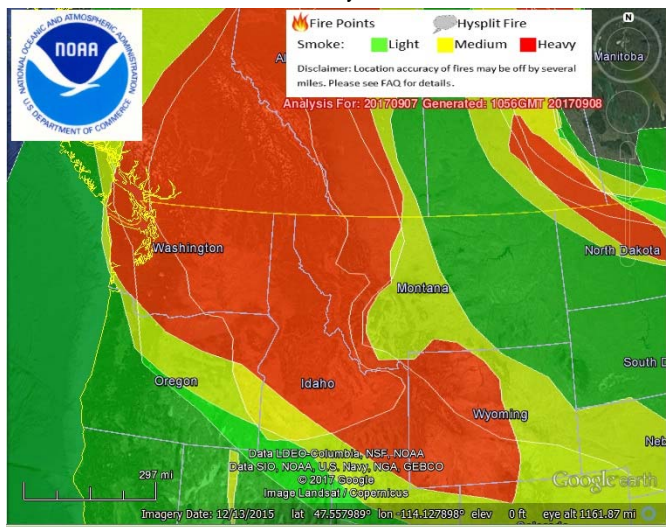
Source: NWCG

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 09, 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**

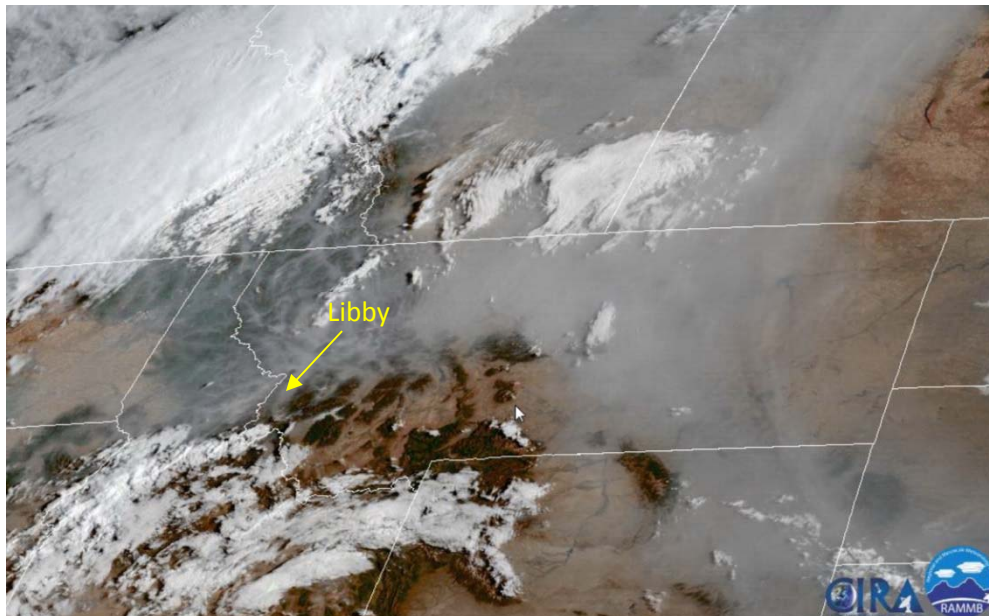
Smoke will move through the state today as it clears from western Montana, causing periods of deteriorated air quality possibly reaching UNHEALTHY levels at times. By tomorrow, most smoke moving through should remain aloft, causing hazy conditions but GOOD to MODERATE air quality at the surface. Impacts 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.

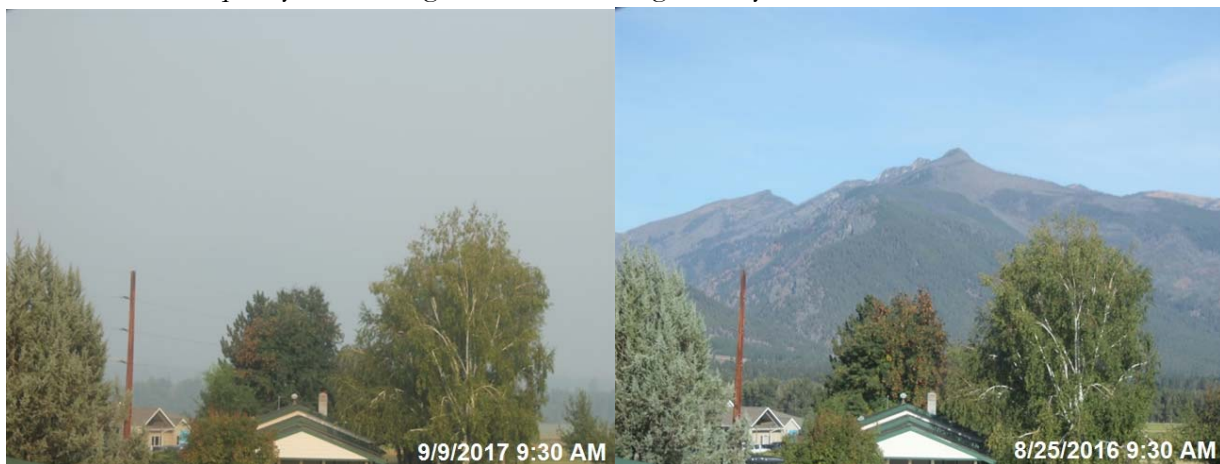
The Montana Department of Environmental Quality has issued an air quality alert for Broadwater, Cascade, Deer Lodge, Flathead, Glacier, Granite, Jefferson, Lake, Lewis and Clark, Lincoln, Meagher, Mineral, Missoula, Pondera, Powell, Ravalli, Sanders, Silver Bow, Teton, and Toole counties in effect until 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.



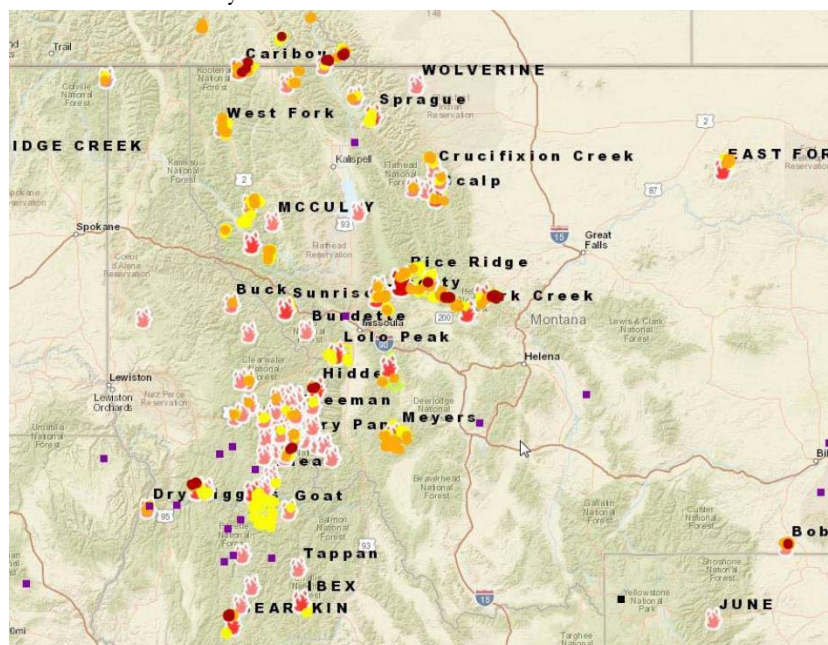
Source: CIRA and NOAA. These data are preliminary and not operational.

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>

## Thursday, September 14, 2017

Air quality is improving in many areas this morning as precipitation is moving across central Montana. We are seeing GOOD air quality as Potomac, Cut Bank, Great Falls, Lincoln, Helena, Bozeman, West Yellowstone, Billings, Lewistown, and Malta. Air quality is MODERATE in Eureka, Condon, Rainy Lake, Seeley Lake, Rock Creek, Drummond, Stevensville, Butte, Dillon, White Sulphur Springs, Birney, Broadus, and Sidney.

Unfortunately, the precipitation is much more sparse in northwest and west-central Montana, with air quality currently UNHEALTHY FOR SENSITIVE GROUPS in Arlee, Superior, Thompson Falls, Flathead Valley, Florence, Frenchtown, Missoula, and Hamilton. Air quality is UNHEALTHY and Trout Creek and Libby due to the nearby fire activity.

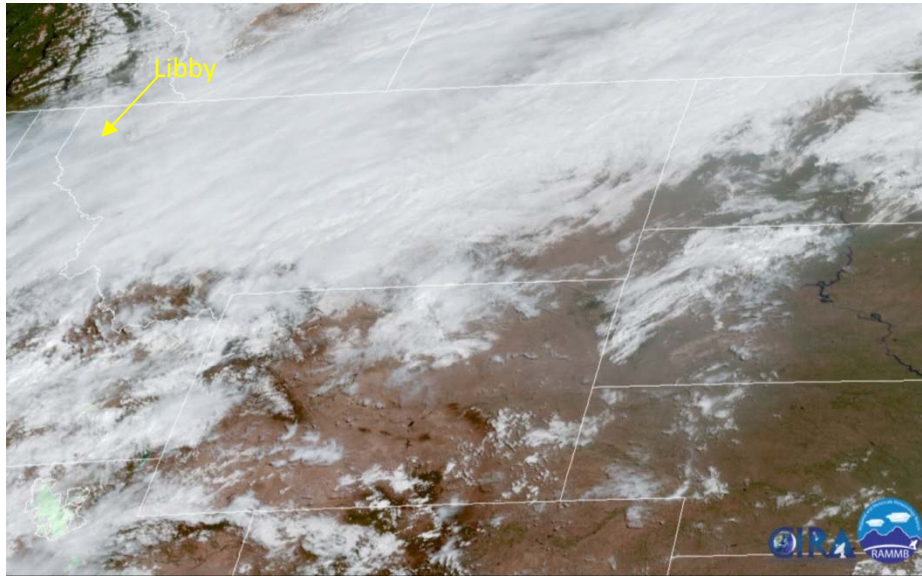
Air quality impacts over the next few days will be hit or miss by location. Areas of southwest and eastern Montana should see generally GOOD air quality due to the wet, cold and breezy conditions. Air quality in West-central and northwest Montana will vary depending on the amount of precipitation that falls on area fires. The low pressure system that is bringing rain to many areas of Montana could leave parts of northwest and west-central Montana largely dry. While the cooler temperatures and higher humidity should help decrease fire behavior, fires are still expected to produce smoke over the next few days. This smoke will likely settle into nearby valleys, with localized impacts ranging from UNHEALTHY FOR SENSITIVE GROUPS to VERY UNHEALTHY expected in close proximity to active fires. Areas likely to see continued smoke impacts are Thompson Falls, Trout Creek, Plains, Libby, and parts of Flathead Valley. Seeley Lake is more questionable, with precipitation possible but not certain. Air quality in the Seeley Lake area could range anywhere from GOOD to VERY UNHEALTHY over the next few days.

The good news is that the next system moving in early next week looks more promising to bring precipitation to northwest Montana. A large low pressure trough will move over the northwest early next week bringing a cold, wet flow that will linger over the area for much of next week. While precipitation may not be as widespread with this system, it looks well positioned to bring rain to northwest Montana. In addition, the cold overnight temperatures expected over the next week will help calm fires.



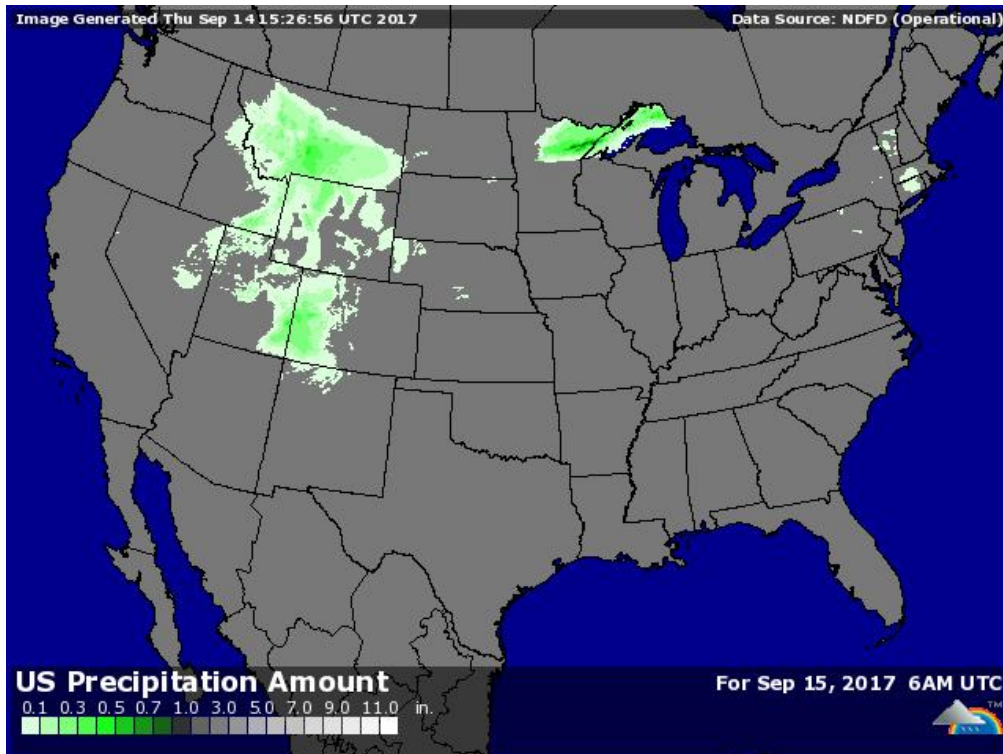
**Bottom line:** Conditions are improving rapidly in locations seeing precipitation this morning. Unfortunately, northwest and west-central Montana will likely have to deal with localized smoke impacts near area fires for the next few days before the next system moves in on Monday night.

Cloud cover is obscuring the smoke that remains in western Montana today.



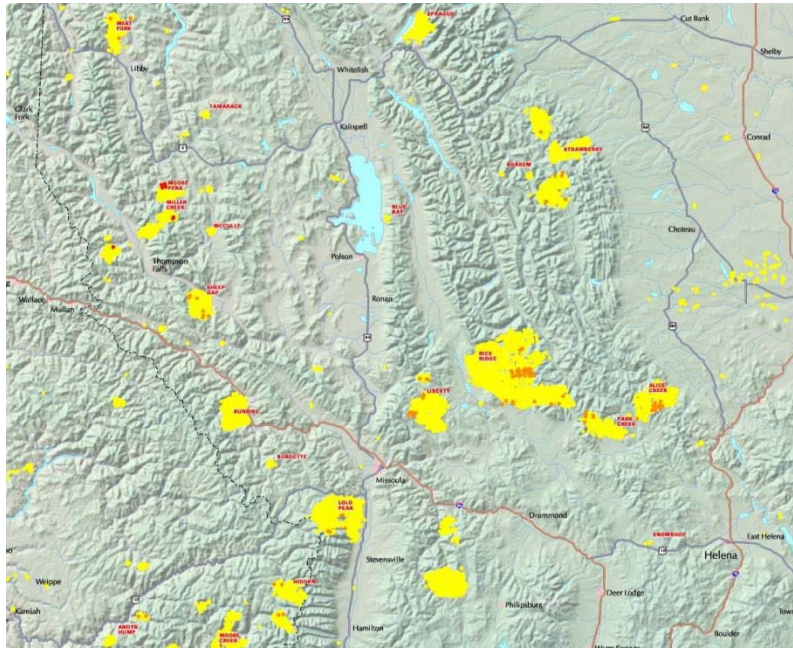
Source: CIRA and NOAA. These data are preliminary and not operational.

Precipitation is expected to largely miss northwest Montana with the system currently over the state. This will cause air quality impacts to linger in that area.



Source: Weather Underground

Cloud cover is largely obscuring fire detection today, with only the Moose Peak fire showing recent activity.



Source: NWCG

## NOAA Text Description:

**Thursday, September 14, 2017**

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY  
THROUGH 1415Z September 14, 2017

### SMOKE:

Pacific Northwest/Central CONUS/Southern Canada/Northeastern Mexico/North Atlantic...

An expansive area of thin density smoke was observed extending from Oregon and Washington eastward across North America towards the Canadian Maritimes and into the Atlantic Ocean. This area also extends from the Upper Midwest south into Texas and northeastern Mexico. Moderate density smoke was observed extending from Montana eastward within the area of light density smoke across North America. Another area of moderate density smoke was seen over Iowa, northern Missouri, and eastern Kansas. Heavily dense smoke was observed over portions of the Great Lakes. This area of smoke is likely produced by wildfire activity throughout northern California, the Pacific Northwest, and southern British Columbia. Cloud cover obscures portions of the smoke plume over the western CONUS, but smoke closer to the edges and in small breaks within the cloud cover allow for the analysis of smoke in the area.

<http://www.ssd.noaa.gov/PS/FIRE/DATA/SMOKE/2017/2017I141725.html>

## Friday, September 15, 2017

“Precipitation occurred over the fire area yesterday.” These much needed words were reported on all but two of the large area fires yesterday. The widespread rain and cool temperatures has led to GOOD air quality in almost all locations this morning. The two fires that did not receive precipitation are the West Fork fire near Libby and the Moose Peak fire near Trout Creek. Consequently, northwest Montana is seeing air quality impacts persist due to smoke from these fires settling into the nearby valleys. As of 1pm Friday, air quality is VERY UNHEALTHY in Libby and MODERATE in Eureka and Trout Creek. Elsewhere, air quality is GOOD.

Rain and snow continued to fall across the Continental Divide and eastern Montana today. Northwest Montana remains dry, allowing the West Fork and Moose Peak fires to continue to produce smoke and impact the nearby communities. This is expected to continue throughout the day, with air quality in Libby and Trout Creek ranging from MODERATE to VERY UNHEALTHY throughout the day. Elsewhere, air quality is expected to be generally GOOD with occasional MODERATE impacts.

The wet and cool conditions are expected to continue through Saturday. Air quality impacts are expected to be similar to Friday, with GOOD air quality in most locations. Northwest Montana will continue to see air quality impacts near active fires on Saturday. On Saturday and Sunday morning, clearing skies could cause strong overnight inversions to form. Air quality impacts in Libby and Trout Creek may become worse on Sunday morning due to smoke being trapped in a shallow layer along the valley floor.

Fortunately, more improvement is on the way for early next week. A deep, strong trough of low pressure will move into the area on Monday and bring cool wet weather for most of next week. This system should bring precipitation to northwest Montana. By Tuesday next week, I expect we will see GOOD air quality in almost all locations, if not everywhere.

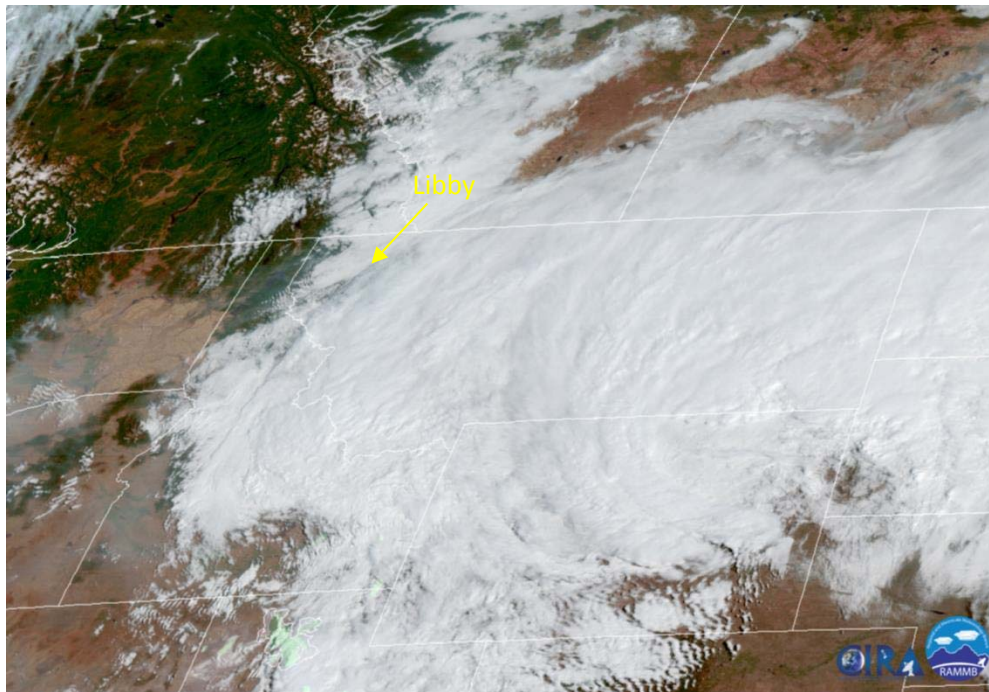
### Summary

Air quality is GOOD in almost all locations today. Unfortunately, fires in northwest Montana did not see precipitation yesterday, which has caused smoke to linger in Libby and Trout Creek due to nearby fires. Cool, wet weather is expected to continue Friday and Saturday, with generally GOOD air quality in most places. Northwest Montana will continue to be the exception through the weekend, with air quality ranging from MODERATE to VERY UNHEALTHY. Clearing skies on Sunday could lead to overnight inversions and potentially more smoke being trapped near the valley floor. Another strong low pressure system bringing cold and wet weather is expected to impact Montana throughout next week. By Tuesday, I expect GOOD air quality in all locations.



The Montana Department of Environmental Quality has issued an air quality alert for Lincoln County in effect until 9AM on Monday 9/18/2017. Air quality impacts ranging from moderate to very unhealthy are expected throughout the weekend due to smoke settling in the valleys from nearby fires. Improvement is expected on Monday when precipitation is expected over the fires. This alert will be updated again at 9AM 9/18/2017.

Satellite shows cloud cover in almost the entire state. Unfortunately, northwest Montana has remained dry, with smoke visible in the far corner of the state.



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

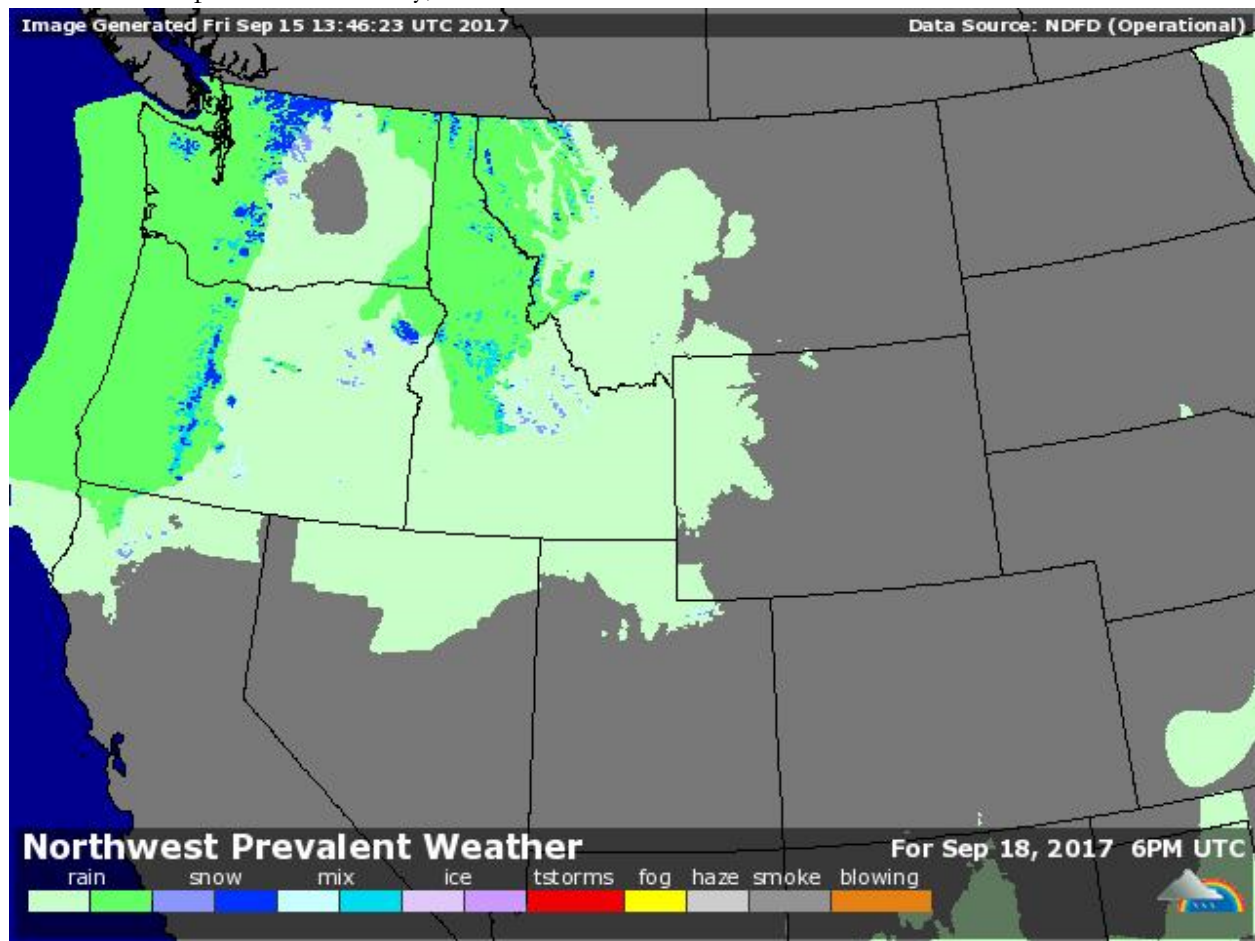


Snow is falling at Gates of the Mountain today.



USFS

More rain is expected on Monday, this time for Northwest Montana.



### Weather Underground

### NOAA Text Description:

**Tuesday, August 15, 2017**

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY  
THROUGH 1730Z August 15, 2017

SMOKE:

Canada/Alaska...

A massive area of thin to moderate density smoke blanketed much of central and northern Canada from the western half of the Hudson Bay to the northern portion of the Yukon and into northeastern Alaska. A large area of heavy density smoke covered most of western half of the Northwest Territories, southern Nunavut, extreme northeastern Alberta, northern Saskatchewan, northern Manitoba, the western half of the Hudson Bay, and portions of central/northern Ontario. Another area of heavy density smoke covered a good portion of central British Columbia around where the wildfires in British Columbia were burning. Most of these large areas of smoke can be attributed to numerous wildfires in British Columbia, the Northwest Territories, northern Saskatchewan, and northern Manitoba.

Continental United States...

Thin density smoke from wildfires in Canada stretched across portions of northeastern Washington, extreme northern Idaho, most of Montana, northern/eastern Wyoming, North Dakota, South Dakota, Nebraska, northern Kansas, Minnesota, Iowa, most of Missouri, Wisconsin, Illinois, Michigan, Indiana, northwestern Kentucky, and western Ohio. Two smaller areas of light density smoke from wildfires in California and Oregon covered portions of California, Oregon, and Nevada. A small area of remnant moderate density smoke from fires burning in Canada covered the arrowhead of Minnesota, extreme northern Wisconsin, and the Upper Peninsula of Michigan. Areas of moderate density smoke were observed near/around wildfires in the western United States.

<http://www.ssd.noaa.gov/PS/FIRE/DATA/SMOKE/2017/2017H151820.html>

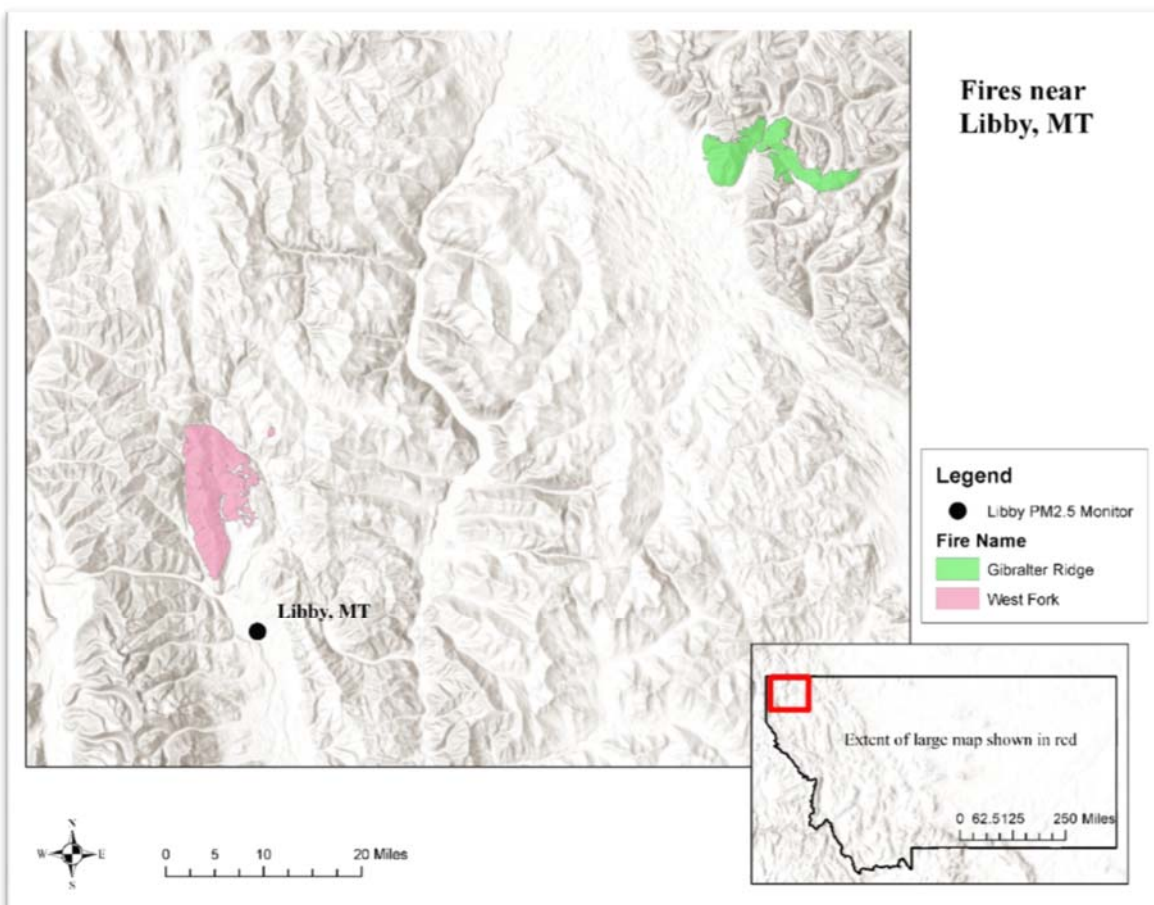
## 5. Not Reasonably Controllable or Preventable

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<sub>2.5</sub> 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 7. Libby, Montana 2017 Notable Fires.**



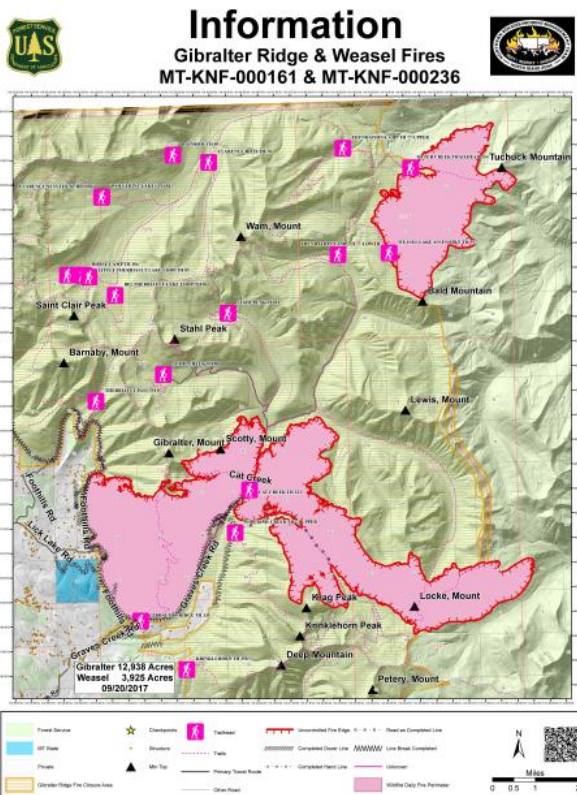


<b>Fire Name</b>	<b>Location</b>	<b>Total Acres</b>	<b>Start Date and Cause</b>	<b>Containment Date</b>	<b>Summary</b>
<a href="#"><u>Gibralter Ridge</u></a>	35 miles NW of Whitefish	24,753	8/7/2018 – Lightning	11/13/2017	Fire burning along the Canadian border in northwest Montana.
<a href="#"><u>West Fork</u></a>	7 miles NW of Libby, MT	20,072	8/30/2017 – 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 Libby PM<sub>2.5</sub> 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 near Libby. All photographs and maps are from InciWeb (<https://inciweb.nwcg.gov/>).

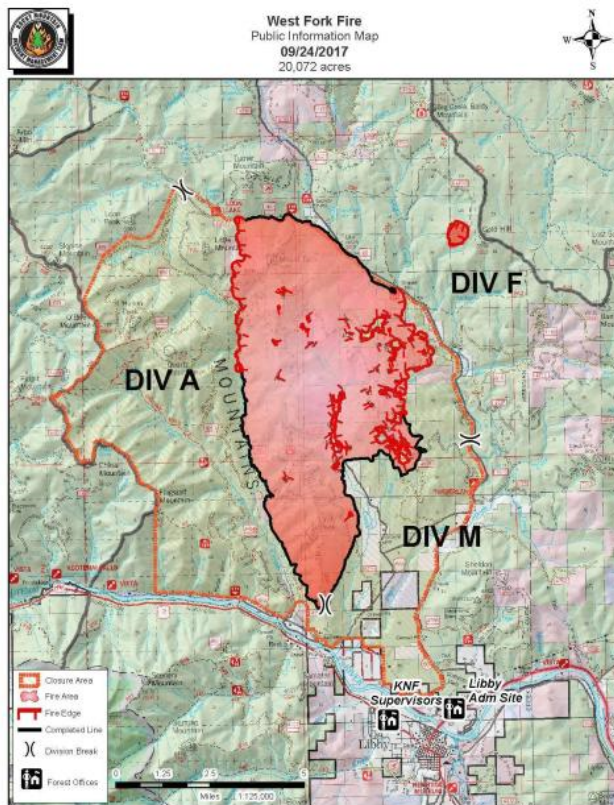
## Gibraltar Ridge



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

<http://www.kpax.com/story/36338685/gibraltar-ridge-fire-pushes-south-and-east>

## West Fork Fire



News articles: <http://www.kpax.com/story/36310705/evacuations-continue-near-west-fork-fire>

<http://nbcmontana.com/archive/west-fork-fire-raises-asbestos-concerns>

## 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 Libby PM<sub>2.5</sub> monitor in 2017 were fires largely on wildlands with unplanned ignitions, the exceptional events are natural events.