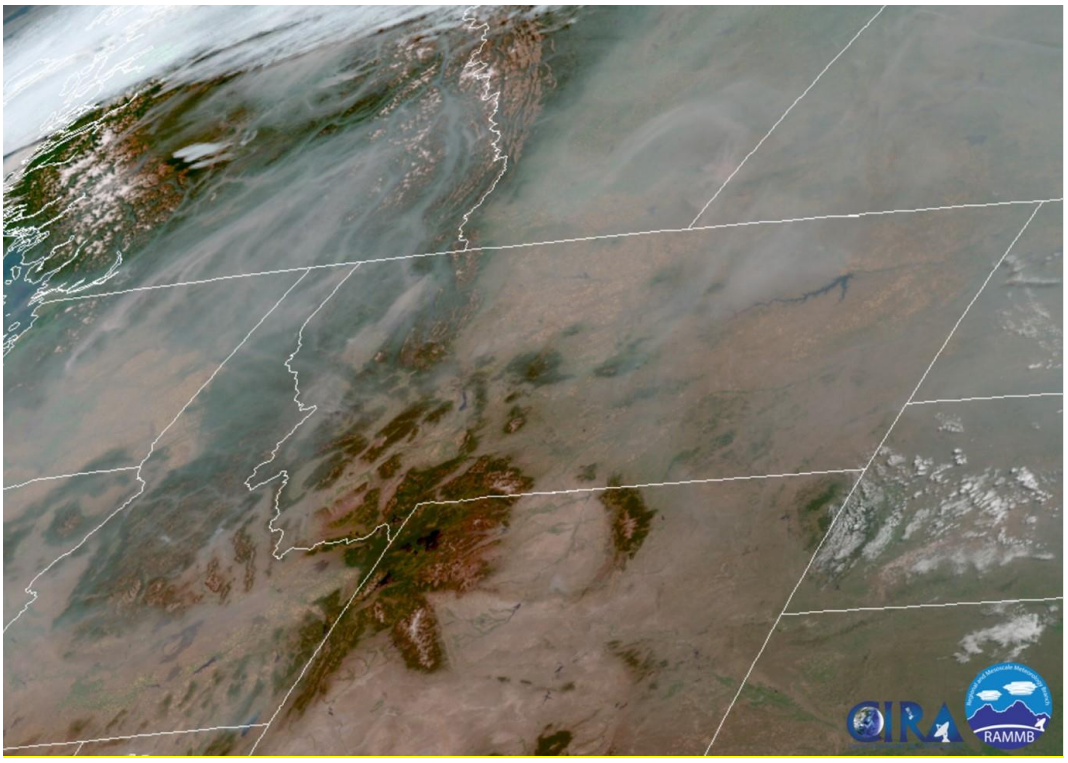
PM_{10} 2018 Exceptional Events due to Wildfires



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

Prepared by:
Montana DEQ
October 2019

DEQ
Montana Department
of Environmental Quality

Contents

1. Summary

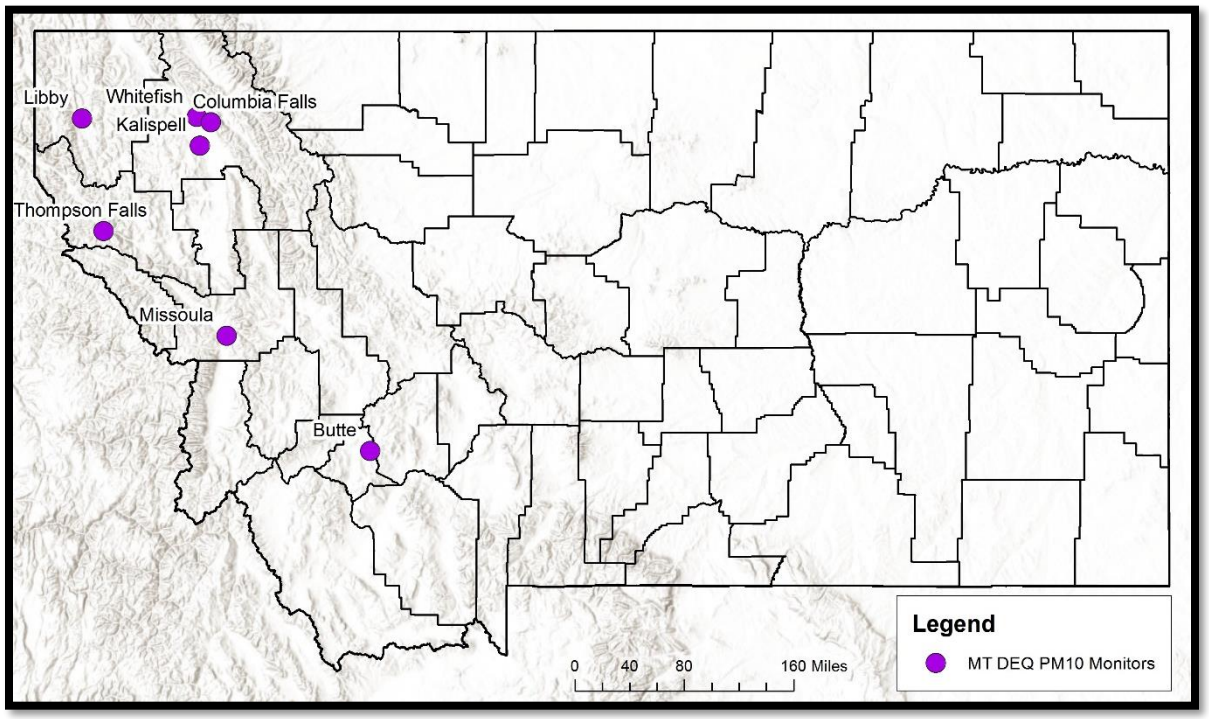
Montana's Department of Environmental Quality (DEQ) is requesting the following wildfire exceptional events in our PM_{10} nonattainment area be considered for concurrence. This request is due to an effort to redesignate the PM_{10} nonattainment areas in Libby, Whitefish, Kalispell, Columbia Falls, Butte, and Thompson Falls. Wildfire impacts leading to 24-hour values above 98 micrograms per cubic meter ($\mu g/m^3$) are included in this package, because 98 ug/m^3 is the threshold value below which an area can follow a limited maintenance plan. Table 1 summarizes the PM_{10} data that DEQ would like EPA to evaluate for the exclusion from design value calculations in each nonattainment area for the purposes of redesignation. Removing these data, and acting on previous years exceptional event demonstrations, will allow these areas to qualify for a limited maintenance plan after applying a regional motor vehicle growth analysis and allow DEQ to make the required annual design value demonstration required for areas with approved limited maintenance plans.

Table 1. 2018 Summary of PM_{10} Data to be Evaluated.

Date	Site	AQS #	24-hour PM_{10} ($\mu g/m^3$)
8/16/2018	Kalispell	30-029-0047	99
8/19/2018	Columbia Falls	30-029-0049	138
	Kalispell	30-029-0047	131
	Libby	30-053-0018	112
	Whitefish	**30-029-0009**	**188**
8/20/2018	Whitefish	30-029-0009	135
8/23/2018	Libby	30-053-0018	106
8/24/2018	Libby	30-053-0018	100

All of the locations included in this submission are located in western Montana valleys. Three monitors (Whitefish, Columbia Falls, and Kalispell) are in the Flathead Valley. All three locations are roughly 3,000 ft above seas level, with steep mountains to the east (Glacier National Park and the Swan Mountain Range) and the Salish Mountain Range to the west. Flathead Lake sits at the southern end of the valley and extends for more 27 miles. Libby sits in a small valley surrounded by steep mountains in the northwest corner of the state. The elevation of Libby is 2,100 feet above sea level. The relative location of the monitors in Montana are shown below.

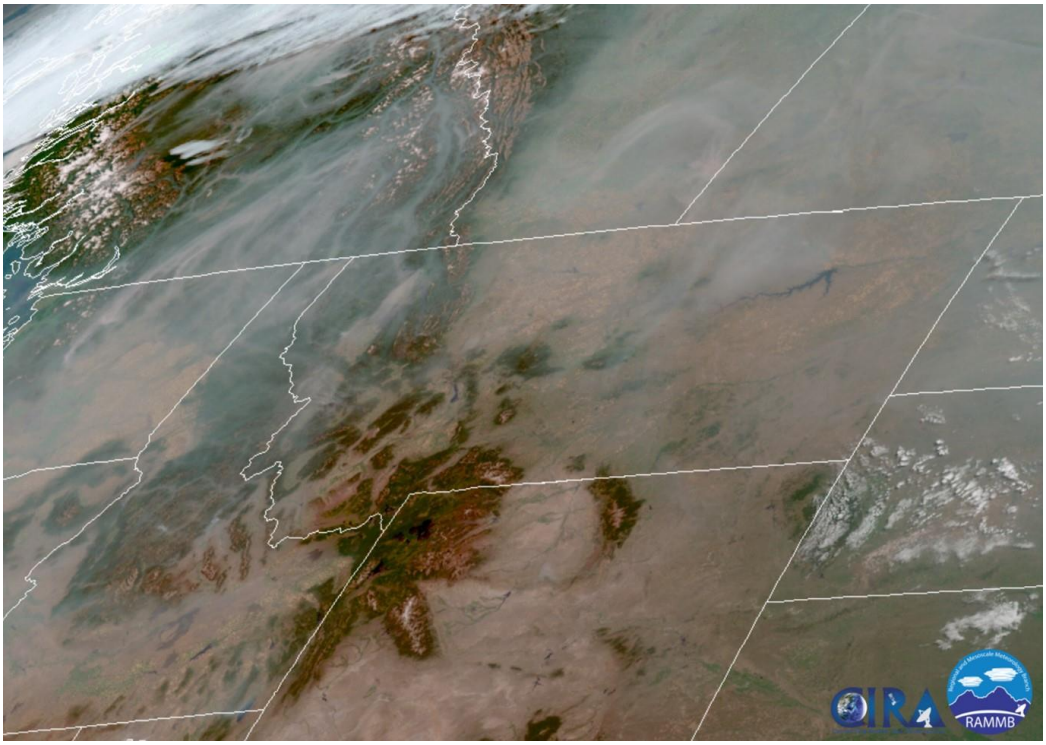
Figure 1. PM_{10} Monitor Location in Montana.



The 2018 wildfire season was defined by numerous fires in northwest Montana and a relatively quiet year elsewhere in Montana. On numerous occasions in August, smoke from British Columbia wildfires significantly impacted Washington, Idaho and the northwest corner of Montana, yet left the rest of Montana relatively smoke free. In addition to the smoke transported from Canada, numerous fires in northwest Montana caused localized impacts to Libby and the Flathead Valley.

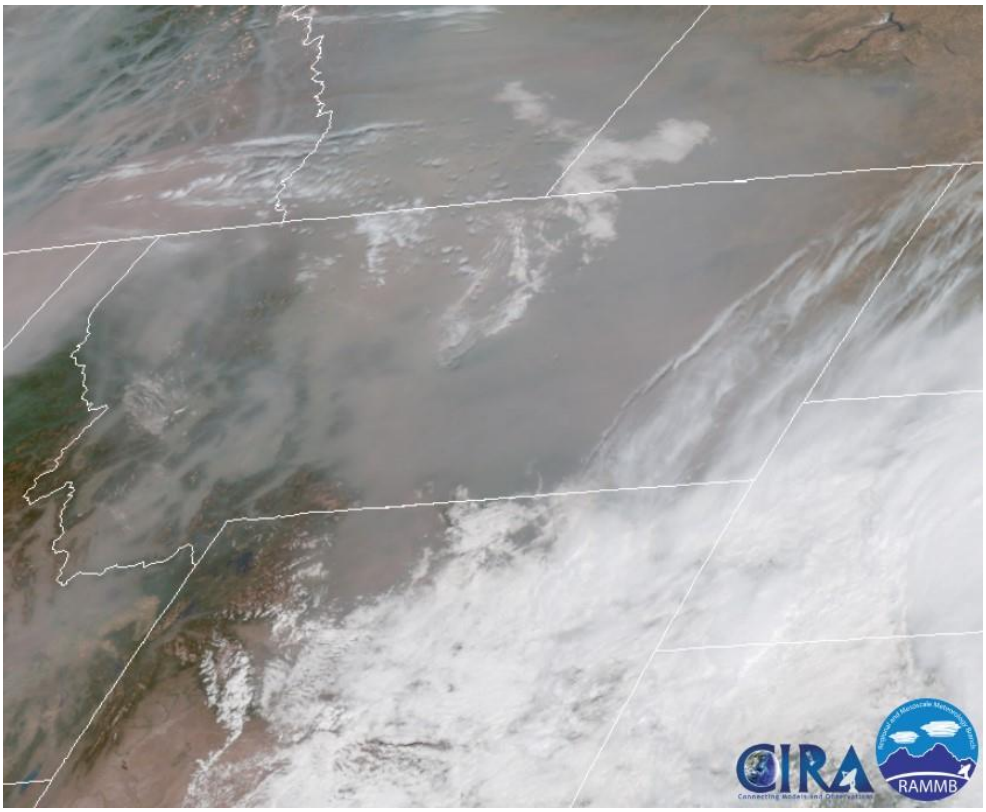
Figure 2 shows smoke from Canada and northwest Montana impacting Libby in August 2018.

Figure 2. Smoke over Montana on August 9, 2018.



Below shows the satellite on the smokiest day of the year, August 19, 2018, when smoke from Canada descended into Montana across the state.

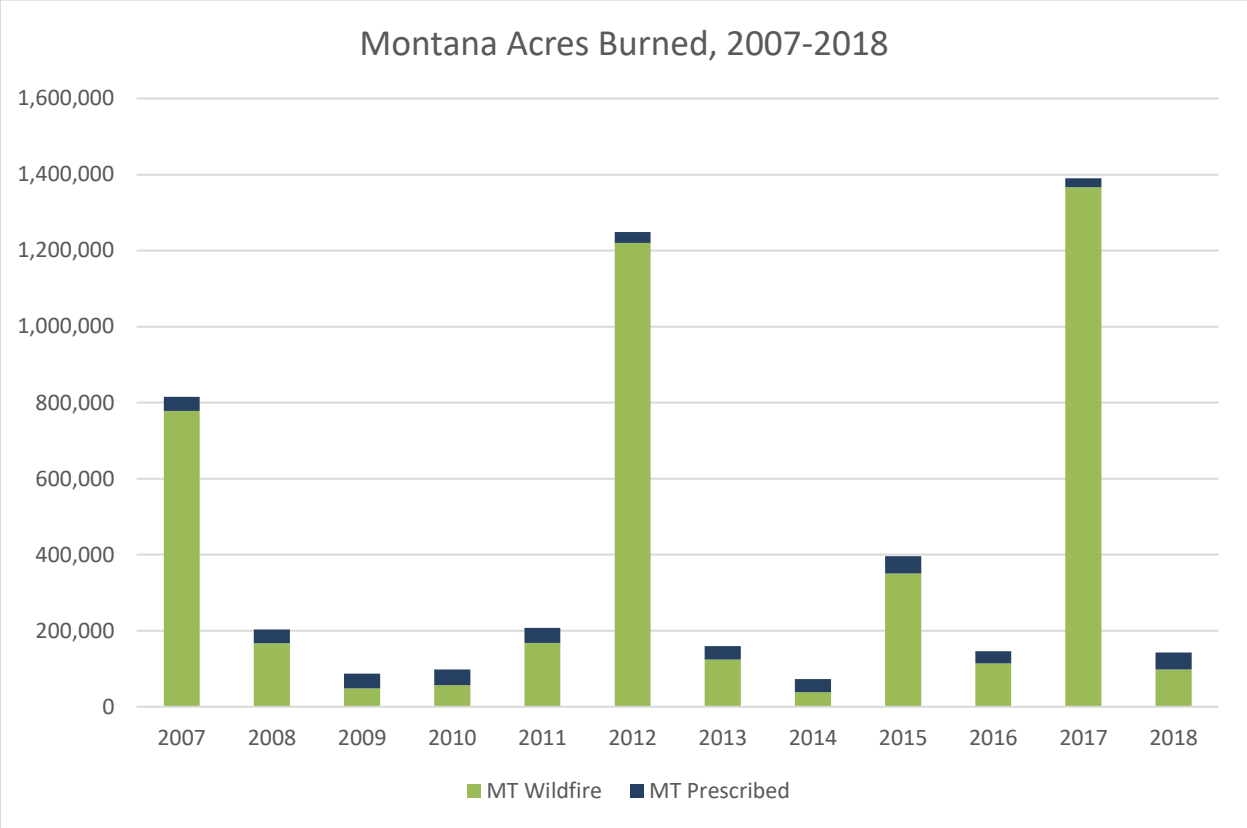
Figure 3. Smoke from Canada impacting Montana on August 19, 2018.



2. Conceptual Model

Without the influence of wildfires, PM_{10} values in western Montana would be highest in the winter due to temperature inversions. In the spring, summer, and fall, PM_{10} values are generally low due to good dispersion from strong solar heating. Unfortunately, summer months can be significantly impacted by wildfires. 2018 saw lower acreage burned by wildfire in Montana compared to the historic wildfire years of 2012 and 2017. However, much of the acreage burned by wildfire in 2018 occurred in northwest Montana near the impacted monitors. In addition to smoke from Montana fires impacting the monitors, smoke from Canada cause frequent impacts throughout the summer.

Figure 4. Acres Burned in Montana, 2008-2018.



The Montana fires of 2018 impacted air quality values from July through September, including days in August when PM_{10} data exceeded the limited maintenance plan threshold (98 $\mu g/m^3$) in Libby, Columbia Falls, Kalispell, and Whitefish. The conceptual model presented in this demonstration relies on three key areas of evidence. First, a comparison to historical data indicating PM_{10} values less than 98 $\mu g/m^3$ 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 98 $\mu g/m^3$ had the smoke not been present. The remaining sections will provide evidence for this conceptual model.

3. Comparison to Historical Data

The historical PM_{10} data comparisons for each site are provided below. These graphs show the average and 95th percentile between 2012-2018, along with the daily average for unflagged PM_{10} data. The 2018PM_{10} flagged days are super imposed in red to show the historical significance of the flagged days. It should be noted that Montana DEQ only flags PM_{10} data above 98 $\mu g/m^3$ for wildfire impacts. There are days when the daily average is below 98 $\mu g/m^3$ that are impacted by wildfires, causing the daily average to be elevated.

Figure 5. Historical PM_{10} Data Comparison for Libby.

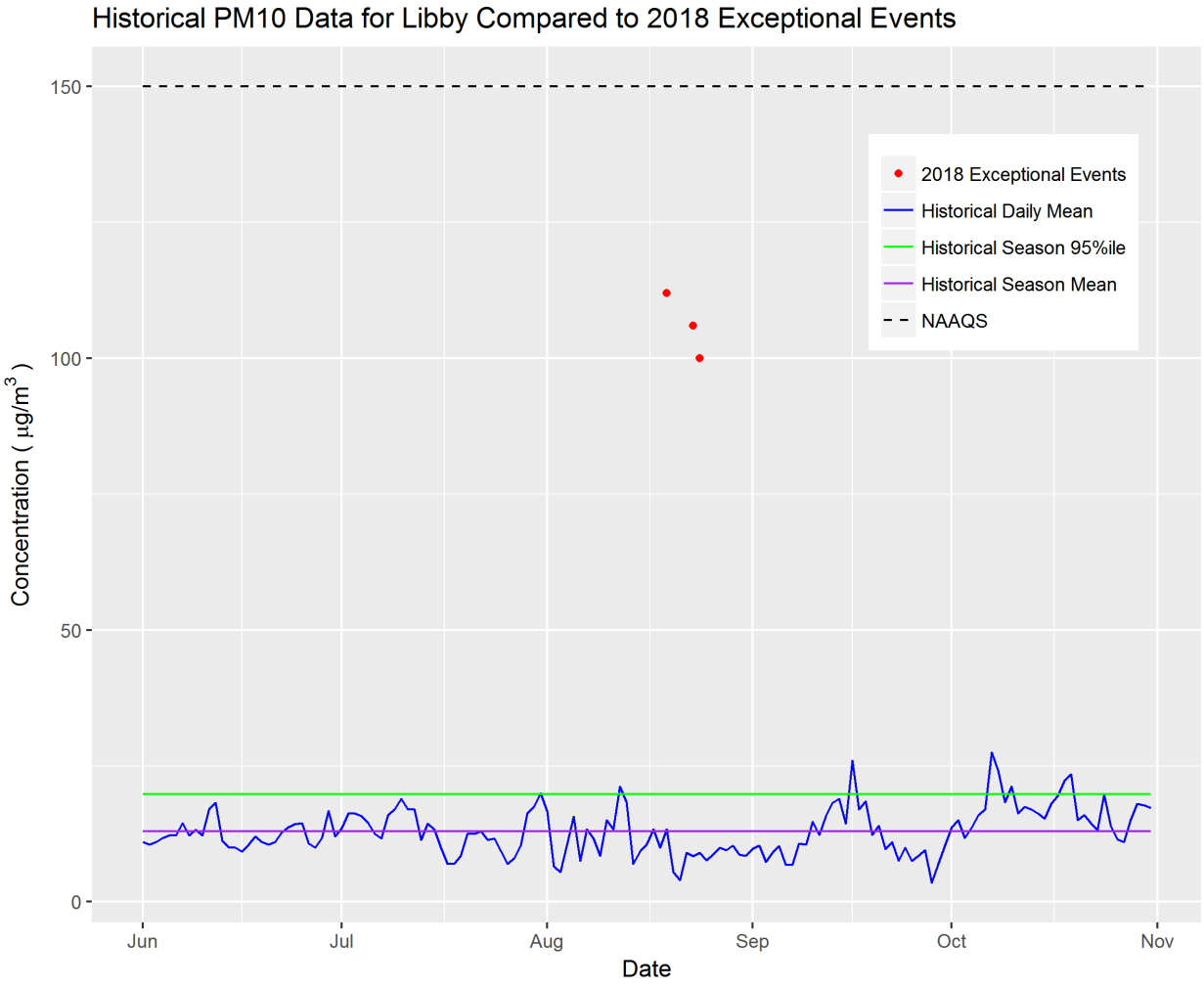


Figure 6. Historical PM_{10} Data Comparison for Columbia Falls.

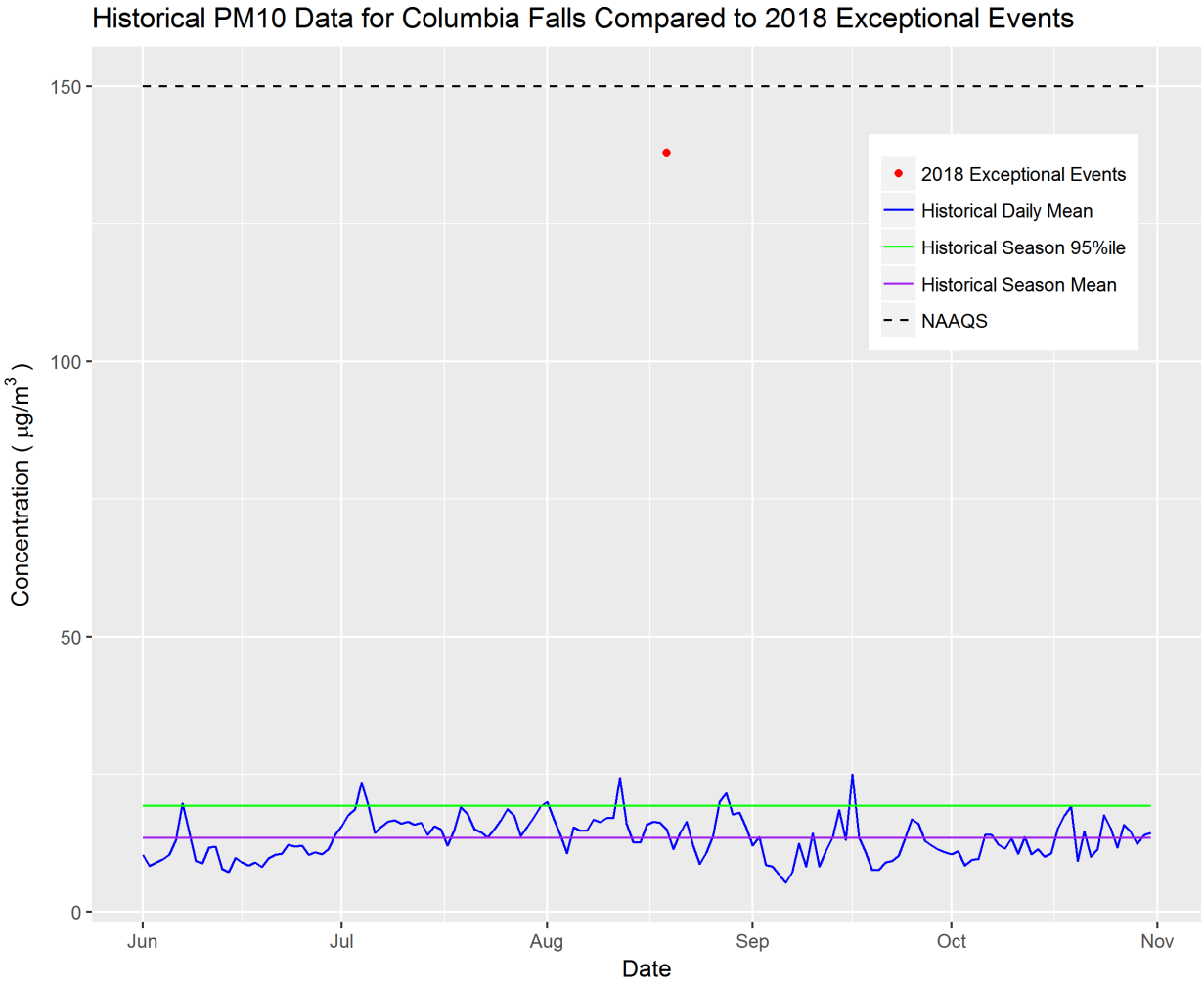


Figure 7. Historical PM_{10} Data Comparison for Kalispell.

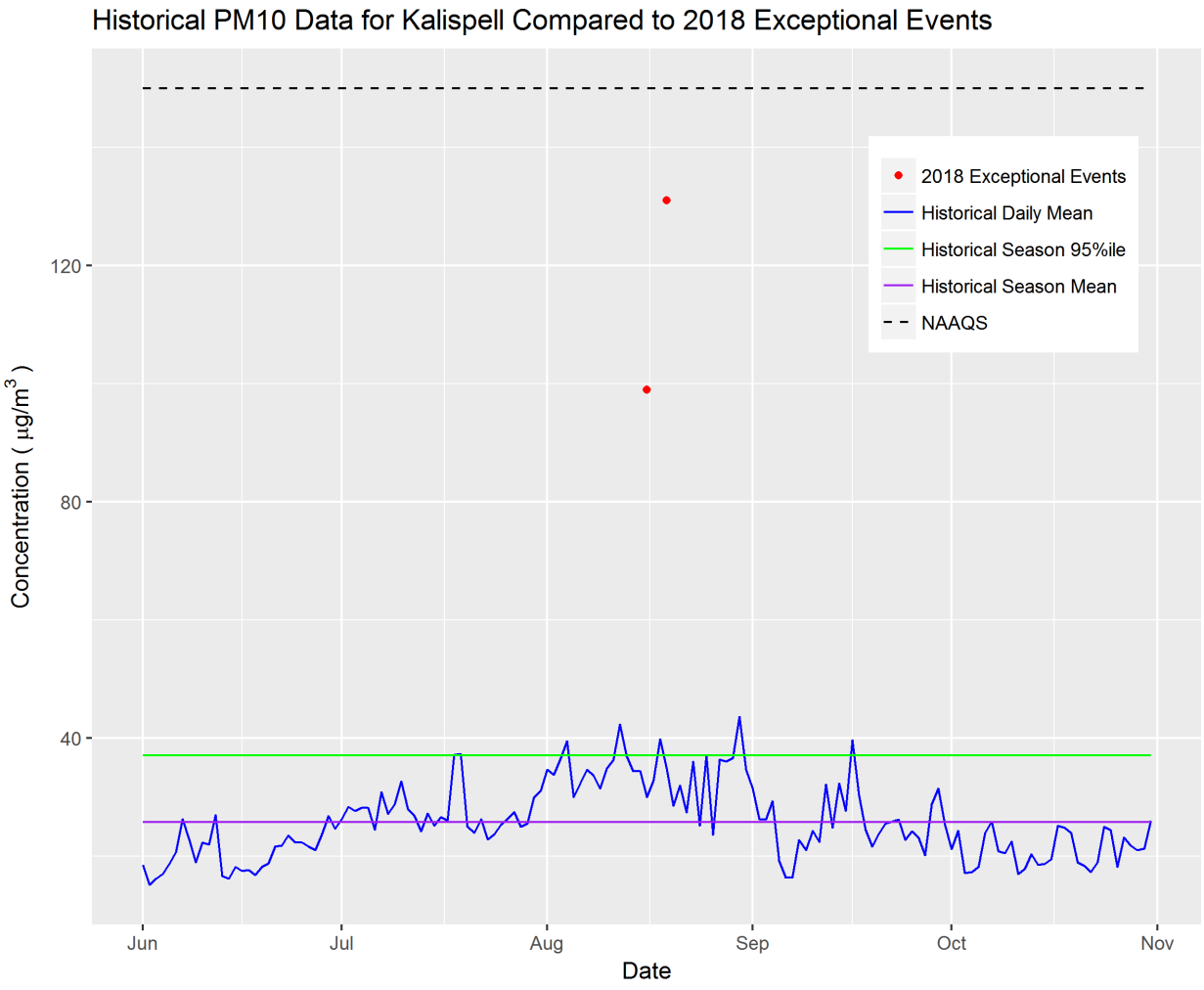
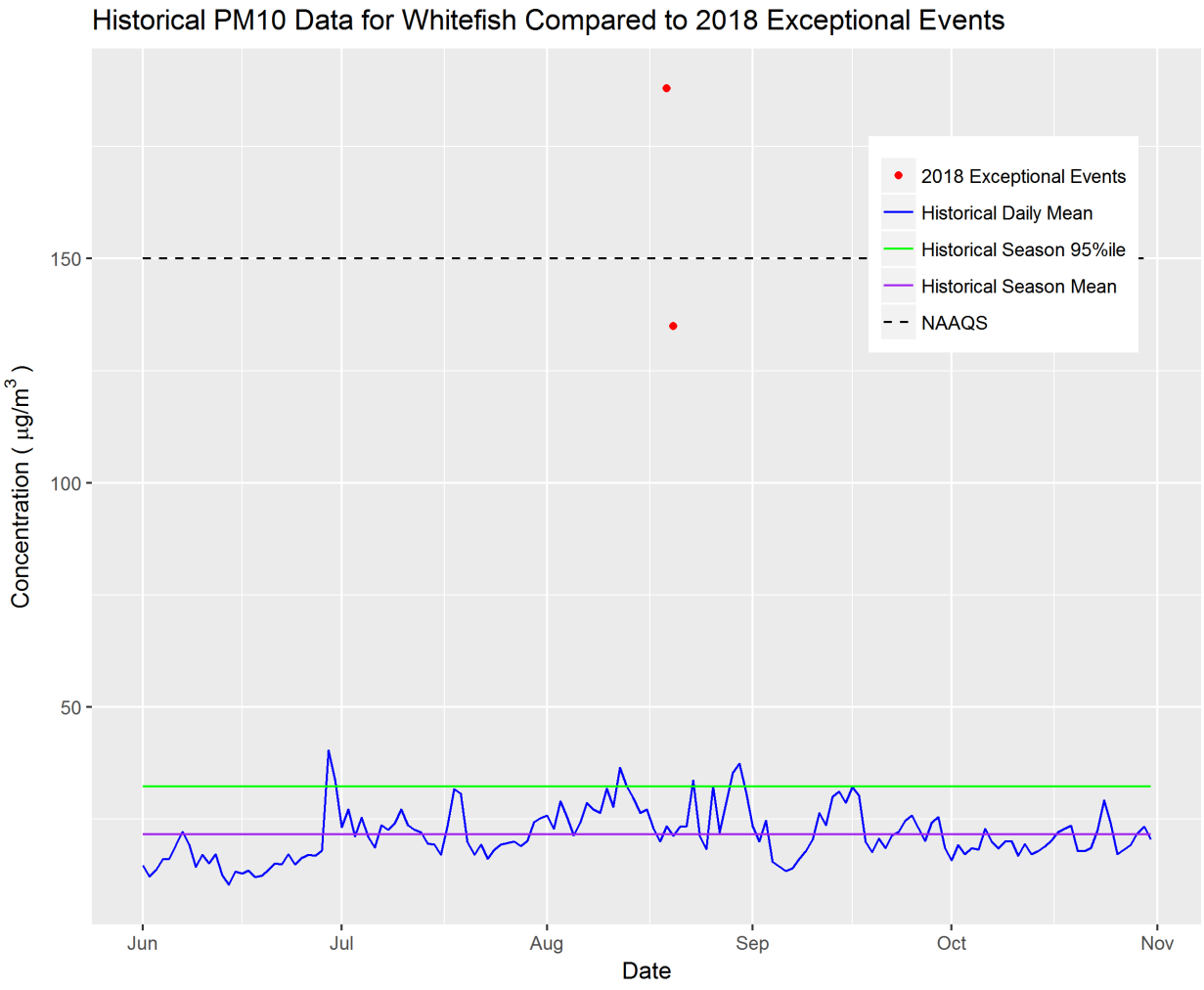


Figure 8. Historical PM_{10} Data Comparison for Whitefish.



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

Table 2. Columbia Falls PM_{10} Exceedances per Year and Seasonal Max.

Columbia Falls					
Year	Exceedances, All Data	Max Winter (Dec-Feb)	Max Spring (Mar-May)	Max Summer (Jun-Aug)	Max Fall (Sep-Nov)
1985	0		69	70	77
1986	0	146	68	86	115
1987	2	115	103	50	186
1988	1*	125	83	99	188*
1989	0	86	67	86	129
1990	0	74	77	43	88
1991	1*	88	83	42	172*
1992	0	75	44	31	58
1993	0	64	46	30	49
1994	0	82	46	65	70
1995	0	53	35	26	45
1996	0	50	56	23	43
1997	0	50	37	22	42
1998	0	32	83	28	48
1999	0	30	30	21	29
2000	0	24	30	43*	45
2001	0	25	32	45	74
2002	0	25	29	31	61
2003	2*	33	46	163*	269*
2004	0	37	55	39	46
2005	0	59	35	39	34
2006	0	47	53	42	50
2007	0	31	48	105*	53
2008	0	42	37	24	33
2009	0	33	40	28	45
2010	0	28	46	18	42
2011	0	49	20	29	47*
2012	0	35	46	46*	46*
2013	0	46	41	35*	46
2014	0	36	40	91*	43
2015	0	56	97	140*	59
2016	0	45	31	31*	32
2017	3*	37	42	57*	228*
2018	0	33	38	138*	47

*Data flagged as exceptional events

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

Table 3. Kalispell PM_{10} Exceedances per Year and Seasonal Max.

Kalispell					
Year	Exceedances, All Data	Max Winter (Dec-Feb)	Max Spring (Mar-May)	Max Summer (Jun-Aug)	Max Fall (Sep-Nov)
1985	0	65		48	77
1986	3	159	198	260	95
1987	0	119	105	41	102
1988	3*	154	65	393*	127*
1989	3*	218	99	52	103
1990	0	111	109	51	79
1991	2	195	120	45	149*
1992	0	107	73	45	102
1993	0	55	69	33	54
1994	0	122	71	85	78
1995	0	104	45	36	56
1996	0	75	74	64	56
1997	0	73	89	47	59
1998	1	68	152	45	39
1999	0	75	44	34	51
2000	0	52	51	95*	49
2001	0	36	53	51	103
2002	0	44	43	78	68
2003	0	41	43	121*	119*
2004	0	64	71	61	56
2005	0	83	48	76	54
2006	0	74	57	52*	57*
2007	0	43	79	147*	57*
2008	0	61	46	31	37
2009	0	27	58	55	42*
2010	0	31	59	31	37
2011	0	42	21	20	50*
2012	0	51	63	56	56
2013	0	53	52	42	87
2014	0	45	73	108	55
2015	0	70	102	146*	49
2016	0	87	46	84	53
2017	5*	55	78	81	228*
2018	0	44	66	131*	72

*Data flagged as exceptional events

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

Table 4. Libby PM_{10} Exceedances per Year and Seasonal Max.

Libby					
Year	Exceedances, All Data	Max Winter (Dec-Feb)	Max Spring (Mar-May)	Max Summer (Jun-Aug)	Max Fall (Sep-Nov)
1985	0	98	65	114	114
1986	4	171	154	81	165
1987	7	234	149	61	187
1988	16*	256	215	75	186*
1989	8	253	158	60	146
1990	12	254	221	68	115
1991	8*	226	140	67	211*
1992	0	139	106	40	89
1993	0	89	84	32	104
1994	0	105	79	99	69
1995	0	93	79	45	81
1996	0	90	113	63	71
1997	0	57	86	45	81
1998	0	121	82	45	81
1999	0	82	74	56	40
2000	0	68	93	57	63
2001	0	95	107	55	89
2002	0	73	67	48	53
2003	0	72	53	91*	74
2004	0	81	73	45	64
2005	0	126	83	42*	71
2006	0	100	64	51	59
2007	0	104	69	77*	56
2008	0	79	86	77*	65
2009	0	47	47	43*	62
2010	0	89	88*	90*	44
2011	0	51	61	83	51*
2012	0	58	80	34*	53
2013	0	76	66	21	57
2014	0	47	45	44*	36
2015	1*	80	65	180*	94*
2016	0	45	32	58*	37
2017	1*	47	51	60*	158*
2018	0	41	51	112*	38

*Data flagged as exceptional events

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

Table 5. Whitefish PM_{10} Exceedances per Year and Seasonal Max.

Whitefish					
Year	Exceedances, All Data	Max Winter (Dec-Feb)	Max Spring (Mar-May)	Max Summer (Jun-Aug)	Max Fall (Sep-Nov)
1991	0	126	71	72	143
1992	8	333	254	52	150
1993	0	115	138	46	82
1994	5	151	174	121	170
1995	0	114	140	39	104
1996	0	73	90	90	104
1997	1	62	177	57	135
1998	0	105	137	53	64
1999	0	60	98	40	90
2000	0	59	97	107	50
2001	0	58	57		105
2002	0	56	100	42	62
2003	0	63	69	129*	109*
2004	0	64	90	60	75
2005	0	105	97	48	49
2006	1	163	73	63*	84
2007	0	77	90	132*	71
2008	0	106	76	41	54
2009	0	37	69	35	44
2010	0	94	96	24	52
2011	0	57	34	26	52
2012	0	51	138	136	61
2013	0	61	82	34	77
2014	0	49	63	104	63
2015	0	135	89	131*	91
2016	0	105	68	43	51
2017	3*	63	90	65	215*
2018	1*	55	85	188*	49

*Data flagged as exceptional events

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

The 2018 flagged data are compared to 2013-2018 (six years) in the figures below for each site presented in this demonstration. Generally, PM_{10} peaks in the winter due to inversions, summer due to wildfire, and occasionally in the spring due to road dust. The highest values are associated with wildfire activity in the summer at all locations. In the figures below, the green dots represent the 2018 wildfire flags and the brown dots represent data flagged with wildfire activity, either from previous years or below the 98 $\mu g/m^3$ threshold. The purple dots represent other flags such as fireworks, prescribed fires, or structure fires. The tan dots are all unflagged data. Please note, prior

to a policy change in recent years, only data above the NAAQS was flagged for exceptional events. There are some days impacted by wildfire that were not flagged.

Figure 9. Columbia Falls Historical PM_{10} Data, 2013-2018

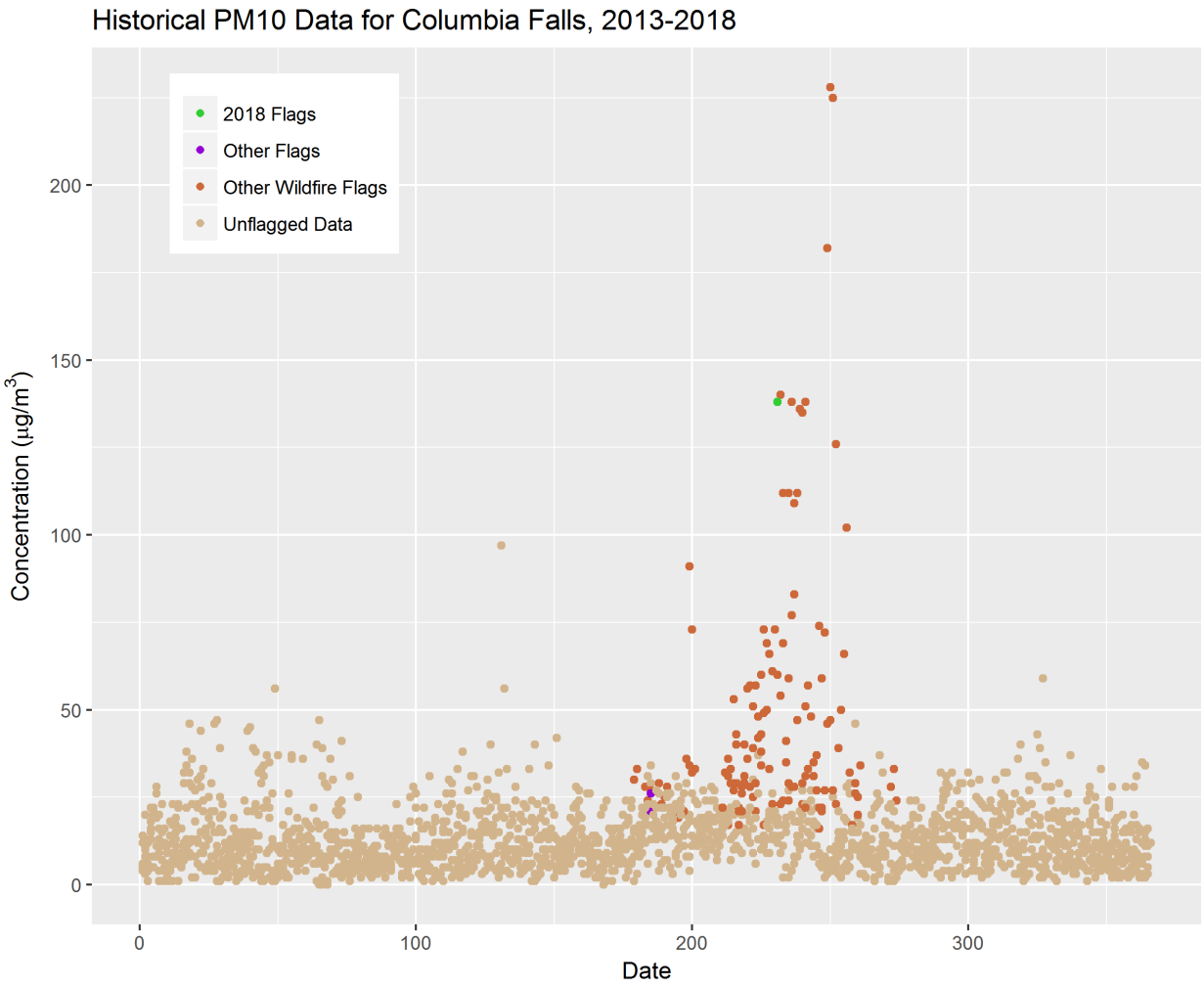


Figure 10. Kalispell Historical PM_{10} Data, 2013-2018

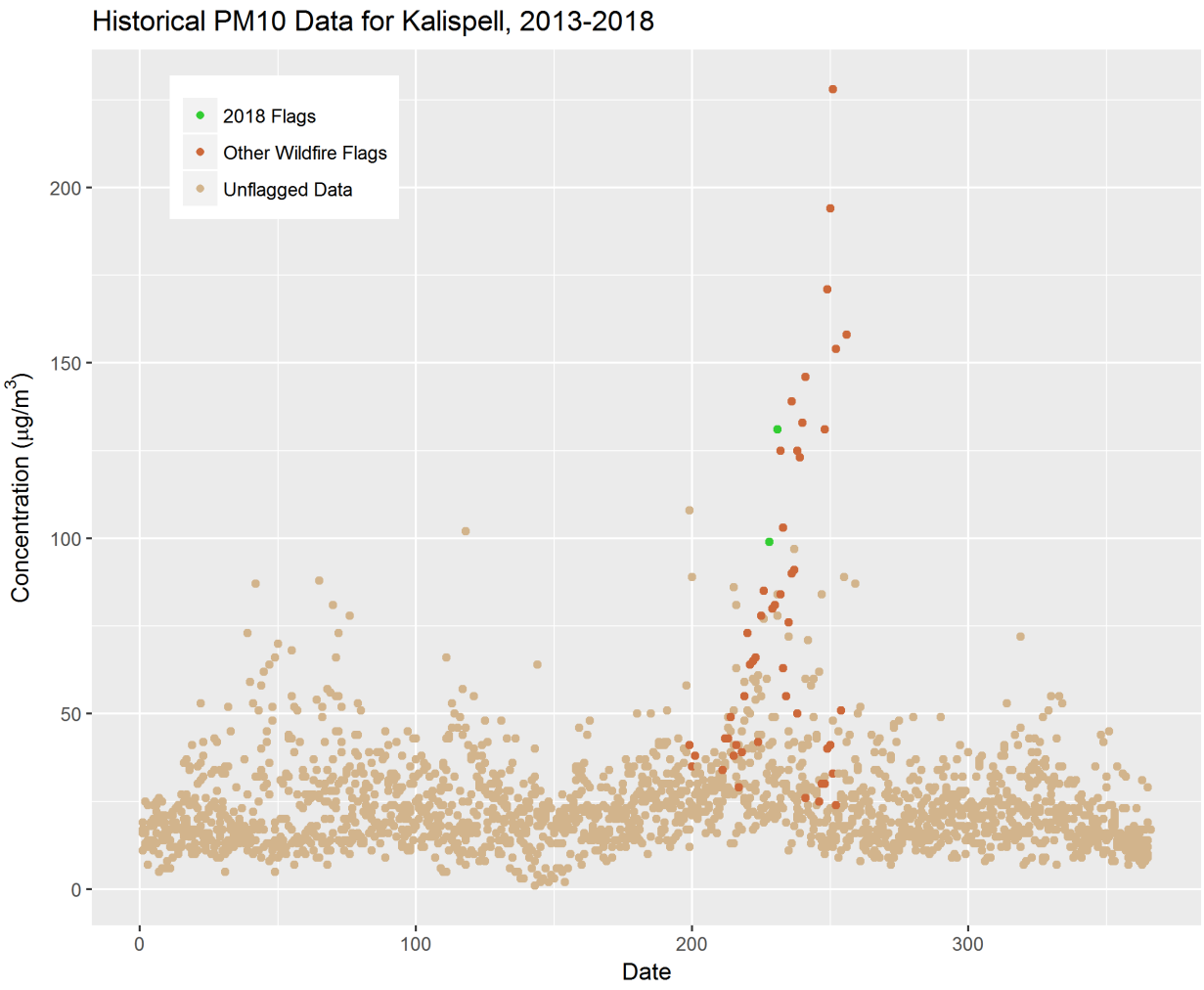


Figure 1. Libby Historical PM_{10} Data, 2013-2018

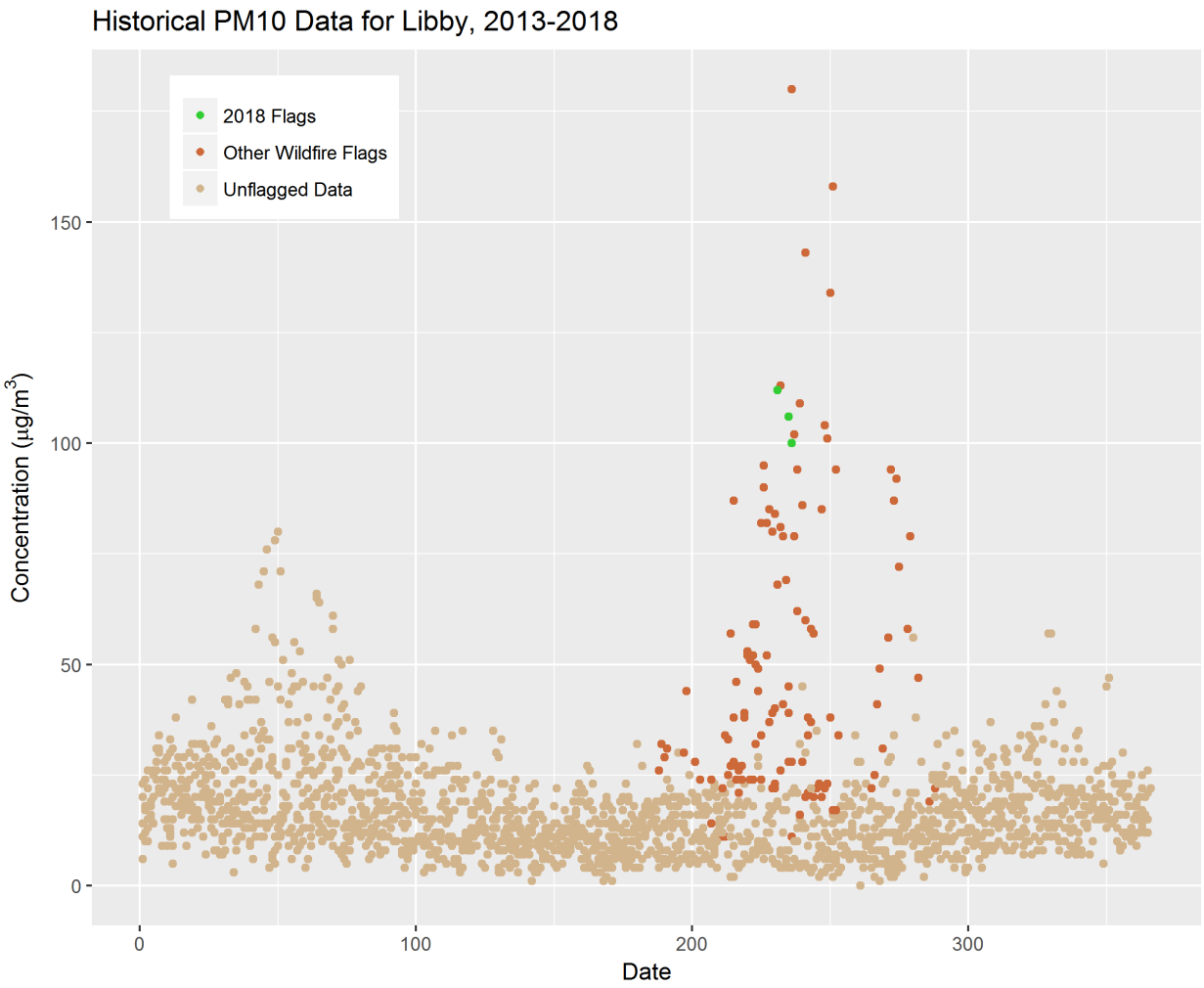
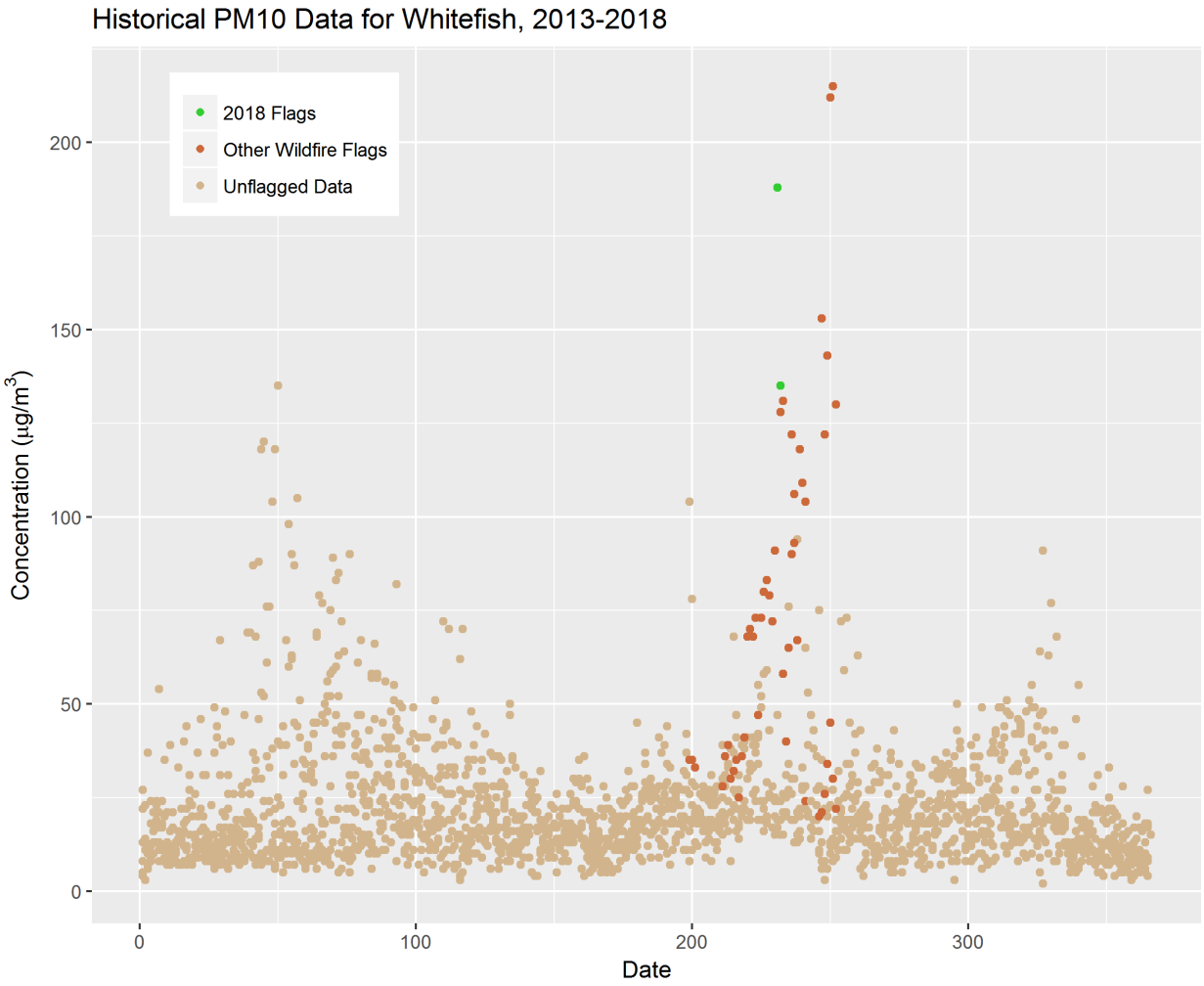


Figure 2. Whitefish Historical PM_{10} Data, 2013-2018



Summary statistics for 2012-2018 data are shown below. Statistics for the high flagged days in 2018 compared to this period are shown in Table 7. These tables are for the entire year, not just the wildfire season.

Table 6. Summary Statistics for PM_{10}, 2012-2018

Site	Count	Maximum (µg/m³)	Mean (µg/m³)	Standard Deviation (µg/m³)	95th Percentile (µg/m³)
Columbia Falls, All Data	2483	228	14.9	14.8	34
Columbia Falls, No Flagged Data	2315	97	12.7	8.3	28
Kalispell, All Data	2463	228	24.6	16.0	49
Kalispell, No Flagged Data	2410	108	23.4	12.1	45
Libby, All Data	2404	180	18.9	14.5	42
Libby, No Flagged Data	1547	80	17.4	10.7	37
Whitefish, All Data	2470	215	22.6	18.1	51
Whitefish, No Flagged Data	2417	138	21.5	14.8	48

Table 7. Statistics Characterizing 2018 Flagged Data Greater than 98 µg/m^3

Date	Site	PM_{10} Conc. (µg/m^3)	Rank, 2012-2018	Percentile, 2012-2018
8/16/2018	Kalispell	99	17	99.35%
8/19/2018	Whitefish	188	3	99.92%
8/19/2018	Kalispell	131	10	99.68%
8/19/2018	Columbia Falls	138	7	99.84%
8/19/2018	Libby	112	6	99.79%
8/20/2018	Whitefish	135	9	99.72%
8/23/2018	Libby	106	8	99.71%
8/24/2018	Libby	100	12	99.54%

In conclusion, the comparison to historical data shows that the flagged values in 2018 were at or above the 99th percentile between 2012-2018. The concentrations seen during wildfire season are among the highest values recorded over the seven years evaluated.

4. Clear Causal Relationship

The comparison to historical data shows that the flagged data in the summer of 2018 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=2018

Thursday, August 16, 2018

Despite widespread haze across the state today, air quality remains MODERATE in most locations this morning. Northwest Montana remains the exception, with air quality remaining firmly in the UNHEALTHY FOR SENSITIVE GROUPS to UNHEALTHY categories. These levels have prompted the Air Quality Alert to remain in effect over northwest Montana through at least tomorrow. The AQA has been extended to include the counties east of Glacier National Park. Webcams and visibility indicate air quality in that area is also ranging between UNHEALTHY FOR SENSITIVE GROUPS and UNHEALTHY. In far eastern Montana, a large area of dense smoke running from north to south is visible on satellite. Ground level concentrations are still MODERATE in that area.

Here is a quick recap of areas that exceeded moderate levels yesterday:

- Thompson Falls and Columbia Falls had generally UNHEALTHY FOR SENSITIVE GROUPS air quality throughout the day while air quality in Libby remained persistently UNHEALTHY.

- Air quality in West Yellowstone was the most variable yesterday, reaching UNHEALTHY levels in the late morning before improving to MODERATE again in the afternoon, then deteriorating to UNHEALTHY again in the evening. Currently air quality is ranging between MODERATE and UNHEALTHY.

- A blast of smoke from Canada moved through eastern Montana yesterday. Most of this smoke remained above ground level, but air quality in Malta reached UNHEALTHY FOR SENSITIVE GROUPS for a period yesterday afternoon. Great Falls also saw levels briefly reach UNHEALTHY FOR SENSITIVE GROUPS last night. Both areas are back to MODERATE this morning.

At the risk of sounding like a broken record, the cause of the widespread haze and moderate air quality is transported smoke from fires around the West Coast and British Columbia. A ridge of high pressure is trapping smoke over a large area of the U.S. In northwest Montana, nearby fires are causing more significant ground level impacts.

Forecast

We may see a stray shower or thunderstorms through northwest Montana today, but I don't expect any significant improvement to the air quality in that region. The ridge of high pressure will remain in place through tomorrow afternoon. For everywhere but northwest Montana, expect the haze and MODERATE air quality to continue, with air quality occasionally reaching UNHEALTHY FOR SENSITIVE GROUPS levels. More significant impacts are possible near individual fires, especially in southwest Montana. Across southern Beaverhead and Madison counties, smoke from the Goldstone fire may cause air quality to deteriorate later this afternoon. In Northwest Montana, and directly east of Glacier National Park, expect the UNHEALTHY FOR SENSITIVE GROUPS to UNHEALTHY air quality to continue through at least tomorrow morning.

Changes are on the way for Friday afternoon and into Saturday. A disturbance will move through the region, breaking down the ridge of high pressure, bringing an increased risk of showers and thunderstorms, and hopefully clearing the haze out of many locations. This system looks to bring a better chance of precipitation than most summertime disturbances of late. Right now, most of this activity looks centered over southwest Montana. This may help decrease fire activity in that region if the showers fall on active fires. However, if precipitation doesn't fall on the fires, the increased winds and lightning could prompt heightened activity on existing fires or ignite new fires. Northwest Montana will see more isolated showers with less chance of meaningful precipitation, so fire activity is not expected to change much in that area. Cooler temperatures are expected for the weekend, with light precipitation expected across southern Montana.

What does this mean for smoke?

We will likely see an improvement to the widespread haze and moderate air quality, especially in the southern half of the state beginning Friday afternoon and continuing through the weekend. Expect some periods of GOOD air quality and clear skies at least some of the time. In northwest Montana, expect air quality impacts ranging from UNHEALTHY FOR SENSITIVE GROUPS to UNHEALTHY, to continue, although they may become more localized in nature, meaning very close to active fires as we move into the weekend.

The Montana Department of Environmental Quality has issued an air quality alert for Flathead, Glacier, Liberty, Lincoln, Pondera, Sanders, and Toole counties in effect until conditions improve. The Air Quality Alert is due to smoke from wildfires in northwest Montana, Idaho, Washington, and British Columbia. This alert will be updated again at 8AM on 8/17/2018.

Particulate levels are ranging between Unhealthy and Unhealthy for Sensitive Groups in northwest Montana and extending to the east of Glacier National Park.

Summary

Air quality impacts have been stable at the ground level over the last 48 hours despite a lot of smoke moving overheard from Canada. Air quality in northwest Montana remains between UNHEALTHY FOR SENSITIVE GROUPS and UNHEALTHY. These impacts have expanded a little to include areas east of Glacier National Park. Elsewhere, air quality is MODERATE and skies are hazy. Conditions are expected to remain the same today. Beginning tomorrow afternoon, we should start to see improvement in southern Montana, as the ridge breaks down and a disturbance moves through. Northwest Montana will struggle to see as much improvement due to the large number of fires in that area and a lower chance of precipitation.

Rundown of fires

Northwest Montana:

The Coal Ridge fire, located north of Whitefish, is 350 acres and 0% contained.

The Gold Hill fire, north of Libby, is 114 acres and 0% contained.

The Paola Ridge fire, near Essex, MT is 400 acres and 0% contained.

The Davis fire, near Yaak, is currently 5,565 acres and 35% contained.

The Tenmile fire is 681 acres and 91% contained and the nearby Sterling Complex, near Eureka, is 907 acres and 27% contained.

The Garden Creek fire is 2,573 acres and 35% contained.

The Brownstone fire, in the Bob Marshall wilderness, is 1,084 acres.

The Cougar fire, over the border in Idaho, is 3,900 acres and 25% contained.

The Surprise Creek fire, also in the Idaho Panhandle, is 2,100 acres.

In Glacier National Park, the Howe Ridge fire, also in the Idaho Panhandle, is 1,100 acres.

In southwest Montana:

The Wigwan fire, near Ennis is 4,190 acres and 0% contained. The nearby Monument fire is 5,400 acres.

The Goldstone fire, on the border with Idaho near Jackson, MT, is 5,700 acres.

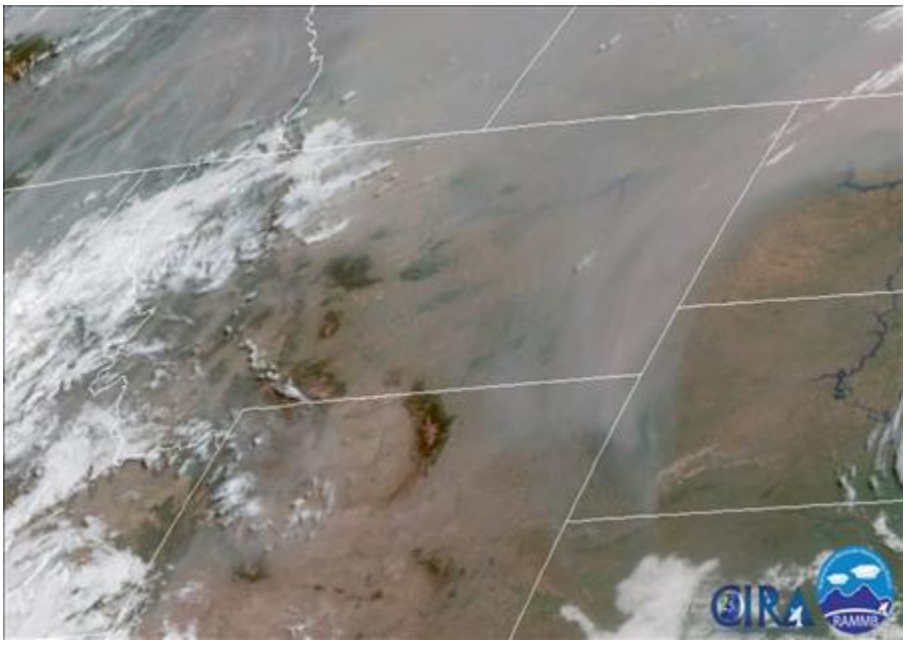
The Beaver Creek fire, near Anaconda, is currently 1,000 acres and 10% contained.

In the rest of the state:

The Shellrock fire, near Helena, is 350 acres and 15% contained with active fire behavior.

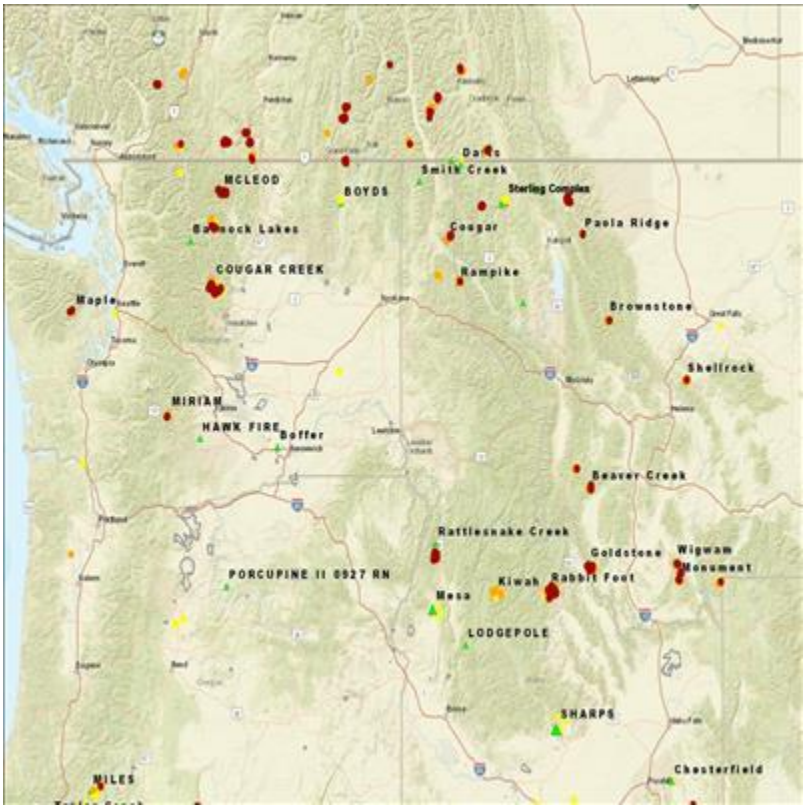
Along the west coast, the fires in Southern Idaho, Washington, Oregon, and California continue to show significant growth each day, sending smoke up into Montana. In Washington, the Cougar Creek is now 31,608 acres. The Rabbit Foot fire in central Idaho is 26,294 acres. Fires in British Columbia have caused significant smoke over Canada lately, with that smoke contributing to the haze in Montana.

Lots of smoke over the state today, but air quality in most areas remains moderate.



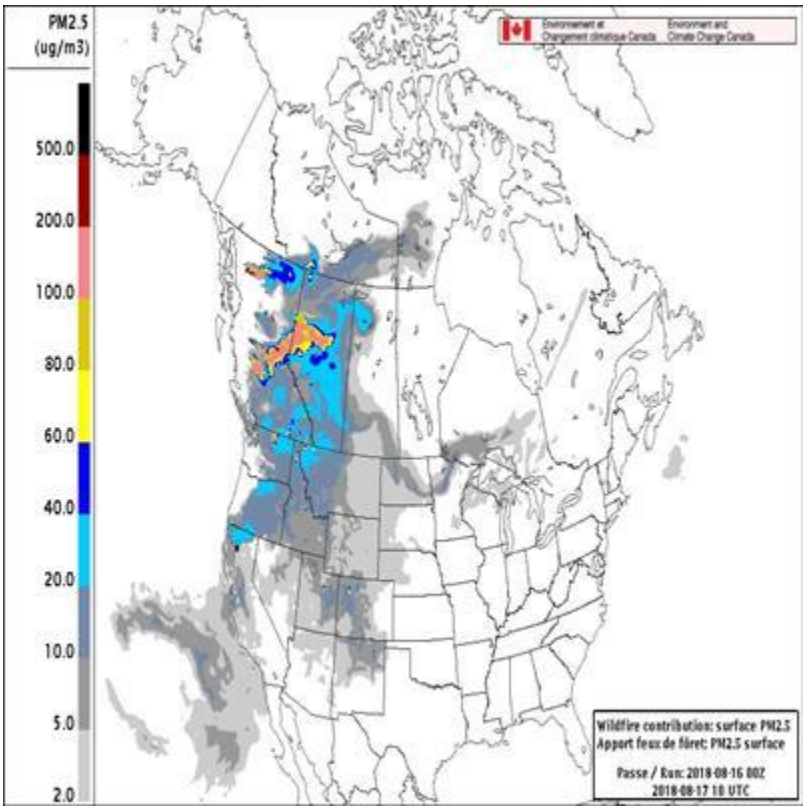
Source: CIRA and NOAA. These data are preliminary and not operational.

Recent fire activity is shown in red below.



Source: NWCG

Smoke forecasts show northwest Montana will continue to see elevated smoke today.



Source: [Government of Canada]

Visibility is impaired in Cut Bank today as smoke moves east of the Park.

Source: Alert Pilots

NOAA Text Description:

Thursday, August 16, 2018

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY
THROUGH 1742Z August 16, 2018.

SMOKE:
Much of Canada and the United States....
The ongoing wildfire activity affecting portions of the western United States and western Canada continues to produce tremendous amounts of smoke with an enormous area of varying density smoke extending over much of Canada and the United States except for portions of the Southeast extending along the Gulf Coast to the Southwest. The area of densest smoke was over the North Atlantic Ocean and also with a very dense area of smoke extending from northern Ontario extending to southern Alberta.
https://www.ssd.noaa.gov/PS/FIRE/DATA/SMOKE/2018H161751.html

Sunday, August 19, 2018

Current Conditions

It looks like the mass of cool air from Canada dominated the fate of the smoke impacts across the state. Unfortunately, the disturbance that swept through did not suppress the smoke as much as anticipated. Smoke has pushed its way down from the north and settled in late last night, showing widespread impacts over the state, prompting Air Quality Alerts issued for every county, which will be updated Monday morning. Significant contributions from fires to our west have also contributed to the elevated concentrations in northwest Montana. Currently, most of the state is UNHEALTHY, and MODERATE for southwest and Thompson Falls. Satellite imagery portrays a thick blanket of smoke over all of Montana today.

We recommend referring to the Outdoor Activity Guide when planning your outdoor activities.

Today's Forecast

Widespread impacts are expected to continue today, as there doesn't appear to be signs of significant relief in the very near future. Isolated storms are possible later today and into tonight, many of which concentrated over the mountains in north and central Montana. Other isolated storms are possible in the mountains of southeastern Montana. These may cause relief in these areas, but expect widespread UNHEALTHY FOR SENSITIVE GROUPS to UNHEALTHY impacts through the day.

Extended Forecast

A weak disturbance will be present in the area through Wednesday, continuing isolated storms and increased gusty winds at times, which could again relieve areas of heavy smoke. This disturbance is expected to mainly affect central and southern Montana. Another potentially favorable factor is the general shift from a north to a northeast wind by tonight, which could alleviate some impacts due to upwind fires. This might be more noticeable in eastern Montana. However, with the quantity of smoke already in, and continuing to move into the region, significant relief may only be spatially and temporally isolated. A high pressure ridge builds into the region again by Wednesday.

Air Quality Alert

The Montana Department of Environmental Quality has issued an air quality alert for Beaverhead, Big Horn, Blaine, Broadwater, Carbon, Carter, Cascade, Chouteau, Custer, Daniels, Dawson, Deer Lodge, Fallon, Fergus, Flathead, Gallatin, Garfield, Glacier, Golden Valley, Granite, Hill, Jefferson, Judith Basin, Lake, Lewis and Clark, Liberty, Lincoln, Madison, McCone, Meagher, Mineral, Missoula, Musselshell, Park, Petroleum, Phillips, Pondera, Powder River, Powell, Prairie, Ravalli, Richland, Roosevelt, Rosebud, Sanders, Sheridan, Silver Bow, Stillwater, Sweet Grass, Teton, Toole, Treasure, Valley, Wheatland, Wibaux, and Yellowstone counties in effect until conditions improve. The air quality alert is due to smoke from wildfires in northwest Montana, Idaho, Washington, and British Columbia causing widespread unhealthy air quality. This alert will be updated again at 8AM on 8/20/2018.

An Air Quality Alert means that particulates have been trending upwards and that an exceedence of the 24 hour National Ambient Air Quality Standard (NAAQS) has occurred or may occur in the near future.

Particulate levels are ranging between Unhealthy for Sensitive Groups and Very Unhealthy across Montana.

When air quality is Very Unhealthy... State and local health officials recommend that people with respiratory or heart disease, the elderly, and children should avoid any outdoor activity; everyone else should avoid prolonged exertion.

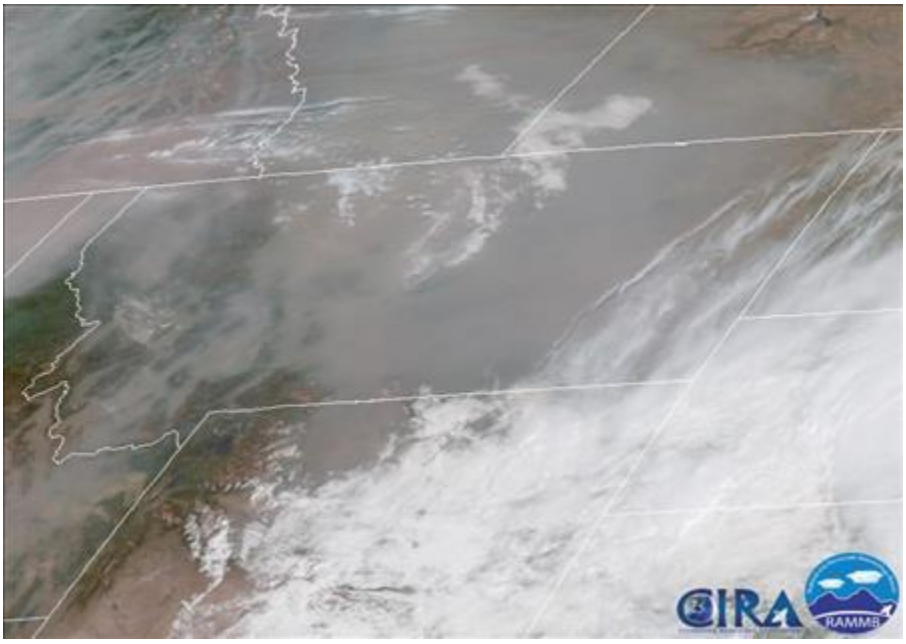
When air quality is Unhealthy... State and local health officials recommend that people with respiratory or heart disease, the elderly, and children should avoid prolonged exertion; everyone else should limit prolonged exertion.

When air quality is Unhealthy for Sensitive Groups... State and local health officials recommend that people with respiratory or heart disease, the elderly and children should limit prolonged exertion.

Summary

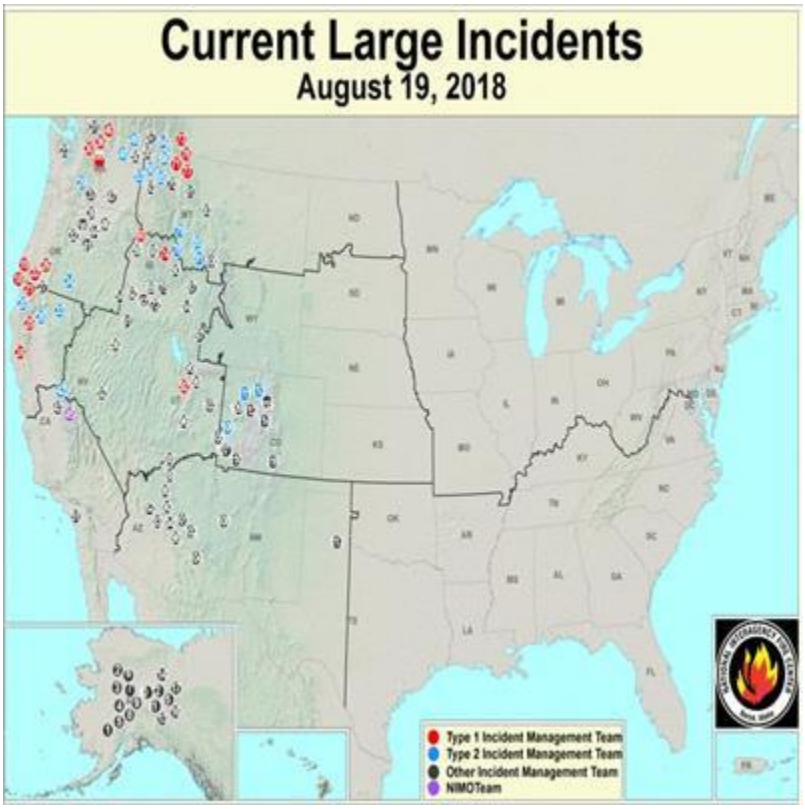
Smoke is affecting the entire state today, prompting Air Quality Alerts in every county. Large amounts of smoke has pushed in, following the cold front from the north, coupled with the wildfire smoke from western Montana and northwestern US. This has caused very widespread UNHEALTHY conditions. Isolated storms and shifting winds later today and into tomorrow may offer relief to some areas.

Satellite shows thick smoke blanketing much of the region.



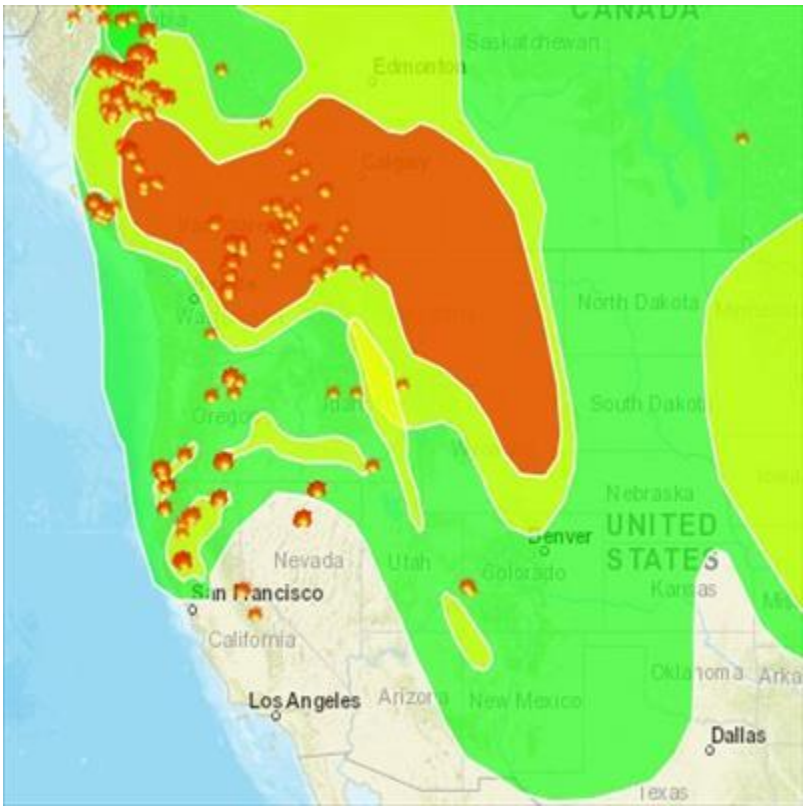
Source: CIRA and NOAA. These data are preliminary and not operational.

Current active fires in the U.S.



Source: USFS

Satellite smoke analysis from today shows widespread smoke.



Source: NOAA

Hazy conditions are widespread today.

Source: Whitefish Mountain Resort

NOAA Text Description:

Sunday, August 19, 2018

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY
THROUGH 1912Z August 19, 2018.

SMOKE:
Much of Canada and the United States....
The ongoing wildfire activity affecting portions of the western United States and western Canada continues to produce enormous amounts of smoke of varying density that covers most of Canada and the United States with the exception of the Mid Atlantic coast, Southeast and Gulf Coast extending to the Southwest. The densest smoke within this area extended from the northern Rockies into portions of the Pacific Northwest and southern British Columbia.

An additional area of light smoke, from wildfire activity over Asia, extends from the Northwest Territories, the Yukon, northern Alberta and northern British Columbia extending west into Alaska.
https://www.ssd.noaa.gov/PS/FIRE/DATA/SMOKE/2018H191925.html

Monday, August 20, 2018

Current Conditions

We are still dealing with a tremendous amount of smoke over Montana this Monday morning but there are some signs of improvement, especially in eastern Montana. Air quality is MODERATE in Sidney, Malta, Lewistown, Great Falls, and Broadus this morning. Unfortunately, western Montana is still struggling with air quality ranging from UNHEALTHY FOR SENSITIVE GROUPS to UNHEALTHY from Libby down to Bozeman. Conditions in Southern Montana, including Billings have been improving throughout the morning.

The large amount of smoke that settled over Montana on Saturday originated from fires in British Columbia, Washington, Idaho, and Northwest Montana. See below for a summary of fire activity as of this morning.

Forecast

The good news is that a disturbance moving through the area, bringing northeasterly winds and showers should bring some much-needed relief from the smoke for many areas of Montana. This improvement will continue to move west today, with areas east of the Divide seeing conditions improve throughout the morning. In west-central and southwest Montana, including the areas around Missoula, Dillon, and Butte, it will take a little longer to see improvement but once it clears there is a decent chance that smoke will stay away for a little while. Unfortunately, in northwest Montana, fires will remain active under high winds with smoke impacts likely continuing for the foreseeable future.

The northeast to easterly winds over the area will persist until Wednesday. During this time smoke from fires to our west and northwest (Washington and British Columbia) will stay out of Montana. Without the steady stream of smoke moving in, we should see generally MODERATE air quality in eastern Montana through Wednesday, although we may see levels reach UNHEALTHY FOR SENSITIVE GROUPS at times. Southwest Montana will likely also benefit from the change in wind direction and the relatively small number of fires in the area. Northwest Montana will unfortunately likely have to deal with smoke from area fires throughout the week. Air quality in northwest Montana and on the west side of Glacier National Park will likely range from UNHEALTHY FOR SENSITIVE GROUPS to UNHEALTHY with only brief periods of improvement this week.

Air Quality Alert

The Montana Department of Environmental Quality has issued an air quality alert for Beaverhead, Broadwater, Deer Lodge, Flathead, Gallatin, Glacier, Granite, Jefferson, Lake, Lewis and Clark, Lincoln, Madison, Meagher, Mineral, Missoula, Powell, Ravalli, Sanders, and Silver Bow counties in effect until conditions improve. The air quality alert is due to smoke from wildfires in northwest Montana and throughout the Pacific Northwest and British Columbia. Conditions may improve briefly this afternoon as showers and thunderstorms move through the area and northeasterly winds

redirect smoke. This alert will be updated again at 8AM on 8/21/2018 if conditions have not improved before that.

An Air Quality Alert means that particulates have been trending upwards and that an exceedence of the 24 hour National Ambient Air Quality Standard (NAAQS) has occurred or may occur in the near future.

Air quality is ranging between Unhealthy for Sensitive Groups and Unhealthy in the affected counties.

When air quality is Unhealthy... State and local health officials recommend that people with respiratory or heart disease, the elderly, and children should avoid prolonged exertion; everyone else should limit prolonged exertion.

When air quality is Unhealthy for Sensitive Groups... State and local health officials recommend that people with respiratory or heart disease, the elderly and children should limit prolonged exertion.

Summary

Air quality is improving in eastern Montana as showers and thunderstorms move in and northeasterly to easterly winds push smoke to the west. Air quality is improving to MODERATE levels in many parts eastern Montana. The improvement should continue to push to the west throughout the day. The change in wind direction should help keep transported smoke out of Montana for the first part of this week. Unfortunately, fire activity, and consequently smoke impacts ranging from UNHEALTHY FOR SENSITIVE GROUPS to UNHEALTHY, will likely continue in northwest Montana through this period.

Beginning Wednesday, winds will shift back to the more traditional westerly winds, which will likely bring more smoke back to the state.

Fires

Northwest Montana:

In Glacier National Park, the Howe Ridge fire is currently 7,835 acres. Also in or near the park, the Whale Butte fire in 251 acres, the Paola Ridge fire is 364 acres, and the Coal Ridge fire is 280 acres.

The Gold Hill fire, north of Libby, is 930 acres and 0% contained.

The Davis fire, near Yaak, is currently 6,032 acres and 7% contained.

The Sterling Complex, near Eureka, is 1,216 acres and 23% contained.

The Garden Creek fire is 2,052 acres and 60% contained.

The Brownstone fire, in the Bob Marshall wilderness, is 2,214 acres.

The Cougar fire, over the border in Idaho, is 5,524 acres and 31% contained.

The Surprise Creek fire, also in the Idaho Panhandle, is 2,555 acres.

The Rampike fire, also in the Idaho Panhandle, is 2,000 acres.

Southwest Montana:

The Wigwan fire, near Ennis, is 4,191 acres and 35% contained. The nearby Monument fire is 6,613 acres and 13% contained.

The Goldstone fire, on the border with Idaho near Jackson, MT, is 9,191 acres and 7% contained.

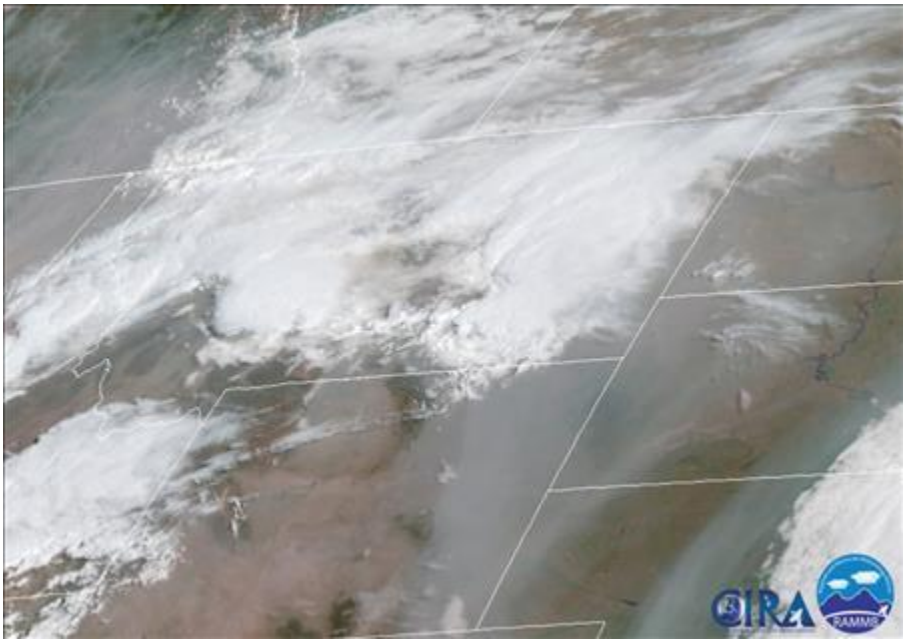
The Beaver Creek fire, near Anaconda, is currently 2,067 acres and 8% contained.

The Rattlesnake Creek fire, near Riggins, ID, is 7,997 acres and 28% contained.

The rest of the state:

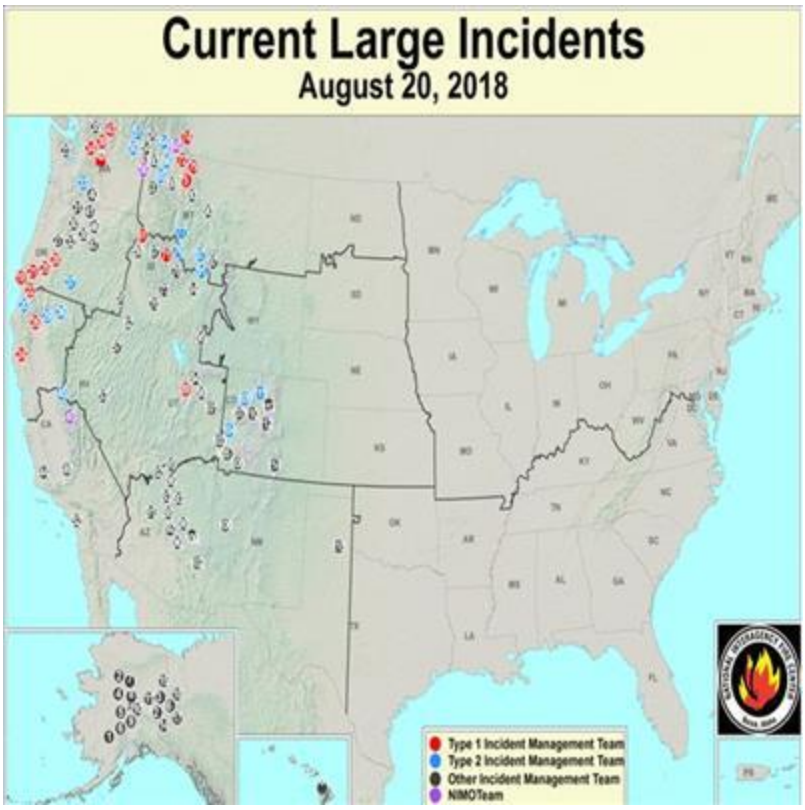
The Shellrock fire, near Helena, is 500 acres and 50% contained.

A disturbance is bringing rain and helping to clear out the smoke in many areas this morning, although lots of smoke can still be seen in between the clouds.



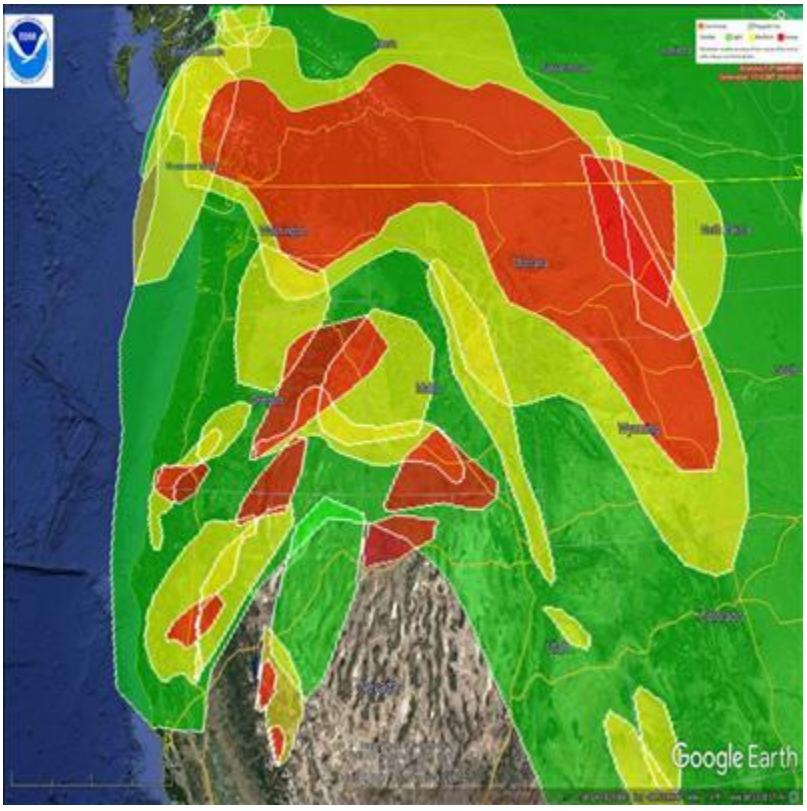
Source: CIRA and NOAA. These data are preliminary and not operational.

Fire activity remains mainly in northwestern Montana.



Source: USFS

Satellite smoke analysis from yesterday shows significant smoke impacting Montana.



Source: NOAA

Visibility is low and air quality is unhealthy in Missoula this morning.

Source: KTVQ

NOAA Text Description:

Monday, August 20, 2018

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY
THROUGH 1907Z August 20, 2018.

SMOKE:
Canada and the U.S.....
The ongoing wildfire activity in the the western U.S. and western Canada continues to produce enormous amounts of smoke of varying density that covers most of southern Canada and the northern United States. The densest smoke within this area extended from the Texas Panhandle north to eastern Montana and also extending offshore the Pacific Northwest to western British Columbia.
https://www.ssd.noaa.gov/PS/FIRE/DATA/SMOKE/2018H201918.html

Thursday, August 23, 2018

The haze and air quality impacts returned to Montana last night. Northwest Montana continues to be hit the hardest, with UNHEALTHY air quality returning to Libby last night. East of Glacier National Park, in Cut Bank, air quality reached UNHEALTHY levels early this morning. Air quality in Flathead Valley and Thompson Falls recently reached UNHEALTHY FOR SENSITIVE GROUPS. Elsewhere, air quality is generally MODERATE with lots of smoke sitting above ground level, causing widespread hazy skies.

The cause of the increase in smoke impacts in northwest Montana is active behavior on area fires plus transported smoke from Washington and British Columbia. The Gold Hill fire, just north of Libby, showed active behavior throughout the night. The Howe Ridge fire in Glacier also was active throughout the evening.

Today and Tomorrow's Forecast

The winds have shifted and Montana is now downwind of the significant fire activity in the Pacific Northwest. There is currently a dense band of smoke moving into western Montana, visible on satellite imagery (below). Air quality in western Montana will likely deteriorate throughout the day from west to east, possibly reaching VERY UNHEALTHY levels in Libby and ranging from UNHEALTHY FOR SENSITIVE GROUPS to UNHEALTHY elsewhere. The smoky conditions are expected to persist through most of Friday with a weak ridge sitting over the area, keeping smoke trapped. Depending on how much of the smoke settles to the ground overnight, we could see another day of widespread UNHEALTHY air quality on Friday.

Weekend and Beyond Forecast

The weekend looks like it could be highly variable in terms of smoke impacts across the state. On Friday night, a cold front is expected to sweep through the state. This will likely cause brief improvement to the hazy conditions as increased winds help push built up smoke out of the region. Unfortunately, with the intense fire activity in Washington and British Columbia, we will likely see smoke pour back into the state on Saturday. Things may improve again on Monday if we see a widespread precipitation event, but there is a lot of uncertainty at this time regarding how much rain might fall. If we don't see a lot of rain, smoke from British Columbia will likely continue to impact Montana, especially the northern half of the state through much of next week.

Even more uncertain is the possibility of rain on the British Columbia fires at the end of next week. There are hints that we could see some widespread improvement in air quality by the end of next week, but it is too soon to tell if this scenario will materialize.

Fires

Northwest Montana:

In Glacier National Park, the Howe Ridge fire is currently 10,323 acres. Also in or near the park, the Whale Butte fire in 327 acres, the Paola Ridge fire is 578 acres, and the Coal Ridge fire is 280 acres.

The Gold Hill fire, north of Libby, is 1,398 acres and 1% contained.

The Davis fire, near Yaak, is currently 6,365 acres and 12% contained.

The Sterling Complex, near Eureka, is 1,265 acres and 34% contained.

The Brownstone fire, in the Bob Marshall wilderness, is 1,920 acres.

The Cougar fire, over the border in Idaho, is 6,626 acres and 24% contained.

The Surprise Creek fire, also in the Idaho Panhandle, is 2,631 acres.

The Rampike fire, also in the Idaho Panhandle, is 2,400 acres.

In southwest Montana:

The Wigwan fire, near Ennis, is 4,087 acres and 87% contained. The nearby Monument fire is 6,614 acres and 32% contained.

The Goldstone fire, on the border with Idaho near Jackson, MT, is 9,264 acres and 7% contained.

The Beaver Creek fire, near Anaconda, is currently 2,067 acres and 13% contained.

The Rattlesnake Creek fire, near Riggins, ID, is 8,136 acres and 28% contained.

Air Quality Alert

The Montana Department of Environmental Quality has issued an air quality alert for Flathead, Glacier, Lake, Lincoln, and Sanders counties in effect until conditions improve. The air quality alert is due to smoke from fires in the Pacific Northwest. This alert will be updated again at 9AM on 8/24/2018.

An Air Quality Alert means that particulates have been trending upwards and that an exceedence of the 24 hour National Ambient Air Quality Standard (NAAQS) has occurred or may occur in the near future.

Air quality is expected to range from Unhealthy for Sensitive Groups to Very Unhealthy in northwest Montana.

When air quality is Very Unhealthy... State and local health officials recommend that people with respiratory or heart disease, the elderly, and children should avoid any outdoor activity; everyone else should avoid prolonged exertion.

When air quality is Unhealthy... State and local health officials recommend that people with respiratory or heart disease, the elderly, and children should avoid prolonged exertion; everyone else should limit prolonged exertion.

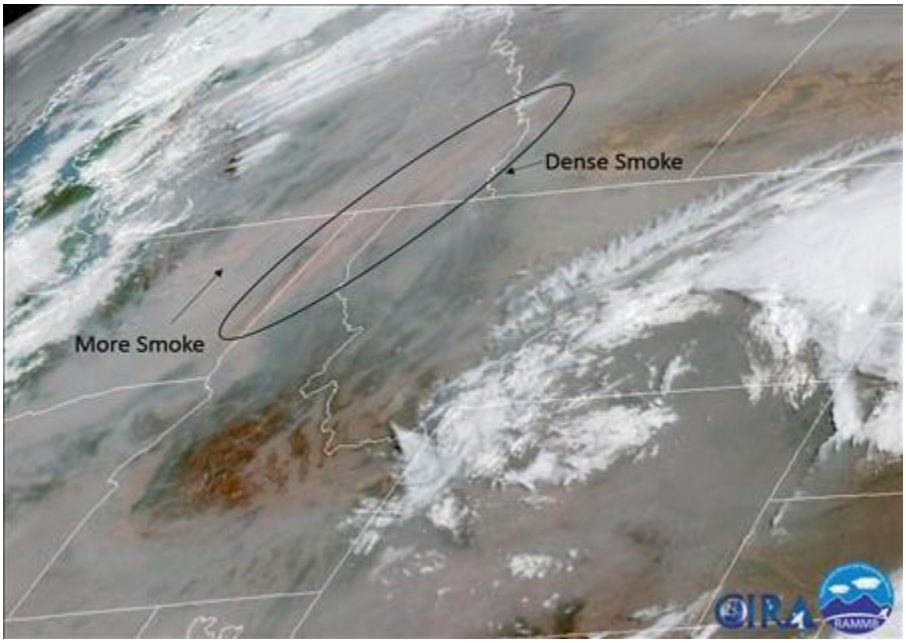
When air quality is Unhealthy for Sensitive Groups... State and local health officials recommend that people with respiratory or heart disease, the elderly and children should limit prolonged exertion.

Summary

Hazy skies and air quality impacts are returning to the state today as westerly winds have returned, bringing smoke in from the Pacific Northwest. Northwest Montana and east of Glacier National Park are seeing the worst impacts this morning. Smoke is expected to move into the state throughout the day, with a dense band of smoke moving into western Montana this morning.

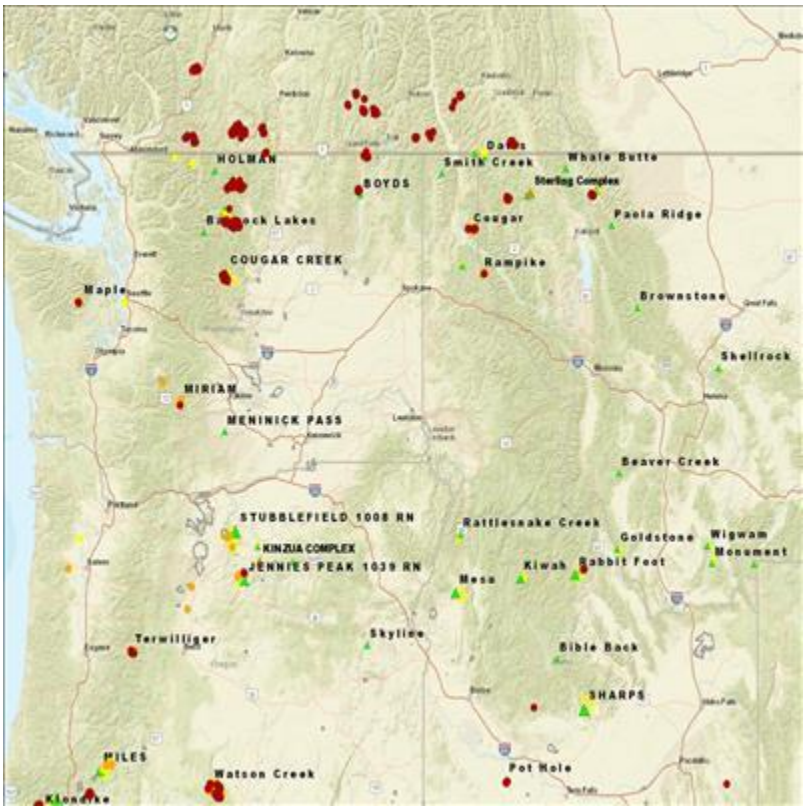
Widespread air quality impacts are expected by tomorrow morning and persisting throughout the day. We may see some brief improvement tomorrow night, but smoke will likely move back in on Saturday.

Smoke is moving into western Montana this morning along westerly winds.



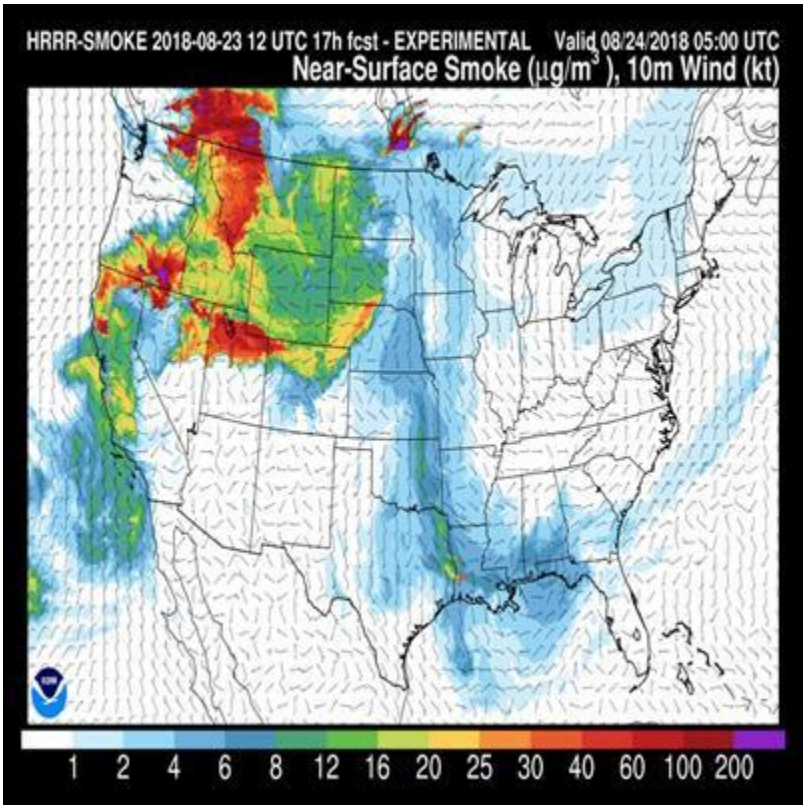
Source: CIRA and NOAA. These data are preliminary and not operational.

Recent fire activity is shown in red below.



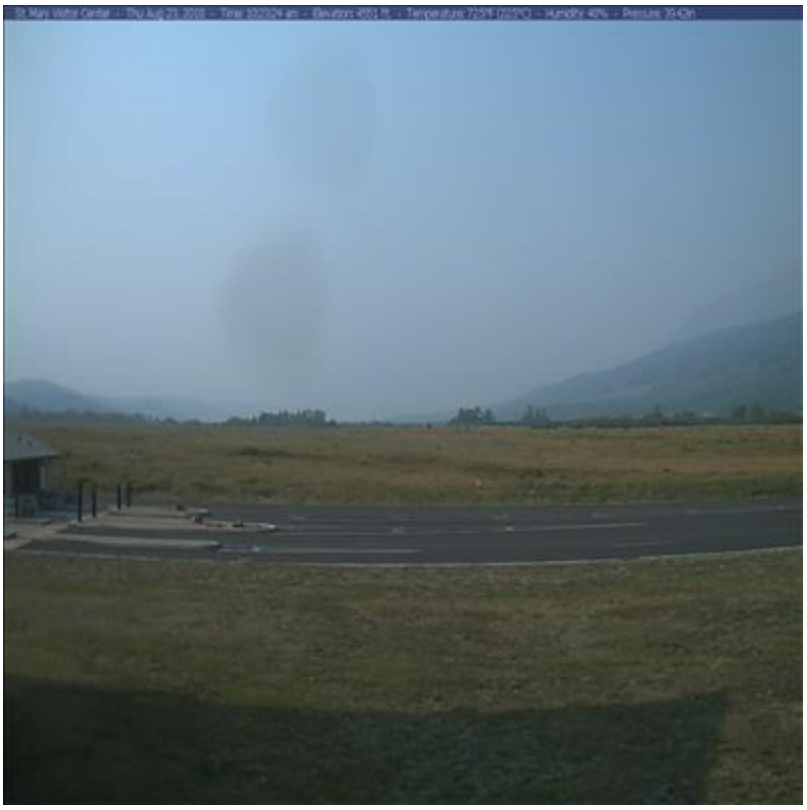
Source: NWCG

Smoke models show smoke from the west moving into Montana throughout the day.



Source: NOAA

Smoke is impacting Glacier National Park again today. Below, the view at St. Mary.



Source: NPS

NOAA Text Description:

Thursday, August 23, 2018

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY
THROUGH 1600Z August 23, 2018.

SMOKE:
Southern Half of Canada/Much of the US...
Significant wildfire activity scattered across the Western US from northern California and northern Nevada northward across portions of Idaho, western Montana, and the Pacific Northwest as well as a massive wildfire outbreak occurring in western Canada, primarily in British Columbia. Those wildfires continued to be responsible for widespread coverage of smoke of varying density affecting most of the southern half of Canada as well as much of the U.S., with the exception of Southwestern U.S., were relatively smoke free at least as far as what was seen in visible satellite imagery. The most significant smoke of moderate to thick density affecting the US blanketed the northwestern portion of the US from western Montana westward to the portion of the West Coast from northern California to northwestern Washington. The smoke also extended offshore of California, Oregon, and Washington over a portion of the nearby eastern Pacific. Swaths of heavy density smoke extended eastward from the Pacific Northwest to the North Plains then south through the Central Plains into the Southern Plains which extended east into the southeast of the U.S. That smoke reached the Atlantic Ocean. There was also a swath of moderate to heavy smoke that extended south in the Gulf of Mexico. Over Canada, thicker smoke covered much of British

Columbia, portions of northern and central Alberta, northern and central Saskatchewan, and northern and central Manitoba.
https://www.ssd.noaa.gov/PS/FIRE/DATA/SMOKE/2018H231723.html

Friday, August 24, 2018

We are seeing widespread smoke impacts this morning across Montana. Air quality is currently UNHEALTHY in the northwest corner of the state, including Libby, Columbia Falls, Great Falls, and Cut Bank. Further south, air quality is UNHEALTHY FOR SENSITIVE GROUPS in Thompson Falls, Frenchtown, Missoula, Hamilton, Butte, Helena, Havre, Lewistown, and Malta. In southern Montana, air quality is MODERATE in Dillon, Bozeman, West Yellowstone, Billings, Birney, Broadus, and Sidney.

The widespread smoke impacts are caused by transported smoke from Washington and British Columbia. Northwest Montana is seeing further impacts from nearby fires, causing the UNHEALTHY levels in that area.

Today's Forecast

We are seeing a small slot of clean air moving in to Northwest Montana this morning in between two large areas of smoke. As this patch of clearer air moves in, expect brief improvement in air quality. We are seeing that improvement to our west this morning, with generally GOOD to MODERATE air quality in eastern Washington and the Idaho Panhandle. This improvement is linked to a dry cold front that is making its way into the state. Unfortunately, any improvement in northwest Montana will likely be brief today. A large area of dense smoke over central Washington and British Columbia will quickly move back in this afternoon. Air quality could reach VERY UNHEALTHY levels by tomorrow morning in northwest Montana. Outside of Northwest Montana, the hazy skies and UNHEALTHY FOR SENSITIVE GROUPS air quality impacts will likely persist throughout the day. The patch of cleaner air will have a smaller and smaller impact as it moves east, with areas in eastern Montana unlikely to see a break today. In southwest Montana, smoke from Idaho fires may move into southern Beaverhead and Madison Counties, causing levels to reach UNHEALTHY FOR SENSITIVE GROUPS in that area later today.

Weekend and Beyond Forecast

Smoke impacts are expected to continue through most of the weekend. Northwest Montana will continue to see the worst air quality impacts, ranging from UNHEALTHY to VERY UNHEALTHY through Sunday. Elsewhere, expect air quality to range from MODERATE to UNHEALTHY FOR SENSITIVE GROUPS. There is good news beginning Sunday night. We are looking at a trough of low pressure moving in for the start of next week. This low pressure will likely bring widespread rain to the area. The only difference between this system and the one last week is that the transport winds will be from the northwest this time, as opposed to northeasterly. This means smoke from British Columbia will continue to want to push into the region. We should still see improvement across the area throughout the day on Monday, but we will likely continue to deal with smoke, especially in areas that don't see much rain.

There is good news for next week. It looks like we could see a number of weather disturbances bringing cooler and wetter weather to both Montana and the Pacific Northwest. I'm hopeful that by the end of next week we could see a significant reduction in smoke over the region.

Fires

Northwest Montana:

In Glacier National Park, the Howe Ridge fire is currently 10,802acres. Also in or near the park, the Whale Butte fire in 351 acres, the Paola Ridge fire is 598 acres, and the Coal Ridge fire is 280 acres.

The Gold Hill fire, north of Libby, is 2,349 acres and 1% contained.

The Davis fire, near Yaak, is currently 6,452 acres and 13% contained.

The Sterling Complex, near Eureka, is 2,734 acres and 38% contained.

The Brownstone fire, in the Bob Marshall wilderness, is 2,342 acres.

The Cougar fire, over the border in Idaho, is 6,655 acres and 24% contained.

The Surprise Creek fire, also in the Idaho Panhandle, is 2,734 acres.

The Rampike fire, also in the Idaho Panhandle, is 2,500 acres.

In southwest Montana, none of the fires currently burning in the area reported growth yesterday.

Air Quality Alert

The Montana Department of Environmental Quality has issued an air quality alert for Blaine, Broadwater, Cascade, Chouteau, Deer Lodge, Fergus, Flathead, Glacier, Granite, Hill, Jefferson, Judith Basin, Lake, Lewis and Clark, Liberty, Lincoln, Meagher, Mineral, Missoula, Petroleum, Phillips, Pondera, Powell, Ravalli, Sanders, Silver Bow, Teton, and Toole counties in effect until conditions improve. The air quality alert is due to smoke from fires in northwest Montana and the Pacific Northwest. This alert will be updated again at 10AM on 8/27/2018 unless conditions improve and the alert is no longer needed.

An Air Quality Alert means that particulates have been trending upwards and that an exceedence of the 24 hour National Ambient Air Quality Standard (NAAQS) has occurred or may occur in the near future.

Air quality is expected to range from Unhealthy for Sensitive Groups to Very Unhealthy throughout the weekend. The worst impacts are expected in northwest Montana.

When air quality is Very Unhealthy... State and local health officials recommend that people with respiratory or heart disease, the elderly, and children should avoid any outdoor activity; everyone else should avoid prolonged exertion.

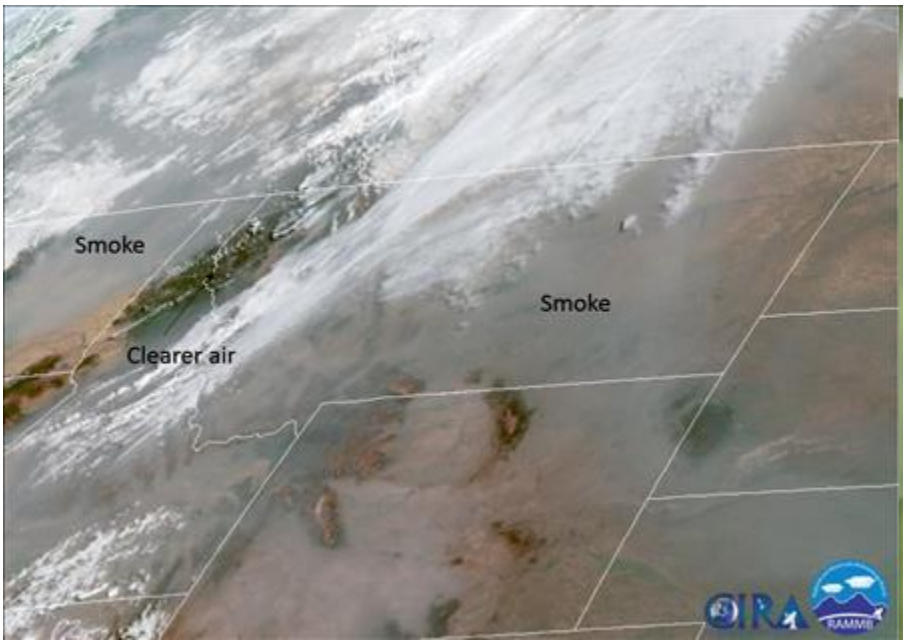
When air quality is Unhealthy... State and local health officials recommend that people with respiratory or heart disease, the elderly, and children should avoid prolonged exertion; everyone else should limit prolonged exertion.

When air quality is Unhealthy for Sensitive Groups... State and local health officials recommend that people with respiratory or heart disease, the elderly and children should limit prolonged exertion.

Summary

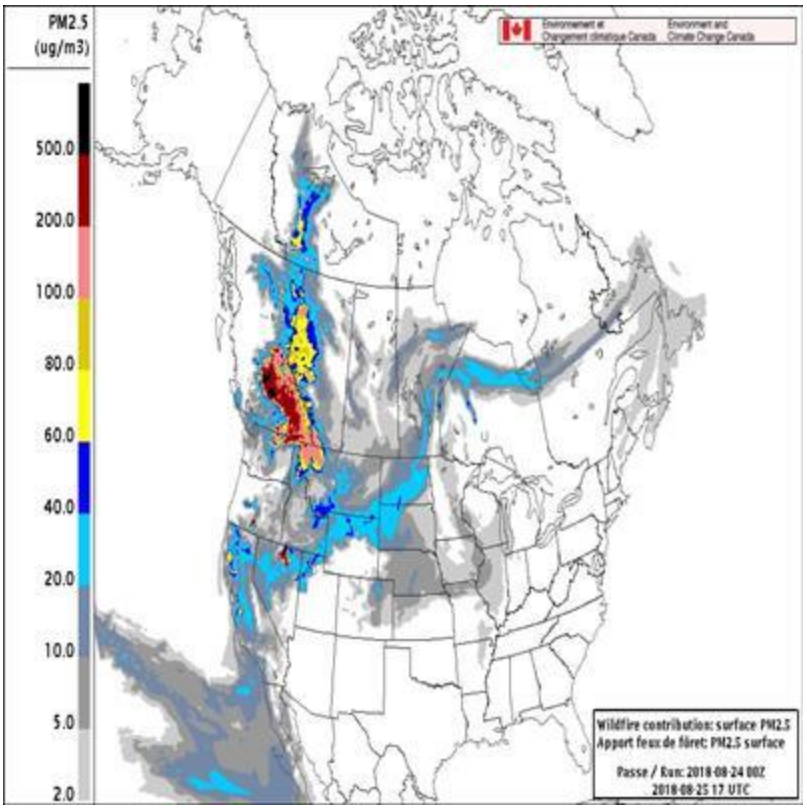
UNHEALTHY air quality is present in Northwest Montana this morning, although a small patch of clearer air is moving through the region this morning. Elsewhere, air quality is UNHEALTHY FOR SENSITIVE GROUPS from Missoula all the way to Malta, and everywhere in between. Further south, air quality is currently MODERATE. Behind the patch of clearer air is more smoke, which will move into northwest Montana this morning. Air quality in northwest Montana is expected to range from UNHEALTHY to VERY UNHEALTHY through Sunday morning. Elsewhere, air quality is expected to range from MODERATE to UNHEALTHY FOR SENSITIVE GROUPS throughout the weekend, possibly reaching UNHEALTHY levels at times. We should see improvement beginning Sunday night, with rain expected over the state on Monday.

A tiny slot of cleaner air will move through the state today, but any improvement will be brief, with more smoke moving in later today.



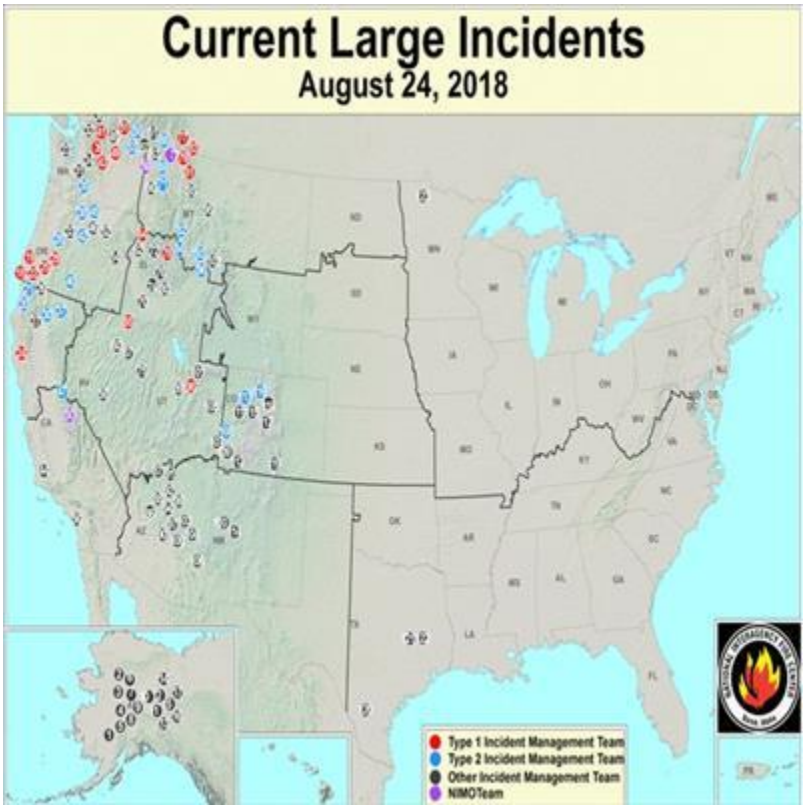
Source: CIRA and NOAA. These data are preliminary and not operational.

Smoke forecasts for tomorrow show significant smoke in NW Montana.



Source: Environment Canada

Active fire locations are shown below.



Source: USFS

Hazy skies over Flathead lake this morning, where air quality has been ranging between unhealthy for sensitive groups and unhealthy.

Source: Polson RV Resort

NOAA Text Description:

Friday, August 24, 2018

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY
THROUGH 1800Z August 24, 2018.

SMOKE:
Southern Half of Canada / Northern Half of the US... Remnant smoke blankets much of the northern U.S. and southern Canadian provinces as a result of significant wildfire activity throughout the Pacific Northwest and British Columbia. Light density smoke stretches east from the source covering Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Nova Scotia, Newfoundland, and is visible approximately half way to Greenland. Light density smoke also stretches southeast from the source covering the Intermountain West, the Central Plains, Great Lakes, Ohio River Valley, the Appalachians and continues out into the Atlantic. Moderate to very heavy remnant smoke is confined mainly to the Canadian Provinces, portions of Montana, and most of New England.
https://www.ssd.noaa.gov/PS/FIRE/DATA/SMOKE/2018H242003.html

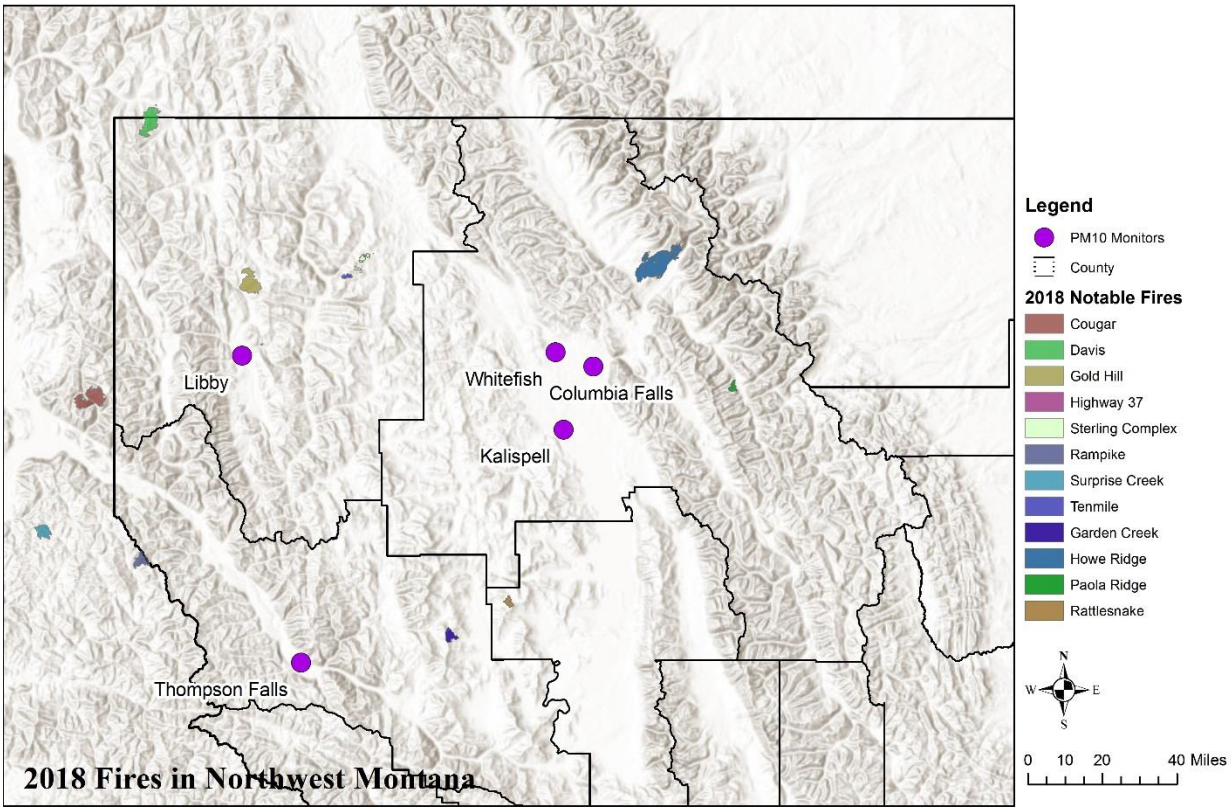
5. Not Reasonably Controllable or Preventable

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 2018 season, the fire activity in Montana played a substantial role. The location of the notable fires in relation to the PM_{10} 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 13. Northwest Montana 2018 Notable Fires.



Fire Name	Location	Total Acres	Start Date and Cause	Containment Date
Cougar	5 Miles east of East Hope ID	7,871	7/27/2019 Lightning	10/18/2018
Davis	10 miles northwest of Yaak, Montana	6,614	7/29/2018 Lightning	10/9/2018
Garden Creek	2 miles north of Hot Springs	2,052	7/29/2018 Lightning	9/4/2018
Gold Hill	Noisy Creek drainage 13 miles north of Libby, Mt.	6,602	8/11/2018 Lightning	10/9/2018
Highway 37	Libby, MT	70	7/19/2018 Human	8/16/2018
Howe Ridge	9 miles from West Glacier, MT	14, 522	8/11/2018 Lightning	10/17/2018
Paola Ridge	Essex, MT	1,111	8/11/2018 Lightning	10/17/2018
Rampike	5 Miles east of East Hope ID	7,871	7/27/2018 Lightning	10/9/2018
Rattlesnake	10 miles northeast of Hot Springs	1,374	8/30/2018 Unknown	10/4/2018
Sterling Complex	19 miles southwest of Eureka, MT	1,405	8/12/2018 Lightning	10/7/2018
Surprise Creek	South of Faset Peak in the Independence drainage	3,185	7/27/2018 Lightning	10/1/2018
Ten Mile	19 Miles south of Eureka, MT	681	7/31/2018 Lightning	9/5/2018

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 northwest Montana PM_{10} monitors in 2018 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.

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 northwest Montana PM_{10} monitor in 2018 were fires largely on wildlands with unplanned ignitions, the exceptional events are natural events.