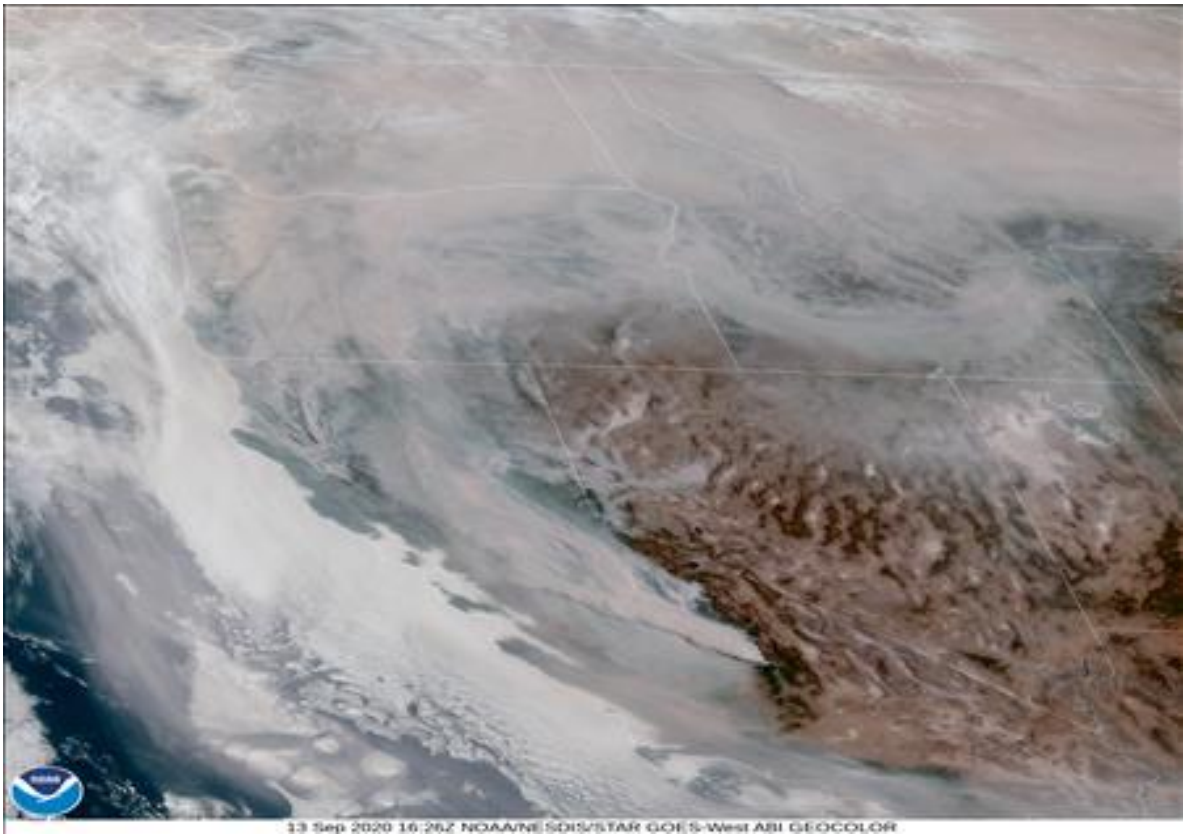
PM10 2020 Exceptional Events due to Wildfires – Whitefish and Thompson Falls



Source: [GOES Image Viewer]

Prepared by:
Montana DEQ
October 2021

DEQ
Montana Department of Environmental Quality

Contents

1. Summary

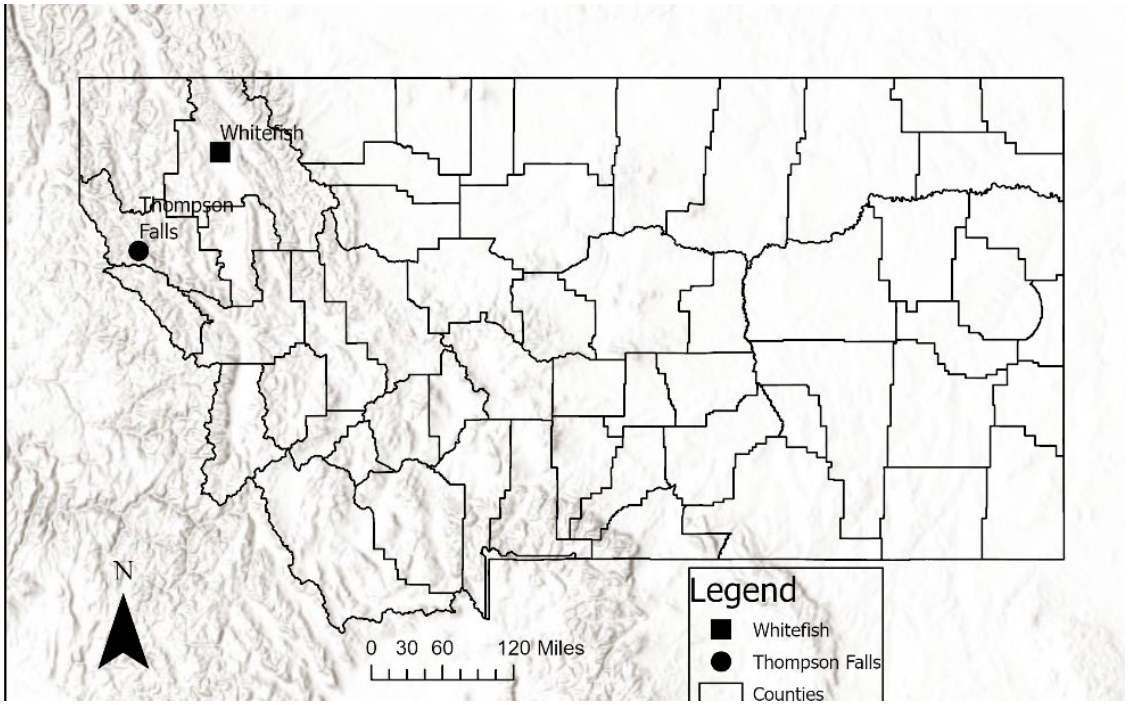
Montana's Department of Environmental Quality (DEQ) is requesting the following wildfire exceptional events in the state's PM_{10} nonattainment area be considered for concurrence. This request is due to an effort to redesignate the PM_{10} nonattainment areas in Whitefish and Thompson Falls. Wildfire 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 concentration 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 concentration demonstration required for areas with approved limited maintenance plans.

Table 1. 2020 Summary of PM_{10} Data to be Evaluated for Whitefish and Thompson Falls

Date	Site	AQS #	24-hr PM_{10} (ug/m3)
9/12/2020	**Thompson Falls**	**30-089-0007**	**168**
9/13/2020	**Thompson Falls**	**30-089-0007**	**206**
	Whitefish	**30-029-0009**	**145**
9/14/2020	**Thompson Falls**	**30-089-0007**	**185**
	Whitefish	**30-029-0009**	**172**
9/15/2020	**Thompson Falls**	**30-089-0007**	**148**
	Whitefish	**30-029-0009**	**139**
9/16/2020	**Thompson Falls**	**30-089-0007**	**103**
9/17/2020	**Thompson Falls**	**30-089-0007**	**107**
9/18/2020	**Thompson Falls**	**30-089-0007**	**99**
	Whitefish	**30-029-0009**	**100**

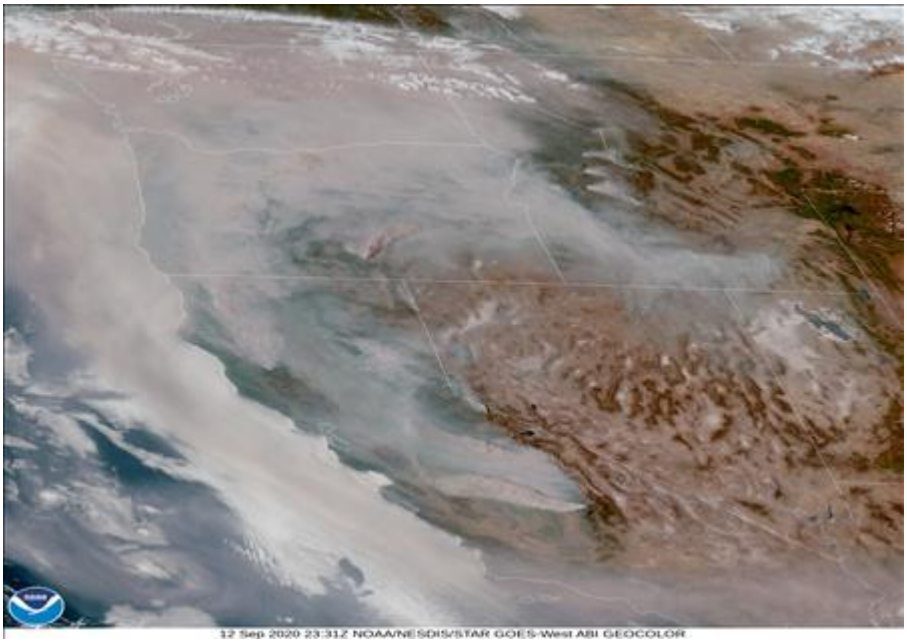
Both the locations included in this submission are located in western Montana valleys. The Whitefish monitor is the Flathead Valley, roughly 3,000 ft above sea level, with steep mountains to the east (Glacier National Park and the Swan Mountain Range) and the Salish Mountain Range to the west. Flathead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

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



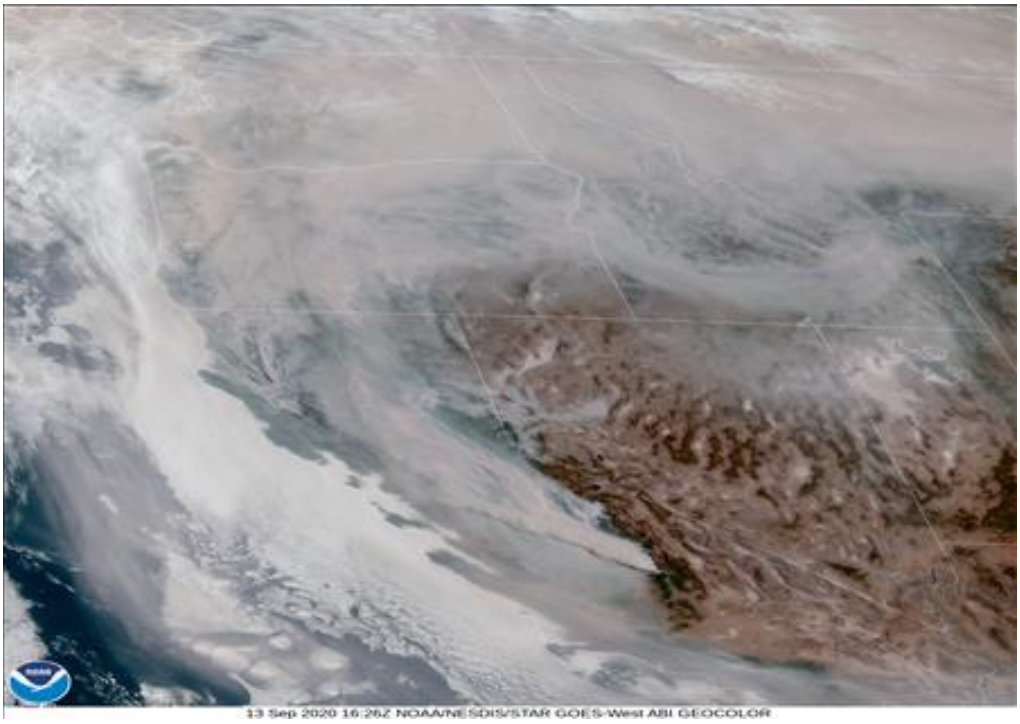
The 2020 wildfire season brought smoke into Montana from other states across the western U.S. Most notably, extremely large wildfires in Oregon and California caused smoke impacts in the Thompson Falls and Whitefish areas. Notable fires elsewhere in Montana were south and east of Thompson Falls and Whitefish, and therefore did not cause smoke impacts in these areas.

Figure 2 shows smoke from across the Western U.S. beginning to push into Northwest Montana.



Below shows the satellite on the following day, when smoke continued to impact air quality in Northwest Montana.

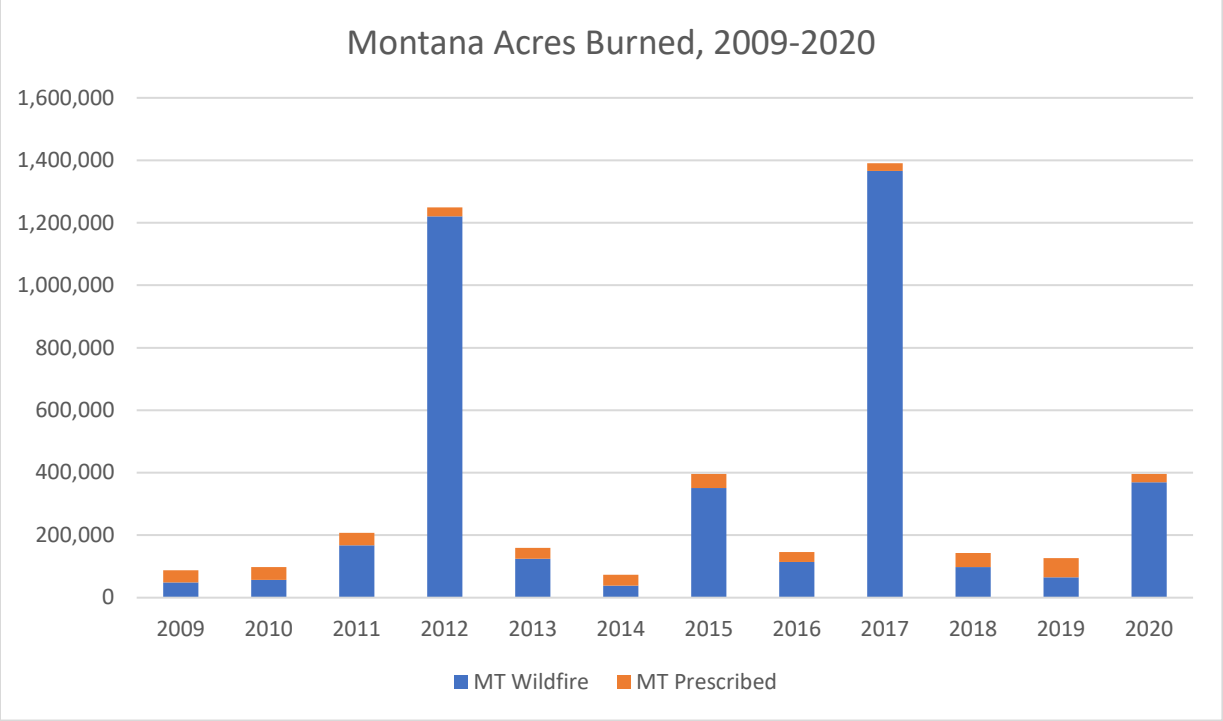
Figure 3. Smoke from Canada impacting Montana on September 13, 2020.



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. The 2020 wildfire season in Montana was more active than 2018 and 2019, but most of the fires within the state were located south and east of these two sites. Thompson Falls and Whitefish were impacted by wildfires occurring out of state, particularly in Oregon and California.

Figure 4. Acres Burned in Montana, 2009-2020



Fires across the western U.S. heavily impacted air quality values in September, with several days in which PM_{10} data exceeded the limited maintenance plan threshold (98 $\mu g/m^3$) in Thompson Falls 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 2014-2019, along with the daily average for unflagged PM_{10} data. The 2020 PM_{10} flagged days are super imposed in red to show the historical significance of the flagged days. There are flagged 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 Thompson Falls.

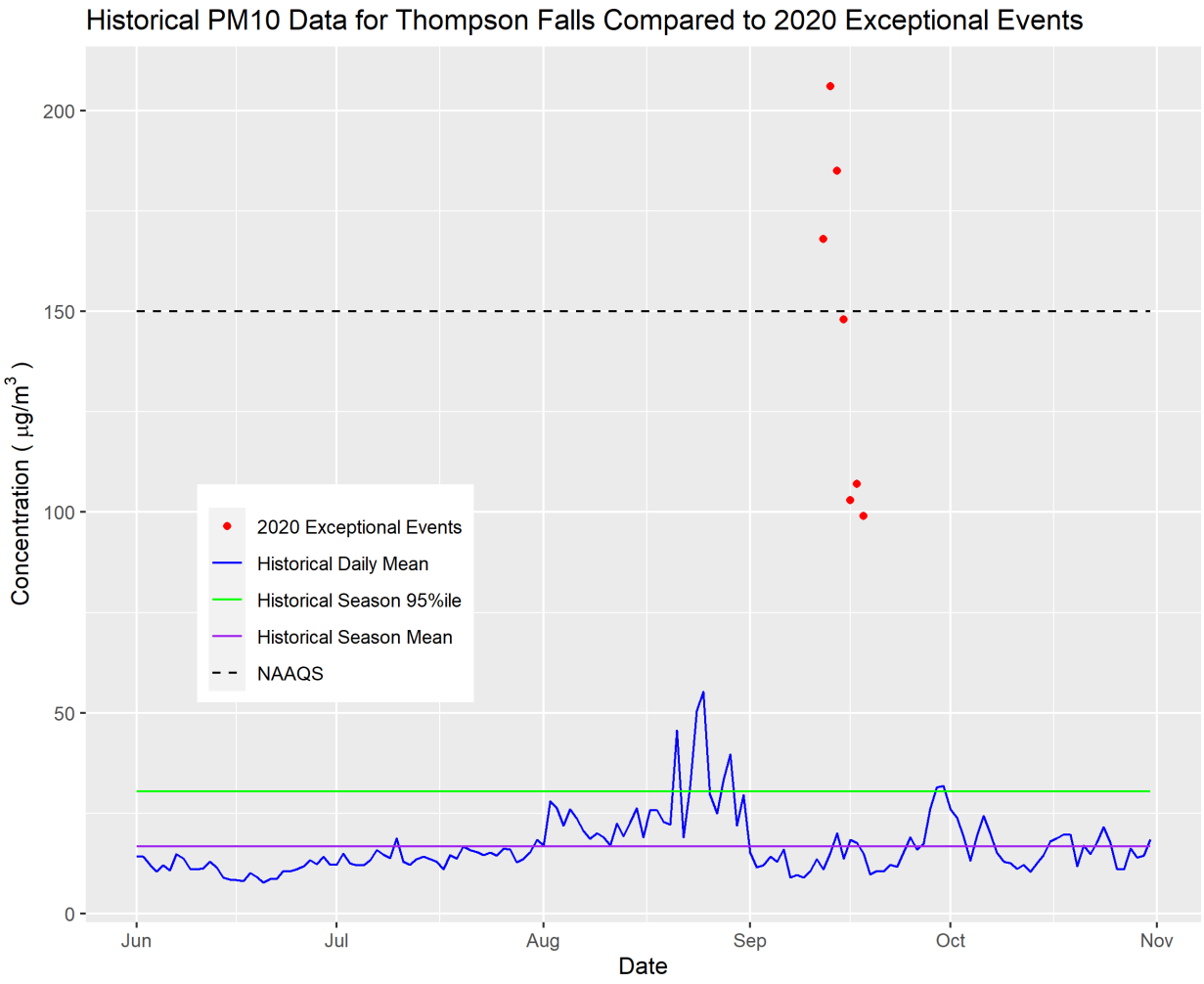
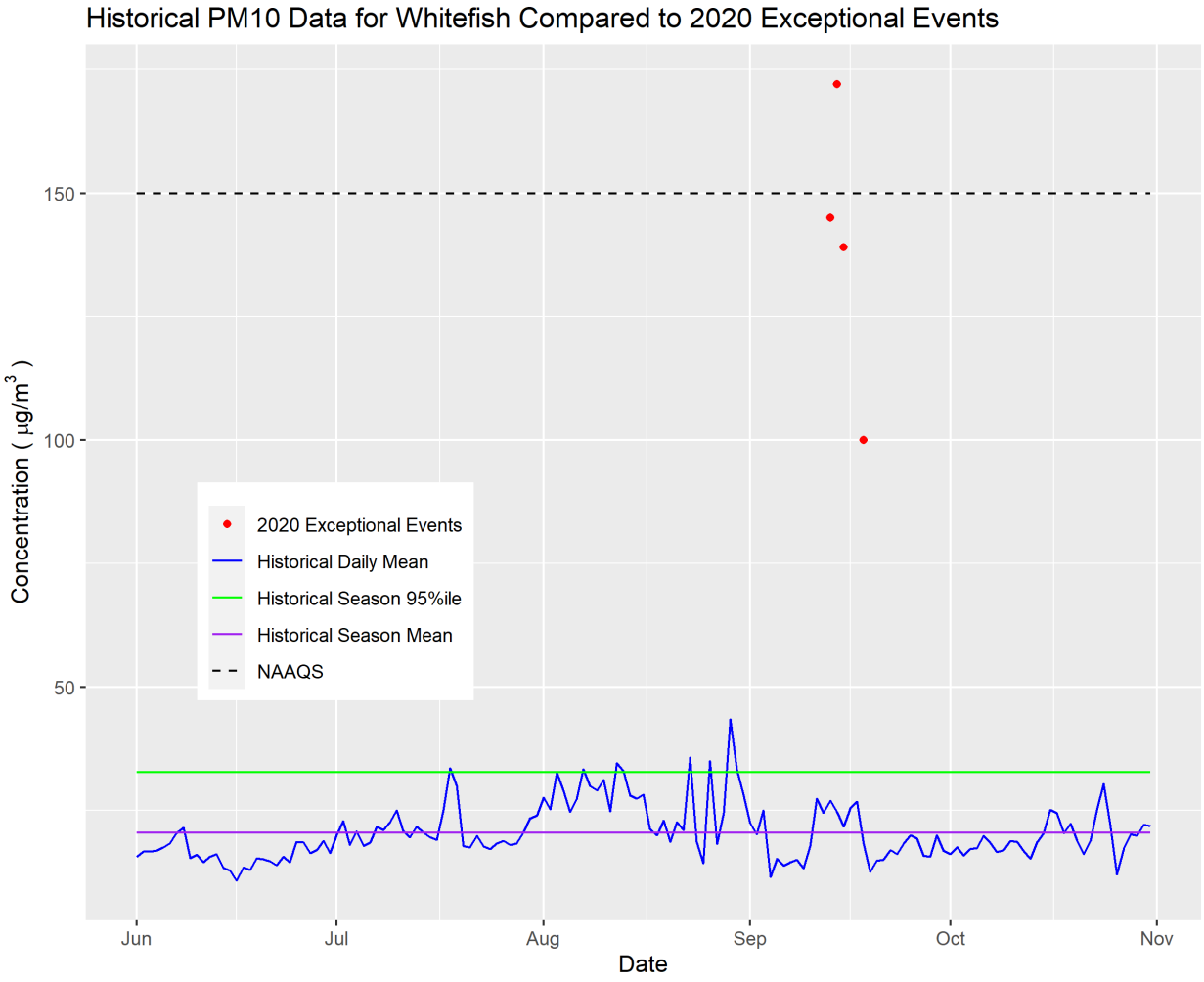


Figure 6. Historical PM_{10} Data Comparison for Whitefish.



The 2016 exceptional 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. Thompson Falls PM_{10} Exceedances per Year and Seasonal Max.

Thompson Falls					
Year	Exceedances, All Data	Max Winter (Dec-Feb)	Max Spring (Mar-May)	Max Summer (Jun-Aug)	Max Fall (Sep-Nov)
1985	0	85	57	78	89
1986	0	83	113	71	113
1987	0	128	105	54	125
1988	1	160	142	67	110
1989	2	152	136	53	219
1990	8	261	194	72	82
1991	3*	185	93	39	240*
1992	0	149	88	40	84
1993	0	107	112	28	71
1994	0	102	140	46	51
1995	0	103	47	35	66
1996	0	99	150	30	66
1997	0	89	66	31	41
1998	0	71	53	35	45
1999	0	47	63	41	25
2000	0	29	41	75	33
2001	0	26	39	39	51
2002	0	38	69	43	37
2003	0	24	21	48	33
2004	0	32	31	26	24
2005	0	21	23	20	19
2006	0	31	22	38	24
2007	0	16	72	104*	29*
2008	0	26	57	17	23
2009	0	16	18	19	23*
2010	0	20	19	19	24
2011	0	57	28	24	38*
2012	0	37	33	22	42
2013	0	32	57	21	39
2014	0	62	56	45	39
2015	0	63	54	143*	135
2016	0	72	53	135*	29
2017	3*	40	48	63*	251*
2018	0	45	60*	72*	50
2019	0	43	31	32*	43
2020	3*	26	31	34	206*

*Data flagged as exceptional events

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

Table 3. 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
2019	0	65	86	42*	64
2020	1*	103	136	45*	172*

*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 2020 flagged data are compared to 2015-2020 (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 2020 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 7. Thompson Falls Historical PM10 Data, 2015-2020

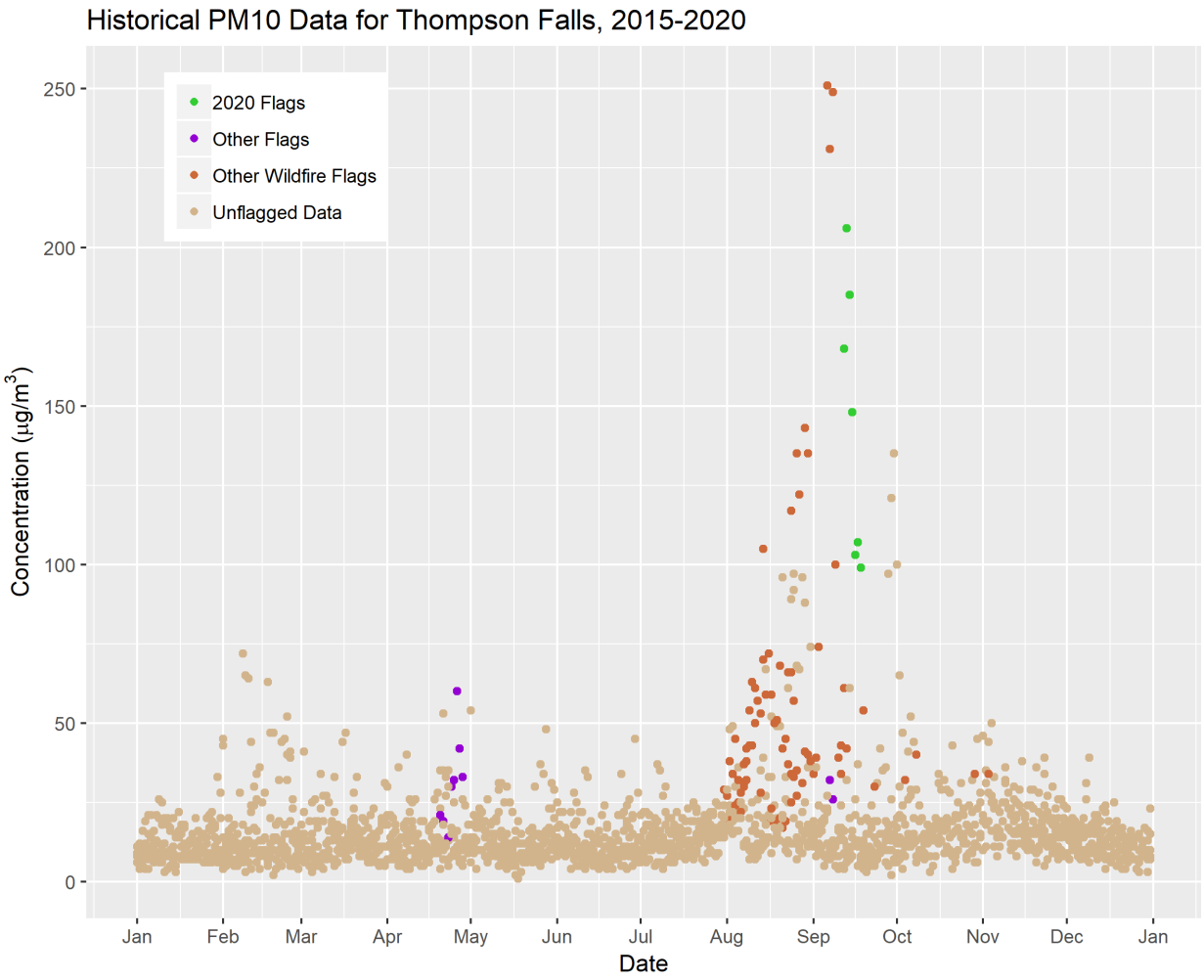
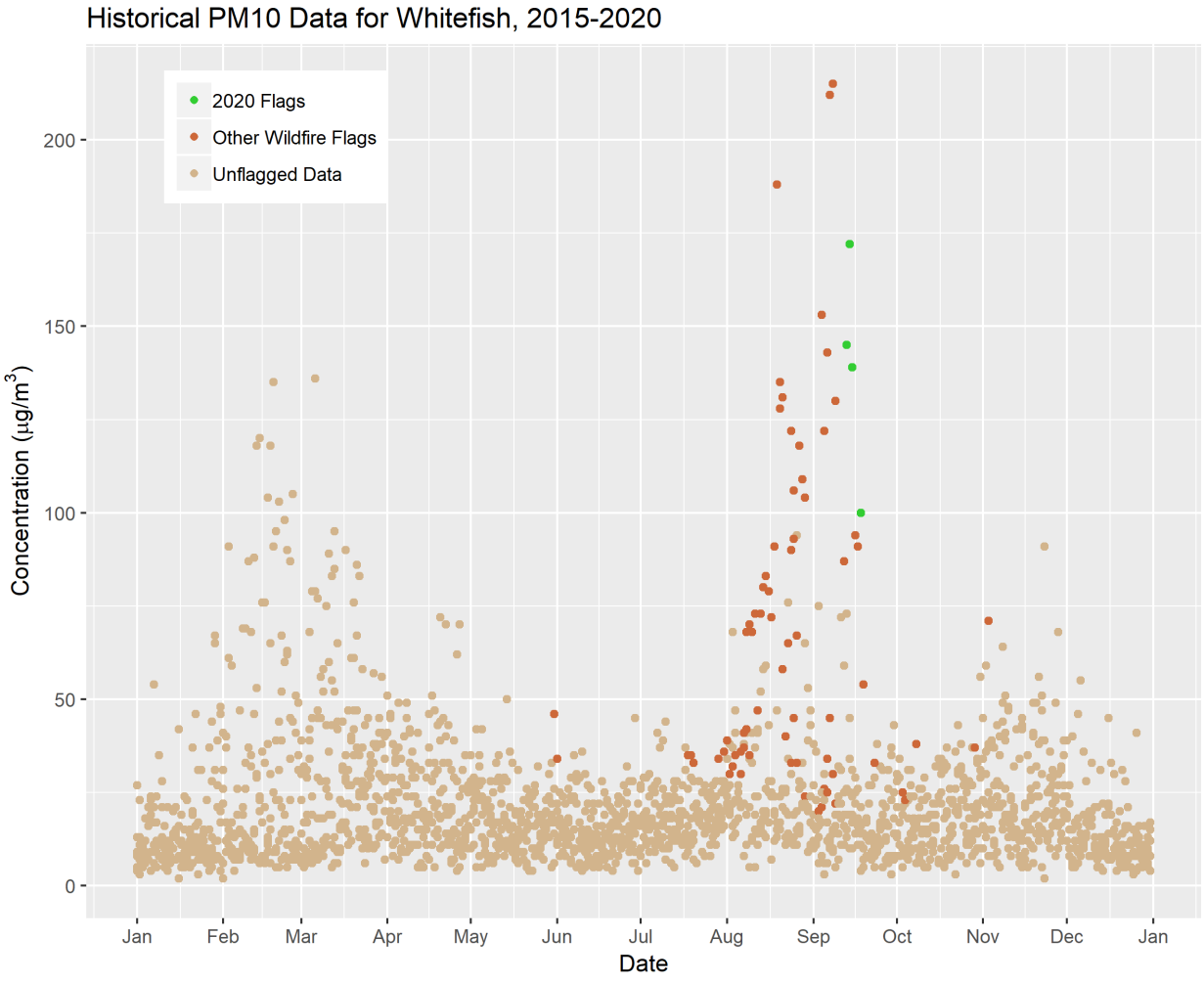


Figure 8. Whitefish Historical PM_{10} Data, 2015-2020



Summary statistics for 2015-2020 data are shown below. Statistics for the high flagged days in 2020 compared to this period are shown in Table 5. These tables are for the entire year, not just the wildfire season.

Table 4. Summary Statistics for PM_{10}, 2015-2020

Site	Count	Maximum (µg/m3)	Mean (µg/m3)	Standard Deviation (µg/m3)	95th Percentile (µg/m3)
Thompson Falls, All Data	2110	251	16.9	17.6	39.0
Thompson Falls, No Flagged Data	2013	135	14.8	10.6	31.4
Whitefish, All Data	2147	215	22.3	19.8	56.7
Whitefish, No Flagged Data	2070	136	20.5	15.3	47.0

Table 5. Statistics Characterizing 2020 Flagged Data Greater than 98 µg/m^3

Date	Site	PM10 Conc. (µg/m3)	Rank, 2015-2020	Percentile, 2015-2020
9/12/2020	Thompson Falls	168	6	99.76%
9/13/2020	Thompson Falls	206	4	99.86%
9/13/2020	Whitefish	145	6	99.77%
9/14/2020	Thompson Falls	185	5	99.81%
9/14/2020	Whitefish	172	4	99.86%
9/15/2020	Thompson Falls	148	7	99.72%
9/15/2020	Whitefish	139	8	99.67%
9/16/2020	Thompson Falls	103	17	99.24%
9/17/2020	Thompson Falls	107	15	99.34%
9/18/2020	Thompson Falls	99	20	99.10%
9/18/2020	Whitefish	100	27	98.79%

In conclusion, the comparison to historical data shows that the flagged values in 2020 were at or above the 99th percentile between 2015-2020. The concentrations seen during wildfire season are among the highest values recorded over the six years evaluated.

4. Clear Causal Relationship

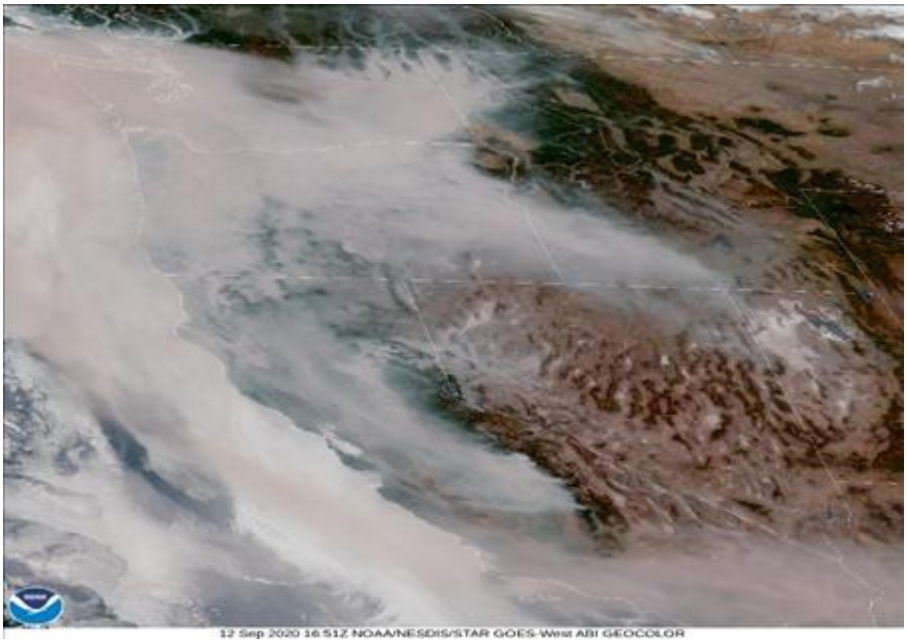
The comparison to historical data shows that the flagged data in the summer of 2018 are unseasonably high and among the highest values over a six-year period. Values that high would have been extremely unusual in the absence of smoke. For each flagged day, an assessment of the meteorology and upwind 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:
https://svc.mt.gov/deq/todaysair/smokereport/SmokeList.aspx?smokeYear=2020

Saturday, September 12, 2020

Air quality has been between GOOD and MODERATE this morning across the state. Wildfire smoke from Idaho, Washington, and Oregon has begun moving into western Montana, and will continue to push eastward throughout the state as the day goes on. The heaviest smoke will be west of the Continental Divide, but air quality will worsen throughout the day for most of the state.

Forecast

Heavy smoke has been building up on the West Coast, due to several large fires burning in Washington and Oregon. Easterly flow kept this smoke confined to our west earlier this week, but now the upper-level flow has shifted to westerly, which is beginning to push this smoke into Idaho and western Montana. Air quality will likely worsen as the weekend goes on, possibly reaching UNHEALTHY FOR SENSITIVE GROUPS in some western Montana locations.



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NOAA Text Description:

Saturday, September 12, 2020

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY
THROUGH 1746Z September 12, 2020

SMOKE:
Very Large Area from the Eastern Pacific, Western United States extending through the southwest and into the Southern Plains, northwest Gulf of Mexico and northeast towards the Upper Midwest….
The ongoing very large wildfires burning primarily in Washington, Oregon, and California were producing a very large area of moderate to high density smoke that was extending from as far east as portions of the Midwest US and then extending southwest through the Southern Plains and Southwest United States and then through the West Coast States from California north to Washington. The smoke then extended offshore into portions of the eastern and northeastern Pacific Ocean.
https://www.ssd.noaa.gov/PS/FIRE/DATA/SMOKE/2020/2020I121906.html

Sunday, September 13, 2020

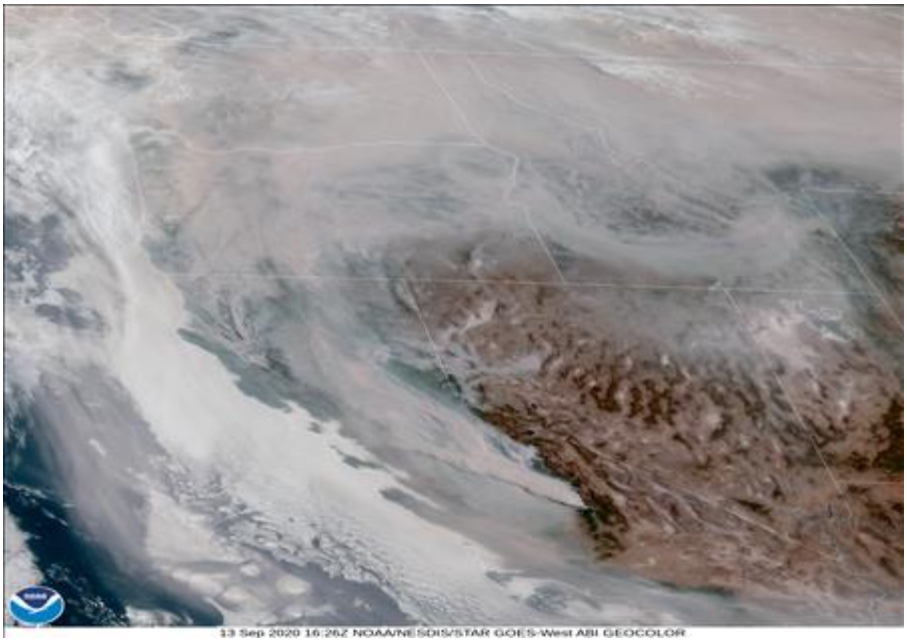
Current Conditions

Smoke has been moving into Montana from wildfires in Idaho, Washington, and Oregon. Air quality has reached HAZARDOUS in Libby, VERY UNHEALTHY in Thompson Falls, and UNHEALTHY in the Flathead Valley. Seeley Lake and Hamilton have both reported air quality levels at UNHEALTHY FOR SENSITIVE GROUPS. Other sites around the state are

reporting GOOD or MODERATE air quality, but may worsen as the day continues.

Forecast

Upper-level winds will continue to steer smoke into Montana today and Monday. A ridge of high pressure is building and moving into Montana, which will continue the same pattern of westerly flow and calm weather. In other words, it is unlikely that air quality will improve significantly today or Monday.



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NOAA Text Description:

Sunday, September 13, 2020

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY
THROUGH 1730Z September 13, 2020

SMOKE:
Central and Western U.S./Pacific Ocean...
Ongoing large wildfire complexes in California, Oregon, and Washington continue to produce a very large plume that covers much of the central and western U.S. and the eastern Pacific Ocean. A light to moderate density plume extends from the Dakotas to the Great Lakes. Another light to moderate density plume covers Oklahoma northeastward to the Ohio Valley. The densest plumes over the western U.S. extend from the Northern Rockies to the Pacific Northwest, then southeastward through Oregon and California, then eastward over Arizona, New Mexico, and the Texas Panhandle. A plume ranging from light to heavy density is

entrained into an upper level low pressure system over the northeastern Pacific Ocean. A light to moderate density plume extends southwest off the southern coast of California southwestward into the tropical Pacific east of Hawaii.
https://www.ssd.noaa.gov/PS/FIRE/DATA/SMOKE/2020/2020I131825.html

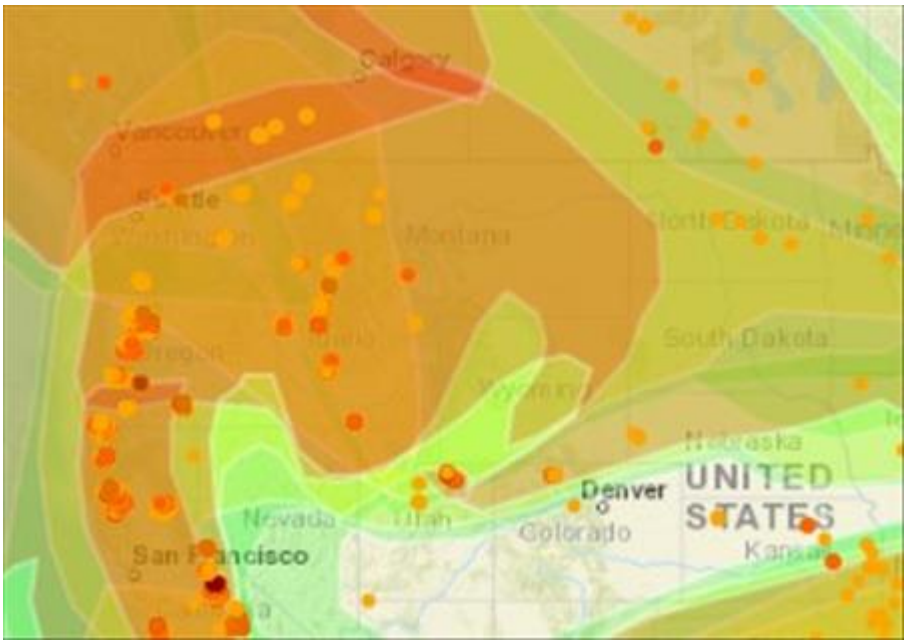
Monday, September 14, 2020

Current Conditions

An AIR QUALITY ALERT has been issued for Beaverhead, Broadwater, Cascade, Deer Lodge, Fergus, Flathead, Gallatin, Granite, Jefferson, Judith Basin, Lake, Lewis and Clark, Lincoln, Madison, Meagher, Mineral, Missoula, Park, Powell, Ravalli, Sanders, Silver Bow, Teton Counties until 9am MDT Tuesday due to elevated particulate concentrations. Air quality in Libby is currently HAZARDOUS. Air quality in Thompson Falls is VERY UNHEALTHY. Air quality in the Flathead Valley, Seeley Lake, Frenchtown, Missoula, Hamilton, Butte, Dillon, Bozeman, Great Falls, and Lewistown is UNHEALTHY. Air quality in Helena and West Yellowstone is UNHEALTHY FOR SENSITIVE GROUPS.

Forecast

Westerly flow has brought smoke in from neighboring states, and this flow pattern is expected to continue. Today, air quality will likely worsen as smoke continues to push eastward through the state.



NOAA OSPO SMOKE

NOAA Text Description:

Monday, September 14, 2020

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY
THROUGH 1730z September 14, 2020

SMOKE:
U.S./Southern Canada/Pacific...
Large wildfire complexes in Oregon and California continue to spread a very large area of smoke across the much of the U.S. and parts of southern Canada. A thin density plume is found extending from Newfoundland southwestward to New England, the Ohio/Tennessee Valley, and Kansas/Oklahoma. A moderate density plume is located over the Great Lakes, the Upper Mississippi Valley, the Northern Plains, the Northern Rockies, and a large part of British Columbia, Alberta, Saskatchewan, Manitoba, and Ontario. Over the southern Rockies, Desert Southwest, northwestern Mexico, and into the subtropical Pacific extending several hundred miles offshore, a light to moderate density plume is detected. Over the northeastern Pacific, a light to moderate density plume is entrained into a low pressure system. The thickest plume is found extending from southwestern Manitoba westward to southeastern British Columbia, and continuing over eastern Washington, western Idaho, most of Oregon, a large part of California, and northwestern Nevada.
https://www.ssd.noaa.gov/PS/FIRE/DATA/SMOKE/2020/2020I141841.html

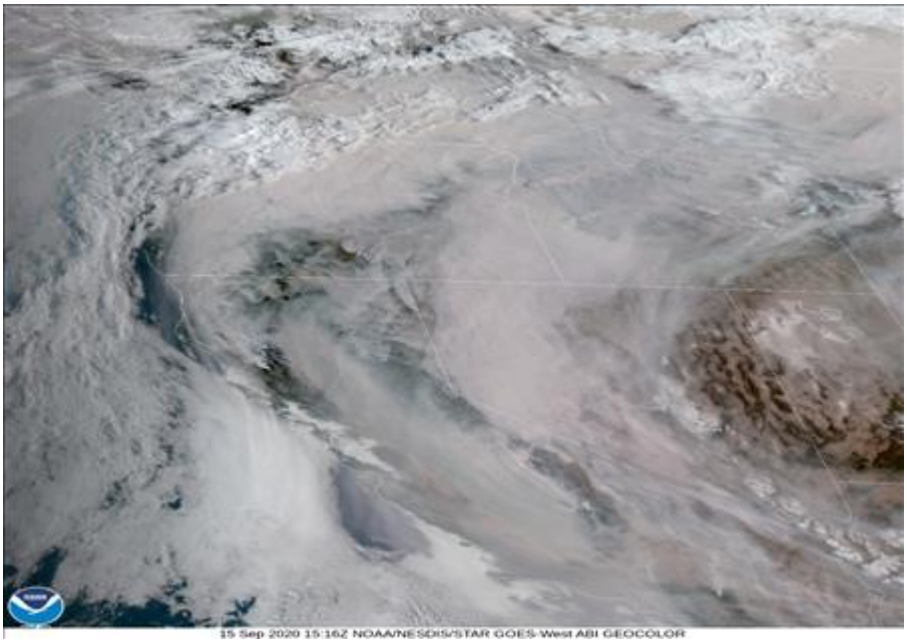
Tuesday, September 15, 2020

Current Conditions

An AIR QUALITY ALERT has been issued for Beaverhead, Broadwater, Deer Lodge, Fergus, Flathead, Granite, Jefferson, Judith Basin, Lake, Lewis and Clark, Lincoln, Madison, Meagher, Mineral, Missoula, Powell, Ravalli, Sanders and Silver Bow Counties until 9am MDT Thursday due to elevated particulate concentrations. Air quality in Libby is currently VERY UNHEALTHY Air quality in Thompson Falls, Flathead Valley, Seeley Lake, Frenchtown, Missoula, Hamilton, Helena, and Lewistown is UNHEALTHY. Air quality in Butte, Billings, and Broadus UNHEALTHY FOR SENSITIVE GROUPS.

Forecast

Montana remains under a westerly flow pattern, while a ridge of high pressure builds to our west. This high-pressure system will inhibit mixing, which could trap smoke in place. The next weather system that may usher in some changes will begin moving into Montana Friday. This may bring some slight improvements to air quality, although smoke may not totally clear out.



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NOAA Text Description:

Tuesday, September 15, 2020

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY
THROUGH 1700Z September 15, 2020

SMOKE:
Eastern Pacific/Lower 48/Southern Canada/Northwestern Mexico/Atlantic East of the Mid-Atlantic and Northeastern U.S…
The ongoing large wildfires burning in the Western U.S. was responsible for a continuing extremely big area of smoke which covers portions of the eastern Pacific and much of the lower 48 with the exception of the far Southern and Southeastern U.S. from central and southern Texas eastward to Georgia and Florida. Also, a small sliver of western Washington may be relatively smoke free. The huge mass of smoke also covers southern Canada and offshore of the Mid-Atlantic and Northeastern U.S. and east of the Canadian Maritimes, along with northwestern Mexico. Thick smoke covered an unusually large region stretching from off the Pacific Northwest coast and off the coast of California and Baja eastward and inland over much of the Western U.S. with the thicker smoke also appearing over much of the northern half of the U.S. and southern Canada.
https://www.ssd.noaa.gov/PS/FIRE/DATA/SMOKE/2020/2020I151714.html

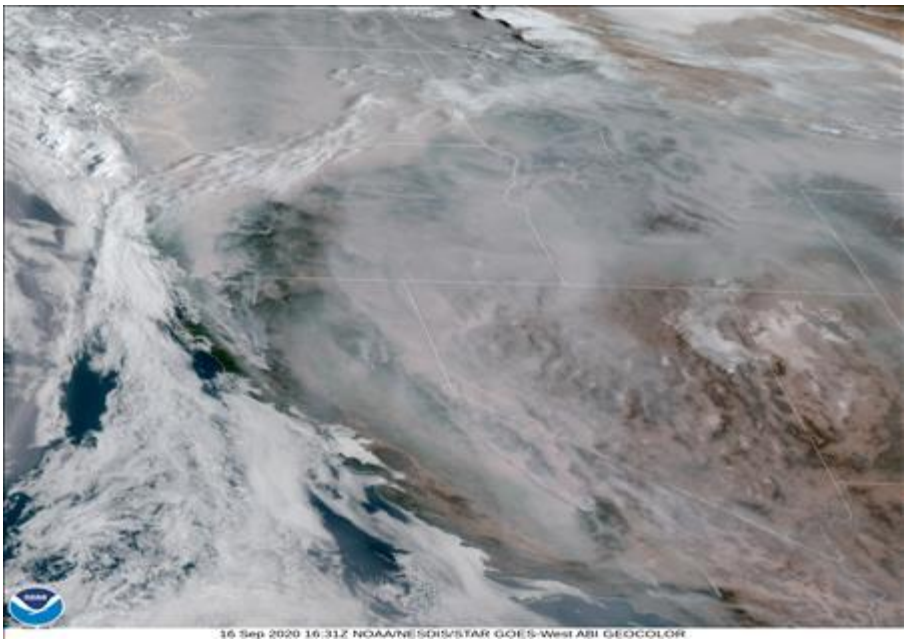
Wednesday, September 16, 2020

Current Conditions

An AIR QUALITY ALERT is still in effect for Beaverhead, Broadwater, Deer Lodge, Flathead, Granite, Lake, Lincoln, Madison, Mineral, Missoula, Powell, Ravalli, Sanders and Silver Bow Counties until 9am MDT Thursday due to elevated particulate concentrations. Air quality in Bozeman, Butte, Dillon, Frenchtown, Hamilton, Libby, Missoula, Seeley Lake, and Thompson Falls is currently UNHEALTHY. While air quality has actually improved in northwest Montana, it still remains above the level for an air quality alert.

Forecast

Western Montana is under a ridge of high pressure, which will inhibit the mixing out of smoke. Air quality concentrations will likely remain high until the next weather system moves through. A low-pressure system is on track to arrive this weekend, which will bring some much-needed rainfall. This system will help to clear out some of the lingering wildfire smoke.



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NOAA Text Description:

Wednesday, September 16, 2020

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY
THROUGH 0200Z September 16, 2020

SMOKE:
Eastern Pacific/Much of Lower 48/Northwestern Mexico/Southern Canada/Atlantic off the Mid-Atlantic, Northeast, and Canadian Maritimes…
More exceptionally widespread smoke from the ongoing large wildfires

in the Western U.S. continued to be visible across portions of the eastern Pacific, much of the lower 48 (with the exception of the region from eastern Texas to South Carolina, Georgia, and Florida), southern Canada, northwestern Mexico, and over the Atlantic off the coast of the Mid-Atlantic, the Northeast, and the Canadian Maritimes. Thicker smoke covered an unusually large area including virtually all of the Western U.S. though it gradually thinned out to moderate density over portions of the Southwest. Thicker smoke also extended east over roughly the northern half of the lower 48, southwestern and southeastern Canada, to off the coast of the Mid-Atlantic, Northeast, and Canadian Maritimes where it became entrained into the circulation of the former tropical system named Paulette.
https://www.ssd.noaa.gov/PS/FIRE/DATA/SMOKE/2020/2020I161727.html

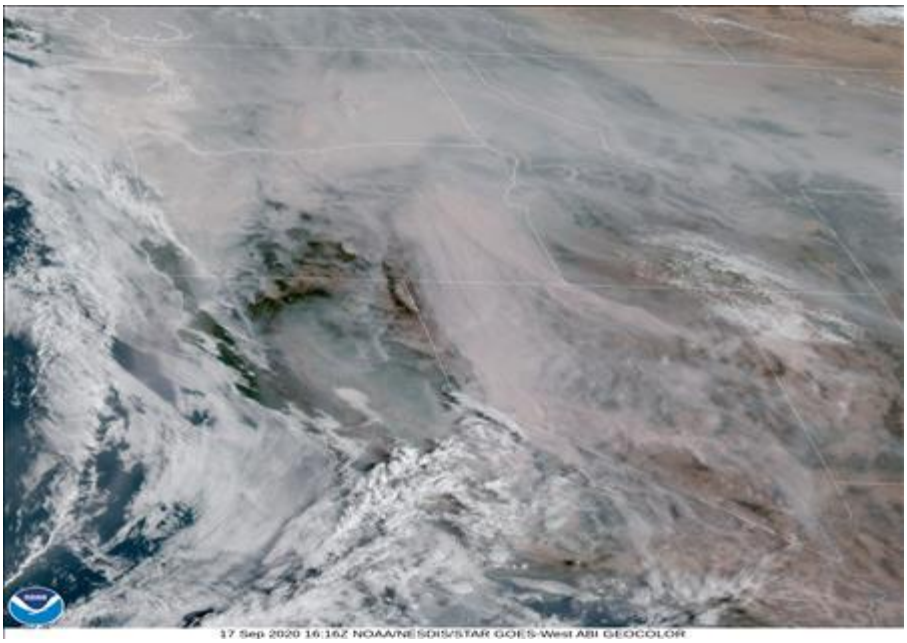
Thursday, September 17, 2020

Current Conditions

An AIR QUALITY ALERT is still in effect for Beaverhead, Big Horn, Broadwater, Carbon, Carter, Cascade, Custer, Deer Lodge, Fallon, Fergus, Flathead, Gallatin, Glacier, Golden Valley, Granite, Jefferson, Judith Basin, Lake, Lewis and Clark, Lincoln, Madison, Meagher, Mineral, Missoula, Mussleshell, Park, Petroleum, Pondera, Powder River, Powell, Ravalli, Rosebud, Sanders, Silver Bow, Stillwater, Sweetgrass, Teton, Wheatland, and Yellowstone Counties until 9am MDT Friday due to elevated particulate concentrations. Air quality in Bozeman, Butte, Dillon, Flathead Valley, Frenchtown, Hamilton, Helena, Libby, Missoula, Seeley Lake, and Thompson Falls is currently UNHEALTHY. Air quality in Billings, Birney, Broadus, Great Falls, and West Yellowstone is currently UNHEALTHY FOR SENSITIVE GROUPS. Another update will be posted at 9 AM MDT Friday.

Forecast

Improvements in air quality are not expected today due to the continued upper-level ridge pattern over Montana. However, a low-pressure system currently located off the West Coast will begin pushing inland, breaking down this high-pressure ridge. Precipitation and wind will help to clear out some of the smoke, so air quality may improve slightly on Saturday and Sunday.



GOES Image Viewer

NOAA Text Description:

Thursday, September 17, 2020

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY
THROUGH 1700Z September 17, 2020

SMOKE:
Huge Region Including the Eastern Pacific/Most of the Lower 48, Southwestern Canada/Northern Mexico/the Atlantic East of the Mid-Atlantic Region, the Northeast, and the Canadian Maritimes…
The large Western U.S. wildfires continued to burn and emit copious amounts of smoke this morning. The result of these fires burning for many days continues to be an expansive mass of smoke over portions of the eastern Pacific and extending inland over much of the lower 48, southwestern and far south central Canada, northern Mexico, and the Atlantic east of the Mid-Atlantic region, the Northeast, and the Canadian Maritimes. The only relatively smoke free areas included much of the Southeastern U.S., far southern Texas, and the U.P. of Michigan along with the far northern portions of lower Michigan, Wisconsin, and northeastern Minnesota. Dense smoke blanketed virtually all of the Western U.S. with the exception of relatively thinner smoke over the Southwestern U.S. The dense smoke also was present over Southwestern Canada and extended eastward from that region and the Western U.S. across the northern and central Rockies to the Northern and Central Plains. From there, the smoke spread eastward over the rest of the Central U.S. before curving a bit more to the northeast over the Ohio Valley and Northeast and over far southeastern Canada before passing over the Atlantic east

of the Canadian Maritimes and south of Greenland.
https://www.ssd.noaa.gov/PS/FIRE/DATA/SMOKE/2020/2020I171722.html

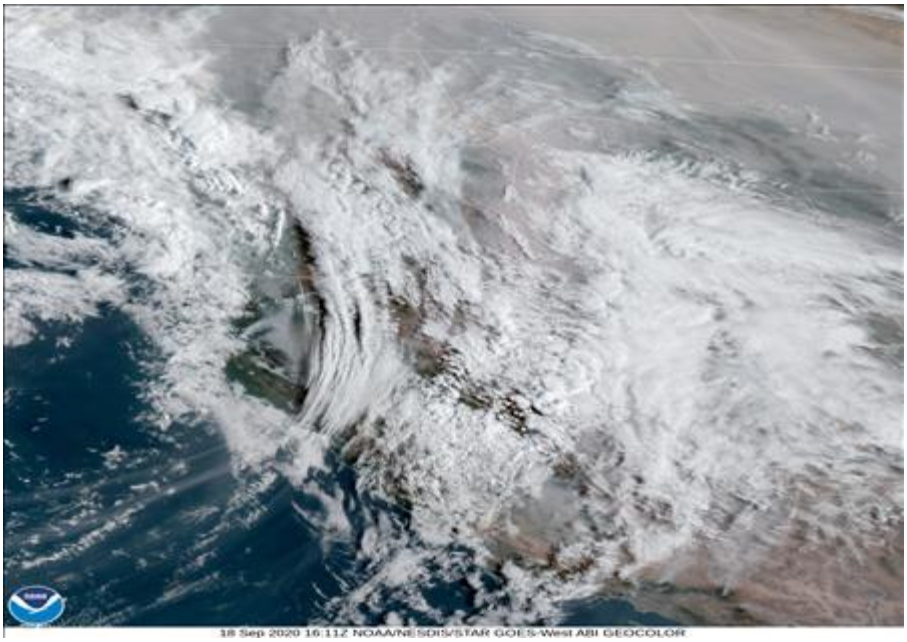
Friday, September 18, 2020

Current Conditions

An AIR QUALITY ALERT is in effect for Beaverhead, Broadwater, Cascade, Deer Lodge, Flathead, Gallatin, Glacier, Granite, Jefferson, Lewis and Clark, Lincoln, Madison, Meagher, Mineral, Missoula, Park, Pondera, Powell, Ravalli, Sanders, Silver Bow, and Teton counties until 4pm MDT Friday due to elevated particulate concentrations. Air quality in Butte, Hamilton, Missoula, Frenchtown, Seeley Lake, Thompson Falls, Flathead Valley, Libby is currently UNHEALTHY. Air quality in Broadus, Lewistown, Great Falls, Helena, Bozeman, Dillon is currently UNHEALTHY FOR SENSITIVE GROUPS.

Forecast

A strong low-pressure system is moving inland from the Pacific, and heading towards Montana. This low will arrive in western Montana late tonight and continue to push east through the state on Saturday. This will bring showers and better dispersion, which will help to improve air quality. Sunday will be the day with the best air quality conditions across the state, before another upper-level ridge builds over the region, bringing more stagnant conditions.



GOES Image Viewer

NOAA Text Description:

Friday, September 18, 2020

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY
THROUGH 1615Z September 18, 2020

SMOKE:
U.S./Central-Southern Canada/Northern Mexico/Eastern Pacific…
Smoke from wildfires in western U.S. continue to cover the majority of the Conterminous U.S. west of the Appalachian Mountains, extending further to the north into central-southern Canada, to the south over northern Mexico and to the west over the eastern Pacific. Areas of heavier density smoke can be found over Oregon, Washington, central-southern British Columbia, southern Alberta, Montana, eastern Wyoming, southwestern South Dakota, Nebraska, Kansas, Oklahoma, southern Missouri and northern Arkansas. Areas of moderate density smoke extend outward from the heavy density smoke for approximately 200 miles, whereas light smoke covers most of the southwestern U.S. and northern Mexico. A second large plume which got detached from the main plume above as tropical storm Sally moved up the eastern U.S. is seen traveling eastward across the northern Atlantic.

https://www.ssd.noaa.gov/PS/FIRE/DATA/SMOKE/2020/2020I181614.html

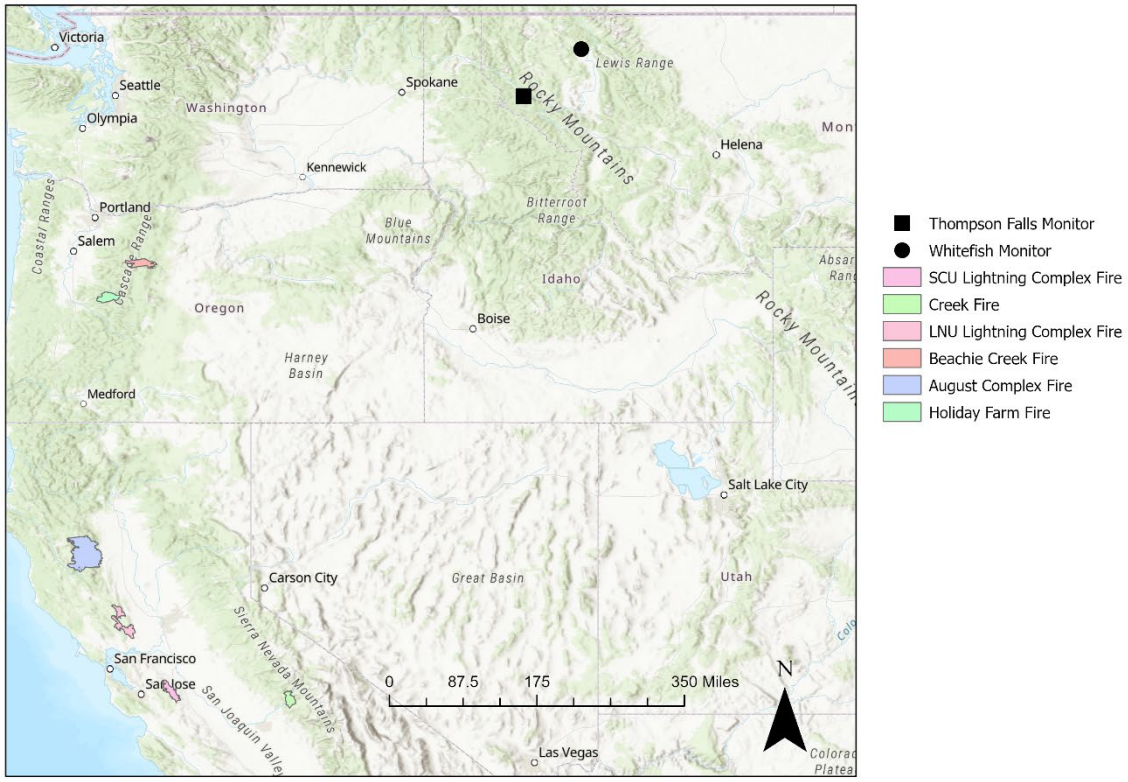
5. Not Reasonably Controllable or Preventable

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.*

Thompson Falls and Whitefish were heavily impacted by smoke from wildfires in Oregon and California during the 2020 wildfire season. Smoke from massive wildfires on the West Coast billowed into northwest Montana, causing air quality impacts for days. In California, wildfires burned over 4 million acres of land; in Oregon, over 1 million acres were burned. The location of the notable fires in relation to Montana's 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. 2020 Notable Fires.



Fire Name	Location	Total Acres	Start Date and Cause	Containment Date
Holiday Farm	Along Highway 126 west of McKenzie Bridge to Vida, Oregon	173,175	9/7/2020, Unknown	10/31/2020
August Complex	Mendocino, Shasta-Trinity and Six Rivers National Forests	1,032,648	8/17/2020, Lightning	11/15/2020

Fire Name	Location	Total Acres	Start Date and Cause	Containment Date
Beachie Creek	2 miles South of Jawbone Flats	193,573	8/16/2020, Unknown	10/31/2020
Lionshead	Lions Head Canyon	204,496	8/16/2020, Lightning	10/31/2020
Creek	Big Creek, Huntington Lake, Shaver Lake, Mammoth Pool, San Joaquin River Canyon	379,895	9/4/2020, Unknown	12/31/2020
SCU Lightning Complex	Santa Clara, Alameda, Contra Costa, San Joaquin, Merced, and Stanislaus Counties, CA	396,624	8/18/2020, Lightning	10/1/2020
LNU Lightning Complex	Colusa, Lake, Napa, Sonoma, Solano, and Yolo Counties, CA	363,220	8/17/2020, Lightning	10/2/2020

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 2020 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 2020 were fires largely on wildlands with unplanned ignitions, the exceptional events are natural events.