

Demonstration to Justify Data Exclusion of Data Influenced by Exceptional Events

Date of Event:
September 5, 2007

Mecklenburg County LUESA Air Quality
700 North Tryon Street
Suite 205
Charlotte, NC 28202

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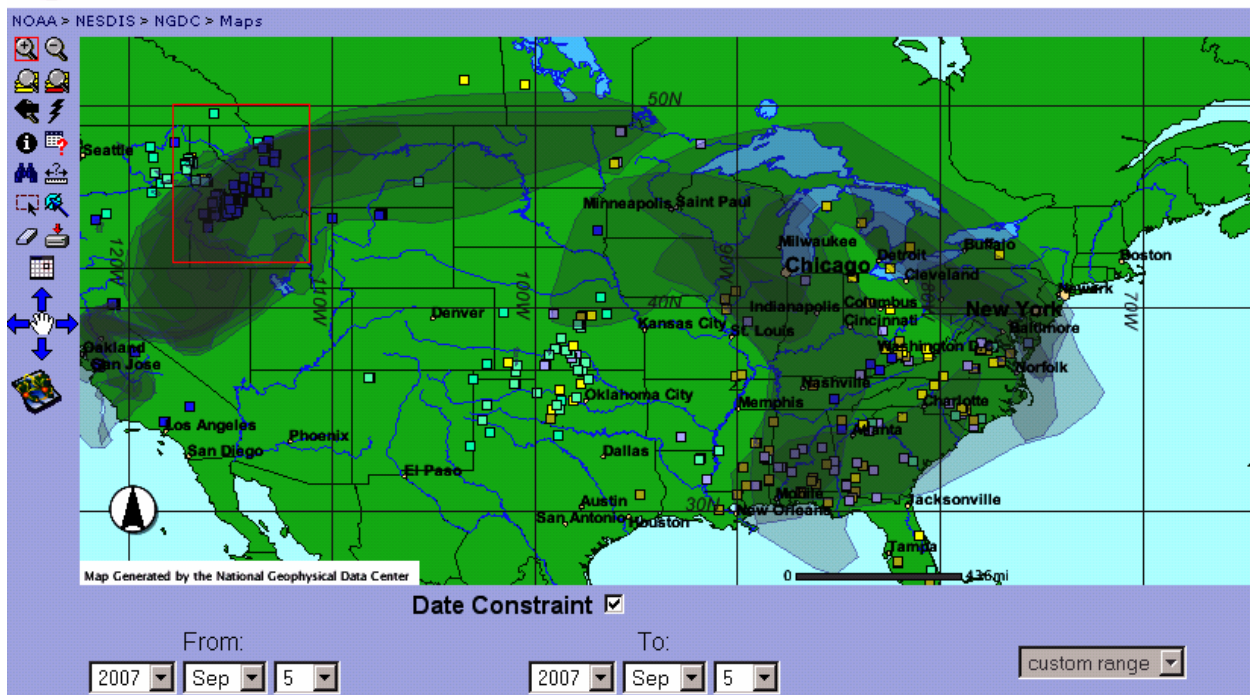
1.0 Background

The following analysis provides evidence to document an exceptional event associated with PM_{2.5} measurements that exceeded the 24 hour National Ambient Air Quality Standard (NAAQS). These concentrations were measured in the Mecklenburg County (MCAQ), North Carolina ambient air monitoring network.

Large forest fires burning in Idaho, Montana, and Canada (primarily Idaho and Montana) bounded by a rectangle drawn at Lat: 44.00 N, Lon: -112.00 W and Lat: 50N, Lon: -117.5 W and centered at Lat: 47 N, Lon: -114.75 W, produced emissions which were transported east and resulted in high PM_{2.5} readings on September 5, 2007 in Mecklenburg County, North Carolina. The high readings resulted in exceedances of the 24-hour PM NAAQS at sites 37-119-0041 and 37-119-0043. The data are listed below:

Site:	37-119-0041	37-119-0043
Parameter:	88101	88101
Sampler:	R-P 2025	R-P 2025
	Sequential	Sequential
Interval:	24 hr	24 hr
September 5, 2007-	36.6 µg/m3	37.2 µg/m3

This data has been flagged in AQS with an E-Forest Fire (e) validity flag.



NOAA Satellite and Information Service, Analyzed Smoke – September 5, 2007¹
Figure 1.

This demonstration is submitted for EPA concurrence or non-concurrence as indicated by 40 CFR Part 50 § 50.14 - Treatment of Air Quality Monitoring Data Influenced by Exceptional Events.

2.0 Definition of an Exceptional Event

An exceptional event as defined by 40CFR Part 50 § 50.1 is “an event that affects air quality, is not reasonably controllable or preventable, is an event caused by human activity that is unlikely to recur at a particular location or a natural event, and is determined by the Administrator in accordance with 40 CFR 50.14 to be an exceptional event.”

3.0 Evidence Event Occurred

3.1 Location of Event

The event consists of multiple large forest fires. The forest fires occurred primarily in Idaho, Montana, and in Canada near the intersection of the borders of Idaho, Montana, and Canada. Figure 2 displays a portion of the areas burned between July 26, 2007 and September 5, 2007 in the southern area of the event.

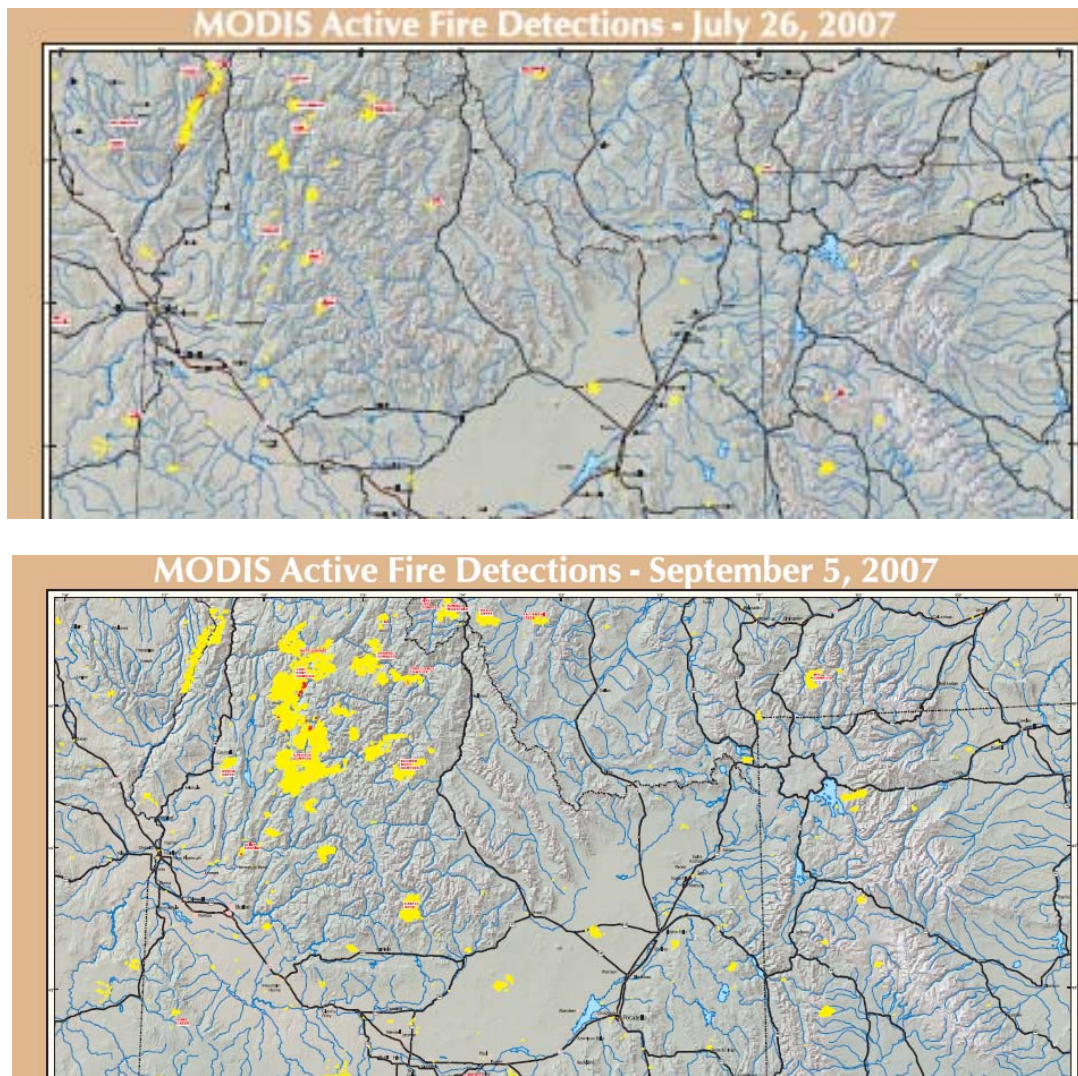


Figure 2. MODIS Active Fire Detection July 26, 2007² and September 5, 2007 Southern Idaho.

3.2 National Oceanic and Atmospheric Administration's National Environmental Satellite, Data, and Information Service (NESDIS)⁴ Information

Listed below is the National Oceanic and Atmospheric Administration's National Environmental Satellite, Data, and Information Service (NESDIS) report from September 4, 2007 through September 5, 2007. The report has been edited to provide data specific to this event.

Tuesday, September 04, 2007

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY

THROUGH 0143Z September 05, 2007

"...Idaho/Montana/North Dakota/southern Saskatchewan/southern Manitoba/Minnesota/the east coast states/the Middle Plains:
The outrageous fires in central Idaho and western Montana are still producing very dense plumes of smoke that are moving east northeasterly and the densest portion of the smoke has covered central Idaho and western half of Montana. The residual smoke from both this morning's burning and yesterday's has covered the area ranges from central Montana to just east of Great Lakes and southern Manitoba. **The several days' residual smoke formed a large area of thin smoke which has covered the east coast states from New Jersey at north all the way south to northern Florida.** Some of the residual smoke has brought to Middle Plains by a weather system...
Virginia:
Three fires in Louisa and Albemarle are producing thin plumes of smoke that are moving southward..."

Zhong

Wednesday, September 05, 2007

DESCRIPTIVE TEXT NARRATIVE FOR SMOKE/DUST OBSERVED IN SATELLITE IMAGERY

THROUGH 1545Z September 05, 2007

"...Atlantic Ocean/Delmarva/E VA/E NC/SC/GA:
Thin smoke and haze from the ID/MT fires over the past week or so can still be traced (particularly over water) from 36N68W in a 1.5 degree wide line to Cape Hatteras, NC and is slowly drifting south. The area fans out a bit as it nears the coastline to cover portions of the Delmarva from DE south and the Norfolk,VA vicinity of E VA. Haze with some embedded smoke can be seen over the low piedmont areas of NC/SC/ and N GA..."

Gallina

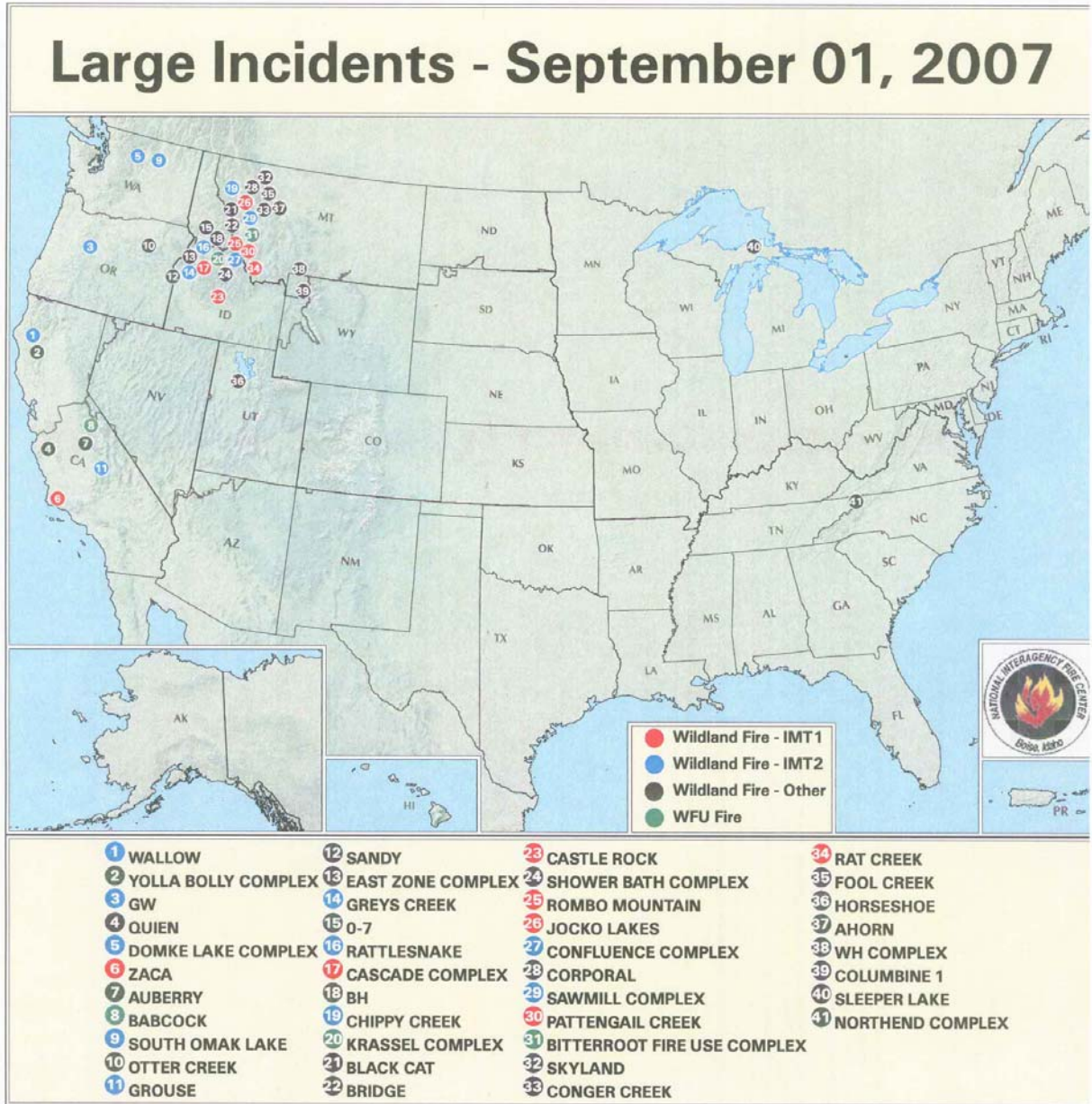
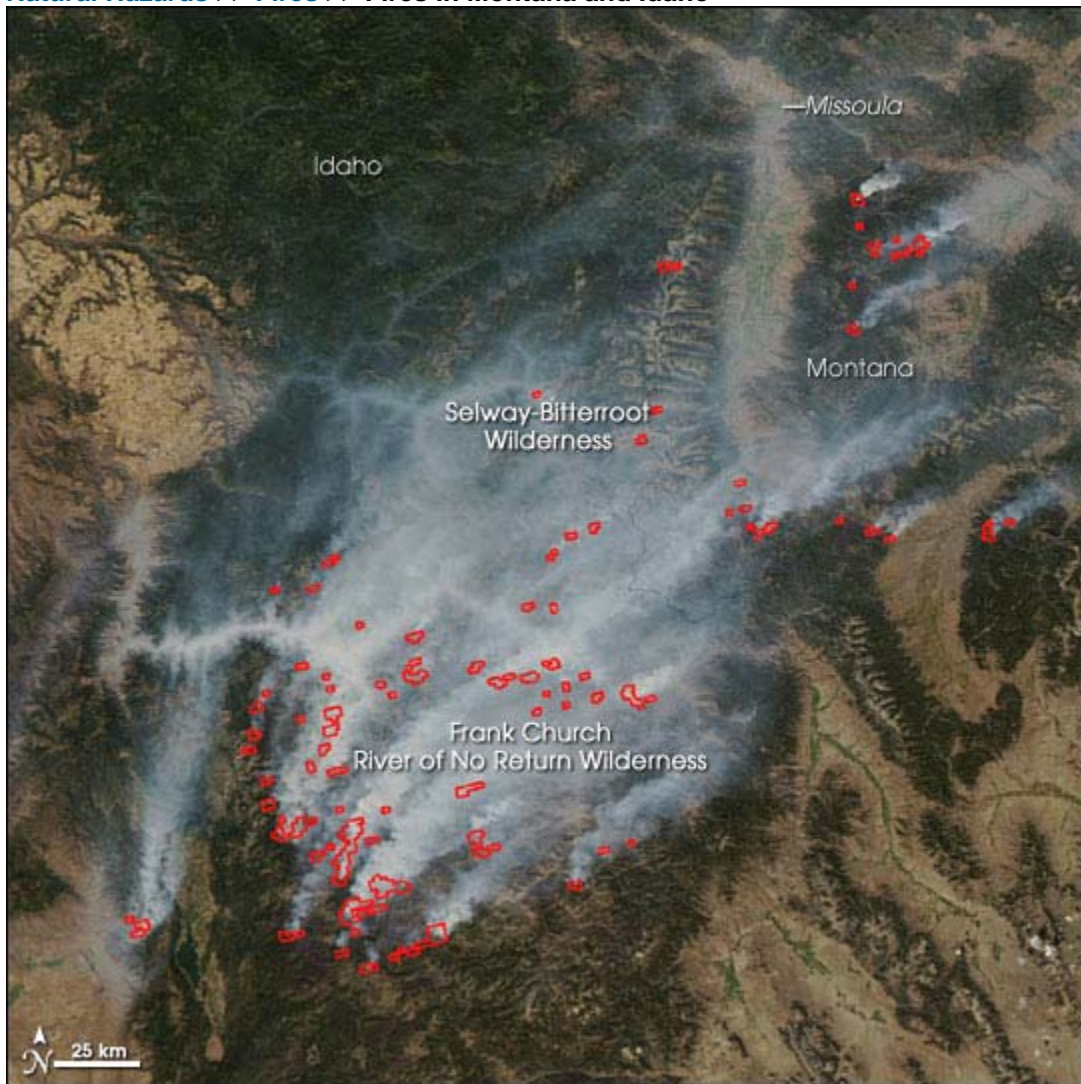


Figure 3 - Large fires – August 12, 2007

3.3 Internet Notice from NASA Earth Observatory⁷



[Natural Hazards](#) >> [Fires](#) >> [Fires in Montana and Idaho](#)



[Click here to view high-resolution version \(1.92MB\)](#)

Image Acquired: September 03, 2007

Fires in Montana and Idaho

According to the September 4 report from the National Interagency Fire Center, 24 large fires burned in Montana and Idaho in early September

Where in the World

2007. Many of these fires had been burning in the states' remote, mountainous terrain for more than a month. Throughout the summer, the fires occasionally produced thick clouds of smoke that spread across the Great Plains and as far as the East Coast. This image from the Moderate Resolution Imaging Spectroradiometer ([MODIS](#)) on NASA's [Aqua](#) satellite shows the fires (red outlines) on September 3, 2007.



The large image provided above has a spatial resolution (level of detail) of 250 meters per pixel. The MODIS Rapid Response Team provides [twice-daily](#) images of the region in additional resolutions.

NASA image courtesy the [MODIS Rapid Response Team](#), Goddard Space Flight Center

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Image Posted

September 04, 2007

Satellite & Sensor

Aqua- MODIS

Other Images for this Event

Posted: [Sep 13, 2007](#)

Posted: [Aug 14, 2007](#)

Posted: [Aug 12, 2007](#)

Posted: [Aug 06, 2007](#)

Posted: [Aug 02, 2007](#)

Posted: [Aug 01, 2007](#)

Fires Latest Events

[Corral Fire Near Malibu, California](#)

[Fires and Haze in West Africa](#)

[Fires in Southern California](#)

[Bushfires in Northern Australia](#)

[Fires in the Amazon](#)

[Fire on Alaska's North Slope](#)

4.0 Composition and Size of Fires

Fires Burning in Idaho and Montana July, 27, 2007⁵: Between mid-July 2007 and mid-September 2007 more than 3000 square miles burned in 25 separate fires in the Idaho/Montana wildfire area.



Exceptional Event Analysis for September 5, 2007

Revision 1.0

January 9, 2008

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IDAHO ⁶								
Incident Name	Start	Est. Containment or End	ID	Type	Fuel	Size	Latitude	Longitude
Bridge	7/25/2007	11/1/2007	ID-CWF-000038	WF	Timber and Brush	43500	46°22'3"	114°37'16"
Cascade Complex	7/17/2007		ID-BOF-000635	WF	Model 8 & 10	302376	44°40'9"	115°41'9"
Chimney Complex	7/13/2007	8/17/2007	ID-CMS-43013	WF	Timber with grass understory	51000	46°2'48"	116°55'0"
Concord			ID-NPF-000022	WF		1570	45°35'42"	115°44'5"
Drake			ID-NPF-00035	WFU		280	45°59'15"	115°7'42"
EAST ZONE COMPLEX	7/7/2007	9/30/2007	ID-PAF-007071	WF	Fir, Lodgepole pine, spruce, ponderosa pine	300022	45°15'0"	115°41'0"
KRASSEL COMPLEX	6/17/2007		ID-PAF-007078	WFU	Timber, litter, and understory	85700	45°24'18"	114°52'30"
Middle Fork Complex	7/17/2007	8/17/2007	ID-BOF-000642	WF	Timber and Brush	17416	44°20'58"	115°29'37"
Murphy Complex	7/16/2007	8/2/2007	ID-TFD-002030	WF	Brush, grass, juniper	652016	42°10'19"	115°30'32"
Poe Cabin	7/18/2007	10/12/2007	ID-CMS-043014	WF	Timber	58520	45°41'39"	116°28'40"
RAINES			ID-PAF-007058	WF			45°18'52"	115°32'29"
Rattlesnake	7/13/2007	10/1/2007	ID-NPF-000017	WF	Timber	102000	45°25'51"	115°39'23"
TONGUE COMPLEX	7/6/2007	7/24/2007	ID-BOD-000490	WF	Juniper, sagebrush, grass	46680	42°15'53"	116°52'28"
Trapper Ridge WFU	7/17/2007		ID-BOF-000575	WFU	Timber	20159	44°1'22"	115°21'10"
Van Horn			ID-SCF-7244	WF		1650	44°45'55"	114°17'45"
						1,682,889		

Montana ⁶								
Incident Name	Start	Est. Containment or End	ID	Type	Fuel	Size	Latitude	Longitude
AHORN	7/11/2007		MT-LCF-000013	WF	Lodgepole pine, spruce	52505	47°31'48"	113°2'48"
CONGER CREEK	7/16/2007		MT-LNF-000143	WF	Timber	25150	47°12'59"	113°2'13"
Fool Creek	6/28/2007		MT-LCF-000009	WF	Lodgepole pine, spruce	60038	47°55'24"	112°59'17"
LITTLE WOLF CREEK			MT-CES-052	WF		547	47°18'27"	112°16'24"
Meriwether	7/21/2007		MT-HNF-033	WF	Timber, grass, Shrub	43296	46°52'11"	111°52'56"
NOVAK			MT-CES-00051	WF		1859	47°17'22"	112°0'55"
Pattengail Creek	7/13/2007		MT-BDF-048	WF	Timber	15297	45°41'27"	113°25'17"
Rugby			MT-LCF-000022	WF		130	46°59'24"	111°0'43"
SAWMILL CREEK			MT-LNF-000145	WF		320	46°36'25"	113°42'2"
SKYLAND	7/23/2007		MT-FNF-000035	WF		45760	48°16'48"	113°23'6"
						244,902		
Total Acres Burned						1,927,791		
Square Miles Burned						3,012		

<http://gacc.nifc.gov/sacc/predictive/intelligence/NationalLargeIncidentYTDReport.htm>

Table 1. Wildfires Idaho and Montana, Burning on July, 27, 2007.

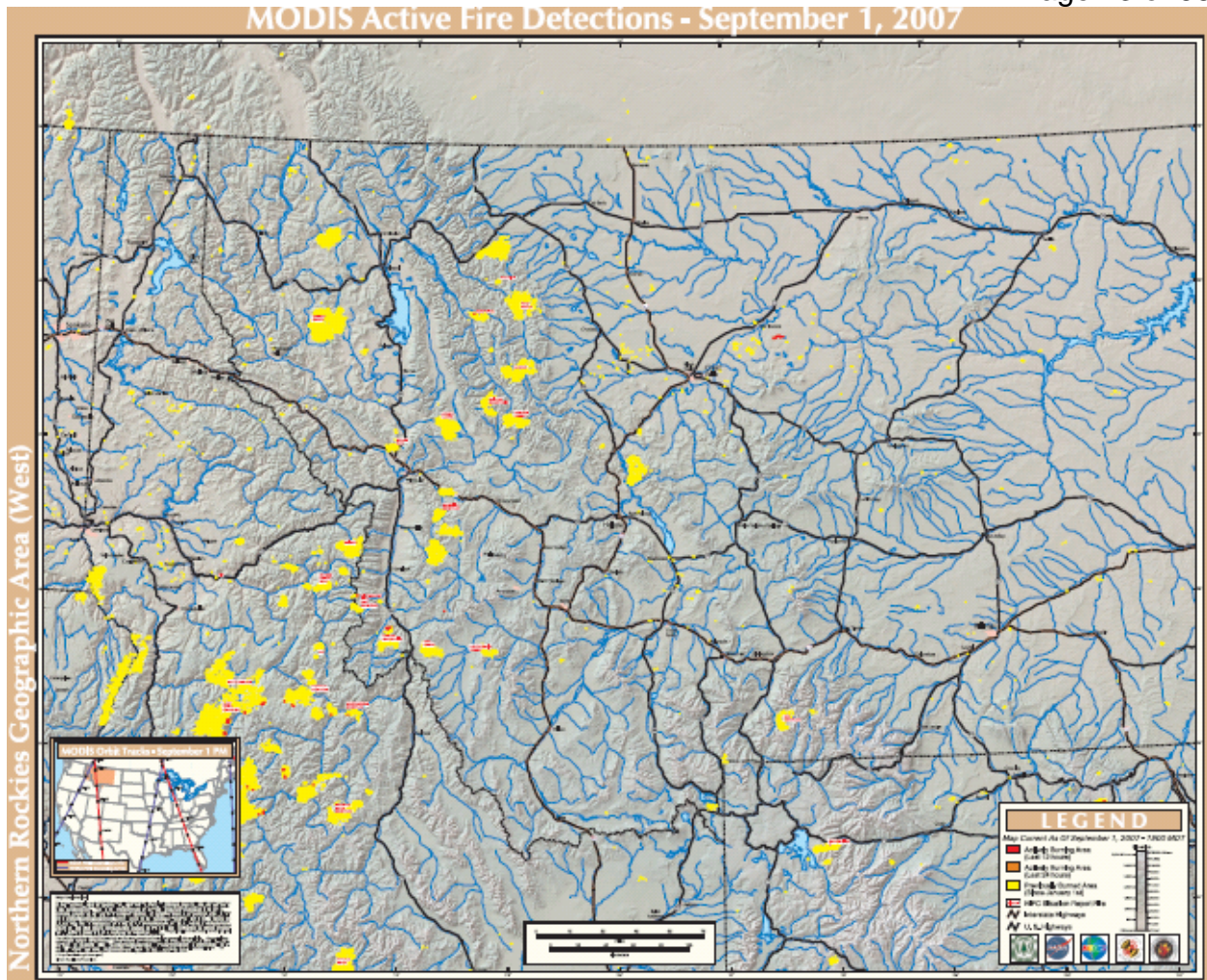


Figure 6. Maps of fires listed in Table 1 above (August 12, 2007), Northern Rockies (Idaho and Montana).²

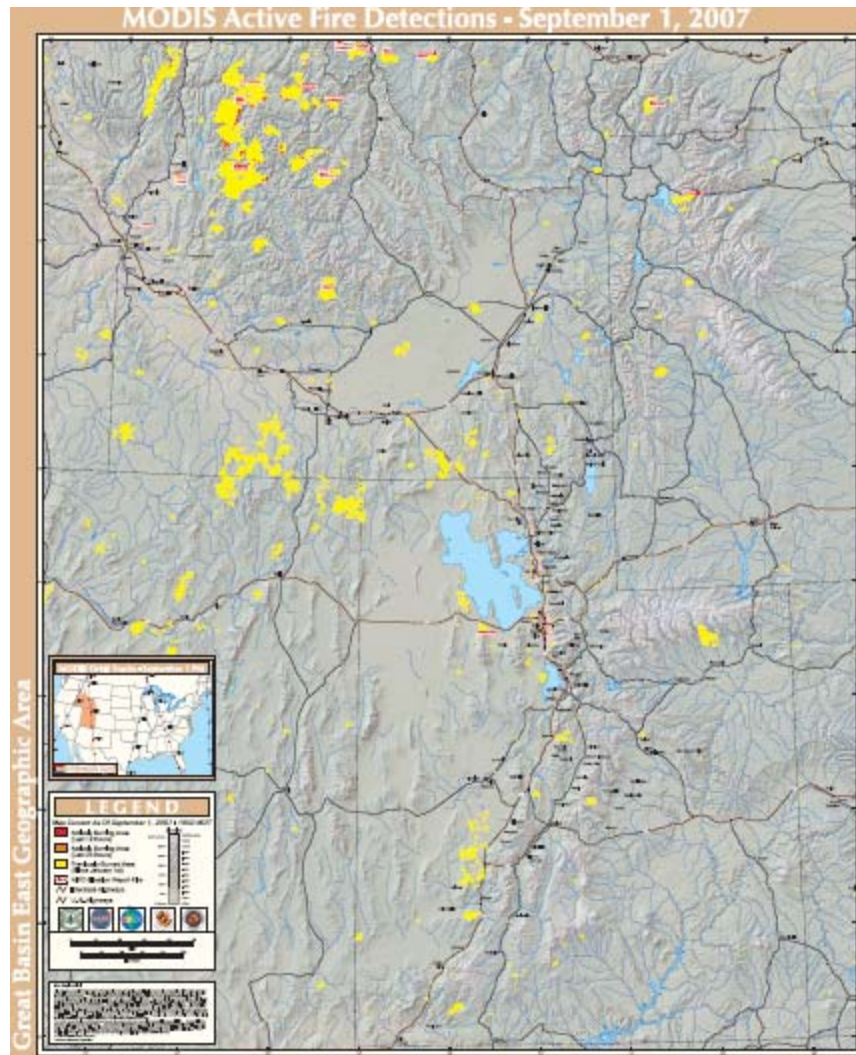


Figure 7. Maps of fires listed in Table 1 above (August 12, 2007), Great Basin Region (Idaho, Montana, Wyoming, Nevada).²

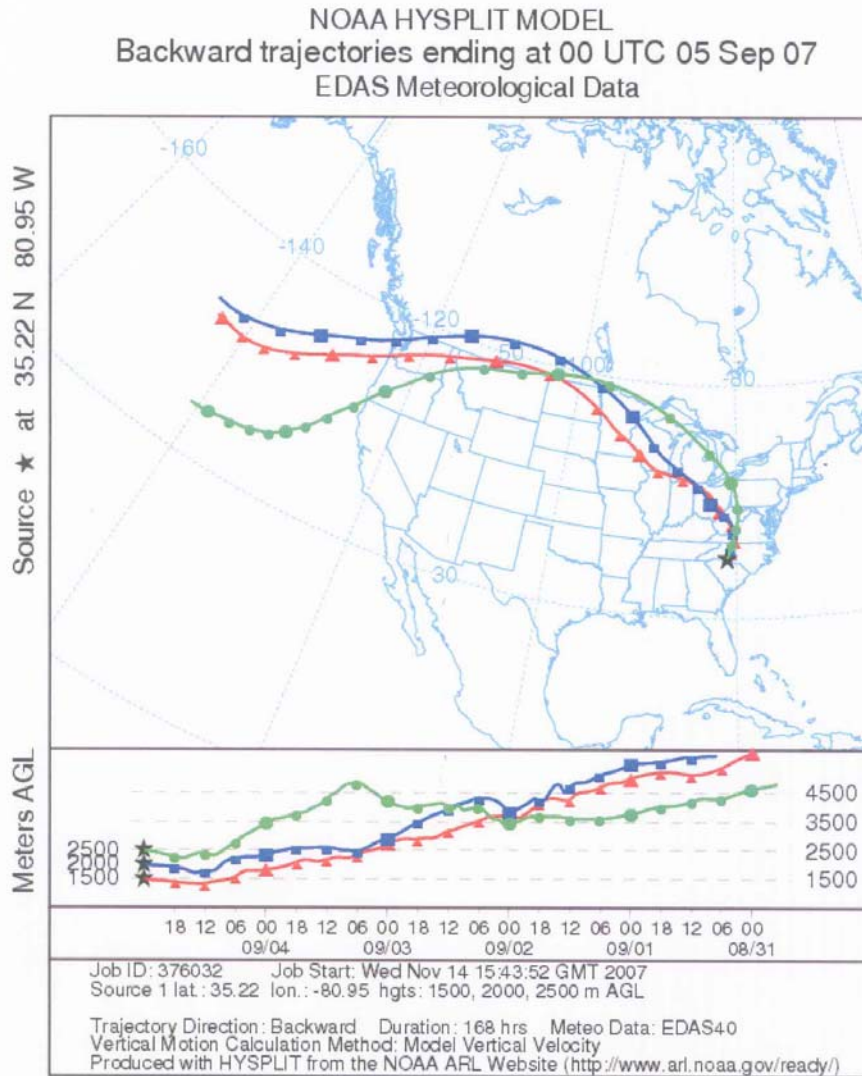
5.0 Meteorological Data

9/5/07											
TimeEDT	Temperatu	Dew Point	Humidity	Sea Level	Visibility	Wind Direction	Wind Speed	Gust Speed	Precipitatio	Events	Conditions
12:52 AM	72	59	64	30.01	8	Calm	Calm	-	N/A		Clear
1:52 AM	66.9	59	76	30.01	8	NW	3.5	-	N/A		Clear
2:52 AM	69.1	59	70	30.01	8	Calm	Calm	-	N/A		Clear
3:52 AM	71.1	60.1	68	30.01	7	Calm	Calm	-	N/A		Clear
4:52 AM	71.1	60.1	68	30.01	7	Calm	Calm	-	N/A		Clear
5:52 AM	70	61	73	30.03	6	Calm	Calm	-	N/A		Haze
6:52 AM	68	61	78	30.04	5	Calm	Calm	-	N/A		Haze
7:52 AM	70	63	78	30.06	4	Calm	Calm	-	N/A		Haze
8:52 AM	75	63	66	30.07	4	Calm	Calm	-	N/A		Haze
9:52 AM	79	63	58	30.09	5	Calm	Calm	-	N/A		Haze
10:52 AM	82.9	63	51	30.1	5	Variable	3.5	-	N/A		Haze
11:52 AM	87.1	63	44	30.09	6	Calm	Calm	-	N/A		Haze
12:52 PM	90	60.1	37	30.08	6	Variable	3.5	-	N/A		Haze
1:52 PM	91.9	60.1	34	30.08	6	Variable	4.6	-	N/A		Haze
2:52 PM	91.9	57	31	30.05	7	SE	9.2	-	N/A		Partly Cloudy
3:52 PM	91.9	57	31	30.05	7	East	5.8	-	N/A		Partly Cloudy
4:52 PM	91	57	32	30.04	7	Calm	Calm	-	N/A		Scattered Clouds
5:52 PM	89.1	60.1	38	30.04	7	SSE	4.6	-	N/A		Mostly Cloudy
6:52 PM	84.9	61	44	30.05	7	SSW	4.6	-	N/A		Mostly Cloudy
7:52 PM	82	61	49	30.06	6	SSW	5.8	-	N/A		Haze
8:52 PM	75	62.1	64	30.07	7	Calm	Calm	-	N/A		Scattered Clouds
9:52 PM	78.1	61	56	30.09	8	South	6.9	-	N/A		Partly Cloudy
10:52 PM	78.1	61	56	30.1	7	South	5.8	-	N/A		Clear
11:52 PM	75.9	62.1	62	30.11	7	Calm	Calm	-	N/A		Clear

6.0 Ozone Data from Mecklenburg County and Other Regional Sites

8 Hour Maximum									
			2-Sep	3-Sep	4-Sep	5-Sep	6-Sep	7-Sep	8-Sep
Site Name	County	AIRS Code	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
MonroeMS	Union	37-179-0003	0.051	0.063	0.080	0.073	0.057	0.061	0.056
Enochville	Rowan*	37-159-0022	0.060	0.066	0.079	0.094	0.075	0.072	0.067
Crouse	Lincoln	37-109-0004	0.067	0.068	0.078	0.090	0.068	0.072	0.073
Rockwell	Rowan*	37-159-0021	0.056	0.068	0.085	0.088	0.066	0.065	0.062
Arrowood	Meck. Co	37-119-1005	0.055	0.077	0.087	0.079	0.055	0.060	0.059
County Line (U)	Meck. Co	37-119-1009	0.054	0.067	0.077	0.085	0.066	0.064	0.060
Garinger	Meck. Co.	37-119-0041	0.054	0.072	0.080	0.085	0.062	0.063	0.060
Max			0.067	0.077	0.087	0.094	0.075	0.072	0.073
Mecklenburg Max			0.055	0.077	0.087	0.085	0.066	0.064	0.06
1 Hour Maximum									
			2-Sep	3-Sep	4-Sep	5-Sep	6-Sep	7-Sep	8-Sep
Site Name	County	AIRS Code	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
MonroeMS	Union	37-179-0003	0.053	0.068	0.09	0.083	0.061	0.064	0.062
Enochville	Rowan*	37-159-0022	0.065	0.075	0.088	0.115	0.081	0.088	0.073
Crouse	Lincoln	37-109-0004	0.075	0.072	0.089	0.098	0.074	0.086	0.077
Rockwell	Rowan*	37-159-0021	0.059	0.08	0.092	0.094	0.07	0.069	0.068
Arrowood	Meck. Co	37-119-1005	0.059	0.087	0.098	0.1	0.057	0.066	0.067
County Line (U)	Meck. Co	37-119-1009	0.057	0.073	0.081	0.099	0.068	0.073	0.069
Garinger	Meck. Co.	37-119-0041	0.057	0.08	0.087	0.098	0.065	0.075	0.074
Max			0.075	0.087	0.098	0.115	0.081	0.088	0.077
Mecklenburg Max			0.059	0.087	0.098	0.100	0.068	0.075	0.074

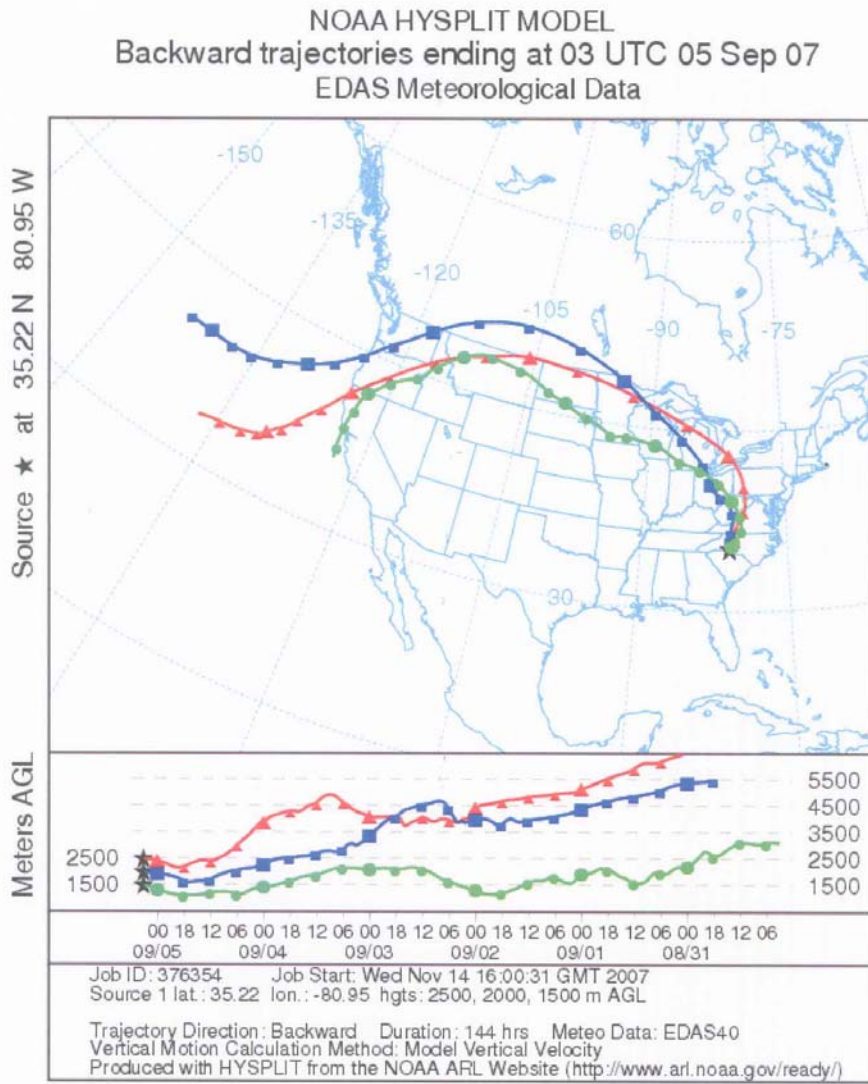
7.0 Trajectories and Mixing Heights



http://www.arl.noaa.gov/data/ready/hysplitarc/376032_trj001.gif

11/14/2007

Figure 8.



http://www.arl.noaa.gov/data/ready/hysplitarc/376354_trj001.gif

11/14/2007

Figure 9.

The table below documents the mixing height in Greensboro, NC on September 5, 2007. Direct upper air measurements are not made in Charlotte, NC. Charlotte is approximately 90 miles SW of Greensboro, NC. The afternoon mixing height reported from Greensboro, NC on September 5, 2007 was 1795 meters.

DAILY MIXING HEIGHTS AND AVERAGE WIND SPEEDS

U/A DATA STA. NO 13723 Greensboro, NC

SFC DATA STA. NO 72314 Charlotte, NC

YEAR	MO	DAY	T	MORNING			AFTERNOON			
				HGT	LYR	SFC	T	HGT	LYR	SFC
2007	09	01	1	838	6.6	2.8	2	1458		3.3
2007	09	02	1	1269	5.6	2.7	1	2318		3.6
2007	09	03	1	324	2.3	.7	1	2420		3.1
2007	09	04	1	62	1.1	1.1	4			
2007	09	05	1	175	2.1	.0	1	1795		1.6
2007	09	06	1	150	1.5	1.5	1	1999		3.9
2007	09	07	1	670	6.2	.6	1	2117		3.2
2007	09	08	1	222	4.7	1.2	1	1976		3.0
2007	09	09	1	184	2.4	.2	1	1924		2.2
2007	09	10	1	130	.6	.6	1	2628		2.8
2007	09	11	1	398	10.4	2.7	1	2544		5.0
2007	09	12	1	1402	7.0	2.1	1	1633		3.1
2007	09	13	2	839	3.9	2.0	1	1714		3.0
2007	09	14	2	1093	5.4	3.8	2	1538		3.0
2007	09	15	1	307	6.2	.6	1	1404		5.7
2007	09	16	1	849	7.4	3.7	1	1639		2.9
2007	09	17	1	619	5.1	2.5	1	1654		4.2
2007	09	18	1	562	4.8	3.0	1	1295		4.3
2007	09	19	1	344	7.3	3.5	1	1115		4.3
2007	09	20	1	709	8.6	4.1	1	1356		5.3
2007	09	21	1	645	6.4	3.2	1	1461		3.7
2007	09	22	1	912	1.9	1.9	1	1912		1.9
2007	09	23	1	47	.5	.5	1	2573		1.9
2007	09	24	1	433	7.1	1.8	1	2234		2.1
2007	09	25	1	299	5.3	1.2	1	1753		2.4
2007	09	26	1	46	.9	.9	1	2163		2.2
2007	09	27	1	190	3.2	.3	1	2583		1.8
2007	09	28	1	95	1.6	1.6	1	1846		5.8
2007	09	29	1	74	3.3	3.3	1	1698		4.7
2007	09	30	1	134	2.5	2.5	1	1500		3.8

MIXING HEIGHT IN METERS

WIND SPEED IN METERS/SEC

TYPE 1 = NO PRECIPITATION

TYPE 2 = PRECIPITATION

TYPE 3 = SELECTED TEMPERATURE LESS THAN RAOB TEMP

TYPE 4 = MISSING

Table 3.

8.0 Selected PM_{2.5} Speciation Data

The following charts were compiled from data collected from the Speciation Trends Network site 37-119-0041:

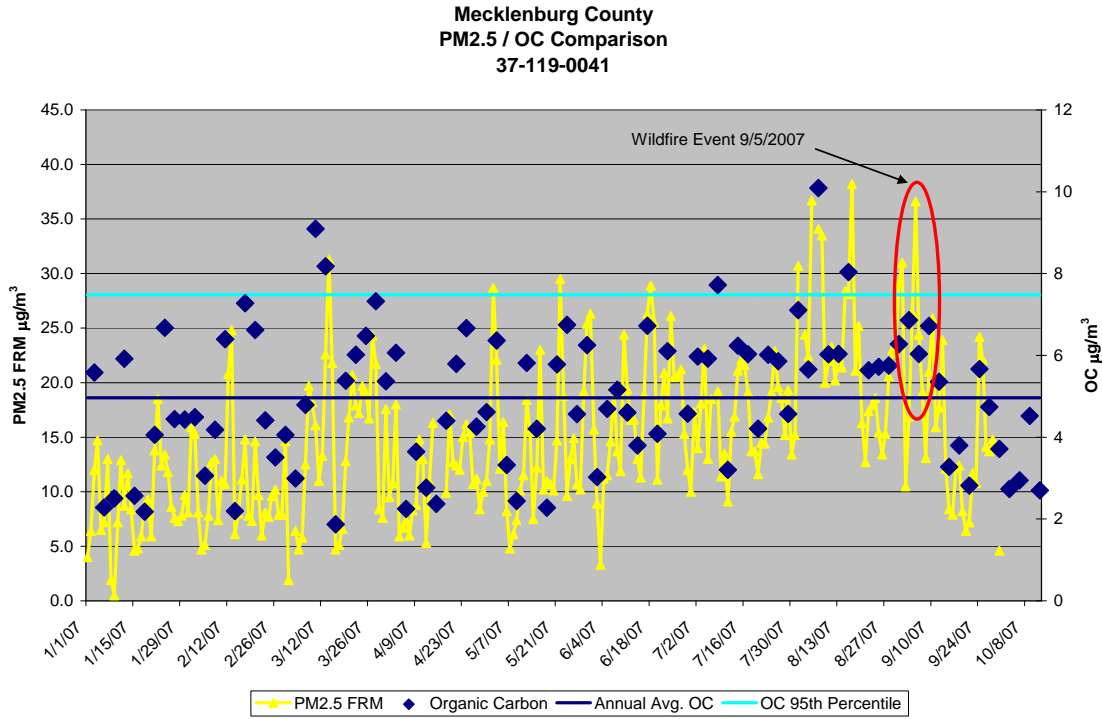


Figure 9. Organic Carbon Data

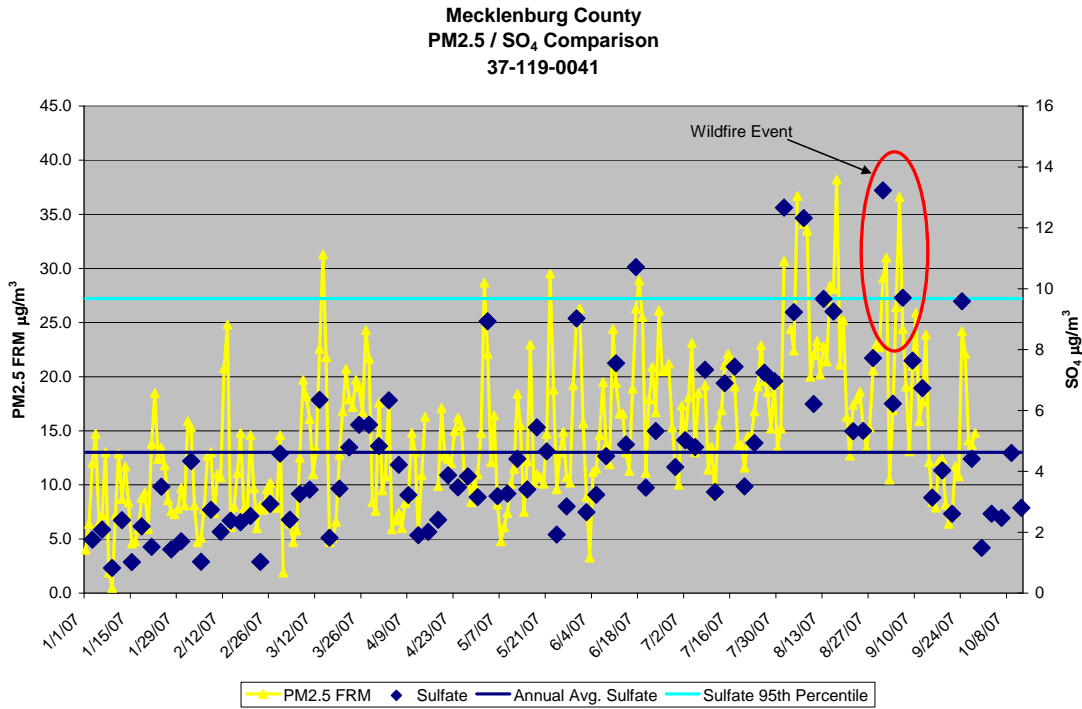


Figure 10. Sulfate Data

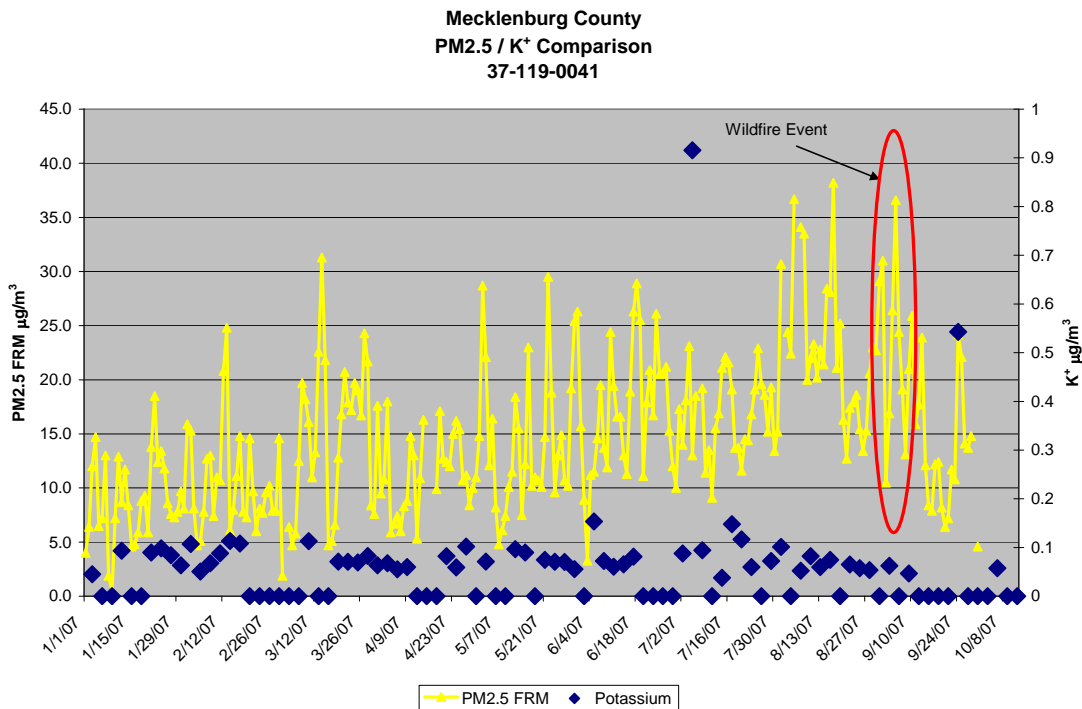


Figure 11.- Potassium Ion Measurements from STN.

9.0 Continuous and FRM PM_{2.5} Monitoring Data

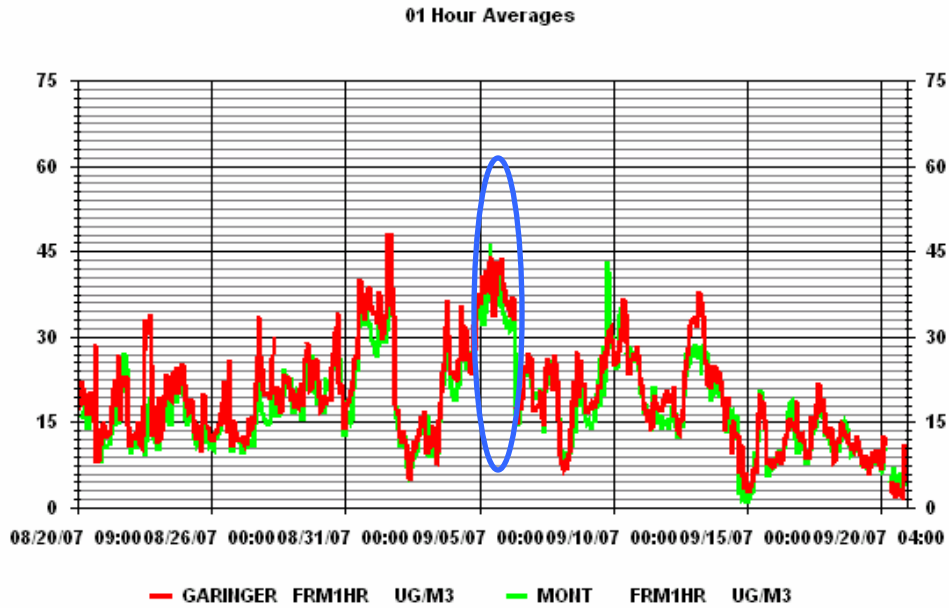


Figure 12. TEOM Data

Data displayed in the chart above was recorded at sites 37-119-0041 and 37-119-0042. The measurements were made using an R&P TEOM continuous PM_{2.5} instrument operating at 50°C.

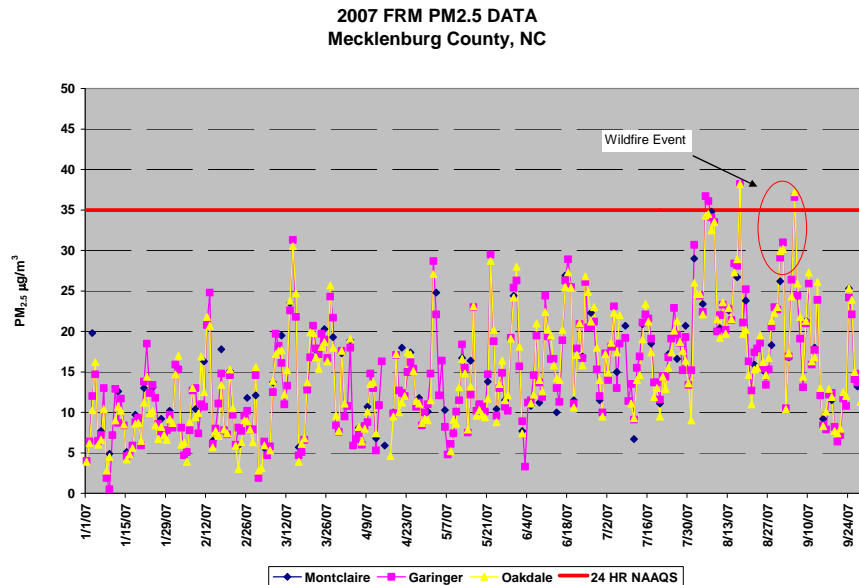


Figure 13. 2007 FRM PM_{2.5} Data for Mecklenburg County

Data displayed in the chart above was recorded at sites 37-119-0041, 37-119-0042, and 37-119-0043.

10.0 Comparison to Typical Data

Below is the box and whisker plot for PM2.5 data measured at all sites operating in Mecklenburg County during the summer months from 2004 to 2006:

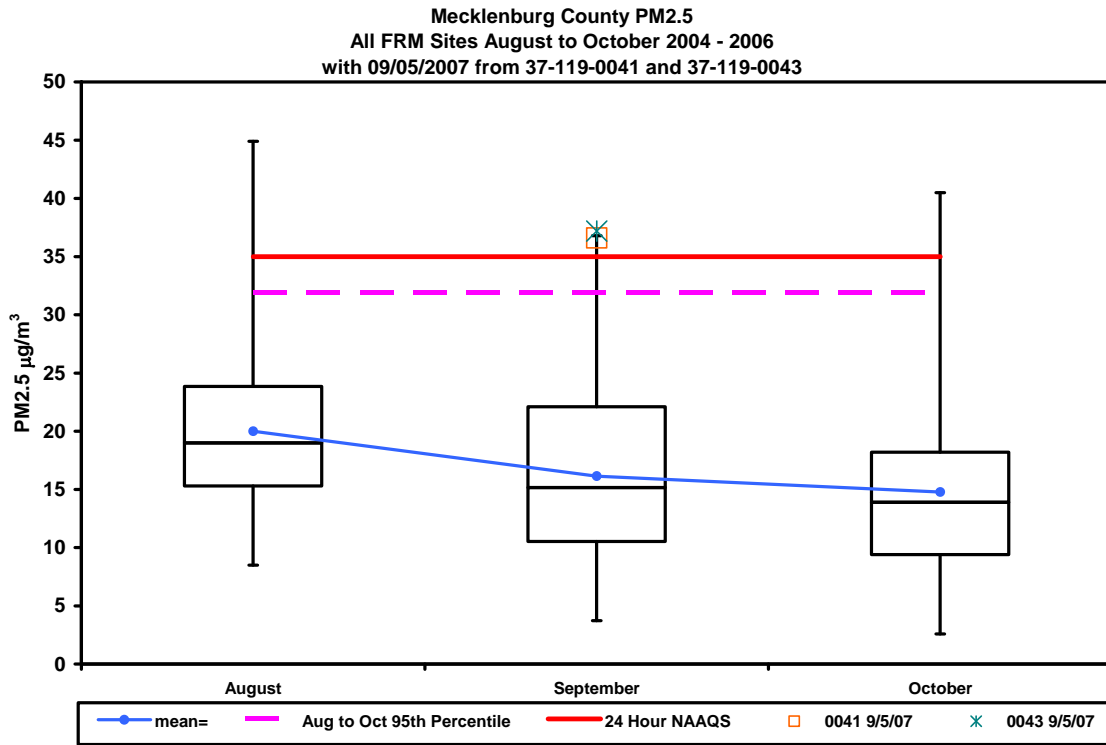


Figure 14.

Since the data being analyzed was measured on September 5, 2007, the months of August through October were chosen for the analysis.

The data from September 5, 2007 at 37-119-0041 (orange box) and 37-119-0043 (teal x), 2007 is plotted. The value measured at 37-119-0041 was 36.6 $\mu\text{g}/\text{m}^3$ and at 37-119-0043 was 37.2 $\mu\text{g}/\text{m}^3$. The 95th percentile for July, August, and September during the period is 31.9 $\mu\text{g}/\text{m}^3$. The 24-hour NAAQS is 35 $\mu\text{g}/\text{m}^3$.

	August	September	October
n	199	200	193
# Values > 95 th %	13	7	8
# Values > NAAQS	10	2	3

Table 2.

During the 3 year summer period listed above, 28 of 592 measurements are greater than the 95th percentile and 2.5% of the measurements (15/599) are greater than the NAAQS.

The seasonal evidence indicates data for the date of concern (September 5, 2007) is greater than the 95th percentile at the sites of concern (37-119-0041 and 37-119-0043). The data is also well above the 75th percentile:

	37-119-0041 September 5, 2007	37-119-0043 September 5, 2007
Data for August 5 - 6, 2007	36.6 $\mu\text{g}/\text{m}^3$	37.2 $\mu\text{g}/\text{m}^3$
95 th Percentile (Seasonal)	31.9 $\mu\text{g}/\text{m}^3$	
75 th Percentile (Seasonal)	22.1 $\mu\text{g}/\text{m}^3$	

Table 3.

For comparison, the annual data for all sites operating during the period 2004 – 2006 is displayed below:

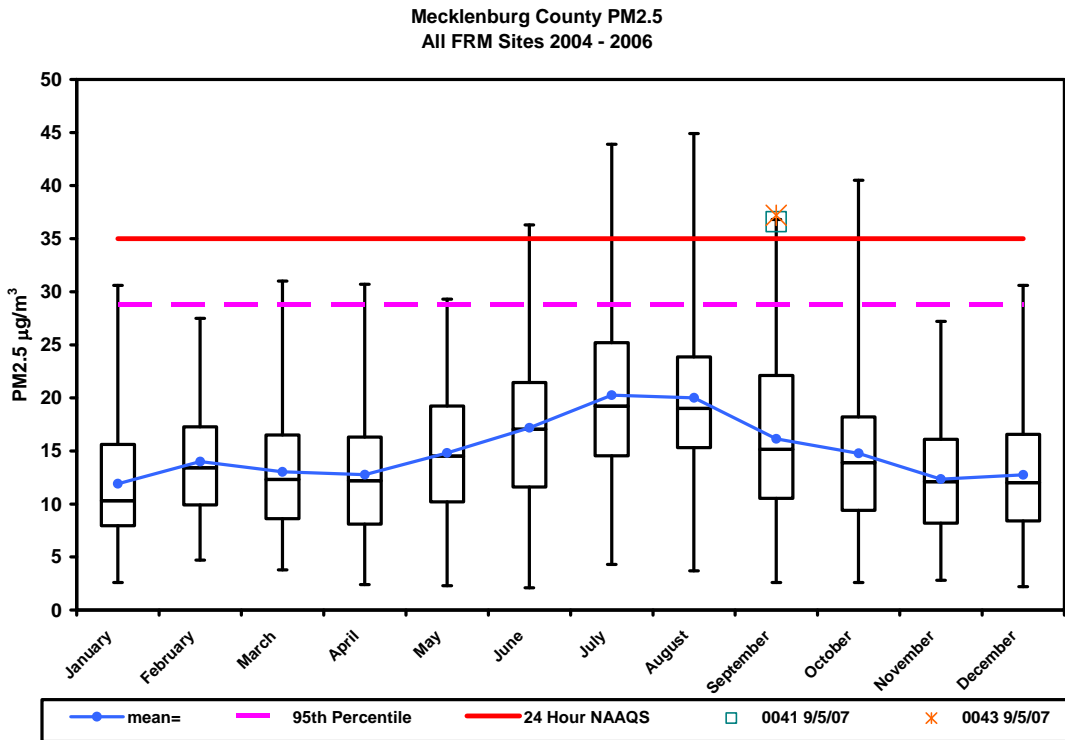


Figure 15.

During the 3 year period listed above 118 of 2375 measurements are greater than the 95th percentile (28.8 $\mu\text{g}/\text{m}^3$) and 1% of the measurements (24/2375) are greater than the NAAQS (35 $\mu\text{g}/\text{m}^3$).

Based on the qualifications of 40 CFR Part 50 § 50.14 (Federal Register / Vol. 72, No. 55 / Thursday, March 22, 2007 / Rules and Regulations Page-13569) and taking into consideration the evidence of the occurrence of the event, the event may be associated with an unusual measured concentration beyond typical fluctuations including background.

11.0 "But For" Analysis

The 25 fires examined as part of the documented events in Idaho and Montana are estimated to have had fuel loadings varying from 0.7 tons/acre (grass) to 12 tons/acre (timber). Assuming an average fuel loading of 6 tons/acre the event is estimated (assuming 100% consumption) to have consumed 11.6 million tons of fuel materials. Using an emission factor from the "First Order Fire Effects Model" (FOFEM)¹³ under moderate conditions (18 lbs/ton) yields estimated total PM_{2.5} emissions of 104,000 tons within a 118 day period (estimated total fire period 6/17/2007 to 10/12/2007).

The National Environmental Satellite, Data, and Information Service (NESDIS) maps document the path of the smoke plume across the continent. The NESDIS data on August 31, 2007 state:

"...Idaho/Montana/North Dakota/South Dakota/Canada/Minnesota/Iowa/Nebraska:
The large complex of fires throughout central Idaho and western Montana continue to produce massive amounts of very dense smoke. This enormous area of smoke is originally moving slightly to the northeast, through Montana and into southern Canada where it then turns back to the southeast and moves down as far south as Iowa and Nebraska. The densest smoke can be found extending all the way through Montana, across North Dakota and just reaching into the north central portions of Minnesota..."

Notices on the NESDIS continue through the date of interest beginning late on September 4, 2007 and continuing on September 5, 2007:

"...Idaho/Montana/North Dakota/southern Saskatchewan/southern Manitoba/Minnesota/the east coast states/the Middle Plains:
The outrageous fires in central Idaho and western Montana are still producing very dense plumes of smoke that are moving east northeasterly and the densest portion of the smoke has covered central Idaho and western half of Montana. The residual smoke from both this morning's burning and yesterday's has covered the area ranges from central Montana to just east of Great Lakes and southern Manitoba. **The several days' residual smoke formed a large area of thin smoke which has covered the east coast states from New Jersey at north all the way south to northern Florida.** Some of the residual smoke has brought to Middle Plains by a weather system... Virginia: Three fires in Louisa and Albemarle are producing thin plumes of smoke that are moving southward..."

"...Atlantic Ocean/Delmarva/E VA/E NC/SC/GA:
Thin smoke and haze from the ID/MT fires over the past week or so can still be traced (particularly over water) from 36N68W in a 1.5 degree wide line to Cape Hatteras, NC and is slowly drifting south. The area fans out a bit as it nears the coastline to cover portions of the Delmarva from DE south and the Norfolk,VA vicinity of E VA. Haze with some embedded smoke can be seen over the low piedmont areas of NC/SC/ and N GA..."

Modeled Hysplit back trajectories (Figures 8-9) from the monitoring location intersect areas of smoke. Afternoon mixing height in Charlotte, NC (Mecklenburg County) is assumed to

have been similar to measured mixing heights in Greensboro, NC (approximately 90 miles NE of Charlotte). The afternoon mixing height at this location was approximately 1795 meters on September 5, 2007.

Information compiled in this analysis indicates the organic carbon (OC) fractions of the STN samples collected on September 3, 2007 and September 6, 2007; the days before and after the sample date at site 37-119-0041, contained measured concentrations of $6.9 \mu\text{g}/\text{m}^3$ and $6.0 \mu\text{g}/\text{m}^3$ of organic carbon (See Figure 10). The average concentration of organic carbon measured at 37-119-0041 from 2003 - 2006 during the months of August through October was $4.7 \mu\text{g}/\text{m}^3$. OC levels were $2.2 \mu\text{g}/\text{m}^3$ and $1.3 \mu\text{g}/\text{m}^3$ above the 3 month average on the STN sampling dates preceding and following the event. Elevated organic carbon concentrations may be associated with wood smoke emissions¹².

Given:

1. Estimated $\text{PM}_{2.5}$ emissions from the described event were in excess of 104,000 tons.
2. The 75th and 95th percentile of August, September, and October $\text{PM}_{2.5}$ data for all sites operating in the MCAQ network from 2004 – 2006 was $22.1 \mu\text{g}/\text{m}^3$ and $31.9 \mu\text{g}/\text{m}^3$, respectively. The values measured on September 5, 2007 were greater than the 95th percentile (36.6 and $37.2 \mu\text{g}/\text{m}^3$).
3. Modeled back trajectories from the location of the described event intersect the event areas in Idaho and Montana.
4. Elevated organic carbon concentrations ($6.9 \mu\text{g}/\text{m}^3$ on September 3, 2007 and $6.0 \mu\text{g}/\text{m}^3$ on September 6, 2007 versus the August-October average (2003-2006) of $4.7 \mu\text{g}/\text{m}^3$); were measured at site 37-119-0041 on the STN dates before and after the date of the $\text{PM}_{2.5}$ measurements.

- Multi-variable regressions of seasonal (August to October) data for 2007 and 2005-2007 (for site 37-119-0041) were performed using meteorological data obtained from Charlotte-Douglas International Airport. (A smaller data set using 2006 and 2007 data was used for site 37-119-0043 since this sampler has only operated for two years.) Daily wind speed, wind direction, temperature, dew point, precipitation, and previous day precipitation data were plotted versus the FRM PM_{2.5} data for each site.

Site	Date of Event	PM2.5 $\mu\text{g}/\text{m}^3$	Data Period Used for Estimation	r^2	99% Up-Bnd	98% Up-Bnd	97.5% Up-Bnd	96% Up-Bnd
37-119-0041	9/5/07	36.6	Aug to Sept 2007	0.47	37.4	35.4	34.8	33.3
37-119-0041	9/5/07	36.6	Aug to Oct 2005-2007	0.39	38.2	36.4	35.8	34.4
37-119-0043	9/5/07	37.2	Aug to Sept 2007	0.49	37.3	35.5	34.9	33.4
37-119-0043	9/5/07	37.2	Aug to Oct 2006 and Aug to Sept 2007	0.49	35.4	33.8	33.2	32.0

Yellow < measured value. Orange < NAAQS.

Site 37-119-0041:

The estimated 97.5% upper-bound of a normal approximation (using estimation of missing observations by covariance with 2007 - August to October data) for September 5, 2007 at site 37-119-0041 was 34.8 $\mu\text{g}/\text{m}^3$ ($r^2 = 0.47$) versus the measured value of 36.6 $\mu\text{g}/\text{m}^3$.

Based on the 2007 seasonal estimation of missing observations by covariance, less than 2.5% of measured values would be expected to be greater than 34.8 $\mu\text{g}/\text{m}^3$ at 37-119-0041 on September 5, 2007.

The results from the multi-year (2005-2007) seasonal regression ($r^2 = 0.39$) indicate less than 4% of measured values would be expected to be greater than 34.4 $\mu\text{g}/\text{m}^3$ on September 5, 2007 versus the measured value of 36.6 $\mu\text{g}/\text{m}^3$.

Site 37-119-0043:

The estimated 97.5% upper-bound of a normal approximation (using estimation of missing observations by covariance with 2007 – August to September data) for September 5, 2007 at site 37-119-0043 was 34.9 $\mu\text{g}/\text{m}^3$ ($r^2 = 0.49$) versus the measured value of 37.2 $\mu\text{g}/\text{m}^3$.

Based on the 2007 seasonal estimations of missing observations by covariance, less than 2.5% of measured values would be expected to be greater than 34.9 $\mu\text{g}/\text{m}^3$ at 37-119-0043 on September 5, 2007.

The results from the multi-year (August to October 2006 & August to September 2007) partial seasonal regression ($r^2 = 0.49$) indicate less than 2% of measured

values would be expected to be greater than $33.8 \mu\text{g}/\text{m}^3$ on September 5, 2007 versus the measured value of $37.2 \mu\text{g}/\text{m}^3$.

But for the contribution of $\text{PM}_{2.5}$ from the event, the $\text{PM}_{2.5}$ NAAQS may not have been exceeded on September 5, 2007 at sites 37-119-0041 and 37-119-0043.

Appendix A

Fire Information - Wildland Fire Statistics

National Year-to-Date Report on Fires and Acres Burned

by State for October 29, 2007

State	Wildland		Prescribed		Wildland Fire Use	
	# Fires	# Acres	# Fires	# Acres	# Fires	# Acres
AK	447	525,019	4	20,650	58	124,768
AL	3,368	64,207	14,725	846,850	0	0
AR	1,196	30,126	225	222,462	1	3,481
AZ	2,170	101,215	295	74,889	23	10,760
CA	8,417	1,463,239	589	59,653	37	731
CO	1,270	16,046	140	28,567	17	206
CT	244	231	7	60	0	0
DE	19	153	9	165	0	0
FL	4,584	571,492	295	238,872	18	2,753
GA	7,096	520,271	99	46,851	0	0
HI	5	21,030	0	0	0	0
IA	49	580	130	4,793	0	0
ID	1,454	1,992,148	290	32,078	73	188,136
IL	73	610	176	11,635	0	0
IN	803	5,401	284	25,161	0	0
KS	51	14,265	56	21,506	0	0
KY	1,821	55,147	32	16,490	0	0
LA	795	8,590	118	112,425	0	0
MA	2,204	2,687	5	46	0	0
MD	645	5,769	51	4,094	0	0
ME	460	399	37	196	0	0
MI	534	23,321	82	7,049	0	0
MN	1,777	115,495	539	81,881	2	11
MO	158	10,294	57	26,719	0	0
MS	991	13,363	191	210,921	0	0
MT	1,847	785,858	289	29,537	25	42,440
NC	6,329	51,234	186	94,084	0	0
ND	883	29,048	101	19,395	0	0

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NE	50	3,920	52	9,540	0	0
NH	419	203	15	187	0	0
NJ	1,212	20,789	133	11,712	0	0
NM	1,387	78,194	141	44,023	22	26,785
NV	869	890,188	21	10,764	6	3,631
NY	211	855	13	353	0	0
OH	491	1,220	10	1,643	0	0
OK	1,230	46,213	30	19,281	0	0
OR	2,408	588,527	642	69,655	0	0
PA	523	1,047	3	40	0	0
PR	3,258	18,913	0	0	0	0
RI	99	60	5	110	0	0
SC	3,143	14,621	202	100,497	0	0
SD	1,478	105,570	118	25,721	0	0
TN	3,129	42,435	17	14,146	0	0
TX	526	16,612	153	190,712	1	1
UT	1,302	615,447	73	31,420	20	7,168
VA	1,414	13,118	35	10,350	2	407
VT	99	230	5	302	0	0
WA	1,249	216,412	1,278	30,326	3	802
WI	1,451	4,728	542	33,871	0	0
WV	922	6,781	6	450	0	0
WY	502	76,139	53	25,097	21	3,891
Grand Totals	77,062	9,189,460	22,559	2,867,229	329	415,971

IDAHO

Incident			Structures Destroyed				Fatalities	Latitude	Longitude
Name	ID	Type	Size	Primary	Commercial	Out Buildings			
INDIAN CREEK	ID-BOD-000292	WF	1,200				0	43°26'20"	116°12'11"
RIMSTEP	ID-BOD-000359	WF	725				0	43°12'43"	116°22'54"
Black Pine	ID-STF-001848	WF	60				0	42°2'38"	113°2'38"
Howard	ID-IFD-007004	WF	1,650	0	0		0	42°52'4"	112°30'50"
Roseworth	ID-TFD-001863	WF	273				0	42°19'6"	114°51'30"
Clover	ID-SIX-001868	WF	910			1	0	42°59'43"	115°1'50"
Cow Canyon	ID-IFDS-001862	WF	16,268				0	42°7'1"	112°51'20"
Brownlee Dam Fire	ID-PAF-007028	WF	80				0	44°50'10"	116°54'0"
ROCK	ID-SCCI-001916	WF	328				0	42°33'3"	114°57'18"
Trail Creek	ID-SIX-001874	WF	288				0	43°43'15"	114°19'44"
Birch	ID-BOD-000458	WF	753					42°57'43"	115°37'9"
Sand Dunes	ID-EICI-007018	WF	1,010				0	44°3'34"	111°47'46"
NICHOL	ID-BOD-000489	WF	4,900					43°0'22"	115°50'42"
LIBERATOR	ID-BOD-	WF	300					42°57'41"	115°39'58"

	000485								
2 Spots	ID-TFD-001957	WF	3,500				0	42°22'32"	113°50'8"
NORTH FLAT	ID-BOD-000488	WF	2,470					42°58'32"	115°39'47"
Dry Creek	ID-CMS-43004	WF	5,700				0	45°50'43"	116°45'51"
BALD MTN	ID-BOD-000474	WF	1,000					42°18'41"	116°56'56"
SPRING	ID-PAF-007033	WF					0	44°20'38"	117°8'1"
RED CANYON	ID-BOD-000476	WF						42°19'33"	116°57'4"
BLACK HAWK	ID-IFDS-007011	WF	6,225	1	0	1	0	43°22'49"	111°55'59"
CRUTCHER	ID-BOD-000475	WF						42°15'55"	116°52'36"
JIM BROWN BRIDGE	ID-TFD-001966	WF	400				0	43°4'42"	114°6'9"
Crater	ID-EIS-007029	WF	604				0	44°14'48"	111°46'42"
Peck Mountain	ID-PAF-007034	WF	136				0	44°52'13"	116°37'34"
ONEIDA NARROWS	ID-IFDS-007013	WF	583	0		0	0	42°13'26"	111°47'59"
RED BRIDGE	ID-TFD-001934	WF	45,862	0	0	5	0	42°47'16"	114°23'37"
Basin	ID-SCF-7191	WF	200					44°16'23"	114°49'42"
DANISH WFU	ID-CTF-007003	WF U	0				0	42°19'45"	112°22'6"
Arlington	ID-NPF-00016	WF U	1				0	45°31'6"	115°39'58"

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Warm Springs	ID-PAF-007035	WF	23,760	0	0	0	44°23'0"	117°4'15"
ZENA CREEK	ID-PAF-007040	WF	700			0	45°4'10"	115°43'33"
West Fork	ID-NPF-000026	WF U	0			0	45°30'54"	115°39'23"
GOAT WFU	ID-PAF-007090	WF U	200				45°2'37"	115°17'6"
BUCKHORN WFU	ID-PAF-007060	WF U					44°52'41"	115°51'7"
MCCALLA WFU	ID-PAF-007041	WF U					45°20'26"	115°6'15"
Tag WFU	ID-PAF-00007019	WF U	5,000			0	45°24'18"	114°52'30"
Jack Fire	ID-TFD-001998	WF	800			0	42°5'16"	114°40'44"
Weston	ID-CTF-007020	WF	375			0	42°8'50"	112°8'56"
Sailor 2	ID-SRQ-002002	WF	2,200			0	42°40'59"	115°35'39"
Jim Sage	ID-TFD-001953	WF	5,400			0	42°7'27"	113°27'58"
Coyote Creek	ID-NPT-000024	WF	3,000	1		0	46°26'48"	116°50'22"
BELL	ID-TFD-001974	WF	400			0	42°50'41"	114°54'13"
Yatahoney	ID-BOD-000559	WF	1,102				42°13'47"	116°26'23"
BOULDER CREEK	ID-BOD-000481	WF	4,350	0		0	42°53'23"	116°41'56"
Gem County	ID-BOD-000632	WF	2,508			0	43°57'13"	116°21'42"
SMITHS CROSSING	ID-TFD-002013	WF	3,000			0	42°10'51"	115°10'34"
Black Canyon	ID-CTF-	WF	583			0	42°1'18"	112°6'21"

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	007018								
Hula Fire	ID-SCS-002032	WF	563				0	42°54'9"	114°55'8"
Arkansas	ID-IFDS-007015	WF	1,498	0		0	0	42°32'5"	112°8'15"
Twin Buttes	ID-INE-007036	WF	9,436	0	0	0	0	43°29'5"	112°40'7"
Rowland	ID-TFD-002012	WF		0	0	0	0	41°56'57" "	115°37'18"
ELK MOUNTAIN	ID-TFD-002017	WF		0		0	0	42°2'13"	115°6'32"
Wood Creek	ID-BOD-000629	WF	2,300				0	43°31'22" "	115°51'59"
INDIAN VALLEY	ID-PAF-007118	WF	572	0			0	44°28'53" "	116°24'39"
Pipeline	ID-IFDS-007020	WF	500			0	0	42°6'33"	111°56'39"
PEARLIE	ID-BOD-000714	WF	2,450				0	43°49'53" "	116°50'48"
NORTH FORK	ID-SIS-007058	WF	800				0	44°41'57" "	115°49'40"
Michaud Creek	ID-FHA-007006	WF	1,000			4	0	42°53'3"	112°35'7"
Elm Street Complex	ID-IPF-004001	WF	107			0	0	47°7'1"	116°13'14"
TONGUE COMPLEX	ID-BOD-000490	WF	46,680	0		3	0	42°15'53" "	116°52'28"
JIM CANYON	ID-STF-002031	WF	4,300				0	41°57'23" "	113°12'5"
Hidden WFU	ID-CWF-000039	WF U	1,400				0	46°21'24" "	114°35'44"
Concord	ID-NPF-000022	WF	1,570				0	45°35'42" "	115°44'5"

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CEDAR SOUTH	ID-TFD-002057	WF	851				0	42°9'41"	114°49'53"
Lizard	ID-NPF-00046	WF U	450				0	46°13'54"	115°6'57"
Dog	ID-NPF-00047	WF U	1,200					46°6'36"	114°50'18"
Three Links	ID-NPF-00036	WF U	1					46°8'30"	115°5'21"
Snowslide WFU	ID-NPF-000014	WF U	5					45°56'59"	115°8'23"
Chain	ID-NPF-00042	WF U	300					46°19'42"	114°53'14"
Mink	ID-NPF-00041	WF U	1					46°3'24"	115°2'48"
Rhoda	ID-NPF-00048	WF U	2					46°14'12"	115°2'36"
Fitting	ID-NPF-00018	WF U	55				0	46°11'24"	114°52'36"
Drake	ID-NPF-00035	WF U	280				0	45°59'15"	115°7'42"
Kendrick	ID-PDS-041006	WF	175				0	46°36'24"	116°40'6"
COLD	ID-BOD-000777	WF	3,690	0	0	0	0	43°6'21"	115°22'17"
Doe	ID-NPF-00055	WF U	1					45°59'49"	115°5'49"
HORTON	ID-PAF-007136	WF	1,000				0	45°7'8"	116°4'20"
PAPOOSE	ID-SCF-7371	WF U	235					45°16'12"	114°48'18"
INSIDE DESERT	ID-TFD-002016	WF	3,041				0	42°19'51"	115°28'22"
Stewart	ID-EICI-007046	WF	360				0	42°23'50"	112°49'48"
GUN CANYON	ID-TFD-002024	WF	7,030				0	42°30'38"	113°27'41"
BALANCED	ID-TFD-002067	WF	500				0	42°33'20"	114°58'18"

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Echo Springs	ID-SJS-32021	WF	505	0		1	0	47°18'50"	116°41'30"
RAINES	ID-PAF-007058	WF		4		3	0	45°18'52"	115°32'29"
Hubbard	ID-EICI-007045	WF	1,106	0		3	0	42°18'38"	112°39'1"
WALCOTT	ID-TFD-002078	WF	3,003				0	42°47'21"	113°19'8"
LAVA BUTTE	ID-TFD-002082	WF	690				0	43°12'19"	113°29'56"
Combine	ID-EICI-007050	WF	7,654	0		0	0	42°18'59"	112°48'38"
HORSE BUTTE	ID-TFD-002089	WF	334				0	42°33'9"	113°27'40"
Boxcar	ID-NPF-00061	WF U	40				0	45°56'23"	114°58'23"
Tony Fire	ID-NPF-000065	WF U	2				0	46°5'30"	114°55'36"
Cone Fire	ID-NPF-000075	WF U	3				0	46°12'18"	114°52'48"
Three Mile	ID-SIX-002071	WF	455				0	43°26'45"	114°50'47"
LOG	ID-NPF-000066	WF U	1					46°10'48"	114°55'48"
Battle Fire	ID-NPF-000076	WF U	7				0	46°13'47"	114°35'21"
Tiger	ID-NPF-000072	WF U	1				0	46°5'48"	114°56'12"
Bailey	ID-NPF-000073	WF U	1				0	46°14'18"	114°53'30"
Grizzly	ID-NPF-000064	WF U	80				0	46°6'12"	114°55'36"
Cleveland Hill	ID-IFD-007024	WF	2,500	1		7	0	42°16'23"	111°45'55"
SHOESTRING	ID-TFD-002095	WF	3,835				0	42°51'53"	114°42'16"
Wahoo	ID-NPF-000080	WF U	10				0	46°8'1"	114°39'1"

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Double	ID-NPF-000081	WF U	1				0	46°14'22" "	114°49'3"
Isaac	ID-NPF-000079	WF U	1				0	46°15'6"	114°49'26"
TAPPEN	ID-SCF-7242	WF U	7					44°53'11" "	114°44'13"
Fox Fire	ID-NPF-000084	WF U	3				0	46°19'22" "	114°48'21"
WOOD	ID-IDFS-007029	WF	2,700	0		0	0	42°13'15" "	112°32'45"
Old Man WFU	ID-CWF-000034	WF U	75					46°15'1"	115°15'35"
Rock Lake WFU	ID-CWF-000035	WF U	55					46°16'52" "	115°14'57"
BOHANNON	ID-IFDN-7174	WF	59				0	45°12'22" "	113°40'28"
Middle Fork Complex	ID-BOF-000642	WF	17,416				0	44°20'58" "	115°29'37"
Russell Ridge	ID-MCS-42013	WF	250	0		0	0	46°26'21" "	116°17'35"
Chimney Complex	ID-CMS-43013	WF	51,000	0		7	0	46°2'48"	116°55'0"
DEADEYE	ID-STF-002077	WF	585				0	42°19'10" "	114°16'30"
Slick 2 WFU	ID-CWF-061	WF U	20				0	46°34'46" "	115°25'1"
Chapin Mountain	ID-SIX-002106	WF	400				0	42°27'8"	113°9'53"
Gifford Springs	ID-TFD-002107	WF	1,500				0	42°40'2"	113°15'35"
Birch Creek	ID-TFD-002105	WF	750				0	42°12'16" "	113°49'27"

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Moonshiner	ID-INE-007063	WF	2,672	0			0	43°29'2"	112°38'34"
Richfield West	ID-TFD-002127	WF	307				0	43°4'36"	114°15'12"
DOVE	ID-STF-002103	WF	600				0	41°51'8"	113°36'12"
WOOD	ID-IFD-007029	WF	2,855	0		0	0	42°13'15"	112°32'45"
Ramey	ID-SCF-7258	WF U	169					44°50'2"	114°52'19"
MOOSE	ID-SCF-7380	WF U	1					43°51'0"	114°3'59"
Bear Den Butte	ID-SCCI-002123	WF	29,532				0	43°8'47"	113°33'50"
Phillips	ID-SCCI-002125	WF	1,849				0	43°21'52"	113°53'26"
COW CREEK	ID-SCCI-002097	WF	5,280			0	0	43°20'48"	115°3'58"
Landmark Complex	ID-BOF-000796	WF	47,270				0	44°38'33"	115°31'57"
ROSS FORK	ID-FHA-007010	WF	1,134	0		1	0	43°1'38"	112°22'1"
Bitch Creek	ID-NPF-000088	WF U	1					46°4'0"	114°55'25"
SANDY	ID-BOD-000912	WF	10,600	0		0	0	44°9'5"	116°46'59"
0-7	ID-MCS-42016	WF	288				0	46°7'25"	115°47'7"
SWEETWATER	ID-IFD-0070036	WF	3,044	0	0	0	0	42°6'38"	111°3'0"
Taylor WFU	ID-CTF-007044	WF U	3				0	43°31'50"	110°59'10"
Middle	ID-TFD-	WF	2,300				0	42°10'39"	113°51'6"

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Mountain	002196								"	
ROSE CREEK	ID-BOD-000935	WF	363					0	42°46'12"	116°43'15"
Plummer	ID-NPF-000096	WF U	2						45°30'45"	115°39'30"
CONFLUENCE COMPLEX	ID-SCF-007371	WF	40,134					0	45°17'56"	114°33'5"
Turnbull	ID-TFD-002206	WF	4,000					0	42°27'29"	113°57'57"
CHIEF PARRISH	ID-SWS-000938	WF	3,690	0				0	44°1'29"	116°8'10"
GERMAN	ID-TFD-002219	WF	1,000					0	42°50'2"	113°31'33"
Boundary Junction	ID-CWF-047	WF	5,100				1	0	46°22'12"	115°35'1"
Bridge	ID-CWF-000038	WF	43,500					0	46°22'3"	114°37'16"
BLACK PINE 2	ID-STF-001943	WF	73,148	0	0	0		0	42°10'36"	113°14'12"
Shower Bath Complex	ID-SCF-7360	WF	122,600				4	0	44°37'15"	114°37'20"
CLEAR SAGE	ID-SCF-7228	WF	20,566						45°15'8"	114°24'59"
Van Horn	ID-SCF-7244	WF	1,650	0			0	0	44°45'55"	114°17'45"
Red Bluff	ID-SCF-7259	WF	62,591				3	0	44°44'29"	114°52'17"
Lake	ID-NPF-000109	WF U						0	45°37'30"	115°5'45"
GRAYS CREEK	ID-PAF-007143	WF	24,900	1			1	0	44°32'15"	116°22'59"
Brush Canyon	ID-IFDS-007037	WF	390					0	42°1'24"	112°15'27"
EAST ZONE COMPLEX	ID-PAF-007071	WF	300,022	6	0	7		0	45°15'0"	115°41'0"

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Cleveland	ID-IFD-007027	WF	16,269	1	0	10	0	42°15'25"	111°48'29"
Murphy Complex	ID-TFD-002030	WF	652,016			3	0	42°10'19"	115°30'32"
Fawntooth	ID-IPF-04021	WF U	1				0	46°57'3"	115°30'38"
LA MOYNE WFU	ID-STF-002018	WF U	5				0	43°50'13"	115°1'7"
Mitchell	ID-IFD-007026	WF	9,473	0	0	0	0	42°17'32"	112°42'53"
ELLIE	ID-CTF-007072	WF U	0				0	43°24'30"	111°2'54"
KRASSEL COMPLEX	ID-PAF-007078	WF U	85,700				0	45°24'18"	114°52'30"
Maple	ID-CWF-0055	WF U					0	46°16'5"	114°44'7"
Spring Mountain	ID-CWF-000076	WF U					0	46°34'57"	114°54'7"
Syrup	ID-CWF-0058	WF U	50				0	46°15'32"	144°44'47"
County Line	ID-CWF-000077	WF U					0	46°35'3"	114°53'27"
Moose Creek WFU	ID-NPF-000047	WF U	48,630			1	0	46°6'36"	114°50'18"
Poe Cabin	ID-CMS-043014	WF	58,520	3		9	0	45°41'39"	116°28'40"
Spring Run	ID-CTF-007060	WF U	1				0	43°17'25"	111°3'58"
Elk Jensen	ID-CTF-007073	WF U	0				0	43°13'4"	111°13'21"
Bell	ID-NPF-000087	WF U	115				0	46°3'12"	114°29'56"
Trapper Ridge WFU	ID-BOF-000575	WF U	20,159				0	44°1'22"	115°21'10"

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Cascade Complex	ID-BOF-000635	WF	302,376	1	0	4	0	44°40'9"	115°41'9"
Castle Rock	ID-STF-002132	WF	48,520	0	0	0	0	43°38'14"	114°33'39"
Slick	ID-CWF-054	WF U	410				0	46°34'58"	115°25'47"
BEAR WFU	ID-CTF-007046	WF U	3,621		0		0	43°14'11"	111°22'30"
Crag WFU	ID-CWF-000063	WF U						46°56'30"	115°35'35"
Elizabeth WFU	ID-CWF-000059	WF U	2				0	46°46'37"	115°14'20"
Cayuse WFU	ID-CWF-000029	WF U						46°38'4"	115°5'53"
Skull WFU	ID-CWF-000009	WF U	2					46°54'14"	115°19'20"
Fish Butte	ID-CWF-052	WF U	132					46°11'44"	115°24'34"
Fire Creek	ID-CWF-071	WF U						46°11'44"	115°24'34"
Rattlesnake	ID-NPF-000017	WF	102,000	5	0	3	0	45°25'51"	115°39'23"
HOMINY WFU	ID-CTF-007070	WF U	110				0	44°1'33"	110°56'3"
SHERMAN PEAK	ID-CTF-007057	WF U	0				0	42°27'37"	111°33'10"
TOTALS			2,495,879	24	0	82	0		

MONTANA

Incident			Structures Destroyed						
Name	ID	Type	Size	Primary	Commercial	Out Building	Fatalities	Latitude	Longitude
Madison Arm	MT-GNF-020	WF	3,660	0	0	0	0	44°41'58"	111°9'58"
Magruder Mtn #2	MT-BRF-5027	WF U	1					45°41'15"	114°48'46"
Magruder Mtn #1	MT-BRF-5026	WF U	1					45°42'25"	114°49'23"
FAREWELLL	MT-BID-000013	WF	521				0	45°33'2"	108°53'50"
Fort Harrison	MT-CES-034	WF					0	46°37'36"	112°9'46"
Halfway Pete	MT-BRF-5060	WF	3				0	45°43'15"	114°35'11"
Big Sag	MT-LED-022	WF	800				0	47°39'14"	109°46'57"
TIMBER CREEK	MT-MCD-027	WF	609				0	45°39'28"	104°59'42"
Fargo Coulee	MT-LED-024	WF	100				0	47°31'26"	108°50'42"
Black Coulee	MT-LED-026	WF	5,660			1		48°17'0"	107°49'0"
DIAMOND RING	MT-EAS-003	WF	270				0	46°36'22"	105°31'18"
CAMPBELL	MT-	WF	800				0	46°6'59"	105°40'51"

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	EAS-004									"
LITTLE WOLF CREEK	MT-CES-052	WF	547	0				0	47°18'27"	112°16'24"
Rugby	MT-LCF-000022	WF	130	0				0	46°59'24"	111°0'43"
NOVAK	MT-CES-00051	WF	1,859	0				0	47°17'22"	112°0'55"
RUMP	MT-MCD-048	WF	544					0	45°4'39"	105°33'6"
Bull Creek	MT-LED-027	WF	86						47°50'0"	108°44'0"
Swet Lake Cabin	MT-BRF-5039	WF U	1				0	0	45°31'42"	114°50'50"
Saddle Gulch	MT-BRF-5087	WF U	5						45°44'23"	114°39'14"
SAWMILL CREEK	MT-LNF-000145	WF	320	0	0	0		0	46°36'25"	113°42'2"
Wyman #2	MT-LNF-207	WF	800	0	0	0		0	46°21'28"	113°42'57"
Fisher Point	MT-LNF-000203	WF	200					0	46°29'56"	113°39'46"
VALLEY DRIVE	MT-EAS-008	WF	213					0	46°30'9"	105°40'38"
CUTT COULEE	MT-EAS-011	WF	1,020					0	46°5'45"	105°9'10"

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Mile Marker 124	MT-SWS-000204	WF	6,231	0		0	0	46°45'0"	113°42'0"
Harrington Ridge	MT-BRF-5053	WF U	3,090			0	0	45°31'35" "	114°53'21" "
Elkhorn Ridge	MT-BRF-5099	WF U	225			0	0	45°29'14" "	114°51'24" "
Harrington Mountain	MT-BRF-5058	WF U	150			0	0	45°32'11" "	114°55'6"
BRIARWOOD	MT-SOS-000007	WF	105				0	45°42'0"	108°30'0"
Patsy Anne	MT-BRF-5126	WF U	555				0	45°57'46" "	114°26'41" "
El Capitan West	MT-BRF-5116	WF U	1,317				0	45°59'3"	114°28'33" "
Watchtower	MT-BRF-5124	WF U	40				0	45°51'52" "	114°27'45" "
JONES	MT-MCD-080	WF	1,206				0	46°17'8"	105°40'51" "
SEVERSON ROAD	MT-EAS-00013	WF	250				0	46°15'16" "	105°43'39" "
GOODALE	MT-EAS-000015	WF	335				0	45°51'10" "	106°12'4"
BALL RANCH	MT-EAS-000016	WF	628				0	45°52'54" "	106°12'44" "
SOUTH	MT-	WF					0	46°2'20"	106°10'21"

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MILLER	MCD-082									"
MOON CREEK SETTLEMENT	MT-EAS-000017	WF	1,161	0			0	0	46°2'13"	106°7'34"
OKERMAN	MT-EAS-000014	WF		0			1	0	46°12'57"	105°34'52"
WOLF CREEK	MT-MCD-087	WF	6,692	0			0	0	46°13'37"	105°49'37"
Tin Cup	MT-BRF-005138	WF	608	0				0	46°1'22"	114°14'1"
MAXWELL	MT-MCD-084	WF	1,700					0	45°56'44"	105°17'55"
Snake Creek	MT-BRF-5097	WF U	210					0	45°51'18"	114°42'29"
ROAD CREEK	MT-EAS-018	WF	5,770	0		0	1	0	45°31'38"	105°41'41"
Signal Rock 07	MT-BDF-129	WF	600					0	46°9'31"	113°46'59"
DeCock	MT-LG33-000001	WF	250					0	46°4'28"	107°3'6"
Pine Crest	MT-SOS-000008	WF	149	0				0	45°35'31"	109°7'37"
Lost Creek	MT-CRA-000098	WF	149					0	45°18'2"	108°26'58"

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Ovando Point	MT-LNF-000253	WF	74					0	47°6'13"	113°0'51"
Ingomar Lake	MT-BRF-005148	WF U	100					0	46°13'7"	114°24'20" "
POWDER RIVER COMPLEX	MT-MCD-096	WF	27,884	1			1	0	45°13'58" "	106°12'35" "
Ford	MT-SOS-000012	WF	804	3				0	45°47'22" "	108°23'11" "
BOYCE	MT-NES-003	WF	400						47°36'59" "	109°41'49" "
LAST DAY	MT-CMR - 008	WF	493					0	47°32'53" "	108°7'41"
Black Cat	MT-SWS-000211	WF	11,758	0	0		7	0	47°1'20"	114°9'6"
Chouteau Co. Asst.	MT-NES-004	WF	2,800	0			2	0	47°43'0"	110°24'0"
BH	MT-BRF-005145	WF	758					0	45°39'0"	114°49'15" "
LIGHTHOUSE	MT-EAS-000035	WF	996				1	0	46°30'53" "	105°45'55" "
BITTERROOT FIRE USE COMPLEX	MT-BRF-000160	WF U	18,790				1	0	45°57'46" "	114°26'41" "
Forest Grove	MT-LNF-	WF	180						47°4'18"	114°46'0"

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	00064 0								
Chippy Creek	MT- NWS- 431	WF	99,090	1		1	0	47°48'30" "	114°59'50" "
Porcupine	MT- GNF- 062	WF	124				0	46°5'49" "	110°24'39" "
HICKS PARK	MT- GNF- 088	WF	2,500				0	45°18'32" "	110°14'39" "
JOE LEG	MT- MCD- 125	WF	388				0	45°48'5" "	106°21'23" "
Felix	MT- FNF- 092	WF	645				0	48°11'12" "	113°40'26" "
STUBBLE	MT- FBA- 135	WF	1,051					48°10'46" "	108°35'49" "
Jocko Lakes	MT- FHA- 115	WF	36,388	1	0	7	0	47°11'56" "	113°43'46" "
SAWMILL COMPLEX	MT- LNF- 211	WF	67,490				0	46°36'25" "	113°42'2" "
South Helen	MT- FNF- 003	WF U	1				0	47°41'48" "	113°17'23" "
CONGER CREEK	MT- LNF- 00014 3	WF	25,150		0	0	0	47°12'59" "	113°2'13" "
Brush Creek	MT- FNF- 00003 9	WF	29,921				0	48°20'37" "	114°54'38" "
Rat Creek	MT- BDF- 00011 3	WF	25,327				0	45°43'8" "	113°51'4" "

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Pattengail Creek	MT-BDF-048	WF	15,297					0	45°41'27"	113°25'17"
FIVEMILE CREEK	MT-MCD-131	WF	1,370	0				0	45°3'25"	104°21'17"
AHORN	MT-LCF-000013	WF	52,505					0	47°31'48"	113°2'48"
MIDDLE FORK	MT-LCF-000008	WF	1,146					0	46°50'31"	110°26'32"
Fool Creek	MT-LCF-000009	WF	60,038				7	0	47°55'24"	112°59'17"
SKYLAND	MT-FNF-000035	WF	45,760	0	0	2		0	48°16'48"	113°23'6"
ROCK SPRINGS	MT-MCD-132	WF	3,237	0			0	0	46°52'7"	106°6'38"
WH COMPLEX	MT-GNF-000078	WF	29,100	0	0	0		0	45°14'8"	110°31'8"
GARCEAU	MT-FHA-107	WF	3,045	0				0	47°38'10"	114°26'30"
Calbick	MT-FNF-076	WF	1,011					0	48°6'51"	113°11'14"
Amphitheatre	MT-FNF-045	WF U	377						47°40'45"	113°11'13"
Turtlehead	MT-FNF-014	WF U	1,408					0	47°40'24"	113°13'9"

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Corporal	MT-FNF-070	WF	16,104				0	47°53'31"	113°25'20"
Railley Mountain	MT-FNF-027	WF	21,858				0	47°17'58"	113°16'51"
Table Mountain	MT-FNF-101	WF U	100					47°52'40"	113°7'1"
WALK IN	MT-NCA-000032	WF	371				0	45°40'51"	106°27'11"
Meriwether	MT-HNF-033	WF	43,296	0		0	0	46°52'11"	111°52'56"
Rombo Mountain	MT-BRF-5130	WF	29,062	0			0	45°44'54"	114°14'7"
Chi Chi	MT-SOS-000018	WF	18,000	3	3	36	0	46°5'51"	110°10'23"
TOTALS			745,767	9	3	68	0		

Appendix B

Various News and Data Reports

From the Website – U.S. Air Quality, The Smog Blog,

[Http://alg.umbc.edu/usaq/archives/2006_07.html](http://alg.umbc.edu/usaq/archives/2006_07.html)

From the SMOGBLOG:

August 5, 2007

Haze in southeast/midAtlantic, fires in the west

Looking at the big picture from MODIS Aqua, the southeast and midAtlantic U.S. had significant haze today, likely enhanced by smoke, pushing fine particle concentrations into the [Code Orange unhealthy range](#). In the northwest, dense smoke continued to cover Idaho, Montana, North Dakota, Minnesota, and southern Canada.



NOAA Satellite and Information Service

National Environmental Satellite, Data, and Information Service (NESDIS)



National Climatic
Data Center

U.S. Department of Commerce



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Climate of 2007 Wildfire Season Summary

National Climatic Data Center

15 November 2007.....

“July

Fire activity spread dramatically across the West this past month. During mid-July, wildfires were burning across [northern Nevada](#), [eastern Oregon](#), and [southern and central Idaho](#), and during the latter-half of July activity was focused [across the Northern Rockies](#).

Idaho lawmaker blames grazing restrictions for wildfire's size

[THE ASSOCIATED PRESS](#)

[Seattle Post-Intelligencer](#)

July 24, 2007

BOISE, Idaho -- An Idaho state lawmaker-rancher is blaming federal grazing restrictions for the size and ferocity of a giant wildfire on the Idaho-Nevada border, a contention dismissed as baseless by the leader of a conservation group.

The Murphy Complex fire has burned across nearly 975 square miles, burning up grassland and killing at least one cow that couldn't escape the flames. Two small communities were briefly under evacuation orders.

Meanwhile, a northern Idaho man says firefighters set a backfire that destroyed his \$1.2 million guest ranch, including an indoor riding arena.

And another northern Idaho resident reported that his home was looted after he fled a fire near Waha.

The Murphy Complex fire killed at least one cow owned by Rep. Bert Brackett, R-Rogerson, although officials say more dead cattle will likely be found.

"This didn't have to happen," he told The Times-News as he stood over the charred body of a cow. Had more cattle been allowed to graze, there would have been less available fuel, he said.

"I think we need to take a hard look at basic (grazing) policy issues because what we're doing just isn't working," Brackett said.

Jon Marvel, executive director of the Idaho-based conservation group Western Watersheds Project, disagreed.

"There is no scientific evidence that cattle or sheep grazing prevents fires at any time," he said. "If ranchers have evidence that grazing prevents fires, they should produce it."

Rick Vander Voet, a field manager with the U.S. Bureau of Land Management based in Jarbidge, Nev., said BLM offices are assessing grazing allotments to determine how the land is being affected by grazing regulations. He said the assessments are expected to be finished in the next two years.

The fire was about 30 percent contained, said Mark Wilkening, fire information officer, noting rain on Wednesday was helping.

Some buildings were being defended by firefighters, and power has been restored to Murphy Hot Springs and Jarbidge, Nev., which had been the subject of evacuation orders.

Meanwhile, the owner of Boulder Creek Outfitters, about eight miles north of White Bird in northern Idaho, said a backfire started last Thursday by firefighters in their efforts against the Poe Cabin Fire was left unmonitored and, when winds came up, burned over a mountain and down the other side to destroy the six buildings at the ranch on Friday.

"The backburn is what burnt us," Tim Craig told The Associated Press on Wednesday. "There was no monitoring it and the winds came and brought it over the hill."

He said he sent six employees out of the area when he saw flames approaching and then used heavy equipment to try to build a fire line around the ranch, but was forced to flee.

"I had to jump in a vehicle and drive through a bunch of flames," he said. "It killed deer right in the road. They weren't burnt at all - just no oxygen. The fire took all the air."

He said he is considering legal action.

Jodi Kramer, a spokeswoman for the Poe Cabin Fire, said the cause of the fire is under investigation but she had no information about any backfires that might have been started.

Laura Smith, a spokeswoman for the Nez Perce National Forest, said the Poe Cabin Fire was at 59 square miles and 20 percent contained on Wednesday, with about 400 managers and firefighters assigned to the blaze.

"We've got most of the flanks protected, especially up in the northern area, so that's either defensible space or structure protection, so we're focusing now on the southern flank," she said.

At another northern Idaho fire, the Chimney Complex south of Waha, an area resident returned from a mandatory evacuation to discover that about \$9,000 worth of items had been taken between Friday and Saturday, according to a Nez Perce County sheriff's report.

The report said two computers, 200 DVDs, elk and deer meat, a case of red wine, a generator, five leather jackets, clothing, two chain saws and a wood splitter were taken.

Sheriff's officers say they are investigating.

On Wednesday, the Chimney Complex of fires had burned across about 80 square miles and was 65 percent contained, officials said.

About 13 large fires were burning in the state and had consumed about 1,400 square miles, according to the National Interagency Fire Center, based in Boise.

Western wildfire roundup

http://www.newwest.net/index.php/topic/article/wildfires_aggressive_in_idaho_oregon_montana/C38/L38/

Wildfires Aggressive in Idaho, Oregon

By Matthew Frank, 7-16-07

Oregon's [Egley Complex Fire](#) northwest of Burns blackened another 11,500 acres Sunday for a total of 101,000. The growth potential remains extreme and a precautionary evacuation was implemented Sunday night by the Harney County Sheriff's Department for the Yellow Jacket area. Five homes were evacuated until further notice. More than 1,800 personnel are assigned to the blaze, now about 45 percent contained. Visit InciWeb.org for more.



Also in Oregon, the Monument Complex Fire burning in the Umatilla National Forest five miles north of Monument has jumped to 20,898 acres, zero percent contained. Power lines and 245 homes near Monument are threatened.

The [Ahorn Fire](#) burning 35 miles west of Augusta, Montana. Photo courtesy of the Forest Service.

Visit the [National Interagency Fire Information page](#) for a rundown of all of Oregon's fires, totaling more than 156,000 acres.

Idaho

In Idaho, lightning storms sparked several fires that continue to grow. The Black Pine 2 Fire, ignited on July 6, is burning six miles southeast of Malta in the Sawtooth National Forest. A crew of almost 400 firefighters has the 72,000-acre fire 75 percent contained.

The Tongue Complex Fire, 45 miles south of Silver City took off fast Sunday, burning an additional 10,000 acres. Officials predict it will be tough to get a handle on the blaze with 97 firefighters preparing for more wind and heat. The Tongue Complex Fire is now 10 percent contained, after burning close to 48,000 acres.

The Chimney Complex fire, 19 miles south of Lewiston, prompted officials to issue a precautionary advisory for the area. Residents around Waha Lake and Redbird road have been advised to move

livestock and pack valuables in case evacuation is necessary. A crew of 178 is working on the fire, which now totals nearly 20,000 acres.

Montana

The [Ahorn Fire](#), burning 35 air miles West of Augusta on the Lewis and Clark National Forest grew over the weekend from 600 acres to an estimated 4,000, helped by high winds. Firefighters were pulled, for safety reasons, from the fire as it spread in “all directions,” under a thunderstorm, said Fire Information Officer Jack de Golia. A helicopter went down Monday morning near the fire’s helispot, about three miles south of the Indian Point cabin. The pilot is reported to have minor injuries.

Meanwhile, the Patengail Creek Fire in Southwest Montana 10 miles north of Wisdom made significant movement Sunday afternoon fueled by high winds and was estimated at nearly 1100 acres by nightfall, according to [InciWeb.org](#). Helicopters and air tankers were dropping water and retardant on the fire over the weekend, but no crews were on the ground because there are no escape routes or safety zones in the area. Two Hot Shot crews were heading into the area Sunday to try to start anchoring a line from the Upper Stone Lake.

Utah

The 363,000-acre Milford Flat Fire is 95 percent contained. Click [here](#) for words and pictures of what Utah’s largest fire in history left behind.

Wyoming

Rain has helped to contained the 2,582-acre Salt Lick Fire burning northwest of Pinedale. It’s 40 percent contained and the growth potential is low.

A new start dubbed the Sheep Trail 2 Fire 24 miles northwest of Kemmerer is up to 800 acres, zero percent contained.

For updates visit [InciWeb.org](#) and the [National Interagency Fire Center](#).

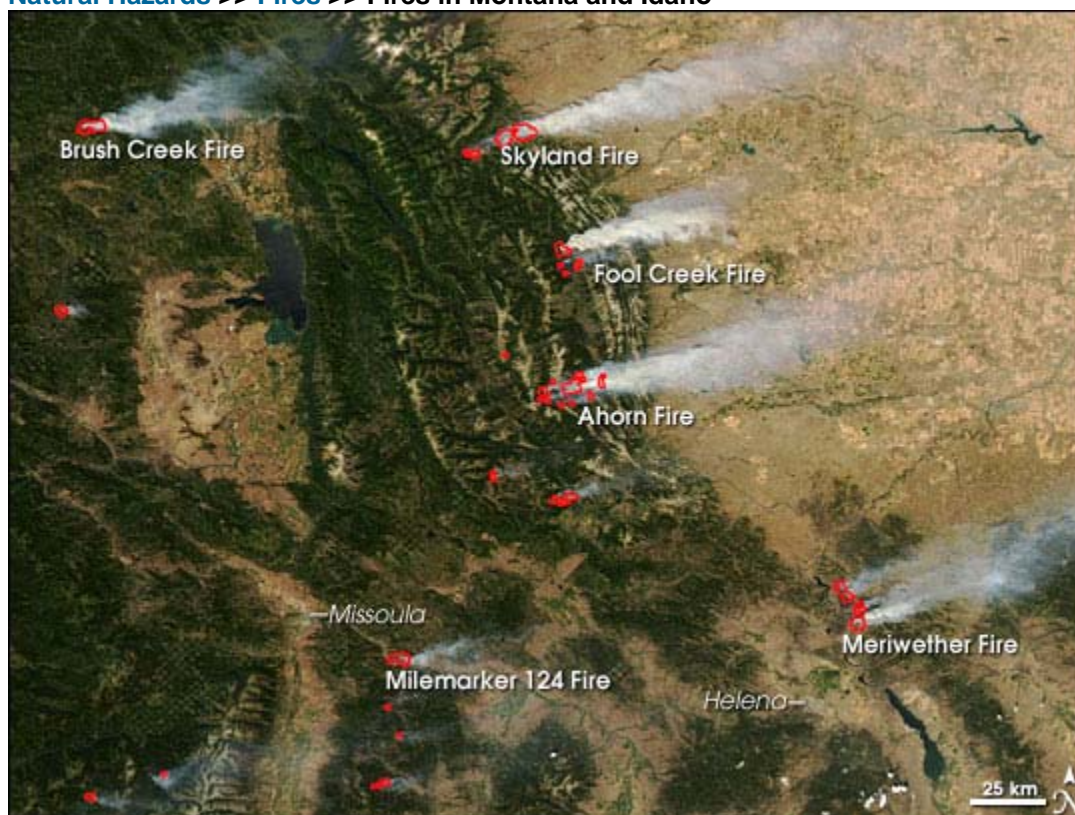
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NATURAL HAZARDS

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Image Acquired: July 31, 2007

Fires in Montana and Idaho

In the northern Rocky Mountains of Idaho and Montana, dozens of large, dangerous wildfires burned tens of thousands of acres in late July and early August 2007. Several communities in Montana were under evacuation on August 1, according to the daily report from the [National Interagency Fire Center](#). Like much of the United States (with the notable exception of the southern [Great Plains](#)), the Northern Rockies of Montana and Idaho were experiencing



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moderate to severe drought in late July according to the weekly report from the U.S. Drought Monitor.

This image of Montana (with a little bit of Idaho included in the lower-left corner) was captured by the Moderate Resolution Imaging Spectroradiometer (MODIS) on NASA's Aqua satellite on July 31, 2007. Locations where the sensor detected actively burning fires are outlined in red. A westerly wind appeared to have been blowing at the time of the image (2:30 p.m. Mountain Daylight Time), and plumes of smoke spread from the mountains over the state's eastern plains. As of August 1, the Meriwether (20,745 acres) and Ahorn (36,311 acres) were the largest fires in the scene, but the Skyland Fire had grown most rapidly in the previous 24 hours; it grew by an estimated 7,505 acres to a total of 16,055 acres.

NASA's Terra and Aqua satellites both collect fire detection data over the United States at least twice a day, once in daylight and once at night. Through a partnership between NASA's Goddard Space Flight Center's MODIS Rapid Response Team, the University of Maryland, and the Remote Sensing Application Center of the USDA Forest Service, the satellite observations are relayed over the Internet to the Forest Service, which maps them. The Forest Service and its partners use the MODIS fire maps to help them make strategic decisions about where firefighting resources are needed at a national level.

The large image provided above has a spatial resolution (level of detail) of 250 meters per pixel. The MODIS Rapid Response Team provides twice-daily images of the region in additional resolutions.

NASA image courtesy the MODIS Rapid Response Team, Goddard Space Flight Center

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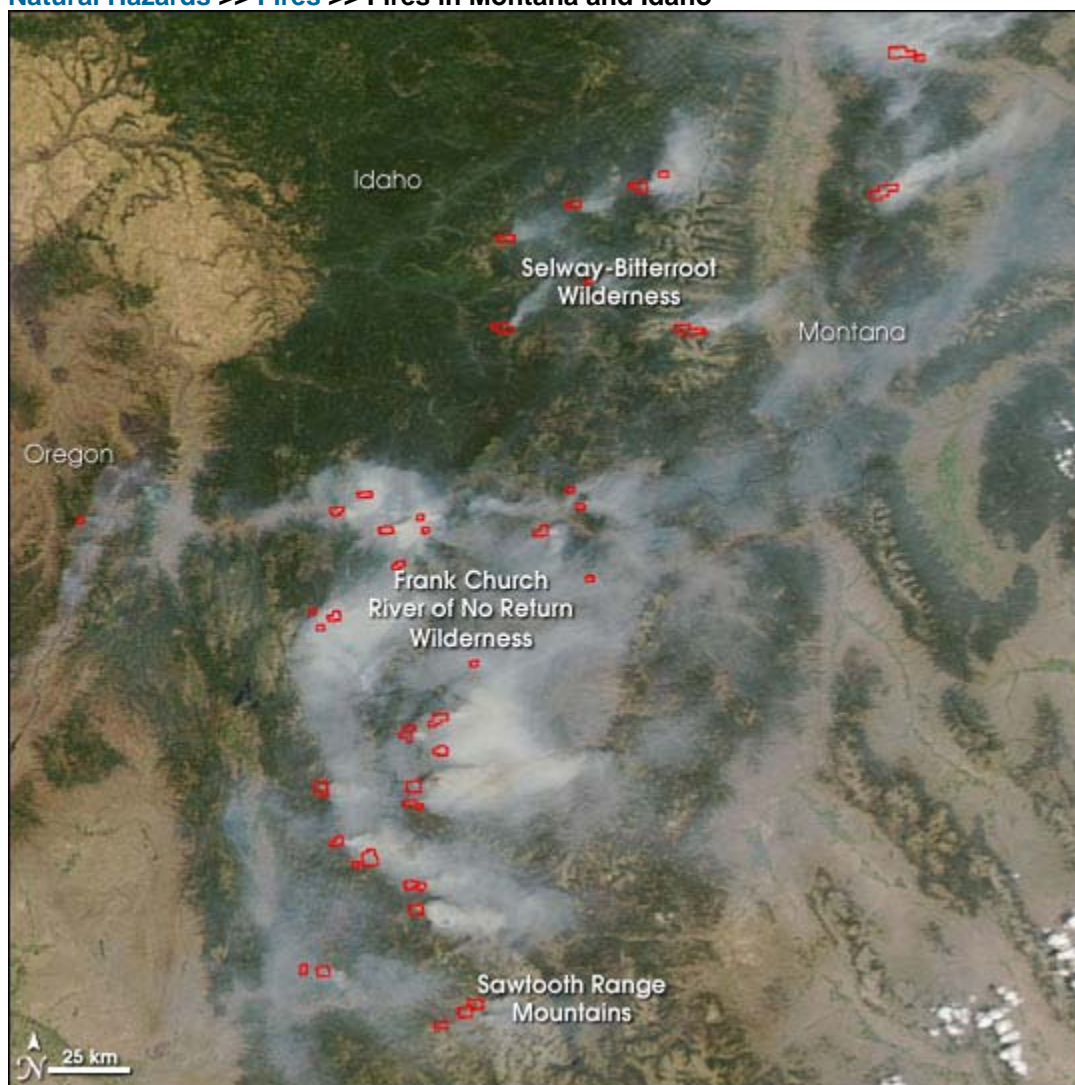
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Image Acquired: August 01, 2007

Fires in Montana and Idaho

In the Northern Rockies of Idaho and Montana, conditions were dry in July and August 2007. Dozens of large forest fires were burning in the area's remote,

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rugged terrain, much of which is federally designated wilderness area. This image of the area was captured on August 1, 2007, by the Moderate Resolution Imaging Spectroradiometer (MODIS) on NASA's Aqua satellite. Places where MODIS detected actively burning fire are outlined in red. Dozens of large fires filled the skies with thick smoke.



According to the August 1 report from the [National Interagency Fire Center](#), 11 large fires totaling more than 880,000 thousand acres were burning in Idaho. Five of these had been designated "Wildland Fire Use" fires, which means they will be allowed to burn according to pre-existing natural resource management plans. Because the forests of the Northern Rockies are adapted to naturally ignited fires, some fires must be allowed to burn to maintain the ecosystem in a healthy state.

The large image provided above has a spatial resolution (level of detail) of 250 meters per pixel. The MODIS Rapid Response Team provides [twice-daily](#) images of the region in additional resolutions.

NASA image courtesy the [MODIS Rapid Response Team](#), Goddard Space Flight Center

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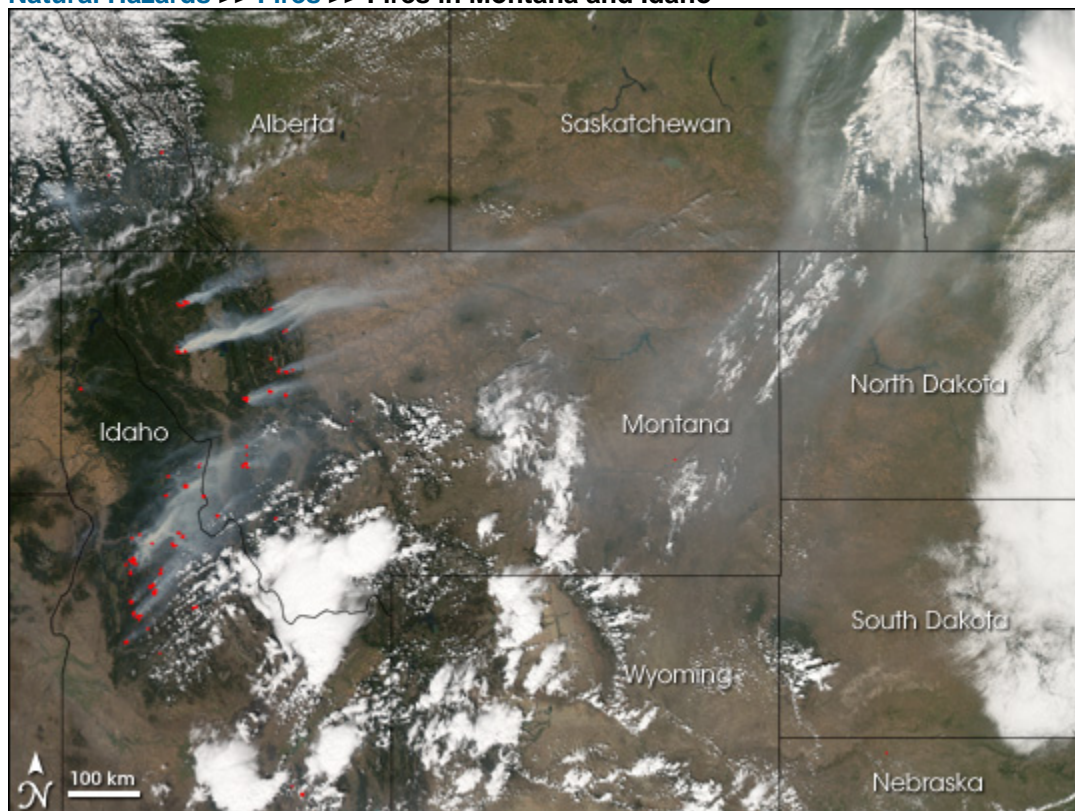
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Image Acquired: August 04, 2007

Fires in Montana and Idaho

Intense wildfires (location in red) raged in Idaho and Montana when the Moderate Resolution Imaging Spectroradiometer ([MODIS](#)) on NASA's [Aqua](#) satellite captured this image on August 4, 2007.

According to reports from the [National Interagency Fire Center](#) on August 7, Idaho and Montana each had 14 large fires burning, with windy weather predicted to increase fire behavior in the area in



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subsequent days. In Montana, the fires had affected more than 255,000 acres; in Idaho, fires had affected nearly 400,000 acres. These fires produced [smoke](#) that blanketed much of the United States.

You can download a [250-meter-resolution KMZ file of the fires in Montana and Idaho](#) suitable for use with [Google Earth](#).

NASA image created by Jesse Allen, using data provided courtesy of the [MODIS Rapid Response](#) team.

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Image Acquired: August 13, 2007

Fires in Montana and Idaho

Columns of thick smoke unfurled from forest fires burning across Idaho, Montana, and Wyoming and spread eastward across the plains at the foothills of the Northern Rocky Mountains on August 13, 2007. This image of the area was captured by the Moderate Resolution Imaging Spectroradiometer (MODIS) on NASA's Aqua satellite at 2:00 p.m. local time (U.S. Mountain Daylight Time). Locations where the sensor detected active fire are outlined in red. Fires are especially active in the Frank Church River of No



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Image Posted

Return Wilderness Area south of Idaho's Salmon River. Gray-brown smoke cuts a diagonal swath across the center of the image. Smoke from these fires has been crossing the United States off and on throughout August, degrading air quality as far away as the East Coast.

The large image provided above has a spatial resolution (level of detail) of 250 meters per pixel. The MODIS Rapid Response Team provides [twice-daily](#) images of the region in additional resolutions.

NASA image by Jeff Schmaltz, [MODIS Rapid Response Team](#), Goddard Space Flight Center.

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