



MEMO

TO: Jim Keane, Chair
Environmental Quality Council

FROM: Bob Habeck, Program Manager
Air Resources Management Bureau

DATE: September 13, 2012

SUBJECT: Wildfire Smoke and Air Quality Discussion Materials

Attached for your consideration are materials in support of the discussion involving wildfire smoke and air quality. Questions regarding these materials may be directed to me at 444-7305 or by e-mail at bhabeck@mt.gov.

MT DEQ Wildfire Smoke Program

- Monitoring Current Wildfire Smoke
- Forecasting Future Wildfire Smoke
- Communicating Information to the Public

Monitoring - Network of Ambient Samplers

- 13 community monitoring sites for PM-2.5
- Communities with monitors are those already susceptible to air pollution
- Visibility Ranges by Health Effects Categories

Forecasting - Wildfire Smoke Update

- Daily report / current conditions / communities at risk
- Produced up to seven days per week / 2x per day (morning / afternoon)
- Smoke forecast using MET, Inciweb, satellite imagery, etc. next 12 hours

Communicating – Public and Media Outreach

- Today's Air web site – Dots on the map with associated Health Effects Categories
- Phone calls to DEQ staff from public & stakeholders
- Media contacts including television, radio, and newspaper
- DEQ outreach and coordination with stakeholders, FLMs, county health departments, etc
- Outdoor Sporting Events handout – cooperation with OPI, DPPHS, State Medical Physician
- Always emphasizing coordination with personal physicians / county health officers

Contact

Bob Habeck, Air Program Manager
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444-7305w bhabeck@mt.gov

Today's Air



HEALTH EFFECTS CATEGORIES

Air Quality Index (AQI) for BAM-2.5 24-Hour ¹

Health Effects Categories	Health Effects	Cautionary Statements
Hazardous	Serious aggravation of heart or lung disease and premature mortality in persons with cardiopulmonary disease and the elderly; serious risk of respiratory effects in the general population.	Everyone should avoid any outdoor exertion; people with respiratory or heart disease, the elderly, and children should remain indoors.
Very Unhealthy	Significant aggravation of heart or lung disease and premature mortality in persons with cardiopulmonary disease and the elderly; significant risk of respiratory effects in the general population.	People with respiratory or heart disease, the elderly, and children should avoid any outdoor activity; everyone else should avoid prolonged exertion.
Unhealthy	Increased aggravation of heart or lung disease and premature mortality in persons with cardiopulmonary disease and the elderly; increased respiratory effects in the general population.	People with respiratory or heart disease, the elderly, and children should avoid prolonged exertion; everyone else should limit prolonged exertion.
Unhealthy for Sensitive Groups	Increasing likelihood of respiratory symptoms in sensitive individuals, aggravation of heart or lung disease and premature mortality in persons with cardiopulmonary disease and the elderly.	People with respiratory or heart disease, the elderly and children should limit prolonged exertion.
Moderate	Possibility of aggravation of heart or lung disease among persons with cardiopulmonary disease and the elderly.	None

¹ Guideline For Reporting Of Daily Air Quality – Air Quality Index (AQI), EPA-454/R-99-010, July 1999, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina, 27711.

VISIBILITY RANGES

Health Effects Categories	Visibility Ranges (miles) ³
<u>Hazardous</u>	< 1.3
<u>Very Unhealthy</u>	2.1 - 1.3
<u>Unhealthy</u>	5.0 - 2.2
<u>Unhealthy for Sensitive Groups</u>	8.7 - 5.1
<u>Moderate</u>	13.3 - 8.8
<u>Good</u>	> 13.4 +

The procedure for making personal observation to determine the forest fire smoke index value for local areas without National Weather Station (NWS) or Department of Environmental Quality (DEQ) monitors is:

1. Face away from the sun.
2. Determine the limit of your visible range by looking for targets at known distances (miles).
3. Visible range is that point at which even high contrast objects totally disappear.
4. Use the values above to determine the local forest fire smoke category.

Air Quality Resources For Wildfire Smoke

Today's Air Website: <http://todaysair.mt.gov/>

The public may go directly to this website, or may find a link from the DEQ home page. DEQ provides real-time PM2.5 monitoring for thirteen locations across the state. Cumulative PM2.5 exposures are reported as one hour, eight hour, and 24 hour averages.

Wildfire Smoke Update: <http://svc.mt.gov/deq/smokereport/mostRecentUpdate.aspx>

From the Today's Air web page, the link to the Wildfire Smoke Update home page is at the top-center. From here, one must click on the "Most Recent Smoke Update" link. This web page is updated every day during fire season by the state air quality meteorologist. The page includes a descriptive narrative of current smoke conditions around the state, wildfire activity, and a weather and smoke forecast.

Explanation of health effects categories: <http://www.deq.mt.gov/FireUpdates/SmokeCategories.mcpX>

Links to this page are provided on the Today's Air home page, the Wildfire Smoke Updates home page, and at the bottom of each Wildfire Smoke Update.

Visibility ranges to determine health effects categories:

<http://www.deq.mt.gov/FireUpdates/VisibilityRanges.mcpX>

Links to this page are provided on the Wildfire Smoke Updates home page, and at the end of the narrative description in each Wildfire Smoke Update. Using the visibility guidelines is suggested for anyone that does not live near one of the thirteen air monitors. One can determine the range of visibility wherever they are and then associate that visibility range with a health effect category to better understand the air quality conditions and the general precautions they can use to protect themselves.

Recommendations for outdoor sporting events:

This PDF can be found on the Wildfire Smoke Updates home page. It was produced by Montana DPHHS, in conjunction with DEQ, and provides recommendations for outdoor physical activity under given visibility ranges and air quality health effects categories.

County Air Quality Programs: <http://www.deq.mt.gov/AirQuality/coprograms.mcpX>

This link can be found on the Today's Air home page. Some counties have their own air quality program, which may provide more specific and localized health-based information in times of poor air quality.



Decision making recommendations during wildfire season for

Outdoor Sporting Events

based on visibility and air quality

Health Effect Category*	Visibility†	Recommendation
Good	13.4 miles and up	Hold outdoor sporting events as usual. Athletes with asthma should keep rescue inhalers at hand. Athletes with other smoke related sensitivities should take precautions as symptoms dictate.
Moderate/ Unhealthy for Sensitive Groups	5.1 to 13.3 miles	Hold outdoor sporting events as usual. Athletes with asthma should have rescue inhalers readily available and pretreat before exercise as directed by their healthcare provider. All athletes with respiratory illness should limit outdoor activity, monitor symptoms and reduce/cease activity if symptoms arise.
Unhealthy	2.2 to 5.0 miles	Consider postponing/delaying outdoor sporting events, especially high exertion activities like soccer and track and field. If possible, move athletic practices indoors. If event/practice is held, athletes with asthma or other respiratory illnesses are advised not to participate. All athletes should limit their outdoor activity for prolonged periods of time.
Very Unhealthy	1.3 to 2.1 miles	Consider postponing/delaying all outdoor sporting events. Move all athletic practices indoors. All athletes with asthma and other respiratory illnesses are advised to stay indoors. All others should avoid prolonged exertion outdoors.
Hazardous	1.3 miles or less	Cancel all outdoor sporting events or relocate to an indoor location. Move all athletic practices indoors.

At all times, athletes experiencing respiratory symptoms should consult their personal healthcare provider

*For more information on the health effect categories visit the "Today's Air" website run by the Department of Environmental Quality at <http://todaysair.mt.gov> Air monitoring stations exist in Billings, Bozeman, Butte, Great Falls, Hamilton, Helena, Kalispell, Libby, Missoula, and West Yellowstone. The Today's Air website has hourly updates on the health effect category at these sites based on measured particulate matter levels. All other locations must determine the health effect category at their location based on visibility.

† To determine visibility:

1. Face away from the sun
2. Determine the limit of your visible range by looking for targets at known distances
3. Visible range is that point at which even high contrast objects totally disappear

Use the values above to determine the local forest fire smoke category



For more information contact the State Medical Officer
Steven Helgerson, MD, MPH at shelgerson@mt.gov

<http://todaysair.mt.gov>



MONTANA 2012 WILDFIRE SMOKE EMISSIONS*

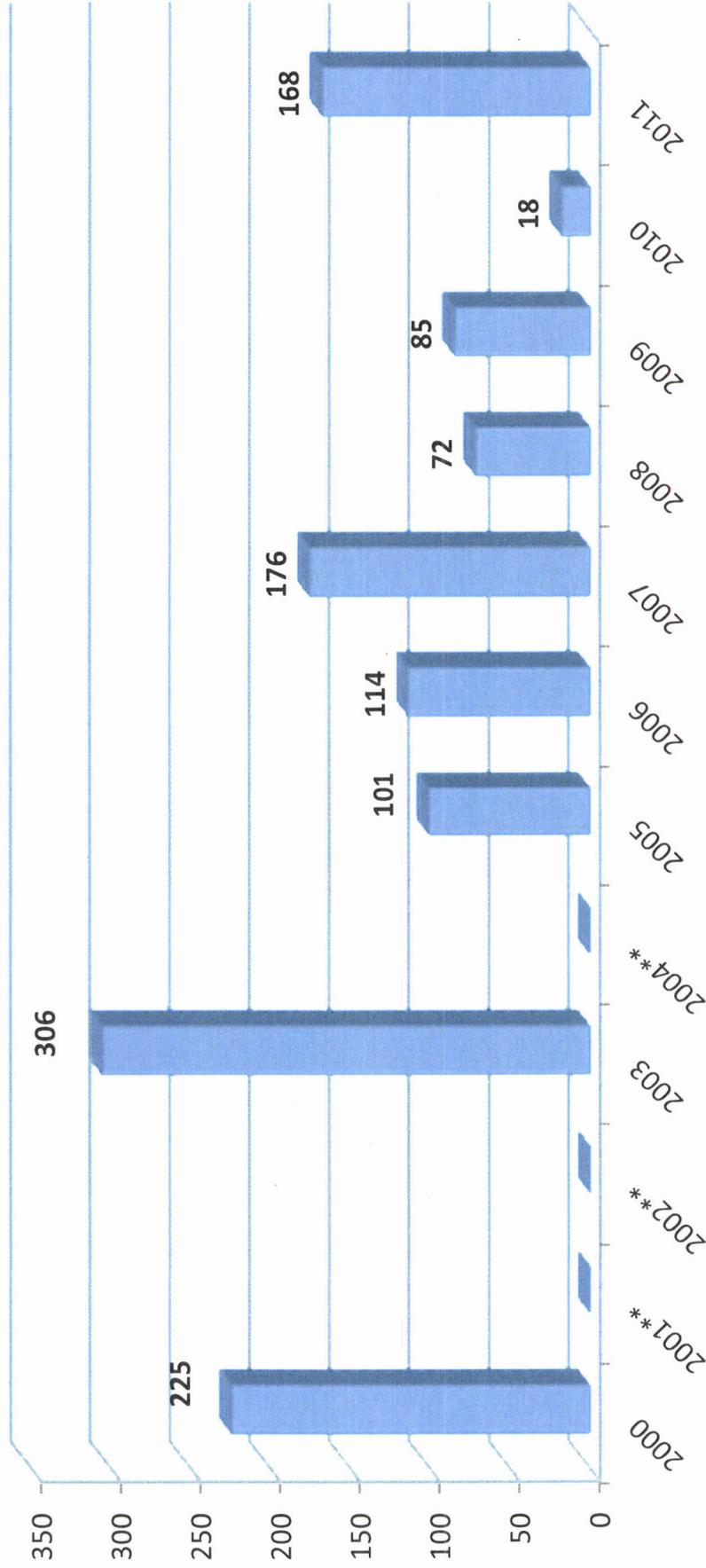
(as of) 9/9/2012

	Forest	Non-Forest	Total
Burned Area (acres)	408,789	404,716	813,505
Fuel Consumption dry vegetation) (ton	3,416,104	1,093,744	4,509,848
	Emissions (tons)		
Species			
Carbon Dioxide (CO ₂)	5,465,767	1,844,053	7,309,819
Carbon Monoxide (CO)	461,174	68,906	530,080
Methane (CH ₄)	25,006	2,122	27,128
Acetylene (C ₂ H ₂)	991	262	1,253
Ethylene (C ₂ H ₄)	5,842	897	6,738
Propylene (C ₃ H ₆)	3,279	864	4,144
Formaldehyde (HCHO)	8,882	798	9,680
Methanol (CH ₃ OH)	10,727	1,291	12,017
Formic Acid (HCOOH)	888	230	1,118
Acetic Acid (CH ₃ COOH)	12,708	3,883	16,591
Phenol (C ₆ H ₅ OH)	3,484	569	4,053
Furan (C ₄ H ₄ O)	2,050	186	2,236
Glycolaldehyde (C ₂ H ₄ O ₂)	3,519	886	4,405
Hydrogen Cyanide (HCN)	2,835	448	3,284
Ammonia (NH ₃)	6,491	569	7,059
Nitrogen Oxides (NO _x as NO)	6,593	4,266	10,859
PM _{2.5} (fine particulate matter)	88,135	7,842	95,978
Propane (C ₃ H ₈)	888	109	998
n-Butane (C ₄ H ₁₀)	284	17	301
Isoprene (C ₅ H ₈)	253	43	295
Benzene (C ₆ H ₆)	1,879	219	2,098
Toluene (C ₆ H ₅ CH ₃)	820	87	907

* **Source:** Shawn Urbanski
 Research Physical Scientist
 Missoula Fire Sciences Laboratory
 RMRS, US Forest Service

* **Methodology** upon request from DEQ

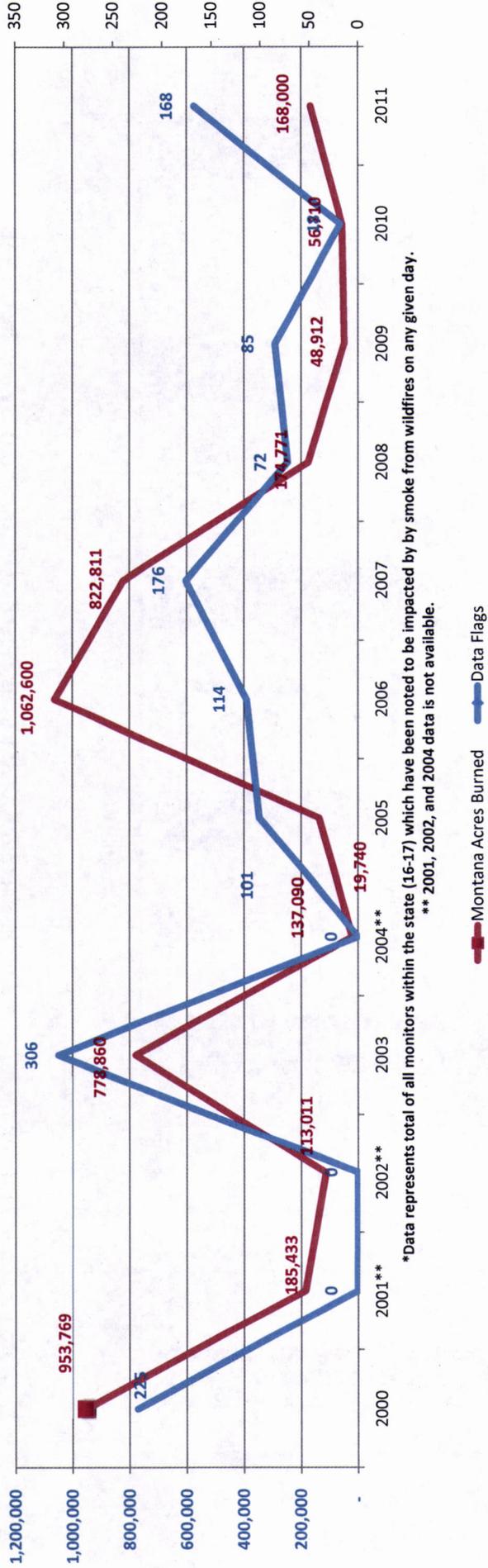
Total Flagged Monitored Days* Impacted by Wildfires



*Data represents total of number of days impacted by wildfires as recorded by all air quality monitors operating statewide by year. i.e. multiple monitors could be "flagged" on any given day.

** 2001, 2002, and 2004 had no data flagged for Fires.

Monitored Days* Impacted by Wildfires vs. Acres burned in Montana



*Data represents total of all monitors within the state (16-17) which have been noted to be impacted by smoke from wildfires on any given day.
 ** 2001, 2002, and 2004 data is not available.

■ Montana Acres Burned ◆ Data Flags