

Missoula Year 2009 Air Pollution Trends Report

Carbon Monoxide

The Brooks/South/Russell intersection carbon monoxide (CO) yearly highest two 1-hour averages were 3.2 and 3.1 parts per million (ppm). This reinforces that the high 2007 1-hour value of 10.2 ppm was an aberration. The 8-hour average appears to have stabilized since 2004 (see attached graphs). Carbon monoxide concentrations in 2009 were well below those levels found in the 1980s and early 1990s. Missoula last violated the 8-hour average National Ambient Air Quality Standard of 9.0 ppm carbon monoxide in 1991. In 2009, the highest 8-hour average concentration for CO in Missoula was 2.5 ppm, very close to the high 2008 8-hour value of 2.9 ppm.

In the future, improvements in vehicle fleet CO emissions should continue to offset the predicted increase in vehicle miles traveled.

A Reserve Street CO study done in the winter of 2005-2006 found CO levels to be well below the 8-hour standard and comparable to the MJF site. Complete study results are available upon request.

PM₁₀

Included with this trends report is an annual average PM₁₀ graph, a highest 24-Hour Average From all Sites Graph, and a graph that shows the two highest 24-hour PM₁₀ values for the Health Department and Boyd Park PM₁₀ sites in Missoula. The Seeley Lake PM₁₀ site had a high value of 46 $\mu\text{g}/\text{m}^3$ in 2009. Seeley Lake PM₁₀ sampling was discontinued on December 31, 2009 because concentrations are well below the standard of 150 $\mu\text{g}/\text{m}^3$.

Even with increased vehicle traffic and population in the Missoula Valley, PM₁₀ concentrations over the last several years have been relatively stable. Several factors that help limit PM₁₀ concentrations include the woodstove removal program, the use of deicer in place of street sand on many streets, prompt street sweeping in the spring and regulations that require most new vehicle use areas to be paved inside the Air Stagnation Zone. Because of Missoula's mountain valley topography and growing population, ways to limit and reduce air pollution in the valley will continue to be important if we wish to maintain and improve on the air quality gains made in the past.

PM_{2.5}

In December of 2006, the United States Environmental Protection Agency promulgated new standards for particulate matter 2.5 microns in diameter or smaller (PM_{2.5}). This new standard lowered the permissible PM_{2.5} 24-hour level from 65 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) to 35 $\mu\text{g}/\text{m}^3$. Based on monitoring results from 2005-2007, Missoula was barely designated as attainment for this new standard. The three year running average from 2005-2007 was 35.2 $\mu\text{g}/\text{m}^3$. A value of 35.5 $\mu\text{g}/\text{m}^3$ would have rounded up to 36 $\mu\text{g}/\text{m}^3$ which would have exceeded the 24-hour PM_{2.5} standard.

Missoula began sampling for PM_{2.5} in 1999. The Health Department and Boyd Park were the two SLAMS sites for PM_{2.5} in the Missoula Valley. The PM_{2.5} Boyd Park site was closed in April 2002 because the results were similar to the concentrations found at the Health Department site. This result is consistent with the regional nature of PM_{2.5} concentrations. A Seeley Lake PM_{2.5} monitoring site was started in late 2004.

An attached PM_{2.5} graph shows the annual averages for Missoula and Seeley Lake. The annual average standard is based on the mean of three consecutive years. The 2007-2009 three-year running annual average of 9.1 $\mu\text{g}/\text{m}^3$ at the Health Department is below the National Ambient Air Quality Annual Standard of 15 $\mu\text{g}/\text{m}^3$.

Typically, Missoula has values over 35 $\mu\text{g}/\text{m}^3$ a few times each year, generally during the winter months. In fact, all of the PM_{2.5} days over 35 $\mu\text{g}/\text{m}^3$ (with the exception of wildfire smoke episodes) for 2003-2009 occurred in November, December, January or early February. Data shown in Tables 1, 2 & 3 below were collected using equipment located on the roof of the Missoula City-County Health Department in downtown Missoula or the new PM_{2.5} monitoring site at Boyd Park near Russell and Brooks Street.

Table 1. Missoula’s 24-Hour High PM_{2.5} Values for Health Department (HD) or Boyd Park (Boyd)

2003 - HD		2004 - HD		2005 - HD		2006 - HD		2007 - HD		2008 - HD		2009 – Boyd	
Date	$\mu\text{g}/\text{m}^3$	Date	$\mu\text{g}/\text{m}^3$	Date	$\mu\text{g}/\text{m}^3$	Date	$\mu\text{g}/\text{m}^3$	Date	$\mu\text{g}/\text{m}^3$	Date	$\mu\text{g}/\text{m}^3$	Date	$\mu\text{g}/\text{m}^3$
1/24	41.6	1/16	62.3	1/19	62.5	11/28	43.2	2/5	43.0	1/25	36.6	12/11	27.8
11/8	32.9	1/10	55.4	12/12	54.0	12/10	36.2	11/26	37.2	1/19	20.0	1/6	26.8
12/2	27.1	1/19	46.8	12/9	42.5	8/30 ¹	34.3 ¹	8/13 ¹	32.8	8/19 ¹	22.7	1/22	26.1
8/25	24.9	12/17	36.6	8/8	30.8	9/5 ¹	31.5 ¹	8/1 ¹	32.5	1/13	21.0	12/20	24.1
8/10	24.7	2/15	30.8	1/16	30.8	12/22	30.2	2/8	31.4	12/5	20.3	1/17	22.9

¹Values were influenced by wildfire smoke and may be flagged in the future. If flagged, the values will no longer be used to determine compliance or non-compliance with the PM_{2.5} standard.

Table 2. Annual 24-hour PM_{2.5} Design Values for Missoula County

(Design value is highest value left after top 2% of values thrown out each calendar year.)

	2004 $\mu\text{g}/\text{m}^3$	2005 $\mu\text{g}/\text{m}^3$	2006 $\mu\text{g}/\text{m}^3$	2007 $\mu\text{g}/\text{m}^3$	2008 $\mu\text{g}/\text{m}^3$	2009 $\mu\text{g}/\text{m}^3$
Boyd Park						21.5
Health Dept.	46.8	42.5	34.3	32.8	22.7	21.9

Table 3. Missoula’s Three Year Running 24-Hour PM_{2.5} Standard Design Values¹

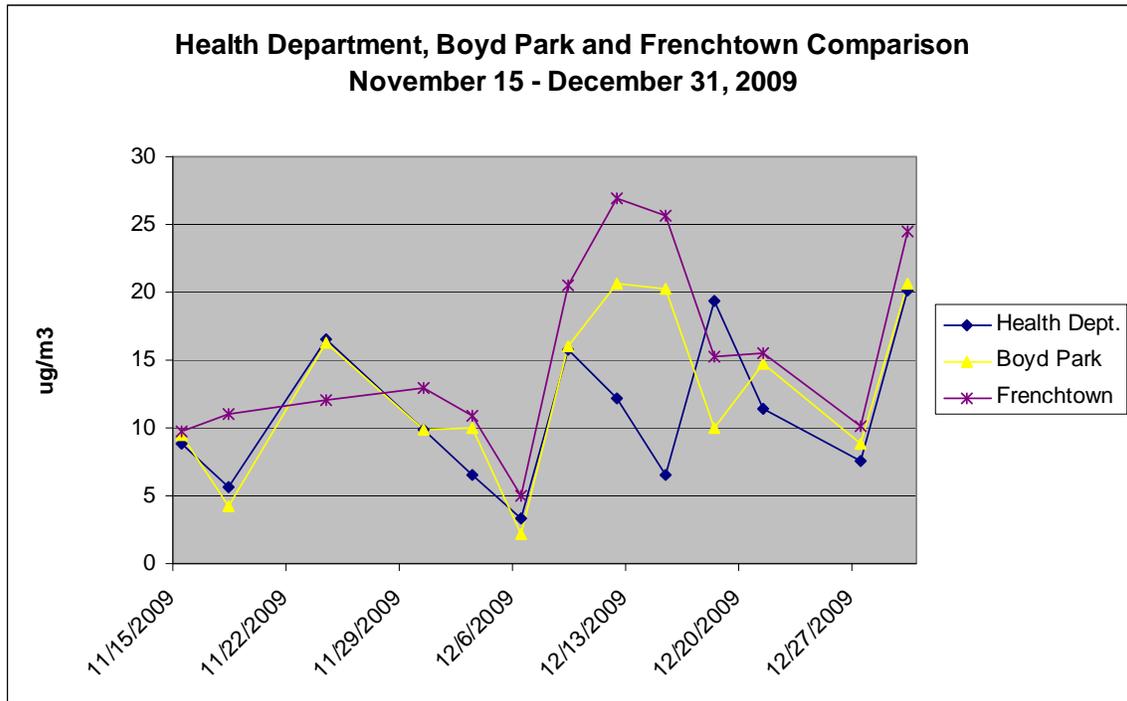
(Based on three year average of yearly 98th percentile 24-hr values at Health Department)

2002 – 2004 $\mu\text{g}/\text{m}^3$	2003 – 2005 $\mu\text{g}/\text{m}^3$	2004 – 2006 $\mu\text{g}/\text{m}^3$	2005 – 2007 $\mu\text{g}/\text{m}^3$	2006 – 2008 $\mu\text{g}/\text{m}^3$	2007 – 2009 $\mu\text{g}/\text{m}^3$
33	39	41	35.2	29.9	25.8

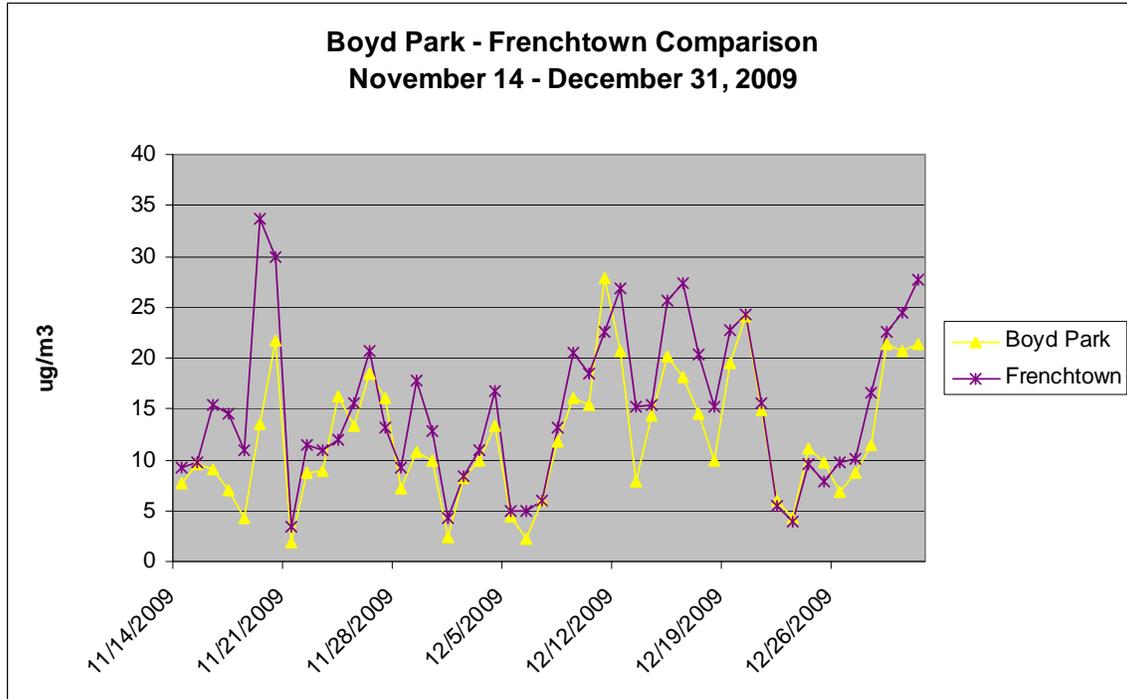
¹24-hour PM_{2.5} Standard Design Values over 35.4 exceed the national ambient air quality standard.

For the winter of 2009-2010 a Bitterroot Valley and Missoula Valley saturation study was done to study the distribution and movement of $PM_{2.5}$ through these connected valleys. Information from the study will soon be available. Also in 2009 a $PM_{2.5}$ monitoring station was installed in Frenchtown. Graph 1 and 2 below compares the initial Frenchtown data with the Missoula $PM_{2.5}$ data. Preliminary indications are that Frenchtown may at times have slightly higher $PM_{2.5}$ levels than Missoula in the winter.

Graph 1.



Graph 2.



The Milltown data shown in Tables 4 & 5 was collected from August of 2002 to September of 2004 for a special study by the Missoula City-County Health Department. The data indicates that the levels of PM_{2.5} in the Milltown area to the east of Missoula are not significantly correlated with PM_{2.5} levels found in downtown Missoula.

Table 4. Milltown 24-Hour High PM_{2.5} Values

2002: Aug.-December		2003		2004: January-Sept.	
Date	µg/m ³	Date	µg/m ³	Date	µg/m ³
11/16	25.8	8/10	29.0	1/16	49.1
10/26	21.7	8/25	27.1	1/19	42.9
11/25	19.8	1/24	26.6	1/13	37.1
11/7	19.5	12/2	25.4	1/10	24.4
12/22	18.4	11/8	22.9	1/7	22.5

Table 5. Missoula-Milltown High Daily PM_{2.5} Value Comparison

Date	Missoula Health Department µg/m ³	Milltown µg/m ³
1/24/03	41.6	26.6
11/8/03	32.9	22.9
12/2/03	27.1	25.4
8/25/03	24.9	27.1
8/10/03	24.7	29.0
1/16/04	62.3	49.1
1/10/04	55.4	24.4
1/19/04	46.8	42.9
1/13/04	No Data	37.1
2/15/04	30.8	13.2
1/7/04	29.8	22.5

Under winter inversion conditions, air frequently drains down the Blackfoot River and the Clark Fork River through Milltown into Missoula. This down drainage, which can bring particulate pollution from the east into Missoula, appears to partially isolate the Milltown area from the main Missoula Valley air shed. The lower high 2003-2004 PM_{2.5} levels found in Milltown, when compared to Missoula, shows that Milltown may receive some winter time air quality benefits from this meteorology.

The data shown in Table 6 was collected from 2005 through 2009 by the Missoula City-County Health Department near the Seeley Lake Fire Station. Samples were collected 1 day in 3 by a filter based method.

Table 6. Seeley Lake High PM_{2.5} Values

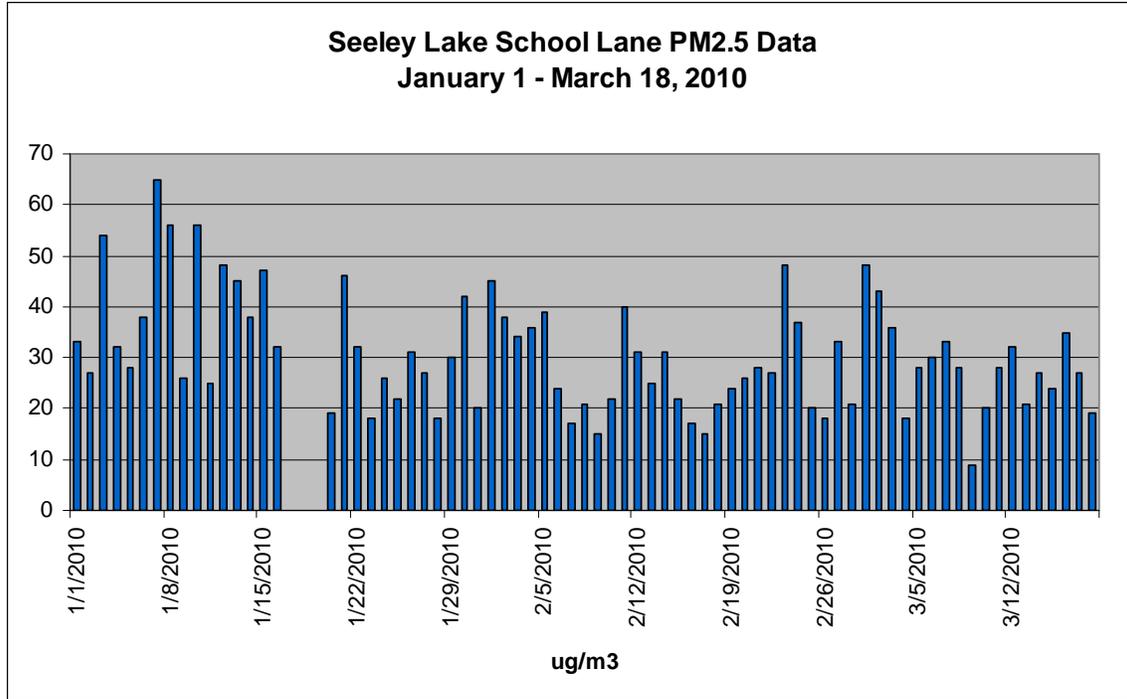
2006		2007 – Partial Year		2008		2009	
Date	µg/m ³	Date	µg/m ³	Date	µg/m ³	Date	µg/m ³
12/7	39.4	11/29	36.0	1/25	26.6	12/30	22.5
1/5	38.3	1/18	29.5	11/5	19.9	11/27	22.2
1/2	32.1	1/9	27.3	1/10	19.4	2/6	22.2
2/4	24.9	2/11	25.1	11/12	17.2	10/8	21.5

Filter based 1 day in 3 sampling in Seeley Lake was replaced in 2010 with a continuous monitor which is located next to the Elementary School playground. The new monitoring location meets siting criteria that the other site could not meet. Daily PM_{2.5} values at the new school site (Graph 3) are well over the national ambient air quality daily standard of 35 µg/m³.

The major reason for the high 2010 PM_{2.5} values at the School Lane site is from residential wood stoves and fireplaces. The Seeley Lake Community Council, citizens of Seeley Lake, and the Missoula City-County Health Department are looking at ways to reduce wood smoke pollution in the Seeley Lake area. A “How You Burn Makes a

Difference” pamphlet has been widely distributed in Seeley Lake through the school system and the local newspaper, The Pathfinder.

Graph 3.



- Attachments:
- Missoula's Annual Average PM₁₀ Levels graph
 - Missoula's highest 24-Hour Average PM₁₀ Data from All Sites graph
 - Missoula's 1st and 2nd highest 24-Hour PM₁₀ Concentrations by Site graph
 - Missoula County's Annual Average PM_{2.5} Levels
 - Missoula County's highest 24-Hour PM_{2.5} Concentrations
 - Missoula Carbon Monoxide Levels graphs
 - 1st and 2nd Highest 8-Hour Average
 - 1st and 2nd Highest 1-Hour Average