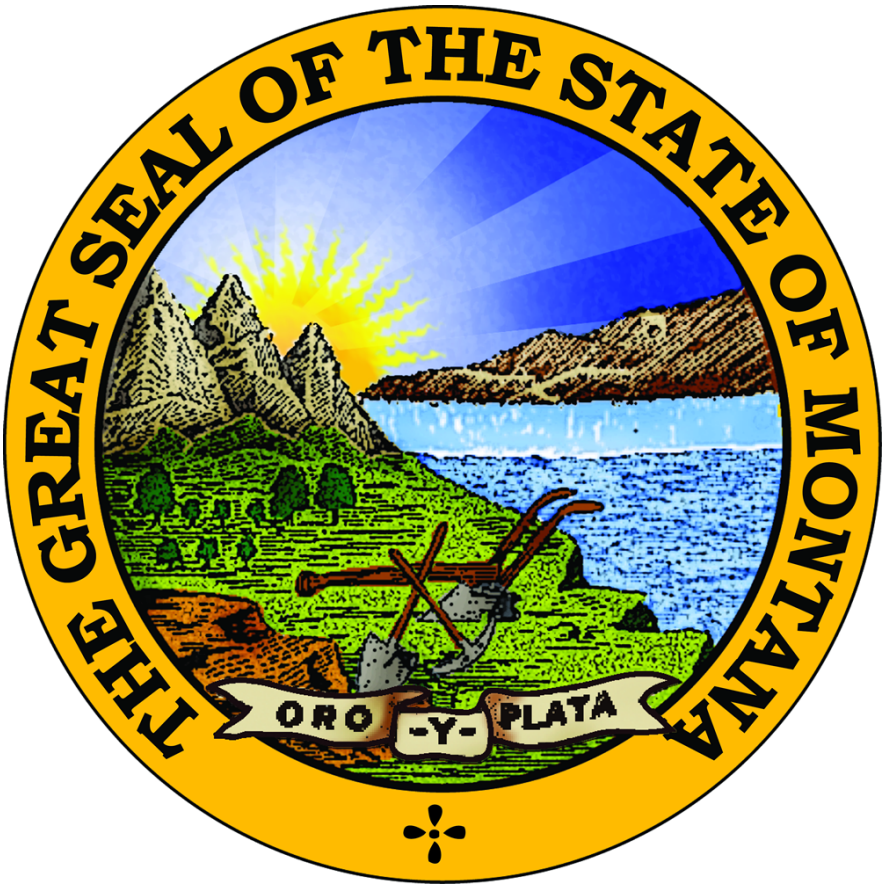
STATE OF MONTANA

AIR QUALITY MONITORING NETWORK PLAN



JUNE 2009

Montana Department of Environmental Quality
Air Resources Management Bureau

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2009 AIR QUALITY MONITORING NETWORK PLAN

Introduction

Since 1979 the Montana Department of Environmental Quality (DEQ) air monitoring program has been producing an annual Network Review Report. The purpose of that report was to document how DEQ was actively evaluating monitoring requirements and using resources effectively.

Federal regulatory changes in December of 2006 altered this requirement to effectively split the required elements of the Network Review Report into two separate documents: (1) the annual Monitoring Network Plan, and (2) the supplemental five-year assessment of the air quality surveillance system beginning in 2010. This document represents DEQ's third Monitoring Network Plan (2009 Plan).

The objective of 2009 Plan is to accurately describe the monitoring sites in the agency network and identify their monitoring objectives. The 2009 Plan also describes any deviations in physical characteristics or operation from regulatory requirements and changes DEQ anticipates making to the network. Detailed descriptions of the individual monitoring sites can be found in Appendix A while Appendix B is a summary of all monitoring.

DEQ monitors air quality in large part by measuring concentrations of criteria air pollutants pursuant to the federal Clean Air Act. Criteria air pollutants are the most common air pollutants with known harmful human health effects. The six criteria pollutants are: carbon monoxide (CO), sulfur dioxide (SO_2), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), and particulate matter (PM). PM includes particles with an aerodynamic diameter of 10 microns and less (PM_{10}) and particles with an aerodynamic diameter of 2.5 microns and less ($PM_{2.5}$). For each criteria air pollutant, National Ambient Air Quality Standards (NAAQS) are established to protect public health and welfare. Montana has adopted similar air quality standards called the Montana Ambient Air Quality Standards (MAAQS). Appendix C outlines the current NAAQS and MAAQS.

Ambient Air Monitoring Requirements

The term 'ambient air' is defined in the Code of Federal Regulations (CFR) as that portion of the atmosphere, external to buildings, to which the general public has access (40 CFR 50.1). The Environmental Protection Agency (EPA) requires each state to establish a network of ambient air monitors based upon population and air quality.

DEQ meets and exceeds its regulatory obligation for measuring air pollution throughout Montana. In Montana, there are no communities with populations large enough where more than one monitoring site is required for any of the criteria air pollutants. Additionally,

there are not any Montana communities where the air quality is so poor that more than one monitoring site is required.

Ozone Requirements

The minimum number of ozone monitors required in the monitoring network is defined in Table D-2 below.

Table D–2 of Appendix D to Part 58. Minimum O_3 Monitoring Requirements

MSA population[1,2]	Most recent 3-year design value concentrations ≥ 85% of any O_3 NAAQS[3]	Most recent 3-year design value concentrations < 85% of any O_3 NAAQS[3,4]
>10 million	4	2
4–10 million	3	1
350,000–<4 million	2	1
50,000–<350,000[5]	1	0

[1] Minimum monitoring requirements apply to the Metropolitan statistical area (MSA)
[2] Population based on latest available census figures.
[3] The ozone (O_3) National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR Part 50.
[4] These minimum monitoring requirements apply in the absence of a design value.
[5] Metropolitan statistical areas (MSA) must contain an urbanized area of 50,000 or more population.

Montana has three MSAs with populations between 50,000 and 350,000. The design value for Billings was determined during 2005-2007 to be 0.059 ppm or 78.7 percent of the NAAQS. Measurements made in the Missoula Metropolitan Statistical Area (MSA) suggested a lower design value. For Great Falls, historical monitoring data and professional judgment support even lower ozone values. All available ozone monitoring data in Montana demonstrates no violations of the newly revised ozone NAAQS, and the data indicates ozone is not currently a pollutant of concern in populated areas.

DEQ continues to review air quality related data in an effort to ensure no circumstances arise which could threaten Montana's continued compliance with the ozone NAAQS. As explained later in this 2009 Plan, DEQ intends to operate three rural ozone monitoring sites. They include the existing site near Sidney (#30-083-0001) and two new sites proposed to be installed near Broadus (# tbd) and near Birney (# tbd).

Lead Requirements

East Helena is the site of ASARCO's now-defunct, primary lead smelter. East Helena is designated as a nonattainment area (NAA) for sulfur dioxide and lead, although the lead NAA designation was made under a NAAQS that has since been substantially revised. The

ASARCO smelter ceased operations in 2003 and shortly thereafter, DEQ stopped lead monitoring when the data indicated measured levels well below the old lead NAAQS.

As mentioned, the lead regulations have changed significantly and states are now required to operate at least one lead monitor in areas with a point source of lead emissions greater than one ton per year or in areas with a population greater than 500,000.

In Montana, neither of these criteria is met and DEQ does not plan to conduct any lead monitoring in 2009. However, as part of the process of designating East Helena back into attainment for the lead NAAQS, DEQ may resume lead monitoring in 2010.

Particulate Matter ≤ 10 Microns in Diameter (PM_{10}) Requirements

The minimum number of required PM_{10} sites is established by Table D-4 below. None of Montana's three MSAs meets the requirement for medium concentration, so no PM_{10} sites are required.

Table D–4 of Appendix D to Part 58. PM_{10} Minimum Monitoring Requirements
(Number of Stations per MSA)[1]

Population category	High concentration[2]	Medium concentration[3]	Low concentration[4,5]
>1,000,000	6–10	4–8	2–4
500,000–1,000,000	4–8	2–4	1–2
250,000–500,000	3–4	1–2	0–1
100,000–250,000	1–2	0–1	0

[1] Selection of urban areas and actual numbers of stations per area within the ranges shown in this table will be jointly determined by EPA and the State Agency.
[2] High concentration areas are those for which ambient PM_{10} data show ambient concentrations exceeding the PM_{10}NAAQS by 20 percent or more.
[3] Medium concentration areas are those for which ambient PM_{10} data show ambient concentrations exceeding 80 percent of the PM_{10} NAAQS.
[4] Low concentration areas are those for which ambient PM_{10} data show ambient concentrations less than 80 percent of the PM_{10} NAAQS.
[5] These minimum monitoring requirements apply in the absence of a design value.

Currently, Montana has seven areas designated as nonattainment under the 24-hour PM_{10} standard where monitoring is conducted. They are: Libby, Columbia Falls, Kalispell, Whitefish, Thompson Falls, Missoula, and Butte.

In 2006, EPA revoked the annual PM_{10} standard but retained the 24-hour standard. Although DEQ is now more focused on smaller particles ($PM_{2.5}$), a network of monitors is operated in the PM_{10} NAA as required by EPA. For this 2009 Plan, DEQ intends to discontinue PM_{10} monitoring at the Seeley Lake site (#30-063-0021).

Particulate Matter ≤ 2.5 Microns in Diameter ($PM_{2.5}$) Requirements

Based on the requirements summarized in Table D-5 below, the number of required monitoring sites is based on the $PM_{2.5}$ design criteria and the population of the MSA. In Montana, there are only three MSA and all fall into the smallest population category. The Missoula MSA is the only one with a $PM_{2.5}$ design value greater than 85 percent of the NAAQS, thus it's the only Montana community required to have a $PM_{2.5}$ monitoring site. This requirement is met in Missoula with the operation of two $PM_{2.5}$ monitoring sites: one at the Missoula City-County Health Department (#30-063-0031) and the other at Boyd Park (#30-063-0026).

Table D–5 of Appendix D to Part 58. $PM_{2.5}$ Minimum Monitoring Requirements

MSA population[1,2]	Most recent 3-year design value ≥85% of any $PM_{2.5}$NAAQS[3]	Most recent 3-year design value <85% of any $PM_{2.5}$NAAQS[3,4]
>1,000,000	3	2
500,000–1,000,000	2	1
50,000–<500,000[5]	1	0

[1] Minimum monitoring requirements apply to the Metropolitan statistical area (MSA).
[2] Population based on latest available census figures.
[3] The $PM_{2.5}$National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR part 50.
[4] These minimum monitoring requirements apply in the absence of a design value.
[5] Metropolitan statistical areas (MSA) must contain an urbanized area of 50,000 or more population.

There are no required $PM_{2.5}$ monitoring sites for the Great Falls and Billings MSA, but DEQ and the local county air quality programs have operated federal reference method (FRM) $PM_{2.5}$ monitors in both communities since 1999. However, the monitoring has revealed low $PM_{2.5}$ concentrations, so DEQ plans to discontinue these FRM sites in 2009.

In the Helena area, the Lincoln School (#30-049-0018) and Rossiter School (#30-049-0026) sites have monitored almost identical $PM_{2.5}$ concentrations. Therefore, DEQ will consolidate the $PM_{2.5}$ monitoring effort at just one site in the Helena area: Rossiter School.

Sulfur Dioxide (SO_2) Requirements

Unlike the federal requirements for a minimum number of O_3, Pb, PM_{10} and $PM_{2.5}$ monitoring sites, there are no similar requirements for SO_2. Currently, SO_2 monitoring is conducted in the Great Falls and Billings areas due to emissions from local industries, e.g. power plants and petroleum refineries.

In the Great Falls area, there is one SO_2 monitoring site in the community of Black Eagle operated by the Montana Refining petroleum refinery. In the Billings/Laurel area, there is one site and five other SO_2 monitoring sites. The five sites are operated by a consortium of

local SO_2-emitting industries. DEQ intends to process SO_2 data from all these sites in 2009. However, the data handling will be modified to reduce workload and meet other statewide priorities.

Nitrogen Dioxide (NO_2) Requirements

Unlike the federal requirements for a minimum number of O_3, Pb, PM_{10} and $PM_{2.5}$ monitoring sites, there are no similar requirements for NO_2. Currently, DEQ only monitors for NO_2 near Sidney. DEQ intends to establish two new sites near the communities of Broadus and Birney. All three sites are in eastern Montana and associated with the expanding oil and gas industry in that part of the state.

Carbon Monoxide (CO) Requirements

Unlike the federal requirements for a minimum number of O_3, Pb, PM_{10} and $PM_{2.5}$ monitoring sites, there are no similar requirements for CO. In Montana, like most other states, CO is closely associated with motor vehicle emissions where ambient CO concentrations increase near locations with high traffic volumes and under conditions of poor atmospheric ventilation. Currently, DEQ and local county air programs conduct CO monitoring in the communities of Kalispell, Missoula, Great Falls, and Billings.

However, due to consistently low CO concentrations and the need to re-direct limited resources to core air monitoring priorities, DEQ intends to discontinue all CO monitoring. However, DEQ may revisit this decision pending EPA's potential revisions to the CO NAAQS.

Summary of Requirements

DEQ designs its network and operates the air monitoring sites in compliance with EPA's requirements for monitoring sites (40 CFR Part 58, Appendices A,C,D and E). There are very few exceptions. Three sites do not meet all of the siting requirements of Appendix E. The Great Falls High School site (#30-013-1026) and Hamilton PS#46 site (#30-081-0007) are less than 15 meters from roadways and the Columbia Falls Ball Park site (#30-029-0007) has partially obstructed air flow.

The data from $PM_{2.5}$ monitoring sites with spatial scales designated as smaller than 'neighborhood' may not be compared to the annual $PM_{2.5}$ NAAQS. Data from such sites can only be compared to the 24-hour $PM_{2.5}$ NAAQS. The only $PM_{2.5}$ site in the Montana network of this nature is the one at the west entrance to Yellowstone National Park (#30-031-0017). All other $PM_{2.5}$ monitors generate data used for determining compliance with the annual $PM_{2.5}$ NAAQS.

If circumstances should make it necessary or desirable to relocate a violating $PM_{2.5}$ monitor, the change would be discussed among the existing local county program, Air Quality Permitting, Air Planning Section, and the Air Monitoring Section. The Air Monitoring Section would seek public comment through the annual Monitoring Network Plan and would seek EPA approval for the change. No such change would ever be made without demonstrating that a replacement site produced comparably high values unless circumstances precluded such a comparison. Montana does not have any community monitoring zones or anticipate creating one, so the impact of relocating a site on such zones is not relevant.

Revisions to the Montana Air Quality Monitoring Network

The 2009 Plan results from a review of past air monitoring data and an analysis of future air pollution trends. DEQ utilizes this information to determine future monitoring needs and to appropriately allocate resources. In no particular order, the 2009 Plan identifies four broad air monitoring priorities:

(1) Eastern Montana and oil & gas development,
(2) Particulate matter in western Montana,
(3) Background (NCore) monitoring, and
(4) Termination of CO monitoring.

Each priority and its impact on the network are discussed in the following pages.

Eastern Montana and Oil & Gas Development

In 2008, DEQ responded to increased oil and gas activity in eastern Montana by establishing a multi-pollutant monitoring site in the Bakken Oil Field west of Sidney (#30-083-0001). In 2009, DEQ intends to establish and operate two new monitoring sites in the Tongue and Powder River Valleys. These sites near Broadus and Birney will monitor for NO-NO_x, O_3, PM_{10}, $PM_{2.5}$, and collect weather data. DEQ is working cooperatively with the federal Bureau of Land Management to collect this baseline air pollution data to assist the agencies in evaluating the effects of coal bed natural gas development.

Particulate Matter in Western Montana

The 2009 Plan calls for termination of PM_{10} monitoring in Seeley Lake site (#30-063-0021) due to the lack of high concentrations. DEQ intends to assist the Missoula City/County Health Department (MCCHD) with the establishment of a new $PM_{2.5}$ monitoring site in Seeley Lake. MCCHD is responsible for finding a location for the new monitoring site that meets EPA siting requirements. DEQ will provide the monitoring shelter and offer advice on

site locations and installation. The type of $PM_{2.5}$ air sampler to be installed has yet to be determined and is dependent on monitor availability at the time of site installation.

DEQ intends to discontinue $PM_{2.5}$ speciation sampling in Missoula. The $PM_{2.5}$ speciation sampler for Montana has been located at the MCCHD site (#30-063-0031) since the federal Speciation Trend Network was established in 2002. The sampler is being relocated to meet the $PM_{2.5}$ monitoring requirement at the new NCore site at Sieben Flats (#30-049-0004). Both DEQ and the EPA believe that speciation data from the NCore site is the higher priority.
In 2009, DEQ intends to discontinue $PM_{2.5}$ monitoring at the Great Falls-High School site (#30-013-1026) and the Billings-Lockwood Park site (#30-111-1065). Even though these are two of Montana's largest communities, both experience favorable weather conditions and neither are subject to prolonged air stagnation episodes. Table 1 below presents measured values from both sites over the last four years.

Table 1 - Great Falls and Billings $PM_{2.5}$ Monitoring Results

	Great Falls-High School						Billings-Lockwood Park					
Year	1st High	2nd High	3rd High	4th High	98th Percentile	Annual Ave.	1st High	2nd High	3rd High	4th High	98th Percentile	Annual Ave.
2005	19.7	17.8	17.6	15.6	17.6	5.9	115.0[1]	93.0[1]	31.0	21.9	31.0	9.0
2006	24.7	15.9	15.2	15.0	15.2	5.6	30.2	18.3	17.6	17.3	17.6	8.9
2007	31.5	24.2	22.4	20.0	22.4	5.9	27.6	25.4	19.9	18.7	19.9	7.9
2008	19.6	16.9	13.3	11.5	13.3	5.2	33.8	18.8	18.2	16.2	18.2	7.0

[1] Data values under revision for decimal error.

Even with the erroneous decimal-inflated 2005 data included for Billings, the $PM_{2.5}$ values are well below 85 percent of the NAAQS which is the threshold for continued monitoring.
In 2008, DEQ installed special purpose continuous $PM_{2.5}$ monitors (BAM $PM_{2.5}$) at the other air monitoring sites in both communities. These BAM $PM_{2.5}$ monitors are used for prompt public notification in the event of elevated air pollution levels as part of a public health protection plan. The BAM $PM_{2.5}$ monitors also provide adequate $PM_{2.5}$ data for assessing air pollution trends.

Regional Background Monitoring Site (NCore)

The development of a national core network of monitoring sites (NCore) grew out of the EPA's National Ambient Air Monitoring Strategy which reached final draft status in 2004 after years of preparation. NCore created a backbone monitoring network of about 75 multi-parameter trends monitoring sites. Approximately 55 of the sites are intended to be urban and the remaining 20 sites will be rural. Montana is required to have one NCore site in operation January 1, 2011.

With Montana's limited population distributed over a huge area, each community becomes an isolated airshed, and measurements made in any given community are relevant to only that one population. Given that the NCore site in any city would represent the air quality of a very limited number of people, a rural site representing background air quality for a broad geographical area was considered the best siting strategy.

Practical considerations restricted the possible sites. It is important that the site be close enough to Helena to be serviced economically, have good year-around access, available power, and telephone service. The site selected is on state land north of Helena on Sieben's Flat. The site is expected to monitor about 10 parameters as well as surface meteorology. Details appear in other sections of this 2009 Plan. DEQ will be constructing the site, assembling the equipment and be dealing with other resource demands as the January 2011 deadline approaches.

Termination of Carbon Monoxide Monitoring

As previously explained, DEQ's highest air monitoring priorities in 2009 are to implement increased monitoring in eastern Montana, to maintain or expand PM monitoring in western Montana, and to install the NCore background monitoring site. For DEQ to implement and maintain these air monitoring priorities in 2009, DEQ had to re-assess all monitoring activities to identify resources that could be freed-up to implement these highest air monitoring goals.

Air monitoring for gaseous air pollutants requires significant resources to operate, maintain and audit the monitors, and process the data. DEQ currently monitors CO in four communities: Kalispell, Missoula, Great Falls, and Billings. For the 1-hr CO NAAQS the level of the standard is 35 ppm and for the 8-hr CO NAAQS the level of the standard is 9 ppm.

Note: Compliance with the CO NAAQS is based on comparing the 2nd highest monitored values for the one hour and eight hour time periods. The information presented below in Figures 1 and 2 clearly indicates compliance in Montana with the CO NAAQS with more than an adequate margin of safety, and the CO values are either stable or declining.

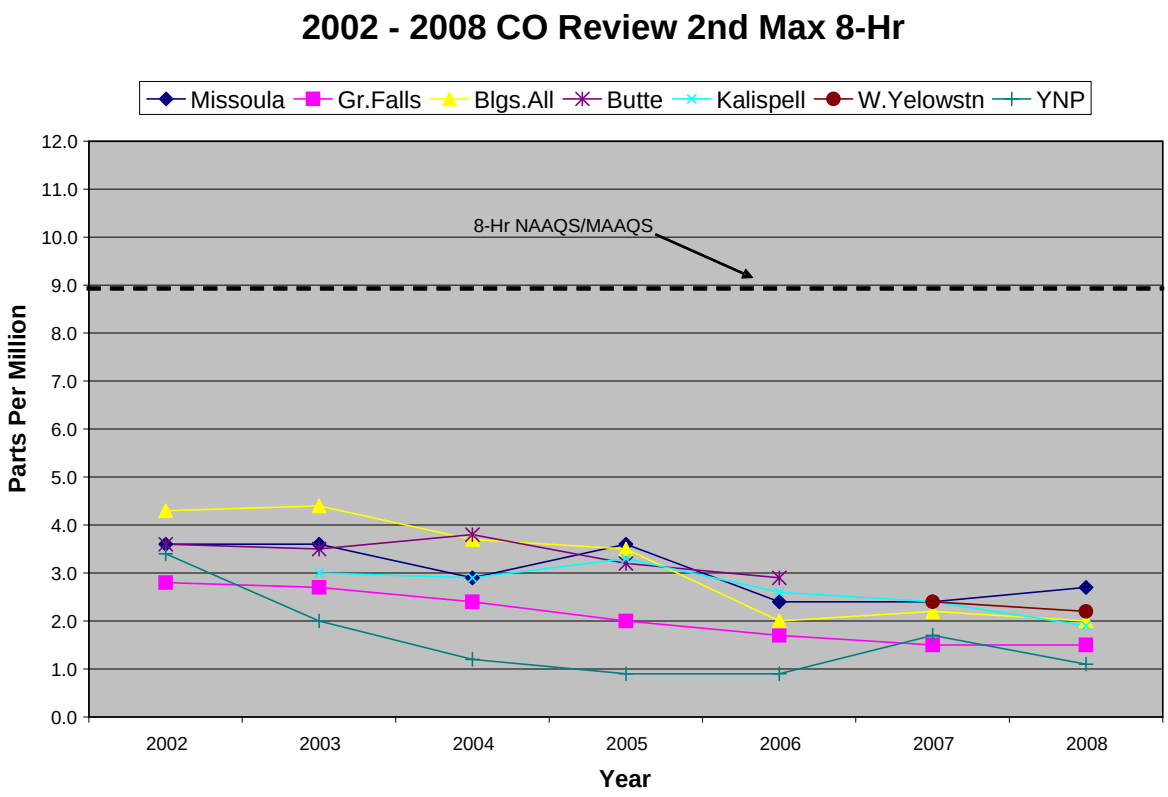


Figure 1. 2nd Max 8-Hour Averages at Montana CO monitoring sites from 2002 to 2008

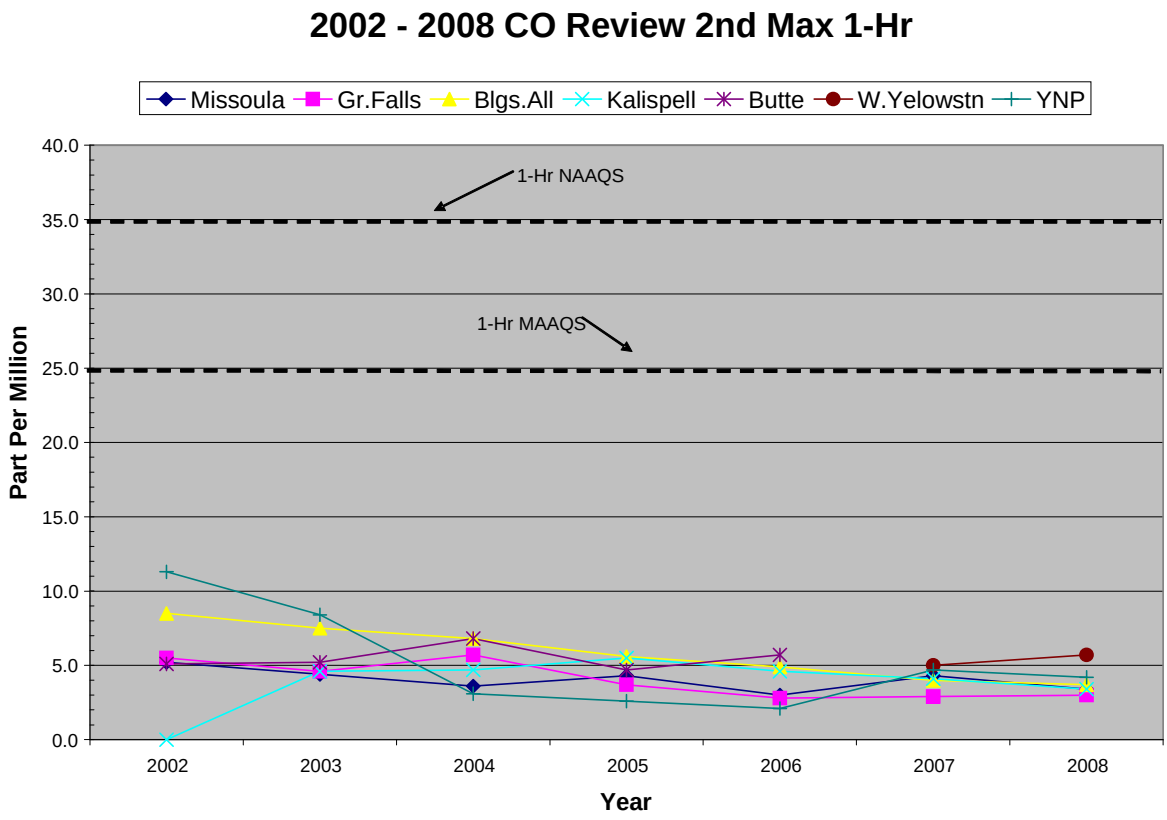


Figure 2. 2nd Max 1-Hour Averages at Montana CO monitoring sites from 2002 to 2008

Several of these communities experienced high CO concentrations in the past and the 8-hour NAAQS was violated. However, the CO control measures implemented and enforced by DEQ significantly reduced and controlled the CO emissions which caused the nonattainment area designations.

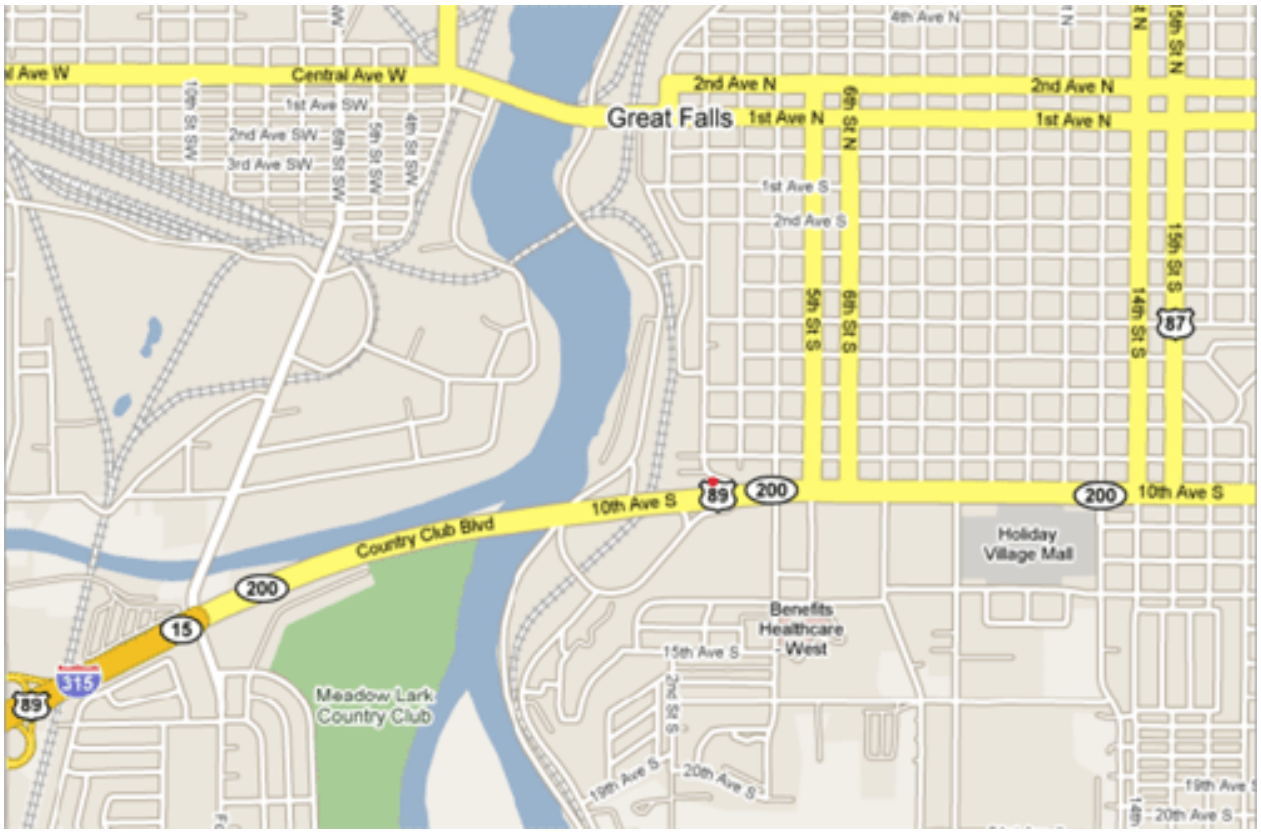
Unfortunately, the enforceable control plans failed to include provisions to discontinue ambient air monitoring once the ambient CO monitoring data clearly indicated the problem had been solved. Therefore, in order to accomplish the agency's air monitoring priorities for 2009, DEQ intends to terminate CO monitoring by reference method machines in Billings, Great Falls, Kalispell and Missoula in favor of alternative monitoring methods such as traffic volumes, vehicle registrations, vehicles miles traveled, speed and delay studies, intersection level of service, etc.

The above changes may occur. They reflect our current intensions. No changes will actually occur without additional discussions with EPA Region 8 and approval of a formal Network Modification Request.

APPENDIX A
MONITORING SITE DESCRIPTIONS

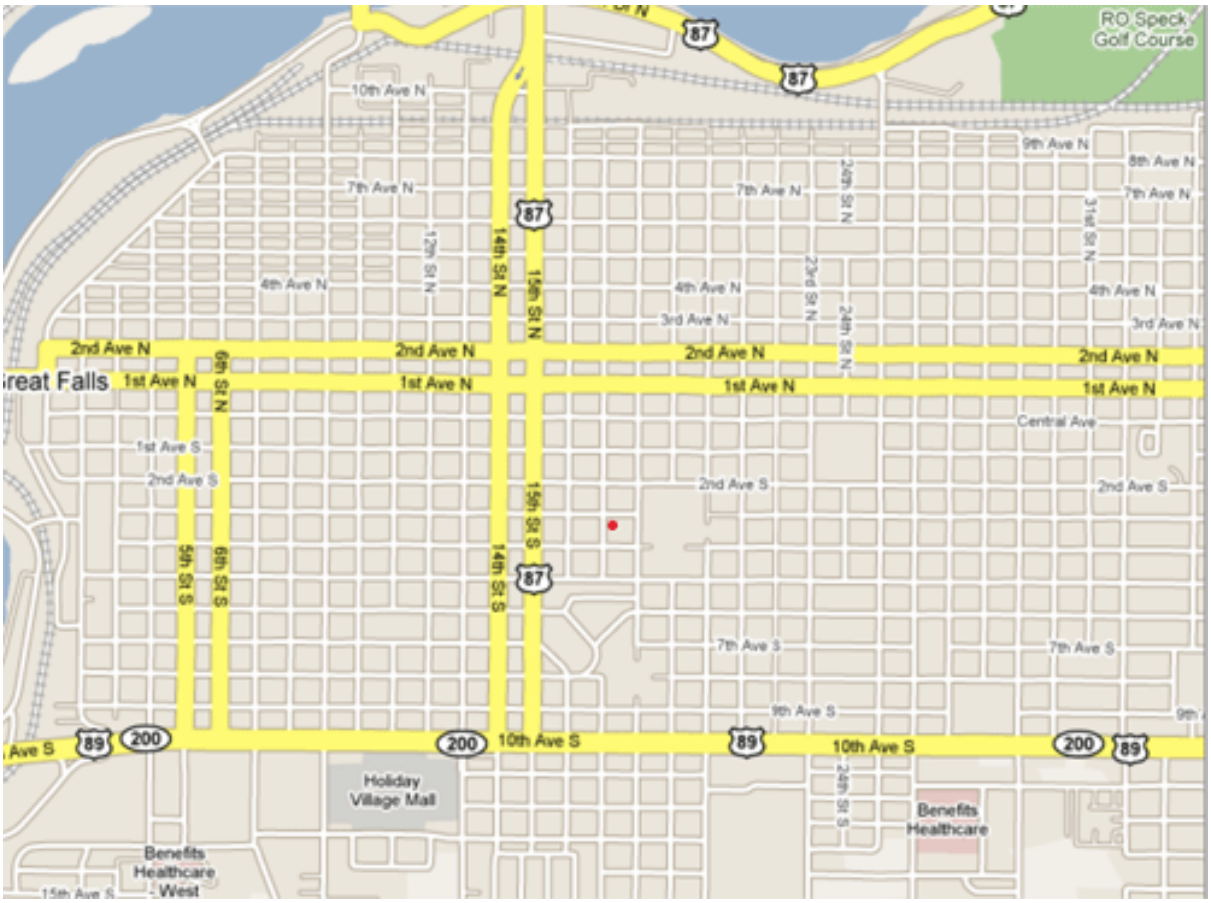
Great Falls-Overlook Park		10th Ave. S. and 2nd St. E.	
ID# 30-013-0001	Lat: 47.49417	Long: -111.30278	Elevation: 3,350 ft 1,021 m
MSA: Great Falls/24500			

This site was established in 2001 to monitor carbon monoxide continuously. The monitoring objective of this microscale site is to track compliance with the NAAQS for the "Limited Maintenance Plan" in the 10th Avenue CO nonattainment corridor. A continuous $PM_{2.5}$ monitor was added to the site during the spring of 2008 to provide near, real-time particulate data for use on the Todays Air website.



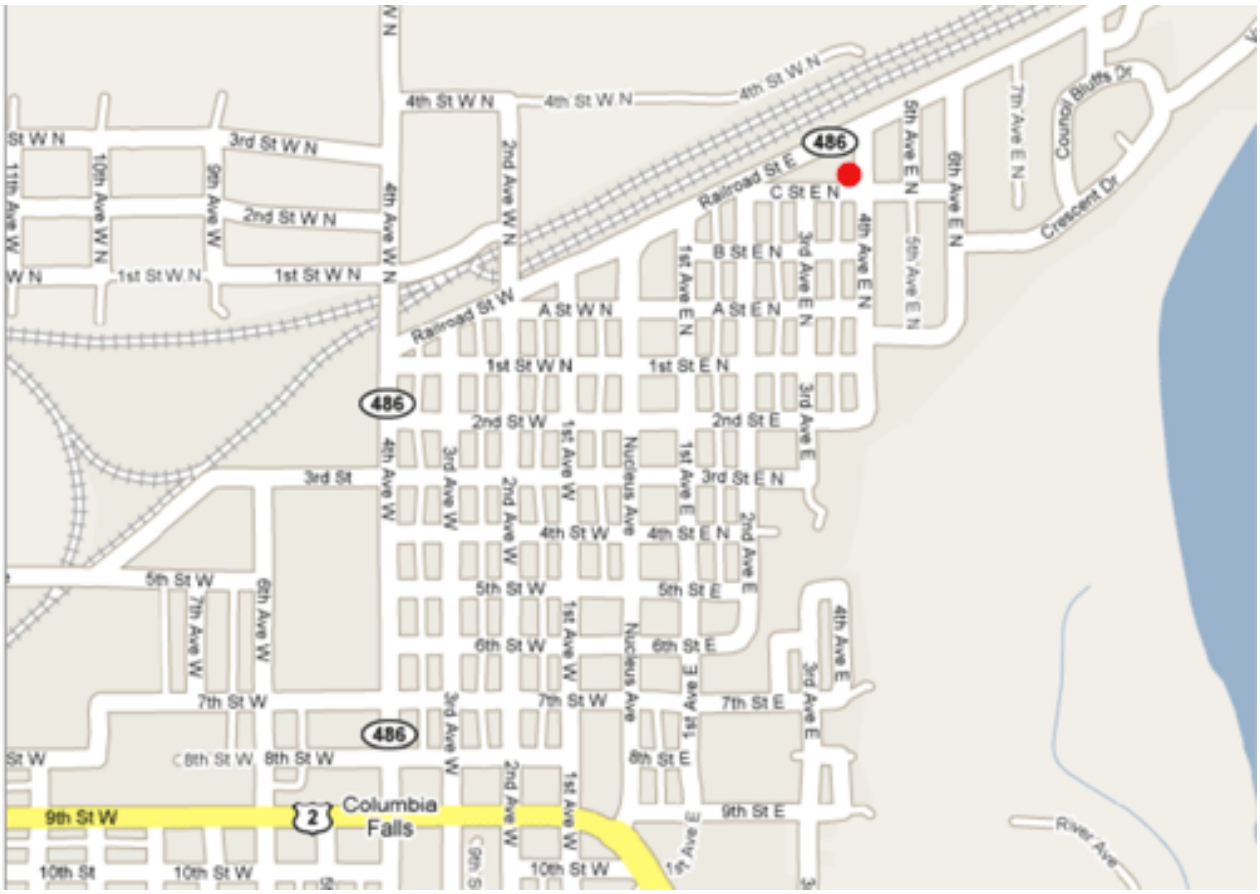
Great Falls-High School		3rd Ave. S and 17th Street E.	
ID# 30-013-1026	Lat: 47.20222	Long: -111.27889	Elevation: 3,350 ft 1,021 m
MSA: Great Falls/24500			

This site has monitored $PM_{2.5}$ since January 2000. This neighborhood scale site is located near the city center and monitors population exposure to area $PM_{2.5}$ emissions. The site is positioned at the corner of a large football field and a few meters from two local streets with very low traffic counts. Due to the low $PM_{2.5}$ concentrations measured at this site and the addition of the continuous $PM_{2.5}$ monitor at the Overlook Park site, this high school site will be shutdown in 2009.



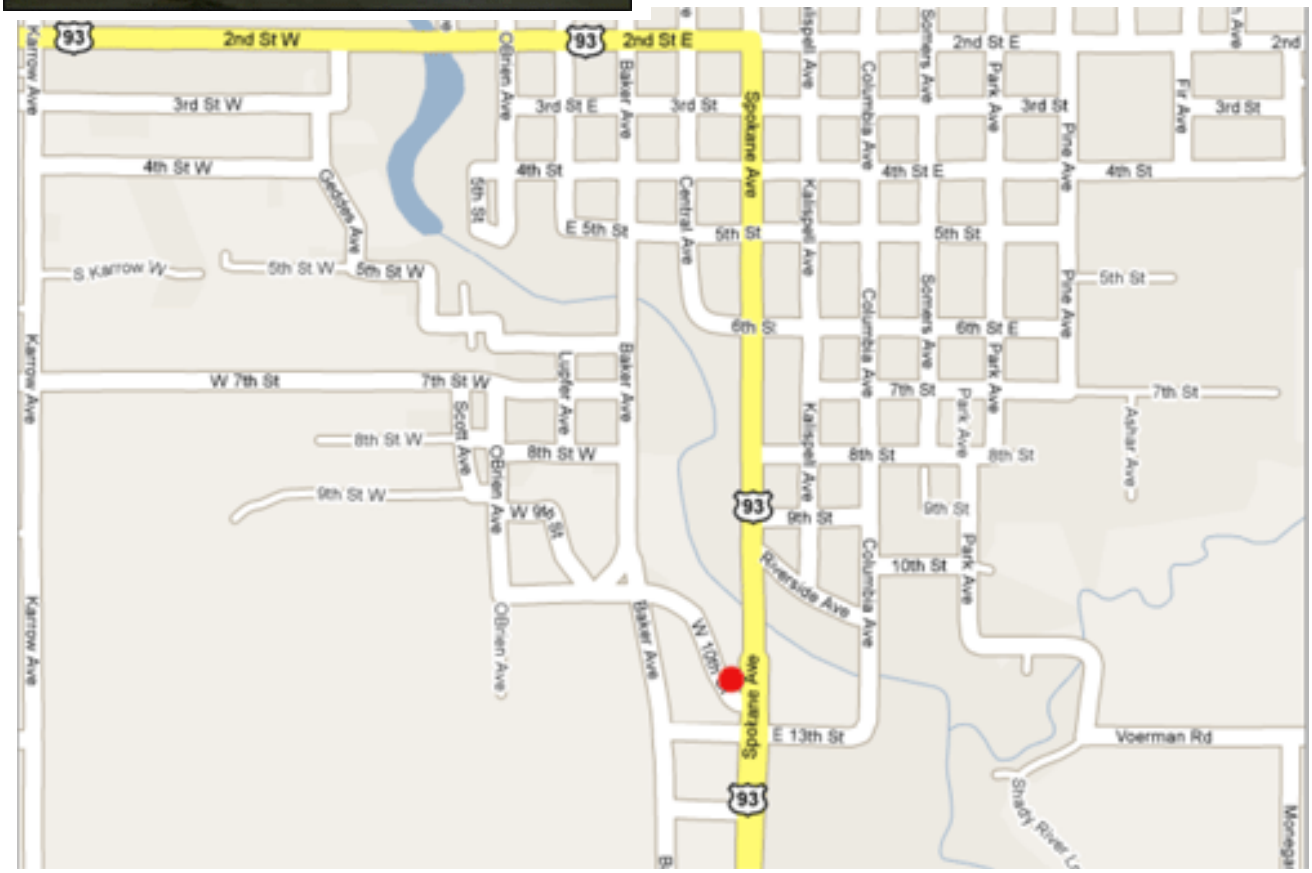
Columbia Falls-Ball Park		C St. and 4th Ave. E N	
ID# 30-029-0007	Lat: 48.38111	Long: -114.17472	Elevation: 3,100 ft 945 m
MSA:			

This co-located PM_{10} site began in 2006 and exists to demonstrate continued compliance with the NAAQS in the Columbia Falls PM_{10} nonattainment area. $PM_{2.5}$ monitoring was added in 2008. The site is neighborhood scale and it's located in the corner of a park between an industrial area to the North and a residential neighborhood to the South. A tree partially obstructs airflow about 90 degrees to the East. The monitors are closer than desirable to the adjacent streets which are paved and have very low traffic volumes.



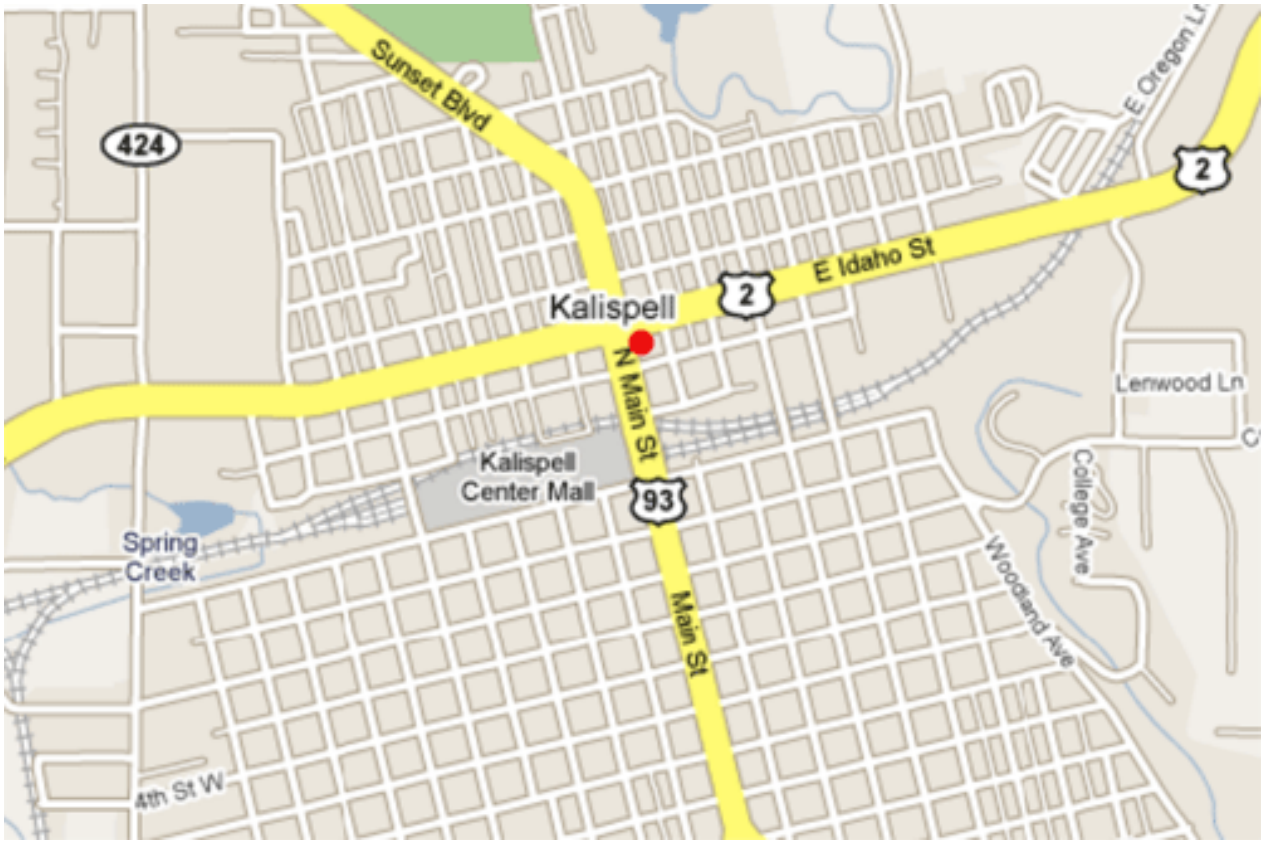
Whitefish – Dead End		End of 10th St.	
ID# 30-029-0009	Lat: 48.39972	Long: -114.33361	Elevation: 3,019 ft 920 m
MSA:			

Both PM_{10} and $PM_{2.5}$ are monitored at this site which is located at the end of 10th Street near the point where US 93 crosses the Whitefish River. The site is neighborhood scale and was installed to provide continuing PM_{10} monitoring for the local nonattainment area. It also provides continuous $PM_{2.5}$ data for the local wood burning control program and to assess population exposure.



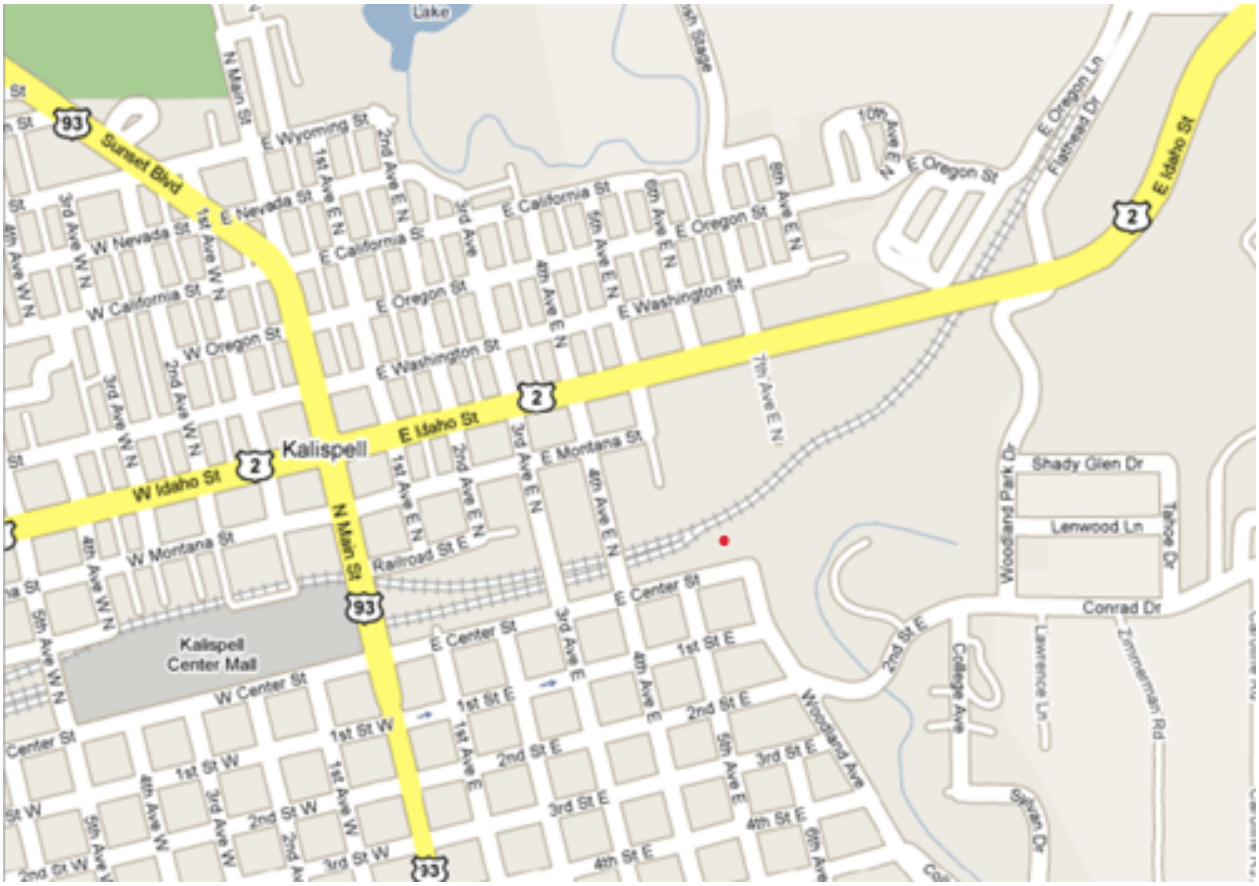
Kalispell - Moose's Saloon		Idaho Ave.	
ID# 30-029-0010	Lat: 48.20229	Long: -114.31349	Elevation: 2,953 ft 900 m
MSA:			

This microscale CO site is on the south side of Idaho Ave. near the intersection of Idaho & Main in downtown Kalispell. In 1996, an exceedance of the CO NAAQS was measured across the street and subsequent studies have shown this site to have the highest CO concentrations in the Kalispell area. The site was established in 2003 to monitor continuing compliance with the CO NAAQS.



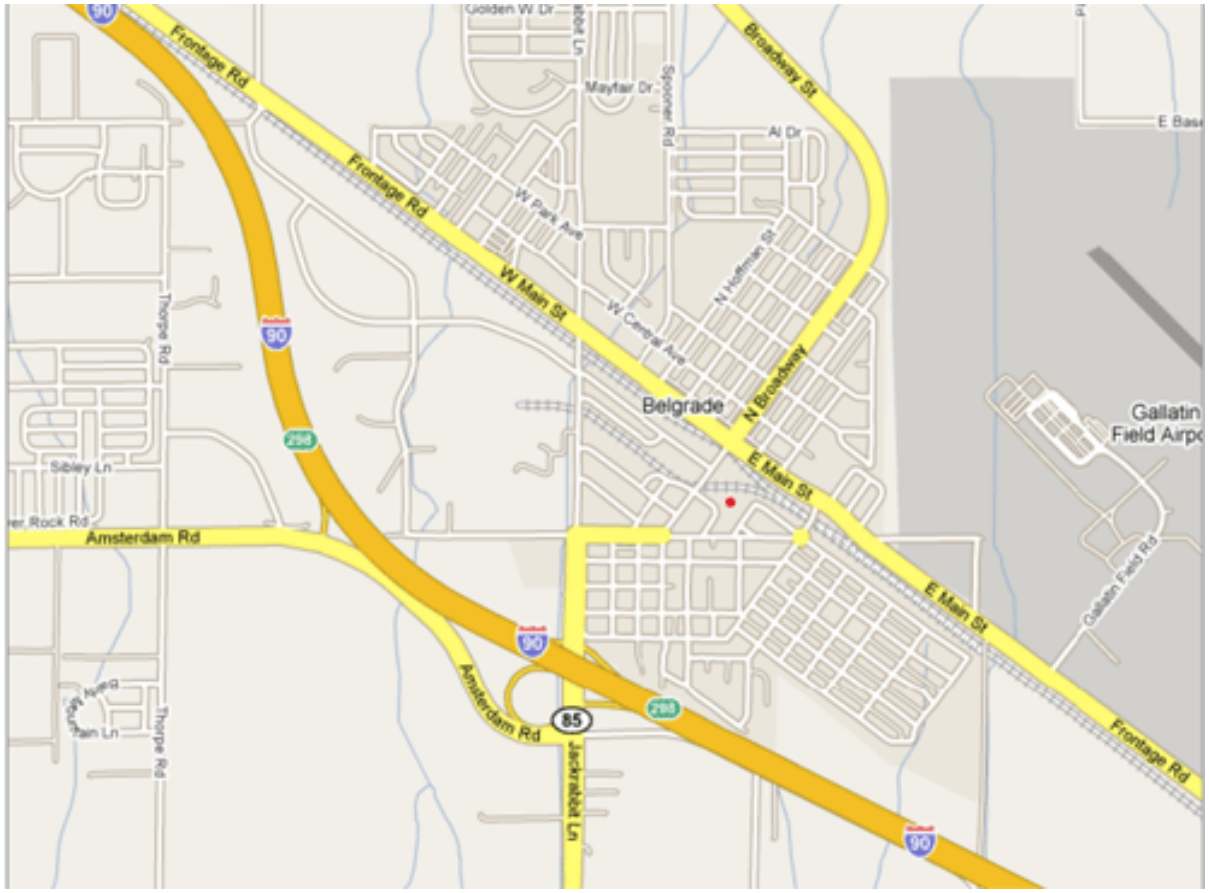
Kalispell – Flathead Electric		Center St. and Woodland Ave.	
ID# 30-029-0047	Lat: 48.2025	Long: -114.30556	Elevation: 2,920 ft 890 m
MSA:			

This site was installed in 1999 to consolidate particulate monitoring in the Kalispell area. The site is neighborhood scale and collects PM_{10} and $PM_{2.5}$ data for population exposure information. It also provides continuous $PM_{2.5}$ data for Flathead County's wood burning control program and demonstrates NAAQS compliance for the Kalispell PM_{10} nonattainment area.



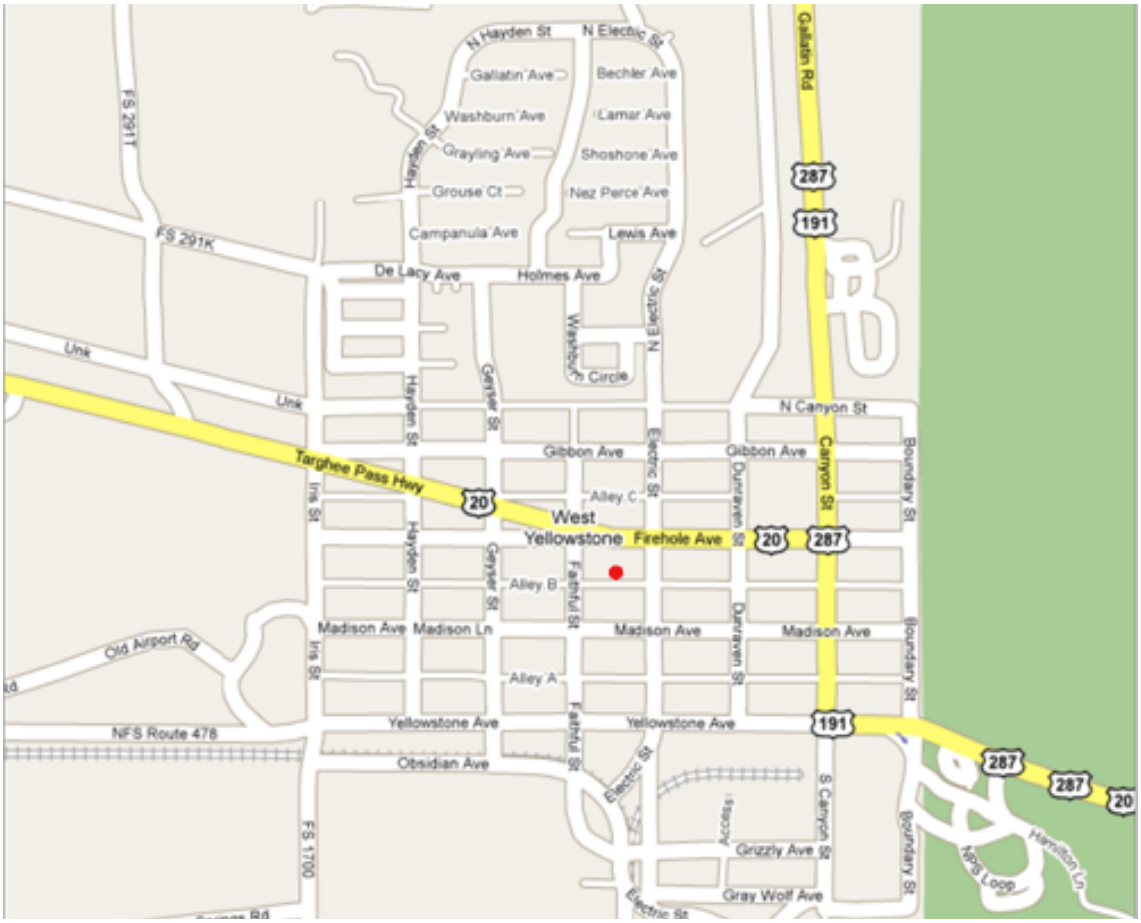
Belgrade - ConAgra		100 S. Broadway	
ID# 30-031-0008	Lat: 45.77372	Long: -111.17758	Elevation: 4,498 ft 1,371 m
MSA:			

This $PM_{2.5}$ site is located close to the center of the community. It is neighborhood scale and provides $PM_{2.5}$ data for population exposure information. This site has historically measured the highest PM_{10} and $PM_{2.5}$ concentrations in the Gallatin Valley.



West Yellowstone – City Center			
ID# 30-031-0016	Lat: 44.6617	Long: -111.1049	Elevation: 6,683 ft 2,037 m
MSA:			

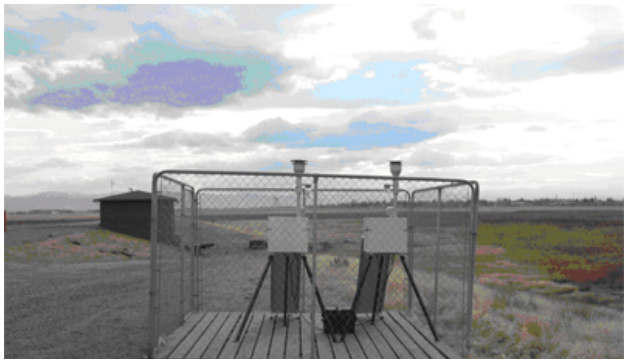
This site was established in 2007 to monitor community wide exposure to CO and $PM_{2.5}$. It is located in the center of town and is neighborhood scale. Like the site at the west entrance to Yellowstone National Park, this site is funded by the National Park Service. However, the site is operated to comply with EPA requirements.



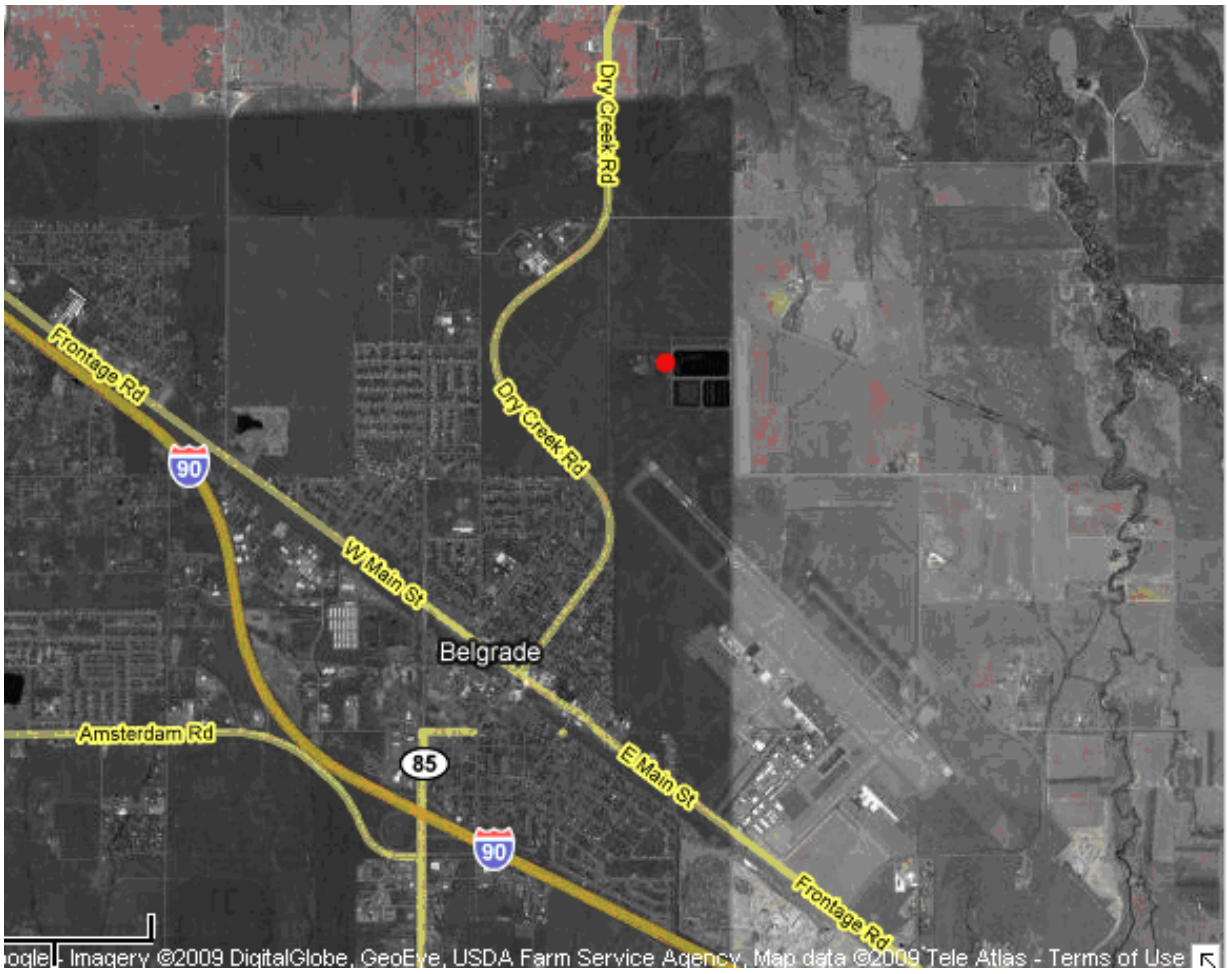
West Yellowstone – Park Entrance #2		West Entrance to National Park	
ID# 30-031-0017	Lat: 44.65703	Long: -111.08958	Elevation: 6,660 ft 2,030 m
MSA:			

This microscale site monitors CO and $PM_{2.5}$. It was established in 1998 to measure CO at the west entrance to Yellowstone National Park (YNP). The site was moved about ¼ mile further into YNP during the spring of 2008. Continuous $PM_{2.5}$ monitoring was added in 2003. The site is very close to the roadway and is surrounded by tall trees. Air flow at monitoring height is up and down the roadway. Results are relevant only to the immediate vicinity. This site is funded by the National Park Service. However, the site is operated to comply with EPA requirements.

Belgrade - Wastewater Lagoon		Lagoon Road	
ID# 30-031-0018	Lat: 47.79367	Long: -111.16489	Elevation: 4,436 ft 1,352 m
MSA:			

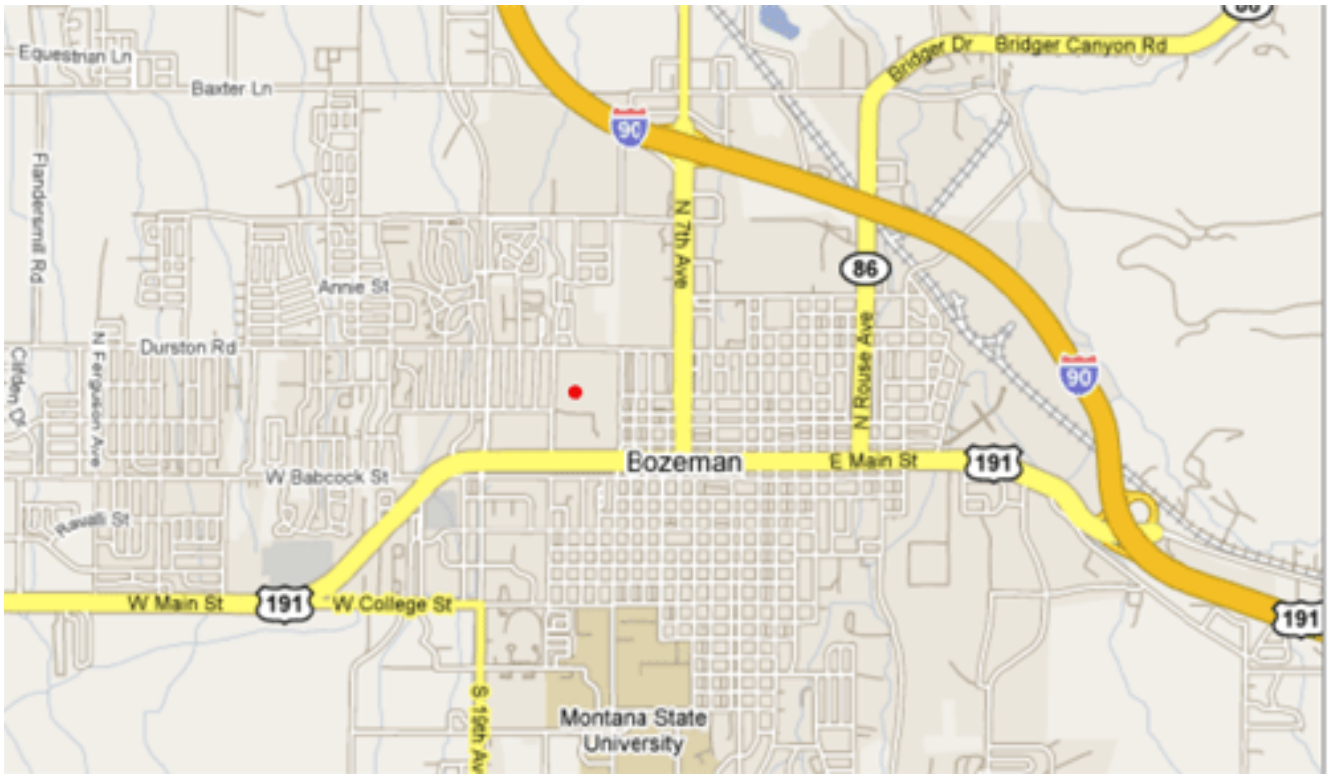


This site was established in 2008 and it measures $PM_{2.5}$ every third day on a neighborhood scale. The $PM_{2.5}$ data from this site is being compared with the $PM_{2.5}$ data from the Belgrade - ConAgra site. Since this is a trial site, line electric power was not installed and the samplers are powered by solar cells.

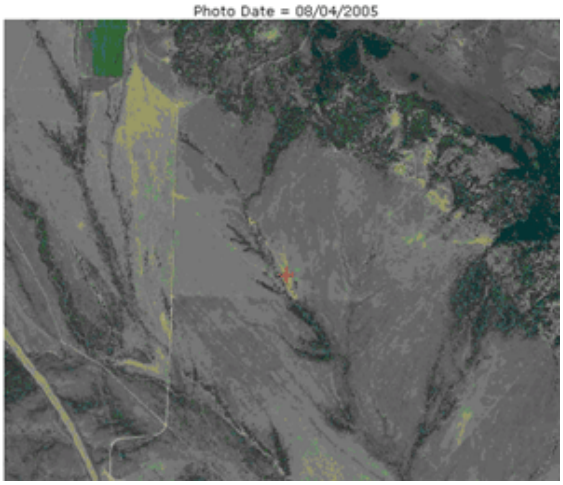


Bozeman – High School		N. 15th Ave.	
ID# 30-031-0019	Lat: 45.68379	Long: -111.05634	Elevation: 4,817 ft 1,468 m
MSA:			

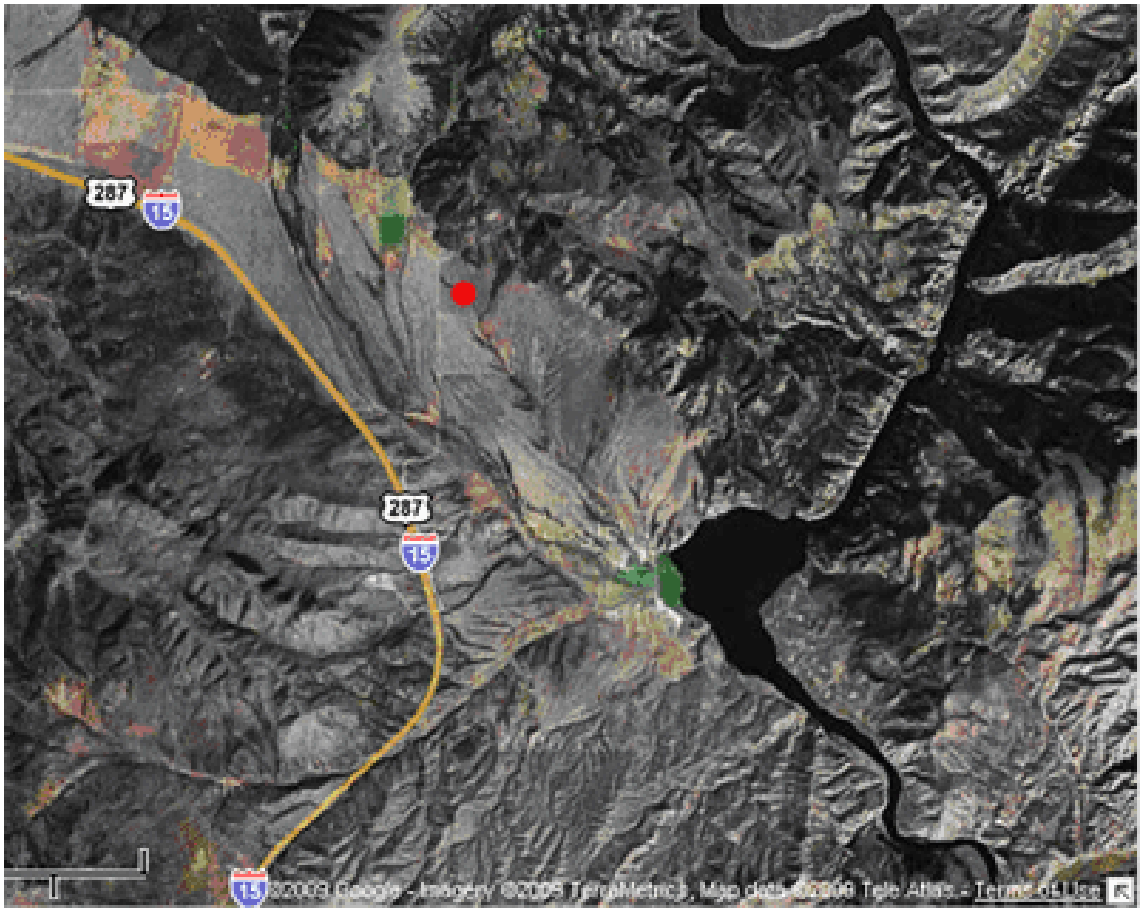
This neighborhood scale monitoring site was installed in January of 2009. The site continuously monitors $PM_{2.5}$ to provide data for population exposure assessment in the Bozeman area. It also provides real-time data for DEQ's Today's Air website and this site replaces the Bozeman Wastewater Treatment Plant PM2.5 site which was lost in the fall of 2008 due to construction activities for expansion of the plant.



NCore		Sieben Flats	
ID# 30-049-0004	Lat: 46.85049	Long: -111.98727	Elevation: 3,918 ft 1,194 m
MSA:			

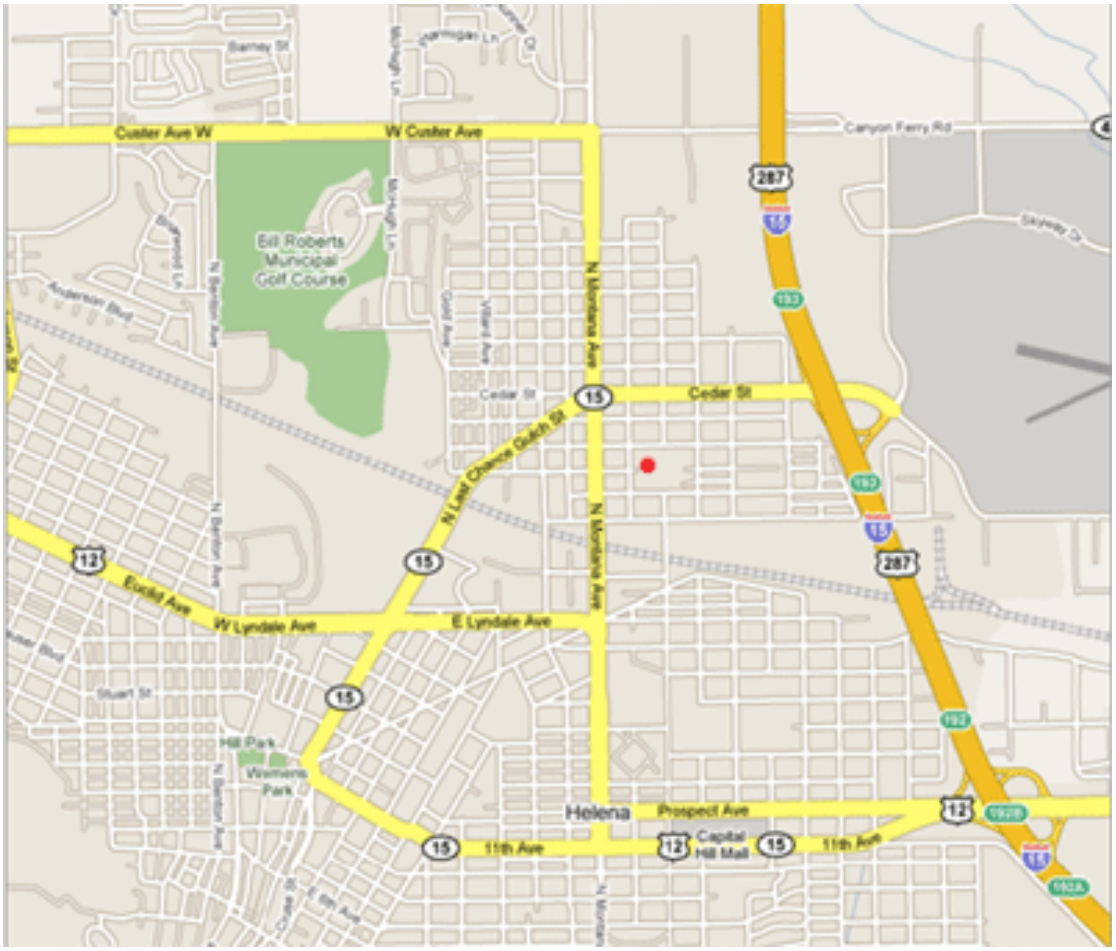


This new monitoring site is currently under construction. The site will monitor background air quality on a regional scale as part of a national air monitoring trends network. EPA requires the site to be fully operational by January 1, 2011.



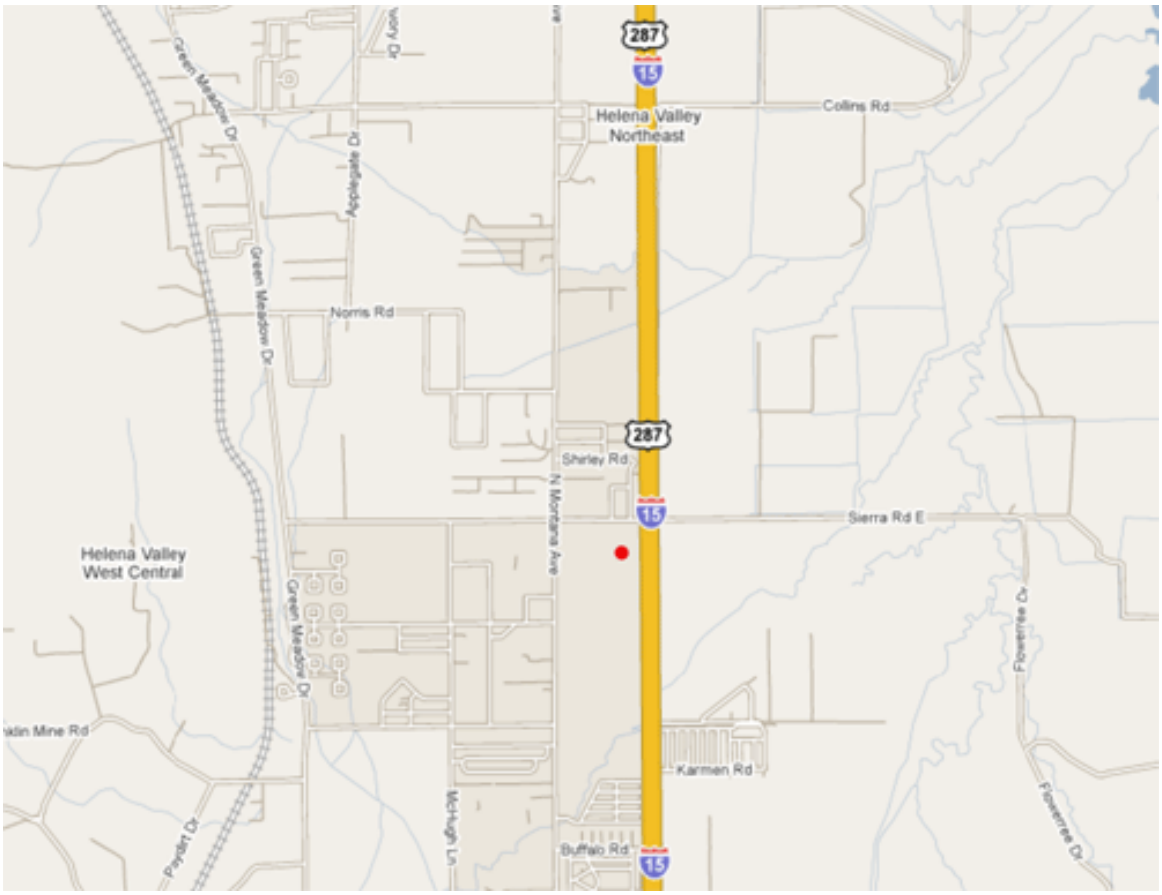
Helena – Lincoln School		1325 Poplar St.	
ID# 30-049-0018	Lat: 46.60388	Long: -112.03527	Elevation: 3,937 ft 1,200 m
MSA:			

This site has monitored particulate matter on a neighborhood scale for general public exposure since 1989. Currently, $PM_{2.5}$ is being monitored continuously and on an every-third day schedule. In 2009, this site will be shutdown and the monitoring equipment moved to the Rossiter School site (#30-049-0026) in the Helena Valley.

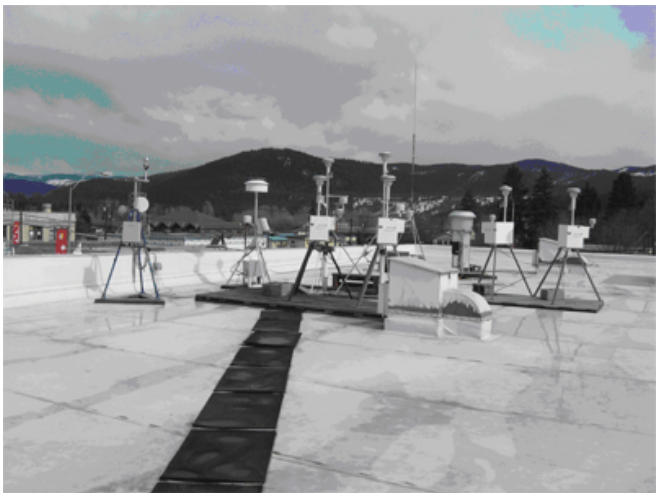


Helena – Rossiter Pump House		1497 Sierra Rd. East	
ID# 30-049-0026	Lat: 46.6588	Long: -112.0123	Elevation: 3,711 ft 1,131 m
MSA:			

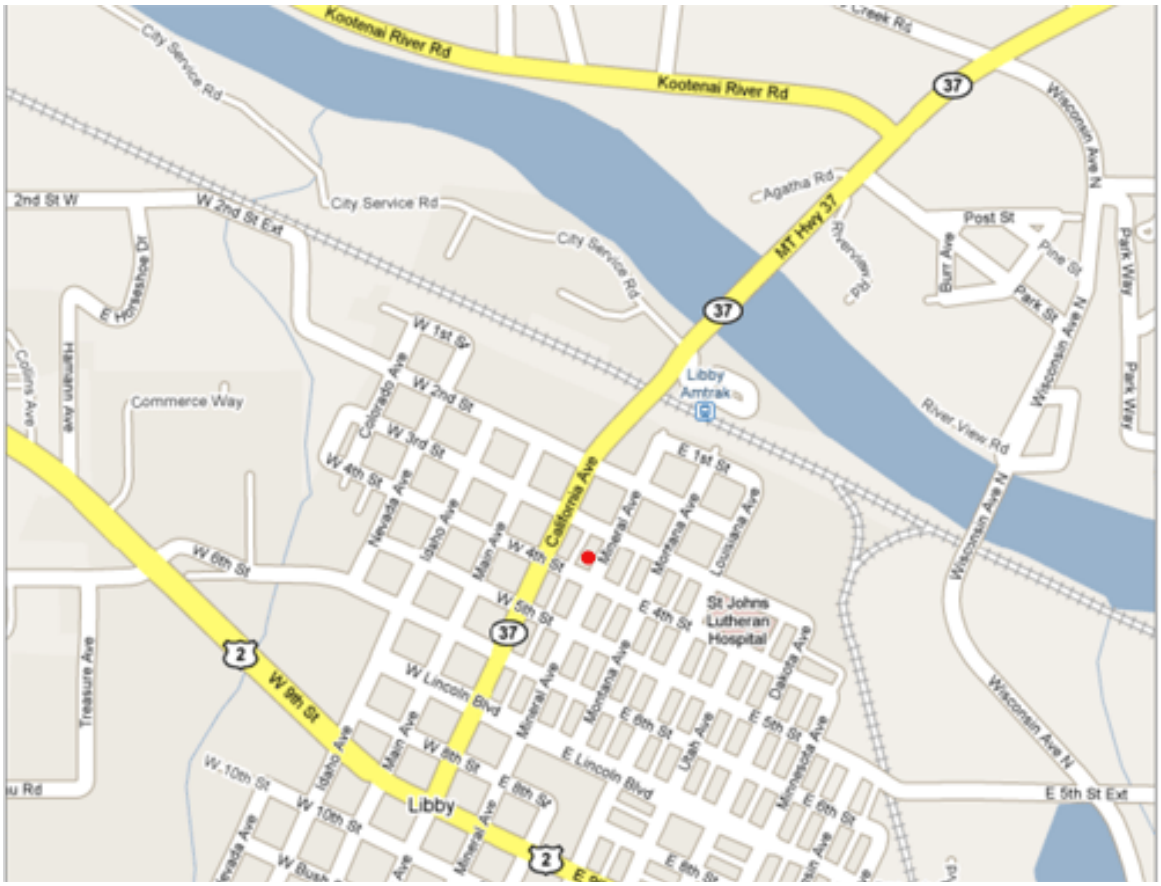
This neighborhood scale site is located in the middle of a field at the Rossiter School in the Helena Valley. The site monitored PM_{10} for many years but in January 2007 sampling switched over to $PM_{2.5}$. The site collects data to assess population exposure and to track the air pollution changes in the area related to ongoing commercial and residential development.



Libby – Courthouse Annex		418 Mineral Ave.	
ID# 30-053-0018	Lat: 48.38416	Long: -115.54805	Elevation: 2,080 ft 634 m
MSA:			

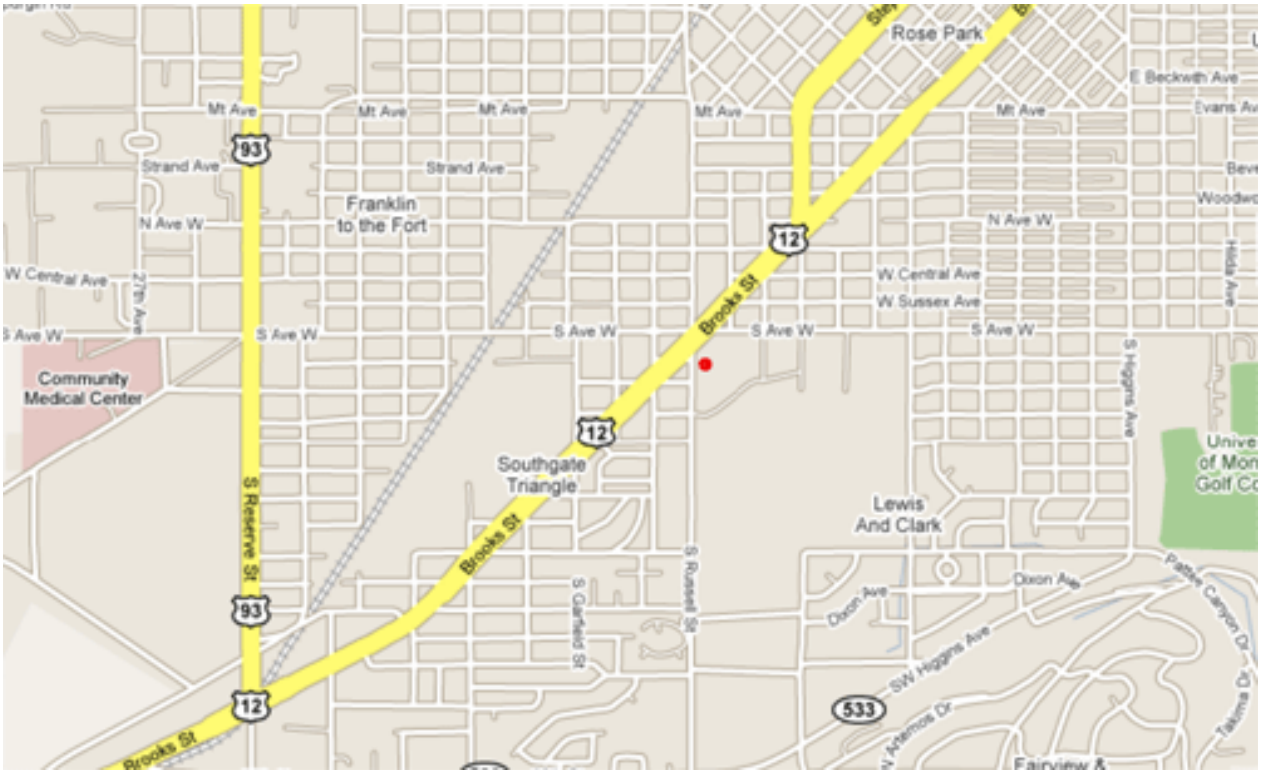


This site on the roof of the Courthouse Annex near the center of Libby has collected particulate data on a neighborhood scale basis since 1987. The site currently monitors PM_{10} and $PM_{2.5}$ for population exposure and NAAQS compliance for the PM_{10} and $PM_{2.5}$ nonattainment areas. $PM_{2.5}$ data is also continuously monitored for the local wood burning control program and to provide data for the Today's Air website.



Missoula – Malfunction Junction		Fairgrounds	
ID# 30-063-0005	Lat: 46.84889	Long: -114.01611	Elevation: 3,179 ft 969 m
MSA: Missoula/33540			

This long-term microscale site collects CO data to verify continued NAAQS compliance in the Missoula CO nonattainment area. The monitor is only operated during the winter months when the historic CO violations were originally measured due to frequent temperature inversions.

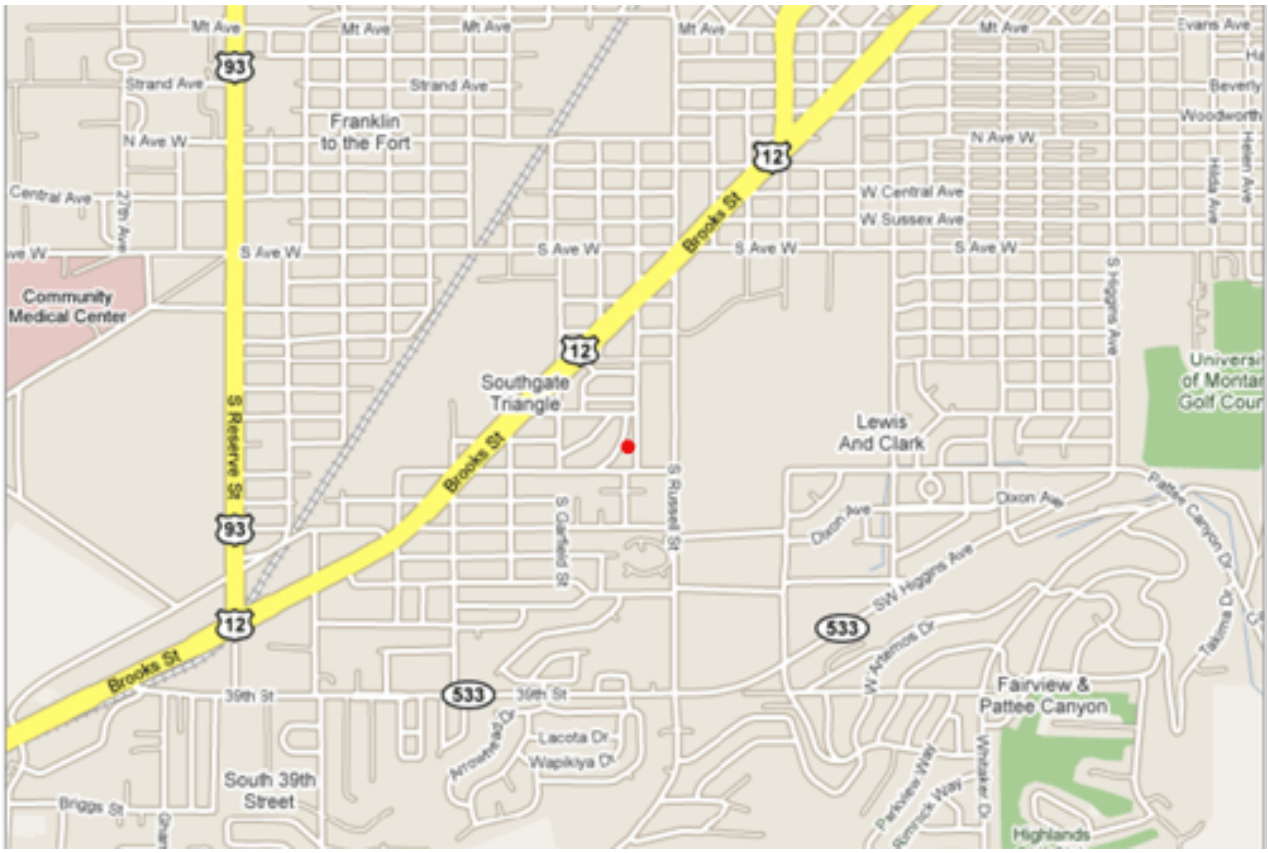


Seeley Lake		Montana State Route 83	
ID# 30-063-0021	Lat: 47.1771	Long: -113.4827	Elevation: 4,009 ft 1,222 m
MSA: Missoula/33540			

This site was installed along the main highway corridor through town to monitor PM_{10} and $PM_{2.5}$ on a neighborhood scale basis for population exposure assessments. Data collected since 2004 is inconclusive but indicates that $PM_{2.5}$ is occasionally high. PM_{10} monitoring will be discontinued in 2009 and an alternate site sought for the $PM_{2.5}$ monitoring.

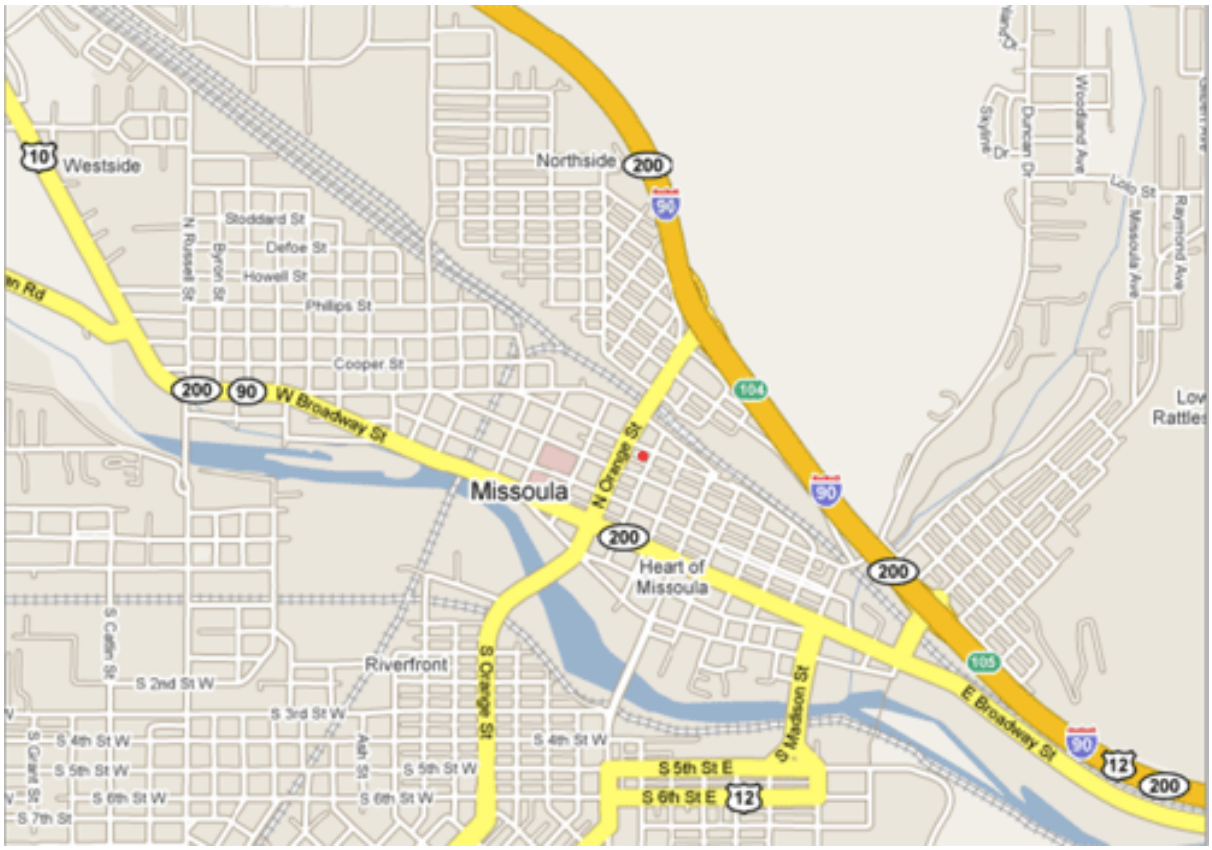
Missoula – Boyd Park		3131 Washburn Rd.	
ID# 30-063-0024	Lat: 46.84222	Long: -114.01972	Elevation: 3,179 ft 969 m
MSA: Missoula/33540			

Monitors at this site have collected particulate data on a neighborhood scale basis since 1981. $PM_{2.5}$ and PM_{10} are currently monitored continuously to demonstrate NAAQS compliance in the Missoula PM_{10} nonattainment area and to provide data for population exposure assessment. $PM_{2.5}$ data is also collected continuously for the Today's Air website and for the local wood burning control program.



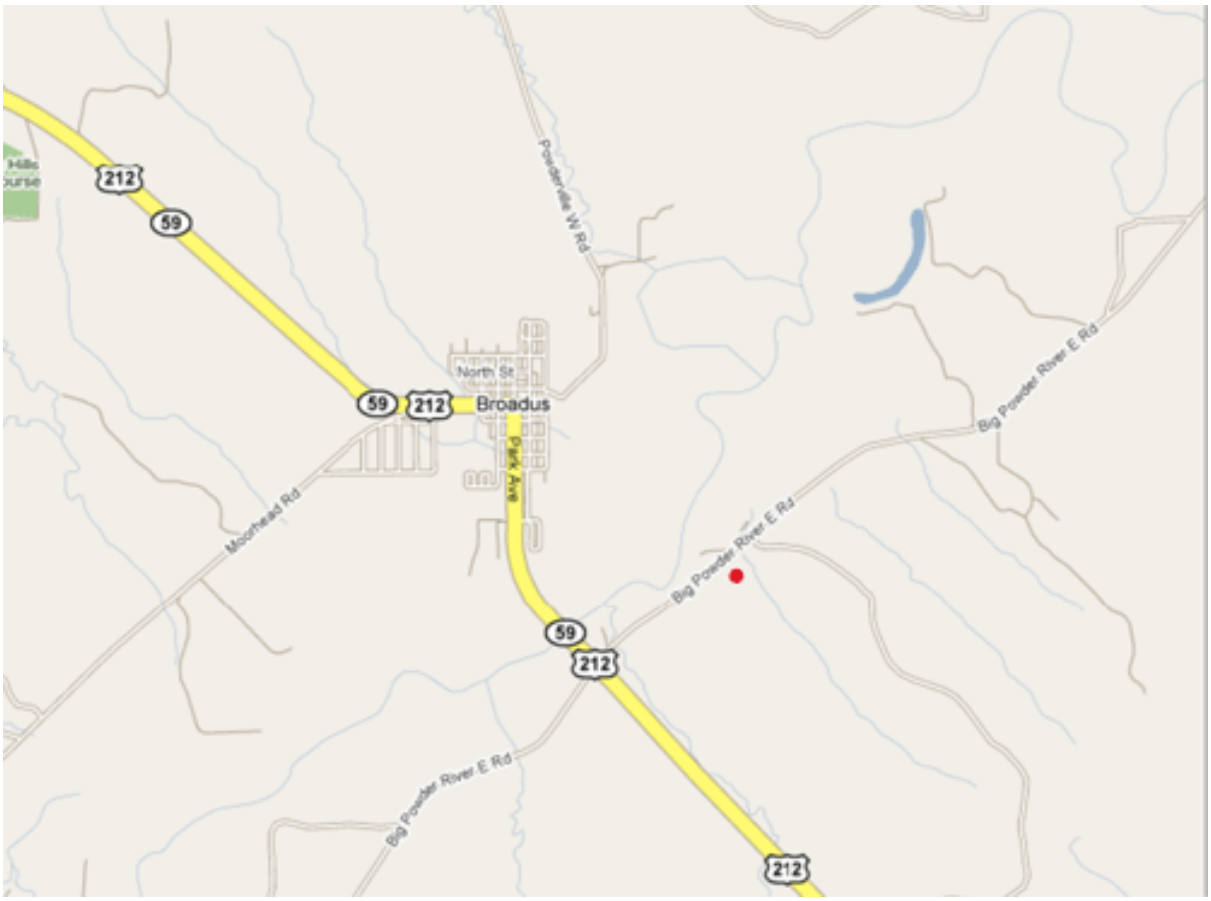
Missoula – Health Department		301 West Alder	
ID# 30-063-0031	Lat: 46.87491	Long: -113.99525	Elevation: 3,199 ft 975 m
MSA: Missoula/33540			

This neighborhood scale site is located on the roof of the Missoula City-County Health Department and particulate data has been collected since 1985. Currently, $PM_{2.5}$ data is collected as part of EPA's national speciation network. $PM_{2.5}$ data is also collected for population exposure assessment and NAAQS compliance purposes.



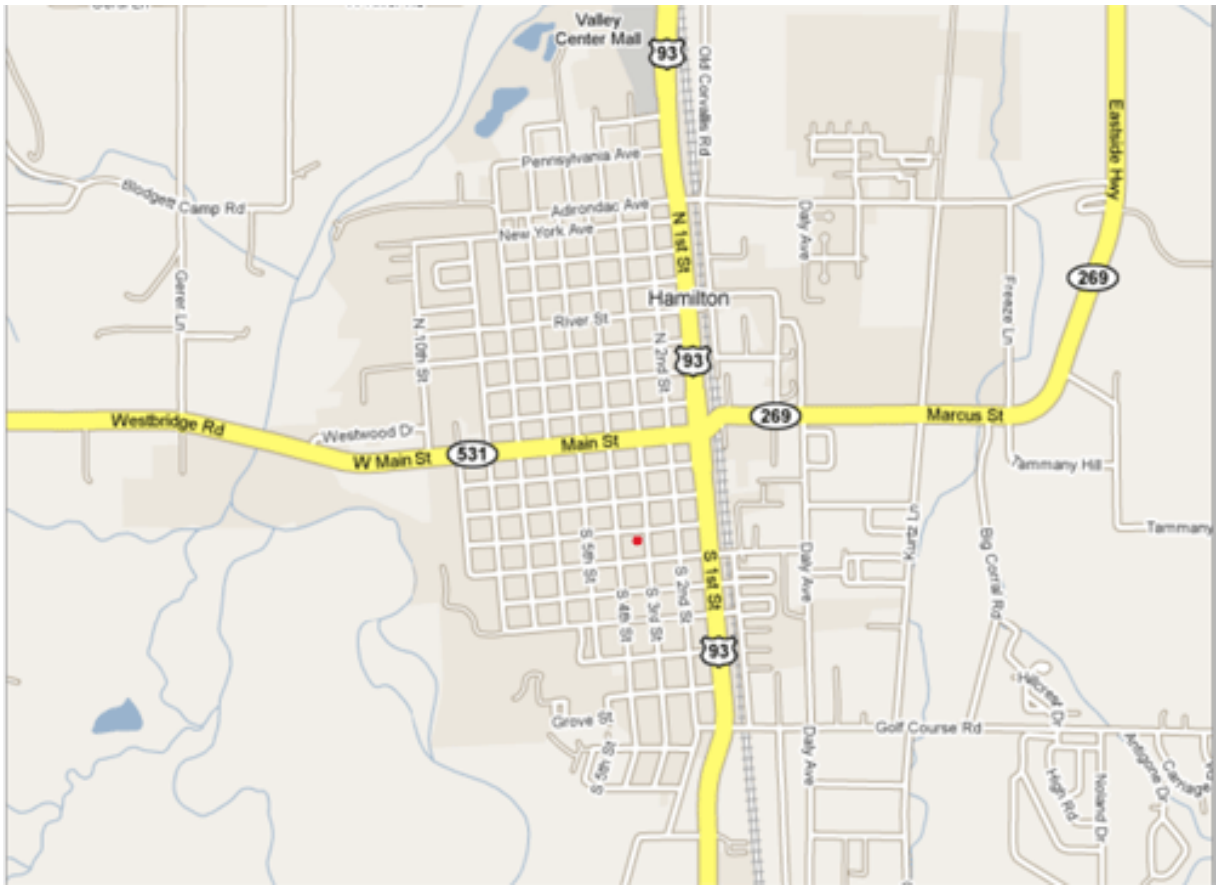
Broadus – Powder River		2 miles east of Broadus	
ID# 30-075-xxxx	Lat: 45.44007	Long: -105.37024	Elevation: 3,097 ft 944 m
MSA:			

In 2009, this site will be established in the Powder River Valley of south-eastern Montana to determine the current levels of a variety of air pollutants and to track changes in air quality that may occur due to coal bed natural gas development. A variety of surface level meteorological data (wind speed and direction, temperature, etc.) will also be collected at this site.



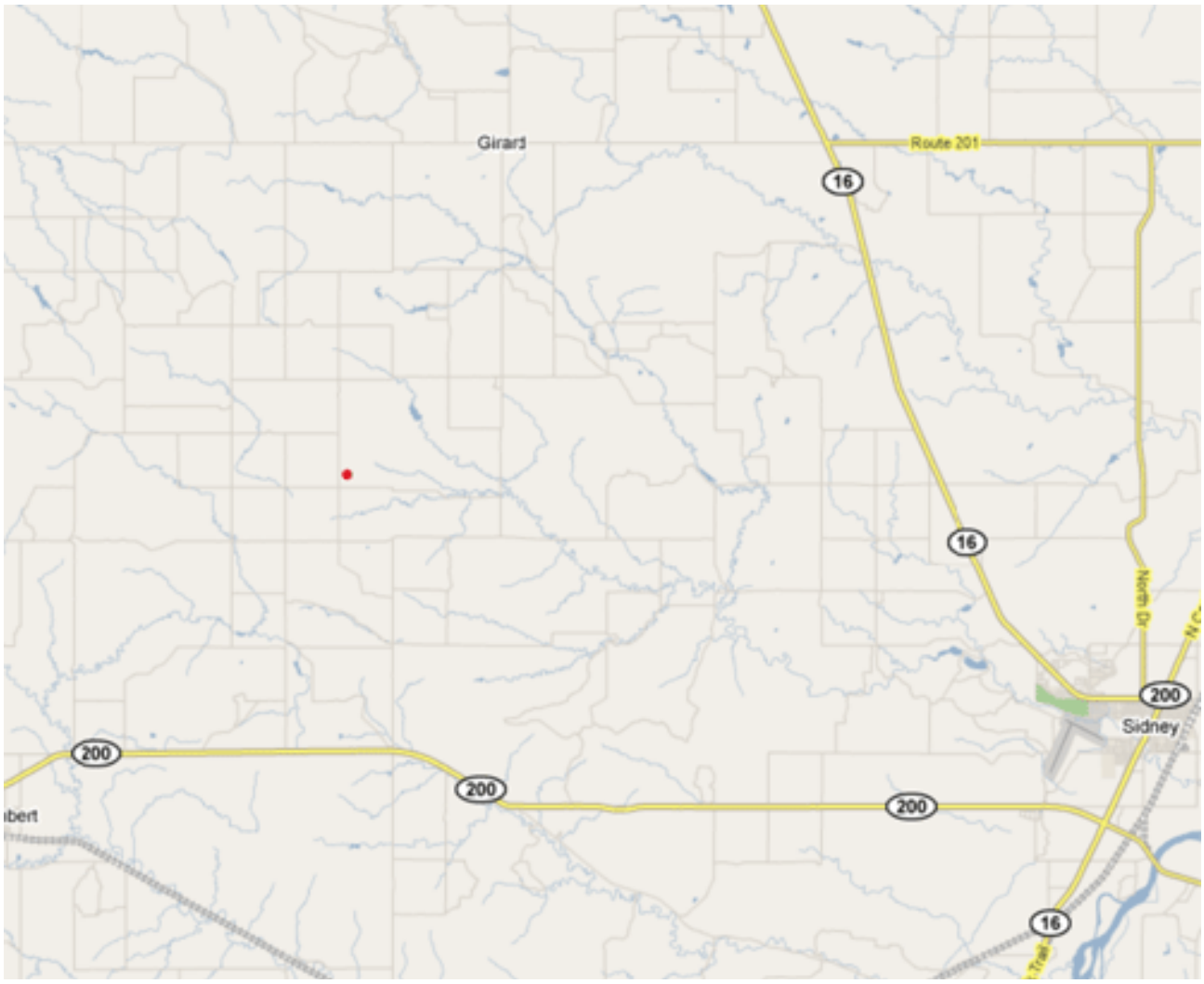
Hamilton – PS#46		Madison and 3rd St. South	
ID# 30-081-0007	Lat: 46.24583	Long: -114.15886	Elevation: 3,570 ft 1,088 m
MSA:			

This neighborhood scale site was established in 2005 in the paved parking lot at the corner of Madison and 3rd Street South. The site is within five meters of an alley (gravel) and Madison Street (paved) but both roadways experience very low levels of motor vehicle traffic. $PM_{2.5}$ data is collected continuously and on an every third day schedule. The data is used to assess population exposure and NAAQS compliance. The continuous $PM_{2.5}$ data is reported to the Today's Air website and used for public health protection plans during periods of poor air quality which the community frequently experiences during summer wildfire events.



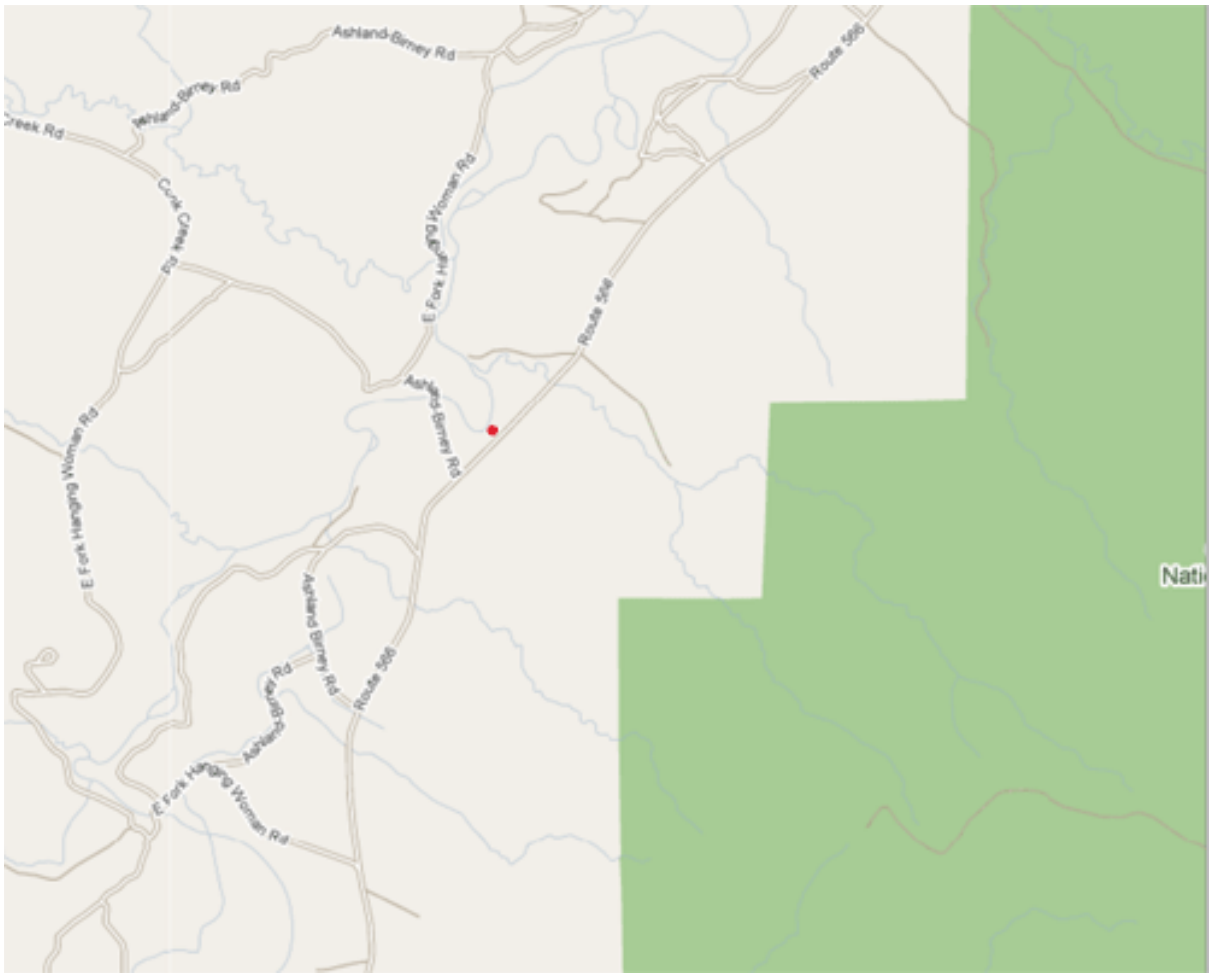
Sidney – Oil Field		15 miles northwest of Sidney	
ID# 30-083-0001	Lat: 47.80342	Long: -104.48562	Elevation: 2,546 ft 776 m
MSA:			

In 2008, this site was established in eastern Montana to determine the levels of a variety of air pollutants on a neighborhood scale basis and to track changes in air quality that may occur due to the development of the Bakken Oil Field. Surface level meteorological data (wind speed and direction, temperature, etc.) is also collected at this site and the continuously monitored $PM_{2.5}$ data is reported to the Today's Air website.



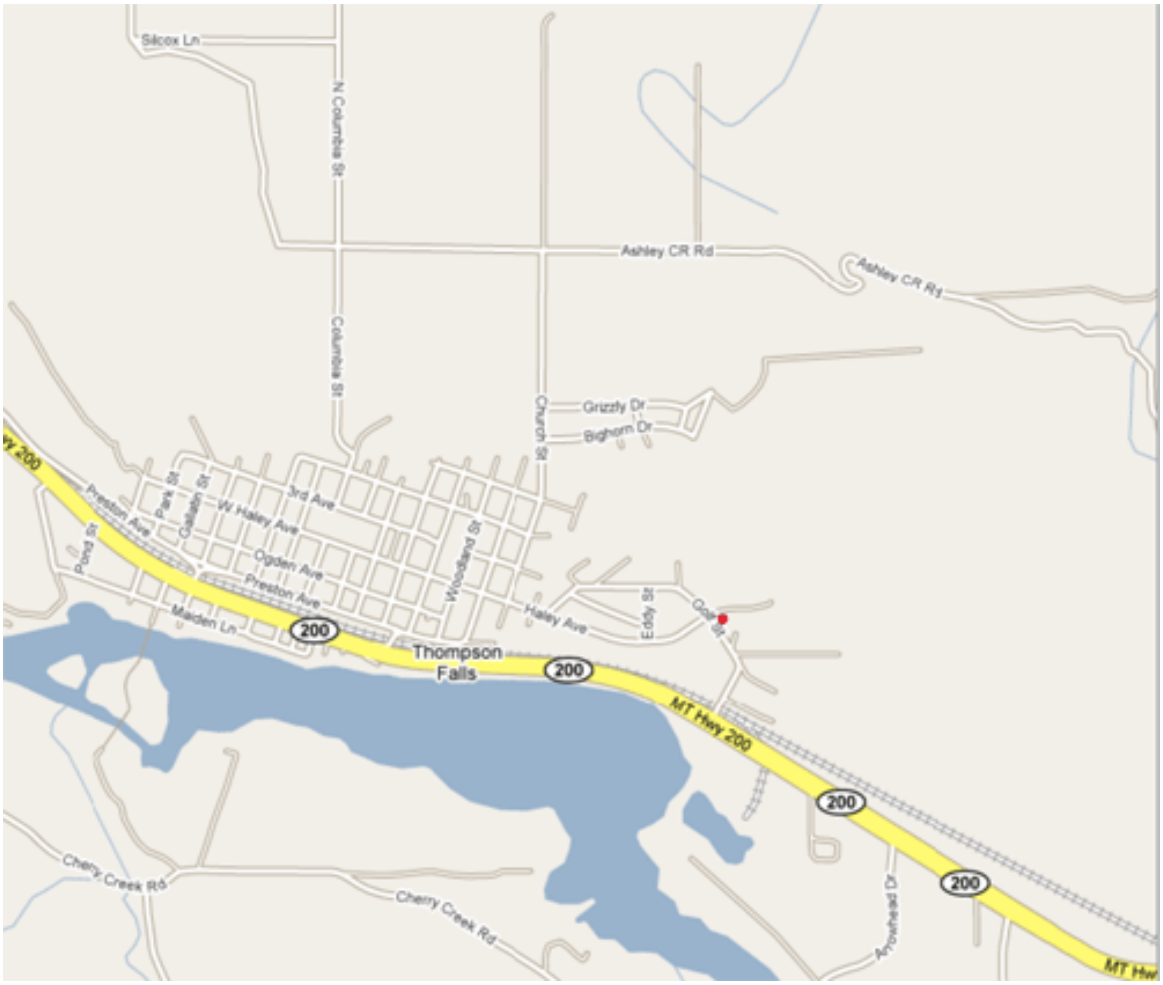
Birney – Tongue River		3 miles north of Birney	
ID# 30-087-xxxx	Lat: 45.36620	Long: -106.48943	Elevation: 3,153 ft 961 m
MSA:			

In 2009, this site will be established in the Tongue River Valley of south-eastern Montana to determine the current levels of a variety of air pollutants and to track changes in air quality that may occur due to coal bed natural gas development. A variety of surface level meteorological data (wind speed and direction, temperature, etc.) will also be collected at this site.



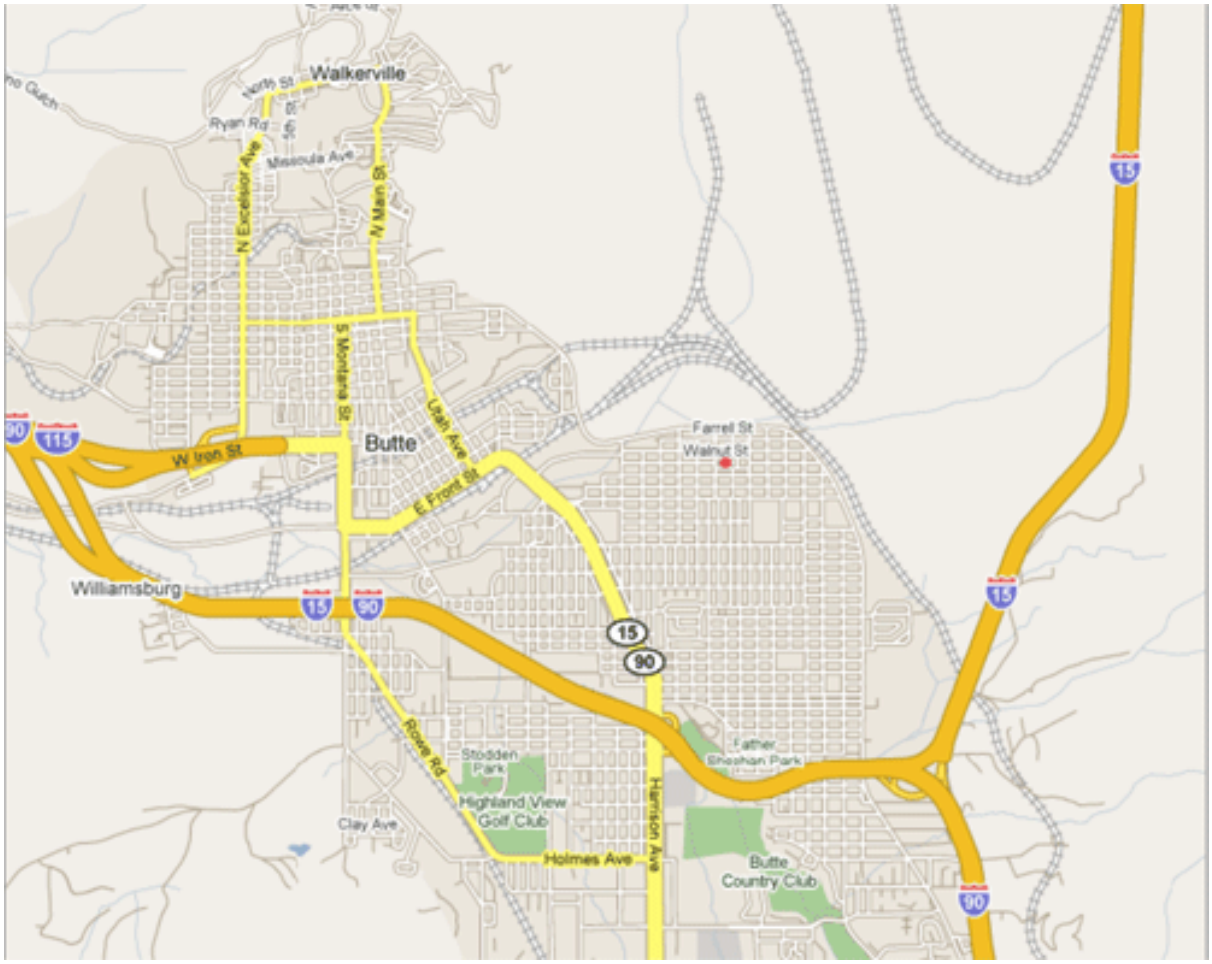
Thompson Falls – High School		Golf and Haley	
ID# 30-089-0007	Lat: 47.59639	Long: -115.32361	Elevation: 2,461 ft 750 m
MSA:			

This site is located on the east side of Thompson Falls at the high school. The site was established in 1999 and collects PM_{10} and $PM_{2.5}$ data on a neighborhood scale basis. Data from the site is used to track NAAQS compliance in the local PM10 nonattainment area and to assess population exposure to particulate matter.



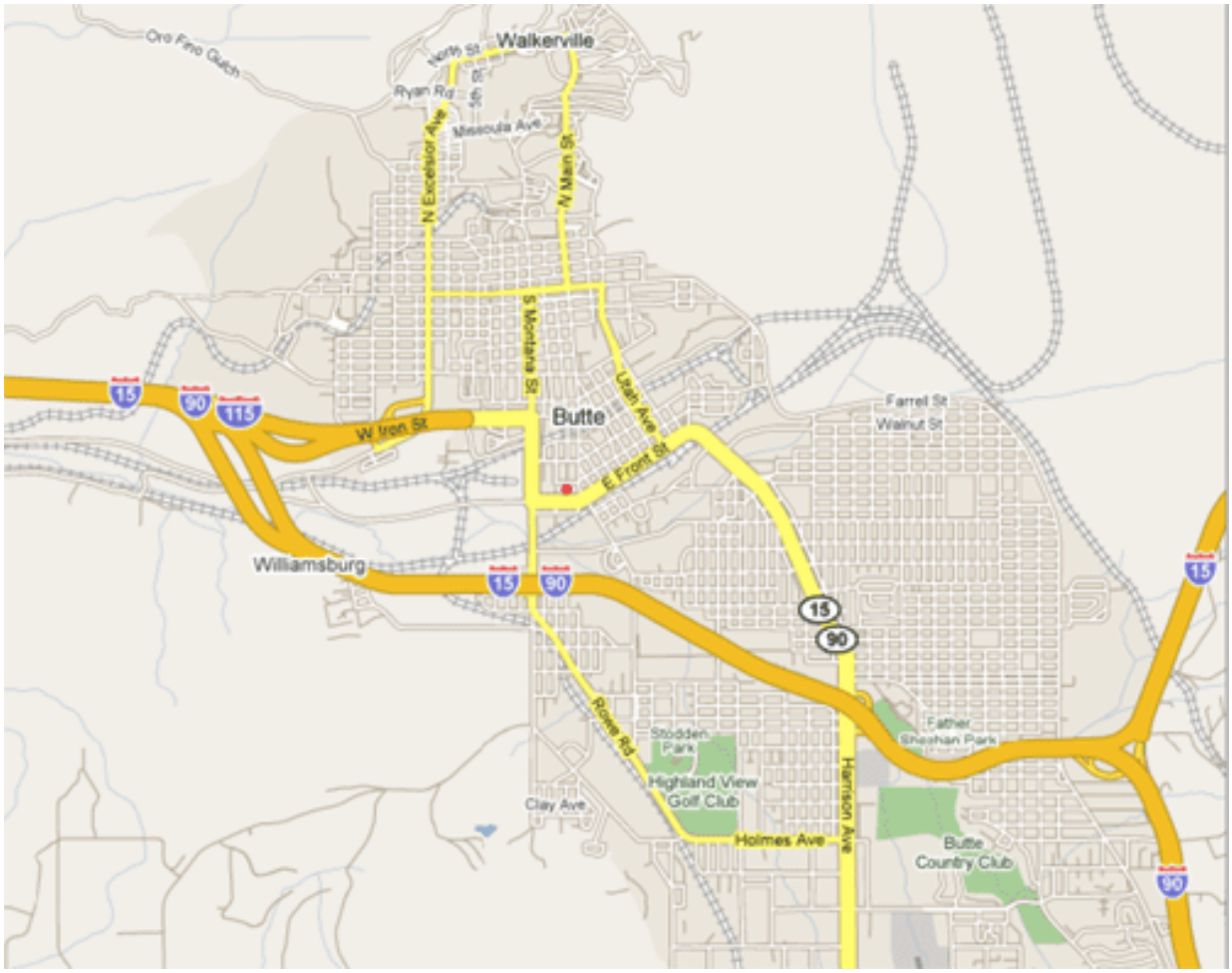
Butte – Greeley School			
ID# 30-093-0005	Lat: 46.00240	Long: -112.50089	Elevation: 5,519 ft 1,682 m
MSA:			

This historical site is at a closed elementary school in a residential neighborhood on the north side of Butte and very near an operating open pit copper mine. PM_{10} and $PM_{2.5}$ data collected at this site represents population exposure on a neighborhood scale. Continuous PM_{10} data is used to monitor NAAQS compliance in the local nonattainment area. Continuous $PM_{2.5}$ data is reported to the Today's Air website and used for public health protection plans during periods of poor air quality. The wintertime saturation study of 2008/09 determined Greeley School is the location for maximum $PM_{2.5}$ concentrations in Butte and site changes are planned.



Butte – Front Street			
ID# 30-093-0009	Lat: 45.99879	Long: -112.53662	Elevation: 5,479 ft 1,670 m
MSA:			

This site is in the parking lot for the offices of the Butte-Silver Bow Health Department. It was established in 2007 and the continuously collected $PM_{2.5}$ data represents population exposures on a neighborhood scale basis. The continuous $PM_{2.5}$ data is also reported to the Today's Air website. The wintertime saturation study of 2008/'09 determined Greeley School is the location for maximum $PM_{2.5}$ concentrations in Butte and this site will be shutdown in 2009.

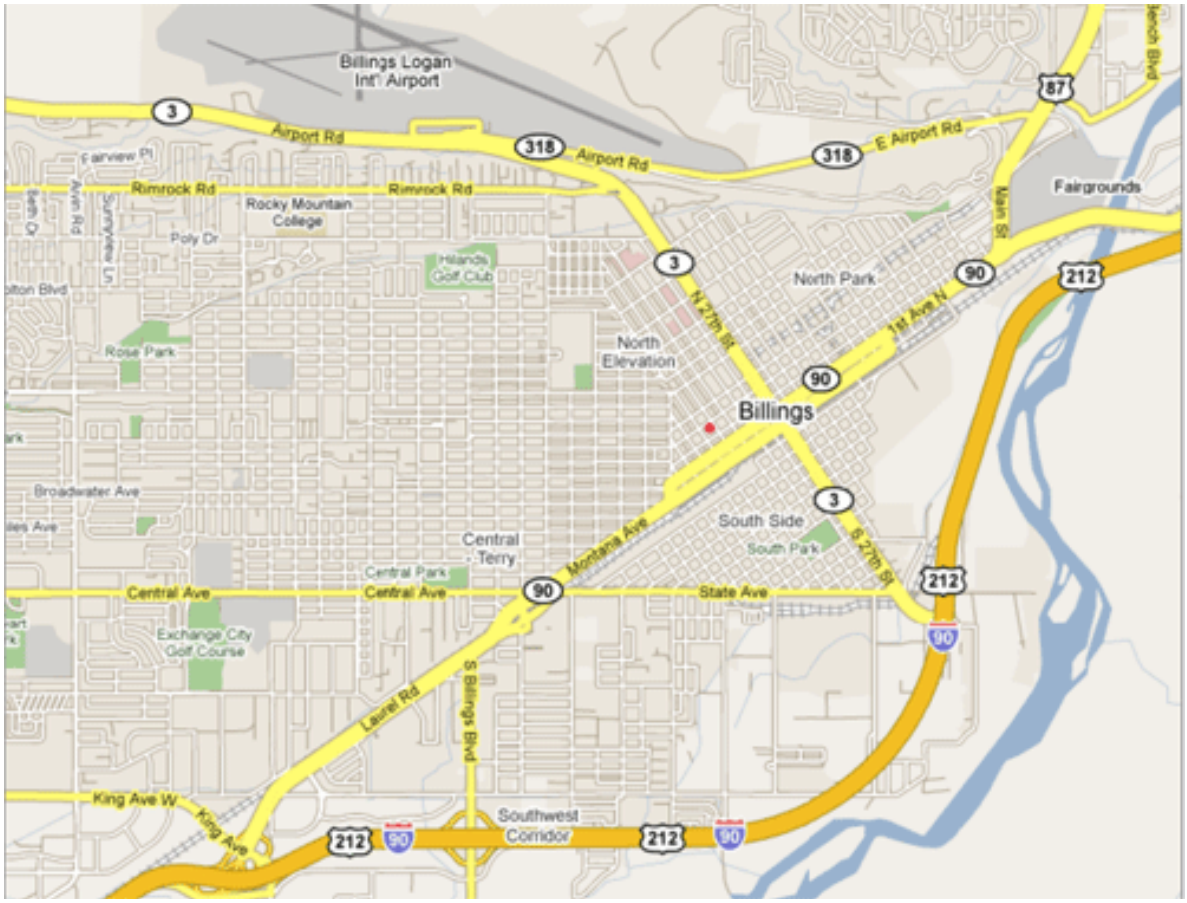


Billings – Coburn Road		Coburn Hill Road	
ID# 30-111-0066	Lat: 45.78667	Long: -108.45778	Elevation: 3,396 ft 1,035 m
MSA: Billings/13740			

This neighborhood scale historical SO_2 monitoring site is located on high ground south of the Conoco and Exxon refineries and has operated for the last three decades. It measures some of the highest SO_2 levels in the Billings area and exists to monitor compliance with the federal and state SO_2 ambient air standards.

Billings – St Luke's		2nd Ave. North and North 32nd Street	
ID# 30-111-0085	Lat: 45.78218	Long: -108.51153	Elevation: 3,166 ft 965 m
MSA: Billings/13740			

This site monitors CO on a microscale basis in downtown Billings at the corner of 2nd Ave. North and North 32nd Street. The site was installed to demonstrate compliance with the CO NAAQS in the Billings nonattainment area. In 2008, continuous $PM_{2.5}$ monitoring was added to provide data for the Today's Air website and to be used for public health protection plans during periods of poor air quality.



Billings – Lockwood Park		Old Hardin Road	
ID# 30-111-1065	Lat: 45.80194	Long: -108.42611	Elevation: 3,137 ft 956 m
MSA: Billings/13740			

This neighborhood scale particulate site is located at Lockwood Park on Old Hardin Road at the east end of Billings. It has monitored population exposure to $PM_{2.5}$ since 1999.

APPENDIX B

EXISTING & PROPOSED AIR MONITORING NETWORK

Table 2
Existing Montana Ambient Air Monitoring Network

AQS Number	Site City-Name	Parameter	Method	Frequency	Type	Spatial Scale	Location Type*
*H=high concentration, P=population exposure, S=source impact, B=background							
30-013-0001	Great Falls-Overlook Park	42101-CO	093[1]	Continuous	SLAMS	Micro.	H,P,S
		88502-$PM_{2.5}$	731[5]	Continuous	SPM	Middle	H,P
30-013-1026	Great Falls-High School	88101-$PM_{2.5}$	116[2]	1 in 3	SLAMS	Neigh.	H,P
30-029-0007	Columbia Falls-Ball Park	81102-PM_{10}	125[3]	1 in 6 (collocated)	SLAMS	Neigh	H,P,S
		88101-$PM_{2.5}$	116[2]	1 in 3	SLAMS	Neigh	H,P
30-029-0009	Whitefish-Dead End	88502-$PM_{2.5}$	731[5]	Continuous	SPM	Neigh.	H,P
		88101-$PM_{2.5}$	116[2]	1 in 3	SLAMS	Neigh.	H,P
		81102-PM_{10}	125[3]	1 in 6	SLAMS	Neigh.	H,P
30-029-0010	Kalispell-Moose's	42101-CO	093[1]	Continuous	SLAMS	Micro.	H,P,S
30-029-0047	Kalispell-Flathead Electric	88502-$PM_{2.5}$	731[5]1	Continuous	SPM	Neigh.	H,P
		88101-$PM_{2.5}$	16[2]	1 in 3	SLAMS	Neigh.	H,P
		81102-PM_{10}	125[3]	1 in 6	SLAMS	Neigh.	H,P
30-031-0018	Belgrade-Wastewater Lagoon	88101-$PM_{2.5}$	116[2]	1 in 3	SPM	Neigh.	H,P
30-031-0019	Bozeman-High School	88502-$PM_{2.5}$	731[5]	Continuous	SPM	Neigh.	P

Table 2 (Continued)
Existing and Proposed Montana Ambient Air Monitoring Network

AQS Number	Site Location City-Name	Parameter	Method	Frequency	Type	Spatial Scale	Type*
*H=high concentration, P=population exposure, S=source impact, B=background							
30-031-0008	Belgrade-ConAgra	88101-$PM_{2.5}$	116[2]	1 in 3	SLAMS	Neigh.	H,P
30-031-0017	West Yellowstone-Park Entrance	42101-CO	093[1]	Continuous	SPM	Micro	S
		88502-$PM_{2.5}$	731[5]	Continuous	SPM	Micro	S
30-031-0016	West Yellowstone-City Center	42101-CO	093[1]	Continuous	SLAMS	Neigh.	H,P
		88101-$PM_{2.5}$	170[8]	Continuous	SLAMS	Neigh.	H,P
30-049-0004	Sieben's Flat	42101-CO	093	Continuous	Proposed	Region	B
		42401-SO_2	100	Continuous	NCore	Region	B
		42601-NO	074	Continuous		Region	B
		42600 -NOy		Continuous		Region	B
		44201-O3	047[9]	Continuous		Region	B
		81102-PM_{10}	122[4]	Continuous		Region	B
		88101-$PM_{2.5}$	170[8]	Continuous		Region	B
		88101-$PM_{2.5}$	116[2]	1 in 3		Region	B
		88502-$PM_{2.5}$	810[6]	1 in 3		Region	B
		86502-PM_{coarse}	899	Continuous		Region	B
30-049-0018	Helena-Lincoln School	88101-$PM_{2.5}$	170[8]	Continuous	SLAMS	Neigh.	H,P
		88101-$PM_{2.5}$	116[2]	1 in 3	Collocated		
30-049-0026	Helena-Rossiter Pump House	88101-$PM_{2.5}$	116[2]	1 in 6	SLAMS	Neigh.	P

Table 2 (Continued)
Existing and Proposed Montana Ambient Air Monitoring Network

AQS Number Location Scale	Site City-Name Type*	Parameter	Method	Frequency	Type	Spatial	
30-053-0018	Libby-Courthouse Annex	81102-PM_{10}	122[4]	Continuous	SLAMS	Neigh.	H,P
		88101-$PM_{2.5}$	116[2]	1 in 3	SLAMS	Neigh.	H,P
		88502-$PM_{2.5}$	731[5]	Collocated Continuous	SPM	Neigh.	H,P
30-063-0005	Missoula-Malfunction Junction	42101-CO	093[1]	Continuous 1st & 4th quarters	SLAMS	Micro	H,P,S
30-063-0021	Seeley Lake	81102-PM_{10}	125[3]	1 in 3	SPM	Middle	H,P,S
		88101-$PM_{2.5}$	116[2]	1 in 3	SPM	Neigh.	H,P
30-063-0024	Missoula-Boyd Park	81102-PM_{10}	122[4]	Continuous	SLAMS	Neigh.	H,P
		88101-$PM_{2.5}$	170[8]	Continuous	SLAMS	Neigh.	H,P
			170[8]	Collocated			
30-063-0031	Missoula-Health Dept.	88101-$PM_{2.5}$	116[2]	1 in 3	SLAMS	Neigh.	H,P
		$PM_{2.5}$ Speciation	810[6]	Collocated 1 in 3	Trends Speciation	Neigh.	H,P
30-075-xxxx	Broadus-Powder River		047[9]	Continuous	Indus.	Neigh.	B,S
			074[11]	Continuous	Indus.	Neigh.	B,S
			074[11]	Continuous	Indus.	Neigh.	B,S
			074[11]	Continuous	Indus.	Neigh.	B,S
			122[4]	Continuous	Indus.	Neigh.	B,S
			170[8]	Continuous	Indus.	Neigh.	B,S

*H=high concentration, P=population exposure, S=source impact, B=background

Table 2 (Continued)
Existing and Proposed Montana Ambient Air Monitoring Network

AQS Number Location Scale	Site City-Name Type*	Parameter	Method	Frequency	Type	Spatial	
30-081-0007	Hamilton-Parking Spot #46	88101-$PM_{2.5}$	116[2]	1 in 3	SLAMS	Neigh.	H,P
		88101-$PM_{2.5}$	170[8]	Continuous	SPM	Neigh.	H,P
30-083-0001	Sidney-Oil Field	44201-O_3	047[9]	Continuous	Indus.	Neigh.	S
		42601-NO	099[10]	Continuous	Indus.	Neigh.	S
		42602-NO_2	099[10]	Continuous	Indus.	Neigh.	S
		42603-NOx	099[10]	Continuous	Indus.	Neigh.	S
		81102-PM_{10}	122[4]	Continuous	Indus.	Neigh.	S
		88101-$PM_{2.5}$	170[8]	Continuous	Indus.	Neigh.	S
30-087-xxxx	Birney-Tongue River	44201-O_3	047[9]	Continuous	Indus.	Neigh.	B,S
		42601-NO	074[11]	Continuous	Indus.	Neigh.	B,S
		42602-NO_2	074[11]	Continuous	Indus.	Neigh.	B,S
		42603-NOx	074[11]	Continuous	Indus.	Neigh.	B,S
		81102-PM_{10}	122[4]	Continuous	Indus.	Neigh.	B,S
		88101-$PM_{2.5}$	170[8]	Continuous	Indus.	Neigh.	B,S
30-089-0007	Thompson Falls-High School	81102-PM_{10}	125[3]	1 in 6	SLAMS	Neigh.	H,P
		88101-$PM_{2.5}$	116[2]	1 in 3	SLAMS	Neigh.	H,P
30-093-0005	Butte-Greeley School	81102-PM_{10}	122[4]	Continuous	SLAMS	Neigh.	H,P,S
		88101-$PM_{2.5}$	116[2]	1 in 3	SLAMS	Neigh.	H,P
		$PM_{2.5}$ Speciation	810[6]	1 in 6	Suppl Speciation	Neigh.	H,P

*H=high concentration, P=population exposure, S=source impact, B=background

Table 2 (Continued)
Existing and Proposed Montana Ambient Air Monitoring Network

AQS Number	Site Location City-Name	Parameter	Method	Frequency	Type	Spatial Scale	Type*
30-093-0009	Butte-Front Street	88502-$PM_{2.5}$	731[5]	Continuous	SPM	Neigh.	H,P
30-111-0066	Billings-Coburn Road	42401-SO_2	100[7]	Continuous	SLAMS	Neigh.	H,S
30-111-0085	Billings-St. Luke's	42101-CO	093[1]	Continuous	SLAMS	Micro.	H,P,S
		88502-$PM_{2.5}$	731[5]	Continuous	SPM	Micro.	P
30-111-1065	Billings-Lockwood Park	88101-$PM_{2.5}$	116[2]	1 in 3	SLAMS	Neigh.	H,P

*H=high concentration, P=population exposure, S=source impact, B=background

[1]Teledyne-API Model 300. Nondispersive infrared-equivalent method.
[2]BGI-PQ200 with very sharp cut cyclone. Federal Reference Method.
[3]BGI-PQ200 with WINS eliminator. Federal Reference Method.
[4]MetOne BAM 1020. Beta attenuation monitor-equivalent method PM_{10}.
[5]MetOne BAM 1020 with $PM_{2.5}$ sharp cut cyclone. Beta attenuation monitor.
[6]MetOne Speciation Air Sampling System.
[7]Teledyne-API Model 100. Ultraviolet fluorescence-equivalent method.
[8]MetOne FEM-BAM 1020 with $PM_{2.5}$ very sharp cut cyclone. Beta attenuation monitor-equivalent method $PM_{2.5}$.
[9]Thermo Model 49i. UV absorption-equivalent method.
[10]Teledyne-API Model 200EV. Chemiluminescence-Federal Reference Method.
[11]Thermo Model 42i TL. Chemiluminescence-Federal Reference Method.

APPENDIX C

NATIONAL & MONTANA AMBIENT AIR QUALITY STANDARDS

FEDERAL & STATE AIR QUALITY STANDARDS

POLLUTANT	TIME PERIOD	FEDERAL (NAAQS)	MONTANA (MAAQS)	STANDARD TYPE
Carbon Monoxide	Hourly Average 8-Hour Average	35 ppm [a] 9 ppm [a]	23 ppm [b] 9 ppm [b]	Primary Primary
Fluoride in Forage	Monthly Average Grazing Season	- - - -	50 µg/g [c] 35 µg/g [c]	- - - -
Hydrogen Sulfide	Hourly Average	- -	0.05 ppm [b]	- -
Lead	90-Day Average Rolling 3-Month Avg.	- - 0.15 $\mu g/m^3$ [c]	1.5 $\mu g/m^3$ [c] - -	- - Prim. & Sec.
Nitrogen Dioxide	Hourly Average Annual Average	- - 0.053 ppm [d]	0.30 ppm [b] 0.05 ppm [e]	- - Prim. & Sec.
Ozone	Hourly Average 8-Hour Average	0.12 ppm [f] 0.075 ppm [g]	0.10 ppm [b] - -	Prim. & Sec. Prim. & Sec.
PM -10	24-Hour Average Annual Average	150 $\mu g/m^3$ [i] - -	150 $\mu g/m^3$ [i] 50 $\mu g/m^3$ [j]	Prim. & Sec. Prim. & Sec.
PM-2.5	24-Hour Average Annual Average	35 $\mu g/m^3$ [k] 15 $\mu g/m^3$ [l]	- - - -	Prim. & Sec. Prim. & Sec.
Settleable Particulate	30-Day Average	- -	10 g/m^2 [c]	- -
Sulfur Dioxide	Hourly Average 3-Hour Average 24-Hour Average Annual Average	- - 0.50 ppm [a] 0.14 ppm [a] 0.030 ppm [d]	0.50 ppm [h] - - 0.10 ppm [b] 0.02 ppm [e]	- - Secondary Primary Primary
Visibility	Annual Average	- -	$3 \times 10^{-5}/m$ [e]	- -

[a] Federal violation when exceeded more than once per calendar year.
[b] State violation when exceeded more than once over any 12 consecutive months.
[c] Not to be exceeded (ever) for the averaging time period as described in state or federal regulation.
[d] Federal violation when the annual arithmetic mean concentration for a calendar year exceeds the standard.
[e] State violation when the arithmetic average over any four consecutive quarters exceeds the standard.
[f] Applies only to NA areas designated before the 8-hour standard was approved in July, 1997. MT has none.
[g] Federal violation when 3-year average of the annual 4th-highest daily max. 8-hour concentration exceeds standard.
[h] State violation when exceeded more than eighteen times in any 12 consecutive months.
[i] State and federal violation when more than one expected exceedance per calendar year, averaged over 3-years.
[j] State violation when the 3-year average of the arithmetic means over a calendar year at each monitoring site exceed the standard.
[k] Federal violation when 3-year average of the 98th percentile values at each monitoring site exceed the standard.
[l] Federal violation when 3-year average of the annual mean at each monitoring site exceeds the standard.

END OF DOCUMENT