Idaho Department of Environmental Quality
Annual Ambient Air Quality Monitoring Network Plan

July 1, 2010

Idaho Department of Environmental Quality
Air Quality Division
1410 North Hilton
Boise, Idaho 83706

This page left blank for double-sided printing

Contents

1. Introduction.....1

2. Air Quality Surveillance Systems and Monitoring Objectives.....2

3. Idaho DEQ's Ambient Air Monitoring Network.....5

3.1. Monitoring Sites 5

3.2. DEQ Monitoring Network – Monitoring Objectives, Scales of Representativeness and Area(s) Represented..... 14

3.3. Monitoring Methods, Monitor Designation and Sampling Frequency..... 18

4. DEQ Network Modifications Following EPA Approval of the 2009 Ambient Monitoring Network Plan.....23

5. Network Modifications Proposed in This 2010 Ambient Monitoring Network Plan.....24

5.1. PM_{10} Monitoring Network 25

5.2. $PM_{2.5}$ FRM Monitoring Network..... 25

5.3. $PM_{2.5}$ Continuous Monitoring Network..... 27

5.4. Ozone Monitoring Network..... 28

5.5. Carbon Monoxide (CO) Monitoring Network..... 29

5.6. Sulfur Dioxide (SO_2) Monitoring Network 29

5.7. Nitrogen Dioxide (NO_2) Monitoring Network 30

5.8. Lead (Pb)Monitoring Network 30

5.9. $PM_{10-2.5}$ (PMcoarse) 31

Summary of Proposed Network Modifications for DEQ's 2010 Air Monitoring..... 32

5.10. Network Plan 32

6. Future Ambient Air Monitoring Requirements and Associated Costs 32

6.1. Lead (Pb)..... 32

6.2. Nitrogen Dioxide (NO_2)..... 33

6.3. Ozone (O_3) 33

6.4. Sulfur Dioxide (SO_2) 34

Appendix A - Ambient Monitoring Network Design Values……35

Appendix B - Description of Hells Canyon and Craters of the Moon IMPROVE Sites……..42

List of Tables

Table 3-1. DEQ Monitoring Stations, Locations, and AQS Identification Codes..... 5

Table 3-2. Relationships Between Site Types and Scales of Representativeness 15

Table 3-3. Monitoring Objectives, Areas Represented, and Scales of Representation 16

Table 3-4. Air Monitoring Method Codes 18

Table 3-5. Pollutants/Monitor Designation/Sampling Frequency/Method Codes..... 20

Table 3-6. DEQ Meteorological Monitoring Stations and Parameters 23

List of Figures

Figure 3-1. Coeur d'Alene Regional Office Monitoring Stations 7
Figure 3-2. Lewiston Regional Office Monitoring Stations 8
Figure 3-3. Boise Regional Office Monitoring Stations 9
Figure 3-4. Twin Falls Regional Office Monitoring Stations 11
Figure 3-5. Pocatello Regional Office Monitoring Stations 12
Figure 3-6. Idaho Falls Regional Office Monitoring Stations 13
Figure 3-7. Minimum Monitoring Frequency Based on Ratio of Local Concentration to Standard 19

1. Introduction

Title 40 of the Code of Federal Regulations §58.10 requires that beginning July 1, 2007, the state agency shall adopt and submit to the U.S. Environmental Protection Agency (EPA) Regional Administrator an annual monitoring network plan which shall provide for the establishment and maintenance of an air quality surveillance system that consists of a network made up of the following types of monitoring stations:

- state and local air monitoring stations (SLAMS) including monitors that use:
  - federal reference method (FRM),
  - federal equivalent method (FEM), or
  - approved regional method (ARM)
- NCore stations (included in the national network of multi-pollutant monitoring stations)
- $PM_{2.5}$ chemical speciation stations (STN), and
- special purpose monitoring (SPM stations).

The plan shall include a statement of purposes for each monitor and evidence that siting and operation of each monitor meets the requirements of appendices A, C, D, and E of 40 CFR 58 where applicable.

The annual monitoring network plan must be made available for public inspection for at least 30 days prior to submission to EPA. Any annual monitoring network plan that proposes SLAMS network modifications including new monitoring sites is subject to the approval of the EPA Regional Administrator, who shall provide opportunity for public comment and shall approve or disapprove the plan and schedule within 120 days. If the State or local agency has already provided a public comment opportunity on its plan and has made no changes subsequent to that comment opportunity, and has submitted the received comments together with the plan, the Regional Administrator is not required to provide a separate opportunity for comment.

The plan shall provide for all required stations to be operational by January 1, 2011. The plan shall provide for all required non-source-oriented lead (Pb) monitoring sites to be operational by January 1, 2011. Specific site locations for the sites to be operational by January 1, 2011, shall be included in the annual network plan due to be submitted to the EPA Regional Administrator on July 1, 2010.

The annual monitoring network plan must contain the following information for each existing and proposed site:

1. The AQS (air quality system, EPA's database) site identification number.
2. The location, including street address and geographical coordinates.
3. The sampling and analysis method(s) for each measured parameter.

4. The operating schedules for each monitor.
5. Any proposals to remove or move a monitoring station within a period of 18 months following plan submittal.
6. The monitoring objective and spatial scale of representativeness for each monitor as defined in appendix D to 40 CFR 58.
7. The identification of any sites that are suitable and any sites that are not suitable for comparison against the annual PM2.5 (particulate matter with diameter ≤ 2.5 microns [μ] national ambient air quality standard (NAAQS) as described in § 58.30.
8. The metropolitan statistical area (MSA), core based statistical area (CBSA), combined statistical area (CSA) or other area represented by the monitor.
9. The designation of any Pb monitors as either source-oriented or nonsource-oriented according to Appendix D to 40 CFR Part 58.
10. Any source-oriented monitors for which a waiver has been requested or granted by the EPA Regional Administrator as allowed for under paragraph 4.5(a)(ii) of Appendix D to 40 CFR Part 58.
11. Any source-oriented or nonsource-oriented site for which a waiver has been requested or granted by the EPA Regional Administrator for the use of Pb-PM10 monitoring in lieu of Pb-TSP monitoring as allowed for under paragraph 2.10 of Appendix C to 40 CFR Part 58.

The annual monitoring network plan must document how States and local agencies provide for the review of changes to a $PM_{2.5}$ monitoring network that impact the location of a violating $PM_{2.5}$ monitor. The affected State or local agency must document the process for obtaining public comment and include any comments received through the public notification process within their submitted plan.

This document, in accordance with the above, is the Idaho Department of Environmental Quality's (DEQ) 2010 Annual Ambient Air Monitoring Network Plan. The primary goal of the annual network plan is to determine whether the state monitoring network is achieving its monitoring objectives and to identify any needed modifications.

2. Air Quality Surveillance Systems and Monitoring Objectives

Ambient air monitoring objectives have shifted over time; a situation that requires air quality agencies to re-evaluate and reconfigure monitoring networks. A variety of factors contribute to these shifting monitoring objectives:

- Air quality has changed since the adoption of the federal Clean Air Act and National Ambient Air Quality Standards (NAAQS). For example, the problems of high ambient concentrations of lead and carbon monoxide have largely been solved.

- Populations and behaviors have changed. For example, the U.S. population has (on average) grown, aged, and shifted toward urban and suburban areas over the past four decades. In addition, rates of vehicle ownership and annual miles driven have increased.
- New air quality objectives have been established, including rules to reduce air toxics, fine particulate matter ($PM_{2.5}$), and regional haze.
- The understanding of air quality issues and the capability to monitor air quality have both improved. Together, the enhanced understanding and capabilities can be used to design more effective air monitoring networks.

Ambient air monitoring networks must be designed to meet three basic monitoring objectives. These basic objectives are listed below. The appearance of any one objective in the order of this list is not based upon a prioritized scheme. Each objective is important and must be considered individually.

(a) **Provide air pollution data to the general public in a timely manner**. Data can be presented to the public in a number of attractive ways including air quality maps, newspaper articles or advertisements, Internet sites, and as part of weather forecasts and public advisories.

(b) **Provide support for determining compliance with ambient air quality standards and developing emissions control strategies**. Data from qualified monitors for NAAQS pollutants will be used for comparing an area's air pollution levels against the NAAQS. Data from monitors of various types can be used in the development of attainment and maintenance plans. SLAMS, and especially NCore station data, will be used to evaluate the regional air quality models used in developing emission strategies, and to track trends in air pollution abatement control measures' impact on improving air quality. In monitoring locations near major air pollution sources, source-oriented monitoring data can provide insight into how well industrial sources are controlling their pollutant emissions.

(c) **Provide support for air pollution research studies**. Air pollution data from the NCore multi-pollutant monitoring network can be used to supplement data collected by researchers working on health effects assessments and atmospheric processes, or for monitoring methods development work.

In order to support the air quality management work indicated in the three basic air monitoring objectives, a network must be designed with a variety of monitoring site types. Monitoring sites must be capable of informing managers about many things including the peak air pollution levels, typical levels in populated areas, air pollution transported into and outside of a city or region, and air pollution levels near specific emissions sources. These types of sites are summarized in the following list of six general site types according to the type of information they are designed to provide:

(a) Sites located to determine the maximum concentrations of air pollutants expected to occur in the area covered by the network.

(b) Sites located to measure typical pollutant concentrations in areas of high population density.

(c) Sites located to determine the impact of significant sources or source categories on air quality.

(d) Sites located to determine general background concentration levels of air pollutants.

(e) Sites located to determine the extent of regional pollutant transport among populated areas, and to assess compliance with secondary air quality standards.

(f) Sites located to measure air pollution impacts on visibility, vegetation damage, or other welfare-based impacts.

The adequacy of an ambient air monitoring network may be determined by using a variety of tools including the following:

- federal monitoring requirements and network minimums,
- analyses of historical monitoring data,
- maps of pollutant emissions densities,
- dispersion modeling,
- special studies/saturation sampling,
- SIP requirements,
- revised monitoring strategies (e.g., new regulations, reengineering of the air monitoring network),
- network maps and network descriptions with site objectives defined, and
- best professional judgment.

The appropriate location of a monitor can only be determined on the basis of stated objectives. The following tools can help determine whether monitor locations are meeting their stated objectives:

- Maps, graphical overlays, and information based on geographical information systems (GIS), which are extremely helpful for visualizing the adequacy of monitor locations.
- Plots (graphs) of potential emissions levels and/or historical monitored levels of pollutants versus monitor locations.
- Modeling or special studies (including saturation monitoring studies) may be appropriate for determining the adequacy of a particular monitor location.

3. Idaho DEQ's Ambient Air Monitoring Network

3.1. Monitoring Sites

DEQ is responsible for operating and maintaining the ambient air monitoring network for the State of Idaho. Some air monitors in Idaho are managed by tribal monitoring organizations on tribal lands. This document is limited to the monitors in the air monitoring network that are managed by DEQ. On January 1, 2010, DEQ's air monitoring network consisted of 54 monitors at 30 distinct monitoring sites. DEQ's ambient air monitoring network is operated and maintained by DEQ's six (6) Regional Office monitoring staff. Figures 3-1 through 3-6 display the locations of the monitoring apportioned by the responsible Regional Office.

Table 3-1 is a list of DEQ's air monitoring sites, including addresses, global positioning system (GPS) coordinates and AQS identifiers.

Table 3-1. DEQ Monitoring Stations, Locations, and AQS Identification Codes

Site	Address	Latitude/ Longitude	AQS Identification
Sandpoint – USFS	1601 Ontario St. Sandpoint ,ID 83864	+48.267500/ -116.572222	160170005
Sandpoint – University of Idaho	U of I Research Center, 2105 N. Boyer Ave. Sandpoint, ID 83864	+48.291820/ - 116.556560	160170003
Coeur d'Alene – Lancaster Rd.	Lancaster Road, Hayden, ID 83835	+47.788908/ -116.804539	160550003
St. Maries	Forest Service Bldg St. Maries, ID 83666	+47.316667/ -116.570280	160050010
Pinehurst	106 Church St. Pinehurst, ID 83850	+47.536389/ -116.236667	160790017
Moscow	1025 Plant Sciences Rd Moscow, ID 83843	+46.721932/ -116.959180	160570005
Lewiston	1200 29th St Lewiston, ID 83501	+46.404722/ -116.968889	160690012
Grangeville	USFS Compound Grangeville, ID 83530	+45.931389/ -116.115278	160490002
McCall	500 N. Mission St, McCall ID 83638	+44.890197 -116.106500	160850002
Garden Valley	946 Banks Lowman Rd Garden Valley, ID 83622	+44.104498 -115.972386	160150002
Middleton – Purple Sage	15192 Purple Sage Rd. Caldwell, ID 83605	+43.735828/ -116.692967	160270009
Nampa	923 1st St S, Nampa, ID 83651	+43.580310/ -116.562676	160270002
Meridian St. Luke's	Eagle Rd & I-84 Meridian, ID 83642	+43.600264/ -116.348434	160010010
Boise- ITD	311 W. State St. Boise, ID 83703	+43.634585/ -116.233919	160010019

Site	Address	Latitude/ Longitude	AQS Identification
Boise- Eastman Garage	166 N. 9th, Boise, ID 83702	+43.616379/ -116.203817	160010014
Boise- Fire Station #5	16th & Front, Boise, ID 83702	+43.618889/ -116.213611	160010009
Boise- White Pine Elementary	401 East Linden St. Boise, ID 83706	+43.577603/ -116.178156	160010017
Boise- Warm Springs	2495 W Warm Springs Ave, Boise ID 83712	+43.598833/ -116.173448	160010022
Garden City	Ada County Fairgrounds, Garden City, ID 83714	+43.647819 -116.269514	160010020
Idaho City	3851 Hwy 21 Idaho City, ID 83631	+43.823017/ -115.838557	160150001
Ketchum	111 West 8th St, Ketchum, ID 83340	+43.682558/ -114.371094	160130004
Twin Falls	1913 Addison Ave E, Twin Falls, ID 83301	+42.564097/ -114.446200	160830010
Kimberly	50 Highway 50, Kimberly, 83341	+42.553325/ -114.354853	160830009
Pocatello	Corner Garrett & Gould, Pocatello, ID 83204	+42.876725/ -112.460347	160050015
Pocatello- Sewage Treatment Plant	Batiste Chubbuck Rd, Pocatello, ID 83204	+42.916389/ -112.515833	160050004
Franklin	East 4800 South Road, 83237	+42.013333/ -111.809167	160410001
Soda Springs	5-Mile Rd., Soda Springs, ID 83276	+42.695278/ -111.593889	160290031
Idaho Falls	Hickory and Sycamore St., Idaho Falls, ID 83402	+43.464700/ -112.046450	160190011
Salmon – Charles St.	N Charles St. Salmon, ID 83467	+45.181893/ -113.890285	160590004
Salmon – Hwy 93	0.8 Miles South of Hwy 93/48 Intersection, Salmon ID 83468	+45.168433/ -113.888967	160590005

Figure 3-1. Coeur d'Alene Regional Office Monitoring Stations

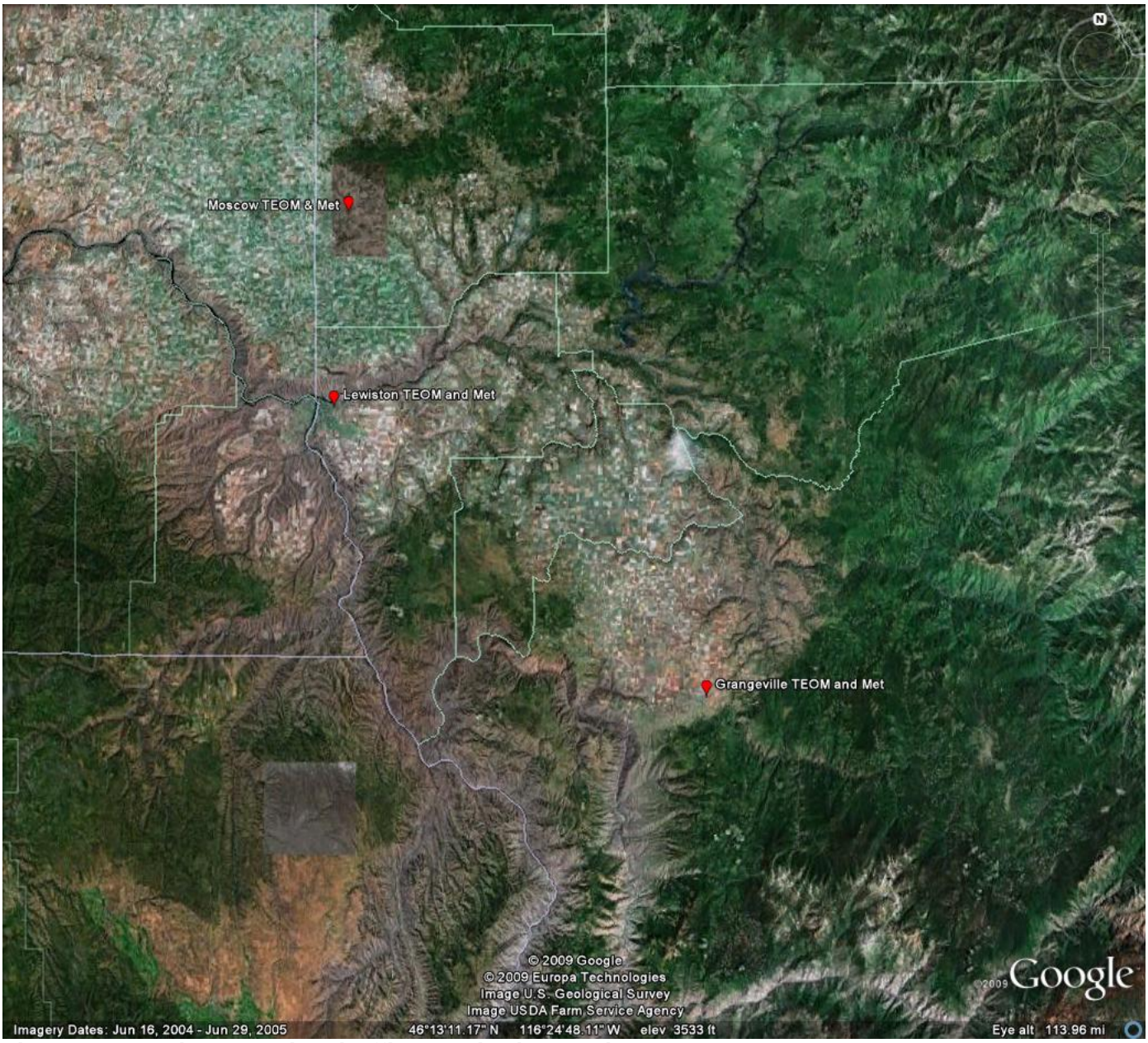


Figure 3-2. Lewiston Regional Office Monitoring Stations

Figure 3-3. Boise Regional Office Monitoring Stations

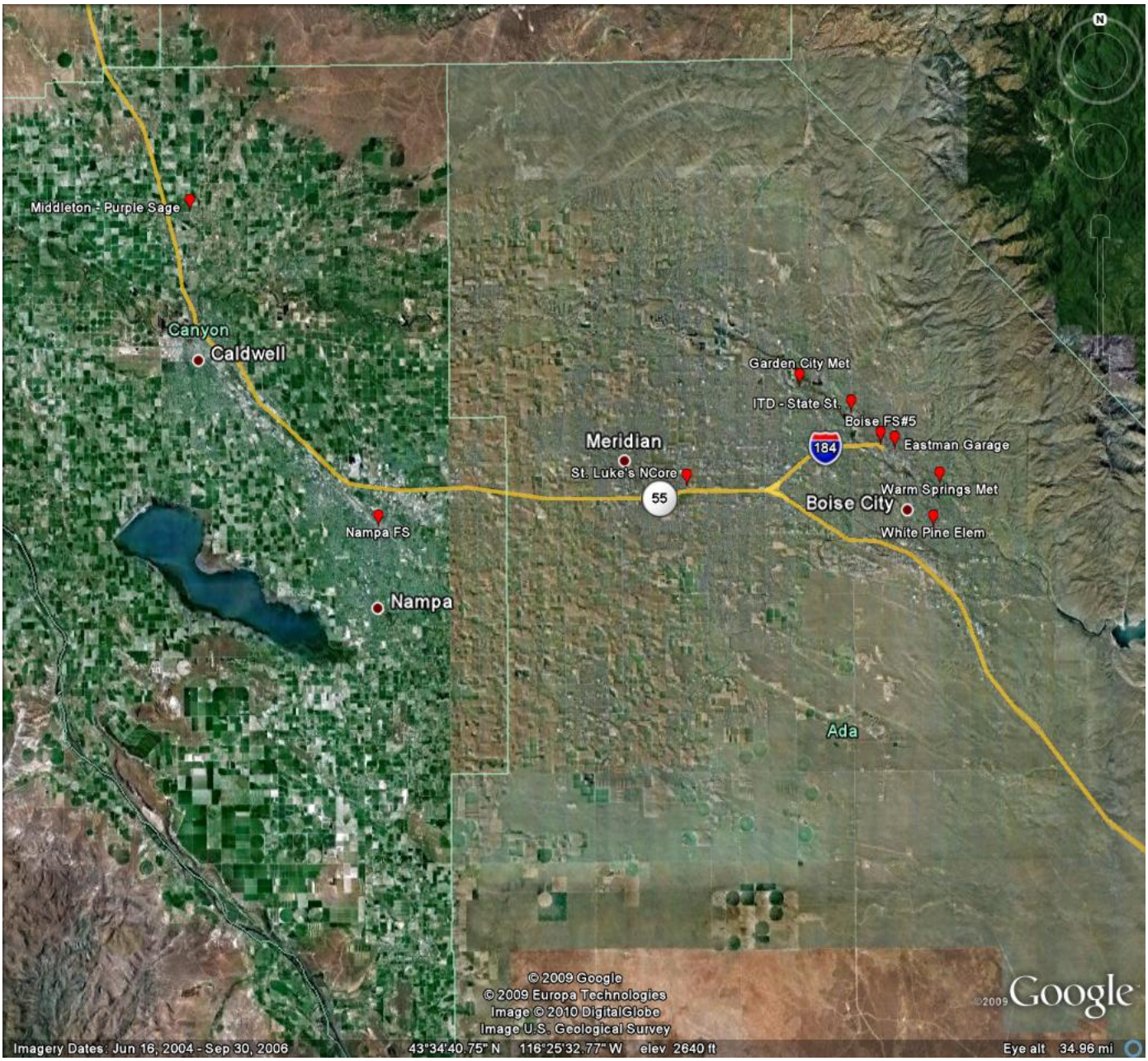


Figure 3-3. (continued)

Figure 3-4. Twin Falls Regional Office Monitoring Stations

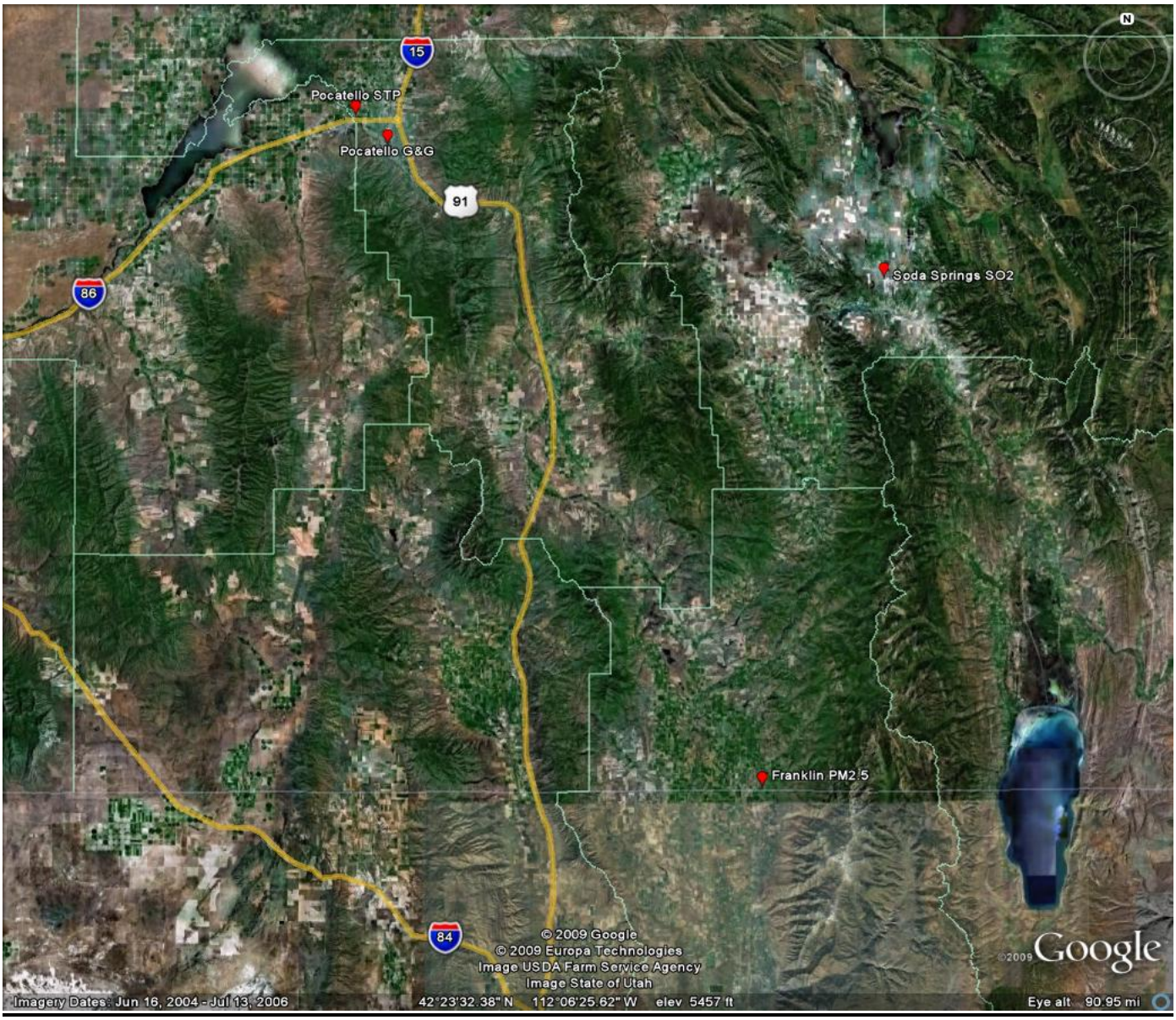


Figure 3-5. Pocatello Regional Office Monitoring Stations

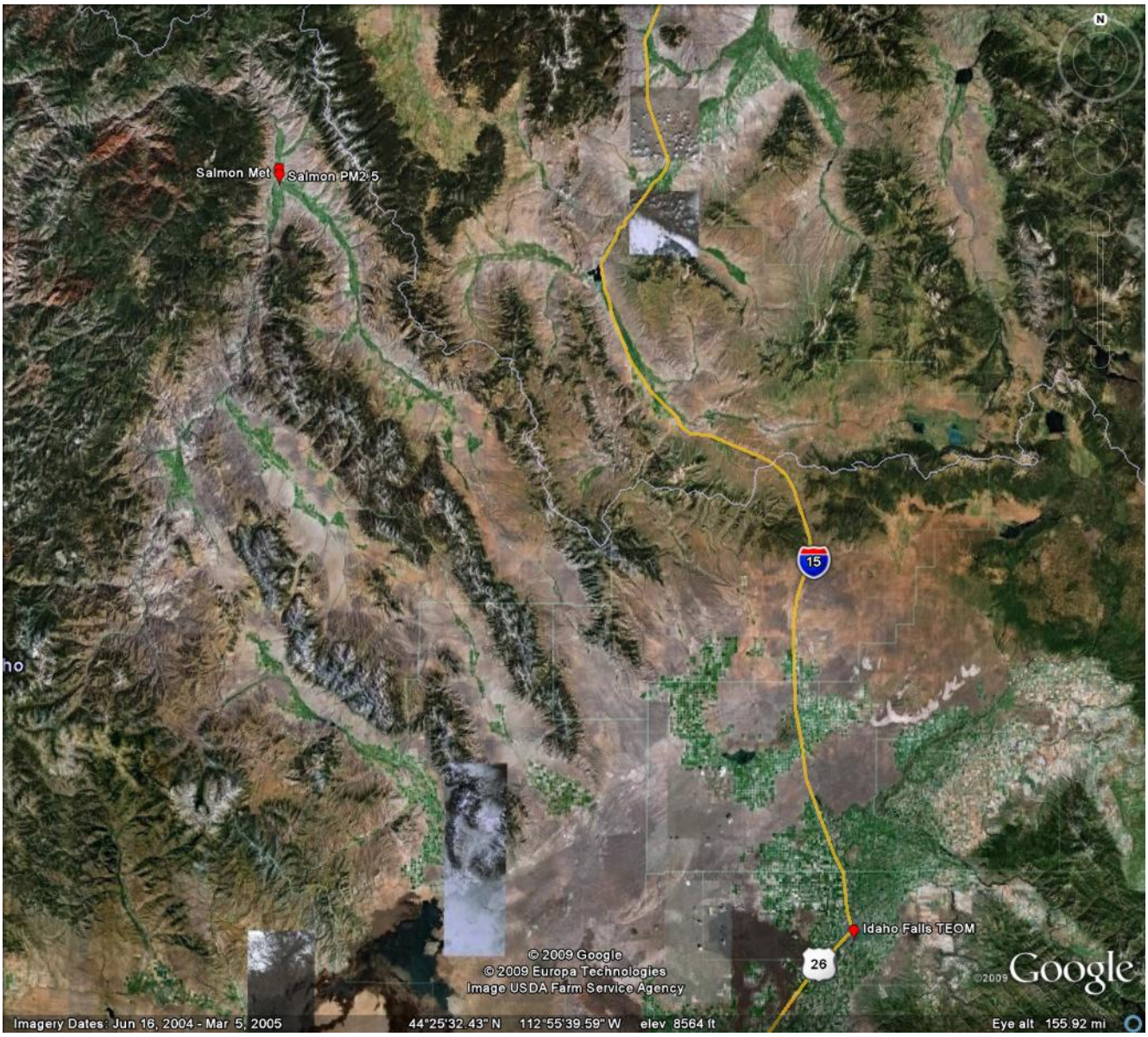


Figure 3-6. Idaho Falls Regional Office Monitoring Stations

3.2. DEQ Monitoring Network – Monitoring Objectives, Scales of Representativeness, and Area(s) Represented

The ambient air quality and meteorological data collected from DEQ's air monitoring network is used for a variety of purposes, including:

- determining compliance with the national ambient air quality standards (NAAQS),
- determining the locations of maximum pollutant concentrations,
- forecasting air quality to determine the Air Quality Index (AQI),
- providing for early detection of smoke impacts (smoke management),
- determining the effectiveness of air pollution control programs,
- evaluating the effects of air pollution levels on public health,
- tracking the progress of air quality-related state implementation plans (SIPs),
- supporting pollutant dispersion models,
- developing responsible, cost-effective air pollution control strategies, and
- analyzing air quality trends.

To clarify the nature of the link between general monitoring objectives, site types, and the physical location of a particular monitor, the concept of spatial scale of representativeness is defined. The goal in locating monitors is to correctly match the spatial scale represented by the sample of monitored air with the spatial scale most appropriate for the monitoring site type, the air pollutant to be measured, and the monitoring objective. Thus, spatial scale of representativeness is described in terms of the physical dimensions of the air parcel nearest to a monitoring site throughout which actual pollutant concentrations are reasonably similar. The scales of representativeness of most interest for the monitoring site types described above are as follows:

(a) ***Microscale*** - Defines the concentrations in air volumes associated with area dimensions ranging from several meters up to about 100 meters.

(b) ***Middle scale*** - Defines the concentrations typical of areas up to several city blocks in size with dimensions ranging from about 100 meters to 0.5 kilometer.

(c) ***Neighborhood scale*** - Defines concentrations within some extended area of the city that has relatively uniform land use with dimensions in the range of 0.5 to 4.0 kilometers.

The neighborhood and urban scales listed below have the potential to overlap in applications that concern secondarily formed or homogeneously distributed air pollutants.

(d) ***Urban scale*** - Defines concentrations within an area of city-like dimensions, on the order of 4 to 50 kilometers. Within a city, the geographic placement of emissions sources may result in there being no single site that can be said to represent air quality on an urban scale.

(e) ***Regional scale*** - Defines an area that is usually rural, is of reasonably homogeneous geography without large emissions sources, and extends from tens to hundreds of kilometers.

(f) ***National and global scales*** - These measurement scales represent concentrations characterizing a nation or the globe as a whole.

Proper siting of a monitor requires specification of the monitoring objective, the types of sites necessary to meet the objective, and then the desired spatial scale of representativeness. For example, consider a case where the objective is to determine NAAQS compliance by understanding the maximum ozone concentrations for an area. Candidate areas would most likely be located downwind of a metropolitan area, probably in suburban residential areas where children and other susceptible individuals are likely to be outdoors. Sites located in such areas are most likely to represent an urban scale of measurement. In this example, physical location was determined by considering ozone precursor emission patterns, public activity, and meteorological characteristics affecting ozone formation and dispersion. Thus, spatial scale of representativeness was not used in the selection process but was a result of site location.

In some cases, the physical location of a site is determined from joint consideration of both the basic monitoring objective and the type of monitoring site desired or required. For example, to determine what $PM_{2.5}$ concentrations are typical over a geographic area that has relatively high $PM_{2.5}$ concentrations, a neighborhood scale site is most appropriate. Such a site would likely be located in a residential or commercial area having a high overall $PM_{2.5}$ emission density but not in the immediate vicinity of any single dominant source. Note that in this example the desired scale of representativeness was an important factor in determining the physical location of the monitoring site. In either case, classification of the monitor by its type and spatial scale of representativeness is necessary and will aid in interpretation of the monitoring data for a particular monitoring objective (e.g., public reporting, NAAQS compliance determination, or research support).

Table 3-2 illustrates the relationship between the various site types that can be used to support the three basic monitoring objectives, and the scales of representativeness that are generally most appropriate for each site type.

Table 3-2. Relationships Between Site Types and Scales of Representativeness

Site Type	Appropriate Siting Scales
Maximum concentration (*sometimes* urban or regional for secondarily-formed pollutants)	Micro, middle, neighborhood
Population oriented	Neighborhood, urban.
Source impact	Micro, middle, neighborhood
General/background	Urban, regional
Regional transport	Urban, regional
Welfare-related impacts	Urban, regional

Federal ambient air monitoring regulations use the statistical-based definitions for metropolitan areas provided by the Office of Management and Budget and the Census Bureau. These areas are referred to as metropolitan statistical areas (MSA), micropolitan statistical areas, both of which are core-based statistical areas (CBSA), and combined statistical areas (CSA). A CBSA associated with at least one urbanized area of 50,000 population or greater is termed a Metropolitan Statistical Area (MSA). A CBSA associated with at least one urbanized cluster of at least 10,000 population or greater is termed a micropolitan statistical area. A CSA consists of two or more adjacent CBSAs. The term MSA is used to refer to a Metropolitan Statistical Area. By definition, both MSAs and CSAs have a high degree of integration; however, many such areas cross state or other political boundaries. An MSA or CSA may also cross more than one airshed. The EPA recognizes that state or local agencies must consider MSA/CSA boundaries and their own political boundaries and geographical characteristics in designing their air monitoring networks. The EPA recognizes that there may be situations where the EPA Regional Administrator and the affected state or local agencies may need to augment or to divide the overall MSA/CSA monitoring responsibilities and requirements among these various agencies to achieve an effective network design. Full monitoring requirements apply separately to each affected state or local agency in the absence of an agreement between the affected agencies and the EPA Regional Administrator.

Table 3-3 summarizes the monitoring objective(s), the area represented, and the monitoring scale of representativeness for DEQ's monitoring sites.

Table 3-3. Monitoring Objectives, Areas Represented, and Scales of Representation

Site	Monitoring Objective	Area Represented	Monitoring Scale
Sandpoint – University of Idaho	AQI* Modeling-meteorological	Bonner County	Urban
Sandpoint – USFS	AQI PM_{10}* SIP* PM_{10} NAAQS*	Bonner County	Urban
Coeur d'Alene – Lancaster Rd.	AQI O_3* NAAQS Modeling-meteorological	Coeur d' Alene, ID MSA*	Urban
St. Maries	$PM_{2.5}$* NAAQS AQI	Benewah County	Neighborhood
Pinehurst	PM_{10} SIP PM_{10} NAAQS $PM_{2.5}$ NAAQS AQI Modeling-meteorological	Shoshone County	Neighborhood
Moscow	AQI Smoke Management Modeling-meteorological	Latah County	Neighborhood
Lewiston	AQI Smoke Management Modeling-meteorological	Lewiston ID – WA MSA	Neighborhood
Grangeville	AQI Smoke Management Modeling-meteorological	Idaho County	Neighborhood

Site	Monitoring Objective	Area Represented	Monitoring Scale
McCall	AQI Smoke Management	Valley County	Neighborhood
Garden Valley	Smoke Management	Boise County	Neighborhood
Middleton – Purple Sage	AQI Smoke Management Modeling-meteorological	Boise City-Nampa MSA**	Urban
Nampa	PM_{10} NAAQS $PM_{2.5}$ NAAQS AQI	Boise City-Nampa MSA**	Neighborhood
Meridian – St. Luke's	NCore-trace gas $PM_{2.5}$ NAAQS $PM_{2.5}$ Chemical Speciation O_3 NAAQS NO_2* NAAQS AQI Modeling-meteorological	Boise City-Nampa MSA**	Neighborhood
Boise – ITD	O_3 NAAQS	Boise City-Nampa MSA*	Neighborhood
Boise – Eastman Garage	CO* SIP CO NAAQS	Northern Ada County	Micro
Boise – Fire Station #5	PM_{10} SIP PM_{10} NAAQS	Northern Ada County	Neighborhood
Boise – White Pine Elementary	O_3 NAAQS	Boise City-Nampa MSA*	Neighborhood
Boise – Warm Springs	Modeling-meteorological	Boise City-Nampa MSA*	Neighborhood
Garden City	Modeling-meteorological	Boise City-Nampa MSA*	Neighborhood
Idaho City	Smoke Management AQI	Boise County	Neighborhood
Ketchum	Smoke Management AQI	Blaine County	Urban
Twin Falls	Smoke Management AQI	Twin Falls, ID Micropolitan Statistical Area	Neighborhood
Kimberly	Modeling-meteorological	Twin Falls, ID Micropolitan Statistical Area	Urban
Pocatello Garrett and Gould	PM_{10} SIP PM_{10} NAAQS AQI Modeling-meteorological	Pocatello, ID MSA	Neighborhood
Pocatello – Sewage Treatment Plant	SO_2* NAAQS	Pocatello, ID MSA	Middle
Franklin	$PM_{2.5}$ NAAQS AQI	Logan UT – ID MSA	Urban
Soda Springs	SO_2 NAAQS	Caribou County	Micro
Idaho Falls	AQI	Idaho Falls, ID MSA	Neighborhood
Salmon – Charles St.	$PM_{2.5}$ NAAQS AQI	Lemhi County	Neighborhood
Salmon – Hwy 93	Modeling-meteorological	Lemhi County	Urban

* AQI – air quality index; SIP – state implementation plan; NAAQS – national ambient air quality standard; PM10 – particulate matter less than 10 microns in diameter; MSA – metropolitan statistical area; O3 – ozone; PM2.5 -- particulate matter less than 2.5 microns in diameter; NO_2 – nitrogen dioxide; SO_2 – sulfur dioxide
** Boise City-Nampa MSA, as defined by the US Census Bureau, includes Ada, Boise, Canyon, Gem, and Owyhee counties

3.3. Monitoring Methods, Monitor Designation, and Sampling Frequency

Generally, monitoring methods used for making NAAQS compliance determinations at a SLAMS site must be designated federal reference (FRM) or federal equivalent (FEM) methods, in accordance with 40 CFR Part 53. A method for monitoring $PM_{2.5}$ concentrations that has not been designated as an FRM or FEM may be approved as an "approved regional method" (or ARM) by the EPA Regional Administrator. Special purpose monitors (SPMs) do not meet any of the above criteria and are typically used for special studies or as surrogate measures or indicators of emergency episodes (e.g., nephelometers used for early detection of smoke).

Table 3-4 lists monitoring methods used by Idaho DEQ along with associated method codes required when submitting the monitoring data to EPA's Air Quality System (AQS) database. Method codes for meteorological parameters are not included in the table.

Table 3-4. Air Monitoring Method Codes

Parameter/ Pollutant*	Method Designation	AQS Method Code	Instrument and Instrument Parameters
PM_{10}	FEM	079	TEOM* – gravimetric analysis, instrumental – R&P SA246B inlet
CO	FRM	093	Teledyne API Gas Filter Correlation M300
CO	FRM	593**	Teledyne API Model 300EU
SO_2	FRM	100	Teledyne API Model 100A – UV Fluorescent
SO_2	FRM	060	Thermo Model 43C, pulsed fluorescence
SO_2	FRM	600**	Teledyne API, Model 100EU – UV Fluorescent
O_3	FRM	087	Teledyne API, Model 400E
NO_2	FRM	099	Teledyne API, Model 200E – Chemiluminescence
NOy	FRM	599**	Teledyne API, Model 200EU
$PM_{2.5}$	FRM	118	R&P Model 2025 Sequential w/WINS, Gravimetric
$PM_{2.5}$	FRM	145	R&P Model 2025 Sequential w/ VSCC
$PM_{2.5}$	SPM	701 or 703***	R&P TEOM w/ SCC – no correction factor
$PM_{2.5}$	SPM	715 or 716***	R&P TEOM w/ VSCC – no correction factor
$PM_{2.5}$	SPM	702 or 704***	R&P TEOM w/ SCC – correction factor
$PM_{2.5}$	FEM	181	R&P TEOM w/ VSCC & FDMS
$PM_{2.5}$	FEM	170	Met One Beta Gauge (BAM)

* PM_{10} – particulate matter less than 10 microns in diameter; CO – carbon monoxide; SO_2 – sulfur dioxide; O_3 – ozone; NO_2 – nitrogen dioxide; Noy – total reactive nitrogen; $PM_{2.5}$ – particulate matter less than 2.5 microns in diameter; TEOM – tapered element oscillating microbalance
** Trace gas monitor – NCore
*** Applicable code varies seasonally w/ instrument operating temperature settings

Monitoring sites designated as SLAMS sites (not NCore sites), are intended to address specific air quality management interests, and as such, are frequently single-pollutant measurement sites. The SLAMS sites must be approved by the EPA Regional Administrator.

Monitoring sites designated as special purpose monitor (SPMs) stations in the annual network plan and in the Air Quality System (AQS) do not count toward meeting network minimum requirements. SPM sites using methods designated as FRMs or FEMs or approved as ARMs are bound to the quality assurance requirements of Appendix A to 40 CFR Part 58.

Gaseous pollutants and meteorological parameters are sampled continuously and typically averaged for each hour. Data completeness for a continuous monitor is computed as the number of valid hourly samples collected divided by the number of potential hourly samples for the period in question (e.g., 8,760 potential hourly samples annually).

Particulate matter (PM) can be sampled continuously or by time-integrated filter-based methods. Filter-based methods typically collect samples for 24-hour periods. For NAAQS comparison, PM data is reported as a 24-hour average, collected from midnight to midnight at local standard time. As illustrated in Figure 3-7, the minimum monitoring schedule for a site is based on the relative concentration level at that monitoring site with respect to the 24-hour standard (i.e., the ratio between the local concentration and the standard with 1:1 = 1.0) .

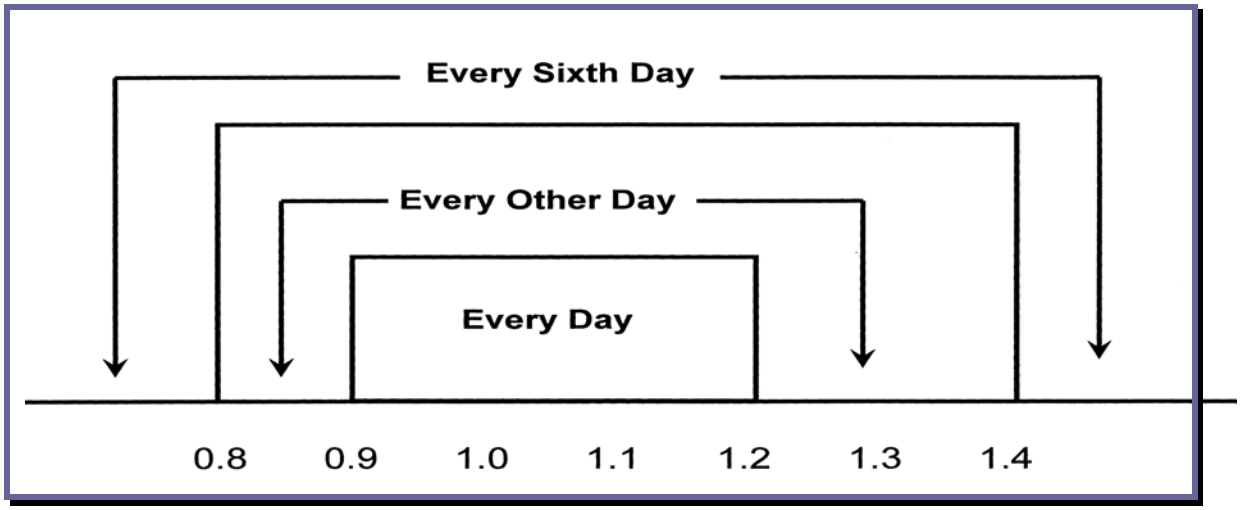


Figure 3-7. Minimum Monitoring Frequency Based on Ratio of Local Concentration to Standard

For the monitors in DEQ's ambient air quality monitoring networ, Table 3-5 lists the pollutants monitored, the monitor's designation (e.g., SLAMS), the monitoring frequency, and the appropriate AQS method code (Table 3-4).

Table 3-5. Pollutants/Monitor Designation/Sampling Frequency/Method Codes

Site	Pollutant Monitored**	Monitor Designation**	Monitoring Frequency	AQS Method Code
Sandpoint – University of Idaho	10-meter meteorology	SPM	Continuous	*
Sandpoint – U.S. Forest Service	PM_{10} – TEOM $PM_{2.5}$ – TEOM	SLAMS SPM–NR***	Continuous Continuous	079 715 or 716
Coeur d'Alene – Lancaster Rd.	$PM_{2.5}$ - TEOM O_3 NOx 10-meter meteorology	SPM-NR*** SLAMS SPM SPM	Continuous Continuous Continuous Continuous	715 or 716 087 099 *
St. Maries	$PM_{2.5}$ – FRM $PM_{2.5}$ – BAM	SLAMS SPM-NR***	1/6 Continuous	145 170
Pinehurst	$PM_{2.5}$ – FRM $PM_{2.5}$ – FRM Precision $PM_{2.5}$ – TEOM/FDMS $PM_{2.5}$ - BAM PM_{10} - TEOM 10-meter meteorology	SLAMS SLAMS QA/Collocated SPM-NR*** SPM-NR*** SLAMS SPM	1/1 1/6 Continuous Continuous Continuous Continuous	145 118 181 170 079 *
Moscow	$PM_{2.5}$ - TEOM 10-meter meteorology	SPM-NR*** SPM	Continuous Continuous	702 or 704 *
Lewiston	$PM_{2.5}$ - TEOM 10-meter meteorology	SPM-NR*** SPM	Continuous Continuous	702 or 704 *
Grangeville	$PM_{2.5}$ - TEOM 10-meter meteorology	SPM-NR*** SPM	Continuous Continuous	702 or 704 *
McCall	$PM_{2.5}$ – TEOM	SPM-NR***	Continuous	715 or 716
Garden Valley	$PM_{2.5}$– TEOM	SPM-NR***	Continuous	701 or 703

Site	Pollutant Monitored**	Monitor Designation**	Monitoring Frequency	AQS Method Code
Middleton – Purple Sage	$PM_{2.5}$- TEOM 10-meter meteorology	SPM-NR*** SPM	Continuous Continuous	715 or 716 *
Nampa	PM_{10} - TEOM $PM_{2.5}$ - FRM $PM_{2.5}$ - TEOM $PM_{2.5}$ – BAM	SLAMS SLAMS SPM-NR*** SPM-NR***	Continuous 1/6 Continuous Continuous	079 118 715 or 716 170
Meridian St. Luke's	$PM_{2.5}$ - FRM $PM_{2.5}$ - TEOM $PM_{2.5}$ - BAM $PM_{2.5}$ Chemical Speciation O_3 SO_2 NO_2 NOy CO 10-meter meteorology	NCore SPM-NR*** SPM-NR*** NCore NCore NCore NCore NCore NCore NCore	1/3 Continuous Continuous 1/3 Continuous Continuous Continuous Continuous Continuous Continuous	118 715 or 716 170 800 087 600 099 599 593 *
Boise - Idaho Transportation Dept.	O_3	SLAMS	Continuous	087
Boise- Eastman Garage	CO	SLAMS	Continuous	093
Boise- Fire Station #5	PM_{10}	SLAMS	Continuous	079
Boise- White Pine Elementary	O_3	SLAMS	Continuous	087
Boise- Warm Springs	10-meter meteorology	SPM	Continuous	*
Garden City	10-meter meteorology	SLAMS	Continuous	*
Idaho City	$PM_{2.5}$ – TEOM	SPM-NR***	Continuous	715 or 716
Ketchum	$PM_{2.5}$ – TEOM	SPM-NR***	Continuous	715 or 716
Twin Falls	$PM_{2.5}$ – TEOM	SPM-NR***	Continuous	702 or 704

Site	Pollutant Monitored**	Monitor Designation**	Monitoring Frequency	AQS Method Code
Kimberly	10-meter meteorology	SPM	Continuous	*
Pocatello	$PM_{2.5}$ - TEOM PM_{10} - TEOM 10-meter meteorology	SPM-NR*** SLAMS SPM	Continuous Continuous Continuous	715 or 716 079 *
Pocatello-Sewage Treatment Plant	SO_2	SLAMS	Continuous	100
Franklin	$PM_{2.5}$ - FRM $PM_{2.5}$ – BAM	SLAMS SPM-NR***	1/6 Continuous	145 170
Soda Springs	SO_2	SLAMS	Continuous	060
Idaho Falls	$PM_{2.5}$ – TEOM	SPM-NR***	Continuous	715 or 716
Salmon – Charles St.	$PM_{2.5}$ - FRM $PM_{2.5}$ – BAM	SLAMS SPM-NR***	1/3 Continuous	145 170
Salmon – Hwy 93	10-meter meteorology	SPM	Continuous	*

* Meteorological parameters are listed in Table 3-6
** Abbreviations: PM_{10} – particulate matter less than 10 microns in diameter; $PM_{2.5}$ – particulate matter less than 2.5 microns in diameter; TEOM – tapered element oscillating microbalance; O_3 – ozone; NO_2 – nitrogen dioxide; FRM – federal reference method; FDMS – filter dynamics measurement system; BAM – beta attenuation monitor; SO_2 – sulfur dioxide; NOy – total reactive nitrogen; CO – carbon monoxide
*** SPM-NR = special purpose monitor, non-regulatory

DEQ currently operates thirteen (13) 10-meter meteorological stations. Meteorological measurements are used to support air quality index forecasting and air quality modeling analyses. DEQ is adjusting and standardizing the meteorological parameters collected to ensure the required inputs for regulatory (e.g. AERMOD) and airshed (e.g., CalPuff) models are provided.

Table 3-6 provides a list of parameters measured at DEQ meteorological stations. DEQ operates the meteorological monitoring network in accordance with EPA's guidance document: *Quality Assurance Handbook for Air Pollution Measurement Systems Volume IV: Meteorological Measurements Version 2.0 (Final).*

Table 3-6. DEQ Meteorological Monitoring Stations and Parameters

Site	Meteorological Parameters Monitored
Sandpoint – University of Idaho	2 m. temp.(°C); 10 m. temp.(°C); Barometric Pressure (mbar); Relative Humidity (%RH); Wind Direction (Degrees); Wind Speed (m/s); Solar Radiation (Watt/cm2); Precipitation (Rain – Inches)
Pinehurst	2 m. temp.(°C); 10 m. temp.(°C); Barometric Pressure (mbar); Relative Humidity (%RH); Wind Direction (Degrees); Wind Speed (m/s); Solar Radiation (Watt/cm2); Precipitation (Rain – Inches)
Coeur d'Alene – Lancaster Rd.	2 m. temp.(°C); 10 m. temp.(°C); Barometric Pressure (mbar); Relative Humidity (%RH); Wind Direction (Degrees); Wind Speed (m/s); Solar Radiation (Watt/cm2); Precipitation (Rain – Inches)
Moscow	2 m. temp.(°C); 10 m. temp.(°C); Barometric Pressure (mbar); Relative Humidity (%RH); Wind Direction (Degrees); Wind Speed (m/s); Solar Radiation (Watt/cm2); Precipitation (Rain – Inches)
Lewiston	2 m. temp.(°C); 10 m. temp.(°C); Barometric Pressure (mbar); Relative Humidity (%RH); Wind Direction (Degrees); Wind Speed (m/s); Solar Radiation (Watt/cm2); Precipitation (Rain – Inches)
Grangeville	2 m. temp.(°C); 10 m. temp.(°C); Barometric Pressure (mbar); Relative Humidity (%RH); Wind Direction (Degrees); Wind Speed (m/s); Solar Radiation (Watt/cm2); Precipitation (Rain – Inches)
Middleton – Purple Sage	2 m. temp.(°C); 10 m. temp.(°C); Barometric Pressure (mbar); Relative Humidity (%RH); Wind Direction (Degrees); Wind Speed (m/s); Solar Radiation (Watt/cm2)
Meridian - St. Luke's	2 m. temp.(°C); 10 m. temp.(°C); Barometric Pressure (mbar); Relative Humidity (%RH); Wind Direction (Degrees); Wind Speed (m/s); Vertical Wind Speed (m/s); Solar Radiation (Watt/cm2);
Boise – Warm Springs	2 m. temp.(°C); 10 m. temp.(°C); Barometric Pressure (mbar); Relative Humidity (%RH); Wind Direction (Degrees); Wind Speed (m/s); Vertical Wind Speed (m/s); Solar Radiation (Watt/cm2);
Garden City	2 m. temp (°C); 10 m. temp. (°C); Barometric Pressure (mbar); Relative Humidity (%RH); Wind Direction (Degrees); Wind Speed (m/s); Solar Radiation (Watt/cm2)
Kimberly	2 m. temp.(°C); 10 m. temp.(°C); Barometric Pressure (mbar); Relative Humidity (%RH); Wind Direction (Degrees); Wind Speed (m/s); Solar Radiation (Watt/cm2); Precipitation (Rain – Inches)
Pocatello	2 m. temp.(°C); 10 m. temp.(°C); Barometric Pressure (mbar); Relative Humidity (%RH); Wind Direction (Degrees); Wind Speed (m/s); Solar Radiation (Watt/cm2)
Salmon – Hwy 93	2 m. temp. (°C); Barometric Pressure (mbar); Relative Humidity (%RH); Wind Direction (Degrees); Wind Speed (m/s); Solar Radiation (Watt/cm2)

4. DEQ Network Modifications As Planned in the EPA-Approved 2009 Ambient Monitoring Network Plan

The following sites were modified as described here in accordance with the 2009 ambient monitoring network plan approved by EPA. (For each site, the AQS site number is provided in parentheses.)

1. St. Luke's meteorological tower was moved on 9/17/2009 to approximately 30 feet adjacent to the monitoring enclosure to support proper NOy reactor height installation. (16-001-0010)
2. Lakes Middle School continuous $PM_{2.5}$ tapered element oscillating microbalance (TEOM) was terminated on 6/10/2009. (16-055-0006)
3. A continuous $PM_{2.5}$ station began monitoring 1/13/2009 at the Coeur d'Alene Lancaster Road. Site. (16-055-0003).
4. The Mountain View Elementary $PM_{2.5}$ FRM monitor was terminated on 12/01/2009. (16-001-0011)
5. The Mountain View Elementary continuous $PM_{2.5}$ TEOM was terminated on 12/03/2009. (16-001-0011)
6. A continuous $PM_{2.5}$ TEOM special purpose monitor (SPM) was installed on 7/22/2009 at Ernest Hemingway Elementary School in Ketchum. (16-013-0004).
7. The Salmon continuous TEOM $PM_{2.5}$ monitor was terminated on 10/29/2009. (16-059-0004)
8. The St. Maries continuousTEOM $PM_{2.5}$ monitor was terminated on 1/7/2010. (16-005-0010)
9. A continuous beta attenuation monitor (BAM) 1020 $PM_{2.5}$ FEM monitor was initiated at the Salmon site on 9/01/2009.
10. A continuous BAM 1020 $PM_{2.5}$ FEM monitor was initiated at the Pinehurst site on 6/12/2009.
11. A continuous BAM 1020 $PM_{2.5}$ FEM monitor was initiated at the St. Maries site on 6/12/2009.
12. A continuous BAM 1020 $PM_{2.5}$ FEM monitor was initiated at the Nampa Fire Station site on 10/06/2009.
13. A continuous BAM 1020 $PM_{2.5}$ FEM monitor was initiated at the Meridian St. Luke's site on 7/02/2009.
14. Sandpoint Middle School continuous PM_{10} TEOM monitor was moved to the Sandpoint – U. S. Forest Service (USFS) site (16-017-0005) on 3/30/2009.

5. Network Modifications Proposed in This 2010 Ambient Monitoring Network Plan

Below is a brief discussion of DEQ's rationale in proposing network modifications (if any) for each monitored pollutant, followed by a summary of those proposed changes. Annual air quality data summaries for DEQ's air monitoring network can be found at: http://www.deq.idaho.gov/air/data_reports/monitoring.

More information about criteria pollutants (those pollutants for which EPA has established NAAQS) and NAAQS can be located at:
http://www.deq.idaho.gov/air/data_reports/monitoring/overview.cfm#NAAQS

5.1. PM_{10} Monitoring Network

Five PM_{10} monitoring sites are currently in operation. These monitors support local state implementation plans (SIPs) and/or PM_{10} maintenance plans by demonstrating compliance with the PM_{10} NAAQS, and will continue operation through 2011. PM_{10} monitoring site locations are selected to represent average population exposure to spatially representative PM concentrations in the middle, neighborhood, and urban scales.

Airsheds classified as "moderate" nonattainment for the 24-hour PM_{10} NAAQS (50 $\mu g/m^3$) in Idaho are:

- Bonner County – partial (City of Sandpoint)
- Shoshone County – partial (excluding City of Pinehurst)
- Pinehurst (Shoshone County – partial – City of Pinehurst)
- Fort Hall Reservation (Bannock County – partial, Power County – partial)

The Fort Hall Reservation nonattainment area is on Tribal land and is not administered by DEQ.

Airsheds previously classified as nonattainment, but now classified as maintenance areas with EPA-approved maintenance plans that identify specific emissions control programs and demonstrate compliance with a specific NAAQS over specific timeframes include:

- Boise-Northern Ada County
- Portneuf Valley (Bannock County – partial, Power County – partial)

Due to the necessity of PM_{10} monitoring to meet the regulatory requirements associated with SIPs and maintenance plan objectives, DEQ proposes no change to the PM_{10} monitoring network.

5.2. $PM_{2.5}$ FRM Monitoring Network

DEQ operates a "core network" of six $PM_{2.5}$ monitoring sites for NAAQS compliance (FRM monitors). DEQ began monitoring $PM_{2.5}$ by FRM in 1998 with an initial network of 13 sites. Over time, the network has been reduced to six sites due to either site redundancy within airsheds, or overall low ambient concentrations relative to the NAAQS. The six remaining sites are:

- Pinehurst
- St. Maries
- Treasure Valley (Nampa – Fire Station)
- Treasure Valley (Meridian – St. Luke's)

- Salmon
- Franklin

Federal regulations require a minimum of two sites in the Treasure Valley based on population. The Meridian monitor also satisfies the requirement for $PM_{2.5}$ FRM monitoring at NCore sites.

In March 2008, EPA granted designation to Met One Instruments' BAM 1020, when equipped with the right accessories, federal equivalency as a $PM_{2.5}$ monitoring method. That is, the BAM 1020 (properly equipped) is a federally equivalent method (FEM) and data collected by the BAM 1020 is suitable for NAAQS compliance monitoring. The BAM 1020 is a continuous monitor, providing hourly-averaged data, which makes it useful for air quality forecasting, air quality index reporting and NAAQS compliance determinations. In addition, the data is resolved at hourly intervals and provides more robust information to scientists performing public health assessments. Recognizing the advantage of monitoring with an FEM that reconciles multiple monitoring objectives at a much reduced cost, DEQ purchased six BAM 1020 units to co-locate with the six FRM monitoring sites. DEQ will operate the BAM units, co-located with the FRM monitors, for a period of one year and then perform a statistical assessment of the relationship (linear correlation) of the BAM 24-hr data to the FRM. If summary statistics indicate satisfactory correlation, DEQ will propose to EPA that the BAM 1020 units become the primary reporting monitors at the six core $PM_{2.5}$ monitoring sites. In addition to substantial savings in filter processing costs associated with the FRM, the BAM 1020 can provide a daily (1/1) sampling frequency at a greatly reduced cost.

The effective dates when the BAMs began collecting this data are:

- St. Maries BAM - 6/12/2009
- Pinehurst BAM - 6/12/2009
- Salmon BAM – 9/01/2009
- Nampa - FS BAM – 10/06/2009
- Meridian - St. Luke's BAM – 7/02/2009
- Franklin BAM – due to electrical issues, this monitor has not been initiated

Co-located BAM 1020 and FRM monitoring will continue until analytical precision of the method can be assessed, after which changes may be proposed, as discussed above.

With the exception of an issue at the Franklin FRM site (power, security), which may require relocation of the monitor to another location nearby, DEQ is proposing no changes to the $PM_{2.5}$ FRM monitoring network in this 2010 Monitoring Network Plan. DEQ will notify EPA in advance of any proposal to relocate the Franklin monitor to ensure prior approval.

$PM_{2.5}$ design values (updated for 2007 – 2009) are listed in Appendix A. The design value for the Salmon monitor will require daily sampling (currently on an every third day frequency).

5.3. $PM_{2.5}$ Continuous Monitoring Network

DEQ monitors $PM_{2.5}$ year-round at nineteen (19) sites throughout the state with continuous $PM_{2.5}$ monitors (tapered element oscillating microbalance [TEOM] monitors), which are not designated as FRM or FEM, and therefore the data are not used for determining NAAQS compliance. The $PM_{2.5}$ TEOM data support DEQ's air quality forecasting, AQI, and smoke management programs such as emergency response for wildfire smoke impacts. BAM 1020 monitors are operated at the Salmon and St. Maries sites for these same objectives. Although the BAM 1020 has been designated an FEM, data are not being used for NAAQS compliance assessment as stated in Section 5.2.

The $PM_{2.5}$ TEOMs are located at these monitoring sites:

- Sandpoint – USFS
- Coeur d'Alene – Lancaster Rd.
- St. Maries (BAM 1020)
- Pinehurst
- Moscow
- Lewiston
- Grangeville
- McCall
- Garden Valley
- Idaho City
- Nampa
- Meridian - St. Luke's
- Idaho City
- Ketchum
- Twin Falls
- Pocatello
- Idaho Falls
- Salmon (BAM 1020)

DEQ is proposing no changes to the $PM_{2.5}$ continuous monitoring network in this 2010 monitoring network plan. However, based on the outcome of the BAM 1020 v. FRM data assessments (Section 5.2), the BAM 1020 units may be selected to replace the

TEOM units for continuous $PM_{2.5}$ monitoring at certain sites and then data would be used for AQI, air quality forecasting, and NAAQS compliance determinations.

5.4. Ozone Monitoring Network

DEQ currently operates three ozone monitors in the Treasure Valley and one in Kootenai County on the Rathdrum Prairie near Coeur d'Alene. Federal regulations require two ozone monitors in an urban area or MSA the size of the Boise City MSA. One site must be designed to record the maximum concentration for the MSA. NCore sites are expected to complement the ozone data collection that take place at a single-pollutant SLAMS site and both types of sites can be used to meet the network minimum requirements.

The Treasure Valley ozone monitors are located at:

- The Boise Idaho Transportation (ITD) site on State Street
- The Meridian St. Luke's site near the Meridian St. Luke's Hospital
- The White Pine Elementary site in southeast Boise.

DEQ began monitoring at the White Pine Elementary school in 2009 when it had to relocate the old Whitney Elementary School site when the school was demolished in 2008. The White Pine Elementary site was chosen based on evidence that it would represent the maximum ozone concentration for the Boise City MSA. Results of the study "*Ozone and its Precursors in the Treasure Valley, Idaho,"* performed in the summer of 2007, concluded that southeast Boise demonstrated the maximum measured ozone concentrations in the Treasure Valley. The final report can be viewed at: http://www.deq.idaho.gov/air/data_reports/reports/ada_co/ozone_treasure_valley_report.pdf.

In the summer months, Coeur d'Alene is typically downwind from the City of Spokane in Washington, about 25 miles southwest. EPA's AirNow web site (http://airnow.gov/) was frequently projecting the Coeur d'Alene area as "moderate" air quality based on ozone data collected in Spokane and regional meteorological data. In an effort to reconcile the AirNow forecasts for the airshed, DEQ began monitoring ozone at the Coeur d' Alene Lancaster Road site in 2005. The Lancaster Road site was selected based on EPA guidance that uses average afternoon wind direction and wind speed criteria to locate a maximum "downwind" monitoring site for an urban area like Spokane.

In January 2010, EPA announced a proposed rulemaking which, if enacted, will lower the ozone 8-hour NAAQS from its current level of 0.075 parts per million (ppm) to somewhere within the range of 0.060 to 0.070 ppm. EPA expects to announce a final determination in August 2010. Compliance with the new 8-hour ozone NAAQS will be determined from "design values" based on 2008-2010 monitoring data. Compliance is based on the monitor with the highest 3-year design value. The 8-hour ozone design values are calculated by averaging the 4th-highest 8-hour daily maximum ozone concentration over three consecutive years. The design value is a 3-year rolling average

in the sense that each year's data adds a new number to the rolling figure while the oldest year drops off from the calculation.

Because of the importance of the 2008 – 2010 ozone design values in regard to EPA's proposed tightening of the 8-hour ozone NAAQS, DEQ is proposing no changes to the ozone monitoring network in this 2010 monitoring network plan.

2007 – 2009 ozone design values for DEQ's monitors are listed in Appendix A.

DEQ is evaluating the potential relocation of the Boise – ITD monitor to the Middleton – Purple Sage site after the 2010 ozone monitoring season. EPA criteria for urban ozone monitoring will be retained with the Boise – White Pine Elementary and Meridian St. Luke's site, while the Middleton Purple Sage site will provide ozone data from a location "upwind" of the urban influence and an estimate of ambient ozone transported to the airshed.

5.5. Carbon Monoxide (CO) Monitoring Network

Monitoring for carbon monoxide (CO) in the Treasure Valley began in 1977. Violations of the *health-based standard for CO occurred every winter from 1977 until 1986. As a result of these* high levels of CO, northern Ada County was designated a CO nonattainment area by EPA. In December 2002, the Northern Ada County CO Limited Maintenance Plan was approved by EPA, which reclassified the area as attainment for the CO NAAQS. No exceedances of the CO NAAQS have occurred since 1991.

DEQ operates two CO monitors, one at the Boise – Eastman site in downtown Boise, and one at the Meridian St. Luke's site. The Boise – Eastman site is an "urban canyon" site designed to measure maximum concentrations to which the population is exposed. This site is needed to demonstrate NAAQS compliance as specified in the Northern Ada County CO Maintenance Plan. The Meridian St. Luke's CO monitor is a "trace-level" monitor, measuring much lower CO than conventional CO monitors used for NAAQS compliance. The Meridian St. Luke's CO monitor is required for NCore sites.

DEQ is proposing no changes to the CO monitoring network in this 2010 monitoring network plan.

5.6. Sulfur Dioxide (SO_2) Monitoring Network

Three SO_2 monitors currently operate in Idaho:

- Pocatello – Sewage Treatment Plant (STP)
- Soda Springs
- Meridian – St. Luke's

The Pocatello Sewage Treatment Plant site is a maximum concentration site used to assess impacts of local industrial emissions. The Soda Springs monitor is also a maximum concentration site for assessing industrial impacts from a nearby source. Both SO_2 monitoring locations in southeastern Idaho were identified as fence-line "hot spots"

from conventional dispersion model applications. The St. Luke's monitor is a "trace-level" monitor, required for NCore monitoring.

DEQ is proposing no changes to the SO_2 monitoring network as part of this 2010 monitoring network plan. Design values for DEQ's SO_2 monitoring stations are listed in Appendix A.

5.7. Nitrogen Dioxide (NO_2) Monitoring Network

NO_2 is monitored at the Meridian - St. Luke's NCore site on a year-round basis and is monitored during ozone season (May through September) at the Coeur d'Alene Lancaster site. The Meridian - St. Luke's monitor is a "trace-level" monitor and is an NCore requirement. The Coeur d' Alene Lancaster Road site is collecting oxides of nitrogen (NO_x) information which includes both nitrogen oxide (NO) and NO_2 measurements. This data will be useful for modeling ozone in the airshed.

No exceedances or violations of the NO_2 NAAQS have been measured in Idaho.

DEQ is proposing no changes to the NO_2 monitoring network as part of this 2010 monitoring network plan.

5.8. Lead (Pb) Monitoring Network

Except for $PM_{2.5}$ chemical speciation at the Meridian NCore site, DEQ currently does not monitor lead in Idaho. However, on November 12, 2008, EPA tightened the national ambient air quality standards (NAAQS) for lead. EPA revised the level of the primary standard from 1.5 micrograms per cubic meter ($\mu g/m^3$) to 0.15 $\mu g/m^3$, measured as total suspended particulate (TSP). EPA also promulgated new monitoring requirements, requiring monitoring near sources that emitting more than 1.0 ton per year of lead, and in Core Based Statistical Areas with greater than 500,000 population. The source-oriented monitors were deployed January 1, 2010, and the nonsource-oriented monitors are required to be deployed January 1, 2011.

On December 23, 2009, EPA proposed to revise the ambient monitoring requirements for measuring airborne lead. EPA is proposing to change the lead emissions monitoring threshold to 0.50 tons per year (tpy). Air quality monitoring agencies would use this threshold to determine if placement of an air quality monitor near a facility that emits lead is required. EPA proposes that these source-oriented monitors would begin operating one year after this rule is finalized (the final rule is expected December, 2010). EPA is also proposing to require lead monitoring at NCore sites instead of the current requirement to place lead monitors in each Core Based Statistical Area (CBSA) with a population of 500,000 or more. Under this proposal, lead monitoring at NCore sites would begin January 1, 2011.

EPA will allow the use of Pb-PM_{10} monitoring instead of Pb-TSP monitoring in certain limited circumstances. If Pb-PM_{10} low-volume monitoring would be allowed where lead is not expected to occur as large particles and a monitoring agency can demonstrate that

lead concentrations are not expected to have three-month averages greater than or equal to 0.1 $\mu g/m^3$, then Pb-PM_{10} monitoring would be allowed. If a Pb-PM_{10} monitor measures three-month levels greater than or equal to 0.1 $\mu g/m^3$, then the monitoring agency would have to install and operate a Pb-TSP monitor within six months. Any Pb-PM_{10} measurements exceeding the NAAQS could lead toward a violation of the standard.

DEQ is proposing to monitor Pb-PM_{10} at the Meridian – St. Luke's NCore site, beginning January 1, 2011. Pb-PM_{10} was a parameter monitored during the Treasure Valley Community Scale Hazardous Air Pollutants Study in 2007 and 2008. There were 290 samples collected at five monitoring sites in Parma, Nampa, and Boise. The maximum lead concentration measured during this study was 0.019 $\mu g/m^3$ and the median concentration was 0.002 $\mu g/m^3$. The 2005 National Emission Inventory identifies non-road mobile sources (e.g., general aviation) as the major emissions category for lead in Ada County, indicating that lead is not likely found in the coarser fraction (larger particles) of TSP.

DEQ proposes to utilize a low-volume PM10 sampler to collect samples for lead concentrations determination. DEQ will install two Partisol 2025 sequential samplers (EPA method RFPS-1298-127); one will collect the primary reporting sample and the second will be the precision monitor for quality control assessments. The primary sampler is required to collect samples every sixth day (1/6) in accordance with the national monitoring schedule, the precision sampler is required to collect samples every twelfth day (1/12), also on the national schedule.

Laboratory analysis will be performed either by Idaho's Bureau of Laboratories or an alternate laboratory through a national contract managed by EPA. EPA is currently working on establishing a national contract for lead analysis, and is also working on establishing alternate FEM(s) for Pb-PM_{10} lead analysis. If a suitable FEM is promulgated, the first option with the Idaho Bureau of Laboratories is preferred by DEQ.

The annual cost for monitoring lead will be approximately $20,270, including operation, maintenance, laboratory analysis of PM_{10} mass, laboratory analysis of Pb, data handling, and quality assurance.

5.9. $PM_{10-2.5}$ (PMcoarse)

PMcoarse is defined as the particulate fraction with a nominal diameter between 2.5 and 10.0 µ.

PMcoarse can be monitored by calculating the fractional mass difference between co-located and matching (i.e., same type of monitor) FRM PM_{10c} and FRM $PM_{2.5}$ monitors. Section 3 of Appendix D, 40 CFR Part 58, requires PMcoarse monitoring at NCore monitoring stations. As with all NCore monitoring requirements, agencies are required to initiate this requirement by January 1, 2011.

DEQ proposes to initiate PMcoarse monitoring at the Meridian – St. Luke's NCore site, beginning January 1, 2011. DEQ will calculate Pmcoarse concentrations by calculating

mass difference between data collected from the existing $PM_{2.5}$ FRM sampler currently in operation and data collected from the PM_{10} sampler proposed in Section 5.8.

Both the $PM_{2.5}$ and PM_{10c} samplers will be operated every third day (1/3) in accordance with the national monitoring schedule.

The annual cost for monitoring PMcoarse is estimated at $9,386 for the laboratory processing of the additional PM_{10} filters due to the 1/3 sampling frequency, added operations and maintenance, and data management. Much of the cost for PMcoarse is already encumbered by the routine $PM_{2.5}$ monitoring and PM_{10} monitoring associated with Pb-PM_{10}.

5.10. Summary of Proposed Network Modifications for DEQ's 2010 Air Monitoring Network Plan

- Increasing the sampling frequency at the Salmon $PM_{2.5}$ monitoring site to daily (1:1). The monitor currently operates every third day (1:3).
- Initiation of Pb-PM_{10} monitoring, beginning January 1, 2010, at Meridian St. Luke's NCore site.
- Initiation of PMcoarse monitoring, beginning January 1, 2010, at Meridian St. Luke's NCore site.

6. Future Ambient Air Monitoring Requirements and Associated Costs

EPA is required to review criteria pollutant NAAQS on a routine 5-year schedule. EPA has recently completed their review of a number of pollutants and through rulemaking is proposing changes to ambient air monitoring requirements for those pollutants. In most cases, additional monitors and new monitoring sites will be required in Idaho. New funding sources for new monitoring initiatives have yet to be identified. Below is a summary of recent proposals and final rules for certain criteria pollutants.

6.1. Lead (Pb)

As mentioned in Section 5.8, EPA is reconsidering the ambient air monitoring requirements in the 2008 lead NAAQS final rule. Monitoring will begin January 1, 2011, and will add approximately $20,000 to DEQ's annual monitoring costs.

EPA intends to finalize lead monitoring requirements in April of 2010.

6.2. Nitrogen Dioxide (NO_2)

On January 22, 2010, EPA announced a final rule that tightened the NO_2 NAAQS. It establishes a new one-hour NO_2 standard of 100 parts per billion (ppb) while retaining the annual standard of 53 ppb.

Within the rule are new monitoring requirements. For Idaho, the addition of a "near roadway" monitor will be required in the Boise urban area by January 1, 2013. This site will have to be within 50 meters from the curb of the busiest road segment in the Boise City-Nampa MSA.

DEQ's proposed NO_2 monitoring network modifications will be submitted to EPA in the 2012 ambient air monitoring network plan, due July 1, 2012.

Capital start-up costs for the one near-roadway site will be approximately $100,000. Annual operations, maintenance, and data management costs will be approximately $20,000.

6.3. Ozone (O_3)

In July 2009, EPA announced a proposed rulemaking to revise ambient air ozone monitoring requirements. In the proposal, EPA is recommending that air monitoring agencies establish ozone monitors in MSAs with populations between 50,000 and 350,000. In addition, agencies will need to establish monitors in three additional types of locations: 1) a micropolitan statistical are with population between 10,000 and 50,000, in order to characterize ozone concentrations in areas of lesser population where high ozone concentrations are expected; 2) a federally managed or tribal non-urban location, to characterize sensitive ecosystems; and 3) a rural location where high ozone concentrations transported from urban areas are expected. EPA has proposed that monitoring agencies can leverage data from ozone monitors currently operated by federal agencies (meeting all required EPA criteria), which can be applied toward the minimum network requirements.

EPA expects to issue the final ozone monitoring requirements near the end of October, 2010. These additional ozone monitoring requirements are proposed to begin January 1, 2012.

If finalized as proposed, the impact on DEQ's ozone monitoring network will be the required addition of either five or six new sites. If DEQ proposes to include the already-established Craters of the Moon (operated by the National Park Service at Craters of the Moon National Monument) ozone monitor and EPA approves, DEQ will be have to add five sites to its ozone network by January 1, 2012, likely in the following areas:

- Idaho Falls (MSA $\geq$ 50,000 $\leq$ 350,000)
- Pocatello (MSA $\geq$ 50,000 $\leq$ 350,000)
- Lewiston (MSA $\geq$ 50,000 $\leq$ 350,000)
- Twin Falls (micropolitan statistical area)

- Site to be determined (rural transport)
- Craters of the Moon National Monument (federal lands) If approved, this already-established monitoring site would become part of the ozone network)

Assuming the addition of just five new ozone sites, the capital start-up cost(s) will be approximately $450,000 and the costs for annual operations, maintenance, and data management will be approximately $92,000.

DEQ's proposed ozone monitoring network modifications will be submitted to EPA in the 2011 ambient air monitoring network plan, due July 1, 2011.

6.4. Sulfur Dioxide (SO_2)

On June 2, 2010, EPA strengthened the primary National Ambient Air Quality Standard (NAAQS) for sulfur dioxide (SO_2). EPA revised the primary SO_2 NAAQS to a new 1-hour standard at a level of 75 parts per billion (ppb). EPA revoked the two existing primary standards of 140 ppb evaluated over 24- hours, and 30 ppb evaluated over an entire year.

EPA also revised the ambient air monitoring requirements for SO_2. States will need to make adjustments to the existing monitoring network in order to ensure that monitors meeting the network design regulations for the new 1-hour SO_2 standard are sited and operational by January 1, 2013.

The final monitoring regulations require monitors to be placed in Core Based Statistical Areas (CBSAs) based on a population weighted emissions index for the area. The final rule requires:

- 3 monitors in CBSAs with index values of 1,000,000 or more;
- 2 monitors in CBSAs with index values less than 1,000,000 but greater than 100,000; and
- 1 monitor in CBSAs with index values greater than 5,000.

Idaho has no CBSAs that fall within these index values and therefore is not required to monitor SO_2 by this rule and therefore DEQ expects no fiscal impact.

Design values for DEQ's SO_2 monitoring stations are listed in Appendix A.

APPENDIX A

DEQ AMBIENT MONITORING NETWORK DESIGN VALUES

DEQ $PM_{2.5}$ Monitoring Stations – Federal Reference Method Data Only
2007-2009 Design Values

Monitoring Site	County/ AQS ID	98th Percentile 24-hour Concentration (µg/m³)			24-hour Design Value (µg/m³)	Required Sampling Frequency (Current Frequency)
		2007	2008	2009		
Meridian St. Luke's	Ada 160010010	20.9*	29.0	17.0	22*	1:3 **(1:3)**
St. Maries	Benewah 160090010	28.8	22.4	26.6	26	1:6 **(1:6)**
Nampa Fire Station	Canyon 160270002		26.7*	18.3	23*	1:6 **(1:6)**
Franklin	Franklin 160410001	27.3*	26.6*	40.3	31*	1:3 **(1:3)**
Salmon	Lemhi 160590004	29.5*	27.9*	42.2*	33*	1:1 **(1:3)**
Pinehurst	Shoshone 160790017	31.9	36.2	34.7	34	1:1 **(1:1)**

Notes: 1- Values not meeting data completeness criteria are marked with an asterisk ("*").
2- Nampa Fire Station monitor was moved from the Nampa NNU site (16-027-0004) and data collection began in June, 2008.
3- 2007 Salmon Natural Event data is excluded (EPA has concurred with event flags).
4- SLAMS monitors that determine the design value for an area, with a design value within ±5 % of the daily NAAQS are required to operate on a daily basis.
5- SLAMS monitors that determine the design value for an area, with a design value within ±10 % of the daily NAAQS are required to operate every third day.
6- SLAMS monitors that determine the design value for an area, with design values in excess of ±10 % of the daily NAAQS are required to operate every sixth day.
7- NCore monitors are required to operate every third day.

2007 – 2009 PM2.5 Continuous SPM Monitoring Sites Design Values

Monitoring Site	County/AQS ID	98th Percentile 24-Hour Block Average Concentration (µg/m^3)			24-Hour Block Average Design Value (µg/m^3)
		2007	2008	2009	
Twin Falls	Twin Falls 160830010	18.2	17.7	17.0	18
Moscow	Latah 160570005	15.4	14.4	12.0	14
Grangeville	Idaho 160490002	18.9	13.7	10.1	14
Lewiston	Nez Perce 160690012	15.6	16.8	15.0	16
Sandpoint	Bonner 160170005	23.7	21.8	14.7	20
Pocatello G&G	Bannock 160050015	16.4	19.5	17.7	21
McCall	Valley 160850002	45.7	19.6	18.0	28
Lancaster	Kootenai 160550003	ns	Ns	10.1	n/a
Ketchum	Blaine 160130004	ns	ns	9.0	n/a
Idaho Falls - North Holms & Pop Kroll	Bonneville 160190013	18.8	14.4		n/a
Idaho Falls - Penford	Bonneville 160190011	ns	21.6	8.5	n/a
Idaho City	Boise 160150001	ns	24.2	16.2	n/a
Garden Valley	Boise 160150002	ns	ns	10.2	n/a

Notes: 1- Data is "non-regulatory" due to special purpose monitor type
2- Idaho Falls TEOM was moved to the Penford site 5/19/2008
3- "ns" = not sampling

2007-2009 O_3 Design Values

Site	County/ AIRS ID	4th – Highest Daily Maximum 8-hour Average (ppm)			3-year Design Value (ppm)
		2007	2008	2009	
Boise White Pine	Ada 160010017	ns	ns	0.073	0.073
Lancaster	Kootenai 160550003	0.067	0.058	0.056	0.060
Meridian St. Luke's	Ada 160010010	0.068*	0.071	0.068	0.069
Boise ITD	Ada 160010019	0.080*	0.071	0.062	0.071

Notes: 1- Monitors not meeting data completeness requirements are marked with an asterisk ("*").
2- The Boise White Pine Monitor was moved from the Boise Whitney Elementary School site prior to the 2009 ozone season.
3- "ns" = not sampling.

2007-2009 PM_{10} Design Values

Site	County/ AQS ID	Estimated Exceedances			3-year Estimated Exceedances
		2007	2008	2009	
Sandpoint	Bonner 160170005	0*	0	0*	0*
Pinehurst	Shoshone 160790017	0	0	0	0
Nampa	Canyon 160270002	1.1*	0*	0*	0.4*
Boise	Ada 160010009	0*	0*	0	0*
Pocatello	Bannock 160050015	0	0	1.2	0.4
Pocatello	Bannock 160050015	0*	0*	1.2	0.4*

Notes: 1- Monitors not meeting data completeness requirements are marked with an asterisk ("*").

2007- 2009 CO Design Values

Site	County/ AQS ID	1st / 2nd Highest 1-hour Average (ppm)		
		2007	2008	2009
Boise Eastman	Ada 160010014	4.6/4.3*	8.0/7.3*	10.0/9.5
Meridian St. Luke's	Ada 160010010	ns	ns	3.4/3.2

Notes: 1- A monitor violates the 1- hour CO NAAQS if it exceeds the 1-hour standard of 35 ppm more than once per year.
2- Meridian St. Luke's CO monitor initiated in December, 2008.
3- "ns" = not sampling

Site	County/ AQS ID	1st / 2nd Highest 8-hour Average (ppm)		
		2007	2008	2009
Boise Eastman	Ada 160010014	1.7/1.6*	2.9/2.9*	3.8/3.3
Meridian St. Luke's	Ada 160010010	ns	ns	3.0/2.2

Notes: 1- A monitor violates the 1- hour CO NAAQS if it exceeds the 8-hour standard of 9 ppm more than once per year.
2- Meridian St. Luke's CO monitor initiated in December, 2008.
3- "ns" = not sampling

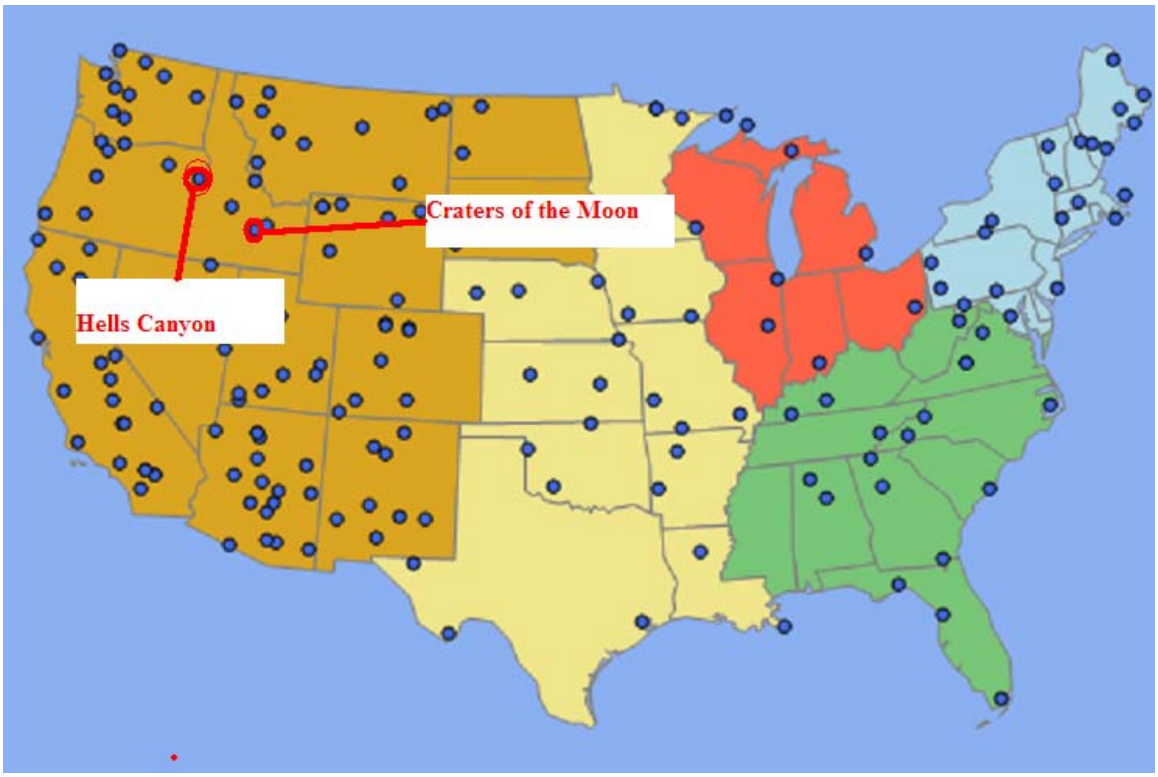
2007- 2009 SO_2 Design Values

Site	County/ AIRS ID	4th – Highest Daily Maximum 1-hour Average (ppm)			3-year Design Value (ppm)
		2007	2008	2009	
Pocatello STP	Bannock 160050004	0.065	0.069*	0.059*	0.064*
Soda Springs	Caribou 160290031	0.097	0.060*	0.054	0.070*
Meridian St. Luke's	Ada 160010010	Ns	ns	0.005*	

Notes: 1- A monitor violates the 1- hour SO_2 NAAQS if the 3-year average of the annual 4th highest daily maximum 1-hour averages exceeds 75 ppb.
2- Meridian St. Luke's CO monitor initiated in December, 2008.
3- Monitors not meeting data completeness requirements are marked with an asterisk ("*").
4- "ns" = not sampling

APPENDIX B

CRATERS OF THE MOON AND HELLS CANYON MONITORING STATIONS (IMPROVE NETWORK)



IMPROVE Monitoring Network

DEQ is leveraging the IMPROVE monitoring network to fulfill requirements for the $PM_{2.5}$ transport (Hell's Canyon) and $PM_{2.5}$ background (Craters of the Moon National Monument) monitoring sites.

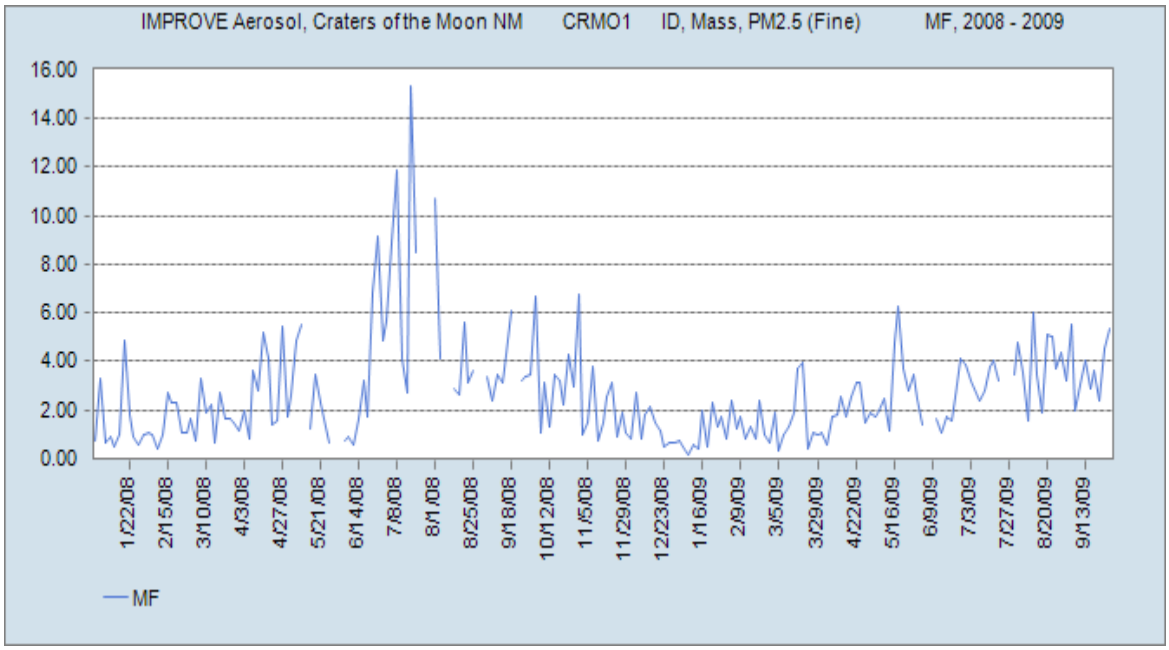
A history of the IMPROVE monitoring network can be found at: http://vista.cira.colostate.edu/improve/Default.htm. The IMPROVE program was initiated in 1985 as an extensive long term monitoring program to establish the current visibility conditions, track changes in visibility and determine causal mechanism for the visibility impairment in the National Parks and Wilderness Areas**.**

Craters of the Moon

Monitoring began at the Craters of the Moon site in 1992. Metadata for the site can be found at: http://vista.cira.colostate.edu/improve/Web/Sitebrowser/Sitebrowser.aspx?SiteID=69.

Raw data gathered at this site can be found at:
http://views.cira.colostate.edu/web/

Craters of the Moon sampling platform.



2008-2009 $PM_{2.5}$ measured at Craters of the Moon IMPROVE site.

The graph above shows the typical background concentration of $PM_{2.5}$ of 1-4 µg/m^3. However, on occasions where the region is impacted by smoke from regional fires, it is quite evident in the data (e.g. June – August 2008).

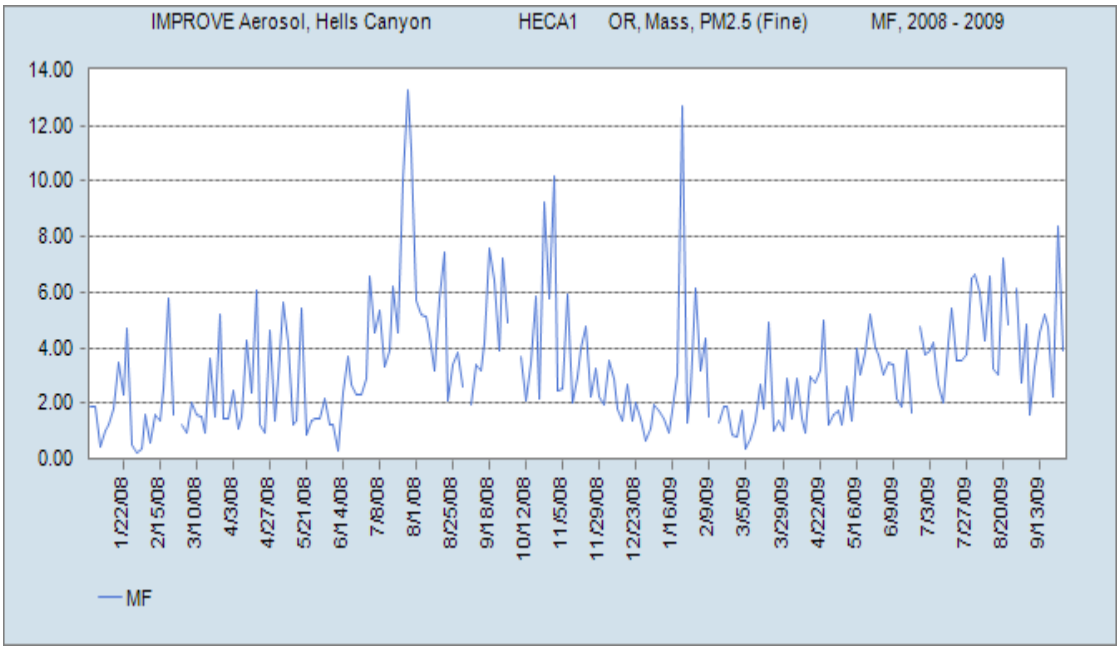
Hells Canyon

Monitoring began at the Hells Canyon site in 2001. Metadata for the site can be found at: http://vista.cira.colostate.edu/improve/Web/Sitebrowser/Sitebrowser.aspx?SiteID=69

Raw data gathered at this site can be found at: http://views.cira.colostate.edu/web/

Hells Canyon monitoring station.

The graph below shows the Hells Canyon $PM_{2.5}$ measurements for 2008-2009. Typical transport concentrations of 3-6 $\mu g/m^3$ are represented, however on occasion(s) values can be higher. Typically elevated levels of $PM_{2.5}$ are associated with either summer/fall smoke impacts or regional winter-time stagnation events.



2008-2009 $PM_{2.5}$ measured at Hell's Canyon IMPROVE site.