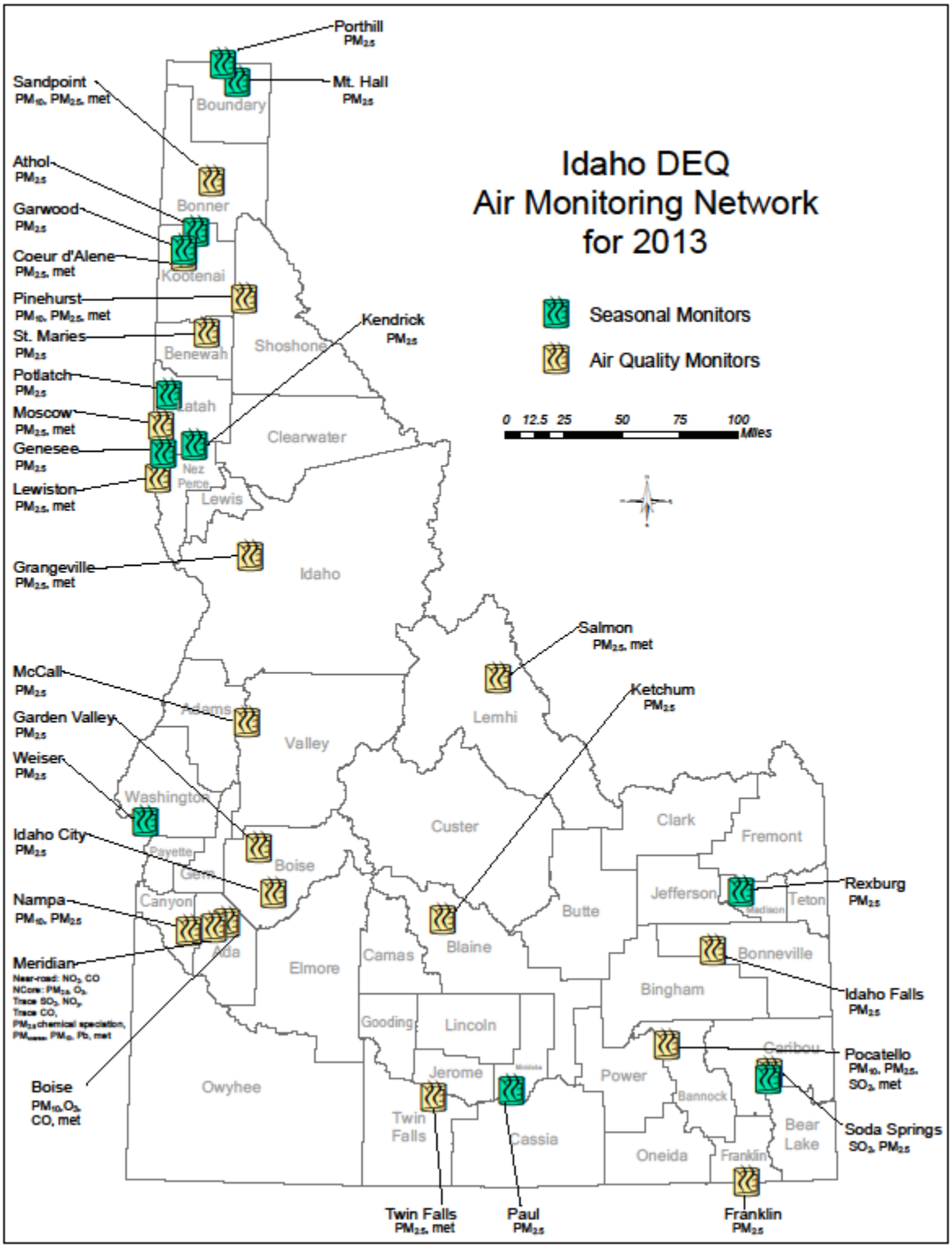
Idaho Department of Environmental Quality
Annual Ambient Air Quality Monitoring Network Plan

DRAFT

July 1, 2013

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

This page left blank for double-sided printing


Idaho DEQ
Air Monitoring Network
for 2013
Seasonal Monitors
Air Quality Monitors
0 12.5 25 50 75 100 Miles
Porthill PM2.5
Mt. Hall PM2.5
Sandpoint PM10, PM2.5, met
Athol PM2.5
Garwood PM2.5
Coeur d'Alene PM2.5, met
Pinehurst PM10, PM2.5, met
St. Maries PM2.5
Potlatch PM2.5
Moscow PM2.5, met
Genesee PM2.5
Lewiston PM2.5, met
Kendrick PM2.5
Grangeville PM2.5, met
Salmon PM2.5, met
Ketchum PM2.5
McCall PM2.5
Garden Valley PM2.5
Weiser PM2.5
Idaho City PM2.5
Nampa PM10, PM2.5
Meridian
Near-road: NO2, CO
NCore: PM2.5, O3,
Trace SO2, NOy,
Trace CO,
PM2.5 chemical speciation,
PMcoarse, PM10, Pb, met
Boise PM10, O3, CO, met
Rexburg PM2.5
Idaho Falls PM2.5
Pocatello PM10, PM2.5, SO2, met
Soda Springs SO2, PM2.5
Twin Falls PM2.5, met
Paul PM2.5
Franklin PM2.5
Boundary
Bonner
Kootenai
Shoshone
Benewah
Latah
Clearwater
Nez Perce
Lewis
Idaho
Lemhi
Adams
Valley
Washington
Custer
Clark
Fremont
Payette
Gem
Boise
Canyon
Ada
Elmore
Camas
Blaine
Butte
Jefferson
Madison
Teton
Bonneville
Bingham
Gooding
Lincoln
Caribou
Jerome
Minidoka
Power
Bannock
Owyhee
Twin Falls
Cassia
Oneida
Franklin
Bear Lake

Executive Summary of Proposed Network Modifications

The main objective of the Idaho Department of Environmental Quality's (DEQ) 2013 Annual Ambient Air Monitoring Network Plan is to determine whether the State's ambient air monitoring network is achieving its monitoring objectives and to identify any needed modifications.

Idaho's monitoring network has four principal objectives: 1) to assess compliance with National Ambient Air Quality Standards (NAAQS), 2) to support smoke management programs, including agricultural and prescribed burning practices, 3) to identify emergency episodes caused by wind-blown dust or wildfire, and 4) to support the evaluation of State Implementation and Maintenance Plans (SIPs). In addition DEQ operates a network of continuous $PM_{2.5}$ monitors and surface meteorology station s to support air quality forecasting, the AQI program, and modeling projects.

DEQ is proposing the following network modifications in this plan:

- Relocation of the Sandpoint USFS PM_{10} and $PM_{2.5}$ TEOMs to the Sandpoint University of Idaho site.
- Relocation of the St. Marie's $PM_{2.5}$ monitors (FRM and TEOM/FDMS) to a location 450' NNW of its' current location.
- EPA approval to designate four continuous FEM $PM_{2.5}$ monitors as "non-regulatory":
    - St. Maries TEOM/FDMS (for evaluation to FRM and AQI only)
    - Franklin TEOM/FDMS (for evaluation to FRM and AQI only)
    - Pinehurst BAM 1020 (for AQI only)
    - Nampa TEOM/FDMS (for evaluation to FRM and AQI only).
- Relocation of the Pinehurst precision $PM_{2.5}$ FRM to the Meridian St. Luke's NCore site. $PM_{2.5}$ FRM network precision will be assessed at the St. Luke's site following the relocation. Issues with AQS' ability to assess dual precision metrics at a single site are requiring DEQ to make this adjustment (EPA has requested).

Contents

Executive Summary of Proposed Network Modifications iv

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 Subsequent to the EPA-Approved 2011 Ambient Monitoring Network Plan **24**

5. Network Modifications Proposed in This 2012 Ambient Monitoring Network Plan **25**

5.1. PM_{10} Monitoring Network 25

5.2. $PM_{2.5}$ Core NAAQS Compliance Monitoring Network 27

5.3. $PM_{2.5}$ Continuous Monitoring Network 28

5.4. Ozone Monitoring Network 29

5.5. Carbon Monoxide (CO) Monitoring Network 29

5.6. Sulfur Dioxide (SO_2) Monitoring Network 30

5.7. Nitrogen Dioxide (NO_2) Monitoring Network 30

5.8. Lead (Pb) Monitoring Network 31

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

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

6. Future Ambient Air Monitoring Requirements and Associated Costs **32**

Appendix A **33**

Appendix B **40**

Appendix C **48**

DRAFT

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 21
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 20

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).

This plan does not address seasonal $PM_{2.5}$ monitors (nephelometers) utilized for smoke and agricultural burning management because they are not part of the Idaho SLAMS network.

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 2013 plan shall include all required stations to be operational by January 1, 2014. Specific locations for the required monitors shall be included in the annual network plan submitted to the EPA Regional Administrator on July 1, 2013.

The annual monitoring network plan must contain the following information for existing and proposed site(s) where appropriate:

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 non source-oriented (i.e. NCore) 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 non source-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) 2013 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, 2013 DEQ's SLAMS air monitoring network consisted of 29 distinct monitoring sites measuring criteria pollutants and surface meteorology. DEQ's ambient air monitoring network is operated and maintained by DEQ's six (6) Regional Office monitoring staff. Table 3-1 is a list of DEQ's air monitoring sites, including addresses, global positioning system (GPS) coordinates and AQS identifiers. Figures 3-1 through 3-6 illustrate the locations of DEQ's monitoring sites according to the responsible Regional Office.

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
Coeur d' Alene LMP	Camp Cross, McDonald Point, Lake Coeur d'Alene, ID	+47.555253/- 116.817331	160550004
St. Maries	Forest Service Bldg St. Maries, ID 83666	+47.316667/ -116.570280	160090010
Pinehurst	106 Church St. Pinehurst, ID 83850	+47.536389/ -116.236667	160790017
Moscow	1025 Plant Sciences Rd Moscow, ID 83843	+46.728000/ -116.955667	160570005
Lewiston	1200 29th St Lewiston, ID 83501	+46.404722/ -116.968889	160690012
Grangeville	USFS Compound Grangeville, ID 83530	+45.9274167/ -116.105944	160490002
McCall	500 N. Mission St, McCall ID 83638	+44.906889 -116.106528	160850002
Garden Valley	946 Banks Lowman Rd Garden Valley, ID 83622	+44.104675/ -115.973084	160150002
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
Meridian Near-road	1311 East Central Dr, Meridian, ID 83642	+43.593929/ -116.38125	160010023

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
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	+45.161682/ -113.892212	160590005

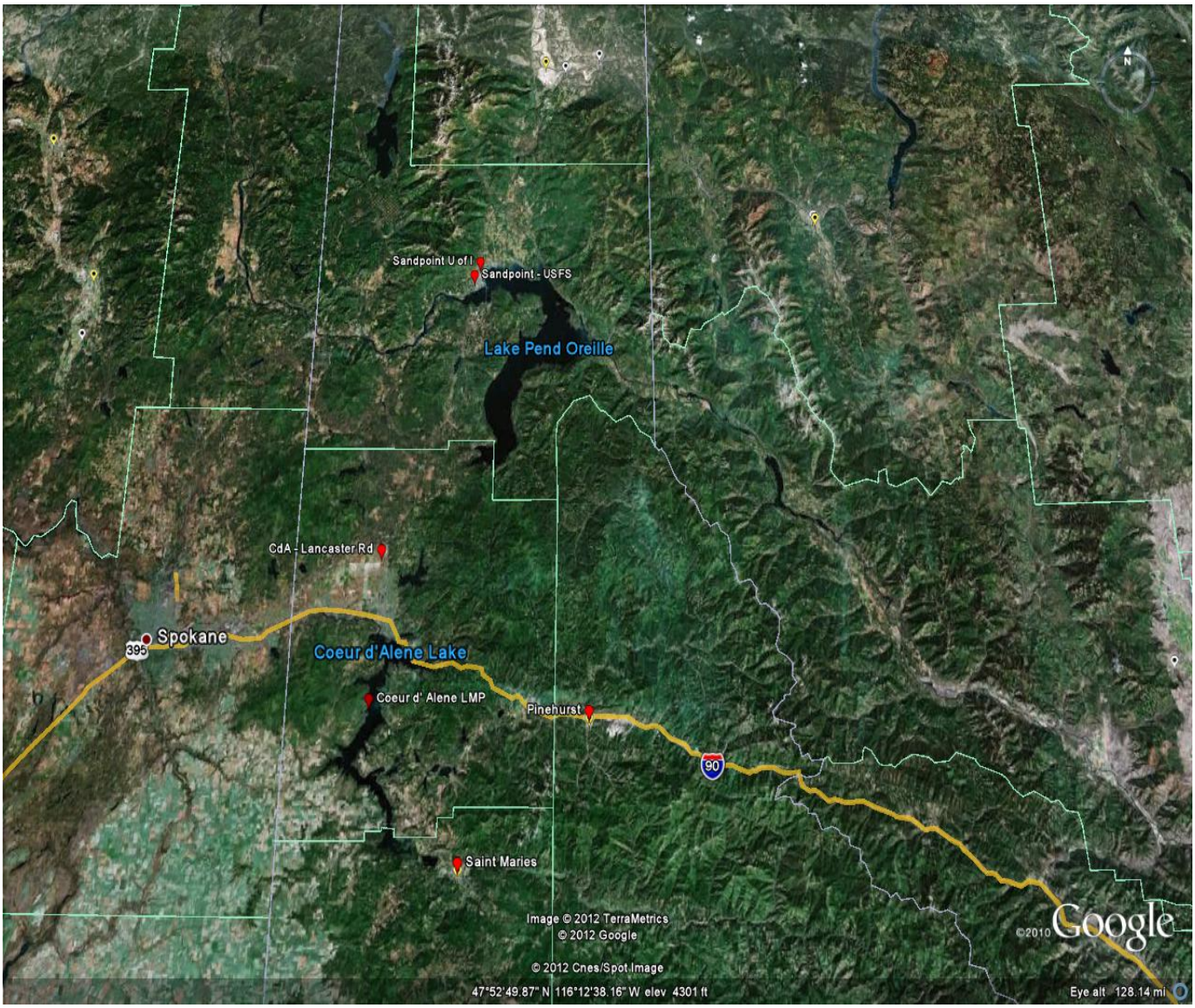


Figure 3-1. Coeur d'Alene Regional Office Monitoring Stations

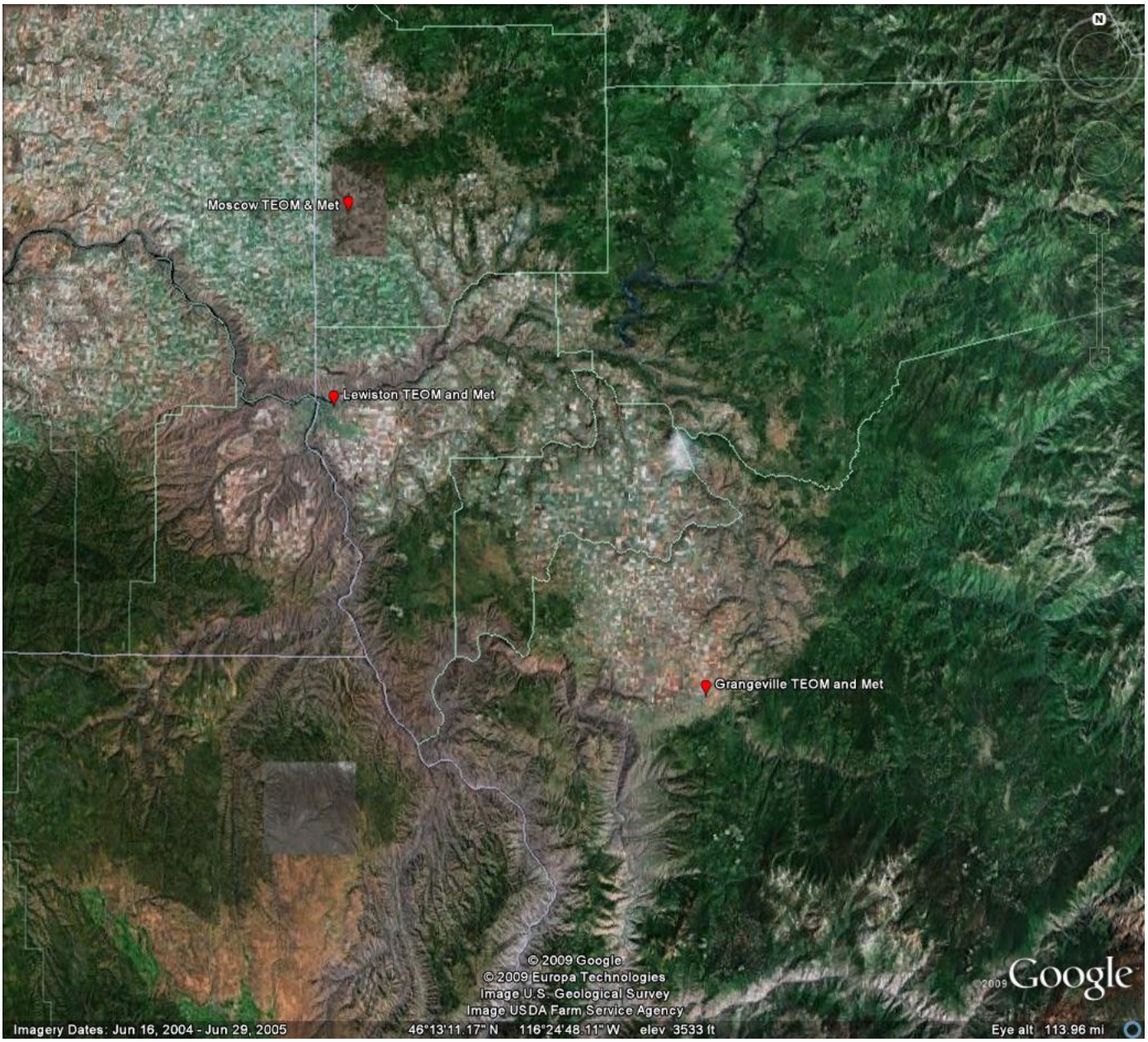


Figure 3-2. Lewiston Regional Office Monitoring Stations

Figure 3-3. Boise Regional Office Monitoring Stations

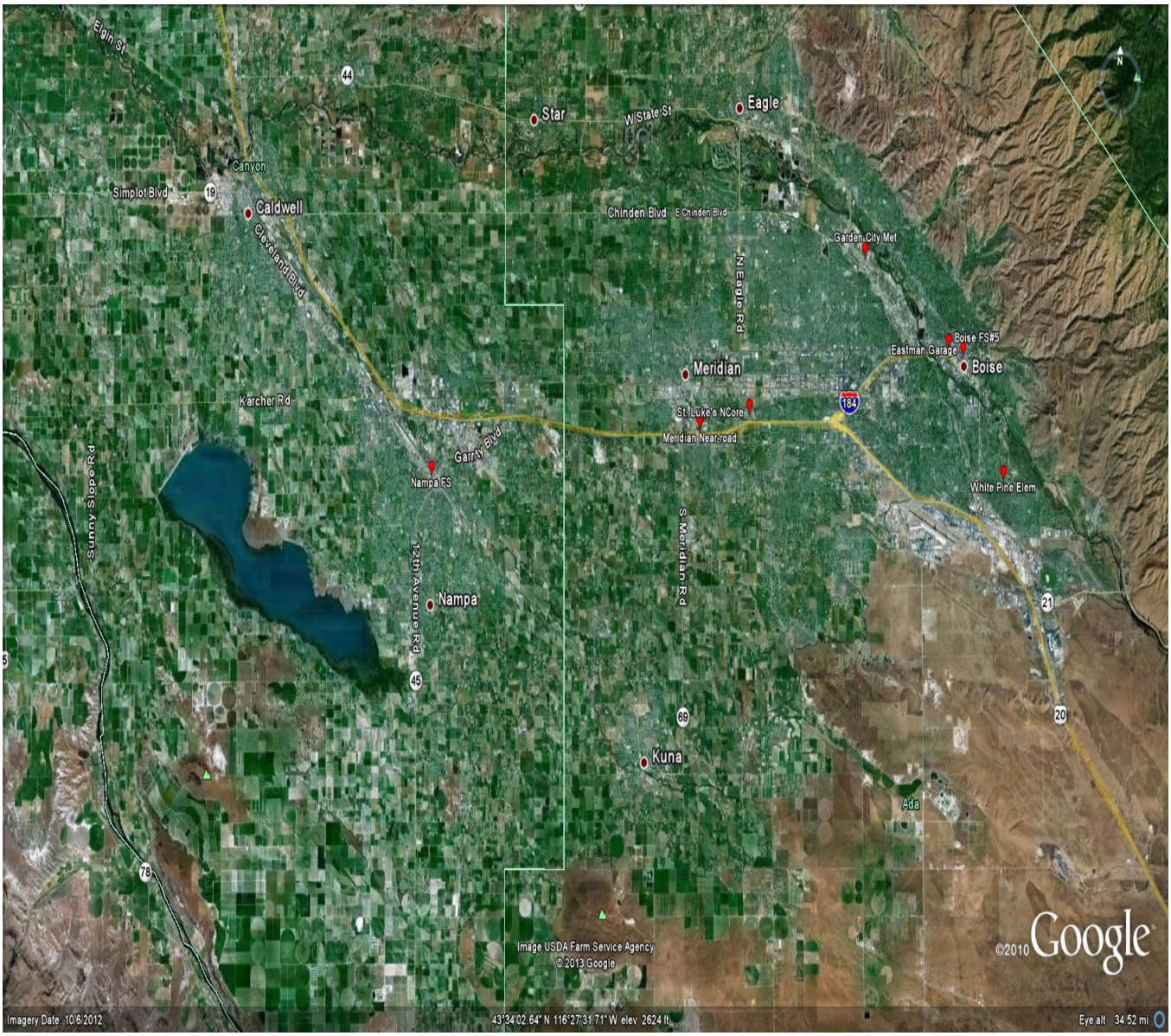


Figure 3-3. (continued)

Figure 3-4. Twin Falls Regional Office Monitoring Stations

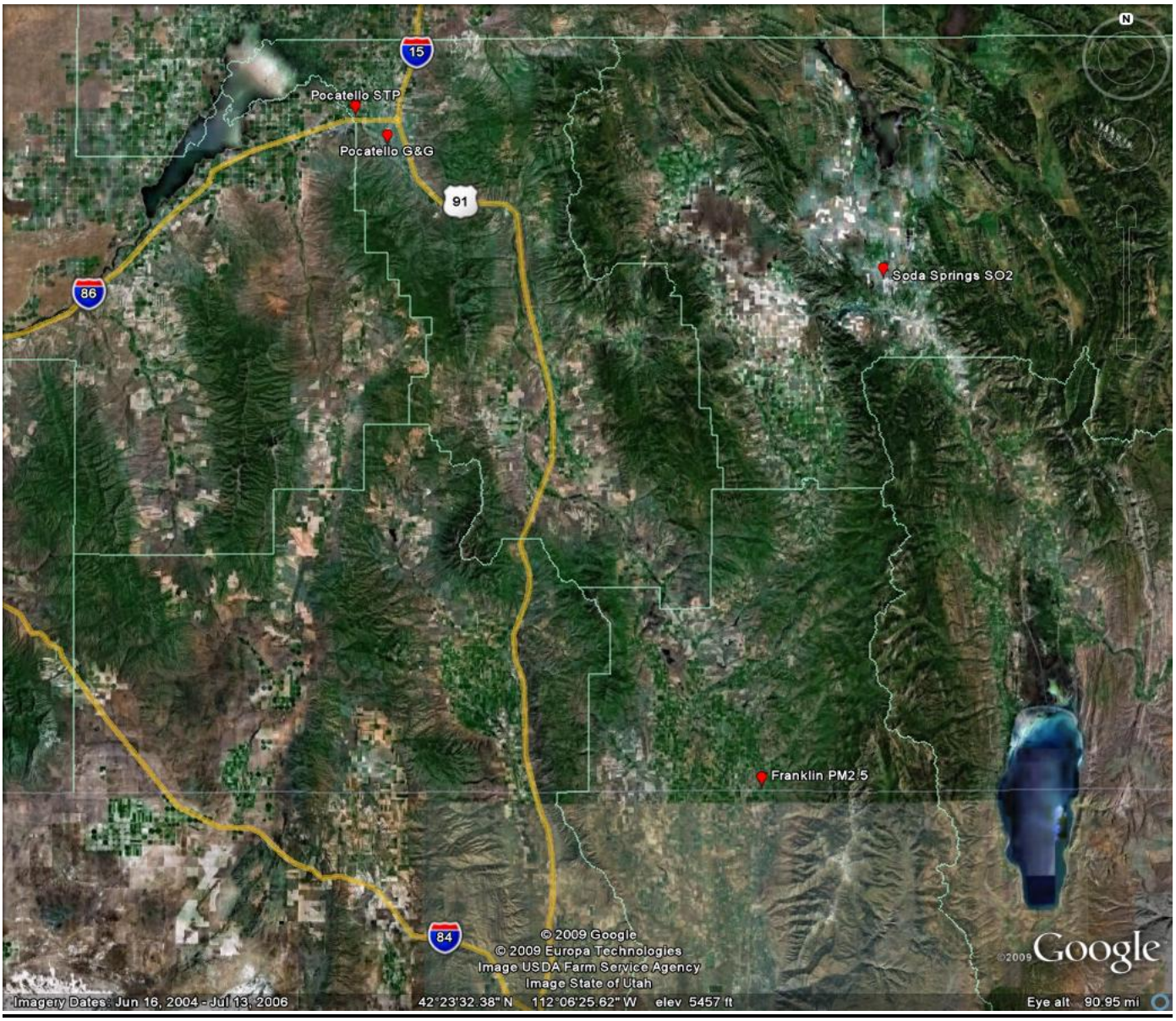


Figure 3-5. Pocatello Regional Office Monitoring Stations

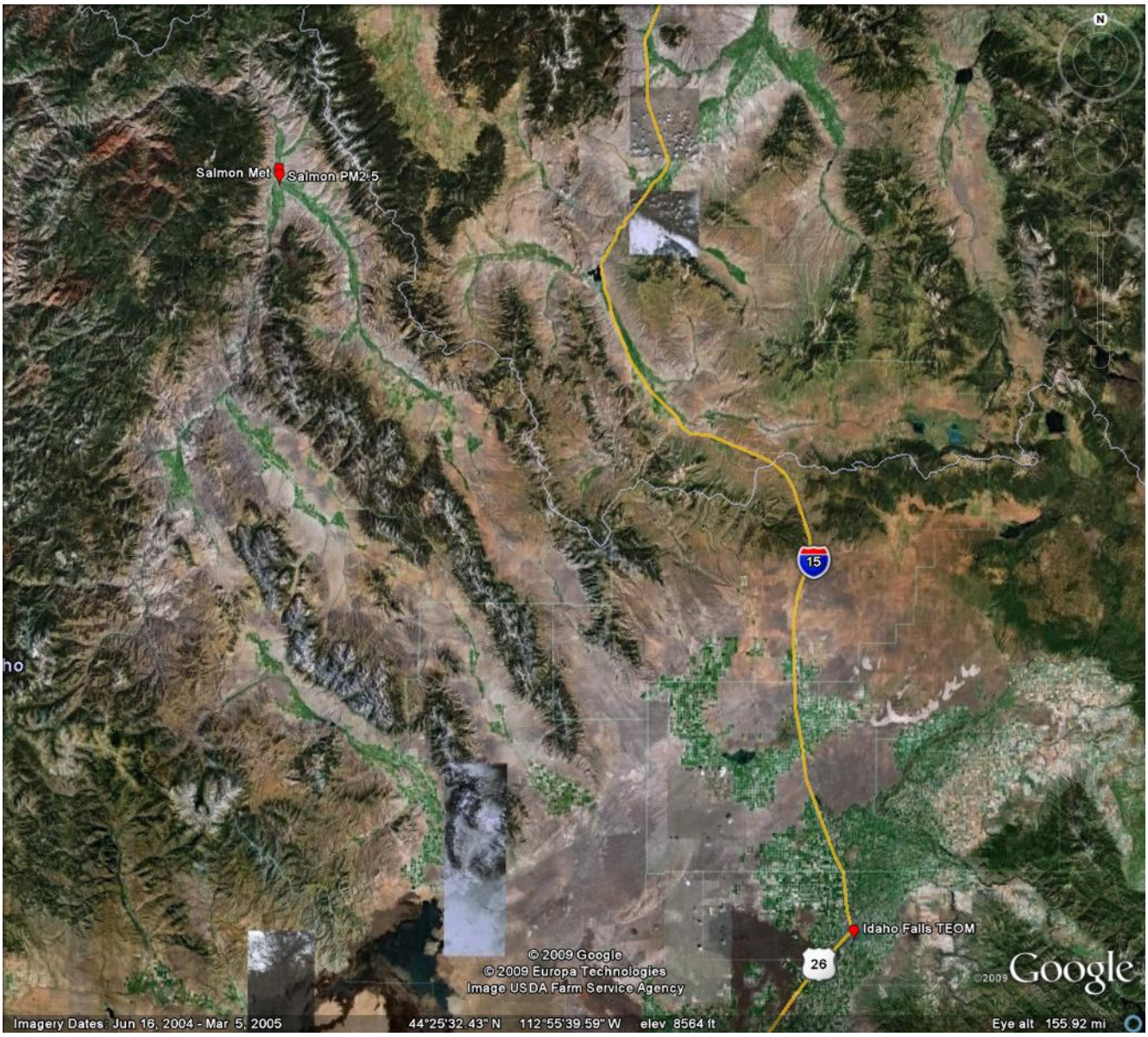


Figure 3-6. Idaho Falls Regional Office Monitoring Stations

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.

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

(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 typical $PM_{2.5}$ concentrations 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), or 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 Modeling-meteorological	Coeur d' Alene, ID MSA	Urban
Coeur d' Alene – LMP	Modeling - meteorological	Coeur d' Alene, ID MSA	Neighborhood
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

Site	Monitoring Objective	Area Represented	Monitoring Scale
Lewiston	AQI Smoke Management Modeling-meteorological	Lewiston ID – WA MSA	Neighborhood
Grangeville	AQI Smoke Management Modeling-meteorological	Idaho County	Neighborhood
McCall	AQI Smoke Management	Valley County	Neighborhood
Garden Valley	AQI Smoke Management	Boise County	Neighborhood
Nampa	PM_{10} NAAQS $PM_{2.5}$ NAAQS AQI	Boise City-Nampa MSA	Neighborhood
Meridian – St. Luke's	NCore-trace gas NCore - PMcoarse $PM_{2.5}$ NAAQS $PM_{2.5}$ Chemical Speciation O_3 NAAQS Pb NAAQS AQI Modeling-meteorological	Boise City-Nampa MSA	Neighborhood
Meridian – Near-road	NO, NO_2, NO_x CO	Boise City-Nampa MSA	Micro
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
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 - Middle

Site	Monitoring Objective	Area Represented	Monitoring Scale
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

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 and TEOMs 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	FEM	100	Teledyne API Model 100A – UV Fluorescent
SO_2	FEM	060	Thermo Model 43C, pulsed fluorescence
SO_2	FRM	600**	Teledyne API, Model 100EU – UV Fluorescent
O_3	FEM	087	Teledyne API, Model 400E
NO_2	FRM	099	Teledyne API, Model 200E – Chemiluminescence
NO_2	FEM	599	Teledyne API, Model 200EU - Photolytic
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

Parameter/ Pollutant*	Method Designation	AQS Method Code	Instrument and Instrument Parameters
$PM_{2.5}$	FEM	181	R&P TEOM w/ VSCC & FDMS
$PM_{2.5}$	FEM	170	Met One Beta Gauge (BAM)
$PM_{10-2.5}$	FRM	176	Thermo Scientific Partisol-Plus Model 2025 Sequential Sampler Pair
PM10 Pb	FEM	811	Thermo/R & P 2025 PM10 w/ XRF analysis

* 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, 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 type of monitor, the monitor's objectives and the design value (relative to the 24-hour NAAQS) determined for the monitored site.

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

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

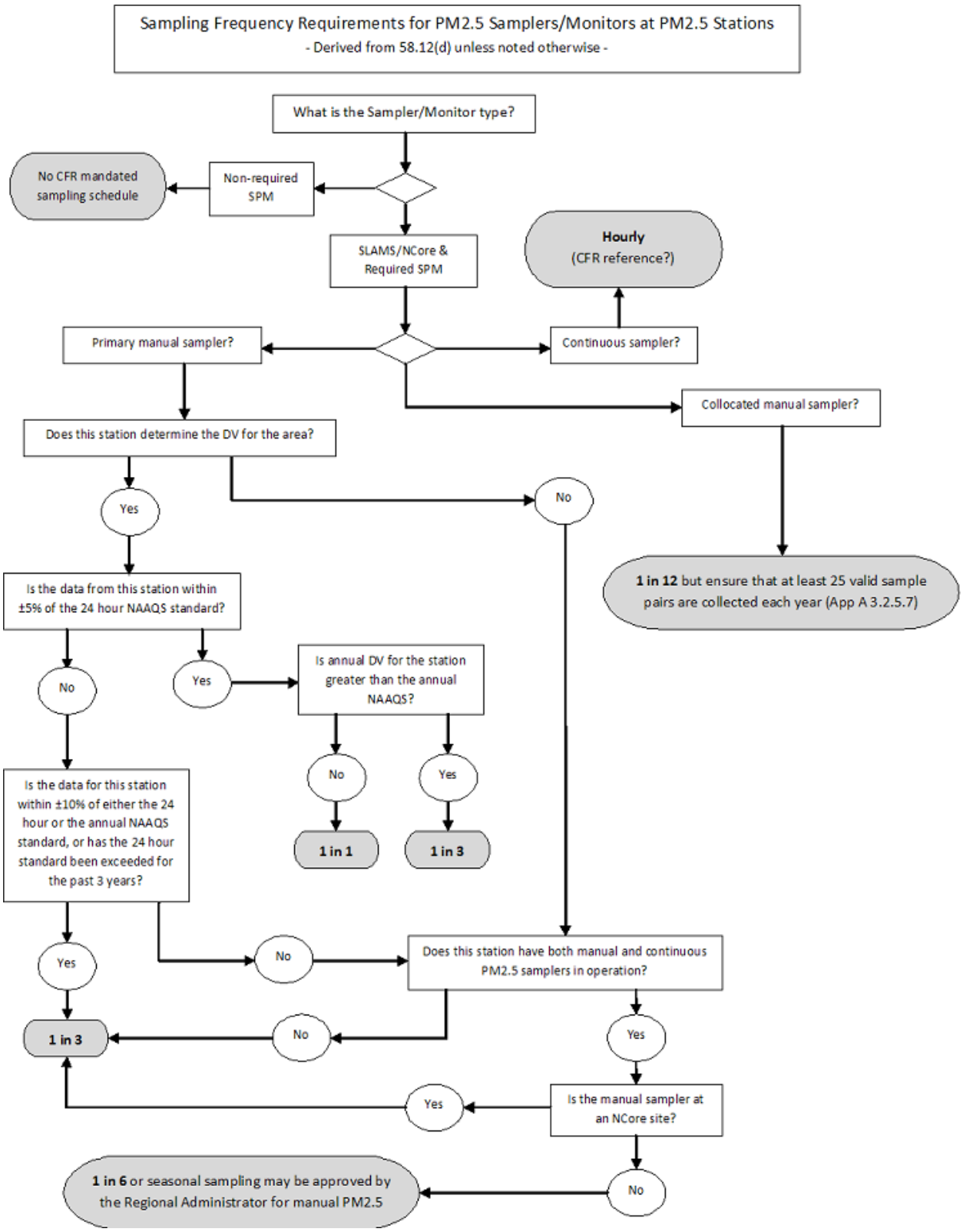


Table 3-5. Pollutants/Monitor Designation/Sampling Frequency/Method Codes

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 10-meter meteorology	SPM-NR SPM	Continuous Continuous Continuous Continuous	715 or 716 087 099
Coeur d' Alene LMP	10-meter meteorology	SPM	Continuous	
St. Maries	$PM_{2.5}$ – FRM $PM_{2.5}$ – TEOM/FDMS	SLAMS SPM-NR	1/6 Continuous	145 181
Pinehurst	$PM_{2.5}$ – FRM Precision $PM_{2.5}$ TEOM/FDMS PM_{10} - TEOM 10-meter meteorology	SLAMS QA/Collocated SLAMS SLAMS SPM	1/6 --- 1/1 Continuous Continuous	145 --- 181 079
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	715 or 716
Nampa	PM_{10} - TEOM $PM_{2.5}$ - FRM $PM_{2.5}$ TEOM/FDMS	SLAMS SLAMS SPM-NR	Continuous 1/6 Continuous	079 145 181

Site	Pollutant Monitored**	Monitor Designation**	Monitoring Frequency	AQS Method Code
Meridian St. Luke's	$PM_{2.5}$ - FRM $PM_{2.5}$ - TEOM $PM_{2.5}$ Chemical Speciation $PM_{10-2.5}$ O_3 SO_2 NOy CO PM_{10} Pb 10-meter meteorology	NCore SPM-NR NCore NCore NCore NCore NCore NCore NCore NCore	1/3 Continuous 1/3 1/3 Continuous Continuous Continuous Continuous 1/6 Continuous	145 715 or 716 810 176 087 600 599 593 811
Meridian Near-road	NO_2,NO,NO_x CO	SLAMS SLAMS	Continuous Continuous	599 093
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
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
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 $PM_{2.5}$ TEOM/FDMS	SLAMS SPM-NR	1/6 Continuous	145 181

Site	Pollutant Monitored**	Monitor Designation**	Monitoring Frequency	AQS Method Code
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	Precision SLAMS	1/6 1/1	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 twelve (12) 10-meter meteorological stations. Meteorological measurements are used to support air quality index forecasting and air quality modeling analyses. Data collected from DEQ's meteorological stations are submitted to AQS.

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 – LMP	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)

Site	Meteorological Parameters Monitored
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)
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);
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 Subsequent to the EPA-Approved 2012 Ambient Monitoring Network Plan

The following network modifications were made subsequent to EPA approval of the 2012 ambient monitoring network plan. Modifications proposed/implemented subsequent to the 2012 plan and prior to DEQ submitting this 2013 plan have been addressed, case by case, through e-mail correspondence or regular mail (AQS site identifier is provided in parentheses.)

1. The Meridian St. Luke's NCore (16-001-0010) station was moved 150 feet due east. An updated NCore site form is included in Appendix C. Data collection for the gases and meteorology was interrupted January 1, 2013 and resumed May 1, 2013. A new shelter was purchased and installed on the new location.

2. DEQ completed the EPA-funded near-road pilot study in December of 2012. The Meridian near-road site (16-001-0023) was added to DEQ's SLAMS on January 1, 2013. DEQ will continue monitoring carbon monoxide (CO) and oxides of nitrogen (NO_2, NO and NO_x) at this location.

5. Network Modifications Proposed in This 2012 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-quality/monitoring/monitoring-network.aspx.

More information about criteria pollutants (those pollutants for which EPA has established NAAQS) and NAAQS can be located at: http://www.epa.gov/air/criteria.html.

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 assessing compliance with the PM_{10} NAAQS, and will continue operation through 2013. PM_{10} monitoring site locations are selected to represent average population exposure to spatially representative concentrations in the middle, neighborhood, and urban scales. Airsheds classified as "moderate" nonattainment for the 24-hour PM_{10} NAAQS (150 $\mu g/m^3$) in Idaho are:

- Bonner County – partial (City of Sandpoint)
- Shoshone County – partial (including the entire 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, now classified as maintenance areas, and require monitoring to demonstrate compliance with a specific NAAQS over specific timeframes include:

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

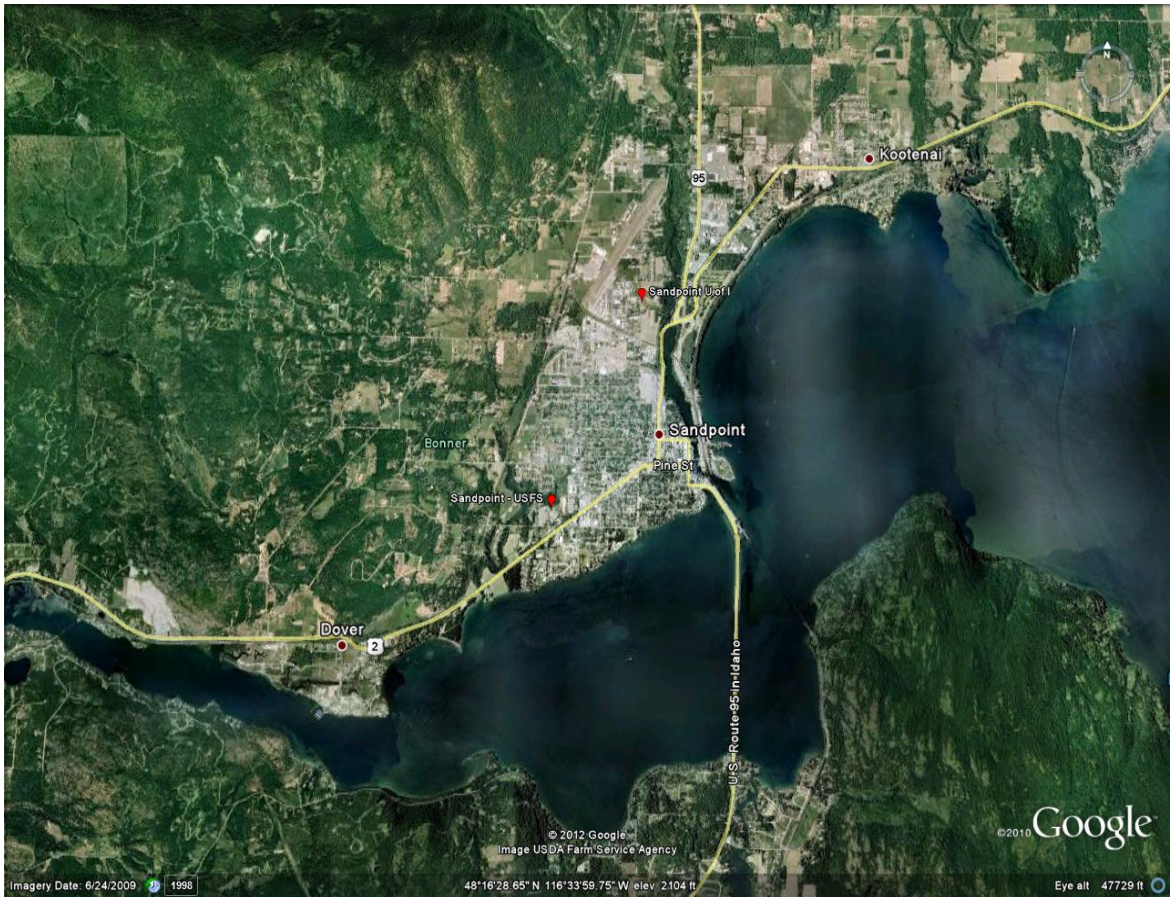
2010 – 2012 PM_{10} design values are listed in Appendix A.

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

However, DEQ is proposing to re-locate the Sandpoint PM_{10} monitor from its' current location at the Sandpoint USFS compound to the University of Idaho site, where a 10-

meter meteorological station is currently operating. Three years ago a major lumber facility (Sandpoint LP) shut down operation, including its' industrial boiler, whose emissions previously prevented location of the current USFS PM_{10} and $PM_{2.5}$ monitors at the University of Idaho site. This is no longer the case. The University of Idaho site will be more representative of population exposure, capturing PM contributions from the northern part of town (our data shows the predominant wind direction is from the south and southeast).

DEQ proposed this move in the 2012 Annual Network Monitoring plan and EPA Region 10 requested DEQ conduct concurrent monitoring of PM_{10} at both sites and perform statistical comparison of the data. If the correlation between the two sites was acceptable, EPA would better be able to approve the relocation of this monitor. DEQ conducted this analyses and the report is included in Appendix C. DEQ believes the study results support relocation of this monitor. An updated site form for the University of Idaho site is included in Appendix C. The relocation will allow consolidation of DEQ resources and infrastructure, including nearby meteorological data. For this reason, DEQ will also relocate the special purpose non-regulatory $PM_{2.5}$ TEOM from the USFS site to the U of I location, pending EPA's approval. See below:



5.2. $PM_{2.5}$ Core NAAQS Compliance Monitoring Network

DEQ operates a "core network" of six $PM_{2.5}$ monitoring sites for NAAQS compliance. 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 $PM_{2.5}$ monitoring sites in the Treasure Valley, based on population. The Meridian monitor also satisfies the requirement for $PM_{2.5}$ monitoring at NCore sites.

DEQ is proposing no substantive changes to the core $PM_{2.5}$ FRM monitoring network in this 2013 Monitoring Network Plan.

However, DEQ is asking for EPA approval to re-locate the $PM_{2.5}$ monitors at the St. Maries site approximately 450 feet to the NNW of its current location at the USFS office. DEQ needs to move the site due to remodeling of the USFS building. The monitors will be installed on a ground-level platform on City-owned property. A site evaluation form for the new site is included in Appendix C.

DEQ is also requesting EPA approval for "non-regulatory" designation for four (4) continuous $PM_{2.5}$ FEM monitors:

- Franklin, TEOM/FDMS – FRM comparison/evaluation
- Nampa, TEOM/FDMS – FRM comparison/evaluation
- Pinehurst, BAM – AQI reporting only
- St. Maries, TEOM/FDMS – FRM comparison/evaluation

DEQ would like to evaluate the new TEOM/FDMS monitors before deciding whether to designate them as primary reporting monitors. DEQ is requesting EPA approve these monitors as "non-regulatory" for up to a two year period. If approved, data from these monitors will not be used to assess compliance to NAAQS but will be used for reporting daily AQI values.

Lastly, during 2012 DEQ operated two (2) $PM_{2.5}$ FRMs and one TEOM/FDMS at the Pinehurst location. The TEOM/FDMS is designated the primary reporting monitor for this site. The two FRMS are used for assessing precision of the BAM to the FRM and the precision of the FREM to FRM. Unfortunately the AQS system cannot manage "dual" precision scenario and EPA has requested DEQ to relocate our FRM precision site. DEQ proposes to move the second FRM at Pinehurst to the St. Luke's NCore site. DEQ will move the monitor soon as EPA approval is issued.

$PM_{2.5}$ design values (updated for 2010 – 2012), current and proposed sampling frequencies are listed in Appendix A.

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. The real-time and continuous $PM_{2.5}$ data support DEQ's air quality forecasting, AQI, and smoke management programs. The BAM 1020 at the Salmon site and the TEOM/FDMS monitor at Pinehurst are also designated as SLAMS primary monitors for NAAQS compliance assessment. The rest are special purpose, non-regulatory monitors.

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

- Sandpoint – USFS
- Coeur d'Alene – Lancaster Rd.
- St. Maries (1405 TEOM/FDMS – non-regulatory)*
- Pinehurst – TEOM/FDMS (SLAMS FEM-primary monitor)
- Moscow
- Lewiston
- Grangeville
- McCall
- Garden Valley
- Idaho City
- Nampa – (1405 TEOM/FDMS – non-regulatory)*
- Meridian - St. Luke's
- Idaho City
- Ketchum
- Twin Falls
- Pocatello
- Franklin (1405 TEOM/FDMS – non-regulatory)*

- Idaho Falls
- Salmon (BAM 1020, SLAMS FEM – primary monitor)

*non-regulatory, pending EPA approval.

DEQ will relocate the Sandpoint USFS TEOM to the Sandpoint U of I site if EPA approves DEQ's request to relocate the PM_{10} monitor to the same location (see discussion and map in Section 5.1).

5.4. Ozone Monitoring Network

DEQ currently operates two ozone monitors in the Treasure Valley. 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 can be counted toward minimum SLAMS ozone network requirements. Ozone is monitored during the ozone "season" as prescribed in 40 CFR Part 58 Appendix D. For 2013 the ozone season is May 1 through September 30.

The Treasure Valley ozone monitors are located at:

- The Meridian St. Luke's NCore 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 Whitney Elementary School site which 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.

DEQ is proposing no changes to the ozone monitoring network in this 2013 monitoring network plan.

2010 – 2012 ozone design values for DEQ's monitors are listed in Appendix A.

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, and as a result 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 three (3) CO monitors, one at the Boise – Eastman site in downtown Boise, one at the Meridian St. Luke's NCore site and one at the Meridian near-road 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, able to measure much

lower CO than conventional CO monitors used for NAAQS compliance. The Meridian St. Luke's CO monitor is required for NCore sites. The Meridian near-road CO monitor has been established in advance of future EPA requirements for near-road CO monitoring.

2010 – 2012 CO design values are listed in Appendix A.

DEQ is proposing no changes to the CO monitoring network in this 2013 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 2013 monitoring network plan.

2010 – 2012 design values for DEQ's SO_2 monitoring stations are listed in Appendix A.

5.7. Nitrogen Dioxide (NO_2) Monitoring Network

DEQ currently has one (1) SLAMS NO_2 monitoring station at the Meridian near-road site. On January 22, 2010 EPA revised the NO_2 primary NAAQS, along with revisions to the NO_2 monitoring requirements. Per this final rule, Idaho will be required to monitor NO_2 at a "near-road" monitoring station in the Boise-Nampa MSA. Initially, all monitoring was scheduled to begin January 1, 2013. However due to funding limitations, EPA has changed the requirement for the Boise City MSA (MSA> 500,000) to January 1, 2017. However, prior to the change in implementation date(s), DEQ received a grant from EPA to pilot a near-road monitoring site, which was established in Meridian, approximately 30 meters to Interstate 84. Upon completion of the pilot study (December 31, 2012) DEQ chose to continue NO_2 monitoring at the near-road site in order to sooner assemble a 3-year data record for NAAQ assessment (NO_2 NAAQS has a 3-year averaging period).

DEQ is proposing no changes to the NO_2 monitoring network as part of this 2013 monitoring network plan.

5.8. Lead (Pb) Monitoring Network

On December 14, 2010 EPA made final revisions to the ambient monitoring requirements for measuring lead. Core Based Statistical Areas, or CBSAs, with a population of 500,000 people or more were required to initiate lead monitoring at NCore monitoring sites beginning by January 1, 2012. DEQ met this requirement and initiated PM_{10} lead monitoring at the St. Luke's NCore site. EPA has also required Pb monitoring near facilities with Pb emissions exceeding 0.5 tons per year (tpy). Idaho has no such facilities and thus is not conducting any source-oriented Pb monitoring.

DEQ is utilizing a low-volume PM_{10} sampler to collect filter-based samples for lead analysis. A lo-volume Partisol 2025 sampler configured to collect PM_{10c} as part of the $PM_{10-2.5}$ (Section 5.9) measurement is already collecting PM_{10c} on the every sixth day schedule required for Pb. DEQ is utilizing the National Laboratory Contract and ships the samples/filters to the contract laboratory for Pb-PM_{10} analysis by x-ray fluorescence (XRF) analysis.

Should lead concentrations exceed a three-month average greater than or equal to 0.1 $\mu g/m^3$, DEQ will be required to install and operate a Pb-TSP monitor within six months of such determination. As of this date, values have been well below this threshold. Any Pb-PM_{10} measurements exceeding the NAAQS could lead toward a violation of the standard.

DEQ is proposing no changes to the Pb monitoring network as part of this 2013 monitoring network plan.

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 is determined 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.

DEQ initiated PMcoarse monitoring at the Meridian – St. Luke's NCore site, beginning January 1, 2011. Both the $PM_{2.5}$ and PM_{10c} samplers are operated every third day (1/3) in accordance with the national monitoring schedule. A second PM_{10c} monitor is operated every twelfth day (1/12) for the purpose of assessing lo-vol PM_{10} sampling precision.

DEQ is proposing no changes to the PMcoarse monitoring network as part of this 2013 monitoring network plan.

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

- Relocation of the Sandpoint USFS PM_{10} and $PM_{2.5}$ Teoms to the Sandpoint University of Idaho site.
- Relocation of the St. Marie's $PM_{2.5}$ monitors to a location 450' NNW of its' current location.
- EPA approval to designate four continuous FEM $PM_{2.5}$ monitors as "non-regulatory":
    - St. Maries TEOM/FDMS
    - Franklin TEOM/FDMS
    - Pinehurst BAM 1020
    - Nampa TEOM/FDMS
- Relocation of the Pinehurst $PM_{2.5}$ precision FRM monitor to the Meridian St. Luke's NCore site for the purpose of assessing network precision at the St. Luke's 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 has proposed changes to ambient air monitoring requirements for some pollutants. This can result in additional monitors and new monitoring requirements for Idaho. Many of the added monitoring requirements anticipated just a few years ago have been greatly reduced due to budget issues and it is difficult to project near-term impacts to DEQ's monitoring network and resources. At this time, aside from near-road monitoring requirements for CO and NO_2, beginning in 2017, there are no anticipated additional federal requirements for ambient air monitoring in Idaho.

APPENDIX A

DEQ AMBIENT MONITORING NETWORK DESIGN VALUES

Note: Many of DEQ's $PM_{2.5}$ monitors were greatly impacted by smoke from wildfires during 2012. The Clean Air Act provides for agencies to flag such data for exceptional and natural events and for EPA to concur if appropriate steps and demonstrations are completed. DEQ intends to pursue Exceptional Event exclusion for Salmon and Pinehurst fire-affected data in 2012. Design values are provided which reflect the inclusion and exclusion of these data. DEQ has not determined whether it will seek EPA concurrence for data affecting the Franklin, Meridian and Nampa monitors because no significant regulatory impact has been determined at this time. This is subject to change, depending on what happens in 2013 and 2014.

Similarly, DEQ is in the process of requesting exceptional event for two PM_{10} exceedances measured in February 2011 at the Boise Fire Station and Nampa monitors. These exceedances were due to windblown dust events.

2010-2012 Design Values for Core $PM_{2.5}$ Monitoring Stations – Federal Reference or Federal Equivalent Method (Primary Monitor)

Monitoring Site	County/ AQS ID	98th Percentile 24-hour Concentration (µg/m³)			2010-2012 24-hour Design Value (µg/m³)	Required Sampling Frequency (Current Frequency)	2010-2012 Annual Design Value (µg/m³)
		2010	2011	2012			
Meridian St. Luke's	Ada 160010010	12	29	41/22	27/21	1:3 **(1:3)**	6.7/6.4
St. Maries	Benewah 160090010	27	29	27	28	1:6 **(1:6)**	8.9
Nampa Fire Station	Canyon 160270002	15	23	27/25	22/21	1:6 **(1:6)**	8.4/8.2
Franklin	Franklin 160410001	70*	40	32/16	47/42	1:6 **(1:3)**	10.3*/10.1*
Salmon	Lemhi 160590004	35	37	154/34	75/35	1:1 **(1:1)**	15.0/11.4
Pinehurst	Shoshone 160790017	36	43	36/35	38/38	1:1 **(1:1)**	12.1/11.7

Notes:
1- A monitor violates the 24-hour $PM_{2.5}$ NAAQS if the 3-year average of the annual 98th percentile 24-hour average exceeds 35 µg/m³. The annual $PM_{2.5}$ NAAQS is violated if the 3-year average of the annual arithmetic mean exceeds 15 µg/m³.
2- Values not meeting data completeness criteria are marked with an asterisk ("*").
3- See figure 3-7 for an explanation of required monitoring/sampling frequencies.
4- NCore monitors are required to operate every third day.
5- 2012 98th percentile concentrations are shown with/without exceptional event data included.
6- 2010-2012 Annual Design Values are shown with/without exceptional event data included.

2010 – 2012 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)
		2010	2011	2012	
Twin Falls	Twin Falls 160830010	13	15	21	16
Moscow	Latah 160570005	11	15	23	16
Grangeville	Idaho 160490002	11	8*	24	14
Lewiston	Nez Perce 160690012	18	15	21	18
Sandpoint	Bonner 160170005	14	13	14	14
Pocatello G&G	Bannock 160050015	10	14	24	16
McCall	Valley 160850002	14	20	32	22
Lancaster	Kootenai 160550003	11	12*	16	13
Ketchum	Blaine 160130004	6	9	28	15
Idaho Falls - Penford	Bonneville 160190011	10	10	24	15
Idaho City	Boise 160150001	17	17	25	20
Garden Valley	Boise 160150002	11	11*	24	15

Notes: 1- Data is "non-regulatory" due to special purpose monitor type
2- Monitors not meeting data completeness requirements are marked with an asterisk ("*").
3- Daily values >35 µg/m^3 in 2012 that were affected by exceptional event wildfires were removed from DV determination(s).

2010-2012 O_3 Design Values

Site	County/ AIRS ID	4th – Highest Daily Maximum 8-hour Average (ppm)			3-year Design Value (ppm)
		2010	2011	2012	
Boise White Pine	Ada 160010017	0.069	0.062	0.070	0.067
Lancaster	Kootenai 160550003	0.056	0.058	Monitoring terminated	Insufficient data
Meridian St. Luke's	Ada 160010010	0.067	0.069*	0.073	0.70*
Boise ITD	Ada 160010019	0.064	0.060	Monitoring terminated	Insufficient data

Notes: 1- A monitor violates the 8-hour ozone NAAQS if the 3-year average of the annual 4th daily maximum average exceeds 0.075 ppm.
2- Monitors not meeting data completeness requirements are marked with an asterisk ("*").

2010-2012 PM_{10} Design Values

Site	County/ AQS ID	Estimated Exceedances			3-year Estimated Exceedances
		2010	2011	2012	
Sandpoint	Bonner 160170005	1.00*	0.00	0.00	0.3*
Pinehurst	Shoshone 160790017	1.01	0.00	0.00	0.3
Nampa	Canyon 160270002	0.00	1.00**	1.03**	0.7**
Boise	Ada 160010009	0.00	2.14**	2.00**	1.3**
Pocatello PM_{10} TEOM	Bannock 160050015	0.00	0.00	2.08**	0.7**

Notes: 1- A monitor violates the 24-hour PM_{10} NAAQS if the 3-year average of estimated exceedances (>150 µg/m^3) is more greater than 1.
2- Monitors not meeting data completeness requirements are marked with an asterisk ("*").
3- Data has been flagged for Exceptional Event – High Wind Events**.

2010- 2012 CO Design Values

Site	County/ AQS ID	1st / 2nd Highest 1-hour Average (ppm)		
		2010	2011	2012
Boise Eastman	Ada 160010014	28.1/7.5*	20.4/8.7	23.1/2.3
Meridian St. Luke's	Ada 160010010	1.3/1.2	1.4/1.4	1.3/1.1
Meridian Near - Road	Ada 160010023	Not Monitored	Not Monitored	2.7/2.6

Notes: 1- A monitor violates the 1- hour CO NAAQS if it exceeds 35 ppm more than once per year.
2- Monitors not meeting data completeness requirements are marked with an asterisk ("*").

Site	County/ AQS ID	1st / 2nd Highest 8-hour Average (ppm)		
		2010	2011	2012
Boise Eastman	Ada 160010014	5.8/2.3*	4.5/1.6	3.5/1.6
Meridian St. Luke's	Ada 160010010	0.8/0.8	1.0/0.8	0.9/0.8
Meridian Near - Road	Ada 160010023	Not Monitored	Not Monitored	1.3/1.0

Notes: 1- A monitor violates the 8- hour CO NAAQS if it exceeds 9 ppm more than once per year.
2- Monitors not meeting data completeness requirements are marked with an asterisk ("*").

2010- 2012 SO_2 Design Values

Site	County/ AIRS ID	99th Percentile – Highest Daily Maximum 1-hour Average (ppb)			3-year Design Value (ppb)
		2010	2011	2012	
Pocatello STP	Bannock 160050004	53	75*	73	67*
Soda Springs	Caribou 160290031	76	53	35	55
Meridian St. Luke's	Ada 160010010	3	8	6	6

Notes: 1- A monitor violates the 1- hour SO_2 NAAQS if the 3-year average of the annual 99th percentile highest daily maximum 1-hour averages exceeds 75 ppb
2- Monitors not meeting data completeness requirements are marked with an asterisk ("*").

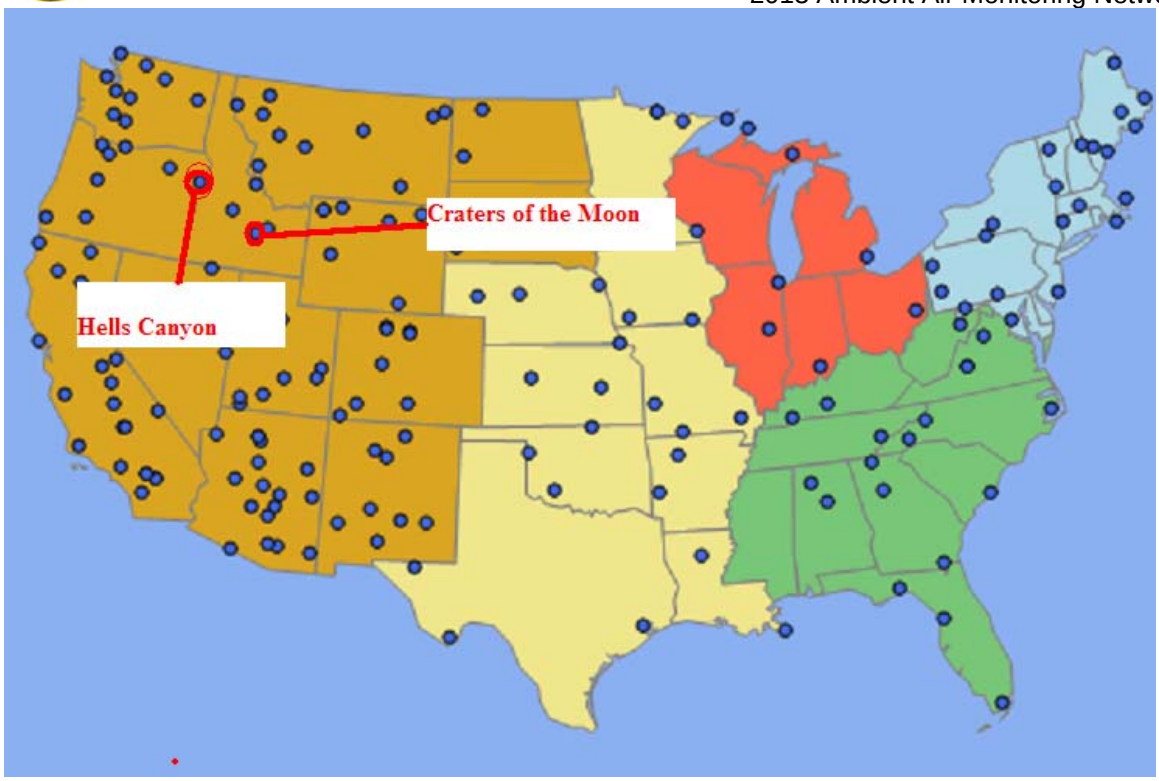
2010- 2012 NO_2 Design Values

Site	County/ AIRS ID	98th Percentile – Highest Daily Maximum 1-hour Average (ppb)			3-year Design Value (ppb)
		2010	2011	2012	
Meridian Near-road	Ada 160010023	Not Monitored	Not Monitored	44*	Insufficient data
Meridian St. Luke's	Ada 160010010	45	36*	Not Monitored	Insufficient data
ITD Boise	Ada 160010019	37*	Not Monitored	Not Monitored	Insufficient data
Coeur d' Alene Lancaster	Kootenai 160550003	16*	Not Monitored	Not Monitored	Insufficient data

Notes: 1- A monitor violates the 1- hour NO_2 NAAQS if the 3-year average of the annual 98th percentile highest daily maximum 1-hour averages exceeds 100 ppb
2- Monitors not meeting data completeness requirements are marked with an asterisk ("*").

APPENDIX B

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



IMPROVE Monitoring Network

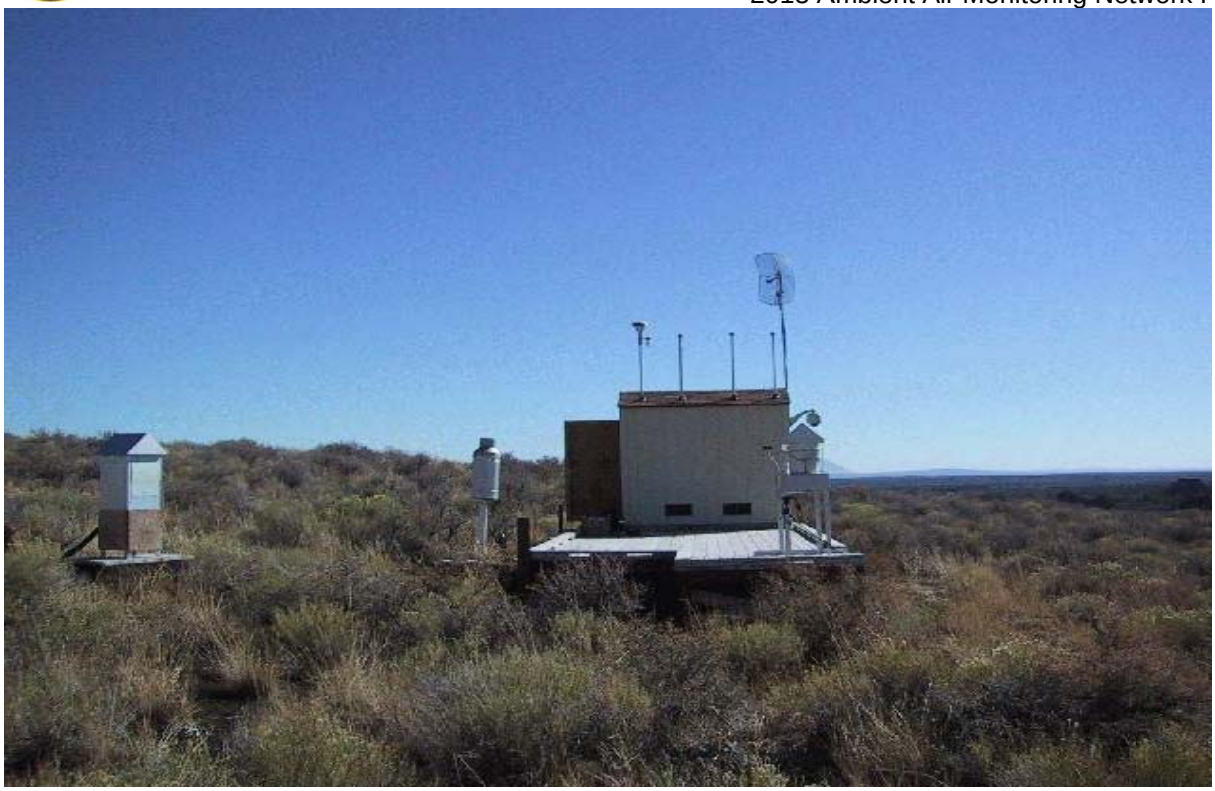
DEQ is leveraging the IMPROVE monitoring network to fulfill requirements for the $PM_{2.5}$ transport (Hell's Canyon) and $PM_{2.5}$ background (Craters of the Moon National Monument) monitoring sites.

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**.**

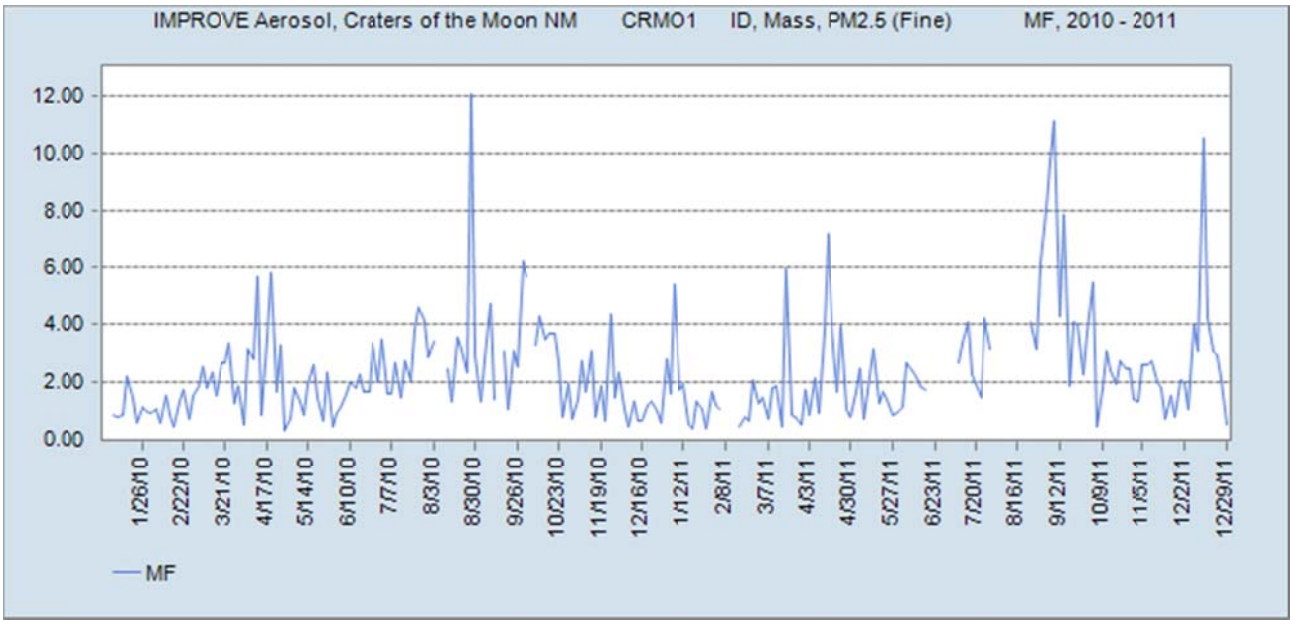
Craters of the Moon

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.



2010-2011 $PM_{2.5}$ measured at Craters of the Moon IMPROVE site.

The graph above shows the typical background concentration of $PM_{2.5}$ of 1-6 µg/m^3. On occasion the monitor is impacted by smoke from regional fires and other burning activities.

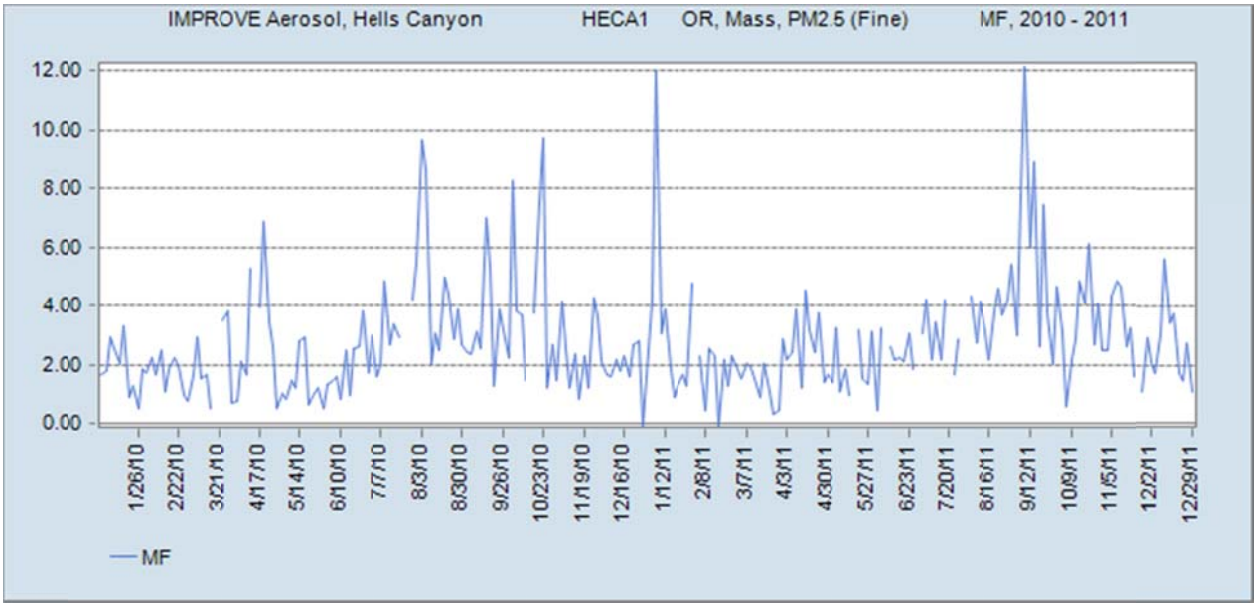
Hells Canyon

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 2010-2011. Typical transport concentrations of 2-6 µg/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.



2010-2011 $PM_{2.5}$ measured at Hell's Canyon IMPROVE site.

APPENDIX C

SPECIAL STUDIES

&

NEW SITE DEVELOPMENT FORMS

State of Idaho
DEPARTMENT OF ENVIRONMENTAL QUALITY

Report on results of the Sandpoint PM_{10} TEOM Monitor Re-location Study Sandpoint Idaho

Shawn Sweetapple, Project Coordinator	4/9/13 Date
Mark Boyle, Project Manager	4/9/13 Date
Steve Miller, Quality Assurance Officer	4/10/13 Date

1. Introduction

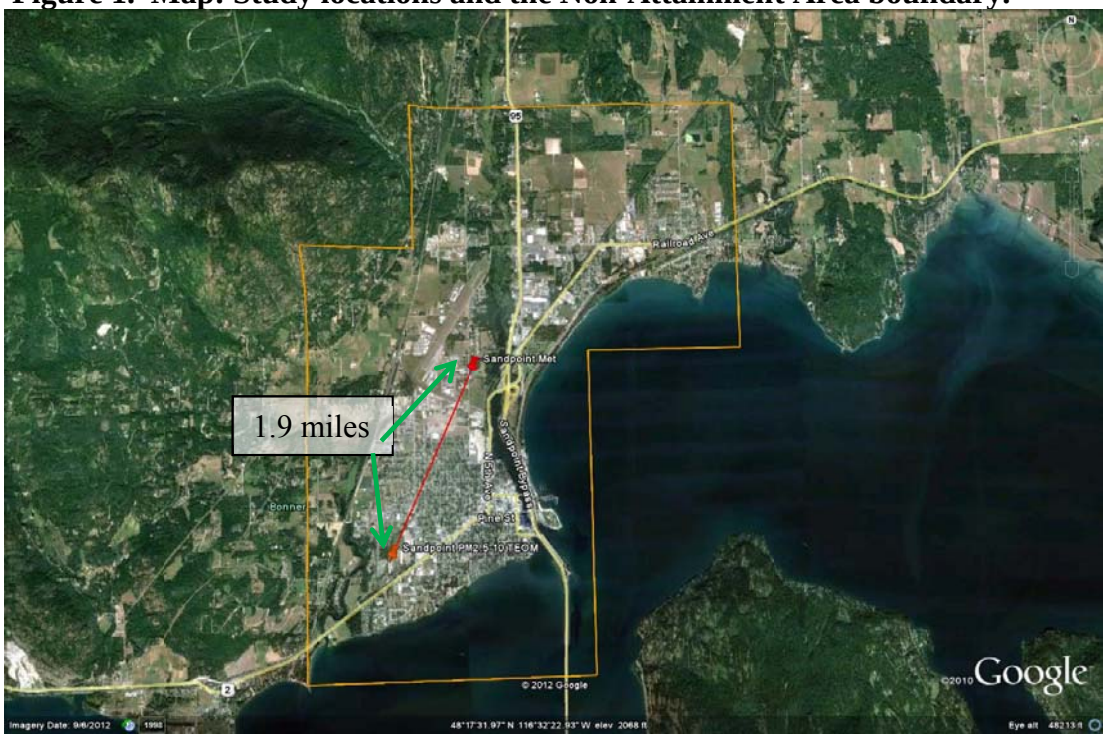
The Coeur d'Alene Regional Office USFS PM10 TEOM sampling site in Sandpoint is being considered for consolidation to the University of Idaho Extension Property (U of I) where a meteorological monitoring station has been operated for several years. This location will also accommodate the PM2.5 TEOM which will complete the sampling array. Establishing the PM10 TEOM and PM2.5 TEOM at this location is expected to increase operational efficiencies and limit data acquisition investment needs. The study was conducted as described in the document Field Sampling Plan for Sandpoint PM_{10} TEOM Monitor Re-location Study (TRIM #2012AAY4). The University of Idaho Extension Property Meteorological site is 1.9 miles to the north-northeast of the USFS TEOM site. The U of I site is on North Boyer Road which is just north of the city's main residential population. The proposed site is approximately 80' directly east of the nearest lane of traffic on North Boyer Road. For a thorough site description of the U of I monitoring site refer to TRIM Doc # 2010ABC7 *CRO Sandpoint Met Site Assessment*.

The objectives identified in the Field Sampling Plan for Sandpoint PM_{10} TEOM Monitor Re-location Study were; to characterize dual PM_{10} TEOM values spatially and temporally, to characterize dual PM_{10} TEOM ratios at the USFS and U of I sampling sites to determine any limiting factors, and to assess transport characteristics of the airshed. The data collection efforts of this study met the original objectives.

Based upon the results of the site comparison study DEQ-CRO proposes relocating the Sandpoint PM10 TEOM from its present location at the USFS Sandpoint Regional Office to our University of Idaho Extension Property Meteorological site.

The site map below (Figure 1) presents both sampling locations and the Sandpoint NAA Boundary. The distance between the sites measured along the red line in figure 1 is 1.9 miles as measured by Google Earth software tools. The proposed site is located north northeast of the current site.

Figure 1. Map: Study locations and the Non-Attainment Area boundary.



2. Study Irregularities

During a period from 1/18/13 to 3/13/13 the ambient temperature probe on the SP1 TEOM began malfunctioning periodically. The malfunction resulted in periods of time when the SP1 TEOM measured ambient temperature was likely higher than the true ambient temperature. This is a concern because the temperature probe of the TEOM is used to determine control of the TEOM's mass flow meters. Concentrations recorded for any period when the malfunction was occurring could have been affected. The ambient temperature data was not being saved in the TEOM datalogger until just a few days before the temperature probe was replaced, so it is impossible to objectively quantify the effect on the concentrations during the period of malfunction. Subjectively comparing the data between the two TEOMs during this period shows the SP1 values were lower than the SP1 MET. Comparisons of the data from the two sites were completed. This examination included using the period of time when the temperature probe may have been malfunctioning and excluded any period of time when the temperature probe may have been malfunctioning.

3. Data Presentation

The following graphs and scatterplots were created using daily data from the Sandpoint PM10 monitor located at the USFS storage yard (SP1) and from a PM10 monitor at the proposed new U of I site (SP1 MET). The data are for the period 11/27/12 to 3/31/13. All graphs and scatterplots in this report use 24 hour average data.

The table of statistics below suggests the monitor at the proposed site (SP1 MET) tends to have slightly higher readings than the monitor at the current site (SP1). This minor disparity was predicted because the proposed site is located more downwind from any sources initiating from activity in the City of Sandpoint and is closer to a roadway. The data collected appears to confirm the proposed site will better characterize any influence from within the PM10 Limited Maintenance Plan Area as well as any transport influences.

Table 1. General statistics from the dataset.

All Data		
	SP1	SP1 MET
Mean	9.0	11.2
Median	8.1	9.8
Standard Deviation	3.9	5.5
Range (Max minus Min)	19.7	29.8
Minimum	3.5	3.8
Maximum	23.2	33.6
Sum	1060.3	1320.7
Count	124	124
Without Uncertain Data		
Mean	7.4	9.1
Median	6.7	8.0
Standard Deviation	2.9	3.9
Range (Max minus Min)	12.4	17.1
Minimum	3.5	4.0
Maximum	15.9	21.1
Sum	468.6	572.2
Count	69	69

This windrose below (Figure 2) was generated using data from the time period of this study. The MET tower that collected this data is located at the proposed site on the U of I property. The results are very representative of the yearly windrose presented in the original Field Sampling Plan (Figure 3). This suggests the use of the abbreviated study data to correlate the two sites is acceptable.

Figure 2. Windrose of the period of the study at the U of site.

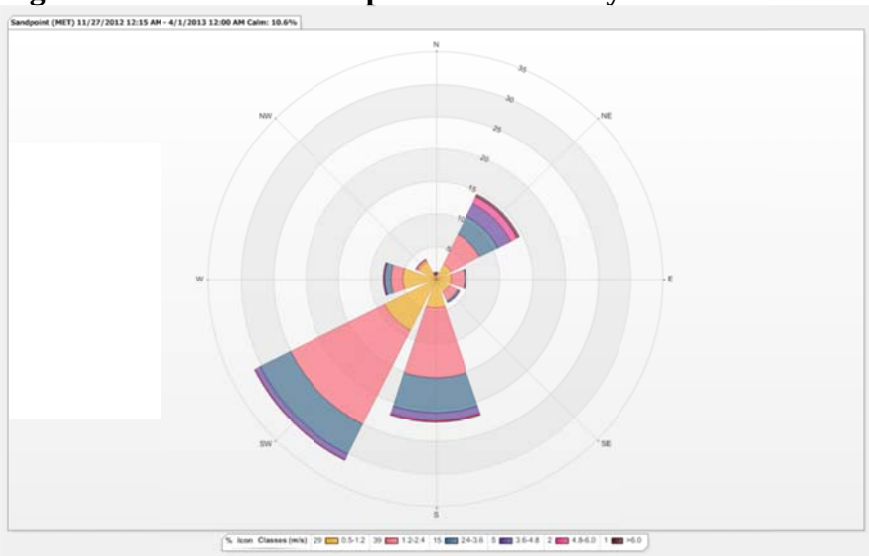
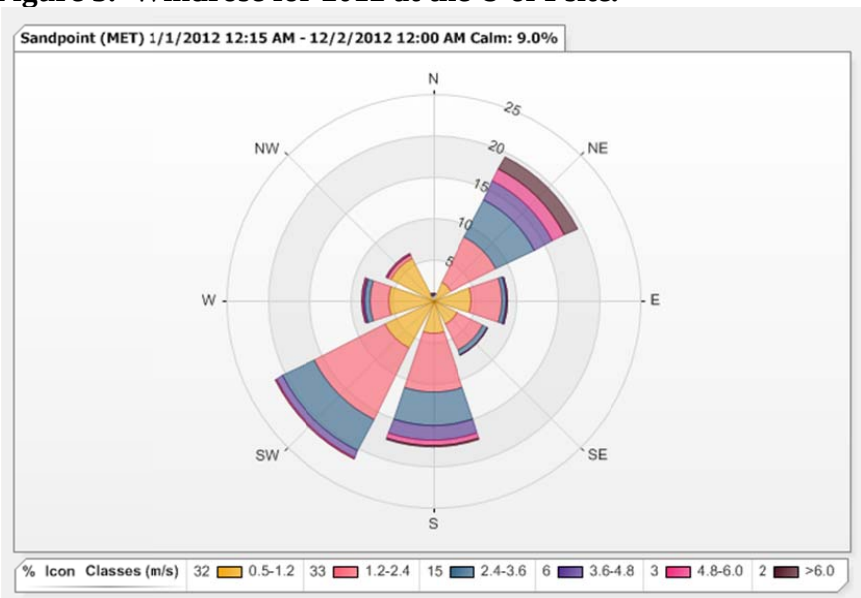


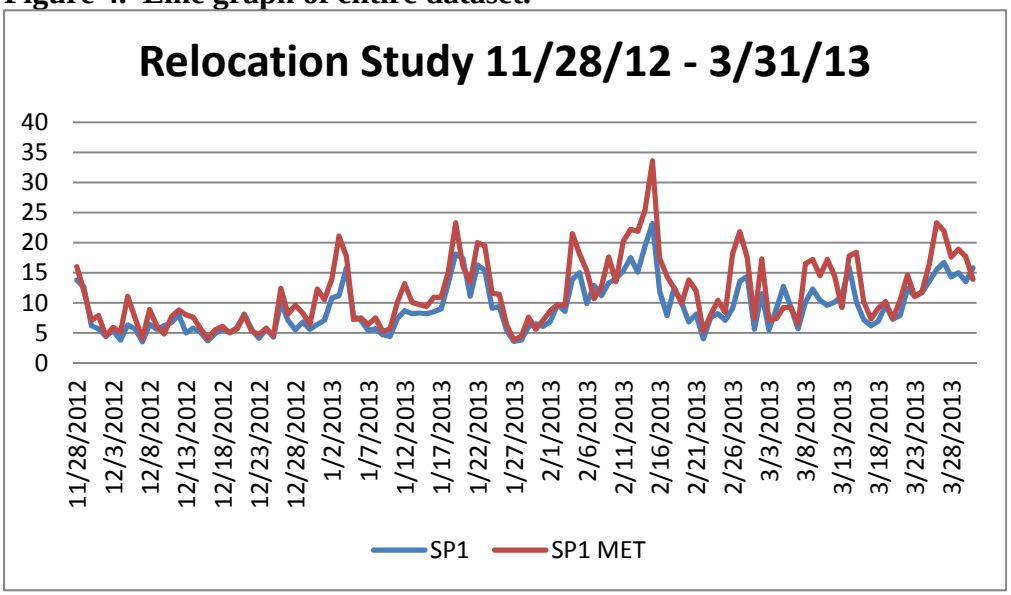
Figure 3. Windrose for 2012 at the U of I site.



The graph below (Figure 4) displays not only the quantitative, but also the temporal relationship between the two monitors over the course of the study. The mirroring of highs and lows represents a parallel in the concentrations between the two spatially separated monitoring locations. The mirroring also shows a temporal parallel in that concentrations change in the same direction at the same time at

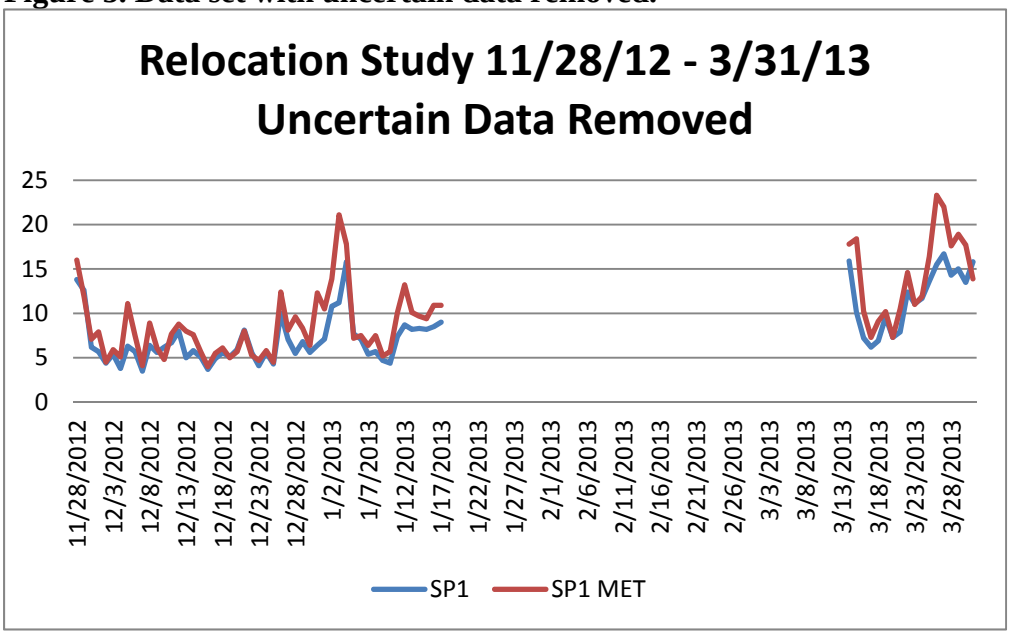
both sites. The SP1 MET line being higher than the SP1 line correlates to the higher concentrations expected at the site more directly downwind of the developed areas and nearer a roadway.

Figure 4. Line graph of entire dataset.



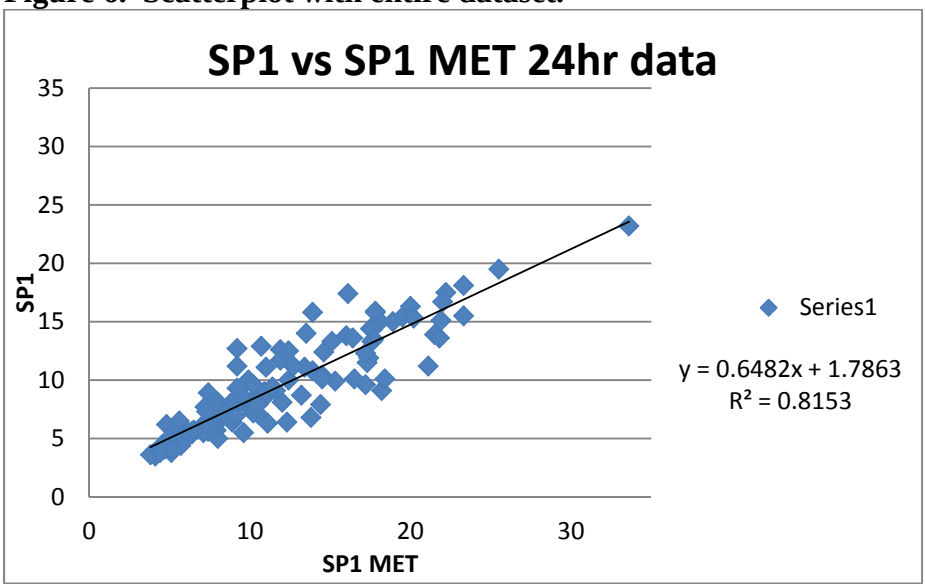
The following graphic illustrates the period of data when the temperature probe was malfunctioning.

Figure 5. Data set with uncertain data removed.



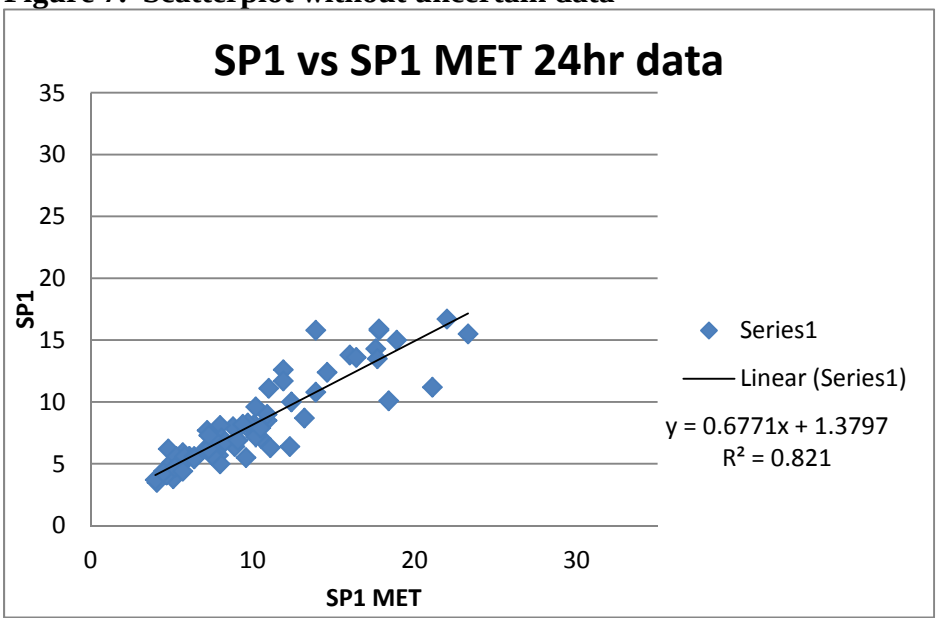
The scatter plot below (Figure 6) depicts all 124 data pairs collected during the comparison study and the resulting regression. The results are generally linear with a good R squared. This level of linearity can be expected between two sites that are spatially separate because they will have slightly different influences on local concentrations. The intercept of 1.7863 again confirms our hypothesis that the SP1 MET site would produce slightly higher concentrations than the SP1 site during periods of predominant wind direction.

Figure 6. Scatterplot with entire dataset.



The next plot (Figure 7) presents the data again, this time with the uncertain data removed leaving 69 pairs available for the analysis. The results are very similar to the complete dataset.

Figure 7. Scatterplot without uncertain data



4. Conclusion

The data from this study, as presented and interpreted by the Coeur d'Alene Regional Office, supports the relocation of the PM monitoring site in the Sandpoint area to the University of Idaho Extension Property site. Coeur d'Alene Regional Office proposes relocating the Sandpoint PM10 TEOM from its present location at the USFS Sandpoint Regional Office to our University of Idaho Extension Property Meteorological site 1.9 miles to the north-northeast on Boyer Road and just north of the city's main residential population. This location is more centrally located within the current PM10 Limited Maintenance Plan Attainment Area boundaries. The U of I site will result in data that represents the air quality of the area at least as well as the current site and support consolidation of efforts. The PM2.5 TEOM will also be relocated to the U of I site. A PM2.5 saturation study was conducted in Sandpoint during calendar year 2000. The results indicated PM2.5 concentrations in this airshed were very homogenous (See TRIM Doc # 2013AAY23). These results were considered when determining the acceptability of relocating the Sandpoint PM2.5 Special Purpose Monitor to the U of I site.

SUMMARY OF SANDPOINT U of I SITING CRITERIA

EVALUATION OF PM_{10} SITE CONFORMANCE WITH APPENDIX E REQUIREMENTS

PM_{10} SITE EVALUATION SUMMARY

Site Name: Proposed Sandpoint PM10 U of I Site
Year Site Established: 2013
AQS Site ID:
Scale: Neighborhood
Site Address: 2105 North Boyer Ave
City & State: Sandpoint, ID
County: Bonners
Time Zone: Pacific
Site Coordinates (Decimal degree format):
Elevation:
Latitude (± nn.nnnnnn): +48.292141
Longitude (± nnn.nnnnnn): -116.556656
Method of Collection: Google Earth
Reference Datum: World Geodetic System of 1984
Elevation (meters above Mean Sea Level): 645m
Method of Collection: GPS
Reference Datum: WGS84
Reason for Evaluation: New Site
Observations by: Shawn Sweetapple
Date: 4/10/13

CRITERIA [a]	REQUIREMENTS [a]	OBSERVED [b]	CRITERIA MET?	
			Yes	No
Probe Height Above Ground Level (AGL)	2–15 meters AGL (neighborhood scale) 2–7 meters AGL (Middle, Micro scale)	2.5m	X	
Horizontal and Vertical Probe Placement	At least 1 meter away from supporting structure, wall, parapets, etc. and away from dusty areas	Free standing enclosures. No supporting structure. No dusty areas.	X	
Spacing from Minor sources	Away from minor sources of PM	Residential and light industrial areas with natural gas and/or wood stove heating > 135 m to the east, north and south.	X	
Spacing from Obstructions	> 2 meters separation from walls, parapets, and structures for rooftop placement	Not on a rooftop.	X	
	Distance must be > twice height of the obstacle protruding above inlet height	Bldg to S = 5 m above inlet/30 m away Trees to E = 5.5 m above inlet/18 m away	X	
	For vertical wall installations, unrestricted air flow in an arc > 180 degrees in the predominant wind direction for the season of greatest pollutant concentration.	Not a vertical wall installation.	X	
Spacing from Trees	> 10 meters from drip-line Source monitoring – no trees between probe and source under investigation	Closest tree drip-line 18 m away		

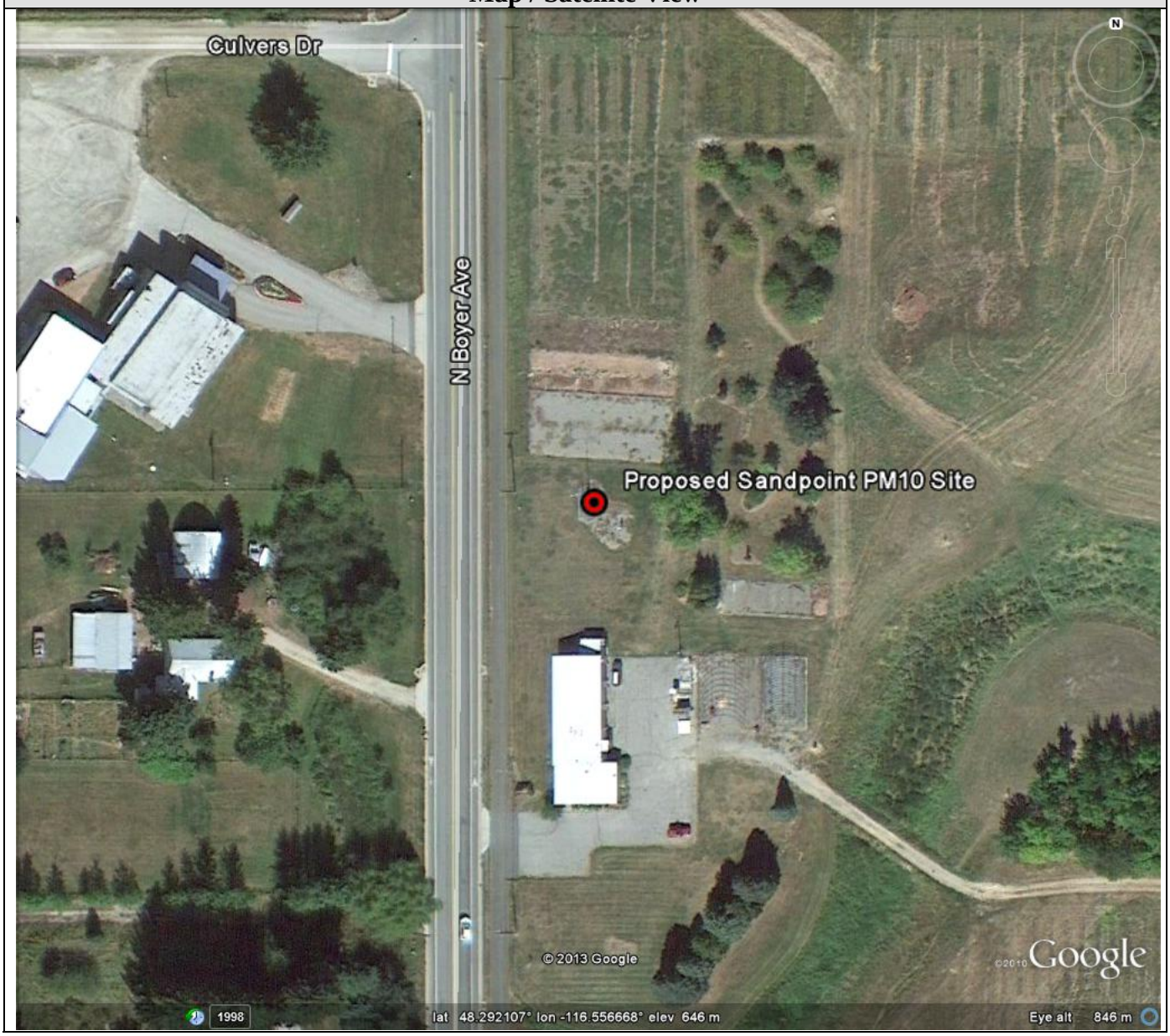
Spacing from roadways	Roadway average daily traffic, vehicles per day. > 10 meters (micro scale) See Supporting information for applicable distance requirements for other scales.	Nearest road is to the west, North Boyer Ave, and has 7000 ADT	X	

a - 40 CFR Part 58, Appendix E
b – "Worst case" observed measurement (i.e. – closest obstacle, nearest source, nearest tree, nearest roadway). Observations by cardinal direction are documented in supporting information following this summary.

EVALUATION OF PM_{10} SITE CONFORMANCE WITH APPENDIX E REQUIREMENTS

PM_{10} SITE EVALUATION SUPPORTING INFORMATION

Map / Satellite View



Map Notes:

EVALUATION OF PM_{10} SITE CONFORMANCE WITH APPENDIX E REQUIREMENTS							
PM_{10} SITE EVALUATION SUPPORTING INFORMATION (continued)							
Predominant Land Use within 100 meters (Industry, Residential, Commercial, Agriculture, Forest, Desert)							
Direction	**Description**						
North	**Agricultural (Agricultural Extension Property)**						
East	**Agricultural (Agricultural Extension Property)**						
South	**Agricultural (Agricultural Extension Property)**						
West	**Residential**						
Topographic Features (hills, valleys, rivers, etc) and General Terrain (flat, rolling, rough)							
Direction	**Description**						
North	**Rolling hills**						
East	**Valley with large lake (Pen Oreille) 1.0 km from site**						
South	**Valley with large lake (Pen Oreille) 3.0 km from site**						
West	**Valley with rolling hills starting 2.1 km from site**						
Obstructions							
Direction	**Description**	**Height** (meters)	**Distance** (meters)				
North	**No obstacles**	**-**	**-**				
East	**Trees**	**8 m**	**18 m**				
South	**U of I shop building**	**5 m**	**31 m**				
West	**No obstacles**	**-**	**-**				
Roadways							
Direction	**Road Name**	**Distance** (meters) **from Site** (from nearest traffic lane)	**Vehicle Count** (average daily traffic, vehicles per day)	**Year of Traffic Count**			
North	**East Mountain View Road**	**164 m**	**No count**	**-**			
East	**Hwy 95**	**533 m**	**14500 ADT**	**2008**			
South	**Larch St**	**1310 m**	**No count**	**-**			
West	**North Boyer Avenue**	**22 m**	**7000 ADT**	**2008**			
Instruments installed at Site (at time of Evaluation) *A separate site assessment must be prepared for each pollutant measured at the site. Site requirements are often similar but there are pollutant-specific variations.* **Co-located (precision) instruments must be between 2 and 4 meters apart from each other**							
Manufacturer	**Model**	**Serial Num.**	**DEQ Tag Number**	**Pollutant**	**Sampling Frequency**	**Monitor Objective**	**Project Class**

R & P	**1400AB**	**140AB-24063-0204**	**300568**	**PM2.5**	**Continuous**	**AQI**	
Thermo Electron	**1400AB**	**140AB-27405-0812**	**303048**	**PM10**	**Continuous**	**AQI PM10 SIP PM10 NAAQS**	

EVALUATION OF PM_{10} SITE CONFORMANCE WITH APPENDIX E REQUIREMENTS

PM_{10} SITE EVALUATION SUPPORTING INFORMATION (continued)

Photographs in each cardinal direction (FROM SITE)
Include site in photograph if possible

Direction	
North	
East	
South	

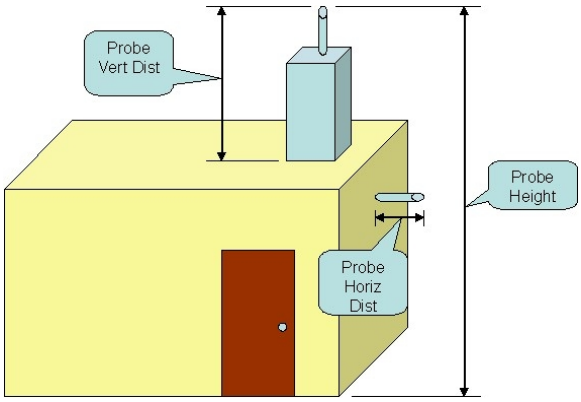
West	

Form Guidance / Additional information:

1. AQS Site ID and Scale (Micro / Neighborhood / Urban / Regional) will be provided by the state office.
   Micro: Area of impact is 0 – 100 m from monitor
   Middle: Area of impact is 100 – 500 m from monitor
   Neighborhood: Area of impact is 500 – 4km from monitor
   Urban: Area of impact is 4 km – 50 km from monitor
   Regional: Area of impact is 50 – 100s km from monitor

2. Potential local sources to consider (not exhaustive):
   a. Mobile emission sources
   b. Woodstoves
   c. Fugitive dust sources

3. Definitions (probe placement terms):



4. Vehicle Count Criteria

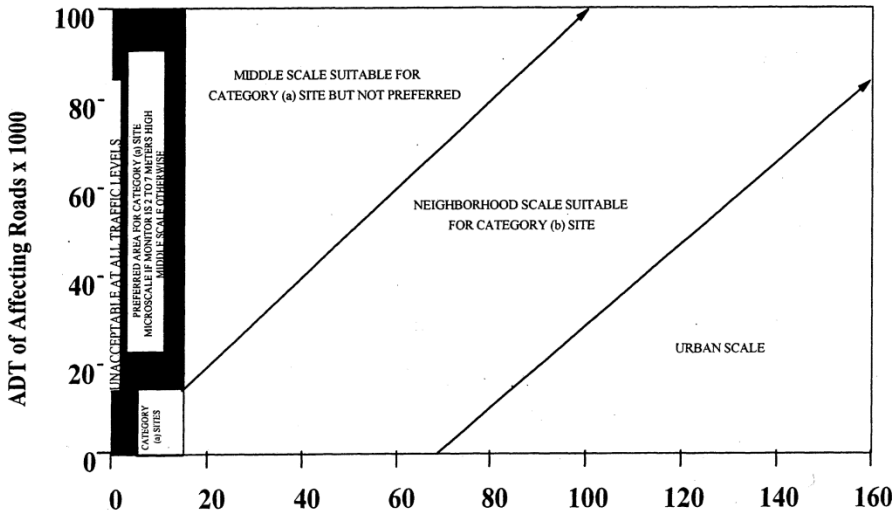


Figure E-1. Distance of PM samplers to nearest traffic lane (meters)

5. More Terms

Monitor Objective: Background, quality assurance, highest concentration, population exposure, source-oriented, extreme downwind

Monitor objective classifies the reason for the air monitoring.

Project Class: Background, population based, source-oriented, special studies, episode monitoring, etc

Project class describes the type of monitoring performed by the monitor.

6. Trim Filing Instructions

Record Type – AQ MMEI Monitoring Monitor and Site Document
Doc Type – Site Document
Monitory Type – Select type of monitor, "Multiple" or "All" as appropriate
Monitor Site – Select appropriate site
File Naming Convention – PM10_Assessment_SiteName_2010.doc

SUMMARY OF ST. MARIES $PM_{2.5}$ SITING CRITERIA

EVALUATION OF $PM_{2.5}$ SITE CONFORMANCE WITH APPENDIX E REQUIREMENTS

$PM_{2.5}$ SITE EVALUATION SUMMARY

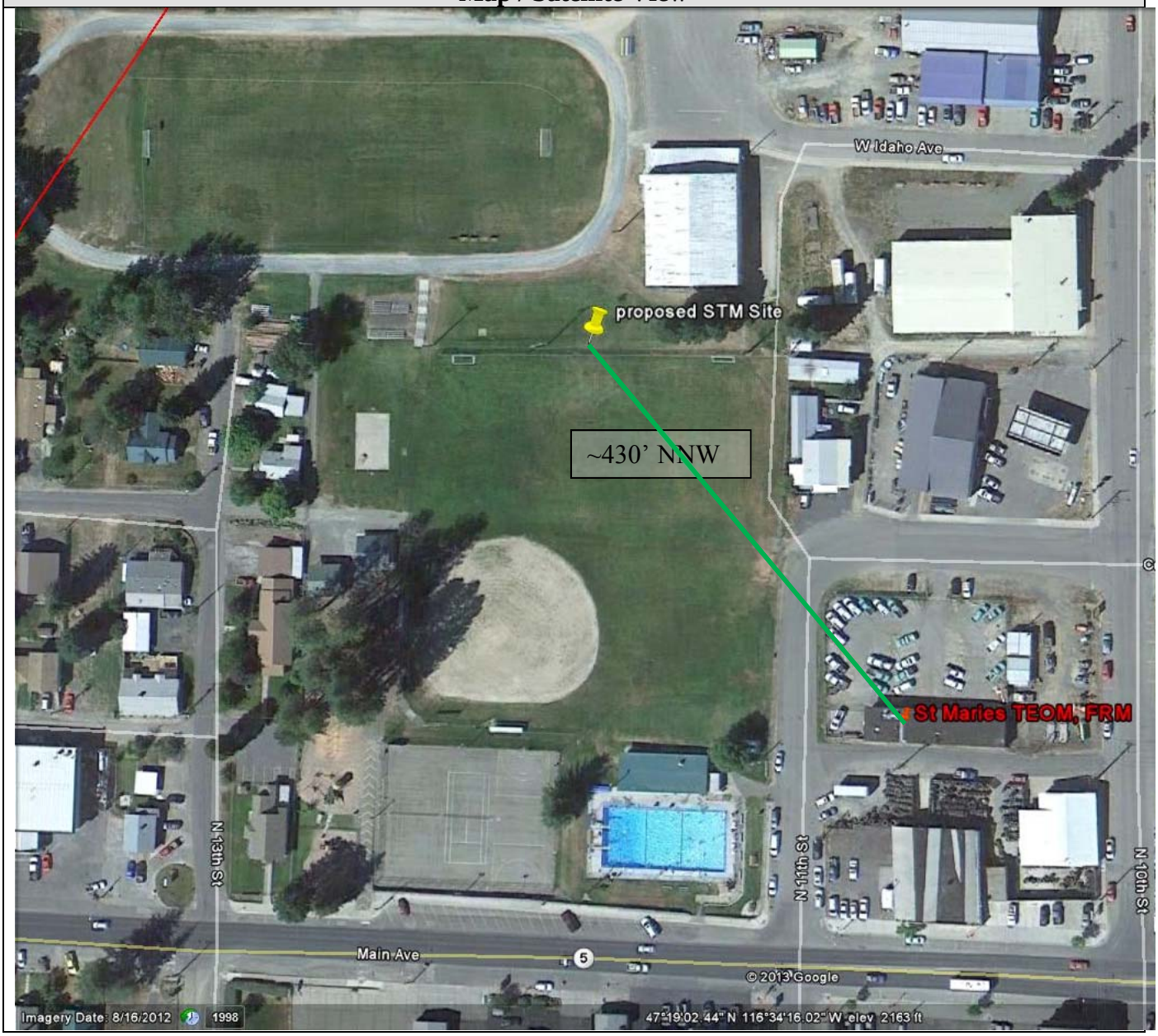
Site Name: Proposed St Maries PM2.5 Site
Year Site Established: 2013
AQS Site ID:
Scale: Neighborhood
Site Address: City Park
City & State: St Maries, ID
County: Benewah
Time Zone: Pacific
Site Coordinates (Decimal degree format):
Elevation: 2158 m
Latitude (± nn.nnnnnn): +47.317771
Longitude (± nnn.nnnnnn): -116.571858
Method of Collection: Google Earth
Reference Datum: WGS84 (GPS systems)
Elevation (meters above Mean Sea Level): 2158 m
Method of Collection: Google Earth
Reference Datum: North American Vertical Datum of 1988
Reason for Evaluation: New Site
Observations by: Shawn Sweetapple
Date: 3/21/13

CRITERIA [a]	REQUIREMENTS [a]	OBSERVED [b]	CRITERIA MET?	
			Yes	No
Probe Height Above Ground Level (AGL)	2–15 meters AGL (neighborhood scale) 2–7 meters AGL (Middle, Micro scale)	FRM – 2.5 m 1405F – 3.5 m	X	
Horizontal and Vertical Probe Placement	At least 1 meter away from supporting structure, wall, parapets, etc. and away from dusty areas	Free standing enclosures. No supporting structure.	X	
Spacing from Minor sources	Away from minor sources of PM	Residential and light industrial areas with natural gas and/or wood stove heating > 70 m to the east and west.	X	
Spacing from Obstructions	> 2 meters separation from walls, parapets, and structures for rooftop placement Distance must be > twice height of the obstacle protruding above inlet height For vertical wall installations, unrestricted air flow in an arc > 180 degrees in the predominant wind direction for the season of greatest pollutant concentration.	Not on a rooftop. Bldg to NE = 5 m height/28 m away Trees to ENE = 7 m tall/26 m away Not a vertical wall installation.	X X X	
Spacing from Trees	> 10 meters from drip-line Source monitoring – no trees between probe and source under investigation	Closest tree drip-line 26 m away	X	
Spacing from roadways	Roadway average daily traffic, vehicles per day. > 10 meters (micro scale)	No traffic counts available. The nearest busy road is Hwy 5 at 88 m. Neighborhood	X	

	See Supporting information for applicable distance requirements for other scales.	scale would allow up to 85K ADT.		

a - 40 CFR Part 58, Appendix E
b – "Worst case" observed measurement (i.e. – closest obstacle, nearest source, nearest tree, nearest roadway). Observations by cardinal direction are documented in supporting information following this summary.

EVALUATION OF $PM_{2.5}$ SITE CONFORMANCE WITH APPENDIX E REQUIREMENTS
$PM_{2.5}$ SITE EVALUATION SUPPORTING INFORMATION
Map / Satellite View



Map Notes:

EVALUATION OF $PM_{2.5}$ SITE CONFORMANCE WITH APPENDIX E REQUIREMENTS							
$PM_{2.5}$ SITE EVALUATION SUPPORTING INFORMATION (continued)							
Predominant Land Use within 100 meters (Industry, Residential, Commercial, Agriculture, Forest, Desert)							
Direction	**Description**						
North	**Baseball/Sports Complex**						
East	**Light industrial**						
South	**Baseball park**						
West	**Residential**						
Topographic Features (hills, valleys, rivers, etc) and General Terrain (flat, rolling, rough)							
Direction	**Description**						
North	**River plain to foothills. Foothills start at 1000 m.**						
East	**River plain for 1500 m then hilly.**						
South	**Uphill for 710 m then rolling foothills.**						
West	**Slightly rolling river plain.**						
Obstructions							
Direction	**Description**	**Height** (meters)	**Distance** (meters)				
North	**Building**	**5 m above inlet**	**38 m**				
East	**Trees**	**3.5 m above inlet**	**26 m**				
South	**Trees to SW**	**23 m above inlet**	**95 m**				
West	**Trees**	**6 m above inlet**	**63 m**				
Roadways							
Direction	**Road Name**	**Distance** (meters) **from Site** (from nearest traffic lane)	**Vehicle Count** (average daily traffic, vehicles per day)	**Year of Traffic Count**			
North	**State Hwy 3**	**517 m**					
East	**N 10th St**	**148 m**					
South	**Main Ave/ State Hwy 5**	**156 m**					
West	**N 13th St**	**88 m**					
Instruments installed at Site (at time of Evaluation) *A separate site assessment must be prepared for each pollutant measured at the site. Site requirements are often similar but there are pollutant-specific variations.* **Co-located (precision) instruments must be between 2 and 4 meters apart from each other**							
Manufacturer	**Model**	**Serial Num.**	**DEQ Tag**	**Pollutant**	**Sampling Frequency**	**Monitor Objective**	**Project Class**

			Number				
Thermo	**2025**	**2025B2 24960**	**303054**	**PM 2.5**	**1/6**		
Thermo	**1405F**	**1405A2 194112 04**	**400389**	**PM 2.5**	**Continuous**		

EVALUATION OF $PM_{2.5}$ SITE CONFORMANCE WITH APPENDIX E REQUIREMENTS	
$PM_{2.5}$ SITE EVALUATION SUPPORTING INFORMATION (continued)	
Photographs in each cardinal direction (FROM SITE) Include site in photograph if possible	
Direction	
North	NA at this time
East	NA at this time
South	NA at this time

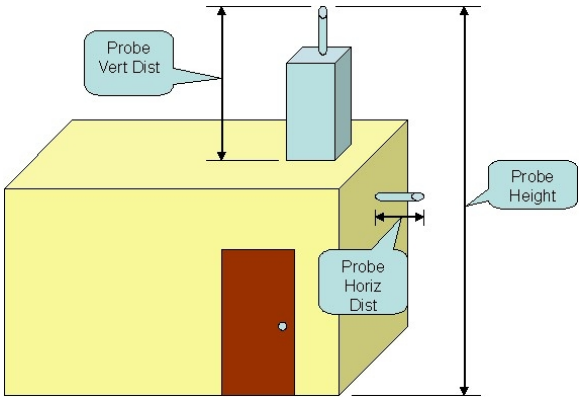
West	NA at this time

Form Guidance / Additional information:

1. AQS Site ID and Scale (Micro / Neighborhood / Urban / Regional) will be provided by the state office.
   Micro: Area of impact is 0 – 100 m from monitor
   Middle: Area of impact is 100 – 500 m from monitor
   Neighborhood: Area of impact is 500 – 4km from monitor
   Urban: Area of impact is 4 km – 50 km from monitor
   Regional: Area of impact is 50 – 100s km from monitor

2. Potential local sources to consider (not exhaustive):
   a. Mobile emission sources
   b. "Major" Facilities
   c. Woodstoves
   d. Open Burning/Prescribed Fire
   e. Fugitive dust sources

3. Definitions (probe placement terms):



4. Vehicle Count Criteria

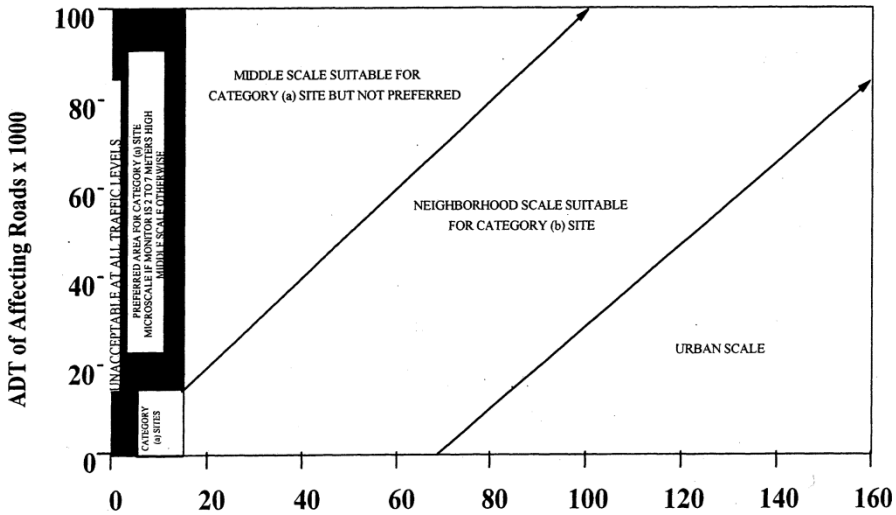


Figure E-1. Distance of PM samplers to nearest traffic lane (meters)

5. More Terms

Monitor Objective: population exposure

Project Class: population based

6. Trim Filing Instructions

Record Type – AQ MMEI Monitoring Monitor and Site Document
Doc Type – Site Document
Monitory Type – Select type of monitor, "Multiple" or "All" as appropriate
Monitor Site – Select appropriate site
File Naming Convention – PM25 Site Assessment SiteName Year

EXAMPLE OF NCORE POLLUTANT-SPECIFIC SITING FORM

EVALUATION OF OXIDES OF NITROGEN SITE CONFORMANCE WITH APP. E REQUIREMENTS

Oxides of Nitrogen (NO, NO_2, NO_x, NO_y) SITE EVALUATION SUMMARY

Site Name: St. Luke's Meridian NCORE — Year Site Established: 5/1/2013
AQS Site ID: 16-001-0010 — Scale: Neighborhood
Site Address: Eagle Road & I-84
City & State: Meridian, ID — County: Ada
Time Zone: Mountain
Site Coordinates (Decimal degree format): — Elevation: 813 meters
Latitude: +43.600699 — Longitude: -116.347853
Method of Collection: Google Earth
Reference Datum: World Geodetic System of 1984 or WGS84
Elevation (meters above Mean Sea Level): 813 meters
Method of Collection: Google Earth
Reference Datum: North American Vertical Datum of 1988
Reason for Evaluation: Site Relocation
Observations by: Edward Jolly — Date: 5/15/2013

CRITERIA [a]	REQUIREMENTS [a]	OBSERVED [b]	CRITERIA MET?	
			Yes	No
Probe Height Above Ground Level (AGL)	2 -15 meters AGL	9.5 meters	X	
Horizontal and Vertical Probe Placement	At least 1 meter away from supporting structure, wall, parapets, etc. and away from dusty areas	Meets Criteria	X	
Spacing from Minor sources	Away from minor sources of reactive emission sources – consider distance & heights of flues	None Observed	X	
Spacing from Obstructions	Probe distance from obstacle >= twice the height of obstacle. Exception – Street canyons or source-oriented sites	Meets Criteria	X	
	>= 180 degrees of unrestricted airflow AND on windward side during the season with largest pollutant concentration	Meets Criteria	X	
Spacing from Trees	> 10 meters from drip-line Source monitoring – no trees between probe and source under investigation	Meets Criteria	X	
Spacing from roadways	Roadway average daily traffic, vehicles per day. Distance requirement varies by traffic count and year of monitor installation. See Supporting information for applicable distance requirements.	Meets Criteria	X	
Sampling Probe Material	Borosilicate glass or FEP / PTFE Teflon®	PTFE Teflon	X	

Sample residence time	<= 20 seconds	Meets Criteria	X	

a - 40 CFR Part 58, Appendix E
b – "Worst case" observed measurement (i.e. – closest obstacle, nearest source, nearest tree, nearest roadway).
Observations by cardinal direction are documented in supporting information following this summary.

EVALUATION OF OXIDES OF NITROGEN SITE CONFORMANCE WITH APP. E REQUIREMENTS
Oxides of Nitrogen (NO, NO_2, NO_x, NO_y) SITE EVALUATION SUPPORTING INFORMATION
Map / Satellite View

Map Notes:

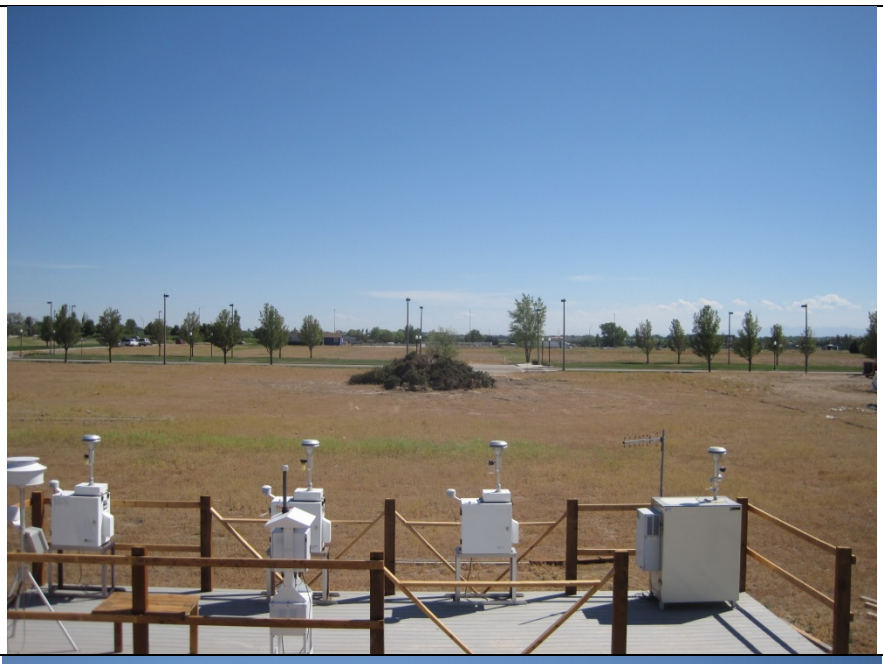
EVALUATION OF OXIDES OF NITROGEN SITE CONFORMANCE WITH APP. E REQUIREMENTS				
Oxides of Nitrogen (NO, NO_2, NO_x, NO_y) SITE EVALUATION SUPPORTING INFORMATION (continued)				
Predominant Land Use within 100 meters (Industry, Residential, Commercial, Agriculture, Forest, Desert)				
Direction	**Description**			
North	**Vacant Commercial Lot**			
East	**Vacant Commercial Lot**			
South	**Vacant Commercial Lot**			
West	**Vacant Commercial Lot**			
Topographic Features (hills, valleys, rivers, etc) and General Terrain (flat, rolling, rough)				
Direction	**Description**			
North	**Flat undeveloped land**			
East	**Flat undeveloped land**			
South	**Flat undeveloped land**			
West	**Flat undeveloped land**			
Obstructions				
Direction	**Description**	**Height** (meters)	**Distance** (meters)	
North	**Medical Office Building (NW)**	**16m**	**183m**	
East	**Touchmark Retirement Community**	**10m**	**220m**	
South	**None**			
West	**St. Luke's RMC**	**28m**	**283m**	
Roadways				
Direction	**Road Name**	**Distance** (meters) **from Site** (from nearest	**Vehicle Count** (average daily traffic, vehicles	**Year of Traffic Count**

		traffic lane)	per day)	
North	**Franklin Road**	**462m**	**15097**	**2009**
East	**South Worth Way**	**70m**		
South	**Interstate 84**	**360m**	**104728**	**2010**
West	**Eagle Road**	**545m**	**57249**	**2011**

Instruments installed at Site (at time of Evaluation)
A separate site assessment must be prepared for each pollutant measured at the site. Site requirements are often similar but there are pollutant-specific variations.

Manufacturer	Model	Serial Num.	DEQ Tag Number	Pollutant	Sampling Frequency	Monitor Objective	Project Class
API	100EU	070		Trace SO2	Cont.	Population Exposure	Pop. Based
API	200EU	107		Trace NOy	Cont.	Population Exposure	Pop. Based
API	300EU	119		Trace CO	Cont.	Population Exposure	Pop. Based
API	400E	1919	303538	Ozone	Cont.	Population Exposure	Pop. Based
Met One	URG	3N-B0819		Chemical Speciation	1 in 3	Population Exposure	Pop. Based
Met One	SASS	V4597		Chemical Speciation	1 in 3	Population Exposure	Pop. Based
Thermo/R&P	2025	2025B213130007		PM10/ Lead	1 in 3	Population Exposure	Pop. Based
Thermo/R&P	2025	2025B223770809		PM10/ Lead	1 in 12	Population Exposure	Pop. Based
Thermo/R&P	2025	2025B213170007		PM2.5	1 in 3	Population Exposure	Pop. Based
Thermo	1400ab	140AB239090201		PM2.5	Cont.	Population Exposure	Pop. Based
Meteorological Station				Meteor-ological	Cont.	Population Exposure	Pop. Based
API	100EU	070		Trace SO2	Cont.	Population Exposure	Pop. Based

EVALUATION OF OXIDES OF NITROGEN SITE CONFORMANCE WITH APP. E REQUIREMENTS	
Oxides of Nitrogen (NO, NO_2, NO_x, NO_y) SITE EVALUATION SUPPORTING INFORMATION (continued)	
Photographs in each cardinal direction (FROM SITE) Include site in photograph if possible	
Direction	
North	
East	

South			
West			

Form Guidance / Additional information:

1. AQS Site ID and Scale (Micro / Neighborhood / Urban / Regional) will be provided by the state office.

   Micro: Area of impact is 0 – 100 m from monitor

   Middle: Area of impact is 100 – 500 m from monitor

   Neighborhood: Area of impact is 500 – 4km from monitor

   Urban: Area of impact is 4 km – 50 km from monitor

   Regional: Area of impact is 50 – 100s km from monitor

2. Potential reactive emission sources to consider (not exhaustive):

   a. Reactive hydrocarbons
   b. Furnace or incineration flues
   c. Trees and physical obstacles – Surface adsorption or reaction

3. Formula to calculate sample residence time:

   Residence time = Total Volume ÷ Flow Rate of all instruments drawing from the sample inlet

   If this is ≤ 20 seconds, the residence time is acceptable.

   Total Volume = Cv +Mv + Lv

   Where:

   Cv = Volume of the sample cane and extensions, cm^3
   Mv = Volume of the sample manifold and trap, cm^3
   Lv = Volume of the instrument lines, cm^3

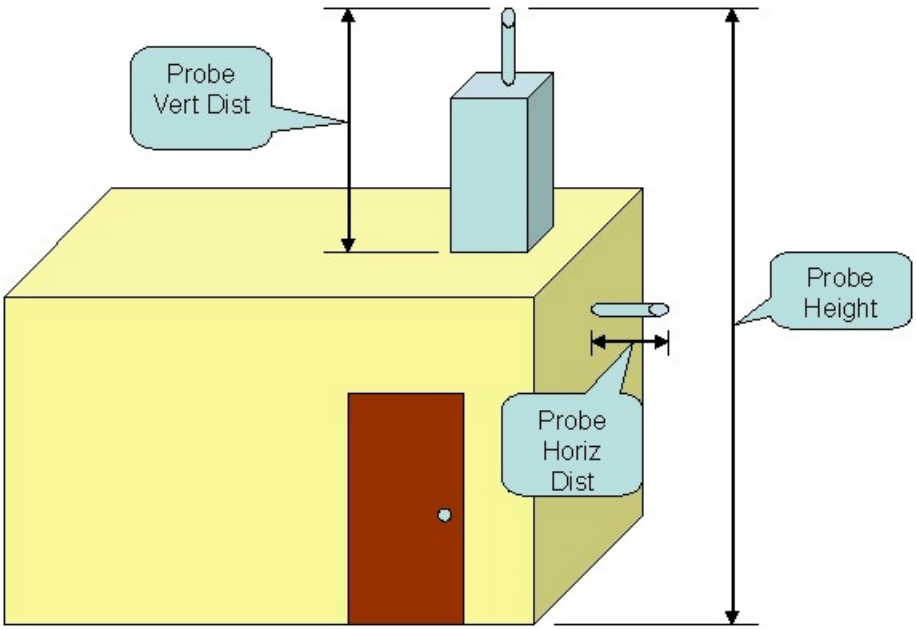
   Each of the components of the sampling system must be measured individually. To measure the volume of the components, use the following calculation:

   $V = pi * (d/2)^2 * L$

   Where:

   V = volume of the component, cm^3
   pi = 3.14159
   L = Length of the component, cm
   d = inside diameter, cm

4. Definitions (probe placement terms):



5. Vehicle Count Criteria

Vehicle Count	Required Distance from site
<=1,000 vehicles	≥ 10 meters [c] ≥ 10 meters [d]
10,000 vehicles	≥ 10 meters [c] ≥ 20 meters [d]
15,000 vehicles	≥ 20 meters [c] ≥ 30 meters [d]
20,000 vehicles	≥ 30 meters [c] ≥ 40 meters [d]
40,000 vehicles	≥ 50 meters [c] ≥ 60 meters [d]
70,000 vehicles	≥ 100 meters [c] ≥ 100 meters [d]
>110,000 vehicles	≥ 250 meters [c] ≥ 250 meters [d]

c – Distance from the edge of the nearest traffic lane.
d – Distance from the edge of the nearest traffic lane for monitors established after December 18, 2006.

6. More Terms

Monitor Objective: Background, quality assurance, highest concentration, population exposure, source-oriented, extreme downwind

Monitor objective classifies the reason for the air monitoring.

Project Class: Background, population based, source-oriented, special studies, episode monitoring, etc

Project class describes the type of monitoring performed by the monitor.

7. Trim Filing Instructions

Record Type – AQ MMEI Monitoring Monitor and Site Document
Doc Type – Site Document
Monitory Type – Select type of monitor, "Multiple" or "All" as appropriate
Monitor Site – Select appropriate site
File Naming Convention – NOx (orNOy)_Assessment_SiteName_2010.doc