UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 900
Seattle, Washington 98101-3140

August 18, 2008

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

The Honorable C. L. "Butch" Otter
Governor of Idaho
Post Office Box 83720,
Boise, Idaho 83720

Dear Governor Otter:

Thank you for your recommendations on the status of fine particle pollution throughout Idaho. Fine-particle pollution represents one of the most significant barriers to clean air facing our nation today. Health studies link these tiny particles – about $1/30^{th}$ the diameter of a human hair – to serious human health problems including aggravated asthma, increased respiratory symptoms like coughing and difficult or painful breathing, chronic bronchitis, decreased lung function, and even premature death in people with heart and lung disease. Fine particle pollution can remain suspended in the air for long periods of time and create public health problems far away from emission sources. Reducing levels of fine-particle ($PM_{2.5}$) pollution is an important part of our nation's commitment to clean, healthy air.

We have reviewed your December 14, 2007 letter submitting Idaho's recommendations on air quality designations for the 2006 24-Hour $PM_{2.5}$ standards. We have also reviewed the technical information submitted to support Idaho's recommendations. We appreciate the effort your State has made to develop this supporting information. EPA intends to designate a portion of the Franklin County and a portion of Shoshone County as nonattainment. This letter is to inform you that the U. S. Environmental Protection Agency intends to make modifications to the recommended boundaries for the Franklin County area and intends to support all the other recommended designations and boundaries.

We have enclosed a detailed description of areas where EPA intends to modify your state recommendations, and the basis for such modification. Your Environmental Director will also receive a copy of this letter and the enclosure. Should you have additional information that you wish to be considered by EPA in this process, please provide it to us by October 20, 2008.

EPA has taken steps to reduce fine particle pollution both regionally and across the country. These actions include the Clean Diesel Program to dramatically reduce emissions from highway, nonroad and stationary diesel engines, and the Fine Particle Implementation rule, which defines requirements for states with levels of fine particle pollution that do not meet national air quality standards.

Please also be aware that in near future, EPA is planning to publish a notice in the Federal Register to solicit public comments on our intended designation decisions. We intend to make final designation decisions for the 2006 24-Hour $PM_{2.5}$ standards by December 18, 2008. If you have any questions, please do not hesitate to contact me. We look forward to a continued dialogue with you as we work together to implement the $PM_{2.5}$ standards.

Sincerely,

Elin D. Miller
Regional Administrator

Enclosure

cc: Ms. Toni HardestyDirector
Director, Idaho Department
of Environmental Quality

IDAHO
Area Designations For the
24-Hour Fine Particle National Ambient Air Quality Standard

The table below identifies the counties in Idaho that EPA intends to designate as not attaining the 2006 24-hour fine particle (PM2.5) standard.[1] A county will be designated as nonattainment if it has an air quality monitor that is violating the standard or if the county is determined to be contributing to the violation of the standard.

Area[1]	Idaho's Recommended Designations	EPA's Intended Designations
Logan UT-ID CBSA	Cache, UT (partial); Franklin, ID (partial)	Cache, UT (partial); Franklin, ID (expanded partial)
Shoshone County, ID	Shoshone (nonattainment – partial county)	Shoshone (nonattainment – partial county)
Lemhi County, ID	Lemhi (unclassifiable)	Lemhi (unclassifiable)
Ada, Canyon, Benewah, Bannock	Attainment	Attainment/unclassifiable
All other counties in State	Unclassifiable	Attainment/unclassifiable

1. Legal descriptions of the boundary(ies) are provided in the attachments
2. Franklin, ID is part of a combined two-state NAA. The TSD for that area is also included submitted with EPA Region 8's, Logan UT-ID Core-Based Statistical Area (CBSA) TSD.

Other than Franklin, Shoshone, and Lemhi counties, Idaho recommended four counties as attainment and the rest of the counties in the State as unclassifiable. EPA intends to designate only Lemhi County as unclassifiable because it had a violating monitor in the 2003-2005 time period but incomplete data in 2004-2006 and 2005-2007. The other counties did not have a previously violating monitor. Thus, EPA intends to designate the four counties recommended by Idaho as attainment plus the remaining counties in the state as "attainment/unclassifiable."

[1] EPA designated nonattainment areas for the 1997 fine particle standards in 2005. In 2006, the 24-hour PM2.5 standard was revised from 65 micrograms per cubic meter (average of 98th percentile values for 3 consecutive years) to 35 micrograms per cubic meter; the level of the annual standard for PM2.5 remained unchanged at 15 micrograms per cubic meter (average of annual averages for 3 consecutive years).

Attachment 1

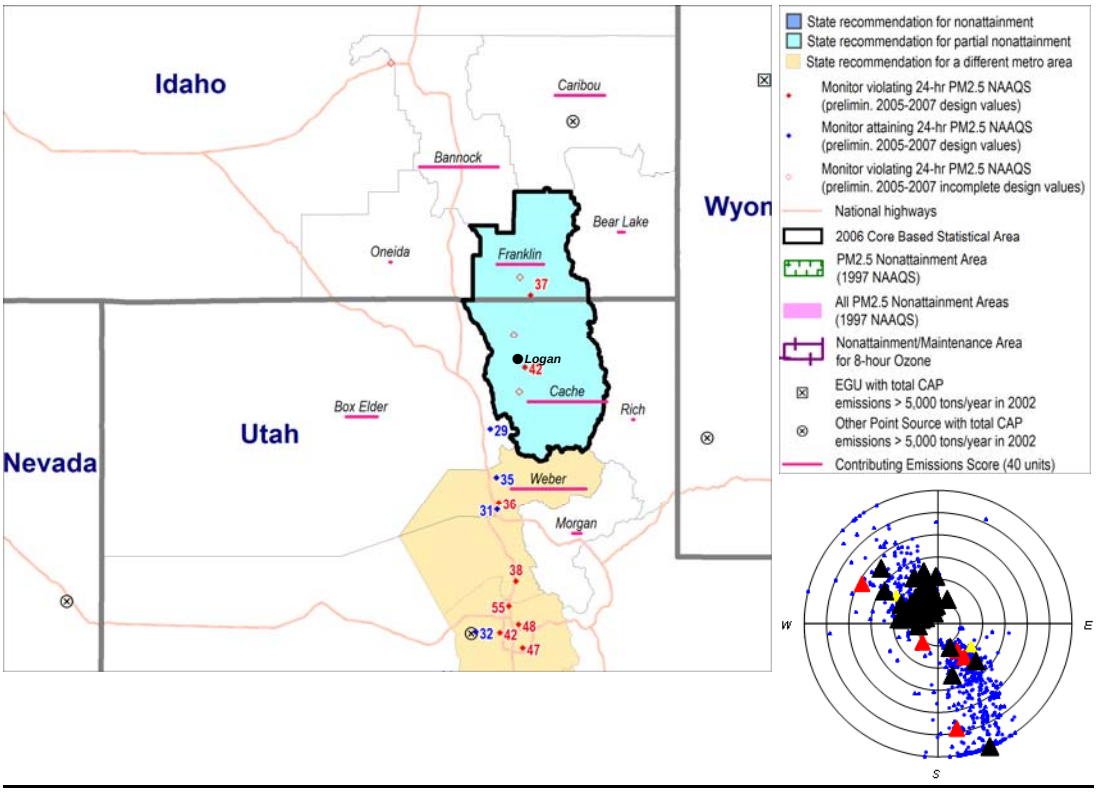
EPA Technical Analysis for the Logan UT-ID Core-Based Statistical Area (CBSA)

Pursuant to section 107(d) of the Clean Air Act, EPA must designate as nonattainment those areas that violate the NAAQS and those areas that contribute to violations. This technical analysis for Logan UT-ID CBSA identifies the counties with monitors that violate the 24-hour PM2.5 standard and evaluates the counties that potentially contribute to fine particle concentrations in the area. EPA has evaluated these counties based on the weight of evidence of the following nine factors recommended in EPA guidance and any other relevant information:

- pollutant emissions
- air quality data
- population density and degree of urbanization
- traffic and commuting patterns
- growth
- meteorology
- geography and topography
- jurisdictional boundaries
- level of control of emissions sources

Figure A.2-1 below is a map of the counties in the area and other relevant information such as the locations and design values of air quality monitors, the metropolitan area boundary, and counties recommended as nonattainment by the State.

Figure A.2-1: Logan, UT-ID



In December, 2007 the State of Utah recommended that Cache County (partial) be designated as "nonattainment" for the 2006 24-hour $PM_{2.5}$ standard based on air quality data from 2004-2006. These data are from Federal Reference Method (FRM) and Federal Equivalent Method (FEM) monitors located in the state. (Ref.: Letter from the Governor of Utah to EPA, Region 8 dated December 18, 2007.) In December, 2007 the State of Idaho recommended that Franklin County (partial) be designated as "nonattainment" for the 2006 24-hour $PM_{2.5}$ standard

based on air quality data from 2005-2007. These data are from Federal Reference Method (FRM) and Federal Equivalent Method (FEM) monitors located in the state. (Ref.: Letter from the Governor of Idaho to EPA, Region 10 dated December 14, 2007.)

Air quality monitoring data on the composition of fine particle mass on a national basis are available from the EPA Chemical Speciation Network and the IMPROVE monitoring network. This type of monitoring is not conducted in the Logan, UT-ID CBSA. However, the Utah Division of Air Quality has referenced speciation data, from FRM filters from the Logan monitor, from analyses performed for high $PM_{2.5}$ episode days in January, 2004. The filter analyses results showed a composition on high $PM_{2.5}$ episode days of up to 90% or greater ammonium nitrate (additional OAQPS- prepared speciation data are provided in Appendix 1.A).

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Based on EPA's 9-factor analysis described below, EPA believes that part of Cache County, Utah and part of Franklin County, Idaho should be designated nonattainment for the 24-hour $PM_{2.5}$ air-quality standard as part of the Logan UT-ID nonattainment area, based upon currently available information. These counties are listed in the table below.

Table A.2-1 Nonattainment Counties[1]

Logan UT-ID	State-Recommended Nonattainment Counties	EPA-Recommended Nonattainment Counties
Utah	Cache (partial)	Cache (partial)
Idaho	Franklin (partial)	Franklin (expanded partial)

[1]Legal descriptions are presented below in EPA's recommendation.

The following is a summary and EPA recommendation, based on the 9-factor analysis (discussed below), for the Logan, UT-ID CBSA. EPA's rationale, information, data, and detailed evaluation are as provided below in the 9-factor analysis.

EPA Recommendation: Single Nonattainment Area vs. Two Nonattainment Areas

As a background, the Logan UT-ID CBSA, also called the Cache Valley, is composed of Cache County, UT and Franklin County, ID. The Cache Valley includes Cache County in Northern Utah and Franklin County in South Eastern Idaho. The Cache Valley is a bowl-shaped valley measuring approximately 60 kilometers north to south and 20 kilometers east to west and almost entirely surrounded by mountain ranges. The Wellsville Mountains lie to the west, and on the east lie the Bear River Mountains; both are northern branches of the Wasatch Range (a more detailed physical description of the area is provided in Factors 6 and 7 below in the following 9-factor analysis.)

In consideration of the portions of Cache County, Utah and Franklin County, ID as described below (with identified Townships) that were proposed for a designation of nonattainment for the $PM_{2.5}$ NAAQS from the Governors of Utah and Idaho (letters dated 12/18/07 and 12/14/07 respectively), and in consideration of information developed in conjunction with the preparation of this 9-factor analysis; EPA Regions 8 and 10 recommend a single Cache Valley $PM_{2.5}$ NAAQS nonattainment area whose boundary encompasses the below described portions of Cache County, UT and Franklin County, ID of the Logan UT-ID CBSA. Refer to the specific descriptions in; "**A.) Cache County, Utah**", "**B.) Franklin County, Idaho**", and Figures A.2-2 and A.2-5 below.

In the Governor's 12/18/07 designations recommendations submittal, the State identified a portion of Cache County in the Logan, UT-ID CBSA that should be designated nonattainment for the 2006 $PM_{2.5}$ 24-hour NAAQS. The State of Utah recommended that all of the Cache Valley, within the State, be designated as one distinct area of nonattainment for $PM_{2.5}$. The collection of townships used to define the Cache Valley (Utah portion) has been refined to more precisely define the geophysical boundary to the East. As such, the State proposed that the nonattainment area should include all portions of Cache County west of and including any portion of the following townships located within Utah (see the "Cache Valley Nonattainment Area" in Figure A.2-3 below as excerpted from the State's 12/18/07 designations recommendations submittal):

Township 15 North Range 1 East
Township 14 North Range 1 East
Township 13 North Range 1 East
Township 12 North Range 1 East

Township 11 North Range 1 East
Township 10 North Range 1 East
Township 9 North Range 1 East

B.) <u>Franklin County, Idaho</u>

The State of Idaho, in their recommendation letter dated Dec 14, 2007 stated that the Cache Valley experiences inversions that build from day to day when strong high-pressure systems are present in the region. The average afternoon mixing height during stagnation events is about 5,500 feet (MSL). Therefore, any areas in Franklin County that is higher than 5,500 feet (MSL) in elevation will not contribute to $PM_{2.5}$ concentrations during wintertime inversions.

However, the state asserted that not all areas below 5,500 feet (MSL) were appropriate to be included in the nonattainment area, and further stated that only those with significant emissions and population need be included. The population in Franklin County is clustered in the towns, with the majority located in Preston and Franklin. The townships identified in Figure 21 of the State's submittal (and in Figure A.2-4 below) are those that account for the higher population density and, therefore, emissions. These townships delineate those portions of Franklin County that are appropriate to include in a Franklin County – Cache Valley $PM_{2.5}$ nonattainment area. Left off the boundary were two populated areas of Clifton and Dayton, ID. Consultation with the State of Idaho indicates that population densities are very low and emissions sources are virtually non- existent in these two areas.

In the Governor of Idaho's 12/14/07 designations recommendations submittal, the State identified four Townships, for a nonattainment designation for the 2006 $PM_{2.5}$ 24-hour NAAQS, for inclusion in Franklin County, ID portion of the Cache Valley (see Figure A.2-4 below as excerpted from the State of Idaho's 12/14/07 designations recommendations submittal):

Township 15 South Range 39 East; Township 16 South Range 38 East; Township 16 South Range 39 East; Township 16 South Range 40 East

EPA notes there are areas of lesser population density which could potentially have sources that contribute to the monitored violation in Franklin County. These populated areas are essentially within the same airshed with no topographical feature separating them from the violating monitor. EPA proposes inclusion of these additional areas as well into the nonattainment area boundary and recommends that the expanded nonattainment area within the State of Idaho be bounded as follows; Selected Townships, Ranges, Sections, and County boundary lines as described below in consideration and as delineated by the topographical features of the 5500 ft (MSL) contour (see Figure A.2-2 above, and in greater detail as provided in Figure A.2-5 below):

Begin in the bottom left corner (southwest) of the nonattainment area boundary, southwest corner of the PLSS - Boise Meridian, Township 16 South, Range 37 East, Section 25. The boundary then proceeds north to the northwest corner of Township 15 South, Range 37 East, Section 25; then the boundary proceeds west to the southeast corner of Township 15 South, Range 38 East, Section 19; then north to the Franklin County boundary at the northwest corner of Township 13 South, Range 38 East, Section 20. From this point the boundary proceeds east 3.5 sections along the northern border of the county boundary where it then turns south 2 sections, and then proceeds east 5 more sections, and then north 2 sections more. At this point, the boundary leaves the county boundary and proceeds east at the southeast corner of Township 13 South, Range 39 East, Section 14; then the boundary heads north 2 sections to northwest corner of Township 13 South, Range 39 East, Section 12; then the boundary proceeds east 2 sections to the northeast corner of Township 13 South, Range 40 East, Section 7. The boundary then proceeds south 2 sections to the northwest corner of Township 13 South, Range 40 East, Section 20; the boundary then proceeds east 6 sections to the northeast corner of Township 13 South, Range 41 East, Section 19. The boundary then proceeds south 20 sections to the southeast corner of Township 16 South, Range 41 East, Section 30. Finally, the boundary is completed as it proceeds west 20 sections along the southern Idaho state boundary to the southwest corner of the Township 16 South, Range 37 East, Section 25.

Figure A.2-2: EPA Recommended Cache Valley PM2.5 Nonattainment Area (Cache, Co., UT and Franklin Co.,ID.)

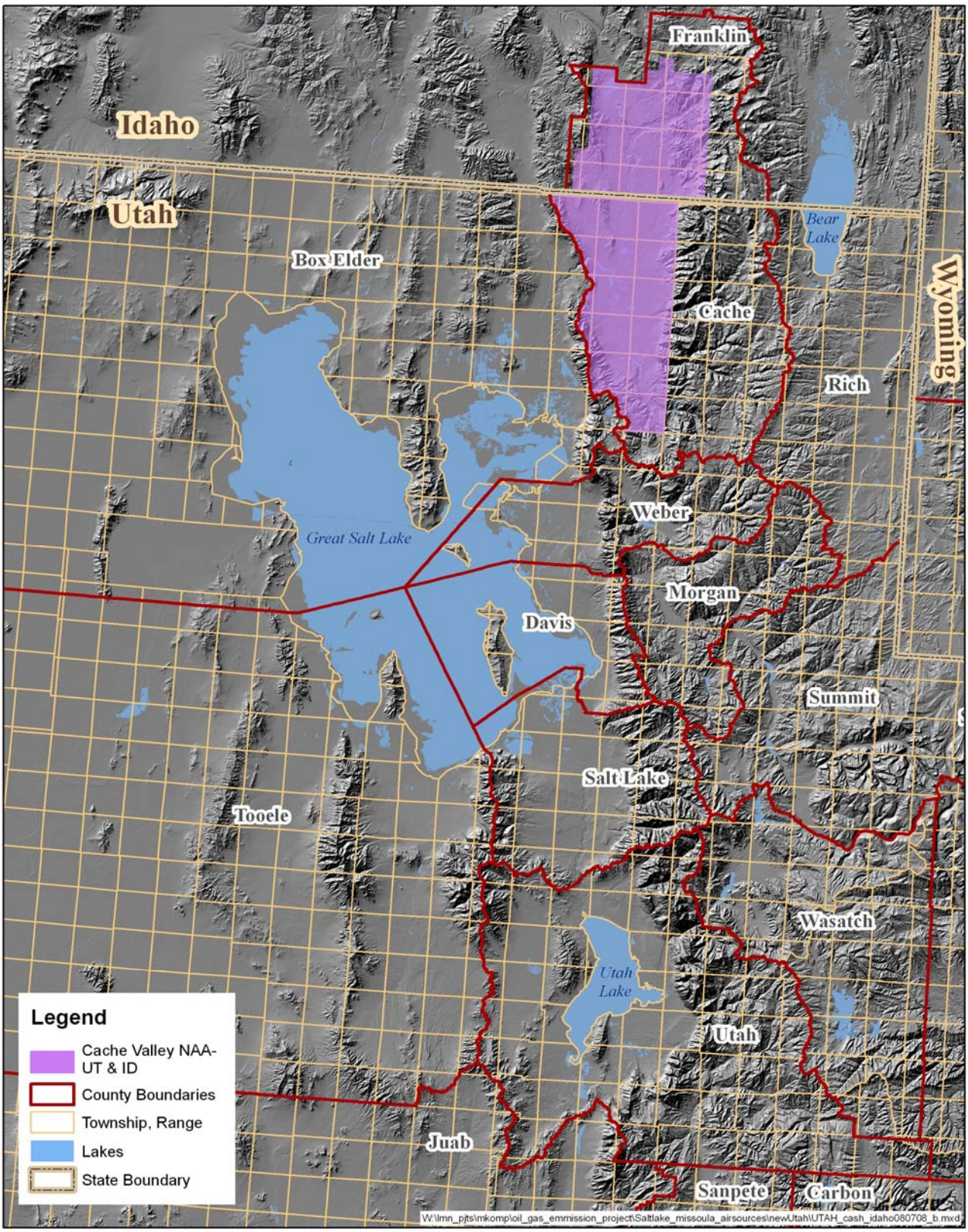


Figure A.2-3: State of Utah Recommended PM2.5 Nonattainment Areas (from the 12/18/07 Governor's submittal)

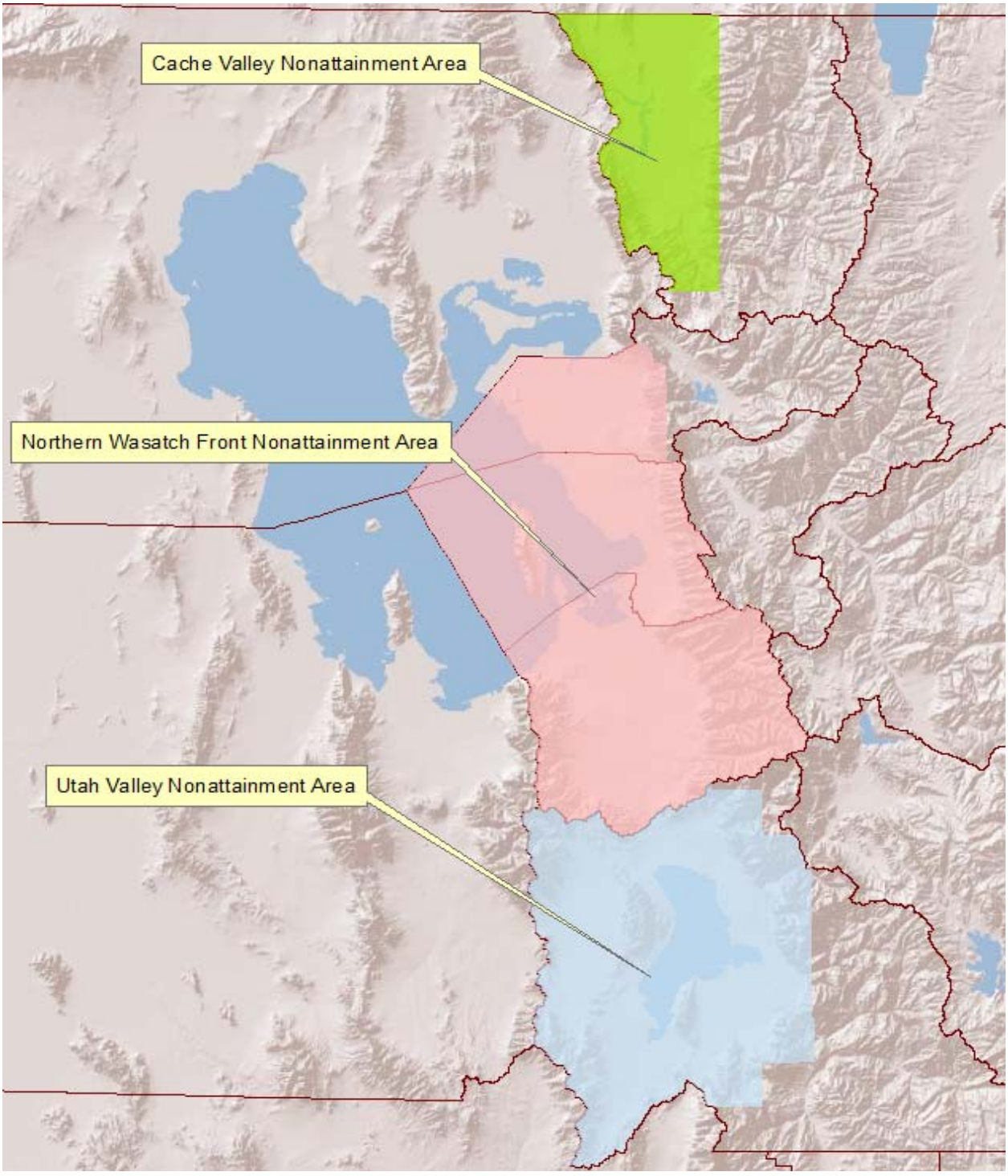


Figure A.2-4: State of Idaho Recommended PM2.5 Franklin County Nonattainment Area (from the 12/14/07 Governor's Submittal)

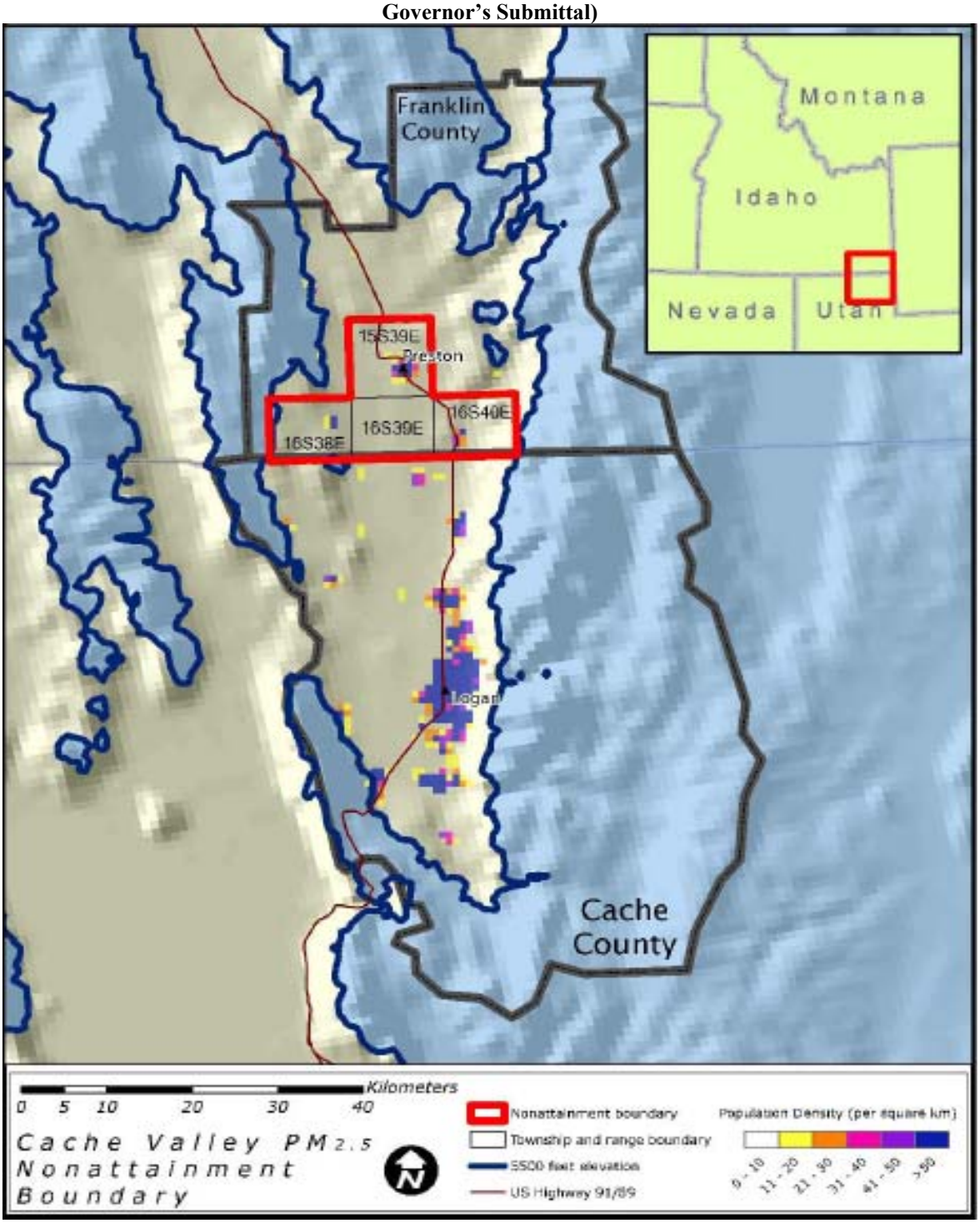
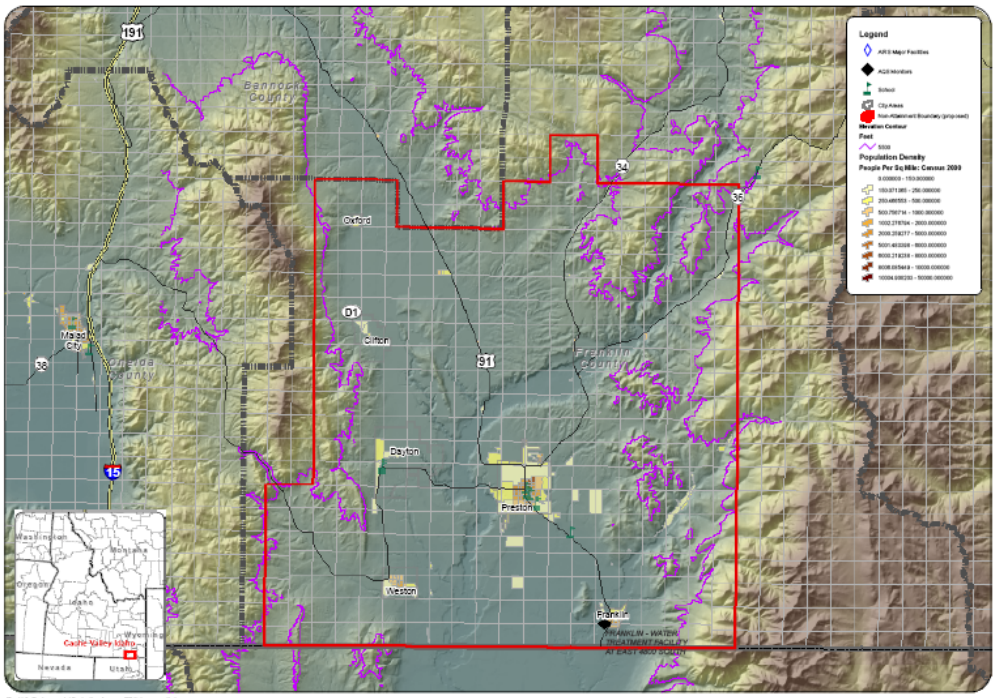
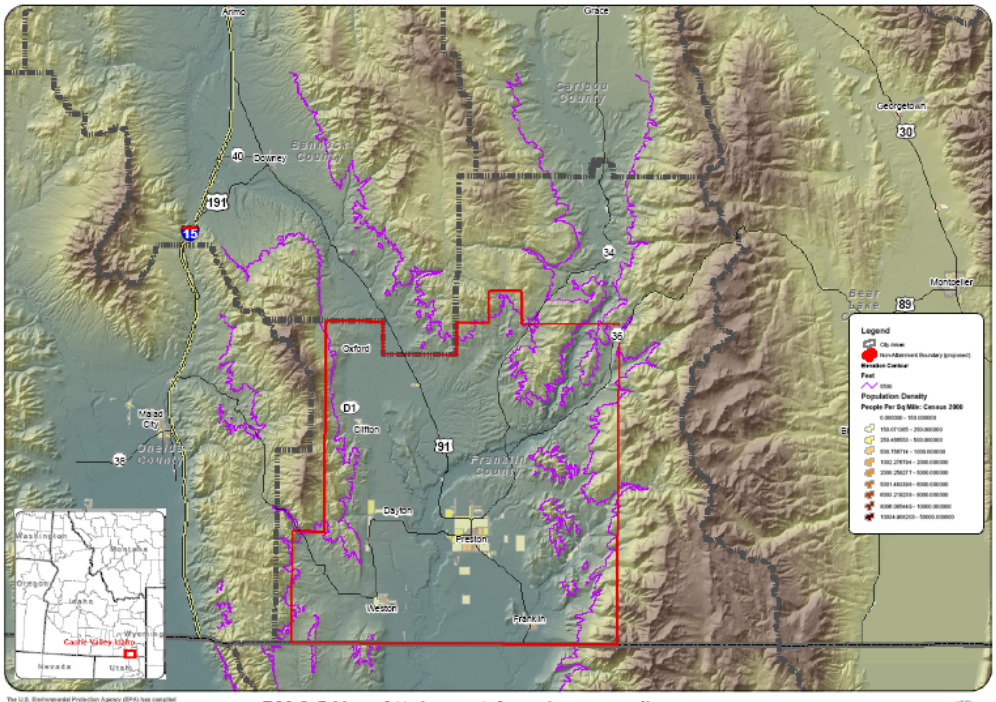


Figure A.2-5: EPA Recommended $PM_{2.5}$ Franklin County Nonattainment Area



PM 2.5 Non-Attainment Area (proposed)
Franklin, Present, Weston (Cache Valley) Idaho Area
shown with Topography & Population Density



PM 2.5 Non-Attainment Area (proposed)
Franklin County (Cache Valley) Idaho Area
shown with Topography & Population Density

EPA 9-Factor Analysis for the Logan, Utah (UT)-Idaho (ID) Core Based Statistical Area (CBSA) for the Designation of Nonattainment Areas for $PM_{2.5}$

The following is a 9-factor analysis for the Logan, UT-ID CBSA counties that are candidates for nonattainment status for the 2006 24-hour fine particle ($PM_{2.5}$) National Ambient Air Quality Standard (NAAQS). The Logan, UT-ID CBSA, also called the Cache Valley, is composed of Cache County, UT and Franklin County, ID. Adjacent counties to the Logan, UT-ID CBSA include; Box Elder, Morgan, Weber in Utah and Bannock, Bear Lake, Caribou, and Oneida in Idaho. The Cache Valley includes Cache County in Northern Utah and Franklin County in South Eastern Idaho. The Cache Valley is a bowl-shaped valley measuring approximately 60 kilometers north to south and 20 kilometers east to west. The Wellsville Mountains lie to the west, and on the east lie the Bear River Mountains; both are northern branches of the Wasatch Range. This analysis has been completed as a collaborative effort between EPA Regions 8 and 10.

Logan UT-ID CBSA has monitors that, based on 2004-2006 (and preliminary data from 2005-2007) Federal reference method (FRM) and Federal equivalent method (FEM) data in the EPA Air Quality System (AQS), violate the 2006 24-hour $PM_{2.5}$ NAAQS.

The State of Utah recommended that Cache County be designated as nonattainment for the 2006 24-hour $PM_{2.5}$ NAAQS based on the most recent three years of air quality data that was available in December 2007 (for 2004-2006). The State of Idaho also recommended that parts of Franklin County be designated nonattainment based on close correlation between monitors in Franklin County and the Logan, UT monitor. These data are from FRM and FEM monitors within the Governor's December 14, 2007 letter to EPA. Further, for Franklin County, preliminary 2005-2007 data shows a design value in violation of the 2006 24-hour $PM_{2.5}$ standard. The term "nonattainment" means an area is violating the $PM_{2.5}$ NAAQS or is contributing to a violation(s) of the NAAQS.

Factor 1: Emissions data

For this factor, EPA evaluated county level emission data for the following $PM_{2.5}$ components and precursor pollutants: "$PM_{2.5}$ emissions total," "$PM_{2.5}$ emissions carbon," "$PM_{2.5}$ emissions other," "SO_2," "NO_x," "VOCs," and "NH_3." "$PM_{2.5}$ emissions total" represents direct emissions of $PM_{2.5}$ and includes: "$PM_{2.5}$ emissions carbon," "$PM_{2.5}$ emissions other", primary sulfate (SO_4), and primary nitrate. (Although primary sulfate and primary nitrate, which are emitted directly from stacks rather than forming in atmospheric reactions with SO_2 and NO_x, are part of "$PM_{2.5}$ emissions total," they are not shown on the template or data spreadsheet as separate items). "$PM_{2.5}$ emissions carbon" represents the sum of organic carbon (OC) and elemental carbon (EC) emissions, and "$PM_{2.5}$ emissions other" represents other inorganic particles (crustal). Emissions of SO_2 and NO_x, which are precursors of the secondary $PM_{2.5}$ components sulfate and nitrate, are also considered. VOCs (volatile organic compounds) and NH_3 (ammonia) are also potential $PM_{2.5}$ precursors and are included for consideration.

Emissions data were derived from the 2005 National Emissions Inventory (NEI), version 1. See http://www.epa.gov/ttn/naaqs/pm/pm25_2006_techinfo.html.

EPA also considered the Contributing Emissions Score (CES) for each county. The CES is a metric that takes into consideration emissions data, meteorological data, and air quality monitoring information to provide a relative ranking of counties in and near an area. Note that this metric is not the exclusive way for consideration of data for these factors. A summary of the CES is included in Attachment 4, and a more detailed description can be found at http://www.epa.gov/ttn/naaqs/pm/pm25_2006_techinfo.html#C.

Table A.2-2 shows emissions of $PM_{2.5}$ and precursor pollutants components (given in tons per year) and the CES for violating and potentially contributing counties in the Logan UT-ID CBSA.

Table A.2-2: Emissions Data
Note: Emission data are from EPA's 2005 NEI and are provided by EPA-OAQPS. CES figures are as provided by EPA-OAQPS.

County	State Recommends Nonattainment	CES	PM2.5 emissions - total (tpy)	PM2.5 emissions – carbon (tpy)	PM2.5 emissions other (tpy)	SO_2 emissions (tpy)	NO_x emissions (tpy	VOC emissions (tpy)	NH_3 emissions (tpy)
Cache, UT	Yes (partial)	100	709	263	445	238	3,833	5,305	1,957
Franklin, ID	Yes (partial)	59	447	134	313	57	851	2,290	1,221
Bannock, ID	No	100	7,667	4,623	3,043	673	4,839	24,792	1,908
Weber. UT	Yes (partial)	95	896	374	521	356	6,951	9,317	774
Caribou, ID	No	63	4,176	1,551	2,624	12,646	2,869	5,064	1,381
Box Elder, UT	No	39	1,269	435	834	345	5,210	6,720	1,972

Based on emission levels and CES values, Cache County, Utah and Franklin County, Idaho are candidates for a 24-hour $PM_{2.5}$ nonattainment designation. We note that Bannock County, Idaho has substantial emission levels and CES value; however, it is both meteorologically and topographically separated from the Cache Valley area (see Factors 6 and 7 below for further information.)

Factor 2: Air quality data

This factor considers the 24-hour $PM_{2.5}$ design values (in $\mu g/m^3$) for air-quality monitors in counties in the Logan, UT-ID CBSA based on data for the 2005-2007 period. A monitor's design value (DV) indicates whether that monitor attains a specified air-quality standard. The 24-hour $PM_{2.5}$ standards are met when the 3-year average of a monitor's 98^{th} percentile values are 35 $\mu g/m^3$ or less. A design value is only valid if minimum data completeness criteria are met.

$PM_{2.5}$ Design Values (in $\mu g/m^3$) for the three-year periods from 2004 to 2006 and 2005-2007 are given in Table A.2-3 below for Cache and Franklin Counties in the Logan, UT-ID CBSA. As shown in Table A.2-3 below, the 2004 to 2006 data for the ambient air quality monitor in Cache County, UT shows a violation of the 24-hour $PM_{2.5}$ NAAQS. In addition, the 2005 to 2007 data from the ambient air quality monitors in both Cache County, UT and Franklin County, ID show a violation of the 24-hour $PM_{2.5}$ NAAQS. Therefore, Cache County, Utah and Franklin County, Idaho are included in the Cache Valley nonattainment area. However, the absence of a violating monitor alone is not sufficient reason to eliminate counties as candidates for nonattainment status. Each county has been evaluated based on the weight of evidence of the nine factors and other relevant information.

Table A.2-3: Air Quality Data

Area	State Recommended Nonattainment?	2004 – 2006 Data $\mu g/m^3$	2005 – 2007 Data $\mu g/m^3$
Logan, UT-ID CBSA			
Cache County, UT	Yes (partial)	63	40
Franklin County, ID	Yes (partial)	Insufficient data	37

For areas in Table A.2-2 above; we note that Bannock County has DV's in the high 20's and there are no monitors in Caribou County. We also note that all these monitors are properly located based on EPA's Network Siting criteria[2] and have collected valid data. EPA has evaluated information, through this 9-factor analysis, from the counties surrounding Franklin County (in the Idaho side of the Cache Valley.) Based on this evaluation and in consideration that; (1) these counties do not contain violating monitors and (2) that Franklin County is essentially topographically separate as it is almost entirely surrounded by mountain ranges. EPA has concluded that it is very unlikely that these surrounding counties are contributing to violations in Franklin County. From the Utah side of the Cache Valley, counties with high CES's for 2004-2006 and 2005-2007; Weber County has a DV of 40 and 36 respectively, and Box Elder has a DV for the same years of 35 and 29. All the above values are in units of $\mu g/m^3$.

Factor 3: Population density and degree of urbanization (including commercial development)

Table A.2-4 below shows information regarding population and population density. Figure A.2-6 below depicts year 2000 census population density and shows the degree of urbanization in the Cache Valley and along the Wasatch Front area. Population data give an indication of whether it is likely that population-based emissions might contribute to violations of the 24-hour PM2.5 standards

Franklin County and the Cache Valley are part of the Logan core based statistical area (CBSA). The majority of the population of Franklin County is in small towns. The two largest Idaho towns in the Cache Valley are Preston, with a 2006 population of 5,089, and Franklin, with 672 residents. The population densities in Franklin County are very low as seen in the table below. The State of Idaho mentions that commercial development in Franklin County has been and is anticipated to be insignificant as a source of emissions.

For the Cache County, Utah area of the Logan CBSA, the population and employment center of the area is Logan City, which is home to more than half the county's population (approx. 45,513 for 2004.) Cities and towns within Cache County and the Cache Metropolitan Planning Organization (CMPO) are Hyde Park, Hyrum, Millville, Nibley, Logan, North Logan, Providence, River Heights, Smithfield, and Wellsville. The economy of the area has historically been agricultural, in addition to a large component of both Cache County and Logan City employment which is the Utah State University with approximately 6,000 employees. Proportionally, Logan has about 53 percent of the CMPO's population and about 70 percent of the employment. While cities like Smithfield and Providence have thousands of residents, they have far fewer jobs indicating that many of the residents of the Cache MPO area commute to work in Logan from their homes in other cities. (Source for the above information is the CMPO 2030 Regional Transportation Plan.)

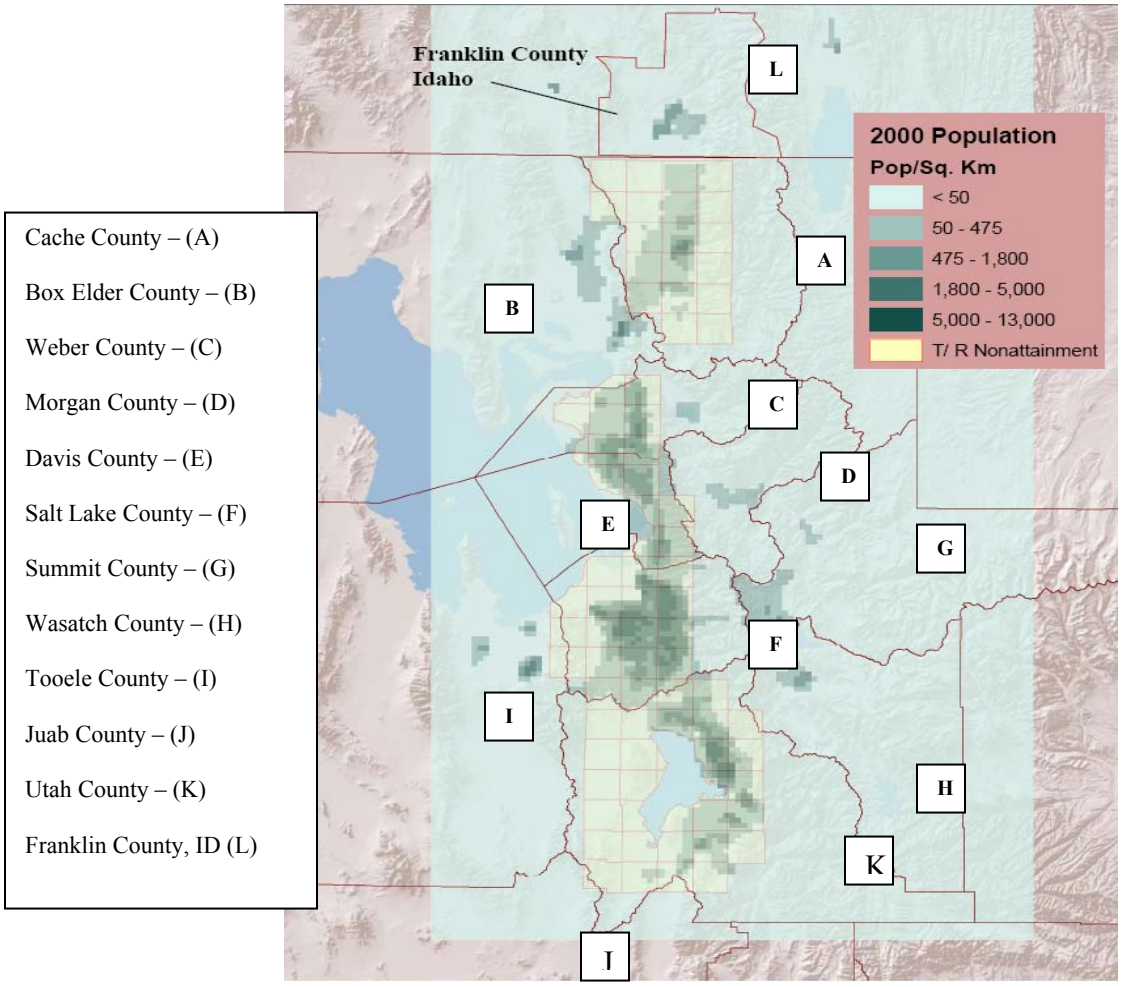
Table A.2-4: Population

Area Logan, UT-ID CBSA	State Recommended Nonattainment	2005 Population	2005 Population Density (pop/sq mi)
Cache, UT	Yes (partial)	102,477[1]	84[3]
Franklin, ID	Yes (partial)	12,410[2]	19[4]

[1]All figures are as provided by Utah with the Governor's 12/18/07 designations recommendations submittal.
[2] All figures are as provided by Idaho with the Governor's 12/14/07 designations recommendations submittal.
[3]Source: EPA OAQPS
[4]Pop/sq mi figures converted from pop/sq km.

[2] Guidance For Network Design and Optimum Site Exposure For PM2.5 And PM10: EPA-454/R-99-022, December 1997 and 71 FR 61236-61328, October 17, 2006.

Figure A.2-6: 2000 Population Density with Counties, Topography, and an Overlay of Townships



Base Figure and Data from Utah's 12/18/07 designations recommendation submittal.

From Figure A.2-6 above, and as described above, EPA has concluded that portions of Cache County ("A") and portions of Franklin County ("L") should be included in the Cache Valley nonattainment area.

Factor 4: Traffic and commuting patterns

Data as presented in Table A.2-5 below for the two candidate counties (Cache, UT–partial and Franklin, ID-partial) display vehicle miles traveled and the number of commuters in-county and out of each county.

Table A.2-5: Traffic and Commuting for the Logan, UT-ID CBSA

County	State Recommended Nonattainment	2005 VMT (Millions Annually)	Commuting within County (no.)	Commuting to other Counties (no.)	Commuting to other Counties (% of total.)
Cache, UT	Yes (partial)	911[1]	39235[3]	4086[3]	10.4%
Franklin, ID	Yes (partial)	190[2]	2852[2]	1897[2]	66.5%

[1] The 2005 VMT figure is from the Utah Department of Transportation (see Appendix 1.A.3)
[2] Figures for Franklin County are as provided from the Governor of Idaho's 12/14/07 designations recommendations submittal to EPA Region 10.

[3] Source: U.S. Census Bureau, "Journey to Work" data for 2000, Internet release date of July 25, 2003. (http://www.census.gov/population/www/cen2000/commuting.html) Refer to Appendix 1.A, Table Appendix 1.A-2 for a full break-out of the commuting figures.

For this factor, the percentage of commuters going from Franklin, ID to Cache, Utah is 66.5% which is a much greater number as compared to the percentage of 10.4% commuting in the opposite direction. It is evident from the data that very few commuters commute to and from Franklin County with the exception of Cache County, UT, which supports the State Of Idaho's assertion of Franklin County being a bedroom community for people working in Cache County. EPA believes that traffic related emissions contribute to $PM_{2.5}$ levels based on the level of traffic and commuting between Franklin and Cache Counties, and is likely to be an increasing contributor to PM2.5 exceedances in this region. However, for the State of Idaho these factors of population growth, VMT, and commute patterns do not indicate the need to consider additional counties for nonattainment designation.

Unless otherwise noted, the 2005 VMT data used for Table A.2-5 above has been derived using methodology similar to that described in "Documentation for the final 2002 Mobile National Emissions Inventory, Version 3, September 2007", prepared for the Emission Inventory Group, U.S. EPA. This document may be found at: http://ftp.epa.gov/EmisInventory/2002finalnei/documentation/mobile/2002_mobile_nei_version_3_report_092807.pdf
These 2005 VMT data were taken from documentation which is still draft, but which should be released in 2008.

Factor 5: Growth rates and patterns

This factor looks at expected population and VMT from 2000 to 2005, as well as patterns of population and VMT growth beyond to 2015. A County with rapid population or VMT growth is generally an integral part of an urban area and is likely to be contributing to fine particulate concentrations in the area.

Table A.2-6 and Table A.2-7 below provide information with respect to two aspects of predicted growth; population growth (current data from 2000 and 2005 and projected growth to 2010 and 2015), and vehicle miles traveled, or VMT, (current data for 2005 and projected growth to 2010 and 2015). This information is for Cache County, UT and Franklin County, ID in the Logan, UT-ID CBSA.

Note for Table A.2-6 (Projected Population Growth); the "% Change" figures represent the percent change from 2000 to 2005, 2005 to 2010, and 2005 to 2015. Note for Table A.2-7 (Projected VMT Growth); the "% Change" figures represent the percent change from 2005 to 2010 and 2005 to 2015. (Refer to Appendix 1.A.3 for a further description regarding how the data for Table A.2-6 and Table A.2-7 below were prepared.)

Table A.2-6: Projected Population Growth for the Logan, UT-ID CBSA

County	2000	% Change	2005	2010	% Change	2015	% Change
Cache, UT[1]	91,897	11.5%	102,477	114,304	11.5%	130,375	27.2%
Franklin, ID[2]	11,329	9.5%	12,410	13651	10%	15016	21.0%

[1] All figures are as provided by Utah with the Governor's 12/18/07 designations recommendations submittal.
[2] EPA Region 10 assume an average 1.75% per year based on US Census Data projections for ID and increasing for the growth of the Logan area to 2%.

Table A.2-7: Projected VMT Growth for the Logan, UT-ID CBSA
VMT (millions annually)

County	2005	% Change	2010	% Change	2015
Cache, UT	911[1]	14.8%	1046[2]	28.4%	1170[2]
Franklin, ID	190	10%	209[3]	21%	230[3]

[1] The 2005 VMT figure is from the Utah Department of Transportation (see Appendix 1.A.3.)
[2] As the State of Utah's 12/18/07 designations recommendations submittal did not contain any VMT data for 2000, 2005 or any other years, EPA used the UDOT VMT data and performed a regression analysis in order to project VMT figures for future years out to 2015. See Appendix 1.A.3, section "**b.) VMT Growth Estimates"** for the discussion of how these projected VMT figures were derived.

[3]The State of Idaho's 12/14/07 designations recommendations submittal did not contain any VMT data beyond 2005. EPA used the projected estimated population changes as a surrogate factor for estimating future VMT figures (see Appendix 1.A.3 for further information.)

The Idaho portion of the Cache Valley is not a highly populated area. From 2000 to 2005, the Idaho side of the Cache Valley experienced a 9.5% increase in population, to a total of 12,410 persons, while the Utah side of the Cache Valley, which is more urbanized, experienced an 11.5% increase in population, to 102,477. These figures are consistent with state averages for the State of Utah, which at 14.2% and the State of Idaho at 13.3 % are in a high growth region of the nation. Services have been identified as one of the fast growing sectors of the economy in Logan, and the growth in Logan has spurred growth in Franklin also. With respect to Cache County, based on the information provided in Table A.2-6 above, Cache County projects a 11.5% increase in population growth from 2005-2010 and a 27.2% increase in population growth from 2005-2015. Table A.2-7 also shows an estimated increase in VMT of 28.4% from 2005-2015.

In the Governor of Idaho's 12/14/07 designations recommendations submittal, the State identified only four Townships, for a nonattainment designation for the 2006 $PM_{2.5}$ 24-hour NAAQS, for inclusion in Franklin County, ID portion of the Cache Valley (see Figure A.2-4 above as excerpted from the State of Idaho's 12/14/07 designations recommendations submittal).

EPA notes there are areas of lesser population density which could potentially have sources that contribute to the monitored violation in Franklin County. These populated areas are essentially within the same airshed with no topographical feature separating them from the violating monitor. This is why EPA has proposed inclusion of these additional areas as well into the nonattainment area boundary and has recommended that the expanded nonattainment area within Franklin County be bounded by the selected Townships identified above in our single nonattainment area recommendation discussion.

Factor 6: Meteorology (weather / transport patterns)

For this factor, EPA considered data from National Weather Service instruments in the area. Wind direction and wind speed data for 2004-2006 were analyzed, with an emphasis on "high $PM_{2.5}$ days" for each of two seasons (an October-April "cold" season and a May-September "warm" season). These high days are defined as days where any FRM or FEM air quality monitors had 24-hour $PM_{2.5}$ concentrations above 95% on a frequency distribution curve of $PM_{2.5}$ 24-hour values

For each air quality monitoring site, EPA developed a "pollution rose" to understand the prevailing wind direction and wind speed on the days with highest fine particle concentrations. The pollution rose figures identify 24-hour PM2.5 values by color; days exceeding 35 ug/m3 are denoted with a red or black icon (see Appendix 1.B for the pollution rose figures.) A dot indicates the day occurred in the warm season; a triangle indicates the day occurred in the cool season. The center of the figure indicates the location of the air quality monitoring site, and the location of the icon in relation to the center indicates the direction from which the wind was blowing on that day. An icon that is close to the center indicates a low average wind speed on that day. Higher wind speeds are indicated when the icon is further away from the center. We also note that the meteorology factor is also considered in each county's Contributing Emissions Score (CES) because the method for deriving this metric included an analysis of trajectories of air masses for high $PM_{2.5}$ days.

EPA's review of the meteorology for the Logan UT-ID CBSA included wind direction, speed, and pollution roses data indicate that $PM_{2.5}$ emissions during high $PM_{2.5}$ days in 2004-2006 showed that the highest concentrations were with light winds from the NW and SE directions and, as anticipated, also showed the highest monitored values with light wind speeds typically four miles per hour or less. The wind rose data with monitored $PM_{2.5}$ pollution concentration data that were reviewed by EPA are included in Appendix 1.B. We note that the wind / pollution roses included in Appendix 1.B. indicate that for Cache County, meteorological data are used from the Salt Lake City International Airport (SLCI) and for Franklin County, meteorological data are used from the Pocatello Regional Airport.

The Governor of Idaho's 12/14/07 $PM_{2.5}$ designations recommendations submittal contained a substantially more in-depth meteorology discussion for the Cache Valley than did the Governor of Utah's 12/18/07 submittal. EPA has

excerpted the majority of the Idaho DEQ meteorology discussion, which appears below, and incorporated it into our 9-factor analysis.

"The Cache Valley experiences air stagnation events in the wintertime. During these periods, the stable layer above the ground is much deeper than a typical nocturnal inversion. Cold air is trapped in the basins, and the air mass stabilizes as high pressure aloft overtakes the region. Under such circumstances, a prolonged strong inversion layer (or layers) limits the vertical mixing, trapping local pollutants in a thin layer against the valley floor. During episodes such as this, emissions increase because more home heating occurs due to the cold temperatures. The low sun angle, short length of the days during winter months, and strong likelihood of snow cover to reflect the solar radiation are all factors that limit daytime surface heating and aggravate the situation. As a result, some inversions may not break for many days. A study of deep stable layers (DSLs) in western air basins (Wolyn and McKee, 1989) revealed that DSLs can cause the stagnation of cold air in basins. In other words, only light winds occur at the surface, even if moderately strong winds aloft are present, and restriction of the growth of daytime convective boundary layers occurs. The Idaho DEQ analyzed DSLs in the Treasure Valley and found high correlation between DSLs and particulate levels in the area. Salt Lake City was found to have a high frequency of DSL occurrence, averaging about 12 days per year in the period from 1959-1983 (Wolyn and McKee, 1989). The Cache Valley is most likely under the same stagnation conditions as the Salt Lake City area during most of these periods. Figure A.2-7, which is from a Utah State University inversion study (Martin, 2006), provides an excellent example of correlation between the $PM_{2.5}$ concentration levels and the evolution of the stable layer over the Cache Valley. In Figure A.2-7, blue represents cold air and red indicates warmer air. The solid yellow line represents the ambient $PM_{2.5}$ concentration as measured at the Logan monitoring site. The dotted green line represents the 1997 $PM_{2.5}$ NAAQS.

From January 9 through January 17, 2004, the cold air pool strengthened and deepened each day, eventually reaching a depth of about 5,500 feet (approximate MSL) on January 15 when the $PM_{2.5}$ concentrations peaked. The $PM_{2.5}$ concentration levels rose steadily as trapped pollutants accumulated from each day to the next. Under this type of stagnation condition, the pollutants may quickly build, especially in areas like the Cache Valley where airflow is greatly restricted by terrain. Figure A.2-8, also taken from the Utah State University inversion study (Martin, 2006), provides an example of inverted temperature profiles in the Cache Valley during the January 2004 extended stagnation episode. During the period from January 1 to January 17, 2004, as shown in the figure, a strong inversion about 1,500 feet thick persistently occupied the area. This can be seen in Figure A.2-7 below when the highest $PM_{2.5}$ readings (yellow line) peak at approximately 5,500 ft. (MSL) during the cold temperatures (as seen in blue.) The record high $PM_{2.5}$ concentration of 132.7$\mu g/m^3$ was observed at Logan, Utah on January 15, 2004. The strong, deep, stable layer persisted through the entire period, even in the afternoon hours (12 noon and 3 pm) when the base of the inversion rose to an average 5,500 feet (approximate MSL) or about 1,500 ft. above ground level. The average 24-hour $PM_{2.5}$ concentration observed at the Franklin monitor during this same period was 39.0 $\mu g/m^3$, with the highest 24-hour concentration of 82.6 $\mu g/m^3$ occurring on January 17, 2005. Thus, it appears that the afternoon mixing height during stagnation episodes (at approximately 5,500 feet MSL) is the controlling factor in accumulating pollutants from day to day."

Based on the information provided above and as further expanded upon in the discussion of topography in Factor 7 below, EPA has concluded, along with both the States of Utah and Idaho, that the inversions that produce the high concentrations of $PM_{2.5}$ in the Logan UT-ID CBSA are confined to the lower Valley areas and are below the elevated, mountainous terrain areas of both Cache and Franklin Counties.

Figure A.2-7: (From Idaho DEQ) January 2004 temperature contour map with PM2.5 concentration (yellow); 1997 $PM_{2.5}$ National Ambient Air Quality Standard (green); blue represents cold air, and red indicates warmer air. (Martin, 2006)

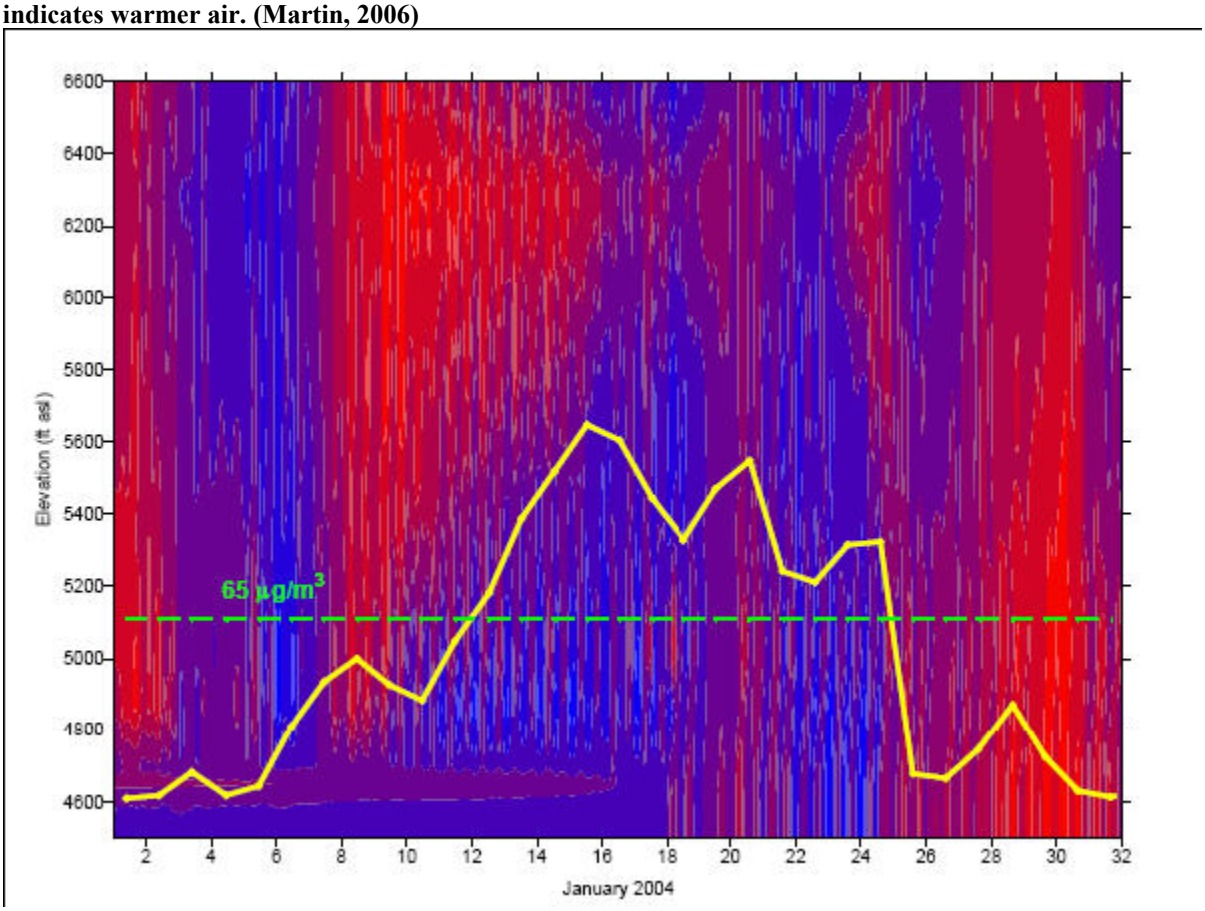
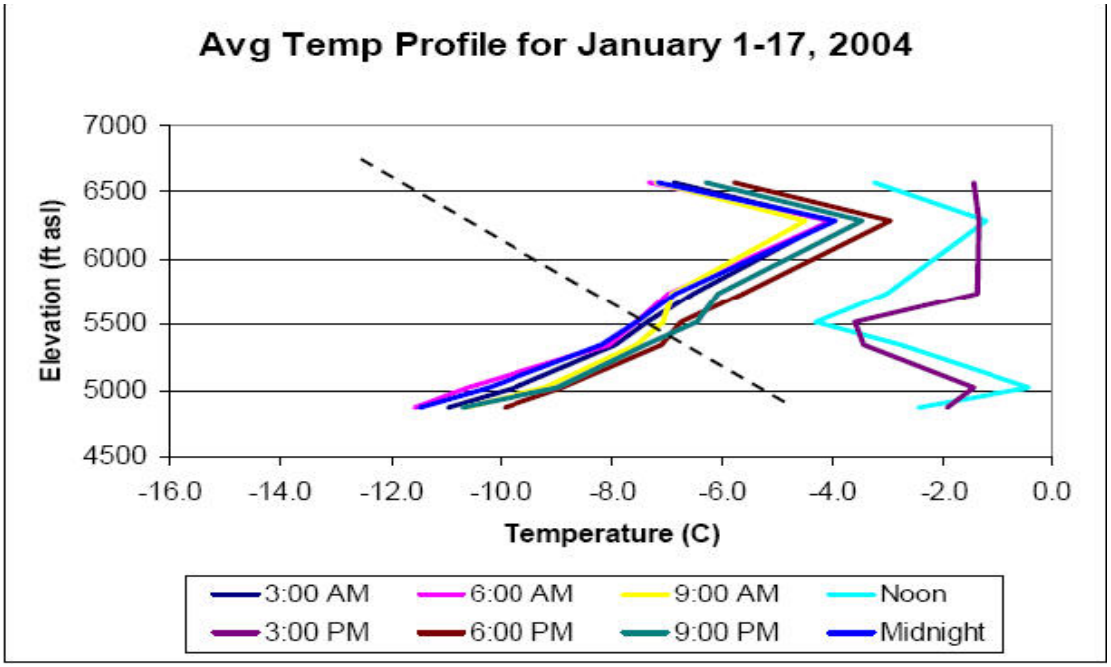


Figure A.2-8: (From Idaho DEQ) Average temperature profiles in Cache Valley during January 1 - 17, 2004 (Martin, 2006)



Factor 7: Geography /topography (mountain ranges or other air basin boundaries)

The geography/topography analysis looks at physical features of the land that might have an effect on the airshed and, therefore, on the distribution of $PM_{2.5}$ over the Logan UT-ID CBSA. We note that episodes of high $PM_{2.5}$ concentrations in the Cache Valley are characterized by stagnant air masses during the winter season. As discussed above in Factor 6, both Utah and Idaho have indicated there will typically be a low mixing height acting as a lid over the air mass; preventing it from dispersing into the upper atmosphere. Thus, the high terrain areas surrounding the air mass and exceeding the mixing height act to essentially define its boundaries.

Cache County encompasses the Cache Valley near the northern border of Utah and extends into Franklin County in southern Idaho. This is an isolated valley, almost completely encircled by mountainous terrain. It is primarily an agricultural community; but as indicated by UDAQ, perhaps includes just the necessary mix of agricultural and urban emissions to produce abundant quantities of secondary particulate matter. Again, the mountainous topography serves to trap these emissions and the $PM_{2.5}$ for days on end during the very strong temperature inversions that occur here.

The Governor of Utah's 12/18/07 recommendations submittal indicated that the topography allows for a description of the area surrounding monitors for which the ambient air quality data is truly representative. The State of Utah also noted that concentrations of $PM_{2.5}$ are relatively uniform throughout a given area under these conditions. A topographical depiction of the Cache Valley, with monitor locations, is provided in Figure A.2-9 below with a topographic photo of the Cache Valley in Figure A.2-10.

The most prominent features to observe in Figures A.2-9 and A.2-10 are; (1) the eastern boundary of the Cache Valley which is composed of the Wasatch-Cache National Forest, the Bear River Mountain Range, and Monte Cristo Mountain Range, and (2) the western boundary which is composed of the northern section of the Wasatch Mountain Range and the Wellsville Mountain Range. As indicated in the Governor of Idaho's 12/18/07 recommendations, the mountains to the east of the Cache Valley rise to approximately 8,300 feet MSL and the mountains to the west of the Cache Valley rise to approximately 9,900 feet MSL. However, the valley floor only ranges in altitude from approximately 4,500 feet MSL to 5,200 feet MSL from south to north respectively.

The highway mountain passes near the southern Cache Valley (Utah) are West Highway 30 whose summit is approximately 4,900 feet MSL and South Highway 89 whose summit is approximately 5,900 feet MSL. The Wellsville Mountains, Bear River Mountains, and northern Wasatch mountains converge in southern Cache County to form a topographical barrier between the Cache Valley and other adjacent counties such as Box Elder and Weber. The main highways in Franklin County are highways 91 and 36 located in the lower areas of the Cache Valley. As

with the southern area of the Cache Valley, the mountain ranges of the northern area of the Cache Valley, bordering the eastern and western portions of Franklin County, effectively meteorologically isolate Franklin County from Bannock, Bear Lake, Caribou, and Oneida Counties.

Not only does the topography of the Cache Valley act as a barrier to air movement during the conditions which lead to elevated concentrations of fine particulate, it also has acted as the primary factor in determining where the population is located. In other words, the low-lying valleys which trap air during winter-time temperature inversions are also the regions within which people chose to live. These populations produce the emissions which lead to fine particulate formation under the conditions described above.

By contrast, much of the area within the affected counties is above the mixing height, and would therefore not experience the high concentrations of $PM_{2.5}$ produced in the low lying valleys. Therefore, EPA concurs with the State of Utah that the topography, when considered alongside the predominant meteorology described above in Factor 6, suggests that these areas of high terrain need not be included in a description of the nonattainment areas. This conclusion would apply to eastern Cache County. EPA is in agreement with Utah in designating those areas, described by applicable Townships that lie in the Cache Valley floor east of the Bear River Mountains and Wasatch-Cache National Forest and up to the western boundary of Cache County be designated as nonattainment.

With respect to Franklin County, the State of Idaho indicated that the average afternoon mixing height during stagnation events is about 5,500 feet (MSL). Therefore, the State asserted that any areas in Franklin County that are higher than 5,500 feet (MSL) in elevation will not contribute to $PM_{2.5}$ concentrations during wintertime inversions. However, the State also noted that not all areas below 5,500 feet (MSL) are appropriate to be included in the nonattainment area and indicated that only those areas with significant emissions and population should be included. The population in Franklin County is clustered in the towns, with the majority located in Preston and Franklin. The townships identified by the State in Figure A.2-4 above, are those that account for the higher population density. However, EPA has also examined the area and finds areas of lesser population density which could potentially have sources that contribute to the monitored violation. These populated areas are essentially within the same airshed with no topographical feature separating them from the violating monitor. EPA proposes inclusion of these areas as well into the nonattainment boundary and recommends than the nonattainment area, within the State of Idaho, be bounded to the North, East, and West of Franklin by the topographical features of the 5500 ft (MSL) contour, and to the South by the Franklin County border (see Figure A.2-2 and Figure A.2-5 above).

Figure A.2-9: Monitoring Network with Counties and Topography (source: UDAQ)

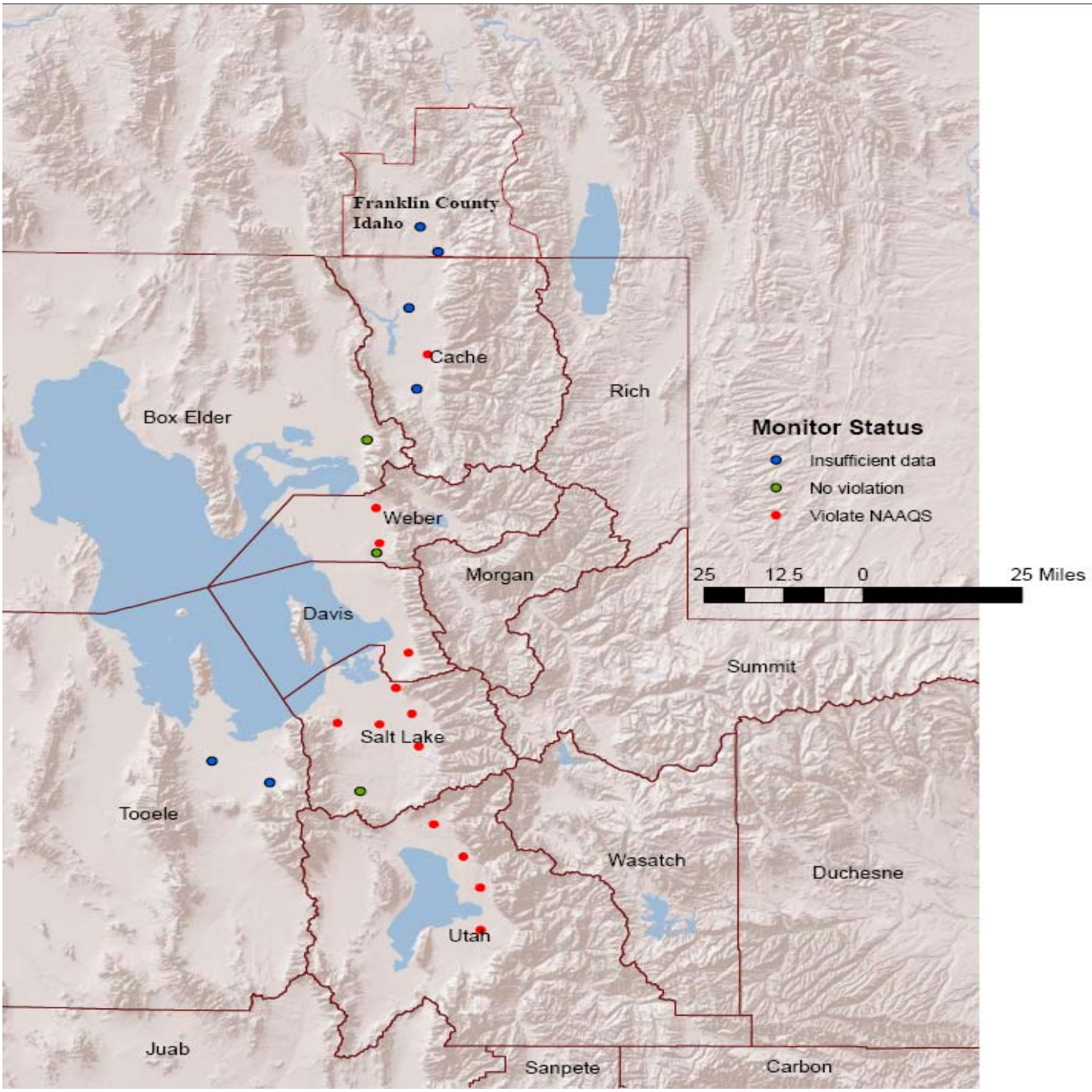


Figure A.2-10: Photo - Counties and Topography (source: Google Earth™)


N
30
91
84
Logan, UT
89
15
Image © 2008 DigitalGlobe
© 2008 TurnHere, Inc.
© 2008 Tele Atlas
© 2008 National Geographic Society
Google
Pointer 41°55'02.64" N 111°47'05.60" W elev 5035 ft Streaming 100%
Eye alt 89.24 mi

Factor 8: Jurisdictional boundaries (e.g., existing PM and ozone areas)

In evaluating the jurisdictional boundary factor, consideration should be given to existing boundaries and organizations that may facilitate air quality planning and the implementation of control measures to attain the standard. Areas designated as nonattainment (e.g. for PM2.5 or 8-hour ozone standard) represent important boundaries for state air quality planning.

As the Logan UT-ID CBSA does not have any existing PM or ozone nonattainment area designations, EPA's analysis of jurisdictional boundaries considered the planning and organizational structure of the Logan, UT-ID CBSA to determine if the implementation of controls in a nonattainment area can be carried out in a cohesive manner.

EPA Region 8 is satisfied that the UDAQ, Cache County, the City of Logan, and the Cache MPO have the necessary legal authorities to develop and implement appropriate control measures to address the $PM_{2.5}$ nonattainment issues facing this area. EPA also notes that the State indicated, in the Governor of Utah's 12/18/07 designations recommendations submittal, that a nonattainment area boundary that is less than the entire county would not preclude control strategies such as motor vehicle inspection and maintenance (I/M) or wood burning controls from the outlying areas of a county that were not included in the actual nonattainment area boundary.

EPA Region 10 is also satisfied that the State of Idaho has the necessary legal authorities to develop and implement appropriate control measures to address the $PM_{2.5}$ nonattainment in Franklin County, ID.

Factor 9: Level of control of emission sources

This factor considers emission controls currently implemented for major sources in an area. The emission estimates that were prepared by EPA and appear in Table A.2-2 (under Factor 1) would typically include any control strategies implemented by states in an area before 2005 that may influence emissions of any component of $PM_{2.5}$ emissions (i.e., total carbon, SO_2, NOx, and crustal $PM_{2.5}$). However, since there are no large point sources located in the Cache Valley area the level of control was not of concern for designation of the nonattainment area.

EPA does note that in 2004 the Bear River Health Department created the Cache Valley Air Quality Task Force with representatives from both Utah and Idaho to help address air pollution in the Cache Valley. The Task Force has solicited voluntary emission reductions from drivers, active in public outreach and education, and has been a source of information, regarding air pollution and especially $PM_{2.5}$, for residents of the Cache Valley in both Cache County and Franklin County. With the first-time development of a nonattainment SIP revision for Cache County, the control of emissions will utilize the State of Utah's Air Quality Rules (http://www.rules.utah.gov/publicat/code/r307/r307.htm) which involve emissions inventories, control measures, permitting, and compliance.

As indicated in the Governor's 12/14/07 designations recommendations submittal, the Idaho DEQ indicates there are no major industrial sources in Franklin County and that direct and precursor $PM_{2.5}$ emissions are from vehicles (tailpipe and fugitive road dust) , residential woodburning, and agriculture (feedlot and dairy ammonia.) The Idaho DEQ also indicated that it is beginning to evaluate emission reduction controls for woodstoves and vehicles.

EPA notes that necessary emission controls and, if applicable, permit limits will have to be established by both States, in order to meet Federal requirements, so as to be able to demonstrate attainment of the 24-hour $PM_{2.5}$ NAAQS.

Attachment 2

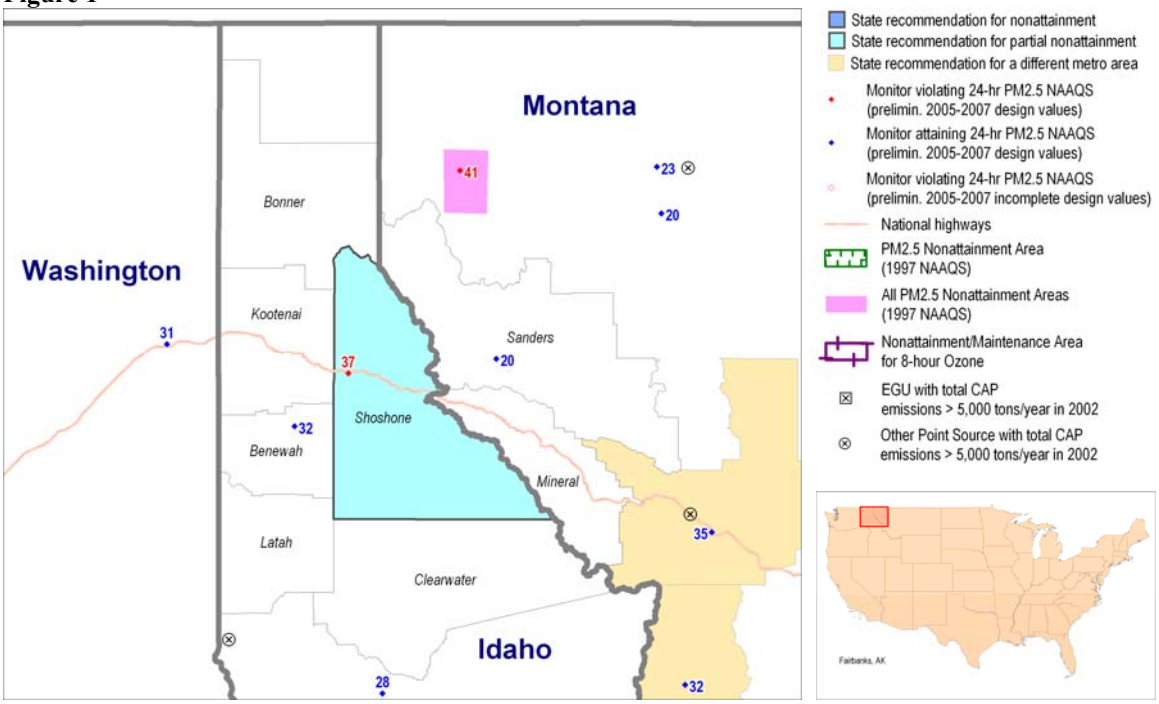
EPA Technical Analysis for Shoshone County

Pursuant to section 107(d) of the Clean Air Act, EPA must designate as nonattainment those areas that violate the NAAQS and those areas that contribute to violations. This technical analysis for Shoshone County identifies the counties with monitors that violate the 24-hour PM2.5 standard and evaluates the counties that potentially contribute to fine particle concentrations in the area. EPA has evaluated these counties based on the weight of evidence of the following nine factors recommended in EPA guidance and any other relevant information:

- pollutant emissions
- air quality data
- population density and degree of urbanization
- traffic and commuting patterns
- growth
- meteorology
- geography and topography
- jurisdictional boundaries
- level of control of emissions sources

Figure 1 is a map of the counties in the area and other relevant information such as the locations and design values of air quality monitors, the metropolitan area boundary, and counties recommended as nonattainment by the State.

Figure 1



Counties labeled in bold reflect NAA's under 1997 NAAQS

In December 2007, the State of Idaho recommended that part of Shoshone County surrounding the City of Pinehurst be designated as "nonattainment" for the 2006 24-hour $PM_{2.5}$ standard based on air quality data from 2004-2006. These data are from Federal Reference Method (FRM) and Federal Equivalent Method (FEM) monitors located in the state(Letter from the Governor of the State of Idaho to the Regional Administrator for US EPA Region 10 on December 14, 2007).

Based on EPA's 9-factor analysis described below, EPA believes that part of Shoshone County should be designated nonattainment for the 24-hour $PM_{2.5}$ air-quality standard as part of the Pinehurst nonattainment area, based upon currently available information. These counties are listed in the table below.

States and Counties in the NAA

Pinehurst	**State-Recommended Nonattainment Counties**	**EPA-Recommended Nonattainment Counties**
ID	Part of Shoshone County	Part of Shoshone County

The following is a summary of the 9-factor analysis for the $Pinehurst_{2.5}$ Nonattainment Area.

State's Recommendation for Pinehurst $PM_{2.5}$ NAA

Shoshone County is a rural county in the panhandle region of Idaho and has a population of over 13,000. The Shoshone county air quality monitor that is violating the 24-hour fine particle standard is located in the town of Pinehurst (Population of 1661). As can be seen in the Figure below, the town of Pinehurst is located in a small, enclosed, bowl-shaped valley in Shoshone County, Idaho.

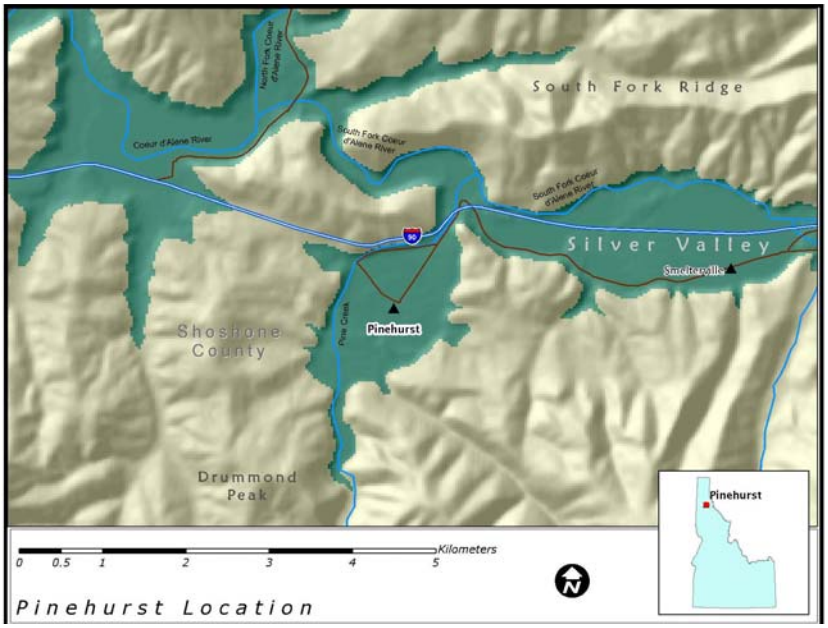


Figure 2: Location map showing Pinehurst and the main valley of the Coeur d'Alene River, known as the Silver Valley.

The main emissions sources located in Pinehurst are residential wood heating and vehicles. However, open burning and slash burning are large emissions sources that can contribute to a violation of the 24-hour $PM_{2.5}$ standard. The location and time of occurrence of slash and open burning vary from year to year. Slash burning can occur on all state and privately owned land that surrounds the Town of Pinehurst.

The Idaho Department of Environmental Quality recommended a geographic boundary for the Pinehurst $PM_{2.5}$ nonattainment area as shown in the figure below. Idaho's analysis of the Pinehurst area shows that topographical features and wintertime meteorology limit transport of pollutants between other air sheds within the County and Pinehurst. Even the air from the valley just east of Pinehurst does not mix with air from Pinehurst during these exceedances. The state asserts that pollutants emitted within Pinehurst remain trapped, and emissions from the Silver

Valley do not contribute to $PM_{2.5}$ pollutant concentrations. To support this, the state submitted meteorological data based on a station located in downtown Pinehurst and CALPUFF modeling to delineate the extent of the airshed relevant to establishing sources that contribute to the $PM_{2.5}$ exceedances.

Due to topographical features, seasonal wintertime meteorology, and types of emission sources, DEQ determined that the appropriate boundary for the $PM_{2.5}$ nonattainment area extends beyond the current PM_{10} NAA boundary. This expanded area includes those areas that, if slash burning occurred, could contribute to a violation of the 24-hour $PM_{2.5}$ standard.

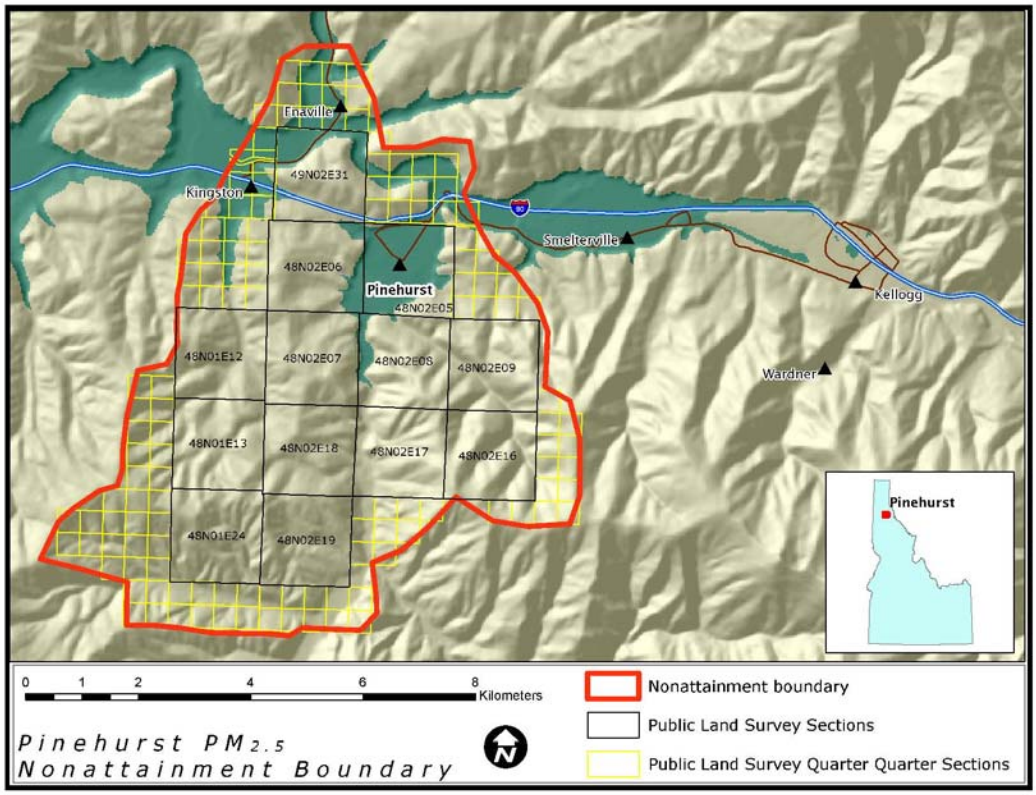


Figure 3: Proposed geographic boundary for the Pinehurst $PM_{2.5}$ nonattainment area.

T	R	S	QQ	
49N	02E	31		
48N	02E	6		
48N	02E	5		
48N	01E	12		
48N	02E	7		
48N	02E	8		
48N	02E	9		
48N	01E	13		
48N	02E	18		
48N	02E	17		
48N	02E	16		
48N	01E	24		
48M	02E	19		
48N	01E	1	NENW	NESW
			NWNE	NWSE

T	R	S	QQ	
			NENE	NESE
			SWNW	SWSW
			SENW	SESW
			SWNE	SWSE
			SENE	SESE
			NWSW	
48N	01E	11	SESE	SWSE
48N	01E	14	NENE	NWSE
			NWNE	NESE
			SWNE	SWSE
			SENE	SESE
48N	01E	22	SENE	NESE
48N	01E	23	NENW	NWSW
			NWNE	NESW
			NENE	NWSE
			SWNW	NESE
			SENW	SESW
			SWNE	SWSE
			SENE	SESE
48N	01E	25	NWNW	SWNW
			NENW	SENW
			NWNE	SWNE
			NENE	SENE
48N	01E	26	SWNE	NWNE
			SENE	NENE
48N	02E	4	NWNW	NWSW
			SENW	SWSW
			NESW	SESW
			NWSE	SWSE
			SWNW	SESE
48N	02E	10	SWSW	
48N	02E	15	NWNW	NWSW
			NENW	NESW
			SWNW	SWSW
			SENW	SESW
48N	02E	20	NWNW	SENW
			NENW	SWNE
			NWNE	NWSW
			NENE	NESW
			SWNW	SWSW

T	R	S	QQ	
48N	02E	21	NWNE	NENE
48N	02E	22	NWNW	NENW
48N	02E	29	NWNW	SWNW
48N	02E	30	NWNW	SWNW
			NENW	SENW
			NWNE	SWNE
			NENE	SENE
49N	01E	25	SESE	
49N	01E	36	NENE	NESE
			SWNE	SESW
			SENE	SWSE
			NWSE	SESE
49N	02E	30	SWNW	NWSW
			SENW	NESE
			NESW	SWSW
			NWSE	SESW
			SWNE	SWSE
			SENE	SESE
49N	02E	32	NWNW	NWSE
			SWNW	NESE
			SENW	SWSW
			SWNE	SESW
			SENE	SWSE
			NWSW	SESE
			NESW	
49N	02E	33	SWSW	

EPA Recommendations of geographic boundaries for the Pinehurst NAA

EPA has reviewed the data and analysis that the state has submitted to justify the $PM_{2.5}$ nonattainment area boundary.

Due to topographical features, seasonal wintertime meteorology, and types of emission sources, an appropriate boundary for the $PM_{2.5}$ nonattainment area should extend beyond the current PM_{10} NAA boundary. This expanded area should include those areas that, if slash burning occurred, could contribute to a violation of the 24-hour $PM_{2.5}$ standard. This would extend to a ring of ridges and valleys starting from SE to the W or 135° to 270° from the North, consistent with the wintertime wind rose.

Following this principle, EPA agrees with DEQ's proposed geographic boundary for the Pinehurst $PM_{2.5}$ NAA as shown in Figure below (legal description provided above). Should additional information be available to EPA during the designation period, EPA will make appropriate changes to the boundaries to more accurately depict the sources that can contribute to violations at the Pinehurst monitor. EPA will specifically look for more data to understand the duration and magnitude of slash burning and its contribution to the violations in Pinehurst. EPA is concerned that slash burning does occur all over the county and more extended study of its effects on regional levels of $PM_{2.5}$ is not fully understood at this point.

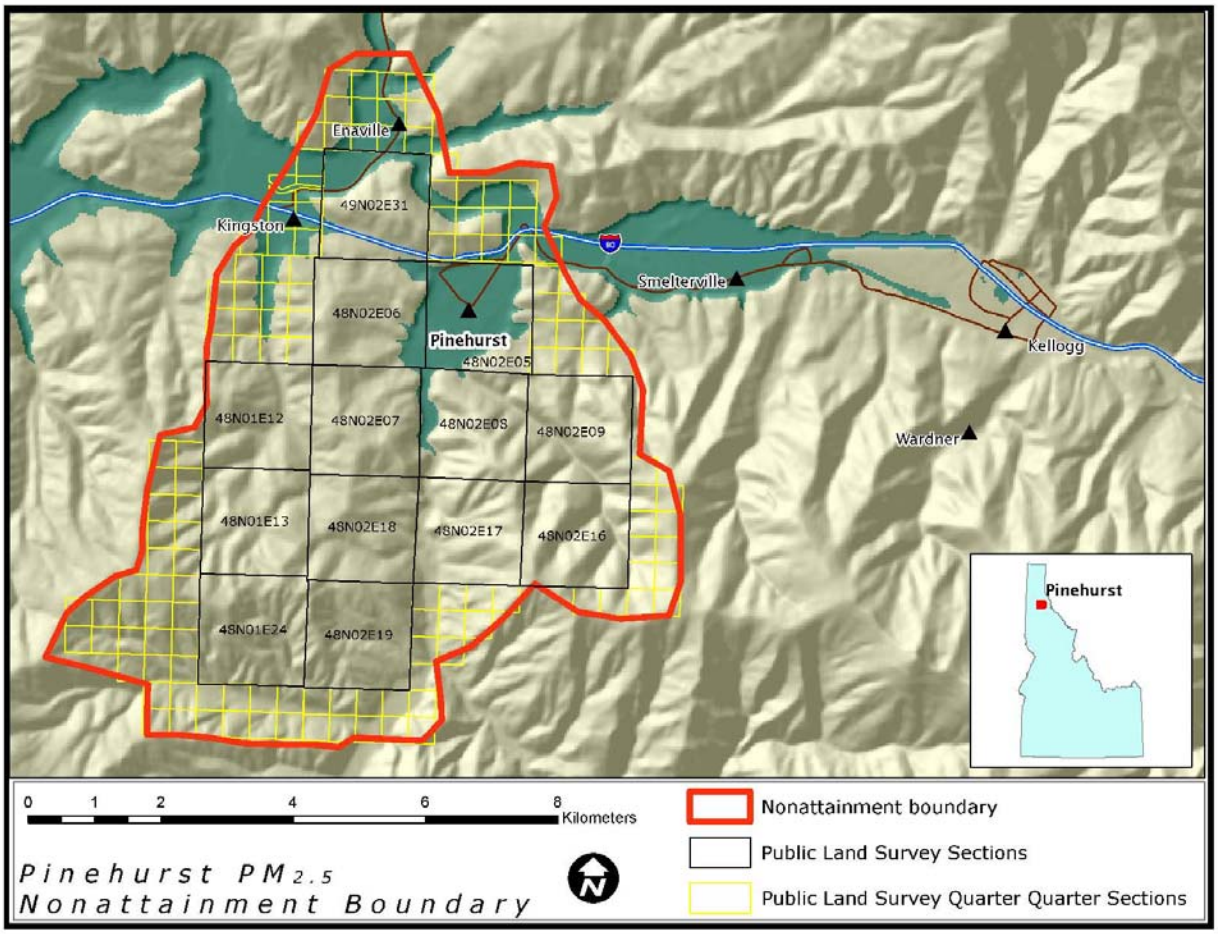


Figure 4: Proposed geographic boundary for the Pinehurst $PM_{2.5}$ nonattainment area.

Factor 1: Emissions data

For this factor, EPA evaluated county level emission data for the following $PM_{2.5}$ components and precursor pollutants: "$PM_{2.5}$ emissions total," "$PM_{2.5}$ emissions carbon," "$PM_{2.5}$ emissions other," "SO_2," "NO_x," "VOCs," and "NH_3." "$PM_{2.5}$ emissions total" represents direct emissions of $PM_{2.5}$ and includes: "$PM_{2.5}$ emissions carbon," "$PM_{2.5}$ emissions other", primary sulfate (SO_4), and primary nitrate. (Although primary sulfate and primary nitrate, which are emitted directly from stacks rather than forming in atmospheric reactions with SO_2 and NO_x, are part of "$PM_{2.5}$ emissions total," they are not shown on the template or data spreadsheet as separate items). "$PM_{2.5}$ emissions carbon" represents the sum of organic carbon (OC) and elemental carbon (EC) emissions, and "$PM_{2.5}$ emissions other" represents other inorganic particles (crustal). Emissions of SO_2 and NO_x, which are precursors of the secondary $PM_{2.5}$ components sulfate and nitrate, are also considered. VOCs (volatile organic compounds) and NH_3 (ammonia) are also potential $PM_{2.5}$ precursors and are included for consideration. Emissions data were derived from the 2005 National Emissions Inventory (NEI), Version 1[3].

EPA also considered the Contributing Emissions Score (CES) for each county. The CES is a metric that takes into consideration emissions data, meteorological data, and air quality monitoring information to provide a relative ranking of counties in and near an area. Note that this metric is not the exclusive way for consideration of data for these factors. A summary of the CES is included in Attachment 2[4].

Table 1 shows emissions of $PM_{2.5}$ components (given in tons per year) and the CES's for potentially contributing counties near Pinehurst and one ring of surrounding counties. Counties are listed in descending order by CES. EPA's analysis indicates that the counties of Kootenai, Benewah, Latah, Clearwater and Idaho can have significant contribution to $PM_{2.5}$ levels in Shoshone County solely based on the magnitude of emissions. Shoshone County is the only area recommended as nonattainment by the State of Idaho.

[3] See http://www.epa.gov/ttn/naaqs/pm/pm25_2006_techinfo.html
[4] A more detailed description can be found at http://www.epa.gov/ttn/naaqs/pm/pm25_2006_techinfo.html#C

Table 1:

County	State Recommends Nonattainment	Contributing Emissions Score (CES)	PM2.5 emissions - total (tpy)	PM2.5 emissions – carbon (tpy)	PM2.5 emissions – other (tpy)	SO_2 emissions (tpy)	NO_x Emissions (tpy)	VOC Emissions (tpy)	NH_3 Emissions (tpy)
Kootenai, ID	No	86	2,364	1,020	1344	466	6,395	11,080	1,319
Benewah, ID	No	49	1,080	587	493	114	992	3,493	314
Latah, ID	No	48	1,361	662	700	214	2,399	4,810	880
Shoshone, ID	**Yes (partial)**	**39**	**642**	**380**	**263**	**106**	**1,045**	**3,950**	**121**
Clearwater, ID	No	37	1,600	1,017	583	189	1,028	5,980	500
Sanders, MT	No	14	3,620	2,278	1292	391	968	9,852	874
Mineral, MT	No	11	2,914	1,830	1044	308	1,268	8,253	665
Bonner, ID	No	5	1,234	608	588	357	4,478	6,831	328

The State identifies that primary source of these pollutants in Shoshone County during PM_{10} exceedances were residential wood heating, tailpipe emissions, paved road fugitive dust, and asphalt paving. They have not submitted a source attribution analysis or filter analysis but it is foreseeable that with sparse roadway miles (few roads?) and low vehicles miles traveled (see Factor 4), and with fugitive dust emissions contributing predominantly to coarse particles (larger than PM2.5) rather than fine particles, wood heating of homes and other burning related emissions can be considered the predominant emissions source in Pinehurst. Although, the State was unable to provide a detailed emissions inventory or any filter analysis for source attribution, the State did provide a 2003 survey on woodstove usage in Shoshone County, which found that over 74% of the homes in the County have woodstoves and 95% of them use it as a main or back up source of heat during the winter. Shoshone County is considered rural, and the area surrounding the monitor is also rural with emissions sources likely being residential wood heating, other burning, and vehicles.

The state recommends looking at contributing emissions without emissions from wildfires that happened in 2005 and were included in the 2005 NEI. Wildfires happen in the summer and fall but all of the exceedances in Pinehurst occurred in the late fall and winter (November – February), when there are no wildfires and related emissions. EPA agrees that there is a temporal mismatch between the occurrence of the wildfires and exceedances. The effect of this adjustment is to decrease emissions in Shoshone County and render it more reflective of actual emissions from the county.

County	State Recommends Nonattainment	$PM_{2.5}$ (TPY)	VOC (TPY)	SO_x (TPY)	NO_x (TPY)	NH_3 (TPY)
Kootenai	No	2000	10628	458	6339	1290
Benewah	No	208	2029	81	863	217
Latah	No	579	3770	191	2278	813
Shoshone	**Yes (partial)**	**289**	**2963**	**68**	**998**	**52**
Clearwater	No	128	2043	74	837	227
Sanders (MT)	No	298	617	75	525	229
Mineral (MT)	No	195	609	87	933	133
Bonner	No	944	6019	331	4440	272

Further analysis indicates that Pinehurst is surrounded by state owned and privately owned timber lands. Slash burning occurs on these lands and is a large emissions source in this area. Smoke generated from local slash burning activities has been directly linked to recent excursions of the $PM_{2.5}$ 24-hour standard. Open burning of yard debris is also considered a significant contributor to $PM_{2.5}$ concentrations buildup in the Pinehurst airshed. From emissions and the CES's Kootenai, Benewah, Latah and Clearwater counties may have an impact on the violating monitor in Pinehurst, so further analysis is required to clarify this matter.

Factor 2: Air quality data

This factor considers the 24-hour $PM_{2.5}$ design values (in $\mu g/m^3$) for air quality monitors in counties in the Pinehurst area based on data from 2004-2006. A monitor's design value indicates whether that monitor attains a specified air quality standard. The 24-hour $PM_{2.5}$ standards are met when the 3-year average of a monitor's 98^{th} percentile values are 35 $\mu g/m^3$ or less. A design value is only valid if minimum data completeness criteria are met.

According to the state's submission and data from the EPA's AQS database, (see table below), the FRM monitor located in Pinehurst shows a 24-hour design value of 38 $\mu g/m^3$, which violates the 24-hour $PM_{2.5}$ standard. The preliminary design value for the same monitor based on 2005-2007 data is 37 $\mu g/m^3$. Therefore, Shoshone County is a candidate for inclusion in the nonattainment area. The data gathered from the continuous monitors in counties adjacent to Shoshone County indicate that these counties do not violate the $PM_{2.5}$ standard. Interestingly counties which had higher CES values than Shoshone County all have very low $PM_{2.5}$ design values supporting the basis that emissions in these counties, in spite of the high CES are not causing violations even locally, and have a very small likelihood of contributing to violations in Shoshone County and supports not including those counties in the NAA boundary. It is worth noting that the 2005 high value for Pinehurst coincides with high levels of slash burning and wild fire related emissions from 2005.

Table 2: 24-hour $PM_{2.5}$ monitoring data - continuous monitors in counties adjacent to Shoshone

County (City)	$PM_{2.5}$ 24-hour 98^{th} Percentile ($\mu g/m^3$)			3-Year Average of 98^{th} Percentiles	CES Scores
	2004	2005	2006	2004 – 2006	
Shoshone (Pinehurst)[a]	40.2	39.6	33.8	38	39
Shoshone (Pinehurst)[b]	35.7	45.7	33.5	38	39
St. Maries, Benewah	24.8	34.3	32.9	31	49
Latah (Moscow)	14.6	11.3	26.9	18	48
Kootenai (Coeur d'Alene)	26.7	24.1	27.5	26	86
Bonner (Sandpoint)	21.7	19.7	24.2	22	5

a. Real-time continuous $PM_{2.5}$ monitor data.
b. FRM Monitor data

[Note: Eligible monitors for providing design value data generally include State and Local Air Monitoring Stations (SLAMS) at population-oriented locations with a FRM or FEM monitor. All data from Special Purpose Monitors (SPM) using an FRM, FEM, or Alternative Reference Method (ARM) which has operated for more than 24 months is eligible for comparison to the relevant NAAQS, subject to the requirements given in the October 17, 2006 Revision to Ambient Air Monitoring Regulations (71 FR 61236). All monitors used to provide data must meet the monitor siting and eligibility requirements given in 71 FR 61236 to 61328 in order to be acceptable for comparison to the 24-hr PM2.5 NAAQS for designation purposes.]

Air quality monitoring data on the composition of fine particle mass are available from the EPA Chemical Speciation Network and the IMPROVE monitoring network. The chemical composition of the fine particle mass in the Pinehurst area is represented in the following table:

PM2.5 Composition Data	Concentration (ug/m^3)					Percent			
	Sulfate	Nitrate	Carbon	Crustal	Total	Sulfate	Nitrate	Carbon	Crustal
Total Concentration (Cold)	3.3	12.3	20.1	1.1	36.8	9	33	55	3

Regional Concentration (Cold)	0.9	3.5	3.9	0.3	8.6	10	41	45	3
Urban Increment (Cold)	2.4	8.8	16.2	0.8	28.2	9	31	57	3

Analysis of these data indicates that the days with the highest fine particle concentrations occur predominantly in the winter, with carbonaceous $PM_{2.5}$ and nitrate being the largest components. Both these components are consistent with emissions from various combustion sources, such as woodstoves, fireplaces with various fireplaces inserts and wood pellets, open and slash burning and vehicle tailpipe emissions. This further corroborates that combustion related sources that are present in the local area may have a large contribution to the $PM_{2.5}$ values in the violating monitor.

Factor 3: Population density and degree of urbanization (including commercial development)

Table 3 shows the 2005 population for each county in the area being evaluated, as well as the population density for each county in that area. Population data gives an indication of whether it is likely that population-based emissions might contribute to violations of the 24-hour $PM_{2.5}$ standards.

The Table below shows that all counties surrounding Shoshone, with the exception of Kootenai, have low population densities. Within Shoshone County, the Town of Pinehurst has a higher population density compared to the rest of the County. The population density in the City of Pinehurst is 1467 persons per square mile compared to 5 persons per square mile for the rest of the county. The City and County scale population density maps below, corroborate this fact. It is clear that there are pockets of density along the I90 corridor but the rest of the County is very sparsely populated. There are several small towns along the Interstate 90 (I-90) corridor that bisect Idaho's panhandle along the Silver Valley. According to census data from the EPA's technology transfer network (TTN), these towns range in size from the largest, Kellogg with 2,296 residents, to the second-largest, Pinehurst with 1,614, to Enaville, Gem, Kinston, and Silverton, which are small enough that they do not register in the census data.

From these data and maps, it appears likely that activity generated emissions from the City of Pinehurst provides a large proportion of contribution to the violating monitor. This also supports the conclusion that population activity-based emissions from the rest of the county are expected to be low. It may be prudent to closely examine if emissions from the nearest pockets of high density contribute to exceedances in the violating monitor.

Table 3: County Population and Population Densities

County	State Recommends Nonattainment	2006 Population	County Size (sqmi)	2006 Population Density (population per sqmi)
Shoshone*, ID	**Yes (partial)**	13,180	2634.0	5
Benewah, ID	No	9,347	776.0	12
Bonner, ID	No	41,275	1737.6	24
Clearwater, ID	No	8,324	2461.5	3
Kootenai, ID	No	131,507	1245.2	106
Latah, ID	No	35,029	1076.7	33
Mineral, MT	No	4,057	1219.9	3
Sanders, MT	No	11,138	2762.3	4
City of Pinehurst, ID	Yes	1614	1.1	1467

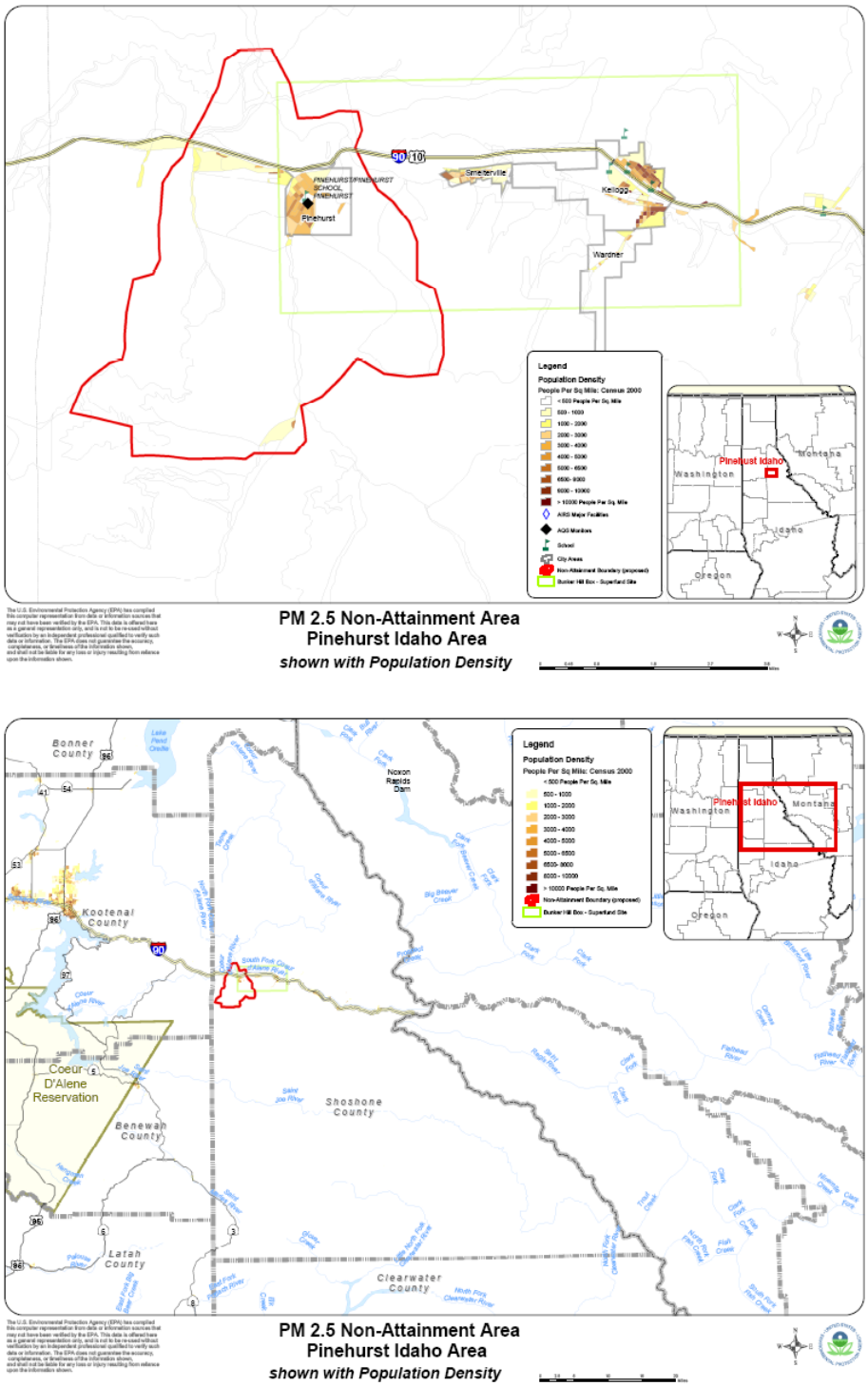


Figure 5: Population density in Shoshone County

Factor 4: Traffic and commuting patterns

This factor considers the number and percent of commuters in each county who commute to Shoshone County, as well as the total Vehicle Miles Traveled (VMT) for each county in thousands of miles (see Table 4). A county with numerous commuters is generally an integral part of an urban area and is likely contributing to fine particle concentrations in the area.

Several counties surrounding Shoshone County have substantially higher annual vehicle miles traveled (VMT) than Shoshone County. Based on 2006 data from EPA's TTN, Shoshone County had a total of 5275 commuters, of which over 4300 stayed in the county. Commuters from all other surrounding counties to Shoshone County amounted to approximately 514 commuters. The commuter information submitted by the state shows that commuting from surrounding counties into Shoshone County is limited and not a key factor for consideration in designating this nonattainment area.

Table 4. Traffic and Commuting Patterns

County	State Recommends Nonattainment	2005 VMT (Millions)	Commuting to Violating County	Percent Commuting to any violating counties (%)
Shoshone	**Yes (partial)**	**227**	**4304**	**89**
Benewah	No	153	78	1.6
Bonner	No	630	16	0.3
Clearwater	No	147	3	0.06
Kootenai	No	852	377	7.8
Latah	No	572	34	0.6
Mineral (MT)	No	203	6	0.12
Sanders (MT)	No	96	0	0.0

All figures as provided by Idaho with the Governor's 12/14/07 recommendations.

The listing of counties in Table 4 reflects a ranking based on the number of people commuting to other counties. The counties that are in the nonattainment area for the 1997 $PM_{2.5}$ NAAQS are shown in boldface.

[Note: The 2005 VMT data used for table 5 and 6 of the 9-factor analysis has been derived using methodology similar to that described in "Documentation for the final 2002 Mobile National Emissions Inventory, Version 3, September 2007, prepared for the Emission Inventory Group, U.S. EPA. This document may be found at: ftp://ftp.epa.gov/EmisInventory/2002finalnei/documentation/mobile/2002_mobile_nei_version_3_report_092807.pdf
The 2005 VMT data were taken from documentation which is still draft, but which should be released in 2008.]

Factor 5: Growth rates and patterns

This factor considers population growth for 2000-2006 and growth in vehicle miles traveled for 1996-2005 for Shoshone County and other nearby counties. A county with rapid population or VMT growth is generally an integral part of an urban area and likely to be contributing to fine particle concentrations in the area.

Table 5 below shows population, population growth, VMT and VMT growth for Shoshone and nearby counties. Counties are listed in descending order based on population growth between 2000 and 2006.

The State of Idaho has established that based on the 2000 and 2006 census data, the population of Shoshone County has decreased by 4.1%. The Town of Pinehurst had a population of 1,614; Pinehurst and data from the Idaho Department of Commerce (IDOC) indicates a slight increase (1.3%) in Pinehurst population from 2005 to 2006. The bigger story is the attractiveness of Kootenai and Bonner counties to tourists and retirees. However, as both the population centers in these counties are at least 45 kilometers away, it is reasonable to assert that growth in those areas will not increase activity based emissions or other emissions that will significantly contribute to $PM_{2.5}$ levels in Pinehurst even with the current growth projections, especially under meteorological conditions accompanying the exceedances (see Factor 6 and 7).

Table 5. Population numbers, density, and growth figures for Shoshone County and adjacent counties

County	2000 Population	2006 Population	Growth 2000 - 2006	% Change	VMT 2005 Millions
Kootenai	109,550	131,507	21,957	20	852
Bonner	37,031	41,275	4,244	11.5	630
Sanders (MT)	10,253	11,138	885	8.6	96
Mineral	3,883	4,057	174	4.5	203

(MT)					
Benewah	9,196	9,347	151	1.6	153
Latah	34,861	35,029	168	0.5	572
Shoshone*	13,747	13,180	-567	-4.1	227
Clearwater	8,895	8,324	-571	-6.4	147

All figures as provided by Idaho with the Governor's 12/14/07 recommendations.

According to information available to EPA, VMT growth from 1996-2002 has been 0% in Shoshone County , and is expected to be 4.5% on the stretch of I-90 that travels through the Pinehurst area, and this is not expected to change in the foreseeable future according to the State. Both these factors population and VMT growth are not expected to generate enough emissions to be major contributors to the violating monitor.

Factors 6 and 7: Meteorology (weather/transport patterns) and Geography/topography (mountain ranges or other air basin boundaries)

For this factor, EPA considered data from instruments in the Spokane Airport. Wind direction and wind speed data for 2004-2006 were analyzed, with an emphasis on "high $PM_{2.5}$ days" for each of two seasons (an October-April "cold" season and a May-September "warm" season). These high days are defined as days where any FRM or FEM air quality monitors had 24-hour $PM_{2.5}$ concentrations above 95% on a frequency distribution curve of $PM_{2.5}$ 24-hour values.

For each air quality monitoring site, EPA developed a "pollution rose" to understand the prevailing wind direction and wind speed on the days with highest fine particle concentrations. The figure identifies 24-hour $PM_{2.5}$ values by color; days exceeding 35 ug/m^3 are denoted with a red or black icon. A dot indicates the day occurred in the warm season; a triangle indicates the day occurred in the cool season. The center of the figure indicates the location of the air quality monitoring site, and the location of the icon in relation to the center indicates the direction from which the wind was blowing on that day. An icon that is close to the center indicates a low average wind speed on that day. Higher wind speeds are indicated when the icon is further away from the center.

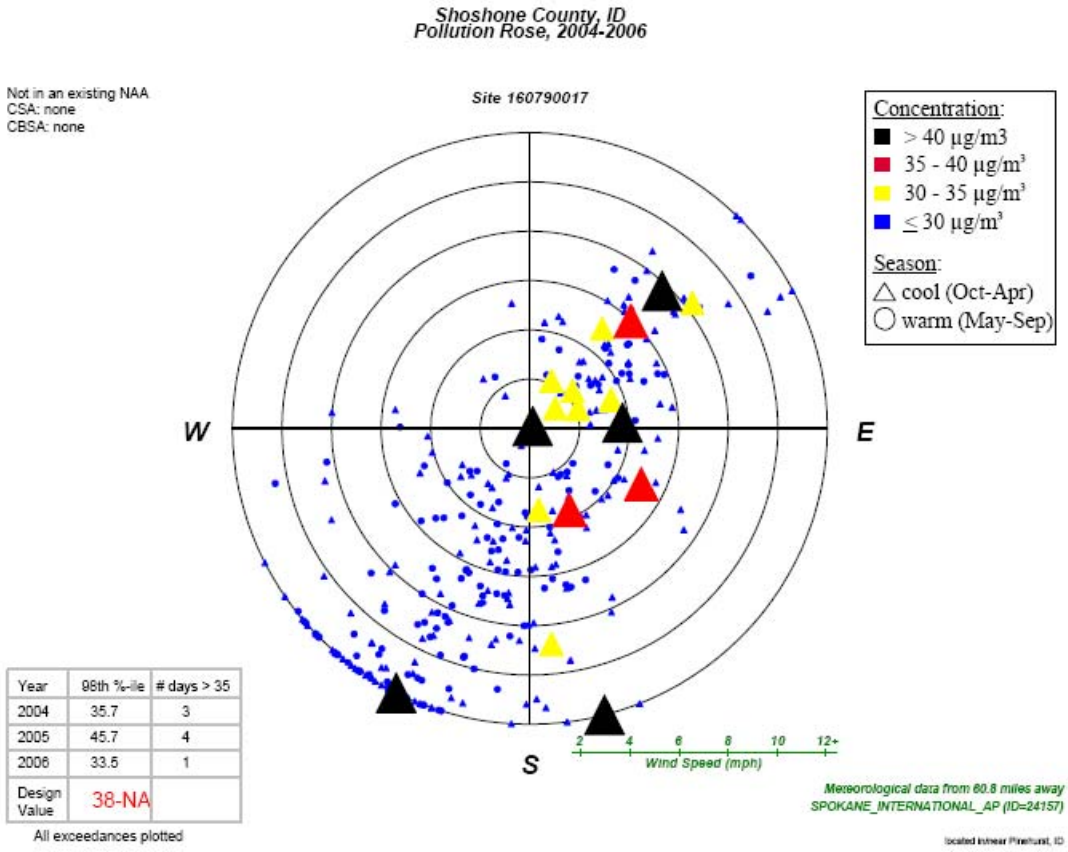


Figure 6. Pollution Rose form the Spokane International Airport, 61 miles to the West

This data from an airport 61 miles away in and urban area with significant terrain features between Pinehurst and Spokane. For the Pinehurst area, EPA discarded this approach in lieu of the local data based analysis that was provided by the State of Idaho. In areas with significant terrain and complex meteorology data from areas that are this far away are not representative of local conditions and can be misleading.

The following are the wind and pollution roses submitted by the state for the winter from data obtained from a metrological station collocated with $PM_{2.5}$ monitor in Pinehurst, ID.

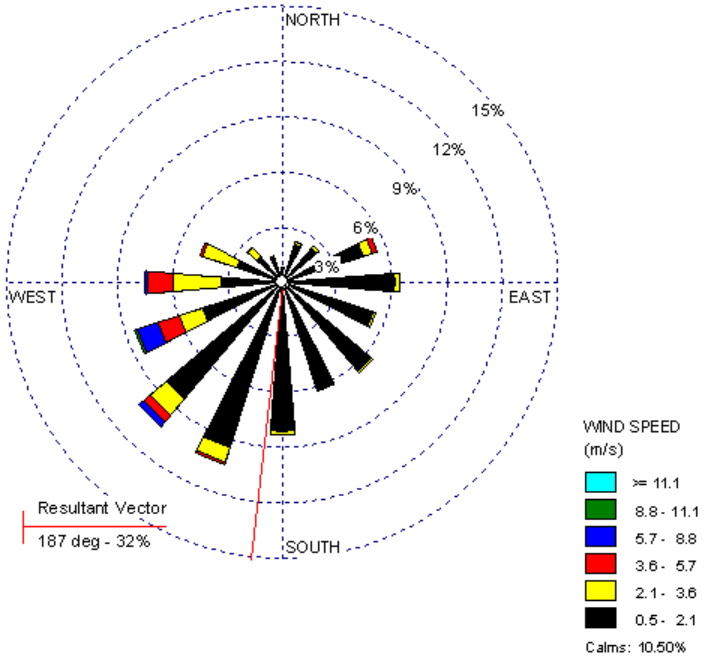


Figure 7: Wind rose for Pinehurst, Idaho in the wintertime. Data from January, February, November, and December 2006.

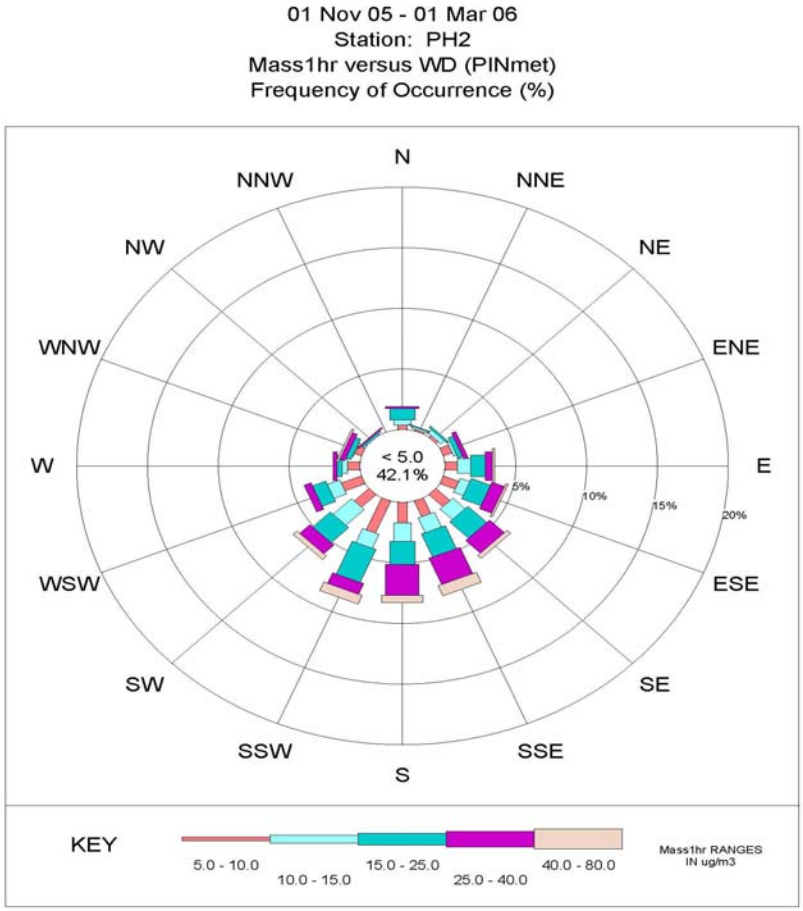


Figure 8: Pollution rose for Pinehurst, Idaho for wintertime: November 2005 – March 2006.

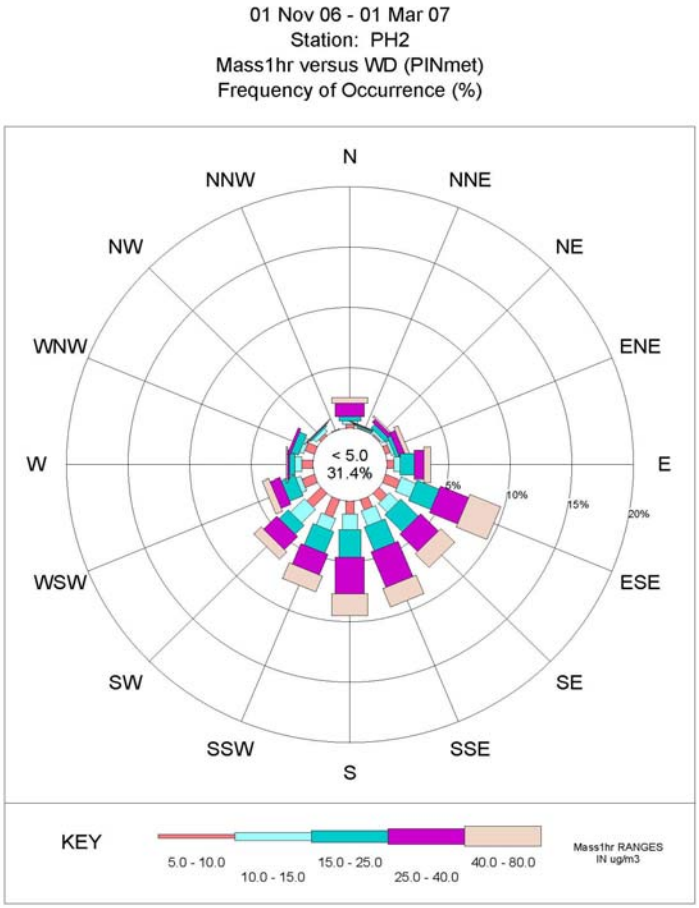


Figure 9: Pollution rose for Pinehurst, Idaho for wintertime: November 2006 – March 2007.

As shown in the wind rose, the predominant direction of flow is from the South with a resultant direction of 189 degrees. The pollution roses also capture this for the winters of 2005 and 2006, with the average prevailing surface wind direction for high $PM_{2.5}$ days in Pinehurst being from the WSW to the E.

The pollution roses indicate wind directionality correlated with $PM_{2.5}$ concentrations. For example, the radial directions indicate direction from which wind is arriving to the met station and the bars in the radials indicate hourly $PM_{2.5}$ values. Each concentric circle represents the percent of time the wind comes from that direction. In the 2005 winter pollution rose, for hours over 40 μgm^{-3}, the winds come from the SW, S, and the SE directions. For the highest value hours in the winter of 2006, the wind comes from SW to ESE. The pollution roses show that 24-hour $PM_{2.5}$ concentrations are influenced by emissions from all directions, but these data especially suggest that emissions from some directions within this sector relative to the violation are more likely to contribute to the violation than emissions from other directions.

Studies referenced by the State of Idaho[5] indicate that a few meteorological conditions dominate this region and the town of Pinehurst, similar to many mountain-valleys in the Western United Stated. The analysis clarifies some important weather-terrain interactions that play a key role in pollutant origin and dispersion, and also indicates the level of contribution from adjacent areas or counties.

1. Predominant Weather Patterns: Occasional masses of arctic air bring bitter cold weather during the winter months to Northern Idaho and many places in the Pacific Northwest. When cold, stable air is

[5] Wolyn, P. G., and T. B. McKee, 1989: Deep Stable Layers in the Intermountain Western United States. *Monthly Weather Review*, 117, 461–472.

advected into the region by arctic outbreaks, cold air becomes pooled in the narrow mountain valleys of the region. Such cold air masses can further stabilize when high pressure aloft dominates the region. Under such conditions, a prolonged strong inversion layer (or layers) near the ground limits vertical mixing, trapping local pollutants close to the valley floor[6].

2. Source Contribution and Pollution build – up: During episodes such as this, emissions increase because more home heating is required due to the cold temperatures. Pollutant concentrations accumulate day to day, especially when the inversions persist even with diurnal heating. The low solar angle, short winter days, light and variable winds, and high albedo limit atmospheric heating contributing to a stable inversion that persists for days. Under these conditions, pollutant concentrations build quickly in areas like Pinehurst where terrain features restrict airflow.
3. Wind and pollution rose analysis (See figure above) for stagnation episodes in the winter of 2006 show that the predominant wind direction is from the South and South East, with little exchange of air masses between Pinehurst and the Silver Valley to the east.
4. The State of Idaho also performed dispersion modeling using CALPUFF, at a 500 m vertical resolution and 100 m horizontal resolution to simulate the winter 2006 episodes, using a hypothetical source located in Pinehurst. The analysis revealed that air mass exchange between Pinehurst and Smelterville, the closest town in the Silver Valley, to the East of Pinehurst was negligible. Pinehurst is essentially cut off from other towns in the Silver Valley.

The states description of the modeling and associated graphics are attached below:

> The airflow and dispersion patterns of the Pinehurst area were further analyzed by dispersion modeling. Modeling using the CALPUFF air quality dispersion model with 500-meter terrain resolution was conducted to simulate the episodes during January 3 – 4 and December 18 – 22, 2006. A low level hypothetical "source" (similar to a woodstove chimney) was located first in Pinehurst, then in other communities in the Silver Valley, to observe the predicted relative flow patterns during inversion conditions. Figure 13 shows the modeling results. The results show insignificant air exchange between Pinehurst and other towns in the main Silver Valley. For a hypothetical source located in Smelterville, the predicted 24-hour relative concentration impact at the Pinehurst monitor is less than 0.1% of the impact in Smelterville itself and even lower when the source was located in the other towns in the Silver Valley more distant from Pinehurst. When the hypothetical source was located in Pinehurst, the predicted 24-hour relative concentration impact in Smelterville is less than 0.1% of the impact in Pinehurst itself.

[6] http://www.wrcc.dri.edu/CLIMATEDATA.html (as of 08/15/08).

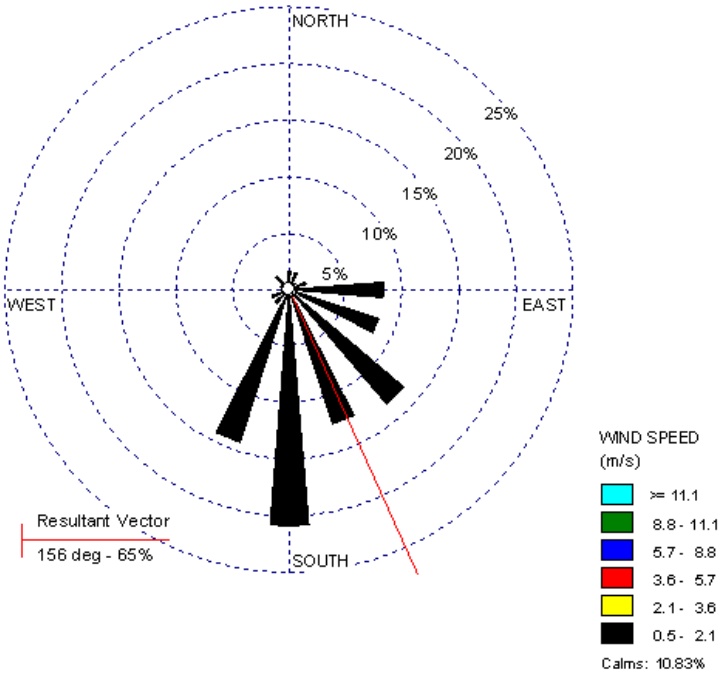


Figure 10: Wind rose for Pinehurst, Idaho, December 18 – 22, 2006, the period of a $PM_{2.5}$ stagnation episode. Very few north and northeasterly winds occurred throughout the period. This indicates that there was very little air mass exchange between Pinehurst and the nearby towns in the Silver Valley.

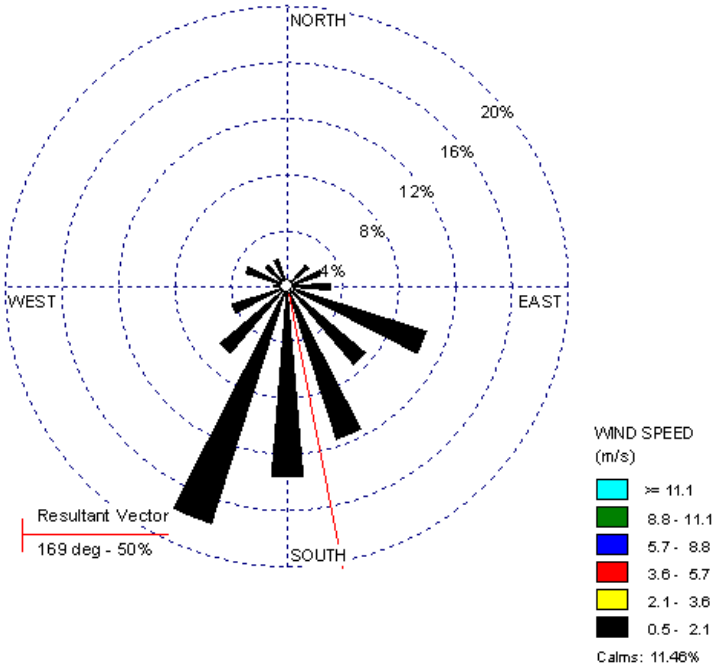


Figure 11: Wind patterns during another winter $PM_{2.5}$ stagnation episode in Pinehurst, Idaho, January 2 – 5, 2006.

All the information presented for these two factors demonstrates that Pinehurst is largely cut off from the Silver Valley airshed. The minimal pollutant transfer behavior in the model runs is explained by the narrow gap in the terrain connecting Pinehurst with the Silver Valley. When stagnation occurs and cold air pools in Pinehurst, the cold air drains to the north, merging with the main Silver Valley drainage winds, thereby blocking the main valley flows from entering Pinehurst.

The greatest contributing emissions source to $PM_{2.5}$ concentrations above the 24-hour standard that occurs consistently is residential wood heating between the hours of 8 p.m. and 6 a.m. However, DEQ has recently gathered data, using a continuous monitor, which shows $PM_{2.5}$ concentrations greater than the 24-hour standards that have been directly linked to slash burning events. Such impacts have been reported to occur from slash burns on the ridges surrounding Pinehurst and neighboring valley floors when smoke rises toward the ridge facing away from Pinehurst, then apparently downwashes on the lee side of the ridge in Pinehurst, resulting in short-term peak concentrations. These short-term peak concentrations (1 to 2 hours) can cause an excursion of the 24-hour standard because the background concentration, due to residential wood heating, is typically already elevated when the slash burning impacts Pinehurst.

Although slash burning is infrequent and the location and time of year is rarely constant, the real-time monitoring data indicate that slash burning can contribute to a violation of the $PM_{2.5}$ 24-hour standard. These impacts suggest that the Pine Creek drainage, the nearest ridges immediately surrounding Pinehurst, and the nearest valley areas just beyond those ridges should be included in the NAA boundaries to address slash burning.

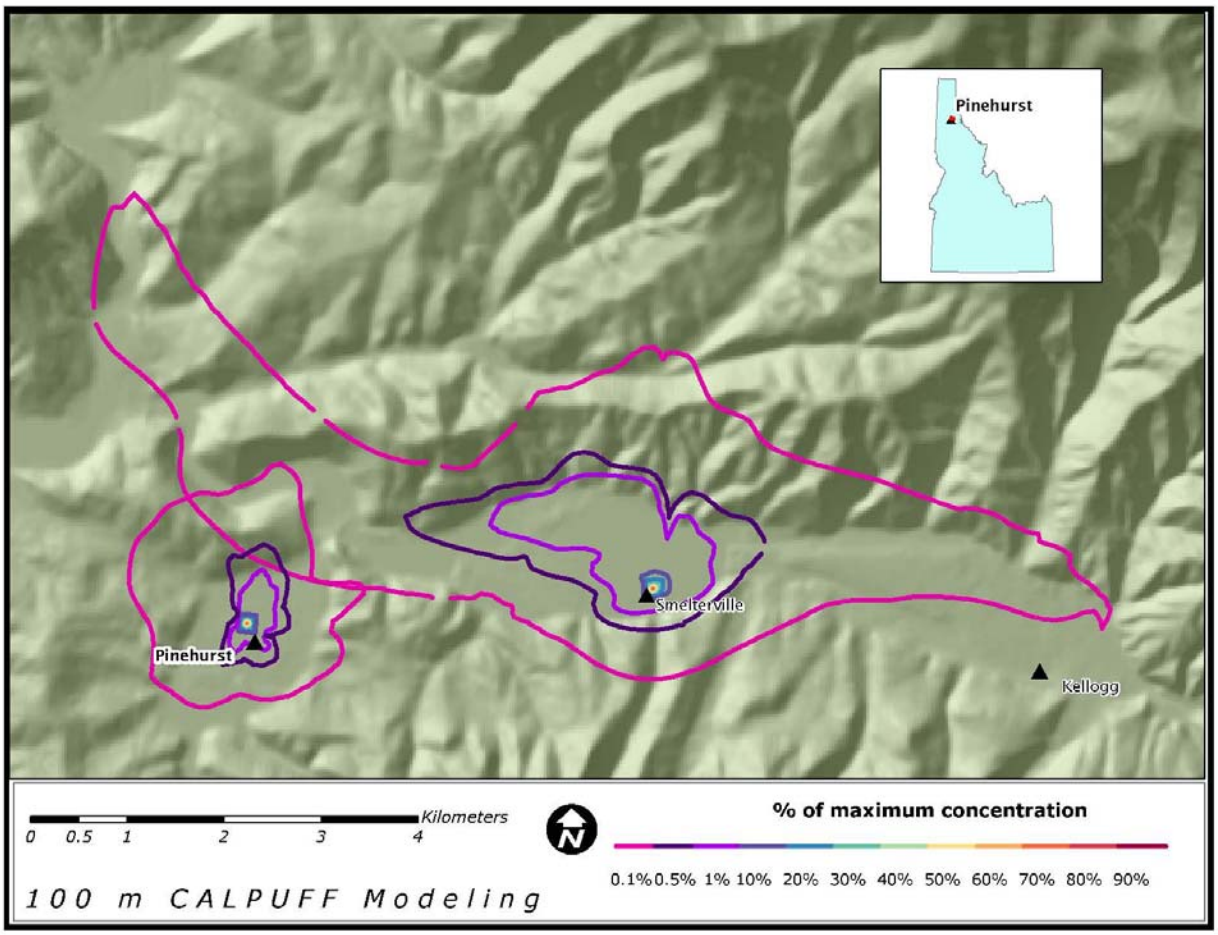


Figure 12: Modeling results of hypothetical sources, showing that sources located in the Silver Valley do not contribute to a violation of the $PM_{2.5}$ standard in Pinehurst.

The State of Idaho claims that this analysis combined with emissions and monitoring data, supports that slash burning is an important contributor to certain exceedances of the standard at the Pinehurst monitor. Slash burning in ridges surrounding Pinehurst and surrounding valley floors rise to the ridge level and downwash towards Pinehurst, resulting in elevated $PM_{2.5}$ concentrations. These elevated concentrations, combined with the already elevated background values due to woodstove combustion and other local sources, typically leads to exceedances of the standard.

EPA agrees that this analysis demonstrates that the designation boundary needs to consider the sources that cause or contribute to the violation of the standard. In this case, the boundaries should be expansive enough to include, at the very least ridges surrounding Pinehurst and one ring of adjacent valleys. Further refinement may be needed understand the point at which including further areas does not benefit the analysis or lead to controls that help Pinehurst attain and maintain the standard.

[Note: the meteorology factor is also considered in each county's Contributing Emissions Score because the method for deriving this metric included an analysis of trajectories of air masses for high $PM_{2.5}$ days.]

Factor 8: Jurisdictional boundaries (e.g., existing PM and ozone areas)

In evaluating the jurisdictional boundary factor, consideration should be given to existing boundaries and organizations that may facilitate air quality planning and the implementation of control measures to attain the standard. Areas designated as nonattainment (e.g. for PM2.5 or 8-hour ozone standard) represent important boundaries for state air quality planning.

The Town of Pinehurst is currently designated nonattainment for PM_{10}. Figure 14 illustrates that the PM_{10} NAA does not include locations within the Silver Valley or surrounding counties. Shoshone County lies entirely within DEQ's Coeur d'Alene Region and EPA Region 10. The town of Pinehurst is also located in the Idaho/Montana Airshed Group, which implements the smoke management program for prescribed fire on both public and private lands.

EPA Region 10 is also satisfied that the State of Idaho has the necessary legal authorities to develop and implement appropriate control measures to address the $PM_{2.5}$ nonattainment in Pinehurst, ID. EPA Region 10 has communicated to the State of Idaho that sources outside of the nonattainment area identified as contributing to the violating monitor will have to be subject to control strategies for attainment of standards at the violating monitor.

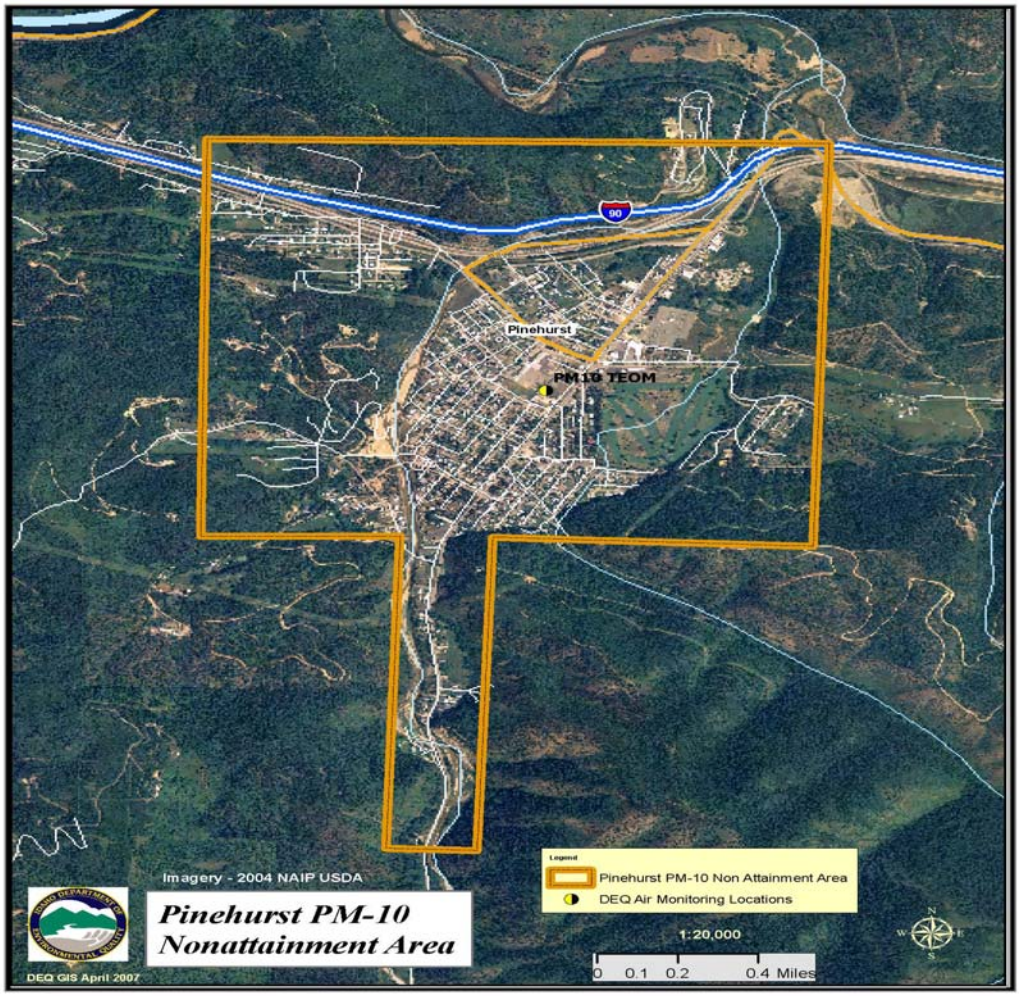


Figure 13: Pinehurst PM_{10} nonattainment area.

Factor 9: Level of control of emission sources

This factor considers emission controls currently implemented for major sources in the Pinehurst area. The emission estimates on Table 1 (under Factor 1) include any control strategies implemented by the states in the Pinehurst area before 2005 that may influence emissions of any component of $PM_{2.5}$ emissions (i.e., total carbon, SO_2, NOx, and crustal $PM_{2.5}$).

The town of Pinehurst is currently a PM_{10} NAA, and specific voluntary controls have been implemented that partially pertain to $PM_{2.5}$ emissions. The major emissions sources of both PM_{10} and $PM_{2.5}$ in Pinehurst are residential wood heating and open burning. DEQ implements a daily air quality advisory program for woodstove and open burning from November 1 through March 31 of each year. Open burning and slash burning in the fall is currently controlled by DEQ burn bans issued based upon ventilation predictive models. The Montana/Idaho Airshed Group also participates in burning restrictions during October and November.

Attachment 3

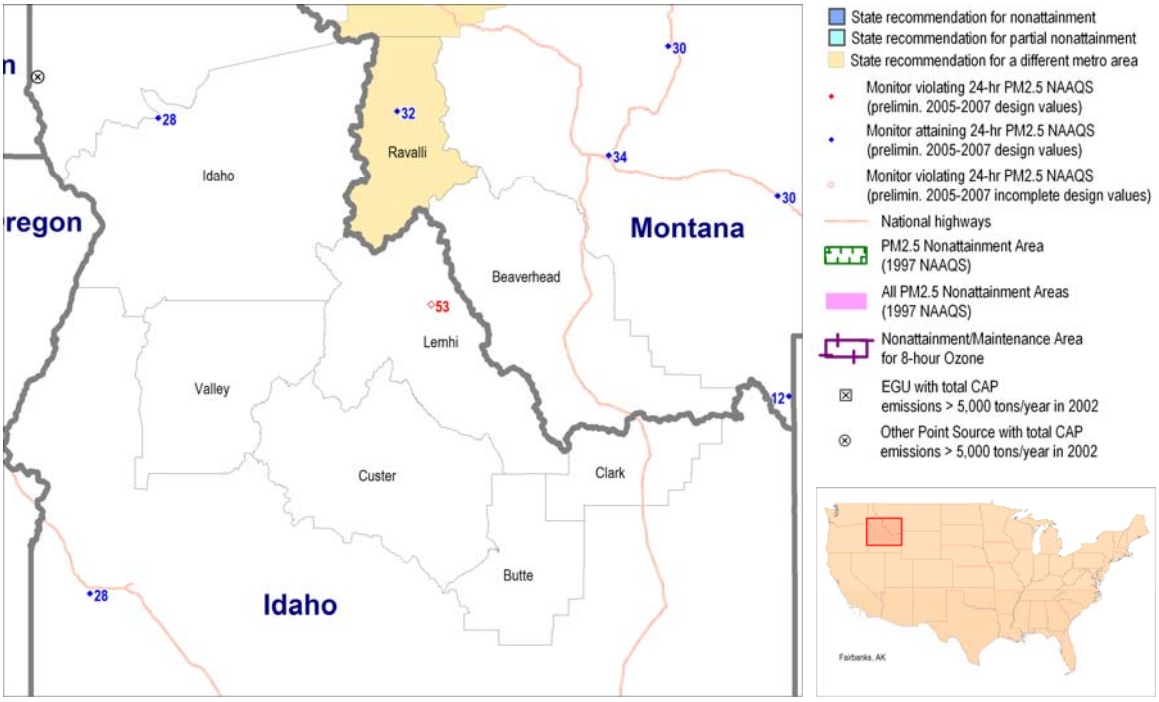
EPA Technical Analysis for Lemhi, ID

Pursuant to section 107(d) of the Clean Air Act, EPA must designate as nonattainment those areas that violate the NAAQS and those areas that contribute to violations. This technical analysis for the Lemhi County area identifies the counties with monitors that violate the 24-hour PM2.5 standard and evaluates the counties that potentially contribute to fine particle concentrations in the area. EPA has evaluated these counties based on the weight of evidence of the following nine factors recommended in EPA guidance and any other relevant information:

- pollutant emissions
- air quality data
- population density and degree of urbanization
- traffic and commuting patterns
- growth
- meteorology
- geography and topography
- jurisdictional boundaries
- level of control of emissions sources

Figure 1 is a map of the counties in the area and other relevant information such as the locations and design values of air quality monitors, the metropolitan area boundary, and counties recommended as unclassifiable by the State.

Figure 1. Lemhi County, ID



In a letter dated December 14, 2007, the State of Idaho recommended that Lemhi County be designated as unclassifiable for the 2006 24-hour $PM_{2.5}$ standards based on air quality data from 2004-2006. These data are from Federal Reference Method (FRM) and Federal Equivalent Method (FEM) monitors located in the state.

Air quality monitoring data on the composition of fine particle mass from the EPA Chemical Speciation Network and the IMPROVE monitoring network are unavailable for Lemhi County.

Based on EPA's 9-factor analysis described below, EPA agrees with the State's recommendation that Lemhi County, ID should be designated unclassifiable for the 24-hour $PM_{2.5}$ air-quality standard based upon currently available information. This county is listed in the table below.

Idaho	Idaho's Recommended Designation	EPA's Intended Designation
Lemhi County	Lemhi County (unclassifiable)	Lemhi County (unclassifiable)

EPA intends to designate Lemhi County, Idaho as "unclassifiable" because Lemhi County had a violation of the 24-hr PM2.5 NAAQS for 2003-2005, followed by incomplete data for the periods of 2004-2006 and 2005-2007 due to malfunctioning monitors. The State of Idaho and the EPA have determined the data from the monitoring periods of 2004-2006 and 2005-2007 to be incomplete, and therefore unusable for the purpose of designations, and therefore, have recommended an unclassifiable designation for Lemhi County. Once the monitor has three consecutive years of complete data, EPA in conjunction with the State will reassess the situation and revise the designation.

Lemhi county is a large county of 4,570 square miles (for comparison, Connecticut is about 5,500 square miles) with complex terrain and a low population of 7,900. The PM2.5 monitor is located in the city of Salmon, which is located at 3,000 feet elevation. Surrounding mountains to the east and west rise to over 8,000.

The following is a summary of the 9-factor analysis for the Lemhi area.

Ravalli and Idaho Counties may merit consideration as candidates for nonattainment due to their levels of potentially contributing emissions and relatively high populations for the region. Ravalli County, in particular, with a violating monitor during 2005-2006 and a much higher population density than the remaining counties in the Lemhi County area, could be considered as a candidate for nonattainment. However, Ravalli and Idaho Counties are considered part of the Hamilton, MT area for purposes of the 24-hour $PM_{2.5}$ designations process. Their respective intended designations will be addressed in a separate technical analysis for the Hamilton area.

The remaining counties in the Lemhi County area should not be considered as candidates for nonattainment due to their relatively low emission levels, small populations, minimal commuter activity, and lack of large emission sources.

Factor 1: Emissions data

For this factor, EPA evaluated county level emission data for the following $PM_{2.5}$ components and precursor pollutants: "$PM_{2.5}$ emissions total," "$PM_{2.5}$ emissions carbon," "$PM_{2.5}$ emissions other," "SO_2," "NO_x," "VOCs," and "NH_3." "$PM_{2.5}$ emissions total" represents direct emissions of $PM_{2.5}$ and includes: "$PM_{2.5}$ emissions carbon," "$PM_{2.5}$ emissions other," primary sulfate (SO_4), and primary nitrate. (Although primary sulfate and primary nitrate, which are emitted directly from stacks rather than forming in atmospheric reactions with SO_2 and NO_x, are part of "$PM_{2.5}$ emissions total," they are not shown in Table 1). "$PM_{2.5}$ emissions carbon" represents the sum of organic carbon (OC) and elemental carbon (EC) emissions, and "$PM_{2.5}$ emissions other" represents other inorganic particles (crustal). Emissions of SO_2 and NO_x, which are precursors of the secondary $PM_{2.5}$ components sulfate and nitrate, are also considered. VOCs (volatile organic compounds) and NH_3 (ammonia) are also potential $PM_{2.5}$ precursors and are included for consideration.

Emissions data were derived from the 2005 National Emissions Inventory (NEI), version 1. See http://www.epa.gov/ttn/naaqs/pm/pm25_2006_techinfo.html.

EPA also considered the Contributing Emissions Score (CES) for each county in most areas. The CES is a metric that takes into consideration emissions data, meteorological data, and air quality monitoring information to provide a relative ranking of counties in and near an area. CES scores are not available for the Lemhi County area due to technical constraints.

Table 1 shows emissions of $PM_{2.5}$ and precursor pollutants components (given in tons per year) for violating and potentially contributing counties in the Lemhi County area. Counties are listed in descending order by total $PM_{2.5}$ emissions.

Table 1. $PM_{2.5}$ Related Emissions

County	State Recommended Nonattainment?	CES	$PM_{2.5}$ emissions total (tpy)	$PM_{2.5}$ emissions carbon (tpy)	$PM_{2.5}$ emissions other (tpy)	SO_2 (tpy)	NO_X (tpy)	VOCs (tpy)	NH_3 (tpy)
Idaho	No	N/A	20,545	13,276	7,269	1,700	3,965	60,128	4,666
Ravalli	No		14,190	8,958	5,232	1,182	3,200	39,629	3,227
Custer	No		6,307	4,070	2,237	522	1,204	19,134	1,402
Valley	No		3,099	1,966	1,132	353	1,316	10,889	659
Lemhi	No		2,396	1,487	909	220	986	9,368	865
Beaverhead	No		701	307	394	90	1,265	1,728	1,476
Clark	No		228	115	113	18	282	3,522	419
Butte	No		187	46	141	89	392	603	426

Based on high emissions levels, the Lemhi County area is a candidate for a 24-hour nonattainment designation. Idaho and Ravalli Counties have high emissions and may contribute to the air quality in the Lemhi County area. Custer, Valley, Beaverhead, Clark, and Butte Counties have emission levels sufficiently low to eliminate them from consideration as candidates for nonattainment for this factor.

Factor 2: Air quality data

This factor considers the 24-hour $PM_{2.5}$ design values (in $\mu g/m^3$) for air quality monitors in counties in the Lemhi County area based on data for the 2005-2007 period. A monitor's design value indicates whether that monitor attains a specified air quality standard. The 24-hour $PM_{2.5}$ standards are met when the 3-year average of a monitor's 98^{th} percentile values are 35 $\mu g/m^3$ or less. A design value is only valid if minimum data completeness criteria are met.

The 24-hour $PM_{2.5}$ design values for counties in the Lemhi County area are shown in Table 2.

Table 2. Air Quality Data

County	State Recommended Nonattainment?	Design Valu 2004-06 ($\mu g/m^3$)	Design Valu 2005-07 ($\mu g/m^3$)
Idaho	No		28
Ravalli	No	38	32
Custer	No		
Valley	No		
Lemhi	No		
Beaverhead			
Clark			
Butte			

Adjacent to Lemhi County, Ravalli County showed a violation of the 24-hour $PM_{2.5}$ standard in 2004-2006, but is not included for designations on the basis of 2005-2007 data. However, the absence of a violating monitor alone is not a sufficient reason to eliminate counties as candidates for nonattainment status.

Note: Eligible monitors for providing design value data generally include State and Local Air Monitoring Stations (SLAMS) at population-oriented locations with a FRM or FEM monitor. All data from Special Purpose Monitors (SPM) using an FRM, FEM, or Alternative Reference Method (ARM) which has operated for more than 24 months is eligible for comparison to the relevant NAAQS, subject to the requirements given in the October 17, 2006 Revision to Ambient Air Monitoring Regulations (71 FR 61236). All monitors used to provide data must meet the monitor sitting and eligibility requirements given in 71 FR 61236 to 61328 in order to be acceptable for comparison to the 24-hr PM2.5 NAAQS for designation purposes.

Factor 3: Population density and degree of urbanization (including commercial development)

Table 3 shows the 2005 population for each county in the area being evaluated, as well as the population density for each county in that area. Population data gives an indication of whether it is likely that population-based emissions might contribute to violations of the 24-hour $PM_{2.5}$ standards.

The populations and population densities for Lemhi county and surrounding counties are relatively low.

Table 3. Population

County	State Recommended Nonattainment?	2005 Population	2005 Population Density (pop/sq mi)
Idaho	No	15,659	2
Ravalli	No	39,822	17
Beaverhead	No	8,778	2
Valley	No	8,310	2
Lemhi	No	7,868	2
Custer	No	4,097	1
Butte	No	2,782	1
Clark	No	914	1

Factor 4: Traffic and commuting patterns

This factor considers the number of commuters in each county who drive to another county within the Lemhi County area; the percent of total commuters in each county who commute to other counties within the Lemhi area; and the total Vehicle Miles Traveled (VMT) for each county in thousands of miles (see Table 4). A county with numerous commuters is generally an integral part of an urban area and is likely contributing to fine particle concentrations in the area.

The listing of counties on Table 4 reflects a ranking in descending order based on the number of people commuting to other counties.

Table 4. Traffic and Commuting Patterns

County	State Recommended Non-attainment?	2005 VMT (millions mi)	Number Commuting to any violating counties	Percent Commuting to any violating counties	Number Commuting into statistical area	Percent Commuting into statistical area
Ravalli	No	514	11,770	77		
Lemhi	No	131	3,000	98	3,000	98
Custer	No	71	60	3	60	3
Idaho	No	259				
Beaverhead	No	232				
Valley	No	133				
Butte	No	47				
Clark	No	17				

Most of the commuters in Lemhi County remain in the county. Ravalli County has the highest number of commuters for counties adjacent to Lemhi county, however very few commuters from Ravalli or any other county commute into Lemhi County.

Note: The 2005 VMT data used for table 4 and 5 of the 9-factor analysis has been derived using methodology similar to that described in "Documentation for the final 2002 Mobile National Emissions Inventory, Version 3,

September 2007, prepared for the Emission Inventory Group, U.S. EPA. This document may be found at: ftp://ftp.epa.gov/EmisInventory/2002finalnei/documentation/mobile/2002_mobile_nei_version_3_report_092807.pdf
The 2005 VMT data were taken from documentation which is still draft, but which should be released in 2008.

Factor 5: Growth rates and patterns

This factor considers population growth for 2000-2005 and growth in vehicle miles traveled for 1996-2005 for counties in the Lemhi County area, as well as patterns of population and VMT growth. A county with rapid population or VMT growth is generally an integral part of an urban area and likely to be contributing to fine particle concentrations in the area.

Table 5 below shows population, population growth, VMT and VMT growth for counties that are included in the Lemhi County area. Counties are listed in descending order based on VMT growth between 1996 and 2005.

Table 5. Population and VMT Values and Percent Change.

Location	Population (2005)	Population Growth (2000 - 2005)	Population % change (2000 - 2005)	2005 VMT (millions mi)	VMT Growth (millions mi from 2000 to 2005)	VMT % change (1996 to 2005)
Lemhi	7,868	154	2	131		101
Idaho	15,659	155	1	259		61
Valley	8,310	686	9	133		45
Custer	4,097	-262	(6)	71		26
Ravalli	39,822	3,620	10	514		25
Beaverhead	8,778	-462	(5)	232		18
Butte	2,782	-116	(4)	47		17
Clark	914	-113	(11)	17		(88)

Overall population growth between 2000 and 2005 was low for the Lemhi County area, with Ravalli and Valley Counties having the highest growth. All counties in the area except Clark had sizable increases in VMT from 1996 and 2005, but the increases were on very small base totals. Lemhi County had the largest increase in VMT in the Lemhi County area during this period.

Factor 6: Meteorology (weather/transport patterns)

For this factor, EPA considered data from National Weather Service instruments in the area. Wind direction and wind speed data for 2004-2006 were analyzed, with an emphasis on "high $PM_{2.5}$ days" for each of two seasons (an October-April "cold" season and a May-September "warm" season). These high days are defined as days where any FRM or FEM air quality monitors had 24-hour $PM_{2.5}$ concentrations above 95% on a frequency distribution curve of $PM_{2.5}$ 24-hour values.

For each air quality monitoring site, EPA developed a "pollution rose" to understand the prevailing wind direction and wind speed on the days with highest fine particle concentrations. The figure identifies 24-hour PM2.5 values by color; days exceeding 35 ug/m3 are denoted with a red or black icon. A dot indicates the day occurred in the warm season; a triangle indicates the day occurred in the cool season. The center of the figure indicates the location of the air quality monitoring site, and the location of the icon in relation to the center indicates the direction from which the wind was blowing on that day. An icon that is close to the center indicates a low average wind speed on that day. Higher wind speeds are indicated when the icon is further away from the center.

EPA was unable to obtain a representative wind speed and direction data to construct a wind rose for Lemhi County. Based on analysis of other factors and the absence of a violating monitor, EPA concludes that Valley, Custer, Butte, Clark, and Beaverhead Counties, are low-ranked candidates for a 24-hour $PM_{2.5}$ nonattainment designation, and can be dropped from further consideration as nonattainment counties.

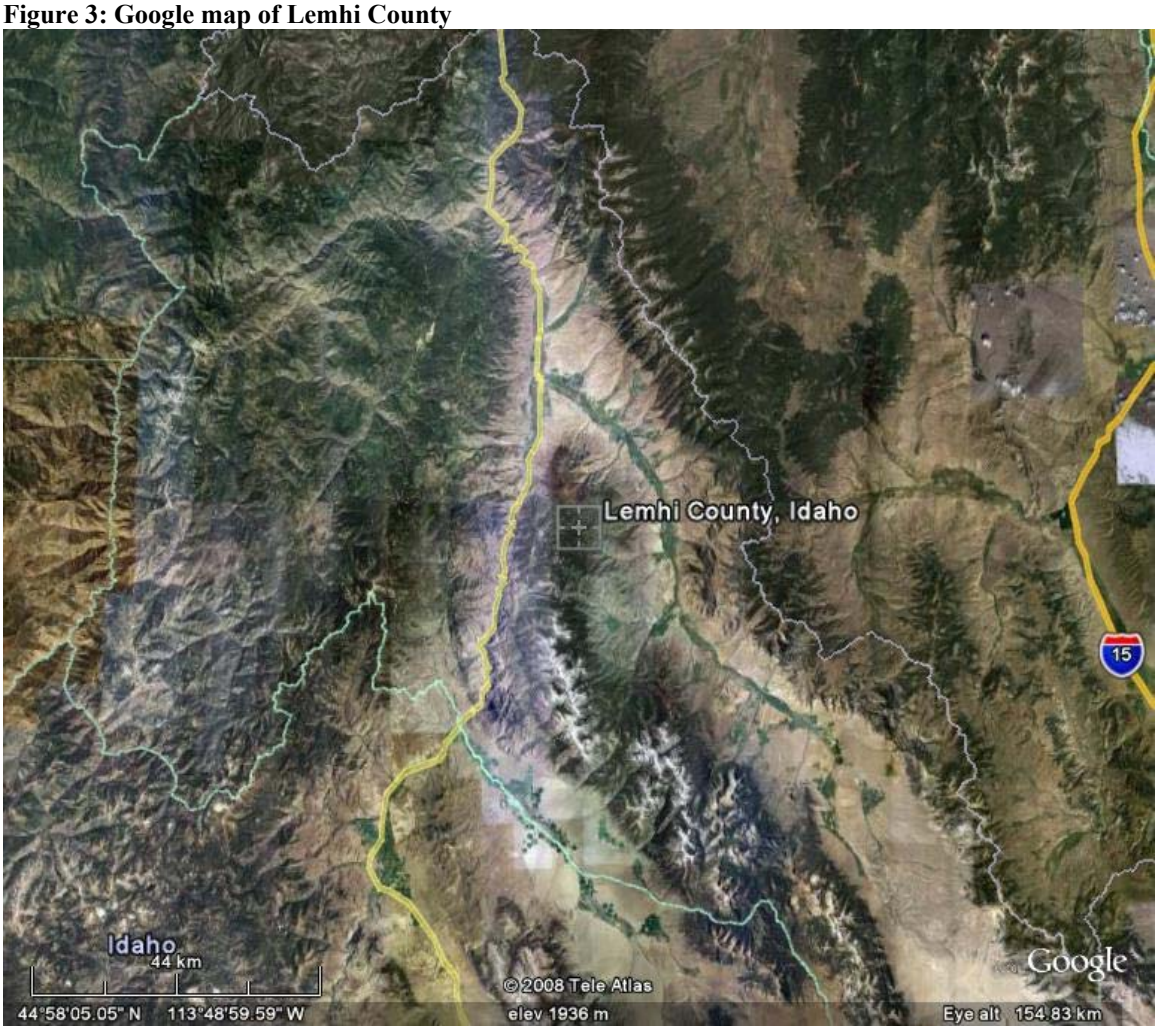
The meteorology for Ravalli and Idaho Counties are consistent with Factors 1 and 3.

Factor 7: Geography/topography (mountain ranges or other air basin boundaries)

The geography/topography analysis looks at physical features of the land that might have an effect on the air shed and, therefore, on the distribution of $PM_{2.5}$ over the Lemhi County area.

The Lemhi County area is a largely mountainous region, with Lemhi County itself marked by a valley that runs along the Idaho-Montana border. The largest population center in this valley is the city of Salmon, with a population of approximately 3,000 people. The valley area is roughly 3,000 feet below surrounding peaks, which rise to over 8,000 feet. These peaks likely limit emissions transport to the valley in Lemhi County, particularly from the East and West.

Figure 3: Google map of Lemhi County



Factor 8: Jurisdictional boundaries (e.g., existing PM and ozone areas)

In evaluating the jurisdictional boundary factor, consideration should be given to existing boundaries and organizations that may facilitate air quality planning and the implementation of control measures to attain the standard. Areas designated as nonattainment (e.g., for PM2.5 or 8-hour ozone standard) represent important boundaries for state air quality planning.

There are no existing nonattainment boundaries for the Lemhi County area. Therefore, this factor did not play a significant role in the decision-making process.

Factor 9: Level of control of emission sources

This factor considers emission controls currently implemented for major sources in the Lemhi County area. The emission estimates on Table 1 (under Factor 1) include any control strategies implemented by the states in the Lemhi County area before 2005 that may influence emissions of any component of $PM_{2.5}$ emissions (i.e., total carbon, SO_2, NOx, and crustal $PM_{2.5}$).

There are no power plants or other notable large emission sources in the Lemhi County area.

Attachment 4

Description of the Contributing Emissions Score

The CES is a metric that takes into consideration emissions data, meteorological data, and air quality monitoring information to provide a relative ranking of counties in and near an area. Using this methodology, scores were developed for each county in and around the relevant metro area. The county with the highest contribution potential was assigned a score of 100, and other county scores were adjusted in relation to the highest county. The CES represents the relative maximum influence that emissions in that county have on a violating county. The CES, which reflects consideration of multiple factors, should be considered in evaluating the weight of evidence supporting designation decisions for each area.

The CES for each county was derived by incorporating the following significant information and variables that impact $PM_{2.5}$ transport:

- Major $PM_{2.5}$ components: total carbon (organic carbon (OC) and elemental carbon (EC)), SO_2, NO_x, and inorganic particles (crustal).
- $PM_{2.5}$ emissions for the highest (generally top 5%) $PM_{2.5}$ emission days (herein called "high days") for each of two seasons, cold (Oct-Apr) and warm (May-Sept)
- Meteorology on high days using the NOAA HYSPLIT model for determining trajectories of air masses for specified days
- The "urban increment" of a violating monitor, which is the urban $PM_{2.5}$ concentration that is in addition to a regional background $PM_{2.5}$ concentration, determined for each $PM_{2.5}$ component
- Distance from each potentially contributing county to a violating county or counties

[A more detailed description of the CES can be found at http://www.epa.gov/ttn/naaqs/pm/pm25_2006_techinfo.html#C.]

Attachment 5

Monitor locations and ID numbers for $PM_{2.5}$ nonattainment areas in Idaho.

Site ID	Location	Address	County
16-079-0017	Pinehurst Elementary School	S. 201 Third St.	Shoshone
16-041-0001	Franklin Water Treatment Facility	East 4800 South	Franklin[1]

The TSD for the Franklin Area is submitted with the Region 8 and Region 8, Cache Valley NAA TSD for Utah and Idaho.