4.0 Analyses of Individual Nonattainment Area

4.10 Region 10 Nonattainment Areas

4.10.2 Idaho

Idaho Area Designations For the 24-Hour Fine Particle National Ambient Air Quality Standards

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	Idaho's Recommended Nonattainment Counties	EPA's Designated Nonattainment Counties
Logan UT-ID CBSA	Cache, UT (partial); Franklin, ID (partial)	Cache, UT (partial); Franklin, ID (expanded partial)
Pinehurst, ID	Shoshone (partial county)	Shoshone (partial county)

EPA has designated Lemhi County as unclassifiable and the remaining counties in the state as "attainment/unclassifiable." EPA designated a county as "unclassifiable" when one or more of its monitors recorded a violation in 2004-2006; all monitors in the county with complete 2005-2007 data showed attainment; and one or more other monitors in the county had 2005-2007 monitoring data that was not complete and could not be used for determining compliance with the standard.

[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).

EPA Technical Analysis for the Logan UT-ID (Cache Valley) 24-hour $PM_{2.5}$ Nonattainment Area

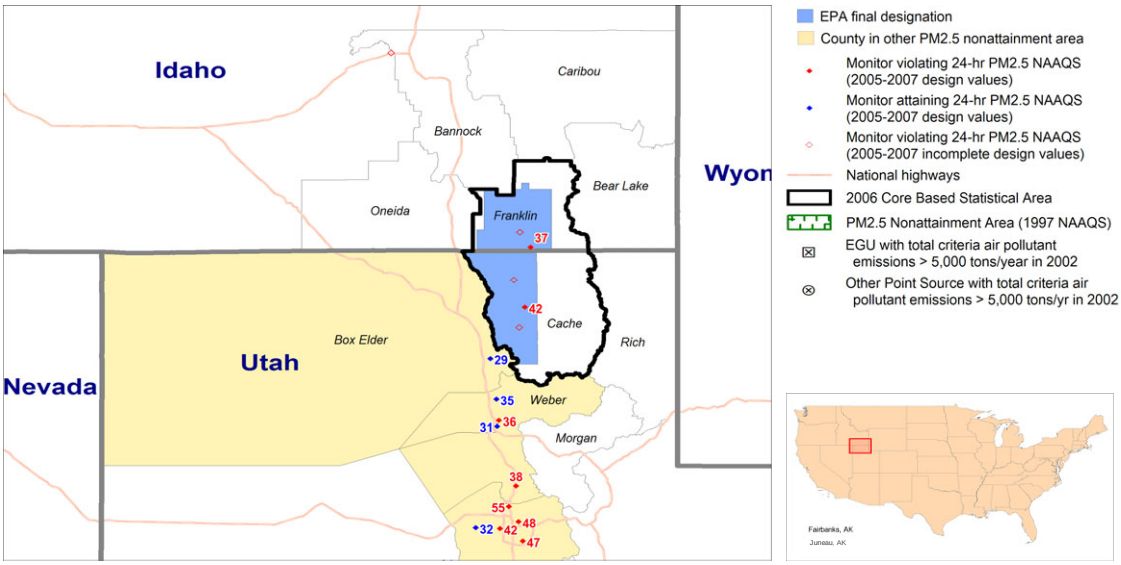
Pursuant to section 107(d) of the Clean Air Act, EPA must designate as nonattainment those areas that violate the NAAQS and those areas that contribute to violations. This technical analysis for the Logan UT-ID CBSA identifies the counties with monitors that violate the 24-hour PM2.5 standard and evaluates 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

EPA also used analytical tools and data such as pollution roses, fine particulate composition monitoring data, back trajectory analyses, and the contributing emission score (CES) to evaluate these areas. (See additional discussion of the CES under factor 1 below.)

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

Figure A.2-1 Logan, UT-ID 24-hr PM2.5 Nonattainment Area



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) monitors located in the state. (Ref.: Letter from the Governor of Utah to EPA, Region 8

[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.

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) monitors located in the state. (Ref.: Letter from the Governor of Idaho to EPA, Region 10 dated December 14, 2007.)

In August 2008, EPA notified Utah of its intended designations. In this letter, EPA also requested that if the State wished to provide comments on EPA's intended designation, it should do so by October 20, 2008. EPA stated that it would consider any additional information (e.g., on power plants or partial county areas) provided by the state in making final decisions on the designations.

Based on EPA's technical analysis described below, EPA has designated part of Cache County, Utah and part of Franklin County, Idaho as nonattainment for the 24-hour $PM_{2.5}$ air quality standard as part of the Logan UT-ID CBSA ("Cache Valley") 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 Designated Nonattainment Counties
Utah	Cache (partial)	Cache (partial)
Idaho	Franklin (partial)	Franklin (partial)

[1]Legal descriptions are presented below.
Note: The State of Utah is located in EPA Region 8 and the State of Idaho is located in EPA Region 10.

EPA designated as nonattainment for the $PM_{2.5}$ NAAQS the Logan UT-ID ("Cache Valley") 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.) <u>Cache County, Utah</u>**", "**B.) <u>Franklin County, Idaho</u>**", and as illustrated in Figures A.2-2 and A.2-3 below.

A.) <u>Cache County, Utah</u>

The Utah portion of the Logan UT-ID ("Cache Valley") nonattainment area includes the following townships, or portions thereof located in Cache County (see Figure A.2-2 below), that form the eastern boundary of the nonattainment area, and then proceeds west to include all areas over to the western boundary of Cache County:

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 (portion located in Cache County)

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

The Idaho portion of the Logan UT-ID ("Cache Valley") nonattainment area includes those areas of Franklin County as described as follows (see Figure A.2-3):

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: Logan UT-ID PM2.5 Nonattainment Area: Cache, County, UT - partial and Franklin County, ID - partial

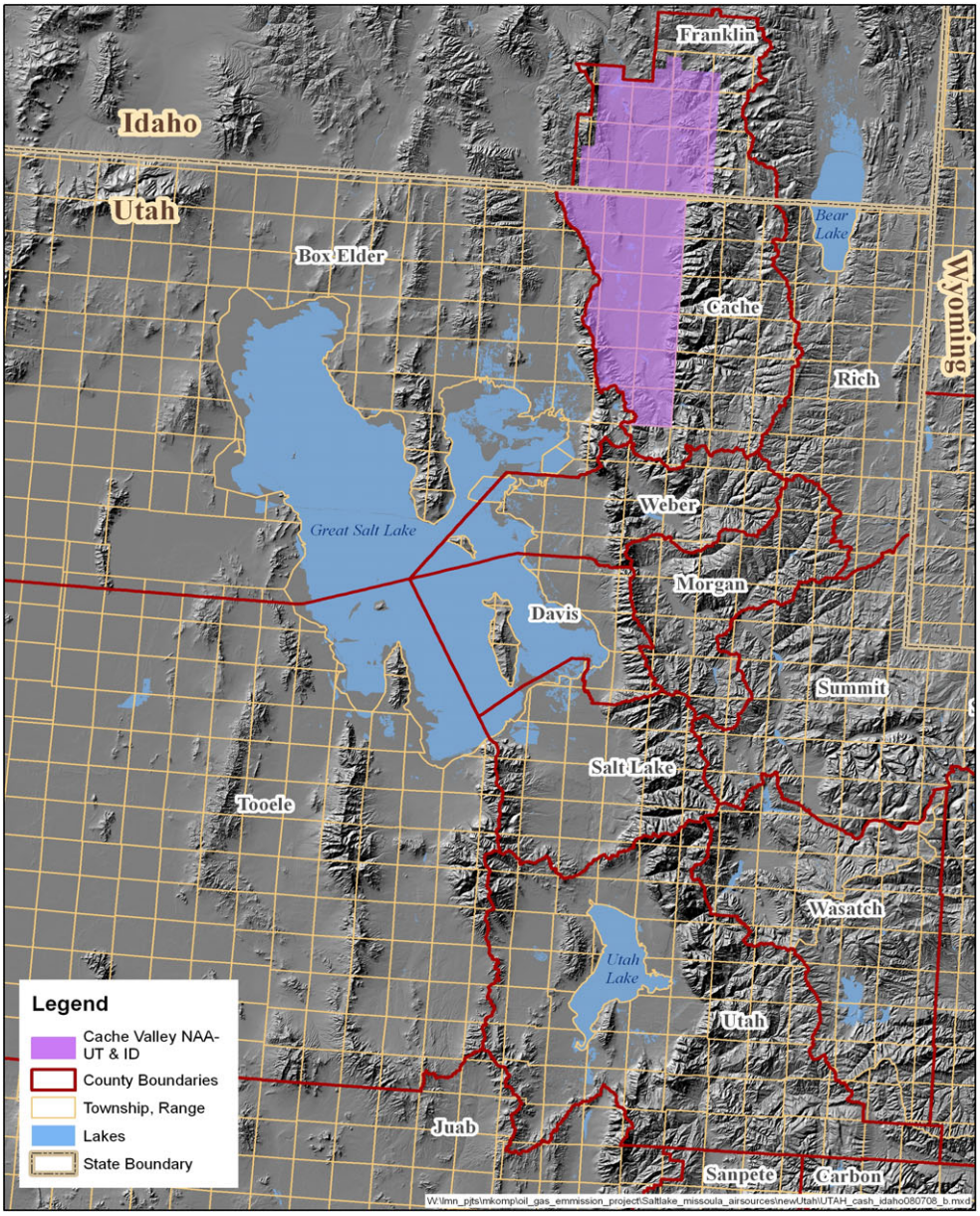
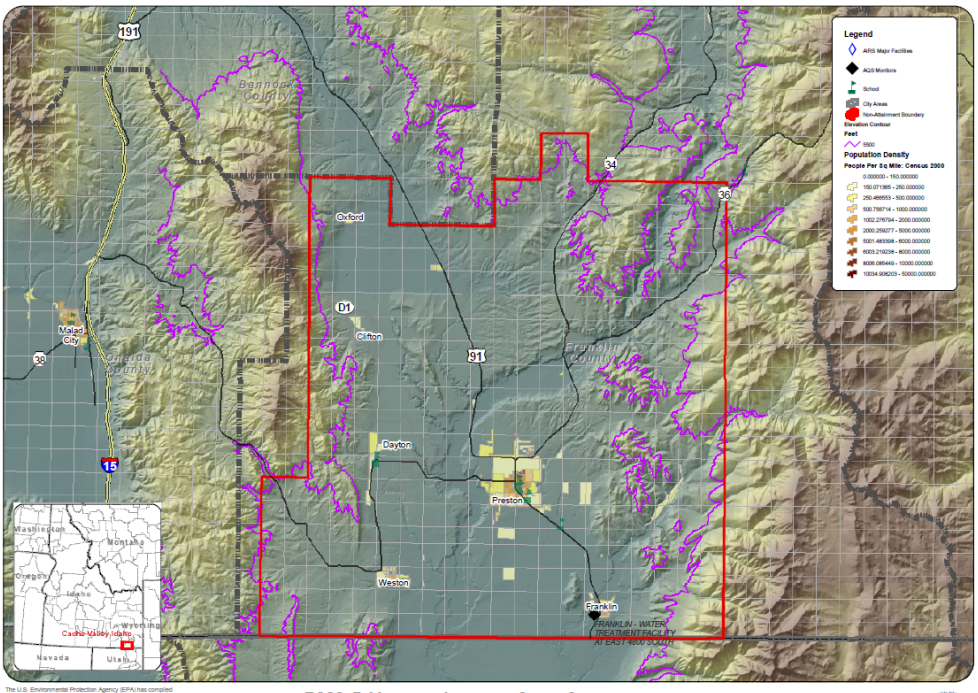
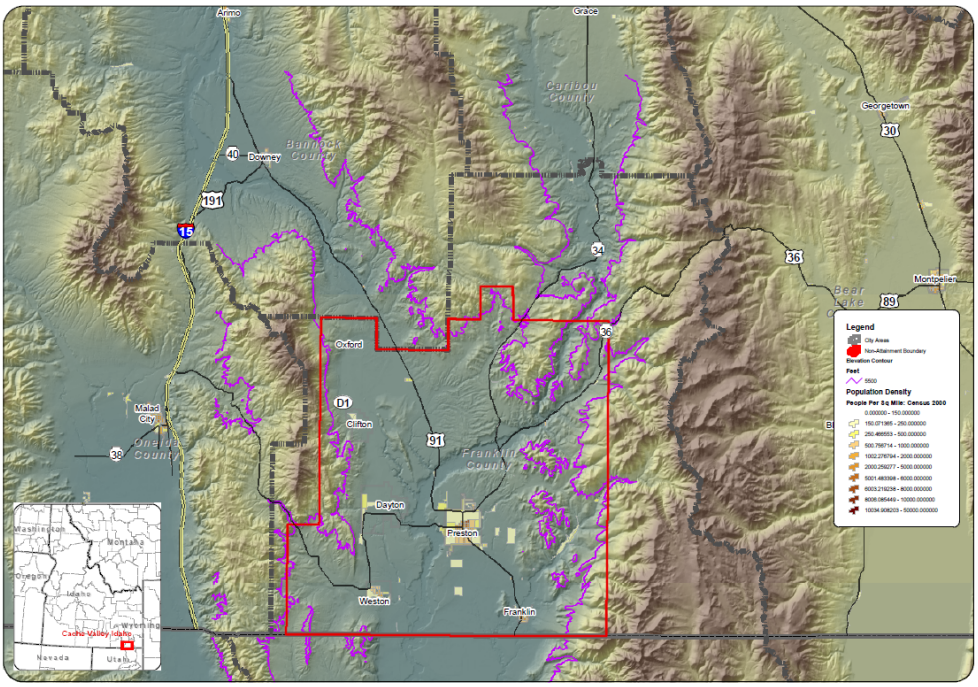


Figure A.2-3: Logan UT-ID PM2.5 Nonattainment Area: Franklin County, ID - partial



The U.S. Environmental Protection Agency (EPA) has compiled this computer representation from data or information sources that may not have been verified by the EPA. This data is offered here as a general representation only, and is not to be re-used without verification by an independent professional qualified to verify such data or information. The EPA does not guarantee the accuracy, completeness, or timeliness of the information shown, and shall not be liable for any loss or injury resulting from reliance upon the information shown.

PM2.5 Nonattainment Area for
Franklin, Present, Weston (Cache Valley) Idaho Area
shown with Topography & Population Density



The U.S. Environmental Protection Agency (EPA) has compiled this computer representation from data or information sources that may not have been verified by the EPA. This data is offered here as a general representation only, and is not to be re-used without verification by an independent professional qualified to verify such data or information. The EPA does not guarantee the accuracy, completeness, or timeliness of the information shown, and shall not be liable for any loss or injury resulting from reliance upon the information shown.

PM2.5 Nonattainment Area for
Franklin County (Cache Valley) Idaho Area
shown with Topography & Population Density

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, Weber in Utah and Bannock, Caribou in Idaho. The Cache Valley includes Cache County in Northern Utah and Franklin County in South Eastern Idaho.

The Logan, UT-ID nonattainment area encompasses a bowl-shaped, topographically isolated valley measuring approximately 37.3 miles (60 kilometers) north to south and 12.4 miles (20 kilometers) east to west. The Wellsville Mountains (with altitudes up to 9,900 feet above mean sea level or MSL) lie to the west, and on the east lie the Bear River Mountains (with altitudes up to 8,300 feet MSL); both are northern branches of the Wasatch Range. These mountain ranges are approximately 3,000 to 5,000 feet above the Cache Valley floor. 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. 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 and topographically isolate Franklin County from other counties such as Bannock and Caribou Counties Based on the information provided in Factor 6 below (Meteorology) and as further expanded upon in the discussion of topography in Factor 7 below (Geography/Topography), 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 only confined to the lower Cache Valley area and are below the elevated, mountainous terrain areas of both Cache and Franklin Counties. Thus, no areas other than the partial county areas in Cache and Franklin Counties area appropriate for consideration within the nonattainment area.

The counties of Bannock and Caribou, located in Idaho, and the counties of Box Elder and Weber, located in Utah, were given consideration; however, based on the information above and as described in more detail below in this technical analysis, EPA determined that these counties are not contributing to the violating monitors in Cache and Franklin counties. Thus, EPA concluded these counties should not be given any further consideration as candidates for nonattainment status with respect to the Logan, UT-ID nonattainment area.

The following is a technical analysis for the Logan, UT-ID CBSA and has been completed as a collaborative effort between EPA Regions 8 and 10.

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 A.2-2 below 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 3, 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

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. EPA notes that Bannock County, Idaho has substantial emission levels and CES value; however, as with Caribou, Box Elder, and Weber Counties it is both meteorologically and topographically separated from the Logan, UT-ID nonattainment "Cache Valley" area (see Factors 6 and 7 below for further information) and, therefore, only portions of Cache and Franklin Counties are candidates for the 24-hour $PM_{2.5}$ standard nonattainment designation.

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.

The 24-hour $PM_{2.5}$ 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.

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
Bannock, ID	No	28	Insufficient data
Weber, UT	Yes (partial)	40	36
Caribou, ID	No	No data	No data
Box Elder, UT	No	35	29

Cache County, Utah and Franklin County, Idaho both show a violation of the 24-hour $PM_{2.5}$ standard. Therefore, EPA is designating these counties as nonattainment. However, EPA notes that the absence of a violating monitor alone is not a sufficient reason to eliminate counties as candidates for nonattainment status as those counties may be contributing to violations in other nearby counties. EPA has evaluated these counties in light of the information recommended in EPA's guidance and other relevant information.

Eligible monitors for providing design value data generally include State and Local Air Monitoring Stations (SLAMS) at population-oriented locations with an FRM monitor. All data from Special Purpose Monitors (SPM) using an FRM 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.

EPA notes in Table A.2-3 above that Bannock County has DVs 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[3] and have collected valid data. EPA has evaluated information through this technical analysis from the counties surrounding Franklin County (in the Idaho side of the Cache Valley), and has also considered 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. Therefore, EPA has concluded that it is very unlikely that these surrounding counties are contributing to violations in Franklin County. From the Utah side for the years 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 $\mu g/m^3$. EPA has concluded, however, Bannock County as well as Caribou, Box Elder, and Weber Counties are both meteorologically and topographically separated from the Logan, UT-ID CBSA "Cache Valley" area (see Factors 6 and 7 below for further information) and, therefore, only portions of Cache and Franklin Counties are candidates for the 24-hour $PM_{2.5}$ standard nonattainment designation.

Under this factor, EPA also considered fine particulate composition monitoring data. 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 EPA- prepared $PM_{2.5}$ speciation data are provided in Appendix 1.A).

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

Table A.2-4 below shows information regarding the 2005 population and population density. Figure A.2-4 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 $PM_{2.5}$ standard.

Franklin County and the Cache Valley are part of the Logan, UT-ID 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 has indicated 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, UT-ID 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

[3] 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.

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.)

Based on our evaluation, EPA concluded that only portions of Cache and Franklin Counties are candidates for the 24-hour $PM_{2.5}$ standard nonattainment designation with respect to this factor.

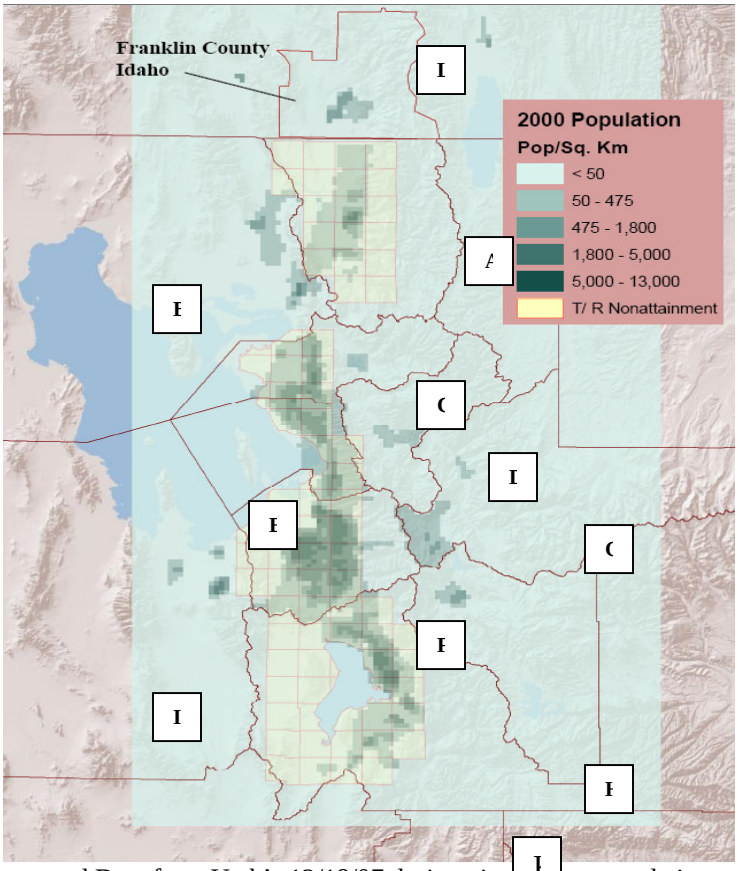
Table A.2-4: Population

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.

Figure A.2-4: 2000 Population Density with Counties, Topography, and an Overlay of Townships

Cache County – (A)
Box Elder County – (B)
Weber County – (C)
Morgan County – (D)
Davis County – (E)
Salt Lake County – (F)
Summit County – (G)
Wasatch County – (H)
Tooele County – (I)
Juab County – (J)
Utah County – (K)
Franklin County, ID (L)



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

From Figure A.2-4 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 Logan, UT-ID CBSA Cache Valley nonattainment area.

Factor 4: Traffic and commuting patterns

This factor considers the number of commuters in each county who drive to another county within the Logan, UT-ID CBSA the percent of total commuters in each county who commute to other counties within the Logan, UT-ID CBSA as well as the total Vehicle Miles Traveled (VMT) for each county in millions of miles (see Table A.2-5 below.) 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.

Data as presented in Table A.2-5 below, for Cache, UT and Franklin, ID, 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 $PM_{2.5}$ exceedances in this region.

Unless otherwise noted, the 2005 VMT data used for Table A.2-5 above have been derived using methodology such as that described in "Documentation for the 2005 Mobile National Emissions Inventory, Version 2," December 2008, prepared for the Emission Inventory Group, U.S. EPA. This document may be found at: ftp://ftp.epa.gov/EmisInventory/2005_nei/mobile_sector/documentation/2005_mobile_nei_version_2_report.pdf

Based on our evaluation, EPA concluded that only portions of Cache and Franklin Counties are candidates for the 24-hour $PM_{2.5}$ standard nonattainment designation with respect to this factor.

Factor 5: Growth rates and patterns

This factor considers population and vehicle miles traveled (VMT) in Cache County and Franklin County in the Logan, UT-ID CBSA from 2000 to 2005, as well as patterns of population and VMT growth beyond out 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.

EPA has evaluated 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 included these additional areas into the nonattainment area boundary and has recommended that the nonattainment area within Franklin County be bounded by the selected Townships identified in the legal description accompanying Table A.2-1 above.

Based on our evaluation, EPA concluded that only portions of Cache and Franklin Counties are candidates for the 24-hour $PM_{2.5}$ standard nonattainment designation with respect to this factor.

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 2005-2007 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 $PM_{2.5}$ 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.

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 2005-2007 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 and Franklin County meteorological data are used from Hill Air Force Base (AFB) located near Ogden in Weber County.

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 technical 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.2-5, 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.2-5, 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.2-6, 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.2-5 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. Thus, no areas other than the partial county areas in Cache and Franklin Counties area appropriate for consideration within the nonattainment area. In addition and as described above and in Factor 7 below, EPA has concluded that Bannock County as well as Caribou, Box Elder, and Weber Counties are both meteorologically and topographically separated from the Logan, UT-ID CBSA "Cache Valley" area and, therefore, are not candidates for the 24-hour $PM_{2.5}$ standard nonattainment designation with respect to this factor for the Logan, UT-ID nonattainment area.

Figure A.2-5: (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)

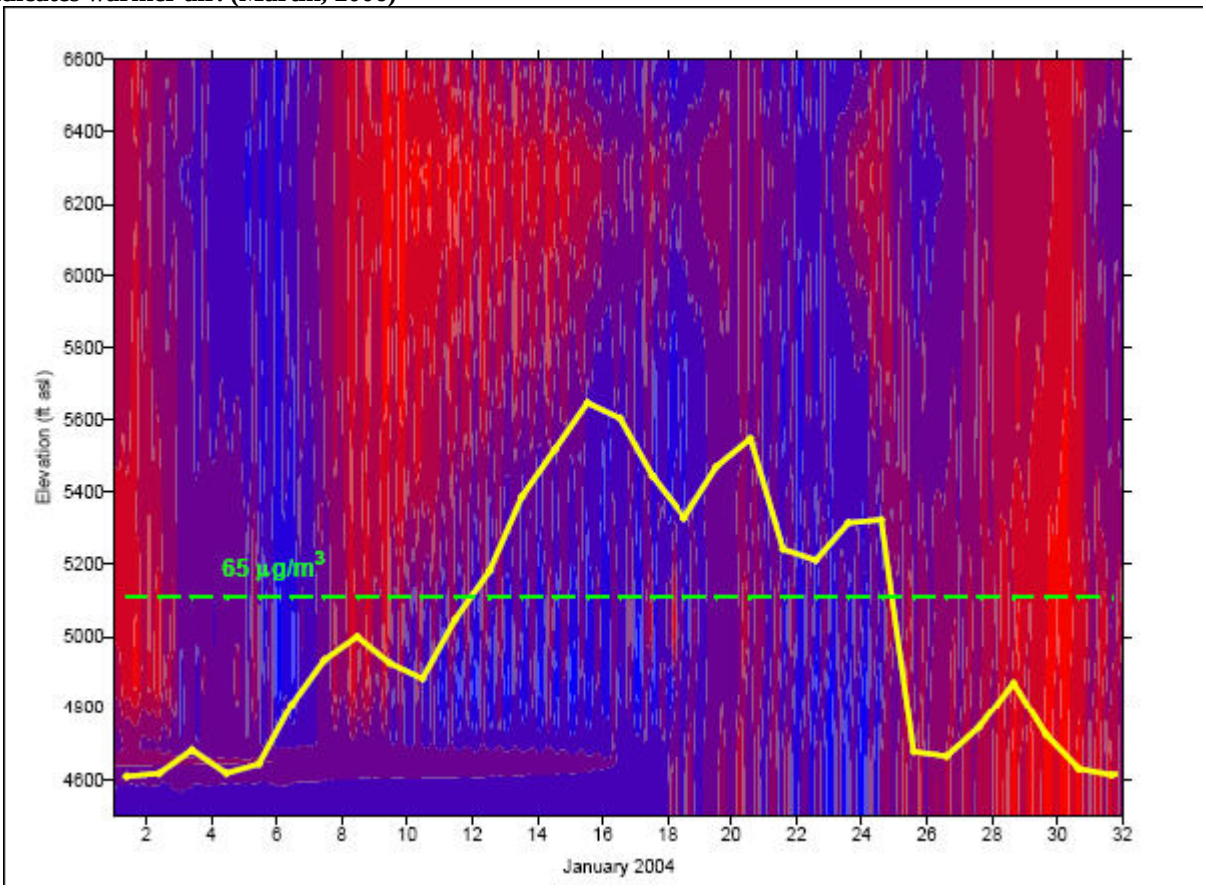
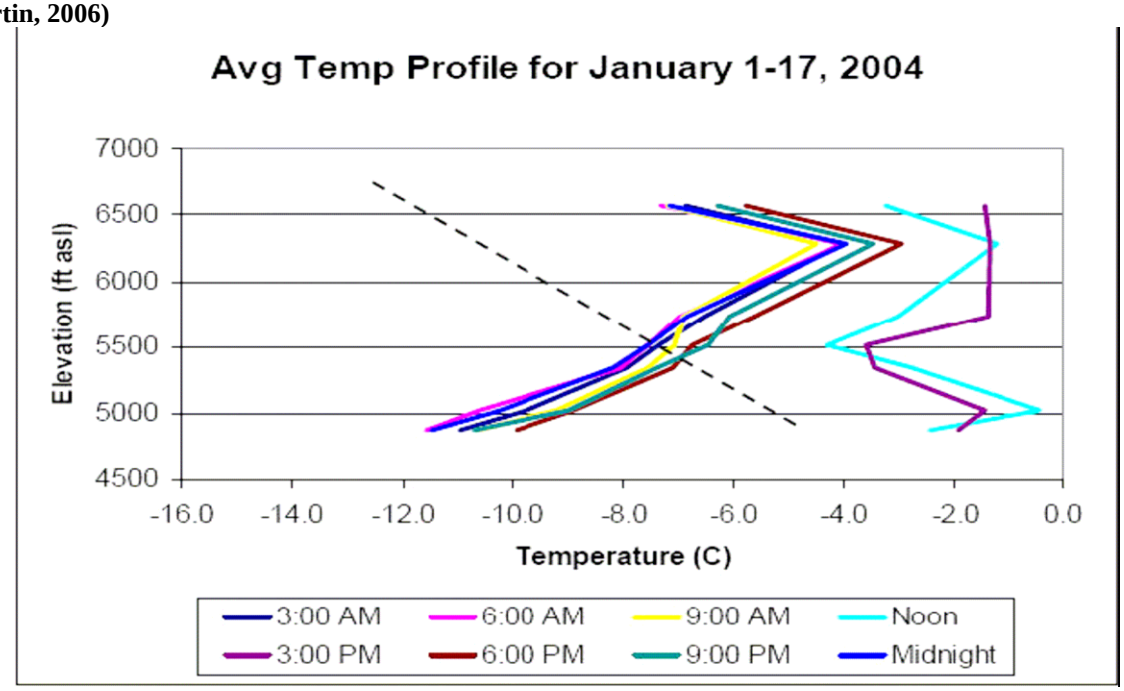


Figure A.2-6: (From Idaho DEQ) Average temperature profiles in Cache Valley during January 1 - 17, 2004 (Martin, 2006)



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.

The Cache Valley is encompassed by Cache County 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.2-7 below with a topographic photo of the Cache Valley in Figure A.2-8.

The most prominent features to observe in Figures A.2-7 and A.2-8 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.

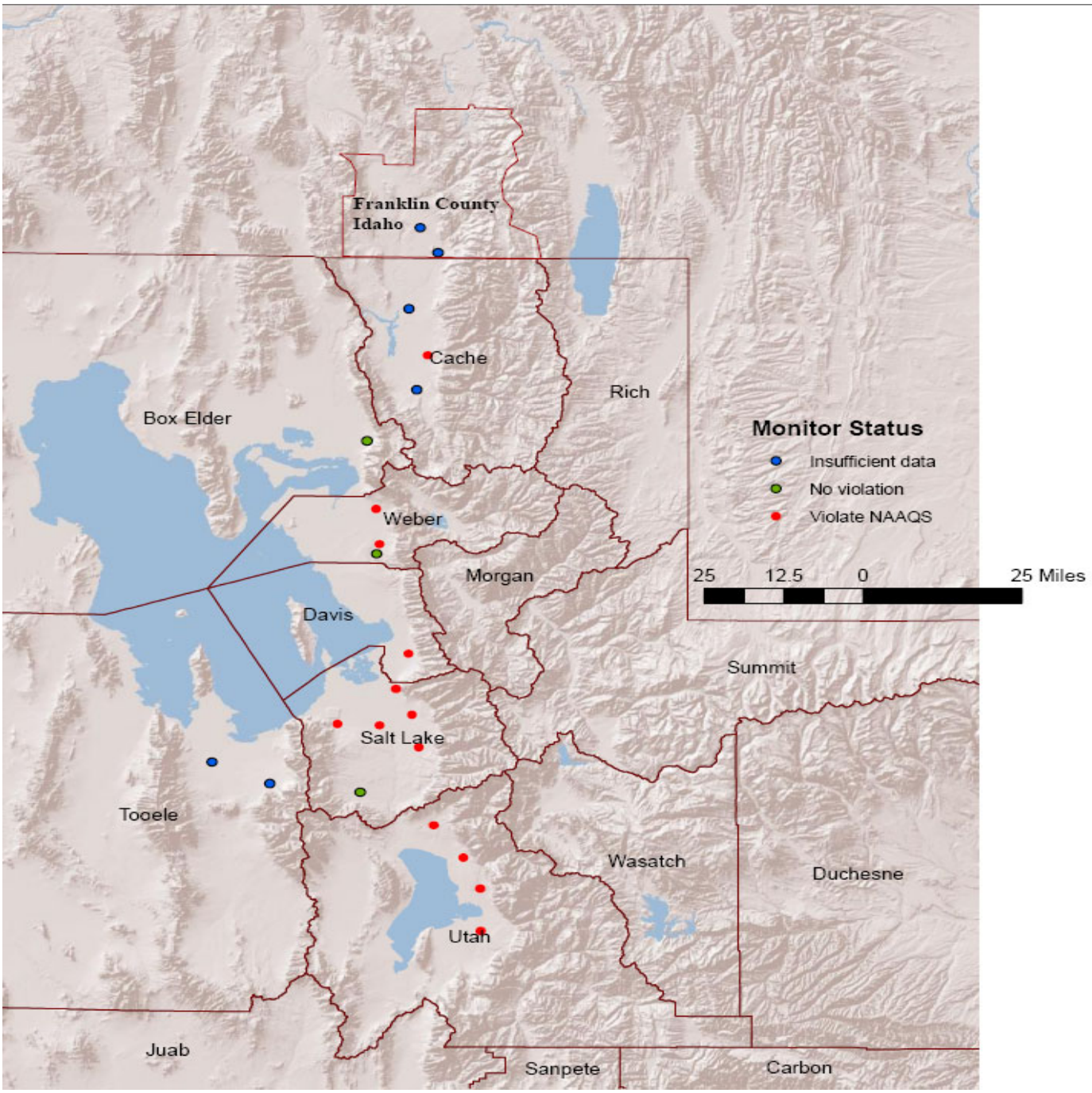
The highway mountain passes near the southern Cache Valley (Utah) are West Highway 30 whose summit is approximately 4,900 feet MSL and South Highway 89 whose summit is approximately 5,900 feet MSL. The Wellsville Mountains, Bear River Mountains, and northern Wasatch mountains converge in southern Cache 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.

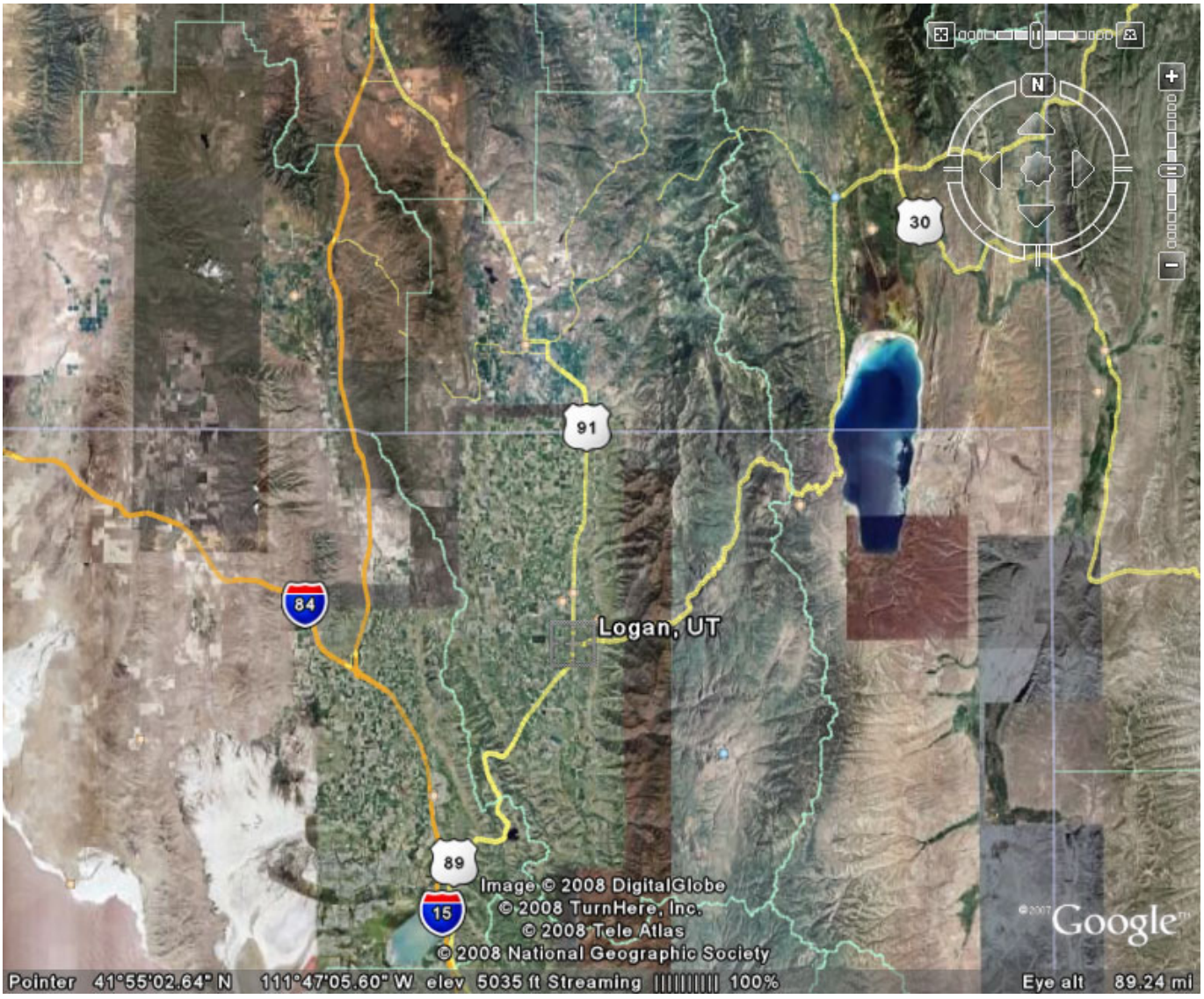
With respect to Franklin County, the State of Idaho indicated that the average afternoon mixing height during stagnation events is about 5,500 feet (MSL). Therefore, the State asserted that any areas in Franklin County that are higher than 5,500 feet (MSL) in elevation will not contribute to $PM_{2.5}$ 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. 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 has included these areas as well into the nonattainment boundary, which within the State of Idaho, will 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 above and the accompanying legal description.)

Figure A.2-7: Monitoring Network with Counties and Topography (source: UDAQ)



As described above, EPA notes that Bannock County as well as Caribou, Box Elder, and Weber Counties are both meteorologically and topographically separated from the Logan, UT-ID CBSA "Cache Valley" area (also see Factor 6 above for further information) and, therefore, only portions of Cache and Franklin Counties are candidates for the 24-hour $PM_{2.5}$ standard nonattainment designation with respect to this factor.

Figure A.2-8: Photo - Counties and Topography (source: Google Earth™)



Factor 8: Jurisdictional boundaries (e.g., existing PM2.5 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 1997 $PM_{2.5}$ standards) represent important boundaries for state air quality planning.

As the Logan UT-ID CBSA does not have any existing PM 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 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 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.

Based on our evaluation, EPA concluded that only portions of Cache and Franklin Counties are candidates for the 24-hour $PM_{2.5}$ standard nonattainment designation with respect to this factor.

Factor 9: Level of control of emission sources

Under this factor, the existing level of control of emission sources is taken into consideration. The emission data that were prepared and used by EPA in this technical analysis appear in Table A.2-2 (under Factor 1) represent emissions levels taking into account any control strategies implemented in an area before 2005 on stationary, mobile, and area sources. Data are presented for $PM_{2.5}$ components that are directly emitted (carbonaceous $PM_{2.5}$ and crustal $PM_{2.5}$) and for pollutants which react in the atmosphere to form fine particulates (e.g.., SO_2, NOx, VOC and ammonia.) 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.

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.

Based on our evaluation, EPA concluded that only portions of Cache and Franklin Counties are candidates for the 24-hour $PM_{2.5}$ standard nonattainment designation with respect to this factor.

Conclusion:

As discussed above, the Logan UT-ID nonattainment area will include portions of the Logan UT-ID CBSA (also called the "Cache Valley") which is composed of Cache County, UT and Franklin County, ID. The Cache Valley includes Cache County in Northern Utah and Franklin County in Southeastern 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 (a more detailed physical description of the area is provided in Factors 6 and 7 above in the technical analysis.) There is no topographic physical barrier that separates the populated areas of Cache County, Utah and Franklin County, Idaho and it is clear that the portions of the two counties are located in the same airshed.

Based on our review of the technical information provided by the Governors of Utah and Idaho (letters dated 12/18/07 and 12/14/07 respectively), and in consideration of the technical information developed by EPA this technical analysis (with special attention to the ambient air quality data, growth rates and patterns, meteorology and topography), EPA has decided that the portions of Cache County, Utah and Franklin County, ID as described above in "**A.) Cache County, Utah**", "**B.) Franklin County, Idaho**", and as illustrated in Figures A.2-2 and A.2-3, shall be designated as nonattainment for the 24-hour $PM_{2.5}$ NAAQS. In consideration of information developed in conjunction with the preparation of this technical analysis; EPA has concluded that a single Logan UT-ID ("Cache Valley") $PM_{2.5}$ NAAQS nonattainment area should be designated as nonattainment in order to appropriately address the $PM_{2.5}$ issues facing the portions of Cache County, UT and Franklin County, ID, of the Logan UT-ID CBSA, as described above.

We note that additional information regarding responses to specific State comments can be found in EPA's Response to State Comments document at: http://www.epa.gov/pmdesignations/2006standards/tech.htm

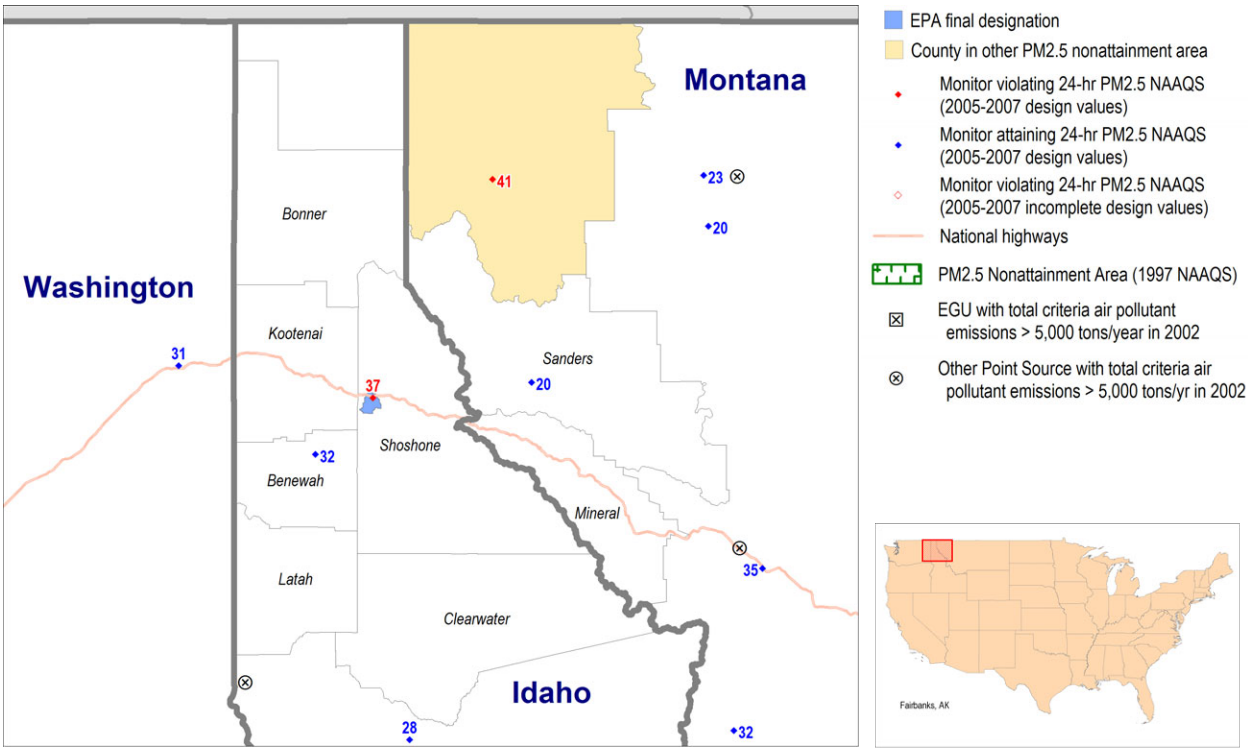
EPA Technical Analysis for the Pinehurst, ID 24-Hour $PM_{2.5}$ Nonattainment Area

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 $PM_{2.5}$ 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 EPA's final nonattainment areas for Shoshone County, ID.

Figure 1



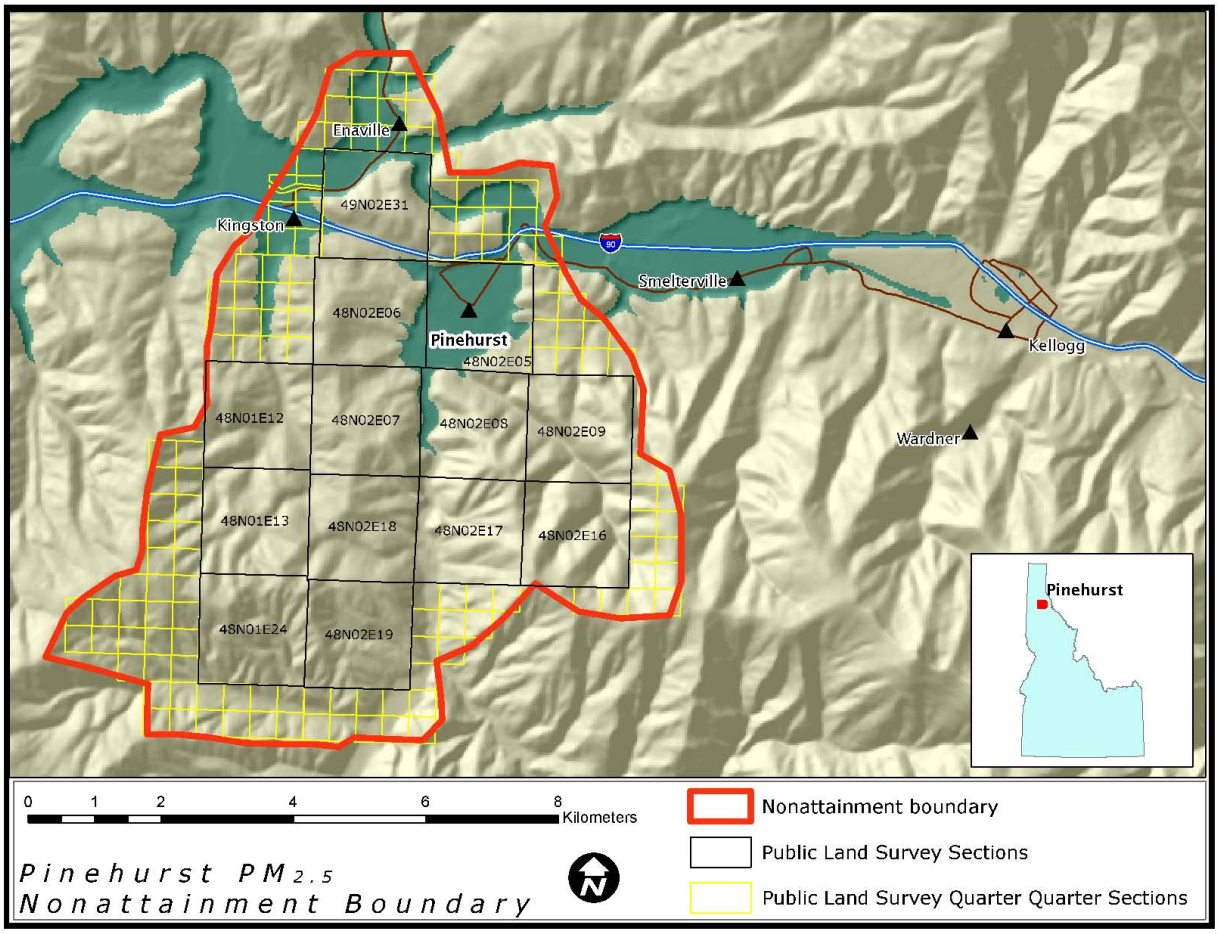
In December 2007, the State of Idaho recommended that part of Shoshone County surrounding the City of Pinehurst be designated as nonattainment for the 2006 24-hour $PM_{2.5}$ standard based on air quality data from 2004-2006. These data are from Federal Reference Method (FRM) monitors located in the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

In August 2008, EPA notified the State if Idaho of its intended designations. In this letter, EPA also requested that if the State wished to provide comments on EPA's intended designation, it should do so by October 20, 2008. EPA stated that it would consider any additional information (e.g., on power plants or partial county areas) provided by the state in making final decisions on the designations.

Based on EPA's technical analysis described below, EPA has designated part of Shoshone County nonattainment for the 24-hour $PM_{2.5}$ air-quality standard as part of the Pinehurst nonattainment area, based upon currently available information, as shown in the figure below and associated legal description. These counties are listed in the table below.

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

Figure 2:



Town Range Delineated Boundary for the $PM_{2.5}$ 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
			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

T	R	S	QQ	
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
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

T	R	S	QQ	
			SENE	SWSE
			NWSW	SESE
			NESW	
49N	02E	33	SWSW	

The following is a technical analysis for the Pinehurst, Shoshone County 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[4].

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 3[5].

Table 1 shows emissions of $PM_{2.5}$ and precursor components (given in tons per year) and the CES's for violating and potentially contributing counties near the City of Pinehurst. Counties are listed in descending order by CES. EPA's analysis and CES scores indicate 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.

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 of Idaho identified that the primary sources of these pollutants in Shoshone County during PM_{10} exceedances were residential wood heating, tailpipe emissions, paved road fugitive dust, and asphalt paving. [A1]The

[4] See http://www.epa.gov/ttn/naaqs/pm/pm25_2006_techinfo.html

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

State provided a 2003 survey of 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 2005 NEI included wildfire related emissions that occurred in 2005. If the emissions from wildfires are eliminated, the resulting annual emissions are more reflective of actual emissions from the county (see table below). Additionally, the there is a temporal mismatch between the occurrence of the wildfires and exceedances. 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. Both these effects indicate that an inventory without wildfire emissions will be more instructive of the actual levels of emissions in the County.

County	Contributing Emissions Score (CES)	State Recommends Nonattainment	$PM_{2.5}$ (TPY)	VOC (TPY)	SO_x (TPY)	NO_x (TPY)	NH_3 (TPY)
Kootenai	86	No	2000	10628	458	6339	1290
Benewah	49	No	208	2029	81	863	217
Latah	48	No	579	3770	191	2278	813
Shoshone	**39**	**Yes (partial)**	**289**	**2963**	**68**	**998**	**52**
Clearwater	37	No	128	2043	74	837	227
Sanders (MT)	14	No	298	617	75	525	229
Mineral (MT)	11	No	195	609	87	933	133
Bonner	5	No	944	6019	331	4440	272

Source: State of Idaho DEQ, Letter from Governor dated Dec 14, 2007, and EPA OAQPS

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 exceedances of the $PM_{2.5}$ 24-hour standard. Open burning of yard debris is also considered a significant contributor to $PM_{2.5}$ concentration 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.

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 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 Pinehurst Area are shown in Table 2.

Table 2: Air Quality Data

County	State Recommends Nonattainment	Contributing Emissions Score (CES)	24 hour $PM_{2.5}$ Design Values 2004 – 2006	24 hour $PM_{2.5}$ Design Values 2005 – 2007[1]
Kootenai, ID	No	86	26*	26*
Benewah, ID	No	49	31^	32^
Latah, ID	No	48	18*	19*
Shoshone, ID	**Yes (partial)**	**39**	38^	37^
Clearwater, ID	No	37	no data	no data
Sanders, MT	No	14	20	20
Mineral, MT	No	11		
Bonner, ID	No	5	22**	23**

^ FRM data

* based on acceptable $PM_{2.5}$ AQI data (QA'd TEOM data)

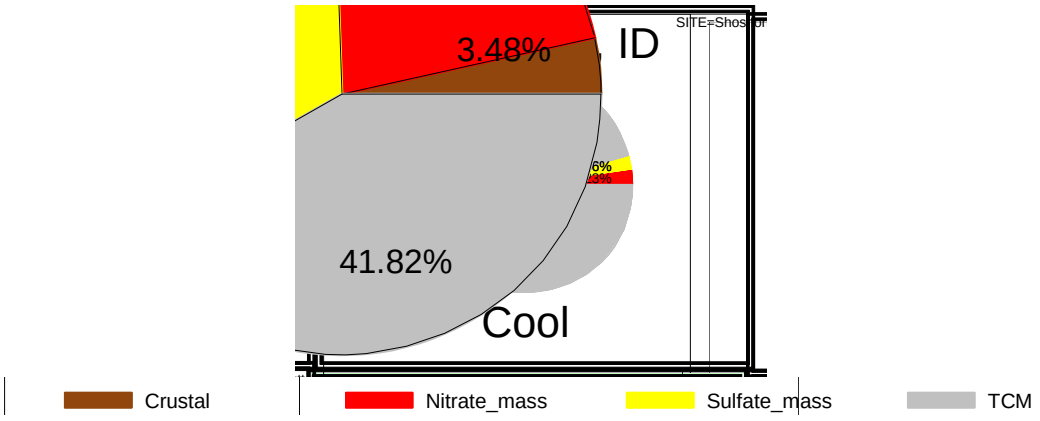
** based on $PM_{2.5}$ raw data (non-QA'd continuous TEOM data)

1. 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.

Data from the table above shows that the FRM monitor located in Pinehurst shows a 2005-2007 24-hour design value of 37 $\mu g/m^3$, which violates the 24-hour $PM_{2.5}$ standard. Therefore, Shoshone County is included in the nonattainment area. The data gathered from 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 $PM_{2.5}$ 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. However, the absence of a violating monitor alone is not a 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.

Under this factor, EPA is also considering fine particle composition monitoring data. Air quality monitoring data on the composition of fine particle mass are available from the EPA Chemical Speciation Network and the IMPROVE monitoring network. More information on the filters used and the techniques used for filter analysis are available at *http://www.epa.gov/ttn/naaqs/pm/pm25_2006_techinfo.htm*. Analysis of these $PM_{2.5}$ speciation data for Pinehurst indicates that the days with the highest particle concentrations occur predominantly in the winter, and the average chemical composition of the highest days is characterized by high levels of carbonaceous matter (see figure 3). Total Carbonaceous Matter (TCM) is more than 95% of the mass on the filter. This is consistent with emissions from 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 at the violating monitor.

Figure 3. $PM_{2.5}$ Composition Data for Pinehurst, ID



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 City 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 (figures 4 & 5), corroborate this fact. It is clear that there are pockets of density along the I-90 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. However, in the factors 6 & 7, EPA and the state examined the contributions from the nearest pockets of high density to understand if emissions from those areas contributed to exceedances in the violating monitor. Based on dispersion modeling analysis those nearby pockets of high populations density were found to be not contributing to the violations at the Pinehurst 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

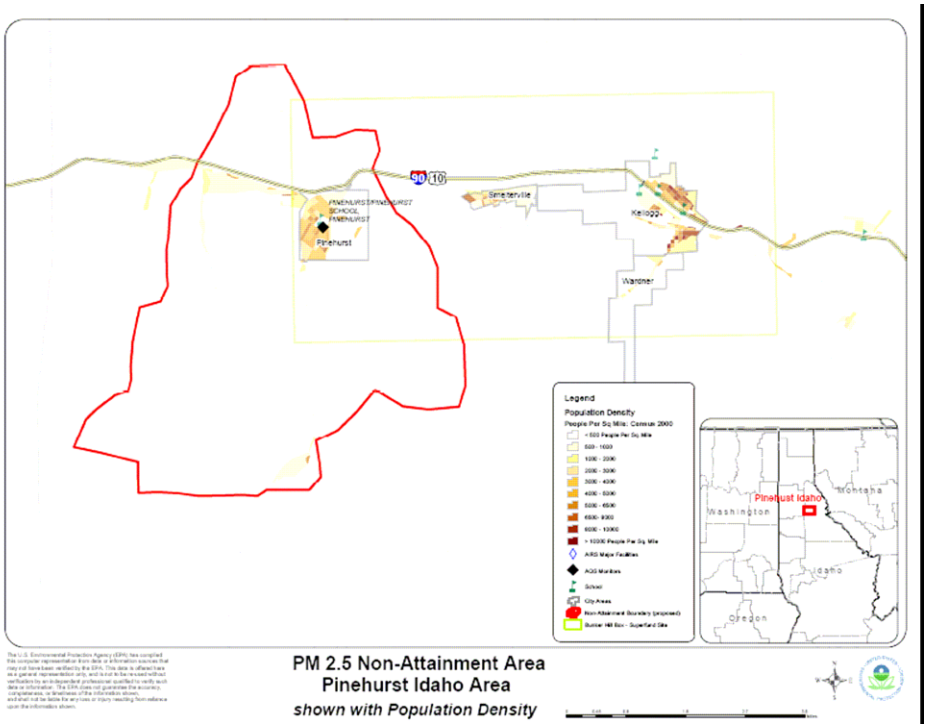


Figure 4. Population Density in the Pinehurst NAA

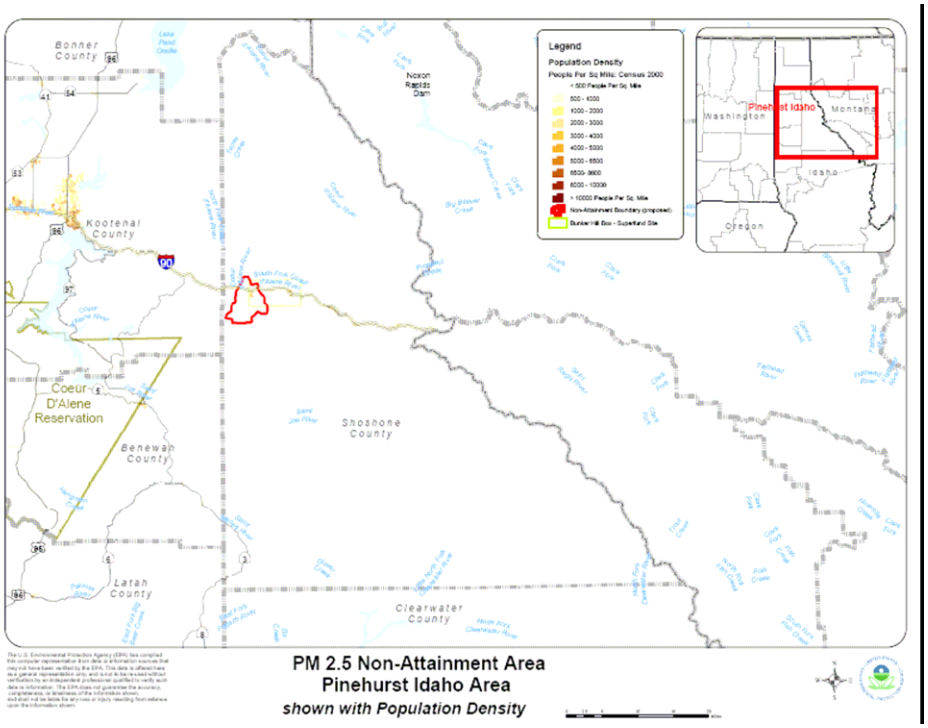


Figure 5: Population density in Shoshone County

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

All figures as provided by Idaho with the Governor of Idaho'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.

The 2005 VMT data used for table 5 and 6 of the 9-factor analysis have been derived using methodology such as that described in "Documentation for the 2005 Mobile National Emissions Inventory, Version 2," December 2008, prepared for the Emission Inventory Group, U.S. EPA. This document may be found at: ftp://ftp.epa.gov/EmisInventory/2005_nei/mobile_sector/documentation/2005_mobile_nei_version_2_report.pdf

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, growth in those areas is unlikely to 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 (MT)	3,883	4,057	174	4.5	203
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 -1.0% in Shoshone County, and according to IDEQ it is expected to be 4.5% on the stretch of I-90 that travels through the Pinehurst area. These growth estimates are 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.

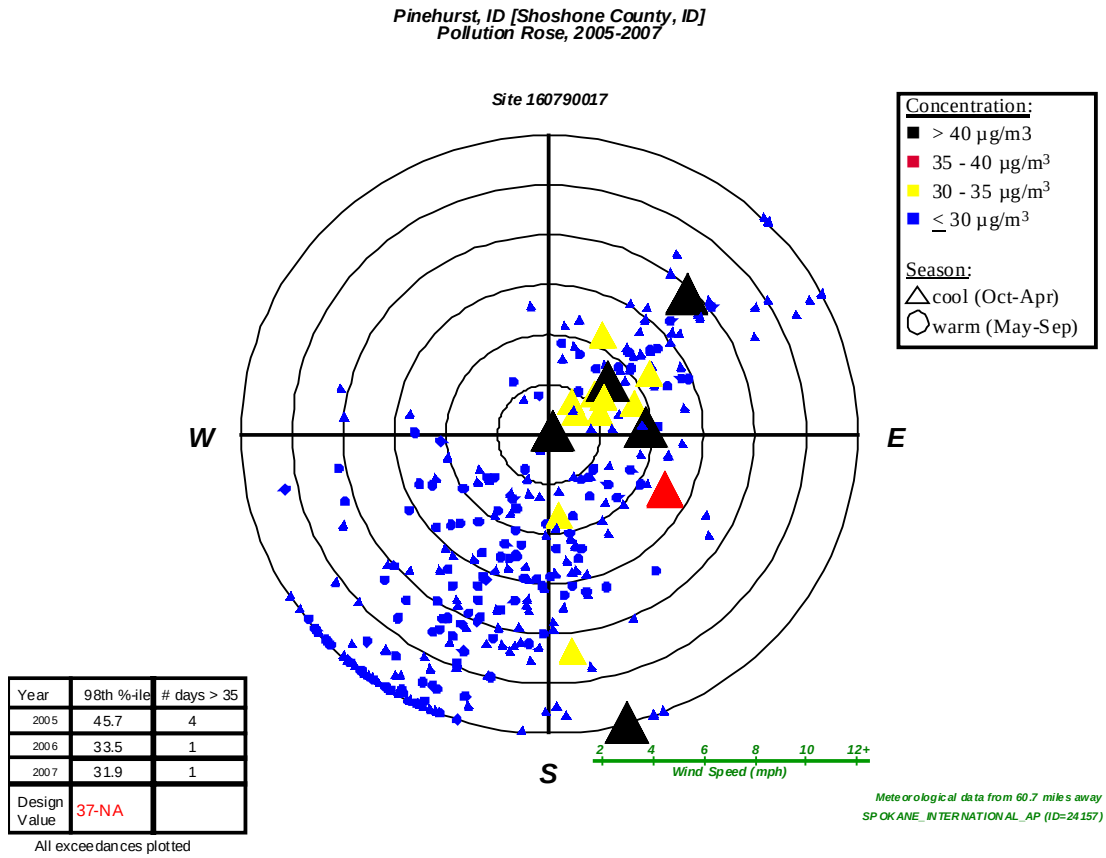


Figure 6. Pollution Rose form the Spokane International Airport, 61 miles to the West

This data from an airport 61 miles away in an urban area with significant terrain features between Pinehurst and Spokane. For the Pinehurst area, EPA has reviewed and concluded that the local data based analysis that was provided by the State of Idaho is more indicative of local meteorology. 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 meteorological station collocated with $PM_{2.5}$ monitor in Pinehurst, ID.

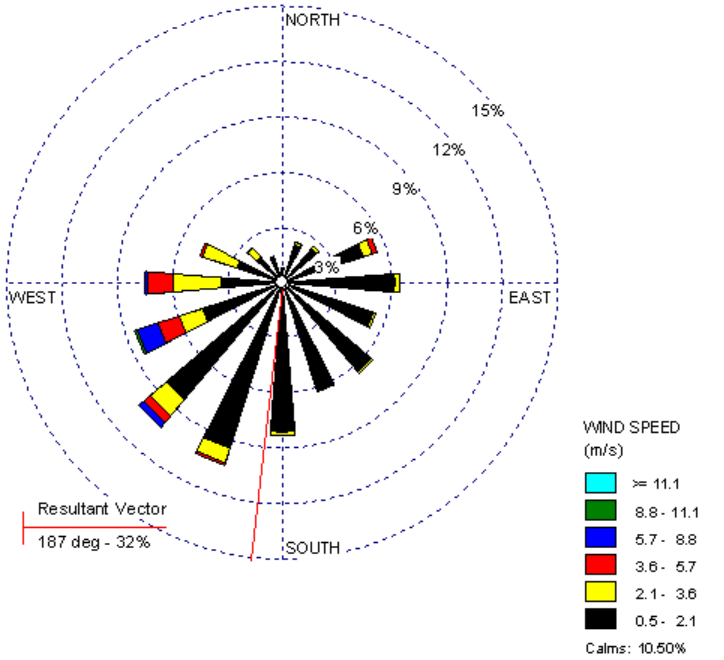


Figure 7: Wind rose for Pinehurst, Idaho in the wintertime. Data from January, February, November, and December 2006.

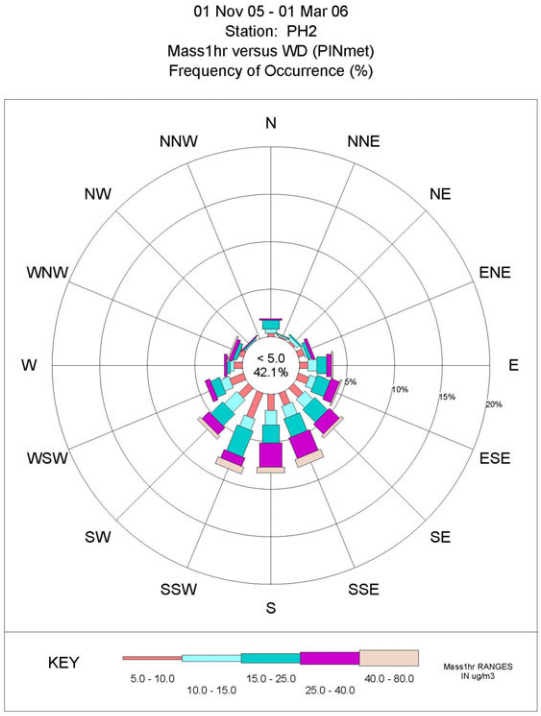


Figure 8: Pollution rose for Pinehurst, Idaho for wintertime: November 2005 – March 2006.

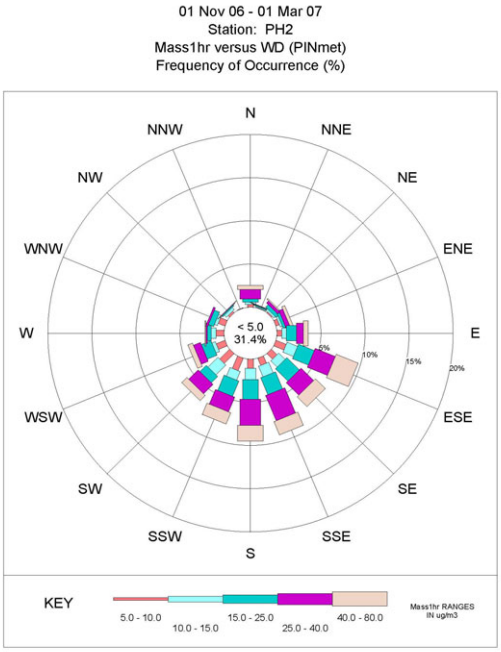


Figure 9: Pollution rose for Pinehurst, Idaho for wintertime: November 2006 – March 2007.

As shown in (Fig 7) the wind rose, the predominant direction of flow is from the South, with a resultant direction of 187 degrees. The pollution roses also (fig 8 &9) 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.

EPA evaluated studies submitted and referenced by the State of Idaho[6], which indicate that certain few meteorological conditions dominate this region and the town of Pinehurst, similar to many mountain-valley areas in the Western United States. 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 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[7].
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

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

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

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 state's 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 2 – 5 and December 18 – 22, 2006 (fig 11&12). 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 10 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.

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.

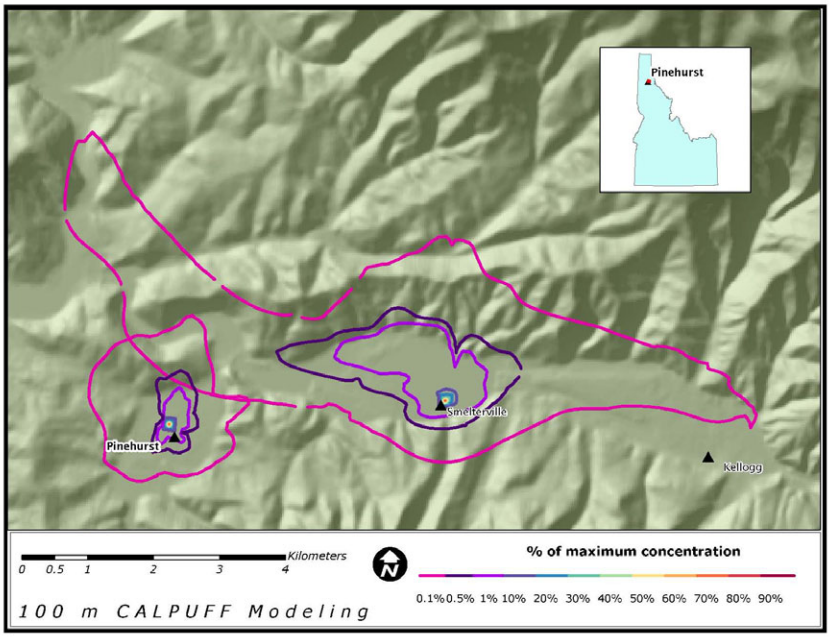


Figure 10: Modeling results of hypothetical sources, showing that sources located in the Silver Valley do not contribute to a violation of the $PM_{2.5}$ standard in Pinehurst.

The 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.

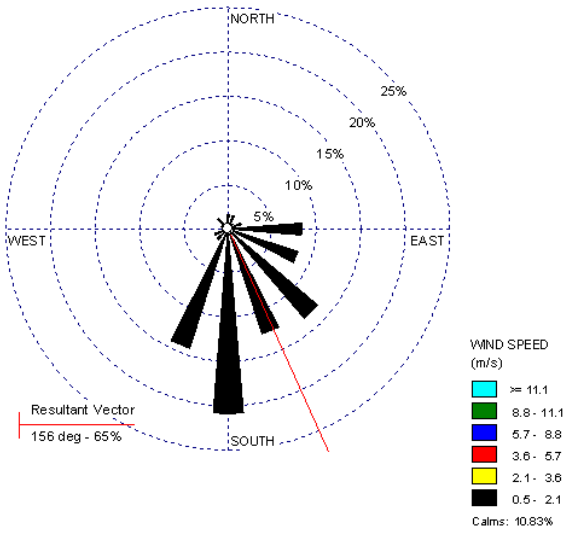


Figure 11: Wind rose for Pinehurst, Idaho, December 18 – 22, 2006, the period of a $PM_{2.5}$ stagnation episode. Very few north and northeasterly winds occurred throughout the period. This indicates that there was very little air mass exchange between Pinehurst and the nearby towns in the Silver Valley.

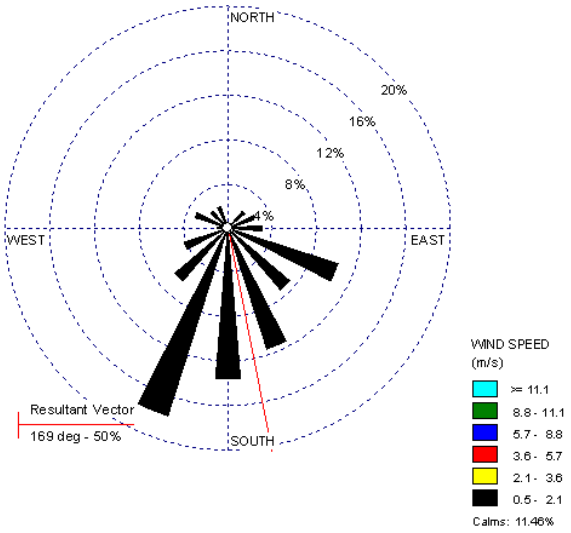


Figure 12: Wind patterns during another winter $PM_{2.5}$ stagnation episode in Pinehurst, Idaho, January 2 – 5, 2006.

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 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.

The summation of factors analyzed clearly demonstrates that adjacent counties do not contribute to violations at the Pinehurst monitor due to a combination of low emissions, low monitored values, low population densities and growth in most cases. The most compelling evidence to eliminate other counties as contributors is from factors 6 and 7, which clearly prove that any available emissions from other counties are not able to transport over long distances to contribute. Within Shoshone County, the population density is in the single digits and there are no major point sources within it and therefore no significant sources that can contribute. Additionally, even populations based sources in airsheds adjacent to the Pinehurst airshed are not contributing based on the above analysis. This is especially true during the types of meteorological conditions that exist during these exceedances, stable atmospheric conditions with no or low winds, and low temperatures near the surface.

[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 $PM_{2.5}$ or 8-hour ozone standard) represent important boundaries for state air quality planning.

The City of Pinehurst within Shoshone County is currently designated nonattainment for PM_{10}. Figure 13 illustrates that the PM_{10} NAA does not include locations within the Silver Valley or surrounding counties. For this designation, adjacent counties do not contribute to the violations at the Pinehurst monitor as established by the analysis of other factors – a combination of lack of emissions, low population densities and growth, and lack of transportability of air

masses during wintertime exceedances to Pinehurst from adjacent counties. The analysis of factors also establishes that the even within Shoshone County, airsheds adjacent to Pinehurst do not contribute to the violations at Pinehurst.

Shoshone County lies entirely within DEQ's Coeur d'Alene Region and EPA Region 10.The City 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 notes that the pre-existing PM_{10} boundary is not determinative of the $PM_{2.5}$ boundaries because PM_{10} and $PM_{2.5}$ are different particles that behave differently in the atmosphere, often result from different sources, and may require different control strategies. In addition, PM_{10} nonattainment boundaries were often determined nearly twenty years ago.

EPA's final designation places little emphasis on the ozone nonattainment area boundary.

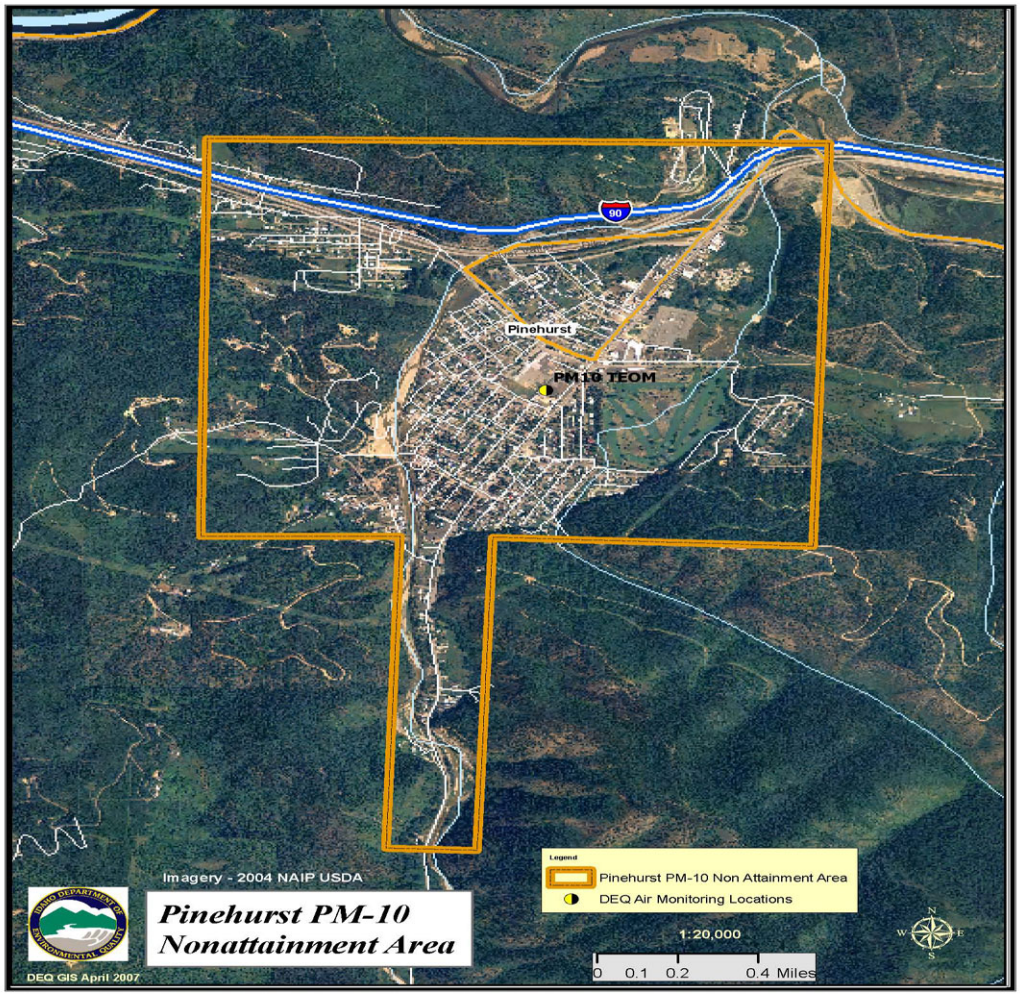


Figure 13: Pinehurst PM_{10} nonattainment area.

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 $PM_{2.5}$).

For the Pinehurst 24-hour $PM_{2.5}$ nonattainment area, the major emissions sources of both PM_{10} and $PM_{2.5}$ in appear to be residential wood heating and open burning. There are no large contributing sources for which this factor would apply.

Conclusion

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, meteorology during exceedances in the wintertime, and types of emission sources available during exceedances, 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. Due to the nature of airflow and pollution transport during these wintertime exceedances in Pinehurst, meteorological and topographical evidence supports the fact that no transport of emission occurs from other counties. Further, this boundary will only be a small part of Shoshone County (Figure 14) because the other areas in the county are very sparsely populated and generate insignificant emissions that can contribute to the Pinehurst monitor. Dispersion modeling in support of this demonstration shows that the City of Pinehurst has its own airshed which has no mutual contributions with other airsheds in the area. Based on this technical evidence, EPA designated part of Shoshone County as the geographic boundary for the Pinehurst 24-hour $PM_{2.5}$ nonattainment area, as shown in Figure 14 below.

Additional information regarding responses to specific State comments can be found in EPA's Response to Comments document at http://www.epa.gov/pmdesignations/2006standards/tech.htm.]

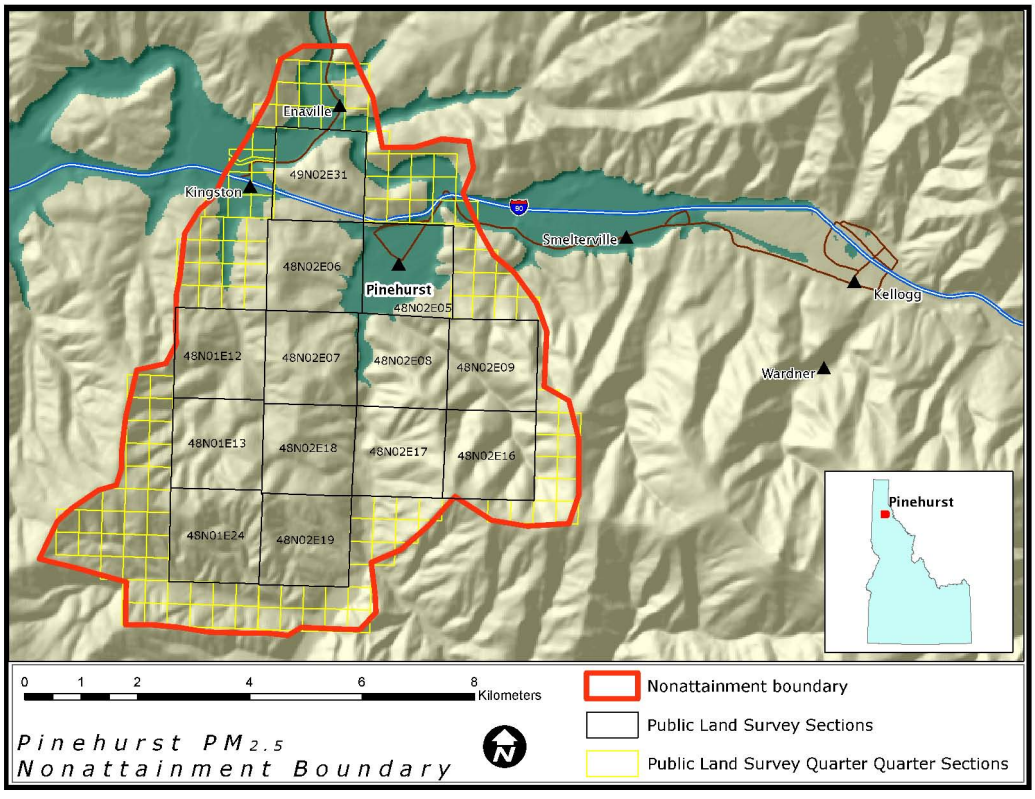


Figure 14. Geographic boundary for the Pinehurst $PM_{2.5}$ nonattainment area.

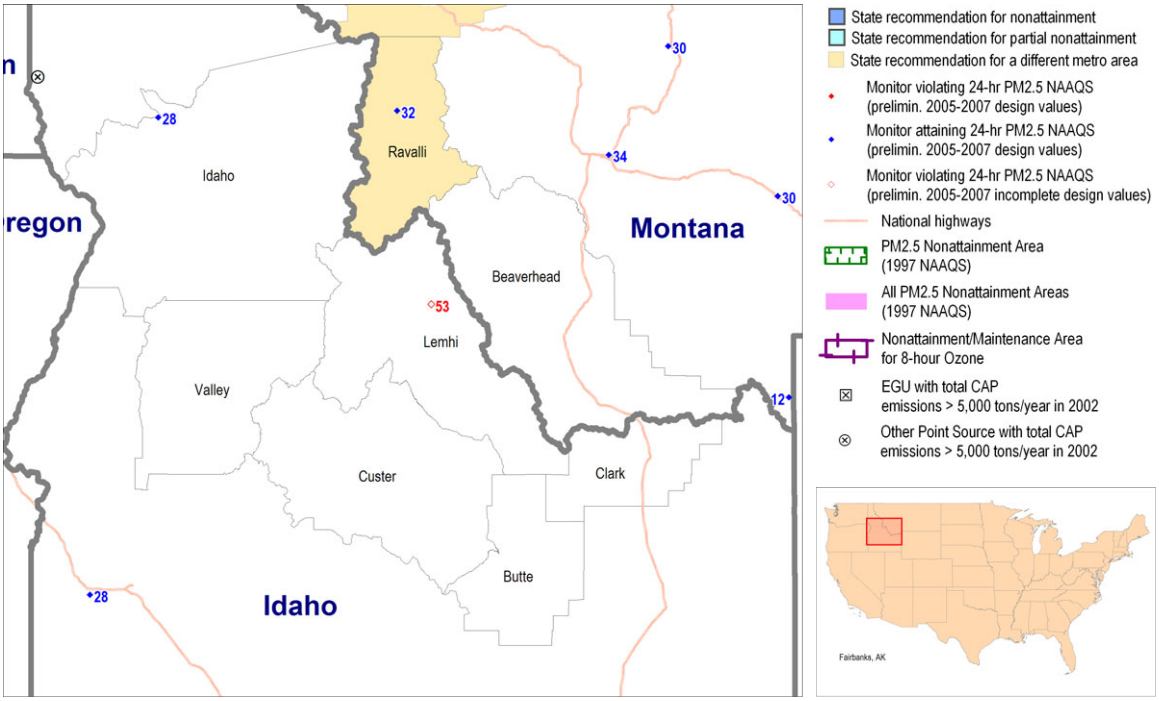
EPA Technical Analysis for Lemhi, ID

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 $PM_{2.5}$ 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 Designation
Lemhi County	Lemhi County (unclassifiable)	Lemhi County (unclassifiable)

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.

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.

The 2005 VMT data used for table 5 and 6 of the 9-factor analysis have been derived using methodology such as that described in "Documentation for the 2005 Mobile National Emissions Inventory, Version 2," December 2008, prepared for the Emission Inventory Group, U.S. EPA. This document may be found at: ftp://ftp.epa.gov/EmisInventory/2005_nei/mobile_sector/documentation/2005_mobile_nei_version_2_report.pdf

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	Population	Population	2005 VMT	VMT	VMT

	(2005)	Growth (2000 - 2005)	% change (2000 - 2005)	(millions mi)	Growth (millions mi from 2000 to 2005)	% 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.

Conclusion:

EPA is designating 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 information with regards to the designation.

Idaho County may merit consideration as a candidate 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.

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.

Additional information regarding responses to specific State comments can be found in EPA's Response to Comments document at http://www.epa.gov/pmdesignations/2006standards/tech.htm.]

ATTACHMENT 2, APPENDIX 1.A: TECHNICAL ANALYSIS OF THE LOGAN UT-ID ("CACHE VALLEY") NONATTAINMENT AREA – References, Data Sources, and Data Interpretations

This Appendix contains the references, data sources, and data interpretations that EPA used for its technical analyses conducted for the individual nonattainment area and also in view of information provided by the State of Utah (Re: The Governor's 12/18/07 submittal), the State of Idaho (Re: The Governor's 12/14/07 submittal), EPA Regions 8 and 10, and other available information.

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

The Logan, Utah-Idaho CBSA is composed of Cache County, Utah and Franklin County, Idaho.

1.) References, data sources, and data interpretations for: "Factor 1: Emissions"

Ref. Table Appendix 1.A-1: Annual Emissions by County (from EPA's 2005 NEI: All emission figures are in tons per year.)
See: www.epa.gov/ttn/chief/net/2005inventory.html

county	MAJOR_CAT	VOC	NOX	SO2	NH3	PM2_5
Cache Co	EGUs	1	17	1	0	1
Cache Co	Fires	241	17	6	16	117
Cache Co	Non-Road	654	863	87	1	72
Cache Co	On-Road	2290	2613	65	93	46
Cache Co	Other_Stationary	2119	323	79	1847	473
Cache Co	Total	5305	3833	238	1957	709
Franklin Co	Non-Road	321	150	17	0	24
Franklin Co	On-Road	293	472	12	19	9
Franklin Co	Other_Stationary	1677	229	28	1201	414
Franklin Co	Total	2290	851	57	1221	447

county	MAJOR_CAT	OC	EC	SO4	NO3	PMFINE
Cache Co	EGUs	0	1	0	0	0
Cache Co	Fires	57	12	2	0	46
Cache Co	Non-Road	20	46	0	0	6
Cache Co	On-Road	11	26	0	0	9
Cache Co	Other_Stationary	83	7	2	1	380
Cache Co	Total	172	91	4	1	440
Franklin Co	Non-Road	8	14	0	0	2
Franklin Co	On-Road	2	5	0	0	2
Franklin Co	Other_Stationary	88	18	8	4	297
Franklin Co	Total	98	36	8	4	301

Column	Description
county	The county name.
MAJOR_CAT	One of either 5 major categories of emission sources or the County total of all 5
VOC	The tonnage of Volatile Organic Compounds emitted
NOX	The tonnage of Nitrogen Oxides emitted
SO2	The tonnage of Sulfur Dioxide emitted
NH3	The tonnage of Ammonia emitted
PM2_5	The total amount of PM less than 2.5 microns diameter, including both filterable and condensable portions
OC	The Organic Carbon portion of PM2_5
EC	The Elemental Carbon portion of PM2_5
SO4	The Sulfate portion of PM2_5
NO3	The Nitrate portion of PM2_5
PMFINE	The remaining portion of PM2_5 that is not OC, EC, SO4, or NO3, sometimes called "crustal" or "PM-fine Other"

MAJOR_CAT	
EGUs	Electric Generation Units
Fires	Wildfires, Prescribed Burns, and Agricultural burns
Non-Road	Non-road equipment mobile source emissions, including Aircraft, Locomotives, and Commercial Marine Vessels, Agricultural & Construction equipment, Recreational equipment, etc.
On-Road	On Road vehicle mobile source emissions
Other_Stationary	All other stationary sources of emissions, both Point and Area sources, other than EGUs
Total	The total of all 5 Major Categories

2.) References, data sources, and data interpretations for: "Factor 4: Traffic and Commuting Patterns"

Reference material from U.S. Census Bureau (http://www.census.gov/population/www/cen2000/commuting.html) for the technical analysis; select Idaho and Utah Counties.

Ref. Table Appendix 1.A-2: Traffic and Commuting Patterns

Residence County to Workplace County Flows for Utah: 2000
Sorted by Residence State-County

Res State	Res County	Res (C)MSA	Res PMSA	Residence State-County-Name	Workplace State-County-Name	Count
49	005	9999	9999	Cache Co. UT	Cache Co. UT	39235
49	005	9999	9999	Cache Co. UT	Box Elder Co. UT	2383
49	005	9999	9999	Cache Co. UT	Weber Co. UT	606
49	005	9999	9999	Cache Co. UT	Salt Lake Co. UT	463
49	005	9999	9999	Cache Co. UT	Davis Co. UT	334
49	005	9999	9999	Cache Co. UT	Franklin Co. ID	179
49	005	9999	9999	Cache Co. UT	Utah Co. UT	94
49	005	9999	9999	Cache Co. UT	Morgan Co. UT	16
49	005	9999	9999	Cache Co. UT	Tooele Co. UT	8

49	005	9999	9999	Cache Co. UT	Summit Co. UT	3
				Subtotal out of County =		4086

Source: U.S. Census Bureau
Internet Release date: July 25, 2003

Residence County to Workplace County Flows for Idaho: 2000 Sorted by Residence State-County

Res State	Res County	Res (C)MSA	Res PMSA	Residence State-County Name	Workplace State-County Name	Count
16	041	9999	9999	Franklin Co. ID	Franklin Co. ID	2,852
16	041	9999	9999	Franklin Co. ID	Cache Co. UT	1,697
16	041	9999	9999	Franklin Co. ID	Caribou Co. ID	92
16	041	9999	9999	Franklin Co. ID	Box Elder Co. UT	82
16	041	9999	9999	Franklin Co. ID	Weber Co. UT	23
16	041	9999	9999	Franklin Co. ID	Salt Lake Co. UT	23
16	041	9999	9999	Franklin Co. ID	Bannock Co. ID	19
16	041	9999	9999	Franklin Co. ID	Davis Co. UT	8
16	041	9999	9999	Franklin Co. ID	Oneida Co. ID	6
16	041	9999	9999	Franklin Co. ID	Flathead Co. MT	5
16	041	9999	9999	Franklin Co. ID	Utah Co. UT	4
16	041	9999	9999	Franklin Co. ID	Bonneville Co. ID	3
16	041	9999	9999	Franklin Co. ID	Rich Co. UT	1
16	041	9999	9999	Franklin Co. ID	Nez Perce Co. ID	1
16	041	9999	9999	Franklin Co. ID	Kootenai Co. ID	1
				Subtotal out of County =		1,965

Footnotes:
Source: U.S. Census Bureau
Internet Release date: March 6, 2003

3.) References, data sources, and data interpretations for: "Factor 5: Growth rates and patterns"

a.) Population Growth Estimates

Table Appendix 1.A-3 below shows population and projected population growth. The percent change was represented by the State as the difference between 2000 to 2005, 2005 to 2010, and 2005 to 2015.

Ref. Table Appendix 1.A-3: 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	13,651	10%	15,016	21.0%

[1] All figures are as provided by Utah with the Governor's 12/18/07 designations recommendations submittal.

[2] For beyond 2005, EPA assumed 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%.

b.) VMT Growth Estimates

Cache County, Utah:

EPA notes that the State of Utah's 12/18/07 designations recommendations submittal **did not contain any VMT data for 2000, 2005 or any other years**. We do note that the metropolitan planning organization for the Logan area (Cache Metropolitan Planning Organization located at http://www.cachempo.org/) contained some VMT information for the Logan area only, but not on a county-wide basis. EPA, therefore, drew upon other sources of information for the necessary VMT data and also performed calculations to adjust those data. Our basis for county-wide VMT data was from the Utah Department of Transportation (UDOT; http://www.udot.utah.gov) and we considered available VMT data for 2000, 2001, 2002, 2003, 2004, 2005, and 2006. The UDOT VMT data used were daily VMT data (in millions) which EPA then multiplied by 365 to get annual VMT data (see Ref. Table Appendix 1.A-4 below.)

Ref. Table Appendix 1.A-4: UDOT Cache CountyVMT Data (millions daily)

County	2000	2001	2002	2003	2004	2005	2006
Cache[1]	2.172146	2.188530	2.268537	2.272995	2.365310	2.495303	2.633928

[1]All the VMT figures are from UDOT and are in VMT millions per day.

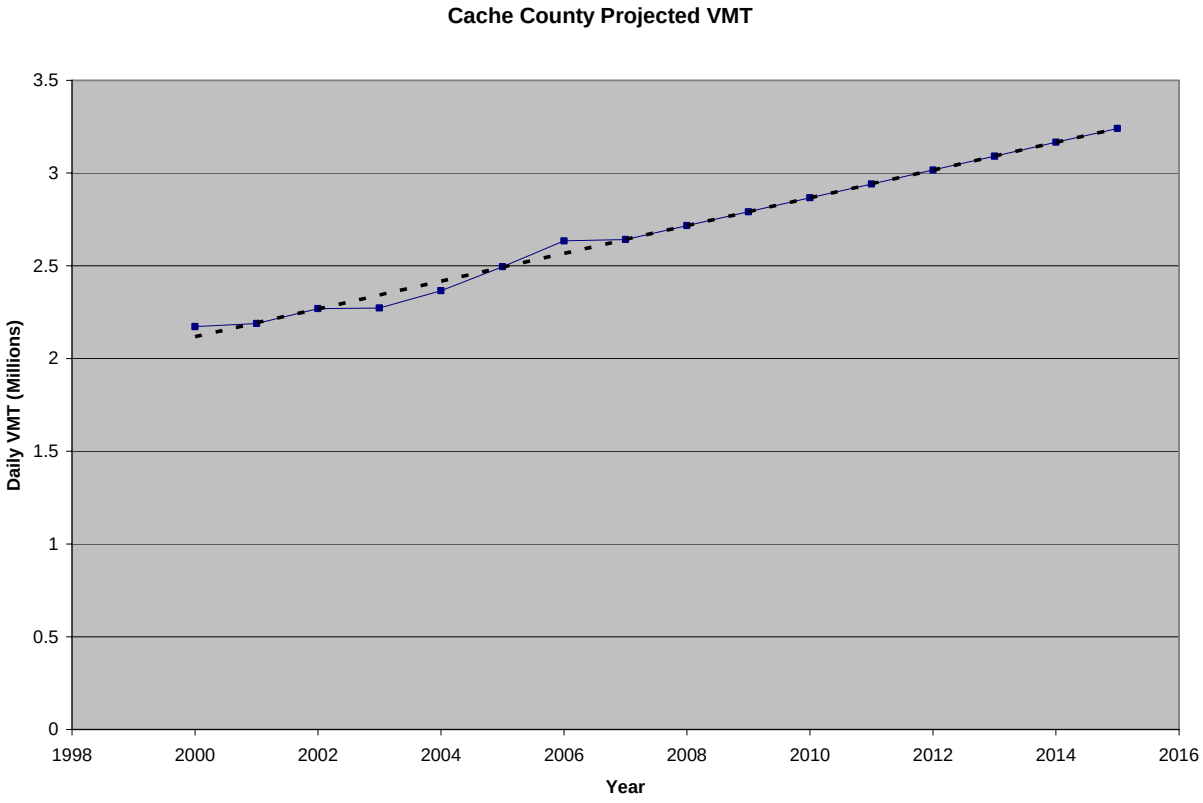
Ref. Table Appendix 1.A-5: UDOT Cache CountyVMT Data (millions annually)

County	2000	2001	2002	2003	2004	2005	2006
Cache[1]	793	799	828	830	863	911	961

[1]All the VMT figures were from UDOT and in VMT millions per day. Absent any other information, EPA merely multiplied these daily VMT figures by 365 to arrive at annual VMT figures.

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 from the above tables and performed a regression analysis in order to project VMT figures for future years out to 2015.

Year	Cache County VMT			
2000	2172146	2.172146	Slope	74845.179
2001	2188530	2.18853	Intercept	-147572500
2002	2268537	2.268537		
2003	2272995	2.272995		
2004	2365310	2.36531		
2005	2495303	2.495303		
2006	2633928	2.633928		
2007	2641773	2.641773		
2008	2716619	2.716619		
2009	2791464	2.791464		
2010	2866309	2.866309		
2011	2941154	2.941154		
2012	3015999	3.015999		
2013	3090845	3.090845		
2014	3165690	3.16569		
2015	3240535	3.240535		



Ref. Table Appendix 1.A-6: EPA Cache County *Projected* VMT Data (millions daily)[1]

County	2007	2008	2009	2010	2011	2012	2013	2014	2015
Cache	2.641773	2.716619	2.791464	2.866309	2.941154	3.015999	3.090845	3.165690	3.240535

[1]All the VMT figures are projected by EPA Region 8 from UDOT data and are in VMT millions per day.

Ref. Table Appendix 1.A-7: EPA Cache County *Projected* VMT Data (millions annually)[1]

County	2007	2008	2009	2010	2011	2012	2013	2014	2015
Cache	964	992	1019	1046	1074	1101	1128	1155	1170

[1]All the VMT figures are projected by EPA from UDOT data and in VMT millions per day. Absent any other information, Region 8 merely multiplied these daily VMT figures by 365 to arrive at annual VMT figures.

Based on the information derived above, Table Appendix 1.A-9 below shows VMT for 2005 and projected VMT growth for Cache County used by EPA for this technical analysis. The percent change was represented by the difference between 2005 (base year) to 2010 and 2005 to 2015. These are strictly estimated/interpolated projected VMT and should be considered in view of the State's 12/18/07 designations recommendations submittal which did not contain any VMT data for 2000, 2005 or any other years.

Franklin County, Idaho:

EPA was unable to locate and specific County-by-County historical or projected VMT data and we welcome any specific data and input from the State of Idaho. EPA was able to locate State VMT data from the U.S. Department of Transportation, Bureau of Transportation Statistics, Research and Innovative Technology Administration (RITA) for the State of Idaho. See http://www.bts.gov/publications/state_transportation_statistics/state_transportation_statistics_2006/html/table_05_03.html and "Table 5-3: Highway Vehicle-Miles Traveled (VMT)". Please see Reference Table Appendix 1.A-8 below:

Ref. Table Appendix 1.A-8: RITA VMT Data for Idaho[1]

Year	VMT Millions / Annual	Est. Population	Est. VMT per Capita / Annual
1999	13,975	N/A[2]	11,165
2000	13,534	1,299,680	10,413
2004	14,729	N/A[2]	10,572
2005	14,866	1,429,096	10,402

[1]All the VMT figures, estimated population figures, and estimated per capita VMT figures are from RITA.
[2] N/A = not available. RITA did not provide estimated population figures for 1999 & 2004.

Based on the RITA data in Table Appendix 1.A-8 above, the State-wide average VMT per capita is approximately 10,638. From the information in the Idaho Governor's 12/14/07 designations recommendations submittal, in 2005 Franklin County was shown to have a population of 12,410 and VMT of 190 million. This would equate to approximately 15,310 VMT per capita. As the above analysis did not provide a clear correlation for Franklin County, EPA instead merely used the projected percent population growth (see Table Appendix 1.A-3 above) as a surrogate factor to project estimated VMT growth for Franklin County. Therefore, EPA assumed a 10% VMT growth for 2010 and a 21% growth for 2015; both relative to 2005.

Ref. Table Appendix 1.A-9: Cache County and Franklin County: Estimated Projected VMT Growth VMT (millions annually)

County	2005	% Change	2010	% Change	2015
Cache	911	14.8%	1046	28.4%	1170
Franklin	190	10%	209	21%	230

4.) <u>The Spreadsheet Tables below display EPA Generated Data for the; Logan, UT-ID CBSA, Provo-Orem CBSA, and the Salt Lake City-Ogden-Clearfield CSA</u>

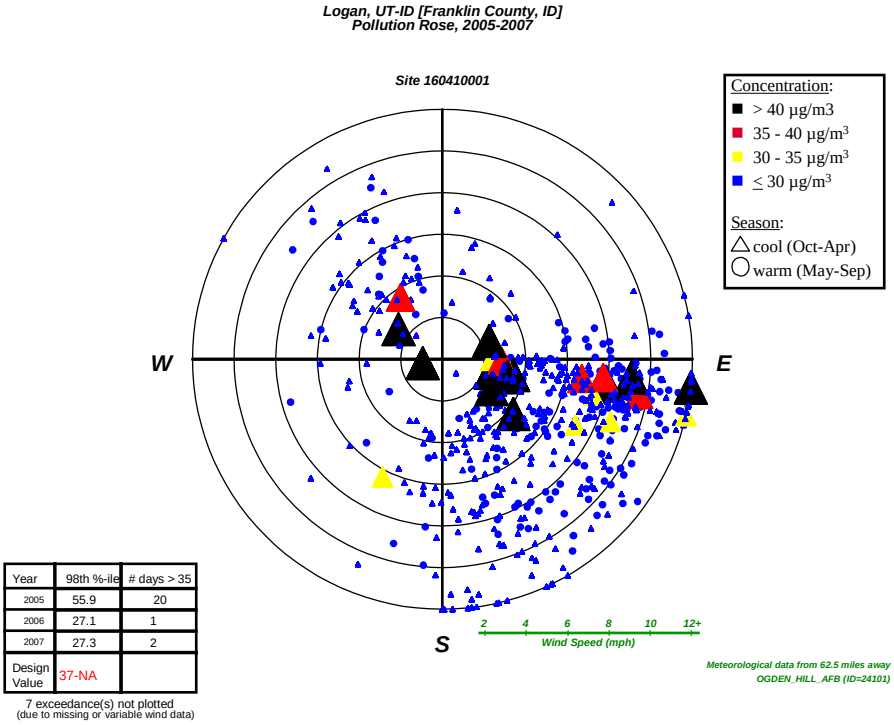
County	State	CSA (2006 and 2007 definitions)	CBSA (2006 and 2007 definitions)	NA Status 1997 PM2.5	State Rec	EPA Reg Rec	Contributing Emissions Score	Daily Des Val 0305	Daily Des Val 0406	Preliminary Daily Des Val 0507	Annual Des Val 0305	Annual Des Val 0406	Preliminary Annual Des Val 0507	NA Status Ozone	NA Status PM10	2005 Population	2005 Population Density (people/sq mi)	Percent Population Change (2000-05)	Vehicle Miles Traveled in 2005 (millions annually)	Percent VMT Growth (1996-2005)	Number commuting into any violating counties	Percent commuting into any violating counties	Number commuting into statistical area	Percent commuting into statistical area	PM2.5 emissions - total (tpy)	PM2.5 emissions - carbon (tpy)
LOGAN, UT-ID								65	64	42	12.1	12.2	10.3													
Cache	UT		Logan, UT-ID		NA-P		100	65	64	42	12.1	12.2	10.3			98,358	84	7	936	31	40,020	92	39,410	91	709	263
Franklin	ID		Logan, UT-ID		NA-P		59			37			7.7			12,410	19	9	190	176	4,570	95	4,550	95	447	134
Bannock	ID		Pocatello, ID				100	27	28		7.6	7.7			Maint	77,794	68	3	474	(33)	130	0	110	0	7,667	4,623
Weber	UT	Salt Lake City-Ogden-Clear	Ogden-Clearfield, UT		other		95	40	40	36	11.5	11.4	10.6		Maint	210,482	320	7	1,995	44	65,050	71	380	0	896	374
Caribou	ID						63									7,094	4	(3)	119	107	70	2	70	2	4,176	1,551
Box Elder	UT	Salt Lake City-Ogden-Clear	Brigham City, UT				39	35	35	29	8.3	8.7	8.2			46,333	7	8	783	6	3,160	18	630	4	1,269	435
Morgan	UT	Salt Lake City-Ogden-Clear	Ogden-Clearfield, UT				11									7,862	13	10	109	(29)	920	29			391	217
Bear Lake	ID						8									6,180	6	(4)	104	89	30	1	30	1	362	126
Oneida	ID						2									4,178	3	1	68	(61)	50	3	30	2	336	113
Rich	UT						2									2,057	2	5	34	5	50	7	40	5	119	41
PROVO, UT								43	44	45	10.5	10.7	10.4													
Utah	UT		Provo-Orem, UT		NA-P		77	43	44	45	10.5	10.7	10.4		Maint	451,855	211	22	4,215	62	158,990	97			1,619	688
Juab	UT		Provo-Orem, UT				1									9,165	3	11	343	50	1,100	33			419	123
Salt Lake	UT	Salt Lake City-Ogden-Clear	Salt Lake City, UT		other		100	49	49	55	12.2	12.1	11.6		Maint	960,297	1190	7	7,512	18	419,360	96			3,214	1,417
Emery	UT						5									10,711	2	(2)	303	(31)	60	1			2,970	183
Carbon	UT		Price, UT				4									19,459	13	(5)	304	28	140	2			525	91
Sanpete	UT						2									23,995	15	5	175	(41)	750	9			689	382
Wasatch	UT	Salt Lake City-Ogden-Clear	Heber, UT				2									19,015	16	23	227	79	1,320	19			247	100
Millard	UT						1									12,280	2	(1)	371	(9)	170	4			2,578	352
Tooele	UT	Salt Lake City-Ogden-Clear	Salt Lake City, UT				1			31			7.6			51,269	7	23	804	26	7,200	40			1,766	725
Duchesne	UT						0									15,328	5	7	160	(9)	130	2			599	314
Summit	UT	Salt Lake City-Ogden-Clear	Salt Lake City, UT				0									35,119	19	17	551	(5)	4,630	29			346	132
White Pine	NV						0									8,919	1	(1)	177	81	30	1			351	83
SALT LAKE CITY, UT								49	49	55	12.2	12.1	11.6													
Davis	UT	Salt Lake City-Ogden-Clea	Ogden-Clearfield, UT		NA		100	40	38	38		10.6	10.0			268,084	424	12	3,352	110	110,940	99	110,640	98	1,391	456
Salt Lake	UT	Salt Lake City-Ogden-Clea	Salt Lake City, UT		NA		100	49	49	55	12.2	12.1	11.6		Maint	960,297	1190	7	7,512	18	430,040	98	426,480	97	3,214	1,417
Weber	UT	Salt Lake City-Ogden-Clea	Ogden-Clearfield, UT		NA-P		60	40	40	36	11.5	11.4	10.6		Maint	210,482	320	7	1,995	44	88,590	97	89,750	99	896	374
Morgan	UT	Salt Lake City-Ogden-Clea	Ogden-Clearfield, UT				6									7,862	13	10	109	(29)	1,800	58	3,120	100	391	217
Box Elder	UT	Salt Lake City-Ogden-Clea	Brigham City, UT				1	35	35	29	8.3	8.7	8.2			46,333	7	8	783	6	4,250	24	17,210	96	1,269	435
Summit	UT	Salt Lake City-Ogden-Clea	Salt Lake City, UT				0									35,119	19	17	551	(5)	4,850	30	15,640	97	346	132
Tooele	UT	Salt Lake City-Ogden-Clea	Salt Lake City, UT				0			31			7.6			51,269	7	23	804	26	7,560	42	17,230	96	1,766	725
Wasatch	UT	Salt Lake City-Ogden-Clea	Heber, UT				0									19,015	16	23	227	79	1,430	21	6,300	92	247	100
Utah	UT		Provo-Orem, UT		other		6	43	44	45	10.5	10.7	10.4		Maint	451,855	211	22	4,215	62	160,160	98	20,570	13	1,619	688
Cache	UT		Logan, UT-ID		other		1	65	64	42	12.1	12.2	10.3			98,358	84	7	936	31	40,910	94	3,800	9	709	263
Carbon	UT		Price, UT				0									19,459	13	(5)	304	28	140	2	80	1	525	91
Cassia	ID		Burley, ID				0									21,391	8		351	(3)	30	0	20	0	941	278
Daggett	UT						0									937	1	1	21	177	20	6	20	6	1,038	688
Duchesne	UT						0									15,328	5	7	160	(9)	150	3	280	5	599	314
Elko	NV		Elko, NV				0									45,576	3	1	1,093	20	10	0	340	2	3,599	1,997
Franklin	ID		Logan, UT-ID		other		0			37			7.7			12,410	19	9	190	176	4,600	96	130	3	447	134
Juab	UT		Provo-Orem, UT				0									9,165	3	11	343	50	1,100	33	220	7	419	123
Oneida	ID						0									4,178	3	1	68	(61)	120	7	490	29	336	113
Rich	UT						0									2,057	2	5	34	5	100	14	60	8	119	41
Sweetwater	WY		Rock Springs, WY				0									38,019	4	1	752	10	40	0	50	0	9,131	832
Uinta	WY		Evanston, WY				0									19,873	10	1	369	15	140	2	240	3	1,582	216
Uintah	UT		Vernal, UT				0									27,129	6	7	275	(4)	140	1	120	1	809	132
White Pine	NV						0									8,919	1	(1)	177	81	30	1	40	1	351	83

County	State	PM2.5 emissions - other (tpy)	SO2 emissions (tpy)	NOx emissions (tpy)	VOC emissions (tpy)	NH3 emissions (tpy)	Trajectory Factor for CES - Cold	Trajectory Factor for CES - Warm	Distance Factor (mi)	Included in Tagged Modeling - County	Included in Tagged Modeling - Pt. Source	County, State	FIPS Code	Percentage of cold days	Percentage of warm days	Collocated Speciation Monitor?	PM2.5 Composition Data	Sulfate (µg/m³)	Nitrate (µg/m³)	Carbon (µg/m³)	Crustal (µg/m³)	Total (µg/m³)	Sulfate Percent	Nitrate Percent	Carbon Percent	Crustal Percent
LOGAN, UT-ID												LOGAN, UT-ID	00	100	0	N	Total Concentration (Cold)	3.3	12.3	20.1	1.1	36.8	9	33	55	3
Cache	**UT**	**445**	**238**	**3,833**	**5,305**	**1,957**	96		18.8	N	N	**Cache, UT**	**49005**				Regional Concentration (Cold)	0.9	3.5	3.9	0.3	8.6	10	41	45	3
Franklin	**ID**	**313**	**57**	**851**	**2,290**	**1,221**	23		37.1	N	N	**Franklin, ID**	**16041**				Urban Increment (Cold)	2.4	8.8	16.2	0.8	28.2	9	31	57	3
Bannock	ID	3,043	673	4,839	24,792	1,908	3		69.6	N	N	Bannock, ID	16005				Total Concentration (Warm)	2.6	0.0	8.6	1.6	12.8	20	0	67	13
Weber	UT	521	356	6,951	9,317	774	100		28.8	N	N	Weber, UT	49057				Regional Concentration (Warm)	1.6	0.0	3.1	0.9	5.6	29	0	55	16
Caribou	ID	2,624	12,646	2,869	5,064	1,381	4		72	N	N	Caribou, ID	16029				Urban Increment (Warm)	1.0	0.0	5.5	0.7	7.2	14	0	76	10
Box Elder	UT	834	345	5,210	6,720	1,972	52		33.3	N	N	Box Elder, UT	49003				Total Concentration (Ann Avg)	1.6	0.6	6.2	0.9	9.3	17	6	67	10
Morgan	UT	174	190	3,130	1,678	240	46		42.3	N	N	Morgan, UT	49029				Regional Concentration (Ann Avg)	1.2	0.3	2.6	0.7	4.8	25	6	54	15
Bear Lake	ID	236	35	2,103	2,389	362	6		47.7	N	N	Bear Lake, ID	16007				Urban Increment (Ann Avg)	0.4	0.3	3.6	0.2	4.5	9	7	80	4
Oneida	ID	223	44	523	1,565	335	7		57.2	N	N	Oneida, ID	16071													
Rich	UT	77	40	221	1,808	725	24		26.8	N	N	Rich, UT	49033													
PROVO, UT												PROVO, UT	00	100	0	Y	Total Concentration (Cold)	2.9	33.5	9.7	1.1	47.2	6	71	21	2
Utah	**UT**	**932**	**1,012**	**13,778**	**17,174**	**2,414**	100		25.8	N	N	**Utah, UT**	**49049**				Regional Concentration (Cold)	0.6	0.6	0.5	0.2	1.9	32	32	26	11
Juab	**UT**	**297**	**305**	**3,642**	**1,728**	**309**	9		72.6	N	N	**Juab, UT**	**49023**				Urban Increment (Cold)	2.3	32.9	9.2	0.9	45.3	5	73	20	2
Salt Lake	UT	1,799	5,738	28,411	34,376	1,579	80		35.8	N	N	Salt Lake, UT	49035				Total Concentration (Warm)	2.8	0.0	11.3	1.7	15.8	18	0	72	11
Emery	UT	2,787	23,925	29,874	1,555	501	8		90.9	N	N	Emery, UT	49015				Regional Concentration (Warm)	1.9	0.0	1.9	1.5	5.3	36	0	36	28
Carbon	UT	434	6,718	5,532	1,849	859	19		68.6	N	N	Carbon, UT	49007				Urban Increment (Warm)	0.9	0.0	9.4	0.2	10.5	9	0	90	2
Sanpete	UT	307	439	963	2,922	1,104	24		52.9	N	N	Sanpete, UT	49039				Total Concentration (Ann Avg)	1.7	1.2	5.1	1.0	9.0	19	13	57	11
Wasatch	UT	147	59	920	1,484	197	31		30.5	N	N	Wasatch, UT	49051				Regional Concentration (Ann Avg)	1.1	0.1	0.7	0.8	2.7	41	4	26	30
Millard	UT	2,226	4,415	29,366	3,275	2,063	4		105	N	N	Millard, UT	49027				Urban Increment (Ann Avg)	0.6	1.1	4.4	0.2	6.3	10	17	70	3
Tooele	UT	1,041	524	5,384	6,658	803	18		47.8	N	N	Tooele, UT	49045													
Duchesne	UT	285	141	1,344	2,738	963	8		66.9	N	N	Duchesne, UT	49013													
Summit	UT	214	297	3,658	2,367	524	5		70.1	N	N	Summit, UT	49043													
White Pine	NV	267	37	477	740	275	0		182.7	N	N	White Pine, NV	32033													
SALT LAKE CITY, UT												SALT LAKE CITY, U	00	100	0	N	Total Concentration (Cold)	3.6	26.2	14.2	1.0	45.0	8	58	31	2
Davis	**UT**	**934**	**2,510**	**12,433**	**12,816**	**696**	95		22.1	N	N	**Davis, UT**	**49011**				Regional Concentration (Cold)	1.8	18.1	9.0	1.1	29.9	6	60	30	4
Salt Lake	**UT**	**1,799**	**5,738**	**28,411**	**34,376**	**1,579**	100		15.9	N	N	**Salt Lake, UT**	**49035**				Urban Increment (Cold)	1.9	8.1	5.1	0.0	15.1	13	54	34	0
Weber	**UT**	**521**	**356**	**6,951**	**9,317**	**774**	50		42.4	N	N	**Weber, UT**	**49057**				Total Concentration (Warm)	1.8	0.0	11.4	3.2	16.5	11	0	69	20
Morgan	**UT**	**174**	**190**	**3,130**	**1,678**	**240**	12		31.2	N	N	**Morgan, UT**	**49029**				Regional Concentration (Warm)	1.6	0.0	6.2	2.1	9.9	16	0	63	21
Box Elder	**UT**	**834**	**345**	**5,210**	**6,720**	**1,972**	18		61.6	N	N	**Box Elder, UT**	**49003**				Urban Increment (Warm)	0.2	0.0	5.2	1.1	6.5	3	0	80	17
Summit	**UT**	**214**	**297**	**3,658**	**2,367**	**524**	2		62.2	N	N	**Summit, UT**	**49043**				Total Concentration (Ann Avg)	2.1	1.2	5.5	0.9	9.7	22	13	57	9
Tooele	**UT**	**1,041**	**524**	**5,384**	**6,658**	**803**	14		35	N	N	**Tooele, UT**	**49045**				Regional Concentration (Ann Avg)	1.7	1.3	5.1	1.0	9.1	19	14	56	11
Wasatch	**UT**	**147**	**59**	**920**	**1,484**	**197**	7		48	N	N	**Wasatch, UT**	**49051**				Urban Increment (Ann Avg)	0.4	0.0	0.4	0.0	0.8	50	0	50	0
Utah	UT	932	1,012	13,778	17,174	2,414	29		35.8	N	N	Utah, UT	49049													
Cache	UT	445	238	3,833	5,305	1,957	5		70.8	N	N	Cache, UT	49005													
Carbon	UT	434	6,718	5,532	1,849	859	3		98.9	N	N	Carbon, UT	49007													
Cassia	ID	663	125	2,181	4,811	5,780	0		146.6	N	N	Cassia, ID	16031													
Daggett	UT	350	110	1,051	3,173	779	0		112.5	N	N	Daggett, UT	49009													
Duchesne	UT	285	141	1,344	2,738	963	8		80.8	N	N	Duchesne, UT	49013													
Elko	NV	1,603	767	6,452	10,677	1,707	0		191.5	N	N	Elko, NV	32007													
Franklin	ID	313	57	851	2,290	1,221	1		106.9	N	N	Franklin, ID	16041													
Juab	UT	297	305	3,642	1,728	309	4		86.7	N	N	Juab, UT	49023													
Oneida	ID	223	44	523	1,565	335	0		114.4	N	N	Oneida, ID	16071													
Rich	UT	77	40	221	1,808	725	1		71.3	N	N	Rich, UT	49033													
Sweetwater	WY	8,298	35,697	53,468	12,585	1,170	0		165.8	N	N	Sweetwater, WY	56037													
Uinta	WY	1,366	7,326	4,848	2,188	407	1		82.7	N	N	Uinta, WY	56041													
Uintah	UT	677	1,321	8,518	2,036	565	3		130.6	N	N	Uintah, UT	49047													
White Pine	NV	267	37	477	740	275	0		184.8	N	N	White Pine, NV	32033													

ATTACHMENT 2, APPENDIX 1.B: TECHNICAL ANALYSIS OF THE LOGAN UT-ID "CACHE VALLEY" NONATTAINMENT AREA – References, Data Sources, and Data Interpretations:

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. 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.

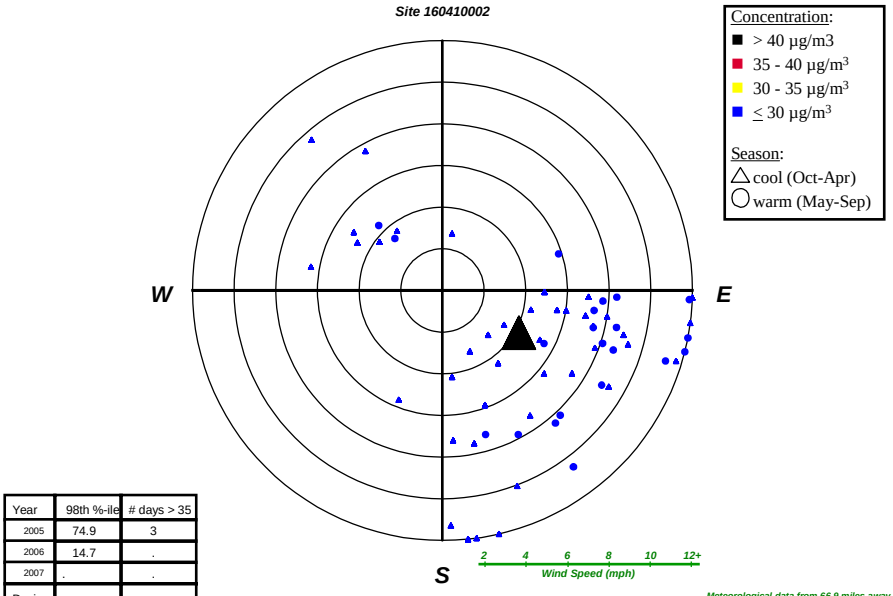
EPA Generated Data: Wind Roses



Year	98th %-ile	# days > 35
2005	55.9	20
2006	27.1	1
2007	27.3	2
Design Value	37-NA	

7 exceedance(s) not plotted
(due to missing or variable wind data)

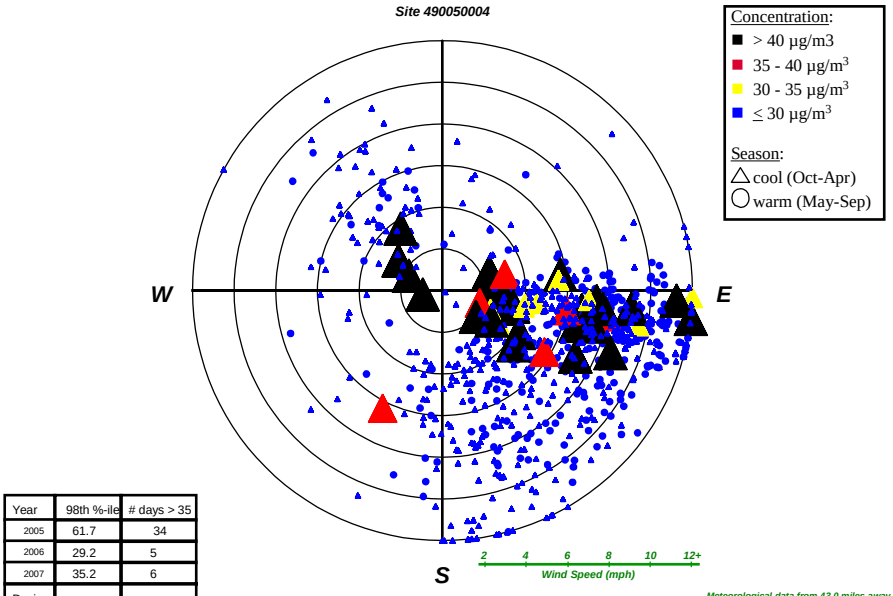
Logan, UT-ID [Franklin County, ID]
Pollution Rose, 2005-2007



Year	98th %-ile	# days > 35
2005	74.9	3
2006	14.7	.
2007	.	.
Design Value	45-inc-na	

2 exceedance(s) not plotted
(due to missing or variable wind data)

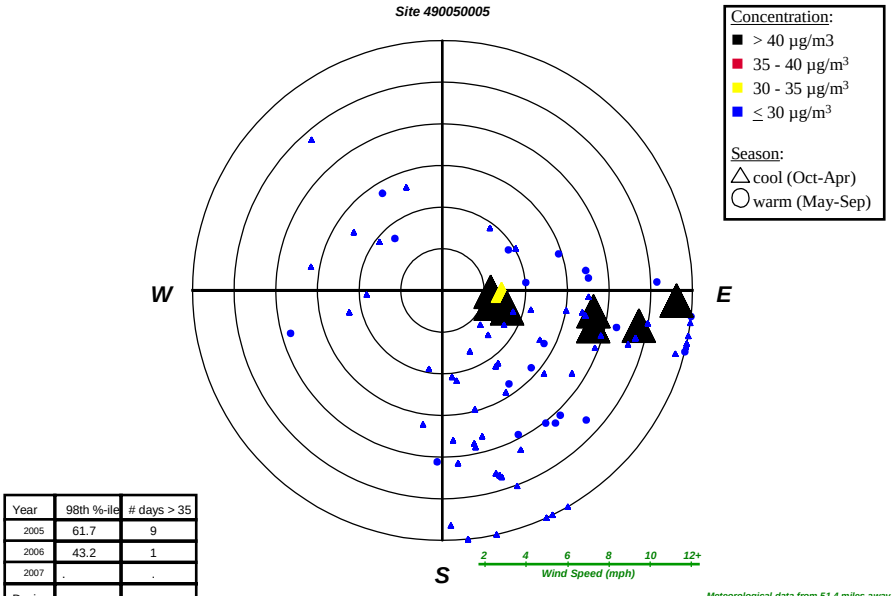
Logan, UT-ID [Cache County, UT]
Pollution Rose, 2005-2007



Year	98th %-ile	# days > 35
2005	61.7	34
2006	29.2	5
2007	35.2	6
Design Value	42-NA	

12 exceedance(s) not plotted
(due to missing or variable wind data)

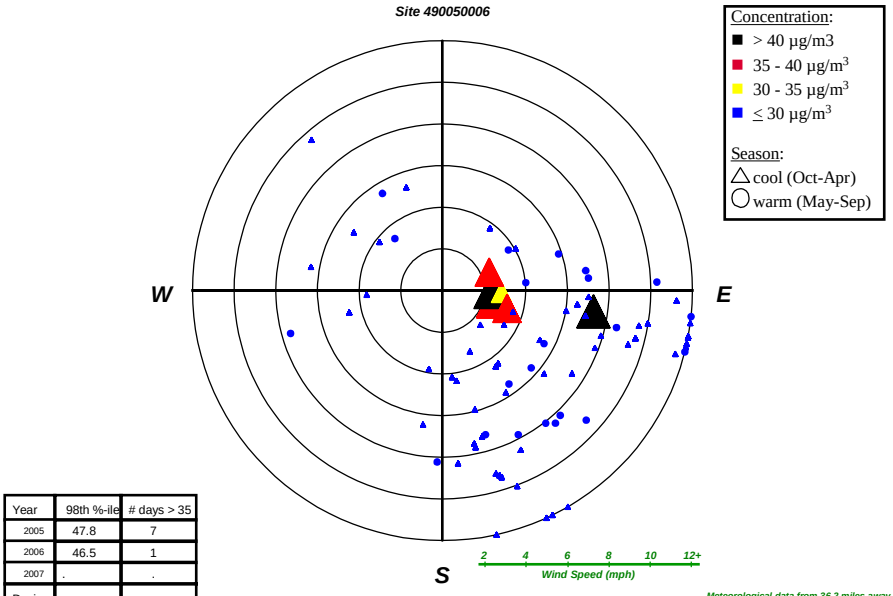
Logan, UT-ID [Cache County, UT]
Pollution Rose, 2005-2007



Year	98th %-ile	# days > 35
2005	61.7	9
2006	43.2	1
2007	.	.
Design Value	52-inc-na	

3 exceedance(s) not plotted
(due to missing or variable wind data)

Logan, UT-ID [Cache County, UT]
Pollution Rose, 2005-2007



Year	98th %-ile	# days > 35
2005	47.8	7
2006	46.5	1
2007	.	.
Design Value	47-inc-na	

3 exceedance(s) not plotted
(due to missing or variable wind data)

Attachment 3

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.]