4.0 Analyses of Individual Nonattainment Area

4.8 Region 8 Nonattainment Areas

4.8.2 Utah

Attachment 1

UTAH and UTAH/IDAHO
Area Designations For The
24-Hour Fine Particle National Ambient Air Quality Standards

Table A.1-1 below identifies the counties in Utah (and Idaho) that EPA has designated as not attaining the 2006 24-hour fine particle (PM2.5) National Ambient Air Quality Standard (NAAQS).[1] A county (or part thereof) is 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.

Table A.1-1 Nonattainment Counties[2]

Area	State Recommended Nonattainment Counties	EPA Designated Nonattainment Counties
Logan UT-ID CBSA	**Cache, UT (partial); Franklin, ID (partial)**	**Cache, UT (partial); Franklin, ID (partial)**
Provo-Orem CBSA (Provo-Orem)	**Utah (partial), UT**	**Utah (partial), UT**
Salt Lake City-Ogden-Clearfield CSA (Salt Lake City)	**Davis, Salt Lake, Weber (partial) – UT**	**Box Elder (partial), Davis, Salt Lake, Tooele (partial), Weber (partial) - UT**

[2]Legal descriptions are found in Attachments 2 and 3 below.

EPA has designated the remaining counties in Utah as "attainment/unclassifiable."

Attachment 2

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

Pursuant to section 107(d) of the Clean Air Act, EPA must designate as nonattainment those areas that violate the NAAQS and those areas that contribute to violations. This technical analysis for 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

[1] EPA designated nonattainment areas for the 1997 fine particle standards in 2005. In 2006, the primary and secondary 24-hour PM2.5 standards were 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 primary and secondary annual standards for PM2.5 remained unchanged at 15 micrograms per cubic meter (average of annual averages for 3 consecutive years).

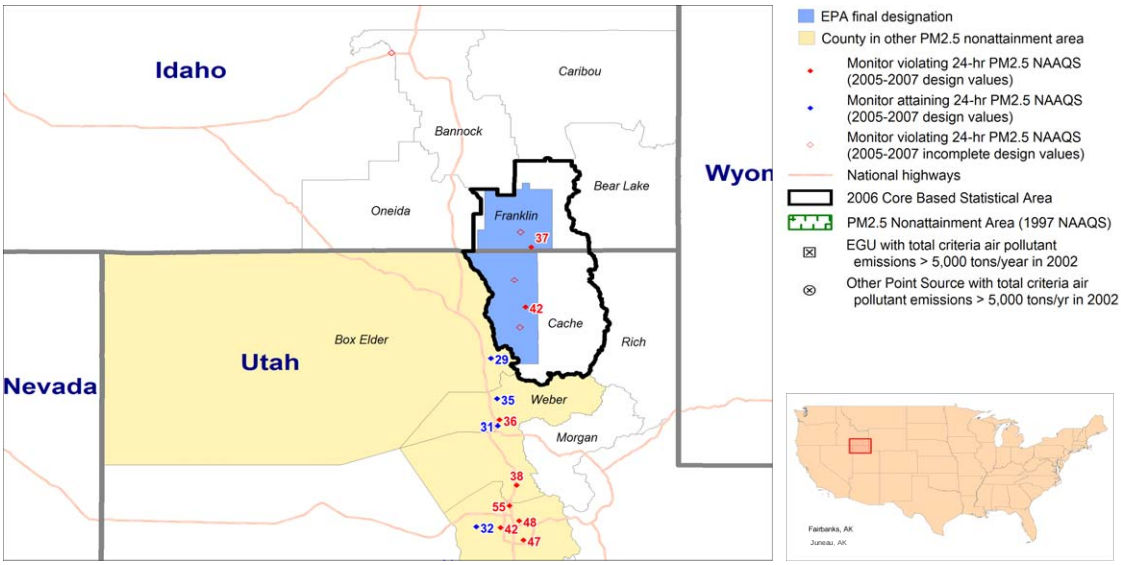
counties based on the weight of evidence of the following nine factors recommended in EPA guidance and any other relevant information:

- 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 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.) Cache County, Utah**", "**B.) Franklin County, Idaho**", and as illustrated in Figures A.2-2 and A.2-3 below.

A.) Cache County, Utah

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.) Franklin County, Idaho

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

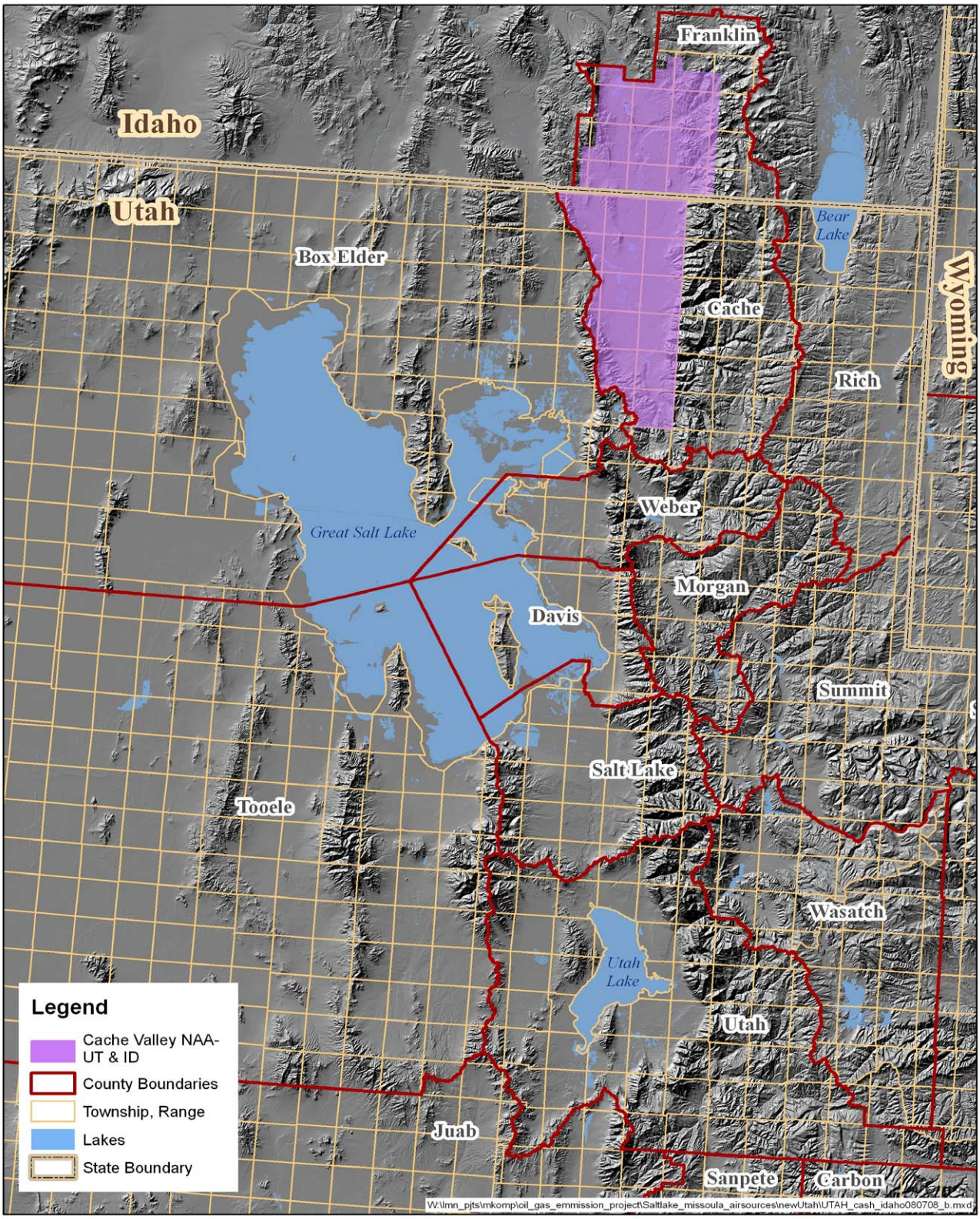
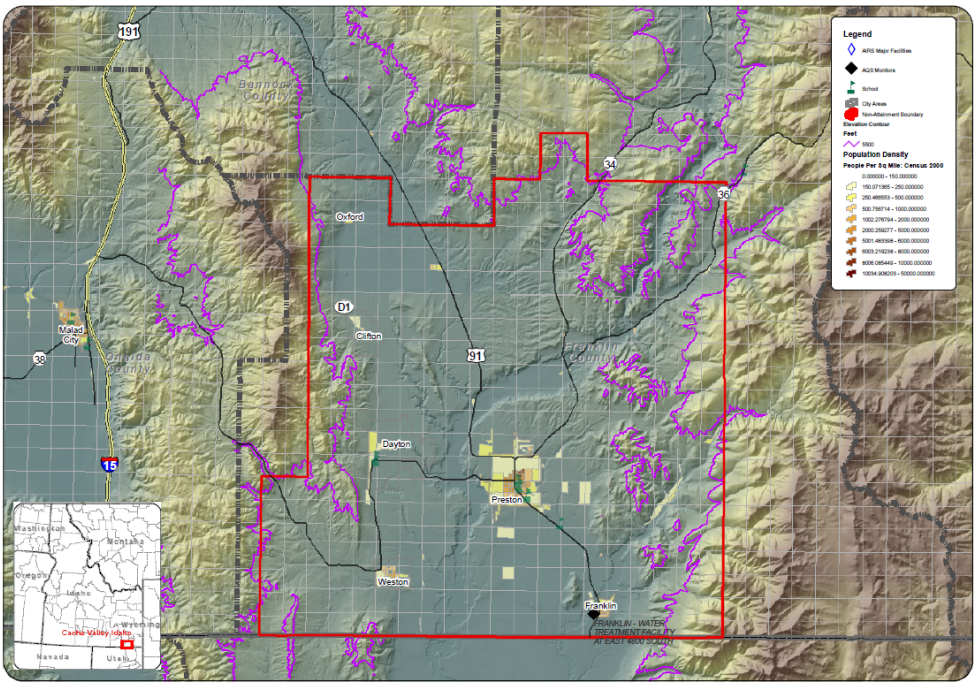
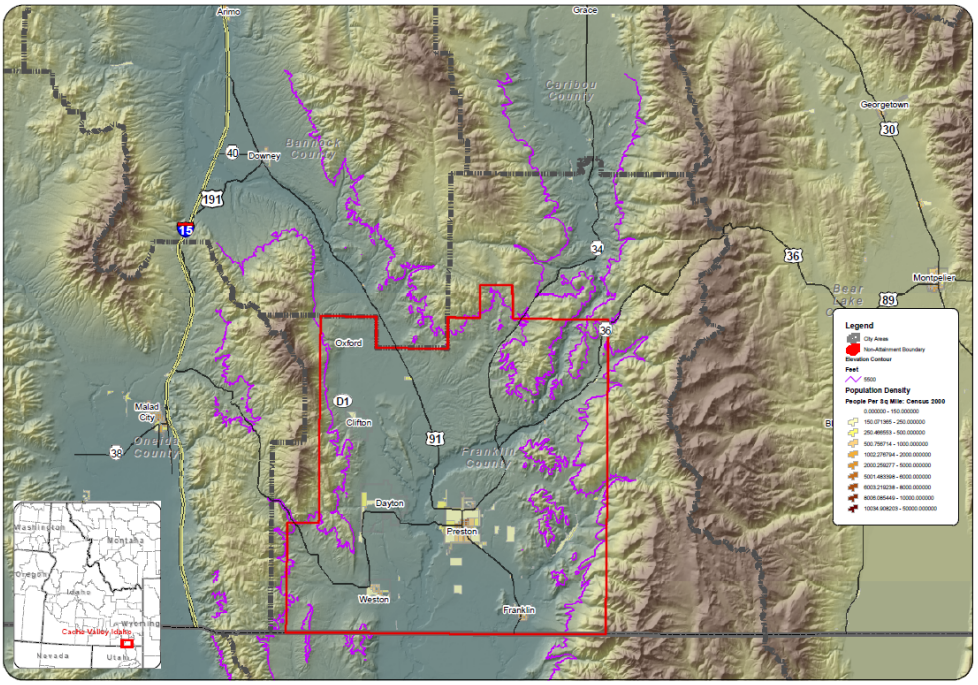

Franklin
Idaho
Utah
Bear Lake
Box Elder
Cache
Wyoming
Rich
Weber
Great Salt Lake
Morgan
Davis
Summit
Salt Lake
Tooele
Wasatch
Utah Lake
Utah
Juab
Sanpete
Carbon
Legend
Cache Valley NAA-UT & ID
County Boundaries
Township, Range
Lakes
State Boundary
W:\lmn_pjts\mkomp\oil_gas_emmission_project\Saltlake_missoula_airsources\newUtah\UTAH_cash_idaho080708_b.mxd

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



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



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 4, and a more detailed description can be found at http://www.epa.gov/ttn/naaqs/pm/pm25_2006_techinfo.html#C.

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

Table A.2-2: Emissions Data

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 µg/m^3	2005 – 2007 Data µg/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[2] 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 µg/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 $PM_{2.5}$

[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.

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 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.)

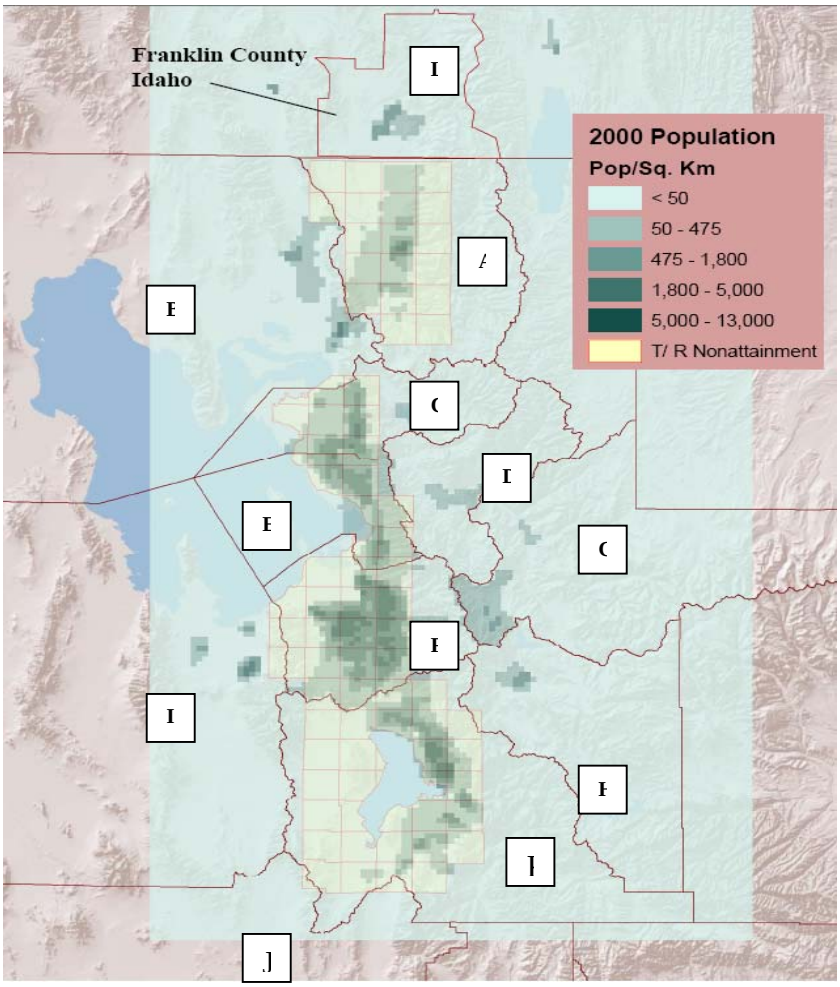
Based on our evaluation, EPA concluded that only portions of Cache and Franklin Counties are candidates for the 24-hour $PM_{2.5}$ standard nonattainment designation with respect to this factor.

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 designations 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 132.7μg/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 μg/m^3, with the highest 24-hour concentration of 82.6 μg/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)

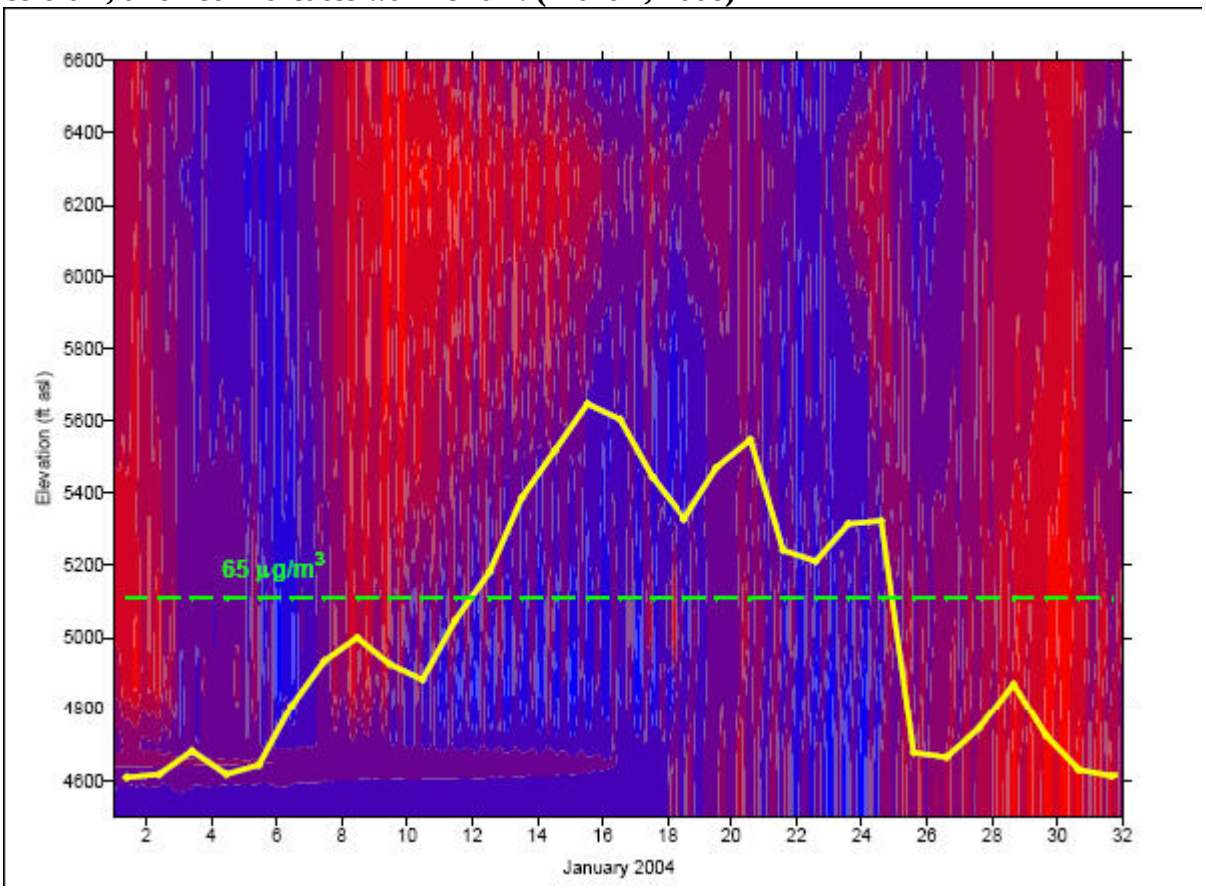
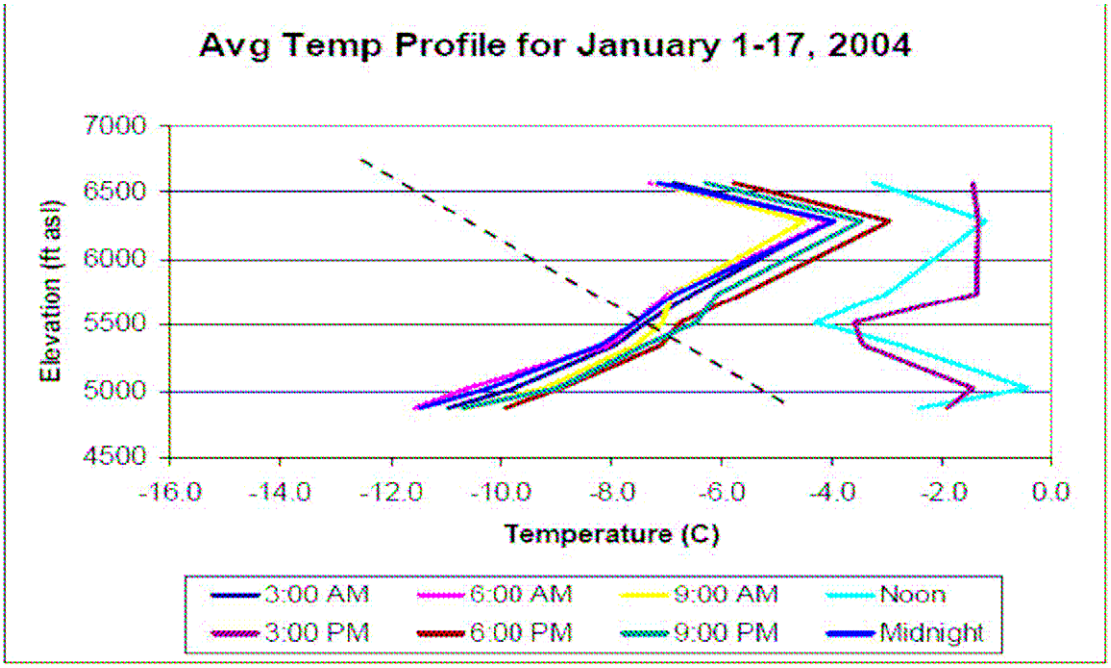


Figure A.2-6: (From Idaho DEQ) Average temperature profiles in Cache Valley during January 1 - 17, 2004
(Martin, 2006)



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.

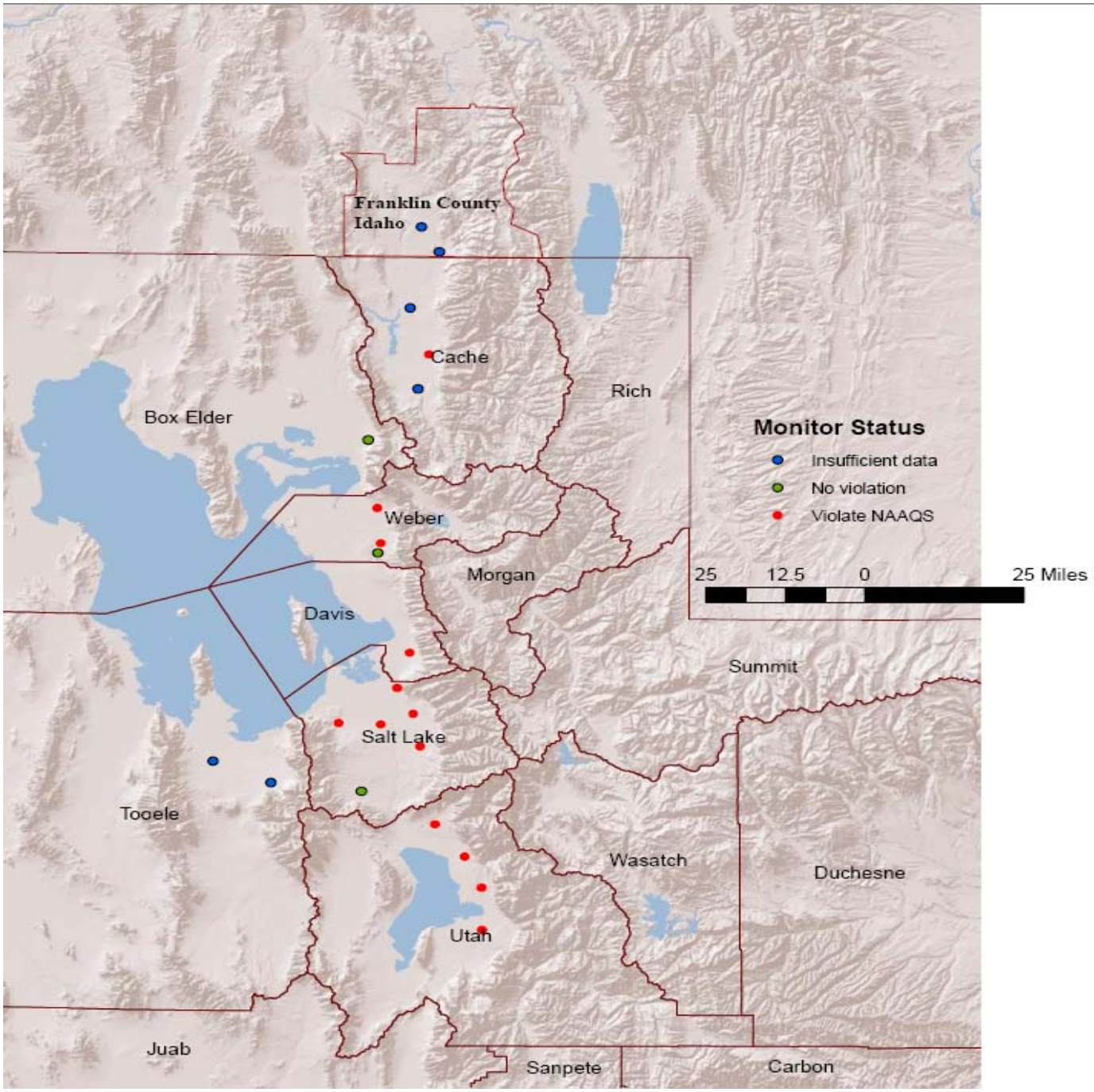
The highway mountain passes near the southern Cache Valley (Utah) are West Highway 30 whose summit is approximately 4,900 feet MSL and South Highway 89 whose summit is approximately 5,900 feet MSL. The Wellsville Mountains, Bear River Mountains, and northern Wasatch mountains converge in southern Cache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

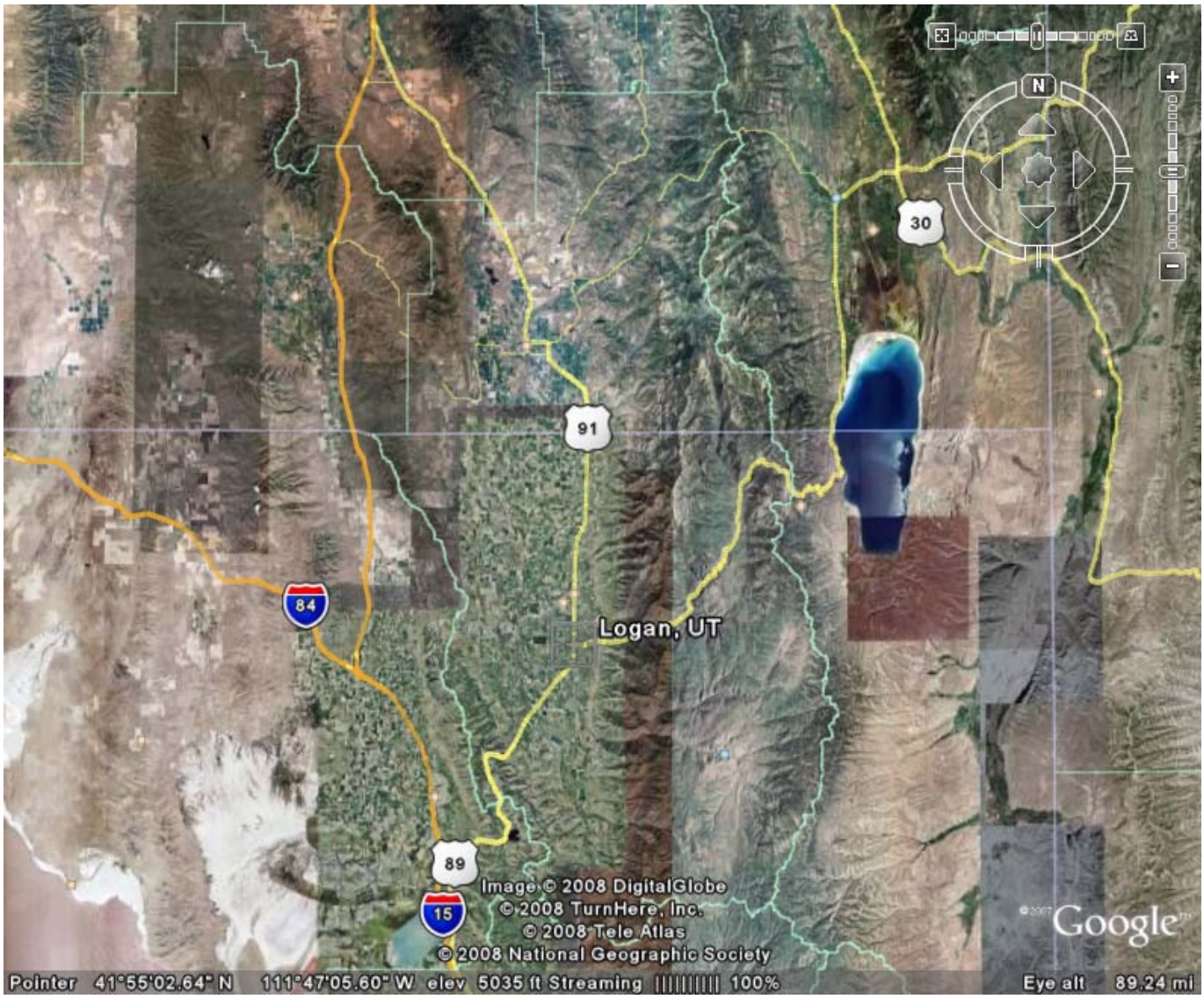
With respect to Franklin County, the State of Idaho indicated that the average afternoon mixing height during stagnation events is about 5,500 feet (MSL). Therefore, the State asserted that any areas in Franklin County that are higher than 5,500 feet (MSL) in elevation will not contribute to $PM_{2.5}$ 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

(continued)

UTAH and UTAH/IDAHO
Area Designations For The
24-Hour Fine Particle National Ambient Air Quality Standards

Table A.1-1 below identifies the counties in Utah (and Idaho) that EPA has designated as not attaining the 2006 24-hour fine particle ($PM_{2.5}$) National Ambient Air Quality Standard (NAAQS).[3] A county (or portion thereof) is 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.

Table A.1-1 Nonattainment Counties[2]

Area	State Recommended Nonattainment Counties	EPA Designated Nonattainment Counties
Logan UT-ID CBSA	**Cache, UT (partial); Franklin, ID (partial)**	**Cache, UT (partial); Franklin, ID (partial)**
Provo-Orem CBSA (Provo-Orem)	**Utah (partial), UT**	**Utah (partial), UT**
Salt Lake City-Ogden-Clearfield CSA (Salt Lake City)	**Davis, Salt Lake, Weber (partial) - UT**	**Box Elder (partial), Davis, Salt Lake, Tooele (partial), Weber (partial) - UT**

[2]Legal descriptions are found in Attachment 2 above (for Logan UT-ID) and in Attachment 3 below (for Provo-Orem and Salt Lake City.)

EPA has designated the remaining counties in Utah as "attainment/unclassifiable."

Attachment 3

EPA Technical Analysis for the Provo-Orem Core Based Statistical Area (CBSA) and the Salt Lake City-Ogden-Clearfield Combined Statistical Area (CSA)

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 is for the Provo-Orem Core Based Statistical Area CBSA and the Salt Lake City-Ogden-Clearfield CSA. This analysis 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

[3] EPA designated nonattainment areas for the 1997 fine particle standards in 2005. In 2006, the primary and secondary 24-hour PM2.5 standards were 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 primary and secondary annual standards for PM2.5 remained unchanged at 15 micrograms per cubic meter (average of annual averages for 3 consecutive years).

- geography and topography
- jurisdictional boundaries
- level of control of emissions sources

We 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 areas. (See additional discussion of the CES under factor 1 below.)
Figure A.3-1 below is a map of the counties in the Provo-Orem nonattainment area and Figure A.3-2 is a map of the counties in the Salt Lake City nonattainment area. These maps also contain other relevant information such as the locations and design values of air quality monitors, the metropolitan area boundary.

Figure A.3-1 Provo-Orem, UT 24-hr PM2.5 Nonattainment Area

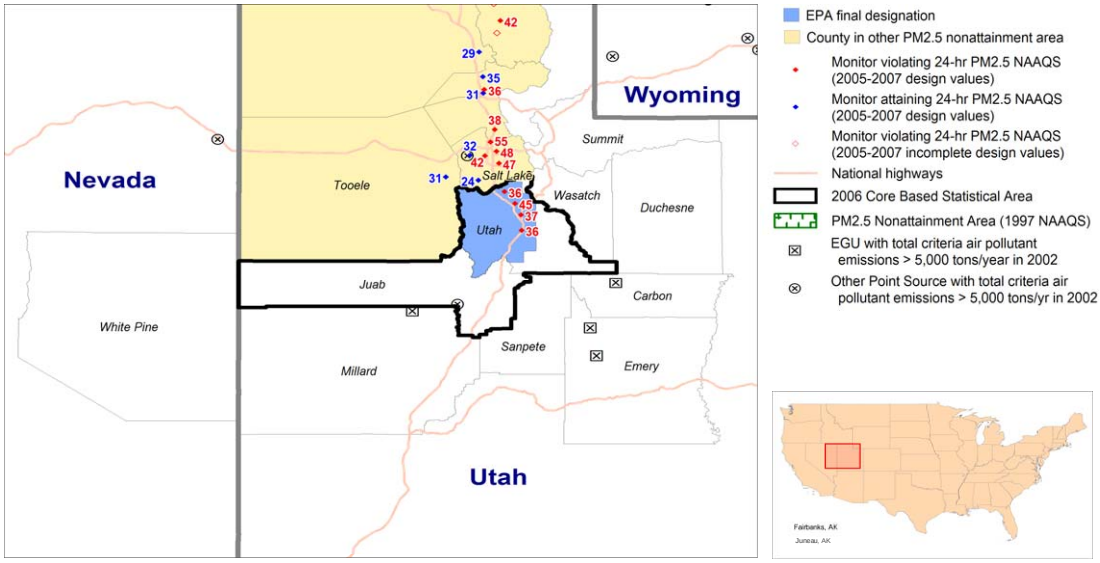
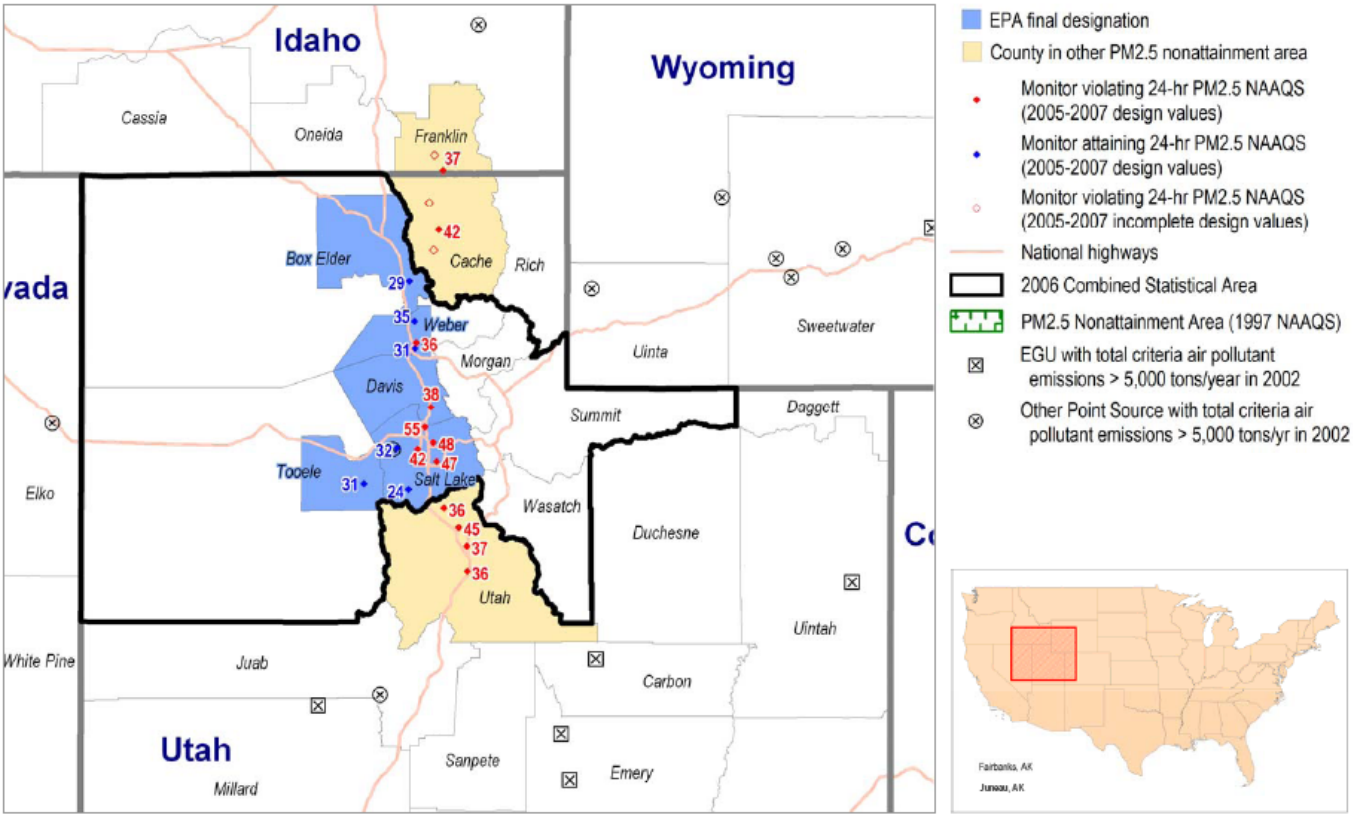


Figure A.3-2 Salt lake City, UT 24-hour PM2.5 Nonattainment Area



In December 2007, the State of Utah recommended that Davis County, Salt Lake County, Utah County (partial), and Weber 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 dated December 18, 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 Utah County as nonattainment for the 24-hour $PM_{2.5}$ air-quality standard as part of the Provo-Orem nonattainment area. EPA has designated part of Box Elder County, Davis County, Salt Lake County, part of Tooele County, and part of Weber County as nonattainment for the 24-hour $PM_{2.5}$ air-quality standard as part of the Salt Lake City nonattainment area. These designations are based upon currently available information. The counties are listed in the table below.

Table A.3-1 Nonattainment Counties[1]

	State-Recommended Nonattainment Counties	EPA Designated Nonattainment Counties
Provo-Orem	Utah (partial)	Utah (partial)
Salt Lake City	Davis Salt Lake Weber(partial)	Box Elder (partial) Davis Salt Lake Tooele (partial)

		Weber (partial)

[1]Legal descriptions are presented below.

EPA has designated as nonattainment for the $PM_{2.5}$ NAAQS the Provo-Orem area whose boundary is as described in "**A.) Provo-Orem**" below, and as illustrated in Figure A.3-3 below, and the Salt Lake City area whose boundary is as described in "**B.) Salt Lake City**" below and also as illustrated in Figure A.3-3 below.

A.) Provo-Orem

The area of Utah County that lies west of the Wasatch Mountain Range with an eastern boundary for Utah County to be defined as the following Townships (or portions thereof) over to the western boundary of Utah County:

Township 3 South Range 1 East
Township 4 South Range 2 East
Township 5 South Range 3 East (portion located in Utah County)
Township 6 South Range 3 East
Township 7 South Range 3 East
Township 8 South Range 3 East
Township 9 South Range 3 East
Township 10 South Range 2 East

B.) Salt Lake City

Box Elder County (partial)

The following Townships (or portions thereof) as noted:

Township 7 North Range 2 West (portion located in Box Elder County)
Township 8 North Range 2 West
Township 9 North Range 2 West
Township 10 North Range 2 West
Township 11 North Range 2 West (portion located in Box Elder County)
Township 12 North Range 2 West (portion located in Box Elder County)
Township 13 North Range 2 West (portion located in Box Elder County)
Township 9 North Range 3 West
Township 10 North Range 3 West
Township 11 North Range 3 West
Township 12 North Range 3 West
Township 13 North Range 3 West
Township 13 North Range 4 West
Township 12 North Range 4 West
Township 11 North Range 4 West
Township 10 North Range 4 West
Township 9 North Range 4 West
Township 13 North Range 5 West

Township 12 North Range 5 West
Township 11 North Range 5 West
Township 10 North Range 5 West
Township 9 North Range 5 West
Township 13 North Range 6 West
Township 12 North Range 6 West
Township 11 North Range 6 West
Township 10 North Range 6 West
Township 9 North Range 6 West
Township 9 North Range 1 West (portion located in Box Elder County)
Township 8 North Range 1 West (portion located in Box Elder County)
Township 7 North Range 1 West (portion located in Box Elder County)

Davis County

All of Davis County.

Salt Lake County

All of Salt Lake County.

Tooele County (partial)

The following Townships (or portions thereof) as noted:

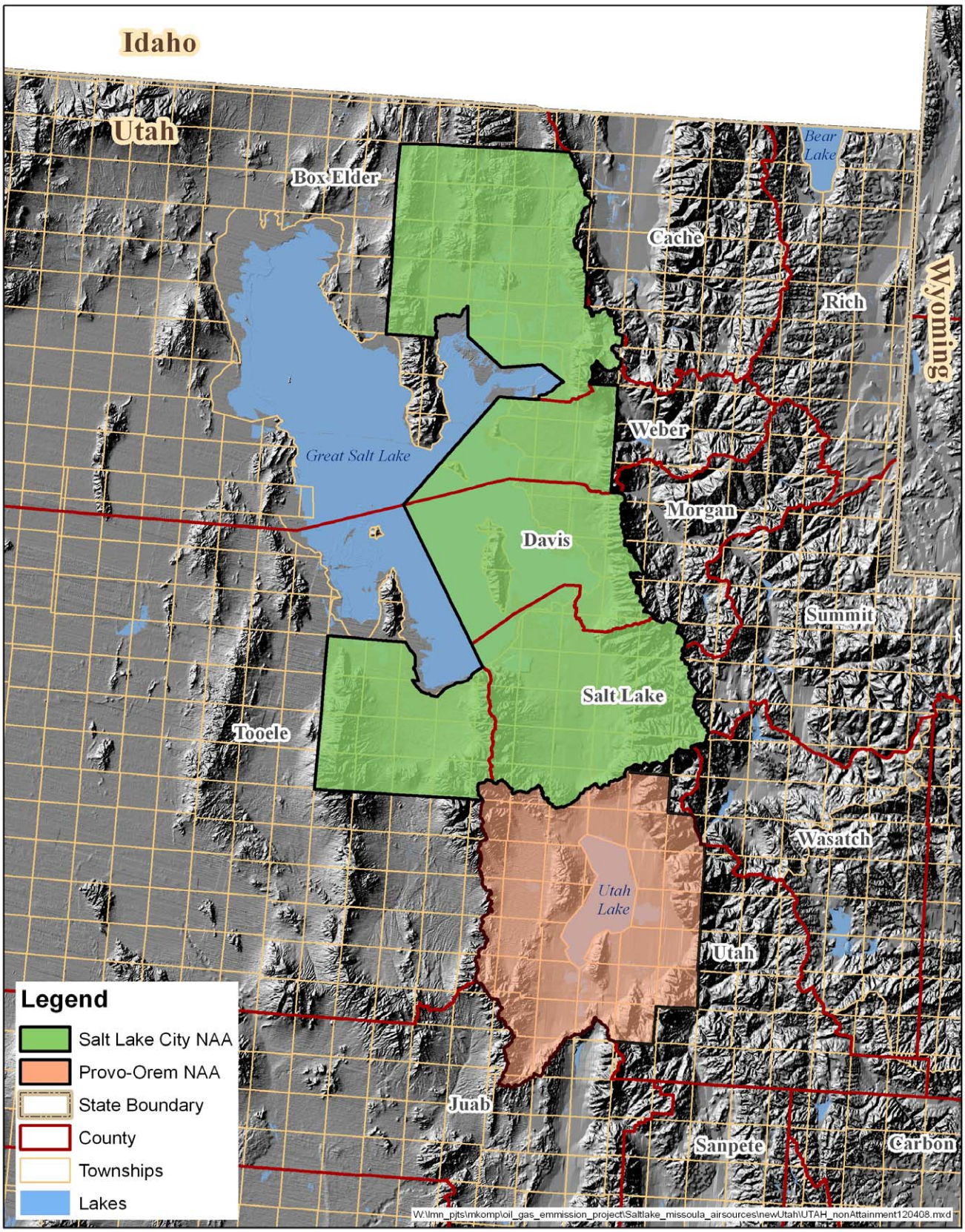
Township 1 South Range 3 West (portion located in Tooele County)
Township 2 South Range 3 West (portion located in Tooele County)
Township 3 South Range 3 West (portion located in Tooele County)
Township 3 South Range 4 West
Township 2 South Range 4 West
Township 2 South Range 5 West
Township 3 South Range 5 West
Township 3 South Range 6 West
Township 2 South Range 6 West
Township 1 South Range 6 West
Township 1 South Range 5 West
Township 1 South Range 4 West
Township 1 South Range 7 West
Township 2 South Range 7 West
Township 3 South Range 7 West
Township 4 South Range 7 West
Township 4 South Range 6 West
Township 4 South Range 5 West
Township 4 South Range 4 West
Township 4 South Range 3 West (portion located in Tooele County)

Weber County (partial)

The area of Weber County that lies west of the Wasatch Mountain Range with an eastern boundary for Weber County to be defined as the following Townships (or portion thereof) and over to the western boundary of Weber County:

Township 5 North Range 1 West
Township 6 North Range 1 West
Township 7 North Range 1 West (portion located in Weber County)
Township 7 North Range 2 West (portion located in Weber County)

Figure A.3-3: PM2.5 Nonattainment Areas: Provo-Orem and Salt Lake City
(Counties: Box Elder-partial, Davis, Salt Lake, Tooele-partial, Utah-partial, & Weber-partial)


Idaho
Utah
Box Elder
Bear Lake
Cache
Rich
Wyoming
Weber
Great Salt Lake
Morgan
Davis
Summit
Salt Lake
Tooele
Wasatch
Utah Lake
Utah
Juab
Sanpete
Carbon
Legend
Salt Lake City NAA
Provo-Orem NAA
State Boundary
County
Townships
Lakes
W:\lmn_pjts\mkomp\oil_gas_emmission_project\Saltlake_missoula_airsources\newUtah\UTAH_nonAttainment120408.mxd

The following is a technical analysis for the Provo-Orem CBSA (Juab and Utah counties) and the Salt Lake City-Ogden-Clearfield CSA (Box Elder, Davis, Morgan, Salt Lake, Summit, Tooele, Wasatch and Weber counties.)

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.3-2 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 4, and a more detailed description can be found at http://www.epa.gov/ttn/naaqs/pm/pm25_2006_techinfo.html#C.

Table A.3-2 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 Provo-Orem CBSA and the Salt Lake City-Ogden-Clearfield CSA.

Table A.3-2: 2005 Emissions

County	State Recommended Nonattainment	CES	$PM_{2.5}$ Emissions Total (TPY)	$PM_{2.5}$ Emissions Carbon (TPY)	Other $PM_{2.5}$ (TPY)	SOx (TPY)	NOx (TPY)	VOCs (TPY)	NH_3 (TPY)
Juab	**No**	1	419	123	281	305	3,642	1,728	309
Utah	**Yes (partial)**	77	1,619	688	907	1,012	13,778	17,174	2,414
Box Elder	No	7[1]	1,269	435	777	345	5,210	6,720	1,972
Davis	Yes	100	1,391	456	912	2,510	12,433	12,816	696
Morgan	No	6	391	217	163	190	3,130	1,678	240
Salt Lake	Yes	100	3,214	1,417	1,728	5,738	28,411	34,376	1,579
Summit	No	0	346	132	210	297	3,658	2,367	524
Tooele	No	2[1]	1,766	725	988	524	5,384	6,658	803
Wasatch	No	0	247	100	145	59	920	1,484	197
Weber	Yes (partial)	60	896	374	502	356	6,951	9,317	774

[1]CES score as provided by EPA Office of Air Quality Planning and Standards (hereafter, OAQPS.) Scores represent data from eastern areas of Box Elder and Tooele Counties (areas east of $112^0\ 50'\ 00''$ west longitude.)
Note: Emission data are from EPA's 2005 National Emission Inventory (NEI) and are provided by EPA.

As noted above, the $PM_{2.5}$ mass on the highest days in the area typically includes significant fractions of nitrate and organic carbon. Salt Lake County has the highest NOx and direct carbon emissions in the area. Davis and Utah counties also have high NOx emissions for the area. Box Elder, Tooele, and Weber counties have more moderate NOx emissions for the area (approximately 5,000 to 7, 000 tons per year.) We note that Tooele County also has the second highest direct carbon emissions in the area. In addition, the emission levels identified for Box Elder and Tooele counties are generated from source categories that are only located in the eastern areas of these counties as the majority of the western areas of both counties are sparsely- inhabited desert areas. Therefore, based on emission levels and CES values presented above, the counties of Box Elder (partial), Davis, Salt Lake, Tooele (partial), Utah (partial), and Weber (partial) are candidates for a 24-hour $PM_{2.5}$ 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 Provo-Orem CBSA and the Salt Lake City-Ogden-Clearfield CSA 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 - 2006 and 2005-2007 for the Provo-Orem CBSA and the Salt Lake City-Ogden-Clearfield CSA are given in Table A.3-3 below.

Table A.3-3: Air Quality Data

Area	State Recommended Nonattainment?	2004 – 2006 Data $\mu g/m^3$	2005 – 2007 Data $\mu g/m^3$
Provo-Orem CBSA			
Juab County, UT	No	N/A[1]	N/A[1]
Utah County, UT	Yes (partial)	44	45
Salt Lake City-Ogden-Clearfield CSA			
Box Elder County, UT	No	35	29
Davis County, UT	Yes	38	38
Morgan County, UT	No	N/A[1]	N/A[1]
Salt Lake County, UT	Yes	49	55[2]
Summit County, UT	No	N/A[1]	N/A[1]
Tooele County, UT	No	N/A[1]	31
Wasatch County, UT	No	N/A[1]	N/A[1]
Weber County, UT	Yes (partial)	40	36

[1] N/A = Not Available.
[2] 55 $\mu g/m^3$ is for the North Salt Lake monitor that was shut down by the State in 2007. The next highest value was recorded at the Hawthorne monitor and is 48 $\mu g/m^3$.

Utah County shows a violation of the 24-hour $PM_{2.5}$ standard and EPA is designating this county as nonattainment for the Provo-Orem nonattainment area as described above. Davis, Salt Lake, and Weber counties show violations of the 24-hour $PM_{2.5}$ standard. Therefore, EPA is designating these counties as nonattainment for the Salt Lake City nonattainment area as described above. EPA is also including the counties of Box Elder and Tooele in the Salt Lake City nonattainment area (as described above) because the absence of a violating monitor alone is not a sufficient reason to eliminate counties from a nonattainment status as those counties may be contributing to violations in other nearby areas. 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.

Under this factor, we also consider 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 (additional EPA $PM_{2.5}$ speciation data are provided in Appendix 2.A.)

EPA has also evaluated speciation data from $PM_{2.5}$ exceedance days in the winters of 2004 through 2006. For all exceedance days with speciation data available during this period, the average composition of $PM_{2.5}$ in Salt Lake City is 58% ammonium nitrate, 31% carbon and organic compounds, 8% ammonium

sulfate, and 2% crustal. In Provo, the composition is even more ammonium nitrate dominated, at 71%, with 21% carbon and organic compounds, 8% ammonium sulfate, and 2% crustal.

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

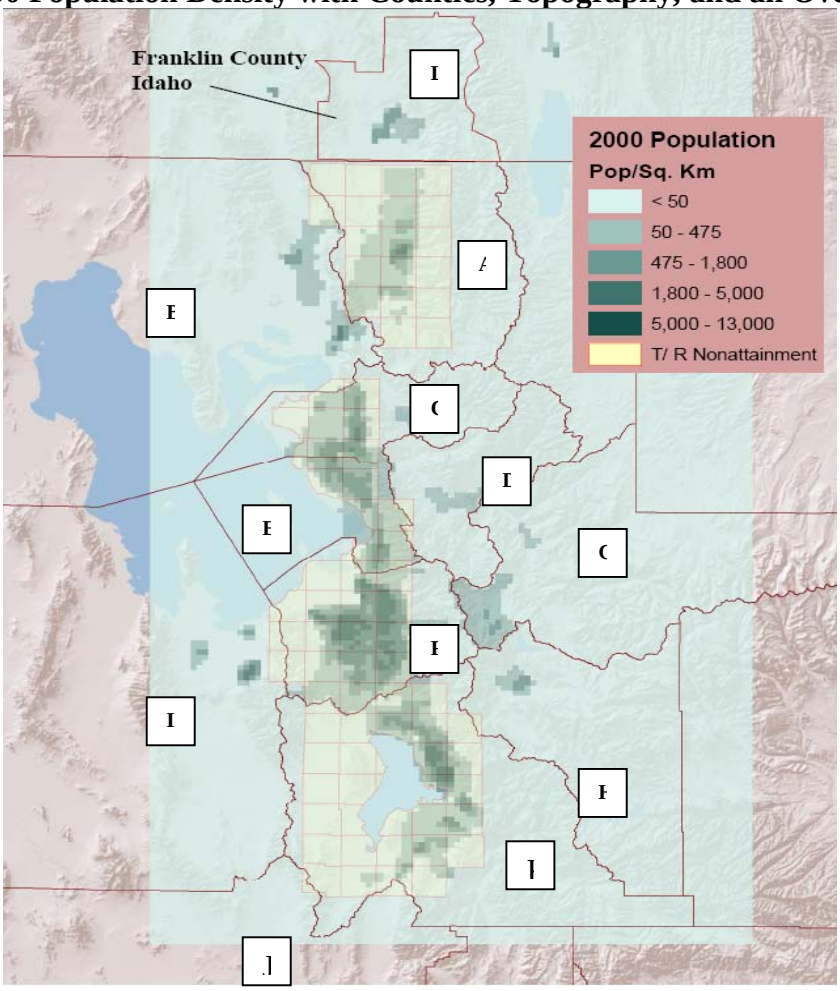
Table A.3-4 below shows information regarding 2005 population and population density. Figure A.3-4 below depicts year 2000 census population density and shows the degree of urbanization along the Wasatch Front area. Population data give an indication of whether it is likely that population-based emissions might contribute to violations of the 24-hour $PM_{2.5}$ standard. As shown in Table A.3-4 below, Davis, Salt Lake, Utah, and Weber Counties have the highest populations and population densities. We note that some counties have a low density figure (i.e., Box Elder, Juab, and Tooele) and this is due in part to a smaller population, but also is attributed to the very large size of these counties (Box Elder = 6,714 sq. mi., Juab = 3,412 sq. mi., & Tooele = 7,287 sq. mi.) when used in the density calculation. It is notable, however, that the eastern portions of Box Elder and Tooele counties have relatively high population densities. For example, approximately 51% of Box Elder County's population are located in two cities; Brigham City (17,411) and Tremonton (5,592). Similarly, approximately 43% of Tooele County's population live in Tooele City (22,502). See http://www.onlineutah.com for further population data and the graphic depiction of population densities in Figure A.3-4 below.

Table A.3-4: Population

Area	County	State Recommended Nonattainment	2005 Population[1]	2005 Population Density (pop. /sq. mi.)[3]
Provo-Orem CBSA				
	Juab	No	8,974[2]	3
	Utah	Yes (partial)	453,977	211
Salt Lake City-Ogden-Clearfield CSA				
	Box Elder	No	45,142	7
	Davis	Yes	276,374	424
	Morgan	No	8,516[2]	13
	Salt Lake	Yes	970,748	1,190
	Summit	No	36,417	19
	Tooele	No	51,835	7
	Wasatch	No	20,138	16
	Weber	Yes (partial)	212,707	320

[1] All figures (except for Juab and Morgan Counties) are as provided by Utah with the Governor's 12/18/07 designations recommendations submittal.
[2] Figures for Juab and Morgan Counties are as provided by EPA Region 8 and are from the Utah Governor's Office of Planning and Budget - GOPB (http://governor.utah.gov/dea/projections.html)
[3] Data provided by EPA.

Figure A.3 -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 designations recommendation submittal.

Factor 4: Traffic and commuting patterns

This factor considers the number of commuters in each county who drive to another county within the Provo-Orem CBSA and the Salt Lake City-Ogden-Clearfield CSA, the percent of total commuters in each county who commute to other counties within the area, as well as the total Vehicle Miles Traveled (VMT) for each county. 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.3-5 below for Box Elder (partial), Davis, Salt Lake, Tooele (partial), Utah (partial), and Weber (partial) counties displays vehicle miles traveled and the number of commuters in-county and out of each county.

Table A.3-5: Traffic and Commuting Patterns

County	State Recommended Nonattainment	2005 VMT (Millions Annually)[1]	Commuting within County (no.)[2]	Commuting to other Counties (no.)[2]	Commuting to other Counties (% of total.)
Provo-Orem CBSA					
Juab	No	427	2,011	1,196	37.3
Utah	Yes (partial)	3,626	140,834	20,824	12.9
Salt Lake-Ogden-Clearfield CSA					
Box Elder	No	1,066	13,570	4,302	24.1
Davis	Yes	2,268	61,208	50,430	45.2
Morgan	No	138	1,217	1,930	163.1
Salt Lake	Yes	8,917	411,283	23,521	5.4
Summit	No	740	10,486	5,279	33.5
Tooele	No	867	9,784	7,622	43.8
Wasatch	No	300	3857	2947	43.3
Weber	Yes (partial)	1,574	64,671	25,916	28.6

[1]VMT data for 2005 were derived from: Wasatch Front Regional Council (http://www.wfrc.org), Mountainland Association of Governments (http://www.mountainland.org), and the State of Utah's Governor's Office of Planning and Budget (http://governor.utah.gov/dea/projections.html). See Appendix 2.A; Tables Appendix 2.A-4 and Appendix 2.A-5 for further information.
[2]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 2.A, Table Appendix 2.A-2 for further information.

Three of the nonattainment counties show a higher percentage of commuters going to Salt Lake County than are commuting from Salt Lake to other counties. The counties of Box Elder at 24.1%, Tooele at 43.8% and Utah at 12.9% are all higher than Salt Lake at 5.4% which shows that emissions related to traffic and commuting from those areas are contributing to violations of the $PM_{2.5}$ standard. Additionally, the data presented on traffic and commuting does not adequately take into account truck traffic. A large volume of diesel truck traffic, on the major highways running through this area including the interstate routes of I-15, I-215, I-80, and I-84, indicates a potential contribution to fine particle concentrations and presents an opportunity for the individual counties to work together to identify measures to reduce diesel emissions.

Unless otherwise noted, the 2005 VMT data used for Table A.3-5 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

Factor 5: Growth rates and patterns

This factor looks at expected population and VMT from 2000 to 2005, as well as patterns of population and VMT growth beyond to 2015 for the Provo-Orem CBSA and the Salt Lake City-Ogden-Clearfield CSA. 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.3-6 and Table A.3-7 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).

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

Table A.3-6: Projected Population Growth[1]

County	2000	% Change	2005	2010	% Change	2015	% Change
Provo-Orem CBSA							
Juab[2]	8,310	8.0%	8,974	10,519	17.2%	12,353	37.7%
Utah	371,894	22.1%	453,977	527,502	16.2%	594,511	31.0%
Salt Lake-Ogden-Clearfield CSA							
Box Elder	42,860	5.3%	45,142	49,254	9.1%	55,212	22.3%
Davis	240,204	15.1%	276,374	304,502	10.2%	330,833	19.7%
Morgan[2]	7,181	18.6%	8,516	10,589	24.3%	13,409	57.5%
Salt Lake	902,777	7.5%	970,748	1,053,258	8.5%	1,145,337	18.0%
Summit	30,048	21.2%	36,417	44,511	22.2%	54,618	50.0%
Tooele	41,549	24.8%	51,835	67,150	29.5%	83,661	61.4%
Wasatch	15,433	30.5%	20,138	25,516	26.7%	31,664	57.2%
Weber	197,541	7.7%	212,707	230,145	8.2%	251,528	18.3%

[1] All figures (except for Juab and Morgan Counties) are as provided by Utah with the Governor's 12/18/07 designations recommendations submittal.
[2] Figures for Juab and Morgan Counties are as provided by EPA and are from the Utah Governor's Office of Planning and Budget - GOPB (http://governor.utah.gov/dea/projections.html)

The counties of Box Elder, Davis, Salt Lake, Tooele, Utah, and Weber are included in the $PM_{2.5}$ nonattainment designation. As described in Table A.3-6 all of the counties currently are and will continue to have high levels of growth. In particular, by 2015 the counties of Box Elder and Tooele are predicted to have a 22.3% change in growth and a 61.4% change in growth respectively.

In Table A.3-7, the projected VMT growth also shows a sizeable increase in VMT that accompanies the projected growth in population identified above. As presented in Table A.3-6 above and Table A.3-7 below, no county in the area is projected to have a decrease in population growth or VMT growth.

Table A.3-7: Projected VMT Growth
VMT (millions annually)

County	2005	% Change	2010[1]	% Change	2015[3]
Provo-Orem CBSA					
Juab	427	21.5%	519	45.4%	621
Utah	3626	13.2%	4105[2]	28.4%	4654[5]
Salt Lake-Ogden-Clearfield CSA					
Box Elder	1066	21.5%	1295	45.3%	1549
Davis	2268	15.8%	2626	30.9%	2969
Morgan	138	21.7%	168	44.9%	200
Salt Lake	8917	11.6%	9952	27.9%	11401[4]
Summit	740	20.9%	895	45.3%	1075
Tooele	867	21.5%	1053	45.2%	1259
Wasatch	300	21.7%	365	45.3%	436
Weber	1574	5.5%	1661	21.2%	1907

[1] All figures (except for Utah County) are from the Utah Governor's Office of Planning and Budget (GOPB) and are daily millions of VMT times 365 to get an annual VMT figure.
[2]Figure for Utah County for 2010 is the 2010 projected daily millions of VMT from Table 93.118 "Emission Budgets Utah County Regional Travel Model VMT Results" (MAG-2030). The 2010 daily millions of VMT figure was multiplied by 365 to get an annual VMT.
[3] All figures (except for Salt Lake and Utah Counties) are from the Utah Governor's Office of Planning and Budget (GOPB) and are daily millions of VMT multiplied by 365 to get an annual VMT figure.

[4]Figure for Salt Lake County for 2015 is the 2015 projected daily millions of VMT from "Air Quality Memorandum, Report No. 23" (WFRC-2030). The 2015 daily millions of VMT figure was multiplied by 365 to get an annual VMT.
[5]The figure for Utah County for 2015 was derived from the 2010 and 2020 projected daily millions of VMT from Table 93.118 "Emission Budgets Utah County Regional Travel Model VMT Results" (MAG-2030). The MAG-2030 daily VMT figures for 2010 and 2020 were summed and an average 2015 figure was produced that equals a daily millions of VMT figure of 12.751901. The 12.751901 daily millions of VMT figure was multiplied by 365 to arrive at an annual millions of VMT figure.

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 PM2.5 values by color; days exceeding 35 ug/m3 are denoted with a red or black icon (see Appendix 2.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 and the wind direction / speed 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 2.B.

In considering the data presented in the wind / pollution roses included in Appendix 2.B; for the Salt Lake City-Ogden-Clearfield CSA, the monitors located in Weber, Davis, and Salt Lake Counties appear to show that some component of measured elevated $PM_{2.5}$ values may originate from the NW and SE. This leads to the conclusion that precursor emissions and some portion of $PM_{2.5}$ that influence these monitor values originates from eastern Box Elder County to the north and from Utah County to the south. In addition, precursor emissions and some portion of $PM_{2.5}$ that influence these monitor values originates from the north and west of Salt Lake County from sources in Tooele County. Similarly, for the Provo-Orem CBSA, monitors located in Utah County show that elevated $PM_{2.5}$ values originate typically from the NW leading to the conclusion that precursor emissions and $PM_{2.5}$ that influence these monitor values may be originating from Salt Lake County, which is directly adjacent to the north, with some additional contributions from Davis and Weber Counties, also located to the north of Utah County. As it appears that with very light wind speeds with both a northern and southern component, the emissions and $PM_{2.5}$, that is both directly and secondarily evolved, oscillate along the entire Wasatch Front region and are influenced by both the diurnal effects of the Great Salt Lake and extended periods of light to stagnant wind conditions. We do note that the wind / pollution roses included in Appendix 2.B indicate that for Box Elder County, meteorological data are used from Hill Air Force Base (AFB) located near Ogden in

Weber County. For Davis County, Salt Lake County, Tooele County, and Utah County, meteorological data used are from Salt Lake City International Airport (SLCI.) For Weber County, meteorological data used are from Hill AFB.

The State of Utah indicated in the Governor's 12/18/07 recommendations submittal that difficulties with $PM_{2.5}$ for the Salt Lake City-Ogden-Clearfield CSA and Provo-Orem CBSA are based on the 24-hour standard. Though the annual standard is currently not violated, the 24-hour design values throughout the monitoring network are in excess of the 24-hour NAAQS. The State indicated that $PM_{2.5}$ episodes begin with a high pressure cell that creates a very stable atmosphere and brings with it a pronounced temperature inversion. Such meteorology provides a barrier to vertical mixing, and the emissions produced from the urban areas below are prevented from dispersing away from the region. As a result, concentrations of fine particulate are able to build up over a period of several days.

Further exacerbating the situation is the seasonal nature of these episodes. They occur in the winter (1^{st} and 4^{th} quarters) when low temperatures, low sun angle, and often high humidity combine to produce conditions ideal for the formation of secondary particulate. In many cases there is also snow on the ground which acts to prevent solar energy from mitigating the inversion in temperature. So at the same time that the air is the most stagnant, the urbanized area is producing $PM_{2.5}$ at its maximal rate via secondary conversion.

The State notes that these meteorological conditions create a vertical barrier to dispersion and that typically, the depth of the layer of air trapped near the ground is only about 1,500 ft. In considering this figure of 1,500 ft. for the depth of the inversion, EPA utilized the Google Earth™ product to look at ground elevations of Salt Lake City and the surrounding area to better understand what the height of the inversion may be relative to mean sea level (MSL). For example, data from Google Earth™ indicated that Salt Lake City is approximately 4,250 ft. MSL; to the north, the Ogden, Clearfield, and Brigham cities are all approximately 4,400 ft. MSL; to the west, Tooele City is approximately 5,000 ft. MSL and the Great Salt Lake is approximately 4,200 ft. MSL; and to the south, the Provo area is approximately 4,700 ft. MSL. Therefore, based on the State's assertion that the inversion is approximately 1,500 ft. above ground level (AGL), this would translate into an inversion height of approximately 5,700 ft. to 6,200 ft. MSL for the top of the inversion from north to south along the Wasatch Front area. Or, an overall approximate average height of 6,000 ft. MSL.

EPA notes that in the Governor's 12/18/07 designations recommendations submittal, the Utah Division of Air Quality (UDAQ) felt that it was appropriate to recommend that the Utah County portion of the nonattaining area along the Wasatch Front be designated its own separate area of nonattainment. UDAQ asserted that is not only consistent with the current designations for PM_{10}, but is supported by the fact that there is some, but very little air movement between the two valleys. UDAQ stated this has been "confirmed" by several studies in which trace elements have been released from either sources in Utah Valley (Geneva Steel) or Salt Lake Valley (KUC) and have been detected at slight concentration in the opposite valley. The overall conclusions from these studies were that there is some transfer of air between the two, when the release points were buoyant enough to penetrate the mixing layer of the inversion cap; but that under the influence of a strong temperature inversion, this mixing height would be lower than the topographic divide between the two valleys, and that this would effectively cap the air masses in each valley such that there would be no significant mixing of the two.

EPA is not convinced this is true in all cases and believes there is mixing between the western Utah County geographic area and the greater Salt Lake City/Wasatch Front geographic area. As detailed above

in prior sections of this technical analysis, consideration must also be given to similar ambient air quality data values which show a 2005 – 2007 design value for Salt Lake County of 48 $\mu g/m^3$ (at the Hawthorne monitor) and a 2005 – 2007 design value for Utah County of 45 $\mu g/m^3$. In addition, significant traffic and commuting patterns are apparent along the I-15 corridor. EPA also considered the potential for mixing of pollutants and $PM_{2.5}$ between the two areas and used the approximate average inversion height of 6,000 ft. MSL, in conjunction with Google Earth™ , to perform an evaluation of the lateral distance that could be available for the pollutants to oscillate back and forth. The results of this evaluation indicate that at the narrowest point, the valley floor is at approximately 4,500 ft. MSL and that a line drawn from a point at 6,000 ft. MSL on the east side (on the "Point of the Mountain" area) to a point at 6,000 ft. MSL on the west side would indicate an opening of approximately 4.75 miles. EPA believes that this approximate opening of 4.75 miles would allow transport, both north and south, of air masses between Salt Lake County and Utah County.

In a similar consideration, EPA also notes there is the potential for transport of air masses and pollution between eastern Box Elder County and western Weber County. As noted above, Brigham City in Box Elder County and Ogden City in western Weber County are both at an approximate altitude of 4,400ft. MSL. A brief review of the topography, as discussed further in Factor 7 of this technical analysis, shows there is no physical impediment to the back and forth movement of air masses in this area as the area is essentially flat and also borders on the northern section of the Great Salt Lake. Also, as we noted earlier, the wind/pollution roses (see Appendix 2.B) for Box Elder County (Brigham City) and Weber County (Ogden City) both show a NW and SE component for the prevailing winds. Other factors that lend to this observation involve traffic and commuting patterns between Box Elder County and Weber County (along with Davis and Salt Lake County.)

EPA also notes the potential of emissions and $PM_{2.5}$ impacts that could be generated from northeastern Tooele County when considering Tooele City and a nearby major point source. As noted above, Tooele City is at approximately 5,000 ft. MSL and has no impediment that would prevent emissions and $PM_{2.5}$ from moving north out across the Great Salt Lake which is at an elevation of approximately 4,200ft. MSL. Once out over the Lake, these emissions and $PM_{2.5}$ have been shown to be transported eastward (refer to the back-trajectory Figures at the end of this factor), with a NW wind component, to the Wasatch Front area and contribute to elevated concentrations of $PM_{2.5}$.

In addition, EPA prepared three-day and 24-hour back-trajectories that were calculated for selected violating $PM_{2.5}$ monitors in Utah for exceedance days in the period of 2004 through 2006. The National Oceanic and Atmospheric Administration (NOAA) HYSPLIT model was used.

The NOAA HYSPLIT (HYbrid Single-Particle Lagrangian Integrated Trajectory) model is the newest version of a complete system for computing simple air parcel trajectories to complex dispersion and deposition simulations. The dispersion of a pollutant is calculated by assuming either puff or particle dispersion. In the particle model, a fixed number of initial particles are advected about the model domain by the mean wind field and a turbulent component. Gridded historical meteorological fields generated by NOAA were used for the modeled days.

All of the model runs for 2004 through 2006 show some degree of transport from one or more of the surrounding areas (Box Elder County, Tooele County or Utah County) into the Salt Lake City and Ogden areas during exceedance events. Three examples are shown in Figures A.3-5 through A.3-10 below. Figure A.3-5 shows the three-day back-trajectory for the Salt Lake County monitors for January 13, 2004. Salt Lake County monitors exceeded the 24-hour $PM_{2.5}$ NAAQS on each day between January 7, 2004

and January 24, 2004. From January 4, 2004 through January 13, 2004, light winds were generally bringing emissions northward from Utah County and points south of Utah County into the Salt Lake County as shown for the January 11-13, 2004 time period in Figure A.3-5. Figure A.3-6 shows the origin points for air parcels which reached the Salt Lake County monitors on one of the 24 sampling hours on January 13, 2004.

Figure A.3-5: Three-day Back-trajectory; Salt Lake County $PM_{2.5}$ Monitors, January 13, 2004.

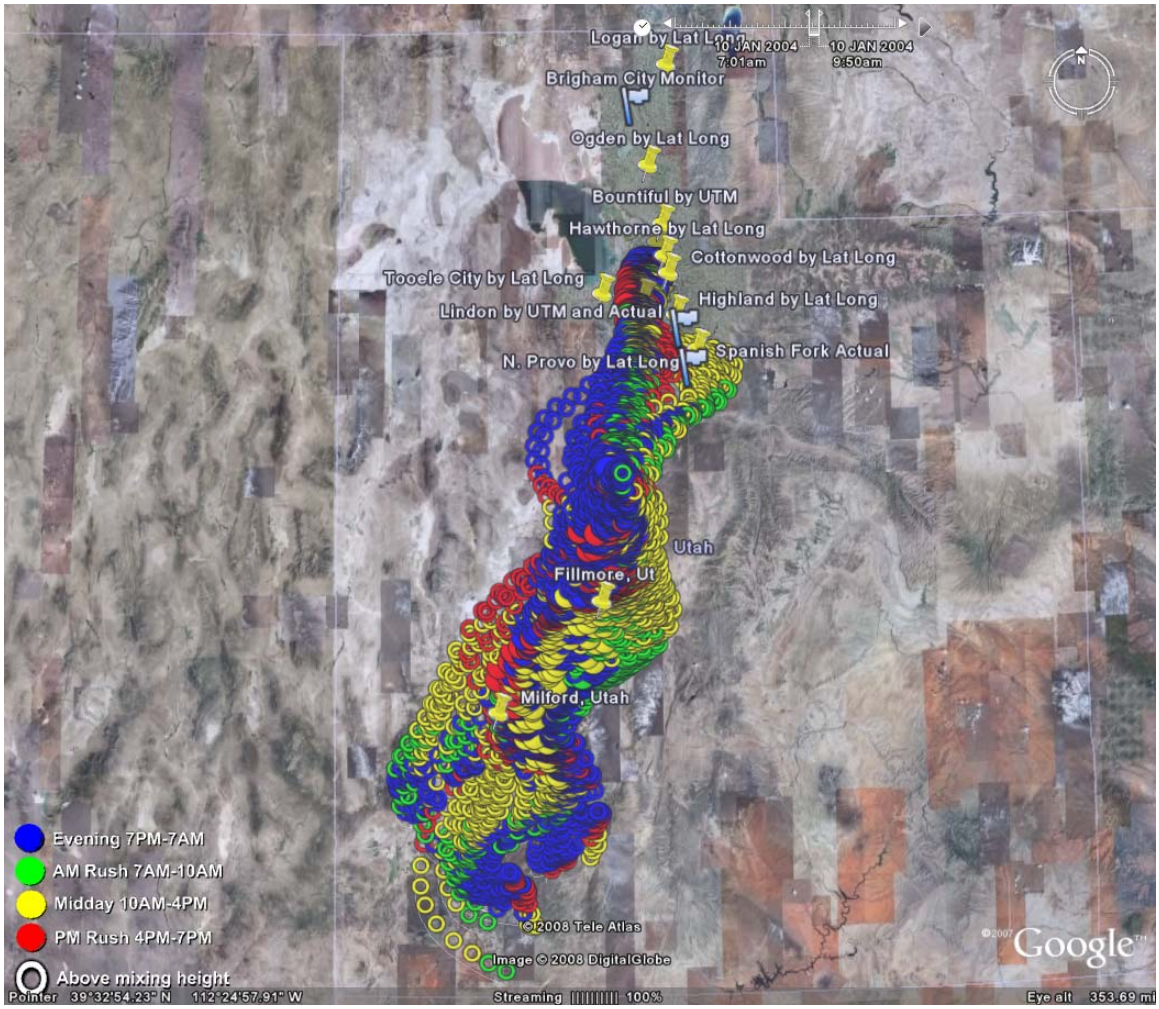


Figure A.3-6: 24-hour Back-trajectory Start-points; Salt Lake County $PM_{2.5}$ Monitors, January 13, 2004.

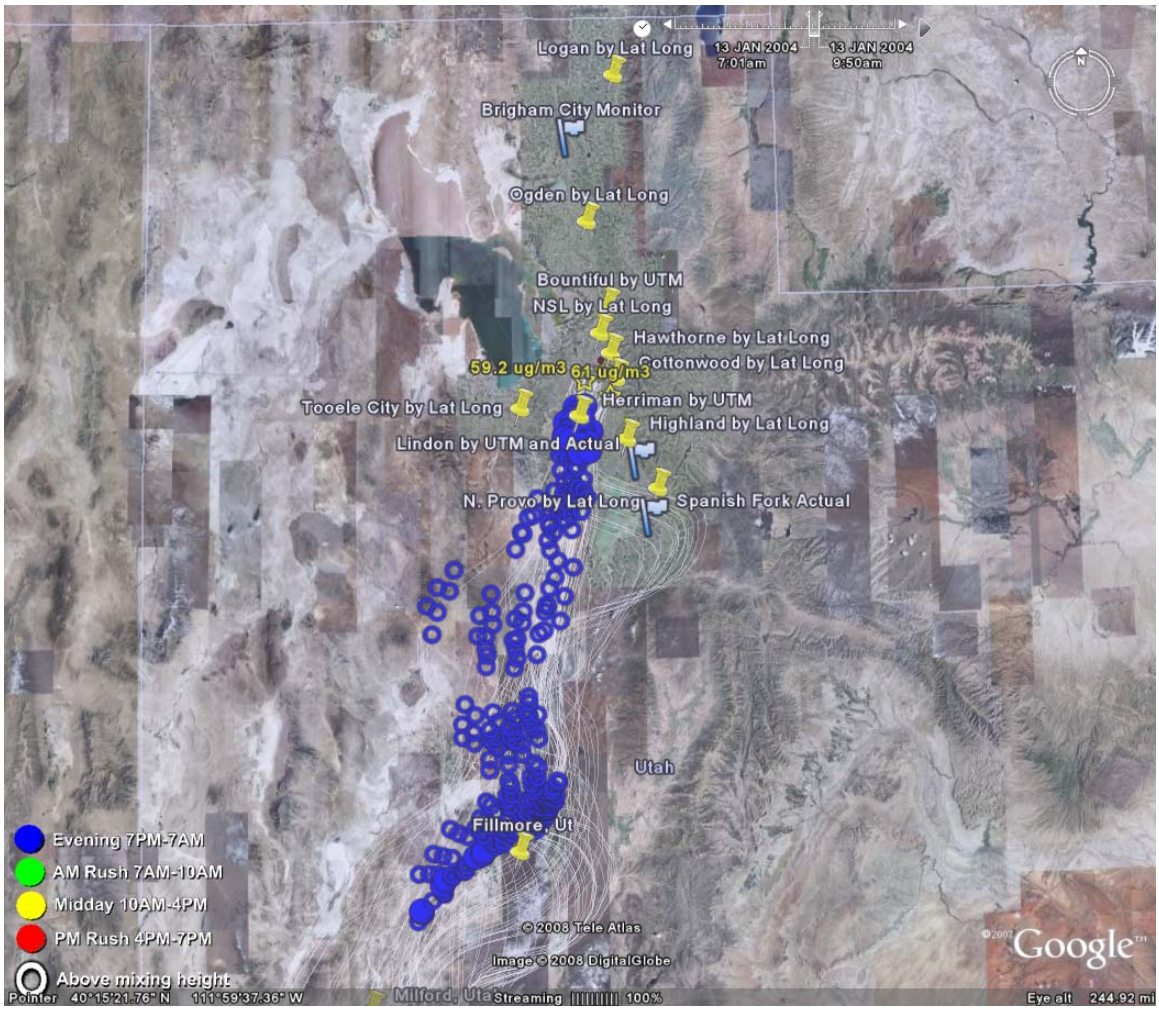


Figure A.3-7 below shows the three-day back-trajectory ending on January 22, 2004. While this is part of the same two week episode of unbroken exceedance days in Salt Lake County, winds have shifted, so that now material is being brought into the north end of the Wasatch Front from the east, and then moving southward along the I-15 corridor. This transports emissions from Brigham City and Ogden to Salt Lake County (and from Salt Lake County into the Utah Valley).

Figure A.3-7: Three-day Back-trajectory; Salt Lake County and Utah County $PM_{2.5}$ Monitors, January 22, 2004.

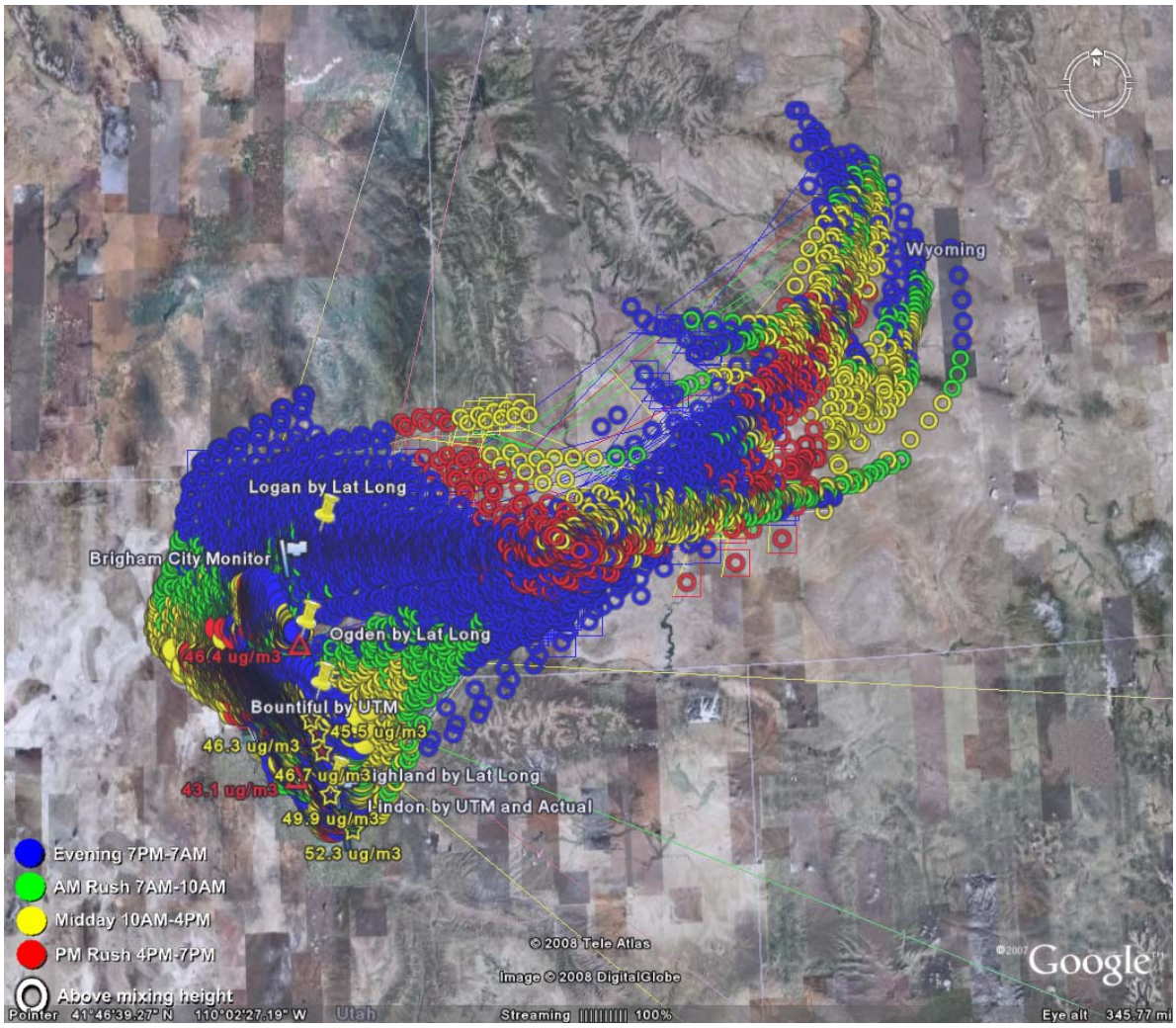


Figure A.3-8: 24-hour Back-trajectories; Salt Lake County Monitors, January 22, 2004.

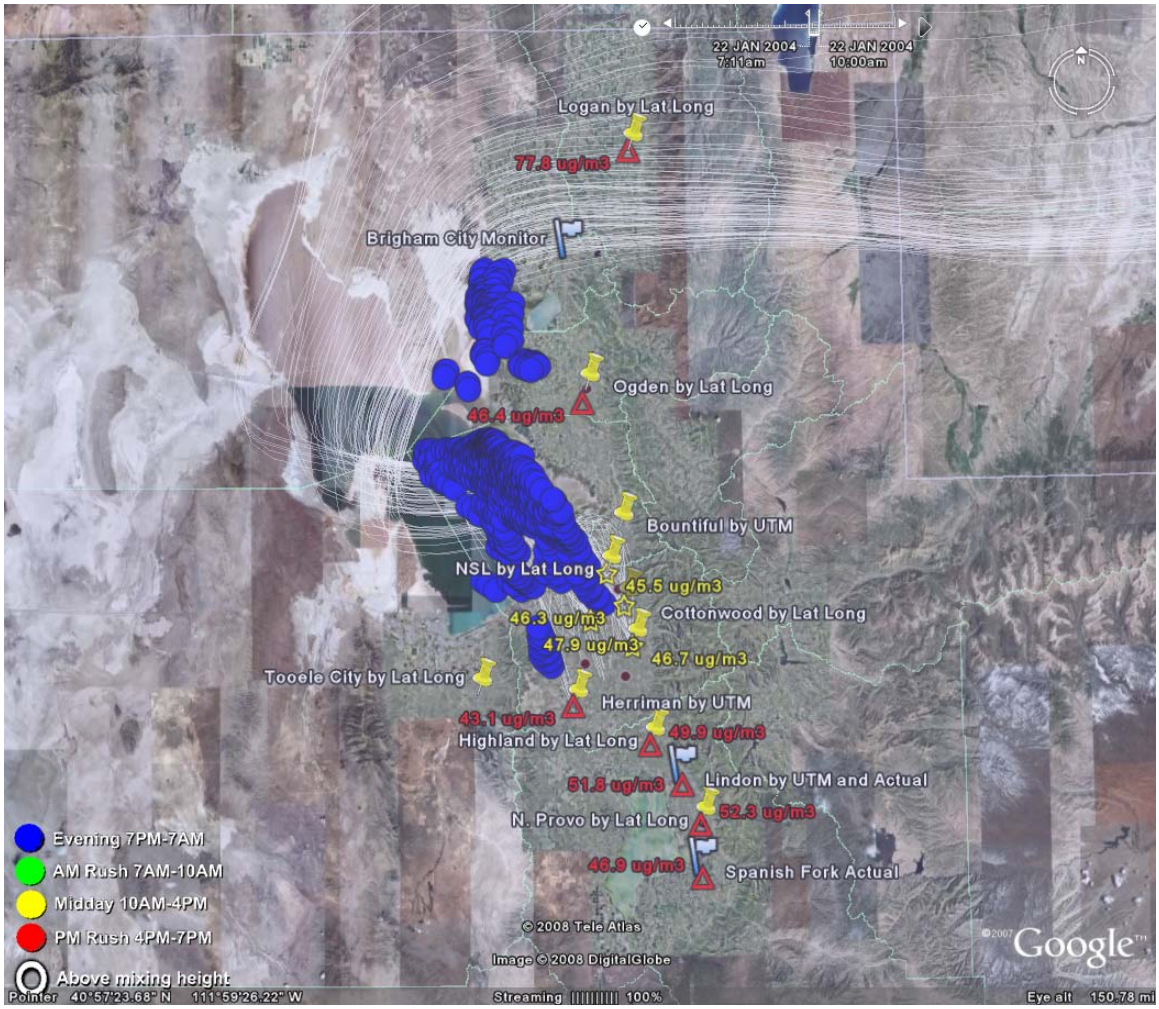
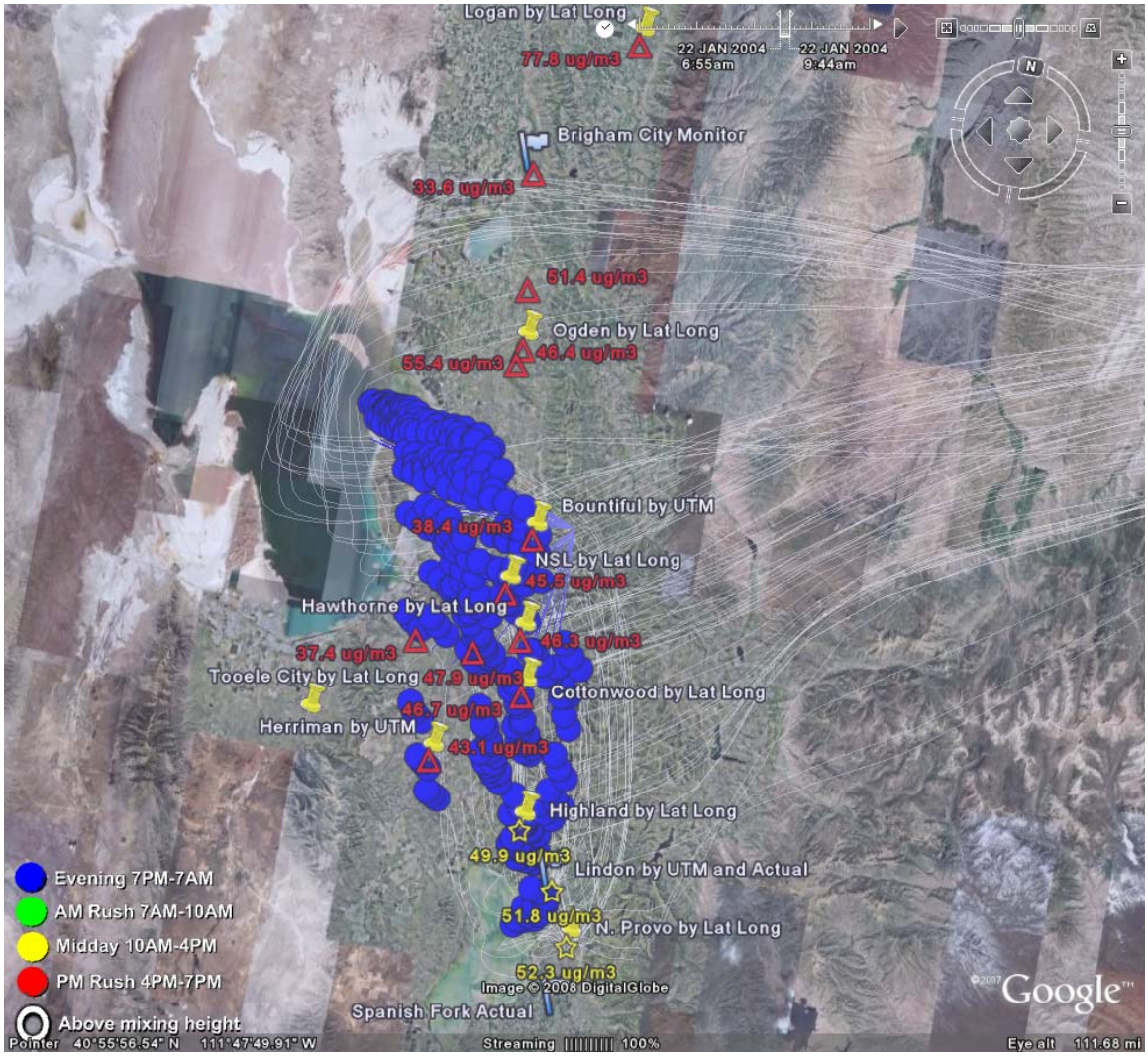
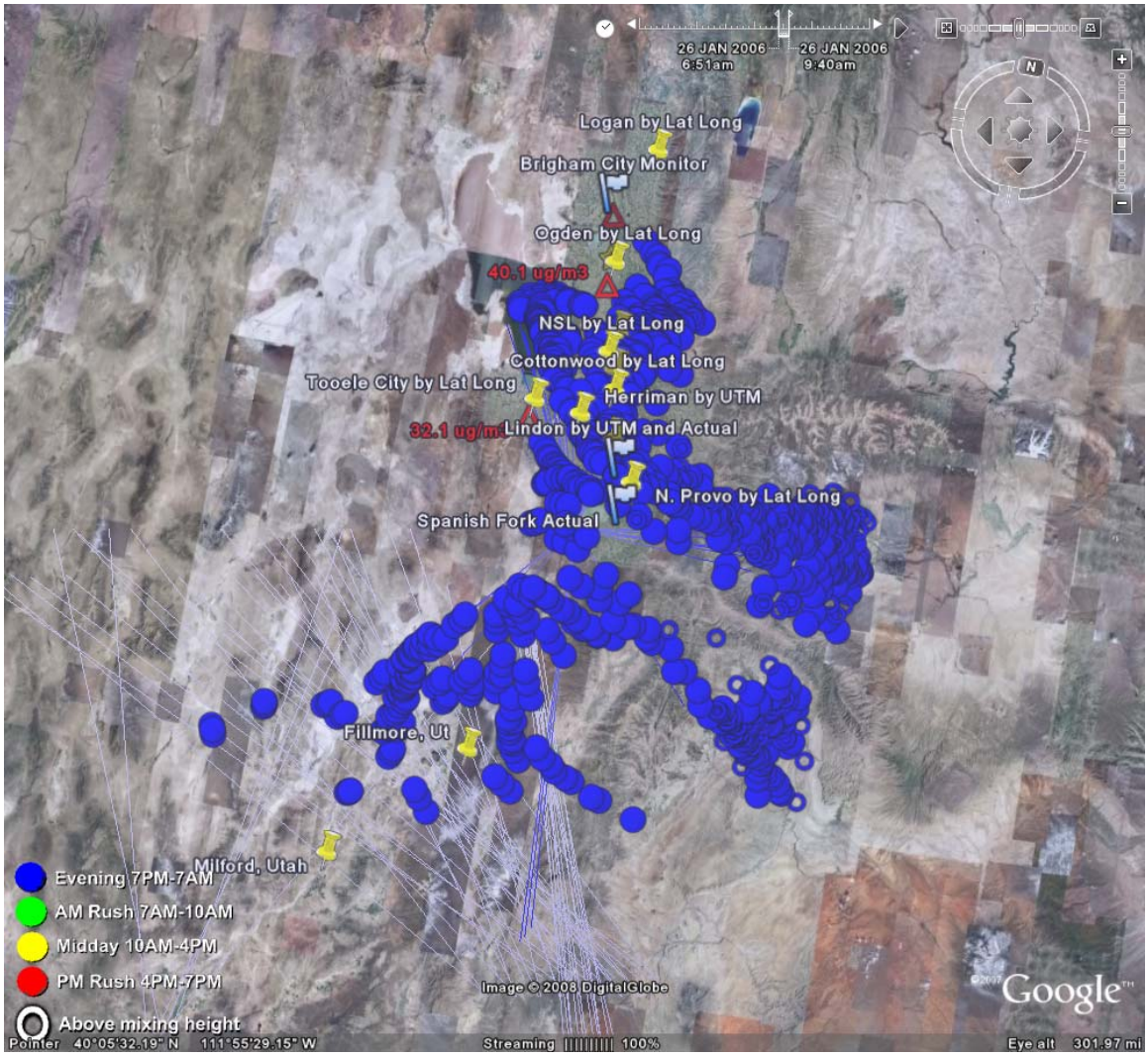


Figure A.3-9: 24-hour Back-trajectories; Utah County Monitors, January 22, 2004.



Finally, Figure A.3-10 below shows the 24-hour back-trajectory endpoints for Salt Lake County monitors for January 26, 2006. Many of the trajectories begin or pass through the urbanized areas of Utah County before arriving at the Salt Lake County monitors.

Figure A.3-10: 24-hour Back-trajectories; Salt Lake County Monitors, January 26, 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 Provo-Orem CBSA and the Salt Lake City-Ogden-Clearfield CSA.

Episodes of high $PM_{2.5}$ concentrations along the Wasatch Front in Utah are characterized by stagnant air masses during the winter season. As discussed above, the State has indicated there will typically be a low mixing height (approximately 1,500 ft. AGL) 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 State indicated in the Governor's 12/18/07 recommendations submittal, that "…the topography allows for a description of the area surrounding monitors for which the ambient air quality data is truly representative." The State also noted concentrations of $PM_{2.5}$ are relatively uniform throughout a given

area under these conditions. A topographical depiction of the region(s) with monitor locations is provided in Figure A.3-11 below with a topographic photo of the region(s) in Figure A.3-12.

The most prominent feature to observe in Figures A.3-11 and A.3-12 is the eastern boundary of the "Wasatch Front." Here, the Wasatch Mountain Range rises abruptly from the valley floor to heights of approximately 7,000 ft. MSL to well over 9,000 ft. MSL and defines the eastern boundaries of both the Salt Lake Valley to the north and the Utah Valley to the south. These valleys are bound on their respective western sides by the Oquirrh Mountains which also have heights of 7,000 ft. MSL to well over 9,000 ft. MSL. North of Salt Lake County, the Wasatch Mountain Range continues to act as a barrier to the east, while the Great Salt Lake serves as the western boundary.

Not only does the topography of the above regions 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. Basically, 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 (which the State indicates is approximately 6,000 ft. MSL), and would therefore not experience the high concentrations of $PM_{2.5}$ produced in the low lying valleys. Therefore, EPA concurs with the State that the topography, when considered alongside the predominant meteorology described above in Factor 6, would suggest that these areas of high terrain need not be included in the nonattainment area. This conclusion would also apply to eastern Cache County, eastern Weber County, and eastern Utah County.

EPA concludes that in consideration of the topography discussed above (and as presented in Figures A.3-11 and A.3-12), and the meteorology discussed in Factor 6 above, there is no apparent physical barrier that impedes the influence and contribution of emissions from Brigham City and eastern Box Elder County to the Wasatch Front area. A western topographic airshed barrier that EPA identified for eastern Box Elder County involves the Promontory Mountains and North Promontory Mountains. The Promontory Mountains are located approximately 24 miles west of both Brigham City and Ogden and show approximate altitudes of 5,600 ft. (MSL) in the south (extending into the Great Salt Lake), areas of over 6,000 ft. (MSL) in the middle, and 5,000 ft. to the North where they meet the southern end of the North Promontory Mountains. The southern end of the North Promontory Mountains are approximately 5,000 ft. (MSL) and are also approximately 5,000 ft. (MSL) to the north (northwest of Howell, UT.)

Similarly, EPA has concluded that there is no apparent physical barrier that impedes the influence and contribution of emissions from Tooele City, and eastern Tooele County to the Wasatch Front area. EPA does note that the Oquirrh Mountain Range does form a separation on the eastern side of Tooele County; however emissions from Tooele City would be able to move unimpeded down-gradient from Tooele City to the Great Salt Lake during winter time, cold weather inversions (i.e., Tooele City is approximately 5,000 ft. MSL and the Great Salt Lake is approximately 4,200 ft. MSL). These emissions from the Tooele City area mix in with the air mass over the Lake and through light winds from the north and/or west and the diurnal effect of the Lake and surrounding mountains, contribute to the high $PM_{2.5}$ concentrations experienced along the Wasatch Front when the inversions occur. In addition, a western topographic airshed barrier that EPA identified for eastern Tooele County involves the Stansbury Mountains. The Stansbury Mountains are located approximately 17 miles west of Tooele City (approximately 43 miles southwest of Salt Lake City) and show approximate altitudes of 8,300 ft. (MSL) in the south, areas 7,000

ft. (MSL) to over 9,500 ft. (MSL) in the middle, and 5,000 ft. (MSL) to the North where they meet the Great Salt Lake. Also, an impediment to airflow in this area would be the South Mountain ridge located at the southern end of the Tooele Valley. This ridge essentially connects the Stansbury Mountains to the Oquirrh Mountains and has a maximum height of approximately 6,500 ft. (MSL).

With regard to the confluence of air masses from the Salt Lake Valley and Utah Valley, we believe that based on the information presented in Factor 6 above, there is good interaction between the two air masses and that they are not separate and distinct. This view is supported by the topography discussed in this factor and our evaluation described in Factor 6 above which indicates that at the narrowest point, the valley floor between the two areas is at approximately 4,500 ft. MSL and that a line drawn from a point at 6,000 ft. MSL on the east side (bench called "Point of the Mountain" area) to a point at 6,000 ft. MSL on the west side would indicate an opening of approximately 4.75 miles. EPA believes that this approximate opening of 4.75 miles would allow transport, both north and south, of the air masses between Salt Lake County and Utah County. Therefore, it is likely that Salt Lake County is contributing to Utah County's high concentration $PM_{2.5}$ violations and that Utah County is contributing to Salt Lake County's high concentration $PM_{2.5}$ violations.

Figure A.3-11: Monitoring Network with Counties and Topography (source: UDAQ)

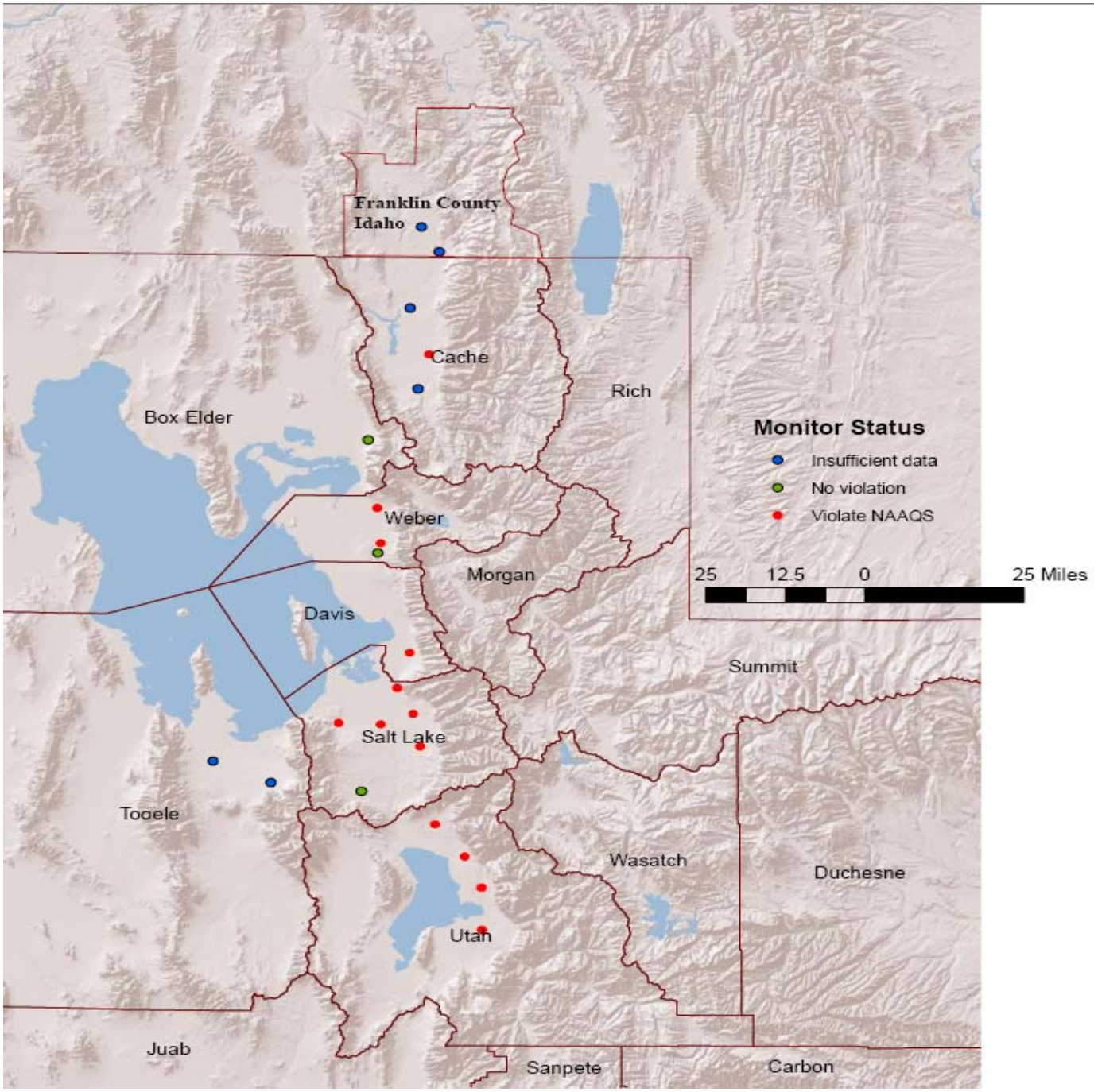
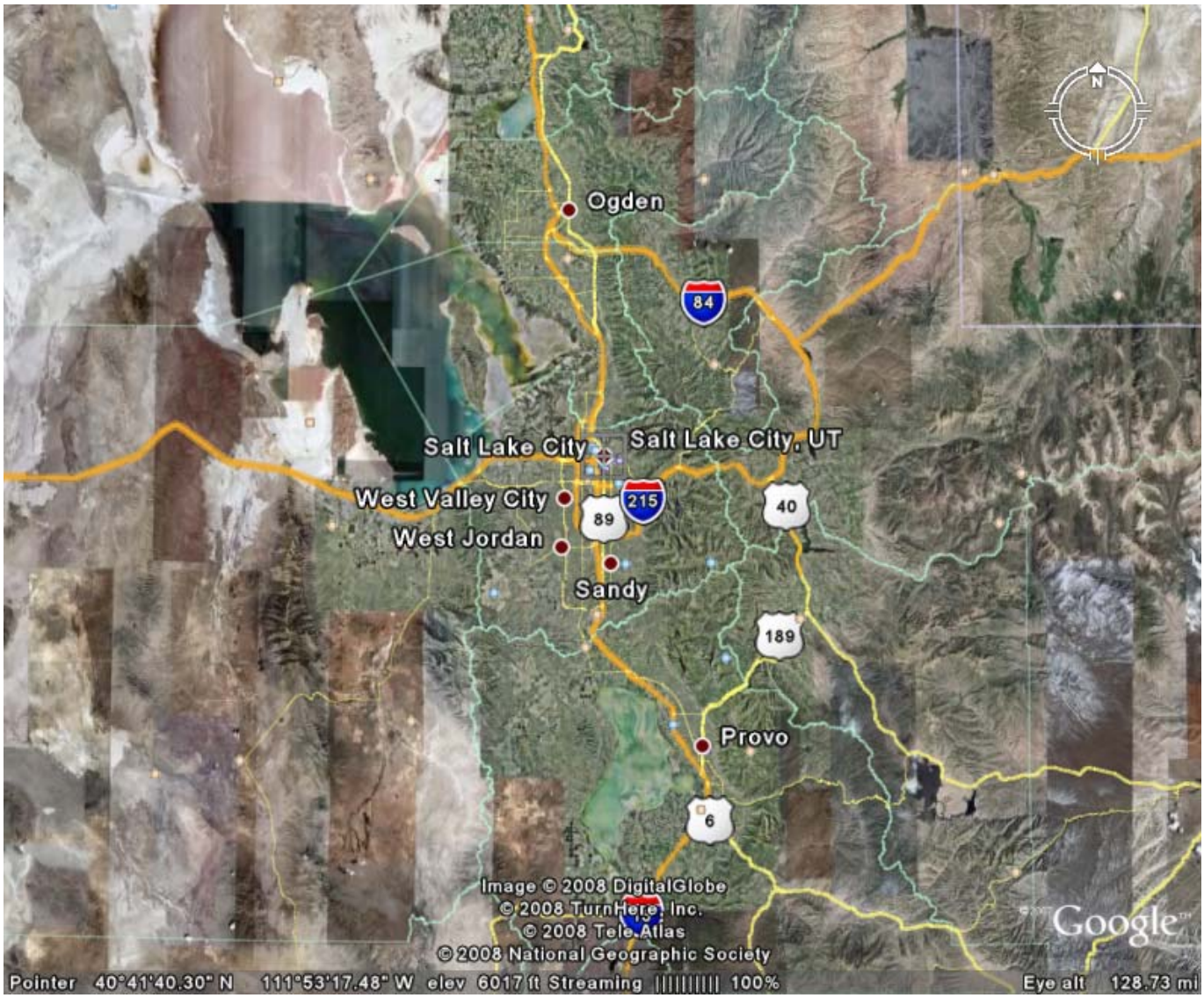


Figure A.3-12: Photo - Counties and Topography (source: Google Earth™)



Factor 8: Jurisdictional boundaries (e.g., existing PM2.5 areas)

In evaluating the jurisdictional boundary factor for this area, EPA gave special consideration to areas that were already designated nonattainment in 2005 for violating the 1997 $PM_{2.5}$ NAAQS. Analysis of chemical composition data in these areas indicates that the same components that make up most of the $PM_{2.5}$ mass in the area on an annual average basis (such as sulfate and direct $PM_{2.5}$ carbon in many eastern areas) also are key contributors to the $PM_{2.5}$ mass on days exceeding the 24-hour $PM_{2.5}$ standard. These data indicate that in many cities, the same source categories that contribute to violations of the annual standard also contribute to exceedances of the 24-hour standard.

Most areas that were originally designated nonattainment for the $PM_{2.5}$ standards still have not attained the standards. Thus, EPA has generally concluded that counties that were designated as having emissions sources contributing to fine particle concentrations which continue to exceed the 1997 standards (all areas violated the annual standard, three also violated the previous 24-hour standard) also contribute to fine particle concentrations on the highest days. For this reason, EPA believes that for most existing nonattainment areas, the nonattainment area for the 2006 24-hour $PM_{2.5}$ standard should be the same. Consideration also should be given to existing boundaries and organizations as they may facilitate air quality planning and the implementation of control measures to attain the standard. Areas already designated as nonattainment represent important boundaries for state air quality planning.

We note that the Salt Lake City-Ogden-Clearfield CSA has an existing PM_{10} nonattainment designation for Salt Lake County and Weber County (partial, only the City of Ogden) and that the Provo-Orem CBSA has an existing PM_{10} nonattainment designation for Utah County. However, PM_{10} nonattainment area boundaries do not give an indication of what boundaries are appropriate for $PM_{2.5}$. PM_{10} and $PM_{2.5}$ are different size particles, behave differently in the atmosphere, are often the result of emissions from different types of sources, and will probably require different control strategies. Thus, the existing boundaries for PM_{10} nonattainment areas are of limited relevance in this area.

Based upon information provided by the State of Utah, EPA has reconsidered the planning and organizational structure of the large area encompassing the Provo-Orem CBSA and the Salt Lake City-Ogden-Clearfield CSA to determine if the implementation of the 2006 $PM_{2.5}$ NAAQS can be carried out in a cohesive manner. EPA has concluded that the UDAQ (which in conjunction with the Utah Air Quality Board has State-wide overall planning and SIP development authority), Counties, affected Cities, and Metropolitan Planning Organizations (MPO) do have the ability to develop and implement appropriate control measures to address the $PM_{2.5}$ nonattainment issues facing this large area, whether it is treated as one or two nonattainment areas for planning purposes. However, EPA anticipates that the two adjacent nonattainment areas will need to have a coordinated approach to controlling $PM_{2.5}$ and $PM_{2.5}$ precursors, given that they are both contributing to one another's violations.

Factor 9: Level of control of emission sources

Under this factor, the existing level of control of emission sources is taken into consideration. The emissions data used by EPA in this technical analysis and provided in Table A.3-2 (under Factor 1) represent emissions levels taking into account any control strategies implemented in the Provo-Orem CBSA and the Salt Lake City-Ogden-Clearfield CSA areas 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 particles (e.g. SO_2, NOx, VOC, and ammonia). In this area, the State of Utah did not provide any additional information to indicate

that there had been substantial decreases in emissions in areas under consideration by EPA for inclusion based upon contribution to a nearby area, thus EPA has concluded that the emissions information does not need to be adjusted in this area.

Conclusion:

EPA has amended our August 18, 2008 intended designation, relative to separating or combining Utah County and Salt Lake County. EPA has given further consideration to the State recommendation to separate the two counties and EPA is designating Utah County (partial) as a separate 24-hour $PM_{2.5}$ nonattainment area. This decision is based on a broader evaluation of jurisdictional issues that the State claims will facilitate SIP planning. Regardless of whether the area is one single nonattainment area or two separate nonattainment areas, both Utah County and Salt Lake County are violating the 2006 24-hour $PM_{2.5}$ standards and have similar design values. The State of Utah will have to insure that these two areas work closely together to develop a consistent strategy for attaining the NAAQS, including a combined modeling demonstration and consistent control measures. However, EPA's analysis of speciated data, pollution roses, and other analytical tools indicates that these two areas are interconnected and thus we expect that SIPs for both areas will fully account for this influence.
ww.epa.gov/pmdesignaWith regard to including portions of Box Elder and Tooele Counties in the Salt Lake City nonattainment area, EPA is required under section 107(d) to designate not only violating areas, but nearby areas that contribute to those violations. Thus, a key objective of the designation process was to ascertain those nearby areas with emissions sources or emissions activities that contribute to violations. EPA based its evaluation of these two areas on the types of information recommended in EPA's guidance and additional relevant information, including traffic and commuting, growth, meteorology, topography, and emissions. Taken together, this information supports the conclusion that both Box Elder and Tooele contribute to the $PM_{2.5}$ violations in adjacent counties. The fact that neither area is currently monitoring nonattainment does not address whether they contribute to violations in nearby [A1]areas.

EPA notes there are no topographical barriers between Brigham City and Salt Lake City; the two areas are part of a single very large air basin. Based on emission transport during long periods of stagnation under persistent temperature inversions, sufficient mixing occurs allowing both Box Elder and Tooele Valley emissions to reach the maximum concentration monitors in Salt Lake City and Ogden and contribute to NAAQS violations.

The monitor in Box Elder County has shown significant daily exceedances of the $PM_{2.5}$ standard as well as three-year design values near the level of the 2006 24-hour $PM_{2.5}$ NAAQS (and above that level for some periods historically). In Box Elder, the 2004-2006 design value was 35 g/m^3 and the 2005-2007 design value was 29 g/m^3; in Tooele the 2005-2007 design value was 31 g/m^3. While not violations, these values demonstrate that these areas are subject to poor air quality at times, and it is likely that these high concentrations contribute to violations in adjacent counties on days when winds blow from this direction towards the rest of this area, and contribute to area wide ambient levels during inversions. If the exceedances are caused by local emissions, it indicates emission levels high enough to leave very little margin to the NAAQS and that emissions are high enough to contribute to the overall air quality issues of the larger basin. If the exceedances are from transport from Salt Lake City and involve sufficient mixing for the central and outlying areas to interact, this demonstrates that Box Elder and Tooele County are in the same air shed.

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

Attachment 4

Description of the Contributing Emissions Score

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

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

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

A more detailed description of the CES can be found at:

http://www.epa.gov/ttn/naaqs/pm/pm25_2006_techinfo.html#C

ATTACHMENT 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.) <u>References, data sources, and data interpretations for</u>: "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.) <u>References, data sources, and data interpretations for</u>: "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

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)

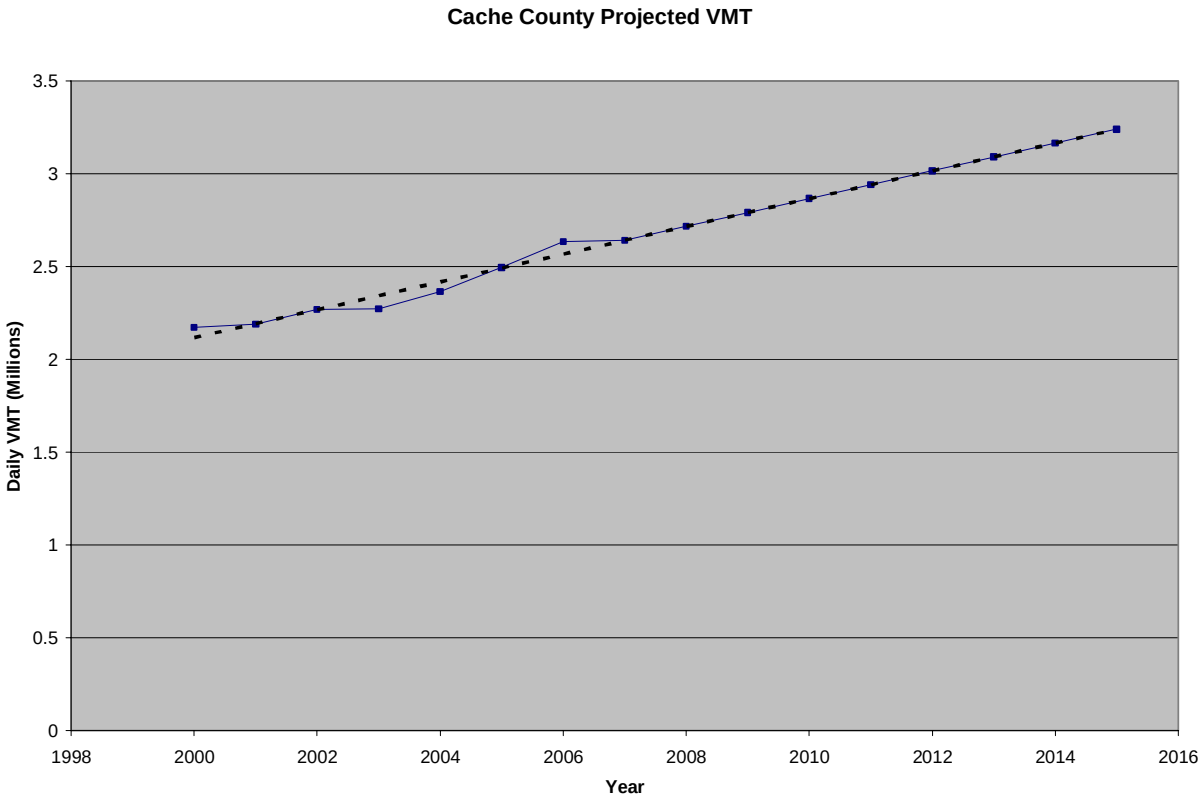
County	2000	2001	2002	2003	2004	2005	2006
Cache[1]	793	799	828	830	863	911	961

these daily VM[1]All the VMT figures were from UDOT and in VMT millions per day. Absent any other information, EPA merely multiplied T 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						6									8,180	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	3,382	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)	1,890	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)	90	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	6	599	314
Elko	NV		Elko, NV				0									45,576	3	1	1,093	29	10	0	340	2	3,589	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	6	119	41
Sweetwater	WY		Rock Springs, WY				0									38,019	4	1	782	10	40	0	50	0	9,131	832
Uinta	WY		Evanston, WY				0									19,673	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

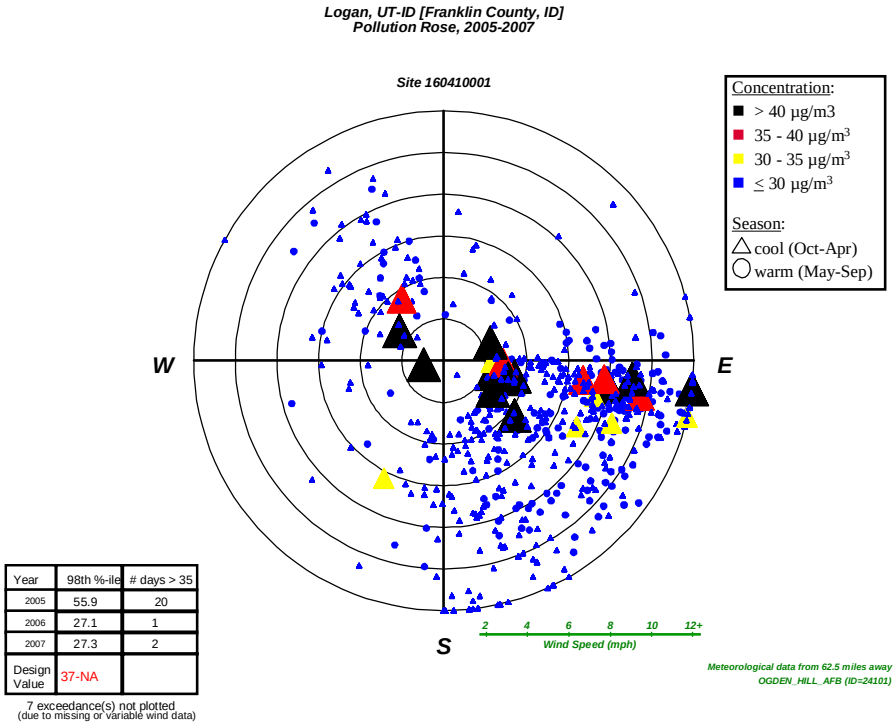
UT-spreadsheet-24hourPM2.5-Info-JUNE-4-06.xls

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	1,906	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	3.5	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	82.2	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	1,767	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	8,516	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.

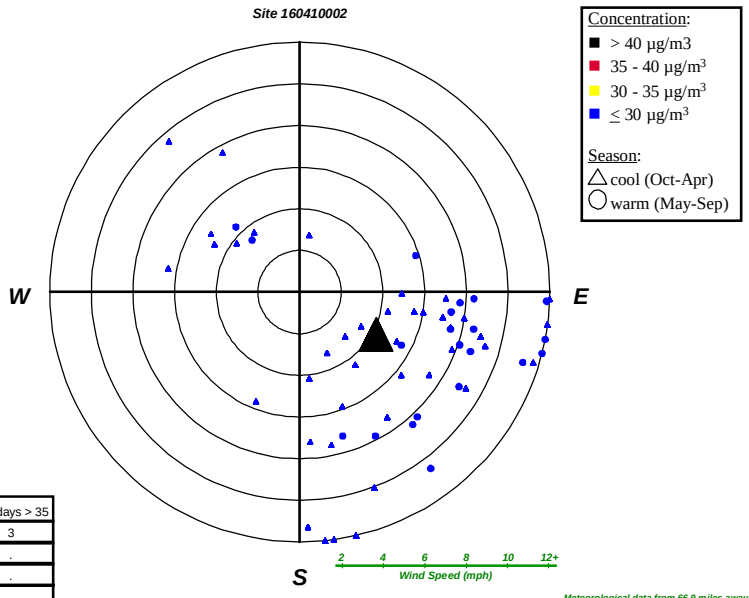
EPA Generated Data: Wind Roses



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)

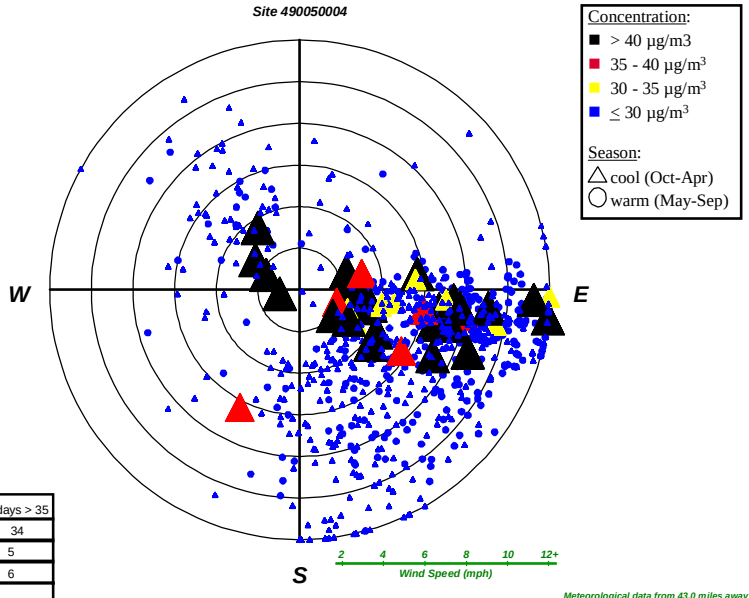
Logan, UT-ID [Franklin County, ID]
Pollution Rose, 2005-2007



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)

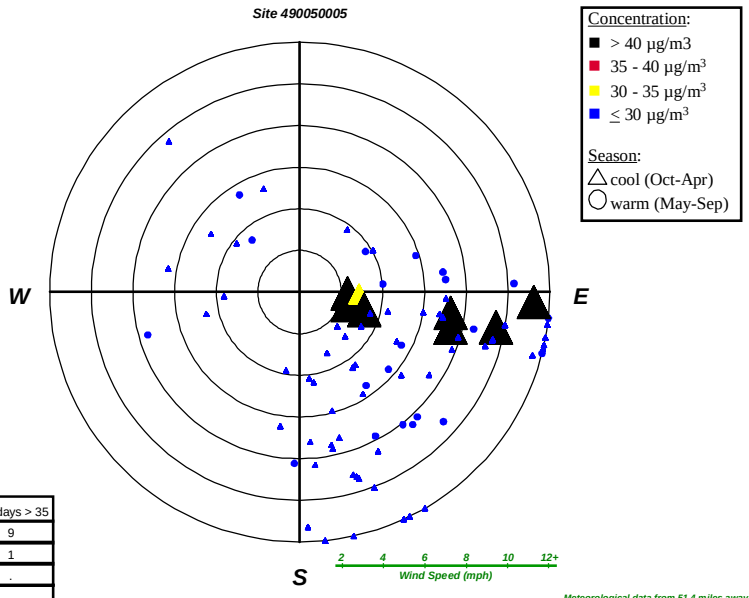
Logan, UT-ID [Cache County, UT]
Pollution Rose, 2005-2007



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)

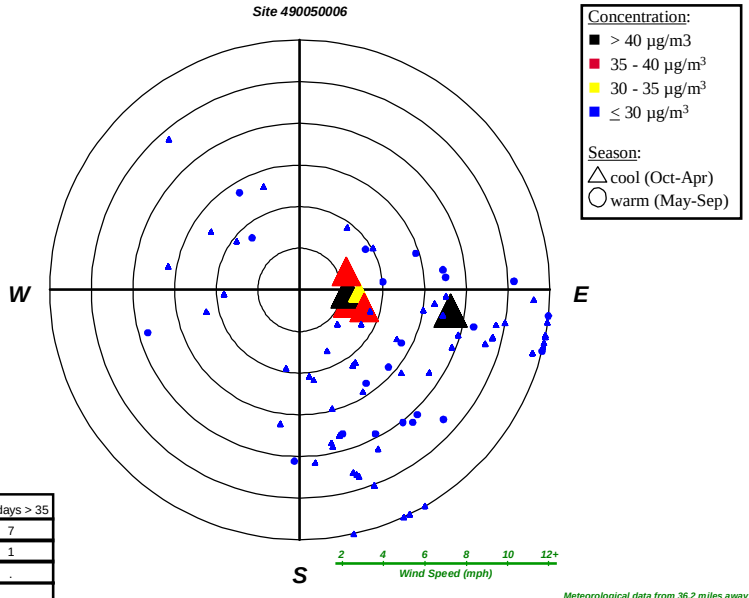
Logan, UT-ID [Cache County, UT]
Pollution Rose, 2005-2007



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, APPENDIX 2.A: TECHNICAL ANALYSES OF THE PROVO-OREM AND SALT LAKE CITY NONATTAINMENT AREAS – 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 areas and also in view of information provided by the State of Utah. (Re: The Governor's 12/18/07 submittal.) This Appendix addresses the Utah-Only Nonattainment Areas:

EPA Technical Analyses for the Provo-Orem Core Based Statistical Area (CBSA) and the Salt Lake City-Ogden-Clearfield Combined Statistical Area (CSA) for the Designation of Nonattainment Areas for $PM_{2.5}$

The Provo-Orem CBSA is composed of Juab and Utah Counties. The Salt Lake City-Ogden-Clearfield CSA is composed of Box Elder, Davis, Morgan, Salt Lake, Summit, Tooele, Wasatch, and Weber Counties.

1.) <u>References, data sources, and data interpretations for</u>: "Factor 1: Emissions"

Ref. Table Appendix 2.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
Box Elder Co	EGUs	0	2	0	0	0
Box Elder Co	Fires	726	58	38	61	399
Box Elder Co	Non-Road	2646	2086	161	1	91
Box Elder Co	On-Road	1636	2615	56	78	39
Box Elder Co	Other_Stationary	1713	449	90	1832	739
Box Elder Co	Total	6720	5210	345	1972	1269

county	MAJOR_CAT	OC	EC	SO4	NO3	PMFINE
Box Elder Co	EGUs	0	0	0	0	0
Box Elder Co	Fires	202	40	6	1	151
Box Elder Co	Non-Road	39	40	0	0	11
Box Elder Co	On-Road	10	22	0	0	7
Box Elder Co	Other_Stationary	76	6	49	1	607
Box Elder Co	Total	327	108	55	2	777

county	MAJOR_CAT	VOC	NOX	SO2	NH3	PM2_5
Davis Co	EGUs	2	21	2	0	1
Davis Co	Non-Road	1693	2112	201	2	138
Davis Co	On-Road	5197	7814	197	348	122
Davis Co	Other_Stationary	5924	2485	2110	346	1130
Davis Co	Total	12816	12433	2510	696	1391

county	MAJOR_CAT	OC	EC	SO4	NO3	PMFINE
Davis Co	EGUs	0	1	0	0	0

Davis Co	Non-Road	41	85	1	0	11
Davis Co	On-Road	32	61	1	0	28
Davis Co	Other_Stationary	215	21	19	2	872
Davis Co	Total	288	168	20	2	912

county	MAJOR_CAT	VOC	NOX	SO2	NH3	PM2_5
Juab Co	Fires	256	16	7	18	115
Juab Co	Non-Road	219	971	73	0	15
Juab Co	On-Road	712	1238	24	34	17
Juab Co	Other_Stationary	541	1417	201	256	272
Juab Co	Total	1728	3642	305	309	419

county	MAJOR_CAT	OC	EC	SO4	NO3	PMFINE
Juab Co	Fires	59	11	2	0	42
Juab Co	Non-Road	5	9	0	0	1
Juab Co	On-Road	4	10	0	0	3
Juab Co	Other_Stationary	22	3	13	0	234
Juab Co	Total	90	33	15	1	281

county	MAJOR_CAT	VOC	NOX	SO2	NH3	PM2_5
Morgan Co	Fires	793	35	22	55	283
Morgan Co	Non-Road	446	1370	102	1	17
Morgan Co	On-Road	204	378	8	11	5
Morgan Co	Other_Stationary	235	1347	58	174	85
Morgan Co	Total	1678	3130	190	240	391

county	MAJOR_CAT	OC	EC	SO4	NO3	PMFINE
Morgan Co	Fires	158	27	4	0	95
Morgan Co	Non-Road	7	8	0	0	2
Morgan Co	On-Road	1	3	0	0	1
Morgan Co	Other_Stationary	11	2	6	2	65
Morgan Co	Total	177	40	9	2	163

county	MAJOR_CAT	VOC	NOX	SO2	NH3	PM2_5
Salt Lake Co	EGUs	30	212	4	62	17
Salt Lake Co	Fires	27	2	1	2	10
Salt Lake Co	Non-Road	4862	6904	634	5	440
Salt Lake Co	On-Road	11496	15738	422	787	254
Salt Lake Co	Other_Stationary	17961	5555	4677	723	2493
Salt Lake Co	Total	34376	28411	5738	1579	3214

county	MAJOR_CAT	OC	EC	SO4	NO3	PMFINE
Salt Lake Co	EGUs	4	7	1	0	4
Salt Lake Co	Fires	6	1	0	0	3
Salt Lake Co	Non-Road	132	269	2	1	36
Salt Lake Co	On-Road	67	123	2	0	62
Salt Lake Co	Other_Stationary	736	72	57	6	1622
Salt Lake Co	Total	945	472	63	8	1728

county	MAJOR_CAT	VOC	NOX	SO2	NH3	PM2_5

Summit Co	EGUs	0	0	0	0	0
Summit Co	Fires	127	5	4	9	45
Summit Co	Non-Road	495	1411	119	1	40
Summit Co	On-Road	824	1644	39	55	27
Summit Co	Other_Stationary	920	598	135	460	235
Summit Co	Total	2367	3658	297	524	346

county	MAJOR_CAT	OC	EC	SO4	NO3	PMFINE
Summit Co	EGUs	0	0	0	0	0
Summit Co	Fires	25	4	0	0	14
Summit Co	Non-Road	13	24	0	0	4
Summit Co	On-Road	6	15	0	0	5
Summit Co	Other_Stationary	42	4	2	0	187
Summit Co	Total	86	46	3	1	210

county	MAJOR_CAT	VOC	NOX	SO2	NH3	PM2_5
Tooele Co	EGUs	3	166	2	0	2
Tooele Co	Fires	2594	89	76	181	908
Tooele Co	Non-Road	1008	1572	121	1	40
Tooele Co	On-Road	1741	2510	57	80	40
Tooele Co	Other_Stationary	1312	1047	268	542	775
Tooele Co	Total	6658	5384	524	803	1766

county	MAJOR_CAT	OC	EC	SO4	NO3	PMFINE
Tooele Co	EGUs	0	1	0	0	0
Tooele Co	Fires	505	86	11	1	304
Tooele Co	Non-Road	15	21	0	0	4
Tooele Co	On-Road	10	23	0	0	7
Tooele Co	Other_Stationary	55	9	39	1	672
Tooele Co	Total	585	140	51	2	988

county	MAJOR_CAT	VOC	NOX	SO2	NH3	PM2_5
Utah Co	EGUs	0	1	0	0	0
Utah Co	Fires	250	17	7	17	115
Utah Co	Non-Road	2232	2981	299	2	206
Utah Co	On-Road	6863	9305	238	438	145
Utah Co	Other_Stationary	7830	1474	469	1957	1154
Utah Co	Total	17174	13778	1012	2414	1619

county	MAJOR_CAT	OC	EC	SO4	NO3	PMFINE
Utah Co	EGUs	0	0	0	0	0
Utah Co	Fires	58	11	2	0	44
Utah Co	Non-Road	60	127	1	0	17
Utah Co	On-Road	39	70	1	0	35
Utah Co	Other_Stationary	298	24	9	11	812
Utah Co	Total	455	233	13	12	907

county	MAJOR_CAT	VOC	NOX	SO2	NH3	PM2_5
Wasatch Co	EGUs	0	5	0	0	0
Wasatch Co	Fires	216	9	6	15	76

Wasatch Co	Non-Road	404	249	27	0	22
Wasatch Co	On-Road	427	604	16	23	11
Wasatch Co	Other_Stationary	437	53	9	159	137
Wasatch Co	Total	1484	920	59	197	247

county	MAJOR_CAT	OC	EC	SO4	NO3	PMFINE
Wasatch Co	EGUs	0	0	0	0	0
Wasatch Co	Fires	43	7	1	0	26
Wasatch Co	Non-Road	6	14	0	0	2
Wasatch Co	On-Road	3	6	0	0	2
Wasatch Co	Other_Stationary	20	1	0	0	115
Wasatch Co	Total	71	29	2	0	145

county	MAJOR_CAT	VOC	NOX	SO2	NH3	PM2_5
Weber Co	EGUs	3	213	2	5	1
Weber Co	Fires	245	12	7	17	88
Weber Co	Non-Road	1418	1699	150	1	95
Weber Co	On-Road	3718	4435	112	208	68
Weber Co	Other_Stationary	3934	592	85	542	645
Weber Co	Total	9317	6951	356	774	896

county	MAJOR_CAT	OC	EC	SO4	NO3	PMFINE
Weber Co	EGUs	0	0	0	0	0
Weber Co	Fires	49	8	1	0	29
Weber Co	Non-Road	31	55	0	0	8
Weber Co	On-Road	18	33	1	0	16
Weber Co	Other_Stationary	166	14	16	1	448
Weber Co	Total	264	110	18	1	502

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 Utah Counties.

Ref. Table Appendix 2.A-2: Traffic and Commuting Patterns
Residence MCD/County to Workplace MCD/County Flows for Utah: 2000
Sorted by Residence State-County, or State-County-County Subdivision (in 12 states)

Res State	Res County	Res (C)MSA	Res PMSA	Residence State-County-MCD Name	Workplace State-County-MCD Name	Count
49	003	9999	9999	Box Elder Co. UT	Box Elder Co. UT	13570
49	003	9999	9999	Box Elder Co. UT	Weber Co. UT	2529
49	003	9999	9999	Box Elder Co. UT	Davis Co. UT	660
49	003	9999	9999	Box Elder Co. UT	Cache Co. UT	631
49	003	9999	9999	Box Elder Co. UT	Salt Lake Co. UT	401
49	003	9999	9999	Box Elder Co. UT	Tooele Co. UT	26
49	003	9999	9999	Box Elder Co. UT	Utah Co. UT	26
49	003	9999	9999	Box Elder Co. UT	Summit Co. UT	22
49	003	9999	9999	Box Elder Co. UT	Morgan Co. UT	7
				Subtotal out of County =		4302
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
49	011	7160	9999	Davis Co. UT	Davis Co. UT	61208
49	011	7160	9999	Davis Co. UT	Salt Lake Co. UT	33851

49	011	7160	9999	Davis Co. UT	Weber Co. UT	14876
49	011	7160	9999	Davis Co. UT	Utah Co. UT	803
49	011	7160	9999	Davis Co. UT	Box Elder Co. UT	313
49	011	7160	9999	Davis Co. UT	Cache Co. UT	199
49	011	7160	9999	Davis Co. UT	Tooele Co. UT	178
49	011	7160	9999	Davis Co. UT	Morgan Co. UT	96
49	011	7160	9999	Davis Co. UT	Summit Co. UT	83
49	011	7160	9999	Davis Co. UT	Wasatch Co. UT	31
				Subtotal out of County =		50430
49	023	9999	9999	Juab Co. UT	Juab Co. UT	2011
49	023	9999	9999	Juab Co. UT	Utah Co. UT	959
49	023	9999	9999	Juab Co. UT	Salt Lake Co. UT	143
49	023	9999	9999	Juab Co. UT	Tooele Co. UT	73
49	023	9999	9999	Juab Co. UT	Box Elder Co. UT	8
49	023	9999	9999	Juab Co. UT	Summit Co. UT	6
49	023	9999	9999	Juab Co. UT	Davis Co. UT	4
49	023	9999	9999	Juab Co. UT	Wasatch Co. UT	3
				Subtotal out of County =		1196
49	029	9999	9999	Morgan Co. UT	Morgan Co. UT	1217
49	029	9999	9999	Morgan Co. UT	Weber Co. UT	922
49	029	9999	9999	Morgan Co. UT	Davis Co. UT	604
49	029	9999	9999	Morgan Co. UT	Salt Lake Co. UT	273
49	029	9999	9999	Morgan Co. UT	Summit Co. UT	107
49	029	9999	9999	Morgan Co. UT	Utah Co. UT	9
49	029	9999	9999	Morgan Co. UT	Box Elder Co. UT	8
49	029	9999	9999	Morgan Co. UT	Wasatch Co. UT	4
49	029	9999	9999	Morgan Co. UT	Tooele Co. UT	3
				Subtotal out of County =		1930
49	035	7160	9999	Salt Lake Co. UT	Salt Lake Co. UT	411283
49	035	7160	9999	Salt Lake Co. UT	Davis Co. UT	8370
49	035	7160	9999	Salt Lake Co. UT	Utah Co. UT	8075
49	035	7160	9999	Salt Lake Co. UT	Summit Co. UT	2678
49	035	7160	9999	Salt Lake Co. UT	Weber Co. UT	2084
49	035	7160	9999	Salt Lake Co. UT	Tooele Co. UT	1656
49	035	7160	9999	Salt Lake Co. UT	Wasatch Co. UT	246
49	035	7160	9999	Salt Lake Co. UT	Cache Co. UT	224
49	035	7160	9999	Salt Lake Co. UT	Morgan Co. UT	81
49	035	7160	9999	Salt Lake Co. UT	Box Elder Co. UT	80
49	035	7160	9999	Salt Lake Co. UT	Juab Co. UT	27
				Subtotal out of County =		23521
49	043	9999	9999	Summit Co. UT	Summit Co. UT	10486
49	043	9999	9999	Summit Co. UT	Salt Lake Co. UT	4501
49	043	9999	9999	Summit Co. UT	Wasatch Co. UT	302
49	043	9999	9999	Summit Co. UT	Utah Co. UT	127

49	043	9999	9999	Summit Co. UT	Weber Co. UT	120
49	043	9999	9999	Summit Co. UT	Davis Co. UT	105
49	043	9999	9999	Summit Co. UT	Morgan Co. UT	81
49	043	9999	9999	Summit Co. UT	Tooele Co. UT	26
49	043	9999	9999	Summit Co. UT	Box Elder Co. UT	17
				Subtotal out of County =		5279
49	045	9999	9999	Tooele Co. UT	Tooele Co. UT	9784
49	045	9999	9999	Tooele Co. UT	Salt Lake Co. UT	7031
49	045	9999	9999	Tooele Co. UT	Davis Co. UT	339
49	045	9999	9999	Tooele Co. UT	Utah Co. UT	165
49	045	9999	9999	Tooele Co. UT	Summit Co. UT	47
49	045	9999	9999	Tooele Co. UT	Weber Co. UT	27
49	045	9999	9999	Tooele Co. UT	Box Elder Co. UT	6
49	045	9999	9999	Tooele Co. UT	Cache Co. UT	5
49	045	9999	9999	Tooele Co. UT	Wasatch Co. UT	2
				Subtotal out of County =		7622
49	049	6520	9999	Utah Co. UT	Utah Co. UT	140834
49	049	6520	9999	Utah Co. UT	Salt Lake Co. UT	18159
49	049	6520	9999	Utah Co. UT	Davis Co. UT	842
49	049	6520	9999	Utah Co. UT	Wasatch Co. UT	461
49	049	6520	9999	Utah Co. UT	Tooele Co. UT	369
49	049	6520	9999	Utah Co. UT	Summit Co. UT	337
49	049	6520	9999	Utah Co. UT	Weber Co. UT	317
49	049	6520	9999	Utah Co. UT	Juab Co. UT	242
49	049	6520	9999	Utah Co. UT	Morgan Co. UT	71
49	049	6520	9999	Utah Co. UT	Box Elder Co. UT	14
49	049	6520	9999	Utah Co. UT	Cache Co. UT	12
				Subtotal out of County =		20824
49	051	9999	9999	Wasatch Co. UT	Wasatch Co. UT	3857
49	051	9999	9999	Wasatch Co. UT	Summit Co. UT	1509
49	051	9999	9999	Wasatch Co. UT	Salt Lake Co. UT	824
49	051	9999	9999	Wasatch Co. UT	Utah Co. UT	498
49	051	9999	9999	Wasatch Co. UT	Davis Co. UT	65
49	051	9999	9999	Wasatch Co. UT	Weber Co. UT	38
49	051	9999	9999	Wasatch Co. UT	Tooele Co. UT	11
49	051	9999	9999	Wasatch Co. UT	Cache Co. UT	2
				Subtotal out of County =		2947
49	057	7160	9999	Weber Co. UT	Weber Co. UT	64671
49	057	7160	9999	Weber Co. UT	Davis Co. UT	16659
49	057	7160	9999	Weber Co. UT	Salt Lake Co. UT	6425
49	057	7160	9999	Weber Co. UT	Box Elder Co. UT	1671
49	057	7160	9999	Weber Co. UT	Utah Co. UT	458
49	057	7160	9999	Weber Co. UT	Cache Co. UT	379
49	057	7160	9999	Weber Co. UT	Morgan Co. UT	163

49	057	7160	9999	Weber Co. UT	Tooele Co. UT	76
49	057	7160	9999	Weber Co. UT	Summit Co. UT	73
49	057	7160	9999	Weber Co. UT	Wasatch Co. UT	12
				Subtotal out of County =		25916

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

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

a.) Population Growth Estimates

Table Appendix 2.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 2.A-3: Projected Population Growth[1]

County	2000	% Change	2005	2010	% Change	2015	% Change
Provo-Orem CBSA							
Juab[2]	8,310	8.0%	8,974	10,519	17.2%	12,353	37.7%
Utah	371,894	22.1%	453,977	527,502	16.2%	594,511	31.0%
Salt Lake-Ogden-Clearfield CSA							
Box Elder	42,860	5.3%	45,142	49,254	9.1%	55,212	22.3%
Davis	240,204	15.1%	276,374	304,502	10.2%	330,833	19.7%
Morgan[2]	7,181	18.6%	8,516	10,589	24.3%	13,409	57.5%
Salt Lake	902,777	7.5%	970,748	1,053,258	8.5%	1,145,337	18.0%
Summit	30,048	21.2%	36,417	44,511	22.2%	54,618	50.0%
Tooele	41,549	24.8%	51,835	67,150	29.5%	83,661	61.4%
Wasatch	15,433	30.5%	20,138	25,516	26.7%	31,664	57.2%
Weber	197,541	7.7%	212,707	230,145	8.2%	251,528	18.3%

[1] All figures (except for Juab and Morgan Counties) are as provided by Utah with the Governor's 12/18/07 designations recommendations submittal.
[2] Figures for Juab and Morgan Counties are as provided by EPA and are from the Utah Governor's Office of Planning and Budget - GOPB (http://governor.utah.gov/dea/projections.html)

b.) VMT Growth Estimates

EPA notes that the State's 12/18/07 designations recommendations submittal **did not contain any VMT data for 2000, 2005 or any other years**. EPA, therefore, drew upon other sources of information for the necessary VMT data and also performed calculations to adjust those data.

To perform the initial step of establishing the 2005 base year VMT data, EPA used the following: For Salt Lake County, EPA reviewed and used VMT data from "Table 1 Travel Characteristics" from the Wasatch Front Regional Council's (http://www.wfrc.org) "Air Quality Memorandum, Report No. 23"

whose subject was "Conformity Analysis for the WFRC Amended 2030 Regional Transportation Plan" that was dated February 8, 2008 (hereafter referred to as WFRC-2030). For Utah County, EPA reviewed and used Mountainland Association of Governments (http://www.mountainland.org) VMT data from section "93.118 – Emission Budgets Utah County Regional Travel Model VMT Results" from the "Conformity Determination Report Mountainland MPO 2030 Regional Transportation Plan" that was dated April, 2007 (hereafter referred to as MAG-2030). The basis for all other 2005 county VMT data was from a table entitled "Vehicle Miles Traveled (VMT) for the Greater Wasatch Area, 2000 to 2030" – "2003 Baseline Scenario" which is from the State of Utah's Governor's Office of Planning and Budget (http://governor.utah.gov/dea/projections.html), and is hereafter referred to as GOPB. EPA noted some inconsistencies between the different VMT data sources (i.e., EPA-OAQPS, WFRC-2030, MAG-2030, and GOPB) and these inconsistencies are provided in the following table:

Ref. Table Appendix 2.A-4: VMT Comparison for 2005
VMT (millions annually)

County	2005	2004[1]	2005	2005
	EPA	**WFRC-2030**	**MAG-2030**	**GOPB**
Provo-Orem CBSA				
Juab	343			427[2]
Utah	4215		3626[2]	3652[2]
Salt Lake-Ogden-Clearfield CSA				
Box Elder	783			1066[2]
Davis	3352			2268[2]
Morgan	109			138[2]
Salt Lake	7512	8917[2]		8527[2]
Summit	551			740[2]
Tooele	804			867[2]
Wasatch	227			300[2]
Weber	1995			1574[2]

[1]WFRC did not have a 2005 VMT figure, but did provide 2004 and 2006 figures. 2004 was used in this table.
[2]All the VMT figures provided by MAG, GOPB, and WFRC were in VMT millions per day. Absent any other information, EPA merely multiplied these daily VMT figures by 365 to arrive at annual VMT figures.

In view of the VMT information detailed in Table Appendix 2.A-2 above; for the Salt Lake-Ogden-Clearfield CSA, EPA elected to use the 2005 GOPB figures for Box Elder, Davis, Morgan, Summit, Tooele, Wasatch, and Weber Counties. For Salt Lake County, EPA used the 2004 WFRC-2030 figure. For the Provo-Orem CBSA, EPA elected to use the GOPB VMT 2005 figure for Juab County and the 2005 MAG-2030 figure for Utah County.

Based on the information derived above, Table Appendix 2.A-5 below shows VMT for 2005 and projected VMT growth used by EPA for our techncial 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.

Ref. Table Appendix 2.A-5: Projected VMT Growth
VMT (millions annually)

County	2005	% Change	2010[1]	% Change	2015[3]
Provo-Orem CBSA					
Juab	427	21.5%	519	45.4%	621
Utah	3626	13.2%	4105[2]	28.4%	4654[5]
Salt Lake-Ogden-Clearfield CSA					
Box Elder	1066	21.5%	1295	45.3%	1549
Davis	2268	15.8%	2626	30.9%	2969
Morgan	138	21.7%	168	44.9%	200
Salt Lake	8917	11.6%	9952	27.9%	11401[4]
Summit	740	20.9%	895	45.3%	1075
Tooele	867	21.5%	1053	45.2%	1259
Wasatch	300	21.7%	365	45.3%	436
Weber	1574	5.5%	1661	21.2%	1907

[1] All figures (except for Utah County) are from the Utah Governor's Office of Planning and Budget (GOPB) and are daily millions of VMT times 365 to get an annual VMT figure.
[2]Figure for Utah County for 2010 is the 2010 projected daily millions of VMT from Table 93.118 "Emission Budgets Utah County Regional Travel Model VMT Results" (MAG-2030). The 2010 daily millions of VMT figure was multiplied by 365 to get an annual VMT.
[3] All figures (except for Salt Lake and Utah Counties) are from the Utah Governor's Office of Planning and Budget (GOPB) and are daily millions of VMT multiplied by 365 to get an annual VMT figure.
[4]Figure for Salt Lake County for 2015 is the 2015 projected daily millions of VMT from "Air Quality Memorandum, Report No. 23" (WFRC-2030). The 2015 daily millions of VMT figure was multiplied by 365 to get an annual VMT.
[5]The figure for Utah County for 2015 was derived from the 2010 and 2020 projected daily millions of VMT from Table 93.118 "Emission Budgets Utah County Regional Travel Model VMT Results" (MAG-2030). The MAG-2030 daily VMT figures for 2010 and 2020 were summed and an average 2015 figure was produced that equals a daily millions of VMT figure of 12.751901. The 12.751901 daily millions of VMT figure was multiplied by 365 to arrive at an annual millions of VMT figure.

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						6									8,180	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	3,382	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)	1,890	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)	90	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	6	599	314
Elko	NV		Elko, NV				0									45,576	3	1	1,093	29	10	0	340	2	3,589	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	6	119	41
Sweetwater	WY		Rock Springs, WY				0									38,019	4	1	782	10	40	0	50	0	9,131	832
Uinta	WY		Evanston, WY				0									19,673	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

UT-spreadsheet-24hourPM2.5-Info-JUNE-4-06.xls

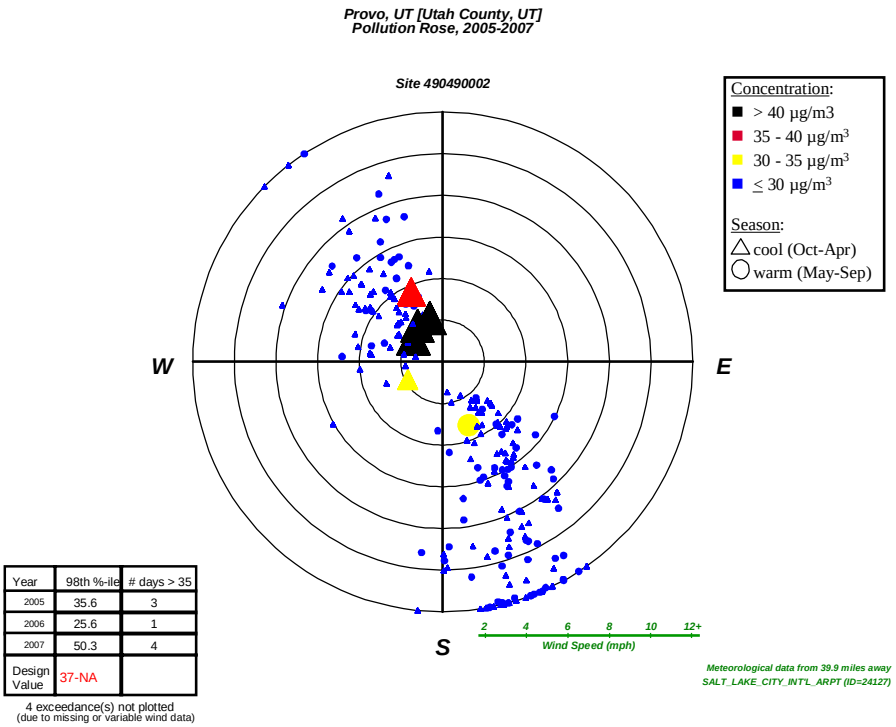
County	State	PM2.5 emissions - other (tpy)	SO2 emissions (tpy)	NOx emissions (tpy)	VOC emissions (tpy)	NH3 emissions (tpy)	Trajectory Factor for CES - Cold	Trajectory Factor for CES - Warm	Distance Factor (mi)	Included in Tagged Modeling - County	Included in Tagged Modeling - Pt. Source
LOGAN, UT-ID											
Cache	**UT**	**445**	**238**	**3,833**	**5,305**	**1,957**	96		18.8	N	N
Franklin	**ID**	**313**	**57**	**851**	**2,290**	**1,221**	23		37.1	N	N
Bannock	ID	3,043	673	4,839	24,792	1,906	3		69.6	N	N
Weber	UT	521	356	6,951	9,317	774	100		28.8	N	N
Caribou	ID	2,624	12,646	2,869	5,064	1,381	4		72	N	N
Box Elder	UT	834	345	5,210	6,720	1,972	52		33.3	N	N
Morgan	UT	174	190	3,130	1,678	240	46		42.3	N	N
Bear Lake	ID	236	35	2,103	2,389	362	6		47.7	N	N
Oneida	ID	223	44	523	1,565	335	7		57.2	N	N
Rich	UT	77	40	221	1,808	725	24		26.8	N	N
PROVO, UT											
Utah	**UT**	**932**	**1,012**	**13,778**	**17,174**	**2,414**	100		25.8	N	N
Juab	**UT**	**297**	**305**	**3,642**	**1,728**	**309**	9		72.6	N	N
Salt Lake	UT	1,799	5,738	28,411	34,376	1,579	80		35.8	N	N
Emery	UT	2,787	23,925	29,874	1,555	501	8		90.9	N	N
Carbon	UT	434	6,718	5,532	1,849	859	19		68.6	N	N
Sanpete	UT	307	439	963	2,922	1,104	24		52.9	N	N
Wasatch	UT	147	59	920	1,484	197	31		30.5	N	N
Millard	UT	2,226	4,415	29,366	3,275	2,063	4		105	N	N
Tooele	UT	1,041	524	5,384	6,658	803	18		47.8	N	N
Duchesne	UT	285	141	1,344	2,738	963	8		66.9	N	N
Summit	UT	214	297	3,658	2,367	524	5		70.1	N	N
White Pine	NV	267	37	477	740	275	0		182.7	N	N
SALT LAKE CITY, UT											
Davis	**UT**	**934**	**2,510**	**12,433**	**12,816**	**696**	95		22.1	N	N
Salt Lake	**UT**	**1,799**	**5,738**	**28,411**	**34,376**	**1,579**	100		15.9	N	N
Weber	**UT**	**521**	**356**	**6,951**	**9,317**	**774**	50		42.4	N	N
Morgan	**UT**	**174**	**190**	**3,130**	**1,678**	**240**	12		31.2	N	N
Box Elder	**UT**	**834**	**345**	**5,210**	**6,720**	**1,972**	18		61.6	N	N
Summit	**UT**	**214**	**297**	**3,658**	**2,367**	**524**	2		82.2	N	N
Tooele	**UT**	**1,041**	**524**	**5,384**	**6,658**	**803**	14		35	N	N
Wasatch	**UT**	**147**	**59**	**920**	**1,484**	**197**	7		48	N	N
Utah	UT	932	1,012	13,778	17,174	2,414	29		35.8	N	N
Cache	UT	445	238	3,833	5,305	1,957	5		70.8	N	N
Carbon	UT	434	6,718	5,532	1,849	859	3		98.9	N	N
Cassia	ID	663	125	2,181	4,811	5,780	0		146.6	N	N
Daggett	UT	350	110	1,051	3,173	779	0		112.5	N	N
Duchesne	UT	285	141	1,344	2,738	963	8		80.8	N	N
Elko	NV	1,603	767	6,452	10,677	1,767	0		191.5	N	N
Franklin	ID	313	57	851	2,290	1,221	1		106.9	N	N
Juab	UT	297	305	3,642	1,728	309	4		86.7	N	N
Oneida	ID	223	44	523	1,565	335	0		114.4	N	N
Rich	UT	77	40	221	1,808	725	1		71.3	N	N
Sweetwater	WY	8,298	35,697	53,468	12,585	1,170	0		165.8	N	N
Uinta	WY	1,366	7,326	4,848	2,188	407	1		82.7	N	N
Uintah	UT	677	1,321	8,516	2,036	565	3		130.6	N	N
White Pine	NV	267	37	477	740	275	0		184.8	N	N

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	00	100	0	N	Total Concentration (Cold)	3.3	12.3	20.1	1.1	36.8	9	33	55	3
Cache, UT	**49005**				Regional Concentration (Cold)	0.9	3.5	3.9	0.3	8.6	10	41	45	3
Franklin, ID	**16041**				Urban Increment (Cold)	2.4	8.8	16.2	0.8	28.2	9	31	57	3
Bannock, ID	16005				Total Concentration (Warm)	2.6	0.0	8.6	1.6	12.8	20	0	67	13
Weber, UT	49057				Regional Concentration (Warm)	1.6	0.0	3.1	0.9	5.6	29	0	55	16
Caribou, ID	16029				Urban Increment (Warm)	1.0	0.0	5.5	0.7	7.2	14	0	76	10
Box Elder, UT	49003				Total Concentration (Ann Avg)	1.6	0.6	6.2	0.9	9.3	17	6	67	10
Morgan, UT	49029				Regional Concentration (Ann Avg)	1.2	0.3	2.6	0.7	4.8	25	6	54	15
Bear Lake, ID	16007				Urban Increment (Ann Avg)	0.4	0.3	3.6	0.2	4.5	9	7	80	4
Oneida, ID	16071													
Rich, UT	49033													
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	**49049**				Regional Concentration (Cold)	0.6	0.6	0.5	0.2	1.9	32	32	26	11
Juab, UT	**49023**				Urban Increment (Cold)	2.3	32.9	9.2	0.9	45.3	5	73	20	2
Salt Lake, UT	49035				Total Concentration (Warm)	2.8	0.0	11.3	1.7	15.8	18	0	72	11
Emery, UT	49015				Regional Concentration (Warm)	1.9	0.0	1.9	1.5	5.3	36	0	36	28
Carbon, UT	49007				Urban Increment (Warm)	0.9	0.0	9.4	0.2	10.5	9	0	90	2
Sanpete, UT	49039				Total Concentration (Ann Avg)	1.7	1.2	5.1	1.0	9.0	19	13	57	11
Wasatch, UT	49051				Regional Concentration (Ann Avg)	1.1	0.1	0.7	0.8	2.7	41	4	26	30
Millard, UT	49027				Urban Increment (Ann Avg)	0.6	1.1	4.4	0.2	6.3	10	17	70	3
Tooele, UT	49045													
Duchesne, UT	49013													
Summit, UT	49043													
White Pine, NV	32033													
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	**49011**				Regional Concentration (Cold)	1.8	18.1	9.0	1.1	29.9	6	60	30	4
Salt Lake, UT	**49035**				Urban Increment (Cold)	1.9	8.1	5.1	0.0	15.1	13	54	34	0
Weber, UT	**49057**				Total Concentration (Warm)	1.8	0.0	11.4	3.2	16.5	11	0	69	20
Morgan, UT	**49029**				Regional Concentration (Warm)	1.6	0.0	6.2	2.1	9.9	16	0	63	21
Box Elder, UT	**49003**				Urban Increment (Warm)	0.2	0.0	5.2	1.1	6.5	3	0	80	17
Summit, UT	**49043**				Total Concentration (Ann Avg)	2.1	1.2	5.5	0.9	9.7	22	13	57	9
Tooele, UT	**49045**				Regional Concentration (Ann Avg)	1.7	1.3	5.1	1.0	9.1	19	14	56	11
Wasatch, UT	**49051**				Urban Increment (Ann Avg)	0.4	0.0	0.4	0.0	0.8	50	0	50	0
Utah, UT	49049													
Cache, UT	49005													
Carbon, UT	49007													
Cassia, ID	16031													
Daggett, UT	49009													
Duchesne, UT	49013													
Elko, NV	32007													
Franklin, ID	16041													
Juab, UT	49023													
Oneida, ID	16071													
Rich, UT	49033													
Sweetwater, WY	56037													
Uinta, WY	56041													
Uintah, UT	49047													
White Pine, NV	32033													

ATTACHMENT 3, APPENDIX 2.B: TECHNICAL ANALYSIS OF THE PROVO-OREM CORE BASED STATISTICAL AREA (CBSA) AND THE SALT LAKE CITY-OGDEN-CLEARFIELD COMBINDED STATISTICAL AREA (CSA): For the Designation of Nonattainment Areas for $PM_{2.5}$ – 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 $PM_{2.5}$ 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.

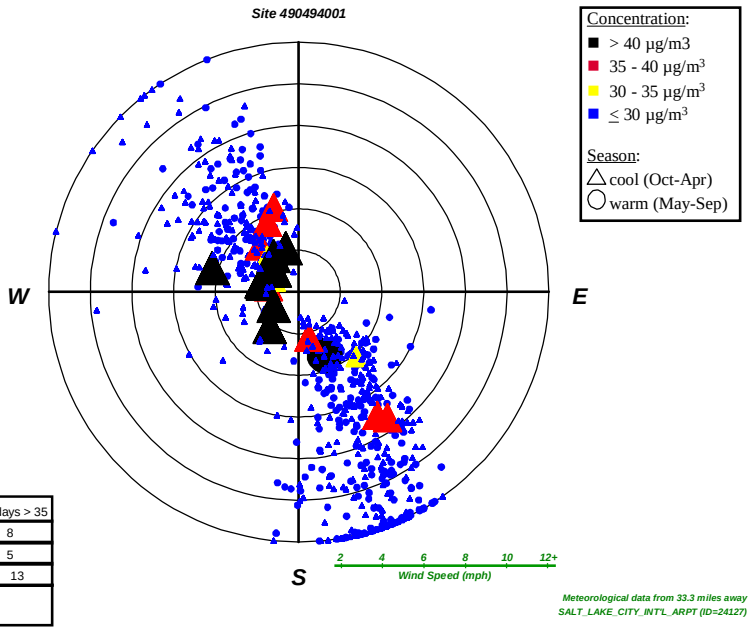
EPA Generated Data: Wind Roses



Year	98th %-ile	# days > 35
2005	35.6	3
2006	25.6	1
2007	50.3	4
Design Value	37-NA	

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

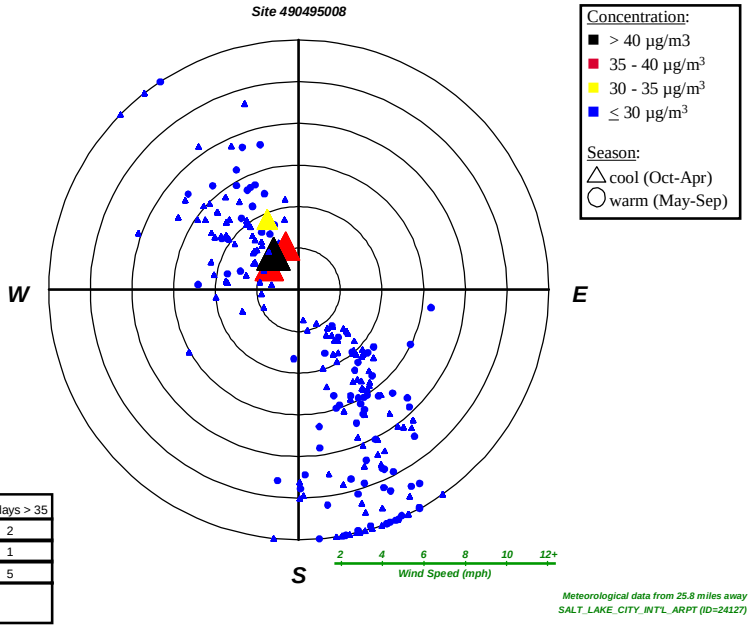
Provo, UT [Utah County, UT]
Pollution Rose, 2005-2007



Year	98th %-ile	# days > 35
2005	36.7	8
2006	32.0	5
2007	64.9	13
Design Value	45-NA	

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

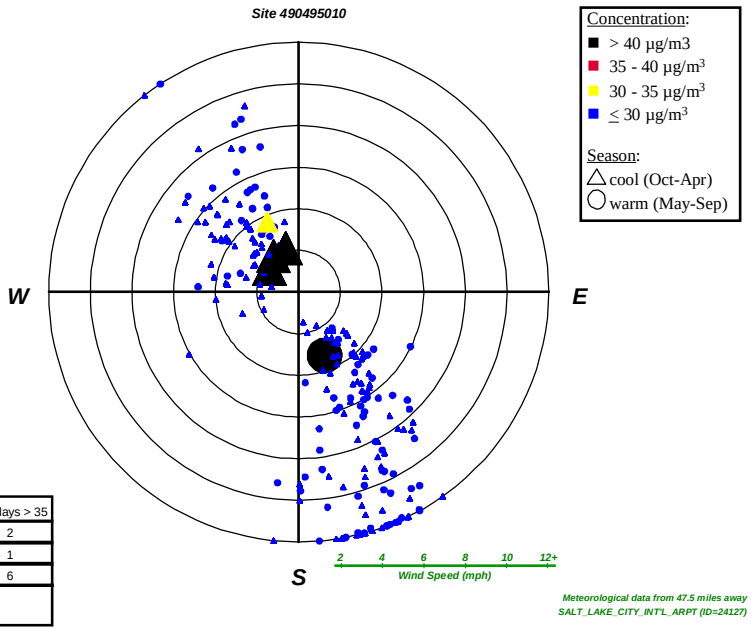
Provo, UT [Utah County, UT]
Pollution Rose, 2005-2007



Year	98th %-ile	# days > 35
2005	33.7	2
2006	23.9	1
2007	51.5	5
Design Value	36-NA	

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

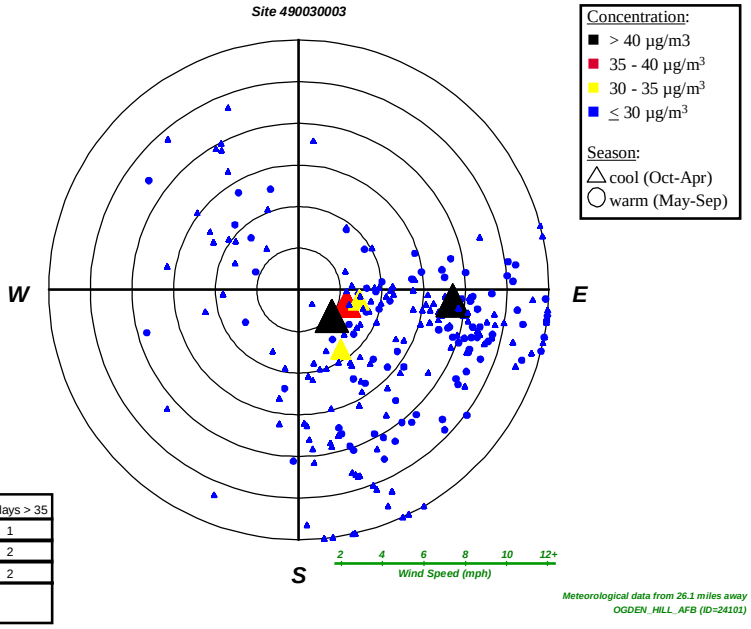
Provo, UT [Utah County, UT]
Pollution Rose, 2005-2007



Year	98th %-ile	# days > 35
2005	32.4	2
2006	21.6	1
2007	55.0	6
Design Value	36-NA	

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

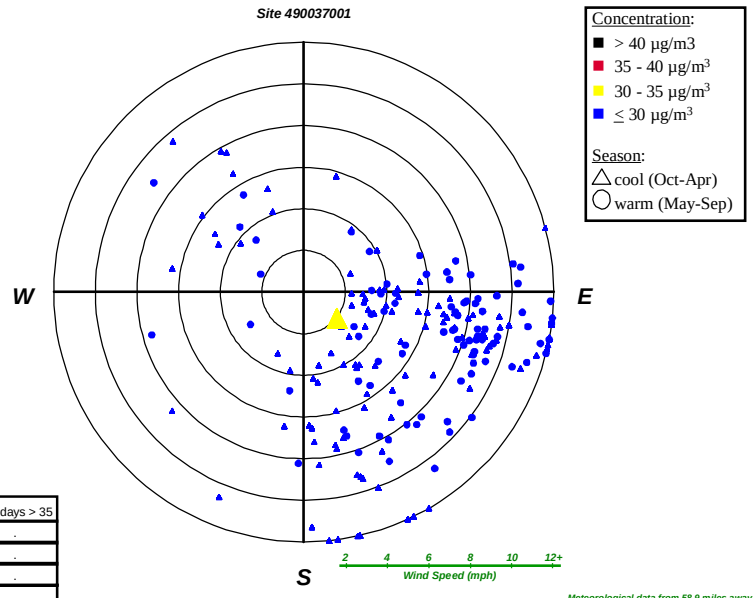
Salt Lake City, UT [Box Elder County, UT]
Pollution Rose, 2005-2007



Year	98th %-ile	# days > 35
2005	25.9	1
2006	28.5	2
2007	33.6	2
Design Value	29-A	

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

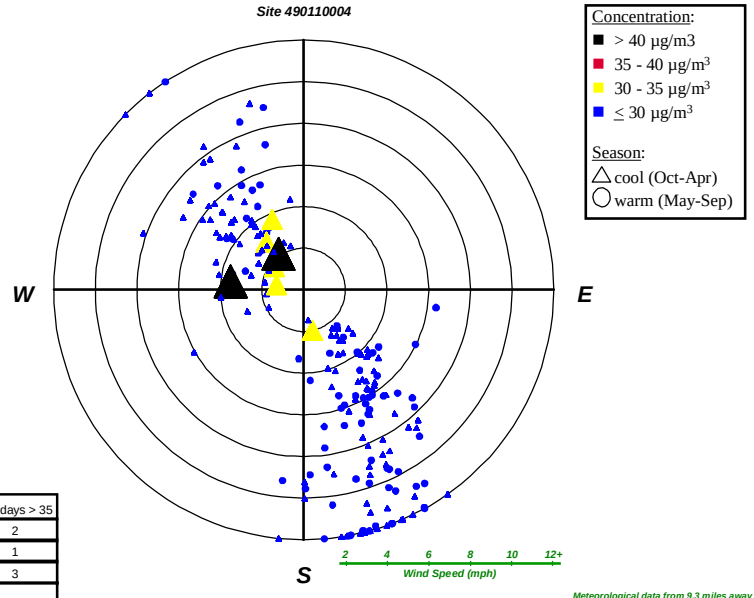
Salt Lake City, UT [Box Elder County, UT]
Pollution Rose, 2005-2007



Year	98th %-ile	# days > 35
2005	17.0	.
2006	20.2	.
2007	29.1	.
Design Value	22-inc-a	

No exceedances

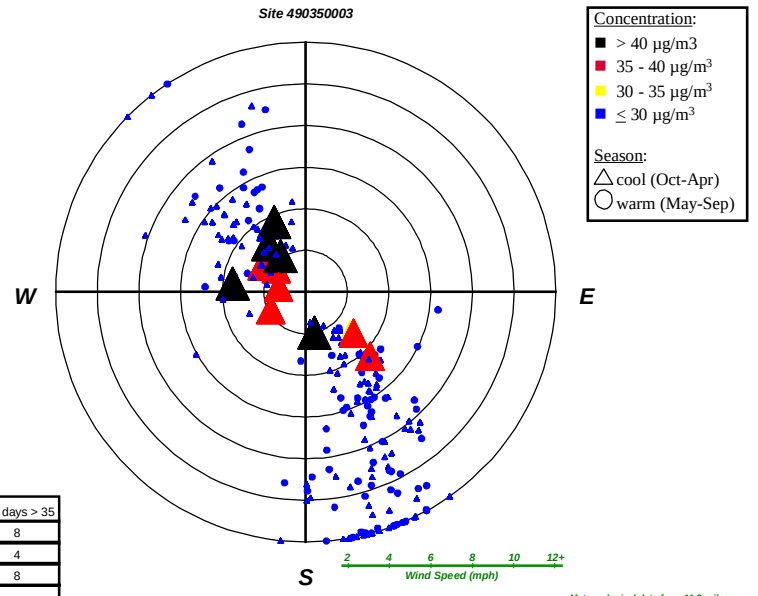
Salt Lake City, UT [Davis County, UT]
Pollution Rose, 2005-2007



Year	98th %-ile	# days > 35
2005	35.1	2
2006	34.1	1
2007	45.1	3
Design Value	38-NA	

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

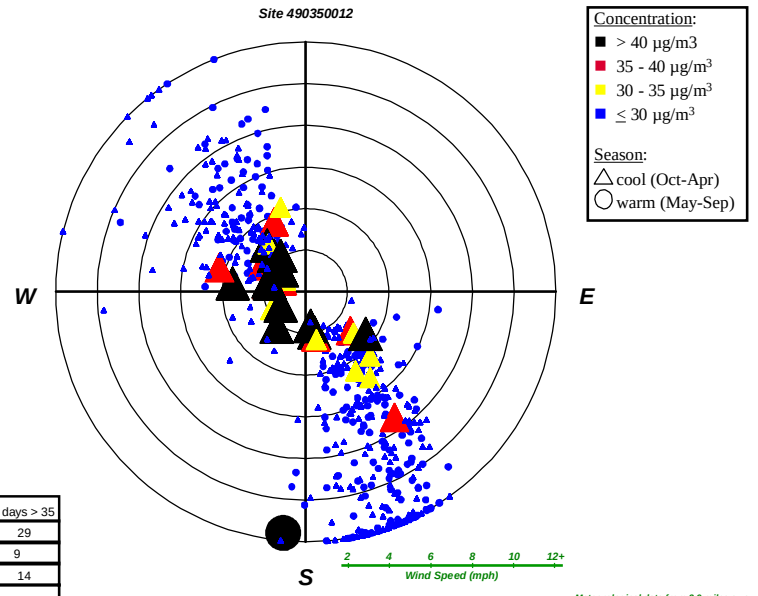
Salt Lake City, UT [Salt Lake County, UT]
Pollution Rose, 2005-2007



Year	98th %-ile	# days > 35
2005	42.0	8
2006	39.2	4
2007	58.4	8
Design Value	47-NA	

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

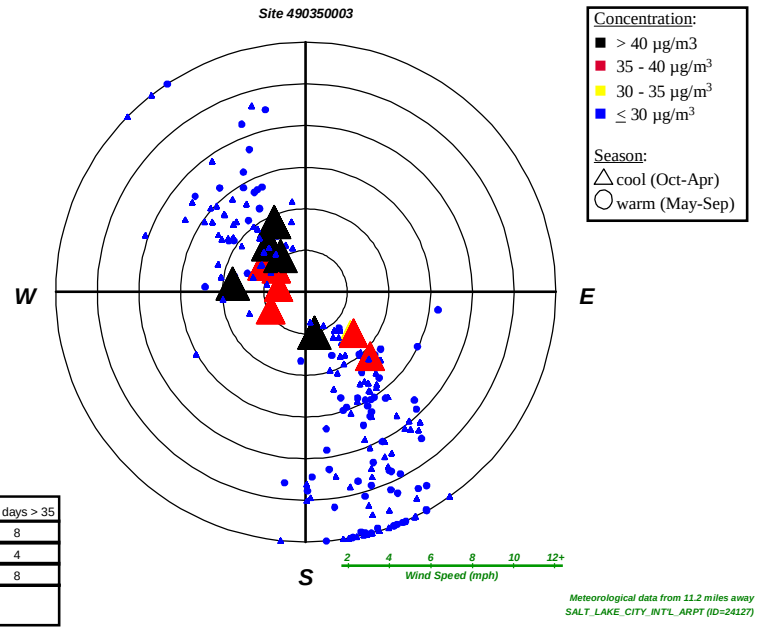
Salt Lake City, UT [Salt Lake County, UT]
Pollution Rose, 2005-2007



Year	98th %-ile	# days > 35
2005	44.4	29
2006	39.9	9
2007	79.2	14
Design Value	55-NA	

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

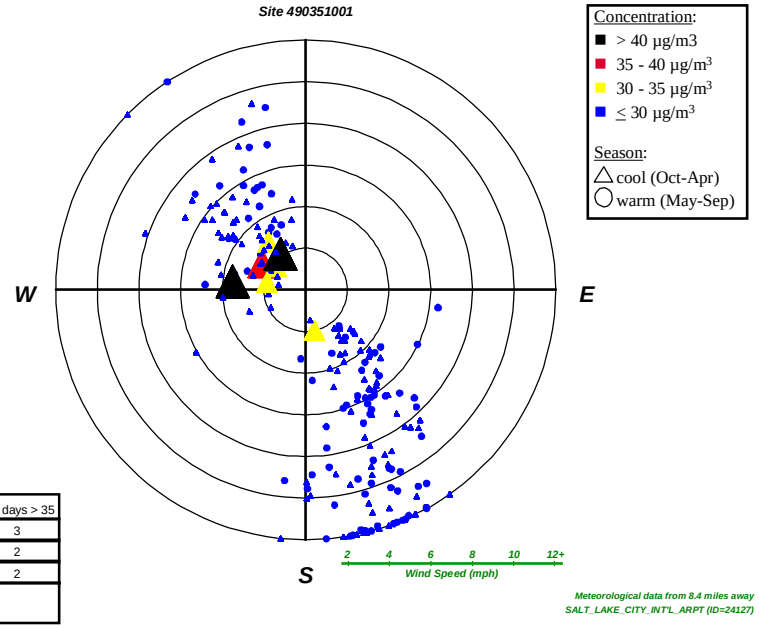
Salt Lake City, UT [Salt Lake County, UT]
Pollution Rose, 2005-2007



Year	98th %-ile	# days > 35
2005	42.0	8
2006	39.2	4
2007	58.4	8
Design Value	47-NA	

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

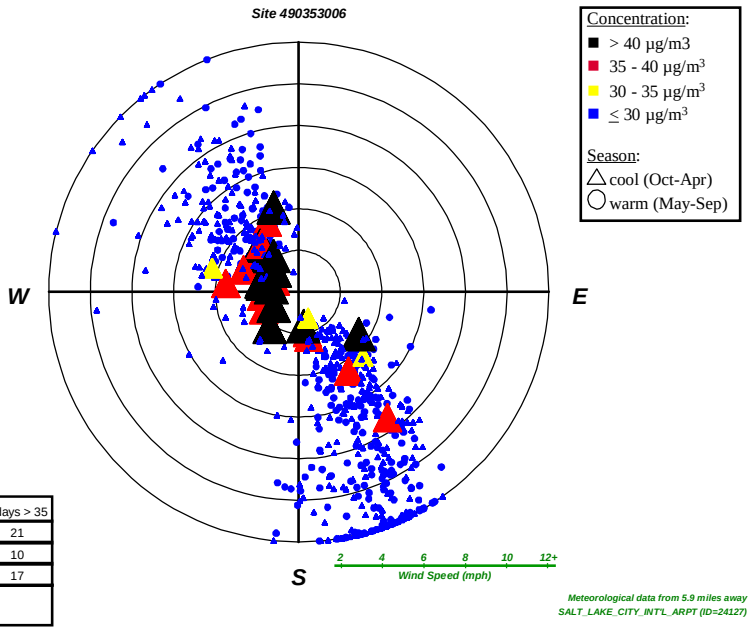
Salt Lake City, UT [Salt Lake County, UT]
Pollution Rose, 2005-2007



Year	98th %-ile	# days > 35
2005	36.7	3
2006	29.3	2
2007	30.0	2
Design Value	32-A	

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

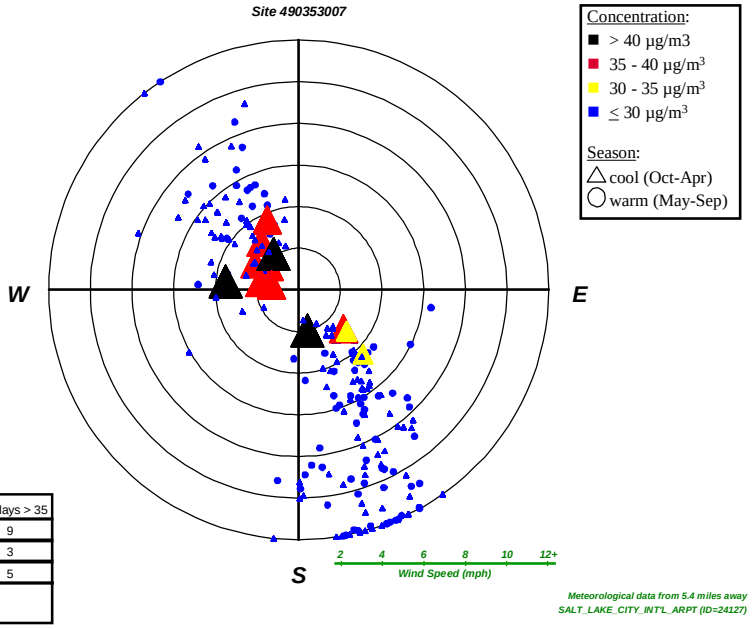
Salt Lake City, UT [Salt Lake County, UT]
Pollution Rose, 2005-2007



Year	98th %-ile	# days > 35
2005	43.3	21
2006	37.6	10
2007	64.2	17
Design Value	48-NA	

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

Salt Lake City, UT [Salt Lake County, UT]
Pollution Rose, 2005-2007

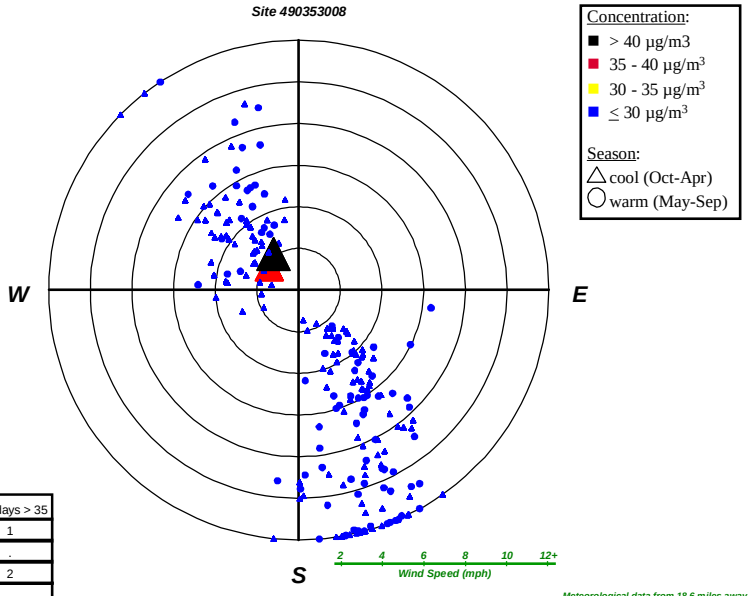


Year	98th %-ile	# days > 35
2005	39.5	9
2006	38.5	3
2007	49.4	5
Design Value	42-NA	

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

Salt Lake City, UT [Salt Lake County, UT]
Pollution Rose, 2005-2007

Site 490353008



Concentration:
- > 40 µg/m3
- 35 - 40 µg/m³
- 30 - 35 µg/m³
- ≤ 30 µg/m³

Season:
- △ cool (Oct-Apr)
- ○ warm (May-Sep)

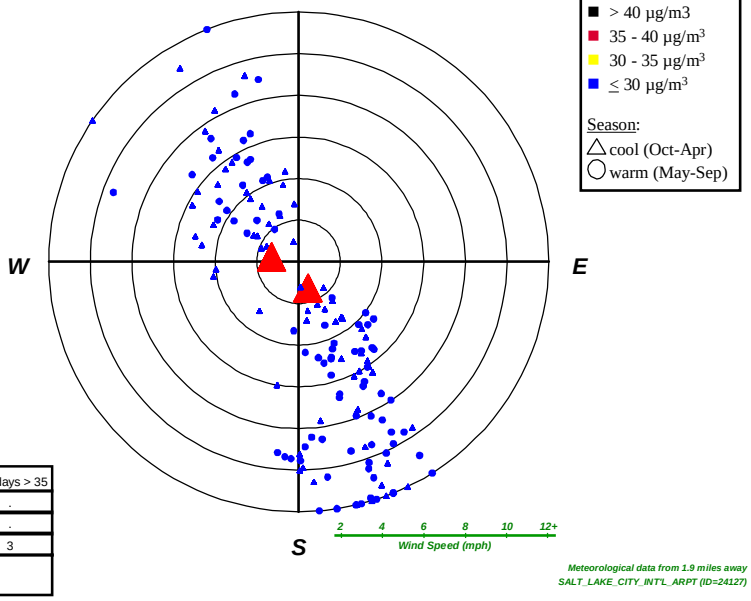
Year	98th %-ile	# days > 35
2005	27.3	1
2006	22.0	.
2007	23.1	2
Design Value	24-A	

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

Meteorological data from 18.6 miles away
SALT_LAKE_CITY_INT'L_ARPT (ID=24127)

Salt Lake City, UT [Salt Lake County, UT]
Pollution Rose, 2005-2007

Site 490353010



Concentration:
- > 40 µg/m3
- 35 - 40 µg/m³
- 30 - 35 µg/m³
- ≤ 30 µg/m³

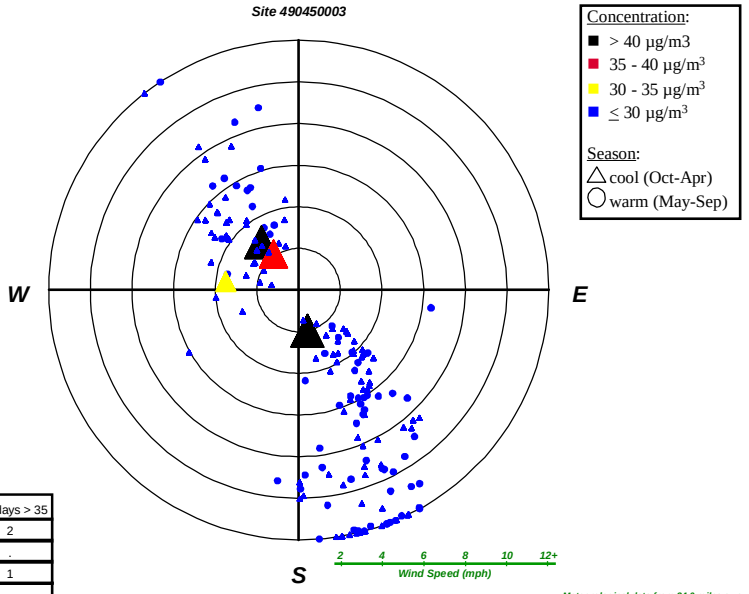
Season:
- △ cool (Oct-Apr)
- ○ warm (May-Sep)

Year	98th %-ile	# days > 35
2005	.	.
2006	.	.
2007	30.3	3
Design Value	30-inc-a	

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

Meteorological data from 1.9 miles away
SALT_LAKE_CITY_INT'L_ARPT (ID=24127)

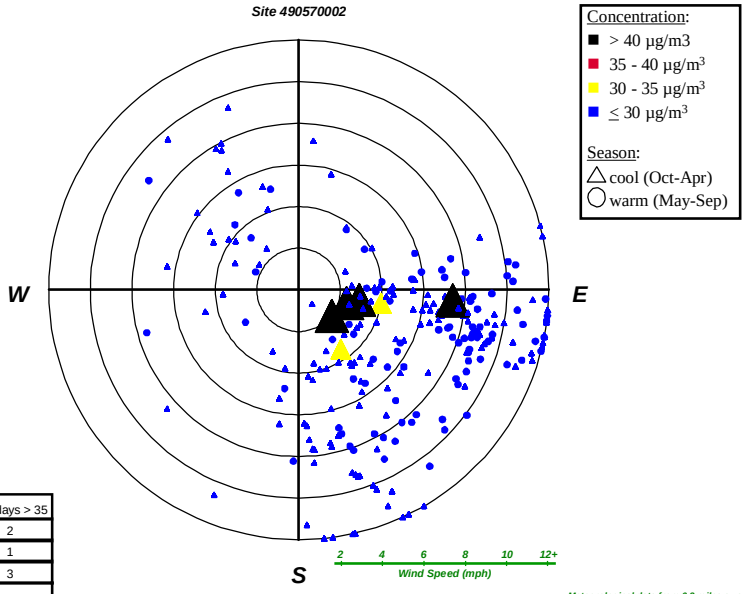
Salt Lake City, UT [Tooele County, UT]
Pollution Rose, 2005-2007



Year	98th %-ile	# days > 35
2005	45.5	2
2006	22.8	.
2007	23.3	1
Design Value	31-A	

All exceedances plotted

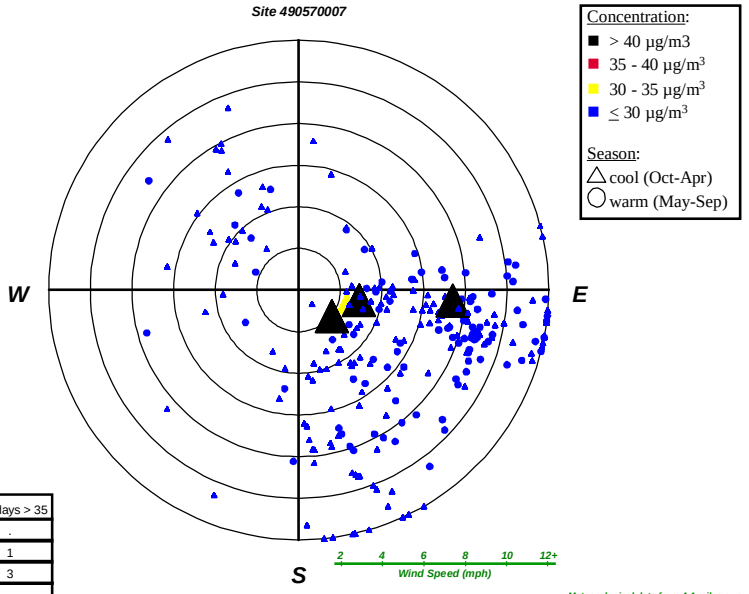
Salt Lake City, UT [Weber County, UT]
Pollution Rose, 2005-2007



Year	98th %-ile	# days > 35
2005	31.0	2
2006	25.8	1
2007	50.4	3
Design Value	36-NA	

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

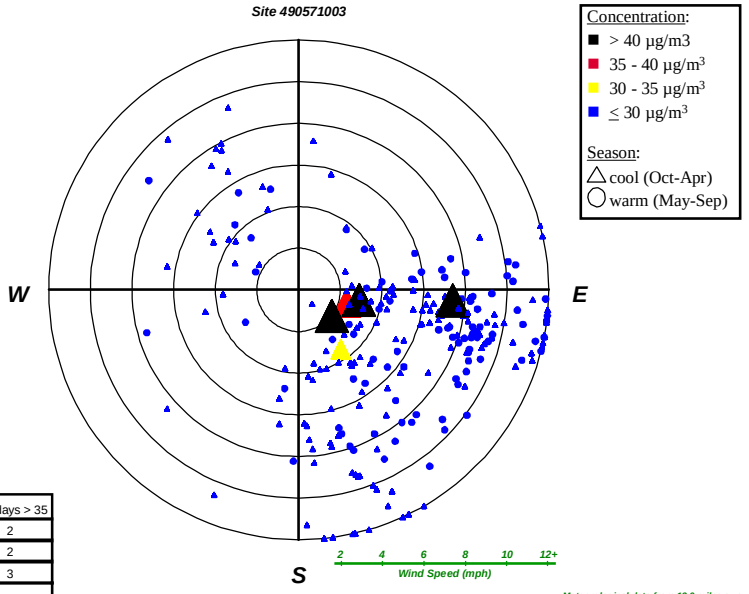
Salt Lake City, UT [Weber County, UT]
Pollution Rose, 2005-2007



Year	98th %-ile	# days > 35
2005	26.5	.
2006	23.5	1
2007	44.2	3
Design Value	31-A	

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

Salt Lake City, UT [Weber County, UT]
Pollution Rose, 2005-2007



Year	98th %-ile	# days > 35
2005	29.8	2
2006	28.6	2
2007	45.2	3
Design Value	35-A	

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