UTAH

Area Designation Recommendation for the
2006 $PM_{2.5}$ NAAQS

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Utah Area Designation Recommendations for the 2006 $PM_{2.5}$ NAAQS

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Purpose and Background

On September 21, 2006 the EPA promulgated revisions to the National Ambient Air Quality Standards (NAAQS) for $PM_{2.5}$. It retained the primary annual standard at 15 micrograms per cubic meter ($\mu g/m^3$), but lowered the 24-hr standard from the 1997 level of 65 $\mu g/m^3$ to 35. Secondary standards were set for each averaging period at the same levels as the respective primary standards. The effective date for these standards was December 18, 2006.

Section 107(d) of the Clean Air Act (CAA, or the Act) establishes that it is incumbent on each of the States to recommend initial designations for all areas within its respective geographic boundary following promulgation of new or revised NAAQS.

States are required to submit these recommendations to EPA not later than one year after the promulgation of a new or revised standard.

Areas should be designated as attaining, not attaining, or as unclassifiable. The Act allows that areas may be designated as:

> (i) nonattainment, for any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant;
>
> (ii) attainment, for any area (other than an area identified in clause (i)) that meets the national primary or secondary ambient air quality standard for the pollutant; or
>
> (iii) unclassifiable, for any area that cannot be classified on the basis of available information as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant.

EPA must finalize the area designations as expeditiously as practicable, but not later than two years following the effective date of the revised NAAQS. In the event that EPA intends to promulgate a designation that deviates from the State's recommendation, it must notify the State at least 120 days prior to promulgating the modified designation and provide the State an opportunity to comment.

Hence, the purpose of this document is to provide Utah's recommendation concerning area designations for the revised $PM_{2.5}$ standards.

Applicable Guidance

When the NAAQS for $PM_{2.5}$ was first promulgated in 1997, EPA issued a guidance memo to assist States and Tribes in making their recommendations with respect to fine particulate matter *(Jeffrey R. Holmstead Memo, April 1, 2003; "Designations for the Fine Particle National Ambient Air Quality Standards.")*

Section 107(d) of the CAA specifies that nonattainment areas shall include "any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant," and this memo (particularly Attachment 2) provided EPA's interpretation of that requirement.

One of the more notable elements of the guidance was a presumption that, for urban nonattainment areas, the area boundaries should be based on Metropolitan Area (MA) boundaries. This reflected the view that violations of the $PM_{2.5}$ NAAQS in urban areas may be attributed to contributions from sources distributed throughout the MA which includes a core urban area plus the full set of associated nearby communities. $PM_{2.5}$ is, after all, a regional pollutant, and sources of it (and its precursors) are numerous and are located over a broad area.

The guidance stated that EPA would consider requests for urban nonattainment area definitions that deviate from the MA boundary definitions on a case-by-case basis, considering the following factors:

1. Emissions in areas potentially included vs. excluded from the nonattainment area
2. Air Quality in potentially included vs. excluded areas
3. Population density and the degree of urbanization including commercial development in included vs. excluded areas
4. Traffic and commuting patterns
5. Expected growth (including extent, pattern and rate of growth)
6. Meteorology (weather/transport patterns)
7. Geography/Topography (mountain ranges or other air basin boundaries)
8. Jurisdictional boundaries (e.g. counties, air districts, reservations etc.)
9. Level of control of emission sources

It explained that a demonstration supporting the designation of boundaries that were less than the full MA would need to show both that violations are not occurring in the excluded portions of the MA and that the excluded portions do not contain sources that contribute to the observed violations.

For rural nonattainment areas, EPA would presume that the entire county in which a violation was identified should be designated nonattainment. A rural area found to violate the standard that was adjacent to a MA would generally be designated as part of that urban nonattainment area, and would not be treated as a rural area. EPA said it

would consider recommendations to adjust rural nonattainment area boundaries based on the same factors cited above for urban areas.

When the NAAQS for $PM_{2.5}$ was revised in 2006, EPA issued subsequent guidance *(Robert J. Meyers Memo of June 8, 2007 "Area Designations for the Revised 24-Hour Fine Particle National Ambient Air Quality Standard.")* In this guidance, EPA acknowledged that boundary recommendations for nonattainment areas should be evaluated on a case by case basis using the same "nine factors" identified in the 2003 guidance, and that these areas must include not only the area that is violating the standard, but also nearby areas that are contributing to the violation. The one notable departure from the earlier guidance was that, for areas violating only the $PM_{2.5}$ 24-hour NAAQS, there would be no presumption of an area boundary based on a Metropolitan Area. That presumption would, however, still apply to areas violating the annual standard.

Overview

As indicated above, the CAA requires area designations for every area of the State. Some distinctions have been made in both guidance documents regarding urban vs. rural areas relating to the presumptive boundaries of nonattainment areas and to the level of assessment required in the case of a departure from the presumption. Urban areas are generally considered to be metropolitan areas surrounding core cities, whereas rural areas would be other areas not included in or adjacent to such urban areas.

In Utah, ambient $PM_{2.5}$ data collected over the past seven years indicates that the new 24-hr standard is routinely violated across much of the State's monitoring network. However, the annual standard is not violated anywhere in the State, and hence there will be no presumption of a nonattainment area boundary described by a Metropolitan Area.

The data collected suggests a couple of important things to keep in mind. Firstly, ours is a seasonal problem characterized by episodic periods of very high concentrations of fine particulate that consists mostly of secondary particulate. The formation of these secondary particles is driven by winter-time temperature inversions which trap air in urbanized valleys. The mix of emissions associated with the urbanized areas reacts very quickly under these conditions to produce spikes in the concentration of fine particulate. Secondly, under these conditions, the observed concentrations are fairly uniform throughout the entire urbanized area. This underscores the association of urban areas with a mix of emissions that inherently reacts under these conditions to form $PM_{2.5}$, and helps to define $PM_{2.5}$ somewhat as an "urban" pollutant. All of this serves to highlight the distinction between urban and rural areas. Much of this phenomenon is also due to the fact that population is generally located within the lowland valley areas in which air is easily trapped by a temperature inversion. In other words, it is not enough to simply have an urban area with an urban mix of emissions; there must also be a barrier to dispersion under these conditions which allows $PM_{2.5}$ concentrations to build up over a period of several days and reach concentrations that exceed the NAAQS.

The foregoing characterization of Utah's difficulties with fine particulate has shaped the State's approach to making these area designations. The vast majority of the area within the State is sparsely populated (see Figure 1.) Most of the monitoring data has been collected in the urbanized portions of the State. This suggests that most of the areas recommended for designation as either "attainment" or "unclassifiable" will be in the rural areas of the State, while those areas recommended for the "nonattainment" designation will be the urban areas. Since the rural areas occupy so much of the State, Utah's recommendations of "attainment" of "unclassifiable" for these areas will generally be described using county boundaries.

By contrast, nonattainment areas in urban areas will be described using a collection of townships. Utah believes that such an approach provides a superior degree of resolution when describing areas defined to a large degree by geography. This then would allow a more sensible approach to airshed management, particularly with regard to permitting issues. At the time these areas will be formally designated, it is likely to remain unclear how $PM_{2.5}$ will be addressed with regard to the Prevention of Significant Deterioration.

It should also be kept in mind that the recommendations presented herein represent Utah's preliminary assessment of the spatial distribution of its $PM_{2.5}$ problem. As the actual work proceeds on the implementation plans necessary to address the problem, Utah would like to reserve the right to modify any such area designation as appropriate.

Document Organization

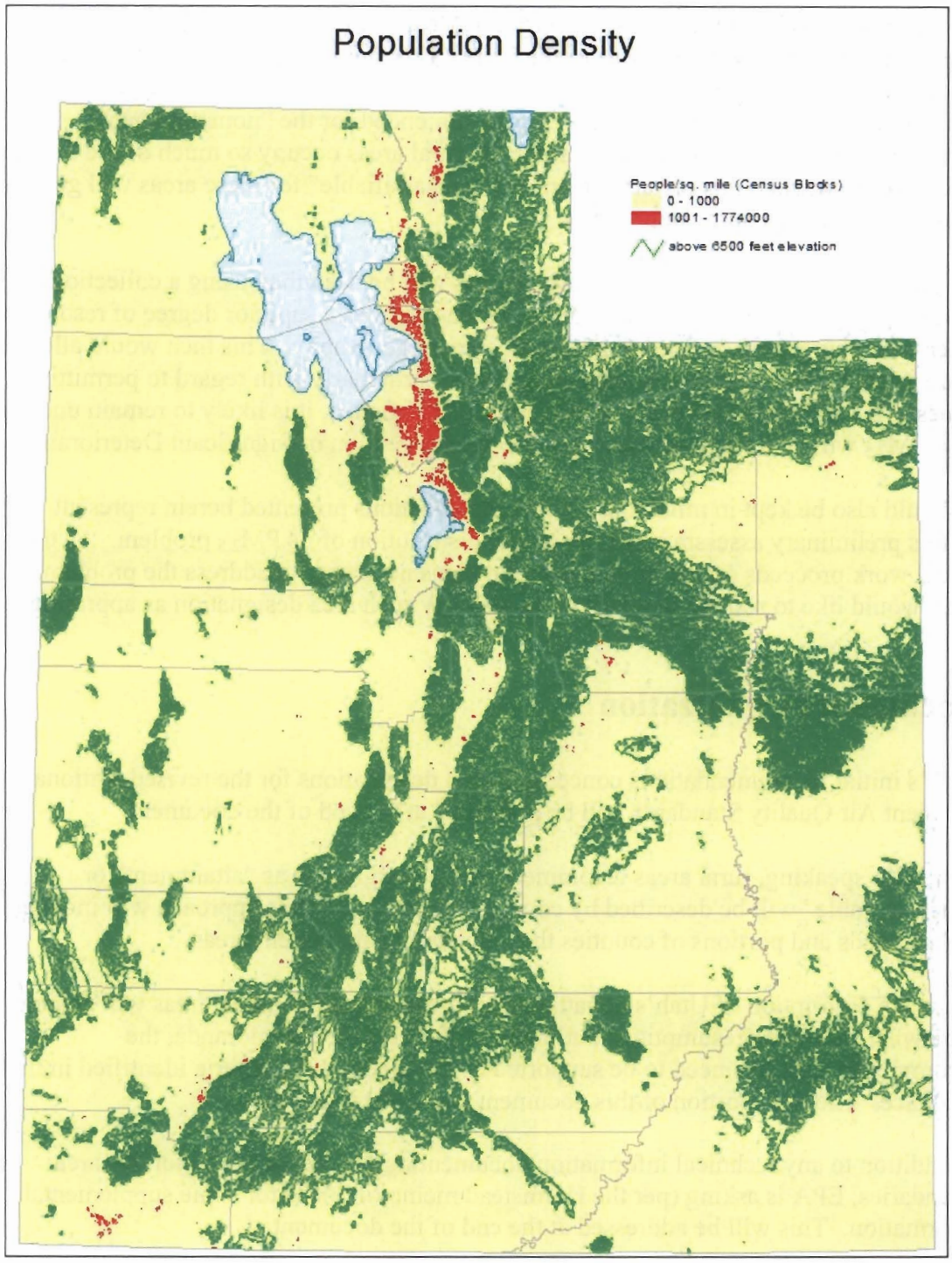
Utah's initial recommendations concerning area designations for the revised National Ambient Air Quality Standards will be presented at the end of the document.

Generally speaking, rural areas recommended for designation as "attainment" or "unclassifiable" will be described by county. Exceptions to this approach will include Tribal Lands and portions of counties that contain nonattainment areas.

Since the description of Utah's nonattainment areas located in urban areas will deviate somewhat from the presumptions outlined in EPA guidance memoranda, the recommendations will need to be supported by considering the criteria identified in that guidance. The next portion of this document addresses this element.

In addition to any technical information documenting the recommendation for area boundaries, EPA is asking (per the Holmstead memo of 2003) for some supplemental information. This will be addressed at the end of the document.

Figure 1 Population Density



Urban Nonattainment Area Boundaries

Setting aside for a moment the detailed criteria identified in the guidance documents, there are some fundamental principles for boundary selections. The CAA requires that a nonattainment area must include not only the area that is violating the primary or secondary standard, but also nearby areas that contribute to the violation. Thus, a key factor in setting boundaries for nonattainment areas is determining the geographic extent of both the area judged to violate the standard as well as nearby areas contributing to the problem. Consideration of such areas must also include emissions of precursors to secondary $PM_{2.5}$.

Utah agrees with this approach, and would also agree with one of the points made in the earlier (2003) guidance; that elevated concentrations of $PM_{2.5}$ are associated with populated regions containing a dispersed collection of urban sources, possibly surrounding an urban core. $PM_{2.5}$ is a regional pollutant, and sources of $PM_{2.5}$ and its precursors are numerous and generally located over a broad area. While a localized nonattainment situation could arise from a single large point source, it is more typical that the collection of "urban emissions" from human activity (motor vehicle use, home heating etc.), including the industrial activities that occur with greater frequency in the more populous regions, is the primary driver of nonattainment in most areas. This is consistent with Utah's past experience with secondary aerosol formation (measured as PM_{10}.) To this point, we would also add that a stagnant air mass is also a necessary condition for elevating concentrations of fine particulate within such a region.

EPA is recommending that, in making their boundary recommendations for nonattainment areas, States should evaluate each area on a case-by-case basis considering the nine factors identified above. Each of these factors will be addressed in the pages to follow.

Ambient Air Quality Data

In general, data is collected from Federal Reference Method (FRM) or Federal Equivalent Method (FEM) monitors that are sited and operated in accordance with 40 CFR Part 58. This data is stored in the EPA Air Quality System (AQS.) Procedures for using the data to determine whether a violation has occurred are given in 40 CFR Part 50 Appendix N.

The Utah Division of Air Quality (UDAQ) operates a network of FRM monitors in accordance with Part 58. The monitors are situated to address a number of monitoring objectives, which include: assessment of air quality in regions where people live and work, identification of highly impacted areas, and identification of background concentrations in areas of low impact. In addition, UDAQ situates monitors for special purposes such as air quality assessment in areas suspected of producing high values. Generally speaking, these monitors are situated in urban areas. As discussed before, $PM_{2.5}$ may be characterized as an "urban" pollutant. The spatial distribution of these monitors may be seen in Figure 2.

EPA recommends that States identify violating areas using the most recent three-year set of air quality data. In most cases, this would encompass the years from 2004 through 2006. Since final action by EPA is not required until December of 2008, data collected in 2007 may be considered as the process transpires.

Data affected by exceptional events may be excluded from use in identifying a violation if it meets the exclusion criteria.

The NAAQS for $PM_{2.5}$ include two averaging periods: a 24-hour standard and an annual standard. For both the annual and the 24-hour standards, EPA has set the secondary standards at the same levels as the primary standards.

The annual standard is 15 $\mu g/m^3$. It is computed for each year by averaging the values for each calendar quarter that data is collected. Annual averages from three consecutive years are then averaged together and compared with the standard which is met, for the monitoring site, when the design value is less than or equal to 15.0 $\mu g/m^3$. Table 1 shows the weighted annual arithmetic mean values, as well as the rolling three-year average of annual means, for each of the monitoring stations. The data shows that the annual standard for $PM_{2.5}$ is not violated at any of these monitoring locations.

Table 1 Annual PM2.5 Design Values

	Weighted Annual Arithmetic Mean			3-Year Average of Annual Means
Location	**2004**	**2005**	**2006**	**04 - 06**
Brigham City	10.11	7.84	8.04	8.7
Logan	15.17	12.95	8.54	12.2
Amalga	11.55	11.43	9.40	10.8
Hyrum	8.60	9.88	9.05	9.2
Bountiful	13.33	9.94	8.55	10.6
Cottonwood	14.31	11.06	10.18	11.9
North Salt Lake	17.81	14.06	13.03	*15.0
Magna	11.49	9.32	7.88	9.6
Hawthorn	14.20	10.99	9.74	11.6
West Valley	13.92	11.99	10.60	12.2
Herriman	10.93	7.79	7.33	8.7
Tooele		9.00	6.60	
North Provo	11.12	9.77	9.14	10.0
Lindon	12.82	10.01	9.34	10.7
Highland	10.67	8.14	8.53	9.1
Spanish Fork	10.55	8.00	7.66	8.7
Ogden 2	13.93	10.46	9.76	11.4
Washington Terrace	11.64	8.81	8.15	9.5
Harrisville	11.50	9.00	8.14	9.5
				A value of 15.1 or greater indicates a violation * Special Purpose monitor; not to be compared with the annual standard

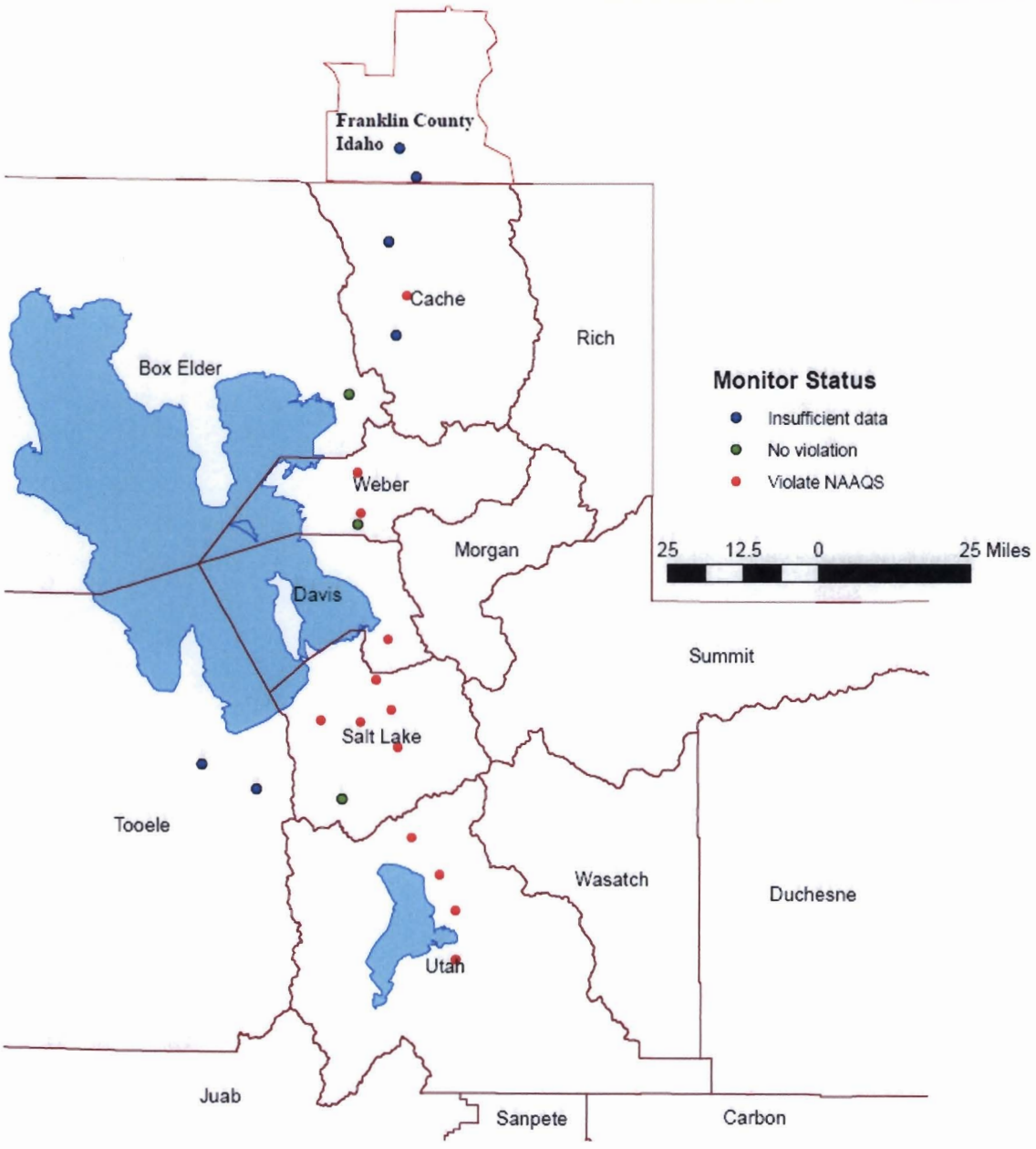
The revised (2006) 24-hour standard is 35 $\mu g/m^3$. It is computed by first ranking all the 24-hr values collected during each year, and then selecting that value below which at least 98 percent of the readings fall. This value is called the 98th percentile for the given year. Compliance with the standard is assessed by averaging the 98th percentile for a rolling three-year period. The standard is met for the monitoring site when the three-year average is less than or equal to 35 $\mu g/m^3$. Table 2 shows the 98th percentile values, and the three-year averages of these values, for each of the monitoring stations. The data shows that the 24-hr standard is violated at most of the monitoring locations throughout the network. Again referring to Figure 2, the colors of the dots used to locate these monitors correspond to whether the design value for 2004-2006 is above the standard (red), below the standard (blue), or whether the data set is incomplete (white.)

The obvious conclusion to be drawn from this data is that there are multiple areas of nonattainment in Utah. The next point to be considered is the extent of the area or areas represented by the data collected at these monitors.

Table 2 PM2.5 24-hour Design Values

	PM2.5 24-hour 98th Percentile			3-Year Average of 98th Percentiles
Location	**2004**	**2005**	**2006**	**04 - 06**
Brigham City	52.0	25.9	28.5	35
Logan	101.5	56.7	29.4	**63**
Amalga	16.5	61.7	43.2	**40**
Hyrum	13.3	47.8	46.5	**36**
Bountiful	45.8	35.1	34.1	**38**
Cottonwood	65.7	42.0	39.2	**49**
North Salt Lake	56.6	44.4	39.9	**47**
Magna	55.1	36.7	29.3	**40**
Hawthorne	63.9	43.3	37.6	**48**
West Valley	60.5	39.5	38.5	**46**
Herriman	48.2	27.3	22.0	33
Tooele		45.5	22.8	
North Provo	53.7	35.6	25.6	**38**
Lindon	63.9	36.7	32.0	**44**
Highland	50.1	33.7	23.9	**36**
Spanish Fork	52.5	32.4	21.6	**36**
Ogden 2	62.5	31.0	25.8	**40**
Washington Terrace	54.9	26.5	23.5	35
Harrisville	56.0	29.8	28.6	**38**
				A value of 36 or greater indicates a violation, and is indicated in bold face

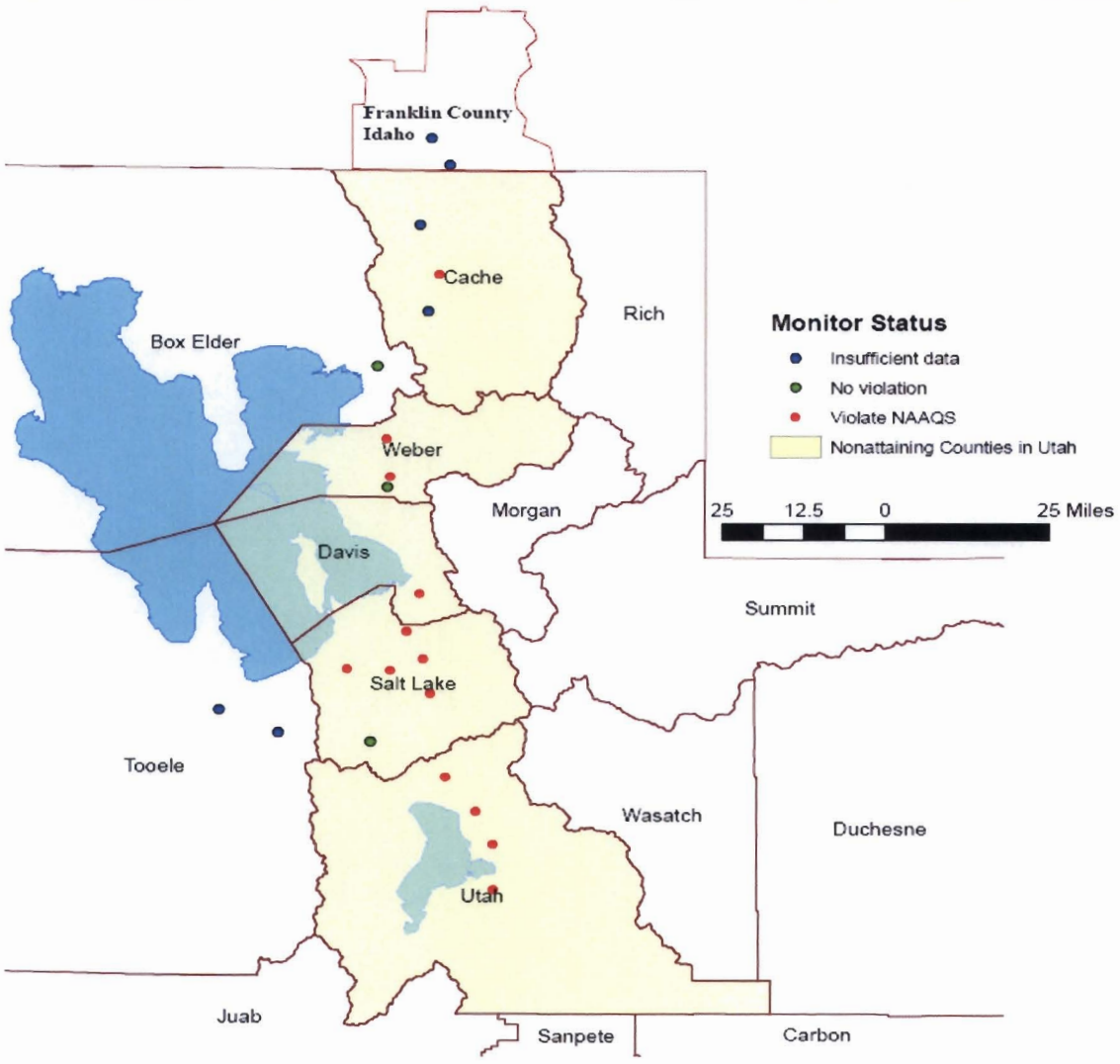
Figure 2 Utah's Air Monitoring Network



Because the annual standard has not been violated at any of these locations, the presumption of area boundaries in urban areas does not apply (see the Robert J. Meyers memo, 2007.) Nevertheless, if one were to use county boundaries as the de-facto delimiter for nonattainment areas, the situation in Utah could be described as shown in Figure 3.

Consideration of the remaining factors identified in the guidance will be used to determine what the actual area(s) of nonattainment should be.

Figure 3 Counties with Data Exceeding NAAQS



Meteorology

It was noted earlier that Utah's difficulties with $PM_{2.5}$ are based on the 24-hr standard. Though the annual standard is not violated, the 24-hr design values throughout the monitoring network are in excess of the 24-hr NAAQS. This is telling in a number of respects. Firstly, it indicates that there are likely no large sources of primary $PM_{2.5}$ that are capable of causing violations under any set of atmospheric circumstances. Secondly, it shows that the quality of Utah's air is generally good, with the exception of certain episodic periods during which the air quality can be very poor. These 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. Instead, 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.

As noted before, these meteorological conditions create a vertical barrier to dispersion. Typically, the depth of the layer of air trapped near the ground is only about 1,500 ft.

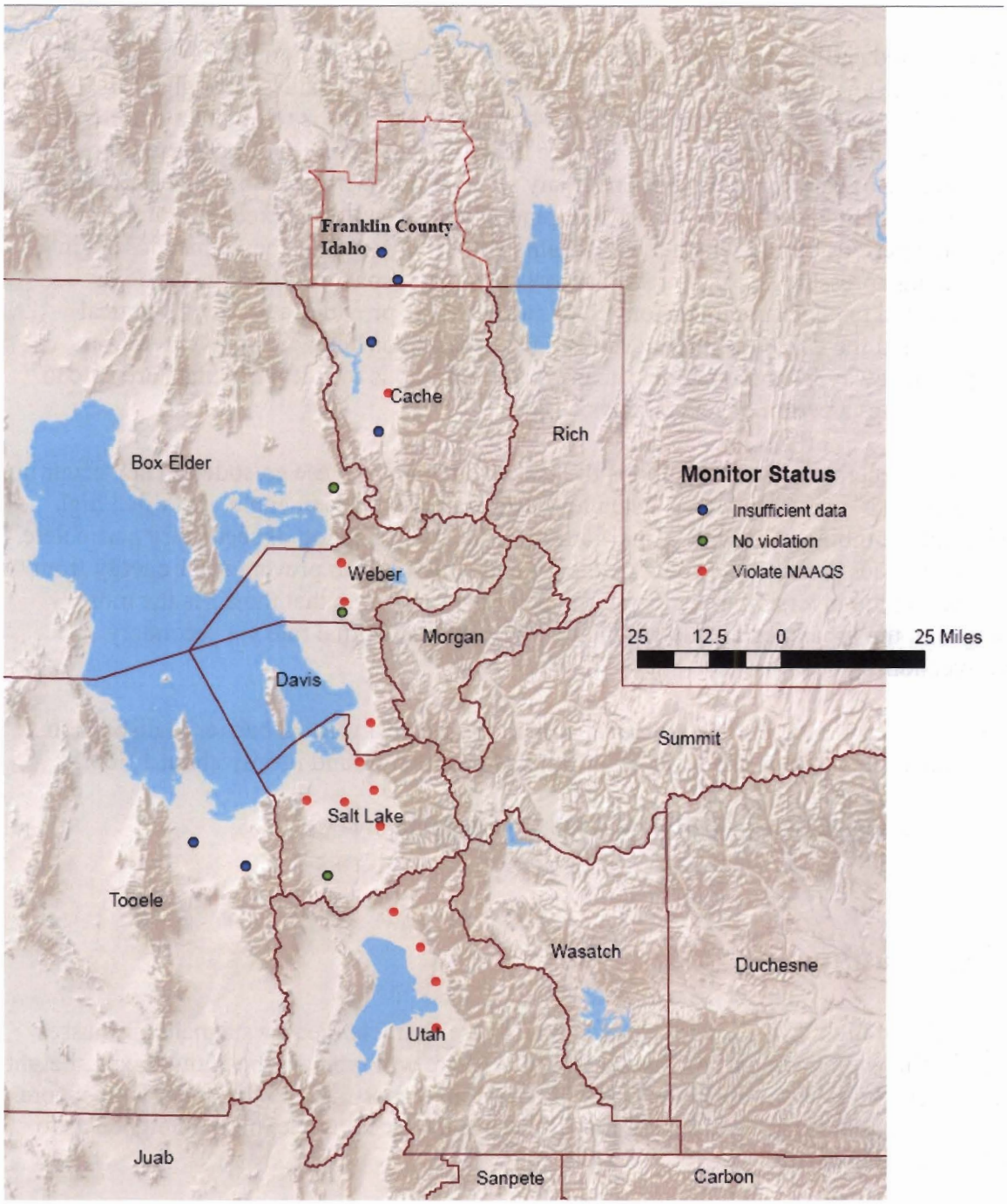
There is also a horizontal barrier to dispersion; topography.

Topography

Episodes of high $PM_{2.5}$ concentrations in Utah are characterized by stagnant air masses during the winter season. As discussed above, 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 surrounding the air mass and exceeding the mixing height acts to define its boundaries.

This allows for a description of the area surrounding monitors for which the ambient air quality data is truly representative. As noted before, concentrations of $PM_{2.5}$ are relatively uniform throughout a given area under these conditions. A graphical depiction of the region(s) so impacted is provided as Figure 4.

Figure 4 Monitoring Network with Counties and Topography



Probably the most prominent feature to observe in this figure is the eastern boundary of the "Wasatch Front." Here, the Wasatch Mountains rise abruptly from the valley floor and help to define both the Utah valley and the Salt Lake Valley. These valleys are bound to the West by the Oquirrh Mountains. North of Salt Lake County, the Wasatch Mountains continue to act as a barrier to the East, while the Great Salt Lake serves as the western boundary to what might be represented by the monitoring network.

Also observable in this figure is the Cache Valley near the northern border of the state and extending into Southern Idaho. This is an isolated valley, completely encircled by mountainous terrain. It is primarily an agricultural community; not nearly as urbanized as the Wasatch Front, but perhaps includes just the right mix of agricultural and urban emissions to produce abundant quantities of secondary particulate matter. Again, the topography serves to trap these emissions for days on end during the very strong temperature inversions that occur here.

Not only does the topography of these 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. In other words, the low-land 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.

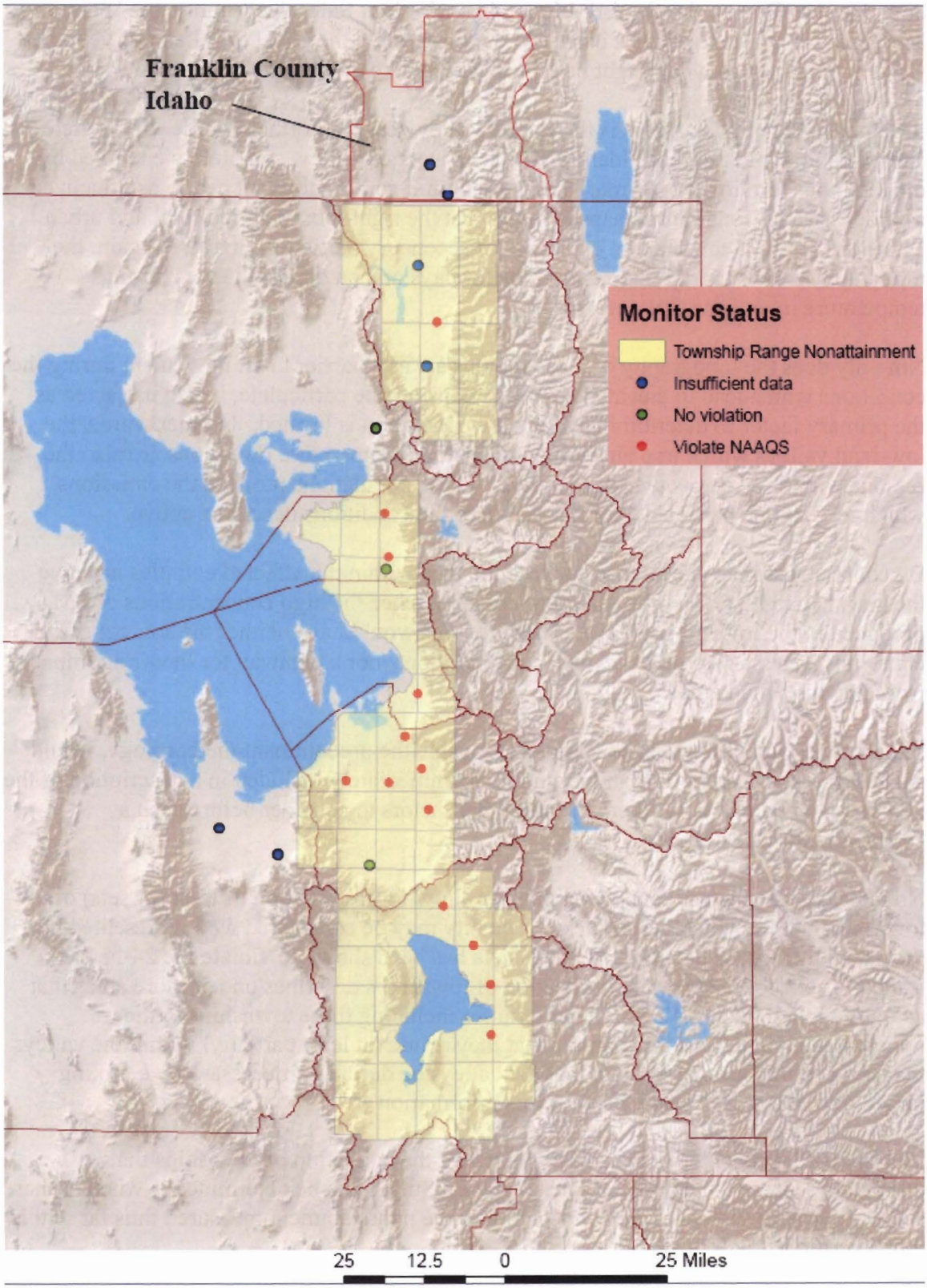
By contrast, the map shows that much of the area within the affected counties is above the mixing height, and would therefore not experience the high concentrations of $PM_{2.5}$ produced in the low lying valleys. These regions would have neither the sources of emissions necessary to produce such concentrations, nor a pathway for incurring impact from upwind urban areas.

Thus, the topography, when considered alongside the predominant meteorology, would suggest that these areas of high terrain not be immediately included in a description of the nonattainment area(s); but there are still other factors to consider before such a conclusion may be drawn.

Nonetheless, the factors considered thus far allow for the creation of a set (or sets) of townships within which the ambient air quality may be considered well represented by the data collected at the monitors. This data has been shown to violate the 24-hr $PM_{2.5}$ standard, so it follows that this collection of townships describes one or more areas that actually violate the NAAQS. The criteria for including these townships in the nonattainment area(s) at this point is that they reside (at least partially) within the valleys that serve to trap air masses, and that the valleys be defined if necessary by a mixing height of 6,500 feet. Figure 5 shows this information.

This should be considered a "starting point" for the collection of townships that will ultimately represent the nonattainment area(s.) Still left to be determined is whether there are any outlying areas that are contributing to the nonattainment measured thus far within this "core" area.

Figure 5 Monitoring Network with Counties, Topography, and an Overlay of Townships



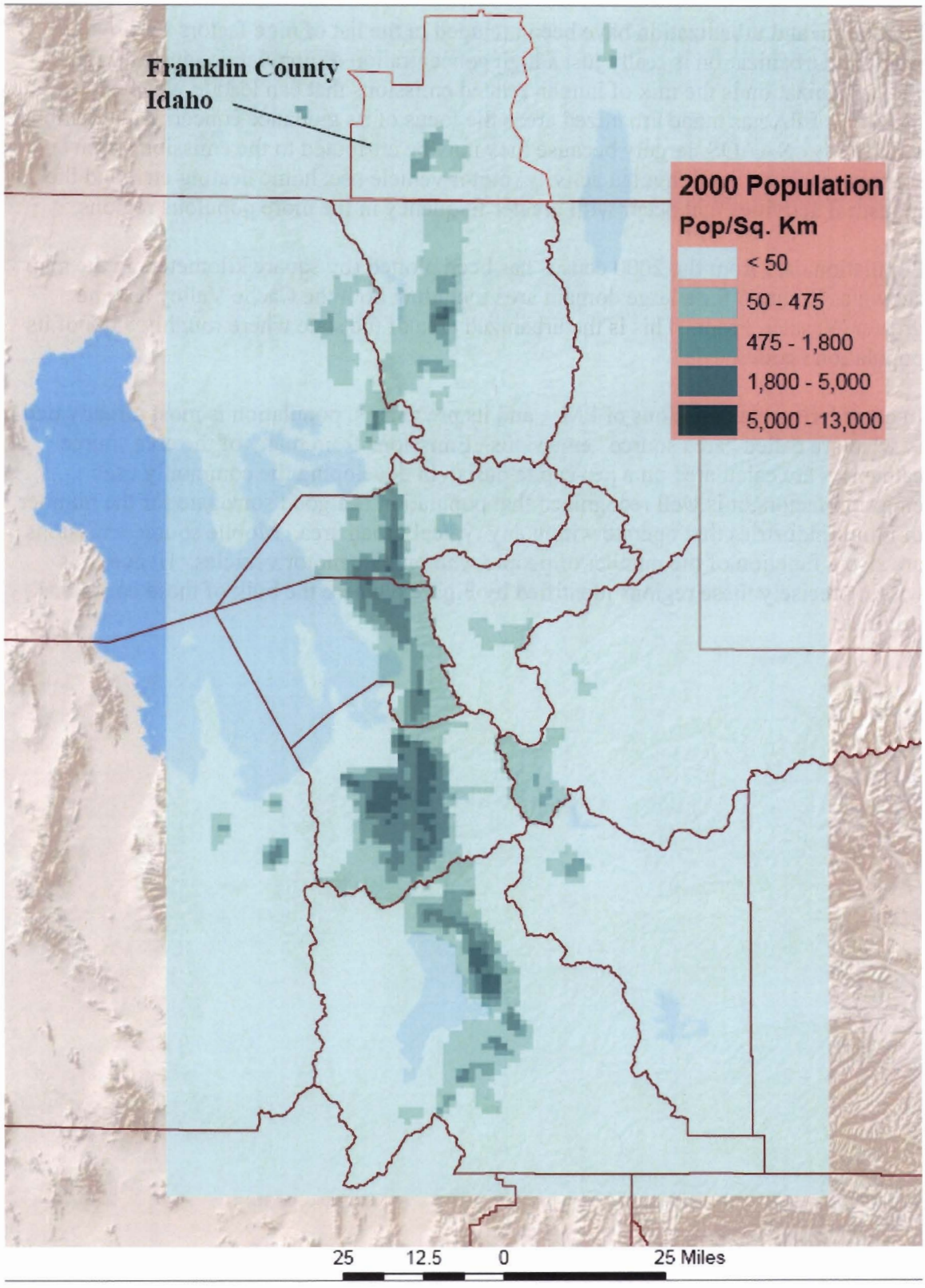
Population and degree of urbanization

Population and urbanization have been included in the list of nine factors for obvious reasons. Urbanization is really just a high concentration of population, and associated with urbanization is the mix of human related emissions that can lead to elevated levels of $PM_{2.5}$. EPA has made urbanized areas the focus of its guidance concerning violations of the $PM_{2.5}$ NAAQS, largely because they may be attributed to the emissions from sources associated with human activity (motor vehicle use, home heating etc.) and the industrial activities that occur with greater frequency in the more populous regions.

Population data from the 2000 census has been plotted (by square kilometer) in the map shown as Figure 6 for a large domain area including both the Cache Valley and the greater Wasatch Front. This is the urbanized area of the state where roughly 85% of its population resides.

In considering the emissions of $PM_{2.5}$ and its precursors, population is most directly tied to what are called "area source" emissions. Emissions from many of the area source categories are calculated on a per-capita basis. In developing the commonly used emission factors, it is well recognized that population is a good surrogate for the number of minor industries that operate within any typical urban area. Mobile source emissions are also a function of the number of people who operate motor vehicles. Hence, it is within precisely these regions identified by Figure 6 where the bulk of these emissions originate.

Figure 6 Population Density within the Study Area

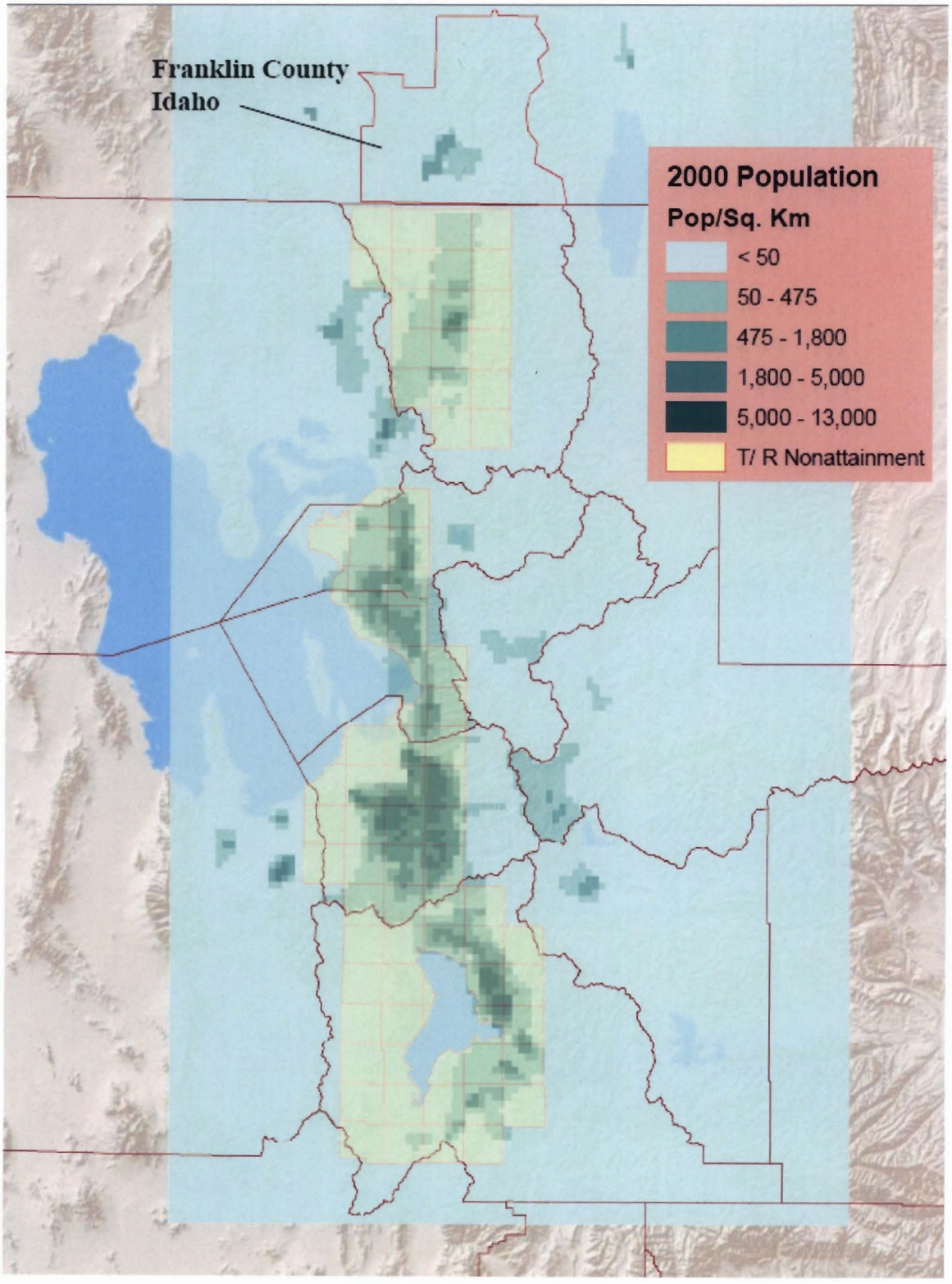


It is also within these populous regions that the risk of human exposure to unhealthy concentrations of fine particulate is greatest. Largely because of this fact, the populous regions within the State are fairly well approximated by the distribution of the monitoring network. This may be illustrated by comparing Figures 2 and 6.

The next map, Figure 7, shows how the distribution of the population along the Wasatch Front and in the Cache Valley coincides with the location of those townships already slated for inclusion in the nonattainment area(s) based on the air quality data. It is apparent that the locations are generally the same. This reflects the fact that people are most likely to reside in the low lying valleys, and it is within these areas that: 1) the air stagnates during wintertime temperature inversions and 2) and the suite of urban emissions reacts under these conditions to produce elevated concentrations of $PM_{2.5}$. It is in these same regions that UDAQ has situated its monitors. Nevertheless there is some region of overlap, and in these cases Figure 7 suggests other areas where townships that could be added to the core group that will ultimately define the nonattainment area(s.) This will be examined in more detail as the discussion turns to emissions.

Thus far, the discussion has centered on northern Utah. This includes the Wasatch Front, which is Utah's most urbanized area, as well as the Cache Valley which has just recently amassed enough people to be considered a metropolitan area in its own right. The Wasatch Front was the only area to violate any of the prior NAAQS for particulate matter (TSP and PM_{10}.) There is, however, one other area of the State that may warrant some consideration on the basis of population, and to some degree urbanization. A look back at Figure 1 shows a populous region in the southwest corner of the State. This is the city of St. George which has a population of 65 thousand (there are about 120 thousand people in the greater St. George area.) Consideration of this region would of course be in the context of its own nonattainment area, rather than as one which contributes to a violation elsewhere. As some of the remaining factors to be considered are discussed, Utah's recommendation concerning St. George will be developed a bit further later in this document.

Figure 7 Population Density with Counties, Topography, and an Overlay of Townships



Traffic and commuting patterns

This topic has been included in the list off nine factors because of its connection with emissions. Mobile sources have always been a significant source category in the attribution of particulate matter. Re-entrained road dust is a large component of TSP, and to some extent PM_{10}. When looking at $PM_{2.5}$, and particularly the type of fine particulate evident during Utah's episodes of elevated concentrations, it becomes apparent that it is the precursor gasses from mobile sources (NO_X in particular) that are of most concern. This was also true of PM_{10}, and without the federal requirements for improvements in the NO_X emissions from cars, it is unlikely that the PM_{10} standards would have been attained along the Wasatch Front. Utah's prior experience with PM_{10} is notable in this case both because of its heavy reliance on control strategies that addressed secondary particulate (the fine fraction of PM_{10} that was likely within the $PM_{2.5}$ fraction), and also because of the controls placed on industry during that time. The latter results in elevating the importance of mobile vehicles as focus now shifts to the remaining sources of $PM_{2.5}$. Mobile sources now account for roughly 65% of the NO_X within the areas likely to be designated nonattainment for $PM_{2.5}$.

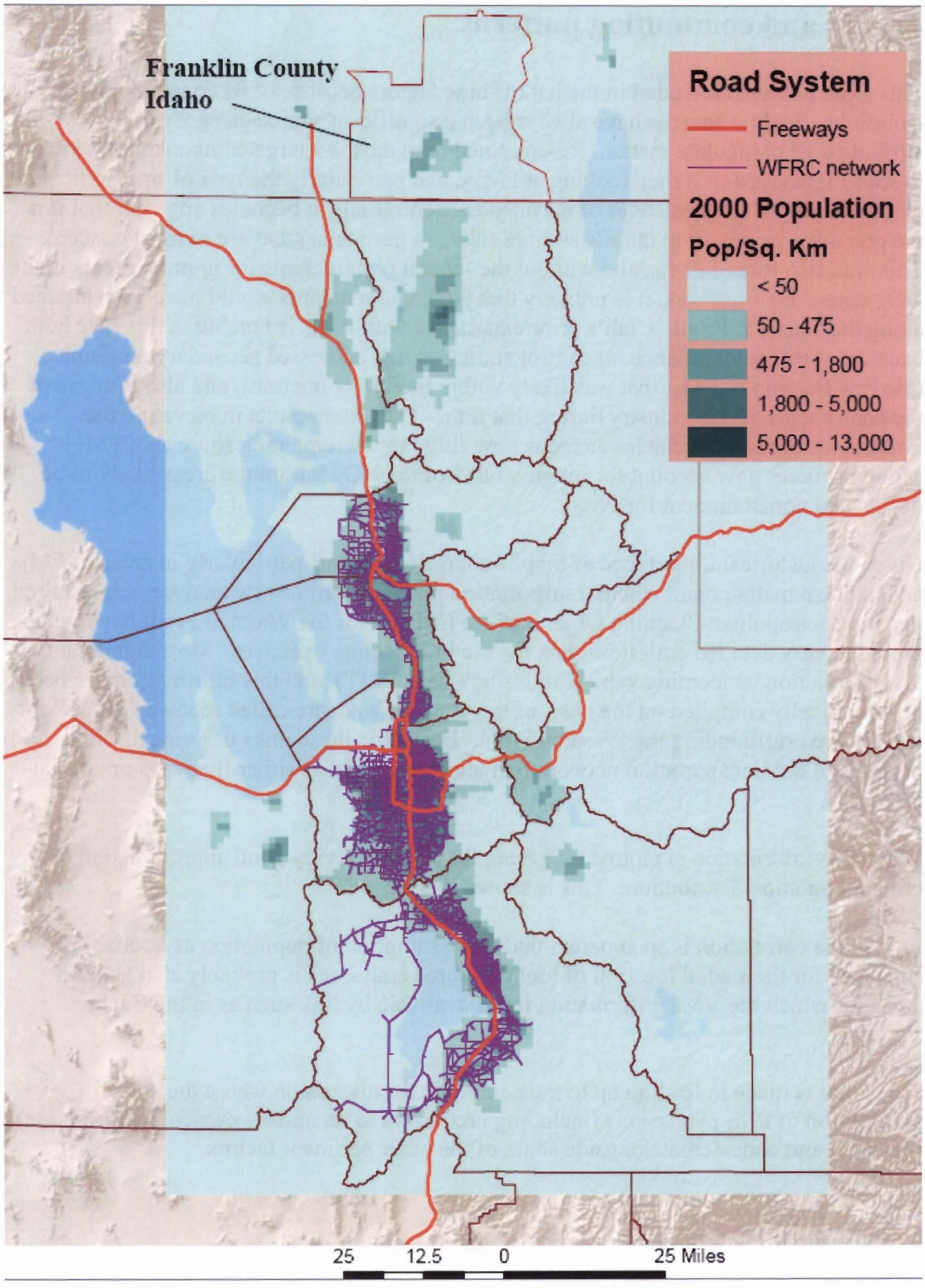
Given the historical importance of mobile source emissions, particularly in areas of PM_{10} and ozone nonattainment where transportation planning conformity analyses are required, the two Metropolitan Planning Organizations (MPOs) for the Wasatch Front have provided very detailed emissions data for use in modeling exercises. Most significant is the information concerning vehicle miles traveled (VMT), and this information has been geographically compiled on the basis of travel along what are called roadway "links" for a study area surrounding the Wasatch Front. Basically, these links describe discrete portions of the transportation network that are categorized as either freeways or arterial roadways.

When this information is plotted on a map, the result is a very good approximation of urban population distribution. This is shown in Figure 8.

In fact, the correlation is so apparent that the assumption of population as a reliable surrogate for the spatial location of mobile source emissions is probably also good in areas for which the VMT information is not available by link such as in the Cache Valley.

This point is made in leading up to the next topic for discussion where the spatial distribution of $PM_{2.5}$ emissions (including precursors to secondary particulate formation) is plotted and considered alongside some of the other pertinent factors.

Figure 8 Population Density and Specific Roadways



Emissions

Under conditions characteristic of Utah's fine particulate episodes, where the air becomes stagnant for periods of several days, it is likely that the sources of emissions would coincide (in location) with areas monitoring bad air. We have already noted the coincidence of population, low-land valley regions, and transportation networks with a network of air monitors indicating violations of the 24-hr NAAQS for $PM_{2.5}$. That the emission sources would also be located in these areas should come as no surprise. Nevertheless, this is one of the factors that must be evaluated in order to determine, not only the core area(s) of nonattainment, but also those areas which may be contributing to violations within the nonattainment area(s.)

As with any inventory prepared by UDAQ, the information typically includes three categories of sources: large industrial point sources, area sources, and mobile sources. While the first and the last of these categories are more or less self explanatory, area sources are generally those of an industrial nature that are too small and too numerous within an urbanized area to inventory on an individual basis. Instead, they are categorized, and emission factors are developed which relate these activities and their associated emissions back to population.

The emissions data used for this analysis is the same data that was reported to EPA and subsequently entered into the AQS database. It represents annual data from 2005, with some minor adjustments made to put mobile source emissions on the same basis (mobile source emissions are typically calculated in terms of tons per day.)

For each of these three categories, SO_2 and NO_X emissions will be evaluated along with primary $PM_{2.5}$. These gasses are known precursors to the formation of fine particulate, and generally must be evaluated for emission reductions in nonattainment areas. In addition, emissions of volatile organic compounds (VOC) were included for point sources to consider the possibility that such a source might be large enough to influence a localized area with a reactive pollutant. VOC is considered a somewhat minor precursor to fine particulate; however, control measures for VOC are not required in nonattainment areas unless it is demonstrated that their presence contributes significantly to $PM_{2.5}$ concentrations. The analysis necessary to make such a determination would be performed as part of SIP development.

Again the focus will be on the area surrounding northern Utah. This area is often evaluated in rigorous computer modeling exercises by UDAQ, and we are here able to make use of one such exercise which includes a "gridded" emissions inventory within a modeling domain that includes both the Wasatch Front and the Cache Valley. In other words, within the area of the domain shown on the maps, the emissions have been located in grid cells measuring one square kilometer each. This lends a high degree of accuracy to the analysis.

As discussed above, in the section on traffic and commuting patterns, mobile source emissions are well represented by the distribution of population.

Area sources too enjoy a good correlation with the location of population. As discussed before, many of the emission factors used to estimate emissions from area source categories are related to population. Good examples of this would include space heating or emissions related to construction.

There are however other source categories for which population is not a good surrogate. Included in this group would be wildland fires and emissions related to agriculture, such as agricultural burning, harvesting and land preparation. Emissions from these source categories will not be considered for this analysis because they do not fit the seasonal scenario under which the $PM_{2.5}$ NAAQS are violated in Utah. Again, these violations occur during the winter months under cold weather temperature inversions. By contrast, agricultural burning happens primarily during the spring and the fall, and wildland fire season occurs in the summer months. Exclusion of these source categories is consistent with other inventories developed for Utah's implementation plans concerning particulate matter. Another notable source category would be unpaved roads. In this case, emissions are calculated based on the amount of non-urban acreage. Hence, their distribution on a map would be even throughout the state, and would not be relevant to this exercise.

A complete tabulation of the 2005 emissions inventory for Utah has been included as Appendix 1 to this document.

Figure 9 shows the location of these emissions relative to the core set of nonattainment townships. It is apparent that the coincidence of the two is very good, and for the reasons discussed above this really is to be expected. In the figure, point sources are identified by red circles where size of the circle is indicative of the quantity of emissions produced by the source. The cut-point for inclusion as a point source was 100 tons/yr of combined $PM_{2.5}$, SO, NO_X, and VOC. Smaller sources were simply included as area sources. The collection of point sources, along with the higher concentrations of area and mobile emissions, shows what might be considered a core urban area within the proposed nonattainment area along the Wasatch Front. This is consistent with the EPA's definition of what the agency believed would characterize a typical urban nonattainment area.

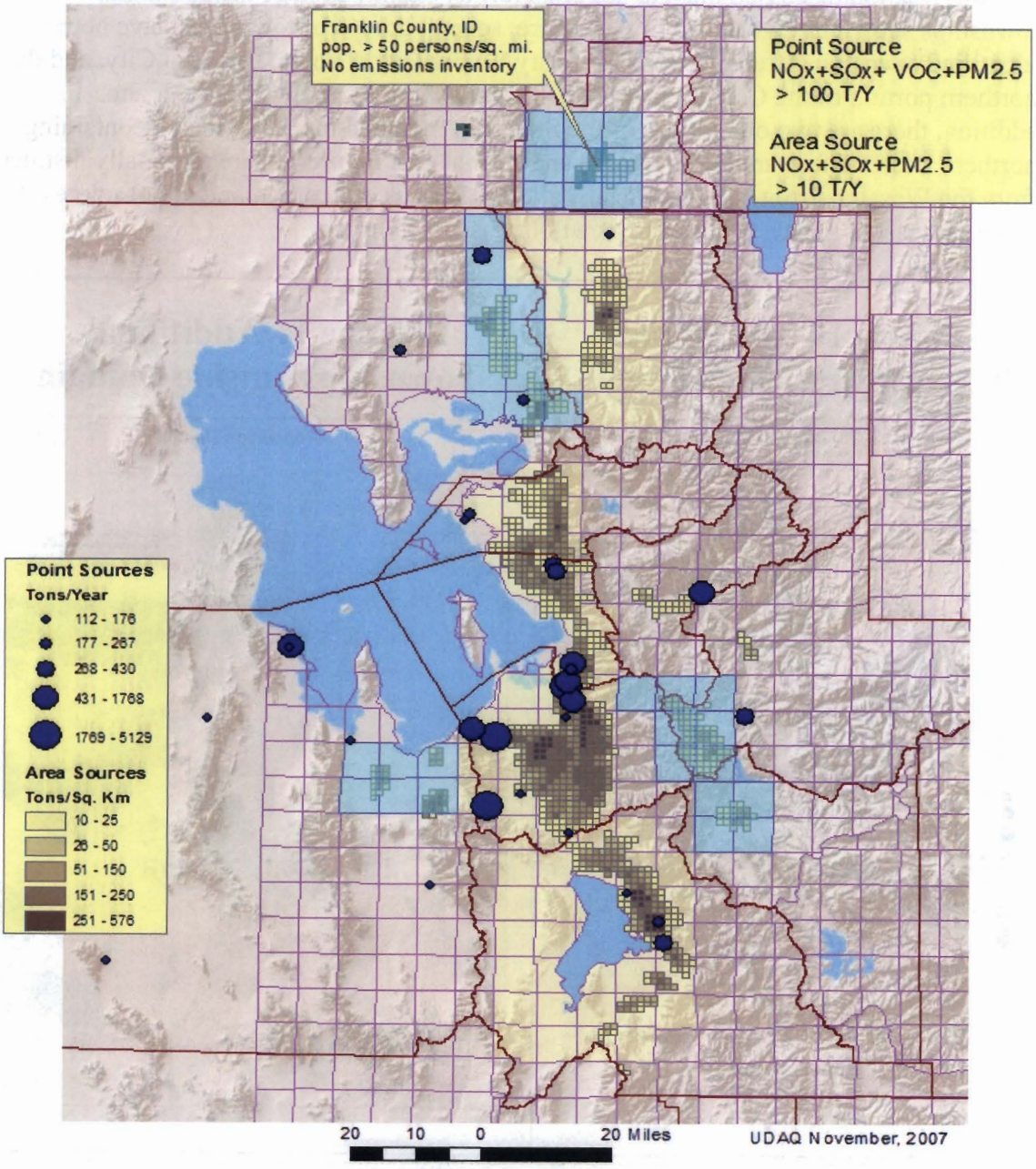
A complete tabulation of the point sources found in Figure 9 and their receptive emissions is included as Appendix 2 to this document.

The addition of the emissions information serves to reinforce the notion of a core collection of townships that will be included in the nonattainment area recommendations. These townships are representative of air quality data that indicates concentrations in excess of the 24-hr NAAQS for $PM_{2.5}$. To a large extent, these townships are bounded by elevated terrain which acts to define low-land valleys within which winter air is prone to stagnate long enough for concentrations to become elevated. These townships also describe a region within which most of the population resides, and therefore a region from which most of the emissions that contribute to $PM_{2.5}$ originate.

Also apparent from this figure are areas of emissions surrounding this core group (or groups) of nonattainment townships. The smaller hatch marks within these regions represent the one square kilometer grid cells used to locate the emissions.

It is now left to the remainder of the discussion to determine whether some additional townships, in these areas indicated by the emissions and population data, should be added to the core group(s) or even considered as separate areas in order to fully describe the appropriate area(s) of nonattainment.

Figure 9 Emissions in Relation to the Core Nonattainment



Townships

Consideration of Additional Areas

In order to fully consider the question posed above, some of the nine factors discussed already will be re-considered with respect to these areas. Probably most important of these will be air quality data and topography. To a certain extent, traffic and commuting patterns will be considered in the context of bedroom communities which may or may not impact on the core nonattainment area(s.) Two other factors will be discussed: growth, and the existing degree of emission control.

The information discussed thus far suggests further examination of the additional townships shown in Figure 10. In this figure, several groups of townships have been identified over five different areas: Park City, Heber City, Tooele, Brigham City, and the northern portion of the Cache Valley which extends into Franklin County, Idaho. In addition, there are two other areas of the State, not included in the "domain" containing northern Utah. These areas, St. George and Vernal (see Figure 11) are regionally distinct from the Wasatch Front and the Cache Valley as well as each other, and are of interest for different reasons. Each of these areas will be discussed in turn.

Figure 10 Additional Townships within Domain

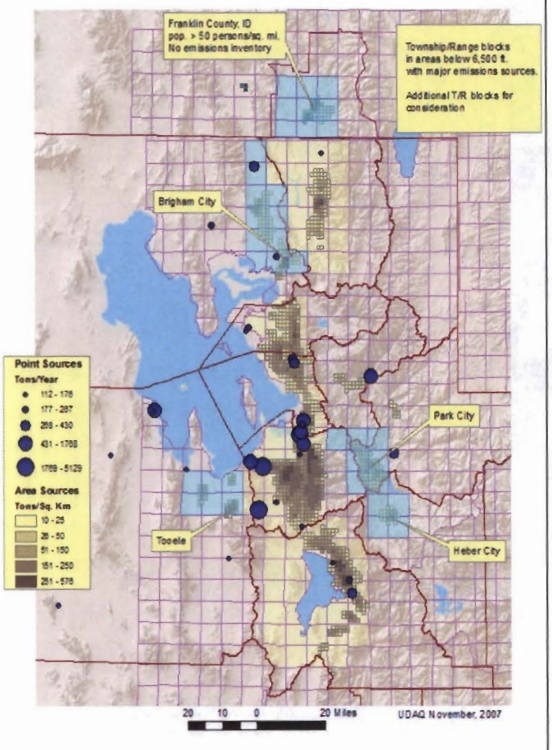
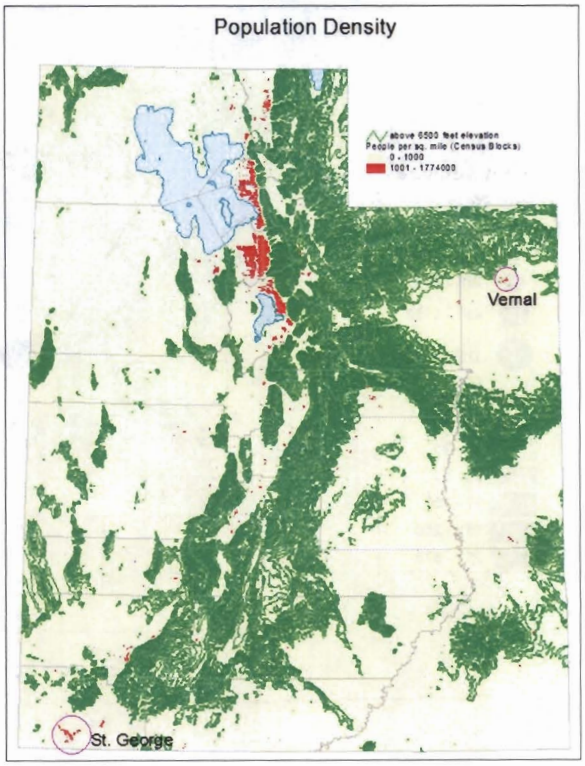


Figure 11 Additional Townships outside Domain



Park City

Park City lies just to the east of the Wasatch Mountains in a relatively high elevation valley (6,450 ft.) called the Snyderville Basin. It is a resort community with significant commuter travel to the Wasatch Front. No air quality data has been collected in Park City, so if it were to be recommended as a nonattainment area, it would have to be in the context of an area that contributes to violations in the Salt Lake Valley (to the West.) The Snyderville Basin is surrounded by high terrain, and is subject to the same type of air stagnation during the winter months as has already been described. However, it is much less likely to stagnate, and the severity of such episodes is nowhere near as great as what is experienced in the Cache Valley or along the Wasatch Front. The most significant aspect of the meteorology however is the lack of a connection to the Wasatch Front. This is dictated by topography. The elevation of the pass connecting the two valleys (Parley's Summit) is 7,100 feet msl, whereas the height of the mixing layer capping a typical air mass along the Wasatch Front would be less than 6,000 feet msl. In other words, there is no significant air movement between the two valleys.

So in essence, Park City is an area in which: population, the emissions generally associated with population, meteorology, and topography might suggest a problem with $PM_{2.5}$ given the similarity, if not the severity, to the conditions characteristic of Utah's documented problems with fine particulate. Yet there is no data to indicate that the air quality in Park City exceeds the NAAQS for $PM_{2.5}$. Nor is there any air movement between the two areas which might suggest an impact on one or the other.

The only reason to possibly conclude that Park City contributes to violations in the Salt Lake Valley would be the level of vehicular traffic between the two areas. While it is true that Park City is considered somewhat of a bedroom community to Salt Lake, the only implication for the Salt Lake nonattainment area would be an influx of vehicles that were not required to meet the same level of Inspection/Maintenance as those registered along the Wasatch Front. Were Park City to be designated as nonattainment, it could implement an I/M program. Without a detailed analysis of Park City and its fleet of vehicles, it is not possible to quantify the benefit such a program might provide. However, it is probably safe to say that a significant portion of these vehicles at least includes some degree of onboard diagnostic (OBD) equipment, and that therefore the influx of vehicles into the Wasatch Front would not be characterized as an older fleet that would benefit greatly from an I/M program.

Control of emissions at point sources would also not be an issue in this case. It is evident from Figure 9 that there are no major point sources in Park City that could be affecting the Wasatch Front. Even if there were, it would be highly unlikely that a significant degree of improvement in emissions control would be achievable only through the SIP process. Utah's permitting rules already require Best Available Control technology on all sources, major or minor, constructed after 1971.

Growth estimates for the Park City area may be surmised from the countywide estimates provided by the Governor's Office of Planning and Budget. This is really the only

populous region of Summit County, so it may be assumed that almost all of the countywide growth will take place in and around Park City. Table 3 summarizes this information for the areas of interest to this analysis (the entire data set is available at http://governor.utah.gov/dea/projections/Jan05populationbyarea.pdf.) Relative to the 2000 census, growth in Summit County is occurring at a rate of four to five percent per year. This is roughly twice the average for the entire state, which is projected to be about two and a half percent per year. As a reference point, population growth for the United States during this period is estimated as slightly less than one percent per year. This really comes as no surprise, as growth in Park City has been very rapid throughout the last twenty years. Growth would be the primary reason that Park City has attracted the attention of UDAQ.

Despite the high rate of growth, there is not enough weight of evidence to determine that Park City be declared an area of nonattainment unto itself. Nor will Utah recommend that Park City be included in the Wasatch Front nonattainment area. Rather, a designation of "unclassifiable" would be more appropriate for this area.

Table 3 Population Growth

Area	2000	% Change	2005	2010	% Change	2015	% Change
Box Elder	42,860	-5.3%	45,142	49,254	9.1%	55,212	22.3%
Cache	91,897	-11.5%	102,477	114,304	11.5%	130,375	27.2%
Davis	240,204	-15.1%	276,374	304,502	10.2%	330,833	19.7%
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%
Utah	371,894	-22.1%	453,977	527,502	16.2%	594,511	31.0%
Washington	91,104	-37.2%	125,010	162,544	30.0%	205,025	64.0%
Weber	197,541	-7.7%	212,707	230,145	8.2%	251,528	18.3%
MCD							
Bear River	136,712	-9.5%	149,705	165,705	10.7%	187,873	25.5%
Wasatch Front	1,389,252	-9.4%	1,520,189	1,665,238	9.5%	1,824,119	20.0%
Mountainland	417,375	-22.3%	510,532	597,529	17.0%	680,793	33.3%
Southwest	135,969	-29.6%	176,202	223,846	27.0%	278,366	58.0%
Uintah Basin	40,627	-4.2%	42,327	43,992	3.9%	46,769	10.5%
State of Utah	2,246,553	-12.6%	2,528,926	2,833,337	12.0%	3,166,498	25.2%
United States	282,124,631	-4.7%	295,507,134	308,935,581	4.5%	322,365,787	9.1%

Table 3 Population Growth (Cont)

Area	2020	% Change	2025	% Change	2030	% Change
Box Elder	61,675	36.6%	68,038	50.7%	73,833	63.6%
Cache	147,776	44.2%	165,626	61.6%	183,989	79.5%
Davis	352,320	27.5%	369,206	33.6%	382,219	38.3%
Salt Lake	1,230,817	26.8%	1,309,168	34.9%	1,381,519	42.3%
Summit	65,001	78.5%	75,450	107.2%	85,660	135.2%
Tooele	95,696	84.6%	104,459	101.5%	112,722	117.5%
Wasatch	37,082	84.1%	41,837	107.8%	46,193	129.4%
Utah	661,319	45.7%	730,897	61.0%	804,112	77.1%
Washington	251,896	101.5%	301,459	141.1%	353,922	183.1%
Weber	271,339	27.6%	289,584	36.1%	306,227	44.0%
MCD						
Bear River	211,898	41.5%	236,238	57.8%	260,458	74.0%
Wasatch Front	1,966,372	29.4%	2,092,801	37.7%	2,207,282	45.2%
Mountainland	763,402	49.5%	848,184	66.1%	935,965	83.3%
Southwest	335,025	90.1%	392,254	122.6%	451,923	156.5%
Uintah Basin	49,451	16.8%	51,673	22.1%	53,347	26.0%
State of Utah	3,486,218	37.9%	3,790,984	49.9%	4,086,319	61.6%
United States	335,804,546	13.6%	349,439,199	18.3%	365,584,435	23.7%

Heber City

Heber City also lies to the East of the Wasatch Mountains, and a bit to the South and East of Park City. The Heber Valley is primarily a farming community with Heber City at its center. It too is meteorologically distinct from the Wasatch Front, and is similar to Park City in terms of its topography. It is a relatively high elevation valley that experiences its own temperature inversions and periods of air stagnation, though not nearly as severe as the Cache Valley or the Wasatch Front.

Like Park City, it is: the population, the emissions generally associated with population, the meteorology, and the topography that might suggest a problem with $PM_{2.5}$. These are the factors which lead to conditions characteristic of Utah's documented problems with fine particulate. Also like Park City, there is no data to indicate that the air quality in Heber City exceeds the NAAQS.

There is probably not much air movement between the Park City and Heber, but the latter is becoming somewhat of a bedroom community to the former. There is presently no I/M program for Wasatch County. Utah statute prohibits such a program unless the area is already not attaining one of the pertinent NAAQS. Nevertheless, as in Park City, there is no reason to believe that the absence of such a program is presently responsible for $PM_{2.5}$ concentrations in excess of the NAAQS for Heber.

Figure 9 indicates that there are no major point sources in Heber City that would warrant special consideration. Even if there were, it would be highly unlikely that a significant degree of improvement in emissions control would be achievable only through the SIP process. Utah's permitting rules already require Best Available Control technology on all sources, major or minor, constructed after 1971.

Heber is also a growing area. Growth estimates for Heber City may be approximated by looking at the countywide estimates for Wasatch County presented in Table 3. This is really the only populous region of that county, so it may be assumed that almost all of the countywide growth will take place in and around Heber City. Relative to the 2000 census, growth in Wasatch County is occurring at more than five percent per year. Again, this is roughly twice the average for the entire state (roughly two and a half percent per year.)

As with Park City, rapid growth in a valley setting is not sufficient reason to recommend Heber as an area of nonattainment. Rather, a designation of "unclassifiable" would be more appropriate.

Tooele

A look back at Figure 4 reveals the layout surrounding the City of Tooele and its neighbor, the town of Grantsville. These municipalities reside to the West of Salt Lake County in the northern half of a valley bound to the East by the Oquirrh Mountains. These mountains also define the western perimeter of the Salt Lake Valley. The Great Salt Lake marks their northern terminus.

This topographical backdrop becomes important when discussing air movement between the two valleys. During the typical $PM_{2.5}$ episode the elevation of the Oquirrhs would preclude any direct air movement between the two regions, but it would be possible for mixing to take place around their northern extremity given that the Great Salt Lake may act as a something of a repository for contaminated air as diurnal wind patterns, from both valleys, transport air back and forth between lake and valley.

UDAQ has been monitoring in Tooele County for $PM_{2.5}$ since 2000, but the location was changed from Grantsville to Tooele, with Grantsville closing in 2003 and Tooele beginning in 2005. A look at Table 2 indicates an incomplete data set for the new monitoring site, but the average of the two years collected thus far would be very close to the 24-hr standard. Data from the old Grantsville site indicates much the same.

If this area were more geographically remote from the core Wasatch Front nonattainment area UDAQs' inclination would be to recommend a designation of "unclassifiable" and wait for more data. However, given its proximity to that area, we might pause to consider some additional information.

A look at Figure 9 reveals that it is far more likely that any potential impact due to industrial point sources would be directed from Salt Lake County into Tooele rather than the other way around (though this would be evaluated during the course of SIP development.) The only truly large source in Tooele County is American Magnesium, and it sits more than 30 miles from either Tooele or the Wasatch Front. Utah's permitting rules already require Best Available Control technology on all sources, major or minor, constructed after 1971. Hence, it is unlikely that a significant degree of improvement in emissions control would be achieved by designating the area as nonattainment.

Growth estimates for this area may be approximated by looking at the countywide estimates for Tooele County presented in Table 3. This is really the only populous region of that county, so it may be assumed that almost all of the countywide growth will take place in and around Tooele and Grantsville. Relative to the 2000 census, growth in Tooele County is occurring at more than four and a half percent per year. Once again, this is roughly twice the average for the entire state (roughly two and a half percent per year.) By contrast, the figures for the Wasatch Front are less than two percent per year. This would seem to indicate that growth will generally take place in and around previously developed areas, but that growth will be more rapid in the peripheral areas that are not already built out. Tooele might be considered just such an area.

Commuting patterns represent another factor to be considered in this situation. According to information compiled for the 2000 census (Journey to Work data; http:www.census.gov/population/www/cen2000/commuting.html#UT), Tooele County has 7,397 commuters that travel to one of the three counties comprising the northern Wasatch Front (Weber, Davis, and Salt Lake.) By contrast, there are 9,784 commuters that travel only within Tooele County. This confirms that Tooele is very much a bedroom community. One might suspect a significant impact within the Wasatch Front from cars originating in Tooele County. The Journey to Work data also reports that there are 619,427 commuters traveling within the northern Wasatch counties. From this it can be determined that the influx of cars from Tooele accounts for roughly 1.2% of all commuter trips. If it's true that cars account for roughly half of all $PM_{2.5}$ emissions, then the influx of cars from Tooele could be said to account for 1.2% of 1/2 of the maximum observed design value (49 µg/m3), or roughly 1/4 to 1/3 of one µg/m3. Though a level of significance for impacting upon a nonattainment area has yet to be established for $PM_{2.5}$, one would think it would be greater than this.

Given the factors discussed above, UDAQ is recommending that the townships identified in Figure 10 be left out of the nonattainment area for the Wasatch Front. Of all the factors discussed so far, the air quality data collected in Tooele should be given the most weight. If the data collected here (or SIP modeling) ultimately indicates that a nonattainment designation would in fact be appropriate, then it will be addressed

specifically for this area at that time. For now, it is recommended that the area be designated as "unclassifiable."

Brigham City

The geographical and topographical layout of Brigham City can be seen clearly in Figure 4. It, like its neighbor Tremonton (a farming community to the North/Northwest), sits against the northern end of the Wasatch Mountains in the low lying area near the Great Salt Lake. Willard Bay, a prominent feature of the Lake, juts out to the East and approximates the boundary between Weber County (to the South) and Box Elder County in which these two municipalities reside.

As is the case with Tooele, UDAQ has monitored $PM_{2.5}$ concentrations in Brigham City since 2000. Design values from the last two three-year periods indicate that the area is attaining the 2006 standard, but just is very close to the standard.

Would this area be more geographically isolated, our inclination would be to recommend a designation of "unclassifiable" and wait for more data. Geographically speaking however, Brigham City sits very nearby to two separate areas that UDAQ will recommend as nonattainment for the 24-hr $PM_{2.5}$ standard. This leads to the consideration of some additional information.

Topography is the first such consideration. Were it not for the elevation of the Wasatch Mountains, Brigham City might be seen as the "connecting piece" that would link nonattainment concerns from the Wasatch Front to the Cache Valley. Given however the effect this physical boundary has on the meteorology which drives the $PM_{2.5}$ episodes in both of these regions, this is a premise that could not be supported. Atmospheric conditions in the Cache Valley are absolutely distinct from those on the other side of the Wasatch Mountains. Still, one is left to consider the degree of connectivity between the air north and south of Willard Bay. Whether Brigham City impacts on the Wasatch Front to the South or vise versa is something that can be evaluated during the course of SIP development.

Looking more closely at the emissions from this area, there are a few major point sources worth mentioning. Nucor Steel sits at the northern extremity of the uppermost township shown in Figure 10. This is considered a major source for $PM_{2.5}$, SO_2, and NO_X. As part of the permitting process, this source has already undergone a BACT review. There is no reason to believe that reclassification as a nonattainment area would have much affect on the allowable emissions for this source. Another source of note is ATK Thiokol, which sits against the mountains to the West of the region under discussion. This source periodically conducts large test burns of rocket motors and burning for the disposal of propellants, but does so under a clearing index system and not during conditions typical of Utah's fine particulate episodes. This mode of operation, as well as the distance from populated areas makes it unlikely that this is a source of much concern. Vulcraft would be the final source worth considering. It is primarily a source of VOC located right in Brigham City. Its emissions of $PM_{2.5}$, SO_2, and NO_X are negligible. It too underwent a BACT review as part of its permit application.

Growth estimates for Brigham City would fall within the countywide estimates for Box Elder County presented in Table 3. Brigham City and Tremonton are really the only populous regions of that county, so it may be assumed that almost all of the countywide growth will take place in this general area. Relative to the 2000 census, growth in Box Elder County is occurring at about 2.3 percent per year. This is a little less than the average for the entire state (roughly two and a half percent per year.) While Brigham City might be considered as the northern extent of the Wasatch Front, it is quite removed from the urbanized core of that area. Likewise, Tremonton is quite removed from Brigham City.

Commuting patterns represent another factor to be considered in this situation. According to information compiled for the 2000 census (Journey to Work data; http:www.census.gov/population/www/cen2000/commuting.html#UT), Box Elder County has 3,590 commuters that travel to one of the three counties comprising the northern Wasatch Front (Weber, Davis, and Salt Lake.) One might wonder about the impact within the Wasatch Front from cars originating in Box Elder County. The Journey to Work data also reports that there are 619,427 commuters traveling within the northern Wasatch counties. From this it can be determined that the influx of cars from Box Elder County accounts for roughly 0.6% of all commuter trips. If it's true that cars account for roughly half of all $PM_{2.5}$ emissions, then the influx of cars from this area could be said to account for 0.6% of 1/2 of the maximum observed design value (49 µg/m3), or roughly 0.15 µg/m3. Though a level of significance for impacting upon a nonattainment area has yet to be established for $PM_{2.5}$, one would think it would be greater than this.

Given the factors discussed above, UDAQ is recommending that the townships identified in Figure 10 be left out of the nonattainment area for the Wasatch Front. Of all the factors discussed so far, the air quality data collected in Brigham City should be given the most weight. If the data collected here (or SIP modeling) ultimately indicates that a nonattainment designation would in fact be appropriate, then it will be addressed specifically for this area at that time. For now, it is recommended that the area be designated as "attainment."

Franklin County Idaho (northern Cache Valley)

Air quality data has already indicated that Utah's portion of the Cache Valley will be a nonattainment area. In fact, the 24-hr design value for Logan is by far the highest of any station within Utah's monitoring network. Figure 5 has already indicated that UDAQ intends to identify the townships on Utah's side of the valley as being representative of the data collected at Logan, Amalga and Hyrum.

The townships included in Figure 10 extend this presumption into the northern portion of the Cache Valley. This of course is within the state of Idaho, and the figure also shows the boundary for Franklin County.

Based on the results of a saturation study that found concentrations of $PM_{2.5}$ to be statistically homogeneous throughout the Cache Valley, the Idaho Department of Environmental Quality established (in 2004) monitors in both Franklin and Preston. Those monitors supported the results of the saturation study by Utah State University. Since that time, the monitor in Preston has been removed, but Idaho continues to operate the Franklin monitor. It has collected some $PM_{2.5}$ data in its half of the valley, but there is not yet a three-year data set for comparison with the NAAQS.

Although the collection of townships on Utah's side of the boarder would seem to extend beyond the "urbanized" area that would likely contribute most of the emissions, it still serves as a good description of the southern half of the valley. Not only is the topography of the valley linked to the meteorology which is so fundamental to the episodes of elevated $PM_{2.5}$ concentrations, it is also likely that ammonia emissions from the agricultural activity in the areas surrounding the urbanized "core" do in fact contribute to the formation of secondary particulate.

For these reasons, it is not really necessary to entertain discussions on growth or emissions control. Given the over-riding importance of ambient air data, and the homogeneity of its concentrations, UDAQ is recommending that the entire valley under its jurisdiction, as represented by the collection of townships shown in Figure 9, be designated as "nonattainment."

However, UDAQ will stop short of providing a recommendation concerning the Idaho side of Cache Valley. Instead it will assent to whatever recommendation the Idaho Department of Environmental Quality may propose for the area identified in Figure 10.

St. George

As may be seen in Figure 1, there is one metropolitan area in southwestern Utah that warrants some discussion. This is the city of St. George, and when one considers the association of mobile source and area source emissions to population, it is natural to conclude that there would be sufficient emissions of $PM_{2.5}$ and its precursors to suspect a problem with the fine particulate standards.

Based on the monitoring requirements of 40 CFR Part 58, St. George does not presently have a large enough population to require a federal reference monitor for $PM_{2.5}$. Nevertheless, UDAQ has conducted "survey" monitoring in the area for the last two years. Results from this survey monitoring have indicated no violation of either the 24-hr or the annual standard, but UDAQ is inclined to continue its efforts to monitor this region (albeit, in a more suitable location) given the rapid pace of growth it has experienced in recent years.

While there is some high terrain, primarily to the North of the city, the degree of confinement does not exist there to the extent that it does along the Wasatch Front or in the Cache Valley. Hence the air does not stagnate to the same degree that it does in those areas. The winter climate in St. George is also significantly warmer that it is in northern

Utah. Lying at an elevation of only 2,600 feet msl, St George is actually on the periphery of the Mojavie Desert. This partly explains the rapid growth in population, which has been driven largely by retirees looking for a warmer climate. Thus, one of the main drivers in the formation of secondary particulate observed in northern Utah is notably absent from this area.

Nevertheless, population growth in the area continues to explode. Estimates from the Governor's Office of Planning and Budget, presented in Table 3, show it has already grown by forty percent since the 2000 census, and this growth is projected to continue at more than seven percent per year through 2030. Naturally, this will be accompanied by emissions. There are presently no major point sources in the area, but the level of construction activity is high, and of course mobile source emissions have grown along with the population.

Despite the results of the survey monitoring, which indicates that the area is attaining the standards, Utah's area recommendations will include a description of "unclassifiable" for St. George. This is consistent with UDAQ's monitoring plan for the region, which includes the continuation of survey monitoring, at a more representative location, with the notion of situating a permanent federal reference monitor at that location in the future.

Vernal

Another area of interest to UDAQ at this time is Vernal. This is a small city in Northeastern Utah (visible in Figure 1.) Topographically speaking, Vernal is located in the Uintah Basin, a large depression defined by the Uintah Mountains to the North and the Tavaputs Plateau to the South. Though this basin may act to trap air masses in the winter, it is not so much the topography or the meteorology that has aroused suspicion as it is the emissions from the area.

In this case it is not the mobile source emissions that dominate the inventory, nor is there a single large point source that could unduly influence the area. Population growth for the Uintah Basin is estimated at only about one percent per year (see Table 3.) Rather, it is the area source emissions from a source category that is not well understood. This area has long been a source of oil and gas deposits, and with the recent emphasis on exploration and development of domestic energy sources, there has been an upsurge in the industry surrounding this resource.

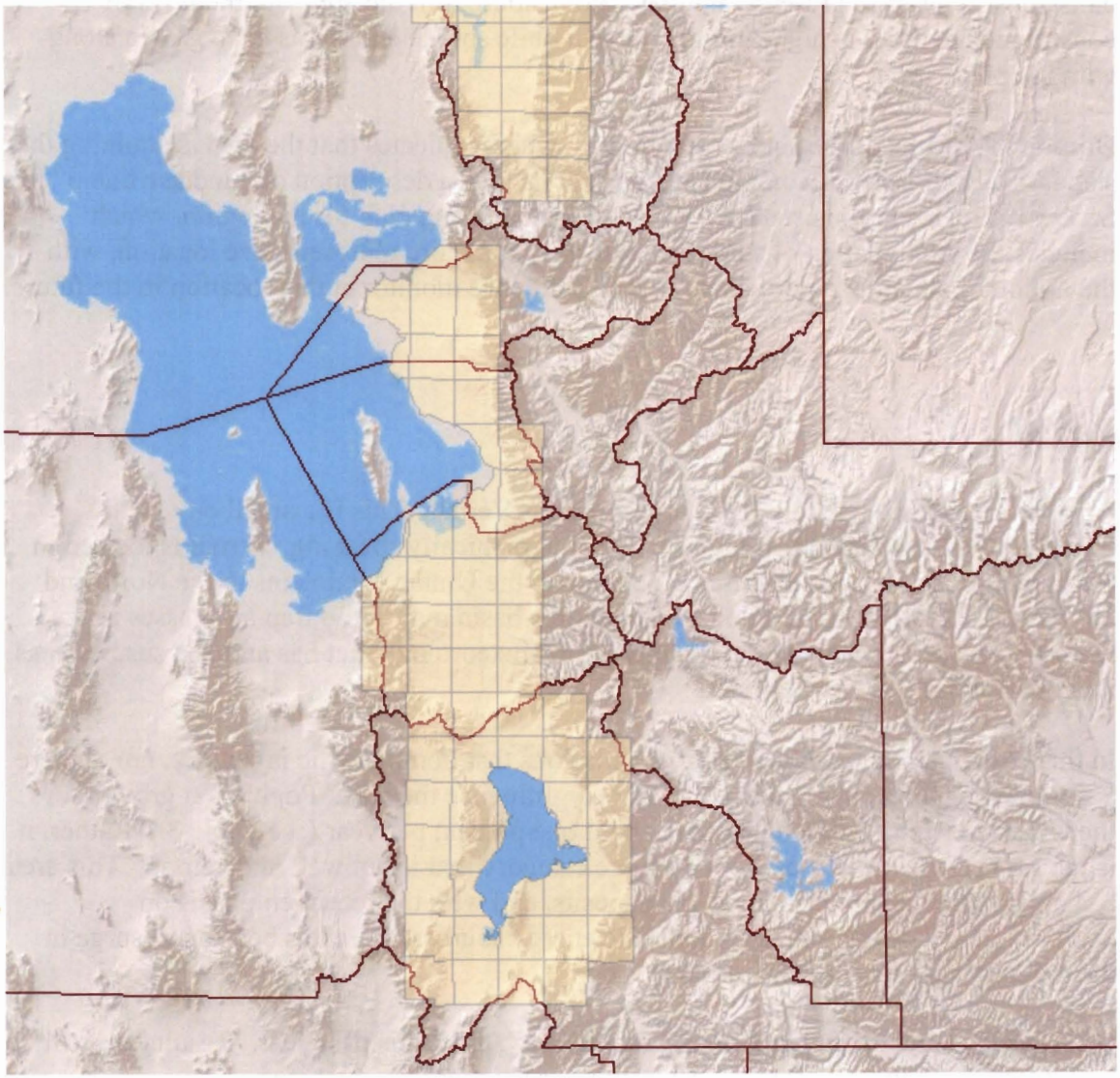
UDAQ has begun operating a survey monitor in Vernal this past year. Results are still preliminary, but indicate that concentrations are higher than expected.

Utah's area recommendations will include a description of "unclassifiable" for the Vernal area.

Conclusions from this step

In following the recommendations concerning each of the areas we have just discussed, we are left with the map shown in Figure 12. However, there is one factor yet to be considered.

Figure 12 Core Nonattainment Townships



Jurisdictional Boundaries

The final factor to be considered will be the pre-existing jurisdictional boundaries. Presumably this has been included in the list of nine because it ultimately becomes more practical to implement some of the inevitable control strategies on the basis of counties (e.g. I/M), or cities (e.g. woodburning control) than it would be using some other area description.

Looking at the collection of townships included thus far, in conjunction with county boundaries, it is clear that the basis for comparison should be at this level; rather than city boundaries for instance.

The townships that have been identified all represent areas that are not attaining the 24-hr NAAQS for $PM_{2.5}$. With very few exceptions, these townships touch on only five of Utah's counties. Each county will be discussed in turn.

Cache County

The collection of townships used to depict Utah's portion of the Cache Valley coincides quite well with the northern and western boarders of the county. The eastern and very southern portions (roughly two thirds) of the county are characterized by high-elevation terrain which might be left out of the nonattainment area. These areas are owned and administered by the Wasatch Cache National Forest, and it is clear from the population map (Figure 7) that very few (if any) people reside in these areas. Hence, from an administrative standpoint there would be very little difference if the area were designated by selected townships or by the county as a whole. However, there is an important travel corridor through Logan Canyon (US 89), and UDAQ sees value in keeping this corridor separate from any of the issues surrounding transportation conformity. For this reason, Utah will recommend that the portion of the Cache Valley within the State be designated as a nonattainment area for $PM_{2.5}$ that is separate and distinct from other areas found to be in nonattainment along the Wasatch Front. Furthermore, the valley should be described by a collection of townships that includes the geophysical boundaries of the valley but does not include Logan Canyon or the high country to the East.

A nonattainment area boundary that is less than the entire county would not preclude control strategies such as vehicle I/M or woodburning control from the outlying areas of the County.

Weber County

Much the same argument could be made for Weber County, in which all of the areas surrounding the selected townships are either located in high terrain or are part of the Great Salt Lake. There is, however, one notable exception; and that is the town of Huntsville, located east of the Wasatch Front (see Figure 7.) There is no reason to suspect that Huntsville is not attaining the $PM_{2.5}$ standards, yet there is enough of a population to warrant the careful consideration of sweeping regulations that need not necessarily apply. For these reasons, Utah will recommend that all of Weber County, west of the ridgeline tracing the Wasatch Mountains, be designated "nonattainment" for $PM_{2.5}$.

It may be useful to point out that, for PM_{10}, the nonattainment area had been defined as Ogden City.

Davis County

The only portions of Davis County not covered by the selected townships are over the Great Salt Lake. Hence, Utah will recommend that all of Davis County be designated "nonattainment" for $PM_{2.5}$. Presently, all of Davis County is designated as a maintenance area for ozone.

Salt Lake County

The collection of townships used to depict the non-attaining portions of Salt Lake County includes all but the mountainous terrain in the very western edge and roughly the eastern third of the county. Figure 7 indicates that there is some population present within the canyons of this eastern highland. In this case, UDAQ feels it would be appropriate to include these areas for the sake of vehicle I/M and other regulatory programs. Presently, all of Salt Lake County is designated as a PM_{10} nonattainment area and as an ozone maintenance area. Utah will recommend that all of Salt Lake County be designated "nonattainment" for $PM_{2.5}$.

Utah County

The collection of townships used to depict the non-attaining portions of Utah County includes virtually all but the mountainous terrain in the very western edge and in the eastern half of the county. Figure 7 indicates that very few (if any) people reside in these

areas, however there is an important travel corridor through here to Eastern Utah. This particular section of Rout 6, from Spanish Fork in Utah County to Price is also Utah's most dangerous roadway, and UDAQ sees value in keeping this corridor separate from any of the issues surrounding transportation conformity. For these reasons Utah will recommend that all areas of Utah County, west of the Wasatch Mountains be designated "nonattainment" for $PM_{2.5}$.

UDAQ also feels that it is appropriate to recommend that the Utah County portion of the nonattaining area along the Wasatch Front be designated its own separate area of nonattainment. This 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. 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 (see Fig. 4), and that this would effectively cap the air masses in each valley such that there would be no significant mixing of the two. Furthermore, with the exception of plumes originating from sources capable of penetrating this mixing layer, $PM_{2.5}$ resulting from the mix of urban emissions from each area would be effectively trapped near the ground.

Utah County also uses a different Metropolitan Planning Organization than the rest of the Wasatch Front. Since each of these organizations is required to produce its own planning documents and it would make sense to consider these areas separately when determining and demonstrating compliance with emissions budgets for the purposes of transportation conformity.

Final Recommendation

Wasatch Front

As shown on Figure 13, Utah is recommending the establishment of two distinct nonattainment areas for $PM_{2.5}$:

1) A Northern Wasatch Front nonattainment area which includes all of Salt Lake County, all of Davis County and all portions of Weber County west of and including Townships 5 & 6 North Range 1 West and all portions of Township 7 North Range 1 West that are in Weber County and west of the ridgeline that traces the Wasatch Mountains from the Southeast corner of the township to the easternmost extension of the county boundary.

2) A Utah Valley nonattainment area that includes all portions of Utah County west of and including any portion of the following townships located within Utah County:

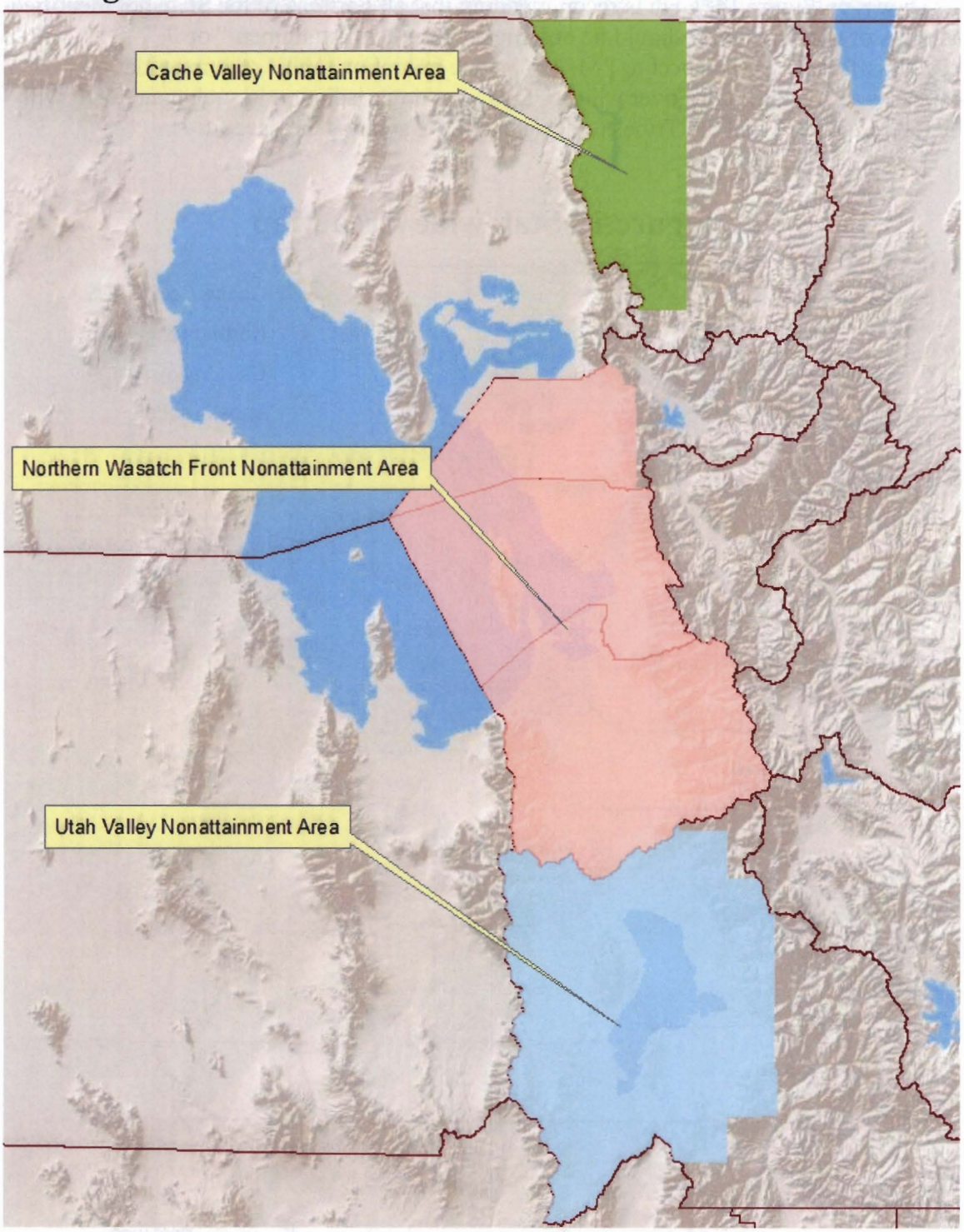
   Township 3 South Range 1 East
   Township 4 South Range 2 East
   Township 5 South Range 3 East
   Township 6 South Range 3 East
   Township 7 South Range 3 East
   Township 8 South Range 3 East
   Township 9 South Range 3 East
   Township 10 South Range 2 East

Cache Valley

As shown on Figure 13, Utah is recommending that all of Cache Valley, within the State, be designated as one distinct area of nonattainment for $PM_{2.5}$. The collection of townships used to define the valley has been refined to more precisely define the geophysical boundary to the East. As such, the nonattainment area should include all portions of Cache County west of and including any portion of the following townships located within Utah:

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

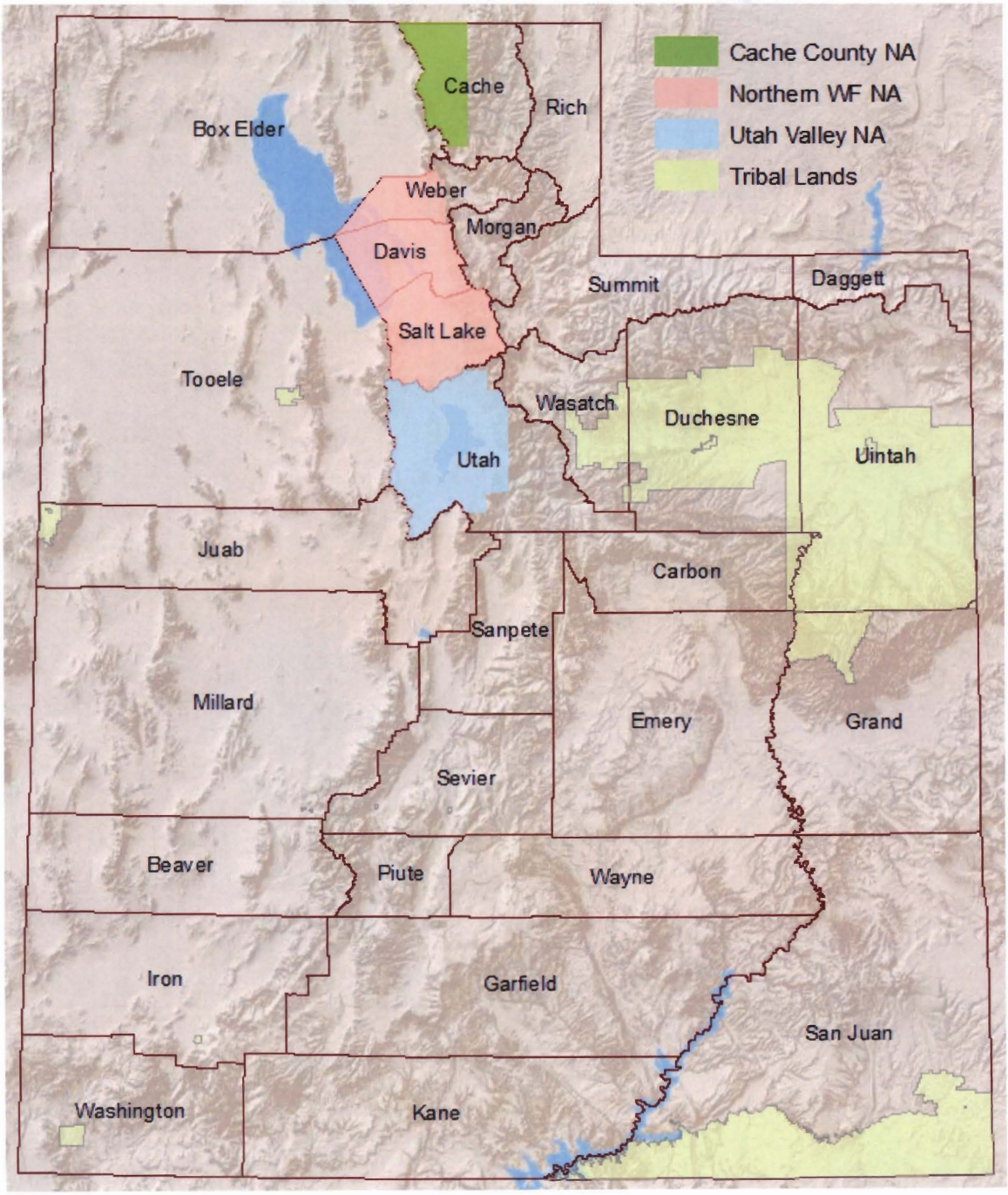
Figure 13 Recommended PM2.5 Nonattainment Areas



Attainment/Unclassifiable Areas

As shown on Figure 14, Utah is recommending that all portions of the State not identified as areas of nonattainment should be designated as either "Attainment" or "Unclassifiable" with respect to $PM_{2.5}$. The one exception to this recommendation concerns all Tribal Lands, over which UDAQ has no jurisdiction in such matters. It will be left to the EPA and the Tribes to designate these areas as they see fit.

Figure 14 Statewide Area Map



Summary

As such, the following Table 4 provides a description of all areas of the State and the designations they should carry with respect to $PM_{2.5}$:

Table 4 Description of all Areas of the State and the Designations

County	Attainment	Unclassifiable	Nonattainment	Nonattainment Area
Cache		All portions of Cache County not otherwise designated nonattainment	All portions of Cache County west of and including any portion of the following townships located in Utah: T15 N R1 E T14 N R1 E T13 N R1 E T12 N R1 E T11 N R1 E T10 N R1 E T9 N R1 E	Cache Valley Nonattainment Area
Weber		All portions of Weber County not otherwise designated nonattainment	All portions of Weber County west of and including T5 N R1 W and T6 N R1 W and all portions of T7 N R1 W that are in Weber County and west of the ridgeline that traces the Wasatch Mountains from the Southeast corner of the township to the easternmost extension of the county boundary	Northern Wasatch Front Nonattainment Area

Table 4 Description of all Areas of the State and the Designations (Cont)

Davis			All portions of Davis County	Northern Wasatch Front Nonattainment Area
Salt Lake			All portions of Salt Lake County	Northern Wasatch Front Nonattainment Area
Utah		All portions of Utah County not otherwise designated nonattainment	All portions of Utah County west of and including any portion of the following townships located in Utah County: T3 S R1 E T4 S R2 E T5 S R3 E T6 S R3 E T7 S R3 E T8 S R3 E T9 S R3 E T10 S R2 E	Utah Valley Nonattainment Area
Box Elder	All portions of Box Elder County			
Carbon Duchesne Grand Iron Juab Millard San Juan Sevier Tooele Uintah Wasatch Washington		All portions of the respective County except for any Tribal Lands.		

Table 4 Description of all Areas of the State and the Designations (Cont)

Beaver Daggett Emery Garfield Kane Morgan Piute Rich Sanpete Summit Wayne		All portions of the respective County		

Supporting Documentation

In addition to any technical information documenting the recommendation for area boundaries, EPA is asking (per the Holmstead memo of 2003) for the information identified below. The italicized text either provides or indicates where this information has been included with Utah's recommendation.

For nonattainment areas:

- The $PM_{2.5}$ design value(s) for the area
- The 3-yr period represented by the design value(s)

  All of the information identified above was included in Tables 1 and 2.

- Site locations and ID numbers *(provided below in Table 5)*

Table 5 Monitor Information

Site ID	Location	Address	County
49-003-0003	Brigham City	140 W. Fishburn	Box Elder
49-005-0004	Logan	125 W. Center St.	Cache
49-005-0005	Amalga	6970 N. 2400 W.	Cache
49-005-0006	Hyrum	480 W. 100 N.	Cache
49-011-0001	Bountiful	65 W. 300 S.	Davis
49-035-0003	Cottonwood	5715 S. 1400 E.	Salt Lake
49-035-0012	North Salt Lake	1795 Warm Springs Rd.	Salt Lake
49-035-1001	Magna	2935 S. 8560 W.	Salt Lake
49-035-3006	Hawthorn	1675 S. 600 E.	Salt Lake
49-035-3007	West Valley	3275 W. 3100 S.	Salt Lake
49-035-3008	Herriman	12950 S. 5600 W.	Salt Lake
49-045-0003	Tooele	434 N. 50 W.	Tooele
49-049-0002	North Provo	1355 N. 200 W.	Utah
49-049-4001	Lindon	30 N. Main St.	Utah
49-049-5008	Highland	10865 N. 6000 W.	Utah
49-049-5010	Spanish Fork	312 W. 2050 N	Utah
49-057-0002	Ogden 2	228 32nd St.	Weber
49-057-0007	Washington Terrace	4601 S. 300 W.	Weber
49-057-1003	Harrisville	425 W. 2550 N.	Weber
49-003-0003	Brigham City	140 W. Fishburn	Box Elder

For attainment/unclassifiable AND nonattainment areas:

- Names of counties and tribal lands included, *(See Table 4)* and
- If partial counties or portions of tribal lands are included, the boundary definition/description *(See Table 4)*

- including a legal definition of the area *(See Table 4; Counties, Townships and names of the respective Tribal Lands are legal definitions)*
- a hard copy map *(Provided as an attachment to the Governor's recommendation)*
- a digitized lat/long description *(Provided as an attachment to the Governor's recommendation)*
- an explanation of how the boundary is consistent with Sect. 107(d)(1) of the CAA

Paragraph (A) of section 107(d)(1) of the Clean Air Act describes the three designations an area may carry (see page 1 of this document.) Utah's recommendations are consistent with the definitions provided therein.

The areas recommended for designation of "Nonattainment" are areas represented by monitored ambient air data that does not meet the primary (or secondary) 24-hr standard for $PM_{2.5}$. The recommendations for these areas were not completed until surrounding areas were evaluated to see whether they were impacting upon the areas.

The areas recommended for designation of "Attainment" are represented by monitored ambient air data that does meet all the primary and secondary standards for $PM_{2.5}$.

The areas recommended for designation of "Unclassifiable" are areas for which there is insufficient data to draw any conclusions.

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Appendix 1

2005 State Summary of Emissions by Source (tons/year)

2005 State Summary of Emissions by Source (tons/year)

County	Source	PM2.5	SOx	NOx	VOC
Beaver	Area Source	185.40	68.59	58.22	295.40
	Non-Road Mobile	7.69	8.98	328.97	44.43
	On-Road Mobile	78.21	16.53	1,119.45	472.10
	Point Source	15.71	3.56	42.30	3.36
	Total	287.01	97.65	1,548.95	815.29
Box Elder	Area Source	1,949.98	12.55	535.24	2,992.59
	Non-Road Mobile	83.63	66.85	553.15	2,471.33
	On-Road Mobile	268.72	61.07	3,976.10	1,523.03
	Point Source	152.71	92.48	553.36	395.78
	Total	2,455.04	232.95	5,617.85	7,382.73
Cache	Area Source	625.62	35.75	356.86	2,437.75
	Non-Road Mobile	68.82	80.07	666.98	612.97
	On-Road Mobile	271.01	62.92	2,928.08	1,269.39
	Point Source	13.82	28.04	139.74	143.84
	Total	979.26	206.78	4,091.66	4,463.96
Carbon	Area Source	85.60	101.94	86.33	482.12
	Non-Road Mobile	18.02	17.12	939.09	134.89
	On-Road Mobile	86.87	18.77	992.42	636.57
	Point Source	216.38	6,358.70	3,981.86	66.30
	Total	406.87	6,496.54	5,999.70	1,319.88
Daggett	Area Source	149.51	0.95	34.63	240.32
	Non-Road Mobile	4.63	1.85	19.37	144.47
	On-Road Mobile	10.18	2.19	113.62	74.29
	Point Source	4.47	1.41	749.18	66.44
	Total	168.79	6.40	916.81	525.52
Davis	Area Source	549.60	10.73	340.98	5,534.81
	Non-Road Mobile	138.96	152.87	1,824.27	1,635.73
	On-Road Mobile	328.02	141.39	6,423.47	2,904.61
	Point Source	207.58	3,178.33	2,152.47	1,559.60
	Total	1,224.17	3,483.33	10,741.19	11,634.75
Duchesne	Area Source	337.03	34.68	80.34	747.49
	Non-Road Mobile	19.47	17.52	148.48	277.51
	On-Road Mobile	69.82	17.50	979.01	372.29
	Point Source	5.98	0.54	656.54	260.62
	Total	432.31	70.25	1,864.36	1,657.91

Emery	Area Source	140.86	102.23	60.28	372.35
	Non-Road Mobile	15.52	15.63	160.31	63.08
	On-Road Mobile	112.76	25.84	1,595.53	663.40
	Point Source	873.94	23,651.02	28,206.90	236.27
	Total	1,143.08	23,794.72	30,023.02	1,335.11
Garfield	Area Source	394.78	34.17	71.29	465.10
	Non-Road Mobile	24.22	10.49	76.77	656.26
	On-Road Mobile	37.31	9.01	478.18	208.14
	Point Source	1.15	1.10	7.40	0.93
	Total	457.45	54.77	633.64	1,330.42
Grand	Area Source	87.55	2.97	15.61	285.30
	Non-Road Mobile	29.97	7.59	175.71	904.50
	On-Road Mobile	78.23	16.39	1,042.04	572.12
	Point Source	4.18	0.30	377.81	68.68
	Total	199.93	27.25	1,611.18	1,830.60
Iron	Area Source	313.44	193.08	187.91	1,193.72
	Non-Road Mobile	29.55	33.55	194.27	223.96
	On-Road Mobile	190.72	43.48	2,815.06	1,058.78
	Point Source	15.90	30.21	72.07	99.09
	Total	549.61	300.32	3,269.32	2,575.54
Juab	Area Source	506.44	81.80	123.04	785.43
	Non-Road Mobile	11.66	10.74	805.06	200.55
	On-Road Mobile	128.22	29.45	2,292.07	695.29
	Point Source	121.86	10.05	1,536.13	62.85
	Total	768.17	132.04	4,756.30	1,744.12
Kane	Area Source	91.04	35.79	25.89	196.92
	Non-Road Mobile	20.89	6.63	58.96	715.20
	On-Road Mobile	42.89	9.44	552.50	272.59
	Point Source	0.00	0.00	0.00	0.00
	Total	154.82	51.86	637.35	1,184.71
Millard	Area Source	387.97	103.56	95.96	578.36
	Non-Road Mobile	29.49	26.66	1,289.10	685.07
	On-Road Mobile	143.05	32.22	2,315.55	797.10
	Point Source	270.65	3,612.35	23,316.67	130.85
	Total	831.15	3,774.79	27,017.27	2,191.38

Morgan	Area Source	93.33	0.23	26.83	263.76
	Non-Road Mobile	4.94	5.80	1,297.00	99.52
	On-Road Mobile	38.38	8.43	513.63	199.55
	Point Source	31.27	232.65	1,333.03	50.98
	Total	167.92	247.11	3,170.50	613.81
Piute	Area Source	46.59	14.39	13.01	153.57
	Non-Road Mobile	2.34	2.65	6.32	76.97
	On-Road Mobile	8.54	2.26	118.90	52.48
	Point Source	0.00	0.00	0.00	0.00
	Total	57.48	19.30	138.24	283.02
Rich	Area Source	215.15	12.11	48.14	223.45
	Non-Road Mobile	16.35	11.07	8.41	375.00
	On-Road Mobile	16.45	3.43	188.04	95.46
	Point Source	0.00	0.00	0.00	0.00
	Total	247.95	26.62	244.58	693.91
Salt Lake	Area Source	1,789.80	83.47	1,901.72	19,963.22
	Non-Road Mobile	382.06	554.53	5,184.10	5,452.65
	On-Road Mobile	1,365.65	558.05	23,310.31	9,574.62
	Point Source	1,322.53	4,886.13	7,710.29	2,130.76
	Total	4,860.04	6,082.17	38,106.41	37,121.25
San Juan	Area Source	223.93	34.68	35.39	516.76
	Non-Road Mobile	19.61	11.02	59.24	546.10
	On-Road Mobile	88.85	21.33	1,057.86	470.43
	Point Source	62.28	301.43	473.29	67.32
	Total	394.68	368.46	1,625.78	1,600.60
Sanpete	Area Source	172.72	169.83	120.29	619.97
	Non-Road Mobile	16.53	16.92	47.05	177.06
	On-Road Mobile	76.70	16.21	918.81	566.38
	Point Source	6.14	2.71	32.79	2.68
	Total	272.08	205.67	1,118.94	1,366.09
Sevier	Area Source	219.51	179.37	144.36	685.69
	Non-Road Mobile	35.74	29.21	170.84	402.08
	On-Road Mobile	145.46	42.07	2,975.83	675.07
	Point Source	35.45	10.97	132.05	11.27
	Total	436.17	261.62	3,423.09	1,774.11

Summit	Area Source	213.08	7.35	155.96	913.20
	Non-Road Mobile	32.53	37.61	1,386.09	422.81
	On-Road Mobile	194.95	42.13	2,148.08	833.84
	Point Source	23.71	177.67	472.20	28.37
	Total	464.27	264.76	4,162.33	2,198.21
Tooele	Area Source	895.93	75.07	298.21	2,157.66
	Non-Road Mobile	33.79	28.60	1,337.40	968.26
	On-Road Mobile	243.70	50.56	2,647.99	1,767.52
	Point Source	742.96	112.73	1,210.20	509.42
	Total	1,916.38	266.96	5,493.79	5,402.86
Uintah	Area Source	328.44	17.34	111.08	1,018.01
	Non-Road Mobile	21.38	26.34	174.94	233.48
	On-Road Mobile	109.44	28.01	1,394.03	571.08
	Point Source	21.10	8.31	150.19	50.68
	Total	480.36	80.00	1,830.25	1,873.25
Utah	Area Source	1,427.03	81.92	780.77	9,391.55
	Non-Road Mobile	194.87	227.70	2,674.25	2,087.73
	On-Road Mobile	561.61	208.82	9,483.84	5,116.22
	Point Source	152.08	202.66	652.69	719.84
	Total	2,335.60	721.09	13,591.55	17,315.33
Wasatch	Area Source	86.07	4.72	46.20	457.91
	Non-Road Mobile	16.25	20.33	206.76	131.49
	On-Road Mobile	81.24	18.25	907.21	445.65
	Point Source	2.89	1.03	67.23	5.95
	Total	186.45	44.34	1,227.40	1,041.00
Washington	Area Source	3,118.14	67.16	841.90	7,193.25
	Non-Road Mobile	97.24	102.39	724.59	1,285.40
	On-Road Mobile	339.49	82.85	4,524.91	1,904.83
	Point Source	25.71	20.69	196.30	57.19
	Total	3,580.57	273.09	6,287.69	10,440.66
Wayne	Area Source	64.78	70.17	31.00	89.49
	Non-Road Mobile	9.51	4.81	19.71	212.24
	On-Road Mobile	12.85	2.84	157.71	85.20
	Point Source	0.00	1.24	15.97	1.24
	Total	87.15	79.05	224.39	388.17

Weber	Area Source	445.62	23.84	304.56	4,535.39
	Non-Road Mobile	87.13	91.75	1,674.89	1,238.53
	On-Road Mobile	274.89	96.06	4,479.23	2,399.52
	Point Source	132.61	28.57	421.78	172.80
	Total	940.25	240.22	6,880.46	8,346.23
Portable Equipment	*Area Source*	*0.00*	*0.00*	*0.00*	*0.00*
	Non-Road Mobile	*0.00*	*0.00*	*0.00*	*0.00*
	On-Road Mobile	*0.00*	*0.00*	*0.00*	*0.00*
	Point Source	*54.45*	*64.49*	*441.61*	*60.18*
	Total	*54.45*	*64.49*	*441.61*	*60.18*
Statewide Totals	Area Source	15,144.95	1,660.44	6,932.02	64,790.53
	Non-Road Mobile	1,472.79	1,627.30	22,212.08	22,479.27
	On-Road Mobile	5,404.21	1,667.49	82,449.48	36,277.54
	Point Source	4,463.05	42,954.86	74,660.42	6,903.09
	Total	***26,485.01***	***47,910.10***	***186,254.00***	***130,450.43***
	Point Source Portables	*54.45*	*64.49*	*441.61*	*60.18*
	Total with Portables	26,539.46	47,974.59	186,695.61	130,510.61

Appendix 2

Point Sources Found in Figure 9

Point Sources Found in Figure 9

Tons/Year	Site ID	Company Name
1,633.6	10007	Devil's Slide Plant
430.0	10008	Nucor Steel
277.0	10009	Promontory Plant
249.7	10028	Steel Products Manufacturing
3,295.3	10119	Salt Lake Refinery
408.2	10121	Main Base
1,161.6	10122	Flying J Refinery (Big West Oil Co.)
1,145.0	10123	Phillips Refinery
267.4	10124	Petroleum Products Refining
346.7	10129	County Landfill & Energy Recovery Facility
146.9	10156	Trailer Manufacturing Facility
1,682.0	10335	Salt Lake City Refinery
1,093.2	10346	Smelter & Refinery
148.8	10565	Point of the Mountain Facility
4,836.9	10571	Mine & Copperton Concentrator
5,129.4	10572	Power Plant/ Lab/ Tailings Impoundment
421.1	10676	Shale Processing
158.6	10706	U.S. Army-Dugway Proving Ground
143.3	10707	Grantsville Plant
1,767.8	10716	Rowley Plant
173.5	10725	Hazardous Waste Storage/Incineration
263.7	10790	Main Campus
375.6	10794	Pipe Casting Plant
111.6	10825	Geneva Nitrogen Plant
175.8	10917	Production Plant
208.9	10973	Little Mountain Power Plant
122.5	11339	Deseret Chemical Depot (South Area)
125.3	11841	Commercial Bakery
117.6	11977	Trans-Jordan Landfill
101.3	12054	Legacy Highway Project
149.9	12519	Desert Power Plant