STATE OF UTAH

JON M. HUNTSMAN, JR.
GOVERNOR

OFFICE OF THE GOVERNOR
SALT LAKE CITY, UTAH
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GARY R. HERBERT
LIEUTENANT GOVERNOR

March 12, 2009

Carol Rushin, Acting Regional Administrator
US EPA Region 8
1595 Wynkoop Street
Denver, Colorado 80202-1129

Dear Ms. Rushin:

Re: Utah Area Designation Recommendations for the 2008 Ozone NAAQS

On March 12, 2008, EPA promulgated revisions to the National Ambient Air Quality Standards (NAAQS) for ozone. Section 107(d) of the Clean Air Act (the Act) establishes that it is incumbent on each state to recommend initial designations for all areas within its respective geographical boundary within one year following the date of promulgation of a new or revised standard. Enclosed please find the Utah Area Designation Recommendations for the March 12, 2008 ozone NAAQS.

Further documentation which may be necessary to verify or otherwise meet the requirements of Sections 110 (a) (1) or 172 of the Act will be submitted by Cheryl Heying, Director of the Utah Division of Air Quality. Questions concerning this submittal may be addressed to Ms. Heying at 150 North 1950 West, Salt Lake City, Utah 84116 (801-536-4015).

Sincerely,

Jon M. Huntsman, Jr.
Governor

Enclosure: Utah Area Designation Recommendations for the 2008 Ozone NAAQS

Utah Area Designation Recommendations for the 2008 Ozone NAAQS

State of Utah
Department of Environmental Quality
Division of Air Quality
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March 2009

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Purpose

The purpose of this document is to provide Utah's recommendation regarding area designations for the revised National Ambient Air Quality Standard (NAAQS) for ozone which was developed under section 109 of the Clean Air Act (CAA) on March 12, 2008.

Overview of Ozone in Utah

The occurrence of ozone in the State of Utah should be considered on a regional basis. In general, higher concentrations of ozone are monitored in certain core areas where the majority of Utah's population resides and where most major industry is located. These core areas are also where high local and interstate vehicular traffic predominate. In Utah, this core area is part of a geographical megalopolis region, better known as the Wasatch Front, extending from the Ogden area in Weber County on the north to the Provo area in Utah County on the south, a distance of approximately 90 miles. This area is bounded on the east by the Wasatch Range and on the west by smaller north-south mountain ranges and the Great Basin. The Wasatch Range is actually an extension of the Northern Rocky Mountains which extends southward to Mount Nebo, in southern Utah County.

The yearly trend of NAAQS exceedances for ozone during the last twenty years shows a decline in ozone. This trend has occurred at the same time that the federal standard has twice been tightened. During this same timeframe, counties along the Wasatch Front maintained the applicable standard, if only by the slightest of margins. Ambient ozone data collected in recent years indicates that the 2008 8-hr standard is routinely exceeded at some monitors located within the state's Wasatch Front core area monitoring network, while other monitors located in more peripheral locations along the Wasatch Front do not show violations. This reflects the State's supposition that ozone generated in the major core area of the Wasatch Front actually moves throughout the area and is the probable cause for increased ozone concentrations being recorded in some peripheral locations along the Wasatch Front. A further discussion of this phenomenon can be found later in this document.

Data collected along the Wasatch Front also indicate that ozone is a seasonal problem, characterized by episodic elevated concentrations during the summer months, usually June through August when temperatures routinely approach or exceed one hundred degrees Fahrenheit. These episodes generally occur during periods of stagnant high pressure associated with calm or very light wind conditions and a very stable atmosphere that acts to inhibit any substantial vertical movement of the air. Under these conditions, ozone begins to form in areas where significant emissions of volatile organic compounds (VOC) and oxides of nitrogen ($NO_{x)}$, most prevalent in Salt Lake and Davis Counties, combine in the presence of strong solar heating. Ozone concentrations along the Wasatch Front generally increase from mid-to-late morning until late afternoon when solar intensity reaches its maximum. As the solar intensity begins to subside and evening rush hour traffic increases, data suggests that some of the ozone is scavenged by NO_x and concentrations begin to decrease. Ozone concentrations generally remain at relatively low levels throughout the night and begin to increase the following morning after the rush hour traffic subsides. If high temperatures and light winds persist over a period of two to three days, ozone can continue to form and accumulate along the Wasatch Front core area where it is

contained vertically by nighttime subsidence and horizontally by the local topography as shown in Figure 1 below.

Data from both Utah Division of Air Quality (DAQ) and National Park Service (NPS) monitors located in more rural and remote areas of the state show lower concentrations of ozone than those recorded along the Wasatch Front. In many cases, these remote concentrations are substantially lower, and reflect a normal regional background level of ozone. At times, however, the regional background level of ozone may increase due to ozone transport or as a result of wildfires during the summer season. A reasonable conclusion from available remote monitoring data is that the NAAQS is not exceeded outside of the urbanized or semi-urbanized counties that make up the Wasatch Front.

Ozone is formed by a chemical interaction of VOCs and NO_x in the presence of intense sunlight. Winds that occur during stagnant periods are generally of the diurnal mountain-valley variety, or very light breezes that flow generally north-south along the Wasatch Front. On many occasions under these conditions, areas of higher ozone concentration have been transported by these local breezes. By tracking daily ozone concentrations at various locations along the Wasatch Front, it has been noted that these concentrations increase and decrease in patterns that are consistent with local wind flows. For example, with a light southerly flow, concentrations that were originally higher in Utah or Salt Lake Counties tended to decrease while concentrations that were originally lower in Weber and Box Elder Counties tended to increase. With a light northerly flow, the opposite effect was noted (i.e., concentrations at northern monitors tended to decrease while concentrations at southern monitors tended to increase). The same phenomenon is true for light

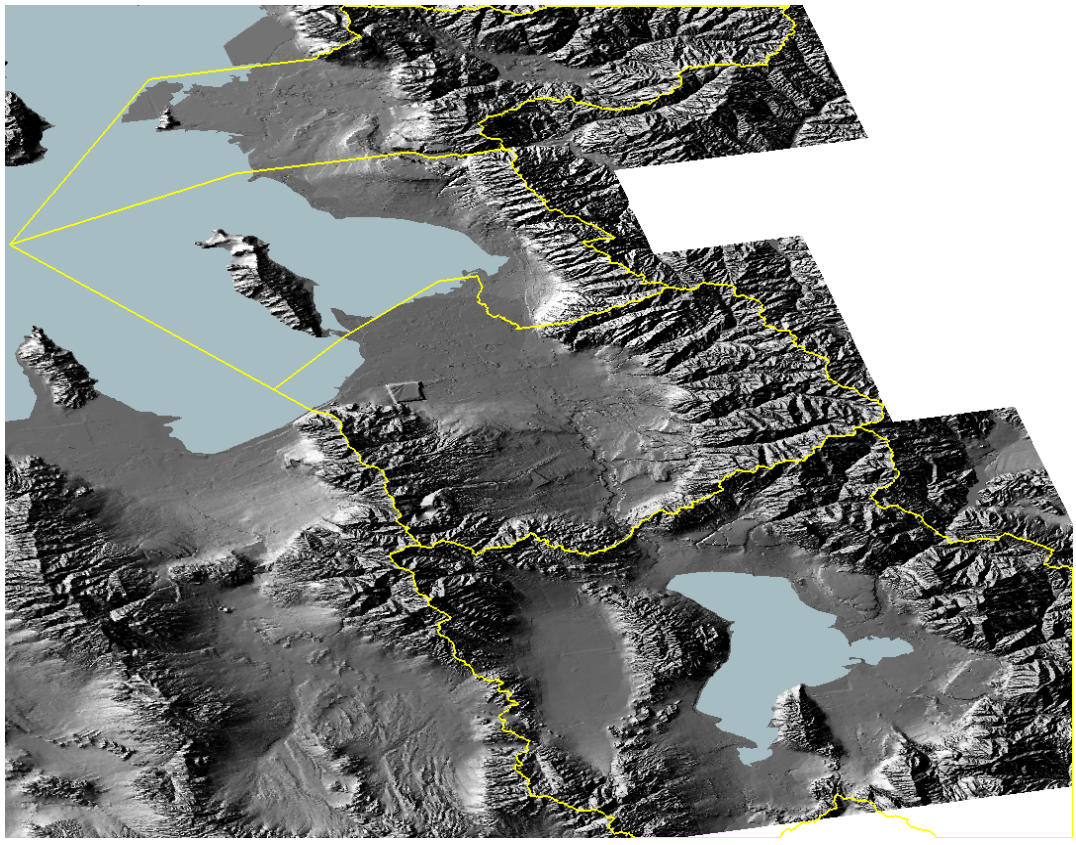


Figure 1. Utah's Wasatch Front extending from Utah County (Lower right) to Box Elder County (Upper left).

diurnal southeast-northwest flows. This local mesoscale transport of ozone along the Wasatch Front also accounts for higher concentrations of ozone being monitored in peripheral areas adjacent to the Wasatch Front core areas where neither sources of VOC nor NO_x in amounts necessary to form ozone are found.

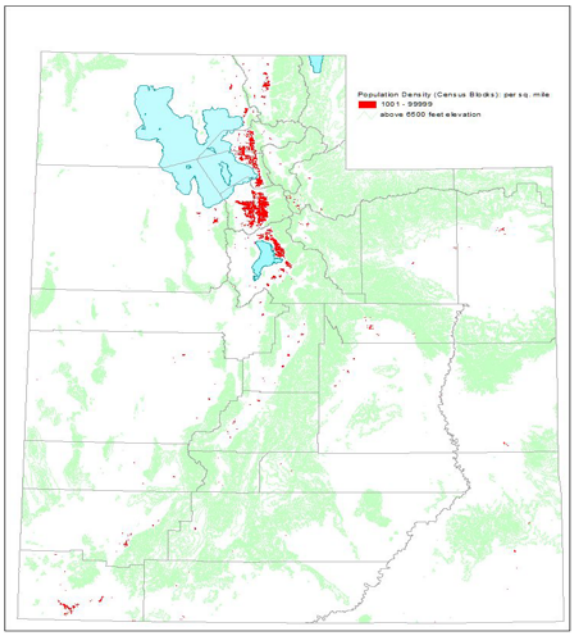
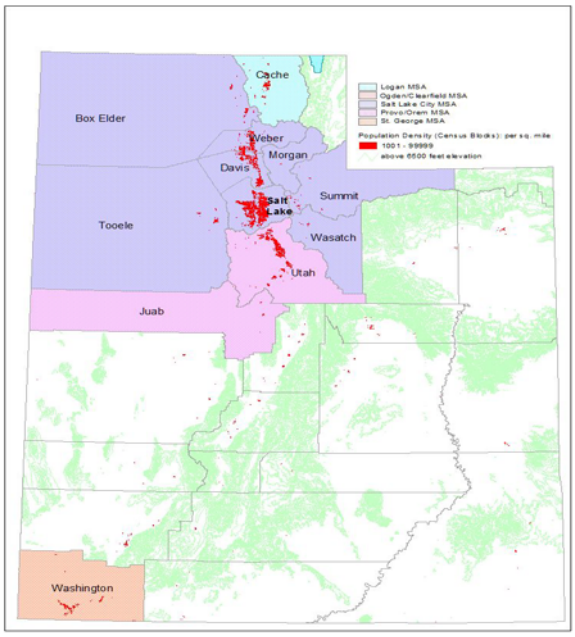


Figure 2. Population Density of Utah



* Combined Statistical Area & Metropolitan Statistical Areas

Figure 3. Population Density w/CSA & MSA*

Ozone is generally considered an urban pollutant since the precursors needed to form it are present in most urban environments and are generally not present in rural environments. This serves to highlight the distinction between urban areas that generally cause pollution and rural areas that may or may not contribute to the ozone problem. Much of this phenomenon is also due to the fact that the bulk of Utah's population is generally located within lowland valley areas along the Wasatch Front in which air is easily trapped either by meteorological conditions or local topography. In other words, it is not enough to simply have an urban area with an urban mix of emissions; there must also be some barrier to dispersion which allows ozone concentrations to build up over a period of time and reach concentrations that eventually exceed the NAAQS.

The foregoing characterization of Utah's ozone problem has shaped the State's approach to making these area designations. The vast majority of Utah is sparsely populated (see Figure 2). Most of the monitoring data has been collected in the heavily populated urbanized areas of the state. This suggests that most of the areas recommended for designation as either "attainment/unclassifiable" will be either in the rural areas of the state or in areas where precursors of ozone are not generated. Those areas recommended for the "nonattainment" designation will be urban areas where most of the sources of ozone precursors are found. However, our modeling domain will be much larger and will include all point sources within the modeling domain.

Some distinctions have been made in the Environmental Protection Agency (EPA) guidance document regarding urban versus 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 urban areas. In Utah there are several instances where both urban and rural areas can be found within a single Metropolitan Statistical Areas (MSA). In many of these instances urban and rural areas have no actual affect on each other. Reasons for this are significant separation due to topographical features and large areas of sparsely populated desert or rangeland, and very large MSAs. Figure 3 displays the population density shown in Figure 2 and also includes an overlay of the MSAs that comprise most of the counties of northern Utah. The Salt Lake-Ogden-Clearfield Combined Statistical Area (CSA) combines the Salt Lake City MSA, the Ogden-Clearfield MSA, the Brigham City Micropolitan Statistical Area (Box Elder County), and the Heber Micropolitan Statistical Area (Wasatch County).

The most noticeable feature of these CSAs and MSAs is their size. The Salt Lake-Ogden-Clearfield CSA contains eight counties and covers 19,819 square miles (larger than nine US states). It extends east/west from the Nevada border to the southern Wyoming border, a distance of over 220 miles, and south from the Idaho border approximately 100 miles. The Provo/Orem MSA contains two counties and covers an east west distance of 170 miles. Each of these MSAs includes densely populated areas, sparsely populated areas, and very large areas with no population at all. The sparse or unpopulated areas are due to extended desert in the west and extreme mountainous terrain in the east. The largest concentration of both population and industry is found in the low valleys west of and adjacent to the Wasatch Front. Smaller concentrations of population are also found in some of the higher valleys east of the Wasatch Range, but there are generally few or no major industrial sources located in these areas. For the reasons cited above, and for additional reasons that will be presented later, Utah feels it is more appropriate to designate nonattainment areas based on the core urban area rather than MSA or CSA boundaries.

The Cache County MSA located in northern Utah should be considered as an entirely separate entity as it is separated from the Wasatch Front by the northern extension of the Wasatch Front Range and is mainly influenced by separate meteorological and topographical factors. In addition, as we will see later in the monitoring section of this document, Cache County is currently in attainment with the ozone standard and always has been. For these reasons Cache County should be treated independently and not be considered as part of the greater Wasatch Front metropolitan area.

The St. George MSA, comprised of Washington County, is located in the extreme southwest corner of Utah. Like Cache County to the north, Washington County is influenced by an entirely separate air shed. The National Park Service operates an ozone monitor at the entrance to Zion National Park, and based on 2006-2008 data from that monitor, Washington County is currently attaining the ozone standard. Washington County air quality will be further discussed later in this report.

San Juan County, located in the southeast corner of Utah, is another area of the state that will also be discussed in this report.

Regional Ozone

Over the past few decades it has become apparent that ground level ozone is not just a local city or urban area problem, but a regional problem. Several studies have found that ozone is present in most areas of the country, even where precursors to ozone are not present. Transport (global and regional) of ozone has been found to be the mechanism that spreads or distributes the ozone from urban source areas, where precursors are readily available, to more rural areas where no anthropogenic precursors are available. Some of the monitored ozone concentrations were attributable to regional background concentrations and, in some instances, portions of total monitored ozone concentrations have been traced to areas along the U.S. West Coast or even Asia. Additionally, smoke from wildfires, from both within the Intermountain Region and from as far away as California has been found to impact local and regional ozone concentrations. The overall effect of this transport is a general concentration of ozone over a large regional area.

In 2001, a Harvard University study[1] was conducted to estimate background ozone concentrations that would exist in the absence of anthropogenic emissions in the surface air over the United States using Global 3-D modeling. They found that these concentrations generally varied from 25–45 ppb, with the highest concentrations found over the Intermountain West region. A depiction of the mean summertime ozone variation across the United States is shown in Figure 4.

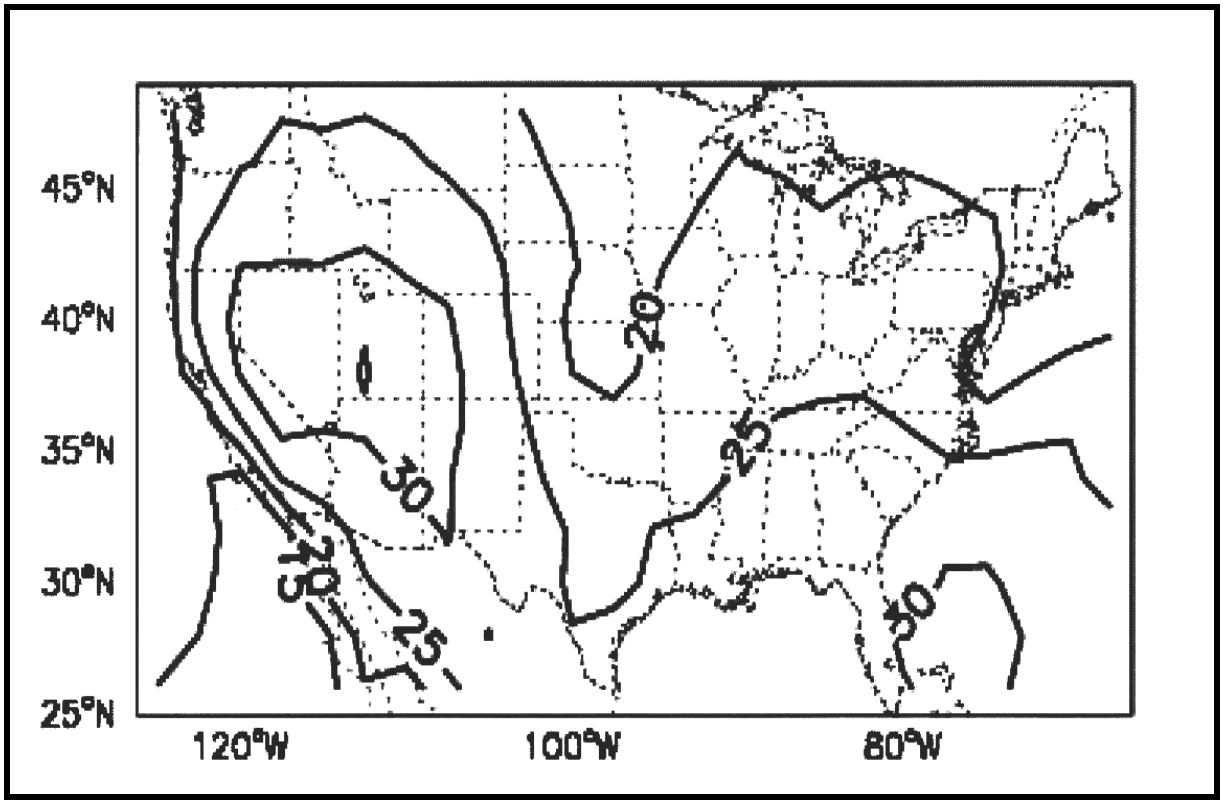


Figure 4. Mean summertime afternoon surface background ozone concentrations

1. "Estimating Background Ozone in Surface Air over the United States with Global 3-D Modeling of Tropospheric Chemistry," Fiore, A.M. & Jacob, D.J., Harvard University Modeling Group, 2001.

In addition, this study made the following conclusions:

- Stratospheric mixing generally accounts for 1-5 ppb of the mean afternoon surface ozone concentration.
- Hemispheric transport from both Asian and European sources can range from 5-12 ppb and generally occurs at intermediate ozone concentrations of 50-70 ppb.
- Regional ozone concentrations range from 8-30 ppb and are very site specific.
- Overall background ozone varies from 20-40 ppb. Higher concentrations of background ozone are generally found at higher elevations in the Intermountain West.

In 2003, a group of scientists used an aerosol analysis model to study the transport of air masses infused with biomass materials from Siberia to North America.[2] Transport of these air masses to North America was confirmed by aircraft and surface observations. The group's findings include the following:

- Siberian biomass fires impacted both CO and ozone concentrations over a wide region of western North America and contributed to exceedances of the ozone air quality standard in the Pacific Northwest.
- Modeled calculation enhancements for ozone were 2-6 parts per billion (ppb) above normal expected concentrations and were consistent with local observations of 5-9 ppb. The average enhancement during periods of low altitude intrusion resulted in observations 9-17 ppb above the normal expected concentration, depending on the site.
- Regression analysis estimated that the Siberian biomass fires contributed 14-15 percent of the total ozone concentrations recorded during high ozone episodes.

In 2006, WESTAR conducted a study[3] to quantify the amount of ozone attributable to 1) natural background ozone, 2) transported anthropogenic ozone, and 3) locally generated anthropogenic ozone for certain large metropolitan areas in the western United States. The results for Salt Lake City showed that during periods with an average peak 8-hour ozone concentration of 91 ppb, 35 ppb were attributable to background ozone, 22 ppb were attributable to transported anthropogenic ozone, and 35 ppb were locally generated ozone. Similarly, during periods with an average peak 8-hour ozone concentration of 77 ppb, 35 ppb were attributable to background ozone, 20 ppb were attributable to transported anthropogenic ozone, and 22 ppb were attributable to locally generated ozone.

From these three studies one could conclude that:

- There is a regional background concentration of ozone present throughout the entire Intermountain West;
- Ozone concentrations in the Intermountain West may be a regional concern;

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2. "Long-range Transport of Siberian Biomass Burning Emissions and Impacts on Surface Ozone in Western North America," Dan Jaffe et.al, Geophysical Research Letters, Vol. 31, 2004

3. "Regional and Local Contributions to Peak Local Ozone Concentrations in Six Western Cities," Sonoma Technology, Petaluma, California, STI-906004-2970-FR, Final Report prepared for the Western States Air Resources Council, May 30, 2006

- Both transport of ozone and smoke from fires affects locally monitored ozone concentrations; and
- The actual amount that transport and wildfires contribute to the overall ozone concentration for a given location varies greatly, and is difficult to quantify except in very specific instances.

Regulatory Background

On March 12, 2008, the EPA promulgated revisions to the NAAQS for ground level ozone. It revised the 8-hour primary (health based) ozone standard to a level of 75 ppb. The previous standard, set in 1997, was 80 ppb. Additionally, the EPA specified the level of the primary standard to three decimal places, thereby eliminating the rounding convention that was present in the previous standard. The EPA also revised the 8-hour secondary (welfare based) ozone standard to be identical to the revised primary standard.

Section 107(d) of the CAA establishes that it is incumbent on each state to recommend initial designations for all areas within its respective geographic boundary following promulgation of a new or revised NAAQS. States are required to submit these recommendations to EPA, based on the most current three year data set, not later than one year after the promulgation of the new or revised standard.

Areas should be designated as attainment, nonattainment, or unclassifiable. The Act allows that areas may be designated as:

> (a) attainment, for any area other than an area identified in clause (b) that meets the national primary or secondary ambient air quality standard for the pollutant; or
>
> (b) 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; or
>
> (c) 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 to provide the State an opportunity to comment. The EPA's designation of areas for the 8-hour ozone NAAQS will be based on the most current three consecutive years of air quality data at the time of the final designation.[4]

4. For the 8-hour ozone NAAQS, it is the three consecutive years of data obtained in accordance with 40 CFR part 50, Appendix I; data used will be quality-assured and meet 40 CFR part 58 requirements (e.g., for monitor siting). Recommended designations should generally be made based on 2006-2008 monitored air quality data and final designations on 2007-2009 data.

Applicable Guidance

On December 4, 2008, EPA issued a guidance memorandum[5] to assist States and Tribes in making their recommendations with respect to ozone. The memorandum recommended that Core Based Statistical Areas (CBSA) or Combined Statistical Areas (CSA) serve as the presumptive boundary for evaluating the geographic boundaries of an ozone nonattainment area. This recommendation reflected a generic assumption that violations of the ozone NAAQS in urban areas may be attributed to contributions from sources distributed throughout the MSA based upon population density, traffic & commuting patterns, commercial development, and area growth. Current CSAs and MSAs in the State of Utah and the counties that are included in these areas are as follows:

- **Logan MSA**
  - Cache County, Utah and Franklin County, Idaho
- **Salt Lake-Ogden-Clearfield CSA**
  - Box Elder County
  - Davis County
  - Morgan County
  - Salt Lake County
  - Summit County
  - Tooele County
  - Wasatch County
  - Weber County
- **Provo Orem MSA**
  - Juab County
  - Utah County
- **St. George MSA**
  - Washington County

Section 107(d) of the CAA addresses the determination of whether an area is to be designated nonattainment. With respect to the 8-hour ozone NAAQS, all areas are to be designated nonattainment if they do not meet the standard or contribute to ambient air quality in a nearby area that does not meet the standard. The guidance memorandum further stated that EPA would consider requests for urban nonattainment area definitions that deviate from the MSA or C/MSA boundary definitions on a case-by-case basis, considering the following factors:

1. Air Quality monitoring data
2. Emissions data
3. Population density and degree of urbanization including commercial development significantly different from surrounding areas
4. Traffic and commuting patterns
5 Growth rates and patterns
6. Meteorology (weather /transport patterns)
7. Geography/Topography (mountain ranges or other air basin boundaries)
8. Jurisdictional boundaries (existing ozone areas)
9. Level of control of emission sources

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5. "Area Designations for the 2008 Revised Ozone National Ambient Air Quality Standards," Memorandum from Robert Meyers dated December 4, 2008

Document Organization

Utah's recommendations concerning area designations for the revised National Ambient Air Quality Standard for ozone will be presented at the end of this 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 the EPA guidance memoranda, the recommendations will need to be supported by considering the nine factors identified in that guidance. The next portion of this document addresses those nine factors.

It should also be kept in mind that the recommendations presented herein represent Utah's preliminary assessment of the spatial distribution of its ozone problem. As actual work proceeds on the implementation plan necessary to address the problem, Utah reserves the right to recommend modifications to the nonattainment area boundaries. Utah will include emission sources outside of the nonattainment area in the control strategies as has been done in prior state implementation plans (SIP) that have been approved by the EPA, and were successful in meeting the NAAQS.

Discussion of EPA Guidance Factors

Factor 1: Air Quality Monitoring Data

In general, Utah monitoring data are collected from Federal Reference Method (FRM) or Federal Equivalent Method (FEM) monitors that are sited and operated in accordance with 40 CFR Part 58. The monitors are sited to address various monitoring objectives, including the assessment of air quality in regions where people live and work; the identification of highly impacted areas; and identification of background concentrations in areas of low impact. In addition, DAQ occasionally sites survey monitors for special purposes in areas where high ambient concentrations might be expected. As discussed earlier, ozone may be characterized as an "urban" pollutant; therefore, in most cases, these monitors have been sited in urban areas. The spatial distribution of these monitors may be seen in Figure 5. The colors of the dots used to approximate the monitor locations show whether the three-year average (2006-2008) of the 4th highest ozone concentration at that monitor is at or below the current 0.075 ppm NAAQS (**green**) or above the NAAQS (**red**). The Santa Clara monitor was placed in operation in July 2008 and does not yet have enough data history to be used for an official attainment determination.

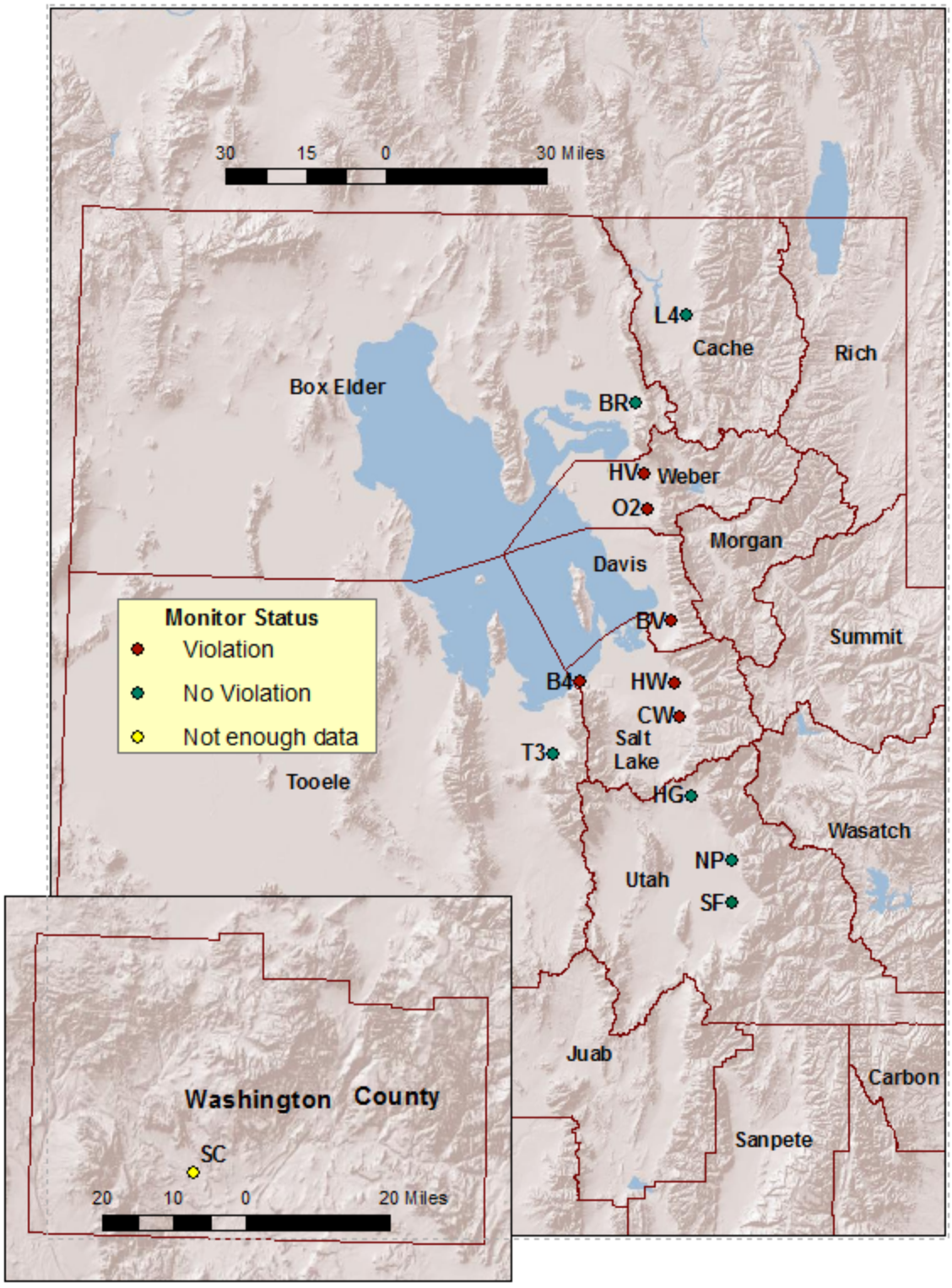

Figure 5. Utah's Air Monitoring Network

Attainment of the primary NAAQS for ozone is determined by the 4th highest concentration recorded at each monitor. Attainment of the ozone standard occurs when the most recent three-year average of the 4th highest concentration recorded at each monitor is less than or equal to 0.075 ppm. Conversely, nonattainment occurs when the most recent three-year average of the 4th highest concentration recorded at each monitor is greater than 0.075 ppm. EPA recommends that

States identify violating areas using the most recent three-year set of air quality data. In Utah, this encompasses the years from 2006 through 2008. Data affected by exceptional events may be excluded from use in identifying a violation if it meets the exclusion criteria. The three-year average data cited in this factor represents both flagged and unflagged data. Since the final designation determination by EPA is not required until March of 2010, data collected in 2009 may be considered as the designation process proceeds.

Table 1 shows the 4th highest ozone concentration as well as the three-year average of the 4th highest ozone concentrations (design value) recorded at each of the monitoring stations in the DAQ network. These are the official monitors discussed previously in this section. An obvious conclusion from Table 1 is that there are several areas of nonattainment to the new 0.075 ppm standard within the monitoring network. These areas are located along the Wasatch Front in Weber, Davis and Salt Lake counties and are highlighted in red in Table 1.

Table 1. Ozone Concentrations from official Utah DAQ Monitors

Monitoring Sites		**4th Highest O_3 Concentration**			**Design Values 3-year Average of the 4th Highest O_3 Concentration[1]**
Name	**County**	**2006**	**2007**	**2008[5]**	**2006-2008[5]**
Salt Lake-Ogden-Clearfield CSA					
Brigham City	Box Elder	0.078	0.077	0.072/0.072	0.075/0.075
Bountiful	**Davis**	0.082	0.082	0.078/0.077	**0.080/0.080**
Washington Terr[2]	Weber	0.083	0.080	No data	n/a
Ogden[3]	Weber	no data	no data	0.075	n/a
Harrisville	**Weber**	0.083	0.082	0.076/0.073	**0.080/0.079**
Cottonwood	**Salt Lake**	0.084	0.082	0.081/0.077	**0.082/0.081**
Beach	**Salt Lake**	0.082	0.082	0.074/0.073	**0.079/0.079**
Hawthorne	**Salt Lake**	0.082	0.079	0.076/0.072	**0.079/0.077**
West Valley[2]	Salt Lake	0.080	0.080	no data	n/a
Herriman[2]	Salt Lake	0.082	0.079	no data	n/a
Tooele	Tooele	0.079	0.076	0.071/0.070	0.075/0.075
Provo-Orem MSA[6]					
North Provo	Utah	0.074	0.075	0.075/0.073	0.074/0.074
Highland	Utah	0.077	0.078	0.072/0.071	0.075/0.075
Spanish Fork	Utah	0.079	0.077	0.071/0.070	0.075/0.075
Non-Wasatch Front Counties					
Logan	Cache	0.073	0.074	0.067	0.071
Santa Clara[4]	Washington	no data	no data	0.063	n/a

1. Concentrations and counties indicated by red indicate violations of the current NAAQS.
2. The Washington Terrace, West Valley and Herriman monitors were shut down in 2008 to make more efficient use of our resources.
3. The Ogden monitor became operational on June 13, 2008.
4. The Santa Clara monitor became operational on July 10, 2008.
5. The left column indicates data with flagged days included. The right column indicates data with flagged days excluded.
6. All monitors in the Provo-Orem MSA are attainment for ozone.

Monitored concentrations in Utah County (North Provo, Highland and Spanish Fork), Box Elder County (Brigham City), Cache County (Logan), Tooele County (Tooele), and Washington County (Santa Clara) currently show attainment of the NAAQS. Monitors located in Box Elder, Tooele and Utah counties show that concentrations there are very close to exceeding the standard, and these areas will be discussed throughout this report.

The Logan monitor in Cache County and the Santa Clara monitor in Washington County show that the monitored concentrations in these areas are well below the NAAQS; therefore Cache and

Washington counties will not be considered any further as potential areas for nonattainment designations.

EPA has chosen to use NPS CASTNet monitoring data in their preliminary nonattainment decision making process. Data from national parks and monuments located within or in close proximity to the State of Utah are included in Table 2 to get a reasonable indication of ozone concentrations in remote areas of the State and Region. Again, it should be kept in mind that CASTNet monitors do not meet the same quality assurance standards as those maintained by the State of Utah and, as such, should be considered unofficial indicators.

Table 2. Ozone Concentrations from National Park Service (CASTNet) Monitors and one monitor located in "Indian Country."

Monitoring Sites		4th Highest O_3 Concentration			3-year Average of the 4th Highest O_3 Concentration
Name	**Location**	**2006**	**2007**	**2008**	**2006-2008**
Washakie Res[1]	Northern UT	0.076	0.078	0.073	0.075
Dinosaur NM	Northeast UT	no data	0.063	0.067	n/a
Canyonlands NP	Southeast UT	0.070	0.072	0.071	0.071
Mesa Verde NP	Southwest CO	0.074	0.070	0.069	0.071
Zion NP	Southwest UT	0.075	0.071	0.073	0.073
Grand Canyon NP	Northwest AZ	0.070	0.069	0.071	0.070
Great Basin NP	East Central NV	0.072	0.075	0.071	0.072

1. The Washakie monitor is located near Portage, Box Elder County, Utah, in "Indian Country". This monitor is under the control of the Northwestern Band of the Shoshone Nation. It is a Federal Reference Method monitoring site.

Both DAQ and NPS monitors located in remote areas in and around the State of Utah indicate that rural areas of Utah are not violating the 0.075 ppm NAAQS.

Factor 2: Emission Data

Table 3 shows precursor component emissions for ozone in the counties under consideration for nonattainment designations. In the case of VOCs, biogenic emissions have been eliminated from consideration to get a clearer understanding of county industrial emissions. In addition, non-ozone season emissions have also been deleted for each county to present a better picture of the actual ozone season precursors available during the summer ozone season.

Table 3. Ozone Precursor Emissions (Utah 2005 Emission Inventory)

Wasatch Front MSA Counties	VOC Emissions Not counting Biogenics (tpy)	Ozone Season VOC Emissions (tpy)	NO_x Emissions (tpy)	Ozone Season NO_x Emissions (tpy)
Box Elder	7,382	2,228	5,617	1,326
Davis	11,635	6,994	10,741	2,627
Morgan	613	276	3,170	789
Salt Lake	37,121	24,069	38,106	9,779
Summit	2,198	1,102	4,162	1,035
Tooele	5,402	2,022	5,494	1,372
Weber	8,346	5,332	6,880	1,663
Wasatch	1,041	557	1,227	305
Utah	17,315	10,891	13,591	3,473
Juab	1,744	477	4,756	1,171

Note: Non ozone season emissions including agricultural burning and harvesting, and all residential and wood combustion categories have been subtracted from total emissions to give a better picture of both VOC and NOx emissions during the ozone season. These emissions do not take place during the ozone season.

Salt Lake, Davis and Weber Counties collectively produce 67.4 % of the VOCs and 59.8 % of the NO_x that is monitored along the Wasatch Front. Utah and Juab Counties collectively have more moderate VOC and NO_x emissions and account for 21.1 % of the VOC and 19.7 % of the NO_x. Box Elder and Tooele Counties, which are located further from the central core of the Wasatch Front, have much lower VOC and NO_x emissions, and together account for only 7.9 % of the VOC and 11.5 % of the NO_x respectively. Morgan, Summit and Wasatch Counties, even though they are included in the Salt Lake-Ogden-Clearfield CSA, together only account for 3.6 % of the VOC and 9.0 % of the NO_x emissions during the ozone season. These percentages are depicted in the following pie charts.

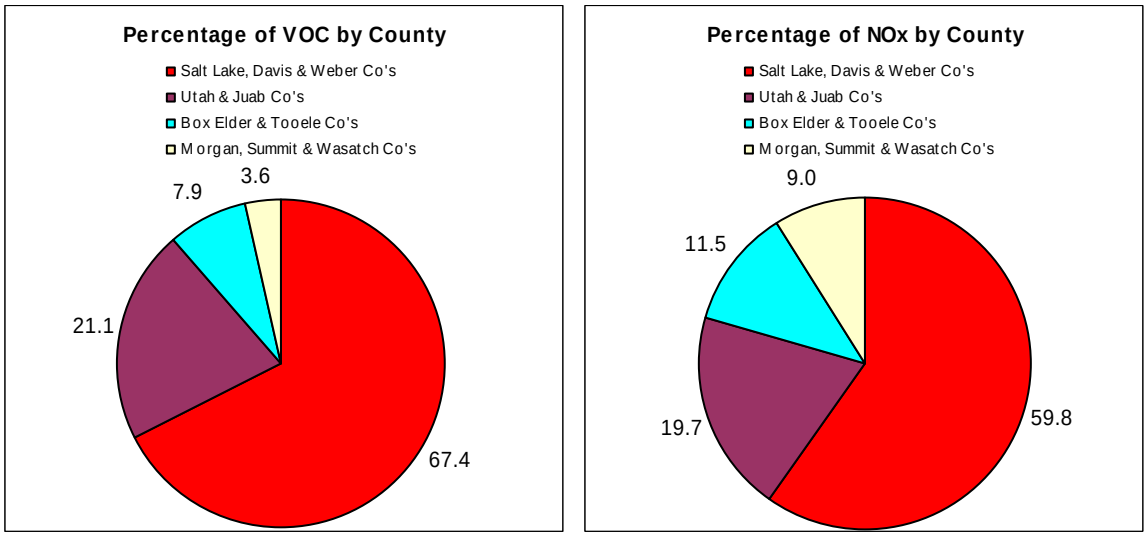

Figure 6. Percentage of VOC and NOx produced along the Wasatch Front (by Counties)

In the case of both Box Elder and Tooele counties, the majority of VOC and NO_x emissions are generated from sources that are located in the extreme eastern portions of these two counties; the western areas of both counties are very sparsely inhabited desert areas. Any VOC or NO_x produced in these west desert areas would come from sources located far from populated core areas (reference Figures 2 & 3).

In Weber County, the majority of both VOC and NO_x emissions are from sources located only in the western portion of the county. Western Weber County is part of the core nonattainment area of the Northern Wasatch Front because it is the home to several industrial sources that produce ozone precursors. The eastern portion of Weber County and all of Morgan County are located east of the Wasatch Range and, with the exception of the Devil's Slide cement plant located in extreme eastern Morgan County, have only minor emissions of both VOC and NO_x. The Wasatch Range prevents emissions from eastern Weber County and Morgan County from impacting in the core nonattainment area (see table 8).

Summit County, located east of Salt Lake City, extends over 100 miles east from the Wasatch Range to the southern border of Wyoming. With the exception of one moderate point source, emissions of VOC and NO_x in Summit County are very low.

Juab County which is part of the Provo/Orem MSA extends from the Nevada border on the west to Mount Nebo, the southern most extension of the Wasatch Range, on the east. Like Tooele and Box Elder counties, it has little or no population west of the I-15 corridor which is located in the

extreme eastern end of the county. The only significant industrial source of emissions in the county is the Leamington Cement Plant located in a mountainous area 35 miles west of Nephi.

Cache County has relatively low VOC and NO_x emissions during the ozone season. Washington County, located in the extreme southwest corner of Utah, has low to moderate VOC and NO_x emissions.

In Section IX, Part D of the Utah State Implementation Plan which was submitted to EPA in January 2007, DAQ demonstrated that both VOC and NO_x emissions along the Wasatch Front are projected to continue decreasing thorough at least 2014. This is demonstrated in the following VOC and NO_x projection graphs (Figures 7 and 8) taken from the SIP:

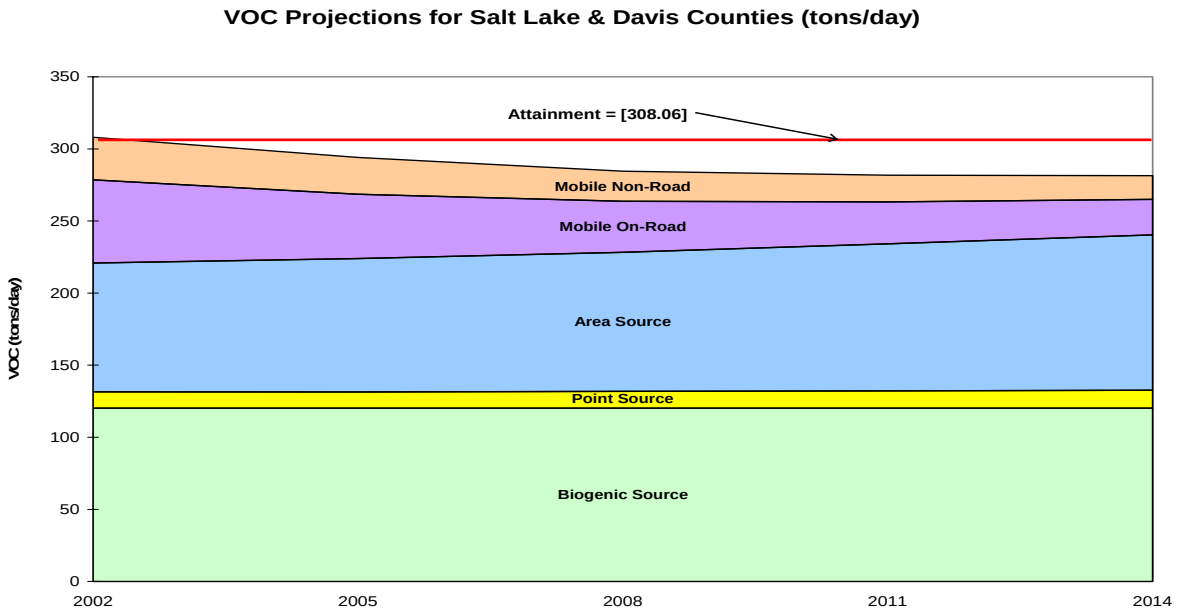

Figure 7. VOC Projections through 2014

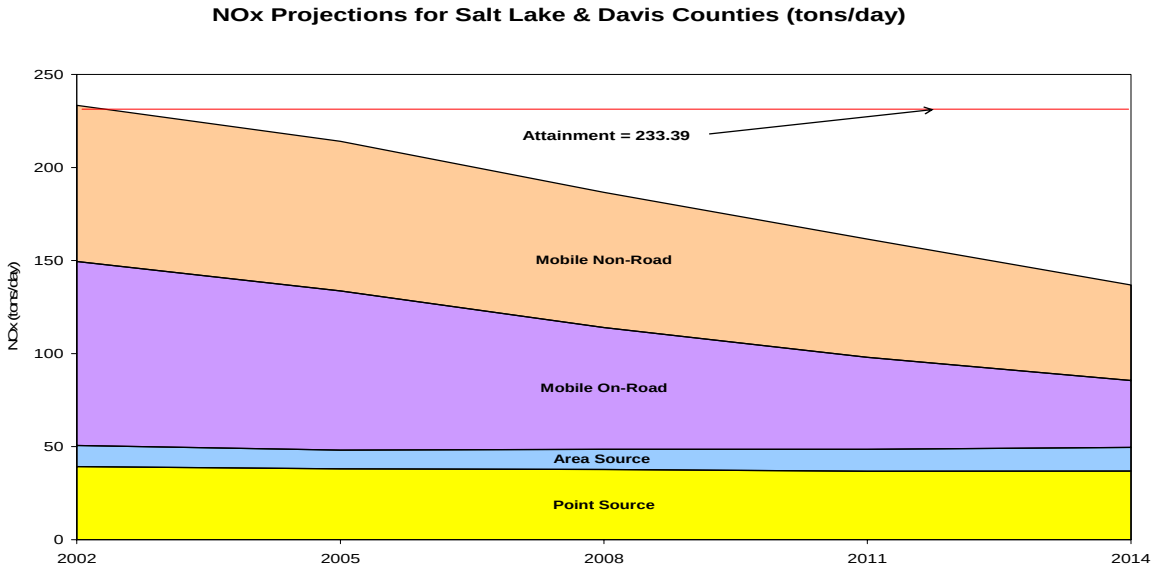

Figure 8. NOx Projections through 2014

Based on the relative emission levels presented in Table 3 and Figure 6, the majority of ozone precursor emissions along the Wasatch Front come from sources in the western portion of Weber County, Davis County and Salt Lake County. Utah County does produce a moderate amount of precursor emissions in the southern part of the county, but their effects are mainly felt only within Utah County due to the topography of Utah Valley. The remaining Wasatch Front counties, Box Elder, Juab, Morgan, Summit and Wasatch, have low or no impact on concentrations in the core area.

Factor 3: Population Density

Urbanization refers to a high concentration of population. It refers to populations that are directly attributable to or located within cities or large metropolitan areas. It is the opposite of rural, which refers to country areas with relatively low populations spread over larger areas. Directly associated with urbanization is the mix of human related emissions that can lead to elevated levels of ozone. EPA has made urbanized areas the focus of its guidance concerning violations of the ozone NAAQS, largely because precursor emission sources associated with both human and industrial activities occur with much greater frequency in these more populous areas. Table 4 below shows the population density in counties that are potential candidates for nonattainment areas. Population data from the most recent 2000 census has been plotted (persons/square kilometer) in Figure 9 for a large domain area extending from the Idaho border to central Utah. This is the area that includes the greater Wasatch Front, where approximately 85 % of Utah's population resides.

Table 4. Population Densities in Counties being considered as potential candidates for Nonattainjment Areas

County	Initial State Recommendation (Based on monitoring data)	2005 Population	2005 Population Density (Population per square Km)
Salt Lake-Ogden-Clearfield CSA			
Box Elder	Attainment	45,142	18
Davis	**Nonattainment**	276,374	1,098
Morgan	Attainment	8,516	36
Salt Lake	**Nonattainment**	970,748	3,082
Summit	Attainment	36,283	41
Tooele	Attainment	51,835	18
Wasatch	Attainment	19,999	34
Weber	**Nonattainment**	212,707	829
Provo-Orem MSA			
Utah	Attainment	453,977	546
Juab	Attainment	8,974	5
Non-Wasatch Front MSA Counties			
Cache	Attainment	103564	202
Washington	Attainment	117,385	124

Note: Data obtained from State of Utah county census data

When considering emissions of the precursors of ozone, population can be tied to emissions labeled as point source, area source, and mobile source emissions. It is fairly common for large point source industries to be co-located within or near large urban areas for many reasons, including access to human resources, educational institutions, transportation, distribution facilities, etc. Emissions from many of the area source categories are calculated on a per-capita

basis. In developing commonly used emission factors, it is 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 within a given area. This suggests that the bulk of the point source, area source, and mobile source emissions originate within regions with higher population densities which are shown in Figure 9.

The risk of human exposure to unhealthy concentrations of ozone is greatest within densely populated areas. The distribution of the monitoring network attempts to address this by providing ozone monitoring in and around highly populated areas. This is illustrated by comparing Figures 5 and 9. As shown in Figure 9 the eastward extension of the population density essentially ends at the western border of the Wasatch Range.

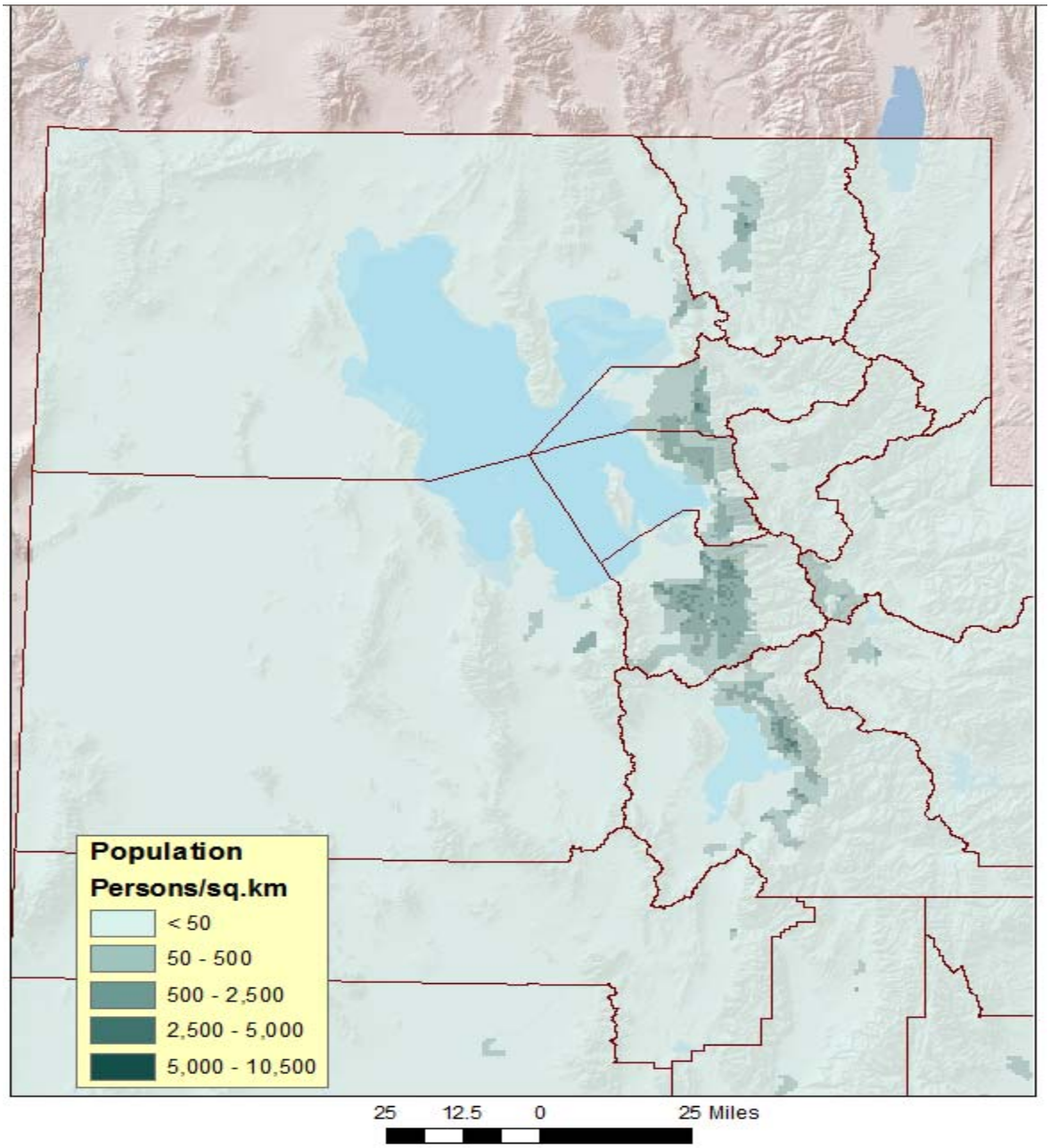

Figure 9. Population Density (Wasatch Front) with Counties

There are several population centers located in the upper valleys east of the Wasatch Front, but these are mostly suburban farming communities with little or no industrial base. These areas will be addressed in the discussion of Factor 8 and in the "Additional Areas" section following the discussion of Factor 9.

Thus far, the discussion has centered on northern Utah, which includes the Greater Wasatch Front. The Greater Wasatch Front is Utah's most urbanized area, and is the only area to violate any of the prior NAAQS for ozone. Figures 2 and 3 show another area of the state, which may warrant some consideration on the basis of population and to some degree urbanization. The populous region in the southwest corner of the State is the city of St. George which has a population of sixty-five thousand (there are about one-hundred twenty thousand people in the greater St. George area). Consideration of this region would 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 Washington County will be discussed further.

Factor 4. Traffic and Commuting Patterns

Data presented in Table 5 displays vehicle miles traveled, the number of commuters driving, in county and out-of-county, and the percentage of commuters that commute to other counties to work, in areas being considered for nonattainment designations.

Salt Lake County is the destination for the largest number of out-of-county commuters from Davis, Tooele and Utah counties. Conversely, Davis and Utah counties are the destinations for the largest number of out-of-county commuters from Salt Lake County. Most out-of-county commuters from Box Elder County commute to Weber County for work and most out-of-county commuters from Morgan and Weber County commute to Davis County for work. Similarly most out-of-county commuters from Tooele, Summit and Wasatch counties commute to Salt

Table 5. Traffic and Commuting Patterns (2005 Data)

County	Initial State Recommendation (Based on Monitoring Data)	2005 VMT (Millions/Year)	Commuting Within County (number)	Commuting to other Counties (number)	Commuting to other Counties (% of total)
Salt Lake-Ogden-Clearfield CSA					
Box Elder	Attainment	782.7	13,570	4,330	24.2
Davis	**Nonattainment**	3,352.0	61,208	50,567	45.2
Morgan	Attainment	109.2	1,217	1,930	61.3
Salt Lake	**Nonattainment**	7,511.9	411,283	24,189	5.6
Summit	Attainment	551.4	10,486	4,912	31.9
Tooele	Attainment	804.2	9,784	7,655	43.8
Wasatch	Attainment	226.8	3,857	2,968	43.5
Weber	**Nonattainment**	1,994.6	64,671	25,975	28.7
Provo-Orem MSA					
Utah	Attainment	4,214.8	140,843	21,050	13.0
Juab	Attainment	342.9	2,011	1,332	39.8
Non-Wastach Front MSA Counties					
Cache	Attainment	935.9	39,235	3,987	9.2
Washington	Attainment	1,112.8	32,708	977	2.9

Note: Data obtained from www.epa.gov/ttn/naaqs/pm/pm25_2006_techinfo.html. (VMT by county, County-to County worker flows)

Lake County to work. Most out-of-county commuters from Juab County work in Utah County. Essentially most of the out-of-county commuters travel into the core metropolitan areas to work and return commute to their home counties after work.

This is evidenced by the fact that several of the counties that are candidates for nonattainment show a higher percentage of commuters traveling to Salt Lake County than those traveling from Salt Lake County to other counties.

In addition, from table 5 it is obvious that commuting trips from counties that make up the periphery of the Wasatch Front core area (Box Elder, Morgan, Summit, Tooele, and Wasatch) are insignificant when compared to the number of in-county trips within the core counties (Davis, Salt Lake, and Weber).

Hill Air Force Base, located in northern Davis County, is one of the largest employers in the state. It employs people from all counties located along the Wasatch Front. On the other hand, the vast majority of employees at Brigham Young University, another large employer in the state, commute mainly from within Utah County.

Mobile sources have always been a significant source category in the attribution of NO_x which is one of the precursor gasses needed to form ozone. Without current federal requirements that mandate improvements in NO_x emissions from cars and light-duty trucks, it is unlikely that the previous (0.08 ppm) ozone standard could have been attained along the Wasatch Front. Mobile sources currently account for approximately 65% of the NO_x within the areas likely to be designated nonattainment for ozone. The two largest Metropolitan Planning Organizations (MPOs) for the Wasatch Front have provided detailed emissions data for use in modeling exercises. Most significant is the information concerning vehicle miles traveled (VMT). 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. 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 (see Figure 10), the result is a very good approximation of Utah’s urban population distribution.

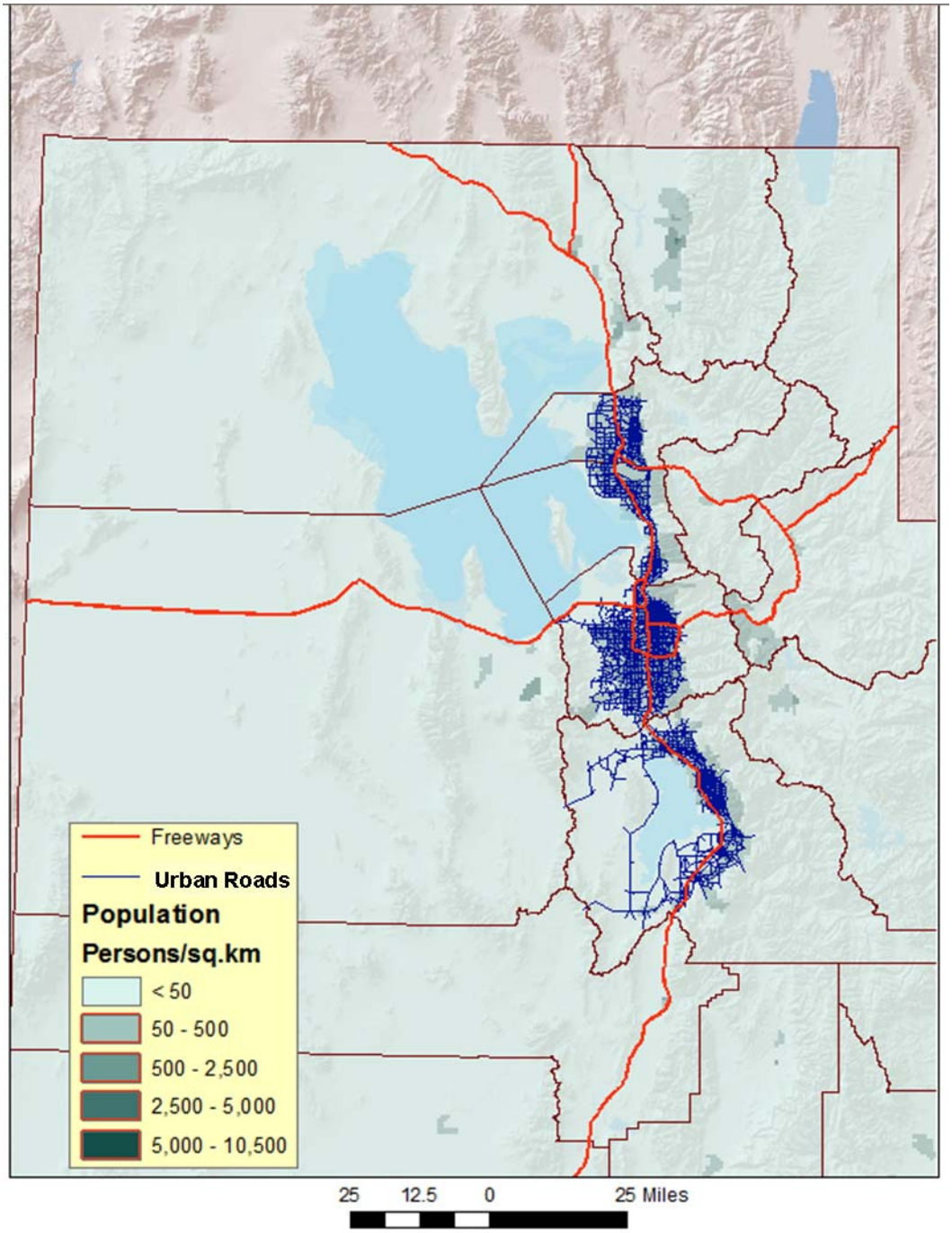

Figure 10. Population Density and Area Roadways

Factor 5. Growth Rates and Patterns

This factor looks at actual population and VMT growth from 2000 to 2005 as well as forecasted population and VMT growth to 2020. Generally, counties with rapid or higher than average population and VMT growth are found to be integral parts of an urban core area. Tables 6 and 7 show the most recent population and VMT projections for counties that could be considered for a nonattainment designation. The tables are based on actual 2000 and 2005 census and VMT data with projections to 2010 and 2020. Table 6 shows that both Salt Lake and Utah counties are expected to have the highest population growth of all counties located along the Wasatch Front

over the next twelve years. Utah County's anticipated population growth rate from 2010-2020 is, in fact, one and one-half times that of Salt Lake County's. This expected growth correlates quite well with the current location of Utah's major industrial and educational infrastructure.

Davis County, which borders Salt Lake County on the north, is expected to have the next highest population growth with Weber County close behind. These four counties, which make up the core emissions area of the Wasatch Front, will account for approximately 82.5 percent of the Wasatch Front population growth by 2020. Tooele, Box Elder and Juab counties, located on the northern and western periphery of the major core areas, and Morgan, Summit and Wasatch counties, located east of the Wasatch Range, will also experience significant increases in their population numbers, but will only account for 17.5 percent of the core area population growth by 2020.

When considering Metropolitan Planning Organizations (MPOs), The Wasatch Front MPO, consisting of Salt Lake, Davis, Weber, Morgan and Tooele counties, is expected to have a

Table 6. Projected Population Growth (2000-2020)

Area	2000 Actual	2005 Actual	Actual Increase 2000-2005	2010 Estimated	Estimated Increase 2005-2010	2020 Estimated	Estimated Increase 2010-2020
Salt Lake-Ogden-Clearfield CSACounties							
Box Elder	42,860	45,142	2,282	49,254	4,112	61,675	12,421
Davis	240,204	276,374	36,170	304,502	28,128	352,320	47,718
Morgan	7,181	8,516	1,335	10,589	2,073	16,756	6,167
Salt Lake	902,777	970,748	67,971	1,053,258	85,510	1,230,817	177,559
Summit	30,048	36,417	6,369	44,511	8,094	65,001	20,490
Tooele	41,549	51,835	10,293	67,150	15,315	95,696	28,546
Wasatch	15,433	20,138	4,705	25,516	5,378	37,082	11,566
Weber	197,541	212,707	15,133	230,145	17,438	271,339	41,194
Provo-Orem MSA							
Juab	8,310	8,974	664	10,519	1,545	14,158	3,639
Utah	371,894	453,977	82,083	527,502	73,525	651,319	123,817
Non-Wasatch Front MSA Counties							
Cache	91,897	102,477	10,580	114,304	11,827	147,776	33,472
Washington	91,104	125,010	33,906	162,544	37,534	251,896	99,352
Areas/MPO's							
Bear River	136,712	149,705	12,993	165,705	16,000	211,898	46,193
Wasatch Front	1,389,252	1,520,189	130,973	1,665,238	145,049	1,966,372	301,134
Mountainland	417,375	510,532	93,157	597,529	86,997	763,402	165,873
Southwest	135,969	176,202	40,233	223,846	47,644	335,025	111,179
State of Utah	2,246,553	2,528,926	282,373	2,833,337	304,411	3,486,218	652,881

Note: Data obtained from www.governor.utah.gov/dea/projections.html (Governor's Office of Planning and Budget – GOPB).

population increase of over 300,000 between 2010 and 2020. The Mountainland Association of Governments (MAG), consisting of Utah, Summit and Wasatch counties, is expected to have a population growth of over 165,000 during the same time period. These increases translate to an 18.1 percent increase for the Wasatch Front MPO and a 27.8 percent increase for the Mountainland MPO.

As we look at Table 7 below, it should be noted that there are many similarities between population growth and VMT growth. With the exception of Box Elder County that experienced an actual decrease in VMT between 2000 and 2005, all counties in the area are projected to have significant population and VMT growth through 2020.

Table 7. Projected Annual VMT Growth in Greater Wasatch Front Area (Millions)

County	2000 Actual	2005 Actual	Actual VMT Increase 2000-2005	2010 Estimated	Estimated VMT Increase 2005-2010	2020 Estimated	Estimated VMT Increase 2010-2020
Salt Lake-Ogden-Clearfield CSA							
Box Elder	2.96	2.92	(.040)	3.55	0.63	4.85	1.30
Davis	5.72	6.21	0.49	7.19	0.98	8.80	1.61
Morgan	0.38	0.38	0	0.46	0.08	0.63	0.17
Salt Lake	21.63	23.36	1.73	27.27	3.91	33.49	6.22
Summit	2.12	2.03	(0.09)	2.46	0.43	3.37	0.91
Tooele	1.82	2.37	0.55	2.88	0.51	3.95	1.07
Wasatch	.64	.82	0.18	1.00	0.18	1.37	0.37
Weber	3.98	4.31	0.33	4.56	0.25	6.10	1.54
Provo-Orem MSA							
Juab	1.04	1.17	0.13	1.42	0.25	1.95	0.53
Utah	8.62	10.01	1.39	11.48	1.47	14.48	3.00

Note: Data obtained from Wasatch Front Regional Council, Mountainland Association of Governments, Utah Dept of Transportation, and Governors Office for Planning and Budget-GOPB.

Similar to Table 6 for population growth, Table 7 shows that, over the next twelve years, Salt Lake and Utah counties are expected to have the highest VMT growth of all the counties along the Wasatch Front area. From the data we can calculate that, from 2010-2020, Weber, Davis, Salt Lake, and Utah County's expected VMT growth rates will be 33.8 %, 22.4 %, 22.8 % and 26.1 % respectively. Once again, and with numbers similar to those for population growth, these four counties will account for 74 percent of the areas VMT growth by the year 2020.

Factor 6. Meteorology

The quality of Utah's air is generally good, with the exception of certain episodic periods during which the air quality is degraded. In the case of ozone, these episodes are most always associated with a semi-permanent high pressure ridge that becomes stationary over the intermountain region, clear skies, intense direct sunlight, and stagnant air with very light surface wind movement. When these meteorological conditions occur simultaneously, they can aid in the formation of ozone while at the same time providing minimal vertical mixing.

Under these stagnant conditions, emissions produced within the populated urban valley areas do not disperse and are maintained in the bowl-shaped valleys. As a result, increased concentrations of ozone are able to build up over a period of several days and to actually meander or oscillate north/south along the Wasatch Front. Under proper conditions, air originating in a southern area could move northward along the Wasatch Front, and conversely, air originating in a northern area could travel southward along the same path.

Actual day-to-day transport of the ozone along the Wasatch Front is mainly influenced by the diurnal effects of the local mountain/valley airflow caused by the Great Salt Lake and Utah Lake on the west and the very prominent Wasatch Range on the east (see table 8). As mentioned above, areas of high ozone concentration have been shown to oscillate both north and south along the Wasatch Front. They also move east and west from areas adjacent to the Wasatch Front to areas over the Great Salt Lake in Weber, Davis and Salt Lake Counties and over Utah Lake in Utah County. In

all cases the general westward movement occurs during the late evening and nighttime hours and the reverse eastward movement occurs during the daylight hours. This is a typical mountain valley flow.

In the case of Box Elder County in the north and Tooele County in the south, it is possible that the diurnal air flow moves air containing "ozone clouds" into and out of these counties on a routine basis and could be responsible for some of the higher concentrations monitored in these counties. In essence, both Box Elder and Tooele Counties are not significant emitters of ozone or its precursors, but receptors. The same could be said for all counties east of the Wasatch range and for Juab County south of the Wasatch Front.

Factor 7. Geography/Topography

The Wasatch Range, extending from near the Idaho border to Mt. Nebo, at the southern tip of the Northern Rocky Mountains, is a formidable obstacle to surface air mass movement toward the east. A satellite view of the region is provided in Figure 11. Probably the most prominent feature in this figure is the Wasatch Front which functions as the eastern boundary of the Great Basin. Here, the Wasatch Mountains rise abruptly to elevations of between 4,000 to 6,000 feet above the valley floor and help to define the Wasatch Front urban areas from Brigham City on the north to the numerous metropolitan areas in Utah County on the south. These valleys are bound on the West by the Great Salt Lake in the north and the Oquirrh Mountains, which also rise 4,000 to 5,000 feet above the valley floor, in the south. In an area of flat terrain one would expect an air mass to gradually be transported in a direction consistent with the prevailing air flow. Conversely, in an area of mountainous terrain, as is the case of the valleys along the Wasatch Front, one would expect the terrain to define the air mass boundaries and movement. With prevailing winds from the west through the north, the high terrain with its bowl shaped valleys that open to the north and west routinely functions to block any eastward horizontal movement of a stagnant air mass. In effect, the local topography actually contains stagnant air masses within these valleys.

To help appreciate the significance of the barrier that the Wasatch Front Range poses to the eastward horizontal movement of air, Table 8 gives the average valley floor elevation at several sites along the Wasatch Front and the average elevation of the Wasatch Mountain Range directly east of the valley floor location.

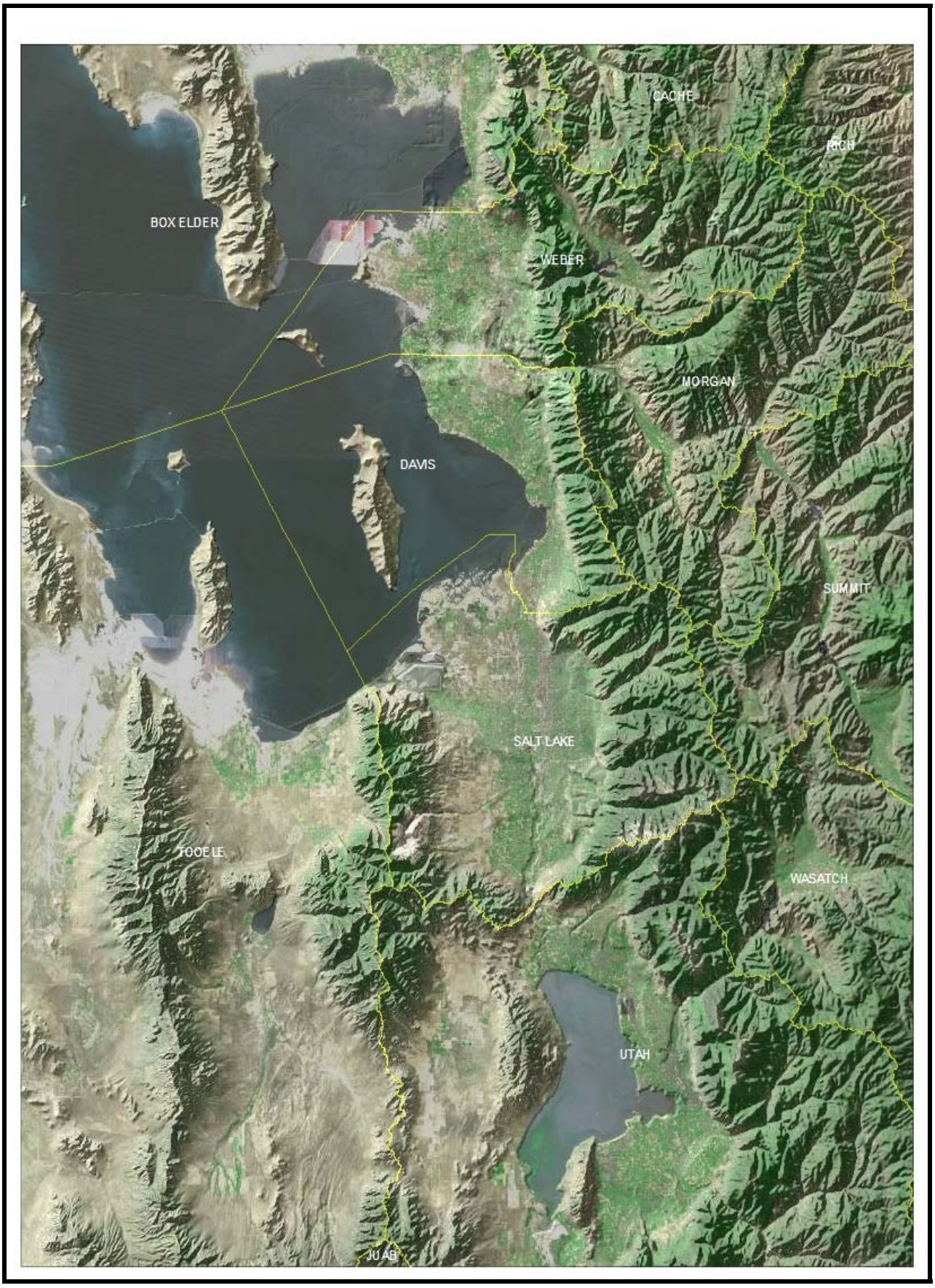

Figure 11. Wasatch Front Topography

Table 8. Elevations of Valley Floor and Adjacent Mountains along the Wasatch Front

Box Elder County	**Valley Elevation**	**Mountain Elevation**	**Elevation difference**
Tremonton	4320 ft	8979 ft	4659 ft
Honeyville	4291 ft	9330 ft	5039 ft
Brigham City	4363 ft	8035 ft	3672 ft
Weber County			
Harrisville	4390 ft	9196 ft	4786 ft
Ogden	4350 ft	9238 ft	4888 ft
Davis County			
Kaysville	4363 ft	9297 ft	4934 ft
Bountiful	4283 ft	8819 ft	4536 ft
Salt Lake County			
Salt Lake City	4363 ft	9107 ft	4744 ft
Cottonwood	4455 ft	9176 ft	4721 ft
Utah County			
Highland	4950 ft	10,698 ft	5748 ft
Provo	4691 ft	10,630 ft	5939 ft
Spanish Fork	4590 ft	9430 ft	4840 ft
Average	**4451 ft**	**9328 ft**	**4876 ft**

As discussed in the meteorology section, it has been found in several studies that concentrations of ozone trapped in large mountain valleys along the Wasatch Front, such as the Salt Lake Valley and Utah Valley, actually move horizontally within or in and out of the valleys with the diurnal mountain-valley flow. In the Salt Lake Valley, for instance, the nighttime flow generally moves the air to the northwest over the eastern portion of the Great Salt Lake while the daytime flow moves the same air back southeastward into the valley where it is contained by the Wasatch Range. In Utah Valley the air is more contained and generally moves westward over Utah Lake in the evening and eastward again during the day. In some instances, however, the air mass in either the Salt Lake Valley or Utah Valley has moved north or south to affect the other valley. In the region north of Salt Lake City air masses have a tendency to move both north and south along the Wasatch Front as well as east and west with the diurnal flow.

Not only does the topography of these regions act as a barrier to air movement during conditions which lead to elevated concentrations of ozone, it also acts as the primary factor in determining where the population is located. In other words, the lower valleys which contain the air during periods of summertime stagnation are also the areas within which most people choose to live. These populations produce the emissions which lead to ozone formation under the conditions described above.

Both Figure 11 and Table 8 show that much of the eastern area of the Wasatch Front counties is at a much higher elevation than the adjacent western valleys, and would therefore not experience the high concentrations of ozone produced in these urban valleys. These regions would have neither the sources of emissions necessary to produce high ozone 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 mountainous terrain not be included in a description of nonattainment area(s).

Factor 8. Jurisdictional Boundaries

In this factor we will look at jurisdictional boundaries and regional government organizations that have law-making authority for these areas. When considering these organizations, and their areas of jurisdiction, it will become clear that the implementation of most of the required control strategies necessary to combat precursors to ozone could be best implemented on a county basis.

Box Elder County

Box Elder is a very large and mostly rural county located in the northwest corner of Utah. Ninety-nine plus percent of the population is concentrated in the extreme eastern portion of the county along the northern Wasatch Front and closely associated with the I-15 and I-84 freeways that extend north into Idaho. The western three-quarters of the county, extending to the Nevada border, is made up of a few unincorporated towns with populations ranging from zero to 20; mostly early railroad towns originally founded in the 1800's. This area would be described as extremely rural and very remote. The eastern area of the county could be considered as the northern most extension of the Ogden/Salt Lake/Provo megalopolis, even though it is separated from the Ogden Valley by 10 - 15 miles of open farmland and a moderately large recreation area (Willard Bay). The entire population of Box Elder County amounts to less than 2 percent of the population found along the Wasatch Front.

The only monitored exceedances of the 0.075 ppm ozone standard in this county occurred at Brigham City which is located near the eastern edge of the county at the foot of the Wasatch Range. Most of the sources of VOC and NO_x can be traced to area and mobile sources associated with urbanization along the I-15/I-84 corridor. Box Elder County does have industrial sources that produce ozone precursors, but these sources are currently not large enough to make Box Elder County a source area of ozone. Generally, whenever the monitor at Brigham City has recorded an exceedance of the NAAQS, the increased concentrations at the monitor have been traced to areas located further south that are part of the major Wasatch Front core area. In these cases, a southerly wind flow carried the ozone plume north along the Wasatch Front as there is no substantial geography or topography separating this core area to the south from Brigham City.

Under the previous 8-hour ozone standard Box Elder County was designated as "attainment" for ozone. Under the current 8-hour ozone standard (0.075 ppm), Box Elder County is still maintaining attainment level concentrations (2006 – 2008). Based mainly on this current monitoring data, Utah will recommend that Box Elder County be designated "attainment" for ozone. If future monitoring data (2007 – 2009) at the Brigham City monitor indicates that the area is not in attainment, then Utah would recommend that Box Elder County be designated nonattainment only for the townships east of the I-15/I-84 junction. The remainder of the county, extending west to the Nevada border, would be recommended for a designation of "attainment/unclassifiable." However, Box Elder County is within the modeling domain, and all emissions from this county will be included in the modeling used to develop the SIP for ozone. Any source in Box Elder County found to have a significant impact on the nonattainment area will be controlled as if it were in the nonattainment area.

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 in a high mountain valley. There is no reason to suspect that Huntsville, which has no industrial base, except for three ski resorts and a recreation reservoir, is not attaining the ozone standard, yet there is enough of a population to warrant a careful consideration of sweeping regulations that need not necessarily apply. Under the previous 8-hour ozone standard, all of Weber County was designated as an ozone maintenance area. Utah will recommend that all of Weber County, west of the ridgeline tracing the Wasatch Mountains, be designated "nonattainment" for ozone, with the remainder of the county, east of the Wasatch ridgeline, being recommended for a designation of "attainment/unclassifiable."

Morgan County

Morgan County is located east of Davis County. It is separated from the metropolitan core areas of the Wasatch Front by the Wasatch Range. The town of Morgan surrounded by eight smaller towns and several family farms comprises the center of population in this very rural county. The only industry in the county, the Devil's Slide cement plant, is located eight miles east of Morgan in a mountainous area near the border with Summit County. Ozone formation has never been a concern in Morgan County mostly because of its rural setting, lack of ozone precursors and significant topographical separation from the Wasatch Front. Utah will recommend that Morgan County be designated "attainment/unclassifiable." However, Weber County is within the modeling domain, and all emissions from this county will be included in the modeling used to develop the SIP for ozone. Any source in Morgan County found to have a significant impact on the nonattainment area will be controlled as if it were in the nonattainment area.

Davis County

The only portions of Davis County not covered by the selected townships are over the Great Salt Lake. Under the previous 8-hour ozone standard, all of Davis County was designated as an ozone maintenance area. Utah will recommend that all of Davis County be designated "nonattainment" for ozone.

Salt Lake County

The collection of townships used to define the non-attaining portions of Salt Lake County includes all but the mountainous terrain in the very western edge and approximately the eastern third of the county which is occupied by the Wasatch Range. There is some population present within the various canyons of this eastern range. In this case, DAQ feels it would be appropriate to include these areas for the sake of vehicle I/M and other regulatory programs. Under the previous 8-hour ozone standard, all of Salt Lake County was designated as an ozone maintenance area. Utah will recommend that all of Salt Lake County be designated "nonattainment" for ozone.

Summit County

Summit County is located directly east of Salt Lake City. It is separated from the Wasatch Front core area by a distance of between eight and ten miles and the very substantial Wasatch Front Range. As discussed earlier, Summit County extends eastward from the back of the Wasatch Range to the western and southern Wyoming border. Most of the population is located in the Park City area and the predominant industry there is tourism. There is one moderate point

source located in Summit County, a shale processing plant, about ten miles from Park City in a very sparsely populated mountainous area. Further discussion of Summit County and the Park City area will be made in the "Consideration of Additional Areas" section following factor 9. Utah will recommend that Summit County be designated "attainment/unclassifiable." However, Summit County is within the modeling domain, and all emissions from this county will be included in the modeling used to develop the SIP for ozone. Any source in Summit County found to have a significant impact on the nonattainment area will be controlled as if it were in the nonattainment area.

Utah County

Utah County is located directly south of the Salt Lake-Davis-Weber nonattainment core area. Current monitoring data (2006 – 2008) from the three DAQ monitors located in Utah County (see Table 3) show that all monitors are at or below the attainment level. Decreasing ozone concentration trends at these monitors show that the decreasing VOC and NO_x trends discussed in factor 2 are slowing ozone formation in Utah County. Based on the most recent monitoring data, Utah will recommend that Utah County be designated as "attainment." However, Utah County is within the modeling domain, and all emissions from this county will be included in the modeling used to develop the SIP for ozone. Any source in Utah County found to have a significant impact on the nonattainment area will be controlled as if it were in the nonattainment area.

If future monitoring data (2007 – 2009) at any of the Utah County monitors indicate that the area is not in attainment, then Utah would recommend that Utah County be designated "nonattainment" only for the townships west of the ridgeline tracing the Wasatch Mountain Range. The remainder of the county, extending east to Wasatch County would be recommended for a designation of "attainment/unclassifiable."

Wasatch County

Heber Valley, the main populated area of Wasatch County, is situated approximately fifteen miles northeast of Provo, Utah. It is a relatively high mountain valley whose main industry is farming and recreation. It is known for its crystal clear air and breathtaking views. In recent years the population has seen an increased of retirees from California settle in the valley because of its pristine climate. There are no threatening point sources located in Wasatch County and for this reason Utah will recommend that Wasatch County be designated "attainment/unclassifiable." However, Wasatch County is within the modeling domain, and all emissions from this county will be included in the modeling used to develop the SIP for ozone. Any source in Wasatch County found to have a significant impact on the nonattainment area will be controlled as if it were in the nonattainment area.

Tooele County

Tooele County, like Box Elder County to the north, is a very large county with a significant population and business presence located primarily south of US Interstate 80 and east of the Stansbury Mountain Range. Southwest of this range and extending to the Nevada border is the Utah Military Test Range and the Army's Dugway Proving Grounds with a permanent population of zero.

Under the previous 8-hour ozone standard, all of Tooele County was designated as "attainment" for ozone. Under the current 8-hour ozone standard (0.075 ppm), Tooele County is still maintaining (2006 – 2008) attainment level concentrations. Based mainly on current monitoring data, Utah will recommend that Tooele County be designated "attainment" for ozone.

If future monitoring data (2007 – 2009) at the Tooele monitor indicates that the area is not in attainment, then Utah would recommend that Tooele County be designated nonattainment only for the townships east of the Stansbury Mountain Range. The remainder of the county, extending west to the Nevada border, would be recommended for a designation of "attainment/unclassifiable." However, Tooele County is within the modeling domain, and all emissions from this county will be included in the modeling used to develop the SIP for ozone. Any source in Tooele County found to have a significant impact on the nonattainment area will be controlled as if it were in the nonattainment area.

Juab County

Juab County is located south of Tooele County and southwest of Utah County. It extends from the Nevada border on the west to the Wasatch Range on the east, an east-west distance of over 100 miles. The only sizeable population, with the exception of less that 100 members of the Goshute tribe located on their tribal land in the extreme northwest corner of county, is located in the far eastern end of the county. The main industry is turkey farming and livestock on several large ranches near the eastern end of the county. There is one relatively small point source, the Leamington cement plant, located about twenty-five miles west of Nephi near the Millard County border. The air quality in Juab County is seldom influenced by air from neighboring Utah County due to the elevated ridge that makes up their common border. Utah will recommend that Juab County be designated "attainment/unclassifiable." However, Juab County is within the modeling domain, and all emissions from this county will be included in the modeling used to develop the SIP for ozone. Any source in Juab County found to have a significant impact on the nonattainment area will be controlled as if it were in the nonattainment area; modeling will also include the Intermountain Power Plant located just south of Juab County in Millard County.

Washington County

Washington County is located in the very southwest corner of Utah. Currently data from the Santa Clara monitor and the Zion National Park CASTNet monitor show ozone concentrations to be well below the current standard. In 2005 the CASTNet monitor at the Zion National Park site recorded high ozone concentrations over a period of several days, but these higher recorded concentrations were directly attributable to wildfires that were located in the immediate vicinity of the monitor. It should also be noted again that CASTNet monitors do not meet the more stringent FRM or FEM requirements specified in 40 CFR Part 58.

As the St. George area grows in both population and VMT, it is conceivable that the area could one day exceed the ozone standard. At this time, however, Utah will recommend that Washington County be designated attainment for ozone.

Factor 9. Level of Control of Emission Sources

This factor will discuss the emission controls that are currently implemented for the major precursors of ozone, namely VOC and NO_x in the areas under consideration.

The control of emissions is governed by the State's Air Quality Rules which can be found at http://www.rules.utah.gov/publicat/code/r307/r307.htm. These rules include emission inventories, control measures, and permitting and compliance limits. Emission controls and permit limits have been established to meet federal requirements and, as necessary, to meet applicable NAAQS.

As discussed previously, in areas where meteorological conditions are conducive to ozone episodes and the air becomes stagnant for several days at a time, it is likely that sources of VOC and NO_x would coincide (in location) with areas monitoring high ozone concentrations. 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 8-hour NAAQS for ozone. That the emission sources would also be located in these areas comes 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 these nonattainment area(s).

Any inventory prepared by DAQ 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 NEI 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, VOC and NO_x emissions were evaluated. These gasses are known precursors to the formation of ozone and generally must be evaluated for emission reductions in nonattainment areas.

The focus area was on the area surrounding northern Utah. This area is often evaluated in rigorous computer modeling exercises by DAQ, which enables the use of one such exercise which includes a "gridded" emissions inventory within a modeling domain that includes the entire Wasatch Front and surrounding areas. In other words, within the area of the domain shown in Figure 11, 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 earlier, in the section on traffic and commuting patterns, mobile source emissions are well represented by the distribution of population. Area sources also show 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 fuel distribution or emissions related to industry. There are, however, other

source categories for which population is not a good surrogate. Included in this group would be emissions related to agriculture, such as agricultural burning, harvesting and land preparation. A complete tabulation of the 2005 emissions inventory for Utah has been included as Appendix 1 to this document.

Figure 12 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 is to be expected. In the figure, point sources are identified by green 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 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 or areas within the proposed Wasatch Front nonattainment region. This is consistent with the EPA's definition of what the agency believed would characterize a typical urban nonattainment area.

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 8-hour NAAQS for ozone. To a large extent, these townships are bounded by elevated terrain which acts to define low-land valleys within which summer air can become stagnant 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 ozone originate.

It is apparent from Figure 12 that there are other areas of emissions located outside of the major core area. Those areas will be discussed in the next section. DAQ requires BACT on all major sources in compliance with federal law, and on all minor sources through our state only regulatory program. Any source found to have a significant impact on a nonattainment area will be controlled as if it were in the nonattainment area.

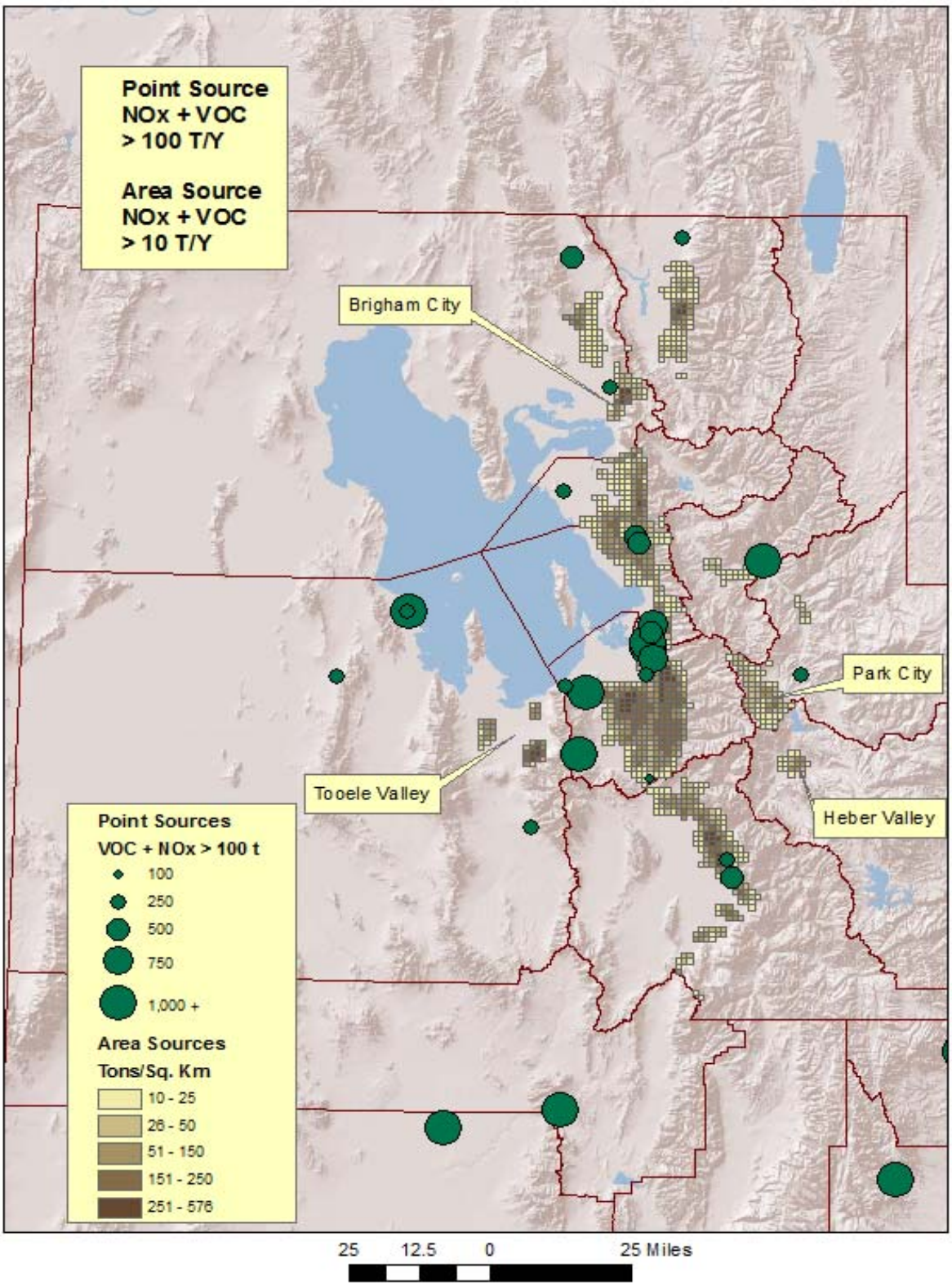

Figure 12. Emissions in Relation to Core Nonattainment Areas

An indication of the point sources located in the CSA/MSAs is annotated in Figure 12 and a complete tabulation of their respective emissions is included as Appendix 2 to this document.

Consideration of Additional Areas Outside the Wasatch Front Core Area

In order to fully consider the smaller areas of emissions located outside the major core area, each of these smaller areas will now be discussed with regard to factors pertinent to each respective area. The most important of these factors will be air quality data and topography. Traffic and commuting patterns and projected growth will also be considered in the context of bedroom communities which may or may not impact the core nonattainment area.

In Figure 12, four areas have been identified; Park City and Heber Valley which lie to the east of the Wasatch Front, and Brigham City and the Tooele Valley which lie west of the Wasatch Front. In addition, there are two other areas of the State not included in the northern Utah "domain." These are the greater St. George area of Washington County located in the southwest corner of Utah and San Juan County located in the southeast corner of Utah.

Park City, Summit County

Park City lies to the east of the Wasatch Mountains in a relatively high elevation valley (~6,500 ft.) called the Snyderville Basin. Park City itself is listed at an elevation of just over 7,000 feet. It was originally settled as a silver mining town in the 1870's and was home to the Silver King Mine, the worlds richest silver mine. Park City is primarily a resort and bedroom community with significant commuter travel to and from the Salt Lake Valley. The Snyderville Basin is surrounded by high terrain to the west, south and southeast. July is the hottest month of the year but rarely, due to its elevation, does the temperature rise above 80 degrees Fahrenheit. There are very few sources of ozone precursors in the area and, regular diurnal flow, in most instances, keeps the area crystal clear. The most significant aspect of the geography of the area is the lack of a connection to the Salt Lake Valley to the west. The elevation of the pass (Parley's Summit) connecting the Salt Lake Valley to the Snyderville Basin is 7,100 feet. This in essence does not allow any significant surface air movement between the two valleys. For these reasons, ozone formation is unlikely.

Park City, Utah looking southwest toward the Salt Lake Valley

Park City has a relatively small permanent population that is enhanced in the winter season by large numbers of skiers. There is no data to indicate that the air quality in Park City exceeds the NAAQS for ozone.

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 are 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, a significant portion of these vehicles includes some degree of onboard diagnostic (OBD) equipment, and, 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 12 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. Park City 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 6, located in the Factor 5 discussion, summarizes the projected population growth in the areas of interest to this analysis. 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 State of Utah during this same period is approximately 2.5 percent while that of the United States during this same 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 DAQ.

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 Northern Wasatch Front nonattainment area. A designation of "unclassifiable" would be more appropriate for this area. However, Park City is within the modeling domain, and all emissions from this county will be included in the modeling used to develop the SIP for ozone. Any source in Park City found to have a significant impact on the nonattainment area will be controlled as if it were in the nonattainment area.

Heber Valley, Wasatch County

Heber Valley lies East of the Wasatch Mountains, and Southeast of Park City. The Heber Valley is primarily a farming community with Heber City at its center. It is meteorologically distinct from the Wasatch Front, and is similar to Park City in terms of its topography. It is situated in a relatively high elevation valley that experiences occasional temperature inversions during the winter.

There is minimal air movement between Park City and the Heber Valley, but due to recent increased home prices in Park City, the Heber Valley has become somewhat of a bedroom community to both Park City and the more populous Utah Valley area to the west. There is presently no I/M program implemented in Wasatch County. Utah statute prohibits such a program unless the area is not attaining one of the pertinent NAAQS.

Heber Valley, Utah looking southwest over Deer Creek Reservoir toward Provo Canyon

Figure 12 indicates that there are no major point sources in the Heber Valley that would warrant special consideration. Notwithstanding, 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.

The Heber Valley is a growing area. Growth estimates for the valley may be approximated by looking at the countywide estimates for Wasatch County presented in Table 6 in factor 5. The Heber Valley is really the only populous region of Wasatch County, so it may be assumed that almost all of the countywide growth will take place in and around the valley. 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. A designation of "unclassifiable" would be more appropriate. However, the Heber Valley is within the modeling domain, and all emissions from this area will be included in the modeling used to develop the SIP for ozone. Any source in the Heber Valley or Wasatch County found to have a significant impact on the nonattainment area will be controlled as if it were in the nonattainment area.

Tooele Valley, Tooele County

Figures 9, 10 and 11 reveal the layout surrounding the Tooele Valley which includes the City of Tooele and its neighboring towns of Grantsville and Stansbury Park. These municipalities reside to the West of Salt Lake County in the northern half of a valley bound on the east and south by the Oquirrh Mountain Range and on the west by the Stansbury Mountain Range. The Great Salt Lake is the northern boundary of this valley.

This topographical backdrop becomes important when discussing air movement between the Salt Lake and Tooele valleys. During a typical ozone episode in the Salt Lake Valley, the Oquirrh Mountains hinder any direct air movement between the two valleys. Diurnal air flows typically moves ozone plumes from the Salt Lake Valley northwestward out and over the Great Salt Lake. When the afternoon on-shore flow kicks in, sometimes there is just enough northward component to the wind to blow a fraction of the ozone plume into the Tooele Valley. This phenomenon has been verified on several occasions by monitoring the timing of ozone concentrations at Salt Lake Valley monitors, the Beach monitor and the Tooele monitor.

Tooele Valley looking southeast from the eastern slopes of the Stansbury Mountains. Tooele City is located at mouth of the canyon at left center of photo. Grantsville is in the foreground.

DAQ has been monitoring ozone in the Tooele Valley since 2005. A look at Table 1 for the Tooele monitoring site shows that, based on 2006-2008 data, the area has a decreasing ozone trend and that the area is currently attaining the new ozone NAAQS.

If the Tooele Valley area were more geographically removed from the core Northern Wasatch Front nonattainment area, DAQs' initial inclination would be to recommend a designation of "unclassifiable" and wait for more data. However, given its proximity to the core area, we will consider additional information.

Figure 12 shows that it is far more likely that any potential impact due to industrial point sources would be directed from Salt Lake County into Tooele County rather than the other way around. This would be evaluated during the course of SIP development**.** The only truly large point source in Tooele County is U.S. Magnesium LLC, located more than 30 miles from either Tooele or the Wasatch Front. A 1997 Wasatch Front Ozone Study[6] showed that chlorine emissions from U.S.Magnesium do not significantly influence ozone formation in either Salt Lake or Tooele County. In addition, Utah's permitting rules already require Best Available Control Technology on all sources, major and minor, constructed after 1971. 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 6. The Tooele Valley is really the only populous region of that county, so it may be assumed that the majority of the countywide growth will take place in and around Tooele Valley. 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, but actual numbers are very small when compared to more populous areas. 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[7], 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 619,397 commuters traveling only within the northern Wasatch counties. From this it can be determined that the influx of cars from Tooele accounts for only about 1.2% of all commuter trips along the Wasatch Front.

Given the factors discussed above, DAQ is recommending that the Tooele County townships identified in Figure 12 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 ultimately indicates that a nonattainment designation would in fact be

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6. "Wasatch Front Ozone Study," prepared for the Utah Department of Environmental Quality by ENVAIR and Alpine Geophysics, LLC, Volume 1, September 12, 1997

7. http:www.census.gov/population/www/cen2000/commuting.html#UT

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." However, Tooele County is within the modeling domain, and all emissions from this county will be included in the modeling used to develop the SIP for ozone. Any source in Tooele County found to have a significant impact on the nonattainment area will be controlled as if it were in the nonattainment area.

Brigham City, Box Elder County

The geographical and topographical layout of Brigham City can be seen clearly in Figures 9 and 10. Brigham City and its neighbor Tremonton (a farming community located 15 miles northwest), sit adjacent to 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, extends toward the East just north of the border with Weber County (see Figure 11).

DAQ has been monitoring ozone in Brigham City since 2000. Current three-year monitoring data indicate that the area is attaining the current ozone NAAQS by a very close margin.

Looking east-northeast at Brigham City from west of I-15.

Similar to the Tooele area, if this area were more geographically isolated, DAQ's initial inclination would be to recommend a designation of "unclassifiable" and wait for more data. Geographically speaking however, Brigham City is located very close to the northern edge of a core area that DAQ will recommend as nonattainment to the current ozone standard. For this reason we need to consider some additional information.

Looking more closely at emissions within this area, there are two major point sources worth mentioning. Nucor Steel is located just north of Tremonton, the uppermost township shown in Figure 12. 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 any affect on the allowable emissions for this source. Another source of note is Vulcraft, a steel manufacturing facility, located just west of Brigham City. It is primarily a source of VOC emissions, but its NO_x emissions are negligible. It also underwent a BACT review as part of its permit application.

Growth estimates for Brigham City fall within the countywide estimates for Box Elder County presented in Table 6. Brigham City and Tremonton are the only populous regions of that county, so it may be assumed that almost all of the countywide growth will take place within 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 removed from the northern urbanized core of that area by about 20 miles of farmland. Likewise, Tremonton is removed from Brigham City by about 15 miles of farmland.

Commuting patterns represent another factor to be considered for the Brigham City area. Looking again at the 2000 census Journey to Work data, Box Elder County has 3,590 commuters that travel to one of the three counties (Weber, Davis, and Salt Lake) that make up the northern Wasatch Front core area. Actually the impact from this factor is even less that the impact from Tooele County commuting traffic. The Journey to Work data shows that only 3,590 commuters travel into the Northern Wasatch Front area counties for work. This amounts to approximately only 0.6 percent of the total travel within these core counties.

Given the factors discussed above, DAQ is recommending that the townships identified in Figure 12, within Box Elder County, not be included within the Northern Wasatch Front nonattainment area.

Of all the factors discussed so far, air quality data collected in Brigham City should be given the most weight. If the data collected here 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." However, Brigham City and Box Elder County are within the modeling domain, and all emissions from this county will be included in the modeling used to develop the SIP for ozone. Any source in Box Elder County found to have a significant impact on the nonattainment area will be controlled as if it were in the nonattainment area.

Utah County

Utah County lies directly to the south of Salt Lake County. They are separated by a semi-formidable elevation barrier of about five to eight-hundred feet (see figures 1 and 11). Air movement between the two counties does exist; however, this barrier tends to keep that movement to a minimum. The diurnal mountain-valley flow in Utah County tends to be more east-west with only an occasional north-south component.

Concentrations of ozone precursors in Utah County have been steadily decreasing for the last decade even though the population of the county has increased. In 2002, Geneva Steel

Corporation, the largest contributor to both ozone and particulate pollution in Utah County, ceased operations. In 2006 Ensign-Bickford, a large explosives manufacturer also ceased operations. From Table 1, we see that ozone concentrations at all three monitors located in Utah County show a slow but steady decrease over the past three years and that the area is currently attaining the new ozone NAAQS.

Figure 12 shows that it is far more likely that any potential impact due to industrial point sources would be directed from Salt Lake County into Utah County rather than the other way around. This would be evaluated during the course of SIP development. The only significant VOC point source currently located in Utah County is the Pacific States Pipe Casting facility located south of Provo. Brigham Young University, also located in Provo, is the only other point source in the county and its VOC contribution to the inventory is minimal (see appendix 2). Utah's permitting rules already require Best Available Control Technology on all sources, major and 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.

Most of Utah County's population currently resides between Utah Lake and the Wasatch Range, extending from Lehi, northeast of Utah Lake, to Payson, southeast of Utah Lake. Areas of new development are beginning to emerge west of Utah Lake and between Spanish Fork and Santaquin in the south end of Utah Valley. Growth estimates for this area may be approximated by looking at the countywide estimates for Utah County presented in Table 6.

Utah County looking northeast toward the Wasatch Range from Salem, Utah

Commuting patterns represent another factor to be considered in this situation. According to information compiled for the 2000 census "Journey to Work" data[6], Utah County has 19,318 commuters that travel to one of the three counties comprising the northern Wasatch Front (Weber, Davis, and Salt Lake). By contrast, there are 140,834 commuters that travel only within

Utah County. This confirms that a great majority of Utah County residents both live and work in the county. Additionally, the Journey to Work data indicates that there are 619,397 commuters traveling only within the northern Wasatch Front counties. From this it can be determined that the influx of cars from Utah County accounts for only about 3.2% of all commuter trips.

The U.S. Census Bureau defines a CSA as an aggregate of adjacent Core Based Statistical Areas that are linked by commuting ties. The lack of commuting ties between Utah County and adjacent counties to the north, as well as other significant social and economic considerations delineated in the U.S. Census, is what prompted the Department of Commerce to designate Utah County as a separate MSA and not include it in the larger Salt Lake-Ogden-Clearfield CSA.

Given the factors discussed above, DAQ is recommending that Utah County not be included in the nonattainment area for the Wasatch Front. Of all the factors discussed so far, the air quality data collected in Utah County should be given the most weight. If future data is collected that indicates that a nonattainment designation would be appropriate, it will be addressed specifically at that time. For now, it is recommended that Utah County be designated as "attainment." However, Utah County is within the modeling domain, and all emissions from this county will be included in the modeling used to develop the SIP for ozone. Any source in Utah County found to have a significant impact on the nonattainment area will be controlled as if it were in the nonattainment area.

St. George, Washington County

As can be seen in Figures 2 and 3, there is one metropolitan area in southwestern Utah that deserves some discussion. This area is generally referred to as St. George, after the largest city in the area. The area is made up of the cities of St. George, Bloomington, Washington, Santa Clara, Hurricane and several other smaller towns.

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 ozone. Nevertheless, DAQ has conducted "survey" monitoring in St. George City since 2004. In 2008 the "survey" monitor was relocated about two miles northwest to the town of Santa Clara to eliminate any effect of NO_x scavenging from nearby Interstate 15 and to give a better indication of ozone transport from the Las Vegas area. Results of this survey monitoring from the combined St. George (2006-2007) and Santa Clara (2008) monitors indicate that summer ozone values have remained well below the current 75 ppb standard. Actual results for the 2006-2008 monitoring seasons from the St George and Santa Clara sites show that the three-year average of the 4th highest ozone concentration at the monitors was 64 ppb. There is also a CASTNet monitor located near the south entrance to Zion National Park; the three year average of the 4th highest ozone concentrations monitored there is 73 ppb (see Table 2). This difference can be explained by severe wildfires in 2005 and again in 2006 just west of the Zion monitor. In one instance, confirmed by National Park Service officials, the wildfire actually burned right up to the monitoring site.

The St. George area lies at an elevation of only 2,600 feet MSL on the periphery of the Mojave Desert. There are mountainous areas to the north and west, but the area is not confined and does not stagnate here like it does in the lower valleys along the Wasatch Front.

St. George looking northeast, approximately 35 miles, toward Entrance to Zion National Park

The St. George area has seen significant growth, as a retirement community, over the past twenty years and this growth is expected to continue, as noted in Table 6, for the foreseeable future. Based on the results of "survey" monitoring in the center of the St. George area, and also the monitoring results at the Zion National Park CASTNet monitor, DAQ will recommend a classification of "attainment/unclassifiable" for this area. DAQ will continue "survey" monitoring at the Santa Clara site and may install a federal reference monitor in the area in the future.

San Juan County

San Juan County is located in the southeast corner of Utah. This county is part of the Four-Corners region, and borders the States of Colorado, New Mexico, and Arizona. The southern portion of San Juan County is part of the Navajo Nation. San Juan County is sparsely populated and oil and gas production is the primary source of emissions in the area. There is one major source located in the northeastern portion of the county, the Lisbon Natural Gas Processing Plant operated by EnCana Oil and Gas (USA) Inc. The oil and gas fields in San Juan County have been producing for many years, and production has been decreasing steadily over the last decade as can be seen in Figure 13. A significant portion of the oil and gas production in the county is occurring on tribal land under the jurisdiction of the Navajo Nation.

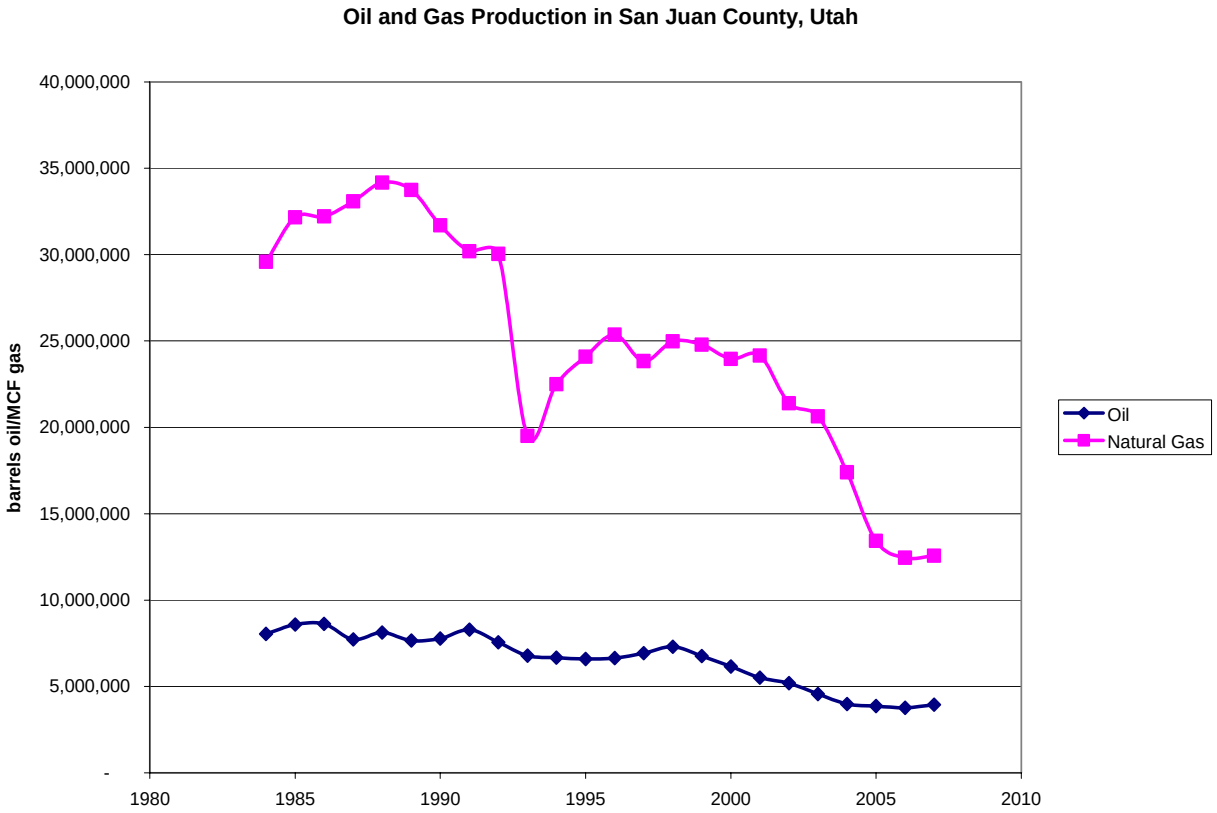

Figure 13. Oil and Gas Production in San Juan County, Utah

DAQ does not have an ozone monitor in San Juan County, however, the National Park Service maintains a CASTNet monitor in Canyonlands National Park in the northern part of the county. The 3-year average for this monitor is 0.071 ppm (see Table 2), and is an indicator that the county is attaining the ozone standard.

San Juan County in Utah adjoins San Juan County in New Mexico where ozone values just above the standard have been measured at the Navajo Dam site. Emissions from San Juan County, Utah are unlikely to significantly contribute to ozone concentrations at this monitor. The Navajo Dam monitoring site is located approximately 80 miles from the Utah border, and two ozone monitors that are located between the Utah border and Navajo Lake monitor are attaining the standard. There has been significant oil and gas development in the Four Corners region in the last decade, but this has occurred primarily to the south and east of Utah's border, in Colorado and New Mexico, and production has been declining in Utah. The 2002 base year inventory (plan02b) that was compiled by the Western Regional Air Partnership (WRAP) shows oil and gas area source emissions for San Juan County Utah to be 286 tons per year NOx and 1,477 tons per year VOC. In comparison, oil and gas area source emissions for San Juan County New Mexico were 20,041 tons per year NOx and 60,178 tons per year VOC.

Canyonlands National Park, San Juan County, Utah

Based on monitoring data in the area, ozone levels are below the NAAQS, and the limited contribution of emissions from Colorado and New Mexico, San Juan County Utah should be designated as attainment/unclassifiable for ozone.

State Recommendations

Wasatch Front

As shown on Figure 14, Utah is recommending the establishment of one nonattainment area for ozone: The **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.

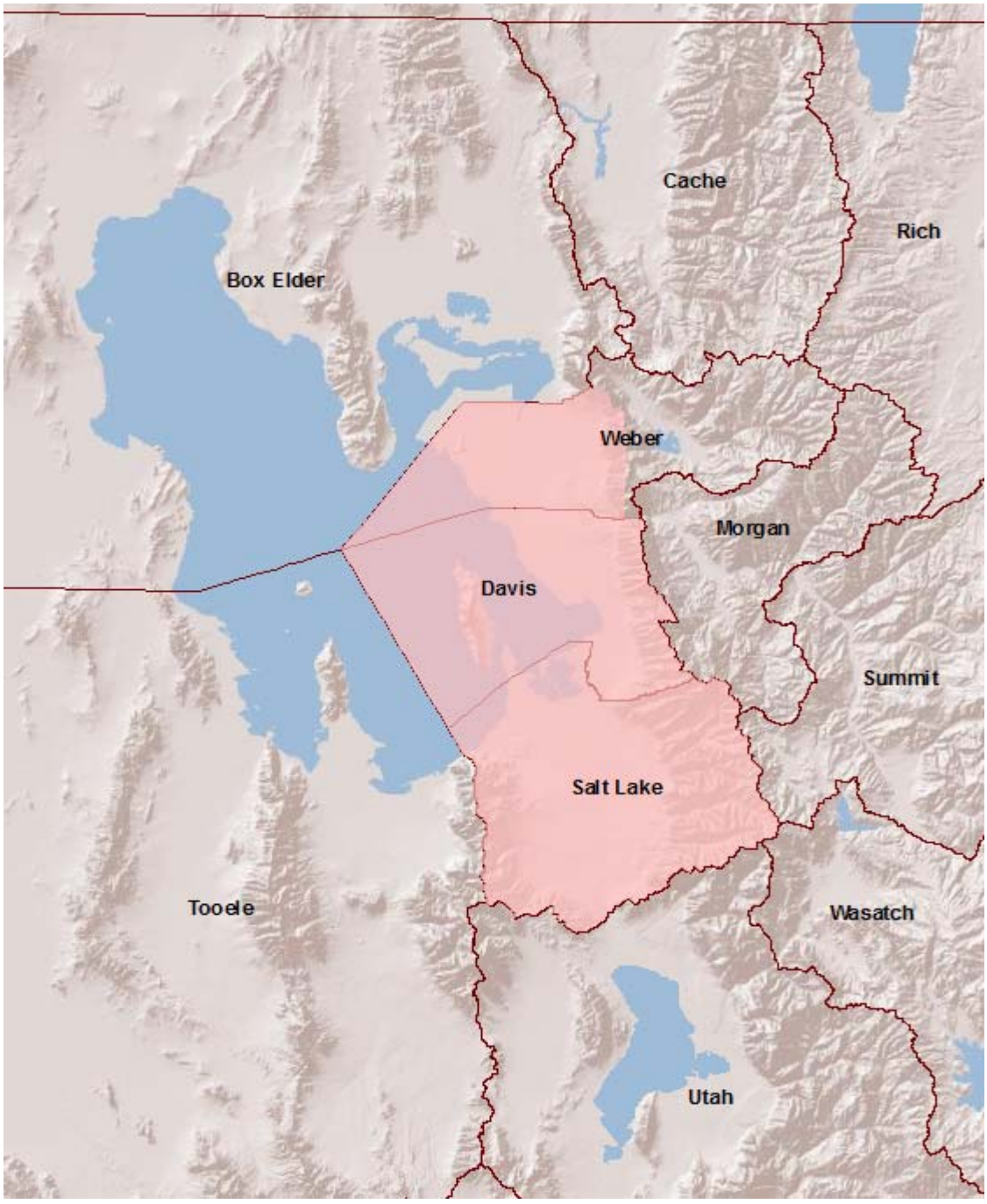

Figure 14. Recommended Ozone Nonattainment Area

Attainment/Unclassifiable Areas

As shown on Figure 15, 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 ozone. An exception to this recommendation is all Indian Country Lands within the State of Utah over which DAQ has no jurisdiction. Designation of those areas will be left to EPA's discretion.

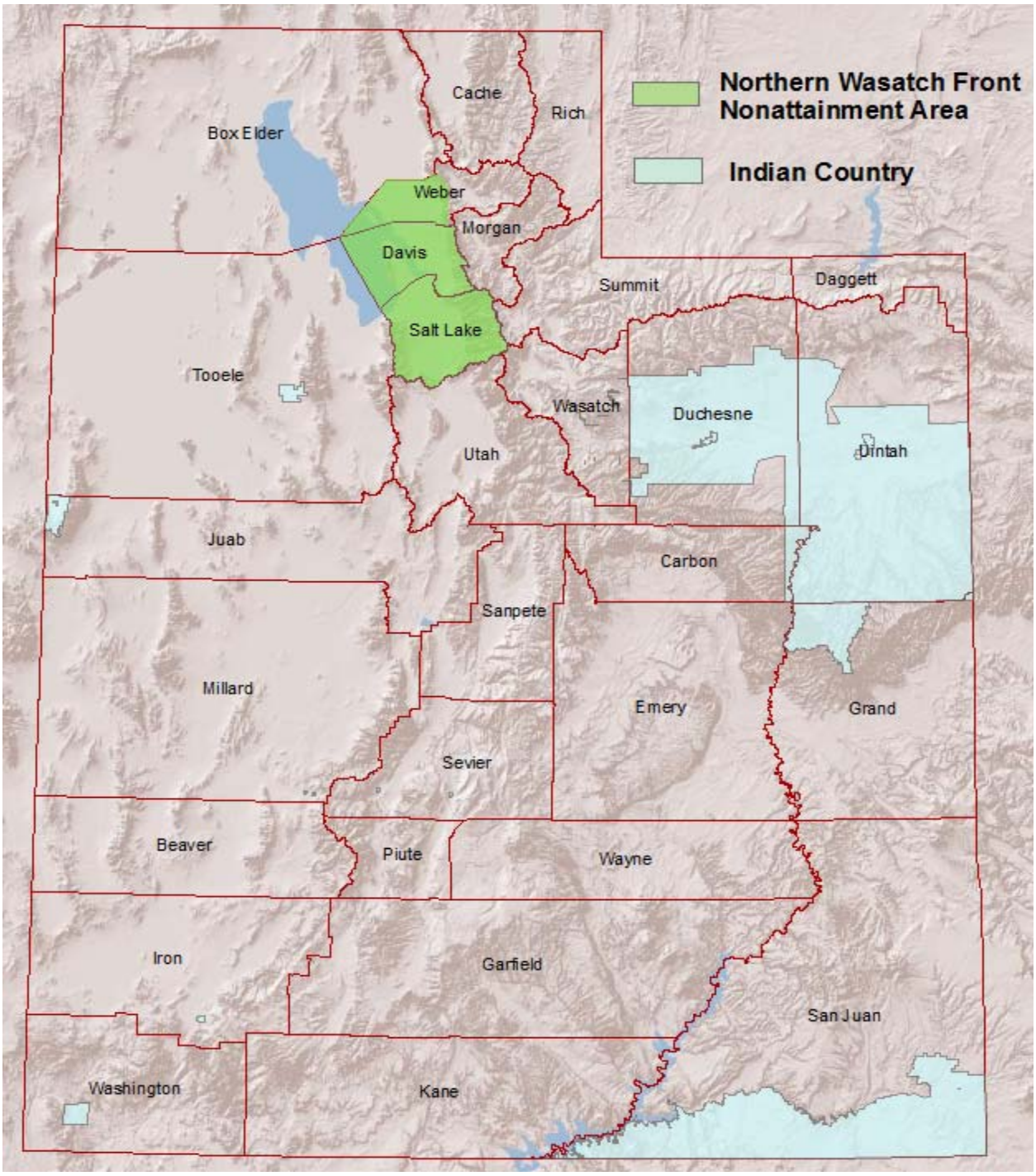

Figure 15. Statewide Area Map showing Recommended Nonattainment Areas and Indian Lands

Summary Table

Table 9 provides a description of all areas of the State and the recommended designations they should carry with respect to ozone. The State does not make recommendations for any portions of any county designated as Indian Country.

Table 9. Description of all Areas of Utah and Recommended Designations

County	Attainment	Unclassifiable	Nonattainment	Nonattainment Area
Beaver	X	X		
Box Elder	X			
Cache	X			
Carbon	X	X		
Daggett	X	X		
Davis			X	Northern Wasatch Front
Duchesne	X	X		
Emery	X	X		
Garfield	X	X		
Grand	X	X		
Iron	X	X		
Juab	X	X		
Kane	X	X		
Millard	X	X		
Morgan	X	X		
Piute	X	X		
Rich	X	X		
Salt Lake			X	Northern Wasatch Front
San Juan	X	X		
Sanpete	X	X		
Sevier	X	X		
Summit	X	X		
Tooele	X			
Uintah	X	X		
Utah	X			
Weber		All portions of Weber County not otherwise designated nonattainment	All portions of Weber County west of and including T5N R1W and T6N R1W and all portions of T7N R1W 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
Wasatch	X	X		
Washington	X			
Wayne	X	X		

Supporting Documentation

In addition to any technical information documenting the recommendation for area boundaries, EPA requested that each state provide 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 ozone 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 Table 1.
- Site locations and ID numbers *(see Table 10)*

Table 10. DAQ Monitor Network Locations (*Denotes monitors that are currently inactive or in the process of being repositioned)

Site ID	Location	Address	County
49-003-0003	Brigham City	140 W. Fishburn	Box Elder
49-005-0004	Logan	125 W. Center St.	Cache
49-011-0004	Bountiful	171 W. 1370 N.	Davis
49-035-0003	Cottonwood	5715 S. 1400 E.	Salt Lake
49-035-2004	Beach	12100 W.1200 S.	Salt Lake
49-035-3006	Hawthorne	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
49-049-5008	Highland	10865 N. 6000 W.	Utah
49-049-5010	Spanish Fork	312 W. 2050 N	Utah
49-057-0007	Washington Terrace*	4601 S. 300 W.	Weber
49-057-0002	Ogden #2	228 E. 32nd St.	Weber
49-057-1003	Harrisville	425 W. 2550 N.	Weber

For attainment/unclassifiable and nonattainment areas:

- Names of counties and tribal lands included, *(See Summary Table and Figure 15)*
- If partial counties or portions of tribal lands are included, the boundary definition/description is presented in *Figure 15*
  - including a legal definition of the area *(See Summary Table and Figure 15)*
  - 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 10) 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) 8-hr standard for ozone. 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 ozone.

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 Emission Summary by County

County	Source	NOx	VOC		County	Source	NOx	VOC
Beaver	Area Source	58.22	295.40		Piute	Area Source	13.01	153.57
	Non-Road Mobile	3238.97	44.43			Non-Road Mobile	6.32	76.97
	On Road Mobile	1119.45	472.10			On Road Mobile	118.90	52.48
	Point Source	42.30	3.36			Point Source	0	0
	Total	1548.95	815.29			Total	138.24	283.02
Box Elder	Area Source	535.24	2992.59		Rich	Area Source	48.14	223.45
	Non-Road Mobile	553.15	2471.33			Non-Road Mobile	8.41	375.00
	On Road Mobile	3976.10	1523.03			On Road Mobile	188.04	95.46
	Point Source	553.36	395.78			Point Source	0	0
	Total	5617.85	7382.73			Total	244.58	693.91
Cache	Area Source	356.86	2437.75		Salt Lake	Area Source	1901.72	19963.22
	Non-Road Mobile	666.98	612.97			Non-Road Mobile	5184.10	5452.65
	On Road Mobile	2928.08	1269.39			On Road Mobile	23310.31	9574.62
	Point Source	139.74	143.84			Point Source	7710.29	2130.76
	Total	4091.66	4463.96			Total	38106.41	37121.25
Carbon	Area Source	86.33	482.12		San Juan	Area Source	35.39	516.76
	Non-Road Mobile	939.09	134.89			Non-Road Mobile	59.24	546.10
	On Road Mobile	992.42	363.57			On Road Mobile	1057.86	470.43
	Point Source	3981.86	66.30			Point Source	473.29	67.32
	Total	5999.70	1319.88			Total	1625.78	1600.60
Daggett	Area Source	34.63	240.32		Sanpete	Area Source	120.29	619.97
	Non-Road Mobile	19.37	144.47			Non-Road Mobile	47.05	177.06
	On Road Mobile	113.62	74.29			On Road Mobile	981.81	566.38
	Point Source	749.18	66.44			Point Source	32.79	2.68
	Total	916.81	525.52			Total	1118.94	1366.09
Davis	Area Source	340.98	5534.81		Sevier	Area Source	144.36	685.69
	Non-Road Mobile	1824.27	1635.73			Non-Road Mobile	170.84	402.08
	On Road Mobile	6423.47	2904.61			On Road Mobile	2975.83	675.07
	Point Source	2152.47	1559.60			Point Source	132.05	11.27
	Total	10741.19	11634.75			Total	3423.09	1774.11
Duchesne	Area Source	80.34	747.49		Summit	Area Source	155.96	913.20
	Non-Road Mobile	148.48	277.51			Non-Road Mobile	1386.09	422.81
	On Road Mobile	979.01	372.29			On Road Mobile	2148.08	833.84
	Point Source	656.54	260.62			Point Source	472.20	28.37
	Total	1864.36	1657.91			Total	4162.33	2198.21

Source	NOx	VOC		County	Source	NOx	VOC	Source
Emery	Area Source	60.28	372.35		Tooele	Area Source	298.21	2157.66
	Non-Road Mobile	160.31	63.08			Non-Road Mobile	1337.40	968.26
	On Road Mobile	1595.53	663.40			On Road Mobile	2647.99	1767.52
	Point Source	28206.90	236.27			Point Source	1210.20	509.42
	Total	30023.02	1335.11			Total	5493.79	5402.86
Garfield	Area Source	71.29	465.10		Uintah	Area Source	111.08	1018.01
	Non-Road Mobile	76.77	656.26			Non-Road Mobile	174.94	233.48
	On Road Mobile	478.18	208.14			On Road Mobile	1394.03	571.08
	Point Source	7.40	0.93			Point Source	150.19	50.68
	Total	633.64	1330.42			Total	1830.25	1873.25
Grand	Area Source	15.61	285.30		Utah	Area Source	780.77	9391.55
	Non-Road Mobile	175.71	904.50			Non-Road Mobile	2674.25	2087.73
	On Road Mobile	1042.04	572.12			On Road Mobile	9483.84	5116.22
	Point Source	377.81	68.68			Point Source	652.69	719.84
	Total	1611.18	1830.60			Total	13591.55	17315.33
Iron	Area Source	187.91	1193.72		Wasatch	Area Source	46.20	457.91
	Non-Road Mobile	194.27	223.96			Non-Road Mobile	206.76	131.49
	On Road Mobile	2815.06	1058.78			On Road Mobile	907.21	445.65
	Point Source	72.07	99.09			Point Source	67.23	5.95
	Total	3269.32	2575.54			Total	1227.40	1041.00
Juab	Area Source	123.04	785.43		Washington	Area Source	841.90	7193.25
	Non-Road Mobile	805.06	200.55			Non-Road Mobile	724.59	1285.40
	On Road Mobile	2292.07	695.29			On Road Mobile	4524.91	1904.83
	Point Source	1536.13	62.85			Point Source	196.30	57.19
	Total	4756.30	1744.12			Total	6287.69	10440.66
Kane	Area Source	25.89	196.92		Wayne	Area Source	31.00	89.49
	Non-Road Mobile	58.96	715.20			Non-Road Mobile	19.71	212.24
	On Road Mobile	552.50	272.59			On Road Mobile	157.71	85.20
	Point Source	0	0			Point Source	15.97	1.24
	Total	637.35	1184.71			Total	224.39	388.17
Millard	Area Source	95.96	578.36		Weber	Area Source	304.56	4535.39
	Non-Road Mobile	1289.10	685.07			Non-Road Mobile	1674.89	1238.53
	On Road Mobile	2315.55	797.10			On Road Mobile	4479.23	2399.52
	Point Source	23316.67	130.85			Point Source	421.78	172.80
	Total	27017.27	2191.38			Total	6880.46	8346.23
Morgan	Area Source	26.83	263.76		**Statewide**	Area Source	6932.02	64790.53
	Non-Road Mobile	1297.00	99.52		**Totals**	Non-Road Mobile	22212.08	22479.27
	On Road Mobile	513.63	199.55			On Road Mobile	82449.48	36277.54
	Point Source	1333.03	50.98			Point Source	74660.42	6903.09
	Total	3170.50	613.81			Total	186,254.0	130,450.4

Appendix 2

Point Sources located in CSA/MSA Factor 9

Site ID	Plant	County	VOC (tpy)	NOx (tpy)
10007	Holcim (US) Inc - Devil's Slide	Morgan	49.4	1,324.5
10008	Nucor Steel	Box Elder	79.6	238.9
10028	Vulcraft - Steel Products Manufacturing	Box Elder	239.6	4.8
10119	Chevron Salt Lake Refinery	Davis	257.7	783.8
10121	Hill Air Force Base - Main Base	Davis	247.3	142.2
10122	Flying J Refinery	Davis	384.7	374.5
10123	Holly - Phillips Refinery	Davis	198.4	324.6
10124	Silver Eagle Refining	Davis	178.0	85.2
10129	Wasatch Waste Mgmt County Landfill Facility	Davis	24.2	280.8
10156	Utility Trailer Manufacturing	Davis	106.7	38.8
10303	Ash Grove Cement Company	Juab	57.5	1,397.6
10335	Tesoro Salt Lake City Refinery	Davis	268.2	446.5
10346	Kennecott Smelter & Refinery	Salt Lake	8.7	154.7
10565	Geneva Rock Pt of the Mountain Facility	Salt Lake	16.3	86.0
10571	Kennecott Mine & Concentrator	Salt Lake	344.6	3,750.0
10572	Kennecott Power Plant/Lab/Tailings	Salt Lake	11.9	2,066.6
10676	Utelite Corp - Shale Processing	Summit	2.6	235.2
10716	US Magnesium - Rowley Plant	Tooele	452.5	746.9
10725	Clean Harbors Aragonite - Hazardous Waste Incineration	Tooele	6.2	131.9
10790	Brigham Young University Main Campus	Utah	9.7	98.8
10794	Pacific States Pipe Casting Plant	Utah	303.5	65.0
10973	PacifiCorp Little Mountain Power Plant	Weber	1.7	200.6
11339	Desert Chemical Depot	Tooele	4.0	108.4
11841	Pepperidge Farm Commercial Bakery	Cache	120.5	4.4
12519	Tooele Power - Desert Power Plant	Tooele	2.7	144.7