Air Resources Board

Mary D. Nichols, Chairman
1001 I Street • P.O. Box 2815
Sacramento, California 95812 • www.arb.ca.gov

Matthew Rodriquez
Secretary for
Environmental Protection

Edmund G. Brown Jr.
Governor

February 23, 2012

Mr. Jared Blumenfeld
Regional Administrator
Region 9
U.S. Environmental Protection Agency
75 Hawthorne Street
San Francisco, California 94105

Dear Mr. Blumenfeld:

This is in response to your letter to Governor Brown providing notification of the U.S. Environmental Protection Agency's modifications to recommended area designations for the revised 2008 federal ozone standard. We are enclosing two documents that further support our original recommendations. Specifically, Enclosure 1 provides justification for designating Amador County and Tuolumne County as separate attainment areas, and Enclosure 2 provides additional information about the 2011 design value for Sutter Buttes.

If you have any questions about the enclosed information, please contact Lynn Terry, Deputy Executive Officer, at (916) 322-2739, or have your staff contact Ms. Karen Magliano, Chief, Air Quality Data Branch, at (916) 322-7137 or via email at kmaglian@arb.ca.gov.

Sincerely,

James N. Goldstene
Executive Officer

Enclosures (2)

cc: See next page.

cc: Ms. Amy Zimpfer
Assistant Director
U.S. Environmental Protection Agency
Air Division – Region 9
75 Hawthorne Street
San Francisco, California 94105

Dr. Matthew Lakin, Manager
Air Quality Analysis Office
U.S. Environmental Protection Agency
Air Division-Region 9
75 Hawthorne Street
San Francisco, California 94105

Mr. Mike Boitano
Air Pollution Control Officer
Amador County Air Pollution
Control District
12200-B Airport Road
Jackson, California 95642

Ms. Vicki Helmar
Air Pollution Control Officer
Tuolumne County Air Pollution
Control District
2 South Green Street
Sonora, California 95370

Dr. Charles Mosher
Air Pollution Control Officer
Mariposa County Air Pollution
Control District
P.O. Box 5
Mariposa, California 95338

Mr. Brian Moss
Air Pollution Control Officer
Calaveras County Air Pollution
Control District
Government Center
891 Mountain Ranch Road
San Andreas, California 95249

cc: (continued)

Mr. Dave Valler
Air Pollution Control Officer
Feather River Air Quality
Management District
1007 Live Oak Boulevard, Suite B-3
Yuba City, California 95991

Lynn Terry
Deputy Executive Officer

Karen Magliano, Chief
Air Quality Data Branch
Planning and Technical Support Division

ENCLOSURE 1
INFORMATION TO SUPPORT
AREA DESIGNATION BOUNDARY RECOMMENDATIONS
FOR THE 2008 FEDERAL 8-HOUR OZONE STANDARD:
AMADOR, CALAVERAS, TUOLUMNE, AND MARIPOSA COUNTIES

On December 9, 2011, the United States Environmental Protection Agency (U.S. EPA) provided California with notification of its preliminary decision to designate 16 areas of California as nonattainment for the revised 2008 federal ozone standard. Two of the recommended nonattainment areas differed from the State's initial recommendation: Central Mountain Counties (Amador and Calaveras counties) and Southern Mountain Counties (Tuolumne and Mariposa counties). In both cases, U.S. EPA's recommended nonattainment area includes counties that attain the standard.

While the Air Resources Board (ARB) supports U.S. EPA's proposal to designate the Central and Southern Mountain Counties separately from the upwind urban areas, ARB reaffirms its recommendation to designate individual counties within these areas as separate attainment and nonattainment areas. Additional justification for the State recommendation is outlined below, using the nine factors U.S. EPA included in its guidance memo (*December 4, 2008, Area Designations for the 2008 Revised Ozone National Ambient Air Quality Standards, Memorandum from Robert J. Meyers, Principal Deputy Assistant Administrator, Office of Air and Radiation, to Regional Administrators, Regions I-X*). These factors include air quality data, emissions data, population density and degree of urbanization, traffic and commuting patterns, growth rates and patterns, meteorology, geography and topography, jurisdictional boundaries, and level of control of emission sources. These nine factors can be combined into five general factors, as addressed for each area, below.

Central Mountain Counties: Amador County and Calaveras County

U.S. EPA recommends that Amador and Calaveras counties be designated together as the Central Mountain Counties federal ozone nonattainment area. Based on data collected during 2008 through 2010, the design values for both areas exceed the federal standard (2010 Amador County design value is 0.081 parts per million (ppm) and 2010 Calaveras County design value is 0.083 ppm). However, these design values are higher than what would be expected normally, because they include data from 2008, when ozone concentrations were adversely impacted by wildfire emissions (refer to air quality discussion, below).

The 2011 design values for both counties (based on complete data for 2009 through 2011) are much lower. They do not include the 2008 data and

therefore, reflect more normal conditions. The 2011 design value for Calaveras County is 0.077 ppm, which is close to the level of the standard, but still exceeds the standard. In contrast, the 2011 design value for Amador County is 0.071 ppm, which does not exceed the federal standard. The following paragraphs provide a five factor analysis to justify designating Amador County as a separate attainment area.

Jurisdictional Boundaries:

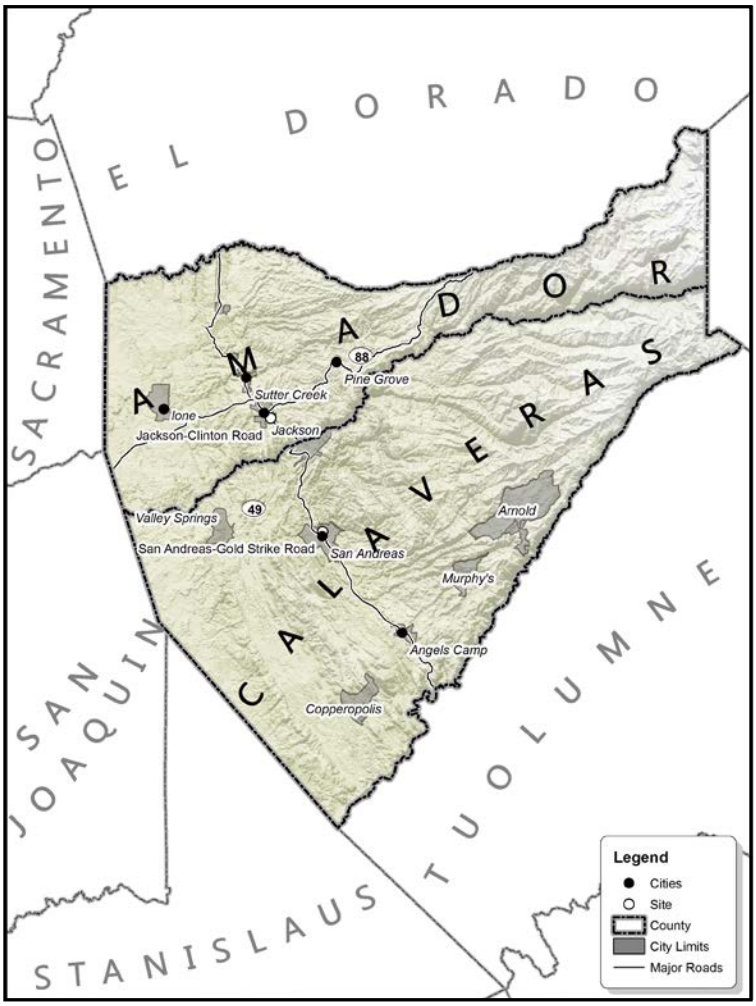
Amador and Calaveras counties are located in the Mountain Counties Air Basin (MCAB). Although both counties are located in the MCAB, they fall under the jurisdiction of two separate agencies. Amador County is under the jurisdiction of the Amador County Air Pollution Control District (APCD), while Calaveras County is under the jurisdiction of the Calaveras County APCD. Air quality in each county is managed at the local level through land use and development planning practices, and the local APCD is responsible for establishing and enforcing local air quality rules and regulations that address the requirements of federal and State air quality laws. With respect to nonattainment planning, it is most efficient to have the nonattainment boundary coincide with the jurisdictional boundary of the area(s) that experience or contribute to violations of the standard. Because Amador County attains the standard and does not significantly contribute to violations in Calaveras County, it is not appropriate to include Amador County in the nonattainment area.

Geography / Topography:

The MCAB is located in the eastern half of California, comprising a 12,226 square mile area. Amador and Calaveras counties are located in the central portion of the MCAB, with Amador County to the north and Calaveras County to the south (refer to Figure 1).

Amador County covers an area of 605 square miles. Calaveras County is nearly twice as large, encompassing an area of approximately 1,037 square miles. The Sierra Nevada Mountain range comprises a large portion of both counties, with elevations ranging from approximately 100 feet in the western foothill areas to over 9,000 feet in the mountainous eastern areas. The physical characteristics of each county impact local air quality. Because the topography consists largely of a succession of east-west canyons and intervening ridges, surface winds are generally restricted to flowing in an east-west direction -- uphill from the west during the day and downhill from the east at night.

FIGURE 1
AMADOR AND CALAVERAS COUNTIES



Meteorology:

ARB staff have conducted extensive studies of meteorological data to better understand the impact of transported emissions and pollutants on high ozone concentrations in Amador and Calaveras counties. These transport studies (ARB 1993 and ARB 1996) concluded that high ozone concentrations in both counties are overwhelmingly impacted by the transport of emissions and pollutants from the Sacramento Valley, the San Joaquin Valley, a combination of the San Joaquin Valley and San Francisco Bay Area regions, or a combination of the Sacramento Valley, San Joaquin Valley, and San Francisco Bay Area regions. The analyses showed that the contribution of local emissions generated within Amador and Calaveras counties was insignificant on high ozone days.

During the summer months, when ozone concentrations are highest, surface winds in Amador County are generally upslope (from the west southwest through west) during the daytime hours, and winds are generally downslope (from the east northeast through east) during the nighttime hours. The upslope airflow is the result of daytime heating of the mountain slopes, while the downslope airflow is the result of nighttime cooling of the mountain slopes. The airflow patterns generally follow the orientation of the mountain valleys and facilitate the transport of pollutants and emissions from upwind urban areas into the MCAB, where they impact ozone air quality in Amador (and Calaveras) County.

ARB staff reviewed EPA's Central Mountain Counties Wind Direction Frequency diagram. Although the upslope/downslope flow is the primary airflow pattern during the summer months, the wind frequency diagram shows that the surface winds can blow from Amador County towards Calaveras County (from the west northwest and north northwest) about 18% percent of the time. However, because ozone concentrations and precursor emissions in Amador County are so much lower than concentrations in the upwind areas of Sacramento and the San Joaquin Valley, Amador County's contribution to high concentrations in Calaveras County is insignificant (refer to discussion of emissions, below).

Air Quality Data:

There is one ozone monitor in Amador County (Jackson-Clinton Road), and one monitor in Calaveras County (San Andreas-Gold Strike Road; refer to Figure 1). Both monitors are located in the more populated western portions of the counties, where ozone exposure is highest. Although there is only one monitor in each county, U.S. EPA has approved both the number and the location of monitors as part of California's network monitoring plan (most recently in the 2011 Annual Network Report for Small Districts in California). One of the main functions identified for both sites is demonstrating compliance with State Implementation Plan (SIP) requirements.

Table 1 shows how the design values for each county compare. It is important to note that design values for two different years will be used for designating the two counties – 2011 for Amador County and 2010 for Calaveras County. This is because using the 2011 design value makes a difference in designation status for Amador County, but not for Calaveras County. The 2011 design value for Amador County is 0.071 ppm at Jackson. It is based on complete data for 2009 through 2011 and is 5 percent below the level of the current federal 8-hour standard.

In contrast, the 2010 design value used for designation purposes in Calaveras County is 0.083 ppm at the San Andreas site. This design value is based on complete data for 2008 through 2010, and it does exceed the federal standard. However, data indicate a 2011 design value of 0.077 ppm. This design value is substantially lower than the 2010 design value, but it is still about 3 percent above the level of the standard.

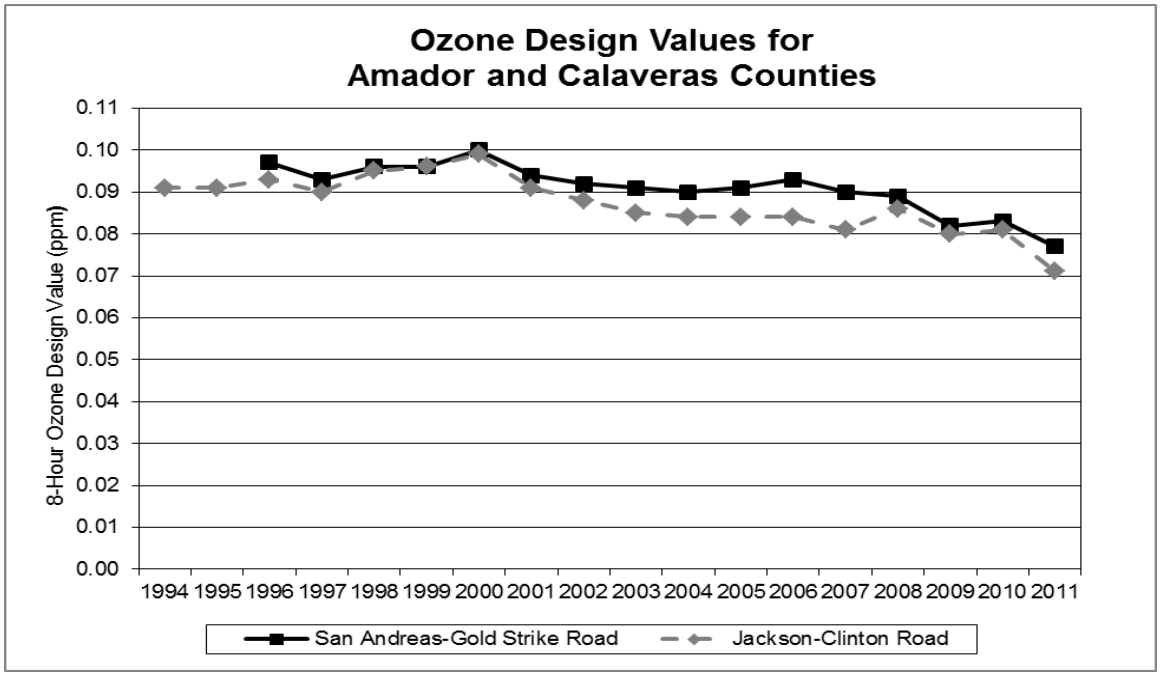
TABLE 1
8-HOUR OZONE DESIGN VALUES FOR
AMADOR COUNTY AND CALAVERAS COUNTY

COUNTY	*DESIGN SITE*	*DESIGN VALUE (ppm)*	*PERCENT FROM STANDARD*
Amador County (2008-2010)	Jackson	0.081	+8%
Calaveras County (2008-2010)	San Andreas	0.083	+11%
Amador County (2009-2011)	Jackson	0.071	-5%
Calaveras County (2009-2011)	San Andreas	0.077	+3%

Design value trends for Amador (Jackson site) and Calaveras (San Andreas site) counties are shown in Figure 2. Although both sites are located at similar elevations (Jackson at about 1200 feet and San Andreas at about 1000 feet), the design value for San Andreas is generally higher than that for Jackson. However, design values for both sites have decreased substantially since 2000. Overall, the design value at Jackson decreased 28 percent since 2000.

The increase in 2008 reflects the substantial impact of wildfire emissions on ozone concentrations during 2008. Furthermore, because the design value calculation is based on three years of data, the 2008 fire-impacted data also impact the design values for 2009 and 2010. Thus, design values for 2008, 2009, and 2010 are all higher than would normally be expected. If the 2008 fire-impacted days were removed, there would be a more consistent downward trend. Because the Jackson ozone data show a relatively consistent decrease over time, despite the influence of the 2008 wildfires, Amador County is expected to continue to attain the federal standard.

FIGURE 2

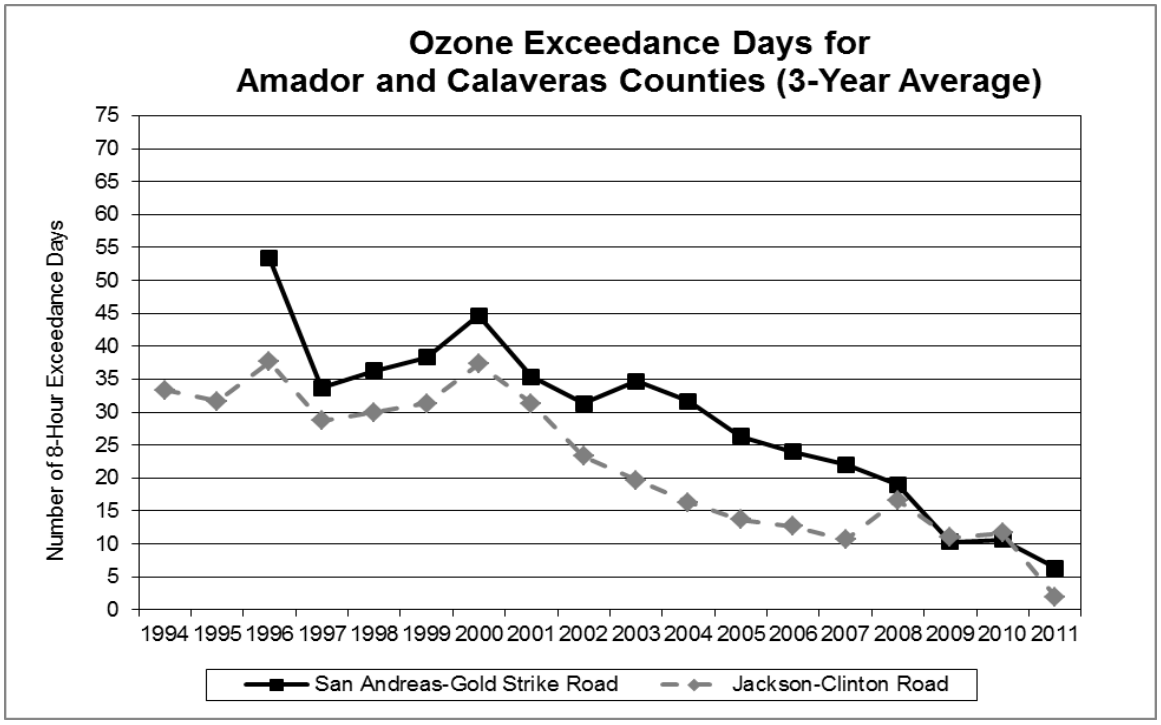


The 3-year average trend in days above the federal 8-hour standard (exceedance days), shown in Figure 3, is similar to the design value trend and further supports continued attainment in Amador County. Similar to Figure 2, Figure 3 shows that the number of exceedance days in Calaveras County is consistently higher than the number in Amador County. However, both counties show significant progress over the years.

The number of exceedance days at Jackson shows a substantial decrease since 2000, with an overall 95 percent decrease. Similar to the design value trend, the exceedance day trend shows the same increase in 2008 through 2010, because the 3-year average exceedance day count for these years includes the 2008 wildfire-impacted data. If the 2008 wildfire-impacted days were not included, there would be a more consistent downward trend. The 2011 value better reflects current conditions.

The form of the federal ozone standard allows several exceedance days each year in attainment areas. During the last three years, the number of exceedance days at Jackson were very limited, with 1 exceedance day in 2009, 3 exceedance days in 2010, and 2 exceedance days in 2011. Based on the trend, Amador County should continue to attain the federal standard.

FIGURE 3



Population Density and Degree of Urbanization; Growth Rates and Patterns; and Traffic and Commuting Patterns:

Compared with the neighboring upwind regions, Amador and Calaveras counties are rural in nature, and the rugged mountain terrain has impacted the way the counties have grown. Using ARB 2010 population estimates based on census data, the population of Amador County was 37,909, and the population of Calaveras County was 45,258. Together, the two counties are home to less than one percent of the total State population. Table 2 provides some summary information, including population density and growth rates over the last decade.

TABLE 2
POPULATION IN AMADOR AND CALAVERAS COUNTIES

COUNTY	*AREA (Sq. mi.)*	*2010 POPULATION*	*GROWTH (2000-2010)*	*PEOPLE PER SQUARE MILE*
Amador	605	37,909	+ 8%	63
Calaveras	1,037	45,258	+ 11 %	44

Although Amador County has more people per square mile, it has a lower overall growth rate when compared with Calaveras County. In both counties, most of the population is concentrated in just a few towns, including Ione, Jackson, Sutter Creek, Buckhorn, and Pine Grove in Amador County and Rancho Calaveras, Arnold, Angels Camp, Copperopolis, Valley Springs, and San Andreas in Calaveras County. These towns are primarily located in the western lower elevation portions of the counties. None of these towns are major population centers, when compared with the upwind urban areas in the Sacramento, San Joaquin Valley and San Francisco Bay Area regions. Thus, their overall contribution to local ozone air quality is minimal.

California has a number of rural counties that are similar in population to Amador and Calaveras counties, including Humboldt, Lake, and Siskiyou counties. Although their population numbers are similar, their ozone design values have been well below the level of the federal standard for a number of years. This is primarily due to the fact that these other rural counties are not located upwind of major urban areas. This suggests that the population density and emission levels in Amador and Calaveras counties are insufficient on their own to cause exceedances of the federal ozone standard.

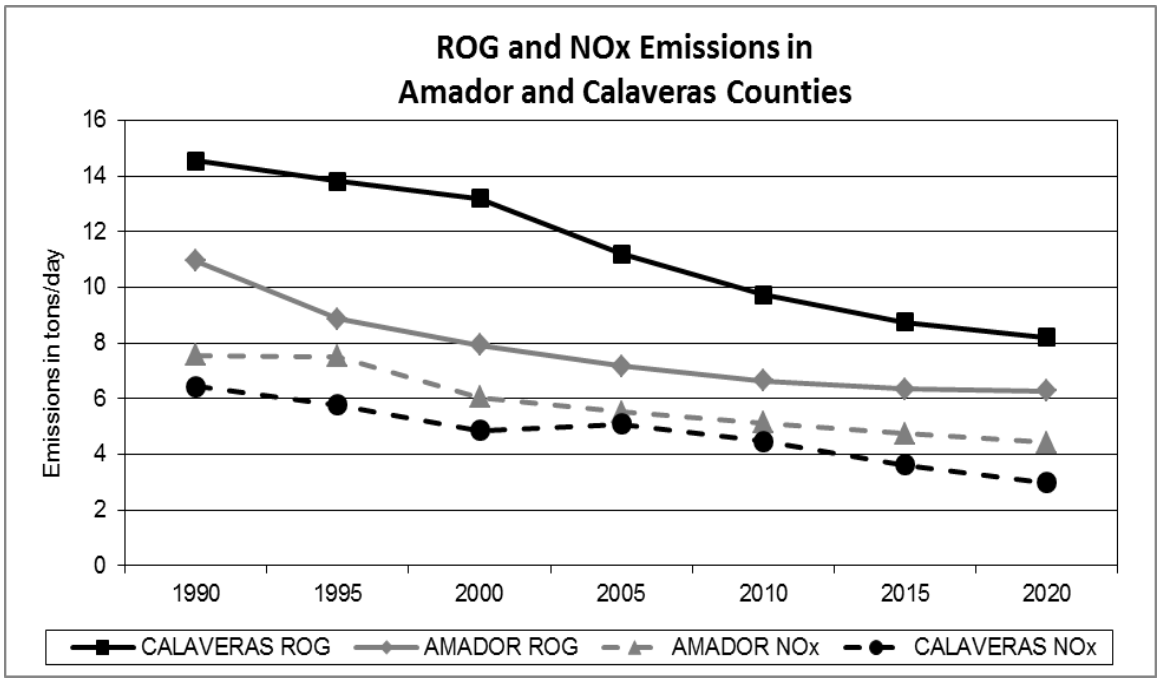
Emissions Data and Level of Emission Controls

Ozone forms when reactive organic gas (ROG) and oxides of nitrogen (NOx) precursor emissions react in the presence of sunlight. Figure 4 shows the precursor emission trends for Amador and Calaveras counties. Both precursors show a relatively consistent decrease over the last two decades. Overall, ROG emissions in Amador County decreased about 40 percent, while NOx emissions decreased about 30 percent from 1990 to 2010. ROG and NOx emissions also decreased in Calaveras County, a more than 30 percent decrease in each between 1990 and 2010. ROG and NOx emissions are projected to continue decreasing in both counties during the next decade.

Although local emissions continue to decrease, previous ARB staff analyses indicate that local precursor emissions are not the primary determinate of high ozone concentrations in Amador and Calaveras counties. As discussed previously, ARB staff has conducted a comprehensive evaluation of the impact of emissions and pollutants transported from the Sacramento, San Joaquin, and San Francisco Bay Area urban regions (all located to the west and upwind) on high ozone concentrations in Amador and Calaveras counties (ARB 1993 and ARB 1996). The analyses concluded that high ozone concentrations in Amador County are primarily caused by emissions and pollutants from the upwind urban areas (the same is true for Calaveras County). Although there is a relatively large stationary source located near Jackson that adds to the total Amador County emissions, the amount of ozone precursor emissions from this source are significantly less than emissions from sources in the upwind regions. Furthermore, because of the prevailing local airflow patterns, the impact of

emissions from this source on ozone concentrations in Calaveras County is not substantial.

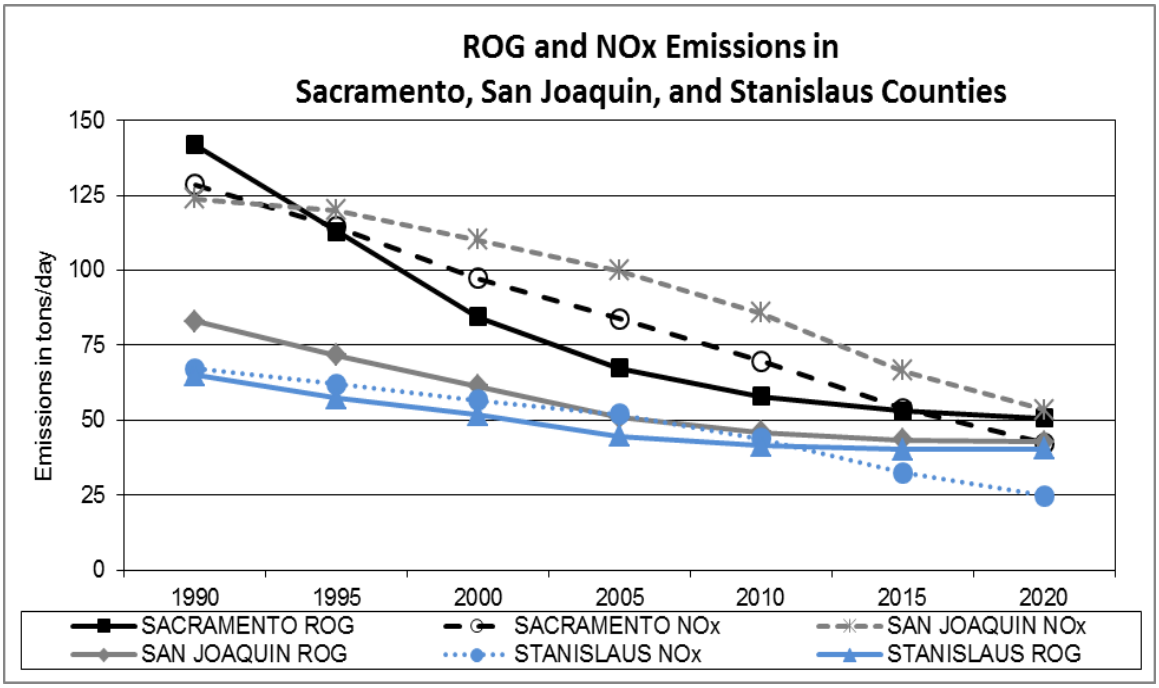
FIGURE 4



The trends in ozone precursor emissions for the three counties located directly upwind and adjacent to Amador County are shown in Figure 5. It is clear from comparing Figures 4 and 5 that the combined ozone precursor emissions in the upwind urban counties are far greater than emissions in Amador County (or in Calaveras County). In fact, estimated 2010 ROG emissions in the three upwind counties were more than 20 times greater than ROG emissions in Amador County, while upwind NOx emissions were nearly 40 times greater.

Amador County APCD has adopted rules to reduce emissions from sources under its jurisdiction. Emission reduction measures adopted by the upwind regions as part of the SIP will further improve ozone air quality in Amador County. Under California law, upwind areas are responsible for controlling transported emissions that contribute to air quality violations in downwind areas. ARB has primary responsibility under State law for evaluating the magnitude of transport and ensuring the adoption and implementation of appropriate mitigation measures. The combination of ARB's statewide measures, SIP emission controls in upwind areas, and local control measures will ensure continued attainment in Amador County, as well as future attainment in Calaveras County.

FIGURE 5



Summary and Recommendation:

U.S. EPA proposes designating Amador and Calaveras counties together as the Central Mountain Counties federal ozone nonattainment area. Based on recent air quality data, Amador County attains the federal 8-hour ozone standard of 0.075 ppm, while Calaveras County does not. Including both Amador County and Calaveras County in the Central Mountain Counties nonattainment area will have no impact on attainment in Calaveras County, where high ozone concentrations are dominated by the transport of ozone and ozone precursor emissions from the upwind Sacramento, San Joaquin, and San Francisco Bay Area regions. Thus, ARB recommends Amador County be designated as a separate attainment area for ozone, based on the following information:

- Amador County and Calaveras County fall under the jurisdiction of two separate air pollution control agencies. For planning purposes, it is most efficient to have the nonattainment boundary coincide with the jurisdictional boundary.

- Air quality data show a consistent decrease in 8-hour ozone concentrations in Amador County since 2000. The apparent increase during 2008 through 2010 reflects the impact of 2008 wildfire emissions, rather than deteriorating air quality.

- The 2011 design value for Amador County is 0.071 ppm, which meets the federal standard. Given the historic trend, the design value is expected to continue decreasing, and Amador County will continue to attain the federal standard.

- Ozone precursor emissions in Amador County are projected to continue decreasing over the next decade.

- The level of ozone precursor emissions generated in Amador County is dwarfed by the level of emissions in the adjacent upwind counties (Sacramento, San Joaquin, and Stanislaus counties).

- High ozone concentrations in both Amador and Calaveras counties are overwhelmed by ozone and ozone precursor emissions transported from the Sacramento, San Joaquin, and San Francisco Bay Area regions. The contribution of local emissions is insignificant on such days.

- The primary attainment strategy for rural areas such as Amador and Calaveras counties relies on statewide controls and control measures implemented by upwind districts. However, the local APCDs will continue to adopt and enforce rules to reduce emissions from sources under their jurisdiction.

Southern Mountain Counties: Tuolumne County and Mariposa County

U.S. EPA recommends that Tuolumne and Mariposa counties be designated together as the Southern Mountain Counties federal ozone nonattainment area. Based on ozone data collected during 2008 through 2010, the design values for both areas exceed the federal standard (2010 Tuolumne County design value is 0.082 ppm and 2010 Mariposa County design value is 0.083 ppm). However, these design values are higher than what would be expected normally, because they include data from 2008, when ozone concentrations were adversely impacted by wildfire emissions (refer to air quality discussion, below).

The 2011 design values for both counties (based on complete data for 2009 through 2011) are much lower. They do not include the 2008 data, and therefore, reflect more normal conditions. The 2011 design value for Mariposa County is 0.077 ppm, which is close to the standard, but is still above the level of the standard. In contrast, the 2011 design value for Tuolumne County is 0.074 ppm, which does not exceed the federal standard. The following paragraphs provide a five factor analysis to justify designating Tuolumne County as a separate attainment area.

Jurisdictional Boundaries:

Tuolumne and Mariposa counties are located in the MCAB; however, they fall under the jurisdiction of two separate agencies. Tuolumne County is under the jurisdiction of the Tuolumne County APCD, while Mariposa County is under the jurisdiction of the Mariposa County APCD. Air quality in each county is managed at the local level through land use and development planning practices, and the local APCD is responsible for establishing and enforcing local air quality rules and regulations that address the requirements of federal and State air quality laws. With respect to nonattainment planning, it is most efficient to have the nonattainment boundary coincide with the jurisdictional boundary of the area(s) that experience or contribute to violations of the standard. Because Tuolumne County attains the standard and does not significantly contribute to violations in Mariposa County, it is not appropriate to include Tuolumne County in the nonattainment area.

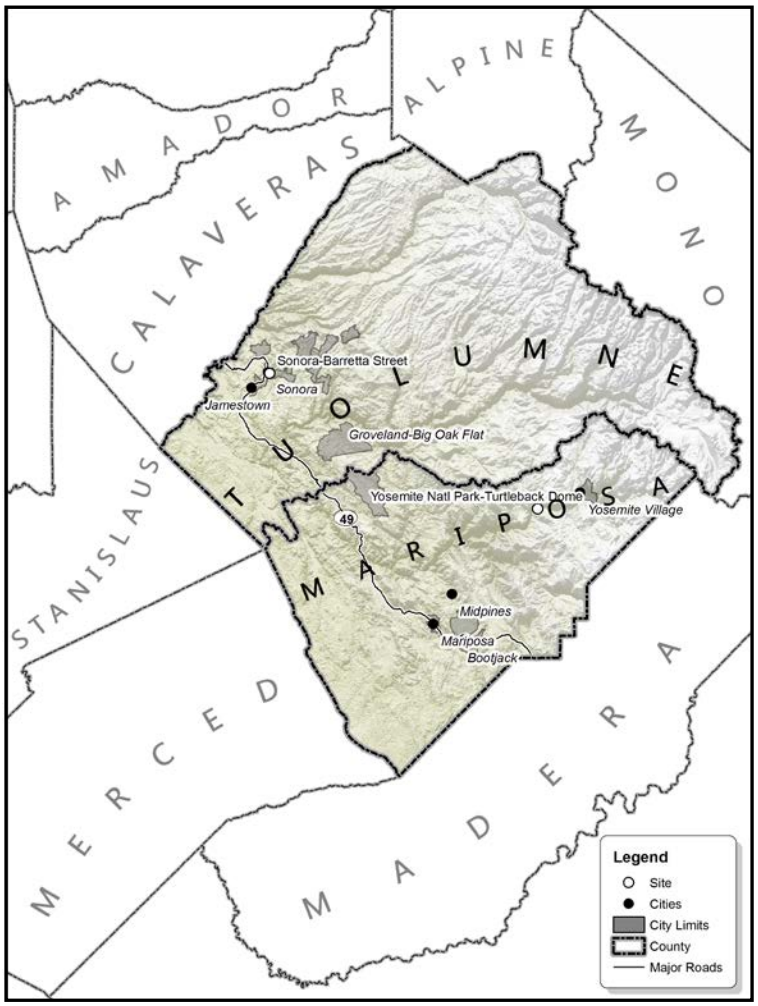
Geography / Topography:

The MCAB is located in the eastern half of California, comprising a 12,226 square mile area. Tuolumne and Mariposa counties are located in the southern portion of the MCAB, with Tuolumne County to the north and Mariposa County to the south (refer to Figure 6).

Tuolumne County covers an area of 2,235 square miles. Mariposa County is smaller, encompassing an area of approximately 1,451 square miles. Both

Counties include significant portions of Yosemite National Park, and the Sierra Nevada Mountain range comprises a substantial portion of both Tuolumne and Mariposa counties. Elevations range from around 200 feet in the western foothill areas to over 12,000 feet in the mountainous eastern areas. The topography of both rural counties is characterized by a series of valleys, generally oriented east-northeast to west-southwest, separated by ridges. These topographic features channel airflow in a general east-west direction – uphill from the west during the daytime and downhill from the east at night. The physical characteristics impact local air quality.

FIGURE 6
TUOLUMNE AND MARIPOSA COUNTIES



Meteorology:

ARB staff have conducted extensive studies of meteorological data to better understand the impact of transported emissions and pollutants on high ozone

concentrations in Tuolumne and Mariposa counties. These transport studies (ARB 1993 and ARB 1996) concluded that high ozone concentrations in both counties are overwhelmingly impacted by the transport of emissions and pollutants from upwind areas, particularly from the San Joaquin Valley. The analyses showed that the contribution of local emissions generated within Tuolumne and Mariposa counties was insignificant on high ozone days.

During the summer months, when ozone concentrations are highest, surface winds in Tuolumne County are generally upslope during the daytime hours and downslope during the nighttime hours. These winds generally follow the orientation of the mountain valleys and facilitate the transport of pollutants and emissions from the upwind urban areas into Tuolumne (and Mariposa) County, where they impact ozone air quality.

ARB staff reviewed EPA's Southern Mountain Counties Wind Direction Frequency diagram. Although the upslope/downslope flow is the primary airflow pattern during the summer months, the wind flow frequency diagram shows that surface winds can blow from Tuolumne County towards Mariposa County (from the north northwest) about 15% of the time. However, because ozone concentrations and precursor emissions in Tuolumne County are so much lower than concentrations and precursor emissions in the upwind San Joaquin Valley, Tuolumne County's contribution to high concentrations in Mariposa County is insignificant (refer to discussion of emissions, below).

Air Quality Data:

Currently, there is one ozone monitor in Tuolumne County (Sonora-Barretta Street) and two monitors in Mariposa County (Jerseydale-6440 Jerseydale and Yosemite-Turtleback Dome; refer to Figure 6). The Sonora monitor is located in the western portion of Tuolumne County at an elevation of 1,800 feet. Because of its location in the town of Sonora, measured ozone concentrations are a good indicator of population exposure. Furthermore, the Sonora monitor has been identified as appropriate for demonstrating compliance with SIP requirements.

In contrast to Sonora, the elevation of the Jerseydale (3,723 feet) and Yosemite (5,248 feet) monitors is higher. The Jerseydale monitor is operated by ARB staff as a high concentration site for determining State Designations and assessment of transport impacts. In contrast, the Yosemite monitor is operated by the National Parks Service and was sited to meet their specific goals. Although the number of monitors in Tuolumne and Mariposa counties is limited, U.S. EPA has approved both the number and location of the monitors as part of California's network monitoring plan (most recently in the 2011 Annual Network Report for Small Districts in California.)

Table 3 shows how the design values for sites in Tuolumne and Mariposa County compare. It is important to note that design values for two different years will be used for designating the two counties – 2011 for Tuolumne County and 2010 for Mariposa County. This is because using the 2011 design value makes a difference in designation status for Tuolumne County, but not for Mariposa County. The 2011 design value for Tuolumne County is 0.074 ppm at Sonora. It is based on complete data for 2009 through 2011and is 1 percent below the level of the current federal 8-hour standard.

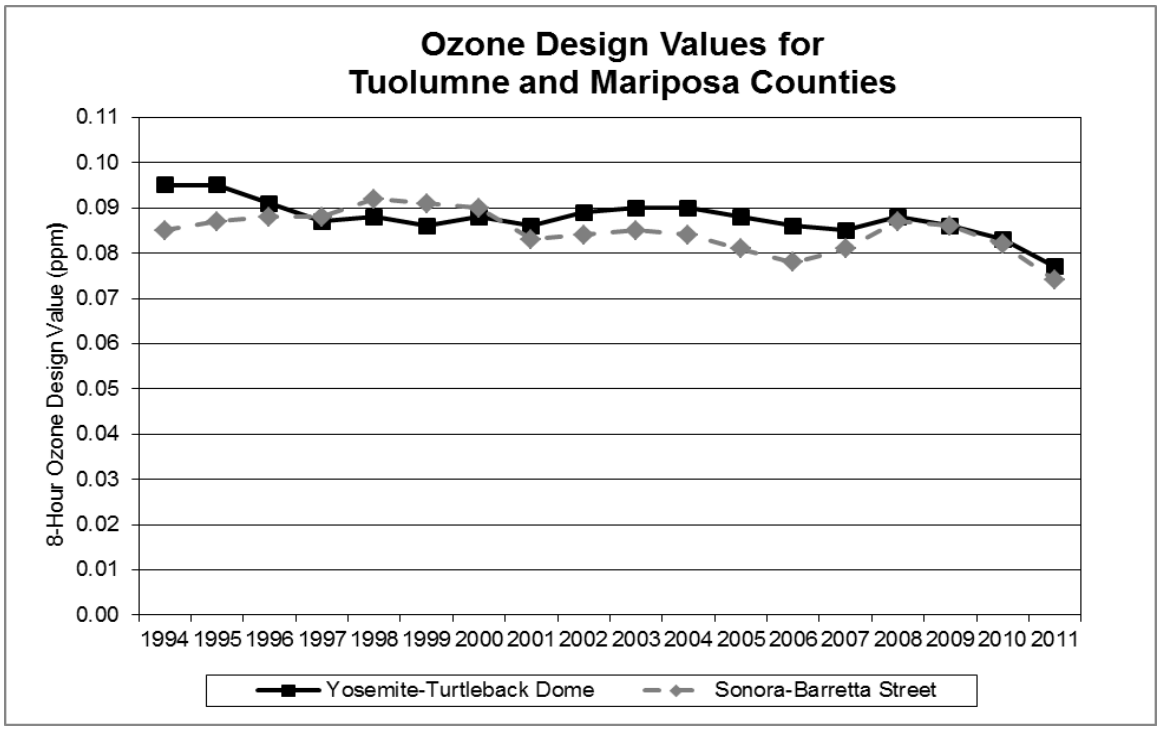
In contrast, the 2010 design value used for designating Mariposa County is 0.083 ppm at the Yosemite site. This design value is based on complete data for 2008 through 2010 data, and it does exceed the federal standard. However, data indicate a 2011 design value of 0.077 ppm. This design value is substantially lower than the 2010 design value, but it is still about 3 percent above the level of the standard. The 2011 design value for Jerseydale is comparable to the 2011 design value for Yosemite, with a design value of 0.076 ppm.

TABLE 3
8-HOUR OZONE DESIGN VALUES FOR
AMADOR COUNTY AND CALAVERAS COUNTY

COUNTY	*DESIGN SITE*	*DESIGN VALUE (ppm)*	*PERCENT FROM STANDARD*
Tuolumne County (2008-2010)	Sonora	0.082	+9%
Mariposa County (2008-2010)	Yosemite	0.083	+11%
	Jerseydale	0.080	+7%
Tuolumne County (2009-2011)	Sonora	0.074	-1%
Mariposa County (2009-2011)	Yosemite	0.077	+3%
	Jerseydale	0.076	+1%

Design value trends for Tuolumne County (Sonora site) and for the design site in Mariposa County (Yosemite site) are graphed in Figure 7. It is apparent from the graph that the design value for Yosemite is generally about the same or higher than for design values for Sonora. Although the trends are variable, design values for both counties show an overall decrease close to 15 percent since the early 2000s.

FIGURE 7



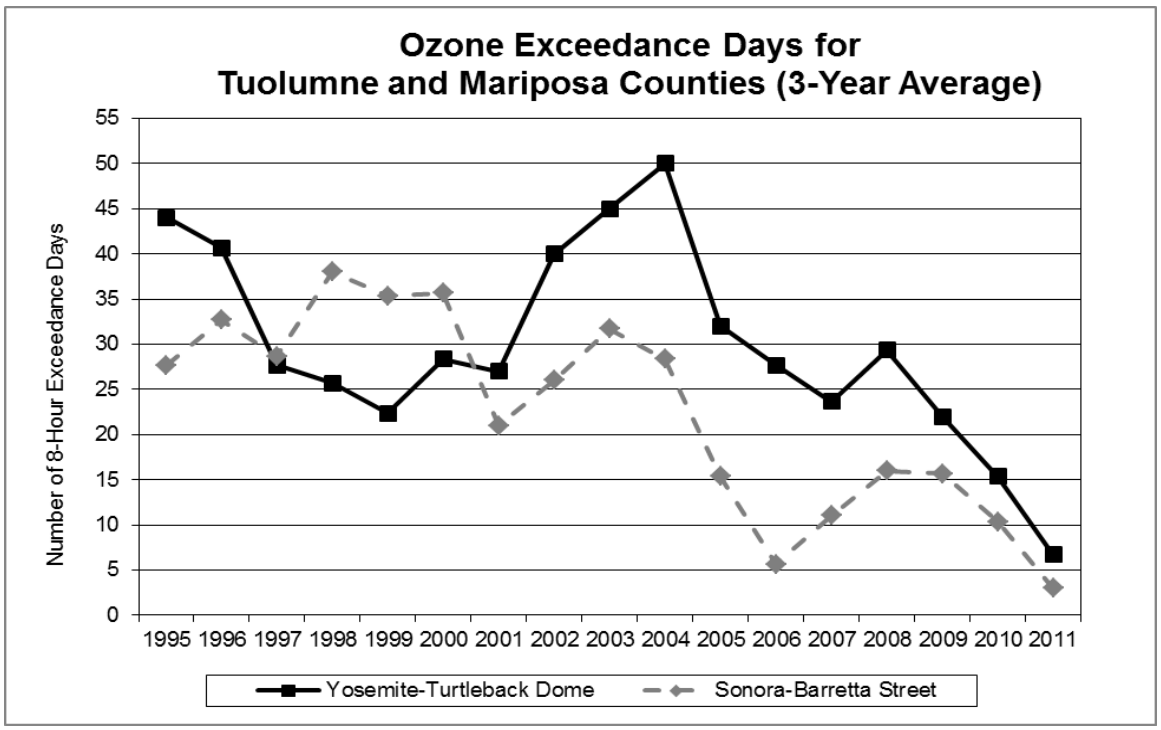
The increase in 2008 reflects the substantial impact of wildfire emissions on ozone concentrations during 2008. Furthermore, because the design value calculation is based on three years of data, the 2008 fire-impacted data also impact the design values for 2009 and 2010. Thus, design values for 2008, 2009, and 2010 are all higher than would normally be expected. If the 2008 fire-impacted days were removed, there would be a more consistent downward trend. Based on the long-term trend, Tuolumne County is expected to continue to attain the federal standard.

The 3-year average trend in days above the federal 8-hour standard (exceedance days), shown in Figure 8, further supports continued attainment in Tuolumne County. Over the last decade, the number of exceedance days at Yosemite is consistently higher than the number of days at Sonora. This is likely attributable to the high-elevation transport impact at the Yosemite site. However, because of the isloated location of the monitor, a higher number of days does not translate into increased exposure.

As seen in Figure 8, both monitors show significant overall improvement, especially since the mid-2000s. The number of exceedance days at Sonora has decreased more than 90 percent overall since 2003. Similar to the design value trend, the exceedance day trend shows the same increase during 2008 through 2010, because the 3-year average exceedance day count for these years reflects

the impact of wildfire emissions on the 2008 data. If the 2008 wildfire-impacted days were not included, there would be a more consistent downward trend. The 2011 value better reflects current conditions.

FIGURE 8



The form of the federal ozone standard allows several exceedances per year in attainment areas. During the last three years, the number of exceedance days at Sonora were limited, with 5 exceedance days in 2009, 3 exceedance days in 2010, and only 1 exceedance day in 2011. Based on the trend, Tuolumne County should continue to attain the federal standard.

Population Density and Degree of Urbanization; Growth Rates and Patterns; and Traffic and Commuting Patterns:

Compared with the neighboring upwind region, Tuolumne and Mariposa counties are rural in nature, and the rugged mountain terrain and National Park area have both impacted the way the counties have grown. Using ARB 2010 population estimates based on census data, the population of Tuolumne County was 54,961, and the population of Mariposa County was 18,119. Together, the two counties are home to less than 1 percent of the total State population. Table 4 provides some summary information, including population density and growth rates over the last decade.

TABLE 4
POPULATION IN AMADOR AND CALAVERAS COUNTIES

COUNTY	*AREA (Sq. mi.)*	*2010 POPULATION*	*GROWTH (2000-2010)*	*PEOPLE PER SQUARE MILE*
Tuolumne	2,235	54,961	+ 1%	25
Mariposa	1,451	18,119	+ 6 %	8

Although Tuolumne County has more people per square mile, it has a much lower overall growth rate when compared with Mariposa County. In both counties, most of the population is concentrated in just a few towns, including Sonora, Phoenix Lake, Jamestown, and Mono Vista in Tuolumne County and Mariposa, Midpines, Lake Don Pedro, and Yosemite Valley in Mariposa County. None of these towns are major population centers, when compared with the upwind urban areas in the San Joaquin Valley. Thus, their overall contribution to local ozone air quality is minimal.

California has a number of rural counties that are similar in population to Amador and Calaveras counties, including Humboldt, Lake, and Siskiyou counties. Although their population numbers are similar, their ozone design values have been well below the level of the federal standard for a number of years. This is primarily due to the fact that these other rural counties are not located upwind of major urban areas. This suggests that the population density and emission levels in Tuolumne and Mariposa counties are insufficient on their own to cause exceedances of the federal ozone standard.

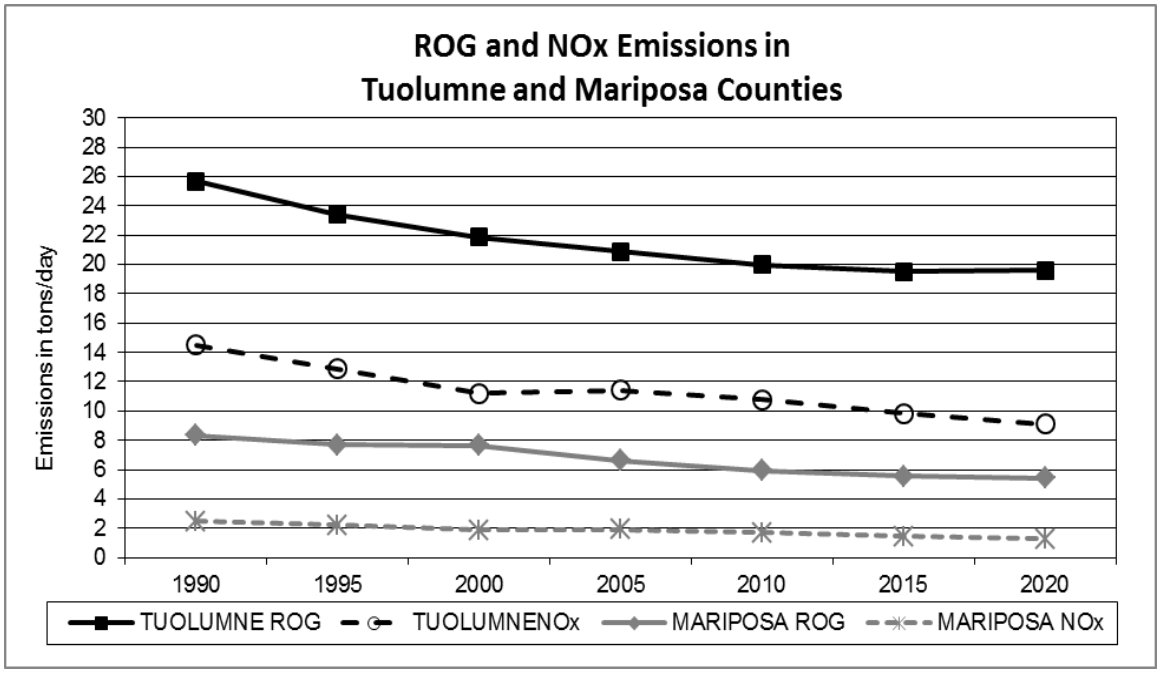
Emissions Data and Level of Emission Controls

As mentioned earlier, ozone forms when reactive organic gas (ROG) and oxides of nitrogen (NOx) precursor emissions react in the presence of sunlight. Figure 9 shows the precursor emission trends for Tuolumne and Mariposa counties. Both

precursors show a decrease over the last two decades. Overall, ROG emissions in Tuolumne County decreased more than 20 percent, while NOx emissions decreased about 25 percent from 1990 to 2010. ROG and NOx emissions also decreased in Mariposa County, about 30 percent each between 1990 and 2010. ROG and NOx emissions are projected to decrease in both counties between now and 2020.

Although local emissions continue to decrease, previous ARB staff analyses indicate that local precursor emissions are not the primary determinate of high ozone concentrations in Tuolumne and Mariposa counties. As discussed previously, ARB staff has conducted a comprehensive evaluation of the impact of emissions and pollutants transported from San Joaquin Valley on high ozone concentrations in Tuolumne and Mariposa counties (ARB 1993 and ARB 1996). The analyses concluded that high ozone concentrations in Tuolumne County are primarily caused by emissions and pollutants from the upwind San Joaquin Valley. The same is true for Mariposa County.

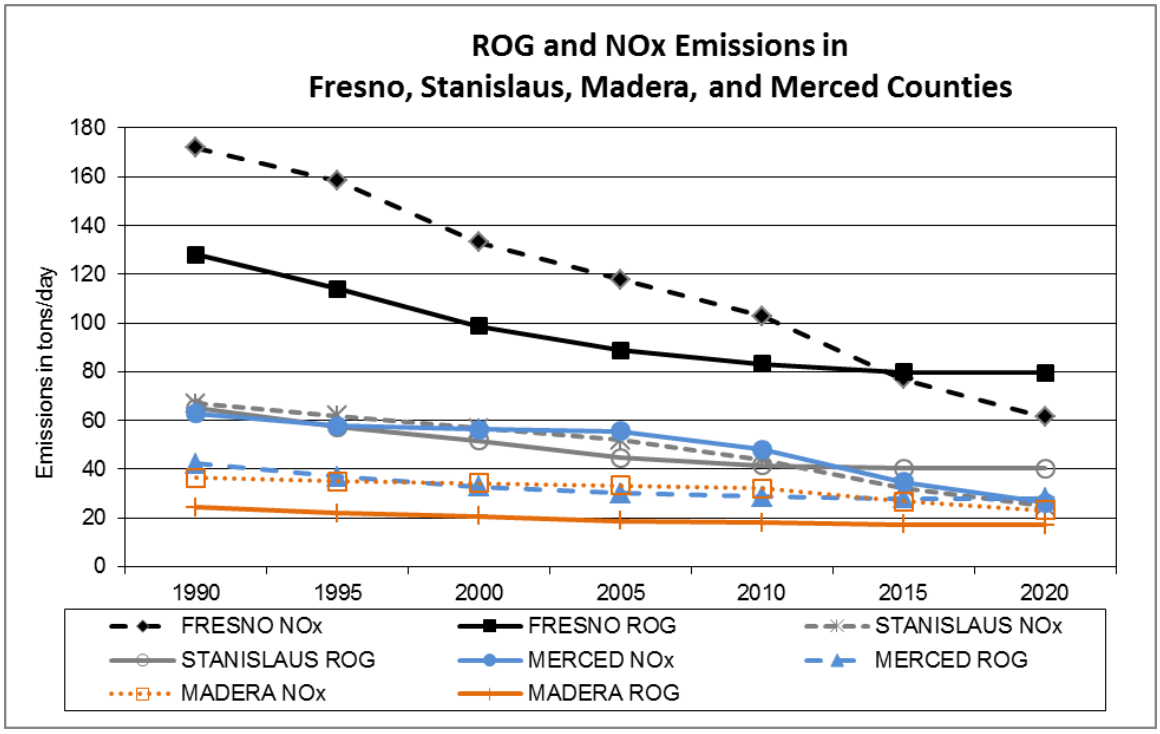
FIGURE 9



The trends in ozone precursor emissions for the four San Joaquin Valley counties located upwind of Tuolumne and Mariposa counties are shown in Figure 10. It is clear from comparing Figures 9 and 10 that the combined ozone precursor emissions in the upwind areas are far greater than emissions in Tuolumne County (or in Mariposa County). In fact, estimated 2010 ROG emissions in the upwind counties are more than eight times greater than ROG emissions in Tuolumne County, while upwind NOx emissions are more than

20 times greater. Although the amount of ROG and NOx emissions in Tuolumne County are greater than emissions in Mariposa County, Tuolumne County emissions are significantly less than emissions from sources in the upwind San Joaquin Valley. Furthermore, because of prevailing local air flow patterns, Tuolumne County emissions do not substantially impact ozone concentrations in Mariposa County.

FIGURE 10



Tuolumne County APCD has adopted rules to reduce emissions from sources under its jurisdiction. Emission reduction measures adopted by the upwind region as part of the SIP will further improve ozone air quality in Tuolumne County. Under California law, upwind areas are responsible for controlling transported emissions that contribute to air quality violations in downwind areas. ARB has primary responsibility under State law for evaluating the magnitude of transport and ensuring the adoption and implementation of appropriate mitigation measures. The combination of ARB's statewide measures, SIP emission controls in upwind areas, and local control measures will ensure continued attainment in Tuolumne County, as well as future attainment in Mariposa County.

Summary and Recommendation:

U.S. EPA proposes designating Tuolumne and Mariposa counties together as the Southern Mountain Counties federal ozone nonattainment area. Based on

recent air quality data, Tuolumne County attains the federal 8-hour ozone standard of 0.075 ppm, while Mariposa County does not. Including both Tuolumne County and Mariposa County in the Southern Mountain Counties nonattainment area will have no impact on attainment in Mariposa County, where high ozone concentrations are dominated by the transport of ozone and ozone precursor emissions from the upwind San Joaquin Valley region. Thus, ARB recommends Tuolumne County be designated as a separate attainment area for ozone, based on the following information:

- Tuolumne County and Mariposa County fall under the jurisdiction of two separate air pollution control agencies. For planning purposes, it is most efficient to have the nonattainment boundary coincide with the jurisdictional boundary.

- Air quality data show a consistent decrease in 8-hour ozone concentrations in Tuolumne County since the early 2000s. The apparent increase during 2008 through 2010 reflects the impact of 2008 wildfire emissions, rather than deteriorating air quality.

- The 2011 design value for Tuolumne County is 0.074 ppm, which meets the federal standard. Given the historic trend, the design value is expected to continue decreasing, and Tuolumne County will continue to attain the federal standard.

- Ozone precursor emissions in Tuolumne County are projected to decrease over the next decade.

- The level of ozone precursor emissions generated in Tuolumne County is dwarfed by the level of emissions in the upwind counties located in the San Joaquin Valley.

- High ozone concentrations in both Tuolumne and Mariposa counties are overwhelmed by ozone and ozone precursors transported from the San Joaquin Valley. The contribution of local emissions is insignificant on such days.

- The primary attainment strategy for rural areas such as Tuolumne and Mariposa counties relies on statewide controls and control measures implemented by upwind districts. However, the local APCDs will continue to adopt and enforce rules to reduce emissions from sources under their jurisdiction.

References:

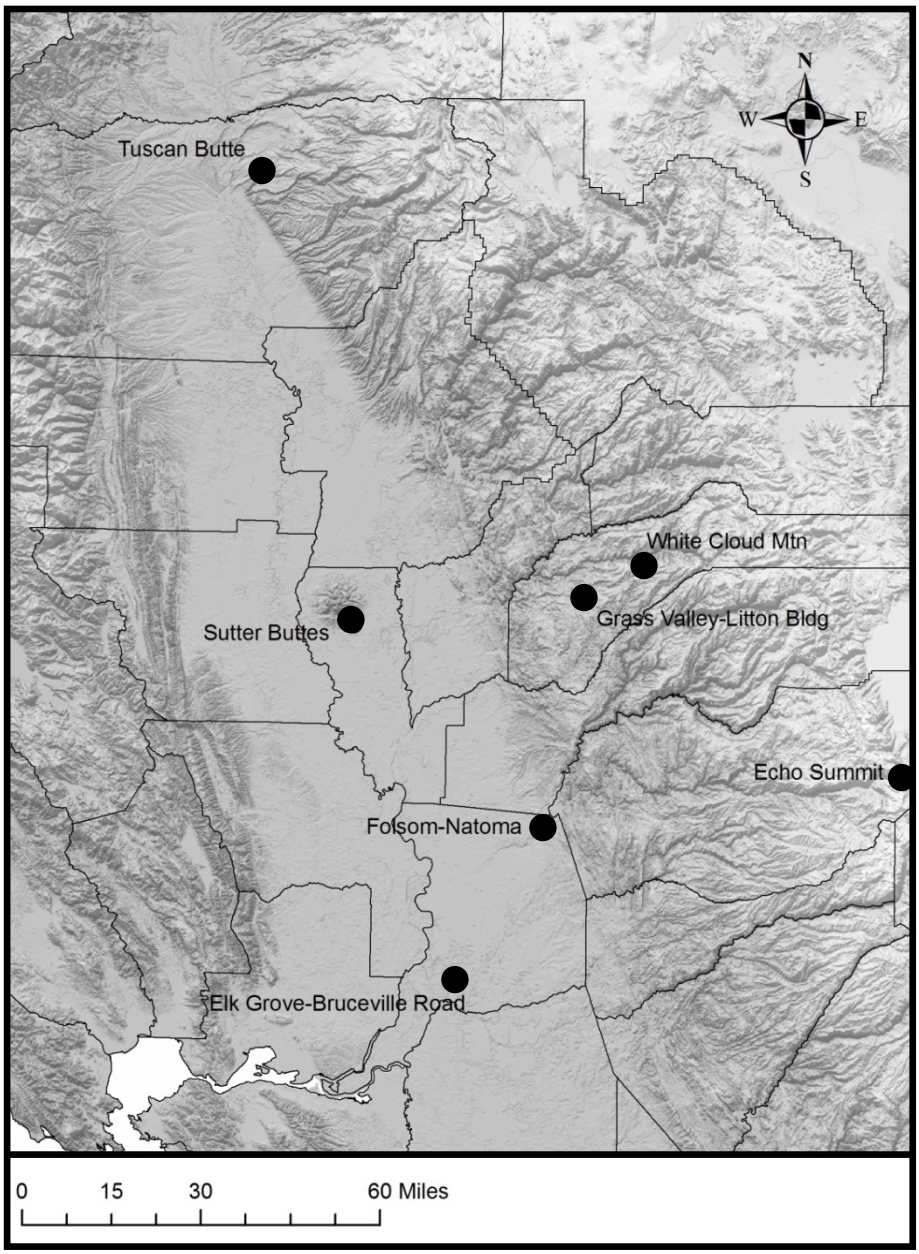
ARB, 1993: Assessment and Mitigation of the Impacts on Ozone Concentrations in California. Staff Report: Initial Statement of Reasons prepared by Technical Support Division, June 1993.

ARB, 1996: Second Triennial Review of the Assessment of the Impacts of Transported Pollutants on Ozone Concentrations in California (Revised). Staff Report: Initial Statement of Reasons prepared by Technical Support Division, November 1996.

ENCLOSURE 2
JUSTIFICATION OF SUTTER BUTTES 2011 DESIGN VALUE

Sutter Buttes is a seasonal site in the upper Sacramento Valley that operates during the May through October ozone season. Located at an elevation of about 2116 feet, Sutter Buttes was sited to monitor the impact of high elevation transport from urban areas. A map of the Sutter Buttes monitor location is provided in Figure 1, below. Other locations referenced in the following analyses are also included in Figure 1.

FIGURE 1
MAP OF SUTTER BUTTES AND SURROUNDING AREA



Data completeness for Sutter Buttes during 2009 through 2011 is summarized in Table 1, below. To be considered complete for regulatory purposes, monitoring data must meet the requirements specified in Appendix P to 40 Code of Federal Regulations (CFR) Part 50. Under Appendix P, data for each year must be at least 75 percent complete, with a three-year average completeness of at least 90 percent. When these minimum requirements are not met, meteorological or ambient data may be used to demonstrate that conditions on missing days were not conducive to concentrations above the standard. Missing days assumed to be less than the standard may be counted towards meeting the completeness requirements.

TABLE 1
SUTTER BUTTES DATA COMPLETENESS BY YEAR

YEAR	*NUMBER OF DAYS POSSIBLE*	*NUMBER OF DAYS WITH DATA*	*PERCENT COMPLETE*
2009	184	172	93%
2010	184	183	99%
2011	184	140	76%
		3-Year Average =	89%

Although the Sutter Buttes data meet the 75 percent completeness requirement for each year, the three-year average (89 percent) is just below the overall 90 percent completeness requirement. A review of the data shows several incomplete days during 2009 through 2011 that can be assumed to have maximum 8-hour concentrations below the standard. Although only one additional day is needed to satisfy the 90 percent criteria, the following evaluation focuses on two days, as shown in Table 2. While some data are available during each of these days, they are not considered complete because more than six hourly measurements are missing, and as a result, there are fewer than the required eighteen rolling 8-hour averages.

TABLE 2
SUTTER BUTTES INCOMPLETE DAYS ASSUMED TO BE BELOW THE STANDARD

DATE	*MISSING HOURS*	*MAX 8-HOUR*	*MAX 8-HOUR DAY BEFORE*	*MAX 8-HOUR DAY AFTER*
05/12/2009	00-13	0.057 ppm*	Not available	0.041 ppm
06/22/2010	04; 09-12	0.053 ppm	0.050 ppm	0.058 ppm

* *ppm = parts per million*

As summarized in Table 2, the two incomplete candidate days occurred during the months of May and June. Typically, these months do not have the highest ozone

concentrations. As shown in Table 3, 90 percent of the high 8-hour ozone concentrations relevant to the design value calculation at Sutter Buttes occur during July, August, and September, compared with only 10 percent during May and June.

TABLE 3
FREQUENCY OF THE TOP FOUR 8-HOUR CONCENTRATIONS BY MONTH*

	2005	***2006***	***2007***	***2009***	***2010***	***Percent by Month***
May	0	0	1	0	0	5%
June	0	0	0	1	0	5%
July	3	2	1	1	0	35%
August	0	0	0	1	2	15%
September	1	2	2	1	2	40%
October	0	0	0	0	0	0%

* *2008 data are not included because concentrations were impacted by wildfire emissions; 2011 data are not included because August data are not complete.*

The following sections provide justification that the maximum 8-hour concentrations on May 12, 2009, and June 22, 2010, were below the standard. Our conclusions are based on the evaluation of several different air quality-related parameters, including the following:

- The typical timing of high ozone concentrations at Sutter Buttes,
- Spatial differences in ozone concentrations on the candidate days,
- Spatial differences in ozone concentrations on the days preceding and following the candidate days, and
- The meteorological conditions on the preceding and the candidate days.

Based on these analyses, conditions on the candidate days were not conducive to high ozone concentrations. Therefore, it can be assumed that the maximum 8-hour average ozone concentration at Sutter Buttes on May 12, 2009, and on June 22, 2010, did not exceed the federal standard.

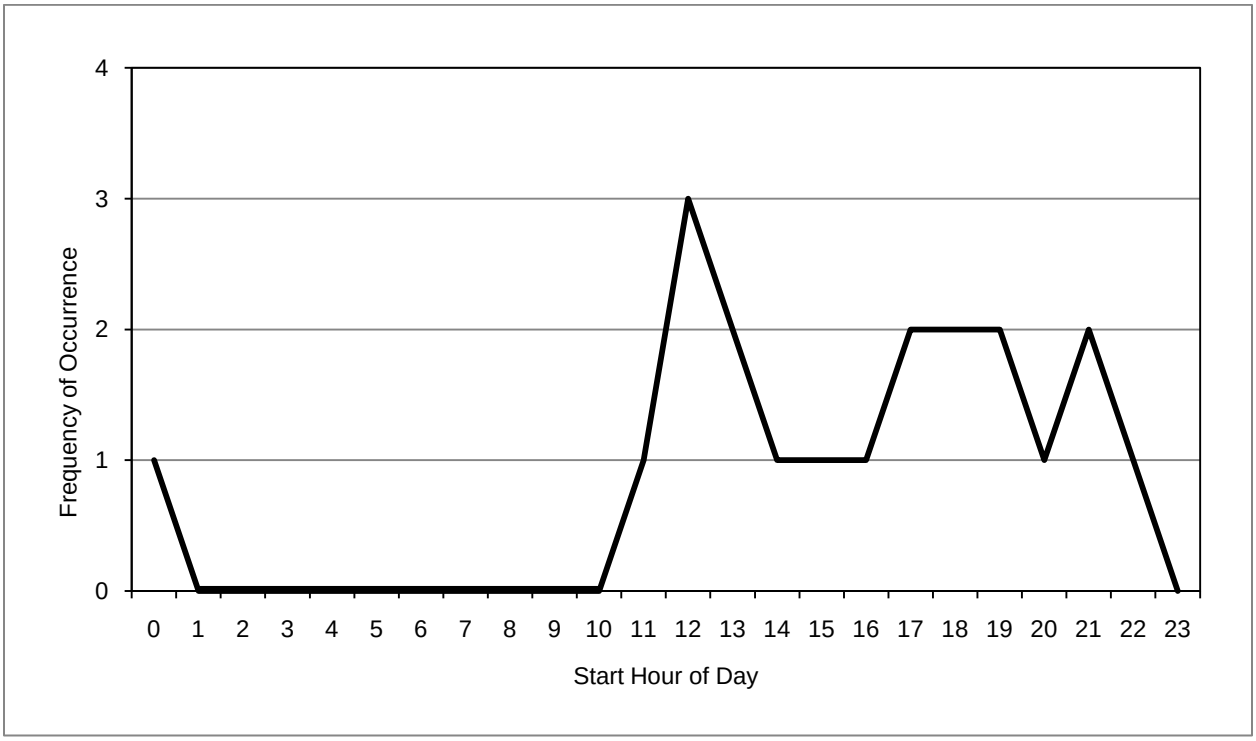
May 12, 2009

The maximum 8-hour concentration at Sutter Buttes on May 12, 2009, was 0.057 parts per million (ppm), which is below the level of the federal standard. Data for the day are not complete because hourly measurements are missing during the first half of the day (hours 00 through 13; refer to Table 2). Based on the available hourly data, twelve valid 8-hour averages can be calculated, which is below the eighteen averages required for a complete day. The missing 8-hour averages have start hours of 00 through 11.[1]

[1] Although hourly data are missing for hours 12 and 13 on May 12, 2009, the 8-hour averages for these start hours are valid because hourly measurements are available for at least six other hours during the 8-hour period.

Despite the missing data, it is highly unlikely the federal 8-hour ozone standard was exceeded at Sutter Buttes on May 12, 2009. A review of recent Sutter Buttes data shows the missing hours are not critical for determining the design value. Figure 2 provides a summary of the frequency of high 8-hour ozone concentrations at Sutter Buttes by start hour. Based on data for the five years, 8-hour averages with start hours 00 through 11 are not critical to the design value calculation, as the four highest ozone concentrations during a year rarely occur during these hours.

FIGURE 2
FREQUENCY OF TOP FOUR 8-HOUR AVERAGES BY START HOUR
(based on data from 2005 - 2010*)



* *2008 data are not included because concentrations were impacted by wildfire emissions; 2011 data are not included because August data are incomplete.*

An evaluation of the 1-hour measurements for May 12 indicates that despite the missing hours, the remaining data (hours 14 through 23) likely capture the peak 1-hour ozone concentration at Sutter Buttes. The hourly measurements show ozone concentrations slowly increasing from 0.057 ppm at hour 14, to a peak concentration of 0.060 ppm at hour 19. Following hour 19, concentrations decline. Thus, the available data appear to capture the highest hourly concentration at Sutter Buttes, and even this concentration is below the level of the 8-hour standard. Similarly, peak 1-hour ozone concentrations at

all other northern California sites on May 12 were below the level of the 8-hour standard, reaching a high of only 0.067 ppm. [2]

Since all 1-hour ozone concentrations were below the level of the 8-hour standard on May 12, 2009, it follows that all 8-hour concentrations were below the standard, as well. Indeed, the maximum 8-hour concentration in northern California on May 12 was 0.064 ppm. This concentration was measured at three sites: Folsom-Natoma in the Sacramento Metro Area, Grass Valley-Litton Building in Western Nevada County, and Echo Summit in the Mountain Counties Air Basin.

In addition to regional 8-hour concentrations below the standard on May 12, concentrations throughout northern California were below the 8-hour standard during the three preceding days (May 9 through May 11, 2009), as well as the three following days (May 13 through May 15, 2009). At Sutter Buttes, there are no ozone data for the days prior to May 12, as monitoring had not yet started for the 2009 ozone season. However, the maximum 8-hour concentrations on the three following days were 0.041 ppm (May 13), 0.038 ppm (May 14), and 0.055 ppm (May 15). These concentrations are all well below the standard.

In addition to air quality data, some meteorological data are available for May 12, 2009. Temperature data for Sutter Buttes show a maximum of 69° Fahrenheit on May 12, and daily maximum temperatures throughout northern California reached only 85° Fahrenheit. These maximums are below temperatures normally associated with federal ozone exceedance days.

No wind data are available for Sutter Buttes on May 12, 2009. However, surface wind data are available for Tuscan Butte, which is located north of Sutter Buttes. Tuscan Butte is another rural high elevation (1876 feet) site that was established to study transport impacts. Wind data are also available for Elk Grove-Bruceville Road, a site in the Sacramento urban area, south of Sutter Buttes. The Elk Grove data comprise measurements at the surface, as well as aloft (2000 feet).

Data for both Tuscan Butte and Elk Grove (2000 foot level) show strong northerly and westerly components during all hours on both May 11 and May 12. In addition, surface winds at Elk Grove were from the southwest during the late afternoon hours of May 11, through the early morning hours of May 12. Around 8 a.m., these surface winds shifted, blowing from the northwest through the afternoon of May 12. The wind patterns, both at the surface and aloft, prevented emissions from the Sacramento urban area from impacting ozone concentrations at Sutter Buttes, thus keeping concentrations low during the missing hours. Furthermore, the southwesterly component of the surface winds at Elk Grove during May 11 and 12 supports the movement of emissions from the Sacramento urban area eastward, contributing to the higher ozone concentrations at Folsom, Grass Valley, and Echo Summit on May 12.

[2] Northern California sites include all ozone monitoring sites from Merced County in the south to the Oregon border in the north.

In summary, it can be assumed that the maximum 8-hour average ozone concentration at Sutter Buttes on May 12, 2009, was below the level of the federal standard, based on the following information:

- 8-hour ozone concentrations at Sutter Buttes during the missing hours on May 12, 2009, are not critical to the design value calculation.
- The increase in 1-hour concentrations at Sutter Buttes during the afternoon hours of May 12, 2009, suggests the available data capture the peak 1-hour concentration, and even this concentration is below the level of the 8-hour standard.
- No site in northern California had a maximum 8-hour average concentration exceeding the standard on May 12, 2009, and even the 1-hour concentrations at the northern California sites were below the level of the federal 8-hour standard.
- The federal 8-hour standard was not exceeded at any site in northern California during the three days prior to May 12, 2009, or during the three days after May 12, 2009.
- Maximum ambient temperatures throughout northern California on May 12, 2009, including temperatures at Sutter Buttes, were lower than those generally associated with ozone exceedances.
- Winds on May 12, 2009, both at the surface and aloft, were not consistent with the transport of ozone and ozone precursor emissions from the urban area to Sutter Buttes, where they could impact ozone concentrations.

June 22, 2010

The maximum 8-hour concentration at Sutter Buttes on June 22, 2010, was 0.053 ppm, which is below the level of the federal standard. Data for the day are not complete because five hourly measurements are missing during the first half of the day (refer to Table 2). Based on the hourly data that are available, sixteen valid 8-hour averages can be calculated, which is just below the eighteen averages required for a complete day. The missing averages have start hours of 03 through 10.[3] A review of recent Sutter Buttes data shows these hours are not critical for determining design value because the four highest 8-hour averages during a year do not occur during these hours (refer to Figure 2).

[3] Although hourly data are missing for hour 04 and hours 09 through 12, the 8-hour averages for some start hours within this range are valid because hourly measurements are available for at least six other hours during the 8-hour period.

Despite the missing hours, it is highly unlikely that ozone concentrations at Sutter Buttes exceeded the federal 8-hour standard on June 22, 2010. In fact, an evaluation of daily maximum 8-hour concentrations shows the 8-hour standard was not exceeded anywhere in northern California on June 22. The maximum 8-hour average was 0.074 ppm, measured at the Folsom-Natoma site in the Sacramento Metro Area. Ozone concentrations at Folsom-Natoma are typically higher than concentrations at Sutter Buttes.

In addition to regional 8-hour concentrations below the standard on June 22, concentrations throughout northern California (including Sutter Buttes) were below the 8-hour standard during the three preceding days (June 19 through June 21, 2010), ranging from less than 0.010 ppm to 0.062 ppm. During the three following days (June 23 through June 25, 2010), a single 8-hour exceedance was measured at the White Cloud Mountain site in Nevada County on June 23. At a level of 0.076 ppm, this maximum was just above the federal 8-hour standard. Concentrations at all other northern California sites ranged from less than 0.010 ppm to 0.075 ppm. The 8-hour averages at Sutter Buttes during these days were all well below the standard: 0.058 ppm (June 23), 0.042 ppm (June 24), and 0.045 ppm (June 25).

In addition to air quality data, wind data are available for both Tuscan Butte and Elk Grove. Surface winds at Elk Grove, in the Sacramento area, were from the south and southwest during the evening hours on June 21 and into the early morning hours on June 22. Later in the morning, winds were very light and variable, changing to a stronger, westerly wind in the afternoon. In contrast, winds measured at Tuscan Butte, located north of Sutter Buttes and at a similar elevation, were from the north to north northwest on both days. Wind speeds at Tuscan Butte were about 8 miles per hour on June 21, strengthening to 15 miles per hour on June 22. At Elk Grove, winds aloft (2000 foot level) were westerly during the afternoon of June 21, becoming light and variable during the early morning through afternoon of June 22. Given the relatively light southwest to westerly winds both at the surface and aloft at Elk Grove, combined with the stronger northerly component at Tuscan Butte, it is unlikely that emissions from the Sacramento urban area had an impact on ozone concentrations at Sutter Buttes on June 22. Therefore, it is unlikely that concentrations during the missing hours of June 22 would have been high enough to cause an exceedance of the federal 8-hour standard.

In summary, it can be assumed that the maximum 8-hour average ozone concentration at Sutter Buttes on June 22, 2010, was below the level of the federal standard, based on the following information:

- Concentrations during the missing hours on June 22, 2010, are not critical to the design value calculation.
- No site in northern California had a maximum 8-hour average concentration exceeding the standard on June 22, 2010.

- The federal 8-hour standard was not exceeded at any site in northern California during the three days prior to June 22, 2010, and only one exceedance was recorded during the three days after June 22, 2010.

- Winds on June 22, 2010, both at the surface and aloft, were not consistent with the transport of ozone and ozone precursor emissions from the urban area to Sutter Buttes, where they could impact ozone concentrations.

2011 Sutter Buttes 8-Hour Ozone Design Value

As shown in Table 4, assuming the maximum 8-hour average ozone concentrations on May 12, 2009, and June 22, 2010, were below the level of the federal standard brings the average completeness for the 2009 through 2011 three-year period to 90 percent. This meets the completeness requirements specified in Appendix P to 40 CFR Part 50.

TABLE 4
SUTTER BUTTES DATA COMPLETENESS BY YEAR WITH ADDITIONAL DAYS

YEAR	*NUMBER OF DAYS POSSIBLE*	*NUMBER OF DAYS WITH DATA*	*PERCENT COMPLETE*
2009	184	173	94%
2010	184	183	100%
2011	184	140	76%
		3-Year Average =	90%

The fourth high values used in the design value calculation are shown in Table 5. The three-year average of these gives Sutter Buttes a 2011 design value of 0.071 ppm, which is below the level of the federal 8-hour ozone standard.

TABLE 5
FOURTH HIGHEST 8-HOUR AVERAGE OZONE CONCENTRATIONS AND 2011 DESIGN VALUE FOR SUTTER BUTTES

YEAR	*4th HIGH 8-HOUR CONCENTRATION*
2009	0.072 ppm
2010	0.068 ppm
2011	0.075 ppm
	2011 Design Value: 0.071 ppm

Because concentrations at Sutter Buttes during May and June generally are not as high as those in July, August, and September, ozone concentrations on May 12, 2009, and

June 22, 2010, do not impact the design value calculation. Furthermore, for either day to make a difference in the 2011 design value, May 12, 2009, would need a maximum 8-hour concentration of at least 0.075 ppm, and June 22, 2010, would need a maximum 8-hour concentration of at least 0.073 ppm. Even if both days had 8-hour concentrations above these threshold levels, the 2011 design value would be 0.074 ppm, which would still be below the level of the federal 8-hour ozone standard.