San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

2010 Ozone Mid-Course Review

June 2010

HEALTHY AIR LIVING™

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2010 Ozone Mid-Course Review

Executive Summary

The San Joaquin Valley's surrounding mountains, stagnant weather patterns, and hot summers provide the ideal conditions for ozone formation. However, despite this uniquely difficult topography and meteorology, the San Joaquin Valley Air Pollution Control District (District) has a history of successfully developing and implementing control measures to reduce both 1-hour and 8-hour ozone concentrations in the Valley.

In order to achieve these successes, the District developed robust regulatory, incentive, outreach, and education strategies in their *2004 Extreme Ozone Attainment Demonstration Plan (EOADP)* and *2007 Ozone Attainment Demonstration Plan (2007 Ozone Plan*). Both of these plans were developed using computer modeling, extensive public input, which included over 15 workshops and Town Hall Meetings involving over 300 Valley residents, and extensive research into all feasible control options. Each plan included a comprehensive and exhaustive list of regulatory and incentive-based measures to reduce emissions of ozone and particulate matter precursors throughout the Valley. Consistent with the direction of each plan, the Governing Board adopted regulatory measures that, in the majority of cases, exceeded the plan commitment for a given source category, especially through the implementation of the Confined Animal Facilities Rule (4570), Phase II of the Stationary Internal Combustion Engines Rule (4702), Stationary Gas Turbines Rule (4703), and multiple rules for Boilers, Steam Generators, and Process Heaters (4307, 4306, 4320). Overall, rules in the *EOADP* achieved 15.8 tons per day more oxides of nitrogen (NOx) and 11.7 tons per day more volatile organic compounds (VOC) than committed to in the plan; and rules in the *2007 Ozone Plan* achieved 9.3 tons per day more NOx and 5.6 tons per day more VOC than committed to in the plan.

Additionally, the plans included consideration of future advancements in pollution control technologies and increases in state and federal funding for incentive-based measures as options to achieve the "black box" reductions. The "black box" reductions are an estimated 82 tons per day of NOx reductions needed by December 31, 2023 to achieve the ozone standard. These reductions depend on the use of technologies, funding sources, and strategies that were not available at the time of plan development and adoption. Thus far, such innovative strategies and new technologies have enabled the District to achieve more emissions reductions than originally projected at the time of plan adoption. These surplus reductions reduce the size of the "black box" in the *2007 Ozone Plan*.

Many of the rules implemented through the *EOADP* and *2007 Ozone Plan*, such as the Indirect Source Review (ISR) rule, are the first of their type in the nation, or are deemed the most stringent in the nation. The District's (ISR) Rule bridges the gap between regulations and incentives to maximize reductions while minimizing socioeconomic impacts. The ISR rule requires developers of new development projects to reduce emissions during both the construction and operational phases of the project. The District works closely with developers to maximize on-site emissions reductions at the

proposed developments; however, if developers are not able to fully achieve required reductions through on-site measures, fees may be collected to fund off-site emission reduction projects. To date, the District has spent approximately $2 million in ISR fees to achieve over 1,172 tons of NOx emissions reductions and 43 tons of particulate matter (PM) emission reductions.

The District's strategy to reduce emissions also includes the proactive use of incentives to obtain reductions that would otherwise not be cost-effective for industry or are outside the District's regulatory authority. Over the twelve years of active incentive program implementation, NOx and VOC emissions have been reduced by 58,620 tons and 2,368 tons, respectively. In addition to the emissions saved, the District was successful in bringing more than $193 million in grant funding into the Valley to support not only emissions reductions, but also the advancement of new technology and the regional economy. The District is working with EPA to make the incentive programs SIP creditable so that these reductions could be used to reduce the "black box" emission reduction commitment.

The District's development and implementation of innovative strategies and outreach programs such as the Healthy Air Living Program, Fast Track Action Plan, and the Regional Energy Efficiency Strategy, have enlisted the voluntary participation of individuals, governmental agencies, businesses, and private citizens throughout the Valley to take actions to reduce NOx and VOC for improved air quality. While implementing and fostering these activities is no trivial task on the part of the District in terms of time and commitment, they can be fairly easy to implement for the public sector given the appropriate information and valuable decision-making tools. In fact, in many instances such as reducing energy use and reducing vehicle miles traveled, consumers can also reduce their costs – a "win-win" for the District and the Valley.

The District has aggressively promoted technology advancement strategies. The recently approved Technology Advancement Program (TAP) will help ensure a comprehensive and collaborative approach to involving all segments of the Valley in realizing attainment of the ozone and other health standards.

In addition to developing strategies and a roadmap to attainment, the 2007 State Implementation Plan (SIP) committed the District to submit a Midcourse Review (MCR) by June 30, 2010. This MCR must evaluate the progress that the District has made towards attaining the 1997 8-hour ozone national ambient air quality standard (NAAQS) and the revoked 1-hour ozone NAAQS. Although the 1-hour ozone NAAQS was revoked in 2005, the anti-backsliding provisions in the implementation rules for the 8-hour NAAQS require the District to continue to implement most commitments previously set under the 1-hour ozone NAAQS, including progress reports and attainment of the standard. In this MCR, staff assessed, at a basin-wide level, recent trends in emissions estimates, monitored air quality data, and other corroborating analyses to demonstrate that the District's strategies are resulting in emissions reductions and air quality improvement needed to attain both ozone NAAQS.

Since ozone concentrations are highly dependent on weather conditions staff adjusted the trends for long-term weather patterns showing that decreasing trends in ozone concentrations are a result of successful regulatory and voluntary emissions reductions programs, not simply favorable weather conditions. Through District efforts, the Valley continues to be on-track to reach attainment of both the 1-hour and 8-hour ozone NAAQS by or before the applicable attainment deadlines.

The path towards attainment is being further accelerated by Valley industry and municipal investments in cleaner technologies and emissions reductions implemented at the state and local level. These included over 20 regulations developed by the California Air Resources Board (ARB) in the last 3 years, numerous transportation control measures implemented by the metropolitan planning organizations, and many measures implemented by the federal government that were not included in either ozone attainment plan.

The District expects air quality to continue to improve as recent regulations are fully implemented, new control technologies are developed, and increased partnership between government and private entities occurs through programs such as Healthy Air Living, the Fast Track Action Plan, Regional Energy Efficiency Strategy, and the Technology Advancement Program.

Despite this success and anticipated attainment of the current 8-hour ozone standards, the challenge continues. On January 6, 2010, EPA, in a effort designed to protect public health, proposed to strengthen the NAAQS for 8-hour ozone from the 1997 85 parts per billion (ppb) standard to a level within the range of 60 to 70 ppb. Additionally, on December 18, 2006, EPA changed the 24-hour NAAQS for particulate matter with an aerodynamic diameter of 2.5 microns or less (PM2.5) from 65 micrograms per cubic meter ($\mu g/m^3$) to 35 $\mu g/m^3$. These two changes trigger a requirement for the District to develop new attainment demonstration plans for 8-hour ozone and PM2.5 in the 2013 timeframe, which may include many of the regulations, incentive measures, and innovative strategies included in our current ozone plans. The achievements highlighted in this 2010 Ozone Midcourse Review, particularly for NOx, which is a precursor to both ozone and PM2.5, will assist the District in meeting these new, more stringent standards. Building upon the momentum for reductions from innovative strategies, new technologies, and partnerships with industry and the public the Valley can all look forward to a future of improved health and quality of life for Valley residents and attainment of not only the revoked 1-hour and current 8-hour ozone standards, but also the future 8-hour ozone and new PM2.5 NAAQS.

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2010 Ozone Mid-Course Review

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Section 1 - Background and Summary

The San Joaquin Valley Air Pollution Control District (District) has prepared this *2010 Ozone Mid-Course Review* (MCR) to demonstrate to the United States Environmental Protection Agency (EPA) that the District has met its obligations under the Federal Clean Air Act (CAA), as amended in 1990, for progress towards attaining the revoked 1-hour and 1997 8-hour ozone national ambient air quality standards (NAAQS). The California Air Resources Board (ARB) committed to conduct an 8-hour ozone MCR and, if appropriate, submit the MCR to EPA by June 30, 2010 as part of the District's 2007 State Implementation Plan (SIP).

This review includes an assessment of the ozone air quality trends in the San Joaquin Valley Air Basin (Valley), a summary of all control measure commitments included in the District's ozone attainment demonstration plans, and the estimated reductions achieved by these measures. This review concludes that the District's efforts, along with the Valley's business' and residents' efforts, have reduced ozone precursors as seen in the continued downward trend of ambient ozone concentration levels and that the District is on track towards meeting attainment of the ozone NAAQS by the applicable attainment dates.

Despite the fact that the EPA revoked the 1-hour ozone NAAQS, effective June 15, 2005, many federal requirements in effect as of the date of revocation continue to apply under the anti-backsliding provisions of the 8-hour ozone NAAQS implementation rules, including a requirement to attain the 1-hour ozone NAAQS per the *2004 Extreme Ozone Attainment Demonstration Plan* (*EOADP*). Since the District continues to implement control measures identified in the adopted *EOADP,* in addition to those in the *2007 Ozone Plan* for the 8-hour ozone NAAQS, this MCR will include data for both the 1-hour and 8-hour NAAQS and associated attainment plans.

1.1 Background

Pursuant to the CAA, the EPA designated the Valley as nonattainment for the current 1-hour and 8-hour ozone NAAQS, with an extreme classification and associated attainment dates of November 15, 2010 and end-of-year (EOY) 2023, respectively. The District submitted the *EOADP* and the *2007 Ozone Plan* to demonstrate anticipated attainment of the current 1-hour and 1997 8-hour ozone NAAQS, respectively. In developing the attainment plans for these ozone NAAQS, the District utilized photochemical modeling, air quality trend analysis, and other corroborating evidence to demonstrate that adopted, mandated, and voluntary control measures and additional commitments would provide emissions reductions sufficient to enable all areas of the Valley to achieve attainment by attainment dates for the two ozone standards. The District has a history of success in reducing ozone precursors; through the effectiveness of the groundbreaking rules, such as Indirect Source Review, Confined Animal Facilities, wine fermentation, and industrial combustion equipment, the California Air Resource Board (ARB) documented a 42 percent reduction in NOx emissions and a 37 percent reduction in VOC emissions from 1990 through 2005, Valley-wide.

The *2007 Ozone Plan* implemented expanded and innovative control measures and strategies to overcome the significant challenge in attaining both the 1-hour and 8-hour plans. Under the EPA implementation rule for the 1-hour NAAQS there is an opportunity for a one-year extension of this attainment date, if the prior year shows clean air quality data. This provision allows for a nonattainment area to reach attainment of the standard, despite the fact the area had one year in the three years prior to attainment that showed higher than typical ozone levels due to a higher than typical number of wildfires, meteorological patterns, and/or other events. In order to receive this one-year extension an air district must demonstrate to EPA that the previous year's ozone levels meet the 1-hour NAAQS in accordance with the implementation rule.

The demonstration of attainment for both the 1-hour and 8-hour ozone NAAQS takes into account the significant natural challenges in the Valley, which are unmatched in any other region of the nation. While the Valley is one of the most fertile agricultural regions in the world, its geomorphology and meteorology exacerbate the formation and retention of high levels of air pollution. The Valley is bounded by the Sierra Nevada on the east, the Tehachapi Mountains on the south, and the Coastal and Temblor Ranges on the west creating a "horseshoe" valley open to the northwest; this geomorphology, together with consistently stagnant weather patterns, both during hot summers and foggy winters, prevents the dispersal of pollutants that accumulate within the Valley. The satellite photograph in Figure 1-1 demonstrates the manifestation of these significant natural challenges during the winter months; the trapped air layer not only includes fog, but undispersed pollutants. In the extremely hot summer months, the Valley is often capped with a temperature inversion layer that further traps ozone and ozone precursors, causing high ozone concentrations throughout the summer.

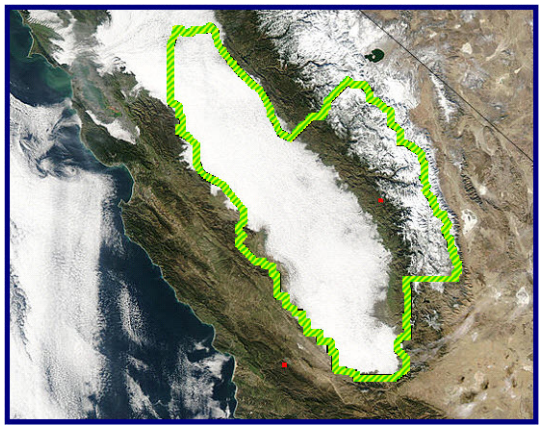


Figure 1-1
San Joaquin Valley Air Basin during winter meteorological stagnation event.

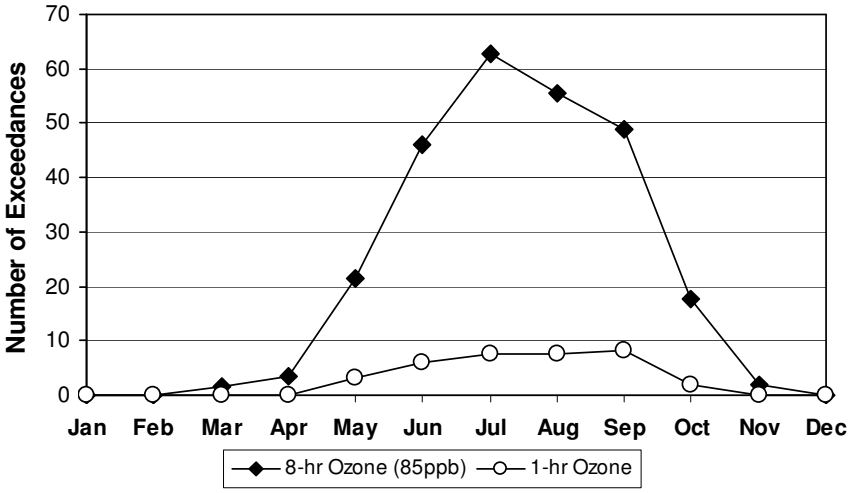
1.2 Health and Economic Effects of Ozone

Understanding the empirical health benefits and modeling the potential economic benefits of reductions in ambient ozone exposure provides decision makers and the public with valuable information for finding the critical balance that regulatory agencies such as the District must maintain between public health protection and economic viability. Additionally, decision makers and the public must have a mechanism to evaluate the progress of an adopted attainment plan, such as the *2007 Ozone Plan*.

Considerable research over the past 35 years documents the physical effects of ozone inhalation on humans. These studies have consistently shown that ozone can lead to inflammation and irritation of airway tissue. Breathing ozone can also reduce lung function and inflame lung epithelial lining. Symptoms and responses to ozone exposure vary widely among individuals. Typical symptoms include cough, chest tightness or pain, shortness of breath, pain when taking a deep breath, coughing, throat irritation, congestion, and increased asthma symptoms

Children are most at risk from exposure to ozone. Children breathe more air per pound of body weight than adults and because children's respiratory systems are still developing, they are more susceptible to air pollutants. The Children's Health Study funded by the California Air Resources Board found that ozone may contribute to the development of asthma in children who play sports outdoors.[1] As shown in Figure 1-2, ground-level ozone is highest in the summertime, when children spend much of their day outdoors, thus disproportionately increasing their ozone risk relative to adults. While children are certainly affected by exposure to summertime ozone, anyone who spends time outdoors during times of increased ozone levels may be impacted as well.

Figure 1-2 Average County Exceedance Days by Month



Average of county exceedance days from 1999 to 2009

Ozone in sufficient concentrations increases the permeability, or "leakiness" of lung cells, making them more susceptible to environmental toxins and infection caused by microorganisms such as viruses and bacteria. In epidemiological studies, ozone exposure has been associated with an increase in hospital admissions and emergency room visits, particularly for pulmonary trauma, such as asthma and chronic obstructive pulmonary disease (COPD). Elevated ozone exposure has also been shown to be positively associated with premature death from respiratory disease in a recent study of

[1] Peters, John, et al. (2004) Epidemiological Investigation to Identify Chronic Effects of Ambient Air Pollutants in Southern Californa. Conducted for the California Air Resources Board. University of Southern California, Los Angeles. See http://www.arb.ca.gov/research/abstracts/94-331.htm

448,850 subjects in 96 U.S. cities.[2] Equally significant, a study of over 6,000 California births found that elevated ozone exposure during pregnancy was correlated with reduced fetal growth among term infants.[3]

These health impacts carry economic costs as well. In *The Health and Related Economic Benefits of Attaining Healthful Air in the San Joaquin Valley*, researchers Jane V. Hall, Victor Brajer, and Frederick Lurmann (2006) report that the economic benefits of meeting the 1997 federal standard for ozone in the Valley could save a total of more than $88.9 million annually, in 2005 dollars.[4] They report that attaining this standard would result in fewer premature deaths, fewer asthma attacks, fewer cases of bronchitis, and fewer hospital admissions.

In May 2009, District staff evaluated the economic cost savings attributable to implementation of the *2007 Ozone Plan* through the year 2020. In 2020 dollars, the resulting cost savings to the San Joaquin Valley is $216,401,880. The analysis utilized the EPA's Environmental Benefits Mapping and Analysis Program (BenMAP) to predict the avoided costs of respiratory emergency room visits, respiratory hospital admissions, school days lost, acute respiratory symptoms, decreased worker productivity, and premature mortality as a result of reductions in ambient ozone exposure resulting from implementation of the *2007 Ozone Plan*.

1.3 Mid-Course Review Summary

This review presents an assessment at a basin-wide level of recent trends in emissions estimates with or without meteorological adjustment, monitored air quality data, and other corroborating analyses to demonstrate that the District's and State's strategies are resulting in emissions reductions and air quality improvement needed to attain the revoked 1-hour ozone NAAQS and will result in the Valley's attainment of the 1997 8-hour ozone NAAQS by or before the 2023 attainment deadline. As a result of investments in cleaner technologies made by Valley businesses, municipalities, and residents, combined with emissions reductions implemented at the state and local level for mobile sources, the Valley appears to be on-track, in spite of anticipated population growth and an associated increase in vehicle miles traveled in the Valley.

To date, the District, through successful implementation of the *EOADP* and *2007 Ozone Plan*, has achieved more emissions reductions than originally anticipated at the time of the respective plan approval because of aggressive and innovative regulatory, outreach and incentive efforts. Reaching attainment of the 8-hour ozone NAAQS will require continued aggressive efforts on all regulatory and non-regulatory fronts, including the

[2] Jerrett, M. et al. (2009) *Long-Term Ozone Exposure and Mortality*. New England Journal of Medicine Vol. 360 (11):1085-1095. March 12.

[3] Salam, M.T., J. Millstein, Y. Li, F. Lurmann, H. Margolis, and F. Gilliland. (2005) *Birth Outcomes and Prenatal Exposure to Ozone, Carbon Monoxide, and Particulate Matter: Results from the Children's Health Study*. Environmental Health Perspectives 113 (11): 1,638-1,644.

[4] This estimate is based on a total of avoided hospitalization and related health care costs as well as the Value of a Statistical Life (VSL). The VSL is an economic estimate of the social value of premature death that is used to guide policy makers in making public investments in public health or safety. VSL estimates range from $3.8 to $8.9 million per case. In the Hall et al. study, 67% of the $88.9 million total was based on the VSL.

development of new strategies to include the proactive deployment of cleaner technologies and innovative control measures. To this end, the District has funded several technology demonstration projects to assist in accelerating the widespread use of promising technologies.

Full attainment of the 1-hour ozone NAAQS by the attainment deadline will require having no 1-hour ozone exceedances throughout the 2010 summer ozone season. In the event a 1-hour exceedance were to occur, the District is prepared to initiate a Section 185 nonattainment fee program or alternative equivalent program to offset the federal requirement.

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Section 2 - Air Quality & Regional Growth Trends

District staff conducted a number of analyses to determine if the Valley is "on-track" to achieve attainment of the 1-hour and 8-hour ozone NAAQS by their respective attainment deadlines. These analyses show that the District has made considerable progress since the CAA was amended in 1990 toward significant reductions in ozone precursor emissions and overall ozone concentrations. The degree of progress is particularly noteworthy since significant emission reductions have occurred despite concurrent population growth and an increase in vehicle miles traveled (VMT) within the Valley.

Despite significant regulatory and voluntary successes in the Valley, conditions and events outside of District control have a tendency to mask such successes in the short-term. During the summer of 2008, California experienced a high number of forest fires, which because of the concurrent meteorological conditions, severely affected the air quality in the Valley. On June 25, 2008 there were over a dozen wildfires in forested areas, in addition to a grass fire burning over 800 acres. On the same day there was a ridge of high pressure bringing warm weather and stagnant air into the Valley, thus preventing dispersion of ozone and ozone precursors. There were at least ten other days in the summer of 2008 that had similar wildfire and weather conditions. As seen in the following data, the effect of these conditions and events affect the annual averages and decadal trends.

The results of such events are seen, to some degree throughout the Valley, in the number of exceedances, the ozone design values, and the Expected Peak Day Concentration values. In all cases, the 2008 data does not follow the existing trends represented by the previous reporting years, especially since 2004. In an effort to account for these events, ARB submitted Exceptional Event documentation to EPA on behalf of all California air districts requesting exclusion of some of these exceedances from consideration in attainment determinations, but only for exceedances that resulted in multiple air districts. EPA has yet to issue determinations on these requests.

2.1 Emission Trends

The District and California (State), following EPA guidelines, have implemented numerous ozone reduction strategies since 1990, resulting in significant reductions in both volatile organic compounds (VOC) and oxides of nitrogen (NOx) emissions. These reductions will continue to grow through 2012 and beyond. Figures 2-1 and 2-2 show that anthropogenic VOC and NOx emissions are expected to decline by 43 percent and 41 percent, respectively, by 2012 from 1990 emission projections. Figures 2-1 and 2-2 illustrate the reductions from each source category: area sources, or those not large enough to be tracked individually, such as a household water heater; stationary sources, or those that are not mobile, but large enough to be tracked individually, such as a power plant; on-road mobile sources, or those that operate predominantly on roads such as automobiles; and "mobile other," or those mobile sources that are not operated on roads, such as boats.

Figure 2-1 Valley VOC Planning Emission Projections

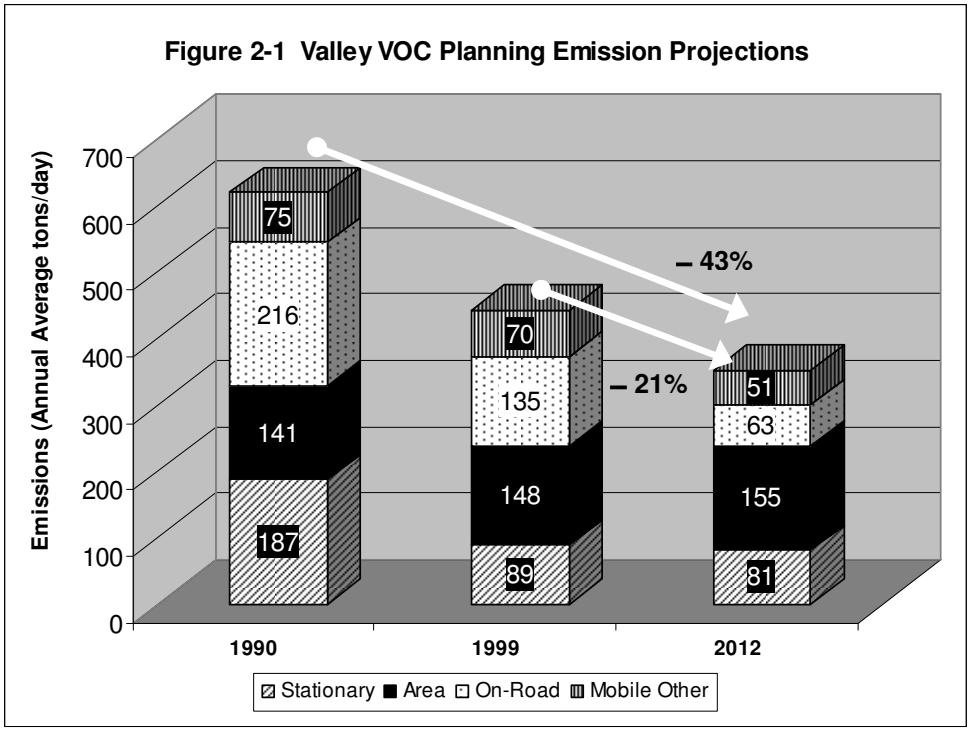
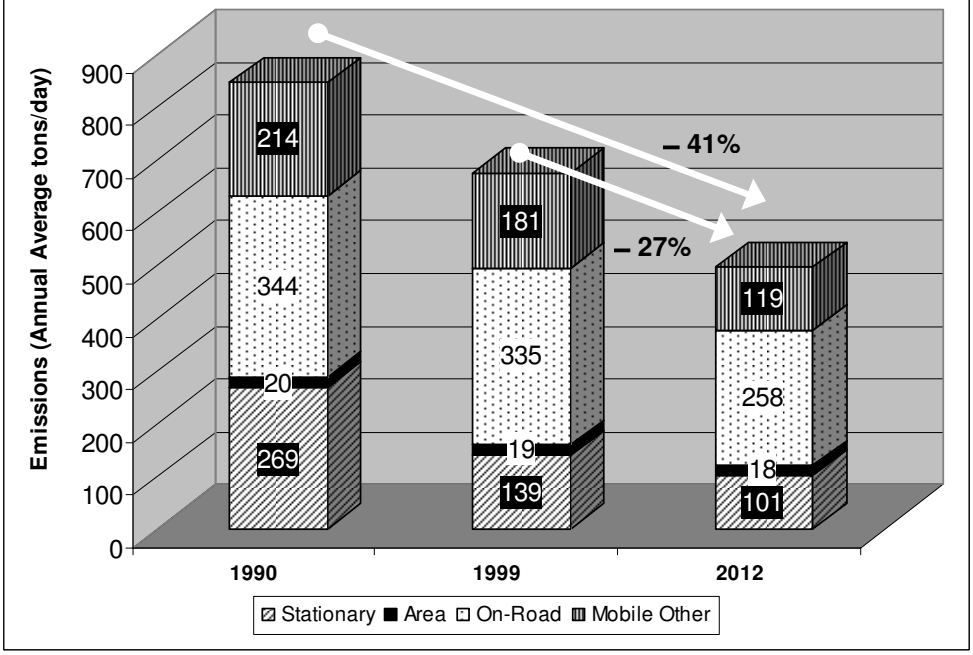


Figure 2-2 Valley NOx Planning Emission Projections



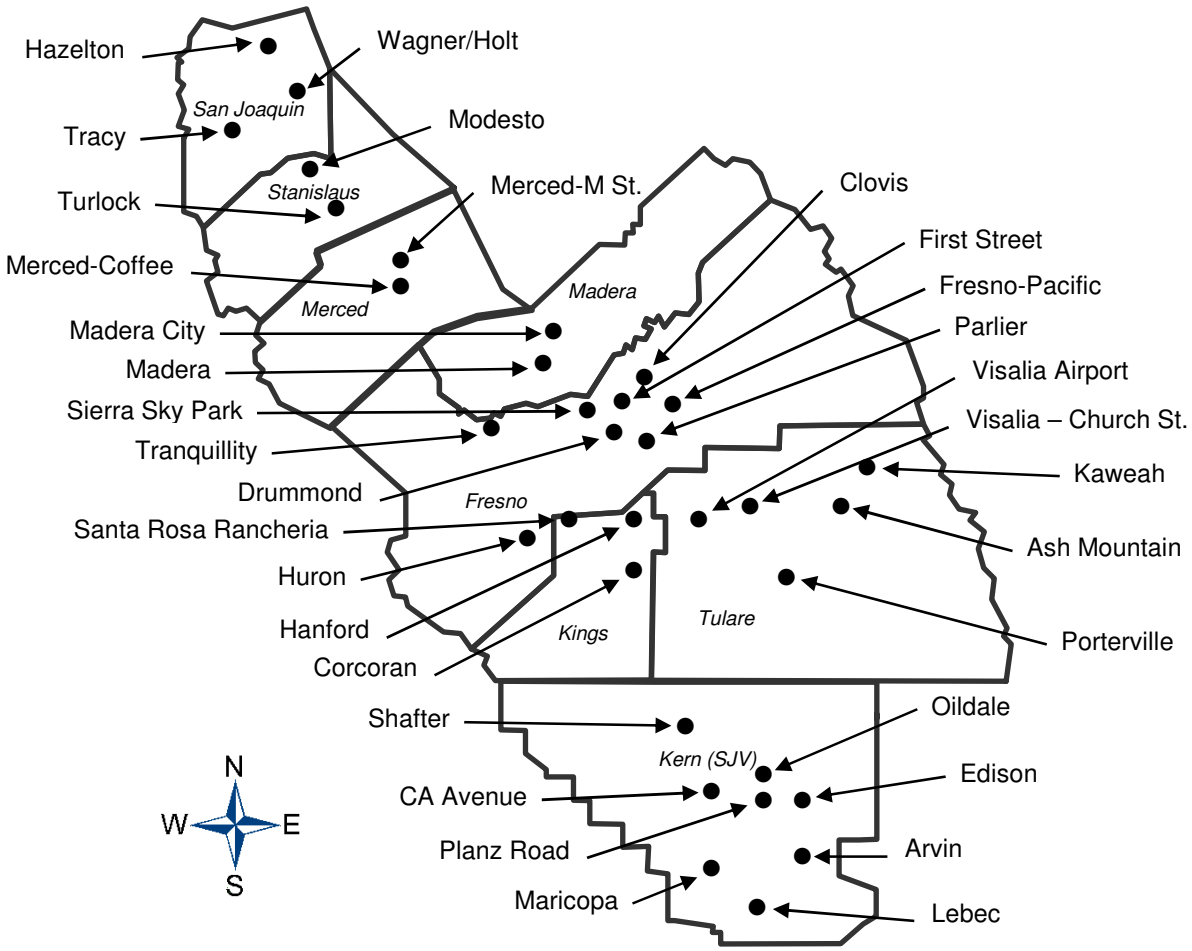
Additional strategies at the District and State level will provide substantial further emissions reductions after 2010. For example, on-road control strategies are projected to provide additional VOC and NOx reductions of 22 percent and 26 percent, respectively, from that source sector between 2010 and 2014, even after consideration of expected growth in vehicle miles traveled. While these projections are based on the current statewide mobile source rules, ARB is considering revisions to the private-fleet

truck rule and off-road construction equipment rule in 2010. In light of the current economic downturn, including reduced activity in the trucking and construction industries and associated reduced emissions statewide, ARB is considering an extended compliance timeline for both of these mobile-source rules. While such amendments are expected to delay emissions reductions previously scheduled for 2010 through 2011 until 2012, there will be no effect on the reductions ultimately projected for 2014. Such modification of the compliance timelines will also give much needed relief to two industries that are severely affected by the current economic condition, while acknowledging reductions resulting from decreased equipment use during the economic downturn.

2.2 Air Quality Trends

The current ozone monitoring network consists of the 22 sites mapped in Figure 2-3. This monitoring network is jointly maintained by the District, ARB, tribal governments, and the National Forest Service.

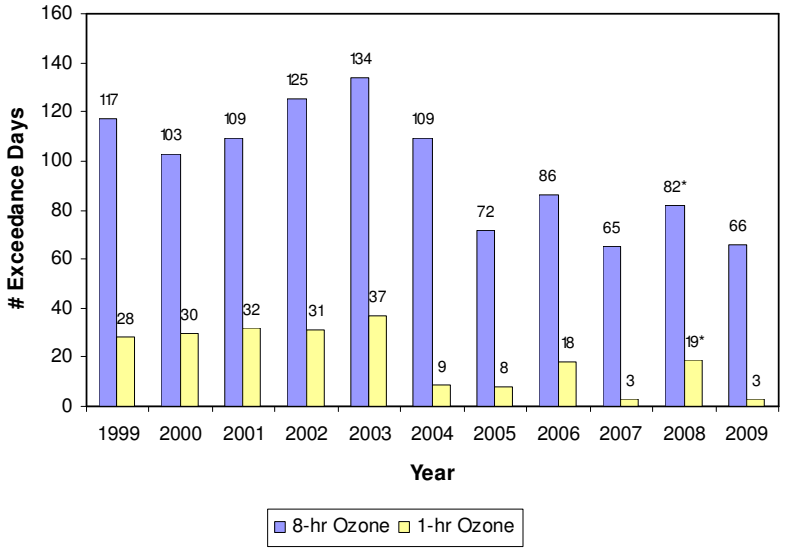
Figure 2-3 Air Monitoring Network in the San Joaquin Valley



Ozone levels over the period of record have improved dramatically, corresponding to the significant decrease in ozone precursor emissions discussed above. The decrease in

ozone levels is shown in Figure 2-4, which shows a decline from 1999 through 2009 in the annual frequency of days exceeding the 1-hour and 8-hour ozone standards. Ozone trends are examined in more detail in the remainder of this section.

Figure 2-4 Valley Annual Exceedance Days



** 2008 impacted by wildfires.*

2.2.1 Ozone Design Values

Compliance with the 1-hour and 8-hour ozone NAAQS is achieved when the highest design value for all monitors in an area does not meet or exceed 125 and 85 parts per billion (ppb), respectively. For the 1-hour ozone NAAQS, the design value at each monitor site is defined as the 4th highest daily maximum ozone concentration measured over a 3-year calendar period. Whereas, for the current 8-hour ozone NAAQS, the design value at each monitor site is defined as the average of each year's 4th highest value for three consecutive years.

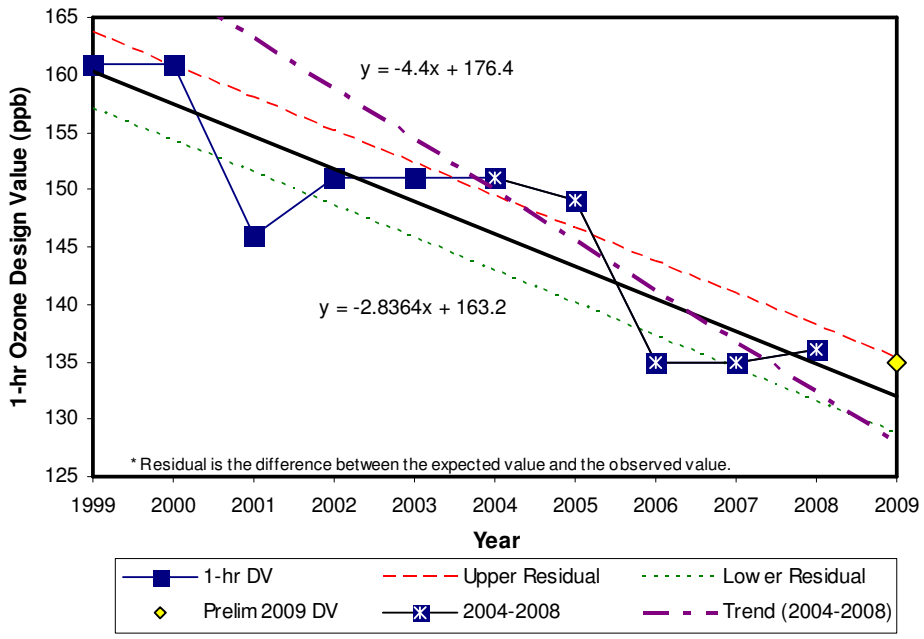
Design values for 1-hour ozone and 8-hour ozone are plotted in Figure 2-5 and Figure 2-6, respectively. For each plot, the calculated design value is designated as a data point for each respective year. The maximum 1-hour ozone design values decreased from 161 parts per billion (ppb) in 1999 to 136 ppb in 2008, which represents a 16 percent decrease. The average maximum 8-hour design values have also decreased over the same time interval by 4 percent. In both plots, the trend of design values data points was extrapolated by applying a best-fit line to the data, which is represented in Figure 2-5 and Figure 2-6 as a solid black line.

The interval of normal meteorological fluctuation is represented as the residual, or difference between the expected value and the observed value. This difference is "added to" or "subtracted from" the trend line to represent the upper and lower residual, respectively, and is represented by the thinner dashed lines parallel to the trend line in Figure 2-5 and Figure 2.6. These residual lines represent the maximum and minimum design values for a year after considering meteorological fluctuations. The preliminary

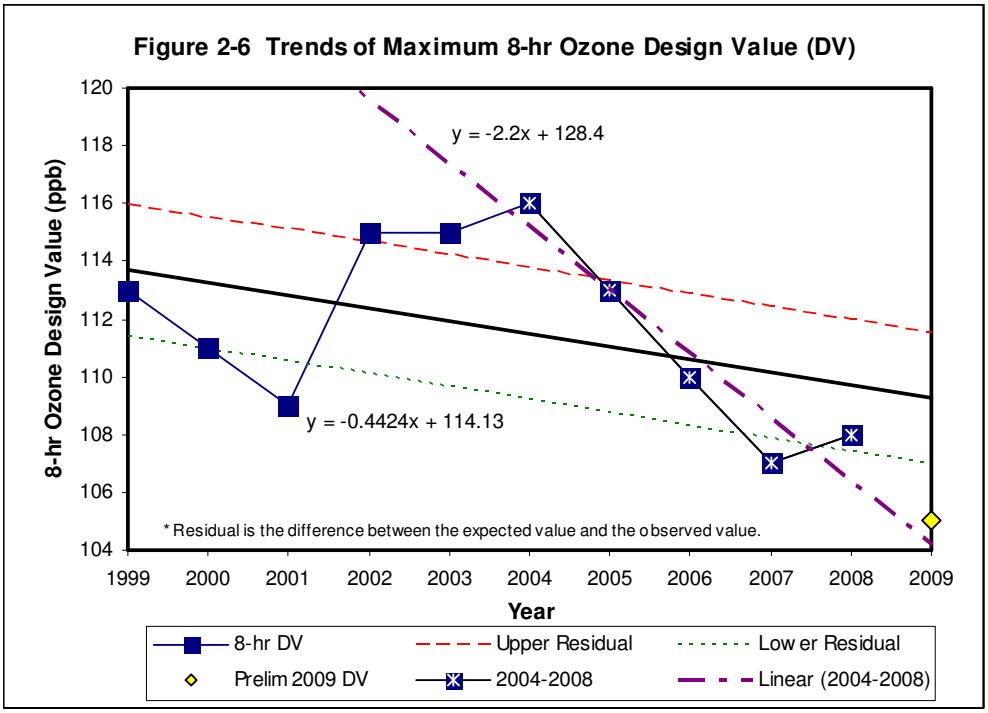
2009 1-hr ozone design value falls within these boundaries, while the preliminary 8-hour ozone design value falls well below even the lower residual line, further supporting the downward trend of improved ambient air quality.

These findings, however, do not take into account the higher-than-anticipated ozone values recorded in 2008 as a result of exceptional events. Since the latest three years of data is evaluated to determine attainment of the standard, if the District does not receive approval for the Exceptional Events in 2008, it may not be feasible to demonstrate attainment in 2010. In such case, the District would submit and Attainment Demonstration Extension request to EPA for 2010, which would extend the attainment deadline for the 1-hour ozone NAAQS from 2010 to 2011. Such a finding would acknowledge the general downward trend shown in Figure 2-5, thus recognizing the fact that 2008 was an atypical year with regard to summertime ozone levels.

Figure 2-5 Trends of Maximum 1-hr Ozone Design Value (DV)



Of important consideration is the significant decrease in ozone design values measured from 2004 to 2008. This increased rate of change coincides with implementation of the *EOADP* and *2007 Ozone Plan*, both of which have resulted in significant emissions reductions over the last four years.



As the District continues the aggressive implementation of regulatory control measures in the *2007 Ozone Plan* and utilizes more innovative strategies to realize non-regulatory emissions reductions, it is reasonable to predict that the accelerated rate of improvement will continue on the same, if not steeper, trend as the previous four years.

Looking at the data in this regard and given the design value trends between 2004 and 2008, attaining the appropriate design values by the attainment deadline is possible, yet will require aggressive implementation of voluntary programs and regulatory controls to further reduce emissions.

2.2.2 Ozone Exceedance Days

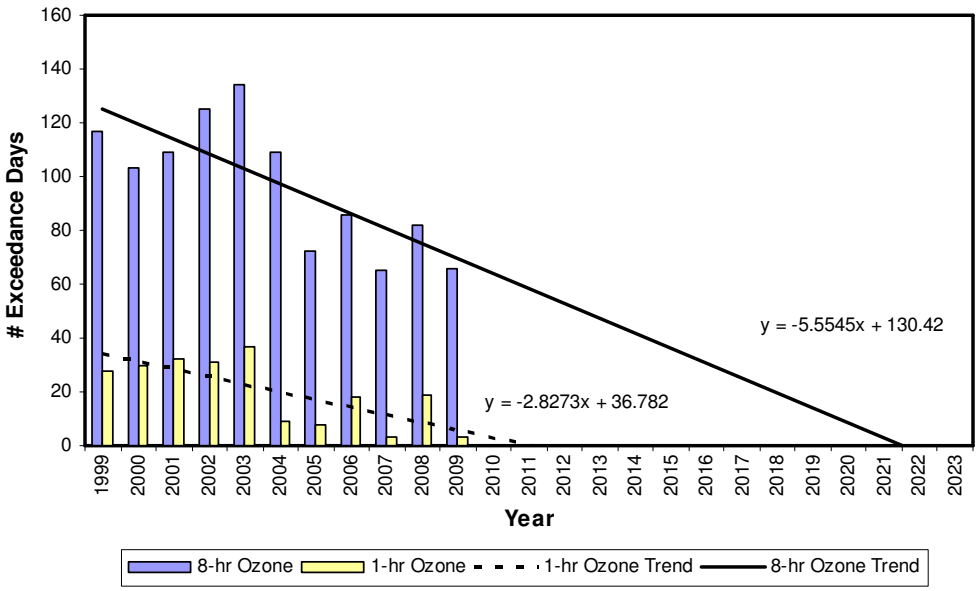
While the design value limit determines the occurrence of an exceedance day, it is the measured values within a three-year period at a given monitoring site that determines attainment of the ozone NAAQS. An exceedance day is defined as a day, measured from midnight to midnight, in which one or more monitors in the Valley records a concentration above the applicable NAAQS for ozone. The total number of days within the Valley in which an exceedance was recorded as measured for 1-hour and 8-hour ozone for each year from 1999 through 2009 was displayed previously in Figure 2-4. That analysis shows that the number of 1-hour exceedance days has decreased since 1999 by 90 percent from 28 days to 3 days in 2009. Likewise, the number of 8-hour exceedance days has decreased by 44 percent from 117 to 66 for the same period of record.

Valley ozone attainment designations for the 1-hour and 8-hour NAAQS require meeting attainment by 2010 and 2023, respectively, and submitting a Clean Data Finding for the three years prior to attainment. If the District were to receive a one- to two-year

extension, the requirement for making the Clean Data Finding would also be delayed by the same time period. Once a Clean Data Finding is approved by EPA, all planning requirements for ozone are suspended, including subsequent attainment demonstrations and rate-of-progress plans

Figure 2-7 represents exceedance days in the Valley since 1999 and includes a best-fit linear trend of the data through 2023. Assuming the downward trends continue at the same rate, projected 8-hour ozone exceedances would be eliminated prior to the 2023 attainment deadline. The slope of the trend lines are dependant on the years selected to develop them, but the future frequency of exceedance days will be affected more significantly by implementation of innovative strategies, new clean-air technology made available for industrial use, and meteorological conditions. The trend lines, shown in heavy solid and dashed lines in Figure 2-7, indicate that compliance with the 8-hour ozone NAAQS is achievable prior to the 2023 attainment deadline.

Figure 2-7 Trends in Valley Exceedance Days



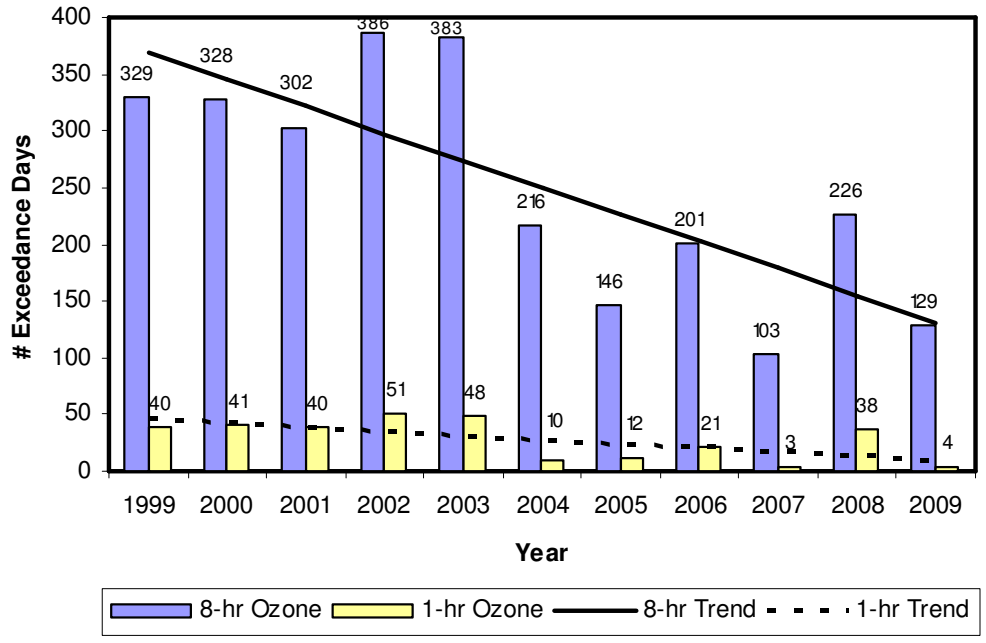
The simple 1-hour ozone trend line indicates that the number of exceedances will reach zero by 2012. While there were three exceedances in 2009, there were 19 exceedances in 2008, most of which were caused by wildfire emissions.[5] The earliest attainment date would be December 31, 2011, only if no 1-hour ozone exceedances occurred in 2010 or 2011. In this case, the District would request an extension to 2011 from EPA. In 2012 the District would be able to request that EPA make a Clean Data Finding based on 2009 through 2011 data.

[5] The higher than expected number of exceedances shown in 2008 is likely attributable to an unusually high frequency of wildfires that occurred during June and July of 2008 in Central California. In addition to particulate matter and carbon monoxide, wildfires release significant NOx and hydrocarbons creating excessive ground-level ozone even in areas far away from traditional urban ozone sources. ARB submitted Exceptional Event documentation to EPA on behalf of all California air districts requesting exclusion of some of these exceedances from consideration in attainment determinations.

As regulatory control measures and innovative strategies continue to lower Valley ozone levels, meteorology and wildfires have a proportionately more significant effect on measured ozone levels and the number of exceedance days. In other words, despite the fact that significant progress has been made, as shown in the reductions of ozone and ozone precursor emissions, the meteorology and wildfires may create a stronger possibility for the occurrence of a 1-hour ozone exceedance. Given the potential for 1-hour ozone exceedances over the next two summer ozone seasons, the District is prepared to implement a Section 185 nonattainment fee program, or implement an alternative equivalent program to offset fees imposed by the federal requirement, if required.

In addition to evaluating the Valley exceedance days, District staff reviewed the trend of County Exceedance Days as a measure of population exposure. While the Valley exceedance days characterize the number of days that any one monitoring site in the Valley measures ozone above the standard, it does not reflect the fact that not all counties, and the population within them, are experiencing the same number of exceedance days. The number of days that each county registers an exceedance on any given summer ozone season day provides a finer scale and better indication of the number of people being exposed to harmful ozone concentrations. Figure 2-8 represents a 61 percent decrease in the number of county exceedance days compared to the 44 percent decrease in Valley exceedance days represented previously in Figure 2-4.

Figure 2-8 County Annual Exceedance Days



2.2.3 8-hr Ozone Expected Peak Day Concentration (EPDC)

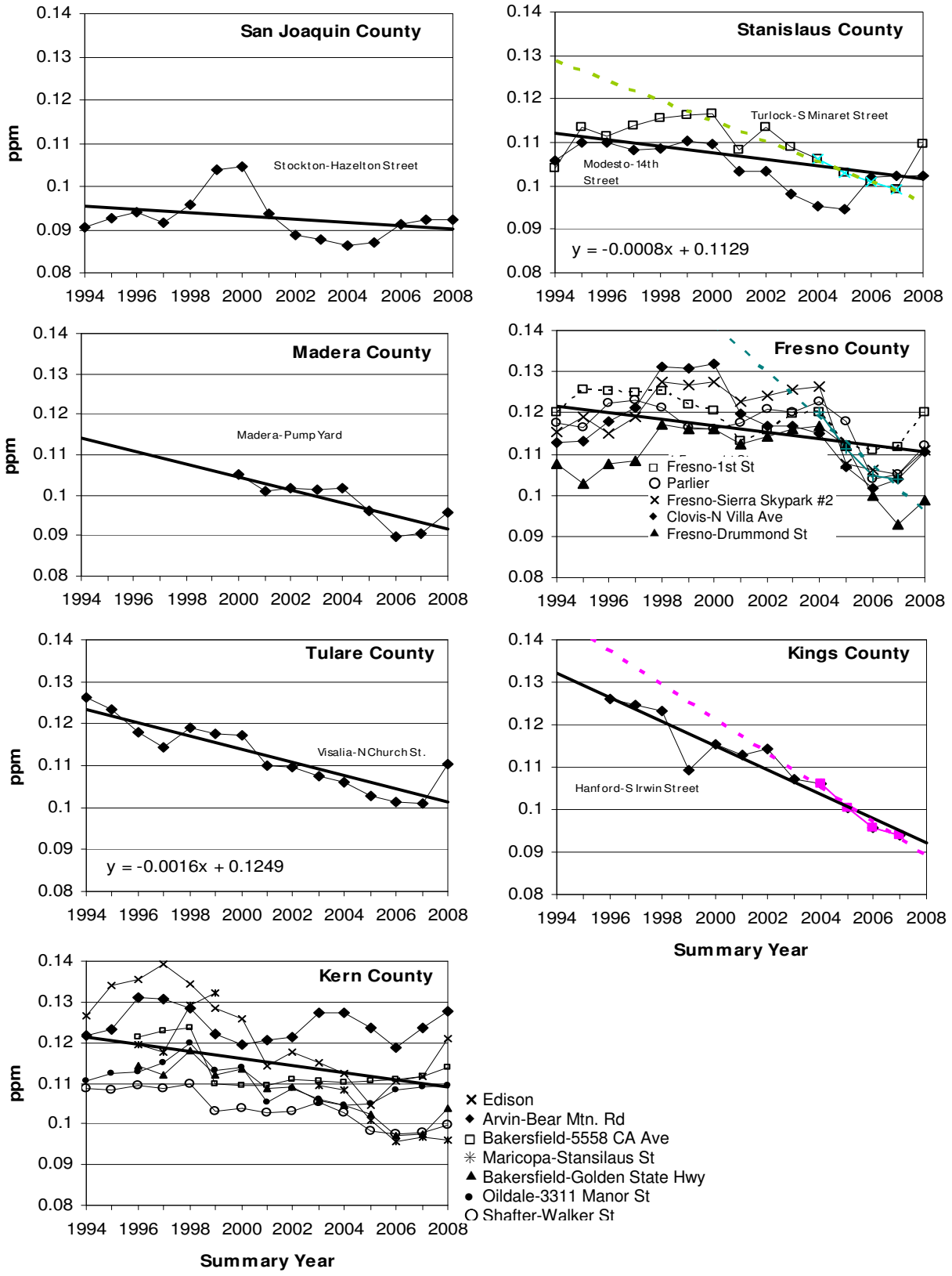
The Expected Peak Day Concentration (EPDC) is useful for tracking ambient air quality progress at individual monitoring locations. The EPDC is calculated for each monitor location using daily maximum 8-hour ozone observations for a three-year period, which includes the summary year and the two years immediately prior to the summary year. The EPDC is computed using a statistical procedure that fits an exponential-tail model to the upper tail of the distribution of concentrations. The fitted distribution is used to analytically determine the peak concentration expected to occur once per year, on average. This robust statistical calculation is relatively stable and provides a trend indicator that is not highly influenced by year-to-year changes in meteorology.

Figure 2-8 details the EPDC data made available by ARB for each monitoring station within each county of the Valley. For the years 1994 to 2008, the data indicates that the counties of San Joaquin, Stanislaus, Fresno, Tulare, and Kern have experienced a downward trend in EPDC. Similarly, but for shorter periods of data collection, the counties of Madera and Kings are also seeing a lowering of EPDC values[6]. In all counties except San Joaquin and Kings, the year 2008 does not fall along the downward trend line. As indicated previously, in 2008 the Valley was affected by an unusually large number of wildfires that plagued the state of California together with a significant number of days in which inversion layers or other meteorological conditions prevented pollutant dispersion.

The steady improvement in EPDC values in part represents regulatory and non-regulatory efforts to reduce emissions of ozone precursors. As with the design value data shown previously in this section, the EPDC data from the counties of Madera, Fresno, Tulare, Kings, and Kern all show marked improvements in EPDC values starting in the year 2004, which coincides with the implementation of the District's strategies to attain the federal health standard for the 1-hour ozone NAAQS and implementation of the *EOADP*. Continued improvement coincides with implementation of control measures identified in the *2007 Ozone Plan*, which to date have provided more emissions reductions than was committed to at the time of plan adoption.

[6] Merced County is not included in the EPDC analysis because of the lack of valid data for the years 2006 through 2008.

Figure 2-8 Valley Expected Peak Day Concentration (EPDC)



2.3 Evaluation of Ozone Trends Adjusted for Weather

Analysis to this point has relied on direct observations of ozone. However, since ozone concentrations are highly dependent on weather conditions, long-term weather patterns, such as shorter than average winter seasons and dryer than normal winters, make interpretation of ozone trends challenging. The changing distribution of weather parameters, such as temperature, wind, ultraviolet radiation, and vertical stability, result in seasons with greater or lesser potentials to produce ozone than an "average" season. Without considering the effect of meteorology on ozone concentrations, it is difficult to determine if changes in observed ozone concentrations are due to effective control strategies or meteorological fluctuations.

District analysis indicates that long-term fluctuations in weather patterns create significant variation in annual season-average ozone concentrations. These large variations in seasonal ozone averages attributed to weather indicate that caution should be used when evaluating ozone observations not adjusted for weather. However, during the past decade 1-hour and 8-hour average meteorologically-adjusted ozone concentrations have steadily decreased, indicating that the observed long-term ozone improvement trend is likely attributable to emission reductions and not weather variations. Further analysis indicates that the overall weather-adjusted ozone trend is nearly identical to, but decreases slightly faster than, the overall unadjusted trend. This finding indicates that ozone trend analysis completed throughout this report is valid and potentially conservative. The remainder of this section describes the process and results in further detail.

2.3.1 Meteorological Adjusted Ozone Trend Methodology

EPA developed a statistical method to account for the weather-related variability of seasonal ozone concentrations[7]. This method compares the observed seasonal average daily 1-hour and 8-hour average ozone concentrations to the same parameters with the influence of weather removed. Since this method uses seasonal average concentrations, results cannot be directly compared to ambient air quality standards, which are based on daily 1-hour and 8-hour concentrations. However, the method is an excellent choice for evaluating the overall influence of weather on the entire ozone season.

To assess the underlying trends in ozone, the District first selected meteorological parameters most influential over San Joaquin Valley ozone concentrations. These selected parameters, including, but not limited to, maximum temperature, standard temperature, wind speed, vertical stability, and solar radiation, were used to develop quantitative relationships between ozone and meteorology for monitoring sites in the Valley. Results from this quantitative relationship were compared against observed air quality. The weather-adjusted ozone trend can be used to evaluate changes in precursor emissions attributable to control measures. The sites chosen for this analysis were generally those that show the highest average ozone concentrations, or the "dirtiest," the exception being Merced, which was chosen as a representative site for the north Valley.

[7] Camalier, L., Cox, W., Dolwick, P. (2007) *The Effects of Meteorology on Ozone in Urban Areas and Their Use in Assessing Ozone Trends*. Atmospheric Environment 41: 7127-7137.

2.3.2 Meteorological Adjusted Ozone Trend Interpretation

Figures 2-9 through 2-22 show the seasonal average daily 1-hour and 8-hour ozone concentrations for the summer months of May through September from 1999 through 2009. The narrower dotted line with hollow data points shows season average observed concentrations at monitoring sites, while the solid black line with solid data points shows season average weather-adjusted concentrations. The weather-adjusted values create a representation of seasonal average ozone concentrations anticipated under typical weather conditions and serves as a more accurate method for evaluating ozone trends associated with emission changes. The heavy dashed line and the heavy solid line show the linear trend in season average concentrations and weather-adjusted concentrations, respectively.

When the unadjusted value is greater than the meteorologically adjusted value, the seasonally averaged observed concentrations were higher due to weather. When the unadjusted value line is less than the meteorologically adjusted value, the seasonally averaged observed concentrations were lower due to weather. When the adjusted value closely approximates the unadjusted value, the summer was near the statistical average.

Figures 2-9 through 2-22 indicate that the summer of 2002 was near the statistical average for most sites, since observations are closely approximated by adjustments for weather. In addition, the significant increase in ozone concentrations from 2000 to 2003, was largely due to the influence of weather, as is evident from the generally flat trend in ozone concentrations adjusted for weather at most sites. In addition, although much of the 2008 summer observations are attributable to weather, increases in ozone concentrations adjusted for weather can be attributed to the influence of northern and central California wildfire emissions during the 2008 ozone season.

After being adjusted for weather, all sites evaluated (Figures 2-9 through 2-22) show a decrease in 1-hr and 8-hr average ozone concentrations from 1997 to 2009. Since this trend is decreasing, rather than flat or increasing, it indicates that emissions reductions, not weather, were responsible for observed ozone improvements. In addition, since the overall weather-adjusted ozone trend is nearly identical to, but slightly steeper than, the overall unadjusted trend, analysis completed throughout this report is valid and potentially conservative.

Figure 2-9: Arvin, 1-hr Ozone Trends

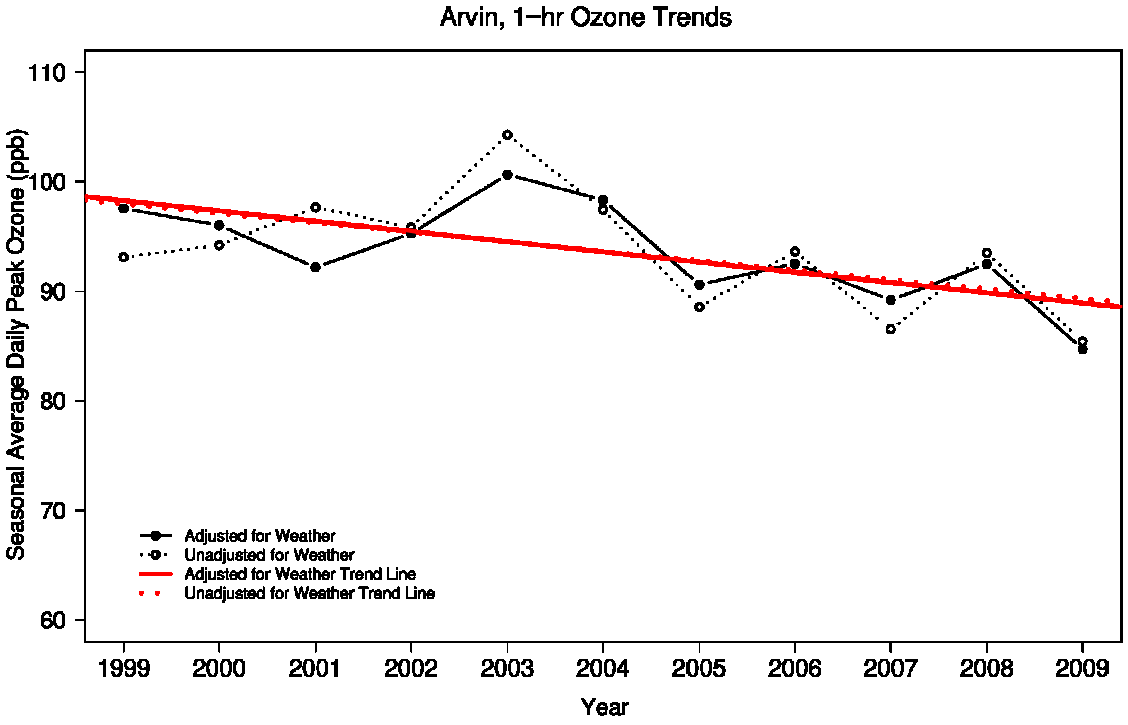


Figure 2-10: Edison, 1-hr Ozone Trends

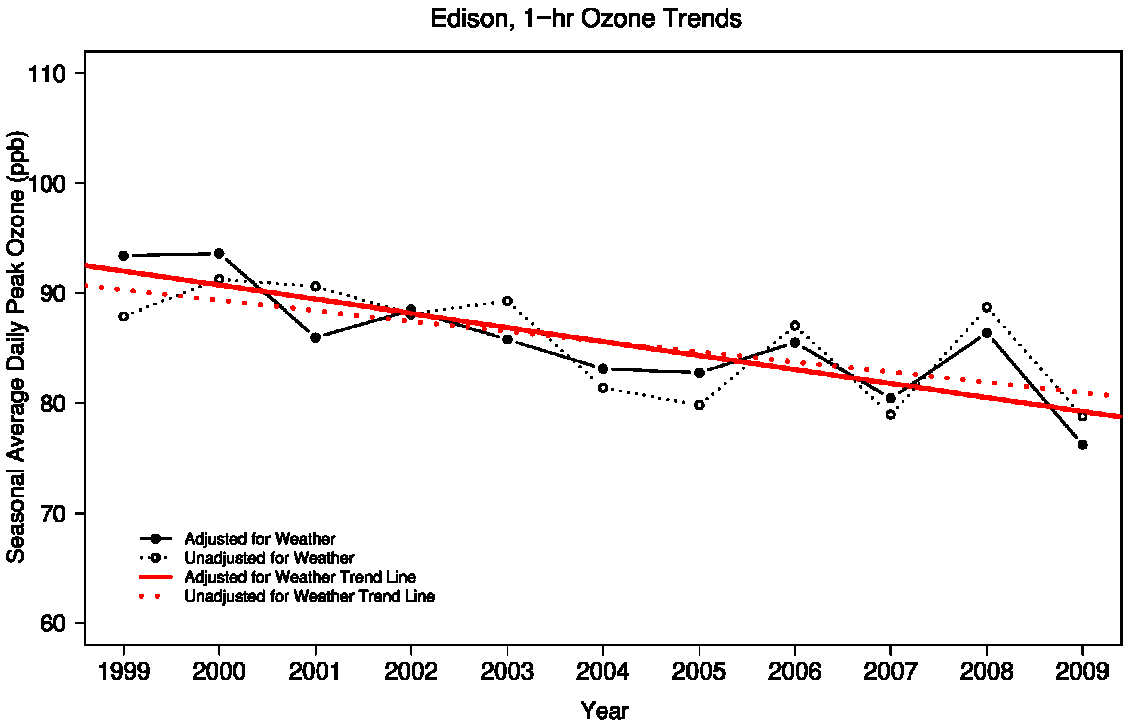


Figure 2-11: Fresno-First St, 1-hr Ozone Trends

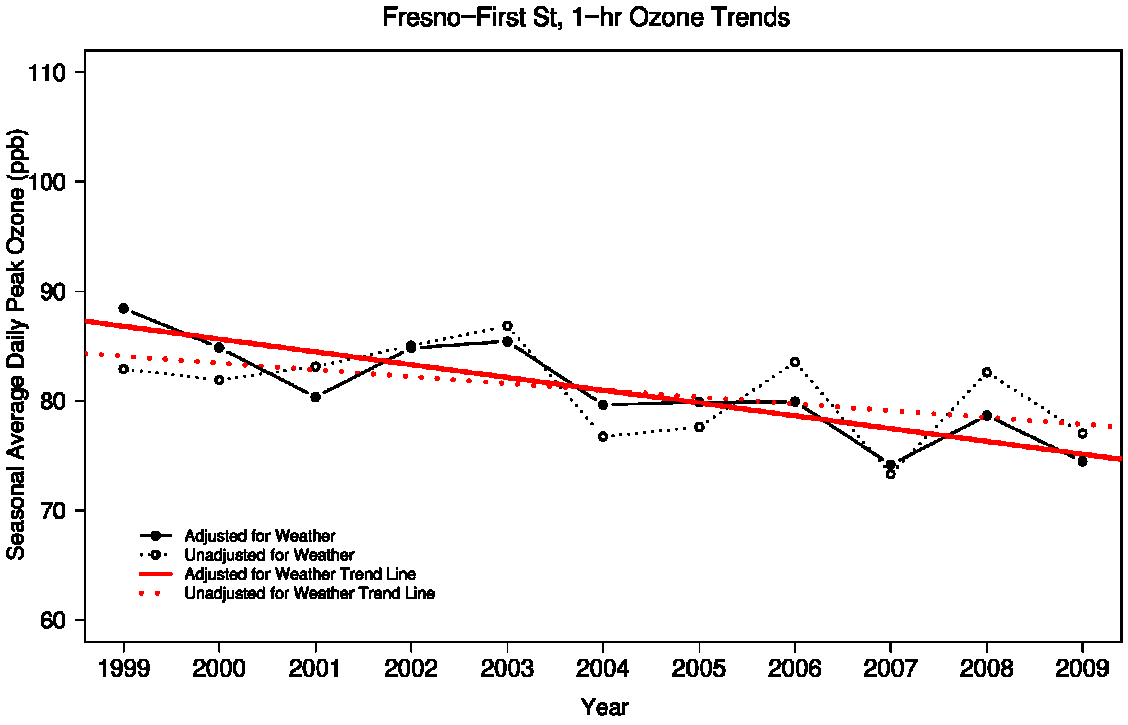


Figure 2-12: Fresno-Sierra Sky Park, 1-hr Ozone Trends

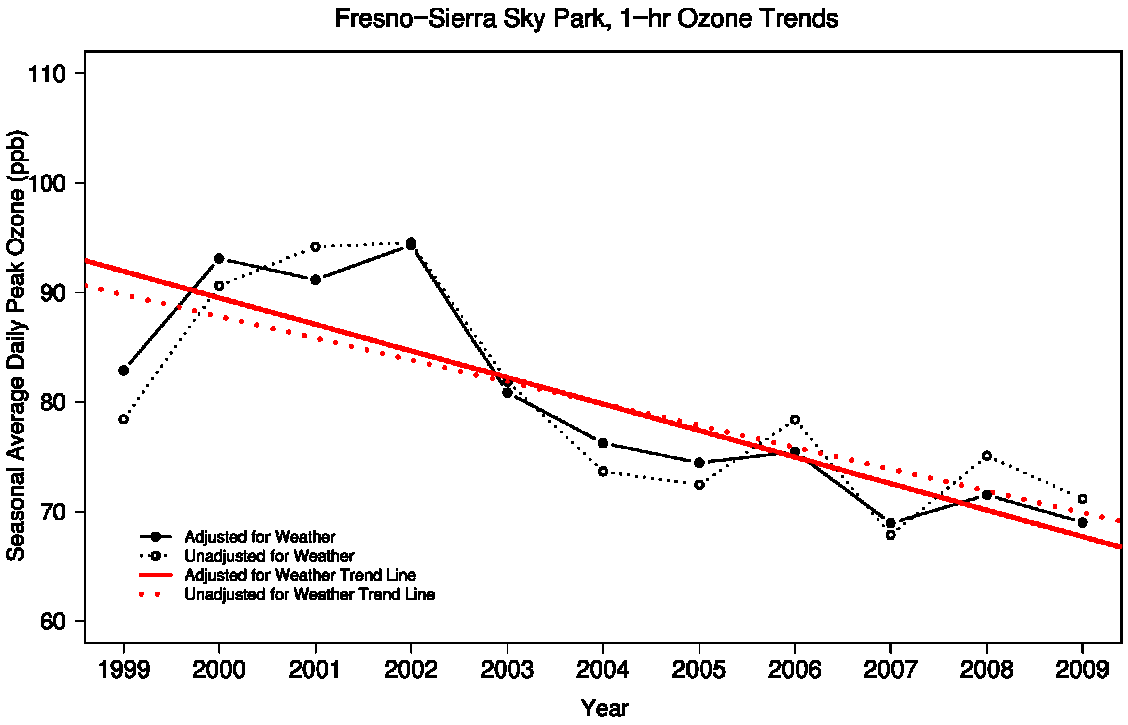


Figure 2-13: Clovis, 1-hr Ozone Trends

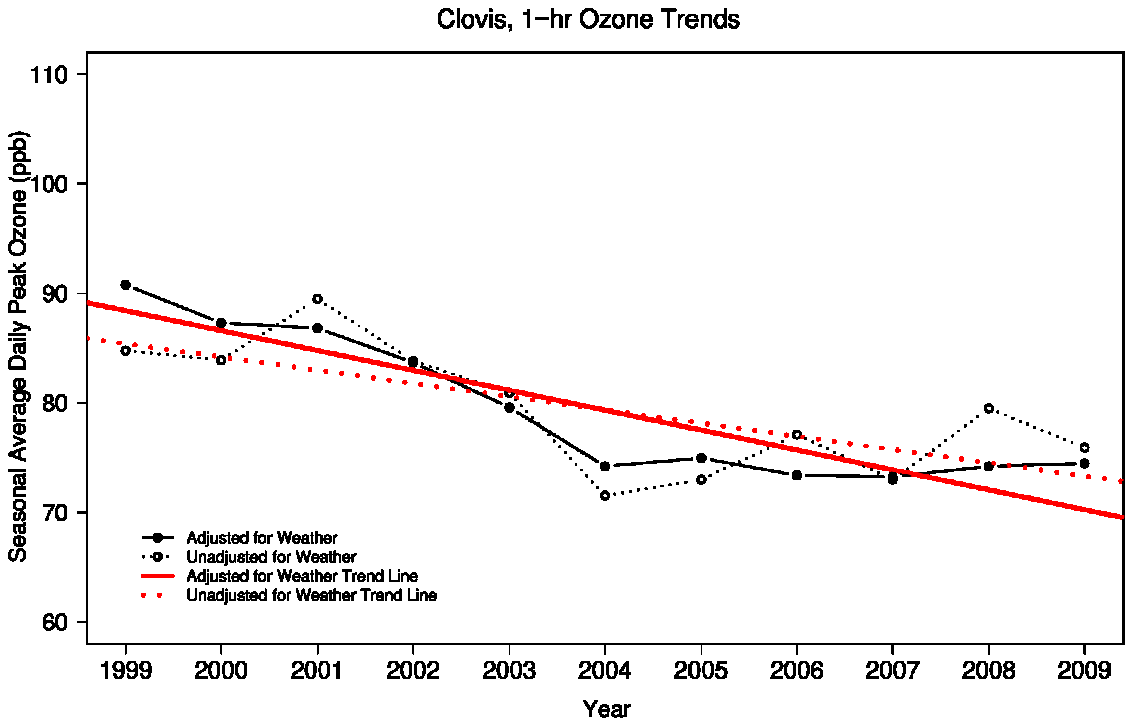


Figure 2-14: Parlier, 1-hr Ozone Trends

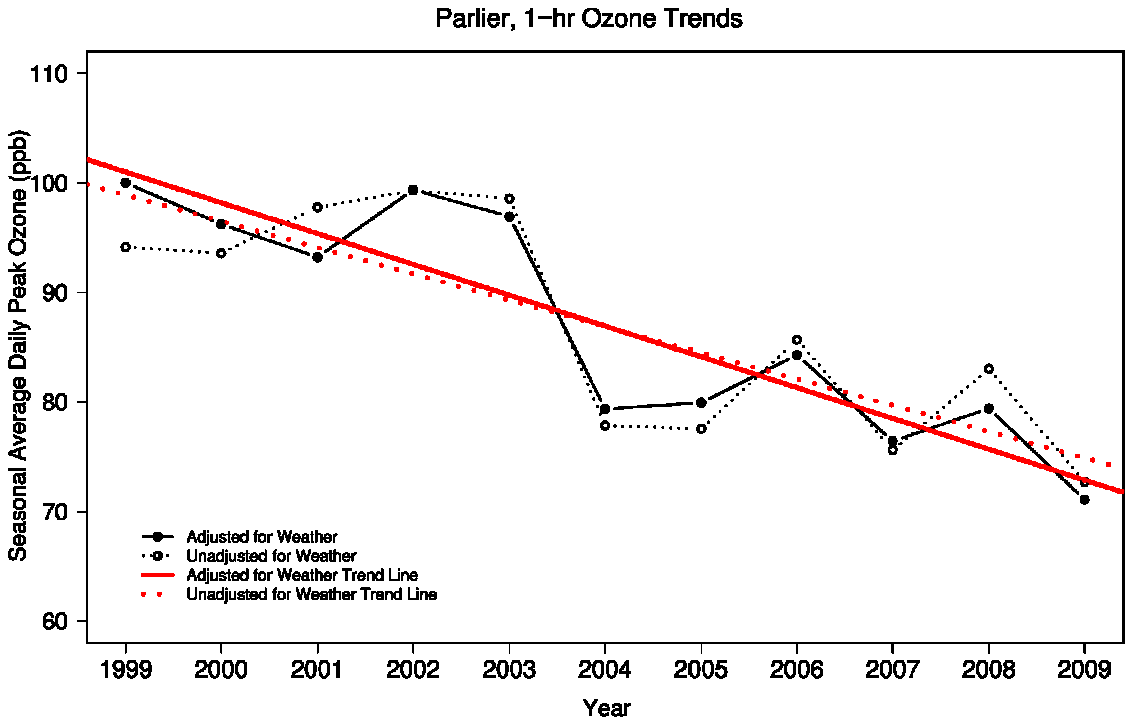


Figure 2-15: Merced-Coffee, 1-hr Ozone Trends

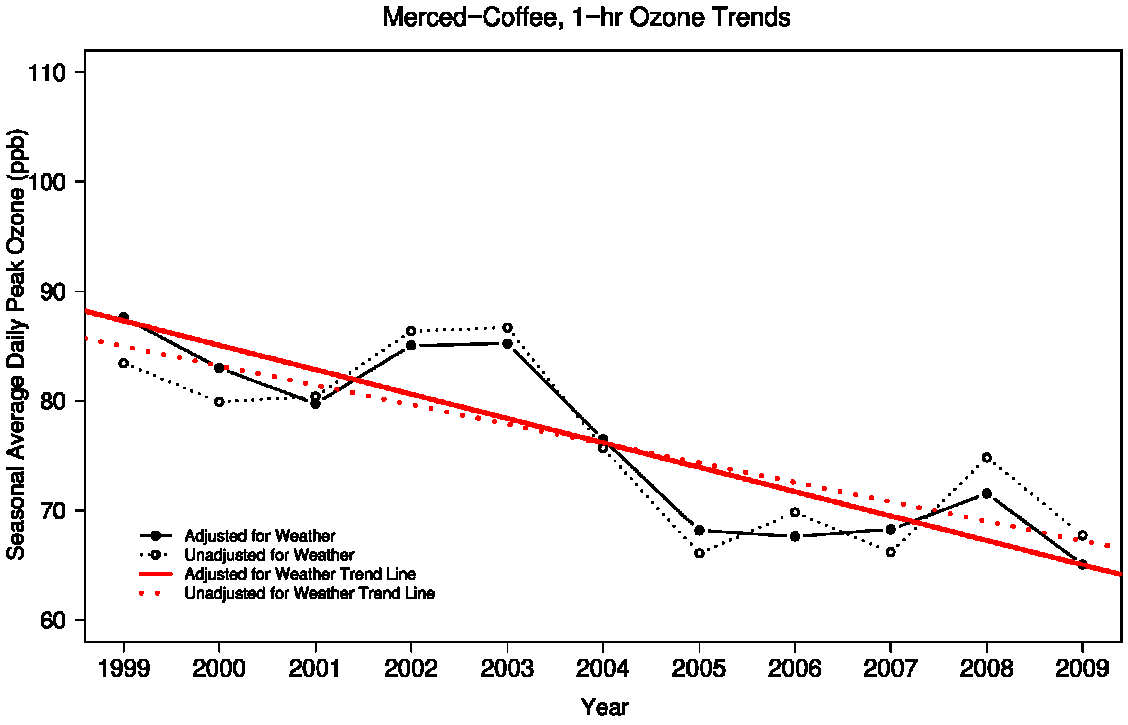


Figure 2-16: Arvin, 8-hr Ozone Trends

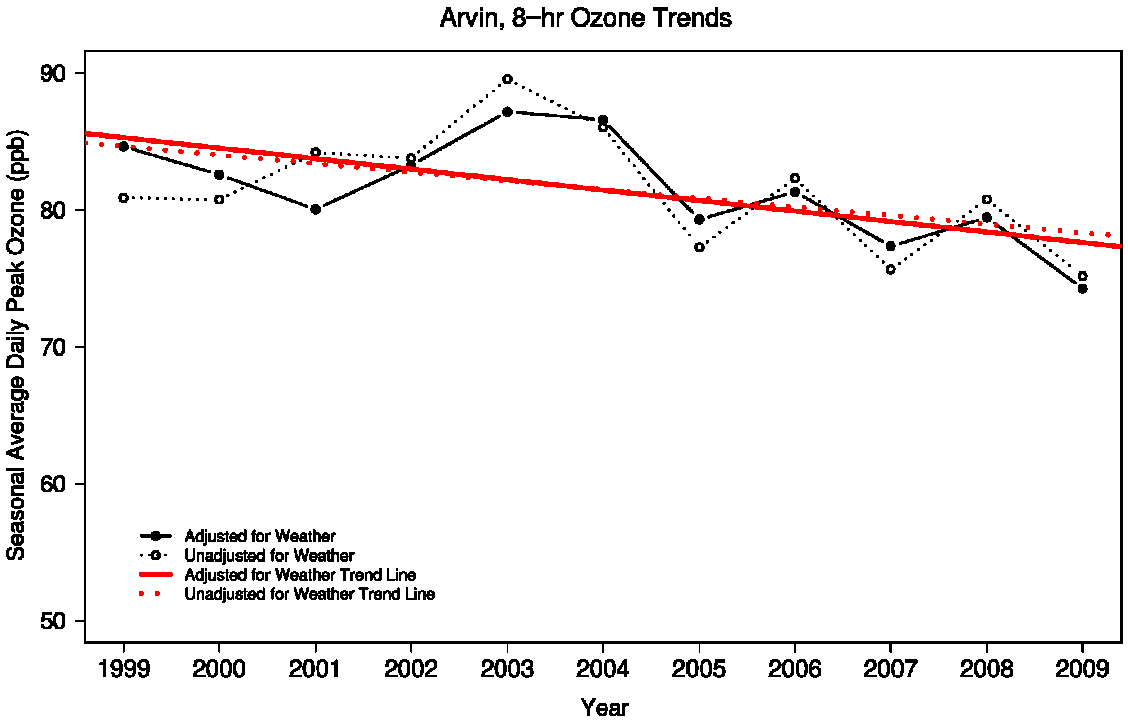


Figure 2-17: Edison, 8-hr Ozone Trends

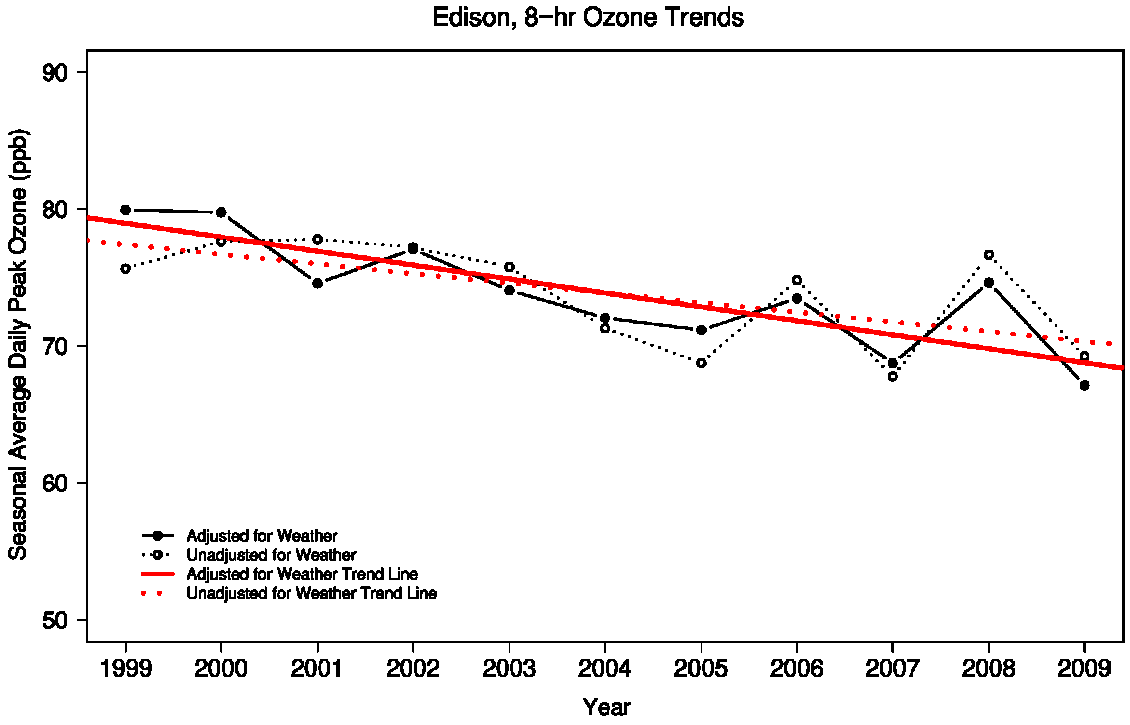


Figure 2-18: Fresno-First St, 8-hr Ozone Trends

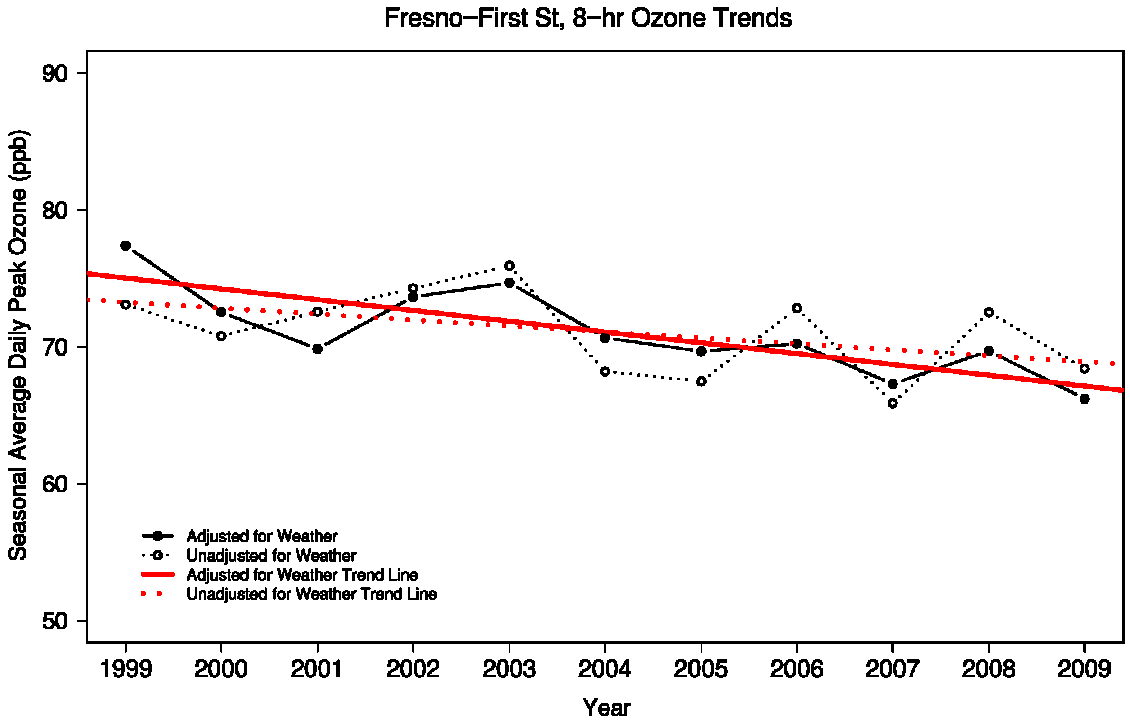


Figure 2-19: Fresno-Sierra Sky Park, 8-hr Ozone Trends

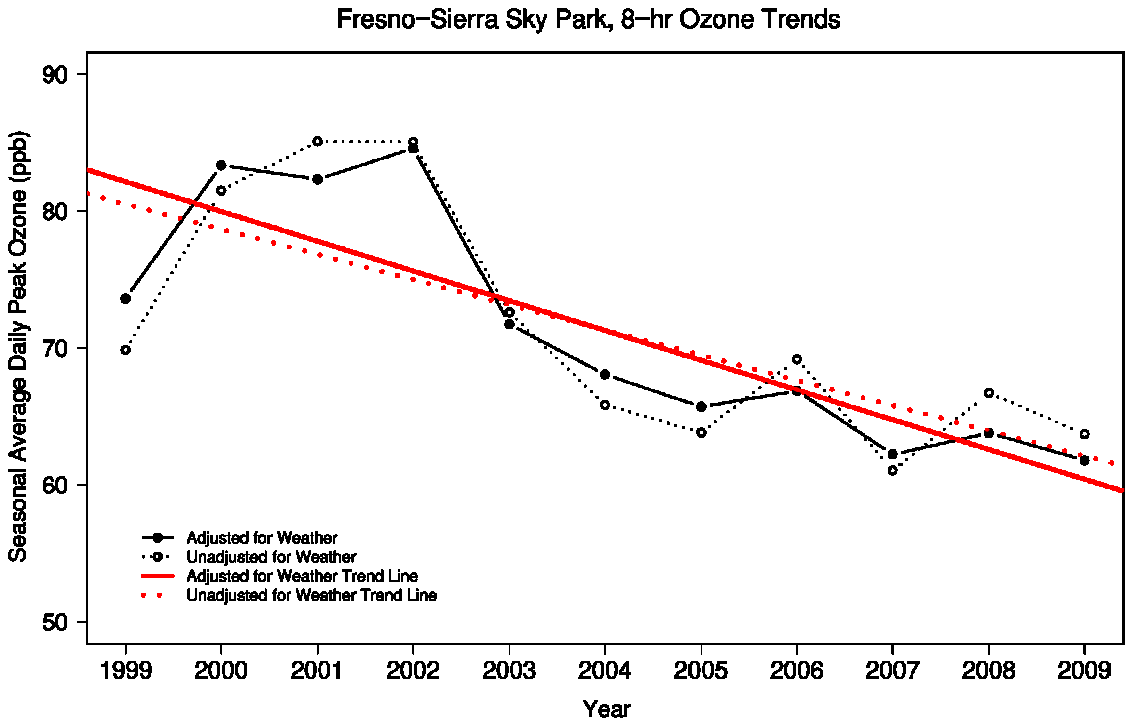


Figure 2-20: Clovis, 8-hr Ozone Trends

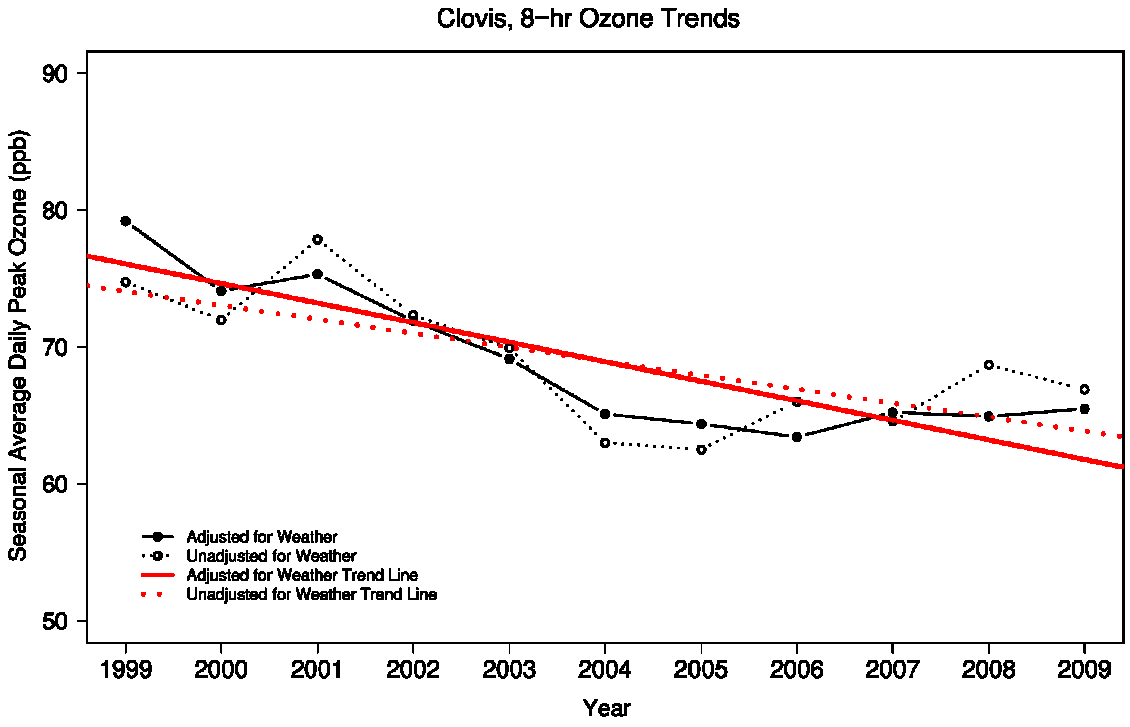


Figure 2-21: Parlier, 8-hr Ozone Trends

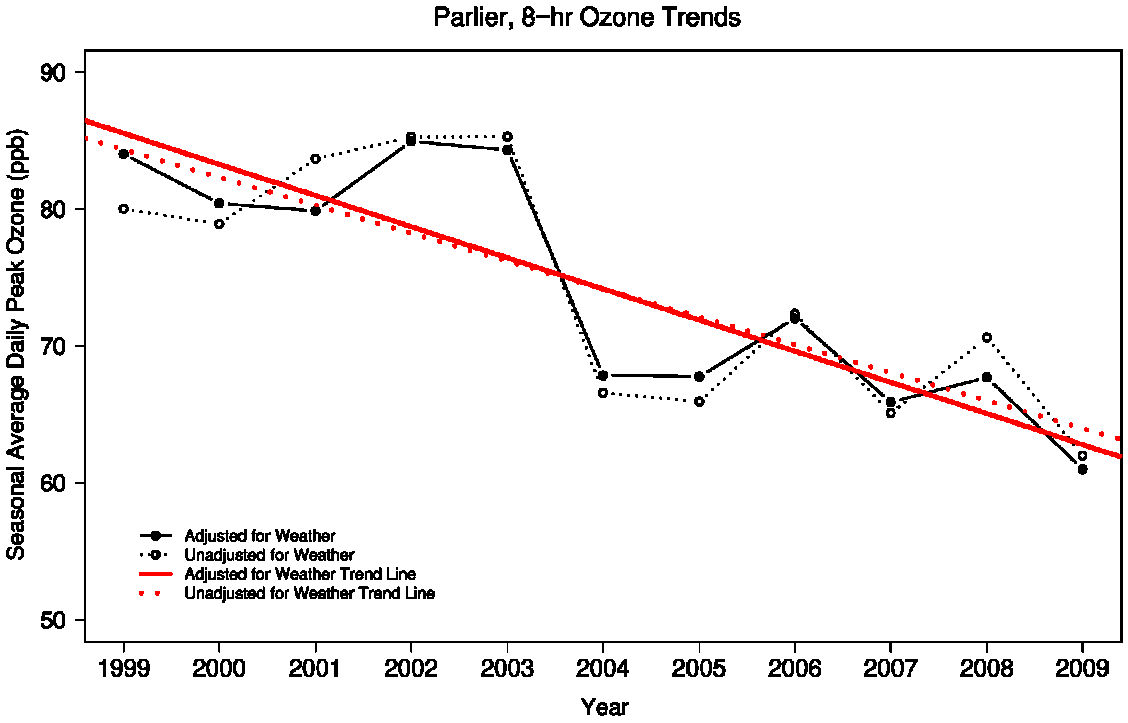
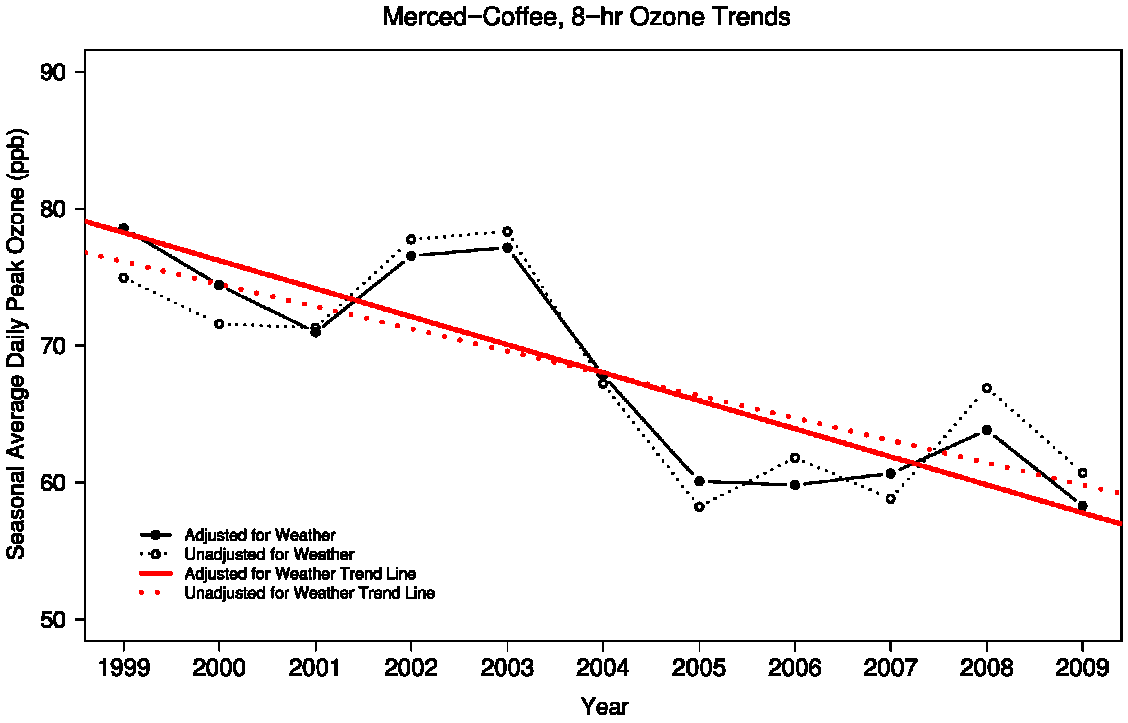


Figure 2-22: Merced-Coffee, 8-hr Ozone Trends

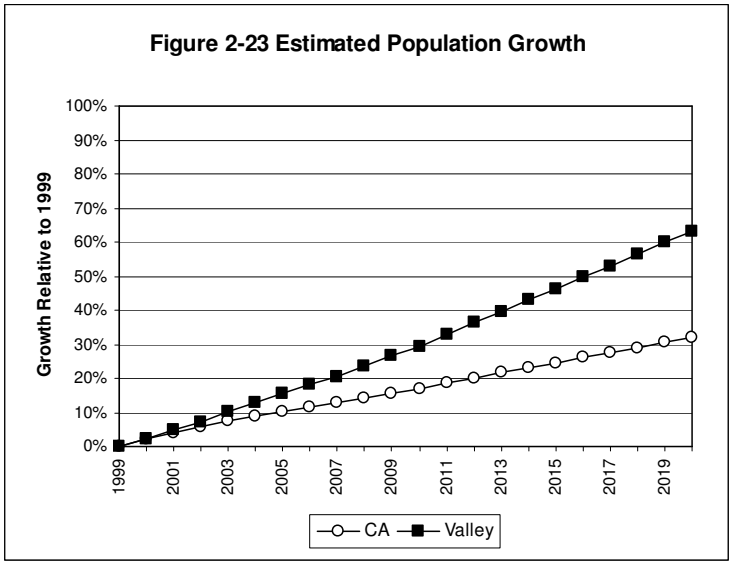


2.4 Growth Trends in Population & Vehicle Miles Traveled

The significant decline in emissions and ozone levels over the past several decades has occurred during a period of overall population growth and increased vehicle miles traveled (VMT) in California and the Valley.

As shown in Figure 2-23, population in the Valley has increased by 26 percent since 1999, whereas the population in the State only increased 16 percent over the same 10-year period. While the projected population growth from 2010 through 2020 is expected to be only 13 percent, the Valley is projected to see a 26 percent increase for the same time period.

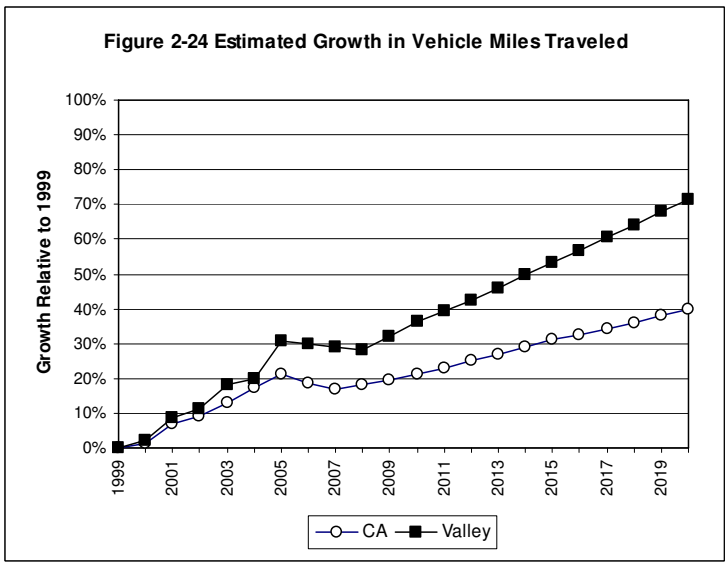
Figure 2-23 Estimated Population Growth



Source: ARB CEPAM:2009 Almanac – Population and Vehicle Trends Tool

A similar trend holds true for VMT in California and the Valley. From 1999 to present, VMT in California has increased 20 percent; however the Valley has seen a 32 percent increase in VMT. For the 10-year period between 2010 and 2020, the projected VMT increase for California is 15 percent and 25 percent for the Valley.

Figure 2-24 Estimated Growth in Vehicle Miles Traveled

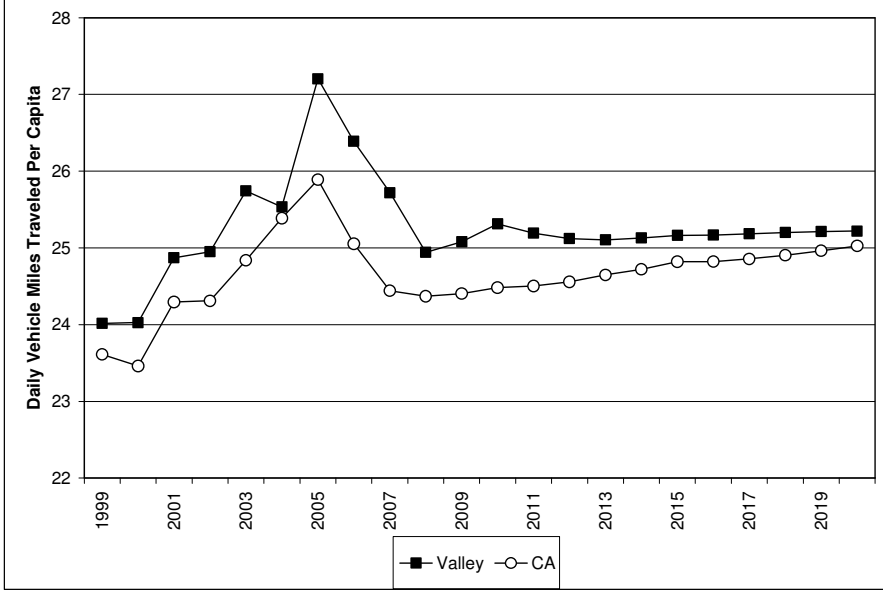


Source: ARB CEPAM:2009 Almanac – Population and Vehicle Trends Tool

Based on the growth in population and the associated increase in VMT, one would expect a related significant percent increase in ozone. However, as shown throughout this review, there has been a significant decrease, suggesting that control strategies have both mitigated the increase in ozone attributable to population growth and decreased the baseline ozone levels.

Figure 2-25 shows trends in daily VMT per capita. VMT per capita in the Valley has averaged 0.77 higher than the state average since 1999. The Valley's VMT per capita from 2010 through 2020 is expected to average 0.43 higher than the state average.

Figure 2-25 Estimated Daily Vehicles Miles Traveled Per Capita



Source: ARB CEPAM:2009 Almanac – Population and Vehicle Trends Tool

2.5 Summary of Air Quality and Regional Growth Trends

Consistent with the strategies identified in the *EOADP* and *2007 Ozone Plan,* the District has implemented regulatory control measures and non-regulatory, voluntary programs that have significantly affected the ozone and ozone precursor concentrations, as shown in the above data and analyses. As detailed in the above analysis, the District is on-track to reach attainment of the 1-hour and 8-hour ozone NAAQS despite increases in population and VMT. The District will continue to implement all feasible controls and innovative strategies, and aggressively pursue grant funding to accelerate attainment.

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Section 3 - Regulatory Control Measures

Traditionally, the District's primary means to meet the challenges of air quality in the Valley are its regulatory stationary source control measures. The District's 1-hour and 8-hour ozone plans, *EOADP* and *2007 Ozone Plan*, respectively, identified such regulatory control measures. At full implementation of the *EOADP,* and for the implementation-to-date of the *2007 Ozone Plan*, the District has achieved more emissions reductions of ozone precursor emissions than was committed to at the time of each plan's adoption. This is consistent with the improving air quality trends shown previously in Section 2. These reductions are in addition to those generated by District incentive programs, innovative programs, and state, federal, and local measures, as presented in this review.

3.1 Implementation of Stationary Source Regulatory Controls

Tables 3-1 lists the stationary source rules adopted or amended consistent with *EOADP.* The District adopted these rules or rule amendments from 2005 through 2007 with full implementation anticipated by 2010. For both ozone precursors, the adopted rules achieved more emissions reductions than were committed to in the *EOADP.* Rule 9510, Indirect Source Review, is discussed more fully in Section 4.

Once EPA approved the *EOADP*, the inventories and assumptions in the SIP became the legal benchmark or baseline for calculating future emissions reductions beyond that point. Since during the rule development process new information is obtained regarding the emission inventory, the rule baseline, or inventory, may be different from the plan baseline or inventory. The reductions calculated during the rule development process are calculated based on the rule baseline. Thus, evaluation of rule effectiveness with regard to emissions reductions requires the conversion of the rule reductions to "SIP Currency." All reductions in Tables 3-1 and 3-2 are stated in SIP Currency and are calculated as follows:

$$\text{Emission Reductions in SIP Currency} = \frac{\text{Rule Reductions}}{\text{Rule Baseline}} \times \text{Plan Baseline}$$

Table 3-1 Completed 1-hour Ozone Plan Control Measures									
Control Measure	**Rule #**	**Completion**	**Reductions Start ***	**Plan Commitment (tons/day)**		**Actual Reductions (tons/day)**		**Additional Reductions (tons/day)**	
				NOx	**VOC**	**NOx**	**VOC**	**NOx**	**VOC**
Open Burning (Phase 3)	4103	2007	2007	2.3	2.9	2.8	3.9	0.5	1.0
Oil and Gas Fugitives	4409	2005	2005	0	4.7	0	4.5	0	-0.2
Refinery & Chemical Fugitives	4455	2005	2005	0	0.2	0	0.4	0	0.2
Wineries - Fermentation and Storage	4694	2005	2007	0	0.7	0	0.7	0	0
Composting/Biosolid Operations	4565	2007	2008	0	0.1	0	0.3	0	0.2
Automotive Coating	4602	2006		0	0.1	0	0.6	0	0.5
Concentrated Animal Feeding Operations	4570	2006	2006	0	15.8	0	22.8	0	7.0
Organic Solvent Degreasing	4662	2007	2009	0	1.3	0	3.1	0	1.8
Organic Solvent Cleaning	4663								
Motor Vehicle and Mobile Equipment Coating	4602								
Surface Coating of Metal Parts and Products	4603								
Can and Coil Coating Operations	4604								
Aerospace Assemblies and Component Coating	4605								
Wood Products Coating	4606								
Graphic Arts	4607								
Adhesives	4653								
Polyester Resin Operations	4684								
Steam-Enhance Oil Well Vents	4401	2006	2007	0	1.4	0	1.2	0	-0.2
Soil Decontamination	4651	2007	2008	0	0.1	0	0.1	0	0
Polymeric Foam Manufacturing	4682	2007	2007	0	0.1	0	0.4	0	0.3
Gasoline Storage & Transfer	4621 4624	2007	2009	0	1.0	0	2.1	0	1.1
School Bus Fleet Rule	9310	2006	2010	2.6	0	4.0	0	1.4	0
Small Boilers, Process Heater, Steam Generators, 2.0-5.0 Mmbtu/hr	4307	2005	2006	9.0	0	13.1	0	4.1	0
Solid-Fuel Boilers, Steam Generators, & Process Heaters	4352	2006	2007	4.4	0	4.3	0	-0.1	0
Stationary IC Engines	4702	2005	2006	20.1	0	28.7	0	8.6	0
Water Heaters 0.075-2.0MMBtu/hr	4308	2005	2008	1.4	0	2.0	0	0.6	0
Stationary Gas Turbines	4703	2007	2009	2.5	0	3.0	0	0.5	0
Completed Control Measures Totals				**42.3**	**28.4**	**57.9**	**40.1**	**15.8**	**11.7**

* All emission values are for calendar year 2014 and controls, in tons per day, rounded to the nearest then of a ton per day

Likewise, Table 3-2 lists the completed stationary source control measures along with the original *2007 Ozone Plan* commitments for the emissions reductions, the estimated

emission reductions based on the adopted rule, and any emission reductions that were surplus to the plan commitments. The District adopted the measures according to the schedule identified in the *2007 Ozone Plan*. Most of the control measures are expected to be fully implemented by 2017, with the majority of the emissions occurring before 2015. Emission reductions shown in Table 3-2 are based on 2014 inventories and controls.

The emission reductions estimates in *2007 Ozone Plan* were based on control techniques existing at the time the Plan was developed. During rule development, the District sometimes found that technologies had advanced and that new more-effective control techniques were available for each measure. These more-effective control techniques were considered in each rule development project and resulted in increased emission reductions from the *2007 Ozone Plan* commitments. In some cases, however, it was determined that previously considered control technology was not applicable to the entire source category and fewer reductions were realized from some of the control measure projects. In 2014, the currently adopted control measures will produce an additional 9.3 tons per day of NOx and 5.6 tons per day of VOC, compared to the *2007 Ozone Plan* commitments. The additional emission reductions will be used to offset any shortfalls that may occur in future rule development projects and will be applied towards the additional "Black Box" reductions required by the *2007 Ozone Plan*.

Table 3-2 Completed *2007 Ozone Plan* Control Measures

CM#	Control Measure	Rule #	Completion	Reduction Start	Plan Commitmen (tons/day)		Actual Reductions (tons/day)		Additional Reductions (tons/day)	
					NOx	VOC	NOx	VOC	NOx	VOC
S-GOV-1	Composting – Bio-solids	4565	2007	2008	0	3.9	0	3.9	0	0
S-AGR-1	Open Burning, Phase III & IV	4103	2007	2007	2.4	2.8	3.7	5.2	1.3	2.4
S-SOL-11	Solvents	4661 4662 4663	2007	2010	0	1.4	0	3.3	0	1.9
S-COM-5	Gas Turbines	4703	2007	2010	0.6	0	2.2	0	1.6	0
S-IND-24	Soil Decontamination	4651	2007	NA	0	0	0	0	0	0
S-IND-6	Polystyrene Foam	4682	2007	2011	0	0.1	0	0.4	0	0.3
S-PET-1,2 S-PET-3	Gasoline Storage & Transfer Aviation Fuel Storage	4624 4623	2007	2009	0	1.2	0	1.4	0	0.2
S-COM-1	Large Boilers	4306 4320	2008	2011	0.7	0	3.3	0	2.6	0
S-COM-2	Medium Boilers	4307	2008	2012	0.5	0	5.1	0	4.6	0
S-COM-7	Glass Melting Furnaces**	4354	2008	2008	1.7	0	0	0	-1.7	0
S-SOL-20	Graphic Arts	4607	2008	2011	0	0.1	0	0.1	0	0
S-COM-9	Residential Water Heaters	4902	2009	2011	0.4	0	0.5	0	0.1	0
S-IND-21	Flares	4311	2009	NA	0	0	0	0	0	0
S-IND-14	Brandy & Wine Aging	4695	2009	2012	0	0	0	0	0	0
S-SOL-1	Architectural Coatings	4601	2009	2012	0	2.1	0	3	0	0.9
S-COM-3	Small Boilers*	4308	2009	2011	0	0	0.6	0	0.6	0
M-TRAN-1	Employer-Based Trip Reductions	9410	2009	2014	0.3	0.6	0.5	0.5	0.2	-0.1
	Completed Control Measures Totals				**6.6**	**12.2**	**14.6**	**15.4**	**9.3**	**5.6**

Note: All emission values are for calendar year 2014 emissions and controls, in tons per day, rounded to the nearest tenth of a ton per day. All values in SIP Currency.
*Feasibility Study commitment in *2007 Ozone Plan*. Feasibility Study completed in 2009 with subsequent rulemaking. No Plan control measure commitment.
**Emissions were received from this rule, but have not been submitted for SIP credit, hence they are not reflected in the total reductions.

3.2 Feasibility Studies

In addition to the *2007 Ozone Plan* regulatory commitments, the District has pursued, and continues to pursue, a number of feasibility studies for potential control measures to evaluate opportunities for additional emissions reductions. The studies listed in Tables 3-3 and 3-4 were identified in the *2007 Ozone Plan* because there was not sufficient information available to determine the feasibility or effectiveness of these potential control measures at the time of plan adoption. Not all of the studies listed in Tables 3-3 and 3-4 will produce a viable rule project, incentive program, or advocacy action; in some cases, the emissions inventory may prove to be too small or the affected sources may not lend themselves to additional control technology or best management practices. The goals of the feasibility study process are to: 1) determine whether or not actions to reduce emissions are technically and economical feasible for the potential control measure; and 2) provide closure on the plan commitment, in other words to proceed with rulemaking, advocacy commitment, incentive program, or other commitment, or make a final determination of non-feasibility.

During the feasibility study process, as required, necessary, and appropriate, staff considers:

- Updating the emission inventories for the sources to be considered in the feasibility study;
- Reviewing best management practices and technologies that likely have the potential to achieve cost-effective emission reductions from the sources considered by the feasibility study;
- Reviewing regulatory, incentive, and advocacy options for achieving emission reductions from the sources being evaluated by the feasibility study;
- Providing details to the public of the District's intended actions for this source category based on information acquired by staff during the feasibility process. This may be at a rule development workshop, stakeholder workshop, in a document or notice published on the internet, or through any other means deemed appropriate by staff considering the applicability and results of the feasibility study.

District staff may also research other controls measures that are not identified in an adopted attainment plan, but which are suggested after the plan is finalized. These studies may include application of reasonably available control technology or management practices for current or new sources where emission reductions are cost-effective via a rule, incentive program, or other strategy. As with every rule development process, the new or amended rule will be developed according to the District's normal procedure of public involvement to gather ideas, cost data, economic impacts, and other feedback on the draft rule prior to seeking Governing Board approval of a proposed rule. Continued awareness of additional measures, such as those that may be identified in the feasibility study process, are needed to achieve the additional reductions required by the *2007 Ozone Plan* "black box." Specifically the "black box" requires that regulatory or non-regulatory measures shall be put in place by the end of 2019 that account for 82 tpd of NOx emissions reductions, to be achieved by the end of 2023.

Since the *2007 Ozone Plan* was adopted, the District has completed or initiated all feasibility studies that were scheduled by 2009. The following subsections briefly describe the completed or initiated control measure feasibility studies, as summarized in Table 3-3.

Table 3-3 Initiated or Completed Stationary Source Feasibility Study Projects

Control Measure #	Control Measure Name	Completion Date	Outcome
S-COM-6	Internal Combustion Engine (ICE) Electrification/Pump Efficiency Incentives	In Progress	Pending further emission inventory refinement
S-GOV-6	Prescribed Burning	2008	Increase Legislative advocacy, public education, interagency coordination
Program Review	Open Burning Biomass Incentive	2008	Incentive Program Potential, Funding not Identified
S-PET-13	Crude Oil Production Sumps	In Progress	Pending further evaluation and inventory refinement
S-PET-16	Heavy Crude Oil Components	2009	Not cost effective for additional VOC controls
S-COM-4	Solid Fuel Fired Boilers	2009	Recommended for Rulemaking
S-COM-3	Small Boilers	2009	Recommended for Rulemaking

Shading represents completed Feasibility Studies

Table 3-4 Planned Stationary Source Feasibility Study Projects

Control Measure #	Control Measure Name	Anticipated Completion Date
S-IND-12	Wine Fermentation & Storage	2010
S-IND-5	Asphalt Roofing	2010
S-PET-18	Heavy Oil Testing Stations (HOTS) & Gauge Tanks	2010
S-AGR-4	Pesticide Fumigation Chambers	2011
S-COM-11	Dryers	2011
S-GOV-4	Asphalt Paving	2011
S-IND-13	Bakeries	2011
S-COM-6	ICE – Standards Review	2012
S-GOV-2	Municipal Water Treatment Plants (POTW)	2012
S-IND-23	Reduction of Animal Matter	2012
S-PET-22	Refinery Turnaround Units	2012
S-PET-23	Refinery Vacuum Devices	2012
S-PET-24	Refinery Wastewater Separators	2012

3.2.1 Internal Combustion Engine (ICE) Electrification/Pump Efficiency Incentives

The *2007 Ozone Plan* committed the District to conduct a feasibility study for emissions reductions from expanding regulation of incentive programs for Reciprocating Internal Combustion Engines (ICE). Businesses and agencies that use internal combustion engines include, but are not limited to, schools and universities, dairies, agricultural

production, petroleum refiners, food processing, public water districts, and manufacturing. Many compression-ignited engines are used in agricultural production for irrigation and in other businesses as emergency engines to provide backup power when electric service is interrupted.

District staff evaluated rules from other air districts, including South Coast Air Quality Management District, and the BACT database to identify potential options. Staff reviewed the District permit and grant databases to estimate the number of reciprocating internal combustion engines over 50 horsepower operating in the Valley and sorted these by fuel type (diesel or natural gas). Staff then met with agricultural industry stakeholders to solicit input of the feasibility of ICE electrification and pump efficiency incentives.

Preliminary indications as to the feasibility of obtaining cost-effective emissions reductions from this source category are good. Additionally, many agricultural industry stakeholders including the California Cotton Ginners and Growers Association supported the concept of increased use of incentive to assist growers in the effort to address engine emissions. Industry also supported implementation of pump efficiency programs, where applicable, if these programs were implemented on a voluntary basis. District staff is in the process of obtaining additional inventory information regarding this source category. Completion is anticipated in 2010.

3.2.2 Prescribed Burning

In the *2007 Ozone Plan*, the District committed to conducting a feasibility study to determine if emissions from wildfires, prescribed burns, and hazard reductions burns could be further reduced to improve air quality. In May 2009, District staff completed this feasibility study, after consulting stakeholders, and found that the enormous and untimely emissions produced by wildfires can be reduced by increasing and modifying prescribed burning, pile burning, and hazard reduction burning practices. The feasibility study determined that in order to prevent wildfire emissions, the following actions would be required: 1) increase legislative action for more prescribed burning resources, implement policy modifications to raise the priority of air quality-related public health concerns; 2) coordinate efforts between multiple agencies; and 3) allocate time for public education.

The District is proceeding with actions recommended by the feasibility study. In May 2009, the District's Governing Board approved an amendment to the District's 2009 Legislative Platform to include a recommendation for Curbing Wildfires and the Associated Adverse Public Health Impacts. The District's 2010 Legislative Platform continues to include a recommendation for Curbing Wildfires and the Associated Adverse Public Health Impact. Furthermore, during the wildfire and prescribed-burn season, the District participates in daily coordination calls with multiple agencies, including land management associations, as needed. The District has also developed brochures and hosts a webpage to educate the public on hazard-reduction burning, issues daily burn forecasts, and provides the public with a phone number to obtain additional information about hazard-reduction burning and prescribed burning including daily prohibition updates.

3.2.3 Open Burning Biomass Incentive

Both the *2007 Ozone Plan* and the *2008 PM2.5 Plan* committed the District to conduct a feasibility study for emissions reductions through Open Burning Biomass Incentives. The source category, qualified agricultural biomass (QAB), is defined as agricultural material, which may be considered for on-site open burning, but could be diverted to a biomass power plant for use as fuel, thus reducing significant emissions inherent in the open burn process. Such materials include various pruning material, orchard and vineyard removal material, and rice, wheat, and barley straw. Agricultural material burned in combustors at a biomass power plant is used to produce steam, which then spins turbines to generate electricity. Burning of agricultural material is on option for compliance with District Rule 4103. Additionally, for the most part, such electricity is sold to utility companies to meet their renewable energy resource commitments as a part of the California Renewable Portfolio Standard (RPS) established by Senate Bill 1078.

During the feasibility study process, District staff identified an opportunity to achieve emissions reductions from such QAB. The District study showed that approximately 149,567 acres, equating to 483,316 tons of agricultural material, were approved for open burning in 2008, thus generating 4.55 tpd of PM2.5 and 3.46 tpd of NOx. The nine biomass power plants within the jurisdictional boundaries of the District burn an average of 1,474,051 bone-dry tons (BDT) of biomass fuel each year. Additionally, there are currently three biomass power plants in the northern San Joaquin Valley, but outside the District boundaries, that accept QAB from the southern Valley, which further reduce the need for burning within the southern Valley. Staff estimates that in 2008, approximately 25% of the BDT was QAB. The 2008 Emission Inventory for biomass power plants was approximately 0.52 tpd of PM and 1.55 tpd for NOx.

Certainly, the open-burn option is generally the least costly option for growers; however adherence to regulatory burn schedules sometimes prohibits efficient and timely removal of agricultural material. An alternative option for growers is to contract a chipper to dispose of the agricultural material. The chipper, in turn has the option of paying to have the material disposed of at a landfill or compost facility, or being paid for the material by a biomass power plant. However, it is generally more economical for the biomass power plants to buy urban biomass fuel instead of agricultural fuel. In recent years, due to the economic downturn and resulting lack of available urban waste, the biomass power plants have increased the use of QAB as fuel. District staff believe that when the economy recovers and urban waste fuel becomes more readily available, the biomass power plants will reduce acceptance of QAB in favor of the less-expensive urban fuel; thus the future supply of QAB fuel may be more than future demand of such fuel at biomass power plants in the Valley, creating an economic disincentive for the use of QAB as a biomass fuel source.

To counteract the economic disincentive for biomass power plants to accept agricultural material as fuel, District staff recommended the development and implementation of an incentive program to increase the use of QAB as fuel for biomass power plants. District staff found that there are no long-term federal or state funding commitments for biomass power plants in place at this time, nor are they aware of any federal or state funding programs that are in the planning stages. While there is currently no direct source for such incentive funding, the District will seek out opportunities for securing a dependable

source of funding to subsidize the increased uptake of agricultural biomass fuel on the demand side of the economic equation.

Given that are two distinct advantages in routing QAB through a biomass facility: 1) reductions in criteria pollutant emissions compared to open burning; and 2) production of electricity that aids the utilities in meeting the RPS; development of a program for biomass incentives would help to sustain a technology that has shown to be a feasible and cost-effective alternative to open burning for many crop types in the Valley.

3.2.4 Crude Oil Production Sumps

The *2007 Ozone Plan* committed the District to conduct a feasibility study to evaluate the potential for VOC emissions reductions from primary, secondary, and tertiary oil field sumps for heavy, intermediate, and light oil. The intent of the feasibility study was to determine if amendments to District Rule 4402 or 4723 could reduce VOC emissions from these sources.

The District has reviewed the BACT database, permit database, and rules of other air districts to identify potential controls. Staff identified potential options including: requiring covering of sumps, prohibition on sumps except for use as emergency outlets, requirement to utilized closed tanks with PV valves in lieu of sumps, and adjustment of exemption levels.

The District is currently reviewing and refining the emission inventory for this source category. The District has reviewed the permit database, acquired information from the regional water board, acquired information from the California Division of Oil, Gas, and Geothermal Resources, worked with ARB to obtain information from survey results, and spoken with industry representatives to estimate the number and surface area of each type of sump. The District is currently working to reconcile the discrepancies in the number and surface area of sumps provided by each information source. The District is also evaluating the cost and impact of various control options and considering voluntary options to reduce emissions. At this time it appears that the potential for VOC emission reductions may be low considering the small inventory of sumps in the Valley. Completion of this feasibility study is anticipated for 2010.

3.2.5 Heavy Crude Oil Components

The *2007 Ozone Plan* committed the District to conduct a Feasibility Study to evaluate the potential of VOC emissions reductions through the prevention of oil leaks in production of heavy crude oil in Valley.

District staff analyzed the costs and cost-effectiveness of controlling leaks from heavy oil components by requiring periodic inspections of the components. Additionally, staff refined the inventory with information obtained from the state and crude oil and natural gas stakeholders. Based on the analysis District staff is not recommending a VOC rule project for this source category at this time, citing that the potential for VOC emission reductions was limited and the cost effectiveness for VOCs alone was higher than recent VOC rule projects. The District does not have the authority to regulate air pollutants other than criteria pollutants (VOC, NOx, SOx, PM2.5, and PM10) so cannot consider greenhouse gases such as methane and ethane when evaluating the feasibility of a

control measure. However, ARB does have the authority to regulate greenhouse gases. Since 61 percent of fugitive emissions from oil and gas production is in the form of methane and ethane, ARB is in the process of evaluating this source category as a greenhouse gas reduction measure for meeting AB32 reduction goals. Any actions to reduce greenhouse gas from heavy crude oil components will have a co-benefit of reducing VOC emissions. The District will monitor ARB's progress closely and evaluate their reduction measure in light of concurrent VOC reductions that will benefit Valley air quality.

3.2.6 Solid Fuel Fired Boilers

Both the *2007 Ozone Plan* and the *2008 PM2.5 Plan* committed the District to conduct a feasibility study to determine if additional emissions reductions could be achieved through amendments to Rule 4352, Solid Fuel Fired Boilers, Steam Generators, and Process Heaters. This source category includes facilities that operate boilers, steam generators, and process heaters (hereafter referred to as "units") that are fired on solid fuel. The units are used in facilities that generate utility and industrial power (electricity and heat) by burning solid fuels including petroleum coke, coal, municipal solid wastes, tires, biomass wastes, urban and construction wood wastes, or any combination thereof.

The District's analysis showed that it may be technologically feasible to control NOx emissions with Selective Catalytic Reduction (SCR) or hybrid SNCR/SCR. Additionally, there are boilers that are operating at emission levels below the limits stated in District Rule 4352. No additional PM2.5 emission reduction could be achieved because existing units in the District already operate fabric filters/baghouses and/or electrostatic precipitators, which are considered as Best Available Control Technology (BACT) for this source category. The units are already operating lime injection or soda ash injection, which are considered BACT for this source category, so there is no additional SOx emission reduction from the current level.

Because of the potential for NOx emissions reductions, a rulemaking project will be scheduled for the next available opportunity to consider additional controls and lower limits for solid fuel fired boilers, steam generators, and process heaters, in addition to addressing EPA concerns regarding the current District Rule 4352.

3.2.7 Small Boilers

The *2007 Ozone Plan* committed the District to conduct a Feasibility Study to re-evaluate the potential of further NOx emissions reductions from boilers, steam generators, and process heaters rated at 0.075 to less than 2.0 MMBtu/hr subject to District Rule 4308.

Staff completed the Feasibility Study in 2009 and initiated a rule amendment project to establish more stringent NOx emissions limits for units running on PUC-qualified natural gas. The District Governing Board adopted Amended Rule 4308 on December 17, 2009. Amendments approved by the Board included elimination of the previous exemption for humidifiers, addition of an exemption for recreational vehicles, reduction of the emission limits for most categories, and adjustment to the compliance schedule for the rule. The rule achieved a 75 percent reduction in emissions from small boilers rated from 0.075 to less than 0.4 MMBtu/hr. The rule achieved an 85 percent reduction in emissions from small boiler rated from 0.4 to less than 2.0 MMBtu/hr. Overall, the rule achieved an 82

percent reduction in emissions from the entire source category for boilers, steam generators, and process heaters rated at 0.075 to less than 2.0 MMBtu/hr, which takes into account that there are more small boilers rated from 0.4 to less than 2.0 MMBtu/hr than less than 0.4 MMBtu/hr. The cost effectiveness of this rule was estimated at $1,500 to $2,000 per ton of NOx reduced for individual units. A co-benefit achieved from this rule amendment was reductions in GHG emissions due to replacement of uncontrolled units operating at low efficiency with high efficiency units.

3.3 Summary of Regulatory Control Measures

The District has met the regulatory commitments identified in the 2007 Ozone Plan, identifying additional emissions reductions in the amount of 9.3 tons per day of NOx and 5.6 tons per day of VOC through adopted regulatory measures. Results from the feasibility studies initiated to date have yielded one completed rule (emissions included in additional emissions above) and a future rulemaking project with anticipated emissions reductions of two to three tons per day of NOx. Additionally, the feasibility studies identified potential incentive program opportunities to further reduce emissions.

Section 4 - Indirect Source Review

While the District has made significant gains in reducing emissions from stationary sources through District regulations, area-wide and motor vehicle emissions diminish the overall effect of such regulations. The past and expected increases in population and VMT, as shown in Section 2, add to the fact that mobile sources remain the largest source of NOx emissions, comprising 78 percent of the Valley total in 2008. Since state and federal motor vehicle regulations were not achieving the necessary results to meet NAAQS attainment deadlines, the District sought to reduce such emissions indirectly.

District Rule 9510, Indirect Source Review (ISR) spans the gap between regulatory control measures and incentive programs developed by the District for emissions reductions. ISR was developed from an emissions reduction commitment made in the *2003 PM10 Attainment Plan* and the *EOADP*. Rule 9510 was adopted by the District's Board on December 15, 2005, with an effective date of March 1, 2006, to reduce the growing impacts of emissions resulting from the land development in the Valley.

During the ISR process, District staff evaluate projects for baseline NOx and PM emissions and potential reductions based on construction, design, and ongoing operations. For emissions not mitigated on-site, Rule 9510 has an established fee schedule to account for any off-site emissions required to meet reduction requirements as follows:

Year	NOx ($/ton)	PM10 ($/ton)
2006	**$4,650**	**$2,907**
2007	**$7,100**	**$5,594**
2008 & beyond	**$9,350**	**$9,011**

To date, the District has reviewed and approved 447 development projects under ISR. Based on this review and approval, 2,660 tons of NOx and 1,692 tons of PM emissions have been reduced through on-site mitigation, either in the construction of operational phases. Through the review of these projects, the District has also collected $9,741,116 in off-site mitigation fees to mitigate 2,495 tons of NOx emissions and 2,298 tons of PM10 emissions that developers were not able to achieve through on-site emission reduction measures.

While the District has collected off-site mitigation fees, litigation against the District over the ISR Rule has delayed expenditure of the majority of funds. On June 27, 2006 a lawsuit was filed by various building industries challenging the validity of Rule 9510. On March 25, 2008, the Fresno County Superior Court ruled in favor of the District on all accounts. An appeal of that decision was filed May 22, 2008. A recent court decision on this appeal upheld the ISR rule as a valid exercise of state law authority. However, a companion case, challenging the construction portion of the rule on federal law grounds, is pending before the Ninth Circuit Court of Appeals. Accordingly, while the District has

recently been able to release the operational phase fees for expenditure, the construction phase fees are on hold pending resolution of the federal lawsuit.

4.1 On-Site Emissions Reductions & Off-Site Emissions Mitigation

ISR applies to new development projects that emit emissions of at least two tons of NOx or two tons of PM10 per year. The rule contains provisions exempting traditional stationary source projects that are subject to the District's stationary source permitting requirements. Developers of projects subject to ISR must reduce emissions occurring during construction and operational phases of a development project. During construction, exhaust emissions of NOx and PM10 are to be reduced by 20 and 45 percent, respectively. Construction exhaust emissions can be reduced through installation and use of aftermarket devices or through the use of construction equipment that is newer than the statewide average. Operational emissions of NOx and PM10 are to be reduced 33.3 and 50 percent, respectively, from the project baseline for 10 years. Operational emissions can be reduced through any combination of land-use decisions, project design element, and building construction.

If a developer cannot achieve the required emission reductions through onsite measures, the rule provides a mechanism by which the developer can pay an offsite mitigation fee to the District. One hundred percent of all offsite mitigation fees received by the District are to be used to fund emission reduction projects, achieving emission reductions on behalf the original project.

In an effort to avoid mitigation fees, developers incorporate many air-friendly operational and design components into their proposals. At the time of initial construction, significant emissions reductions are garnered through the use of modern or retrofitted construction equipment. In planning for operational emissions reductions, developers and site users can make provisions for the use of cleaner fleets, which are especially significant for large distribution centers. Design features, such as installation of solar power, integrated mixed-use development, pedestrian connectivity and high-efficiency housing and building design, cumulatively add up to significant emissions reductions.

4.2 Mitigation Fees for Incentives

In light of the legal issues related to ISR, the majority of funds have remained on hold pending court decisions. The District was however able to utilize $2 million in an innovative effort to reduce regional emissions in the Valley. The District collaborated with the Natural Resources Conservation Service (NRCS) to co-fund agricultural tractor replacement projects using $2 million of ISR off-site fees. Funds utilized by the NRCS were provided through the Environmental Quality Incentives Program (EQIP) Conservation Innovation Grants (b) [CIG (b)] portion of the 2008 U.S. Department of Agriculture Farm Bill.

The District and NRCS combined funding to replace existing, in-use agricultural tractors equipped with uncontrolled (Tier 0) engines with new tractors equipped with Tier 3 or cleaner engines. Total funding provided by both agencies paid up to 70% of eligible tractor costs. In an effort to achieve maximum emissions reductions, the District ranked

all eligible project applications received and only selected the most cost-effective projects to co-fund. In total, the District was able to co-fund 84 projects, replacing 102 tractors. For 21 projects, two existing tractors were replaced with one new tractor.

The following table summarizes the estimated lifetime emissions reductions achieved for all projects co-funded with the $2 million ISR fees:

Number of Co-funded Projects:	**84**
Project Life:	**10 years**
Project PM Reductions:	**43 tons**
Project NOx Reductions:	**1,172 tons**

4.3 Summary of ISR

While utilization of off-site mitigation funds for incentive programs for primarily mobile sources was anticipated beginning in 2006, these funds have been sequestered in light of litigation, thus anticipated emissions reductions are not yet realized. Recent legal decisions have the effect of releasing approximately $7 million for District use in emissions reductions projects. While the District anticipated a steady utilization of these funds for incentive programs, full implementation should result in intensified emissions reductions over the next few years and help to maintain the increased rate of reductions subsequent to 2005. Through established accountability measures, ISR ensures that the District will utilize off-site fees to fund quantifiable and enforceable off-site projects that reduce surplus emissions of NOx and PM10.

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Section 5 - Incentive Programs

While the District's regulatory control of stationary sources has been successful in reducing precursors to ambient ozone formation and will continue to be successful in that regard with the implementation of control measures identified in the *2007 Ozone Plan*, 80 percent of the Valley's NOx inventory is produced by mobile sources, either those within the Valley or those that travel through the Valley. Because of its limited authority to regulate such mobile sources, the District has developed other non-regulatory emissions reduction strategies to accelerate attainment of the 1-hour and 8-hour ozone NAAQS by federal deadlines or before. Such strategies are a major component of the District's *2007 Ozone Plan* "black box" approach, which is an option allowed by the EPA given the Valley's extreme 8-hour ozone designation. The *2007 Ozone Plan*, identified all emissions reductions given known and prospective technologies; however, these technologies do not result in sufficient federally creditable reductions for attainment of the 8-hour ozone NAAQS in the Valley. The "black box" contains those measures, including potential regulatory and non-regulatory measures identified in feasibility studies subsequent to attainment plan adoption, that incentivize voluntary reductions or utilization of newer technologies when not immediately economically feasible for a given source category.

The District's highly successful Emissions Reduction Incentive Program (ERIP) is one strategy that provides such non-regulatory emissions reductions. Without the increase in incentive measures and incentive funding identified in the *2007 Ozone Plan,* attainment of the 8-hour ozone NAAQS would be delayed to after 2020 for over 1,000,000 Valley residents. To accomplish reaching early attainment, approximately $200 million annually in funding is required until attainment is reached.

Through incentives, funding is provided for projects that achieve emission reductions prior to or beyond reductions required from rules and regulations. Most importantly, incentives allow the District to reduce emissions from source categories outside of the District's regulatory authority, as well as source categories where financial hardship would otherwise prevent traditional control strategies from being implemented.

5.1 Ongoing Incentive Programs

Since 1992, the District has gained significant experience in developing and implementing successful incentive programs. The funding for such programs has expanded over the years, as has the sophistication and diversity of programs offered by the District. The District is currently operating three primary incentive programs aimed at reducing precursor emissions: the Heavy-Duty Engine Emission Reduction Incentive Program (Heavy-Duty Engine Program), the Reduce Motor Vehicle Emissions II (REMOVE II) Program, and Community Based Incentives. These overarching programs offer incentives to businesses, public agencies, and the general public for a wide variety of emissions reductions projects including the Lower Emission School Bus Program, the Burn Cleaner Wood Stove Change Out, and the Stationary Agricultural Irrigation Pump replacement program as opportunities to achieve cost-effective emission reductions present themselves and funding becomes available, the District has been willing to develop new programs and new components for existing programs.

The amount of funding currently available to the District for incentive-based programs is over $100 million per year. The primary sources for these funds are the expected revenues from the District's Indirect Source Review Rule, voluntary development mitigation agreements, local DMV surcharge fees, the state's Carl Moyer Program, Proposition 1B, and various federal funds.

In 2008, the District consolidated advocacy efforts in order to secure additional funding under the State Proposition 1B Goods Movement Emission Reduction Program (Prop 1B) for the San Joaquin Valley. The Prop 1B program provides incentive funds to retrofit or replace diesel engines in heavy-duty trucks, locomotives, and harbor craft that are used to transport goods in California. The District was awarded approximately $46 million for the first year of the Prop 1B programs. In light of California's current fiscal situation, the second year of program funding was delayed and will be combined with the third year funding allocation. The District expects to be awarded approximately $92 million in June 2010 for eligible equipment projects.

Table 5-1 identifies the individual incentive programs that the District has or is administering, including the total funding amount for each program, the total recipient cost-share, the number of projects and vehicles or engines that were funded for each program, and the applicable NOx and VOC emissions reductions attributable to each program.

Table 5-1 Incentive Program Totals, 1998 - 2009

Program	# of Projects	# of Vehicles/ Engines	NOx (tons)	VOC (tons)	District Grant Amount	Recipient Cost Share
Agricultural Engine	2,349	5,529	43,997	1,933	$91,856,789	$26,241,927
Alternative Fuel/Hybrid Vehicle Rebate	3	3	NC	NC	$23,665	$0
Bicycle Infrastructure	12	12	10	15	$664,583	$4,840,730
Car Crushing	16	406	16	23	$1,400,386	$2,160,461
Commuter Subsidy	166	178	24	20	$1,004,980	$2,119,335
E-Mobility	6	6	5	4	$444,403	$707,940
Electric Forklift	6	34	30	2	$316,370	$774,755
Infrastructure	15	15	NC	NC	$2,931,913	$0
Light and Medium Duty	28	161	<1	<1	$323,000	$1,333,515
Locomotive	4	24	570	29	$6,354,857	$1,957,515
Off-Road Heavy Duty	467	977	5,926	334	$32,818,894	$8,883,634
Off-Road Forklift	1	5	13	NC	$32,625	$84,045
On-Road Heavy Duty	234	1306	4,683	6	$29,318,751	$381,321,013
On-Road Heavy Duty Prop1B	34	76	712	NC	$3,350,000	$5,414,917
On-Road Heavy Duty VIP	3	3	NC	NC	$95,000	$272,952
School Bus Replacement	43	114	NC	NC	$15,658,673	$1,659,008
School Bus Retrofit	54	398	NC	NC	$4,538,868	$0
Truck Electrification	1	202	2,634	NC	$1,795,000	$2,775,778
Wood Stove Change Out	167	167	NC	NC	$148,500	$410,743
Totals	**3,609**	**9,616**	**58,620**	**2,368**	**$193,077,257**	**$440,958,268**

NC – not calculated

Table 5-2 itemizes the total funding received each year from 1998 through 2009 and the associated surplus emissions reductions each year.

Table 5-2 Total Annual Incentive Funding 1998 - 2009

Year	Total Grant	# of Projects	NOx (tons)	VOC (tons)
1998	$932,367	9	173	NC
1999	$4,606,091	95	3198	NC
2000	$4,869,698	159	3427	NC
2001	$13,926,978	447	7148	NC
2002	$12,813,174	398	4656	NC
2003	$10,018,459	309	5769	NC
2004	$11,718,105	284	8189	NC
2005	$13,305,269	287	5188	60
2006	$43,168,868	466	6626	557
2007	$35,106,298	340	5914	617
2008	$30,177,927	459	5183	774
2009	$12,434,023	356	3149	360
Totals	**$193,077,257**	**3,609**	**58,620**	**2,368**

NC – Not calculated

In addition to applying for various funding sources, the District is working with ARB to make the Carl Moyer Program and the Prop 1B programs more flexible and streamlined to attract a greater pool of potential projects to fund. Over the last few years, ARB has adopted new rules and regulations that require emission reductions from sources that participate in the District's incentive programs. As these sources approach compliance deadlines, the opportunities for awarding incentive funds for these projects become reduced. The District and ARB are committed to work within the framework of these regulations to identify opportunities for continued funding. In addition, the District is working with ARB staff to identify sources and project types for funding consideration.

5.2 Incentive Programs in Development

In light of past successes and the ongoing need for additional emissions reductions, the District continues to develop new avenues for incentive funding opportunities. The following programs are currently in development:

5.2.1 Technology Advancement Program (TAP)

In addition to the traditional incentive programs that have been implemented, the District's Governing Board recently adopted the Technology Advancement Program (TAP). The primary goal of TAP is to advance technology and accelerate the accessibility of innovations that will bring about emission reductions as rapidly as practicable. This innovative strategy is discussed more fully in Section 6, but includes the procurement of incentive funding for research and new technology development. The

program will position the District to identify and seek out its fair share of funding to overcome the barriers to technology adoption for areas of specific need in the Valley.

5.2.2 Air Quality Action Center for Technology & Innovation for the Valley

The District, in collaboration with Valley Universities, will establish the Air Quality Action Center for Technology and Innovation for the Valley (AQ-ACTIV). This will provide the District the opportunity to leverage available resources to build regional capacity for research, technology demonstration projects, and expended emissions measurement and testing in the Valley.

5.2.3 Energy Efficiency Funding Opportunities

The District's Fast Track Action Plan, which is discussed further in Section 6, identified energy efficiency and conservation as an important component in reducing emissions necessary to reach attainment of the Federal ozone NAAQS. The District has applied for State and Federal grants related to energy efficiency and will be providing the lead role in the implementation of the California Energy Commission's (CEC) Small Jurisdiction Energy Efficiency and Conservation Block Grant Program (EECBG). The EECBG will provide approximately $4 million to small cities and counties throughout the Valley for energy efficiency retrofit projects in jurisdictional facilities. Such projects include lighting replacements to energy efficient compact fluorescent bulbs, LED street light retrofits, heating ventilation and air conditioning system upgrades, and motor and pump replacements to newer high-efficiency models.

5.2.4 Other State & Federal Funding Opportunities

The District has taken the lead in preparing a number of regional and large-scale grant applications that will benefit air quality in the hopes of bringing much-needed funds into the Valley. Most recently, the District has received funding from AB 118 for the Lawn and Garden Equipment Replacement Program, the Statewide Zero-Emission All-Terrain Agricultural Utility Vehicle Incentive Program, and funding made available through the Diesel Emissions Reduction Act (DERA). DERA will fund projects such as school bus replacement and retrofit, agricultural irrigation pump repowers, and the on-road heavy duty truck selective catalytic reduction (SCR) technology demonstration project. The District has also applied for funding through the Department of Energy (DOE), including funding available through the American Recovery and Reinvestment Act, the EPA's Climate Showcase funding opportunity, and DERA Heavy-Duty On-Road replacements.

The District has also worked partnered with the Natural Resources Conservation Service (NRCS) to increase funding opportunities for Valley farmers. The Environmental Quality Incentives Program (EQIP) provides a voluntary conservation program for agricultural sources to promote agricultural production and environmental quality as compatible goals. EQIP offers financial and technical assistance to eligible participants to install or implement conservation management practices. Funding provided by EQIP goes towards the following programs:

- Replacement of diesel internal combustion engines;
- Conservation tillage;
- Dust control on unpaved roads;

- Smoke reduction by chipping and removing orchard and vineyard prunings;
- Dairy waste utilization;
- Precision pesticide spray technology; and
- Establishment of windbreaks around confined animal facilities

Those who engage in livestock or agricultural production are eligible to participate in the EQIP. NRCS offers contracts based on the effectiveness of the practice and overall benefit to air quality and the environment in the form of incentive payments and cost-shares of 50 percent of the overall cost to implement the proposed conservation practice. From 1998 through 2008, EQIP is responsible for $65.2 million used to combat air pollution, with half the funding provided by EQIP and half contributed by local farmers and ranchers. The District worked with the NRCS, using approximately $3 million in District funds, to help fund tractor replacements for Valley farmers. The District will continue to engage the NRCS in future funding opportunities.

The District is currently seeking funding from the EPA's Targeted Air Shed Grant Program, which assists local, state, and tribal air control agencies in developing plans, conducting demonstrations, and implementing projects that reduce air pollution in the most polluted nonattainment areas. The District falls within EPA's designation in this regard for both ozone and PM2.5.

5.3 State Implementation Plan Creditability for Incentive Programs

Current federal policy limits the use of incentive-based emissions reductions to meet CAA goals in air quality plans. Projects in this category usually involve sources outside the District's regulatory authority and generally focus on reductions above and beyond those required by rule or regulation. However, in order to meet the SIP reductions commitments as identified in the District's adopted air quality plans, some level of SIP creditability must be achieved for emissions attained through its incentive program. The District is working closely with the EPA to identify and implement procedures and protocols to ensure that emissions reductions will eventually be applied to the SIP. To that end, the District has established the framework for enforcement and accountability that will need to be in place to ensure success.

The District's incentive program infrastructure already has the core elements that contribute to the creditability of emission reductions in the SIP. These elements include increased post-project monitoring, verification of emission reductions and comparison with predicted reductions, real-time reporting of emission reductions with associated preparation of annual reports, and development of program elements such as protocols in a transparent and open process. The District has continued to create and implement incentive programs in a manner consistent with these principles. The majority of the District's incentive programs are funded by sources that establish program implementation guidelines that generally conform to these SIP-creditable principles.

5.4 Summary of Incentive Program Success

To date, the District has successfully reduced ozone precursor emissions through its aggressive Emissions Reduction Incentive Program. Over the twelve years of active incentive program implementation NOx and VOC emissions have been reduced by 58,620 tons and 2,368 tons, respectively. In addition to the emissions saved, the District was successful in bringing more than $193 million in grant funding into the Valley to support not only the emissions reductions, but also the regional economy.

The District is committed to making the air quality goals of *2007 Ozone Plan* attainable by aggressively seeking additional funding sources and modifying current incentive programs to improve efficiency, streamline grant processes, and increase applicant participation.

The District's incentive programs have not only proven to be a highly cost-effective method for improving Valley air quality, but have become a model for incentive programs throughout the state. In recent state audits, which included the Bureau of State Audits, ARB Carl Moyer Program, and State Department of Finance, the District was noted for its efficient, robust, and effective use of incentive grant funds in reducing air pollution. Because of this recognition, numerous other California air districts have approached the District to either assist with incentive fund administration or to accept their unused funds as an alternative to returning funds to the State. Most recently, the District has successfully partnered with the Great Basin, Kern County, Antelope Valley, Mojave Desert, Mariposa County, and Calaveras County air districts.

Section 6 - Innovative Strategies

The District's ability to develop stringent, yet economically feasible stationary source regulations and secure much-needed incentive and grant funding for air quality benefits is second only to its ability to successfully utilize and develop innovative strategies to maximize emissions reductions across all sectors of the Valley. This component of the District's multi-faceted approach toward the attainment of federal health standards has become a critical means to achieve potential "black box" reductions. These innovative strategies are designed to enlist the public, local governments, businesses, and industry as willing contributors to a successful clean air strategy.

To date, the implementation of such innovative strategies has led to increased public awareness of air quality issues, increased public participation towards air pollution solutions, and improvement in air quality in the Valley. This broad spectrum of involvement will be critical in helping the District reach attainment by the 2023 deadline.

6.1 Healthy Air Living

Healthy Air Living is a comprehensive, year-round outreach initiative that aims to improve the health and quality of life of all Valley residents through individual and collective strategies that reduce emissions. The goal is to create an environment where air quality becomes a priority in the decision making process and the day-to-day choices made by individuals and businesses. Healthy Air Living has become the District's hallmark program and now encompasses all regulatory and voluntary emission-reduction measures. The slogan, "Make One Change," and the colorful, distinctive Healthy Air Living logo brand all outreach materials and advertising.

Although only recently implemented, Healthy Air Living has already produced several high-profile, high-participation campaigns, including the Kids for Clean Air pledge card contest and an annual hybrid vehicle giveaway. The strategy of Healthy Air Living strategy is simple: give people the tools to make clean-air choices that work in their lives, and they will commit to healthier lifestyles. Healthy Air Living aims to reduce emissions through a variety of ways on both individual and organizational levels, including: reducing the number of vehicle miles traveled each day through the Valley; reducing emissions during peak smog episodes; reducing emissions created by equipment and processes; and encouraging higher energy efficiency and the development of cleaner energy sources.

6.2 Fast Track Measures

On June 21, 2007, the District Governing Board adopted a "dual path" strategy to attain the 8-hour ozone NAAQS as expeditiously as feasible. This strategy included the regulatory measures identified in the *2007 Ozone Plan* to satisfy legal mandates under

the CAA and a Fast Track Action Plan designed to be a dynamic non-regulatory air quality management strategy to capitalize on evolving technologies, market opportunities, and public funding mechanisms to accelerate attainment of the 8-hour NAAQS prior to the 2023 federal deadline.

The following sections describe the innovative strategies developed by the District to implement the Fast Track Action Plan.

6.2.1 Advanced Emission Reduction Options (AERO)

The District has imposed Reasonably Available Control Technology (RACT) and at least one generation of Best Available Retrofit Control Technology (BARCT) on virtually all of the stationary sources in the Valley. As the District continues to implement its clean air strategy, some industries have implemented fourth and fifth generations of BARCT. In developing the *2007 Ozone Plan*, District staff investigated every known source of emission reductions and proposed measures to pursue, including regulations to address mobile sources and another generation of regulatory controls on stationary sources.

Despite effective control measures for emissions reductions, including past, current, and proposed control measures, there remains a significant need for additional reductions. Attaining the 8-hour ozone standard requires emission reductions of approximately 75 percent from 2005 levels. Because of this need, the District has and will continue to seek to reduce emissions from source categories and industries that have been previously controlled, although continued generations of emissions from previously regulated sources are increasingly more expensive, thus less cost-effective.

The AERO program sets emission reduction goals for stationary sources based on advanced technologies, but also provides several options that operators could use to comply when unable to utilize such advanced technologies. The specified emission reduction options would include control of the subject equipment, mitigation fees, specified offsite reductions, and alternative onsite approaches. All of these options would be well in excess of previously established RACT and BARCT levels. Each option will have adequate provisions to ensure reductions are surplus, enforceable, quantifiable, and permanent. During each rulemaking project, District staff will determine if benefits could be achieved through AERO provisions being incorporated into the rule.

6.2.2 Alternative Energy

The use of alternative sources of energy reduces and slows the growth of NOx emissions from utility power generation. In real terms, the viability of alternative energy sources depends on the cost comparison to traditional energy sources, generally the combustion of fossil fuels. Potential alternative energy sources include, but are not limited to: landfill gas; VOC and methane from confined animal facilities; agricultural waste products such as prunings, rice stalks, and orchard removal materials; biosolids; VOC from oil and gas production plants and other industrial facilities that are incinerated using flares or thermal oxidizers; solar; and hydrogen fuel cells.

The District has developed resources to promote alternative sources of energy, supported efforts promoting alternative energy, and aligned the District programs with initiatives that promote alternative energy, including utilizing ERIP funding for alternative

fuel vehicles. Additionally, as part of the 2010 Legislative Platform the District committed to supporting legislation that provides additional biomass capacity utilizing agricultural materials and expanding net metering and feed in tariffs for the utilization of solar and other renewable sources of energy.

6.2.3 Energy Conservation

The District has taken several steps to increase energy efficiency that will specifically benefit the Valley through improved air quality and reduced energy costs. In addition to having energy efficiency listed as a priority on the District's 2010 Legislative Platform, the Governing Board approved the District's Regional Energy Efficiency Strategy (REES) in January 2010. The District's proactive role as a regional leader in energy efficiency will put the Valley in a position to participate in new state and federal initiatives and funding opportunities to bring additional resources to the District that will further reduce greenhouse gas emissions, NOx emissions and lead to improved air quality.

The REES is being implemented through a coordinated and collaborative process that engages regional partners and stakeholders, including potential recipients of proposed tools and programs. Towards that end, the District is working in a regional framework to: educate energy users as to the financial and air quality benefits of energy efficiency; identify regional barriers that have prevented maximum utilization of energy efficiency options in the past; work closely with San Joaquin Valley utilities, other public and nonprofit agencies, and local energy experts to leverage the maximum support, services, expertise, and funding for unlocking the energy efficiency potential; and develop a reliable and sustainable funding stream to incentivize energy efficiency and encourage development and utilization of new energy efficiency technologies.

Currently the District is serving as a role model for other entities by evaluating their own energy efficiency and conservation practices. Through the efforts of a District Energy Conservation Committee established to evaluate the internal energy policies and usage patterns, the District identified no-cost and low-cost energy conservation and waste minimization opportunities within its offices. Many of these measures can be readily applied to other businesses. The District is willing to share the lessons they have learned with other entities.

Preliminary calculations indicate that the District's efforts to reduce emissions through coordinated energy efficiency programs and activities throughout the Valley have the potential for reducing NOx emissions by as much 2.8 tons per day. This assumes that gross residential energy use can be reduced by an overall 20 percent and gross non-residential electricity use can be reduced by 15 percent. Complexities in the import and export of electricity across regional boundaries will affect the ultimate realized reductions. Achieving such gross reductions across all economic sectors will require and effective and coordinated regional effort, one which the District is prepared to facilitate.

6.2.4 Episodic & Regionally-Focused Controls

Advances in real-time air quality measurement and meteorological forecasting have made it possible to apply regulatory controls in a more focused manner. Examples of this concept include the District's Smoke Management Program and the "Check Before You Burn" Program that implements Rule 4901 (Wood Burning Fireplaces and Wood Burning

Heaters). Both programs use real-time meteorological measurements and emissions estimates to determine if next-day conditions are conducive to violations of ambient air quality standards. The District's forecasters prepare and issue forecasts that can result in episodic and county-specific prohibitions on prescribed burning, agricultural burning, and residential fireplace burning.

Banking on the success of these programs, the District believes that episodic and regionally focused controls could be used to "surgically" control emissions during the worst days of the ozone season. The District will consider episodic controls and regionally-focused controls during each rule development project in order to optimize the benefits of each measure. Some of the source categories that may also be evaluated for possible episodic/regional controls include: recreational vehicles, including dirt bikes and power boats; non-essential structural painting and related activities; non-essential through-truck traffic in urban areas; industrial activities amenable to postponement; diversion of heavy duty diesel truck traffic from Highway 99 to Interstate 5; and non-essential use of lawn care equipment.

6.2.5 Green Contracting

Green Contracting is a practice that may be used by public agencies to give preference points when awarding contracts to companies that use low-emission fleet vehicles and equipment, and to those that actively promote ridesharing programs. Contracts awarded to companies with "green" practices could also contain clauses that require participation in District Spare the Air activities. While the District does not have regulatory authority to require local government agencies to adopt these ordinances, many have done so voluntarily, and more might be inclined to do so if assistance was provided. To promote green contracting practices in the Valley, the District will:

- Develop a model resolution, or policy, and promote its adoption by cities and counties;
- Make Green Contracting an attractive option for contractors by awarding incentive funding for the retrofit of off-road construction equipment, vehicle fleets, and other equipment;
- Issue "Green Contractor Certification" to companies that fulfill minimum criteria, such as meeting advanced fleet standards; and
- Explore the possibility of increasing the District's mandate for requiring Green Contracting practices in public projects through legislative changes to public law.

6.2.6 Green Fleets

The goal of this Fast Track Measure is to encourage both private and public fleet turnover through incentives and state regulations. Adopting a green fleet program can have major benefits, including reduced operating costs, decreased greenhouse gas and criteria pollutant emissions, and improved organizational reputation. The District has achieved significant emissions reductions from encouraging fleet turnover through incentive funding. Emissions reductions from greening fleets are expected to continue in the next few years through Proposition 1B and other funding sources.

6.2.7 Heat Island Mitigation

The Heat Island Mitigation Fast Track Measure will encourage jurisdictions to adopt methods and practices that would reduce surface temperatures in urban areas. Emissions reductions will result from lower energy consumption and decreased temperatures will slow the formation of ozone from VOCs and NOx. To promote heat island mitigation measures, the District will:

- Develop a model resolution or policy for heat island mitigation and promote its adoption by cities and counties, including providing incentive funding to seed projects;
- Encourage practices conducive to heat island mitigations through informational educational opportunities and incentives;
- Include elements of heat island mitigation as a compliance option for facilities; and
- Support research that adds certainty to the emission reduction potential or benefits of heat island mitigation programs.

The District is currently working with the University of California at Davis on a project to assess the benefits of implementing heat island mitigation practices in Fresno.

6.2.8 High Speed Rail

In November 2008, Californians approved Proposition 1A, the *Safe, Reliable, High-Speed Train Bond Act*, to provide $9.95 billion in bonds (with federal and private matching funds required) to establish a high-speed train service linking Southern California, the Central Valley, and the San Francisco Bay Area. This project has the potential to dramatically reduce passenger car trips through the Valley, reduce emissions, and improve air quality. The California High Speed Rail Authority and partners are currently holding public meetings and workshops as they develop Environmental Impact Reports for each major section of the proposed railway.[8] District staff will continue to participate in many of the meetings and workshops.

6.2.9 Inland Ports and Short Sea Shipping

These two Fast Tracks initiatives could provide a very large emission reduction, but would require significant additional infrastructure, for which the District is actively lobbying for federal and state infrastructure funding. Additionally the District has facilitated meetings with Port of Oakland, Valley agricultural representatives, and other stakeholders to develop ideas for how to implement these two Fast Track initiatives.

Through the Fast Track process, the District has taken a leadership role, partnering with the Bay Area Air Quality Management District and the Ports of Stockton and Oakland, in pursuing a “marine highway” system to reduce truck and travel between the Valley and the Port of Oakland.

[8] The annual report for this project can be found at www.cahighspeedrail.ca.gov/news/CHSRAProgramSummaryReportJuly2009.pdf.

6.2.10 Truck Replacement/Retrofit

District staff, in coordination with an advisory committee, is currently working to use Proposition 1B funds to establish the most effective program to reduce emissions from heavy-duty diesel trucks driven in the Valley. The District is currently processing grants for truck replacements, repowers, and retrofits funded by the state's Proposition 1B Goods Movement Emission Reduction Program. Following the close of the Year 1 solicitation period (7/5/08-9/5/08), applications from more than 600 different applicants and for 2,800 trucks were received. Once District staff verified eligibility, the qualified trucks were ranked based on the anticipated emission reductions that would be achieved by truck replacement, retrofits, and repowers. Notices were sent to eligible truck owners informing them of their ranking on the list and prospects for funding. Staff processed awards for roughly 790 trucks with the first year's allocation of nearly $40 million and are gearing up to disburse approximately $92 million in grants in 2010.

6.3 Technology Advancement Program

The Technology Advancement Program (TAP) represents a strategic and comprehensive program to identify, solicit, and support technology advancement opportunities and represents a significant step forward in fulfilling the District's public health mission. The TAP's primary goal is to advance technology and accelerate the deployment of innovative clean air technologies that result in emissions reductions as rapidly as practicable. While the primary focus will be on NOx reductions, to maximize administrative efficiency and funding opportunities, the District will integrate when possible grant programs for greenhouse gases and criteria pollutant emissions reductions. The District will implement TAP through a coordinated and collaborative process that will engage technology developers and potential end-users as follows:

- Integrate of technology advancement goals into existing grant programs;
- Identify specific technology focus areas;
- Conduct comprehensive outreach;
- Review and obtain ongoing feedback on new technology concepts;
- Develop a competitive process for funding technology advancement projects;
- Partner with other agencies for regional and multi-agency efficiencies; and
- Build and expand local capacity for research and development in the Valley.

6.4 Other Public Education, Awareness & Information

The Outreach and Communications Division's mission is to further the District's goals of improving air quality and protecting public health through education, partnership, outreach and cooperation with the media, public, business, government, district employees and other stakeholders. To this end, this District Division leaves "no stone unturned" in taking every advantage to educate the public through public appearances and media events throughout the Valley. This commitment also comes through with every employee's interaction with the public in which every customer service interaction becomes an opportunity to share information about ways that every person in the Valley can participate in clean air practices.

6.5 Summary of Innovative Strategies

Most of the innovative strategies discussed in this chapter are not yet SIP creditable; however, maximizing their effectiveness is critical for meeting NAAQS ozone attainment by or before 2024. While emission reduction success from implementation of the *2004 Extreme Ozone Attainment Demonstration Plan* (*EOADP*) for the 1-hour ozone NAAQS primarily relied on more effective regulatory controls on stationary sources at the District level and mobile-source regulations at the state level, such regulatory controls have become increasingly expensive for the regulated source operators. The District's need for further reductions must be balanced with the economic sustainability of the Valley. For this reason, further emissions reductions will rely heavily on innovation strategies such as the ones described in this Section.

While implementing and fostering these activities is no trivial task on the part of the District in terms of time and commitment, they can be fairly easy to implement for the public sector if they have information and valuable decision-making tools. In fact, in many instances such as reducing energy use and reducing vehicle miles traveled, consumers can also reduce their costs – a "win-win" for the District and the Valley.

To maximize the potential for receiving "black box" emissions reductions, the District must undertake this deliberative and strategic approach that involves the public, educational institutions, private technology innovators, and state and federal agencies. Only through a comprehensive and well-documented accounting of attempts and successes will the District be able to access all available emissions reductions opportunities on the road to attainment of the 8-hour ozone NAAQS.

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Responsibility for implementing emission reduction measures does not rest solely on the District's shoulders, especially when it comes to emissions from mobile sources; rather it is shared between the District, the State Air Resources Board (ARB), other State agencies, the EPA, and local jurisdictions. Only through the coordinated efforts of all these agencies will the goals of adopted air quality plans be met. Because motor vehicles are the largest source of ozone precursor emissions in the Valley, the District is in active partnership with federal, state, and local agencies to minimize the impact of motor vehicles on air quality. Such a partnership is crucial in addressing the difficult challenge of balancing the need to provide increased mobility for the enhancement of the social and economic well being of the Valley, with the equally important goal of attaining healthy air quality for all the residents.

7.1 State & Federal Controls

At the state level, ARB is responsible for controlling emissions from: mobile sources and consumer products, except where federal law preempts ARB's authority; developing fuel specifications; establishing gasoline vapor recovery standards and certifying vapor recovery systems; providing technical support to the districts; and overseeing local air district compliance with State and federal law. The California Department of Pesticide Regulation is responsible for control of agricultural, commercial and structural pesticides, while the California Bureau of Automotive Repair runs the State's Smog Check programs to identify and repair polluting cars.

The District's *2007 Ozone Plan* identified ARB's statewide strategy to bring areas of the state into attainment of both the federal ozone and PM2.5 standards. In September 2007, ARB adopted the *2007 State Strategy* for the California State Implementation Plan (SIP), including specific reductions in the Valley from sources under ARB's regulatory authority. The total emissions reductions for the Valley include 76 tons per day of NOx and 23 tons per day of VOC in 2014, and 46 tons per day of NOx and 25 tons per day of VOC in 2023. The specific categories of adopted and proposed SIP measures, along with the implementing agency are identified in Table 7-1. In 2007 and 2008, ARB adopted rules for ten measures identified in the *2007 State Strategy*, representing 11 separate rulemakings.

Specific emissions reductions by DPR include a commitment to manage VOC emissions from commercial structural and agricultural pesticide use, to ensure that such emissions do not exceed 18.1 tons per day in the Valley. DPR further committed to implement restrictions on agricultural fumigation methods and non-fumigant pesticides. In typical years, DPR estimates that such restrictions will reduce pesticide VOC emissions by 1.5 tons per day and 1.0 tons per day, respectively. In years of unusually high fumigant pesticide use, this measure will help ensure that the inventory target of 18.1 tons per day is not exceeded.

ARB's proposed new SIP measures also include emissions reductions through rules implemented by the BAR, specifically, the development and implementation of

enhancements to California's Smog Check Program. To date, these include the addition of diesel vehicles to the inspection program through state legislation (AB 1488) in 2007, the authority to conduct visible smoke tests (AB 1870) in 2006. BAR regulations in progress will increase the stringency of tests by setting lower cut points used make the initial vehicle pass/fail determination in Smog Check test.

Table 7-1 Proposed New SIP Measures from California State Strategy

Proposed New SIP Measures	Implementing Agency	Expected Action	Expected Implementation
Passenger Vehicles			
Smog Check Improvements*	BAR	2007-2008	By 2010
Expanded Vehicle Retirement	ARB/BAR	2008-2014	2008-2014
Modifications to Reformulated Gasoline Program*	ARB	2007	Phase-in starting 2010
Trucks			
Cleaner In-Use Heavy-Duty Trucks*	ARB	2008	2010-2015
Goods Movement Sources			
Auxiliary Ship Engine Cold Ironing and Other Clean Technology*	EPA/ARB/ Local	2007-2008	Phase-in starting 2010
Cleaner Main Ship Engines and Fuel*	EPA/ARB Local	Fuel: 2007	2007-2010
		Engines: 2009	Phase-in starting 2010
Port Truck Modernization*	ARB/Local	2007-2008	2008-2020
Accelerated Introduction of Cleaner Line-Haul Locomotives*	EPA/ARB	2007-2008	Starting in 2012
Clean Up Existing Harbor Craft*	ARB	2007	2009-2018
Off-Road Equipment			
Cleaner In-Use Off-Road Equipment*	ARB	2007	Phase-in starting 2008
Cleaner In-Use Agricultural Equipment	ARB	2009	Phase-in starting 2014
Other Off-Road Sources			
New Emission Standards for Recreational Boats	ARB	2009-2010	2012-2013
Expanded Off-Road Recreational Vehicle Emission Standards	ARB	By 2010	2012-2015
Enhanced Vapor Recovery for Above Ground Storage Tanks*	ARB	2007	Phase-in starting 2008
Additional Evaporative Emission Standards*	ARB	By 2010	2010-2012
AREAWIDE SOURCES			
Consumer Products Program*	ARB	2007-2008	By 2010
		2010-2012	By 2012-2014
DPR Pesticide Regulation*	DPR	2008	2008

DAR = Department of Pesticide Regulation. BAR = Bureau of Automotive Repair.
* Adopted either in part of in full
Further information regarding the 2007 State Strategy is available at http://www.arb.ca.gov/planning/sip/2007sip/2007sip.htm

As EPA strengthens the NAAQS, new federal regulations are being developed to assist air districts in reaching attainment. Upcoming or recently adopted regulations will limit emissions from federally controlled sources such as marine vessels, aircraft, locomotives, and automotive fuel.

7.2 Local Government Commitments & Achievements

Local governments also play a significant role in air quality improvements, given that vehicular movement, and associated emissions, to some degree, is within the control of the jurisdiction through development and transportation policies and codes. Federal and state legislation affect all levels of local government through transportation planning and funding. The District works closely with the Metropolitan Planning Organizations (MPOs) for all matters that pertain to transportation and air quality. Such coordination is critical for ensuring that air quality plan goals are attained.

7.2.1 Regional Transportation Plans

At the county level, the Metropolitan Planning Organizations (MPOs), representing the eight counties in the Valley, work in concert with their numerous municipalities, unincorporated areas, public interest groups, the District, and state and federal agencies to develop and maintain regional transportation plans (RTPs) that maximize efficient regional mobility and minimize unnecessary ozone precursor emissions consistent with emissions budgets established in the SIP. Such regional emissions budgets serve as regulatory limits for on-road mobile source emissions. As a condition to receive federal transportation funding, transportation plans, programs, and projects are required to meet those emission budgets through strategies that increase the efficiency of the transportation system and reduce motor vehicle use.

Transportation plans and programs within the Valley are also required to conform to air quality plans in the region, as established by the CAA and reinforced by the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). District staff review transportation plans and plan amendments to ensure such conformity. While Valley MPOs have limited legal authority to implement emission reduction measures, their status as Regional Transportation Planning Agencies places them in a position to help coordinate and facilitate consensus among their member jurisdictions, which do have authority to implement local measures.

7.2.2 Conformity Budgets

Section 176(c) of the CAA outlines its conformity provision. Federal actions are required to conform to the SIP's purpose of eliminating or reducing the severity and number of exceedances of the NAAQS and achieving expeditious attainment of these standards. The CAA distinguishes transportation actions, or those actions undertaken by the Federal Highway Administration (FHWA) or the Federal Transit Administration (FTA), from all other federal actions. MPOs must make findings that RTPs and transportation improvement programs (TIPs) conform to the SIP and submit such findings to the FHWA and FTA for approval. The conformity finding must demonstrate that the emissions associated with the RTP and TIP do not exceed "emission budgets" that are contained in the SIP. The District's *2007 Ozone Plan* established subarea emissions budgets for each county for VOC and NOx for 2011, 2014, 2017. On January 22, 2009, these budgets were found adequate by the U.S. EPA and published in the Federal Register.

Both District and ARB control measures included in the *2007 Ozone Plan* that affect on-road mobile sources have been included in the conformity emission budgets. These county-level emissions are shown in Table 7-2. District controls include: 1) Existing

Indirect Source Mitigation and School Bus Fleets rules; and 2) Rule 9410 – Employer-based Trip Reduction. ARB controls include: 1) Existing Reflash, Idling, and Carl Moyer Program emissions reductions; and 2) Proposed passenger vehicle and truck measures included in the Draft State Strategy, as shown in Table 7-1.

Table 7-2 Transportation Conformity Budgets[1]

County	2008		2011		2014		2017		2020		2023	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
San Joaquin	13.9	40.0	12.1	34.7	10.1	27.8	8.6	21.3	6.3	12.7	6.3	11.9
Stanislaus	10.5	26.7	9.0	22.3	7.5	17.2	6.5	13.4	4.9	8.0	4.6	7.1
Merced	7.4	35.5	6.2	28.8	5.1	22.3	4.2	17.1	2.9	9.9	2.8	9.0
Madera	4.4	14.6	3.1	12.2	3.1	9.7	2.6	7.7	1.9	4.8	1.9	4.5
Fresno	18.6	58.5	15.5	47.9	12.9	37.2	11.1	29.1	8.0	16.9	7.8	15.7
Tulare	10.5	23.4	9.2	20.9	7.7	16.6	6.7	13.1	5.2	8.4	4.8	7.4
Kings	3.9	18.3	3.4	15.9	2.8	12.3	2.3	9.4	1.7	5.3	1.6	4.7
Kern (SJV)	18.1	93.9	15.7	79.4	13.5	64.1	11.6	49.5	8.5	28.4	8.1	24.8

[1] All emissions are expressed as summer tons/day, and were derived using EMFAC2007 (November 1, 2007) with updated vehicle population and vehicle miles traveled data where available. The budget was established by taking the EMFAC results, subtracting by County, emission reductions from District and ARB control measures and rounding up to the nearest tenth if the hundredths place was "1" or higher. See Appendix C for detailed documentation supporting the conformity emission budget development.

The MPOs and their member jurisdictions have adopted Reasonably Available Control Measures (RACM) affecting motor vehicle use in the Valley. Three sets of RACM have been adopted in the past five years for the following District-adopted air quality plans: (1) The *2002/2005 Amended Rate of Progress Plan for San Joaquin Valley Ozone;* (2) The *Amended 2003 PM10 Plan (as amended on December 20, 2003);* and (3*)* The *2004 EOADP.* The transportation RACM for the *2003 PM10 Plan* provide for the reduction of NOx and implementation of these measures is underway. For the *2007 Ozone Plan*, the Valley MPOs drafted the local RACM approach and documentation regarding such implementation has been transmitted for interagency consultation. Additionally, the District reviews all applicable city and county plan updates, RTP amendments, FTIP amendments, and hot-spot analyses to ensure that they conform with District plans.

7.2.3 Congestion Mitigation Air Quality (CMAQ) Program

The MPOs administer the CMAQ program. The purpose of the CMAQ program is to fund transportation projects or programs that will contribute to attainment or maintenance of the NAAQS for ozone, carbon monoxide (CO), and PM. While all CMAQ funding must go to transportation-related projects that demonstrate an air quality benefit, the eight Valley MPOs currently have different criteria and processes for allocating funding to eligible jurisdictions.

In addition to the local RACM approach, the Valley MPOs are voluntarily developing a standardized process across the Valley for distributing 20 percent of the CMAQ funds to projects that meet a minimum cost-effectiveness beginning in FY2011. This policy will focus on achieving the most cost-effective emission reductions, while maintaining flexibility to meet local needs. The policy is scheduled to be implemented in FY 2011 because the current federally approved 2007 Federal Transportation Improvement

Programs (FTIPs) have committed CMAQ funds through FY 2009 and in some cases, regional commitments continue through FY 2010. In addition, the current CMAQ programming assists in implementing approved local RACM (Amended 2003 PM-10 Plan) that are currently committed through 2010. Due to changes in project costs and technology over time, the MPOs will revisit the minimum cost-effectiveness standard, as well as policy feasibility. A periodic review of the policy is necessary due to potential changes in federal transportation legislation, apportionments, and project eligibility.

7.3 Summary of Federal, State & Local Controls

In order to meet the 8-hour ozone NAAQS, consistent with the *2007 Ozone Plan,* the District requires the collaboration of federal, state, regional, and local agencies. In light of the fact that mobile source emissions make up majority of the Valley's ozone precursor inventory, significant dependence is place on those agencies that regulate, monitor and affect transportation and vehicular movement and operation.

Significant emissions reductions will be realized through future state regulations for cleaner in-use heavy-duty trucks and off-road equipment. Additionally, with anticipated growth in population and vehicle miles traveled, as shown in Section 2 of this review, working closely with the Valley MPOs and local jurisdictions will be critical for minimizing automobile emissions reductions.

Such significant anticipated emissions reductions from mobile sources support the District's analysis in Section 2 of this review, that there are still significant reductions to be had in the Valley, thus ensuring ozone attainment by or before the 2023 deadline.

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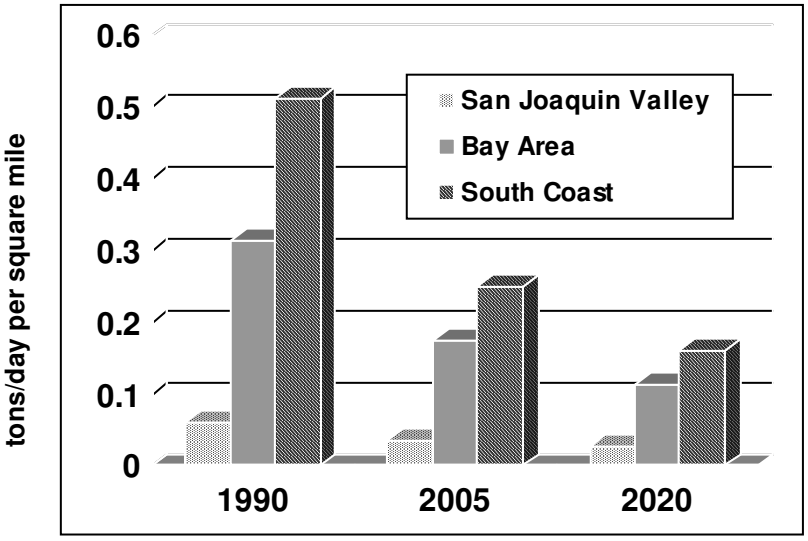
While the successes documented in this MCR are real and significant, the District's goal of reaching attainment with the ozone standards is far from over given its unique and immense challenges. These challenges include physical attributes that trap and encourage ozone formation, and limited regulatory jurisdiction. Reaching attainment of the 8-hour ozone health standard will require continued diligence in finding innovative ways to achieve further emissions reductions, such as the recently adopted Technology Advancement Program (TAP), a strategic and comprehensive program that will identify, solicit, and support technology advancement opportunities in the Valley. The District continues to adopt innovative control measures, and aggressively seek out additional grant funding for projects that reduce emissions.

8.1 Meteorological and Topographical Challenges

Central to the Valley's air quality challenge is its topography and meteorology. The horseshoe configuration of the surrounding mountains combined with persistently stagnant weather patterns and high summer-time temperatures lead to inversion layers that make the formation and minimal dispersion of ozone in the Valley inevitable. No other region in California faces such significant challenges, as illustrated by the fact, and shown in Figure 8-1, that the San Joaquin Valley has the lowest pollutant emissions per square mile compared to other regions in California with equivalent, or even better, annual air quality. In other words, to achieve the same level of air quality and health benefit, the Valley must achieve greater reductions than the San Francisco Bay Area and the Los Angeles Basin (South Coast).

Figure 8-1 VOC & NOx Emissions Concentration
(Based on ARB's 2006 Almanac)



8.2 Growth

The District has achieved success not only in reducing emissions from historical levels to help meet federal ozone standards, but has also developed a successful strategy to meet the challenge of emissions associated with future population and economic growth in the Valley. Several factors contribute to population growth in the Valley: a steady supply of agricultural jobs; migration from California coastal regions with significantly higher cost-of-living; and immigration of minority populations not only from Mexico, but Europe, the Middle East, and Asia.

As shown previously in Section 2.4, the Valley population has increased 26 percent since 1999, compared to a 16 percent increase for the entire state of California for the same 11-year time period, making it the fastest growing region in California. Likewise, the associated vehicle miles traveled (VMT) in the Valley increased at a higher rate than the state, 32 percent and 20 percent, respectively. ARB anticipates the growth in population to continue through 2020 at similar rates: 26 percent for the Valley and 13 percent for the state. Likewise, future VMT growth projections are 25 percent for the Valley and 15 percent for the state.

8.3 Goods Movement

The Valley is an integral link in goods movement for the railroad and trucking industries. Highway 99 and Interstate 5 are vital north-south transportation corridors that run through the middle of the Valley, linking northern California and the entire Pacific Northwest, with southern California, including Los Angeles, San Diego, and their associated ports. Highway 99, from Bakersfield to Stockton, carries more than one million vehicles per day; it is the backbone of the California goods movement infrastructure. The majority of these vehicles are not driven or operated by people or companies that reside in the Valley, nor do they spend the majority of their time in the Valley. This creates a significant challenge in reducing emissions from these vehicles. While the District does not have the regulatory authority over mobile source emissions, that authority belongs to ARB, the District does offer significant incentives through the Carl Moyer Program to heavy duty truck operators located in the Valley for cleaner diesel engines and technologies. Trucks that operate in multiple air districts, or even multiple states, are generally not eligible for such incentives because of cost-effectiveness criteria for District incentive funds; in other words, for incentive dollars to be spent, the majority of the emissions benefit must be realized within the Valley.

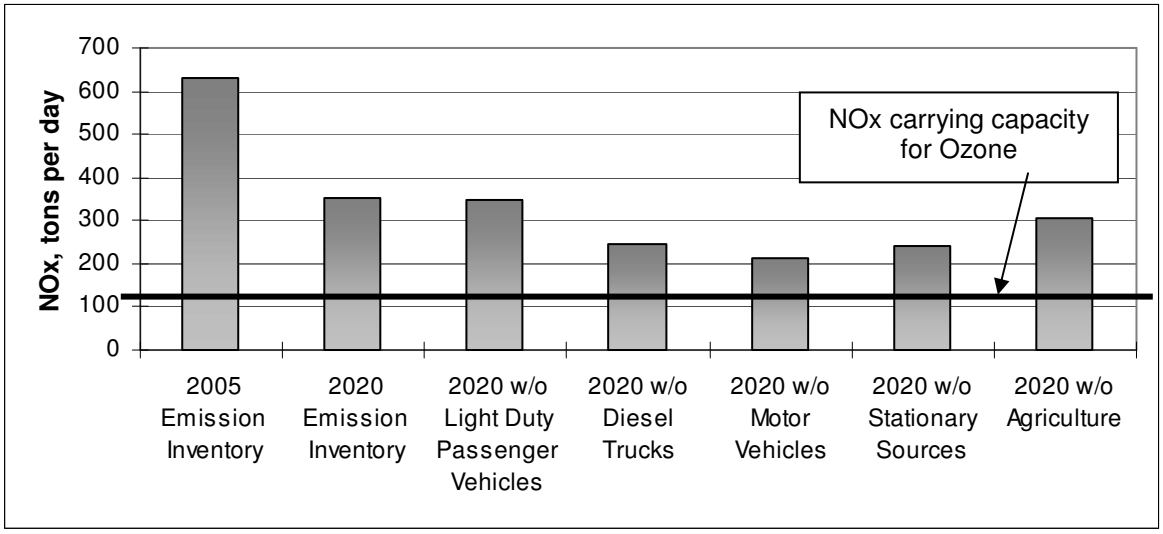
The District is also limited in its ability to reduce goods-movement-related emissions through transportation infrastructure improvements. Additional lanes on highly-traveled roads and traffic-light synchronization reduce idle times and keep traffic moving efficiently; however these solutions are beyond the regulatory authority of the District. Therefore, assistance from local transportation planning agencies, Cal-Trans, and the federal government is vital to reducing emissions from largest single source category of emissions in the Valley.

8.4 Legal Jurisdictions

The jurisdictional and regulatory boundaries assigned to governmental agencies tasked with the control of pollutant emissions require vigilant collaboration between such agencies; specifically, the District, EPA, the State, regional transportation planning agencies, and local jurisdictions. The EPA is responsible for regulating emissions from locomotives, aircrafts, heavy-duty trucks, and many off-road engines. ARB is responsible for regulating on-road motor vehicles, fuels, some off-road sources, and consumer products. Regional planning agencies and local jurisdictions have authority over transportation planning and land use. Together, the EPA, ARB, and the regional and local agencies have the authority to regulate or influence over 80 percent of the NOx emissions within the Valley.

While the District's regulatory authority is essentially limited to stationary sources and some area sources, which make up less than 20 percent of the NOx emissions in the Valley, it has the sole responsibility of designing a plan to achieve full attainment of the ozone NAAQS. The *2007 Ozone Plan* identified that a 75 percent reduction in NOx from 2005 levels was needed for the Valley to reach attainment of the 8-hour NAAQS. As shown in Figure 8-1, if the District eliminated ALL emissions from ALL sources within its regulatory authority, there would not be enough emissions reductions to meet the 8-hour ozone standard, thus attainment would not be achieved. For that matter, no single source elimination reduces the entire projected 2020 NOx emission inventory, although the unrealistic elimination of all light-duty passenger vehicles is close. This further emphasizes the necessity for collaboration between federal, state, and local agencies for the Valley to reach attainment.

Figure 8-2 How Difficult is Achieving the Valley's NOx Carrying Capacity for Ozone?



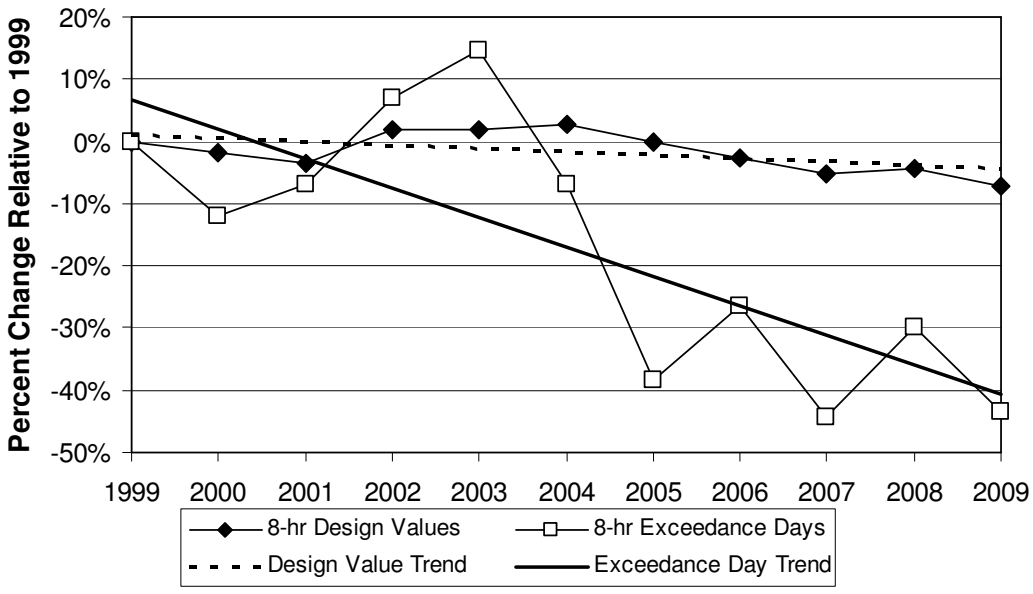
8.5 NAAQS Attainment and Design Values

Attainment of a NAAQS is reached when no air monitoring site within an air district accumulates over three exceedances of the standard in any year, for three consecutive years, irrespective of what the specific pollutant design value is for that year. While the

ozone design value represents a mathematically-determined pollutant concentration for a given year and is used as a national comparative standard, as overall air quality improves through reduced emissions, especially in the Valley, it is reflective more of unusual meteorological events that either increase the production of ozone or hinder its dispersion. The significant reduction of daily and annual emissions through regulatory and non-regulatory control measures implemented by the District and other agencies is reflected more in the rate of decrease in the number of exceedance days measured over the entire summer or ozone season and over the entire Valley air basin. This comparison is illustrated in Figure 8-3; while the Valley's design values have only decreased by seven percent since 1999, the number of exceedance days has decrease by 44 percent over the same time period. Because the Valley's published design value is dictated by the site with the highest ozone levels, perhaps over a short period of time, it is not reflective of the air quality of the entire Valley for the entire ozone season; routinely, site-specific design values are lower at certain monitoring sites.

It is difficult to extrapolate attainment using linear trends in decreasing design values given the disproportionate relevance of meteorology on annual design values as overall emissions levels decrease. However, site-specific design values are extremely valuable in another aspect of reaching attainment; as progress is made through the Valley-wide reduction in the number of exceedance days, the sites that are critical for reducing Valley-wide design values are emphasized. Site-specific design values can be traced back to localized ozone-level highs and it is the reduction of these highs that will help the District focus on overall attainment.

Figure 8-3 Relative Change in Valley 8-Hour Design Values & Exceedance Days



8.6 Conclusion

While there remain significant challenges in reaching attainment of the 1-hour and 8-hour ozone NAAQS, the past successes as shown in this MCR demonstrate the ability of the District to develop strategies to overcome such challenges. These successes have not been achieved in a vacuum, but through the collaboration and participation of Valley industries, citizens, local jurisdictions, and other governmental agencies. Such alliances and aggressive efforts will need to continue and be strengthened as the Valley seeks out technology advancements and innovative emissions reductions measures now and in the future.

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