

Clearing the Air

in the San Joaquin Valley



**Developing an Action Plan for
Regulators, Legislators, and the Public**



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Louise Wells Bedsworth

UNION OF CONCERNED SCIENTISTS

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Louise Wells Bedsworth is a Senior Analyst in the Union of Concerned Scientists Clean Vehicles program.

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ACRONYMS AND ABBREVIATIONS

AB	Assembly bill
Cal/EPA	California Environmental Protection Agency
CARB	California Air Resources Board
DRRP	Diesel Risk Reduction Plan
EPA	United States Environmental Protection Agency
NAAQS	National Ambient Air Quality Standard
NO _x	oxides of nitrogen
O ₃	ozone
PM-2.5	particulate matter less than 2.5 microns in diameter
PM-10	particulate matter less than 10 microns in diameter
ROG	reactive organic gases
SB	Senate bill
SJVAPCD	San Joaquin Valley Air Pollution Control District

Executive Summary

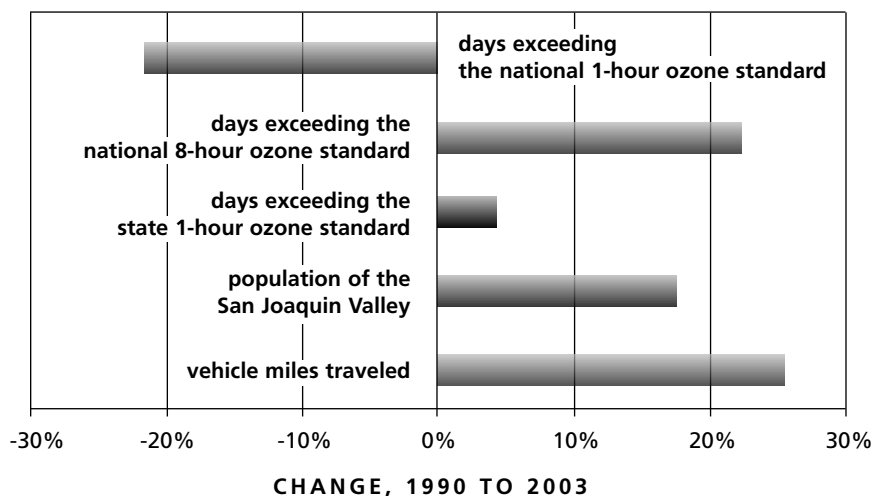
The San Joaquin Valley now officially shares the distinction of having the worst air quality in the nation with the Los Angeles region. Poor air quality is affecting the region's residents, public health, and the economy. Without further action, the problem will only get worse. The population of the region is growing more rapidly than in any other air basin in the state. This growth brings with it increases in vehicle miles traveled and urbanization, both of which counteract progress in emission reductions. As a result, the valley risks becoming the nation's dirtiest region. Strong action by local, state, and federal officials can put the San Joaquin Valley back on the road to clean air, but it will take a coordinated effort and strong leadership that has, to date, been lacking.

The Problem Is Not Going Away

The San Joaquin Valley air basin has been home to the highest population growth rate in the state and this trend is projected to continue. From 1990 to 2000, the population grew by almost 20% and daily vehicle miles traveled increased more than 25%. Over this time period, violations of the national 1-hour standard for ozone have decreased, but the number of days exceeding the state 1-hour and federal 8-hour standard has increased, as the figure shows.

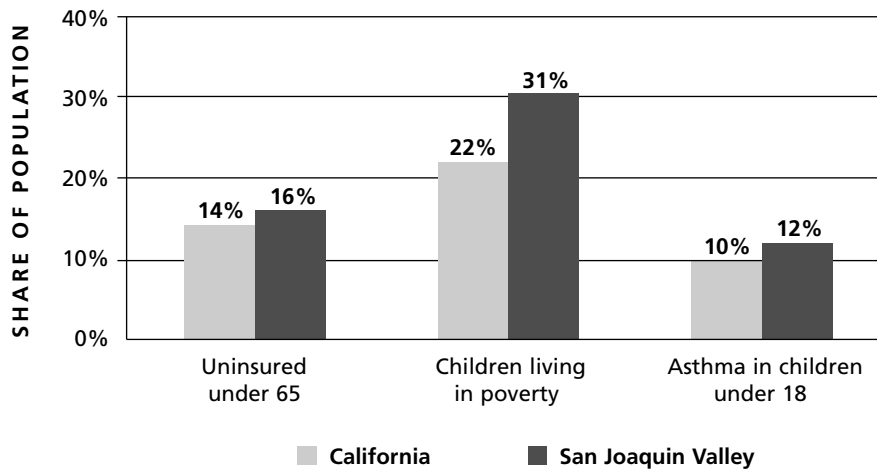
Population growth and its associated pressures are overtaking previous reductions in emissions from a variety of sources. The rate of reduction in days exceeding the federal 1-hour ozone standard has slowed in the past decade, and the decrease since 1990 is much less than has occurred in the

San Joaquin Valley changes, 1990 to 2003



Note: Population and VMT data for 1990 and 2000
 Source: CARB, 2004a

Various indicators comparing the San Joaquin Valley with California as a whole



Note: Data on insurance and asthma rates for 2001; data on poverty for 1999
Source: Porter et al., 2003

Los Angeles region. No downward trend is apparent in the number of days exceeding either the federal 8-hour or state 1-hour ozone standard, nor are the number of violations of the state and federal particulate matter standards decreasing. This is particularly troubling because projections show that the counties of the San Joaquin Valley are headed for some of the highest population growth rates in the state over the next 50 years.

Poor Air Quality Is Affecting the Region’s Residents and the Economy

Residents of the San Joaquin Valley are particularly vulnerable to the effects of air pollution. Rates of asthma, lack of insurance, and childhood poverty are higher in the region than in the state as a whole, as the figure above shows. Each is an indicator of vulnerability to environmental hazards such as air pollution. Fresno County, the location of the worst air quality in the region, is already home to the highest rate of childhood asthma in the state.

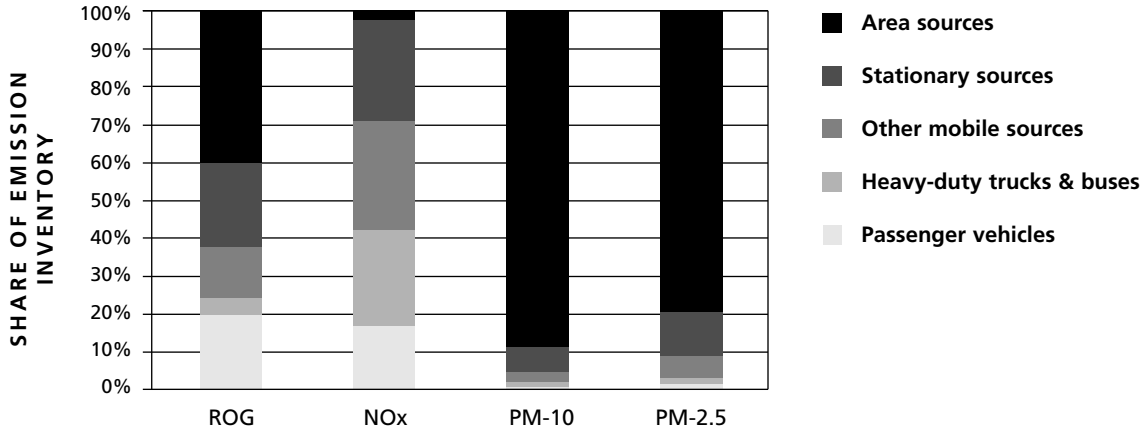
Poor air quality affects the region’s economic base: agriculture. In addition to generating

significant revenue in the region, employment in agriculture in the San Joaquin Valley is well above the state average. Air pollution damages crop quality and reduces yields. Polluted air from the region is also affecting downwind neighbors. Transport from the San Joaquin Valley is causing bad air quality in national parks and the Sierra Nevada Mountains.

New Emission Control Strategies Are Needed

The emissions that lead to the region’s air quality problem derive from several categories of sources, as the figure at the top of the next page shows. Reactive organic gases (ROG) and oxides of nitrogen (NOx) are the precursors to ozone pollution. Area sources, including farming operations and consumer products such as paints, are responsible for the largest portion of ROG emissions. Heavy-duty diesel trucks and buses and other mobile sources, including off-road diesel engines, are the principal contributors to NOx emissions. Particulate matter comes predominantly from area sources, including field preparation, road dust, and agricultural burning.

Inventory of emissions in the San Joaquin Valley, 2003



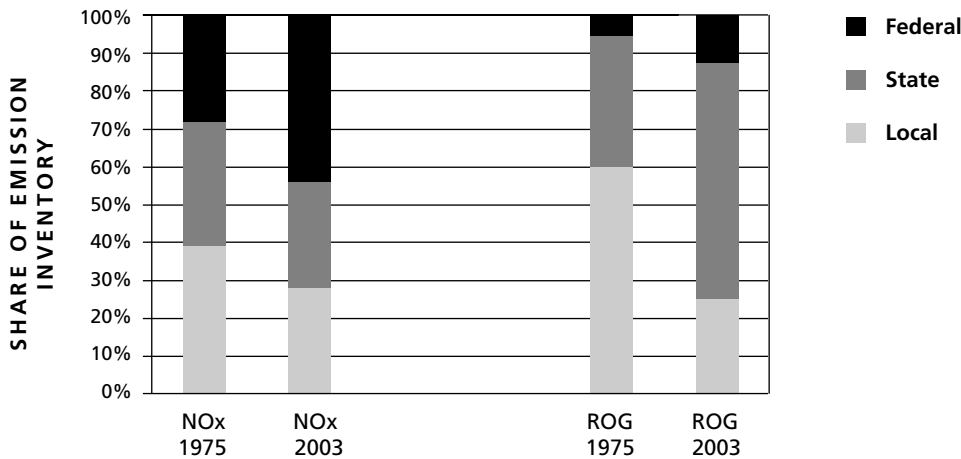
Source: CARB, 2004d

As the region has grown and emissions from local stationary sources of pollution have been controlled, the effects of increased population, vehicle miles traveled, and greater heavy duty truck travel have come to account for a larger share of the emission inventory. These sources, with their heavy contribution to ROG and NOx pollution, are outside the jurisdiction of the San Joaquin Valley Air Pollution Control District (SJVAPCD). As the figure

below shows, state and federal authorities are responsible for regulating a much larger portion of the emission inventory in 2003 than they were in 1975.

Projected growth in passenger and heavy-duty vehicle travel in the region will only exacerbate the valley’s air problem. This shift emphasizes the importance of putting pressure on state and federal regulators to reduce emissions from sources under their jurisdiction.

Inventory of emissions of ozone precursors by jurisdiction, 1975 and 2003



Source: Data from Carb, 2004a

The Work Is Just Beginning

Local, state, and federal regulators have displayed a pattern of neglect and inaction when it has come to taking adequate measures to improve air quality in the San Joaquin Valley. A series of lawsuits by medical, environmental, and community groups have documented a pattern of missed deadlines, inadequate filings, and neglect on the part of regulators. Recent legal victories have brought about some important changes, such as the regulation of agricultural sources of air pollution emissions.

Prompted by these legal victories and growing public concern about the region’s air quality problem, state legislators and state and local regulators have taken some steps to address the air quality problems in the San Joaquin Valley. Legislation has been drafted that targets sources of emissions that have not been regulated before, provides greater funding for air quality improvement programs, and improves the air quality planning process. The California Air Resources Board and SJVAPCD are implementing rules to control emissions from significant sources of pollution in the valley. But the work is just beginning.

The coming years will require coordinated actions on the part of local, state, and federal lawmakers and regulators to attain clean air standards. Over the coming year, the three top priorities for cleaning the air in the San Joaquin Valley should be:

1. Create more public accountability for the SJVAPCD by passing legislation to create seats for public members on the governing board
2. Establish a secure funding mechanism for clean air programs in the region through legislation and local programs, such as the indirect source mitigation fee program

3. Create an institutional mechanism, such as a regional transportation planning agency, to coordinate regional transportation and air quality planning

These priorities are part of a comprehensive air quality action plan (detailed in the table below) that calls for actions on the part of state lawmakers and regulators as well as local elected officials and regulators. Combined with an active and engaged public, this action plan should put the valley on the road to cleaner air.

An Air Quality Action Plan for the San Joaquin Valley

State Legislature

Pass legislation to create three public seats on the governing board of the SJVAPCD.

Establish fee mechanisms to secure funding for air quality improvement programs.

Pass legislation to enable control of emissions from sources outside of the SJVAPCD’s jurisdiction.

California Air Resource Board

Develop and implement strong emission control regulations under the Diesel Risk Reduction Plan, in particular regulations for on- and off-road fleets and locomotives.

Continue to develop new stringent regulations for passenger vehicles, including tighter tailpipe standards and continued updates of the zero emission vehicle program.

Implement on- and off-road diesel emission rules and ensure appropriate monitoring and compliance.

Develop and implement strong regulations to limit greenhouse gas emissions from passenger vehicles sold in the state, including aggressive future regulatory updates.

SJVAPCD and other local officials

Develop and implement an effective, comprehensive, and stringent indirect source mitigation fee program.

Coordinate land use, transportation, and air quality planning through a regional institution.

Improve outreach to the public and seek public input on rule development.

CHAPTER 1

Introduction

The valley has the raw potential, if the issue is neglected, to produce a smog problem that rivals that of the Los Angeles area in severity. That kind of air quality is obviously unacceptable.

—JANANNE SHARPLESS, CARB CHAIR, 1989

Unfortunately, the prediction quoted above has been realized. The San Joaquin Valley now shares the distinction of having the worst air quality in the nation. In 2003, the region was classified as extreme nonattainment for the 1-hour national ambient air quality standard for ozone, a classification long held by Los Angeles alone. And, since 1999, the San Joaquin Valley has had more days above the new, more protective 8-hour national air quality standard for ozone than any other part of the nation. In addition, the region is struggling with particulate matter pollution that violates both state and federal standards.

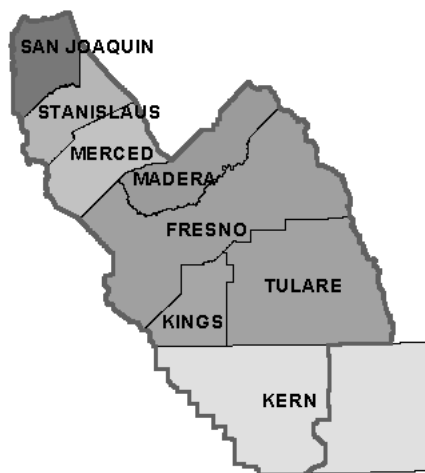
Several important questions lurk behind this cloud of pollution. First, how did the San Joaquin Valley, California's agricultural heartland, get to this point? Second, what is being done now to help the region get on the road to cleaner air? Finally, what more needs to be done to clear the air in the valley? This report provides partial answers to these complex questions. It begins with an introduction to the San Joaquin Valley and its air quality problems. The second chapter provides background on the effects and sources of air pollution, and the state and national regulations governing air quality. The third chapter analyzes recent state and local

efforts to improve air quality. The final chapter discusses further actions the state legislature, state and local regulators, and the citizens of the valley need to take. It also provides information about how to become more involved in improving air quality.

The San Joaquin Valley

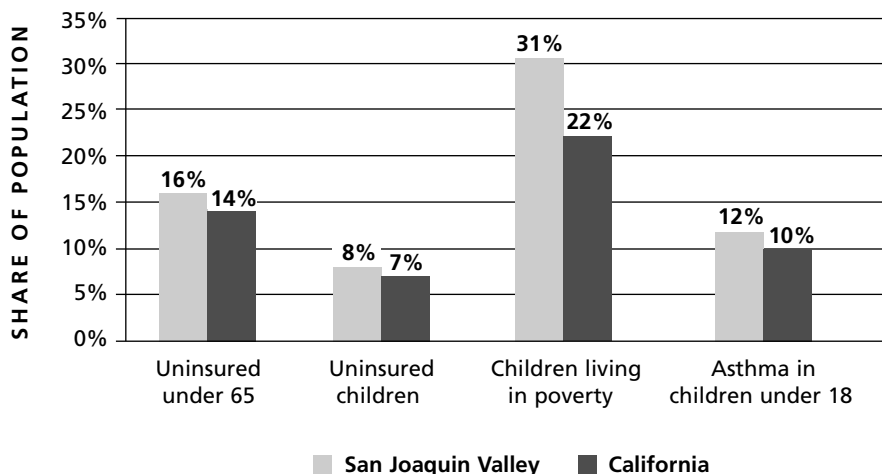
The San Joaquin Valley is made up of the eight counties (Figure 1) that form the southern portion of California's Great Central Valley: San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern. The San Joaquin Valley air basin includes all eight counties, with the exception of the eastern portion of Kern County, which is in a separate air basin because of the natural separation created by the Tehachapi Mountains. (The dark line on the map delineates the boundaries of the air basin.)

Figure 1. The San Joaquin Valley air basin



Source: CARB website

Figure 2. Indicators of well-being for the San Joaquin Valley compared with California as a whole



Sources: Porter et al., 2003; Meng et al., 2003

Mountains surround the valley on the east, west, and south. The Sacramento region lies to the north and the San Francisco Bay area to the northwest. The valley's geography is one key to its agricultural success, but that geography is its downfall when it comes to air quality. The ring of mountains creates a bowl that traps pollution.

The valley's topography can also send the trapped pollution into a circular wind pattern, called an eddy. Under certain conditions in the evenings, winds blow south along the western side of the valley, but they cannot flow out the southern end because the air has cooled and sunk below the top of the mountains. Blocked, the wind flows north up the eastern side of the valley, forming a counterclockwise eddy over the Fresno-Clovis metropolitan area. Thus the Fresno eddy carries polluted air in a circle around the region; new emissions are added daily, leading to a buildup of pollution over the Fresno metropolitan area (SJVAPCD, 2002).

Geography is not the only challenge to healthy air quality in the San Joaquin Valley. From 1980 to 2000, population in the San Joaquin Valley air basin

grew by 60%, outstripping the pace in other California air basins. The added population brought with it a 150% increase in daily vehicle miles traveled (VMT) (CARB, 2004a). These trends are likely to continue, as population in the entire Central Valley, which includes the San Joaquin and Sacramento valleys, and is expected to double over the next 40 years (Great Valley Center, 2001).

Not surprisingly, undeveloped land, open space, and farmland are being rapidly converted into urban space. Prime agricultural land has suffered the greatest loss to development (Great Valley Center, 2001). With increased urbanization, the San Joaquin Valley has also become an attractive area for business development. One example is the growth of warehouse facilities to store and distribute goods brought in through California ports up and down the West Coast (Hesse, 2002). Such development is seen as economic opportunity in the face of the valley's declining agricultural employment (Collaborative Economics and Great Valley Center, 2000). However, along with economic opportunity, these facilities bring an increase in truck travel and associated emissions.

Valley residents are particularly vulnerable to this increasing air pollution, as Figure 2 shows. Sixteen percent of San Joaquin Valley residents under 65 are uninsured, well above uninsured rates in the San Francisco Bay Area (9%) or Sacramento (9%) (Porter et al., 2003). A higher percentage of the valley's children live in poverty than in California as a whole. Poverty has been linked to higher risk due to exposure to environmental hazards and can be an indicator of poor access to health care (Porter et al., 2003). Incidence of asthma in children under 18 years old is much higher in the San Joaquin Valley than in the state as a whole, as Figure 2 shows. Fresno County has the highest rate of asthma among children under 18 in the state: 16.4% (Meng et al., 2003).

How the San Joaquin Valley Stacks Up

Recently the San Joaquin Valley has, as noted above, joined the Los Angeles area (the South Coast air basin.¹) in the dubious distinction of having the worst ozone air pollution in the country. In fact,

the San Joaquin Valley's ozone problem is by some measures worse than that of its southern neighbor. The South Coast continues to reach higher 1-hour peak ozone concentrations than the San Joaquin Valley, but for the last five years (1999–2003), the valley has exceeded the new, more protective 8-hour ozone standard on more days than has the South Coast air basin (CARB, 2004a). This new standard measures ozone concentrations over eight hours rather than one, reflecting new scientific understanding that long-term exposure to ozone pollution poses a greater threat to public health than acute exposure (Cal/EPA, 2004).

Since 1980, growth in the San Joaquin Valley has outpaced Los Angeles, with population and vehicle miles traveled increasing at a faster rate in the valley. Since 1990, the San Joaquin Valley has seen a small decrease in the number of days on which ozone levels exceeded the federal 1-hour standard (an 18% decrease), while the South Coast has seen a much larger decrease (51%). Other key air quality indicators have also decreased in the

Table 1. Air quality indicators in the South Coast and San Joaquin Valley

	South Coast Air Basin	San Joaquin Valley Air Basin
Peak 1-hour ozone (ppm), 2003	0.178	0.151
Days over 1-hour state standard, 2003	125	137
Days over 1-hour national standard, 2003	64	37
Days over 8-hour national standard, 2003	109	134
Decrease in days over 1-hour national standard, 1990 to 2003	51%	18%
Population, 2000	14,654,200	3,210,800
Area (mi ²)	6,480	23,490
Population increase, 1980 to 2000	38%	62%
Daily VMT increase, 1980 to 2000	100%	146%

Source: Data from CARB, 2004a

¹ The South Coast air basin includes Los Angeles, Orange, and portions of Riverside and San Bernardino Counties.

South Coast, such as the number of days over the state 1-hour ozone standard and the number of days over the federal 8-hour standard. But in the San Joaquin Valley similar measures have increased.

As severe as the valley's air pollution is now, it has the potential to get much worse. The population of the San Joaquin Valley (3,210,800 in 2000) is less than a quarter that of the Los Angeles area (14,654,200 in 2000). And the San Joaquin Valley air basin (23,490 mi²) covers over 3.5 times the area of the South Coast air basin (6,480 mi²) (CARB, 2004). Given this low population density, the region is projected to grow rapidly over the next 50 years. Population in every county in the San Joaquin Valley is projected to more than double by 2050, with the population of the region as a whole projected to increase almost 140% (California Department of Finance, 2004).² Unless action is taken, this rapid growth will compound future pollution problems.

A Pattern of Neglect

The region's air quality problems are not news. CARB recognized the air quality challenges facing the San Joaquin Valley in the 1980s. A 1989 report cited growth as the most important factor in the region's air quality and called for

1. Considering the combined effect of individual sources of air pollution
2. Becoming aware of the valleywide impact of urban and industrial development
3. Making land-use decisions favorable to air quality

The San Joaquin Valley, CARB stated, had an opportunity to make decisions that would allow it

to sidestep the severe air pollution that plagues Los Angeles and other urban areas (CARB, 1989).

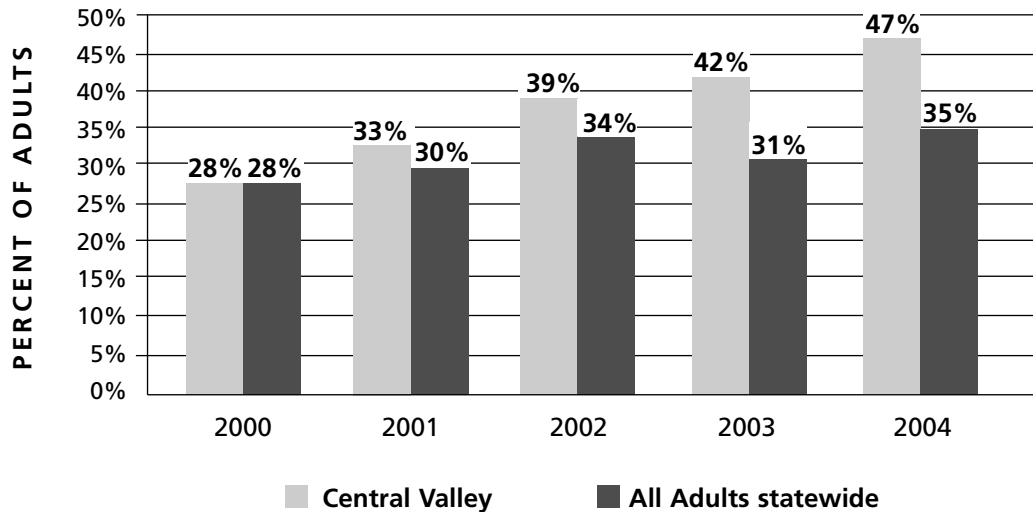
Unfortunately, this opportunity was not seized upon by local, state, or federal regulators. When the Clean Air Act Amendments of 1990 took effect, the region was designated out of attainment with two of the national air quality standards. Since then, local air regulators have repeatedly filed inadequate plans to meet the air quality standards. Local, state, and federal regulators have failed to take action on submitted plans. And they have missed filing deadlines for plans documenting how and when the region will comply with national air quality standards. In addition, agriculture, the largest industry in the region, was exempt from air quality regulations by state law from the mid- 1970s until 2003.

Growing Public Concern

Clean air advocates have not shown similar inaction. In 2001, a coalition of medical, community, and environmental organizations sued the U.S. Environmental Protection Agency (EPA) to take action on one of the air quality plans submitted by the local air district that the groups knew to be inadequate. This lawsuit was followed by others, almost all successful, calling attention to the failures of regulators to adequately address the valley's air quality problems. Several groups of residents have organized around clean air issues and the Central Valley Air Quality Coalition (CVAQ), a group of local, state, and national environmental and health advocates, formed to support a series of state legislative and regulatory efforts to clean up the air. CVAQ members have worked with the legislature on air quality laws, organized valley residents to

² These population projections do not take into account the fact that some counties are split between air districts. If a county falls in the air district, the entire population has been included.

Figure 3. Percent of adults in the Central Valley who view air pollution as a "big problem"



*Note: The Central Valley includes the San Joaquin and Sacramento valleys
Source: PPIC Statewide Survey (Baldassare, 2000–2004)*

rally on air quality issues, and begun regular meetings with air district officials and other local groups.

The emergence of these organizations attests to growing public concern about air quality in the Central Valley, as Figure 3 shows. In 2000, just over a quarter of Central Valley residents viewed air quality as a "big problem," the same percentage as the state as a whole. Since that time, the level of

concern in the Central Valley has grown to nearly 50%, well above the statewide level of 35% (Baldassare, 2000, 2001, 2002, 2003, 2004). This rising activism and concern offer new hope for turning the situation around. The problem is complex and stubborn, but, as the remainder of this report shows, opportunities to clear the air in the San Joaquin Valley do exist.

CHAPTER 2

An Air Pollution Primer

Impacts of Poor Air Quality

Poor air quality affects human health, impairs visibility, and can cause material damage to buildings, structures, and vegetation. Recent studies have linked exposure to air pollution to decreases in lung function growth rate in children (Gauderman et al., 2002). Ozone and particulate matter are the chief components of the San Joaquin Valley air quality problem. Exposure to ozone has been linked to decreased lung function, inflammation of the airways, and increased respiratory discomfort (EPA, 2004). Children who play outdoors are at particular risk from exposure to ozone pollution, as are adults who spend a large portion of their time outdoors, such as farm or construction workers. Exposure to ozone poses a large risk to asthmatics and those with preexisting respiratory conditions. According to the California Health Interview Survey, almost 12% of children ages 1 to 17 in the San Joaquin Valley have been diagnosed with asthma. The highest rate is in Fresno County, where over 16% of the children have been diagnosed with asthma (Meng et al., 2003).

Particulate matter (PM) is a respiratory irritant that has been associated with premature mortality, aggravation of respiratory and cardiac diseases, changes in lung function, damage to lung tissue, and reduction in respiratory defense mechanisms (EPA, 1997). PM is divided into categories based on its size. Smaller particles can be inhaled and deposited deeply in the lungs. Those at highest risk from PM exposure include people with preexisting respiratory and cardiac illnesses, asthmatics, children,

and the elderly (EPA, 1997). Directly emitted diesel PM has been classified as a toxic air contaminant by the California Air Resources Board (CARB, 1998). A recent analysis of diesel emissions in the state determined that approximately 3,000 premature deaths in California in 2004 will be attributable to diesel PM pollution. Of these, approximately 260 will occur in the San Joaquin Valley (Anair and Monahan, 2004).

In addition to harming health, poor air quality has detrimental effects on the valley's economy as well. A 1989 study estimated that valley harvests of grapes, cotton, tomatoes, oranges, and alfalfa were reduced 10% to 20% as a result of air pollution (CARB, 1989). This is a serious threat, because agriculture is a large source of employment and economic activity in the valley. Close to 31% of jobs in Madera County are in agriculture, and employment in agriculture in the remaining seven counties ranges from 9% to 27%, well above the statewide average of 2% (Umbach, 2002). Agriculture accounts for 21% of income in the Central Valley (Kuminoff et al., 2000).

The effects of the valley's poor air quality do not stop at its borders. Nearby national parks also suffer as emissions and pollution generated in the valley are transported out of the area. From 1990 to 1999, Sequoia-Kings Canyon National Parks had the second highest annual average 1-hour ozone level of any national park (National Park Service, 2002). A recent analysis listed Sequoia-Kings Canyon National Parks as one of the five most polluted national parks in the country (Appalachian

Voices et al., 2004). Park vegetation shows signs of damage from air pollution. Transport from the San Joaquin Valley is also responsible for air quality violations in Mammoth Lakes and Yosemite National Park (CARB, 2001).

Air Quality Standards

The EPA sets standards designed to protect public health for six criteria air pollutants. These National Ambient Air Quality Standards (NAAQS) include standards for ozone and PM. For several years, these standards included a 1-hour standard for ozone and a 24-hour standard for PM-10, which includes all particulate matter less than 10 microns in diameter, and an annual average standard for PM-10.

In 1996, these ozone and PM-10 standards were found to be insufficient to protect public health. As a result of the EPA's study and review, the 1-hour ozone standard is being replaced with an 8-hour standard, and the PM-10 standards will be supplemented by 24-hour and annual average standards for PM-2.5 (particulate matter smaller than 2.5 microns in diameter). Attainment designations for the new 8-hour standard were made in April 2004 and the 1-hour ozone standard will be revoked in the April 2005.³ The San Joaquin Valley has been designated out of attainment with the federal 1-hour and 8-hour ozone standards and the PM-10 standard, as detailed in Chapter 1. Attainment designations have not been made for the PM-2.5 standard, but the San Joaquin Valley violated the standard 14 times in 2002.

California has set its own, more stringent 1-hour standard for ozone, as well as standards for PM-10 and PM-2.5. Recently, it proposed its own

8-hour ozone standard (Cal/EPA, 2004). The San Joaquin Valley regularly violates these state air quality standards. Table 2 lists the state and federal air quality standards for ozone and PM.

Table 2. State and federal air quality standards for ozone and PM

	Federal	State
Ozone		
1-hour	0.12 ppm	0.09 ppm
8-hour	0.08 ppm	0.07 ppm ^a
PM-10		
annual ^b	50 mg/m ³	20 mg/m ³
24-hour	150 mg/m ³	50 mg/m ³
PM-2.5		
annual ^b	15 mg/m ³	12 mg/m ³
24-hour	65 mg/m ³	no separate std.

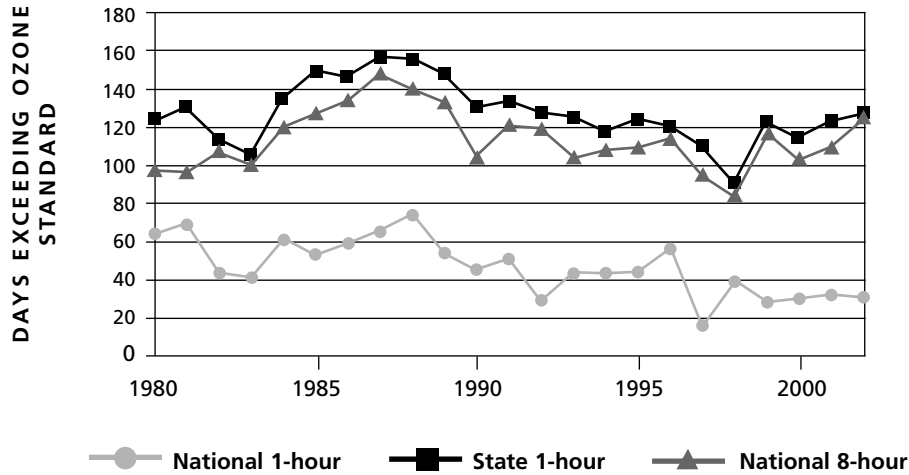
Notes: a. Proposed b. Annual arithmetic mean
Source: CARB, 2004a

In 2003, ozone levels in the San Joaquin Valley exceeded the federal 1-hour ozone standard on 37 days and the federal 8-hour standard on 134 days. This indicates that the region is suffering from a chronic ozone problem. As Figure 4 shows, the number of days above the national 1-hour standard for ozone have decreased since the early 1980s, but, as in the rest of country, progress has slowed in the past decade (EPA, 2002; 2004). Over the same time period, no progress has been made in reducing the number of days exceeding the more stringent state 1-hour ozone standard or the new federal 8-hour standard.⁴

³ 40 CFR Parts 50, 51, and 81

⁴ No significant trend is detectable in the state 1-hour or federal 8-hour ozone standard data.

Figure 4. Days ozone exceeded state and federal standards, San Joaquin Valley, 1980–2002



Source: CARB, 2004b

Fresno County has the highest number of days each year that exceed all three ozone standards, but the pattern of violations varies throughout the valley and among the three standards. Fresno and Kern Counties consistently lead in the number of days over the 1-hour national ozone standard. Far fewer violations have occurred in the valley’s northern counties. Violations of the 8-hour national

ozone standard are more distributed: Fresno and Tulare Counties have the highest number of violations, but Merced County exceeded the 8-hour standard on 56 days in 2002, while it violated the 1-hour standard on only 6 days that year.

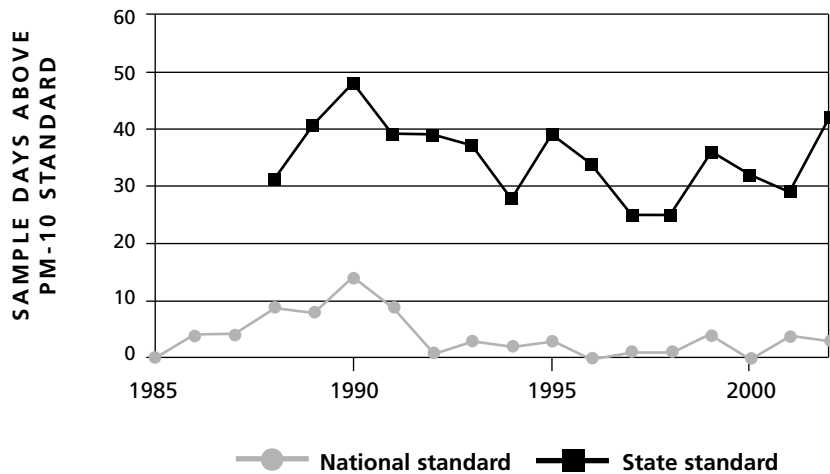
Figure 5 shows the number of days each year on which PM-10 levels in the valley were above the state and federal 24-hour standards. As the

Table 3. Days ozone exceeded state and federal standards, by county, 2002

	Fresno	Kern	Kings	Madera	Merced	San Joaquin	Stanislaus	Tulare	San Joaquin Valley
Ozone									
Federal 1-hour standard	25	17	1	6	3	0	1	3	31
Federal 8-hour standard	95	89	27	18	56	3	25	93	125
State 1-hour standard	106	95	29	21	55	12	31	86	127

Source: CARB, 2004b

Figure 5. Days PM-10 exceeded state and federal 24-hour standards, San Joaquin Valley, 1980–2002



Source: CARB, 2004b

figure shows, the number of days exceeding the standards has remained relatively constant since a spike in the early 1990s. Kern and Kings Counties lead the valley in the number of days above the national PM-10 standard. In 2002, the valley as a whole exceeded the state PM-10 standard on 42 days, with Kern County contributing the largest number of days.

Data on PM-2.5 have been collected for regulatory monitoring only since 2000. The San Joaquin Valley exceeded the national PM-2.5 standard 14 times in 2002. Kern County had the highest number of violations, followed closely by Fresno County.

Where Air Pollution Comes From

Air pollution is caused by emissions from a variety of activities, most of them actions by people. Although some pollutants are transported into the valley from upwind neighbors including the Bay area and the Sacramento region, most are the result of emissions generated within the valley.

How much transport impacts pollution in the valley depends on meteorological conditions and the impact decreases toward the southern part of the air basin. Even if all transport from adjacent air basins ceased, the San Joaquin Valley would continue to violate the national ambient air quality standards (CARB, 2001).

Emissions sources are grouped into three categories: stationary, area, and mobile. Stationary sources are single, large sources of emissions, including electric power plants, petroleum production facilities, and other industries such as food-processing plants. Area sources are stationary sources that are too small to quantify individually, but that contribute significantly in aggregate. Examples include road dust, farming operations, and residential wood burning. Mobile sources include both on-road and off-road engines. The former are primarily passenger vehicles, heavy-duty trucks, and buses. Examples of the latter are farm and construction equipment, ships, and locomotives (CARB, 2004c).

Sources of Ozone Pollution

Ozone is not emitted directly, but is a product of a chemical reaction between hydrocarbons, also called reactive organic gases (ROG), and oxides of nitrogen (NOx). This reaction is fueled by sunlight. Emissions of ROG and NOx come from all three source categories, including cars and trucks, farming operations, and petroleum-refining facilities. Until 2003, agricultural sources of air pollution in California were exempt from air quality regulations. This included stationary sources such as pumps, large feeding lots, or waste lagoons, as well as smaller area sources.

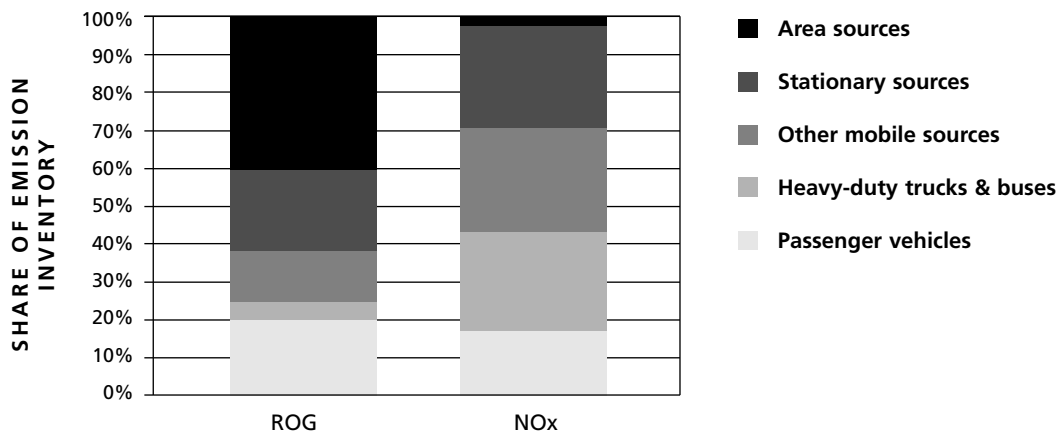
In the past, stationary sources such as power plants and petroleum facilities produced most ROG emissions. But decades of control and reductions in petroleum production have reduced emissions from these sources by over 85% since 1975 (CARB, 2004). Today, area sources are the largest contributor of ROG emissions, as Figure 6 shows. These

include emissions from consumer products such as paints, pesticides and fertilizers, waste disposal, and farming operations. Animal feed lots, waste lagoons, and other farming operations contribute close to 40% of area emissions.

Mobile sources are the largest emitters of NOx in the San Joaquin Valley. These include passenger cars and light trucks, as well as heavy-duty trucks, buses, and some off-road equipment. The largest contribution to NOx emissions in the valley come from heavy-duty diesel trucks (20%) and farm equipment (12%). Diesel emissions have become increasingly important in recent years. Between 1990 and 2000, diesel fuel consumption in the valley grew 60%, much faster than gasoline consumption. But emission control regulations for diesel engines have lagged behind those for gasoline engines (Harley, et al., 2004).

An additional challenge to emissions control is the amount of truck traffic that passes through the valley. Trucks from Mexico are of particular

Figure 6. Sources of ozone precursor emissions in the San Joaquin Valley, 2003



Source: CARB, 2004d

concern: a recent Supreme Court decision held that Mexican trucks traveling in the United States need not comply with US clean air or safety regulations.⁵ This could have a detrimental impact on air quality in states where Mexican trucks travel. Their greatest impact will be felt after 2006 when stringent new standards for US heavy-duty diesel trucks go into effect and clean, low-sulfur diesel fuel is phased in. In addition, Mexican trucks tend to be older, on average, than US trucks (Sierra Research, 2002).

Sources of Particulate Matter Pollution

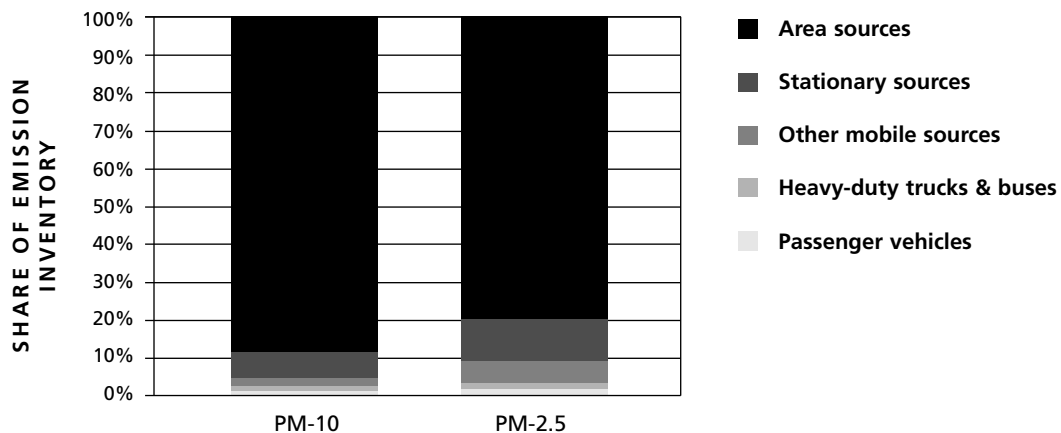
Particulate matter can be emitted directly (primary PM) or may form in the atmosphere through chemical reactions (secondary PM). Direct emissions of particulate matter derive primarily from such area sources as road dust (paved and unpaved roads), farming operations (including tilling and field preparation), and agricultural waste

burning. Secondary PM forms through a series of reactions involving NOx, ammonia (NH₃), ROG, and oxides of sulfur (SOx). Primary PM, mostly of geologic origin, is dominant in the summer and fall, while secondary PM dominates in the winter (SJVAPCD, 2003).

All particulate matter emissions are not created equal. PM exacerbates pulmonary conditions such as asthma and causes general discomfort and irritation. PM can also be composed of toxic compounds from diesel engines and other sources. Toxic PM causes irritation, but can also cause illnesses such as cancer. Consequently, strategies to reduce PM emissions cannot be based solely on reducing mass PM emissions. Targeting emissions from the most toxic sources may have the greatest benefit.

Figure 7 shows that area sources dominate emission inventories for both PM-10 and PM-2.5. Road dust and farming operations are the largest component of PM-10 area emissions. Agricultural

Figure 7. Sources of PM-10 and PM-2.5 direct emissions, San Joaquin Valley, 2003



Source: CARB, 2004d

5 Department of Transportation et al. v. Public Citizen et al., 2004

burning, followed by road dust, contributes most PM-2.5 emissions. Diesel engines are responsible for approximately 5% of direct PM-10 and 10% of PM-2.5 emissions. From a toxicity standpoint, these emissions are especially important. Diesel engines are also an important source of NO_x emissions, a PM precursor.

The Emissions and Jurisdiction Puzzle

Air pollution control regulations are generated and implemented at all three levels of government: local, state, and federal. The primary agencies involved in the control of air pollution in the San Joaquin Valley are the San Joaquin Valley Air Pollution Control District (SJVAPCD), the California Air Resources Board (CARB), and the U.S. Environmental Protection Association (EPA).

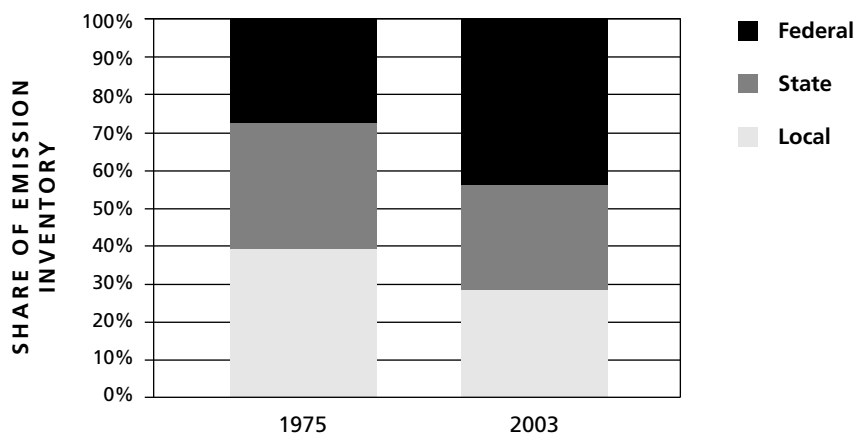
The SJVAPCD is responsible for local air quality control programs in the entire San Joaquin Valley. It sets emission standards for stationary

sources of pollution and is charged with developing a plan on how the region will meet state and federal air quality standards. Aside from the district, there is little regionally coordinated decision making in the valley. Each county makes its own transportation planning decisions. Each city makes land use planning decisions. No regional authority coordinates these decisions, despite their regional impacts.

CARB is responsible for air quality regulations at the state level, such as setting state air quality standards. It sets emission standards for new passenger vehicles, as well as for some area sources (e.g., consumer products and pesticides). CARB also submits a plan to the EPA detailing how all regions in the state will come into compliance with federal air quality standards.

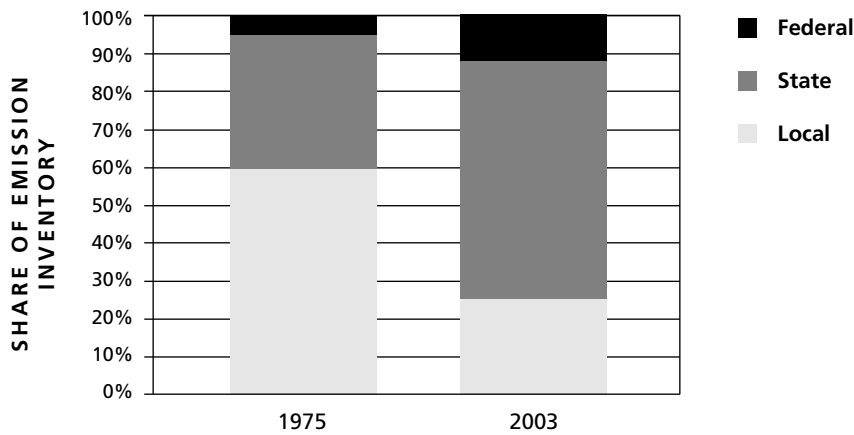
The EPA sets the NAAQS, as well as emission standards for certain classes of engines used for interstate commerce (e.g., heavy-duty diesel trucks, ships, and trains) and off-road diesel

Figure 8. NO_x emission inventory by jurisdiction, 1975 and 2003



Note: Some emission categories are split between jurisdictions; therefore, the percentages are approximations. Source: Emissions data from CARB, 2004d

Figure 9. ROG emission inventory by jurisdiction, 1975 and 2003



Note: Some emission categories are split between jurisdictions; therefore, the percentages are approximations.
 Source: Emissions data from CARB, 2004d

equipment. It has the authority to impose sanctions if a state or region does not attain or fails to demonstrate future attainment with the NAAQS. Recently, the EPA finalized rules to limit emissions from off-road diesel engines and heavy-duty diesel trucks. As these are implemented, they will provide significant emission benefits to the valley.

The San Joaquin Valley has run up, as have other air districts, against some hurdles as a result

this layering of jurisdictional authority, particularly in controlling ozone precursor emissions. With the enormous increase in population, urbanization, and passenger vehicle and truck traffic, the region has seen a growth in emissions from sources of pollution that are outside of the SJVAPCD's jurisdiction. Figures 8 and 9 show that, since 1975, emissions that fall under state and federal jurisdiction have become an increasingly large part of the ozone precursor emission inventory.

CHAPTER 3

Overcoming Obstacles to Cleaning the Air

The San Joaquin Valley faces enormous challenges to achieving clean air. Years of improvement in the number of days exceeding the federal 1-hour ozone standard are slowing and little progress is being made in reducing the number of days exceeding the state air quality standard for ozone or the new, federal 8-hour ozone standard. One of the primary challenges is that emissions are increasingly from sources that have not been regulated previously and from sources outside the local air district's jurisdiction. Another challenge has been securing funding to implement voluntary and incentive-based emission reduction programs. Finally, local, state, and federal officials have repeatedly failed to adequately address valley air quality problems.

What is being done to help the valley overcome these obstacles and clear the air? Over the past year, several important actions have been taken at the state and local level to control previously unregulated sources of pollution, address emissions from sources outside state and local jurisdiction, and generate funding for clean air programs.

State Legislation

During the 2003–2004 legislative session, several important pieces of legislation were proposed to improve air quality in the valley, as Table 4 shows. Most passed; several are still pending; a few were withdrawn. These bills were legislative priorities for the CVAQ coalition, and they fall into four categories:

1. Bills that address general air quality regulations in the state
2. Bills that regulate new sources of emissions
3. Bills that offer mechanisms to secure funding for district and state cleanup programs
4. Bills that address structural issues in regional air quality planning

General Air Quality Protection

- *SB 288 (Sher)*
In 2002, the EPA announced changes to the new source review program. New source review requires stationary sources of emissions to upgrade pollution control equipment when they undergo modifications. The federal changes will allow sources to undergo large modifications without upgrading pollution control equipment. SB 288 prohibits any air district in the state from changing its new source review program in a way that makes it less stringent than it was prior to the EPA's relaxation.
- *SB 656 (Sher)*
Directs CARB to work with the air districts to develop a list of all readily available, feasible, and cost-effective measures to reduce emissions of PM-10 and PM-2.5. Through public workshops, CARB and the districts must prioritize these measures and develop a schedule for implementation.

Table 4. Air quality improvement bills in the 2003–2004 legislative session

Bill Number	Author	Status
General		
SB 288	Senator Byron Sher	Passed and signed by governor 9/22/03
SB 656	Senator Byron Sher	Passed and signed by governor 10/8/03
Controlling new sources of emissions		
SB 700	Senator Dean Florez	Passed and signed by governor 9/22/03
SB 705	Senator Dean Florez	Passed and signed by governor 9/22/03
SB 704	Senator Dean Florez	Passed and signed by governor 9/22/03
AB 1009	Assemblymember Fran Pavley	Awaiting governor's signature
Funding for air quality programs		
SB 709	Senator Dean Florez	Passed and signed by governor 9/22/03
AB 923	Assemblymember Marco Antonio Firebaugh Assemblymember Fran Pavley	Awaiting governor's signature
AB 3104	Assemblymember Marco Antonio Firebaugh	Withdrawn
Air quality planning process		
SB 999	Senator Michael Machado	Withdrawn
AB 170	Assemblymember Sarah Reyes	Passed and signed by governor 9/22/03

Regulating New Sources of Emissions

- *SB 700 (Florez)*
Repeals the law that exempted agriculture from air quality regulations. In addition, the bill requires nonattainment areas to require best available control technology and management practices for agricultural sources. The bill extends an existing small business loan program to agricultural businesses for the purposes of implementing air pollution control measures.
- *SB 705 (Florez)*
Phases out agricultural burning in the valley. A companion bill, SB 704 (Florez), provides incentives for using agricultural waste in energy production.
- *AB 1009 (Pavley)*
Requires that any heavy-duty diesel vehicle operating in the state, including those from

outside the United States, meet federal emission standards applicable for that model year truck and be able to provide documentation to that effect to enforcement authorities.

Funding for Air Quality Improvement Programs

- *SB 709 (Florez)*
Directs the SJVAPCD to impose a fee on area sources of emissions not currently subject to permit, such as housing developments. Fees collected from these sources are to be used to establish programs to offset the emission impact of these sources. The bill directs the district to impose an additional \$1 fee on all vehicle registrations in the valley to provide funding to reduce emissions from passenger vehicles, such as incentives to purchase clean fuel and low emission vehicles.

- *AB 3104 (Firebaugh)*
Would have imposed a small fee on each unit of on-road fuel sold in California. These fees were intended to provide funding for the Carl Moyer diesel cleanup program and other mobile source emission reduction programs.
- *AB 923 (Firebaugh and Pavley)*
Introduced as an alternative to AB 3104. Directs air districts to collect larger fees on vehicles registered in their districts (from \$4 to \$6) and increases the fee on new tire sales. These fees are intended to fund three programs: Carl Moyer, clean schoolbuses, and light duty vehicle retirement.

Improving Air Quality Planning

- *SB 999 (Machado)*
Would have required that three members of the public be appointed to the SJVAPCD governing board. Specified that the public members be residents of the valley, that they be nominated by public health and environmental groups in the valley, and that they be selected from this list by the governing board. Public members could not be employers or owners of businesses regulated by the district. Currently, the governing board of the South Coast Air Quality Management District is the only one in the state on which members of the public serve; it was the model for this bill.
- *AB 170 (Reyes)*
Requires each city and county to amend elements of its general plan to assess the air quality impacts and potential mitigation measures. Calls for the SJVAPCD to review the general plans of each city and county.

In addition to the legislation discussed above, several other bills in the 2003–2004 session provided potential air quality benefits for the valley.

These bills were tracked and supported by some members of the CVAQ coalition.

- *SB 391 (Flores)*
Establishes a program to train and fund local emergency medical response officials to treat nonoccupational exposure to pesticide drift. Fees collected from those responsible for the pesticide drift would fund this program. This bill was pending at the time this report went to press.
- *AB 2683 (Lieber)*
Repeals the exemption from Smog Check inspections for passenger vehicles over 30 years old. This bill was pending at the time this report went to press.
- *AB 2906 (Nation)*
Requires CARB to amend smog index labels for passenger vehicles to include information on both smog and greenhouse gas emissions. This bill did not pass, but could be considered again in the next session.

State Emission Reduction Programs

Two important state programs serve to reduce emissions from diesel engines in the state, sources that are important in the San Joaquin Valley. The first is the Carl Moyer program. The second is the Diesel Risk Reduction Plan (DRRP). Diesel engines are particularly problematic because of their long lifetimes, which are often on the order of decades. Regulations that limit emissions from new diesel engines take a long time to work their way into the fleet. Together, these programs will ensure that all new diesel engines in the state will use the best emission control technology and that existing engines are retrofitted to run as cleanly as possible.

The Moyer program provides funding for near-term reductions of NO_x emissions from existing diesel engines. It has achieved substantial,

cost-effective reductions in both NO_x and PM emissions (CARB, 2002). Projects funded by the Moyer program could target on-road engines, diesel agricultural pumps, marine engines, and construction equipment. The program provides state funding for projects that is then matched by the air district (CARB, 2003); however, it has no dedicated source of state funding. In the past, funds have come from year-to-year state budget allotments and voter-approved bond initiatives. In 2000, a state-appointed advisory board recommended that the program be funded at \$100 million annually (CARB, 2003). This level of funding has never been met. Several pieces of legislation (AB 3104 and 923 discussed above) have focused on securing funding for incentive programs like the Moyer program. This year's state budget includes \$61 million in incentive funding through a restructuring of the Smog Check program.

The DRRP was adopted in 2000 to address the cancer risk associated with diesel PM. The goal of the plan is to reduce diesel PM emissions and the associated cancer risk 75% by 2010 and 85% by 2020. This will be accomplished by supplementing existing regulations with new regulations requiring that all new diesel engines be equipped with particulate filters, all existing engines be evaluated and, if possible, retrofitted with particulate filters, and diesel fuel quality be improved through a reduction in sulfur levels (CARB, 2000). These regulations will be adopted over several years, addressing a single fleet of engines at a time.⁶

Local Emission Reduction Programs

The SJVAPCD's primary challenges have been to regulate sources of pollution that have not been regulated before and to reduce the impact of emissions outside its jurisdiction. Traditionally, the district has accomplished this through incentive programs and voluntary measures. For example, it has provided funding for clean vehicle purchases and gasoline lawnmower trade-ins. It has sponsored programs such as Spare the Air Days or Please Don't Light Tonight, requesting voluntary actions on the part of valley residents to refrain from activities that contribute to air pollution.

In the past year, two controversial rules have been considered that address sources of pollution that have never been regulated before. Rule 4901 restricts wood burning during peak PM periods. It was passed by the governing board in July 2003. Another rule still under consideration places fees on indirect sources of emissions.

- *Rule 4901*
Prohibits burning any solid fuel (wood, manufactured firelogs, or pellets) when the air quality is forecast to reach unhealthy levels. It also requires that, when a property is sold, any existing fireplace must be upgraded to meet EPA certifications for emissions and performance standards or be rendered inoperable. Violations of the prohibition can result in fines. When air quality is forecast to be unhealthy for sensitive groups, wood burning is discouraged. The rule does not apply where wood burning is the only

⁶ Between 2001 and May 2004, CARB passed regulations for five diesel fleets: transit buses, refuse haulers, transportation refrigeration units, stationary engines, and portable engines.

source of heat or where natural gas service is not available. Nor does it apply to businesses or residences above 3000 feet. It also limits the number of wood-burning fireplaces allowed in new residential developments.

- *Rules 9510 and 3180 (both were in draft form at time this report went to press)*

Together, these rules create a program to impose a fee on *indirect* emission sources. An indirect source of emissions is defined as any development that attracts or generates motor vehicle trips in the air basin. The indirect source mitigation fee program is still under development by the district. It targets emissions of NO_x and PM-10, as well as ROG. It will require that a percentage of annual indirect and area source emissions associated with a project be mitigated either through on-site measures or contributions to a fund to be used to offset emissions. This program will improve air quality as the region grows and VMT continues to increase.

CHAPTER 4

A Clean Air Action Plan

How Did We Get Here?

Since 1990, residents of the San Joaquin Valley have grown increasingly concerned about the quality of the region’s air. Over that time, the region has seen large increases in population, vehicle population, and vehicle travel. Since 1990, these changes have been accompanied, as Figure 10 shows, by a reduction in the number of days when air pollution exceeded the federal 1-hour ozone standard. But the number of days over the state 1-hour and the federal 8-hour ozone standards has increased.

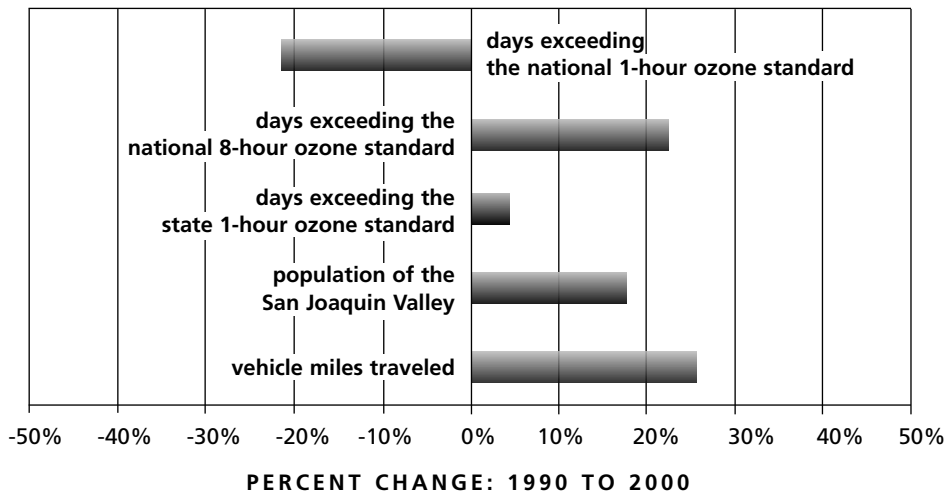
The growth in population and vehicle miles traveled is not projected to slow down in coming years. The region’s progress in reducing the number of days above federal 1-hour ozone standard has stagnated. No detectable decrease in the number of

days violating state and federal PM-10 standards can be observed. Over the past several years, local, state, and federal regulators have missed deadlines, prepared inadequate compliance plans, and failed to act on plans to bring the region into compliance with air quality standards. This is a crucial moment in the region’s development. Decisions must be made at all levels of government and by residents of the valley to balance the necessity of clean air with the region’s current climate and future growth.

What Is Being Done?

Some important first steps have been taken in the effort to clear the valley’s air. Several significant pieces of legislation have become law in the past year. Agriculture has been brought into the air

Figure 10. San Joaquin Valley changes, 1990 to 2003



Note: Population and VMT data for 1990 and 2000
 Source: CARB, 2004a

quality planning process. Control of these sources will provide significant air quality benefits to the San Joaquin Valley. Agricultural burning is being phased out, providing large reductions in PM emissions. Some sources of funding have been identified to help the region implement air quality improvement programs. These successes are an important step in achieving clean air.

Passage of each of the bills was a struggle, with intense opposition from different parties, and some disappointments have accompanied these hard-won successes. The failure of SB 999 (Machado), in particular, was a missed opportunity. Increased public participation in and accountability of the SJVAPCD's governing board would provide new, and much needed, voices in the region's air quality planning process. The bill has been opposed by elected officials from the valley and the oil industry and was withdrawn from consideration during the legislative session. Another disappointment was the failure to secure full funding for the Moyer Program. The 2004 budget allotment is a solid start, but it falls short of the recommended \$100 million.⁷ Such an annual investment would provide benefits over the next 10 years that outweigh the costs ten to one (Anair and Monahan, 2004).

The state's Diesel Risk Reduction Plan is providing rules that will ensure that the cleanest diesel engines available operate in the state and that existing engines are cleaned up. Between 2001 and May 2004, CARB implemented regulations for fleets that account for approximately 15% of California's diesel PM pollution. These regulations have faced strong opposition and some have taken years to develop. Given the delays in implementation, California is likely to achieve only a 30% reduction in diesel PM

emissions by 2010, short of the 75% reduction goal (Anair and Monahan, 2004). These regulations will continue to be implemented over the coming years as the state addresses specific fleets of vehicles, but results will not be achieved as quickly as planned or needed. This makes implementing and funding the Moyer program especially important for addressing diesel emissions while regulations are being developed.

The local air district is making headway in regulating sources of pollution that have not previously been regulated, such as wood-burning fireplaces. Progress on the indirect source mitigation fee is behind schedule, but will provide a valuable mechanism to counter some of the air quality impacts associated with the region's growth.

A Clean Air Action Plan

Clearly, our work is far from over. Much more is needed from state legislators, regulators, and local air quality regulators and other local officials. Government officials must strive for and achieve critical goals over the coming year to get the valley on the road to clean air. And the San Joaquin Valley community, as well as all concerned state residents, should remain engaged and vigilant to ensure progress occurs.

The State Legislature should

- Pass legislation to create seats for public representatives on the governing board of the San Joaquin Valley Air Pollution Control District.
- Establish a secure mechanism for funding state and local incentive-based air quality improvement programs at the maximum level.
- Continue to pass legislation that ensures that all sources of air pollution are addressed in state and

⁷ At the time that this report went to press, AB 923 was pending. If AB 923 is signed by the governor, it will generate an additional \$80 million for clean air programs. With the Smog Check revision that has already been approved, this would authorize \$140 million for cleanup programs, a portion of which would be dedicated to the Moyer program.

local planning, and that no backsliding is allowed in emissions control. In particular, the legislature needs to focus on sources of pollution outside of the district's jurisdiction, such as Mexican trucks, ships, and locomotives.

The California Air Resources Board must

- Develop and implement the strongest possible regulations for all remaining fleets under the Diesel Risk Reduction Plan.
- Continue to develop stringent passenger vehicle regulations, including in-use compliance programs such as Smog Check.
- Implement new on-road and off-road diesel engine regulations, ensuring appropriate monitoring and in-use compliance.
- Develop and implement strong regulations to limit greenhouse gas emissions from passenger vehicles sold in California.

The San Joaquin Valley Air Pollution Control District and other local officials need to

- Develop and implement an effective, comprehensive, and stringent indirect source mitigation fee program.
- Seek opportunities to develop innovative programs to address sources of emissions associated with the region's growth through regional coordination of land use and transportation planning.
- Improve outreach to the public and seek public input on rule development.

San Joaquin Valley residents should continue to

- Communicate to local and state elected officials that air quality is a priority for residents of the San Joaquin Valley.

- Become involved in local and state air quality decisions by attending workshops, writing letters to representatives, and attending and presenting comments at hearings where decisions are made.
- Educate others about the region's air quality problems. For example, volunteer to provide information in the workplace about Spare the Air Days or periods when burn restrictions are in effect.

For more information

For more information on the valley's air quality and how you can become involved contact:

Air Quality Data and Legislative Information

San Joaquin Valley Air Pollution Control District

Website: www.valleyair.org
Phone: 559-230-5800

California Air Resources Board

Website: www.arb.ca.gov
Phone: 916-322-2990 or 800-242-4450

The Great Valley Center Indicators Database

Website: www.greatvalley.org/indicators

California Legislative Information

Website: www.leginfo.ca.gov

Local Advocates

Latino Issues Forum

Website: www.lif.org
Phone: 559-241-6572

American Lung Association – Central California

Website: www.amerilungcencal.org
Phone: 559-222-4800

Fresno Metro Ministry

Website: www.fresnometroministry.org
Phone: 559-485-1416

Californians for Pesticide Reform

Website: www.pesticidereform.org
Phone: 661-721-2535

Legal Information

Earthjustice Oakland Regional Office

Website: www.earthjustice.org
Phone: 510-550-6725

Center for Race, Poverty, and the Environment

Phone: 415-346-4179

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The San Joaquin Valley now officially shares the distinction of having the worst air quality in the nation with the Los Angeles region. A history of neglect, missed opportunity, and now rapid growth are compounding the region's problem. Poor air quality is affecting the valley's residents, public health, and the economy. Without action, the problem will only get worse.

This report examines the sources and effects of the San Joaquin Valley's air pollution problem and some recent legislative and regulatory efforts to clear the air. It outlines an action plan to put the valley on the road to healthy air.

