CHAPTER 2

LOCAL AIR QUALITY

- INTRODUCTION
- CLIMATE OF SANTA BARBARA COUNTY
- AIR QUALITY MONITORING
- STATE AND FEDERAL OZONE EXCEEDANCES
- STATE AIR QUALITY INDICATORS
- STATE DESIGNATION VALUE
- FEDERAL 8-HOUR OZONE STANDARD
- STATE 8-HOUR OZONE STANDARD
- CONCLUSION

2. LOCAL AIR QUALITY

2.1 INTRODUCTION

This chapter provides the background for this 2007 Plan by presenting an overview of the climate of Santa Barbara County, and an assessment of local air quality trends using ARB-specified indicators and federal design value data. The description of the climate of Santa Barbara County is important for understanding the factors that influence air quality in the county, while the air quality data are important for assessing progress towards attainment of the State 1-hour ozone standard and maintenance of the federal 8-hour ozone standard.

There are two related terms that are used frequently in this chapter: standard *exceedance* and standard *violation*. A *standard exceedance* occurs when a measured concentration exceeds the applicable air quality standard. A *standard violation* occurs after a certain number of exceedances have been measured and is dependent on the standard in question. For example, a federal 8-hour ozone exceedance occurs when ozone is measured over the standard of 0.08 parts per million. A federal ozone standard violation occurs when the fourth highest ozone concentration at an individual monitoring site, averaged over three years, is higher than the standard. Attainment and nonattainment designations are based on violations of standards. It should be emphasized that both exceedances and violations are determined on a site-by-site basis. If any monitoring site experiences a violation of an ambient air quality standard, then the entire county would be designated as nonattainment for that standard.

The next section of this chapter, Section 2.2, discusses the local climate of Santa Barbara County and the relationship of the climate to air quality. Santa Barbara County's air quality monitoring network is described in Section 2.3. A summary of state ozone exceedances experienced in the county from 1988 through 2005 are highlighted in Section 2.4 while Section 2.5 summarizes State air quality trends using air quality indicators. Section 2.6 discusses the State Designation Value and its relation to the air quality indicators. Section 2.7 discusses the federal 8-hour ozone standard and the federal design value concept while Section 2.8 details the new State 8-hour ozone standard. Finally, Section 2.9 highlights the conclusions of this chapter. For clarity, all tables and figures associated with this chapter will appear after the conclusions.

2.2 CLIMATE OF SANTA BARBARA COUNTY

Santa Barbara County's air quality is influenced by both local topography and meteorological conditions. Surface and upper-level wind flow varies both seasonally and geographically in the county and inversion conditions common to the area can affect the vertical mixing and dispersion of pollutants. The prevailing wind flow patterns in the county are not necessarily those that cause high ozone values. In fact, high ozone values are often associated with atypical wind flow patterns. Meteorological and topographical influences that are important to air quality in Santa Barbara County are as follows:

- Semi-permanent high pressure that lies off the Pacific Coast leads to limited rainfall (around 18 inches per year), with warm, dry summers and relatively damp winters. Maximum summer temperatures average about 70 degrees Fahrenheit near the coast and in the high 80s to 90s inland. During winter, average minimum temperatures range from the 40s along the coast to the 30s inland. Additionally, cool, humid, marine air causes frequent fog and low clouds along the coast, generally during the night and morning hours in the late spring and early summer. The fog and low clouds can persist for several days until broken up by a change in the weather pattern.

- In the northern portion of the county (north of the ridgeline of the Santa Ynez Mountains), the sea breeze (from sea to land) is typically northwesterly throughout the year while the prevailing sea breeze in the southern portion of the county is from the southwest. During summer, these winds are stronger and persist later into the night. At night, the sea breeze weakens and is replaced by light land breezes (from land to sea). The alternation of the land-sea breeze cycle can sometimes produce a "sloshing" effect, where pollutants are swept offshore at night and subsequently carried back onshore during the day. This effect is exacerbated during periods when wind speeds are low.

- The terrain around Point Conception, combined with the change in orientation of the coastline from north-south to east-west can cause counterclockwise circulation (eddies) to form east of the Point. These eddies fluctuate temporally and spatially, often leading to highly variable winds along the southern coastal strip. Point Conception also marks the change in the prevailing surface winds from northwesterly to southwesterly.

- Santa Ana winds are northeasterly winds that occur primarily during fall and winter, but occasionally in spring. These are warm, dry winds blown from the high inland desert that descend down the slopes of a mountain range. Wind speeds associated with Santa Ana's are generally 15-20 mph, though they can sometimes reach speeds in excess of 60 mph. During Santa Ana conditions, pollutants emitted in Santa Barbara, Ventura County, and the South Coast Air Basin (the Los Angeles region) are moved out to sea. These pollutants can then be moved back onshore into Santa Barbara County in what is called a "post-Santa Ana condition." The effects of the post-Santa Ana condition can be experienced throughout the county. Not all post-Santa Ana conditions, however, lead to high pollutant concentrations in Santa Barbara County.

- Upper-level winds (measured at Vandenberg Air Force Base once each morning and afternoon) are generally from the north or northwest throughout the year, but occurrences of southerly and easterly winds do occur in winter, especially during the morning. Upper-level winds from the south and east are infrequent during the summer. When they do occur during summer, they are usually associated with periods of high ozone levels. Surface and upper-level winds can move pollutants that originate in other areas into the county.

- Surface temperature inversions (0-500 ft) are most frequent during the winter, and subsidence inversions (1000-2000 ft) are most frequent during the summer. Inversions are an increase in temperature with height and are directly related to the stability of the

atmosphere. Inversions act as a cap to the pollutants that are emitted below or within them and ozone concentrations are often higher directly below the base of elevated inversions than they are at the earth's surface. For this reason, elevated monitoring sites will occasionally record higher ozone concentrations than sites at lower elevations. Generally, the lower the inversion base height and the greater the rate of temperature increase from the base to the top, the more pronounced effect the inversion will have on inhibiting vertical dispersion. The subsidence inversion is very common during summer along the California coast, and is one of the principal causes of air stagnation.

- Poor air quality is usually associated with "air stagnation" (high stability/restricted air movement). Therefore, it is reasonable to expect a higher frequency of pollution events in the southern portion of the county where light winds are frequently observed, as opposed to the northern part of the county where the prevailing winds are usually strong and persistent.

2.3 AIR QUALITY MONITORING

Both the federal and state Clean Air Acts identify pollutants of specific importance, which are known as criteria pollutants. Ambient air quality standards are adopted by the ARB and the USEPA to protect public health, vegetation, materials and visibility (Table 2-1). State standards for ozone and both respirable (less than 10 microns in diameter-PM_{10}) and fine (less than 2.5 microns in diameter– $PM_{2.5}$) particles are more stringent than federal standards.

Monitoring of ambient air pollutant concentrations is conducted by the ARB, APCD and industry. Monitors operated by the ARB and APCD are part of the State and Local Air Monitoring System (SLAMS). The SLAMS stations are located to provide local and regional air quality information. Monitors operated by industry, at the direction of the APCD, are called Prevention of Significant Deterioration (PSD) stations. PSD stations are required by the APCD to ensure that new and modified sources under APCD permit do not interfere with the county's ability to attain or maintain air quality standards. Figure 2-1 shows the locations of all monitoring stations in Santa Barbara County that are currently in operation. Note that data collection from the Santa Rosa Island monitoring ceased on December 31, 2004 due to both financial constraints and logistical challenges in collecting data from and maintaining the remote island site.

2.4 STATE AND FEDERAL OZONE EXCEEDANCES

Figure 2-2a presents the number of state and federal ozone exceedances in Santa Barbara County during the period of 1988 to ~~2005~~ 2006. As shown in the figure, Santa Barbara County has experienced as many as 42 days where the State 1-hour ozone standard was exceeded to no exceedance days in 2005. The number of federal 8-hour ozone standard exceedances ranges from 27 days in both 1988 and 1989 to no exceedance days during 2005 and 2006.

The most striking feature of Figure 2-2a is the dramatic decrease in the number of State and federal ozone exceedances since 1988, when the county experienced 42 days where the State 1–hour ozone standard was exceeded and 27 days where the federal 8-hour ozone standard was exceeded. In contrast, there were no exceedances of the State and federal ozone standard during 2005. A clear declining trend in the number of state and federal ozone exceedances is evident from 1988 through 1999. Since 1999, however, with the relatively low number of State 1-hour and federal 8-hour ozone exceedances experienced in Santa Barbara County each year, the trend is less discernable, and likely more the result of natural year-to-year variability of weather patterns.

The long-term declining trend in both State 1-hour and federal 8-hour exceedance days has occurred concurrently with increases in both population and daily vehicle miles traveled in Santa Barbara County (Figure 2-2b). This suggests that local, state and federal emission reduction programs have been effective in improving air quality in Santa Barbara County despite significant increases in population and vehicle miles traveled.

2.5 STATE AIR QUALITY INDICATORS

The California Clean Air Act (CCAA) requires the ARB to evaluate and identify three air quality related indicators for districts to use in assessing their progress toward attainment of the State standards [Health and Safety Code section 39607(f)]. Districts are required to assess their progress triennially and report to the ARB as part of the triennial plan revisions. The assessment must address (1) the peak concentrations in the peak "hot spot" subarea, (2) the population-weighted average of the total exposure, and (3) the area-weighted average of the total exposure (ARB Resolution 90-96, November 8, 1990).

2.5.1 Peak Concentration Indicators

As mentioned above, the ARB specifies the use of three air quality indicators to assess progress toward attaining the state 1-hour ozone standard: peak "hot spot" indicator, population-weighted exposure, and area-weighted exposure. These data were provided by the ARB with the recommendation that we report improvement in air quality using the Expected Peak Day Concentration (EPDC), and two exposure indicators (population-weighted and area-weighted).

The peak "hot spot" indicator is assessed in terms of the EPDC. The EPDC is provided to districts by the ARB for each monitoring site in the county and represents the maximum ozone concentration expected to occur once per year, on average. The EPDC is useful for tracking air quality progress at individual monitoring stations since it is relatively stable, thereby providing a trend indicator that is not highly influenced by year-to-year changes in weather. Simply, progress means the change or improvement in air quality over time that can be attributed to a reduction in emissions rather than the influence of other factors, such as variable weather. The EPDC is also used in the area designation process, which is described in Section 2.6.

The EPDC is calculated using ozone data for a three-year period (the summary year and the two years proceeding the summary year). For example, the 2005 EPDC for a monitoring site uses

data from 2003, 2004 and 2005. The data that are used in the calculation are the daily maximum one-hour concentrations. The EPDC is calculated using a complex statistical procedure that analytically determines for each monitoring site the highest ozone concentration that is expected to recur at a rate of once per year.

Figure 2-3 presents 1988 through 2006 ~~2005~~ peak air quality indicators for monitoring sites in Santa Barbara County. Note that the Santa Barbara station was offline for several months during 2001, but came back online at the beginning of 2003. Due to the temporary loss of data, the 2002 EPDC value for the Santa Barbara site is not available.

Figure 2-3 shows that peak air quality indicators have declined significantly from 1988 levels at all monitoring stations. 1999 EPDC values (based on 1997, 1998 and 1999 ozone data) fell below the State standard at the GTC-B, Santa Ynez, El Capitan, Goleta, Lompoc HS&P and Santa Barbara sites. The Carpinteria EPDC indicator dropped below the State ozone standard in 2002 from earlier levels that were significantly above the standard. Additionally, the peak indicator for the Las Flores Canyon site fell below the state standard in 2003 and has leveled-off at or below the standard since then. The Paradise Road monitoring site has shown considerable improvement in air quality from earlier years. In fact, based on 2004 through 2006 data, the Paradise Road site has come into compliance with the State 1-hour ozone standard for the first time since monitoring began at the site in 1986. ~~while showing considerable improvement from earlier years, continues to have an EPDC value slightly above the State 1-hour ozone standard.~~

As discussed previously, the ARB requires that district's assess the peak "hot spot" subareas as one method of determining progress toward meeting State air quality standards. Since 1988, both the Paradise Road and Las Flores Canyon monitoring sites have experienced the most State ozone exceedances in the county, and therefore can be considered hot spot locations (see Table 2-2). The Las Flores Canyon monitoring site had a maximum of 24 State ozone exceedances in 1990 with no exceedances during ~~both~~ 2002, 2005 and 2006, while the number of State exceedances at the Paradise Road site has ranged from 24 in 1988 to no State ozone exceedances during 2000, 2005 and 2006.

The EPDC indicators have improved significantly from earlier levels at both the Las Flores Canyon and Paradise Road sites. The EPDC indicator was as high as 0.140 ppm during 1989 and 1990 at the Las Flores Canyon site decreasing to 0.092 ~~0.094~~ ppm during 2006 ~~2005~~. At the Paradise Road site, the peak indicator was as high as 0.125 ppm in 1989 and 1991, decreasing to 0.090 ~~0.098~~ ppm by 2006 ~~2005~~. Figure 2-4 presents the overall EPDC trend improvement for both the Las Flores Canyon and Paradise Road sites from 1988 to 2006 ~~2005~~. Based on these data, the overall EPDC improvement for the Las Flores Canyon site from 1988 to 2006 ~~2005~~ is about 28%. ~~27%~~. The Paradise Road EPDC trend improvement is about 32% ~~22%~~ over the period of 1988 to 2006 ~~2005~~. Additionally, the Paradise Road EPDC has improved over the short-term. From 2003 to 2006 ~~2005~~, the EPDC from the Paradise Road monitoring site has decreased from 0.105 ppm to 0.090 ~~0.098~~ ppm, representing a short-term improvement of about 14% ~~7%~~.

2.5.2 Population and Area Exposure Indicators

Population and area exposure indicators are intended to provide an indication of the potential for chronic adverse health impacts. Unlike the EPDC that tracks air quality progress at individual monitoring sites, the population- and area-weighted exposure indicators consolidate hourly ozone monitoring data from all sites within the county into a single exposure value. The result is a value representing the average potential exposure in an area.

The population exposure indicator is based on the annual number of hours that ozone levels were above the state standard. Hourly ozone concentrations are interpolated to each census tract centroid. Hourly ozone exposures are determined for each centroid by subtracting the value of the State ozone standard from each interpolated hourly concentration. Any computed negative values are set to zero. The hourly exposures for each census tract are multiplied by the number of people residing in the census tract. These hourly exposures are then added together and divided by the total population of all the census tracts for which interpolated exposure values are available.

The area-weighted exposure value is similar to the population exposure except that it is based on the area within each census tract rather than the population in each tract. For area-weighted exposure, the hourly exposures for each census tract are multiplied by the square kilometer land area of the census tract. These hourly exposures are then added together and divided by the total land area for which interpolated exposure values are available. The result represents an hourly area-weighted exposure for the district.

Population- and area-weighted trends are presented in Figure 2-5a and 2-5b. These figures show that both exposure indicators have decreased over time since 1988 (with the exception of 1989) and that indicator values have been very low during the last few years due to dramatic improvement in air quality. It should be noted that high values during 1989, shown as spikes in the trend data, are due to two specific ozone episodes in March and April of that year where ozone concentrations were significantly higher than both federal and state standards. Due to spikes in the data during 1989, exposure trend data for 1990 to 2005 are presented in a separate figure (Figure 2-5b) with a more suitable scale to better display trends during that period. These trends in the population- and area-weighted exposure data suggest that even with population growth and natural fluctuations in weather, air quality has improved significantly since 1988.

2.6 STATE DESIGNATION VALUE

Designation values (DV) are used to determine whether an area is in or out of attainment of applicable air quality standards. The designation value refers to the highest measured concentration remaining at a given site after all measured concentrations affected by extreme concentration events are excluded. In the State designation process, measured concentrations that are higher than the calculated EPDC are identified as being affected by an extreme concentration event (weather conditions conducive to high concentrations of ozone) and are not considered violations of the State standard. If the highest designation value within an area does not exceed the State standard, then the area can be considered in attainment for that pollutant.

For example, if the calculated EPDC for a site is 0.096 parts per million (ppm) and the four highest measured ozone concentrations are 0.125, 0.113, 0.102 and 0.094 ppm, then the designation value is equal to 0.10 ppm.. This is because the EPDC of 0.096 is first rounded to 0.10 to be consistent with the precision of the State 1-hour standard, which is two decimal places, and 0.10 is the highest concentration measured (0.102 rounds down to 0.10) that is equal to or lower than the rounded EPDC. The concentrations of 0.125 ppm (rounded to 0.13 ppm) and 0.113 ppm (rounded to 0.11 ppm) are higher than the rounded EPDC of 0.10 and are excluded as an extreme concentrations and are not considered as the DV.

DV data for the period of 1988 to 2006 ~~2005~~ for Las Flores Canyon and Paradise Road, sites historically measuring the most ozone exceedances, are presented in Figure 2-6. Based on these data, ~~only~~ the Paradise Road site has come into compliance with the State 1-hour ozone standard in 2006, marking the first time the standard has been attained at the site since it began operation in 1986. ~~that remained out of compliance with the State 1-hour ozone standard during 2005.~~

2.7 FEDERAL 8-HOUR OZONE STANDARD

EPA has established standards (termed National Ambient Air Quality Standards or NAAQS), under the authority of the Federal Clean Air Act that identify safe levels for ozone in the lower atmosphere to prevent and minimize adverse impacts to human health and to crops, forests, and materials. Ozone levels measured in the atmosphere at levels equal to or lower than the standards are viewed as safe, whereas levels above the standards represent a reasonable risk to public health and welfare (non-health related damages), and thus require action to reduce emissions of ozone precursors. The current federal ozone standard is an 8-hour average of 0.08 parts per million. This standard is subdivided into primary standards that protect public health and secondary standards that protect public welfare (the numeric value of the standard is the same for primary and secondary standards).

The federal 8-hour ozone standard of 0.08 ppm replaces the 1-hour standard of 0.12 ppm. The 1-hour ozone standard was revoked by EPA effective June 15, 2005. The 8-hour standard is considered more protective of health than the former 1-hour standard since it takes into account health effects over a longer exposure period.

Similar to State 1-hour ozone exceedances, the number of federal 8-hour exceedances has decreased significantly since 1988. As shown in Figure 2-2a, the number of 8-hour exceedances in Santa Barbara County have decreased from 27 days in 1988 and 1989 to no exceedance days in both 2005 and 2006. As with the State 1-hour standard, a declining trend was evident between 1988 and 1999 with no real distinguishable trend after about 1999.

2.7.1 Federal 8-hour Design Value

The severity or magnitude of a given area's federal 8-hour ozone nonattainment problem is determined by the ozone design value for that standard. The design value for the federal 8-hour ozone standard is determined by calculating the 3-year average of the fourth-highest daily

maximum 8-hour average ozone concentrations measured at any given monitoring station. The overall federal design value for Santa Barbara County is given by the highest design value of all of the individual monitoring stations in the county.

EPA attainment designations became effective on June 15, 2004 with these designations based on 2001 to 2003 monitoring data. Federal design values for this period are presented in Table 2-3. As shown in the table, the highest federal 8-hour design value at any site in Santa Barbara County for 2003 is 0.084 ppm at the Paradise Road site. Santa Barbara County is therefore in compliance with the federal 8-hour ozone standard since the highest design value is less than the federal 8-hour standard itself.

Current 2005 federal design values for each monitoring site in the County utilizing 2003 through 2005 data are presented in Table 2-4. These data show that Santa Barbara County has continued to comply with the federal 8-hour ozone standard since designations were made in 2004. As presented in the table, the highest 2005 federal 8-hour designation value for the County is 0.078 ppm at the Paradise Road site. This not only validates continued compliance with the federal 8-hour standard, but it also shows progress in reducing the countywide federal 8-hour design value.

2.8 NEW STATE 8-HOUR OZONE STANDARD

On April 28, 2005, the California Air Resources Board (ARB) approved a new more health protective air quality standard for ozone with special consideration for children's health. The new State 8-hour standard was given final approval by the ARB's Office of Administrative Law on April 17, 2006 and became effective on May 17, 2006. The new 8-hour standard, set at 0.070 parts per million (ppm), is not to be exceeded and is in addition to the existing state 1-hour ozone standard set at 0.09 ppm. The new standard was adopted pursuant to the Children's Environmental Health Protection Act, passed in 1999,that requires ARB to work in consultation with the Office of Environmental Health Hazard Assessment to "review all existing health-based ambient air quality standards to determine whether these standards protect public health, including infants and children, with an adequate margin of safety."

Note that the new State 8-hour standard has a higher level of precision than the current 1-hour standard. The level of precision for the 1-hour standard is two decimal places whereas the level of precision for the new 8-hour standard is three decimal places. Typically, ozone concentrations are measured in parts per billion (ppb) then converted to parts per million (ppm) then rounded to the appropriate level of precision. The ARB rounding convention is that values of 5 or more round up and values below 5 round down. For example, a measured 1-hour ozone concentration of 84 ppb is 0.084 ppm, which is rounded to 0.08 ppm to meet the level of precision of the 1-hour standard. A 1-hour ozone concentration of 85 ppb is 0.085 ppm and rounded to 0.09 ppm. Since the new State 8-hour ozone standard has a higher level of precision, the same rounding process does not apply. That is, an 8-hour concentration of 85 ppb is converted to 0.085 ppm and rounding is not necessary because the level of precision of the 8-hour standard is three decimal places. As a consequence of

the precision of the new State 8-hour standard, a concentration of 71 ppb (0.071 ppm) is an exceedance of the new standard. Were the precision of the State 8-hour standard similar to the current 1-hour State standard (set at two decimal places), a concentration of 75 ppb (0.075 ppm) would be needed before an exceedance occurs due to the rounding process discussed above.

The most important implications of the new 8-hour ozone standard are:

- The new 8-hour standard will be more difficult to attain as it is more health protective than existing state and federal ozone standards.
- Implementation of the new standard will extend our planning mandates to develop Clean Air Plan progress reports and plan revisions.
- The new standard will extend our programs for Rule Development, New Source Review (NSR) permitting, and analysis of projects using existing thresholds under the California Environmental Quality Act (CEQA).

Compliance with the new 8-hour standard is determined in a manner similar to the State 1-hour standard using the same expected peak day and design value approach. Based on data collected from 2002 through 2004, seven monitoring stations in Santa Barbara County are out of compliance with the new standard (Carpinteria, Las Flores Canyon, Lompoc HS&P, Vandenberg AFB, Nojoqui Summit, Santa Ynez, and Paradise Road). Currently, only the Paradise Road site does not comply with the both existing State 1-hour ozone standard and the new 8-hour standard.

State 8-hour exceedance data for the period of 1988 through ~~2005~~ 2006 are presented in Figure 2-7. These data show that the number of exceedances ranges from a high of 98 days in 1989 to a low of 13 days in 2005. Although we are currently out of compliance with the new state 8-hour standard, the long-term trend shows a significant decrease in the number of State 8-hour exceedances from 1988 to ~~2005~~ 2006, clearly an indication of air quality improvement in Santa Barbara County over this time period.

2.9 CONCLUSION

This 2007 Plan has been prepared to demonstrate maintenance of the federal 8-hour ozone standard and to document progress toward meeting the State 1-hour and new 8-hour ozone standards. Although Santa Barbara County violates the State 8-hour ozone standard, recent data show that the county has attained the State 1-hour ozone standard of 0.09 parts per million, evidence that the air quality of the county has improved dramatically over the years. This air quality improvement is clearly seen in the EPDC data, which show that the EPDC has decreased below that State 1-hour ozone standard at all sites in the county including Paradise Road, where the EPDC has historically exceeded standard. ~~continues to violate the State 1-hour ozone standard of 0.09 parts per million, long-term EPDC indicator trend and exposure data show that air quality has improved dramatically since 1988. Since 1999, with the relatively low number of State 1-hour ozone exceedances experienced in Santa Barbara County, the trend is less discernable. As a result of overall air quality improvement,~~

~~however, the EPDC has decreased below the State 1-hour ozone standard at every site within the county since 1988 with the exception of the Paradise Road site.~~ A further indication of air quality improvement is shown in the historical exceedance data, where the number of State 1-hour exceedances has decreased from 42 days in 1988 to no exceedances in 2005, with only one exceedance in 2006. ~~Our air quality improvement is clearly evident as the number of days experiencing State 1-hour ozone exceedances decreased from 42 in 1988 to no exceedances in 2005.~~ Additionally, the number of federal 8-hour exceedances has decreased from 27 days in both 1988 and 1989 to no exceedance days in 2005. Based on a 2003 federal design value of 0.084 ppm, Santa Barbara County has been designated as an attainment area for the federal 8-hour ozone standard. The 2005 federal 8-hour design value of 0.078 ppm shows improvement in air quality and continued compliance with the federal 8-hour standard.

A new State 8-hour standard was approved by the ARB on April 28, 2005 and became effective on May 17, 2006. The new standard is in addition to the current State 1-hour standard and is considered more health protective than the current 1-hour standard, particularly for children and other sensitive individuals. Based on current monitoring data, Santa Barbara County will be out compliance with the new State 8-hour standard when designations are made by the ARB.

TABLE 2-1
AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	California Standards[1]	National Standards[2]	
		Concentration[3]	Primary[2, 4]	Secondary[2, 5]
Ozone	1 Hour	0.09 ppm (180 ug/m^3)	0.12 ppm (235 ug/m^3)	Same as Primary
	8 Hour	0.070 ppm (137 ug/m^3)	0.08 ppm (157 ug/m^3)	Same as Primary
Carbon Monoxide	8 Hour	9 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	Same as Primary
	1 Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	
Nitrogen Dioxide	Annual Average	0.03 ppm (56 µg/m^3)	0.053 ppm (100 ug/m^3)	Same as Primary
	1 Hour	~~0.25 ppm~~ 0.18 ppm ~~(470 ug/m^3)~~ (339 µg/m^3)	--	
Sulfur Dioxide	Annual Average	--	0.03 ppm (80 ug/m^3)	
	24 Hour	0.04 ppm[6] (105 ug/m^3)	0.14 ppm (365 ug/m^3)	--
	3 Hour	--	--	0.5 ppm (1,300 ug/m^3)
	1 Hour	0.25 ppm (655 ug/m^3)	--	--
Respirable Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 ug/m^3	--	--
	24 Hour	50 ug/m^3	150 ug/m^3	Same as Primary
Fine Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	12 ug/m^3	15 ug/m^3	Same as Primary
	24 Hour	--	35 ug/m^3	Same as Primary
Sulfates	24 Hour	25 ug/m^3		--
Lead	30 Day Average	1.5 ug/m^3	--	--
	Calendar Quarter	--	1.5 ug/m^3	Same as Primary
Hydrogen Sulfide	1 Hour	0.03 ppm (42 ug/m^3)		--
Vinyl Chloride (chloroethene)	24 Hour	0.010 ppm (26 ug/m^3)		--
Visibility Reducing Particles	1 Observation	In sufficient amount to reduce the prevailing visibility[7] to less than 10 miles when the relative humidity is less than 70%		--

TABLE 2-1 (CONCLUDED)

NOTES:

1. California standards for ozone, carbon monoxide, sulfur dioxide (1 hour), nitrogen dioxide and particulate matter - PM_{10}, and visibility reducing particles are values that are not to be exceeded. The sulfur dioxide (24-hour), sulfates, lead, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded.

2. National standards, other than ozone and those based on annual averages or annual arithmetic means are not to be exceeded more than once a year. The ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than one.

3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parenthesis are based upon a reference temperature of 25^{o}C and a reference pressure of 760 mm of mercury. All measurements of air quality are to be corrected to a reference temperature of 25^{o}C and a reference pressure of 760 mm of mercury (1,013.2 millibar); ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

4. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health. Each state must attain the primary standards no later than three years after that state's implementation plan is approved by the Environmental Protection Agency.

5. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant. Each state must attain the secondary standards within a "reasonable time" after the implementation plan is approved by the EPA.

6. At locations where the state standards for ozone and/or suspended particulate matter are violated. National standards apply elsewhere.

7. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range when relative humidity is less than 70 percent.

TABLE 2-2

NUMBER OF DAYS EXCEEDING STATE AND FEDERAL OZONE STANDARDS BY SITE AND COUNTYWIDE

1988-~~2005~~ 2006*

* preliminary data

		1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Carpinteria	Federal 8-Hour	8	7	1	4	6	2	4	3	4	1	1	1	0	0	0	0	1	0	0
	State 8-Hour	26	22	8	10	16	19	15	13	18	9	3	2	7	3	0	3	5	0	1
	State 1-Hour	10	14	5	8	9	6	11	7	8	4	3	1	1	1	0	1	0	0	1
El Capitan	Federal 8-Hour	3	2	1	0	3	1	0	3	3	0	1	0	0	0	0	0	1	0	0
	State 8-Hour	10	5	5	3	8	7	4	6	5	1	1	2	0	2	0	1	3	0	0
	State 1-Hour	0	3	2	2	6	3	2	5	4	0	1	0	0	0	0	1	1	0	0
Goleta	Federal 8-Hour	3	3	3	0	6	2	2	2	1	0	0	0	0	0	0	0	1	0	0
	State 8-Hour	14	10	7	9	12	12	5	10	8	4	1	1	0	0	0	1	2	0	0
	State 1-Hour	5	6	5	5	8	5	3	3	5	0	1	1	0	0	0	1	0	0	0
Nojoqui	Federal 8-Hour	3	2	3	1	1	3	0	1	4	0	1	0	0	0	0	1	0	0	0
	State 8-Hour	6	7	11	10	9	9	3	6	13	1	2	1	0	1	0	3	2	0	0
	State 1-Hour	4	5	4	7	5	5	2	3	5	1	0	0	1	0	0	1	0	0	0
Las Flores Canyon	Federal 8-Hour	6	14	15	7	9	5	9	12	12	1	2	2	0	1	0	1	2	0	0
	State 8-Hour	33	56	54	39	31	25	39	40	30	23	23	9	11	11	3	4	16	4	3
	State 1-Hour	10	23	24	12	15	9	15	15	14	5	5	1	4	1	0	1	2	0	0
Lompoc HS&P	Federal 8-Hour	1	3	0	1	0	2	1	1	2	0	1	0	0	0	0	0	2	0	0
	State 8-Hour	17	7	5	4	3	11	4	4	10	6	1	5	2	2	1	7	6	0	0
	State 1-Hour	4	5	1	3	1	3	1	1	3	0	1	0	1	0	0	1	1	0	0
Lompoc H Street	Federal 8-Hour	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	State 8-Hour	3	2	1	1	3	2	0	2	2	0	0	0	0	0	1	0	1	0	0
	State 1-Hour	1	1	0	1	1	1	1	2	0	0	0	0	0	0	0	0	0	0	0
Paradise Road	Federal 8-Hour	19	16	14	15	9	4	3	4	12	2	5	1	2	2	5	5	0	0	0
	State 8-Hour	76	70	61	85	44	38	20	22	40	23	34	24	30	28	32	35	15	10	14
	State 1-Hour	24	20	10	22	12	7	5	6	10	3	11	3	0	4	3	6	0	0	0
Santa Ynez	Federal 8-Hour	0	5	0	0	1	0	0	1	2	0	1	0	0	0	0	0	0	0	0
	State 8-Hour	11	8	5	4	11	8	9	7	14	3	2	1	0	2	1	6	3	1	1
	State 1-Hour	3	6	0	3	4	1	1	1	4	1	2	0	0	1	0	0	0	0	0
VAFB STS	Federal 8-Hour	0	3	1	2	1	1	0	1	2	0	0	1	0	0	0	0	0	0	0
	State 8-Hour	2	9	8	3	7	10	3	5	6	1	2	2	0	0	1	5	5	0	0
	State 1-Hour	0	3	3	2	1	1	0	1	2	0	0	1	0	0	0	0	0	0	0
Countywide	Federal 8-Hour	27	27	26	25	16	10	11	16	19	4	6	2	2	3	5	5	2	0	0
	State 8-Hour	97	98	87	97	64	55	50	57	57	42	48	31	37	34	35	40	19	13	16
	State 1-Hour	42	39	37	37	25	18	22	24	23	10	15	3	6	5	3	7	2	0	0

TABLE 2-3

2003 DESIGN VALUE FOR MONITORING STATIONS IN SANTA BARBARA COUNTY FEDERAL 8-HOUR OZONE STANDARD 2001-2003 DATA (PPB)*

Station Name	2001 4th High	2002 4th High	2003 4th High	Average
Carpinteria	**69** 10/15/01	**63** 10/04/02	**69** 10/26/03	**67**
El Capitan	**70** 05/24/01	**61** 07/01/02	**69** 09/18/03	**66**
GTC B	**63** 07/04/01	**65** 08/09/02	**64** 10/25/03	**64**
Lompoc HS&P	**69** 10/15/01	**68** 09/09/02	**74** 04/08/03	**70**
Paradise Road	**83** 07/03/01	**85** 08/09/02	**86** 10/14/03	**84**
Exxon 1	**76** 05/05/01	**70** 09/13/02	**71** 05/20/03	**72**
VAFB STS	**63** 10/15/01	**63** 10/05/02	**71** 10/26/03	**65**
Goleta	**63** 05/05/01	**56** 08/28/02	**64** 10/15/03	**61**
Lompoc H Street	**57** 03/31/01	**63** 09/10/02	**58** 09/18/03	**59**
Santa Barbara	**52** 08/18/01	**50** 08/13/02	**63** 09/20/03	**55**
Santa Maria	**51** 05/03/01	**49** 10/07/02	**52** 10/12/03	**50**
Santa Ynez	**67** 05/07/01	**67** 08/08/02	**73** 07/18/03	**69**
Santa Rosa Island	**64** 10/15/01	**66** 09/01/02	**64** 10/16/03	**64**

*EPA 8-hour Ozone designations became effective June 15, 2004. Designations were based on 2001-2003 monitoring data.

TABLE 2-4

2005 DESIGN VALUE FOR MONITORING STATIONS IN SANTA BARBARA COUNTY FEDERAL 8-HOUR OZONE STANDARD 2003-2005 DATA (PPB)

Station Name	2003 4th High		2004 4th High		2005 4th High		Average
Carpinteria	**69**	10/26/03	**72**	09/07/04	**51**	04/13/05	**64**
El Capitan	**69**	09/18/03	**69**	05/15/04	**63**	04/15/05	**67**
GTC B	**64**	10/25/03	**67**	04/25/04	**50**	04/13/05	**60**
Lompoc HS&P	**74**	04/08/03	**73**	09/08/04	**63**	04/05/05	**70**
Paradise Road	**86**	10/14/03	**76**	04/25/04	**74**	07/16/05	**78**
Exxon 1	**71**	05/20/03	**80**	04/25/04	**71**	08/26/05	**74**
VAFB STS	**71**	10/26/03	**76**	04/26/04	**60**	04/05/05	**69**
Goleta	**64**	10/15/03	**69**	09/07/04	**61**	09/19/05	**64**
Lompoc H Street	**58**	09/18/03	**62**	05/02/04	**49**	09/20/05	**56**
Santa Barbara	**63**	09/20/03	**71**	09/05/04	**59**	04/13/05	**64**
Santa Maria	**52**	10/12/03	**57**	05/02/04	**50**	09/20/05	**53**
Santa Ynez	**73**	07/18/03	**69**	05/02/04	**62**	05/19/05	**68**

Figure 2-1
Santa Barbara County Air Quality Monitoring Stations

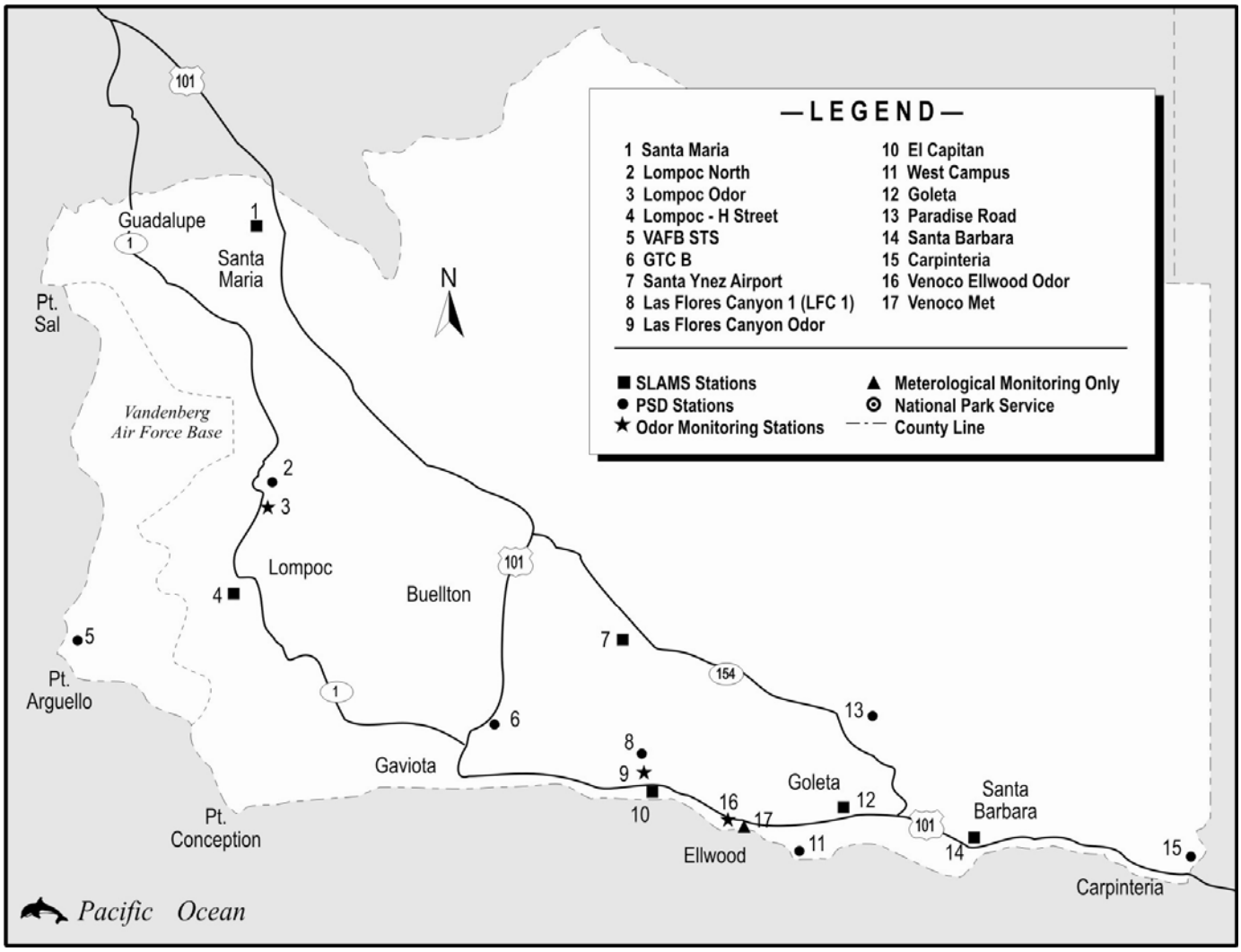
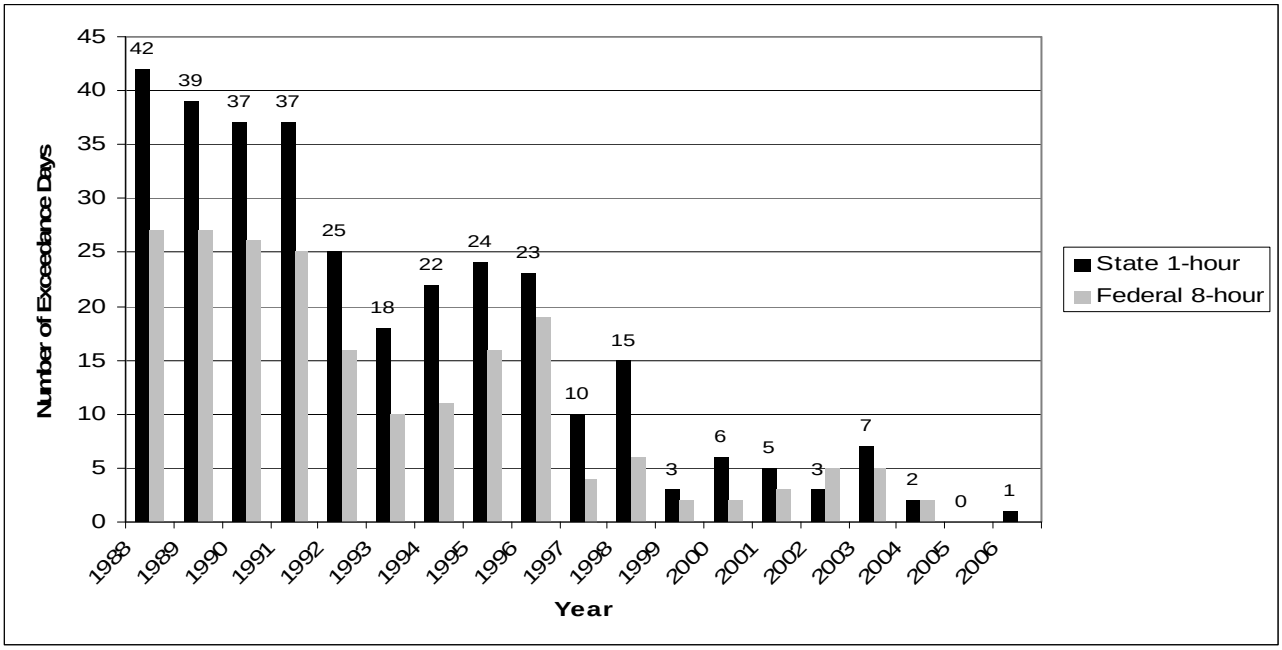


FIGURE 2-2A
NUMBER OF DAYS EXCEEDING STATE AND FEDERAL OZONE STANDARDS
SANTA BARBARA COUNTY
1988- 2006 ~~2005~~ *



*** 2006 data are preliminary**

FIGURE 2-2B
POPULATION AND DAILY VEHICLE MILES TRAVELED
SANTA BARBARA COUNTY
1988- 2006 ~~2005~~

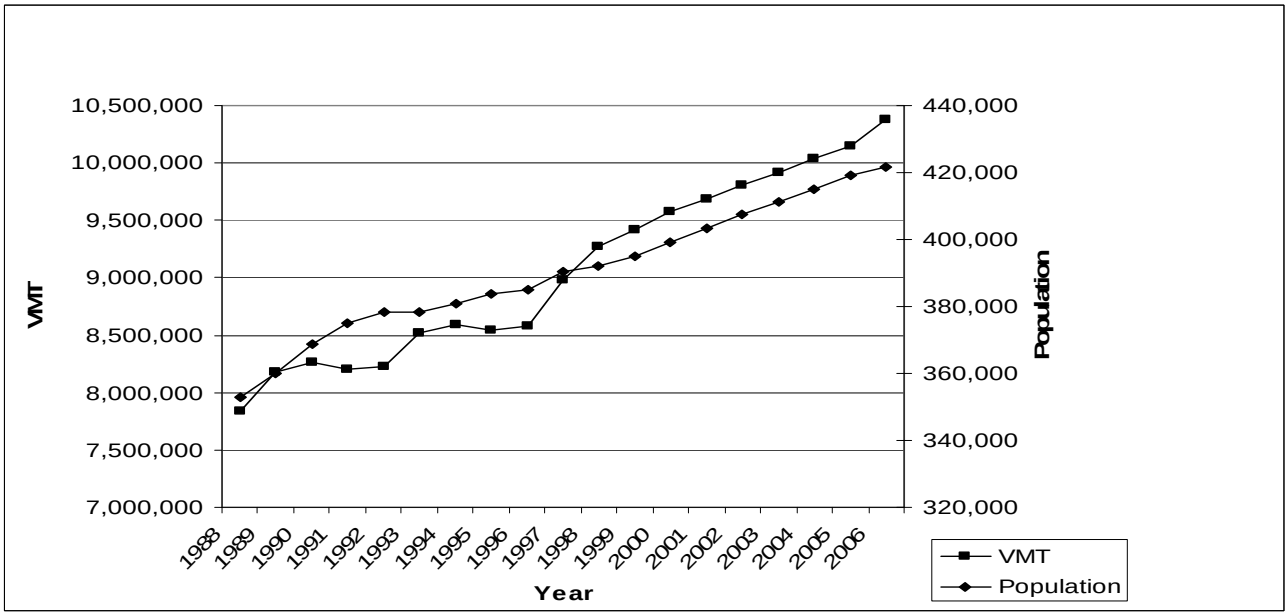
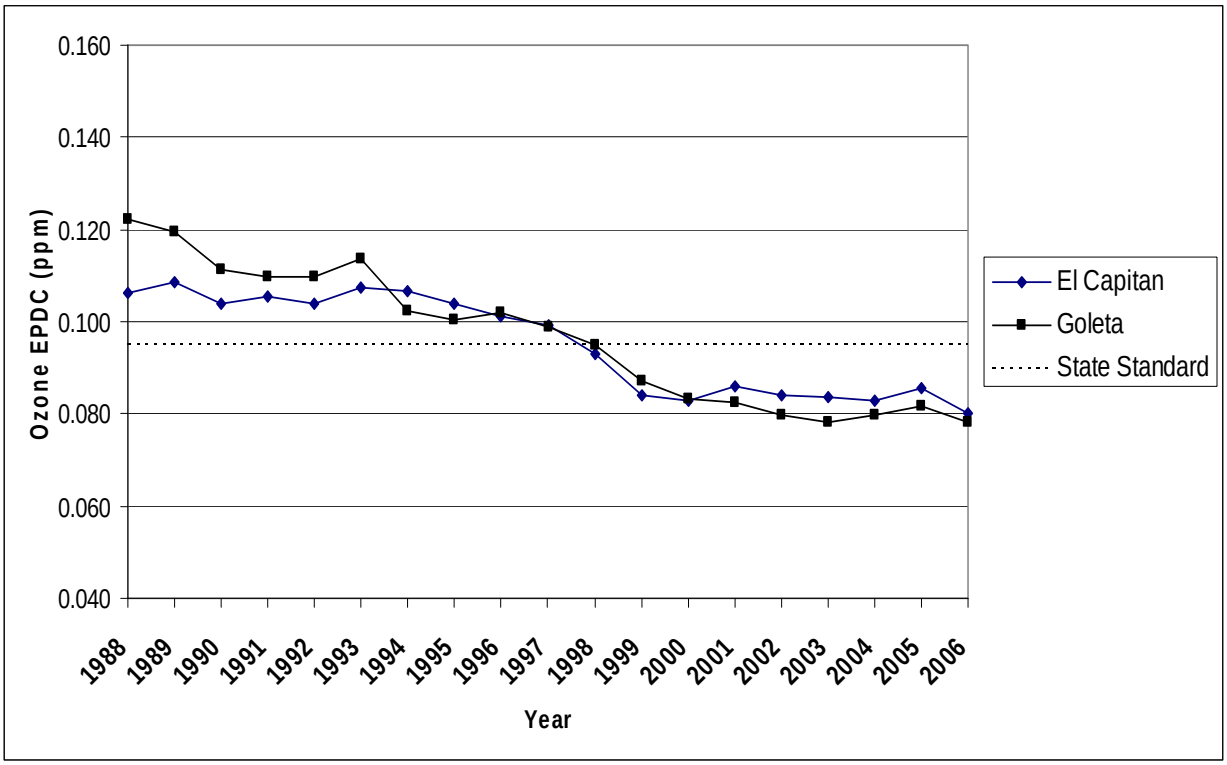


FIGURE 2-3
STATE OZONE EXPECTED PEAK DAY CONCENTRATION
SANTA BARBARA COUNTY MONITORING SITES
1988 – 2006 ~~2005~~



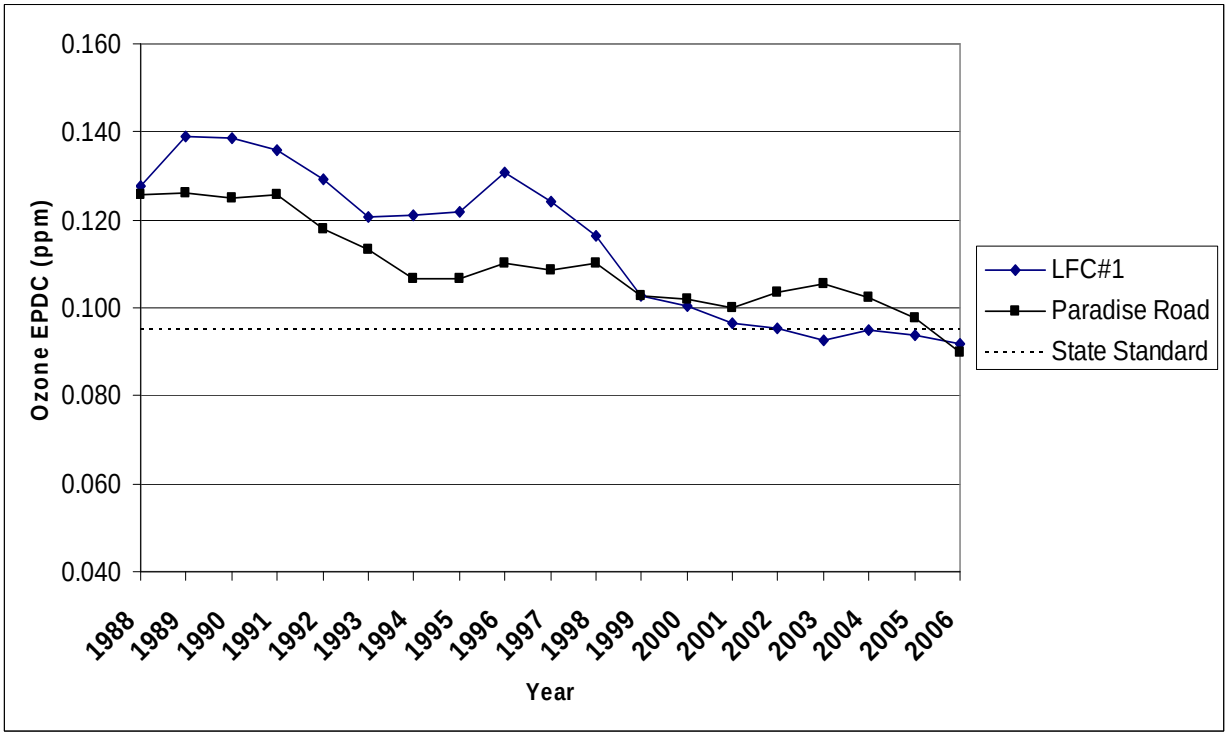
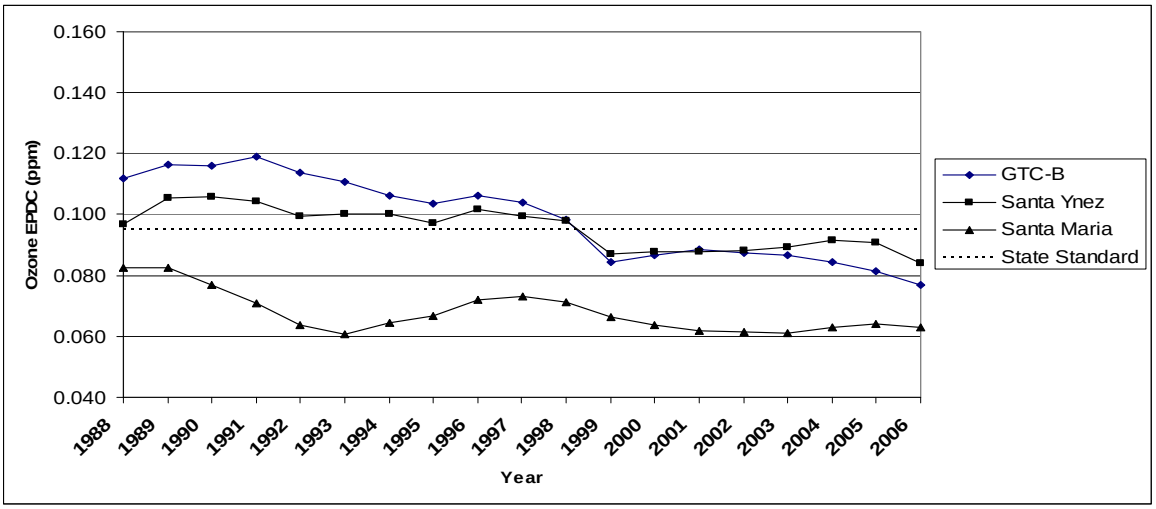
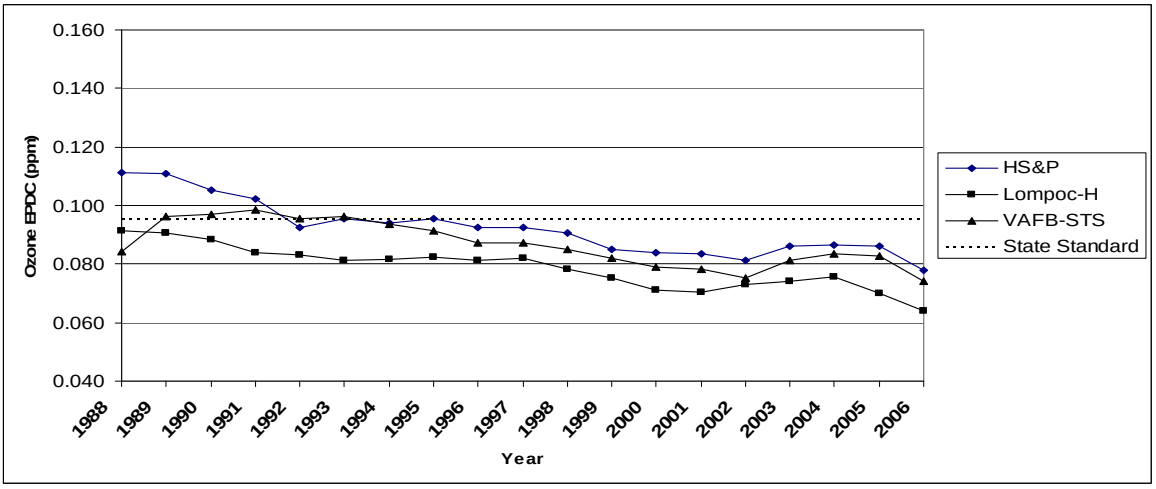


FIGURE 2-3 CONCLUDED
STATE OZONE EXPECTED PEAK DAY CONCENTRATION
SANTA BARBARA COUNTY MONITORING SITES
1988 - 2006 ~~2005~~





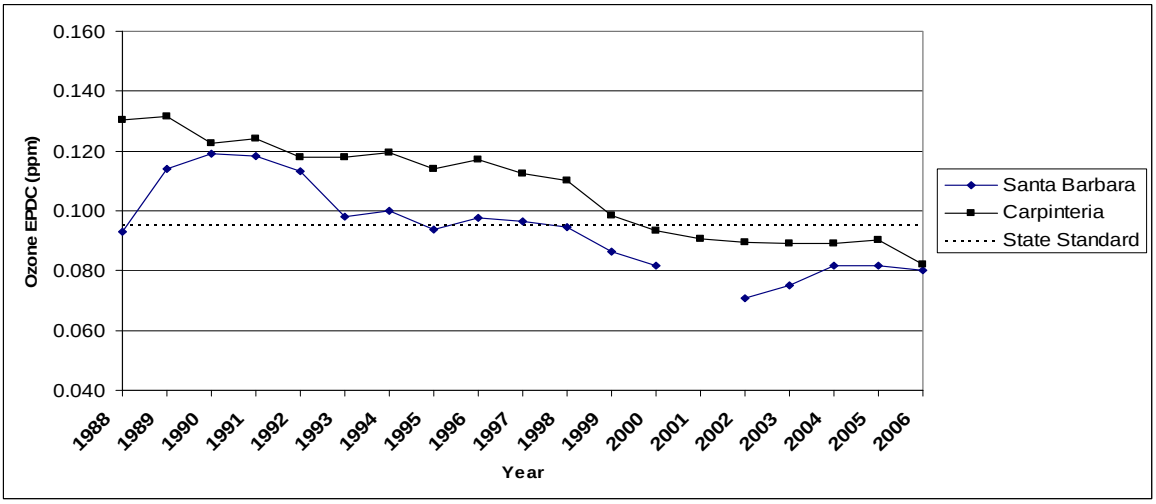
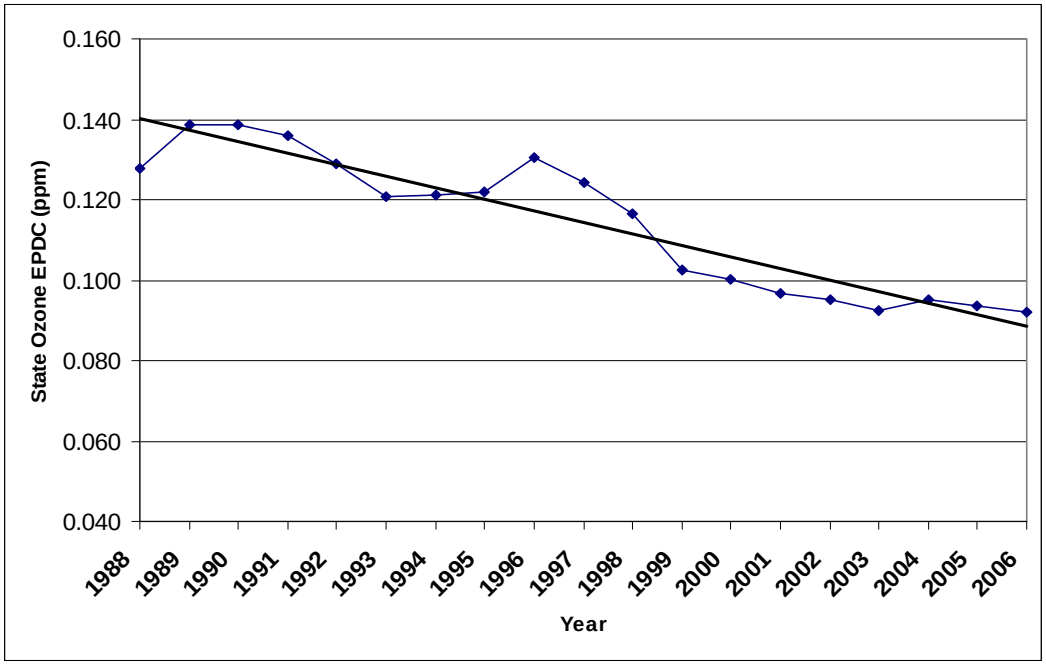


FIGURE 2-4

PEAK "HOT SPOT" EPDC TRENDS
1988 - 2006 ~~2005~~

LAS FLORES CANYON



PARADISE ROAD

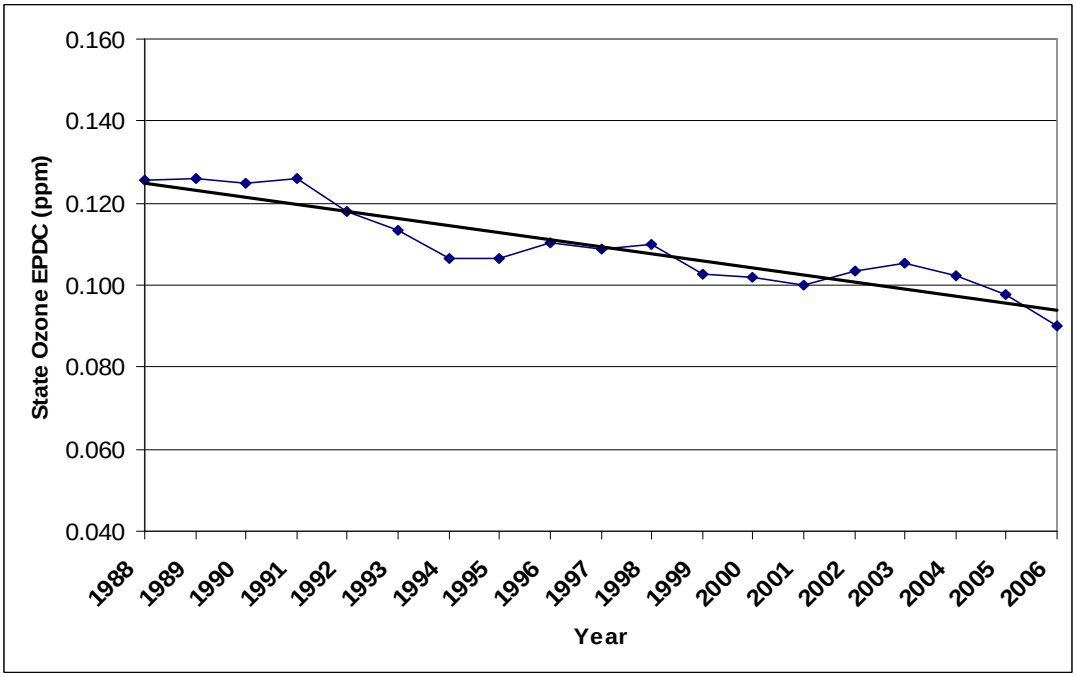


FIGURE 2-5A
POPULATION- AND AREA-WEIGHTED EXPOSURE
SANTA BARBARA COUNTY
1988 - 2005

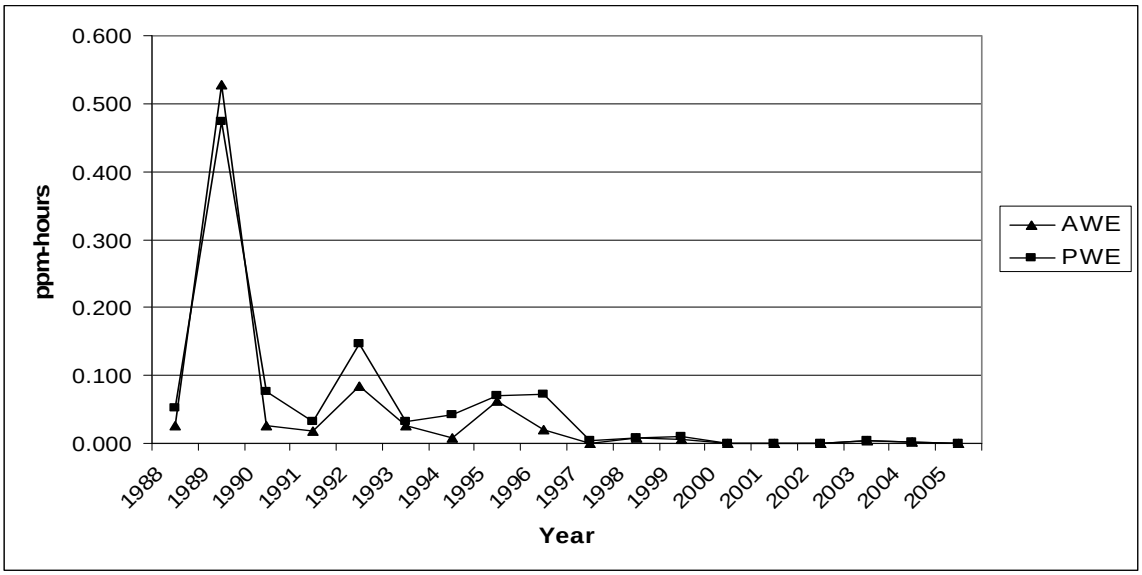


FIGURE 2-5B
POPULATION-AND AREA-WEIGHTED EXPOSURE
SANTA BARBARA COUNTY
1990 - 2005

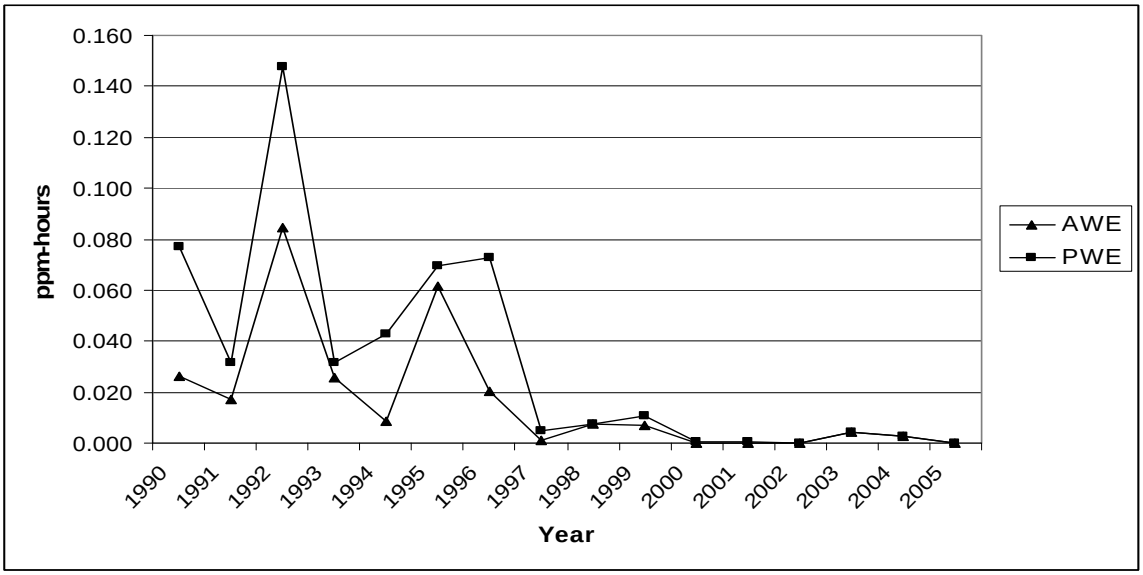
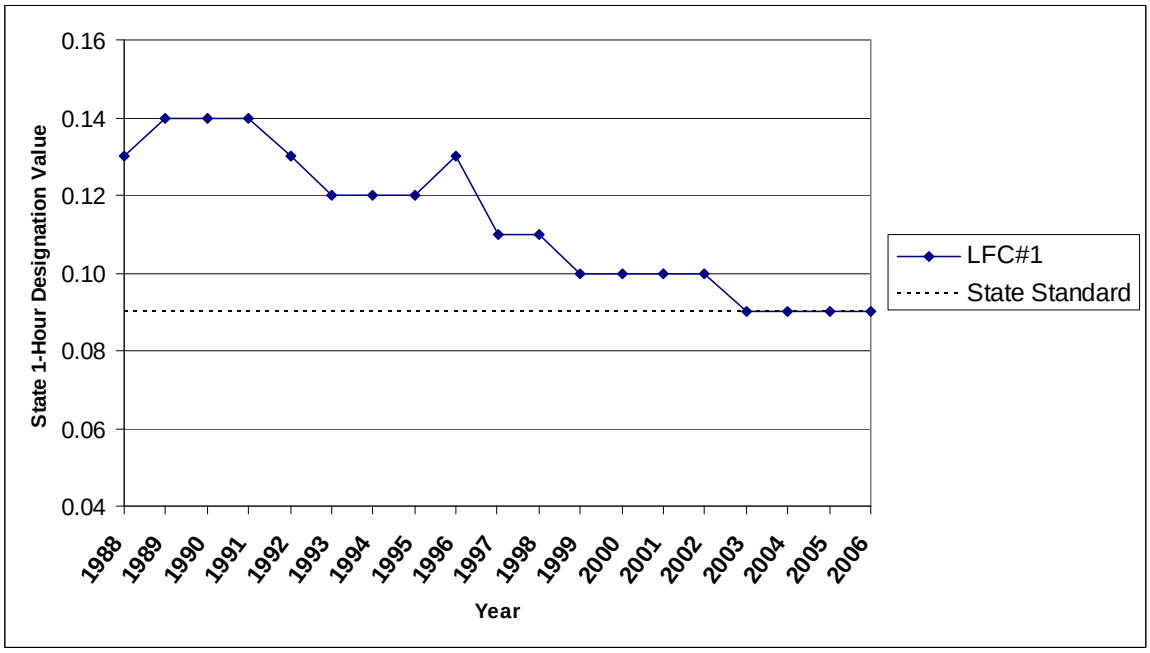


FIGURE 2-6
1988 – 2006 ~~2005~~ DESIGNATION VALUES
LAS FLORES CANYON AND PARADISE ROAD

LAS FLORES CANYON



PARADISE ROAD

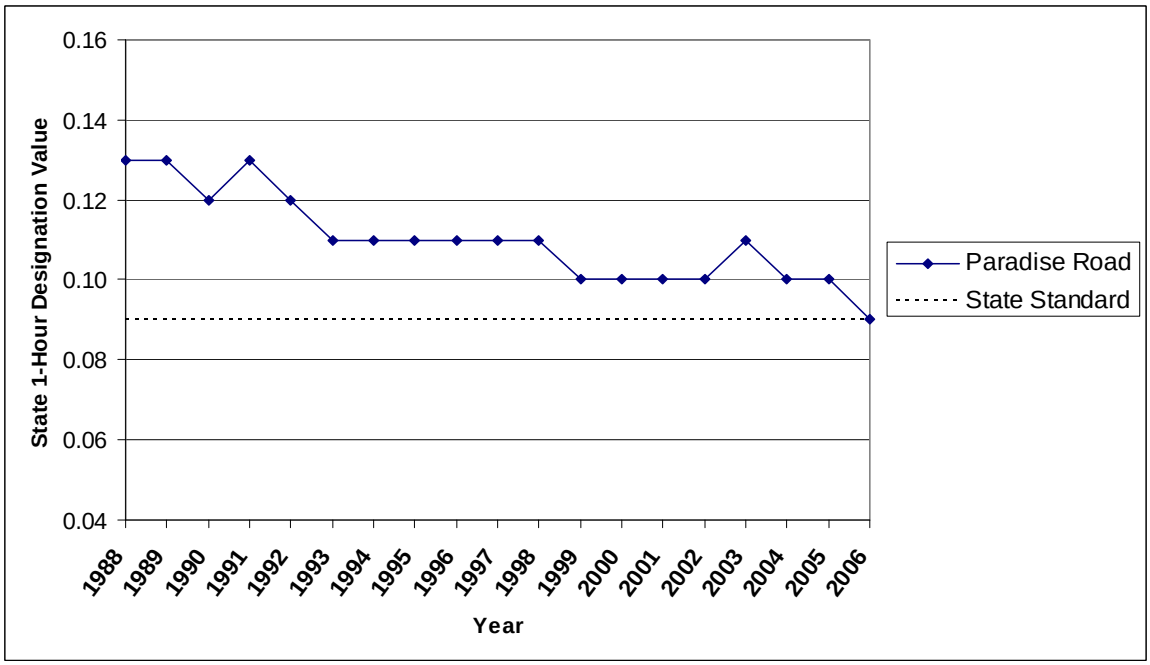
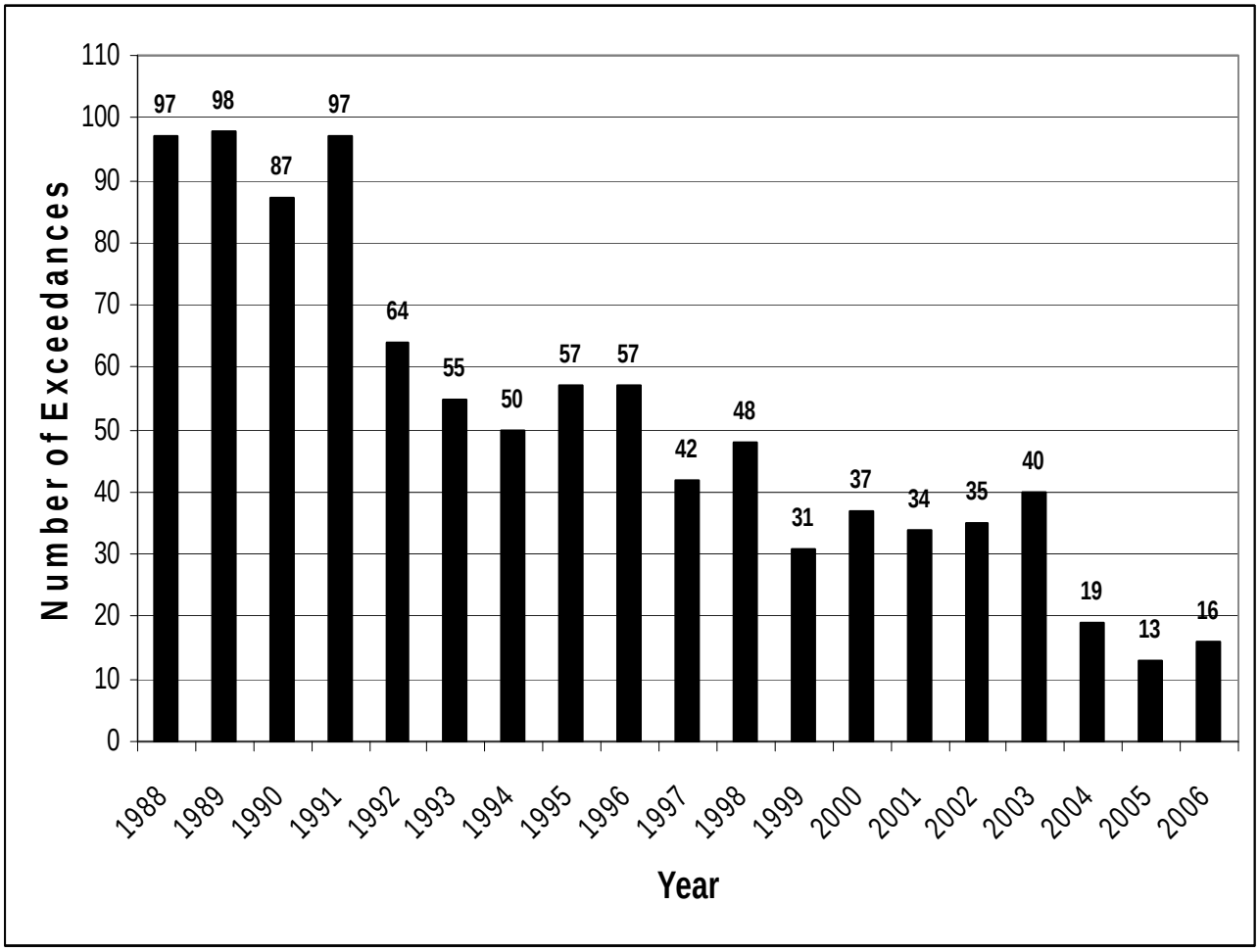


FIGURE 2-7
NUMBER OF DAYS EXCEEDING STATE 8-HOUR OZONE STANDARD
SANTA BARBARA COUNTY
1988-~~2005~~ 2006*



*2006 data are preliminary