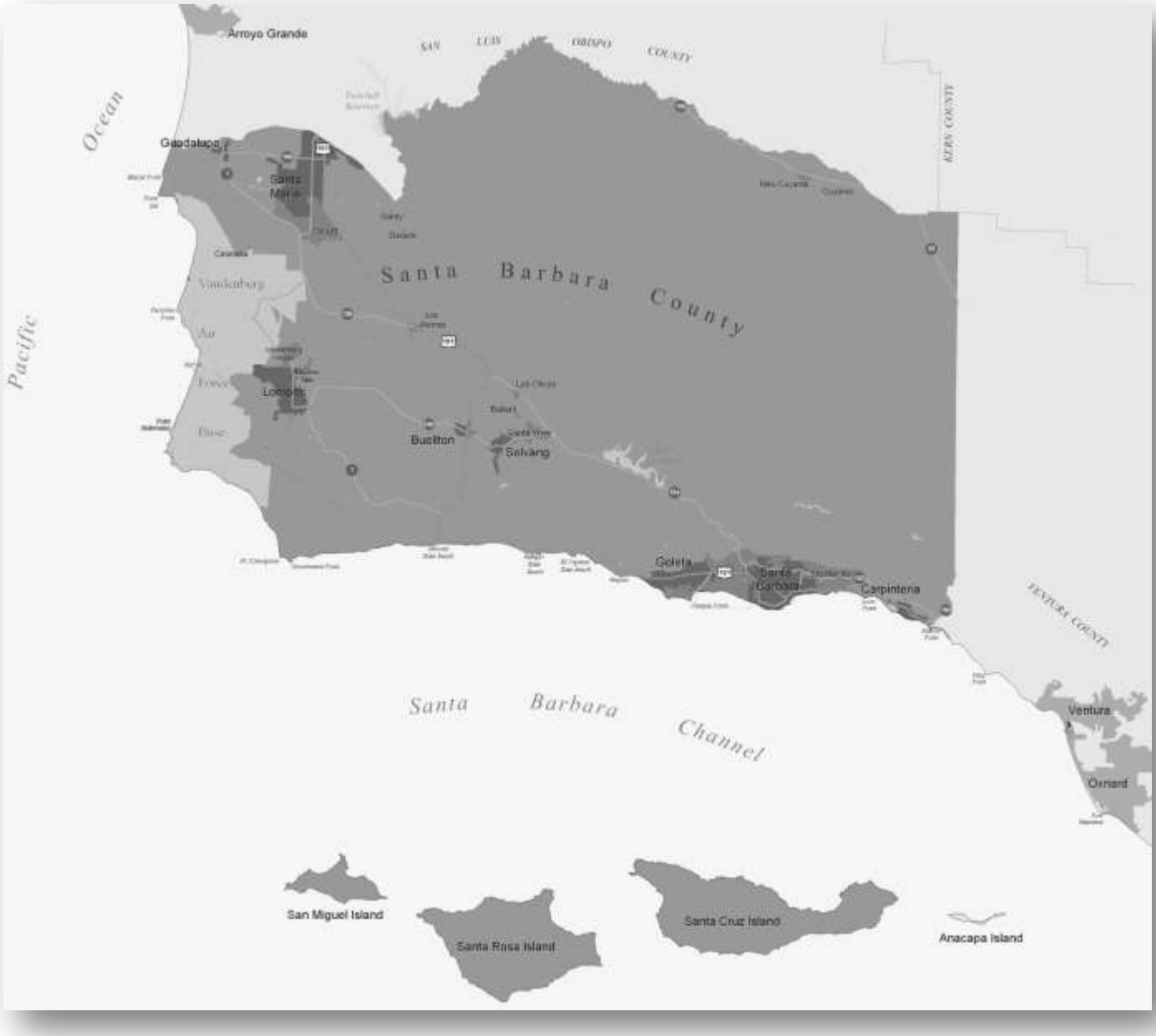
DRAFT

OCTOBER 2010

2010

CLEAN AIR PLAN

SANTA BARBARA COUNTY'S PLAN TO ATTAIN THE STATE OZONE STANDARD



Santa Barbara County
Air Pollution Control District

SBCAG
santa barbara county association of governments

2010

CLEAN AIR PLAN

SANTA BARBARA COUNTY'S PLAN TO ATTAIN THE STATE OZONE STANDARD

TRIENNIAL UPDATE TO THE 2007 CLEAN AIR PLAN – STATE OZONE STANDARD

DRAFT
OCTOBER 2010

SANTA BARBARA COUNTY
AIR POLLUTION CONTROL DISTRICT
260 N. SAN ANTONIO ROAD, SUITE A
SANTA BARBARA, CALIFORNIA 93110
WWW.SBCAPCD.ORG
(805) 961-8800

SANTA BARBARA COUNTY
ASSOCIATION OF GOVERNMENTS
260 N. SAN ANTONIO ROAD, SUITE B
SANTA BARBARA, CALIFORNIA 93110
WWW.SBCAG.ORG
(805) 961-8900

Santa Barbara County
Air Pollution Control District

BOARD OF DIRECTORS

SUPERVISOR **SALUD CARBAJAL**, FIRST DISTRICT
SANTA BARBARA COUNTY BOARD OF SUPERVISORS

SUPERVISOR **JANET WOLF**, SECOND DISTRICT
SANTA BARBARA COUNTY BOARD OF SUPERVISORS

SUPERVISOR **DOREEN FARR**, THIRD DISTRICT, **CHAIR**
SANTA BARBARA COUNTY BOARD OF SUPERVISORS

SUPERVISOR **JONI GRAY**, FOURTH DISTRICT
SANTA BARBARA COUNTY BOARD OF SUPERVISORS

SUPERVISOR **JOE CENTENO**, FIFTH DISTRICT
SANTA BARBARA COUNTY BOARD OF SUPERVISORS

MAYOR **VICTORIA POINTER**
CITY OF BUELLTON

VICE-MAYOR **AL CLARK**
CITY OF CARPINTERIA

COUNCILMEMBER **ED EASTON**
CITY OF GOLETA

MAYOR **LUPE ALVAREZ**
CITY OF GUADALUPE

MAYOR PRO-TEM **CECILIA MARTNER**
CITY OF LOMPOC

MAYOR **HELENE SCHNEIDER**
CITY OF SANTA BARBARA

MAYOR **LARRY LAVAGNINO**
CITY OF SANTA MARIA

COUNCILMEMBER **ED SKYTT**
CITY OF SOLVANG

AIR POLLUTION CONTROL OFFICER

TERRY DRESSLER

SBCAG

santa barbara county association of governments

BOARD OF DIRECTORS

SUPERVISOR **SALUD CARBAJAL**, FIRST DISTRICT, **CHAIR**
SANTA BARBARA COUNTY BOARD OF SUPERVISORS

SUPERVISOR **JANET WOLF**, SECOND DISTRICT
SANTA BARBARA COUNTY BOARD OF SUPERVISORS

SUPERVISOR **DOREEN FARR**, THIRD DISTRICT
SANTA BARBARA COUNTY BOARD OF SUPERVISORS

SUPERVISOR **JONI GRAY**, FOURTH DISTRICT
SANTA BARBARA COUNTY BOARD OF SUPERVISORS

SUPERVISOR **JOE CENTENO**, FIFTH DISTRICT
SANTA BARBARA COUNTY BOARD OF SUPERVISORS

MAYOR **VICTORIA POINTER**
CITY OF BUELLTON

COUNCILMEMBER **JOE ARMENDARIZ**
CITY OF CARPINTERIA

COUNCILMEMBER **ROGER ACEVES**
CITY OF GOLETA

MAYOR **LUPE ALVAREZ**
CITY OF GUADALUPE

MAYOR **MIKE SIMINSKI**
CITY OF LOMPOC

MAYOR **HELENE SCHNEIDER**
CITY OF SANTA BARBARA

MAYOR **LARRY LAVAGNINO**
CITY OF SANTA MARIA

COUNCILMEMBER **ED SKYTT**
CITY OF SOLVANG

EXECUTIVE DIRECTOR

JIM KEMP

2010
CLEAN AIR PLAN

DRAFT
OCTOBER 2010

PROJECT MANAGEMENT

RON TAN, SBCAPCD

MICHAEL POWERS, SBCAG

PRINCIPAL AUTHORS

RON TAN, SBCAPCD

JIM FREDRICKSON, SBCAPCD

DOUGLAS GRAPPLE, SBCAPCD

JOE PETRINI, SBCAPCD

ANDREW ORFILA, SBCAG

CONTRIBUTORS

TERRY DRESSLER, SBCAPCD

JOEL CORDES, SBCAPCD

BRIAN SHAFRITZ, SBCAPCD

TOM MURPHY, SBCAPCD (RETIRED)

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

LIST OF TABLES

Page #

CHAPTER 1 - INTRODUCTION

CHAPTER 2 – LOCAL AIR QUALITY

CHAPTER 3 – EMISSION INVENTORY

CHAPTER 4 – EMISSION CONTROL MEASURES

CHAPTER 5 – TRANSPORTATION CONTROL MEASURES

LIST OF TABLES (CONCLUDED)

Page #

CHAPTER 6 – EMISSION FORECASTING

CHAPTER 7 – STATE CLEAN AIR ACT REQUIREMENTS

CHAPTER 8 – STATE MANDATED TRIENNIAL PROGRESS REPORT AND TRIENNIAL PLAN REVISION

CHAPTER 9 – GREENHOUSE GASES AND CLIMATE CHANGE

CHAPTER 10 – TRANSPORTATION POLICY, AIR QUALITY AND LAND USE

LIST OF FIGURES

PAGE #

EXECUTIVE SUMMARY

CHAPTER 2 – LOCAL AIR QUALITY

CHAPTER 3 – EMISSION INVENTORY

LIST OF FIGURES (CONCLUDED)

CHAPTER 5 – TRANSPORTATION CONTROL MEASURES

CHAPTER 6 – EMISSION FORECASTING

CHAPTER 9 – GREENHOUSE GASES AND CLIMATE CHANGE

EXECUTIVE SUMMARY

- INTRODUCTION
- WHY IS THIS 2010 PLAN BEING PREPARED?
- WHAT'S NEW IN THIS 2010 PLAN?
- HOW WAS THIS 2010 PLAN PREPARED?
- WHAT ARE THE HEALTH EFFECTS OF OZONE?
- IS AIR QUALITY IMPROVING?
- HOW IS ATTAINMENT OF THE STATE OZONE STANDARD DETERMINED?
- DOES THIS 2010 PLAN ADDRESS ANY FEDERAL REQUIREMENTS?
- WHAT KEY STATE REQUIREMENTS DOES THIS 2010 PLAN ADDRESS?
- HOW HAS THE EMISSION INVENTORY CHANGED?
- WHERE DOES OUR HUMAN-GENERATED AIR POLLUTION COME FROM?
- HAS THE OVERALL CONTROL STRATEGY CHANGED?
- DOES THE 2010 PLAN SHOW THAT WE WILL ATTAIN THE STATE OZONE STANDARD?
- HOW DOES THE ADOPTION OF THIS 2010 PLAN IMPACT APCD RULEMAKING?

INTRODUCTION

Air quality in Santa Barbara County continues to improve and 2009 was one of the cleanest years on record. In fact, our air quality has improved to the point that the California Air Resources Board (ARB) has declared us as attainment for the state 1-hour ozone standard. Meeting this milestone is clear evidence that Santa Barbara County residents are breathing cleaner air. However, we do not yet comply with the state 8-hour ozone standard which is more protective of public health.

Continuing our progress toward clean air is a challenge that demands participation by the entire community. A Clean Air Plan represents the blueprint for air quality improvement in Santa Barbara County; the goals are to explain the complex interactions between emissions and air quality, and to design the best possible emission control strategy in a cost-effective manner. This 2010 Plan represents a partnership among the Santa Barbara County Air Pollution Control District (APCD), the Santa Barbara County Association of Governments (SBCAG), the California Air Resources Board (ARB), local businesses, and the community at large to reduce pollution from all sources: cars, trucks, industry, consumer products, and many more.

We have made remarkable progress in cleaning our air; the number of unhealthful air quality days in Santa Barbara County has been reduced dramatically since 1988 despite substantial increases in population and vehicle miles traveled. The community should be proud of these accomplishments in reducing air pollution. This 2010 Plan reflects a commitment to continue this progress and bring clean air to all of the residents of Santa Barbara County.

WHY IS THIS 2010 PLAN BEING PREPARED?

The California Clean Air Act mandates under Health and Safety Code sections 40924 and 40925 require that every three years areas update their clean air plans to attain the state ozone standard. More specifically, this 2010 Plan provides a three-year update to the APCD's 2007 Clean Air Plan. Previous plans developed to comply with the state ozone standard include the 1991 Air Quality Attainment Plan, the 1994 Clean Air Plan, the 1998 Clean Air Plan, the 2001 Clean Air Plan and the 2004 Clean Air Plan.

WHAT'S NEW IN THIS 2010 PLAN?

Each clean air plan represents a snapshot in time, based on the most current information available. This 2010 Plan is similar to the 2007 Clean Air Plan but includes significant new information. Some new key elements include:

- Updated local air quality information (through 2009)
- An updated baseline emission inventory (year 2007)
- An updated baseline emission estimate of marine shipping emissions (year 2007)
- Updated future year emission estimates for 2020 and 2030.
- A new Greenhouse Gas and Climate Protection chapter which includes a CO_2 emission inventory
- A new Transportation, Land Use and Air Quality chapter which discusses the linkages between these elements.

HOW WAS THIS 2010 PLAN PREPARED?

The APCD prepared this 2010 Plan in partnership with SBCAG and ARB. SBCAG provided future growth projections, developed the transportation control measures, and estimated the on-road mobile source emissions. ARB provided information on statewide mobile sources and consumer product control measures.

The APCD Board of Directors established the Community Advisory Council (CAC) to help provide important local policy and technical input on APCD clean air plans and rules. Starting in January 2010, the CAC considered various components of this 2010 Plan at their monthly meetings. The input provided by the CAC was, on many occasions, directly incorporated into this 2010 Plan. APCD staff also conducted a public workshop to obtain direct public input on the 2010 Plan.

WHAT ARE THE HEALTH EFFECTS OF OZONE?

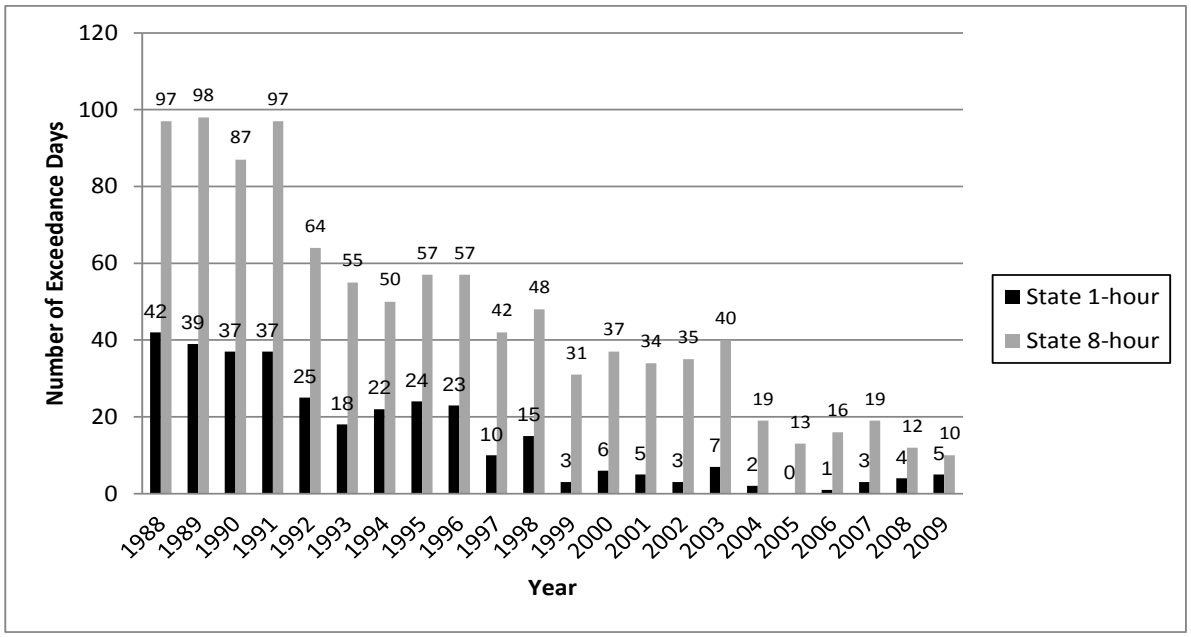
Ozone can damage the respiratory system, causing inflammation, irritation, and symptoms such as coughing and wheezing, and worsening of asthma symptoms. High levels of ozone are especially harmful for children, people who exercise outdoors, older people, and people with asthma or other respiratory problems. Ozone can harm the development of children's lungs, and recent studies suggest ozone plays a role in causing early childhood asthma. Ozone air pollution also hurts the economy by increasing hospital visits and medical expenses, and loss of work time due to illness, and by damaging crops, buildings, paint, and rubber.

IS AIR QUALITY IMPROVING?

A further indication of air quality improvement is shown in the historical exceedance data (Figure EX-1), 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. Additionally, the number of state 8-hour exceedances has decreased from 98 days in 1989 to 10 days in 2009.

The long-term declining trend in both state 1-hour and 8-hour exceedance days has occurred concurrently with increases in both population and daily vehicle miles traveled in Santa Barbara County. 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.

FIGURE EX-1
NUMBER OF DAYS EXCEEDING STATE 1-HOUR AND 8-HOUR OZONE STANDARDS



HOW IS ATTAINMENT OF THE STATE OZONE STANDARD DETERMINED?

Attainment of the state ozone standard is determined using a statistical model developed by the ARB that excludes extreme concentration events, which are not expected to occur more frequently than once per year. This statistical concentration is commonly referred to as the Expected Peak Day Concentration (EPDC). An area is considered to be in attainment of the state 1-hour and state 8-hour ozone standards if all monitoring stations have ozone concentrations less than 0.09 ppm, and 0.070 ppm, respectively, after excluding those days with concentrations identified as extreme events.

DOES THIS 2010 PLAN ADDRESS ANY FEDERAL REQUIREMENTS?

This 2010 Plan does not address any specific federal planning requirements as Santa Barbara was designated as a maintenance area for the federal 8-hour ozone standard. The 2007 Plan is a maintenance plan required under Section 110(a)(1) of the Federal Clean Air Act.

WHAT KEY STATE REQUIREMENTS DOES THIS 2010 PLAN ADDRESS?

The key requirements of the California Clean Air Act addressed in this 2010 Plan are the Triennial Progress Report (H&SC Section 40924(b)) and the Triennial Plan Revision (H&SC Section 40925(a)). Additionally, this 2010 Plan must provide an annual five percent emission reduction of ozone precursors, or, if this cannot be done, include every feasible measure as part of the emission control strategy. Finally, state law requires this 2010 Plan to provide for attainment of the state ambient air quality standards at the earliest practicable date (H&SC Section 40910).

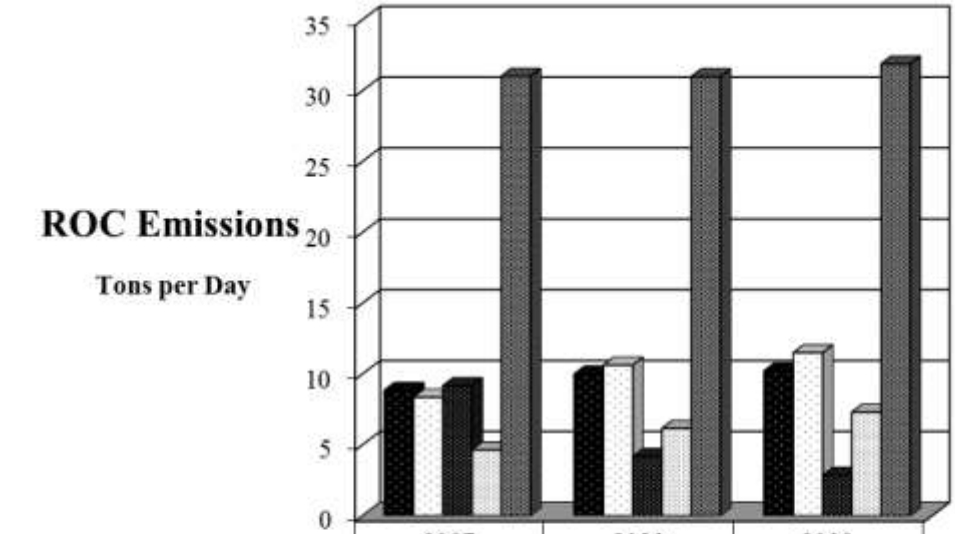
HOW HAS THE EMISSION INVENTORY CHANGED?

An updated emission inventory was developed for 2007 for both onshore and Outer Continental Shelf (OCS) sources for this 2010 Plan. This inventory serves as our base year emission inventory, and is used to forecast emissions for 2020 and 2030. The 2007 emission inventory was developed in accordance with ARB policies and procedures. The emissions inventory follows the organizational structure developed by ARB, and assigns all air pollution sources into one of four categories: stationary sources, area-wide sources, mobile sources, and natural sources. The biggest change to the emission inventory since the 2007 Plan is to future marine shipping emissions which are significantly lower than previously estimated.

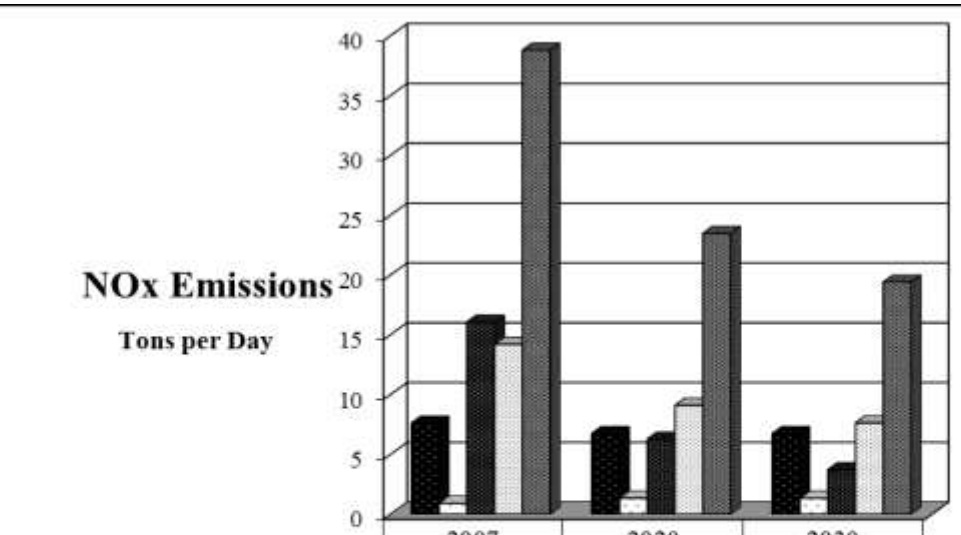
WHERE DOES OUR HUMAN-GENERATED AIR POLLUTION COME FROM?

Figure EX-2 shows Santa Barbara County's onshore emission inventory for 2007 to 2030. This figure presents the estimated emissions of reactive organic compounds and oxides of nitrogen (precursors that combine to form ozone), generated locally by human activities. This does not include emissions on the Outer Continental Shelf, or those from natural sources (seeps and vegetation). The largest contributor to our locally generated air pollution is on-road mobile sources (cars and trucks). Other mobile sources (planes, trains, boats, off-road equipment, farm equipment), the evaporation of solvents, combustion of fossil fuels, surface cleaning and coating, prescribed burning, and petroleum production and marketing combine to make up the remainder. Figure EX-3 shows the emission inventory for the Outer Continental Shelf, where the majority of reactive organic compounds and oxides of nitrogen emissions come from mobile sources (predominantly international marine shipping activities).

FIGURE EX-2
SANTA BARBARA COUNTY ONSHORE ROC & NO_X EMISSIONS

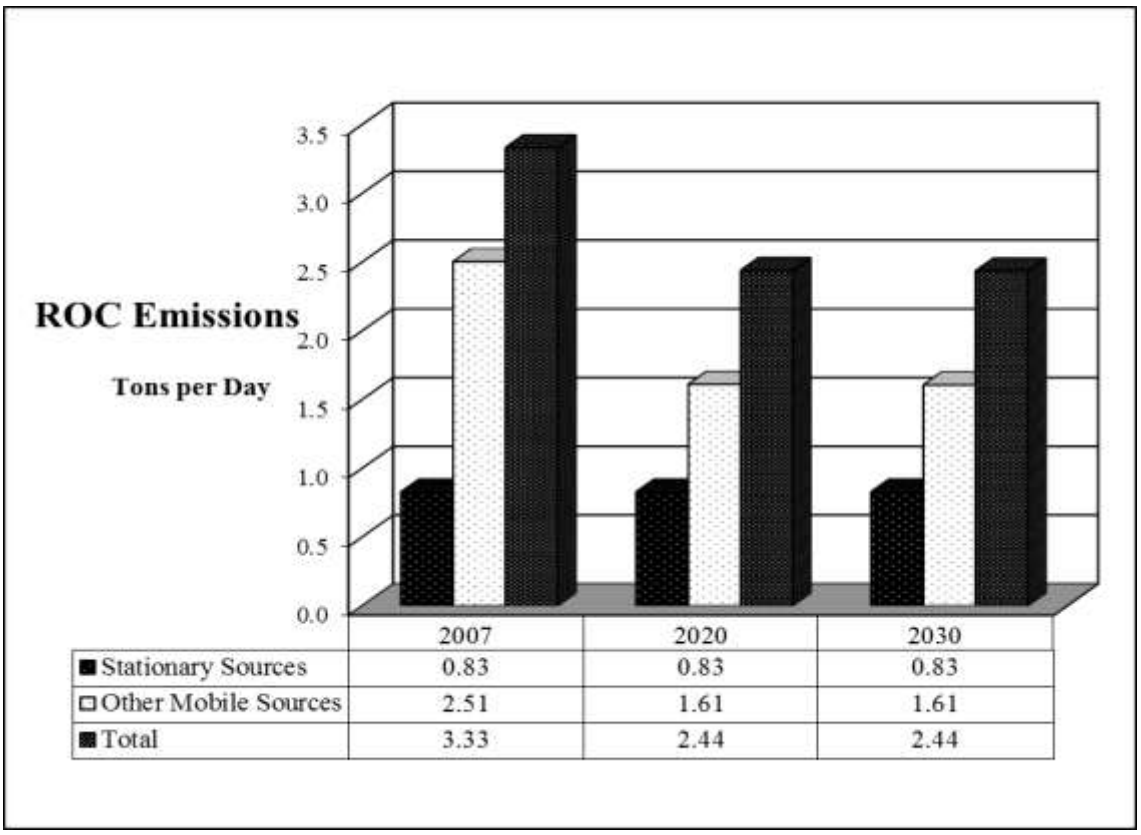


	2007	2020	2030
Stationary Sources (including Source Register ERC's)	8.85	10.00	10.22
Area-Wide Sources	8.36	10.63	11.50
On-Road Motor Vehicles	9.17	4.19	2.86
Other Mobile Sources (including VAFB ABL)	4.64	6.16	7.30
Total	31.01	30.98	31.88

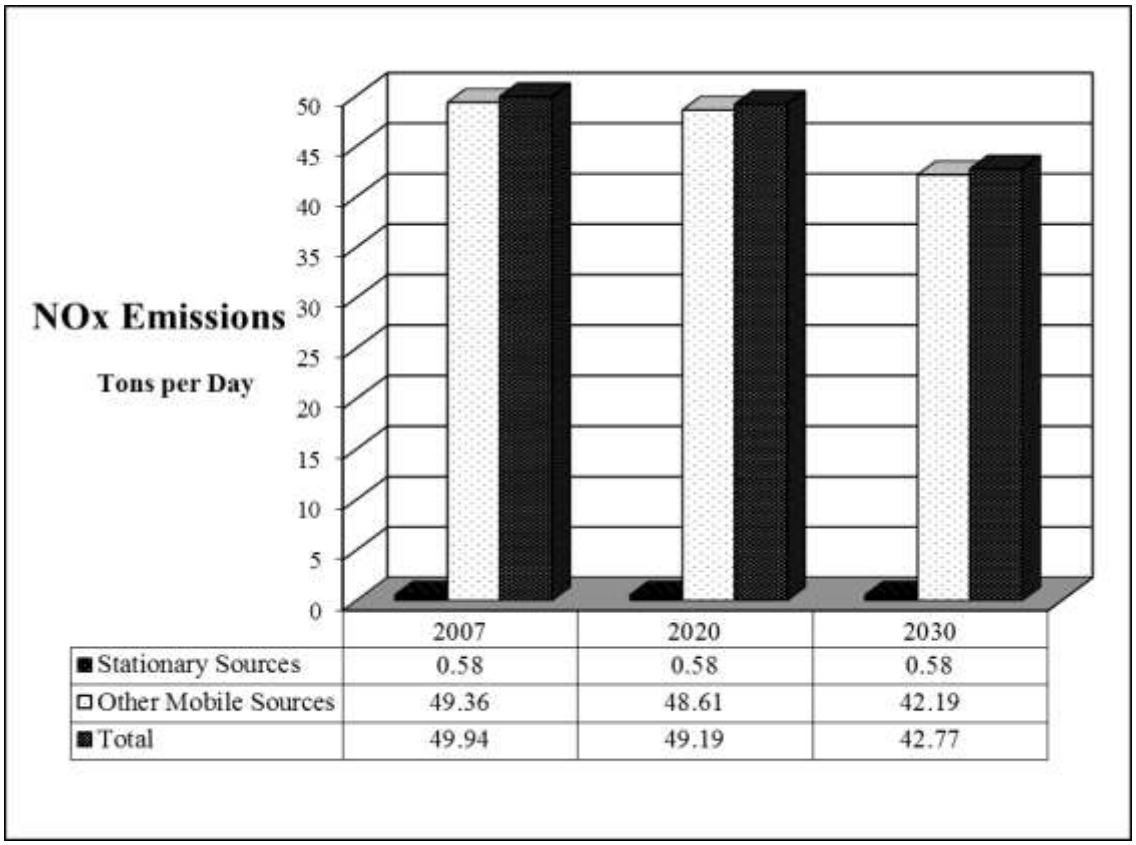


	2007	2020	2030
Stationary Sources (including Source Register ERC's)	7.61	6.74	6.73
Area-Wide Sources	0.91	1.34	1.32
On-Road Motor Vehicles	16.06	6.28	3.72
Other Mobile Sources (including VAFB ABL)	14.21	9.11	7.63
Total	38.79	23.47	19.41

FIGURE EX-3
OUTER CONTINENTAL SHELF ROC & NO_X EMISSIONS



	2007	2020	2030
Stationary Sources	0.83	0.83	0.83
Other Mobile Sources	2.51	1.61	1.61
Total	3.33	2.44	2.44



	2007	2020	2030
Stationary Sources	0.58	0.58	0.58
Other Mobile Sources	49.36	48.61	42.19
Total	49.94	49.19	42.77

HAS THE OVERALL CONTROL STRATEGY CHANGED?

No, the overall strategy for control of both reactive organic compounds and oxides of nitrogen adopted in the 2007 Clean Air Plan continues in this 2010 Plan. This 2010 Plan proposes revised stationary emission control measures based on our most recent all feasible measures analysis.

DOES THE 2010 PLAN SHOW THAT WE WILL ATTAIN THE STATE 8-HOUR OZONE STANDARD?

Our air quality monitoring data indicates that we have attained the state 1-hour ozone standard. We will be relying on the 2010 Plan's control strategies and measures to remain in attainment for this standard as well as to assist us in attaining the stricter state 8-hour ozone standard.

This 2010 Plan shows that onshore emissions of reactive organic compounds and oxides of nitrogen will continue to decrease through 2030, due primarily to on-road mobile source emission reduction measures. We expect a slight decrease in oxides of nitrogen and a slight increase in reactive organic compound emissions to occur in the OCS due to marine shipping activities.

HOW DOES THE ADOPTION OF THIS 2010 PLAN IMPACT APCD RULEMAKING?

The rules that are proposed in this 2010 Plan are directly included into the rulemaking priorities of the APCD. The measures that this Plan proposes on a near-term or mid-term basis will be adopted by the APCD according to that schedule. The formal adoption of this 2010 Plan by the APCD Board of Directors establishes the commitments to adopt all proposed rules according to the schedule identified in the plan.

CHAPTER 1

INTRODUCTION

- PURPOSE
- CURRENT STATE PLANNING REQUIREMENTS
- SUMMARY OF ATTAINMENT PLANNING EFFORTS
- PLAN ORGANIZATION

1. INTRODUCTION

1.1 PURPOSE

The purpose of this 2010 Clean Air Plan (2010 Plan) is to chart a course of action that will ensure clean, healthful air for the residents and environment of Santa Barbara County. Clean air is fundamental to good public health; it enhances the environment and contributes to the attractiveness of the area to residents, businesses, and visitors. Fortunately, our air quality has been improving through the implementation of several air quality plans. These plans have been developed for Santa Barbara County as required by both the 1988 California Clean Air Act (State Act) and the 1990 Federal Clean Air Act Amendments (Federal Act).

Santa Barbara County's air quality has historically violated both the state and federal ozone standards. Ozone concentrations above these standards adversely affect public health, diminish the production and quality of many agricultural crops, reduce visibility, and damage native and ornamental vegetation. Since 1999, however, local air quality data show that every monitoring location in Santa Barbara County complies with the federal 1-hour ambient air quality standard for ozone. And on August 8, 2003, Santa Barbara County officially became an attainment area for the federal 1-hour ozone standard.

On June 15, 2004, USEPA replaced the federal 1-hour ozone standard with an 8-hour ozone standard for Santa Barbara County and most parts of the country. This 8-hour ozone standard, originally promulgated by USEPA on July 18, 1997, is set at 0.08 parts per million measured over eight hours and is more protective of public health and more stringent than the federal 1-hour standard. For the purposes of the federal 8-hour ozone standard, Santa Barbara County has been designated attainment and the 2007 Clean Air Plan provided for maintenance of this federal standard.

In March 2008, USEPA revised the 8-hour federal ozone standard from 0.08 ppm to 0.075 ppm. However, on September 16, 2009, EPA announced it would reconsider the 2008 standard of 0.075 ppm to ensure that this standard is clearly grounded in science and protect the public health with an adequate margin of safety. In January 2010 USEPA announced that the revised standard would be between 0.060 and 0.070 ppm. A final decision is anticipated in Fall 2010.

Our County's air quality has improved enough to be considered in attainment of the federal 8-hour ozone standard and the state 1-hour ozone standard. As we have yet to attain the state 8-hour ozone standard this 2010 CAP demonstrates how we plan to attain that standard. This 2010 CAP will therefore satisfy all state triennial planning requirements.

Included in this 2010 CAP is a new Climate Protection chapter which discusses greenhouse gas emissions and climate change issues in a planning context. This chapter is informational and not regulatory in nature, presents an overview of global climate change issues and provides a baseline 2007 carbon dioxide (CO_2) inventory for the county. Also new in this 2010 CAP is another informational chapter which discusses the impact transportation and land planning have on air quality and strategies which can mitigate these impacts.

1.2 CURRENT STATE PLANNING REQUIREMENTS

The California Clean Air Act requires that we report our progress in meeting state mandates and revise our 1991 Air Quality Attainment Plan (1991 AQAP) to reflect changing conditions on a triennial basis. There are two major items required to be in the triennial update (Sections 40924 and 40925 of the California Health and Safety Code): a Triennial Progress Report and a Triennial Plan Revision. The Triennial Progress Report must assess the overall effectiveness of an air quality program and the extent of air quality improvement resulting from the Plan. The Triennial Plan Revision must correct for deficiencies in meeting the interim measures of progress and incorporate new data or projections into the Plan.

The control strategy originally presented in the 1991 AQAP failed to produce the state mandated five percent per year emission reductions, so the 1991 AQAP was approved under the every feasible measure option. The evaluation of every feasible measure was conducted for subsequent clean air plans developed in 1994, 1998, 2001, 2004 and 2007 and will be re-evaluated in this 2010 CAP. In addition to the requirements that the State Act mandates for Santa Barbara County as a nonattainment area for the state ozone standard, we are also responsible for the impacts our air pollution has on areas downwind of us. The State Act mandates that ARB identify air basins (or portions thereof) in which transported air pollutants cause or contribute to violations of the state 1-hour ozone standard in downwind areas and establish mitigation requirements commensurate with the level of contribution.

This 2010 CAP examines the emission reductions achieved from existing and proposed regulations with respect to every feasible measure and identifies measures for further study. It also examines the change in emissions related to changes in population, industrial activity, vehicle use, and provides updated emission inventories out to 2030. Finally, this plan evaluates local air quality indictors and the impact of our local air pollution on areas downwind of us.

1.3 SUMMARY OF ATTAINMENT PLANNING EFFORTS

Several prior air quality plans have been prepared for Santa Barbara County. The first clean air plan for Santa Barbara County was the 1979 Air Quality Attainment Plan (1979 AQAP) which was updated in 1982. These two plans were prepared in response to mandates established by the Federal Clean Air Act Amendments of 1977. At that time only the southern portion of the county, the region south of the Santa Ynez Mountains, violated the federal 1-hour ozone standard. The 1982 update predicted attainment of the federal ozone standard by 1984, but acknowledged that the county's ability to attain the federal ozone standard was uncertain because pollution generated on the OCS was not considered in the Plan.

The predicted attainment of the federal ozone standard did not occur. As a consequence, the USEPA called for an update to the 1982 Air Quality Attainment Plan on March 17, 1986. On May 26, 1988, the USEPA issued a subsequent mandate that our planning efforts address air quality for the entire county. This new mandate was issued in response to the failure of many regions of the country to attain the federal 1-hour ozone standard by 1987. In response, the APCD prepared the 1989 Air Quality Attainment Plan (1989 AQAP), which was adopted by the APCD Board of Directors in June of 1990 and was designed to bring the southern portion of the county into attainment with the federal 1-hour ozone standard.

The APCD also prepared a 1991 Air Quality Attainment Plan (1991 AQAP). This plan was required by the State Act to bring the entire county into attainment of the more health protective California ozone standard. The APCD Board of Directors adopted the 1991 AQAP in December 1991 and ARB approved it in August 1992.

In 1990, Congress amended the federal Clean Air Act (Federal Act). The Federal Act required Santa Barbara County, as a "moderate" nonattainment area, to submit a Rate-of-Progress Plan to the USEPA by November 15, 1993, and an attainment demonstration by November 15, 1994. The 1994 Clean Air Plan (1994 CAP) that contained these required elements was adopted by the APCD Board of Directors and formally submitted to the USEPA on November 15, 1994. The 1994 CAP included: amendments to the 1993 Rate-of-Progress Plan (1993 ROP); an attainment demonstration of the federal ozone standard by 1996; a request for redesignation from a nonattainment area to an attainment area for the federal ozone standard; and a plan to show maintenance of the federal ozone standard through the year 2006. The 1994 CAP also provided a three-year update to the 1991 AQAP for the state ozone standard, as required by the State Act.

On January 8, 1997, the USEPA approved several elements of the 1994 CAP, including the amendments to the 1993 ROP, the base year emission inventory, and the control strategy. USEPA did not approve the attainment demonstration element due to violations of the federal 1-hour standard that occurred during 1994-1996. This element was withdrawn from the 1994 CAP submittal. Similarly, the USEPA never acted upon the maintenance plan element due to the measured violations of the federal 1-hour ozone standard.

On December 10, 1997, the USEPA issued a final action finding that Santa Barbara County had not attained the federal 1-hour ozone standard by the statutory attainment date for "moderate" nonattainment areas of November 15, 1996. As a result, the entire Santa Barbara County nonattainment area was reclassified as a "serious" nonattainment area by operation of federal law. The USEPA action mandated that we continue progress toward the federal 1-hour ozone standard through the development of a revised Clean Air Plan. The 1998 CAP was adopted by the APCD Board of Directors on December 17, 1998, and forwarded by the ARB to the USEPA on March 19, 1999. The 1998 CAP addressed all the new federal planning requirements for "serious" nonattainment areas and was approved by the USEPA on August 14, 2000. The 1998 CAP also addressed the triennial plan revision and progress report requirements under the State Act.

Since 1999, local air quality data collected in Santa Barbara County showed that we had achieved the federal 1-hour ozone standard. Achieving this milestone allowed us to request USEPA to designate the county as an attainment area for this standard. The 2001 CAP was adopted by the APCD Board of Directors on November 15, 2001 and subsequently amended on December 19, 2002. The 2001 CAP addressed all federal planning requirements for "maintenance plans" and provided for ongoing attainment of the federal 1-hour ozone standard through the year 2015. The plan was forwarded by the ARB to USEPA on February 21, 2002, formally approved by USEPA on July 9, 2003, and became effective on August 8, 2003 with Santa Barbara County being officially designated as an attainment area. The 2001 CAP also addressed the state triennial plan revision and progress report requirements under the State Act.

The 2004 Clean Air Plan (2004 CAP) was prepared to address the California Clean Air Act mandates under Health and Safety Code sections 40924 and 40925 requiring that every three years

areas update their clean air plans to attain the state 1-hour ozone standard. The 2004 CAP was a three year update to the 2001 CAP. Because we had yet to meet the state 1-hour ozone standard at the time the 2004 CAP was prepared, the State Act required that we report our the overall effectiveness of our air quality plan, the extent of air quality improvements resulting from the plan and any revisions to deficiencies identified in the plan. On December 16, 2004, the APCD Board of Directors adopted the 2004 CAP to fulfill this requirement.

In April 2005, ARB approved a new more health protective air quality standard for ozone with special consideration for children's health. The new state 8-hour ozone 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. This standard became effective on May 17, 2006 and based on our ambient air quality data, Santa Barbara County has been classified as nonattainment for the state 8-hour ozone standard.

The 2007 Clean Air Plan (2007 CAP) addressed both federal and state requirements, serving as the maintenance plan for the federal 8-hour ozone standard and as the state triennial update required by the Health and Safety Code by demonstrating how we will expedite attainment of the state 8-hour ozone standard. The 2007 CAP has been reviewed by ARB and is currently undergoing review by EPA.

A summary of Santa Barbara County's planning activities that addressed state mandates is presented in Table 1-1 beginning with the 1991 AQAP.

1.4 PLAN ORGANIZATION

Chapter 2, Local Air Quality, provides a summary of Santa Barbara County's climatology, air quality trends, and discusses the status of ARB's re-assessment of our transport contributions to neighboring air districts.

Chapter 3, Emission Inventory, establishes a baseline emissions inventory for Santa Barbara County by quantifying the emissions of reactive organic compounds and oxides of nitrogen for the year 2007. This emission inventory is tailored to meet state requirements.

Chapter 4, Emission Control Measures, provides an overview of the APCD's control measures in relation to the "every feasible measure" requirement of the State Act. This chapter identifies the status of each control measure in relation to state requirements.

Chapter 5, Transportation Control Measures, describes all transportation-related control measures, and identifies their applicability to state requirements.

Chapter 6, Emission Forecasting, details the forecast procedures used to develop future year emission inventories for 2020 and 2030.

Chapter 7, State Clean Air Requirements, provides an overview of all state Clean Air Act planning requirements and discusses how the work completed in conjunction with this 2010 CAP complies with all applicable requirements.

Chapter 8, State mandated Triennial Progress Report and Triennial Plan Revision satisfies the Health and Safety Code which requires us to document our progress towards meeting the state ambient air quality standards.

Chapter 9, Climate Protection, presents an overview of global climate change issues and provides a baseline 2007 carbon dioxide (CO2) inventory for the county.

Chapter 10, Transportation, Land use and Air Quality, provides a discussion of how land use and transportation planning decisions impact air quality and strategies to mitigate those impacts.

Table 1 - 1

Comparison of the 1991 AQAP, 1994 CAP, 1998 CAP, 2001 CAP, 2004 CAP, 2007 CAP and 2010 CAP

	Mandates	Air Quality Standards	Region Covered	Emission Inventory	Plan Summary
1991 AQAP	State Act	Addresses only the state 1-hour ozone standard (0.09 parts per million).	All of Santa Barbara County failed to attain the state 1-hour ozone standard. The 1991 AQAP covered the entire county.	A 1987 baseline inventory of emission sources countywide was developed, but excluded sources in the Outer Continental Shelf. Forecasted inventories included 1991, 1994, 1997, 2000, and 2010	The 1991 AQAP was required to reduce ROG and NO_x emissions by 5% per year until the state 1-hour ozone standard was achieved, or to include all feasible control measures.
1994 CAP	Federal Act and State Act	Addresses both the state 1-hour ozone standard (0.09 parts per million) and the federal 1-hour ozone standard (0.12 parts per million).	Under the Federal Act, all of Santa Barbara County failed to attain the federal 1-hour ozone standard. The 1994 CAP covers the entire county and the Outer Continental Shelf.	A 1990 baseline inventory of emission sources countywide was developed, including sources in the Outer Continental Shelf. The 1990 inventory was used to forecast a 1996 inventory. Also, an "emission budget" for ROG and NO_x was established.	The 1994 CAP was required to demonstrate attainment of the federal 1-hour ozone standard by 1996; document amendments to the 1993 ROP; initiate the federal re-designation process; and satisfy state triennial update requirements.
1998 CAP	Federal Act and State Act	Addresses both the state 1-hour ozone standard (0.09 parts per million) and the federal 1-hour ozone standard (0.12 parts per million).	The USEPA re-classified the entire county as a “serious” nonattainment area. The 1998 CAP covers the entire county and the Outer Continental Shelf.	A 1996 baseline inventory of emission sources countywide was developed, including sources in the Outer Continental Shelf. The 1996 inventory was used to update the 1990 emissions and to forecast 1999 and 2005 emissions. Also, an "emission budget" for ROG and NO_x was established.	The 1998 CAP was required to demonstrate attainment of the federal 1-hour ozone standard by 1999 and show a 24% reduction in ROG emissions between 1990 and 1999. This 1998 CAP also satisfied state planning requirements.
2001 CAP	Federal Act and State Act	Addresses both the state 1-hour ozone standard (0.09 parts per million) and the federal 1-hour ozone standard (0.12 parts per million).	The Maintenance Plan and redesignation request covers the onshore area of Santa Barbara County and the Outer Continental Shelf.	A 1999 baseline inventory of emission sources countywide was developed, including sources in the Outer Continental Shelf. The 1999 inventory was used to develop an “attainment inventory” and to forecast 2005, 2010, and 2015 emissions. Also, an "emission budget" for ROG and NO_x are re-established.	The 2001 CAP contained a Maintenance Plan and redesignation request for the federal 1-hour ozone standard. The 2001 CAP also satisfied state planning requirements.
2004 CAP	State Act	Addresses only the state 1-hour ozone standard (0.09 parts per million).	The 2004 CAP covers the onshore area of Santa Barbara County and the Outer Continental Shelf.	A 2000 baseline inventory of emission sources countywide was developed including sources in the Outer Continental Shelf. The 2000 inventory was used to forecast 2005, 2010, 2015, and 2020 emissions. No “emission budgets” are established or re-established in the CAP.	The 2004 CAP focused solely on California Clean Air Act requirements.
2007 CAP	Federal Act and State Act	Addresses both the state ozone standard and the federal 8-hour ozone standard	The federal 8-hour ozone Maintenance Plan covers the onshore area of Santa Barbara County and the Outer Continental Shelf.	A 2002 baseline inventory of emission sources countywide was developed, including sources in the Outer Continental Shelf. The 2002 inventory was used to forecast 2010, 2015 and 2020 emissions.	The 2007 CAP contained a federal 8-hour ozone Maintenance Plan The 2007 CAP also satisfied state planning requirements.
2010 CAP	State Act	Addresses only the state ozone standard	The 2010 CAP covers the onshore area of Santa Barbara County and the Outer Continental Shelf.	A 2007 baseline inventory of emission sources countywide was developed, including sources in the Outer Continental Shelf. The 2007 inventory was used to forecast 2020 and 2030 emissions.	The 2010 CAP satisfies state planning requirements.

CHAPTER 2

LOCAL AIR QUALITY

- INTRODUCTION
- CLIMATE OF SANTA BARBARA COUNTY
- AIR QUALITY MONITORING
- STATE OZONE EXCEEDANCES
- STATE AIR QUALITY INDICATORS
- STATE DESIGNATION VALUES
- CONCLUSION

2. LOCAL AIR QUALITY

2.1 INTRODUCTION

This chapter provides the background for this 2010 Plan by presenting an overview of the climate of Santa Barbara County, and an assessment of local air quality trends using California Air Resources Board (ARB) specified indicators. 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 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 state -8-hour ozone exceedance occurs when ozone is measured over the standard of 0.070 ppm. A state ozone standard violation occurs when the state 8-hour design value is greater than the standard itself. Design values are discussed in more detail later in this chapter. 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 2008 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 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 United States Environmental Protection Agency (USEPA) to protect public health, vegetation, materials and visibility, shown in **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, Santa Barbara County Air Pollution Control District (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.

2.4 STATE OZONE EXCEEDANCES

Figure 2-2a presents the number of state ozone exceedances in Santa Barbara County during the period of 1988 to 2009. 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 state 8-hour ozone standard exceedances ranges from 98 days in 1989 to 10 exceedance days during 2009.

The most striking feature of Figure 2-2a is the dramatic decrease in the number of state 1-hour ozone exceedances since 1988. The exceedance data show that there is a clear declining trend in the number of state 1-hour ozone exceedances from 1988 through 1999. Since 1999, however, the state 1-hour ozone exceedance trend is less discernable and likely more the result of natural year-to-year variability of weather patterns.

The 8-hour ozone exceedance data also show a clear declining trend since 1988. These data, however, show that there are distinct periods where the number of 8-hour exceedances is relatively stable but decrease substantially from one period to the next. Between 1991 and 1992 the number of 8-hour exceedances decreased from 97 to 64 days; between 1996 and 1997 the number of exceedance days declined from 57 to 42; and from 2003 to 2004 the number of state 8-hour exceedances decreased from 40 day to 19 days.

It is important to note that the long-term declining trend in both state 1-hour and 8-hour exceedance days has occurred concurrently with increases in both population and daily vehicle miles traveled in Santa Barbara County, shown in 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 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). The exposure data are typically provided by ARB and have been presented in previous plans. ARB, however, is no longer providing area-weighted and population-weighted exposure data to the districts and those data are not available to be included in this plan. As an alternative, ARB has recommended that in addition to peak 1-hour and 8-hour concentrations, the mean of the highest thirty 1-hour and 8-hour concentrations be included in this plan.

2.5.1 PEAK ONE-HOUR CONCENTRATION INDICATORS

The indicator data were provided by the ARB with the recommendation that we report improvement in air quality using the Expected Peak Day Concentration (EPDC), and the mean of the highest 30 concentrations.

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 2007 EPDC for a monitoring site uses data from 2005, 2006 and 2007. The data that are used in the calculation are the daily maximum 1-hour and 8-hour ozone 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 2008 peak 1-hour 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 1-hour 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 also shown considerable improvement in air quality from earlier years. 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. The 2007 through 2009 data show that the EPDC at Paradise Road continues to remain below 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, shown in Table 2-2. The Las Flores Canyon monitoring site had a maximum of 24 state 1-hour ozone exceedances in 1990 with no exceedances during 2002, 2005 and 2006, while the number of state 1-hour ozone exceedances at the Paradise Road site has ranged from 24 in 1988 to no state ozone exceedances during 2000, 2005 and 2006.

Figure 2-4 presents the overall 1-hour EPDC trend improvement for both the Las Flores Canyon and Paradise Road sites from 1988 to 2009. The 1-hour 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 0.093 ppm during 2009. At the Paradise Road site, the peak indicator was as high as 0.125 ppm in 1989 and 1991, decreasing to 0.090 ppm by 2006 and is currently at 0.088 ppm. The overall 1-hour EPDC improvement for the Las Flores Canyon site from 1988 to 2009 is about 27%. The Paradise Road EPDC trend improvement is about 30 % over the period of 1988 to 2009.

2.5.2 PEAK 8-HOUR CONCENTRATION INDICATORS

Figure 2-5 presents 8-hour EPDC data from 1988 through 2009. Based on these data, five monitoring stations in Santa Barbara County have 8-hour EPDC's greater than the state standard (Carpinteria, Las Flores Canyon, Lompoc HS&P, Santa Ynez, and Paradise Road). Since 2004, two monitoring stations, Vandenberg AFB and Nojoqui Summit have seen a reduction in the 8-hour EPDC to below the state standard. The remaining sites in the county historically have had 8-hour EPDC values above the state 8-hour ozone standard but are now below the standard.

As with the1-hour standard, both the Paradise Road and Las Flores Canyon sites historically have measured more 8-hour ozone exceedances than any other site and are considered "hot spot" subareas within the county. As can be seen from Figure 2-6, both sites have EPDC indicator values that have improved significantly from 1988. The Las Flores Canyon 8-hour EPDC has decreased

from 0.103 in 1988 to 0.084 in 2009, representing an improvement of 18 percent. The EPDC at this site has been as high as 0.112 in 1996, which is based on 1994 through1996 data. The Paradise Road site 8-hour EPDC has decreased from 0.107 in 1988 to 0.081 in 2009, a 24 percent improvement. The 1991 EPDC of 0.112 is the maximum for the 1988 to 2009 period at Paradise Road.

2.5.3 MEAN OF HIGHEST 30 ONE-HOUR AND EIGHT-HOUR OZONE CONCENTRATIONS

The ARB has recommended that we use the mean of the highest thirty 1-hour and 8-hour ozone concentrations as an additional indicator of progress toward meeting the state ozone standards. This statistic is referred to as the "Top Thirty Mean." The 1988 through 2009 trend for these indicators are presented in Figure 2-7. This figure shows that while there is some year-to-year variability in the average of the highest thirty 1-hour and 8-hour concentrations, there is a clear downward long-term trend at each monitoring location. This can be seen in Figure 2-8 that graphically presents the percent change in the mean top thirty indicator values from 1988 to 2009.

Figure 8 shows that the Paradise Road, Goleta and Nojoqui Pass sites have experienced the greatest decline in the mean of the 30 highest 1-hour concentrations between 1988 and 2009 with reductions of 28.2, 27.9 and 27.2 percent, respectively. For 8-hour concentrations, the greatest reductions were at the Paradise Road site where the mean of the highest 8-hour concentrations declined by 26.8 percent from 1988 to 2009. The El Capitan, Goleta and Lompoc HS&P sites each had a reduction in the mean of the highest 8-hour concentrations of about 23 percent between 1988 and 2009. The average improvement for all sites in the county based on 1988 to 2009 mean highest thirty data is 21.4 percent for 1-hour concentrations and 18.9 percent for 8-hour concentrations.

2.6 STATE DESIGNATION VALUES

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 (e.g., 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 1-hour EPDC for a site is 0.096 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.

Figure 2-9 presents 1-hour designation value data for the period of 1988 to 2009 for the Las Flores Canyon and Paradise Road sites that historically measure the most ozone exceedances. Based on these data, the Paradise Road site came 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. Both the Las Flores Canyon and Paradise Road sites continue to be in compliance with the 1-hour state ozone standard.

Compliance with the 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. The state 8-hour standard, however, 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 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 rounds down. For example, a measured 1-hour ozone concentration of 84 ppb is 0.084 ppm, which is rounded down 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 up 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 standard.

State 8-hour designation data are presented in Figure 2-10 for all sites in the county. These data show that 8-hour designation values have been declining since 1988 although four sites in the county remain out of compliance with the standard. Based on data collected from 2007 through 2009, the Carpinteria, Las Flores Canyon, Paradise Road, Lompoc HS&P and Santa Ynez monitoring stations in Santa Barbara County are out of compliance with the state 8-hour standard. The peak "hot spot" locations, Paradise Road and Las Flores Canyon, while still out of compliance with the standard, have seen a significant reduction in the designation value since 1988. The Las Flores Canyon site has experienced a 18 percent reduction in the 8-hour designation value since 1988, while the Paradise Road site designation value has been reduced by about 24 percent.

2.7 CONCLUSION

This 2010 Plan has been prepared to document progress toward meeting the state 1-hour and 8-hour ozone standards. Although Santa Barbara County violates the state 8-hour ozone standard, recent data show that the county continues to attain (since 2006) the state 1-hour ozone standard of 0.09 ppm, evidence that the air quality of the county has improved dramatically over the years. This air quality improvement is clearly seen in the 1-hour 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 the standard. Long-term improvement can also be seen in the 8-hour EPDC data. In addition, the mean of the highest 30 1-hour concentrations has been reduced by as much as 27 percent from 1988 to 2009 while the mean of the highest 8-hour concentrations has decreased by as much as 28 percent for the same time period.

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. Additionally, the number of state 8-hour exceedances has decreased from 98 days in 1989 to 10 days in 2009. Although the state 8-hour designation value has decreased significantly since 1988 throughout county monitoring sites, Santa Barbara County remains out of compliance with the 8-hour standard.

Reductions in the number of exceedance days and significant improvement in each of the indicators clearly demonstrates that air quality has substantially improved in Santa Barbara County. This suggests that local, state and federal emission reduction programs have been effective in the long-term improvement of air quality of Santa Barbara County.
Based on current monitoring data, Santa Barbara County is out of compliance with the state 8-hour standard.

TABLE 2-1
AMBIENT AIR QUALITY STANDARDS

		California Standards[1]		National Standards[2]		
Pollutant	**Averaging Time**	**Concentration[3]**	**Attainment Status**	**Primary[2, 4]**	**Secondary[2, 5]**	**Attainment Status**
Ozone	8 Hour	0.070 ppm (137 ug/m^3)	**N[8]**	0.075 ppm (147 ug/m^3)	Same as Primary	A
	1 Hour	0.09 ppm (180 ug/m^3)	**A**	0.12 ppm[9] (235 ug/m^3)	Same as Primary	A
Carbon Monoxide	8 Hour	9.0 ppm (10 mg/m^3)	A	9.0 ppm (10 mg/m^3)	Same as Primary	A
	1 Hour	20.0 ppm (23 mg/m^3)	A	35.0 ppm (40 mg/m^3)		A
Nitrogen Dioxide[10]	Annual Average	0.03 ppm (56 µg/m^3)	A	0.053 ppm (100 ug/m^3)	Same as Primary	A
	1 Hour	0.18 ppm (339 µg/m^3)	A	0.100 ppm (188 ug/m^3)	Same as Primary	U
Sulfur Dioxide	Annual Average	--	-	0.03 ppm (80 ug/m^3)		A
	24 Hour	0.04 ppm[6] (105 ug/m^3)	A	0.14 ppm (365 ug/m^3)	--	A
	3 Hour	--	-	--	0.5 ppm (1,300 ug/m^3)	A
	1 Hour	0.25 ppm (655 ug/m^3)	A	0.075 ppm (147 ug/m^3)	-	-
Respirable Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 ug/m^3	**N**	--	--	
	24 Hour	50 ug/m^3	**N**	150 ug/m^3	Same as Primary	A
Fine Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	12 ug/m^3	U	15 ug/m^3	Same as Primary	A
	24 Hour	--	-	35 ug/m^3 [11]	Same as Primary	A
Sulfates	24 Hour	25 ug/m^3	A		--	-
Lead	Calendar Quarter	--		1.5 ug/m^3	Same as Primary	A
	30 Day Average	1.5 ug/m^3	A			
	Rolling 3-month Average	--	--	0.15 ug/m^3	--	U
Hydrogen Sulfide	1 Hour	0.03 ppm (42 ug/m^3)	A	--	--	--
Vinyl Chloride (Chloroethene)	24 Hour	0.010 ppm (26 ug/m^3)	A	--	--	--
Visibility Reducing Particles[7]	8 Hour (1000 to 1800 PST)	--	--	--	--	--
A = Attaninment, N = Nonattainment, U= Unclassified						

TABLE 2-1 (FOOTNOTES)

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.

8) This state 8-hour ozone standard went into effect in June, 2006.

9) This federal 1-hour ozone standard was revoked in 2005.

10) The state Nitrogen Dioxide ambient air quality standard was amended on February 22, 2007, to lower the 1-hour standard to 0.18 ppm and establish a new annual standard of 0.030 ppm. EPA set a new one-hour NO2 standard of 0.100 ppm on January 25, 2010 and retained the existing annual average standard of 0.053 ppm.

11) Effective December 18, 2006, the USEPA revoked the annual PM10 standard and lowered the 24-hour PM2.5 standard, with the changes reflected in the table.

TABLE 2-2
NUMBER OF DAYS EXCEEDING STATE OZONE STANDARDS BY SITE AND COUNTYWIDE
1988 – 2009

Monitoring Site	Year	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09
Carpinteria	State 8-Hour	26	22	8	10	16	19	15	13	18	9	3	2	7	3	0	3	5	0	0	2	4	7
	State 1-Hour	10	14	5	8	9	6	11	7	8	4	3	1	1	1	0	1	0	0	0	1	2	3
El Capitan	State 8-Hour	10	5	5	3	8	7	4	6	5	1	1	2	0	2	0	1	3	0	0	1	0	0
	State 1-Hour	0	3	2	2	6	3	2	5	4	0	1	0	0	0	0	1	1	0	0	1	0	0
Goleta	State 8-Hour	14	10	7	9	12	12	5	10	8	4	1	1	0	0	0	1	2	0	0	0	0	1
	State 1-Hour	5	6	5	5	8	5	3	3	5	0	1	1	0	0	0	1	0	0	0	0	0	0
Nojoqui	State 8-Hour	6	7	11	10	9	9	3	6	13	1	2	1	0	1	0	3	2	0	0	0	0	0
	State 1-Hour	4	5	4	7	5	5	2	3	5	1	0	0	1	0	0	1	0	0	0	0	0	0
Las Flores Canyon	State 8-Hour	33	56	54	39	31	25	39	40	30	23	23	9	11	11	3	4	16	4	4	11	3	7
	State 1-Hour	10	23	24	12	15	9	15	15	14	5	5	1	4	1	0	1	2	0	0	1	1	4
Lompoc HS&P	State 8-Hour	17	7	5	4	3	11	4	4	10	6	1	5	2	2	1	7	6	0	0	0	1	0
	State 1-Hour	4	5	1	3	1	3	1	1	3	0	1	0	1	0	0	1	1	0	0	0	0	0
Lompoc H Street	State 8-Hour	3	2	1	1	3	2	0	2	2	0	0	0	0	0	1	0	1	0	0	0	1	0
	State 1-Hour	1	1	0	1	1	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Paradise Road	State 8-Hour	76	70	61	85	44	38	20	22	40	23	34	24	30	28	32	35	15	10	10	9	2	5
	State 1-Hour	24	20	10	22	12	7	5	6	10	3	11	3	0	4	3	6	0	0	0	1	1	1
Santa Ynez	State 8-Hour	11	8	5	4	11	8	9	7	14	3	2	1	0	2	1	6	3	1	1	2	3	0
	State 1-Hour	3	6	0	3	4	1	1	1	4	1	2	0	0	1	0	0	0	0	0	0	0	0
Vandenberg STS	State 8-Hour	2	9	8	3	7	10	3	5	6	1	2	2	0	0	1	5	5	0	0	2	2	0
	State 1-Hour	0	3	3	2	1	1	0	1	2	0	0	1	0	0	0	0	0	0	0	0	0	0
Countywide	State 8-Hour	97	98	87	97	64	55	50	57	57	42	48	31	37	34	35	40	19	13	13	19	12	10
	State 1-Hour	42	39	37	37	25	18	22	24	23	10	15	3	6	5	3	7	2	0	0	3	4	5

Figure 2-1
Santa Barbara County Air Quality Monitoring Stations

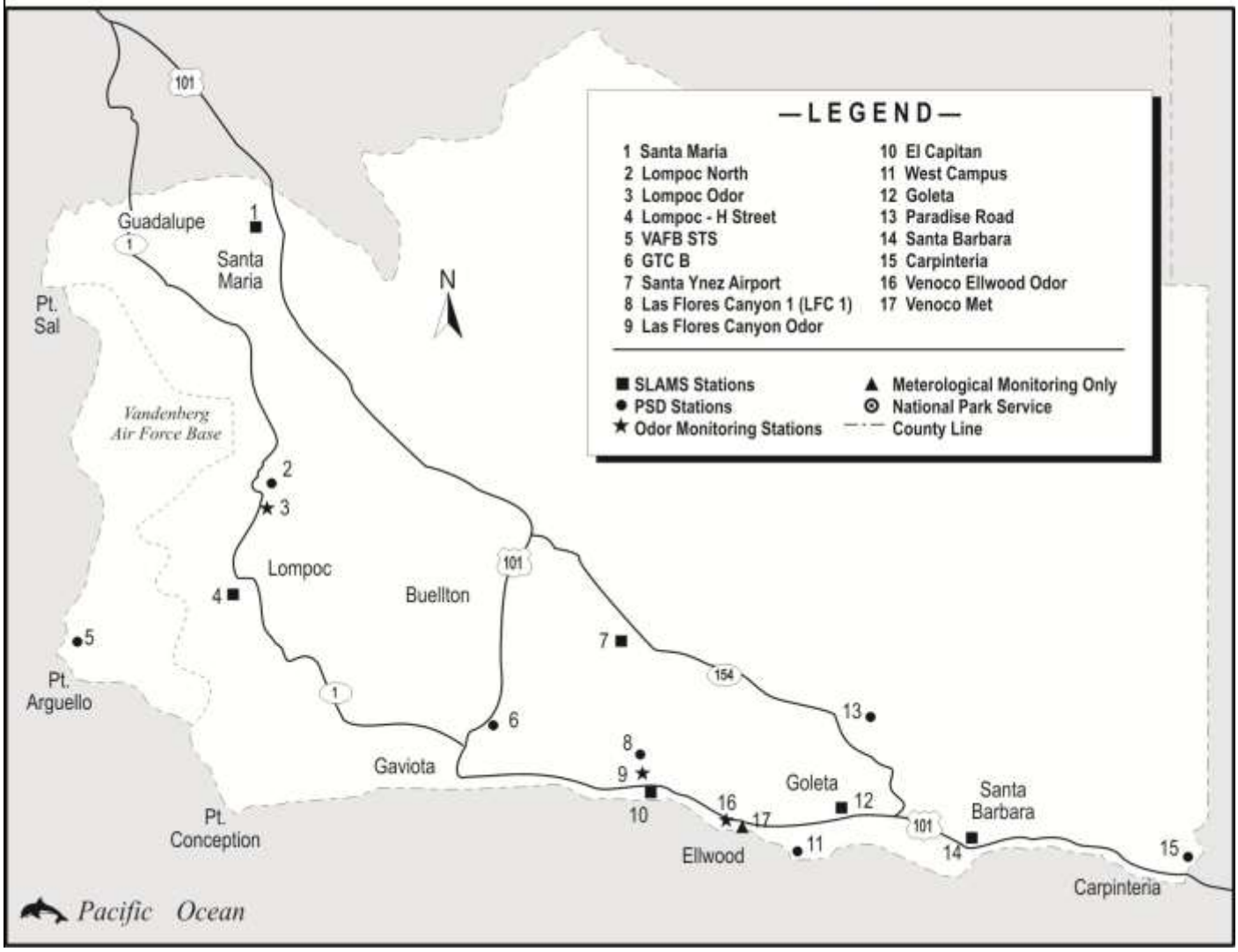


FIGURE 2-2A
NUMBER OF DAYS EXCEEDING STATE 1-HOUR AND 8-HOUR OZONE STANDARDS
SANTA BARBARA COUNTY
1988 - 2009

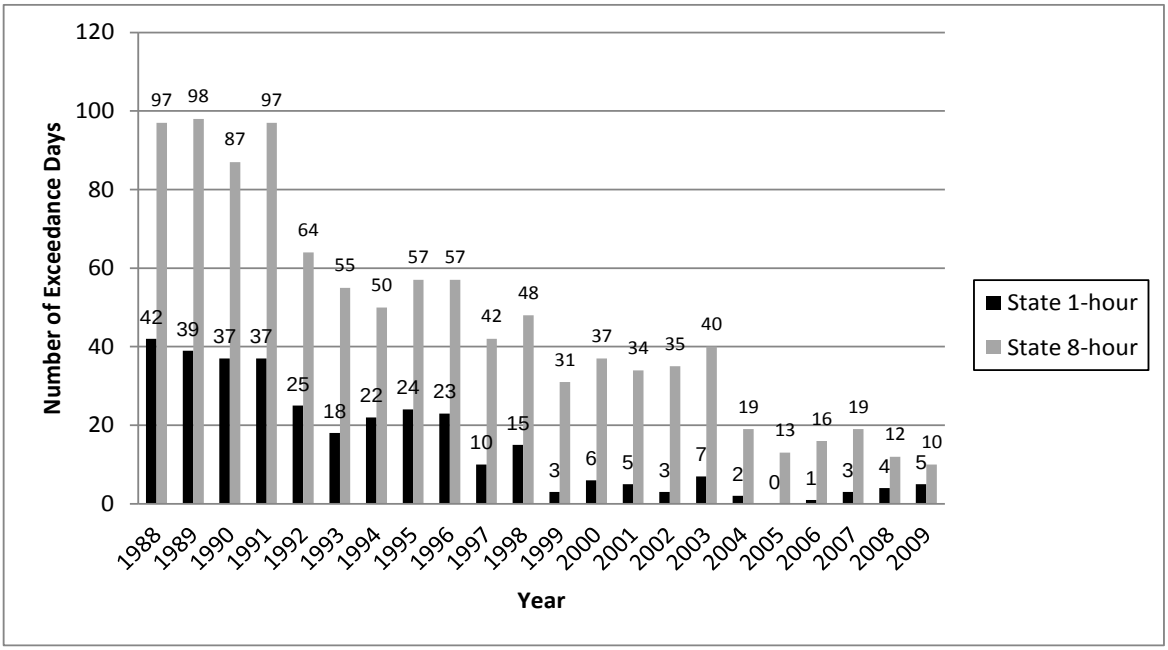


FIGURE 2-2B
POPULATION AND DAILY VEHICLE MILES TRAVELED
SANTA BARBARA COUNTY
1988 - 2008

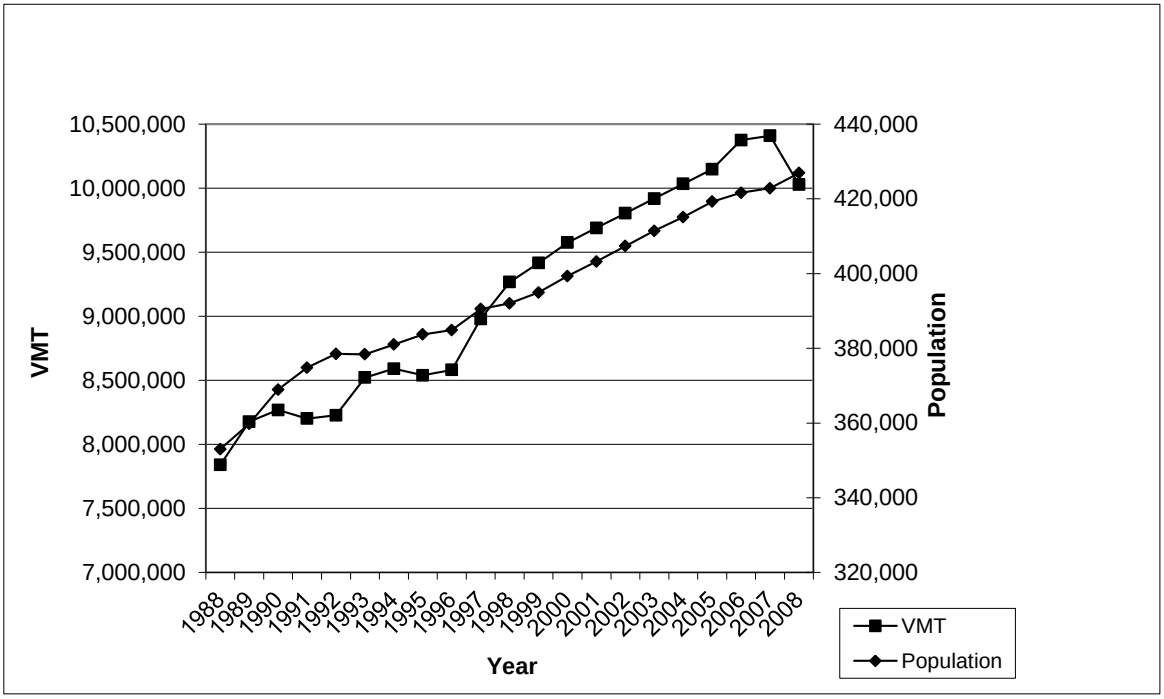
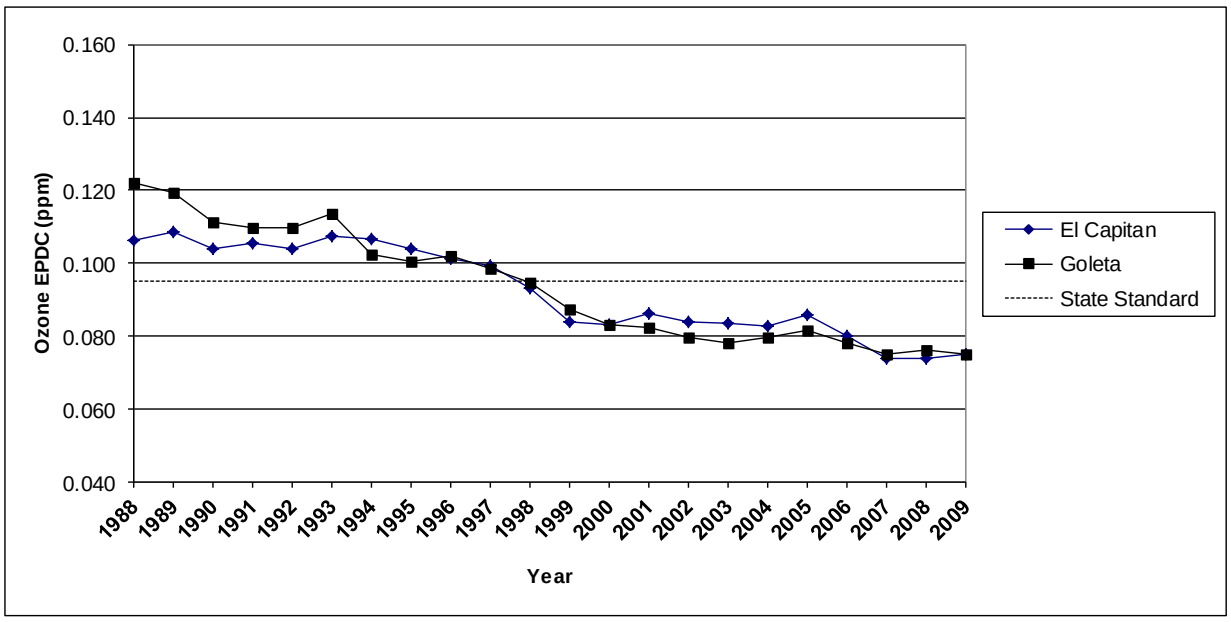


FIGURE 2-3
STATE 1-HOUR OZONE EXPECTED PEAK DAY CONCENTRATION
SANTA BARBARA COUNTY MONITORING SITES
1988 - 2009



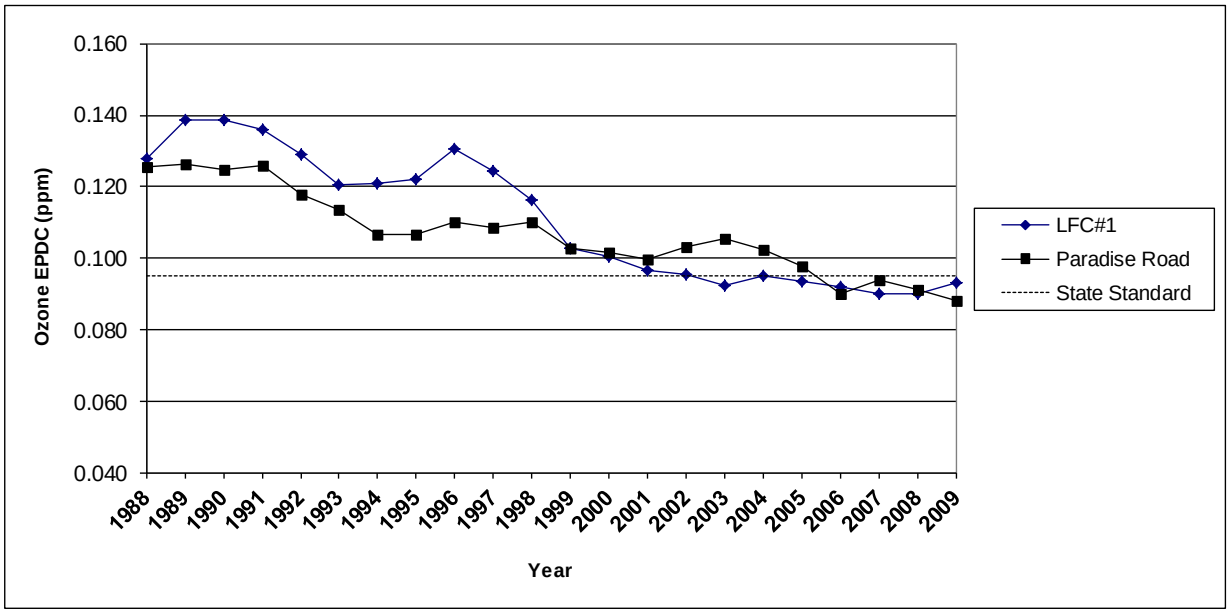
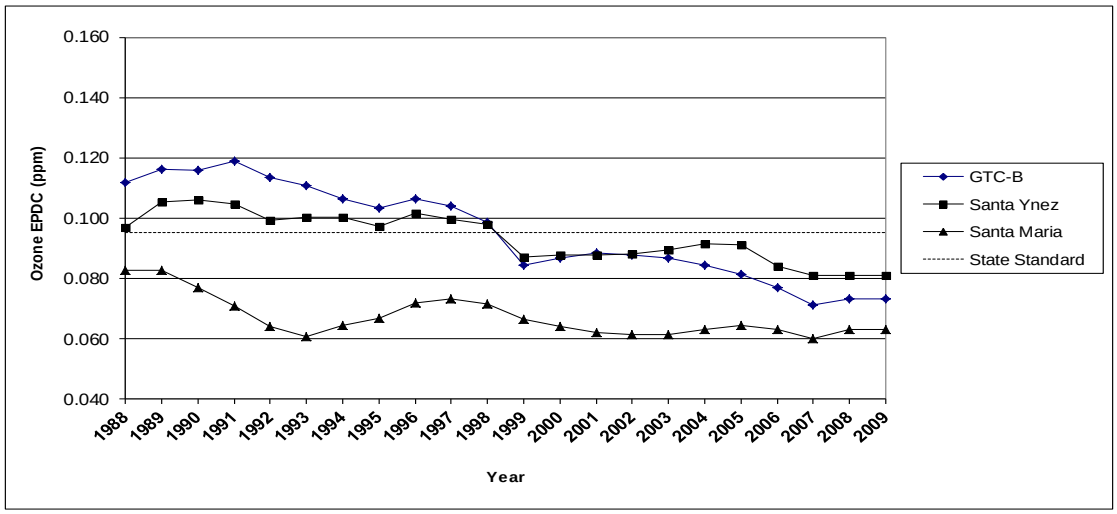
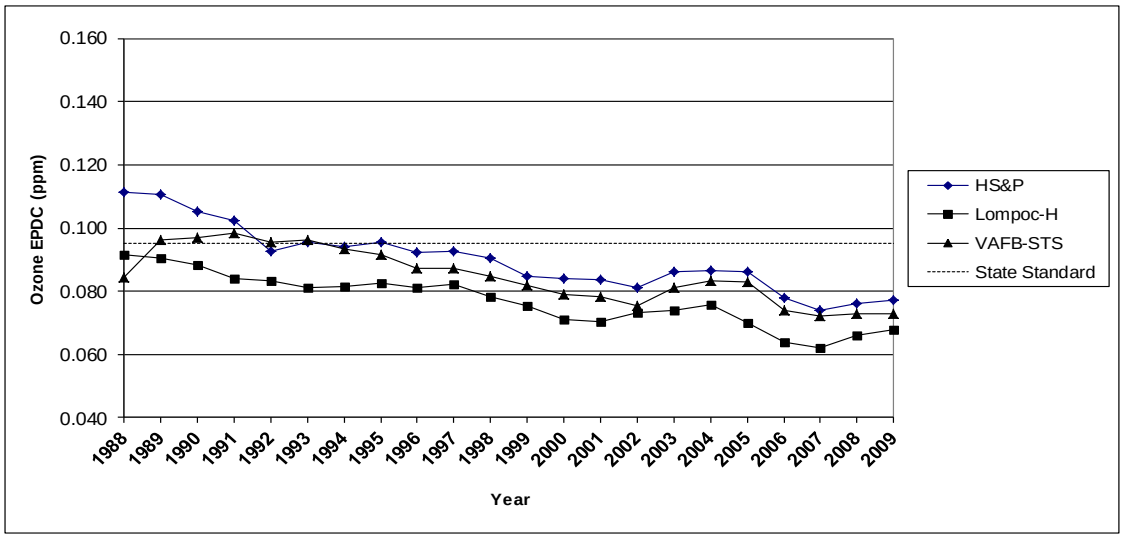


FIGURE 2-3 CONCLUDED
STATE 1-HOUR OZONE EXPECTED PEAK DAY CONCENTRATION
SANTA BARBARA COUNTY MONITORING SITES
1988 – 2009





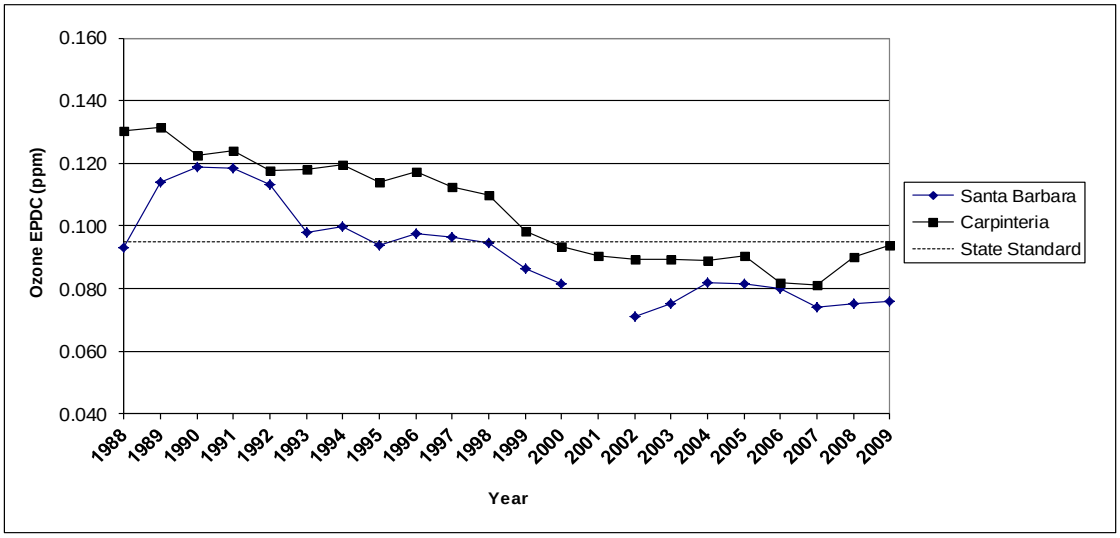
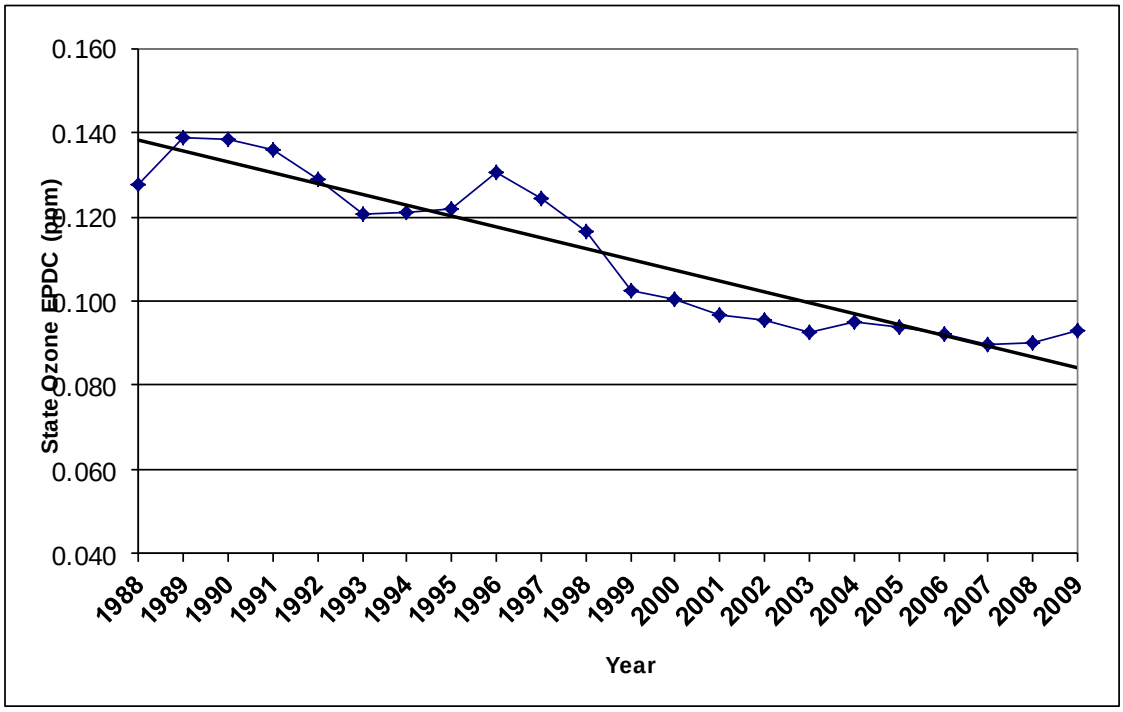


FIGURE 2-4
PEAK "HOT SPOT" 1-HR EPDC TRENDS
1988 – 2009

LAS FLORES CANYON



PARADISE ROAD

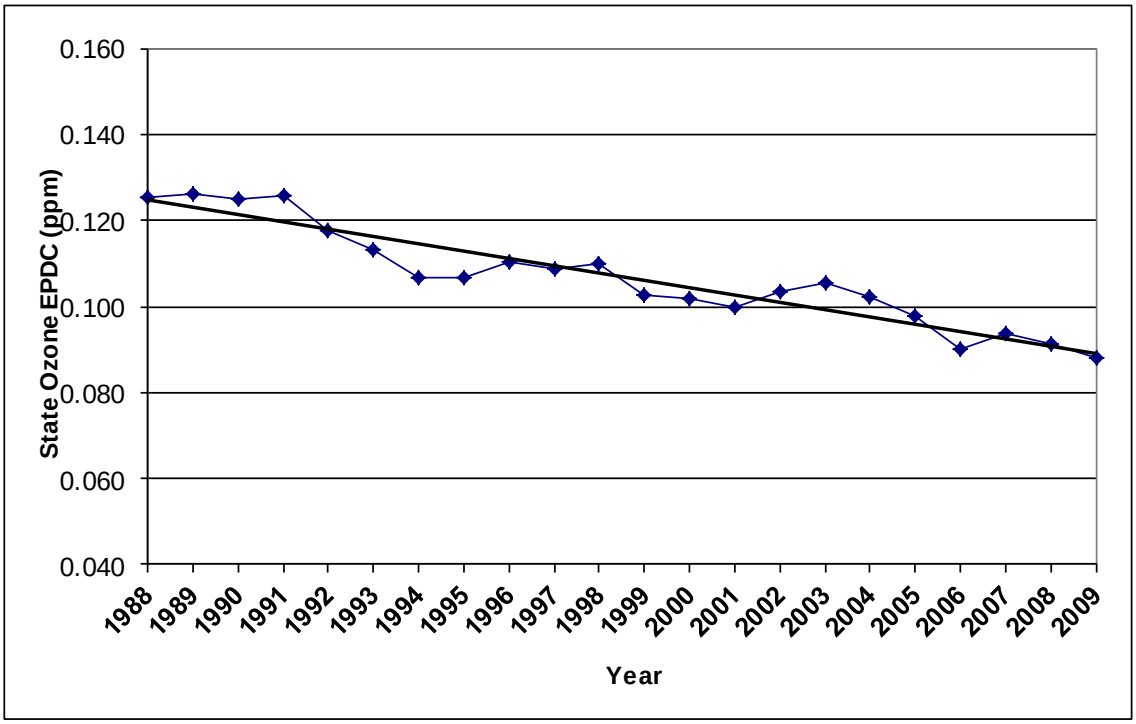
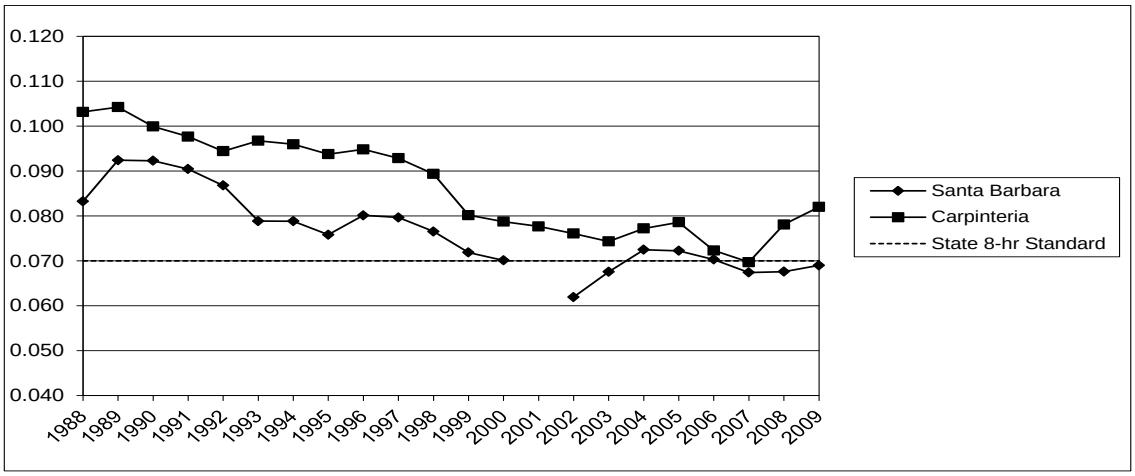
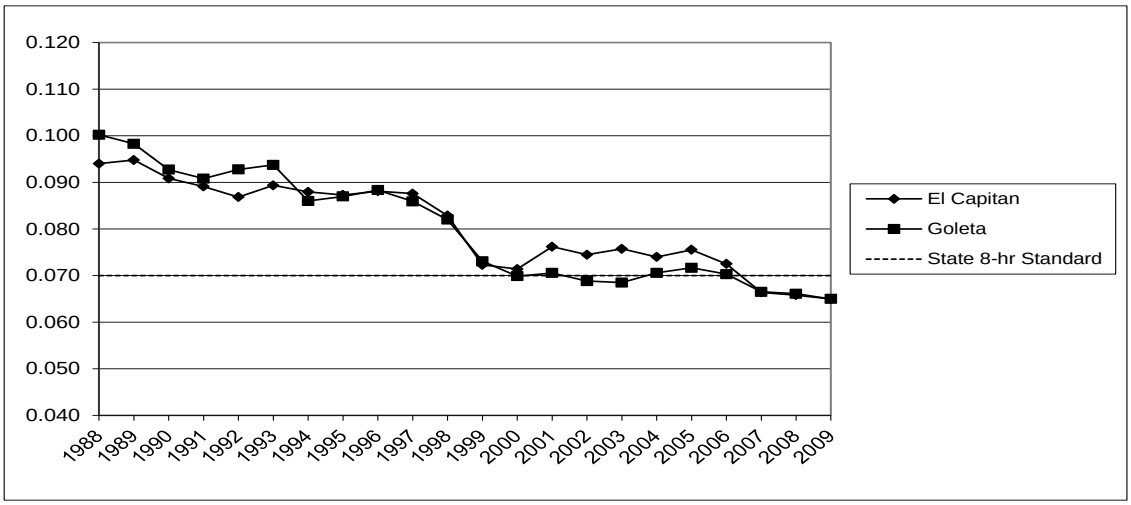


FIGURE 2-5
STATE 8-HOUR OZONE EXPECTED PEAK DAY CONCENTRATION
SANTA BARBARA COUNTY MONITORING SITES
1988 – 2009





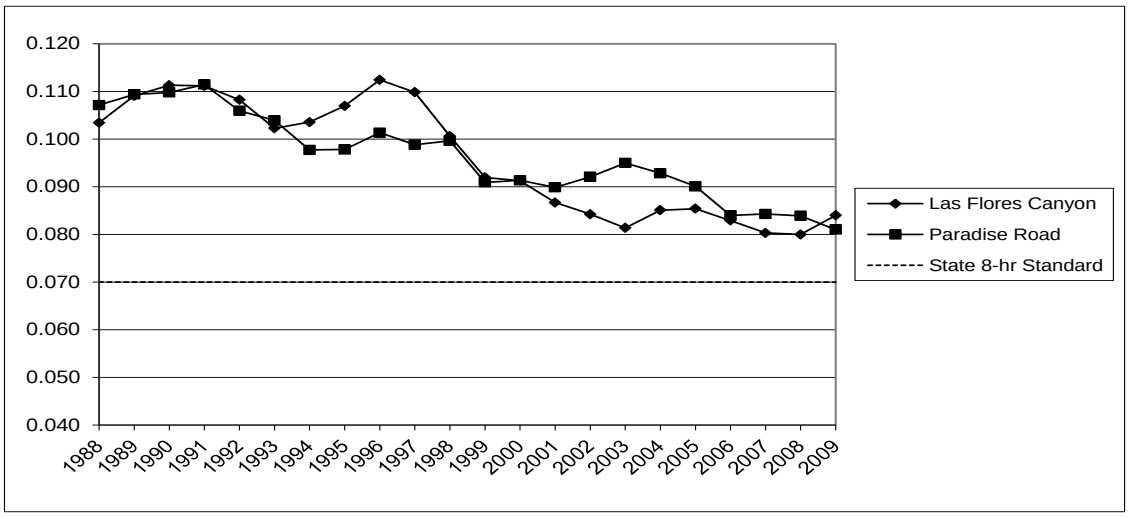
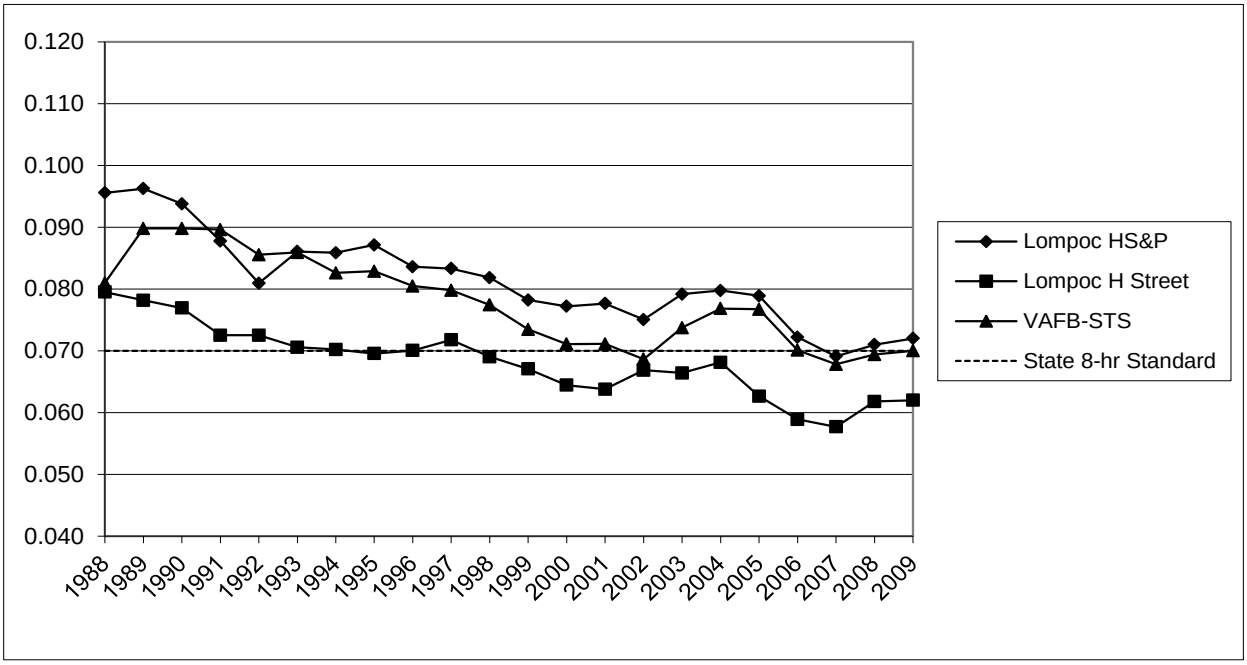


FIGURE 2-5 CONCLUDED
STATE 8-HOUR OZONE EXPECTED PEAK DAY CONCENTRATION
SANTA BARBARA COUNTY MONITORING SITES
1988 – 2009



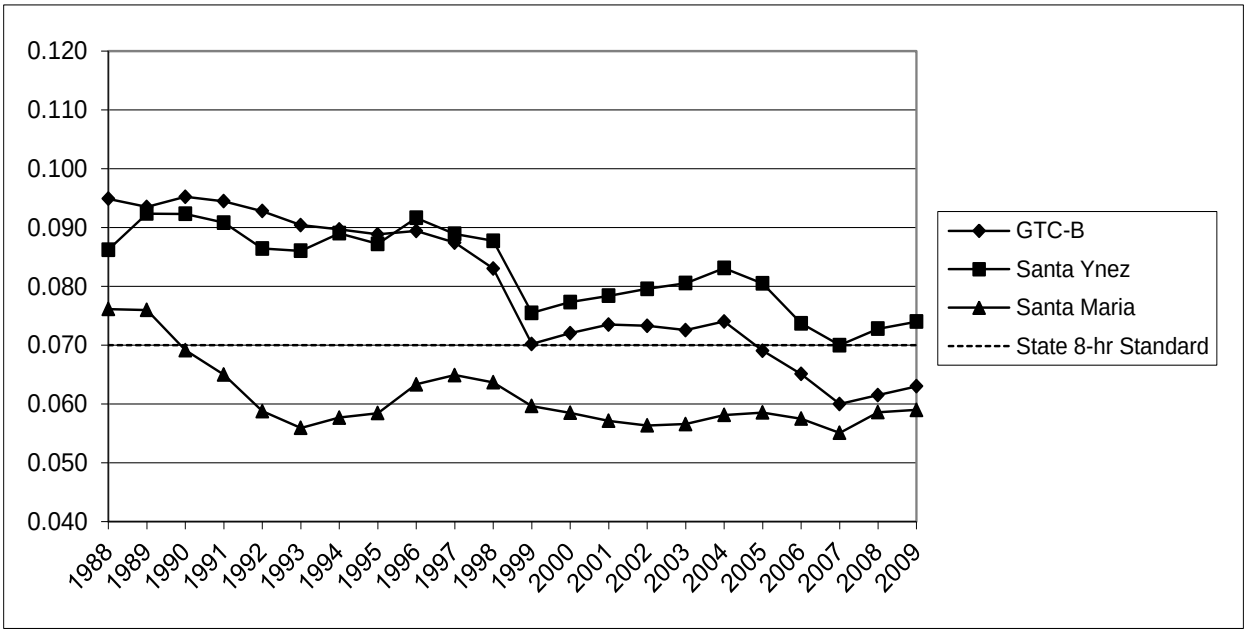
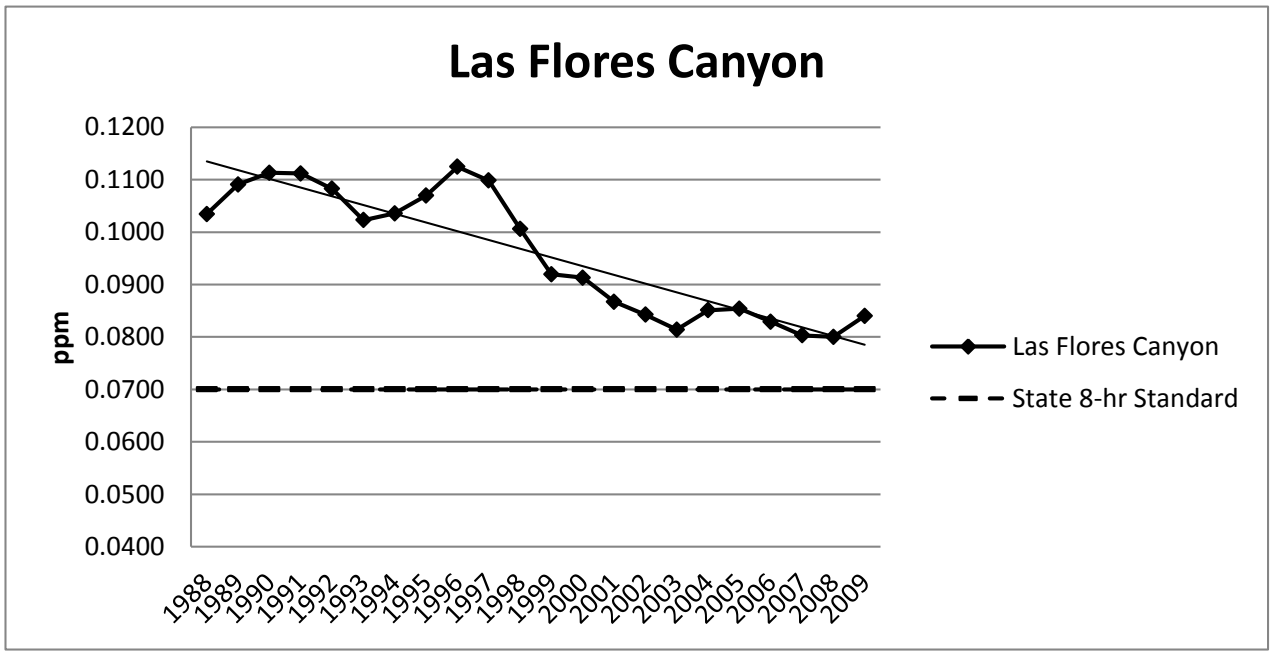


FIGURE 2-6
PEAK "HOT SPOT" 8- HR EPDC TRENDS
1988 – 2009



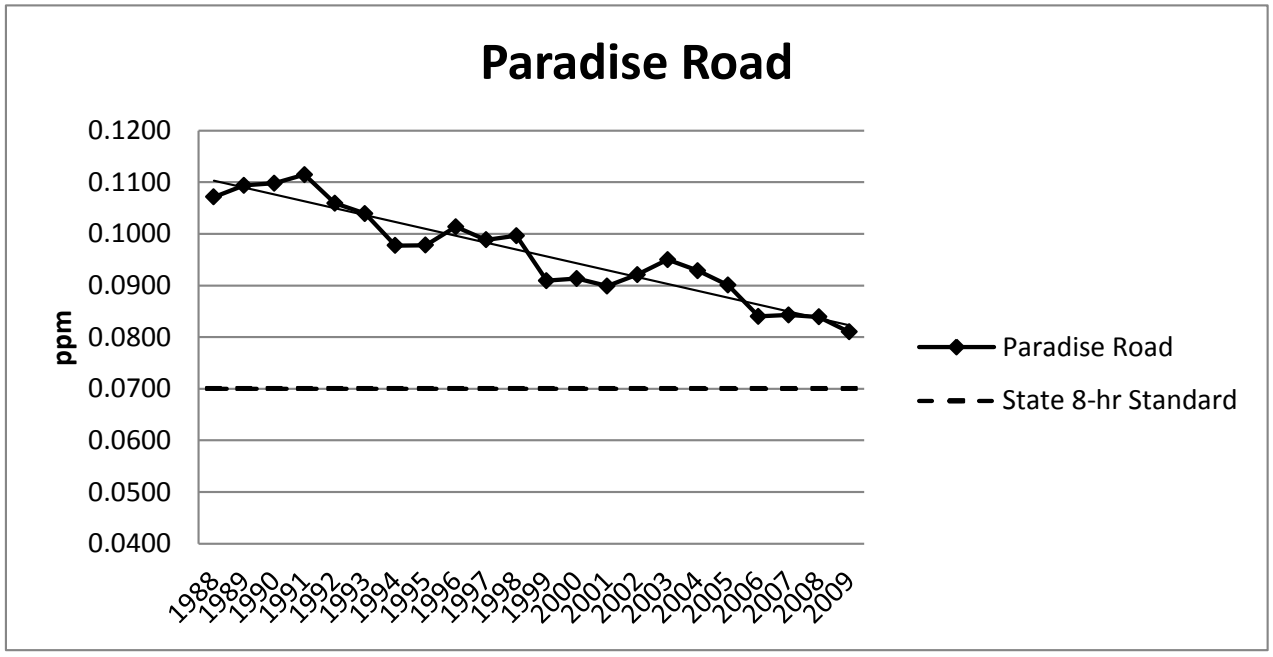
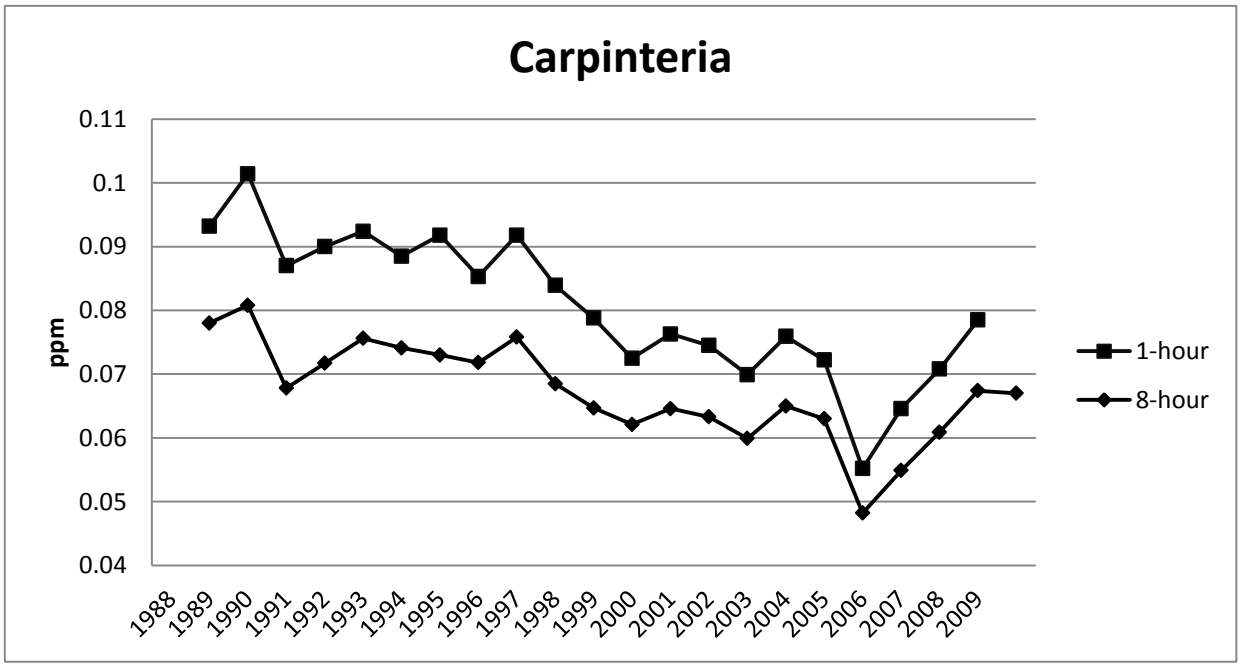


FIGURE 2-7
MEAN OF HIGHEST 30 1-HR AND 8-HR CONCENTRATIONS
1988-2009



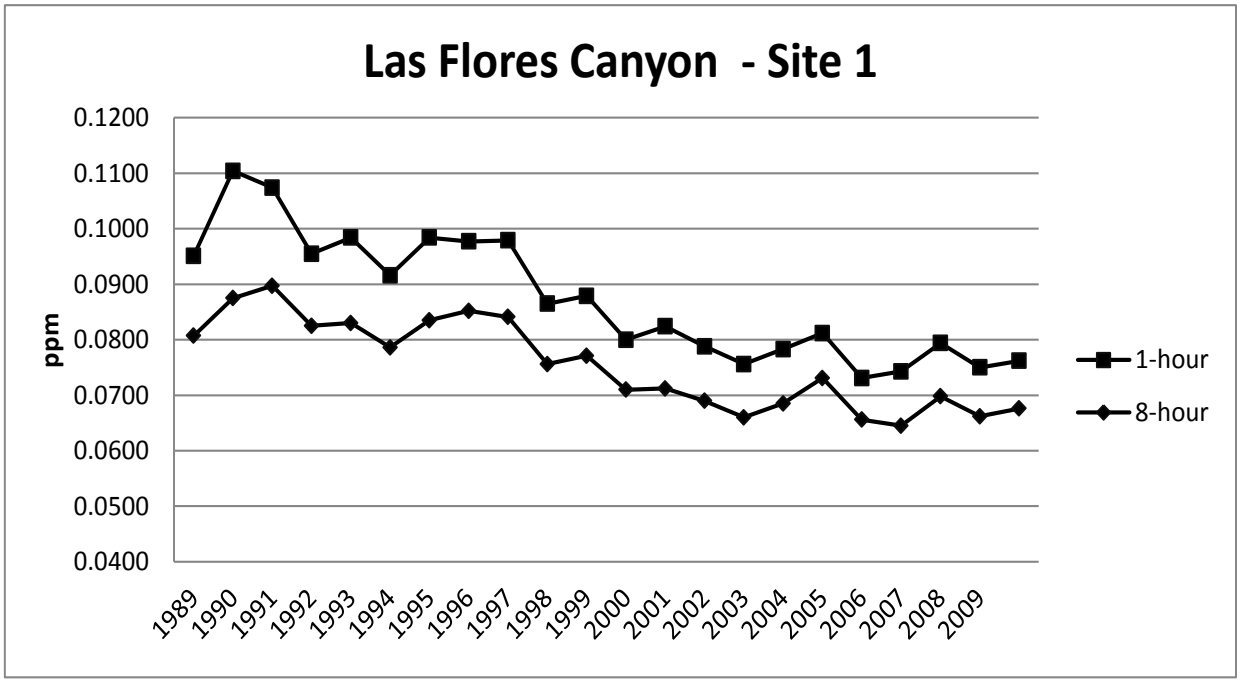
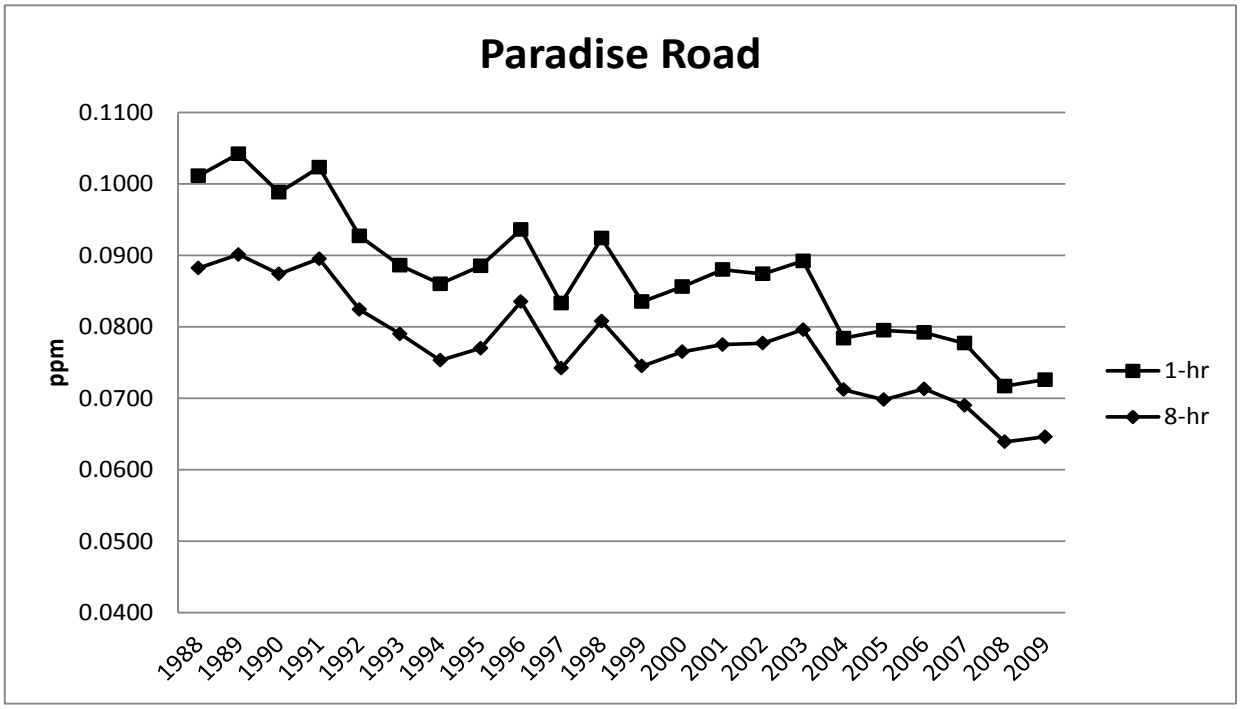


FIGURE 2-7 CONCLUDED
MEAN OF HIGHEST 30 1-HR AND 8-HR CONCENTRATIONS
1988-2009



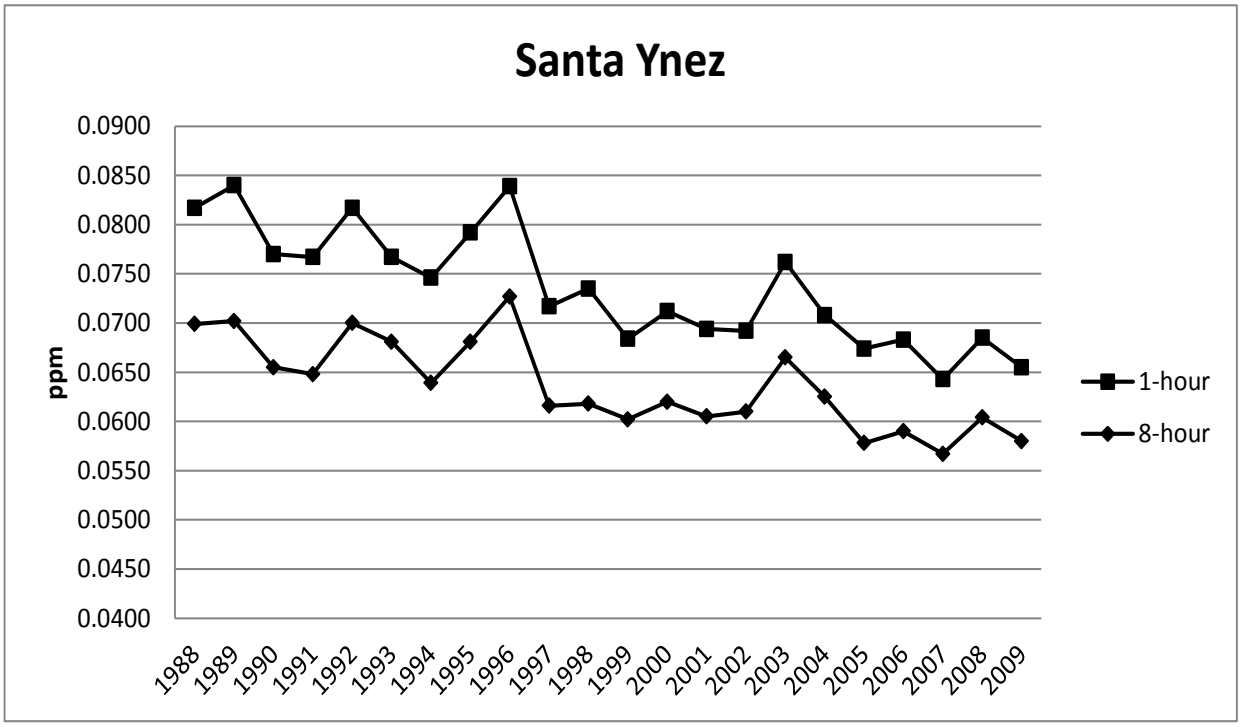


FIGURE 2-8
MEAN OF HIGHEST 30 1-HR AND 8-HR CONCENTRATIONS
PERCENT IMPROVEMENT FROM 1988 TO 2009
ALL SITES

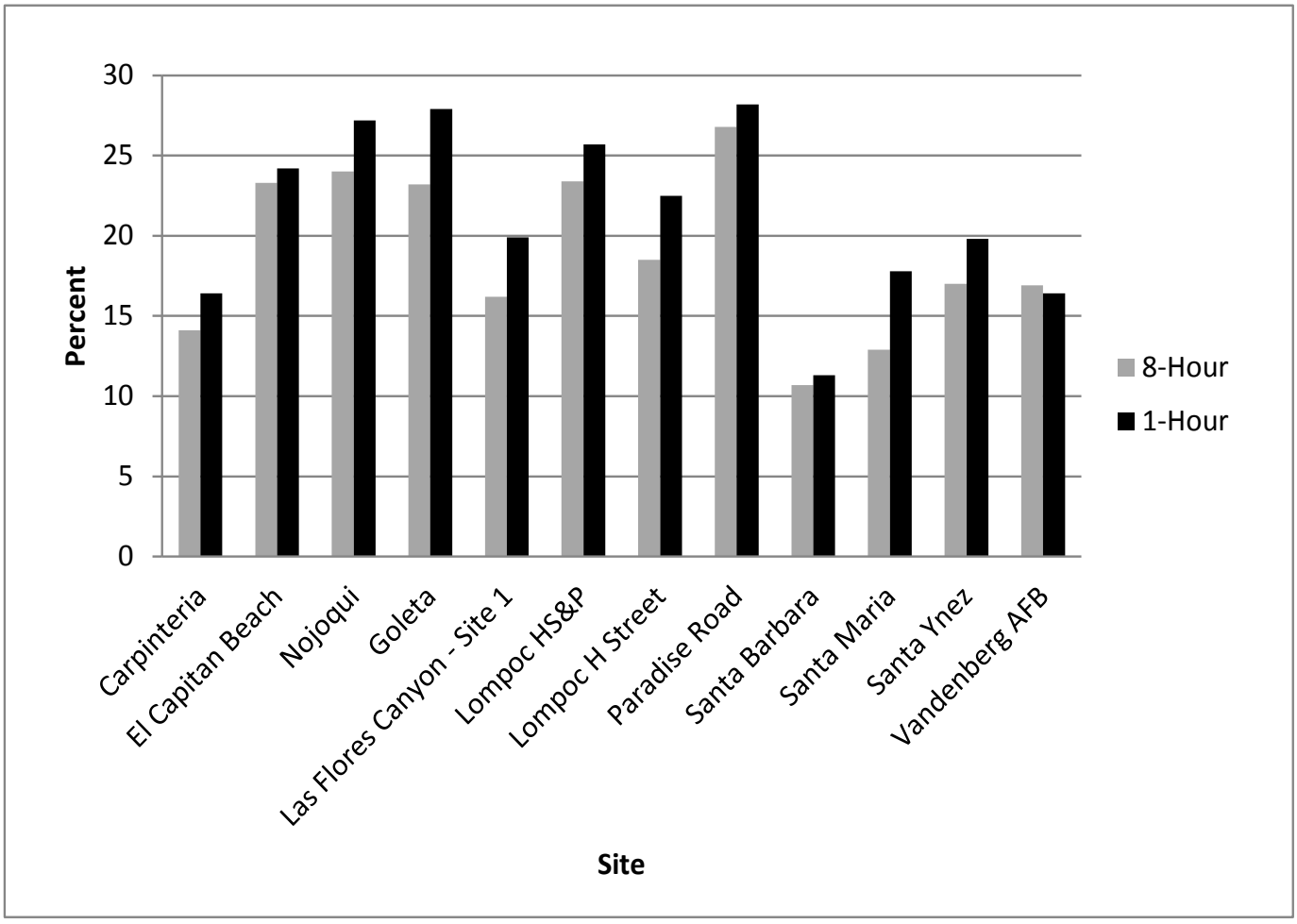
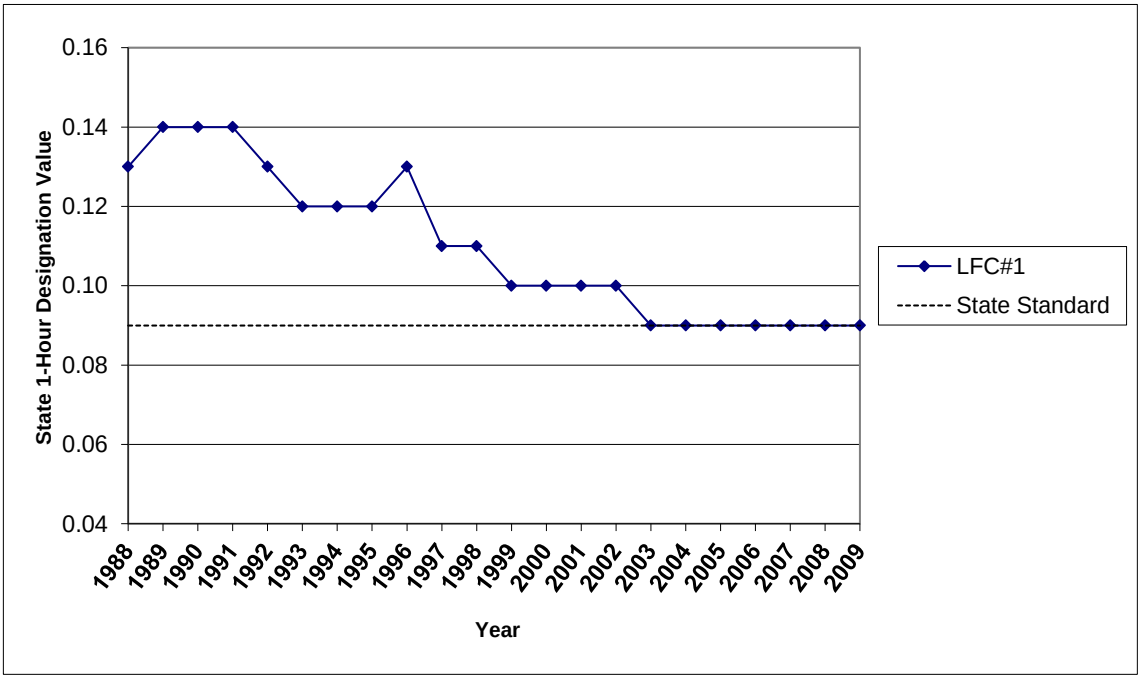


FIGURE 2-9
1988 – 2009 1-HOUR DESIGNATION VALUES
LAS FLORES CANYON AND PARADISE ROAD

LAS FLORES CANYON



PARADISE ROAD

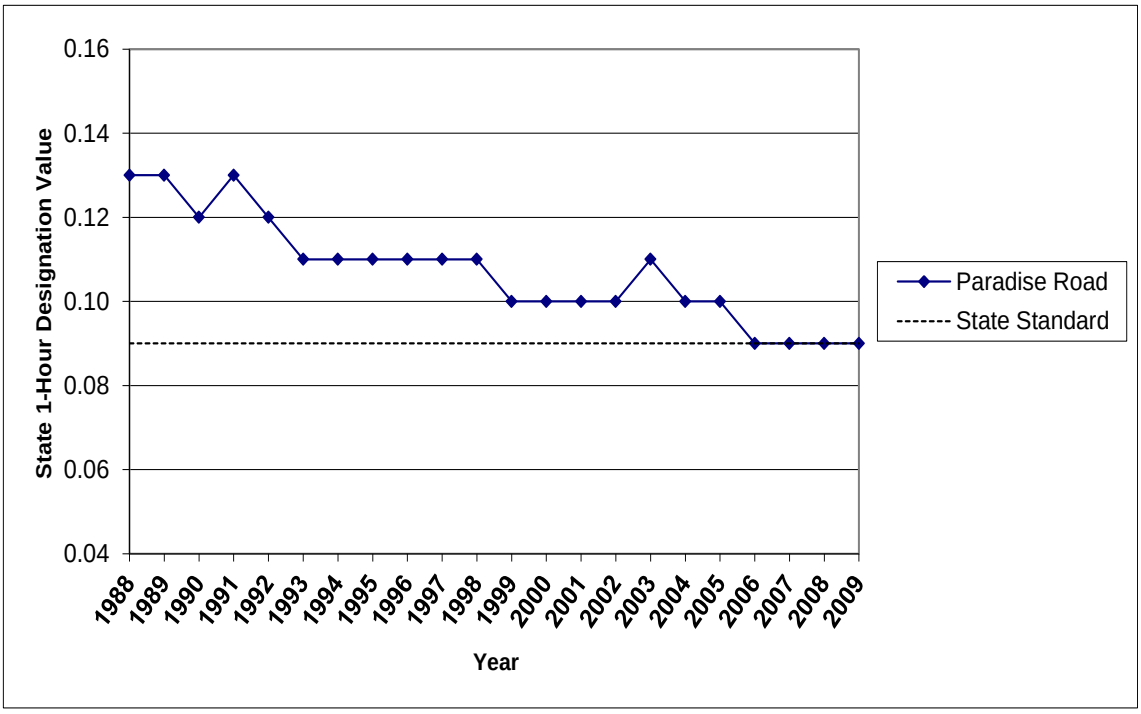
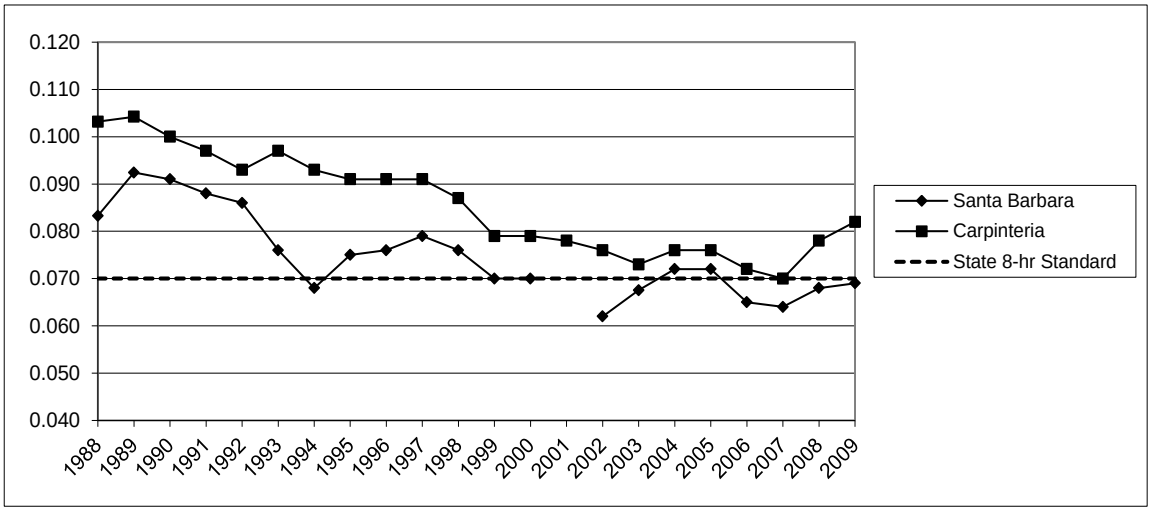
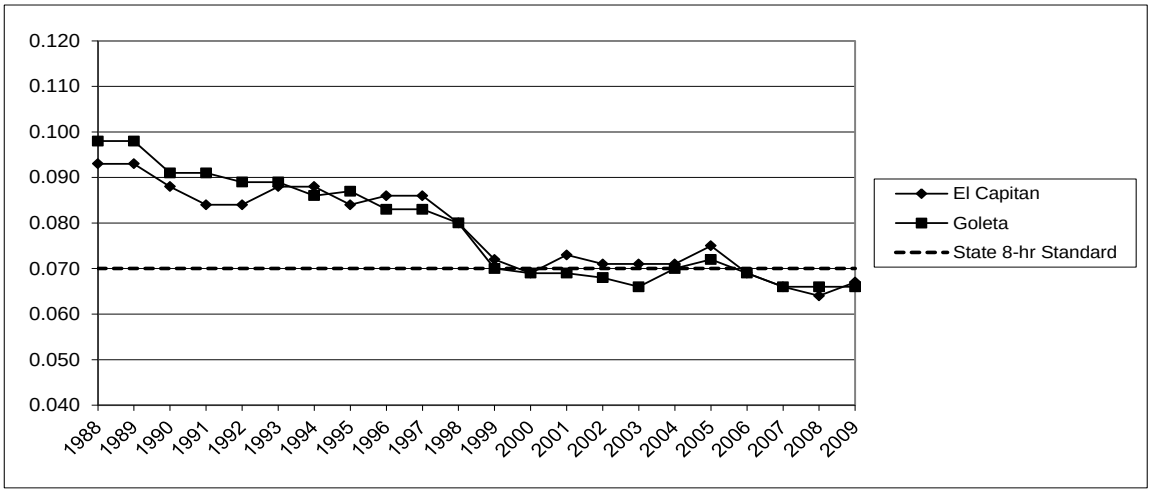


FIGURE 2-10
1988 – 2009 STATE 8-HOUR OZONE DESIGNATION VALUES
ALL SITES





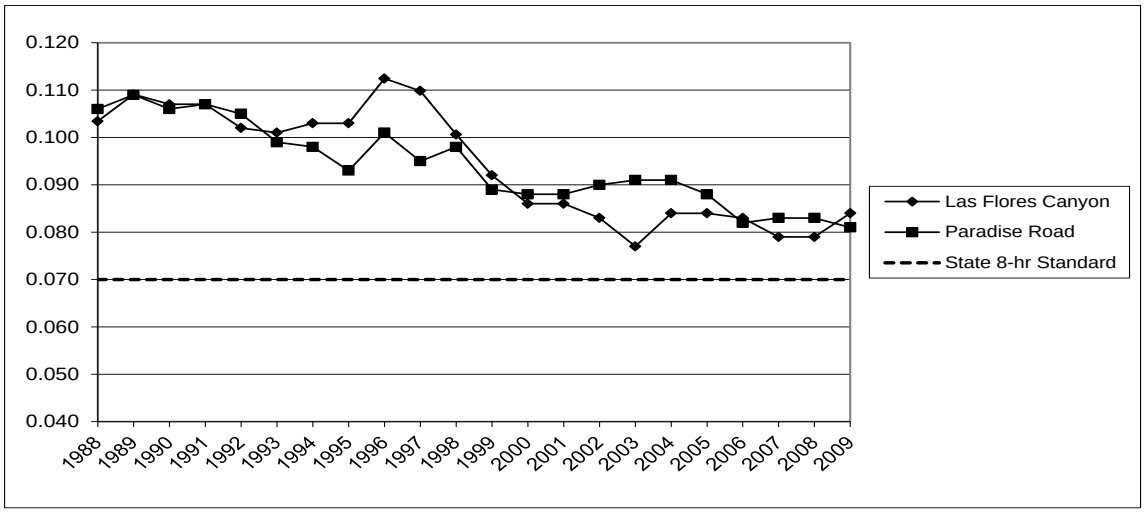
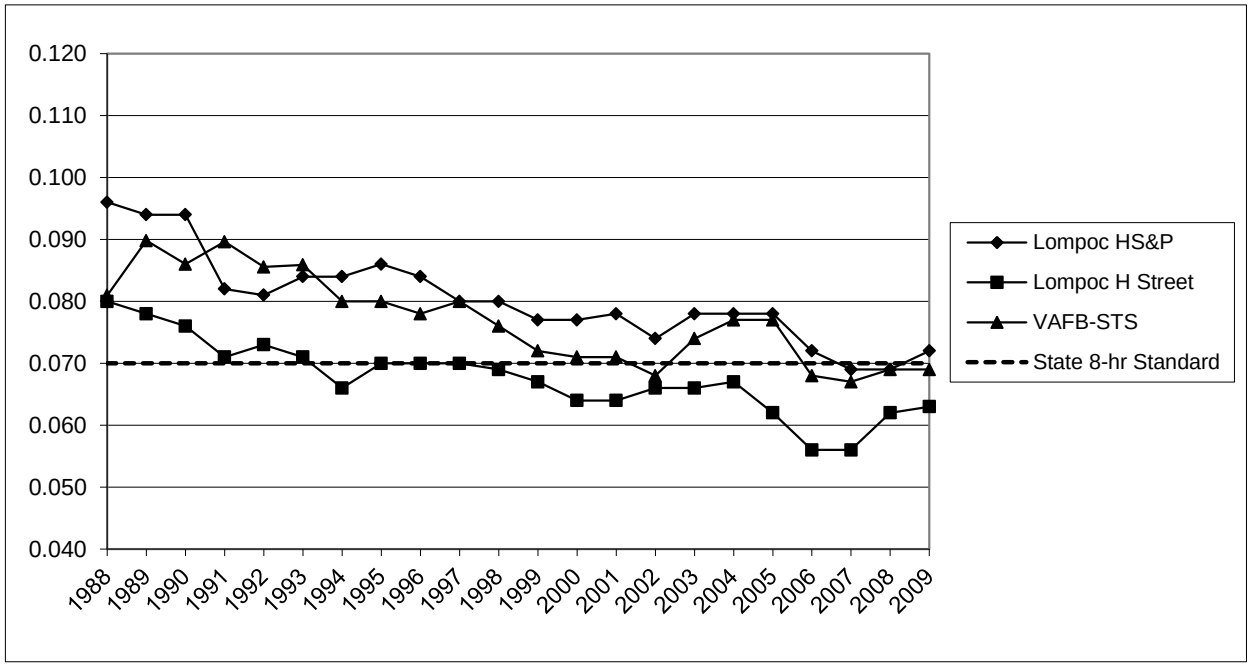
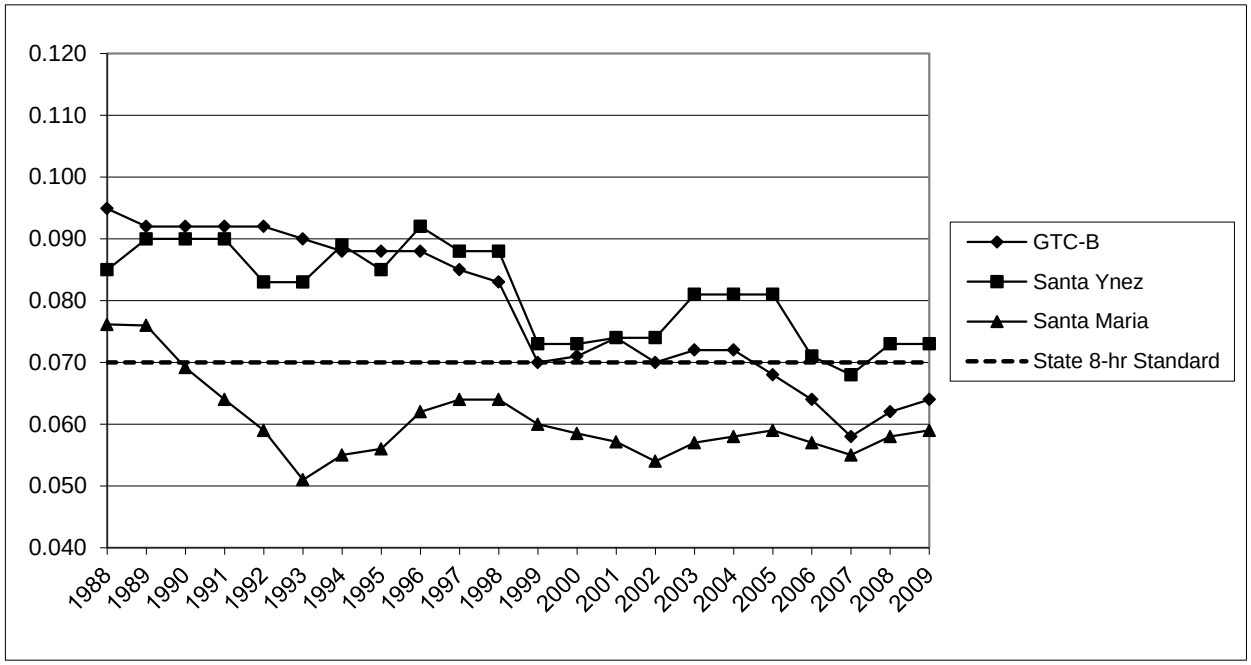


FIGURE 2-10 CONCLUDED
1988 – 2009 STATE 8-HOUR OZONE DESIGNATION VALUES
ALL SITES





CHAPTER 3

EMISSION INVENTORY

- INTRODUCTION
- POLLUTANTS
- EMISSION INVENTORY HIERARCHY
- 2007 ANNUAL EMISSION INVENTORY
- 2007 PLANNING EMISSION INVENTORY
- COMBINED OCS AND SANTA BARBARA COUNTY INVENTORIES
- CONCLUSION

3. EMISSION INVENTORY

3.1 INTRODUCTION

This chapter describes the 2007 emission inventory used in the development of this 2010 Clean Air Plan (2010 Plan). The emission inventory accounts for the types and amounts of pollutants emitted from a wide variety of sources, including on-road motor vehicles and other mobile sources, fuel combustion at industrial facilities, solvent and surface coating usage, consumer product usage, and emissions from natural sources. The emission inventory is used to describe and compare contributions from air pollution sources, evaluate control measures, schedule rule adoptions, forecast future pollution, and prepare clean air plans.

The emission inventory is divided into two geographical regions: ***Santa Barbara County*** and the ***Outer Continental Shelf*** *(OCS)***.** The Santa Barbara County emission inventory encompasses all onshore sources of air pollution within Santa Barbara County and the State Tidelands (three miles from the shoreline). The OCS emission inventory includes pollution sources 25 miles beyond the State Tideland boundary offshore of Santa Barbara County.

This chapter describes the "2007 Annual Emission Inventory", which was derived from many sources including the Santa Barbara County Air Pollution Control District's (APCD) Annual Emission Inventory Questionnaire and Annual Reports programs, the Santa Barbara County Association of Governments (SBCAG), the California Air Resources Board (ARB), surveys from Santa Barbara businesses, and other U.S., California, and Santa Barbara County government agencies.

Also included in this chapter is a modified version of the 2007 Annual Emission Inventory, known as the "2007 Planning Emission Inventory," which will be used as the base year to forecast emissions for the years 2020 and 2030. Please refer to *Chapter 6, Emission Forecasting*, for more discussion on how the 2007 Planning Emission Inventory is used to forecast future emissions.

The 2007 Planning Emission Inventory is a modified subset of the 2007 Annual Emission Inventory and they differ from each other in three ways. First, the creation of the 2007 Planning Emission Inventory involves adjusting the 2007 Annual Emission Inventory to account for seasonal variation because most exceedances of ozone standards occur during the April to October ozone season. This is commonly referred to as a "summer seasonal" inventory. Second, the emissions from natural sources such as biogenics, oil and gas seeps, and wildfires that are part of the 2007 Annual Emission Inventory are excluded from the 2007 Planning Emission Inventory since they are not regulated or controlled through implementation of emission control measures. Finally, the annual emissions in the 2007 Annual Emission Inventory are converted to daily emissions in the 2007 Planning Emission Inventory.

This chapter presents both the 2007 Annual Emission Inventory and the 2007 Planning Emission Inventory for both Santa Barbara County and the OCS. These inventories are presented in Table 3-1 and Table 3-2, and Figure 3-1 to Figure 3-6.

3.2 POLLUTANTS

The Annual Emission Inventory and Planning Emission Inventory include two pollutants that contribute to ozone formation, referred to as ***ozone precursors***. These pollutants are Reactive Organic Compounds (ROC) and Oxides of Nitrogen (NO_x). The definition of ROC used in this plan is essentially equivalent to the USEPA's definition of Volatile Organic Compounds (VOC) and ARB's definition of Reactive Organic Gases (ROG), and does not include methane, ethane, acetone or perchloroethylene as reactive organic chemical species.

3.3 EMISSION INVENTORY HIERARCHY

The emission inventory is organized in a three-tiered hierarchy that categorizes all air pollution sources. The first tier of this hierarchy contains four divisions:

3.3.1. Stationary Sources (individual facilities and aggregated point sources),
3.3.2. Area-Wide Sources (geographically dispersed area sources),
3.3.3. Mobile Sources (both on-road vehicles and off-road sources) and
3.3.4. Natural Sources (not man-made).

In the second tier, each of the four divisions is sub-divided into major source categories. The third tier divides the major source categories into summary categories

The following sections discuss each of the four divisions and their major source and summary categories:

3.3.1 STATIONARY SOURCES

The Stationary Sources emission inventory division contains five major source categories: Fuel Combustion, Waste Disposal, Cleaning and Surface Coatings, Petroleum Production and Marketing, and Industrial Processes.

The specific summary categories and sources of emissions associated with these major categories are identified and described in the following sections.

3.3.1.1 FUEL COMBUSTION

This major source category contains emissions produced by stationary fossil fuel combustion equipment such as boilers and engines. Fuel combustion is the greatest source of NO_x emissions within the Stationary Sources division. Emissions in the Fuel Combustion major source category are produced in the following eight summary categories:

A. Electric Utilities: Natural gas turbines used at electrical generation facilities.
B. Cogeneration: Natural gas turbine engines used in the production of electrical energy and useful thermal energy.
C. Oil and Gas Production (Combustion): Natural gas engines, boilers, process heaters, turbines, and steam generators at facilities engaged in the extraction and processing of petroleum products for shipment. Also diesel drilling rigs. Most of the emissions in

this summary category are from natural gas-fired engines used in oil production operations.

D. Petroleum Refining (Combustion): Natural gas boilers and process heaters located at refineries.
E. Manufacturing and Industrial: Most of the emissions in this summary category are from diesel-fired engines and natural gas process heaters used in other industrial and manufacturing activities such as: sand, rock, and gravel processing; concrete and asphalt production; and mineral processing.
F. Food and Agricultural Processing: Diesel and natural gas-fired engines used for agricultural irrigation.
G. Service and Commercial: Natural gas commercial space and water heaters and small boilers and diesel-fired engines at non-industrial facilities.
H. Other (Fuel Combustion). Fuel combustion emissions not accounted for in any other category.

3.3.1.2 WASTE DISPOSAL

This major source category contains emissions associated with wastewater treatment plants, municipal landfills and incineration in five summary categories:

A. Sewage Treatment: Wastewater treatment plants and process gas flares.
B. Landfills: Landfill gas emissions from natural biodegradation and decomposition of waste material at Class II landfill sites, and waste gas flares.
C. Incinerators: Incinerators burning natural gas and process gas.
D. Soil Remediation: Contaminated soil clean-up sites.
E. Other (Waste Disposal): Waste disposal emissions not accounted for in any other category.

3.3.1.3 CLEANING AND SURFACE COATINGS

This major source category consists entirely of evaporative ROC emissions from solvents and coatings, and is the most significant source of ROC emissions in the Stationary Sources division. The six summary categories are:

A. Laundering: Use of petroleum-based solvents at dry cleaning facilities.
B. Degreasing: Cold cleaning of parts and materials at industrial and commercial facilities, mostly using petroleum naphtha, isopropyl alcohol and other degreasing solvents.
C. Coatings and Related Process Solvents: Automotive refinishing, metal parts, furniture and wood product coatings and associated solvent and thinner use.
D. Printing: Inks, solvents and cleaning agents.
E. Adhesives and Sealants: Organic solvent-based and water-based adhesives and sealants used in various commercial and industrial applications.
F. Other (Cleaning and Surface Coating): Solvent emissions not accounted for in any other category.

3.3.1.4 PETROLEUM PRODUCTION AND MARKETING

This major source emission category includes emissions resulting from the handling of petroleum liquids and gases at petroleum extraction, processing, transport, and marketing

facilities. This category is comprised primarily of ROC emissions. The emissions are produced from processes in the following three summary categories:

A. Oil and Gas Production: Fugitive hydrocarbon emissions from oil wells, oil valves and fittings, compressor seals, flanges, fixed and floating roof tanks, oil sumps, pits and well cellars, glycol regenerator vents, tank car and truck loading operations, and combustion emissions from vapor recovery flares at oil and gas extraction and processing facilities.
B. Petroleum Refining: Fugitive hydrocarbon emissions from valves, fittings, storage tanks and loading racks at oil and gas production facilities.
C. Petroleum Marketing: Fugitive hydrocarbon emissions from crude oil storage tanks affiliated with pipelines, and loading of marine vessels and tank cars and trucks with crude oil, natural gas transmission losses, refined fuel vapor losses from underground storage tanks, gasoline dispensing facilities, and bulk fuel storage plants.

3.3.1.5 INDUSTRIAL PROCESSES

The Industrial Processes major source category pertains to industries other than the petroleum industry. Industrial Processes produce only a small fraction of the county's ROC and NO_x emissions. They include the following seven summary categories:

A. Chemical: Fiberglass operations and plastic product manufacturing.
B. Food and Agriculture: Wine fermentation and aging.
C. Mineral Processes: Crushed rock, diatomaceous earth processing, asphalt and cement concrete production and limestone processing.
D. Metal Processes: There are no sources in Santa Barbara County for this category.
E. Wood and Paper: There are no sources in Santa Barbara County for this category.
F. Electronics: Chemicals used in semiconductor manufacturing.
G. Other (Industrial Processes): Aerospace operations (missile launches from Vandenberg Air Force Base).

3.3.2 AREA-WIDE SOURCES

The Area-Wide Sources emission inventory division is composed entirely of emissions from sources that are not subject to APCD permitting requirements. Emissions from area sources are geographically dispersed throughout the county but are aggregated into two major source emission categories: Solvent Evaporation and Miscellaneous Processes.

3.3.2.1 SOLVENT EVAPORATION

The Solvent Evaporation major source category consists mostly of evaporative ROC emissions from consumer product use, architectural coatings, and pesticide use. The Solvent Evaporation major source category includes the following four summary categories:

A. Consumer Products: Solvents used in antiperspirants, personal fragrance products, air fresheners, automotive cleaners, household and bathroom cleaners, insecticides, barbecue lighter fluid, aerosol paints, hair spray, rubbing alcohol, and laundry detergents.
B. Architectural Coatings and Related Process Solvents: Oil and water-based paints and thinners used to paint commercial and residential buildings and other structures.

C. Pesticides/Fertilizers: Pesticides used in agricultural, structural and consumer product applications.
D. Asphalt Roofing and Paving: Road oils, emulsified asphalt, and hot-mix asphalt.

3.3.2.2 MISCELLANEOUS PROCESSES

The emissions produced by miscellaneous processes are listed in the following 10 summary categories:

A. Residential Fuel Combustion: Fuel combustion for cooking, space heating, and water heating using natural gas, distillate oil, and liquified petroleum gas. Also wood stoves and fireplaces.
B. Farming Operations: Tilling, harvest season operations and cattle feedlots.
C. Construction and Demolition: Residential, commercial and industrial building and demolition, and road construction.
D. Paved Road Dust: Vehicular travel on paved roads, including freeways, major roads, and local streets.
E. Unpaved Road Dust: Vehicular travel on unpaved roads, including city and county, farm and federal land roads.
F. Fugitive Windblown Dust: Wind erosion of agricultural fields, pastures, and unpaved roads.
G. Fires: Automobile and structural fires.
H. Managed Burning and Disposal: Burning of agricultural debris, weed abatement and range management burning, prescribed forest management burning and firefighting training.
I. Cooking: Commercial charbroiling.
J. Other (Miscellaneous Processes): Miscellaneous process emissions not accounted for in any other category.

3.3.3 MOBILE SOURCES

The Mobile Sources emission inventory division contains emissions related to on-road motor vehicles and a variety of off-road vehicles and equipment, including aircraft, recreational vehicles and marine vessels. Mobile Sources consists of two major source categories: On-Road Motor Vehicles and Other Mobile Sources.

The Mobile Sources emission inventory category contains most of the NO_x emissions and a substantial percentage of the ROC emissions in the Santa Barbara County and OCS inventories.

3.3.3.1 ON-ROAD MOTOR VEHICLES

The On-Road Motor Vehicles emission inventory in the 2010 Plan was developed from the latest working draft version of ARB's Emission Factor (EMFAC) model, which incorporates county-specific vehicle activity data generated by SBCAG's Santa Barbara Travel Model, ARB, and vehicle demographic data from the Department of Motor Vehicles (DMV). SBCAG coordinates with CalTrans and the ARB to estimate vehicle emissions by vehicle class. *Chapter 5, Transportation Control Measures*, of the 2010 Plan will provide analysis of the On-Road Motor Vehicle inventory.

The On-Road Motor Vehicles major source category includes 18 summary categories described in more detail below:

A. Light Duty Passenger (LDA): Catalytic and non-catalytic converter-equipped gasoline engine and diesel engine automobiles designed primarily for transportation and having a design capacity of 12 persons or less.
B. Light Duty Trucks – 1 (LDT1): Catalytic and non-catalytic converter-equipped gasoline engine and diesel engine trucks rated at less than or equal to 3,750 pounds gross vehicle weight designed primarily for transportation of property but also includes Sport Utility Vehicles (SUV).
C. Light Duty Trucks – 2 (LDT2): Catalytic and non-catalytic converter-equipped gasoline engine and diesel engine trucks from 3,751 to 5,750 pounds gross vehicle weight designed primarily for transportation of property but also includes Sport Utility Vehicles (SUV).
D. Medium Duty Trucks (MDV): Catalytic and non-catalytic converter-equipped gasoline engine and diesel engine trucks from 5,751 to 8,500 pounds gross vehicle weight. Some larger SUV are included in this vehicle class.
E. Light-Heavy Duty Gas Trucks – 1 (LHDV1): Catalytic and non-catalytic converter-equipped gasoline engine trucks from 8,501 to 10,000 pounds gross vehicle weight.
F. Light-Heavy Duty Gas Trucks – 2 (LHDV2): Catalytic and non-catalytic converter-equipped gasoline engine trucks from 10,001 to 14,000 pounds gross vehicle weight.
G. Medium-Heavy Duty Gas Trucks (MHDV): Catalytic and non-catalytic converter-equipped gasoline engine trucks from 14,001 to 33,000 pounds gross vehicle weight.
H. Heavy-Heavy Duty Gas Trucks (HHDV): Catalytic and non-catalytic converter-equipped gasoline engine trucks from 33,001 to 60,000 pounds gross vehicle weight.
I. Light-Heavy Duty Diesel Trucks – 1 (LHDV1): Diesel engine trucks from 8,501 to 10,000 pounds gross vehicle weight.
J. Light-Heavy Duty Diesel Trucks – 2 (LHDV2): Diesel engine trucks from 10,001 to 14,000 pounds gross vehicle weight.
K. Medium-Heavy Duty Diesel Trucks (MHDV): Diesel engine trucks from 14,001 to 33,000 pounds gross vehicle weight.
L. Heavy-Heavy Duty Diesel Trucks (HHDV): Diesel engine trucks from 33,001 to 60,000 pounds gross vehicle weight.
M. Motorcycles (MCY): Non-catalytic converter equipped gasoline engines in vehicles with not more than three wheels and weighing less than 1,500 pounds.
N. Heavy Duty Diesel Urban Buses (UB): Diesel engine buses typically used for municipal transportation.
O. Heavy Duty Gas Urban Buses (UB): Gas engine buses typically used for municipal transportation.
P. School Buses (SB).
Q. Other Buses (OB)
R. Motor Homes (MH).

3.3.3.2 OTHER MOBILE SOURCES

The Other Mobile Sources category pertains to emission sources that do not produce emissions on roads and highways. These include ships, boats, airplanes, trains, residential utility equipment, and construction and mining equipment. The ARB has the primary responsibility for estimating the emissions from these categories; however,

the APCD currently estimates the emissions from ships, diesel commercial boats, OCS crew & supply boats, and aircraft.

The ARB OFFROAD model was used to calculate emissions from these categories. The OFFROAD model consists of three main modules: population, activity, and emission factor. The base year equipment population is adjusted for growth and scrappage, producing population distributions for specified calendar years from 1970 through 2040. The statewide population is allocated to each geographic region, including air basin and county. The base emission factors are corrected for in-use and ambient conditions. The annual equipment emissions are adjusted for seasonal and diurnal factors, producing the base emissions output. Emissions are produced for fuel type (e.g., gasoline, diesel, compressed natural gas, etc.), engine type (e.g., two-stroke and four stroke), equipment category and horsepower group.

Virtually all of the Other Mobile Source emissions are related to engine fuel combustion. A significant percentage of the NO_x emissions come from marine vessels that operate in the State Tidelands and the Outer Continental Shelf. The Other Mobile Sources category is divided into seven summary categories:

A. Aircraft: Piston and jet powered commercial, civil, and military aircraft, and agricultural crop dusting.
B. Trains: Diesel road hauling locomotives.
C. Ships and Commercial Boats: A variety of large container ships, tankers, and cargo vessels, both of US and foreign origin traversing the Santa Barbara Channel, gasoline and diesel commercial fishing vessels, and crew and supply boats servicing offshore oil production platforms.
D. Recreational Boats: Gasoline and diesel powered boats, determined by ARB's OFFROAD model. These emissions are divided equally between the Santa Barbara County onshore (which includes the State Tidelands) and the Outer Continental Shelf.
E. Off-Road Recreational Vehicles: Four-wheel drive all-terrain and off-road passenger vehicles, and off-road motorcycles, determined by ARB's OFFROAD model.
F. Off-Road Equipment: Gasoline, diesel and LPG powered construction and industrial equipment. Light duty equipment with engines less than 175 horsepower, such as forklifts, mobile cranes, airport ground support equipment, portable generators, compressors, and pumps. Heavy-duty non-farm equipment with engines greater than or equal to 175 horsepower including construction equipment such as pavers, scrapers, loaders and mining equipment. Diesel powered refrigeration units on trucks and trailers. This category also includes emissions from lawn and garden equipment, which include small horsepower two and four stroke utility engines driving chainsaws, lawn mowers, leaf blowers, portable compressors and generators used in residential and commercial applications. Lastly, there are emissions from oil drilling and workover rigs, and military tactical support equipment. The emissions from these categories are determined by ARB's OFFROAD model.
G. Farm Equipment: Gasoline and diesel heavy-duty farm equipment, including tractors, mowers, combines and other mobile agricultural equipment. The emissions from these categories are determined by ARB's OFFROAD model.

3.3.4 NATURAL SOURCES

The Natural Sources emission inventory division consists of emissions that are not man-made. Emission estimates for these categories tend to be difficult to quantify with any degree of certainty. Note that natural emissions are excluded from the Planning Emission Inventory.

3.3.4.1 NATURAL SOURCES

There are four summary categories of Natural Sources emissions:

A. Biogenic Sources: Emission estimates from natural vegetation are generated using the Urban Airshed Model's Biogenic Emission Inventory System (BEIS), a complex regional model incorporating biomass types and distribution, plant species emission factors and climate correction factors. Soil microorganisms contribute some NO_x emissions.
B. Geogenic Sources: Naturally occurring oil seeps and gas seeps located off the southern coast of Santa Barbara County. Seep emissions flow out from subsurface sources on the ocean floor, primarily in the State Tidelands, and exhibit a high degree of temporal and spatial variability. We have worked in cooperation with the Institute of Crustal Studies at the University of California at Santa Barbara to determine estimates of seep emissions in the Santa Barbara Channel. The results of their research have been used in this inventory.
C. Wildfires: Timber, grass and brush wildfires. This is different from the planned or prescribed burn fires that are part of the Area-Wide Source division. Note that there were significant ROC and NOx emissions from wildfires during 2007, predominately from the Zaca Fire, which burned over 240,000 acres in the Los Padres National Forest. Wildfire emissions are calculated by ARB using a GIS-based fire emissions model.
D. Windblown Dust.

Based on information presented in Sections 3.2 and 3.3, the 2007 Annual Emission Inventory and the 2007 Planning Emission Inventory will be described in the following sections. These two inventories will form the basis for determining emission reductions and forecasting future inventories.

3.4 2007 ANNUAL EMISSION INVENTORY

The 2007 Santa Barbara County and the Outer Continental Shelf Annual Emission Inventory document the current sources of ROC and NO_x emissions, both in quantity and relative contribution.

3.4.1 SANTA BARBARA COUNTY ANNUAL EMISSIONS

The 2007 Santa Barbara County Annual Emissions Inventory of ROC and NO_x in tons per year is presented in Table 3-1. The Santa Barbara County inventory represents onshore and State Tidelands emission sources, and includes natural sources. Figure 3-1 shows each major source category's relative contribution for each pollutant during 2007. The largest sources of each pollutant and their percent of contribution are as follows:

2007 Santa Barbara County ROC Annual Emissions: 58,712.66 tons per year

- **5% Stationary Sources: 3,244 tons per year**
  Primarily coatings and process solvents, degreasing, adhesives and sealants, and oil and gas production.
- **5% Area-Wide Sources: 3,051 tons per year**
  Primarily consumer products, pesticides, forest management, and farming livestock waste.
- **6% Mobile Sources – On-Road Motor Vehicles: 3,347 tons per year**
  Predominantly light duty passenger cars and light duty trucks.
- **3% Other Mobile Sources: 1,692 tons per year**
  Significant emissions from lawn and garden equipment, transport refrigeration units, fuel storage and handling, recreational boats, and diesel agricultural equipment, and diesel construction and mining equipment.
- **81% Natural Sources: 47,379 tons per year**
  Mostly biogenic sources and wildfires with a significant contribution from geogenic sources.

2007 Santa Barbara County NO_x Annual Emissions: 22,931 tons per year

- **12% Stationary Sources: 2,843 tons per year**
  Almost all from oil and gas production (natural gas IC engines), manufacturing and industrial (diesel IC engines), agricultural irrigation (diesel and natural gas IC engines).
- **1% Area-Wide Sources: 333 tons per year**
  Mostly residential fuel combustion (natural gas space heating and water heating) and forest management.
- **26% Mobile Sources – On-Road Motor Vehicles: 5,862 tons per year**
  The majority from light duty passenger cars, light duty trucks, and heavy-heavy duty diesel trucks.
- **23% Other Mobile Sources: 5,186 tons per year**
  Contributors are trains, diesel construction and mining equipment, and diesel agricultural equipment, and transport refrigeration units.
- **38% Natural Sources: 8,707 tons per year**

In summary, Natural Sources (both biogenic and geogenic sources) contribute the most ROC emissions in the Annual Emission Inventory. On-road motor vehicles, specifically light duty passenger, also produce large amounts of ROC emissions and most of the NO_x emissions. On-road motor vehicles, , and other mobile sources such as trains, off-road equipment and farm equipment also significantly contribute to the onshore NO_x emissions inventory.

3.4.2 OCS ANNUAL EMISSIONS

The 2007 OCS emission inventory is presented in Table 3-2. The OCS emissions are summarized separately from the onshore emission inventory for clarity. Figure 3-2 shows each

major source's relative contribution for each pollutant during 2007. The largest sources of each pollutant and their percent of contribution are discussed below.

2007 OCS ROC Annual Emissions: 3,221.37 tons per year

- **10% Stationary Sources: 303 tons per year**
  Primarily oil and gas production (fugitives from crude oil valves).
- **28% Mobile Sources: 914 tons per year**
  Mostly ships (foreign motor ships), recreational boats, and commercial boats.
- **62% Natural Sources: 2,004 tons per year**
  All from geogenic sources (gas seeps and oil seeps).

2007 OCS NO_x Annual Emissions: 18,230 tons per year

- **1% Stationary Sources: 213 tons per year**
  Primarily oil and gas production (natural gas turbine IC engines).
- **99% Mobile Sources: 18,017 tons per year**
  Predominantly ships (foreign motor ships).

The 2007 marine shipping inventory was developed by growing the 2006 marine shipping inventory by trends in power consumption for ships traversing the Santa Barbara Channel. The inventory was developed using 2006 ship-specific data including ship name, vessel number, ship type, and cruising speed that were obtained from the Southern California Marine Exchange and Port Hueneme. The marine shipping inventory is based on estimating emissions by utilizing the ship-specific power consumption data for each ship that transited the coast of the county during 2006. Ship power data were obtained from the Lloyds Maritime Database and correlated to each ship transiting the Santa Barbara Channel by a unique vessel number. Utilizing ship speed data along with a ship travel distance of 130 miles (county-line to county-line distance) for ships servicing west coast ports and 90 miles for ships on a Great Circle Route servicing Asian ports, the amount of time it took each ship to transit the Santa Barbara County coastline was determined. Emissions were then calculated by essentially multiplying together transit time, ship power, number of transits through the Channel and a NO_x emission factor that ranges from 16.32 grams per kilowatt-hour for cargo ships to 18.1 grams per kilowatt-hour for container ships. It is assumed that the ships operate at 80 percent load while in transit. Of the approximately 17,750 tons of NO_x emissions in 2007, about 93% are from foreign motor ships with about 7% from U.S. motor ships. Utilizing trends in power consumption for growth, the 2007 inventory is about 6% higher than the 2006 inventory that was used as a baseline.

In summary, nearly two thirds of the ROC emissions in the OCS are from Natural Sources, specifically offshore oil seeps and gas seeps. Ships and commercial boats in transit, and oil and gas production, primarily offshore platform fugitive hydrocarbons, contribute the largest remaining portions of ROC emissions to the OCS inventory. Ships and commercial boats also account for almost all of the OCS NO_x emissions.

3.5 2007 PLANNING EMISSION INVENTORY

The 2007 Planning Emission Inventory had been developed by modifying the Annual Emission Inventory three significant ways. First, seasonal variations were factored into the Planning Emission Inventory because most exceedances of ozone standards occur during the April to October ozone season. Second, the Planning Emission Inventory excluded emissions from natural sources such as biogenics, oil seeps and gas seeps, and wildfires, since they're not regulated or controlled. Third, the emission values were converted from tons per year to tons per day.

3.5.1 SANTA BARBARA COUNTY PLANNING EMISSION INVENTORY

Figure 3-3 shows each major source's relative contribution for each pollutant during 2007. The largest sources of each pollutant and their relative contribution are discussed in the following section.

2007 Santa Barbara County ROC Planning Emissions: 31.01 tons per day

- **28% Stationary Sources: 8.85 tons per day**
  Primarily coatings and process solvents, degreasing, adhesives and sealants, and oil and gas production.
- **27% Area-Wide Sources: 8.36 tons per day**
  Primarily consumer products, pesticides, forest management, and farming livestock waste.
- **30% Mobile Sources – On-Road Motor Vehicles: 9.17 tons per day**
  Predominantly light duty passenger cars and light duty trucks.
- **15% Other Mobile Sources: 4.64 tons per day**
  Significant emissions from lawn and garden equipment, transport refrigeration units, fuel storage and handling, recreational boats, diesel agricultural equipment, and diesel construction and mining equipment.

2007 Santa Barbara County NO_x Planning Emissions: 38.79 tons per day

- **20% Stationary Sources: 7.61 tons per day**
  Almost all from oil and gas production (natural gas IC engines), manufacturing and industrial (diesel IC engines), agricultural irrigation (diesel IC engines).
- **2% Area-Wide Sources: 0.91 tons per day**
  Mostly residential fuel combustion (natural gas space and water heating) and forest management.
- **41% Mobile Sources – On-Road Motor Vehicles: 16.06 tons per day**
  The majority from light duty passenger cars, light duty trucks, and heavy-heavy duty diesel trucks.
- **37% Other Mobile Sources: 14.21 tons per day**
  Contribution from trains, diesel construction and mining equipment, and diesel agricultural equipment, and transport refrigeration units.

In summary, on-road motor vehicles, specifically light duty passenger cars and light duty trucks produce about two-thirds of the ROC emissions along with significant contributions from cleaning and surface coatings, solvent evaporation, and petroleum production and marketing. On-road motor vehicles, primarily light duty passenger cars, light duty trucks, and heavy, heavy duty diesel trucks, along with the other mobile source categories of off-road equipment and farm equipment, produce the majority of the NO_x emissions.

3.5.2 OCS PLANNING EMISSION INVENTORY

The 2007 OCS Planning Emission Inventory is presented in Table 3-2. The OCS emissions are summarized separately from the onshore emission inventory for clarity. Figure 3-4 shows each major source's relative contribution for each pollutant during 2007. The largest sources of each pollutant and their percent of contribution are discussed as follows.

2007 OCS ROC Planning Emissions: 3.33 tons per day

- **25% Stationary Sources: 0.83 tons per day**
  Primarily oil and gas production (fugitives from crude oil valves).
- **75% Mobile Sources: 2.51 tons per day**
  Mostly ships (foreign motor ships), recreational boats, and commercial boats.

2007 OCS NO_x Planning Emissions: 49.95 tons per day

- **1% Stationary Sources: 0.58 tons per day**
  Primarily oil and gas production (natural gas turbine IC engines).
- **99% Mobile Sources: 49.36 tons per day**
  Predominantly ships (foreign motor ships).

Ocean-going ships, primarily foreign motor ships, account for most of the ROC and NO_x emissions in the Planning Emission Inventory for the OCS. Emissions from marine shipping comprise 99% of the NO_x inventory and 75% of the ROC inventory on the OCS.

3.6 COMBINED OCS AND SANTA BARBARA COUNTY INVENTORIES

Figure 3-5 presents the combined Annual Emission Inventory for both the OCS and Santa Barbara County sources. This figure shows that about 49,383 tons per year, or 80% of the ROC emissions are from Natural Sources, including wildfire, biogenic (vegetative) and geogenic emissions. As previously discussed, significant wildfire emissions occurred during 2007 due to the Zaca Fire, which burned nearly 240,000 in the Los Padres National Forest. Stationary Sources comprise 6% of the ROC emissions while Area Wide-Sources and On-road Mobile Sources each make up 5% of the ROC emissions for the combined Annual Emission Inventory. Other Mobile Sources contribute the remaining 4% of the ROC inventory.

Other Mobile Sources account for about 23,203 tons per year, or 56% of the NOx emissions of the combined Annual Emission Inventory. Nearly 18,000 tons per year of these NOx emissions are from ships and commercial boats, primarily marine shipping. Natural Sources account for 21% of the combined annual NOx inventory with most of these emissions from wildfires. On-

Road Motor Vehicles, while making up about 26% of the onshore NOx inventory, account for 14% of the combined OCS-Santa Barbara County NOx inventory due to the significant NOx emissions from marine shipping. The combined Annual Emission Inventory for NOx includes another 8% of the emissions from stationary sources and 1% of the NOx emissions from area-wide sources.

The combined OCS and Santa Barbara Planning Emission Inventory, which excludes natural sources, is shown in Figure 3-6. The combined ROC inventory shows a fairly equal distribution of emissions among each of the four source categories. Stationary Sources comprise 28% of the ROC inventory at 9.7 tons per day while On-Road Motor Vehicles makes up about 27% of the inventory at 9.2 tons per day. Area-Wide Sources account for 8.4 tons per day or 24% of the combined ROC inventory while Other Mobile Sources emit 7.1 tons per day, which is 21% of the combined ROC inventory.

Nearly three-fourths, or about 64 tons per day of the combined OCS-Santa Barbara County Planning NOx inventory is from Other Mobile Sources, a majority of these NOx emissions from marine shipping. On-Road Motor Vehicles account for about 16 tons per day or 18% of the combined NOx inventory. This is compared to a 41% contribution On-Road Motor Vehicles make to the onshore Planning Inventory for NOx, which once again underscores the impact of marine shipping emissions on the overall NOx inventory. NOx emissions from Stationary Sources, at about 8 tons per day, make up 9% of the combined planning inventory, while Area-Wide Sources contribute 1% of the NOx emissions to the combined inventory.

3.7 CONCLUSION

In this chapter we have described how our emission inventories are categorized into Stationary Sources, Area-Wide Sources, Mobile Sources and Natural Sources. The emphasis in the 2010 Plan is on the ozone precursors of ROC and NO_x. We have also discussed the development of the 2007 Annual Emission Inventory and Planning Emission Inventory for both Santa Barbara County and the Outer Continental Shelf. These inventories provide the foundation for this plan and are key elements to calculating emission reductions attributable to control measures and for forecasting future emission inventories for 2020 and 2030.

In Santa Barbara County, the largest contribution of ROC emissions is from natural sources in the Annual Emission Inventory and from on-road motor vehicles in the Planning Emission Inventory. Santa Barbara County NO_x emissions for both inventories are mostly from on-road motor vehicles and other mobile sources, such as trains and off-road equipment. The most significant source of ROC and NO_x emissions in both the Annual Emission Inventory and the Planning Emission Inventory for the Outer Continental Shelf is from sources in the other mobile sources category, with a majority of these emissions from international maritime shipping activities.

TABLE 3 – 1 2007 EMISSION INVENTORY – SANTA BARBARA COUNTY		Annual ROC *(tons per year)*	Planning ROC *(tons per day)*	Annual NO_x *(tons per year)*	Planning NO_x *(tons per day)*
STATIONARY SOURCES					
Fuel Combustion					
010	ELECTRIC UTILITIES	0.7	0.0019	1.53	0.0042
020	COGENERATION	11.79	0.0323	40.36	0.1106
030	OIL AND GAS PRODUCTION (COMBUSTION)	42.76	0.1172	644.26	1.7651
040	PETROLEUM REFINING (COMBUSTION)	0.18	0.0005	4.4	0.0121
050	MANUFACTURING AND INDUSTRIAL	23.12	0.0639	363.08	1.0022
052	FOOD AND AGRICULTURAL PROCESSING	68.55	0.1878	1,414.69	3.8758
060	SERVICE AND COMMERCIAL	24.18	0.0577	303.17	0.6413
099	OTHER (FUEL COMBUSTION)	0.00	0.0000	0.00	0.0000
	Fuel Combustion Total	**171.28**	**0.4613**	**2,771.48**	**7.4113**
Waste Disposal					
110	SEWAGE TREATMENT	0.73	0.0020	0.85	0.0023
120	LANDFILLS	50.74	0.1390	1.69	0.0046
130	INCINERATORS	0.13	0.0004	1.43	0.0039
140	SOIL REMEDIATION	0.00	0.0000	0.00	0.0000
199	OTHER (WASTE DISPOSAL)	11.43	0.0000	0.00	0.0000
	Waste Disposal Total	**63.03**	**0.1414**	**3.97**	**0.0108**
Cleaning and Surface Coatings					
210	LAUNDERING	2.31	0.0063	0.00	0.0000
220	DEGREASING	686.20	1.8800	0.00	0.0000
230	COATINGS AND RELATED PROCESS SOLVENTS	748.25	2.0500	0.00	0.0000
240	PRINTING	174.29	0.4775	0.00	0.0000
250	ADHESIVES AND SEALANTS	302.95	0.8300	0.00	0.0000
299	OTHER (CLEANING AND SURFACE COATINGS)	38.56	0.1056	0.00	0.0000
	Cleaning and Surface Coatings Total	**1,952.56**	**5.3495**	**0.00**	**0.0000**
Petroleum Production and Marketing					
310	OIL AND GAS PRODUCTION	768.34	2.1050	24.36	0.0667
320	PETROLEUM REFINING	14.84	0.0407	0.06	0.0002
330	PETROLEUM MARKETING	190.67	0.5224	0.00	0.0000
	Petroleum Production and Marketing Total	**973.84**	**2.6681**	**24.42**	**0.0669**
Industrial Processes					
410	CHEMICAL	5.64	0.0155	0.00	0.0000
420	FOOD AND AGRICULTURE	41.04	0.1124	0.00	0.0000
430	MINERAL PROCESSES	1.57	0.0043	12.71	0.0348
440	METAL PROCESSES	NA	NA	NA	NA
450	WOOD AND PAPER	NA	NA	NA	NA
470	ELECTRONICS	0.00	0.0000	0.00	0.0000
499	OTHER (INDUSTRIAL PROCESSES)	35.00	0.0959	30.62	0.0839
	Industrial Processes Total	**83.25**	**0.2281**	**43.33**	**0.1187**
	STATIONARY SOURCES TOTAL	**3,243.96**	**8.8484**	**2,843.20**	**7.6077**

TABLE 3 – 1 2007 EMISSION INVENTORY – SANTA BARBARA COUNTY	Annual ROC *(tons per year)*	Planning ROC *(tons per day)*	Annual NO_x *(tons per year)*	Planning NO_x *(tons per day)*

AREA-WIDE SOURCES

Solvent Evaporation

510	CONSUMER PRODUCTS	992.80	2.7200	0.00	0.0000
520	ARCHITECTURAL COATINGS AND SOLVENTS	445.30	1.2200	0.00	0.0000
530	PESTICIDES/FERTILIZERS	1,175.30	3.2200	0.00	0.0000
540	ASPHALT PAVING/ROOFING	85.70	0.2348	0.00	0.0000
	Solvent Evaporation Total	**2,699.10**	**7.3948**	**0.00**	**0.0000**

Miscellaneous

610	RESIDENTIAL FUEL COMBUSTION	13.42	0.0368	332.08	0.9098
620	FARMING OPERATIONS	320.04	0.8768	0.00	0.0000
630	CONSTRUCTION AND DEMOLITION DUST	0.00	0.0000	0.00	0.0000
640	PAVED ROAD DUST	0.00	0.0000	0.00	0.0000
645	UNPAVED ROAD DUST	0.00	0.0000	0.00	0.0000
650	FUGITIVE WINDBLOWN DUST	0.00	0.0000	0.00	0.0000
660	FIRES	0.00	0.0000	0.00	0.0000
670	MANAGED BURNING AND DISPOSAL	8.21	0.0225	0.5712	0.0016
690	COOKING	10.32	0.0283	0.00	0.0000
699	OTHER (MISCELLANEOUS PROCESSES)	0.00	0.0000	0.00	0.0000
	Miscellaneous Total	**351.99**	**0.9644**	**332.65**	**0.9114**

	AREA-WIDE SOURCES TOTAL	**3,051.00**	**8.3592**	**332.65**	**0.9114**

MOBILE SOURCES

On-Road Motor Vehicles

710	LIGHT DUTY PASSENGER	1,343.20	3.6800	1,102.30	3.0200
722	LIGHT DUTY TRUCKS – 1	693.50	1.9000	686.20	1.8800
723	LIGHT DUTY TRUCKS – 2	558.45	1.5300	799.35	2.1900
724	MEDIUM DUTY TRUCKS	149.65	0.4100	292.00	0.8000
732	LIGHT HEAVY DUTY GAS TRUCKS – 1	65.70	0.1800	113.15	0.3100
733	LIGHT HEAVY DUTY GAS TRUCKS – 2	73.00	0.2000	91.25	0.2500
734	MEDIUM HEAVY DUTY GAS TRUCKS	87.60	0.2400	113.15	0.3100
736	HEAVY HEAVY DUTY GAS TRUCKS	69.35	0.1900	229.95	0.6300
742	LIGHT HEAVY DUTY DIESEL TRUCKS – 1	36.50	0.0100	138.70	0.3800
743	LIGHT HEAVY DUTY DIESEL TRUCKS – 2	36.50	0.0100	120.45	0.3300
744	MEDIUM HEAVY DUTY DIESEL TRUCKS	10.95	0.0300	748.25	2.0500
746	HEAVY HEAVY DUTY DIESEL TRUCKS	58.40	0.1600	1,011.05	2.7700
750	MOTORCYCLES	197.10	0.5400	58.40	0.1600
760	HEAVY DUTY DIESEL URBAN BUSES	36.50	0.0100	116.80	0.3200
762	HEAVY DUTY GAS URBAN BUSES	7.30	0.0200	10.95	0.0300
770	SCHOOL BUSES	36.50	0.0100	124.10	0.3400
776	OTHER BUSES	7.30	0.0200	47.45	0.1300
780	MOTOR HOMES	10.95	0.0300	62.05	0.1700
	On-Road Motor Vehicles Total	**3,347.05**	**9.1700**	**5,861.90**	**16.0600**

TABLE 3 – 1 2007 EMISSION INVENTORY – SANTA BARBARA COUNTY		Annual ROC *(tons per year)*	Planning ROC *(tons per day)*	Annual NO_x *(tons per year)*	Planning NO_x *(tons per day)*
Other Mobile Sources					
810	AIRCRAFT	113.24	0.3102	303.73	0.8321
820	TRAINS	76.65	0.2100	1,113.25	3.0500
830	SHIPS AND COMMERCIAL BOATS	15.73	0.0431	202.65	0.5552
840	RECREATIONAL BOATS	299.30	0.8200	36.50	0.1000
850	OFF-ROAD RECREATIONAL VEHICLES	222.01	0.6082	30.08	0.0824
860	OFF-ROAD EQUIPMENT	670.73	1.8376	2,592.27	7.1021
870	FARM EQUIPMENT	159.44	0.4368	907.47	2.4862
890	FUEL STORAGE AND HANDLING	135.05	0.3700	0.00	0.0000
	Other Mobile Sources Total	**1,692.15**	**4.6360**	**5,185.95**	**14.2081**
	MOBILE SOURCES TOTAL	**5,039.20**	**13.8060**	**11,047.85**	**30.2681**
NATURAL SOURCES					
Natural Sources					
910	BIOGENIC SOURCES	22,532.47	0.0000	882.48	0.0000
920	GEOGENIC SOURCES	6,786.09	0.0000	0.00	0.0000
930	WILDFIRES	18,059.94	0.0000	7,824.73	0.0000
940	WINDBLOWN DUST	0.00	0.0000	0.00	0.0000
	Natural Sources Total	**47,378.50**	**0.0000**	**8,707.21**	**0.0000**
	NATURAL SOURCES TOTAL	**47,378.50**	**0.0000**	**8,707.21**	**0.0000**
	2007 SANTA BARBARA COUNTY TOTAL	**58,712.66**	**31.0136**	**22,930.91**	**38.7872**

TABLE 3 – 2 2007 EMISSION INVENTORY – OCS	Annual ROC *(tons per year)*	Planning ROC *(tons per day)*	Annual NO_x *(tons per year)*	Planning NO_x *(tons per day)*

STATIONARY SOURCES

Fuel Combustion

030	OIL AND GAS PRODUCTION (COMBUSTION)	10.36	0.0284	208.26	0.5706
	Fuel Combustion Total	**10.36**	**0.0284**	**208.26**	**0.5706**

Cleaning and Surface Coatings

230	COATINGS AND RELATED PROCESS SOLVENTS	12.96	0.0355	0.00	0.0000
	Cleaning and Surface Coatings Total	**12.96**	**0.0355**	**0.00**	**0.0000**

Petroleum Production and Marketing

310	OIL AND GAS PRODUCTION	279.36	0.7654	4.70	0.0129
	Petroleum Production and Marketing Total	**279.36**	**0.7654**	**4.70**	**0.0129**

	STATIONARY SOURCES TOTAL	**302.68**	**0.8293**	**212.96**	**0.5835**

MOBILE SOURCES

Other Mobile Sources

810	AIRCRAFT	3.34	0.0092	1.47	0.0040
830	SHIPS AND COMMERCIAL BOATS	611.67	1.6758	17,979.03	49.2576
840	RECREATIONAL BOATS	299.30	0,8200	36.50	0.1000
	Other Mobile Sources Total	**914.31**	**2.5050**	**18,017.00**	**47.9672**

	MOBILE SOURCES TOTAL	**914.31**	**2.5050**	**18,017.00**	**49.3616**

NATURAL SOURCES

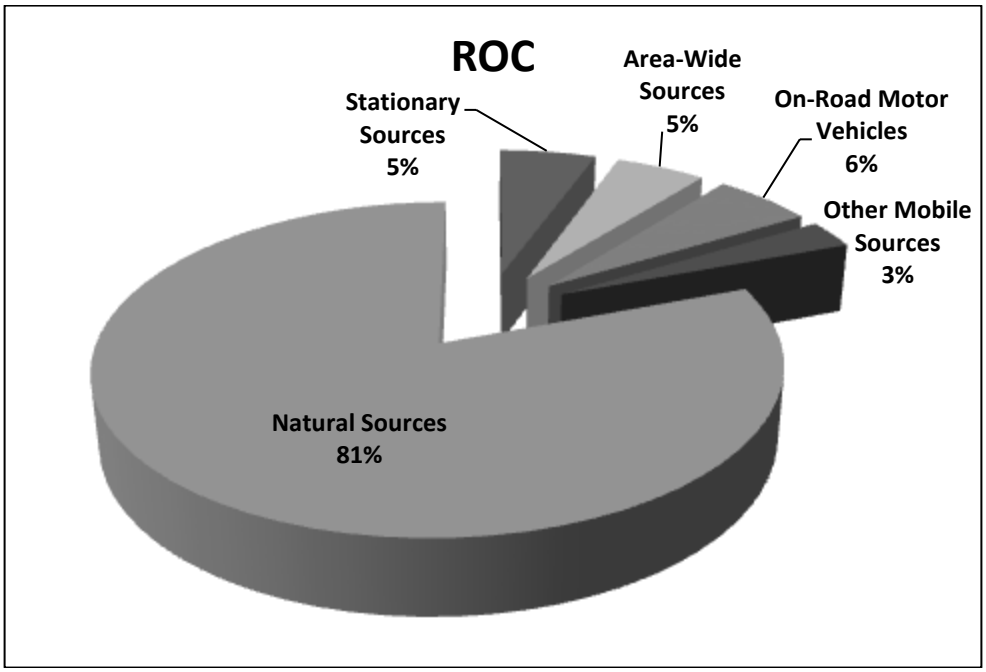
Natural Sources

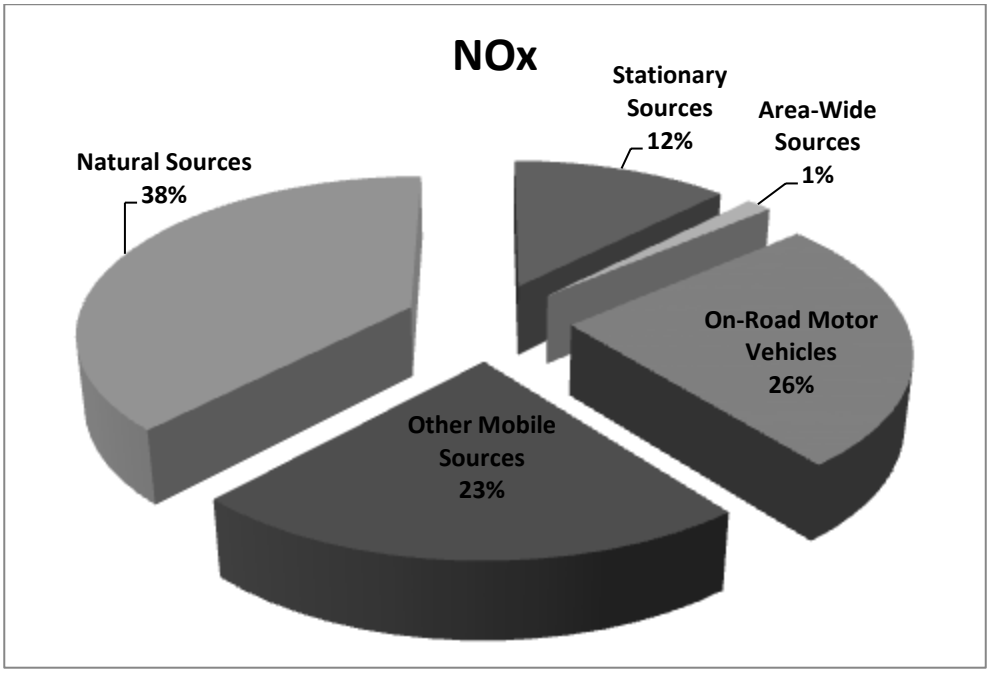
920	GEOGENIC SOURCES	2,004.38	0.0000	0.00	0.0000
	Natural Sources Total	**2,004.38**	**0.0000**	**0.00**	**0.0000**

	NATURAL SOURCES TOTAL	**2,004.38**	**0.0000**	**0.00**	**0.0000**

2007 OUTER CONTINENTAL SHELF TOTAL	**3,221.37**	**3.3343**	**18,229.96**	**49.9451**

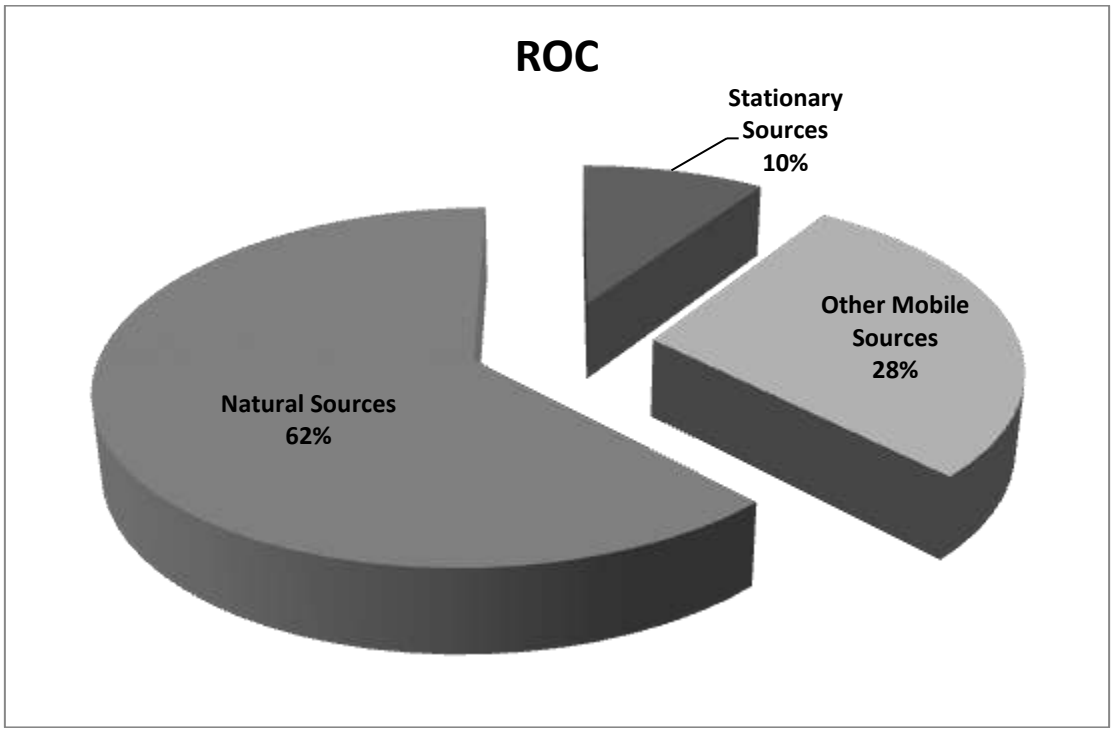
FIGURE 3-1
2007 Annual Emission Inventory
Santa Barbara County ROC and NOx Emissions

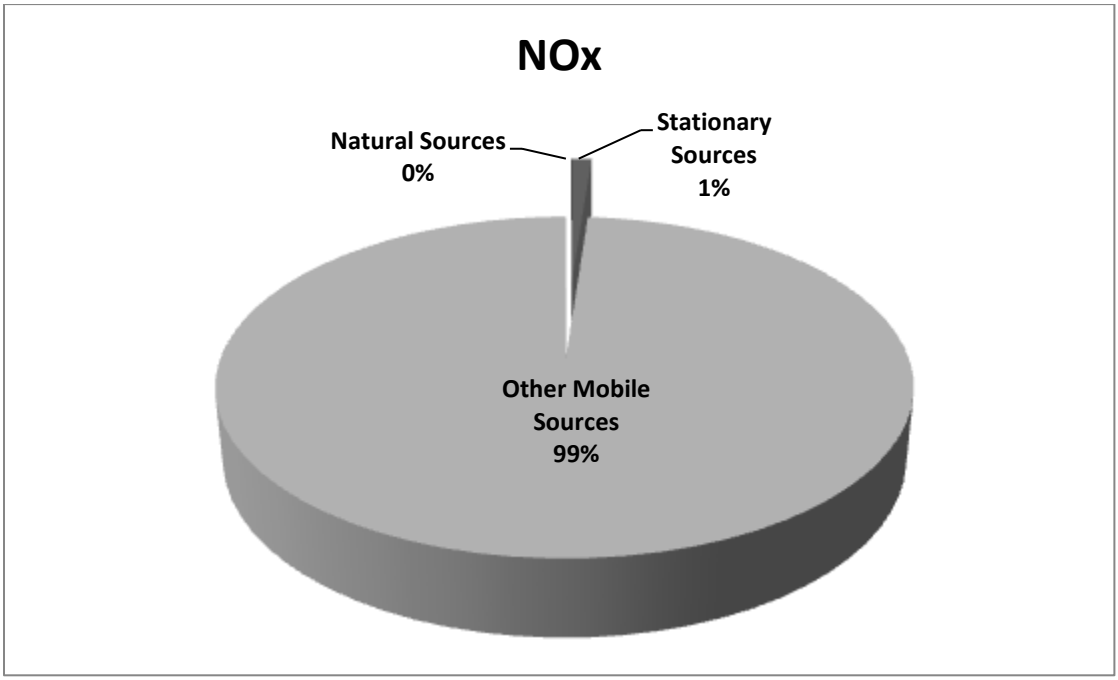




	ROC (tpy)	NOx (tpy)
Stationary Sources	**3,243.96**	**2,843.2**
Area-wide Sources	**3,051.00**	**332.65**
On-road Motor Vehicles	**3,347.05**	**5,861.90**
Other Mobile Sources	**1,692.15**	**5,185.95**
Natural Sources	**47,378.5**	**8,707.21**
Total	**58,712.66**	**22,930.91**

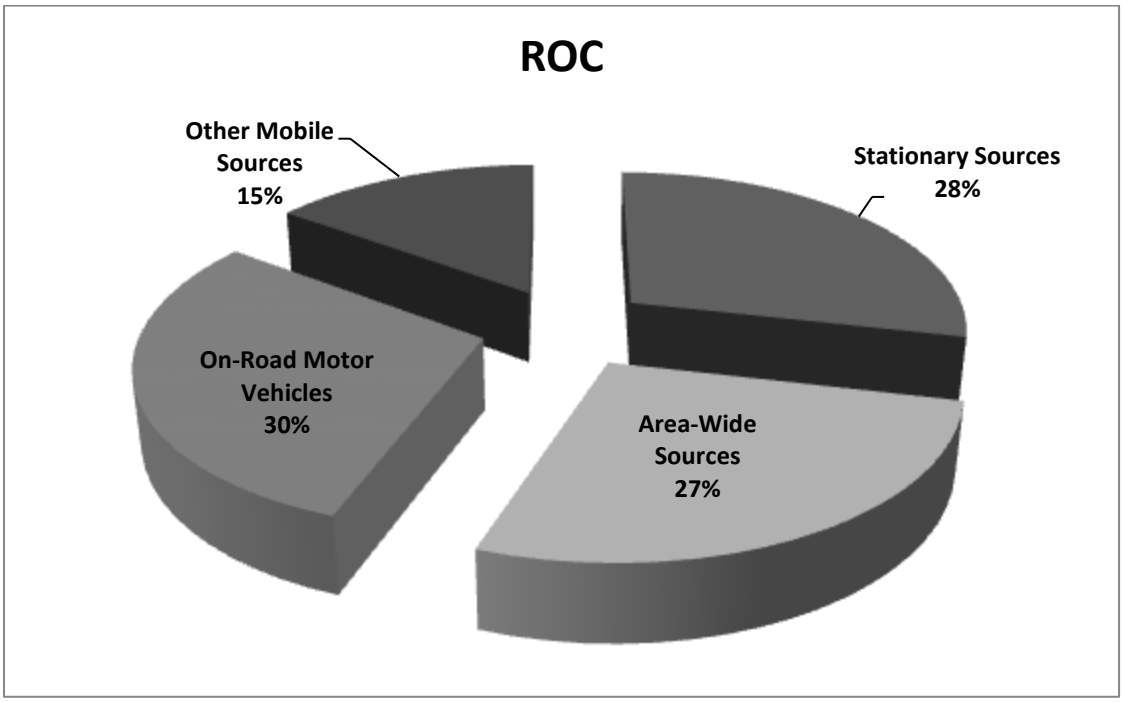
FIGURE 3-2
2007 Annual Emission Inventory
Outer Continental Shelf ROC and NOx Emissions

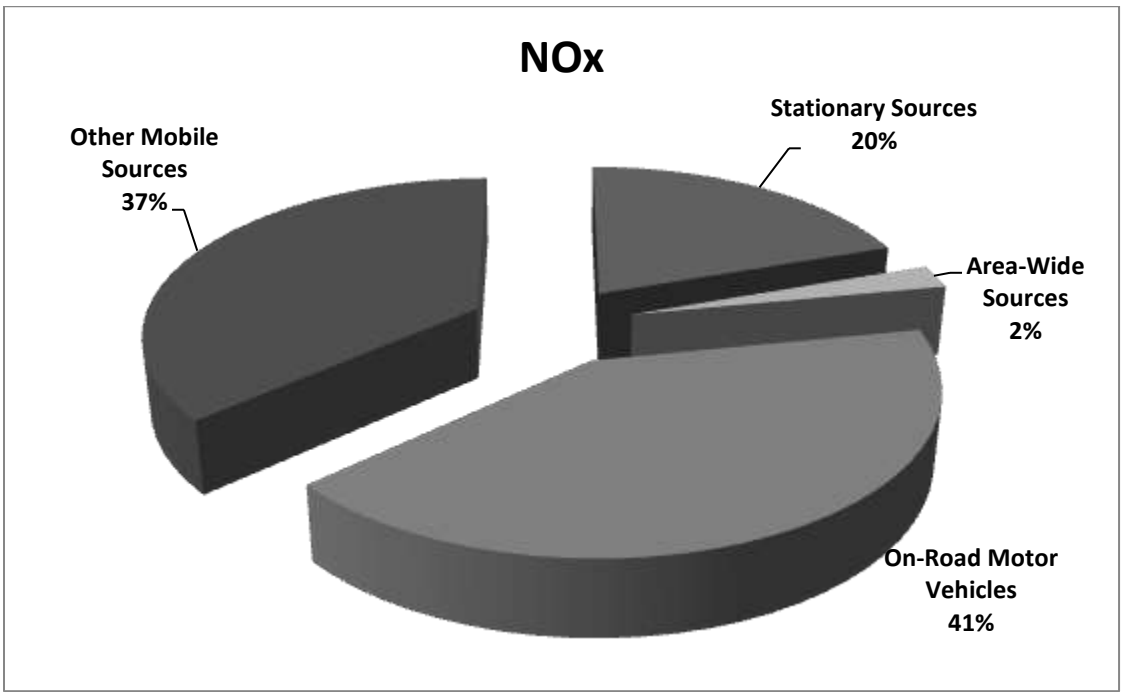




	ROC (tpy)	NOx (tpy)
Stationary Sources	**302.68**	**212.96**
Other Mobile Sources	**914.31**	**18,017.00**
Natural Sources	**2,004.38**	**0.00**
Total	**3,221.37**	**18,229.96**

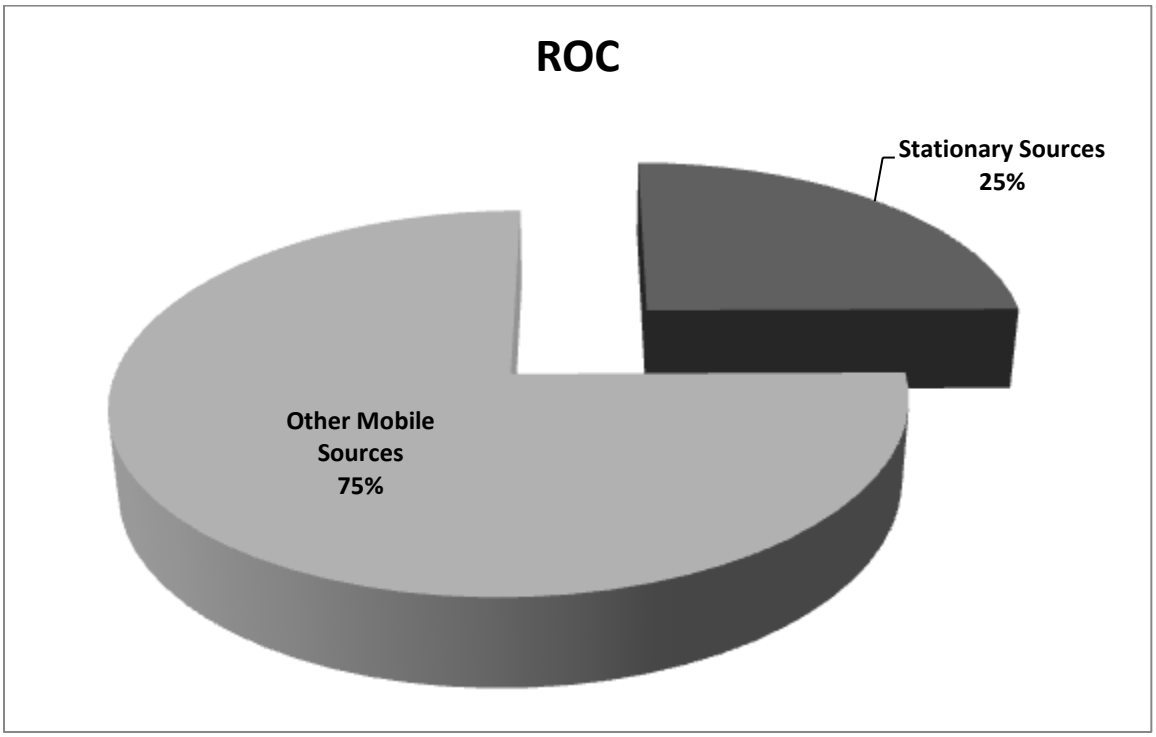
FIGURE 3-3
2007 Planning Emission Inventory
Santa Barbara County ROC and NOx Emissions

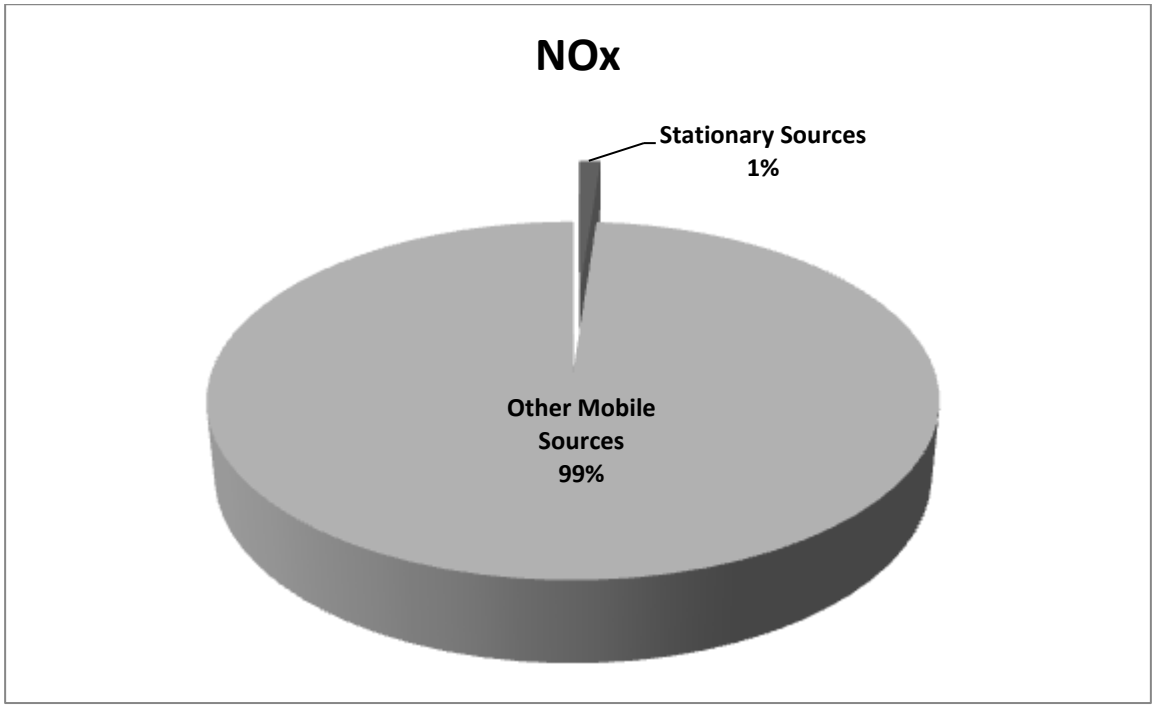




	ROC (tpd)	NOx (tpd)
Stationary Sources	**8.85**	**7.61**
Area-wide Sources	**8.36**	**0.91**
On-road Motor Vehicles	**9.17**	**16.06**
Other Mobile Sources	**4.64**	**14.21**
Total	**31.01**	**38.79**

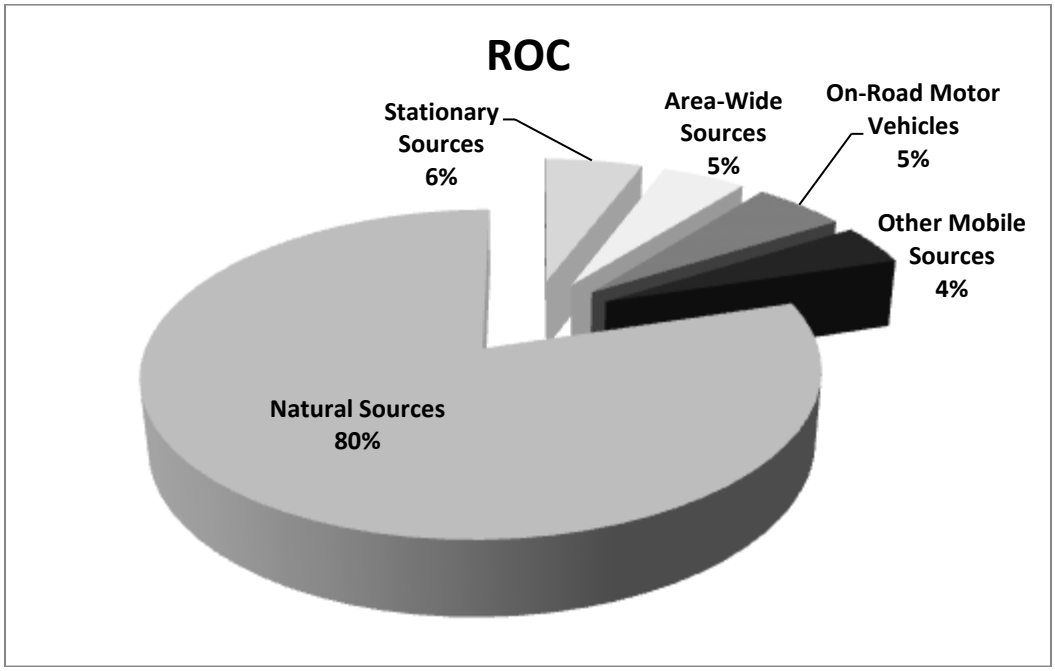
FIGURE 3-4
2007 Planning Emission Inventory
Outer Continental Shelf ROC and NOx Emissions

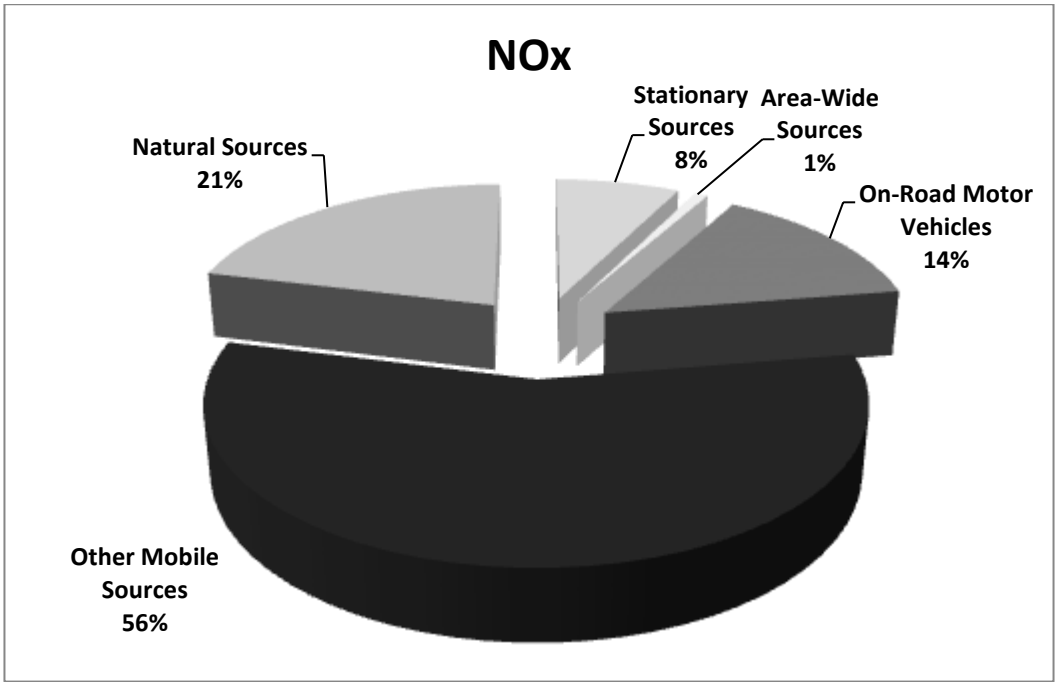




	ROC (tpd)	NOx (tpd)
Stationary Sources	**0.83**	**0.58**
Other Mobile Sources	**2.51**	**49.36**
Total	**3.33**	**49.95**

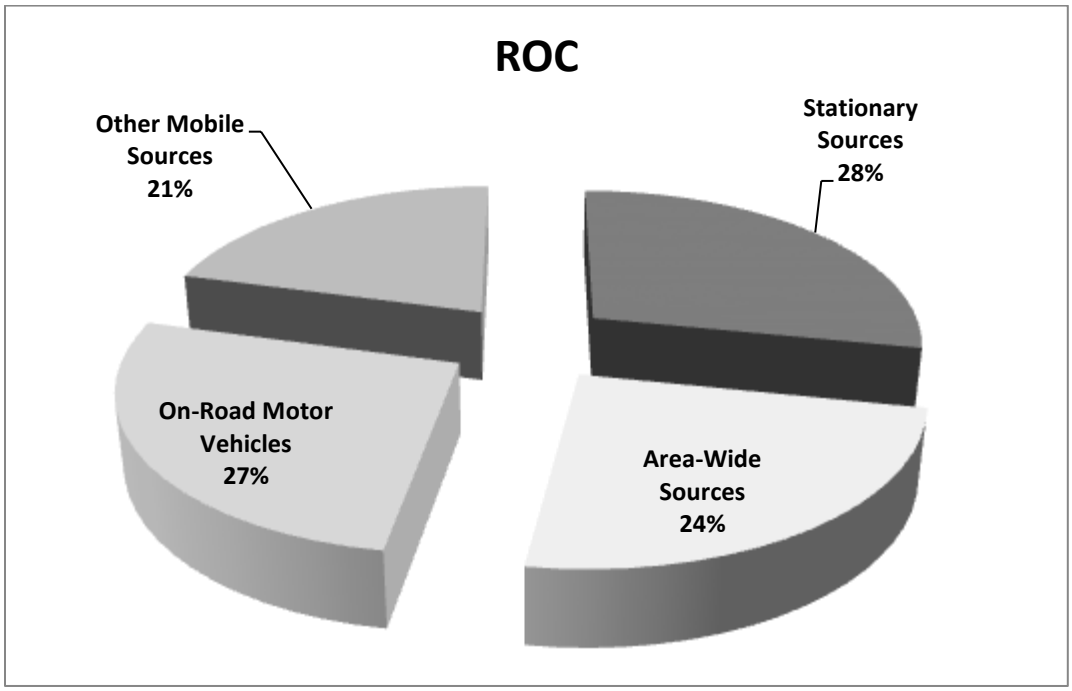
FIGURE 3-5
2007 Annual Emission Inventory
Outer Continental Shelf and Santa Barbara County ROC and NOx Emissions

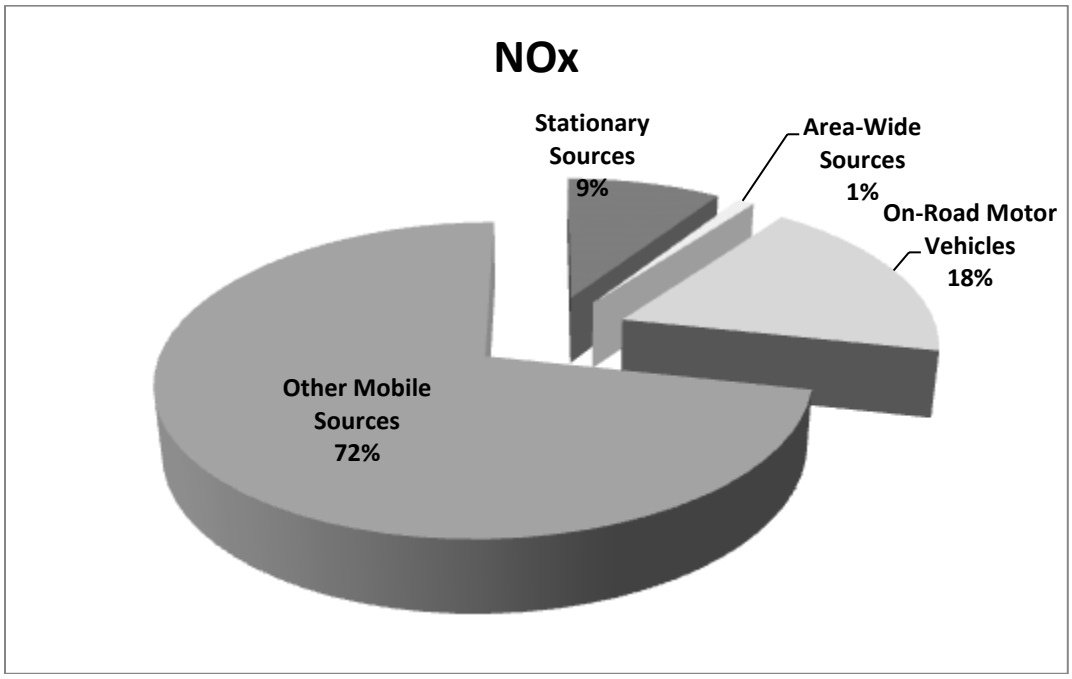




	ROC (tpy)	NOx (tpy)
Stationary Sources	**3,546.64**	**3,056.16**
Area-wide Sources	**3,051.00**	**332.65**
On-road Motor Vehicles	**3,347.05**	**5,861.9**
Other Mobile Sources	**2,606.46**	**23,202.95**
Natural Sources	**49,382.88**	**8,707.21**
Total	**61,934.03**	**41,160.87**

FIGURE 3-6
2007 Planning Emission Inventory
Outer Continental Shelf and Santa Barbara County ROC and NOx Emissions





	ROC (tpd)	NOx (tpd)
Stationary Sources	**9.68**	**8.19**
Area-wide Sources	**8.36**	**0.91**
On-road Motor Vehicles	**9.17**	**16.06**
Other Mobile Sources	**7.14**	**63.57**
Total	**34.35**	**88.73**

CHAPTER 4

EMISSION CONTROL MEASURES

- INTRODUCTION
- EMISSION CONTROL MEASURE MANDATES
- EMISSION CONTROL MEASURES ADOPTED BEFORE 2007
- EMISSION CONTROL MEASURES ADOPTED DURING THE REPORTING PERIOD (2007 TO 2009)
- PROPOSED EMISSION CONTROL MEASURES
- EMISSION CONTROL MEASURES FOR FURTHER STUDY
- CALIFORNIA AIR RESOURCES BOARD CONTROL MEASURES
- INTERNATIONAL MARITIME ORGANIZATION
- CONCLUSION

4. EMISSION CONTROL MEASURES

4.1 INTRODUCTION

This chapter addresses emission control measures adopted and proposed by the Santa Barbara County Air Pollution Control District (APCD), the California Air Resources Board (ARB), and the International Maritime Organization to reduce ROC or NO_x emissions and identifies additional ***stationary source*** control measures for further study. This chapter also addresses the state triennial plan assessment and update requirements specified in Health and Safety Code Sections 40924 and 40925. Control measures that focus on reducing local transportation-related emissions are discussed in *Chapter 5 – Transportation Control Measures*.

The control measures presented in this chapter are founded on the following plans:

- 1989 Air Quality Attainment Plan
- 1991 Air Quality Attainment Plan
- 1993 Rate-Of-Progress Plan
- 1994 Clean Air Plan
- 1998 Clean Air Plan
- 2001 Clean Air Plan
- 2004 Clean Air Plan
- 2007 Clean Air Plan

Control measures are evaluated and classified as *adopted*, *proposed*, or *further study*, based on an analysis of the measures applicability to Santa Barbara County, potential emission reductions, and the implementation of similar measures in other areas of California. The following describes the control measure classes:

- ***Adopted*** control measures are those that the APCD has formally adopted as APCD rules for inclusion into the State Implementation Plan (SIP). These are also adopted for the purpose of attaining the state ozone standards. Table 4-1 lists the control measures adopted before 2007 and Table 4-2 identifies the control measures adopted or modified within the reporting period (2007 to 2009) for this 2010 Plan.
- ***Proposed*** control measures are those that the APCD plans to adopt for the purposes of 1) maintaining the state 1-hour ozone standard, and 2) attaining the state 8-hour ozone standard. These measures are scheduled as either near-term (2010 to 2012) or mid-term (2013 to 2015). Table 4-3 shows the proposed control measures for this 2010 Plan.
- ***Further study*** measures are emission reduction techniques that the APCD plans to investigate further before making a commitment to adopt them in our next triennial plan update and revision. Tables 4-4 and Table 4-5 identify the control measures for further study.

Through a public process, the APCD Board of Directors adopts control measures as local rules. Once the APCD Board adopts a rule, the APCD is responsible to ensure that the affected parties comply with the rule. Some rules impose emission limits and other requirements on businesses and industry. Other rules require manufacturers and retailers to comply with requirements that limit emissions.

The ARB adopts emission control measures that apply throughout the state. These measures apply to a variety of sources including automobiles, consumer products, off-road equipment, and others. Section 4.7 provides a summary of these measures.

4.2 EMISSION CONTROL MEASURE MANDATES

The air pollution control strategy identified in this chapter is proposed to meet the California Clean Air Act requirements. No federal Clean Air Act requirements are addressed in this 2010 Plan. The 2007 Clean Air Plan addresses all applicable federal planning requirements for Santa Barbara County.

Under the California Clean Air Act, each air district that is nonattainment for the state ozone standards must demonstrate a five percent reduction in emissions per year or adopt every feasible measure available to that district.[a] The APCD has taken the approach of evaluating and adopting every feasible measure since the 1991 AQAP failed to produce the state mandated five percent per year emission reductions and was approved by ARB under the every feasible measure option.[b]

To ensure that the APCD has adopted or has proposed to adopt every feasible measure, staff:

1. Compared the APCD's rules to rules of other California air districts using ARB's document titled, "Identification of Performance Standards," April 1999, which evaluates emission control measures adopted throughout the state.

2. Reviewed and considered information provided in the California Air Pollution Control Officer Association document titled, "Potential All Feasible Measures," September 2003.

If an analysis performed during the rulemaking process indicates that the cost-effectiveness of a proposed control measure is too high, the District will not move forward with adopting the new or revised rule.

The control measure requirements (e.g., ppm limits, gr/l ROC-content limits) indicated in this 2010 Clean Air Plan are subject to change when the actual rulemaking effort is undertaken. The APCD is using the figures herein to develop emission reduction estimates required to be in the plan by ARB and to give a general indication of today's limits necessary to comply with the "every feasible measure" mandate. However, there could be technological advancements between the adoption of this 2010 Clean Air Plan and when the District begins to undertake the rulemaking effort, which would lower the emission limits or other limits used in this plan. The rulemaking staff will consider such improvements in technology and lower emission limits or other limits found in other air district rules during the rule development process. The state

[a] Health and Safety Code Section 40914(b).

[b] The Air Resources Board interprets *the adoption of every feasible measure* to mean that, at a minimum, a district consider regulations that have been successfully implemented elsewhere. The districts should also consider going beyond what has already been accomplished by evaluating new technologies and innovative approaches that may offer potential emission reductions. Further, districts should consider not only technological factors, but also social, environmental, economic (e.g., cost-effectiveness), and energy factors which prevail in the district, along with the resources realistically available to the district to adopt, implement, and enforce the measures.

statutory mandate to comply with the requirement to adopt every feasible control measure applies to both the clean air plan and to rule adoptions.

4.3 EMISSION CONTROL MEASURES ADOPTED BEFORE 2007

Table 4-1 identifies the APCD emission control measures adopted before 2007.

TABLE 4-1
EMISSION CONTROL MEASURES ADOPTED BEFORE 2007

Rule	CAP Control Measure ID	Description	Rule Adoption Date	Full Implementation Date
316	R-PM-1	Gasoline Bulk Plants	November 1990	1992
316	R-PM-2	Gasoline Dispensing Phase I Vapor Recovery	November 1990	1992
316	R-PM-3	Gasoline Dispensing Phase II Vapor Recovery	November 1990	1992
320	R-SL-1	Petroleum Solvent Dry Cleaners	June 1979	1985
321	R-SL-2	Solvent Cleaning (Degreasers)	July 1997	1998
323	R-SC-1	Architectural Coatings	February 1990	1994
325	R-PT-2	Crude Oil Production and Separation	January 1994	1996
326	R-PT-2	Storage of Reactive Organic Compound Liquids	December 1993	1995
329	R-SL-3	Cutback and Emulsified Asphalt	February 1992	1992
330	R-SC-2	Surface Coating of Metal Parts and Products	November 1990	1992
331	R-PG-1	Fugitive Emissions I & M	December 1991	1992 (1995 OCS)
333[a]	N-IC-1	IC Engines (Gas-Fired)	December 1991	1994 (1995 OCS)
333[a]	N-IC-3	IC Engines (Diesel-Fired)	December 1991	1994 (1995 OCS)
337	R-SC-2	Surface Coating of Aircraft or Aerospace vehicle Parts and Products	July 1990	1992
339	R-SC-4	Motor Vehicle and Mobile Equipment Coating Operations	May 1994	1994

[a] EPA did not take final SIP action to grant approval, disapproval, or limited approval/disapproval of Rule 333 as adopted on December 10, 1991. The Federal Register of February 1, 1995 (60 FR 6049) indicates the EPA was considering the granting of limited approval and limited disapproval of the rule. On June 19, 2008 the APCD Board adopted an amended Rule 333 to address EPA concerns.

TABLE 4-1
EMISSION CONTROL MEASURES ADOPTED BEFORE 2007

Rule	CAP Control Measure ID	Description	Rule Adoption Date	Full Implementation Date
341[a] / 901	R-GN-1	Landfill Gas Emissions	September 1997	2001
342	N-XC-5	Boilers, Steam Generators, and Process Heaters Equal to or Greater than 5 MMBtu/hr	March 1992	1996
343	R-PT-1	Petroleum Storage Tank Degassing	December 1993	1995
344	R-PP-1	Petroleum Sumps, Pits, and Well Cellars	November 1994	1998
346	R-PP-9	Loading of Organic Liquid Cargo Vessels	October 1992	1995
349	R-SL-5	Polyester Resin Operations	April 1993	1994
351	R-SC-5	Surface Coating of Wood Products	August 1998	2005
352	N-XC-1	Residential Water Heaters	September 1999	2000
352	N-XC-3	Natural-Gas Fired Fan-Type Central Furnaces	September 1999	2000
353	R-SL-9	Adhesives and Sealants	August 1999	2000
354	R-SL-7	Graphic Arts – Rotogravure/Flexographic Printing	June 1994	1995
359	N-XC-8	Petroleum Flares & Relief Gas Oxidizers	June 1994	1999
360	N-XC-2	Large Water Heaters and Small Boilers	October 2002	2003

As seen in Table 4-1, the APCD has adopted a wide range of control measures that reduced ROC and NO_x emissions both onshore and in the outer continental shelf.

[a] The California Air Resources Board withdrew Rule 341 for SIP consideration on April 24, 2001 because the rule implements the requirements of 40 CFR Part 60, Section 111(d) and Rule 341 is already federally enforceable by EPA's approval of the 111(d) State Plan.

4.4 EMISSION CONTROL MEASURES ADOPTED DURING THE REPORTING PERIOD (2007 TO 2009)

Rulemaking activities during the 2007 to 2009 period focused on the development of control measure N-XC-4 (Rule 361) and revisions to control measures N-IC-1 (Rule 333), N-IC-3 (Rule 333), R-SL-2 (Rule 321), and R-SC-4 (Rule 339).

In addition to the control measures identified for the 2007 to 2009 period, several other rulemaking projects and mandates displaced staff from working on revising the control measures originally scheduled in the 2007 Clean Air Plan. These include:

- Industry-requested revisions to Rule 316, Storage and Transfer of Gasoline.
- New Rule 345, Control of Fugitive Dust from Construction and Demolition Activities, to fulfill the Senate Bill 656 (SB 656, Sher) requirements.
- Revisions to Regulation XI (Public Notification).
- Revisions to the "ATCM/MACT" material found in the rulebook binder behind the APCD's rules and regulations.

The APCD has identified 1) the *expected* emission reductions that were in the 2007 CAP and 2) the current *revised* emission reductions for each measure scheduled for adoption in the 2007 CAP during the 2007 to 2009 reporting period.[a] This information is shown in Table 4-2.

On the Rule 333 figures, changes to the NOx reduction estimates (and to the ROC increase estimates) are due to changing the baseline year from 2002 to 2005. The solvent rules' ROC reductions estimates changed due to changing the baseline year from 2002 to 2007, refining the calculations methods, and adding more rule exemptions.

[a] Health and Safety Code Section 40924(b)(2) requires the APCD to provide this information.

TABLE 4-2
EMISSION CONTROL MEASURES SCHEDULED FOR ADOPTION DURING THE REPORTING PERIOD (2007-2009)

Rule	CAP Control Measure ID	Description	Scheduled Rule Adoption Date	Actual Rule Adoption Date	Pollutant	2007 CAP EXPECTED EMISSION REDUCTIONS (Tons/Day)			REVISED EMISSION REDUCTIONS (Tons/Day) [a]	
						2010	2015	2020	2020	2030
333	N-IC-1 N-IC-3	Control of Emissions from Engines (Rev's to address ARB & U.S. EPA concerns)	2007	June 19, 2008	ROC	-0.0051	-0.0047	-0.0043	-0.0001	-0.0001
333	N-IC-1 N-IC-3	Same as above	2007	June 19, 2008	NO_x	0.0246	0.0233	0.0220	0.0132	0.0132
321	R-SL-2	Solvent Cleaning Machines and Solvent Cleaning	2007	September 20, 2010	ROC	0.6516	0.7204	0.7891	0.5261	0.5261
330	R-SC-2	Coating of Metal Parts and Products[b]	2007	Pending	ROC	0.0214	0.0234	0.0254	0.0212	0.0212
337	R-SC-2	Coating of Aircraft or Aerospace Vehicle Parts and Products [b]	2007	Pending	ROC	0.0004	0.0004	0.0005	0.0006	0.0006
339	R-SC-4	Motor Vehicle and Mobile Equipment Coating Operations[c]	2007 - 2009	June 19, 2008	ROC	0.1404	0.1493	0.1582	0.0468	0.0512

[a] The 2010 Clean Air Plan uses forecast years 2020 and 2030 only. Therefore, there are no 2010 or 2015 figures shown in the columns for the revised emission reductions.
[b] The emission reductions are associated with adding solvent cleaning requirements to the rule.
[c] The APCD modified this rule to 1) include the state Suggested Control Measure for limiting coating ROC contents, and 2) added a limit of 25 grams per liter for solvents used in solvent cleaning.

TABLE 4-2
EMISSION CONTROL MEASURES SCHEDULED FOR ADOPTION DURING THE REPORTING PERIOD (2007-2009)

Rule	CAP Control Measure ID	Description	Scheduled Rule Adoption Date	Actual Rule Adoption Date	Pollutant	2007 CAP EXPECTED EMISSION REDUCTIONS (Tons/Day)			REVISED EMISSION REDUCTIONS (Tons/Day) [a]	
						2010	2015	2020	2020	2030
361	N-XC-4	Small Boilers, Steam Generators, and Process Heaters	2007 - 2009	January 17, 2008	NO_x	0.0000	0.0024	0.0467	0.0294[b]	0.0278
351	R-SC-5	Coating of Wood Products [b]	2007 - 2009	Pending	ROC	0.0016	0.0018	0.0019	0.0019	0.0019
349	R-SL-5	Polyester Resin Operations [c]	2007 - 2009	Pending	ROC	0.0028	0.0031	0.0035	0.0058	0.0058
353	R-SL-9	Adhesives and Sealants [b]	2007 - 2009	Pending	ROC	0.0018	0.0020	0.0023	0.0050	0.0050
TOTALS FOR ROC						0.8149	0.8957	0.9766	0.6073	0.6117
TOTALS FOR NO_x						0.0246	0.0257	0.0687	0.0426	0.0410

[a] The 2010 Clean Air Plan uses forecast years 2020 and 2030 only. Therefore, there are no 2010 or 2015 figures shown in the columns for the revised emission reductions.
[b] The reduction from the 2007 CAP estimate of 0.0467 to 0.0294 tons per day for calendar year 2020 is primarily due to a new calculation assumption (i.e., that only 43.43 percent of the units will need to be retrofitted to comply with the emission limit).
[c] The emission reductions are associated with adding solvent cleaning requirements to the rule.

4.5 PROPOSED EMISSION CONTROL MEASURES

The proposed control measures are summarized in Table 4-3. These control measures are scheduled as either near-term (2010 - 2012) or mid-term (2013-2015).

TABLE 4-3
PROPOSED EMISSION CONTROL MEASURES

Rule (Status)	CAP Control Measure ID	Description	Adoption Schedule	Year for the Emission Reduction Estimate	Emission Reductions (Tons per Day) from the Control Measure When Fully Implemented (Unless Otherwise Specified)	
					ROC	NO_X
342 (Revised)	N-XC-4 and N-XC-5	Revisions to Reduce the NOx Limits for Boilers, Steam Generators and Process Heaters Greater than or Equal to 5 MMBtu/hr.	2010 – 2012	2020	––	0.0080
330 (Revised)	R-SC-2	Surface Preparation and Coating of Metal Parts and Products (Revisions to Include Solvent Cleaning Requirements)	2010 - 2012[a]	2020	0.0212	––
337 (Revised)	R-SC-2	Surface Preparation and Coating of Aircraft or Aerospace Vehicle Parts and Products (Revisions to Include Solvent Cleaning Requirements)	2010 - 2012[a]	2020	0.0006	––
351 (Revised)	R-SC-5	Surface Preparation and Coating of Wood Products (Revisions to Include Solvent Cleaning Requirements and to Incorporate any New or Modified State Suggested Control Measure Provisions)	2010 - 2012[a]	2020	0.0019	––
349 (Revised)	R-SL-5	Polyester Resin Operations (Revisions to Include Solvent Cleaning Requirements)	2010 – 2012[a]	2020	0.0058	––
353 (Revised)	R-SL-9	Adhesives and Sealants (Revisions to Include Solvent Cleaning Requirements)	2010 - 2012	2020	0.0050	––

TABLE 4-3
PROPOSED EMISSION CONTROL MEASURES

Rule (Status)	CAP Control Measure ID	Description	Adoption Schedule	Year for the Emission Reduction Estimate	Emission Reductions (Tons per Day) from the Control Measure When Fully Implemented (Unless Otherwise Specified)	
					ROC	NO_X
354 (Revised)	R-SL-7	Graphic Arts and Paper, Film Foil, and Fabric Coatings (Revisions to Rule 354 to Include Solvent Cleaning and Additional Requirements for Rotogravure, Flexographic, Lithographic, Letterpress, and Screen Printing)	2010 – 2012	2020	0.0579	––
352 (Revised)	N-XC-6	Residential Water Heaters; Residential and Commercial Space Heaters (Revisions to Reduce the NOx Limits on the Residential Water Heaters to 15 ppmv)	2013 – 2015	2020	––	0.0660[a]
323 (Revised)	R-SC-1	Architectural Coatings (Revision to Regulate General Solvent Wipe Cleaning and the Cleaning of Application Equipment used in Architectural Coating Applications and to Incorporate any New or Modified State Suggested Control Measure Provisions)	2013 – 2015	2020	0.0887	––
361 (Revised)	N-XC-4	Small Boilers, Steam Generators, and Process Heaters (Greater than 2 MMBtu/hr to Less than 5 MMBtu/hr)	2013 – 2015	2020	––	0.0059[b]
360 (Revised)	N-XC-2	Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers	2013 – 2015	2030[c]	––	0.0088[d]
321 (Revised)	R-SL-2	Solvent Cleaning Machines and Solvent Cleaning (Revisions to Lower ROC-Content Limits)	2013 – 2015	2020	0.0273[e]	––

[a] Calculated using a 40 percent rule implementation figure. This emission reduction is in addition to the reduction attributed to Rule 352 as adopted on September 16, 1999.
[b] This emission reduction is in addition to the reduction attributed to Rule 361 as adopted on January 17, 2008.
[c] The APCD is providing data for 2030 because in 2020 only 15 percent of installed units would be subject to the new limit. This assumes the Board adopts the modified rule in the latter part of 2015 and the rule has a one-year grace period for the manufacturers, suppliers, installers, and/or solicitors to comply with the rule. The calculated additional NOx emission reductions with 15 percent implementation is 0.0018 tons per day of NOx. The District is assuming that the replacement rate is 5 percent per year (i.e., the life of a combustion unit subject to Rule 360 is 20 years).
[d] Calculated using a 65 percent rule implementation figure. This emission reduction is in addition to the reduction attributed to Rule 360 as adopted on October 17, 2002.
[e] This figure represents the additional emission reduction from revising the general solvent ROC-content limit from 50 grams per liter to 25 grams per liter. The overall ROC emission reduction from all Rule 321 revisions is projected to be 0.5534 tons per year for forecast year 2020.

TABLE 4-3
PROPOSED EMISSION CONTROL MEASURES

Rule (Status)	CAP Control Measure ID	Description	Adoption Schedule	Year for the Emission Reduction Estimate	Emission Reductions (Tons per Day) from the Control Measure When Fully Implemented (Unless Otherwise Specified)	
					ROC	NO_X
325, 326, 343, & 344 (Revised)	R-PP-1, R-PT-1, and R-PT-2	Crude Oil Production and Separation and Storage of Reactive Organic Compound Liquids; Petroleum Tank Degassing; and Petroleum Sumps, Pits and Well Cellars (Add New Solvent Cleaning Provisions (25 grams per liter))	2013 – 2015	2020	0.0074	
Total for the local control measures					0.2161	0.0887

The following is a summary of the changes to the control measures shown in Table 4-3.

The APCD intends to add new solvent cleaning requirements to several operation-specific rules. Staff anticipates that the order of the operation-specific rule revisions will be generally consistent with those shown in prior clean air plans:[a]

1. Rule 330, Surface Preparation and Surface Coating of Metal Parts and Products.
2. Rule 337, Surface Preparation and Surface Coating of Aircraft or Aerospace Vehicle Parts and Products.
3. Rule 351, Surface Preparation and Surface Coating of Wood Products.[b]
4. Rule 349, Polyester Resin Operations.
5. Rule 353, Adhesives and Sealants.

[a] The actual sequence of the proposed rule revisions may change within their respective near- or mid-term timeframes. To meet the requirement to adopt every feasible control measure, there may also be: 1) revisions to the ROC-content limits for other process materials (e.g., coatings, adhesives, sealants, inks, resins), 2) a maximum allowable ROC-content limit that is lower than 50 grams per liter (e.g., a limit of 25 grams of ROC per liter), and 3) revisions to the equipment and operation requirements.

[b] The APCD may add any new or modified state Suggested Control Measure provisions during this rulemaking effort as well.

6. Rule 354, Graphic Arts and Paper, Film, Foil, and Fabric Coatings.[a]
7. Rule 323, Architectural Coatings, to implement a 25 grams of ROC per liter solvent ROC-content limit when cleaning application equipment (e.g., spray guns) and general wipe cleaning used in architectural coating operations. [b]
8. Rules 325, 326, 343, and 344, Crude Oil Production and Separation and Storage of Reactive Organic Compound Liquids; Petroleum Tank Degassing; and Petroleum Sumps, Pits and Well Cellars.[c]

Table 4-3 also includes the following control measures for combustion equipment (other than internal combustion engines), ranked from the smallest to the largest units:

Control Measure	Rule	Equipment Subject to the Control Measure	Heat Input Range of Applicability
N-XC-1	352	Residential water heaters	Less than 75,000 British thermal units (Btu) per hour (hr)
N-XC-2	360	Large water heaters and small boilers, steam generators, and process heaters	Greater than or equal to 75,000 Btu/hr to 2 million (MM) Btu/hr
N-XC-4	361	Small boilers, steam generators, and process heaters	Greater than 2 MMBtu/hr to less than 5 MMBtu/hr
N-XC-5	342	Boilers, steam generators, and process heaters	Greater than or equal to 5 MMBtu/hr

On the Rule 352 revision, the APCD proposes that the natural gas-fired water heater NO_x limit be lowered to 15 parts per million by volume (ppmv) of NO_x at 3 percent oxygen (0.0175 pound of NO_x per MMBtu on a heat input basis).[d] In addition, the Rule 352.E.1 provision on certification tests will be revised to accept only certifications performed per Rule 352 or South

[a] Besides incorporating the solvent cleaning requirements, the proposed changes will include ink, coating, adhesive, resists, wash primers, and fountain solution ROC-content requirements. The revised rule will include components or be modeled on provisions in the South Coast AQMD Rule 1130, Graphic Arts, and Rule 1130.1, Screen Printing Operations, San Joaquin Valley Unified APCD Rule 4607, Graphic Arts and Paper, Film, Foil, and Fabric Coatings, and/or Ventura County Rule 74.19 Graphic Arts, and Rule 74.19.1 Screen Printing Operations. Rule 354 exemptions, definitions, and rule requirements are planned to be revised for promulgating and implementing control techniques for gravure, flexography, lithography, letterpress, and screen printing methods.

[b] The actual sequence of the proposed rule revisions may change within their respective near- or mid-term timeframes. To meet the requirement to adopt every feasible control measure, there may also be: 1) revisions to the ROC-content limits for other process materials (e.g., coatings, adhesives, sealants, inks, resins), 2) a maximum allowable ROC-content limit that is lower than 50 grams per liter (e.g., a limit of 25 grams of ROC per liter), and 3) revisions to the equipment and operation requirements.

[c] The 2007 CAP included emission reductions from applying solvent cleaning provisions to facilities subject to these rules. However, through the development of amended Rule 321 (2008-2010), an oil and gas production and processing industry representative asked for (and received) Rule 321 exemptions. Hence, these solvent cleaning emission reductions will be obtained by amending Rules 325, 326, 343, and 344.

[d] Also approximately equivalent to 10 nanograms of NOx (calculated as NO_2) per joule of heat output or 0.023 pound of NOx per MMBtu of heat output. These limits are similar to the ones found in South Coast AQMD Rule 1121.

Coast AQMD (SC) Rules 1111 (furnaces) or 1121 (water heaters). Rule 352 will remain a *point-of-sale* type rule and the emission limits for the central furnaces will remain unchanged.

Summarized Amended Rule Data for Rule 352

Rule 352 - Residential Water Heaters, < 0.075 MMBtu/hr. Current NOx limit: 60 ppm. Proposed new limit: 15 ppm NOx. The rule is a point of sale-type rule.

Similar Rules in Other Air Districts	
1	SC Rule 1121, Control of Nitrogen Oxides from Residential Type, Natural-Gas-Fired Water Heaters
2	San Joaquin Valley Unified APCD (SJV) Rule 4902, Residential Water Heaters

Currently, Rule 360 has two NOx limits:

- 55 ppmv at 3 percent oxygen for units in the 0.075 MMBtu/hr to 0.4 MMBtu/hr range.[a]
- 30 ppmv at 3 percent oxygen for units in the greater than 0.4 MMBtu/hr range to 2.0 MMBtu/hr range.

Using the SJV Rule 4308 and the SC Rule 1146.2 as models to meet the *every feasible* control measure requirement, the NOx limits will become 20 ppmv at 3 percent oxygen (0.024 lb/MMBtu of heat input) for both categories.[b] Certain specific provisions, like higher limits for 1) instantaneous water heaters and pool heaters and 2) the use of natural gas that does not meet Public Utility Company specifications or liquid fuel, will also be considered. Rule 360 will remain a *point-of-sale* type rule.

Summarized Amended Rule Data for Rule 360

Rule 360 - Combustion Equipment, ≥ 0.075 MMBtu/hr to ≤ 2 MMBtu/hr. Current NOx limits are either 55 ppm or 30 ppm depending on if the unit's size is ≤ 0.4 MMBtu/hr or above it. Proposed new limit: 20 ppmv NOx. The amended rule may have higher limits for pool heaters, etc. The rule is a point of sale-type rule.

Similar Rules in Other Air Districts	
1	SC Rule 1146.2, Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers and Process Heaters
2	SJV Rule 4308, Boilers, Steam Generators, and Process Heaters - 0.075 MMBtu/hr to Less than 2.0 MMBtu/hr

The APCD plans to revise Rule 361 to have a NOx limit of 15 ppmv at 3 percent oxygen when burning gaseous fuel per the NOx limit found in the Bay Area AQMD (BA) Regulation 9, Rule 7. Under the proposed revised Rule 361, some equipment categories will have higher limits, which is similar to provisions in the BA rule, the SJV Rule 4308, and the SC Rule 1146.1.

[a] Or 40 nanograms per joule (0.093 pound of NOx per MMBtu) of heat output.
[b] The APCD may provide an approximately equivalent alternative emission limit of 14 nanograms of NOx per joule of heat output.

Thermal fluid heaters, for example, will have a NOx limit of 30 ppm (same as the current Rule 361 limit).[a]

Summarized Amended Rule Data for Rule 361

Rule 361 - Combustion Equipment, > 2 MMBtu/hr to < 5 MMBtu/hr. Current NOx limit: 30 ppm. Proposed NOx limits: 15 ppm for gaseous fuels and 40 ppm on nongaseous fuel. The amended rule will have higher limits for thermal fluid heaters, etc. Existing Rule 361 has a low usage threshold of 1.8 Billion Btu/year and this provision will be retained in proposed amended Rule 361.

	Rules with Similar Provisions in Other Air Districts	**Low Usage Cut-off**
1	BA Reg. 9, Rule 7, Nitrogen Oxides and Carbon Monoxide from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters	10% or less of the unit's maximum heat input capacity
2	SC Rule 1146.1, Emissions of Oxides of Nitrogen from Small Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters	1.8 Billion Btu/Year
3	SJV Rule 4307, Boilers, Steam Generators, and Process Heaters - 2.0 MMBtu/hr to 5.0 MMBtu/hr	5.0 Billion Btu/Year (until 06-30-2015), 1.8 Billion Btu/Year (on and after 07-01-2015)

For Rule 342 revisions, the APCD plans to revise the rule to have a NOx limit of 15 ppmv at 3 percent oxygen when burning gaseous fuel per the NOx limit found in the BA Regulation 9, Rule 7. Under the proposed revised Rule 342, some equipment categories will have higher limits, which is similar to provisions in the BA rule, the SJV Rule 4306, and the SC Rule 1146.

Some specific equipment categories will be subject to higher NOx limits (e.g., boilers burning a mixture of PUC quality gas and vapor recovery system hydrocarbons and thermal fluid heaters will have a NOx limit of 30 ppm).

Staff had proposed revisions to this control measure during the development of 2007 CAP. However, due to concerns regarding the availability of emission reduction credits, the APCD listed the revised control measure in that plan as a further study measure with this qualifier (reference Page 4-13 of the 2007 CAP, footnote "a"):

> If the SBCAPCD does not receive an application for emission reduction credits that are to be generated by retrofitting low- NOx technology (e.g., a burner designed to emit 9 ppmv NOx at 3% O2 or less or a selective catalytic convertor designed to emit 5 ppmv NOx at 3% O2 or less) on combustion equipment subject to Rule 342 by July 1, 2009 and Santa Barbara County is nonattainment for the state one-hour or eight-hour ozone standard, the next Clean Air Plan will list this as a near-term proposed control measure.

The APCD records indicate that no such emission reduction credit applications were received by July 1, 2009. Thus, consistent with the commitment in the 2007 CAP, the APCD is scheduling the Rule 342 revision to be in the near term (2010 - 2012).

[a] **Thermal Fluid Heater** means a process heater in which a process is heated indirectly by a heated fluid other than water.

Summarized Amended Rule Data for Rule 342

Rule 342 - Combustion Equipment, ≥ 5 MMBtu/hr. Current NOx limits: 30 ppm for gaseous fuels and 40 ppm on nongaseous fuel. Limits in revised Rule 342: 15 ppm for gaseous fuels and 40 ppm on nongaseous fuel. The amended rule will have higher limits for thermal fluid heaters, etc. Existing Rule 342 has a low usage threshold of 9 Billion Btu/year and this provision will be retained in proposed amended Rule

Rules with Similar Provisions in Other Air Districts		**Low Usage Cut-off**
1	BA Reg. 9, Rule 7, Nitrogen Oxides and Carbon Monoxide from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters	10% or less of the unit's maximum heat input capacity or 9 Billion Btu/Year
2	SC Rule 1146, Emissions of Oxides of Nitrogen from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters	9 Billion Btu/Year
3	SJV Rule 4306, Boilers, Steam Generators, and Process Heaters - Phase 3	9 Billion Btu/Year

4.6 EMISSION CONTROL MEASURES FOR FURTHER STUDY

Additional potential control measures and possible modifications to existing control measures that merit further study are shown in Table 4-4 (Further Study – New Rules) and Table 4-5 (Further Study – Existing Rules).

TABLE 4-4
FURTHER STUDY - NEW RULES

Description	Comments	APCD/AQMD Rule that could be used to model a SBCAPCD Rule
Gas Turbines	Carried forward from the 2007 plan.	Ventura Rule 74.23 and San Joaquin Rule 4703

TABLE 4-4
FURTHER STUDY - NEW RULES

Description	Comments	APCD/AQMD Rule that could be used to model a SBCAPCD Rule
Natural Gas Fuel Specifications	The SBCAPCD may set a Wobbe Index (a figure based on the fuel's *higher heating value*[a] and the ratio of the gas density to air density) to eliminate: 1) potential equipment problems associated with engines designed for low-Btu gas that are fueled by "hot gas," and 2) to prohibit increased emissions from the use of or disposal of "hot gas." The South Coast AQMD included this control measure in their 2007 AQMP. The SCAQMD Rule 433 is a two-component regulation with the first component implementing monitoring, testing, reporting, and recordkeeping on the natural gas quality being supplied by the operators of natural gas distribution systems. The second component will include limiting the Wobbe Index to1360 or less (or an equivalent mechanism/parameter) with mitigation measures to mitigate any emission increases in the same time frame.	South Coast AQMD Rule 433 (and future modified Rule 433)
Pleasure Craft Fuel Transfer	According to ARB, this measure should be retained pending technology development and ARB action in this category. ARB's recreational marine engine program may require that newer pleasure craft be equipped with onboard refueling vapor recovery (ORVR) systems similar to the ORVR systems found on contemporary motor vehicles.	None
Wineries and Breweries	Carried forward from the 2007 CAP.	San Joaquin Valley APCD, Rule 4694 Wine Fermentation and Storage Tanks (Adopted December 15, 2005)

Table 4-5 shows APCD rules currently in the rulebook that have been implemented in a more stringent fashion elsewhere in the state.

TABLE 4-5
FURTHER STUDY – EXISTING RULES

Rule	CAP Control Measure ID	Description	Comments	APCD/AQMD Rule that could be used to model a SBCAPCD Rule
331	R-PG-1	Fugitive Emissions Inspection and Maintenance	This is an ARB-identified performance standard and a CAPCOA-identified all feasible measure category. The South Coast AQMD and Bay Area AQMD rules have lower thresholds for leaks.	South Coast AQMD Rule 1173 and Bay Area AQMD Reg. 8, Rule 18

[a] Rule 102 provides a definition of "Higher Heating Value."

TABLE 4-5
FURTHER STUDY – EXISTING RULES

Rule	CAP Control Measure ID	Description	Comments	APCD/AQMD Rule that could be used to model a SBCAPCD Rule
333	N-IC-3	IC Engines (Diesel-Fired)	Require lower emission limits for compression ignition internal combustion engines (ICEs).	San Joaquin Valley APCD Rule 4702 and South Coast AQMD Rule 1110.2
333	N-IC-1	IC Engines (Gas-Fired)	Require lower emission limits for spark ignition ICEs.	San Joaquin Valley APCD Rule 4702 and South Coast AQMD Rule 1110.2
320	R-SL-1	Petroleum Solvent Dry Cleaners	Carried forward from the 2007 CAP. The South Coast rule phased-out the use of transfer-type machines.	South Coast AQMD Rule 1102
326	R-PT-2	Storage of Reactive Organic Compound Liquids	The Bay Area Rule 8-5 applies to tanks 264 gallons or greater and the San Joaquin Rule 4623 applies to tanks 1,100 gallons or greater, whereas the SBCAPCD rule exempts tanks that are less than or equal to 5,000 gallons capacity.	Bay Area AQMD Reg. 8, Rule 5 and San Joaquin Valley APCD Rule 4623

4.7 CALIFORNIA AIR RESOURCES BOARD CONTROL MEASURES

The ARB has adopted numerous regulations that reduce pollution from motor vehicles, off-road equipment, consumer products, fueling operations, and other miscellaneous sources and operations. Emission reductions from these adopted control measures will 1) help maintain attainment with the state 1-hour ozone standard, and 2) help make progress toward the state 8-hour ozone standard in Santa Barbara County. In addition, emission reductions from some of these measures will also reduce the precursors of secondary particulate, helping make progress toward attaining the state PM10 standard.

Some of the mobile source and consumer product control measures were initially presented in California's 1994 State Implementation Plan (SIP) for Ozone, adopted by the Air Resources Board (ARB or Board) on November 15, 1994. Since 1994, ARB has adopted many of the SIP measures, and also identified and adopted additional measures to further reduce emissions. Table 4-6 lists the adopted state control measures that apply to Santa Barbara County. Additional details on the "2003 State and Federal Strategy for the California SIP" are available at this link: http://www.arb.ca.gov/planning/sip/stfed03/stfed03.htm.

TABLE 4-6
STATE MEASURES ADOPTED SINCE THE 1994 SIP

Description of Control Measure	Responsible Agency	Adopted
Defined Measures in 1994 Ozone SIP		
M1: Light-duty vehicle scrappage	ARB	1998
M2: Low Emission Vehicle II program	ARB	1998
M3: Medium-duty vehicles	ARB	1995
M4: Incentives for clean engines (Moyer Program)	ARB	1999
M5: California heavy-duty diesel vehicle standards	ARB	1998
M7: Heavy-duty vehicle scrappage	ARB	Replaced with M17
M17: In-use reductions from heavy-duty vehicles	ARB	No
M8: Heavy-duty gasoline vehicle standards	ARB	1995
M9: CA heavy-duty off-road diesel engine standards	ARB	2000
M11: CA large off-road gas/LPG engine standards	ARB	1998
CP2: Consumer products mid-term measures	ARB	1997/1999
CP3: Aerosol paint standards	ARB	1995/1998
Enhanced I/M (Smog Check II)	BAR[a]	1995
DPR-1: Emission reductions from pesticides	DPR[b]	Voluntary
Adopted measures not originally included in 1994 Ozone SIP		
Clean fuels measures	ARB	Multiple
Marine pleasurecraft (reductions beyond M16)	ARB	1998/2001
Motorcycle standards	ARB	1998
Urban transit buses	ARB	2000
Enhanced vapor recovery program	ARB	2000
Medium/heavy-duty gasoline standards (beyond M8)	ARB	2000
2007 heavy-duty diesel truck standards (beyond M5 and M6)	ARB/U.S. EPA	2001
Small off-road engine standard revisions	ARB	1998
Cleaner in-use off-road diesel vehicles	ARB	2007
Modifications to reformulated gasoline program – Phase 3	ARB	2007
Cleaner main ship fuel	ARB	2008
Diesel engines on commercial harbor craft	ARB	2007
Enhanced vapor recovery for aboveground storage tanks	ARB	2007

[a] Bureau of Automotive Repair.
[b] Department of Pesticide Regulation.

TABLE 4-6
STATE MEASURES ADOPTED SINCE THE 1994 SIP

Description of Control Measure	Responsible Agency	Adopted
New aftermarket and used catalytic convertors	ARB	2007
Cleaner in-use heavy-duty trucks	ARB	2008
Port truck modernization	ARB	2007/2008
Ship auxiliary engines (cold ironing)	ARB/U.S. EPA	2008
Consumer products program I	ARB	2008
Additional evaporative emission standards [partial] – portable outboard marine tanks	ARB	Partial in 2008
Greenhouse gas emissions from heavy-duty vehicles	ARB	2008
Large spark ignition engines ≤ 1 L, rule amendment	ARB	2008
Regulations for aftermarket critical emission control parts on highway motorcycles	ARB	2009
Regulation for AB 118 air quality improvement program guidelines	ARB	2009
In-use off-road diesel-fueled fleets	ARB	2009
Fuel Sulfur and Other Operational Requirements for Ocean-Going Vessels[a]	ARB	2009
Auxiliary Diesel Engines and Diesel-Electric Engines Operated on Ocean-Going Vessels[a]	ARB	2009
Low carbon fuel standard (LCFS)	ARB	2010
Small Containers of automotive refrigerant	ARB	2010
Semiconductor operations	ARB	2010
Sulfur hexafluoride emissions in non-semiconductor and non-utility applications	ARB	2009
New passenger motor vehicle greenhouse gas emission standards	ARB	2010

4.8 INTERNATIONAL MARITIME ORGANIZATION

In 1973, an International Conference adopted regulations in a treaty for the Prevention of Pollution from Ships. The International Maritime Organization (IMO) held a Conference on Tanker Safety

[a] On May 29, 2009, as part of its Diesel Risk Reduction Plan, the ARB approved regulations for Fuel Sulfur for Ocean-Going Vessels within California Waters and 24 Nautical Miles of the California Baseline (reference California Code of Regulations, Title 13, Section 2299.1, *et seq.* and California Code of Regulations, Title 17, Section 93118, *et seq.* These regulations became effective on June 28, 2009, with compliance for Phase I fuel requirements beginning on July 1, 2009 for the main engines, auxiliary engines, diesel electric engines and auxiliary boilers. The Phase I fuel requirement requires the sulfur levels of Marine gas oil (DMA) to be at or below 1.5% sulfur, or Marine diesel oil (DMB) to be at or below 0.5% sulfur. The Phase II fuel requirement will become effective January 1, 2012, and will require both DMA and DMB fuels to be at or below 0.1% sulfur.

and Pollution Prevention in February 1978. At that conference, the IMO adopted measures, including the Protocol of 1978 relating to the 1973 International Convention for the Prevention of Pollution from Ships (1978 MARPOL Protocol). Because the 1973 Convention had not yet become effective, the 1978 MARPOL Protocol absorbed the earlier Convention. The combined treaty - the **International Convention for the Prevention of Marine Pollution from Ships, 1973 as modified by the Protocol of 1978 relating thereto (MARPOL 73/78)** - became effective in 1983.

Following the 1978 treaty, the IMO made several additions ("Annexes") to the MARPOL 73/78. In September 1997, the IMO adopted Annex VI, Prevention of Air Pollution from Ships, which has an effective date of May 19, 2005. This treaty applies to any vessel, such as internationally-flagged container ships and cruise vessels, equipped with engines having a cylinder displacement greater than 30 liters.

The Act to Prevent Pollution from Ships (APPS), Title 33 of the United States Code, Sections 1905-1915, implements the provisions of MARPOL and the Annexes to which the United States is a party. In April 2006, the U.S. Senate approved Annex VI (Treaty Document 108-7). In March 2007, the House of Representatives passed legislation to implement the Annex VI standards through EPA-promulgated regulations (e.g., 40 CFR Parts).

In July 2008, President Bush signed into law the Maritime Pollution Prevention Act of 2008, which implements Annex VI of the International Convention for the Prevention of Pollution from Ships. Annex VI provides the criteria and procedure for the designation of Emission Control Areas (ECAs).

In October 2008, the IMO's Marine Environment Protection Committee (MEPC) adopted amendments to Annex VI [Resolution MEPC.1976(58)] that set stricter operating requirements and emission standards than those in the original Annex VI.[a] The stricter standards, which became effective on July 1, 2010, set: a) global emissions limits, and b) limits that apply to vessels operating in ECAs that have gone through the formal IMO designation process.

Resolution MEPC.1976(58) requires marine diesel engines installed on ships constructed on or after January 1, 2016 to meet Tier III NOx limits when such vessels are operated within designated ECAs.[b] The Tier III standards represent an 80 percent reduction from the current Tier I standards and in most cases will require the installation of selective catalytic reduction. The following tables summarize the Resolution MEPC.1976(58) requirements:

[a] At that time, MEPC consisted of 53 countries, including the United States, which represented almost 82 percent of the global shipping tonnage.

[b] Tier III is defined in Resolution MEPC.1976(58) and differs from the Tier 3 standards in 40 CFR Parts 89 and 94.

TABLE 4-7
MEPC TREATY OXIDES OF NITROGEN (NOX) EMISSION STANDARDS

Time Period	Operating "Everywhere" except in an ECA	Operating in an ECA
Engine installed on a ship constructed on or after January1, 2008 and prior to January 1, 2011	Tier I (this continues the pre-October 2008 Annex VI NOx standard of 17 g/kWh)	Same as" Everywhere" – i.e., 17 g/kWh
Engine installed on a ship constructed on or after January 1, 2011	Tier II (NOx standard = 14.4 g/kWh)	Same as "Everywhere" – i.e., 14.4 g/kWh
Engine installed on a ship constructed on or after January 1, 2016	Tier II (NOx standard = 14.4 g/kWh)	Tier III (NOx standard reduced to 3.4 g/kWh)

TABLE 4-8
MEPC TREATY FUEL SULFUR CONTENT REQUIREMENTS

	Time Period	Fuel Sulfur Limit
Operating "Everywhere" except in an ECA	A. March 1,2010 to January 1, 2020 B. After January 1, 2020	3.5% 0.5%[a]
Operating in an ECA	A. July 1, 2010 to July 1, 2015 B. After July 1, 2015	1.0% 0.10%

The United States Senate ratified Annex VI as amended by Resolution MEPC.1976(58) on January 8, 2009, clearing the way for the submittal of a request to the IMO for an ECA designation. A nation must ratify Annex VI before it can request an ECA designation from the IMO.

The United States and Canada jointly proposed the designation of an ECA for specified portions of United States and Canadian coastal waters on March 27, 2009. On March 26, 2010, the IMO designated the North American ECA, which extends up to 200 nautical miles from the coast. The North American ECA, which becomes effective in 2012, includes standards for both NOx and SOx emissions.

On April 30 2010, EPA promulgated new emissions standards in 40 CFR, Part 1043, Control of NOx, SOx, and PM emissions from Marine Engines and Vessels Subject to the MARPOL Protocol. These standards apply to new U.S.-flagged or U.S.-registered Category 3 marine compression-ignition engines. 40 CFR Part 1043 clarifies the application of some of the Annex VI provisions; provides procedures and criteria for the issuance of Engine International Air Pollution Prevention

[a] Subject to a feasibility review to be completed by IMO no later than 2018. Should the 2018 review reach a negative conclusion, the effective date would default to 1 January 2025.

(EIAPP) certificates that apply to new marine engines. The effective date shown in 40 CFR Section 1043.5 (c) indicates:

> Compliance with the applicable regulations of this part is required for all persons as of July 1, 2010. (Note that certain requirements begin later, as described in paragraph (d) of this section.) Note also that compliance with §§ 1043.40 and 1043.41 is required to obtain EIAPP certificates under this part whether the application is submitted before July 1, 2010 or later.

To summarize the IMO NOx standards, pre-2000 engines, require a 20 percent NOx reduction except for those engines where reduction is impractical. These reductions need to be met by the year 2012. All engines onboard any vessel constructed on or after January 1, 2011 need to meet a NOx limit 15-25 percent below the current limits. These are known as Tier II NOx limits.

Beginning in 2016, all engines onboard any new vessel constructed on or after January 1, 2016 must meet a NOx limit 80 percent below the Tier I limits. These are known as Tier III limits.

4.9 CONCLUSION

The APCD, SBCAG, county, cities, ARB, and the International Maritime Organization have developed a comprehensive air pollution control strategy for Santa Barbara County. This strategy is updated in this 2010 Plan and identifies every feasible measure available to make progress toward attainment of the state ozone standards. Staff considered the ARB-identified performance standards, the California Air Pollution Control Officers Association (CAPCOA)-identified potential all feasible measures, the commitments in the 2007 Plan, and other APCD and AQMD rules to derive the proposed control measures and control measures for further study.

The 2010 Plan control measures include controls on all inventory categories contributing ROC and NO_x emissions: industrial processes, combustion sources, petroleum handling, solvent use, consumer products, waste burning, and mobile sources. The control measures evaluated and identified in this chapter, combined with the emissions reductions expected from on-road mobile sources in *Chapter 5, Transportation Control Measures*, show that Santa Barbara County is making significant progress in reducing emissions from sources subject to our control.

CHAPTER 5

TRANSPORTATION CONTROL MEASURES

- BACKGROUND
- HISTORICAL TRENDS IN VEHICLE ACTIVITY
- TRANSPORTATION CONTROL MEASURES
- ON-ROAD MOBILE SOURCE EMISSIONS ANALYSIS
- EMISSION RESULTS

5. TRANSPORTATION CONTROL MEASURES

5.1 BACKGROUND

In June 1993, the boards of the Santa Barbara County Association of Governments (SBCAG) and the Santa Barbara County Air Pollution Control District (APCD) jointly approved a Memorandum of Understanding (MOU), which effectively placed the responsibility for developing the transportation elements of the air quality plans with SBCAG. This MOU allows SBCAG to assist the APCD in a cooperative effort toward meeting the APCD's responsibilities for developing the transportation elements of its state and federal air quality plans. Under the MOU, SBCAG is responsible for the development and analysis of the 2010 Plan's on-road mobile source emission estimates and Transportation Control Measures (TCMs). SBCAG also provides the APCD with socio-economic projections, that form the basis for many of the stationary and area source growth forecasts for this 2010 Plan.

5.2 HISTORICAL TRENDS IN VEHICLE ACTIVITY

5.2.1 STATE ACT PERFORMANCE MEASURE

The state Act requires areas classified as having a "moderate" non-attainment classification for the state 1-hour ozone standard, such as Santa Barbara County, to track and meet the following transportation performance standard: a substantial reduction in the rate of increase in passenger vehicle trips and Vehicle Miles Traveled (VMT).[a] ARB has defined substantial reduction as holding growth in VMT and trips to the same growth rate as population.

Figure 5-1 shows annual estimates of daily vehicle miles traveled and human population for Santa Barbara County for the 20-year period between 1988 and 2008. Figure 5-2 shows that the annual VMT growth rate since 1988 has been highly variable with many peaks accompanied by negative growth occurring during the recession years of 1991 and 1995. For 11 of the 20 years monitored since the passage of the California Clean Air Act in 1988, the annual VMT growth rate has exceeded the annual population growth rate in Santa Barbara County. As indicated by the negative spikes during 1991 and 1995, VMT is sensitive to a host of economic variables and conditions - especially fuel prices. Figure 5-3 shows the VMT per capita rates for Santa Barbara County between 1988 and 2008.

Although causality is difficult to verify, rising fuel prices are considered a major influence on the decline in VMT growth rates in Santa Barbara County beginning in 2002. In 2008, VMT declined by almost 4%. Similar decreases were seen in other urban areas across the country. This decline can be primarily attributed to a fuel price spike seen in the first few months of 2008 along with worsening economic conditions. During this time period, transit ridership increased for most of the major transit agencies in the County, particularly regional transit services such as the Clean Air Express, which provides service between North and South Santa Barbara County, and the Coastal Express, which provides service between South Santa Barbara County and Ventura County.

[a] VMT is considered a surrogate for vehicle trips for state Act performance standard monitoring.

As shown in Table 5-1, the average annual VMT growth rate from 1990 to 1999 was 1.31 percent. The annual average population growth rate over this same period was 0.63 percent – below the comparable average annual rate of VMT growth. The trend over the last eight years has been a further decline in the VMT growth rate. For the period 2000 to 2008, the average annual VMT growth rate was 0.73 percent. The average annual population growth rate for this same time period was 0.91 percent – higher than the comparable average annual rate of VMT growth. The ten year growth rate ratios over the last three decades indicate that the VMT growth rate has leveled off with the population growth rate.

5.3 TRANSPORTATION CONTROL MEASURES

TCMs are programs or activities that states and localities can implement to encourage the traveling public to rely less on the automobile or to use the automobile more efficiently. TCMs reduce emissions from on-road motor vehicles and trucks by: improving the existing transportation system to allow motor vehicles to operate more efficiently; inducing people to change their travel behavior to less polluting modes; or, ensuring emission control technology improvements in the motor vehicle fleet are fully and expeditiously realized. TCMs address the need for the traveling public to carefully consider: 1) the implications of continued reliance on the single occupant vehicle as the major choice of commute trips; 2) the need to provide and promote alternatives to single occupant vehicle travel; and, 3) the need to consider regulating those factors which promote single occupant vehicle travel. While the greatest on-road mobile source emission reductions (over 95 percent) are attributable to motor vehicle emission controls established by federal and state laws and the natural attrition of older more polluting vehicles (i.e., fleet turnover), TCMs should be considered as an integral part of air quality plans given that they help meet multiple objectives (e.g., congestion relief, energy efficiency, etc.).

Table 5-2 summarizes the implementation characteristics of all currently adopted TCM categories in the county. Identified are: the type of TCM; the adopting agency/agencies; the agency/agencies responsible for implementing the TCM; the formal agreements between the adopting and implementing agencies; and, how TCM implementation will be monitored and by whom. All currently adopted TCMs except for T-18 (Alternative Fuels) are listed as TCMs by the U.S. EPA in Section 108(f) of the federal Act.

For state air quality planning purposes, control measures are classified as being adopted, proposed, contingency, further study, or deleted. Adopted TCMs are those projects and programs that the APCD has formally adopted and included in the federal SIP. These TCM projects/programs were developed as part of the 1994, 1998, 2001, 2004 and 2007 Plans and are listed in Table 5-3. These measures meet the every feasible control measure (Health and Safety Code, Section 40914(b)) provisions of the state Act.

All TCMs evaluated as part of the last triennial update (2007 Plan) are listed below.

Currently Adopted

T-1 Trip Reduction Ordinance
T-2 Employer Based Transportation Demand Management Programs
T-3 Work Schedule Changes
T-4 Area-wide Ridesharing Incentives
T-5 Improve Commuter Public Transit Service
T-7 Traffic Flow Improvements
T-8 Parking Management
T-9 Park-and-Ride / Fringe Parking
T-10 Bicycle and Pedestrian Programs
T-13 Accelerated Retirement of Vehicles
T-17 Telecommunications
T-18 Alternative Fuels
T-19 Public Education

Measures Adopted in 2007 Plan

T-6 High Occupancy Vehicle (HOV) Lanes
T-20 Parking Management to Reduce Non-Commute Single Occupant Vehicle Use

Proposed For Further Study

T-15 Extended Vehicle Idling

Contingency Measure

T-21 Enhanced Inspection and Maintenance Program

Measure Rejected in 2007 Plan

T-14 Activity Centers/Indirect Source Review

There are no new TCMs proposed for adoption in the 2010 Clean Air Plan. The TCMs adopted in the prior Clean Air Plan (2007 Clean Air Plan) will form the basis for the 2010 Plan on-road mobile source control strategy. Also included are new projects that have been implemented during the reporting period 2007-2010 such as new transit routes (e.g., MTD Mesa Loop) and traffic flow improvements (e.g., Carrillo St. signal synchronization project). Table 5-4, Table 5-5, and Table 5-6 list these measures and the process by which the implementation feasibility will be assessed.

As shown in Table 5-4, projects associated with the Highway 101 Deficiency Plan (SBCAG, June 2002) and the 101-In-Motion Implementation Plan (SBCAG, July 2006) play a major role in the TCM strategy. The potential air quality impacts of the worsening Highway 101 congestion in the South Coast of Santa Barbara County have been outlined in previous Clean Air Plans. The worsening congestion on the 4-lane segment of Highway 101 between the Ventura-Santa Barbara County line and the City of Santa Barbara continues to have an effect on the local economy, air

quality, and mobility within the South Coast area. In 2002, SBCAG joined with other agencies to prepare the Highway 101 Deficiency Plan to address the growing congestion on Highway 101 within the South Coast. The plan, adopted by local agencies and SBCAG, included short-term congestion relief improvements and committed adopting agencies to complete the 101-In-Motion Plan.

The goal of the 101-In-Motion Plan was to develop long-term solutions for addressing congestion on 101 through a process that would include a broad range of public members. A Stakeholder Advisory Committee was formed to include major employers, representatives from the business community, commuters, environmental interests, automobile advocates, alternative transportation advocates, non-profit community organizations, and neighborhood/homeowner associations. Members of the public were invited to community meetings and many proposed solutions and provided information on what was most important to them regarding possible solutions. A "package" of solutions was identified through this extensive public outreach process and was formally approved by the SBCAG board in October 2005. The 101-In-Motion Plan was completed in July 2006, and incorporates the recommendations made through the public outreach process. The major components of the Implementation Plan include; widening Highway 101 between the Ventura County line and Milpas Street to provide HOV lanes on both sides of the freeway, re-timing of the Pacific Surfliner passenger train to coincide with peak commute hours (which will enable commuters from Ventura to ride to the South Coast in the mornings and return to Ventura County in the evenings), extensive transportation demand management programs, and intelligent transportation systems (ITS) improvements. The long-term solutions identified in the 101-In-Motion Plan were incorporated into SBCAG's 2009 Regional Transportation Plan for Santa Barbara County. Major elements of the 101-In-Motion Plan were also incorporated into the 2007 Clean Air Plan as transportation control measures.

Table 5-5 shows two measures proposed for further study. SBCAG staff is currently working on a Park-and-Ride Lot Study to determine the feasibility of adding additional capacity to existing lots or constructing new lots throughout the County. The results of this study will be incorporated into the next Clean Air Plan update.

The other measure proposed for further study, the Activity Centers measure, arose from Senate Bill 375, which was passed in 2008 by the California legislature. SB 375 places new regional planning responsibilities on Metropolitan Planning Organizations (MPO) like SBCAG. The bill is intended to help meet the state's GHG emission reduction goals in AB 32 through regional transportation and land use strategies to reduce emissions from car and light-duty truck travel. SB 375 ties the regional housing and transportation planning and land use planning processes together by mandating the preparation of a Sustainable Communities Strategy (SCS) in the Regional Transportation Plan. The SCS will be prepared to show how the region will meet targeted reductions in GHG emissions. The targeted reductions (which were set by ARB's Regional Targets Advisory Committee in September 2010) will be incorporated into SBCAG's SCS in the next Regional Transportation Plan update (currently scheduled for early 2013).

The SCS requirements represent an opportunity to improve the link between transportation and land use planning. One component of the SCS includes analyzing the feasibility of transit priority projects that will contribute to reducing regional GHG emissions. SB 375 sets criteria for what can be considered a transit priority project, such as;

- minimum residential/commercial mixed use sizes,
- close access to major transit stops and high quality transit corridors, and
- compliance with extensive environmental and land use criteria.

The criteria for transit priority projects were written in a way to incentivize their development. CEQA exemptions (for growth-inducing impacts and project-specific and cumulative traffic impacts) could make development of these projects less expensive than non-transit priority projects. In addition, identification of potential development sites in the SCS can help in identifying locations for local jurisdictions to address State housing mandates.

The concept of transit priority projects and their evaluation in the SCS represents a good example of local adoption of ordinances that would enhance transit development and development of mixed use projects, thus representing an opportunity for further study of the Activity Centers TCM under SBCAG's new responsibilities under SB 375. The SCS will identify potential locations for transit priority projects based on the criteria outlined in the statute. In addition, the SCS will also capture co-benefits, such as reductions in criteria pollutants. SBCAG will analyze the potential for criteria pollutant reductions in its upcoming SCS, therefore, it is proposed for further study in the 2010 Plan.

Also shown in Table 5-5 is the contingency measure for an Enhanced Inspection and Maintenance (I/M) Program.

Table 5-6 shows one measure proposed for rejection: a study of the benefits of restricting bus idling Countywide. This measure has been slated "for further study" since 2001 and is proposed for rejection due to a pre-existing statewide regulation put into effect by the California Air Resources Board that restricts bus and heavy truck idling. This regulation was put into effect to address diesel particulate matter emissions, but also results in reduced ROG and NOx emissions. The presence of the State regulation would make it difficult to implement a local rule, therefore, it is proposed for rejection in the 2010 Plan.

5.3.1 TCM FUNDING

Since, the passage of the Inter-modal Transportation and Efficiency Act (ISTEA) in 1991 and continuing with the reauthorization of the national transportation bill, SAFETEA-LU, in 2005, the source of funding for transportation control measures primarily comes from the federal Congestion Management and Air Quality (CMAQ) program. The CMAQ program was specifically created to provide a funding source for TCMs in areas designated non-attainment or maintenance for the national ambient air quality standards (NAAQS). With the attainment classification for the federal 8-hour ozone standard and revocation of the 1-hour federal ozone standard in April 2005, annual apportionments of federal CMAQ funds are no longer available for Santa Barbara County.

In the November 2008 election, Santa Barbara County residents voted to renew a ½ percent sales tax that would provide nearly $1 billion in funding towards transportation projects over the next 30 years (Measure A). The availability of the sales tax funds also allows for an additional $500 million in federal and state matching funds. The sales tax measure went into effect in April 2010

and SBCAG is working with its board, local agencies, Caltrans and the public in developing an investment plan. Funding for most of the major operational improvements on the South Coast U.S. 101 and the re-timing of the Pacific Surfliner service to provide peak hour service between Ventura and Santa Barbara Counties would come from Measure A. In addition, Measure A would fund a significant amount towards inter-regional transit services (such as the Clean Air Express and the Coastal Express) and is the primary source of funding for the Traffic Solutions division of SBCAG. Therefore, Measure A is a critical funding piece in the implementation of many of the TCMs that were adopted in the 2007 Clean Air Plan.

5.4 ON-ROAD MOBILE SOURCE EMISSIONS ANALYSIS

On-road mobile source emissions are estimated using the California Air Resources Board (ARB) on-road mobile source emissions inventory model (EMFAC). EPA approved the EMFAC 2007v2.3 model in January 2008. The on-road emission estimates documented in this Chapter were developed using the EMFAC 2007v2.3 emissions model for 2007 (baseline year), 2020 and 2030. The transportation activity data (e.g., regional vehicle miles of travel (VMT), regional vehicle trips, and VMT by speed class distributions) generated by SBCAG's Santa Barbara Travel Model provided the basis for the on-road mobile source emission estimates contained in this plan. In order to calculate 2007 base year trips and VMT, staff applied growth factors developed from the future year forecasts of VMT for Santa Barbara County to the SBCAG model year 2005 estimate of VMT and trips. For the 2030 emission forecasts, on-road activity data was interpolated from the 2020 and 2035 model forecasts.

5.4.1 ON-ROAD ACTIVITY DATA INPUTS

Table 5-7 lists the transportation and emissions modeling assumptions of the 2007 Plan on-road mobile source emissions analysis.

The countywide VMT and vehicle trips were derived from SBCAG's Transcad Travel Demand Model. The SBCAG model is fully calibrated in accordance with the federal and state guidelines and performance standards for model accuracy.

The most current modeling products available from the model are a 2005 (base year) and 2020 and 2035 forecasts. The coded transportation networks for each forecast scenario reflect road improvements identified in the 2009 Federal Transportation Improvement Program (FTIP) and the planned projects identified in the 2008 Vision 2030 Regional Transportation Plan (RTP). The activity forecasts assume completion of all of the programmed projects (those projects for which specific funding sources have been secured) listed in the 2009 FTIP by the year 2020 and completion of all of the planned projects listed in the 2009 RTP by the year 2030. A list of the programmed projects is provided in Table 5-8 and a list of the planned projects is provided in Table 5-9.

The socio-economic inputs (employment and households) that form the basis for the transportation model are based on SBCAG's 2007 Regional Growth Forecast (RGF). The 2007 RGF forecasts population, housing, and employment growth in Santa Barbara County out to 2040. Table 5-10 shows the major activity indicators from the 2007 Regional Growth Forecast. The vehicle activity forecasts generated by the SBCAG Travel Model are provided in Table 5-11.

These forecasts reflect countywide vehicle activity for light-duty autos and trucks, motorcycles and medium-duty trucks.

Figure 5-4 summarizes the 2010 through 2030 forecasted average annual VMT growth rates and their relationship to population growth rates over the same period. This graph indicates that both population and annual average VMT will continue to grow, but at a declining growth rate. By 2030, the average annual population growth rate will exceed the average annual VMT growth rate by about 3-tenths of one percent. This represents a departure of trends experienced between 1980 and 2000 and is closer to the trend seen in VMT growth between 2000 and 2008.

The forecasted population and VMT growth rate trend is interesting but not entirely unexpected. VMT change is a product of demographic, social, and economic factors that vary over time. The 1970s through the 1980s were characterized by: post-second world war children having a baby boom; significant increases in the female labor force; and significant increases in vehicle ownership per licensed driver. These factors dramatically impacted the demand for travel over this twenty year period. However, these factors have now reached saturation and will be less significant in the future. For example, during the 1990s the female labor force participation rate (% females 16 - 60 or so who are working) stabilized and has probably reached its peak; the post WWII baby boom generation has had their children; and, the number of vehicles per licensed driver is near or at 1.0. Hence, it has been postulated by transportation researchers that in the absence of "new" demographic and/or socio-economic changes, VMT growth in the future should track more closely with overall population growth.

Social factors emerged in the 1990s that impacted travel. Given the increase in dual income families, more vehicle trips resulted (e.g., two working parents requiring two work trips instead of one; an added trip to the day care center; a trip to the gym on the way to or from work etc.). Another potential factor in future demand is the change in ethnic composition. At this time, change in ethnic composition and its impact on travel is not well understood. The emergence of the Hispanic population can be seen in elementary school enrollment data. This ethnic age cohort will age and turn into licensed drivers, but their driving characteristics may differ from prevailing patterns. At this time, travel forecasting models do not account for ethnicity and its impact on travel behavior.

Another economic trend that is impacting travel demand in Santa Barbara County is the high cost of housing in the South Coast. Many workers in the South Coast are opting to buy more affordable homes in northern Santa Barbara County or Ventura County – living farther from the worksite and increasing VMT. The U.S. Census indicates that between 1990 and 2000, Santa Barbara County experienced approximately a 20 percent increase in the number of commuters who must travel 30 minutes or more from within or to Santa Barbara County for work[b]. The resulting jobs-housing imbalance that these housing costs have fostered is a contributing factor to VMT growth rates into the future.

[b] This estimate includes inter-county commuting into Santa Barbara County from outside counties (e.g., LA, Ventura and San Luis Obispo) and implicitly assumes that these inter-county commutes require 30 minutes or more to achieve.

5.4.2 EMISSIONS MODELING

Two basic quantities are required to calculate a given emission estimate, an emission factor and an activity factor. In general, the emission factor is the amount of emissions generated by a certain amount of motor vehicle activity. A countywide on-road mobile source emission estimate is calculated by summing the product between the vehicle activity (VMT and trips) and the emission factors contained in the EMFAC emissions model developed by ARB.

EMFAC 2007v2.3 computes emissions associated with the following emitting processes:

1) Running exhaust emissions based on VMT;
2) Cold start incremental emissions and hot start incremental emissions based on the number of vehicles starts as a function of time after engine shutoff;
3) Diurnal emissions based on numbers of vehicles;
4) Hot soak emissions based on total numbers of vehicle starts;
5) Evaporative running losses based on VMT, and;
6) Resting loss emissions based on number of vehicles.

EMFAC 2007v2.3 will produce two types of inventories, an annual average inventory and a planning inventory. This 2010 Plan is based on a summer ozone season (April to October) average daily emissions planning inventory. Refer to *Chapter 3, Emission Inventory*.

ARB distributions were used to allocate VMT and vehicle trips into 24 1-hour time periods within EMFAC. To compute running emissions, each time period's VMT total was stratified into 13 speed classes, or bins (0-65 miles per hour (mph) in 5 mph increments) by vehicle classification. Hence, for the 13 vehicle classifications modeled by EMFAC, there are 24 VMT by Speed Class Distributions (SCD). The SCD estimates for 2007, 2020 and 2030 are derived from SBCAG's travel model. SCD from the A.M. and P.M. peak hour loaded networks were applied to all of the vehicle types except the Urban Bus category, which has a unique drive cycle. For the Urban Bus class, ARB default distributions were applied. The off-peak VMT by SCD were derived by subtracting the A.M. and P.M. peak hour activity from the daily activity for each of the 13 EMFAC speed class bins (0-65 mph by 5 mph increments) and re-calculating the percentage distribution.

Traffic analyses completed over the last few years have revealed that the duration of traffic congestion on the County's major freeways is expected to increase in the future. Peak spreading refers to the amount of time freeways experience congestion. Peak spreading is accounted for in the emissions modeling for the 2010 Plan by extending the A.M. and P.M. peak VMT by SCD up to 4 hours (2 hours in the A.M. and 2 hours in the P.M.) for the base year 2007 and 6 hours for the year 2020. The planned improvements outlined in the Vision 2030 Regional Transportation Plan would provide significant congestion relief. Therefore, peak spreading was reduced back down to 4 hours for the year 2030 scenario. These adjustments to the SCD are described below:

Year	A.M. Peak		P.M. Peak	
	Duration of Congestion	Time Period	Duration of Congestion	Time Period
2007	2 hours	6:00-8:00 AM	2 hours	4:00-6:00 PM
2020	3 hours	6:00-9:00 AM	3 hours	4:00-7:00 PM
2030	2 hours	6:00-8:00 AM	2 hours	4:00-6:00 PM

The emissions associated with vehicle starts are accounted for in the EMFAC model based on the distribution of vehicle starts by vehicle classification, vehicle technology class, and operating mode. This allows the model to compute emissions associated with vehicle starts and evaporative processes (for reactive organic compounds - ROC). EMFAC adds these vehicle start and evaporative emissions to running emissions to compute total on-road mobile source emissions.

Historically, SBCAG has adjusted the ARB estimates of vehicle starts for Santa Barbara County. ARB estimates the vehicle starts by factoring the County's vehicle registration data. SBCAG staff has noted that this excludes vehicles that are operating within the County that are registered outside the County (i.e. Ventura or San Luis Obispo residents working in Santa Barbara County). Furthermore, the SBCAG model estimates trip ends, rather than trip-starts. As such, the reliance on trip starts lessens the sensitivity to future mode split/vehicle trip changes resulting from HOV facilities, new transit services, transit fare policy changes, and other TCMs. Based on these concerns, SBCAG revised the estimate of total Countywide vehicle trip starts by applying the EMFAC7G trip-end to vehicle start adjustment factors to SBCAG's travel model output for trip-ends. The revised vehicle start control totals were then input into EMFAC and allocated by vehicle type based on EMFAC's existing activity data distribution percentages.

The on-road activity data used in calculating the daily emissions for the 2010 Plan is summarized in Table 5-12.

5.5 EMISSION RESULTS

The 2010 Plan emission results are summarized below. The SBCAG model output data and ARB travel demand activity data (VMT, trips, VMT by SCD) is summarized in Table 5-12. The output sheets from the EMFAC model runs are included at the end of this Chapter.

From 2007-2030, ROC on-road mobile source emissions are forecast to decrease as follows:

2007 ROC Baseline	9.17 tons/day
2020 ROC Forecast	4.19 tons/day
2030 ROC Forecast	2.86 tons/day
Total On-Road Mobile Source ROC Emission Decrease 2007-2030	**6.31 tons/day**

From 2002-2020, NO_x on-road mobile source emissions are forecast to decrease as follows:

2007 NOx Baseline	16.06 tons/day
2020 NO_x Forecast	6.28 tons/day
2030 NOx Forecast	3.72 tons/day
Total On-Road Mobile Source NO_x Emission Decrease 2007-2030	**12.34 tons/day**

On-road mobile source emissions of ROC and NO_x are forecast to decline by 6.31 and 12.34 tons per day respectively. This represents a 69 and 65 percent reduction in ROC and NO_x respectively over the 23-year planning horizon of the 2010 Plan. These ROC and NO_x emission reductions will primarily result from state and federal controls on light duty vehicle and heavy-duty diesel emissions and the natural attrition of older vehicles being replaced by newer vehicles (i.e., fleet turnover). Figure 5-5 illustrates how the on-road mobile source emissions are distributed among six major vehicle type categories. These figures show that light-duty autos and trucks will continue to be the primary source of ROC whereas light-duty trucks and heavy-duty diesel vehicles will be the primary source of NO_x into the future. The relative contribution of ROC emissions will decline over time for light duty vehicles while heavy duty vehicles will increase its share of NO_x emissions in the future.

TABLE 5-1
SANTA BARBARA COUNTY ANNUAL AVERAGE POPULATION AND VMT GROWTH RATES

TIME PERIOD	ANNUAL AVG. GROWTH RATE POPULATION	ANNUAL AVG. GROWTH RATE VEHICLE MILES OF TRAVEL	ANNUAL AVG. GROWTH RATIO (POP:VMT)
1981-1989	1.98 %	4.58 %	1:2.31
1990-1999	0.63 %	1.31 %	1:2.08
2000-2008	0.91 %	0.73 %	1:0.8

TABLE 5-2
SANTA BARBARA COUNTY TRANSPORTATION CONTROL MEASURES

TCM	TCM DESIGNATION	TYPE OF TCM	ADOPTING AGENCY(IES)	IMPLEMENTING AGENCY(IES)	COMMITMENTS	MONITORING MECHANISM (AGENCY)
T-1 T-2	Trip Reduction Program Employer-Based TDM Program	Voluntary; TDM Program; State AQAP	Tier 1: Guadalupe; Buellton; Solvang; County, SYV Tier 2: Lompoc; Santa Maria; Carpinteria; County Unincorporated Tier 3: Santa Barbara; County, Goleta	Tier 1 (County/ Cities) Tier 2 (County/Cities) Tier 3 (County/Cities)	Tiers 1 & 2: Resolution of Commitments from Affected jurisdictions; Tier 3: City and County TDM Program City of Santa Barbara and Goleta area	TDM Program (SBCAG) CMP Conformity (SBCAG)
T-3	Work Schedule Changes	Voluntary	County and Cities	County and Cities; Private Sector	Adopted Policy, County, 1988	Not Applicable (TDM)
T-4	Area Wide Ridesharing	Voluntary	County and Cities	SBCAG	Interagency Agreement	TDM Program (SBCAG)
T-5	Public Transportation	Programmed	County and Cities	SBMTD; SMAT; SBCAG; APCD; COLT; SYVT	FTIP and RTIP; SRTP, TDP	RTP List of Programmed Projects(SBCAG)
T-6	High Occupancy Vehicle Lanes	Programmed	Caltrans and SBCAG	Caltrans and SBCAG	FTIP and RTIP; Measure A Strategic Plan	RTP List of Programmed Projects (SBCAG)
T-7	Traffic Flow Improvement	Programmed	County and Cities	County and Cities; Caltrans; SBMTD; SBCAG	FTIP and RTIP	RTP List of Programmed Projects (SBCAG)
T-8	Parking Management	Parking Ordinance	City of Santa Barbara	City of Santa Barbara	Not Applicable	City of Santa Barbara Parking Task Force
T-9	Park-and-Ride Fringe Parking	Voluntary; Programmed	County and Cities	County and Cities; Caltrans	FTIP and RTIP	Caltrans, District 5; RTP List of Programmed Projects (SBCAG)
T-10	Bicycle/Pedestrian	Programmed	County and Cities	County and Cities; Caltrans; SBCAG	FTIP and RTIP; General Bikeway Elements; Bikeway Master Plans	RTP List of Programmed Projects (SBCAG)
T-13	Accelerated Retirement of Vehicles	Voluntary	APCD	APCD	Contract APCD/Engineering	APCD
T-17	Telecommunication	Voluntary	County and Cities	County and Cities; Private Sector	Not Applicable	Not Applicable (TDM)
T-18	Alternative Fuel Program	Voluntary	APCD	APCD; County and Cities	Interagency Agreements Unnecessary	APCD
T-19	Public Education	Committal; Voluntary	County and Cities APCD; SBCAG	County and Cities APCD; SBCAG	Interagency Agreements Unnecessary	Not Applicable; CMP Conformance (SBCAG)

TABLE 5-3
EXISTING SIP TCM COMMITMENTS

TCM	DESIGNATION	CLEAN AIR PLAN YEAR	PROJECT SPONSOR	PROJECT/PROGRAM DESCRIPTION	IMPLEMENTATION STATUS	SIP ANALYSIS?
1-4	Travel Demand Management	1994/1998/2004	Traffic Solutions	City-County TDM Program	Program On-Going	Yes
	Areawide Ridesharing		Traffic Solutions	County Rideshare Program	Program On-Going	Yes
	Work Schedule Changes		Traffic Solutions/ Private Sector	Flexible Work Hours	Program On-Going	No
		2007	Traffic Solutions	Individualized Marketing Carpool/Vanpool Pricing Incentives	On-Going (Curb Your Commute)	No
5	Public Transportation	1994	SBMTD	Isla Vista-SBCC Express Service	Service On-Going	Yes
			SBMTD	Downtown Waterfront Shuttle Expansion	Service On-Going	Yes
			APCD	Clean Air Express Expansion	Service On-Going	Yes
			City of Santa Maria	SMAT Expansion – 1 30' Bus	Service On-Going	Yes
			City of Lompoc	COLT Expansion – 2 Buses and Farebox Recovery System	Service On-Going	Yes
			City of Solvang	SYVT Expansion – 1 Van to establish fixed route service	Service On-Going	Yes
			AMTRAK	Service Expansion from 2 to 4 train stops per day	Service On-Going	Yes
		1998	City of Santa Maria	Transit Bus and expanded service to Guadalupe	Service On-Going	Yes
			County of Santa Barbara	Goleta Rail Platform – San Diegan Extension	Service On-Going	Yes
			County of Santa Barbara	Surf Rail Platform – San Diegan Extension	Service On-Going	Yes
			City of Guadalupe	Guadalupe Rail Platform – San Diegan Extension	Service On-Going	Yes
		2007	SBCAG/ Transit Operators	Interregional Bus Service Program (Clean Air Express, Coastal Express)	Service On-Going	Yes
			SBCAG/ Transit Operators	Local/Regional Bus Service Program	Service On-Going	Yes
			MTD/SBCAG	Express Bus Transit Service – Carpinteria to Santa Barbara	Service On-Going	Yes
			MTD/SBCAG	Express Bus Transit Service – UCSB Line 24 Extension	Service On-Going	Yes
			SBCAG/VCTC	Enhanced Commuter Rail Service – Ventura to Carp/SB/Gol.	Pending	Yes
			SMAT/COLT/SBCAG	Intercommunity Transit Service (Breeze)	Service On-Going	Yes
			SBCAG/ Transit Operators	Bus connections to rail stations and transit hubs	Service On-Going	Yes
			MTD	Valley Express – Service between SY Valley and South Coast	Service On-Going	Yes
			MTD	Calle Real/Old Town Shuttle	Service On-Going	Yes
			SMAT	Route 24 – Service from Town Center to Hidden Pines/Preisker Park area	Service On-Going	Yes
			SMAT	Route 8 – Increased service to West McCoy Ln. and airport industrial area.	Service On-Going	Yes
			SMAT	Extension of Route 3 to Edwards Community Center and Pioneer Valley High School	Service On-Going	Yes

TCM	DESIGNATION	CLEAN AIR PLAN YEAR	PROJECT SPONSOR	PROJECT/PROGRAM DESCRIPTION	IMPLEMENTATION STATUS	SIP ANALYSIS?
			COLT	New Route 5 between Mission Plaza and the Com. Center	Service On-Going	Yes
6	High Occupancy Vehicle (HOV) Lanes	2007	Caltrans/SBCAG	HOV Lane on Rte. 101 between Ventura County line to Milpas	In Design and Environmental Review	Yes
7	Traffic Flow Improvements	1994	Caltrans	Crosstown Freeway Project	Completed	Yes
			County/Caltrans	Rte. 101 / Patterson Avenue interchange	Completed	Yes
			SBCAG/Caltrans	Rte. 101 / La Cumbre Road interchange	Completed	Yes
			SBCAG/Caltrans	Rte. 101 / Storke Road interchange	Completed	Yes
			SBCAG/Caltrans	Rte. 101 / Betteravia Road interchange	Completed	Yes
			County/Caltrans	Rte. 101 / Fairview Avenue interchange	Completed	Yes
			City of Santa Maria	Rte. 135 / Betteravia Road intersection	Completed	Yes
			County of Santa Barbara	Hollister Avenue / Fairview Avenue intersection	Completed	Yes
			City of Santa Barbara	Castillo Street / Montecito Street intersection	Completed	Yes
			County of Santa Barbara	Signal Synchronization – Hollister Avenue	Completed	Yes
		2007	Caltrans/SBCAG	Network Surveillance – CCTV & Loop Detectors on Rte. 101 between Ventura County line and Hollister Ave. (a)	Under Construction	No
			Caltrans/SBCAG	Changeable Message Signs –		No
				Junction of Rte. 101/154 (N & S)	In Place	
				Junction of Route 101/1	Pending	
			Caltrans/CHP	CT D5 Traffic Management Center expansion (SLO) – Integrated freeway and arterial control	Pending	No
			MTD	Transit Operations – Vehicle tracking, passenger counts, electronic fare collection, surveillance and communications	Pending	No
			Caltrans/SBCAG	Operational Improvements – Milpas to Fairview Ave.: Auxiliary lanes, full lanes and/or interchange improvements.	Pending	Yes
			MTD/Local Agencies	Bus Priority Treatments – Improvements at intersections to provide extra exclusive lanes for buses, bulb-outs at bus stops, and extension of green lights at intersections.	Pending	No
			Caltrans/SBCAG	Smart Call Boxes on Rte. 101 between Ventura County line and Hollister Ave.	Pending	No
			Caltrans/SBCAG	Ramp Metering – Installation of ramp meters along South Coast 101 corridor, where feasible	Pending	Yes
			City of Santa Maria	Skyway Dr./Betteravia Rd. Signal Interconnect (10 signals)	Operational	Yes
			SBCAG	Freeway Service Patrol	Service On-going	Yes
8	Parking Management	1994/1998/2004	City of Santa Barbara	Residential Parking Program	On-going	No
		2007	Santa Barbara; County; UCSB	Variable Parking Rates by Location (voluntary)	Pending	No
9	Park-n-Ride Lots	1998	County of Santa Barbara	Lompoc Park-n-Ride Lot – Ocean Ave./7th St.	Completed	Yes
				Santa Maria Park-n-Ride Lot – Clark Ave./Hwy. 101	Completed	Yes
		2007	City of Buellton	Lot near south end of Avenue of the Flags	Completed	Yes

TCM	DESIGNATION	CLEAN AIR PLAN YEAR	PROJECT SPONSOR	PROJECT/PROGRAM DESCRIPTION	IMPLEMENTATION STATUS	SIP ANALYSIS?
10	Bicycle/Pedestrian	1994	City of Santa Maria	Santa Maria Valley Railroad Bikeway	Completed	Yes
			City of Santa Maria	Battles Road Bicycle and Pedestrian Project	Completed	Yes
			City of Solvang	Alamo Pintado Creek Bikeway/Pedestrian Bridge	Pending	Yes
			City of Santa Barbara	SBCC – East Campus Bicycle and Pedestrian Project	Completed	Yes
			County of Santa Barbara	Fairview Ave. Bike lane	Completed	Yes
			County of Santa Barbara	Bradley Road Bikeway	Completed	Yes
		1998	City of Santa Maria	1 Bike Locker	Completed	Yes
			County of Santa Barbara	Class II Bikeway in Santa Ynez – Alamo Pintado Rd.	Completed	Yes
			County of Santa Barbara	Refugio Road Class II Bikeway – Samantha Dr.-SR 246	Completed	Yes
			County of Santa Barbara	Phelps Road Class II Bikeway	Completed	Yes
13	Old Car Buyback	1994/1998/ 2004 /2007	APCD	Vehicle Buyback Program (1996-1999, 2004+)	Program On-Going	Yes
18	Alternative Fuel Program	1994	APCD	Innovative Technologies Group` Program	On-going	Yes
			APCD	Clean Air Express Expansion	On-going	Yes T-5
			SBMTD	Waterfront Shuttle Service Expansion	On-going	Yes T-5
			SBMTD	Easy Lift Conversion of 5 vans to CNG	On-going	Yes
			SBMTD	Gillig bus refurbishment	On-going	Yes
			SBMTD	AMG bus refurbishment	On-going	Yes
		1998	UCSB	2 CNG Truck conversions/fuel maker	On-going	Yes
			City of Santa Maria	Purchase dual fuel van	On-going	Yes T-5
		2007	MTD	Purchase of 8 hybrid buses for replacement	Vehicles in Service	Yes
19	Public Education	1994/1998/2004	APCD	Overall Work Program	On-going	No
			SBCAG	Overall Work Program	On-going	No
		1998	SB Bike Coalition	Bicycle Video	On-going	No

TABLE 5-4
PROJECTS ADDED TO SUPPLEMENT PREVIOUSLY ADOPTED TRANSPORTATION CONTROL MEASURES

TCM	DESIGNATION	PROJECT SPONSOR	PROJECT
2	Travel Demand Management	SBCAG/Traffic Solutions	Expansion of Local Employer Support
3	Work Schedule Changes	SBCAG/Traffic Solutions	Flex Work Santa Barbara Phases I and II
4	Areawide Ridesharing	SBCAG/Traffic Solutions	On-line Carpool and School Pool Matching
5	Public Transportation	SBCAG/VCTC	Coastal Express Expansion
		MTD	New Mesa Loop service
			Increased frequency on existing Lines 1/2, 3, and 6/11
		SMAT	Transit Center
			Evening Service (Night Owl)
		COLT	Wine Country Express
			Evening Service to/from Alan Hancock College
		County of SB	Farm Worker Vanpools
		SBCAG	Clean Air Express expansion
		SMOOTH	Guadalupe Flyer expansion
		Amtrak	Re-time Pacific Surfliner
			Siding Improvements
7	Traffic Flow Improvements	City of Santa Barbara	Signal Synchronization – Carrillo St.
		City of Goleta	Signal Synchronization – Los Carneros Rd.
13	Old Car Buyback	APCD	Continued Support of Vehicle Buyback Program
19	Public Education	SBCAG/Traffic Solutions	Expanded educational outreach with the Curb Your Commute and Commuter Challenge campaigns

TABLE 5-5
TRANSPORTATION CONTROL MEASURES PROPOSED FOR FURTHER STUDY AND CONTINGENCY MEASURES

TCM	DESIGNATION	PROJECT SPONSOR	PROJECT/PROGRAM DESCRIPTION	PROCESS
Proposed for Further Study				
9	Park-n-Ride Lots	Caltrans/SBCAG	Countywide, Southern SLO County and Western Ventura County. Study currently underway by SBCAG staff.	SBCAG OWP
14	Activity Centers	SBCAG/ Transit Agencies/ Local Jurisdictions	The upcoming Sustainable Communities Strategies (mandated by SB 375) will look at potential transit oriented development sites. The SCS will include an analysis of potential co-benefits of criteria pollutant reduction with various SCS strategies.	SBCAG RTP
Contingency Measure				
21	Inspection and Maintenance	BAR	Enhanced I/M Program	Pending

TABLE 5-6
TRANSPORTATION CONTROL MEASURES PROPOSED FOR REJECTION

TCM	DESIGNATION	PROJECT SPONSOR	PROJECT/PROGRAM DESCRIPTION	REASON
15	Extended Vehicle Idling	City of Santa Barbara	City Ordinance restricting extended bus idling in the vicinity of the County Courthouse continues. (scale of applicability too small)	N/A

TABLE 5-7
2010 PLAN ON-ROAD MOBILE SOURCE ACTIVITY MODELING ASSUMPTIONS

MODELING ASSUMPTIONS	2010 PLAN ASSUMPTIONS
Socio-economic growth assumptions	2007 Regional Growth Forecast (SBCAG)
Vehicle Activity Levels (trips, VMT)(LDA, LDT, MDT, MCY)	SBCAG Travel Model (2005, 2020, 2035); modified to years 2007 and 2030
Vehicle Activity Levels (trips, VMT) (HHDT, HDGT, UB, SBUS)	EMFAC2007 v 2.3 (ARB) ARB Default Activity (2007, 2020, 2030)
VMT by Speed Class Distributions (LDA, LDT, MDT, HDDT, HDGT, SBUS, MCY)	SBCAG Travel Model (2005, 2020, 2035)
VMT by Speed Class Distributions (UB)	EMFAC2007 v 2.3 (ARB) ARB Default Activity (2007, 2020, 2030)
Transportation Model Networks	SBCAG Travel Model (2005, 2020, 2030)
Infrastructure Improvements & Schedules	2009 FTIP Programmed Projects Vision 2030 Regional Transportation Plan
Emission Model	EMFAC2007 v 2.3 (ARB)
Vehicle Type/Technology & Demographic Distributions	EMFAC2007 v 2.3 (ARB)
Vehicle Population	Adjusted by SBCAG
Vehicle Starts	Adjusted by SBCAG - Travel Model vehicle trip output and 7G trip start to trip end factors
HDDT & HDGT Activity	EMFAC2007 v 2.3 (ARB)

TABLE 5-8
REGIONALLY SIGNIFICANT PROGRAMMED PROJECTS IN YEAR 2020 SCENARIO

State Highways
Rt.135/UVP - Const. at-grade intersection
Rt.101/Hollister - Relocate interchange to join C. Oaks Extension.
Rt.101 SM Way-SLO County line - Widen to 6-lane (currently under construction)
Rt.154, SB to Lake Cachuma, Group II Operational Improvements
101/Milpas Interchange reconstruction, const. Cacique under-crossing
Rt.101 (Rt.144 to Hot Springs SB) - Add auxiliary. lane
Rt.101 (Hot Springs - Milpas NB) - Add 3rd lane
Rt.101 Hot Springs/Cabrillo - Improve interchange
Rt.101/Linden & C Pass – Reconstruction I/C + Via Real between ICs & extension to Creek.
Via Real - Const. frontage road between ICs (part of I/C project)
Rt.101/Carrillo Blvd - Widen NB ramp to 2-ln, Ramp metering. No aux
Rt.101/UVP - Const. full diamond interchange
City of Carpinteria
Via Real Extension across Carp. Creek (part of I/C project)
County of Santa Barbara - South County
Evans Ave/Ortega Hill Rd - Improve intersection, widen 101 NB ramp
El Colegio (Camino Corto to UCSB West gate) - Widen to 4-lane
Lillie Ave./Evans Rd. Intersection - intersection improvement
S. Fairview, Const cap modification, landscape, bike lane
City of Goleta
Hollister at Patterson Ave - Add exclusive RT on Hollister WB appr.
Fowler Rd Ext. - Const. road ext & I/S at Kellogg w/roundabout @ Pine
Ekwill Rd Ext. - Const. road ext & I/S at Kellogg w/roundabout @ Fairview
Fairview/Calle Real - Add NB LT on Fairview & EB LT on Calle Real
Hollister/L. Carneros - Add NB LT on L. Carneros, LT on WB Hollister
North County
Hummel Drive Extension, connect UVP & Hobbs Ln
City of Santa Barbara
Las Positas Road/Cliff Drive Intersection Improvement
City of Santa Maria
UVP - Const. E/W 2-ln arterial from Hummel Dr to Blosser Road
Blosser Rd (Cook to north city limit) - Widen to 4-lane
Miller St. (Stowell - Cook St.) - Widen to 4-lane
Miller St. (Chapel to Alvin Ave.) - Widen to 4-lane
Betteravia (101-135) widen to 6 lanes, signalize (2007)

TABLE 5-9
REGIONALLY SIGNIFICANT PLANNED PROJECTS IN YEAR 2030 SCENARIO

State Highways	
Hwy 101 at Santa Maria Bridge	Widen Hwy 101 bridge over Santa Maria River, and additional lane each direction
Hwy 101 between 0.44 miles south of Carpinteria Creek Bridge and Sycamore Creek Bridge	Widen Hwy 101 with HOV lanes
SR 246; Purisima intersection	Passing lanes on SR 246; Purisima intersection improvements
Hwy 101 northbound between Las Positas and Mission St.	Construct auxiliary lane, operational improvements
Hwy 101 from Fairview Ave to Storke Rd	Widen to six lanes
SR 166 from Santa Maria to Kern Co. Line	Passing lanes at three locations; turnouts, shoulder widening
SR 1 from Las Cruces to Lompoc	Construct spot widening and curve realignment, replace bridges
SR246 between Buellflat Rd and 5th St	Phase I: re-stripe to continue center turn lane Phase II: widen, one lane in each direction
Hwy 101 – South Coast corridor	Install ramp meters
City of Buellton	
Hwy 101, southbound offramp (Jonata/Ave of Flags)	Improve transition from highway speed to city street speed, lengthen southbound off ramp; realign with Jonata Rd/Ave of Flags intersection
SR 246 at McMurray Rd	Align intersections from two successive intersections to one (McMurray Rd/SR 246 off ramp); provide additional lanes on approaches
Hwy 101; Damassa Rd Interchange	Provide over-crossing and modify interchange to increase capacity and accommodate projected traffic flow at City build-out
SR 246 at Industrial Way, Lata Dr, Sycamore Dr	Traffic Signals, turn lanes
City of Carpinteria	
Santa Ynez overcrossing	Reconstruction of Santa Ynez overcrossing
Holly Ave to Caprinteria Ave	Extend Holly Ave (two lanes) to Carpinteria Ave, construct at grade RR crossing
Santa Ynez Ave and Via Real; Carpinteria Ave and Palm Ave; Linden Ave and 7th St; Santa Monica Rd and Via Real	Channelize and signalize intersections
Via Real at Santa Monica Creek bridge and Via Real between Santa Ynez Ave and Santa Monica Rd	Widen to four lanes
Hwy 101 at Bailard	Widen overcrossing
Hwy 101/150	Modification project to provide direct access to Via Real
Carpinteria Ave Bridge	Reconstruct Bridge

City of Goleta	
Storke Rd from Whittier to City Limits	Widen roadway
Phelps Rd, Los Carneros to Storke	Circulation improvements for Storke/Hollister, El Colegio/Los Carneros, Los Carneros/Hollister intersections
La Patera Rd; Calle Real to Railroad	Construct roadway over-crossing
Fairview Ave, Hollister Rd to Fowler Rd	Construct Class II bikelanes, landscaped raised medians and vehicle capacity modifications
Ellwood Station Rd	Ellwood Station Rd overcrossing

City of Guadalupe	
SR 1 through Guadalupe	Reconstruction, widen to four lanes, bring up to standard
Guadalupe	Add/improve RR crossing
City of Lompoc	
SR 246 to Lompoc (Central Ave Extension)	Central Ave extension; improve SR246 connection to Lompoc
Hwy 1, North H St.	Widen from Central to Purisima Jct.
City of Santa Barbara	
Hwy 101 between Mission St./Las Positas St.	Access improvements
City of Santa Maria	
Hwy 101 & SR 135 interchanges	Reconstruct Interchange and extend Broadway East, revise N/B ramps, widen overcrossing, add Park and Ride
Hwy 101 at McCoy Lane	Construction southbound off ramps; construction full interchange
Hwy 101 at Betteravia	Modify northbound ramps, construct NB auxiliary lane in future.
Miller St between Robles St and Cook St	Widen arterials to City standard
Alvin Ave between Curryer St and Miller St	Modify to secondary arterial standards with Class II bikelanes
Intersection of Railroad Depot and Fester	Construct round-about
Stowell Rd at College Dr	Lengthen Eastbound left turn lane
Hwy 101 at Main St	Add capacity to approaches and on/off ramps
Betteravia Rd, Blosser, and SR 135	Purchase ROW, widen to 6 lanes, signalize intersections
College Dr between Battle Rd to Betteravia Rd	Improve north/south circulation
Miller St between Barcelius to Stowell Rd	Widen to four lanes with channelization and Class II bikelanes
Foster Rd between SR 135 and Blosser Rd	Widen to four lanes and construct Class II bikelane
E Street	Acquire ROW and construction four lane arterial from Fairway to Betteravia
City of Solvang	
Highway 246/Alamo Pintado Rd. intersection	Widen highway, install roundabout or signals, and widen Alamo Pintado Bridge. Construct bicycle/pedestrian bridge at Alamo Pintado Creek to extend existing bikeway along Hwy 246 from Santa Ynez to Solvang.
Unincorporated County Areas	
Hollister Ave between San Antonio Rd and Hwy 101	Widen to four lanes with channelization and bike lanes; reconstruct UPRR overcrossing
La Purisima Rd between Hwy 101 and SR 246	Widen La Purisima Rd to include standard lane widths, shoulders and Class II bikelanes
Clark and Bradley Rd	Widen intersection to provide additional left and right turn lanes
Clark Ave and Hwy 101	Relocate on and off ramps and install signals
Bradley Rd and Santa Maria Way	Widen intersection, add eastbound and westbound right turn lanes on Santa Maria Way
SBCAG	
South Coast-Ventura County	Commuter-friendly intercity rail pilot program (Pacific Surfliner re-timing)

TABLE 5-10
2010 PLAN ACTIVITY INDICATORS

INDICATOR	UNITS	2007*	2020	2030
Population	Residents	422,600	459,600	481,400
Housing	Households	145,067	157,648	164,422
Employment	Workers	192,800	216,000	233,000

*Interpolated from the 2005 data and 2010 forecasts.
Source: SBCAG 2007 Regional Growth Forecast

TABLE 5-11
VEHICLE ACTIVITY FORECASTS

ACTIVITY	2005	2007	2020	2030	2035
VMT	9,605,095	9,877,880	10,934,981	11,273,106	11,442,169
Trip Ends	1,331,802	1,369,625	1,560,118	1,629,192	1,663,729

TABLE 5-12A
ARB/SBCAG ON-ROAD ACTIVITY DATA (2007)

Year: 2007

	Vehicles	VMT	Trip Ends	7G Adj	Trip Starts
LDA-TOT	140,539	4,771,671	633,992	1.668	1,057,499
LDT1-TOT	49,255	1,684,384	219,527	1.766	387,684
LDT2-TOT	58,105	2,114,248	265,537	1.766	468,938
MDV-TOT	21,321	895,700	98,702	1.630	160,884
LHDT1-TOT	4,288	205,939	84,948	1.630	138,465
LHDT2-TOT	2,799	108,815	51,444	1.630	83,853
MHDT-TOT	3,499	201,000	115,919	1.000	115,919
HHDT-TOT	1,098	160,000	19,189	1.000	19,189
OBUS-TOT	248	14,000	9,449	1.000	9,449
SBUS-TOT	536	25,000	2,146	1.000	2,146
UB-TOT	184	25,000	738	1.000	738
MH-TOT	3,694	43,000	370	1.000	370
MCY-TOT	10,669	97,124	15,476	1.000	15,476
TOTAL	**296,235**	**10,345,880**	**1,517,436**		**2,460,610**

2007 VMT by Speed Class Distributions (LDA, LDT1, LDT2, MDT, MCY, LHDT1, LHDT2, MHDT, HHDT, OBUS, SBUS, MH)

Source: SBCAG Model Update - Year 2005

	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70
12-6	0.0011	0.0018	0.0019	0.0012	0.0097	0.0221	0.0284	0.0533	0.1577	0.1941	0.2097	0.0996	0.1618	0.0576
7-9	0.0034	0.0071	0.0101	0.0079	0.0180	0.1105	0.0392	0.0931	0.2023	0.1698	0.1966	0.0769	0.0602	0.0050
9-3	0.0011	0.0018	0.0019	0.0012	0.0097	0.0221	0.0284	0.0533	0.1577	0.1941	0.2097	0.0996	0.1618	0.0576
4-6	0.0040	0.0023	0.0011	0.0043	0.0093	0.0861	0.0455	0.1127	0.1750	0.1322	0.2007	0.1037	0.0997	0.0234
6-11	0.0011	0.0018	0.0019	0.0012	0.0097	0.0221	0.0284	0.0533	0.1577	0.1941	0.2097	0.0996	0.1618	0.0576

2007 VMT by Speed Class Distributions - ARB Defaults (UB)

TABLE 5-12B
ARB/SBCAG ON-ROAD ACTIVITY DATA (2020)

Year: 2020

	Vehicles	VMT	Trip Ends	7G Adj	Trip Starts
LDA-TOT	157,742	5,443,333	729,662	1.668	1,217,077
LDT1-TOT	54,590	1,903,803	246,300	1.766	434,967
LDT2-TOT	64,750	2,271,627	297,586	1.766	525,536
MDV-TOT	23,930	887,610	110,292	1.630	179,776
LHDT1-TOT	4,807	193,264	101,625	1.630	165,649
LHDT2-TOT	3,142	125,466	56,927	1.630	92,791
MHDT-TOT	4,555	270,000	145,221	1.000	145,221
HHDT-TOT	991	168,000	10,377	1.000	10,377
OBUS-TOT	323	19,000	10,992	1.000	10,992
SBUS-TOT	682	32,000	2,729	1.000	2,729
UB-TOT	235	32,000	938	1.000	938
MH-TOT	4,702	59,000	470	1.000	470
MCY-TOT	11,912	109,880	17,725	1.000	17,725
TOTAL	**332,361**	**11,514,981**	**1,730,845**		**2,804,248**

2020 VMT by Speed Class Distributions (LDA, LDT1, LDT2, MDT, MCY, LHDT1, LHDT2, MHDT, HHDT, OBUS, SBUS, MH)

Source: SBCAG Model Update - Year 2020

	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70
12-6	0.0000	0.0008	0.0015	0.0020	0.0089	0.0798	0.0259	0.0607	0.1449	0.1674	0.1850	0.1061	0.1887	0.0283
6-9	0.0011	0.0040	0.0026	0.0019	0.0100	0.0901	0.0369	0.0697	0.1588	0.1141	0.1513	0.1560	0.1761	0.0274
10-3	0.0000	0.0008	0.0015	0.0020	0.0089	0.0798	0.0259	0.0607	0.1449	0.1674	0.1850	0.1061	0.1887	0.0283
4-7	0.0041	0.0019	0.0041	0.0085	0.0245	0.0970	0.0752	0.1164	0.1647	0.1446	0.1299	0.0969	0.1079	0.0242
8-11	0.0000	0.0008	0.0015	0.0020	0.0089	0.0798	0.0259	0.0607	0.1449	0.1674	0.1850	0.1061	0.1887	0.0283

2020 VMT by Speed Class Distributions - ARB Defaults (UB)

TABLE 5-12C
ARB/SBCAG ON-ROAD ACTIVITY DATA (2030)

Year: 2030

	Vehicles	VMT	Trip Ends	7G Adj	Trip Starts
LDA-TOT	167,172	5,622,785	765,191	1.668	1,276,339
LDT1-TOT	57,230	1,969,981	255,942	1.766	451,993
LDT2-TOT	67,915	2,327,945	305,113	1.766	538,829
MDV-TOT	25,515	911,038	114,507	1.630	186,646
LHDT1-TOT	5,116	199,044	109,473	1.630	178,441
LHDT2-TOT	3,346	129,024	60,364	1.630	98,393
MHDT-TOT	4,876	278,000	154,839	1.000	154,839
HHDT-TOT	932	156,000	7,259	1.000	7,259
OBUS-TOT	345	20,000	11,256	1.000	11,256
SBUS-TOT	686	32,000	2,744	1.000	2,744
UB-TOT	236	32,000	944	1.000	944
MH-TOT	4,870	61,000	487	1.000	487
MCY-TOT	12,553	113,290	18,603	1.000	18,603
TOTAL	**350,793**	**11,852,106**	**1,806,721**		**2,926,773**

2030 VMT by Speed Class Distributions (LDA, LDT1, LDT2, MDT, MCY, LHDT1, LHDT2, MHDT, HHDT, OBUS, SBUS, MH)

Source: SBCAG Model Update - Year 2035

	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70
12-6	0.0000	0.0008	0.0005	0.0025	0.0076	0.0849	0.0331	0.0676	0.0784	0.1153	0.1896	0.1680	0.2382	0.0135
6-9	0.0007	0.0004	0.0028	0.0027	0.0102	0.0969	0.0352	0.0758	0.1498	0.1115	0.1418	0.1400	0.2208	0.0114
10-3	0.0000	0.0008	0.0005	0.0025	0.0076	0.0849	0.0331	0.0676	0.0784	0.1153	0.1896	0.1680	0.2382	0.0135
4-7	0.0005	0.0019	0.0041	0.0034	0.0134	0.0915	0.0567	0.1028	0.1600	0.1240	0.1638	0.1309	0.1355	0.0115
8-11	0.0000	0.0008	0.0005	0.0025	0.0076	0.0849	0.0331	0.0676	0.0784	0.1153	0.1896	0.1680	0.2382	0.0135

2030 VMT by Speed Class Distributions - ARB Defaults (UB)

FIGURE 5-1
HISTORICAL POPULATION GROWTH AND DAILY VEHICLE MILES TRAVELED (DVMT) (1988-2008)

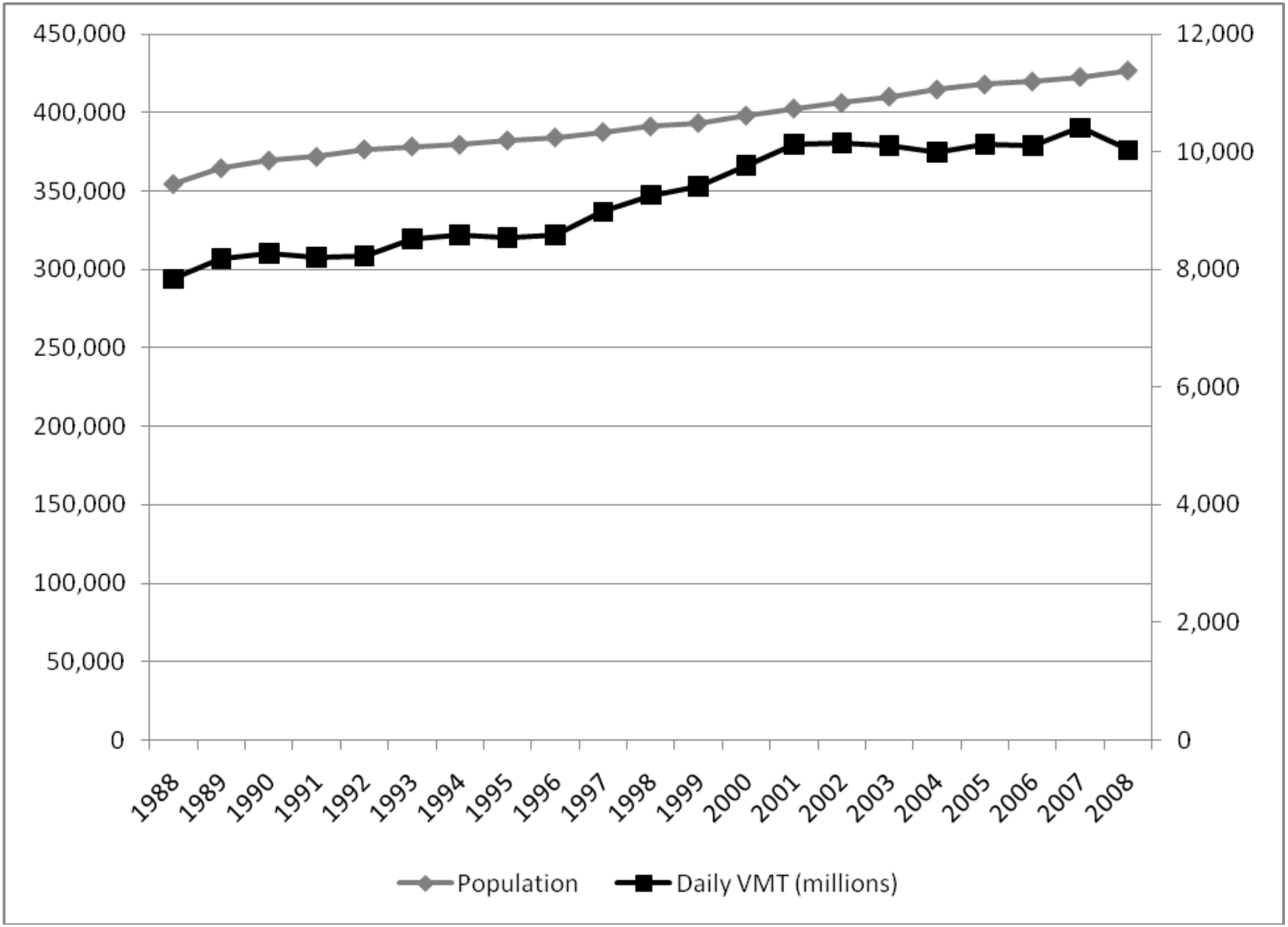
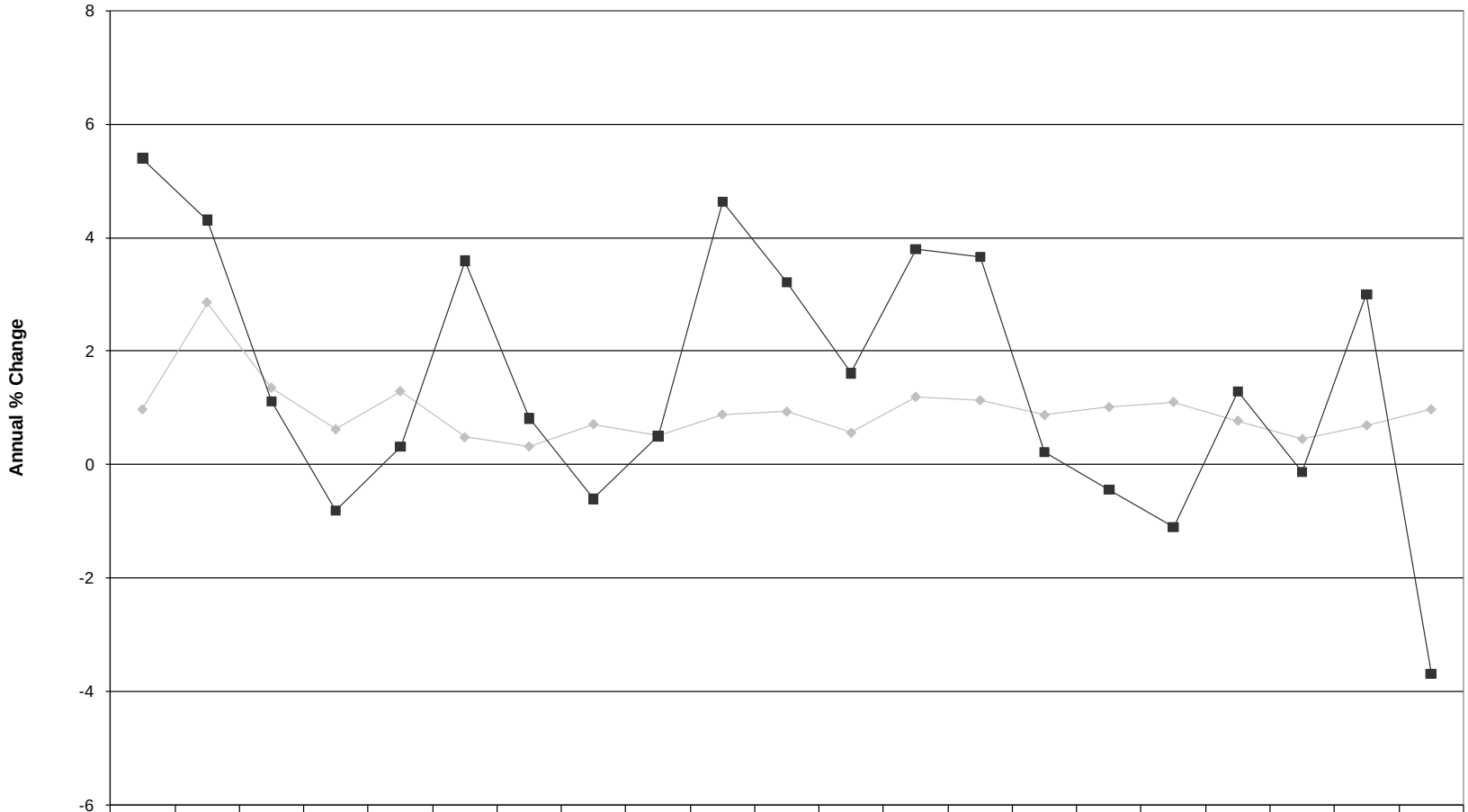


FIGURE 5-2
HISTORICAL POPULATION GROWTH RATE VS. DAILY VEHICLE MILES TRAVELED (DVMT) GROWTH RATE (1988-2008)



	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Population	0.97	2.85	1.35	0.62	1.29	0.48	0.32	0.71	0.50	0.88	0.93	0.56	1.19	1.13	0.87	1.01	1.1	0.77	0.45	0.69	0.97
DVMT	5.40	4.31	1.11	-0.82	0.32	3.59	0.81	-0.61	0.50	4.63	3.21	1.61	3.80	3.66	0.22	-0.44	-1.11	1.29	-0.13	3	-3.7

Population Source: Department of Finance
VMT Source: Caltrans HPMS/MVSTAFF Reports

FIGURE 5-3
AVERAGE DAILY VMT PER CAPITA – 1988-2008

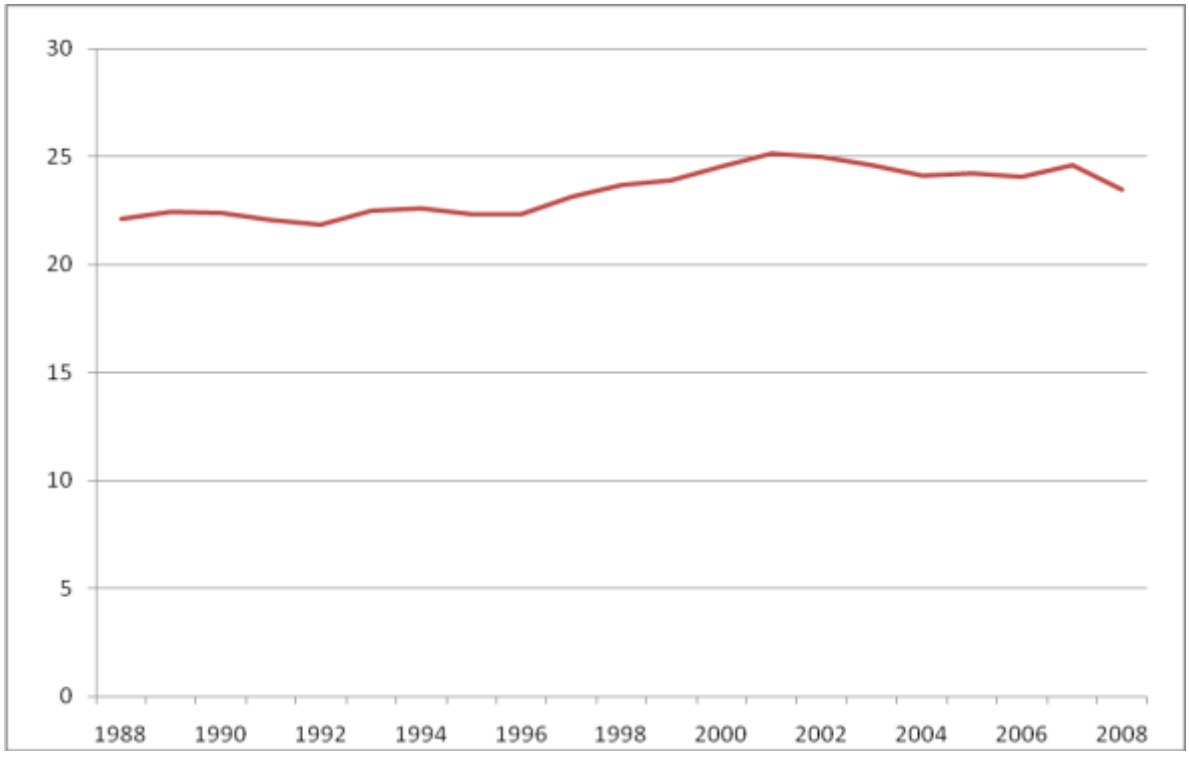
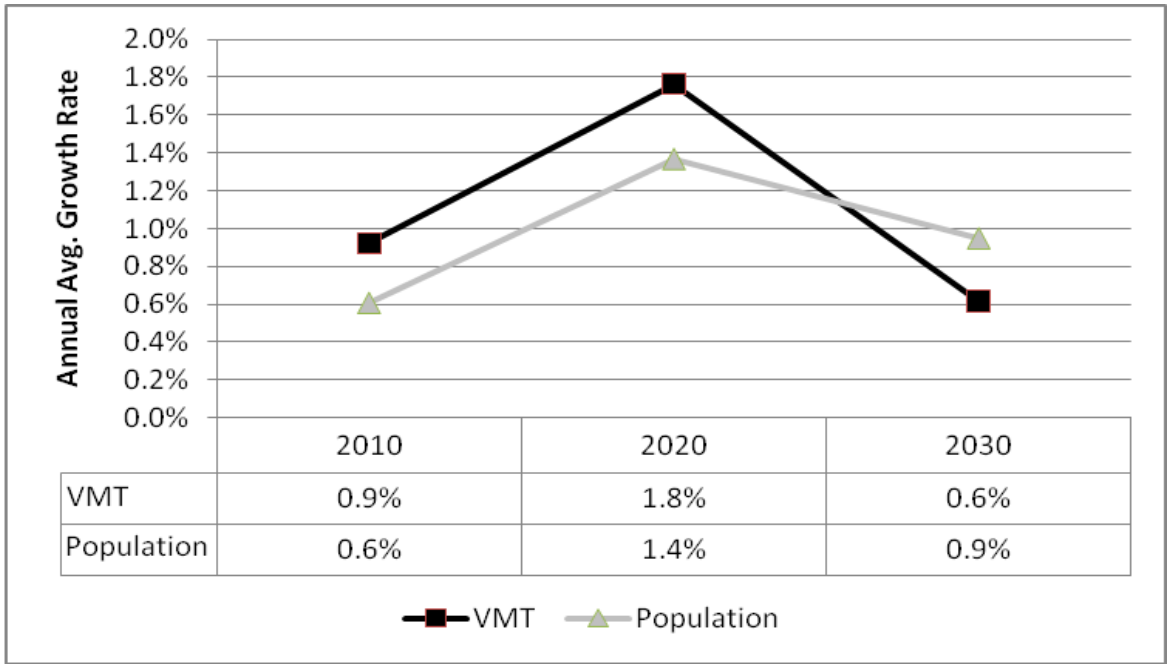
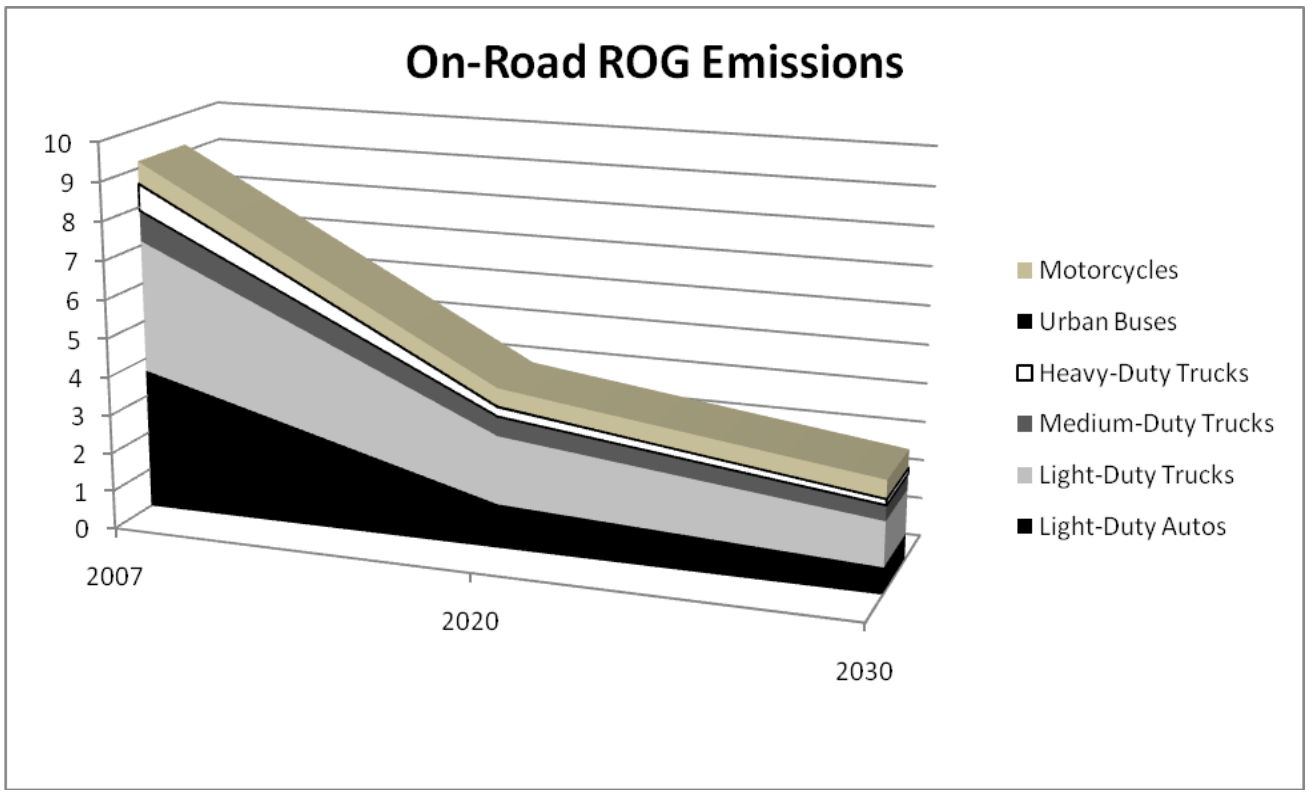


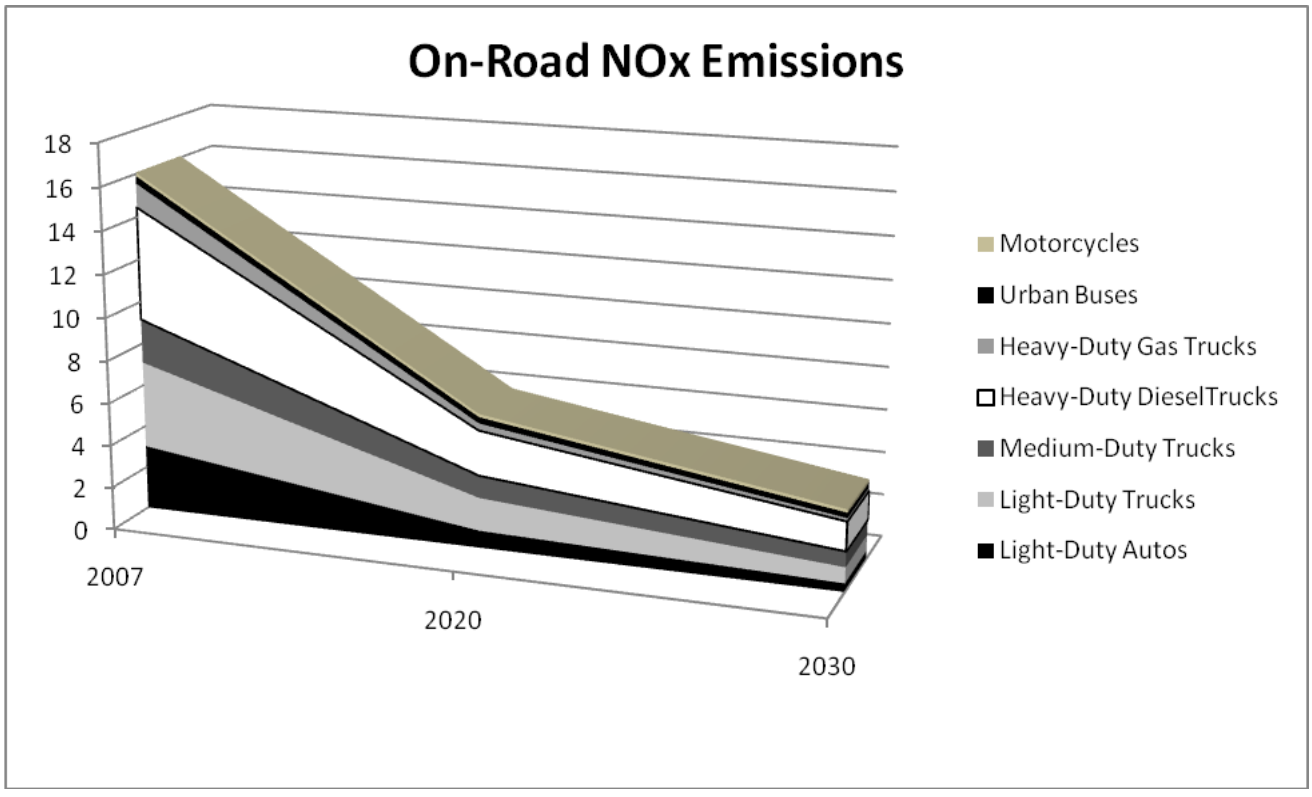
FIGURE 5-4
POPULATION GROWTH RATE VS. DAILY VMT GROWTH RATE (10-YEAR AVERAGE ANNUAL CHANGE) SANTA BARBARA COUNTY (2010-2030)



	2010	2020	2030
VMT	0.9%	1.8%	0.6%
Population	0.6%	1.4%	0.9%

FIGURE 5-5
ON-ROAD MOBILE SOURCE EMISSION RESULTS





Title : 2010 CLEAN AIR PLAN
Version : Emfac2007 V2.3 Nov 1 2006 ** WIS Enabled **
Run Date : 2010/05/18 12:00:45
Scen Year: 2007 -- All model years in the range 1965 to 2007 selected
Season : Summer
Area : Santa Barbara County
I/M Stat : Enhanced Basic (2005)
Emissions: Tons Per Day

	Light Duty Passenger Cars				Light Duty Trucks				Medium Duty Trucks				Heavy Duty Trucks						
	Non-cat	Cat	Diesel	Total	Non-cat	Cat	Diesel	Total	Non-cat	Cat	Diesel	Total	Gasoline Trucks Non-cat	Gasoline Trucks Cat	Gasoline Trucks Total	Diesel Trucks	Total HD Trucks	Urban Buses	Motor-cycles	All Vehicles
Vehicles	4552.	150852.	872.	156276.	3020.	114048.	2314.	119383.	318.	28655.	2615.	31588.	609.	4318.	4928.	4147.	9075.	184.	11864.	328370.
VMT/1000	71.	4681.	20.	4772.	70.	3658.	70.	3799.	7.	1095.	109.	1210.	6.	112.	118.	325.	443.	25.	97.	10346.
Trips	20149.	1031970.	5377.	1057500.	14537.	825529.	16556.	856622.	5118.	343809.	34275.	383202.	10223.	58265.	68488.	78585.	147073.	738.	15476.	2460610.
Reactive Organic Gas Emissions																				
Run Exh	0.38	0.55	0.00	0.93	0.37	0.60	0.01	0.97	0.03	0.14	0.02	0.19	0.02	0.11	0.14	0.18	0.32	0.04	0.37	2.82
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.03
Start Ex	0.10	0.84	0.00	0.94	0.07	0.73	0.00	0.81	0.03	0.25	0.00	0.28	0.10	0.13	0.23	0.00	0.23	0.00	0.04	2.31
Total Ex	0.48	1.39	0.00	1.87	0.44	1.33	0.01	1.78	0.06	0.40	0.02	0.48	0.13	0.25	0.38	0.20	0.58	0.04	0.41	5.16
Diurnal	0.04	0.20	0.00	0.24	0.02	0.16	0.00	0.18	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.47
Hot Soak	0.06	0.23	0.00	0.30	0.04	0.19	0.00	0.23	0.00	0.03	0.00	0.04	0.00	0.00	0.01	0.00	0.01	0.00	0.01	0.58
Running	0.39	0.73	0.00	1.11	0.18	0.93	0.00	1.11	0.03	0.23	0.00	0.26	0.05	0.04	0.09	0.00	0.09	0.00	0.06	2.63
Resting	0.03	0.13	0.00	0.16	0.02	0.11	0.00	0.13	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.32
Total	1.00	2.68	0.00	3.68	0.71	2.71	0.01	3.43	0.09	0.69	0.02	0.80	0.18	0.30	0.48	0.20	0.69	0.04	0.54	9.17
Carbon Monoxide Emissions																				
Run Exh	5.31	16.90	0.01	22.22	5.13	20.21	0.04	25.38	0.71	3.89	0.08	4.67	0.92	2.64	3.56	0.95	4.51	0.21	5.31	62.31
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.05	0.00	0.02	0.02	0.07	0.09	0.00	0.00	0.14
Start Ex	0.66	8.56	0.00	9.22	0.48	8.51	0.00	8.99	0.24	2.87	0.00	3.11	1.11	1.90	3.02	0.00	3.02	0.01	0.15	24.50
Total Ex	5.97	25.46	0.01	31.44	5.61	28.72	0.04	34.37	0.95	6.81	0.08	7.84	2.03	4.56	6.60	1.02	7.61	0.22	5.46	86.95
Oxides of Nitrogen Emissions																				
Run Exh	0.39	1.95	0.03	2.37	0.37	2.86	0.12	3.34	0.04	0.82	0.70	1.56	0.04	0.78	0.82	5.08	5.90	0.35	0.15	13.68
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.20	0.20	0.00	0.00	0.20
Start Ex	0.03	0.61	0.00	0.64	0.02	0.71	0.00	0.73	0.01	0.49	0.00	0.50	0.02	0.28	0.30	0.00	0.30	0.00	0.01	2.18
Total Ex	0.42	2.57	0.03	3.02	0.39	3.57	0.12	4.07	0.04	1.31	0.71	2.07	0.05	1.07	1.12	5.28	6.40	0.35	0.16	16.06
Carbon Dioxide Emissions (000)																				
Run Exh	0.04	1.74	0.01	1.78	0.03	1.66	0.03	1.72	0.00	0.68	0.06	0.74	0.00	0.07	0.07	0.57	0.64	0.06	0.01	4.96
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.01
Start Ex	0.00	0.08	0.00	0.09	0.00	0.08	0.00	0.09	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21
Total Ex	0.04	1.82	0.01	1.87	0.04	1.74	0.03	1.81	0.01	0.71	0.06	0.78	0.01	0.07	0.08	0.58	0.66	0.06	0.01	5.18
PM10 Emissions																				
Run Exh	0.00	0.05	0.00	0.05	0.00	0.06	0.00	0.07	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.15	0.15	0.01	0.00	0.30
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Ex	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
Total Ex	0.00	0.05	0.00	0.06	0.00	0.07	0.00	0.08	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.15	0.16	0.01	0.01	0.33
TireWear	0.00	0.04	0.00	0.04	0.00	0.03	0.00	0.03	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.10
BrakeWr	0.00	0.06	0.00	0.07	0.00	0.05	0.00	0.05	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.15
Total	0.00	0.16	0.00	0.17	0.00	0.15	0.01	0.16	0.00	0.04	0.01	0.05	0.00	0.00	0.01	0.17	0.17	0.01	0.01	0.57
Lead	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOx	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.05
Fuel Consumption (000 gallons)																				
Gasoline	5.17	191.13	0.00	196.29	4.87	183.51	0.00	188.39	0.69	73.77	0.00	74.45	0.98	7.90	8.88	0.00	8.88	0.58	2.26	470.85
Diesel	0.00	0.00	0.71	0.71	0.00	0.00	2.43	2.43	0.00	0.00	5.67	5.67	0.00	0.00	0.00	52.48	52.48	4.70	0.00	65.99

Title : 2010 CLEAN AIR PLAN
Version : Emfac2007 V2.3 Nov 1 2006 ** WIS Enabled **
Run Date : 2010/05/18 12:00:45
Scen Year: 2020 -- All model years in the range 1976 to 2020 selected
Season : Summer
Area : Santa Barbara County
I/M Stat : Enhanced Basic (2005)
Emissions: Tons Per Day

	Light Duty Passenger Cars				Light Duty Trucks				Medium Duty Trucks				Heavy Duty Trucks						
	Non-cat	Cat	Diesel	Total	Non-cat	Cat	Diesel	Total	Non-cat	Cat	Diesel	Total	Gasoline Trucks Non-cat	Gasoline Trucks Cat	Gasoline Trucks Total	Diesel Trucks	Total HD Trucks	Urban Buses	Motor-cycles	All Vehicles
Vehicles	28.	202189.	202.	202418.	61.	151988.	1090.	153140.	25.	37716.	3166.	40907.	10.	5505.	5515.	5738.	11253.	235.	15286.	423238.
VMT/1000	0.	5440.	3.	5443.	1.	4150.	25.	4175.	0.	1109.	97.	1206.	0.	115.	115.	433.	548.	32.	110.	11515.
Trips	102.	1215960.	1014.	1217080.	240.	954007.	6256.	960503.	146.	400752.	37317.	438216.	173.	56935.	57107.	112683.	169790.	938.	17725.	2804250.
Reactive Organic Gas Emissions																				
Run Exh	0.00	0.15	0.00	0.15	0.00	0.23	0.00	0.24	0.00	0.05	0.01	0.06	0.00	0.03	0.03	0.09	0.12	0.04	0.32	0.92
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.03
Start Ex	0.00	0.23	0.00	0.23	0.00	0.29	0.00	0.29	0.00	0.13	0.00	0.13	0.00	0.07	0.07	0.00	0.07	0.00	0.04	0.75
Total Ex	0.00	0.37	0.00	0.37	0.00	0.52	0.00	0.53	0.00	0.19	0.01	0.20	0.00	0.10	0.10	0.11	0.20	0.04	0.36	1.70
Diurnal	0.00	0.12	0.00	0.12	0.00	0.14	0.00	0.14	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.31
Hot Soak	0.00	0.18	0.00	0.18	0.00	0.21	0.00	0.21	0.00	0.04	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.44
Running	0.00	0.37	0.00	0.37	0.00	0.76	0.00	0.76	0.00	0.22	0.00	0.22	0.00	0.03	0.03	0.00	0.03	0.00	0.02	1.40
Resting	0.00	0.10	0.00	0.10	0.00	0.12	0.00	0.13	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.27
Total	0.00	1.14	0.00	1.14	0.01	1.76	0.00	1.77	0.00	0.49	0.01	0.51	0.00	0.13	0.13	0.11	0.24	0.04	0.44	4.13
Carbon Monoxide Emissions																				
Run Exh	0.02	5.92	0.00	5.93	0.09	9.33	0.01	9.43	0.07	1.92	0.06	2.05	0.01	0.62	0.63	0.66	1.29	0.16	2.97	21.83
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.06	0.00	0.02	0.02	0.07	0.09	0.00	0.00	0.14
Start Ex	0.00	2.86	0.00	2.86	0.01	3.85	0.00	3.85	0.01	1.49	0.00	1.50	0.02	0.96	0.98	0.00	0.98	0.01	0.18	9.39
Total Ex	0.02	8.78	0.00	8.80	0.09	13.18	0.01	13.28	0.08	3.46	0.07	3.61	0.03	1.59	1.63	0.73	2.36	0.17	3.15	31.36
Oxides of Nitrogen Emissions																				
Run Exh	0.00	0.59	0.01	0.60	0.00	1.17	0.04	1.22	0.00	0.32	0.27	0.60	0.00	0.18	0.18	1.84	2.02	0.29	0.14	4.88
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.26	0.26	0.00	0.00	0.27
Start Ex	0.00	0.21	0.00	0.21	0.00	0.34	0.00	0.34	0.00	0.44	0.00	0.44	0.00	0.15	0.15	0.00	0.15	0.00	0.01	1.14
Total Ex	0.00	0.80	0.01	0.80	0.00	1.51	0.04	1.55	0.00	0.76	0.28	1.05	0.00	0.33	0.33	2.10	2.43	0.29	0.15	6.28
Carbon Dioxide Emissions (000)																				
Run Exh	0.00	1.97	0.00	1.97	0.00	1.90	0.01	1.91	0.00	0.69	0.06	0.75	0.00	0.07	0.07	0.76	0.83	0.06	0.02	5.54
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.02
Start Ex	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23
Total Ex	0.00	2.07	0.00	2.07	0.00	2.00	0.01	2.01	0.00	0.73	0.06	0.78	0.00	0.07	0.07	0.77	0.85	0.06	0.02	5.79
PM10 Emissions																				
Run Exh	0.00	0.05	0.00	0.05	0.00	0.08	0.00	0.08	0.00	0.02	0.00	0.03	0.00	0.00	0.00	0.07	0.07	0.01	0.00	0.24
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Ex	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
Total Ex	0.00	0.06	0.00	0.06	0.00	0.09	0.00	0.09	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.07	0.07	0.01	0.00	0.27
TireWear	0.00	0.05	0.00	0.05	0.00	0.04	0.00	0.04	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.11
BrakeWr	0.00	0.08	0.00	0.08	0.00	0.06	0.00	0.06	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.16
Total	0.00	0.19	0.00	0.19	0.00	0.19	0.00	0.19	0.00	0.06	0.01	0.06	0.00	0.00	0.00	0.09	0.10	0.01	0.00	0.54
Lead	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOx	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.06
Fuel Consumption (000 gallons)																				
Gasoline	0.02	213.27	0.00	213.29	0.08	206.62	0.00	206.70	0.04	75.00	0.00	75.04	0.02	7.58	7.60	0.00	7.60	0.99	2.74	506.36
Diesel	0.00	0.00	0.12	0.12	0.00	0.00	0.85	0.85	0.00	0.00	5.04	5.04	0.00	0.00	0.00	69.68	69.68	5.01	0.00	80.69

Title : 2010 CLEAN AIR PLAN
Version : Emfac2007 V2.3 Nov 1 2006 ** WIS Enabled **
Run Date : 2010/05/18 12:00:45
Scen Year: 2030 -- All model years in the range 1986 to 2030 selected
Season : Summer
Area : Santa Barbara County
I/M Stat : Enhanced Basic (2005)
Emissions: Tons Per Day

	Light Duty Passenger Cars				Light Duty Trucks				Medium Duty Trucks				Heavy Duty Trucks						
	Non-cat	Cat	Diesel	Total	Non-cat	Cat	Diesel	Total	Non-cat	Cat	Diesel	Total	Gasoline Trucks Non-cat	Gasoline Trucks Cat	Gasoline Trucks Total	Diesel Trucks	Total HD Trucks	Urban Buses	Motor-cycles	All Vehicles
Vehicles	0.	212449.	41.	212489.	0.	158707.	361.	159069.	0.	40027.	3161.	43188.	0.	5626.	5626.	6084.	11710.	236.	15956.	442648.
VMT/1000	0.	5622.	1.	5623.	0.	4290.	8.	4298.	0.	1145.	95.	1239.	0.	114.	114.	433.	547.	32.	113.	11852.
Trips	0.	1276150.	193.	1276340.	0.	989073.	1749.	990822.	0.	425836.	37644.	463480.	0.	54513.	54513.	122073.	176586.	944.	18603.	2926770.
Reactive Organic Gas Emissions																				
Run Exh	0.00	0.06	0.00	0.06	0.00	0.10	0.00	0.10	0.00	0.02	0.01	0.03	0.00	0.01	0.01	0.07	0.07	0.01	0.33	0.61
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.01	0.02	0.00	0.00	0.03
Start Ex	0.00	0.09	0.00	0.09	0.00	0.13	0.00	0.13	0.00	0.08	0.00	0.08	0.00	0.03	0.03	0.00	0.03	0.00	0.04	0.38
Total Ex	0.00	0.15	0.00	0.15	0.00	0.23	0.00	0.23	0.00	0.11	0.01	0.12	0.00	0.04	0.04	0.08	0.12	0.01	0.37	1.01
Diurnal	0.00	0.06	0.00	0.06	0.00	0.10	0.00	0.10	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.22
Hot Soak	0.00	0.12	0.00	0.12	0.00	0.16	0.00	0.16	0.00	0.04	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.34
Running	0.00	0.28	0.00	0.28	0.00	0.56	0.00	0.56	0.00	0.20	0.00	0.20	0.00	0.02	0.02	0.00	0.02	0.00	0.02	1.08
Resting	0.00	0.07	0.00	0.07	0.00	0.10	0.00	0.10	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.22
Total	0.00	0.68	0.00	0.68	0.00	1.15	0.00	1.15	0.00	0.40	0.01	0.40	0.00	0.07	0.07	0.08	0.15	0.01	0.46	2.86
Carbon Monoxide Emissions																				
Run Exh	0.00	3.31	0.00	3.31	0.00	4.85	0.00	4.85	0.00	1.35	0.06	1.41	0.00	0.17	0.17	0.58	0.74	0.11	2.99	13.42
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.06	0.00	0.02	0.02	0.07	0.09	0.00	0.00	0.15
Start Ex	0.00	1.36	0.00	1.36	0.00	1.93	0.00	1.93	0.00	1.07	0.00	1.07	0.00	0.48	0.48	0.00	0.48	0.01	0.19	5.04
Total Ex	0.00	4.67	0.00	4.67	0.00	6.78	0.00	6.79	0.00	2.47	0.06	2.53	0.00	0.66	0.66	0.65	1.31	0.12	3.18	18.61
Oxides of Nitrogen Emissions																				
Run Exh	0.00	0.30	0.00	0.30	0.00	0.55	0.01	0.57	0.00	0.18	0.15	0.33	0.00	0.06	0.06	1.08	1.14	0.24	0.15	2.73
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.27	0.27	0.00	0.00	0.28
Start Ex	0.00	0.09	0.00	0.09	0.00	0.16	0.00	0.16	0.00	0.37	0.00	0.37	0.00	0.08	0.08	0.00	0.08	0.00	0.01	0.72
Total Ex	0.00	0.39	0.00	0.39	0.00	0.71	0.01	0.73	0.00	0.56	0.16	0.72	0.00	0.14	0.14	1.34	1.49	0.24	0.15	3.72
Carbon Dioxide Emissions (000)																				
Run Exh	0.00	2.03	0.00	2.03	0.00	1.98	0.00	1.98	0.00	0.72	0.05	0.77	0.00	0.07	0.07	0.76	0.83	0.06	0.02	5.69
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.00	0.00	0.02
Start Ex	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.04	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.24
Total Ex	0.00	2.13	0.00	2.13	0.00	2.07	0.00	2.08	0.00	0.76	0.05	0.81	0.00	0.07	0.07	0.77	0.84	0.06	0.02	5.95
PM10 Emissions																				
Run Exh	0.00	0.06	0.00	0.06	0.00	0.09	0.00	0.09	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.24
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Ex	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
Total Ex	0.00	0.07	0.00	0.07	0.00	0.10	0.00	0.10	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.27
TireWear	0.00	0.05	0.00	0.05	0.00	0.04	0.00	0.04	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.11
BrakeWr	0.00	0.08	0.00	0.08	0.00	0.06	0.00	0.06	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.17
Total	0.00	0.19	0.00	0.19	0.00	0.20	0.00	0.20	0.00	0.06	0.00	0.06	0.00	0.00	0.00	0.07	0.08	0.01	0.00	0.54
Lead	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOx	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.06
Fuel Consumption (000 gallons)																				
Gasoline	0.00	219.02	0.00	219.02	0.00	213.42	0.00	213.42	0.00	77.78	0.00	77.78	0.00	7.43	7.43	0.00	7.43	0.99	2.91	521.55
Diesel	0.00	0.00	0.02	0.02	0.00	0.00	0.26	0.26	0.00	0.00	4.91	4.91	0.00	0.00	0.00	69.41	69.41	4.84	0.00	79.44

CHAPTER 6

EMISSION FORECASTING

- INTRODUCTION
- EMISSION FORECAST
- EMISSION INVENTORIES
- IMPACTS OF MARINE SHIPPING EMISSIONS
- CONCLUSION

6. EMISSION FORECASTING

6.1 INTRODUCTION

Chapter 6 presents two emission inventory forecasts used in the development of this 2010 Plan. These inventories are the 2020 and 2030 Planning Emission Inventory forecasts of reactive organic compounds (ROC) and oxides of nitrogen (NO_x) emissions in Santa Barbara County and the Outer Continental Shelf (OCS), offshore of Santa Barbara County.

The 2020 and 2030 Planning Emission Inventory forecasts are based on the 2007 Planning Emission Inventory, which is described in *Chapter 3, Emission Inventory*. This 2007 Planning Emission Inventory is the base year for emission forecasting and was developed by modifying the 2007 Annual Emission Inventory, (also described in *Chapter 3*). A Planning Emission Inventory is essentially a modified subset of an Annual Emission Inventory and differs from an Annual Emission Inventory in three ways. First, the creation of the Planning Emission Inventory involves adjusting the Annual Emission Inventory to account for seasonal variation because most exceedances of the state and federal ozone standards occur during the April to October ozone season. This is commonly referred to as a summer seasonal inventory. Second, the emissions from natural sources such as biogenics, oil seeps and gas seeps, and wildfires are excluded from the Planning Emission Inventory since they are not regulated or controlled through implementation of emission control measures. Finally, the annual emissions in the Annual Emission Inventory are converted to daily emissions in the Planning Emission Inventory.

6.2 EMISSION FORECAST

The 2007 Planning Emission Inventory is used to forecast emissions in order to determine whether the emission control measures described in *Chapter 4* and *Chapter 5* of the 2010 Plan will reduce enough emissions in order to attain the state 8-hour ozone standard, while accounting for the growth that is expected to occur in the county. The inventory approach to assessing progress assumes that if forecasted inventories are below base level values, then the reductions will be sufficient enough to meet air quality goals, particularly if an area is close to meeting the standard. It should be noted, however, that there are uncertainties with regard to using the emission inventory approach since there is not always a direct correlation between ozone precursor emissions and monitored ozone values. Important factors such as weather conditions and the transport of pollution from other areas can significantly influence local air quality and ozone concentrations. Photochemical modeling is often used in lieu of the inventory approach; however, due to resource limitations the Santa Barbara County Air Pollution Control District (APCD) is not able to provide modeling analyses for this 2010 Plan.

To forecast future year emissions, the estimate of the changes in the level of pollution producing activities, known as "activity indicators", is used to grow the 2007 Planning Emission Inventory. In addition, emission reductions resulting from local control rules adopted by the APCD Board of Directors and from statewide regulations adopted by the California Air Resources Board (ARB) are estimated and accounted for in the future year forecasts.

Since we are using a 2007 emission inventory base year, future year forecasted emission inventories must be adjusted to account for the most recent Emission Reduction Credits (ERC) that were in the APCD Source Register as of April 23, 2010. ERC's are previous reductions in emissions that can be credited to allow increased emissions from a new or modified stationary source. USEPA policy mandates that ERC's must be treated as potential growth in forecast years. Total available ERC's in the Source Register for Santa Barbara County as of the April 23, 2010, were 0.3077 tons per day of ROC and 0.6212 tons per day of NO_x. These total ERC values are included in the emission forecast tables presented at the end of this chapter. A detailed list of each source that owns these ERC's are listed in Table 6-1.

TABLE 6 – 1

SANTA BARBARA COUNTY SOURCE REGISTER ERC'S
(AS OF APRIL 23, 2010) (TONS PER DAY)

	NO_x	ROC
BKS Energy	0.0540	0.0008
BreitBurn Energy Company	0.0669	0.0010
E&B Resource Management	0.0098	0.1063
ExxonMobil Production Company	0.0127	0.0000
Plains Exploration and Production	0.0162	0.1497
Point Arguello Companies	0.0709	0.0000
Space X	0.0000	0.0053
The Okonite Company	0.0579	0.0000
United Launch Alliance	0.0134	0.0086
US Air Force – VAFB*	0.3091	0.0361
Wm. Bolthouse Farms	0.0103	0.0000
TOTAL SOURCE REGISTER ERC's	**0.6212**	**0.3077**

6.2.1 ACTIVITY INDICATORS

Forecasting quantities of pollution in future years is accomplished by assuming that the amount of pollution is related to activity levels of selected activity indicators. Examples of activity indicators include population, housing, employment, oil production, number of producing oil wells, daily vehicle miles traveled, and daily vehicle starts. The Santa Barbara County Association of Governments (SBCAG) is the source for several of the activity indicator estimates. The ARB and other state and local agencies also contributed activity data. These data represent the best available estimates of future activity levels for the county. The activity factor is the ratio of the 2020 and 2030 forecast levels of activity to the 2007 level of activity. An activity factor of greater than one indicates an increase in growth, while an activity factor of less than one indicates a decline in activity relative to the 2007 value. While activity indicators and factors have been determined for

* ERC's for the US Air Force – VAFB are only allowed to be used for projects at Vandenberg Air Force Base.

the milestone years of 2020 and 2030, the indicators for any intermediate year can be estimated through simple linear interpolation. It is not expected that the activity data for the intermediate years will "spike" resulting in non-linear trends in the data. Table 6-5 provides the 2007 level of activity, the predicted 2020 and 2030 levels of activity, the activity factors, and the source of the forecast for each of the activity indicators.
Activity indicators are assigned to each Stationary Source and Area-Wide Source category described in *Chapter 3*. The categories of On-Road Motor Vehicles and Other Mobile Sources are derived from ARB's EMFAC2000 and OFFROAD Model, respectively. The ARB also provided the APCD emission forecasts for Consumer Products and Architectural Coatings.

6.2.2 CONTROL MEASURES

The next step in forecasting future year emissions is to account for regulations and control measures that have been previously implemented or that are scheduled for implementation. Emission reductions are achieved through implementation of federal, state and local controls on a variety of pollution sources, including Stationary Sources, Area-Wide Sources, and Mobile Sources.

The emissions from each source are reduced according to the expected efficiency of any control measures that apply to that source, taking into account any existing level of control. Estimated efficiencies take into account equipment (design) efficiencies, exemptions, phased implementations, and expected rates of compliance (assumed to be a default 80%, as recommended in USEPA guidelines). The resulting emissions after the application of control measures represent a seasonally adjusted emission inventory forecast.

6.2.3 VANDENBERG AIR FORCE BASE GROWTH ALLOWANCE

During the preparation of the 2001 Plan, Vandenberg Air Force Base (VAFB) requested that the APCD include a General Conformity growth allowance into the 2001 Plan to account for an Airborne Laser (ABL) Mission that may potentially come to VAFB. On November 15, 2001, the APCD Board of Directors approved this request, with the condition that a portion of the emissions from the ABL Mission be offset by withdrawing Emission Reduction Credits (ERC's) from the VAFB Source Register. The VAFB growth allowance was also included into the Emission Forecasting chapter in the 2004 and 2007 Clean Air Plans. Since then, VAFB has learned that the ABL will not be coming to their base but they envision an unmanned aerial vehicle (UAV) program coming to there in the future. Although General Conformity is not directly applicable to this 2010 Plan since Santa Barbara County is in attainment for the federal 8-hour ozone standard, projected emissions from a possible UAV program coming to VAFB in the future are presented in this Plan at the request of VAFB. Table 6-2 shows the emissions from the UAV program estimated by VAFB, and the ERC's required from VAFB required to offset this UAV program. The remaining emissions from this program are included as line items in Table 6-3.

TABLE 6 - 2

VAFB UNMANNED AERIAL VEHICLE (UAV) PROGRAM *(TONS PER DAY)*		
	ROC	**NOx**
Projected 2020 Emissions: UAV Program	0.0260	0.1600
Projected 2030 Emissions: UAV Program	0.0260	0.1600
Source Register ERC's required to offset the UAV Program	0.0024	0.0152
2020 Emissions added to the 2010 Plan for the UAV Program	0.0236	0.1448
2030 Emissions added to the 2010 Plan for the UAV Program	0.0236	0.1448

6.3 EMISSION INVENTORIES

Planning emission inventory forecasts for 2020 and 2030 for both Santa Barbara County and the OCS are presented in Tables 6-3 and 6-4 and Figures 6-1 through 6-4, located at the end of the chapter. Tables 6-3 and 6-4 provide a detailed summary of both ROC and NO_x emissions for each emission source category and for each forecast year. These tables also include base year (2007) estimates for each source category for ease of comparison with forecasted emissions. Table 6-5 presents activity data that are utilized to grow base year emissions data. Figures 6-1 and 6-2 present a graphical time series representation of ROC and NO_x emissions for both Santa Barbara County and the OCS. Figure 6-5 shows total NO_x emissions from both Santa Barbara County and the OCS, while Figure 6-6 shows combined Santa Barbara County and OCS NO_x emissions, but does not include emissions from marine shipping.

The bar graph presented in Figure 6-1 shows that Santa Barbara County total onshore ROC emissions are forecasted to increase from 31.01 tons per day in 2007 to 31.88 tons per day in 2030 representing about a three percent increase in emissions. Total onshore NO_x emissions are projected to decrease from 38.79 tons per day in 2007 to 19.41 tons per day by 2030, a 50 percent decrease in emissions.

On a source category basis, ROC emissions from onshore stationary sources are forecasted to increase from 8.85 tons per day in 2007 to 10.22 tons per day in 2030 while NO_x emissions from onshore stationary sources are expected to decrease from 7.61 tons per day in 2007 to 6.73 tons per day in 2030. ROC emissions from area-wide sources are forecasted to increase from 8.36 tons per day in 2007 to 11.50 tons per day in 2030. Area-wide NO_x emissions are predicted to increase from 0.91 tons per day in 2007 to 1.32 tons per day by 2030.

The largest decreases in both onshore NO_x and ROC emissions are attributable to mobile sources (On-road Motor Vehicles and Other Mobile Sources). ROC emissions from onshore mobile sources are projected to decrease by about one quarter from 13.81 tons per day in 2007 to10.14 tons per day in 2030, while NO_x emissions from onshore mobile sources are expected to decrease by almost two-thirds from 30.27 tons per day in 2007 to 11.21 tons per day by 2030.

Figure 6-2 presents forecasts for OCS ROC and NO_x emissions. The figure shows that total offshore ROC emissions are predicted to decrease from 3.33 tons per day in 2007 to 2.44 tons per day in 2030. Total offshore NO_x emissions are anticipated to decrease from 49.94 tons per day in 2007 to 42.77 tons per day in 2030. Mobile OCS sources, predominately marine shipping, account for almost all of the OCS NO_x emissions. NO_x emissions from OCS mobile sources are forecasted to decrease from 49.36 tons per day in 2007 to 42.19 tons per day in 2030 as a result of revised international marine engine standards. The impacts of these international standards, along with state and federal marine fuel and engine standards are discussed in more detail in sections 6.4.1 and 6.4.2.

6.4 IMPACTS OF MARINE SHIPPING EMISSIONS

6.4.1 CALIFORNIA AIR RESOURCES BOARD FUEL SULFUR REGULATION

On May 29, 2009, as part of its Diesel Risk Reduction Plan, the ARB approved the regulation for Fuel Sulfur for Ocean-Going Vessels within California Waters and 24 Nautical Miles of the California Baseline. This regulation became effective on June 28, 2009, with compliance for Phase I fuel requirements beginning on July 1, 2009 for the main engines, auxiliary engines, diesel electric engines and auxiliary boilers. The Phase I fuel requirement requires the sulfur levels of Marine gas oil (DMA) to be at or below 1.5% sulfur, or Marine diesel oil (DMB) to be at or below 0.5% sulfur. The Phase II fuel requirement will become effective January 1, 2012, and will require both DMA and DMB fuels to be at or below 0.1% sulfur.

The United States Coast Guard (USCG) Headquarters issued a Marine Safety Notice to provide guidance on switching between heavy/intermediate fuel oils and marine distillates. In addition, ARB strongly advised non-tanker ocean-going vessels to continue using traffic separation lanes established by the International Maritime Organization (IMO) and USCG and avoid transiting through the Point Mugu Sea Range outside this traffic separation scheme. Evidence confirms that ocean-going vessels have chosen to ignore this advice from ARB and instead of traveling in the Santa Barbara Channel, about 70% of the vessels are now traveling south around the Channel Islands to avoid fuel switching and using the more expensive lower sulfur fuel. The USCG is concerned about safety and is now developing a Port Access Route Study to explore the range of impacts of vessel routing and to evaluate whether to establish shipping lanes south of the Channel Islands. The APCD will be working with the USCG to ensure that this study assesses air quality impacts and also requesting that the study consider vessel speed reduction measures.

The APCD is currently coordinating with ARB to model the onshore air quality impacts from ships using cleaner fuel traveling through the Santa Barbara Channel versus south of the Channel Islands.

6.4.2. 2008 AMENDMENTS TO MARPOL ANNEX VI

In October 2008, the International Maritime Organization (IMO) amended Annex VI of the MARPOL convention and will include several new requirements for Emission Control Areas (ECA) and global areas that enter into force starting July 1, 2011. Annex VI was ratified by 53 countries including the United States and represents almost 82% of the global shipping tonnage. The new Annex VI requirements include:

- new fuel quality requirements beginning from July 2010
- Tier I NOx requirements for existing pre-2000 engines
- Tier II NOx requirements for new engines starting 2011 (global). (Tier II standards represent a 20% NOx reduction below Tier I).
- Tier III NOx requirements for new engines starting 2016 (ECA). (Tier III standards represent a 80% NOx reduction below Tier I).

On March 26, 2010, the IMO designated North American ECA, extending up to 200 nautical miles from the coast. The North American ECA, which will become enforceable in 2012, includes standards for both NOx and Sox emissions. The ECA NOx emission standards require new engines to be certified Tier III by 2016. The ECA Sox emission standards require the sulfur content of fuel not to exceed 1.5% until July 2010, 1.0% until 2015, and 0.1% thereafter.

Table 6-3 and 6-4 summarize these standards and requirements.

TABLE 6-3

ANNEX VI OXIDES OF NITROGEN (NOX) EMISSION STANDARDS

Time Period	Operating "Everywhere" except in an ECA	Operating in an ECA
Engine installed on a ship constructed on or after January1, 2008 and prior to January 1, 2011	Tier I (this continues the pre-October 2008 Annex VI NOx standard of 17 g/kWh)	Same as" Everywhere" – i.e., 17 g/kWh
Engine installed on a ship constructed on or after January 1, 2011	Tier II (NOx standard = 14.4 g/kWh)	Same as "Everywhere" – i.e., 14.4 g/kWh
Engine installed on a ship constructed on or after January 1, 2016	Tier II (NOx standard = 14.4 g/kWh)	Tier III (NOx standard reduced to 3.4 g/kWh)

TABLE 6-4

ANNEX VI FUEL SULFUR CONTENT REQUIREMENTS

	Time Period	Fuel Sulfur Limit
Operating "Everywhere" except in an ECA	A. March 1,2010 to January 1, 2020 B. After January 1, 2020	3.5% 0.5%[1]
Operating in an ECA	A. July 1, 2010 to July 1, 2015 B. After July 1, 2015	1.0% 0.10%

To summarize the IMO NOx standards, pre-2000 engines, require a 20% NO_x reduction except for those engines where reduction is impractical. These reductions need to be met by the year 2012. All engines on board any vessel constructed on or after January 1, 2011 need to meet a NO_x limit 15-25% below the current limits. These are known as Tier 2 NO_x limits. Beginning in 2016, all engines on board any new vessel constructed on or after January 1, 2016 must meet a NO_x limit 80% below the Tier 1 limits discussed above. These are known as Tier 3 limits.

Figure 6-3 presents combined OCS and onshore NO_x forecasts out to 2030. This figure illustrates that while marine shipping NOx emissions account for the largest percentage of the overall combined NOx inventory, IMO engine requirements will lead to a decrease in NOx emissions through the period. Combined NO_x emissions from onshore and OCS sources are anticipated to decline from 88.73 tons per day in 2007 to 72.66 tons per day by 2020. By 2030, combined NO_x emissions are anticipated to decrease to 62.18 tons per day, about 30 percent lower than base year estimates.

NO_x emissions from marine shipping alone (excluding commercial and recreational boats) are expected to slightly decrease from 48.62 tons per day in 2007 to 48.23 tons per day by 2020. By 2030, marine vessel NO_x emissions are forecasted to decline even further to 41.87 tons per day, representing a 14% decrease in NOx emissions from 2007.

Figure 6-4 presents total onshore and OCS NO_x emissions but excludes the marine shipping contribution. This figure shows that existing and proposed emission reduction strategies on all sources, excluding marine shipping, are anticipated to be successful at reducing future NO_x emissions below baseline levels. Excluding marine shipping emissions, total onshore and OCS NO_x emissions are predicted to be reduced from 40.69 tons per day in 2007 to 20.88 tons per day by 2030, which represents an almost 50 percent decrease in NO_x emissions over the planning horizon.

Figure 6-5 displays combined onshore and OCS ROC forecasts. This figure shows that total ROC emissions are projected to slightly decrease from base year levels by approximately 0.03 tons per day by 2030.

[1] Subject to a feasibility review to be completed by IMO no later than 2018. Should the 2018 review reach a negative conclusion, the effective date would default to January 1, 2025.

Figure 6-6 provide a graphical representation of ROC emissions from each source category for both onshore and OCS sources, but excludes marine shipping. . Figure 6-6, however, emphasizes that proposed control strategies for onshore and non-marine shipping OCS sources will be effective in reducing ROC emissions to below baseline levels.

Figure 6-7 shows the combination of ROC and NO_x emission forecasts from both onshore sources and OCS sources.

Based on the IMO NOx limits, future emissions have been calculated to determine the emission benefits of the IMO standards. As shown in Figure 6-8, NO_x emissions based on IMO limits are significantly lower than current estimates for the years 2012 through 2020. The NO_x emissions reflect the assumption that the marine shipping fleet turnover would be 2% per year. Additionally, Tier 2 reductions are assumed to be 20% below the current limits, which is the mid-point of the range proposed by the IMO. In the year 2012, one year after the proposed Tier 2 limits are initiated, NO_x emissions are calculated to be 48.85 tons per day, which is about 7 tons per day less than current NO_x emission forecast for 2012. By 2030, the NO_x limits provide a NOx reduction of about 65tons per day less than an uncontrolled forecast. These NO_x reductions are substantial and reflect the introduction of Tier 3 standards, which are 80% lower than Tier 1 standards.

6.5 CONCLUSION

This chapter presents the 2020 and 2030 Planning Emission Inventory Forecasts. The 2007 Planning Emission Inventory is used as the basis to calculate the 2020 and 2030 forecasts.

ROC emissions from onshore stationary and area-wide sources are forecasted to increase over base year levels by about 0.53 and 1.23 tons per day, respectively, by 2030. NO_x emissions from onshore stationary sources are anticipated to decrease from base year levels by about 1.49 tons per day by 2030. NO_x emissions decrease from base year estimates by about 0.62 tons per day by 2030 for onshore area-wide sources.

Any increases in ROC and NO_x emissions from onshore stationary and area-wide sources are significantly offset by emission reductions from onshore mobile sources. Baseline ROC emissions from onshore mobile sources are predicted to decrease by over 7 tons tons per day by 2030, while baseline NO_x emissions are anticipated to decrease by nearly 19 tons per day by 2030. Mobile sources account for the highest percentage of overall onshore ROC emissions until 2030, when area-wide sources comprise the largest percentage contribution to the overall ROC onshore inventory. Although there are substantial reductions of NO_x emissions from mobile sources through 2030, mobile sources are anticipated to comprise the largest portion of the total onshore NO_x inventory for each of the planning years.

International, federal and state marine shipping fuel and engine standards will significantly reduce shipping emissions throughout the planning horizon. Based on revised IMO engine standards, it is expected that NOx emissions from marine shipping will decrease from about 49 tons per day in 2007 to about 42 tons per day by 2030.

TABLE 6-5 SANTA BARBARA COUNTY EMISSION INVENTORY		2007 ROC *(tons per day)*	2007 NO_X *(tons per day)*	2020 ROC *(tons per day)*	2020 NO_X *(tons per day)*	2030 ROC *(tons per day)*	2030 NO_X *(tons per day)*
STATIONARY SOURCES							
Fuel Combustion							
010	ELECTRIC UTILITIES	0.0019	0.0042	0.0019	0.0042	0.0019	0.0042
020	COGENERATION	0.0323	0.1106	0.0230	0.0789	0.0184	0.0631
030	OIL AND GAS PRODUCTION (COMBUSTION)	0.1172	1.7651	0.0844	1.2459	0.0680	0.9986
040	PETROLEUM REFINING (COMBUSTION)	0.0005	0.0121	0.0004	0.0036	0.0003	0.0028
050	MANUFACTURING AND INDUSTRIAL	0.0639	1.0022	0.0639	0.9979	0.0639	0.9979
052	FOOD AND AGRICULTURAL PROCESSING	0.1878	3.8758	0.1179	2.9266	0.1348	3.1373
060	SERVICE AND COMMERCIAL	0.0577	0.6413	0.0626	0.6751	0.0670	0.7251
099	OTHER (FUEL COMBUSTION)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Fuel Combustion Total	**0.4613**	**7.4113**	**0.3541**	**5.9322**	**0.3543**	**5.9290**
Waste Disposal							
110	SEWAGE TREATMENT	0.0020	0.0023	0.0021	0.0023	0.0021	0.0024
120	LANDFILLS	0.1390	0.0046	0.1823	0.0061	0.2152	0.0072
130	INCINERATORS	0.0004	0.0039	0.0004	0.0040	0.0004	0.0041
140	SOIL REMEDIATION	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
199	OTHER (WASTE DISPOSAL)	0.0000	0.0000	0.0313	0.0000	0.0313	0.0000
	Waste Disposal Total	**0.1414**	**0.0108**	**0.2161**	**0.0124**	**0.2490**	**0.0137**
Cleaning and Surface Coatings							
210	LAUNDERING	0.0063	0.0000	0.0069	0.0000	0.0072	0.0000
220	DEGREASING	1.8800	0.0000	2.0564	0.0000	2.2641	0.0000
230	COATINGS AND RELATED PROCESS SOLVENTS	2.0500	0.0000	2.8587	0.0000	3.3834	0.0000
240	PRINTING	0.4775	0.0000	0.5193	0.0000	0.4847	0.0000
250	ADHESIVES AND SEALANTS	0.8300	0.0000	0.7491	0.0000	0.6936	0.0000
299	OTHER (CLEANING AND SURFACE COATINGS)	0.1056	0.0000	0.1566	0.0000	0.1873	0.0000
	Cleaning and Surface Coatings Total	**5.3494**	**0.0000**	**6.3470**	**0.0000**	**7.0203**	**0.0000**
Petroleum Production and Marketing							
310	OIL AND GAS PRODUCTION	2.1050	0.0667	1.8752	0.0575	1.7274	0.0519
320	PETROLEUM REFINING	0.0407	0.0002	0.0290	0.0001	0.0232	0.0001
330	PETROLEUM MARKETING	0.5224	0.0000	0.5502	0.0000	0.5597	0.0000
	Petroleum Production and Marketing Total	**2.6681**	**0.0669**	**2.4544**	**0.0576**	**2.3103**	**0.0520**
Industrial Processes							
410	CHEMICAL	0.0155	0.0000	0.0108	0.0000	0.0108	0.0000
420	FOOD AND AGRICULTURE	0.1124	0.0000	0.1525	0.0000	0.1689	0.0000
430	MINERAL PROCESSES	0.0043	0.0348	0.0043	0.0348	0.0043	0.0348
440	METAL PROCESSES	NA	NA	NA	NA	NA	NA
450	WOOD AND PAPER	NA	NA	NA	NA	NA	NA
470	ELECTRONICS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
499	OTHER (INDUSTRIAL PROCESSES)	0.0959	0.0839	0.1483	0.0840	0.1483	0.0840
	Industrial Processes Total	**0.2281**	**0.1187**	**0.3159**	**0.1188**	**0.3323**	**0.1188**
	STATIONARY SOURCES TOTAL	**8.8483**	**7.6077**	**9.6875**	**6.1210**	**9.9119**	**6.1135**

TABLE 6-5 SANTA BARBARA COUNTY EMISSION INVENTORY	2007 ROC *(tons per day)*	2007 NO_X *(tons per day)*	2020 ROC *(tons per day)*	2020 NO_X *(tons per day)*	2030 ROC *(tons per day)*	2030 NO_X *(tons per day)*

AREA-WIDE SOURCES

Solvent Evaporation

510	CONSUMER PRODUCTS	2.7200	0.0000	2.8986	0.0000	2.9171	0.0000
520	ARCHITECTURAL COATINGS AND SOLVENTS	1.2200	0.0000	1.5756	0.0000	1.6845	0.0000
530	PESTICIDES/FERTILIZERS	3.2200	0.0000	3.4295	0.0000	4.1508	0.0000
540	ASPHALT PAVING/ROOFING	0.2348	0.0000	0.2997	0.0000	0.3017	0.0000
	Solvent Evaporation Total	**7.3948**	**0.0000**	**8.2034**	**0.0000**	**9.0541**	**0.0000**

Miscellaneous

610	RESIDENTIAL FUEL COMBUSTION	0.0368	0.9098	0.1586	0.8004	0.1663	0.7795
620	FARMING OPERATIONS	0.8768	0.0000	0.8768	0.0000	0.8768	0.0000
630	CONSTRUCTION AND DEMOLITION	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
640	PAVED ROAD DUST	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
645	UNPAVED ROAD DUST	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
650	FUGITIVE WINDBLOWN DUST	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
660	FIRES	0.0000	0.0000	0.0039	0.0012	0.0041	0.0013
670	MANAGED BURNING AND DISPOSAL	0.0225	0.0016	1.3537	0.5392	1.3596	0.5392
690	COOKING	0.0283	0.0000	0.0332	0.0000	0.0368	0.0000
699	OTHER (MISCELLANEOUS PROCESSES)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Miscellaneous Total	**0.9644**	**0.9114**	**2.4262**	**1.3408**	**2.4436**	**1.3200**

	AREA-WIDE SOURCES TOTAL	**8.3592**	**0.9114**	**10.6296**	**1.3408**	**11.4977**	**1.3200**

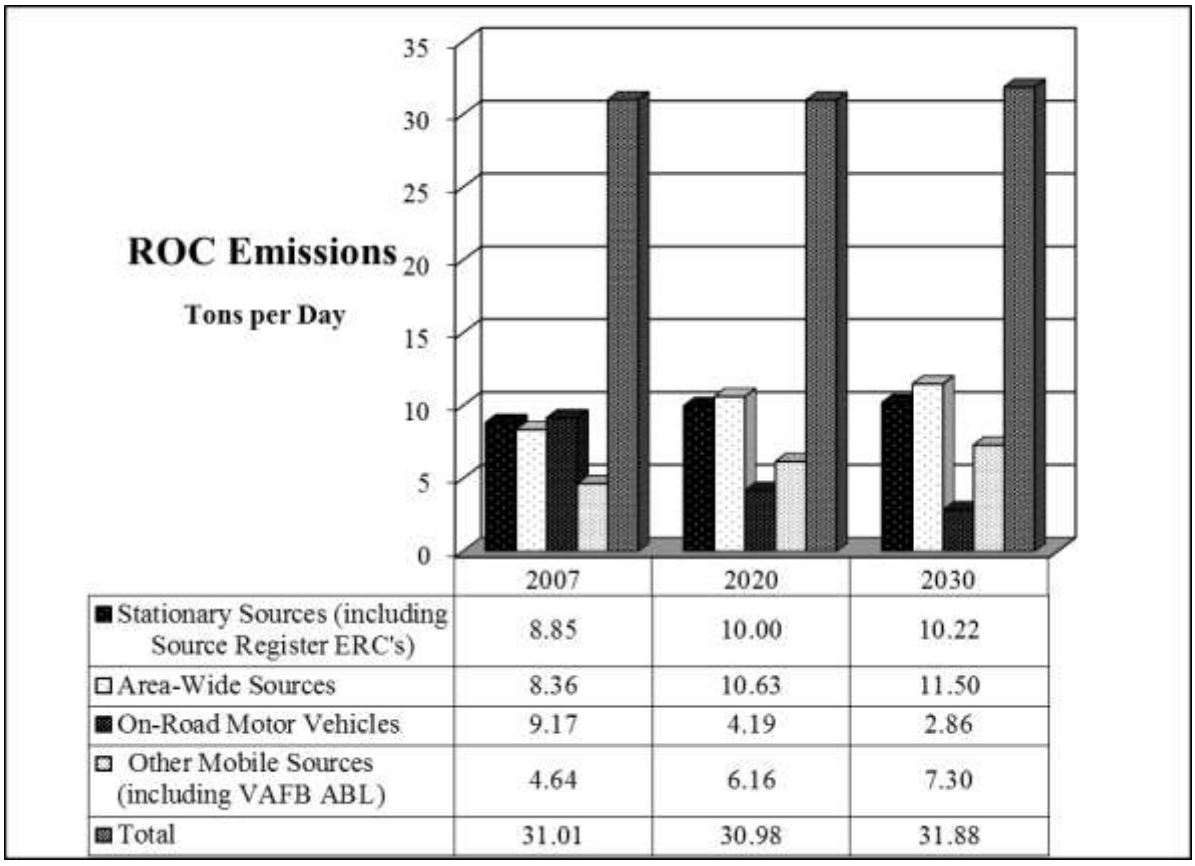
TABLE 6-5 SANTA BARBARA COUNTY EMISSION INVENTORY		2007 ROC *(tons per day)*	2007 NO_X *(tons per day)*	2020 ROC *(tons per day)*	2020 NO_X *(tons per day)*	2030 ROC *(tons per day)*	2030 NO_X *(tons per day)*
MOBILE SOURCES							
On-Road Motor Vehicles							
710	LIGHT DUTY PASSENGER	3.6800	3.0100	1.1600	0.8100	0.6700	0.3900
722	LIGHT DUTY TRUCKS – 1	1.9000	1.8800	0.9200	0.7000	0.4900	0.2700
723	LIGHT DUTY TRUCKS – 2	1.5300	2.1900	0.8800	0.8600	0.6700	0.4500
724	MEDIUM DUTY TRUCKS	0.4100	0.8000	0.2900	0.3500	0.2400	0.1900
732	LIGHT HEAVY DUTY GAS TRUCKS – 1	0.1800	0.3100	0.1200	0.2800	0.1100	0.2500
733	LIGHT HEAVY DUTY GAS TRUCKS – 2	0.2000	0.2500	0.0900	0.1400	0.0500	0.1100
734	MEDIUM HEAVY DUTY GAS TRUCKS	0.2400	0.3100	0.0600	0.1200	0.0400	0.0600
736	HEAVY HEAVY DUTY GAS TRUCKS	0.1900	0.6300	0.0500	0.1300	0.0200	0.0500
742	LIGHT HEAVY DUTY DIESEL TRUCKS – 1	0.0100	0.3800	0.0000	0.1400	0.0000	0.0800
743	LIGHT HEAVY DUTY DIESEL TRUCKS – 2	0.0100	0.3300	0.0100	0.1400	0.0000	0.0800
744	MEDIUM HEAVY DUTY DIESEL TRUCKS	0.0300	2.0500	0.0300	0.7400	0.0200	0.4100
746	HEAVY HEAVY DUTY DIESEL TRUCKS	0.1600	2.7700	0.0700	0.9700	0.0500	0.6400
750	MOTORCYCLES	0.5400	0.1600	0.4400	0.1500	0.4600	0.1500
760	HEAVY DUTY DIESEL URBAN BUSES	0.0100	0.3200	0.0100	0.2600	0.0100	0.2200
762	HEAVY DUTY GAS URBAN BUSES	0.0200	0.0300	0.0300	0.0300	0.0100	0.0200
770	SCHOOL BUSES	0.0100	0.3400	0.0100	0.3200	0.0100	0.2800
776	OTHER BUSES	0.0200	0.1300	0.0100	0.0600	0.0100	0.0400
780	MOTOR HOMES	0.0300	0.1700	0.0100	0.0800	0.0000	0.0300
	On-Road Motor Vehicles Total	**9.1700**	**16.0600**	**4.1900**	**6.2800**	**2.8600**	**3.7200**
Other Mobile Sources							
810	AIRCRAFT	0.3102	0.8321	0.3792	1.0821	0.4270	1.2554
820	TRAINS	0.2100	3.0500	0.1983	2.4922	0.2031	2.4922
830	SHIPS AND COMMERCIAL BOATS	0.0431	0.5552	0.0497	0.3663	0.0484	0.3184
840	RECREATIONAL BOATS	0.8200	0.1000	0.4809	0.0979	0.5736	0.1320
850	OFF-ROAD RECREATIONAL VEHICLES	0.6082	0.0824	3.1339	0.1585	4.3873	0.1871
860	OFF-ROAD EQUIPMENT	1.8376	7.1021	1.4702	3.5093	1.3481	2.5026
870	FARM EQUIPMENT	0.4368	2.4862	0.2238	1.2542	0.1416	0.6001
890	FUEL STORAGE AND HANDLING	0.3700	0.0000	0.1994	0.0000	0.1520	0.0000
	Other Mobile Sources Total	**4.6359**	**14.2080**	**6.1354**	**8.9605**	**7.2811**	**7.4878**
	MOBILE SOURCES TOTAL	**13.8059**	**30.2680**	**10.3254**	**15.2405**	**10.1411**	**11.2078**
	SOURCE REGISTER EMISSION REDUCTION CREDITS	**NA**	**NA**	**0.3077**	**0.6212**	**0.3077**	**0.6212**
	VANDENBERG AIR FORCE BASE UAV PROGRAM	**NA**	**NA**	**0.0236**	**0.1448**	**0.0236**	**0.1448**
	SANTA BARBARA COUNTY TOTAL	**31.0134**	**38.7871**	**30.9738**	**23.4683**	**31.8820**	**19.4073**

TABLE 6 – 6 OUTER CONTINENTAL SHELF EMISSIONS INVENTORY		2007 ROC *(tons per day)*	2007 NO_x *(tons per day)*	2020 ROC *(tons per day)*	2020 NO_x *(tons per day)*	2030 ROC *(tons per day)*	2030 NO_x *(tons per day)*
Fuel Combustion							
030	OIL AND GAS PRODUCTION (COMBUSTION)	0.0284	0.5706	0.0284	0.5640	0.0284	0.5640
	Fuel Combustion Total	**0.0284**	**0.5706**	**0.0284**	**0.5640**	**0.0284**	**0.5640**
Cleaning and Surface Coatings							
230	COATINGS AND RELATED PROCESS SOLVENTS	0.0355	0.0000	0.0355	0.0000	0.0355	0.0000
	Cleaning and Surface Coatings Total	**0.0355**	**0.0000**	**0.0355**	**0.0000**	**0.0355**	**0.0000**
Petroleum Production and Marketing							
310	OIL AND GAS PRODUCTION	0.7654	0.0129	0.7654	0.0129	0.7654	0.0129
	Petroleum Production and Marketing Total	**0.7654**	**0.0129**	**0.7654**	**0.0129**	**0.7654**	**0.0129**
	STATIONARY SOURCES TOTAL	**0.8293**	**0.5835**	**0.8293**	**0.5769**	**0.8293**	**0.5769**
MOBILE SOURCES							
Other Mobile Sources							
810	AIRCRAFT	0.0092	0.0040	0.0092	0.0040	0.0092	0.0040
830	SHIPS AND COMMERCIAL BOATS	1.6758	49.2576	1.6115	48.6142	1.6075	42.1919
840	RECREATIONAL BOATS	0.8200	0.1000	0.4809	0.0979	0.5736	0.1320
	Other Mobile Sources Total	**2.5050**	**49.3616**	**2.1016**	**48.7161**	**2.1903**	**42.3279**
	MOBILE SOURCES TOTAL	**2.5050**	**49.3616**	**2.1016**	**48.7161**	**2.1903**	**42.3279**
	OUTER CONTINENTAL SHELF TOTAL	**3.3343**	**49.9451**	**2.9309**	**49.2930**	**3.0196**	**42.9048**

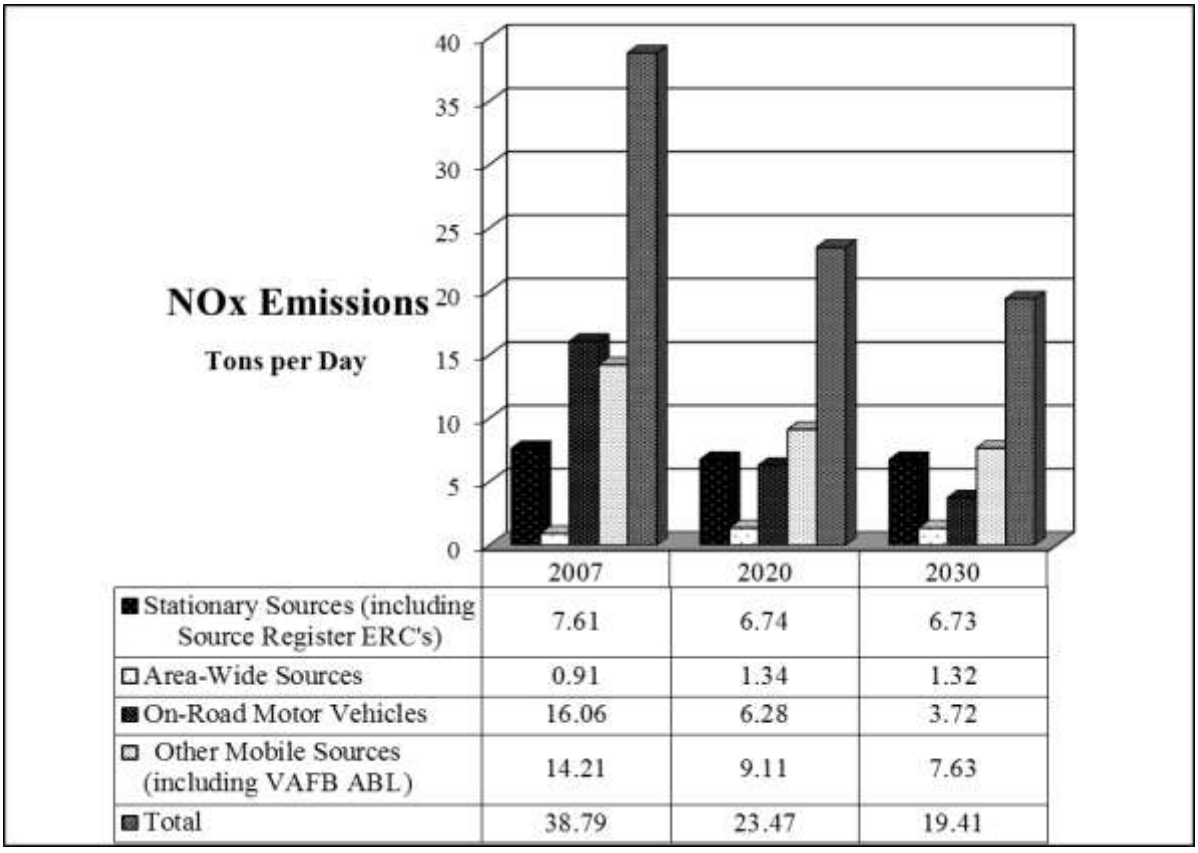
TABLE 6-7
2010 CLEAN AIR PLAN ACTIVITY INDICATORS AND FACTORS FOR 2020 AND 2030

ACTIVITY INDICATOR	UNITS	VALUE			FACTOR		INFORMATION SOURCE
		2007	2020	2030	2020	2030	
Agricultural Acres	Acres	132,434	110,826	131,334	0.8368	0.9917	Agricultural Commissioner's Crop Reports
Aircraft Operations	Operations	259,746	340,383	396,238	1.3104	1.5255	Airport Master Plans / SBCAG RTP
Daily Vehicle Miles	1,000 Miles Traveled	10,346	11,515	11,852	1.1130	1.1456	SBCAG Travel Model
EMP. - Commercial	Employees	103,180	121,150	134,250	1.1742	1.3011	SBCAG 2007 RGF
EMP. - Industrial	Employees	24,506	24,500	24,500	0.9998	0.9998	SBCAG 2007 RGF
EMP. - Public Services	Employees	39,650	40,950	41,950	1.0328	1.0580	SBCAG 2007 RGF
Housing	Households	149,022	157,648	164,422	1.0579	1.1033	SBCAG 2007 RGF
Landfills	1,000 Tons Waste in Place	19,022	24,950	29,442	1.3116	1.5478	Local Solid Waste Agencies
Locomotives	Annual Train Passages	10,038	16,729	16,729	1.6666	1.6666	AMTRAK/Union Pacific
No Growth	No Units	1	1	1	1.0000	1.0000	APCD
OCS Production	No Units	1	1	1	1.0000	1.0000	APCD Community Advisory Council
Petroleum Production	1,000 Barrels Oil	3,178	2,267	1,813	0.7133	0.5705	CA Division of Oil & Gas
Petroleum Wells	Producing & Inactive Wells	2,105	1,903	1,762	0.9040	0.8371	CA Division of Oil & Gas
Population	Residents	422,580	459,600	481,400	1.0876	1.1392	SBCAG 2007 RGF
Prescribed Fires	Acres	1,275	6,250	6,250	4.9020	4.9020	U.S. Forest Service
Ship Activity	1,000 TEU	15,668	21,827	34,563	1.3931	2.2060	Ports of LA and LB

FIGURE 6-1
SANTA BARBARA COUNTY ONSHORE ROC & NO_X EMISSIONS

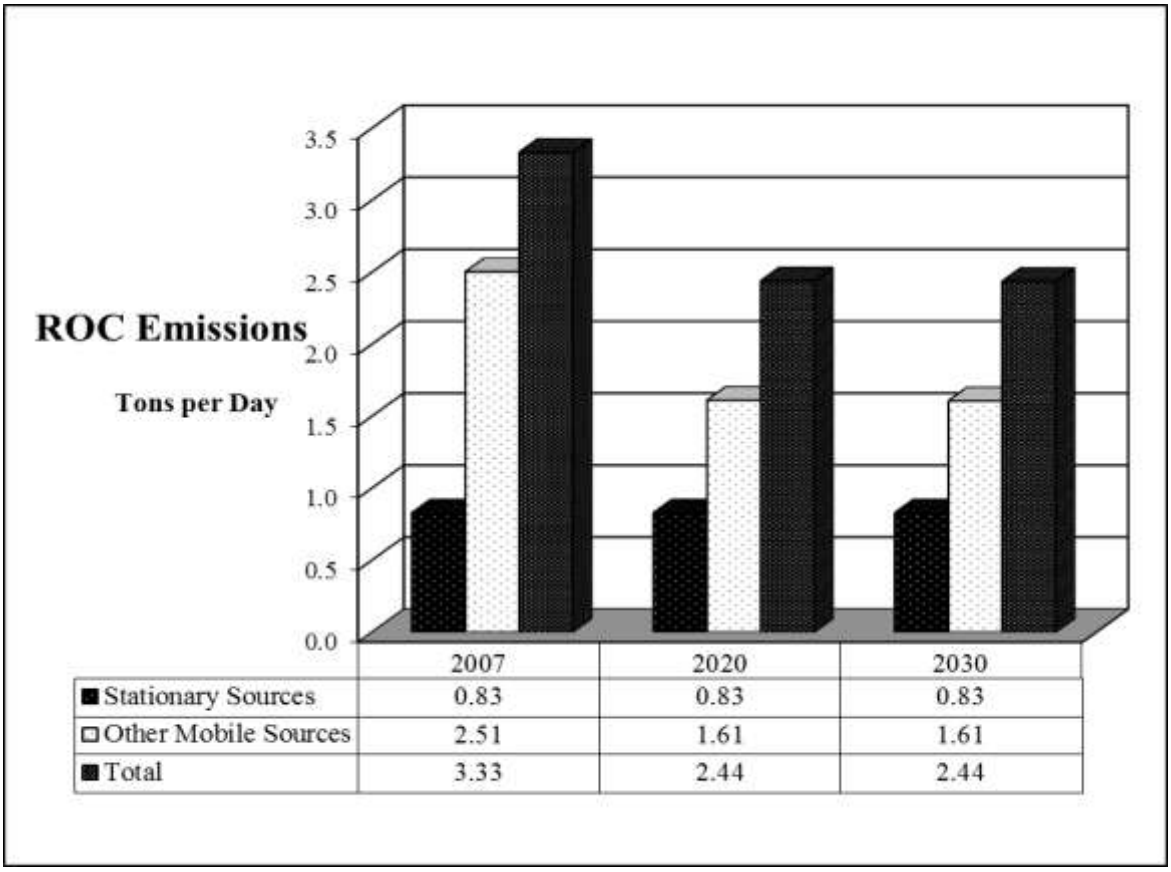


	2007	2020	2030
Stationary Sources (including Source Register ERC's)	8.85	10.00	10.22
Area-Wide Sources	8.36	10.63	11.50
On-Road Motor Vehicles	9.17	4.19	2.86
Other Mobile Sources (including VAFB ABL)	4.64	6.16	7.30
Total	31.01	30.98	31.88

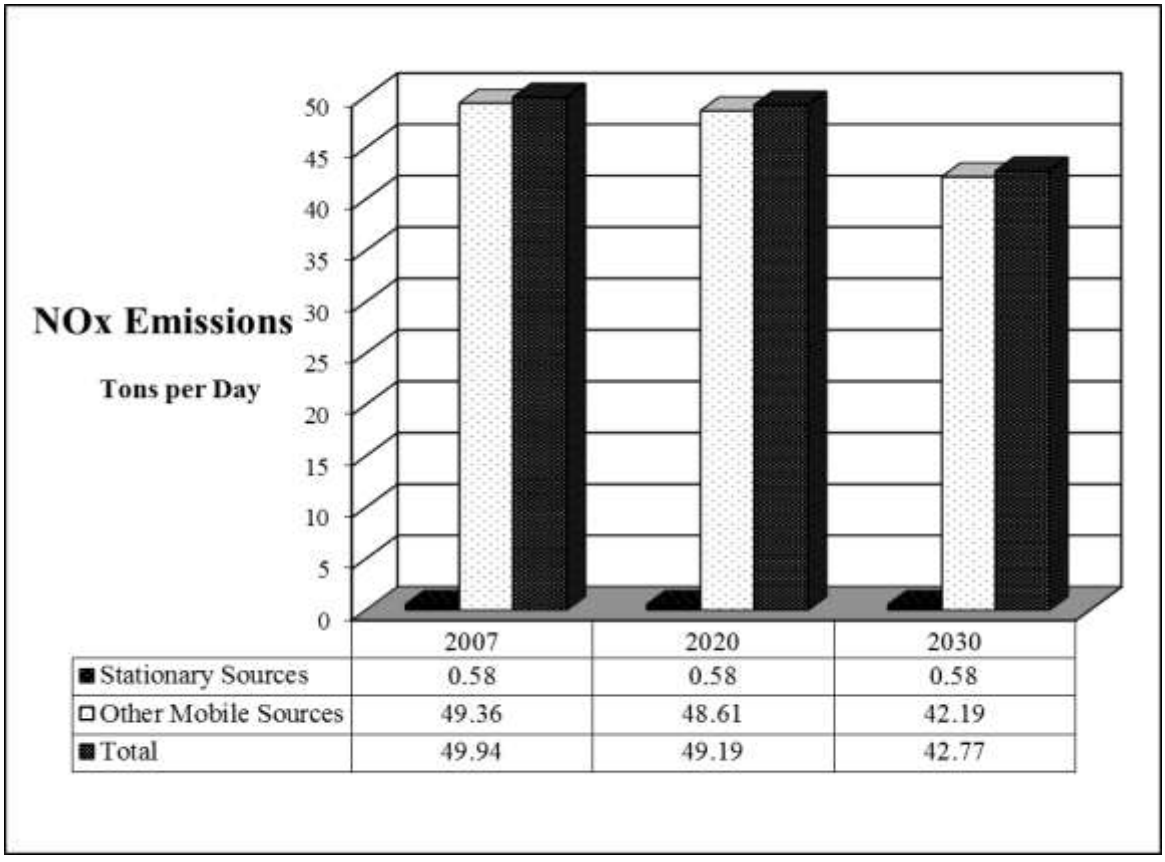


	2007	2020	2030
Stationary Sources (including Source Register ERC's)	7.61	6.74	6.73
Area-Wide Sources	0.91	1.34	1.32
On-Road Motor Vehicles	16.06	6.28	3.72
Other Mobile Sources (including VAFB ABL)	14.21	9.11	7.63
Total	38.79	23.47	19.41

FIGURE 6-2
OCS ROC & NO_X EMISSIONS

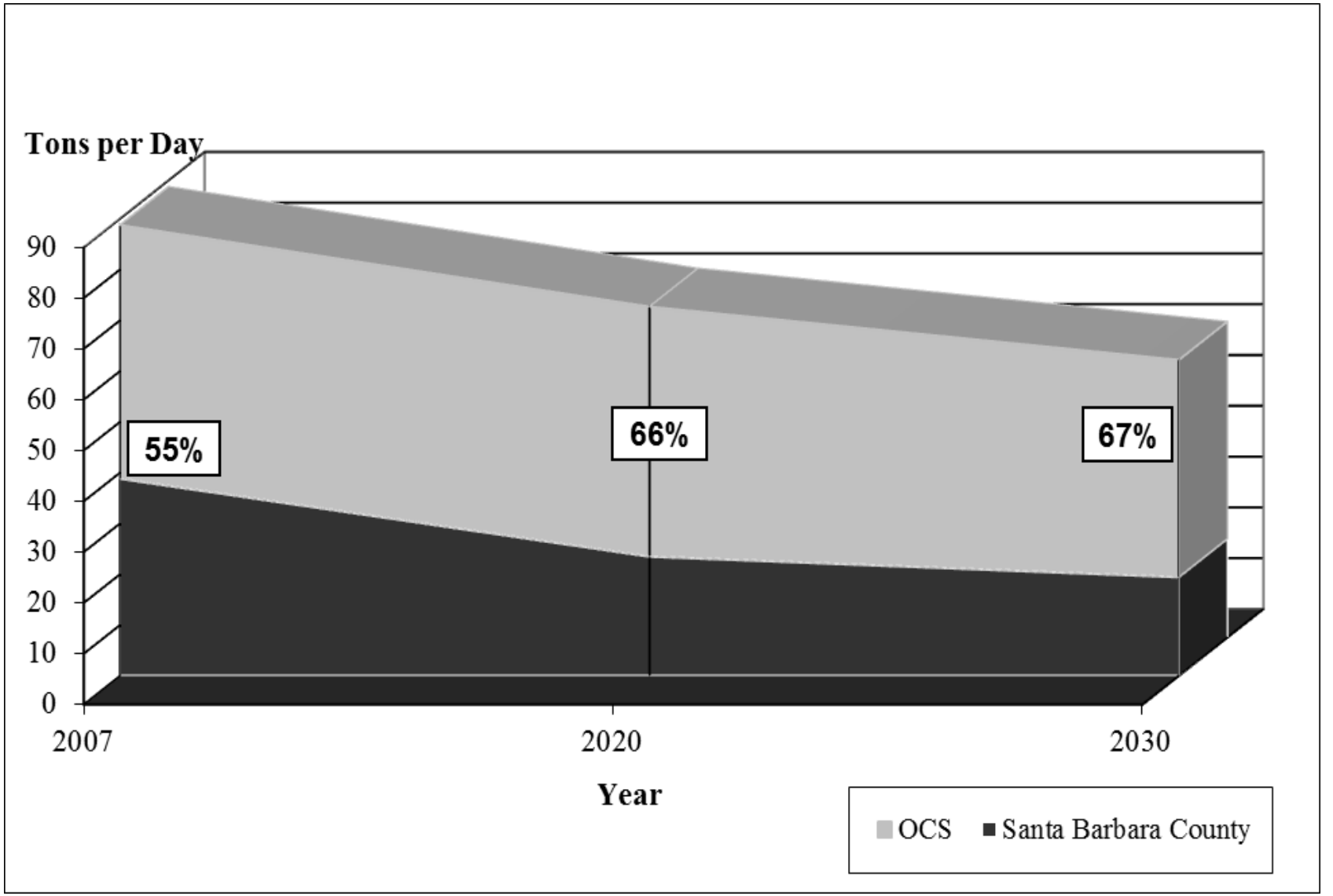


	2007	2020	2030
Stationary Sources	0.83	0.83	0.83
Other Mobile Sources	2.51	1.61	1.61
Total	3.33	2.44	2.44



	2007	2020	2030
Stationary Sources	0.58	0.58	0.58
Other Mobile Sources	49.36	48.61	42.19
Total	49.94	49.19	42.77

FIGURE 6-3
SANTA BARBARA COUNTY AND OCS NO_X EMISSIONS FORECAST INCLUDING MARINE VESSELS



*** Percentage of total NO_x emissions from Other Mobile Sources – Foreign and US Ships-in-Transit.**

FIGURE 6-4
SANTA BARBARA COUNTY AND OCS NO_X EMISSIONS FORECAST MARINE VESSELS EXCLUDED

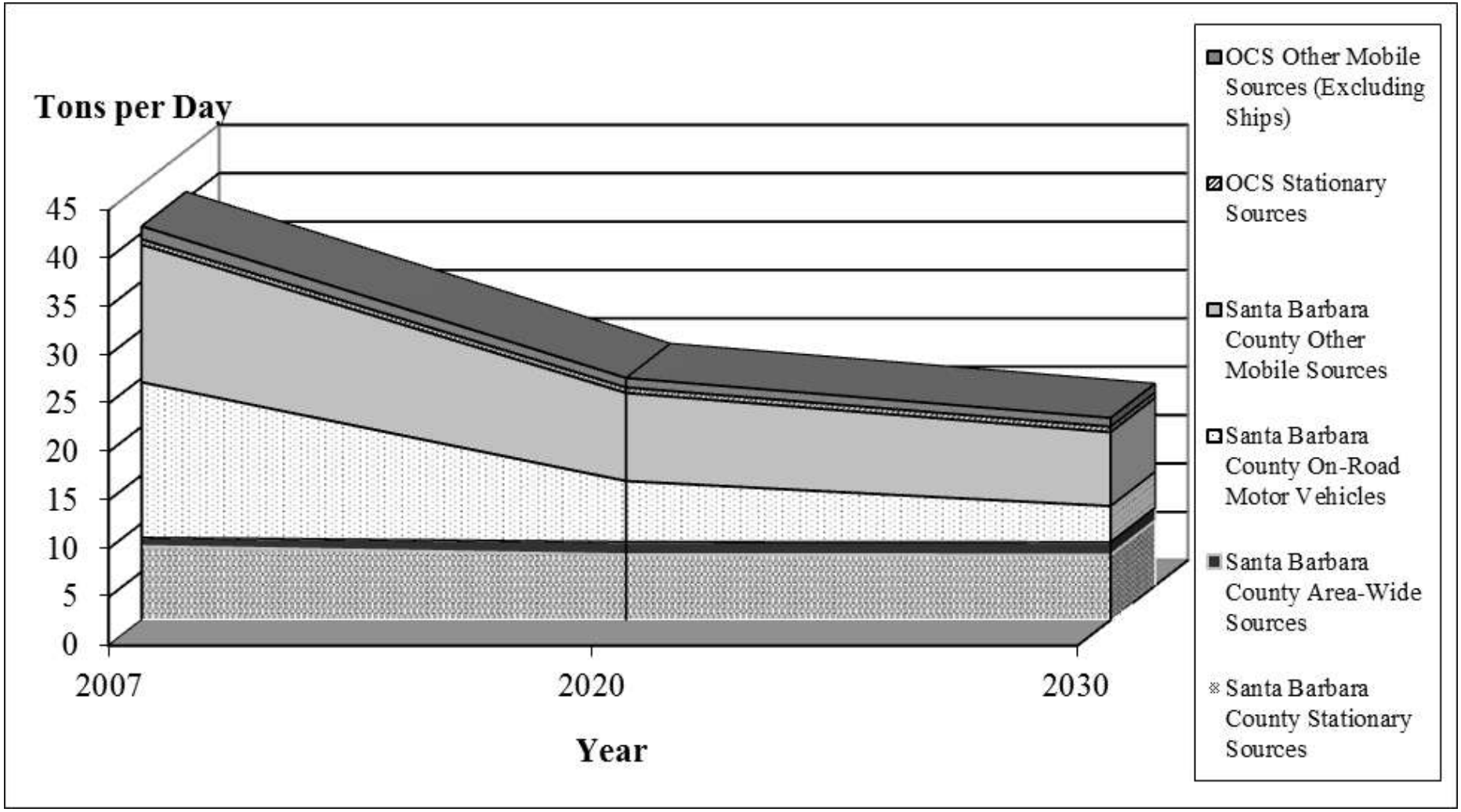
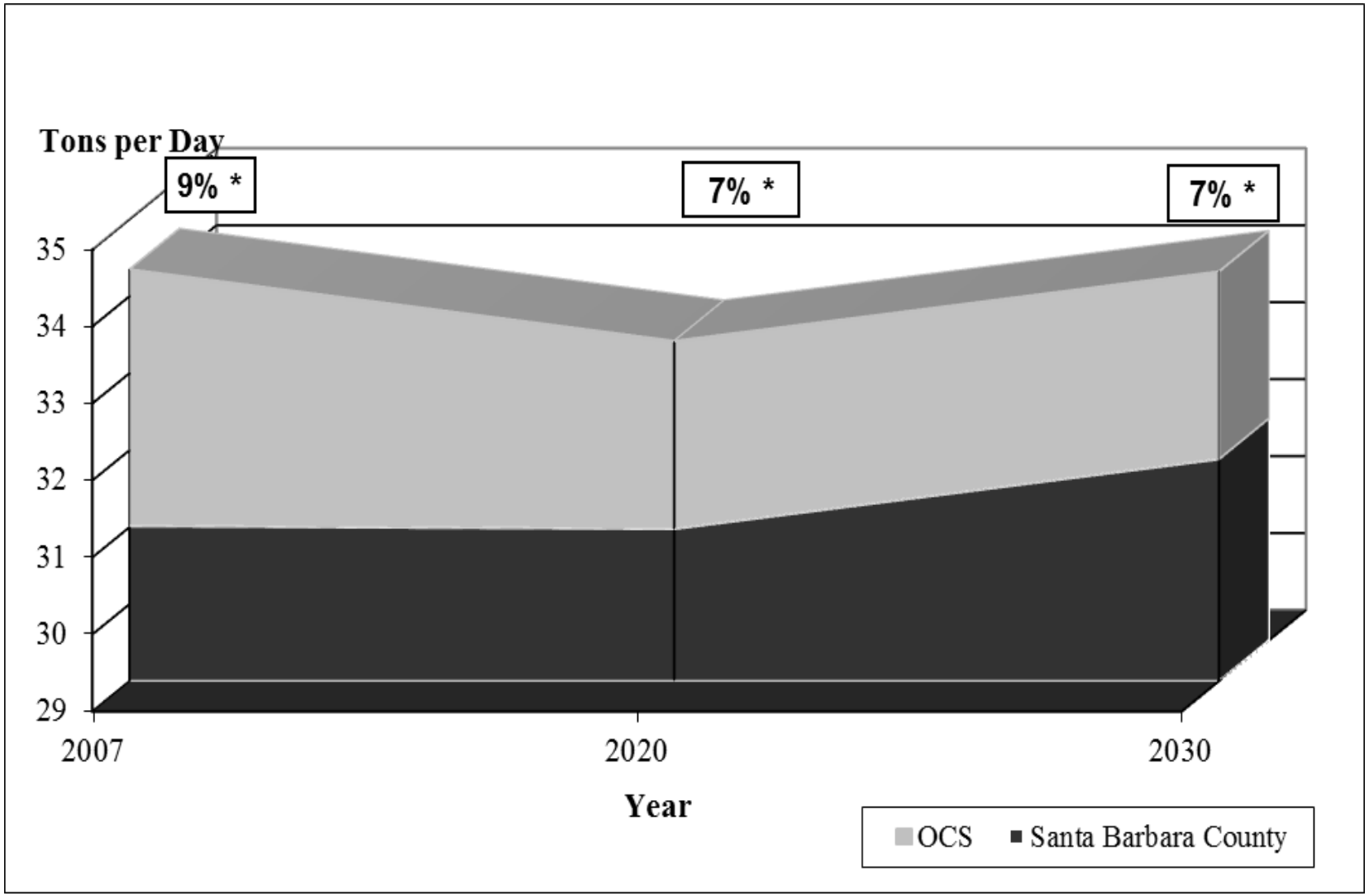


FIGURE 6-5
SANTA BARBARA COUNTY AND OCS ROC EMISSIONS FORECAST INCLUDING MARINE VESSELS



*** Percentage of total ROC emissions from Other Mobile Sources – Foreign and US Ships-in-Transit.**

FIGURE 6-6
SANTA BARBARA COUNTY AND OCS ROC EMISSIONS FORECAST MARINE VESSELS EXCLUDED

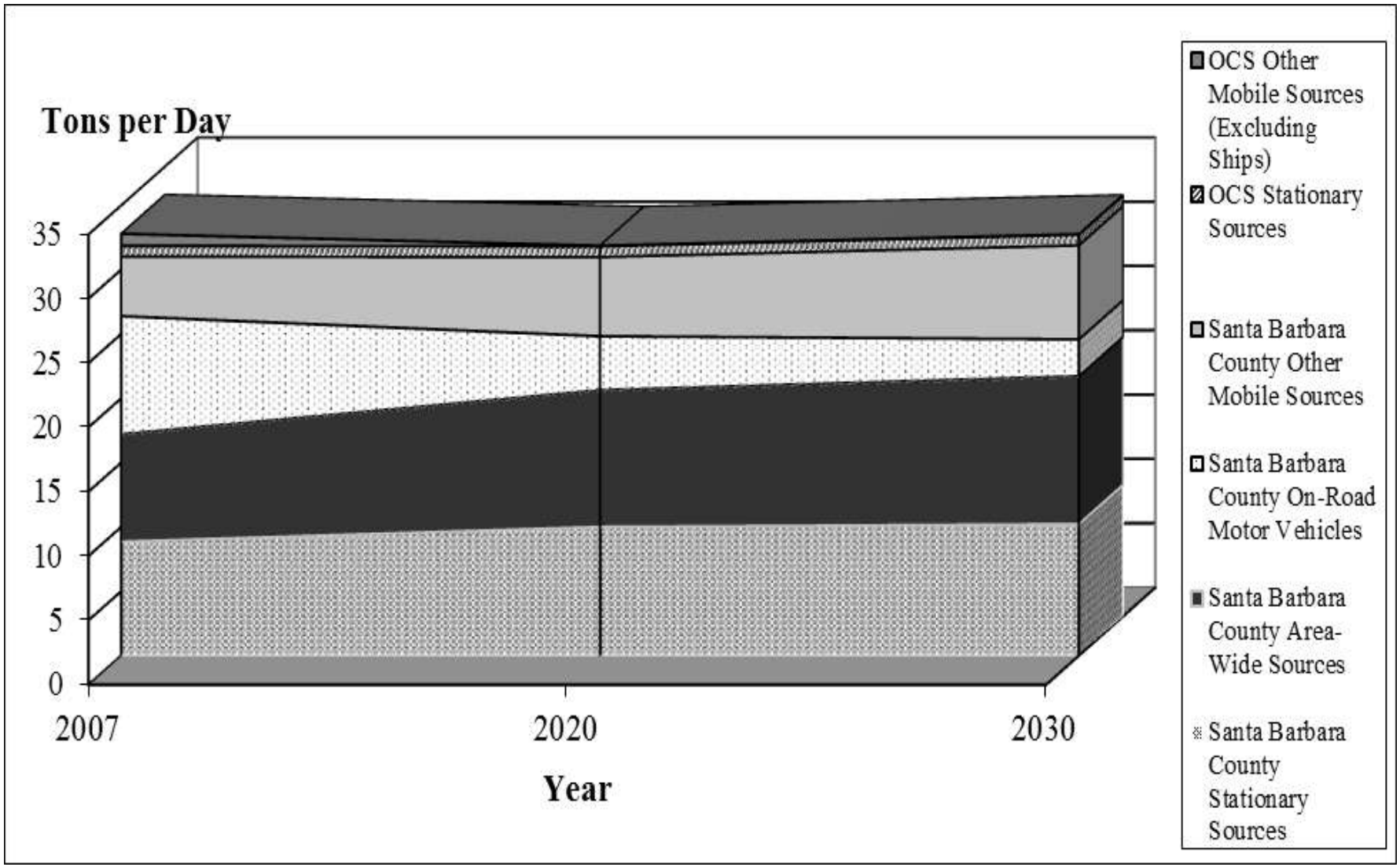
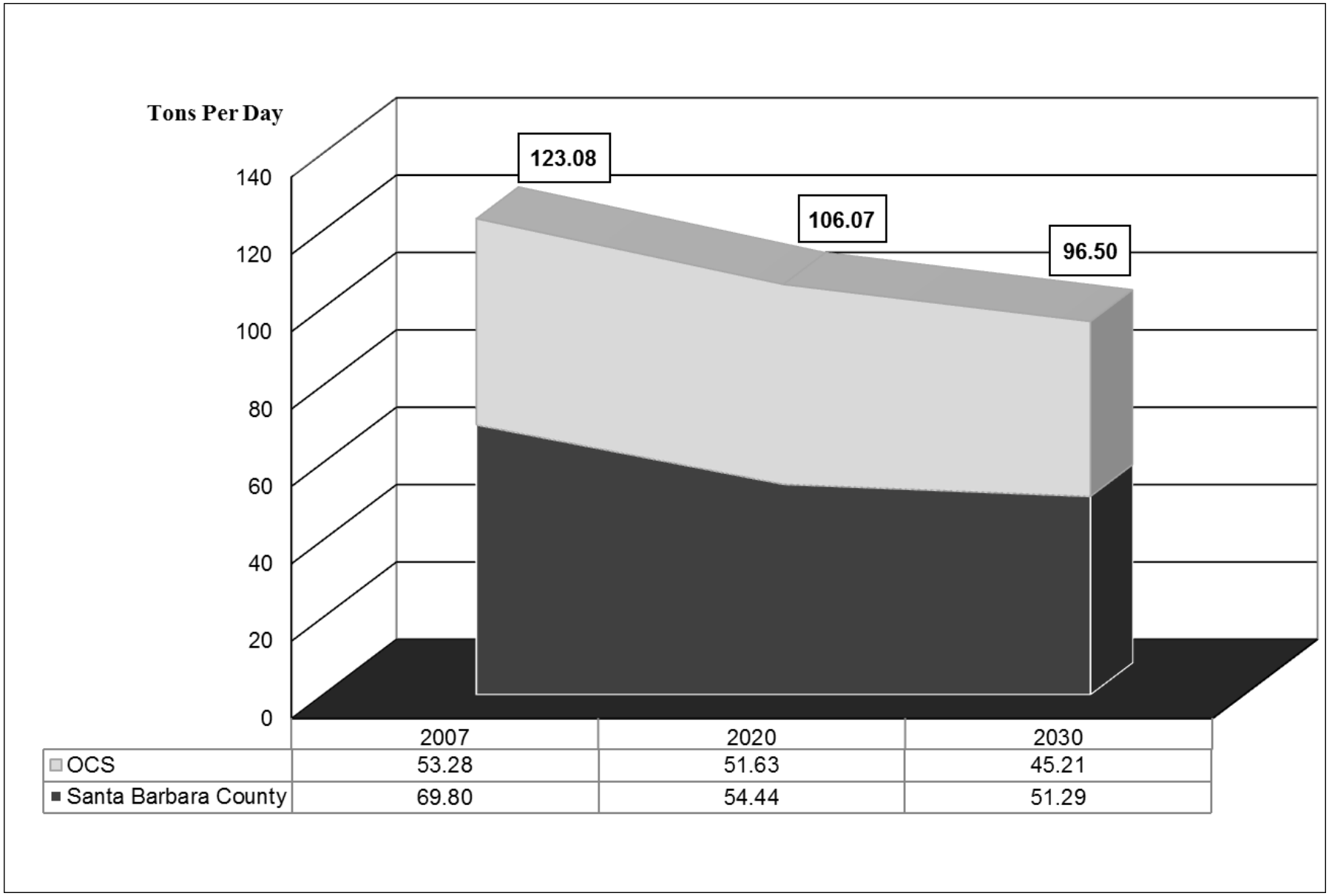
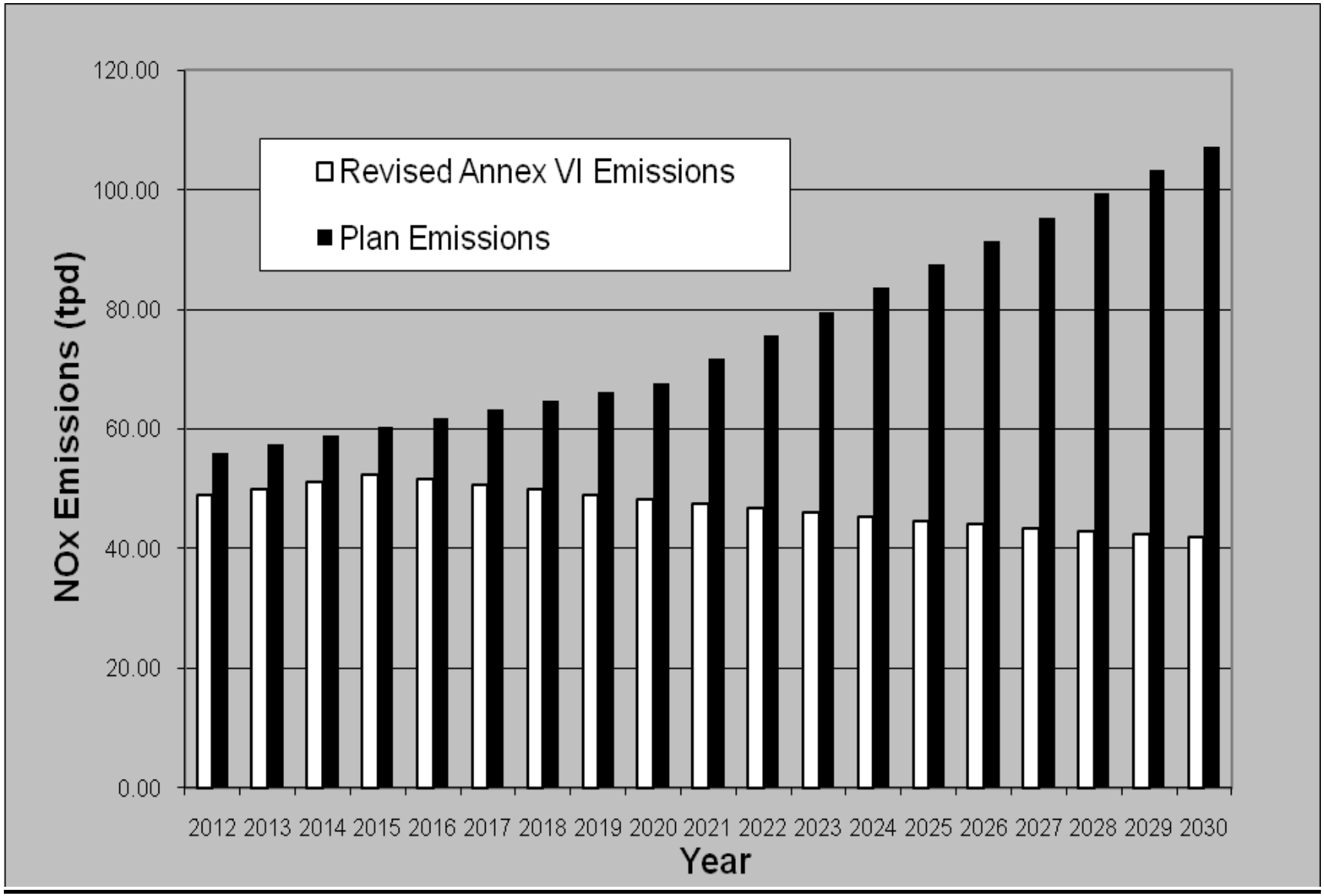


FIGURE 6-7
SANTA BARBARA COUNTY AND OCS ROC AND NO_X EMISSIONS



	2007	2020	2030
OCS	53.28	51.63	45.21
Santa Barbara County	69.80	54.44	51.29

FIGURE 6-8
POTENTIAL MARINE SHIPPING NO_x EMISSIONS BASED ON MARPOL ANNEX VI REVISIONS COMPARISON TO CURRENT MARINE SHIPPING NO_x EMISSION FORECASTS



CHAPTER 7

STATE CLEAN AIR ACT REQUIREMENTS

- INTRODUCTION
- CALIFORNIA CLEAN AIR ACT MANDATES
- CONCLUSION

7. STATE CLEAN AIR ACT REQUIREMENTS

7.1 INTRODUCTION

This 2010 Clean Air Plan (2010 Plan) is being prepared by the Santa Barbara County Air Pollution Control District (APCD) to satisfy various mandates of the California Clean Air Act of 1988 (CCAA). This chapter presents an overview of all state clean air act requirements and discusses how the work completed in conjunction with this 2010 Plan complies with all applicable requirements.

7.2 CALIFORNIA CLEAN AIR ACT MANDATES

As indicated previously, an integral objective of this 2010 Plan is to satisfy the requirements of the California Clean Air Act. The APCD is required to submit a triennial progress report and a triennial update to the 1991 Air Quality Attainment Plan under the provisions of the CCAA.

7.2.1 TRIENNIAL PROGRESS REPORT

Section 40924(b) of the California Health and Safety Code (H&SC) requires the APCD to conduct an assessment of its air quality control program every three years, starting in 1994. This assessment must address the expected and revised emission reductions scheduled for adoption during the previous three years. This triennial report must also include an assessment of progress based on monitored pollutant levels, modeling techniques and air quality indicators.

The emission control measures are presented in *Chapters 4* and *Chapter 5*. In addition, Table 7-1 summarizes APCD rule activity from 2007 – 2009. A summary of ambient air quality data and the air quality indicators for Santa Barbara County is presented in *Chapter 2*.

7.2.2 TRIENNIAL PLAN REVISION

H&SC Section 40925(a) requires the APCD to review and revise its attainment plan at least once every three years, beginning in 1994. The review and revisions are to correct for any deficiencies in meeting the interim measures of progress incorporated into the plan pursuant to **Section 40914** [emission reductions], and to incorporate new data or projections.

Correct Deficiencies in Meeting Interim Measures of Progress: The APCD has not identified any significant deficiencies in meeting the 1991 AQAP rule adoption schedule. *Chapters 4* and *Chapter 5* present a discussion of the stationary source and transportation control measures as well as an updated adoption schedule for each proposed control measure.

Incorporate New Data and Projections: This plan includes a reassessment of emission growth forecasts and control measure effectiveness estimates presented in *Chapter 4*, *Chapter 5*, and *Chapter 6*.

7.2.3 OVERALL PLAN REQUIREMENTS

Sections 40912 through 40922 of the H&SC specify overall requirements that apply to any plan submitted to the ARB to satisfy the State Act requirements. The requirements applicable to Santa Barbara County are discussed below.

Transport Mitigation (H&SC Section 40912): Prior to 2004 Santa Barbara County was identified as a transport contributor (as part of the South Central Coast Air Basin) to the South Coast Air Basin. The APCD satisfied the transport mitigation requirements through the application of Best Available Retrofit Control Technology (BARCT) requirements by January 1, 1994. In 2004, ARB re-assessed transport impacts of Santa Barbara County to the South Coast and found our contribution to 2000 through 2003 South Coast exceedances to be "inconsequential".

Cost Effective Strategy (H&SC Section 40913(b)): A cost effectiveness analysis of the control measures is included in *Chapter 4* and Appendix C of the 1991 AQAP and Appendix B of the 2001 Plan. For control measures which are newly proposed in Chapter 5 of this 2010 Plan (i.e., those measures not proposed in the 2007 Plan), these measures have been implemented in other air districts and are thus assumed to be cost-effective. A detailed cost-effectiveness study of each measure will be conducted during the rulemaking process.

Annual Emissions Reduction (H&SC Section 40914): The APCD must demonstrate a reduction in APCD emissions of five percent or more per year for each nonattainment pollutant averaged over every consecutive three-year period. In the 1991 AQAP, the APCD identified every feasible control measure in lieu of the five percent annual emission reduction requirement. The 1998 Clean Air Plan was conditionally approved by the ARB (Resolution 99-2b) with the requirement that APCD provide a schedule to review the further study measures identified in the plan, complete this review, and make any appropriate rulemaking commitments based on this review. This-2010 Plan includes the results of this review and identifies every feasible measure in *Chapter 4* and *Chapter 5*.

Contingency Measures (H&SC Section 40915): Contingency measures are to be implemented in the event the ARB finds that the APCD fails to meet interim goals or maintain adequate progress towards attainment. Proposed contingency measures are discussed in *Chapter 4* and *Chapter 5*.

Moderate Air Pollution Areas (H&SC Section 40918(a)): The attainment plan must include the following:

(1) A stationary source control program which achieves no net emission increases for sources which emit or have the potential to emit 25 tons per year of any nonattainment pollutant;
(2) Stationary sources which emit more than 250 tons per year must be equipped with best available retrofit control technology;
(3) Reasonable available transportation control measures;
(4) Provisions to develop an area-wide source and indirect source programs;
(5) An emissions inventory system; and
(6) Public education programs.

APCD Regulations II (Permits) and III (Prohibitions) fulfill the first two requirements. Transportation control measures that are described in *Chapter 5* of this document fulfill the third

requirement. The APCD has an inventory system in place that was utilized to prepare the emissions inventory presented in *Chapter 3* to fulfill the fifth requirement. The fourth and sixth requirements are fulfilled with the APCD public education, area-wide and indirect source, and other programs, which are described in *Chapter 8* of the 2001 Plan.

Control Measure Cost-Effectiveness (H&SC Section 40922): Analysis of control measure cost effectiveness was included in *Chapter 4* of the 1991 AQAP and in Appendix B of the 2001 Plan. For control measures which are newly proposed in Chapter 5 of this 2010 Plan (i.e., those measures not proposed in the 2007 Plan), these measures have been implemented in other air districts and are thus assumed to be cost-effective. A detailed cost-effectiveness study of each measure will be conducted during the rulemaking process.

7.3 CONCLUSION

This 2010 Plan was prepared by the Santa Barbara County APCD to address all applicable state mandates. Specifically, this 2010 Plan provides for the expeditious attainment of the state 8- hour ozone standard and maintenance of the state 1-hour ozone standard. Moreover, this 2010 Plan complies with all applicable sections of the California Health and Safety Code.

TABLE 7-1

SANTA BARBARA COUNTY APCD RULE ACTIVITY FROM 2007--2009 SUMMARY OF MEASURES (RULES ADOPTED OR IMPLEMENTED)					
Rule #	**CAP ID#**	**Description**	**Adoption Date**	**Implementation Date**	**Comments**
361	N-XC-4	Small industrial and commercial boilers, steam generators and process heaters (> 2 MMBtu/hr to < 5 MMBtu/hr)	January 2008	January 2008	This is a new phase-in rule with a final compliance date of January 2010
333	N-IC-1 N-IC-3	Control of Emissions from Engines	June 2008	June 2008	This is a rule revision in response to ARB and EPA concerns
339	R-SC-4	Motor vehicle and mobile equipment surface preparation and coating operations	June 2008	January 2009	This is a rule revision with revised solvent cleaning requirements and solvent coating ROC content limits

CHAPTER 8

STATE MANDATED TRIENNIAL PROGRESS REPORT AND TRIENNIAL PLAN REVISION

- INTRODUCTION
- TRIENNIAL PROGRESS REPORT
- TRANSPORTATION PERFORMANCE STANDARDS
- TRIENNIAL PLAN REVISION
- STATE 8-HOUR OZONE STANDARD

8. STATE MANDATED TRIENNIAL PROGRESS REPORT AND TRIENNIAL PLAN REVISION

8.1 INTRODUCTION

The California Clean Air Act requires that we report our progress in meeting state mandates and revise our 1991 Air Quality Attainment Plan (1991 AQAP) to reflect changing conditions. Our 1994 CAP, 1998 CAP, 2001 CAP and 2007 CAP addressed these state requirements. This chapter summarizes how this 2010 Plan satisfies the triennial update requirements of the California Clean Air Act.

This chapter will discuss each state triennial requirement and refer to the chapters in this document where the information complying with state requirements can be found. There are two major items required to be in the triennial update (Sections 40924 and 40925 of the California Health and Safety Code): a Triennial Progress Report and a Triennial Plan Revision. The Triennial Progress Report must assess the overall effectiveness of an air quality program and the extent of air quality improvement resulting from the plan. The Triennial Plan Revision must correct for deficiencies in meeting the interim measures of progress and incorporate new data or projections into the plan.

8.2 TRIENNIAL PROGRESS REPORT

The Triennial Progress Report must assess the overall effectiveness of our air quality program and the extent of air quality improvement resulting from the plan. This 2010 Plan examines the emission reductions achieved from existing regulations. It also examines the change in emissions related to changes in population, industrial activity, vehicle use, and provides updated emission inventories out to 2030.

The control strategy presented in the 1991 AQAP failed to produce the state mandated five percent per year emission reductions, so the plan was approved under the "every feasible measure" option. The most relevant measure of progress is how well the APCD has maintained the schedule of adoption of all feasible controls as presented in that plan. *Chapter 4* and *Chapter 5* of this 2010 Plan document that “every feasible measure” is being adopted as expeditiously as practicable. In addition, *Chapter 4* discusses our rule-making activity from 2007 to 2009.

The State Act also requires that we assess the extent of air quality improvement achieved during the preceding three years, based upon:

1) Ambient pollutant measurements,
2) Best available modeling techniques, and
3) Air quality indicators.

A summary of ambient air quality data and air quality indicators for Santa Barbara County is presented in *Chapter 2.*

8.3 TRANSPORTATION PERFORMANCE STANDARDS

The State Act requires areas classified as having a "moderate" air quality classification for the state 1-hour ozone standard, such as Santa Barbara County, meet the following transportation performance standard: a substantial reduction in the rate of increase in passenger vehicle trips and miles traveled.[1] ARB has defined substantial reduction as holding growth in Vehicle Miles Traveled (VMT) and trips to the same growth rate as population. This would equate to reducing VMT growth rates by more than one half the growth rates experienced during the 1980's. The annual VMT and population growth rates from 1987 to 2007 are discussed in *Chapter 5*.

8.4 TRIENNIAL PLAN REVISION

The Triennial Plan Revision must correct for deficiencies in meeting the interim measures of progress and incorporate new data or projections into the plan. To satisfy these state Triennial Plan Revision requirements, Table 8-1 identifies what is required and how this 2010 Plan complies with the requirement.

8.5 STATE 8-HOUR OZONE STANDARD

CARB has yet to classify areas with respect to the new state 8-hour ozone standard. While our air quality data show that the number of exceedances of this standard has declined significantly from a high of 98 days in 1988 to a low of 12 days in 2008 (see section 2.8), we clearly do not meet the standard. Although CARB has yet to issue any guidance with respect to developing 8-hour ozone standard attainment plans, we believe that the control strategies in this 2010 Plan will expedite progress toward attaining the state 8-hour ozone standard.

[1] Recognizing the close relationship between vehicle trip making activity and VMT, VMT is considered a surrogate for vehicle trips by ARB for State Act performance standard monitoring

TABLE 8-1
TRIENNIAL PLAN REVISION REQUIREMENTS

CCAA MANDATE	APCD SUBMITTAL
Emission Inventory	The updated 2007 attainment emission inventory is presented in *Chapter 3*.
Air Quality Analysis	Discussed in *Chapter 2*.
Control Measures	The control measure strategy is fully described in *Chapter 4* and *Chapter 5*.
Transportation Performance Standards	Discussed in *Chapter 5*
Emission Reductions / All Feasible Measures	All feasible measures have been incorporated into this plan as described in *Chapter 4* and *Chapter 5*.
Expeditious Adoption/Implementation	The schedule of adoption and implementation is provided in *Chapter 4* and *Chapter 5*.
Transport	Discussed in *Chapter 7, Section 7.2.3*.
Cost-Effectiveness	A cost effectiveness analysis of the control measures is included in *Chapter 4* and Appendix C of the 1991 AQAP and Appendix B of the 2001 Plan[1]. http://www.sbcapcd.org/sbc/download01.htm
Contingency Measures	The schedule of adoption of the control measures is included in *Chapters 4* and *Chapter 5*.
Public Education	APCD public education efforts are outlined in *Chapter 8* of the 2001 Plan. http://www.sbcapcd.org/sbc/download01.htm

[1] For control measures which are newly proposed in Chapter 5 of this 2010 Plan (i.e., those measures not proposed in the 2007 Plan), these measures have been implemented in other air districts and are thus assumed to be cost-effective. A detailed cost-effectiveness study of each measure will be conducted during the rulemaking process.

CHAPTER 9

GREENHOUSE GASES AND CLIMATE CHANGE

- INTRODUCTION
- GREENHOUSE EFFECT AND CLIMATE CHANGE
- RELEVANT CLIMATE PROTECTION ACTION AND LEGISLATION
- CO_2 EMISSIONS INVENTORY
- GREENHOUSE GAS INDICATORS
- CONCLUSION

9. GREENHOUSE GASES AND CLIMATE CHANGE

9.1 INTRODUCTION

Upon the recommendation of the APCD's Community Advisory Council, and with direction from the Board of Directors, the APCD is for the first time including a discussion of greenhouse gas emissions and climate protection in a clean air plan. This chapter is informational and not regulatory in nature; its inclusion is not mandated by state planning requirements.

This chapter presents an overview of global climate change issues and a baseline 2007 carbon dioxide (CO_2) inventory for the county. This inventory will provide a starting point to track the county's progress in reducing gases that cause global climate change.

9.2 GREENHOUSE EFFECT AND CLIMATE CHANGE

The greenhouse effect is a natural process by which some of the radiant heat from the Sun is captured in the lower atmosphere of the Earth, thus maintaining the temperature and making Earth habitable. The gases that help capture the heat are called greenhouse gases.

Since the Industrial Revolution human activities such as fossil fuel burning deforestation and other agricultural and industrial practices, as well as activities associated with our growing population (e.g. waste disposal), have been increasing the levels of greenhouse gases in the Earth's atmosphere. The higher levels of these gases are in turn affecting the Earth's climate. The world's temperature has increased up to 1°F (0.5°C) over the past century and some of the colder, more remote spots have warmed much more. This phenomenon is referred to as global warming. Global climate change is perhaps a more accurate term, as higher levels of greenhouse gas emissions in the atmosphere not only raise overall temperatures, but also affect other climate sensitive aspects of the environment, including precipitation, crops, pest populations, sea levels, and the fresh water supply.

Scientists estimate that emissions of greenhouse gases will need to be reduced by 80 percent by 2050 to avoid a 2°C (3.6°F) increase in global temperatures, which would produce a sharp rise in the risk of dangerous impacts. The most common greenhouse gases are carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride.

9.3 RELEVANT CLIMATE PROTECTION ACTION AND LEGISLATION

9.3.1. STATE OF CALIFORNIA LEGISLATION

Assembly Bill 32

In 2006, Governor Schwartzenegger signed into law Assembly Bill 32 (AB 32), which created the first-ever statewide cap on greenhouse gas (GHG) emissions. AB 32 required the California Air Resources Board (CARB) to establish a reporting program for GHG emissions beginning with the largest sources of emissions, to determine a 1990 GHG emissions baseline and to set that as the statewide limit to be achieved by 2020.

AB 32 also required that CARB publish a list of "Early-Action" GHG reduction measures by June 2007 and adopt regulations for those measures by January 2010. By January 2009, CARB had to prepare a detailed scoping plan outlining the direct reduction measures, market-based mechanisms, and incentives needed to meet the 2020 emissions cap.

By January 1, 2011 CARB has to adopt regulations to meet the 2020 emission cap including provisions for using both market mechanisms ("Cap and Trade") and alternative compliance mechanisms, then by January 1, 2012 CARB is required to enforce regulations to meet the 2020 emissions cap.

CARB adopted a Scoping Plan in December 2008. The key elements include:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards;
- Achieving a statewide renewable energy mix of 33 percent;
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system;
- Establishing targets for transportation-related greenhouse gas emissions for regions throughout California, and pursuing policies and incentives to achieve those targets;
- Adopting and implementing measures pursuant to existing State laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard; and
- Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the State's long term commitment to AB 32 implementation.

CARB Mandatory Reporting Regulation

To track California's progress in implementing AB 32, CARB adopted a mandatory reporting regulation to obtain facility-level data from the largest sources of greenhouse gas emissions in California. The regulation requires annual reporting of GHG emissions from the largest facilities in the state, accounting for 94 percent of greenhouse gas emissions from industrial and commercial stationary sources in California*. There are approximately 800 separate sources that fall under the reporting rules, which include electricity generating facilities, electricity retail providers and power marketers, oil refineries, hydrogen plants, cement plants, cogeneration facilities, and industrial sources.

*Currently facilities that emit greater than or equal to 25,000 metric tons of CO_2. Electricity generating and cogeneration facilities that individually have a nameplate generating capacity of 1 megawatt and that emit greater than or equal to 2,500 metric tons of CO_2 also must report

Senate Bill 375

In 2008, California enacted the Sustainable Communities and Climate Protection Act of 2008 (SB 375). This law aims to reduce greenhouse gas emissions by 5 million metric tons by reducing miles traveled by passenger vehicles and light duty trucks. By September 30, 2010, GHG emission reduction targets will be set by CARB for each Metropolitan Planning Organization. Each Metropolitan Planning Organization such as the Santa Barbara County

Association of Governments (SBCAG) must develop a Sustainable Communities Strategy that achieves those targeted GHG reductions.

SB 375 also aligns planning for GHG reductions with regional housing and transportation by 2013. By integrating transportation, land use, and housing planning with a Sustainable Communities Strategy, SB 375 ties together three major planning activities currently conducted by SBCAG:

1. Regional Growth Forecast
2. Regional Transportation Plan
3. Regional Housing Needs Assessment Plan

While SB 375 mandates the actions that SBCAG must undertake, the APCD will assist SBCAG in fulfilling its obligations. However, the role of air districts in the SB 375 process is consultative and limited to the process of setting regional targeted GHG reductions.

SBCAG has provided the mobile source inventory and transportation control measures chapters for APCD Clean Air Plans and SBCAG and APCD staff work closely together on these elements. It is possible that VMT reductions achieved through the implementation of SB 375 targets will also produce reductions of criteria pollutants. It is possible that reductions in vehicle miles traveled achieved thought the implementation of SB 375 targets will also produce reductions of criteria pollutants.

9.3.2 FEDERAL ACTIONS

U.S. Environmental Protection Agency Tailoring Rule

On May 13, 2010, the U.S. Environmental Protection Agency (USEPA) issued a final rule that establishes the approach to addressing GHG emissions from stationary sources under the federal Clean Air Act (CAA) permitting programs. This final rule sets thresholds for GHG emissions that define when permits under the New Source Review Prevention of Significant Deterioration (PSD) and Title V Operating Permit programs are required for new and existing industrial facilities.

The CAA permitting program emissions thresholds for criteria pollutants such as lead, sulfur dioxide and nitrogen dioxide, are 100 and 250 tons per year. While these thresholds are appropriate for criteria pollutants, they are not feasible for GHG emissions because GHGs are emitted in much higher volumes. Without this tailoring rule, the criteria pollutants emissions thresholds would take effect automatically for GHGs on January 2, 2011. PSD and Title V requirements at these thresholds would lead to dramatic increases in the number of required permits —tens of thousands of PSD permits and millions of title V permits.

The final USEPA rule "tailors" the requirements of these federal CAA permitting programs to limit the number of facilities that will be required to obtain PSD and Title V permits based on GHG emissions. Only facilities responsible for nearly 70 percent of the national GHG emissions from stationary sources will be subject to permitting requirements under this rule. This includes the nation's largest GHG emitters— power plants, refineries, and cement production facilities. For the first step of the Tailoring Rule, which will begin on January 2, 2011, PSD or title V requirements will apply to sources' GHG emissions only if the sources are subject to PSD or title V anyway due to their non-GHG conventional pollutants. The applicable requirements of PSD,

most notably, the best available control technology (BACT) requirement, will apply to projects that increase net GHG emissions by at least 75,000 tons per year (tpy) carbon dioxide equivalent (CO_2e), but only if the project also significantly increases emissions of at least one non-GHG pollutant. For the title V program, only existing sources with, or new sources obtaining, title V permits for non-GHG pollutants will be required to address GHGs during this first step.

The second step begins on July 1, 2011, will phase-in additional large sources of GHG emissions. New sources as well as existing sources not already subject to title V that emit, or have the potential to emit, at least 100,000 tpy CO_2e will become subject to the PSD and title V requirements. In addition, sources that emit or have the potential to emit at least 100,000 tpy CO_2e and that undertake a modification that increases net emissions of GHGs by at least 75,000 tpy CO_2e will also be subject to PSD requirements.

USEPA Mandatory Reporting Rule

On October 30, 2009, USEPA published the Mandatory Greenhouse Gas Reporting Rule (MRR). The rule requires reporting of GHG emissions from large sources and suppliers in the United States, and is intended to collect accurate and timely emissions data to inform future policy decisions. Under the rule, suppliers of fossil fuels or industrial GHGs, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions, are required to submit annual reports to USEPA. The MRR requires reporting of GHG emissions and other relevant information from certain sources beginning in 2010. The rule does not require control of GHGs, it only requires that sources emitting above certain thresholds monitor and report GHGs.

On May 27, 2010, USEPA proposed technical corrections, clarifications, and amendments for this rule.

Nationwide Car and Truck CO_2 Standard

On May 20, 2009, the White House announced that the federal government, major U.S. automakers and California had reached an agreement to establish a single nationwide car and truck emission standard that would require a reduction of 30 percent in CO_2 and other emissions from vehicles sold in the United States by 2016. Capping GHG emissions would effectively require better gas mileage.

9.3.3 COUNTY OF SANTA BARBARA ACTIONS

On March 17, 2009, the Santa Barbara County Board of Supervisors unanimously passed a resolution adopting Santa Barbara County's climate change guiding principles and supporting county efforts to reduce GHG emissions. These principles recognize the county's role in the state climate change arena as threefold: a producer of operational GHGs, and both a regulator and an incentivizer in reducing community-wide GHG emissions. The General Services Department has been charged with developing a plan that would enable the county, as a "producer" of GHG emissions, to achieve the state's 15 percent reduction target for county operations. To address the "regulator" and "incentivizer" roles, the Office of Long Range Planning will develop a countywide Climate Action Strategy.

9.4 CO_2 EMISSIONS INVENTORY

An emissions inventory is a detailed estimate of the amount of air pollutants discharged into the atmosphere from a given area by various emission sources during a specific time period. This inventory builds on the APCD's many years of experience preparing inventories of criteria and toxic air pollutants. This inventory only includes direct emissions of CO_2 due to human activity, and does not account for carbon sinks or sequestration from agricultural and forestry lands. The inventory includes only emissions of CO_2, the most prevalent GHG. The CO_2 emissions are estimated for industrial, commercial, transportation, residential, and agriculture activities in Santa Barbara County. Emissions from electricity consumption for residential, commercial and industrial sectors are also included in the inventory.

Emissions of CO2 are estimated using the most current activity (e.g., cubic feet of natural gas burned or vehicle miles traveled) and emission factor data from various sources including the USEPA, the California Energy Commission (CEC) and CARB. Table 9-1 presents CO_2 emission factors for common fuels combusted in a variety of emission devices including internal combustion engines, boilers and steam generators. Table 9-1 also includes global warming potentials (GWP) for greenhouse gases, which are used to convert emissions of greenhouse gases to CO_2 equivalent values (CO_2e). The GWP values are simply being presented for informational purposes since the greenhouse gas inventory in this chapter only includes CO_2. Activity data used in preparing this inventory are the same process rate and throughput data that were used in preparing the APCD's inventories for criteria and toxic air pollutants.

9.4.1 METHODOLOGY

Emission sources can be broadly divided between stationary and mobile sources. Stationary sources can be further divided between point and area sources.

Stationary emission sources identified on an individual basis, or as a single source, are called point sources. Oil and gas processing facilities, and sand, rock and gravel plants are examples of point sources. The APCD maintains a computer database with detailed information on operations and emission characteristics for many facilities, in connection with their APCD permits. Activity data on the sources are collected at the process level from each facility and are updated annually for emissions inventory requirements. The CO_2 emissions from these sources are calculated by multiplying activity data by a CO_2 emission factor. These emission factors take into account fuel-specific carbon content, and the percent of carbon that oxidizes to convert to CO_2emissions.

Stationary emission sources that are not identified individually are called area sources. Area sources are groups of small emission sources, which individually do not emit significant amounts of pollutants, but which together make an appreciable contribution to the emissions inventory. Many area sources do not require permits from the APCD. These include residential heating sources and restaurants, as well as a wide range of consumer products such as paints, solvents, and cleaners. Some facilities considered as area sources require permits from the APCD, such as gas stations and dry cleaners. Emissions estimates for area sources are developed based on estimated activities and emission factors for various categories.

Mobile sources include: on-road motor vehicles and other sources such as boats, ships, trains and aircraft, as well as garden, farm and construction equipment.

Electricity consumption emissions are based on 2007 countywide consumption data obtained from the CEC. These data were allocated to the appropriate portions of the county by assuming that the northern part of the county is serviced by Pacific Gas & Electric, with the exception of Lompoc, which is serviced by Lompoc City Electric. The southern portion of the county is assumed to be serviced by Southern California Edison. Utility-specific electricity CO_2 emission factors (see Table 9-1) based on the power mix of the utility were then applied to the consumption data to determine CO_2 emissions for each portion of the county. For the Lompoc area, the CO_2 emissions were determined from the actual power mix for that utility since a utility-specific emission factor is not available. Lompoc electricity consumption CO_2 emissions were calculated by applying the fuel-specific emission factor to the appropriate percentage of CO_2 generating electricity consumption. The 2008 power mixes for each of the three electric utilities are as follows:

Energy Resources	PG&E	SCE	City of Lompoc
Natural Gas	39%	46%	27%
Nuclear	22%	19%	3%
Hydroelectric	16%	7%	23%
Renewable	14%	16%	25%
Coal	8%	12%	22%
Other	1%	0%	<1%

The "On-Road Motor Vehicles" CO_2 emission inventory was developed from the latest working draft version of CARB's Emission Factor (EMFAC) model, which incorporates county-specific vehicle activity data generated by SBCAG's Santa Barbara Travel Model, CARB, and vehicle demographic data from the Department of Motor Vehicles (DMV). SBCAG coordinates with CalTrans and CARB to estimate vehicle emissions by vehicle class. The EMFAC model provides a number for CO_2 emissions for specified inventory years.

As stated above, the "Other Mobile Sources" category includes emission sources that do not produce emissions on roads and highways, such as ships, boats, airplanes, trains, residential utility equipment, and construction and mining equipment. CARB has the primary responsibility for estimating the emissions from these categories; however, the APCD currently estimates the CO_2 emissions from ships, diesel commercial boats, Outer Continental Shelf (OCS) crew and supply boats, and aircraft. GHG emissions for ships are calculated for ship travel within 24 miles of the Santa Barbara coastline using the same emission estimation methodology discussed in Chapter 3.

The CARB "OFFROAD" model was used to calculate emissions from sources in the *Other Mobile Sources* category. The OFFROAD model consists of three main modules: equipment population (encompassing pieces of equipment, equipment types and ages), activity, and emission factor. The base year equipment population is adjusted for growth and scrappage, producing distributions for specified calendar years from 1970 through 2040. The statewide equipment population is allocated to each geographic region, including air basin and county. The base emission factors are corrected for in-use and ambient conditions. The annual equipment emissions are adjusted for seasonal and diurnal factors, producing the base emissions output. Emissions are produced for fuel type (e.g., gasoline, diesel, compressed natural gas, etc.), engine type (e.g., two-stroke and four-stroke), equipment category and horsepower group.

Aircraft CO_2 emissions were estimated using the Emissions and Dispersion Modeling System (EDMS) that was developed in the mid-1980s as a complex source computer model designed to assess the air quality impacts of proposed airport development projects. EDMS is a combined emissions and dispersion model for assessing air quality at civilian airports and military air bases. The model was developed by the Federal Aviation Administration in cooperation with the United States Air Force. EDMS utilizes the latest aircraft engine emission factors from the International Civil Aviation Organization Engine Exhaust Emissions Data Bank.

Aircraft activity data (operations) were obtained from each of the five airports in the county (Santa Barbara, Santa Maria, Lompoc, Santa Ynez and Cuyama). Activity by commercial aircraft type for Santa Barbara and Santa Maria airports was determined through 2007 airport operating schedules that specify aircraft type for each flight. For general aviation activity, a composite fleet of aircraft was assumed utilizing information from local flight schools. The general aviation fleet consists of approximately 15 aircraft including Beech, Cessna, Piper and Gulfstream. It is assumed that the emission characteristics of the composite fleet are representative of actual CO_2 emissions from general aviation aircraft.

EDMS allows the user to specify the mixing height as appropriate for the local region. The mixing height is defined as the portion of the lower atmosphere that undergoes mechanical or turbulent mixing and is generally equivalent to the height of the base of the inversion. An appropriate mixing height for the Santa Barbara County area is approximately 3,000 feet given the geography and the meteorological conditions of the region. In order to allow sufficient time for climb-out and approach emissions from aircraft within the county borders, however, the mixing height was set to 10,000 feet. It is assumed that once the aircraft reaches the top of the mixing height it will be beyond Santa Barbara County borders.

9.4.2 2007 CO_2 EMISSION INVENTORY

The 2007 Santa Barbara County CO_2 emissions inventory is presented in Table 9-2 in units of metric tons per year. It should be noted that some source categories within Table 2 show zero CO_2 emissions. These categories have been retained within the table to be consistent with Chapters 3 and 6. Zero CO_2 emissions in a category imply that there was either no activity in that category during the 2007 base year (category 670 – managed burning and disposal, for example) or that the source types within a category do not emit CO_2. For example, the emission sources within the cleaning and surface coating categories (210-299) produce reactive organic gases (ROG) but do not emit CO_2. The Santa Barbara County inventory represents onshore and State Tidelands emission sources. Figure 9-1 shows each major source category's relative contribution for each pollutant during 2007. Sources of CO_2 emissions and their relative contribution are as shown below.

2007 Santa Barbara County CO_2 Emissions: 4,349,932 metric tons per year

- **20 percent Stationary Sources: 859,248 metric tons per year**
  Sources include oil and gas production (natural gas Internal Combustion, or IC engines), manufacturing and industrial (diesel IC engines), agricultural irrigation (diesel and natural gas IC engines) and external combustion sources (boilers and heaters).

- **20 percent Electricity Consumption: 874,869 metric tons per year**

Residential, commercial and industrial electricity consumption account for these emissions.

- **7 percent Area-Wide Sources: 319,042 metric tons per year**
  These emissions are primarily from residential fuel combustion (natural gas space heating and water heating).

- **44 percent Mobile Sources – On-Road Motor Vehicles: 1,894,350 metric tons per year**
  The majority of CO_2 emissions are from light duty passenger cars, light duty trucks, and diesel trucks.

- **9 percent Other Mobile Sources: 400,337 metric tons per year**
  Contributors include trains, diesel construction and mining equipment, and diesel agricultural equipment.

In summary, on-road motor vehicles contribute 44 percent of the CO_2 emissions within the onshore portion of Santa Barbara County. The on-road emissions are primarily from light duty passenger cars, light duty trucks, diesel trucks. About 20 percent of the CO_2 emissions, or 874,869 metric tons, are from county-wide electricity consumption. The stationary source category includes emissions from internal and external combustion sources including natural gas and diesel engines, boilers and process heaters. These onshore stationary sources also contribute 20 percent of the total onshore CO_2 emissions.

The 2007 Outer Continental Shelf CO_2 emission inventory is presented in Table 9-3. The OCS emissions are summarized separately from the onshore emission inventory for clarity. Figure 9-1 shows each major source's relative contribution for each pollutant during 2007. The largest sources of CO_2 and their contribution percentages are discussed below.

2007 OCS CO_2 Emissions: 835,118 metric tons per year

- **17 percent Stationary Sources: 146,406 metric tons per year**
  Primarily oil and gas production (natural gas turbine IC engines)

- **83 percent Mobile Sources: 690,799 metric tons per year**
  Predominantly ships (foreign-flagged motor ships).

Ocean-going ships, primarily foreign motor ships, account for most of the CO_2 emissions within the OCS. Emissions from marine shipping alone at 675,670 metric tons per year comprise 98 percent of the Mobile Source CO_2 emissions and 81percent of the entire CO_2 inventory on the OCS.

The combined Santa Barbara and OCS CO_2 inventory is presented in Figure 9-2. The largest contributor of CO_2 emissions to the combined inventory is on-road mobile sources, which make up 37 percent of the CO_2 inventory. Other mobile sources contribute 1,091,135 metric tons per year, which is equivalent to 21 percent of the combined inventory. Combined Santa Barbara County and OCS stationary source CO_2 emissions are 1,005,654 metric tons per year or 19 percent of the combined CO_2 inventory. CO_2 emissions from electricity consumption at 874,869

metric tons per year comprise 17 percent of the overall inventory, while area-wide sources account for 319,042 metric tons per year or 6 percent of the combined CO_2 inventory.

Figure 9-3 presents CO_2 emissions from local sources alone and excludes emissions attributed to county-wide electricity consumption. When excluding the electricity consumption contribution, CO_2 emissions from on-road motor vehicles make up 44% of the combined CO_2 inventory. Other mobile sources account for 25% of the CO_2 inventory while stationary and area sources contribute 23% and 8% of the CO_2 emissions to the combined inventory, respectively.

9.5 GREENHOUSE GAS INDICATORS

Activity data used to prepare the inventory along with their annual trends since year 2000 are presented in Table 9-4 and Figure 9-4. In addition to population, the data include county-wide energy statistics such as natural gas and electricity consumption that are directly related to greenhouse gas emissions. Although population has increased from 2000 through 2007, the energy-related data show no distinctive trend over the period. Factors such as year-to-year variations in weather and the economy have an impact on annual energy consumption trends. For example, a mild winter could lead to lower natural gas and electricity usage while a weakened economy or higher gas prices could affect both vehicle miles traveled and gasoline sales. Since the energy statistics provide a surrogate of actual emissions, however, we will continue to track these indicators on an annual basis to evaluate countywide greenhouse gas emission trends.

9.6 CONCLUSION

This chapter provides an inventory of CO_2 emissions from point, area and mobile sources for both onshore Santa Barbara and the OCS. The inventory only provides an estimate of CO_2 emissions from combustion sources and does not include emissions of any other Kyoto greenhouse gases (methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride). The largest contributor to the overall (onshore and OCS) 2007 Santa Barbara County CO_2 inventory is on-road mobile sources, which account for 37 percent of the emissions. Other mobile sources, which include off-road vehicles and marine shipping, comprise 21 percent of the CO_2 inventory. Electricity consumption and stationary sources account for 17 percent and 19 percent of the CO_2 emissions, respectively, while area sources account for the remaining 6 percent of the overall CO_2 inventory.

As discussed above, the inventory in this chapter only includes direct emissions of CO_2 due to human activity and does not account for carbon sinks or sequestration from agricultural and forestry lands. The CO_2 emissions are estimated for industrial, commercial, transportation, residential, and agriculture activities and electricity consumption in Santa Barbara County. This inventory could be improved in the future with the addition of and inventory of emissions of additional Kyoto greenhouse gases, including methane from fugitive sources such as seeps, landfills and oil and gas equipment.

TABLE 9-1

GREENHOUSE GAS EMISSION FACTORS AND GLOBAL WARMING POTENTIALS

(Source: California Air Resources Board)

Fuel Type	kg CO_2/MMBtu
Natural Gas (by heat content)	
975-1,000 BTU/scf	53.97
1,000-1,025 BTU/scf	52.87
1,025-1,050 BTU/scf	53.02
1,050-1,075 BTU/scf	53.42
1,075-1,100 BTU/scf	53.68
> 1,100 BTU/scf	54.67
Petroleum Products	
Distillate Fuel Oil (#1,2,&4)	73.1
Residual Fuel Oil (#5 & 6)	78.74
Propane	63.02
Marine Shipping	**g CO_2/kW-hr**
All Marine Fuels	620
Electricity Consumption	**lb CO_2/MW-hr**
PG&E	635.67
SCE	630.89

GAS	GLOBAL WARMING POTENTIAL (GWP)
CO_2	1
CH_4	21
N_2O	310
HFC-23	11,700
HFC-32	650
HFC-125	2,800
HFC-134a	1,300
HFC-143a	3,800
HFC-152a	140
HFC-227ea	2,900
HFC-236fa	6,300
HFC-431mee	1,300
CF_4	6,500
C_2F_6	9,200
C_4F_{10}	7,000
C_6F_{14}	7,400
SF_6	23,900

TABLE 9 – 2 2007 CO_2 EMISSION INVENTORY – SANTA BARBARA COUNTY	CO_2 (*metric tons per year)*

STATIONARY SOURCES

Fuel Combustion

010	ELECTRIC UTILITIES	1,759
020	COGENERATION	188,674
030	OIL AND GAS PRODUCTION (COMBUSTION)	101,257
040	PETROLEUM REFINING (COMBUSTION)	12,890
050	MANUFACTURING AND INDUSTRIAL	60,066
052	FOOD AND AGRICULTURAL PROCESSING	70,249
060	SERVICE AND COMMERCIAL	263,462
099	OTHER (FUEL COMBUSTION)	85
	Fuel Combustion Total	**698,442**

Waste Disposal

110	SEWAGE TREATMENT	1,243
120	LANDFILLS	7,276
130	INCINERATORS	548
140	SOIL REMEDIATION	0
199	OTHER (WASTE DISPOSAL)	0
	Waste Disposal Total	**9,067**

Cleaning and Surface Coatings

210	LAUNDERING	0
220	DEGREASING	0
230	COATINGS AND RELATED PROCESS SOLVENTS	0
240	PRINTING	0
250	ADHESIVES AND SEALANTS	0
299	OTHER (CLEANING AND SURFACE COATINGS)	0
	Cleaning and Surface Coatings Total	**0**

Petroleum Production and Marketing

310	OIL AND GAS PRODUCTION	143,146
320	PETROLEUM REFINING	65
330	PETROLEUM MARKETING	0
	Petroleum Production and Marketing Total	**143,211**

Industrial Processes

410	CHEMICAL	0
420	FOOD AND AGRICULTURE	0
430	MINERAL PROCESSES	8,528
470	ELECTRONICS	0
499	OTHER (INDUSTRIAL PROCESSES)	0
	Industrial Processes Total	**8,528**

	STATIONARY SOURCES TOTAL	**859,248**

TABLE 9 – 2 2007 CO_2 EMISSION INVENTORY – SANTA BARBARA COUNTY	CO_2 (*metric tons per year)*

AREA-WIDE SOURCES

Solvent Evaporation

510	CONSUMER PRODUCTS	0
520	ARCHITECTURAL COATINGS AND SOLVENTS	0
530	PESTICIDES/FERTILIZERS	0
540	ASPHALT PAVING/ROOFING	0
	Solvent Evaporation Total	**0**

Miscellaneous

610	RESIDENTIAL FUEL COMBUSTION	319,042
620	FARMING OPERATIONS (LIVESTOCK HUSBANDRY)	0
630	CONSTRUCTION AND DEMOLITION DUST	0
640	PAVED ROAD DUST	0
645	UNPAVED ROAD DUST	0
650	FUGITIVE WINDBLOWN DUST	0
660	FIRES	0
670	MANAGED BURNING AND DISPOSAL	0
690	COOKING	0
699	OTHER (MISCELLANEOUS PROCESSES)	0
	Miscellaneous Total	**319,042**

	AREA-WIDE SOURCES TOTAL	**319,042**

ELECTRICITY CONSUMPTION

Electricity Consumption

NA	RESIDENTIAL, COMMERCIAL AND INDUSTRIAL	874,869
	ELECTRICITY CONSUMPTION TOTAL	**874,869**

TABLE 9 – 2 2007 CO_2 EMISSION INVENTORY – SANTA BARBARA COUNTY	CO_2 (*metric tons per year)*

MOBILE SOURCES

On-Road Motor Vehicles

710	LIGHT DUTY PASSENGER	682,550
722	LIGHT DUTY TRUCKS – 1	292,000
723	LIGHT DUTY TRUCKS – 2	368,650
724	MEDIUM DUTY TRUCKS	211,700
732	LIGHT HEAVY DUTY GAS TRUCKS – 1	32,850
733	LIGHT HEAVY DUTY GAS TRUCKS – 2	14,600
734	MEDIUM HEAVY DUTY GAS TRUCKS	7,300
736	HEAVY HEAVY DUTY GAS TRUCKS	7,300
742	LIGHT HEAVY DUTY DIESEL TRUCKS – 1	14,600
743	LIGHT HEAVY DUTY DIESEL TRUCKS – 2	10,950
744	MEDIUM HEAVY DUTY DIESEL TRUCKS	98,550
746	HEAVY HEAVY DUTY DIESEL TRUCKS	94,900
750	MOTORCYCLES	3,650
760	HEAVY DUTY DIESEL URBAN BUSES	18,250
762	HEAVY DUTY GAS URBAN BUSES	3,650
770	SCHOOL BUSES	14,600
776	OTHER BUSES	7,300
780	MOTOR HOMES	10,950
	On-Road Motor Vehicles Total	**1,894,350**

Other Mobile Sources

810	AIRCRAFT	82,532
820	TRAINS	37,999
830	SHIPS AND COMMERCIAL BOATS	9,456
840	RECREATIONAL BOATS	2,087
850	OFF-ROAD RECREATIONAL VEHICLES	3,529
860	OFF-ROAD EQUIPMENT	196,858
870	FARM EQUIPMENT	67,876
890	FUEL STORAGE AND HANDLING	0
	Other Mobile Sources Total	**400,337**

	MOBILE SOURCES TOTAL	**2,294,687**

2007 SANTA BARBARA COUNTY TOTAL	**4,347,846**

TABLE 9 – 3 2007 CO_2 EMISSION INVENTORY – OUTER CONTINENTAL SHELF	CO_2 (*metric tons per year)*

STATIONARY SOURCES

Fuel Combustion

030	OIL AND GAS PRODUCTION (COMBUSTION)	138,780
	Fuel Combustion Total	**138,780**

Cleaning and Surface Coatings

230	COATINGS AND RELATED PROCESS SOLVENTS	0
	Cleaning and Surface Coatings Total	**0**

Petroleum Production and Marketing

310	OIL AND GAS PRODUCTION	7,626
	Petroleum Production and Marketing Total	**7,626**

	STATIONARY SOURCES TOTAL	**146,406**

MOBILE SOURCES

Other Mobile Sources

810	AIRCRAFT	82
830	SHIPS AND COMMERCIAL BOATS	688,630
840	RECREATIONAL BOATS	2,087
	Other Mobile Sources Total	**690,799**

	MOBILE SOURCES TOTAL	**690,799**

2007 OUTER CONTINENTAL SHELF TOTAL	**837,205**

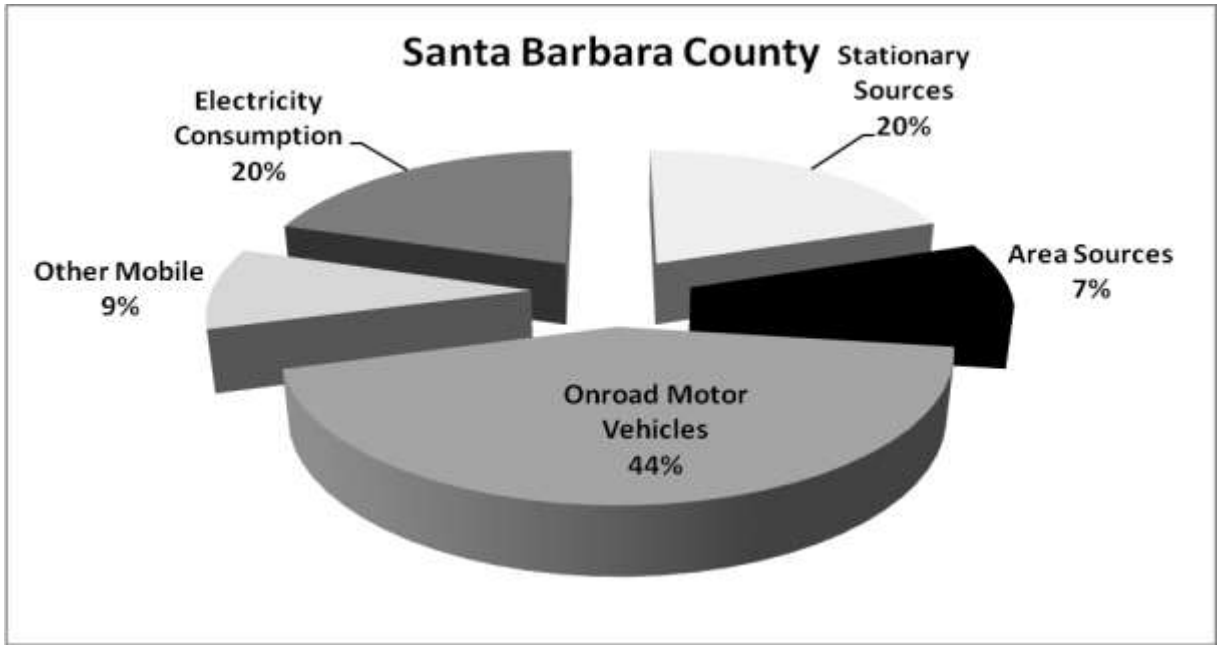
TABLE 9-4

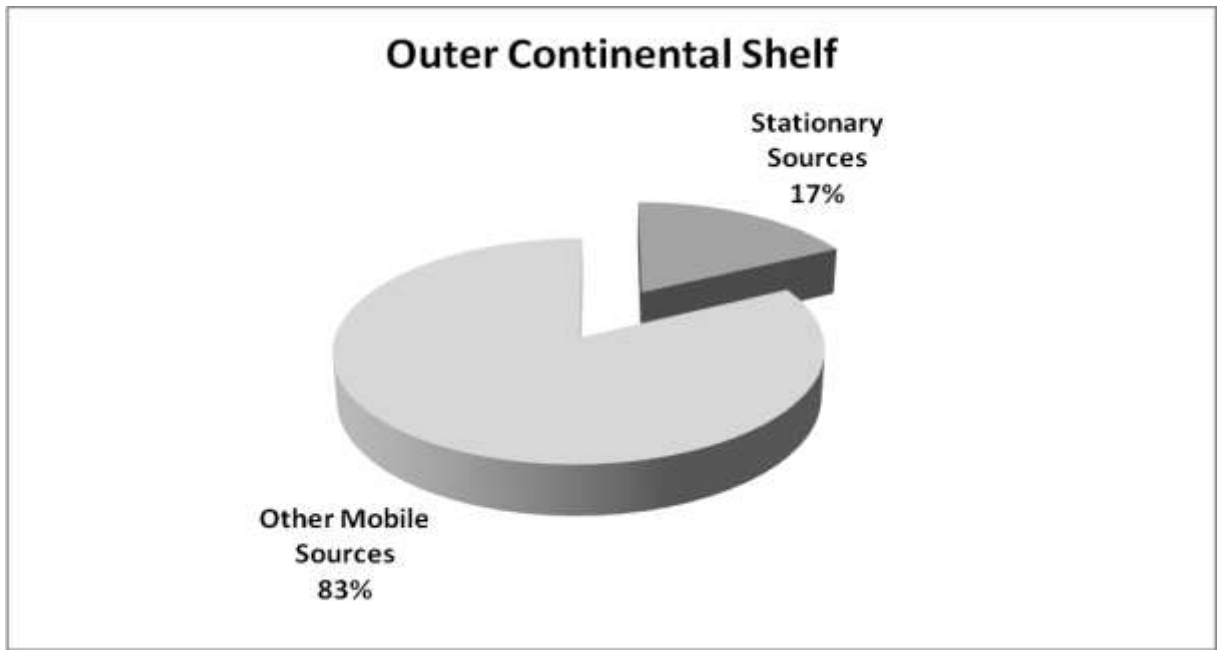
GREENHOUSE GAS INDICATORS

Santa Barbara County GHG Indicator Data (2000 – 2008)					
Year	**Population**	**VMT**	**Gasoline Dispensed (gal)**	**Natural Gas Consumption (MCF)**	**Electricity Usage (GWh)**
2000	399,347	9,771	143,452,072	13,761,912	2,851
2001	403,400	10,129	146,879,267	12,387,239	2,712
2002	407,774	10,151	148,324,842	12,714,492	2,987
2003	411,887	10,106	164,839,504	11,540,042	2,966
2004	415,339	9,994	161,199,191	11,791,094	3,150
2005	417,870	10,123	161,838,060	11,414,793	3,243
2006	419,942	10,110	153,701,106	11,210,971	3,178
2007	422,835	10,410	139,366,961	11,446,510	3,242
2008	426,900	10,027	146,507,845	11,530,028	3,261

FIGURE 9-1

2007 CO_2 Emissions
Santa Barbara County and Outer Continental Shelf

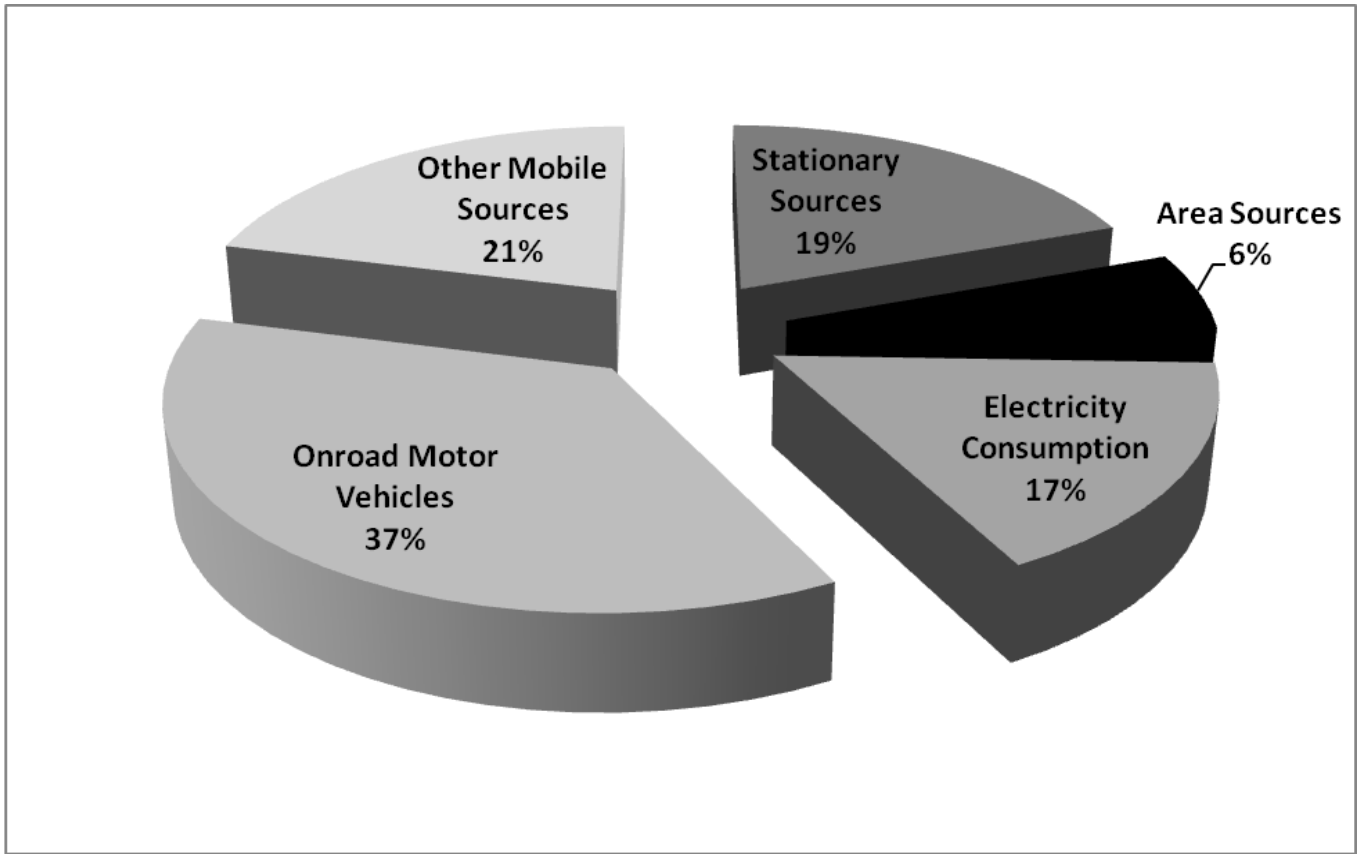




	Santa Barbara County (MT CO_2/year)	OCS (MT CO_2/year)
Stationary Sources	**859,248**	**146,406**
Area-wide Sources	**319,042**	**0**
Electricity Consumption	**874,869**	**0**
On-road Motor Vehicles	**1,894,350**	**0**
Other Mobile Sources	**400,337**	**690,799**
Total	**4,347,846**	**837,205**

FIGURE 9-2

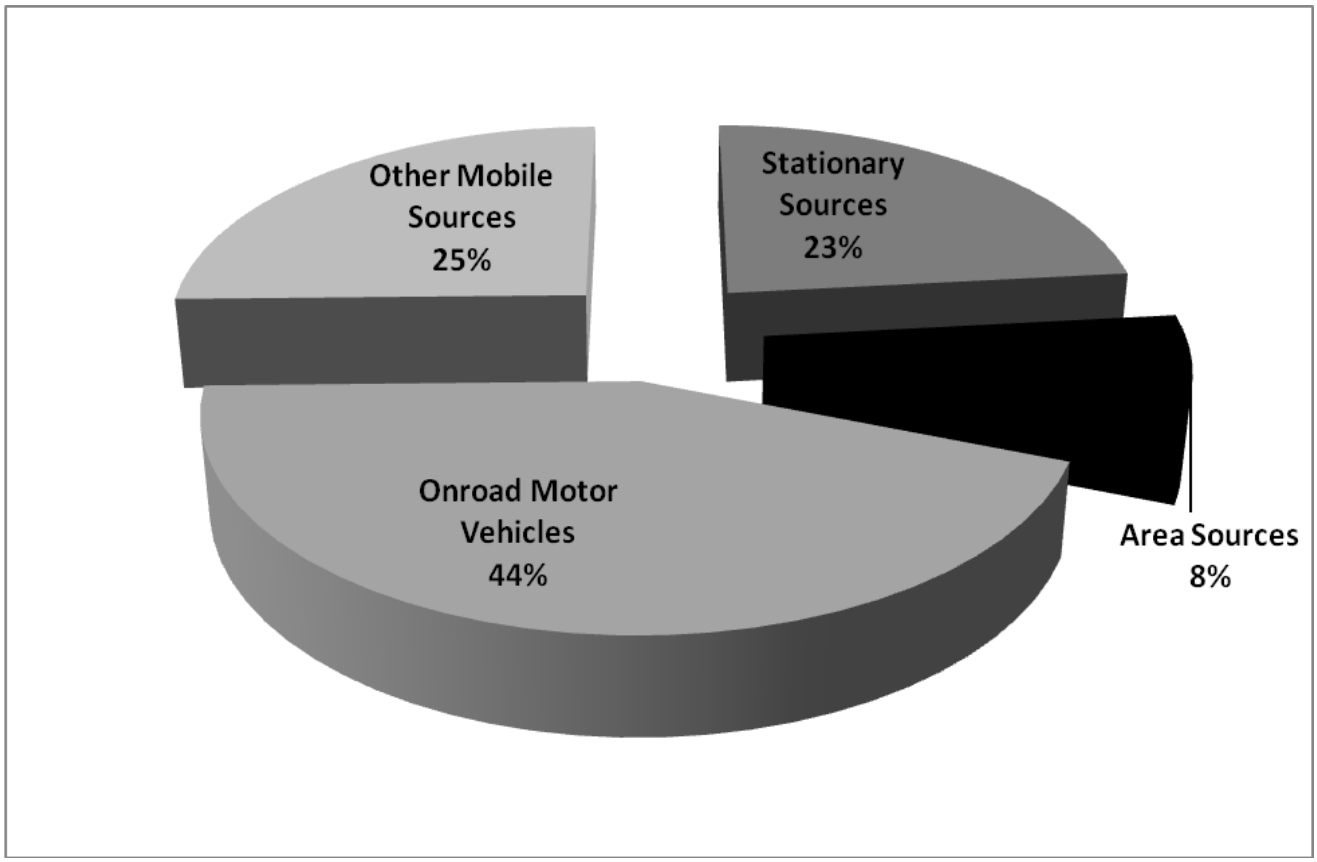
2007 Combined OCS and Santa Barbara County CO_2 Emissions



	Combined Santa Barbara County and OCS Inventory (MT CO_2/year)
Stationary Sources	**1,005,654**
Area-wide Sources	**319,042**
Electricity Consumption	**874,869**
On-road Motor Vehicles	**1,894,350**
Other Mobile Sources	**1,091,135**
Total	**5,185,050**

FIGURE 9-3

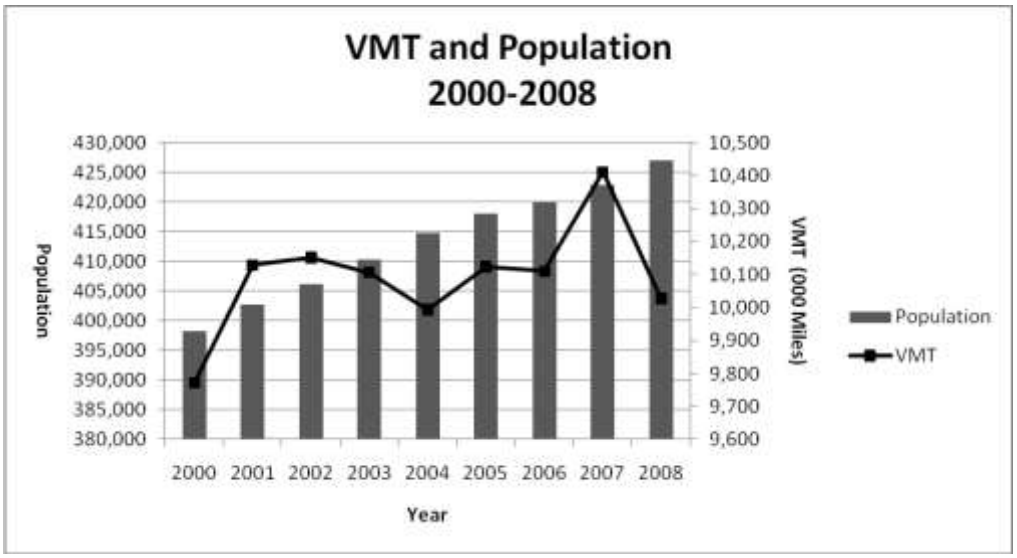
2007 COMBINED OCS AND SANTA BARBARA COUNTY CO_2 EMISSIONS ELECTRICITY CONSUMPTION EMISSIONS EXCLUDED

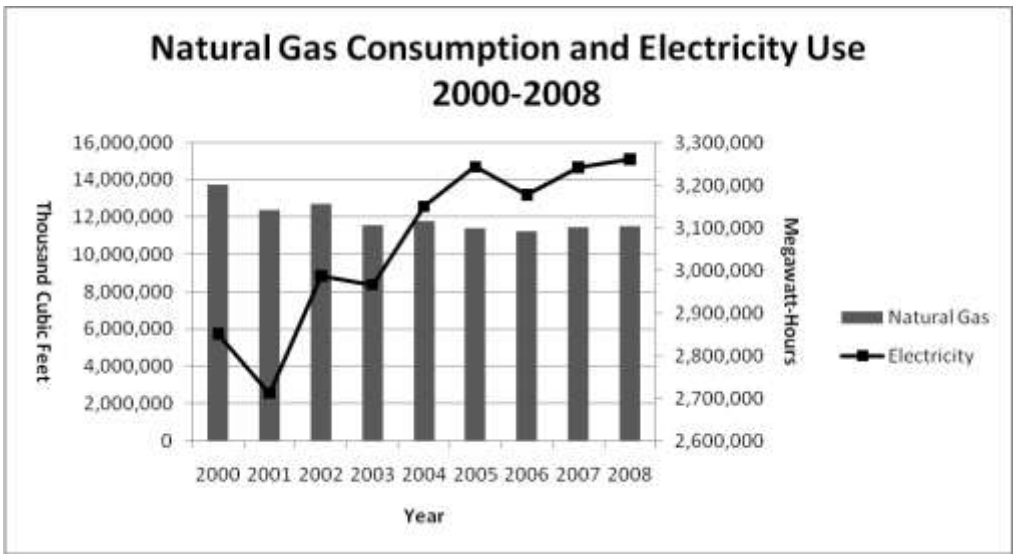


	Combined Santa Barbara County and OCS Inventory (MT CO_2/year)
Stationary Sources	**1,005,654**
Area-wide Sources	**319,042**
On-road Motor Vehicles	**1,894,350**
Other Mobile Sources	**1,091,135**
Total	**4,310,181**

FIGURE 9-4

2000 -2008 GREENHOUSE GAS INDICATOR TRENDS





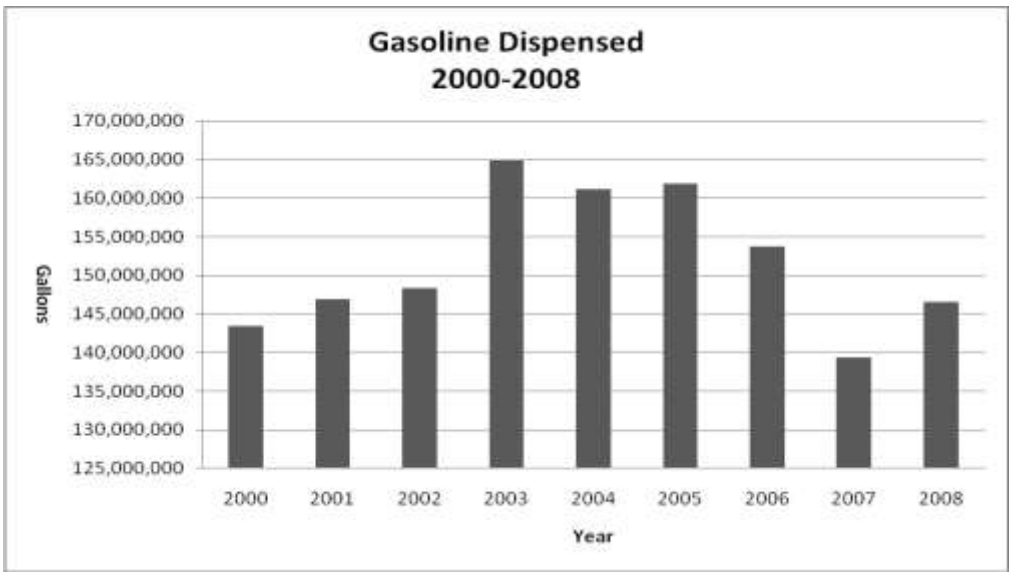
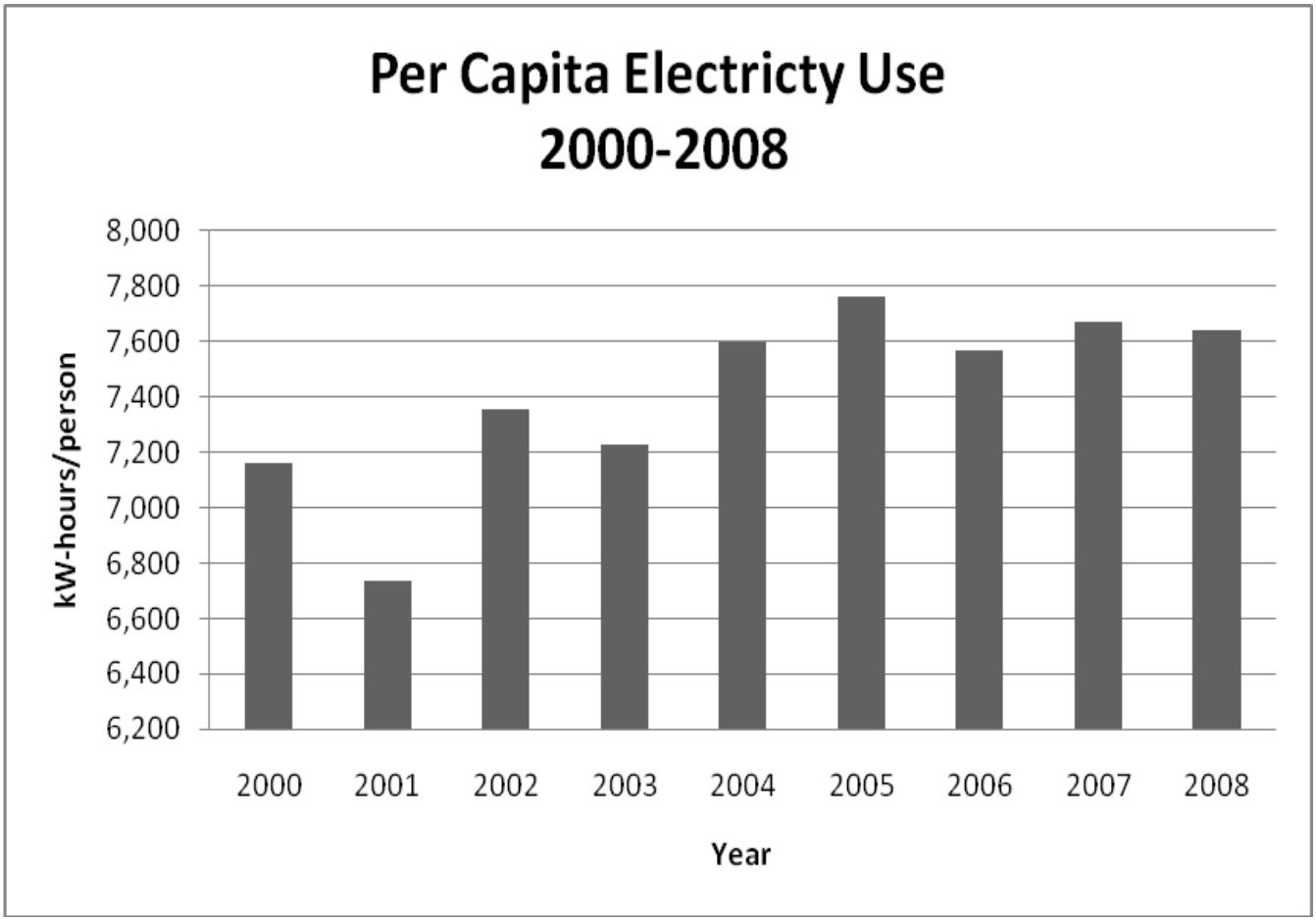


FIGURE 9-4 (CONTINUED)

2000 -2008 GREENHOUSE GAS INDICATOR TRENDS



CHAPTER 10

TRANSPORTATION POLICY, AIR QUALITY AND LAND USE

- INTRODUCTION
- JOBS/HOUSING IMBALANCE
- SUSTAINABLE COMMUNITIES AND CLIMATE PROTECTION ACT OF 2008 (SENATE BILL 375)
- LAND USE CONCEPTS RECOMMENDED FOR CONSIDERATION BY COUNTY AND CITY PLANNING AGENCIES
- TRANSPORTATION SYSTEM MANAGEMENT POLICIES AND PROGRAMS
- EMISSION REDUCTION POTENTIAL

10. TRANSPORTATION POLICY, AIR QUALITY AND LAND USE

10.1 INTRODUCTION

Motor vehicles are the largest source of human-generated onshore air pollution in Santa Barbara County (County). Consistent with state and national trends, and as discussed in Chapter 5 of this Plan, motor vehicle use continues to increase, and the number of vehicle miles traveled is increasing at a rate generally greater than the rate of population growth. Many factors contribute to this phenomenon. One principal factor is land development that produces an imbalance between the location of jobs and the location of housing, leading to long-distance commuting to and from work, which in turn leads to more air pollution. Additionally, land use decisions that rely on the automobile as the primary means of transportation from housing to services and commercial centers can increase the number of associated vehicle trips. Other social and economic factors that affect the price of housing can result in demographic shifts that also affect vehicle miles traveled and the number of vehicle trips.

According to the U.S. Centers for Disease Control, urban sprawl and the increasing time spent in automobiles may be contributing to myriad societal ills such as obesity, isolation of children and elderly, and poor air quality, which has harmed the respiratory health of millions of children. To continue to reduce automobile- generated air pollution and associated health impacts in the County, it is important to consider transportation and land use design strategies that will reduce vehicle miles from automobile use.

10.2 JOBS/HOUSING IMBALANCE

Approximately 50 percent of the County's population resides south of the Santa Ynez Mountains and between Gaviota and the Santa Barbara-Ventura County line, an area commonly referred to as the South Coast. Roughly 60 percent of all the jobs in the County are on the South Coast and about 30,000 South Coast employees (26 percent of the South Coast workforce and 16 percent of the total County workforce) commute daily over 50 miles one way to work. These long-distance commuters create almost 20 percent of the County's daily average VMT and have a disproportionately larger impact on VMT due to their longer trip distances. This is an effect produced by a jobs/housing imbalance in the County.

As a consequence of many factors, including real estate prices, the desire to live in detached single family homes, the tendency of retired workers to stay on the South Coast, and a host of other socio-economic and cultural factors, the land use policies discussed in Section 10.4 are not anticipated to substantially mitigate this jobs/housing imbalance. Rather these policies at best may prevent this imbalance from becoming even more serious. To substantially reduce VMT and air pollution from long-distance commuters, more attention must be paid to transportation policy that identifies ways to shift significant numbers of the long-distance commuters to more efficient commuting modes. How much VMT reduction is possible and at what cost would have to be determined by a thorough analysis, which could perhaps be done as part of the Senate Bill 375 Sustainable Communities Strategy process.

10.3 SUSTAINABLE COMMUNITIES AND CLIMATE PROTECTION ACT OF 2008 (SENATE BILL 375)

Senate Bill 375 (SB 375), passed in 2008 by the California legislature, places new regional planning responsibilities on Metropolitan Planning Organizations (MPOs). The County's MPO is the Santa Barbara County Association of Governments or SBCAG. The bill is intended to help meet the state's greenhouse gas (GHG) emission reduction goals in Assembly Bill 32 by reducing emissions from car and light-duty truck travel through regional transportation and land use strategies (see Chapter 9 for more details on AB 32). It is anticipated that these strategies will produce co-benefits by reducing criteria pollutant emissions as well.

SB 375 ties the regional housing and transportation planning and land use planning processes together by mandating the preparation of a Sustainable Communities Strategy (SCS) in the Regional Transportation Plan. The SCS is to be prepared to show how the region will meet targeted reductions in GHG emissions. The targeted reductions will be set by the California Air Resources Board (ARB) in September 2010 and then incorporated into SBCAG's SCS in the next Regional Transportation Plan update (currently scheduled for early 2013). The bill requires certain transportation planning and programming activities by MPOs to be consistent with the SCS contained in the regional transportation plan. A Further Study Transportation Control Measure has been included in Chapter 5 of this plan and is tied closely to the analysis and development of the SCS over the next few years.

To achieve the targeted reductions by reducing vehicle miles travelled (VMT), the SCS requirements represent a unique opportunity to align VMT-reduction strategies with regional housing and transportation planning strategies through land use and related policies. For example, one component of the SCS includes analyzing the feasibility of transit priority projects that will contribute to reducing regional GHG emissions. SB 375 sets criteria for what can be considered a transit priority project, such as:

- minimum residential/commercial mixed use sizes,
- close access to major transit stops and high quality transit corridors, and
- adoption by local planning jurisdictions of environmental and land use criteria that would reduce or minimize the growth of VMT resulting from development.

Agencies are given incentives to adopt criteria for transit priority projects; the bill allows for California Environmental Quality Act (CEQA) exemptions (for growth-inducing impacts and project-specific and cumulative traffic impacts) for projects that meet these criteria.

10.4 LAND USE CONCEPTS FOR CONSIDERATION BY COUNTY AND CITY PLANNING AGENCIES

This section discusses the connection between land use, transportation and air quality, and introduces some ideas and concepts relevant to minimizing air pollution impacts of growth. As discussed in Section 10.2, the concepts presented here are not anticipated to alleviate the jobs/housing imbalance in the South Coast; rather, when properly applied, they may at best

prevent this imbalance from becoming more serious. In any case, it is still important to consider these concepts when making future land use decisions.

This discussion is purely informational; its intent is not to establish land use policies or to suggest that local jurisdictions consider these concepts. Communities can and should decide which land use policies would ultimately result in the fewest negative impacts on air quality. It is important to note that strategies that might result in reductions in VMT in one community may actually produce increases in VMT in another community that has different demographics and employment patterns. Finally, these policies are directed towards large-scale development projects (e.g., greater than 100 dwelling units) and are not particularly effective when applied to small projects.

A comprehensive approach should be applied when considering the ideas discussed in this chapter. Applying any one element alone may lead to unintended results. For example, land use policies that increase densities with the intent of reducing vehicle trips may not succeed if adequate alternative transportation opportunities are not provided.

10.4.1 APPROPRIATE LOCATION AND DENSITY

Contiguous development within existing urban boundaries is preferred. Urban growth boundaries delineate where development ends and open space begins. They are an effective way to reduce sprawl and preserve agriculture and environmentally sensitive resources. The preservation of open space areas within urban boundaries can also increase quality of life and reduce potential vehicle trips. At the same time, infill, redevelopment, and reuse of vacant or underused parcels within already developed areas and along existing or potential transit corridors may encourage walking and make possible higher rates of transit use because activities are located closer together. Infill development, however, should not place residents or employees near sources of nuisance dust or odors or high traffic roadways, or expose them to chronic or acute health risks or accidental releases of hazardous or toxic substances.

Concepts

- *Cities and unincorporated urban communities should consider incorporating appropriately located development designed to reduce the relative share of car trips and travel distances and encourage the use of alternative forms of transportation.*
- *Urban growth should occur within the urban boundary lines of cities and unincorporated communities. Rural areas and agriculturally-zoned parcels should be maintained as open space, agricultural lands and very low-density residential development.*
- *Local planning agencies should encourage walking and transit use by planning neighborhoods and commercial centers to allow for convenient access to, and use of, local and regional transit systems.*
- *Transit providers and local planning agencies should collaborate to ensure that convenient and regular transit service is available when development occurs.*

10.4.2 MIX OF LAND USES

Mixed-use neighborhoods reduce automobile use by allowing people to work, shop and play near where they live. Locating compatible land uses within walking distance of each other can result in a higher level of walking and more transit use compared to single-use projects. Development projects that provide or contribute to a diverse mix of residential, commercial and institutional land-use types and open space are desirable. However, as with infill projects, mixed-use projects should not compromise the health and safety of the public. While conventional zoning typically results in the spatial separation of different land uses, mixed use recognizes that some land uses are functionally compatible with one another and need not be physically separated.

Concept

- *The mixing of compatible commercial and residential land uses should be encouraged when it will reduce dependence on the automobile or improve the balance between jobs and housing without creating incompatible land use relationships that could increase exposure to air pollutants*.

10.5 TRANSPORTATION SYSTEM MANAGEMENT POLICIES AND PROGRAMS

Providing improved accessibility for all travelers should be the primary objective in the design and construction of transportation systems that support alternative travel modes and decrease reliance on single occupant motor vehicles.

10.5.1 PROMOTING ACCESSIBILITY IN THE TRANSPORTATION SYSTEM

Providing direct routes and ensuring some separation from vehicles for pedestrians and bicycles can result in safer environments for bicyclists and pedestrians while maintaining efficient travel times for vehicles. Adequate sidewalks and paths can increase pedestrian accessibility and afford protection from fast vehicular traffic.

Concepts

- *Jurisdictions should consider adopting the concept of improved accessibility as a planning goal and as a means to coordinate land use and transportation planning efforts.*
- *Where jobs/housing imbalance is already established, explore the development of transportation alternatives that would reduce the overall number of vehicle miles traveled.*

10.5.2 PROMOTING WALKING AND BICYCLING

A connected network of streets is important for the design of pedestrian-scaled and bicycle-friendly residential and commercial neighborhoods. A network of sidewalks and pathways makes walking and biking routes shorter and more convenient. Wide sidewalks, trees and attractive buildings that face the street are features that encourage people to walk and bike in a neighborhood. Also, infrastructure such as bike paths, bike racks, and bike lockers can provide incentives to people to choose this alternative transportation mode.

Concepts

- *Local planning agencies should encourage walking by planning for existing and new residential and commercial areas to include a safe and interconnected street system with adequate sidewalks and/or pedestrian trails.*
- *Local planning agencies should consider developing pedestrian- and bicycle-friendly design standards and infrastructure that apply to all residential and commercial projects.*

10.5.3 TRANSPORTATION DEMAND MANAGEMENT

Transportation Demand Management strategies reduce single-occupant vehicle trips by providing more transportation options. Jurisdictions can implement programs that encourage or require new development projects to provide facilities and amenities supporting the use of alternative transportation modes. Implementation of a structured Transportation Demand Management-based program by local jurisdictions could also partially mitigate the negative transportation and air quality impacts associated with the planned development of commercial and retail land uses[1].

Concepts

- *Jurisdictions should support actions to reduce single-occupant vehicle trips by adopting programs that encourage or require new commercial and industrial development projects to provide facilities and amenities that reduce reliance on private vehicle use and support the use of alternative transportation. As an example, this could include required installation of plug-in charging stations for new commercial and residential developments.*
- *Where significant jobs/housing imbalances have been identified, jurisdictions should support the establishment of efficient and convenient alternatives to single-occupant vehicle commuting.*

10.6 EMISSION REDUCTION POTENTIAL[2]

A rough estimate of the emission-reduction potential of a strategy can be derived by multiplying the number of VMT reduced (miles) by the emission factor for a given pollutant (grams per mile). Table 10-1 provides emission factors for the two ozone precursor pollutants, reactive organic gases (ROG) and nitrogen oxides (NOx). These composite running mode factors[3] were calculated using the Air Resources Board's EMFAC model and reflect County specific conditions for light-duty cars and trucks. As the table shows, the emission factors decline with time as cleaner vehicles are introduced into the fleet in the future.

[1] Traffic Solutions at SBCAG can provide more information on these measures.

[2] As the strategies in this chapter primarily affect light-duty vehicles and trucks (e.g., passenger vehicles) the emission-reduction potentials focus on potential reductions from this group of vehicles.

[3] ARB's EMFAC model generates emission factors for two modes of vehicle operation: when a vehicle is started ("start mode"), and when it is in motion ("running mode"). Emissions are greater during the start mode as emissions controls are not fully functional (e.g., the catalytic converter has not warmed up).

TABLE 10-1
RUNNING MODE EMISSION FACTORS FOR LIGHT DUTY CARS AND TRUCKS

Pollutant	2010	2015	2020	2030
	(grams per mile)	(grams per mile)	(grams per mile)	(grams per mile)
ROC	0.36	0.21	0.15	0.09
NOx	0.44	0.29	0.20	0.10

Table 10-2 illustrates the annual emission reductions for ROC and NO_x that could potentially be realized in the County if annual VMT were reduced by 1 percent, 5 percent and 10 percent.

TABLE 10-2
POTENTIAL EMISSION REDUCTIONS IN SANTA BARBARA COUNTY (TONS/YEAR)[4]

VMT reduction	2010		2015		2020		2030	
	ROC	NO_x	ROC	NO_x	ROC	NO_x	ROC	NO_x
1%	13.9	17	8.5	11.7	6.3	8.4	3.9	4.4
5%	69.5	85	42.5	58.5	31.5	42	19.5	22
10%	139	170	85	117	63	84	39	44

[4] These reductions are calculated using the running mode emissions in Table 10-1.

GLOSSARY OF TERMS

A

Acute Health Effect: An adverse heath effect that occurs over a relatively short period of time, (e.g., minutes, or hours.)

Adverse Health Effect: A health effect from exposure to air contaminants that may range from relatively mild temporary conditions, such as eye or throat irritation, shortness of breath, or headaches to permanent and serious conditions, such as birth defects, cancer or damage to lungs, nerves, liver, heart, or other organs.

Aerosol: Particles of solid or liquid matter that can remain suspended in air from a few minutes to many months depending on the particle size and weight.

Agricultural Burning: The intentional use of fire for vegetation management in areas such as agricultural fields, orchards, rangelands, and forests. The regulation of agricultural burning is described in the Agricultural Burning Guidelines, Title 17, California Code of Regulations.

Air: So called "pure" air is a mixture of gases containing about 78 percent nitrogen, 21 percent oxygen, and less than one percent carbon dioxide, argon, and other inert gases, with varying amounts of water vapor. See also ambient air.

Air Basin: A land area with generally similar meteorological and geographic conditions throughout. To the extent possible, air basin boundaries are defined along political boundary lines and include both the source and receptor areas. California is currently divided into 15 air basins. Santa Barbara County is located in the South Central Coast Air Basin, along with San Luis Obispo and Ventura Counties.

Air District: A political body responsible for managing air quality on a regional or county basis. California is currently divided into 35 air districts. (See also air pollution control district).

Air Monitoring: Sampling for and measuring of pollutants present in the atmosphere.

Air Pollutant: Any foreign and/or natural substance that is discharged, released, or propagated into the atmosphere that may result in adverse effects on humans, animal, vegetation and/or materials. Also known as an air contaminant. Examples include but are not limited to smoke, charred paper, dust, soot, grime, carbon, fumes, gases, odors, particulate matter, acids, or any combination thereof.

Air Pollution: Degradation of air quality resulting from unwanted chemicals or other materials occurring in the air.

Air Pollution Control District (APCD): This is the local agency that has authority to regulate stationary, indirect, and area sources of air pollution and governing air quality issues. The APCD proposes and adopts local air pollution rules, enforces those rules, responds to air pollution related complaints, issues permits to polluting sources, inventories sources of air pollution emissions. An air pollution control board composed of elected officials governs the APCD.

Air Quality Attainment Plan (AQAP): A comprehensive document required under the California Clean Air Act (Health and Safety Code Section 40910 et. seq.), which details the programs and control measures to be

implemented for the purpose of reducing emissions. Emissions ultimately must be reduced to the extent that measured concentrations of pollutants in the air will not exceed California ambient air quality standards.

Air Quality Index (AQI): The USEPA recently revised its method of reporting air quality and the associated health effects. The Air Quality Index replaces the Pollutant Standards Index (PSI) previously used to report air quality to the public. The AQI is a measure of air quality based on a percentage of the federal air quality standard: An AQI of 100 means the pollutant level is equal to the federal standard for that pollutant. An AQI below 100 means the air quality is better than the standard, and above 100 can be considered unhealthful. The higher the number, the more air pollution we are breathing. In Santa Barbara County, we report the AQI for ozone, based on the federal 8-hour standard. Ozone is the only pollutant for which we have recently violated a federal air quality standard.

Air Quality Simulation Model: A computer program that simulates the transport, dispersion, and transformation of compounds emitted into the air and can project the relationship between emissions and air quality.

Air Toxics: A generic term referring to a harmful chemical or group of chemicals in the air. Typically, substances that are especially harmful to health, such as those considered under EPA's hazardous air pollutant program or California's AB 1807 toxic air contaminant program, are considered to be air toxics. Technically, any compound that is in the air and has the potential to produce adverse health effects is an air toxic.

Airborne Toxic Control Measure (ATCM): A type of control measure, adopted by the ARB (Health and Safety Code Section 39666 et seq.), which reduces emissions of toxic air contaminants from non-vehicular sources.

Alternate Fuels: Any fuel used for vehicular sources other than standard gasoline or diesel fuels. These include ethanol, methanol, compressed natural gas, liquid petroleum gas and electricity. Alternative fuels are cleaner burning and help meet ARB's mobile and stationary emission standards.

Ambient Air: The air that is in the troposphere and is subjected to meteorological and climatic change. Often used interchangeably with "outdoor" air.

Ambient Air Quality Standard: Health and welfare based standards established by the state or federal government for clean outdoor air that identify the maximum acceptable average concentrations of air pollutants during a specified period of time.

Ammonia (NH_3): A pungent colorless gaseous compound of nitrogen and hydrogen that is very soluble in water and can easily be condensed into a liquid by cold and pressure. Ammonia reacts with NOx to form ammonium nitrate -- a major PM2.5 component in the Western United States.

Anthropogenic Emissions: Emissions related to human activity or devices.

Area-Wide Source: Stationary sources of pollution (e.g., water heaters, gas furnaces, fireplaces, and residential wood stoves) that are typically associated with homes and non-industrial sources. The emissions from these sources in themselves don't emit a significant amount of emissions, but when considered collectively with other similar sources become significant.

Arterial Streets: Streets designed to serve longer vehicle trips to, from, and within urban areas.

Atmosphere: The gaseous mass or envelope surrounding the Earth. From ground level up, the atmosphere is further subdivided into the troposphere, stratosphere, mesosphere, and the thermosphere. Where air pollutants are emitted into a building not designed specifically as a piece of air pollution control equipment, such emission into the building shall be considered an emission into the atmosphere.

Attainment: Achievement of air quality standards.

Attainment Area: A geographic region, which is in compliance with the National and/or California Ambient Air Quality Standards for a criteria pollutant under the Federal Clean Air Act or California Clean Air Act.

Attainment Plan: In general, a plan that details the emission reducing control measures and their implementation schedule necessary to attain air quality standards. In particular, the federal Clean Air Act requires attainment plans for nonattainment areas; these plans must meet several requirements, including requirements related to enforceability and adoption deadlines.

Average Daily Emissions: Annual emissions divided by 365 (the number of days in a year).

B

Best Available Control Measure (BACM): A term used to describe the "best" measures (according to U.S. EPA guidance) for controlling small or dispersed sources of particulate matter and other emissions from sources such as roadway dust, woodstoves, and open burning.

Best Available Control Technology (BACT): BACT is a term used to describe up-to-date methods, systems, techniques, and processes applied to new and modified sources of air pollution in order to achieve the most feasible air pollution emission control. BACT is a requirement stipulated in APCD Regulation VIII (New Source Review), in both Rule 802 (Nonattainment Review) and Rule 803 (Prevention of Significant Deterioration). Rule 802 governs the permitting of new and modified stationary sources of air pollution that emit pollutants for which the County has been designated as nonattainment for either the State or federal ambient air quality health standards. Rule 803 governs the permitting of new or modified stationary sources of attainment pollutants. Each of these two rules contains its own emission rate thresholds over which the BACT requirement is triggered. For sources permitted under Rule 802, BACT is the more stringent of:

a.) The most effective control device, emission unit, or technique that has been achieved in practice for the type of equipment comprising the stationary source; or
b.) The most stringent limitation contained in any State Implementation Plan; or
c.) Any other emission control device or technique determined after public hearing to technologically feasible and cost effective by the Control Officer.

For sources permitted under Rule 803, BACT is an emission limitation based on the maximum degree of reduction for each pollutant that would be emitted from any new or modified stationary source. This is done on a case-by-case basis, taking into account energy, environment, and economic impacts and other costs. It also needs to be achievable for such a source or modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of such a pollutant.

Best Available Mitigation Measures (BAMM): Design or operation measures that are directly related to the particular project, and are intended to reduce the number of vehicle trips.

Best Available Retrofit Control Technology (BARCT): An emission limitation based on the maximum degree of reduction achievable by existing sources, taking into consideration environmental, energy and economic needs.

Bicycle Master Plan: A formal city or county document that describes existing bicycle use, and sets out goals and actions that the government plans to do to increase bicycling as a means of travel.

Biogenic Emissions: Biological sources such as plants and animals that emit air pollutants such as volatile organic compounds. Examples of biogenic sources include animal management operations, and oak and pine tree forests. (See also natural sources.).

Bureau of Automotive Repair (BAR): An agency of the California Department of Consumer Affairs that manages the implementation of the motor vehicle Inspection and Maintenance Program.

C

California Air Resources Board (ARB or CARB): The State's lead air quality agency consisting of an eleven-member board appointed by the Governor and several hundred employees. CARB is responsible for attainment and maintenance of the state and federal air quality standards, and is fully responsible for motor vehicle pollution control. CARB oversees county and regional air pollution management programs.

California Ambient Air Quality Standards (CAAQS): A legal limit that specifies the maximum level and time of exposure in the outdoor air for a given air pollutant and which is protective of human health and public welfare (Health and Safety Code 39606b). CAAQSs are recommended by the California Office of Environmental Health Hazard Assessment and adopted into regulation by the CARB. CAAQSs are the standards, which must be met per the requirements of the California Clean Air Act (State Act).

California Clean Air Act of 1988 (State Act): A California law passed in 1988, which provides the basis for air quality planning and regulation independent of federal regulations. A major element of the Act is the requirement that local air districts in violation of the CAAQS must prepare attainment plans which identify air quality problems, causes, trends, and actions to be taken to attain and maintain California's air quality standards by the earliest practicable date.

California Environmental Protection Agency (Cal/EPA): A state government agency established in 1991 for unifying environmental activities related to public health protection in the State of California. There are six boards, departments, and offices under the organization of Cal/EPA including the California Air Resources Board (ARB), California Integrated Waste Management Board (IWMB), State Water Resources Control Board (SWRCB) and its nine Regional Water Quality Control Boards (RWQCB), Department of Pesticide Regulation (DPR), Department of Toxic Substances Control (DTSC), and Office of Environmental Health Hazard Assessment (OEHHA. The Cal/EPA boards, departments, and offices are directly responsible for implementing California environmental laws, or play a cooperative role with other regulatory agencies at regional, local, state, and federal levels.

California Environmental Quality Act (CEQA): A California law, which sets forth a process for public agencies to make informed decisions on discretionary project approvals. The process aids decision-makers to determine whether any environmental impacts are associated with a proposed project. It requires environmental impacts associated with a proposed project to be eliminated or reduced, and that air quality mitigation measures are implemented.

Carbon Monoxide (CO): A colorless, odorless, poisonous gas resulting from the incomplete combustion of fossil fuels. Over 80% of the CO emitted in urban areas is contributed by motor vehicles. CO interferes with the blood's ability to carry oxygen to the body's tissues and results in numerous adverse health effects. CO is a criteria air pollutant. This is one of the six pollutants for which there is a national ambient standard. (See Criteria Pollutants).

Carl Moyer Fund: A multi-million dollar incentive grant program designed to encourage reduction of emissions from heavy-duty engines. The grants cover the additional cost of cleaner technologies for on-road, off-road, marine, locomotive and agricultural pump engines, as well as forklifts and airport ground support equipment.

Car Share: A program organized by a public or private entity for the purpose of sharing the use of a number of vehicles between a number of individuals. For a nominal fee, the individual is able to reserve use of a vehicle as needed (usually by the hour), without actually being responsible for the maintenance, storage, insurance, etc. of the vehicle.

Central Business District (CBD): The downtown business areas of cities, historically the central downtown area.

Chlorofluorocarbons (CFCs): Any of a number of substances consisting of chlorine, fluorine, and carbon. CFCs are used for refrigeration, foam packaging, solvents, and propellants. They have been found to cause depletion of the atmosphere's ozone layer.

Chronic Health Effect: An adverse health effect, which occurs over a relatively long period of time (e.g., months or years).

Circulation Element: A plan adopted by a city or county to describe how people and goods should move.

Commute: A home-to-work or work-to-home trip made regularly in connection with employment.

Commute Alternatives: Carpooling, vanpooling, transit, bicycling, and walking as commute modes during peak period, as well as any Alternative Work Hours Program which results in the use of any mode of transportation for commuting outside of the peak periods.

Compliance Efficiency: The percent of emission sources subject to a control measure that is in compliance with its requirements. EPA recommends that compliance efficiency is assumed to be 80 percent unless a District proves otherwise.

Composite Efficiency: The efficiency value, which represents the actual effect of a control measure on a source category. Composite efficiency is calculated by finding the product of the control efficiency, percent implementation, the compliance efficiency, and the fraction of the source category affected.

Compressed Natural Gas (CNG): An alternative fuel currently being demonstrated in motor vehicles in Santa Barbara County and considered one of the cleanest alternative fuels because of low hydrocarbon emissions. However, it does emit a significant quantity of nitrogen oxides.

Compressed Work Schedules: Work schedules that compress the traditional 40-hour weekly work period into fewer than five days by adopting longer work day such as 4/40 (4-ten hour days), and 9/80 (8-nine hour and 1-eight hour days out of every ten work days).

Conformity: A demonstration of whether a federally supported activity is consistent with the State Implementation Plan (SIP) -- per Section 176 (c) of the Clean Air Act. Transportation conformity refers to plans, programs, and projects approved or funded by the Federal Highway Administration or the Federal Transit Administration. General conformity refers to projects approved or funded by other federal agencies.

Congestion: Traffic conditions on roads, highways, or freeways, which do not permit movement at optimal legal speeds.

Congestion Management Program (CMP): A state mandated program (Government Code Section 65089a) that requires each county to prepare a plan to relieve congestion and reduce air pollution. The CMP is a comprehensive program designed to reduce auto-related congestion through provision of roadway improvements, travel demand management and coordinated land use planning among all local jurisdictions. The program is required of every county in California with an urbanized area of at least 50,000 people. The CMP is updated biennially.

Congestion Mitigation and Air Quality Program (CMAQ): A program created by the Intermodal Surface Transportation and Efficiency Act (ISTEA) which provides funds for transportation plans and programs in areas that are currently not in attainment with the federal Clear Air Act for ozone or carbon monoxide. CMAQ-funded projects must contribute to the attainment of air quality standards by demonstrating a reduction in vehicular emissions.

Consumer Products: Products such as detergents, cleaning compounds, polishes, lawn and garden products, personal care products, and automotive specialty products which are part of our everyday lives and, through consumer use, may produce air emissions which contribute to air pollution.

Contiguous Property: Two or more parcels of land with a common boundary or that are separated solely by a public roadway or other public right-of-way.

Contingency Measure: Contingency measures are statute-required back-up control measures to be implemented in the event of specific conditions. These conditions can include failure to meet interim milestone emission reduction targets or failure to attain or maintain the standard by the statutory attainment date. Both state and federal Clean Air Acts require that District plans include contingency measures.

Control Efficiency: The percent of emissions that are controlled (i.e. not emitted) as a result of some control on a polluting device or process.

Control Measure: A strategy to reduce the emissions of air pollution caused by a specific activity or related group of activities. An existing control measure is a measure, which is currently being implemented as a rule. A proposed for adoption control measure is a measure that the APCD will be mandated to make into a rule if the plan is approved by the Board. A further study control measure is a measure that has the potential of being proposed for adoption, but warrants further study.

Corporate Average Fuel Economy: The sales-weighted average fuel economy of an automobile manufacturer's annual production; CAFE is also used to refer to the Federal law that mandates that automobile manufacturers meet minimum average fuel economy standards.

Cost-Effectiveness: A cost per unit of emission reduction, which is lower than or equivalent to the maximum unit costs of the same emission reduction through the use of demonstrated Best Available Control Technology, calculated in current year dollars.

Criteria Pollutants: The Federal Clean Air Act required the Environmental Protection Agency to set air quality standards for common and widespread pollutants after preparing "criteria documents" summarizing scientific knowledge on their characteristics and potential health and welfare effects. Today there are standards for six "criteria pollutants" for which State or National Ambient Air Quality Standards exist. These criteria pollutants include ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, lead, and suspended particulate matter (PM_{10} and $PM_{2.5}$). The USEPA and CARB periodically review new scientific data and may propose revisions to the standards as a result.

D

Design Value: For ozone, the state defines that a calculated design day is based on three years of data excluding: extreme values, values that result from exceptional events or values attributable to overwhelming transport from an upwind district. Under federal law, the design day for ozone (1-hour standard) is the fourth highest one-hour concentration experienced at an individual monitoring station during the past three years.

E

Electric Motor Vehicle: A motor vehicle, which uses a battery-powered electric motor as the basis of its operation. Such vehicles emit virtually no air pollutants. Hybrid electric motor vehicles may operate using both electric and gasoline powered motors. Emissions from hybrid electric motor vehicles are also substantially lower than conventionally powered motor vehicles.

EMFAC: The Emission Factor model used by ARB to calculate on-road mobile vehicle emissions.

Emission Budget: An emission "ceiling" for future transportation emissions that cannot be exceeded.

Emission Factor: For stationary sources, the relationship between the amount of pollution produced and the amount of raw material processed or burned. For mobile sources, the relationship between the amount of pollution produced and the number of vehicle miles traveled. By using the emission factor of a pollutant and specific data regarding quantities of materials used by a given source, it is possible to compute emissions for the source. This approach is used in preparing an emissions inventory.

Emission Forecasting: Estimating air pollutant emissions in future years using population, economic and control projections.

Emission Inventory: An estimate of the amount of pollutants emitted from mobile, stationary, area-wide, and natural sources into the atmosphere over a specific period such as a day or a year.

Emission Offsets: A rule-making concept whereby approval of a new or modified stationary source of air pollution is conditional on the reduction of emissions from other existing stationary sources of air pollution. These reductions are required in addition to reductions required by BACT.

Emission Reductions: The amount of emissions that will be reduced due to the implementation of a control measure. Emission reductions can be calculated by finding the product of the emissions and the composite efficiency, while accounting for existing control.

Emission Standard: The maximum amount of a pollutant that is allowed to be discharged from a polluting source such as an automobile or smoke stack.

Employment Centers: Locations having a concentration of jobs or employment. Centers may vary in size and density, serving sub-regional or local markets, generally meeting the needs of the immediate population.

Environmental Impact Report (EIR): A document discussing the potential adverse environmental impacts of a project required by the California Environmental Quality Act.

Ethanol: A clear liquid derived from biomass (also known as "ethyl alcohol" or "grain alcohol").

Evaporative Emissions: Emissions from evaporating gasoline, which can occur during vehicle refueling, vehicle operation, and even when the vehicle is parked. Evaporative emissions can account for two-thirds of the hydrocarbon emissions from gasoline-fueled vehicles on hot summer days.

Exceedance: Ambient pollutant concentrations measured above the applicable ambient air quality standards.

Exhaust Gas Recirculation (EGR): An emission control method that involves recirculating exhaust gases from an engine back into the intake and combustion chambers. This lowers combustion temperatures and reduces NO_x.

Expected Peak Day Concentration (EPDC): A calculated value that represents the concentration expected to occur at a particular site once per year, on average. The calculation procedure uses measured data collected at the site during a three-year period. Measured concentrations that are higher than the EPDC are excluded from the state area designation process.

Express service: Bus Service designed to connect high volume destinations, using the freeway where possible.

F

Facility: A structure, building, or operation that has one or more permitted pieces of equipment.

Feasible: Feasibility is most frequently used in the context of "feasible" stationary source control measures. In this context, feasible means Best Available Retrofit Control Technology (see definition, above).

Federal Clean Air Act (Federal Act): A federal law passed in 1970 and amended in 1977 and 1990, which forms the basis for the national air pollution control effort. Basic elements of the act include national ambient air quality standards for major air pollutants, air toxics standards, acid rain control measures, and enforcement provisions.

Federal Implementation Plan (FIP): In the absence of an approved State Implementation Plan (SIP), a plan prepared by the EPA which provides measures that nonattainment areas must take to meet the requirements of the Federal Clean Air Act.

Feeder service: Bus Service designed to connect low-density areas, usually residential, with trunk or other lines. Feeder services are quite similar to local service.

Flexible Fuel Vehicle (FFV): A vehicle capable of operating on any combination of methanol, ethanol, and gasoline.

Fraction Reactive Organic Gases (FROG): The weight fraction of reactive organic gases in emissions of total organic gases from a source.

Fugitive Dust: Dust particles, which are introduced into the air through certain activities such as soil cultivation, off-road vehicles, or any vehicles operating on open fields or dirt roadways.

G

Gasoline Tolerant: A term used to describe vehicles that normally operate on methanol but can run on gasoline as well.

Growth Management Plan: A plan for a given geographical region containing demographic projections (i.e., housing units, employment, and population) through some specified point in time, and which provides recommendations for local governments to better manage growth and reduce projected environmental impacts.

H

Hazardous Air Pollutant (HAP): An air pollutant listed under section 112 (b) of the federal Clean Air Act as particularly hazardous to health. Emission sources of hazardous air pollutants are identified by USEPA, and emission standards are set accordingly.

Haze (Hazy): A phenomenon that results in reduced visibility due to the scattering of light caused by aerosols. Haze is caused in a large part by man-made air pollutants.

Health-Based Standard (Primary Standard): A dosage of air pollution scientifically determined to protect against human health effects such as asthma, emphysema, and cancer.

High Occupancy Vehicle (HOV): A vehicle which is transporting more than one person. HOV lanes are segments of roadway which are restricted to HOV vehicles.

Highway Performance Monitoring System (HPMS): The Highway Performance Monitoring System (HPMS) is a federally mandated inventory system and planning study designed to assess the nation's highway system. It maintains its authority through the following Codes of Federal Regulations: 23 CFR 420.105(b), 23 CFR 500.807(b), 40 CFR 51.452 (b)(2), 40 CFR 93.130(b)(2), and Section 187 of the 1990 Clean Air Act Amendments (CAAA). It is used to provide data to the Environmental Protection Agency (EPA) to assist in monitoring air quality conformity and travel forecasts generated for federal air quality plans.

Hybrid Electric Vehicle (HEV): Hybrid electric motor vehicles may operate using both electric and gasoline-powered motors. Emissions from hybrid electric motor vehicles are also substantially lower than conventionally powered motor vehicles. (See also Electric Motor Vehicle.)

Hydrocarbons: Compounds containing various combinations of hydrogen and carbon atoms. They may be emitted into the air by natural sources (e.g., trees) and as a result of fossil and vegetative fuel combustion, fuel volatilization, and solvent use. Hydrocarbons are a major contributor to smog. (See also Reactive Organic Compounds).

Hydrogen Sulfide (H_2S): A colorless, flammable, poisonous compound having a characteristic rotten-egg odor. It is used in industrial processes and may be emitted into the air.

101 Def: Highway 101 Deficiency Plan adopted by SBCAG, June 2002.

101 I-M: Highway 101 In-Motion – $1.6 million study to identify long-term solutions to the congestion problems within the Highway 101 corridor in southern Santa Barbara County.

I

Incentives: Measures designed to encourage certain actions or behavior. These include inducements for the use of carpools, buses and other high-occupancy vehicles in place of single occupant automobile travel. Examples include HOV lanes, preferential parking and financial incentives.

Indirect Source: Any facility, building, structure, or installation, or combination thereof, which generates or attracts mobile source activity that results in emissions of any pollutant (or precursor) for which there is a state ambient air quality standard. Examples of indirect sources include employment sites, shopping centers, sports facilities, housing developments, airports, commercial and industrial development, and parking lots and garages.

Indirect Source Control Program: Rules, regulations, local ordinances and land use controls, and other regulatory strategies of air pollution control districts or local governments used to control or reduce emissions associated with new and existing indirect sources.

Indirect Source Review: A major component of an indirect source control program, which applies to new and modified indirect sources. Strategies for indirect source review include permit programs, review and comment on new and modified indirect source projects through the California Environmental Quality Act (CEQA) process, and coordination of air quality, transportation and land use policies through local government general plans. Indirect source review reduces emissions from new and modified sources through best available mitigation measures and additional offsite mitigation such as offsets and mitigation fees.

Infill: Development that focuses on the rehabilitation or redevelopment of land within an existing urban or town boundary rather than the conversion of previously undeveloped open space.

Inspection and Maintenance Program: A motor vehicle inspection program implemented by the California Bureau of Automotive Repair. The purpose of I&M is to reduce emissions by assuring that cars are running properly. It is designed to identify vehicles in need of maintenance and to assure the effectiveness of their emission control systems on a biennial basis. Enacted in 1979 and strengthened in 1990. (Also known as the "Smog Check" program.)

Inversion: A layer of warm air in the atmosphere that prevents the rise of cooling air and traps pollutants beneath it.

Intelligent Transportation System (ITS): Advanced electronic and information systems that can improve the safety, operational efficiency and productivity of the transportation system.

L

Lead: A gray-white metal that is soft, malleable, ductile, and resistant to corrosion. Sources of lead resulting in concentrations in the air include industrial sources and crustal weathering of soils followed by fugitive dust emissions. Health effects from exposure to lead include brain and kidney damage and learning disabilities. Lead is the only substance, which is currently listed as both a criteria air pollutant and a toxic air contaminant.

Lead Agency: The public agency, which has the principal responsibility to carry out or approve a project.

Level of Service (LOS): A measure of the congested level on a highway facility or intersection based primarily on the comparison between the facility's capacity and the speed and density of its traffic volume it carries. Increasing levels of congestion are designated along a scale from A to F.

Light-Duty Vehicle (LDV): Any motor vehicle with a gross vehicle weight of 6000 pounds or less.

Liquefied Petroleum Gas (LPG): A gaseous byproduct of petroleum refining that is compressed to a liquefied form for sales. LPG consists of butane, propane, or a mixture of the two, and of trace amounts of propylene and butylene.

Local Agency: Any public agency other than a state or federal agency.

Local Service: Service connecting residential areas with central business districts.

Low Emission Vehicle (LEV): The LEV standards for passenger cars represent a 70 percent reduction in gasoline-equivalent hydrocarbon and a 50 percent reduction in NO_X from ARB's 1994 standards.

Lowest Achievable Emission Rate (LAER): Under the Federal Clean Air Act, the rate of emissions that reflects (1) the most stringent emission limitation in the State Implementation Plan of any state for a given source unless the owner or operator demonstrates such limitations are not achievable; or (2) the most stringent emissions limitation achieved in practice, whichever is more stringent.

M

Maintenance Plan: In general, a plan that details the actions necessary to maintain air quality standards. In particular, the federal Clean Air Act requires maintenance plans for areas that have been redesignated as attainment areas.

Memorandum of Understanding (MOU): The Santa Barbara Association of Governments (SBCAG) is the regional agency responsible for preparing regional transportation plans and programs. Most of these programs require the participation of cities, the county, and other affected local agencies. A number of these programs also have implications to regional air quality plans such as the Clean Air Plan. Since SBCAG currently works with cities and the county on regional transportation programs, and because of the close interaction between many of these programs and the regional air quality plan, the APCD and SBCAG have entered into a MOU. Within this MOU, SBCAG is charged with developing the transportation elements of the plan, especially the transportation control measures, which essentially seek to reduce the use of the single passenger automobile and are implemented by a number of local agencies such as local cities and the county.

Methanol: A colorless, clear liquid derived from natural gas or coal (also known as "methyl alcohol" or "wood alcohol").

Methyl Tertiary Butyl Ether (MTBE): An ether compound added to gasoline to provide oxygen and enhance complete combustion. MTBE is being fazed out of California's gasoline.

Mitigation: A change or alternative to the proposed project, which reduces or eliminates its significant adverse environmental impacts. Mitigation can be in the form of traditional offsets, transportation-based mitigation measures that are directly associated with the project under consideration, or mitigation fees to be used to secure off site mitigation.

Mobile Source: Sources of air pollution such as automobiles, motorcycles, trucks, buses, off-road vehicles, boats and airplanes. (Contrast with stationary sources.)

Model Rule: A generically formatted control measure, prepared as a guide for adoption by regulatory agencies. Model rules have no force of law until they are adopted by a regulatory agency. Historically, model rules were prepared by the California Air Resources Board and given to local Air Pollution Control Districts for their consideration. The model rule process was replaced by the suggested control measure process. (See Suggested Control Measure).

Metropolitan Planning Organization (MPO): Under federal law, the organization designated by the governor as responsible for transportation planning and programming activities required under federal law in an urbanized area. It serves as the forum for cooperative decision making by a regional board made up of local elected officials. As the regions' designated MPO, SBCAG is responsible for development of the federal long range transportation plan and multi-year funding programs, and the selection and approval of transportation projects using federal funds.

N

National Ambient Air Quality Standards (NAAQS): Standards established by the United States EPA that apply for outdoor air throughout the country. There are two types of NAAQS. Primary standards set limits to protect public health and secondary standards set limits to protect public welfare

Natural Sources: Non-manmade emission sources, including biological and geological sources, wildfires, and windblown dust.

Net Emissions: The actual emissions occurring from a new or modified project after actual on site and off site mitigation, and other effective mitigation has been applied, as determined by the Air Pollution Control Officer.

New Source Review (NSR): A program used in development of permits for new or modified industrial facilities which are in a nonattainment area, and which emit nonattainment criteria air pollutants. The two major requirements of NSR are Best Available Control Technology and Emission Offsets.

Nitrogen Oxides (Oxides of Nitrogen, NO_x): A general term pertaining to compounds of nitric acid (NO), nitrogen dioxide (NO_2), and other oxides of nitrogen. Nitrogen oxides are typically created during combustion processes, and are major contributors to smog formation and acid deposition. NO_2 is a criteria air pollutant, and may result in numerous adverse health effects; it absorbs blue light, resulting in a brownish-red cast to the atmosphere and reduced visibility.

Nonattainment Area: A geographic area identified by the USEPA and/or ARB as not meeting either NAAQS or CAAQS standards for a given pollutant.

O

Opacity: The amount of light obscured by particle pollution in the atmosphere. Opacity is used as an indicator of changes in performance of particulate control systems.

Outer Continental Shelf: The area of the Pacific Ocean extending twenty-five miles out to sea from the State Tidelands (which extends three miles from the coastline).

Oxygenate: Any oxygen-rich substance added to gasoline to enhance octane and reduce carbon monoxide emissions.

Ozone: A strong smelling, pale blue, reactive toxic chemical gas consisting of three oxygen atoms. It is a product of the photochemical process involving the sun's energy. Ozone exists in the upper atmosphere ozone layer as well as at the earth's surface. Ozone at the earth's surface causes numerous adverse health effects and is a criteria air pollutant. It is a major component of smog.

Ozone Precursors: Chemicals such as reactive organic compounds and oxides of nitrogen, occurring either naturally or as a result of human activities, which contribute to the formation of ozone, a major component of smog.

P

Particulate Matter (PM): Any material, except pure water, that exists in the solid or liquid state in the atmosphere, such as soot, dust, smoke, fumes, and aerosols. The size of particulate matter can vary from coarse, wind-blown dust particles to fine particle combustion products.

Particulate Matter less than 10 microns (PM_{10}): A criteria air pollutant consisting of small particles with an aerodynamic diameter less than or equal to a nominal 10 microns (about 1/7 the diameter of a single human hair). Their small size allows them to make their way to the air sacs deep within the lungs where they may be deposited and result in adverse health effects. PM10 also causes visibility reduction.

Particulate Matter less than 2.5 microns ($PM_{2.5}$): A major air pollutant consisting of tiny solid or liquid particles, generally soot and aerosols. The size of the particles (2.5 microns or smaller, about 0.0001 inches or less) allows them to easily enter the air sacs deep in the lungs where they may cause adverse health effects, as noted in several recent studies. $PM_{2.5}$ also causes visibility reduction.

Peak Period/Peak Hour Demand: The time of most intensive use of a service or facility. In terms of travel, generally there is a morning and an afternoon peak on streets and highways.

Permit: Written permission and authorization from a government agency that allows for the construction and/or operation of an emission generating facility or its equipment within certain specified limits or conditions.

Photochemical: Of, relating to, or resulting from the chemical action of radiant energy, especially sunlight.

Planning Inventory: Emissions inventory from which pollution from natural sources (e.g., seeps, vegetation) are excluded because they are currently not regulated by implementation of APCD rules.

Precursor: Any directly emitted pollutant that, when released into the atmosphere, forms or causes to be formed or contributes to the formation of a secondary pollutant for which an ambient air quality standard has been adopted, or whose presence in the atmosphere will contribute to the violation of one or more ambient air quality standards.

Prevention of Significant Deterioration (PSD): A program used in development of permits for new or modified industrial facilities in an area that is already in attainment. The intent is to prevent an attainment area from becoming a non-attainment area. This program, like NSR, can require BACT and, if a standard is projected to be exceeded, Emission Offsets.

Public Transportation: Transportation service by bus, rail, airplane, and ship offered by an operator on a regular basis to the general public.

Public Workshop: A workshop held by a public agency for the purpose of informing the public and obtaining its input on the development of a regulatory action or control measure by that agency.

R

Reactive Organic Compound (ROC): A reactive chemical gas, composed of hydrocarbons, that reacts with nitrogen oxides and contributes to the formation of ozone. Also known as Volative Organic Compounds (see VOC), or as Non-Methane Organic Compounds (NMOCs). The APCD considers all volatile compounds containing carbon ***except*** the following to be reactive: ethane, methane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, ammonium carbonates, methyl chloroform (TCA), methylene chloride (dichloromethane), CFC-11, CFC-12, HCFC-22, FC-23, CFC-113, CFC-114, CFC-115, HCFC-123, HCFC-134a, HCFC-141b, HCFC-142b.

Reactive Organic Gases (ROG): See reactive organic compound.

Reactivity: A measure of the tendency of a hydrocarbon species to react with nitrogen oxides to form atmospheric ozone.

Reasonable Further Progress: Annual incremental reductions in emissions of the relevant air pollutant and its precursors required to ensure attainment of the applicable air quality standard by the applicable date.

Reasonably Available Control Measures (RACM): A broadly defined term referring to technologies and other measures that can be used to control pollution. They include Reasonably Available Control Technology and other measures. In the case of PM10, RACM refers to approaches for controlling small or dispersed source categories such as road dust, woodstoves, and open burning.

Reasonably Available Control Technology (RACT): Process changes and/or devices to minimize air pollution from mobile and stationary sources that are cost-effective and readily available.

Reformulated Gasoline: Also called Cleaner Burning Gasoline (CBG). Gasoline with a different composition from conventional gasoline (e.g., lower aromatics content) that results in the production of lower levels of air pollutants.

Regional Haze: The haze produced by a multitude of sources and activities, which emit fine particles and

their precursors across a broad geographic area. National regulations require states to develop plans to reduce the regional haze that impairs visibility in national parks and wilderness areas.

Residential Second Units (RSU): Residential Second Unit means one additional living unit on any one lot or parcel within a single-family residential zoning district containing a single family dwelling. Such residential second unit is further defined as a building, or portion thereof, that provides complete, independent living facilities for one or more persons and permanent provisions for living, sleeping, eating, cooking, and sanitation.

Retrofit: Modification of a polluting device to make it less polluting.

Ridesharing: A cooperative effort of two or more people to travel together. Examples are carpools, vanpools, bus pools, trains, and public transit.

ROP Plan: The 1993 Rate-of-Progress Plan. The 1993 ROP Plan demonstrated that by 1996 existing and proposed control measures reduced emissions of reactive organic gases (ROG) to a level 15 percent below the 1990 baseline inventory.

S

Santa Maria Basin: An area of undersea oil reserves off the western coast of Santa Barbara County.

Secondary Pollutants: Pollutants not emitted directly, but formed in the atmosphere through chemical reactions or transformation of other pollutants (e.g., ozone).

Single Occupant Vehicle (SOV): A motor vehicle occupied by one employee for commute purposes, including motorcycles.

Smog: A combination of smoke, ozone, hydrocarbons, nitrogen oxides, and other chemically reactive compounds which, under certain conditions of weather and sunlight, may result in a murky brown haze that causes adverse health effects. The primary contributor to smog in California is motor vehicles.

Smog Check: A vehicle inspection and maintenance exam. Smog Check Program: (See Inspection and Maintenance Program.)

Smoke: A form of air pollution consisting primarily of particulate matter (i.e., particles). Other components of smoke include gaseous air pollutants such as hydrocarbons, oxides of nitrogen, and carbon monoxide. Sources of smoke may include fossil fuel combustion, agricultural burning, and other combustion processes.

Solvent: A substance that dissolves another to form a solution.

Source: Something that produces air pollution emissions. Sources can be stationary or mobile, and anthropogenic or natural.

South Coast Transit Plan (SCTP): A transit plan prepared by Santa Barbara MTD that describes extensive improvements to transit service throughout the South Coast.

Sprawl: Dispersed development outside of compact urban and village centers along highways and in

rural countryside.

State Implementation Plan (SIP): A comprehensive plan prepared by each state, mandated by the federal Clean Air Act, which describes the existing air quality conditions and measures which will be taken to attain and maintain national ambient air quality standards.

State Tidelands: The area of the Pacific Ocean within three miles of the shores of Santa Barbara County.

Stationary Source: A non-mobile structure, building, facility, equipment installation or operation. Examples include oil production facilities, industrial coating operations, a rock crushing facility, and factories that use large amounts of solvents. A stationary source is classified as having a common production process, located on one or more adjacent properties, and is under the same or common ownership, operation, or control. (Contrast with mobile sources.)

Stationary Source Control Measures: A control measure designed to limit the kind and amount of pollutants emitted from stationary sources.

Street Furniture: Items that add interest and convenience to the pedestrian street environment including benches, planters, newsstands, drinking fountains, lighting fixtures and bike racks.

Suggested Control Measure (SCM): A document upon which air pollution control rules and regulations can be based. The California Air Resources Board issues SCMs to provide guidance to districts in their consideration and development of rules and regulations. However, approval by the ARB of an SCM does not obligate the local districts to develop particular regulations for sources addressed by the SCM. Local districts have the latitude to develop regulations that are as stringent, more stringent, or less stringent than SCMs. The stringency of regulations that are developed by the local districts is usually based in part on the extent to which emissions reductions are needed to achieve compliance with the ambient air quality standards, in that district's area of jurisdiction, as well as other local considerations. The districts also consider the costs for achieving the emission reductions.

Sulfur Dioxide (SO_2): A strong smelling, colorless gas that is formed by the combustion of fossil fuels. Power plants, which may use coal or oil high in sulfur content, can be major sources of SO_2. SO_2 and other sulfur oxides contribute to the problem of acid deposition. SO_2 is a criteria pollutant.

T

Telecommuting: Working at a location other than the conventional office. This place may be the home, or an office other than the employee's primary office. Telecommuting employees can communicate with their offices by telephone.

Total Organic Gases (TOG): Reactive organic gases plus non-reactive organic gases.

Toxic Air Contaminant: An air pollutant, identified in regulation by the ARB, which may cause or contribute to an increase in deaths or in serious illness, or which may pose a present or potential hazard to human health. TACs are considered under a different regulatory process (California Health and Safety Code Section 39650 et seq.) than pollutants subject to CAAQS. Health effects due to TACs may occur at extremely low levels, and it is typically difficult to identify levels of exposure, which do not produce adverse health effects.

Transfer of Development Rights (TDR): Transfer of development rights refers to a method for protecting land by transferring the "rights to develop" from one area and giving them to another. What is actually occurring is a consensus to place conservation easements on property in agricultural areas while allowing for an increase in development densities or "bonuses" in other areas that are being developed. The costs of purchasing the easements are recovered from the developers who receive the building bonus.

Transitional Low Emission Vehicle (TLEV): TLEV vehicle standards will be 50 percent less hydrocarbon emissions than 1993 model-year conventional gasoline vehicles.

Transport: The act of emissions from one source being carried by wind to other locations.

Transportation Control Measure (TCM): Any strategy to reduce vehicle trips, vehicle use, vehicle miles traveled, vehicle idling, or traffic congestion for the purpose of reducing motor vehicle emissions. TCMs can include encouraging the use of carpools and mass transit. TCM's include both Transportation Demand Management and Transportation System Management measures.

Transportation Demand Management (TDM): The implementation of measures, which encourage people to change their mode of travel, or not to make a trip at all, (e. g., ridesharing, pricing incentives, parking management and telecommuting.)

Transportation System Management (TSM): The implementation of measures, which improve the efficiency of transportation infrastructure.

Trip: A single or one direction vehicle movement.

U

Ultra Low Emission Vehicle (ULEV): ULEV standards would lower gasoline-equivalent hydrocarbon emissions by 85 percent, carbon monoxide by 50 percent, and NO_X emissions by 50 percent, from 1993 levels.

United States Environmental Protection Agency (USEPA): The federal agency charged with setting policy and guidelines, and carrying out legal mandates for the protection of national interests in environmental resources.

Urban Growth Boundary (UGB): Boundaries that delineate where development ends and open space begins.

V

Vapor Recovery Systems: Mechanical systems that collect and recover chemical vapors resulting from transfer of gasoline from operations such as tank-to-truck systems at refineries, tanker-to-pipeline systems at offshore oil operations, and pump-to-vehicle systems at gasoline stations.

Vehicle Miles Traveled (VMT): VMT is the sum number of miles traveled by a given vehicle in a specified time period. This sum number of miles is sometimes estimated for the entire fleet of on road vehicles during a fixed period of time on a fixed expanse of highways.

Violation: A number of measured exceedances of an applicable ambient air quality standard.

Visibility: The distance that atmospheric conditions allow a person to see at a given time and location. Visibility reduction from air pollution is often due to the presence of sulfur and nitrogen oxides, as well as particulate matter.

Volatile Organic Compound (VOC): This term is generally used similarly to the term "reactive organic compounds" but excludes ethane, which the federal government does not consider to be reactive. VOCs are hydrocarbon compounds that exist in the ambient air and contribute to the formation of smog and/or may themselves be toxic. VOCs often have an odor, and some examples include gasoline, alcohol, and the solvents used in paints.

Z

Zero Emission Vehicle (ZEV): A vehicle, which will maintain zero emissions throughout its lifetime.

Zoning. The public regulation of the use of land. It involves the adoption of ordinances that divide a community into various districts or zones. Each district allows certain uses of land within that zone, such as residential, commercial, or industrial. Typical zoning regulations address building height, bulk, lot area, setbacks, parking, signage, and density.

GLOSSARY OF ACRONYMS

APCD	Air Pollution Control District
APCD	Santa Barbara County Air Pollution Control District
APCO	Air Pollution Control Officer
API	American Petroleum Institute
AQAP	Air Quality Attainment Plan
ARB	California Air Resources Board
ATCM	Air Toxic Control Measure
ATV	All Terrain Vehicle
AVR	Average Vehicle Ridership
BACT	Best Available Control Technology
BAMM	Best Available Mitigation Measures
BAR	Bureau of Automotive Repair
BARCT	Best Available Retrofit Control Technology
BBLS	Barrels
BOPD	Barrels of Oil Per Day
Btu	British thermal unit
CAC	Community Advisory Council
Caltrans	California Department of Transportation
CAP	Clean Air Plan
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CCAA	California Clean Air Act of 1988
CCC	California Coastal Commission
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CES	Category of Emission Source (for Area-Wide Sources)
CFR	Code of Federal Regulations
CMAQ	Congestion Mitigation and Air Quality
CMP	Congestion Management Program
CNG	Compressed Natural Gas
CO	Carbon Monoxide
CO_2	Carbon Dioxide
DMV	Department of Motor Vehicles
DOG	Department of Oil and Gas (California)
DPR	Department of Pesticide Regulation
DVMT	Daily Vehicle Miles of Travel
EDS	Statewide Emission Data System
EIR	Environmental Impact Report
EMFAC	Emission Factor Model for on-road vehicles (by ARB)
EPA	Environmental Protection Agency (United States)
EPDC	Expected Peak Day Concentration
ERC	Emissions Reduction Credit
ERF	Environmental Research Foundation
EtO	Ethylene Oxide
FCAA	Federal Clean Air Act
FCAAA	Federal Clean Air Act Amendments
Federal Act	Federal Clean Air Act Amendments

FFV	Flexible Fuel Vehicle
FIP	Federal Implementation Plan
FMVCP	Federal Motor Vehicle Control Program
FROG	Fraction Reactive Organic Gases
FPM10	Fraction Particulate Matter Less Than 10 Microns in Diameter
FTIP	Federal Transportation Improvement Program
FTP	Federal Emissions Test Procedure
GVR	Gasoline Vapor Recovery
H&SC	Health & Safety Code
HAP	Hazardous Air Pollutant
H_2S	Hydrogen Sulfide
HC	Hydrocarbons
HDDT	Heavy Duty Diesel Truck
HDGT	Heavy Duty Gas Truck
HDT	Heavy Duty Truck
HDV	Heavy Duty Vehicle
HHDT	Heavy-Heavy Duty Trucks (33,001 – 60,000 lbs)
HOT	High Occupancy Toll (Lane)
HOV	High Occupancy Vehicle (Lane)
Hp	Horsepower
HPMS	Highway Performance Monitoring System
IC	Internal Combustion
IMPROVE	Interagency Monitoring of Protected Visual Environments Program
I&M	Inspection and Maintenance
IMO	International Maritime Organization
IPM	Integrated Pest Management
IRTA	Institute for Research & Technical Assistance
ISTEA	Intermodal Surface Transportation Efficiency Act
ISR	Indirect Source Review
ITG	Innovative Technology Group
LAER	Lowest Achievable Emission Rate
LDA	Light Duty Auto
LDT	Light Duty Truck (0 – 5,750 lbs)
LDT1	Light Duty Truck (0 - 3,750 lbs)
LDT2	Light Duty Truck (3,751 – 5,750 lbs)
LDV	Light Duty Vehicle (LDA, LDT1, LDT2)
LEV	Low Emission Vehicle
LHDT1	Light-Heavy Duty Trucks (8,501 – 10,000 lbs)
LHDT2	Light Heavy Duty Trucks (10,001 – 14,000 lbs)
LHV	Line Haul Vehicle (60,001 lbs +)
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
M	Thousand
MCY	Motorcycle
MH	Motor Homes
MM	Million
M85	85 percent Methanol/15 percent Gasoline Fuel
MDT	Medium Duty Truck
MDV	Medium Duty Vehicle
MHDT	Medium Heavy Duty Trucks (14,001 – 33,000 lbs)

MMBTU	Million British Thermal Units
MMSCFD	Million Standard Cubic Feet Per Day
MOU	Memorandum of Understanding
MSCF	Thousand Standard Cubic Feet
MTD	Metropolitan Transit District
MTBE	Methyl Tertiary-Butyl Ether
MVFF	Motor Vehicle Fueling Facility (Gas Station)
MVRF	Motor Vehicle Refurbishing Facility (Auto Body Repair Shop)
MVIP	Motor Vehicle Inspection Program
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NESHAPS	National Emission Standards for Hazardous Air Pollutants
NGL	Natural Gas Liquids
NMHC	Non-Methane Hydrocarbons
NO	Nitric Oxide
NO_2	Nitrogen Dioxide
NO_x	Oxides of Nitrogen
NOV	Notice of Violation
NSPS	New Source Performance Standards
NSR	New Source Review
O_3	Ozone
OCS	Outer Continental Shelf
OVA	Organic Vapor Analyzer
PAM	Photochemical Assessment Monitoring Station
PAN	Peroxyacyl Nitrate
PC	Passenger Cars (LDA)
Pb	Lead
PM	Particulate Matter
PM_{10}	Particulate Matter Less Than 10 Microns in Diameter
$PM_{2.5}$	Particulate Matter Less Than 2.5 Microns in Diameter
ppb	Parts Per Billion
pphm	Parts Per Hundred Million
ppm	Parts Per Million
PSD	Prevention of Significant Deterioration
psi	Pounds Per Square Inch
PSI	Pollution Standards Index
psia	Pounds Per Square Inch Absolute Pressure
PVC	Polyvinyl Chloride
PVRV	Pressure Vacuum Relief Valves
RACT	Reasonably Available Control Technology
RHC	Reactive Hydrocarbons - same as ROG
RMD	Resource Management Department (Santa Barbara County)
ROC	Reactive Organic Compounds - same as ROG
ROG	Reactive Organic Gases - same as ROC
ROP	Rate-of-Progress Plan
RTIP	Regional Transportation Implementation Plan
RTP	Regional Transportation Plan
RVP	Reid Vapor Pressure
SAFETEA-LU	Reauthorization of the national transportation bill ISTEA Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users

SBCAPCD	Santa Barbara County Air Pollution Control District
SBCAG	Santa Barbara County Association of Governments
SBMTD	Santa Barbara Metropolitan Transportation District
SBUS	School Bus
SCC	Source Classification Code (for Stationary Sources)
SCCAB	South Central Coast Air Basin
SCCCAMP	South Central Coast Cooperative Aerometric Monitoring Program
SCD	Speed Class Distributions
scf	Standard Cubic Feet
SCOS	Southern California Ozone Study
SCR	Selective Catalytic Reduction
SHOPP	State Highway Operations and Protection Program
SIC	Standard Industrial Classification Code
SIP	State Implementation Plan
SLAMS	State and Local Air Monitoring Stations
SO_2	Sulfur Dioxide
SO_4	Sulfates
SOX	Oxides of Sulfur
SOV	Single-Occupant Vehicle
State Act	California Clean Air Act of 1988
SUV	Sport Utility Vehicle
TAC	Toxic Air Contaminant
TCM	Transportation Control Measure
TDA	Transportation Development Act
TDM	Transportation Demand Management
TEA-21	Transportation Efficiency Act for the 21st Century
THC	Total Hydrocarbons
TLEV	Transitional Low Emission Vehicle
TMP	Transportation Management Plan
TOC	Total Organic Compounds
TOG	Total Organic Gases
TPD	Tons Per Day
TPY	Tons Per Year
TSM	Transportation Systems Management
TSP	Total Suspended Particulates
UAM	Urban Airshed Model
UB	Urban Bus
ug	Microgram
ug/m^3	Micrograms Per Cubic Meter
ULEV	Ultra-Low Emission Vehicle
USEPA	United States Environmental Protection Agency
UTM	Universal Transverse Mercator
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compounds
VRS	Vapor Recovery System
ZEV	Zero Emission Vehicle