CHAPTER 6

EMISSION FORECASTING

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6. EMISSION FORECASTING

6.1 INTRODUCTION

This chapter presents the three emission inventory forecasts used in the development of this ~~2004~~ 2007 Plan. These inventories are the ~~2005,~~ 2010, 2015 and 2020 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 ~~2005,~~ 2010, 2015 and 2020 Planning Emission Inventory forecasts are based on the ~~2000~~ 2002 Planning Emission Inventory, which is described in Chapter 3, Emission Inventory. This ~~2000~~ 2002 Planning Emission Inventory is the base year for emission forecasting and was developed by modifying the ~~2000~~ 2002 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 ~~1-hour~~ 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 ~~2000~~ 2002 Planning Emission Inventory is used to forecast emissions in order to determine whether the emission control measures described in Chapters 4 and 5 of the ~~2004~~ 2007 Plan will reduce enough emissions in order to attain the State 1-hour and 8-hour ozone standards, and maintain the federal 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 APCD is not able to provide modeling analyses for this ~~2004~~ 2007 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 ~~2000~~ 2002 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 ~~2000~~ 2002 emission inventory base year, future year forecasted emission inventories must be adjusted to account for the most recent emission reduction credits (ERCs) that were in the APCD Source Register during the 3rd quarter of ~~2004~~ 2006. 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 3rd quarter of ~~2004~~ 2006, were ~~0.2504~~ 0.3740 tons per day of ROC and ~~0.4191~~ 0.4377 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 3rd Quarter 2006) (Tons per day)

	NOx	ROC
Arguello, Inc.	0.0011	0.1037
Boeing	0.0098	0.0020
BreitBurn Energy Company	0.0007	0.0010
Chevron	0.0000	0.0194
Dos Cuadros Offshore Resources, L.L.C	0.0000	0.0001
E&B Resource Management	0.0098	0.1074
ExxonMobil Production Company	0.0000	0.0025
GTC/Shell	0.0020	0.0076
Lockheed Martin Corporation	0.0057	0.0076
Plains Exploration and Production	0.0140	0.0483
Southern California Gas Company	0.0003	0.0301
Space X	0.0000	0.0053
US Air Force – VAFB*	0.3943	0.0390
TOTAL SOURCE REGISTER ERC's	**0.4377**	**0.3740**

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

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 ~~2005,~~ 2010, 2015 and 2020 forecast levels of activity to the ~~2000~~ 2002 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 ~~2000~~ 2002value. While activity indicators and factors have been determined for the milestone years of 2010, 2015 and 2020, 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 6-7 provides the ~~2000~~ 2002 level of activity, the predicted ~~2005,~~ 2010, 2015 and 2020 levels of activity, the activity factors, and the source of the forecast for each of the activity indicators.

~~Note that the activity indicator for OCS Oil and Gas Production has been set to 1.0 or "no-growth." The recommendation to use a no-growth activity factor came from the Santa Barbara County Air Pollution Control District Community Advisory Council after deliberation of what the future projection of the OCS Production should be. The Community Advisory Council considered potential OCS growth scenarios identified in the federal Minerals Management Service's California Offshore Oil and Gas Energy Resources (COOGER) study. The COOGER study presents several scenarios of future growth for the OCS, including a "future baseline" scenario that projects existing OCS platforms to decline steeply in production over the next fifteen years. The COOGER study also presents scenarios that project substantial growth and development of future platforms from existing undeveloped leases. The Council noted that, since any future oil and gas production on the OCS will be required to be permitted under New Source Review/Prevention of Significant Deterioration process, any potential increase in emissions must be offset to provide a net emission benefit from the new OCS production activity. This would also ensure consistency of these future projects with this Plan. Therefore, the Council recommended that the activity indicator for OCS Production should be set to no-growth as a reasonable assumption of future oil and gas production emissions on the OCS.~~

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 AFB AIRBORNE LASER MISSION 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. Although General Conformity is not directly applicable to this 2004 Plan as this Plan addresses only State planning requirements, projected ABL emissions are presented in this Plan so that the inventory for VAFB is consistent with the 2001 Plan. Table 6-2 shows the emissions from the ABL Mission estimated by VAFB, and the ERC's required from VAFB required to offset the ABL Mission. The remaining emissions from the ABL Mission are included as line items in Tables 6-3 and 6-5.

TABLE 6 - 2

VANDENBERG AIR FORCE BASE (VAFB) AIRBORNE LASER (ABL) MISSION*

	ROC	NOx
	(Tons per day)	*(Tons per day)*
Projected 2005 Emissions for the ABL Mission by VAFB	0.0552	0.0634
Projected 2010 Emissions for the ABL Mission by VAFB	0.0656	0.4867
Projected 2015 Emissions for the ABL Mission by VAFB	0.0656	0.4867
Projected 2020 Emissions for the ABL Mission by VAFB	0.0656	0.4867
Source Register ERC's required to offset the ABL Mission	0.0000	0.1265
2005 Emissions added to the 2004 Plan for the ABL	0.0552	0.0000
2010 Emissions added to the 2004 Plan for the ABL	0.0656	0.3602

2015 Emissions added to the 2004 Plan for the ABL	0.0656	0.3602
2020 Emissions added to the 2004 Plan for the ABL	0.0656	0.3602

*According to EPA's April 30, 2004 Phase 1 Implementation Rule, general conformity requirements would not apply to Santa Barbara County once the federal 1-hour ozone standard is revoked.

6.3 FORECASTED EMISSION INVENTORIES

Planning emission inventory forecasts for 2005, 2010, 2015 and 2020 for both Santa Barbara County and the OCS are presented in Tables 6-1 and 6-2, 6-3 through 6-6 and Figures 6-1 through 6-12 6-4, located at the end of the chapter. Tables 6-1 and 6-2 6-3 through 6-6 provide a detailed summary of both ROC and NOx emissions for each emission source category and for each forecast year. These tables also include base year (2000 2002) estimates for each source category for ease of comparison with forecasted emissions. Table 6-3 6-7 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 NOx emissions for both Santa Barbara County and the OCS. Figures 6-3 through 6-10 categorize Santa Barbara County and OCS emissions for both ROC and NOx by major emission category (stationary, area and mobile sources). Figure 6-3 6-11 shows total NOx emissions from both Santa Barbara County and the OCS, while Figure 6-4 6-12 shows combined Santa Barbara County and OCS NOx emissions, but does not include emissions from marine shipping.

The bar graph presented in Figure 6-1 shows that Santa Barbara County onshore NOx and ROC emissions are expected to decrease continually through 2020. Total onshore ROC emissions are forecasted to decrease from 38.44 41.84 tons per day in 2002 2000 to 35.81 29.69 tons per day in 2020 representing about a 7 29 percent decrease in emissions. Total onshore NOx emissions are projected to decrease from 40.69 43.89 tons per day in 2002 2000 to 23.17 21.66 tons per day by 2020, about a 43 51 percent decrease in emissions.

On a source category basis, ROC emissions from onshore stationary sources are forecasted to increase from 8.69 10.06 tons per day in 2002 2000 to 10.88 11.49 tons per day in 2020 while NOx emissions from onshore stationary sources are expected to increase from 6.61 5.57 tons per day in 2002 2000 to 6.67 6.74 tons per day in 2020. ROC emissions from area-wide sources are forecasted to increase from 10.67 7.94 tons per day in 2002 2000 to 15.99 10.16 tons per day in 2020. Area-wide NOx emissions are predicted to increase from 1.00 0.48 ton per day in 2002 2000 to 3.05 1.23 tons per day by 2020.

The largest decreases in both onshore NOx and ROC emissions are attributable to decreased emissions from onshore mobile sources (On-road Motor Vehicles and Other Mobile Sources). ROC emissions from onshore mobile sources are projected to decrease from 19.09 23.85 tons per day in 2002 2000 to 8.94 8.03 tons per day in 2020 (53 66 percent decrease), while NOx emissions from onshore mobile sources are expected to decrease to 13.45 13.69 tons per day by 2020 from 33.06 37.83 tons per day in 2002 2000 (59 64 percent decrease).

Figure 6-2 presents forecasts for OCS ROC and NOx emissions. The figure shows that total offshore ROC emissions are predicted to increase from 3.29 ~~2.92~~ tons per day in 2002 ~~2000~~ to 4.05 ~~3.36~~ tons per day in 2020. Total offshore NOx emissions are anticipated to increase from 37.38 ~~33.37~~ tons per day in 2002 ~~2000~~ to 77.23 ~~65.59~~ tons per day in 2020. Mobile sources on the OCS, predominately marine shipping, account for all of the anticipated growth in OCS ROC and NOx emissions. ROC emissions from OCS mobile sources are expected to increase from 2.12 ~~1.77~~ tons per day in 2002 ~~2000~~ to 2.92 ~~2.22~~ tons per day in 2020, while OCS mobile source NOx emissions are forecasted to increase from 36.55 ~~32.55~~ tons per day in 2002 ~~2000~~ to 76.40 ~~64.77~~ tons per day in 2020.

~~As shown in Figure 6-3,~~ It is anticipated that mobile sources (on-road and other mobile sources) will ~~are forecasted to~~ account for 37 ~~50~~ percent of total onshore ROC emissions and 71 ~~81~~ percent of the onshore NOx emissions by ~~in~~ 2010 ~~2005~~. By 2020, mobile sources are predicted to account for 25 ~~30~~ percent of the onshore ROC emissions and 58 ~~64~~ percent of the onshore NOx emissions. ~~as presented in Figure 6-9.~~

The relative contribution of ROC and NOx from onshore stationary and area sources to overall onshore emissions increases considerably over the planning horizon due to significant reductions of these pollutants from onshore mobile sources during this time period. ~~NOx from stationary and area sources increase only slightly from 2005 to 2020, their relative contribution to overall onshore emissions increase considerably due to significant reductions of both ROC and NOx emissions from on-road mobile sources through the planning horizon. As displayed in figures 6-3 and 6-9,~~ The relative percentage of total ROC emissions from onshore stationary sources increases from 25 percent in 2002 ~~2005~~ to 29 ~~31~~ percent of the onshore inventory in 2020, while NOx emissions from onshore stationary sources increases from 16 percent in 2002 ~~2005~~ to 27 ~~31~~ percent of the overall onshore inventory in 2020. Area-wide ROC emissions are forecasted to increase from 28 ~~27~~ percent of total onshore emissions in 2002 ~~2005~~ to 45 ~~39~~ percent of the total onshore inventory by 2020. The projected contribution from area-wide NOx emissions increases from about 2 ~~3~~ percent in 2002 ~~2005~~ to 13 ~~6~~ percent of the total onshore NOx inventory by 2020.

6.4 IMPACTS OF MARINE SHIPPING EMISSIONS

As discussed in the previous section, Santa Barbara County onshore emissions of ROC and NOx are expected to decrease significantly by 2020, primarily from reductions in on-road mobile emissions and through the implementation of the State Act's every feasible measure requirements. While Santa Barbara County onshore emissions are forecasted to substantially decrease during the planning horizon, OCS NOx emissions are expected to dramatically increase from base year levels. The increase in OCS NOx emissions is the result of projected growth in marine shipping activities, which are estimated to more than double from 2002 ~~2000~~ levels by 2020. Note that in the 2001 and 2004 Plans, marine shipping emission forecasts were based on the projection of the number of vessel transits through the Santa Barbara Channel. It has become clear since then that transit projections are not a good indicator of forecasted emissions since transits can actually decrease while emissions increase. This is due to the fact that marine vessels are becoming larger in order to accommodate significant growth in cargo entering California ports. The trend toward larger ships is associated

with larger engines that consume more power. As a result, forecasted emissions for this 2007 Plan are based on projections of ship power consumption rather than forecasted marine vessel transits.

Figure 6-3 presents combined OCS and onshore NOx forecasts out to 2020. This figure clearly illustrates that increases in NOx emissions from marine vessels will overwhelm stationary source NOx reductions that will be achieved by implementing every feasible measure strategies and by significant decreases in NOx from onshore mobile sources. Combined NOx emissions from onshore and OCS sources are anticipated to grow from 78.07 ~~77.25~~ tons per day in 2002 ~~2000~~ to 89.93 ~~78.49~~ tons per day by 2010 ~~2005~~. By 2020, combined NOx emissions are anticipated to increase to 100.40 ~~87.14~~ tons per day, about 29 ~~13~~ percent higher than base year estimates.

NOx emissions from marine shipping alone (excluding commercial and recreational boats) are expected to grow to 53.54 ~~38.1~~ tons per day by 2010 ~~2005~~ from base year estimates of 35.45 ~~32.1~~ tons per day, a 51 ~~19~~ percent increase. By 2020, marine vessel NOx emissions are forecasted to reach 75.37 ~~64.2~~ tons per day, representing a more than two-fold increase from base year levels. At these growth rates, marine vessel NOx emissions will account for about 60 ~~48~~ percent of the overall (onshore and OCS) NOx inventory by 2010 ~~2005~~, increasing to approximately 73 ~~72~~ percent of the total NOx inventory by 2020.

Figure 6-4 presents total onshore and OCS NOx emissions but excludes the marine shipping contribution. This figure shows that existing and proposed emission reduction strategies on all sources other than marine shipping are anticipated to be successful at reducing future NOx emissions below baseline levels. Excluding marine shipping emissions, total onshore and OCS NOx emissions are predicted to be reduced from 42 ~~44.4~~ tons per day in 2002 ~~2000~~ to 25 ~~22.2~~ tons per day by 2020, which represents about a 40 ~~50~~ percent decrease in NOx emissions over the planning horizon. These data are presented because while onshore control strategies provide significant reductions in NOx emissions through the planning period, marine shipping emissions will negate any gains realized through these strategies. With increased difficulty in obtaining added reductions from onshore sources, further reductions will need to come from controlling marine shipping activities in order to meet air quality goals. This clearly indicates that additional action from the federal government, USEPA and ARB is required to reduce emissions from both American and foreign-flagged marine vessels traversing our coastline. Otherwise, the burden of attaining or maintaining air quality improvement goals may fall disproportionately on onshore sources.

Figure 6-5 displays combined onshore and OCS ROC forecasts. This figure shows that total ROC emissions are projected to increase slightly by 2010, then decline steadily through the rest of the forecast period. Combined ROC emissions from onshore and OCS sources are projected to increase above baseline levels by about 0.35 tons per day by 2010, and then decrease from base year levels by approximately 1.9 tons per day by 2020. Any increases in ROC emissions from marine shipping are negated by significant reductions in ROC emissions that occur from onshore sources, particularly on-road mobile sources.

Figure 6-6 provide a graphical representation of ROC emissions from each source category for both onshore and OCS sources, but excludes marine shipping. As stated above, combined ROC emissions from onshore and OCS sources are expected to remain below baseline levels even with

significant growth in 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.

It is important to note that increases in NOx emissions from marine shipping activities may not directly correlate to increases in ozone levels in Santa Barbara County since potential impacts are highly dependent on meteorological conditions. In fact, air quality has been improving in Santa Barbara County while marine vessel transits and emissions have been increasing over the last several years. To fully understand the impacts of marine vessel emissions on county-wide ozone levels, however, would require the use of photochemical modeling techniques. This would allow for an evaluation of potential impacts from all sources of ozone precursors (ROC and NOx), both onshore and offshore, and would also provide an assessment of the relative contribution of impacts from marine vessel emissions on ozone concentrations. Since the resources and expertise required to perform photochemical modeling are beyond our capabilities, we must defer the need for such an exercise to the discretion of USEPA and ARB.

6.5 CONCLUSIONS

This chapter presents the ~~2005,~~ 2010, 2015 and 2020 Planning Emission Inventory Forecasts. The 2000 Planning Emission Inventory is used as the basis to calculate the ~~2005,~~ 2010, 2015 and 2020 forecasts.

ROC emissions from onshore stationary and area-wide sources are forecasted to increase over base year levels by about 1.82 ~~1.57~~ and 5.32 ~~2.22~~ tons per day, respectively, by 2020. NOx emissions from onshore stationary sources are anticipated to increase from base year levels by about 0.06 ~~0.65~~ tons per day by 2020, while NOx increases over base year estimates are expected to be about 2.05 ~~0.71~~ tons per day by 2020 for onshore area-wide sources.

Any increases in ROC and NOx 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 ~~nearly~~ 10 ~~16~~ tons per day by 2020, while baseline NOx emissions are anticipated to decrease by nearly 20 ~~24~~ tons per day by 2020. Mobile sources account for the highest percentage of overall onshore ROC emissions until 2010 ~~2015~~, when area-wide sources comprise the largest percentage contribution to the overall ROC onshore inventory. Although there are substantial reductions of NOx emissions from mobile sources through 2020, mobile sources are anticipated to comprise the largest portion of the total onshore NOx inventory for each of the planning years.

While reductions of onshore ROC and NOx emissions are forecasted to occur through the planning period due to existing and proposed emission reduction strategies, emissions from OCS sources are predicted to increase dramatically over the same time horizon. These increases in NOx and ROC emissions in the OCS are exclusively from significant growth that is forecasted for marine shipping. Marine shipping NOx emissions are expected to more than double from 2002 ~~2000~~ to 2020. The increases in marine vessel NOx emissions that are expected to occur will eliminate anticipated NOx

emission reductions from onshore sources. While monitoring data show that air quality in Santa Barbara County has improved significantly over the past several years, the expected growth in emissions from marine shipping could potentially jeopardize our ability to meet or maintain state or federal ozone standards. It should be noted that the ARB is currently in the process of finalizing a control measure to reduce particulate matter and NOx emissions from marine vessel auxiliary engines. The proposed rule requires that marine vessel operators use cleaner marine distillate fuels when operating auxiliary engines within 24 miles of the California coastline. While significant reductions in particulate matter are expected from this proposed statewide rule, we anticipate that NOx reductions will be less than 0.1 tons per day for Santa Barbara County. ~~Without the contributions from this large uncontrolled source of emissions, air quality in Santa Barbara County would clearly be improving~~. Further emission reductions from marine shipping will require additional action from ARB and USEPA. ~~Adequately reducing emissions from marine shipping will require further action from USEPA and the ARB. will be required to reduce emissions from marine shipping.~~

	TABLE 6 – 1 Santa Barbara County Emission Inventory	2002 ROC *(tons per day)*	2002 NOx *(tons per day)*	2010 ROC *(tons per day)*	2010 NOx *(tons per day)*	2015 ROC *(tons per day)*	2015 NOx *(tons per day)*	2020 ROC *(tons per day)*	2020 NOx *(tons per day)*
STATIONARY SOURCES									
Fuel Combustion									
010	ELECTRIC UTILITIES	0.0050	0.0244	0.0050	0.0244	0.0050	0.0244	0.0050	0.0244
020	COGENERATION	0.0358	0.1183	0.0249	0.0830	0.0202	0.0681	0.0166	0.0564
030	OIL AND GAS PRODUCTION (COMBUSTION)	0.2373	1.5376	0.1705	1.0567	0.1389	0.8614	0.1140	0.7062
040	PETROLEUM REFINING (COMBUSTION)	0.0022	0.0497	0.0025	0.0344	0.0020	0.0277	0.0017	0.0184
050	MANUFACTURING AND INDUSTRIAL	0.0852	1.1559	0.1054	1.4269	0.1172	1.5861	0.1290	1.7457
052	FOOD AND AGRICULTURAL PROCESSING	0.1226	3.0207	0.3790	3.0295	0.3734	2.9594	0.3700	2.9164
060	SERVICE AND COMMERCIAL	0.0296	0.4787	0.0318	0.5041	0.0333	0.5177	0.0346	0.5315
099	OTHER (FUEL COMBUSTION)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Fuel Combustion Total	**0.5177**	**6.3853**	**0.7191**	**6.1588**	**0.6901**	**6.0447**	**0.6709**	**5.9990**
Waste Disposal									
110	SEWAGE TREATMENT	0.0003	0.0088	0.0003	0.0094	0.0003	0.0097	0.0003	0.0100
120	LANDFILLS	0.3371	0.0034	0.4229	0.0043	0.4745	0.0048	0.5128	0.0052
130	INCINERATORS	0.0009	0.0086	0.0010	0.0091	0.0010	0.0093	0.0010	0.0095
140	SOIL REMEDIATION	0.2594	0.0000	0.8064	0.0000	0.8064	0.0000	0.8064	0.0000
199	OTHER (WASTE DISPOSAL)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Waste Disposal Total	**0.5977**	**0.0208**	**1.2306**	**0.0228**	**1.2822**	**0.0238**	**1.3205**	**0.0246**
Cleaning and Surface Coatings									
210	LAUNDERING	0.0055	0.0000	0.0547	0.0000	0.0578	0.0000	0.0598	0.0000
220	DEGREASING	1.5542	0.0000	1.8438	0.0000	1.9644	0.0000	2.0698	0.0000
230	COATINGS AND RELATED PROCESS SOLVENTS	1.8895	0.0000	2.5257	0.0000	2.8373	0.0000	3.1392	0.0000
240	PRINTING	0.4523	0.0000	0.0389	0.0000	0.0366	0.0000	0.0379	0.0000
250	ADHESIVES AND SEALANTS	0.8647	0.0000	0.8202	0.0000	0.7898	0.0000	0.7642	0.0000
299	OTHER (CLEANING AND SURFACE COATINGS)	0.0963	0.0000	0.0088	0.0000	0.0097	0.0000	0.0107	0.0000
	Cleaning and Surface Coatings Total	**4.8625**	**0.0000**	**5.2920**	**0.0000**	**5.6957**	**0.0000**	**6.0816**	**0.0000**
Petroleum Production and Marketing									
310	OIL AND GAS PRODUCTION	1.8025	0.0740	1.5989	0.0651	1.5026	0.0609	1.4081	0.0569
320	PETROLEUM REFINING	0.0440	0.0001	0.0305	0.0001	0.0248	0.0001	0.0203	0.0001
330	PETROLEUM MARKETING	0.5970	0.0000	0.6628	0.0000	0.6964	0.0000	0.7300	0.0000
	Petroleum Production and Marketing Total	**2.4435**	**0.0741**	**2.2922**	**0.0652**	**2.2238**	**0.0610**	**2.1584**	**0.0569**
Industrial Processes									

	TABLE 6 – 1 Santa Barbara County Emission Inventory	2002 ROC *(tons per day)*	2002 NOx *(tons per day)*	2010 ROC *(tons per day)*	2010 NOx *(tons per day)*	2015 ROC *(tons per day)*	2015 NOx *(tons per day)*	2020 ROC *(tons per day)*	2020 NOx *(tons per day)*
410	CHEMICAL	0.0260	0.0000	0.0322	0.0000	0.0353	0.0000	0.0389	0.0000
420	FOOD AND AGRICULTURE	0.1329	0.0000	0.1479	0.0000	0.1572	0.0000	0.1666	0.0000
430	MINERAL PROCESSES	0.0110	0.0475	0.0136	0.0587	0.0151	0.0653	0.0166	0.0719
440	METAL PROCESSES	NA	NA	NA	NA	NA	NA	NA	NA
450	WOOD AND PAPER	NA	NA	NA	NA	NA	NA	NA	NA
470	ELECTRONICS	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
499	OTHER (INDUSTRIAL PROCESSES)	0.0936	0.0839	0.0523	0.0839	0.0523	0.0839	0.0523	0.0839
	Industrial Processes Total	**0.2638**	**0.1314**	**0.2459**	**0.1426**	**0.2600**	**0.1492**	**0.2744**	**0.1558**
	STATIONARY SOURCES TOTAL	**8.6852**	**6.6116**	**9.7798**	**6.3894**	**10.1517**	**6.2786**	**10.5059**	**6.2364**

AREA-WIDE SOURCES

Solvent Evaporation

510	CONSUMER PRODUCTS	3.0773	0.0000	2.7879	0.0000	2.8569	0.0000	2.9256	0.0000
520	ARCHITECTURAL COATINGS AND SOLVENTS	1.4681	0.0000	1.2890	0.0000	1.3291	0.0000	1.3763	0.0000
530	PESTICIDES/FERTILIZERS	3.1186	0.0000	2.8335	0.0000	3.1172	0.0000	3.4295	0.0000
540	ASPHALT PAVING/ROOFING	0.2755	0.0000	0.3353	0.0000	0.3702	0.0000	0.4043	0.0000
	Solvent Evaporation Total	**7.9395**	**0.0000**	**7.2457**	**0.0000**	**7.6734**	**0.0000**	**8.1357**	**0.0000**

Miscellaneous

610	RESIDENTIAL FUEL COMBUSTION	0.1220	0.4661	0.1265	0.4279	0.1294	0.4415	0.1329	0.4257
620	FARMING OPERATIONS	1.2440	0.0000	1.2440	0.0000	1.2440	0.0000	1.2440	0.0000
630	CONSTRUCTION AND DEMOLITION	0.0000	0.0000	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	0.0000	0.0000
645	UNPAVED ROAD DUST	0.0000	0.0000	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	0.0000	0.0000
660	FIRES	0.0035	0.0011	0.0036	0.0011	0.0037	0.0012	0.0037	0.0012
670	MANAGED BURNING AND DISPOSAL	1.3293	0.5363	6.4376	2.6211	6.4364	2.6211	6.4357	2.6211
690	COOKING	0.0287	0.0000	0.0319	0.0000	0.0339	0.0000	0.0359	0.0000
699	OTHER (MISCELLANEOUS PROCESSES)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Miscellaneous Total	**2.7275**	**1.0035**	**7.8436**	**3.0501**	**7.8474**	**3.0638**	**7.8522**	**3.0480**
	AREA-WIDE SOURCES TOTAL	**10.6670**	**1.0035**	**15.0893**	**3.0501**	**15.5208**	**3.0638**	**15.9879**	**3.0480**

TABLE 6 – 1 Santa Barbara County Emission Inventory	2002 ROC *(tons per day)*	2002 NOx *(tons per day)*	2010 ROC *(tons per day)*	2010 NOx *(tons per day)*	2015 ROC *(tons per day)*	2015 NOx *(tons per day)*	2020 ROC *(tons per day)*	2020 NOx *(tons per day)*

MOBILE SOURCES

On-Road Motor Vehicles

710	LIGHT DUTY PASSENGER	5.6535	5.0595	3.0433	2.7359	1.8437	1.6447	1.2434	1.0329
722	LIGHT DUTY TRUCKS – 1	2.4145	2.8598	1.6781	1.7749	1.3011	1.2939	0.9179	0.8449
723	LIGHT DUTY TRUCKS – 2	1.7251	2.7492	1.4090	2.0071	1.1240	1.4416	0.9224	1.0228
724	MEDIUM DUTY TRUCKS	0.4046	0.8116	0.4183	0.7547	0.3759	0.5782	0.3302	0.4181
732	LIGHT HEAVY DUTY GAS TRUCKS – 1	0.2929	0.2171	0.2450	0.2878	0.2110	0.2737	0.1805	0.2544
733	LIGHT HEAVY DUTY GAS TRUCKS – 2	0.3181	0.2797	0.2725	0.2346	0.2195	0.2021	0.1519	0.1609
734	MEDIUM HEAVY DUTY GAS TRUCKS	0.4162	0.3385	0.2452	0.2797	0.1682	0.2200	0.1026	0.1580
736	HEAVY HEAVY DUTY GAS TRUCKS	0.2856	0.7824	0.1509	0.4037	0.0774	0.2169	0.0411	0.1219
742	LIGHT HEAVY DUTY DIESEL TRUCKS – 1	0.0026	0.0723	0.0084	0.1965	0.0068	0.1190	0.0063	0.0910
743	LIGHT HEAVY DUTY DIESEL TRUCKS – 2	0.0104	0.2533	0.0123	0.2514	0.0108	0.1835	0.0089	0.1316
744	MEDIUM HEAVY DUTY DIESEL TRUCKS	0.0344	1.7803	0.0381	1.5163	0.0316	0.9785	0.0273	0.6213
746	HEAVY HEAVY DUTY DIESEL TRUCKS	0.1464	2.2199	0.1215	1.8415	0.0925	1.2619	0.0718	0.8948
750	MOTORCYCLES	0.4921	0.1103	0.5494	0.1771	0.5139	0.1798	0.5264	0.1882
760	HEAVY DUTY DIESEL URBAN BUSES	0.0130	0.3457	0.0121	0.3235	0.0111	0.2916	0.0104	0.2708
762	HEAVY DUTY GAS URBAN BUSES	0.0244	0.0319	0.0230	0.0329	0.0231	0.0340	0.0253	0.0347
770	SCHOOL BUSES	0.0167	0.2091	0.0159	0.2747	0.0145	0.2636	0.0140	0.2493
776	OTHER BUSES	0.0363	0.1024	0.0193	0.1039	0.0144	0.0723	0.0103	0.0475
780	MOTOR HOMES	0.0847	0.2099	0.0478	0.1477	0.0292	0.1080	0.0132	0.0693
	On-Road Motor Vehicles Total	**12.3715**	**18.4329**	**8.3101**	**13.3439**	**6.0687**	**9.3633**	**4.6039**	**6.6124**

Other Mobile Sources

	TABLE 6 – 1 Santa Barbara County Emission Inventory	2002 ROC *(tons per day)*	2002 NOx *(tons per day)*	2010 ROC *(tons per day)*	2010 NOx *(tons per day)*	2015 ROC *(tons per day)*	2015 NOx *(tons per day)*	2020 ROC *(tons per day)*	2020 NOx *(tons per day)*
810	AIRCRAFT	0.7743	0.0865	0.9105	0.1021	0.9721	0.1077	1.0337	0.1133
820	TRAINS	0.1399	2.6075	0.2332	2.3467	0.2416	2.2518	0.2501	2.1910
830	SHIPS AND COMMERCIAL BOATS	0.0502	0.4965	0.0538	0.5418	0.0561	0.5700	0.0583	0.5982
840	RECREATIONAL BOATS	0.9270	0.1416	0.6399	0.1002	0.5394	0.0844	0.4770	0.0802
850	OFF-ROAD RECREATIONAL VEHICLES	0.7068	0.0570	0.7660	0.0921	0.8500	0.0959	0.9739	0.1907
860	OFF-ROAD EQUIPMENT	2.5479	7.6454	1.6930	5.4153	1.2732	3.6964	1.0542	2.4925
870	FARM EQUIPMENT	0.6163	3.6073	0.4128	2.6465	0.2765	1.8996	0.1806	1.2508
890	FUEL STORAGE AND HANDLING	0.9603	0.0000	0.2964	0.0000	0.3048	0.0000	0.3123	0.0000
	Other Mobile Sources Total	**6.7227**	**14.6418**	**5.0056**	**11.2448**	**4.5135**	**8.7057**	**4.3401**	**6.8357**
	MOBILE SOURCES TOTAL	**19.0942**	**33.0648**	**13.3157**	**24.5887**	**10.5822**	**18.0690**	**8.9440**	**13.4481**
	SOURCE REGISTER EMISSION REDUCTION CREDITS	**NA**	**NA**	**0.3740**	**0.4377**	**0.3740**	**0.4377**	**0.3740**	**0.4377**
	2002 SANTA BARBARA COUNTY TOTAL	**38.4464**	**40.6898**	**38.5588**	**34.4659**	**36.6287**	**27.8492**	**35.8119**	**23.1702**

TABLE 6 – 2 Outer Continental Shelf Emission Inventory	2002 ROC *(tons per day)*	2002 NOx *(tons per day)*	2010 ROC *(tons per day)*	2010 NOx *(tons per day)*	2015 ROC *(tons per day)*	2015 NOx *(tons per day)*	2020 ROC *(tons per day)*	2020 NOx *(tons per day)*
STATIONARY SOURCES								
Fuel Combustion								
030 OIL AND GAS PRODUCTION (COMBUSTION)	0.0684	0.8090	0.0688	0.8019	0.0688	0.8019	0.0688	0.8019
Fuel Combustion Total	**0.0684**	**0.8090**	**0.0688**	**0.8019**	**0.0688**	**0.8019**	**0.0688**	**0.8019**
Cleaning and Surface Coatings								
230 COATINGS AND RELATED PROCESS SOLVENTS	0.0543	0.0000	0.0197	0.0000	0.0197	0.0000	0.0197	0.0000
Cleaning and Surface Coatings Total	**0.0543**	**0.0000**	**0.0197**	**0.0000**	**0.0197**	**0.0000**	**0.0197**	**0.0000**
Petroleum Production and Marketing								
310 OIL AND GAS PRODUCTION	1.0441	0.0271	1.0440	0.0271	1.0440	0.0271	1.0440	0.0271
Petroleum Production and Marketing Total	**1.0441**	**0.0271**	**1.0440**	**0.0271**	**1.0440**	**0.0271**	**1.0440**	**0.0271**
STATIONARY SOURCES TOTAL	**1.1668**	**0.8361**	**1.1325**	**0.8289**	**1.1325**	**0.8289**	**1.1325**	**0.8289**
MOBILE SOURCES								
Other Mobile Sources								
810 AIRCRAFT	0.0214	0.0156	0.0214	0.0156	0.0214	0.0156	0.0214	0.0156
830 SHIPS AND COMMERCIAL BOATS	1.1757	36.3898	1.7400	54.5200	2.0815	65.4960	2.4180	76.3090
840 RECREATIONAL BOATS	0.9270	0.1416	0.6399	0.1002	0.5394	0.0844	0.4770	0.0802
Other Mobile Sources Total	**2.1241**	**36.5470**	**2.4013**	**54.6358**	**2.6423**	**65.5960**	**2.9164**	**76.4048**
MOBILE SOURCES TOTAL	**2.1241**	**36.5470**	**2.4013**	**54.6358**	**2.6423**	**65.5960**	**2.9164**	**76.4048**
2002 OUTER CONTINENTAL SHELF TOTAL	**3.2909**	**37.3831**	**3.5338**	**55.4647**	**3.7748**	**66.4249**	**4.0489**	**77.2337**

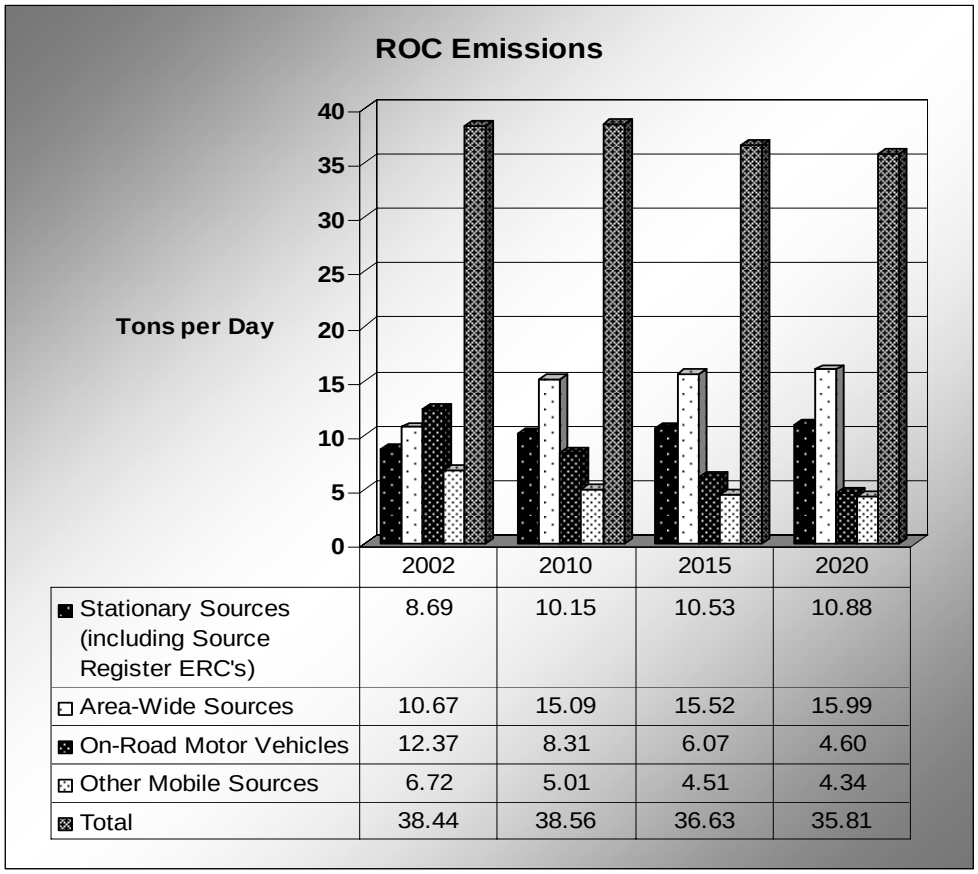
TABLE 6-3
2007 CLEAN AIR PLAN ACTIVITY INDICATORS AND FACTORS FOR 2010, 2015 and 2020

ACTIVITY INDICATOR	UNITS	VALUE				FACTOR			INFORMATION SOURCE
		2002	2010	2015	2020	2010	2015	2020	
Agricultural Acres	Acres	120,653	121,527	114,596	110,350	1.007	0.950	0.915	(7)
Aircraft Operations	Operations	304,464	385,300	414,200	443,100	1.266	1.360	1.455	(1) / (10)
Daily Vehicle Miles	1,000 Miles Traveled	9,952	12,064	13,108	14,151	1.212	1.317	1.422	(12)
EMP. - Commercial	Employees	92,300	102,700	109,200	115,700	1.113	1.183	1.254	(11)
EMP. - Industrial	Employees	28,900	35,820	39,840	43,860	1.239	1.379	1.518	(11)
EMP. - Public Services	Employees	39,480	42,000	43,200	44,400	1.064	1.094	1.125	(11)
Housing	Households	140,638	154,053	160,724	164,641	1.095	1.143	1.171	(11)
Landfills	1,000 Tons in Place	16,729	20,983	23,545	25,443	1.254	1.407	1.521	(13)
Locomotives	Annual Train Passages	6,023	10,038	10,403	10,768	1.667	1.727	1.788	(2) / (4) / (13)
No Growth	No Units	1	1	1	1	1.000	1.000	1.000	(8)
OCS Production	No Units	1	1	1	1	1.000	1.000	1.000	(9)
Petroleum Production	1,000 Barrels Oil	3,635	2,517	2,044	1,672	0.692	0.562	0.460	(3)
Petroleum Wells	Producing & Inactive Wells	2,202	1,979	1,871	1,762	0.899	0.850	0.800	(3)
Population	Residents	399,300	462,000	488,000	505,000	1.157	1.222	1.265	(11)
Prescribed Fires	Acres	1,275	6,250	6,250	6,250	4.902	4.902	4.902	(15)
Ship Activity	1,000 Kilowatts	165,081	249,509	300,610	350,966	1.511	1.821	2.126	(5) / (6)

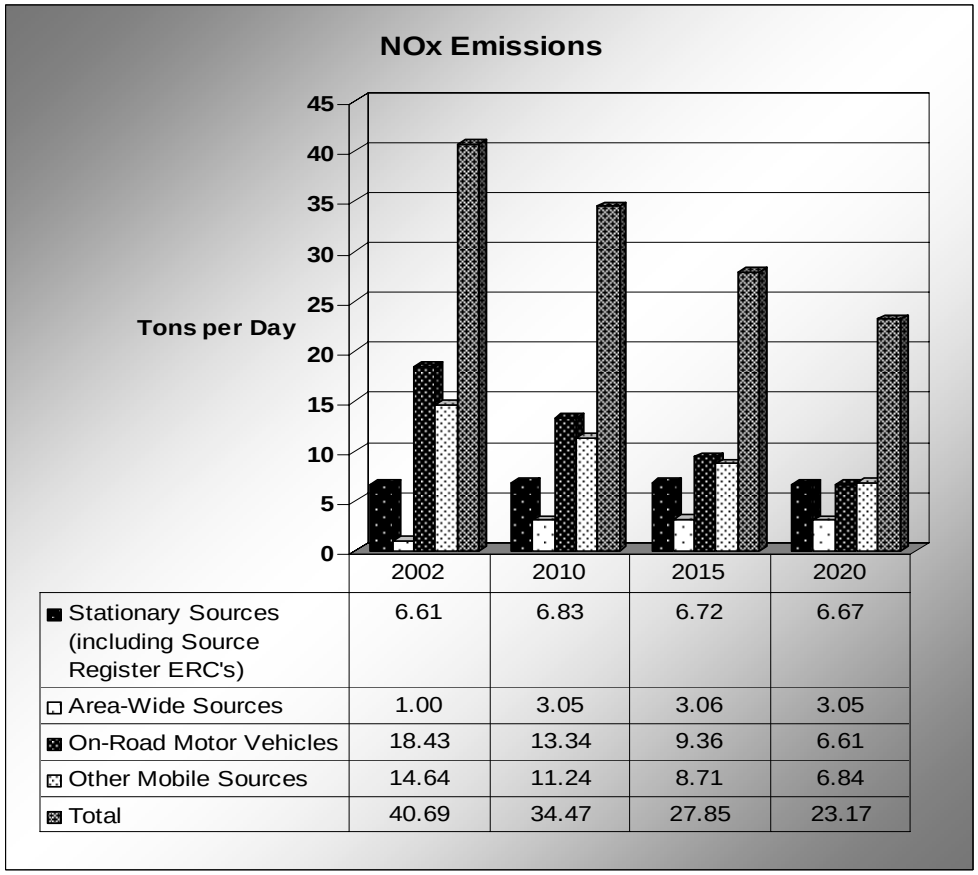
INFORMATION SOURCES

(1) Airport Master Plans within Santa Barbara County
(2) AMTRAK
(3) California Department of Conservation - Divisions of Oil & Gas
(4) California Department of Transportation
(5) Lloyds Maritime Database
(6) Marine Exchange of Southern California
(7) Santa Barbara County Agriculture Commissioner: Agricultural Crop Reports
(8) Santa Barbara County Air Pollution Control District
(9) Santa Barbara County Air Pollution Control District Community Advisory Council
(10) Santa Barbara County Association of Governments
(11) Santa Barbara County Association of Governments 2004 Regional Growth Forecast
(12) Santa Barbara County Association of Governments Travel Model
(13) Solid Waste Agencies within Santa Barbara County
(14) Union Pacific
(15) United States Forest Service

Figure 6-1
Santa Barbara County Onshore ROC & NOx Emissions

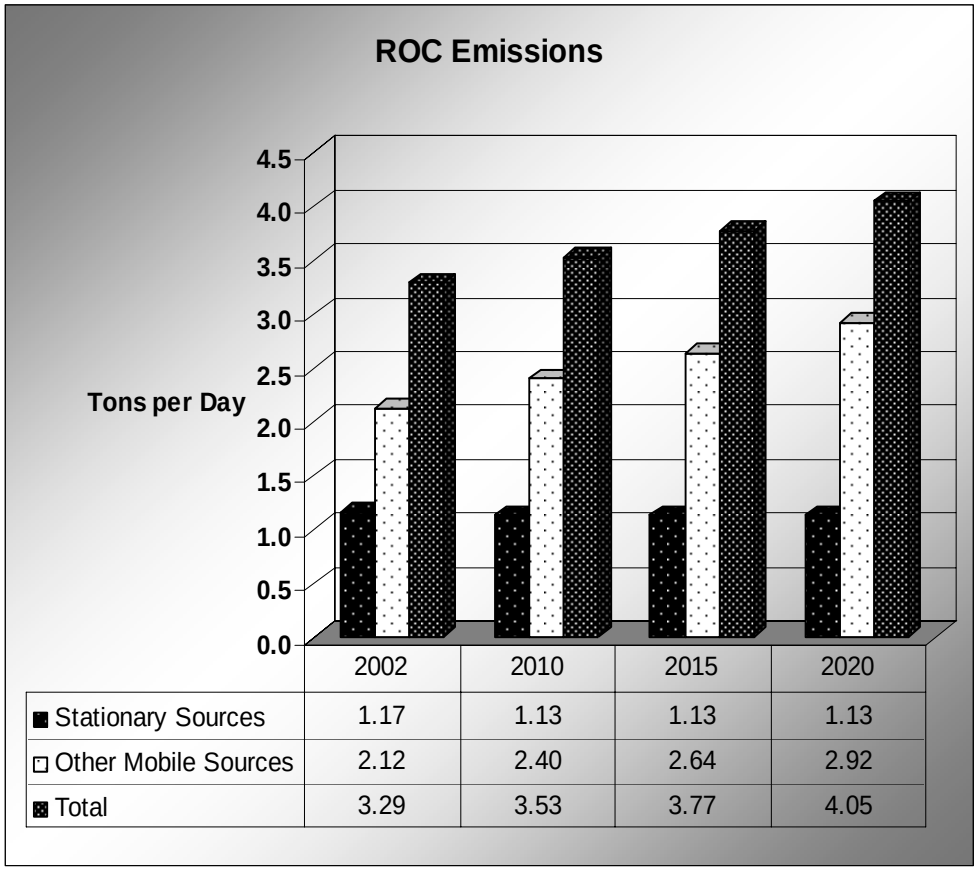


	2002	2010	2015	2020
Stationary Sources (including Source Register ERC's)	8.69	10.15	10.53	10.88
Area-Wide Sources	10.67	15.09	15.52	15.99
On-Road Motor Vehicles	12.37	8.31	6.07	4.60
Other Mobile Sources	6.72	5.01	4.51	4.34
Total	38.44	38.56	36.63	35.81

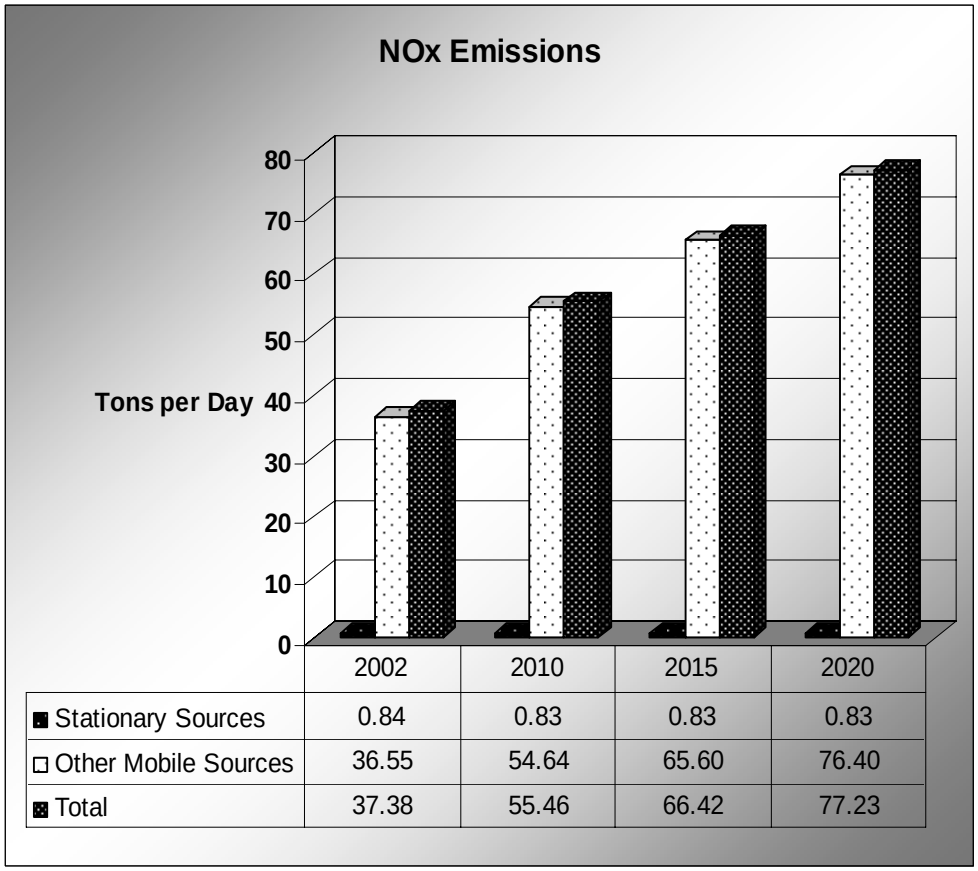


	2002	2010	2015	2020
Stationary Sources (including Source Register ERC's)	6.61	6.83	6.72	6.67
Area-Wide Sources	1.00	3.05	3.06	3.05
On-Road Motor Vehicles	18.43	13.34	9.36	6.61
Other Mobile Sources	14.64	11.24	8.71	6.84
Total	40.69	34.47	27.85	23.17

Figure 6-2
OCS ROC & NOx Emissions

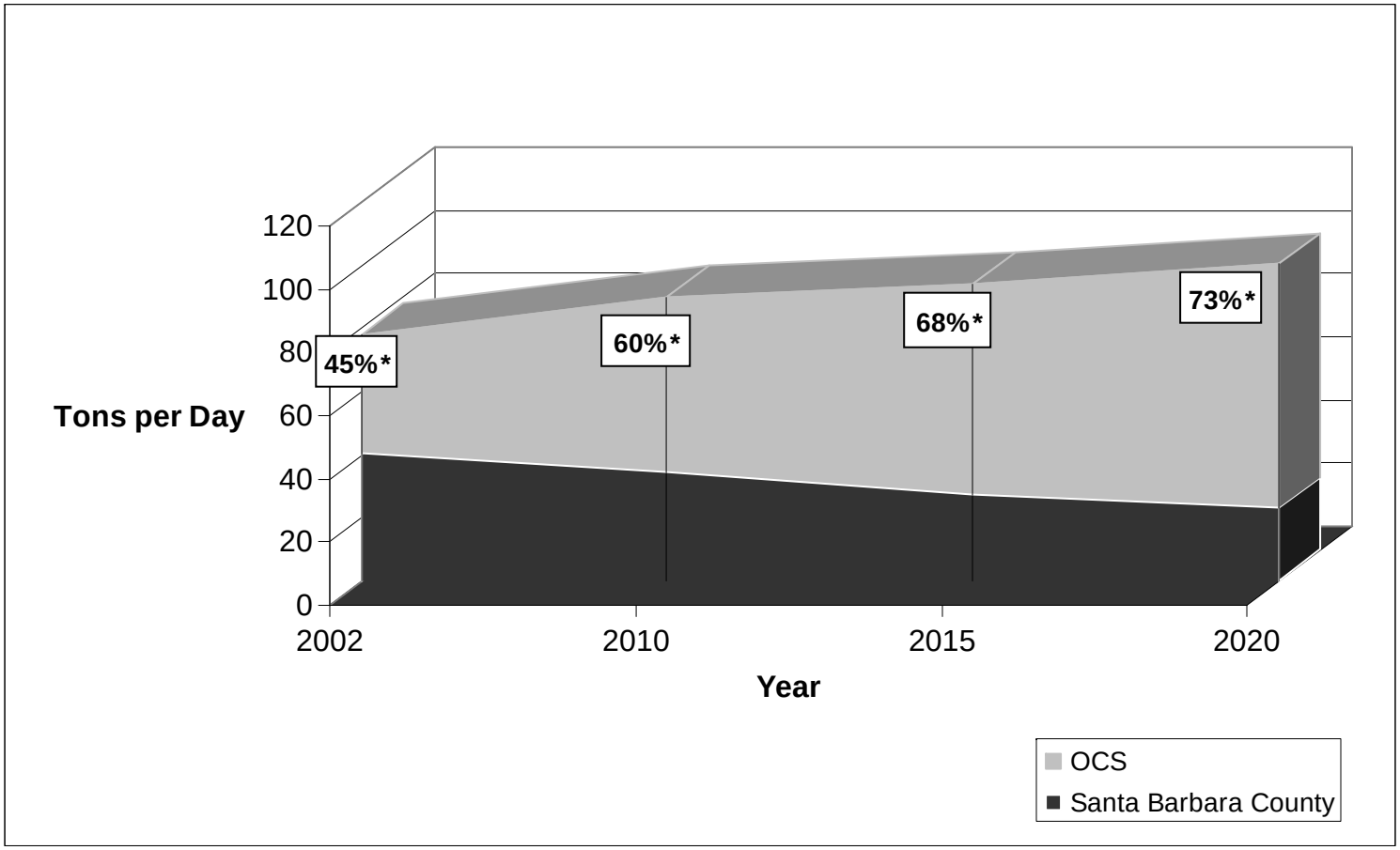


	2002	2010	2015	2020
Stationary Sources	1.17	1.13	1.13	1.13
Other Mobile Sources	2.12	2.40	2.64	2.92
Total	3.29	3.53	3.77	4.05



	2002	2010	2015	2020
Stationary Sources	0.84	0.83	0.83	0.83
Other Mobile Sources	36.55	54.64	65.60	76.40
Total	37.38	55.46	66.42	77.23

Figure 6-3
Santa Barbara County and OCS NOx Emissions Forecast Including Marine Vessels



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

Figure 6-4
Santa Barbara County and OCS NOx Emissions Forecast
Marine Vessels Excluded

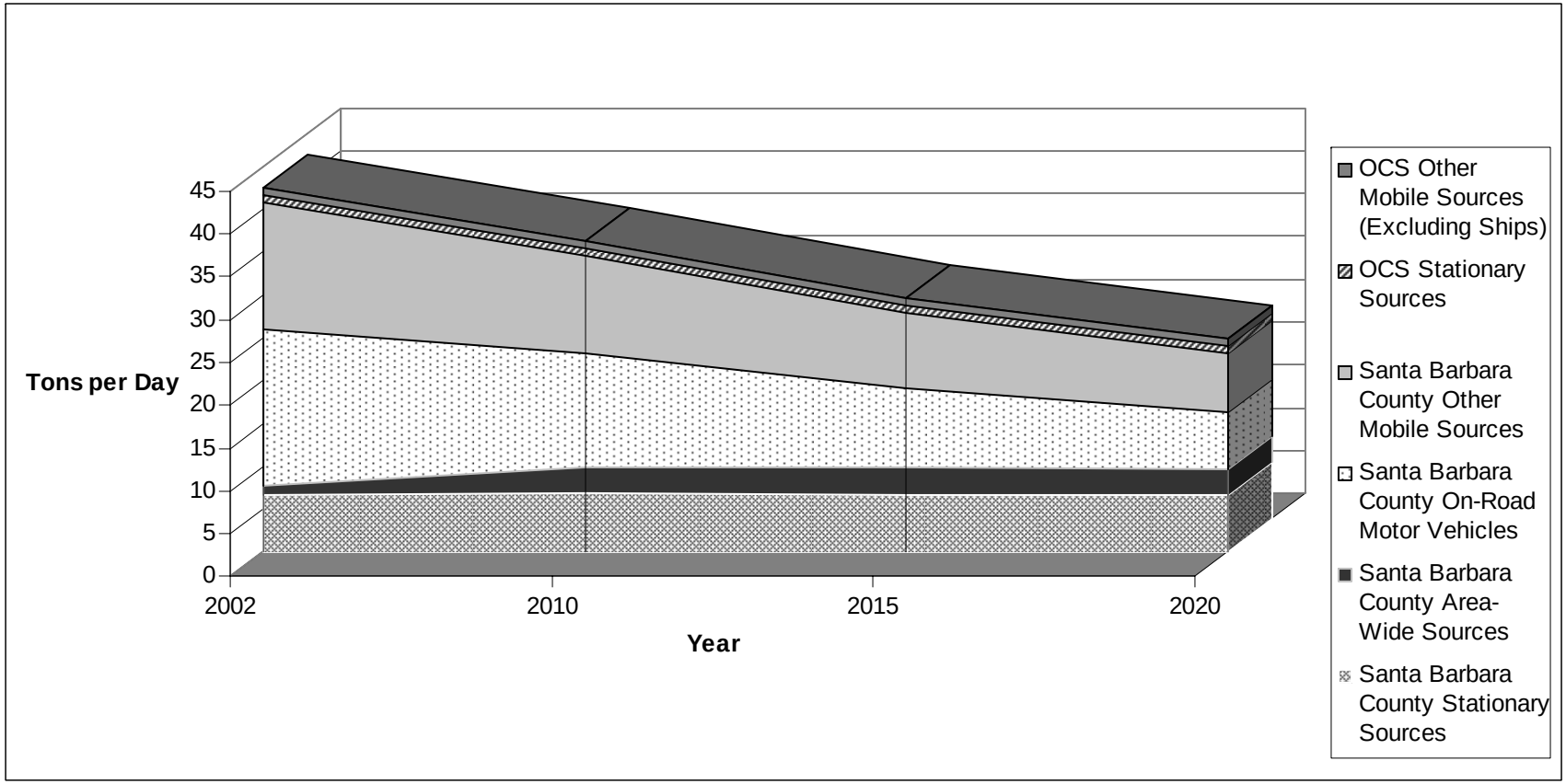
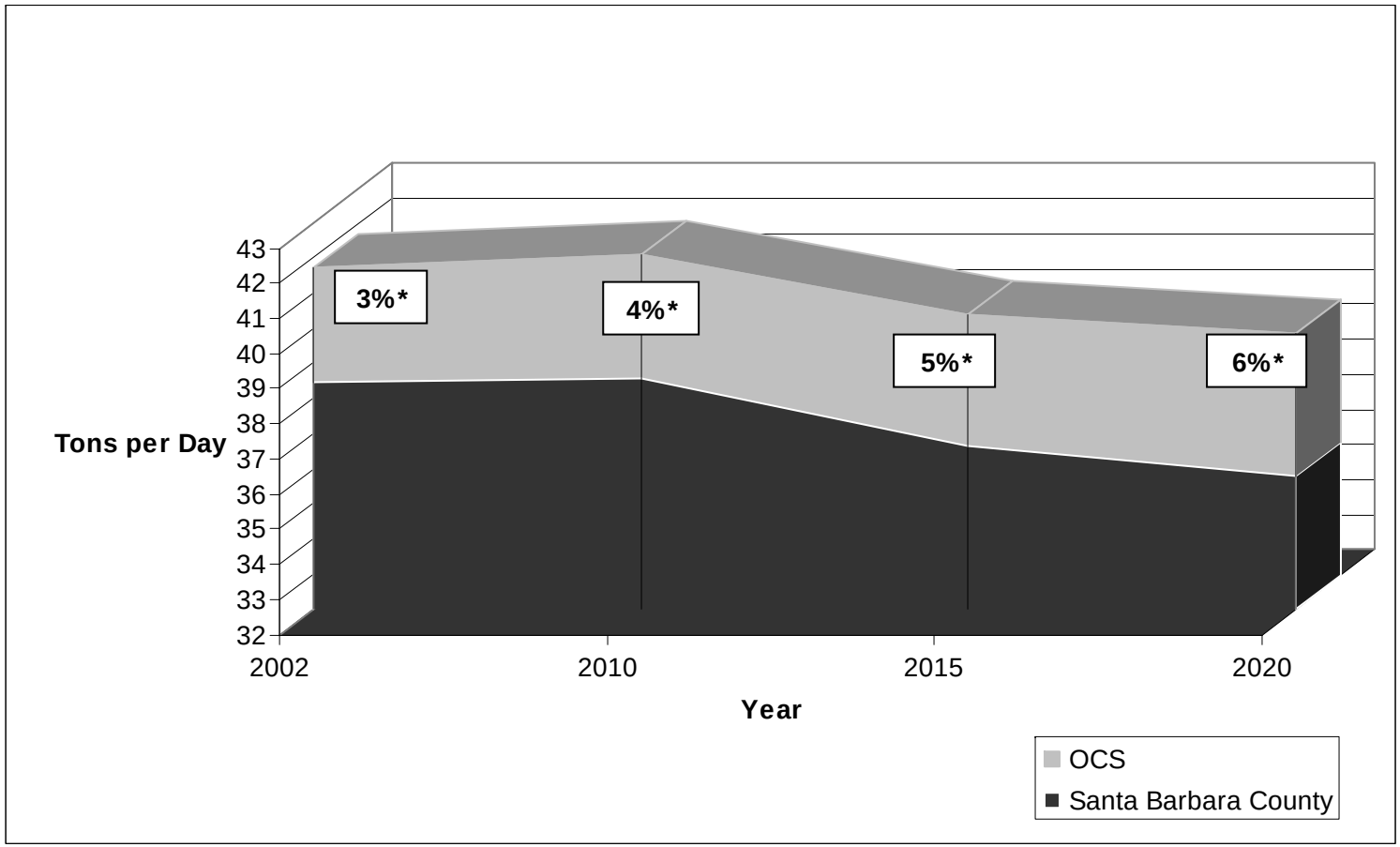


Figure 6-5
Santa Barbara County and OCS ROC Emissions Forecast Including Marine Vessels



*** 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