



Evaluation of the 2007 Sacramento Region Spare The Air Campaign

Prepared by

Naomi E. Holobow, Ph.D.

and

Dawn Morley Chavero

November 2007



www.auroraresearchgroup.com

(916) 363-8682



Evaluation of the 2007 Sacramento Region Spare The Air Campaign

Table of Contents

BACKGROUND & METHODOLOGY	3
RESULTS & CONCLUSIONS	7
AWARENESS OF THE 2007 SPARE THE AIR CAMPAIGN	7
General vs. Specific Awareness	7
Year-By-Year Comparisons of Awareness	9
Spare The Air Versus Control Days.....	11
Estimating the Number of STA-Aware Drivers.....	13
PURPOSEFUL DRIVING REDUCTION	15
Driving Behavior On 2007 Spare The Air Days	17
Driving Behavior on 2007 Spare The Air Days: By Air Quality District	17
Driving Behavior On Spare The Air Days: Year-To-Year Comparison.....	18
Spare The Air Days vs. Control Days by Air Quality District	19
Percentage of Purposeful Reducers by Air Quality District	21
Estimated Number of Purposeful Reducers.....	23
Estimated Number of Single Trips Avoided by Purposeful Reducers	24
Percentage of Purposeful Reducers: Spare The Air Days vs. Control Days	25
ESTIMATED EMISSION REDUCTIONS	27
Calculation of Estimated Emission Reductions.....	27
Comparison with Previous Years: Sacramento Metropolitan AQMD (only).....	31
SUMMER 2007 HEALTH ISSUES	32
Perceived Health Effects: Spare The Air Days vs. Control Days.....	33
Year-To-Year Comparison	35
Perceived Health Effects: By Air Quality District	36
EMPLOYER PARTICIPATION IN 2007 SPARE THE AIR	40
Year-To-Year Comparison	41
2007 SUMMERTIME SEASONAL TRIP REDUCTIONS	43
Percentage Who Reduce Driving in the Summer for Air Quality Reasons	44
Seasonal Trip Reduction: Estimated Emission Reductions	45
Year-To-Year Comparison	49



Evaluation of the 2007 Sacramento Region Spare The Air Campaign

BACKGROUND & METHODOLOGY

Background

Air pollution in the Sacramento region during the summer months is a major concern – the area is designated a severe ozone non-attainment area by the U.S. Environmental Protection Agency (US EPA). This means that the region fails to meet the federal health based 8-hour ozone standard, thus affecting the quality of life and health of residents. The Sacramento nonattainment area includes Sacramento County, Yolo County, and parts of Placer, Solano, El Dorado and Sutter Counties.

The Sacramento Metropolitan Air Quality Management District (SMAQMD) estimates that about 70% of the Sacramento region's air pollution is caused by emissions from vehicles and other mobile sources. Unhealthy levels of ground-level ozone are created when volatile organic compounds (VOC) and nitrogen oxides (NOx), primarily from cars, trucks, construction and agricultural equipment, lawn mowers, and other mobile sources, react in the presence of sunlight, and form ozone in hot weather conditions. The residential driving population is therefore a large contributor to the air quality problem in the region.

The region must improve air quality. There is a June 2013 deadline for meeting the federal 8-hour ozone standard. The region's air quality management districts and the California Air Resources Board (ARB) have developed and implemented plans aimed at improving air quality; including educational and community outreach efforts, higher emission standards for new cars, smog check programs, cleaner burning gasoline, increased regulations, improved measurement tools and models, and a variety of voluntary as well as incentive programs to reduce emissions.

One of these programs, a public education and voluntary driving reduction program, called Spare The Air, has been in operation in the Sacramento region for the past twelve years. The program was designed to engage the general public in helping to solve the problem of air pollution by informing them when air quality is unhealthy and encouraging them to voluntarily reduce their driving on those days. The Spare The Air program runs from May through October of each year. The trigger for alerting the population of a Spare The Air day for the next day is based on forecasted estimates of the Air Quality Index (AQI), which are provided by Sonoma Technology Inc. Estimates are derived using mathematical predictive modeling procedures on actual measurements obtained by local air districts and the California Air Resources Board at air quality monitoring sites throughout the region. If it is estimated that



Sacramento Region Spare The Air Program

Final Report of the 2007 Spare The Air Campaign Evaluation

December 2007

the AQI will be 127¹ or higher the next day, a Spare The Air advisory is issued by the Sacramento Metropolitan AQMD.

The Spare The Air program features a Web site (www.SpareTheAir.com), radio commercials, free Air Alert notifications, tip cards & brochures distributed to the public, community and employer partners, and participation in community events throughout the region. This year the media buy was less than in previous years, in part, because there were fewer Spare The Air days than in the past. In addition, **only radio commercials** were aired the day before and during each of the five Spare The Air days during the summer of 2007. Approximately \$35,000 was spent on these radio advisories.² **No** episodic television advertising was used. However, a more general television commercial focusing on the harm poor yet unseen air quality can have on the lung development of children was created and ran throughout the summer season. It can be viewed at <http://www.sparetheair.com/commercial.cfm>. In previous years, this type of general information commercial was broadcast on both radio and television.

This report is comprised of a series of reports designed to assess the effectiveness of the 2007 Spare The Air campaign. Annual evaluations of the program (with the exception of 1997) have been conducted since 1995.

The 2007 Spare The Air Season

The summer of 2007 was relatively good as far as air quality was concerned – only 5 Spare The Air days were called versus 15 in 2006 and 14 in 2005. Further, when we examined the daily maximum AQI it was found that the recorded actual AQI for ozone did **not** exceed 127 on four of the five Spare The Air days in most districts. This is because alerts about Spare The Air days are based on forecasted estimates. In other words, Spare The Air alerts were issued for days when the actual air quality turned out not to have been as poor as was expected. The table below summarizes the actual maximum AQI for ozone experienced by each county on the five Spare The Air 2007 days (obtained from www.sparetheair.com/aqmaps.cfm). The circled cells represent AQIs greater than 127.

<i>Air District</i>	<i>Maximum AQI for Ozone: STA July 5, 2007</i>	<i>Maximum AQI for Ozone: STA July 6, 2007</i>	<i>Maximum AQI for Ozone: STA Aug 1, 2007</i>	<i>Maximum AQI for Ozone: STA Aug 30, 2007</i>	<i>Maximum AQI for Ozone: STA Sept 10, 2007</i>
Sacramento Metropolitan AQMD	192	82	95	82	48
Yolo-Solano AQMD	116	48	44	82	41
Placer County APCD	140	114	77	74	72
El Dorado County AQMD	154	122	127	79	59
Sacramento Nonattainment Area	192	122	127	82	72

¹ If the next day's ozone forecast predicted a .095 parts per million level of ozone anywhere in the region for at least one hour, then a Spare The Air day was triggered. This is the equivalent of an AQI of 127.

² Radio media spending figures were provided to Lori Kobza, SMAQMD in an e-mail, dated October 26, 2007.

Spare The Air days are called for the Sacramento air basin region as a whole, but all air quality districts within the basin may not have the same conditions. For example, foothill districts (such as Placer and El Dorado) sometimes experience poorer air quality than central plain districts such as Yolo-Solano. This is to some extent due to the fact that ozone created by drivers in Yolo-Solano and Sacramento travels east into the foothills. It is, therefore, important that the Spare The Air message continue to involve everyone in the basin, although the air quality in individual districts on specific days may not be poor. In fact, as can be seen in the table above, the maximum AQI for ozone in Yolo-Solano AQMD did not reach the trigger level of 127 on any of the Spare The Air days this past summer.

Project Methodology

This year interviews were conducted with a representative sample of residents of **four** of the five air quality management districts within the Sacramento nonattainment area – Sacramento Metropolitan AQMD, Yolo-Solano AQMD, Placer County APCD, and El Dorado County AQMD.³ [In the past, interviews with residents in El Dorado County AQMD were only conducted in 2004 and 2006; and were only conducted in 2006 in the Feather River AQMD.]

The goal was to interview a total of 600 drivers in Sacramento Metropolitan AQMD, 600 drivers in Yolo-Solano AQMD, 500 drivers in Placer County APCD and 400 drivers in El Dorado County AQMD. At the end of the season, the number of interviews was considerably short of the goal, at just over half the targeted number. However, the samples obtained nevertheless provide for less than a 6 percent margin of error. A continuing challenge in terms of methodology is trying to estimate the number of Spare The Air days each season so that interviewing days and the number of completed interviews can be representative of the season and still provide adequate statistical precision. A field house needs advance notification and a target of a certain minimum number of interviews on a given day in order to maximize efficiency and contain costs. It was decided to conduct approximately 150 interviews throughout the region (proportional to county), starting with every occurrence of a Spare The Air advisory, and then deciding on an episode-by-episode basis whether to conduct interviews, taking into consideration the month within the season, the day of the week, and whether the event was single or multi-day, until the maximum number of budgeted interviews and the best coverage was obtained.

The number of completed interviews following Spare The Air days was less this year than in previous years due to the relatively fewer number of STA days in the 2007 season. A sample of **1,074** (462⁴ when proportionally weighted to represent the **Sacramento nonattainment area** as a whole) randomly selected respondents was interviewed following all of the **five** Spare The Air days (July 5, July 6, August 1, August 30, and September 10) of the 2007 season, which ran from May through October. This included **305** completed interviews with residents in Sacramento Metropolitan AQMD, **319** with residents in Yolo-Solano AQMD, **255** with residents in Placer County APCD, **205** with residents in El Dorado County AQMD.

³ Based on 2007 estimates from the 2000 US Census: State of California, Department of Finance, *E-1: State/County Population Estimates with Annual Percent Change-January 1, 2006 and 2007*. Sacramento, California, May 2007. Available online at: <http://www.dof.ca.gov/HTML/DEMOGRAP/ReportsPapers/Estimates/E1/documents/E-1table.xls>, the total population in the entire Sacramento nonattainment area [including El Dorado AQMD] is 2,126,552: [Sacramento Metropolitan AQMD (66%) - 1,406,804; Yolo-Solano AQMD (15%) - 315,939 (this includes the total 193,983 from Yolo County and 121,956 from the Dixon, Rio Vista and Vacaville areas of Solano County); Placer County APCD (13%) - 282,311 (this figure represents the 87% of Placer County's 324,495 residents who do not live in zip codes north or east of Auburn), El Dorado AQMD (6%) - 121,498 (this figure represents 68% of El Dorado County's 178,674 residents, and includes residents from El Dorado Hills, Placerville, Shingle Springs, Georgetown, Cool, and the following unincorporated ZIP codes: 95613, 95619, 95623, 95633, 95635, 95651, 95664, and 95672).

⁴ Since the beginning evaluation in 1995, the methodology for weighting has been to set Sacramento Metropolitan AQMD interviews as 1, and down-weight interviews from all other air districts appropriately, depending on the size of their populations. This is why the weighted totals of completed interviews are less than the sum of the raw totals.



Sacramento Region Spare The Air Program

Final Report of the 2007 Spare The Air Campaign Evaluation

December 2007

In order to be able to compare current results with those from previous years' evaluations, El Dorado County results have been excluded from some of the year-to-year analyses, and the "**Sacramento Core Region**" is the term used for the combined air districts of Sacramento Metropolitan AQMD, Yolo-Solano AQMD, and Placer County APCD. Proportions and weights were appropriately re-calculated.⁵ The total number of interviews conducted on Spare The Air days for the Sacramento Core Region was 869 (436 when weighted).

Control day interviewing took place on non Spare The Air days that were matched in terms of the day of the week (August 9, 10, 11; and September 14, 15, 25, 27, 28; and October 4, 5, 9, 11, 12, 16, 19, 23. A total of **1,621** (611 when weighted) Control interviews were conducted: **403** in Sacramento Metropolitan AQMD, **406** in Yolo-Solano AQMD, **402** in Placer County APCD, and **410** in El Dorado County AQMD. When discussing the Sacramento nonattainment area as a whole, interview results will have been weighted appropriately. For annual comparisons, the total number of Control day interviews conducted in the Sacramento Core Region (excluding El Dorado County AQMD) was 1,211 (576 when weighted.)

All respondents were drivers: they were initially screened for having driven a vehicle (a car, truck, or van) within the last week.

Caveat

The sole purpose of this report is to provide a collection, categorization and summary of public opinion data. Aurora Research Group intends to neither endorse nor criticize the Spare the Air program, Crocker/Flanagan, the Sacramento Metropolitan Air Quality Management District (AQMD), Yolo-Solano AQMD, Placer Air Pollution Control District, or El Dorado AQMD; or their policies, products, or staff. The Clients shall be solely responsible for any modifications, revisions, or further disclosure/distribution of this report.

⁵ Excluding El Dorado AQMD, the new proportions for the smaller Sacramento Core Region for 2007 are: 70% in Sacramento Metropolitan AQMD, 16% in Yolo-Solano AQMD, and 14% in Placer County APCD.

RESULTS & CONCLUSIONS

AWARENESS OF THE 2007 SPARE THE AIR CAMPAIGN

Objectives

The specific objectives of the current section are to:

- a. measure awareness of the 2007 Spare The Air campaign using two questions and determine if awareness was similar or different among drivers in four air quality districts in the Sacramento nonattainment area (Sacramento Metropolitan AQMD, Yolo-Solano AQMD, Placer County APCD, and El Dorado County AQMD),
- b. determine if awareness during annual summer Spare The Air seasons has increased, decreased, or stayed the same from 2000 to the present,
- c. compare levels of awareness between respondents interviewed following Spare The Air days and those interviewed on Control (non-Spare The Air) days, and
- d. extrapolate the results to the population by estimating the number of **drivers** who were aware of the 2007 Spare The Air campaign (correcting for Control days).

Since 2002, two questions have been used in the annual evaluation to assess overall awareness of the Spare The Air campaign – one with wording that asks about general awareness of Spare The Air advisories (proposed by the Air Resources Board), and the other with wording that started in 1995 and measures a more specific remembrance of the request not to drive, without mentioning the Spare The Air program by name. They were asked in random order so as to eliminate any possible order-response bias:

1. General Awareness: “In the past two days have you heard, read, or seen any advertisements or news broadcasts about Spare The Air, or poor air quality, or requests to drive less in this area?” (ARB-worded question)
2. Specific Awareness: “Do you recall being asked not to drive yesterday because our area was experiencing a period of unhealthy air?” (1995 question)

Results

General vs. Specific Awareness

General awareness in 2007 in the region as a whole was significantly higher at 50% than specific awareness of the request not to drive (23%). There were no differences among the individual air quality districts in terms of either general or specific awareness.

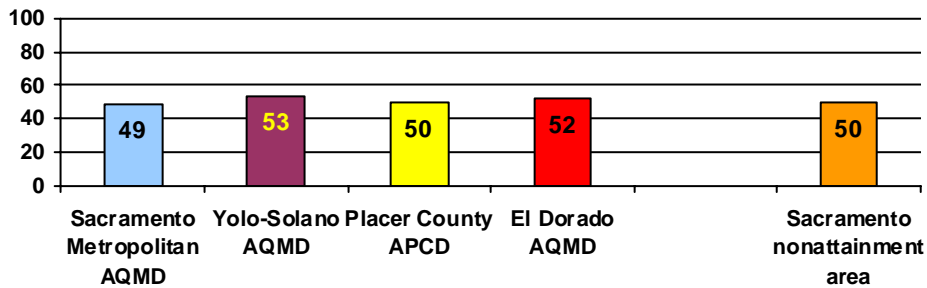
2007 General Awareness of Spare The Air (ARB Wording)

The percentages of respondents who said they had heard, read or seen the Spare The Air 2007 summer advisories or news broadcasts (the ARB worded question) are presented in the next chart.⁶ It can be seen that 50% of respondents in the Sacramento nonattainment area as a whole (including El Dorado County AQMD) were aware of the Spare The Air advisories. Levels of general awareness in the individual air districts did not differ significantly from one another, although awareness in Yolo-Solano

⁶ Responses of “don’t know/refused” were excluded from this analysis.

AQMD was the highest at 53%, followed by El Dorado County AQMD at 52%, followed by Placer County AQMD at 50%, then by Sacramento Metropolitan AQMD at 49%.

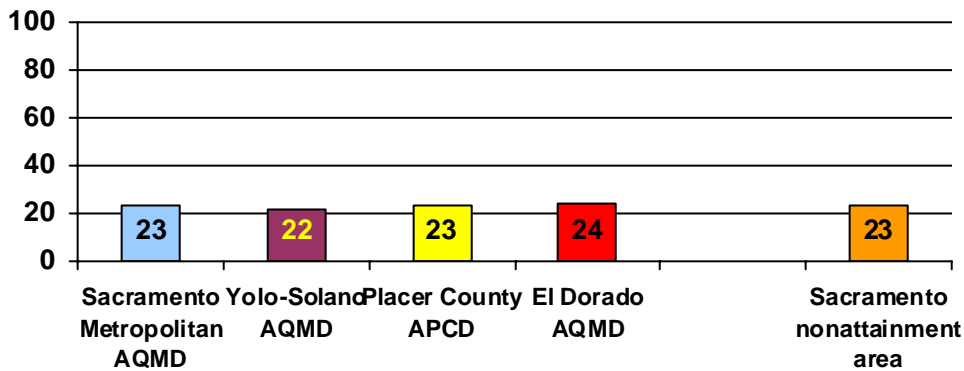
**2007 General Awareness of Spare The Air
(ARB wording)**



2007 Specific Awareness: Heard Request Not to Drive

A different and more conservative way of measuring awareness of Spare The Air has been to assess remembrance of the content of the message itself. The percentages of respondents who specifically recalled “being asked not to drive yesterday because our area was experiencing a period of unhealthy air” (the specific awareness question used since 1999) are presented in the next chart. It can be seen that 23% of respondents in the Sacramento nonattainment area as a whole were specifically aware of the request not to drive. This was significantly fewer than the 50% who remembered hearing the Spare The Air advisory. However, levels of general awareness of Spare The Air have always been greater than levels of specific awareness and these results are consistent with previous years’ results. Specific awareness, although highest in El Dorado County AQMD (24%), was not significantly different among individual air districts in the area.

**2007 Specific Awareness:
Heard Request Not to Drive**

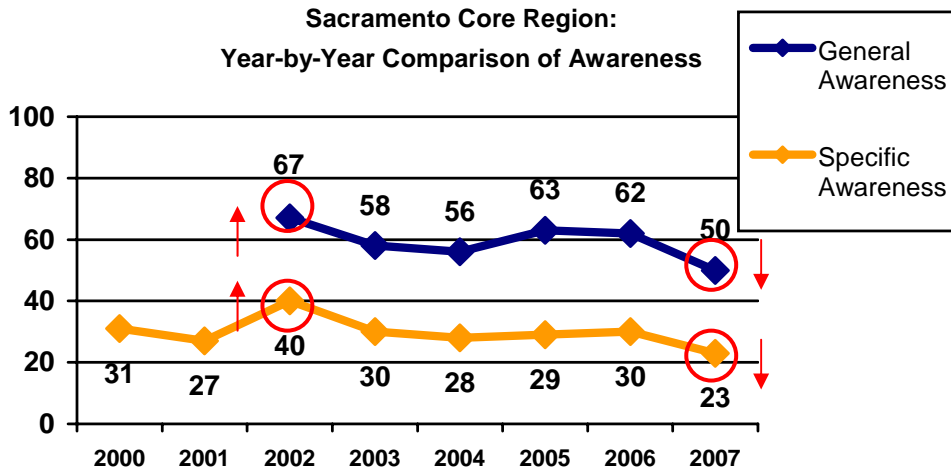


Year-By-Year Comparisons of Awareness

This year's levels of general (50%) and specific (23%) awareness in the region as a whole are the lowest ever. This may have been due to a combination of factors: the comparatively few number of Spare The Air days that occurred this summer, the public's (accurate) perception that the air quality was not as poor as was predicted, and to a different media buy strategy announcing each STA day.

There were a few noteworthy differences in levels of awareness within individual air districts over time.

Annual levels of both general and specific awareness of Spare The Air for the Sacramento Core Region (excluding El Dorado County AQMD in order to allow direct comparisons) are presented in the next graph. Results of comparisons indicate that this year's levels of both types of awareness were significantly **lower** than in all previous years.



Circled percentages represent significant highs and lows.

General awareness has been tracked since the introduction of the ARB-worded question in 2002. Year by year tests of proportion indicate that, for the Sacramento Core Region, awareness in 2002 was significantly higher than all other years at 67%, a very poor air quality season.⁷ This year, general awareness was significantly lower than in all other years, at 50%. The next lowest year in terms of general awareness (56%) occurred in 2004, a relatively good summer as far as air quality was concerned as there were only 6 Spare The Air days. However, the 2004 level was still significantly higher than this year's proportion. There was also a significant increase in general awareness from 2004 (56%) to 2005 (63%).

In terms of specific awareness, 2002 results were significantly higher (40%) than in all other years and this year's results were significantly lower (23%). In all of the seven previous years results were relatively stable with about 30% of area drivers saying they heard the specific request not to drive on days of poor air quality. This was true even in 2004 (28%), the Spare The Air season most similar to this year's season in terms of the number of Spare The Air days.

The fact that significantly fewer respondents were aware of the Spare The Air episodes this year warranted further examination. The obvious factors – fewer Spare The Air days in the season as well as

⁷ 2002 was an exceptional year with high temperatures, multiple-day Spare The Air episodes, and the greatest number of STA days (22) of all years.

the different **media buy strategy** for the specific episodes and the **type** of media (**only radio advisories** announcing Spare The Air days were bought this year⁸) – have already been mentioned. A possible further reason involved the public's perceptions of the air quality actually experienced on the Spare The Air days. We tested the hypothesis that relatively good air quality on and around Spare The Air days could result in lower awareness by conducting crosstabulations of awareness by individual STA days and checking the maximum AQI for ozone experienced each day.⁹

Results in the Sacramento Metropolitan AQMD indicated that both kinds of awareness were the highest (67% general and 40% specific) for respondents interviewed following the July 5th Spare The Air day, when the maximum AQI reached that day was 192 (the highest of the entire 2007 season). They were significantly lower (40% general and 12% specific) following the September 10th episode, when the maximum AQI reached was only 48. These findings tend to support the hypothesis. However, they are not unequivocal, as results also showed increased awareness following the August 30th episode (58% general and 30% specific), but the maximum AQI reached was only 82. In other words, awareness was high, but the AQI was low. Further examination of the AQI of the days around the August 30th episode indicated that the area experienced an "unhealthy for sensitive groups" AQI of 106 and 101 on the days prior to the forecasted STA day, indicating that the public could well have experienced poorer air quality days prior to August 30th.

In sum, although the results are not completely clear-cut, they do tend to support the notion that the public becomes more conscious of the Spare The Air message when the days forecast as poor air quality are actually perceived and experienced as such.

Year-By-Year Comparisons by Air District: General Awareness

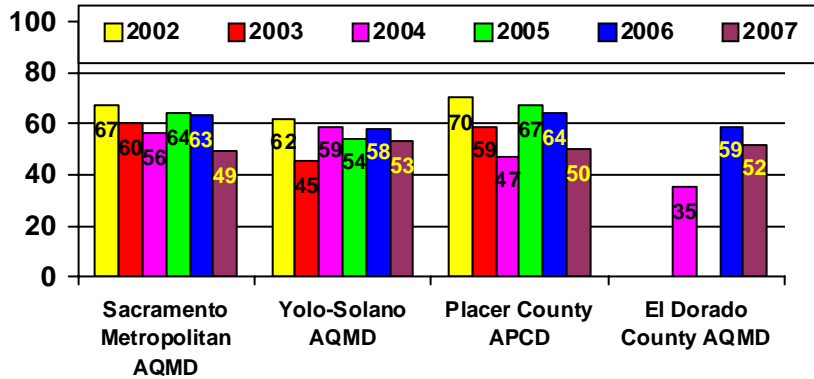
Levels of Spare The Air awareness in the individual air districts are presented in the next two charts (El Dorado County AQMD residents were interviewed only in 2004, 2006, and this year). In terms of general awareness, results were highest for all air districts in the core region (Sacramento Metropolitan AQMD, Yolo-Solano AQMD, and Placer County APCD) in 2002. Within individual areas, although no significant differences were found between 2005 and 2006, most of the previous year-to-year differences within each district were significant.¹⁰ In all districts except Yolo-Solano AQMD, this year's results were significantly lower than last year's.

⁸ A more general television commercial was used this year to inform viewers about the harm poor (yet invisible) air quality can have on the lung development of children. It did not announce specific Spare The Air days. The commercial can be viewed on the Spare The Air Website at www.SpareTheAir.com/commercial.cfm.

⁹ Generally this type of analysis is not conducted as the number of completed interviews on each day is quite small. However, we felt the anomalous results this year warranted further exploration.

¹⁰ One exception was in Sacramento Metropolitan AQMD, where the difference between 2003 and 2004 was not significant. Another exception occurred in Yolo-Solano AQMD, where the difference between 2004 and 2005 was not statistically significant.

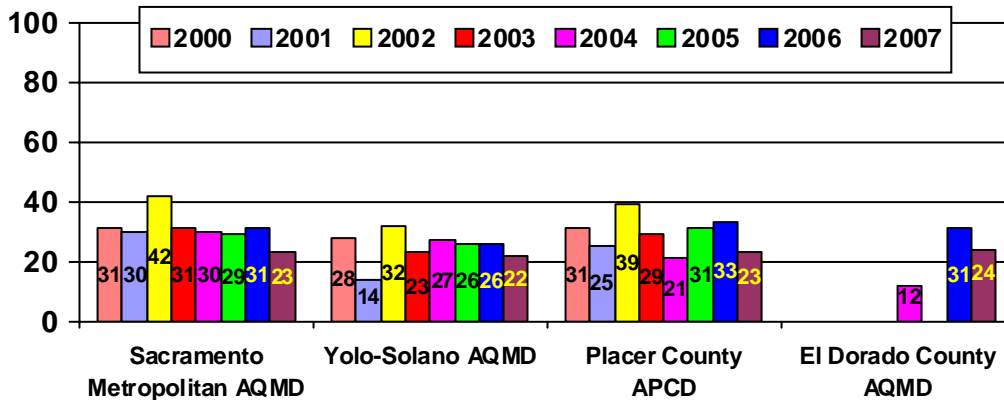
General Awareness: Individual Air Districts
 Year-by-Year Comparisons (Since 2002)



Year-By-Year Comparisons by Air District: Specific Awareness

In terms of specific awareness among the individual air districts, results were significantly higher in 2002, a very poor air quality season in all air districts. Results were also significantly lower in all air quality districts except Yolo-Solano AQMD this year as compared to last year. Excluding 2002 and 2007, in general about three-in-ten respondents in the Sacramento Metropolitan AQMD were aware of the specific request not to drive. In Yolo-Solano AQMD, there was an anomaly in 2001 when awareness was significantly lower at 14% than any other year. Results in Placer County APCD and El Dorado County AQMD indicated that in 2004, the levels of awareness were also significantly lower.¹¹

Specific Awareness: Individual Air Districts
 Year-by-Year Comparisons (Since 2000)



Spare The Air Versus Control Days

Significantly more respondents interviewed following Spare The Air days were aware of the Spare The Air advisories than were respondents interviewed on Control days. In fact, the vast majority of those interviewed on Control days were correct in not hearing any advisories. This means that respondents are generally not giving what might be considered "socially-acceptable" responses, but rather are quite truthful in their

¹¹ The reader is referred to the 2004 Spare The Air Evaluation Report for possible explanations.

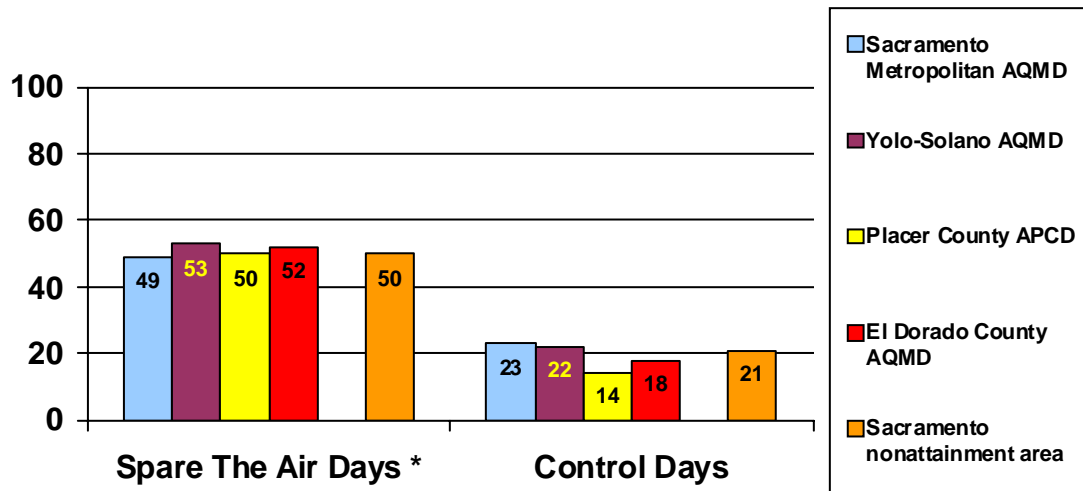
answers. It also attests to the effectiveness of the program – when the advisories are issued, a significant portion of the residential population hears them.

Telephone interviews were also conducted with residents in all air quality districts on non-Spare The Air, or Control, days, in order to test for a possible response bias – it was important to verify that the percentage of respondents who said they had heard or seen the Spare The Air announcements was significantly higher following Spare The Air days than on Control days.

Spare The Air vs. Control Days: 2007 General Awareness

Results from the question of general awareness conducted on Control days are presented along with Spare The Air day results in the next chart. It can be seen that, although 21% of area respondents interviewed on Control days incorrectly said they had heard the Spare The Air advisories, significantly more (50%) of those interviewed after Spare The Air days correctly remembered the advisories. Differences between Spare The Air and Control day interviewing in all individual air districts were likewise significant. **This indicates that, as in past years, the program is effective in reaching drivers about the specific alert days.**

Spare The Air vs. Control Days: 2007 General Awareness

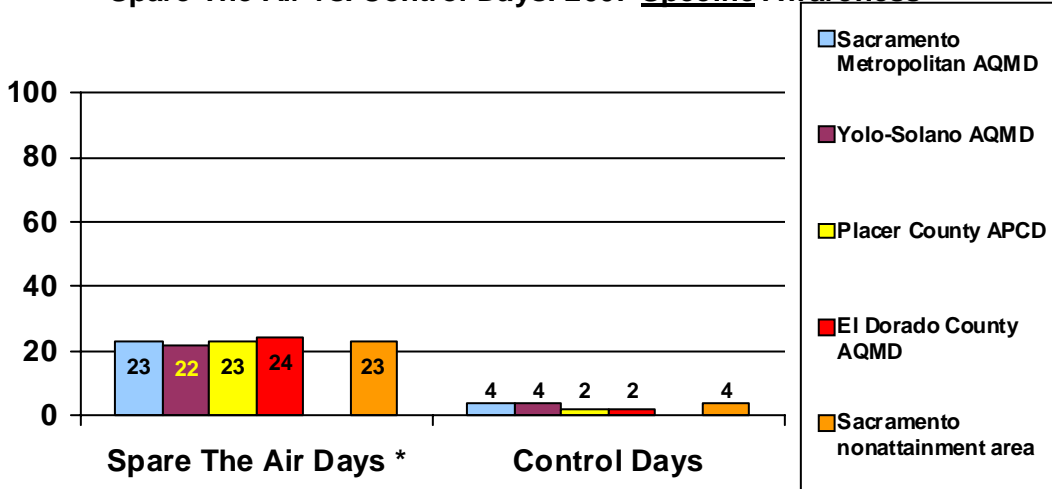


* indicates statistically significant differences between Spare The Air and Control percentages in all groupings.

Spare The Air vs. Control Days: 2007 Specific Awareness

In terms of specific awareness, results were similar in that area respondents interviewed following Spare The Air days were significantly more likely to have heard the specific request not to drive (23%) than those interviewed on matched day-of-the-week Control days (4%). The next chart indicates that this was true in each air district as well as the region as a whole.

Spare The Air vs. Control Days: 2007 Specific Awareness



* indicates statistically significant differences between Spare The Air and Control percentages in all districts.

Estimating the Number of STA-Aware Drivers

*After adjusting for Control day responses through subtraction, the 50% of respondents who were aware of Spare The Air in general translates into **410,618 drivers** in the non-attainment area who noticed the advisory each Spare The Air day during the 2007 season.*

*In terms of specific awareness, and again correcting for Control day responses, this represented **269,025 drivers** who, on an average Spare The Air day, noticed the specific request not to drive.*

2007 General Awareness

There were an estimated 1,415,921 drivers in the Sacramento nonattainment area in the summer of 2007.¹² As the level of general awareness of Spare The Air was 50%, this means that approximately 707,961 drivers in the region were aware of Spare The Air in the summer of 2007. However, we also know that 21% of respondents interviewed on non-Spare The Air (Control days) also said they heard a Spare The Air advisory when in fact none had been issued. Correcting for Control day responses through subtraction, it can be seen that **410,618 drivers in the Sacramento nonattainment area as a whole** were aware of the 2007 Spare The Air campaign in general. The table below indicates the calculations and the corrected estimated number of drivers who heard the advisories for each air district.

¹² The number of drivers in the Sacramento nonattainment area for 2007 was estimated, using the number of driver licenses by county for 2006, obtained from the California Department of Motor Vehicles database at http://www.dmv.ca.gov/about/profile/dl_outs_by_county.pdf, and calculating the percentage increase, based on county population figure increases from 2006 to 2007 listed at: (www.dof.ca.gov/HTML/DEMOGRAP/ReportsPapers/Estimates/E1/documents/E-1table.xls). The estimated number of licensed drivers for the total Sacramento nonattainment area in 2007, therefore, was 1,415,921: Sacramento Metropolitan AQMD: total 907,420 + Yolo-Solano: total of 199,824 (120,977 in Yolo County + Solano County: 271,886 * 29% for the proportion located within the Air Quality district = 78,847) + Placer County (245,383 * 87% for Air Quality district) = 213,483 + El Dorado County: (139,991 * 68% for Air Quality district) = 95,194.

Sacramento Region Spare The Air Program

Final Report of the 2007 Spare The Air Campaign Evaluation

December 2007

<i>Air District</i>	<i>Total Estimated Number of Drivers</i>	<i>Percent Aware of STA (General Awareness) STA / Control</i>	<i>Estimated Number of Drivers Aware of STA in General (STA - Control)</i>
Sacramento Metropolitan AQMD	907,420	49% / 23%	$444,636 - 208,707 = 235,929$
Yolo-Solano AQMD	199,824	53% / 22%	$105,907 - 43,961 = 61,945$
Placer County APCD	213,483	50% / 14%	$106,742 - 29,888 = 76,854$
El Dorado County AQMD	95,194	52% / 18%	$49,501 - 17,135 = 32,366$
Sacramento Nonattainment Area	1,415,921	50% / 21%	$707,961 - 297,343 = 410,618$

2007 Specific Awareness

The estimated numbers of drivers who were aware of the specific request not to drive are presented in the next table. For the entire Sacramento nonattainment area, and correcting for Control day responses, this translates into an estimated **269,025 drivers** who were specifically aware of Spare The Air.

<i>Air District</i>	<i>Total Estimated Number of Drivers</i>	<i>Percent Aware of STA(Specific Awareness) STA / Control</i>	<i>Estimated Number of Drivers Aware of STA Specific Request Not to Drive (STA - Control)</i>
Sacramento Metropolitan AQMD	907,420	23% / 4%	$208,707 - 36,297 = 172,410$
Yolo-Solano AQMD	199,824	22% / 4%	$43,961 - 7,993 = 35,968$
Placer County APCD	213,483	23% / 2%	$49,101 - 4,270 = 44,831$
El Dorado County AQMD	95,194	24% / 2%	$22,847 - 1,904 = 20,943$
Sacramento Nonattainment Area	1,415,921	23% / 4%	$325,662 - 56,637 = 269,025$



Conclusions

1. (pg. 7) *Five Spare The Air days were forecast during the summer of 2007, although the actual maximum Air Quality Index for ozone only surpassed the trigger on one day. General awareness of Spare The Air in 2007 in the region as a whole was significantly higher at 50% than specific awareness of the request not to drive (23%). There were no differences among the individual air quality districts in terms of either general or specific awareness.*
2. (pg. 9) *This year's levels of general (50%) and specific (23%) awareness in the region as a whole are the lowest ever. Both levels are down significantly compared with all other years. This may have been due to a combination of factors: the comparatively few number of Spare The Air days that occurred this summer, the public's (correct) perception that the air quality was not as poor as was predicted, and to a different media buy strategy announcing each STA day. The type of media purchased may have made a difference – this year, there was no television advertising for each specific Spare The Air day -- only radio advertisements were purchased.*
3. (pg. 11) *Significantly more respondents interviewed following Spare The Air days were aware of the Spare The Air advisories than were respondents interviewed on Control days. This means that respondents are generally not giving what might be considered “socially-acceptable” responses, but rather, are quite truthful in their answers. It also attests to the effectiveness of the program – when the advisories are issued, a significant portion of the residential population hears them.*
4. (pg. 13) *After adjusting for Control day responses through subtraction, the 50% of respondents who were aware of Spare The Air in general translates into 410,618 drivers in the non-attainment area who noticed the advisory each Spare The Air day during the 2007 season.*
5. (pg. 13) *In terms of specific awareness, and again correcting for Control day responses, this represented 269,025 drivers in the Sacramento nonattainment area who, on an average Spare The Air day, noticed the specific request not to drive. This is down from the estimated 362,041 drivers who noticed the request last year, but closer to the number in the 2004 season (284,185) when the air quality was more similar to this year in that there were only six Spare The Air days.*

PURPOSEFUL DRIVING REDUCTION

Objectives

One measure of the effectiveness of the Spare The Air¹³ public education program in the Sacramento nonattainment area is to examine actual **changes in driving behavior**. Since 2002, following

¹³ The Spare The Air program has been in place in the Sacramento Air Quality Basin since 1995. The trigger for alerting the population of a Spare The Air day for the next day is based on forecasted estimates of the Air Quality Index (AQI), recorded at

discussions with the Air Resources Board (ARB), the following standard for measuring behavioral driving reductions was implemented – it requires that drivers be aware of Spare The Air, make fewer vehicle trips on Spare The Air days, and further, that they do so purposefully to help reduce air pollution on Spare The Air days. These drivers are called

The broad objectives of the current section are to calculate purposeful driving reduction within the Sacramento nonattainment area using the strict ARB standard, and to see whether driving reduction will be lower this year compared with previous years. Specifically, the objectives are to:

- e. report the percentage of respondents who reported driving “less” the previous day and statistically compare with annual results from 2000 to the present
- f. calculate the percentage of purposeful “reducer” drivers, that is, those who:
 - i. made fewer vehicle trips on Spare The Air days, and
 - ii. did so purposefully to help reduce air pollution in the region, and
 - iii. were aware of the Spare The Air advisories (general awareness).and determine if the percentage of reducers is similar or different among four air quality districts in the Sacramento nonattainment area (Sacramento Metropolitan AQMD, Yolo-Solano AQMD, Placer County APCD, and El Dorado County AQMD)
- g. determine if the percentage of purposeful reducers in the Sacramento Core Region has increased, decreased, or stayed the same from 2000 to the present
- h. extrapolate to the population by estimating the number of **drivers** in the Sacramento nonattainment area who purposefully reduced the number of trips they made on Spare The Air days in 2007
- i. estimate the number of **single trips** avoided by purposeful reducers on Spare The Air days, and
- j. compare the percentage of reducers found in the group of respondents interviewed about Spare The Air days with that of the group interviewed on Control (non-Spare The Air) days.

Method

The following questions were used to calculate the percent of purposeful reducers and the number of trips they reduced:

- “Yesterday, did you drive your car, truck or van the same, more, or less frequently than you normally do on a [day of the week]?”
- “Why did you make that change or those changes?” [This question was asked only of drivers who said they drove less the previous day.]
- “In the past two days have you heard, read, or seen any advertisements or news broadcasts about Spare The Air, or poor air quality, or requests to drive less in this area?” [This question assessed general awareness of the Spare The Air program and was proposed by the ARB. It was added to the questionnaire in 2002.]
- “About how many SINGLE TRIPS in your car did you avoid driving yesterday to reduce air pollution? And by a SINGLE trip, I mean getting in your car, driving from one place to another and then stopping. For example, leaving your house and going to the store is one trip. Leaving the store and going to work or coming back home is another trip. (PROBE:

different stations throughout the Sacramento nonattainment area. If it is estimated that the AQI will be 127 or higher the next day, a Spare The Air advisory is issued. The advisory involves radio announcements, e-mail based Air Alert notifications, and employer networks. A general television commercial stressing the negative impact on child lung development caused by poor air quality was also developed this year, although it did not announce specific STA episodes.

Give me a reasonable approximation --a round number.)” [This question was asked only of drivers who said they drove less for air quality reasons.]

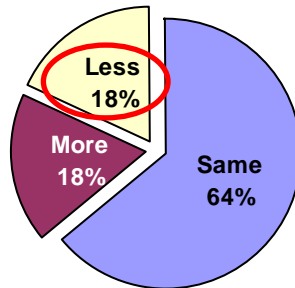
Results

Driving Behavior On 2007 Spare The Air Days

Although fewer residents said they drove “less” on Spare The Air days this year (18%) compared with last year (28%), this appeared to be mitigated by the actual quality of air experienced. There were no differences among the four air quality districts in terms of the proportion of drivers who reportedly drove less on Spare The Air days.

Near the beginning of the questionnaire, respondents were asked whether they drove their vehicle the same, more, or less frequently than normal the previous day. Results for the entire Sacramento nonattainment area were the same as those for the Sacramento Core Region and are presented in the next pie chart. Nearly two-thirds (64%) of all respondents did not change their driving behavior on Spare The Air days – they said they drove the same as they normally do on that particular day of the week. Eighteen percent said they drove “more” the previous day and the same percentage (18%) drove “less”.

**Driving Behavior Yesterday:
 2007 Spare The Air Responses in the
 Sacramento Nonattainment Area and
 Sacramento Core Region**



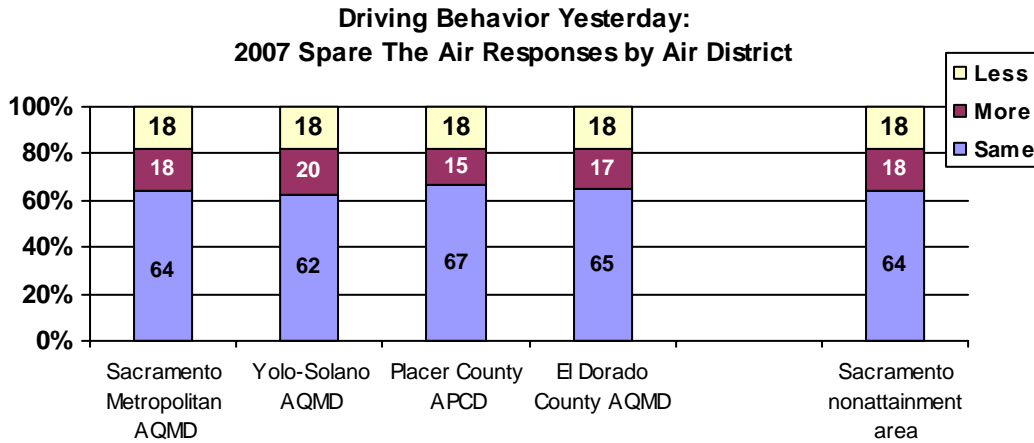
Driving Behavior on 2007 Spare The Air Days: By Air Quality District

Results from each of the individual air quality districts were similar and are presented in the next chart. There were no significant differences among the air quality districts.

Sacramento Region Spare The Air Program

Final Report of the 2007 Spare The Air Campaign Evaluation

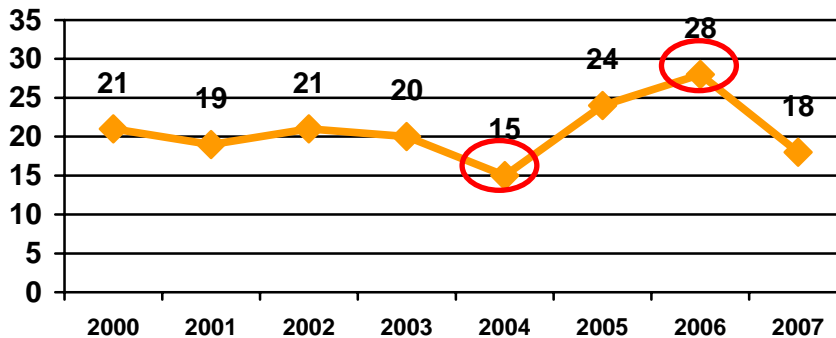
December 2007



Driving Behavior On Spare The Air Days: Year-To-Year Comparison

The percentages of drivers from 2000 to the present who said they drove less on Spare The Air days are shown in the next graph.¹⁴ Year-to-year tests of proportion indicate that self-reported driving reduction on Spare The Air days from 2000 to 2003 was fairly stable, but declined significantly to 15% in 2004, a summer that resembled this year's season in terms of better air quality and fewer Spare The Air days. 2005 saw a significant increase (to 24%) in the percentage of respondents who said they drove less on Spare The Air days, and 2006 registered the highest percentage of all years, at 28%. This year's percentage (18%), while significantly lower than in 2005 or 2006, is not significantly different from any of the other five years (2000 to 2004).

**Year-by-Year Comparison: Percent of Respondents Who Drove "Less" on Spare The Air Days:
Sacramento Core Region
(excludes El Dorado County AQMD)**

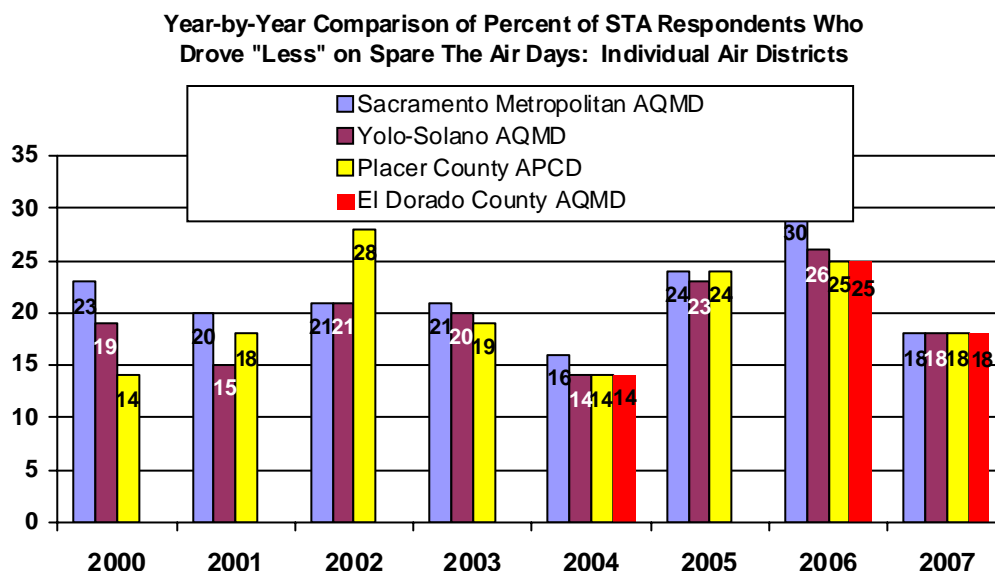


Driving Behavior On Spare The Air Days: Year-To-Year Comparison by Air District

The percentages of drivers who said they drove less on Spare The Air days in the individual air districts over the years are presented in the next chart. Because Sacramento Metropolitan AQMD contains the

¹⁴ Results are for the Sacramento Core Region and exclude El Dorado County AQMD.

largest proportion of residents, it is not surprising that results from SMAQMD are very similar to those just described from the region as a whole. Last year's results in **SMAQMD** were the highest (30%) and 2004 results the lowest (16%). For **Yolo-Solano** AQMD, it can be seen that the percentage of self-reported driving reducers ranged from a low of 14% in 2004 to a high of 26% in 2006. In **Placer County** APCD results fluctuated more from one year to the next and the percentage who drove less in 2002 was the highest at 28%. Drivers in **El Dorado** County AQMD were only interviewed in three of the eight years. 2004 results (14%) did not differ significantly from this year's results (18%), but both were significantly lower than the 2006 results (25%).



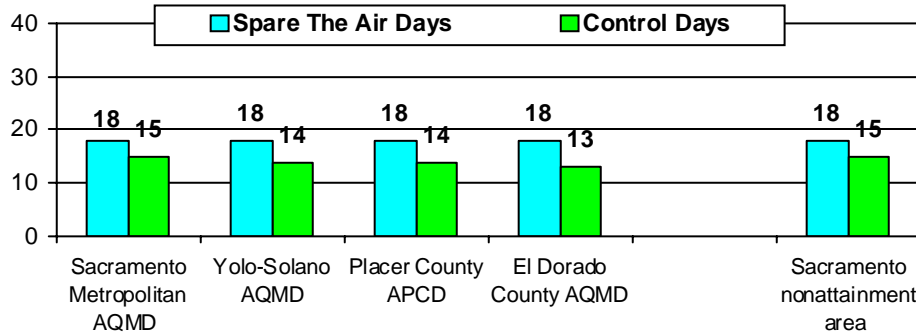
Spare The Air Days vs. Control Days by Air Quality District

The percentage of respondents in the nonattainment are who said they drove less on all Spare The Air days combined was not significantly different from the percentage who drove less on Control days. However, the difference between the groups was found to be significant on a specific Spare The Air episode, when the maximum AQI for ozone reached 192. This indicates that perceived air quality likely influenced driving behavior.

Many years ago a control procedure was introduced into the evaluation methodology of Spare The Air. To correct for possible respondent exaggeration about driving behavior, a group of respondents were interviewed from the same areas on the same days of the week as the Spare The Air interviews, but on cooler, non Spare The Air days in the season. The use of Control day interviewing provides a means of calculating a correction or adjustment factor to account for any tendency for individuals to overstate their driving reduction on Spare The Air days, and, therefore, provides the most conservative (and probably more accurate) estimates of program effectiveness.

The next analysis examined whether a higher percentage of respondents reported driving "less" on Spare The Air days than on matched Control days. Results are shown in the next chart.

**2007 Spare The Air vs. Control Days:
 Percent of Respondents Who Drove "Less" The Previous Day**



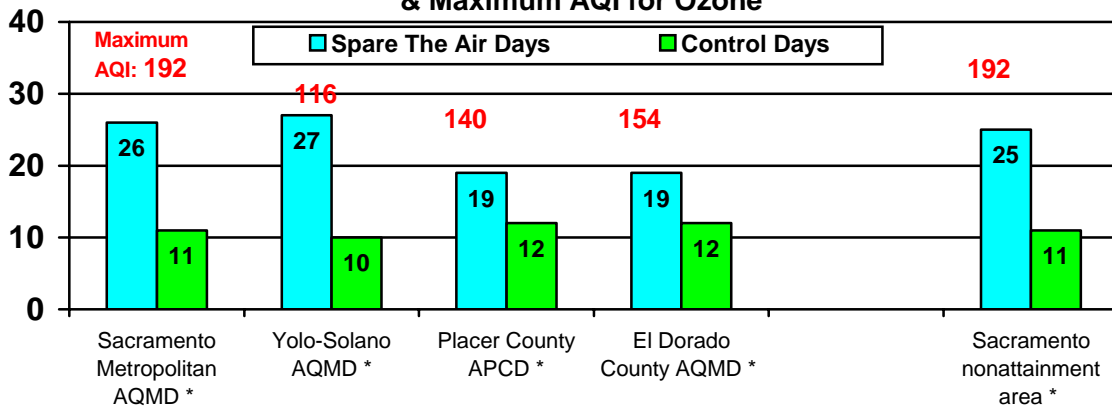
Statistical tests of proportion determined that, although fewer Control day respondents in all air districts said they drove "less" the previous day than did Spare The Air respondents, the differences were not statistically significant in any of the individual districts, the Sacramento Core Region, nor the entire nonattainment area. This is only the **second time** in eight years that we have not seen a significant difference between Spare The Air and Control groups in the Sacramento Metropolitan AQMD as well as the Sacramento Core Region.¹⁵ Results indicating the differences over time from the Sacramento Core Region are presented in the next table.

Year	Percentage of Respondents Who Drove "Less" Yesterday: <u>Sacramento Core Region</u> (excludes El Dorado County AQMD)		Difference (or "Spread")	Statistically Significant Difference?
	Spare The Air Day Respondents	Control Day Respondents		
2000	21%	13%	8%	Yes
2001	19%	14%	5%	Yes
2002	21%	17%	4%	Yes
2003	21%	18%	3%	No
2004	15%	11%	4%	Yes
2005	23%	17%	6%	Yes
2006	28%	18%	10%	Yes
2007	18%	15%	3%	No

¹⁵ In terms of the individual air districts within the Sacramento Core Region, Sacramento Metropolitan AQMD showed significant differences in all years except 2003 and this year; Placer County APCD showed differences in three of the eight years (2002, 2005, and 2006); and in Yolo-Solano AQMD there has been only one year in which the difference was significant (2002). Yolo-Solano AQMD generally experiences better air quality than any of the other air districts in the nonattainment area.

The lack of difference could be an indication of a decline in the effectiveness of the program. However, it is more likely to be due in part to the fact that the summer of 2007 was relatively good from an air quality perspective. To test the hypothesis that the quality of air experienced by residents influenced their driving behavior, further analyses were conducted, comparing the percentage of respondents who said they drove "less" on the Thursday, July 5, 2007 Spare The Air day versus the percentage of respondents who drove less on Thursdays in the Control group. A previous section (Awareness of the 2007 Spare The Air Campaign) indicated that the actual maximum AQI for ozone only surpassed the trigger level of 127 on **one** of the five Spare The Air days called during the summer of 2007: July 5. Although the sample sizes are small, the next chart indicates that **significantly more** respondents said they drove "less" on the July 5th episode than on non Spare The Air Thursdays in all air districts.¹⁶ It can be seen, for example, that in Sacramento Metropolitan AQMD, 26% of respondents said they drove "less" on the July 5 Spare The Air day, when the actual maximum AQI for ozone reached 192. This was significantly higher than the 11% of respondents interviewed on Control day Thursdays who said they drove "less". **In other words, it is likely that the perceived poor quality of air contributed to respondents' decision to drive less on the one 2007 Spare The Air day when the maximum AQI surpassed the trigger of 127.**

**Percent of Respondents Who Drove "Less" on Thursday, July 5
 Spare The Air Day vs. Control Thursdays
 & Maximum AQI for Ozone**



* indicates a statistically significant difference between the groups

Percentage of Purposeful Reducers by Air Quality District

During the summer of 2007, 1.3% of all respondent drivers in the entire Sacramento nonattainment area were classified as having purposefully driven less on Spare The Air days because they wanted to improve air quality in the region and were aware of the Spare The Air advisories.

In order to measure purposeful driving reduction, the next step involved calculating the percentage of all drivers interviewed following Spare The Air days who not only said they drove less, but did so specifically for air quality reasons, and, further, were also aware of Spare The Air in general (using the

¹⁶ In El Dorado County AQMD results from both July 5 and August 1 Spare The Air days were included as the maximum AQI reached on August 1 was 127. Control days therefore included Wednesdays and Thursdays.

ARB question¹⁷). Results from each air district and for the weighted Sacramento regions (Sacramento Core Region as well as the entire nonattainment area) are presented in the next table. It can be seen that for the entire Sacramento nonattainment area, 1.3% of all Spare The Air respondent drivers (6 out of 462) met the strict ARB standard for purposeful driving reduction. The same percentage was found in Sacramento Metropolitan AQMD and Yolo-Solano AQMD. There were fewer purposeful reducers in Placer County APCD this year – only 0.4%. The highest percentage of purposeful reducers was found this year in El Dorado County AQMD, at 2.0%.

<i>Spare The Air: Purposeful Reducers in 2007</i>	<i>Number of Respondents Who Reduced Driving For Air Quality Reasons and Were Aware of STA Advisories</i>	<i>Total Number of Respondents Interviewed on Days Following Spare The Air</i>	<i>% of Total Respondents Who Reduced Driving for Air Quality Reasons and Were Aware of STA Advisories</i>
Sacramento Metropolitan AQMD	4	305	1.3%
Yolo-Solano AQMD	5	309	1.6%
Placer County APCD	1	255	0.4%
Sacramento Core Region¹⁸	5	436	1.2%
El Dorado County AQMD	4	205	2.0%
Sacramento Nonattainment Area¹⁹	6	462	1.3%

Percentage of Purposeful Reducers: Year-To-Year Comparison By Air Quality District

The percentage of purposeful reducers in the Sacramento Core Region has basically remained the same since 2000. Over the last eight years, an average of 1.7% of all drivers in the Sacramento Core Region purposefully reduced driving on Spare The Air days in order to help improve air quality. In Sacramento Metropolitan AQMD, the percentage of reducers has also not changed from one year to the next, but some differences have been observed in Yolo-Solano AQMD and Placer County APCD.

Tests of proportion compared the percentage of reducers²⁰ each year with every other year from 2000 to the present. Results, presented in the next table, indicate that the percentage of reducers has not changed significantly from one year to the next in Sacramento Metropolitan AQMD and the Sacramento

¹⁷ There were two questions in the survey that measured awareness of Spare The Air. The one referred to here measured general awareness and was proposed by the ARB (i.e. “In the past two days have you heard, read, or seen any advertisements or news broadcasts about Spare The Air, or poor air quality, or requests to drive less in this area?”). It was introduced in 2002. Comparisons of reducers with years prior to 2002 used another question to measure awareness, which was more specific (i.e. “Do you recall being asked not to drive yesterday because our area was experiencing a period of unhealthy air?”) It has been included in all evaluations since 1999. Typically, more respondents indicate general awareness of Spare The Air than specific awareness of the request not to drive the previous day.

¹⁸ Weighted, excludes El Dorado County AQMD.

¹⁹ Weighted, includes El Dorado County AQMD.

²⁰ Results from 2000 and 2001 were recalculated but still are not directly comparable, as two of the questions were not the same. The measure of STA awareness was the stricter specific question (see footnote 8 above) and the number of round trips avoided was asked rather than single trips avoided. Single trips were therefore calculated by doubling responses from those two years. Results should therefore be treated with some caution.

Sacramento Region Spare The Air Program

Final Report of the 2007 Spare The Air Campaign Evaluation

December 2007

Core Region (which excludes El Dorado County AQMD). It can also be seen that, **averaged over eight years, 1.7% of all drivers in the Sacramento Core Region** purposefully reduced driving on Spare The Air days, specifically in order to help improve air quality.

In Yolo-Solano AQMD the percentage of reducers was significantly higher in 2002 than in most other years. In fact, 2002 was an exceptional year with high temperatures and multiple-day Spare The Air episodes. [The percentages of reducers in Sacramento Metropolitan AQMD and the Sacramento Core Region were also higher in 2002 than in other years; however, the differences were not statistically significant.]

In Placer County APCD, the percentages of reducers were significantly higher in 2002 and 2006 than in most other years.

<i>Spare The Air: Purposeful Reducers</i>	2000	2001	2002	2003	2004	2005	2006	2007	<i>Significant Difference Between Years?</i>	<i>Average</i>
Sacramento Metropolitan AQMD	2.0%	2.1%	2.3%	1.2%	1.6%	1.5%	1.9%	1.3%	No	1.7%
Yolo-Solano AQMD	1.3%	0.2%	3.5%	1.2%	1.1%	1.3%	1.9%	1.6%	Yes – 2002 significantly higher than 2001, 2003, 2004, 2005, and 2007	1.5%
Placer County APCD	1.0%	0.9%	3.9%	2.3%	1.4%	1.5%	4.3%	0.4%	Yes – 2002 and 2006 significantly higher than 2000, 2001, 2004, 2005, and 2007	2.0%
Sacramento Core Region²¹	1.8%	1.7%	2.7%	1.4%	1.5%	1.4%	2.2%	1.2%	No	1.7%

Estimated Number of Purposeful Reducers

When extrapolated to the population of drivers, about 18,410 drivers in the entire Sacramento nonattainment area could be said to have purposefully made fewer trips on average each Spare The Air day, specifically in order to reduce air pollution.

There were an estimated 1,415,921 drivers in the Sacramento nonattainment area in the summer of 2007.²² Extrapolating to the population of drivers, the 1.3% of reducers means that approximately

²¹ Excludes El Dorado County AQMD.

²² The number of drivers in the Sacramento nonattainment area for 2007 was estimated, using the number of driver licenses by county for 2006, obtained from the California Department of Motor Vehicles database at http://www.dmv.ca.gov/about/profile/dl_outs_by_county.pdf, and calculating the percentage increase, based on county population figure increases from 2006 to 2007 listed at: (www.dof.ca.gov/HTML/DEMOGRAP/ReportsPapers/Estimates/E1/documents/E-1table.xls). The estimated number of licensed drivers for the total Sacramento nonattainment area in 2007, therefore, was 1,415,921: Sacramento Metropolitan AQMD: total 907,420 + Yolo-Solano: total of 199,824 (120,977 in Yolo County + Solano County: 271,886 * 29% for

Sacramento Region Spare The Air Program

Final Report of the 2007 Spare The Air Campaign Evaluation

December 2007

18,410 drivers purposefully made fewer trips on Spare The Air days for air quality reasons. Estimates for the individual air districts as well as for the region (both excluding and including El Dorado County AQMD) are presented in the next table.

<i>Air District</i>	<i>Total Number of Drivers</i>	<i>Percent of Purposeful Reducers</i>	<i>Estimated Number of Purposeful Reducers in 2006</i>
Sacramento Metropolitan AQMD	907,420	1.3%	11,795
Yolo-Solano AQMD	199,824	1.6%	3,200
Placer County APCD	213,483	0.4%	850
Sacramento Core Region	1,320,727	1.2%	15,850
El Dorado County AQMD	95,194	2.0%	1,905
Sacramento Nonattainment Area²³	1,415,921	1.3%	18,410²⁴ <i>purposeful reducers</i>

Estimated Number of Single Trips Avoided by Purposeful Reducers

*Drivers who purposefully reduced driving on Spare The Air days in the nonattainment area avoided making an average of 2.6 single trips each. This translates into a total of **47,866 trips** purposefully avoided on average each Spare The Air day during the 2007 season.*

Purposeful reducers were asked how many single vehicle trips they had avoided on the Spare The Air day. The mean number of single trips avoided by the purposeful reducer drivers in the entire Sacramento nonattainment area was 2.6.²⁵ Multiplying by the estimated 18,410 drivers who purposefully reduced their driving on Spare The Air days, this translates into an estimated **47,866 single trips** that drivers avoided making on Spare The Air days during the summer of 2007, specifically to help reduce air pollution in the region. Results for the individual air districts as well as for the region (both excluding and including El Dorado County AQMD) are presented in the next table.

the proportion located within the Air Quality district = 78,847) + Placer County (245,383 * 87% for Air Quality district) = 213,483 + El Dorado County: (139,991 * 68% for Air Quality district) = 95,194.

²³ Includes El Dorado County AQMD.

²⁴ The total number of drivers estimated in the Sacramento Core Region and the Sacramento nonattainment area are not the simple sums of drivers in the individual air districts: the percentage of reducers was calculated using weighted results, adjusted proportionally to the population within each air district: Sacramento Metropolitan AQMD represents 66% of the entire population, Yolo-Solano AQMD is 15%, Placer County APCD is 13%, and El Dorado County AQMD is 6%.

²⁵ The mean was 2.6, with a standard deviation of 1.58, the median was 3.3, and the range was zero (0) to four (4) trips avoided. There was one (1) driver who was unable or refused to estimate the number of trips avoided and that individual was not included in this calculation.

Sacramento Region Spare The Air Program

Final Report of the 2007 Spare The Air Campaign Evaluation

December 2007

<i>Air District</i>	<i>Estimated Number of Purposeful Reducers</i>	<i>Mean # of Trips Avoided for Air Quality Reasons</i>	<i>Estimated Number of Single Trips Reduced</i>
Sacramento Metropolitan AQMD	11,795	3.0	35,385
Yolo-Solano AQMD	3,200	1.8	5,760
Placer County APCD	850	Missing data²⁶	---
Sacramento Core Region²⁷	15,850	2.7	42,795
El Dorado County AQMD	1,905	1.5	2,858
Sacramento Nonattainment Area²⁸	18,410	2.6	47,866 trips

Percentage of Purposeful Reducers: Spare The Air Days vs. Control Days

Although more respondents purposefully reduced driving on Spare The Air days than on Control days, the differences were not significant. This may have been due to a combination of factors, including fewer Spare The Air days this season, relatively good air quality, and a different media buy strategy to announce each Spare The Air episode.

Respondents interviewed on Control days were also asked if they had reduced the number of trips they made the day before, and if so, why. If the same percentage of drivers claimed to have reduced their driving on Control days for air quality reasons as on Spare The Air days, it would be difficult to credit the Spare The Air program as the cause of driving reduction. Control day interviewing can, therefore, be used as a validation check.²⁹

As shown in the next chart, the percentage of respondents who reduced the number of trips they made for air quality reasons on Control days was less than the percentage who reduced on Spare The Air days in most air districts (Placer County APCD was the exception) and in the Sacramento nonattainment area as a whole. However, in all instances these differences were not statistically significant. The argument could, therefore, be made that the program is becoming less effective, or it could be attributed to the relatively good air quality experienced during the summer of 2007, even on (four of the five) Spare The Air days. Our secondary analysis near the beginning of this section lends support to the latter. A further explanation is that not only was the media buy reduced this year, but the type of media purchased may have made a difference – this year, there was no television advertising for each specific Spare The Air episode -- only radio advertisements were purchased.

²⁶ The one purposeful reducer on Spare The Air days in Placer County APCD could not estimate the number of trips avoided.

²⁷ Excludes El Dorado County and Feather River AQMDs.

²⁸ Includes El Dorado County and Feather River AQMDs.

²⁹ For Control day interviews, for the purpose of this analysis, reducers were classified as those respondents who said they drove less the previous day for air quality reasons.

Sacramento Region Spare The Air Program

Final Report of the 2007 Spare The Air Campaign Evaluation

December 2007

Air District	% of Total Respondents Who Reduced for Air Quality Reasons		Significant Difference?
	Who Were Aware On STA Days	On Control Days	
Sacramento Metropolitan AQMD	1.3%	0.7%	No
Yolo-Solano AQMD	1.6%	1.0%	No
Placer AQMD	0.4%	0.5%	No
Sacramento Core Region	1.2%	0.7%	No
El Dorado County AQMD	2.0%	0.5%	No
Sacramento Nonattainment Area	1.3%	0.7%	No

A final factor to consider regarding the relatively low percentage of purposeful reducers on Spare The Air days is that this is probably a very conservative estimate. Those individuals who already typically reduce the amount of driving they do during the summer months are not included in our calculations of purposeful reducers – only those who said they drove “less” enter into the calculation. In other words, seasonal reducers may have already limited the number of trips they make on hot days and are unable to drive even less on Spare The Air days. A further section will assess the impact of such seasonal driving reduction.

Conclusions

6. (pg. 17) *Although fewer residents said they drove “less” on Spare The Air days this year (18%) compared with last year (28%), this appeared to be mitigated by the actual quality of air experienced. There were no differences among the four air quality districts in terms of the proportion of drivers who reportedly drove less on Spare The Air days.*
7. (pg. 19) *The percentage of respondents in the nonattainment area who said they drove less on all Spare The Air days combined was not significantly different from the percentage who drove less on Control days. However, the difference between the groups was found to be significant on the Spare The Air episode when the maximum AQI for ozone reached 192. This indicates once again that perceived air quality likely influenced driving behavior.*
8. (pg. 21) *During the summer of 2007, 1.3% of all respondent drivers in the entire Sacramento nonattainment area were classified as having purposefully driven less on Spare The Air days because they wanted to improve air quality in the region and were aware of the Spare The Air advisories.*
9. (pg. 22) *The percentage of purposeful reducers in the Sacramento Core Region has basically remained the same since 2000. Over the last eight years, an average of 1.7% of all drivers in the Sacramento Core Region purposefully reduced driving on Spare The Air days in order to help improve air quality. In Sacramento Metropolitan AQMD, the percentage of reducers has also not changed from one year to the next, but some differences have been observed in Yolo-Solano AQMD and Placer County APCD.*

10. (pg. 23) *When extrapolated to the population of drivers, about 18,410 drivers in the entire Sacramento nonattainment area could be said to have purposefully made fewer trips on average each Spare The Air day, specifically in order to reduce air pollution. They avoided making an average of 2.6 single trips each. This translates into a total of 47,866 trips purposefully avoided on average each Spare The Air day during the 2007 season.*
11. (pg. 25) *Although more respondents purposefully reduced driving on Spare The Air days than on Control days, the differences were not significant. This may have been due to a combination of factors including fewer Spare The Air days this season, relatively good air quality, and a reduced (because of fewer Spare The Air episodes) and different media buy strategy to announce each Spare The Air episode. The type of media purchased may have made a difference – this year, there was no television advertising for each specific Spare The Air episode – only radio advertisements were purchased.*

ESTIMATED EMISSION REDUCTIONS

Results

The main objective of the current section is to estimate how many tons of ozone precursor emissions [Volatile Organic Compounds (VOC) and Nitrogen Oxides (NOx)] were reduced during the 2007 season that could be attributed directly to the Spare The Air program. In order not to overestimate possible reductions, a correction factor based on Control day interviewing has been applied. Results, therefore, are conservative.

Specifically, the calculation of emission reductions involves:

- k. subtracting the estimated number of single trips avoided by purposeful reducers on Control (non Spare The Air) days from the estimated number of single trips avoided by purposeful reducers on Spare The Air days,
- l. using the latest approved standard EMFAC2007 model (V2.3) run on the 2007 summer season to calculate 2007 VOC and NOx starting and running emissions factors.³⁰ This will be used to estimate the number of tons of ozone precursors we can confidently say were reduced specifically due to the Spare The Air program,
- m. doing this for each air quality management district that showed a significant difference in terms of the percentage drivers who reported driving “less” the previous day between Spare The Air and Control days, as well as for the entire Sacramento nonattainment area,³¹ and
- n. comparing the estimated ozone precursor emissions reductions in the Sacramento Metropolitan AQMD from 2000 to the present.

Calculation of Estimated Emission Reductions

The methodology that has been used for the last few years to estimate emission reductions due specifically to the Spare The Air program is conservative. It eliminates many respondents from

³⁰ The emissions model was provided in a spreadsheet by Bruce Katayama, SMAQMD on October 12, 2007. In previous years' evaluations the model used was EMFAC2002 v2.2.

³¹ This has always been a condition for estimating emissions reductions, however, this year, although a higher percentage of drivers following Spare The Air days than Control days could be classified as purposeful reducers, the difference was not statistically significant (see the Purposeful Driving Report). This was true for all air districts and the region as a whole.

consideration, such as seasonal reducers who generally make fewer trips during the summer to help air quality and so may not have been able to drive even less on specific STA days, or those who reduced their driving for reasons other than air quality, or those who drove less but had not heard the Spare The Air advisory. The methodology also uses current season results from Control day interviewing as a correction factor.

This year was different from the previous seven years of evaluations in that there were no significant differences between the percentages of respondents who reported driving less on Spare The Air days and on Control days.³² This has been considered a necessary prerequisite for the calculation of emission reductions in any air district.³³ One explanation, as we have already indicated, is that 2007 was a relatively good summer from an air quality perspective – only 18 exceedances of the federal 8-hour standard for ozone occurred. In a previous section (Purposeful Driving Reduction in the 2007 Spare The Air Season), we tested the hypothesis that residents' perceptions of air quality influenced their decision to drive less, as four of the five Spare The Air days in the 2007 season did not experience air quality as poor as had been predicted. When analysis of the one day when the actual Air Quality Index reached a maximum of 192 (unhealthy) indicated that significantly more drivers did report driving less, the hypothesis was supported. In addition, the reduced media buy and type of media (radio only) may also have contributed to the lack of a difference between Spare The Air and Control groups in terms of self-reported driving reduction. (The total amount of money spent on Spare The Air advisories this season was reduced due to fewer Spare The Air days requiring advertising, and the fact that purchasing radio time costs less than purchasing television time.) Although these explanations are plausible, the necessary prerequisite driving reductions differences were not present and, therefore, in the current section, we will report estimated emission reductions for only the two largest areas – the nonattainment area as a whole and the Sacramento Metropolitan AQMD.

Results from the Sacramento nonattainment area as a whole are used to illustrate the procedure according to the following steps:

1. Calculate the percentage of purposeful reducers, that is, drivers who said they were aware of the Spare The Air advisories,³⁴ and who also said they drove less than usual on Spare The Air days, specifically for air quality reasons. For the nonattainment area as a whole, this was **1.3%** (6 / 462³⁵) of all respondents interviewed following Spare The Air days.
2. Record the mean (average) number of single trips they avoided for air quality reasons on Spare The Air Days. These purposeful reducers were asked to estimate the number of single trips they avoided making on the Spare The Air day. For the nonattainment area, the mean was **2.6** single trips avoided.³⁶

³² 2003 was the one other year when the percentages who said they drove "less" on Spare The Air days were not significantly different from the percentages who drove less on Control days. We nevertheless found statistically significant differences between Spare The Air and Control groups in terms of higher percentages of purposeful reducers following Spare The Air episodes. This year, there were no differences between the two groups in terms of either self-reported driving reduction or the proportions of purposeful reducers.

³³ The prerequisite was introduced in 2000 by Jude Lamare, Ph.D.; formerly with the Cleaner Air Partnership.

³⁴ Using the ARB-worded question for measuring general awareness of Spare The Air: "In the past two days have you heard, read, or seen any advertisements or news broadcasts about Spare The Air, or poor air quality, or requests to drive less in this area?"

³⁵ The total number of completed interviews was weighted. Since the beginning evaluation in 1995, the methodology for weighting has been to set Sacramento County interviews as 1, and down-weight interviews from all other counties appropriately, depending on the size of their populations. This is why the weighted total of completed interviews (462) is less than the sum of the total number of interviews of all air districts (1,074).

³⁶ The mean was 2.6 with a standard deviation of 1.58, the median was 3.3, and the range was zero (0) to four (4) trips avoided. There was one (1) driver who was unable or refused to estimate the number of trips avoided and that individual was not included in this calculation.

3. Extrapolate to the total number of drivers in the region³⁷ this year: the percentage of Spare The Air reducers therefore represents **18,410** drivers in the Sacramento nonattainment area, and the number of single trips avoided was **47,866** (18,410 drivers x 2.6 trips avoided on average).
4. Multiply the number of trips avoided by a per trip emission reduction average of **5.79 grams of ozone precursors**.³⁸ [This includes a total of VOC (3.27 grams per trip for light duty passenger cars plus two categories of light duty trucks) plus NOx (2.52 grams per trip for light duty passenger cars and light duty trucks) emissions.] EMFAC2007 V2.3 was the latest update to the EMFAC model at the time this report was prepared. It is used by California state and local governments to meet Clean Air Act (CAA) requirements. EMFAC2007 defines trips as vehicle starts and calculates them separately as a function of vehicle population (derived from vehicle registration data), based on ARB and US EPA instrumented vehicle studies. For the Sacramento nonattainment area, this amounts to **277,144 grams** of ozone precursors (47,866 single trips avoided x 5.79 grams per trip).
5. Convert to tons.³⁹ For the Sacramento nonattainment area as a whole, this translates to an estimated total of **0.31 tons of pollutants reduced** per Spare The Air day.
6. Repeat the process for Control day interviews: record the mean number of trips avoided by the respondents who drove less for air quality reasons on Control days. In the entire Sacramento nonattainment area, there were **4** individuals (or 0.7% of all Control day respondents) who reduced an average of **3.5**⁴⁰ driving trips on Control days for air quality reasons. Extrapolated to the total population, therefore, this means that **9,911** drivers on control days avoided a total of **34,689** single trips (9,911 drivers x 3.5 trips avoided). Multiplying the number of trips avoided by a per trip emission reduction average of 5.79 grams of ozone precursors indicates that 200,849 grams or **0.22** tons of emission precursors were reduced per Control day in 2007.
7. Apply the correction factor. To ensure that only purposeful driving reduction due to the Spare The Air program is counted in the estimate of emission reduction, we subtract the Control day air quality emission reduction from the Spare The Air day reduction. The correction for the Control days in this instance is 0.22 tons of ozone precursors, which, when subtracted from the 0.31 tons reduced on Spare The Air days, yields:
8. Result: **0.09 tons of ozone precursors reduced per Spare The Air day in 2007.**

³⁷ The number of drivers in the Sacramento nonattainment area for 2007 was estimated, using the number of driver licenses by county for 2006, obtained from the California Department of Motor Vehicles database at http://www.dmv.ca.gov/about/profile/dL_outs_by_county.pdf, and calculating the percentage increase, based on county population figure increases from 2006 to 2007 listed at: (www.dof.ca.gov/HTML/DEMOGRAP/ReportsPapers/Estimates/E1/documents/E-1table.xls). The estimated number of licensed drivers for the total Sacramento nonattainment area in 2007, therefore, was 1,415,921: Sacramento Metropolitan AQMD: total 907,420 + Yolo-Solano: total of 199,824 (120,977 in Yolo County + Solano County: 271,886 x 29% for the proportion located within the Air Quality district = 78,847) + Placer County (245,383 x 87% for Air Quality district) = 213,483 + El Dorado County: (139,991 x 68% for Air Quality district) = 95,194.

³⁸ Based on summer 2007 EMFAC2007 V2.3 SMAQMD spreadsheet figures provided by Bruce Katayama, SMAQMD, October 12, 2007. Models were run for the summer of 2007. The total VOC tons for a combined total of light duty passenger cars and two categories of light duty trucks (10.22 + 2.56 + 4.74) were converted to pounds (multiplied by 2,000) and then to grams (multiplied by 454) before dividing by the combined total number of trips (i.e. 2,944,650 for light duty passenger cars + 610,052 for light duty trucks1 + 1,317,040 for light duty trucks2) in order to obtain the average grams per trip. The same process was used to calculate NOx grams per trip (6.44 + 1.9 + 5.19) x 2000 x 454 / (2,944,650 + 610,052 + 1,317,040). VOC grams and NOx grams were then combined (3.27 + 2.52) to obtain 5.79 grams per trip of emission precursors in the region as a whole. These are the figures considered most accurate at the time this report was written.

³⁹ There are 907,200 grams in a ton.

⁴⁰ The standard deviation was 2.88; and answers ranged from 0 to 8 single trips avoided.

2007 Emissions Reductions in the Nonattainment Area

The procedure described above for calculating the 2007 Emissions Reduction Estimate in the entire Sacramento nonattainment area (including El Dorado County AQMD) is summarized in the table that follows:

Sacramento Nonattainment Area	Percent of Respondent Drivers Who Drove Less for Air Quality Reasons ⁴¹	X Number of Licensed Drivers in Sacramento Nonattainment Area (1,415,921 Total)	X Mean Number of Single Trips Reduced Per Day	x 5.79 Grams of Ozone Precursors Per Trip (EMFAC 2007 V2.3) 2007 Model	= Estimated Tons per Day of Ozone Precursors Reduced
Spare The Air Days	1.3% (6 / 462 ⁴²)	18,410	x 2.6 = 47,866	277,144 grams	0.31 tons
Control Days	0.7% (4 / 611)	9,911	x 3.5 = 34,689	200,849 grams	0.22 tons
Estimated Tons of Ozone Precursors Reduced Per Day: (STA Day Reductions – Control Day Reductions)					0.09 tons

Summary of Results:

Correcting for control day interviewing, the 2007 Spare The Air program was successful in reducing air pollution in the entire Sacramento nonattainment area by an estimated 0.09 tons of ozone precursors per day. This is due specifically to drivers purposefully reducing the number of trips they took on Spare The Air days for air quality reasons. In the Sacramento Metropolitan AQMD, an estimated .06 tons of ozone precursors were reduced.

As was previously discussed (page 3), one criterion for calculating emission reductions in the individual air quality districts has been to demonstrate that significantly more respondents in the Spare The Air group than in the Control group said they drove “less” the previous day. This year, the differences were not significant⁴³, and therefore we will only calculate estimates of emission reductions from the largest (in terms of population) individual air district in the region, which was also the one that experienced the highest maximum AQI for ozone during the summer, namely Sacramento Metropolitan AQMD.

⁴¹ In addition, in the case of Spare The Air respondents, these drivers had to say they had heard the Spare The Air advisory (the ARB general awareness question).

⁴² Please note that the weighted total number of completed interviews for the Sacramento nonattainment area as a whole (i.e. 462) is less than the total number of completed interviews within all air districts (1,074 unweighted). Since the beginning evaluation in 1995, the methodology for weighting has been to set Sacramento Metropolitan AQMD interviews as 1, and down-weight interviews from all other counties appropriately, depending on the size of their populations. The Sacramento Metropolitan AQMD represents the largest percentage of the nonattainment area population at 66%, followed by Yolo-Solano AQMD (15% of area population), Placer County APCD (13%), El Dorado County AQMD (6%). In other words, the number of completed interviews for the entire Sacramento nonattainment area is not the simple sum of the number of completed interviews in each individual air district.

⁴³ See explanation on page 3 describing the combination of factors that likely contributed to this finding.

2007 Emissions Reduction Estimate: Sacramento Metropolitan AQMD

It can be seen in the next table that in Sacramento Metropolitan AQMD, air pollution was reduced by an estimated **0.06 tons of ozone precursors** per Spare The Air day, specifically due to residents driving less on Spare The Air days.

Sacramento Metropolitan AQMD	Percent of Respondent Drivers Who Drove Less for Air Quality Reasons	X Number of Licensed Drivers in Sacramento Metropolitan AQMD (907,420 Total)	X Mean Number of Single Trips Reduced Per Day	x 5.79 Grams of Ozone Precursors Per Trip (EMFAC 2007 V2.3) 2007 Model	= Estimated Tons Per Day of Ozone Precursors Reduced
Spare The Air Days	1.3% (4 / 305)	11,797	x 3.0 = 35,391	204,914 grams	0.23 tons
Control Days	0.7% (3 / 403)	6,,352	x 4.3 = 27,314	158,148 grams	0.17 tons
Estimated Tons of Ozone Precursors Reduced Per Day: (STA Day Reductions – Control Day Reductions)					0.06 tons

Comparison with Previous Years: Sacramento Metropolitan AQMD (only)

A comparison of estimated emission reductions⁴⁴ from 2001 to the present in the Sacramento Metropolitan AQMD⁴⁵ (only) are presented in the next table. It is important to point out that the factors that contribute to the estimates, including differences in yearly estimated VOC and NOx emission factors per trip, changes in the number of drivers, the percentage of purposeful reducers, the average number of trips reduced, the severity of conditions and the number of Spare The Air days experienced during each summer season vary from one year to the next. This year the estimated emissions reductions are the lowest ever, however this was also a relatively good summer from an air quality perspective – only five Spare The Air days were predicted and of those, the maximum AQI exceeded the trigger of 127 on only one of those days. **That being said, looking across the years, it is clear that the Spare The Air program has been successful each year in reducing the amount of ozone precursors in the air.**

⁴⁴ The estimated emissions reductions shown in the current table were based on accepted EMFAC models for each year. This year, estimates were based on the EMFAC 2007 v 2.3 model. According to Bruce Katayama, the EMFAC2007 factors for 2007 are just slightly less than the EMFAC2002 factors which were used in 2006 : “The slight reduction in emission factors would be expected since the motor vehicle fleet is getting cleaner each year. There seems to be some consistency between the two EMFAC series and it probably should not skew the comparisons much with prior years that used EMFAC2002.”

⁴⁵ Over the years, reductions could often not be calculated for Placer County APCD, Yolo-Solano AQMD, and El Dorado County AQMD as there were sometimes no significant differences between Spare The Air and Control day drivers who said they drove less.

<i>Estimated Tons of Ozone Precursors Reduced on Spare The Air Days</i>							
<i>Year</i>	<i>2001</i>	<i>2002</i>	<i>2003</i>	<i>2004</i>	<i>2005</i>	<i>2006</i>	<i>2007</i>
<i>Sacramento Metropolitan AQMD</i>	1.32 tons (.69 VOC + .63 NOx)	0.99 tons (.52 VOC + .47 NOx)	0.26 tons (.14 VOC + .12 NOx)	0.42 tons (.23 VOC + .19 NOx)	0.25 tons (.13 VOC + .12 NOx)	0.26 tons (.14 VOC + .12 NOx)	.06 tons (.04 VOC + .02 NOx)

Conclusions

12. (pg. 30) *Correcting for control day interviewing, the 2007 Spare The Air program was successful in reducing air pollution in the entire Sacramento nonattainment area by an estimated 0.09 tons of ozone precursors per day. This is due specifically to drivers purposefully reducing the number of trips they took on Spare The Air days for air quality reasons.*
13. (pg. 31) *In terms of reductions in individual air quality districts, in Sacramento Metropolitan AQMD an estimated .06 tons of ozone precursors were reduced. Reductions in the other air districts were not estimated as the percentage of drivers who said they drove less on Spare The Air days was not significantly higher than the percentage interviewed on Control days. Although more respondents purposefully reduced driving on Spare The Air days than on Control days, the differences were not significant, even in the Sacramento Metropolitan AQMD. This may have been due to a combination of factors including fewer Spare The Air days this season, relatively good air quality (only 18 exceedances of the federal 8-hour standard for ozone), and a different media buy strategy to announce each Spare The Air episode. The type of media purchased may have made a difference – this year, there was no television advertising for each specific Spare The Air episode – only radio advertisements were purchased.*

SUMMER 2007 HEALTH ISSUES

Objectives

The U.S. Environmental Protection Agency has designated the Sacramento region as a “severe” ozone nonattainment area. During summer months, the region fails to meet the federal 8-hour health standard for ozone. Even at relatively low levels, **ozone affects human health**. It may cause inflammation and irritation of the respiratory tract, particularly during physical activity and exercise. The resulting symptoms can include breathing difficulty, coughing, and throat irritation. Breathing ozone can affect lung function and worsen asthma attacks. It can also aggravate other respiratory diseases such as emphysema and bronchitis. Children in particular are vulnerable. Medical studies have shown that ozone damages lung tissue and complete recovery may take several days after exposure has ended.⁴⁶

⁴⁶ US Environmental Protection Agency: <http://www.epa.gov>

Ground-level ozone is formed by a chemical reaction between volatile organic compounds (VOCs) and oxides of nitrogen (NO_x) in the presence of sunlight. Sources of these emissions include, cars, light-duty trucks, and vans – in fact, mobile sources cause approximately 70% of the region's ozone pollution problem.

Ozone levels can reach unhealthy levels particularly during the summer months when the weather is hot and sunny with relatively light winds.

The main objective of the current section is to document the relationship between air quality and the health effects experienced by households in the Sacramento nonattainment area during the summer of 2007.

Specific objectives of the current section are to:

- o. compare levels of perceived health effects due to poor air quality between respondents interviewed following Spare The Air days and those interviewed on Control (non Spare The Air) days,
- p. estimate the number of households in the Sacramento nonattainment area whose health was affected by poor air quality specifically due to ozone air pollution on Spare The Air days in 2007,
- q. determine if levels of reported health problems during summer Spare The Air seasons have increased, decreased, or stayed the same from 2000 to the present in the Sacramento Core Region (excluding El Dorado County AQMD), and
- r. compare the incidence of reported health problems among the five air quality districts in the Sacramento nonattainment area (Sacramento Metropolitan AQMD, Yolo-Solano AQMD, Placer County APCD, and El Dorado County AQMD).

Method

Household breathing problems during the Spare The Air season have been tracked since 2000 using the following question:

- “Did you or did anyone else in your household have difficulty breathing yesterday because of unhealthy air yesterday?”

In 2004, a few additional health-related questions were added:

- “And what about today?”
- “Did you or did anyone else in your household experience any of the following conditions either yesterday or today because of unhealthy air yesterday?
 - a. Coughing?
 - b. Headache?
 - c. Burning eyes?”

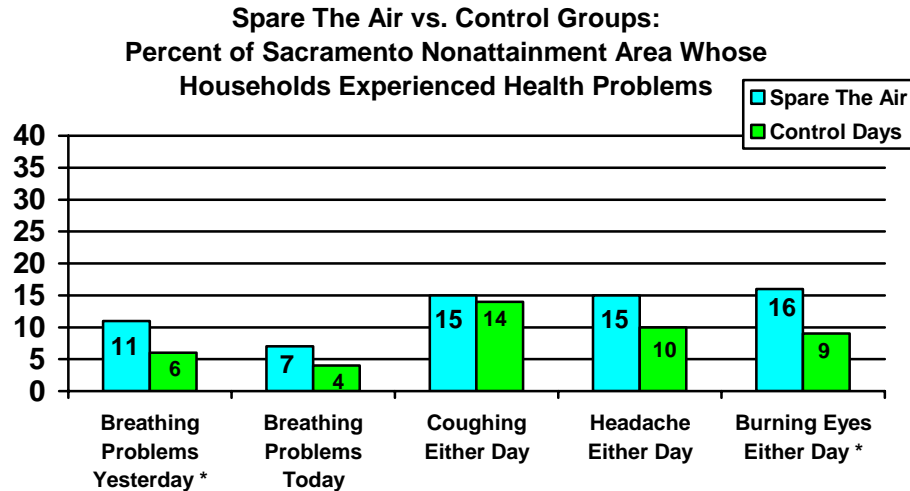
Results

Perceived Health Effects: Spare The Air Days vs. Control Days

Respondents reported experiencing significantly more breathing difficulties and burning eyes in households interviewed about Spare The Air days than about Control days in the Sacramento nonattainment area.

Although the air this summer was relatively clean as far as air quality was concerned, nevertheless, significantly more respondents said they experienced health problems on Spare The Air days than on Control days. In particular, and as can be seen in the next chart, significantly more households

experienced breathing problems (11%) and burning eyes (16%) on Spare The Air days than on Control days.⁴⁷ This was a very interesting finding, as it indicated that even though the air quality on Spare The Air days was not as poor as had been predicted nevertheless, the percentage of health problems experienced by households was more on those days than on Control days.



* indicates a statistically significant difference

Further examination of the maximum Air Quality Index (AQI) for ozone on each of the interview days was conducted. As indicated below, a range of between 0 to 50 is considered “Good” air quality, 51 to 100 is considered “Moderate”, and 101 to 150 is considered “Unhealthy for Sensitive Groups”. The trigger of 127 for calling a Spare The Air day occurs in this latter range.

Air Quality Index (AQI) Category
Very Unhealthy (201– 300)
Unhealthy (151 – 200)
Unhealthy for Sensitive Groups (101 – 150)
Moderate (51 – 100)
Good (0 – 50)

We looked at the maximum AQI for ozone experienced in the Sacramento region as a whole on each and every interview day (www.sparetheair.com/histsummary.cfm). Results indicated that all Control day interviews were conducted on days when the maximum AQI was in the “Good” range. The EPA considers air quality at this level to be “considered satisfactory, and air pollution poses little or no risk.”⁴⁸ In contrast, the maximum AQI for ozone on Spare The Air days in the region was either in the Moderate or Unhealthy for Sensitive Groups range. The air quality for the “Moderate” range “is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people. For example, people who are unusually sensitive to ozone may experience respiratory

⁴⁷ Excludes responses of don't know/undecided.

⁴⁸ From <http://airnow.gov/index.cfm?action=static.aqi>

symptoms.⁴⁹ It would appear that these were the households in the survey who experienced breathing difficulties on the Spare The Air days this past summer.

There were no differences between Spare The Air and Control respondents in terms of the percentage of households who experienced breathing problems on the day of the interview, or coughing or headaches either the day before or the day of the interview.

Perceived Health Effects: Estimated Number of Households

*An estimated **42,017 households** in the Sacramento nonattainment area experienced breathing problems during Spare The Air days specifically due to ozone air pollution. In addition, **58,823 households** experienced burning eyes.*

As summarized the next table, there are an estimated 840,334⁵⁰ households in the Sacramento nonattainment area; therefore, the 11% of respondents who claimed that someone in their household experienced breathing problems on a Spare The Air day translates into 92,437 households. The 6% of respondents who reported breathing problems on Control days translates into 50,420 households. Correcting for Control days through subtraction, this means that **42,017 households experienced breathing problems due specifically to ozone air pollution on Spare The Air days.** The number of households who experienced burning eyes either the day before or the day of the interview was 58,823.

	<i>Number of Households Affected</i>		
<i>Sacramento Nonattainment Area (840,334 Households)</i>	<i>Spare The Air Respondents</i>	<i>Less Control Respondents</i>	<i>Equals Remaining Number of Households Affected Specifically Due to Air Pollution on STA Days</i>
<i>Breathing Difficulties Yesterday</i>	<i>11% = 92,437</i>	<i>6% = 50,420</i>	<i>42,017</i>
<i>Burning Eyes Yesterday or Today</i>	<i>16% = 134,453</i>	<i>9% = 75,630</i>	<i>58,823</i>

Year-To-Year Comparison

The percentage of households reporting breathing difficulties in the Sacramento Core Region on Spare The Air days has stayed the same from 2000 to the present, at an average of 11% of all households during the past eight years. An average of 8% of households interviewed on Control days experienced breathing difficulties.

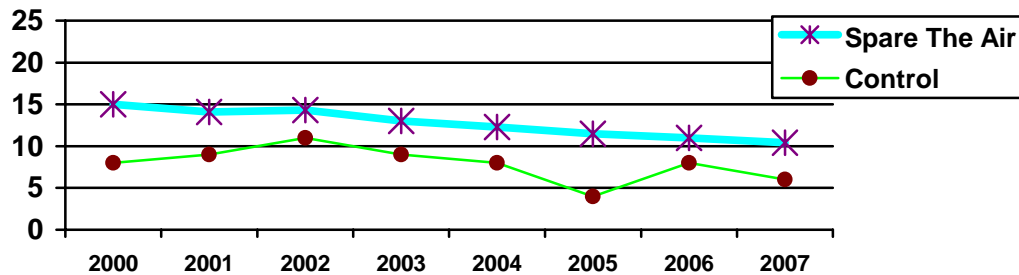
The annual percentages of respondents in the Sacramento Core Region (excluding El Dorado County AQMD) who said someone in their household had trouble breathing on Spare The Air and Control days from 2000 to the present are plotted in the next graph. There is no significant difference over time in terms of households affected on Spare The Air days. It can be seen that eight years ago (in 2000), 15% of respondents had difficulty breathing, followed by two years where 14% experienced problems, followed by 13% in 2003; 12% in 2004 and 2005; and 11% in 2006 and 2007. The eight year average is

⁴⁹ From <http://airnow.gov/index.cfm?action=static.aqi>

⁵⁰ The measure used for households was the number of housing units. Reference: State of California, Department of Finance, [E-5 City / County Population and Housing Estimates](http://www.dof.ca.gov/HTML/DEMOGRAP/ReportsPapers/Estimates/E5/E5-06/documents/E-5a.xls), January 1, 2007. Available online at: www.dof.ca.gov/HTML/DEMOGRAP/ReportsPapers/Estimates/E5/E5-06/documents/E-5a.xls. The estimated number of households for the entire Sacramento nonattainment area is 840,334 ((Sacramento Metropolitan AQMD: 545,287) + (Placer County APCD: 144,207 * 87% = 125,460) + (Yolo-Solano AQMD: 113,354 (Yolo: 71,755; Solano (Dixon, Rio Vista & Vacaville: 41,599)) + (El Dorado County AQMD: 82,695 * 68% = 56,233)).

11% of households. Basically, the reported level of breathing difficulty caused by ozone air pollution on Spare The Air days has remained stable over the last eight years. In terms of Control day interviewing, the percent of households who reported breathing difficulties has also remained relatively stable at about 8%, with the exception of 2005, an anomalous result.

Year-by-Year Comparison of Percent of Respondents Whose Households Experienced Breathing Difficulties on Spare The Air Days: Sacramento Core Region



Perceived Health Effects: By Air Quality District

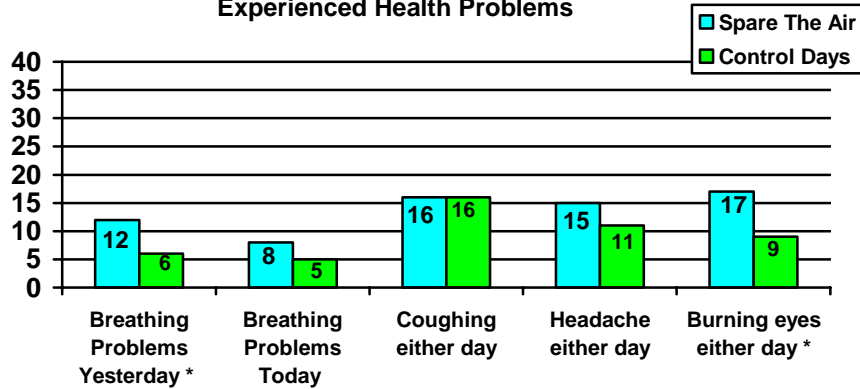
Significantly more households experienced breathing problems on Spare The Air days than on Control days in the three air districts where the maximum AQI for ozone reached the Moderate or Unhealthy For Sensitive Groups range – Sacramento Metropolitan AQMD, Placer County APCD, and El Dorado County AQMD. There were no significant differences between Spare The Air and Control households in Yolo-Solano AQMD, but the air quality was also better.

Other health effects attributable to poor air quality on Spare The Air days included burning eyes in Sacramento Metropolitan and El Dorado County AQMDs; headaches in Placer County APCD and El Dorado County AQMD; and coughing in El Dorado County AQMD households.

Sacramento Metropolitan AQMD

In terms of the individual counties, results from Sacramento Metropolitan AQMD indicated that more households experienced breathing problems and burning eyes on Spare The Air days than on Control days. There were no significant differences between the two groups of respondents in terms of, coughing, headaches, or breathing problems on the day of the interview. Results are shown in the next chart.

Spare The Air vs. Control Groups: Percent of Sacramento Metropolitan AQMD Respondents Whose Households Experienced Health Problems

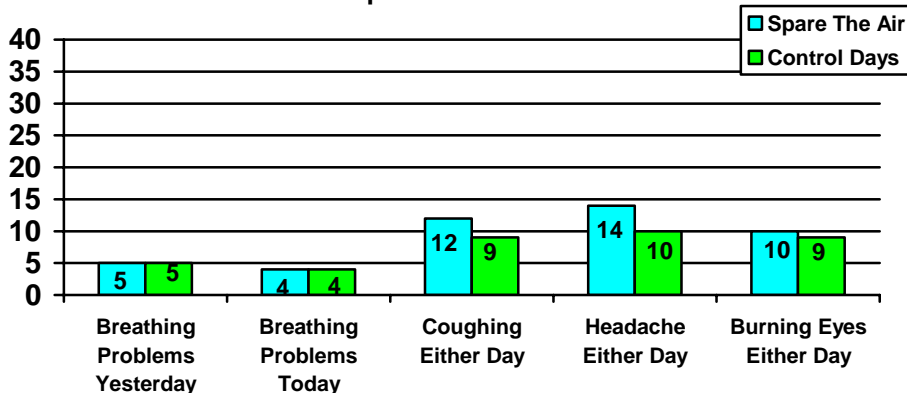


* indicates a statistically significant difference

Yolo-Solano AQMD

In Yolo-Solano AQMD, as can be seen in the next chart, there were no significant differences between Spare The Air respondents and Control respondents in terms of health related issues. Yolo-Solano AQMD generally experiences better air quality than the other air districts in the nonattainment area, and this year was no different. Further examination of the maximum AQI for ozone experienced in Yolo-Solano AQMD (there are three reporting sites in the district) indicated that only one site on one Spare The Air day (July 5) was in the Unhealthy for Sensitive Groups range, and on one day all three sites were in the Moderate range (August 30) – all other Spare The Air days were in the “Good” range at all sites. In other words, it is not surprising that the percentage of health problems in both groups of respondents is the same – for the most part, the air quality they both experienced was relatively good.

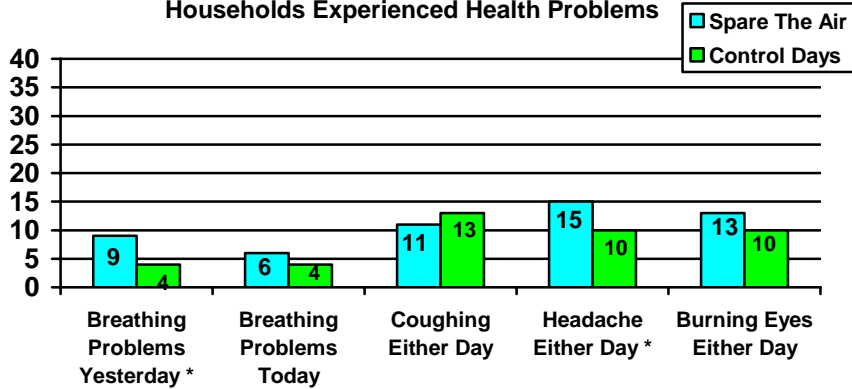
Spare The Air vs. Control Groups: Percent of Yolo-Solano AQMD Respondents Whose Households Experienced Health Problems



Placer County APCD

In Placer County APCD significantly more Spare The Air than Control households experienced breathing problems on Spare The Air days and headaches on either the day of the interview or the day before.

**Spare The Air vs. Control Groups:
 Percent of Placer County APCD Respondents Whose
 Households Experienced Health Problems**

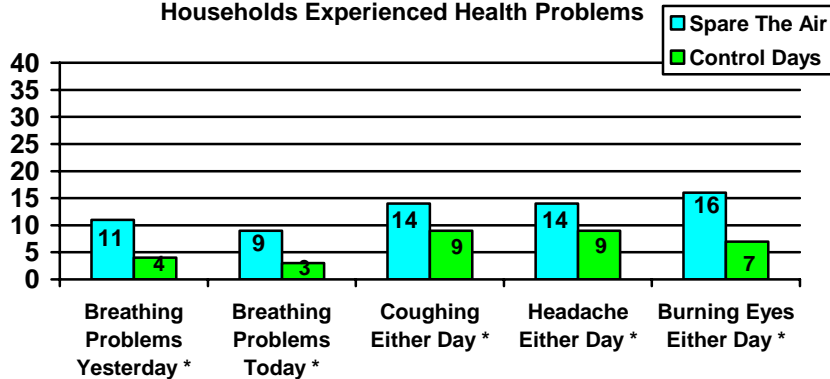


* Indicates a statistically significant difference

El Dorado County AQMD

It can be seen in the next chart that households interviewed following Spare The Air days experienced significantly more health problems than those interviewed following Control days: there were differences between the two groups on all aspects measured -- breathing problems, coughing, headaches, and burning eyes. Further examination of the maximum AQI for ozone experienced in El Dorado County AQMD indicated that the air quality was quite poor: one Spare The Air day was in the Unhealthy range, two of the five Spare The Air days were in the Unhealthy for Sensitive Groups range, and the remaining two days were in the Moderate range. On all Control days but one, the maximum AQI experienced was in the "Good" range. In other words, households experienced significantly more health problems on days of poorer air quality.

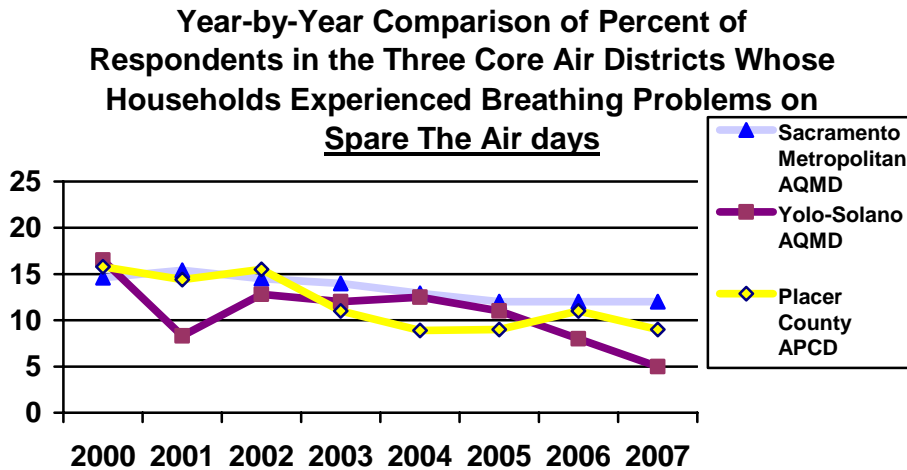
**Spare The Air vs. Control Groups:
 Percent of El Dorado County AQMD Respondents Whose
 Households Experienced Health Problems**



* Indicates a statistically significant difference

Year-To-Year Comparison

The percentage of households experiencing breathing problems on Spare The Air days from 2000 to the present are presented in the next chart. Results from each of the three air districts in the Sacramento Core Region (excluding El Dorado County AQMD) indicate that the percentage has remained relatively stable among the three air quality districts from one year to the next. The only exceptions occurred in Yolo-Solano AQMD, when significantly fewer households in both 2001 (8%) and 2007 (5%) experienced breathing difficulties compared to the other two air quality districts.



Conclusions

14. (pg. 33) *Although the air this summer was relatively clean as far as air quality was concerned (only five Spare The Air days were called), respondents reported experiencing significantly more breathing difficulties and burning eyes in households interviewed about Spare The Air days than about Control days in the Sacramento nonattainment area.*
15. (pg. 35) *The 11% of respondents in the Sacramento nonattainment area who reported breathing difficulties on Spare The Air days translates into 92,437 affected households.*
16. (pg. 35) *Correcting for Control days (6%, or 50,420 households), an estimated 42,017 households in the Sacramento nonattainment area experienced breathing problems during Spare The Air days specifically due to ozone air pollution. In addition, 58,823 households experienced burning eyes.*
17. (pg. 35) *The percentage of households reporting breathing difficulties in the Sacramento Core Region on Spare The Air days has stayed the same from 2000 to the present, at an average of 11% of all households during the past eight years. An average of 8% of households interviewed on Control days experienced breathing problems.*
18. (pg. 36) *Household health appeared to be related to the AQI range reached in each air district. Breathing problems were experienced by significantly more households on Spare The Air days than on Control days in the three air districts where the maximum AQI for ozone reached on Spare The Air days was in the Moderate or Unhealthy For Sensitive Groups range – Sacramento Metropolitan AQMD, Placer County APCD, and El Dorado County AQMD. There*

were no significant differences between Spare The Air and Control households in Yolo-Solano AQMD, but the air quality was also better. Other health effects attributable to poor air quality on Spare The Air days included burning eyes in Sacramento Metropolitan and El Dorado County AQMDs; headaches in Placer County APCD and El Dorado County AQMD; and coughing in El Dorado County AQMD households.

EMPLOYER PARTICIPATION IN 2007 SPARE THE AIR

Objectives

The objectives of the current section are to:

- s. assess employer participation in Spare The Air through the percentage of employed drivers who say their employer encourages them to drive less on days of poor air quality,
- t. measure participation by information channel – e-mail, signs, or asking employees to sign up for Air Alert notifications, and
- u. test whether employer participation has increased, decreased, or stayed the same since 2003 (when we first started to track it).

Method

Questions about employer participation were introduced to the Spare The Air evaluation questionnaire in 2003. The following questions were asked of respondents who were employed (excluding those who were self-employed):

- “Does your employer encourage you to drive less on poor air quality days?”
- “I am going to read you a list and I’d like you to just tell me, yes or no, if your employer does any of the following **to inform you about poor air quality days**. Does your employer:
 - a. Send e-mails to employees about poor air quality days?
 - b. Post signs about poor air quality days?
 - c. Ask employees to sign up for Air Alert notification?”

Results

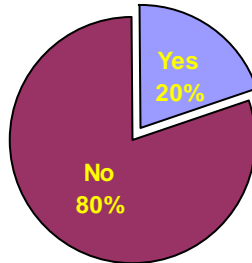
Employer Participation

Twenty percent of employed respondents in the Sacramento nonattainment area said their employer encourages them to drive less on days of poor air quality.

Among respondents interviewed on Spare The Air and Control days during the summer of 2007, employment was at 72%, a level that has been stable in evaluation reports for at least eight years (i.e. since 2000). As it is quite likely that many respondents live in one air district in the region, but work in another, only the weighted results for the Sacramento nonattainment area as a whole (including El Dorado County AQMD) are discussed in this section rather than for the individual air districts because respondents were identified by where they resided, and not where they worked. This year, as can be seen in the next pie chart, 20%, or one-in-five of employed respondents in the region as a whole said their employer encourages them to drive less on poor air quality days.⁵¹

⁵¹ For this analysis, self-employed respondents and those who were undecided or refused to answer were excluded.

Does Your Employer Encourage You To Drive Less On Poor Air Quality Days?

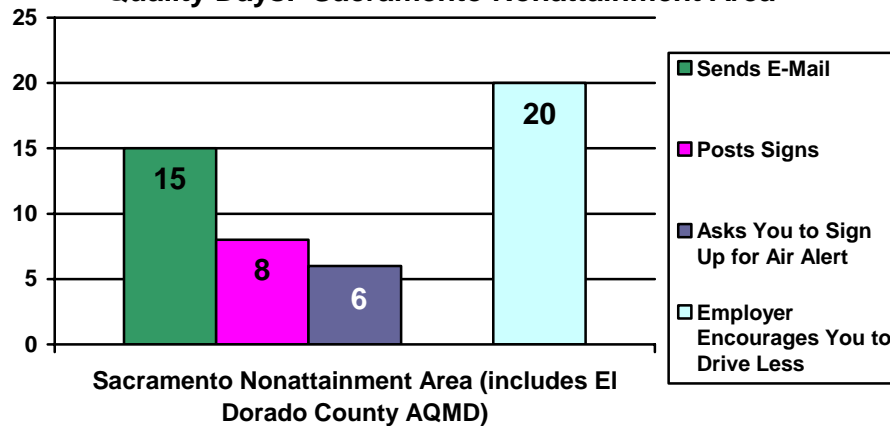


Employer Participation by Information Channel

Employers notified employees about Spare The Air days via e-mail (15%), by posting signs (8%), and by asking them to sign up for Air Alert notifications (6%).

Fifteen percent (15%) of regional employers use e-mail to notify their employees about Spare The Air days. Eight percent of employed respondents said their employer posted signs about poor air quality days, and 6% said they were encouraged to sign up for Air Alert notifications.

Employer Channels of Communicating Poor Air Quality Days: Sacramento Nonattainment Area



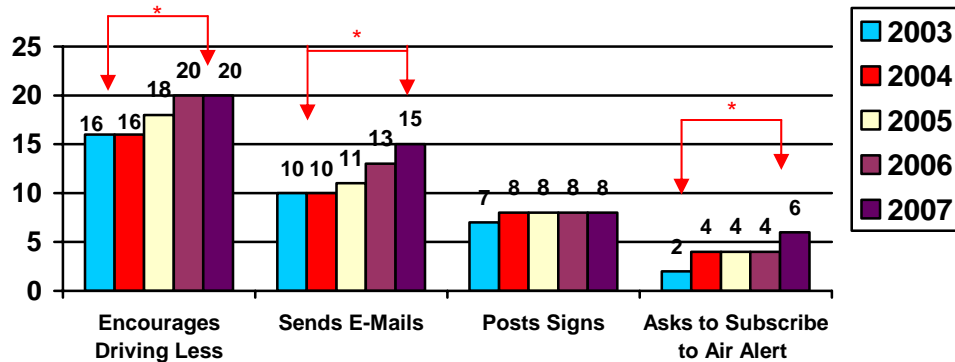
Year-To-Year Comparison

Employer participation in the Spare The Air program is the same as it was in 2006 at 20%. However, this is significantly higher than it was in 2003 and 2004 (16%). More employers are using e-mail to tell their employees about poor air quality days now than in 2003 and 2004. The percent of employers who post signs about Spare The Air days (8%) has not changed in five years. More employers are now asking their employees to register to receive Air Alert notifications than in previous years, but the percentage is still relatively low at 6%.

Employer participation in the Spare The Air program has been tracked since 2003. Annual results for the Sacramento Core Region (excluding EI Dorado County AQMD) are presented in the next graph. It can be seen that employer participation has increased significantly from 16% in 2003 and 2004 to 20% both

this year and last year. More employers are now sending e-mails about poor air quality days to their employees this year than in previous years, but the percent who post signs has not changed from one year to the next and remains stable at 8%. This year 6% percent of employers asked their employees to subscribe to Air Alert notifications, up from 4% in the previous three years, and significantly higher than the 2% in 2003. **It would appear that some inroads have been made in encouraging employers to have their workers subscribe to Air Alerts.**

Employer Participation Since 2003 (Sacramento Core Region)



* indicates a statistically significant difference

Conclusions

19. (pg. 40) *Twenty percent of employed respondents in the Sacramento nonattainment area said their employer encourages them to drive less on days of poor air quality.*
20. (pg.41) *Employers notified employees about Spare The Air days via e-mail (15%), by posting signs (8%), and by asking them to sign up for Air Alert notifications (6%).*
21. (pg.41) *Employer participation in the Spare The Air program is the same as it was in 2006 (at 20%). However, this is significantly higher than it was in 2003 and 2004 (both 16%). More employers are using e-mail to tell their employees about poor air quality days now than in 2003 and 2004. The percent of employers who post signs about Spare The Air days (8%) has not changed in five years. More employers are now asking their employees to register to receive Air Alert notifications than in previous years, but the percentage is still relatively low at 6%.*

2007 SUMMERTIME SEASONAL TRIP REDUCTIONS

Objectives

Previous sections⁵² demonstrated that **1.3% of all the drivers in the region** interviewed following 2007 Spare The Air days reported making fewer trips on those days because they had heard the advisories and specifically wanted to reduce air pollution. However, there is another group of drivers who help contribute to improved air quality in the region – those who routinely drive less during the summer months. They are not counted in the above estimate of ozone precursors reduced because our evaluation methodology specifically asks whether the driver drove less than usual on the previous day.⁵³ **In other words, drivers who already cut back on their driving during the summer may have already adjusted their driving behavior to drive less, and so a Spare The Air day would not necessarily trigger a greater reduction in terms of the number of trips these respondents took.**

The significance of such summertime seasonal driving avoidance is that reductions on an average summer day can have an impact on the build-up of the pollution load in the region, thus slowing the formation of ozone leading to Spare The Air conditions. We have been looking more closely at the issue of seasonal driving reduction since 2004, with a view to estimating emission reductions from this particular group of drivers. The main objective of the current section is to assess the impact of seasonal driving reduction in the Sacramento nonattainment area in the summer of 2007.

Specific objectives are to:

- v. test whether those drivers who say they usually reduce the amount of driving they do during the summer to avoid adding to air pollution actually do report making fewer trips than those who say they do not seasonally reduce driving, and
- w. compare the percentage of seasonal trip reducers and the mean number of trips they have avoided over the past eight years.

Method

The following questions from the Spare The Air evaluation questionnaire were used to describe seasonal trip reduction. First, the number of self-reported vehicle trips made by respondent drivers in the region was assessed using the following question:

“Thinking just about yesterday, how many different TIMES did you get into a car, truck, or van to drive?”

[Probe: “Give me a reasonable approximation – a round number.”]

[INTERVIEWER – IF NEEDED: for this question, we are interested in just how many times the respondent opened the door and got into the car as the driver, not in how many trips they may have made while driving.]

The percentage of seasonal (summer) trip reducers was measured by asking:

“Do you usually reduce the amount of driving you do during the summer to avoid adding to air pollution?”

⁵² See the sections of this report called “Purposeful Driving Reduction in the 2007 Spare The Air Season” and “2007 Estimated Emissions Reductions.”

⁵³ The methodology for calculating purposeful driving reducers was episode-specific and included only those drivers who: said they drove “less” on Spare The Air days, had heard the Spare The Air advisory (according to an Air Resources Board worded-question), and drove less specifically for reasons of air quality. This is the strict ARB definition of purposeful driving reduction, and has been used in annual Spare The Air evaluations.

Followed by:

IF YES, “And how have you reduced driving this summer to decrease air pollution?”

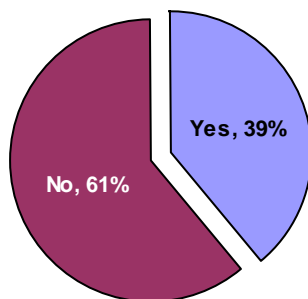
Results

Nearly four-in-ten (39%) of all respondents in the Sacramento Nonattainment Area are seasonal reducers – that is, they say they usually reduce the amount of driving they do during the summer to avoid adding to air pollution. These reducers reported entering their cars significantly fewer times than those respondents who said they did not usually reduce driving during the summer, making on average, .61 of a trip less per day than non-reducers. This could translate into 2.2 tons per day of emission precursor reductions.

Percentage Who Reduce Driving in the Summer for Air Quality Reasons

Respondents interviewed about Spare The Air days have been combined with those interviewed about Control days, as the seasonal trip reduction questions were not dependent on the specific interviewing days. It can be seen in the next pie chart that, in the entire Sacramento nonattainment area as a whole, 39% of all respondents said they usually reduce the amount of driving they do during the summer to avoid adding to air pollution.

Percent Who Reduce Driving in the Summer for Air Quality Reasons: 2007 Results for the Sacramento Nonattainment Area



Seasonal Trip Reduction: Number of Reduced Trips

Respondents who said they usually reduce driving during the summer for air quality reasons (seasonal driving reducers) reported entering their cars the previous day an average of 3.19 times. Those who said they did not usually reduce the amount of driving they do during the summer reported entering their cars an average of 3.80 times. An analysis of variance indicated that these means were statistically different from each other.⁵⁴ In other words, drivers who said they usually drive less in the summer actually reported making significantly fewer trips than those who did not. **On average seasonal driving reducers made over half a trip (.61 trips) less per day than non-reducers (3.80 – 3.19 = 0.61 trips).**

⁵⁴ F (1,1040) = 5.52, p < .05.

Sacramento Region Spare The Air Program

Final Report of the 2007 Spare The Air Campaign Evaluation

December 2007

	<i>Seasonal Driving Reducers: Mean # Times Entered Vehicle</i>	<i>Non-Reducers: Mean # Times Entered Vehicle</i>	<i>Statistically Significant Difference?</i>
Sacramento Nonattainment Area⁵⁵	3.19	3.80	Yes

Seasonal Trip Reduction: Estimated Emission Reductions

Respondents who regularly drive less during the summer for air quality reasons represent a substantial proportion (39%) of the general population who are helping to reduce emissions. Although the methodology has not yet been approved, one way of estimating the tons of ozone precursors reduced is to apply a similar methodology to that used to estimate emission reductions on Spare The Air days,⁵⁶ and is summarized in the next table. It can be seen that the average of .61 of a trip per day that seasonal reducers avoided could translate into an estimated **2.2 tons of ozone precursors reduced** per summer day.

Sacramento Nonattainment Area	Percent of Respondent Drivers Who Usually Drive Less During the Summer for Air Quality Reasons	x Number of Licensed Drivers in Sacramento Nonattainment Area (1,415,921 Total⁵⁷)	x Mean Number of Trips Reduced Per Day Compared to Non-Reducers	x 5.79 Grams of Ozone Precursors Per Trip (EMFAC 2007 V2.3) 2006 Model⁵⁸	= Estimated Tons⁵⁹ Per Day of Ozone Precursors Reduced
Spare The Air and Control Day Interviews Combined	39%	552,209	x 0.61 = 336,848	1,950,350 grams	2.2 tons

⁵⁵ Includes El Dorado County AQMD.

⁵⁶ For a full explanation of the methodology, see report titled "Estimated Emission Reductions during the 2007 Spare The Air Season", Naomi E. Holobow, November 2007.

⁵⁷ The number of drivers in the Sacramento nonattainment area for 2007 was estimated, using the number of driver licenses by county for 2006, obtained from the California Department of Motor Vehicles database at http://www.dmv.ca.gov/about/profile/dl_outs_by_county.pdf, and calculating the percentage increase, based on county population figure increases from 2006 to 2007 listed at: (www.dof.ca.gov/HTML/DEMOGRAP/ReportsPapers/Estimates/E1/documents/E-1table.xls). The estimated number of licensed drivers for the total Sacramento nonattainment area in 2007, therefore, was 1,415,921: Sacramento Metropolitan AQMD: total 907,420 + Yolo-Solano: total of 199,824 (120,977 in Yolo County + Solano County: 271,886 x 29% for the proportion located within the Air Quality district = 78,847) + Placer County (245,383 x 87% for Air Quality district) = 213,483 + El Dorado County: (139,991 x 68% for Air Quality district) = 95,194.

⁵⁸ Based on summer 2007 EMFAC2007 V2.3 SMAQMD spreadsheet figures provided by Bruce Katayama, SMAQMD, October 12, 2007. Models were run for the summer of 2007. The total VOC tons for a combined total of light duty passenger cars and two categories of light duty trucks (10.22 + 2.56 + 4.74) were converted to pounds (multiplied by 2,000) and then to grams (multiplied by 454) before dividing by the combined total number of trips (i.e. 2,944,650 for light duty passenger cars + 610,052 for light duty trucks1 + 1,317,040 for light duty trucks2) in order to obtain the average grams per trip. The same process was used to calculate NOx grams per trip (6.44 + 1.9 + 5.19) x 2000 x 454 / (2,944,650 + 610,052 + 1,317,040). VOC grams and NOx grams were then combined (3.27 + 2.52) to obtain 5.79 grams per trip of emission precursors in the region as a whole.

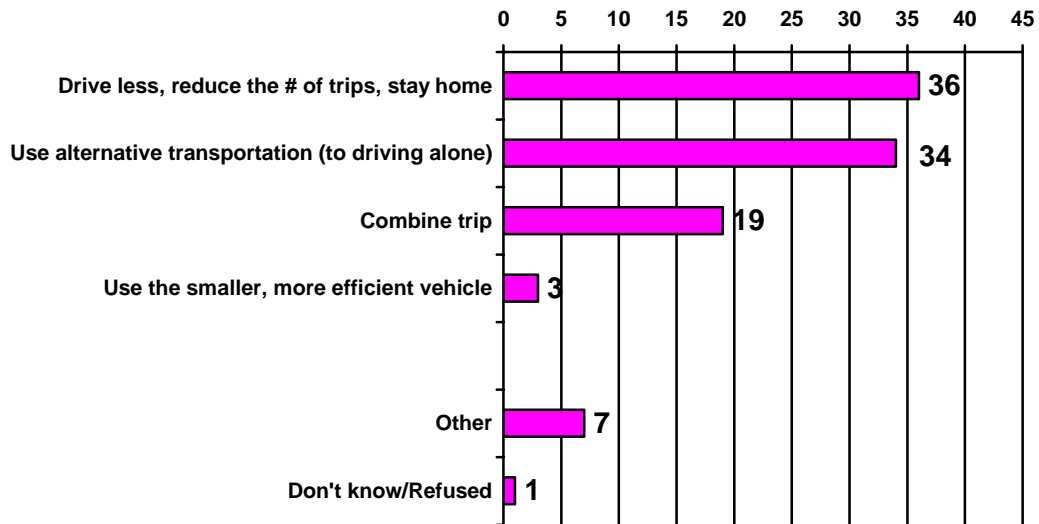
⁵⁹ These are the figures considered most accurate at the time this report was written.

⁵⁹ There are 907,200 grams in a ton.

Seasonal Trip Reduction: Ways They Drive Less

Respondents who said they reduced the amount of driving they did during the summer to avoid adding to air pollution were then asked to specify exactly how they reduced driving this summer. Comments were captured, then categorized, and the results are presented in the next graph. It can be seen that over a third (36%) of these respondents said they made fewer trips or just stayed home. Another third (34%) used alternative transportation to driving alone, which included carpooling, walking, cycling, taking transit, or telecommuting. An additional 19% said they regularly planned their days to consolidate trips and avoid multiple excursions; and a further 3% used a more fuel efficient vehicle. Seven percent (7%) gave other responses and 1% did not answer.

How Have You Reduced Driving This Summer?



A few representative comments⁶⁰ from those who said they drove less, reduced the number of trips, or stayed home are listed below. [Note that quite a few comments indicate that the implicit message of the Spare The Air campaign of educating residents to understand the impact of driving on air pollution has been learned.]

- “A lot of times, I think I’m going to go someplace, and then I think, no, I’ll do that tomorrow.
- At least schedule things in shorter distances.
- Avoid the heat. I’m a stay at home mom. Once in a while it’s smoggy and I stay home on those days.
- Basically, not doing more than I normally would do. I reduce my driving. I wait for a better day if I hear the alert go on or if the **air quality is bad**.
- By just making fewer trips.
- By not going out of my way on the way to work or home.
- Don’t do as many car trips.
- Driving half of what I did last year.
- I’m off. I don’t drive. No commute. I’m a teacher.

⁶⁰ The complete transcripts of all responses are available in the statistical file.

- I only went camping one time this year, instead of three, and we don't have air conditioning. So I've tried to reduce my trips. I've also been trying to save on gas.
- I didn't travel that much on the days with **poor air quality**.
- I do drive less in the summer to reduce **pollution**, but the main reason I drive less is to reduce my gas bill.
- I don't go as many places. I usually go to work and the grocery store, and I come home. I don't go out and visit with people like I normally do. Especially on **Spare The Air** days.
- I drove 50 percent less this summer. I am cognizant of **air pollution**. I rode my bicycle more often this summer. I just ride my bike to **save the air** and to avoid the high gas prices.
- I have driven less this summer. If I had a bike, I would use that. I have two little daughters. I want them to be able to breathe when they grow up. I don't want to see us as a victim of global warming.
- I just decide I don't need to go. I usually leave on Fridays. **Air pollution** and price of gas. I don't drive, because of the cost of gas.
- I just drive a short distance. Like three miles. If I have to drive, I don't go any further.
- I just haven't been going out as much. I talked myself into not going out as much. Gas prices are still high, even though they've gone down. I think it through real good. Like I'm thinking about going to my girlfriend's house to go swimming.
- Just driving less. Price of gas. That would be it. Always of course, to cut down on **pollution**.
- On days when it has been really hot and on **save the air** days, I won't run my errands. I will wait for another day when it is cooler, and it isn't a **Spare The Air** day.
- Reducing the number of trips that I take in the car.
- Stay home. It's cheaper. Just staying home. Because if you stay home, you're not going to go out and do two things. One is cause **pollution**. Two is spending. If you leave your house, you're more than likely going to spend more money.
- We didn't go on vacation, and we took less trips out of town."

A few comments⁶¹ from those who said they use alternative transportation (to driving alone) are listed below. Note specific reference to Spare The Air days in some of them:

- "At lunch time I don't drive anywhere I just walk to town. Because it's really hot and I don't have to figure out where to park and using no gas. It's actually better for your health to walk, it's about a mile to town and better for cholesterol.
- I actually rode my bike and I don't work in the summer. Because it was **Spare The Air** day.
- I bike to work more often in the summer, and I also have a diesel engine car that runs better in the summer on waste and vegetable oil. Veggie-car is carbon-neutral, but may have monoxide emissions which may be a bad thing.
- I do it by riding my bike to places nearby, where I do not need to pollute the **air**.
- I have been using my bicycle more this summer to reduce exhaust emissions. We have also been carpooling.
- I reduce my driving by running and walking wherever I need to go, instead of driving my car to places. I only drive to work and I usually try to walk instead. I only drive to work when absolutely necessary. I take the bus when I need to get to college.
- Ride my bike to run an errand.
- I ride my bike a lot of places for exercise, and to cut down on **air pollution**. If I do drive, I try to drive early and get back early. I also make lists of where I need to go.
- Bicycle riding.
- Bicycle. I try to use it every day, and sometimes I go a whole week without driving.
- By carpooling and by taking one car instead of many.
- By carpooling and the other by staying put. The staying home is obvious, doing the work by yourself, doing work from home is easy. When I need to go to the office for instance, I would carpool with someone for the destination. I carpool with my husband.
- Bus to work.
- By using public transit to go to work. So, generally, I use public transit five days a week.
- By working at home.

⁶¹ The complete transcripts of all responses are available in the statistical file.

Sacramento Region Spare The Air Program

Final Report of the 2007 Spare The Air Campaign Evaluation

December 2007

- Carpool and ride my bike.
- Carpooling to the same place as the neighbor. And I am not going down to see my parents as much. I just don't drive as much. Because I want my grandchildren to have a planet to come to. Because as a society, we are taking advantage of it and destroying it.
- Commuter van just to work, less frequent trips.
- Cut back on mileage. Ride bikes sometimes.
- I'm really close to my job and my kid's school, so we will take a walk.
- I've started walking a lot more. Got a bike. As long as I'm not going anywhere too far away, I can do any number of things. I can ride my bike, walk, or hitchhike. Hitch a ride with somebody. I can ride my skateboard, and I can ride my scooter.
- I ride my bike to work, and the only other thing is, I ride my bike and I use my cruise control. That doesn't do much to reduce **air pollution**. I don't know that I do it routinely, but I walk to the market. If it's a **Spare The Air** day, I definitely walk.
- I take the light rail train.
- I usually try to commute on my bike or the bus when its too hot for the bike. I kind of view driving as a luxury that should be used sparingly I guess. I don't want to live in place that's polluted. I don't really like **air pollution** all that much.
- Public transportation like the train.
- Telecommuting and carpooling.
- To decrease **air pollution**. I just don't drive, I ride my bike instead.
- Walking and riding bicycles. Because **air** quality causes breathing problems and I would want to see **air** quality get better in the Sacramento area.
- Walking or biking and/or carpooling. Carpooling, I just arranged, we arranged frequent carpooling. Because of the environment, and we have only one car because of that. It's good exercise and doesn't pollute. Same thing for biking. Davis is very bikeable.
- Working from home. Especially with **Spare The Air** day. I think it was declared because of the heat and everything. It helps the **air quality**, and the air we are breathing."

A few representative comments by those who combine trips include:

- "Basically I like to just make one trip to do everything I need to do. Because there's more traffic on the road. I like to avoid that.
- By being more conscientious about trips that are repetitive. Pick up everything I need when I go shopping. Also combining trips so I don't have to go one day for one trip, and one day for another trip. I do the errands at one time.
- Combine shopping trips and combine dropping kids off at work and school. I live close to work, which is a planned idea. The car is high mileage, which is a planned idea.
- Consolidating trips. If I have to go to a shopping center, I want to go to the gym, and I want to go out to eat, I'll make it all one trip. I'll meet my friend at the gym and go to dinner from there.
- I combine all my errands into one trip. I wish that I had somebody to carpool with. Sometimes I'll just let my errands go, if it's really bad outside.
- I consolidate all my trips. Instead of going and leaving, I try to drive all in a row, so I don't use so many miles. I try to drive less miles. I am familiar with global warning, and I try to be as energy conscientious as possible.
- I get all my errands done at one time, do stuff by mail, by phone, that I would normally drive for. I walk to the store.
- I live in the foothills, so when I go to shop, I make a list of five or six stores, and I try to do all of them in one loop trip. It saves gas and it **saves on pollution**.
- If I am going to go out, I accumulate several trips, instead of one, so that I make better use of my time, and it's better for the **air**.
- Make wiser choices when I get in my vehicle. Really think it out. Well, if I'm going to go out and do errands, I'm going to do it all at once. And what I'm thinking now, I try to do it during non-commuting hours as well.
- What I try to do is combine as many trips as I can, as many stops on one day, so I don't have to take it out every day. So I can say, yes, I'm doing my share."

Year-To-Year Comparison

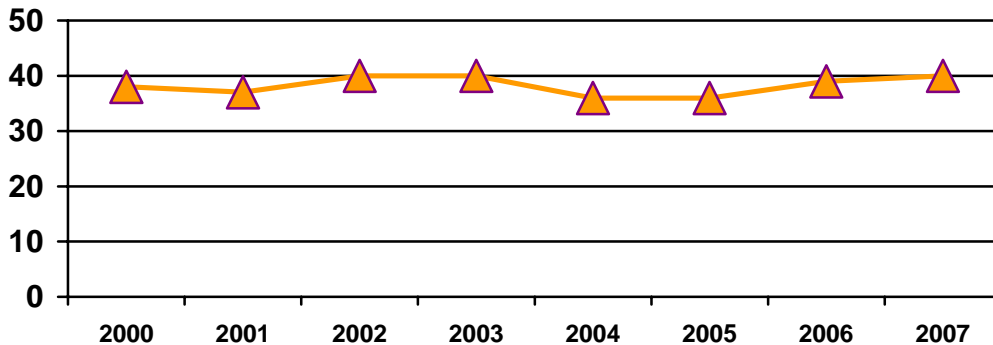
The percentage of seasonal trip reducers in the Sacramento Core Region has remained relatively stable for the past eight years, at just under four-in-ten of all respondents. Over the years, drivers who said they usually reduced the amount of driving they did during the summer to avoid adding to air pollution reported making significantly fewer trips than those who said they did not generally reduce their driving.

During the past eight years, seasonal driving reducers made between half a trip to just over one trip per day less than non-reducers. Air quality management districts may want to consider measuring and tracking the substantial emission reductions represented by this group of seasonal driving reducers in future evaluations.

Percentage of Seasonal Reducers

For the purpose of the year-to-year analysis, results from interviews conducted with El Dorado County AQMD residents have been excluded, and results representing the remaining Sacramento Core Region have been appropriately re-weighted. It can be seen in the next graph that the percentage of respondents in the Sacramento Core Region who said they usually reduce the amount of driving they do during the summer to avoid adding to air pollution has remained relatively stable at just under four-in-ten from 2000 to the present.

Year-To-Year Comparison of Percent of Respondents Who Seasonally Reduce Driving to Avoid Adding to Air pollution: Sacramento Core Region



Number of Daily Single Trips Avoided

The average number of trips reported by those who reduced the amount of driving they did during the summer months to avoid adding to air pollution versus those who did not are presented in the next table. It can be seen that in every year, from 2000 to the present, seasonal reducers reported making significantly fewer trips than the group who said they do not usually reduce driving during the summer. It can also be seen that the average number of additional trips avoided by seasonal reducers (that is, the difference between reducers and non-reducers) ranged from half a trip per day to just over 1 trip per day. **These results support the idea that a subset of the population of respondents in the Spare The Air evaluations habitually reduce the amount of driving they do during the summer months and some of these individuals may not qualify as episodic reducers on specific Spare The Air days for methodological reasons.**

<i>Year</i>	<i>Seasonal Driving Reducers: Mean # Times Entered Vehicle</i>	<i>Non-Reducers: Mean # Times Entered Vehicle</i>	<i>Difference (Mean Number of Daily Single Trips Avoided by Seasonal Reducers)</i>	<i>Statistically Significant Difference?</i>
2000	3.6	4.1	0.5	Yes
2001	3.1	4.2	1.1	Yes
2002	3.1	4.1	1.0	Yes
2003	3.1	4.2	1.1	Yes
2004	3.4	3.9	0.5	Yes
2005	3.0	3.5	0.5	Yes
2006	2.9	3.6	0.7	Yes
2007	3.2	3.8	0.6	Yes

Conclusions

22. (pg. 44) *Nearly four-in-ten (39%) of all respondents in the Sacramento Nonattainment Area are seasonal reducers – that is, they say they usually reduce the amount of driving they do during the summer to avoid adding to air pollution.*
23. (pg. 44) *These reducers reported entering their cars significantly fewer times than those respondents who said they did not usually reduce driving during the summer, making on average, 0.61 of a trip less per day than non-reducers.*
24. (pg. 45) *This could translate into an estimated 2.2 tons of emission precursor reductions per summer day in 2007.*
25. (pg. 49) *For the past eight years, the percentage of seasonal trip reducers in the Sacramento Core Region has remained relatively stable, at just under four-in-ten of all respondents.*
26. (pg. 49) *Since 2000, drivers who said they usually reduced the amount of driving they did during the summer to avoid adding to air pollution reported making between half a trip to just over one trip per day less than non-reducers.*
27. (pg. 49) *These results again support the idea that air quality management districts may want to document and use the additional estimated emission reductions by these drivers who may not qualify as episodic reducers on Spare The Air days for methodological reasons.*