Evaluation of the 2011 Sacramento Region Spare The Air Campaign

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Table of Contents

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BACKGROUND & METHODOLOGY

Background

The public outreach program **Spare The Air** was created in 1995 to engage the general public in voluntarily helping to solve the problem of ozone air pollution. The U.S. Environmental Protection Agency (EPA) designated the Sacramento region a **severe ozone nonattainment area** for the 1997 federal 8-hour ozone standard with an attainment deadline of June 2019. The region fails to meet the federal health based 8-hour ozone standard,[1] thus affecting the quality of life and health of area residents, particularly during the summer months. 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. Ozone pollution is lowest in the morning and reaches its highest levels in the afternoon and early evening hours. The residential driving population is therefore a large contributor to the air quality problem in the region.

The Spare The Air program provides residents in the Sacramento region with information and resources to protect their health during the summer smog season (May to October) by encouraging them to be aware of ozone levels and by asking motorists to reduce their driving on days when unhealthy air is predicted. Outreach efforts included radio advertising featuring various air quality tips (buy local products, group and reduce trips, use electric lawn tools), a website (www.SpareTheAir.com) including "Scooter's Corner" for children, social media (Facebook and Twitter), as well as appearances at events, newsletter article placements, etc. 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 the AQI will be above the threshold of 150 the next day, a Spare The Air advisory is issued by the Sacramento Metropolitan AQMD by 12:00 p.m. This involves notifying the public through a variety of communication channels, including paid radio and television announcements, email Air Alerts, news broadcasts, the Spare The Air website, and the Sacramento Bee.

Spare The Air days are called for the Sacramento nonattainment area as a whole, but all air quality districts within the area 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. To some extent this is due to the fact that ozone created by all drivers in the region travels east into the foothills. It is, therefore, important that the Spare The Air message continue to

[1] The latest federal ozone health standard is .075 parts per million averaged over 8 hours. This standard became effective May 27, 2008. From 1997 to May 2008, the federal 8-hour ozone standard was .08 parts per million averaged over 8-hours.

involve everyone in the basin, although the air quality in individual districts on specific days may not be poor.

Spare The Air 2011 Season

Air quality in the region is improving. There were only **five** Spare The Air days called during the summer smog season of 2011 which ran from May to October.[2] Of these, only one was called in the hottest summer months of July and August. The remaining four Spare The Air days occurred in September, an unusual occurrence. Generally one expects the hot weather to generate poor air quality much earlier in the summer.

Further examination of the daily maximum Air Quality Index (AQI) for the nonattainment area revealed that the recorded actual AQI for ozone did not meet or exceed the 150 threshold on any of the five Spare The Air days. In other words, Spare The Air advisories were issued for days when the actual air quality turned out not to have been as poor as was expected, as can be seen in the table below.[3] In fact, the maximum AQI on September 21 was only 97, a level that is classified as "moderate." It can also be seen that the air district most likely to have experienced the maximum AQI was Sacramento Metropolitan Air Quality Management District (on four of the five days). In other words, Yolo-Solano AQMD and Placer County APCD and often El Dorado County AQMD experienced better air quality than Sacramento. Another indication of better air quality is that there was only one multi-day episode in 2011, and that one lasted only two days: September 21 and 22.

Spare The Air date	*Forecast AQI*	*Actual Maximum AQI*	*Health Level for Actual AQI*	*Reporting Station of Actual Maximum AQI*
July 5	151	132	Unhealthy for Sensitive Groups	Sacramento
Sept 3	154	147	Unhealthy for Sensitive Groups	El Dorado
Sept 7	151	106	Unhealthy for Sensitive Groups	Sacramento
Sept 21	154	97	Moderate	Sacramento
Sept 22	154	106	Unhealthy for Sensitive Groups	Sacramento

Additionally, the number of violations the region experiences now compared to five years ago has dropped. There were no (0) violations of the old 1-hour federal standard in 2011 compared with eight in 2006. In fact, the region has now met the federal 1-hour ozone standard.[4]

[2] The five Spare Air Days were Tuesday, July 5; Saturday, September 3; Wednesday, September 7; Wednesday, September 21; Thursday, September 22.

[3] AQI figures obtained from the Historical Data section at www.sparetheair.com .

[4] SMAQMD news release May 10, 2011. "This is a momentous milestone in improving air quality in the Sacramento Region," said Sacramento Metropolitan Air Quality Management District Executive Director Larry Greene. "The efforts of countless Sacramento Region organizations, businesses and individuals all working together have made it possible."

Media Buy

The media buy involved general radio commercial announcements and specific radio and television episodic advisories about Spare The Air.

General Media Buy

In 2011, a total of $115,200 was spent on the general radio Spare The Air awareness campaign.[5] It ran from June 12 to September 18,[6] and used four commercials. They were designed to create awareness of air quality issues and encourage listeners to sign up for Air Alert email notifications. They featured "Scooter, the Spare The Air dog" and provided air improvement tips such as buying local produce, grouping and reducing trips, using electric lawn and yard tools, and understanding the health effects of poor air quality. These radio spots are available on the website: www.SpareTheAir.com .

Specific Episodic Media Buy

This year, a total of $38,830 purchased episodic TV and radio commercials for each of the five Spare The Air days.[7] The amount spent per episode was:

- July 5 episode = $5,050
- September 3 episode = $9,940
- September 7 episode = $9,960
- September 21 episode = $6,980
- September 22 episode = $6,900

Research Objectives

Annual evaluations (with the exception of 1997) have been conducted since 1995 to assess the effectiveness of the Spare The Air program. Levels of awareness, driving behaviors, health issues, and estimated emission reductions have been measured and tracked. In the early 2000s, numerous discussions took place between the Cleaner Air Partnership and staff of the California Air Resources Board (ARB) to arrive at an evaluation procedure acceptable to both. In 2002 an ARB-suggested question about general awareness was incorporated into the questionnaire in order to be able to calculate their definition of what qualifies as a "reduced" trip.[8]

The specific evaluation objectives were to:

1. Measure general awareness and the specific episodic request not to drive on Spare The Air days among drivers in the Sacramento nonattainment area.
2. Measure the effectiveness of the Spare The Air program in terms of reduced driving among drivers who were aware of the program and purposefully reduced the number of trips they made due to air quality reasons.
3. Estimate emission reductions from the trips reduced during Spare The Air episodes.[9]

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5 Less money was spent on advertising this year than in the past. For example, the general media buy was $178K in 2008, compared to a general buy of only $115K in 2011. Further, the frequency of airing the spots has declined as the cost of advertising has risen.

6 Email message from Lori Kobza, Assoc. Communications & Marketing Specialist, SMAQMD, November 7, 2011.

7 Email message from Lori Kobza, Assoc. Communications & Marketing Specialist, SMAQMD, November 4, 2011.

8 The ARB recommended that only trip reductions from drivers who were aware of the Spare The Air program and purposefully reduced the number of trips they made on Spare The Air days specifically for air quality reasons should be counted in the measurement of the emissions reductions attributable to the program. This is the definition of a purposeful reducer.

9 Methods for estimating ozone precursor reductions based on the survey data have been used in all evaluations conducted since 1999 but were based on different Emission Factor models over the years. This year's estimates were based on the Summer On-Road Inventory - EMFAC 2007 v 2.3 model, for the summer of 2011, provided by Charles Anderson, Program Coordinator, SMAQMD Planning & Emission Inventory & Hao Quinn, SMAQMD Associate Air Quality Engineer in an email dated November

4. Compare awareness of the Spare The Air campaign and driving reduction among the individual air quality management districts in the Sacramento nonattainment area.
5. Track the health effects of poor air quality.
6. Measure the percentage of drivers who habitually drive less during the summer season in order to improve air quality, and estimate the emission reductions from this group of seasonal reducers.
7. Track awareness and behavioral changes over time.

Research Methodology

Since 1995, two groups of respondents have been interviewed, one following Spare The Air days, and the other following non-Spare The Air (or Control) days, matched for the same day of the week as the Spare The Air interviews. A further control is that no interviews are conducted on rainy days. This type of experimental design adjusts for any overstatements individuals might make about their reported driving reduction on Spare The Air days (social desirability response bias), by providing a means of calculating a correction or adjustment factor. More accurate estimates about the number of drivers and households impacted by the Spare The Air program and the amount of emissions reduced are therefore obtained by subtracting this correction factor from the results. Including Control day data provides the most conservative estimates of program effectiveness. Control day data also have provided other insights into driving behavior.

Sampling Frames

In previous years, telephone interviews were conducted with samples of residents throughout the air basin, using Random Digit Dialing (RDD) procedures in which a computer generates phone numbers from known landline area codes and prefixes. Up to now, these samples have only included landline numbers and not cell phone numbers, and, although Spare The Air interviewing has always set quotas based on geography, age, and gender, it is becoming more and more difficult to survey young adults in the U.S. aged 18 to 34 years via a landline-only frame. As cell phone use in the United States grows, the potential for coverage bias in RDD telephone surveys will also increase if they continue to exclude most cell phone numbers.

This potential for coverage error stemming from the growth of the cell phone-only population has led to the development of dual frame, random digit dial (RDD) surveys. In these dual frame designs, a traditional sample from the landline RDD frame is supplemented with an independent sample from the banks of numbers designated for cellular phones. However, the emergence of this new approach to telephone survey design has raised numerous statistical questions as well as operational ones for the entire survey industry.[10] At this point in time, although the American Association of Public Opinion

4, 2011. The total ROG tons for a combined total of light duty passenger cars and two categories of light duty trucks (8.1 + 2.04 + 4.58) 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. 3,509,210 for light duty passenger cars + 729,340 for light duty trucks1 + 1,566,110 for light duty trucks2) in order to obtain the average grams per trip. The same process was used to calculate NOx grams per trip (4.91 +1.44 + 4.3) x 2000 x 454 / (3,509,210 + 729,340 + 1,566,110). ROG grams and NOx grams were then combined (2.30 + 1.66) to obtain 3.96 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. It should be noted that over the years, motor vehicle emissions have lowered, because cleaner burning vehicles produce fewer emissions.

[10] For example, a "critical decision that researchers need to make is about whether to choose an overlapping dual frame design (with no screening of the cell phone sample based on the respondent's telephone service type and usage) or a dual frame design with screening of the cell phone sample for cell phone-only status (and possibly for cell phone mostly/mainly status)." Screening for cell phone-only status will obviously increase costs as additional questions need to be asked, and many cell phone users will also have landline phones. There are also statistical weighting issues, particularly troublesome as there is a lack of accurate population parameters to use in weighting cell phone samples of regional, state and local areas. In addition, "due to federal telecommunication laws and regulations in the U.S., those who conduct surveys with people who are reached on a cell phone

Research (AAPOR), of which Aurora Research Group is a member, does not recommend one standard approach, it has studied the issue and has released a 2010 Cell Phone Task Force Report.

For the purpose of the 2011 Spare The Air evaluation, the following dual-frame sampling design was proposed and was accepted by the client – namely, a replication of the previous sampling strategy using RDD landline frames in all air districts, and an additional "test" sample to supplement the landline sample from a cellular RDD frame in Sacramento County only, for interviews conducted following Spare The Air days. This type of overlapping design did not screen for cell phone-only persons/households, due to the extra costs involved. The sample therefore contained some households who have landlines in addition to cell phones, but questions about cell phone and regular/wired phone use were added to try and estimate the percentage of "cell phone-only" households. It must also be stated that in Yolo-Solano AQMD, Placer County APCD and El Dorado County AQMD persons residing in households with no landline telephone are not included in the results.[11]

In Sacramento Metropolitan AQMD, comparisons between the two groups of Spare The Air respondents (landline RDD sample versus cell phone RDD sample) on key questions revealed no significant differences in responses. Results from both groups were therefore combined, new weights for the entire nonattainment area were calculated and all results reported include the Sacramento cell phone sample responses. Results from the key comparisons are presented in Appendix A. Because of the potentially high incidence of **cell phone-only** households (i.e. 36% in this, albeit, small sample of respondents) it is suggested that an RDD cell phone sample be included in future surveys, and for all the air districts in the Sacramento nonattainment basin. Augmenting a landline sample with a cell phone sample will better represent the population as a whole; despite the fact that the survey industry is still addressing and has not reached conclusions on some of the research, weighting, and analytic issues inherent with such dual-frame sampling designs.

Sampling Design

The next table summarizes the targeted maximum number of completed interviews for both Spare The Air and Control days.[12] The goal was to conduct up to 1,300 interviews (including up to 100 completed interviews with the RDD cell phone sample of Sacramento County drivers) following Spare The Air days and 1,200 following Control days. The margin of error associated with a sample of 1,200 is +/– 2.5%, at a 95% confidence level.

must avoid using auto dialers (including self-dialing modems and predictive dialers) to place calls, unless they have prior permission of the cell phone owner to do so. This increases the time and cost of processing RDD cell phone samples considerably." (AAPOR Cell Phone Task Force 2010 Report)

[11] The American Association for Public Opinion Research (AAPOR) recommends: "RDD surveys without a cell phone augmentation should include in their methods report and in the survey information that accompanies published findings that "persons residing in households with no landline telephone are not included in the results." Further, the report goes on to state: "If researchers believe that they have produced unbiased estimates without the cell phone only segment, this belief and the reason for it should be directly discussed in the report of findings, because the topic is no longer ignorable and should not be lightly dismissed." "New Considerations for Survey Researchers When Planning and Conducting RDD Telephone Surveys in the U.S With Respondents Reached via Cell Phone Numbers", AAPOR Cell Phone Task Force 2010, available online at http://aapor.org/Cell_Phone_Task_Force.htm. Unfortunately there is not an easy or inexpensive solution to this issue, but various combination-type samples are currently being studied by AAPOR. The reader is referred to the report which deals with Coverage and Sampling, Nonresponse, Measurement, Weighting, Legal and Ethical Issues, Operational Issues, and Costs.

[12] It should be noted that the sampling design is for the maximum number of interviews to be completed. Due to the uncertainty about the number of Spare The Air days in each season, the actual number of completed interviews is often less than the targeted maximum.

Air District	Spare The Air interviews	Control day interviews
Sacramento Metropolitan:	Up to	
RDD landline	400	300
RDD cell phone	100	
Yolo-Solano AQMD	300	300
Placer County APCD	300	300
El Dorado County AQMD	200	300
Maximum Total	1,300	1,200

Within each air district, quotas were set with respect to geographic area, age, and gender.[13] Additionally, respondents were screened so that only those who had driven within the last week were interviewed.

Interviewing Strategy

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. The strategy adopted was to conduct approximately 150-200 interviews throughout the region (proportionally representative of the population in general by 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. For the Spare The Air day in July, we completed 161 interviews. The next Spare The Air days occurred only in September, and although the targeted number of completed interviews was increased, the total number of interviews completed was only 838, which was 462 short of the goal of 1,300.

Interviewing took place the day following each Spare The Air day. Control day interviewing took place only in October as four of the five Spare The Air days occurred in September. Control day interviews were matched in terms of the day of the week (Wednesday, Sunday, Thursday, and Friday) of the Spare The Air day interviews, and took place on October 9, 12, 13, 14, 19, 20, 26, and 27. Control day interviewing was not conducted during the first week of October because of rain. We were unable to complete the targeted number of 1,200 completed interviews on Control days due to the start of the Winter Spare The Air Check Before You Burn program.

[13] Interviewing took place only in the relevant zip codes within certain counties (i.e. in Placer County, zip codes north or east of Auburn were excluded as well as those west of Vacaville in Solano County and those east of Placerville in El Dorado County). In order to avoid potential unbalanced and biased samples quotas were set for gender and age in order to ensure that respondents were representative of the population as a whole. It is well-known in survey research that certain groups (such as elderly females) are more likely to respond to telephone interviews than others (such as young males).: so, for example, no more than 13% of the 400 interviews conducted in Sacramento County were to have been with females aged 65 years and older; and no fewer than 10% were to be conducted with males aged 18 to 24. It has also been the case that residents in Davis are more likely to answer surveys than residents in other areas of the Yolo-Solano Air Quality Management District and so a quota of no more than 20% of interviews were to be conducted with Davis residents.

Respondents

In Yolo-Solano AQMD, Placer County APCD, and El Dorado County AQMD interviews were conducted with a random representative sample of landline telephone residents (meaning that cell phone-only households were not included in the sample and were therefore not interviewed). In Sacramento Metropolitan AQMD interviews were conducted with a representative sample of landline residents, augmented with a random sample of cell phone users.

Respondents included a total of **1,714 drivers**, following both Spare The Air as well as Control days. Results for the Sacramento nonattainment area as a whole were weighted proportionally.[14] The next table lists the number of completed interviews for each group along with their affiliated margins of error (at the most conservative level).

It can be seen that a total of **838** interviews were conducted on days following Spare The Air episodes. Control day calling completed **876** interviews. When weighted,[15] the total number of completed interviews was 411 following Spare The Air days, and 343 on Control days in the Sacramento nonattainment area as a whole. In order to be able to compare current results with those from previous years' evaluations, El Dorado County[16] 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 for these analyses.[17]

[14] Based on 2011 estimates from the 2010 US Census: State of California, Department of Finance, *E-1 Population Estimates for Cities, Counties and the State with Annual Percent Change — January 1, 2010 and 2011*. Sacramento,CA, May 2011. Available online at: http://www.dof.ca.gov/research/demographic/reports/estimates/e-1/documents/E-1_2011_Internet_Version.xls The total population in the entire Sacramento nonattainment area [including El Dorado AQMD] is 2,179,662: [Sacramento Metropolitan AQMD (65%) - 1,428,355; Yolo-Solano AQMD (15%) - 320,638 (this includes the total 201,759 from Yolo County and 118,879 from the Dixon, Rio Vista and Vacaville areas of Solano County); Placer County APCD (14%) - 306,571 (this figure represents the 87% of Placer County's 352,380 residents who do not live in zip codes north or east of Auburn), El Dorado AQMD (6%) - 124,099 (this figure represents 68% of El Dorado County's 182,498 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). .

[15] Weighted, includes El Dorado County AQMD. 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, adjusted proportionally to the population within each air district. (Sacramento Metropolitan AQMD represents 65% of the entire population, Yolo-Solano AQMD is 15%, Placer County APCD is 14%, and El Dorado County AQMD is 6%.) This is why the weighted total number of completed interviews (i.e. 411) is less than the sum of the total number of interviews conducted in all air districts (i.e. 838).

[16] Interviews with residents in El Dorado County AQMD were only conducted in 2004, 2006, 2007, 2008 and 2009.

[17] Excluding El Dorado AQMD, the new proportions for the smaller Sacramento Core Region for 2011 are: 69% in Sacramento Metropolitan AQMD, 16% in Yolo-Solano AQMD, and 15% in Placer County APCD.

Number of Completed Interviews (unweighted)	*Spare The Air Days*	*Margin of Error*	*Control Days*	*Margin of Error*
Sacramento Metropolitan AQMD: **Landline RDD** **Cellular RDD** **TOTAL**	 ***206*** ***61*** **267**	 +/- 6.0%	 **223**	 +/- 6.6%
Yolo-Solano AQMD	**188**	+/- 7.2%	**231**	+/- 6.5%
Placer County APCD	**245**	+/- 6.3%	**259**	+/- 6.1%
El Dorado County AQMD	**138**	+/- 8.4%	**163**	+/- 7.7%
Total Regional (Unweighted)	**838**	+/- 2.4%	**876**	+/- 3.3%
Total Regional (Weighted)	**411**	**+/- 4.8%**	**343**	+/- 5.3%

The Questionnaire

The main body of the questionnaire has remained the same in order to maintain consistency, although slight modifications have sometimes occurred, due to information needs or budget constraints. In 2002 a question about Spare The Air awareness that was worded by the Air Resources Board (ARB)[18] was added and has been included every year since. All surveys were conducted using a Computer Assisted Telephone Interviewing (CATI) system. In 2010 four questions that dealt with employer encouragement on Spare The Air days were deleted in order to save on costs. Questions about cell phone versus regular/wired phone use were added this year in order to try and estimate the percentage of cell phone-only households. The questionnaire was translated into Spanish and approximately 2% of all interviews were conducted in that language. The average interview lasted just under 4 minutes. A copy of the 2011 questionnaire is included as Appendix B.

Questions about Driving Behavior on the Previous Day

The questionnaire begins by asking respondent drivers how many times they entered a vehicle to drive the preceding day, and then whether they had driven the "same", "more" or "less" than usual. Respondents who reported driving "less" were then asked what they did instead of driving and why they reduced driving. Those who drove less for air quality reasons were then asked to describe how many single trips they avoided.

[18] ARB memo dated April 26, 2002 by J. Weir, J. Lu, & E. Schreffler sent to J. Lamare, Cleaner Air Partnership.

Questions about Air Quality

After the portion of the interview about driving, respondents were asked questions about air quality. Awareness of the Spare The Air program was asked in two questions, and the order of these two was randomized so as to eliminate any possible order-response bias. The two questions are:

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?" (the ARB-worded question)

2) Specific awareness of the request not to drive: "Do you recall being asked not to drive yesterday because our area was experiencing a period of unhealthy air?" (original question)

Respondents were also asked whether they typically tried to reduce driving for air quality reasons in the summer, and if so, what they had done specifically this past summer to avoid adding to air pollution. In addition, they were asked whether anyone in the household had had trouble breathing, or experienced headaches, coughing, or burning eyes because of poor air quality.

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, the Sacramento Metropolitan Air Quality Management District (SMAQMD), Yolo-Solano AQMD, Placer County APCD or El Dorado County AQMD; Katz and Associates or their policies, products, or staff. The Client (SMAQMD) shall be solely responsible for any modifications, revisions, or further disclosure/distribution of this report.

RESULTS & CONCLUSIONS

AWARENESS OF THE 2011 SPARE THE AIR CAMPAIGN

Objectives

The specific objectives of the current section are to:

a. measure awareness of the 2011 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 2011 Spare The Air campaign (correcting for Control days).

Results

General Awareness

1 ➢ ***The level of general awareness of Spare The Air in 2011 was low – an average of only 37% of respondents in the entire Sacramento region had heard, read, or seen the Spare The Air advertisements. This could well be due to a summer of relatively good air quality. Further analysis showed that awareness increased to 63% on the second day of a two-day episode, indicating that the media continues to be effective in reaching the population, but that the impact may need to be cumulative. The 37% translates into an estimated 806,500 residents in the Sacramento nonattainment area who were aware of the 2011 Spare The Air campaign in general.***

The Spare The Air season runs from May to October of each year. This year there were five Spare The Air days, four of which occurred unusually in September.[19] Levels of general awareness of Spare The Air have been measured since 2002 with the following question:

> "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?"

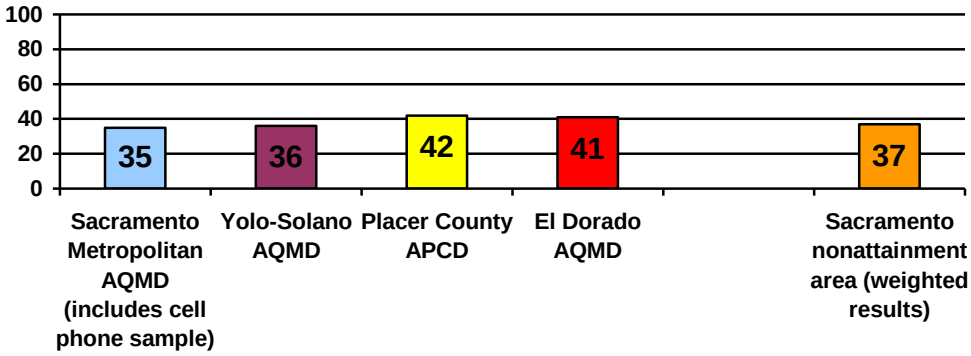
The next chart indicates 2011 levels of general awareness for residents in the individual air districts as well as in the entire Sacramento nonattainment area as a whole (weighted results[20]). It can be seen that only 37% of respondents in the entire region were aware of

[19] The five Spare The Days in 2011 were: Tuesday, July 5; Saturday, September 3; Wednesday, September 7; Wednesday, September 21; and Thursday, September 22. Interviewing took place following each day.

[20] See methodology section for a complete description of weighting methods. Interviews were conducted with random digit dialed (RDD) samples of residents with landline phones in all counties, and an additional RDD cell phone sample of residents in Sacramento County (only).

Spare The Air in general. Although this means that over three-quarters of a million (**806,475**) residents in the region[21] were aware of Spare The Air, it also represents the lowest level of awareness since the evaluation began (see a later section in this report for a year-to-year analysis). In terms of the individual air quality districts, it can be seen that general awareness ranged from 35% in Sacramento Metropolitan AQMD[22] to 42% in Placer County APCD. However, the differences among individual air districts were not statistically significant.

2011 General Awareness of Spare The Air (ARB wording)



There are a number of possible explanations for the relatively low levels of general awareness this year. First and foremost, air quality in the region is actually improving. The number of violations the region experiences now compared to five years ago has dropped. There were no (0) violations of the old 1-hour federal standard in 2011 compared with eight in 2006. In fact, the region has met the federal 1-hour ozone standard.[23]

The fact that this year four of the five Spare The Air days occurred in September whereas in the past most Spare The Air days occurred during the months of June, July and August may also have had an impact. In September, with the end of summer vacation and the return of children to school, residents are busier and are more likely to be multi-tasking. It may take more effort on the part of mainstream media to capture their "fractured" attention. The poor

[21] Based on 2011 estimates from the 2010 US Census: State of California, Department of Finance, *E-1 Population Estimates for Cities, Counties and the State with Annual Percent Change — January 1, 2010 and 2011*. Sacramento, California, May 2011. Available online at: http://www.dof.ca.gov/research/demographic/reports/estimates/e-1/documents/E-1_2011_Internet_Version.xls The total population in the entire Sacramento nonattainment area [including El Dorado AQMD] is 2,179,662: [Sacramento Metropolitan AQMD (65%) - 1,428,355; Yolo-Solano AQMD (15%) - 320,638 (this includes the total 201,759 from Yolo County and 118,879 from the Dixon, Rio Vista and Vacaville areas of Solano County); Placer County APCD (14%) - 306,571 (this figure represents the 87% of Placer County's 352,380 residents who do not live in zip codes north or east of Auburn), El Dorado AQMD (6%) - 124,099 (this figure represents 68% of El Dorado County's 182,498 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).

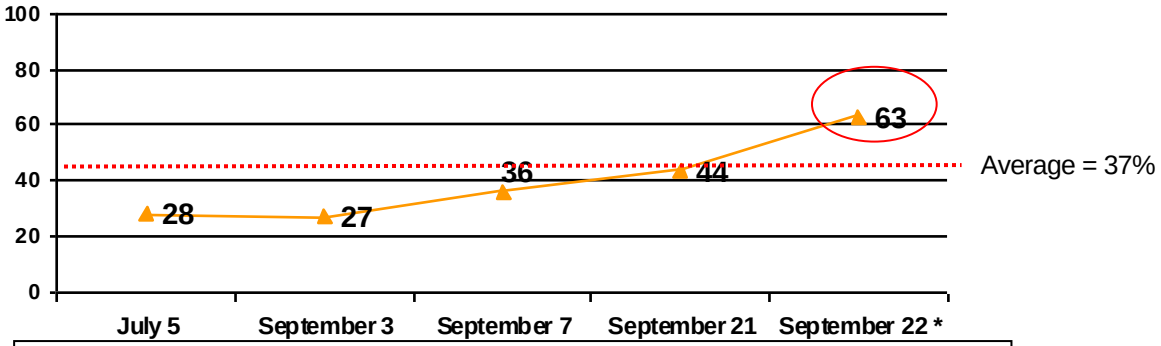
[22] This year a new dual frame sampling strategy was introduced, and included an RDD cellular frame in addition to the usual RDD landline frame to improve population coverage in Sacramento County only. (In all other counties traditional RDD samples drawn from landline frames were used.) See methodology section for further information. Because results to key questions were similar between the two groups of respondents, the 61 cellular interviews in Sacramento County were combined with the RDD landline results. For the region as a whole, all weights were recalculated to include the Sacramento cell phone component.

[23] SMAQMD news release May 10, 2011. "This is a momentous milestone in improving air quality in the Sacramento Region," said Sacramento Metropolitan Air Quality Management District Executive Director Larry Greene. "The efforts of countless Sacramento Region organizations, businesses and individuals all working together have made it possible. Measures implemented by the State including cleaner gasoline, Smog Check II and Clean Vehicles programs all played important roles."

economy could also contribute to air quality issues not being uppermost in residents' minds; as could a backlash against government.

Finally, another explanation involves a combination of air pollution levels with media penetration. There are now fewer multi-day Spare The Air episodes: only one two-day episode in 2011 compared with three separate multi-day episodes in 2006. It could be the case that a cumulative experience of hearing multiple days' worth of Spare The Air media advisories is needed to capture the attention of residents. To test this hypothesis, we compared general awareness results on each Spare The Air day, and paid particular attention to the results on the second day (i.e. September 22) of the two-day Spare The Air episode (September 21-22). Although only 10% of all Spare The Air interviews were conducted about that day and therefore the sample size is quite small, the results of the analysis indicated a **statistically significant increase in awareness to 63%**, compared with all other days. Results are presented in the next chart.

2011 General Awareness of Spare The Air on each Spare The Air day: weighted results for the entire Sacramento nonattainment area



* The red circle indicates a statistically significant difference from all other days. September 21 was also higher than July 5 and September 3 levels.

In other words, it would appear that the cumulative effect of having two Spare The Air days in a row helped the media message penetrate to the population. The 63% of respondents who were aware of Spare The Air on September 22 was similar to many previous years' levels of general awareness.

Specific Awareness: Request Not to Drive

2 ➢ ***One fifth (20%) of respondents in the Sacramento region were aware of the specific request not to drive on Spare The Air days. When extrapolated to the entire population, this means that an estimated 436,000 residents were aware of Spare The Air advisories.***

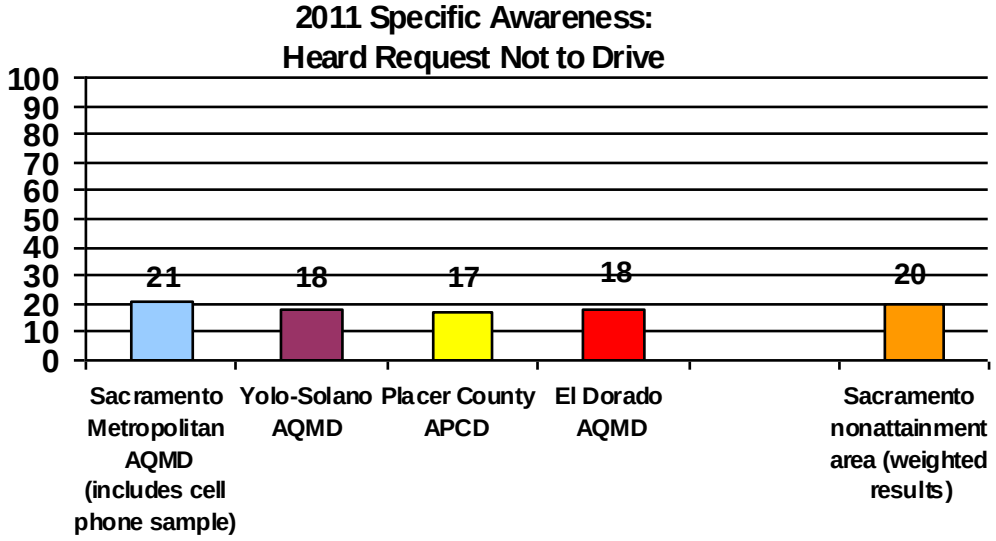
Since 1995, specific awareness of the request not to drive has been measured every survey year with the following question:

"Do you recall being asked not to drive yesterday because our area was experiencing a period of unhealthy air?"[24]

The specific episodic advisory that is sent to Air Alert subscribers and radio, television and print media says: "Drivers in the Sacramento region are asked to reduce driving or not drive at all during this period of unhealthy air quality. Carpool to sports and recreation activities, bike or walk in the morning hours when pollution levels are low, postpone errands or take the bus and light rail."

The next chart indicates that 20% of respondents in the region as a whole (weighted results) were aware of this specific request not to drive. Specific awareness has always been statistically lower than general awareness. The 20% translates into an estimated **435,932** residents[25] in the entire region who heard the specific request not to drive on Spare The Air days.

There were no statistically significant differences among the individual air quality districts. Levels of specific awareness ranged from 17% among Placer County APCD respondents to 21% in Sacramento Metropolitan AQMD.



Year-To-Year Comparisons of Awareness: Sacramento Core Region

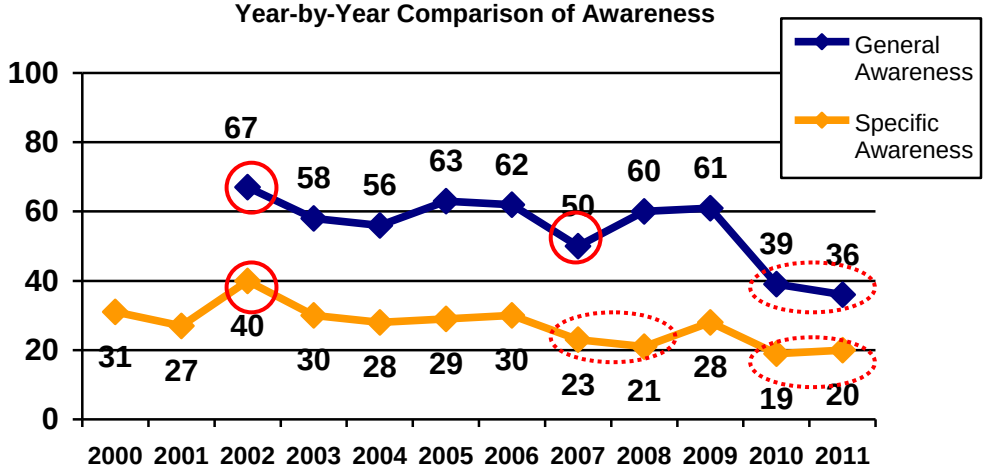
3 ➢ The level of general awareness in the Sacramento Core Region is significantly lower at 36% than in most previous evaluation years. Specific awareness is also low relative to the years prior to 2007, but not different from some more recent levels.

[24] The order of the specific and general awareness questions was randomized so as to eliminate any possible order-response bias.

[25] Calculated using the same methodology as in footnote 21.

The next chart indicates annual percentages of general (since 2002) and specific awareness (since 2000) of Spare The Air in the Sacramento Core Region.[26] It can be seen that general awareness at 36% is the lowest it has been in 10 years of evaluations. It is not significantly different from last year's level, but 2010 was considered an anomalous season for a variety of reasons.[27] General awareness was highest in 2002 at 67%, a year when air quality was very poor and there were 22 Spare The Air days, including many multi-day episodes. As has already been discussed, this year's low level can likely be attributed to better air quality (only five Spare The Air days), including only one multi-day episode (September 21-22). Further analysis indicated that on the second day of the two-day episode, 63% of respondents in Sacramento Metropolitan AQMD, Yolo-Solano AQMD and Placer County APCD said they had heard, read, or seen advertisements or news broadcasts about Spare The Air. Over time, and including results from this year, the average level of general awareness is 57%.

Sacramento Core Region (excludes El Dorado AQMD):
Year-by-Year Comparison of Awareness



Circled percentages represent significant highs and lows.
Levels in dashed circles are not different from each other.

In terms of specific awareness, while this year's result of 20% is not statistically different from levels in 2007, 2008, and 2010, it is significantly lower than eight of the previous 11 years of evaluations. Over time, and including this year's results, the average of specific awareness is 27%. Improved air quality likely accounts for the low percentage of respondents who heard the 2011 specific requests not to drive on Spare The Air days, as there is a precedent: it can be seen that 2007 was the first time a significant decline in awareness occurred – and 2007 was a comparatively mild season with relatively good air quality and the same number of Spare The Air days as this year. Additionally, and as was done for general awareness, further analysis of the specific awareness results for the two-day episode indicated an increase from September 21 of 24% to 34% on September 22. Because of the small sample sizes, this increase is not statistically significant, but nevertheless still supports the explanation that it takes a cumulative effect for the media message to penetrate through to the population.

[26] Throughout this report, any references to the Sacramento Core Region exclude El Dorado County AQMD as it was not included in all the evaluation years. Weights were recalculated proportionally after excluding El Dorado responses. Results from the cell phone sample in Sacramento County were again included.

[27] See "Awareness of the 2010 Spare The Air Campaign" section of the report : available online at http://sparetheair.com/assets/SurveyPDF/2010_STA_Detailed_Summary_Report_Final.pdf.

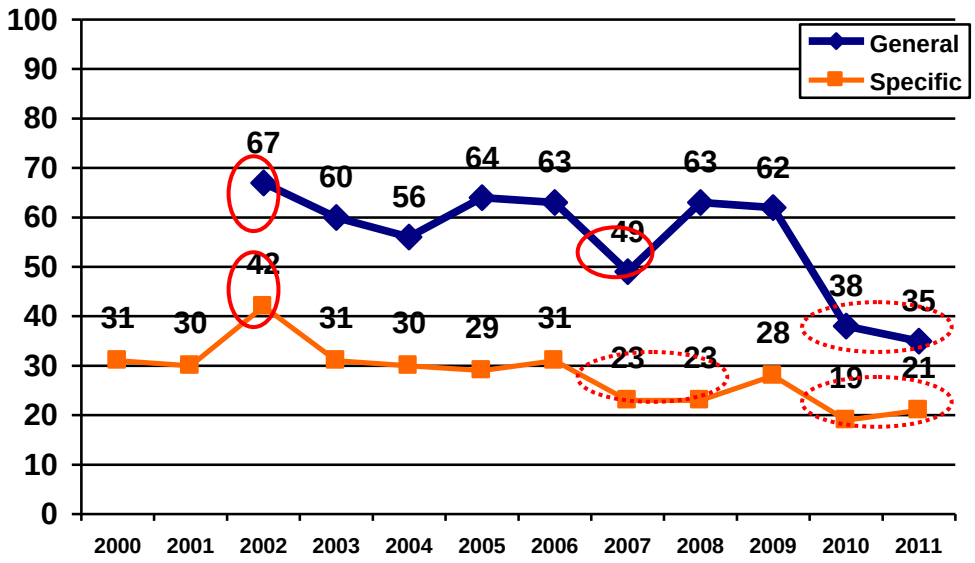
Year-To-Year Comparisons by Air District

4 ➢ ***Levels of both types of awareness were highest in 2002 in all individual air districts, and at their lowest both last year and this year. Year-to-year results in Placer County APCD have been the most variable.***

Year-to-year comparisons of the annual levels of general and specific awareness for the individual air districts are presented in the next four graphs. (El Dorado County AQMD residents were not interviewed in 2002, 2003, or 2005).

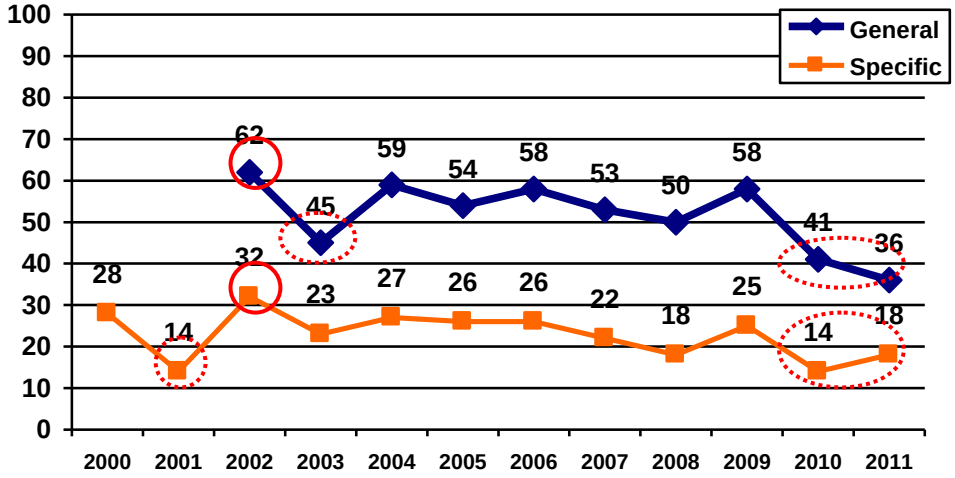
As can be seen in the next graph, in Sacramento Metropolitan AQMD the highest levels of general as well as specific awareness occurred in 2002. There was a significant drop in the two types of awareness in 2007; and again during 2010 as well as this year. The general awareness average over time in Sacramento Metropolitan AQMD is 56%; the average for specific awareness is 28%.

Awareness: Sacramento Metropolitan AQMD
Year-to-Year Comparisons



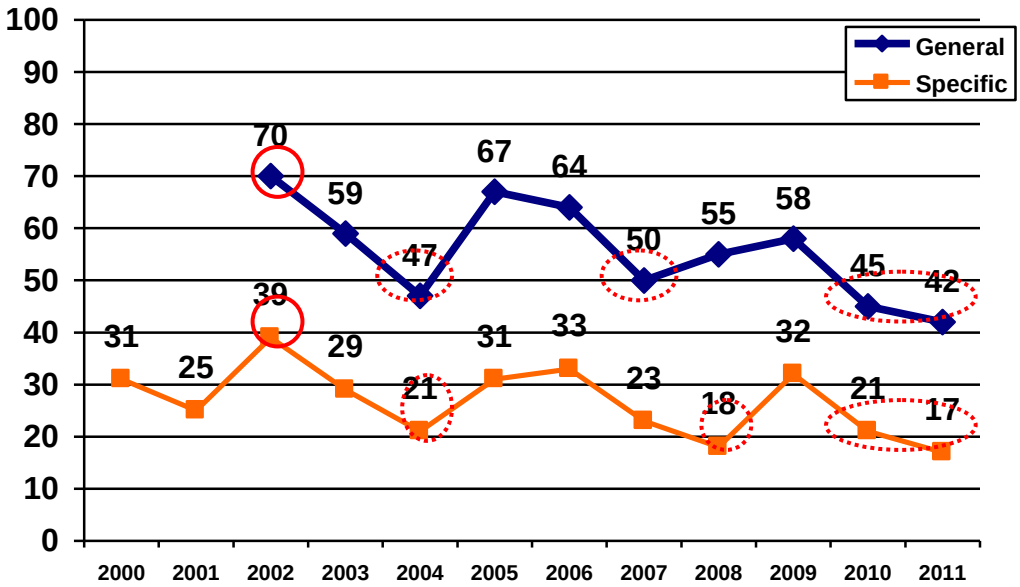
In Yolo-Solano AQMD, this year's level of general awareness was the lowest yet, although it was not significantly different from last year. The average over time is 52%. In terms of specific awareness, this year's level of 18% did not differ from last year's. The average over time for specific awareness is 23%.

Awareness: Yolo-Solano AQMD
Year-to-Year Comparisons



Results have been the most variable in Placer County APCD from one year to the next. The average level of general awareness in Placer County APCD is 56%; and that of specific awareness is 27%. (Note that only the largest differences are circled in the following chart.)

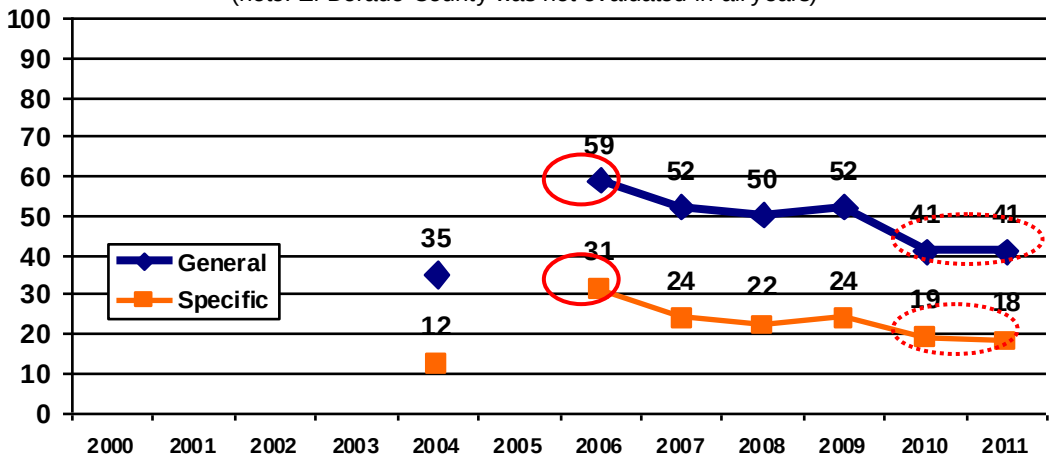
Awareness: Placer County APCD
Year-to-Year Comparisons



In El Dorado County AQMD, with the exception of 2004 (when interviews were conducted following only one Spare The Air day and so are not representative of the entire season), it can be seen that results for both types of awareness have declined since 2006. The average over time for general awareness is 47%; and the average for specific awareness is 21%.

Awareness: El Dorado County AQMD
Year-to-Year Comparisons

(note: El Dorado County was not evaluated in all years)



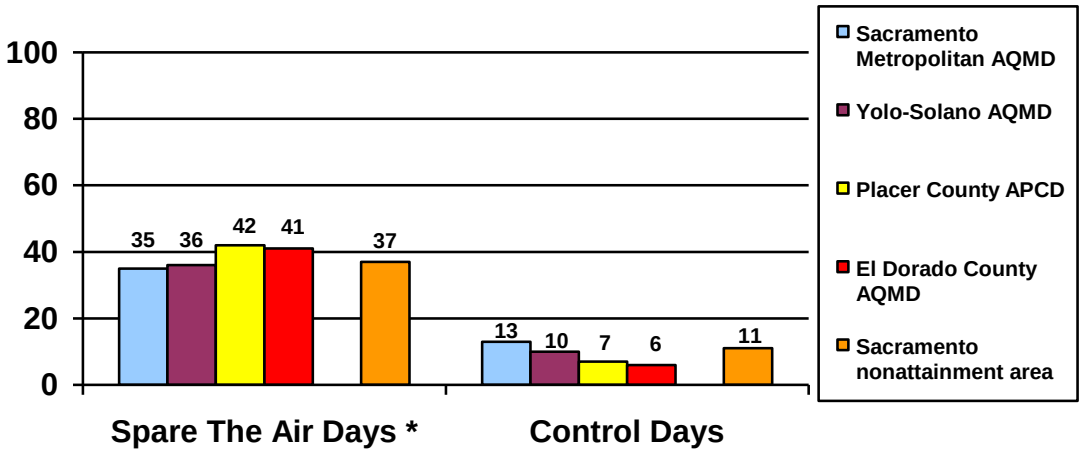
Spare The Air Versus Control Days

6 ➢ ***Levels of both general and specific awareness of Spare The Air were significantly higher when respondents were interviewed following Spare The Air days than on Control days, a further indication that the announcements are in fact being heard.***

Control day interviews were conducted on non Spare The Air days with random samples of landline residents representative of all air districts in the nonattainment area. The same questionnaire as that used following Spare The Air days was used for Control day calling. The use of a Control group insures that any positive results attributed to the Spare The Air program are indeed due to the program itself and not to a possible social desirability response bias. Control interviews took place on the same days of the week as the Spare The Air interviews, but on days in October when the Air Quality Index (AQI) was estimated to be good or moderate (0 - 100).

Results for general awareness are presented in the next chart and indicate that although 11% of area respondents interviewed on Control days incorrectly said they had seen or heard Spare The Air announcements, significantly more (37%) of those interviewed after Spare The Air days correctly remembered seeing or hearing them. Results in each of the individual air districts were similar. In other words, despite the lower levels of general awareness this year relative to previous years, it is clear that the **Spare The Air program is still able to use the media to effectively reach the Sacramento air basin population**.

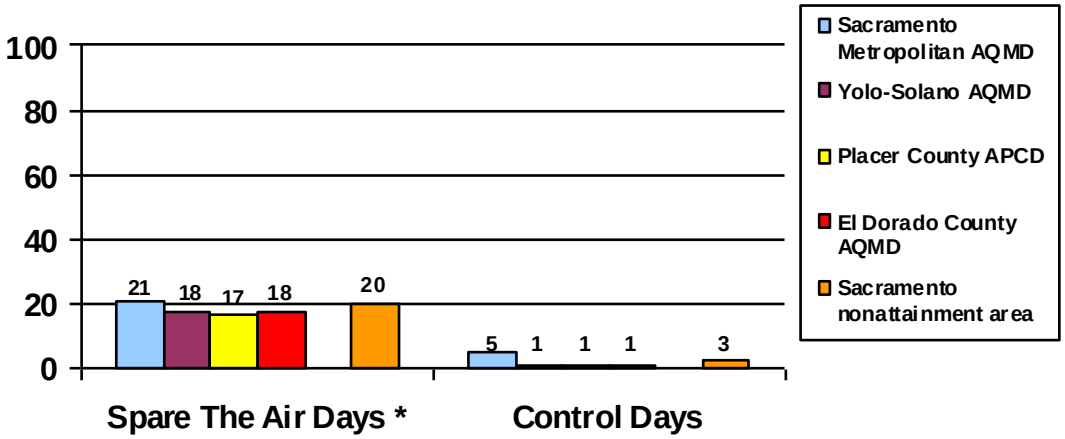
Spare The Air vs. Control Days: 2011 General Awareness



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

In terms of specific awareness, 3% of Control day respondents in the area as a whole incorrectly heard a request not to drive versus the 20% of respondents who correctly remembered the request following Spare The Air days. As can be seen in the following chart, the difference between Spare The Air and Control day interviewing in each individual air district was likewise significant. These results indicate once again that the **Spare The Air program is still effective in reaching area residents**.

Spare The Air vs. Control Days: 2011 Specific Awareness



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

Estimating the Number of STA-Aware Drivers

7 ➢ ***Adjusting for Control day responses, the percentage of respondents who were aware of Spare The Air in general translates into an estimate of 377,980 drivers in the nonattainment area who were aware of Spare The Air day during the 2011 season.***

There were an estimated 1,453,768 drivers in the entire Sacramento nonattainment area in the summer of 2011.[28] With the level of general awareness of Spare The Air at 37%, this translates into an estimated 537,895 **drivers** in the region who were aware of Spare The Air. However, there were also 11% of Control day respondents (or 159,915 drivers) who thought they heard about Spare The Air when in fact no advertisement had been issued.[29] Correcting then for Control day responses through subtraction means that **377,980 drivers in the Sacramento nonattainment area as a whole were aware of the 2011 Spare The Air campaign in general**. The next table indicates the calculations and the estimated number of drivers who heard the advisories in each individual air district.

Air District	*Total Estimated Number of Drivers*	*Percent Aware of STA (General Awareness) STA / Control*	*Estimated Number of Drivers Aware of STA in General (STA – Control)*
Sacramento Metropolitan AQMD	924,541	35% / 13%	***323,589 – 120,190= 203,399***
Yolo-Solano AQMD	202,895	36% / 10%	***73,042 - 20,289= 52,753***
Placer County APCD	229,334	42% / 7%	***96,320 – 16,053= 80,267***
El Dorado County AQMD	96,998	41% / 6%	***39,769 - 5,820= 33,949***
Sacramento Nonattainment Area[30]	1,453,768	37% / 11%	**537,894 -159,914= *377,980***

[28] The number of drivers in the Sacramento nonattainment area for 2011 was estimated, using the number of driver licenses by county for 2010, obtained from the California Department of Motor Vehicles database http://www.dmv.ca.gov/about/profile/dl_outs_by_county.pdf , and calculating the percentage increase, based on county population figure increases from 2010 to 2011 listed at: http://www.dof.ca.gov/research/demographic/reports/estimates/e-1/documents/E-1_2011_Internet_Version.xls. The estimated number of licensed drivers for the total Sacramento nonattainment area in 2011, therefore, was 1,453,768: Sacramento Metropolitan AQMD: total 924,541 + Yolo-Solano: total of 202,895 (124,230 in Yolo County + Solano County: 271,258 * 29% for the proportion located within the Air Quality district = 78,665) + Placer County: total of 229,334 (263,603 * 87% for Air Quality district) + El Dorado County: total of 96,998 (142,644 * 68% for Air Quality district). The proportion of drivers in each district also corresponds to the residential population proportions used in the calculation of weights for the region as a whole.

[29] Although no advertisement had been issued, and the general radio tips ended on September 18 (and Control day interviews all took place in October), other Spare The Air public outreach efforts continued. It is possible that Control day respondents were reacting to these.

[30] The results for the Sacramento nonattainment area as a whole are not the simple sum of the individual air districts, but rather, are weighted results that reflect the relative proportional distribution of residents in the area.

8 ➢ ***In terms of specific awareness, and again correcting for Control day responses, this means that nearly a quarter of a million (247,141) drivers in the region heard the episodic request not to drive on Spare The Air days in 2011.***

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 247,141 drivers who were specifically aware of the requests not to drive on Spare The Air days.

Air District	*Total Estimated Number of Drivers*	*Percent Aware of STA (Specific Awareness) STA / Control*	*Estimated Number of Drivers Aware of STA Specific Request Not to Drive (STA - Control)*
Sacramento Metropolitan AQMD	924,541	21% / 5%	***194,154 – 46,227= 147,926***
Yolo-Solano AQMD	202,895	18% / 1%	***36,521 -2,029= 34,492***
Placer County APCD	229,334	17% / 1%	***38,987 – 2,293= 36,693***
El Dorado County AQMD	96,998	18% / 1%	***17,460 - 970= 16,490***
Sacramento Nonattainment Area[31]	1,453,768	20% / 3%	**290,754 – 43,613= *247,141***

PURPOSEFUL DRIVING REDUCTION

Objectives

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

[31] The results for the Sacramento nonattainment area as a whole are not the simple sum of the individual air districts, but rather, are weighted results which reflect the relative proportional distribution of residents in the area.

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 (excluding El Dorado County AQMD) 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 2011

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.

Results

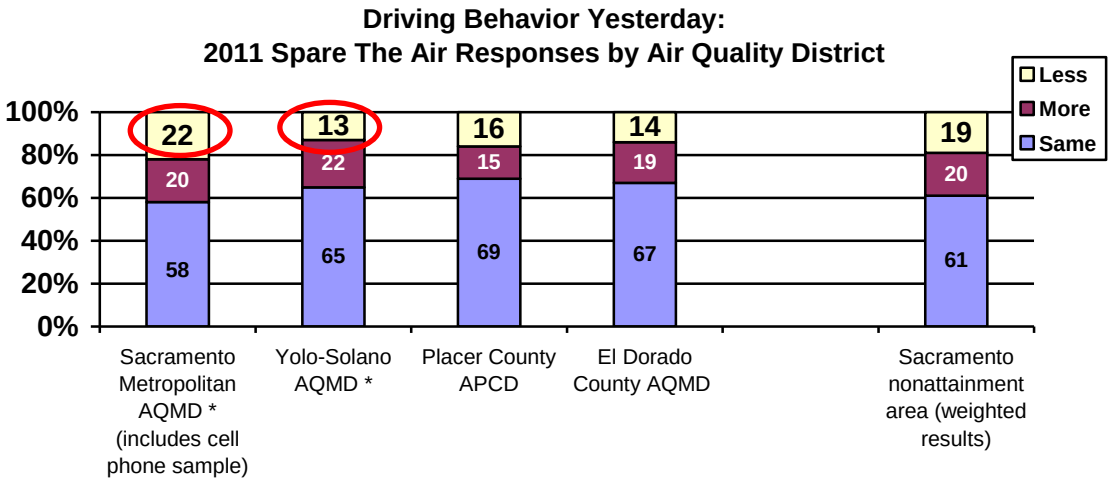
Driving Behavior Yesterday

9 ➢ ***About one in five (19%) of respondents in the Sacramento region as a whole said they drove "less" on Spare The Air days. The percentage was highest among Sacramento Metropolitan residents (20%), and lowest among Yolo-Solano AQMD residents (13%).***

At the beginning of the survey, respondents interviewed following Spare The Air days were asked to think about their driving behavior the previous day and say whether they drove the "same, more, or less frequently" than they normally did on that particular day of the week. Results from each of the four individual air quality districts and the entire Sacramento nonattainment area (weighted results) are presented in the next chart.

It can be seen that the majority of respondents did not make any changes in their driving behavior – 61% in the area as a whole said they drove the same as usual the previous day. Twenty percent (20%) said they drove more, and the remaining 19% said they drove less. Results from each of the individual air quality districts indicate that drivers in Placer County APCD were the most likely to have not changed their driving behavior – approximately seven out of ten (69%) said they drove the same as usual the previous day.

The highest percentage of those who said they drove "less" on Spare The Air days occurred in Sacramento Metropolitan AQMD (22%). This was significantly higher than the percentage in Yolo-Solano AQMD, where only 13% of respondents drove less the day before. In Placer County APCD, 16% drove less and in El Dorado County, 14% of respondents claimed to have driven less on Spare The Air days.



* circles indicate a significant difference between Sacramento Metropolitan AQMD and Yolo-Solano AQMD.

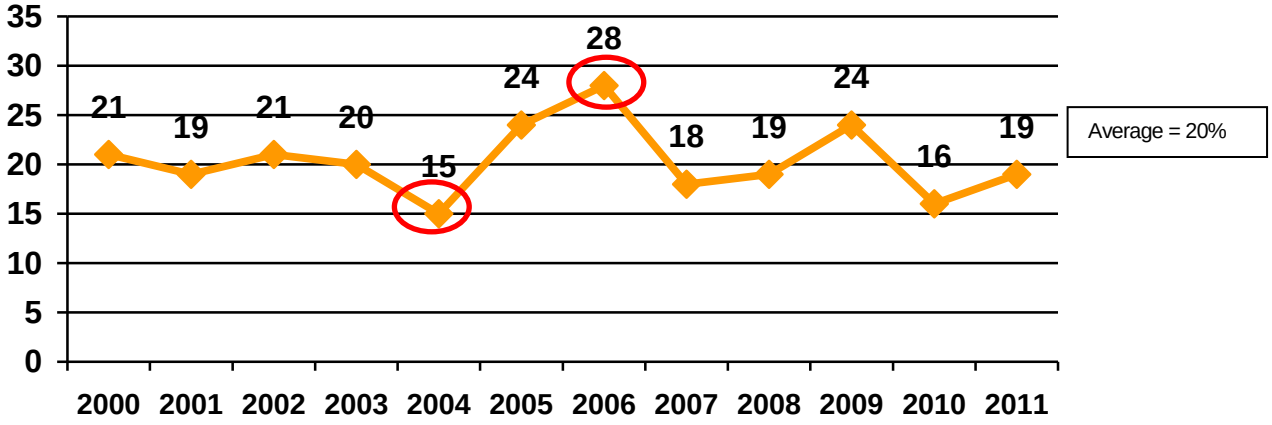
Year-to-Year Comparisons: Percent Who Drove Less

10 ➢ ***Over the last 12 years, the highest percentage of those who drove less on Spare The Air days in the Sacramento Core Region occurred in 2006 (28%), and the lowest percentage occurred in 2004 (15%). This year's 19% of respondents said they drove less on Spare The Air days was similar to the 12-year average of 20%.***

The next graph plots the percentages of drivers from 2000 to the present who said they drove less on Spare The Air days in the Sacramento Core Region (which excludes El Dorado County AQMD).[32] It can be seen that, with only a couple of exceptions, the percentage of respondents who said they drove less on Spare The Air days has remained relatively stable at about 20%, which is the 12 year average. In 2004 the level declined significantly to 15%, a summer with relatively good air quality and only six Spare The Air days. 2006 registered the highest percentage of all years, at 28%: 2006 was a poor air quality summer, with 15 Spare The Air days. Current results at 19% are not significantly different from the 12-year average.

[32] Results are for the Sacramento Core Region (weighted) and exclude El Dorado County AQMD because interviews were not conducted with El Dorado respondents in all survey years. Results include a cell phone sample of respondents in Sacramento County (only), which augmented the RDD landline sample for that district.

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

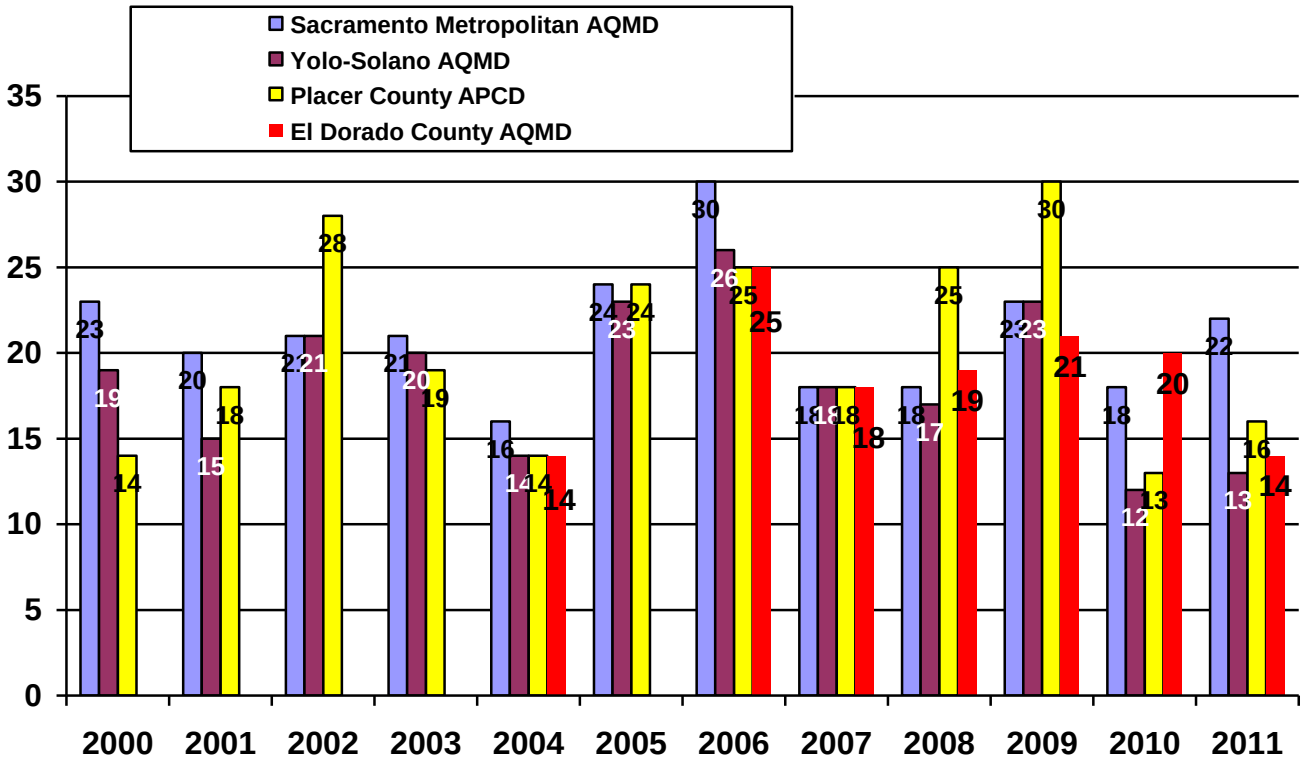


* circles indicate the highest and lowest percentages over time.

11 ➢ In the individual air districts, the percentage of respondents who drove less this year was not significantly different from each air district's average over time.

The annual percentage of respondents who drove "less" the previous day in the individual air districts from 2000 to the present are presented in the next chart. In **Sacramento Metropolitan AQMD** the percentage of residents who said they drove less on Spare The Air days ranged from a low of 16% in 2004 to a high of 30% in 2006. This year's percentage of 21% is the same as the 12-year average of 21% in SMAQMD. Results in **Yolo-Solano** AQMD ranged from a low of 12% in 2010 to a high of 26% in 2006. This year's 13% is not significantly lower than the 12-year average of 18% in that air district. In **Placer County** APCD results tended to fluctuate more from one year to the next. The 16% of residents this year who said they drove less was not significantly lower than the 12-year average of 20%. Respondents in **El Dorado County** AQMD were interviewed in seven of the 12 years, and this year's 14% of respondents who reported driving less was not significantly lower than the 7-year average of 19%.

Year-to-Year Comparison of Percent of STA Respondents Who Drove "Less" on Spare The Air Days: Individual Air Districts



Spare The Air Days vs. Control Days

12 ➢ ***A significantly higher percentage of respondents in the Sacramento Core Region said they drove less on Spare The Air days (19%) than on Control days (14%), one indication of the continuing effectiveness of the program.***

Control day interviewing is an integral part of the evaluation methodology of Spare The Air. Samples of respondents were interviewed about the same days of the week as the Spare The Air interviews, but on cooler, non Spare The Air days in October.[33] The use of Control day interviewing provides a means of calculating a correction or adjustment factor to account for any tendency that some individuals might have to overstate their driving reduction on Spare The Air days (social desirability response bias), and, therefore, provides the most conservative estimates of program effectiveness.

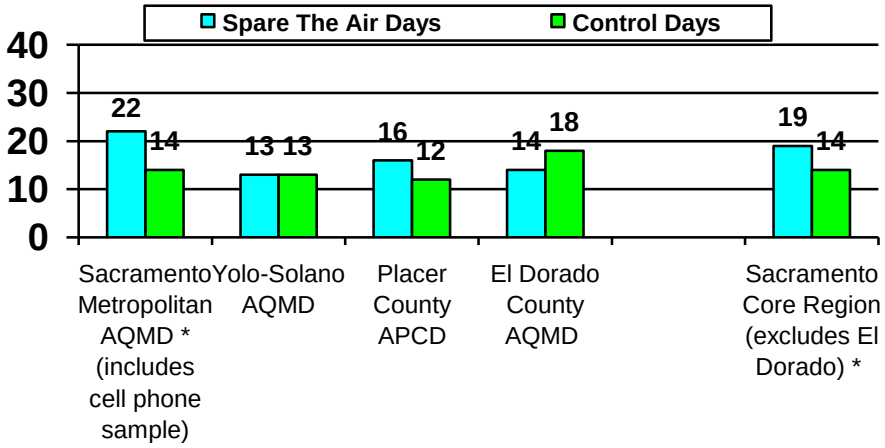
The next chart shows the results of Spare The Air and Control day interviewing for each individual air district and for the weighted Sacramento Core Region.[34] It can be seen that the percentage of respondents who said they drove less on Spare The Air days in the

[33] In order to know which days of the week to match, Control day interviews have to be conducted after Spare The Air days. As four of the five 2011 Spare The Air days occurred in September, Control day interviewing did not start until October. See methodology section for a complete description of the sampling design.

[34] The Sacramento Core Region excludes El Dorado County AQMD in order to be able to make comparisons with previous years.

Sacramento Core Region was significantly greater at 19% than the 14% of respondents interviewed on Control days. This was also true in Sacramento Metropolitan AQMD, where the 22% of respondents interviewed following Spare The Air days was significantly higher than the 14% interviewed on Control days. In Placer County APCD the difference was not significant (16% vs. 12%). The same percentage of respondents (13%) in Yolo-Solano AQMD drove less on Spare The Air days as on Control days. In El Dorado County AQMD, more respondents on Control days (18%) drove less than on Spare The Air days (14%), although this difference was not significant.

2011 Spare The Air vs. Control Days: Percent of Respondents Who Drove "Less" The Previous Day



* Indicates a statistically significant difference between Spare The Air and Control responses.

Over the past twelve years, significant differences between the percentage of respondents who said they drove less on Spare The Air versus Control days have been found in all but four years – 2003, 2007, 2008, and 2010. (Within the individual air quality districts, however, there have been fewer years when the differences were significant.[35]) Results for the Sacramento Core Region are presented in the next table.

[35] In terms of the individual air districts within the Sacramento Core Region, Sacramento Metropolitan AQMD showed significant differences in 2000, 2001, 2002, 2004, 2005, and 2006. Placer County APCD showed differences in only four of the 12 years (2002, 2005, 2006, and 2009); 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.

Year	Percentage of Respondents Who Drove "Less" Yesterday: Sacramento Core Region (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
2008	19%	16%	3%	No
2009	24%	19%	5%	Yes
2010	16%	17%	-1%	No
2011	19%	14%	5%	Yes

Although this year's results indicate a significant difference between the two groups of respondents, it has been suggested in the past and is reiterated again here that perhaps the time has come to drop this as a prerequisite to the calculation of emission reductions.[36]

Percentage of Purposeful Reducers

13 ➢ ***During the summer of 2011, only 0.5% of all respondent drivers in the entire Sacramento nonattainment area were classified "purposeful reducers" -- they drove less on Spare The Air days because they heard the Spare The Air advisories and wanted to improve air quality in the region.***

The definition of a purposeful driving reducer is quite strict: it includes only those interviewed following a Spare The Air day who said they drove less the previous day, specifically for air quality reasons, and who had heard announcements about Spare The Air (general awareness using the ARB question.[37]) Results from each air quality district and for the

[36] This requirement was introduced into the methodology in 2000 by Jude Lamare, Ph.D.; formerly with the Cleaner Air Partnership; and prior to discussions in 2002 with the Air Resources Board as to what would constitute a purposeful driving reducer. The definition of a purposeful reducer changed after these discussions, but the previous methodology requiring a significant difference between Spare The Air and Control drivers saying they drove less the previous day did not. The air districts might therefore want to reconsider whether this prerequisite is still necessary, given the fact that Control day interviewing already acts as a correction factor; that the sampling design change in 2008 of fewer completed interviews means that the margins of error in each air district are increased, that many drivers are seasonal reducers and have already reduced the amount of driving they do during the summer, and that other explanations are plausible.

[37] 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

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, only 0.5% of all Spare The Air respondent drivers (2 out of 411) met the strict ARB standard for purposeful driving reduction. Individually, it can be seen that 0.8% of respondents in Sacramento Metropolitan AQMD qualified as purposeful reducers; none (0%) in Yolo-Solano AQMD; 0.4% were identified in Placer County APCD; and in El Dorado County AQMD there were no (0%) purposeful reducers.

Spare The Air: Purposeful Reducers in 2011	*Number of Respondents Who Reduced Driving For Air Quality Reasons and Were Aware of STA Advisories*	*Total Number of Respondents Interviewed on Days Following Spare The Air*	*% of Total Respondents Who Reduced Driving for Air Quality Reasons and Were Aware of STA Advisories*
Sacramento Metropolitan AQMD	2	267	0.8%
Yolo-Solano AQMD	0	188	0.0%
Placer County APCD	1	245	0.4%
Sacramento Core Region[38]	2	387	0.5%
El Dorado County AQMD	0	138	0.0%
Sacramento Nonattainment Area[39]	2	411	0.5%

Percentage of Purposeful Reducers: Year-To-Year Comparisons

14 ➢ ***The percentage of purposeful reducers in the Sacramento Core Region is low, but not significantly different from either last year's percentage, or the 12-year average of 1.4% of drivers who reduced driving on Spare The Air days in order to help improve air quality.***

The next table lists the annual proportions of purposeful reducers from 2000 to the present. Tests of proportion were used to compare year-to-year results. In the Sacramento Core Region (which excludes El Dorado County AQMD), although this year's result was significantly lower at 0.5% than in some previous years, it was not significantly different from the 12-year average of **1.4%** of all drivers who purposefully reduced driving on Spare The Air days, specifically in order to help improve air quality.

In terms of the Sacramento Metropolitan AQMD, although annual results have varied slightly, the percentage of reducers has not changed significantly from one year to the next.

included in all evaluations from 1999 to the present. Typically, more respondents indicate general awareness of Spare The Air than specific awareness of the request not to drive the previous day.

38 Weighted, excludes El Dorado County AQMD.

39 Weighted, includes El Dorado County AQMD. 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, adjusted proportionally to the population within each air district. (Sacramento Metropolitan AQMD represents 65% of the entire population, Yolo-Solano AQMD is 15%, Placer County APCD is 14%, and El Dorado County AQMD is 6%.) This is why the weighted total number of completed interviews (i.e. 411) is less than the sum of the total number of interviews conducted in all air districts (i.e. 838).

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 percentage of reducers in Sacramento Metropolitan AQMD was 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.

Spare The Air: Purposeful Reducers	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*Significant Difference Among Years? (see footnotes)*	*12-year Aver-age*
Sacramento Metropolitan AQMD	2.0%	2.1%	2.3%	1.2%	1.6%	1.5%	1.9%	1.3%	0.5%	1.2%	0.5%	0.8%	No	1.4%
Yolo-Solano AQMD	1.3%	0.2%	3.5%	1.2%	1.1%	1.3%	1.9%	1.6%	0.5%	2.7%	0.0%	0.0%	Yes[40]	1.3%
Placer County APCD	1.0%	0.9%	3.9%	2.3%	1.4%	1.5%	4.3%	0.4%	1.6%	2.6%	0.3%	0.4%	Yes[41]	1.7%
Sacramento Core Region	1.8%	1.7%	2.7%	1.4%	1.5%	1.4%	2.2%	1.2%	0.7%	1.7%	0.36%	0.5%	Yes[42]	1.4%

Estimated Number of Purposeful Reducers

15 ➢ An estimated 7,269 drivers in the entire Sacramento nonattainment area purposefully made fewer trips on average each Spare The Air day in 2011, in order to reduce air pollution.

There were an estimated 1,453,768 drivers[43] in the entire Sacramento nonattainment area in 2011. Extrapolating to this population of drivers, the 0.5% of purposeful reducers means that approximately **7,269 drivers** purposefully made fewer trips on Spare The Air days for air

[40] In Yolo-Solano AQMD, 2002 was significantly higher than 2001, 2003, 2004, 2005, 2007, 2008, 2010 and 2011; 2009 was higher than 2001, 2010 and 2011; 2006 and 2007 were higher than 2010 and 2011.

[41] In Placer County APCD, 2002 and 2006 results were significantly higher than 2000, 2001, 2004, 2005, 2007, 2010 and 2011; and 2003 and 2009 were higher than 2007, 2010, and 2011.

[42] In the Sacramento Core Region, results in 2002 and 2006 were significantly higher than 2008, 2010 and 2011; and 2000, 2001 and 2009 were higher than 2010.

[43] The number of drivers in the Sacramento nonattainment area for 2011 was estimated, using the number of driver licenses by county for 2010, obtained from the California Department of Motor Vehicles database http://www.dmv.ca.gov/about/profile/dl_outs_by_county.pdf , and calculating the percentage increase, based on county population figure increases from 2010 to 2011 listed at: http://www.dof.ca.gov/research/demographic/reports/estimates/e-1/documents/E-1_2011_Internet_Version.xls. The estimated number of licensed drivers for the total Sacramento nonattainment area in 2011, therefore, was 1,453,768: Sacramento Metropolitan AQMD: total 924,541 + Yolo-Solano: total of 202,895 (124,230 in Yolo County + Solano County: 271,258 * 29% for the proportion located within the Air Quality district = 78,665) + Placer County: total of 229,334 (263,603 * 87% for Air Quality district) + El Dorado County: total of 96,998 (142,644 * 68% for Air Quality district). The proportion of drivers in each district also corresponds to the residential population proportions used in the calculation of weights for the region as a whole.

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.

Air District	*Total Number of Drivers*	*Percent of Purposeful Reducers*	*Estimated Number of Purposeful Reducers in 2011*
Sacramento Metropolitan AQMD (includes cell phone sample)	**924,541**	**0.8%**	***7,396***
Yolo-Solano AQMD	**202,895**	**0.0%**	***0***
Placer County APCD	**229,334**	**0.4%**	***917***
Sacramento Core Region[44]	**1,356,770**	**0.5%**	***6,784***
El Dorado County AQMD	**96,998**	**0.0%**	***0***
Sacramento Nonattainment Area[45]	**1,453,768**	**0.5%**	***7,269***[46] ***purposeful reducers***

Estimated Number of Single Trips Avoided by Purposeful Reducers

16 ➢ ***Purposeful reducers in the region as a whole avoided making an average of 2.5 single trips on Spare The Air days, translating into a total of 18,172 trips avoided on Spare The Air days during the summer season of 2011.***

Purposeful driving reducers were then asked how many single vehicle trips they had avoided on the Spare The Air day. The mean number of single trips avoided in the entire Sacramento nonattainment area was **2.5**.[47] Multiplying by the estimated 7,269 drivers who purposefully reduced their driving on Spare The Air days, this translates into an estimated **18,172 single trips** that drivers avoided making on Spare The Air days during the summer of 2011, specifically to help reduce air pollution in the region. Results for the individual air districts as well as for the weighted regions are presented in the next table.

44 Excludes El Dorado County AQMD.

45 Includes El Dorado County AQMD.

46 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. For the Core Region, Sacramento Metropolitan AQMD represents 69% of the population, Yolo-Solano AQMD is 16%, and Placer County APCD is 15%. For the entire nonattainment area, Sacramento Metropolitan AQMD represents 65% of the entire population, Yolo-Solano AQMD is 15%, Placer County APCD is 14%, and El Dorado County AQMD is 6%.

47 The mean was 2.5, the standard deviation was 0.67, the median was 2.4, and the range was 2 to 3 trips avoided.

Air District	*Estimated Number of Purposeful Reducers*	*Mean # of Trips Avoided for Air Quality Reasons*	*Estimated Number of Single Trips Reduced*
Sacramento Metropolitan AQMD (includes cell phone sample)	***7,396***	**2.5**	**18,491**
Yolo-Solano AQMD	***0***	**0**	**0**
Placer County APCD	***917***	**2.0**	**1,835**
Sacramento Core Region[48]	***6,784***	**2.5**	**16,960**
El Dorado County AQMD	***0***	**0.0**	**0**
Sacramento Nonattainment Area[49]	***7,269***	**2.5**	**18,172 trips**

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

17 ➢ ***Control day interview results indicated that there was only one respondent who specifically avoided making trips for air quality reasons on non Spare The Air days. However, because of the low percentage of purposeful reducers on Spare The Air days, there is no significant difference between Spare The Air and Control percentages this year.***

Control day respondents were also asked if they had reduced the number of trips 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 is harder to credit the Spare The Air program as the cause of driving reduction.[50]

The next table indicates the results from Control interviews in all the air districts. It can be seen that in the entire nonattainment area, only one respondent (0.3%) reduced the number of trips for air quality reasons on Control days. However, the difference between Spare The Air and Control groups was not statistically significant; due largely to the small number of purposeful reducers on Spare The Air days during this past summer. The lack of a difference can also be attributed to the relatively good air quality experienced during the summer of 2011.

48 Excludes El Dorado County AQMD.

49 Includes El Dorado County AQMD.

50 This year the same methodology as was adopted last year was used for Control day interviews: namely, reducers were classified as those respondents who said they drove less the previous day for air quality reasons, and who were not seasonal driving reducers (see 2010 Seasonal Driving Reduction Report for a complete description.) This year there were three Control day respondents who said they drove less for air quality reasons, but as none were in Sacramento Metropolitan AQMD (two were in Yolo-Solano AQMD and one in El Dorado County AQMD), when results were weighted for the nonattainment area as a whole, they totaled less than one (but rounded up to one), or 0.3% of the weighted total number of respondents in the region, and the mean number of trips they reduced was 0. Last year it was recommended that any future evaluations take into account the effect of seasonal trip reductions on Control day interviews for this particular analysis, none of this year's Control reducers were also seasonal reducers and so they are included.

Air District	*% of Respondents Who Reduced for Air Quality Reasons*		*Significant Difference?*
	Who Were Aware On STA Days	*On Control Days*	
Sacramento Metropolitan AQMD	0.8%	0.0%	No
Yolo-Solano AQMD	0.0%	0.9%	No
Placer AQMD	0.4%	0.0%	No
Sacramento Core Region	0.5%	0.0%	No
El Dorado County AQMD	0.0%	0.6%	No
Sacramento Nonattainment Area	0.5%	0.3%	No

ESTIMATED EMISSION REDUCTIONS

Objective

The main objective of the current section is to estimate how many tons of ozone precursor emissions [Reactive Organic Gas (ROG) and Nitrogen Oxides (NOx)] were reduced during the 2011 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.

Results

Calculation of Estimated Emission Reductions

18 ➢ ***The 2011 Spare The Air program was successful in reducing air pollution in the entire Sacramento nonattainment area by an estimated 0.08 tons of ozone precursors (ROG and NOx) per day. Drivers specifically reduced the number of trips they took on Spare The Air days to improve air quality in the region.***

The methodology used to estimate emission reductions due specifically to the Spare The Air program is conservative. First, it includes only those drivers who said they drove "less" the previous day (we interview respondents the day after a Spare The Air day is called). Thus, seasonal reducers who normally make fewer trips during the summer to help improve air quality are not (necessarily) included[51] nor are those who reduced the number of trips they made on Spare The Air days for reasons other than air quality, nor are those who drove less but had not heard the Spare The Air advisory. Further, any purposeful driving reduction for air quality reasons on non Spare The Air days (i.e. Control day interviews) is subtracted from the emission reduction estimate. In the past, in addition, emission reductions were to be calculated only in those air districts where significantly more respondents said they drove

[51] These respondents are examined in another report on Seasonal Driving Reduction.

"less" on Spare The Air days than on Control days. However, even though this year there was a significant difference between the two groups of respondents in Sacramento Metropolitan AQMD, it is still recommended that the necessity of requiring this last step be dropped.[52] The prerequisite was introduced at a time when air quality in the nonattainment area was much worse.[53]

Results from the Sacramento nonattainment area as a whole (including El Dorado County AQMD results) are used to illustrate the procedure for estimating emission reductions 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,[54] 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 **0.5%** (2 / 411[55]) 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 **2.5** single trips avoided.[56]

3. Extrapolate to the total number of drivers in the region[57] this year: the percentage of Spare The Air reducers therefore represents **7,269** drivers in the Sacramento nonattainment area, and the number of single trips avoided was **18,172** (7,269 drivers x 2.5 trips avoided on average).

4. Multiply the number of trips avoided by a per trip emission reduction average of **3.96**

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52 See also Purposeful Driving Reduction reports in 2009, 2010, and 2011.

53 This requirement, considered a prerequisite for the calculation of emission reductions in each air district, was introduced into the methodology in 2000 by Jude Lamare, Ph.D.; formerly with the Cleaner Air Partnership; and prior to discussions in 2002 with the Air Resources Board as to what would constitute a purposeful driving reducer. The definition of a purposeful reducer changed after these discussions, but the previous methodology requiring a significant difference between Spare The Air and Control drivers saying they drove "less" the previous day did not. The air districts might therefore want to reconsider whether this prerequisite is still necessary, given the fact that Control day interviewing already acts as a correction factor; that the sampling design change in 2008 of fewer completed interviews means that the margins of error in each air district are increased, and that other explanations are plausible. In fact, in 2009 a significant difference was found in the weighted Sacramento nonattainment area as a whole as well as in Placer County APCD, but not in Sacramento Metropolitan AQMD, or Yolo-Solano AQMD, or El Dorado County AQMD. Emission reductions were still calculated for Sacramento Metropolitan AQMD as it is the largest air district within the nonattainment area. This year there was a significant difference in Sacramento Metropolitan AQMD but not in any of the other air districts.

54 Using the ARB-worded question for measuring general awareness of Spare The Air: Q.12b "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?"

55 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. (Sacramento Metropolitan AQMD: 65%, Yolo-Solano AQMD: 15%, Placer County APCD: 14%, and El Dorado County AQMD: 6%.) This is why the weighted total of completed interviews (411) is less than the sum of the total number of interviews in all air districts (838).

56 The mean was 2.5, the standard deviation was 0.67, the median was 2.4, and the range was 2 to 3 trips avoided.

57 The number of drivers in the Sacramento nonattainment area for 2011 was estimated, using the number of driver licenses by county for 2010, obtained from the California Department of Motor Vehicles database http://www.dmv.ca.gov/about/profile/dl_outs_by_county.pdf , and calculating the percentage increase, based on county population figure increases from 2010 to 2011 listed at: http://www.dof.ca.gov/research/demographic/reports/estimates/e-1/documents/E-1_2011_Internet_Version.xls. The estimated number of licensed drivers for the total Sacramento nonattainment area in 2011, therefore, was 1,453,768: Sacramento Metropolitan AQMD: total 924,541 + Yolo-Solano: total of 202,895 (124,230 in Yolo County + Solano County: 271,258 * 29% for the proportion located within the Air Quality district = 78,665) + Placer County: total of 229,334 (263,603 * 87% for Air Quality district) + El Dorado County: total of 96,998 (142,644 * 68% for Air Quality district). The proportion of drivers in each district also corresponds to the residential population proportions used in the calculation of weights for the region as a whole.

grams of ozone precursors.[58] [This includes a total of Reactive Organic Gas (ROG) emissions (2.30 grams per trip for light duty passenger cars plus two categories of light duty trucks) plus Oxides of Nitrogen (NOx) emissions (1.66 grams per trip for light duty passenger cars and light duty trucks) emissions, based on 2011 models of EMFAC2007 V2.3.] EMFAC2007 V2.3 is the latest update to the EMFAC model. 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 **71,962 grams** of ozone precursors (18,172 single trips avoided x 3.96 grams per trip).

5. Convert to tons.[59] For the Sacramento nonattainment area as a whole, this translates to an estimated total of **0.08 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 weighted Sacramento nonattainment area, although there were 0.3% respondents,[60] the number of trips reduced was **0**.

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 0.0 tons of ozone precursors, which, when subtracted from the 0.08 tons reduced on Spare The Air days, yields:

8. Result: **0.08 tons of ozone precursors reduced per Spare The Air day in 2011.**

[58] Estimates were based on the Summer On-Road Inventory - EMFAC 2007 v 2.3 model, for the summer of 2011, provided by Charles Anderson, Program Coordinator, SMAQMD Planning & Emission Inventory & Hao Quinn, SMAQMD Associate Air Quality Engineer in an email dated November 4, 2011. The total ROG tons for a combined total of light duty passenger cars and two categories of light duty trucks (8.1 + 2.04 + 4.58) 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. 3,509,210 for light duty passenger cars + 729,340 for light duty trucks1 + 1,566,110 for light duty trucks2) in order to obtain the average grams per trip. The same process was used to calculate NOx grams per trip (4.91 +1.44 + 4.3) x 2000 x 454 / (3,509,210 + 729,340 + 1,566,110). ROG grams and NOx grams were then combined (2.30 + 1.66) to obtain 3.96 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.

[59] There are 907,200 grams in a ton.

[60] This year the same methodology as was adopted last year was used for Control day interviews: namely, reducers were classified as those respondents who said they drove less the previous day for air quality reasons, and who were not seasonal driving reducers (see 2010 Seasonal Driving Reduction Report for a complete description.) This year there were three Control day respondents who said they drove less for air quality reasons, but as none were in Sacramento Metropolitan AQMD (two were in Yolo-Solano AQMD and one in El Dorado County AQMD), when results were weighted for the nonattainment area as a whole, they totaled less than one (but rounded up to one), or 0.3% of the weighted total number of respondents in the region, and the mean number of trips they reduced was 0. Last year it was recommended that any future evaluations take into account the effect of seasonal trip reductions on Control day interviews for this particular analysis, but none of this year's Control reducers were also seasonal reducers and so they are included.

The procedure just described is summarized in the following table:

Sacramento Nonattainment Area	Percent of Respondent Drivers Who Drove Less for Air Quality Reasons[61]	X Number of Licensed Drivers in Sacramento Nonattain-ment Area (1,453,768 Total)	X Mean Number of Single Trips Reduced Per Day	X 3.96 Grams of Ozone Precursors Per Trip (EMFAC 2007 V2.3) 2011 summer	= Estimated Tons per Day of Ozone Precursors Reduced
Spare The Air Days	**0.5% (2 / 411[62])**	**7,269**	**x 2.5 = 18,172**	**71,962 grams**	**0.08 tons**
Control Days	**0.3% (1 /343)**	**4,361**	**0**	**0 grams**	**0 tons**
Estimated Tons of Ozone Precursors Reduced Per Day: (STA Day Reductions – Control Day Reductions)					***0.08 tons***

2011 Emissions Reduction Estimate: Sacramento Metropolitan AQMD

19 ➢ ***Air pollution in Sacramento Metropolitan AQMD was also reduced by an estimated 0.08 tons of ozone precursors per Spare The Air day.***

Sacramento Metropolitan AQMD	Percent of Respondent Drivers Who Drove Less for Air Quality Reasons	X Number of Licensed Drivers in Sacramento Metropolitan AQMD (924,541 Total)	X Mean Number of Single Trips Reduced Per Day	X 3.96 Grams of Ozone Precursors Per Trip (EMFAC 2007 V2.3) 2011 summer	= Estimated Tons Per Day of Ozone Precursors Reduced
Spare The Air Days	**0.8% (2 /267)**	**7,396**	**x 2.5 = 18,491**	**73,224 grams**	**0.08 tons**
Control Days	**0.0% (0 / 259)**	**0**	**0**	**0 grams**	**0tons**
Estimated Tons of Ozone Precursors Reduced Per Day: (STA Day Reductions – Control Day Reductions)					***0.08 tons***

[61] 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 - Q12b).

[62] Please note that the weighted total number of completed interviews for the Sacramento nonattainment area as a whole (i.e. 411) is less than the total number of completed interviews within all air districts (838 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 65%, followed by Yolo-Solano AQMD (15% of area population), Placer County APCD (14%), and El Dorado County AQMD (6%). In other words, the number of completed interviews for the weighted Sacramento nonattainment area is not the simple sum of the number of completed interviews in each individual air district.

Comparison with Previous Years: Sacramento Metropolitan AQMD (only)

A comparison of estimated emission reductions[63] due to the Spare The Air program from 2001 to 2011 present in the Sacramento Metropolitan Air Quality Management District[64] are presented in the next table. It is important to point out that the factors that contribute to the estimates (i.e. differences in yearly estimated ROG and NOx emission factors per trip,[65] 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.

It can be seen that the average estimated emission reductions per Spare The Air day ranged from a low of .03 tons in 2008 to a high of 1.32 tons in 2001. **Looking across the years, it can be seen that the Spare The Air program has been successful in reducing the amount of ozone precursors in the air each year.**

Year	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*
Sacramento Metropolitan AQMD: ***Average emission reductions attributed to Spare The Air (tons)***	**1.32**	**0.99**	**0.26**	**0.42**	**0.25**	**0.26**	**0.06**	**0.03**	**0.19**	**0.07**	**0.08**

SUMMER 2011 HEALTH ISSUES

Objectives

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 2011. More specific objectives are to:

k. 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,
l. 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 2011,

63 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, 2011 summer, Charles Anderson, Program Coordinator, SMAQMD Planning & Emission Inventory & Hao Quinn, SMAQMD Associate Air Quality Engineer in an email dated November 4, 2011.

64 Over the years, reductions could often not be calculated for Placer County APCD, Yolo-Solano AQMD, and El Dorado County AQMD as there were often no significant differences between Spare The Air and Control day drivers who said they drove less. (See footnote 3.) Once again, the air quality districts might want to consider dropping this prerequisite. Also, as El Dorado County AQMD respondents were not interviewed in every survey year, it is not feasible to compare the tons reduced from the entire nonattainment area over the years. Emission reductions for just the Sacramento Core Region (excluding El Dorado County AQMD) were not included in previous years' evaluations.

65 It should be noted that over the years the motor vehicle emissions have lowered, because cleaner burning vehicles produce fewer emissions.

m. 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
n. compare the incidence of reported health problems among the four air quality districts in the Sacramento nonattainment area (Sacramento Metropolitan AQMD, Yolo-Solano AQMD, Placer County APCD, and El Dorado County AQMD).

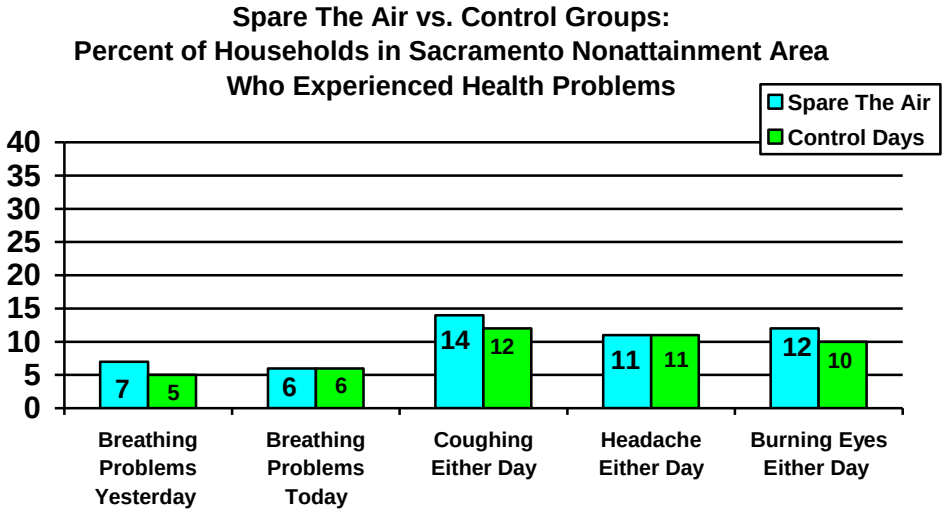
Results

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

20 ➢ ***Seven percent (7%) of households in the entire Sacramento nonattainment area reported breathing problems on Spare The Air days in 2011. This was not significantly different from the 5% of households interviewed on Control days. Nevertheless, correcting for Control day responses, this translates into 17,384 additional households that were affected specifically by ozone pollution on Spare The Air days during the summer of 2011.***

There were five questions in the survey that asked about the respiratory health of individuals within the household. First, respondents in both Spare The Air as well as Control groups were asked whether they or someone in their household had experienced breathing difficulties the day before the interview or on the day of the interview. In addition they were asked if anyone experienced coughing, headaches, or burning eyes either day. Results from the weighted Sacramento nonattainment area as a whole[66] are presented in the next chart. It can be seen that although some Spare The Air day respondents experienced more health problems than did Control day respondents, none of the differences were statistically significant. Seven percent (7%) of Spare The Air respondents day experienced breathing problems the previous day, compared with 5% of Control day respondents. On the day of the interview 6% in both groups had breathing problems. Coughing, headaches, and burning eyes were experienced by both groups of households at levels ranging from 10% to 14%.

[66] Includes a cell phone sample of 61completed interviews conducted in Sacramento County only. See the methodology section for a complete description of the sampling design.



We have estimated that there are 869,181 households in the Sacramento nonattainment area;[67] therefore, the 7% of respondents who claimed that someone in their household experienced breathing problems on a Spare The Air day translates into 60,843 households. The 5% of respondents who reported breathing problems on Control days translates into 43,459 households. Correcting for Control days through subtraction, this means that **17,384 households experienced breathing problems due specifically to ozone air pollution on Spare The Air days in 2011**.

Year-To-Year Comparisons

21 ➢ ***There are fewer health problems now than 12 years ago: the percentage of households experiencing breathing difficulties in the Sacramento Core Region on Spare The Air days has declined to 8% from a high of 15% in 2000.***

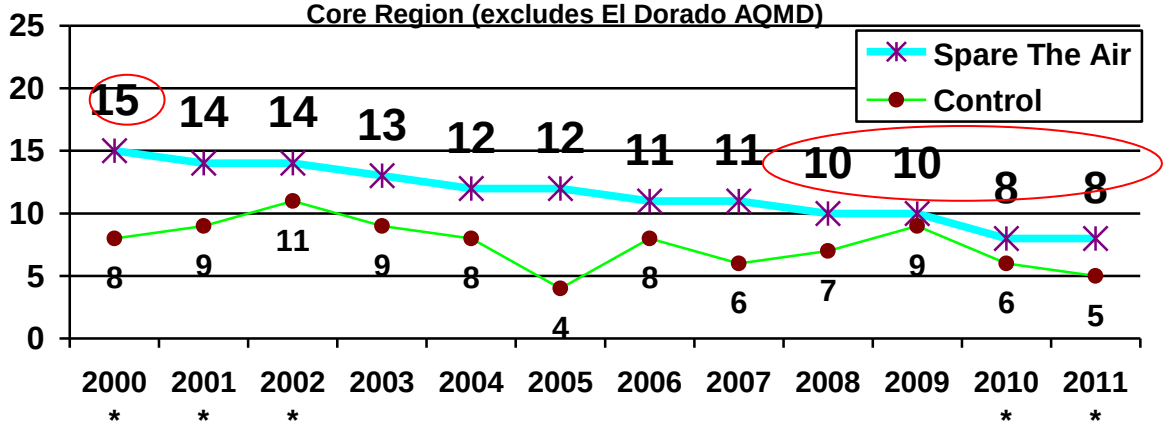
Because respondents in El Dorado County AQMD were not interviewed in all evaluation years, their responses were excluded and results for just the Sacramento Core Region were reweighted and recalculated. The percentages of respondents who said someone in their household had trouble breathing the previous day[68] on Spare The Air and Control days from 2000 to the present are plotted in the next graph. It can be seen that air quality in the area must be improving as the percentage of households experiencing breathing difficulties has declined significantly from 2000 (15%) to the present (8%). This year and last year's levels are also significantly lower than the 12-year average of 12%. In terms of Control day interviewing, the percentage of households who reported breathing difficulties has remained

[67] The measure used for households was the "total housing units" column, in order to be consistent with previous years' evaluations. This year the dataset includes a new column for "total households", not previously present. Reference: State of California, Department of Finance, E-5 Population and Housing Estimates for Cities, Counties, and the State, 2010-2011, with 2010 Benchmark. Sacramento, California, May 2011. Online source http://www.dof.ca.gov/research/demographic/reports/estimates/e-5/2011-20/documents/E-5_2011_Internet_Version.xls . The estimated number of households for the entire Sacramento nonattainment area is **869,181** ((Sacramento Metropolitan AQMD: 556,973) + (Placer County APCD: 153,730* 87% = 133,745) + (Yolo-Solano AQMD: 118,438 (Yolo: 75,326; Solano (Dixon, Rio Vista & Vacaville: 43,112)) + (El Dorado County AQMD: 88,272* 68% = 60,025)).

[68] The additional health-related questions of breathing today, coughing, headache, and burning eyes have only been asked since 2004.

relatively stable and consistently lower, with annual results not differing from the 12-year average of 8%, with the exception of 2005. The fact that the gap between Spare The Air day and Control day households who experience breathing difficulties is narrowing is a further indication that air quality during the summer months is improving. In fact, 2011 was relatively good as far as air quality was concerned – only five Spare The Air days were called, and on these, the actual AQI for ozone did not exceed 150[69] on any of the five days. (Advisories about Spare The Air days are based on forecasted estimates. In other words, Spare The Air advisories were issued for days when the actual air quality turned out not to have been as poor as was expected, and this translates into households with fewer breathing problems.)

Year-to-Year Comparison of Percent of Respondents Whose Households Experienced Breathing Difficulties Yesterday: Sacramento Core Region (excludes El Dorado AQMD)



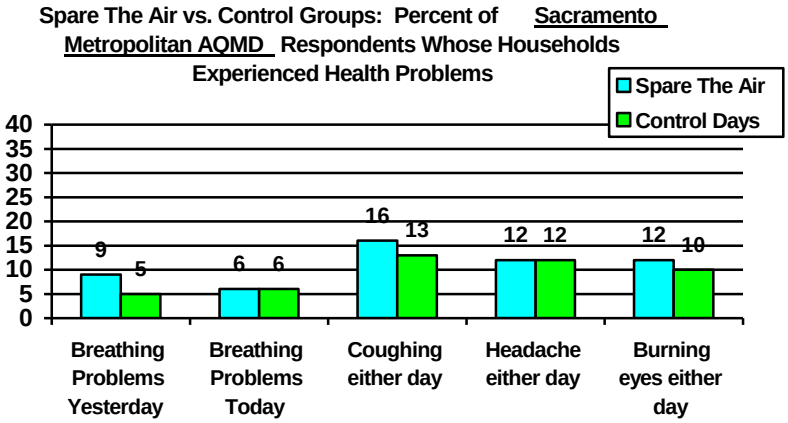
* circles indicate a significant decline in the percentage of Spare The Air day households from 2000 compared to 2008 - 2011. In addition, 2010 and 2011 percentages were significantly lower than in 2000 - 2002.

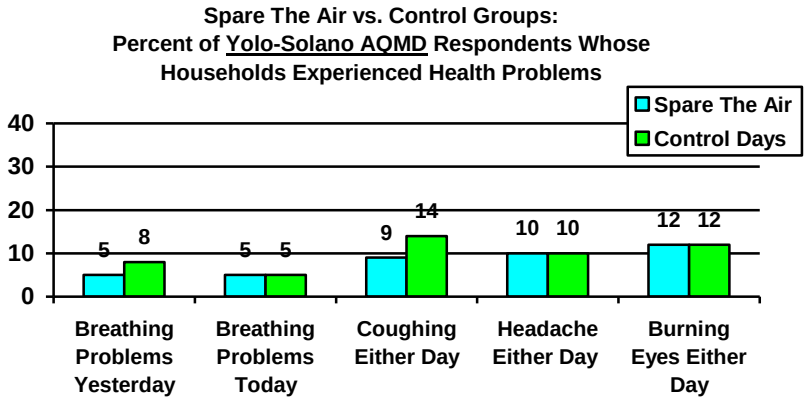
Individual Air Quality Districts

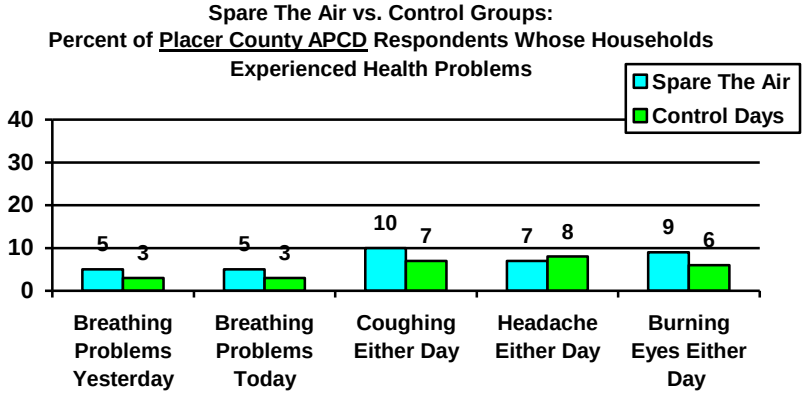
22 ➢ ***There were no significant differences between Spare The Air day and Control day households in terms of health problems in any of the individual air districts.***

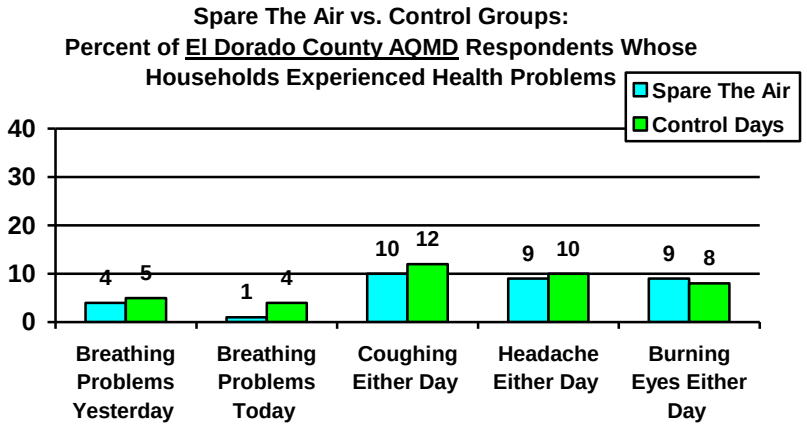
The next four graphs indicate the percentages of household health issues experienced by Spare The Air and Control groups of respondents in each of the individual air quality districts. There were no significant differences between the two groups in any of the air districts, indicating once again that air quality is improving in the region.

[69] 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) by Sonoma Technology Inc. Estimates are derived by 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 the AQI will be 150 or higher the next day, a Spare The Air advisory is issued. The Spare The Air season runs from May through October of each year. On the five Spare The Air days of 2011, the actual AQI ranged between 97 and 147.


Spare The Air vs. Control Groups: Percent of Sacramento Metropolitan AQMD Respondents Whose Households Experienced Health Problems
Spare The Air
Control Days
40
35
30
25
20
15
10
5
0
9
5
6
6
16
13
12
12
12
10
Breathing Problems Yesterday
Breathing Problems Today
Coughing either day
Headache either day
Burning eyes either day


Spare The Air vs. Control Groups:
Percent of Yolo-Solano AQMD Respondents Whose Households Experienced Health Problems
Spare The Air
Control Days
40
30
20
10
0
5
8
5
5
9
14
10
10
12
12
Breathing Problems Yesterday
Breathing Problems Today
Coughing Either Day
Headache Either Day
Burning Eyes Either Day


Spare The Air vs. Control Groups:
Percent of Placer County APCD Respondents Whose Households Experienced Health Problems
Spare The Air
Control Days
40
30
20
10
0
5
3
5
3
10
7
7
8
9
6
Breathing Problems Yesterday
Breathing Problems Today
Coughing Either Day
Headache Either Day
Burning Eyes Either Day



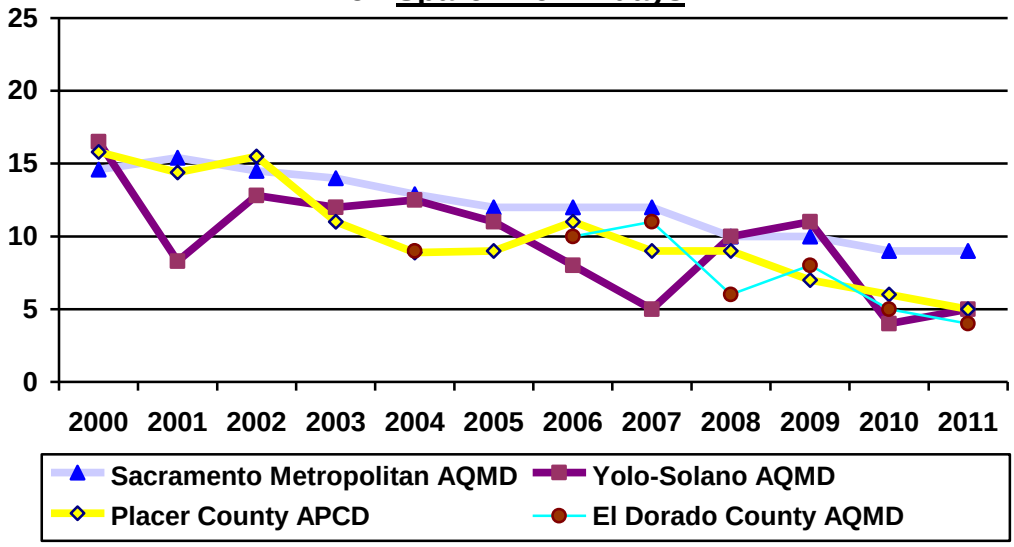
Air Quality Districts: Year-To-Year Comparisons

23 ➢ ***Summer air quality is improving in all the individual air districts as there are fewer households experiencing breathing problems on Spare The Air days now than 12 years ago.***

The percentages of households who reported breathing problems on Spare The Air days from 2000 to the present in the individual air districts are presented in the next graph. El Dorado County AQMD results are only available for seven years. Results indicate an overall decline in the percentage of households experiencing breathing difficulties from 2000 to the present, although year-to-year comparisons are often not statistically significant. This reflects the improving air quality in the region.

In Sacramento Metropolitan AQMD, the 9% with breathing problems this year is significantly lower than the 15% in the years 2000 to 2002. Similarly, in Yolo-Solano AQMD the 5% this year is significantly lower than the 17% reported in 2000. In Placer County APCD, the 5% of households reporting breathing difficulties this year is significantly lower than the 15% to 16% experienced in 2000 to 2002.

Year-to-Year Comparison of Percent of Respondents Whose Households Experienced Breathing Problems on Spare The Air days



2011 SUMMERTIME SEASONAL TRIP REDUCTIONS

Objectives

There is a group of residents who usually drive less to help improve air quality in the region during the summer months who are not necessarily included in emission reduction estimates as they may have not driven less on a Spare The Air day because they have already reduced their driving behavior. Specific objectives of the current report are to:

o. 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,
p. compare the percentage of seasonal trip reducers and the mean number of trips they have avoided over the past 12 years, and
q. estimate emission reductions from these voluntary driving reducers.

Results

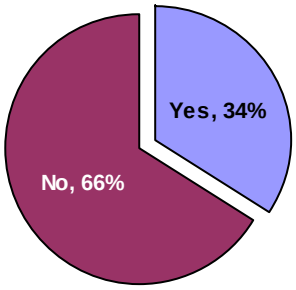
Seasonal Driving Reducers

24 ➢ ***Over one third (34%) of all respondents in the Sacramento nonattainment area are seasonal reducers – that is, they usually reduce the amount of driving they do during the summer to avoid adding to air pollution.***

Seasonal driving reducers are defined as those who say they usually reduce the amount of driving they do during the summer months to avoid adding to air pollution. In large part, they can be considered as Spare The Air "success" stories – they understand that driving is a significant contributor to air pollution particularly through the summer months, and have

incorporated it into their actual driving behavior by reducing the number of vehicle trips they make during the summer. It can be seen in the next pie chart that for the entire Sacramento nonattainment area as a whole, 34% of all[70] respondents in 2011 can be considered seasonal driving reducers.

Percent Who Usually Reduce Driving in the Summer for Air Quality Reasons: 2011 Results for the Sacramento Nonattainment Area



Number of Reduced Trips

25 ➢ ***Summertime driving reducers made fewer trips than those who did not change their driving habits during the summer: on average, they made .4 fewer trips per day. However, the difference between reducers and non-reducers was not statistically significant.***

This 34% of seasonal reducers reported that they entered their cars the previous day an average of 2.9 times. The 66% who said they did not usually reduce the amount of driving they do during the summer self-reported entering their cars more frequently, an average of 3.3 times. **On average, seasonal driving reducers made 0.4 fewer trips per day** than did non-reducers (3.3 – 2.9 = 0.4 trips). However, an analysis of variance indicated that these means were not significantly different from each other [71] - in other words, even though drivers who said they usually drive less in the summer actually entered their vehicles fewer times than those who do not reduce, the difference was not significant.

	Seasonal Driving Reducers: Mean # Times Entered Vehicle	*Non-Reducers: Mean # Times Entered Vehicle*	*Statistically Significant Difference?*
Sacramento Nonattainment Area (weighted results)	**2.9**	**3.3**	**No**

[70] For the purpose of this report, results from respondents interviewed following Spare The Air days have been combined with those interviewed on Control days as the issue under discussion applies equally to both groups of respondents. In addition, a cell phone sample of 61 completed interviews in Sacramento Metropolitan AQMD augmented the RDD landline sample. See the methodology section for a complete description of the sampling design.

[71] $F(1, 732) = 1.52$, $p = .22$.

Seasonal Trip Reduction: Estimated Emission Reductions

26 ➢ In 2011, nearly half a million (494,281) drivers were seasonal reducers. The number of trips they avoided translated into a reduction of 0.9 tons per day of ozone precursors during the summer of 2011.

Respondents who habitually drive less in the summer represent a substantial proportion of the general population of drivers who are helping to improve air quality in the region by reducing emissions. The 34% of 2011 seasonal reducers translates into nearly half a million drivers (494,281) in the entire nonattainment area.[72] Although not officially recognized, it is possible to estimate the amount of ozone precursors that have been reduced due to respondents habitually driving less during the summer for air quality reasons. The methodology is the same as that used to estimate emission reductions on Spare The Air days[73] and is summarized in the next table. **It can be seen that the average of 0.4 of a trip per day that seasonal reducers avoided translates into an estimated 0.9 tons of ozone precursors reduced per summer day in 2011.**

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 Nonattain-ment Area (1,453,768 Total)	x Mean Number of Trips Reduced Per Day Compared to Non-Reducers	x 3.96 Grams of Ozone Precursors Per Trip (EMFAC 2007 V2.3) 2011 Summer Model [74]	= Estimated Tons[75] Per Day of Ozone Precursors Reduced
Spare The Air and Control Day Interviews Combined	**34%**	**494,281**	**x 0.4 = 197,712**	**782,940 grams**	**0.9 tons**

[72] The number of drivers in the Sacramento nonattainment area for 2011 was estimated, using the number of driver licenses by county for 2010, obtained from the California Department of Motor Vehicles database http://www.dmv.ca.gov/about/profile/dl_outs_by_county.pdf , and calculating the percentage increase, based on county population figure increases from 2010 to 2011 listed at: http://www.dof.ca.gov/research/demographic/reports/estimates/e-1/documents/E-1_2011_Internet_Version.xls. The estimated number of licensed drivers for the total Sacramento nonattainment area in 2011, therefore, was 1,453,768: Sacramento Metropolitan AQMD: total 924,541 + Yolo-Solano: total of 202,895 (124,230 in Yolo County + Solano County: 271,258 * 29% for the proportion located within the Air Quality district = 78,665) + Placer County: total of 229,334 (263,603 * 87% for Air Quality district) + El Dorado County: total of 96,998 (142,644 * 68% for Air Quality district). The proportion of drivers in each district also corresponds to the residential population proportions used in the calculation of weights for the region as a whole.

[73] For a full explanation of the methodology, see report titled "Estimated Emission Reductions during the 2011 Spare The Air Season", Naomi E. Holobow & Dawn Morley, November 2011.

[74] Estimates were based on the Summer On-Road Inventory - EMFAC 2007 v 2.3 model, for the summer of 2011, provided by Charles Anderson, Program Coordinator, SMAQMD Planning & Emission Inventory & Hao Quinn, SMAQMD Associate Air Quality Engineer in an email dated November 4, 2011. The total ROG tons for a combined total of light duty passenger cars and two categories of light duty trucks (8.1 + 2.04 + 4.58) 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. 3,509,210 for light duty passenger cars + 729,340 for light duty trucks1 + 1,566,110 for light duty trucks2) in order to obtain the average grams per trip. The same process was used to calculate NOx grams per trip (4.91 +1.44 + 4.3) x 2000 x 454 / (3,509,210 + 729,340 + 1,566,110). ROG grams and NOx grams were then combined (2.30 + 1.66) to obtain 3.96 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.

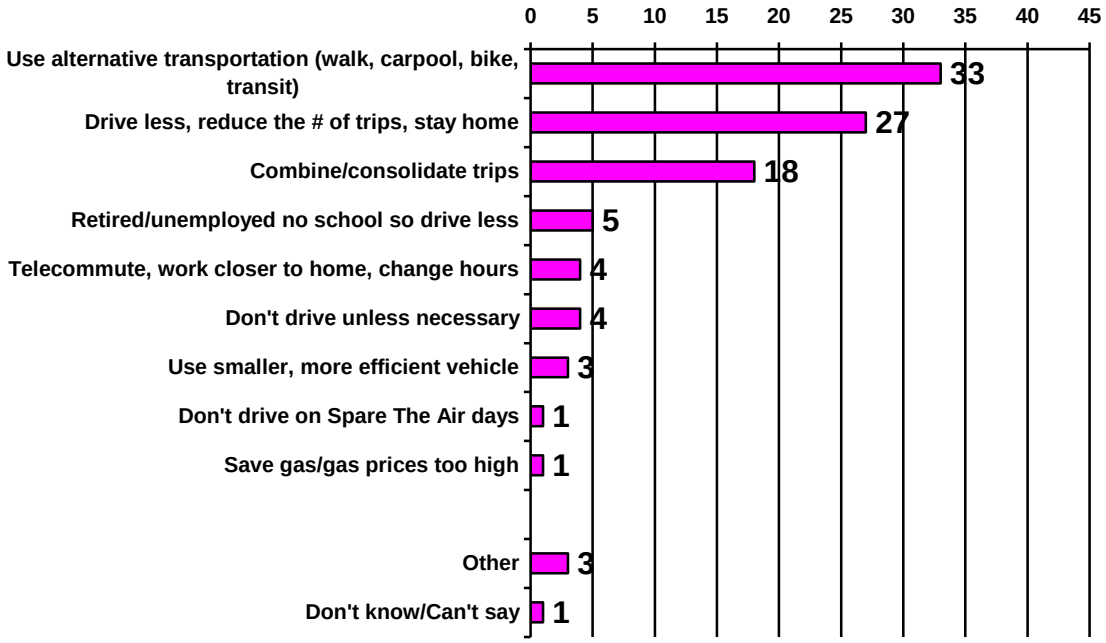
[75] There are 907,200 grams in a ton.

How They Reduce Driving

27 ➢ Seasonal reducers used alternative transportation, made fewer trips, stayed home, or planned and consolidated errands in order to reduce the amount of driving they did during the summer months.

Those who said they usually reduce the amount of driving during the summer months were then asked to elaborate. Verbatim comments were captured and later categorized, and the results are presented in the next graph. It can be seen that a third (33%) of seasonal reducers said they used alternative transportation, which included biking, walking, carpooling, or using public transit. Over a quarter (27%) said they made fewer trips or just stayed home. A further 18% said they regularly combined or consolidated their trips so as to go out less. Five percent (5%) were either retired, unemployed, or as parents or teachers, they didn't have to drive to school during the summer. Four percent (4%) were able to telecommute and the same percent (4%) said they just didn't drive unless it was absolutely necessary. Three percent (3%) used a smaller, more efficient vehicle. One percent (1%) specifically mentioned that they avoided driving on Spare The Air days, 1% said that gas prices kept them from driving, 3% gave "other" responses and 1% could not specify further.

How Have You Reduced Driving This Summer?



A few representative comments[76] from those who used alternative transportation are listed below.

- "Bike riding more; going to the Bay area I took the train and BART.

[76] The complete transcripts of all responses are available in the statistical file.

- By not driving. Walk to work.
- Carpool with two persons.
- We walk more or ride bikes and part of it is that the kids are not in school.
- We try to walk as much as we can, like to grocery store cause it's close, doing errands on the same day.
- We're in a convenient location that if we need to, we walk.
- Walking, cycling and carpooling.
- Ride bicycle to work during the summer.
- Much more bicycling.
- In terms of driving less and driving shorter distances. Organizing shopping trips. Carpooling and one household member walks to work.
- I walk more, bike more, plan my driving trips more accurately, ride share with people, changed my shopping patterns, mail catalog delivery instead of shopping, household using intelligence on how to continue to decrease driving, no family summer vacation.
- I will take the Placer Commuter Express to work.
- I walk or take public transportation.
- I take the bus to work. I don't know if we drivers do it to save air or gas prices.
- Doing less errands and riding my bike instead of driving to the store.
- I take regional transit.
- I rode the light rail.
- Carpooling, reduce number meetings.
- I have carpooled with friends. I have found different ways to travel such as biking.
- Carpool, walk to park and stores.
- I drive a mile and a half to the park and then I take the bus to Sacramento.
- I carpool with my wife.
- Carpooling with spouse, and worked more hours on a 4 day work week.
- Bicycle or motorcycle.
- By walking more."

A few representative comments from those who said <u>they drove less, reduced the number of trips, or stayed home</u> are listed below.

- "Do not make as many shopping trips.
- I stay inside during the summertime.
- I would not go out as much because of the heat.
- I try to hardly drive. Just every once and awhile.
- I haven't made as many trips to the store or shopping.
- Trying to drive only once a day.
- Staying home more, reducing trips and not going to movies as much.
- We minimize our trips into town.
- We don't drive around and cruise around.
- Plan trips to be shorter.
- I just don't get out much. I don't like the heat.
- I don't visit my mom as much.
- I don't go, I limit my trips to the grocery store. I usually go once a week. And I drive to the doctor's office and that's about it. I don't usually drive anymore.
- Driving less frequently.
- Driving less...drive in the evening.
- Didn't drive long distances, didn't go out a lot, minimize everything.
- By doing more activities at home.
- Decreased driving."

A few representative comments by those who <u>combined trips</u> include:

- "Arrange my errands in a row to leave the house only once.

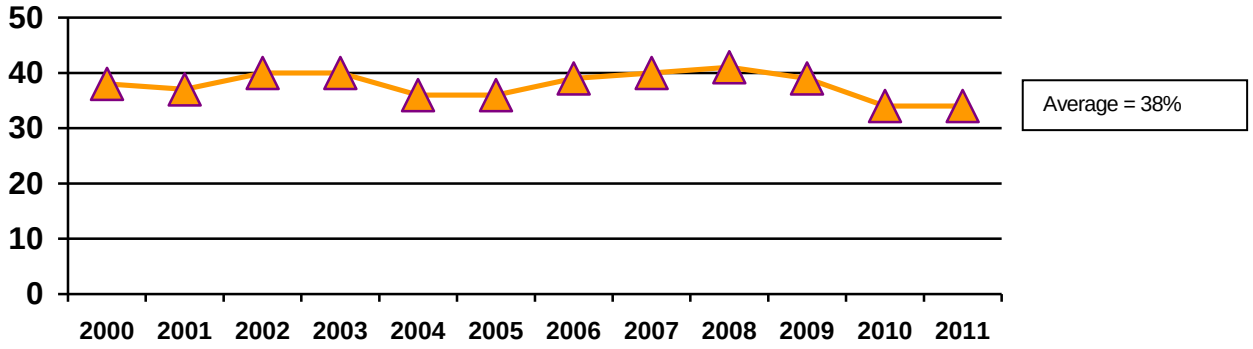
- Combining trips and making fewer ones.
- Do multiple errands in one trip instead of going out several different times.
- I batch up my errands usually before or after work.
- I do my errands early in the morning and in a circle and I am done. I start at point A and complete my errands and I come home.
- I try to consolidate all my trips into one.
- I try to do all things in one area instead of making different trips. And I tend to walk my kids to school instead of driving.
- Make sure that if I go to Auburn I get all things done that I need to in one day.
- Making trips that are necessary. Making one trip to do everything in one trip instead of several trips.
- My husband and I try to put our chores together and try to do them in one trip. Consolidate.
- Plan my trips in one loop so I don't take several trips.
- Try and lump as many errands together as possible so one trip takes care of more things.
- We go to the bank, grocery store, and shopping all in one trip for 10 miles.
- Try to bundle trips."

Year-To-Year Comparisons

28 ➢ This year's percentage of seasonal reducers in the Sacramento Core Region, is not significantly different from the 12-year average of 38%.

The year-to-year analysis excludes respondents from El Dorado County AQMD as they were not interviewed in evaluations prior to 2004. As can be seen in the next graph, the percentage of respondents who said they usually reduce their driving during the summer to avoid adding to air pollution has remained relatively stable, with a 12-year average of 38%. The high of 41% reached in 2008 was significantly greater than the 34% of this year and last year. However, 2010 and 2011 results do not differ significantly from the 12-year average.

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



29 ➢ The 12-year average number of trips avoided on an average summer day by seasonal reducers was 0.7. This varied from a high of 1.1 trips avoided in 2001 and 2003 to a low of .4 trips in 2008 and this year.

The next table shows the average numbers of self-reported trips made by seasonal reducers versus non-reducers[77] from 2000 to the present. It can be seen that the average number of additional trips avoided by seasonal reducers (that is, the difference between reducers and non-reducers) ranged from .4 of a trip per day to just over 1 trip per day. **In other words, a substantial subset of the population of respondents in the Spare The Air evaluations habitually reduce the amount of driving they do during the summer months.** Some of these individuals may not qualify as episodic reducers on specific Spare The Air days for methodological reasons (i.e. they may not have driven "less" on a specific Spare The Air day because they already had reduced their driving as much as they could.)

This is the only year in which the difference in trips avoided was not significant,[78] but at least the difference was in the right direction – namely, that those who said they normally reduce the number of trips they make in the summer to help air quality entered their car fewer times than did non-reducers.

Year	*Seasonal Driving Reducers: Mean # Times Entered Vehicle*	*Non-Reducers: Mean # Times Entered Vehicle*	*Difference (Mean Number of Daily Single Trips Avoided by Seasonal Reducers*	*Statistically Significant Difference?*
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
2008	2.9	3.3	0.4	Yes
2009	2.6	3.4	0.8	Yes
2010	2.9	3.8	0.9	Yes
2011	2.9	3.3	0.4	No

[77] Excludes El Dorado County AQMD results. The very first question of the survey asked respondents "Thinking just about yesterday, how many different TIMES did you get into a car, truck, or van to drive?" This was before any mention of air quality or Spare The Air or driving habits was asked and therefore is likely a fairly accurate self-report.

[78] In 2008, the difference between the two groups of respondents was significant, even though the number of trips made by both groups was exactly the same as this year. This was because the sample sizes (total number of completed interviews) in 2008 were greater. (This year Control day interviewing had to be stopped prior to completing 300 interviews in each air district because the winter program of Spare The Air ("Check Before You Burn") began and we did not want to create respondent confusion. Interviewing in October could not take place on every "matched" day of the week due to rain.)

APPENDIX A

Landline versus Cell phone RDD samples: Sacramento Metropolitan AQMD

Naomi E. Holobow, Ph.D. & Dawn Morley

November, 2011

Background

In previous years, telephone interviews were conducted with samples of residents throughout the air basin, using Random Digit Dialing (RDD) procedures in which a computer generates phone numbers from known landline area codes and prefixes. Up to now, these samples have only included landline numbers and not cell phone numbers. Although Spare The Air interviewing has always set quotas based on geography, age, and gender, it is becoming more and more difficult to survey young adults in the U.S. aged 18 to 34 years via a landline-only frame. As cell phone use in the United States grows, the potential for coverage bias in typical RDD telephone surveys will also increase if they continue to exclude most cell phone numbers.

Sampling Design

This potential for coverage error stemming from the growth of the cell phone-only population has led to the development of dual frame, random digit dial (RDD) surveys. In these dual frame designs, a traditional sample from the landline RDD frame is supplemented with an independent sample from the banks of numbers designated for cellular phones. For the purpose of the 2011 Spare The Air evaluation, a dual-frame overlapping sampling design was conducted in Sacramento Metropolitan AQMD only. Up to 400 interviews were to be conducted with respondents drawn from a typical Random Digit Dialed (RDD) landline frame, and up to 100 additional interviews were to be conducted with respondents from an RDD cellular frame, following Spare The Air days. This type of overlapping design means that some households could have landlines in addition to cell phones, but questions about cell phone and regular/wired phone use were added to try and estimate the percentage of "cell phone-only" households.

The total number of interviews actually completed was less than the maximum budgeted: 206 from the landline sample and 61 from the cell phone sample, for a combined total of 267.

Methodology

The purpose of the current report was to use "key" questions in the survey to compare results from the landline sample with those from the cell phone sample of respondents. If no significant differences were found, it was reasoned that the cell phone results could be combined with the landline results and would better represent the entire population within Sacramento County. The key questions involved driving behavior, whether they seasonally reduced driving during the summer, their employment status, and awareness of Spare The Air (Q5, Q9, Q10, Q12a and Q12b).

Results

Results are presented in the next table. It can be seen that the cell phone sample of respondents did not differ from the landline sample on any of the key questions. The two groups were therefore combined for all analyses in the report of the 2011 evaluation of the Spare The Air campaign.

	Percentage of Respondents in the Sacramento Metropolitan AQMD		
Question	***RDD Landline Sample (N=206)***	***RDD Cell phone Sample (N=61)***	***Statistically Significant Difference?***
Q5. Yesterday, did you drive your car, truck or van:			
Same	**57%**	**59%**	
Less	**24%**	**15%**	
More	**19%**	**26%**	**No**
Q9. Do you usually reduce the amount of driving you do during the summer to avoid adding to air pollution?			
Yes	**37%**	**34%**	
No	**63%**	**66%**	**No**
Q10. Are you presently employed?			
Yes	**62%**	**62%**	
No	**38%**	**38%**	**No**
Q.12a. Do you recall being asked not to drive yesterday because our area was experiencing a period of unhealthy air?			
Yes	**22%**	**18%**	
No	**78%**	**82%**	**No**
Q12b. In the past two days have you heard, read, or seen any advertise-ments or news broadcasts about Spare The Air, or poor air quality, or requests to drive less in this area?			
Yes	**36%**	**33%**	
No	**64%**	**67%**	**No**

In order to try and estimate the percentage of cell phone-only households, questions were asked about landline and cell phone use. The next table indicates that nearly two-thirds (64%) of the cell phone sample also had landline phones at home, which means that in Sacramento County, **the percentage of cell phone-only households could be as high as 36%.** Among those contacted via a landline, 91% also had a cell phone. Respondents who had both cell phones and landlines were then asked whether they used one or the other more frequently when at home. Results, also presented in the next

table, indicate that about a third (34%) use their cell phones more, 40% use their landline phones more, and the remaining 26% use them both equally.

	Percentage of Respondents in the Sacramento Metropolitan AQMD		
Question	***RDD Landline Sample (N=206)***	***RDD Cell phone Sample (N=61)***	***Those with both landlines and cell phones (N=225)***
Q16. Do you also have a regular/wired telephone in your home?			
Yes		**64%**	
No		**36%**	
Q17. Do you also have a cellular telephone?			
Yes	**91%**		
No	**9%**		
Q.18. When you are home, are you more likely to use your cellular phone, your regular/wired phone, or do you use them both?			
Use Cellular More			**34%**
Use Regular/Wired More			**40%**
Use Both Equally			**26%**

cell phone-only households

Because of the potentially high incidence of **cell phone-only** households (i.e. 36% in this, albeit, small sample of respondents) it is suggested that an RDD cell phone sample be included in further reports, and for all the air districts in the Sacramento nonattainment basin. Augmenting a landline sample with a cell phone sample will better represent the population as a whole; despite the fact that the survey industry is still addressing and has not reached conclusions on some of the research, weighting, and analytic issues inherent with such dual-frame sampling designs.

APPENDIX B

2011 BEHAVIOR & ATTITUDE TELEPHONE TRACKING SURVEY
FINAL QUESTIONNAIRE ~ APRIL 12, 2011

	Methods:
Field Dates:	• STA episodes days: May – September, 2011 Control days: September, 2011
Sample Size:	• up to 2,500 completed interviews - up to 1,300 completes on STA episodes days - 400 Sacramento Co. residents + up to 100 cell phone residents - 300 Yolo/Solano Co. residents - 300 Placer Co. residents - 200 El Dorado Co. residents - 1,200 completes on Control days - 300 Sacramento Co. residents - 300 Yolo/Solano Co. residents - 300 Placer Co. residents - 300 El Dorado Co. residents
Unit of Analysis:	• Household
Sampling Frame:	• RDD landline, RDD cell phone Sacramento County
Budgeted Length of Interview:	• 4 minutes (Average)

• SURVEY INTRODUCTION & REQUEST •

Hello, my name is _____ with Aurora Research Group, a regional public opinion research firm. We are conducting a 4-minute survey regarding your transportation activities yesterday. I would like to interview the youngest male driver aged 18 or older who is home now. [If none available: I would like to interview the youngest female driver aged 18 or older who is home now.] Would that be you? [IF NOT, ASK FOR PERSON WHO IS, REPEAT INTRODUCTION]
Do you have 4 minutes for a confidential interview? Your opinions are very important.

[IF NECESSARY, CONTINUE WITH: This is research, NOT SALES. Your telephone number WILL NOT BE associated with your answers. Your answers will be summarized with other peoples' answers; results will not be reported individually.]

[IF RESPONDENT ASKS FOR NAME OF SURVEY SPONSOR, SAY] In order not to bias your responses, we will be glad to tell you the name of the sponsoring agency at the conclusion of the survey.

• DATA FROM SAMPLE •

DB1. Zip Code

DB2. Geographic Population

1) Sacramento County
2) Yolo/Solano County
3) Placer County
4) El Dorado County

DB3A. Geo/Location Population **QUOTAS for landline sample**
[NOTE TO PROGRAMMER: The data files are divided by the category names and should be coded appropriately. Interviews should be completed proportionally. In other words, categories 20, 21, 22, and 23 should be called simultaneously as well as 30 and 31; similarly for 41 to 46.]

10) Sacramento – Sacramento
(STA QUOTA: 400 completes)
(CONTROL QUOTA: 300 completes)

20) Yolo/Solano – Davis (95616) (20%)
(STA QUOTA: 61 completes)
(CONTROL QUOTA: 61 completes)

21) Yolo/Solano – Woodland (95695, 95776), West Sacramento (95605, 95691), Others 95606, 95607, 95612, 95618, 95627, 95653, 95679, 95694, 95698, 95937) (41%)
(STA QUOTA: 125 completes)
(CONTROL QUOTA: 125 completes)

22) Yolo/Solano – Vacaville (30%)
(95687, 95688)
(STA QUOTA: STA 90 completes)
(CONTROL QUOTA: 90 completes)

23) Yolo/Solano – Dixon/Rio Vista (8%)
(95620, 945741)
(STA QUOTA: 24 completes)
(CONTROL QUOTA: 24 completes)

30) Placer – Auburn and vicinity (22%)
(95602, 95603, 95658, 95663)
(STA QUOTA: 66 completes)
(CONTROL QUOTA: 66 completes)

31) Placer – Roseville (95661, 95678, 95747), Lincoln (95648), Rocklin, Loomis, Other South Placer (95650, 95677, 95765, 95746, 95681) (78%)
(STA QUOTA: 234 completes)
(CONTROL QUOTA: 234 completes)

41) El Dorado – El Dorado Hills (95762) (23%)
(STA QUOTA: 46 completes)
(CONTROL QUOTA: 69 completes)

42) El Dorado – Placerville (95667) (31%)
(STA QUOTA: 63 completes)
(CONTROL QUOTA: 95 completes)

43) El Dorado – Shingle Springs (95682) (24%)
(STA QUOTA: 49 completes)
(CONTROL QUOTA: 73 completes)

44) El Dorado – Georgetown (95634) (2%)
(STA QUOTA: 4 completes)
(CONTROL QUOTA: 6 completes)

45) El Dorado – Cool (95614) (3%)
(STA QUOTA: 6 completes)
(CONTROL QUOTA: 9 completes)

46) El Dorado – Other (95613, 95619, 95623, 95633, 95635, 95651, 95664) (16%)
(STA QUOTA: 32 completes)
(CONTROL QUOTA: 48 completes)

• CATI GENERATED •

DB4. STA / Control Date

DB5. Day of Week (for STA or Control Day)

1) Sunday
2) Monday
3) Tuesday
4) Wednesday
5) Thursday
6) Friday
7) Saturday

DB6. Type

1) Spare the Air
2) Control

• SURVEY BEGINS •

I want to inform you that this call may be monitored for quality purposes.

• SCREENING QUESTIONS •

ASK ALL RESPONDENTS

Q1. First, did you drive a car, truck or van within the last week?
[If no, thank and seek interview with another driver within the household]

1) Yes
2) No

Q2. To assist in our analysis, please tell me which of the following categories contains your age:

1) 18 to 24
2) 25-34
3) 35-44
4) 45-54
5) 55-64
6) 65 or over
8) Refused

03. Gender [BY OBSERVATION]

1) Male
2) Female

Data for quotas taken from the American Community Survey.[79]

1200 COMPLETES FOLLOWING A **SPARE THE AIR EPISODES** DAYS

400 COMPLETES **SACRAMENTO COUNTY** RESIDENTS
204 FEMALES (51%) / 196 MALES (49%), OF THESE WE NEED

FEMALE 18 - 24 NO LESS THAN **9%**	**18**	Completes
MALE 18 - 24 NO LESS THAN **10%**	**20**	Completes
FEMALE 65 PLUS NO MORE THAN **13%**	**27**	Completes
MALE 65 PLUS NO MORE THAN **9%**	**18**	Completes

300 COMPLETES **YOLO/SOLANO COUNTY** RESIDENTS
150 FEMALES (50%) / 150 MALES (50%) , OF THESE WE NEED

FEMALE 18 - 24 NO LESS THAN **9%**	**13**	Completes
MALE 18 - 24 NO LESS THAN **11%**	**17**	Completes
FEMALE 65 PLUS NO MORE THAN **12%**	**17**	Completes
MALE 65 PLUS NO MORE THAN **9%**	**12**	Completes

300 COMPLETES PLACER COUNTY RESIDENTS
153 FEMALES (51%) / 147 MALES (49%), OF THESE WE NEED

FEMALE 18 - 24 NO LESS THAN **8%**	**12**	Completes
MALE 18 - 24 NO LESS THAN **8%**	**12**	Completes
FEMALE 65 PLUS NO MORE THAN **16%**	**24**	Completes
MALE 65 PLUS NO MORE THAN **13%**	**19**	Completes

200 COMPLETES **EL DORADO COUNTY** RESIDENTS
100 FEMALES (50%) / 100 MALES (50%), OF THESE WE NEED

FEMALE 18 - 24 NO LESS THAN **8%**	**8**	Completes

[79] http://factfinder.census.gov/servlet/STTable?_bm=y&-geo_id=05000US06067&-qr_name=ACS_2009_5YR_G00_S0101&-ds_name=ACS_2009_5YR_G00_&-redoLog=false

MALE 18 - 24 NO LESS THAN **8%**	**8**	Completes
FEMALE 65 PLUS NO MORE THAN **13%**	**13**	Completes
MALE 65 PLUS NO MORE THAN **11%**	**11**	Completes

1200 COMPLETES ON **CONTROL** DAYS

300 COMPLETES **SACRAMENTO COUNTY** RESIDENTS
153 FEMALES (51%) / 147 MALES (49%), OF THESE WE NEED

FEMALE 18 - 24 NO LESS THAN **9%**	**14**	Completes
MALE 18 - 24 NO LESS THAN **10%**	**15**	Completes
FEMALE 65 PLUS NO MORE THAN **13%**	**20**	Completes
MALE 65 PLUS NO MORE THAN **9%**	**13**	Completes

300 COMPLETES **YOLO/SOLANO COUNTY** RESIDENTS
150 FEMALES (50%) / 150 MALES (50%), OF THESE WE NEED

FEMALE 18 - 24 NO LESS THAN **9%**	**13**	Completes
MALE 18 - 24 NO LESS THAN **11%**	**17**	Completes
FEMALE 65 PLUS NO MORE THAN **12%**	**17**	Completes
MALE 65 PLUS NO MORE THAN **9%**	**12**	Completes

300 COMPLETES PLACER COUNTY RESIDENTS
153 FEMALES (51%) / 147 MALES (49%), OF THESE WE NEED

FEMALE 18 - 24 NO LESS THAN **8%**	**12**	Completes
MALE 18 - 24 NO LESS THAN **8%**	**12**	Completes
FEMALE 65 PLUS NO MORE THAN **16%**	**24**	Completes
MALE 65 PLUS NO MORE THAN **13%**	**19**	Completes

300 COMPLETES **EL DORADO COUNTY** RESIDENTS
150 FEMALES (50%) / 150 MALES (50%), OF THESE WE NEED

FEMALE 18 - 24 NO LESS THAN **8%**	**12**	Completes
MALE 18 - 24 NO LESS THAN **8%**	**12**	Completes
FEMALE 65 PLUS NO MORE THAN **13%**	**20**	Completes
MALE 65 PLUS NO MORE THAN **11%**	**17**	Completes

Q15. Language of interview [BY OBSERVATION]

1) English
2) Spanish

• DRIVING BEHAVIOR •

[ALL RESPONDENTS]

Q4. 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.]

_____ Specific number
999) Don't know/Refused

Q4.1 CATI-CALC – NUMBER OF TIMES IN CAR

0) None
1) 1 time
2) 2 times
3) 3 times
4) 4 times
5) 5 times
6) 6 times
7) More than six times
9) Don't know/Refused

[ALL RESPONDENTS]
Q5. 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]?

1) Same
2) Less
3) More
8) Don't know/Refused [Thank and TERMINATE]

[PROGRAMMER: For each q5=8, we will need a replacement survey]: Note that any surveys answered to this point do not count as a completed interview.

[Q5=2: THOSE WHO DROVE LESS]
Q6. What did you do instead of driving? Did you . . .

[CATEGORIES FOR CODING]
1) Yes
2) No
9) Don't know/Refused

6a. Delay any trip to another day?
6b. Carpool instead of driving alone?
6c. Use transit instead of driving?
6d. Walk instead of driving?
6e. Bicycle instead of driving?
6f. Work at home instead of driving to work?

[Q5=2: THOSE WHO DROVE LESS]
Q7a. Why did you make that change or those changes? [OPEN ENDED-do not read; use for coding only]

1) Air quality/ reduce pollution / concerned about smog/ Spare the Air campaign
2) Weather related reason [skip to Q9]
3) Some other reason [skip to Q9]
4) Multiple INCLUDING air quality related
5) Multiple NOT including air quality related [skip to Q9]
6) High gas prices

9) Don't know/Refused [skip to Q9]

[Q5=2: AND Q7A= 1 OR 4: THOSE WHO DROVE LESS FOR AIR QUALITY REASONS]

Q7b. 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: "Give me a reasonable approximation --a round number."]

[NOTE TO INTERVIEWER: VALIDATE RESPONSES OVER 12 TIMES]

_____ Specific number
999) Don't know/Refused

Q7b2 CATI-CALC – NUMBER OF SINGLE TRIPS AVOIDED

0) None
1) 1 single trip
2) 2 single trips
3) 3 single trips or more
9) Don't know/Refused

[Q7B> 0 AND Q7B < 999, FOR THOSE WHO ESTIMATED THE NUMBER OF SINGLE TRIPS ELIMINATED]

Q7c. And of the [# from q7b] SINGLE trips you avoided, how many were <u>commute</u> trips to or from work? [NOTE TO PROGRAMMER: Prevent the interviewers from entering a number that is higher than q7b]

_____ Specific number
999) Don't know/Refused

[**NOTE to programmer**: if q7c response is greater than 4, we need to add a prompt to confirm that the person is talking about commute trips. It should read as follows:]

q7c2. When I say commute trips, I am talking about single trips between home and work and NOT work-related trips or trips made on a break or lunch hour. So, just to confirm, you avoided _____ (number from response) single commute trips yesterday between your work and home?

If yes, accept answer and continue
If no, accept revised answer, and continue

[This should be q7c or q7c2 for q7c>4]

Q7c3 CATI-CALC – NUMBER OF SINGLE <u>COMMUTE</u> TRIPS AVOIDED

0) None
1) 1 single trip
2) 2 single trips
3) 3 single trips or more
9) Don't know/Refused

[ALL RESPONDENTS]
Q9. Do you usually reduce the amount of driving you do during the summer to avoid adding to air pollution?

1) Yes
2) No
8) Refused/Don't Know/ "depends"

[ASK RESPONDENTS WHO USUALLY REDUCE Q9=1]
Q9b. And how have you reduced driving this summer to decrease air pollution?
50) Record response
99) Non-response (Don't know / Refused)

[ALL RESPONDENTS]
Q10. Are you presently employed?

1) Yes
2) No

[Q10=1: EMPLOYED ONLY]
Q11a. Do you USUALLY…[READ CATEGORIES]
[NOTE: A carpool is 2 or more adults riding together.]

1) Commute to work by driving alone?
2) Commute to work by carpooling, transit, biking or walking?
3) Work out of your home?
4) Work out of your vehicle (such as in delivery, service or sales), or
5) Combine commuting with working out of your vehicle?
9) [DO NOT READ] Other/Don¹t know/Refused]

[q11a=2: pooler, transit, bike or walk only]
Q11b. Is that carpooling, transit, biking or walking?

1) Carpooling
2) Transit
3) Biking
4) Walking
9) [DO NOT READ] Other/Don¹t know/Refused]

Q11c. CATI-CALC Commute status as

1) Not a commuter (11a = 3, 4, or 5)
2) Solo driver commuter (11a is 1)
3) Alternative mode commute [q11a=2]
9) Unable to calculate (q11a=9 or q11b=9)

[ALL RESPONDENTS]
[NOTE TO PROGRAMMER: Please rotate the order of q12a and q12b for every other interview, asking both questions of everyone]
q12. CATI-CALC: Q12 question order

1) Q12a asked first
2) Q12b asked first

[ALL RESPONDENTS]
Q12a. Do you recall being asked not to drive yesterday because our area was experiencing a period of unhealthy air?

1) Yes
2) No, do not recall that
8) Don't know/Refused

[ALL RESPONDENTS]
Q12b. 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?

1) Yes
2) No, do not recall that
8) Don't know/Refused

[ALL RESPONDENTS]
q12e CATI-CALC: Previous CAP Reducer Status

1) Reducer [q5=2 drove less and (q7a=1 or Q7a=4) drove less because of STA]
2) Non-reducer [all other combos]

[ALL RESPONDENTS]
q12f. CATI-CALC: Combined Reducer Status

1) Reducer [(q12b = 1) aware of STA message and q5=2 drove less and (q7a=1 or Q7a=4) drove less because of STA]
2) Non-reducer [all other combos]

[ALL RESPONDENTS]
Q13a. Did you, or did anyone else in your household have trouble breathing yesterday because of unhealthy air yesterday?

1) Yes
2) No
8) Don't know/Don't recall/Refused

Q13b. And what about today? [PROMPT IF NECESSARY: Did you, or did anyone else in your household have trouble breathing today because of unhealthy air?]

1) Yes
2) No
8) Don't know/Don't recall/Refused

Q14. Did you or did anyone else in your household experience any of the following conditions either yesterday or today because of unhealthy air yesterday?

1) Yes
2) No
8) Don't know/Don't recall/Refused

RANDOMIZE
a. Coughing?
b. Headache?
c. Burning eyes?

[FROM SAMPLE]
CELLX. Landline RDD sample or cell phone RDD sample?
0) Landline
1) Cell phone

[READ TO ALL]
Finally, I'd just have a couple of questions about your telephone usage…

[ASK IF CELLX = 1 (CELL PHONE SAMPLE]
Q16. Do you also have a landline phone in your home?
[Interviewer, if needed: A land line is a regular/wired phone.]

1) Yes
2) No
8) Don't know/Don't recall/Refused

[ASK IF CELLX = 0 (LANDLINE SAMPLE]
Q17. Do you also have a cell phone?

1) Yes
2) No
8) Don't know/Don't recall/Refused

[ASK THOSE WHO HAVE BOTH CELL PHONE AND LANDLINE (Q16=1, Q17=1]
Q18. When you're at home, are you more likely to use your cell phone, your landline phone, or both equally?

[NOTE TO PROGRAMMER: Please alternate the order in which CELL PHONE and LANDLINE phone are presented in the question.]

[Interviewer, if needed: A land line is a regular/wired phone.]

1) Use Cellular more
2) Use Regular/wired more
3) Use both Equally
8) Don't know/Don't recall/Refused

THIS HAS BEEN A CONFIDENTIAL INTERVIEW CONDUCTED BY _____ AT AURORA RESEARCH GROUP. YOU MAY BE CALLED BY SOMEONE FROM AURORA TO VERIFY THAT THIS INTERVIEW WAS CONDUCTED. May I have just your first name for verification purposes? THANK YOU VERY MUCH FOR YOUR TIME.

IF ASKED, AT END OF SURVEY EXPLAIN THAT THIS SURVEY IS BEING CONDUCTED FOR:
Sacramento Metropolitan Air Quality Management District