



Evaluation of the 2010 Sacramento Region Spare The Air Campaign

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December 2010



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BACKGROUND & METHODOLOGY

Background

Spare The Air is a public outreach program that was created in 1995. Its goal is to engage the general public to voluntarily help reduce the amount of ozone air pollution. The Sacramento region has been designated a **severe ozone non-attainment area** by the U.S. Environmental Protection Agency (US EPA). The region fails to meet the federal health based 8-hour ozone standard¹, 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. 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. 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, e-mail Air Alerts, news broadcasts, the Spare The Air Web site, and the Weather Channel.

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

¹ The latest federal ozone health standard is .075 parts per million averaged over 8 hours. This standard began in 2008. From 1999 to 2007, the federal 8-hour ozone standard was .084 parts per million.



Spare The Air 2010 Season

The summer of 2010 appears to have been an anomalous year. Many variables occurred this season that were unique to 2010. They are summarized below, and then described in further detail.

- two of the declared Spare The Air days, September 29 & 30, were the latest Spare The Air days called in the campaign's 16-year history
- the largest viewed TV station in the Sacramento area, KCRA – Channel 3, changed its policy and stopped allowing the purchase of episodic Spare The Air commercials for the first time in the campaign's history
- the general media buy of TV and radio ended on August 29 and three of the six Spare The Air days occurred in September
- the general awareness media buy was \$26,000 less than in 2009, and although the episodic advisory buy increased by \$7,200, it bought fewer spots (25% fewer than in 2009)
- there was likely respondent fatigue to both advertising and survey polling during the summer due to an unprecedented amount of political ads and polling for the November mid-term elections
- improved air quality caused fewer high pollution levels

The summer of 2010 was relatively good as far as air quality was concerned - only six Spare The Air days were called². The season was unusual in the sense that half of the Spare The Air days were called in September, and the two called for on September 29 and 30 were the latest days ever. Generally one expects the hot weather to generate poor air quality much earlier in the summer.

When we examined the daily maximum ozone Air Quality Index (AQI), we found that the recorded actual AQI for ozone did not exceed the 150 threshold on four of the six Spare The Air days. In other words, Spare The Air alerts were issued for days when the actual air quality turned out not to have been as poor as was expected, as can be seen in the table below³.

Spare The Air date	Forecast AQI	Actual Maximum AQI	Health Level	Reporting Station of Actual Maximum AQI
July 16	154	129	Unhealthy for Sensitive Groups	Sacramento
July 17	151	100	Moderate	Placer
August 25	161	190	Unhealthy	Sacramento
Sept 3	161	161	Unhealthy	Sacramento
Sept 29	161	106	Unhealthy for Sensitive Groups	El Dorado and Yolo-Solano
Sept 30	151	84	Moderate	Placer

Media Buy

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

² The 6 Spare Air Days were July 16, July 17; August 25; September 3, September 29 and September 30.

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



General Media Buy

In 2010, 385 radio spots and 445 television spots (local and Comcast cable) were aired, as opposed to 1,760 radio (only) spots purchased in 2009⁴. The 2010 radio campaign was the same as that of 2009 – namely, the four commercials that were used were designed to create awareness of air quality issues and encourage listeners to sign up for Air Alert e-mail notifications by using humorous pets to deliver the message: “Spare The Air. If not for yourself, do it for the dog.” Unlike last year when radio spots ran from late May to September, this year’s general media was purchased from mid-June through August.

A general television commercial campaign was added in 2010, and television is significantly more expensive than radio. However, this year \$26,000 less than in 2009⁵ was spent on general media, and any cuts in budget affect outreach and advertising, which in turn affect awareness and action. Advertising costs were also higher because of competition caused by election ads which occurred throughout the summer, and therefore reduced the frequency of being shown. Further, the radio and television general awareness Spare The Air commercials were not broadcast in September, when half of the declared Spare The Air days occurred. Therefore any benefits of having dual media messages (general announcements and episodic advisories) were not realized during the three September Spare The Air days.

Specific Episodic Media Buy

This year, although approximately \$7,000 more was spent than last year on purchasing episodic advisories for each of the six Spare The Air days, the total number of advisories was less (259 in 2010 compared with 346 in 2009, a 25% reduction). The breakdown this year for episodic spending was:

“Grand Total Spend - \$43,509

Total season spot count tv/radio: 259, averaging \$168/spot

- Six total STA days covered in four media buys
 - 07/15-07/17 for 07/16 and 07/17 STA days
 - 63 total spots
 - 21 television spots (English and Spanish – NO KCRA; prime news time am, pm and midday)
 - 42 radio spots (prime drive time – am and pm)
 - 08/24-08/25 for 08/25 STA day
 - 41 total spots
 - 8 television spots (English and Spanish – NO KCRA; prime news time am and pm)
 - 33 radio spots (prime drive time – am and pm)
 - 09/02-09/03 for 09/03 STA day
 - 40 total spots
 - 10 television spots (English and Spanish – NO KCRA; prime news time am and pm)
 - 30 radio spots (prime drive time – am and pm)
 - 09/28-09/30 for 09/29 & 09/30 STA days
 - 115 total spots
 - 26 television spots (English and Spanish – NO KCRA; prime news time am and pm and midday)

⁴ E-mail message from Kari Miranda, Senior Account Supervisor, Katz & Associates, Inc. to Lori Kobza, Associate Communications & Marketing Specialist, Sacramento Metropolitan AQMD, dated November 23, 2010.

⁵ E-mail document “The Perfect Storm of 2010” from Lori Kobza, SMAQMD, November 15, 2010.



- 89 radio spots (prime drive time – am and pm)⁶

The largest viewed TV station in the Sacramento area, KCRA – Channel 3, changed its policy and stopped allowing the purchase of episodic Spare The Air commercials for the first time in the campaign's 16-year history. This also affected the reach and frequency of all purchased Spare The Air commercial time.

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 past, employer involvement was also measured but this year questions about employer involvement were dropped due to budget considerations. 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.⁷

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.⁸
4. Compare awareness of the Spare The Air campaign and driving reduction among the individual air quality management districts.
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.

⁶ E-mail message December 2, 2010 to Lori Kobza, SMAQMD Associate Communications & Marketing Specialist from Kari Miranda-Chapman, Senior Account Supervisor, Katz & Associates, Inc.

⁷ 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.

⁸ 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 EMFAC 2007 v 2.3 model, for the summer of 2010, provided by Charles Anderson, SMAQMD Program Coordinator, Planning & Emission Inventory & Steven Lau, SMAQMD Air Quality Planner, in an e-mail dated November 23, 2010. The total ROG tons for a combined total of light duty passenger cars and two categories of light duty trucks (8.08 + 2.0 + 4.31) 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. 3,154,100 for light duty passenger cars + 655,333 for light duty trucks1 + 1,409,190 for light duty trucks2) in order to obtain the average grams per trip. The same process was used to calculate NOx grams per trip (4.99 + 1.47 + 4.24) x 2000 x 454 / (3,154,100 + 655,333 + 1,409,190). ROG grams and NOx grams were then combined (2.50 + 1.86) to obtain 4.37 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.



Research Methodology

As has been done since the first evaluation in 1995, two groups of respondents were 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 days. This type of experimental design adjusts for any overstatements individuals might make about their reported driving reduction on Spare The Air days, 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.

Interviewing Strategy

For the third year in a row, a slightly different sampling strategy from years previous to 2008 was applied to keep survey costs down, and involved reducing the targeted number of completed interviews per air district. Using RDD (random-digit-dialed) procedures, telephone interviews were to be conducted with a maximum of 1,200 residents following Spare The Air days. The goal was to interview up to 400 drivers in Sacramento County (rather than 600 in years prior to 2008), 300 drivers in Yolo-Solano AQMD (instead of 500), 300 drivers in Placer County APCD (instead of 500), and 200 drivers in El Dorado County AQMD (instead of 400). Another group of 1,200 interviews (300 in each of the four air quality districts, rather than 400 in each in years prior to 2008) were to be conducted on "matching" (same day of the week as the STA interviews) non-Spare The Air Control days. The margin of error associated with a sample of 1,200 is $\pm 2.5\%$, at a 95% confidence level. Quotas were set to respect geographic area,⁹ age, and gender. Additionally, respondents were screened so that only those who had driven within the last week were interviewed.

Despite setting quotas and post-weighting the results according to population estimates within each air district, it must be stated that results do not include persons residing in households with no landline telephone. Land-line based random digit dialed (RDD) telephone sampling has been used since 1995, but with the increasing population of cell phone only households, **another sampling strategy may have to be adopted in the future in order to be assured that results can be generalized to the population as a whole.** The American Association for Public Opinion Research (AAPOR) has just released a report (2010) that 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."^{10, 11}

⁹ In addition to interviewing 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), quotas were set (based proportionally on current Census estimates) specifically in the Davis area so as to insure that Davis was not over-represented (previous research indicates that residents of Davis are more likely than those in other areas to participate in telephone surveys).

¹⁰ 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.

¹¹ There is also some evidence to suggest that landline-only samples of voters may skew the results toward Republicans. "The Growing Gap between Landline and Dual Frame Election Polls", by Scott Keeter, Leah Christian and Michael Dimock, Pew Research Center, November 22, 2010. Available online at <http://pewresearch.org/pubs/1806/growing-gap-between-landline-and-dual-frame-election-polls>.



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 two Spare The Air days in July, we completed 201 about the first day, and 155 about the second. The next Spare The Air day occurred only in late August, and so we decided to double the number of interviews, and completed 333 interviews. Then another day was called on September 3, and 227 interviews were completed. Unusually, two additional Spare The Air days were called at the end of September, and we reduced the number of completed interviews to 158 about the September 29 day, and 136 about the 30th.

Respondents

There were six Spare The Air days during the summer of 2010: Friday, July 16; Saturday, July 17; Wednesday, August 25; Friday, September 3; Wednesday, September 29; and Thursday, September 30. Interviewing took place the day following each of these. Control day interviewing took place on non-Spare The Air days that were matched in terms of the day of the week (Wednesday, Thursday, Friday and Saturday) of the actual Spare The Air days: September 15, 17, 18, and 25; and October 7, 8, 14, and 15.

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) of four of the five air quality management districts¹² within the Sacramento nonattainment area – Sacramento Metropolitan AQMD, Yolo-Solano AQMD, Placer County APCD, and El Dorado County AQMD. [Interviews with residents in El Dorado County AQMD were only conducted in 2004, 2006, 2007, 2008 and 2009; and were only conducted in 2006 in the Feather River AQMD.] Respondents included a total of **2,414 drivers**. (Only respondents who had driven a car, truck or van within the last week were interviewed.) Results for the Sacramento nonattainment area as a whole were weighted proportionally.¹³ The next table lists the number of completed interviews for each group along with their affiliated margins of error (at the most conservative level).

¹² Quotas were established (using the latest 2010 estimates of population size from the 2000 Census) for the four air districts (Sacramento Metropolitan, Yolo-Solano, Placer County and El Dorado County) as well as for gender and age in order to ensure that respondents were representative of the landline telephone population as a whole (cell phone only households could not be interviewed). 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). In order to avoid potential unbalanced and biased samples and to better ensure generalizability, quotas were set. There are too few residents in the nonattainment portion of the Feather River AQMD to interview.

¹³ Based on 2010 estimates from the 2000 US Census: State of California, Department of Finance, *E-1: State/County Population Estimates with Annual Percent Change-January 1, 2009 and 2010*. Sacramento, California, May 2010. Available online at: http://www.dof.ca.gov/research/demographic/reports/estimates/e-1/2009-10/documents/E-1_2010.xls. The total population in the entire Sacramento nonattainment area [including El Dorado AQMD] is 2,197,266: [Sacramento Metropolitan AQMD (66%) - 1,445,327; Yolo-Solano AQMD (15%) - 326,187 (this includes the total 202,953 from Yolo County and 123,234 from the Dixon, Rio Vista and Vacaville areas of Solano County); Placer County APCD (14%) - 301,979 (this figure represents the 87% of Placer County's 347,102 residents who do not live in zip codes north or east of Auburn), El Dorado AQMD (5%) - 123,773 (this figure represents 68% of El Dorado County's 182,019 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).



<i>Number of Completed Interviews (unweighted)</i>	<i>Spare The Air Days</i>	<i>Margin of Error</i>	<i>Control Days</i>	<i>Margin of Error</i>	<i>Total</i>	<i>Margin of Error</i>
Sacramento Metropolitan AQMD	394	+/- 4.9%	312	+/- 5.6%	706	+/- 3.7%
Yolo-Solano AQMD	297	+/- 5.7%	299	+/- 5.7%	596	+/- 4.0%
Placer County APCD	310	+/- 5.6%	312	+/- 5.6%	622	+/- 3.9%
El Dorado County AQMD	209	+/- 6.8%	281	+/- 5.9%	490	+/- 4.4%
Total Regional (Unweighted)	1,210	+/- 2.8%	1,204	+/- 2.8%	2,414	+/- 2.0%
Total Regional (Weighted)	597	+/- 4.0%	473	+/- 4.5%	1,070	+/- 3.0%

It can be seen in the previous table that a total of **1,210** interviews were conducted on days following Spare The Air episodes. Control day interviewing completed the targeted number of **1,204** interviews. When weighted, the total number of completed interviews was 597 following Spare The Air days, and 473 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 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.¹⁴

The Questionnaire

The main body of the questionnaire has remained the same for the past nine years in order to maintain consistency, although slight modifications have sometimes occurred, due to information needs. In 2002 a question about Spare The Air awareness that was worded by the Air Resources Board (ARB)¹⁵ was added and has been used every year since. All surveys were conducted using a Computer Assisted Telephone Interviewing (CATI) system. This year the four questions that dealt with employer encouragement on Spare The Air days were deleted in order to save on costs. The average interview lasted just under 4 minutes.

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.

¹⁴ Excluding El Dorado AQMD, the new proportions for the smaller Sacramento Core Region for 2010 are: 70% in Sacramento Metropolitan AQMD, 16% in Yolo-Solano AQMD, and 14% in Placer County APCD.

¹⁵ ARB memo dated April 26, 2002 by J. Weir, J. Lu, & E. Schreffler sent to J. Lamare, Cleaner Air Partnership.



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.

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 2010 SPARE THE AIR CAMPAIGN

Objectives

The specific objectives of the current section are to:

- a. measure awareness of the 2010 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 2010 Spare The Air campaign (correcting for Control days).

Results

General Awareness

- 1 ➤ *About four in ten (39%) respondents in the Sacramento region were aware of Spare The Air in general this year – they heard, read, or had seen the Spare The Air advertisements. This means that an estimated 857,000 residents in the Sacramento nonattainment area were aware of the 2010 Spare The Air campaign in general.*

In 2002, at the suggestion of the Air Resources Board (ARB), a question about general awareness of Spare The Air was introduced. Respondents interviewed following Spare The Air days were asked: “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 2010 general radio campaign was the same as that of 2009 – namely, the four commercials that were used were designed to create awareness of air quality issues and encourage listeners to sign up for Air Alert e-mail notifications by using humorous pets to deliver the message: “Spare The Air. If not for yourself, do it for the dog.” A general television commercial campaign was added in 2010. However, the media buy for both general radio and TV commercials ended on August 29, which was prior to three Spare The Air days that occurred in September.

This year, in the Sacramento nonattainment area as a whole, only 39% of respondents were aware of Spare The Air in general (weighted results¹⁶). Although this means that over three-quarters of a million (856,934) residents in the region¹⁷ were aware of Spare The Air during

¹⁶ See methodology section for a complete description of weighting methods.

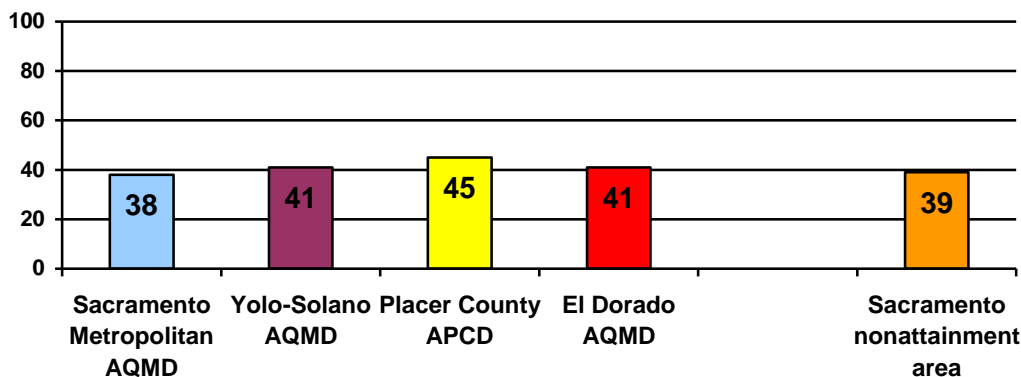
¹⁷ Based on 2010 estimates from the 2000 US Census: State of California, Department of Finance, *E-1: State/County Population Estimates with Annual Percent Change-January 1, 2009 and 2010*. Sacramento, California, May 2010. Available online at: http://www.dof.ca.gov/research/demographic/reports/estimates/e-1/2009-10/documents/E-1_2010.xls. The total population in the entire Sacramento nonattainment area [including El Dorado AQMD] is 2,197,266: [Sacramento Metropolitan AQMD (66%) - 1,445,327; Yolo-Solano AQMD (15%) - 326,187 (this includes the total 202,953 from Yolo County and 123,234 from the Dixon,



the 2010 season, which ran from May to October¹⁸, it also represents the lowest level of awareness since the introduction of the question in 2002 (see a later section in this report).

In the individual air quality districts, general awareness ranged from 38% in Sacramento Metropolitan AQMD to 45% in Placer County APCD; as seen in the next chart. None of the differences among air districts was statistically significant.

2010 General Awareness of Spare The Air (ARB wording)



Specific Awareness: Request not to drive

- 2 ➤ *About a fifth (19%) of respondents in the Sacramento region were aware of the specific request not to drive on Spare The Air days.*

Specific awareness of the request not to drive has been measured every survey year since 1995 with the following question: “Do you recall being asked not to drive yesterday because our area was experiencing a period of unhealthy air?” 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.”

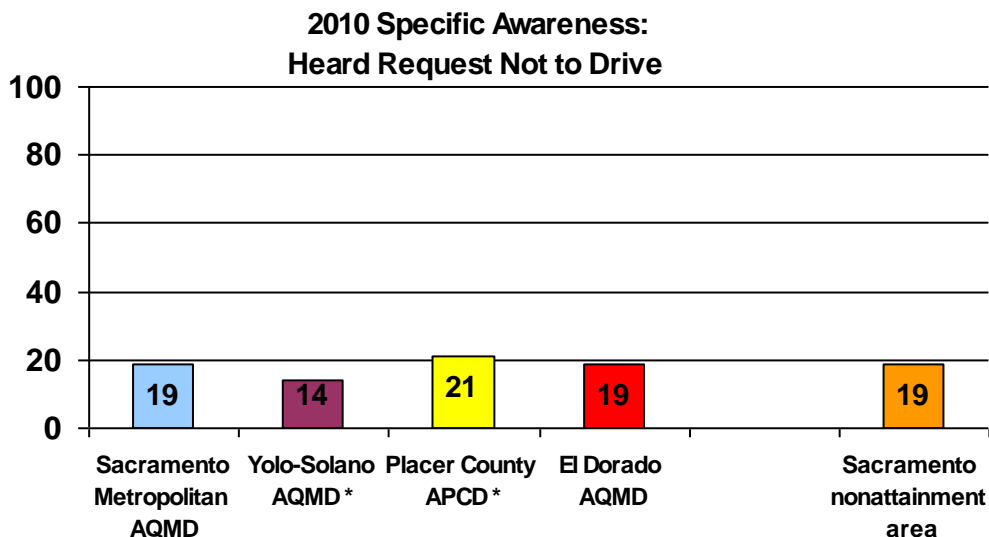
The next chart indicates that only 19% of respondents in the region as a whole (weighted results) were aware of this specific request not to drive. Specific awareness has always been statistically lower than general awareness, and that is still the case this year. Among the individual air quality districts, the level of awareness among Yolo-Solano AQMD

Rio Vista and Vacaville areas of Solano County); Placer County APCD (14%) - 301,979 (this figure represents the 87% of Placer County's 347,102 residents who do not live in zip codes north or east of Auburn), El Dorado AQMD (5%) - 123,773 (this figure represents 68% of El Dorado County's 182,019 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).

¹⁸ There were six Spare The Days in 2010: July 16 and 17; August 25; and September 3, 29, and 30. Interviewing took place following each day. It should be noted that the September 29 & 30 Spare The Air days were the latest ones called in the program's history; a possible indication of a different air quality season. See the methodology section for a brief description of the 2010 summer season.



respondents was significantly lower at 14% than that of Placer County APCD respondents (21%).

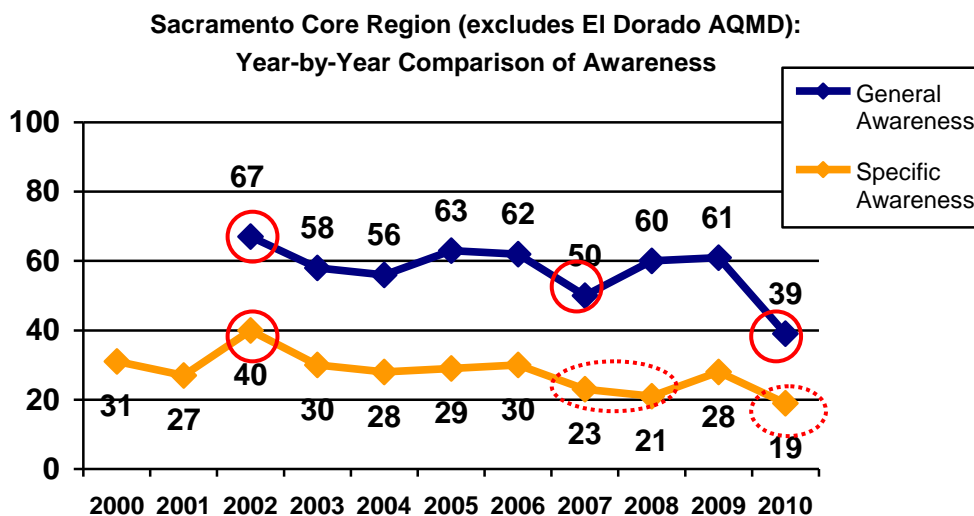


* indicates a statistically significant difference between the two air districts.

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

- 3 ➤ *Levels of general awareness in the Sacramento Core Region are significantly lower than in all previous evaluation years. Levels of specific awareness are also down, although not significantly different from 2007 and 2008. With numerous unique variables occurring this season, it is difficult to state that awareness levels are low due to a decline in the effectiveness of the Spare The Air program.*

The annual levels of general (since 2002) and specific awareness (since 2000) of Spare The Air for the Sacramento Core Region, which excludes El Dorado County AQMD as it was not included in all the evaluation years, are presented in the next chart. It can be seen that the levels of both types of awareness are the lowest this year relative to all other years. General awareness is statistically significantly lower than all previous years. Specific awareness, while not statistically different from levels in 2007 and 2008, is lower than last year and all years prior to 2007. It can also be seen that 2002 and 2007 were exceptional years – in 2002, both types of Spare The Air awareness were at their highest levels, and the season was one of the poorest in terms of air quality. In 2007, a comparatively mild season with relatively good air quality, levels were lower than all previous years. This year awareness is lower still, but the season was more similar to 2007 in terms of air pollution levels and weather patterns. Over time, and including results from this year, the average level of general awareness is 57% and that of specific awareness is 28%.



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

Declines in awareness may possibly be due to a drop in the effectiveness of the 2010 Spare The Air outreach and advertising campaign, but are more likely attributable to other factors – for example: unusually, three of the six Spare The Air days occurred in September rather than earlier in the summer. The season itself was relatively mild with regard to temperature and pollution levels – even though it was estimated that the Air Quality Index (AQI) on the 6 declared Spare The Air days would hit 150 or higher, only 2 of the days actually surpassed that trigger. In fact, for the last two Spare The Air days called in September (29th and 30th), the actual maximum AQIs for the region turned out to be only 106 and 84 respectively. (And in Yolo-Solano AQMD the maximum AQI on the 30th was only 37.) September 29 & 30 were the latest Spare The Air days called in the campaign’s history; and the 30th was a Friday before Labor Day, which may also have affected results. It is possible that respondents may be more likely to take action on Spare The Air days if in fact they experience soaring temperatures and poor air quality on the actual day in their particular air district. With the additional outreach tool of real-time data on the Current Conditions tab of the Spare The Air website (www.sparetheair.com), we know that individuals are using that information rather than the Spare The Air advisories to monitor their activities¹⁹.

Secondly, in terms of the media buy, this year \$26,000 less than in 2009²⁰ was spent on general awareness media, and any cuts in budget affect outreach and advertising, which in turn affect awareness and action. Advertising costs were also higher because of competition caused by election ads which occurred throughout the summer, and therefore reduced the frequency of being shown. Further, the radio and television general awareness Spare The Air commercials were not broadcast in September, when half of the declared Spare The Air days occurred. Therefore any benefits of having dual media messages (general announcements and episodic advisories) were not realized during the three September Spare The Air days. In terms of the media buy for each of the six episodic Spare The Air advisories, although \$7,200 more was

¹⁹ Although anecdotal, Lori Kobza of the Sacramento Metropolitan AQMD recounted instances whereby teachers and/or coaches would call her and her colleague on Spare The Air days to confirm whether they in fact needed to cancel their sports or other outdoor activities, because actual conditions seen on the website suggested otherwise. This was especially true on September 29 & 30.

²⁰ E-mail document “The Perfect Storm of 2010” from Lori Kobza, SMAQMD Associate Communications & Marketing Specialist, November 15, 2010.



spent this year than last year, it bought 25% fewer spots²¹. Further, the largest viewed TV station in the Sacramento area, KCRA – Channel 3, changed its policy and stopped allowing the purchase of episodic Spare The Air commercials for the first time in the campaign’s 16-year history. This also affected the reach and frequency of all purchased Spare The Air commercial time.

Another factor could have been the sampling strategy. Land-line based random digit dialed (RDD) telephone sampling has been used since 1995 (see Methods section for a complete description), but with the increasing population of cell phone only households, another sampling strategy may have to be adopted in the future in order to be assured that results can be generalized to the population as a whole. The American Association for Public Opinion Research (AAPOR) has just released a report (2010) that 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.”²² Further, there is some evidence to suggest that landline-only samples of voters skew the results toward Republicans.²³

It is also possible that there was a general respondent fatigue to both advertising and surveying due to the vast number of political ads and the “proliferation” of polls²⁴ that were conducted during the pre-election summer before the November mid-term election.²⁵

Year-To-Year Comparisons by Air District

- 4 ➤ *Year to year comparisons indicate that levels of awareness in all air districts were at their highest in 2002 and at their lowest this year. Year-to-year results in Placer County APCD have been the most variable.***

The individual air district annual levels of general and specific awareness are presented in the next four graphs. (El Dorado County AQMD residents were not interviewed in 2002, 2003, or 2005). It can be seen, first of all, that both types of awareness were at their highest levels in 2002 in all the air districts evaluated.

In Sacramento Metropolitan AQMD, as can be seen below, there was a significant drop in both types of awareness in 2007; and again this year. The general awareness average over time in Sacramento Metropolitan AQMD is 61%; the average for specific awareness is 29%.

²¹ E-mail message December 2, 2010 to Lori Kobza, SMAQMD Associate Communications & Marketing Specialist from Kari Miranda-Chapman, Senior Account Supervisor, Katz & Associates, Inc.

²² 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.

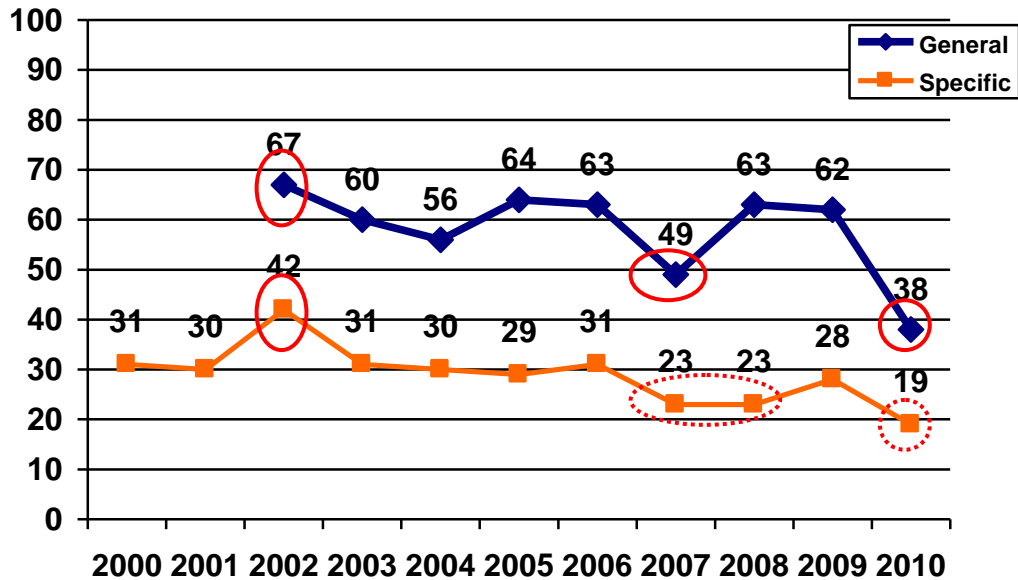
²³ "The Growing Gap between Landline and Dual Frame Election Polls", by Scott Keeter, Leah Christian and Michael Dimock, Pew Research Center, November 22, 2010. Available online at <http://pewresearch.org/pubs/1806/growing-gap-between-landline-and-dual-frame-election-polls>.

²⁴ http://www.huffingtonpost.com/2010/11/08/pollsters-raise-alarm-ina_n_780705.html

²⁵ Anecdotally, we know that people were publicly discussing their frustration with the large quantity of “ROBO” calls from candidates and propositions on the ballot.

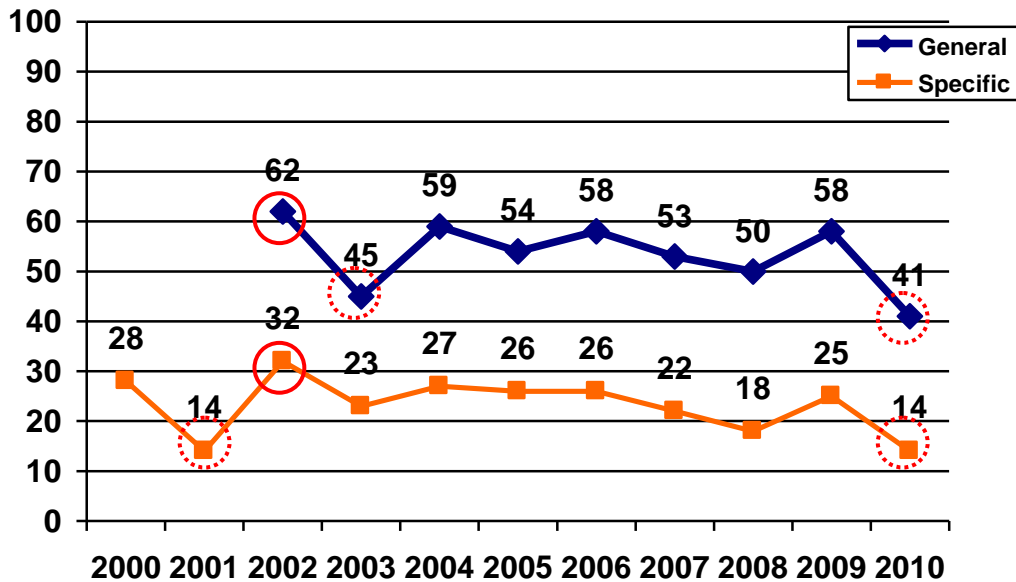


**Awareness: Sacramento Metropolitan AQMD
 Year-to-Year Comparisons**



In Yolo-Solano AQMD, this year's level of general awareness was about the same as that of 2003. The average over time is 53%. In terms of specific awareness, this year's level of 14% last occurred in 2001. The average over time for specific awareness is 23%.

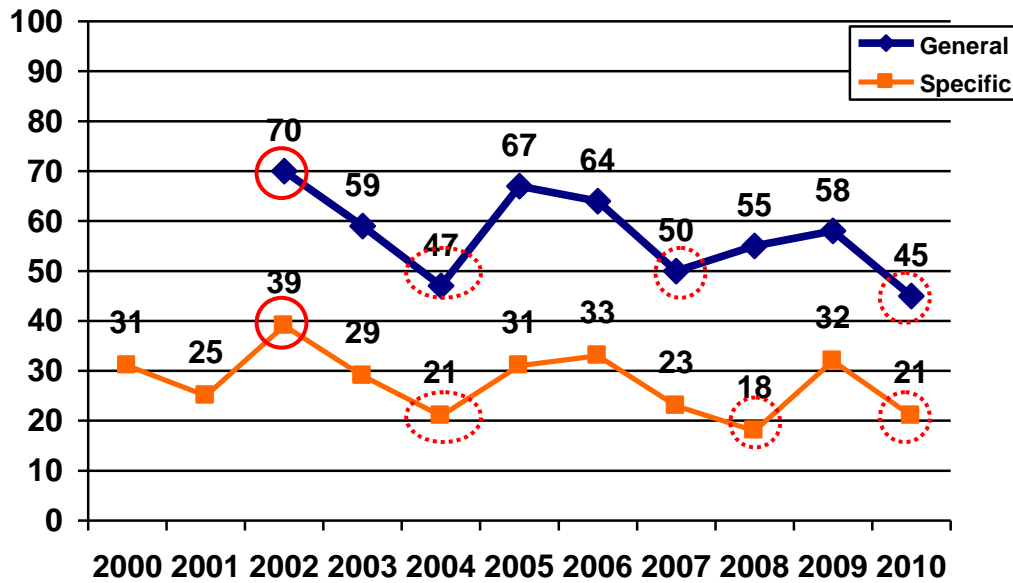
**Awareness: Yolo-Solano AQMD
 Year-to-Year Comparisons**



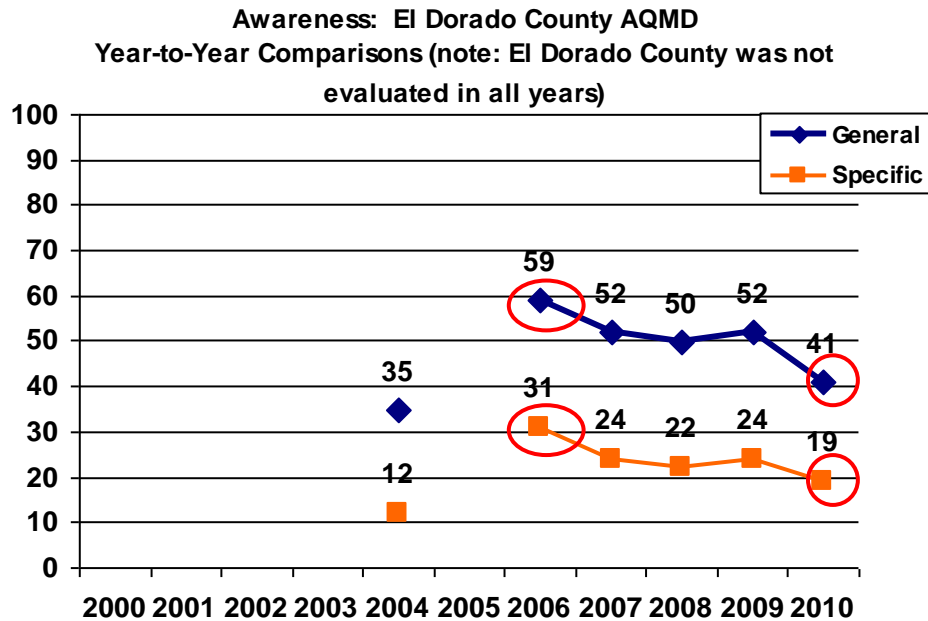


Results have been the most variable in Placer County APCD from one year to the next. The average level of general awareness in Placer County APCD is 57%; and that of specific awareness is 28%. (Note that only the largest differences are circled below.)

**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 48%; and the average for specific awareness is 22%.



Spare The Air Versus Control Days

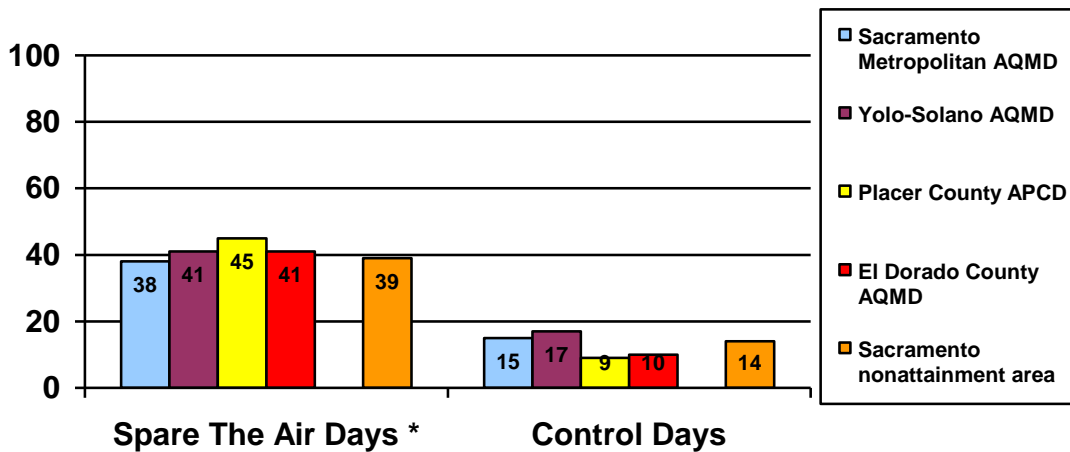
- 6 ➤ *Despite the drop in levels of awareness, significantly more respondents interviewed following Spare The Air days were aware of the Spare The Air advisories than were respondents interviewed on Control days, indicating that the message is still being heard.*

Control day interviewing is a study design element whereby random samples of respondents in all air districts in the nonattainment area are given the same questionnaire as those interviewed following Spare The Air days. It insures that any positive results attributed to the Spare The Air program are indeed due to the program itself and not to a possible “socially acceptable” response bias. Control day interviews took place on the same days of the week as the Spare The Air interviews, but on days 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 14% of area respondents interviewed on Control days incorrectly said they had seen or heard Spare The Air announcements, significantly more (39%) of those interviewed after Spare The Air days correctly remembered seeing or hearing the general advisories. Results in each of the individual air districts were similar.



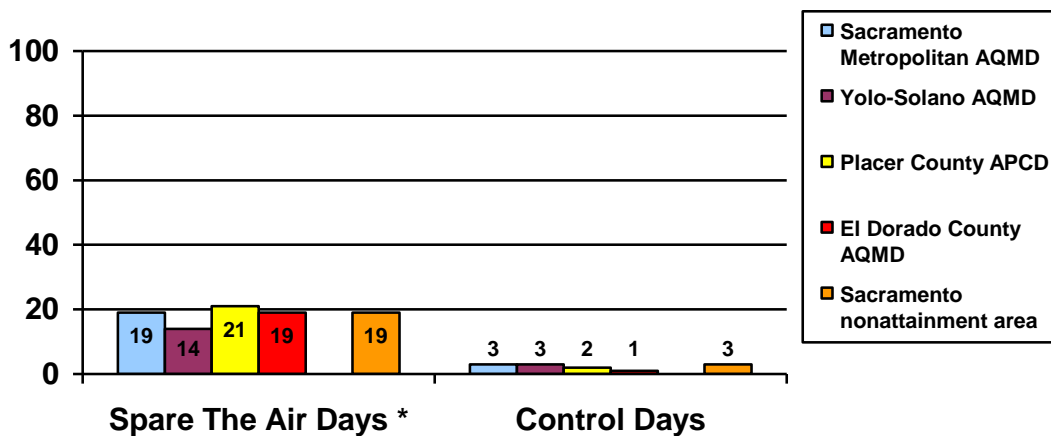
Spare The Air vs. Control Days: 2010 General Awareness



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

Similarly, 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 19% 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 that, although awareness may have declined this year, the **Spare The Air program is still reaching area residents.**

Spare The Air vs. Control Days: 2010 Specific Awareness



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



Estimating the Number of STA-Aware Drivers

- 7 ➤ In terms of general awareness, and adjusting for Control day responses, results indicate that over a third of million (362,000) drivers in the nonattainment area were aware of Spare The Air day during the 2010 season.

In the summer of 2010 there were an estimated 1,447,679 drivers in the Sacramento nonattainment area.²⁶ As the level of general awareness of Spare The Air was 39%, this means that an estimated 564,595 drivers in the region were aware of Spare The Air in the summer of 2010. However, we also know that 14% of respondents (or 202,675 drivers) interviewed on non-Spare The Air (Control days) said they heard a Spare The Air advisory when in fact none had been issued. Correcting then for Control day responses through subtraction means that **361,920 drivers in the Sacramento nonattainment area as a whole were aware of the 2010 Spare The Air campaign in general.** The table below indicates the calculations and the estimated number of drivers who heard the advisories by 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	921,168	38% / 15%	350,044 - 138,175= 211,869
Yolo-Solano AQMD	203,685	41% / 17%	83,511 - 34,626= 48,884
Placer County APCD	226,309	45% / 9%	101,839 - 20,368= 81,471
El Dorado County AQMD	96,518	41% / 10%	39,572 - 9,652= 29,921
Sacramento Nonattainment Area ²⁷	1,447,679	39% / 14%	564,595 - 202,675= 361,920

²⁶ The number of drivers in the Sacramento nonattainment area for 2010 was estimated, using the number of driver licenses by county for 2009, 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 2009 to 2010 listed at: http://www.dof.ca.gov/research/demographic/reports/estimates/e-1/2009-10/documents/E-1_2010.xls). The estimated number of licensed drivers for the total Sacramento nonattainment area in 2010, therefore, was 1,447,679: Sacramento Metropolitan AQMD: total 921,168 + Yolo-Solano: total of 203,685 (124,371 in Yolo County + Solano County: 273,494 * 29% for the proportion located within the Air Quality district = 79,313) + Placer County: total of 226,309 (260,125 * 87% for Air Quality district) + El Dorado County: total of 96,518 (141,938 * 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.

²⁷ 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.



- 8 ➤ In terms of specific awareness, and again correcting for Control day responses, this represents 232,000 drivers in the region who heard the episodic request not to drive on Spare The Air days.

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 231,629 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	921,168	19% / 3%	175,022 - 27,635= 147,387
Yolo-Solano AQMD	203,685	14% / 3%	28,516 - 6,111= 22,405
Placer County APCD	226,309	21% / 2%	47,525 - 4,526= 42,999
El Dorado County AQMD	96,518	19% / 1%	18,338 - 965= 17,373
Sacramento Nonattainment Area ²⁸	1,447,679	19% / 3%	275,059 - 43,430= 231,629

PURPOSEFUL DRIVING REDUCTION

Objectives

One measure of the effectiveness of the Spare The Air public 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.”

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:

²⁸ 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.



- 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 2010
- 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

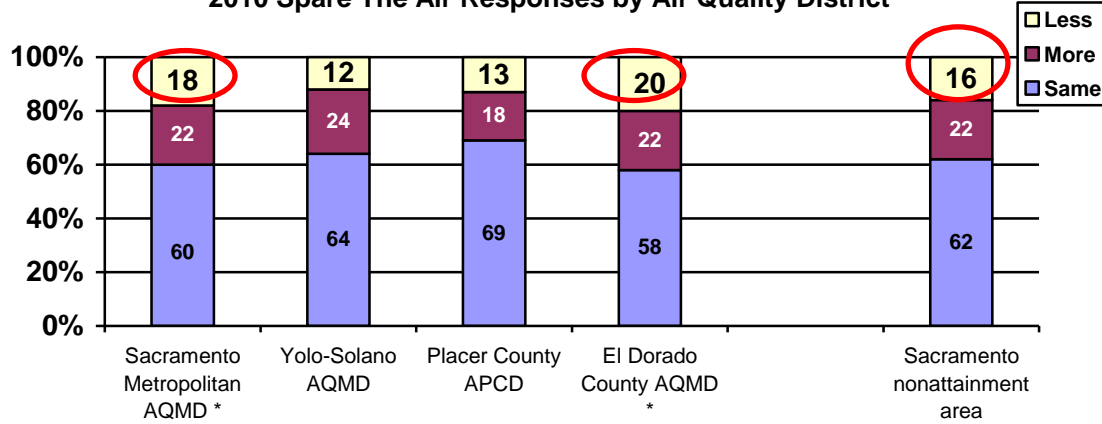
- 9 ➤ *Only 16% of respondents interviewed following Spare The Air days in the region as a whole said they drove “less” the previous day. The percentages who drove less in both El Dorado County (20%) and Sacramento Metropolitan (18%) AQMDs were significantly higher than in either Yolo-Solano AQMD (12%) or Placer County APCD (13%).*

One of the first few questions in the survey asked respondents 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 greatest percentage of respondents did not make any changes in their driving behavior – for the nonattainment area, 62% said they drove the same as usual the previous day. Twenty-two percent (22%) said they drove more, and the remaining 16% 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 – 69% drove the same as usual the previous day. The percentages of respondents who said they drove “less” on Spare The Air days were significantly higher in both El Dorado County AQMD (20%) and Sacramento Metropolitan AQMD (18%) than in either Yolo-Solano AQMD (12%) or Placer County APCD (13%).



**Driving Behavior Yesterday:
 2010 Spare The Air Responses by Air Quality District**



* circles indicate a significant difference from Yolo-Solano and Placer County

Year-to-Year Comparisons: Percent Who Drove Less

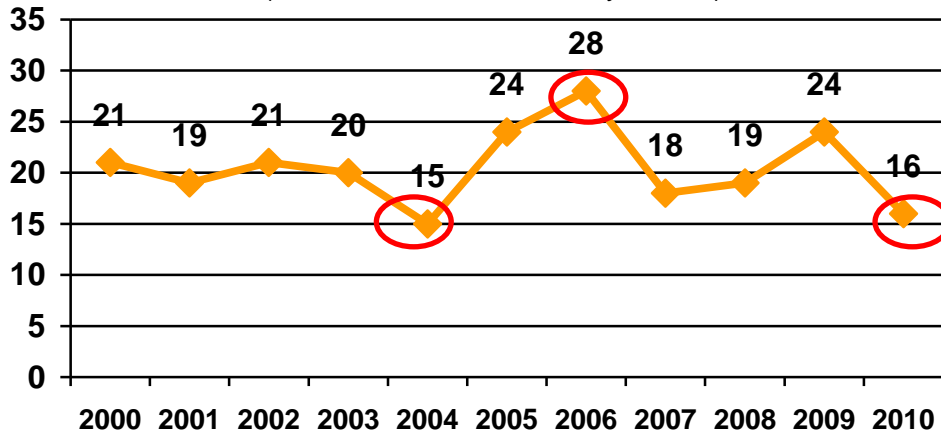
- 10 ➤ *The 11-year average percentage of respondents in the Sacramento Core Region (excluding El Dorado AQMD) who said they drove less on Spare The Air days is 20%. This year's level of 16% is not significantly lower than that average.*

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).²⁹ Year-to-year tests of proportion indicate that self-reported driving reduction on Spare The Air days from 2000 to 2003 was fairly stable at about one in five respondents, but declined significantly to 15% in 2004, a summer that experienced relatively good air quality and only six Spare The Air days. 2005 saw a significant increase (to 24%) in the percentage of respondents who said they drove less on Spare The Air days, and 2006 registered the highest percentage of all years, at 28%: 2006 was a poor air quality summer, with 15 Spare The Air days. Results in 2007 (18%) and 2008 (19%) were significantly lower than in either 2005 or 2006, but not significantly different from any of the previous five years (2000 to 2004). Results from 2009 (24%) were significantly higher than 2007 results, but not 2008. This year's result of 16% is significantly lower than in 2005, 2006, and 2009. The 11-year average percentage of respondents who said they drove less on Spare The Air days was 20%. Current results, although lower, are not significantly different from the 11-year average.

²⁹ 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.



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

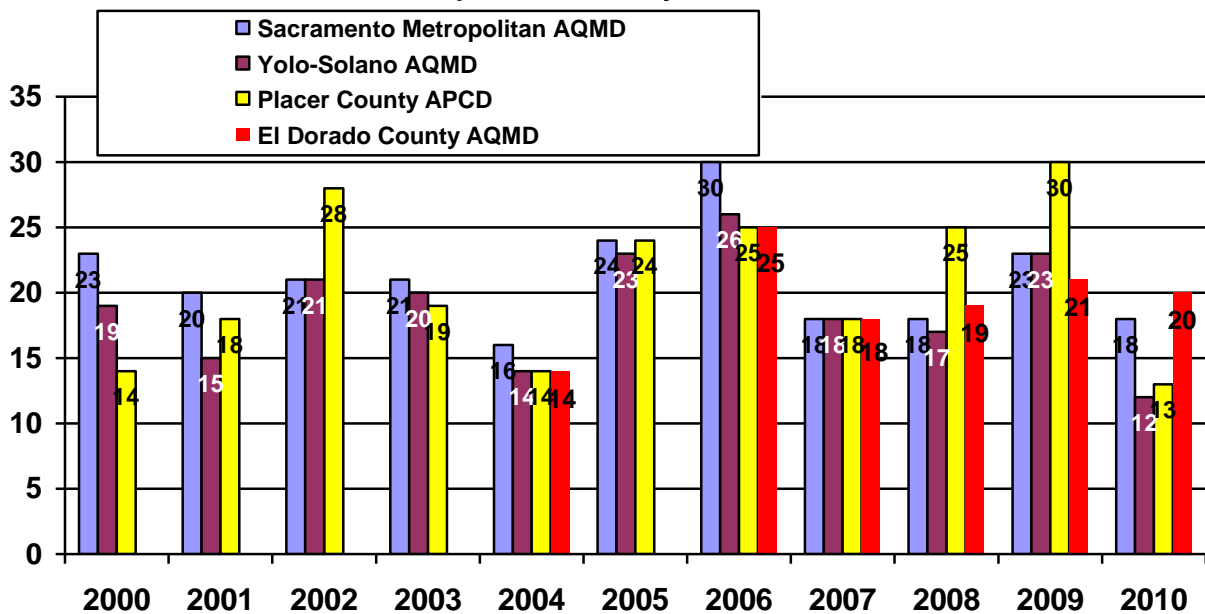


- 11 ➤ *Among the individual air districts, the percentage of respondents who drove less in both Yolo-Solano AQMD and Placer County APCD this year was significantly lower than their 11-year averages.*

The 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 18% is not significantly different from the 11-year average of 21% in SMAQMD. Results in **Yolo-Solano AQMD** ranged from a low of 12% this year to a high of 26% in 2006 -- this year's results are significantly lower than the 11-year average of 19% in that air district. In **Placer County APCD** results tended to fluctuate more from one year to the next. The 13% of residents this year who said they drove less was the lowest in 11 years, and significantly lower than the 11-year average of 21%. Respondents in **El Dorado County AQMD** were only interviewed in six of the 11 years, and this year's 20% of respondents who reported driving less was the same as the 6-year average of 20%.



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

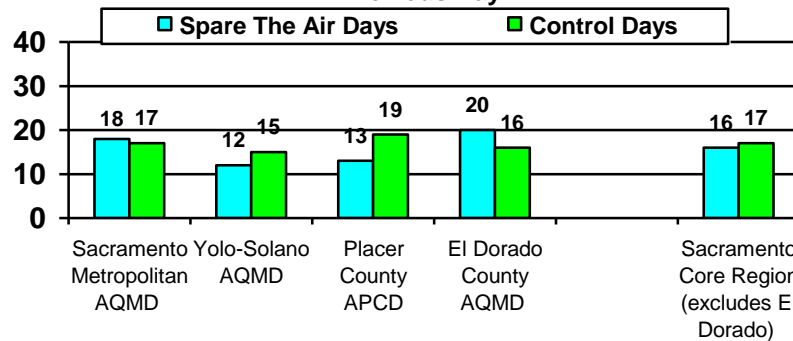
12 ➤ *This year there was no difference in the percentage of drivers who drove less on Spare The Air days than on Control days in the Sacramento Core Region. This might indicate a decline in the effectiveness of the program, but it could equally be due to a number of other factors, including better air quality, the poor economy, or more drivers who seasonally drive less during the summer.*

Since the beginning, annual evaluations of the effectiveness of the Spare The Air program in the Sacramento nonattainment area have included groups of "control day" respondents. These are residents who were interviewed about the same days of the week as the Spare The Air interviews, but on cooler, non Spare The Air days during the season. 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 effect).

The next chart shows the percentage of respondents who said they drove "less" the previous day for both Spare The Air and Control groups, for each individual air district and for the weighted Sacramento Core Region (excluding El Dorado County AQMD). What was different this year from previous years was that the percentage of respondents who said they drove less in the Core Region was actually higher on Control days than on Spare The Air days; although not significantly so. Closer examination revealed that this was actually true only in Placer County APCD and Yolo-Solano AQMD, but not in Sacramento Metropolitan AQMD (nor was it in El Dorado County AQMD, although it was excluded from the Core Region results).



**2010 Spare The Air vs. Control Days:
 Percent of Respondents Who Drove "Less" The
 Previous Day**



There have been other years when no significant differences were found between the percentage of respondents who said they drove less on Spare The Air versus Control days – 2003, 2007, and 2008. Within the individual air quality districts, there have in fact been even more years when the differences were not significant³⁰. Results for the Sacramento Core Region are presented in the next table.

Year	<i>Percentage of Respondents Who Drove "Less" Yesterday: Sacramento Core Region (excludes El Dorado County AQMD)</i>		Difference (or "Spread")	Statistically Significant Difference?
	<i>Spare The Air Day Respondents</i>	<i>Control Day Respondents</i>		
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

The lack of a significant difference between Spare The Air and Control day responses could be due to a number of factors, including cleaner air, the duration and type of media buy and the amount spent; the severity of the season, the poor economy (respondents with work might be less able or willing to find alternatives to driving), and the possibility that some respondents habitually drive less during the summer and therefore might not have been able

³⁰ 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 11 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.



to further reduced their driving on Spare The Air days. Of course it could also represent a decline in the effectiveness of the Spare The Air program, but given that results have fluctuated from one year to the next and there is no general downward trend, that explanation is the least likely. Results should continue to be monitored, but as has been previously suggested, it is perhaps time for this prerequisite to the calculation of emission reductions to be dropped³¹.

Percentage of Purposeful Reducers

- 13 ➤ *During the summer of 2010, only 0.34% of all respondent drivers in the entire Sacramento nonattainment area were classified “purposeful reducers” – they purposefully 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 question³²). Results from each air quality district and for the weighted Sacramento regions (Sacramento Core Region as well as the entire nonattainment area) are presented in the next table. It can be seen that for the entire Sacramento nonattainment area, 0.34% of all Spare The Air respondent drivers (2 out of 597) met the strict ARB standard for purposeful driving reduction. Individually, it can be seen that no respondents (0%) in Yolo-Solano AQMD qualified as purposeful reducers; 0.3% were identified in Placer County APCD; and 0.5% were found in both Sacramento Metropolitan and El Dorado County AQMDs.

³¹ 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, and that other explanations are plausible.

³² There were two questions in the survey that measured awareness of Spare The Air. The one referred to here measured general awareness and was proposed by the ARB (i.e. “In the past two days have you heard, read, or seen any advertisements or news broadcasts about Spare The Air, or poor air quality, or requests to drive less in this area?”). It was introduced in 2002. Comparisons of reducers with years prior to 2002 used another question to measure awareness, which was more specific (i.e. “Do you recall being asked not to drive yesterday because our area was experiencing a period of unhealthy air?”) It has been included in all evaluations 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.



<i>Spare The Air: Purposeful Reducers in 2010</i>	<i>Number of Respondents Who Reduced Driving For Air Quality Reasons and Were Aware of STA Advisories</i>	<i>Total Number of Respondents Interviewed on Days Following Spare The Air</i>	<i>% of Total Respondents Who Reduced Driving for Air Quality Reasons and Were Aware of STA Advisories</i>
Sacramento Metropolitan AQMD	2	394	0.5%
Yolo-Solano AQMD	0	297	0.0%
Placer County APCD	1	310	0.3%
Sacramento Core Region³³	2	563	0.36%
El Dorado County AQMD	1	209	0.5%
Sacramento Nonattainment Area³⁴	2	597	0.34%

Percentage of Purposeful Reducers: Year-To-Year Comparisons

14 ➤ *The percentage of purposeful reducers in the Sacramento Core Region is the lowest it has been in 11 years at 0.36%. However, this percentage is not statistically different from the 11-year average of 1.4% of all drivers who purposefully reduced driving on Spare The Air days in order to help improve air quality.*

Annual proportions of purposeful reducers in the three individual air districts within the Sacramento Core Region (excluding El Dorado County AQMD) as well as in the weighted core region from 2000 to the present are presented in the next table. Tests of proportion compared year-to-year results. It can be seen, first of all, that results this year are the lowest they have ever been in all air quality districts and in the Sacramento Core Region (but not necessarily significantly so). This is not too surprising, as a previous report (Awareness of Spare The Air) indicated that there was a significant drop in awareness of Spare The Air this year relative to other years. The explanations to account for this have been included in that report.

In the Sacramento Core Region, although this year's results were significantly lower than some previous years', it was not significantly different from the 11-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. 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.

³³ Weighted, excludes El Dorado County AQMD.

³⁴ Weighted, includes El Dorado County AQMD.



<i>Spare The Air: Purposeful Reducers</i>	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	<i>Significant Difference Among Years? (see footnotes)</i>	<i>11-year Average</i>
<i>Sacramento Metropolitan AQMD</i>	2.0%	2.1%	2.3%	1.2%	1.6%	1.5%	1.9%	1.3%	0.5%	1.2%	0.5%	No	1.5%
<i>Yolo-Solano AQMD</i>	1.3%	0.2%	3.5%	1.2%	1.1%	1.3%	1.9%	1.6%	0.5%	2.7%	0.0%	Yes ³⁵	1.4%
<i>Placer County APCD</i>	1.0%	0.9%	3.9%	2.3%	1.4%	1.5%	4.3%	0.4%	1.6%	2.6%	0.3%	Yes ³⁶	1.8%
<i>Sacramento Core Region</i>	1.8%	1.7%	2.7%	1.4%	1.5%	1.4%	2.2%	1.2%	0.7%	1.7%	0.36%	Yes ³⁷	1.4%

Estimated Number of Purposeful Reducers

15 ➤ *When extrapolated to the population, 4,922 drivers in the entire Sacramento nonattainment area purposefully made fewer trips on average each Spare The Air day in 2010, specifically in order to reduce air pollution.*

In 2010 there were an estimated 1,447,680 drivers in the Sacramento nonattainment area.³⁸ Extrapolating to this population of drivers, the 0.34% of reducers means that approximately **4,922 drivers** purposefully made fewer trips on Spare The Air days for air quality reasons. Estimates for the individual air districts as well as for the region (both excluding and including El Dorado County AQMD) are presented in the next table.

³⁵ In Yolo-Solano AQMD, 2002 was significantly higher than 2001, 2003, 2004, 2005, 2007, 2008 and 2010; 2009 was higher than 2001 and 2010; 2006 and 2007 were higher than 2010.

³⁶ In Placer County APCD, 2002 and 2006 results were significantly higher than 2000, 2001, 2004, 2005, 2007 and 2010; and 2003 and 2009 were higher than 2007 and 2010.

³⁷ In the Sacramento Core Region, results in 2002 and 2006 were significantly higher than 2008 and 2010; and 2000, 2001 and 2009 were higher than 2010.

³⁸ The number of drivers in the Sacramento nonattainment area for 2010 was estimated, using the number of driver licenses by county for 2009, 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 2009 to 2010 listed at: http://www.dof.ca.gov/research/demographic/reports/estimates/e-1/2009-10/documents/E-1_2010.xls. The estimated number of licensed drivers for the total Sacramento nonattainment area in 2010, therefore, was 1,447,679: Sacramento Metropolitan AQMD: total 921,168 + Yolo-Solano: total of 203,685 (124,371 in Yolo County + Solano County: 273,494 * 29% for the proportion located within the Air Quality district = 79,313) + Placer County: total of 226,309 (260,125 * 87% for Air Quality district) + El Dorado County: total of 96,518 (141,938 * 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.



<i>Air District</i>	<i>Total Number of Drivers</i>	<i>Percent of Purposeful Reducers</i>	<i>Estimated Number of Purposeful Reducers in 2010</i>
Sacramento Metropolitan AQMD	921,168	0.5%	4,606
Yolo-Solano AQMD	203,685	0.0%	0
Placer County APCD	226,309	0.3%	679
Sacramento Core Region³⁹	1,351,162	0.36%	4,864
El Dorado County AQMD	96,518	0.5%	483
Sacramento Nonattainment Area⁴⁰	1,447,680	0.34%	4,922⁴¹ <i>purposeful reducers</i>

Estimated Number of Single Trips Avoided by Purposeful Reducers

- 16 ➤ *Purposeful reducers in the region as a whole avoided an average of 2.8 single trips on Spare The Air days, translating into a total of 13,782 trips purposefully avoided on Spare The Air days during the summer season of 2010.*

Respondents classified as purposeful reducers were asked how many single vehicle trips they had avoided on the Spare The Air day. The mean number of single trips avoided in the entire Sacramento nonattainment area was **2.8**.⁴² Multiplying by the estimated 4,922 drivers who purposefully reduced their driving on Spare The Air days, this translates into an estimated **13,782 single trips** that drivers avoided making on Spare The Air days during the summer of 2010, 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.

³⁹ Excludes El Dorado County AQMD.

⁴⁰ Includes El Dorado County AQMD.

⁴¹ The total number of drivers estimated in the Sacramento Core Region and the Sacramento nonattainment area are not the simple sums of drivers in the individual air districts: the percentage of reducers was calculated using weighted results, adjusted proportionally to the population within each air district: Sacramento Metropolitan AQMD represents 66% of the entire population, Yolo-Solano AQMD is 15%, Placer County APCD is 14%, and El Dorado County AQMD is 5%.

⁴² The mean was 2.8, the median was 3.0, and the range was 2 to 3 trips avoided.



<i>Air District</i>	<i>Estimated Number of Purposeful Reducers</i>	<i>Mean # of Trips Avoided for Air Quality Reasons</i>	<i>Estimated Number of Single Trips Reduced</i>
Sacramento Metropolitan AQMD	4,606	3.0	13,818
Yolo-Solano AQMD	0	0	0
Placer County APCD	679	2.0	1,358
Sacramento Core Region⁴³	4,864	2.9	14,106
El Dorado County AQMD	483	2.0	966
Sacramento Nonattainment Area⁴⁴	4,922	2.8	13,782 trips

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

- 17 ➤ *Control day interview results indicated that there were no (0) respondents who specifically avoided making trips for air quality reasons on non Spare The Air days. However, because of the low percentages of purposeful reducers on Spare The Air days, there is no 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 would be difficult to credit the Spare The Air program as the cause of driving reduction.⁴⁵

As shown in the next chart, although there were no (0) respondents who reduced the number of trips they made for air quality reasons on Control days (and who were not seasonal trip reducers), 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 argument could, therefore, be made that the program was less effective this year, or it could be attributed to the relatively good air quality experienced during the summer of 2010 - even on four of the six Spare The Air days. There are also other explanations that occurred this year that might have contributed to a lack of participation in Spare The Air, including a poor economy, vast numbers of political surveys

⁴³ Excludes El Dorado County AQMD.

⁴⁴ Includes El Dorado County AQMD.

⁴⁵ For Control day interviews, for the purpose of this analysis, reducers were classified as those respondents who said they drove less the previous day for air quality reasons, and who were not seasonal driving reducers. This year, although there were 5 Control day respondents throughout the region who said they drove less for air quality reasons (representing 1.1% when weighted), all of them were “seasonal trip reducers” (described in a later report). They in fact are Spare The Air “success” stories – those who now typically reduce the number of trips they make during the summer months to avoid adding to air pollution. As such, they are excluded from Control group data as they more resemble Spare The Air reducers than true Controls. As there were 0 Control respondents in both 2008 and 2009 who drove less for air quality reasons, regardless of whether or not they were seasonal reducers, this would not have made any difference. It is recommended that any future evaluations take into account the effect of seasonal trip reductions on Control day interviews for this particular analysis.



being conducted in the lead-up to November mid-term elections, and negative political advertisements that saturated the media. These issues were addressed in an earlier report - Awareness of the 2010 Spare The Air Campaign.

Air District	% of Respondents Who Reduced for Air Quality Reasons		Significant Difference?
	Who Were Aware On STA Days	On Control Days ⁴⁶	
Sacramento Metropolitan AQMD	0.5%	0.0%	No
Yolo-Solano AQMD	0.0%	0.0%	No
Placer AQMD	0.3%	0.0%	No
Sacramento Core Region	0.36%	0.0%	No
El Dorado County AQMD	0.5%	0.0%	No
Sacramento Nonattainment Area	0.34%	0.0%	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 2010 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 2010 Spare The Air program was successful in reducing air pollution in the entire Sacramento nonattainment area by an estimated 0.07 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 estimate of emission reductions attributed to residents voluntarily reducing their driving because of 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). Seasonal reducers who normally make fewer trips during the summer

⁴⁶ The Control group excludes those who said they usually reduce the amount of driving they do during the summer to avoid adding to air pollution.



to help improve air quality are not (necessarily) included⁴⁷ 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 "less" on Spare The Air days than on Control days. However, the necessity of requiring this last step has been called into question (see Purposeful Driving Reduction reports in both 2009 and 2010), as it was introduced at a time when air quality in the nonattainment area was much worse⁴⁸.

Results from the Sacramento nonattainment area as a whole 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,⁴⁹ 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 **0.34%** (2 / 597⁵⁰) 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 **2.8** single trips avoided.⁵¹
3. Extrapolate to the total number of drivers in the region⁵² this year: the percentage of Spare

⁴⁷ These respondents are examined in another report on Seasonal Driving Reduction.

⁴⁸ 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, although there were no significant differences in any of the air districts, we again will report results from the region as a whole and from SMAQMD, as it is the largest district in the region.

⁴⁹ Using the ARB-worded question for measuring general awareness of Spare The Air: "In the past two days have you heard, read, or seen any advertisements or news broadcasts about Spare The Air, or poor air quality, or requests to drive less in this area?"

⁵⁰ The total number of completed interviews was weighted. Since the beginning evaluation in 1995, the methodology for weighting has been to set Sacramento County interviews as 1, and down-weight interviews from all other counties appropriately, depending on the size of their populations. This is why the weighted total of completed interviews (597) is less than the sum of the total number of interviews of all air districts (1,210).

⁵¹ The mean was 2.8, the median was 3.0, and the range was 2 to 3 trips avoided.

⁵² The number of drivers in the Sacramento nonattainment area for 2010 was estimated, using the number of driver licenses by county for 2009, 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 2009 to 2010 listed at: http://www.dof.ca.gov/research/demographic/reports/estimates/e-1/2009-10/documents/E-1_2010.xls). The estimated number of licensed drivers for the total Sacramento nonattainment area in 2010, therefore, was 1,447,679: Sacramento Metropolitan AQMD: total 921,168 + Yolo-Solano: total of 203,685 (124,371 in Yolo County + Solano County: 273,494 * 29% for the proportion located within the Air Quality district = 79,313) + Placer County: total of 226,309 (260,125 * 87% for Air Quality district) + El Dorado County: total of 96,518 (141,938 * 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.



The Air reducers therefore represents **4,922** drivers in the Sacramento nonattainment area, and the number of single trips avoided was **13,782** (4,922 drivers x 2.8 trips avoided on average).

4. Multiply the number of trips avoided by a per trip emission reduction average of **4.37 grams of ozone precursors**.⁵³ [This includes a total of Reactive Organic Gas (ROG) emissions (2.50 grams per trip for light duty passenger cars plus two categories of light duty trucks) plus Oxides of Nitrogen (NOx) emissions (1.86 grams per trip for light duty passenger cars and light duty trucks) emissions, based on 2010 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 **60,227 grams** of ozone precursors (13,782 single trips avoided x 4.37 grams per trip).
5. Convert to tons.⁵⁴ For the Sacramento nonattainment area as a whole, this translates to an estimated total of **0.07 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, there were no (0) individuals⁵⁵, and therefore **0** trips were reduced as well.
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 0.07 tons reduced on Spare The Air days, yields:
8. Result: **0.07 tons of ozone precursors reduced per Spare The Air day in 2010.**

⁵³ Estimates were based on the EMFAC 2007 v 2.3 model, for the summer of 2010, provided by Charles Anderson, Program Coordinator, SMAQMD Planning & Emission Inventory & Steven Lau, SMAQMD Air Quality Planner in an e-mail dated November 23, 2010. The total ROG tons for a combined total of light duty passenger cars and two categories of light duty trucks (8.08 + 2.0 + 4.31) 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. 3,154,100 for light duty passenger cars + 655,333 for light duty trucks1 + 1,409,190 for light duty trucks2) in order to obtain the average grams per trip. The same process was used to calculate NOx grams per trip (4.99 + 1.47 + 4.24) x 2000 x 454 / (3,154,100 + 655,333 + 1,409,190). ROG grams and NOx grams were then combined (2.50 + 1.86) to obtain 4.37 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.

⁵⁴ There are 907,200 grams in a ton.

⁵⁵ For Control day interviews, for the purpose of this analysis, reducers were classified as those respondents who said they drove less the previous day for air quality reasons, and who were not seasonal driving reducers. This year, although there were 5 Control day respondents throughout the region who said they drove less for air quality reasons (representing 1.1% when weighted), all of them were "seasonal trip reducers" (described in a later report). They in fact are Spare The Air "success" stories – those who now typically reduce the number of trips they make during the summer months to avoid adding to air pollution. As such, they are excluded from Control group data as they more resemble Spare The Air reducers than true Controls. As there were 0 Control respondents in both 2008 and 2009 who drove less for air quality reasons, regardless of whether or not they were seasonal reducers, this would not have made any difference. It is recommended that any future evaluations take into account the effect of seasonal trip reductions on Control day interviews for this particular analysis.



The procedure just described is summarized in the following table:

Sacramento Nonattainment Area	Percent of Respondent Drivers Who Drove Less for Air Quality Reasons ⁵⁶	X Number of Licensed Drivers in Sacramento Nonattainment Area (1,447,680 Total)	X Mean Number of Single Trips Reduced Per Day	X 4.37 Grams of Ozone Precursors Per Trip (EMFAC 2007 V2.3) 2010 summer	= Estimated Tons per Day of Ozone Precursors Reduced
Spare The Air Days	0.34% (2 / 597 ⁵⁷)	4,922	x 2.8 = 13,782	60,227 grams	0.07 tons
Control Days	0.0% (0 / 473)	0	0	0 grams	0 tons
Estimated Tons of Ozone Precursors Reduced Per Day: (STA Day Reductions – Control Day Reductions)					0.07 tons

2010 Emissions Reduction Estimate: Sacramento Metropolitan AQMD

19 ➤ *Air pollution in Sacramento Metropolitan AQMD was also reduced by an estimated 0.07 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 (921,168 Total)	X Mean Number of Single Trips Reduced Per Day	X 4.37 Grams of Ozone Precursors Per Trip (EMFAC 2007 V2.3) 2010 summer	= Estimated Tons Per Day of Ozone Precursors Reduced
Spare The Air Days	0.5% (2 / 394)	4,606	x 3.0 = 13,818	60,385 grams	0.07 tons
Control Days	0.0% (0 / 312)	0	0	0 grams	0 tons
Estimated Tons of Ozone Precursors Reduced Per Day: (STA Day Reductions – Control Day Reductions)					0.07 tons

⁵⁶ 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).

⁵⁷ Please note that the weighted total number of completed interviews for the Sacramento nonattainment area as a whole (i.e. 597) is less than the total number of completed interviews within all air districts (1,210 unweighted). Since the beginning evaluation in 1995, the methodology for weighting has been to set Sacramento Metropolitan AQMD interviews as 1, and down-weight interviews from all other counties appropriately, depending on the size of their populations. The Sacramento Metropolitan AQMD represents the largest percentage of the nonattainment area population at 66%, followed by Yolo-Solano AQMD (15% of area population), Placer County APCD (14%), El Dorado County AQMD (5%). In other words, the number of completed interviews for the entire Sacramento nonattainment area is not the simple sum of the number of completed interviews in each individual air district.



Comparison with Previous Years: Sacramento Metropolitan AQMD (only)

A comparison of estimated emission reductions⁵⁸ due to the Spare The Air program from 2001 to the present in the Sacramento Metropolitan Air Quality Management District⁵⁹ 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, 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
Sacramento Metropolitan AQMD:	1.32	0.99	0.26	0.42	0.25	0.26	0.06	0.03	0.19	0.07
<i>Average emission reductions attributed to Spare The Air (tons)</i>										

SUMMER 2010 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 2010. 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 2010,
- 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

⁵⁸ 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, 2010 summer, Charles Anderson, Program Coordinator, SMAQMD Planning & Emission Inventory & Steven Lau, SMAQMD Air Quality Planner, in an e-mail dated November 23, 2010.

⁵⁹ 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 2.) Once again, the air quality districts might want to consider dropping this prerequisite.



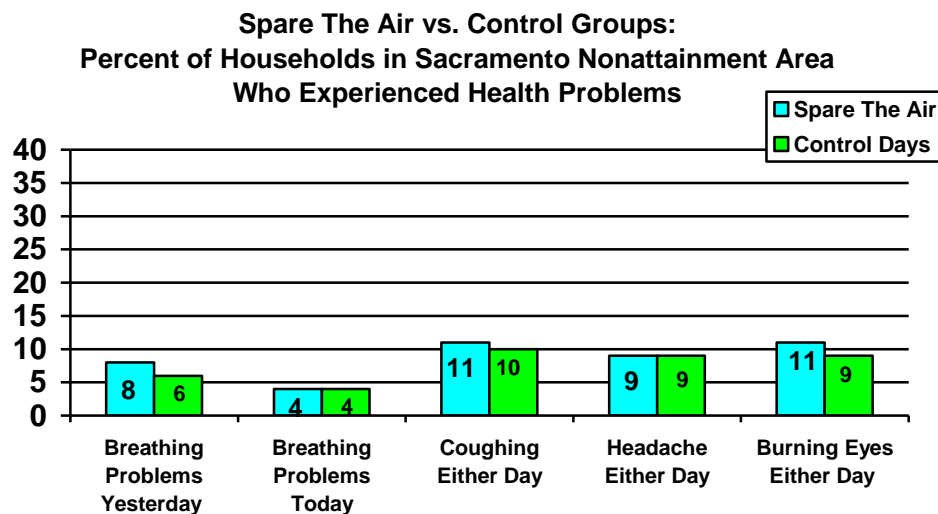
- n. compare the incidence of reported health problems among the four air quality districts in the Sacramento nonattainment area (Sacramento Metropolitan AQMD, Yolo-Solano AQMD, Placer County APCD, and El Dorado County AQMD).

Results

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

20 ➤ *Eight percent (8%) of households in the entire Sacramento nonattainment area reported breathing problems on Spare The Air days in 2010. This was not significantly different from the 6% of households interviewed on Control days. Nevertheless, correcting for Control day responses, this translates into 17,233 additional households that were affected specifically by ozone pollution on Spare The Air days during the summer of 2010.*

Respondents were asked whether they or someone in their household had experienced breathing difficulties the day before the interview or the day of the interview in both Spare The Air as well as Control groups. 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 are presented in the next chart. It can be seen that although Spare The Air respondents tended to experience more breathing problems, coughing, and burning eyes than did Control respondents, none of the differences were statistically significant: eight percent (8%) of Spare The Air respondents experienced breathing problems the previous day, compared with 6% of Control respondents. On the day of the interview, however, only 4% in either group had breathing problems. Coughing, headaches, and burning eyes were experienced by both groups of households at levels ranging from 9% to 11%.





We have estimated that there are 861,659 households in the Sacramento nonattainment area⁶⁰; therefore, the 8% of respondents who claimed that someone in their household experienced breathing problems on a Spare The Air day translates into 68,933 households. The 6% of respondents who reported breathing problems on Control days translates into 51,700 households. Correcting for Control days through subtraction, this means that **17,233 households experienced breathing problems due specifically to ozone air pollution on Spare The Air days.**

Year-To-Year Comparisons

21 ➤ *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.*

In the Sacramento Core Region (excluding El Dorado County AQMD respondents because they were not interviewed each survey year), the percentages of respondents who said someone in their household had trouble breathing⁶¹ on Spare The Air and Control days from 2000 to the present are plotted in the next graph. Over the course of the last 11 years, it appears that the number of households experiencing trouble breathing on Spare The Air days is declining, perhaps as a result of cleaner air in the region. At the turn of the century in 2000, 15% of households interviewed about Spare The Air days had difficulty breathing, a significantly higher percentage than the 8% of households this year. This year's percentage is also significantly lower than the 11-year average of 12%. In terms of Control day interviewing, the percentage of households who reported breathing difficulties has remained relatively stable and consistently lower, with annual results not differing from the 11-year average of 8%, except in 2005, which was considered to be an anomaly. Because the gap between Spare The Air and Control households who experience breathing difficulties is narrowing, a possible explanation is that air quality during the summer months in the Sacramento nonattainment area as a whole is improving. In fact, 2010 was relatively good as far as air quality was concerned – only six Spare The Air days were called, and of these, the actual AQI for ozone only exceeded 150⁶² on two of the six days. (Alerts about Spare The Air days are based on forecasted estimates. In other words, Spare The Air alerts were issued for days when the actual air quality turned out not to have been as poor as was expected, and this translates into households with fewer breathing problems.)

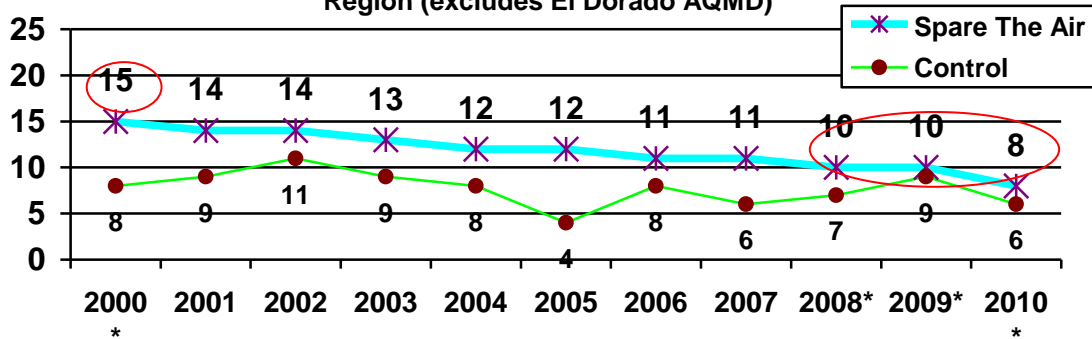
⁶⁰ The measure used for households was the number of housing units. Reference: State of California, Department of Finance, E-5 Population and Housing Estimates for Cities, Counties and the State, 2001-2010, with 2000 Benchmark. Sacramento, California, May 2010. Source: http://www.dof.ca.gov/research/demographic/reports/estimates/e-5/2001-10/documents/E-5_2010.xls. The estimated number of households for the entire Sacramento nonattainment area is 861,659 ((Sacramento Metropolitan AQMD: 556,208) + (Placer County APCD: 150,682* 87% = 131,093) + (Yolo-Solano AQMD: 116,933 (Yolo: 74,224; Solano (Dixon, Rio Vista & Vacaville: 42,709)) + (El Dorado County AQMD: 84,449* 68% = 57,425)).

⁶¹ The additional health-related questions of breathing today, coughing, headache, and burning eyes have only been asked since 2004.

⁶² 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.



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



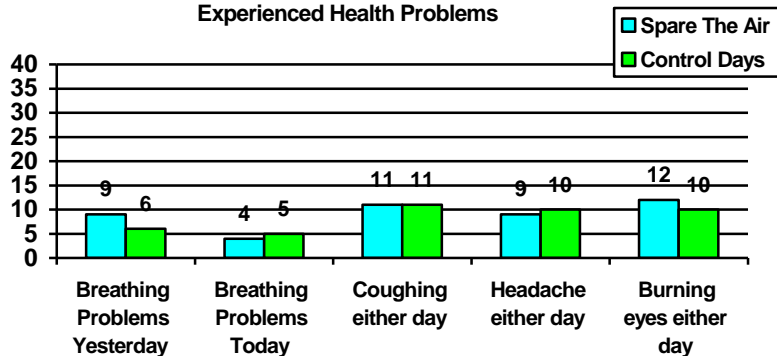
* significant difference from 2000 compared to 2008 - 2010 Spare The Air households

Individual Air Quality Districts

22 ➤ *In general, in terms of health problems, there were no significant differences in the individual air districts between percentages of Spare The Air versus Control households.*

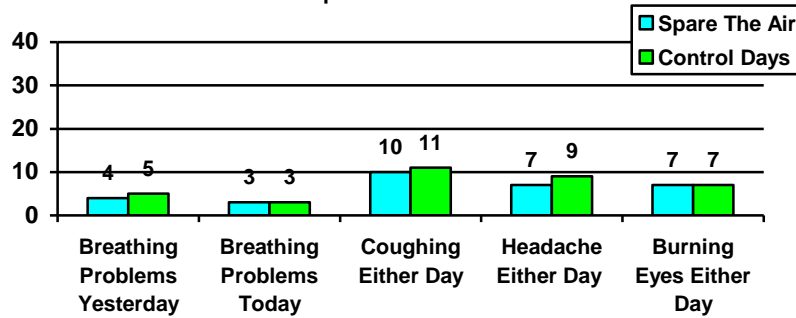
The percentage of household health issues experienced in the individual air quality districts are presented in the next four graphs. There was only one significant difference between Spare The Air and Control households – more headaches on either day occurred in Placer County APCD in Spare The Air (11%) than in Control households (6%). In general, therefore, households are experiencing the same health issues in all air quality districts, regardless of whether they were interviewed about Spare The Air or Control days. This supports the argument previously mentioned about improvements in air quality in the region.

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

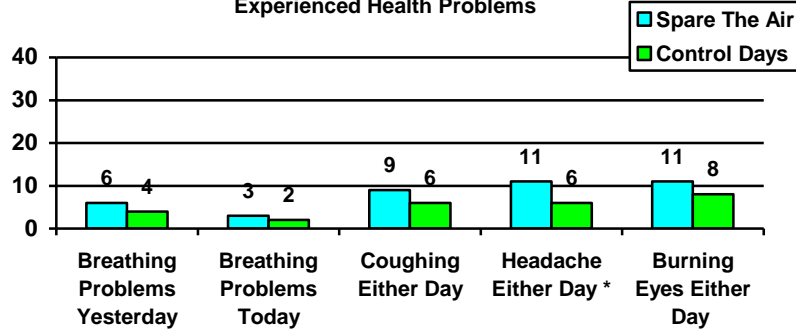




Spare The Air vs. Control Groups:
 Percent of Yolo-Solano AQMD Respondents Whose
 Households Experienced Health Problems

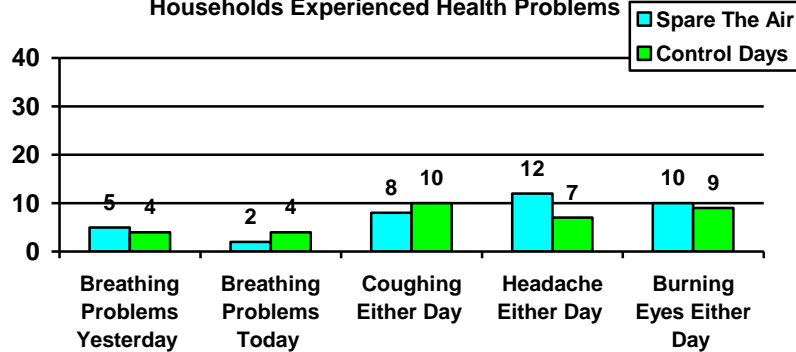


Spare The Air vs. Control Groups:
 Percent of Placer County APCD Respondents Whose Households
 Experienced Health Problems



* Indicates a statistically significant difference

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





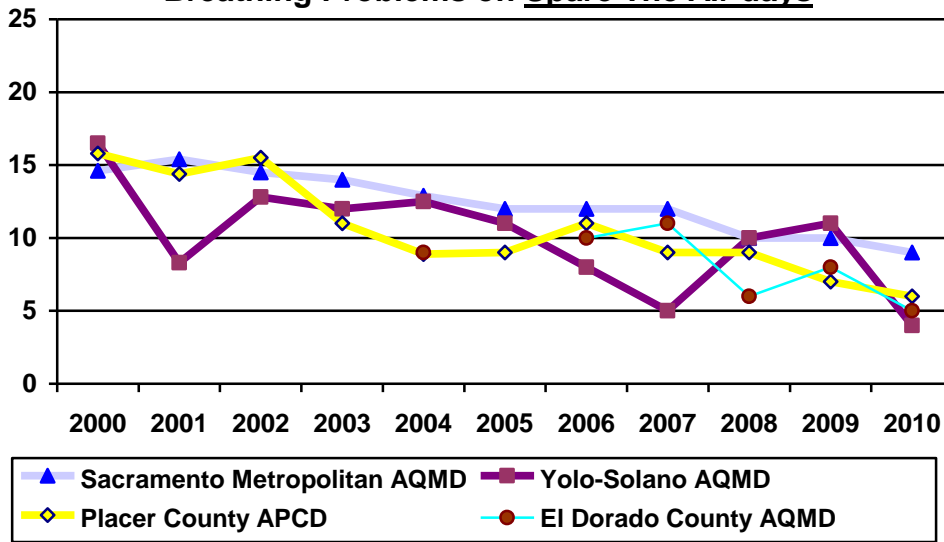
Air Quality Districts: Year-To-Year Comparisons

- 23 ➤ *Within individual air districts, there are likewise fewer households experiencing breathing problems on Spare The Air days now than 11 years ago; once again possibly reflecting improved summer air quality in the region.*

Individual air quality district results of the percentages of households who reported breathing problems on Spare The Air days from 2000 to the present are presented in the next chart. El Dorado County AQMD results are only available for six years. Results indicate an overall decline in the percentage of households experiencing breathing difficulties, although year-to-year comparisons are often not significant. This could once again reflect improving air quality in the region.

In Sacramento Metropolitan AQMD, the 9% with problems this year is significantly lower than the 15% in the years 2000 to 2002. Similarly, in Yolo-Solano AQMD the 4% of breathing difficulties this year is significantly lower than the 17% reported in 2000. (However, results in Yolo-Solano AQMD tend to fluctuate the most from year to year.) In Placer County APCD, the 6% 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





2010 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 ten years, and
- q. estimate emission reductions from these voluntary driving reducers.

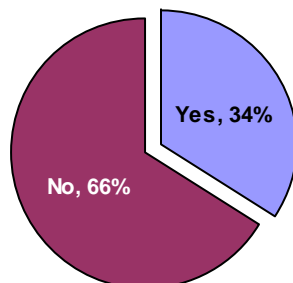
Results

Seasonal Driving Reducers

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

Over the years seasonal driving reducers have been 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 behavior by seasonally reducing the number of trips they make. It can be seen in the next pie chart that for the entire Sacramento nonattainment area as a whole, 34% of all⁶³ respondents in 2010 are seasonal driving reducers.

**Percent Who Reduce Driving in the
Summer for Air Quality Reasons: 2010
Results for the Sacramento Nonattainment
Area**



⁶³ 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.



Number of Reduced Trips

- 25 ➤ *Summertime driving reducers made significantly fewer trips than those who did not change their driving habits during the summer: on average, they made .9 fewer trips per day.*

This 34% of seasonal reducers reported entering 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 an average of 3.8 times. An analysis of variance indicated that these means were significantly different from each other.⁶⁴ In other words, drivers who said they usually drive less in the summer actually made fewer trips than those who did not. **On average, seasonal driving reducers made .9 fewer trips per day than non-reducers (3.8 – 2.9 = 0.9 trips).**

	<i>Seasonal Driving Reducers: Mean # Times Entered Vehicle</i>	<i>Non-Reducers: Mean # Times Entered Vehicle</i>	<i>Statistically Significant Difference?</i>
<i>Sacramento Nonattainment Area</i>	2.9	3.8	Yes

Seasonal Trip Reduction: Estimated Emission Reductions

- 26 ➤ *In 2010, seasonal driving reduction translated into a reduction of 2.1 tons per day of ozone precursors, representing substantial emission reductions due to public concern about summertime air quality.*

The percentage of seasonal driving reducers in the Sacramento nonattainment area as a whole represents a substantial proportion of the general population of drivers who are helping to improve air quality in the region by reducing emissions. In fact, just under half a million drivers (492,211) in the area are seasonal reducers. 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 days⁶⁵ and is summarized in the next table. **It can be seen that the average of .9 of a trip per day that seasonal reducers avoided translates into an estimated 2.1 tons of ozone precursors reduced per summer day in 2010.**

	Percent of	x	x	x	=
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⁶⁴ F (1,1033) = 4.25, p < .05.

⁶⁵ For a full explanation of the methodology, see report titled “Estimated Emission Reductions during the 2010 Spare The Air Season”, Naomi E. Holobow & Dawn Morley, November 2010.



Sacramento Nonattainment Area	Respondent Drivers Who Usually Drive Less During the Summer for Air Quality Reasons	Number of Licensed Drivers in Sacramento Nonattainment Area (1,447,679 Total ⁶⁶)	Mean Number of Trips Reduced Per Day Compared to Non-Reducers	4.37 Grams of Ozone Precursors Per Trip (EMFAC 2007 V2.3) 2010 Summer Model ⁶⁷	Estimated Tons ⁶⁸ Per Day of Ozone Precursors Reduced
Spare The Air and Control Day Interviews Combined	34%	492,211	x 0.9 = 442,990	1,935,866 grams	2.1 tons

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.*

Seasonal reducers were then asked to specify exactly how they reduced driving this summer. Verbatim comments were captured and later categorized, and the results are presented in the next graph. It can be seen that nearly a third (31%) of these respondents said they used alternative transportation, which included biking, walking, carpooling, or using public transit. Almost the same percentage (30%) 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. Six percent (6%) were either retired, unemployed, or as teachers they did not need to drive during the summer. Three percent (3%) were able to telecommute, 2% used a smaller, more efficient vehicle, and another 2% said they just didn't drive unless it was absolutely necessary. Two percent (2%) also 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 2% could not specify further.

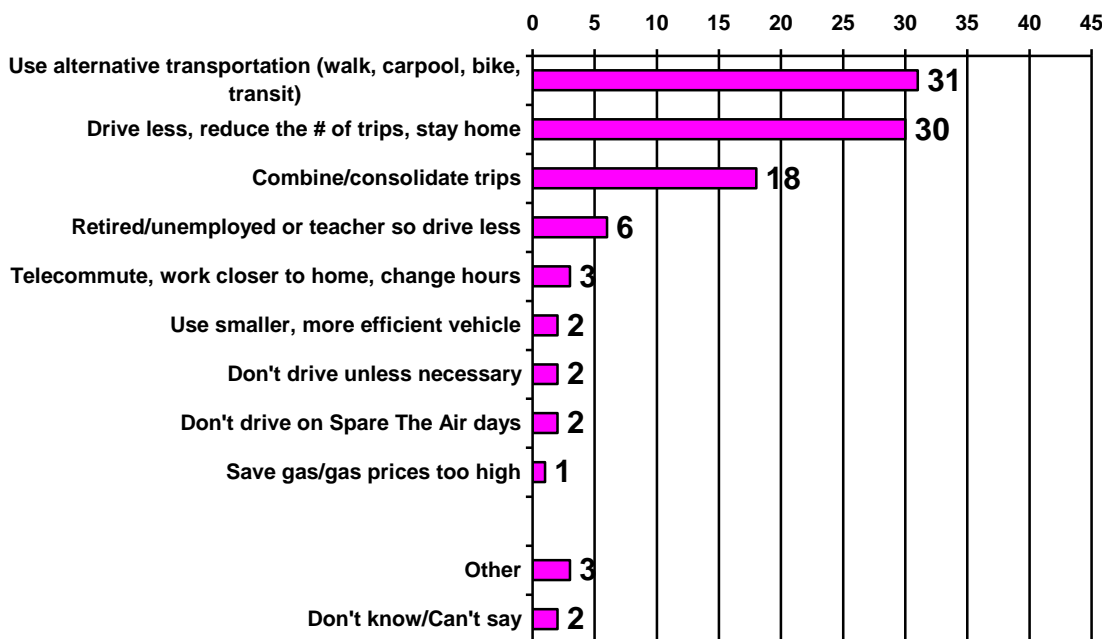
⁶⁶ The number of drivers in the Sacramento nonattainment area for 2010 was estimated, using the number of driver licenses by county for 2009, obtained from the California Department of Motor Vehicles database http://www.dmv.ca.gov/about/profile/dl_outs_by_county.pdf, and calculating the percentage increase, based on county population figure increases from 2009 to 2010 listed at: http://www.dof.ca.gov/research/demographic/reports/estimates/e-1/2009-10/documents/E-1_2010.xls. The estimated number of licensed drivers for the total Sacramento nonattainment area in 2010, therefore, was 1,447,679: Sacramento Metropolitan AQMD: total 921,168 + Yolo-Solano: total of 203,685 (124,371 in Yolo County + Solano County: 273,494 * 29% for the proportion located within the Air Quality district = 79,313) + Placer County: total of 226,309 (260,125 * 87% for Air Quality district) + El Dorado County: total of 96,518 (141,938 * 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.

⁶⁷ Estimates were based on the EMFAC 2007 v 2.3 model, for the summer of 2010, provided by Charles Anderson, Program Coordinator, SMAQMD Planning & Emission Inventory & Steven Lau, SMAQMD Air Quality Planner, in an e-mail dated November 23, 2010. The total ROG tons for a combined total of light duty passenger cars and two categories of light duty trucks (8.08 + 2.0 + 4.31) 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. 3,154,100 for light duty passenger cars + 655,333 for light duty trucks1 + 1,409,190 for light duty trucks2) in order to obtain the average grams per trip. The same process was used to calculate NOx grams per trip (4.99 + 1.47 + 4.24) x 2000 x 454 / (3,154,100 + 655,333 + 1,409,190). ROG grams and NOx grams were then combined (2.50 + 1.86) to obtain 4.37 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.

⁶⁸ There are 907,200 grams in a ton.



How Have You Reduced Driving This Summer?



A few representative comments⁶⁹ from those who used alternative transportation (to driving alone) are listed below. Note that any specific references to Spare The Air are marked in bold>.

- “A lot of times I ride my bike to work.
- Took the bus this year to reduce the air pollution, to work.
- By carpooling. Trying to drive less frequently. I got a bicycle and I look forward to getting out on that more.
- We carpool. Probably nothing at the present time, it hasn't been over a hundred for more than three days for this year, when it's over a hundred we usually take the commuter bus into the city.
- I carpool as often as possible. I can't carpool on Fridays, but I carpool two to three days a week. I try to limit the amount of trips that I take out of here. We bought a Toyota to reduce the rate of fuel and pollution.
- Walking to the park rather than driving. Walking to school and places near me, rather than driving.
- By not driving my car. Either I bicycle or mass transit.
- Walk and carpool.
- By riding my bike. I always carpool whenever possible, I would say.
- Carpooling with friends, or riding my bike around, if I have to go to a store, rather than driving.
- Walked places, rode my bike, and carpooled.
- For the air pollution to decrease I cut back on where I have to go, and we walk if it is to the park or to the school.
- Walking and riding bikes. I just do it for the exercise. Use the bus or transportation going in the same direction to save the air.

⁶⁹ The complete transcripts of all responses are available in the statistical file.



- We try to carpool. Only carpool. We do carpooling with two friends. To shopping or to the market and stuff.
- Well, more carpooling and having more occupants in the vehicle. Combining trips instead of making one trip to bank and grocery store. Occasionally bicycle places. We do own a hybrid.
- Use my bike to pick up kid at the daycare center.
- Taking the transit. Public transportation. I think that it needs to be cleaned up as much as possible. I think that they should have more carpooling and I think that they should reduce the money needed for public transit, then they would have more riders.
- I have a child who's in elementary school. We rode our bikes to the store versus taking the truck and we walked to the store and library.
- I have car pooled with friends, and I don't drive during the day when it's hot or car pool when it's hot.
- I ride my bike to the bus.
- I take the bus more to work now.
- I walk as many times as I can, along with biking and carpooling.
- Instead of driving, I walk or I take a bike, or I do all my shopping in the morning.
- Part of the reason I decided to ride my bike was for air pollution and exercise.
- Ride bicycle. Walk. Because I do not want to use my car to prevent air pollution. Because I want to keep my environment as clean as possible. Well, can I say, I save money."

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

- "By decreasing the number of trips. And by decreasing the distance I drive.
- Choosing not to go somewhere.
- By staying home.
- Do not go anywhere, it's too hot.
- Don't go very many places when it's hot. I wait until it's cool.
- Don't make as many trips.
- For example, today, I have not left the house in an effort to decrease air pollution.
- Go out less.
- Haven't gone as many places as I normally do.
- I've taken less trips out of town and less trips to visit and recreate.
- I didn't go out to go yard-saleing. I'm pretty conservative on my driving.
- I drive less, stay away from peak hours. Oh, and stay off of freeways.
- I drove fewer miles and I went slower.
- I try to pick a store that's closest to home, I try to reduce our negativity on our environment. I think it's important that everybody try to conserve, conserve everything in regards to water, gas, anything that we use and I'm resourceful and I try not to be wasteful, I've been a girl scout since I was a girl, and I'm a girl scout leader, and as a mother I try to tell the kids we share this world but I think that we should care as a human in regard having empathy for other life forms on our earth.
- Just driven less, probably delayed trips.
- Just stay home. Just try to stay in the area and not on the freeways.
- Less time away from the house, I guess you could say. I stay home. Less vacation.
- Limited trips to one day a week.
- Oh, I do the best I can. I don't travel, I don't take vacations, I don't barbecue. Well, because I know the air quality is really bad here, and I'm trying to minimize my contribution. I realize we need to contribute to our quality of life.
- Taking sack lunch, so I don't have to drive to get lunch, and carpooling.
- To cut down on air pollution, I don't go as many places. I don't really think that it is that big of a problem though.
- We just don't go out as many places when it is hot. We just plan trips, when it's more like in the fall. So we don't have to go out, on the **Spare the Air** days. And when it is hot, it's bothersome, the pollution, it's bothersome, so we live up in the mountains."



A few representative comments by those who combined trips include:

- “Better planning. Multiple places in one trip. I would say, we try and take care of business and do more than one thing.
- Combined trips. I will wait until I have a number of things to do in the same area to do then combine trip.
- If I were to make a trip somewhere, I make sure if there's more than one place I need to go, I make sure I do all the places at one time, instead of driving back and forth.
- By planning trips more carefully and altering my driving habits so that I'm in the car less.
- Combined stuff. Instead of doing one trip for one thing, combining trips.
- Consolidating chores and reducing the amount of driving just for pleasurable activities. In other words, not going out if I don't have to in a car.
- Do multiple things on the same trip.
- I combined errands and try to make them in a line, so I am not zigzagging across town. Planning my trips so I am not zigzagging. Planning my errands.
- I make sure when I go somewhere that it's first something I have to do, and while I'm out, I make sure I have other errands that can be done in the same vicinity.
- Combining all the errands all in one day.
- I put errands together to one trip to reduce mileage. Good, I get everything done at once, and I reduce money in gas. It reduces pollution. I keep the tires inflated and my car tuned up.
- I try to consolidate appointments because I drive a lot for work so I try to see everyone in the same area.
- Once I leave, I do all my errands in one swoop, and I drive within the speed limit.
- Trying to combine chores that I have to do. If I know that I'll be driving in a certain direction tomorrow, I may put off buying something in that direction until tomorrow.
- Consolidate trips so we don't go out as much.
- We try to combine trips and try to get several things done at the same time. If my wife and I have errands we try and combine them together.”

Year-To-Year Comparisons

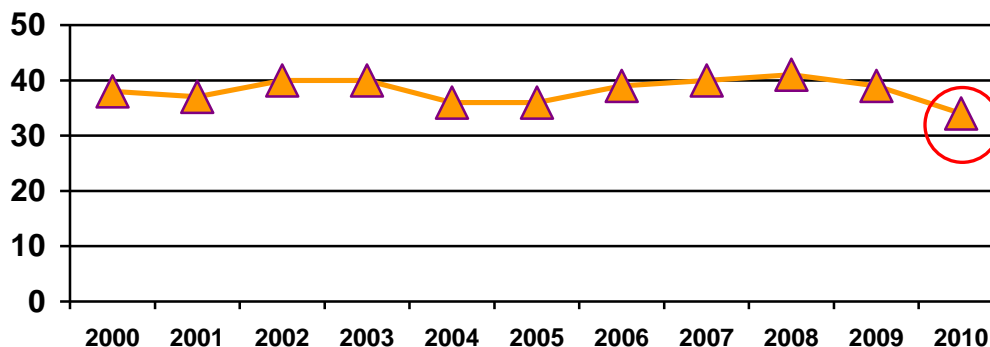
28 ➤ *This year's percentage of seasonal reducers in the Sacramento Core Region, although down from the previous four years, is not significantly different from the 11-year average of 38%.*

The 11-year analysis excludes respondents from El Dorado County AQMD as they were not interviewed in evaluations prior to 2004. Results from the Sacramento Core Region (SMAQMD, Yolo-Solano AQMD and Placer County APCD) have been appropriately re-weighted. As can be seen in the next graph, prior to this year, the percentage of respondents who said they usually reduce the amount of driving they do during the summer to avoid adding to air pollution has remained relatively stable. This year showed a decline to 34%, but that is in keeping with previous results from 2010, when both awareness of Spare The Air and purposeful driving reduction were found to be lower as well. This past summer was different from previous years in that environmental issues may have taken a back seat to other issues. (A complete description of the anomalous nature of the summer of 2010 was given in the Awareness of the 2010 Spare The Air Campaign report.)

This year's results do not differ significantly from the 11-year average of 38%.



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



- 29 ➤ *The 11-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.*

The next table shows the average numbers of self-reported trips made by respondents⁷⁰ the day before the interview for the last 11 years. In every year since 2000, seasonal reducers reported making significantly fewer trips than the group who said they do not usually reduce driving during the summer. 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.)

<i>Year</i>	<i>Seasonal Driving Reducers: Mean # Times Entered Vehicle</i>	<i>Non-Reducers: Mean # Times Entered Vehicle</i>	<i>Difference (Mean Number of Daily Single Trips Avoided by Seasonal Reducers)</i>	<i>Statistically Significant Difference?</i>
2000	3.6	4.1	0.5	Yes
2001	3.1	4.2	1.1	Yes
2002	3.1	4.1	1.0	Yes
2003	3.1	4.2	1.1	Yes

⁷⁰ 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.



<i>2004</i>	<i>3.4</i>	<i>3.9</i>	<i>0.5</i>	<i>Yes</i>
<i>2005</i>	<i>3.0</i>	<i>3.5</i>	<i>0.5</i>	<i>Yes</i>
<i>2006</i>	<i>2.9</i>	<i>3.6</i>	<i>0.7</i>	<i>Yes</i>
<i>2007</i>	<i>3.2</i>	<i>3.8</i>	<i>0.6</i>	<i>Yes</i>
<i>2008</i>	<i>2.9</i>	<i>3.3</i>	<i>0.4</i>	<i>Yes</i>
<i>2009</i>	<i>2.6</i>	<i>3.4</i>	<i>0.8</i>	<i>Yes</i>
<i>2010</i>	<i>2.9</i>	<i>3.8</i>	<i>0.9</i>	<i>Yes</i>