Spare The Air Evaluation
2019 Survey Summary & Report

designed & conducted for the
Sac Metro Air District



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INTRODUCTION

The Sacramento Metropolitan Air Quality Management District (Sac Metro Air District) was created under Health and Safety Code Sections 40960 et. seq. to monitor, promote, and improve air quality in the County of Sacramento, as well as neighboring jurisdictions within the Sacramento Federal Ozone Nonattainment Area[1] for ozone standards. One of 35 regional air quality districts in California, the Sac Metro Air District is responsible for monitoring air pollution within the basin and for developing and administering programs to reduce air pollution levels below the health-based standards established by the state and federal governments.

To this end, the Spare The Air Program was established in 1995 to educate residents about air pollution and to encourage them to modify their behavior to reduce and prevent it. During the summer ozone season (May to October), the Spare The Air Program conducts an episodic public education campaign designed to encourage the public to reduce their driving on days that are expected to violate ozone air quality standards. In recent years, these outreach efforts have included radio, television, newspaper, digital and outdoor billboard advertising featuring various air quality tips, a website (www.SpareTheAir.com) including "Scooter's World" for children, daily social media posts (Facebook, Twitter, Instagram, and Pinterest), the Sacramento Region Air Quality app, community events, and the distribution of newsletter articles and other materials to over 4,000 business and community partners.

PURPOSE OF STUDY The motivation for the current study was to design and employ a methodology that would accurately assess the effectiveness of the Spare The Air program. Conducted annually since 1995 (with the exception of 1997), the study measures public awareness of the Spare The Air program, driving behaviors and changes that can be attributed to the program, health issues associated with air pollution, and estimates the emission reductions that can be attributed to Spare The Air.

More specifically, the study was designed to:

- Measure general awareness of air quality messages and specific episodic requests not to drive on Spare The Air days among drivers in the Sacramento Nonattainment Area.
- 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.
- Estimate emission reductions from the trips reduced during Spare The Air episodes.
- Compare awareness of the Spare The Air campaign and driving reduction among the individual districts in the Sacramento Nonattainment Area.
- Estimate the percentage of drivers who habitually drive less during the summer season to improve air quality, and estimate the emission reductions from this group of seasonal reducers.
- Track awareness and behavioral changes over time.

1. For study purposes, the Sacramento Nonattainment Area was defined as all of Sacramento and Yolo Counties, the eastern portion of Solano County, and the western slopes of El Dorado and Placer Counties up to the Sierra crest.

OVERVIEW OF METHODOLOGY A full description of the methodology used for this study is included later in this report (see *Methodology* on page 35). In brief, a total of 1,350 randomly selected adult residents in the Sacramento Nonattainment Area participated in a survey on a night following one of the region's six Spare The Air days (650 respondents) or the night following a control day (650 respondents). Control days were matched for the same day of the week as the Spare The Air days and excluded rainy days. Administered in English and Spanish during the 2019 summer ozone season (May to October), the average telephone interview lasted six minutes.

STATISTICAL SIGNIFICANCE Many of the figures and tables in this report present the results of questions asked in 2019 alongside results found in prior surveys for identical questions. In such cases, True North conducted the appropriate tests of statistical significance to identify changes that likely reflect actual changes in public opinion or stated behavior from the last survey (2018) to the current survey (2019)—as opposed to being due to chance associated with selecting two samples independently and at random. Differences between the two studies are identified as *statistically significant* if one can be 95% confident that the differences reflect an actual change in public opinion or stated behavior between the two studies. Where appropriate, significance testing was also utilized to assess differences between groups of interest, such as Spare The Air respondents and control respondents or seasonal reducers and non-reducers. Statistically significant differences within response categories over time or between groups are denoted by the † symbol, which appears in the figure next to the appropriate response value.

ORGANIZATION OF REPORT This report is designed to meet the needs of readers who prefer a summary of the findings as well as those who are interested in the details of the results. For those who seek an overview of the findings, the section titled *Key Findings* is for you. It provides a summary of the most important factual findings of the survey and a discussion of their implications. For the interested reader, this section is followed by a more detailed discussion of the results from the survey by topic area (see *Table of Contents*), as well as a description of the methodology employed for collecting and analyzing the data. And, for the truly ambitious reader, the questionnaire used for the interviews is contained at the back of this report (see *Questionnaire & Toplines* on page 41) and a complete set of crosstabulations for the survey results is contained in Appendix A.

ACKNOWLEDGEMENTS True North thanks Lori Kobza (Sac Metro Air District), Lori Prosio (Prosio Communications), and Lindsay Pangburn (Prosio Communications) for their valuable input during the design and reporting stages of this study. Their expertise and insight improved the overall quality of the research presented here.

DISCLAIMER The statements and conclusions in this report are those of the authors, Dr. Timothy McLarney and Richard Sarles at True North Research, Inc. (True North), and not necessarily those of the Sac Metro Air District. Any errors or omissions are the responsibility of the authors.

ABOUT TRUE NORTH True North is a full-service survey research firm that is dedicated to providing public agencies with a clear understanding of the values, perceptions, opinions, and behaviors of their residents and customers. Through designing and implementing scientific sur-

veys, focus groups, and one-on-one interviews, as well as expert interpretation of the findings, True North helps its clients to move with confidence when making strategic decisions in a variety of areas, such as planning, policy evaluation, performance management, and developing effective public information campaigns.

During their careers, Dr. McLarney (President) and Mr. Sarles (Principal Researcher) have designed and conducted over 1,000 survey research studies for public agencies, including dozens of studies related to air quality and Spare The Air public education programs.

Key Findings

As noted in the *Introduction*, the primary purpose of this study was to gather information that will assist the Sac Metro Air District with evaluating the effectiveness of its Spare The Air outreach program that encourages the public to reduce driving on days that are expected to violate ozone air quality standards. Whereas subsequent sections of this report are devoted to conveying the detailed results of the study, in this section we attempt to 'see the forest through the trees' and note how the collective results answer the key questions that motivated the research.

How many drivers in the Sacramento Nonattainment Area are aware of Spare The Air advertisements and the specific request not to drive on Spare The Air days?

During the 2019 summer season, 22% of residents in the Sacramento Nonattainment Area who had driven in the week prior to the interview had heard, read, or seen commercials, news broadcasts, or information online about Spare The Air, poor air quality, or requests to drive less in the two days prior to the interview. Levels of **general awareness** for Spare The Air advertisements ranged from 20% among respondents in Sac Metro Air District to 33% among those in El Dorado County Air Quality Management District (AQMD). With the level of general awareness of Spare The Air at 22%, this translates into an estimated 356,145 drivers 18 years and older in the Sacramento Nonattainment Area who were aware of the 2019 Spare The Air campaign in general.

Overall, 13% of the region's respondents who were interviewed on control days indicated general awareness of Spare The Air advertisements. As would be expected, significantly more of those interviewed after Spare The Air days recalled the messaging (22%). The results indicate that the media purchases were effective at reaching drivers in the Sacramento region throughout the season, although this was particularly the case following Spare The Air days when respondents also had the opportunity to be exposed to notices related to a specific episode.

When asked if they specifically recalled being asked not to drive on the day prior to the interview because the area was experiencing a period of unhealthy or smoggy air, 9% of respondents recalled this specific request. Levels of **specific awareness** for the Spare The Air alerts ranged from 6% in Placer County Air Pollution Control District (APCD) to 18% in El Dorado County AQMD. For the entire Sacramento Nonattainment Area, and after correcting for control day responses,[2] this translates into an estimated 114,278 drivers 18 years and older who were specifically aware of the requests not to drive on Spare The Air days.

The 2019 summer season experienced six Spare The Air days, far fewer than occurred during the past three seasons. Examining both general and specific awareness of the Spare The Air campaign finds that awareness levels were lower in 2019 for the Sacramento Nonattainment Area

2. Approximately 2% of respondents erroneously recalled requests not to drive on control days. This percentage (2%) is subtracted from the 9% who recalled a similar request on Spare The Air days before estimating the number of drivers who were aware of specific Spare The Air alerts.

as a whole when compared to the prior year (2018) as well as the 10-year historic averages. This pattern appears to continue a long-term trend. With a few seasonal exceptions (such as 2018 when wildfires were rampant), there has been a slow, reasonably steady decline in both general and specific awareness levels in the Sacramento Nonattainment Area since 2010. This declining trend is driven by respondents within Sac Metro Air District and Yolo-Solano AQMD, which collectively comprise 75% of the adult driving population in the Sacramento Nonattainment Area.

How many residents purposefully reduced their driving on Spare The Air days as a result of the campaign?

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 California Air Resources Board (ARB), the following strict 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* that they do so purposefully to help reduce air pollution on Spare The Air days. As such, these drivers are labeled "purposeful reducers."

The majority of respondents did not make any changes in their driving behavior on a Spare The Air day, with 57% in the Sacramento Nonattainment Area stating they drove the same as usual. Approximately one-fifth of drivers indicated they drove less (22%), whereas a similar percentage indicated that they drove more (21%) when interviewed about a recent Spare The Air day. On average, those who drove less on a Spare The Air day reported driving 18 miles less than normal. The average number of vehicle miles reduced by those who said they drove less on a Spare The Air day ranged from 7 miles in Yolo-Solano AQMD to 27 miles in Placer County APCD.

For the Sacramento Nonattainment Area, 0.11% of Spare The Air respondents met the strict ARB standard for purposeful driving reduction, which translated to an estimated **1,827 purposeful reducers per Spare The Air episode** for the 2019 season. Among the individual districts, Sac Metro Air District was the only one to record purposeful reduction, with all 1,827 estimated reducers in that district. No significant differences were found for the Sacramento Nonattainment Area or its four districts when comparing the 2019 results to 2018 or the 10-year averages for the percentage of purposeful reducers. The mean number of single trips avoided in the Sacramento Nonattainment Area among purposeful reducers was 2.96, **resulting in a total of 5,410 trips avoided per episode directly attributed to the Spare The Air program.**

What are the estimated emission reductions that can be attributed to the Spare The Air program?

Having measured purposeful reducers and their average trip reduction, True North is able to estimate how many tons of ozone precursor emissions [Reactive Organic Gases (ROG) and Nitrogen Oxides (NOx)] were reduced during the 2019 season that can be attributed directly to the Spare The Air program. In order not to overestimate possible reductions, a correction factor based on control day interviewing was applied. Results, therefore, are very conservative. For the Sacramento Nonattainment Area as a whole, an estimated total of **0.015 tons of ozone precursors were reduced per Spare The Air day**, or 0.088 total tons of pollutants for the six episodes during the 2019 summer season.

How many residents reduce driving during the summer season to avoid adding to air pollution?

There is a group of residents who usually drive less to help improve air quality in the region during the summer months. Some of these individuals may not qualify as purposeful (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), but they nonetheless contribute to voluntary emissions reductions during the summer months.

Seasonal driving reducers are defined as those who say they usually reduce the amount of driving they do during the summer months to avoid adding to air pollution. In large part, they can be considered Spare The Air "success" stories—they understand that driving is a significant contributor to air pollution particularly through the summer months, and have incorporated it into their actual driving behavior by reducing the number of vehicle trips they make during the summer. For the entire Sacramento Nonattainment Area, 28% of all respondents in 2019 (Spare The Air and control respondents) can be considered seasonal driving reducers.

Seasonal reducers reported that they entered their vehicles to drive the previous day an average of 2.65 times, whereas respondents who said they did not usually reduce their amount of driving during the summer (i.e., non-reducers) self-reported entering their vehicles to drive more frequently (an average of 3.88 times). Seasonal driving reducers made 1.23 fewer trips per day on average than did non-reducers during the 2019 season, which represents a statistically significant difference between the two groups and is a larger gap than found in the past. **The pattern of self-reported seasonal reducers entering their vehicle to drive fewer times than non-reducers is present in all prior studies of the impacts of the Sacramento region's Spare The Air program and is a major indicator of the success of the program.**

The 28% of 2019 seasonal reducers translates into **just under half a million drivers 18 years and older** (467,008) in the entire Sacramento Nonattainment Area. **The average of 1.23 trips per day that seasonal reducers avoided translates into an estimated 1.56 tons of ozone precursors reduced per summer day in 2019.**

When asked to elaborate on how they reduce driving during the summer, more than four-in-ten seasonal reducers (44%) indicated that they "just drove less," often by staying home or by avoiding joy rides and extra trips, whereas 32% said they used alternative transportation, such as walking, carpooling, biking, or public transit to avoid driving during the summer.

What types of health issues are experienced on Spare The Air days?

Overall, 15% of respondents interviewed following a Spare The Air episode reported that at least one person in their household experienced health problems on the Spare The Air day such as burning eyes, headaches, coughing, or difficulty breathing. Reported health impacts on Spare The Air days were significantly lower in 2019 when compared to 2018, although it should be noted that 2018 witnessed larger and more impactful wildfires that kept smoke in the air far more often than in 2019.

Campaign Awareness

The Spare The Air season runs from May through October of each year, and in 2019 there were six Spare The Air days.[3] One of the principal goals of this study was to gauge public awareness of the Spare The Air campaign and its specific request not to drive during times of unhealthy air quality. Strategically placed after collecting information on respondents' driving habits and behaviors, questions 10-13 assessed campaign awareness and the source of the message. To avoid a systematic position bias where the order in which a question is asked can influence the results, half of the respondents received Question 10 (specific awareness) first and the other half received Question 11 (general awareness) first.

GENERAL AWARENESS In 2019, 22% of residents in the Sacramento Nonattainment Area who had driven in the week prior to the interview had heard, read, or seen commercials, news broadcasts, or information online about Spare The Air, poor air quality, or requests to drive less in the two days prior to the interview. As shown in Figure 1, levels of general awareness for Spare The Air advertisements ranged from 20% among respondents in Sac Metro Air District to 33% among those in El Dorado County AQMD.

Question 11 *In the past two days have you heard, read, or seen any commercials, news broadcasts or information online about Spare The Air, poor air quality, or requests to drive less in this area?*

Figure 1 General Awareness of STA Advertisements by District

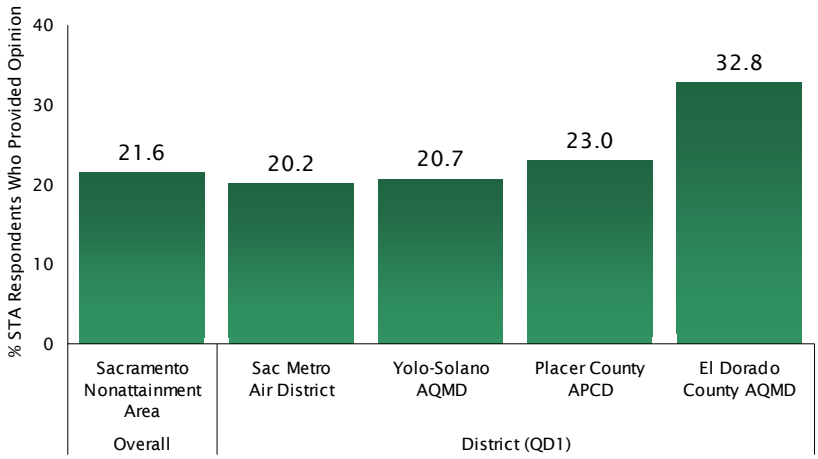
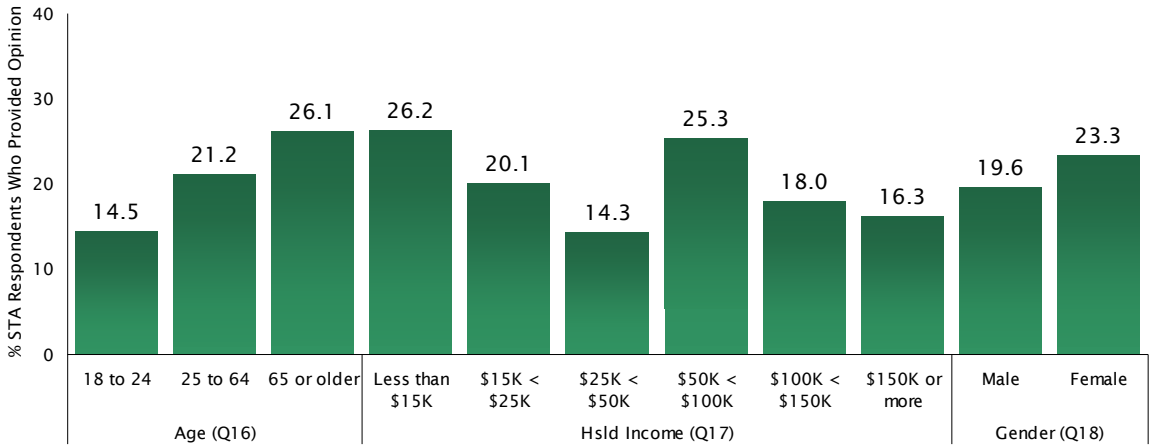


Figure 2 on the next page displays general awareness of Spare The Air advertisements within the Sacramento Nonattainment Area by respondents' age, household income, and gender. Of particular note is the positive, linear relationship between general awareness and age.

3. See *Methodology* on page 35 for a complete list of 2019 Spare The Air episodes.

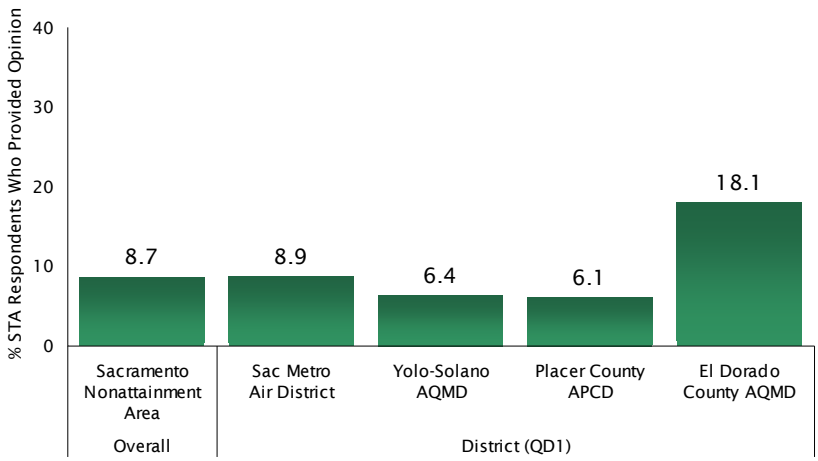
FIGURE 2 GENERAL AWARENESS OF STA ADVERTISEMENTS BY AGE, HOUSEHOLD INCOME & GENDER



SPECIFIC AWARENESS When asked if they specifically recalled being asked not to drive yesterday because the area was experiencing a period of unhealthy or smoggy air, 9% of respondents recalled this specific request (see Figure 3). Levels of specific awareness for Spare The Air alerts ranged from 6% in Placer County APCD to 18% in El Dorado County AQMD.

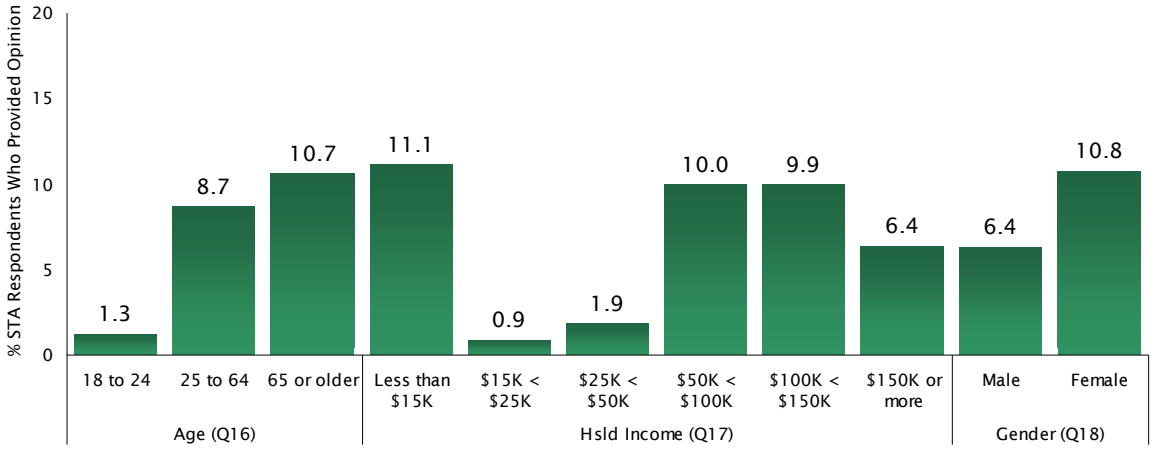
Question 10 *Do you recall being asked not to drive yesterday because our area was experiencing a period of unhealthy or smoggy air?*

FIGURE 3 SPECIFIC AWARENESS OF REQUEST NOT TO DRIVE ON STA DAYS BY DISTRICT



For the interested reader, Figure 4 on the following page displays specific awareness of the request not to drive on a Spare The Air day by respondents' age, household income, and gender within the Sacramento Nonattainment Area.

FIGURE 4 SPECIFIC AWARENESS OF REQUEST NOT TO DRIVE ON STA DAYS BY AGE, HOUSEHOLD INCOME & GENDER



YEAR-TO-YEAR COMPARISONS OF AWARENESS: SACRAMENTO NONATTAINMENT AREA The 2019 summer season experienced six Spare The Air days, significantly fewer than each of the past three years (Figure 5). Examining both general and specific awareness of the Spare The Air campaign from 2010 to 2019 shows that awareness levels were lower in 2019 for the Sacramento Nonattainment Area as a whole (Figure 6 on the next page), with levels significantly lower than in 2018 and when compared to the 10-year historic averages (general awareness: 34%, specific awareness: 15%). There is no clear relationship between awareness (general or specific) from 2010 through 2019 and the number of Spare The Air days in each year. With a few seasonal exceptions, there has been a slow, but steady decline in both general and specific awareness levels in the Sacramento Nonattainment Area since 2010. As shown in *Year-to-Year Comparisons by District* starting on page 12, this declining trend is driven by respondents within Sac Metro Air District and Yolo-Solano AQMD, which collectively comprise 75% of the adult driving population in the Sacramento Nonattainment Area.

FIGURE 5 NUMBER OF STA DAYS BY STUDY YEAR

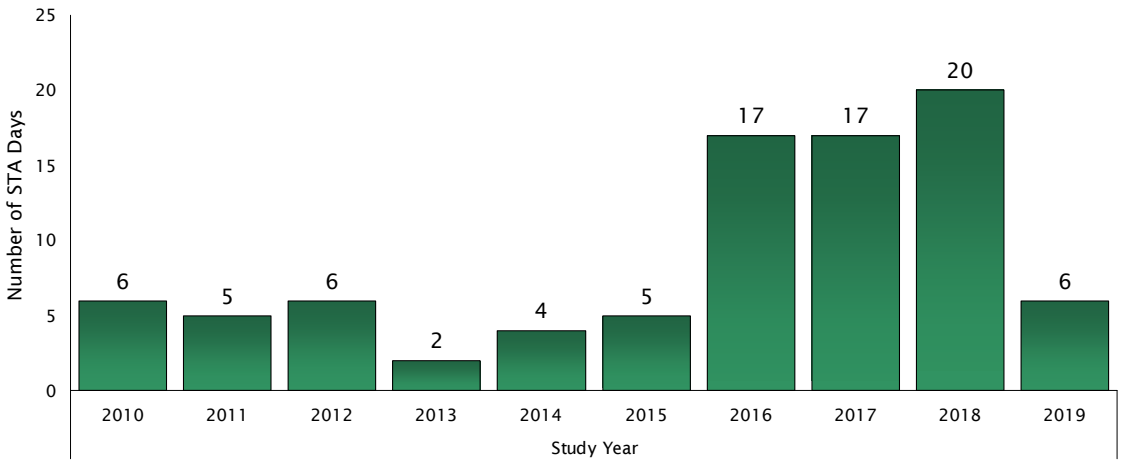
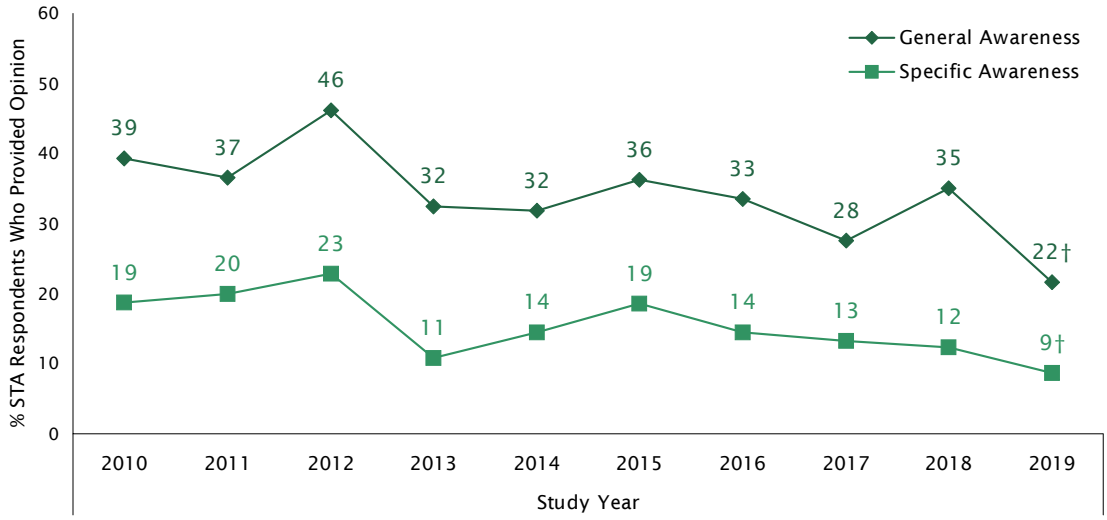


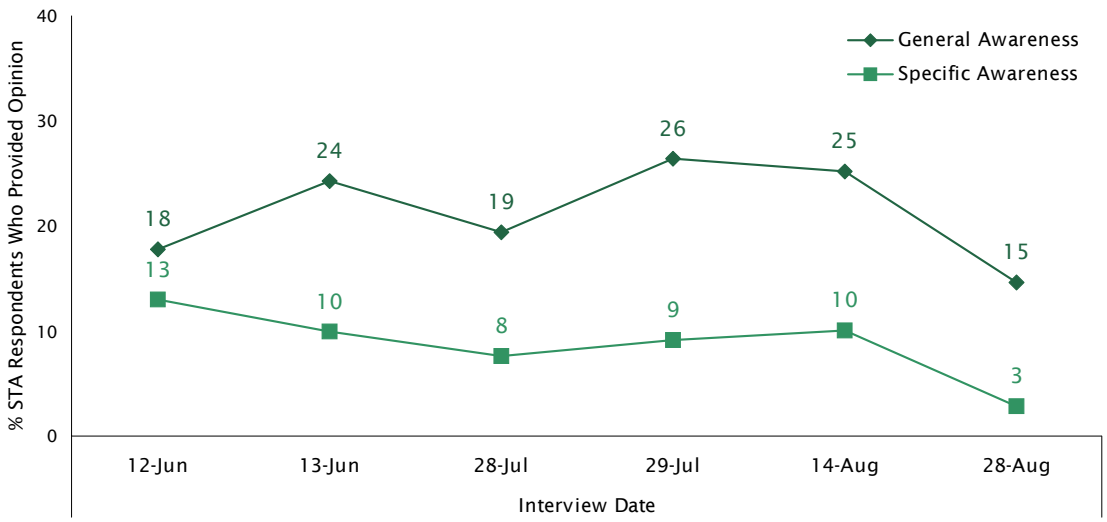
FIGURE 6 AWARENESS OF STA CAMPAIGN BY STUDY YEAR: SACRAMENTO NONATTAINMENT AREA



† Statistically significant change ($p < 0.05$) between the 2018 and 2019 studies.

Figure 7 displays general and specific awareness on each interviewed Spare The Air day.[4] The 2019 season experienced two multi-day episodes, which allow us to further explore the analysis presented in the 2018 report showing that multi-day episodes result in greater awareness levels. There was a clear increase in general awareness within each two-day episode in 2019, but specific awareness remained relatively consistent within each period.

FIGURE 7 AWARENESS OF STA CAMPAIGN BY DATE: SACRAMENTO NONATTAINMENT AREA

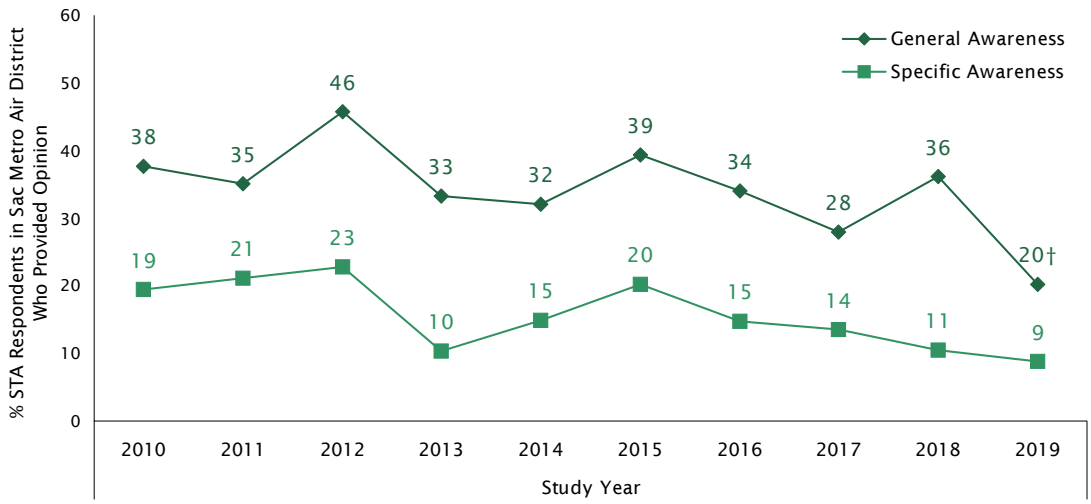


4. Interviews were conducted on the night following each Spare The Air day. For example, the June 12th interview date assessed awareness for the June 11th Spare The Air day.

YEAR-TO-YEAR COMPARISONS OF AWARENESS: SAC METRO AIR DISTRICT

In 2019, 20% of respondents within the Sac Metro Air District reported general awareness and 9% reported specific awareness, both of which are lower than the historic 10-year averages within the Sac Metro Air District (34% and 16%, respectively). Although there was a statistically significant decline in general awareness from 2018 to 2019, specific awareness remained statistically consistent over the past year.

FIGURE 8 AWARENESS OF STA CAMPAIGN BY STUDY YEAR: SAC METRO AIR DISTRICT

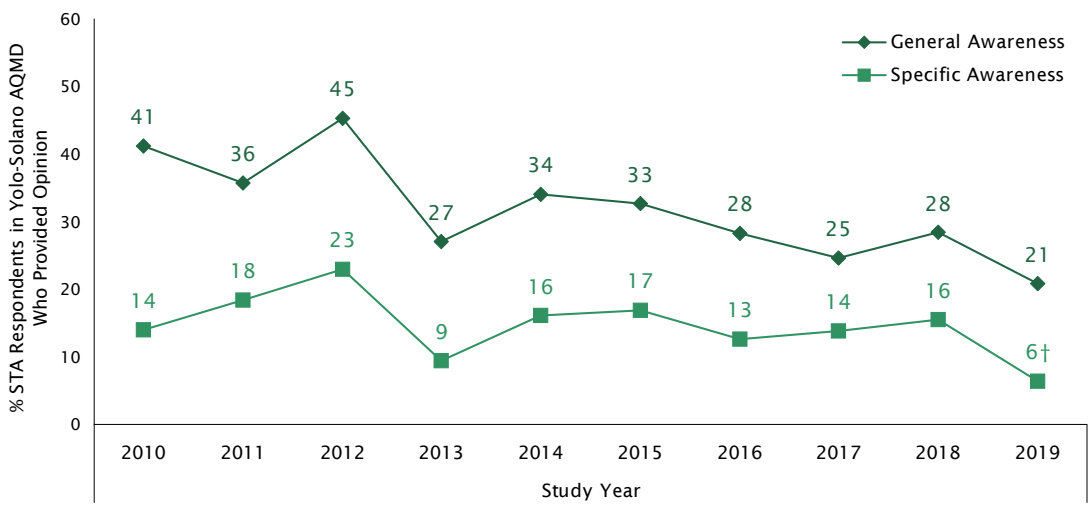


† Statistically significant change ($p < 0.05$) between the 2018 and 2019 studies.

YEAR-TO-YEAR COMPARISONS OF AWARENESS: YOLO-SOLANO AQMD

Figure 9 shows annual awareness of the Spare The Air campaign within the Yolo-Solano AQMD. In 2019, general awareness (21%) and specific awareness (6%) were significantly lower than the 10-year averages for Yolo-Solano AQMD (32% and 15%, respectively). Both general and specific awareness levels exhibited declines from the levels reported in 2018, although the difference was not statistically significant for general awareness.

FIGURE 9 AWARENESS OF STA CAMPAIGN BY STUDY YEAR: YOLO-SOLANO AQMD

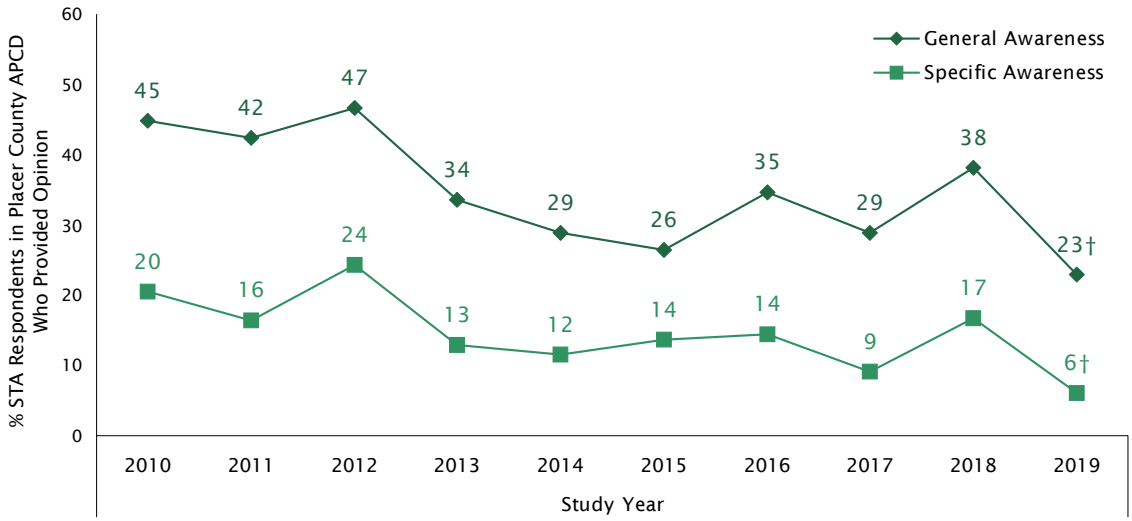


† Statistically significant change ($p < 0.05$) between the 2018 and 2019 studies.

YEAR-TO-YEAR COMPARISONS OF AWARENESS: PLACER COUNTY APCD

In 2019, 23% of respondents within the Placer County APCD reported general awareness and 6% reported specific awareness. Both general and specific awareness experienced statistically significant declines over the past year, as well as compared with the historic 10-year averages for Placer County APCD (35% and 15%, respectively).

FIGURE 10 AWARENESS OF STA CAMPAIGN BY STUDY YEAR: PLACER COUNTY APCD

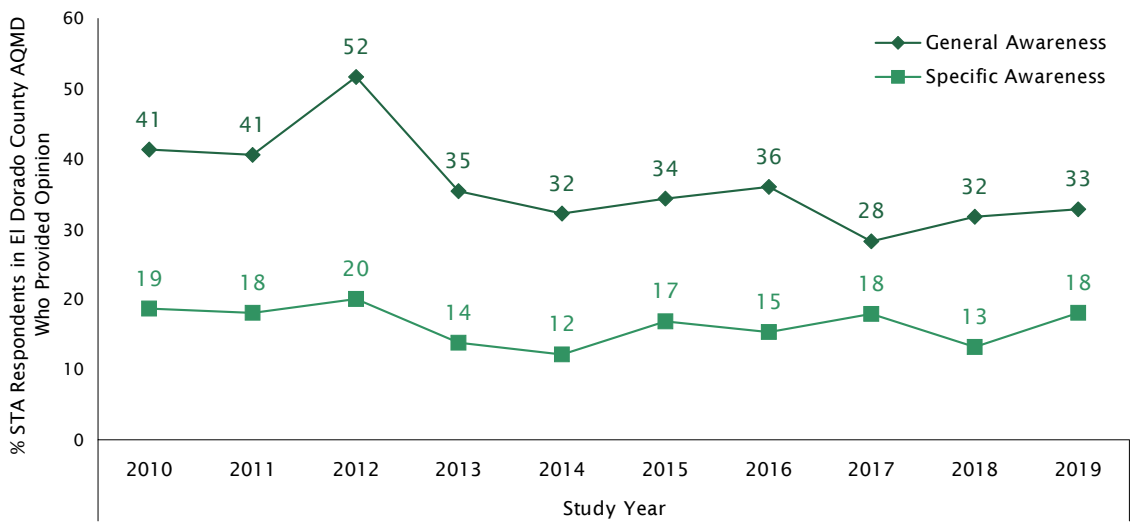


† Statistically significant change ($p < 0.05$) between the 2018 and 2019 studies.

YEAR-TO-YEAR COMPARISONS OF AWARENESS: EL DORADO COUNTY AQMD

Figure 11 presents annual awareness of the Spare The Air campaign within the El Dorado County AQMD. In 2019, both general awareness (33%) and specific awareness (18%) remained statistically consistent with the 10-year averages for the district (36% and 16%, respectively), as well as the levels reported in 2018.

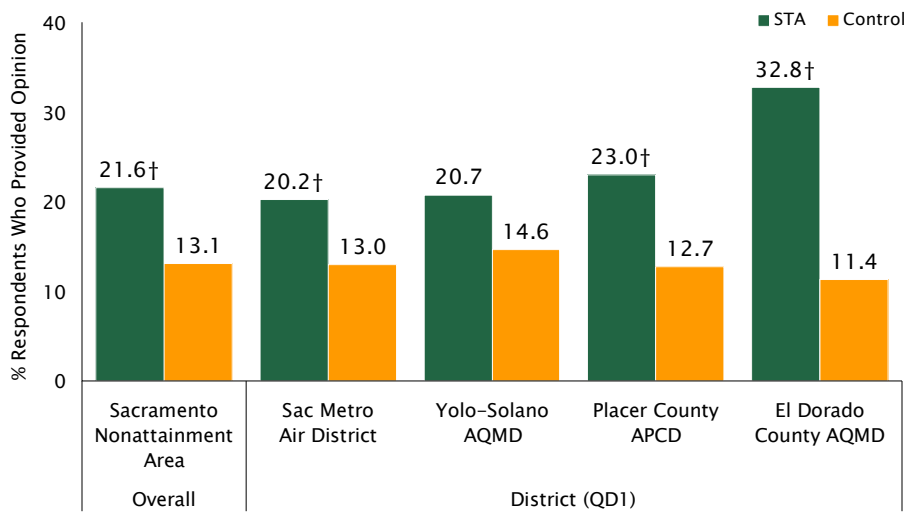
FIGURE 11 AWARENESS OF STA CAMPAIGN BY STUDY YEAR: EL DORADO COUNTY AQMD



AWARENESS: SPARE THE AIR VS. CONTROL DAYS The next section of the report compares general and specific awareness levels on Spare The Air days and control days. Control day interviews were conducted on non-Spare The Air days using the same random sampling methodology as Spare The Air days (see *Methodology* on page 35). Control interviews took place on the same days of the week as the Spare The Air interviews (but on a day that was not a Spare The Air day), and the same survey instrument was used for both groups. The use of a control group ensures that any positive results attributed to the Spare The Air program are due to the program itself and not to a possible social desirability response bias. Figure 12 displays the results for general awareness among Spare The Air and control respondents both overall and by district, and Figure 13 on the next page shows the same analysis for specific awareness.

Overall, 13% of the region's respondents who were interviewed on control days indicated that they had heard, read, or seen commercials, news broadcasts, or information online about Spare The Air, poor air quality, or requests to drive less. As would be expected, significantly more of those interviewed after Spare The Air days remembered the messaging (22% vs. 13%). Figure 12 also shows the general awareness results within each of the individual districts. Recall was higher on Spare The Air days compared to control days within each district, and achieved statistical significance in Sac Metro Air District, Placer County APCD, and El Dorado County AQMD.

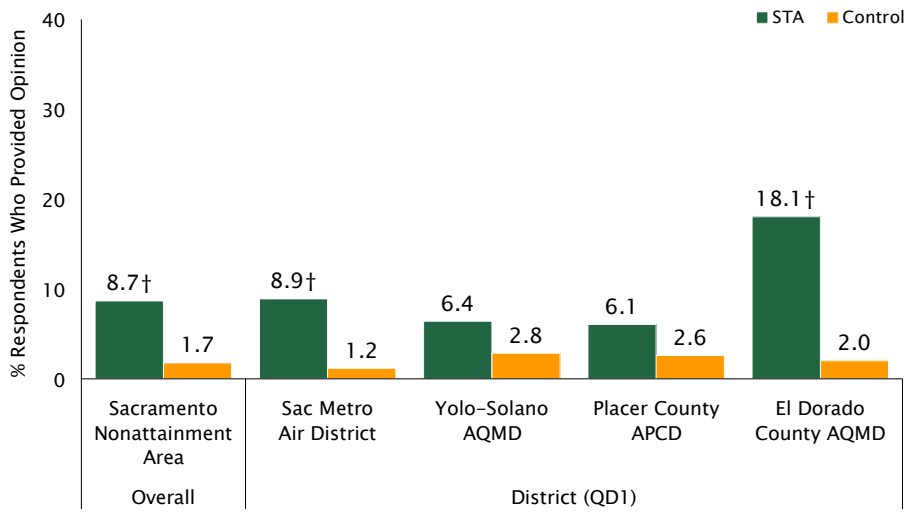
FIGURE 12 2019 GENERAL AWARENESS BY DISTRICT: STA VS. CONTROL



† Statistically significant change ($p < 0.05$) between STA and control groups.

Turning to specific awareness, 2% of control respondents in the Sacramento Nonattainment Area incorrectly recalled being asked not to drive on the day preceding the interview compared with 9% who correctly remembered the request following a Spare The Air day. Examining the results by district reveals that statistical significance was also achieved within Sac Metro Air District (9% vs. 1%) and El Dorado County AQMD (18% vs. 2%). Although respondents interviewed following Spare The Air days in Yolo-Solano AQMD and Placer County APCD were more likely to recall the request not to drive than control day respondents, the differences were not statistically significant.

FIGURE 13 2019 SPECIFIC AWARENESS BY DISTRICT: STA VS. CONTROL



† Statistically significant change ($p < 0.05$) between STA and control groups.

ESTIMATED NUMBER OF SPARE THE AIR-AWARE DRIVERS There were an estimated 1,651,624 drivers 18 years and older in the entire Sacramento Nonattainment Area in the summer of 2019.[5] With the level of general awareness of Spare The Air at 22%, this translates into an estimated 356,145 drivers in the Sacramento Nonattainment Area who were aware of the 2019 Spare The Air campaign in general. Table 1 displays the calculations and the estimated number of drivers who heard, read, or saw Spare The Air media in each individual district.[6]

TABLE 1 ESTIMATED NUMBER OF DRIVERS WITH GENERAL AWARENESS OF STA ADVERTISEMENTS[7]

	Total Estimated Number of Drivers 18 yrs +	Percent Aware of STA (General Awareness)	Estimated Number of Drivers Aware of STA in General
Sacramento Nonattainment Area	**1,651,624**	**21.6**	**356,145**
Sac Metro Air District	1,013,246	20.2	205,074
Yolo-Solano AQMD	231,331	20.7	47,996
Placer County APCD	287,951	23.0	66,159
El Dorado County AQMD	119,096	32.8	39,015

5. The number of drivers 18 years and older in the Sacramento Nonattainment Area for 2019 was estimated using the number of driver licenses by county for 2018 and adjusting for the proportion of residents 16 years and older located within each district relative to each county as a whole with an additional adjustment based on populations to take into account that license data represent residents 16 years and older and the sampling universe is residents 18 years and older. Driver license data were obtained from the California Department of Motor Vehicles database found at: https://www.dmv.ca.gov/portal/wcm/connect/90a04dc3-ac0d-4528-a6a3-4797d0842689/DL+By+County+2018.pdf?MOD=AJPERES.
6. The results for the Sacramento Nonattainment Area are not the simple sum of the individual districts. Although rounded numbers are presented, additional decimals were used in all calculations.
7. In previous seasons, control day respondents who said they were generally aware of the campaign were subtracted from the total generally aware Spare The Air day respondents to make these calculations. It was decided in a meeting on April 2, 2014 that for general awareness, a correction factor to extrapolate to the resident population is unnecessary because control day respondents can reasonably be generally aware of the campaign even if they do not recall a specific request not to drive because there are Spare The Air outreach efforts taking place from May through October. Reducing estimates of generally aware residents by subtracting control day responses greatly under-reports total awareness estimates.

Table 2 presents the estimated number of drivers who were aware of the specific request not to drive for the region as a whole and by district. For the entire Sacramento Nonattainment Area, and correcting for control day responses, the 9% aware, less the 2% erroneously aware control respondents, translates into an estimated 114,278 drivers 18 years and older who were specifically aware of the requests not to drive on Spare The Air days.

TABLE 2 ESTIMATED NUMBER OF DRIVERS WITH SPECIFIC AWARENESS OF REQUEST NOT TO DRIVE ON STA DAYS[8]

	Total Estimated Number of Drivers 18 yrs +	Percent Aware of STA (Specific Awareness) STA/Control	Estimated Number of Drivers Aware of STA Specific Request Not to Drive (STA - Control)
Sacramento Nonattainment Area	**1,651,624**	**9% / 2%**	**114,278**
Sac Metro Air District	1,013,246	9% / 1%	77,599
Yolo-Solano AQMD	231,331	6% / 3%	8,251
Placer County APCD	287,951	6% / 3%	10,159
El Dorado County AQMD	119,096	18% / 2%	19,125

SOURCES OF GENERAL CAMPAIGN INFORMATION

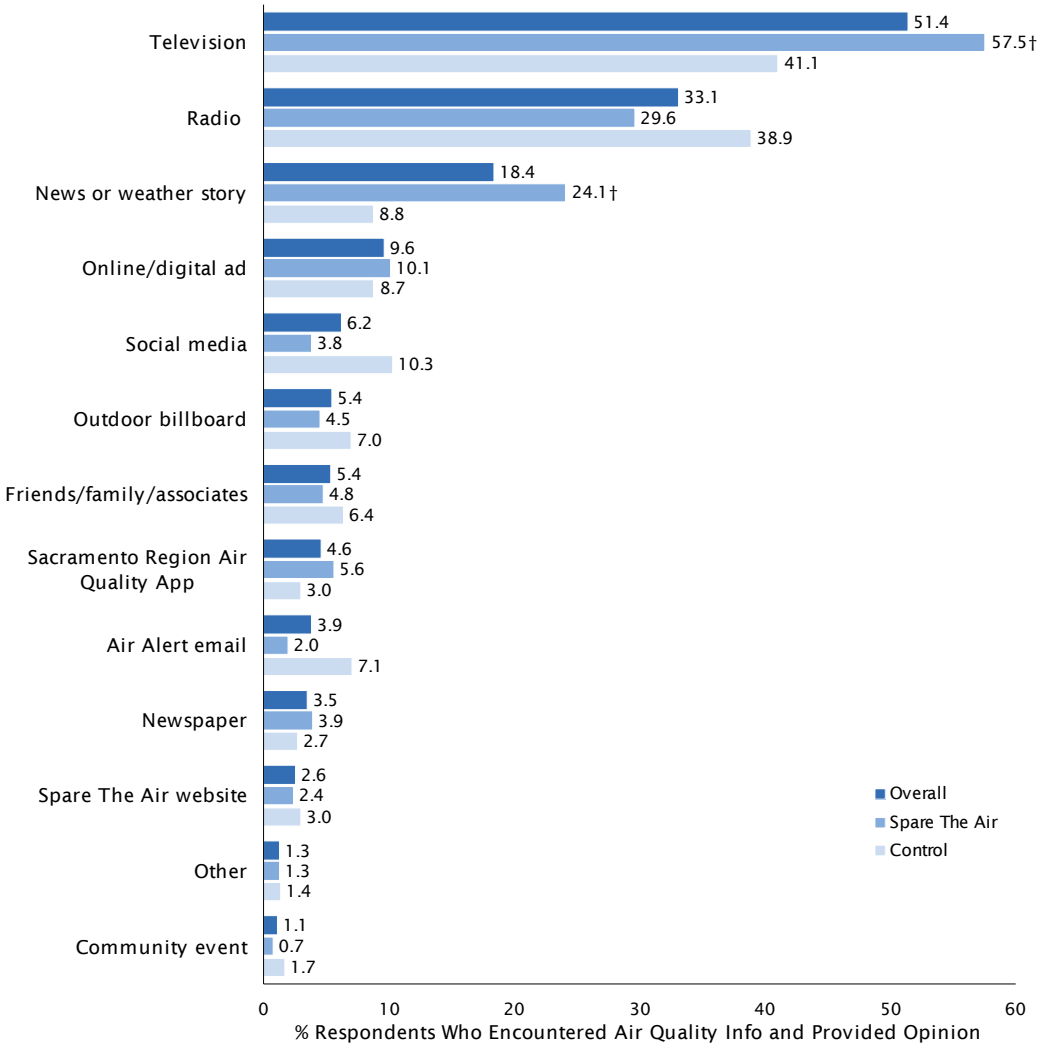
Respondents who indicated that they recalled hearing, reading, or seeing information about Spare The Air, poor air quality, or requests to drive less (i.e., general awareness) were asked where they obtained the information. This question was posed in an open-ended manner, thereby allowing respondents to mention any source that came to mind without being prompted by—or restricted to—a particular list of options. True North later reviewed the verbatim responses and grouped them into the categories shown in Figure 14 on the next page. Multiple responses to the question were allowed, so the percentages shown in the figure provide the percentage of respondents who mentioned a particular source and thus add to more than 100%.

Overall, television was the most common source for air quality-related information in the two days prior to the interview (51%), followed by radio (33%), news or weather story (18%), and an online or digital ad (10%). Spare The Air day respondents were much more likely to recall encountering the information on television (58% vs. 41%) or from a news or weather story (24% vs. 9%) than control group respondents.

8. The results for the Sacramento Nonattainment Area are not the simple sum of the individual districts. Although rounded numbers are presented, additional decimals were used in all calculations.

Question 12 *Where do you recall seeing, hearing or reading that information?*

FIGURE 14 SOURCES FOR GENERAL CAMPAIGN INFORMATION: STA VS. CONTROL



† Statistically significant change ($p < 0.05$) between STA and control groups.

Purposeful Driving Reduction

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 California Air Resources Board, 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. As such, 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 how driving reduction this year compares with previous years.

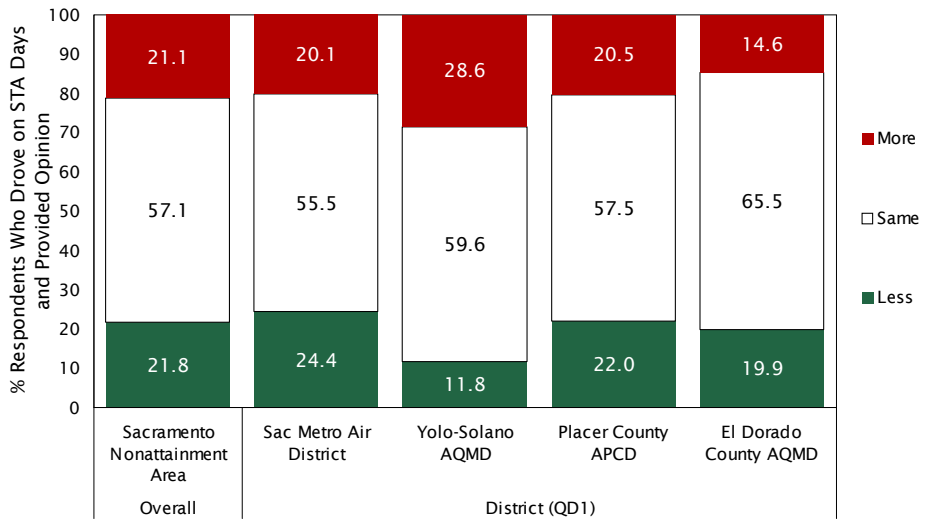
DRIVING BEHAVIOR YESTERDAY

At the beginning of the survey, respondents who had driven at least once time in the day prior to the interview were asked to think about their driving behavior the previous day and indicate whether they drove the same, more, or less frequently than they normally do on that particular day of the week.

As shown in Figure 15, the majority of respondents did not make any changes in their driving behavior—57% in the Sacramento Nonattainment Area said they drove the same as usual. Over a fifth each said they drove less (22%) or that they drove more (21%). Within each individual district, the majority of respondents drove the same number of times as usual. The percentage driving less varied from a low of 12% in Yolo-Solano AQMD to a high of 24% in Sac Metro Air District, whereas the percentage who drove more frequently varied from a low of 15% in El Dorado County AQMD to a high of 29% in Yolo-Solano AQMD.

Question 3 *Yesterday, did you drive your car, truck, motorcycle, or van the same, more, or less frequently than you normally do on a [current day of week]?*

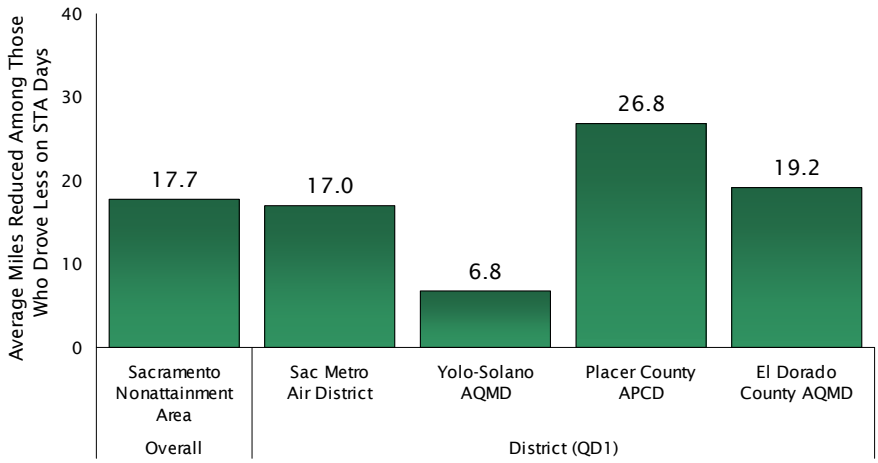
Figure 15 Driving Behavior Yesterday by District



FEWER VEHICLE MILES TRAVELED Respondents who drove less on a Spare The Air day were next asked approximately how many miles less than normal they drove. The results for the 2019 season are displayed in Figure 16 for the Sacramento Nonattainment Area as a whole as well as for each district. On average, area residents drove 18 miles less than normal on Spare The Air days. The average number of vehicle miles reduced by those who said they drove less on a Spare The Air day ranged from 7 miles in Yolo-Solano AQMD to 27 miles in Placer County APCD.

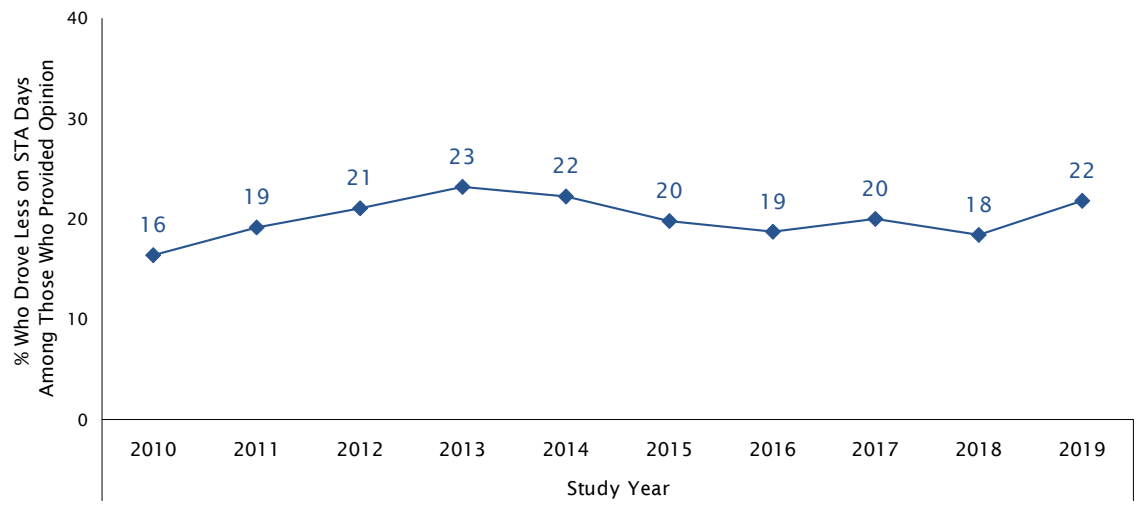
Question 4 *Approximately how many miles less than normal did you drive?*

FIGURE 16 FEWER VEHICLE MILES TRAVELED ON STA DAYS BY DISTRICT



YEAR-TO-YEAR COMPARISONS: PERCENT WHO DROVE LESS Figure 17 plots the percentage of drivers from 2010 to present who said they drove less on Spare The Air days in the Sacramento Nonattainment Area. In 2019, 22% of area respondents who drove on a Spare The Air Day reported that they drove fewer times than normal that day, which is statistically consistent with the results of 2018 (18%), as well as the 10-year historic average (20%).

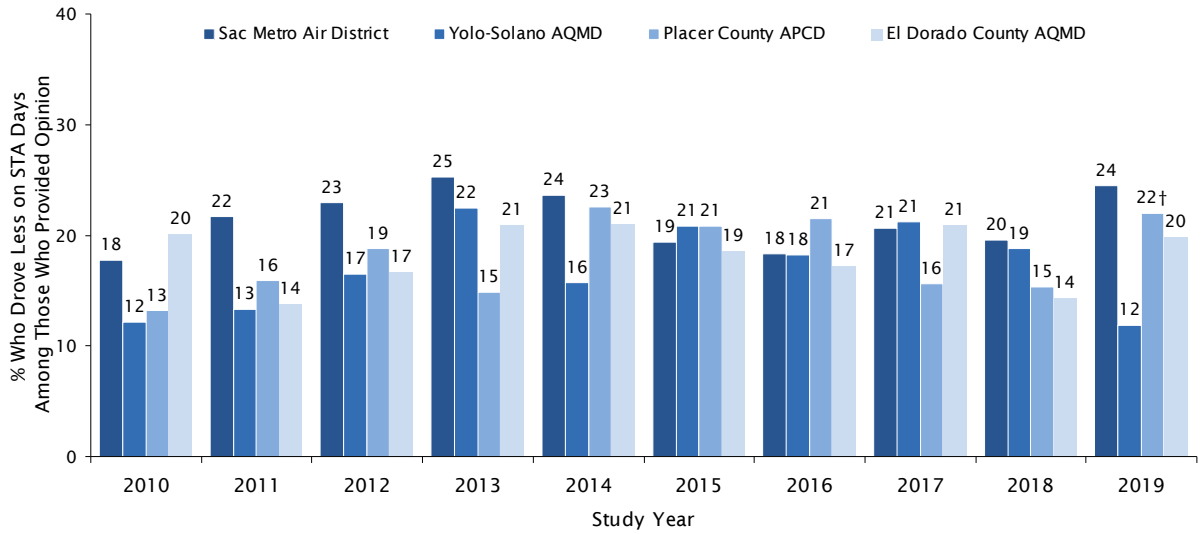
FIGURE 17 DROVE LESS ON STA DAYS BY STUDY YEAR: SACRAMENTO NONATTAINMENT AREA



The annual percentage of respondents who drove less the previous day in the individual districts from 2010 to 2019 are presented in Figure 18. In Sac Metro Air District, the percentage of respondents who said they drove less on Spare The Air days ranged from a low of 18% in 2010 and 2016 to a high of 25% in 2013. This year's percentage of 24% is not significantly different from the average of 21%.

Results in Yolo-Solano AQMD ranged from a low of 12% in 2010 and 2019 to a high of 22% in 2013. Although this year's 12% matches the low from 2010, it is not statistically different from the 10-year average of 17% in that district. In Placer County APCD, the 22% of respondents this year who said they drove less does not differ from the 10-year average of 18%, but is statistically higher than the 15% recorded in 2018. In El Dorado County AQMD, the 20% of respondents who reported driving less is not significantly different from the 10-year average of 18%.

FIGURE 18 DROVE LESS ON STA DAYS BY STUDY YEAR & DISTRICT



† Statistically significant change ($p < 0.05$) between the 2018 and 2019 studies.

PERCENTAGE OF PURPOSEFUL REDUCERS For purposes of this study, the definition of a purposeful driving reducer is quite strict with three requirements: it includes only those interviewed following a Spare The Air day who said they drove less the previous day, did so specifically for air quality reasons, *and* had heard announcements about Spare The Air (general awareness using the ARB wording, Question 11[9]). Results for the Sacramento Nonattainment Area and each individual district are presented in Table 3 on the following page.

9. 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 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 or smoggy 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.

For the Sacramento Nonattainment Area, 0.11% of Spare The Air respondents met the strict ARB standard for purposeful driving reduction. Individually, one respondent in Sac Metro Air District was classified as a purposeful reducer, however, no respondents in Yolo-Solano AQMD, Placer County APCD, or El Dorado County AQMD met all three criteria to be classified as a purposeful reducer. Therefore, one purposeful reducer is recorded for the Sacramento Nonattainment Area as a whole.

Question 5 *Why did you drive less yesterday? In other words, what prompted the change?*

Question 11 *In the past two days have you heard, read, or seen any commercials, news broadcasts or information online about Spare The Air, poor air quality, or requests to drive less in this area?*

TABLE 3 PURPOSEFUL REDUCERS BY DISTRICT

	# Respondents Who Reduced Driving for Air Quality Reasons and Aware of STA Alerts	# of Respondents Interviewed on Days Following Spare The Air	Sampling Error	% of Total Respondents Who Reduced Driving for Air Quality Reasons and Aware of STA Alerts
Sacramento Nonattainment Area	**1**	**650**	**+/- 3.8%**	**0.11**
Sac Metro Air District	1	325	+/- 5.4%	0.18
Yolo-Solano AQMD	0	97	+/- 10.2%	0.00
Placer County APCD	0	130	+/- 8.6%	0.00
El Dorado County AQMD	0	98	+/- 10.1%	0.00

Table 4 displays the percentage of purposeful reducers by study year from 2010 to 2019. No significant differences were found for the Sacramento Nonattainment Area or its four districts when comparing the 2019 results to 2018 or the 10-year averages.

TABLE 4 PURPOSEFUL REDUCERS BY STUDY YEAR & DISTRICT

	Study Year										Ten-Year Average
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	
Sacramento Nonattainment Area	**0.4**	**0.5**	**0.0**	**0.5**	**0.8**	**2.8**	**0.8**	**0.1**	**0.3**	**0.1**	**0.6**
Sac Metro Air District	0.5	0.7	0.0	0.6	0.8	3.9	0.8	0.0	0.0	0.2	0.8
Yolo-Solano AQMD	0.0	0.0	0.0	0.0	0.4	0.4	0.0	0.4	0.5	0.0	0.2
Placer County APCD	0.3	0.4	0.0	0.7	1.4	0.8	1.1	0.0	1.1	0.0	0.6
El Dorado County AQMD	0.5	0.0	0.6	0.9	0.0	0.6	1.1	0.0	0.6	0.0	0.4

ESTIMATED NUMBER OF PURPOSEFUL REDUCERS There were an estimated 1,651,624 drivers in the entire Sacramento Nonattainment Area in 2019. Estimates of the number of purposeful reducers for the individual districts as well as for the region are presented in Table 5 on the next page, and were calculated based on the difference between Spare The Air respondents and control respondents. If the same percentage of drivers claimed to have reduced their driving on control days for air quality reasons as on Spare The Air days, it is difficult to credit the Spare The Air program as the cause of driving reduction.

For the purpose of this analysis, control 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.[10] Additionally, control reducers had to erroneously claim to have reduced their driving

because of a specific request not to drive the previous day (i.e., specific awareness). For the entire Sacramento Nonattainment Area, no control respondents met this definition and as such, the percentage of purposeful reducers from Spare The Air days remained unchanged.

In the Sacramento Nonattainment Area, 1,827 purposeful reducers are estimated on average per Spare The Air episode for the 2019 season. Among the individual districts, Sac Metro Air District was the only one to record purposeful reduction, with all 1,827 estimated reducers in that area.

TABLE 5 ESTIMATED NUMBER OF PURPOSEFUL REDUCERS BY DISTRICT[11]

	Total Number of Drivers 18 yrs +	Percent of Purposeful Reducers	Percent of Control Reducers	Estimated Number of Purposeful Reducers [(Reducers - Control)*Drivers]
Sacramento Nonattainment Area	**1,651,624**	**0.11**	**0.00**	**1,827**
Sac Metro Air District	1,013,246	0.18	0.00	1,827
Yolo-Solano AQMD	231,331	0.00	0.00	0
Placer County APCD	287,951	0.00	0.00	0
El Dorado County AQMD	119,096	0.00	0.00	0

ESTIMATED NUMBER OF SINGLE TRIPS AVOIDED: PURPOSEFUL REDUCERS

Purposeful driving 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 Sacramento Nonattainment Area was 2.96, resulting in a total of 5,410 trips avoided per episode directly attributed to the Spare The Air program (Table 6).

Question 6 *About how many single trips in your vehicle did you avoid driving yesterday to reduce air pollution? By single trip, I mean getting in your vehicle, driving from one place to another, and stopping.*

TABLE 6 ESTIMATED NUMBER OF SINGLE TRIPS AVOIDED AMONG PURPOSEFUL REDUCERS BY DISTRICT

	Estimated Number of Purposeful Reducers	Mean # of Trips Avoided for Air Quality Reasons	Estimated Number of Single Trips Reduced
Sacramento Nonattainment Area	**1,827**	**2.96**	**5,410**
Sac Metro Air District	1,827	2.96	5,410
Yolo-Solano AQMD	0	0.00	0
Placer County APCD	0	0.00	0
El Dorado County AQMD	0	0.00	0

10. Seasonal driving reducers are defined as those who say they usually reduce the amount of driving they do during the summer months to avoid adding to air pollution
11. Although rounded numbers are presented, additional decimals were used in all calculations.

Estimated Emission Reductions

Having estimated the number of purposeful reducers and vehicle trips reduced during the 2019 season, the final step in the method involves estimating how many tons of ozone precursor emissions [Reactive Organic Gases (ROG) and Nitrogen Oxides (NOx)] were reduced during the 2019 season that could be attributed directly to the Spare The Air program. In order not to over-estimate possible reductions (and consistent with the methodology used for purposeful reducers in the previous section), a correction factor based on control day interviewing was applied. Results, therefore, are conservative.

CALCULATING ESTIMATED EMISSION REDUCTIONS The methodology used to estimate emission reductions due specifically to the Spare The Air program is very conservative. First, it includes only those drivers who said they drove less the previous day for air quality reasons (among respondents interviewed the day after a Spare The Air day is called). Thus, purposeful reduction necessitates that air quality is a top-of-mind accessible reason for driving less at the time a respondent answers the question. Seasonal reducers who normally make fewer trips during the summer to help improve air quality are not (necessarily) included.[12] 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. Although rounded numbers are presented in the text and tables for emission reduction estimates, additional decimals were used for all calculations. As such, the reader may get a slightly different number when trying to reproduce calculations based on the numbers presented in the text or tables.

Results from the Sacramento Nonattainment Area are used to illustrate the procedure for estimating emission reductions according to the following steps:

Step 1: Calculate the Percentage of Purposeful Reducers

Purposeful reducers are drivers who said they were aware of the Spare The Air alerts,[13] and who also said they drove less than usual on Spare The Air days, specifically for air quality reasons. For the Nonattainment Area, this was 0.11% of all respondents interviewed following Spare The Air days.[14]

Step 2: Record the Mean (Average) Number of Single Trips Avoided

Drivers 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 2.96 single trips avoided.

Step 3: Extrapolate to the Total Number of Drivers in the Region this Year

The percentage of Spare The Air reducers represents an estimated 1,827 drivers in the Sacramento Nonattainment Area, and the number of single trips avoided was 5,410 (1,827 drivers x 2.96 trips avoided on average).

12. See *Summer Season Trip Reductions* on page 27 for a separate examination of this group.
13. Using general awareness of Spare The Air: Q11 "In the past two days have you heard, read, or seen any commercials, news broadcasts, or information online about Spare The Air, poor air quality, or requests to drive less in this area?"
14. See *Purposeful Driving Reduction* on page 18 for a full explanation of these results.

Step 4: Multiply the Number of Trips Avoided by a Per Trip Emission Reduction Average for Grams of Ozone Precursors[15]

The per trip emission reduction average of 2.47 grams of ozone precursors includes a total of Reactive Organic Gases (ROG) emissions (6.52 grams per trip for light duty passenger cars plus two categories of light duty trucks) plus Oxides of Nitrogen (NOx) emissions (3.36 grams per trip for light duty passenger cars and light duty trucks) emissions, based on 2019 models of EMFAC 2017. EMFAC 2017 is the latest update to the EMFAC model. It is used by California state and local governments to meet Clean Air Act (CAA) requirements. EMFAC 2017 defines trips as vehicle starts and calculates them separately as a function of vehicle population (derived from vehicle registration data), based on ARB and U.S. EPA instrumented vehicle studies. For the Sacramento Nonattainment Area, this amounts to 13,367 grams of ozone precursors (5,410 single trips avoided x 2.47 grams per trip).

Step 5: Convert to Tons[16]

For the Sacramento Nonattainment Area as a whole, this translates to an estimated total of 0.015 tons of pollutants reduced per Spare The Air day.

Step 6: Repeat the Process for Control Day Interviews

This step includes recording the mean number of trips avoided by the respondents who drove less for air quality reasons on control days[17]. As there were no recorded purposeful reducers on control days, this step was skipped for 2019.

Step 7: Apply the Control Day Correction Factor

To ensure that only purposeful driving reduction due to the Spare The Air program is counted in the estimate of emission reduction, the control day air quality emission reduction is subtracted from the Spare The Air day reduction. Because control day emissions reductions in 2019 equal zero, no correction factor was necessary this season.

Step 8: Result

The calculation results in 0.015 tons of ozone precursors reduced per Spare The Air day directly attributable to the Spare The Air program. There were six Spare The Air days in 2019. Thus, the estimated amount of ozone precursors reduced during the summer due to the Spare The Air program is 0.088 tons (0.015 tons per day x 6 Spare The Air days in 2019).

15. Since only Sac Metro Air District recorded purposeful reduction, the emission reduction average for Sac Metro Air District is used in place of the average for the Sacramento Nonattainment Area as a whole. Estimates were based on the Summer On-Road Inventory: EMFAC 2017 model, for the summer of 2019, accessed from https://www.arb.ca.gov/emfac/2017/. The total ROG tons for a combined total of light duty passenger cars and two categories of light duty trucks (3.77 + 0.93 + 1.82) were converted to grams (multiplied by 90,7185) before dividing by the combined total number of trips (i.e. 2,556,384 for light duty passenger cars + 278,883 for light duty trucks1 + 911,912 for light duty trucks2) in order to obtain the average grams per trip. The same process was used to calculate NOx grams per trip (2.01 + 0.42 + 1.26) x 90,7185 / (2,556,384 + 278,883 + 911,912). ROG grams and NOx grams were then combined (6.52 + 3.69) to obtain 2.47 grams per trip of emission precursors. These are the figures considered most accurate at the time this report was written.
16. There are 907,185 grams in a ton.
17. As defined earlier, control reducers were classified as those respondents who said they drove less the previous day for air quality reasons, erroneously claimed to have reduced their driving because of a specific request not to drive (i.e., specific awareness), and who were not seasonal driving reducers.

TABLE 7 EMISSIONS REDUCTION ESTIMATE: SACRAMENTO NONATTAINMENT AREA

	Number of Purposeful Reducers	Single Trips Reduced per Day	Grams of Ozone Precursors Reduced per Day	Estimated Tons of Ozone Precursors Reduced per Day
Spare The Air Day	1,827	5,410	13,367	0.015
Control Day	0	0	0	0.000
Estimated Tons of Ozone Precursors Reduced Per Day (STA minus Control):				**0.015**

EMISSIONS REDUCTION ESTIMATES BY DISTRICT

Using the established methodology, emission reductions can only be claimed in Sac Metro Air District. After weighting, one respondent qualified as a purposeful reducer in Sac Metro Air District, resulting in an estimated reduction of 0.015 ozone precursors per Spare The Air Day (0.088 total for the six days this summer). Claiming no emission reduction is not unusual for several of the districts in a given season. The impact of the many factors contributing to emission reductions are variable from year to year. This is especially true in Yolo-Solano AQMD, Placer County APCD, and El Dorado County AQMD given their smaller populations and thus sample sizes of respondents.

TABLE 8 EMISSIONS REDUCTION ESTIMATE: SAC METRO AIR DISTRICT[18]

	Number of Purposeful Reducers	Single Trips Reduced per Day	Grams of Ozone Precursors Reduced per Day	Estimated Tons of Ozone Precursors Reduced per Day
Spare The Air Day	1,827	5,410	13,367	0.015
Control Day	0	0	0	0.000
Estimated Tons of Ozone Precursors Reduced Per Day (STA minus Control):				**0.015**

TABLE 9 EMISSIONS REDUCTION ESTIMATE: YOLO-SOLANO AQMD

	Number of Purposeful Reducers	Single Trips Reduced per Day	Grams of Ozone Precursors Reduced per Day	Estimated Tons of Ozone Precursors Reduced per Day
Spare The Air Day	0	0	0	0.000
Control Day	0	0	0	0.000
Estimated Tons of Ozone Precursors Reduced Per Day (STA minus Control):				**0.000**

TABLE 10 EMISSIONS REDUCTION ESTIMATE: PLACER COUNTY APCD

	Number of Purposeful Reducers	Single Trips Reduced per Day	Grams of Ozone Precursors Reduced per Day	Estimated Tons of Ozone Precursors Reduced per Day
Spare The Air Day	0	0	0	0.000
Control Day	0	0	0	0.000
Estimated Tons of Ozone Precursors Reduced Per Day (STA minus Control):				**0.000**

18.See Table 6 on page 22 for the average number of single trips avoided for each district.

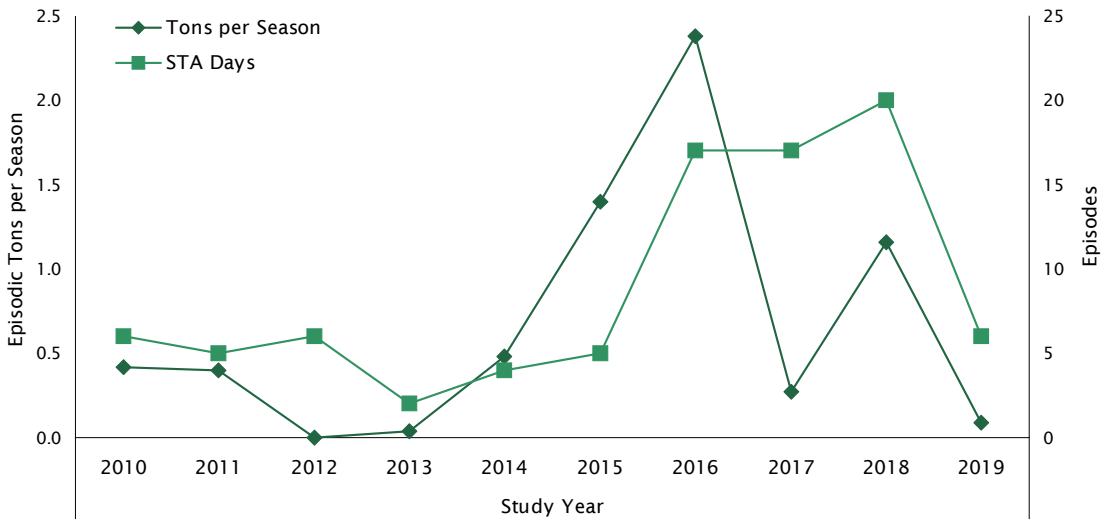
TABLE 11 EMISSIONS REDUCTION ESTIMATE: EL DORADO COUNTY AQMD

	Number of Purposeful Reducers	Single Trips Reduced per Day	Grams of Ozone Precursors Reduced per Day	Estimated Tons of Ozone Precursors Reduced per Day
Spare The Air Day	0	0	0	0.000
Control Day	0	0	0	0.000
Estimated Tons of Ozone Precursors Reduced Per Day (STA minus Control):				**0.000**

YEAR-TO-YEAR COMPARISONS OF EMISSION REDUCTIONS: SACRAMENTO NONATTAINMENT AREA

Figure 19 shows the yearly episodic emission reduction total from 2010 to 2019. 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 air quality conditions and the number of Spare The Air days experienced during each summer season, among many other reasons) vary from one year to the next. The per season reductions attributable to the campaign are calculated by multiplying the number of episodes per season by the per episode emission reductions, and thus seasons with a greater number of Spare The Air episodes also tend to have a larger total amount of emissions reduced. **In 2019, that value is 0.09 tons reduced in the Sacramento Nonattainment Area attributable to the campaign.**

FIGURE 19 YEAR-TO-YEAR COMPARISONS OF EMISSION REDUCTIONS: SACRAMENTO NONATTAINMENT AREA



Summer Season Trip Reductions

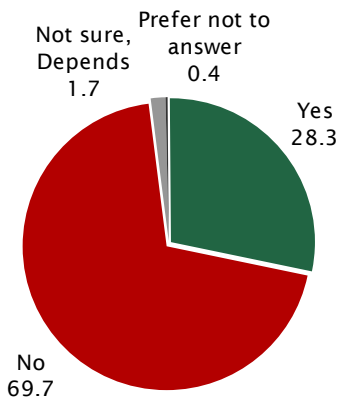
There is a group of residents who usually drive less to help improve air quality in the region during the summer months. Some of these individuals may not qualify as purposeful (episodic) reducers on specific Spare The Air days for methodological reasons (i.e. they may not have driven less on a specific Spare The Air day because they already had reduced their driving as much as they could), but they nonetheless contribute to voluntary emissions reductions during the summer months. This section of the report seeks to profile seasonal reducers, including their average number of trips avoided and resulting emission reductions.

SEASONAL DRIVING REDUCERS

Seasonal driving reducers are defined as those who say they usually reduce the amount of driving they do during the summer months to avoid adding to air pollution. In large part, they can be considered Spare The Air "success" stories—they understand that driving is a significant contributor to air pollution particularly through the summer months, and have incorporated it into their actual driving behavior by reducing the number of vehicle trips they make during the summer. **For the entire Sacramento Nonattainment Area, 28% of all[19] respondents in 2019 can be considered seasonal driving reducers** (Figure 20).

Question 7 *Do you usually reduce the amount of driving you do during the summer to avoid adding to air pollution?*

Figure 20 Seasonal Reducers



Figures 21 and 22 on the following page show how the propensity to reduce summertime driving for air quality reasons varied across demographic subgroups. Higher than average reduction was reported among residents in Sac Metro Air District and Yolo-Solano AQMD, those 18 to 24 years of age, female respondents, those from households earning less than $25,000 annually, residents with specific awareness of the request not to drive on the day preceding the interview, and those with general awareness of the Spare The Air advertisements.

19. For this section of the report, results from respondents interviewed following Spare The Air days have been combined with those interviewed following control days as the issue under discussion applies equally to both groups of respondents.

FIGURE 21 SEASONAL REDUCERS BY DISTRICT, AGE & GENDER

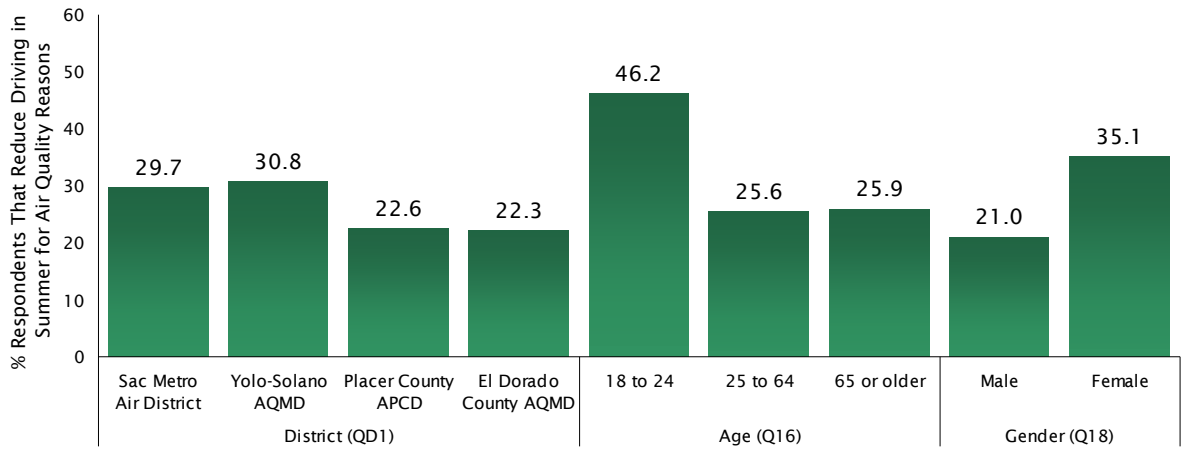
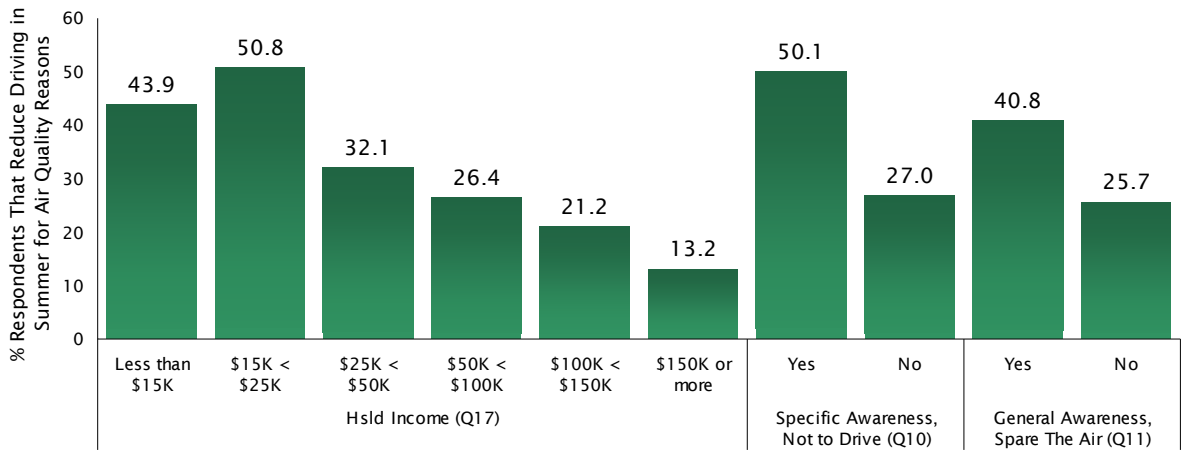
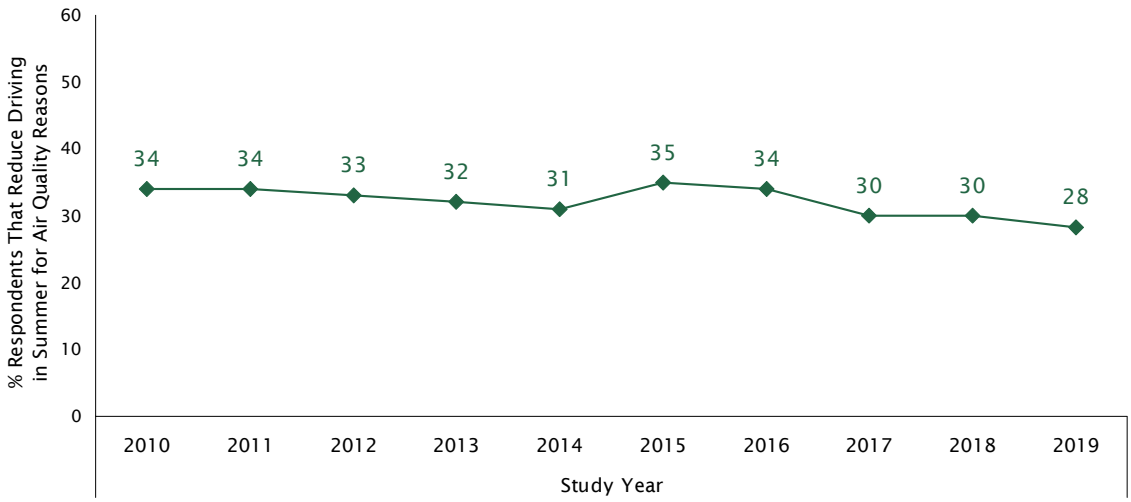


FIGURE 22 SEASONAL REDUCERS BY HOUSEHOLD INCOME, SPECIFIC AWARENESS & GENERAL AWARENESS



YEAR-TO-YEAR COMPARISONS: PERCENT SEASONAL REDUCERS As shown in Figure 23 on the next page, the percentage of respondents who indicated that they usually reduce their driving during the summer to avoid adding to air pollution has remained relatively stable, with a 10-year average of 32%. The 2019 season finding of 28% is statistically consistent with both the 2018 survey percentage and the historic average.

FIGURE 23 SEASONAL REDUCERS BY STUDY YEAR



NUMBER OF REDUCED TRIPS

Seasonal reducers reported that they entered their vehicles to drive the previous day an average of 2.65 times, whereas respondents who said they did not usually reduce the amount of driving they do during the summer (i.e., non-reducers) self-reported entering their cars more frequently, an average of 3.88 times. On average, seasonal driving reducers made 1.23 fewer trips per day than did non-reducers, representing a statistically significant difference between the two groups.

Question 1 *Thinking just about yesterday, how many different TIMES did you get into a car, truck, motorcycle or van to drive the vehicle?*

TABLE 12 NUMBER OF REDUCED TRIPS FROM SEASONAL REDUCERS

	Average Times Entered Vehicle		Difference: Average Number of Daily Single Trips Reduced
	Seasonal Reducers	Non-Reducers	
Sacramento Nonattainment Area	2.65	3.88	1.23†

† Statistically significant change ($p < 0.05$) between the two groups.

YEAR-TO-YEAR COMPARISONS: DAILY TRIPS REDUCED

Table 13 on the next page shows the average number of self-reported trips made by seasonal reducers compared to non-reducers from 2010 to 2019. The average number of single trips avoided by seasonal reducers (that is, the difference between reducers and non-reducers) ranged from a low of 0.30 trips per day in 2013 to a new high of 1.23 trips in 2019. In the vast majority of Spare The Air seasons since 2010, seasonal reducers have reported entering their vehicle to drive significantly fewer times than non-reducers.

TABLE 13 AVERAGE NUMBER OF DAILY TRIPS REDUCED BY STUDY YEAR

	Average Times Entered Vehicle		Difference: Average Number of Daily Single Trips Reduced
	Seasonal Reducers	Non-Reducers	
2010	2.94	3.84	0.90†
2011	2.88	3.26	0.38
2012	2.55	3.67	1.12†
2013	2.40	2.70	0.30†
2014	2.92	3.43	0.51
2015	2.80	3.37	0.57†
2016	2.75	3.38	0.63†
2017	3.00	3.85	0.85†
2018	2.94	3.54	0.60
2019	2.65	3.88	1.23†

† Statistically significant change ($p < 0.05$) between the two groups.

ESTIMATED EMISSION REDUCTIONS

Respondents who habitually drive less in the summer represent a substantial proportion of the general population of drivers who are helping to improve air quality in the region by reducing emissions. The 28% of 2019 seasonal reducers translates into just under half a million drivers (467,008) in the entire Sacramento Nonattainment Area. 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 similar to that used to estimate emission reductions on Spare The Air days.[20] As shown in Table 14, the average of 1.23 trips per day that seasonal reducers avoided translates into an estimated 1.56 tons of ozone precursors reduced per summer day in 2019.

TABLE 14 ESTIMATED EMISSION REDUCTIONS FROM SEASONAL REDUCERS

	Number of Seasonal Reducers	Single Trips Reduced per Day	Grams of Ozone Precursors Reduced per Day	Estimated Tons of Ozone Precursors Reduced per Day
Sacramento Nonattainment Area	467,008	576,568	1,410,996	1.56

HOW THEY REDUCE DRIVING

Those who said they usually reduce the amount of driving during the summer months to decrease air pollution were then asked to elaborate specifically on how they reduced their driving. Verbatim responses were captured, later categorized, and the results are presented in Figure 24 on the next page. Since multiple responses to the question were allowed, the percentages in the figure sum to more than 100%.

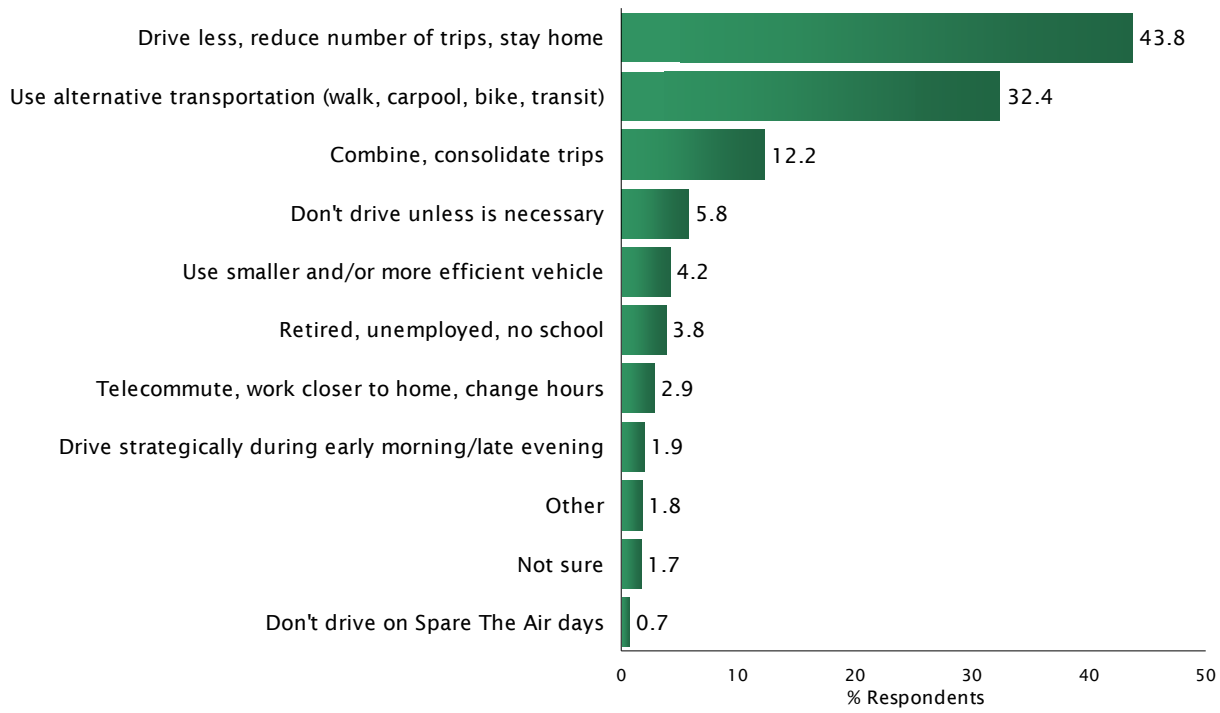
More than four-in-ten seasonal reducers (44%) indicated that they "just drove less," often by staying home or by avoiding joy rides and extra trips and 32% said they used alternative transportation, such as walking, carpooling, biking, or public transit to avoid driving during the summer. Less frequently, respondents said they were able to combine or consolidate trips (12%), that they don't drive unless absolutely necessary (6%), that they switched to a smaller or more efficient

20. See Calculating Estimated Emission Reductions on page 22. Since seasonal reducers were identified in each district (and not just Sac Metro Air District as detailed for purposeful reducers), the per trip emission reduction average of 2.45 grams of ozone precursors for the Nonattainment Area as a whole was utilized.

vehicle (4%), or said they are retired, unemployed, or did not have school (4%). No other response categories were cited by at least 4% of seasonal reducers.

Question 8 *How have you reduced driving this summer to decrease air pollution?*

FIGURE 24 WAYS REDUCED DRIVING THIS SUMMER



Summer Health Issues

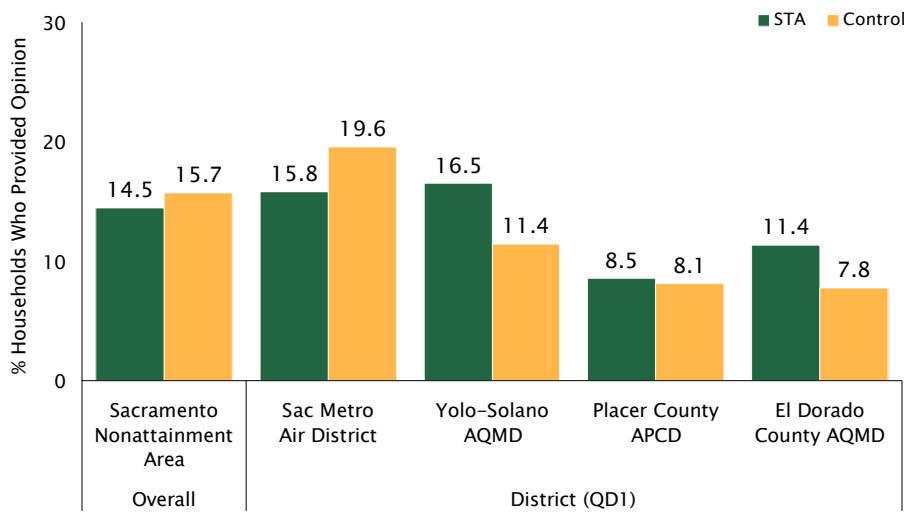
The final substantive section of the report examines the relationship between air quality and the health effects experienced by households in the Sacramento Nonattainment Area during the summer of 2019.

PERCEIVED HEALTH PROBLEMS: SPARE THE AIR VS. CONTROL DAYS

Both Spare The Air and control respondents were asked whether they, or anyone in their household, had experienced any effects on their health such as burning eyes, headaches, coughing, or difficulty breathing the day before the interview. Figure 25 shows the results for the Sacramento Nonattainment Area as a whole, as well as within each district. Overall, 15% of respondents interviewed following a Spare The Air day reported that at least one person in their household experienced health problems, which was statistically consistent with the 16% reported among control respondents. Perceived health effects ranged from a low of 9% in Placer County APCD to a high of 17% in Yolo-Solano AQMD following Spare The Air Days. There were no statistically significant differences found between Spare The Air and control day respondents for any of the districts.

Question 13 *Thinking just about yesterday, did you or anyone in your household experience any effects on your health such as burning eyes, headaches, coughing, or difficulty breathing?*

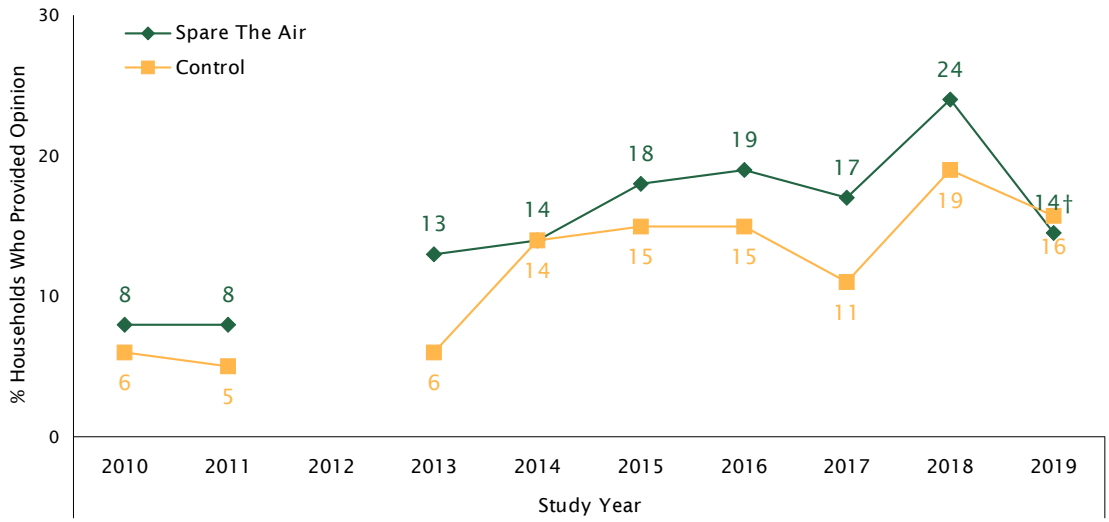
FIGURE 25 PERCEIVED HEALTH PROBLEMS YESTERDAY BY DISTRICT: STA VS. CONTROL



YEAR TO YEAR COMPARISONS OF PERCEIVED HEALTH PROBLEMS

Figure 26 displays the annual percentage of households in the Sacramento Nonattainment Area who reported health effects such as burning eyes, headaches, coughing, or difficulty breathing on the day prior to the interview for both Spare The Air and control day respondents. Reported health impacts on Spare The Air days were significantly lower in 2019 than 2018. Although the percentage was also lower among control respondents, the difference was not statistically significant. As noted in last year's report, it was difficult to avoid conducting interviews during periods of the 2018 season without wildfires impacting air quality. As such, the differences evidenced from 2018 to 2019 likely reflect the return to a summer season without extensive wildfires and their associated health effects.

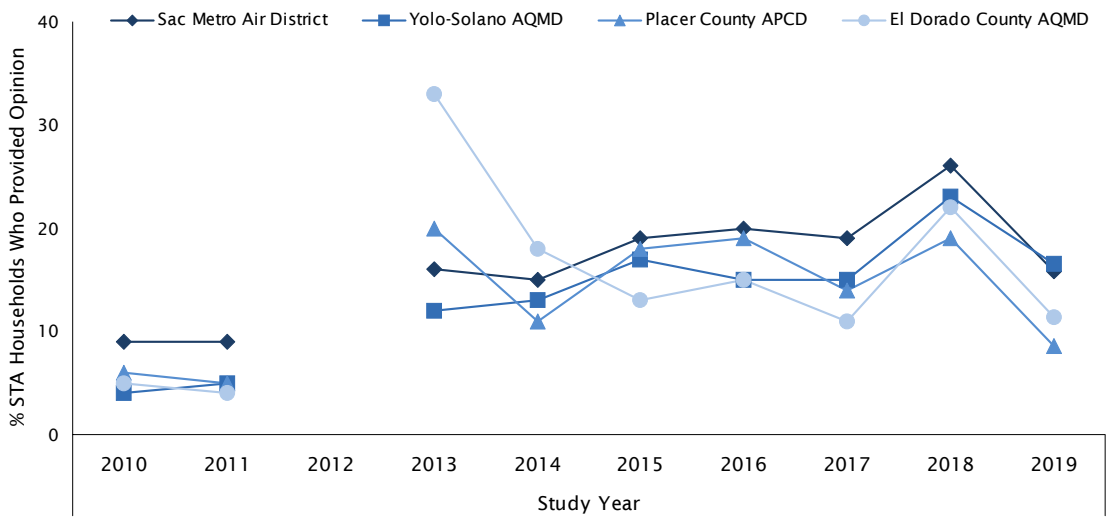
FIGURE 26 PERCEIVED HEALTH PROBLEMS YESTERDAY BY STUDY YEAR: STA VS. CONTROL, SACRAMENTO NONATTAINMENT AREA



† Statistically significant change ($p < 0.05$) between STA and control groups.

For the interested reader, Figure 27 shows perceived health problems among households on Spare The Air Days by individual district. With the exception of Yolo-Solano AQMD, each district experienced a statistically significant decline in the percentage of households that reported issues such as burning eyes, headaches, coughing, or difficulty breathing from 2018 to 2019.

FIGURE 27 PERCEIVED HEALTH PROBLEMS ON STA DAYS BY STUDY YEAR & DISTRICT

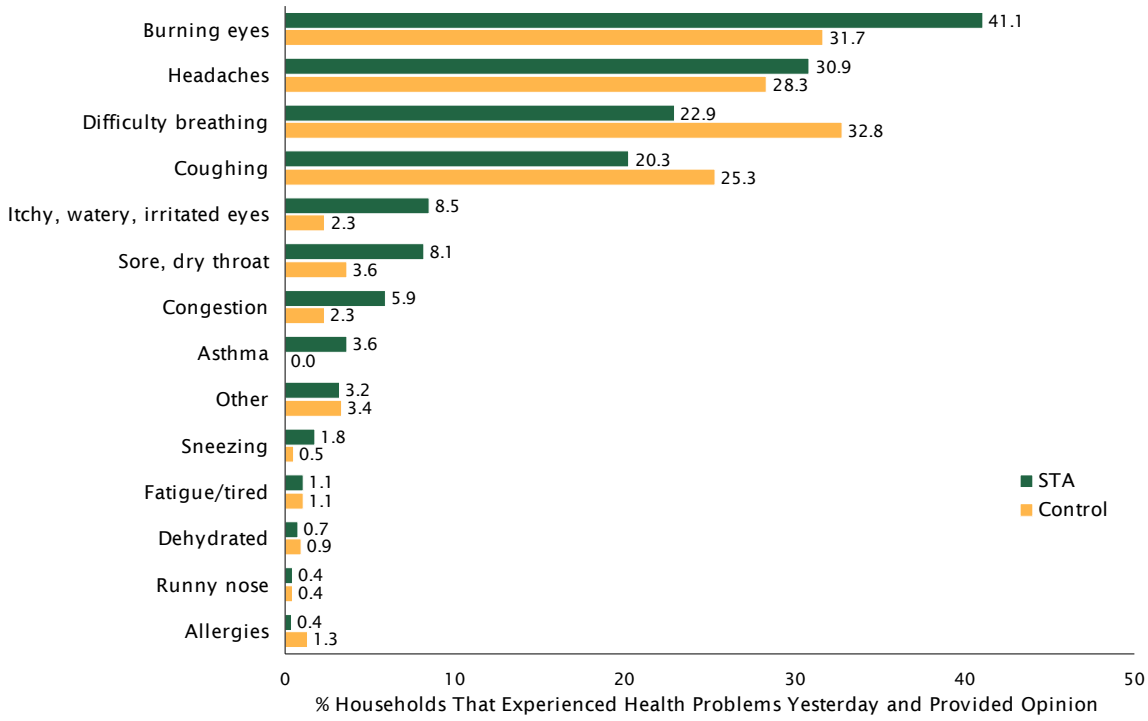


SPECIFIC HEALTH PROBLEMS EXPERIENCED As a follow-up, respondents in households that experienced effects on their health the day before the interview were asked, in an open-ended format, to provide additional detail about what they experienced. As shown in Figure 28 on the next page, burning eyes (41%), headaches (31%), difficulty breathing (23%), and coughing (20%) were the most frequently reported health effects among those experiencing

issues following Spare The Air days. Although differences were reported among Spare The Air day and control day respondents, none were statistically significant.

Question 14 *What was it that you or others in your household experienced?*

FIGURE 28 HEALTH PROBLEMS EXPERIENCED YESTERDAY: STA VS. CONTROL, SACRAMENTO NONATTAINMENT AREA



METHODOLOGY

This section of the report outlines the methodology and procedures used when conducting this study, as well as the motivation for employing certain techniques.

BACKGROUND The Sacramento region's public outreach program Spare The Air was created in 1995 to engage the general public in voluntarily helping to solve the problem of ground-level ozone air pollution. The Sacramento region is a severe nonattainment area for the federal 1997 and 2008 eight-hour ozone standards. The attainment deadlines are June 2019 for the 1997 standard and July 2027 for the 2008 standard. However, for the 2008 standard, the Sacramento Regional 2008 NAAQS 8-hour Ozone Attainment and Reasonable Further Progress Plan demonstrated that the region can attain the standard by July 2025.

These health-based standards affect the quality of life and health of area residents, particularly during the summer months. **The region is on track to attain these health-based standards by the deadlines, provided the District continues to maintain key efforts like the Spare The Air campaign.** The Sacramento Nonattainment Area includes Sacramento County, Yolo County, and parts of Placer, Solano, El Dorado, and Sutter counties.

The Sac Metro Air District 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 Reactive Organic Gases (ROGs) and nitrogen oxides (NOx), primarily from cars, trucks, construction and agricultural equipment, lawn mowers, and other mobile sources, react in the presence of sunlight and form ozone in hot weather conditions. Ozone pollution is lowest in the morning and reaches its highest levels in the afternoon and early evening hours. The residential driving population is therefore a large contributor to the air quality problem in the region.

The 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 126 (0.078 parts per million) the next day, a Spare The Air alert is issued by the Sac Metro Air District by 12:00 p.m. The Spare The Air alert communication involves notifying the public through a variety of channels, including social media, paid radio, television and digital outdoor billboard advertising, email Air Alerts, news broadcasts, the Spare The Air website, and the Sacramento Region Air Quality app.

Spare The Air days are called for the Sacramento Nonattainment Area as a whole, but all 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 the central plain district of Yolo-Solano. To some extent this is due to the fact that ozone precursors emitted by vehicles throughout the region take time to convert into ground-level ozone pollution, and that pollution can be transported into the foothills. The pollutants can also get “trapped” if there are stagnant, stable conditions, which would prevent flow uphill. It is, therefore, important that the Spare The Air

message continue to involve everyone in the basin, although the air pollution readings in individual districts on specific days may not be the same.

SPARE THE AIR DAYS, AQI & MEDIA BUY

There were six Spare The Air days called during the 2019 summer smog season, far fewer than in recent seasons. To educate a broad audience about the campaign and its message to reduce driving on a Spare The Air day, the 2019 Spare The Air campaign's paid advertising for general outreach consisted of radio, TV, outdoor billboards, online banner ads, and paid social media advertising on Facebook and Twitter. For episodic advisories, alerts were issued the day before and the day of each Spare The Air day. The 2019 season used a variety of mediums to communicate the alert, including Spare The Air alert TV and radio commercials, digital outdoor billboard advertising, news broadcasts, social media, the Spare The Air website, plus online advertising.

General Media Buy

In 2019, a total of $144,135 was spent on the Spare The Air general awareness advertising campaign. It ran from May through September 2019 and used radio commercials in English and Spanish, television commercials in multiple languages, billboards, transit ads, online digital ads, social media ads, and boosted social media posts to reach residents throughout the Sacramento region. The campaign focused around the message "Clean Air Is Up To Us." The advertising emphasized the various things people can do to reduce their impact on air quality during the season, how everyone can help contribute to reducing air pollution and how to take action on Spare The Air days.

Specific Spare The Air Alert Episodic Media Buy

This year, a total of $43,388 was spent on episodic TV and radio commercials and digital outdoor billboards to advertise the six specific Spare The Air episodes.

TABLE 15 SPARE THE AIR DATES, AQI AND MEDIA BUY DOLLARS

Spare The Air date	Forecast AQI	Actual maximum AQI	Health Level for Actual AQI	Reporting Station for Actual Max AQI	Media Buy
June 11	126	119	Unhealthy for Sensitive Groups	Elk Grove	$6,000
June 12	136	122	Unhealthy for Sensitive Groups	Elk Grove	$6,000
July 27	126	97	Moderate	Vacaville	$6,983
July 28	126	93	Moderate	Sloughhouse	$6,983
August 13	129	87	Moderate	Placerville	$7,432
August 27	129	122	Unhealthy for Sensitive Groups	Cool	$9,991
Total					**$43,388**

QUESTIONNAIRE

Dr. McLarney of True North Research worked closely with the Sac Metro Air District to review the questionnaire that has been utilized in past seasons and make slight modifications as appropriate. Some of the questions asked in this study were presented only to a subset of respondents. For example, only respondents who got into their vehicle at least once the day prior to the interview (Question 1) were asked how many total miles they drove (Question 2). The questionnaire included with this report (see *Questionnaire & Toplines* on page 41) identifies the skip patterns that were used during the interview to ensure that each respondent received the appropriate questions.

PROGRAMMING, PRE-TEST & TRANSLATION Prior to fielding the survey, the questionnaire was CATI (Computer Assisted Telephone Interviewing) programmed to assist interviewers when conducting the telephone interviews. The CATI program automatically navigates the skip patterns, randomizes the appropriate question items, and alerts the interviewer to certain types of keypunching mistakes should they happen during the interview. The integrity of the questionnaire was pre-tested internally by True North and by dialing into 20 randomly selected homes in the region prior to formally beginning the survey. The final questionnaire was also professionally translated into Spanish to allow for data collection in English and Spanish.

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

The goal was to conduct up to 2,000 total interviews during the 2019 summer ozone season. However, due to uncertainty regarding the number of Spare The Air days that would occur during the 2019 season and the need to save data collection capacity for later months (September and October) for potential episodes that ultimately did not occur, the actual number of completed interviews was less (1,300) than the targeted maximum.

SAMPLE The sample for the 2019 survey was developed by compiling a list of residential addresses in the Sacramento Nonattainment Area (by district) and cross-referencing multiple public and private databases to append additional contact information, including occupant names and telephone numbers (land lines and mobile). From this master database, True North developed a stratified, random sample of households to recruit to participate in the survey and used additional screening questions to confirm eligibility. The sample was then divided into subsamples in order to spread data collection between Spare The Air and control days over the entire season.

The sample was drawn to only include the relevant residential zip codes by county within each district. For study purposes, the Sacramento Nonattainment Area[21] was defined as all of Sacramento and Yolo Counties, the eastern portion of Solano County, and the western slopes of El Dorado and Placer Counties up to the Sierra crest. In order to avoid potential unbalanced and biased samples, quotas were set for gender and age in order to ensure that respondents were representative of the population as a whole. In survey research, certain groups (such as elderly females) are more likely to respond to telephone interviews than others (such as young males).

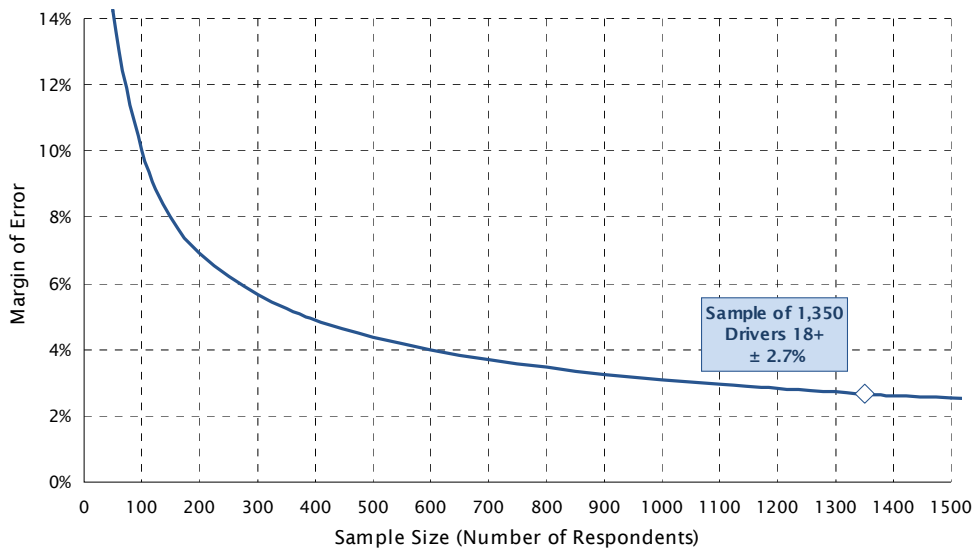
21. Although small portion of Sutter County falls within the federal definition of the Sacramento Nonattainment Area, the Feather River Air Quality Management District was not one of the districts included in the study.

DATA COLLECTION Telephone interviews averaged 10 minutes in length and were conducted during weekday evenings (5:30PM to 9PM) and on weekends (10AM to 5PM). It is standard practice not to call during the day on weekdays because most working adults are unavailable and thus calling during those hours would bias the sample. A total of 1,350 randomly selected adult residents in the Sacramento Nonattainment Area participated in a survey on a night following one of the region's six Spare The Air days (650 respondents) or the night following a control day (650 respondents). Surveys were administered in English and Spanish during the 2019 summer ozone season (May to October).

MARGIN OF ERROR DUE TO SAMPLING The results of the survey can be used to estimate the opinions of all adult drivers in the Sacramento Nonattainment Area. Because not every adult driver in the region participated in the survey, however, the results have what is known as a statistical margin of error due to sampling. The margin of error refers to the difference between what was found in the survey of 1,350 adult drivers for a particular question and what would have been found if all of the estimated 1,651,624 adult drivers[22] had been interviewed.

Figure 29 provides a plot of the *maximum* margin of error in this study. The maximum margin of error for a dichotomous percentage result occurs when the answers are evenly split such that 50% provide one response and 50% provide the alternative response. For this survey, the maximum margin of error is ± 2.7% for questions answered by all 1,350 respondents.

FIGURE 29 MAXIMUM MARGIN OF ERROR



22. The number of drivers 18 years and older in the Sacramento Nonattainment Area for 2019 was estimated using the number of driver licenses by county for 2018 and adjusting for the proportion of residents 16 years and older located within each district relative to each county as a whole with an additional adjustment based on populations to take into account that license data represent residents 16 years and older and the sampling universe is residents 18 years and older. Driver license data were obtained from the California Department of Motor Vehicles database found at: https://www.dmv.ca.gov/portal/wcm/connect/90a04dc3-ac0d-4528-a6a3-4797d0842689/DL+By+County+2018.pdf?MOD=AJPERES. Population counts for the relative proportions were estimated from U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates.

Within this report, figures and tables show how responses to certain questions varied by demographic characteristics such as age and gender of the respondent. Figure 29 is thus useful for understanding how the maximum margin of error for a percentage estimate will grow as the number of individuals asked a question (or in a particular subgroup) shrinks. Because the margin of error grows exponentially as the sample size decreases, the reader should use caution when generalizing and interpreting the results for small subgroups.

Table 16 on the next page displays the number of completed interviews separately for Spare The Air respondents and control respondents by district along with their affiliated margins of error (at the most conservative level for questions answered by all respondents within each respective group).

TABLE 16 MAXIMUM MARGIN OF ERROR AND NUMBER OF SPARE THE AIR & CONTROL INTERVIEWS BY DISTRICT

	Total Estimated Number of Drivers 18 yrs +	Number of Spare The Air Respondents (unweighted)	STA Sampling Error	Number of Control Respondents (unweighted)	Control Sampling Error
Sacramento Nonattainment Area	**1,651,624**	**650**	**+/- 3.8%**	**650**	**+/- 3.8%**
Sac Metro Air District	1,013,246	325	+/- 5.4%	325	+/- 5.4%
Yolo-Solano AQMD	231,331	97	+/- 10.2%	98	+/- 10.1%
Placer County APCD	287,951	130	+/- 8.6%	130	+/- 8.6%
El Dorado County AQMD	119,096	98	+/- 10.1%	97	+/- 10.2%

DATA PROCESSING & WEIGHTING Data processing consisted of checking the data for errors or inconsistencies, coding and recoding responses, categorizing verbatim responses, and preparing frequency analyses and cross-tabulations. The final data were weighted (separately for Spare The Air respondents and control respondents) to balance the sample by age and gender within each individual district (as needed), as well as the relative distribution of the population 18 years and older by district within the Sacramento Nonattainment Area as a whole according to Census estimates.[23]

STATISTICAL SIGNIFICANCE The level of significance for each statistical test is set to a p value of less than .05, which equates to at least 95% assurance in the integrity of an identified significant relationship. That is, a significant relationship is one that cannot be accounted for by chance alone. Because the relationship cannot be accounted for by chance alone it is instead 95% likely due to differences in the subpopulations being compared. It is assumed this relationship holds for members of the population who are not part of the sample, but who share the quality being used to compare subpopulations. For example, it may be determined that a significant difference arises in the driving reduction between Yolo-Solano AQMD and El Dorado County AQMD respondents such that Yolo-Solano residents reduced driving to a greater degree than El Dorado residents. This means researchers are 95% sure that a difference in reported driving reduction between residents of these regions is due to their location, and not to chance.

23.Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates.

ROUNDING Numbers that end in 0.5 or higher are rounded up to the nearest whole number, whereas numbers that end in 0.4 or lower are rounded down to the nearest whole number. These same rounding rules are also applied, when needed, to arrive at numbers that include a decimal place in constructing figures and charts. Occasionally, these rounding rules lead to small discrepancies in the first decimal place when comparing tables and pie charts for a given question.

TRUE NORTH RESEARCH

Sac Metro AQMD
Spare The Air Evaluation Tracking Survey
Final Toplines (STA: n=650, Control: n=650)
November 2019

Section 1: Introduction to Study
Hi, may name is _____ and I'm calling from TNR, an independent public opinion research firm. We're conducting a **short** survey about transportation issues and would like to get your input. It will take less than 5 minutes.
If needed: This is a survey for research purposes only. I'm NOT trying to sell anything and I won't ask for a donation. *If needed:* The survey is anonymous and your responses will be confidential. *If needed:* If now is not a convenient time, can you let me know a better time so I can call back?
If asked to know which agency sponsored the survey, explain: For statistical purposes and to avoid biasing the study, I can't reveal the agency's name at the outset of the interview. However, I will glad to tell you at the end of the survey.

Section 2: Screeners for Inclusion in the Study					
SC1	To begin, did you drive a car, truck, motorcycle or van within the last seven days?				
			STA	Control	
	1	Yes	100%	100%	*Skip to Q1*
	2	No	0%	0%	*Go to instruction below*
	9	Prefer not to answer	0%	0%	*Terminate*
If landline and SC1=2, ask: Since this survey is about transportation issues, is there another person available in your household who has driven in the past week? *Ask to speak to this person, if available, and start again at SC1. If not available, thank and terminate.*					

Section 3: Driving Behavior				
Q1	Thinking just about yesterday, how many different TIMES did you get into a car, truck, motorcycle or van to **drive** the vehicle? *If unsure, ask them to provide their best estimate. Note to interviewer: we're interested in how many times the respondent opened the door and got into the vehicle as the **driver**, not as a passenger.*			
			STA	Control
		Average number of times	*3.23*	*3.78*
		None	9%	10%
		1	11%	15%
		2	27%	30%
		3	18%	13%
		4	19%	13%
		5	6%	6%
		6	5%	6%
		7 or more	6%	8%
	99	Prefer not to answer	0%	0%
If Q1=0, skip to Q3. If Q1>0, ask Q2.				

Q2	And approximately how many total miles did you drive yesterday during those trips? *If unsure, ask them to provide their best estimate.*		
		STA	Control
	Average number of miles	*41.57*	*46.10*
	1 to 10	26%	31%
	11 to 19	9%	10%
	20 to 29	18%	16%
	30 to 39	10%	8%
	40 to 49	7%	7%
	50 to 59	11%	8%
	60 to 69	2%	5%
	70 to 79	3%	2%
	80 or more	11%	13%
99	Prefer not to answer	2%	1%

Q3	Yesterday, did you drive your car, truck, motorcycle or van the **same**, **more**, or **less** frequently than you normally do on a [current day of week]?			
		STA	Control	
1	Same	57%	55%	*Skip to Q7*
2	More	21%	22%	*Skip to Q7*
3	Less	22%	23%	*Ask Q4*
99	Prefer not to answer	0%	0%	*Terminate*

Q4	Approximately how many miles ***less*** than normal did you drive? *If unsure, ask them to provide their best estimate.*		
		STA	Control
	Average number of miles reduced	*17.72*	*20.76*
	1 to 10	43%	47%
	11 to 19	11%	9%
	20 to 29	14%	14%
	30 to 39	9%	11%
	40 to 49	3%	2%
	50 to 59	5%	2%
	60 to 69	2%	2%
	70 to 79	0%	0%
	80 to 500	1%	5%
998	Drove same or more miles, just fewer trips	4%	2%
999	Prefer not to answer	8%	6%

Section 4: Reduced Trips Yesterday				
Ask Q5 if Q3=3. Otherwise skip to Q7.				
Q5	Why did you drive less yesterday? In other words, what prompted the change? *Open end. Do NOT read response options – use for coding only. Multiple responses allowed.* 'Other' verbatim responses recorded and grouped into new categories as needed and shown below in blue.			
			STA	Control
	1	Mentions **Spare The Air**	0%	0%
	2	Mentions **air quality, smog, air pollution, or to reduce pollution**	0%	0%
	3	Mentions **air is unhealthy, public health, or breathing**	1%	1%
		Do not need to, nothing to do, didn't drive, relaxing	25%	20%
		Didn't have to go to work (non-work day)	10%	23%
		Went shopping, groceries, did an errand, visited family/friend	8%	15%
		Too busy/No time to drive (work, school, chores)	12%	6%
		Too hot, weather	16%	0%
		It was a weekend/holiday/vacation	2%	6%
		Transportation, mechanical issues (broken car, lost keys)	8%	0%
		Didn't have to go to school (non-school day)	1%	6%
		Going to a different route/location	0%	6%
		Had another driver/somebody else drove	2%	1%
		Didn't feel good	0%	2%
		Retired	2%	0%
	4	Other: *specify*	2%	4%
	5	Not sure	7%	8%
	99	Prefer not to answer	2%	1%

Ask Q6 if Q5=(1,2 or 3). Otherwise, skip to Q7.				
Q6	About how many **single trips** in your vehicle did you avoid driving yesterday to reduce air pollution? By single trip, I mean getting in your vehicle, driving from one place to another, and stopping. For, example, leaving your house and going to the store is one trip. Leaving the store and coming back home is another trip.			
			STA	Control
		Average # of single trips avoided	*2.63*	*2.00*
		1	0%	0%
		2	57%	100%
		3	23%	0%
		4	20%	0%
		5	0%	0%
	99	Prefer not to answer	0%	0%

Section 5: Seasonal Trip Reduction					
Q7	Do you usually reduce the amount of driving you do during the summer to avoid adding to air pollution?				
			STA	Control	
	1	Yes	30%	26%	*Ask Q8*
	2	No	68%	71%	*Skip to Q10*
	98	Not sure/depends	1%	2%	*Skip to Q10*
	99	Prefer not to answer	0%	1%	*Skip to Q10*
Q8	***How*** have you reduced driving this summer to decrease air pollution? *Note to interviewer: we're looking for the **ways** they reduced their driving, such as taking fewer trips, riding transit, carpooling with other people, trip linking, etc.* Verbatim responses recorded and later grouped into categories shown below.				
			STA	Control	
		Use alternative transportation (walk, carpool, bike, transit)	31%	34%	
		Drive less, reduce number of trips, stay home	45%	42%	
		Combine, consolidate trips	12%	13%	
		Telecommute, work closer to home, change hours	3%	3%	
		Don't drive unless is necessary	6%	5%	
		Use smaller and/or more efficient vehicle	3%	6%	
		Drive strategically during early morning/late evening	2%	2%	
		Don't drive on Spare The Air days	1%	0%	

		Retired, unemployed, no school	6%	1%
		Other	1%	2%
	98	Not sure	1%	3%
	99	Prefer not to answer	0%	0%

Q9	On an average day during the summer, by approximately how many miles do you reduce your driving*? If unsure, ask them to provide their best estimate.*			
			STA	Control
		Average number of miles reduced	*17.74*	*21.48*
		1 to 10	52%	47%
		11 to 19	7%	4%
		20 to 29	9%	15%
		30 to 39	2%	4%
		40 to 39	1%	2%
		50 to 59	3%	7%
		60 to 69	1%	3%
		70 to 79	0%	0%
		80 or more	4%	3%
	98	Not sure	21%	13%
	99	Prefer not to answer	0%	2%

Section 6: Spare The Air Awareness					
Randomize order that Q10 & Q11 are asked.					
Q10	Do you recall being asked not to drive yesterday because our area was experiencing a period of unhealthy or smoggy air?				
			STA	Control	
	1	Yes	9%	2%	
	2	No, do not recall	91%	98%	
	99	Prefer not to answer	0%	0%	
Q11	In the past two days have you heard, read, or seen any commercials, news broadcasts or information online about Spare The Air, poor air quality, or requests to drive less in this area?				
			STA	Control	
	1	Yes	22%	13%	*Ask Q12*
	2	No	78%	87%	*Skip to Q13*
	99	Prefer not to answer	0%	0%	*Skip to Q13*

Q12	Where do you recall seeing, hearing or reading that information? *Multiple responses allowed.* 'Other' verbatim responses recorded and grouped into new categories as needed and shown below in blue.			
			STA	Control
	1	Radio	28%	36%
	2	Television	55%	38%
	3	Social Media, such as Facebook, Twitter, or Instagram	4%	10%
	4	Online/digital ad	10%	8%
	5	Outdoor billboard	4%	7%
	6	News or weather story	23%	8%
	7	Community event	1%	2%
	8	Air Alert email	2%	7%
	9	Spare The Air website	2%	3%
	10	Sacramento Region Air Quality App	5%	3%
	11	Friends/Family/Associates	5%	6%
		Newspaper	4%	3%
	12	Other: *specify*	1%	1%
	98	Not sure	5%	5%
	99	Prefer not to answer	0%	1%

Section 7: Health

Almost finished. Just a few more questions for statistical purposes.

Q13	Thinking just about yesterday, did you or anyone in your household experience any effects on your health such as burning eyes, headaches, coughing, or difficulty breathing?				
			STA	Control	
	1	Yes	14%	16%	*Ask Q14*
	2	No	85%	84%	*Skip to Q15*
	98	Not sure	0%	0%	*Skip to Q15*
	99	Prefer not to answer	0%	0%	*Skip to Q15*

Q14	What was it that you or others in your household experienced? *Do NOT read response options – use for coding only. Multiple responses allowed.* 'Other' verbatim responses recorded and grouped into new categories as needed and shown below in blue.			
			STA	Control
	1	Burning eyes	40%	32%
	2	Headaches	30%	28%
	3	Coughing	20%	25%

	4	Difficulty breathing	22%	33%
		Sore, dry throat	8%	4%
		Itchy, watery, irritated eyes	8%	2%
		Congestion	6%	2%
		Asthma	4%	0%
		Sneezing	2%	1%
		Fatigue/tired	1%	1%
		Allergies	0%	1%
		Dehydrated	1%	1%
	5	Other: *specify*	3%	3%
	98	Not sure	3%	0%
	99	Prefer not to answer	1%	0%

Section 8: Demographics				
Q15	Thinking of your media use, with which of the following do you spend the ***most*** time? *Randomize items 1-4, then read the rest in order.* 'Other' verbatim responses recorded and grouped into new categories as needed and shown below in blue.			
	1	**Broadcast** Television	10%	9%
	2	**Cable** Television	24%	22%
	3	**Subscription streaming services** such as Netflix, Amazon Prime, or Hulu	12%	19%
	4	**Social Media** platforms such as Facebook, Twitter, Instagram, or Snapchat	24%	20%
	5	**Broadcast Radio**	6%	5%
	6	**Satellite radio** or other subscription streaming service such as Spotify, Google Music, Apple Music, or Pandora	5%	7%
	7	**Printed** newspapers or magazines	3%	3%
	8	**Online** newspapers or magazines	6%	6%
		Satellite TV	0%	1%
		YouTube	2%	1%
	12	Something else: *specify*	1%	1%
	98	Not sure	4%	2%
	99	Prefer not to answer	2%	3%

Q16	Which of the following categories contains your age? Are you: _____?			
			STA	Control
	1	18 to 24	12%	13%
	2	25 to 64	67%	67%
	3	65 or older	18%	18%
	4	Prefer not to answer	3%	2%
Q17	Finally, for statistical purposes only, please stop me when I reach the category that best describes your household income before taxes in 2018.			
			STA	Control
	1	Less than $15,000	6%	7%
	2	$15,000 to less than $25,000	6%	9%
	3	$25,000 to less than $50,000	17%	14%
	4	$50,000 to less than $100,000	26%	25%
	5	$100,000 to less than $150,000	13%	15%
	6	$150,000 or more	15%	14%
	98	Not sure	2%	2%
	99	Prefer not to answer	14%	14%
Q18	Gender (record by voice)			
			STA	Control
	1	Male	48%	49%
	2	Female	52%	51%
Q19	Language of interview (by observation)			
			STA	Control
	1	English	98%	97%
	2	Spanish	2%	3%
Those are all of the questions that I have for you! Thanks very much for participating. This survey is sponsored by the Sac Metro Air Quality Management District.				

Section 9: Sample & CATI Items				
D1	County			
			STA	Control
	1	Sacramento	62%	62%
	2	Yolo/Solano	15%	15%
	3	Placer	16%	16%
	4	El Dorado	6%	6%
D2	Day Type			
			STA	Control
	1	Spare The Air	100%	0%
	2	Control	0%	100%
D3	Interview Date			
			STA	Control
		6/12/2019	12%	0%
		6/13/2019	14%	0%
		7/17/2019	0%	12%
		7/18/2019	0%	11%
		7/28/2019	20%	0%
		7/29/2019	17%	0%
		8/11/2019	0%	19%
		8/14/2019	22%	0%
		8/28/2019	15%	0%
		9/04/2019	0%	18%
		9/11/2019	0%	17%
		9/23/2019	0%	23%