EVALUATION OF THE 2016-2017 PIMA COUNTY CLEAN AIR PROGRAM CAMPAIGN AND CLEAN WATER PROGRAM CAMPAIGN SURVEY

(May 2017)

Prepared for:

PIMA COUNTY DEPARTMENT OF
ENVIRONMENTAL QUALITY

Tucson, Arizona

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(May 2017)

Digest of the Contents

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Appendix

EVALUATION OF THE 2016-2017 PIMA COUNTY CLEAN AIR PROGRAM CAMPAIGN AND CLEAN WATER PROGRAM CAMPAIGN SURVEY

(May 2017)

Detailed Perceptual Tables

Explanation of Detailed Perceptual Table Format

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Detailed Perceptual Tables (Cont'd)

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Introduction and Goals

This Campaign Effectiveness Study, conducted for the Pima County Department of Environmental Quality, was designed to evaluate the specific effectiveness of the 2016-2017 Clean Air and Clean Water Program Campaigns.

This study is a continuation of the Pima County Department of Environmental Quality's long-term effort to raise the level of public awareness regarding air quality problems in the Tucson metropolitan area and reduce air pollution by encouraging use of alternative modes of transportation and other options. The Clean Air Program Campaign is the 27th annual installment of this long-term effort which began in January 1989. In addition, the study measured and tracked key issues related to stormwater management and hazardous waste disposal for PDEQ's Clean Water Program. The Clean Water Program Campaign is the 5th annual installment of the effort to raise awareness to keep stormwater clean.

Areas of Investigation – The tracking survey was implemented and the results analyzed so as to determine the success of the Campaign in accomplishing its objectives, including:

1. Determining current travel behavior (commuting/ telecommuting/compressed work weeks) in Pima County and measuring changes from previous studies.

2. Increasing long-range awareness that motor vehicles are the primary source of air pollution and that effective long-term solutions to air quality problems will involve reducing single occupant motor vehicle trips.

3. Determining the present and potential use of alternate transportation modes, with specific emphasis on carpooling and employer encouragement of alternative modes. Estimating the number of daily commuter miles saved through alternative modes.

4. Assessing the awareness and perceptions of air quality problems in Tucson and what is known about air pollution. Learning whether children are talking about or bringing home materials from school about improving air quality.

Determining the actions, if any, taken to help reduce air pollution.

5. Measuring the awareness of the Clean Air Program in Pima County and various clean air special events or activities.

6. Tracking the perception or awareness of stormwater destinations, level of seriousness for local stormwater pollution and land use behaviors influencing stormwater quality.

7. Tracking actions impacting stormwater quality, including disposal methods of household products, reporting dumping to a government entity and willingness to take selected actions to improve stormwater quality.

8. Assessing the demographics of people whose perceptions do not match the facts or have behaviors contributing to stormwater pollution.

Methodology Overview – To accomplish the goals of this study, a random sampling of 504 men and women, 16 years of age and older, in the Pima County area was interviewed by telephone (250) and online (254) during May 2017. The specific procedures used to select the sample are explained in detail in the Appendix of this report.

Details of the Findings

Profile of Respondents

Interview Language – Consistent with prior projects, 97% of survey interviews were conducted in English. The remaining 3% (13 surveys overall) were Spanish-language interviews – including 7 Telephone and 6 Internet. Nearly all Spanish surveys (11 of 12) were conducted among self-identified Hispanic survey respondents in the Central or Northwest zip codes. (Refer to Table 4 for zip code zone definitions.)

Table 1 Type of Interview

	05/06 Total	05/07 Total	05/08 Total	06/11 Total	06/13 Total	06/14 Total	05/15 Total	05/16 Total	**05/17 Total**	Sample	
										Telephone	Internet
English	96%	99%	99%	98%	98%	98%	98%	98%	**97%**	97%	98%
Spanish	4%	1%	1%	2%	2%	2%	2%	2%	**3%**	3%	2%
	N=502	N=503	N=402	N=403	N=504	N=502	N=500	N=500	**N=504**	N=250	N=254

Question: Would you feel most comfortable if this interview is conducted in Spanish, English or does it make no difference?

Interview Method – In line with recent projects, and per the project sampling plan, survey interviews were fielded both via telephone and online (about 250 each, for a combined in-tab of 504 respondents). Before 2015, all surveys were 100% telephone interviews. Internet surveys were conducted utilizing a panel company which sent a link to randomly-selected panelists (who opt in to receive invitations and are provided an incentive of some sort to participate in surveys for which they qualify). Telephone survey respondents were randomly-selected for participation, with interviews conducted by the FMR field staff.

Once again, the two sampling methodologies utilized the same screening criteria (Pima County residents 16 or older who live in specific zip codes) and survey instrument – including bilingual options for both. The only difference in the survey design relates to questions with unaided responses. Specifically, in the Telephone survey, unaided question response options are not read to respondents – whereas, in the Internet surveys, all response options are provided to respondents to select from.

Table 2 Method of Interview

	05/15 Total	05/16 Total	**05/17 Total**
Telephone	50%	50%	**50%**
Internet	50%	50%	**50%**
	N=500	N=500	**N=504**

Self-Identified Ethnicity – Regardless of interview method (Internet or Telephone), one of four respondents are Hispanic. This is right on target with the survey sampling quotas for this project. For the first time, the Internet sub-sample included more non-Whites (34%) than did the Telephone (29%). Overall, the combined 2017 sample is highly consistent with ethnic survey quotas (as well as past surveys), and is broken down as follows: 69% White, 25% Hispanic, 3% African-American, 2% Asian/Pacific Islander and 1% Native American.

Table 3 Racial Background of Respondents

	05/06 Total	05/07 Total	05/08 Total	06/11 Total	06/13 Total	06/14 Total	05/15 Total	05/16 Total	**05/17 Total**	Sample	
										Telephone	Internet
White	75%	76%	78%	74%	71%	67%	72%	71%	**69%**	72%	66%
Hispanic	20%	19%	17%	20%	24%	24%	20%	22%	**25%**	26%	25%
African-American	2%	2%	1%	2%	3%	5%	3%	3%	**3%**	1%	5%
Asian, Pacific Islander	2%	2%	2%	1%	1%	2%	2%	2%	**2%**	0%	3%
Native American	1%	2%	2%	4%	2%	2%	3%	2%	**1%**	2%	1%

Question: This survey is intended to reflect the attitudes of all segments of the population. To which of the following ethnic groups do you belong?

Area of Residence – The geographic distribution of the combined Internet-Telephone sample is very consistent with the sampling plan for the study: 30% Central, 28% South, 27% Northwest and 15% East. As in past years, sampling quotas for the telephone sub-sample were based on population density in Pima County. There were no specific geographic quotas for the Internet sub-sample (although it ended up reflecting survey quotas).

Table 4 Area of Residence

	05/06 Total	05/07 Total	05/08 Total	06/11 Total	06/13 Total	06/14 Total	05/15 Total	05/16 Total	**05/17 Total**
Central 85710 85711 85712 85716 85718 85719	28%	27%	29%	28%	30%	28%	31%	31%	**30%**
South 85321 85614 85622 85629 85634 85641 85701 85706 85707 85708 85713 85714 85735 85736 85746 85756 85757 85341 85601 85633 85639	31%	27%	30%	28%	29%	28%	27%	27%	**28%**
Northwest 85653 85654 85658 85704 85705 85737 85739 85741 85742 85743 85745 85755 85652 85738	25%	29%	26%	28%	27%	28%	27%	27%	**27%**
East 85619 85715 85730 85747 85748 85749 85750	16%	17%	16%	16%	14%	16%	15%	15%	**15%**
	N=502	N=503	N=402	N=403	N=504	N=502	N=500	N=500	**N=504**

	Air Quality Problem			Sample	
	Major	Moderate	Minor	Telephone	Internet
Central 85710 85711 85712 85716 85718 85719	30%	32%	27%	30%	30%
South 85321 85614 85622 85629 85634 85641 85701 85706 85707 85708 85713 85714 85735 85736 85746 85756 85757 85341 85601 85633 85639	30%	26%	30%	28%	28%
Northwest 85653 85654 85658 85704 85705 85737 85739 85741 85742 85743 85745 85755 85652 85738	25%	27%	24%	26%	28%
East 85619 85715 85730 85747 85748 85749 85750	15%	15%	19%	15%	15%
	N=107	N=272	N=95	N=250	N=254

Gender – Consistent with all past surveys, there are no specific sampling quotas with respect to sex or age distribution. As indicated in Table 5, the gender distribution of the 2017 sample is 46% male and 54% female (compared to 44%/56% in 2016). This is true regardless of sample method, with relatively few differences based on geographic area. As in past Telephone studies, there was only one survey conducted per household and all respondents contacted to participate were further randomized by interviewing "the male or female in your household who is 16 or older and most recently celebrated a birthday." Internet invitations were sent by the online panel company to their "opt in" panelists who reside in Pima County zip codes.

Table 5 Gender of Respondents

	05/06 Total	05/07 Total	05/08 Total	06/11 Total	06/13 Total	06/14 Total	05/15 Total	05/16 Total	**05/17 Total**	Sample	
										Telephone	Internet
Men	46%	44%	47%	44%	45%	50%	42%	44%	**46%**	46%	46%
Women	54%	56%	53%	56%	55%	50%	58%	56%	**54%**	54%	54%

Question: For this survey, we need to speak with the male or female in your household who is sixteen years old or older and most recently celebrated a birthday. Are you that person?

Age Distribution – Similar to last year, 47% of the combined Telephone-Internet sample is 26 to 55. However, consistent with other dual-methodology studies that we conduct, the distribution of the Telephone sub-sample skews older than the Internet. Specifically, a majority of Telephone respondents (55%) are 56 to 75 – while the identical share of Internet panelists are 16 to 35. As a result, the median age of the Internet sample is much younger (34.3 years) than the Telephone sample (62.0 years).

Table 6 Age of Respondents

	05/06 Total	05/07 Total	05/08 Total	06/11 Total	06/13 Total	06/14 Total	05/15 Total	05/16 Total	**05/17 Total**	Sample	
										Telephone	Internet
16 to 25	13%	14%	10%	10%	13%	10%	16%	14%	**15%**	5%	24%
26 to 35	18%	16%	17%	15%	19%	17%	16%	17%	**17%**	3%	31%
36 to 45	17%	17%	20%	19%	19%	18%	15%	16%	**15%**	10%	20%
46 to 55	13%	16%	17%	16%	14%	15%	14%	15%	**15%**	15%	16%
56 to 65	13%	14%	14%	15%	14%	16%	18%	18%	**18%**	29%	8%
66 to 75	16%	14%	15%	17%	15%	16%	15%	14%	**14%**	26%	1%
76 or over	9%	8%	6%	8%	6%	8%	6%	6%	**6%**	12%	0%

Question: Please stop me when I read the age category you belong to. Are you...

Length of Residence – More than six of ten report that they have lived in Pima County for 11+ years (61%), including two-thirds of Telephone residents (68% versus 54% Internet). Still, nearly three of four Internet panelists (73%) are 6+ year Pima County residents. In line with last year, 6% are "new" Pima County residents (for less than two years) – while 7% are part-year residents.

Table 7 Length of Residence in Pima County

	05/06 Total	05/07 Total	05/08 Total	06/11 Total	06/13 Total	06/14 Total	05/15 Total	05/16 Total	**05/17 Total**	Sample	
										Telephone	Internet
Part year	5%	6%	2%	3%	8%	3%	4%	4%	**7%**	9%	5%
Less than 2 years	4%	6%	4%	2%	6%	6%	8%	7%	**6%**	3%	8%
2 to 5 years	10%	15%	16%	10%	9%	12%	11%	9%	**11%**	8%	13%
6 to 10 years	11%	13%	12%	12%	14%	14%	13%	14%	**16%**	12%	19%
11 or more years	70%	60%	65%	73%	62%	66%	64%	67%	**61%**	68%	54%

Question: Do you live in Pima County all year or are you a part-year resident?
Question: How many years have you lived in Pima County?

Household Member With a Breathing-Related Medical Condition – Overall, 42% of survey respondents (46% of Internet versus 37% of Telephone participants) indicate that someone in their household suffers from a breathing-related medical condition. This is up slightly from 2016 (40%), and represents the highest mention in recent surveys. Allowing for multiple mentions, 21% say that they themselves have a breathing-related medical condition (unchanged from last year), while 31% indicate that children (10%, down slightly from 11%) or other family members (21%, up from 17%) are affected. Geographically, the incidence of a household member with a breathing-related medical condition is highest in the Central or South zips.

Consistent with prior surveys, there is a strong correlation between the incidence of impacted household members and the perception of a "major" air quality problem in the Tucson area.

Table 8 Household Member With Breathing-Related Medical Condition

	05/06 Total	05/07 Total	05/08 Total	06/11 Total	06/13 Total	06/14 Total	05/15 Total	05/16 Total	**05/17 Total**	Sample	
										Telephone	Internet
Yes	40%	37%	37%	33%	37%	38%	34%	40%	**42%**	37%	46%
Respondent	(16%)	(15%)	(19%)	(14%)	(19%)	(20%)	(18%)	(21%)	**(21%)**	(20%)	(22%)
Children	(12%)	(14%)	(11%)	(12%)	(12%)	(10%)	(9%)	(11%)	**(10%)**	(10%)	(9%)
Other family member	(19%)	(19%)	(17%)	(15%)	(16%)	(16%)	(13%)	(17%)	**(21%)**	(16%)	(26%)
No	59%	62%	62%	66%	62%	59%	64%	58%	**57%**	62%	52%
Don't know/ Not sure	1%	1%	1%	1%	1%	3%	2%	2%	**1%**	1%	2%
	N=502	N=503	N=402	N=403	N=504	N=502	N=500	N=500	**N=504**	N=250	N=254

Question: Do you, your children or any other family member suffer from a breathing-related medical condition – such as asthma, emphysema, lung disease, etc.? If yes, who?

Number of Motor Vehicles Owned or Leased – Highly consistent with the last two years, 16% report that members of their household own or lease three or more motor vehicles. While the percentage of single-vehicle households (35%) is lower than we found last year (41%), it is nearly identical to 2015 levels (36%). Instead, there are a few more two-vehicle households (42%, up from 37%). Similar to recent studies, 7% (more often Central region residents) say that that no one in their household owns or rents a motor vehicle in working condition. Geographically, South area residents are most apt to have three or more vehicles (23%). Single-vehicle homes are more common in the Central region (43%).

Table 9 Number of Motor Vehicles Owned or Leased

	05/06 Total	05/07 Total	05/08 Total	06/11 Total	06/13 Total	06/14 Total	05/15 Total	05/16 Total	**05/17 Total**	Sample	
										Telephone	Internet
No working cars	2%	4%	6%	5%	6%	9%	8%	6%	**7%**	6%	8%
One	30%	27%	30%	25%	28%	32%	36%	41%	**35%**	36%	34%
Two	43%	44%	40%	46%	40%	38%	40%	37%	**42%**	38%	45%
Three or more	24%	26%	24%	24%	27%	21%	17%	16%	**16%**	19%	13%

Question: How many motor vehicles in working condition are owned or leased by members of your household?

Education Level – In line with recent surveys, and regardless of sample methodology, three of four respondents have at least some college level education. Once again, Telephone respondents are more likely to have some graduate work or a degree (18% versus 8% of Internet panelists). At the same time, Internet respondents are more apt to have some college (but no degree) (33% versus 20% of Telephone). Northwest area residents are more likely to be college graduates or better.

Regardless of interview method, and identical to last year, 19% are high school graduates. Only 5% have less than a high school diploma.

Table 10 Education Level of Respondents

	05/06 Total	05/07 Total	05/08 Total	06/11 Total	06/13 Total	06/14 Total	05/15 Total	05/16 Total	**05/17 Total**	Sample	
										Telephone	Internet
Less than high school	10%	8%	8%	9%	8%	9%	7%	4%	**5%**	6%	5%
Completed high school/Trade school	24%	19%	19%	18%	19%	13%	16%	19%	**19%**	18%	20%
Some college	25%	25%	29%	26%	28%	28%	31%	33%	**27%**	20%	33%
College graduate	23%	31%	27%	28%	29%	29%	28%	27%	**36%**	38%	34%
Some graduate work or graduate degree	16%	16%	15%	18%	14%	18%	17%	15%	**13%**	18%	8%

Question: What was the last grade of school you completed?

Annual Household Income – The median annual household income among all survey respondents (excluding refusals) is $46,995. This is very consistent with the 2016 survey ($43,974). In line with prior years, median household income is much higher among Telephone respondents ($53,679) as compared with Internet panelists ($40,690). Households in the highest income category ($80,000+) are more common in the Northwest or East zips.

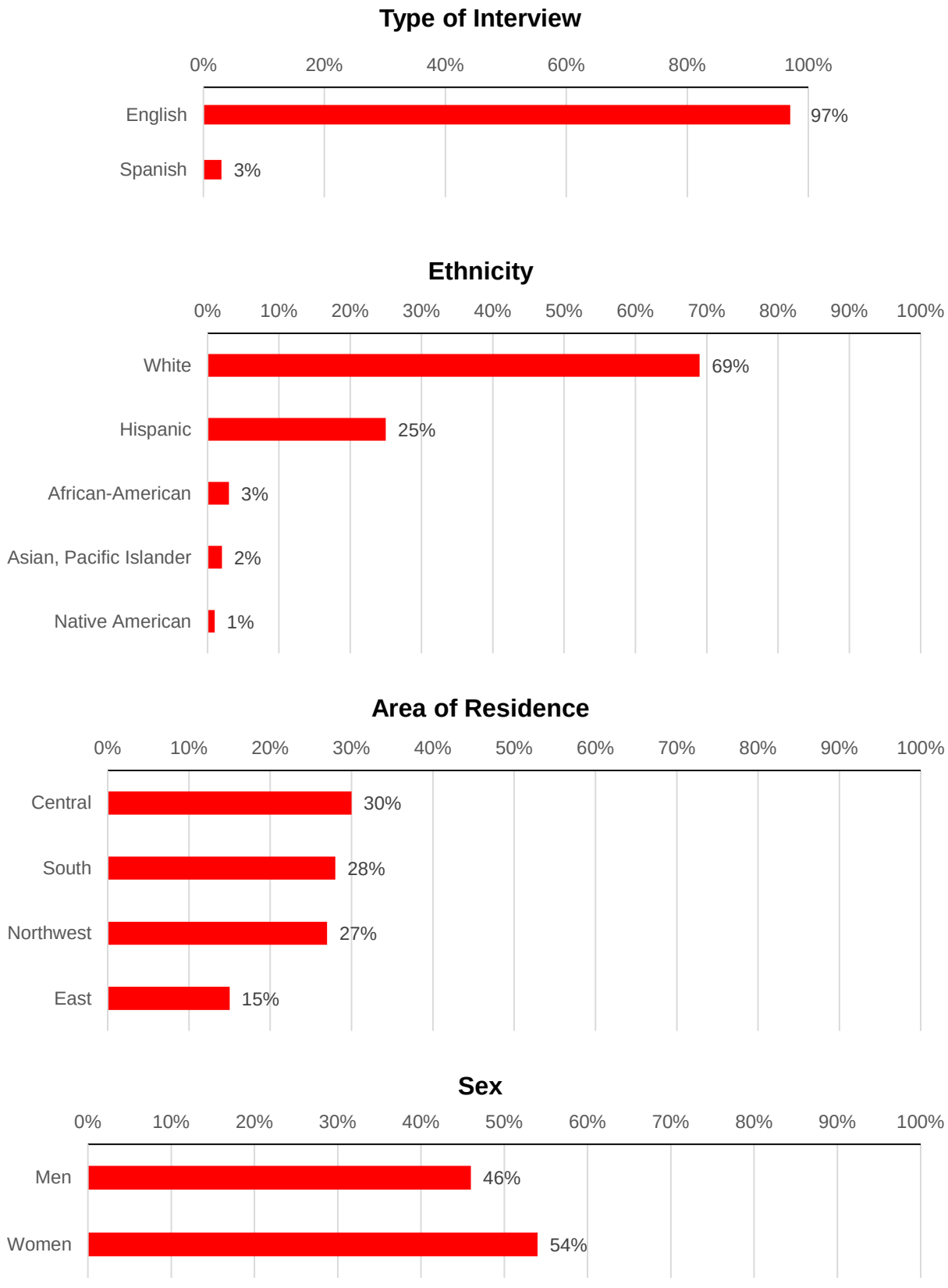
Identical to last year, 11% refused to indicate their broad annual household income category – more often Telephone respondents (17% versus 5% of Internet panelists).

Table 11 Household Income

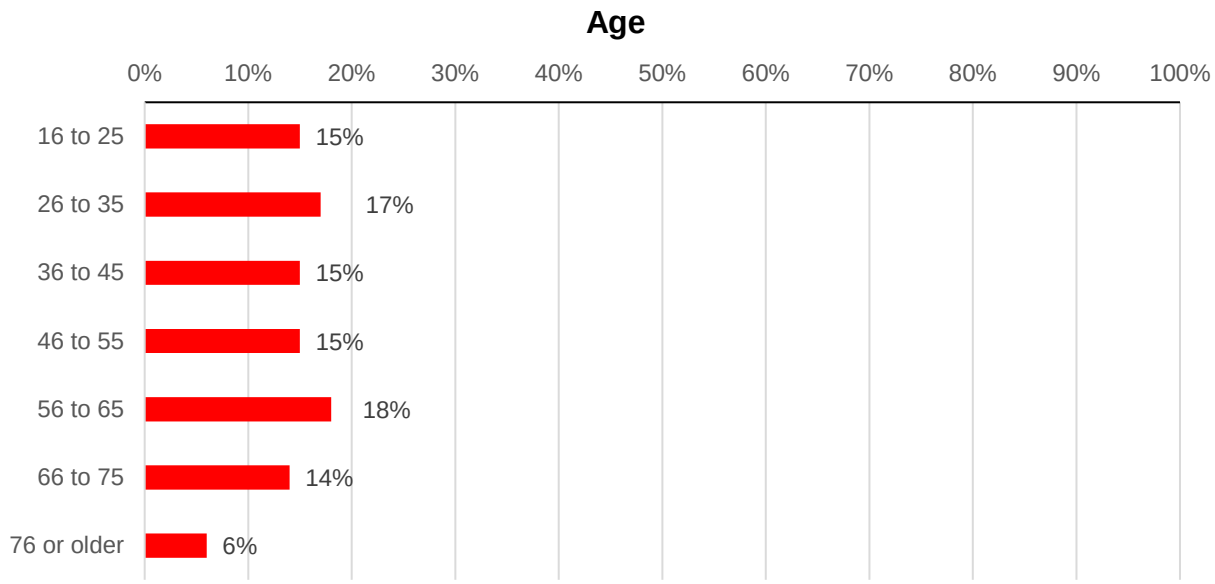
	05/06 Total	05/07 Total	05/08 Total	06/11 Total	06/13 Total	06/14 Total	05/15 Total	05/16 Total	**05/17 Total**	Sample	
										Telephone	Internet
Less than $15,000	7%	5%	8%	5%	9%	8%	12%	11%	**12%**	8%	16%
$15,000 to $24,999	12%	8%	9%	7%	9%	10%	14%	13%	**10%**	8%	12%
$25,000 to $39,999	12%	15%	16%	15%	16%	9%	16%	17%	**17%**	15%	19%
$40,000 or more*	49%	50%	49%	47%	46%	53%	46%	48%	**50%**	53%	47%
No answer/Refused	20%	21%	18%	25%	21%	20%	13%	11%	**11%**	17%	5%
* $40,000 to $59,999	20%	16%	19%	13%	15%	15%	14%	16%	**16%**	16%	16%
$60,000 to $79,999	11%	12%	12%	12%	10%	11%	11%	12%	**10%**	8%	12%
$80,000 or more	18%	22%	18%	22%	21%	27%	21%	20%	**24%**	29%	19%

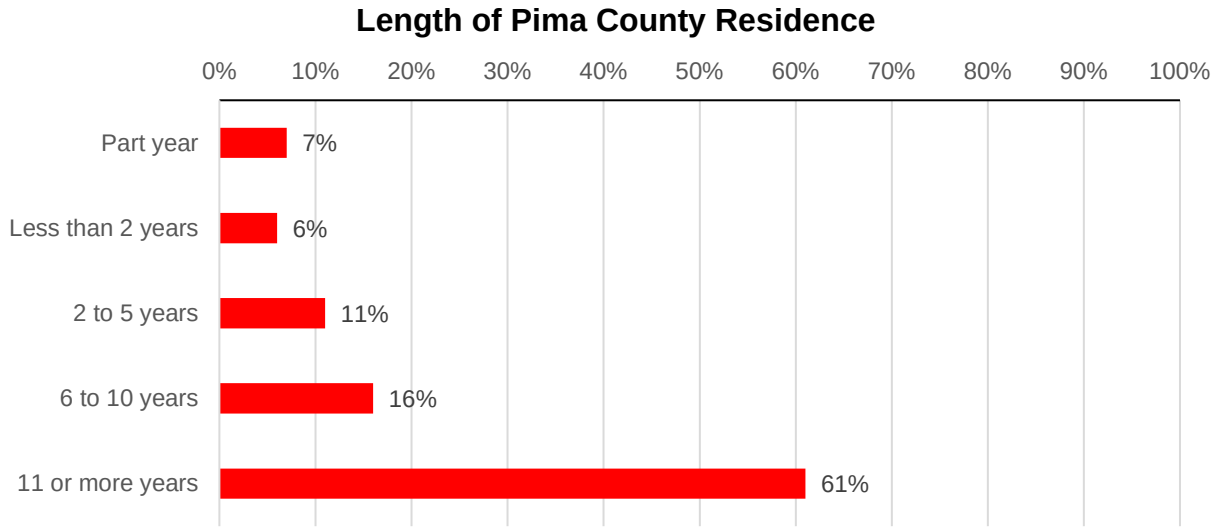
Question: As I read the following categories, please tell me into which group your total annual household income falls. We are not interested in your exact income, just your household income category...from all sources before taxes.

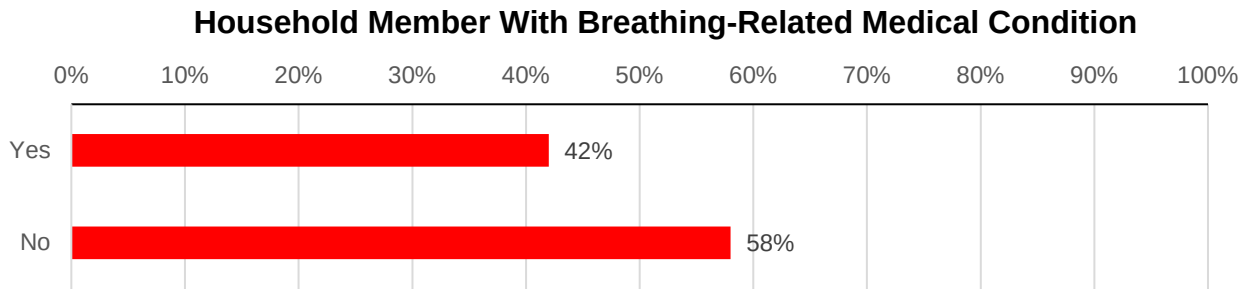
Display 1 **Demographic Profile of Respondents**
(Among the Total Sample)



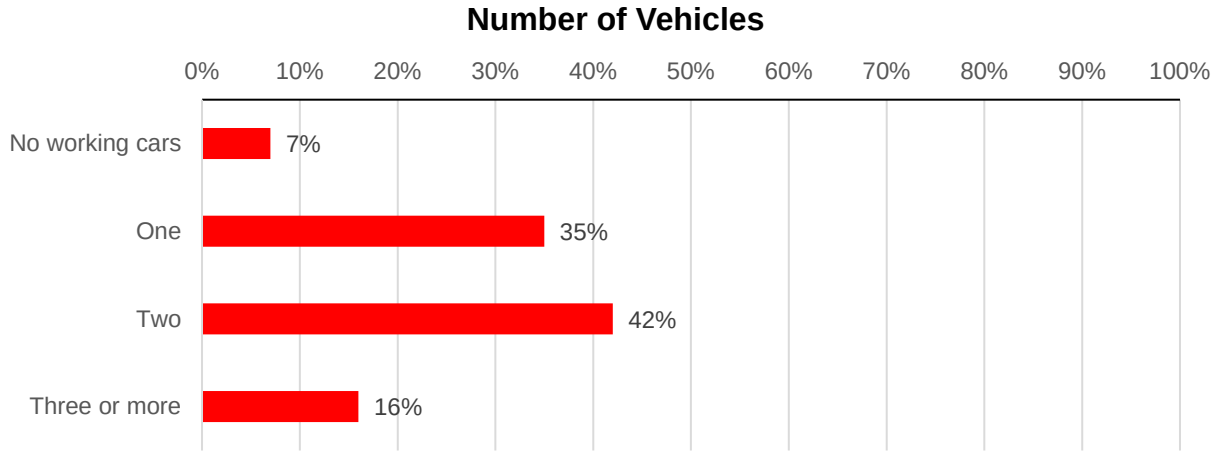
Display 1 (Cont'd) **Demographic Profile of Respondents**
(Among the Total Sample)

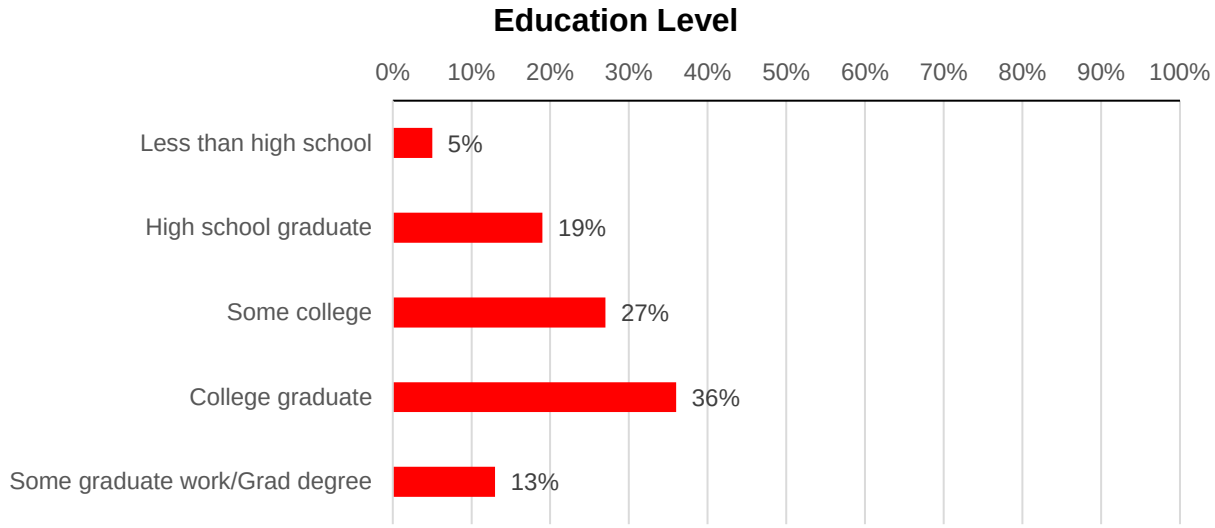


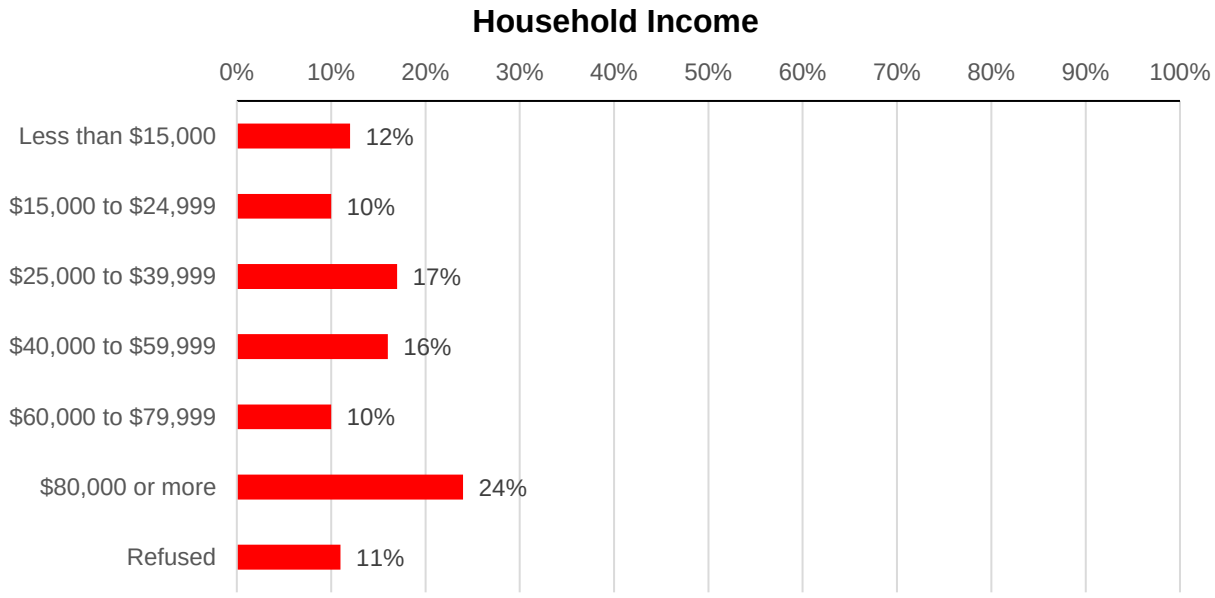




Display 1 (Cont'd) **Demographic Profile of Respondents**
(Among the Total Sample)







Awareness of Information About Air Quality/Pollution

Awareness of the Pima County "Clean Air" Program – As indicated in Table 12, 44% (regardless of sampling method) are familiar with the Pima County "Clean Air" Program. This is down from one-half in 2016, but remains highly consistent with 2015 findings (45%).

Awareness is highest in the Central (49%) or South (45%) zip codes and among respondents who think that Tucson has a "major" air quality problem (58%) – as well as those who perceive a progressively more severe stormwater pollution problem. Awareness tends to be higher among men (47%) than women (41%), with fewer differences based on ethnicity. Program awareness is also higher among progressively more long-term Pima County residents.

Table 12 Awareness of the Pima County "Clean Air" Program

	05/06 Total	05/07 Total	05/08 Total	06/11 Total	06/13 Total	06/14 Total	05/15 Total	05/16 Total	**05/17 Total**
Yes	59%	59%	46%	52%	43%	52%	45%	50%	**44%**
No	37%	36%	46%	43%	52%	45%	49%	42%	**47%**
Don't know	4%	5%	7%	5%	5%	3%	6%	7%	**9%**
	N=502	N=503	N=402	N=403	N=504	N=502	N=500	N=500	**N=504**

	Area				Air Quality Problem			Sample	
	Central	South	Northwest	East	Major	Moderate	Minor	Telephone	Internet
Yes	49%	45%	39%	39%	58%	41%	44%	44%	44%
No	42%	45%	52%	55%	38%	48%	50%	50%	44%
Don't know	9%	9%	10%	7%	4%	11%	5%	6%	12%
	N=151	N=141	N=137	N=75	N=107	N=272	N=95	N=250	N=254

Question: Have you ever heard of or are you aware of the Pima County Department of Environmental Quality "Clean Air" Program?

Awareness of Various Clean Air Events or Activities – Overall, 86% indicate familiarity with at least one "Clean Air" event or activity. This is up slightly from 83% in 2016. Once again, as we have found in past years, awareness of specific events or activities continues to be significantly higher among survey respondents familiar with the "Clean Air" Program. Awareness is also higher among men as compared to women.

Similar to past surveys, the three "Clean Air" events with the highest degree of familiarity include:

- **"Earth Day Festival and Parade"** (62% awareness [72% Telephone versus 52% Internet], up from 55% last year. Awareness is greater in the South zips.)

- **"Bike to Work Day"** (53% awareness [50% Telephone versus 56% Internet], down from 60%-63% in the last three surveys. Event recall is highest in the Central or East zips, as well as among 36 to 45 year-olds and those who perceive a progressively more severe air quality problem.)

- **"Bike Fest"** (47% awareness [54% Telephone versus 41% Internet], off slightly from the last two years [51%-52%]. Awareness is slightly lower only in the Northwest zips, and elevated among 36 to 45 year-olds.)

One of four or more are familiar with the remaining events:

- **"Car-Free Day"** (33% awareness [34% Telephone versus 32% Internet], identical to last year. South zip residents, 36 to 45 or 56 to 65 year-olds, Hispanics and those who perceive a progressively more severe air quality problem are more likely to aware of this clean air event.)

- **"Walk and Roll to School Day"** (31% awareness [30% Telephone versus 32% Internet], basically unchanged since last year [32%]. South region residents, 36 to 45 year-olds and Hispanics indicate the highest degree of awareness – as do those who think Tucson has a progressively more severe air quality problem.)

- **"Cyclovia"** (23% awareness [24% Telephone versus 22% Internet], highly consistent with the past two surveys [24% each]. Central residents and those who perceive a progressively more severe air quality problem are more apt to be aware of this event, with few differences based on ethnicity.)

Table 13 Awareness of Various Clean Air Events or Activities

	05/06 Total	05/07 Total	05/08 Total	06/11 Total	06/13 Total	06/14 Total	05/15 Total	05/16 Total	**05/17 Total**
"Earth Day Festival and Parade"	66%	74%	72%	68%	66%	68%	59%	55%	**62%**
"Bike to Work Day"	56%	55%	61%	57%	54%	63%	62%	60%	**53%**
"Bike Fest"	–	–	30%	53%	48%	45%	52%	51%	**47%**
"Car-Free Day"	–	–	–	–	–	30%	27%	33%	**33%**
"Walk and Roll to School Day"*	38%	22%	33%	34%	36%	32%	29%	32%	**31%**
"Cyclovia"	–	–	–	13%	11%	21%	24%	24%	**23%**
None of these	12%	10%	7%	12%	10%	10%	15%	17%	**14%**
	N=502	N=503	N=402	N=403	N=504	N=502	N=500	N=500	**N=504**

	Area				Air Quality Problem			Sample	
	Central	South	Northwest	East	Major	Moderate	Minor	Telephone	Internet
"Earth Day Festival and Parade"	62%	67%	62%	53%	65%	64%	56%	72%	52%
"Bike to Work Day"	56%	52%	46%	60%	67%	52%	48%	50%	56%
"Bike Fest"	52%	45%	43%	49%	50%	50%	40%	54%	41%
"Car-Free Day"	30%	40%	28%	33%	52%	30%	25%	34%	32%
"Walk and Roll to School Day"*	29%	35%	29%	32%	49%	30%	19%	30%	32%
"Cyclovia"	30%	21%	23%	17%	29%	25%	17%	24%	22%
None of these	9%	19%	17%	11%	8%	11%	24%	10%	18%
	N=151	N=141	N=137	N=75	N=107	N=272	N=95	N=250	N=254

* Was "Walk Our Children to School Day" (5/04-5/06).

Question: I am now going to read you some events or activities that are used to promote clean air in the Tucson area. As I read each, simply tell me if you have seen or heard of the event.

Household Participation in a "Clean Air" Campaign Event – Among the 86% aware of at least one "Clean Air" event or activity, 18% indicate that they or someone in their household participated in at least one of these events. This represents a significant improvement since last year (12%), and nearly matches the all-time high recorded in 2015 (20%).

Participants in a "Clean Air" event are more apt to be Internet panelists (22% versus 14% Telephone), South region residents, men, 26 to 45 year-olds and high income households ($60,000+) – along with those who perceive a "major" (24%) or "moderate" (21%) air quality problem. Once again, past participation is much higher among residents aware of the "Clean Air" Program (27% versus 8% unaware).

Table 13a Participation of Anyone in Household in a Clean Air Campaign Event
(Among Those Aware of at Least One Event)

	05/06 Total	05/07 Total	05/08 Total	06/11 Total	06/13 Total	06/14 Total	05/15 Total	05/16 Total	**05/17 Total**
Yes	9%	11%	10%	17%	17%	12%	20%	12%	**18%**
No	88%	86%	88%	82%	83%	84%	79%	85%	**77%**
Don't know	4%	3%	2%	1%	1%	3%	2%	3%	**5%**
	N=444	N=455	N=374	N=354	N=452	N=450	N=425	N=417	**N=432**

	Area				Air Quality Problem			Sample	
	Central	South	Northwest	East	Major	Moderate	Minor	Telephone	Internet
Yes	14%	24%	18%	16%	24%	21%	3%	14%	22%
No	81%	72%	75%	79%	71%	73%	94%	84%	69%
Don't know	5%	4%	7%	4%	4%	6%	3%	2%	9%
	N=137	N=114	N=114	N=67	N=98	N=243	N=72	N=225	N=207

Question: Did you or anyone in your household attend or participate in any of the clean air events in the past year?

Incidence of Changing Routines/Behaviors to Improve Air Quality After Participating in "Clean Air" Events – Among the 18% who report participation in a "Clean Air" event, three of four indicate that they have changed (or are considering actions to change) their daily routines or behaviors to help improve air quality. This is down from a near record 80% mention last year, and remains higher than we found in both 2015 (69%) and 2014 (55%). Internet panelists are especially apt to report a behavior or routine change (87% versus 55% Telephone).

Among the combined sample, this means that 11% report a change in their behavior after participating in a "Clean Air" event. This is up from 10% in 2016, and ties the all-time high recorded in 2015. Willingness to change in the current survey is highest among Central zip residents, women, 26 to 45 year-olds and households impacted by a breathing-related medical condition.

Table 13b Incidence of Changing Routines/Behaviors to Improve Air Quality After Participating in Clean Air Events
(Among Those With a Household Member Who Participated)

	05/07 Total	05/08 Total	06/11 Total	06/13 Total	06/14 Total	05/15 Total	05/16 Total	**05/17 Total**
Yes	65%	81%	57%	76%	55%	69%	80%	**74%**
No	27%	11%	41%	23%	39%	23%	8%	**25%**
Don't know	8%	8%	2%	1%	5%	8%	12%	**1%**
	N=52	N=36	N=61	N=75	N=56	N=83	N=49	**N=77**

	Area				Air Quality Problem		Sample	
	Central	South	Northwest	East	Major	Moderate	Telephone	Internet
Yes	84%	74%	70%	64%	83%	69%	55%	87%
No	16%	26%	30%	27%	17%	29%	45%	11%
Don't know	0%	0%	0%	9%	0%	2%	0%	2%
	N=19	N=27	N=20	N=11	N=24	N=41	N=31	N=46

Question: After participating in a clean air event, did you or someone in your household take or consider any actions to change your daily routines or behaviors to help improve air quality?

Opinion of Activities/Events to Encourage Use of Other Modes of Transportation – Nine of ten familiar with at least one "Clean Air" event (regardless of sample methodology) have a positive opinion of "events and activities that encourage people to use other modes of transportation or work from home instead of driving alone." This represents progressive improvement from the 2015 (85%) and 2016 (88%) surveys, and is the highest positive mention to-date. In fact, for the first time ever, a majority are now "very favorable" towards these type of activities/events (52%, up from 45%-47% the last two years).

Geographically, Central and South residents are most highly favorable of activities and events to encourage use of other modes of transportation. This is also true among women, 26 to 45 year-olds and those who perceive a progressively more severe air quality problem in Tucson.

Consistent with recent years, just 7% have a negative opinion (to any extent) of air quality related events and activities.

Table 13c

Opinion of Activities/Events to Encourage Use of Other Modes of Transportation
(Among Those Aware of at Least One Event)

	05/06 Total	05/07 Total	05/08 Total	06/11 Total	06/13 Total	06/14 Total	05/15 Total	05/16 Total	**05/17 Total**
Very favorable	43%	45%	46%	42%	45%	38%	47%	45%	**52%**
Somewhat favorable	40%	39%	36%	44%	40%	35%	38%	43%	**38%**
Not very favorable	4%	5%	5%	7%	6%	5%	7%	4%	**5%**
Not at all favorable	3%	3%	3%	6%	4%	6%	3%	4%	**2%**
Don't know/No answer	10%	8%	9%	1%	5%	15%	5%	4%	**4%**
	N=444	N=455	N=374	N=354	N=452	N=450	N=425	N=417	**N=432**

	Area				Air Quality Problem			Sample	
	Central	South	Northwest	East	Major	Moderate	Minor	Telephone	Internet
Very favorable	59%	56%	44%	45%	67%	53%	32%	52%	63%
Somewhat favorable	31%	38%	42%	43%	30%	37%	50%	38%	37%
Not very favorable	5%	2%	7%	6%	2%	4%	10%	5%	5%
Not at all favorable	1%	2%	3%	2%	0%	1%	6%	2%	1%
Don't know/No answer	4%	3%	4%	4%	1%	4%	3%	4%	4%
	N=137	N=114	N=114	N=67	N=98	N=243	N=72	N=225	N=207

Question: Overall, what is your opinion of these events and activities that encourage people to use other modes of transportation or work from home instead of driving alone? Is your opinion of the various Clean Air Campaign events and activities very favorable, somewhat favorable, not very favorable or not at all favorable?

Steps Taken to Reduce Air Pollution – As we found last year, and allowing for multiple mentions (unaided in the Telephone survey and aided in the Internet survey), the four steps most often taken to help reduce air pollution in the Tucson area include:

- **Keep car tuned** (38%, basically unchanged from 39% last year [which was the highest mention to-date]. There are few differences based on perception of the air quality problem in Tucson. Most likely to keep their car tuned are South or Northwest residents, 26 to 35 year olds and Internet respondents [46% versus 30% Telephone].)

- **Carpool/Less driving alone** (38%, up from 33% last year [and the highest mention since 40% in 2007]. Internet respondents [42% versus 34% Telephone], South zip residents, women, 16 to 25 year-olds and those who perceive a progressively more severe air quality problem are likelier to be increasing carpooling.)

- **Generally reduced driving** (38%, identical to last year. This is generally the case regardless of geography [lower only in Northwest zips] or sample method. Those who have reduced their driving levels tend to be women, 26 to 35 or 46 to 55 year-olds and respondents who perceive a "major" or "moderate" air quality problem.)

- **Keep tires inflated properly** (31%, down from 35% last year. More apt to keep their tires properly inflated are Internet respondents [41% versus 21% Telephone], Northwest or East area residents, 36 to 55 year-olds and those who perceive a "moderate" or "minor" air quality problem.)

Progressively more (especially South residents) indicate that they have **planted trees** to help reduce air pollution (23%, up from 21% in 2016 and 17% in 2015). Other significant actions taken include: **bought a more fuel efficient car** (20%, up from 13% in the last two surveys), **choose one day a week not to drive** (16%, up from 12% last year), **avoid excessive idling** (16%, up from 12%), **bought bicycles** (15%, up from 12%), **adjusted vehicle's emission control equipment** (14%, up from 12%), **use BBQ grill less** (8%, down slightly from 9%), **moved closer to work** (8%, down slightly from 9%) and/or **use fireplace/wood stove less** (unchanged at 8%).

Down from 16% in the last two surveys, and representing a record mention, just 12% overall indicate that they have done **nothing** to reduce air pollution. Once again, these tend to be residents unaware of the "Clean Air" Program (16% versus 7% familiar) and those who perceive a "minor" air quality problem (16%).

Table 14 Steps Taken to Reduce Air Pollution

	05/06 Total	05/07 Total	05/13 Total	05/14 Total	05/15 Total	05/16 Total	**05/17 Total**
Keep car tuned	31%	28%	12%	25%	35%	39%	**38%**
Carpool/Less driving alone	32%	40%	28%	28%	32%	33%	**38%**
Generally reduced driving/Driven less	39%	39%	37%	44%	35%	38%	**38%**
Keep tires properly inflated	13%	14%	7%	22%	39%	35%	**31%**
Planted trees	10%	12%	5%	12%	17%	21%	**23%**
Bought more fuel efficient car	8%	11%	7%	13%	13%	13%	**20%**
Chosen once a week not to drive	2%	4%	5%	6%	10%	12%	**16%**
Avoid excessive idling	6%	6%	4%	12%	12%	12%	**16%**
Bought bicycles	8%	5%	8%	6%	12%	12%	**15%**
Adjusted vehicle's emission control equipment	12%	7%	3%	11%	10%	12%	**14%**
Using BBQ grill less	2%	6%	1%	2%	6%	9%	**8%**
Moved closer to work	4%	2%	2%	2%	8%	9%	**8%**
Using fireplace/Wood stove less	4%	6%	3%	3%	5%	8%	**8%**
Challenged friends/Co-workers to change	0%	3%	1%	2%	3%	2%	**6%**
Bought alternative-fueled car	2%	3%	4%	3%	4%	3%	**5%**
Advocated alternative to cars	1%	1%	1%	1%	4%	2%	**4%**
Walk more	3%	1%	2%	2%	1%	2%	**2%**
Ride the bus/Public transportation	1%	0%	1%	2%	1%	3%	**1%**
Other	7%	5%	7%	4%	3%	4%	**5%**
Nothing	15%	14%	21%	15%	16%	16%	**12%**
	N=502	N=503	N=504	N=502	N=500	N=500	**N=504**

	Area				Air Quality Problem			Sample	
	Central	South	Northwest	East	Major	Moderate	Minor	Telephone	Internet
Keep car tuned	37%	42%	40%	31%	38%	42%	37%	30%	46%
Carpool/Less driving alone	34%	45%	34%	36%	49%	41%	22%	34%	42%
Generally reduced driving/Driven less	39%	40%	32%	41%	42%	42%	26%	36%	40%
Keep tires properly inflated	30%	26%	34%	35%	28%	34%	33%	21%	41%
Planted trees	16%	30%	23%	25%	40%	22%	13%	14%	33%
Bought more fuel efficient car	15%	23%	20%	23%	28%	18%	19%	16%	23%
Chosen once a week not to drive	11%	21%	16%	15%	24%	13%	12%	9%	22%
Avoid excessive idling	11%	16%	20%	15%	15%	18%	13%	10%	20%
Bought bicycles	11%	26%	9%	15%	27%	12%	12%	8%	22%
Adjusted vehicle's emission control equipment	13%	15%	14%	11%	18%	13%	14%	11%	16%
Using BBQ grill less	8%	8%	7%	9%	6%	10%	7%	2%	14%
Moved closer to work	5%	9%	9%	9%	8%	10%	5%	0%	15%
Using fireplace/Wood stove less	6%	11%	8%	5%	12%	8%	3%	6%	10%
Challenged friends/Co-workers to change	3%	8%	6%	4%	11%	5%	1%	3%	8%
Bought alternative-fueled car	1%	6%	8%	7%	8%	5%	3%	6%	5%
Advocated alternative to cars	3%	7%	4%	0%	8%	4%	1%	3%	5%
Walk more	4%	0%	2%	0%	2%	1%	3%	2%	1%
Ride the bus/Public transportation	2%	0%	1%	0%	1%	0%	2%	2%	0%
Other	3%	4%	7%	11%	2%	7%	6%	9%	2%
Nothing	12%	9%	16%	8%	4%	9%	16%	12%	11%
	N=151	N=141	N=137	N=75	N=107	N=272	N=95	N=250	N=254

Question: What, if anything, have you been able to do to help reduce air pollution in the Tucson area?

Presence of Children 5-18 in Household – Among the total sample, 28% indicate that they have children between the ages of 5 and 18 living in their household. This is higher than we found in 2015 (26%) or 2016 (24%). South or Northwest residents, 26 to 45 year-olds and non-Whites are more likely to report the presence of children in their households.

Table 15 Presence of Children Ages 5-18 in Household

	05/06 Total	05/07 Total	05/08 Total	06/11 Total	06/13 Total	06/14 Total	05/15 Total	05/16 Total	**05/17 Total**
Yes	30%	30%	30%	27%	33%	22%	26%	24%	**28%**
No	70%	70%	70%	73%	67%	78%	74%	76%	**72%**
	N=502	N=503	N=402	N=403	N=504	N=502	N=500	N=500	**N=504**

	Area				Air Quality Problem			Sample	
	Central	South	Northwest	East	Major	Moderate	Minor	Telephone	Internet
Yes	24%	30%	31%	28%	33%	26%	28%	18%	37%
No	76%	70%	69%	72%	67%	74%	72%	82%	63%
	N=151	N=141	N=137	N=75	N=107	N=272	N=95	N=250	N=254

Question: Do children 5 to 18 years of age live in your household?

Incidence of Children Ages 5-18 Receiving Air Pollution Information From School – Among households with young children (28% of the combined sample), one-half report that these 5 to 18 year-olds have "talked about or brought home materials from school about improving air quality." This represents an incremental increase from the 2015 (45%) and 2016 (48%) studies. Recall of school material in 2017 is apparent regardless of geography (especially in the East zips), and highest among Whites, higher income households and those who perceive a "major" air quality problem – along with residents aware of the "Clean Air" Program (68% versus 36% unfamiliar).

Table 15a Incidence of Children Ages 5-18 Receiving Information From School About Air Pollution
(Among Households With Children Ages 5-18)

	05/06 Total	05/07 Total	05/08 Total	06/11 Total	06/13 Total	06/14 Total	05/15 Total	05/16 Total	**05/17 Total**
Yes	36%	36%	29%	36%	40%	54%	45%	48%	**50%**
No	59%	50%	64%	59%	51%	34%	47%	48%	**43%**
Don't know	5%	14%	7%	6%	9%	11%	8%	3%	**8%**
	N=149	N=153	N=119	N=109	N=168	N=110	N=131	N=120	**N=141**

	Area				Air Quality Problem			Sample	
	Central	South	Northwest	East	Major	Moderate	Minor	Telephone	Internet
Yes	50%	48%	48%	57%	69%	46%	44%	52%	48%
No	44%	40%	43%	43%	29%	45%	48%	41%	43%
Don't know	6%	12%	10%	0%	3%	8%	7%	6%	8%
	N=36	N=42	N=42	N=21	N=35	N=71	N=27	N=46	N=95

Question: Have the children 5 to 18 years old in your home ever talked about or brought home materials from school about improving air quality – including school presentations or brochures?

Gasoline-Powered Lawn & Garden Equipment – One of ten report that they (or someone in their household) use gasoline-powered lawn & garden equipment to care for their home property (Table 16). This compares to 14% usage in 2016. Once again, gasoline-powered equipment usage is generally consistent regardless of geography (slightly higher in the Northwest region) or gender – with fewer differences between Telephone (7%) and Internet (12%) respondents. Usage is elevated among 46 to 55 year-olds and those with less formal education (high school diploma or less).

Similar to last year, users were asked for the types of gasoline-powered lawn & garden equipment used (Table 16a) – including (for each piece of equipment used) the type of engine (2-stroke or 4-stroke) (Table 16b) and number of minutes of usage in a typical month (Table 16c). Among the 9% who report having such equipment, the usage details are summarized as follows:

	Usage (Among Equipment Users)	**Total Usage** (Among the Total Sample)	**% 2-Stroke Engine** (Among Equipment Users)	**Average Monthly Usage** (Minutes) (Among Equipment Users)
Gasoline-powered lawn mower				
2017	**64%**	**6%**	**37%**	**37**
2016	54%	8%	38%	38
Gasoline-powered chainsaw				
2017	**40%**	**4%**	**58%**	**35**
2016	26%	4%	42%	39
Gasoline-powered leaf blower or vacuum				
2017	**36%**	**3%**	**53%**	**40**
2016	36%	5%	58%	25
Gasoline-powered string trimmer				
2017	**34%**	**3%**	**62%**	**48**
2016	24%	3%	59%	33
Gasoline-powered hedge trimmers				
2017	**19%**	**2%**	**56%**	**62**
2016	21%	3%	47%	31

Table 16 Use of Gasoline-Powered Lawn & Garden Equipment to Care for Property

	05/16 Total	**05/17 Total**	Area			
			Central	South	Northwest	East
Yes	14%	**9%**	9%	7%	12%	9%
No	84%	**88%**	89%	91%	84%	89%
Don't know	2%	**2%**	2%	2%	4%	1%
	N=500	**N=504**	N=151	N=141	N=137	N=75

	Air Quality Problem			Sample	
	Major	Moderate	Minor	Telephone	Internet
Yes	12%	9%	10%	7%	12%
No	86%	89%	90%	93%	84%
Don't know	2%	2%	1%	0%	4%
	N=107	N=272	N=95	N=250	N=254

Question: Do you or anyone in your household use *gasoline-powered* lawn & garden equipment to care for your home property?

Table 16a Types of Gasoline-Powered Lawn & Garden Equipment Used to Care for Property

	05/16 Total	**05/17 Total**	Area			
			Central	South	Northwest	East
Gasoline-powered lawn mower	54%	**64%**	77%	70%	65%	29%
Gasoline-powered chainsaw	26%	**40%**	38%	40%	41%	43%
Gasoline-powered leaf blower or vacuum	36%	**36%**	38%	30%	47%	14%
Gasoline-powered string trimmer	24%	**34%**	46%	40%	29%	14%
Gasoline-powered hedge trimmers	21%	**19%**	23%	20%	12%	29%
Other gasoline-powered equipment	6%	**0%**	0%	0%	0%	0%
	N=72	**N=47**	N=13	N=10	N=17	N=7

	Air Quality Problem			Sample	
	Major	Moderate	Minor	Telephone	Internet
Gasoline-powered lawn mower	77%	62%	56%	71%	60%
Gasoline-powered chainsaw	46%	29%	56%	47%	37%
Gasoline-powered leaf blower or vacuum	54%	25%	33%	35%	37%
Gasoline-powered string trimmer	54%	29%	22%	12%	47%
Gasoline-powered hedge trimmers	54%	4%	11%	12%	23%
Other gasoline-powered equipment	0%	0%	0%	0%	0%
	N=13	N=24	N=9	N=17	N=30

Question: As I read each type of gasoline-powered lawn & garden equipment, please tell me if you currently use it to care for your home property.

Table 16b Type of Engine in Gasoline-Powered Lawn & Garden Equipment Used

	2-Stroke	4-Stroke	Don't Know
Gasoline-powered lawn mower			
2017 (N=30)	**37%**	**20%**	**43%**
2016 (N=39)	38%	28%	33%
Gasoline-powered chainsaw			
2017 (N=19)	**58%**	**0%**	**42%**
2016 (N=19)	42%	16%	42%
Gasoline-powered leaf blower or vacuum			
2017 (N=17)	**53%**	**29%**	**18%**
2016 (N=26)	58%	15%	27%
Gasoline-powered string trimmer			
2017 (N=16)	**62%**	**6%**	**31%**
2016 (N=17)	59%	12%	29%
Gasoline-powered hedge trimmers			
2017 (N=9)	**56%**	**11%**	**33%**
2016 (N=15)	47%	27%	27%
Other gasoline-powered equipment			
2017 (N=0)	**–**	**–**	**–**
2016 (N=4)	25%	25%	50%

Question: Does that have a 2-stroke or a 4-stroke engine?

Table 16c Minutes Per Month Gasoline-Powered Lawn & Garden Equipment Used

	15 Minutes or Less	16-30 Minutes	31 Min-1 Hour	More Than 1 Hour
Gasoline-powered lawn mower				
2017 (N=30)	**57%**	**21%**	**7%**	**14%**
2016 (N=39)	13%	61%	18%	8%
Gasoline-powered chainsaw				
2017 (N=19)	**47%**	**29%**	**6%**	**18%**
2016 (N=19)	47%	21%	10%	21%
Gasoline-powered leaf blower or vacuum				
2017 (N=17)	**33%**	**33%**	**13%**	**20%**
2016 (N=26)	46%	27%	23%	4%
Gasoline-powered string trimmer				
2017 (N=16)	**44%**	**13%**	**6%**	**38%**
2016 (N=17)	41%	24%	24%	12%
Gasoline-powered hedge trimmers				
2017 (N=9)	**13%**	**22%**	**33%**	**33%**
2016 (N=15)	40%	20%	33%	7%
Other gasoline-powered equipment				
2017 (N=0)	**–**	**–**	**–**	**–**
2016 (N=4)	25%	50%	25%	0%

Question: In a typical month, how many minutes would you estimate that you use this piece of equipment?

Agreement With Various Statements Regarding PDEQ Programs and Air Pollution – As in prior years, survey respondents were asked to agree or disagree with a variety of statements related to various PDEQ programs (including clean air and clean water).

PDEQ and Rideshare Awareness –

- **You are aware of the Pima County Department of Environmental Quality** (63% agreement, down from 2016 [68%] but still higher than we found in 2015 [60%]. Agreement is consistent regardless of geography, and highest among men, Telephone respondents [68% versus 58% Internet] and households with progressively higher incomes. Consistent with prior studies, 84% of those aware of the "Clean Air" Program also indicate an awareness of PDEQ [compared to 42% who are unaware of the program].)

- **You are aware of the services provided by Sun Rideshare** (51% agree, down somewhat from record levels found in 2016 [58%] and 2015 [55%]. Central or Northwest region residents, 26 to 45 year-olds, non-Hispanic minorities and Internet respondents [55% versus 47% Telephone] indicate the most agreement – along with those aware of the "Clean Air" Program [66% versus 38% unaware].)

PDEQ Program and Campaign Awareness –

- **You have seen or heard information about the importance of keeping your tires properly inflated** (86% agree, up from 83% last year. Recall is generally consistent regardless of geography [somewhat lower only in the Northwest], gender or air quality problem perception. Most apt to agree are those 36 or older, 11+ year Pima County residents, non-Hispanics, 2+ vehicle households, Telephone respondents [92% versus 79% Internet] and those familiar with the "Clean Air" Program [93% versus 80% unfamiliar].)

- **You are aware of the "Clean Water Starts With Me" campaign** (55% agree, down just slightly from last year's record mention [57%]. Again, agreement is directly related to the perception of a progressively more severe stormwater pollution problem. Campaign awareness remains significantly higher among those familiar with the "Clean Air" Program [76% versus 34% unfamiliar] – as well as among Central or South residents and non-Whites.)

- **You have seen or heard the phrase "Healthy Air Is in Our Hands"** (34% agree. This is off slightly from last year [36%], but still higher than 2015 [26%]. Again, there is recall regardless of geography [highest in the South zips] – with increased agreement among men, 26 to 45 year-olds, Internet panelists [45% versus 23% Telephone] and those aware of the "Clean Air" Program [58% versus 13% unaware]. Familiarity remains directly related to the perception of a progressively more severe air quality problem.)

Air Pollution Evaluations –

- **You are aware that air pollution causes health problems** (Identical to last year, fully 96% agree.)

- **You have seen or heard information that vehicle engine idling causes air pollution** (New to the 2017 survey, nine of ten agree – with few differences based on geography, gender, age, air quality problem perception or interview method.)

- **You understand what an air pollution advisory means** (86% agree, down just slightly from the all-time mention recorded in 2013 and 2016 [89% each].)

- **You have seen or heard information regarding clean air or air pollution** (84% agree, the highest percentage recorded to-date [when 68%-80% agreed with the statement "you have seen or heard commercials on TV or radio regarding clean air or air pollution"]. Recall is similar regardless of geography, interview method or air quality problem perception. It is highest among men, the oldest [66+] respondents and those aware of the "Clean Air" Program [91% versus 77% unaware].)

- **You are aware that the majority of our air pollution comes from motor vehicle use** (81% agree, very consistent with the four most recent surveys [81%-83%]. Agreement is highest among Central residents, 36 to 45 year-olds, Hispanics and residents familiar with the "Clean Air" Program [90% versus 75% unfamiliar] – as well as those who consider Tucson to have a "major" or "moderate" air quality problem.)

- **You are aware of air pollution advisories in Pima County** (Two-thirds report awareness. This represents a decline from 2016 [72%], but remains higher than what we found in 2015 [64%]. There are few differences in awareness with respect to geography, ethnicity or air quality problem perception. It is highest among men, Telephone respondents [71% versus 61% Internet] and the most formally educated. Similar to past studies, awareness is higher among those aware of the "Clean Air" Program [90%] than not [44%].)

- ***Because you want to reduce air pollution,* you are generally driving less** (As we have found in the prior two years, 58% agree. Agreement is somewhat lower only in Northwest zips [51% versus 56%-62% elsewhere]. Agreement tends to be higher among non-Hispanic minorities and lower income households – as well as those who perceive a progressively more serious air quality problem and are aware of the "Clean Air" Program [66% versus 50% unaware].)

Table 17 Agreement With Various Statements Regarding PDEQ Programs and Air Pollution

	05/06 Total	05/07 Total	05/08 Total	06/11 Total	06/13 Total	06/14 Total	05/15 Total	05/16 Total	**05/17 Total**
You are aware that air pollution causes health problems.*	–	98%	96%	98%	99%	94%	95%	96%	**96%**
You have seen or heard information that vehicle engine idling causes air pollution.	–	–	–	–	–	–	–	–	**90%**
You understand what an air pollution advisory means.**	83%	83%	79%	87%	89%	87%	85%	89%	**86%**
You have seen or heard information about the importance of keeping your tires properly inflated.	–	–	–	–	–	90%	88%	83%	**86%**
You have seen or heard information regarding clean air or air pollution.***	75%	76%	69%	74%	68%	80%	66%	77%	**84%**
You are aware that the majority of our air pollution comes from motor vehicle use.	–	–	–	79%	81%	82%	82%	83%	**81%**
You are aware of air pollution advisories in Pima County.****	70%	74%	79%	75%	75%	78%	64%	72%	**66%**
You are aware of the Pima County Department of Environmental Quality (PDEQ).*****	48%	65%	70%	69%	64%	68%	60%	68%	**63%**
Because you want to *reduce air pollution*, you are generally driving less	–	–	55%	48%	53%	55%	58%	58%	**58%**
You are aware of the services provided by Sun Rideshare.	–	–	–	48%	45%	49%	55%	58%	**51%**
You are aware of the "Clean Water Starts With Me" campaign.	–	–	–	–	–	47%	47%	57%	**55%**
You have seen or heard the phrase "Healthy Air Is in Our Hands."	–	–	–	–	–	–	26%	36%	**34%**
	N=502	N=503	N=402	N=403	N=504	N=502	N=500	N=500	**N=504**

	Area				Air Quality Problem			Sample	
	Central	South	North-west	East	Major	Moderate	Minor	Telephone	Internet
You are aware that air pollution causes health problems.*	98%	92%	95%	99%	95%	97%	97%	98%	94%
You have seen or heard information that vehicle engine idling causes air pollution.	93%	86%	89%	89%	91%	88%	94%	91%	88%
You understand what an air pollution advisory means.**	85%	84%	86%	92%	85%	88%	88%	95%	78%
You have seen or heard information about the importance of keeping your tires properly inflated.	84%	87%	82%	91%	89%	87%	85%	92%	79%
You have seen or heard information regarding clean air or air pollution.***	85%	83%	85%	84%	86%	86%	84%	86%	83%
You are aware that the majority of our air pollution comes from motor vehicle use.	89%	78%	77%	77%	86%	84%	78%	82%	81%
You are aware of air pollution advisories in Pima County.****	68%	64%	66%	68%	68%	68%	66%	71%	61%
You are aware of the Pima County Department of Environmental Quality (PDEQ).*****	64%	63%	61%	64%	71%	64%	58%	68%	58%
Because you want to *reduce air pollution*, you are generally driving less	61%	62%	51%	66%	71%	58%	45%	60%	56%
You are aware of the services provided by Sun Rideshare.	53%	47%	54%	49%	64%	53%	33%	47%	55%
You are aware of the "Clean Water Starts With Me" campaign.	58%	60%	48%	49%	66%	58%	38%	53%	56%
You have seen or heard the phrase "Healthy Air Is in Our Hands."	30%	38%	35%	33%	51%	34%	22%	23%	45%
	N=151	N=141	N=137	N=75	N=107	N=272	N=95	N=250	N=254

* Was "You are aware that airborne dust causes health problems" (5/07-5/08).
** Was ""You understand what an air pollution advisory means, issued as part of an Air Quality Action Day" (5/06-5/08).
*** Was "You have seen or heard commercials on TV or radio regarding clean air or air pollution" (5/06-5/16)
**** Was "in Tucson" (5/06-6/14).
***** Was "You are **knowledgeable** about the Pima County Department of Environmental Quality (PDEQ)" (5/06).

Question: As I read the following statements, simply tell me if you agree or disagree.

Travel Behavior for Shopping – A majority (54%) indicate they generally **drive alone** for shopping. This in down from 60% last year, but short of the record low of 50% recorded in 2015. Instead, a few more **carpool with 1 to 4 other adults** (30%, up from 27% in 2016). Others take the **bus** (6%, up from 5%), **walk** (5%, up from 4%), **bicycle** (2%, up from 1%), **vanpool with 5 or more other adults** (unchanged at 1%) or **motorcycle** (1%, up from 0%-1% in past years). Internet respondents are more likely to use single driver alternatives and less apt to drive alone (48% versus 61% of Telephone).

The incidence of driving alone for shopping is again greater among Northwest or East area residents – as well as college graduates or better and higher income households. South zip residents, women, 16 to 25 year-olds and Hispanics are more apt to carpool for shopping. Bus usage is elevated among 16 to 25 year-olds and lower income households.

Table 18 Travel Behavior for Shopping

	05/06 Total	05/07 Total	05/15 Total	05/16 Total	**05/17 Total**	Sample	
						Telephone	Internet
Drive alone	77%	77%	50%	60%	**54%**	61%	48%
Carpool with 1 to 4 other adults	19%	18%	29%	27%	**30%**	28%	32%
Bus	1%	1%	9%	5%	**6%**	4%	7%
Walk	1%	1%	4%	4%	**5%**	4%	6%
Bicycle	1%	1%	3%	1%	**2%**	1%	4%
Vanpool with 5 or more other adults	0%	1%	2%	1%	**1%**	0%	1%
Motorcycle	0%	1%	1%	–	**1%**	0%	2%
Take the streetcar	–	–	1%	–	**0%**	0%	0%
Other	–	0%	1%	2%	**1%**	1%	2%

Question: What type of transportation do you generally use to go shopping?

Travel Behavior for Leisure Purposes – As we found last year, for leisure purposes ("such as dining out, meeting with friends, going to the movies, going to the gym, etc."), more **drive alone** (44%) rather than **carpool with 1 to 4 other adults** (41%). In 2016, the drive alone-to-carpool split was 45% and 44%, respectively. Once again, Internet respondents are more apt to carpool (43% versus 39% drive alone), while the Telephone sample is more likely to drive alone (48%) than carpool (39%). In lesser numbers, others say they generally take the **bus** (6%, up from 3% last year), **walk** (unchanged at 3%), **motorcycle** (2%, up from 0%-1%), **bicycle** (1%, down from 2%) or **vanpool with 5 or more other adults** (1% versus 0%-1% in past years) for leisure purposes.

Single passenger leisure travel is highest in the East or Northwest zip codes, as well as among the oldest respondents (66+), Hispanics and higher income households. Carpooling for leisure purposes is higher among Central area residents, women, 16 to 25 year-olds and non-Hispanic minorities. South or Central residents and lower income-types are more apt to take the bus.

Table 18a Travel Behavior for Leisure Purposes

	05/06 Total	05/07 Total	05/15 Total	05/16 Total	**05/17 Total**	Sample	
						Telephone	Internet
Drive alone	60%	60%	39%	45%	**44%**	48%	39%
Carpool with 1 to 4 other adults	30%	30%	43%	44%	**41%**	39%	43%
Bus	1%	2%	6%	3%	**6%**	3%	9%
Walk	3%	2%	4%	3%	**3%**	2%	3%
Motorcycle	1%	1%	1%	0%	**2%**	2%	2%
Bicycle	2%	2%	2%	2%	**1%**	1%	2%
Vanpool with 5 or more other adults	0%	1%	1%	0%	**1%**	1%	1%
Take the streetcar	–	–	1%	–	–	–	–
Other	–	–	2%	2%	**2%**	2%	1%

Question: What type of transportation do you generally use for leisure purposes, such as dining out, meeting with friends, going to the movies, going to the gym, etc.?

Perceived Seriousness of Air Quality Problem in Tucson Area – Overall, 21% perceive that Tucson has a "major" air quality problem. This represents an incremental increase from the 2015 (14%) and 2016 (18%) surveys. At the same time, progressively fewer consider air quality to be a "minor" problem (19%, down from 21% in 2016 and 24% in 2015). Most of the rest (basically unchanged at 54%) think it is a "moderate" issue, while the balance (6%) are not sure.

The perception of a "major" air quality problem is generally consistent regardless of geography, gender and ethnicity. Internet panelists are twice as likely as Telephone respondents (28% versus 14%, respectively) to perceive a "major" air quality problem. Younger respondents and households impacted by a breathing-related medical condition are also more apt to say that Tucson has a "major" air quality problem. So are those aware of the "Clean Air" Program (28% versus 17% unfamiliar) and residents who perceive there to be a progressively more "serious" stormwater pollution problem.

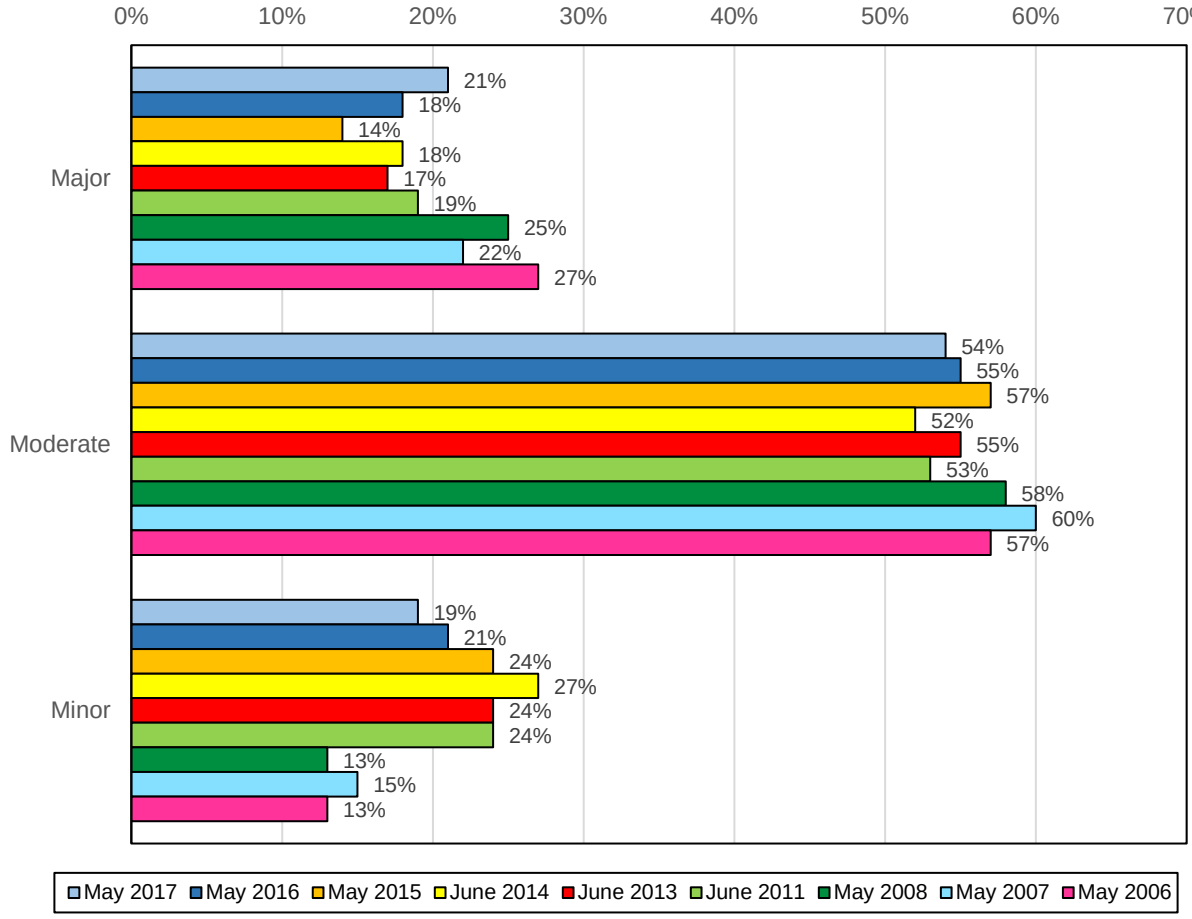
The perception of a "minor" air quality problem is greater in the East zips (24% versus 17%-20% elsewhere), and elevated among men, 3+ motor vehicle households and Telephone respondents (25% versus 13% Internet).

Table 19 Perceived Seriousness of Air Quality Problem in Tucson Area

	05/06 Total	05/07 Total	05/08 Total	06/11 Total	06/13 Total	06/14 Total	05/15 Total	05/16 Total	**05/17 Total**	Sample	
										Telephone	Internet
Major problem	27%	22%	25%	19%	17%	18%	14%	18%	**21%**	14%	28%
Moderate problem	57%	60%	58%	53%	55%	52%	57%	55%	**54%**	56%	52%
Minor problem	13%	15%	13%	24%	24%	27%	24%	21%	**19%**	25%	13%
Don't know	3%	2%	4%	4%	5%	4%	4%	6%	**6%**	4%	8%

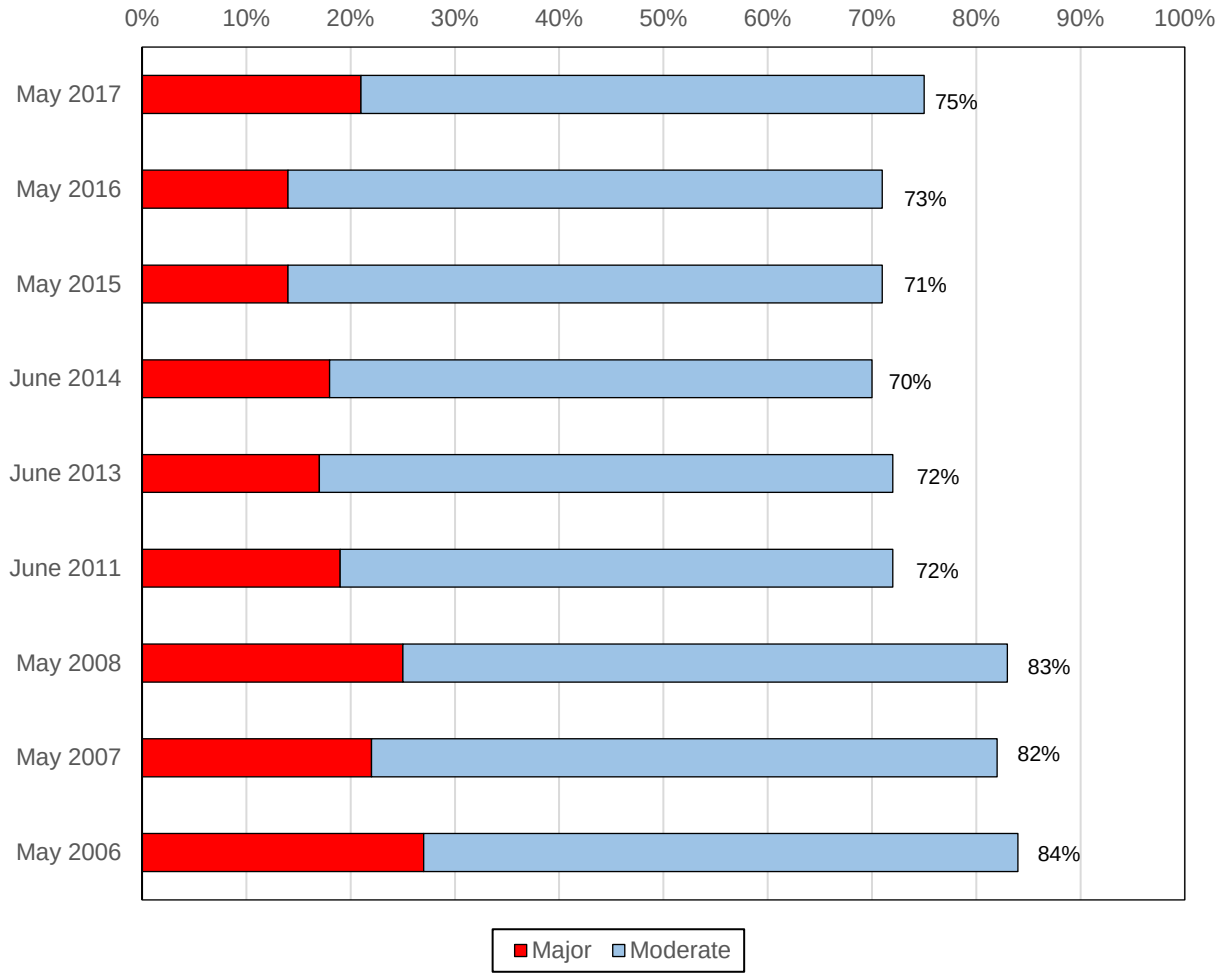
Question: How much of an air quality problem do you think exists in the Tucson area? Do you think this is a major problem, a moderate problem or a minor problem?

Display 19 Perceived Seriousness of Air Quality Problem in Tucson Area
(Among the Total Sample)



Display 19 **Perceived Seriousness of Air Quality Problem in Tucson Area**

Among the Total Sample – Sum of "Moderate" and "Major" Responses



Work Commuting Behavior

Employment Status – With respondents allowed to select more than one category of response, 35% indicate that they are employed full-time (30 hours or more each week), up from the last three surveys (29%-31%). Northwest (37%) and East (40%) zip code zone residents are more apt to be employed full-time (versus 33% in South and Central), as are Internet respondents, men, 26 to 55 year-olds and those with a college degree or better. Identical to last year, another 12% work part-time (less than 30 hours a week). Part-time employees are more likely to be Internet respondents, women and 35 or younger, as well as Central or Northwest residents. Also in line with last year, 8% report being currently unemployed, more often Central region residents.

Down from last year (36%), but consistent with 2015 (26%), 27% in the current survey say they are retired, more often South region respondents, those 56+ and Telephone respondents. Overall, the share of homemakers (12%) and students (8%) remain unchanged from last year.

Table 20

Employment Status
(Multiple Mentions Allowed)

	05/06 Total	05/07 Total	05/08 Total	06/11 Total	06/13 Total	06/14 Total	05/15 Total	05/16 Total	**05/17 Total**
Employed full-time (30 hours or more each week)	34%	35%	29%	35%	27%	30%	31%	29%	**35%**
Employed part- time (Less than 30 hours each week)	11%	11%	12%	8%	11%	8%	13%	12%	**12%**
A student	11%	10%	9%	9%	9%	4%	11%	8%	**8%**
Retired	32%	31%	34%	35%	31%	38%	26%	36%	**27%**
A homemaker	12%	10%	12%	9%	13%	9%	12%	12%	**12%**
Currently unemployed	4%	4%	8%	6%	10%	11%	11%	8%	**8%**
	N=502	N=503	N=402	N=403	N=504	N=502	N=500	N=500	**N=504**

	Area				Air Quality Problem			Sample	
	Central	South	Northwest	East	Major	Moderate	Minor	Telephone	Internet
Employed full-time (30 hours or more each week)	33%	33%	37%	40%	44%	33%	34%	23%	47%
Employed part-time (Less than 30 hours each week)	15%	9%	13%	9%	8%	14%	15%	9%	15%
A student	8%	10%	8%	7%	12%	6%	10%	5%	12%
Retired	24%	33%	26%	24%	19%	28%	32%	53%	1%
A homemaker	10%	8%	15%	15%	10%	14%	7%	4%	20%
Currently unemployed	11%	7%	6%	9%	8%	8%	4%	8%	8%
	N=151	N=141	N=137	N=75	N=107	N=272	N=95	N=250	N=254

Question: Are you one or more of the following...

Location of Place of Employment – Among those who work full-time or part-time (47% of the total sample), 21% work exclusively for a home-based business – up from 14%-15% the past two years. The remaining 79% of employees work outside the home, for another company exclusively (71%) or in conjunction with a home-based business (8%). South area residents are more apt to exclusively work for a home-based business (30% versus 16%-20% in other areas).

Table 21 Location of Place of Employment
(Among Those Employed)

	05/06 Total	05/07 Total	05/08 Total	06/11 Total	06/13 Total	06/14 Total	05/15 Total	05/16 Total	**05/17 Total**
Home-based business	18%	17%	15%	15%	12%	22%	14%	15%	**21%**
Another company	78%	78%	82%	82%	84%	78%	78%	78%	**71%**
Both	4%	5%	4%	3%	4%	0%	7%	7%	**8%**
	N=227	N=233	N=163	N=170	N=193	N=188	N=218	N=209	**N=238**

	Area				Air Quality Problem			Sample	
	Central	South	Northwest	East	Major	Moderate	Minor	Telephone	Internet
Home-based business	20%	30%	17%	16%	49%	14%	11%	15%	25%
Another company	66%	66%	77%	78%	46%	79%	80%	75%	69%
Both	14%	3%	6%	5%	6%	7%	9%	10%	6%
	N=73	N=59	N=69	N=37	N=55	N=126	N=46	N=80	N=158

Question: Do you operate a home-based business or are you an employee of another company?

Incidence of Telecommuting – Identical to last year, 26% who work outside the home say that they telecommute ("working from home as an alternative to going in to your office or place of business during regular business hours"). Telecommuters are more apt to be South (32%) or East (39%) area residents, as well as men, 26 to 45 or 56 to 65 year-olds and college graduates or better.

Table 22 Incidence of Telecommuting
(Among Those Who Work Outside the Home)

	05/06 Total	05/07 Total	05/08 Total	06/11 Total	06/13 Total	06/14 Total	05/15 Total	05/16 Total	**05/17 Total**
Yes	4%	14%	9%	19%	19%	17%	18%	26%	**26%**
No/Employer does not offer telecommuting/ Don't know/Not sure	96%	86%	91%	81%	81%	83%	82%	74%	**74%**
	N=185	N=193	N=139	N=144	N=170	N=146	N=187	N=178	**N=187**

	Area				Air Quality Problem			Sample	
	Central	South	Northwest	East	Major	Moderate	Minor	Telephone	Internet
Yes	21%	32%	21%	39%	25%	27%	29%	25%	27%
No/Employer does not offer telecommuting/ Don't know/Not sure	79%	68%	79%	61%	75%	73%	71%	75%	73%
	N=58	N=41	N=57	N=31	N=28	N=108	N=41	N=68	N=119

Question: Some employers offer the option of telecommuting – in other words, working from your home as an alternative to going in to your office or business location during regular business hours. Do you personally ever telecommute during regular business hours? This excludes working extra hours at home in your spare time – such as evenings or weekends.

Frequency of Telecommuting – Down from last year (70%), but still higher than in 2015 (39%), one-half of telecommuters say they do so more than once a week (51%). Another 24% telecommute about once a week (up from 15% last year), and 10% report telecommuting 2-3 times a month (similar to last year). Overall, 14% say they telecommute only once a month (up from 2%-3% in the last two years).

Table 23 Frequency of Telecommuting
(Among Those Who Telecommute)

	05/06 Total	05/07 Total	05/08 Total	06/11 Total	06/13 Total	06/14 Total	05/15 Total	05/16 Total	**05/17 Total**	Sample	
										Telephone	Internet
More than once a week	62%	52%	31%	26%	52%	64%	39%	70%	**51%**	53%	50%
About once a week	25%	15%	23%	33%	12%	8%	39%	15%	**24%**	18%	28%
2 to 3 times a month	12%	15%	31%	15%	21%	12%	12%	11%	**10%**	12%	9%
Once a month	0%	18%	15%	26%	15%	16%	3%	2%	**14%**	18%	12%
	N=8	N=27	N=13	N=27	N=33	N=25	N=33	N=47	**N=49**	N=17	N=32

Question: How often do you typically telecommute (or work at home instead of driving to the office) – excluding working extra hours at home in your spare time?

Availability of "Compressed Workweek" Programs – Among those working outside the home, three of ten indicate they have the option of a "compressed workweek" program. This is down slightly from last year (32%), but an increase from 2015 (27%). South or East region residents, 26 to 35 or 56 to 65 year-olds and those with a college degree are more apt to say they have a compressed workweek program available to them.

Table 24 Availability of "Compressed Workweek" Programs
(Among Those Who Work Outside the Home)

	05/06 Total	05/07 Total	05/08 Total	06/11 Total	06/13 Total	06/14 Total	05/15 Total	05/16 Total	**05/17 Total**
Yes	35%	31%	27%	33%	32%	23%	27%	32%	**30%**
No	65%	69%	73%	67%	68%	77%	73%	68%	**70%**
	N=185	N=193	N=139	N=144	N=170	N=146	N=187	N=178	**N=187**

	Area				Air Quality Problem			Sample	
	Central	South	Northwest	East	Major	Moderate	Minor	Telephone	Internet
Yes	21%	42%	23%	48%	57%	27%	27%	24%	34%
No	79%	58%	77%	52%	43%	73%	73%	76%	66%
	N=58	N=41	N=57	N=31	N=28	N=108	N=41	N=68	N=119

Question: Does your employer either require or offer any form of "COMPRESSED WORKWEEK"? For example, working four 10-hour days each week, rather than five 8-hour days.

Current Work Schedule – Down from last year (65%), but higher than 2014-2015 (56% each), 61% of full-time employees in the 2017 survey say they work a "standard" schedule (8 hour days five days a week). Another 12% work a 10 hour day, 4 days a week (identical to last year), while 9% indicate working either a 12 hour day, 3 or 4 days a week (4%, up slightly from 3%) or working 80 hours over 9 days, with the 10th day off (5%, up slightly from 3% in 2016). Overall, 17% continue to indicate some "other" workweek options or say their workweek varies. East zip code residents are more apt to utilize compressed workweek options.

Table 25 Current Work Schedule
(Among Those Employed Full-Time)

	05/06 Total	05/07 Total	05/08 Total	06/11 Total	06/13 Total	06/14 Total	05/15 Total	05/16 Total	**05/17 Total**
8 hour day, 5 days a week	62%	68%	64%	72%	67%	56%	56%	65%	**61%**
10 hour day, 4 days a week	6%	6%	11%	10%	9%	10%	14%	12%	**12%**
12 hour day, 3 or 4 days a week	10%	7%	6%	5%	2%	5%	6%	3%	**4%**
80 hours over 9 days with the 10th day off	1%	3%	3%	2%	3%	4%	4%	3%	**5%**
Varies/Other	20%	17%	16%	11%	19%	26%	20%	17%	**17%**
	N=138	N=146	N=100	N=118	N=125	N=115	N=133	N=130	**N=134**

	Area				Air Quality Problem			Sample	
	Central	South	Northwest	East	Major	Moderate	Minor	Telephone	Internet
8 hour day, 5 days a week	59%	72%	64%	46%	70%	56%	64%	50%	67%
10 hour day, 4 days a week	5%	10%	14%	21%	15%	12%	11%	17%	9%
12 hour day, 3 or 4 days a week	5%	7%	2%	4%	0%	3%	11%	4%	4%
80 hours over 9 days with the 10th day off	3%	0%	10%	8%	0%	8%	4%	11%	2%
Varies/Other	28%	10%	10%	21%	15%	22%	11%	17%	17%
	N=39	N=29	N=42	N=24	N=20	N=78	N=28	N=46	N=88

Question: Which of the following most closely describes your current work schedule?

Daily Usage of Transportation Methods for Traveling To and From Work or School – As in past projects, survey respondents who work outside the home or go to school were read a list of different travel methods and asked to indicate the number of days they use each one to travel to and from work or school. A summary of the data from this question series (including tracking data) is included in Table 26-S, with detailed daily usage in Table 26-D.

Up from 2015-2016 (70%), but still lower than 2014 (83%), 76% utilize **single passenger commuting to work or school** – more often Telephone respondents (80% versus 74% of Internet respondents). The average frequency of use is 4.3 days, down slightly from last year (4.4). Northwest (84%) and East (82%) area residents are most likely to drive alone at least one day a week, while South area residents are *least* apt to drive alone 5+ days a week (30% versus 37%-50% in other regions).

Alternative commute travel methods measured by this survey include:

- **Carpool/Vanpool** (Up from the last two years [24%], 28% indicate they carpool or vanpool at least one day per week. Average frequency has dropped somewhat from last year [from 3.5 to 3.1 days]. The incidence of carpooling is greatest in the South zip codes.)

- **Walk to work or school** (Consistent with last year, 24% say they walk to work or school, but with a slight increase in average days [from 2.8 to 3.0 days]. Consistent with the last two years, Central or South area residents, as well as Internet respondents, are most likely to walk to work or school.)

- **Work at home instead of driving to work** (While telecommuting is not as popular as last year [19%, down from 24%], its usage remains higher than in 2015 [14%]. Meanwhile, frequency of usage is consistent with last year [3.4 days]. Northwest residents remain more apt to telecommute.)

- **Ride the bus to work or school** (Bus ridership has increased to 18%, up from 13% last year, and the highest total for bus ridership to-date. At the same time, the average days using this method has decreased [from 4.4 last year to 3.6]. Internet respondents and Central or South area residents are more apt to take the bus.)

- **Ride a bike to work or school** (Consistent with last year, one of ten indicate riding bikes to work or school [10%], with no change in frequency [2.4 days]. South or Central area residents and 16 to 25 or 46 to 55 year-olds are more apt to ride a bike to work or school.)

- **Ride a motorcycle to work or school** (Compared to last year, more are riding a motorcycle to work or school [from 2% to 6%], with a significant increase in frequency as well [from 1.4 to 2.8 days].)

- **Take the streetcar to work or school** (Consistent with last year, 4% take the streetcar, with a slight increase in frequency [from 1.8 to 2.0 days].)

Table 26-S Summary of Usage of Transportation Methods for Traveling to and from Work or School
(Among Those Working Outside the Home or Going to School)

Travel Method	2006 Usage* (N=219)	2006 Average Frequency	2007 Usage* (N=229)	2007 Average Frequency	2008 Usage* (N=159)	2008 Average Frequency
Drive alone	81%	4.4 days	78%	4.1 days	74%	4.7 days
Carpool/Vanpool	24%	4.4 days	30%	3.4 days	22%	3.9 days
Walk	9%	3.2 days	14%	3.6 days	14%	3.4 days
Work at home instead of driving to work	6%	3.5 days	10%	2.7 days	12%	3.2 days
Take the bus	6%	3.9 days	7%	3.8 days	11%	3.7 days
Ride a bike	6%	2.8 days	9%	2.8 days	8%	3.5 days
Ride a motorcycle	3%	4.2 days	2%	3.6 days	1%	1.0 days

Travel Method	2011 Usage* (N=171)	2011 Average Frequency	2013 Usage* (N=205)	2013 Average Frequency	2014 Usage* (N=162)	2014 Average Frequency
Drive alone	84%	4.5 days	79%	4.5 days	83%	4.5 days
Carpool/Vanpool	28%	4.0 days	26%	3.9 days	10%	3.1 days
Walk	15%	4.0 days	12%	3.7 days	6%	2.3 days
Work at home instead of driving to work	9%	3.3 days	15%	3.5 days	7%	3.5 days
Take the bus	5%	3.1 days	9%	3.8 days	10%	3.1 days
Ride a bike	7%	3.7 days	9%	2.1 days	1%	1.5 days
Ride a motorcycle	2%	2.7 days	5%	2.6 days	7%	2.3 days

Travel Method	2015 Usage* (N=226)	2015 Average Frequency	2016 Usage* (N=203)	2016 Average Frequency	**2017 Usage* (N=219)**	**2017 Average Frequency**
Drive alone	70%	4.3 days	70%	4.4 days	**76%**	**4.3 days**
Carpool/Vanpool	24%	3.6 days	24%	3.5 days	**28%**	**3.1 days**
Walk	21%	3.5 days	24%	2.8 days	**24%**	**3.0 days**
Work at home instead of driving to work	14%	2.5 days	24%	3.4 days	**19%**	**3.4 days**
Take the bus	14%	3.8 days	13%	4.4 days	**18%**	**3.6 days**
Ride a bike	12%	2.8 days	10%	2.4 days	**10%**	**2.4 days**
Ride a motorcycle	4%	2.3 days	2%	1.4 days	**6%**	**2.8 days**
Take the streetcar	5%	2.2 days	4%	1.8 days	**4%**	**2.0 days**

* Percentage who use each mode at least one day/week.

Table 26-D Detailed Daily Usage and Tracking of Transportation Methods for Traveling To and From Work or School
(Among Those Working Outside the Home or Going to School)

	05/08 Total	06/11 Total	06/13 Total	06/14 Total	05/15 Total	05/16 Total	**05/17 Total**	Area				Awareness of "Clean Air" Program	
								Central	South	North-west	East	Yes	No
Take the bus													
Not at all	89%	95%	91%	90%	86%	87%	**82%**	76%	70%	92%	91%	78%	82%
1-4 days/week	6%	4%	5%	8%	7%	5%	**12%**	13%	23%	5%	6%	17%	10%
5 days/week	3%	2%	2%	1%	4%	5%	**3%**	3%	6%	2%	3%	3%	4%
6+ days/week	2%	0%	2%	1%	3%	2%	**3%**	7%	2%	2%	0%	3%	3%
Ride a motorcycle													
Not at all	99%	98%	95%	93%	96%	98%	**94%**	96%	91%	97%	88%	90%	95%
1-4 days/week	1%	1%	4%	7%	3%	2%	**6%**	4%	10%	3%	9%	10%	4%
5 days/week	0%	1%	1%	1%	0%	0%	**0%**	0%	0%	0%	0%	0%	0%
6+ days/week	0%	0%	0%	0%	0%	0%	**1%**	0%	0%	0%	3%	0%	1%
Ride a bike													
Not at all	92%	93%	91%	99%	88%	90%	**90%**	88%	87%	92%	97%	90%	90%
1-4 days/week	5%	6%	8%	1%	8%	8%	**8%**	10%	9%	8%	3%	8%	9%
5 days/week	2%	0%	1%	0%	1%	2%	**1%**	2%	4%	0%	0%	1%	2%
6+ days/week	1%	1%	0%	0%	2%	0%	**0%**	0%	0%	0%	0%	0%	0%
Walk													
Not at all	86%	85%	88%	94%	79%	76%	**76%**	65%	70%	88%	85%	72%	77%
1-4 days/week	9%	9%	7%	6%	14%	17%	**18%**	26%	23%	9%	9%	20%	17%
5 days/week	3%	1%	3%	0%	4%	4%	**2%**	3%	2%	2%	0%	4%	1%
6+ days/week	2%	4%	1%	0%	4%	3%	**5%**	6%	6%	2%	6%	4%	6%
Work at home instead of driving to work													
Not at all	88%	91%	85%	93%	86%	76%	**81%**	79%	89%	72%	88%	72%	87%
1-4 days/week	8%	5%	9%	4%	11%	14%	**12%**	10%	10%	19%	9%	25%	4%
5 days/week	2%	3%	4%	2%	1%	7%	**4%**	6%	2%	5%	0%	1%	5%
6+ days/week	1%	1%	1%	1%	2%	3%	**3%**	4%	0%	5%	3%	1%	4%
Take the streetcar													
Not at all	–	–	–	–	95%	96%	**96%**	96%	94%	97%	97%	93%	98%
1-4 days/week	–	–	–	–	5%	4%	**4%**	4%	6%	3%	3%	7%	2%
5 days/week	–	–	–	–	0%	0%	**0%**	0%	0%	0%	0%	0%	0%
6+ days/week	–	–	–	–	0%	0%	**0%**	0%	0%	0%	0%	0%	0%
	N=159	N=171	N=205	N=162	N=226	N=203	**N=219**	N=68	N=53	N=64	N=34	N=72	N=124

-Table 26-D continued on next page-

Table 26-D (Cont'd)

	05/08 Total	06/11 Total	06/13 Total	06/14 Total	05/15 Total	05/16 Total	**05/17 Total**	Area				Awareness of "Clean Air" Program	
								Central	South	North-west	East	Yes	No
Drive or ride with people age 16 or older in a carpool													
Not at all	78%	72%	74%	90%	76%	76%	**72%**	72%	60%	73%	85%	67%	73%
1 day/week	2%	2%	1%	1%	5%	5%	**10%**	12%	17%	8%	0%	19%	5%
2 days/week	3%	4%	4%	4%	2%	4%	**4%**	3%	2%	5%	6%	1%	6%
3 days/week	2%	3%	4%	1%	4%	4%	**4%**	2%	8%	5%	0%	1%	6%
4 days/week	3%	5%	5%	1%	2%	2%	**2%**	2%	4%	0%	3%	1%	2%
5 days/week	11%	12%	10%	4%	7%	4%	**6%**	7%	2%	8%	3%	6%	5%
6+ days/week	1%	2%	2%	0%	3%	4%	**4%**	3%	8%	2%	3%	4%	4%
Drive alone													
Not at all	26%	16%	21%	17%	30%	30%	**24%**	28%	32%	16%	18%	21%	26%
1 day/week	2%	4%	6%	4%	6%	8%	**7%**	9%	8%	5%	6%	8%	6%
2 days/week	4%	7%	5%	2%	5%	7%	**8%**	7%	8%	8%	9%	8%	7%
3 days/week	8%	6%	10%	11%	8%	4%	**10%**	12%	13%	9%	6%	10%	10%
4 days/week	12%	15%	10%	11%	10%	8%	**10%**	7%	9%	14%	12%	14%	9%
5 days/week	38%	41%	33%	47%	30%	27%	**26%**	28%	13%	38%	21%	22%	27%
6+days/week	11%	12%	16%	8%	11%	16%	**15%**	9%	17%	11%	29%	17%	14%
	N=159	N=171	N=205	N=162	N=226	N=203	**N=219**	N=68	N=53	N=64	N=34	N=72	N=124

Question: During a typical week, how many days do you typically use each of the following travel methods to get to and from work or school?

2017 Estimated Number of Daily Commuter Miles Saved Through Alternate Modes – Tables 26-T and 26-1 reflect the combination of results related to modes of commuter travel and distances traveled with employment estimates (Source: Arizona Office of Employment and Population Statistics) to provide an estimate of the number of vehicle miles saved daily through the use of alternative methods of transportation. The specific computations and data sources are described in the footnotes included with Table 26-1. As shown in Table 26-1's column "I" (on the far right), **we estimate that the reduction of single-occupant vehicles commuting through the use of alternative methods of travel saves 3,569,409 vehicle miles per day – or 35% of total miles driven/not driven.** As summarized in the tracking display below, the percentage of miles saved has decreased slightly from 2016 (38%), but is similar to 2015 findings (34%).

Overall, fewer miles are being traveled (from 11,187,316 in 2016 to 10,276,836) – in part because of a decrease in the share of non-home-based employees (from 85% to 79%, which results in fewer employed persons who have commute miles to calculate).

Table 26-T Tracking Summary of Estimated Number of Daily Commuter Miles Saved Through Alternate Modes

Year	Total Employed (Non-Home-Based)/ Students	% Who Single-Passenger Commute 1+ Days/Week	Average Single Occupant Auto Commute Distance	# of Commute Miles Driven/ Not Driven	# of Vehicle Miles Saved Daily	% of Miles Saved Through Alternate Mode Use
2017	**420,190**	**76%**	**14.5**	**10,276,836**	**3,569,409**	**35%**
2016	441,320	70%	13.4	11,187,316	4,242,773	38%
2015	434,601	70%	15.6	11,382,426	3,840,196	34%
2014	401,281	83%	15.0	11,461,091	1,780,430	16%
2013	449,057	79%	11.6	9,977,822	3,195,589	32%
2011	419,555	84%	14.8	10,915,750	2,739,932	25%
2008	439,394	74%	11.9	9,695,554	2,864,682	30%
2007	437,911	78%	11.4	9,162,668	2,796,391	30%
2006	423,986	81%	11.2	9,276,739	2,477,921	27%
2005	422,141	77%	13.3	9,448,097	2,317,878	25%
2004	429,532*	84%	14.9	11,560,391	2,483,773	21%

* Based on May, 2004 DES estimates to allow for direct year-to-year tracking.

Table 26-1 2017 Estimated Number of Daily Commuter Miles Saved Through Alternative Modes (Among Employed Persons and Students)

	(A) # of Non-Home-Based Employed Persons/ Students	(B) # One-Way Commute Trips Per Week	(C) Estimated # of One-Way Trips Each Week	(D) Average Days/Week Commute Using Any Mode	(E) # of One-Way Commute Trips/Day	(F) Average Commute Distance	(G) Estimated # Commute Miles Driven/Not Driven	(H) Vehicle Miles Traveled Daily	(I) Vehicle Miles Saved Daily
Travel Mode									
Single Occupant (auto)	(76%) 319,344	4.28x2=8.56	2,733,585	6.7	407,998	14.5	5,915,971	5,915,971	-0-
Motorcycle	(6%) 25,211	2.79x2=5.58	140,677	6.7	20,997	12.1	254,064	254,064	-0-
Alternative Modes:									
Carpool	(28%) 117,653	3.13x2=6.26	736,508	6.7	109,927	12.8	1,407,066	521,136	885,930
Bus	(18%) 75,634	3.60x2=7.20	544,565	6.7	81,278	7.0	568,946	16,256	552,690
Bike	(10%) 42,019	2.43x2=4.86	204,212	6.7	30,479	9.0	274,311	-0-	274,311
Walk	(24%) 100,846	2.98x2=5.96	601,042	6.7	89,708	6.3	565,160	-0-	565,160
Streetcar	(4%) 16,808	2.00x2=4.00	67,232	6.7	10,035	9.5	95,333	-0-	95,333
Telecommute	(19%) 79,836	3.36x2=6.72	536,498	6.7	80,074	11.8	944,873	-0-	944,873
Compressed workweek	(13%) 54,625	1.00x2=2.00	109,250	6.7	16,306	15.4	251,112	-0-	251,112
					846,802		10,276,836		3,569,409

(A) # employed persons in Pima County (est. @ 378,100 as of April, 2017 by Arizona Office of Employment & Population Statistics) x % non-home-based employees (79%) (Table 21) + # students 16+ (est. 121,491 in 2015 Census Bureau American Community Survey) x % of work/school commuters reported using each mode (Table 26).

(B) Average # of days/week mode used (Table 26) x 2 ways = estimate of average # of 1-way trips made each week per work/school commuter.

(C) (A) x (B)

(D) # of work/school commuters in survey x % using each mode x average # days/week mode used = Total days/week all modes ÷ # of work/school commuters in survey = average # days/week work/school commuters use any mode.

(E) (C) ÷ (D)

(F) From Table 26c. Reported commute miles ranged from 1 to 200 miles.

(G) (E) x (F)

(H) Vehicle miles/day:
Driving alone: Estimated # miles commuted
Bus: # miles/day ÷ average # rides/bus (peak hours) - (estimated at 35)
Carpool: # miles/day ÷ average # persons (2.7) in each carpool (Table 26b)
Bike/Walk/Telecommute/Streetcar/Compressed: -0- (no polluting vehicles used)

(I) (G) - (H)

Most Used Mode of Transportation for Work/School Commute – Consistent with last year, the share who indicate that **single-passenger vehicle commuting** is their ***most-used*** method of commuting is 62%. Primary use of single-passenger commuting continues to be lower among Central or South region residents and 16 to 25 year-olds. Those with household incomes between $25,000 and $59,999 and college graduates are more apt to primarily use single-passenger commuting.

Consistent with last year, 10% are **carpooling** most often. These are more apt to be Northwest area residents and women. **Bus riding** is also consistent with last year at 9%, with greater primary usage among South area residents and men. While down from last year (11%), 8% say they are **telecommuting** most often, primarily Northwest or Central respondents.

A few more primarily utilize **walking** as their most-used mode (from 4% to 6%), although this is still fewer than we found in 2015 (9%).

In lesser numbers, a few indicate that **riding a bike** (2%, down slightly from 3%), **riding a motorcycle** (1%, up from 0%) or **taking the streetcar** (1%, up from 0%) is their primary mode of commuting to work or school.

Table 26a Most Used Mode of Transportation for Work/School Commute
(Among Those Working Outside the Home or Going to School)

	5/06 Total	5/07 Total	5/08 Total	6/11 Total	6/13 Total	6/14 Total	5/15 Total	5/16 Total	**5/17 Total**
Drive alone	66%	66%	70%	71%	66%	80%	58%	61%	**62%**
Drive or ride in a carpool	16%	17%	11%	10%	12%	5%	12%	11%	**10%**
Take the bus	6%	4%	6%	2%	6%	6%	8%	9%	**9%**
Work at home instead of driving to work	3%	3%	6%	4%	8%	4%	5%	11%	**8%**
Walk	4%	5%	4%	8%	5%	2%	9%	4%	**6%**
Ride a bike	2%	4%	3%	4%	1%	1%	3%	3%	**2%**
Ride a motorcycle	3%	2%	–	1%	2%	2%	2%	–	**1%**
Take the streetcar	–	–	–	–	–	–	2%	–	**1%**
	N=219	N=229	N=159	N=171	N=205	N=162	N=226	N=203	**N=219**

	Area				Air Quality Problem			Sample	
	Central	South	Northwest	East	Major	Moderate	Minor	Telephone	Internet
Drive alone	57%	53%	70%	68%	62%	61%	64%	60%	62%
Drive or ride in a carpool	9%	9%	11%	9%	10%	11%	6%	7%	11%
Take the bus	9%	19%	5%	3%	10%	8%	11%	5%	11%
Work at home instead of driving to work	10%	2%	11%	6%	8%	8%	6%	11%	6%
Walk	12%	8%	2%	3%	10%	2%	11%	3%	8%
Ride a bike	3%	4%	2%	0%	0%	3%	2%	7%	0%
Ride a motorcycle	0%	0%	0%	6%	0%	2%	0%	3%	0%
Take the streetcar	0%	2%	0%	3%	0%	2%	0%	1%	1%
	N=68	N=53	N=64	N=34	N=40	N=120	N=47	N=75	N=144

Question: During a typical week, how many days do you typically use each of the following travel methods to get to and from work or school? (Record most used mode based on number of days.)

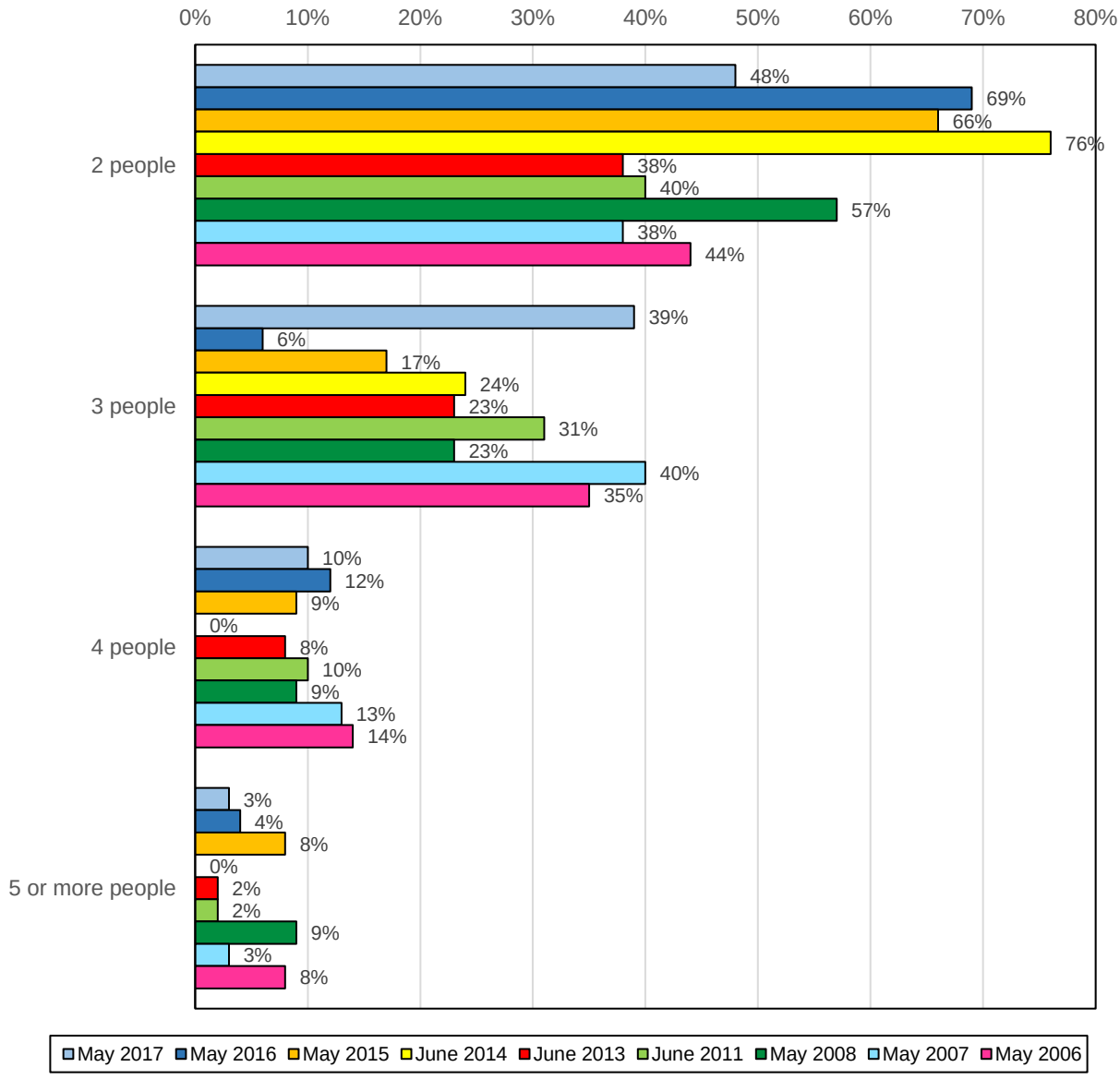
Size of Work or School Commute Carpool – Among carpoolers, fewer are travelling to work or school in a 2-person carpool (from 69% in 2016 to 48%), with a marked increase in 3-person carpools (from 6% to 39%). Others are commuting in carpools of 4 people (10%, down slightly from 12%) or 5 or more people (3%, down slightly from 4%). The average carpool size has increased slightly from last year (2.7 versus 2.6 in 2016).

Table 26b Size of Work or School Commute Carpool
(Among Those Who Carpool)

	05/06 Total	05/07 Total	05/08 Total	06/11 Total	06/13 Total	06/14 Total	05/15 Total	05/16 Total	**05/17 Total**
2 people	44%	38%	57%	40%	38%	76%	66%	69%	**48%**
3 people	35%	40%	23%	31%	23%	24%	17%	6%	**39%**
4 people	14%	13%	9%	10%	8%	0%	9%	12%	**10%**
5 or more people	8%	3%	9%	2%	2%	0%	8%	4%	**3%**
Varies	–	6%	3%	17%	30%	0%	0%	8%	–
	N=52	N=68	N=35	N=48	N=53	N=17	N=53	N=49	**N=59**

Question: Including yourself, how many people are typically in your carpool?

Display 26b Size of Work or School Commute Carpool
(Among Those Who Carpool)



Miles Traveled to Work or School – Work commute distances are highly consistent with last year. As reflected in Table 26c, 36% indicate they have a commute of 5 miles or less (up slightly from 35% last year), while another three of ten report their commute is between 6 and 10 miles (unchanged at 29%). Another 8% say they travel 11 to 14 miles (unchanged from 2016), and one of four indicate they travel 15 miles or more (26%, down slightly from 27%). As we've seen in the last two years, Telephone respondents tend to have longer commute distances than Internet respondents. Geographically, Northwest (35%) and East (30%) area residents are more apt to have a commute of 15+ miles, while the vast majority of Central (71%) or South (78%) residents travel 10 miles or less.

Table 26c Miles Traveled to Work or School
(Among Those Working Outside the Home or Going to School)

	05/06 Total	05/07 Total	05/08 Total	06/11 Total	06/13 Total	06/14 Total	05/15 Total	05/16 Total	**05/17 Total**
5 miles or less	35%	36%	34%	27%	29%	14%	31%	35%	**36%**
6 to 10 miles	24%	25%	26%	28%	32%	26%	26%	29%	**29%**
11 to 14 miles	10%	5%	4%	6%	10%	9%	7%	8%	**8%**
15 or more miles	29%	28%	24%	38%	23%	41%	33%	27%	**26%**
Don't know/Not sure	4%	6%	11%	2%	5%	9%	3%	2%	**1%**
	N=219	N=229	N=159	N=169	N=203	N=162	N=222	N=203	**N=216**

	Area				Air Quality Problem			Sample	
	Central	South	Northwest	East	Major	Moderate	Minor	Telephone	Internet
5 miles or less	43%	43%	27%	30%	45%	34%	32%	25%	42%
6 to 10 miles	28%	35%	27%	24%	18%	32%	30%	32%	27%
11 to 14 miles	9%	2%	10%	15%	15%	7%	6%	10%	8%
15 or more miles	19%	20%	35%	30%	22%	25%	30%	29%	24%
Don't know/Not sure	2%	0%	3%	0%	0%	2%	2%	4%	0%
	N=68	N=51	N=64	N=33	N=40	N=117	N=47	N=72	N=144

Question: Approximately how many miles do you travel one-way from your home to the place where you work or go to school?

Reasons for Driving Alone To and From Work or School – As in previous surveys, respondents who commute in a single occupant vehicle at least one day a week were asked to explain why. Like last year, for Telephone respondents this was an unaided question, while Internet respondents were provided a list of responses to choose from.

Up from previous surveys, 43% say that **"convenience"** is the reason they drive alone. This is true regardless of area of residence, and remains especially true among Internet respondents (who were offered an aided list to choose from). Those who perceive a "major" air quality problem are especially apt to cite convenience (58%).

Virtually unchanged from the past two years, **"irregular work hours"** is the second most common reason for driving alone (31%, up slightly from 30%). Irregular work hours has elevated mention among Central area residents and Internet respondents.

Another two of ten indicate that they drive alone because of **"no one to carpool with"** (19%, down from 25%), more often South or East zip code residents. Nearly as many in the current survey say that they **"like to drive alone"** (17%, up from 13% in 2016) – particularly Central or Northwest area residents and Internet respondents.

Down from last year (19%), 15% say they **"need their car for business,"** while a similar share (14%, down from 17%) cite **"personal errands."** Internet respondents and Central or Northwest area residents are more apt to use their car for business, while personal errands are cited more often among Central or South residents.

About one of ten say that they **"work overtime"** (10%, up from 6%) or have **"no bus service in the area"** (8%, up slightly from 7%). Working overtime is a more common explanation among Internet respondents and South area residents, while a lack of bus service is cited more often in the South or Northwest regions.

Fewer now cite a **"child drop off"** (4%, down from 12%) as a reason for single passenger vehicle travel.

Table 26d Reasons for Driving Alone To and From Work or School
(Among Single-Car Commuters)

	05/06 Total	05/07 Total	06/13 Total	06/14 Total	05/15 Total	05/16 Total	**05/17 Total**
Convenience	30%	32%	33%	20%	32%	32%	**43%**
Irregular work hours	19%	23%	25%	27%	30%	30%	**31%**
No one to carpool with	24%	24%	24%	27%	26%	25%	**19%**
Like to drive alone	12%	7%	9%	25%	16%	13%	**17%**
Need car for business	15%	15%	12%	9%	15%	19%	**15%**
Personal errands	3%	7%	7%	2%	11%	17%	**14%**
Work overtime	–	–	–	–	2%	6%	**10%**
No bus service in area	6%	8%	4%	13%	8%	7%	**8%**
Child drop off	1%	4%	6%	2%	7%	12%	**4%**
Other	7%	6%	4%	2%	6%	5%	**5%**
	N=177	N=178	N=162	N=135	N=157	N=142	**N=167**

	Area				Air Quality Problem			Sample	
	Central	South	Northwest	East	Major	Moderate	Minor	Telephone	Internet
Convenience	41%	42%	46%	43%	58%	39%	46%	30%	50%
Irregular work hours	41%	22%	28%	32%	19%	33%	39%	25%	35%
No one to carpool with	16%	25%	15%	25%	16%	22%	15%	20%	19%
Like to drive alone	20%	8%	20%	14%	16%	17%	12%	12%	20%
Need car for business	20%	8%	20%	4%	26%	13%	12%	12%	17%
Personal errands	22%	17%	7%	11%	29%	10%	12%	13%	15%
Work overtime	6%	17%	11%	7%	10%	10%	12%	0%	16%
No bus service in area	4%	11%	11%	4%	0%	8%	12%	8%	8%
Child drop off	6%	3%	4%	4%	6%	4%	3%	5%	4%
Other	6%	0%	6%	7%	0%	6%	0%	8%	3%
	N=49	N=36	N=54	N=28	N=31	N=95	N=33	N=60	N=107

Question: What is the main reason you drive alone?

Stormwater Perceptions and Practices

Perception of Where Stormwater That Flows Into Tucson Storm Drains Ends Up – As in previous surveys, survey respondents were told that "streets in the Tucson are equipped with storm drains." Immediately after, respondents were asked (to the best of their knowledge, unaided for the Telephone sample and aided for the Internet sample) where water that flows into these storm drains ends up. Allowing for multiple answers, ranked responses include:

- **River or wash** (45%, highly consistent with the last two years [45%-46%]. These are more apt to be East or Central region residents, men, Telephone respondents [48% versus 42% Internet] and 56 to 65 year-olds.)

- **Groundwater** (18%, down slightly from 2016 [20%], but still higher than 2015 [15%] results. These remain more apt to be Internet respondents [30% versus 5% Telephone] – as well as men, respondents under 35 and those who perceive a "serious" stormwater pollution problem.)

- **Sewage plants** (17%, up from 11%-12% in past surveys. Only Central residents are *less* apt to think stormwater that flows into a storm drain ends up in a sewage plant, while this response is more common among Internet [21%] than Telephone [13%] respondents.)

- **Water plants** (13%, up from 7% in 2015 and 2016. Like last year, these are primarily Internet respondents [22% versus 3% of Telephone].)

- **Canals** (12%, up from 7% the last two years. More often South residents and Internet respondents [22% versus 1% Telephone].)

Identical to last year, 29% in the current survey say they **do not know** where stormwater that flows into storm drains ends up. This includes a significant share of both Telephone (34%) and Internet (23%) respondents. Who else is not sure? Central or South area residents, women, the oldest respondents (66+) and part-year or less than five year Pima County residents.

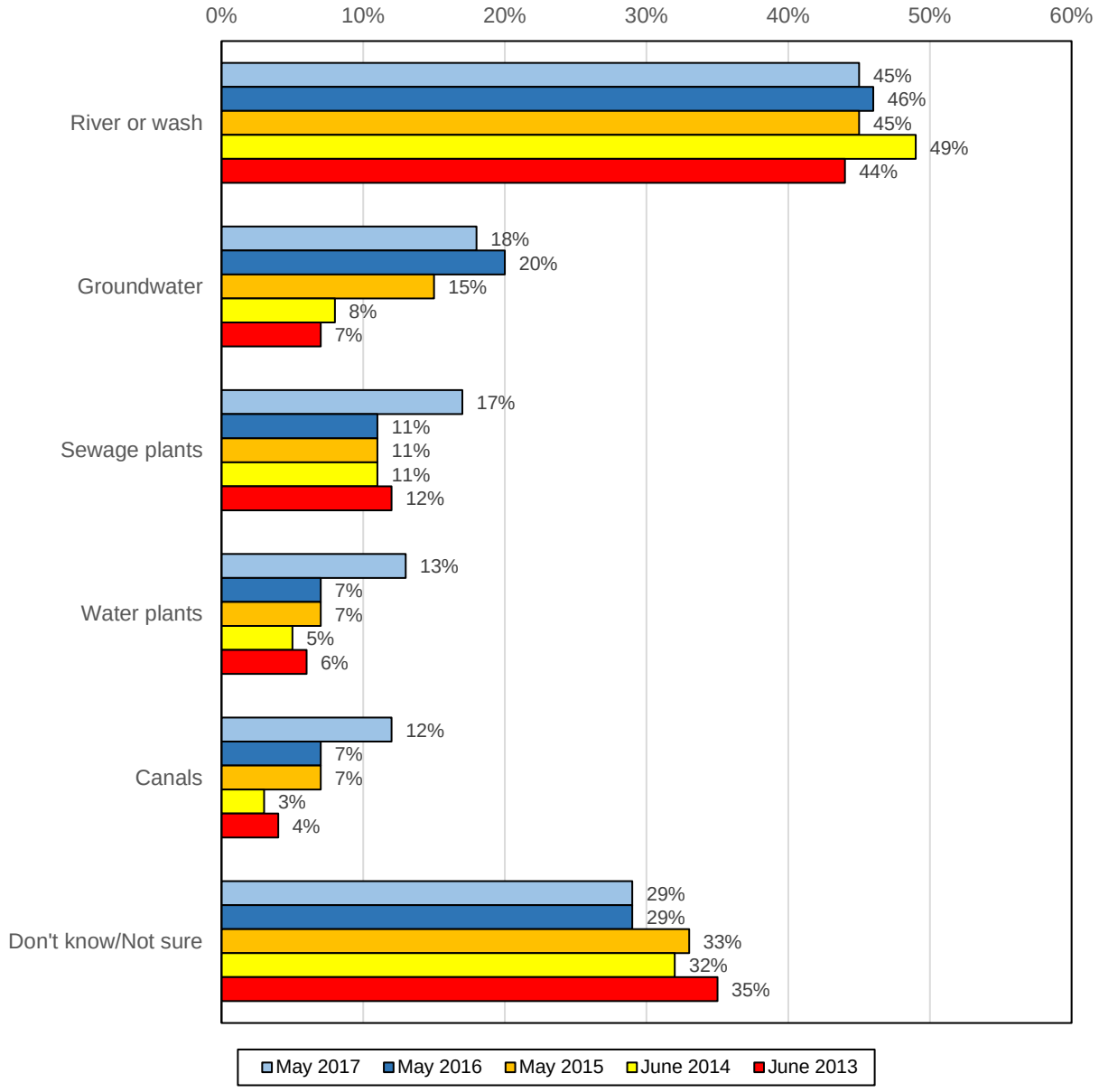
Table 27 Perception of Where Stormwater That Flows Into Tucson Storm Drains Ends Up

	06/13 Total	06/14 Total	05/15 Total	05/16 Total	**05/17 Total**	Area			
						Central	South	North-west	East
River or wash	44%	49%	45%	46%	**45%**	49%	40%	44%	52%
Groundwater	7%	8%	15%	20%	**18%**	13%	21%	18%	20%
Sewage plants	12%	11%	11%	11%	**17%**	7%	21%	22%	21%
Water plants	6%	5%	7%	7%	**13%**	7%	14%	19%	11%
Canals	4%	3%	7%	7%	**12%**	10%	16%	12%	8%
Don't know/Not sure	35%	32%	33%	29%	**29%**	34%	32%	24%	20%
	N=504	N=502	N=500	N=500	**N=504**	N=151	N=141	N=137	N=75

	Stormwater Pollution Problem			Sample	
	Not a Problem	Moderate Problem	Serious Problem	Telephone	Internet
River or wash	46%	46%	45%	48%	42%
Groundwater	11%	11%	27%	5%	30%
Sewage plants	19%	14%	20%	13%	21%
Water plants	12%	8%	18%	3%	22%
Canals	6%	8%	18%	1%	22%
Don't know/Not sure	33%	32%	23%	34%	23%
	N=72	N=226	N=206	N=250	N=254

Question: Streets in the Tucson area are equipped with storm drains. To the best of your knowledge, where does the stormwater that flows into these drains end up?

Display 27 Perception of Where Stormwater That Flows Into Tucson Storm Drains Ends Up



Green Infrastructures Implemented/Installed at Home or Business – Survey participants were provided a listing of seven different types of Green Infrastructures and asked if each one has been implemented at their home or business. In past surveys, Green Infrastructures were referred to as "Low Impact Development practices." Results (including tracking data) are summarized in Table 28.

- **Landscaping with native plants** (53% – highly consistent with the last two years [52% each]. Again, these are more likely to be Telephone respondents [63% versus 42% Internet] – as well as East area residents, higher income households and those who perceive a progressively more "serious" stormwater pollution problem.)

- **Landscape depressions that collect stormwater** (28%, up from 24% last year. Implementation remains higher among Telephone [34%] than Internet [22%] respondents, as well as South area residents, those who perceive a progressively more "serious" stormwater pollution problem and households with at least $60,000 in annual income.)

- **Connecting runoff from a roof or paved surface to a basin or to water plants** (25%, up from 22% in 2016. Increased implementation among Telephone respondents [28% versus 22% Internet], with little difference based on geography.)

- **Water harvesting with rain barrels or cisterns** (21%, consistent with 2016 [19%] and 2015 [20%]. Internet respondents [27% versus 16% Telephone], South zip code residents, Hispanics and households with incomes of $40,000 or more are more likely to utilize rain barrels or cisterns.)

- **Porous pavements or bricks** (21%, up from 15% last year but consistent with 2015 [20%]. Implementation continues to be greatest among high income households and Telephone respondents [26% versus 16% Internet], as well as Northwest residents and the most formally educated.)

- **A trench that is filled with gravel to collect stormwater** (19%, up from 16% in 2016. Implementation is higher among South or Northwest residents, 56 to 65 year-olds and high income households.)

- **Natural areas protected from clearing and grading** (18%, up from 15% last year. In addition to Telephone respondents [25% versus 10% Internet], East area residents and those 46 or older are more likely to have set aside natural areas.)

Table 28

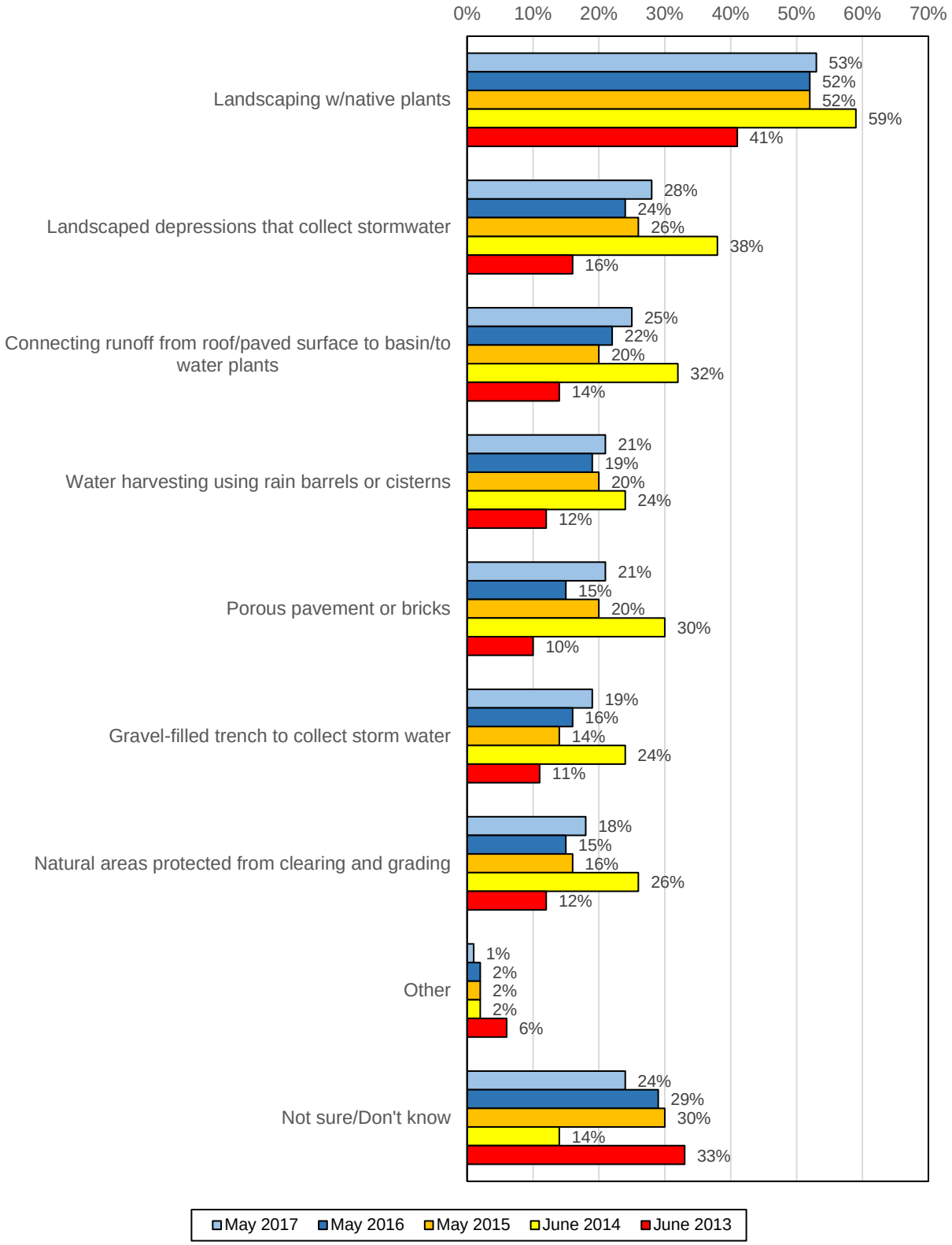
Green Infrastructures Implemented/Installed at Home or Business

	06/13 Total	06/14 Total	05/15 Total	05/16 Total	**05/17 Total**	Area			
						Central	South	North-west	East
Landscaping with native plants	41%	59%	52%	52%	**53%**	48%	48%	55%	67%
Landscaped depressions that collect stormwater	16%	38%	26%	24%	**28%**	24%	36%	23%	31%
Connecting runoff from a roof or paved surface to a basin or to water plants	14%	32%	20%	22%	**25%**	24%	27%	25%	23%
Water harvesting using rain barrels or cisterns	12%	24%	20%	19%	**21%**	17%	30%	21%	15%
Porous pavements or bricks	10%	30%	20%	15%	**21%**	15%	19%	31%	19%
A trench that is filled with gravel to collect stormwater	11%	24%	14%	16%	**19%**	14%	25%	26%	9%
Natural areas protected from clearing and grading	12%	26%	16%	15%	**18%**	17%	14%	17%	27%
Other	6%	2%	2%	2%	**1%**	2%	1%	0%	0%
Not sure/Don't know	33%	14%	30%	29%	**24%**	30%	21%	23%	17%
	N=504	N=502	N=500	N=500	**N=504**	N=151	N=141	N=137	N=75

	Stormwater Pollution Problem			Sample	
	Not a Problem	Moderate Problem	Serious Problem	Telephone	Internet
Landscaping with native plants	43%	49%	60%	63%	42%
Landscaped depressions that collect stormwater	12%	24%	38%	34%	22%
Connecting runoff from a roof or paved surface to a basin or to water plants	11%	24%	31%	28%	22%
Water harvesting using rain barrels or cisterns	12%	16%	31%	16%	27%
Porous pavements or bricks	15%	18%	27%	26%	16%
A trench that is filled with gravel to collect stormwater	10%	15%	28%	19%	20%
Natural areas protected from clearing and grading	18%	16%	18%	25%	10%
Other	0%	2%	1%	2%	0%
Not sure/Don't know	31%	30%	15%	15%	32%
	N=72	N=226	N=206	N=250	N=254

Question: I am now going to read you a list of different types of Green Infrastructures. After each, simply tell me if this practice has been implemented or installed at your home or business.

Display 28 **Green Infrastructures Implemented/Installed at Home or Business**



Perceived Seriousness of Stormwater Pollution Problem in the Tucson Area – In line with previous surveys, the vast majority of survey respondents (86%) indicate that there is a "moderate" (45%) or "serious" (41%) problem in the Tucson area regarding "polluting materials entering storm drains" – with the percentage who perceive a "serious" problem remaining virtually unchanged from last year (41% versus 40% in 2016). Consistent with 2016, this results in a 5.8 average score (on the "1-to-9" scale).

Internet panelists, 26 to 35 year-olds and more formally educated respondents are most likely to perceive a "serious" stormwater pollution problem. Geographically, Northwest residents are *less* apt to say the problem is "serious" (36% versus 41%-44% elsewhere).

As in previous surveys, those who perceive a progressively more serious air quality problem are almost more likely to indicate a seriously more progressive stormwater pollution problem.

Table 29 Perceived Seriousness of Stormwater Pollution Problem in Tucson Area

	06/13 Total	06/14 Total	05/15 Total	05/16 Total	**05/7 Total**	Area			
						Central	South	North-west	East
Serious problem (7-9)	41%	38%	37%	40%	**41%**	44%	41%	36%	43%
Moderate problem (4-6)	43%	51%	50%	49%	**45%**	42%	42%	49%	48%
Not a problem (1-3)	16%	11%	13%	11%	**14%**	14%	17%	15%	9%
Average score on 1-9 scale	5.7	5.8	5.7	5.8	**5.8**	6.0	5.6	5.6	6.0
	N=504	N=502	N=500	N=500	**N=504**	N=151	N=141	N=137	N=75

	Sample	
	Telephone	Internet
Serious problem (7-9)	38%	43%
Moderate problem (4-6)	46%	44%
Not a problem (1-3)	16%	13%
Average score on 1-9 scale	5.6	6.0
	N=250	N=254

Question: On a scale of "1-to-9" where "9" means "a serious problem" and "1" means "not a problem," how much of a problem do you think there is in the Tucson area with polluting materials entering storm drains? You can give me any number between "1" and "9."

Rating of Various Contributors to Stormwater Pollution Problem in the Tucson Area – As in prior surveys, respondents were asked to rate (on a "1-to-9" scale) a variety of contributors to the severity of the stormwater pollution problem in the Tucson area. On this "1-to-9" rating scale, "1" means "not a problem" and "9" represents a "serious problem."

Once again, there was a direct relationship between perceived severity of Tucson's stormwater pollution problem and the degree to which each of these factors contribute to the issue – with generally higher scores also among Central region residents, Internet respondents and households impacted by a breathing-related medical condition. Results are summarized in Table 30.

On average, the top five contributors by perceived degree of causation are:

- **Chemicals and materials from construction sites** (46% "serious" contributor to stormwater pollution, up from 40% last year – 6.0 average score [up from 5.9]. These tend to be women, Hispanics and 11+ year Pima County residents.)

- **Chemicals and materials from industrial facilities** (45% "serious" contributor to stormwater pollution, up slightly from 43% last year – 5.9 average score [unchanged from 2016]. These are most apt to be women and college graduates.)

- **Household products such as cleaning fluids, detergents, paints, degreasers and bleaches** (45% "serious" contributor to stormwater pollution, up from 37% last year – 5.9 average score [up from 5.6 in 2016]. East residents, 26 to 35 year-olds and Hispanics are more likely to indicate increased perceived causation.)

- **Automotive fluids such as oil, gasoline and brake fluid** (44% "serious" contributor to stormwater pollution, up slightly from 42% last year – 5.9 average score [unchanged from 2016]. East zip residents, women and 26 to 35 year-olds are more likely to believe that automotive fluids contribute to the stormwater pollution problem.)

- **Pesticides, fertilizers and debris from lawns and gardens** (43% "serious" contributor to stormwater pollution, up from 36% last year – 5.8 average score [up from 5.6 in 2016]. These are more apt to be East area residents and 56 to 65 year-olds.)

Three of four continue to say that **household trash and bulky items like mattresses, sofas and tires** contribute (to some degree) to stormwater pollution (77% versus 76% in 2016); still, slightly more now say it is a "serious" problem (40%, up from 37% in 2016), resulting in a 5.5 average score (unchanged from last year). These are more apt to be non-Whites and 26 to 35 year-olds.

Consistent with last year, two-thirds say **animal waste from household pets** is at least a “moderate” contributor to stormwater pollution (66%), although just one of four say it is a “serious” problem. At the same time, one-third perceive it to be a non-factor – resulting in a 4.7 average score (unchanged from 2016).

New this year, 63% indicate that **copper from brake pads made with copper** is at least a “moderate” contributor to the stormwater pollution problem in the Tucson area, while 37% say it is a non-issue – resulting in a 4.5 average score.

Table 30 Rating of Various Contributors to Stormwater Pollution Problem in Tucson Area

(5/17 N=504) (5/16 N=500) (5/15 N=500) (6/14 N=502) (6/13 N=504)	Serious Problem	Moderate Problem	Not a Problem	Average Score on 1-9 Scale
Chemicals and materials from construction sites				
5/17	**46%**	**40%**	**14%**	**6.0**
5/16	40%	46%	14%	5.9
5/15	40%	43%	17%	5.7
6/14	38%	39%	23%	5.5
6/13	39%	42%	19%	5.6
Chemicals and materials from industrial facilities				
5/17	**45%**	**38%**	**17%**	**5.9**
5/16	43%	40%	17%	5.9
5/15	39%	42%	19%	5.7
6/14	38%	38%	24%	5.5
6/13	40%	38%	21%	5.7
Household products such as cleaning fluids, detergents, paints, degreasers and bleaches				
5/17	**45%**	**37%**	**18%**	**5.9**
5/16	37%	43%	20%	5.6
5/15	37%	42%	20%	5.5
6/14	34%	43%	23%	5.4
6/13	38%	39%	23%	5.5
Automotive fluids such as oil, gasoline and brake fluid				
5/17	**44%**	**41%**	**15%**	**5.9**
5/16	42%	42%	16%	5.9
5/15	41%	40%	19%	5.7
6/14	38%	37%	24%	5.5
6/13	45%	34%	21%	5.8
Pesticides, fertilizers and debris from lawns and gardens				
5/17	**43%**	**39%**	**18%**	**5.8**
5/16	36%	45%	19%	5.6
5/15	36%	42%	23%	5.4
6/14	39%	38%	22%	5.5
6/13	37%	42%	22%	5.5
Household trash and bulky items like mattresses, sofas and tires				
5/17	**40%**	**37%**	**23%**	**5.5**
5/16	37%	39%	23%	5.5
5/15	35%	43%	22%	5.5
6/14	29%	40%	31%	4.9

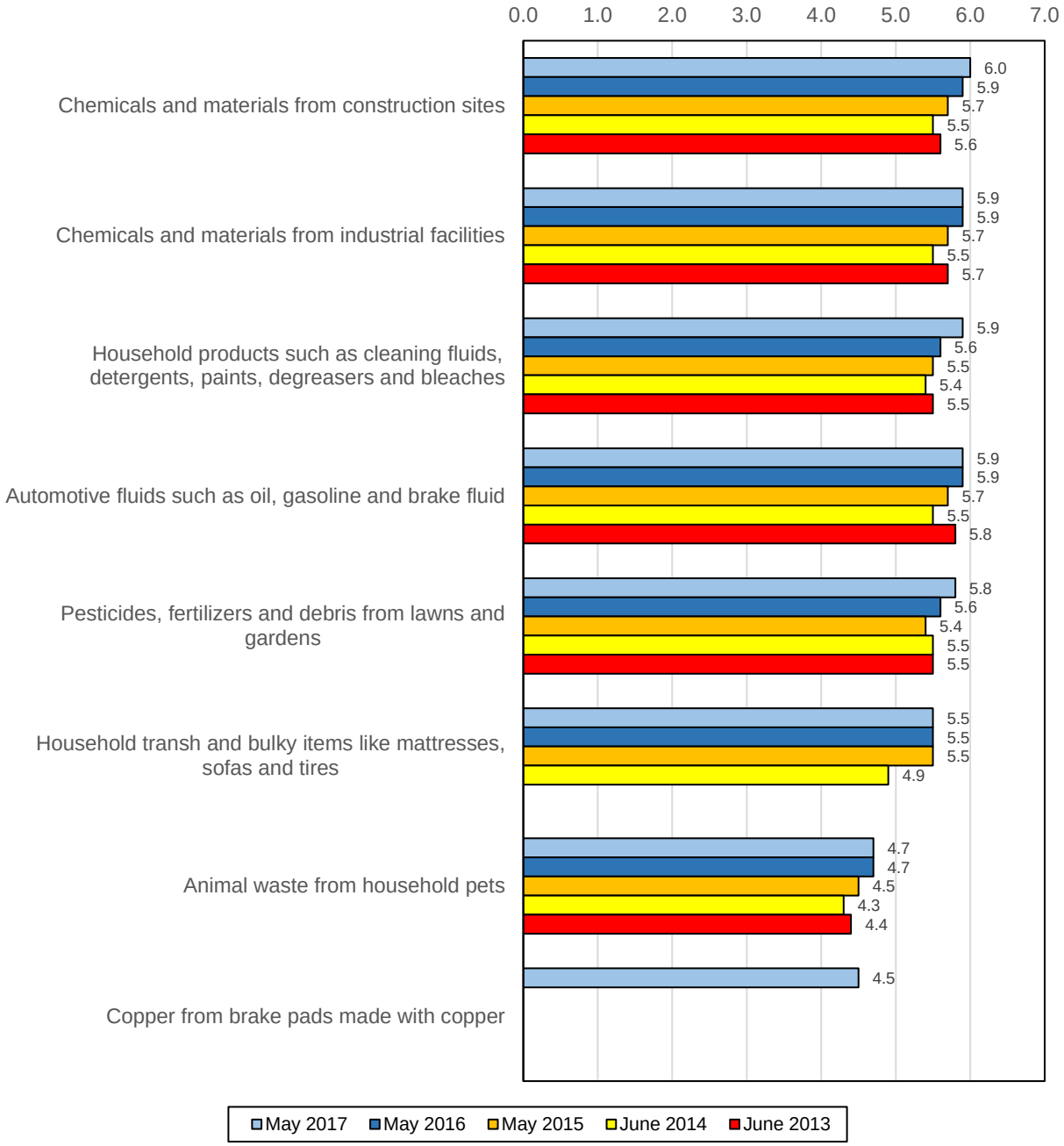
-Table 30 continued on next page-

Table 30 (Cont'd)

(5/17 N=504) (5/16 N=500) (5/15 N=500) (6/14 N=502) (6/13 N=504)	Serious Problem	Moderate Problem	Not a Problem	Average Score on 1-9 Scale
Animal waste from household pets				
5/17	**25%**	**41%**	**34%**	**4.7**
5/16	26%	41%	33%	4.7
5/15	22%	39%	39%	4.5
6/14	23%	35%	43%	4.3
6/13	23%	36%	41%	4.4
Copper from brake pads made with copper				
5/17	**21%**	**42%**	**37%**	**4.5**

Question: Using the same "1-to-9" scale – where "9" means "a serious problem" and "1" means "not a problem" - how much do you think each of the following contributes to the problem of stormwater pollution in the Tucson area? You can give me any number between "1" and "9."

Display 30 **Rating of Various Contributors to Stormwater Pollution Problem in Tucson Area**
(By Average Score on 1-9 Scale)



Methods Used to Dispose of Various Types of Household Hazardous Wastes – Consistent with the past two years, the most-often used methods to dispose of household wastes (such as "household chemicals, automotive fluids and lawn & garden chemicals") include:

- **Hazardous waste collection site** (52%, up from the past two years [42%-47%]. Usage is lowest in the Central zips [47%], and highest in the South region [60%] – as well as among men, residents 56 or older and those with the highest household incomes.)

- **Auto parts store** (42%, up from 38% in 2015 and 2016 – higher in the East zips [52% versus 39%-42% elsewhere], as well as among men and 26 to 35 year-olds.)

- **Put in the garbage** (37%, up significantly from 29% in 2016. These tend to be younger respondents [16 to 35], with few differences based on gender or area of residence.)

- **Service station** (26%, up from 19% last year. Geographically, only Central residents are less likely to dispose of household waste at a service station [17% versus 28%-31% elsewhere]. Men, 26 to 35 year-olds and higher income households are more likely to utilize this option.)

- **Landfill** (18%, unchanged from last year. Landfill users are more likely to live in higher-income households. Usage is lowest in the Central zips [13% versus 20%-22% elsewhere].)

Up from 12% last year, 18% in the current study – especially Internet respondents (26% versus 9% Telephone) – dispose of household hazardous wastes by **pouring in the sink or down the drain**. These tend to be progressively younger respondents, with little difference based on area of residence.

Among the rest, 8% are unsure how they dispose of such wastes (up from 6% last year) – while 11% (down from 16%) report not using these types of household products at all (or finishing them all up when they do).

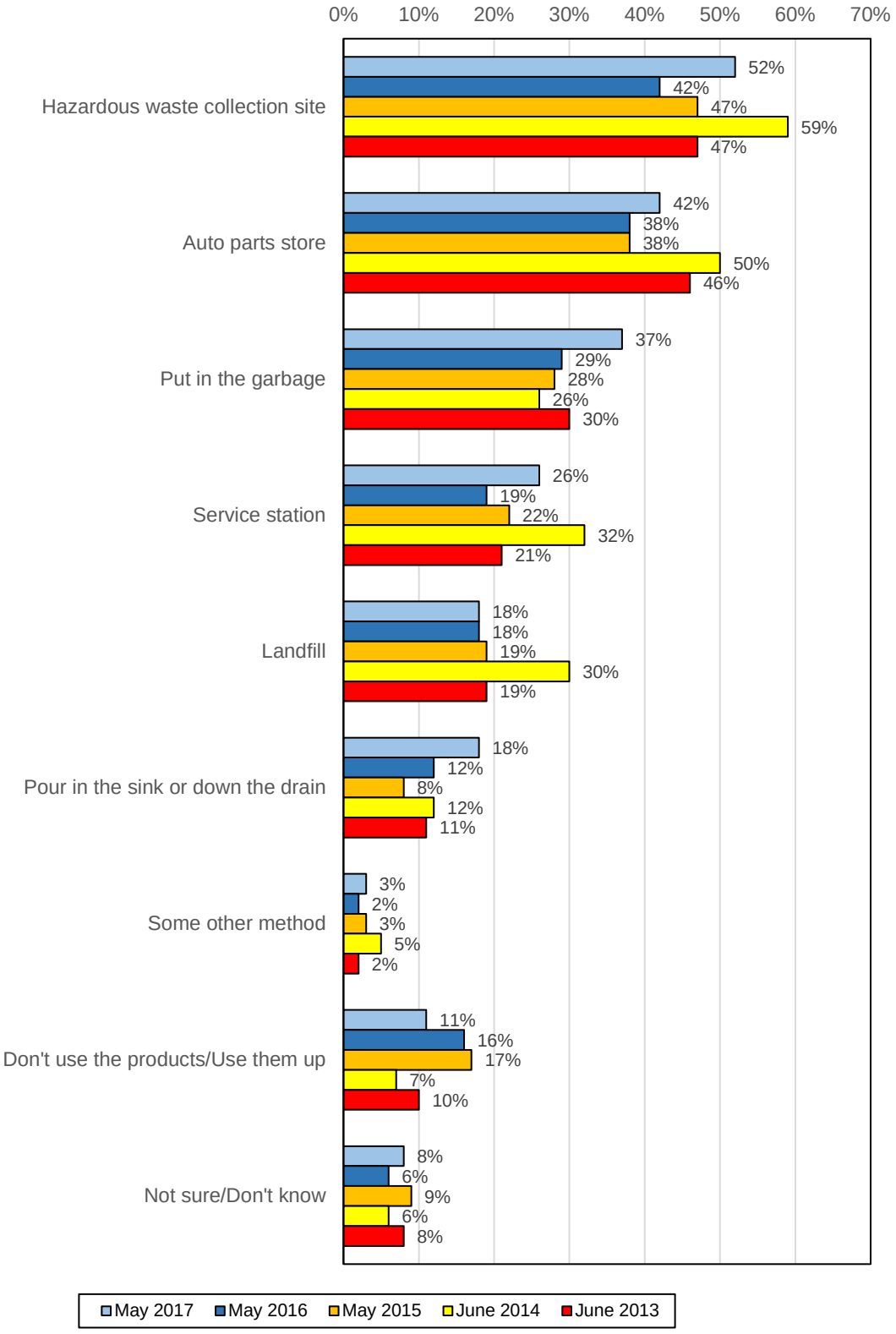
Table 31 Methods Used to Dispose of Various Types of Household Hazardous Waste

	06/13 Total	06/14 Total	05/15 Total	05/16 Total	**05/17 Total**	Area			
						Central	South	North-west	East
Hazardous waste collection site	47%	59%	47%	42%	**52%**	47%	60%	52%	51%
Auto parts store	46%	50%	38%	38%	**42%**	42%	39%	40%	52%
Put in the garbage	30%	26%	28%	29%	**37%**	36%	38%	37%	35%
Service station	21%	32%	22%	19%	**26%**	17%	30%	31%	28%
Landfill	19%	30%	19%	18%	**18%**	13%	20%	22%	20%
Pour in the sink or down the drain	11%	12%	8%	12%	**18%**	17%	17%	20%	16%
Some other method	2%	5%	3%	2%	**3%**	3%	4%	1%	4%
Don't use these products/Use them up	10%	7%	17%	16%	**11%**	16%	7%	12%	8%
Not sure/Don't know	8%	6%	9%	6%	**8%**	7%	11%	7%	7%
	N=504	N=502	N=500	N=500	**N=504**	N=151	N=141	N=137	N=75

	Stormwater Pollution Problem			Sample	
	Not a Problem	Moderate Problem	Serious Problem	Telephone	Internet
Hazardous waste collection site	43%	52%	56%	62%	43%
Auto parts store	38%	35%	52%	42%	42%
Put in the garbage	40%	33%	40%	32%	42%
Service station	21%	22%	32%	28%	23%
Landfill	15%	17%	21%	20%	17%
Pour in the sink or down the drain	24%	13%	21%	9%	26%
Some other method	6%	2%	2%	5%	0%
Don't use these products/Use them up	8%	10%	13%	6%	16%
Not sure/Don't know	12%	11%	3%	7%	9%
	N=72	N=226	N=206	N=250	N=254

Question: I am now going to read you a list of different methods that people use to dispose of items such as household chemicals, automotive fluids and lawn & garden chemicals. After each, simply tell me if you or someone in your household use this method to dispose of these items.

Display 31 Methods Used to Dispose of Various Types of Household Hazardous Waste



Government Entity to Call If Witness Someone Dumping Trash or Chemicals in a Storm Drain – As we found last year, three of ten are **unsure** about who they would contact if they saw someone dumping trash or chemicals into a storm drain and wanted to report it. This includes both Telephone (35%) and Internet (26%) respondents. Central or East zip residents, women, older survey participants (55+) and new or part-year Pima County residents are also more likely to be unsure whom to call.

Among those who specify a particular government entity, results are generally consistent with recent surveys, including:

- **911/Police Department** (29% [down from 31% last year], more often Northwest or East residents, the youngest respondents and non-Whites.)

- **Water Department** (14% [up from 13%], especially South region residents and 16 to 35 year-olds.)

- **Health Department** (13% [up from 11%], with fewer differences based on area of residence.)

- **Sanitation Department** (13% [up from 11%], typically South or East zip residents.)

There continue to be a number of (growing) generic references to "government" – including **city government** (12%, up from 8%), **county government** (11%, up from 10%) or a **government agency** (9%, up from 3%).

Consistent with prior surveys, just 5% indicate that they would *not* report illegal waste disposal or dumping.

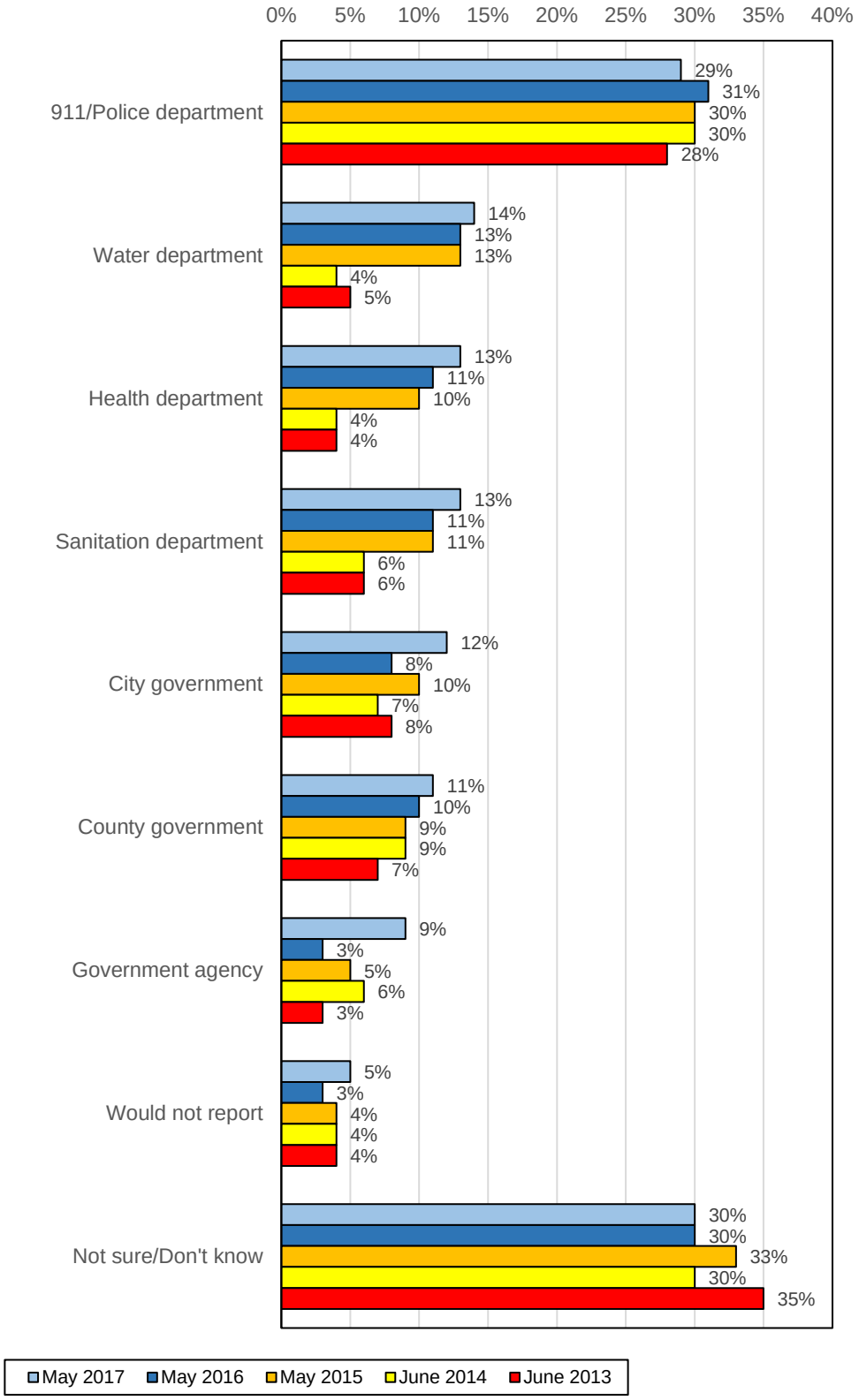
Table 32 Government Entity to Call If Witness Someone Dumping Trash or Chemicals in a Storm Drain

	06/13 Total	06/14 Total	05/15 Total	05/16 Total	**05/17 Total**	Area			
						Central	South	North-west	East
911/Police department	28%	30%	30%	31%	**29%**	26%	27%	33%	32%
Water department	5%	4%	13%	13%	**14%**	12%	22%	12%	9%
Health department	4%	4%	10%	11%	**13%**	15%	11%	12%	16%
Sanitation department	6%	6%	11%	11%	**13%**	9%	18%	10%	16%
City government	8%	7%	10%	8%	**12%**	13%	8%	14%	16%
County government	7%	9%	9%	10%	**11%**	9%	16%	11%	8%
Government agency	3%	6%	5%	3%	**9%**	9%	13%	7%	5%
Would not report	4%	4%	4%	3%	**5%**	6%	6%	6%	0%
Not sure/Don't know	35%	30%	33%	30%	**30%**	34%	26%	29%	33%
	N=504	N=502	N=500	N=500	**N=504**	N=151	N=141	N=137	N=75

	Stormwater Pollution Problem			Sample	
	Not a Problem	Moderate Problem	Serious Problem	Telephone	Internet
911/Police department	29%	32%	26%	30%	29%
Water department	4%	12%	20%	3%	25%
Health department	14%	11%	16%	4%	22%
Sanitation department	8%	9%	18%	4%	22%
City government	7%	11%	16%	9%	16%
County government	8%	9%	15%	9%	13%
Government agency	7%	6%	13%	8%	9%
Would not report	8%	5%	3%	2%	8%
Not sure/Don't know	38%	33%	25%	35%	26%
	N=72	N=226	N=206	N=250	N=254

Question: If you saw someone dumping trash or chemicals into a storm drain or a wash and wanted to report them, who would you call to report the incident?

Display 32 Government Entity to Call If Witness Someone Dumping Trash or Chemicals in a Storm Drain



Likelihood of Taking Part in Various Activities to Help Keep Stormwater Clean – Consistent with past studies, six of ten or more (particularly those who perceive a progressively more severe stormwater pollution problem) report that they would be "very likely" (with no more than 9% "not at all likely") to take part in the following activities to help keep Tucson stormwater clean:

- **If you have a dog, using a doggie bag to clean up after them** (80% "very likely" to take part, unchanged since last year. Participation is somewhat lower only in the South zips [68% versus 83%-88% elsewhere]. Women and 46 to 65 year-olds are "very likely" to use a doggie bag to clean up after their dog.)

- **Safely dispose of chemicals** (75% "very likely" to take part, up from 71% last year. Once again, participation is generally consistent regardless of geography [including fully 92% of East zip residents].)

- **Replacing a toxic compound with a non-toxic compound** (62% "very likely" to take part, up incrementally from 58% in 2016 and 56% in 2015. These are more likely to be East residents, those 55+ and high income households.)

- **Report a spill** (60% "very likely" to take part, down from 63% last year. These tend to be East residents, those 46 or older and the least formally educated.)

Unchanged from last year, 49% (regardless of geography) indicate that they would be "very likely" to **gather stormwater to use for watering plants**. Participants are more apt to be 36 to 55 year-olds and longer term Pima County residents (for 6+ years).

One-third say that they would be "very likely" to **implement green infrastructure**. This is down from 43%-54% in past surveys who would be highly likely "to implement Low Impact Development practices." Potential participation is lower only in the Central zips (29% versus 33%-39% elsewhere), and greater among 26 to 35 year-olds and higher income households.

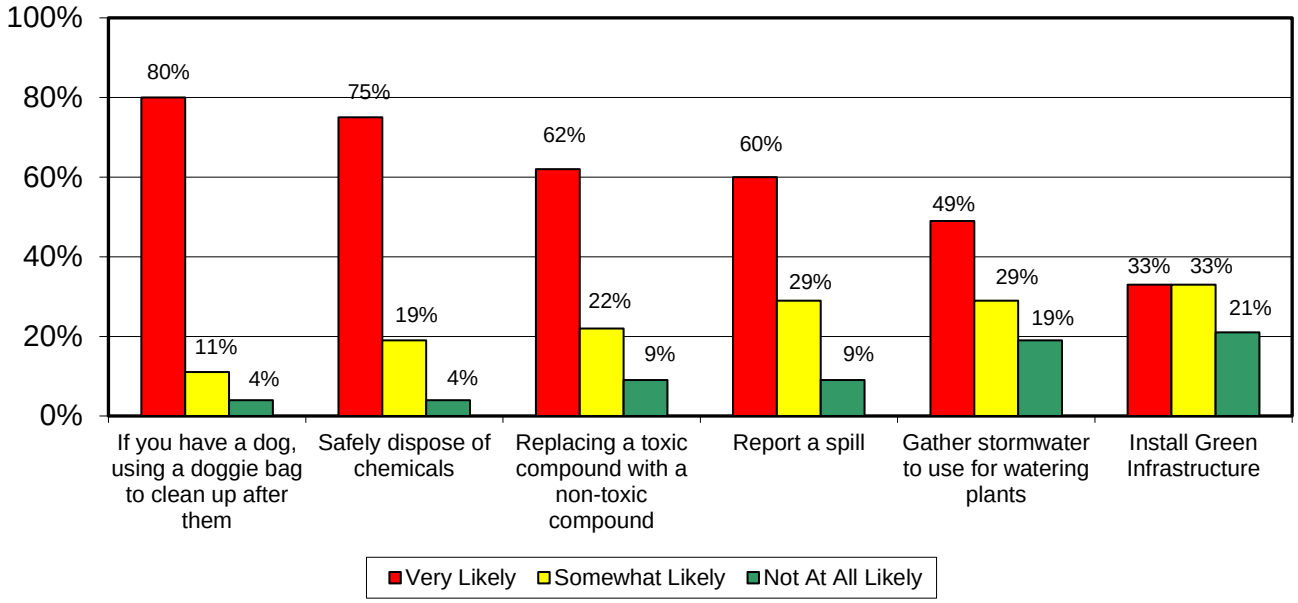
Table 33 Likelihood of Taking Part in Various Activities To Help Keep Stormwater Clean

	06/14 Total	05/15 Total	05/16 Total	**05/17 Total**	Area			
					Central	South	North-west	East
If you have a dog, using a doggie bag to clean up after them								
Very likely	80%	76%	80%	**80%**	85%	68%	83%	88%
Somewhat likely	5%	10%	8%	**11%**	7%	21%	10%	4%
Not at all likely	4%	6%	5%	**4%**	6%	2%	4%	4%
Don't know/Not sure	11%	9%	8%	**4%**	3%	8%	4%	4%
Safely dispose of chemicals								
Very likely	82%	76%	71%	**75%**	72%	70%	75%	92%
Somewhat likely	11%	18%	22%	**19%**	21%	22%	19%	8%
Not at all likely	4%	4%	4%	**4%**	5%	5%	3%	0%
Don't know/Not sure	3%	2%	4%	**2%**	3%	3%	3%	0%
Replacing a toxic compound with a non-toxic compound								
Very likely	67%	56%	58%	**62%**	60%	58%	64%	72%
Somewhat likely	19%	29%	27%	**22%**	22%	21%	24%	21%
Not at all likely	6%	8%	6%	**9%**	12%	13%	4%	4%
Don't know/Not sure	8%	7%	8%	**6%**	7%	8%	7%	3%
Report a spill								
Very likely	75%	58%	63%	**60%**	58%	59%	56%	71%
Somewhat likely	14%	29%	26%	**29%**	31%	29%	29%	25%
Not at all likely	6%	8%	6%	**9%**	9%	8%	12%	3%
Don't know/Not sure	5%	5%	5%	**3%**	2%	4%	2%	1%
Gathering stormwater to use for watering plants								
Very likely	–	53%	49%	**49%**	50%	47%	50%	48%
Somewhat likely	–	31%	29%	**29%**	30%	28%	27%	29%
Not at all likely	–	13%	17%	**19%**	18%	21%	20%	20%
Don't know/Not sure	–	3%	5%	**3%**	3%	4%	3%	3%
Install green infrastructure*								
Very likely	54%	41%	43%	**33%**	29%	35%	33%	39%
Somewhat likely	23%	37%	34%	**33%**	34%	29%	36%	35%
Not at all likely	8%	11%	11%	**21%**	21%	22%	21%	16%
Don't know/Not sure	15%	11%	12%	**13%**	16%	14%	10%	11%
	N=502	N=500	N=500	**N=504**	N=151	N=141	N=137	N=75

* Was "Implement Low Impact Development practices" (6/14-5/16).

Question: I am now going to read you a list of activities that people can do to help keep stormwater clean. As I read each activity, simply tell me how likely you would be to take part – very likely, somewhat likely or not at all.

Display 33 Likelihood of Taking Part in Various Activities to Help Keep Stormwater Clean



EVALUATION OF THE 2016-2017
PIMA COUNTY CLEAN AIR PROGRAM CAMPAIGN AND
CLEAN WATER PROGRAM CAMPAIGN SURVEY
(May 2017)

Appendix

Survey Methodology and Sample Selection

This survey consists of a 504-person, randomly-selected and statistically-projectable sample of the 16 years and older male and female target audience in designated Pima County zip code areas. This study utilized a dual-methodology sampling plan, with Telephone (N=250) and Internet (N=254) interviews. Before 2015, all surveys in this tracking study series were all conducted via telephone.

All Telephone and Internet interviews were conducted during May 2017. Regardless of the sample source, the survey instrument and screening criteria were identical. Neither the interviewer nor the interviewee had any knowledge of the study sponsor.

Telephone Interviews – The Telephone interviews were distributed on the basis of geographic population density in the market, with specific steps taken to ensure a proportionate number of interviews in each survey "region." The sample distribution in each region was developed using recent population estimate projections. The final in-tab geographic proportions are reflective of these actual population estimates. A similar sampling plan (based on household distribution) was also developed to ensure the ethnic composition of the final sample was as close as possible to actual proportions in Pima County.

Telephone respondents included in this survey were selected through a random sampling procedure that allows equal probability of selection. This technique ensures that area residents who are not yet listed in a telephone directory (or choose not to be listed) are still eligible for selection. All interviews were conducted and validated by the FMR Field staff. Each Telephone interview lasted approximately 16 minutes.

Cell Phone Only Households – To address "cell phone only" households (households without a land line that utilize a cell phone exclusively), FMR interviewers manually dialed randomly-generated cell phone numbers (based on known cell phone exchanges) and attempted to interview these households for the Telephone portion of the survey. Potential respondents reached through manual dialing were given three options: to proceed with the interview using their cell phone provider's calling plan minute allocations; allow for a call-back at a mutually arranged time on a

land line; or to call the cell phone back when minutes are “free” (i.e., weekends, evenings, etc.).

Internet Interviews – Online surveys were conducted via the Internet utilizing a questionnaire administered by FMR Associates and hosted on the sgizmo.com website (with completed surveys downloaded directly to FMR for data processing and analysis). Respondents were contacted through a third party database Internet panel company that emailed invitations to their “opt in” panelists who reside in Pima County. Each Internet interview lasted approximately 11 minutes.

Spanish-Language Interviews – Where relevant, respondents were asked if they preferred their interview to be conducted in English or Spanish. A Spanish-language version of the survey was developed by FMR Associates, and made available to both Telephone and Internet respondents. A total of 158 non-White respondents were interviewed in the project, including 127 Hispanics. Overall, 13 respondents (3%) requested that their survey be conducted in Spanish by a bilingual interviewer. This compares to 2% in the 2016 survey.

Statistical Reliability

The statistics in this report are subject to a degree of variation that is determined by sample (or sub-sample) size. All research data are subject to a certain amount of variation for this reason. This does not mean that the figures represented in the various tables are wrong. It means that each percentage represents a possible "range" of response. This is because the random sampling process, as well as human behavior itself, can never be perfect. For this sample, at N=504 (rounded), the statistical variation is ±4.5% under the most extreme circumstances – with a 95% confidence level. That is, when the percentages shown in the tables are near 50% (the most conservative situation), the actual behavior or attitude may range from 45.5% to 54.5%. The 95% confidence level means that if the survey were repeated 100 times, in 95 cases the same range of response would result. Those percentages that occur at either extreme (for example, 10% or 90%) are subject to a smaller degree of statistical fluctuation (in this case, ±2.7%).

Sub-samples, such as age groups or sex, have a higher degree of statistical fluctuation due to the smaller number of respondents in those groupings.

Confidence Intervals for a Given Percent
(at the 95% confidence level)

N	Reported Percentage				
(Base for %)	**10 or 90%**	**20 or 80%**	**30 or 70%**	**40 or 60%**	**50%**
500	2.7%	3.6%	4.1%	4.4%	4.5%
400	2.9%	3.9%	4.5%	4.8%	4.9%
300	3.3%	4.5%	5.1%	5.5%	5.7%
200	4.2%	5.5%	6.4%	6.8%	6.9%
100	5.9%	7.8%	9.0%	9.6%	9.8%
50	8.3%	11.1%	12.7%	13.6%	13.9%
25	11.8%	15.7%	18.0%	19.2%	19.6%

Example: If the table shows that 20% of all respondents (when N=500) have a positive or negative attitude about a question category, the chances are 95 out of 100 that the true value is 20% ±3.6 percentage points; that is, the range of response would be 16.4% to 23.6%.

Significance of Difference Between Percentages
(at the 95% confidence level)

Average of the Bases of Percentages Being Compared	Reported Percentage				
	10 or 90%	20 or 80%	30 or 70%	40 or 60%	50%
400	4.4%	5.6%	6.5%	7.1%	7.2%
250	5.2%	7.1%	8.1%	8.6%	8.8%
200	5.9%	7.8%	8.9%	9.6%	9.8%
150	6.8%	9.1%	10.3%	11.0%	11.3%
100	8.3%	11.0%	12.7%	13.6%	13.9%
50	11.7%	15.7%	18.0%	19.2%	19.7%
25	16.7%	22.2%	25.5%	27.2%	27.7%

Example: (Within Survey)

If a table indicates that 34% of Internet respondents have a positive attitude toward a category of response, and that 25% of Telephone respondents have the same attitude, the following procedure should be used to determine if this attitude is due to chance:

The average base is 250 (rounded) for the reported percentages (254+250)/2=252. The average of the percentages is 30.0% – (34+25)/2=29.5%. The difference between the percentages is 9%. Since 9% is greater than 8.1% (the figure in the table for this base and this percentage), the chances are 95 out of 100 that the attitude is significantly different between Internet and Telephone respondents.

2017 PIMA AIR QUALITY/CLEAN WATER REGION DEFINITIONS

Northwest:	85653
	85654
	85658
	85704
	85705
	85737
	85739
	85741
	85742
	85743
	85745
	85755
	85652
	85738
Central:	85710
	85711
	85712
	85716
	85718
	85719
South:	85321
	85614
	85622
	85629
	85634
	85641
	85701
	85706
	85707
	85708
	85713
	85714
	85735
	85736
	85746
	85756
	85757
	85341
	85601
	85633
	85639
East:	85619
	85715
	85730
	85747
	85748
	85749
	85750