EVALUATION OF THE 2017-2018 PIMA COUNTY CLEAN AIR PROGRAM CAMPAIGN AND CLEAN WATER PROGRAM CAMPAIGN SURVEY

(April 2018)

Prepared for:

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ENVIRONMENTAL QUALITY

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Explanation of Detailed Perceptual Table Format

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EVALUATION OF THE 2017-2018 PIMA COUNTY CLEAN AIR PROGRAM CAMPAIGN AND CLEAN WATER PROGRAM CAMPAIGN SURVEY

(April 2018)

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 2017-2018 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 28th 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 6th 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 500 men and women, 16 years of age and older, in the Pima County area was interviewed by telephone (260) and online (240) during March and early April 2018. 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

Survey Language – In line with past years, 98% of 2018 interviews were conducted in English and the balance (2% or 11 surveys overall) in Spanish. All 11 Spanish-language surveys in the current project were conducted among self-identified Hispanics who reside in the Central, South or Northwest zip code zones. (Turn to Table 4 for zip code area definitions.)

Table 1 Type of Interview

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**	Sample	
					Telephone	Internet
English	98%	98%	97%	**98%**	98%	98%
Spanish	2%	2%	3%	**2%**	2%	2%
	N=500	N=500	N=504	**N=500**	N=260	N=240

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

Survey Method – Per the dual-methodology sampling plan utilized since 2015, interviews were conducted by telephone and online utilizing the same bilingual survey instrument. There were 500 total interviews, split evenly between telephone (52%) and online (48%). Telephone respondents were randomly-selected for participation, with surveys conducted by the FMR field staff. Internet surveys were conducted using a national online panel company. This panel company sent an email invitation to randomly-selected panelists. These panelists opt in to accept such invitations, and receive an incentive to participate in surveys for which they qualify.

The screening criteria for the two methodologies is identical (and has remained unchanged for 25+ years). Namely, all survey respondents are Pima County residents, age 16 or older, who live in specific zip codes. The only difference in the questionnaire design methodology is how survey questions with unaided responses are handled. For Telephone surveys, unaided questions response options are not read to respondents – while Internet respondents are provided all response options to select from.

Table 2 Method of Interview

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**
Telephone	50%	50%	50%	**52%**
Internet	50%	50%	50%	**48%**
	N=500	N=500	N=504	**N=500**

Self-Identified Ethnicity – The 2018 sample is right on target with respect to ethnicity survey quotas: 69% White, 25% Hispanic, 3% African-American, 2% Asian/Pacific Islander and 1% Native American. In terms of interview method, there are more Hispanics in the Telephone sample (29% versus 21% Internet) – while the Internet sample has few more Whites (72% versus 66% Telephone).

Table 3 Racial Background of Respondents

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**	Sample	
					Telephone	Internet
White	72%	71%	69%	**69%**	66%	72%
Hispanic	20%	22%	25%	**25%**	29%	21%
African-American	3%	3%	3%	**3%**	2%	3%
Asian, Pacific Islander	2%	2%	2%	**2%**	1%	2%
Native American	3%	2%	1%	**1%**	2%	1%
	N=500	N=500	N=504	**N=500**	N=260	N=240

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 overall geographic distribution of the 2018 sample is a mirror image of the survey quotas: 30% Central, 28% South, 27% Northwest and 15% East. Sampling quotas are based on population density in Pima County, with specific zip codes assigned to the four geographic areas (as defined below).

Table 4 Area of Residence

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**
Central 85710 85711 85712 85716 85718 85719	31%	31%	30%	**30%**
South 85321 85614 85622 85629 85634 85641 85701 85706 85707 85708 85713 85714 85735 85736 85746 85756 85757 85341 85601 85633 85639	27%	27%	28%	**28%**
Northwest 85653 85654 85658 85704 85705 85737 85739 85741 85742 85743 85745 85755 85652 85738	27%	27%	27%	**27%**
East 85619 85715 85730 85747 85748 85749 85750	15%	15%	15%	**15%**
	N=500	N=500	N=504	**N=500**

	Air Quality Problem			Sample	
	Major	Moderate	Minor	Telephone	Internet
Central 85710 85711 85712 85716 85718 85719	29%	32%	32%	29%	32%
South 85321 85614 85622 85629 85634 85641 85701 85706 85707 85708 85713 85714 85735 85736 85746 85756 85757 85341 85601 85633 85639	30%	29%	22%	25%	30%
Northwest 85653 85654 85658 85704 85705 85737 85739 85741 85742 85743 85745 85755 85652 85738	29%	26%	27%	28%	26%
East 85619 85715 85730 85747 85748 85749 85750	13%	14%	19%	17%	12%
	N=87	N=276	N=118	N=260	N=240

Gender Distribution – Consistent with prior years, there were no sampling quotas in terms of gender or age. For 2018, the sample includes a 50/50 split of men and women. This is slightly more male-oriented than the past three surveys (an increase from 42%-46%). As with all past telephone interviews, there was only one survey conducted per randomly-selected household, and all respondents were further randomized by speaking with "the male or female in your household who is 16 or older and most recently celebrated a birthday." Internet surveys were conducted among randomly selected online panelists with a Pima County zip code who "opt in" to receive survey invitations.

Table 5 Gender of Respondents

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**	Sample	
					Telephone	Internet
Men	42%	44%	46%	**49%**	50%	48%
Women	58%	56%	54%	**51%**	50%	52%
	N=500	N=500	N=504	**N=500**	N=260	N=240

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 Category Distribution – One-half of the final 2018 in-tab sample is 26 to 55, up slightly from last year (47%). Consistent with other dual-methodology studies, the age distribution of the Telephone sub-sample tends to skew older than the Internet. As indicated below, 24% of Telephone respondents are 66 or older – compared to just 11% of the Internet sub-sample. Consequently, the median age of Telephone respondents is older (50.7 years) than Internet respondents (41.7 years). For the combined sample, the median age is 45.6 years.

Table 6 Age of Respondents

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**	Sample	
					Telephone	Internet
16 to 25	16%	14%	15%	**15%**	11%	19%
26 to 35	16%	17%	17%	**19%**	16%	21%
36 to 45	15%	16%	15%	**16%**	15%	17%
46 to 55	14%	15%	15%	**15%**	17%	14%
56 to 65	18%	18%	18%	**18%**	17%	18%
66 to 75	15%	14%	14%	**11%**	13%	9%
76 or over	6%	6%	6%	**7%**	11%	2%
	N=500	N=500	N=504	**N=500**	N=260	N=240

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

Length of Residence – Two-thirds indicate that they have lived in Pima County for 11 or more years, including fully three of four Telephone respondents. This compares to 59% of Internet panelists who are "long-term" (11+ year) residents. Consistent with last year, 13% of the total sample are "new" (for less than two years – 6%) or part-year (7%) Pima County residents.

Table 7 Length of Residence in Pima County

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**	Sample	
					Telephone	Internet
Part year	4%	4%	7%	**7%**	7%	8%
Less than 2 years	8%	7%	6%	**6%**	4%	8%
2 to 5 years	11%	9%	11%	**10%**	6%	14%
6 to 10 years	13%	14%	16%	**10%**	8%	12%
11 or more years	64%	67%	61%	**68%**	76%	59%
	N=500	N=500	N=504	**N=500**	N=260	N=240

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 – There continues to be an incremental increase in the percentage of survey respondents who report that someone in their household suffers from a breathing-related medical condition: from 40% in 2016 to 42% last year to 43% now. Accounting for multiple responses, 21% indicate that they themselves are impacted (unchanged since last year), while 34% report they their children (13%, up from 10%) or some other family member (unchanged at 21%) have a breathing-related medical condition. With respect to geography, it is clear that residents of the South zips are most likely to be impacted.

Once again, there is a high degree of correlation between the incidence of affected household members and the perception of a progressively more severe air quality problem in the Tucson area.

Table 8 Household Member With Breathing-Related Medical Condition

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**	Sample	
					Telephone	Internet
Yes	34%	40%	42%	**43%**	43%	43%
Respondent	(18%)	(21%)	(21%)	**(21%)**	(20%)	(22%)
Children	(9%)	(11%)	(10%)	**(13%)**	(14%)	(12%)
Other family member	(13%)	(17%)	(21%)	**(21%)**	(23%)	(19%)
No	64%	58%	57%	**55%**	55%	55%
Don't know/ Not sure	2%	2%	1%	**2%**	2%	2%
	N=500	N=500	N=504	**N=500**	N=260	N=240

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 – Compared to the last two years, a few more in the 2018 sample indicate that members of their household own or lease 3+ motor vehicles (from 16% to 19% now). At the same time, there has been a decline in two-vehicle households (from 42% last year to 36% now) – while 37% have one working motor vehicle (up from 35%). Multi-vehicle (3+) households are more likely to be found in the South zip codes. Central or Northwest residents are more apt to be single-vehicle households. Overall, 8% indicate no one in their household owns or leases a motor vehicle (compared to 7% last year) – more often Central residents.

Table 9 Number of Motor Vehicles Owned or Leased

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**	Sample	
					Telephone	Internet
No working cars	8%	6%	7%	**8%**	5%	10%
One	36%	41%	35%	**37%**	35%	40%
Two	40%	37%	42%	**36%**	37%	35%
Three or more	17%	16%	16%	**19%**	23%	14%
	N=500	N=500	N=504	**N=500**	N=260	N=240

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

Education Level – Consistent with past years, three of four survey respondents say they have completed at least some college coursework. This is the case regardless of sample method. However, compared to recent surveys, more are highly educated (with some graduate work or an advanced degree) (from 13%-17% to 19% now). Once again, Telephone respondents (22%) are more likely than Internet panelists (17%) to be the most formally educated. Geographically, educational achievement (college degree or better) is greatest in the Northwest or East zips.

Among the rest, and regardless of interview method, two of ten are high school graduates – while just 4% have less than a high school diploma.

Table 10 Education Level of Respondents

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**	Sample	
					Telephone	Internet
Less than high school	7%	4%	5%	**4%**	3%	4%
Completed high school/Trade school	16%	19%	19%	**20%**	19%	21%
Some college	31%	33%	27%	**25%**	23%	27%
College graduate	28%	27%	36%	**31%**	32%	30%
Some graduate work or graduate degree	17%	15%	13%	**19%**	22%	17%
	N=500	N=500	N=504	**N=500**	N=260	N=240

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

Annual Household Income – Consistent with the higher levels of education attainment, the median household income of survey respondents has increased from $46,995 last year to $50,612 in 2018. As we have found in prior years, the median income of Telephone respondents ($52,362) is higher than Internet panelists ($48,705). Unchanged since last year, high income households ($80,000+) are more likely in the Northwest or East zip codes.

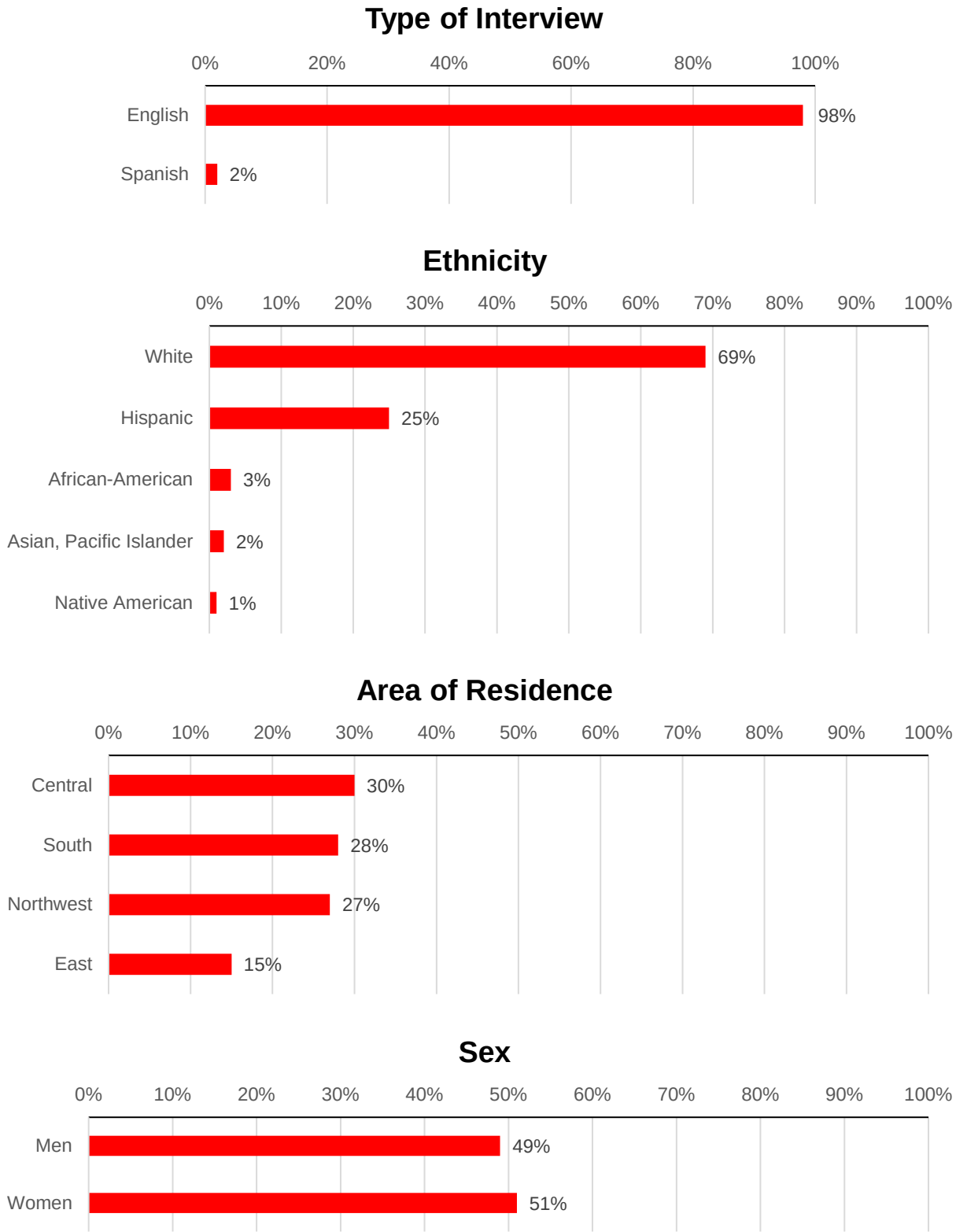
Overall, just 7% refused to divulge their income category. This is down from 11% in the past two surveys.

Table 11 Household Income

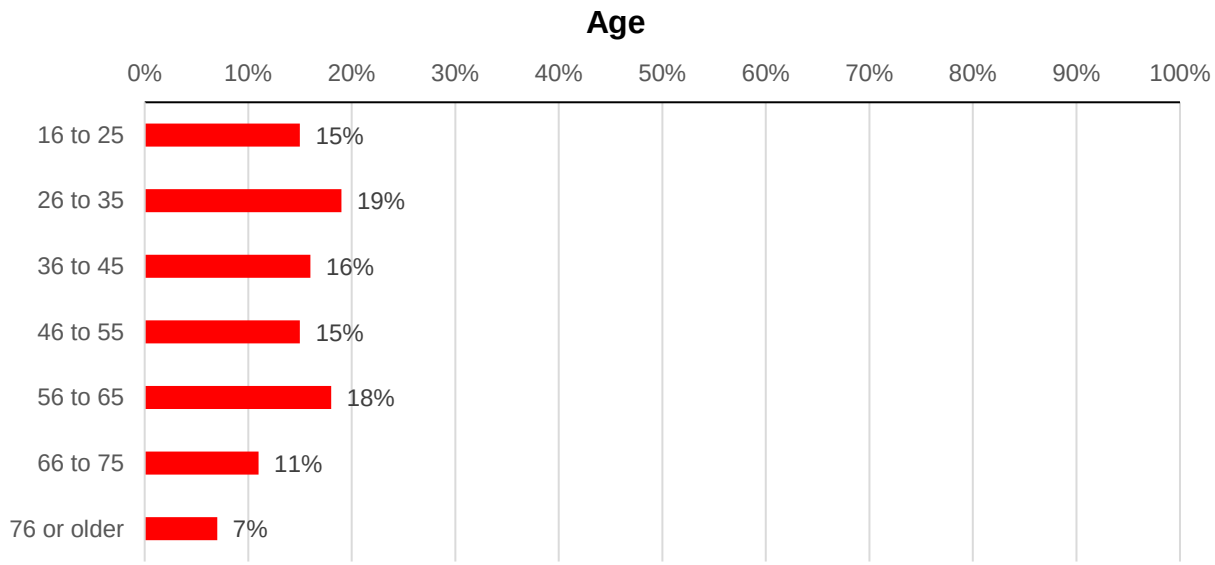
	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**	Sample	
					Telephone	Internet
Less than $15,000	12%	11%	12%	**11%**	7%	15%
$15,000 to $24,999	14%	13%	10%	**10%**	10%	11%
$25,000 to $39,999	16%	17%	17%	**15%**	18%	13%
$40,000 or more*	46%	48%	50%	**56%**	57%	55%
No answer/Refused	13%	11%	11%	**7%**	9%	5%
* $40,000 to $59,999	14%	16%	16%	**18%**	18%	18%
$60,000 to $79,999	11%	12%	10%	**16%**	11%	21%
$80,000 or more	21%	20%	24%	**22%**	28%	16%
	N=500	N=500	N=504	**N=500**	N=260	N=240

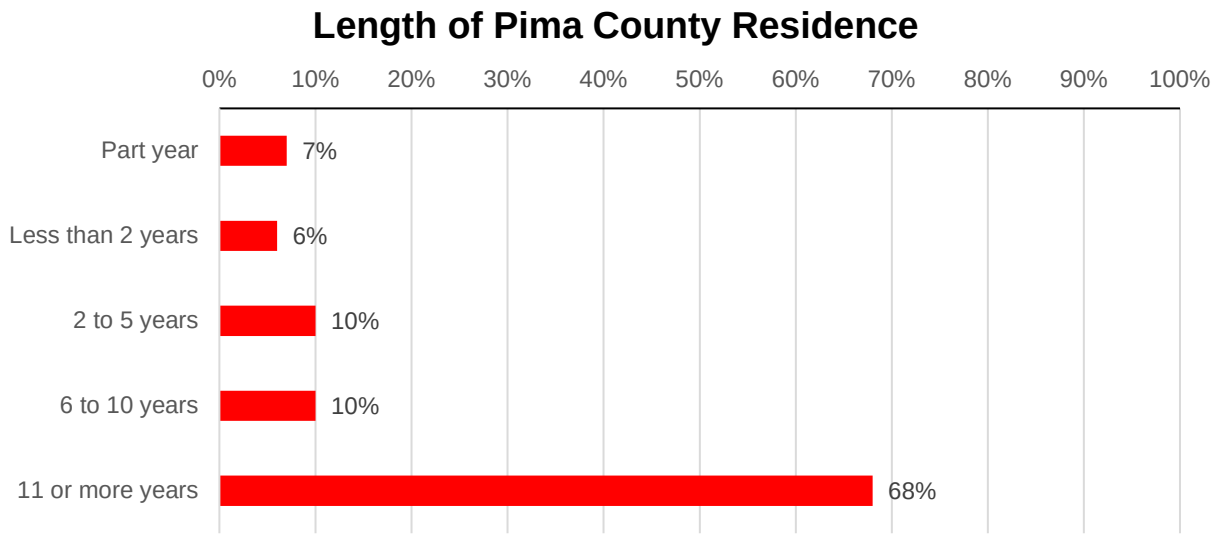
Question: As I read the following categories, please tell me into which group your total annual household income falls. We are not interested in your exact income, just your household income category...from all sources before taxes.

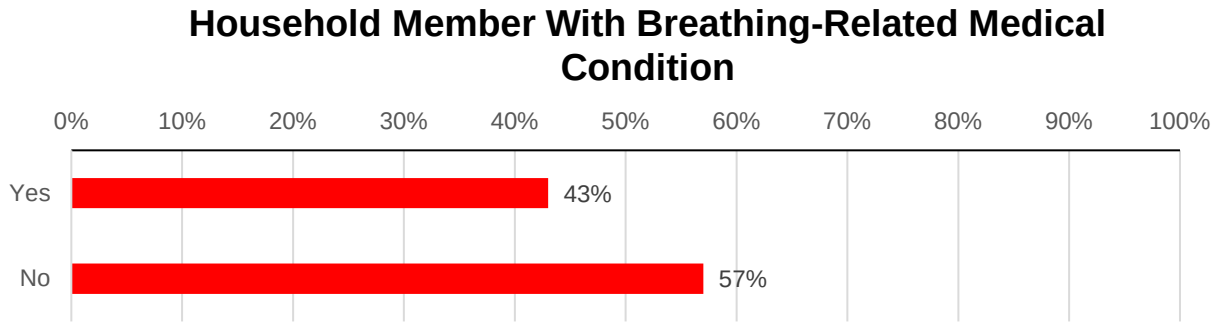
Display 1 **Demographic Profile of Respondents**
(Among the Total Sample)



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







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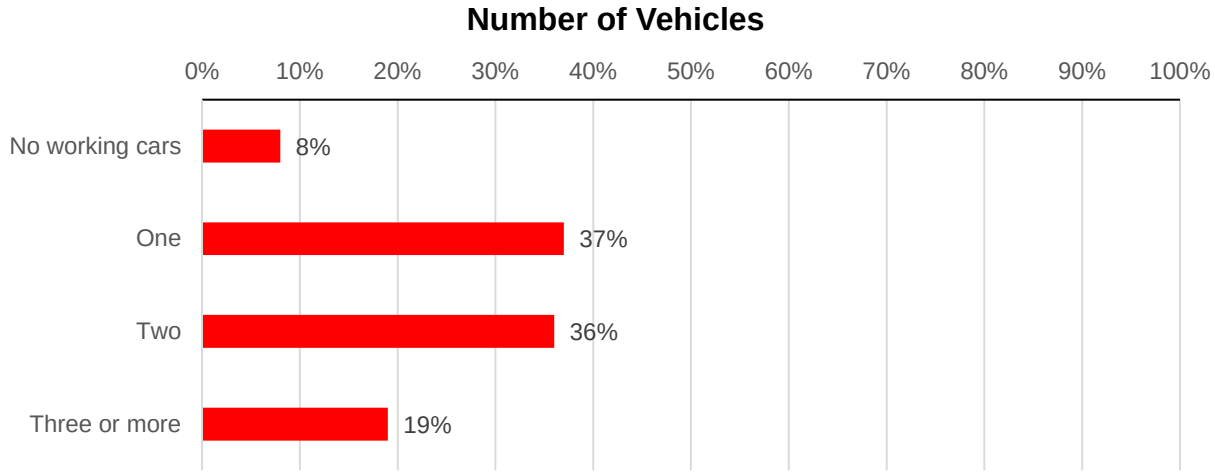
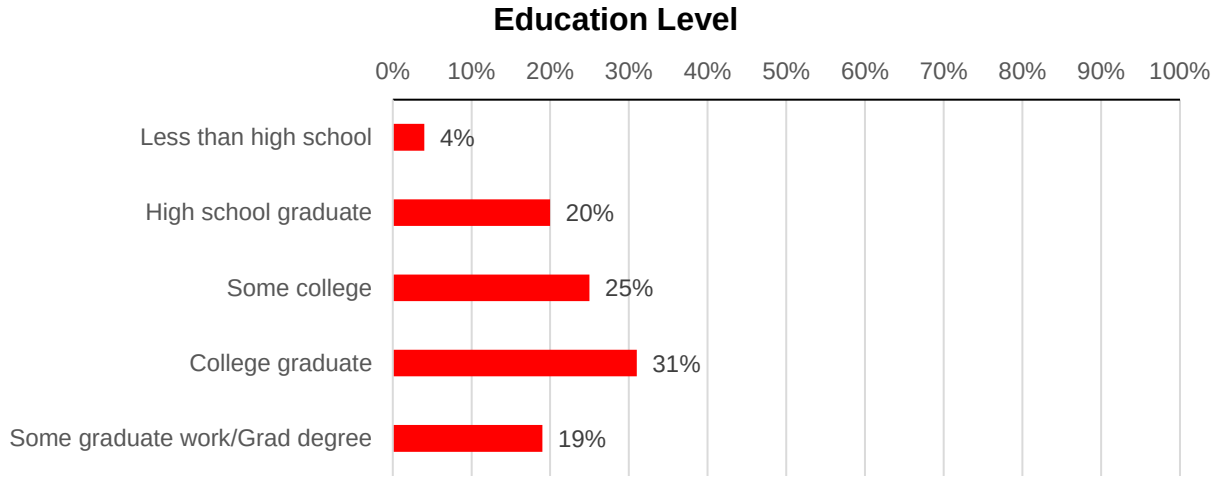
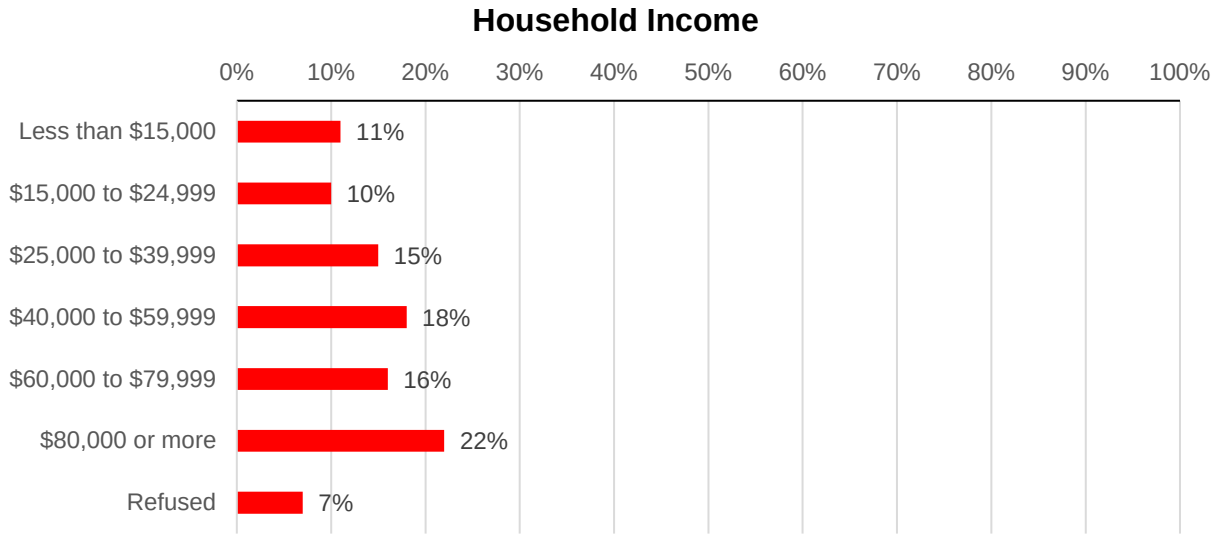
(Among the Total Sample)







Awareness of Information About Air Quality/Pollution

Awareness of the Pima County "Clean Air" Program – Overall, 46% of survey respondents indicate that they are familiar with the Pima County "Clean Air" Program. This is up slightly from last year (44%), but short of 2016 findings (50%).

Program awareness is highest in the South zips (52%) and among 36 to 55 year-olds, 6+ year Pima County residents, the most formally educated respondents and high income households ($60,000 or more). Familiarity is directly related to the perception of a progressively more severe air quality or stormwater problem. Program awareness is also higher among households impacted by a medical-related breathing condition. There are fewer differences in awareness with respect to gender or between Whites and Hispanics.

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

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**
Yes	45%	50%	44%	**46%**
No	49%	42%	47%	**47%**
Don't know	6%	7%	9%	**8%**
	N=500	N=500	N=504	**N=500**

	Area				Air Quality Problem		
	Central	South	Northwest	East	Major	Moderate	Minor
Yes	41%	52%	44%	45%	67%	45%	36%
No	52%	42%	48%	42%	29%	48%	56%
Don't know	7%	6%	7%	14%	5%	7%	8%
	N=152	N=138	N=136	N=74	N=87	N=276	N=118

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 – Once again, the vast majority (84% overall) are familiar with at least one event or activity that is used to promote clean air in the Tucson area. This is highly consistent with 2017 (86%) and 2016 (83%) findings. Similar to past years, awareness of individual events/activities is significantly higher among respondents familiar with the "Clean Air" Program. Generally, familiarity is also higher among those who perceive a progressively more severe air quality problem in the Tucson area.

<u>These three "Clean Air" events/activities continue to elicit the highest levels of awareness</u>:

- **"Earth Day Festival and Parade"** (58% familiarity, down just slightly from 62% last year. Still, awareness is lower only in the Northwest zip codes [49% versus 60%-62% elsewhere]. Non-Whites indicate increased recall.)

- **"Bike to Work Day"** (56% familiarity, up from 53% last year. There are relatively few differences in recall based on area, gender or age.)

- **"Bike Fest"** (50% familiarity, up from 47% last year. Recall is consistent across geography and gender, but elevated among those 16 to 35 or 56+ and Whites.)

<u>The remaining three events/activities are familiar to at least one of four overall, including</u>:

- **"Walk and Roll to School Day"** (31% familiarity, unchanged since last year. This event is more highly familiar to South region residents, 16 to 35 year-olds and non-Whites.)

- **"Car-Free Day"** (29% familiarity, down slightly from 33% last year. South zip residents, 16 to 25 or 56 to 65 year-olds and non-Whites are more likely to indicate increased awareness.)

- **"Cyclovia"** (25% familiarity, up from 23% last year. Elevated awareness in the Central or East zips, 46 to 55 year-olds and those who think that Tucson has a "moderate" air quality problem.)

Table 13 Awareness of Various Clean Air Events or Activities

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**
"Earth Day Festival and Parade"	59%	55%	62%	**58%**
"Bike to Work Day"	62%	60%	53%	**56%**
"Bike Fest"	52%	51%	47%	**50%**
"Walk and Roll to School Day"*	29%	32%	31%	**31%**
"Car-Free Day"	27%	33%	33%	**29%**
"Cyclovia"	24%	24%	23%	**25%**
None of these	15%	17%	14%	**16%**
	N=500	N=500	N=504	**N=500**

	Area				Air Quality Problem		
	Central	South	Northwest	East	Major	Moderate	Minor
"Earth Day Festival and Parade"	62%	62%	49%	60%	68%	59%	54%
"Bike to Work Day"	54%	56%	57%	58%	70%	56%	51%
"Bike Fest"	50%	51%	51%	47%	59%	51%	46%
"Walk and Roll to School Day"*	28%	40%	24%	32%	45%	32%	20%
"Car-Free Day"	29%	34%	27%	24%	52%	26%	22%
"Cyclovia"	30%	22%	20%	31%	24%	30%	20%
None of these	14%	14%	20%	18%	12%	14%	20%
	N=152	N=138	N=136	N=74	N=87	N=276	N=118

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 84% familiar with at least one "Clean Air" campaign event, 18% say that they or someone in their household participated in at least one of these activities. This is unchanged since last year.

Geographically, participation is lower only among residents of the East zip codes (15% versus 18%-20% elsewhere) – with no real difference based on gender or education level. Participants tend to be 26 to 35 year-olds, non-Whites and those who perceive a progressively more severe air quality problem. In line with prior surveys, past participation is significantly higher among those familiar with the "Clean Air" Program (25% versus 12% not familiar).

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

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**
Yes	20%	12%	18%	**18%**
No	79%	85%	77%	**79%**
Don't know	2%	3%	5%	**3%**
	N=425	N=417	N=432	**N=418**

	Area				Air Quality Problem		
	Central	South	Northwest	East	Major	Moderate	Minor
Yes	18%	19%	20%	15%	27%	19%	12%
No	80%	76%	78%	80%	71%	78%	85%
Don't know	2%	5%	2%	5%	1%	3%	3%
	N=130	N=118	N=109	N=61	N=77	N=236	N=95

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 indicate past participation in a "Clean Air" event or activity, nearly two-thirds say that they have changed (or are considering to change) their daily routines or behaviors to help improve air quality (64%). This is down from last year (74%) and the record mention recorded in 2016 (80%).

However, when calculated among the total sample, this decline in post-participation changed behavior is only slight – 10%, down from the all-time high recorded in 2017 (11%). Who is most apt to indicate a change in behavior to help improve air quality after attending a "Clean Air" Program event? South region residents, women, 16 to 35 year-olds and non-Whites.

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)

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**
Yes	69%	80%	74%	**64%**
No	23%	8%	25%	**34%**
Don't know	8%	12%	1%	**1%**
	N=83	N=49	N=77	**N=76**

	Area				Air Quality Problem		
	Central	South	Northwest	East	Major	Moderate	Minor
Yes	65%	77%	59%	44%	81%	70%	9%
No	35%	18%	41%	56%	14%	30%	91%
Don't know	0%	4%	0%	0%	5%	0%	0%
	N=23	N=22	N=22	N=9	N=21	N=44	N=11

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 – Fully 87% aware of at least one "Clean Air" Program event indicate a favorable opinion of "events and activities that encourage people to use other modes of transportation or work from home instead of driving alone." This is down just slightly from last year's record mention of 90% positive opinion – with the decline among those "very favorable" (from 52% in 2017 to 49% now).

Central residents, women and those who perceive a progressively more severe air quality problem are most likely to be "very favorable" of activities and events to encourage telecommuting or use of alternative modes of transportation.

For the fourth consecutive year, less than one of ten have an unfavorable opinion of campaign 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 "Clean Air" Event)

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**
Very favorable	47%	45%	52%	**49%**
Somewhat favorable	38%	43%	38%	**38%**
Not very favorable	7%	4%	5%	**5%**
Not at all favorable	3%	4%	2%	**4%**
Don't know/No answer	5%	4%	4%	**4%**
	N=425	N=417	N=432	**N=418**

	Area				Air Quality Problem		
	Central	South	Northwest	East	Major	Moderate	Minor
Very favorable	60%	42%	45%	44%	62%	51%	35%
Somewhat favorable	30%	38%	45%	43%	32%	40%	41%
Not very favorable	4%	8%	4%	3%	0%	4%	10%
Not at all favorable	1%	5%	3%	8%	3%	2%	7%
Don't know/No answer	5%	6%	4%	2%	3%	3%	6%
	N=130	N=118	N=109	N=61	N=77	N=236	N=95

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 – Consistent with recent surveys, and allowing for multiple response mentions, the four actions taken most often to help reduce air pollution in the Tucson area include:

- **Generally reduced driving** (37%, very consistent with the 38% recorded in the last two surveys. These tend to be Northwest residents, women, those 46 or older and lower income households.)

- **Carpool/Less driving alone** (35%, down slightly from 38% last year. South residents, women, 16 to 35 year-olds and Hispanics are more to report increased carpooling.)

- **Keep car tuned** (34%, down from 38%-39% in the last two studies. There are few differences based on geography and among those 26 or older. Those who perceive a "moderate" or "minor" air quality problem are more likely to report keeping their car tuned – as do men and Whites.)

- **Keep tires properly inflated** (34%, up from 31% last year. Again, there are few differences based on area of residence. Whites and 56 to 65 year-olds are more apt to keep their tires properly inflated.)

In lesser numbers, others report that they have **planted trees** (17%, down from a record 23% mention last year), **avoid excessive idling** (unchanged at 16%), **bought bicycles** (unchanged at 15%), **adjusted vehicle's emission control equipment** (unchanged at 14%), **chosen once a week not to drive** (13%, down from 16%) and/or **bought a more fuel efficient car** (13%, down from 20%). Similar to last year, just less than one of ten are **using fireplace/wood stove less** (8%) and/or **using BBQ grill less** (7%).

A record low 11% now say that they have done **nothing** to reduce air pollution (down from 12% last year). As we have found in past years, these tend to be residents who perceive a "minor" air quality problem and those unaware of the "Clean Air" Program.

Table 14 Steps Taken to Reduce Air Pollution

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**
Generally reduced driving/Driven less	35%	38%	38%	**37%**
Carpool/Less driving alone	32%	33%	38%	**35%**
Keep car tuned	35%	39%	38%	**34%**
Keep tires properly inflated	39%	35%	31%	**34%**
Planted trees	17%	21%	23%	**17%**
Avoid excessive idling	12%	12%	16%	**16%**
Bought bicycles	12%	12%	15%	**15%**
Adjusted vehicle's emission control equipment	10%	12%	14%	**14%**
Chosen once a week not to drive	10%	12%	16%	**13%**
Bought more fuel efficient car	13%	13%	20%	**13%**
Using fireplace/Wood stove less	5%	8%	8%	**8%**
Using BBQ grill less	6%	9%	8%	**7%**
Moved closer to work	8%	9%	8%	**6%**
Challenged friends/Co-workers to change	3%	2%	6%	**4%**
Bought alternative-fueled car	4%	3%	5%	**4%**
Advocated alternative to cars	4%	2%	4%	**3%**
Walk more	1%	2%	2%	**1%**
Ride the bus/Public transportation	1%	3%	1%	**1%**
Other	3%	4%	5%	**7%**
Nothing	16%	16%	12%	**11%**
	N=500	N=500	N=504	**N=500**

	Area				Air Quality Problem		
	Central	South	Northwest	East	Major	Moderate	Minor
Generally reduced driving/Driven less	38%	34%	42%	30%	42%	38%	31%
Carpool/Less driving alone	35%	39%	33%	28%	42%	37%	25%
Keep car tuned	33%	36%	35%	34%	29%	35%	37%
Keep tires properly inflated	34%	34%	34%	32%	38%	33%	32%
Planted trees	14%	22%	15%	18%	28%	18%	10%
Avoid excessive idling	16%	15%	15%	18%	15%	19%	11%
Bought bicycles	17%	18%	12%	11%	23%	16%	9%
Adjusted vehicle's emission control equipment	12%	22%	9%	11%	17%	14%	9%
Chosen once a week not to drive	11%	20%	12%	4%	20%	14%	6%
Bought more fuel efficient car	11%	10%	14%	18%	14%	13%	12%
Using fireplace/Wood stove less	7%	14%	4%	7%	15%	8%	4%
Using BBQ grill less	7%	8%	8%	4%	9%	8%	4%
Moved closer to work	6%	9%	6%	3%	6%	8%	5%
Challenged friends/Co-workers to change	3%	9%	3%	3%	2%	6%	2%
Bought alternative-fueled car	3%	4%	3%	5%	7%	3%	2%
Advocated alternative to cars	3%	6%	2%	1%	5%	4%	2%
Walk more	0%	1%	2%	3%	2%	1%	2%
Ride the bus/Public transportation	1%	2%	2%	0%	1%	1%	2%
Other	9%	3%	7%	8%	8%	6%	5%
Nothing	10%	11%	13%	10%	6%	9%	14%
	N=152	N=138	N=136	N=74	N=87	N=276	N=118

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 – Nearly identical to 2017 findings (28%), 29% in the 2018 survey report that they have children between the ages of 5 and 18 living in their household. Residents of the South or East zip codes – along with women, 36 to 45 year-olds and non-Whites – are more apt to indicate the presence of children in their homes.

Table 15 Presence of Children Ages 5-18 in Household

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**
Yes	26%	24%	28%	**29%**
No	74%	76%	72%	**71%**
	N=500	N=500	N=504	**N=500**

	Area				Air Quality Problem		
	Central	South	Northwest	East	Major	Moderate	Minor
Yes	24%	36%	24%	32%	32%	28%	27%
No	76%	64%	76%	68%	68%	72%	73%
	N=152	N=138	N=136	N=74	N=87	N=276	N=118

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 children 5 to 18 (29% of the total sample), 53% indicate that these children have "talked about or brought home materials from school about improving air quality." This represents a progressive, incremental increase since 2015 (45%). Recall of air pollution information received from school in the current study is highest in the South or East zips, as well as among residents aware of the Pima County "Clean Air" Program (71% versus 35% unaware).

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

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**
Yes	45%	48%	50%	**53%**
No	47%	48%	43%	**42%**
Don't know	8%	3%	8%	**5%**
	N=131	N=120	N=141	**N=144**

	Area				Air Quality Problem		
	Central	South	Northwest	East	Major	Moderate	Minor
Yes	46%	58%	48%	58%	57%	51%	59%
No	46%	38%	46%	42%	39%	42%	41%
Don't know	8%	4%	6%	0%	4%	8%	0%
	N=37	N=50	N=33	N=24	N=28	N=77	N=32

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 – Among the total sample, 14% indicate that they (or someone in their household) use gasoline-powered lawn & garden equipment to care for their home property (Table 16). This is up from 9% last year, but identical to 2016 findings (14%). Usage of gasoline-powered lawn & garden equipment is highest in the South region, as well as among 16 to 35 year-olds and 6-to-10 year Pima County residents.

Once again, users (14% of the total sample) were probed for the type of gasoline-powered lawn & garden equipment used (Table 16a) – as well as (for each kind 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). These usage profiles are summarized in the display below and detailed in the key tables that follow:

	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 leaf blower or vacuum				
2018	**46%**	**7%**	**54%**	**70**
2017	36%	3%	53%	40
2016	36%	5%	58%	25
Gasoline-powered lawn mower				
2018	**45%**	**6%**	**72%**	**32**
2017	64%	6%	37%	37
2016	54%	8%	38%	38
Gasoline-powered chainsaw				
2018	**39%**	**6%**	**75%**	**27**
2017	40%	4%	58%	35
2016	26%	4%	42%	39
Gasoline-powered string trimmer				
2018	**31%**	**4%**	**64%**	**61**
2017	34%	3%	62%	48
2016	24%	3%	59%	33
Gasoline-powered hedge trimmers				
2018	**14%**	**2%**	**60%**	**56**
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	**04/18 Total**	Area			
				Central	South	Northwest	East
Yes	14%	9%	**14%**	10%	24%	10%	12%
No	84%	88%	**85%**	89%	74%	89%	88%
Don't know	2%	2%	**1%**	1%	2%	1%	0%
	N=500	N=504	**N=500**	N=152	N=138	N=136	N=74

	Air Quality Problem		
	Major	Moderate	Minor
Yes	21%	13%	12%
No	79%	86%	87%
Don't know	0%	1%	1%
	N=87	N=276	N=118

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	**04/18 Total**	Area			
				Central	South	Northwest	East
Gasoline-powered leaf blower or vacuum	36%	36%	**46%**	40%	54%	29%	56%
Gasoline-powered lawn mower	54%	64%	**45%**	33%	58%	29%	44%
Gasoline-powered chainsaw	26%	40%	**39%**	20%	52%	29%	44%
Gasoline-powered string trimmer	24%	34%	**31%**	33%	33%	14%	44%
Gasoline-powered hedge trimmers	21%	19%	**14%**	13%	15%	7%	22%
Other gasoline-powered equipment	6%	0%	**14%**	7%	18%	7%	22%
	N=72	N=47	**N=71**	N=15	N=33	N=14	N=9

	Air Quality Problem		
	Major	Moderate	Minor
Gasoline-powered leaf blower or vacuum	67%	44%	28%
Gasoline-powered lawn mower	56%	36%	50%
Gasoline-powered chainsaw	44%	36%	43%
Gasoline-powered string trimmer	28%	31%	29%
Gasoline-powered hedge trimmers	17%	19%	0%
Other gasoline-powered equipment	6%	17%	21%
	N=18	N=36	N=14

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 leaf blower or vacuum			
2018 (N=33)	**54%**	**33%**	**12%**
2017 (N=17)	53%	29%	18%
2016 (N=26)	58%	15%	27%
Gasoline-powered lawn mower			
2018 (N=32)	**72%**	**19%**	**9%**
2017 (N=30)	37%	20%	43%
2016 (N=39)	38%	28%	33%
Gasoline-powered chainsaw			
2018 (N=28)	**75%**	**11%**	**14%**
2017 (N=19)	58%	0%	42%
2016 (N=19)	42%	16%	42%
Gasoline-powered string trimmer			
2018 (N=22)	**64%**	**14%**	**23%**
2017 (N=16)	62%	6%	31%
2016 (N=17)	59%	12%	29%
Gasoline-powered hedge trimmers			
2018 (N=10)	**60%**	**10%**	**30%**
2017 (N=9)	56%	11%	33%
2016 (N=15)	47%	27%	27%
Other gasoline-powered equipment			
2018 (N=10)	**30%**	**60%**	**10%**
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 leaf blower or vacuum				
2018 (N=33)	**15%**	**48%**	**21%**	**15%**
2017 (N=17)	33%	33%	13%	20%
2016 (N=26)	46%	27%	23%	4%
Gasoline-powered lawn mower				
2018 (N=32)	**31%**	**50%**	**12%**	**6%**
2017 (N=30)	57%	21%	7%	14%
2016 (N=39)	13%	61%	18%	8%
Gasoline-powered chainsaw				
2018 (N=28)	**61%**	**25%**	**7%**	**7%**
2017 (N=19)	47%	29%	6%	18%
2016 (N=19)	47%	21%	10%	21%
Gasoline-powered string trimmer				
2018 (N=22)	**36%**	**32%**	**14%**	**18%**
2017 (N=16)	44%	13%	6%	38%
2016 (N=17)	41%	24%	24%	12%
Gasoline-powered hedge trimmers				
2018 (N=10)	**40%**	**20%**	**20%**	**20%**
2017 (N=9)	13%	22%	33%	33%
2016 (N=15)	40%	20%	33%	7%
Other gasoline-powered equipment				
2018 (N=10)	**40%**	**20%**	**10%**	**30%**
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 – Consistent with past surveys, respondents were asked to agree or disagree with a series of statements related to PDEQ-related programs and perceptions related to air pollution.

PDEQ and Rideshare Awareness –

- **You are aware of the Pima County Department of Environmental Quality** (Two-thirds agree, up from 63% last year and just shy of the 68% recorded in 2016. Agreement is lower only in the Central zips [59% versus 66%-70% elsewhere], and elevated among those 46 or older, higher income households and residents who perceive a progressively more severe air quality problem. Once again, awareness is significantly higher among those who are familiar with the "Clean Air" Program [85% versus 46% unfamiliar].)

- **You are aware of the services provided by Sun Rideshare** (55% agree, up from 51% last year. There are relatively few differences based on geography [slightly lower only in the South zips] or gender. Most likely to agree are 36 to 45 year-olds, Hispanics and residents familiar with the "Clean Air" Program [71% versus 42% unfamiliar].)

PDEQ Program and Campaign Awareness –

- **You have seen or heard information about the importance of keeping your tires properly inflated** (88% agreement, representing incremental improvement from 2017 [86%] and 2016 [83%]. As we found last year, agreement is consistent regardless of geography, gender or perceived air quality problem. It is highest among those 46 or older, Whites and residents aware of the "Clean Air" Program [93% versus 83% unaware].)

- **You are aware of the "Clean Water Starts With Me" campaign** (50% agree, down from 55%-57% in the last two surveys. Still, agreement is again directly related to the perception of a progressively more severe stormwater pollution problem. South or East residents, 26 to 45 year-olds and lower income households are most apt to agree – as are those familiar with the "Clean Air" Program [77% versus 24% unfamiliar].)

- **You have seen or heard the phrase "Healthy Air Is in Our Hands"** (One-third agree with this statement, down from 2017 [34%] and 2016 [36%] levels. Recall continues to be highest in the South zips and among those aware of the "Clean Air" Program [50% versus 15% unaware] – as well as residents who perceive a progressively more severe air quality problem. Agreement skews younger [16 to 35] and is highest among non-Whites and 2-to-5 year Pima County residents.)

Air Pollution Evaluations –

- **You are aware that air pollution causes health problems** (Consistent with past surveys, nearly everyone [94%] agrees.)

- **You have seen or heard information that vehicle engine idling causes air pollution** (Added to the survey last year, nine of ten continue to agree [88%] – regardless of geography or gender. This includes the vast majority of residents aware [92%] or unaware [84%] of the "Clean Air" Program.)

- **You understand what an air pollution advisory means** (Unchanged since last year, 86% agree. This is the case regardless of geography.)

- **You have seen or heard information regarding clean air or air pollution** (80% agreement, down just slightly from the record 84% mention last year. Northwest or East residents, those 56 or older and respondents familiar with the "Clean Air" Program [86% versus 74% unfamiliar] are most likely to agree.)

- **You are aware that the majority of our air pollution comes from motor vehicle use** (82% agree, very much consistent with recent surveys [81%-83%]. Agreement is directly related to the perception of a progressively more severe air quality problem, and is higher among those aware of the "Clean Air" Program [88% versus 76% unaware]. Central or South residents and women are also more apt to agree.)

- **You are aware of air pollution advisories in Pima County** (Like last year, two-thirds agree – with few differences based on geography or gender. Awareness is higher among those 46 or older and residents who perceive a progressively more severe air quality problem. Fully 85% of residents familiar with the "Clean Air" Program are aware of air pollution advisories [compared to just 47% unaware].)

- ***Because you want to reduce air pollution*, you are generally driving less** (58% agreement, unchanged over the last three surveys. South residents, 26 to 45 year-olds, non-Whites and those who think Tucson has a progressively more severe air quality problem are most likely to agree – as do respondents familiar with the "Clean Air" Program [71% versus 49% unfamiliar].)

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

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**
You are aware that air pollution causes health problems.	95%	96%	96%	**94%**
You have seen or heard information that vehicle engine idling causes air pollution.	–	–	90%	**88%**
You have seen or heard information about the importance of keeping your tires properly inflated.	88%	83%	86%	**88%**
You understand what an air pollution advisory means.	85%	89%	86%	**86%**
You are aware that the majority of our air pollution comes from motor vehicle use.	82%	83%	81%	**82%**
You have seen or heard information regarding clean air or air pollution.*	66%	77%	84%	**80%**
You are aware of the Pima County Department of Environmental Quality (PDEQ).	60%	68%	63%	**66%**
You are aware of air pollution advisories in Pima County.	64%	72%	66%	**65%**
Because you want to *reduce air pollution*, you are generally driving less	58%	58%	58%	**58%**
You are aware of the services provided by Sun Rideshare.	55%	58%	51%	**55%**
You are aware of the "Clean Water Starts With Me" campaign.	47%	57%	55%	**50%**
You have seen or heard the phrase "Healthy Air Is in Our Hands."	26%	36%	34%	**32%**
	N=500	N=500	N=504	**N=500**

	Area				Air Quality Problem		
	Central	South	Northwest	East	Major	Moderate	Minor
You are aware that air pollution causes health problems.	95%	91%	95%	97%	92%	95%	97%
You have seen or heard information that vehicle engine idling causes air pollution.	88%	88%	85%	89%	92%	90%	84%
You have seen or heard information about the importance of keeping your tires properly inflated.	86%	88%	89%	89%	92%	89%	89%
You understand what an air pollution advisory means.	86%	84%	89%	85%	93%	84%	89%
You are aware that the majority of our air pollution comes from motor vehicle use.	86%	85%	79%	72%	90%	83%	77%
You have seen or heard information regarding clean air or air pollution.*	79%	72%	85%	86%	87%	81%	76%
You are aware of the Pima County Department of Environmental Quality (PDEQ).	59%	70%	66%	69%	75%	66%	62%
You are aware of air pollution advisories in Pima County.	61%	67%	69%	62%	79%	66%	58%
Because you want to *reduce air pollution*, you are generally driving less	60%	67%	55%	46%	78%	62%	40%
You are aware of the services provided by Sun Rideshare.	56%	51%	58%	57%	56%	61%	46%
You are aware of the "Clean Water Starts With Me" campaign.	45%	56%	47%	54%	62%	54%	37%
You have seen or heard the phrase "Healthy Air Is in Our Hands."	26%	44%	24%	36%	51%	32%	20%
	N=152	N=138	N=136	N=74	N=87	N=276	N=118

* Was "You have seen or heard commercials on TV or radio regarding clean air or air pollution" (5/15-5/16)

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

Travel Behavior for Shopping – Shopping travel behavior in the current survey is generally consistent with last year. Specifically, a majority again report that they generally **drive alone** for shopping (56%, up slightly from 54%). Three of ten **carpool with 1 to 4 other adults**, while others ride the **bus** (6%), **walk** (3%), **bicycle** (2%), **take the streetcar** (2%) or ride a **motorcycle** (1%).

Northwest residents, women and those 56 or older are most apt to drive alone for shopping. Carpooling is consistent regardless of geography (slightly higher in the East zips), and higher among 36 to 45 year-olds, Hispanics and residents who perceive a progressively more serious air quality problem. Central or Northwest residents are more apt to ride the bus while shopping.

Table 18 Travel Behavior for Shopping

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**
Drive alone	50%	60%	54%	**56%**
Carpool with 1 to 4 other adults	29%	27%	30%	**30%**
Bus	9%	5%	6%	**6%**
Walk	4%	4%	5%	**3%**
Bicycle	3%	1%	2%	**2%**
Take the streetcar	1%	–	0%	**2%**
Motorcycle	1%	–	1%	**1%**
Vanpool with 5 or more other adults	2%	1%	1%	**0%**
Other	1%	2%	1%	**1%**
	N=500	N=500	N=504	**N=500**

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

Travel Behavior for Leisure Purposes – In a reversal from the last two surveys, slightly more now **carpool with 1 to 4 other adults** (43%) than **drive alone** (42%) for leisure purposes ("such as dining out, meeting with friends, going to movies, going to the gym, etc."). Among the rest, and generally consistent with past surveys, fewer ride the **bus** (5%), drive a **motorcycle** (3%), **walk** (2%), **bicycle** (2%), **vanpool with 5 or more other adults** (1%) or **take the streetcar** (1%).

East residents, women, Hispanics and higher income households are more apt to carpool for leisure purposes – with few differences based on age (lower only among 56 to 65's). Single passenger leisure travel is highest in the Northwest zips, and is elevated among those 56 or older, non-Hispanics and those with the least formal education. Low income households are more likely to ride the bus.

Table 18a Travel Behavior for Leisure Purposes

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**
Carpool with 1 to 4 other adults	43%	44%	41%	**43%**
Drive alone	39%	45%	44%	**42%**
Bus	6%	3%	6%	**5%**
Motorcycle	1%	0%	2%	**3%**
Walk	4%	3%	3%	**2%**
Bicycle	2%	2%	1%	**2%**
Vanpool with 5 or more other adults	1%	0%	1%	**1%**
Take the streetcar	1%	–	–	**1%**
Other	2%	2%	2%	**2%**
	N=500	N=500	N=504	**N=500**

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 the Tucson Area – Returning to 2016 levels, 17% in the current study think that the Tucson area has a "major" air quality problem. This is down from 21% in 2017. Instead, compared to the last two years, more now believe that air quality is a "minor" issue (24%, up from 19%-21%). Still, most (55%) continue to characterize air quality in Tucson as a "moderate" problem.

As we found last year, there are few differences in the perception of a "major" air quality problem with respect to geography or ethnicity. Instead, 16 to 35 year-olds, households impacted by a breathing-related medical condition and residents aware of the "Clean Air" Program (25% versus 11% unaware) are most likely to think that Tucson has a significant air quality problem. This is also true among residents who perceive that Tucson has a progressively more severe stormwater pollution problem.

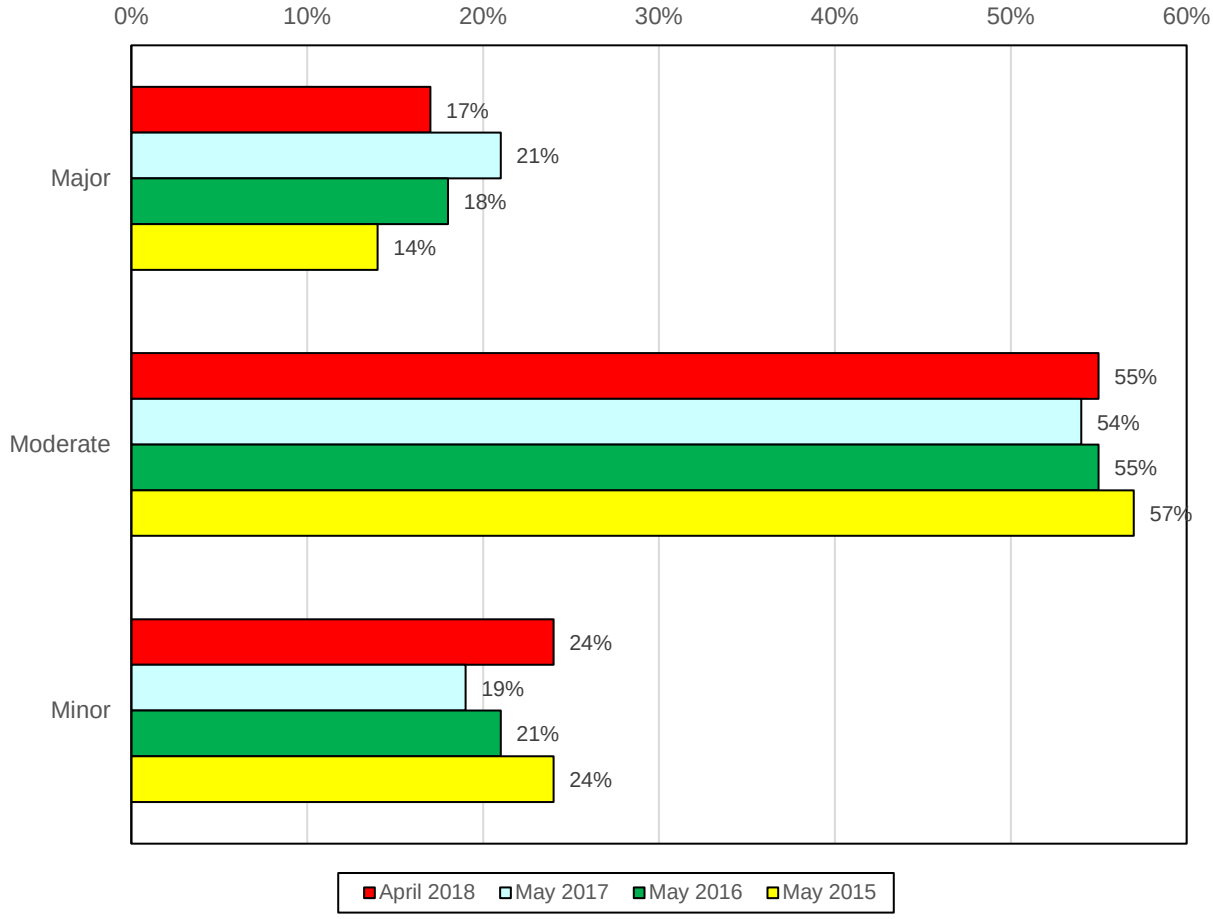
Once again, East residents are more likely to rate air quality as a "minor problem." Men, 56 to 65 year-olds, snowbirds and the newest Pima County residents (for less than two years) are also more apt to think a "minor" air quality exists in the Tucson area.

Table 19 Perceived Seriousness of Air Quality Problem in Tucson Area

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**
Major problem	14%	18%	21%	**17%**
Moderate problem	57%	55%	54%	**55%**
Minor problem	24%	21%	19%	**24%**
Don't know	4%	6%	6%	**4%**
	N=500	N=500	N=504	**N=500**

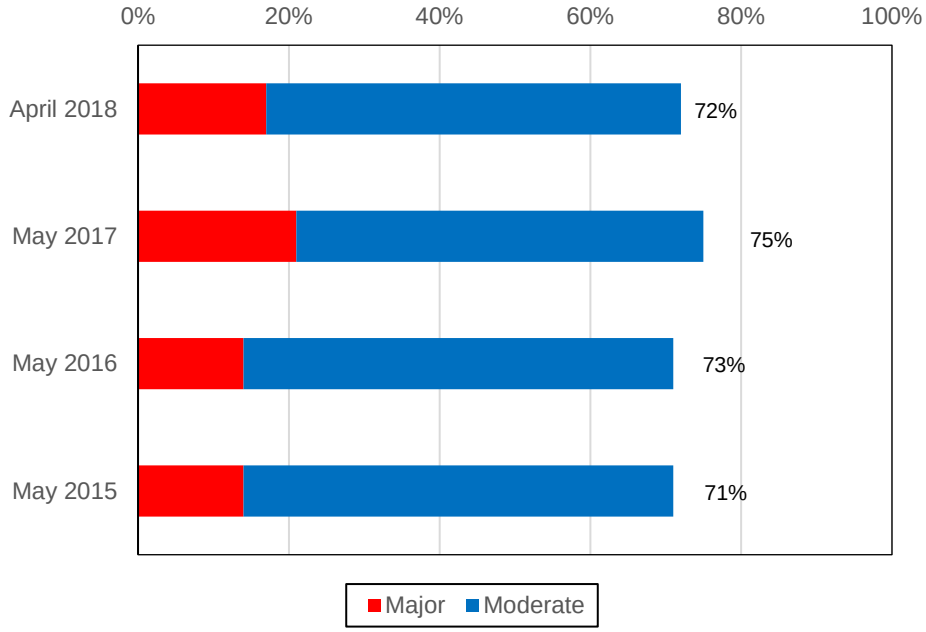
Question: How much of an air quality problem do you think exists in the Tucson area? Do you think this is a major problem, a moderate problem or a minor problem?

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 survey respondents allowed to select more than one category of response, 38% say that they are employed full-time (30 hours or more each week). This is up 35% last year. Full-time employment is similar regardless of area of residence or gender, with elevated levels among 26 to 55 year-olds and those with a college degree. Similar to last year, 11% work part-time (less than 30 hours a week). Women, 16 to 25 year-olds and Central residents are more apt to be part-time employees. Also in line with last year, 9% report being currently unemployed. These tend to Central or South region residents.

Consistent with last year, 28% in the current survey say they are retired, more often Northwest or East region respondents, men and those 56+. While the percentage of students (8%) remains unchanged from last year, fewer report being homemakers (7%, down from 12%).

Table 20 Employment Status
(Multiple Mentions Allowed)

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**
Employed full-time (30 hours or more each week)	31%	29%	35%	**38%**
Employed part- time (Less than 30 hours each week)	13%	12%	12%	**11%**
A student	11%	8%	8%	**8%**
Retired	26%	36%	27%	**28%**
A homemaker	12%	12%	12%	**7%**
Currently unemployed	11%	8%	8%	**9%**
	N=500	N=500	N=504	**N=500**

	Area				Air Quality Problem		
	Central	South	Northwest	East	Major	Moderate	Minor
Employed full-time (30 hours or more each week)	38%	38%	38%	40%	42%	38%	35%
Employed part- time (Less than 30 hours each week)	14%	10%	9%	11%	8%	11%	14%
A student	9%	10%	5%	4%	12%	7%	5%
Retired	20%	26%	37%	32%	21%	29%	35%
A homemaker	8%	6%	7%	8%	5%	7%	8%
Currently unemployed	14%	10%	6%	4%	12%	10%	6%
	N=152	N=138	N=136	N=74	N=87	N=276	N=118

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

Location of Place of Employment – Among those who work full-time or part-time (49% of the total sample), 13% work exclusively for a home-based business – down from 21% last year, but in line with 2015-2016 totals (14%-15%). The remaining 87% of employees work outside the home, for another company exclusively (80%) or in conjunction with a home-based business (7%). South or Northwest area residents are more apt to exclusively work for a home-based business (15%-16% versus 10%-11% in the Central or East region).

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

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**
Home-based business	14%	15%	21%	**13%**
Another company	78%	78%	71%	**80%**
Both	7%	7%	8%	**7%**
	N=218	N=209	N=238	**N=246**

	Area				Air Quality Problem		
	Central	South	Northwest	East	Major	Moderate	Minor
Home-based business	11%	15%	16%	10%	16%	12%	16%
Another company	84%	80%	73%	82%	75%	81%	79%
Both	5%	4%	11%	8%	9%	7%	5%
	N=79	N=66	N=63	N=38	N=44	N=137	N=57

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

Incidence of Telecommuting – Down from the last two years (26% each), but similar to 2015 findings (18%), 19% 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 likely to be East (29%) area residents, as well as women, 36 to 55 year-olds, college graduates or better and from households with incomes over $60,000.

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

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**
Yes	18%	26%	26%	**19%**
No/Employer does not offer telecommuting/ Don't know/Not sure	82%	74%	74%	**81%**
	N=187	N=178	N=187	**N=213**

	Area				Air Quality Problem		
	Central	South	Northwest	East	Major	Moderate	Minor
Yes	16%	18%	19%	29%	24%	16%	27%
No/Employer does not offer telecommuting/ Don't know/Not sure	84%	82%	81%	71%	76%	84%	73%
	N=70	N=56	N=53	N=34	N=37	N=121	N=48

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 2017 (51%) and 2016 (70%) levels, but still higher than we found in 2015 (39%), 44% of telecommuters indicate they do so more than once a week. Another 15% telecommute about once a week (down from last year [24%] but similar to 2016), and 17% report telecommuting 2-3 times a month (up from previous years [10%-12%]). Similar to last year, 15% say they telecommute only once a month.

Table 23 Frequency of Telecommuting
(Among Those Who Telecommute)

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**
More than once a week	39%	70%	51%	**44%**
About once a week	39%	15%	24%	**15%**
2 to 3 times a month	12%	11%	10%	**17%**
Once a month	3%	2%	14%	**15%**
	N=33	N=47	N=49	**N=41**

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, and consistent with last year (30%), 29% say they have the option of a "compressed workweek" program. South region residents and men 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)

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**
Yes	27%	32%	30%	**29%**
No	73%	68%	70%	**71%**
	N=187	N=178	N=187	**N=213**

	Area				Air Quality Problem		
	Central	South	Northwest	East	Major	Moderate	Minor
Yes	21%	41%	24%	32%	32%	30%	27%
No	79%	59%	76%	68%	68^	70%	73%
	N=70	N=56	N=53	N=34	N=37	N=121	N=48

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 – Up from prior years, 69% of full-time employees in the current survey say they work a "standard" schedule (8 hour days five days a week). Another one of ten work a 10 hour day, 4 days a week (down slightly from 12% last year), while 9% indicate working either a 12 hour day, 3 or 4 days a week (5%, up slightly from 4%) or working 80 hours over 9 days, with the 10th day off (4%, down slightly from 5%). Overall, 12% continue to indicate some "other" workweek options or say their workweek varies (down from 17% last year). Central zip code residents are more likely to utilize compressed workweek options.

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

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**
8 hour day, 5 days a week	56%	65%	61%	**69%**
10 hour day, 4 days a week	14%	12%	12%	**10%**
12 hour day, 3 or 4 days a week	6%	3%	4%	**5%**
80 hours over 9 days with the 10th day off	4%	3%	5%	**4%**
Varies/Other	20%	17%	17%	**12%**
	N=133	N=130	N=134	**N=169**

	Area				Air Quality Problem		
	Central	South	Northwest	East	Major	Moderate	Minor
8 hour day, 5 days a week	61%	75%	70%	70%	68%	75%	58%
10 hour day, 4 days a week	11%	7%	9%	15%	19%	8%	8%
12 hour day, 3 or 4 days a week	4%	4%	9%	4%	3%	3%	8%
80 hours over 9 days with the 10th day off	4%	2%	4%	4%	0%	3%	8%
Varies/Other	20%	11%	7%	7%	10%	11%	18%
	N=54	N=44	N=44	N=27	N=31	N=95	N=38

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 last year (76%), 81% utilize **single passenger commuting to work or school**. The average frequency of use is 4.2 days, down slightly from last year (4.3). Only Central area residents are less likely to drive alone at least one day per week (78% versus 83%-84% in other areas). Meanwhile, East (56%) and Northwest (55%) residents are most apt to drive alone 5+ days a week.

Alternative commute travel methods measured by this survey include:

- **Carpool/Vanpool** (Down from last year [28%], but similar to 2015-2016 [24%], 23% indicate they carpool or vanpool at least one day per week. Average frequency has dropped from last year [from 3.1 to 2.6 days]. South and East area residents are more apt to carpool at least one day a week.)

- **Walk to work or school** (Down slightly from 24% last year, 21% say they walk to work or school, with a slight dip in average days as well [from 3.0 to 2.8 days]. Walking to work or school is more common among South area residents.)

- **Work at home instead of driving to work** (Identical to last year, 19% telecommute. However, frequency of usage has declined [from 3.4 to 3.0 days]. South and Northwest area residents are somewhat more apt to telecommute.)

- **Take the bus to work or school** (Bus ridership has declined from last year [from 18% to 14%], but is in line with 2016 [13%]. The average days using this method has also decreased [from 3.6 last year to 2.6]. South area residents are more apt to take the bus.)

- **Ride a bike to work or school** (Up from the last two years [10%], 17% indicate riding bikes to work or school, with an increase in frequency as well [from 2.4 days to 2.9 days]. South area residents and 16 to 25 year-olds are more apt to ride a bike to work or school.)

- **Take the streetcar to work or school** (Up significantly from the last few years [4%-5%], 11% say they take the streetcar – with an increase in frequency as well [from 2.0 to 2.4 days].)

- **Ride a motorcycle to work or school** (Similar to last year, 5% indicate riding a motorcycle to work or school, but with a decline in frequency [from 2.8 to 1.5 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	2015 Usage* (N=226)	2015 Average Frequency	2016 Usage* (N=203)	2016 Average Frequency
Drive alone	70%	4.3 days	70%	4.4 days
Carpool/Vanpool	24%	3.6 days	24%	3.5 days
Walk	21%	3.5 days	24%	2.8 days
Work at home instead of driving to work	14%	2.5 days	24%	3.4 days
Take the bus	14%	3.8 days	13%	4.4 days
Ride a bike	12%	2.8 days	10%	2.4 days
Take the streetcar	5%	2.2 days	4%	1.8 days
Ride a motorcycle	4%	2.3 days	2%	1.4 days

Travel Method	2017 Usage* (N=219)	2017 Average Frequency	**2018 Usage* (N=240)**	**2018 Average Frequency**
Drive alone	76%	4.3 days	**81%**	**4.2 days**
Carpool/Vanpool	28%	3.1 days	**23%**	**2.6 days**
Walk	24%	3.0 days	**21%**	**2.8 days**
Work at home instead of driving to work	19%	3.4 days	**19%**	**3.0 days**
Take the bus	18%	3.6 days	**14%**	**2.6 days**
Ride a bike	10%	2.4 days	**17%**	**2.9 days**
Take the streetcar	4%	2.0 days	**11%**	**2.4 days**
Ride a motorcycle	6%	2.8 days	**5%**	**1.5 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)

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**	Area				Awareness of "Clean Air" Program	
					Central	South	North-west	East	Yes	No
Take the bus										
Not at all	86%	87%	82%	**86%**	94%	78%	86%	86%	79%	93%
1-4 days/week	7%	5%	12%	**11%**	5%	16%	10%	14%	17%	4%
5 days/week	4%	5%	3%	**1%**	0%	3%	2%	0%	2%	1%
6+ days/week	3%	2%	3%	**2%**	1%	3%	2%	0%	2%	2%
Ride a motorcycle										
Not at all	96%	98%	94%	**95%**	99%	90%	97%	94%	91%	98%
1-4 days/week	3%	2%	6%	**5%**	1%	10%	3%	6%	9%	2%
5 days/week	0%	0%	0%	**0%**	0%	0%	0%	0%	0%	0%
6+ days/week	0%	0%	1%	**0%**	0%	0%	0%	0%	0%	0%
Ride a bike										
Not at all	88%	90%	90%	**83%**	87%	72%	90%	86%	76%	88%
1-4 days/week	8%	8%	8%	**12%**	6%	25%	8%	8%	16%	10%
5 days/week	1%	2%	1%	**3%**	4%	3%	2%	3%	4%	2%
6+ days/week	2%	0%	0%	**1%**	2%	0%	0%	3%	3%	0%
Walk										
Not at all	79%	76%	76%	**79%**	81%	72%	83%	81%	76%	81%
1-4 days/week	14%	17%	18%	**16%**	13%	22%	15%	14%	18%	15%
5 days/week	4%	4%	2%	**2%**	4%	2%	0%	6%	2%	3%
6+ days/week	4%	3%	5%	**2%**	3%	4%	2%	0%	4%	0%
Work at home instead of driving to work										
Not at all	86%	76%	81%	**81%**	84%	79%	80%	83%	81%	82%
1-4 days/week	11%	14%	12%	**14%**	9%	20%	15%	11%	15%	13%
5 days/week	1%	7%	4%	**2%**	4%	0%	2%	0%	2%	2%
6+ days/week	2%	3%	3%	**3%**	4%	2%	3%	6%	3%	3%
Take the streetcar										
Not at all	95%	96%	96%	**89%**	91%	76%	97%	94%	82%	96%
1-4 days/week	5%	4%	4%	**10%**	6%	21%	3%	6%	16%	2%
5 days/week	0%	0%	0%	**1%**	2%	0%	0%	0%	0%	2%
6+ days/week	0%	0%	0%	**1%**	0%	3%	0%	0%	2%	0%
	N=226	N=203	N=219	**N=241**	N=79	N=67	N=59	N=36	N=110	N=118

-Table 26-D continued on next page-

Table 26-D (Cont'd)

	05/15 Total	05/16 Total	05/17 Total	**04/18 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	76%	76%	72%	**77%**	80%	70%	81%	75%	76%	75%
1 day/week	5%	5%	10%	**8%**	5%	10%	3%	14%	6%	9%
2 days/week	2%	4%	4%	**5%**	6%	4%	3%	8%	7%	4%
3 days/week	4%	4%	4%	**5%**	5%	6%	5%	3%	6%	5%
4 days/week	2%	2%	2%	**1%**	1%	0%	3%	0%	1%	2%
5 days/week	7%	4%	6%	**4%**	3%	8%	3%	0%	4%	4%
6+ days/week	3%	4%	4%	**1%**	0%	2%	0%	0%	1%	0%
Drive alone										
Not at all	30%	30%	24%	**19%**	22%	16%	17%	17%	19%	18%
1 day/week	6%	8%	7%	**8%**	0%	24%	5%	3%	14%	2%
2 days/week	5%	7%	8%	**9%**	8%	9%	7%	17%	10%	8%
3 days/week	8%	4%	10%	**5%**	5%	6%	8%	0%	4%	5%
4 days/week	10%	8%	10%	**12%**	20%	8%	8%	8%	10%	14%
5 days/week	30%	27%	26%	**34%**	32%	28%	41%	36%	29%	40%
6+days/week	11%	16%	15%	**13%**	13%	9%	14%	20%	13%	12%
	N=226	N=203	N=219	**N=241**	N=79	N=67	N=59	N=36	N=110	N=118

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?

2018 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 4,141,734 vehicle miles per day – or 38% of total miles driven/not driven.** As summarized in the tracking display below, the percentage of miles saved has increased over last year (35%) – and is identical to 2016 (38%).

Not only has the percentage of miles saved through the use of alternate modes increased from 35% to 38%, but the actual number of vehicle miles saved daily has increased by 16% as well (from 3,569,409 to 4,141,734) – primarily due to a decrease in the average single-passenger commute distance (from 14.5 to 12.4 miles). In addition, there has been an increase in usage of some reported alternate modes and/or increases in frequency of usage of these alternate modes.

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
2018	**455,682**	**81%**	**12.4**	**10,809,324**	**4,141,734**	**38%**
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%

Table 26-1 2018 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)	(81%) 369,102	4.25x2=8.50	3,137,367	6.4	490,214	12.4	6,078,654	6,078,654	-0-
Motorcycle	(5%) 22,784	1.50x2=3.00	68,352	6.4	10,680	13.2	140,976	140,976	-0-
Alternative Modes:									
Carpool	(23%) 104,807	2.57x2=5.14	538,708	6.4	84,173	12.8	1,077,414	430,966	646,448
Bus	(14%) 63,795	2.55x2=5.10	325,355	6.4	50,837	11.7	594,793	16,994	577,799
Bike	(17%) 77,466	2.92x2=5.84	452,401	6.4	70,688	10.9	770,499	-0-	770,499
Walk	(21%) 95,693	2.75x2=5.50	526,312	6.4	82,236	7.2	592,099	-0-	592,099
Streetcar	(11%) 50,125	2.44x2=4.88	244,610	6.4	38,220	9.4	359,268	-0-	359,268
Telecommute	(19%) 86,580	3.00x2=6.00	519,480	6.4	81,169	12.0	974,028	-0-	974,028
Compressed workweek	(13%) 59,239	1.05x2=2.10	124,402	6.4	19,438	11.4	221,593	-0-	221,593
					927,655		10,809,324		4,141,734

(A) # employed persons in Pima County (est. @ 384,500 as of February, 2018 by Arizona Office of Employment & Population Statistics) x % non-home-based employees (87%) (Table 21) + # students 16+ (est. 121,167 in 2016 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 100 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 (2.5) 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 – Up from recent years (58%-62%), the percentage of commuters who indicate that **single-passenger vehicle commuting** is their ***most-used*** method of transportation is 66%. Primary use of single-passenger commuting tends to be *lower* among South region residents and 36 to 45 year-olds, and as well as those familiar with the "Clean Air" Program (58% versus 75% unfamiliar).

More are **riding a bike** as their primary mode of transportation to work or school (from 2% to 7%), more often South region residents and men. Consistent with last year, 7% are **telecommuting** most often, primarily Central or East area residents. Down from last year (10%), 7% are **carpooling** most often. These are more apt to be Northwest or South area residents and women.

Similar to last year, 6% utilize **walking** as their most-used mode, especially 16 to 25 year-olds. Meanwhile, fewer primarily use **bus riding** for work/school transportation (from 9% to 4%). In lesser numbers, a few indicate that **taking the streetcar** (2%, up from 1%) 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)

	5/15 Total	5/16 Total	5/17 Total	**4/18 Total**
Drive alone	58%	61%	62%	**66%**
Ride a bike	3%	3%	2%	**7%**
Work at home instead of driving to work	5%	11%	8%	**7%**
Drive or ride in a carpool	12%	11%	10%	**7%**
Walk	9%	4%	6%	**6%**
Take the bus	8%	9%	9%	**4%**
Take the streetcar	2%	–	1%	**2%**
Ride a motorcycle	2%	–	1%	–
	N=226	N=203	N=219	**N=241**

	Area				Air Quality Problem		
	Central	South	Northwest	East	Major	Moderate	Minor
Drive alone	67%	55%	75%	72%	57%	65%	75%
Ride a bike	8%	12%	2%	6%	2%	10%	4%
Work at home instead of driving to work	9%	4%	5%	11%	6%	8%	8%
Drive or ride in a carpool	4%	10%	10%	3%	8%	8%	6%
Walk	5%	9%	5%	6%	13%	5%	4%
Take the bus	4%	4%	3%	3%	11%	2%	2%
Take the streetcar	4%	4%	0%	0%	2%	2%	2%
	N=79	N=67	N=59	N=36	N=47	N=133	N=52

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.)

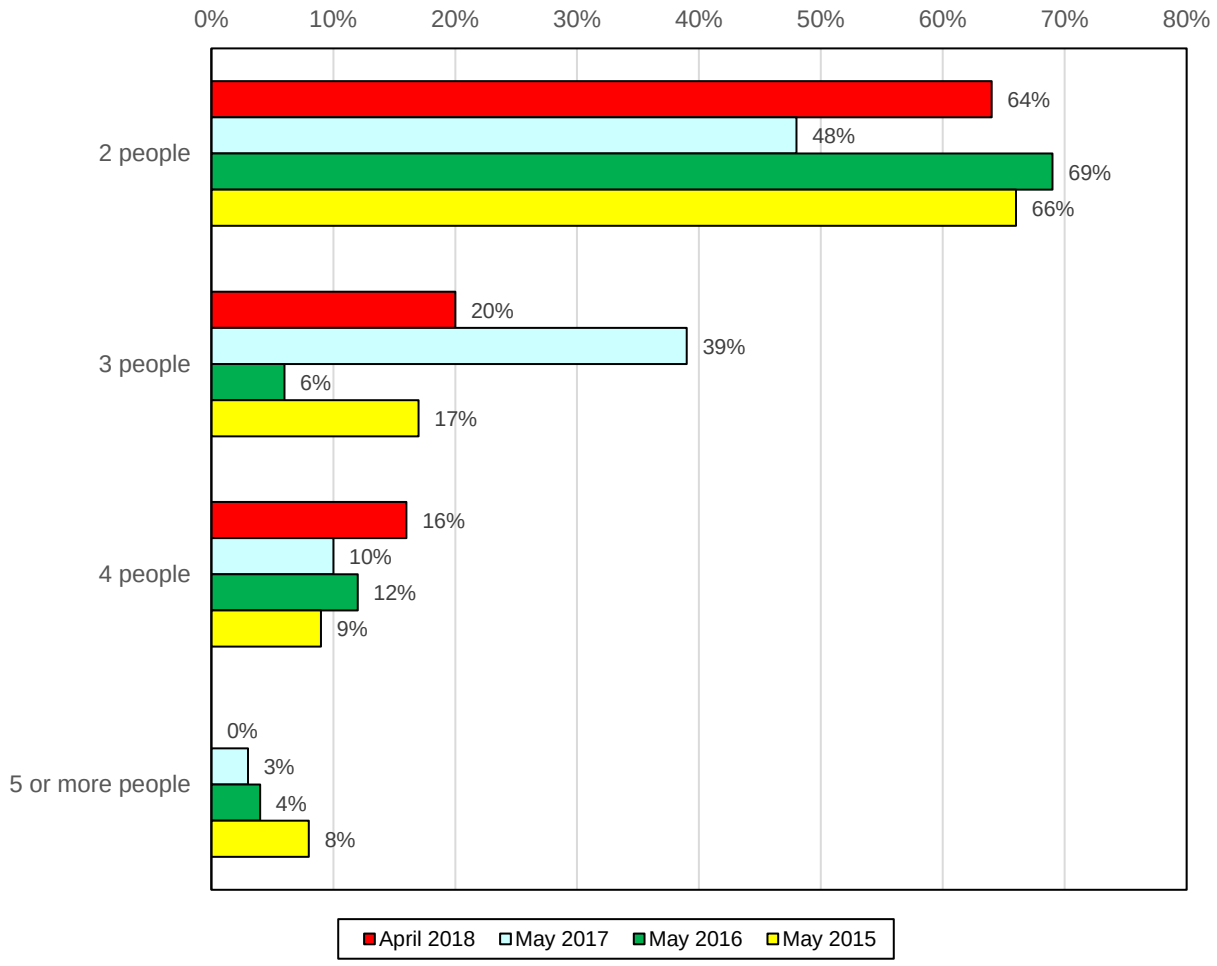
Size of Work or School Commute Carpool – Among carpoolers, 64% are travelling to work or school in a 2-person carpool. This is up from last year (48%), and is more consistent with 2015-2016 findings (66%-69%). While fewer ride in 3-person carpools (from 39% last year to 20%), more are commuting in carpools with 4 people (16%, up from 10%). The average carpool size has declined slightly from last year (2.5 versus 2.7 in 2017).

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

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**
2 people	66%	69%	48%	**64%**
3 people	17%	6%	39%	**20%**
4 people	9%	12%	10%	**16%**
5 or more people	8%	4%	3%	**–**
Varies	0%	8%	–	**–**
	N=53	N=49	N=59	**N=56**

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 – As reflected in Table 26c, 29% indicate they have a commute of 5 miles or less (down from 36% last year), and a similar share report their commute is between 6 and 10 miles (30%, up slightly from 29%). Another 8% continue to say they travel 11 to 14 miles (unchanged from 2017), and three of ten indicate they travel 15 miles or more (up from 26%). Geographically, Northwest (37%) and South (36%) area residents are more apt to have a commute of 15+ miles, while the vast majority of Central (63%) or East (79%) residents travel 10 miles or less.

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

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**
5 miles or less	31%	35%	36%	**29%**
6 to 10 miles	26%	29%	29%	**30%**
11 to 14 miles	7%	8%	8%	**8%**
15 or more miles	33%	27%	26%	**30%**
Don't know/Not sure	3%	2%	1%	**2%**
	N=222	N=203	N=216	**N=241**

	Area				Air Quality Problem		
	Central	South	Northwest	East	Major	Moderate	Minor
5 miles or less	30%	30%	29%	28%	19%	32%	31%
6 to 10 miles	33%	22%	24%	51%	51%	22%	34%
11 to 14 miles	3%	12%	8%	8%	2%	8%	11%
15 or more miles	29%	36%	37%	11%	26%	36%	21%
Don't know/Not sure	5%	0%	2%	3%	2%	2%	2%
	N=79	N=67	N=59	N=36	N=47	N=133	N=52

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.

Down slightly from last year (43%), 40% say that **"convenience"** is the reason they drive alone. This reason is cited more often among East area residents and those who perceive a "minor" air quality problem.

Another two of ten indicate that they drive alone because of **"no one to carpool with"** (22%, up slightly from 19% in 2017), regardless of area of residence. Nearly as many in the current survey say that they **"like to drive alone"** (19%, up from 17%) – particularly South area residents.

Meanwhile, significantly fewer cite **"irregular work hours"** for driving alone (16%, down from 31%). South or East area residents are more apt to mention irregular work hours. Down slightly from last year (15%), 13% say they **"need their car for business,"** lower only in the Central region.

One of ten cite **"personal errands"** as the reason they drive alone. Northwest area residents are more apt to use their car for personal errands. About one of ten say that they have **"no bus service in the area"** (unchanged at 8%) or they **"work overtime"** (7%, down from 10%). Lack of bus service is mentioned more often among the South or Northwest area respondents, while working overtime is a more common explanation among Northwest residents.

Like last year, few cite a **"child drop off"** (5%, up from 4%) as a reason for single passenger vehicle travel.

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

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**
Convenience	32%	32%	43%	**40%**
No one to carpool with	26%	25%	19%	**22%**
Like to drive alone	16%	13%	17%	**19%**
Irregular work hours	30%	30%	31%	**16%**
Need car for business	15%	19%	15%	**13%**
Personal errands	11%	17%	14%	**10%**
No bus service in area	8%	7%	8%	**8%**
Work overtime	2%	6%	10%	**7%**
Child drop off	7%	12%	4%	**5%**
Other	6%	5%	5%	**6%**
	N=157	N=142	N=167	**N=196**

	Area				Air Quality Problem		
	Central	South	Northwest	East	Major	Moderate	Minor
Convenience	39%	41%	33%	50%	37%	40%	47%
No one to carpool with	23%	20%	22%	23%	26%	21%	18%
Like to drive alone	18%	29%	14%	13%	21%	21%	16%
Irregular work hours	20%	16%	10%	20%	5%	21%	13%
Need car for business	8%	14%	14%	17%	16%	13%	7%
Personal errands	5%	11%	16%	10%	16%	8%	9%
No bus service in area	5%	11%	10%	7%	3%	8%	16%
Work overtime	5%	5%	10%	7%	5%	6%	9%
Child drop off	7%	4%	8%	0%	5%	6%	2%
Other	7%	4%	10%	0%	5%	8%	2%
	N=61	N=56	N=49	N=30	N=38	N=105	N=45

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 – Consistent with past years, all respondents were informed in the survey text that "streets in the Tucson area are equipped with storm drains." After receiving this information, respondents were asked (to the best of their knowledge) where stormwater that flows into these drains ends up. Respondents were able to provide multiple responses to this question, with the ranked results as follows:

- **River or wash** (53%, up from prior years [45%-46%] and the highest mention to-date. Results are similar regardless of geography [slightly lower only in the East zips]. Men, 26 to 35 year-olds, the newest Pima County residents [for less than two years] and those who perceive a "serious" stormwater pollution problem are most likely to think that stormwater that flows into storm drains ends up in a river or wash.)

- **Sewage plants** (16%, basically unchanged since last year [17%]. South zip residents, 36 to 45 year-olds and 6-to-10 year Pima County citizens are more apt to believe that stormwater that flows into a storm drain ends up in sewage plants.)

- **Groundwater** (15%, down incrementally from 20% in 2016 and 18% in 2017. Generally, this perception is consistent regardless of geography, gender or age – and higher among residents who perceive a progressively more serious stormwater pollution problem.)

- **Water plants** (10%, down from 13% last year. These tend to be women and 16 to 35 year-olds – with few differences with respect to geography or stormwater pollution problem perception.)

- **Canals** (7%, down from 12% last year. Once again, South region residents are more likely to think that stormwater ends up in canals.)

Down from 29% the last two years, one of four (regardless of geography or gender) in the 2018 survey indicate that they **do not know** where stormwater that runs into a storm drain ends up. These tend to be 16 to 25 or 46 to 55 year-olds and 2-to-10 year Pima County residents.

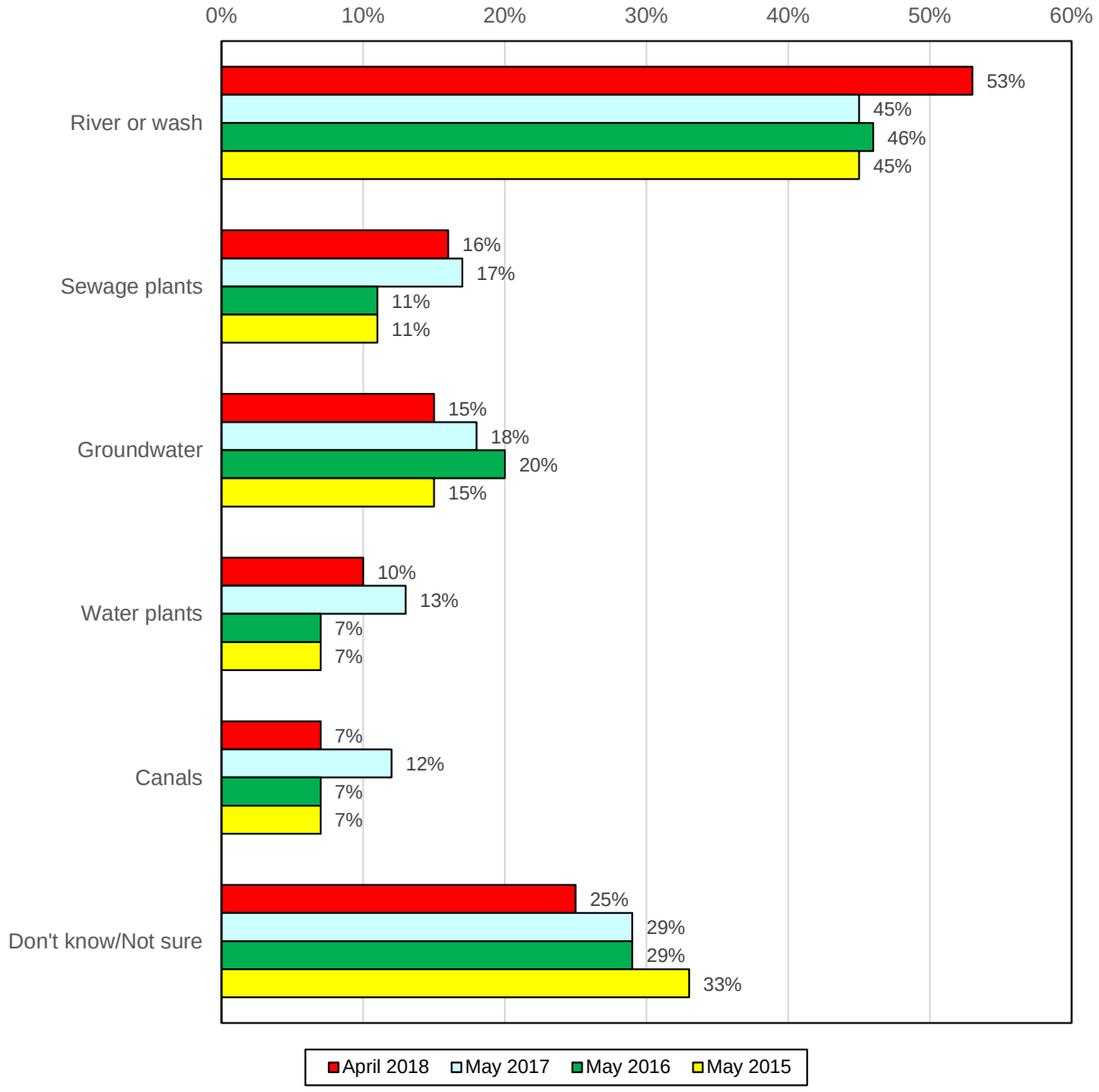
Table 27 Perception of Where Stormwater That Flows Into Tucson Storm Drains Ends Up

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**	Area			
					Central	South	North-west	East
River or wash	45%	46%	45%	**53%**	56%	54%	53%	49%
Sewage plants	11%	11%	17%	**16%**	13%	22%	12%	19%
Groundwater	15%	20%	18%	**15%**	12%	17%	15%	14%
Water plants	7%	7%	13%	**10%**	10%	11%	9%	8%
Canals	7%	7%	12%	**7%**	5%	15%	2%	4%
Don't know/Not sure	33%	29%	29%	**25%**	25%	22%	27%	27%
	N=500	N=500	N=504	**N=500**	N=152	N=138	N=136	N=74

	Stormwater Pollution Problem		
	Not a Problem	Moderate Problem	Serious Problem
River or wash	48%	51%	58%
Sewage plants	18%	11%	21%
Groundwater	10%	12%	19%
Water plants	10%	8%	12%
Canals	10%	7%	7%
Don't know/Not sure	34%	30%	17%
	N=62	N=226	N=212

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 – Consistent with past years, **landscaping with native plants** is the Green Infrastructure most often implemented at home or business (55%, up from 52%-53% in 2015-2017). Northwest residents, men, the oldest respondents (66+), high income households and those who perceive a "serious" stormwater pollution problem are most apt to landscape with native plants.

Other Green Infrastructures implemented at home or business include:

- **Landscaped depressions that collect stormwater** (29%, up slightly from 28% last year. These tend to be South or Northwest residents, 36 to 45 year-olds, high income households and citizens who perceive a "serious" stormwater pollution problem.)

- **Connecting runoff from a roof or paved surface to a basin or to water plants** (24% implementation, a dip from 25% last year. There are few differences based on geography [only slightly higher in South zips]. Implementation skews older [56 to 65] and is elevated among high income households and residents who think Tucson has a "serious" stormwater pollution problem.)

- **Porous pavements or bricks** (24%, up from 21% last year [and the highest mention to date]. South zip residents, men, non-Whites and those who perceive a progressively more serious stormwater pollution problem are more apt to have installed porous pavements or bricks.)

- **Water harvesting using rain barrels or cisterns** (22%, up incrementally from 2016 [19%] and 2017 [21%] totals. Again, these are most likely to be South residents and Hispanics – with few differences based on gender and among those 16 to 65.)

- **Natural areas protected from clearing and grading** (20%, again representing progressive improvement from 2016 [15%] and 2017 [18%]. Implementation is consistent regardless of geography or stormwater pollution problem perception, and higher among Pima County residents for 11+ years.)

- **A trench that is filled with gravel to collect stormwater** (18%, down slightly from last year [19%] – but still higher than 2015-2016 totals [14%-16%]. Usage is lower only in the Central zips [12% versus 19%-22% elsewhere], and elevated among non-Whites, 6-to-10 year Pima County residents and high income households.)

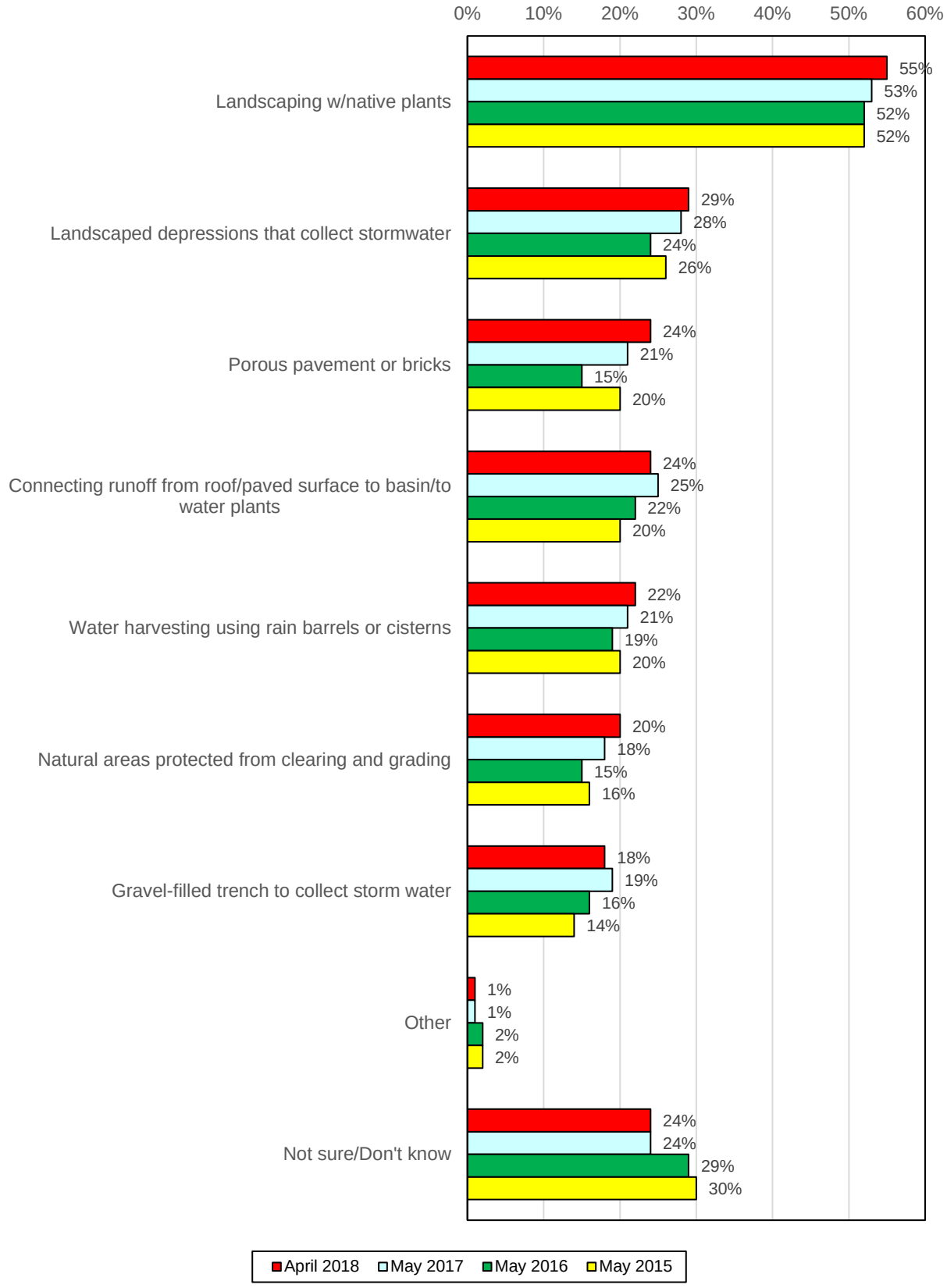
Table 28 Green Infrastructures
Implemented/Installed at Home or Business

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**	Area			
					Central	South	North-west	East
Landscaping with native plants	52%	52%	53%	**55%**	47%	51%	68%	55%
Landscaped depressions that collect stormwater	26%	24%	28%	**29%**	27%	32%	31%	26%
Porous pavements or bricks	20%	15%	21%	**24%**	25%	30%	18%	24%
Connecting runoff from a roof or paved surface to a basin or to water plants	20%	22%	25%	**24%**	22%	27%	24%	23%
Water harvesting using rain barrels or cisterns	20%	19%	21%	**22%**	14%	36%	20%	18%
Natural areas protected from clearing and grading	16%	15%	18%	**20%**	20%	17%	23%	20%
A trench that is filled with gravel to collect stormwater	14%	16%	19%	**18%**	12%	22%	19%	19%
Other	2%	2%	1%	**1%**	1%	0%	1%	3%
Not sure/Don't know	30%	29%	24%	**24%**	35%	18%	19%	20%
	N=500	N=500	N=504	**N=500**	N=152	N=138	N=136	N=74

	Stormwater Pollution Problem		
	Not a Problem	Moderate Problem	Serious Problem
Landscaping with native plants	47%	51%	62%
Landscaped depressions that collect stormwater	24%	26%	34%
Porous pavements or bricks	18%	23%	28%
Connecting runoff from a roof or paved surface to a basin or to water plants	19%	19%	31%
Water harvesting using rain barrels or cisterns	18%	19%	26%
Natural areas protected from clearing and grading	18%	20%	21%
A trench that is filled with gravel to collect stormwater	18%	15%	20%
Other	3%	1%	1%
Not sure/Don't know	29%	28%	18%
	N=62	N=226	N=212

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 – Highly consistent with all past surveys, fully 87% perceive that there is a problem (to some degree) in the Tucson area "with polluting materials entering storm drains." This includes 42% who think the problem is "serious," increasing incrementally from 37% in 2015. At the same time, fewer than last year indicate it is "not a problem" (from 14% to 12%). This results in a 5.9 average score on the "1-to-9" rating scale (up from 5.8 the last two years).

Central or South residents, 26 to 45 year-olds and Hispanics are most apt to perceive that there is a "serious" stormwater pollution problem in the Tucson area. Women (44%) are slightly more likely than men (40%) to believe that there is a "serious" problem. The newest Pima County residents (for less than two years) are less likely to characterize stormwater pollution as "serious" (21%).

Similar to past years, residents who indicate a progressively more serious air quality problem are also more likely to perceive a seriously more progressive stormwater pollution problem.

Table 29 Perceived Seriousness of Stormwater Pollution Problem in Tucson Area

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**	Area			
					Central	South	North-west	East
Serious problem (7-9)	37%	40%	41%	**42%**	49%	45%	38%	34%
Moderate problem (4-6)	50%	49%	45%	**45%**	38%	46%	47%	54%
Not a problem (1-3)	13%	11%	14%	**12%**	13%	9%	15%	12%
Average score on 1-9 scale	5.7	5.8	5.8	**5.9**	6.1	6.0	5.6	5.7
	N=500	N=500	N=504	**N=500**	N=152	N=138	N=136	N=74

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 – Survey respondents were again asked to rate seven contributors to stormwater pollution on a "1-to-9" scale, where "1" means "not a problem" and "9" means a "serious problem." As we have found in past years, there is a direct relationship between the severity of the stormwater pollution problem in Tucson and the degree to which each of these factors are perceived to contribute to the problem. Central zip code residents and Hispanics also indicate consistently higher average scores on the "1-to-9" rating scale.

On average, these six factors elicit the highest degree of perceived causation:

- **Chemicals and materials from industrial facilities** (46% "serious" cause of stormwater pollution, up slightly from 45% in 2017 – resulting in a 5.9 average score [unchanged from last year]. These tend to be 26 to 45 year-olds and progressively more long-term Pima County residents.)

- **Automotive fluids such as oil, gasoline and brake fluid** (45% "serious" cause of stormwater pollution, a slight increase from 44% in 2017 – resulting in a 5.9 average score [unchanged from last year]. Women and 26 to 55 year-olds are more likely to think that automotive fluids are significant contributors to stormwater pollution.)

- **Chemicals and materials from construction sites** (43% "serious" cause of stormwater pollution, down from 46% in 2017 – resulting in a 5.8 average score [down from 6.0 last year]. Those with some college or college degree – along with 26 to 45 year-olds – are more likely to think industrial sites are a "serious" contributor to stormwater pollution in Tucson.)

- **Household products such as cleaning fluids, detergents, paints, degreasers and bleaches** (43% "serious" cause of stormwater pollution, down from 45% in 2017 – resulting in a 5.8 average score [down from 5.9]. This perception is stronger among women, 26 to 35 year-olds and 6-to-10 year Pima County residents.)

- **Pesticides, fertilizers and debris from lawns and gardens** (37% "serious" cause of stormwater pollution, down from 43% in 2017 – resulting in a 5.6 average score [down from 5.8]. Higher perceived causation among residents with at least some college and those 36 or older. Slightly more 16 to 25 year-olds think that lawn & garden-oriented contributors are "not a problem" than a "serious problem" [29% versus 24%, respectively].)

- **Household trash and bulky items like mattresses, sofas and tires** (42% "serious" cause of stormwater pollution, up from 40% in 2017 – resulting in a 5.5 average score [unchanged from last year]. This represents incremental improvement in the perception of a "serious" contributor since 2015 [35%]. East residents, women and 26 to 45 year-olds are more likely to consider household trash to be a significant contributor to stormwater pollution.)

As we have found in prior years, two-thirds perceive that **animal waste from household pets** contributes to stormwater pollution to some degree – including 26% who say it is a "serious problem." Still, a larger percentage (more often East residents) continue to say it is a non-factor (33%), resulting in a 4.7 average score (unchanged from past surveys).

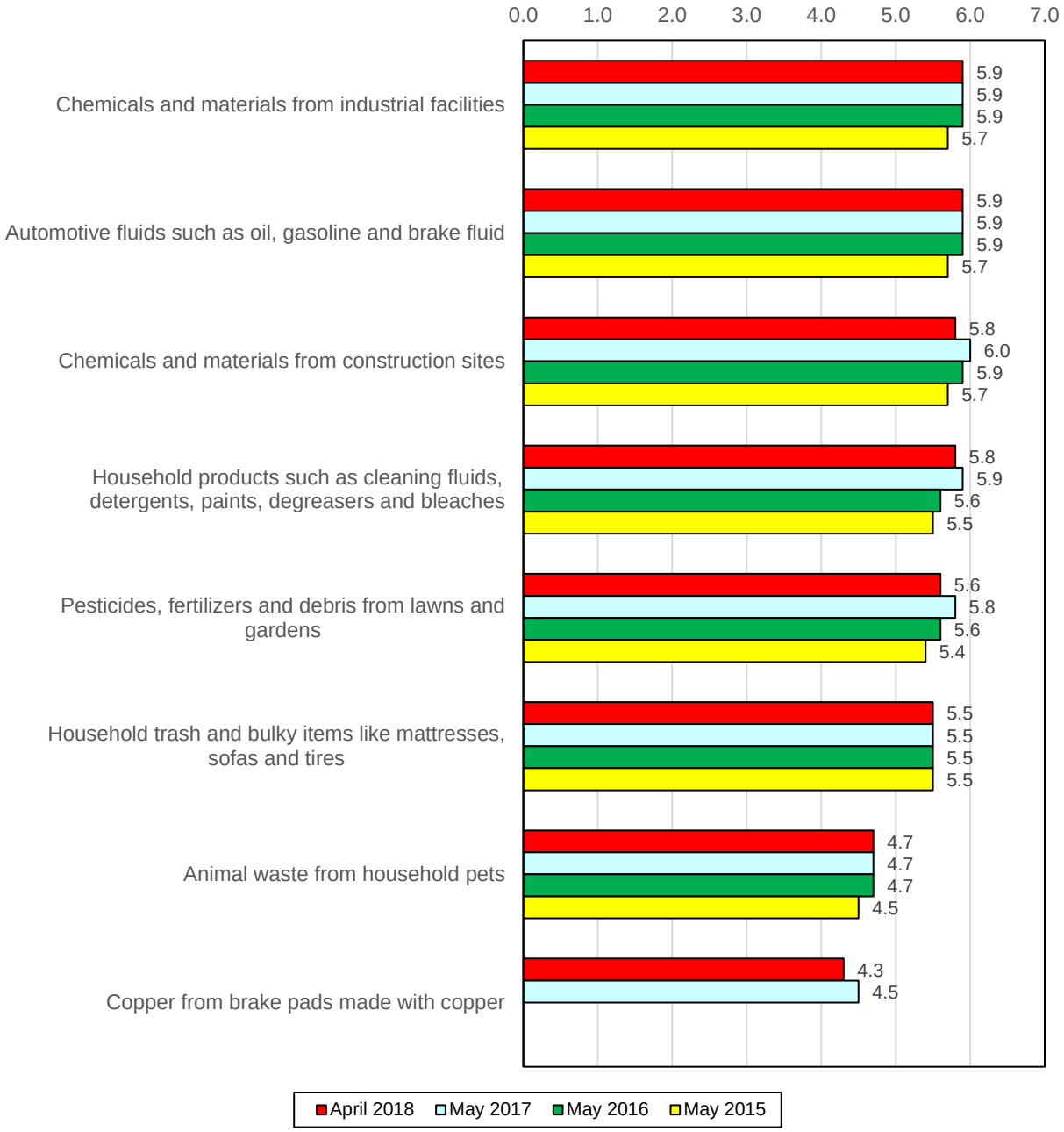
Consistent with 2017 findings, more say that **copper from brake pads made with copper** are a non-factor (38%) than a "serious" contributor (22%) to stormwater pollution (4.3 average score).

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

(4/18 N=500) (5/16 N=500) (5/17 N=504) (5/15 N=500)	Serious Problem (7-9)	Moderate Problem (4-6)	Not a Problem (1-3)	Average Score on 1-9 Scale
Chemicals and materials from industrial facilities				
4/18	**46%**	**35%**	**19%**	**5.9**
5/17	45%	38%	17%	5.9
5/16	43%	40%	17%	5.9
5/15	39%	42%	19%	5.7
Automotive fluids such as oil, gasoline and brake fluid				
4/18	**45%**	**38%**	**17%**	**5.9**
5/17	44%	41%	15%	5.9
5/16	42%	42%	16%	5.9
5/15	41%	40%	19%	5.7
Chemicals and materials from construction sites				
4/18	**43%**	**39%**	**18%**	**5.8**
5/17	46%	40%	14%	6.0
5/16	40%	46%	14%	5.9
5/15	40%	43%	17%	5.7
Household products such as cleaning fluids, detergents, paints, degreasers and bleaches				
4/18	**43%**	**39%**	**18%**	**5.8**
5/17	45%	37%	18%	5.9
5/16	37%	43%	20%	5.6
5/15	37%	42%	20%	5.5
Pesticides, fertilizers and debris from lawns and gardens				
4/18	**37%**	**44%**	**19%**	**5.6**
5/17	43%	39%	18%	5.8
5/16	36%	45%	19%	5.6
5/15	36%	42%	23%	5.4
Household trash and bulky items like mattresses, sofas and tires				
4/18	**42%**	**34%**	**23%**	**5.5**
5/17	40%	37%	23%	5.5
5/16	37%	39%	23%	5.5
5/15	35%	43%	22%	5.5
Animal waste from household pets				
4/18	**26%**	**41%**	**33%**	**4.7**
5/17	25%	41%	34%	4.7
5/16	26%	41%	33%	4.7
5/15	22%	39%	39%	4.5
Copper from brake pads made with copper				
4/18	**22%**	**41%**	**38%**	**4.3**
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 – In line with past surveys, the five most utilized methods of disposing of household wastes such as "household chemicals, automotive fluids and lawn & garden chemicals" include:

- **Hazardous waste collection site** (53%, very consistent with last year [52%] – highest in the Northwest zip codes and among men, older respondents [56+] and progressively more formally educated residents. Usage remains lowest in the Central area [44%].)

- **Auto parts store** (45%, up incrementally from 2016 [38%] and 2017 [42%]. Usage is lower only in the East zips [38% versus 43%-48% elsewhere] and elevated among men, 26 to 55 year-olds and the least formally educated.)

- **Put in the garbage** (35%, down slightly from the all-time high of 37% recorded last year. Geographically, South region residents are most likely to utilize this method of disposal – along with 16 to 45 year-olds and non-Whites.)

- **Service station** (Unchanged from 26% last year, which was the highest mention to-date. Service station usage is lower only in the Northwest region, and elevated among 36 to 45 year-olds, college graduates and non-Hispanic minorities.)

- **Landfill** (22%, up from 18%-19% in prior surveys. Men and 6+ year Pima County residents are more likely to utilize landfills. Usage is lowest in the Central zip codes [14% versus 24%-27% elsewhere].)

Down from a record 18% mention last year, 14% indicate that they dispose of household hazardous wastes by **pouring them down the drain**. Central or South residents, 16 to 35 year-olds, Hispanics and the least formally educated respondents are more apt to use this disposal method.

Like last year, about one of ten indicate that they do not use items such as household chemicals, automotive fluids or lawn & garden chemicals (or finishing them all up when they do). Overall, 6% are not sure how they dispose of these types of household wastes.

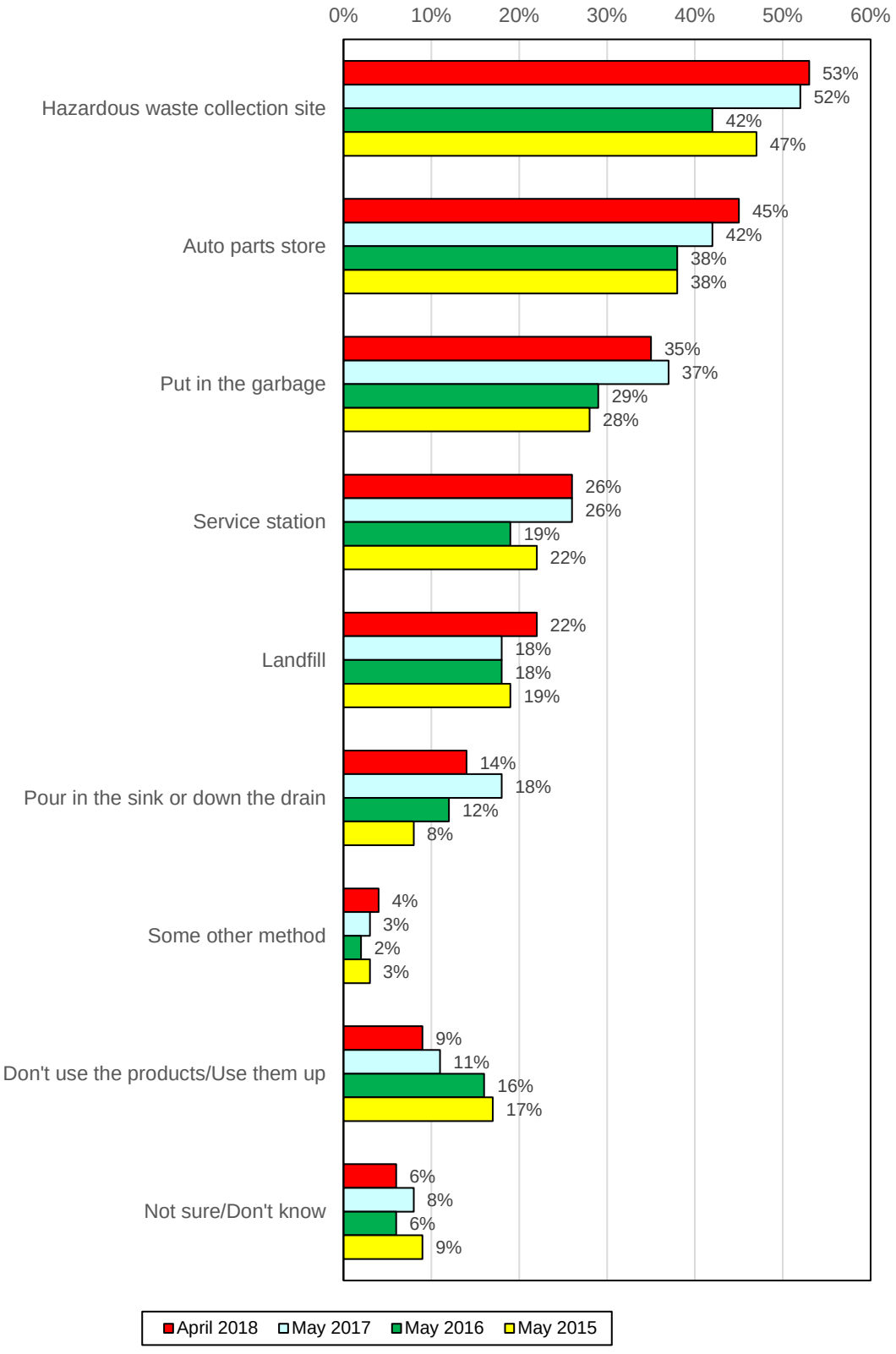
Table 31 Methods Used to Dispose of
Various Types of Household Hazardous Waste

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**	Area			
					Central	South	North-west	East
Hazardous waste collection site	47%	42%	52%	**53%**	44%	55%	62%	51%
Auto parts store	38%	38%	42%	**45%**	47%	43%	48%	38%
Put in the garbage	28%	29%	37%	**35%**	33%	49%	25%	31%
Service station	22%	19%	26%	**26%**	31%	27%	20%	28%
Landfill	19%	18%	18%	**22%**	14%	24%	26%	27%
Pour in the sink or down the drain	8%	12%	18%	**14%**	18%	15%	10%	10%
Some other method	3%	2%	3%	**4%**	6%	4%	3%	4%
Don't use these products/Use them up	17%	16%	11%	**9%**	10%	9%	7%	12%
Not sure/Don't know	9%	6%	8%	**6%**	6%	4%	7%	5%
	N=500	N=500	N=504	**N=500**	N=152	N=138	N=136	N=74

	Stormwater Pollution Problem		
	Not a Problem	Moderate Problem	Serious Problem
Hazardous waste collection site	39%	52%	58%
Auto parts store	40%	41%	50%
Put in the garbage	27%	32%	40%
Service station	23%	24%	31%
Landfill	21%	22%	22%
Pour in the sink or down the drain	11%	9%	19%
Some other method	2%	2%	8%
Don't use these products/Use them up	13%	11%	7%
Not sure/Don't know	13%	7%	2%
	N=62	N=226	N=212

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 to Someone Dumping Trash or Chemicals in a Storm Drain – Compared to past years, fewer say they are **unsure** who they would contact if they saw someone dumping trash or chemicals in a storm drain (from 30%-33% to 22% now). Instead, more now indicate they would contact **911/Police Department** (31%, up slightly from 29% last year) – especially men and 36 to 45 year-olds. Geographically, only East region residents are less likely to dial 911 (24% versus 31%-34% elsewhere).

Others specify that they would contact the following government entities:

- **City government** (16%, up from 8% in 2016 and 12% in 2017. These tend to be South or East zip residents and Hispanics.)

- **County government** (14%, up from 9%-11% in past years. South or Northwest residents, snowbirds and high income households are more apt to say they would contact County government.)

- **Water Department** (13%, consistent with past surveys – with few differences based on geography.)

- **Sanitation Department** (10%, down from 13% last year. These tend to be 26 to 45 year-olds.)

- **Health Department** (9%, down from 11%-13% in the last two surveys. South residents and 16 to 45 year-olds are more likely to contact the Health Department.)

In line with past years, only 3% say they would not report dumping of trash or chemicals in a storm drain.

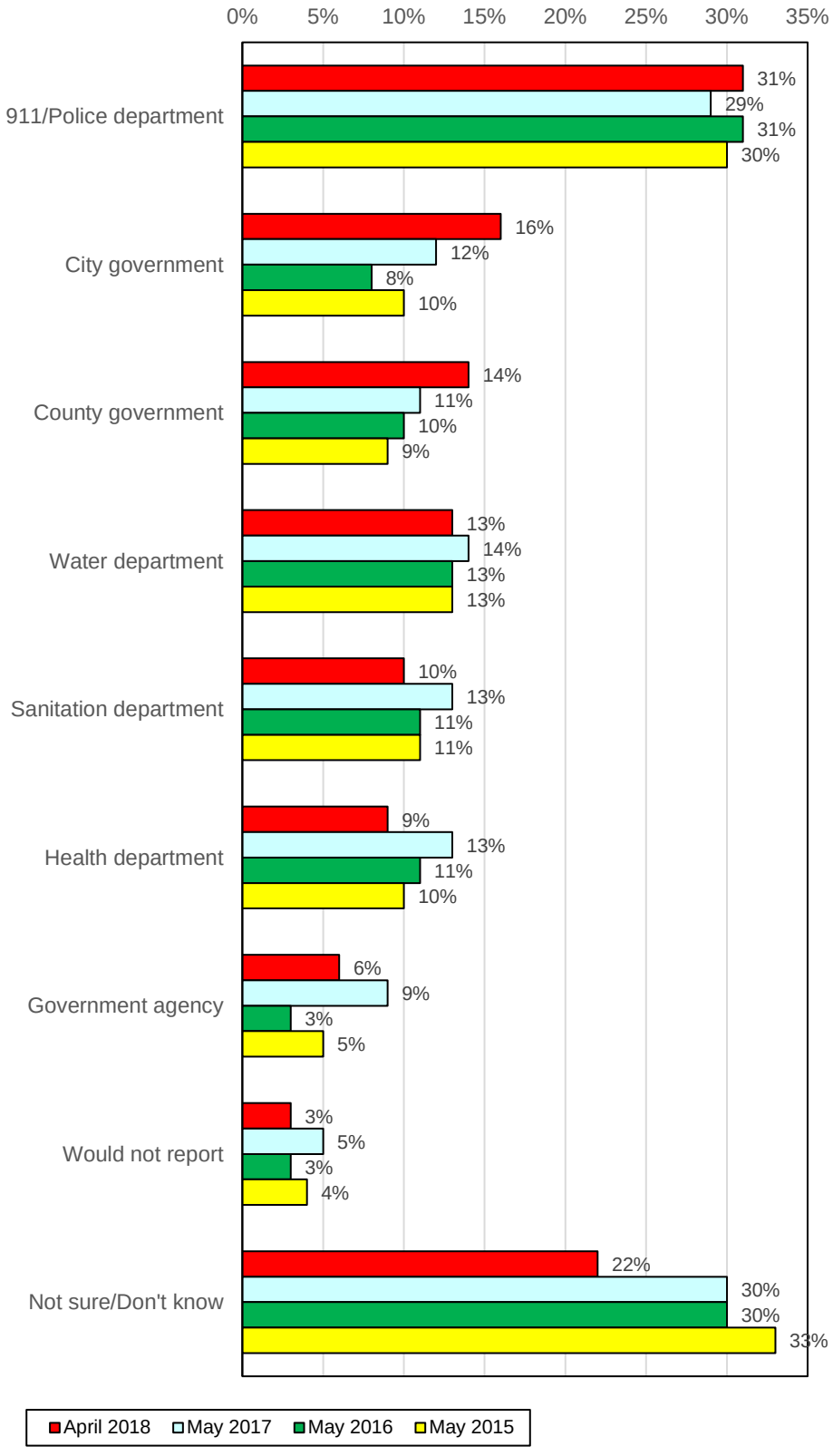
Table 32 Government Entity to Call If Witness Someone Dumping Trash or Chemicals in a Storm Drain

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**	Area			
					Central	South	North-west	East
911/Police department	30%	31%	29%	**31%**	31%	34%	32%	24%
City government	10%	8%	12%	**16%**	14%	20%	12%	22%
County government	9%	10%	11%	**14%**	8%	17%	17%	12%
Water department	13%	13%	14%	**13%**	13%	13%	12%	14%
Sanitation department	11%	11%	13%	**10%**	11%	11%	9%	10%
Health department	10%	11%	13%	**9%**	10%	13%	6%	5%
Government agency	5%	3%	9%	**6%**	9%	7%	2%	3%
Would not report	4%	3%	5%	**3%**	4%	3%	2%	1%
Not sure/Don't know	33%	30%	30%	**22%**	22%	12%	33%	19%
	N=500	N=500	N=504	**N=500**	N=152	N=138	N=136	N=74

	Stormwater Pollution Problem		
	Not a Problem	Moderate Problem	Serious Problem
911/Police department	32%	32%	29%
City government	8%	16%	19%
County government	10%	12%	16%
Water department	10%	12%	14%
Sanitation department	6%	8%	14%
Health department	11%	7%	11%
Government agency	6%	4%	8%
Would not report	3%	4%	2%
Not sure/Don't know	27%	25%	18%
	N=62	N=226	N=212

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 – In line with prior surveys, we find that residents (especially those who perceive a progressively more severe stormwater pollution problem) are "very likely" to take part in these activities to help keep stormwater clean:

- **Safely dispose of chemicals** (77% "very likely," up from 2016 [71%] and 2017 [75%] levels. These are most apt to be East residents and those 55 or older.)

- **If you have a dog, using a doggie bag to clean up after them** (77% "very likely," down just slightly from the 80% record mention recorded in 2016-2017. Response is highly positive regardless of area [especially in the East zips], gender or age.)

- **Report a spill** (62% "very likely," up from 60% last year. Strong likelihood of taking action is lower only in the South zips [54%] and among 16 to 25 year-olds [39%].)

- **Replacing a toxic compound with a non-toxic compound** (62% "very likely," unchanged from last year. These are particularly apt to be East residents and those 66 or older.)

Similar to the last two years, one-half are "very likely" to say they would **gather stormwater to use for watering plants**. This is especially true among Central residents and progressively more long term Pima County citizens.

Overall, 72% say they would be likely (to some degree) to **install Green Infrastructure**. This is up from last year – both overall (from 66% to 72%) and those "very likely" (from 33% to 37%). East residents, 56 to 65 year-olds and low income households say they would be "very likely" to implement this type infrastructure.

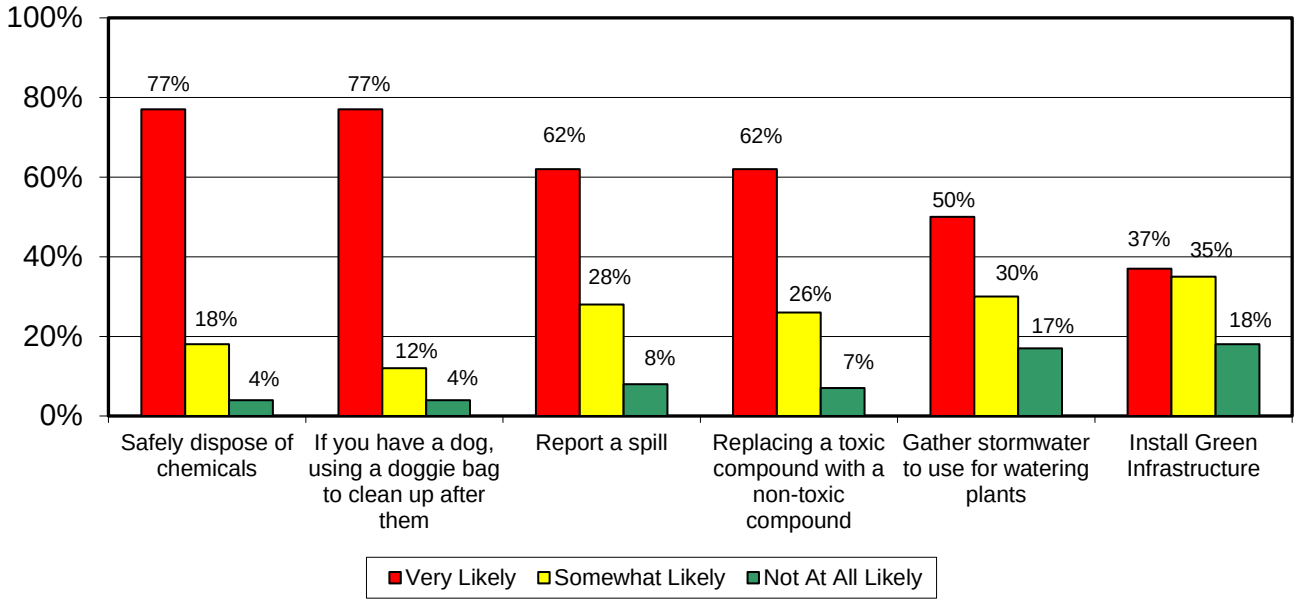
Table 33 Likelihood of Taking Part in Various Activities To Help Keep Stormwater Clean

	05/15 Total	05/16 Total	05/17 Total	**04/18 Total**	Area			
					Central	South	North-west	East
Safely dispose of chemicals								
Very likely	76%	71%	75%	**77%**	78%	72%	74%	85%
Somewhat likely	18%	22%	19%	**18%**	17%	25%	17%	12%
Not at all likely	4%	4%	4%	**4%**	3%	3%	6%	1%
Don't know/Not sure	2%	4%	2%	**1%**	1%	0%	3%	1%
If you have a dog, using a doggie bag to clean up after them								
Very likely	76%	80%	80%	**77%**	81%	72%	74%	86%
Somewhat likely	10%	8%	11%	**12%**	11%	19%	12%	4%
Not at all likely	6%	5%	4%	**4%**	2%	4%	7%	1%
Don't know/Not sure	9%	8%	4%	**6%**	6%	4%	8%	8%
Report a spill								
Very likely	58%	63%	60%	**62%**	65%	54%	60%	70%
Somewhat likely	29%	26%	29%	**28%**	24%	38%	24%	22%
Not at all likely	8%	6%	9%	**8%**	8%	6%	12%	5%
Don't know/Not sure	5%	5%	3%	**3%**	3%	1%	4%	3%
Replacing a toxic compound with a non-toxic compound								
Very likely	56%	58%	62%	**62%**	60%	59%	62%	69%
Somewhat likely	29%	27%	22%	**26%**	24%	31%	26%	18%
Not at all likely	8%	6%	9%	**7%**	10%	6%	6%	8%
Don't know/Not sure	7%	8%	6%	**5%**	6%	4%	5%	5%
Gathering stormwater to use for watering plants								
Very likely	53%	49%	49%	**50%**	57%	46%	45%	51%
Somewhat likely	31%	29%	29%	**30%**	27%	36%	28%	26%
Not at all likely	13%	17%	19%	**17%**	12%	15%	22%	19%
Don't know/Not sure	3%	5%	3%	**4%**	4%	2%	5%	4%
Install Green Infrastructure*								
Very likely	41%	43%	33%	**37%**	34%	35%	38%	47%
Somewhat likely	37%	34%	33%	**35%**	33%	44%	29%	32%
Not at all likely	11%	11%	21%	**18%**	20%	14%	22%	14%
Don't know/Not sure	11%	12%	13%	**10%**	12%	8%	11%	7%
	N=500	N=500	N=504	**N=500**	N=152	N=138	N=136	N=74

* Was "Implement Low Impact Development practices" (5/15-5/16).

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 2017-2018
PIMA COUNTY CLEAN AIR PROGRAM CAMPAIGN AND
CLEAN WATER PROGRAM CAMPAIGN SURVEY
(April 2018)

Appendix

Survey Methodology and Sample Selection

This survey consists of a 500-person, randomly-selected and statistically-projectable sample of the 16 years and older male and female residents in designated Pima County zip code areas. This study utilized a dual-methodology sampling plan, with Telephone (N=260) and Internet (N=240) interviews. Before 2015, all surveys in this tracking study series were conducted via telephone.

All Telephone and Internet interviews were conducted during late March and early April 2018. 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 154 non-White respondents were interviewed in the project, including 126 Hispanics. Overall, 11 respondents (2%) requested that their survey be conducted in Spanish by a bilingual interviewer. This compares to 3% in the 2017 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=500, 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 for the reported percentages (240+260)/2=250. 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.

2018 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