EVALUATION OF THE 2018-2019 PIMA COUNTY CLEAN AIR PROGRAM CAMPAIGN AND CLEAN WATER PROGRAM CAMPAIGN SURVEY

(May 2019)

Prepared for:

PIMA COUNTY DEPARTMENT OF
ENVIRONMENTAL QUALITY

Tucson, Arizona

Prepared by:

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Tucson, Arizona

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EVALUATION OF THE 2018-2019 PIMA COUNTY CLEAN AIR PROGRAM CAMPAIGN AND CLEAN WATER PROGRAM CAMPAIGN SURVEY

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Introduction and Goals

This Campaign Effectiveness Study, conducted for the Pima County Department of Environmental Quality, was designed to evaluate the specific effectiveness of the 2018-2019 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 29th 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 7th 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. Measuring the awareness of the Clean Water Program in Pima County.

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

8. Tracking actions impacting stormwater quality, including reporting dumping to a government. Measuring perceived value and concerns of how areas near washes are used.

9. 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 (245) and online (255) during May 2019. 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 – Consistent with past years, nearly all surveys (98%) were conducted in English, with the balance (2%) in Spanish. All 11 Spanish-language surveys were fielded with self-identified Hispanics who live in the Central, South or Northwest zip code regions. Turn to Table 4 for complete zip code region definitions.

Table 1 Type of Interview

	05/15 Total	05/16 Total	05/17 Total	04/18 Total	**05/19 Total**	Sample	
						Telephone	Internet
English	98%	98%	97%	98%	**98%**	98%	98%
Spanish	2%	2%	3%	2%	**2%**	2%	2%
	N=500	N=500	N=504	N=500	**N=500**	N=245	N=255

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

Survey Method – In accordance with the dual-methodology sampling plan utilized since 2015, surveys were conducted by telephone and online utilizing the same bilingual questionnaire. There were 500 total interviews, split between telephone (49%) and online (51%). 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.

Importantly, the screening criteria for the two survey methodologies is identical (and has remained unchanged for 25+ years). Specifically, 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	**05/19 Total**
Telephone	50%	50%	50%	52%	**49%**
Internet	50%	50%	50%	48%	**51%**
	N=500	N=500	N=504	N=500	**N=500**

Self-Identified Ethnicity – Once again there were sampling quotas with respect to self-identified ethnicity (with targets set based on household distributions within Pima County). The composition of the 2019 sample is reflective of these sampling goals: 68% White, 26% Hispanic, 2% Native American, 2% African-American, and 2% Asian/Pacific Islander. This distribution is highly consistent regardless of survey methodology (Internet or Telephone).

Table 3 Racial Background of Respondents

	05/15 Total	05/16 Total	05/17 Total	04/18 Total	**05/19 Total**	Sample	
						Telephone	Internet
White	72%	71%	69%	69%	**68%**	66%	70%
Hispanic	20%	22%	25%	25%	**26%**	26%	26%
Native American	3%	2%	1%	1%	**2%**	2%	2%
African-American	3%	3%	3%	3%	**2%**	3%	1%
Asian, Pacific Islander	2%	2%	2%	2%	**2%**	2%	1%
	N=500	N=500	N=504	N=500	**N=500**	N=245	N=255

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 – In addition to ethnicity goals, there were also sampling quotas with respect to area of residence. These quotas are based on population density in Pima County (with all zip codes assigned to one of four geographic regions as defined in the table below). The geographic composition of the 2019 sample is highly representative of these quotas: 30% Central, 28% South, 27% Northwest and 15% East.

Table 4 Area of Residence

	05/15 Total	05/16 Total	05/17 Total	04/18 Total	**05/19 Total**
Central 85710 85711 85712 85716 85718 85719	31%	31%	30%	30%	**30%**
South 85321 85614 85622 85629 85634 85641 85701 85706 85707 85708 85713 85714 85735 85736 85746 85756 85757 85341 85601 85633 85639 85645	27%	27%	28%	28%	**28%**
Northwest 85653 85654 85658 85704 85705 85737 85739 85741 85742 85743 85745 85755	27%	27%	27%	27%	**27%**
East 85619 85715 85730 85747 85748 85749 85750	15%	15%	15%	15%	**15%**
	N=500	N=500	N=504	N=500	**N=500**

	Air Quality Problem			Sample	
	Major	Moderate	Minor	Telephone	Internet
Central 85710 85711 85712 85716 85718 85719	26%	29%	34%	31%	29%
South 85321 85614 85622 85629 85634 85641 85701 85706 85707 85708 85713 85714 85735 85736 85746 85756 85757 85341 85601 85633 85639 85645	32%	25%	31%	27%	28%
Northwest 85653 85654 85658 85704 85705 85737 85739 85741 85742 85743 85745 85755	26%	31%	19%	26%	28%
East 85619 85715 85730 85747 85748 85749 85750	16%	15%	16%	15%	15%
	N=98	N=272	N=106	N=245	N=255

Gender Distribution – There are no survey sampling quotas with respect to gender or age. However, identical to last year, there is a near 50/50 mix of men (49%) and women (51%) in the 2019 sample. Consistent with the methodology for the 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 again 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	**05/19 Total**	Sample	
						Telephone	Internet
Men	42%	44%	46%	49%	**49%**	51%	47%
Women	58%	56%	54%	51%	**51%**	49%	53%
	N=500	N=500	N=504	N=500	**N=500**	N=245	N=255

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 – Similar to last year, one-half of the 2019 sample is 26 to 55. Consistent with other dual Telephone-Internet studies that we conduct, the Telephone sub-sample tends to skew older. For the 2019 sample, 26% of Telephone respondents are 66 or older – compared to just 11% of the Internet sub-sample. As a result, the median age of Internet participants (41.7 years) is much younger than Telephone respondents (50.7 years). The median age among the combined 2019 sample is 45.8 years.

Table 6 Age of Respondents

	05/15 Total	05/16 Total	05/17 Total	04/18 Total	**05/19 Total**	Sample	
						Telephone	Internet
16 to 25	16%	14%	15%	15%	**16%**	13%	20%
26 to 35	16%	17%	17%	19%	**18%**	16%	20%
36 to 45	15%	16%	15%	16%	**16%**	14%	18%
46 to 55	14%	15%	15%	15%	**15%**	15%	14%
56 to 65	18%	18%	18%	18%	**17%**	16%	17%
66 to 75	15%	14%	14%	11%	**12%**	15%	9%
76 or over	6%	6%	6%	7%	**7%**	11%	2%
	N=500	N=500	N=504	N=500	**N=500**	N=245	N=255

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

Length of Residence – Consistent with last year, two-thirds report that they have lived in Pima County for 11+ years. These longest term residents are more likely to be Telephone (69%) than Internet (62%) respondents. Another 15% are newer residents (for five years or less), virtually unchanged since last year (16%). Part-year residents comprise 6% of the total sample (versus 7% last year).

Table 7 Length of Residence in Pima County

	05/15 Total	05/16 Total	05/17 Total	04/18 Total	**05/19 Total**	Sample	
						Telephone	Internet
Part year	4%	4%	7%	7%	**6%**	4%	8%
Less than 2 years	8%	7%	6%	6%	**4%**	1%	7%
2 to 5 years	11%	9%	11%	10%	**11%**	8%	13%
6 to 10 years	13%	14%	16%	10%	**14%**	18%	11%
11 or more years	64%	67%	61%	68%	**66%**	69%	62%
	N=500	N=500	N=504	N=500	**N=500**	N=245	N=255

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 – Four of ten in the 2019 study indicate that someone in their household suffers from a breathing-related medical condition. This is down slightly from 42%-43% in the last two surveys. Allowing for multiple responses, 24% report that they themselves are impacted (up from 21% in 2018), while three of ten indicate their children (11%, down from 13%) or some other family member (19%, down from 21%) have a breathing-related medical condition. As we found last year, it is evident that residents of the South region are most likely to be impacted.

As we have found in past years, 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	**05/19 Total**	Sample	
						Telephone	Internet
Yes	34%	40%	42%	43%	**40%**	39%	42%
Respondent	(18%)	(21%)	(21%)	(21%)	**(24%)**	(22%)	(25%)
Children	(9%)	(11%)	(10%)	(13%)	**(11%)**	(14%)	(8%)
Other family member	(13%)	(17%)	(21%)	(21%)	**(19%)**	(18%)	(20%)
No	64%	58%	57%	55%	**57%**	59%	54%
Don't know/ Not sure	2%	2%	1%	2%	**3%**	2%	4%
	N=500	N=500	N=504	N=500	**N=500**	N=245	N=255

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 last year, there are a few more two-vehicle households (from 36% to 39%) and slightly less single-vehicle households (from 37% to 34%). At the same time, the percentage of multi-vehicle (3+) households is basically unchanged at 18%. Just less than one of ten report that no one in their household lease or own any motor vehicles (9%, up incrementally from 6% in 2016). Single-vehicle households are more common in the South zips, while the distribution of two-vehicle households is consistent among residents of the Central, Northwest and East regions (40%-43% versus 30% in the South). East residents are most likely to own or lease 3+ vehicles (23%). The distribution of "no vehicle" households in generally similar across geography (slightly higher in the Northwest zips).

Table 9 Number of Motor Vehicles Owned or Leased

	05/15 Total	05/16 Total	05/17 Total	04/18 Total	**05/19 Total**	Sample	
						Telephone	Internet
No working cars	8%	6%	7%	8%	**9%**	5%	12%
One	36%	41%	35%	37%	**34%**	32%	36%
Two	40%	37%	42%	36%	**39%**	40%	37%
Three or more	17%	16%	16%	19%	**18%**	23%	14%
	N=500	N=500	N=504	N=500	**N=500**	N=245	N=255

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

Education Level – In line with previous surveys, more than seven of ten (72%) say they completed at least some college level coursework. However, compared to last year, there are fewer college graduates (from 31% to 25%) and more with some college (but no degree) (from 25% to 28%). The percentage with some graduate work or graduate degree is unchanged at 19%. Similar to last year, educational achievement (a college degree or better) is highest in the East and Northwest zip codes.

The remaining three of ten are high school/trade school graduates (23%, up from 20%) or have less than a high school diploma (6%, up from 4%). These tend to be Central or South area residents.

Table 10 Education Level of Respondents

	05/15 Total	05/16 Total	05/17 Total	04/18 Total	**05/19 Total**	Sample	
						Telephone	Internet
Less than high school	7%	4%	5%	4%	**6%**	5%	7%
Completed high school/Trade school	16%	19%	19%	20%	**23%**	18%	28%
Some college	31%	33%	27%	25%	**28%**	22%	33%
College graduate	28%	27%	36%	31%	**25%**	30%	20%
Some graduate work or graduate degree	17%	15%	13%	19%	**19%**	24%	13%
	N=500	N=500	N=504	N=500	**N=500**	N=245	N=255

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

Annual Household Income – In line with the lower level of educational achievement, the overall median household income (excluding refusals) of 2019 respondents ($46,378) is somewhat lower than we found last year ($50,612). Similar to prior surveys, median household incomes among Telephone respondents ($57,403) are much higher than Internet panelists ($40,288). Geographically, high income households ($80,000+) are more likely to be found in the Northwest zips.

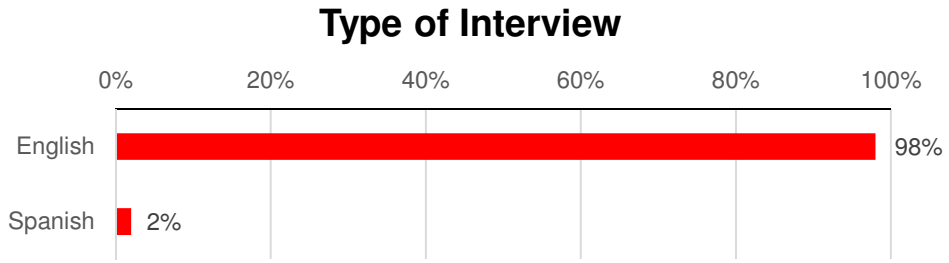
Among the total sample, 13% refused to disclose their household income category. This is up from 2018 (7%), but consistent with prior years (11%-13%).

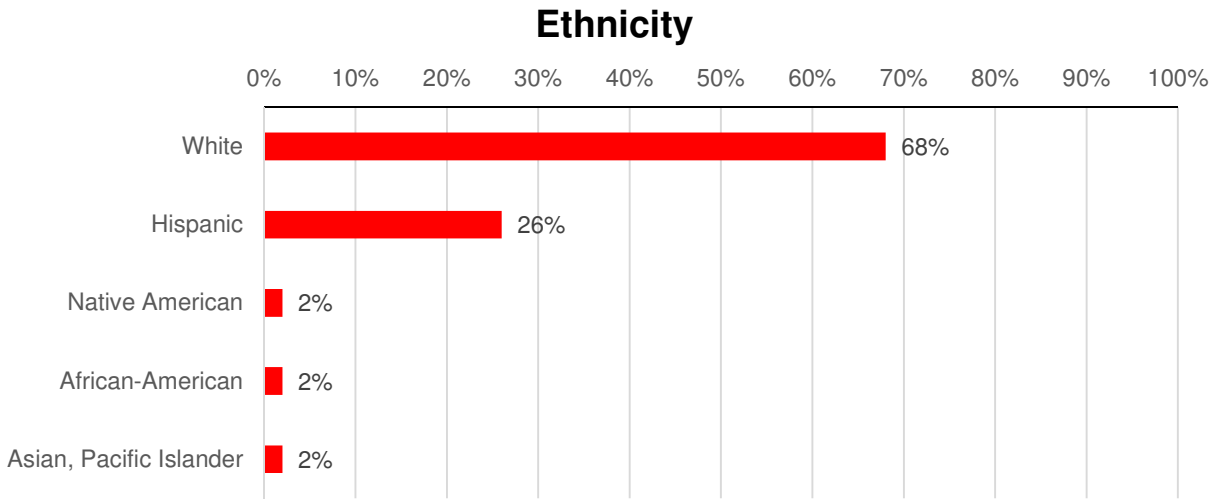
Table 11 Household Income

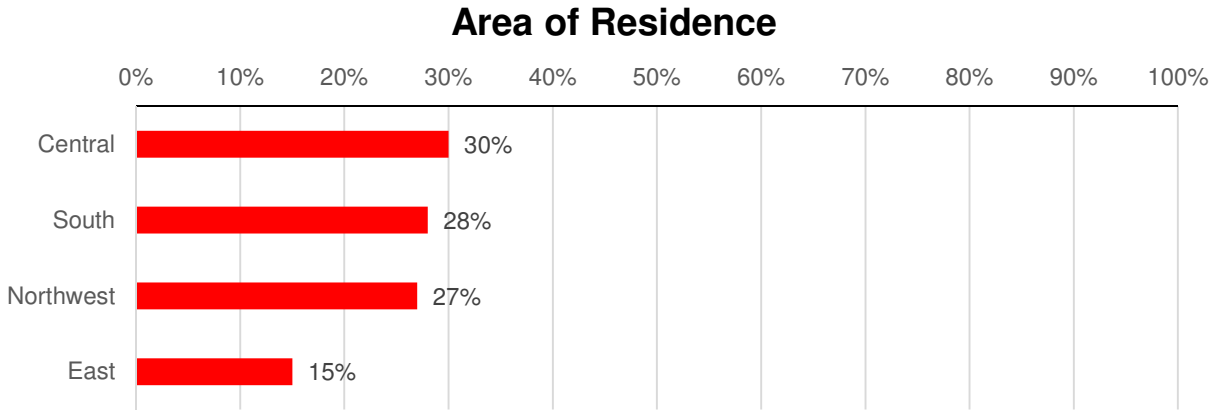
	05/15 Total	05/16 Total	05/17 Total	04/18 Total	**05/19 Total**	Sample	
						Telephone	Internet
Less than $15,000	12%	11%	12%	11%	**12%**	6%	18%
$15,000 to $24,999	14%	13%	10%	10%	**11%**	11%	11%
$25,000 to $39,999	16%	17%	17%	15%	**15%**	12%	18%
$40,000 or more*	46%	48%	50%	56%	**48%**	49%	48%
No answer/Refused	13%	11%	11%	7%	**13%**	23%	4%
* $40,000 to $59,999	14%	16%	16%	18%	**16%**	12%	20%
$60,000 to $79,999	11%	12%	10%	16%	**12%**	14%	11%
$80,000 or more	21%	20%	24%	22%	**20%**	23%	18%
	N=500	N=500	N=504	N=500	**N=500**	N=245	N=255

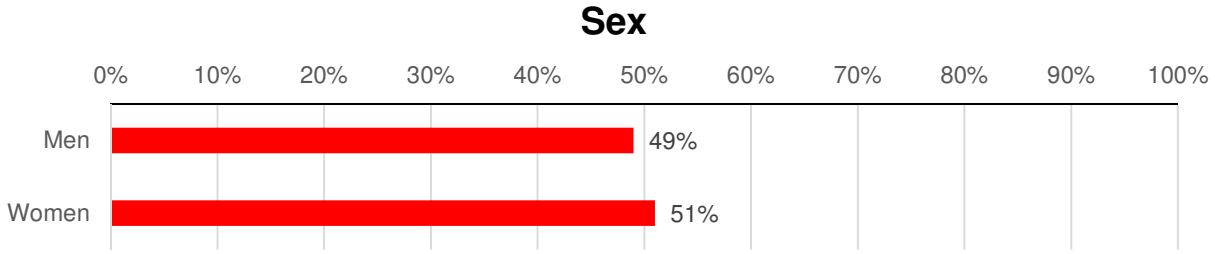
Question: As I read the following categories, please tell me into which group your total annual household income falls. We are not interested in your exact income, just your household income category...from all sources before taxes.

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

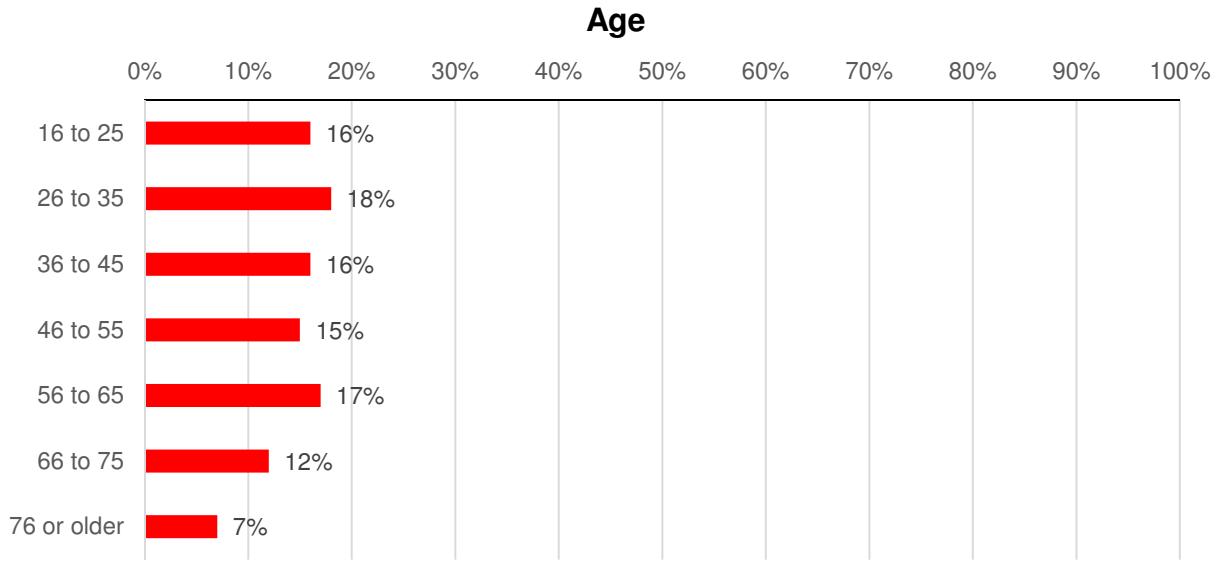


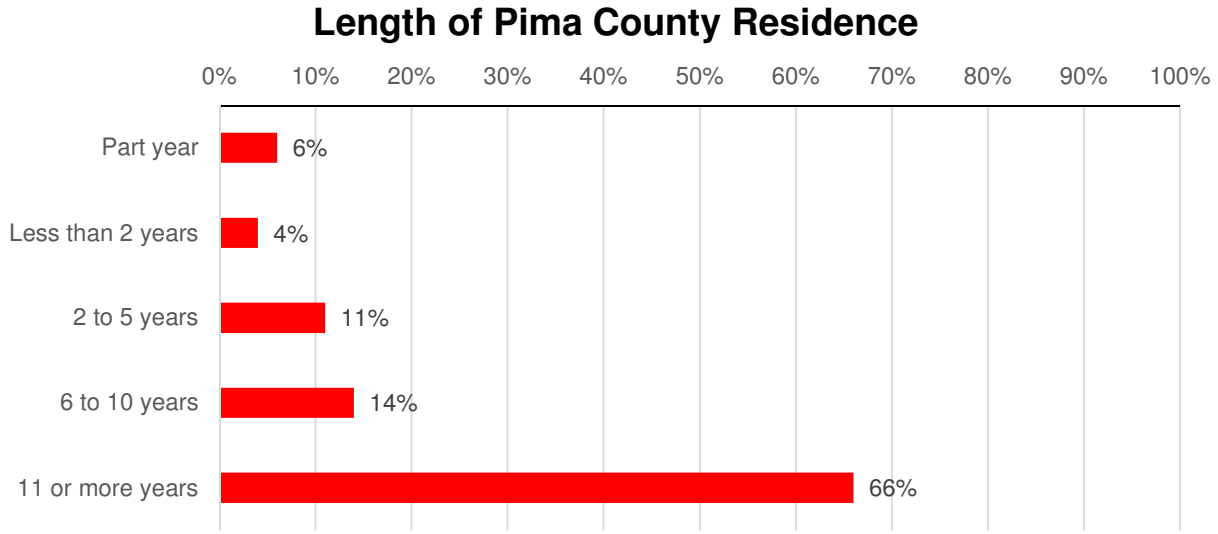


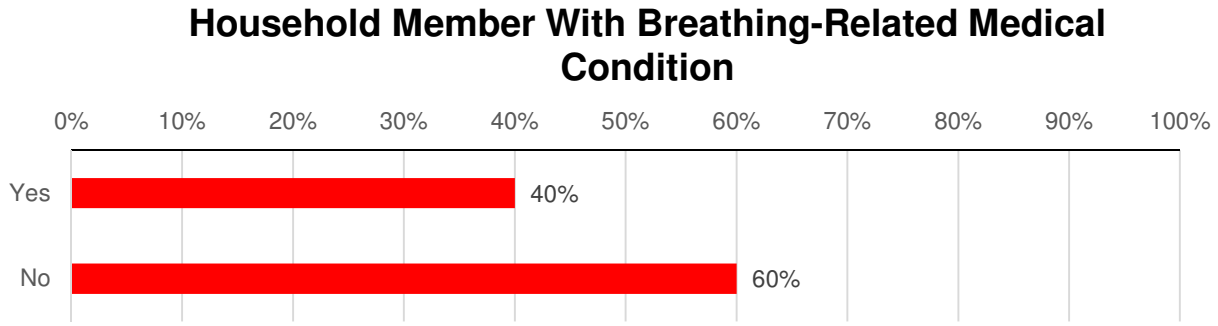




Display 1 (Cont'd) **Demographic Profile of Respondents**
(Among the Total Sample)

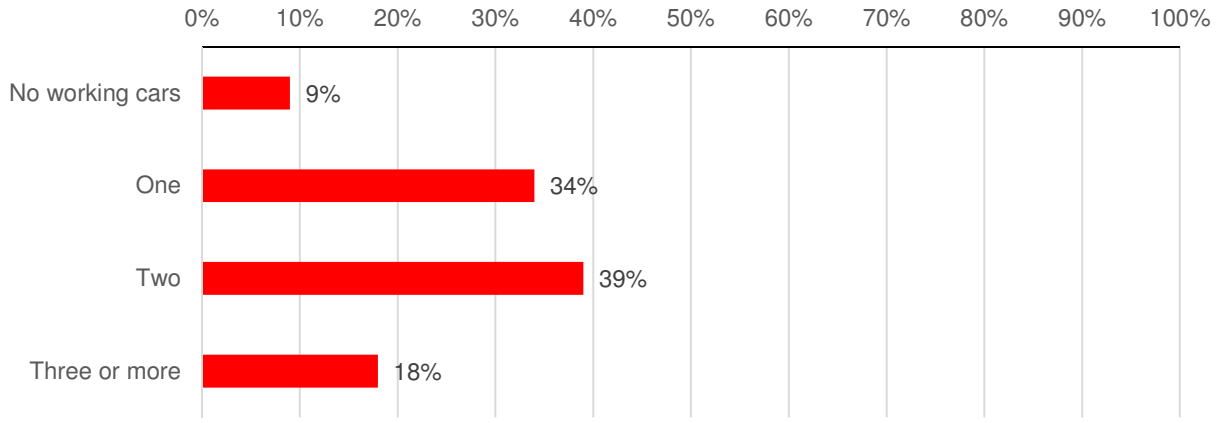




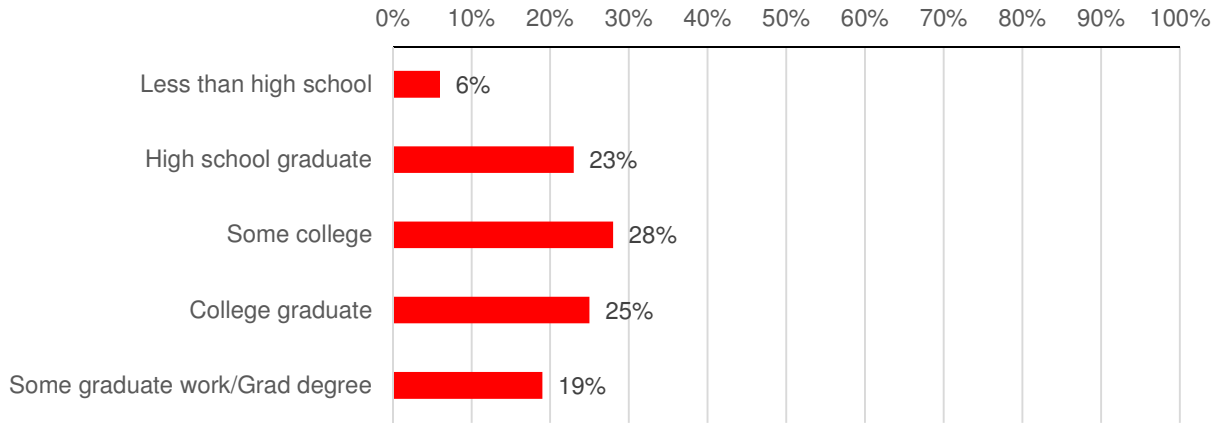


Display 1 (Cont'd) **Demographic Profile of Respondents**
(Among the Total Sample)

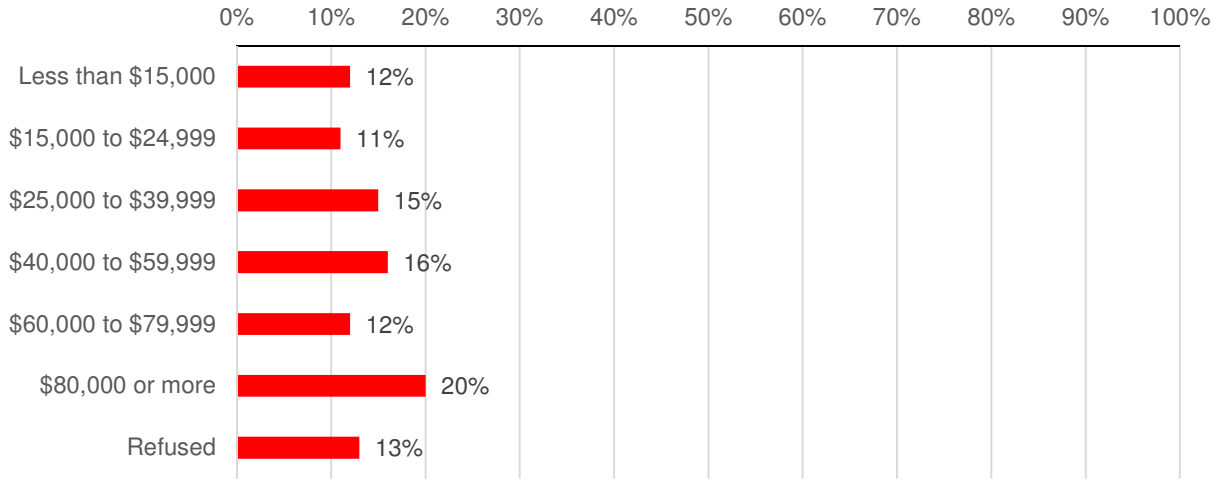
Number of Vehicles



Education Level



Household Income



Awareness of Information About Air Quality/Pollution

Awareness of the Pima County "Clean Air" Program – Compared to last year, awareness of the Pima County "Clean Air" Program is slightly lower (from 46% to 43%). Still, 2019 awareness (43%) is similar to 2017 levels (44%).

Awareness is balanced across ethnicity or geography (slightly higher in Northwest or East zips) and is highest among women, those 46 or older, 11+ year Pima County residents and higher income households. Program awareness is directly related to the perception of a progressively more severe stormwater pollution problem. However, there are fewer differences with respect to perceived air quality problem or households impacted by a breathing-related medical condition.

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

	05/15 Total	05/16 Total	05/17 Total	04/18 Total	**05/19 Total**
Yes	45%	50%	44%	46%	**43%**
No	49%	42%	47%	47%	**49%**
Don't know	6%	7%	9%	8%	**8%**
	N=500	N=500	N=504	N=500	**N=500**

	Area				Air Quality Problem		
	Central	South	Northwest	East	Major	Moderate	Minor
Yes	41%	41%	46%	45%	47%	42%	46%
No	52%	51%	47%	44%	43%	52%	50%
Don't know	7%	8%	7%	11%	10%	6%	4%
	N=152	N=138	N=135	N=75	N=98	N=272	N=106

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, more than eight of ten are familiar with at least one event or activity used to promote clean air in the Tucson area (81%). However, awareness is incrementally lower than we found in 2018 (84%) and 2017 (86%). Still, highly consistent with past years, the awareness of individual events and activities remains significantly higher among those familiar with the "Clean Air" Program.

At least three of ten overall are familiar with the following "Clean Air" events/activities:

- **"Earth Day Festival and Parade"** (57% awareness, nearly unchanged since 2018 [58%]. Women and the most formally educated indicate the highest familiarity. Geographically, only East region residents are slightly less familiar [52% versus 56%-60% elsewhere].)

- **"Bike to Work Day"** (52% awareness, down from 56% in 2018. More highly familiar to South or Northwest zip residents, women, 56 to 65 year-olds and those who perceive a progressively more severe air quality problem.)

- **"Walk and Bike to School Day"** (46% awareness, up significantly from 31% in 2018 [when it was tested as "Walk and Roll to School Day"]. South region residents, women and those who think Tucson has a "moderate" air quality issue are most likely to be familiar with this event.)

- **"Bike Fest"** (41% awareness, down from 50% in 2018. This event is more familiar to South zip code residents, non-Whites and those who perceive a progressively more serious air quality problem.)

- **"Cyclovia"** (29% awareness, up from 23%-25% previously. Awareness is marginally lower only in the South region [25% compared to 30%-32% elsewhere], and higher among 11+ year Pima County residents.)

New to the current study, 21% indicate an awareness of **"The Travel Reduction Program."** These tend to be South or East residents, women, 46 to 55 year-olds and higher income types.

Table 13 Awareness of Various Clean Air Events or Activities

	05/15 Total	05/16 Total	05/17 Total	04/18 Total	**05/19 Total**
"Earth Day Festival and Parade"	59%	55%	62%	58%	**57%**
"Bike to Work Day"	62%	60%	53%	56%	**52%**
"Walk and Bike to School Day"*	29%	32%	31%	31%	**46%**
"Bike Fest"	52%	51%	47%	50%	**41%**
"Cyclovia"	24%	24%	23%	25%	**29%**
"Travel Reduction Program"	–	–	–	–	**21%**
None of these	15%	17%	14%	16%	**19%**
	N=500	N=500	N=504	N=500	**N=500**

	Area				Air Quality Problem		
	Central	South	Northwest	East	Major	Moderate	Minor
"Earth Day Festival and Parade"	58%	60%	56%	52%	58%	60%	52%
"Bike to Work Day"	45%	59%	58%	44%	57%	53%	51%
"Walk and Bike to School Day"*	36%	56%	47%	41%	47%	50%	37%
"Bike Fest"	40%	46%	36%	40%	52%	39%	35%
"Cyclovia"	31%	25%	30%	32%	34%	31%	24%
"Travel Reduction Program"	20%	25%	16%	23%	26%	19%	21%
None of these	19%	17%	15%	29%	15%	15%	27%
	N=152	N=138	N=135	N=75	N=98	N=272	N=106

* Was "Walk and Roll to School Day" (5/15-4/18).

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 81% of survey respondents familiar with at least one "Clean Air" campaign activity, 15% indicate that they or someone in their household participated in at least one event. This is down slightly from 2017-2018 levels (18% each).

Participation is generally consistent regardless of geography (slightly higher in the Northwest zips), and elevated among women, 16 to 35 year-olds and non-Whites. Once again, participation is significantly higher among those aware of the "Clean Air" Program (22% versus 9% unaware).

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	**05/19 Total**
Yes	20%	12%	18%	18%	**15%**
No	79%	85%	77%	79%	**80%**
Don't know	2%	3%	5%	3%	**5%**
	N=425	N=417	N=432	N=418	**N=406**

	Area				Air Quality Problem		
	Central	South	Northwest	East	Major	Moderate	Minor
Yes	14%	13%	18%	15%	19%	14%	16%
No	80%	82%	76%	85%	72%	81%	84%
Don't know	6%	5%	5%	0%	8%	5%	0%
	N=123	N=115	N=115	N=53	N=83	N=230	N=77

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 15% who report past participation in a "Clean Air" event or activity, fully three of four indicate that they have changed (or are considering changing) their daily routines or behaviors to help improve air quality. This is up from 64% from last year, and in line with 2017 findings (74%).

Among the combined sample, this means that 9% report a change in their behavior after participating in a "Clean Air" event. This compares to 10% in 2018. Willingness to change in the current survey is highest among Central or South zip residents, women and households impacted by a breathing-related medical condition.

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

	05/15 Total	05/16 Total	05/17 Total	04/18 Total	**05/19 Total**
Yes	69%	80%	74%	64%	**75%**
No	23%	8%	25%	34%	**25%**
Don't know	8%	12%	1%	1%	**0%**
	N=83	N=49	N=77	N=76	**N=61**

	Area				Air Quality Problem		
	Central	South	Northwest	East	Major	Moderate	Minor
Yes	88%	80%	71%	50%	81%	81%	50%
No	12%	20%	29%	50%	19%	19%	50%
Don't know	0%	0%	0%	0%	0%	0%	0%
	N=17	N=15	N=21	N=8	N=16	N=32	N=12

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 – Consistent with last year, 86% familiar with at least one "Clean Air" event have a positive opinion of "events and activities that encourage people to use other modes of transportation or work from home instead of driving alone." This includes nearly one-half who are "very favorable" (47%, down slightly from 49%). And this is the case regardless of geography.

Women, non-Whites and more highly educated respondents are most highly favorable of activities and events to encourage use of other modes of transportation. This is also true among residents who perceive a progressively more severe air quality problem in Tucson.

As we have found in recent years, less than one of ten (8%) have a negative opinion (to any extent) of air quality related events and activities.

Table 13c Opinion of Activities/Events to Encourage Use of Other Modes of Transportation (Among Those Aware of at Least One "Clean Air" Event)

	05/15 Total	05/16 Total	05/17 Total	04/18 Total	**05/19 Total**
Very favorable	47%	45%	52%	49%	**47%**
Somewhat favorable	38%	43%	38%	38%	**39%**
Not very favorable	7%	4%	5%	5%	**7%**
Not at all favorable	3%	4%	2%	4%	**1%**
Don't know/No answer	5%	4%	4%	4%	**5%**
	N=425	N=417	N=432	N=418	**N=406**

	Area				Air Quality Problem		
	Central	South	Northwest	East	Major	Moderate	Minor
Very favorable	47%	48%	47%	47%	53%	50%	35%
Somewhat favorable	37%	40%	46%	28%	32%	40%	46%
Not very favorable	8%	6%	3%	17%	5%	7%	12%
Not at all favorable	0%	3%	0%	2%	1%	0%	3%
Don't know/No answer	7%	4%	4%	6%	8%	4%	5%
	N=123	N=115	N=115	N=53	N=83	N=230	N=77

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 – In line with past years, and allowing for multiple responses, the top five steps taken to help reduce air pollution in the Tucson area include:

- **Carpool/Less driving alone** (43%, up significantly from 32%-38% in recent surveys. South or East zip residents, women and Hispanics are more apt to indicate an increase in carpooling or less solo driving.)

- **Keep car tuned** (41%, up from 34% last year, and the highest mention in recent surveys. There are few differences with respect to geography or gender. Instead, older residents [56+], non-Hispanics and higher income households are more likely to say they are keep their car tuned.)

- **Keeping tires properly inflated** (40%, up significantly over the last three surveys [31%-35%]. These tend to be East residents, women, 56 to 65 year-olds, Whites and higher income types.)

- **Generally reduced driving** (35%, down slightly from the prior three years [37%-38%]. More apt to have reduced driving are Northwest or East region residents, women and those who perceive a progressively more serious air quality problem.)

- **Avoid excessive idling** (23%, up from 12%-16% in recent surveys. Avoiding excessive idling is lower only in the South region [19% versus 22%-27% in other areas], and higher among those who perceive a "major" or "moderate" air quality problem.)

Compared to 2018 findings, more also report they have **planted trees** (20%, up from 17%) and **bought a more fuel efficient car** (17%, up from 13%). Others indicate that they have **bought bicycles** (14%, down slightly from 15% last year), **chosen once a week not to drive** (12%, down slightly from 13%), **using BBQ grill less** (10%, up from 7%) and/or **using fireplace/wood stove less** (7%, down slightly from 8%). Compared to the last two years, fewer are **adjusting their vehicle's emission control equipment** (7%, down from 14%).

Overall, 15% indicate they have done **nothing** to reduce air pollution. This is up from the record low 11%-12% mention recorded in 2017-2018, but consistent with 2015-2016 levels (15% each). Once again, these tend to be those who perceive a "minor" air quality problem and residents unfamiliar with the "Clean Air" Program.

Table 14 Steps Taken to Reduce Air Pollution

	05/15 Total	05/16 Total	05/17 Total	04/18 Total	**05/19 Total**
Carpool/Less driving alone	32%	33%	38%	35%	**43%**
Keep car tuned	35%	39%	38%	34%	**41%**
Keep tires properly inflated	39%	35%	31%	34%	**40%**
Generally reduced driving/Driven less	35%	38%	38%	37%	**35%**
Avoid excessive idling	12%	12%	16%	16%	**23%**
Planted trees	17%	21%	23%	17%	**20%**
Bought more fuel efficient car	13%	13%	20%	13%	**17%**
Bought bicycles	12%	12%	15%	15%	**14%**
Chosen once a week not to drive	10%	12%	16%	13%	**12%**
Using BBQ grill less	6%	9%	8%	7%	**10%**
Using fireplace/Wood stove less	5%	8%	8%	8%	**7%**
Adjusted vehicle's emission control equipment	10%	12%	14%	14%	**7%**
Moved closer to work	8%	9%	8%	6%	**6%**
Bought alternative-fueled car	4%	3%	5%	4%	**5%**
Advocated alternative to cars	4%	2%	4%	3%	**4%**
Challenged friends/Co-workers to change	3%	2%	6%	4%	**2%**
Walk more	1%	2%	2%	1%	**2%**
Other	3%	4%	5%	7%	**3%**
Nothing	16%	16%	12%	11%	**15%**
	N=500	N=500	N=504	N=500	**N=500**

	Area				Air Quality Problem		
	Central	South	Northwest	East	Major	Moderate	Minor
Carpool/Less driving alone	38%	48%	40%	49%	48%	45%	36%
Keep car tuned	38%	39%	44%	43%	40%	44%	35%
Keep tires properly inflated	43%	33%	40%	49%	34%	47%	31%
Generally reduced driving/Driven less	34%	29%	39%	39%	41%	38%	23%
Avoid excessive idling	22%	19%	24%	27%	24%	26%	11%
Planted trees	18%	19%	23%	23%	20%	24%	17%
Bought more fuel efficient car	14%	13%	18%	27%	15%	20%	11%
Bought bicycles	17%	17%	11%	9%	12%	17%	11%
Chosen once a week not to drive	14%	12%	13%	5%	16%	11%	6%
Using BBQ grill less	8%	9%	12%	9%	11%	11%	7%
Using fireplace/Wood stove less	6%	7%	9%	5%	8%	8%	3%
Adjusted vehicle's emission control equipment	9%	2%	9%	8%	11%	5%	8%
Moved closer to work	7%	7%	5%	4%	8%	8%	1%
Bought alternative-fueled car	5%	3%	5%	7%	5%	6%	3%
Advocated alternative to cars	3%	4%	5%	4%	6%	4%	1%
Challenged friends/Co-workers to change	3%	4%	2%	0%	4%	2%	1%
Walk more	2%	3%	2%	1%	4%	1%	3%
Other	3%	2%	4%	5%	3%	4%	4%
Nothing	17%	15%	13%	15%	8%	10%	30%
	N=152	N=138	N=135	N=75	N=98	N=272	N=106

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 – Three of ten overall indicate that they have children between the ages of 5 and 18 living in their household. This is up incrementally from 2017 (28%) and 2018 (29%) levels. South region residents, 16 to 45 year-olds and non-Whites are more likely to report the presence of children in their households.

Table 15 Presence of Children Ages 5-18 in Household

	05/15 Total	05/16 Total	05/17 Total	04/18 Total	**05/19 Total**
Yes	26%	24%	28%	29%	**30%**
No	74%	76%	72%	71%	**70%**
	N=500	N=500	N=504	N=500	**N=500**

	Area				Air Quality Problem		
	Central	South	Northwest	East	Major	Moderate	Minor
Yes	22%	39%	29%	32%	26%	35%	23%
No	78%	61%	71%	68%	74%	65%	77%
	N=152	N=138	N=135	N=75	N=98	N=272	N=106

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

Incidence of Children Ages 5-18 Receiving Air Pollution Information From School – Among households with young children (30% of the total sample), 38% report that these 5 to 18 year-olds have "talked about or brought home materials from school about improving air quality." This is down from 50%-53% in 2017-2018. Air pollution information recall in the current survey is elevated among Central region residents, men, 26 to 35 year-olds, non-Whites and those aware of the "Clean Air" Program (43% versus 37% unfamiliar).

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	**05/19 Total**
Yes	45%	48%	50%	53%	**38%**
No	47%	48%	43%	42%	**53%**
Don't know	8%	3%	8%	5%	**9%**
	N=131	N=120	N=141	N=144	**N=150**

	Area				Air Quality Problem		
	Central	South	Northwest	East	Major	Moderate	Minor
Yes	46%	39%	38%	25%	31%	35%	58%
No	54%	48%	51%	67%	69%	55%	38%
Don't know	0%	13%	10%	8%	0%	9%	4%
	N=33	N=54	N=39	N=24	N=26	N=96	N=24

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 Mower Usage and Characteristics – Identical to last year, 7% overall indicate they or someone in their household uses a gasoline-powered lawn mower to care for their home property. Usage is slightly lower only in the Northwest zips (4% versus 7%-9% elsewhere), and elevated among men, 16 to 35 year-olds and Hispanics Among these users who know, slightly more say their gas-powered mower has a 4-stroke (43%) than 2-stroke (40%) engine (Table 16a) – with average monthly usage of 34 minutes (Table 16b).

Table 16 Use of Gasoline-Powered Lawn Mower to Care for Property

	05/16 Total*	05/17 Total*	04/18 Total*	**05/19 Total**	Area			
					Central	South	Northwest	East
Yes	8%	6%	6%	**7%**	7%	9%	4%	7%
No	90%	92%	93%	**90%**	90%	90%	91%	91%
Don't know	2%	2%	1%	**3%**	3%	1%	4%	3%
	N=500	N=504	N=500	**N=500**	N=152	N=138	N=135	N=75

	Air Quality Problem		
	Major	Moderate	Minor
Yes	8%	6%	8%
No	88%	92%	89%
Don't know	4%	2%	3%
	N=98	N=272	N=106

* Calculated from combination of use of gasoline-powered lawn & garden equipment and specific use of a gasoline-powered lawn mower among those users (5/16-4/18).

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

Table 16a Type of Engine in Gasoline-Powered Lawn Mower Used

	05/16 Total	05/17 Total	04/18 Total	**05/19 Total**
2-stroke	38%	37%	72%	**40%**
4-stroke	28%	20%	19%	**43%**
Don't know	33%	43%	9%	**17%**
	N=39	N=30	N=32	**N=35**

Question: Does your gasoline-powered lawn mower have a 2-stroke or a 4-stroke engine?

Table 16b Minutes Per Month Gasoline-Powered Lawn Mower Used

	05/16 Total	05/17 Total	04/18 Total	**05/19 Total**
15 minutes or less	13%	57%	31%	**14%**
16-30 minutes	61%	21%	50%	**46%**
31 minutes-1 hour	18%	7%	12%	**37%**
More than 1 hour	8%	14%	6%	**3%**
	N=39	N=30	N=32	**N=35**

Question: In a typical month, how many minutes would you estimate that you use your gasoline-powered lawn mower?

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

PDEQ and Rideshare Awareness –

- **You are aware of the Pima County Department of Environmental Quality (PDEQ)** (60% agree with this statement, down from 66% last year and the lowest awareness recorded since 2015 [60%]. Awareness in the current study is highest in the Northwest zips and among progressively older or more long-term residents – as well as those familiar with the "Clean Air" Program [83% versus 44% unaware].)

- **You are aware of the services provided by Sun Rideshare** (52% agree, down slightly from 2018 [55%] but consistent with 2017 findings [51%]. Awareness is very consistent across geography and higher among women, 26 to 35 or 46 to 65 year-olds, the most formally educated and residents familiar with the "Clean Air" Program [64% versus 45% unaware].)

PDEQ Program and Campaign Awareness –

- **You have seen or heard information about the importance of keeping your tires properly inflated** (82% agree. This is down from the last two surveys [86%-88%], but consistent with 2016 agreement [83%]. East region residents, older respondents [46 or older], non-Hispanics and those aware of the "Clean Air" Program [88% versus 80% unaware] are most apt to agree.)

- **You have seen or heard the phrase "Healthy Air Is in Our Hands"** (Three of ten agree, down incrementally from 36% in 2016. Awareness is higher among South region residents, 16 to 25 year-olds, Hispanics, respondents who perceive a "major" air quality problem and those aware of the "Clean Air" Program [44% versus 21%].)

Air Pollution Evaluations –

- **You have seen or heard information regarding clean air or air pollution** (82% agree, up from 80% in 2018. Agreement is lower only in the East zips [75% versus 81%-85% elsewhere] and higher among those 56 or older, the newest Pima County residents [for less than two years], non-Hispanic minorities and those aware of the "Clean Air" Program [92% versus 76% unaware].)

- **You are aware that the majority of our air pollution comes from motor vehicle use** (77% agreement, down from 81%-83% in recent years. Northwest residents, women, non-Hispanics and those who perceive a progressively more serious air quality problem in Tucson are more apt to agree. So are those aware of the Pima County "Clean Air" Program [84% versus 72% unaware].)

- **You have seen or heard information that vehicle engine idling causes air pollution** (75% agree, down from 88%-90% in 2017-2018. Most likely to agree are older respondents [56+], the newest residents [for less than two years], non-Hispanics and high income households – along with those familiar with the "Clean Air" Program [85% versus 70% unfamiliar]. Geographically, agreement is somewhat lower only in Central zips [70% versus 75%-80% elsewhere].)

- **Because *you want to reduce air pollution*, you are generally driving less** (52% agreement, down from 58% in the last four years. Women, 56 to 65 year-olds, residents who perceive a progressively more severe air quality problem and those aware of the "Clean Air" Program [58% versus 48% unaware] are most likely to agree. Only in the East zips do residents disagree [53%] more often than they agree [47%].)

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

	05/15 Total	05/16 Total	05/17 Total	04/18 Total	**05/19 Total**
You have seen or heard information about the importance of keeping your tires properly inflated.	88%	83%	86%	88%	**82%**
You have seen or heard information regarding clean air or air pollution.*	66%	77%	84%	80%	**82%**
You are aware that the majority of our air pollution comes from motor vehicle use.	82%	83%	81%	82%	**77%**
You have seen or heard information that vehicle engine idling causes air pollution.	–	–	90%	88%	**75%**
You are aware of the Pima County Department of Environmental Quality (PDEQ).	60%	68%	63%	66%	**60%**
You are aware of the services provided by Sun Rideshare.	55%	58%	51%	55%	**52%**
Because you want to *reduce air pollution*, you are generally driving less	58%	58%	58%	58%	**52%**
You have seen or heard the phrase "Healthy Air Is in Our Hands."	26%	36%	34%	32%	**30%**
	N=500	N=500	N=504	N=500	**N=500**

	Area				Air Quality Problem		
	Central	South	Northwest	East	Major	Moderate	Minor
You have seen or heard information about the importance of keeping your tires properly inflated.	82%	80%	81%	89%	83%	83%	84%
You have seen or heard information regarding clean air or air pollution.*	81%	85%	83%	75%	83%	83%	81%
You are aware that the majority of our air pollution comes from motor vehicle use.	76%	75%	80%	73%	85%	80%	67%
You have seen or heard information that vehicle engine idling causes air pollution.	70%	80%	76%	75%	76%	79%	72%
You are aware of the Pima County Department of Environmental Quality (PDEQ).	58%	58%	65%	59%	64%	60%	62%
You are aware of the services provided by Sun Rideshare.	53%	50%	54%	51%	50%	54%	54%
Because you want to *reduce air pollution*, you are generally driving less	52%	54%	53%	47%	63%	56%	36%
You have seen or heard the phrase "Healthy Air Is in Our Hands."	31%	34%	27%	29%	38%	29%	28%
	N=152	N=138	N=135	N=75	N=98	N=272	N=106

* 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 – Six of ten overall indicate that they generally **drive alone** to go shopping. This is up progressively from 2017 (54%) and 2018 (56%) levels, and equals the 2016 study (60%). Fewer also **carpool with 1 to 4 other adults** (from 30% last year to 25% now). While there has been a healthy uptick is those who **walk** for shopping (from 3% to 7%), use of other alternative methods is unchanged to lower: **bus** (4%, down from 6%), **bicycle** (1%, down from 2%) or **motorcycle** (unchanged at 1%). Less than 1% overall in the current study say the **vanpool with 5 or more other adults** or **take the streetcar** for shopping purposes.

The incidence of driving alone for shopping is highest in the Northwest or East zip codes, as well as among 46 to 55 year-olds and those who perceive a progressively more minor air quality problem. Carpoolers skew female and younger, while walkers tend to be Central residents and those who think that Tucson has a "major" air quality problem. Non-Whites are more likely to take the bus.

Table 18 Travel Behavior for Shopping

	05/15 Total	05/16 Total	05/17 Total	04/18 Total	**05/19 Total**
Drive alone	50%	60%	54%	56%	**61%**
Carpool with 1 to 4 other adults	29%	27%	30%	30%	**25%**
Walk	4%	4%	5%	3%	**7%**
Bus	9%	5%	6%	6%	**4%**
Bicycle	3%	1%	2%	2%	**1%**
Motorcycle	1%	–	1%	1%	**1%**
Vanpool with 5 or more other adults	2%	1%	1%	0%	**0%**
Take the streetcar	1%	–	0%	2%	**0%**
Other	1%	2%	1%	1%	**1%**
	N=500	N=500	N=504	N=500	**N=500**

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

Travel Behavior for Leisure Purposes – For leisure purposes ("such as dining out, meeting with friends, going to the movies, going to the gym, etc."), more now say they generally **drive alone** (46%) than **carpool with 1 to 4 other adults** (41%). In 2018, slightly more carpooled (43%) than drove solo (42%). Similar to past years, fewer ride the **bus** (4%), **walk** (2%), **motorcycle** (2%) or **vanpool with 5 or more other adults** (1%).

Single passenger travel for leisure purposes is highest in the Northwest zip codes and among 46 to 55 year-olds, non-Hispanic minorities and 2+ vehicle households. Carpoolers are more apt to be East residents, women and 16 to 25 year-olds. Bus ridership for leisure purposes is highest in the Central zips.

Table 19 Travel Behavior for Leisure Purposes

	05/15 Total	05/16 Total	05/17 Total	04/18 Total	**05/19 Total**
Drive alone	39%	45%	44%	42%	**46%**
Carpool with 1 to 4 other adults	43%	44%	41%	43%	**41%**
Bus	6%	3%	6%	5%	**4%**
Walk	4%	3%	3%	2%	**2%**
Motorcycle	1%	0%	2%	3%	**2%**
Vanpool with 5 or more other adults	1%	0%	1%	1%	**1%**
Bicycle	2%	2%	1%	2%	**0%**
Take the streetcar	1%	–	–	1%	**0%**
Other	2%	2%	2%	2%	**3%**
	N=500	N=500	N=504	N=500	**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 Tucson Area – Two of ten perceive that a "major" air quality problem exists in the Tucson area. This is up from 17% last year and consistent with 2017 findings (21%). At the same time, slightly fewer think that air quality is a "minor problem" (from 24% last year to 21% now). In line with recent years, most say that the air quality problem is "moderate" issue (54%), with 5% who are unsure.

The perception of a "major" air quality problem is lower only among residents of the Central zips (16% versus 19%-22% elsewhere). There are few differences with respect to gender or age (somewhat lower only among those 66+). Instead, it is 6+ year Pima County residents, non-Hispanic minorities and those aware of the "Clean Air" Program (21% versus 17% unaware) who are more likely to indicate that Tucson's air quality is a "major problem." This is also the case among residents who perceive that Tucson has a progressively more severe stormwater pollution problem.

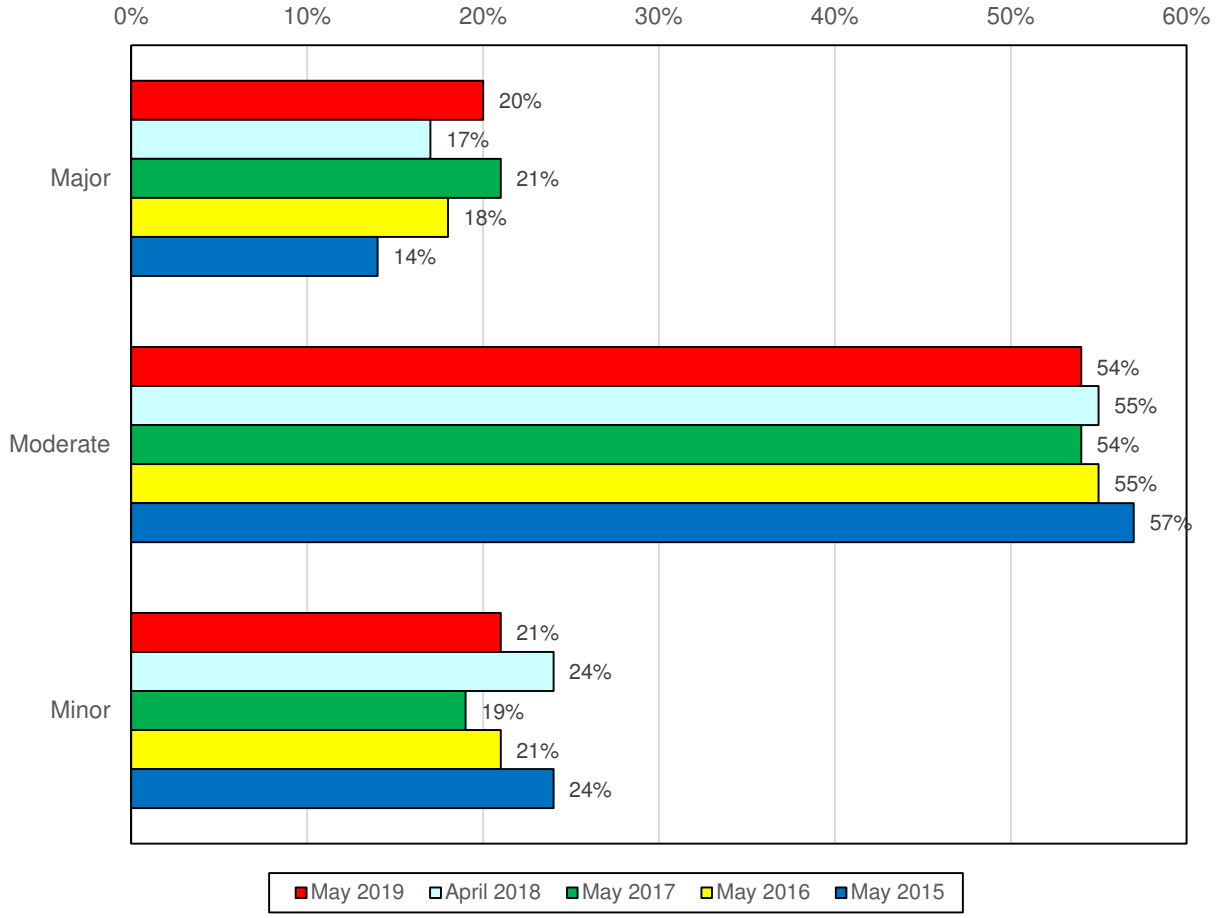
Men, those 66 or older and multi-vehicle households are more likely to say that Tucson has a "minor" air quality problem. Few Northwest residents perceive a "minor" issue (15% versus 23%-24% elsewhere) – instead, most (63%) say air quality is a "moderate problem" in Tucson.

Table 20 Perceived Seriousness of Air Quality Problem in Tucson Area

	05/15 Total	05/16 Total	05/17 Total	04/18 Total	**05/19 Total**
Major problem	14%	18%	21%	17%	**20%**
Moderate problem	57%	55%	54%	55%	**54%**
Minor problem	24%	21%	19%	24%	**21%**
Don't know	4%	6%	6%	4%	**5%**
	N=500	N=500	N=504	N=500	**N=500**

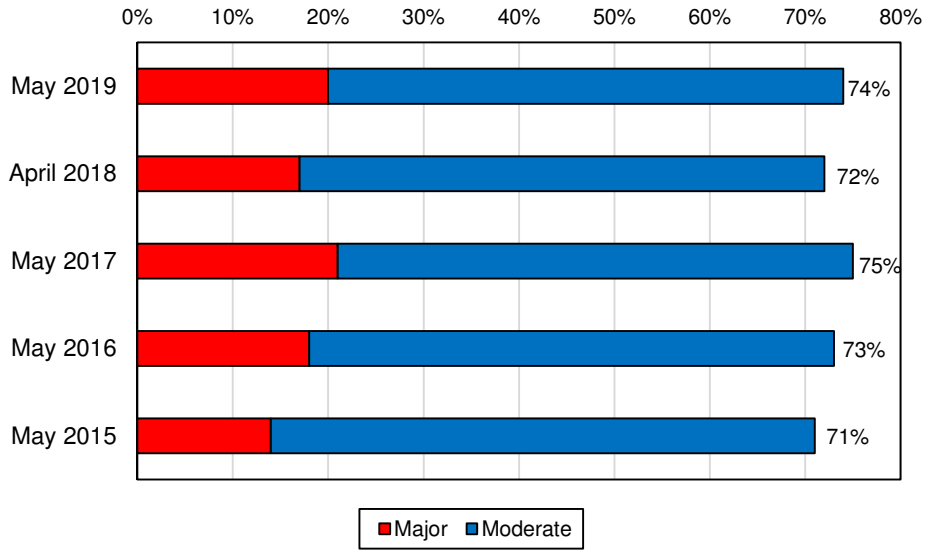
Question: How much of an air quality problem do you think exists in the Tucson area? Do you think this is a major problem, a moderate problem or a minor problem?

Display 20 Perceived Seriousness of Air Quality Problem in Tucson Area
(Among the Total Sample)



Display 20 **Perceived Seriousness of Air Quality Problem in Tucson Area**

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



Work Commuting Behavior

Employment Status – Identical to last year, and allowing survey respondents to select more than one category of response, 38% say that they are employed full-time (30 hours or more each week). Full-time employment is greater in the Central and Northwest areas, as well as among men, 26 to 55 year-olds, Hispanics and those with a college degree. Consistent with last year, 12% report working part-time (less than 30 hours each week). Part-time employees are similar regardless of area, and are more apt to be women, 16 to 25 or 36 to 45 year-olds and residents for less than five years. Unchanged since 2018, 9% report being unemployed, with little difference based on area of residence.

Similar to last year, 27% in the current survey are retired, more often Northwest or South region respondents and those 56+. In line with 2018 findings, about one of ten are students or homemakers (9% each).

Table 21 Employment Status
(Multiple Mentions Allowed)

	05/15 Total	05/16 Total	05/17 Total	04/18 Total	**05/19 Total**
Employed full-time (30 hours or more each week)	31%	29%	35%	38%	**38%**
Employed part- time (Less than 30 hours each week)	13%	12%	12%	11%	**12%**
A student	11%	8%	8%	8%	**9%**
Retired	26%	36%	27%	28%	**27%**
A homemaker	12%	12%	12%	7%	**9%**
Currently unemployed	11%	8%	8%	9%	**9%**
	N=500	N=500	N=504	N=500	**N=500**

	Area				Air Quality Problem		
	Central	South	Northwest	East	Major	Moderate	Minor
Employed full-time (30 hours or more each week)	47%	32%	39%	31%	39%	36%	42%
Employed part- time (Less than 30 hours each week)	12%	12%	10%	13%	15%	11%	8%
A student	7%	14%	5%	11%	12%	10%	5%
Retired	22%	30%	30%	27%	22%	26%	37%
A homemaker	9%	9%	10%	12%	5%	11%	10%
Currently unemployed	9%	7%	10%	8%	9%	10%	4%
	N=152	N=138	N=135	N=75	N=98	N=272	N=106

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

Location of Place of Employment – Among those who work full-time or part-time (50% of the total sample), 21% work exclusively for a home-based business. This is up from 13% last year, but identical to the 2017 study. Of those who work outside the home (79%), 73% work for another company exclusively, while 6% work for both another company and a home-based business. South zip code residents are more apt to work exclusively for a home-based business (33% versus 12%-20% in other regions).

Table 22 Location of Place of Employment
(Among Those Employed)

	05/15 Total	05/16 Total	05/17 Total	04/18 Total	**05/19 Total**
Home-based business	14%	15%	21%	13%	**21%**
Another company	78%	78%	71%	80%	**73%**
Both	7%	7%	8%	7%	**6%**
	N=218	N=209	N=238	N=246	**N=250**

	Area				Air Quality Problem		
	Central	South	Northwest	East	Major	Moderate	Minor
Home-based business	20%	33%	17%	12%	23%	15%	31%
Another company	71%	67%	76%	85%	74%	77%	67%
Both	9%	0%	8%	3%	4%	8%	2%
	N=90	N=61	N=66	N=33	N=53	N=130	N=52

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

Incidence of Telecommuting – Down just slightly from last year (19%), 17% who work outside the home indicate that they telecommute ("working from home as an alternative to going in to your office or place of business during regular business hours"). Telecommuters are more apt to be Central area respondents (22%), as well as 36 to 45 year-olds, those with a college degree or better and households with incomes over $60,000.

Table 23 Incidence of Telecommuting
(Among Those Who Work Outside the Home)

	05/15 Total	05/16 Total	05/17 Total	04/18 Total	**05/19 Total**
Yes	18%	26%	26%	19%	**17%**
No/Employer does not offer telecommuting/ Don't know/Not sure	82%	74%	74%	81%	**83%**
	N=187	N=178	N=187	N=213	**N=197**

	Area				Air Quality Problem		
	Central	South	Northwest	East	Major	Moderate	Minor
Yes	22%	12%	13%	17%	17%	17%	11%
No/Employer does not offer telecommuting/ Don't know/Not sure	78%	88%	87%	83%	83%	83%	89%
	N=72	N=41	N=55	N=29	N=41	N=111	N=36

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 – Among telecommuters, 58% say they do so more than once a week, up from 44% last year and 51% in 2017. Another 12% telecommute about once a week (down from 15% last year), and 24% do so 2-3 times a month (up from 17%). Just 6% say they telecommute only once a month (down from 15%).

Table 24 Frequency of Telecommuting
(Among Those Who Telecommute)

	05/15 Total	05/16 Total	05/17 Total	04/18 Total	**05/19 Total**
More than once a week	39%	70%	51%	44%	**58%**
About once a week	39%	15%	24%	15%	**12%**
2 to 3 times a month	12%	11%	10%	17%	**24%**
Once a month	3%	2%	14%	15%	**6%**
	N=33	N=47	N=49	N=41	**N=33**

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?

Current Work Schedule – Three of four full-time employees report working a "standard" schedule (8 hour days five days a week), up from last year (69%). Another 6% work 10 hour days, 4 days a week (down from 10% last year), and 5% work a 12 hour day, either 3 or 4 days a week (unchanged from last year). Just 2% report working 80 hours over 9 days with the 10th day off (down from 4%). Similar to last year, 12% indicate some "other" workweek options or say their workweek varies. Central or Northwest area residents are more apt to utilize some type of compressed workweek.

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

	05/15 Total	05/16 Total	05/17 Total	04/18 Total	**05/19 Total**
8 hour day, 5 days a week	56%	65%	61%	69%	**75%**
10 hour day, 4 days a week	14%	12%	12%	10%	**6%**
12 hour day, 3 or 4 days a week	6%	3%	4%	5%	**5%**
80 hours over 9 days with the 10th day off	4%	3%	5%	4%	**2%**
Varies/Other	20%	17%	17%	12%	**12%**
	N=133	N=130	N=134	N=169	**N=156**

	Area				Air Quality Problem		
	Central	South	Northwest	East	Major	Moderate	Minor
8 hour day, 5 days a week	70%	81%	71%	90%	83%	75%	81%
10 hour day, 4 days a week	7%	0%	11%	0%	3%	6%	0%
12 hour day, 3 or 4 days a week	5%	10%	4%	0%	3%	3%	13%
80 hours over 9 days with the 10th day off	0%	6%	2%	0%	0%	1%	0%
Varies/Other	18%	3%	9%	10%	10%	14%	6%
	N=60	N=31	N=45	N=20	N=30	N=88	N=31

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 previous 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.

Similar to last year, 80% utilize **single passenger commuting to work or school**. The average frequency of use is 4.6 days, up from 4.2 last year. Only East area residents are somewhat *less* likely to drive alone at least one day per week (74% versus 78%-83% in other areas). At the same time, Northwest (62%) and Central (57%) residents are most apt to drive alone 5+ days per week.

Alternative commute travel methods measured by this survey include:

- **Walk to work or school** (Similar to last year [21%], 20% say they walk to work or school, with a decline in average days [from 2.8 to 2.4 days]. Walking to work or school is more common among South area residents.)

- **Work at home instead of driving to work** (Nearly identical to 2018 findings [19%], 20% telecommute, although frequency of usage has declined slightly [from 3.0 to 2.8 days]. Telecommuting is lower only in the East zips [11% versus 20%-23% in other areas].)

- **Carpool/Vanpool** (Down from last year [23%], 19% indicate they carpool or vanpool at least one day per week. Average frequency, however, has increased [from 2.6 to 3.1 days]. Northwest area residents are somewhat more apt to carpool at least one day a week.)

- **Ride a bike to work or school** (Down from last year [17%], but more in line with 2017 findings [10%], 13% indicate riding a bike to work or school. The frequency has also returned to 2017 levels [2.5 days, down from 2.9 last year]. East area residents are more apt to ride a bike to work or school.)

- **Take the bus to work or school** (Bus ridership has again declined [from 14% to 12%], with no change in the average days using this method [2.6]. South area residents are more apt to take the bus.)

- **Take the streetcar to work or school** (Down from last year [11%], but in line with 2017, 4% say they take the streetcar. The frequency of usage has increased [from 2.4 days to 3.2 days].)

- **Ride a motorcycle to work or school** (Similar to last year, 4% indicate riding a motorcycle to work or school, with the frequency increasing to 2017 levels [2.9 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	**2019 Usage* (N=230)**	**2019 Average Frequency**
Drive alone	76%	4.3 days	81%	4.2 days	**80%**	**4.6 days**
Carpool/Vanpool	28%	3.1 days	23%	2.6 days	**19%**	**3.1 days**
Walk	24%	3.0 days	21%	2.8 days	**20%**	**2.4 days**
Work at home instead of driving to work	19%	3.4 days	19%	3.0 days	**20%**	**2.8 days**
Take the bus	18%	3.6 days	14%	2.6 days	**12%**	**2.6 days**
Ride a bike	10%	2.4 days	17%	2.9 days	**13%**	**2.5 days**
Take the streetcar	4%	2.0 days	11%	2.4 days	**4%**	**3.2 days**
Ride a motorcycle	6%	2.8 days	5%	1.5 days	**4%**	**2.9 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	**05/19 Total**	Area				Awareness of "Clean Air" Program	
						Central	South	North-west	East	Yes	No
Take the bus											
Not at all	86%	87%	82%	86%	**88%**	87%	81%	93%	91%	87%	92%
1-4 days/week	7%	5%	12%	11%	**9%**	10%	12%	5%	9%	10%	7%
5 days/week	4%	5%	3%	1%	**3%**	3%	7%	2%	0%	3%	2%
6+ days/week	3%	2%	3%	2%	**0%**	0%	0%	0%	0%	0%	0%
Ride a motorcycle											
Not at all	96%	98%	94%	95%	**96%**	94%	100%	98%	94%	95%	98%
1-4 days/week	3%	2%	6%	5%	**3%**	6%	0%	2%	0%	3%	2%
5 days/week	0%	0%	0%	0%	**1%**	0%	0%	0%	6%	2%	0%
6+ days/week	0%	0%	1%	0%	**0%**	0%	0%	0%	0%	0%	0%
Ride a bike											
Not at all	88%	90%	90%	83%	**87%**	91%	88%	86%	80%	88%	88%
1-4 days/week	8%	8%	8%	12%	**11%**	9%	7%	14%	17%	11%	10%
5 days/week	1%	2%	1%	3%	**1%**	0%	3%	0%	3%	1%	2%
6+ days/week	2%	0%	0%	1%	**0%**	0%	2%	0%	0%	0%	0%
Walk											
Not at all	79%	76%	76%	79%	**80%**	78%	76%	86%	80%	78%	80%
1-4 days/week	14%	17%	18%	16%	**18%**	21%	17%	14%	20%	22%	15%
5 days/week	4%	4%	2%	2%	**1%**	1%	3%	0%	0%	0%	2%
6+ days/week	4%	3%	5%	2%	**1%**	0%	3%	0%	0%	0%	2%
Work at home instead of driving to work											
Not at all	86%	76%	81%	81%	**80%**	77%	81%	80%	89%	77%	83%
1-4 days/week	11%	14%	12%	14%	**15%**	18%	15%	12%	12%	19%	11%
5 days/week	1%	7%	4%	2%	**3%**	3%	2%	7%	0%	2%	4%
6+ days/week	2%	3%	3%	3%	**2%**	3%	2%	2%	0%	2%	2%
Take the streetcar											
Not at all	95%	96%	96%	89%	**96%**	95%	93%	98%	97%	94%	97%
1-4 days/week	5%	4%	4%	10%	**3%**	5%	5%	0%	0%	5%	2%
5 days/week	0%	0%	0%	1%	**0%**	0%	0%	2%	0%	1%	0%
6+ days/week	0%	0%	0%	1%	**1%**	0%	2%	0%	3%	0%	2%
	N=226	N=203	N=219	N=241	**N=230**	N=77	N=59	N=59	N=35	N=97	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	**05/19 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%	**81%**	84%	81%	76%	80%	87%	74%
1 day/week	5%	5%	10%	8%	**4%**	3%	3%	8%	0%	4%	4%
2 days/week	2%	4%	4%	5%	**5%**	8%	0%	3%	11%	3%	8%
3 days/week	4%	4%	4%	5%	**1%**	1%	0%	3%	0%	3%	0%
4 days/week	2%	2%	2%	1%	**4%**	1%	8%	7%	0%	2%	7%
5 days/week	7%	4%	6%	4%	**4%**	1%	5%	2%	9%	1%	6%
6+ days/week	3%	4%	4%	1%	**1%**	1%	2%	0%	0%	0%	2%
Drive alone											
Not at all	30%	30%	24%	19%	**20%**	20%	22%	17%	26%	22%	20%
1 day/week	6%	8%	7%	8%	**5%**	3%	10%	7%	0%	4%	7%
2 days/week	5%	7%	8%	9%	**4%**	0%	7%	3%	11%	3%	3%
3 days/week	8%	4%	10%	5%	**10%**	3%	14%	8%	20%	10%	8%
4 days/week	10%	8%	10%	12%	**8%**	18%	0%	3%	6%	12%	5%
5 days/week	30%	27%	26%	34%	**38%**	39%	36%	48%	23%	39%	38%
6+days/week	11%	16%	15%	13%	**15%**	18%	12%	14%	14%	9%	20%
	N=226	N=203	N=219	N=241	**N=230**	N=77	N=59	N=59	N=35	N=97	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?

2019 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 Economic Opportunity) 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 2,877,389 vehicle miles per day – or 30% of total miles driven/not driven.** As summarized in the tracking display below, the percentage of miles saved has decreased from last year (38%). This is due to a combination of the lower percentage of those who report working outside the home (79%) (from Table 22) and, perhaps relatedly, reductions in use (both overall and average days) of some alternative modes (as summarized in Table 26-S).

Overall, 10.3% fewer miles are being traveled (from 10,809,324 in 2018 to 9,691,879 now) – in part (and as documented in Table 22) because of the decrease in non-home-based employees (from 87% to 79%, which results in fewer employed persons who have commute miles to calculate).

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

Year	Total Employed (Non-Home-Based)/ Students	% Who Single-Passenger Commute 1+ Days/Week	Average Single Occupant Auto Commute Distance	# of Commute Miles Driven/ Not Driven	# of Vehicle Miles Saved Daily	% of Miles Saved Through Alternate Mode Use
2019	**430,438**	**80%**	**12.5**	**9,691,879**	**2,877,389**	**30%**
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 2019 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)	(80%) 344,350	4.55x2=9.10	3,133,585	6.2	505,417	12.5	6,317,713	6,317,713	-0-
Motorcycle	(4%) 17,218	2.88x2=5.76	99,176	6.2	15,996	9.9	158,360	158,360	-0-
Alternative Modes:									
Carpool	(19%) 81,783	3.07x2=6.14	502,148	6.2	80,992	11.3	915,210	326,861	588,349
Bus	(12%) 51,653	2.61x2=5.22	269,629	6.2	43,489	9.3	404,448	11,556	392,892
Bike	(13%) 55,957	2.50x2=5.00	279,785	6.2	45,127	8.7	392,605	-0-	392,605
Walk	(20%) 86,088	2.35x2=4.70	404,614	6.2	65,260	6.0	391,560	-0-	391,560
Streetcar	(4%) 17,218	3.20x2=6.40	110,195	6.2	17,773	6.6	117,302	-0-	117,302
Telecommute	(20%) 86,088	2.78x2=5.56	478,649	6.2	77,201	10.6	818,331	-0-	818,331
Compressed workweek	(9%) 38,739	1.12x2=2.24	86,775	6.2	13,996	12.6	176,350	-0-	176,350
					865,251		9,691,879		2,877,389

(A) # employed persons in Pima County (est. @ 388,200 as of February, 2019 by Arizona Office of Economic Opportunity) x % non-home-based employees (79%) (Table 21) + # students 16+ (est. 123,760 in 2017 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 (2.8) 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 – Representing incremental annual growth from 58% in 2015, 68% of commuters now say that **single-passenger vehicle commuting** is their ***most-used*** method of transportation. Primary use of single-passenger commuting is *lower* only among South region residents, 16 to 25 year-olds and those who think Tucson has a "major" air quality problem.

Consistent with last year, 7% each are either primarily **carpooling** or **telecommuting**. Those who carpool for their primary transportation tend to be South or Northwest zip code residents and younger (16 to 35). Telecommuting primaries are more apt to be Northwest area residents and 36 to 55.

Down slightly from last year (7%), 5% are **riding a bike** as their primary mode of transportation to work or school, more often South or East area residents and men. As many are primarily **taking the bus** (5%, up slightly from 4%) or **walking** (5%, down from 6%). In lesser numbers, a few **take the streetcar** (unchanged at 2%) or **ride a motorcycle** (1%, up from 0%) as their primary mode of commuting.

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	**5/19 Total**
Drive alone	58%	61%	62%	66%	**68%**
Drive or ride in a carpool	12%	11%	10%	7%	**7%**
Work at home instead of driving to work	5%	11%	8%	7%	**7%**
Ride a bike	3%	3%	2%	7%	**5%**
Take the bus	8%	9%	9%	4%	**5%**
Walk	9%	4%	6%	6%	**5%**
Take the streetcar	2%	–	1%	2%	**2%**
Ride a motorcycle	2%	–	1%	–	**1%**
	N=226	N=203	N=219	N=241	**N=229**

	Area				Air Quality Problem		
	Central	South	Northwest	East	Major	Moderate	Minor
Drive alone	75%	59%	68%	66%	54%	70%	74%
Drive or ride in a carpool	4%	10%	12%	3%	10%	8%	3%
Work at home instead of driving to work	6%	5%	10%	6%	8%	7%	5%
Ride a bike	4%	7%	3%	9%	8%	4%	8%
Take the bus	6%	7%	3%	0%	10%	4%	3%
Walk	3%	9%	2%	9%	6%	5%	3%
Take the streetcar	0%	3%	2%	3%	4%	2%	0%
Ride a motorcycle	1%	0%	0%	6%	0%	0%	5%
	N=77	N=58	N=59	N=35	N=50	N=131	N=39

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.)

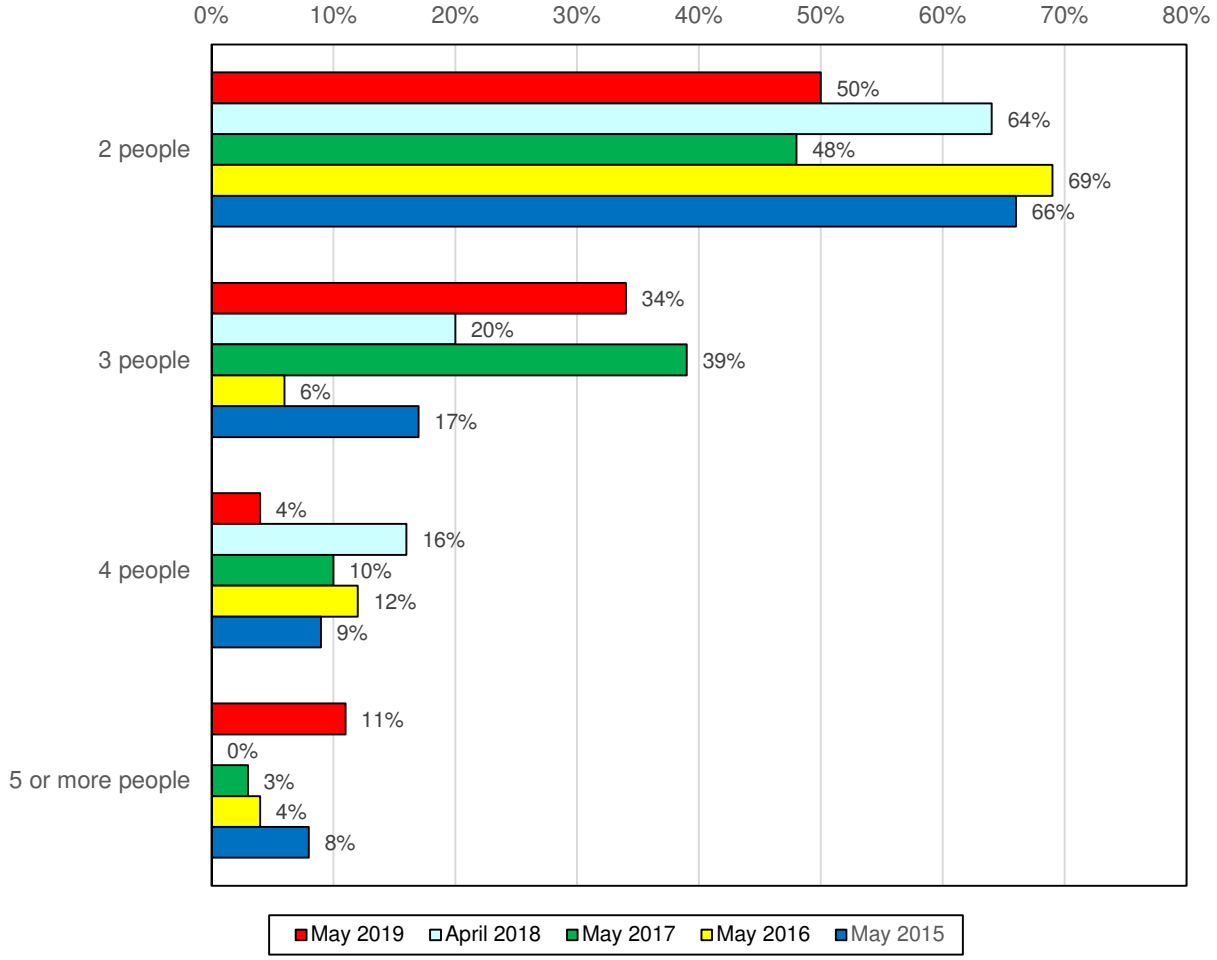
Size of Work or School Commute Carpool – Among carpoolers, one-half are travelling to work or school in a 2-person carpool. This is down from last year (64%), but consistent with 2017 (48%). Instead, more are riding in 3-person carpools (from 20% last year to 34% now). Fewer have 4-person carpools (4%, down from 16%), while 11% say they ride with 5 or more people. The average carpool size has increased from last year (from 2.5 to 2.8), and is consistent with 2017 findings (2.7).

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	**05/19 Total**
2 people	66%	69%	48%	64%	**50%**
3 people	17%	6%	39%	20%	**34%**
4 people	9%	12%	10%	16%	**4%**
5 or more people	8%	4%	3%	–	**11%**
Varies	0%	8%	–	–	**–**
	N=53	N=49	N=59	N=56	**N=44**

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, and consistent with last year, three of ten indicate they have a commute of 5 miles or less. Another 23% say their commute is between 6 and 10 miles (down from 30%), while 17% commute 11 to 14 miles (up from 8%). Similar to last year, 29% travel 15 miles or more. Geographically, East area residents are most apt to have a commute of 15+ miles (46%), while the vast majority of Central zip code residents commute 10 miles or less (71%).

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	**05/19 Total**
5 miles or less	31%	35%	36%	29%	**30%**
6 to 10 miles	26%	29%	29%	30%	**23%**
11 to 14 miles	7%	8%	8%	8%	**17%**
15 or more miles	33%	27%	26%	30%	**29%**
Don't know/Not sure	3%	2%	1%	2%	**1%**
	N=222	N=203	N=216	N=241	**N=229**

	Area				Air Quality Problem		
	Central	South	Northwest	East	Major	Moderate	Minor
5 miles or less	40%	33%	17%	26%	26%	37%	15%
6 to 10 miles	31%	19%	20%	17%	24%	23%	26%
11 to 14 miles	12%	12%	30%	11%	20%	16%	13%
15 or more miles	14%	36%	32%	46%	26%	24%	46%
Don't know/Not sure	3%	0%	0%	0%	4%	0%	0%
	N=77	N=58	N=59	N=35	N=50	N=131	N=39

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

Stormwater Perceptions and Practices

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

- **River or wash** (49%, down from 53% in 2018 [the highest mention to-date]. These tend to be Central denizens, men, 46 to 65 year-olds and the newest Pima County residents [for less than two years] – with no difference based on the perceived severity of the stormwater pollution problem.)

- **Groundwater** (15%, unchanged since last year. East zip residents, 56 to 65 year-olds and those who perceive that stormwater pollution is not a problem are more likely to think that water that flows into storm drains ends up in the groundwater.)

- **Water treatment plants** (12%, up slightly from 10% in 2018. Northwest or East residents, 16 to 45 year-olds and respondents who think Tucson has a "moderate" stormwater pollution problem are more likely to believe that stormwater flows into water treatment plants.)

- **Sewage plants** (11%, down from 16%-17% the past two years. There are fewer differences based on geography [slightly lower only in the South zips] – with increased mentions among women, 16 to 45 year-olds and part-year Pima County residents.)

- **Canals** (7%, unchanged for the last two surveys. Again, these tend to be South region residents.)

Unchanged since last year, and regardless of stormwater pollution perception, one of four in the current survey say they **do not know** where stormwater that flows into a storm drain ends up. These are more apt to be South zip code residents, women, 36 to 45 or 66+ year-olds and 6-to-10 year Pima County residents.

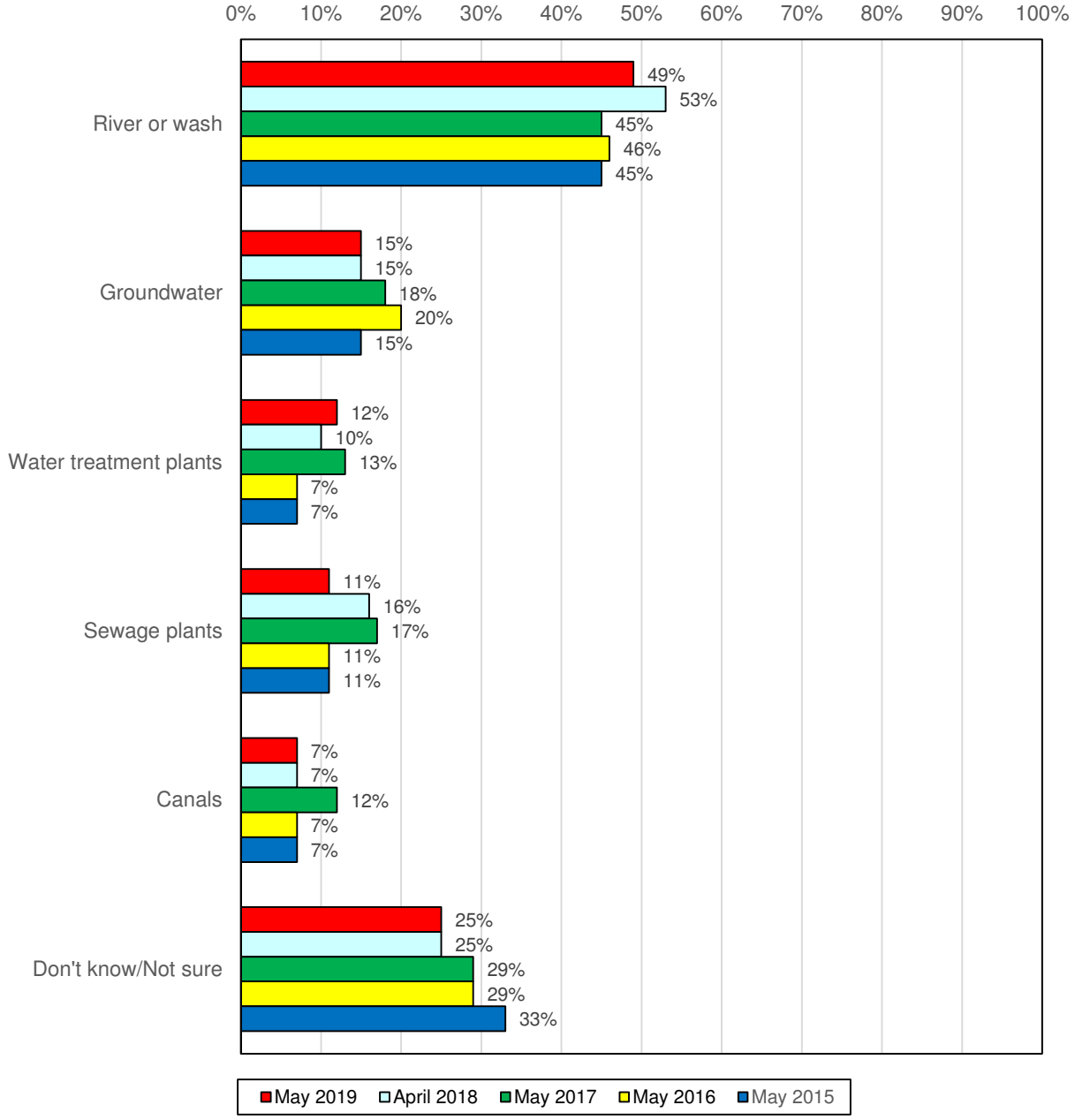
Table 27 Perception of Where Stormwater That Flows Into Tucson Storm Drains Ends Up

	05/15 Total	05/16 Total	05/17 Total	04/18 Total	**05/19 Total**	Area			
						Central	South	North-west	East
River or wash	45%	46%	45%	53%	**49%**	54%	41%	51%	49%
Groundwater	15%	20%	18%	15%	**15%**	16%	13%	13%	21%
Water treatment plants	7%	7%	13%	10%	**12%**	13%	4%	16%	17%
Sewage plants	11%	11%	17%	16%	**11%**	11%	9%	13%	12%
Canals	7%	7%	12%	7%	**7%**	7%	11%	2%	5%
Don't know/Not sure	33%	29%	29%	25%	**25%**	20%	36%	24%	20%
	N=500	N=500	N=504	N=500	**N=500**	N=152	N=138	N=135	N=75

	Stormwater Pollution Problem		
	Serious Problem	Moderate Problem	Not a Problem
River or wash	49%	49%	48%
Groundwater	16%	13%	20%
Water treatment plants	9%	16%	11%
Sewage plants	9%	13%	9%
Canals	5%	9%	4%
Don't know/Not sure	28%	23%	26%
	N=218	N=228	N=54

Question: Some 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



Perceived Value of Various Uses for Areas Near a Wash – Survey participants were also informed that "washes carry stormwater, and the areas near them also serve other purposes." Using a "1-to-9" scale (where "9" means "highly valuable" and "1" means "low or no value"), respondents were asked to rate the perceived value of six different possible uses for these areas. Results are summarized in Table 28, ranked by average score on the "1-to-9" rating scale. For each use tested, the incidence of value is directly related to the perception of a more severe stormwater pollution problem in the Tucson area.

The two uses of areas near a wash with the highest perceived value include:

- **Reduces floods** (64% "highly valuable" versus 14% "low/no value," 6.9 average score on the "1-to-9" scale. These are more likely to be Northwest or East residents and progressively older or higher income respondents.)

- **Recharging groundwater supplies** (60% "highly valuable" versus 14% "low/no value," 6.7 average score. Northwest residents, those 56 or older and non-Hispanics are more apt to find this use valuable.)

A slight majority also perceive some degree of value for these two uses of areas near a wash:

- **Relief from heat in a shady area** (52% "highly valuable" versus 18% "low/no value," 6.3 average score. Increased perceived value among East residents, older [56+] respondents and college graduates or better.)

- **Active recreation, like walking or biking** (52% "highly valuable" versus 18% "low/no value," 6.2 average score. East residents, 56 to 65 year-olds, non-Hispanics and college graduates are more likely to indicate increased value.)

About four of ten overall indicate value for these two potential wash uses:

- **Viewing flowing water** (42% "highly valuable" versus 23% "low/no value," 5.7 average score. There are fewer differences based on geography [slightly lower only in the South], with higher scores among non-Hispanics and high income households.)

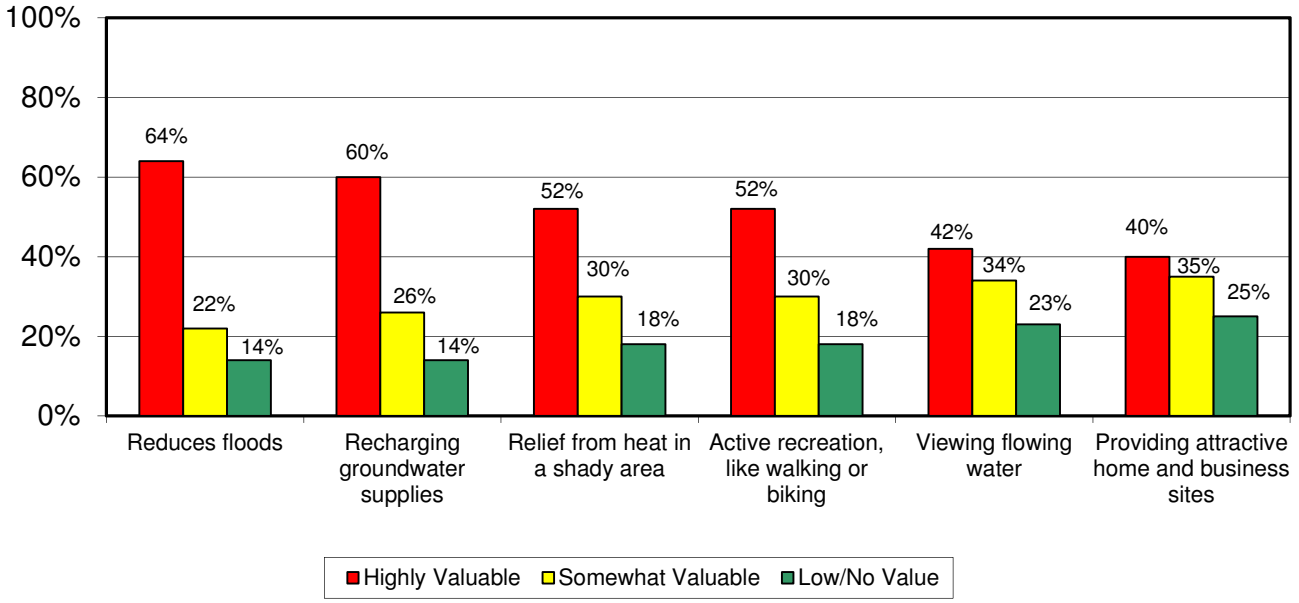
- **Providing attractive home and business sites** (40% "highly valuable" versus 25% "low/no value," 5.5 average score. East residents, those 56 or older and high income types indicate the highest level of perceived value for this wash area use.)

Table 28 Perceived Level of Value of Various Uses for Areas Near a Wash

(5/19 Total N=500) (5/19 Central N=152) (5/19 South N=138) 5/19 Northwest N=135) 5/19 East N=75)	Highly Valuable (7-9)	Somewhat Valuable (4-6)	Low/No Value (1-3)	Don't Know/ No Opinion	**Average Score on 1-9 Scale**
Reduces floods					
5/19 Total	**64%**	**22%**	**14%**	**3%**	**6.9**
5/19 Central	67%	20%	13%	4%	6.9
5/19 South	57%	24%	19%	3%	6.5
5/19 Northwest	66%	26%	8%	2%	7.1
5/19 East	67%	18%	15%	4%	7.1
Recharging groundwater supplies					
5/19 Total	**60%**	**26%**	**14%**	**8%**	**6.7**
5/19 Central	59%	29%	13%	12%	6.6
5/19 South	59%	25%	16%	5%	6.6
5/19 Northwest	61%	27%	12%	5%	7.0
5/19 East	64%	17%	19%	7%	6.8
Relief from heat in a shady area					
5/19 Total	**52%**	**30%**	**18%**	**4%**	**6.3**
5/19 Central	50%	35%	16%	7%	6.2
5/19 South	52%	31%	17%	3%	6.3
5/19 Northwest	47%	30%	22%	3%	5.9
5/19 East	68%	18%	14%	4%	6.9
Active recreation, like walking or biking					
5/19 Total	**52%**	**30%**	**18%**	**4%**	**6.2**
5/19 Central	52%	28%	19%	5%	6.2
5/19 South	46%	34%	20%	3%	6.0
5/19 Northwest	52%	29%	20%	2%	6.2
5/19 East	60%	29%	11%	4%	6.7
Viewing flowing water					
5/19 Total	**42%**	**34%**	**23%**	**5%**	**5.7**
5/19 Central	40%	40%	20%	9%	5.7
5/19 South	38%	35%	27%	2%	5.6
5/19 Northwest	45%	34%	21%	4%	5.9
5/19 East	51%	24%	25%	5%	5.8
Providing attractive home and business sites					
5/19 Total	**40%**	**35%**	**25%**	**7%**	**5.5**
5/19 Central	39%	38%	23%	8%	5.5
5/19 South	38%	35%	27%	7%	5.5
5/19 Northwest	39%	34%	27%	6%	5.4
5/19 East	46%	31%	22%	11%	5.8

Question: Washes carry stormwater, and the areas near them also serve other purposes. For each of the following descriptions, tell me how valuable you think these uses near a wash are, using a "1-to-9" scale, where a "9" means "highly valuable" and a "1" means "low or no value."

Display 28 **Perceived Level of Value of Various Uses for Areas Near a Wash**



Level of Concern Over Various Risks of Areas Near a Wash – After being informed that "the areas near washes also pose risks to the community," respondents were asked to indicate their degree of concern for six possible risks on another "1-to-9" scale. On this scale, "9" means "very concerned" and "1" means "not concerned." For each item tested, the degree of concern indicated is directly related to the perception of a progressively more severe stormwater pollution problem.

More than four of ten are "very concerned" about these two risks of areas near a wash:

- **Is unattractive and hazardous due to trash dumping** (44% "very concerned" versus 26% "not concerned," 5.7 average score on the "1-to-9" scale. Of increased concern in the South zips, as well as among those 56 or older and non-Hispanic minorities.)

- **Road closures** (41% "very concerned" versus 24% "not concerned," 5.6 average score. East denizens, women, non-Hispanics, 56 to 65 year-olds and the newest Pima County residents [for less than two years] report increased concern.)

Other potential risks evaluated include:

- **Flooding** (38% "very concerned" versus 28% "not concerned," 5.3 average score. Lower only in the Central zips, with increased concerns among non-Hispanics and Pima County residents for less than two years.)

- **Erosion or bank collapse** (37% "very concerned" versus 29% "not concerned," 5.3 average score. Some increased concern among South or Northwest residents, non-Hispanics and those with some college level coursework [but no degree].)

- **Creates a safety issue from homeless camps** (36% "very concerned" versus 29% "not concerned," 5.2 average score. These tend to be Central or South residents, women, 36 to 45 or 66+ year-olds, non-Hispanic minorities and those who have lived in Pima County for less than two years.)

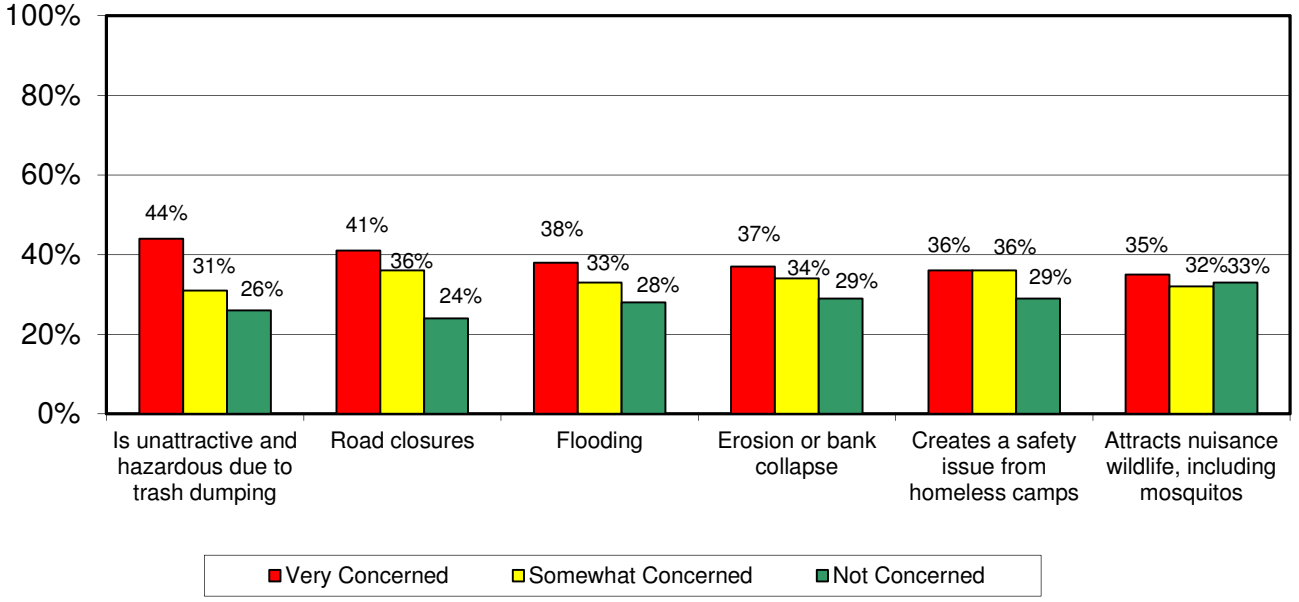
- **Attracts nuisance wildlife, including mosquitoes** (35% "very concerned" versus 33% "not concerned," 5.1 average score. Least concerned are East residents. On the other hand, South denizens, 36 to 45 year-olds, non-Hispanic minorities and "new" Pima County residents express some degree of concern.)

Table 29 Level of Concern Over Various Risks of Areas Near a Wash

(5/19 N=500)	Very Concerned (7-9)	Somewhat Concerned (4-6)	Not Concerned (1-3)	Don't Know/ No Opinion	**Average Score on 1-9 Scale**
Is unattractive and hazardous due to trash dumping	44%	31%	26%	3%	**5.7**
Road closures	41%	36%	24%	2%	**5.6**
Flooding	38%	33%	28%	2%	**5.3**
Erosion or bank collapse	37%	34%	29%	3%	**5.3**
Creates a safety issue from homeless camps	36%	36%	29%	5%	**5.2**
Attracts nuisance wildlife, including mosquitoes	35%	32%	33%	2%	**5.1**

Question: The areas near washes also pose risks to the community. For each of the following descriptions, tell me how concerned you are, using a "1-to-9" scale, where a "9" means "very concerned" and a "1" means "not concerned at all."

Display 29 Level of Concern Over Various Risks of Areas Near a Wash



Green Infrastructures Implemented/Installed at Home or Business – Survey participants were provided a listing of seven different types of Green Infrastructures and asked if each one has been implemented or installed at their home or business. Results (including tracking data) are summarized in Table 30.

Nearly two-thirds (65%) indicate that **landscaping with native plants** is the most often implemented Green Infrastructure, up from 52%-55% in recent years. These tend to be Northwest residents, women, those 56 or older and Whites – as well as those who perceive a "serious" or "moderate" stormwater pollution problem.

<u>About three of ten overall report that these three Green Infrastructures have been implemented at home or their place of business</u>:

- **Porous pavements or bricks** (33%, up from one of four last year and the highest mention to-date. Again, these tend to be Northwest residents, along with 56 to 65 year-olds, Whites, high income households and those who perceive a progressively more severe stormwater pollution problem.)

- **Connecting runoff from a roof or paved surface to a basin or to water plants** (29%, up from 24%-25% in the last two surveys. Northwest or East residents, women, those 66 or older and Whites are more likely to have implemented this Green Infrastructure – with few differences between those who perceive a serious [33%] or non-existent [28%] stormwater pollution problem.)

- **Landscaped depressions that collect stormwater** (28%, highly consistent with the last two years [28%-29%]. Landscaped depressions are more common in the East zips, as well as among 26 to 35 year-olds, non-Hispanics, college graduates and those who perceive at least a moderate stormwater pollution problem.)

<u>Other Green Infrastructures implemented at home or business include</u>:

- **Natural areas protected from clearing and grading** (24%, up progressively from 15% in 2016. Implementation is lower only in the Central zip codes [16% versus 27%-31% elsewhere], and higher among Hispanics and college graduates or better. This practice is utilized regardless of stormwater pollution problem perception.)

- **A trench that is filled with gravel to collect stormwater** (21%, up from 18%-19% in the last two surveys. These tend to be East denizens, the newest Pima County residents, high income households and those who perceive a "serious" stormwater pollution problem.)

- **Water harvesting using rain barrels or cisterns** (19%, down slightly from last year [22%]. Northwest residents, women, 56 to 65 year-olds and college graduates or better are more apt to utilized rain barrels or cisterns.)

Table 30

Green Infrastructures Implemented/Installed at Home or Business

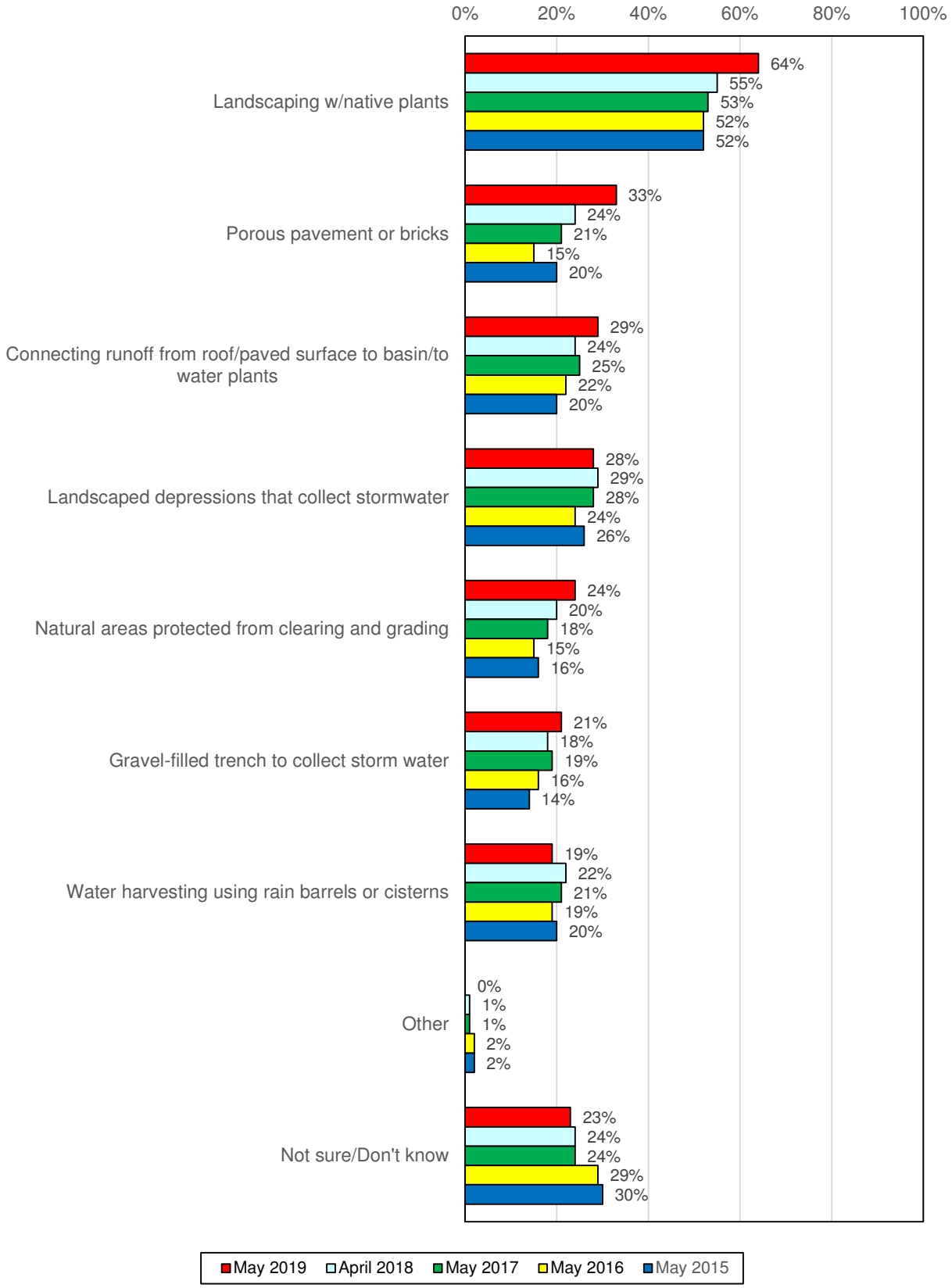
	05/15 Total	05/16 Total	05/17 Total	04/18 Total	**05/19 Total**	Area: Central	South	North-west	East
Landscaping with native plants	52%	52%	53%	55%	**65%**	55%	60%	77%	69%
Porous pavements or bricks	20%	15%	21%	24%	**33%**	31%	27%	41%	32%
Connecting runoff from a roof or paved surface to a basin or to water plants	20%	22%	25%	24%	**29%**	26%	22%	33%	37%
Landscaped depressions that collect stormwater	26%	24%	28%	29%	**28%**	18%	26%	33%	44%
Natural areas protected from clearing and grading	16%	15%	18%	20%	**24%**	16%	27%	28%	31%
A trench that is filled with gravel to collect stormwater	14%	16%	19%	18%	**21%**	18%	18%	22%	28%
Water harvesting using rain barrels or cisterns	20%	19%	21%	22%	**19%**	14%	14%	27%	21%
Other*	2%	2%	1%	1%	**0%**	0%	0%	1%	0%
Not sure/Don't know	30%	29%	24%	24%	**23%**	30%	25%	16%	19%
	N=500	N=500	N=504	N=500	**N=500**	N=152	N=138	N=135	N=75

	Stormwater Pollution Problem: Serious Problem	Moderate Problem	Not a Problem
Landscaping with native plants	69%	64%	50%
Porous pavements or bricks	41%	27%	24%
Connecting runoff from a roof or paved surface to a basin or to water plants	33%	25%	28%
Landscaped depressions that collect stormwater	29%	29%	20%
Natural areas protected from clearing and grading	28%	22%	22%
A trench that is filled with gravel to collect stormwater	24%	18%	17%
Water harvesting using rain barrels or cisterns	22%	18%	11%
Other*	0%	0%	0%
Not sure/Don't know	22%	22%	32%
	N=218	N=228	N=54

* Includes a mention of using grey water to water plants/yard.

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 30 **Green Infrastructures Implemented/Installed at Home or Business**



Awareness of the "Clean Water Starts With Me" Campaign – As in prior years, survey respondents were asked to agree or disagree with a statement related to PDEQ's Clean Water Campaign. The campaign "Clean Water Starts With Me" was developed through the Stormwater Management Working Group. Pima Association of Governments hosts the meeting for the eight jurisdictions within Pima County that manage stormwater.

When asked if they were aware of the campaign, 41% agree, down progressively from 2017 (55%) and 2018 (50%) levels. Awareness is generally consistent regardless of geography (slightly higher in the East zips) and is elevated among women, 36 to 45 year-olds, non-Whites and residents who perceive that Tucson has a "serious" stormwater pollution problem. There is also significantly higher awareness among those familiar with the "Clean Air" Program (64%) than not (26%).

Table 30a Awareness of the "Clean Water Starts With Me" Campaign

	05/15 Total	05/16 Total	05/17 Total	04/18 Total	**05/19 Total**
You are aware of the "Clean Water Starts With Me" campaign.	47%	57%	55%	50%	**41%**
	N=500	N=500	N=504	N=500	**N=500**

	Area				Air Quality Problem		
	Central	South	Northwest	East	Major	Moderate	Minor
You are aware of the "Clean Water Starts With Me" campaign.	39%	43%	41%	45%	46%	40%	41%
	N=152	N=138	N=135	N=75	N=98	N=272	N=106

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

Perceived Seriousness of Stormwater Pollution Problem in the Tucson Area – Nine of ten indicate that there is at least a "moderate" problem in the Tucson area "with polluting materials entering storm drains." This is up from 86%-87% in the last two surveys, including incremental and progressive growth in the percentage who perceive a "serious problem" (from 37% in 2015 to 44% now). The remaining 11% think stormwater pollution is "not a problem," resulting in a 6.0 average score on the "1-to-9" rating scale (up from 5.9 in 2018).

More likely to perceive a "serious" stormwater pollution problem are those in the Northwest or East zips, women, 56 to 65 year-olds and the newest Pima County residents (for less than two years).

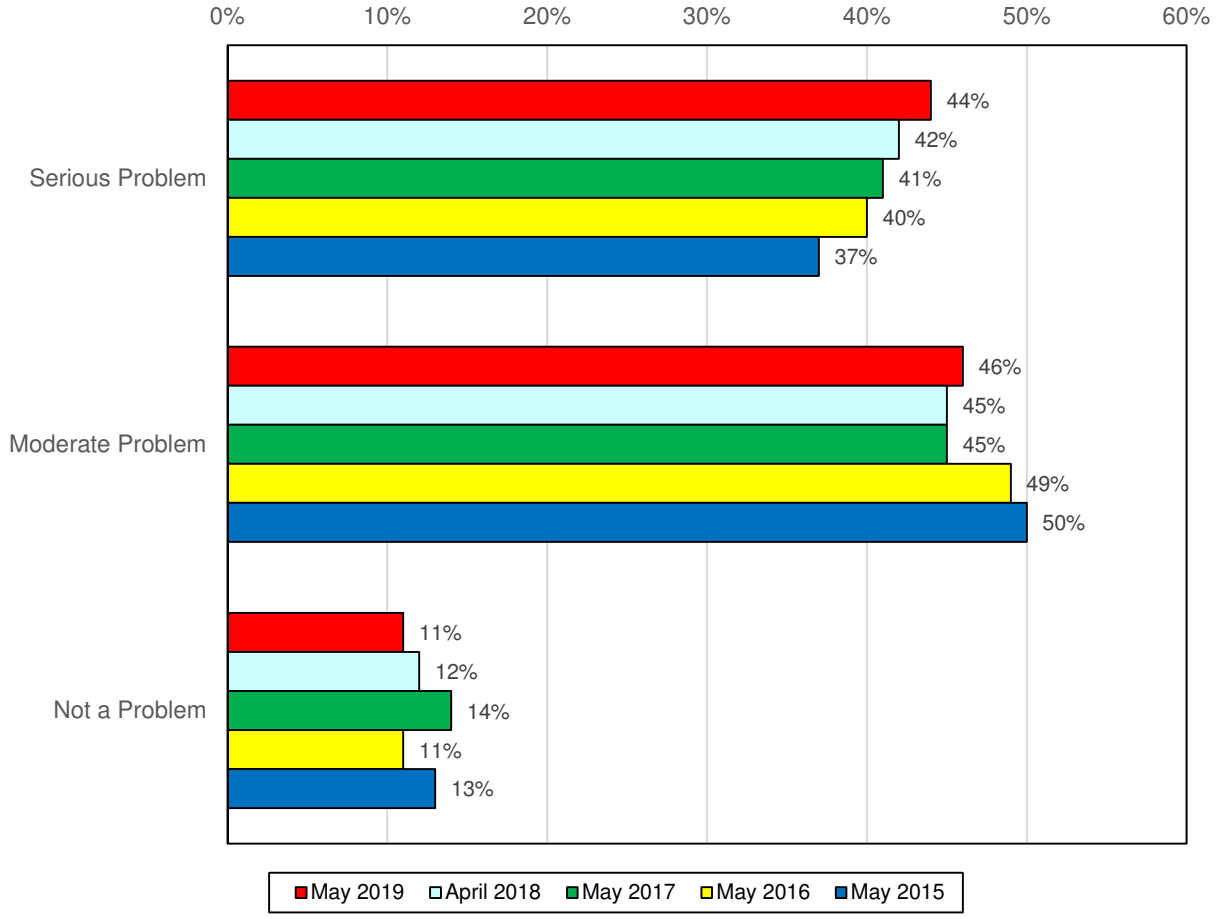
As in previous surveys, those who perceive a progressively more serious air quality problem are also more likely to indicate a seriously more progressive stormwater pollution problem.

Table 31 Perceived Seriousness of Stormwater Pollution Problem in Tucson Area

	05/15 Total	05/16 Total	05/17 Total	04/18 Total	**05/19 Total**	Area			
						Central	South	North-west	East
Serious problem (7-9)	37%	40%	41%	42%	**44%**	40%	43%	47%	47%
Moderate problem (4-6)	50%	49%	45%	45%	**46%**	47%	48%	43%	44%
Not a problem (1-3)	13%	11%	14%	12%	**11%**	13%	9%	10%	9%
Average score on 1-9 scale	5.7	5.8	5.8	5.9	**6.0**	5.8	5.9	6.0	6.2
	N=500	N=500	N=504	N=500	**N=500**	N=162	N=138	N=135	N=75

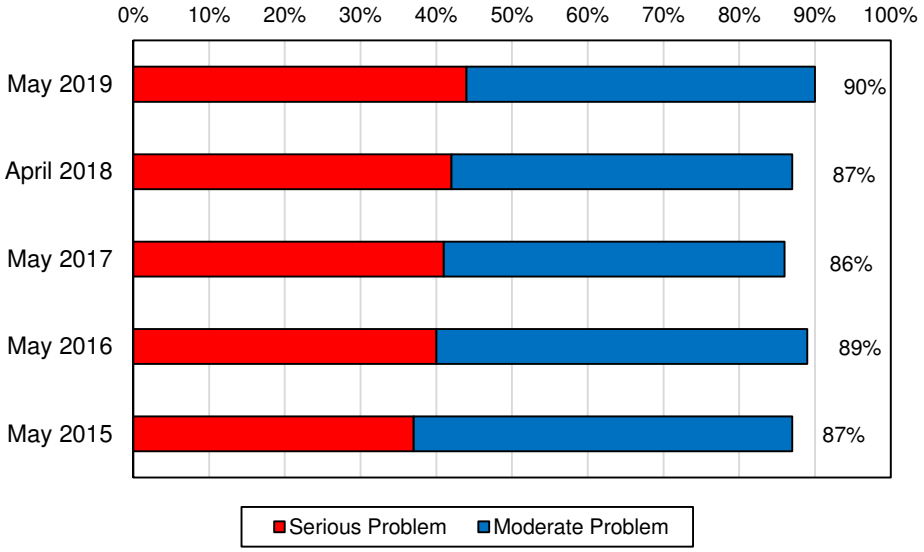
Question: On a scale of "1-to-9" where "9" means "a serious problem" and "1" means "not a problem," how much of a problem do you think there is in the Tucson area with polluting materials entering storm drains? You can give me any number between "1" and "9."

Display 31 **Perceived Seriousness of Stormwater Pollution Problem in Tucson Area**
(Among the Total Sample)



Display 31 **Perceived Seriousness of Stormwater Pollution Problem in Tucson Area**

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



Rating of Various Contributors to Stormwater Pollution Problem in the Tucson Area – As in prior surveys, respondents were asked to rate (on a "1-to-9" scale) a variety of contributors to the severity of the stormwater pollution problem in the Tucson area. On this "1-to-9" rating scale, "1" means "not a problem" and "9" represents a "serious problem." Once again, there was a direct relationship between perceived severity of Tucson's stormwater pollution problem and the degree to which each of these factors contribute to the issue – with generally higher scores also among women and 56 to 65 year-olds. Results of this question series are summarized in Table 30.

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

- **Automotive fluids such as oil, gasoline and brake fluid** (42% "serious" contributor to stormwater pollution, down from 45% last year – 5.7 average score on the "1-to-9" scale [down from 5.9]. These tend to be Northwest residents, 26 to 45 year-olds and non-Hispanic minorities.)

- **Pesticides, fertilizers and debris from lawns and gardens** (42% "serious" contributor to stormwater pollution, up from 37% last year – 5.6 average score [unchanged from last year]. This perception is stronger among the newest Pima County residents and the most formally educated. There are fewer differences with respect to geography [slightly higher among Northwest residents].)

- **Chemicals and materials from construction sites** (40% "serious" contributor to stormwater pollution, down from 43% last year – 5.6 average score [down from 5.8]. Northwest residents and non-Hispanics are more likely to think construction sites are a "serious" contributor to the stormwater pollution problem in Tucson.)

- **Household trash and bulky items like mattresses, sofas and tires** (39% "serious" contributor to stormwater pollution, down from 42% last year – 5.6 average score [up from 5.5]. Higher perceived causation in the Northwest zip codes and among 36 to 55 year-olds, non-Hispanics and the newest Pima County residents.)

- **Household products such as cleaning fluids, detergents, paints, degreasers and bleaches** (40% "serious" contributor to stormwater pollution, down from 43% last year – 5.5 average score [down from 5.8]. In addition, one of four now think these products are "not a problem" [up from 18%] – more often 16 to 25 year-olds and part-year Pima County residents. On the other hand, South or Northwest residents, non-Hispanic minorities and progressively more formally educated respondents are more apt to say household products contribute to stormwater pollution.)

- **Chemicals and materials from industrial facilities** (39% "serious" contributor to stormwater pollution, down from 46% last year – 5.5 average score [down from 5.9]. What's more, the percentage who think industrial chemicals/materials are "not a problem" has increased from 19% to 25%. These tend to be 16 to 25 year-olds and those with progressively less formal education. Northwest denizens, non-Hispanic minorities and Pima County residents for less than two years are more likely to consider industrial facilities a "serious" stormwater pollution contributor.)

Compared to recent surveys, fewer indicate that **animal waste from household pets** contribute to stormwater pollution to some degree (from 66%-67% to 59% now) – with four of ten who now say it is a non-factor (up from 33%-34%). This results in a 4.3 average score (down from 4.7). East zip code residents, 46 to 55 year-olds and low income households are more likely to consider animal waste to be a non-contributor to stormwater pollution.

In line with past results, significantly more perceive that **copper from brake pads made with copper** is "not a problem" (42%) than a "serious" contributor (17%) to Tucson's stormwater pollution problem (4.2 average score, down from 4.3 and 4.5 in the last two surveys).

Table 32 Rating of Various Contributors to Stormwater Pollution Problem in Tucson Area

(5/19 N=500) (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
Automotive fluids such as oil, gasoline and brake fluid				
5/19	**42%**	**37%**	**22%**	**5.7**
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
Pesticides, fertilizers and debris from lawns and gardens				
5/19	**42%**	**35%**	**23%**	**5.6**
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
Chemicals and materials from construction sites				
5/19	**40%**	**40%**	**20%**	**5.6**
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 trash and bulky items like mattresses, sofas and tires				
5/19	**39%**	**37%**	**24%**	**5.6**
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
Household products such as cleaning fluids, detergents, paints, degreasers and bleaches				
5/19	**40%**	**36%**	**24%**	**5.5**
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
Chemicals and materials from industrial facilities				
5/19	**39%**	**37%**	**25%**	**5.5**
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
Animal waste from household pets				
5/19	**20%**	**39%**	**41%**	**4.3**
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

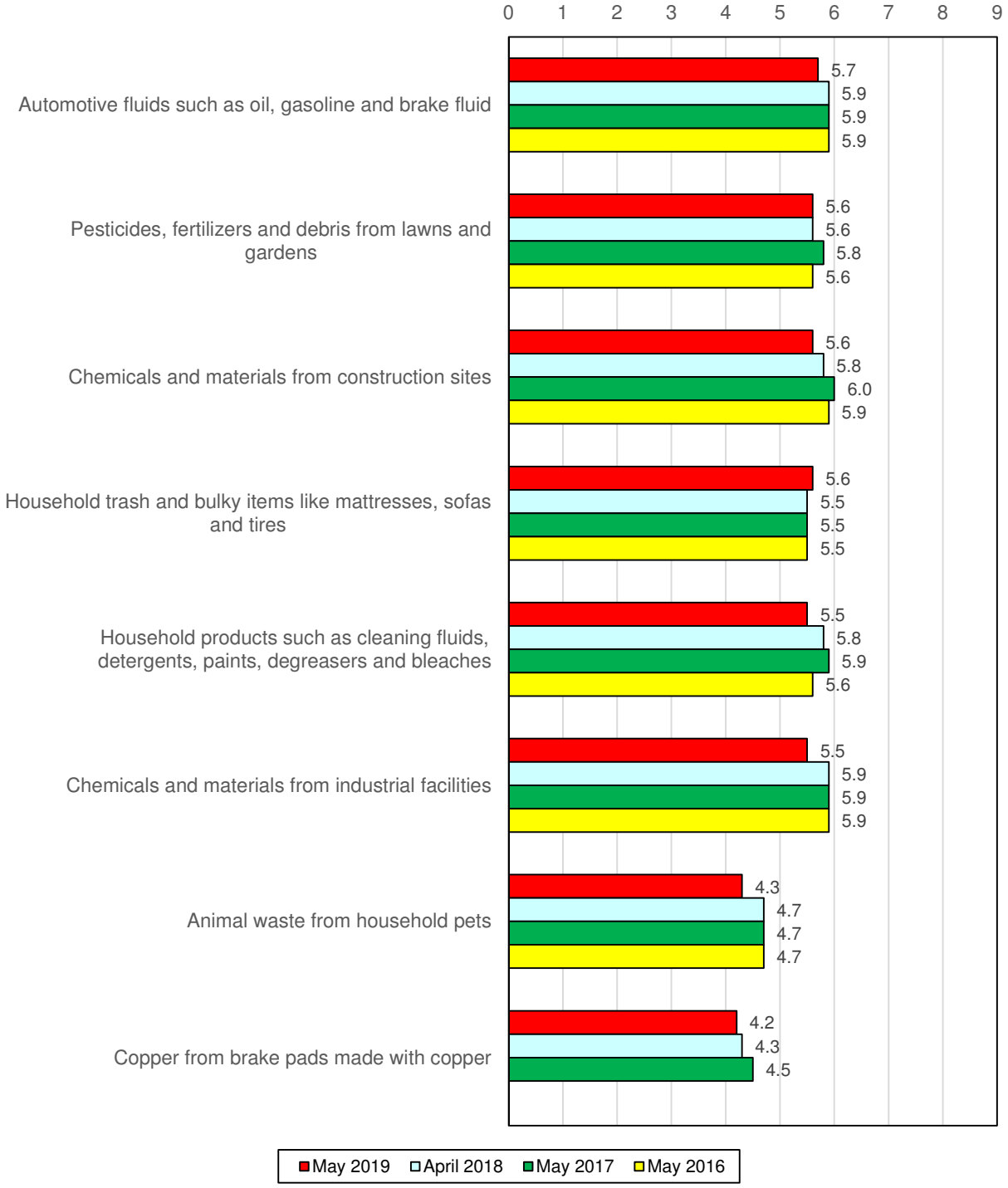
-Table 32 continued on next page-

Table 32 (Cont'd)

(5/19 N=500) (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
Copper from brake pads made with copper				
5/19	**17%**	**41%**	**42%**	**4.2**
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 32 **Rating of Various Contributors to Stormwater Pollution Problem in Tucson Area**
(By Average Score on 1-9 Scale)



Government Entity to Call If Witness Someone Dumping Trash or Chemicals in a Storm Drain – Overall, 28% indicate they are **unsure** who they would contact if they saw someone dumping trash or chemicals in a storm drain. This is down from the all-time low of 22% recorded last year, but still better than found in prior surveys (30%-33%). Those unsure in the 2019 study tend to be Northwest residents (33% versus 25%-28% elsewhere).

Up from 29%-31% in past years, 37% now say they would contact **911/Police department** to report a storm drain dumping incident. There are few differences with respect to geography, gender or ethnicity. Most likely to contact 911 are 56 to 65 year-olds and residents who indicate that stormwater pollution is "not a problem."

Others indicate they would contact these government-oriented agencies or departments:

- **City government** (15%, basically unchanged since last year [16%]. Central residents, 16 to 45 year-olds and Hispanics are more likely to say they would contact City government.)

- **County government** (12%, down slightly from 14% last year. These tend to be women and 46 to 55 year-olds, with few differences based on geography or ethnicity.)

- **Water department** (11%, down slightly from 13% last year. Lower only in the Northwest zips [7% versus 11%-14% elsewhere].)

- **Sanitation department** (9%, basically unchanged since last year [10%]. Geographically, only East residents are less likely to indicate contacting this entity [5% versus 8%-10% everywhere else].)

- **Health department** (8%, basically unchanged since last year [9%]. Central or East residents are more apt to report a dumping incident to the health department.)

Just 2% overall say they would not report dumping of trash or chemicals in a storm drain. This is down from incrementally from 5% in 2017.

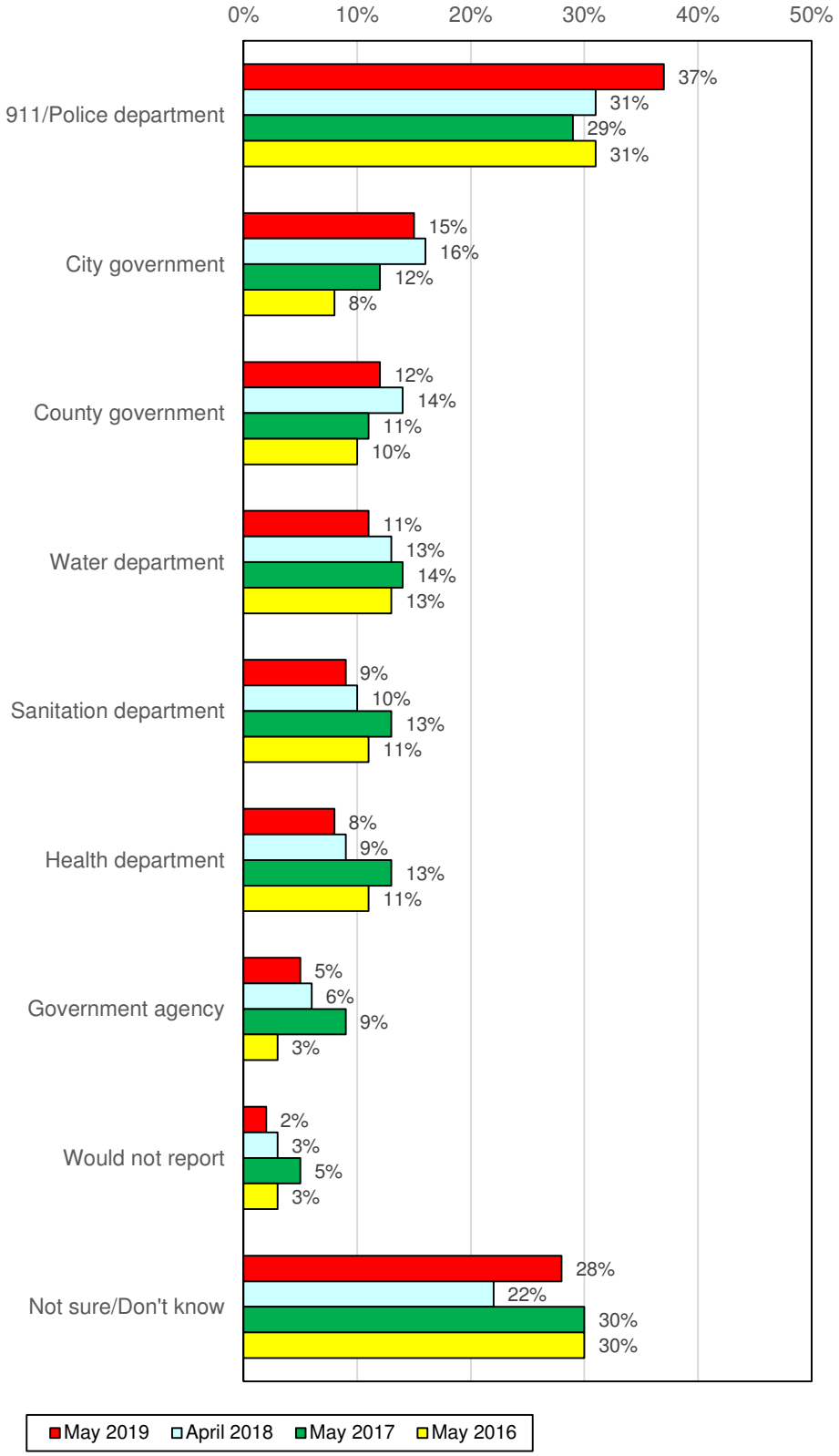
Table 33 Government Entity to Call If Witness Someone Dumping Trash or Chemicals in a Storm Drain

	05/15 Total	05/16 Total	05/17 Total	04/18 Total	**05/19 Total**	Area			
						Central	South	North-west	East
911/Police department	30%	31%	29%	31%	**37%**	38%	33%	38%	39%
City government	10%	8%	12%	16%	**15%**	18%	14%	15%	12%
County government	9%	10%	11%	14%	**12%**	11%	13%	12%	13%
Water department	13%	13%	14%	13%	**11%**	14%	12%	7%	11%
Sanitation department	11%	11%	13%	10%	**9%**	10%	8%	9%	5%
Health department	10%	11%	13%	9%	**8%**	10%	5%	6%	15%
Government agency	5%	3%	9%	6%	**5%**	5%	6%	4%	3%
Flood Control district	–	–	–	–	**1%**	1%	2%	1%	0%
Would not report	4%	3%	5%	3%	**2%**	2%	4%	1%	1%
Not sure/Don't know	33%	30%	30%	22%	**28%**	25%	28%	33%	28%
	N=500	N=500	N=504	N=500	**N=500**	N=152	N=138	N=135	N=75

	Stormwater Pollution Problem		
	Serious Problem	Moderate Problem	Not a Problem
911/Police department	36%	34%	52%
City government	13%	15%	24%
County government	10%	14%	15%
Water department	8%	13%	17%
Sanitation department	7%	8%	15%
Health department	6%	10%	9%
Government agency	6%	4%	4%
Flood Control district	1%	2%	0%
Would not report	1%	3%	4%
Not sure/Don't know	32%	28%	15%
	N=218	N=228	N=54

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



EVALUATION OF THE 2018-2019
PIMA COUNTY CLEAN AIR PROGRAM CAMPAIGN AND
CLEAN WATER PROGRAM CAMPAIGN SURVEY
(May 2019)

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=245) and Internet (N=255) interviews. Before 2015, all surveys in this tracking study series were conducted via telephone.

All Telephone and Internet interviews were conducted during May 2019. 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 15 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 an independent website partner of FMR Associates (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 160 non-White respondents were interviewed in the project, including 129 Hispanics. Overall, 11 respondents (2%) requested that their survey be conducted in Spanish by a bilingual interviewer. This is identical to the 2018 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)

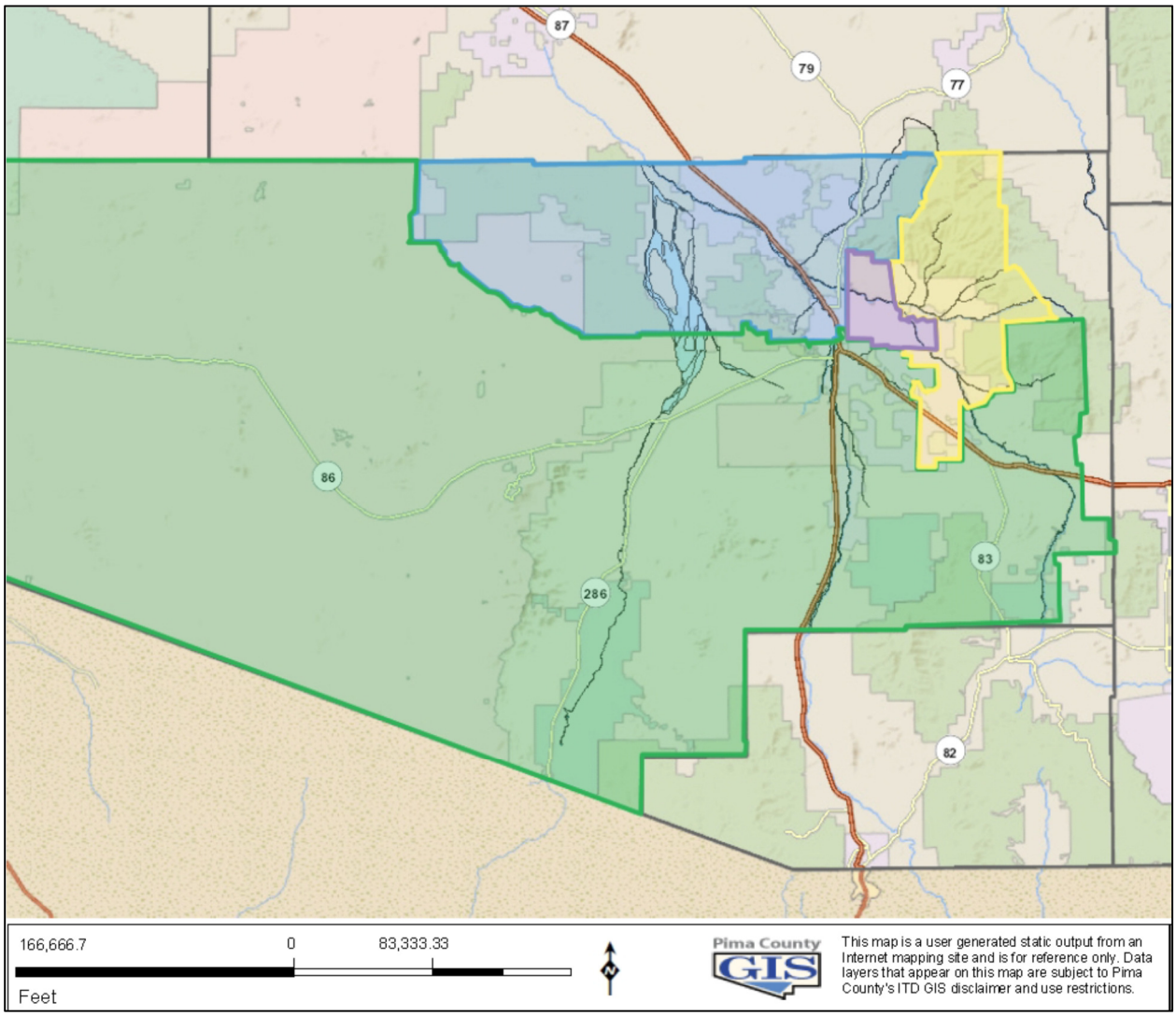
If a table indicates that 34% of Internet respondents have a positive attitude toward a category of response, and that 25% of Telephone respondents have the same attitude, the following procedure should be used to determine if this attitude is due to chance:

The average base is 250 for the reported percentages (255+245)/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.

2019 PIMA CLEAN AIR/CLEAN WATER REGION DEFINITIONS

Northwest:	85653
	85654
	85658
	85704
	85705
	85737
	85739
	85741
	85742
	85743
	85745
	85755
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
	85645
East:	85619
	85715
	85730
	85747
	85748
	85749
	85750

2019 Pima Clean Air/Clean Water Region Definitions – Map



Blue = Northwest
Purple = Central
Yellow = East
Green = South