



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

(May 2017)

Executive Summary

Prepared for:

PIMA COUNTY DEPARTMENT OF
ENVIRONMENTAL QUALITY

Tucson, Arizona

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FMR ASSOCIATES, INC.

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Methodology Overview and Tracking – This dual-methodology tracking survey, conducted for the Pima County Department of Environmental Quality (PDEQ), includes a 504-person, randomly-selected and statistically-projectable sample of adult (16 or older) residents of Pima County, Arizona. The 2017 survey employed a split-methodology sampling plan, with 250 Telephone and 254 Internet interviews. Projects conducted before 2015 were all Telephone surveys.

The Telephone and Internet survey instruments and screening criteria were identical. All fielding was conducted during May 2017. A Spanish-language version of the final questionnaire design was prepared and made available to Telephone/Internet survey respondents who requested it.

All Telephone surveys were fielded among randomly-selected adults (16+) who reside in Pima County. Telephone survey respondents were further randomized by interviewing only “the male or female in your household who is 16 or older and most recently celebrated a birthday.” There was only one Telephone interview conducted per household. Telephone interviews were distributed on the basis of geographic population density in Pima County, with specific steps taken to ensure a proportionate number of interviews (based on population estimates) in each of four zip code-defined survey “regions” (Northwest, Central, South and East). The 2017 Telephone sub-sample is highly representative of geographic sampling quotas.

Internet surveys were conducted utilizing a questionnaire administered by FMR Associates and hosted on the sgizmo.com website. Potential survey respondents were contacted through a third party database Internet panel sample company that emailed invitations to their “opt in” panelists who reside in Pima County zip codes.

This survey analyzed and tracked the overall effectiveness of the Clean Air Program after 27 campaign sessions. For the fifth consecutive year, the survey also measured and tracked key issues related to stormwater management, land use behaviors and household item disposal for PDEQ’s Clean Water Program.

Awareness of the Pima County “Clean Air” Program – More than four of ten (44% – regardless of sample method) are familiar with the “Clean Air” Program. This is down from one-half in 2016, but remains highly consistent with 2015 findings (45%). Awareness is highest in the Central (49%) or South (45%) zip codes and among respondents who think that Tucson has a “major” air quality problem (58%) – as well as those who perceive a progressively more severe stormwater pollution problem.

Awareness of Various Clean Air Events or Activities – Overall, 86% indicate familiarity with at least one “Clean Air” event or activity. This is up slightly from 83% in 2016.

Once again, as we have found in past years, awareness of specific events or activities continues to be significantly higher among survey respondents familiar with the “Clean Air” Program. Similar to past surveys, the three “Clean Air” events with the highest degree of familiarity include:

- **“Earth Day Festival and Parade”** (62% awareness [72% Telephone versus 52% Internet], up from 55% last year. Awareness is greater in the South zips.)
- **“Bike to Work Day”** (53% awareness [50% Telephone versus 56% Internet], down from 60%-63% in the last three surveys. Event recall is highest in the Central or East zips.)
- **“Bike Fest”** (47% awareness [54% Telephone versus 41% Internet], off slightly from the last two years [51%-52%]. Awareness is slightly lower only in the Northwest zips.)

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

- **“Car-Free Day”** (33% awareness [34% Telephone versus 32% Internet], identical to last year. South zip residents are more likely to aware of this clean air event.)
- **“Walk and Roll to School Day”** (31% awareness [30% Telephone versus 32% Internet], basically unchanged since last year [32%]. South region residents indicate the highest degree of awareness.)
- **“Cycloviva”** (23% awareness [24% Telephone versus 22% Internet], highly consistent with the past two surveys [24% each]. Central residents are more apt to be aware of this event.)

“Clean Air” Campaign Event Participation and Actions Taken – Among the 86% aware of at least one “Clean Air” event or activity, 18% indicate that they or someone in their household participated in at least one of these events. This represents a significant improvement since last year (12%), and nearly matches the all-time high recorded in 2015 (20%). Participants in a “Clean Air” event are more apt to be South region residents, men, 26 to 45 year-olds and high income households (\$60,000+).

Among the 18% who report participation in a “Clean Air” event, three of four indicate that they have changed (or are considering actions to change) their daily routines or behaviors to help improve air quality. This is down from a near record 80% mention last year, but remains higher than we found in both 2015 (69%) and 2014 (55%). Internet panelists are especially apt to report a behavior or routine change (87% versus 55% Telephone). Among the combined sample, this means that 11% report a change in their behavior after participating in a “Clean Air” event. This is up from 10% in 2016, and ties the all-time high recorded in 2015. Willingness to change in the current survey is highest among Central zip residents, women, 26 to 45 year-olds and households impacted by a breathing-related medical condition.

Opinion of Activities/Events – Nine of ten familiar with at least one “Clean Air” event (regardless of sample methodology) have a positive opinion of “events and activities that encourage people to use other modes of transportation or work from home instead of driving alone.” This represents progressive improvement from the 2015 (85%) and 2016 (88%) surveys, and is the highest positive mention to-date. In fact, for the first time ever, a majority are now “very favorable” towards these type of activities/events (52%, up from 45%-47% the last two years). Geographically, Central and South residents are most highly favorable of activities and events to encourage use of other modes of transportation. Consistent with recent years, just 7% have a negative opinion (to any extent) of air quality related events and activities.

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

- **Keep car tuned** (38%, basically unchanged from 39% last year [which was the highest mention to-date]. Most likely to keep their car tuned are South or Northwest residents and Internet respondents [46% versus 30% Telephone].)
- **Carpool/Less driving alone** (38%, up from 33% last year [and the highest mention since 40% in 2007]. Internet respondents [42% versus 34% Telephone] and South zip residents are likelier to be increasing carpooling.)
- **Generally reduced driving** (38%, identical to last year. This is generally the case regardless of geography [lower only in Northwest zips] or sample method.)
- **Keep tires inflated properly** (31%, down from 35% last year. More apt to keep their tires properly inflated are Internet respondents [41% versus 21% Telephone] and Northwest or East area residents.)

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

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

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

One-half of these households with young children report that these 5 to 18 year-olds have “talked about or brought home materials from school about improving air quality.” This represents an incremental increase from the 2015 (45%) and 2016 (48%) studies. Recall is apparent regardless of geography (especially in the East zips), and highest among Whites, those who perceive a “major” air quality problem and residents aware of the “Clean Air” Program (68% versus 36% unfamiliar).

Gasoline-Powered Lawn & Garden Equipment – One of ten report that someone in their household uses gasoline-powered lawn & garden equipment to care for their home property. This compares to 14% usage in 2016. Once again, gasoline-powered equipment usage is generally consistent regardless of geography. Among the 9% who report having such equipment, usage details are summarized as follows:

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

Air Pollution Statement Evaluations – The following is a summary of agreement/disagreement with twelve statements related to program awareness, pollution awareness, topics and knowledge:

PDEQ and Rideshare Awareness –

- **You are aware of the Pima County Department of Environmental Quality** (63% agreement, down from 2016 [68%] but still higher than we found in 2015 [60%]. Agreement is consistent regardless of geography, and highest among Telephone respondents [68% versus 58% Internet] and those aware of the “Clean Air” Program [84% versus 42% unaware].)
- **You are aware of the services provided by Sun Rideshare** (51% agree, down somewhat from record levels found in 2016 [58%] and 2015 [55%]. Central or Northwest region residents, Internet respondents [55% versus 47% Telephone] and those aware of the “Clean Air” Program [66% versus 38% unaware] indicate the most agreement.)

PDEQ Program and Campaign Awareness –

- **You have seen or heard information about the importance of keeping your tires properly inflated** (86% agree, up from 83% last year. Recall is generally consistent regardless of geography [somewhat lower only in the Northwest]. Most apt to agree are Telephone respondents [92% versus 79% Internet] and those familiar with the “Clean Air” Program [93% versus 80% unfamiliar].)
- **You are aware of the “Clean Water Starts With Me” campaign** (55% agree, down just slightly from last year’s record mention [57%]. Awareness remains significantly higher among those familiar with the “Clean Air” Program [76% versus 34% unfamiliar], as well as among Central or South residents.)
- **You have seen or heard the phrase “Healthy Air Is in Our Hands”** (34% agree. This is off slightly from last year [36%], but still higher than 2015 [26%]. Again, there is recall regardless of geography [highest in the South zips] – with increased agreement among Internet panelists [45% versus 23% Telephone] and those aware of the “Clean Air” Program [58% versus 13% unaware].)

Air Pollution Evaluations –

- **You are aware that air pollution causes health problems** (Identical to last year, fully 96% agree.)
- **You have seen or heard information that vehicle engine idling causes air pollution** (New to the 2017 survey, nine of ten agree – with few differences based on geography or interview method.)
- **You understand what an air pollution advisory means** (86% agree, down just slightly from the all-time mention recorded in 2013 and 2016 [89% each].)
- **You have seen or heard information regarding clean air or air pollution** (84% agree, the highest percentage recorded to-date [when 68%-80% agreed with the statement “you have seen or heard commercials on TV or radio regarding clean air or air pollution”]. Recall is similar regardless of geography or interview method. It is highest among those aware of the “Clean Air” Program [91% versus 77% unaware].)
- **You are aware that the majority of our air pollution comes from motor vehicle use** (81% agree, very consistent with the four most recent surveys [81%-83%]. Agreement is highest among Central residents and those familiar with the “Clean Air” Program [90% versus 75% unfamiliar].)
- **You are aware of air pollution advisories in Pima County** (Two-thirds report awareness. This represents a decline from 2016 [72%], but remains higher than what we found in 2015 [64%]. There are few differences in awareness with respect to geography. It is highest among Telephone respondents [71% versus 61% Internet] and those aware of the “Clean Air” Program [90%] than not [44%].)
- **Because you want to reduce air pollution, you are generally driving less** (As we have found in the prior two years, 58% agree. Agreement is somewhat lower only in Northwest zips [51% versus 56%-62% elsewhere] and is higher among those aware of the “Clean Air” Program [66% versus 50% unaware].)

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

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

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

The perception of a “major” air quality problem is generally consistent regardless of geography. Internet panelists are twice as likely as Telephone respondents (28% versus 14%, respectively) to perceive a “major” air quality problem. Those aware of the “Clean Air” Program (28% versus 17% unfamiliar) and residents who perceive there to be a progressively more “serious” stormwater pollution problem are also more apt to say that Tucson has a “major” air quality problem. The perception of a “minor” air quality problem is greater in the East zips (24% versus 17%-20% elsewhere), and elevated among Telephone respondents (25% versus 13% Internet).

Work Commuting Behavior – With respondents allowed to select more than one category of response, 35% indicate that they are employed full-time (30 hours or more each week), up from the last three surveys (29%-31%). Identical to last year, another 12% work part-time (less than 30 hours a week). Also in line with last year, 8% report being currently unemployed, more often Central region residents. Down from 2016 (36%), but consistent with 2015 (26%), 27% in the current survey say they are retired. Overall, the share of homemakers (12%) and students (8%) remain unchanged.

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

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

Why is it that single occupant vehicle commuters drive alone to and from work or school? Up from previous surveys, 43% say that “**convenience**” is the reason they drive alone. This is true regardless of area of residence. Virtually unchanged from the past two years, “**irregular work hours**” is the second most common reason for driving alone (31%, up slightly from 30%). Irregular work hours has elevated mention among Central area residents and Internet respondents. Another two of ten indicate that they drive alone because of “**no one to carpool with**” (19%, down from 25%), more often South or East zip code residents. Nearly as many in the current survey say that they “**like to drive alone**” (17%, up from 13% in 2016). Down from last year (19%), 15% say they “**need their car for business**,” while a similar share (14%, down from 17%) cite “**personal errands**.” About one of ten say that they “**work overtime**” (10%, up from 6%) or have “**no bus service in the area**” (8%, up slightly from 7%). Fewer now cite a “**child drop off**” (4%, down from 12%) as a reason for single passenger vehicle travel.

Use of Alternative Work/School Commute Modes – The following is a summary of the use of alternative modes for commute travel:

- **Carpool/Vanpool** (Up from the last two years [24%], 28% indicate they carpool or vanpool at least one day per week. Average frequency has dropped somewhat from last year [from 3.5 to 3.1 days]. The incidence of carpooling is greatest in the South zip codes.)
- **Walk to work or school** (Consistent with last year, 24% say they walk to work or school, but with a slight increase in average days [from 2.8 to 3.0 days].)
- **Work at home instead of driving to work** (While telecommuting is not as popular as last year [19%, down from 24%], its usage remains higher than in 2015 [14%]. Meanwhile, frequency of usage is consistent with last year [3.4 days].)
- **Ride the bus to work or school** (Bus ridership has increased to 18%, up from 13% last year, and is the highest total for bus ridership to-date. At the same time, the average days using this method has decreased [from 4.4 last year to 3.6].)
- **Ride a bike to work or school** (Consistent with last year, one of ten indicate riding bikes to work or school [10%], with no change in frequency [2.4 days].)
- **Ride a motorcycle to work or school** (Compared to last year, more are riding a motorcycle to work or school [from 2% to 6%], with a significant increase in frequency as well [from 1.4 to 2.8 days].)
- **Take the streetcar to work or school** (Consistent with last year, 4% take the streetcar, with a slight increase in frequency [from 1.8 to 2.0 days].)

Most Used Mode of Transportation for Work/School Commute – Consistent with last year, the share who indicate that **single-passenger vehicle commuting** is their **most-used** method of commuting is 62%.

Also in line with 2016 findings, 10% are **carpooling** most often. These are more apt to be Northwest area residents and women. **Bus riding** is also consistent with last year at 9%, with greater primary usage among South area residents and men. While down from last year (11%), 8% say they are **telecommuting** most often. A few more primarily utilize **walking** as their most-used mode (from 4% to 6%), although this is still fewer than we found in 2015 (9%). In lesser numbers, a few indicate that **riding a bike** (2%, down slightly from 3%), **riding a motorcycle** (1%, up from 0%) or **taking the streetcar** (1%, up from 0%) is their primary mode of commuting to work or school.

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

Telecommuting – Identical to last year, 26% who work outside the home say that they telecommute (“working from home as an alternative to going in to your office or place of business during regular business hours”). Telecommuters are more apt to be South (32%) or East (39%) area residents. Down from last year (70%), but still higher than in 2015 (39%), one-half of telecommuters say they do so more than once a week (51%). Another 24% telecommute about once a week (up from 15% last year), and 10% report telecommuting 2-3 times a month (similar to last year). Overall, 14% say they telecommute only once a month (up from 2%-3% in the last two years).

“Compressed Workweek” Programs – Among those working outside the home, three of ten indicate they have the option of a “compressed workweek” program. This is down slightly from last year (32%), but an increase from 2015 (27%). South or East region residents are more apt to say they have a compressed workweek program available to them.

Daily Commuter Miles Saved Through Alternate Modes – Based on the combination of results related to modes of commuter travel and distances traveled with employment estimates (Source: Arizona Office of Employment & Population Statistics), we estimate that the reduction of single-occupant vehicles commuting through the use of alternative methods of travel saves **3,569,409 vehicle miles per day** – or **35% of total miles driven/not driven**. As summarized in the tracking display below, the percentage of miles saved has decreased slightly from 2016 (38%), but is similar to 2015 findings (34%).

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

2017 Estimated Number of Work/School Miles Saved Through Alternative Modes

Mode	(A) % Take Mode	(B) # Daily Commuter Trips	(C) Average Commuter Miles	(D) Total Miles Traveled	(E) Miles Driven	(E) Miles Not Driven
Drive alone	76%	407,998	14.5	5,915,971	5,915,971	-0-
Motorcycle	6%	20,997	12.1	254,064	254,064	-0-
Carpool	28%	109,927	12.8	1,407,066	521,136	885,930
Bus	18%	81,278	7.0	568,946	16,256	552,690
Bicycle	10%	30,479	9.0	274,311	-0-	274,311
Walk	24%	89,708	6.3	565,160	-0-	565,160
Streetcar	4%	10,035	9.5	95,333	-0-	95,333
Telecommute	19%	80,074	11.8	944,873	-0-	944,873
Compressed workweek	13%	16,306	15.4	251,112	-0-	251,112
TOTALS:	--	846,802	--	10,276,836	6,707,427	3,569,409

- (A) From Table 26.
- (B) Based on number of work/school commuters in survey, percentage using mode and number of days/week mode used.
- (C) From Table 26c.
- (D) (D) = (B) x (C).
- (E) Carpool: based on workers average carpool/vanpool of 2.7 (from Table 26b). Bus: based on average of 35 riders/bus. Walk/bicycle/streetcar/telecommute/compressed workweek: no polluting vehicles used.

Daily Shopping/Leisure Miles Saved Through Alternate Modes – Combining trip frequency/length estimates provided by Pima Association of Governments with the “most used” methods of transportation (Tables 18/18a in our report), we can further estimate daily vehicle miles saved through the use of alternative modes for shopping and leisure purposes. As summarized in the display below, we estimate that the reduction of single-occupant vehicles commuting through the use of alternative methods of travel for **shopping** saves 631,735 vehicle miles per day, or 32% of total miles driven/not driven (up from 28% in 2016, due primarily to decreased levels of single passenger vehicle travel and an uptick in carpooling). The number of **leisure** travel miles saved daily is 3,202,182 – 37% of total miles driven/not driven (up slightly from 36%). These compare to a savings of 3,569,409 vehicle miles per day in **travel to work or school** (or 35% of total miles driven/not driven).

2017 Estimated Number of Shopping Miles Saved Through Alternative Modes

Mode	(A) % Take Mode Most Often	(B) # Daily Shopping Trips	(C) Average Shopping Miles	(D) Total Miles Traveled	(E) Miles Driven	(E) Miles Not Driven
Drive alone	54.2%	398,487	5.00	1,079,900	1,079,900	0
Motorcycle	0.8%	398,487	5.00	15,939	15,939	0
Carpool/Vanpool	30.6%	398,487	5.00	609,685	225,809	383,876
Bus	5.6%	398,487	5.00	111,576	3,188	108,388
Walk	4.6%	398,487	5.00	91,652	0	91,652
Bicycle	2.2%	398,487	5.00	43,834	0	43,834
Streetcar	0.2%	398,487	5.00	3,985	0	3,985
TOTALS:	--	--	--	1,956,571	1,324,836	631,735

- (A) From Table 18.
- (B) Source: Pima Association of Governments.
- (C) Source: Pima Association of Governments.
- (D) (D) = (A) x (B) x (C).
- (E) Carpool: based on workers average carpool/vanpool of 2.7 (from Table 26b). Bus: based on average of 35 riders/bus. Walk/bicycle/streetcar: no polluting vehicles used.

2017 Estimated Number of Leisure Miles Saved Through Alternative Modes

Mode	(A) % Take Mode Most Often	(B) # Daily Leisure Trips	(C) Average Leisure Miles	(D) Total Miles Traveled	(E) Miles Driven	(E) Miles Not Driven
Drive alone	43.7%	1,518,736	5.78	3,836,115	3,836,115	0
Motorcycle	1.8%	1,518,736	5.78	158,009	158,009	0
Carpool/Vanpool	41.7%	1,518,736	5.78	3,660,549	1,355,759	2,304,790
Bus	6.2%	1,518,736	5.78	544,254	15,550	528,704
Walk	2.8%	1,518,736	5.78	245,792	0	245,792
Bicycle	1.4%	1,518,736	5.78	122,896	0	122,896
TOTALS:	--	--	--	8,567,615	5,365,433	3,202,182

- (A) From Table 18a.
- (B) Source: Pima Association of Governments.
- (C) Source: Pima Association of Governments.
- (D) (D) = (A) x (B) x (C).
- (E) Carpool: based on workers average carpool/vanpool of 2.7 (from Table 26b). Bus: based on average of 35 riders/bus. Walk/bicycle/streetcar: no polluting vehicles used.

Final Air Quality Campaign Observations

Compared to last year, awareness of the Pima County “Clean Air” Program has decreased somewhat (from 50% to 44%). However, as we found last year, the vast majority are familiar with at least one “Clean Air” event (86%, up from 83%). In line with past years, there continues to be a significant difference in key attitudes and behaviors related to air quality among those aware of the “Clean Air” Program and those unaware (44% and 47%, respectively). This relationship continues to be readily apparent, as summarized in the comparative displays below.

<u>Some key differences:</u>	<u>Difference</u>	<u>“Clean Air” Program</u>	
		<u>Aware</u> (44%)	<u>Unaware</u> (47%)
<i>Air Quality Event Awareness</i>			
• <u>Car-Free Day</u>			
2017	+231%	53%	16%
2016	+182%	48%	17%
• <u>Walk and Roll to School Day</u>			
2017	+156%	46%	18%
2016	+150%	45%	18%
• <u>Bike to Work Day</u>			
2017	+109%	73%	35%
2016	+67%	75%	45%
• <u>Bike Fest</u>			
2017	+82%	62%	34%
2016	+86%	67%	36%
• <u>Cyclovia</u>			
2017	+76%	30%	17%
2016	+61%	29%	18%
• <u>Earth Day Festival & Parade</u>			
2017	+40%	74%	53%
2016	+64%	69%	42%
• <u>Participation in a “Clean Air” event</u>			
2017	+238%	27%	8%
2016	+220%	16%	5%
✓ On average, there is a 133% higher awareness and/or participation in “Clean Air” events or programs among those familiar with the “Clean Air” Program – up from 2016 findings (119%).			

<u>Some key differences:</u>	<u>Difference</u>	<u>“Clean Air” Program</u>	
		<u>Aware</u> (44%)	<u>Unaware</u> (47%)

PDEQ and Sun Rideshare Awareness

• <u>Aware of PDEQ</u>			
2017	+100%	84%	42%
2016	+65%	86%	52%
• <u>Aware of Sun Rideshare services</u>			
2017	+74%	66%	38%
2016	+80%	72%	40%

✓ **On average, there is an 87% greater awareness of PDEQ and Sun Rideshare services among those aware of the “Clean Air” Program (up from 73% in 2016).**

PDEQ Activity Understanding

• <u>Aware of Pima County air pollution advisories</u>			
2017	+105%	90%	44%
2016	+49%	88%	59%
• <u>Aware that majority of air pollution comes from motor vehicle use</u>			
2017	+20%	90%	75%
2016	+6%	99%	93%
• <u>Understand air pollution advisory meaning</u>			
2017	+18%	94%	80%
2016	+14%	95%	83%
• <u>Seen or heard information regarding clean air or air pollution</u>			
2017	+18%	91%	77%
2016	+29%	88%	68%
• <u>Seen or heard information about the importance of keeping tires properly inflated</u>			
2017	+16%	93%	80%
2016	+20%	91%	76%
• <u>Seen or heard information that vehicle engine idling causes air pollution</u>			
2017	+11%	94%	85%

✓ **On average, there is a 31% higher understanding of PDEQ activities among those aware of the “Clean Air” Program (up from 24% in 2016).**

<u>Some key differences:</u>	<u>Difference</u>	<u>“Clean Air” Program</u>	
		<u>Aware</u> (44%)	<u>Unaware</u> (47%)
<i>Steps Taken to Reduce Air Pollution</i>			
• <u>Adjusted emission control equipment</u>			
2017	+150%	20%	8%
2016	-8%	12%	13%
• <u>Planted trees</u>			
2017	+100%	32%	16%
2016	+22%	22%	18%
• <u>Bought a more fuel-efficient car</u>			
2017	+73%	26%	15%
2016	+25%	15%	12%
• <u>Choose one day/week to not drive</u>			
2017	+46%	19%	13%
2016	+114%	15%	7%
• <u>Carpool more/Less solo driving</u>			
2017	+44%	46%	32%
2016	+63%	39%	24%
• <u>Keep car tuned</u>			
2017	+14%	40%	35%
2016	+14%	41%	36%

✓ **There is a 71% greater likelihood of taking specific steps to reduce air pollution among those aware of the “Clean Air” Program (up from 38% in 2016).**

Air Quality Perceptions – The vast majority of those aware (79%) and unaware (72%) of the “Clean Air” Program think that Tucson has at least a “moderate” air quality problem. However, those aware are much more likely to think the problem is a “major” one (28% versus 17% unaware, 65% higher).

As we have concluded in prior years, these survey findings and tracking results suggest that the “Clean Air” Program increases awareness, belief and actions related to improving air quality. Consequently, targeting those *unaware* of the program continues to be a key recommendation of this study. Those unaware of the “Clean Air” Program tend to be Northwest or East area residents, 16 to 25 year-olds and newer Pima residents (for less than five years). As a result, promotional, communication and awareness-building efforts should be targeted towards these groups. This year's study showed a lower awareness of the “Clean Air” Program, suggesting less marketing exposure. Since the positive response to the messaging in terms of awareness, belief and most importantly action is greater this year than in the past, we highly recommend an increase in promotional, marketing, branding and advertising efforts – to the extent possible – in order to expand awareness of the “Clean Air” Program.

Tire Inflation Education Campaign – In line with last year, more than eight of ten “have seen or heard information about the importance of keeping your tires properly inflated” (86%, up from 83%). What’s more, 31% indicate that they are keeping their tires properly inflated to help reduce air pollution in the Tucson (essentially the same as we found in 2016).

What is the direct impact of this action taken to keep tires properly inflated? There are an estimated 647,885 working vehicles (automobiles, vans and trucks of one-ton capacity or less for household use) in Pima County (source: 2015 American Community Survey). According to PDEQ, a vehicle will save 144 gallons of gasoline per year with properly inflated tires.

If 31% are keeping their tires properly inflated, this yields an annual reduction of 28,921,586 gallons of gasoline not purchased (along with the pollutants this gasoline would release).

Stormwater Perceptions and Practices

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

After being informed that “streets in the Tucson area are equipped with storm drains,” 45% indicate that (to the best of their knowledge) the water that flows into these drains ends up in a **river or wash** (highly consistent with the last two years). These tend to be East or Central zone residents.

Allowing for multiple answers, others think that stormwater that flows into storm drains ends up in:

- **Groundwater** (18%, down slightly from 2016 [20%], but still higher than 2015 [15%] results.)
- **Sewage plants** (17%, up from 11%-12% in past surveys.)
- **Water plants** (13%, up from 7% in 2015 and 2016.)
- **Canals** (12%, up from 7% the last two years. More often South residents.)

Most of the rest (unchanged since last year at 29%) **do not know** where stormwater ends up. These tend to be Central or South zip residents.

Green Infrastructures Implemented/Installed – Implementation of Green Infrastructures (at home or business) is unchanged to slightly higher than we found in 2017, including:

- **Landscaping with native plants** (53% – highly consistent with the last two years [52% each]. These are more likely to be East area residents.)
- **Landscape depressions that collect stormwater** (28%, up from 24% last year. Implementation is higher among South area residents.)
- **Connecting runoff from a roof or paved surface to a basin or to water plants** (25%, up from 22% in 2016. There are few differences based on geography.)
- **Water harvesting with rain barrels or cisterns** (21%, consistent with 2016 [19%] and 2015 [20%]. South zip code residents are more likely to utilize rain barrels or cisterns.)
- **Porous pavements or bricks** (21%, up from 15% last year but consistent with 2015 [20%]. Implementation continues to be greatest among Northwest residents.)
- **A trench that is filled with gravel to collect stormwater** (19%, up from 16% in 2016. Implementation is higher among South or Northwest residents.)
- **Natural areas protected from clearing and grading** (18%, up from 15% last year. East area residents are more likely to have set aside natural areas.)

Perceived Seriousness of Stormwater Pollution Problem in Tucson Area – In line with previous surveys, the vast majority of survey respondents (86%) indicate that there is a “moderate” (45%) or “serious” (41%) problem in the Tucson area regarding “polluting materials entering storm drains” – with the percentage who perceive a “serious” problem remaining virtually unchanged from last year (41% versus 40% in 2016). Consistent with 2016, this results in a 5.8 average score (on the “1-to-9” scale). Internet panelists, 26 to 35 year-olds and more formally educated respondents are most likely to perceive a “serious” stormwater pollution problem. Geographically, only Northwest residents are *less* apt to say the problem is “serious” (36% versus 41%-44% elsewhere).

Rating of Various Contributors to Stormwater Pollution Problem in the Tucson Area – Using the same “1-to-9” scale, the top five contributors by perceived degree of causation to the stormwater pollution problem in the Tucson area include:

- **Chemicals and materials from construction sites** (46% “serious” contributor to stormwater pollution, up from 40% last year – 6.0 average score [up from 5.9].)
- **Chemicals and materials from industrial facilities** (45% “serious” contributor to stormwater pollution, up slightly from 43% last year – 5.9 average score [unchanged from 2016].)
- **Household products such as cleaning fluids, detergents, paints, degreasers and bleaches** (45% “serious” contributor to stormwater pollution, up from 37% last year – 5.9 average score [up from 5.6 in 2016].)
- **Automotive fluids such as oil, gasoline and brake fluid** (44% “serious” contributor to stormwater pollution, up slightly from 42% last year – 5.9 average score [unchanged from 2016].)
- **Pesticides, fertilizers and debris from lawns and gardens** (43% “serious” contributor to stormwater pollution, up from 36% last year – 5.8 average score [up from 5.6 in 2016].)

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

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

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

Methods Used to Dispose of Various Types of Household Hazardous Waste – Consistent with last year, the most-often used methods to dispose of household wastes (such as “household chemicals, automotive fluids and lawn & garden chemicals”) include:

- **Hazardous waste collection site** (52%, up from the past two years [42%-47%]. Usage is lowest in the Central zips [47%], and highest in the South region [60%.])
- **Auto parts store** (42%, up from 38% in 2015 and 2016 – higher in the East zips [52% versus 39%-42% elsewhere].)
- **Put in the garbage** (37%, up significantly from 29% in 2016. There are few differences based on area of residence.)
- **Service station** (26%, up from 19% last year. Geographically, only Central residents are *less* likely to dispose of household waste at a service station [17% versus 28%-31% elsewhere].)
- **Landfill** (18%, unchanged from last year. Usage is lowest in the Central zips [13% versus 20%-22% elsewhere].)

Up from 12% last year, 18% in the current study (regardless of area of residence) indicate that they dispose of household hazardous wastes by **pouring in the sink or down the drain**.

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

Government Entity to Call if Witness Someone Dumping Trash or Chemicals in a Storm Drain – As we found last year, three of ten are **unsure** about who they would contact if they saw someone dumping trash or chemicals into a storm drain and wanted to report it. Central or East zip residents and new or part-year Pima County residents are also more likely to be unsure whom to call.

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

- **911/Police Department** (29% [down from 31% last year], more often Northwest or East residents.)
- **Water Department** (14% [up from 13%], especially South region residents.)
- **Health Department** (13% [up from 11%], with fewer differences based on area of residence.)
- **Sanitation Department** (13% [up from 11%], typically South or East zip residents.)

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

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

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

- **If you have a dog, using a doggie bag to clean up after them** (80% “very likely” to take part, unchanged since last year. Participation is somewhat lower only in the South zips [68% versus 83%-88% elsewhere].)
- **Safely dispose of chemicals** (75% “very likely” to take part, up from 71% last year. Once again, participation is generally consistent regardless of geography [including fully 92% of East zip residents].)
- **Replacing a toxic compound with a non-toxic compound** (62% “very likely” to take part, up incrementally from 58% in 2016 and 56% in 2015. These are more likely to be East residents.)
- **Report a spill** (60% “very likely” to take part, down from 63% last year. These tend to be East residents.)

Unchanged from last year, 49% (regardless of geography) indicate that they would be “very likely” to **gather stormwater to use for watering plants.**

One-third say that they would be “very likely” to **implement green infrastructure.** This is down from 43%-54% in past surveys who would be highly likely “to implement Low Impact Development practices.” Potential participation is lower only in the Central zips (29% versus 33%-39% elsewhere).

Final Clean Water Program Campaign Observations

A majority of Pima County residents surveyed indicate an awareness of the “Clean Water Starts With Me” campaign (55%, down just slightly from the record 57% mention in 2016). As we have found in past surveys, there are significant differences between those familiar with the “Clean Water Starts With Me” campaign (55%) and those who are not (45%) with respect to key perceptions and actions related to stormwater pollution.

Once again, residents aware of the “Clean Water Starts With Me” campaign are far more apt to perceive that Tucson has a “serious” stormwater pollution problem (46% versus 34% of those unaware).

With respect to perceptions of where stormwater that flows into Tucson storm drains end up, there are few differences in the ordinal ranking of responses. Again, the largest share (regardless of campaign awareness) think that stormwater flows in a river or wash (45% overall). However, as we have found in the past, significantly more unaware of the “Clean Water Starts With Me” campaign indicate they are unsure where stormwater ends up (36% versus 22% of those aware).

As summarized below, there continue to be additional differences related to the perceived factors that contribute to the stormwater pollution problem and the likelihood of taking specific actions to help keep stormwater clean.

<u>Some key differences:</u>	<u>Difference</u>	<u>“Clean Water Starts With Me”</u>	
		<u>Aware</u> (55%)	<u>Unaware</u> (45%)
<i>Green Infrastructures Implemented/Installed at Home/Business</i>			
Water harvesting using rain barrels/ cisterns	+142%	29%	12%
Connecting runoff from a roof or paved surface to a basin or to water plants	+100%	32%	16%
Landscaped depressions that collect stormwater	+84%	35%	19%
Trench that is filled with gravel to collect stormwater	+38%	22%	16%
Porous pavements or bricks	+33%	24%	18%

✓ **There is a 79% higher usage of Green Infrastructure among those aware of the “Clean Water Starts With Me” campaign.**

<u>Some key differences:</u>	<u>Difference</u>	<u>“Clean Water Starts With Me”</u>	
		<u>Aware</u> (55%)	<u>Unaware</u> (45%)
“Serious” Contributors to Stormwater Pollution			
Copper from copper brake pads	+53%	26%	17%
Household trash and bulky items	+48%	46%	31%
Pesticides/Fertilizers/Lawn & garden debris	+43%	50%	35%
Industrial facility chemicals/materials	+32%	50%	38%
Automotive fluids	+32%	49%	37%
Household products	+31%	51%	39%
Construction site chemicals/materials	+31%	51%	39%
Animal waste from household pets	+27%	28%	22%

- ✓ **There is a 37% higher rating/awareness of “serious” contributors to the stormwater pollution problem in the Tucson area among those aware of the “Clean Water Starts With Me” campaign.**

<u>Some key differences:</u>	<u>Difference</u>	<u>“Clean Water Starts With Me”</u>	
		<u>Aware</u> (55%)	<u>Unaware</u> (45%)
“Very Likely” to Take Actions to Help Keep Stormwater Clean			
Install Green Infrastructures	+50%	39%	26%
Gathering stormwater to use for watering plants	+37%	56%	41%
Report a spill	+27%	66%	52%
Replacing a toxic compound with a non-toxic compound	+25%	69%	55%

- ✓ **There is a 35% higher strong likelihood of taking specific actions to help keep stormwater clean among those aware of the “Clean Water Starts With Me” campaign. Importantly, about eight of ten – regardless of campaign awareness – are “very likely” to use a doggie bag to clean up after a pet. Nearly as many (75% – again, regardless of campaign awareness) are “very likely” to safely dispose of chemicals.**

Residents aware of the “Clean Water Starts With Me” campaign are more likely to dispose of household hazardous waste by taking it to a hazardous waste collection site (59% versus 44% of those unaware), auto parts store (46% versus 37% of those unaware) or landfill (21% versus 15% of those unaware). However, there are few differences based on campaign awareness between those who dispose of household hazardous waste by putting it in the garbage (37% overall) or down the sink/drain (18% overall).

Taken as a whole, these findings do (once again) suggest that “Clean Water Starts With Me” campaign awareness does have a positive impact on the perceptions, knowledge and willingness to act related to the stormwater pollution problem in Tucson.

Consequently, we recommend targeting those not currently aware of the “Clean Water Starts With Me” campaign for future outreach/education efforts – including Northwest or East area residents, 46 to 55 year-olds, the newest (for less than two years) Pima County residents and low income households. Meanwhile, younger residents (16 to 35 year-olds) are among those who are more likely to dispose of household hazardous waste by putting it in the garbage or down the sink.