



**EVALUATION OF THE 2021-2022 PIMA COUNTY  
CLEAN AIR PROGRAM CAMPAIGN  
AND  
CLEAN WATER CAMPAIGN SURVEY**

(May 2022)

***Executive Summary***

*Prepared for:*

PIMA COUNTY DEPARTMENT OF  
ENVIRONMENTAL QUALITY

Tucson, Arizona

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FMR ASSOCIATES, INC.

Tucson, Arizona

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**Methodology Overview and Tracking** – This tracking survey, conducted annually for the Pima County Department of Environmental Quality (PDEQ), is comprised of a 500-person, randomly-selected and statistically-projectable sample of adult (16 or older) residents of Pima County, Arizona. This project was conducted utilizing a dual-sample methodology, divided equally between Telephone interviews and Internet surveys (250 each).

This study analyzed and tracked the overall effectiveness of the “Clean Air” Program after 32 campaign sessions. For the tenth year, the survey also measured and tracked key issues related to the management, perceptions, behaviors and actions impacting stormwater quality for PDEQ’s “Clean Water” Program.

The Telephone and Internet survey instruments and screening criteria for each methodology were identical. A Spanish-language version of the final questionnaire design was prepared and made available to both Telephone and Internet survey respondents. The survey was fielded during May 2022.

Telephone interview 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.

Internet surveys were hosted on an independent 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.

Regardless of methodology, all surveys 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 geographic composition of the 2022 sample is again highly representative of these quotas: 32% South, 29% Northwest, 25% Central and 14% East.

**Awareness of the Pima County “Clean Air” Program** – Consistent with the last three surveys (41%-43%), 42% indicate an awareness of the Pima County “Clean Air” Program. Program awareness is highest in the Central zip codes and among 56 to 65 year-olds. There is also some increased familiarity among higher income households (\$40,000+) and respondents with college level education (some college coursework or a degree). Once again, awareness of the “Clean Air” Program is directly related to the perception of a progressively more serious air quality problem and among those who live in households impacted by a breathing-related medical condition.

**Awareness of Various Clean Air Events or Activities** – As we found last year, three of four survey respondents are aware of at least one event or activity to promote clean air in the Tucson area. Still, this remains lower than pre-COVID awareness levels (81%-86% between 2015 and 2020).

In line with recent surveys, the “Clean Air” event that elicits the most awareness is the **Earth Day Festival** (55%, up from 51% in 2021). Awareness is elevated among Central region residents.

About three of ten are familiar with these four events or programs:

- **Walk and Roll to School Week** (31% awareness, down significantly from recent surveys [41%-42%]. Familiarity is somewhat higher in the South zips.)
- **Car-Free Day** (New to the 2002 survey, 31% awareness. There are few differences in familiarity with respect to geography.)
- **“This Is Clean Air” Challenge** (30% awareness, up marginally from 27% last year [the first year it was measured]. Awareness is lower only in the East zips [18% versus 31%-32% elsewhere].)
- **Travel Reduction Program** (28% awareness, up from 21% last year and back to 2020 levels. Central zone residents indicate increased familiarity with this program.)

One of four indicate awareness of these events or activities:

- **“Healthy Air Is In Our Hands Drive-Less Pledge”** (26% awareness, up from 20% in 2021 [the first time it was tested]. Awareness is marginally higher in the South region.)
- **Cyclovia** (25% awareness, up from 20% last year. Central or South residents indicate some increased awareness.)

New to the 2022 survey, 21% indicate awareness of the **“Cut Down Pollution” lawn & garden program**. These tend to be South region residents.

**Clean Air Campaign Event Participation and Actions Taken** – Among the 76% of survey respondents aware of at least one “Clean Air” campaign event, 15% indicate that they (or someone in their household) participated in at least one such activity. This is up marginally from the 2021 study (12%, which was the lowest participation rate recorded since 2016). The participation rate is lower only in the East zips (8% versus 15%-17% elsewhere), and higher among 16 to 35 year-olds, non-Hispanic minorities and those who perceive a “major” air quality problem.

Among the 15% of survey respondents who indicate past participation in a “Clean Air” event or activity, 82% report they have changed (or are considering changing) their daily routine or behaviors to help improve air quality. This is down just slightly from 86% in 2021 (the highest percentage recorded in recent surveys). Among the total N=500 sample, this means that 9% indicate a change in their behavior after participating in a “Clean Air” Program event. This is up from 7% in 2021.

**Opinion of Activities/Events** – Nearly eight of ten (78%) familiar with at least one “Clean Air” event have a favorable opinion of “events and activities that encourage people to use other modes of transportation or work from home instead of driving alone.” This is down from 86% last year, and represents a progressive decline over the last three years in the “very favorable” rating percentage (from 47% in 2020 to 38% now). Up from 7% last year, 11% have no strong opinion. Respondents with a “very favorable” opinion of these activities and events are more apt to be Central region residents. Overall, 12% are not favorable towards air quality related events and activities (up from 7% last year). However, similar to past years, few are “not at all favorable” (2%). Those with an unfavorable opinion are primarily those who think that Tucson has a “minor” air quality problem.

**Steps Taken to Reduce Air Pollution** – Consistent with the last two years, 47% report that they have **generally reduced driving** to help reduce air pollution in the Tucson area. Once again, this is the case regardless of geography. It is likely that “driving less” has increased to an extent because of COVID-19 (and now high gas prices), as in prior surveys these findings were consistently between 35% and 38%.

Compared to last year, results are mixed with respect to taking other steps to help reduce air pollution:

- **Keep tires properly inflated** (26%, down slightly from 29% in 2021. Northwest zip residents are more likely to be keeping their tires properly inflated.)
- **Keep car tuned** (25%, down from 28%. Again, these tend to be Northwest residents.)
- **Carpool/Less driving alone** (23%, up from 20%. South or Northwest residents are more likely to be carpooling.)
- **Avoid excessive idling** (13%, down from 15%. Slightly lower only in the Central zips [9% versus 11%-16% elsewhere].)

- **Planted trees** (12%, down slightly from 13%. These are more apt to be Northwest residents.)
- **Bought bicycles** (10%, up from 8%. Marginally higher among Northwest residents.)
- **Chosen once a week not to drive** (9%, down from 11%. This is the case regardless of geography.)
- **Bought more fuel-efficient car** (9%, down from 12%.)

In lesser numbers, others are **using their BBQ grill less** (7%, down from 9%), **walking more** (7%, up from 4%), **working closer to home** (unchanged at 6%) and/or **adjusted vehicle's emission control equipment** (6%, up from 5%).

Unchanged from last year, 15% indicate they are doing **nothing** to reduce air pollution.

**School Materials Recall Among Children 5-18** – One-third report that they have children between the ages of 5 and 18 living in their household. This compares to 27% last year, and very consistent with 2019-2020 findings (30%-32%). Households with school-aged children are more common in the South zip codes, as well as among 36 to 45 year-olds and non-Whites.

Among these households with school-aged children, 35% say that these young children “talked about or brought home materials from school about improving air quality.” This is identical to 2021 findings. School materials recall is higher in the Central or South regions.

**Gasoline-Powered Lawn Mower Usage** – Up slightly from the last two surveys (8% each), 9% of residents report that they or someone in their household use a gasoline-powered lawn mower to care for their home property. As we found in 2021, reported usage is lower only in the East zip codes (4% versus 9%-10% elsewhere). Average monthly usage of these gas-powered mowers is 37 minutes.

**Gasoline-Powered Lawn & Garden Equipment Usage** – New to the 2022 survey, 12% of residents indicate they or someone use other gasoline-powered lawn & garden equipment (such as a leaf blower, string trimmer, chainsaw, hedge trimmers, etc.) to care for their home property. Usage is consistent across zip code zone. Average monthly usage of this other gas-powered lawn & garden equipment is 49 minutes.

**Statement Evaluations** – The following is a summary of the percentage of agreement/disagreement with a series of statements related to program awareness, air pollution awareness, topics and general knowledge.

#### **PDEQ and Sun Tran Awareness –**

- **You are aware that Sun Tran buses and streetcar have been free for the last year** (Two-thirds agree, particularly Central region residents.)

- **You are aware of the Pima County Department of Environmental Quality (PDEQ)** (57% agreement, up from 51% in 2021 [nearly back to 2019-2020 levels at 59%-60%]. Awareness is highest in the Central zips.)

#### **PDEQ Program Awareness –**

- **You have seen or heard information about the importance of keeping your tires properly inflated** (77% agreement, down slightly from last year [81%]. This compares to 83%-88% awareness between 2015 and 2018. Agreement is consistent regardless of geography [marginally higher in the Northwest zips].)

#### **Air Pollution Evaluations –**

- **You are aware that the majority of our air pollution comes from motor vehicle use** (75% agreement, identical to the last two surveys. Agreement is consistently strong across geography [particularly in the Central region].)
- **You have seen or heard information that vehicle engine idling causes air pollution** (73% agreement, in line with 2021 [71%] and 2020 [72%] findings. Agreement is somewhat lower only in the South zips [65% versus 73%-78% elsewhere].)
- **You are aware of air pollution advisories in Pima County** (69% agreement. This is up from 65% in 2018 – the last time this question was asked. Awareness is lower in the South region [60% versus 70%-75% in the other zips].)
- **You have seen or heard information on how to reduce your own air pollution emissions** (61% agreement. Recall is lower only in the East zip codes [54% versus 61%-63% elsewhere].)
- **Because you want to reduce air pollution, you are generally driving less** (55% agreement, representing an incremental and progressive increase since 2019 [52%]. These tend to be South or Central region residents.)
- **You are aware of how to access real-time air quality data** (37% agreement. Agreement is marginally higher among Central area residents.)

**Travel Behavior for Shopping –** A majority (56%) report they generally **drive alone** to go shopping. This is down from 64%, and is likely related (in part) to the recent spike in gasoline prices. Consequently, usage of several alternative modes of shopping transportation have increased: **carpooling** (with 1 to 4 other adults) (from 21% to 25%), **bus** (from 6% to 8%), **walking** (from 4% to 6%) and **motorcycle** (from 0% to 1%).

**Travel Behavior for Leisure Purposes** – In a reversal from last year, more now say they **carpool (with 1 to 4 other adults)** (43%) than **drive alone** (38%) for leisure purposes (“such as dining out, meeting with friends, going to the movies, going to the gym, etc.”). Compared to 2021 totals, there has been an uptick in the percentage who take the **bus** (9%, up from 6%) or **walk** (5%, up from 3%). Consistent with last year, few in the current study indicate they most often **bicycle** (2%), **vanpool** (with 5 or more adults) (1%) or **take the streetcar** (1%) for leisure purposes.

**Perceived Seriousness of Air Quality Problem in Tucson Area** – As we have found over the past three years, two of ten survey respondents think that there is a “major” air quality problem in the Tucson area. The majority (53%) continue to say that it is a “moderate” problem. The remaining 27% perceive a “minor” problem (20%) or are unsure (7%). This perception profile is highly consistent with what we found in 2021.

More apt to think that Tucson has a “major” air quality issue are Central region residents, 16 to 25 year-olds and less formally educated respondents. Once again, there are few differences with respect to ethnicity. Those impacted by a medical-related breathing condition and residents who perceive a progressively more severe stormwater pollution problem are also more likely to think that Tucson has a “major” air quality problem. The perception of a “minor” air quality problem is higher in the East zip codes.

**Note on 2021-2022 Commute-Related Comparative Findings** – The 2020 and 2021 studies were fielded during the height of the COVID-19 pandemic, with many restrictions imposed on everyday life that included a number of commute-related behaviors (both work and employment), especially in 2020 (when we surveyed both pre-COVID and COVID-era behaviors). During the fielding of the 2021 survey, many of these restrictions had been relaxed or eliminated, and some commuting behaviors began to return to pre-pandemic levels. Consequently, for comparative purposes, it is important to keep in mind the circumstances of the 2020 COVID (with significant restrictions) and 2021 (with relaxed restrictions, but some still in place) surveys.

**Work and School Commuting Behavior** – When asked about their employment status (and allowing respondents to select more than one category of response), 34% indicate that they are employed full-time (30 hours or more each week). This is identical to last year. Full-time employment continues to be slightly higher in the South region (37% versus 32%-34% in other areas). Part-time employment is at 13%, rebounding after a dip (to 8%) last year. Part-time employment is slightly elevated in the Central region. Overall, 12% report being unemployed, down from 14%. Just 1% now say they are currently furloughed due to COVID-19 (down from 2% last year and 7% in 2020). Down somewhat from recent years (26%-28%), 23% in the current survey indicate they are retired. In line with recent results, about one of ten each are students (8%) or homemakers (9%).

Among those who work full-time or part-time (47% of the total sample), 18% work exclusively for a home-based business. This is up slightly from last year (17%). Those who work outside the home (82%) primarily work for another company exclusively (74%), rather than work for both another company and a home-based business (8%). Home-based businesses are more common in the Central zip codes.

Among full-time employees in the current survey, about seven of ten (69%) work a “standard” schedule (8 hour days, five days a week). This is down slightly from last year (72%), but in-line with 2020 pre-COVID levels. Similar to last year, 7% say they work 10 hour days, 4 days a week, while 4% work a 12-hour day, 3 or 4 days a week. In line with the past few years, few work 80 hours over 9 days with the 10<sup>th</sup> day off (2%). Similar to 2020 pre-COVID levels, 18% say their workweek varies. Compressed workweeks in general continue to be more common in the South region.

Up somewhat from 2021 (64%) and COVID-era 2020 (61%) levels, but still lower than pre-COVID 2020 (71%), 68% indicate that they use **single passenger commuting to work or school**. The average frequency of single passenger commuting is unchanged from last year at 4.2 days.

Alternative work/school commute travel methods tracked by this survey include:

- **Carpool/Vanpool** (Up from last year [22%], 27% say they are carpooling or vanpooling at least one day per week. The average frequency of carpooling has stayed about the same [2.9 days, up slightly from 2.8].)
- **Work at home instead of driving to work** (Similar to last year, one of four indicate they telework at least one day per week [26%], although average frequency of use has dipped slightly [from 3.7 days to 3.5].)
- **Take the bus to work or school** (Bus ridership has returned to 2020 pre-COVID levels [15%], with little change since last year in the average number of days [3.2].)
- **Walk to work or school** (Compared to last year [23%], half as many indicate they walk to work or school [12%]. However, the average number of days has increased [from 2.5 to 3.1 days].)
- **Attend classes at home instead of going to school** (Reflecting the return to in-classroom instruction, the share who report attending classes at home instead of going to school has rebounded to pre-COVID 2020 levels [8%], with a decline from last year in the average number of days [from 3.7 to 2.9].)
- **Ride a bike to work or school** (Bike ridership to work or school has declined somewhat from last year [from 11% to 8%], with a decline in frequency [from 2.0 to 1.6 days].)



- **Take the streetcar to work or school** (Streetcar usage is down slightly [from 5% to 4%], although average frequency of usage is higher [from 1.9 to 2.3 days].)
- **Ride a motorcycle to work or school** (Identical to last year, 2% say they ride a motorcycle to work or school, although average frequency has rebounded to 3.0 days [up from 1.0 days].)

**Most Used Mode of Transportation for Work/School** – Similar to last year, about one-half of commuters in the current survey (51%) utilize **single-passenger vehicle commuting** as their *most-used* method of transportation.

Unchanged from last year, 16% primarily **telecommute**. Another 4% in the current survey say they primarily **attend classes from home instead of going to school**. Returning to 2020 pre-COVID levels, 12% say they are primarily **carpooling** for their commute. Also bouncing back to pre-COVID 2020 levels, 8% say they most often **take the bus**. Down slightly from last year (7%), 5% indicate that **walking** is their most used mode of commute transportation. Overall, 1% are **riding a bike** as their primary mode of transportation to work or school, down from 4% in 2021.

**Miles Traveled to Work or School** – Up from last year (31%), 41% say they have a school or work commute of 5 miles or less. Another 24% indicate they travel between 6 and 10 miles to work or school (down from 30% last year), while 8% say their commute is between 11 and 14 miles. Similar to 2020 COVID findings, the remaining 27% travel 15 miles or more. In terms of geography, those in the Northwest region are most likely to commute 15+ miles (43%), while one-half of Central (52%) or East (49%) area residents say they travel 5 miles or less.

**Telecommuting** – Among those who work outside the home, 32% say that they telecommute. While this is down from last year (37%) and 2020 COVID levels (49% – primarily due to pandemic restrictions), it continues to be significantly higher than the 2020 pre-COVID total (20%). Telework is lower only in the South region (26% versus 33%-38% elsewhere). Overall, 83% of telecommuters report working from home more than once a week. This is up from last year (71%), but not quite as high as the 2020 COVID levels (90%). Still, consistent with the overall incidence of telecommuting, the rate of frequent 2022 telecommuting (83%) is much higher than 2020 pre-COVID levels (70%). Compared to last year, 5+ day/week teleworking is unchanged (39%), while more are telecommuting two to four days per week (from 23% to 44%).

**Daily Commuter Miles Saved Through Alternate Modes** – Based on the combination of results related to the modes of commuter travel and distances traveled with March 2022 employment estimates (Source: Arizona Office of Economic Opportunity), **we estimate that the 2022 reduction of single-occupant vehicles commuting through the use of alternative methods of travel saves 4,263,223 vehicle miles per day – or 44% of total miles driven/not driven.** This percentage of miles saved is up slightly over last year (43%). These continued positive miles saved findings are primarily related to levels of single-passenger travel that have not returned to pre-COVID levels (68% versus 70%-81% in 2015-2020 pre-COVID), as well as continued strong participation rates and/or frequency of use of many alternate modes (particularly telecommuting and carpooling).

**2022 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	68%	418,841	11.6	4,858,556	4,858,556	-0-
Motorcycle	2%	8,791	15.2	133,623	133,623	-0-
Carpool	27%	114,706	10.7	1,227,354	454,576	772,778
Bus	15%	69,900	7.6	531,240	15,178	516,062
Bicycle	8%	19,287	7.9	152,367	-0-	152,367
Walk	12%	54,685	3.1	169,524	-0-	169,524
Streetcar	4%	13,642	7.6	103,679	-0-	103,679
Telecommute	26%	134,155	16.0	2,146,480	-0-	2,146,480
School from home	8%	34,458	6.7	230,869	-0-	230,869
Compressed workweek	8%	12,701	13.5	171,464	-0-	171,464
<b>TOTALS:</b>	<b>--</b>	<b>881,166</b>	<b>--</b>	<b>9,725,156</b>	<b>5,461,933</b>	<b>4,263,223</b>

- (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 18/19 in our report), we can further estimate daily vehicle miles saved through the use of alternative modes for shopping and leisure purposes. As indicated below, we estimate that the reduction of single-occupant vehicles commuting through the use of alternative methods for **shopping** saves 634,139 vehicle miles per day, or 32% of total miles driven/not driven (up significantly from 26% in 2021). The number of **leisure** travel miles saved daily is 3,838,429 – 44% of total miles driven/not driven (up from 35% in 2021). These compare to a savings of 4,263,223 vehicle miles per day in 2021 **travel to work or school** (or 44% of total miles driven/not driven).

**2022 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	55.6%	398,487	5.00	1,107,794	1,107,794	0
Motorcycle	0.6%	398,487	5.00	11,955	11,955	0
Carpool/Vanpool	25.8%	398,487	5.00	514,048	190,388	323,660
Bus	7.6%	398,487	5.00	151,425	4,326	147,099
Walk	5.8%	398,487	5.00	115,561	0	115,561
Bicycle	2.0%	398,487	5.00	39,849	0	39,849
Streetcar	0.4%	398,487	5.00	7,970	0	7,970
<b>TOTALS:</b>	--	--	--	<b>1,948,602</b>	<b>1,314,463</b>	<b>634,139</b>

- (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 32b). Bus: based on average of 35 riders/bus. Walk/bicycle/streetcar: no polluting vehicles used.

**2022 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	37.6%	1,518,736	5.78	3,300,639	3,300,639	0
Motorcycle	0.4%	1,518,736	5.78	35,113	35,113	0
Carpool/Vanpool	43.8%	1,518,736	5.78	3,844,893	1,424,034	2,420,859
Bus	8.8%	1,518,736	5.78	772,490	22,071	750,419
Walk	4.6%	1,518,736	5.78	403,802	0	403,802
Bicycle	2.4%	1,518,736	5.78	210,679	0	210,679
Streetcar	0.6%	1,518,736	5.78	52,670	0	52,670
<b>TOTALS:</b>	--	--	--	<b>8,620,286</b>	<b>4,781,857</b>	<b>3,838,429</b>

- (A) From Table 19.
- (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 32b). Bus: based on average of 35 riders/bus. Walk/bicycle/streetcar: no polluting vehicles used.

**Final Air Quality Campaign Observations**

While there has been little change in awareness of the Pima County “Clean Air” Program over the last several surveys (41%-43%), there continues to be a significant difference in key attitudes and behaviors related to air quality among those familiar of the “Clean Air” Program (42%) and those who are not (47%). This relationship is once again 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> (42%)	<u>Unaware</u> (47%)
<b>Air Quality Event Awareness</b>			
• <u>Healthy Air Is in Our Hands</u>			
<u>Drive-Less Pledge</u>			
<b>2022</b>	<b>+340%</b>	<b>44%</b>	<b>10%</b>
2021	+720%	41%	5%
• <u>This Is Clean Air Challenge</u>			
<b>2022</b>	<b>+317%</b>	<b>50%</b>	<b>12%</b>
2021	+671%	54%	7%
• <u>“Cut Down Pollution” lawn &amp; garden program</u>			
<b>2022</b>	<b>+278%</b>	<b>34%</b>	<b>9%</b>
• <u>Car-Free Day</u>			
<b>2022</b>	<b>+257%</b>	<b>50%</b>	<b>14%</b>
• <u>Travel Reduction Program</u>			
<b>2022</b>	<b>+207%</b>	<b>43%</b>	<b>14%</b>
2021	+720%	41%	5%
• <u>Walk and Roll to School Week</u>			
<b>2022</b>	<b>+171%</b>	<b>46%</b>	<b>17%</b>
2021	+158%	62%	24%
• <u>Cyclovia</u>			
<b>2022</b>	<b>+100%</b>	<b>34%</b>	<b>17%</b>
2021	+325%	34%	8%
• <u>Earth Day Festival</u>			
<b>2021</b>	<b>+82%</b>	<b>73%</b>	<b>40%</b>
2021	+94%	66%	34%
• <u>Participation in a “Clean Air” event</u>			
<b>2022</b>	<b>+360%</b>	<b>23%</b>	<b>5%</b>
2021	+850%	19%	2%
✓ <b>On average, there is a 235% higher awareness and/or participation in “Clean Air” events or programs among those familiar with the “Clean Air” Program (compared to 433% in 2021).</b>			

<u>Some key differences:</u>	<u>Difference</u>	<u>“Clean Air” Program</u>	
		<u>Aware</u> (42%)	<u>Unaware</u> (47%)

***PDEQ and Sun Tran Awareness***

- Aware of PDEQ  

<b>2022</b>	<b>+174%</b>	<b>85%</b>	<b>31%</b>
2021	+200%	78%	26%
  - Aware of Sun Tran buses and streetcar being free for the past year  

<b>2022</b>	<b>+21%</b>	<b>74%</b>	<b>61%</b>
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- ✓ **On average, there is a 98% greater awareness of PDEQ and free Sun Tran services among those aware of the “Clean Air” Program (compared to 147% in 2021).**

***PDEQ Activity Understanding***

- Aware of how to access real-time air quality data  

<b>2022</b>	<b>+160%</b>	<b>52%</b>	<b>20%</b>
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  - Seen or heard information on how to reduce your own air pollution emissions  

<b>2022</b>	<b>+91%</b>	<b>82%</b>	<b>43%</b>
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  - Aware of air pollution advisories in Pima County  

<b>2022</b>	<b>+67%</b>	<b>87%</b>	<b>52%</b>
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  - Seen or heard information that vehicle engine idling causes air pollution  

<b>2022</b>	<b>+43%</b>	<b>86%</b>	<b>60%</b>
2021	+38%	83%	60%
  - Seen or heard information about the importance of keeping tires properly inflated  

<b>2022</b>	<b>+18%</b>	<b>84%</b>	<b>71%</b>
2021	+26%	91%	72%
  - Aware that majority of air pollution comes from motor vehicle use  

<b>2022</b>	<b>+13%</b>	<b>80%</b>	<b>71%</b>
2021	+17%	83%	71%
- ✓ **On average, there is a 65% higher understanding of PDEQ activities among those aware of the “Clean Air” Program (compared to 28% in 2021).**

**Based on these findings, we again conclude that the “Clean Air” Program increases awareness, belief and actions related to improving air quality.** As a result, targeting those *unfamiliar* with the program continues to be a key recommendation of this project.

Those unfamiliar with (or unsure of) the “Clean Air” Program are more apt to be South region residents and 26 to 35 or 65+ year-olds who live in lower income households.

**With respect to target messaging, given the high fuel prices, we recommend programs or educational messages that promote air quality and result in saving gas (such as tire inflation education, increased carpooling, “free” bus ridership, etc.).** Social media remains a cost-effective method of promoting these messages (particularly among younger residents), supplemented (as the budget allows) with traditional media (such as television, print and/or radio).

**Tire Inflation Education Campaign** – More than three of four (77%) indicate that they “have seen or heard information about the importance of keeping your tires properly inflated” (down from 81% last year). One of four report that they are keeping their tires properly inflated to help reduce air pollution in the Tucson (26%, down slightly from 29% last year).

***What is the direct impact of this action taken to keep tires properly inflated?*** In Pima County, there are an estimated 714,452 working vehicles (automobiles, vans and trucks of one-ton capacity or less for household use) (source: 2020 American Community Survey 5-Year Estimate). According to PDEQ, a vehicle will save 144 gallons of gasoline per year with properly inflated tires.

If 26% of Pima County residents are keeping their tires properly inflated, this yields an annual reduction of 26,749,083 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 –**

As in past years, residents were informed that “some streets in the Tucson area are equipped with storm drains.” Immediately afterwards, respondents were asked to identify where (to the best of their knowledge) water that flows into these storm drains ends up. Allowing for multiple responses, and very consistent with 2021 findings, ranked perceptions include:

- **River or wash** (45%, basically unchanged since last year [46%]. This perception is strongest in the Northwest.)
- **Water treatment plants** (14%, up slightly from 13% last year. Perceptions are generally consistent regardless of geography [somewhat higher in Central region].)
- **Groundwater** (12%, down progressively and incrementally from 17% in 2020. This perception is lower only in the Northwest zips [8% versus 13%-15% elsewhere].)
- **Sewage plants** (11%, unchanged since last year. These tend to be East zip residents.)
- **Canals** (7%, up from 5% last year. South residents are more apt to think that stormwater ends up in canals.)

Overall, 28% indicate that they **do not know** where water that flows into storm drains ends up. This is up slightly from 25%-26% in recent years. These tend to be Central region residents.

**Green Infrastructures Implemented/Installed at Home or Business** – One-half indicate that **landscaping with native plants** has occurred at their home or business. This represents a slight dip from the last two years (52%-53%). Implementation is highest in the Northwest zip codes and is elevated among those who perceive a progressively more serious stormwater pollution problem.

Other Green Infrastructures with more significant implementation include:

- **Porous pavements or bricks** (20%, down from 22%-24% the last two years. These tend to be Northwest or East region residents.)
- **Water harvesting using rain barrels or cisterns** (19%, rebounding to 2019 levels [up from 13%-16% in 2020-2021]. Elevated usage among those who live in the East zips.)
- **Connecting runoff from a roof or paved surface to a basin to water plants** (17%, down incrementally from 2021 [19%] and 2020 [26%] levels. Users in the 2022 study are more apt to be Northwest residents.)

Additional Green Infrastructure installed at home or business include:

- **Natural areas protected from clearing and grading** (14%, up slightly from last year [13%]. Implementation is lower only in the Central zips [8% versus 14%-17% elsewhere].)
- **Landscaped depressions that collect stormwater** (14%, nearly the same as last year [15%] – but well short of prior surveys [24%-29%]. Usage is generally consistent across zip code region.)
- **A trench that is filled with gravel to collect stormwater** (12%, up slightly from 11% last year. Still, these totals are lower than found between 2016 and 2019 [16%-21%]. There are few differences in current implementation with respect to geography.)

**Awareness of the “Clean Water Starts With Me” Campaign** – Highly consistent with the previous three years, 42% indicate they are familiar with the “Clean Air Starts With Me” campaign. As we found in 2021, campaign awareness is elevated in the Central zips and among residents who perceive a “serious” or “moderate” stormwater pollution problem.

**Perceived Seriousness of Stormwater Pollution Problem in the Tucson Area** – While more than eight of ten overall (84%) continue to believe that there is at least a “moderate” problem in the Tucson area “with polluting materials entering storm drains,” progressively fewer perceive it to be a “serious problem.” In 2019, a record 44% perceived a “serious problem.” This percentage has incrementally declined each year since: 33% in 2020, 27% in 2021 and 22% in 2022. Instead, progressively more perceive stormwater pollution to be a “moderate” problem (up to 62% now). Still, as in recent studies, just 16% think stormwater pollution is “not a problem” (compared to 11% back in 2019). This represents a 5.1 average score on the “1-to-9” rating scale (down from 5.4 in 2021). The perception of a more “serious” stormwater pollution problem is (on average) higher among Central region residents.

**Methods Used to Dispose of Various Types of Household Hazardous Wastes** – Despite some mixed comparative results, the most often used methods of disposing of household wastes such as “household chemicals, automotive fluids and lawn & garden chemicals” include:

- **Hazardous waste collection site** (41%, down from 43% in 2021. Usage is lower only in the South zips [36% versus 42%-46% elsewhere].)
- **Auto parts store** (31%, unchanged since last year. These tend to be Northwest or East residents.)
- **Put it in the garbage** (24%, down from 27% in 2021 – representing progressive improvement since 2017 [37%]. Results are generally consistent across geography.)



- **Service station** (16%, down from 18% in 2021. South region residents are more apt to take household hazardous wastes to a service station.)
- **Pour in the sink or down the drain** (14%, up slightly from 12% last year. These are more likely to be Northwest or East region residents.)
- **Landfill** (13%, up slightly from 12% in 2021. Landfill users tend to be Northwest residents.)

Two of ten overall indicate that they **do not use** these types of hazardous household items (or finish them when they do so). This is up progressively from just 9% in 2018. As we have found in past years, 8% are not sure how their household disposes of its hazardous waste.

**Rating of Various Contributors to Stormwater Pollution Problem** – Consistent with past years, respondents were asked to rate the perceived severity of eight contributors to the problem of stormwater pollution in the Tucson area. The same “1-to-9” rating scale was used, where “1” means “not a problem” and “9” means a “serious problem.”

As we have found in recent surveys, average contribution scores continue to trend incrementally lower – although (once again) the ordinal rankings of these contributors remain generally consistent. In part, this is related to each item being perceived to be a less “serious” contributor to stormwater pollution. Still, as in past years, there continues to be a direct relationship between the severity of the stormwater pollution problem in Tucson and the degree to which each of these factors is perceived to contribute to the problem.

The eight contributors to stormwater pollution evaluated include:

- **Chemicals and materials from construction sites** (75% perceived contributor to stormwater pollution [compared to 76% last year], 22% “serious” [down from 25%] – yielding a 4.9 average score on the “1-to-9” scale [compared to 5.0 last year]. Lower perceived contributor only in the South zips [4.6 versus 5.0-5.1 elsewhere].)
- **Chemicals and materials from industrial facilities** (74% perceived contributor to stormwater pollution [compared to 77% last year], 21% “serious” [down from 26%] – yielding a 4.8 average score [compared to 5.0 last year]. Geographically, scores are lower only in the South region [4.4 versus 5.0-5.1 in the other zips].)
- **Automotive fluids such as oil, gasoline and brake fluid** (74% perceived contributor to stormwater pollution [compared to 76% last year], 19% “serious” [down from 24%] – yielding a 4.8 average score [compared to 5.0 last year]. Northwest residents are more likely to consider automotive fluids a “serious” contributor to stormwater pollution.)

- **Pesticides, fertilizers and debris from lawns and gardens** (73% perceived contributor to stormwater pollution [compared to 75% last year], 21% “serious” [down from 26%] – yielding a 4.7 average score [compared to 5.0 last year]. These tend to be Northwest residents.)
- **Household trash and bulky items like mattresses, sofas and tires** (69% perceived contributor to stormwater pollution [compared to 74% last year], 19% “serious” [down from 24%] – yielding a 4.6 average score [compared to 4.9 last year]. Central zip residents are likelier to perceive these items to be a “serious” contributor to stormwater pollution.)
- **Household products such as cleaning fluids, detergents, paints, degreasers and bleaches** (69% perceived contributor to stormwater pollution [compared to 71% last year], 19% “serious” [down from 23%] – yielding a 4.6 average score [compared to 4.9 last year].)
- **Animal waste from household pets** (59% perceived contributor to stormwater pollution [compared to 61% last year], 10% “serious” [down from 13%] – yielding a 4.0 average score [compared to 4.1 last year]. In line with the last three surveys, four of ten say animal waste is “not a problem.”)
- **Copper from brake pads made with copper** (57% perceived contributor to stormwater pollution [compared to 59% last year], 10% “serious” [down from 12%] – yielding a 4.0 average score [compared to 4.1 last year].)

**Government Entity to Call If Witness Someone Dumping Trash or Chemicals in a Storm Drain** – Three of ten report that they **don’t know** who they would contact if they saw someone dumping trash or chemicals in a storm drain. This represents an incremental increase from 2020 (24%) and 2021 (28%) totals.

As we found last year, one-third would contact **911/the police department**. Northwest zip residents are more likely to contact 911 to report someone dumping trash or chemicals in a storm drain.

Other government-related departments or agencies that residents would contact include:

- **Water department** (13%, up from 10% in 2021. These are more likely to be Northwest residents.)
- **Health department** (11%, up from 8%. Northwest residents are among those more apt to say they would contact the health department.)
- **Sanitation department** (11%, up from 9%. These tend to be Central region residents.)

- **City government** (11%, down from 13%.)
- **County government** (10%, down from 13% last year. East region residents are among those more apt to say they would contact county government.)

Only a few (3%) indicate they would **not report** storm drain dumping.

**Typical Methods of Handling Pet and Animal Waste** – Like last year, 55% report that they typically get rid of pet and animal waste by **placing it in the garbage for disposal**. This is true regardless of geography (somewhat lower only in South zips).

Consistent with last year (and allowing for more than one response), one of ten overall:

- **Leave waste to decompose on grass or soil** (10%, down slightly from 12% last year. Incidence is lower only in the East zips [4% versus 10%-13% elsewhere].)
- **Flush down the toilet** (10%, up slightly from 9% last year. Higher incidence among Central or East residents.)

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

Highly consistent with past surveys, most remain “very likely” to take part in these two activities to help keep stormwater clean:

- **Safely dispose of chemicals** (65% “very likely,” up slightly from 2021 levels [63%]. Central residents are especially apt to say they would be “very likely” to dispose of chemicals safely.)
- **If you have a dog, using a doggie bag to clean up after them** (65% “very likely,” off from 69% last year. Somewhat lower only in the South zips [57% versus 69%-70% elsewhere].)

As we found last year, just less than one-half (47%) are “very likely” to **report a spill**. Central residents are particularly apt to say they would be “very likely” to report a spill to help keep stormwater clean.

Compared to last year, a few more are “very likely” to say they would **replace a toxic compound with a non-toxic compound** (from 42% to 44%). These tend to be Northwest residents.

The percentage “very likely” to indicate they would **gather stormwater to use for watering plants** has increased to its highest level in two years (44% versus 37%-39% in 2020-2021).

Compared to last year, more are likely (to some degree) to **install Green Infrastructure** (from 60% to 65%) – including an uptick in those “very likely” (from 23% to 25%). Most willing to install Green Infrastructures are South or Central residents.

### ***Final Clean Water Program Campaign Observations***

As we have found in the past four surveys, four of ten indicate awareness of the “Clean Water Starts With Me” campaign. Similar to recent years, there continues to be significant positive perception, attitudinal and behavior differences with respect to stormwater between those aware of the “Clean Water Starts With Me” campaign (42%) and those who are not (58%).

Regardless of campaign awareness, a majority think that Tucson has a “moderate” stormwater pollution problem (62% overall). Respondents familiar with “Clean Water Starts With Me” remain slightly more likely to perceive a “serious” pollution problem” (24% versus 22% of those unfamiliar).

In terms of where stormwater that flows into Tucson storm drains end up, there are few differences (once again) in the ordinal ranking of resident perceptions. The highest percentage (regardless of campaign awareness) continue to say that stormwater flows in a river or wash (45% overall).

As summarized in following the displays, there are key differences related to the perceived factors that contribute to the stormwater pollution problem, the implementation/ installation of Green Infrastructures at home or business and willingness to take 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> (42%)	<u>Unaware</u> (58%)
<b>“Serious” Contributors to Stormwater Pollution</b>			
<u>Copper from copper brake pads</u>			
<b>2022</b>	<b>+75%</b>	<b>14%</b>	<b>8%</b>
2021	+60%	16%	10%
<u>Automotive fluids such as oil, gasoline and brake fluid</u>			
<b>2022</b>	<b>+35%</b>	<b>23%</b>	<b>17%</b>
2021	+4%	25%	24%
<u>Household products such as cleaning fluids, detergents, paints, etc.</u>			
<b>2022</b>	<b>+29%</b>	<b>22%</b>	<b>17%</b>
2021	+35%	27%	20%
<u>Industrial facility chemicals/materials</u>			
<b>2022</b>	<b>+21%</b>	<b>23%</b>	<b>19%</b>
2021	+12%	28%	25%
<u>Construction site chemicals/materials</u>			
<b>2022</b>	<b>+14%</b>	<b>24%</b>	<b>21%</b>
2021	+12%	27%	24%

- ✓ **There is a 35% 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 (up from 32% last year).** Regardless of campaign awareness, three other contributors elicit about the same degree of “serious” perceived causation: pesticides, fertilizers and debris from lawns and gardens (21%), household trash and bulky items (like mattresses, sofas and tires) (19%) and animal waste from household pets (10%).

<u>Some key differences:</u>	<u>Difference</u>	<u>“Clean Water Starts With Me”</u>	
		<u>Aware</u> (42%)	<u>Unaware</u> (58%)
<b><i>Green Infrastructures Implemented/ Installed at Home or Business</i></b>			
<u>Landscape depression that collect stormwater</u>			
<b>2022</b>	<b>+100%</b>	<b>20%</b>	<b>10%</b>
2021	-7%	14%	15%
<u>Water harvesting using rain barrels or cisterns</u>			
<b>2022</b>	<b>+79%</b>	<b>25%</b>	<b>14%</b>
2021	+100%	18%	9%
<u>Connecting runoff from a roof or paved surface</u>			
<b>2022</b>	<b>+64%</b>	<b>23%</b>	<b>14%</b>
2021	+86%	26%	14%
<u>Natural areas protected from clearing and grading</u>			
<b>2022</b>	<b>+50%</b>	<b>18%</b>	<b>12%</b>
2021	+45%	16%	11%
<u>Trench filled with gravel to collect stormwater</u>			
<b>2022</b>	<b>+30%</b>	<b>13%</b>	<b>10%</b>
2021	+30%	13%	10%
<u>Porous pavement or bricks</u>			
<b>2022</b>	<b>+28%</b>	<b>23%</b>	<b>18%</b>
2021	+4%	23%	22%

- ✓ **There is a 58% higher incidence of Green Infrastructures implemented or installed at home of business among those aware of the “Clean Water Starts With Me” campaign (compared to 65% last year).** Regardless of campaign awareness, one-half report that they are landscaping with native plants.

<u>Some key differences:</u>	<u>Difference</u>	<u>“Clean Water Starts With Me”</u>	
		<u>Aware</u> (40%)	<u>Unaware</u> (60%)
<b>“Very Likely” to Take Actions to Help Keep Stormwater Clean</b>			
<u>Install Green Infrastructures</u>			
<b>2022</b>	<b>+48%</b>	<b>31%</b>	<b>21%</b>
2021	+76%	30%	17%
<u>Gathering stormwater to use for watering plants</u>			
<b>2022</b>	<b>+34%</b>	<b>51%</b>	<b>38%</b>
2021	+66%	48%	29%
<u>Report a spill</u>			
<b>2022</b>	<b>+24%</b>	<b>52%</b>	<b>42%</b>
2021	+26%	54%	43%
<u>Replacing a toxic compound with a non-toxic compound</u>			
<b>2022</b>	<b>+20%</b>	<b>49%</b>	<b>41%</b>
2021	+32%	49%	37%

- ✓ **There is a 32% higher strong likelihood of taking specific actions to help keep stormwater clean among those aware of the “Clean Water Starts With Me” campaign (compared to 50% last year).** Consistent with recent years, and regardless of campaign awareness, the vast majority remain “very likely” to use a doggie bag to clean up after a pet and safely dispose of chemicals (65% each). Among pet owners (and regardless of campaign awareness), most (55%) continue to say they dispose of animal waste by placing in the garbage.

**Consistent with past years, these findings suggest that “Clean Water Starts With Me” campaign awareness has a positive impact on the perceptions and willingness to act related to the stormwater pollution problem in Tucson.** Consequently, we recommend targeting future stormwater outreach/education efforts towards Pima County residents who are less familiar with the “Clean Water Starts With Me” campaign. These include South zip residents, 46 to 55 year-olds, non-Hispanic minorities and lower income households.

Another potential audience for education and outreach might be residents unsure who they would call to report someone dumping trash or chemicals into a storm drain or wash. These tend to be Central region residents, non-Hispanic minorities and low-income households. Waste disposal education efforts might be focused on younger residents (16 to 35) – who are more likely to indicate they dispose of household hazardous waste by pouring in the sink or placing in the garbage.