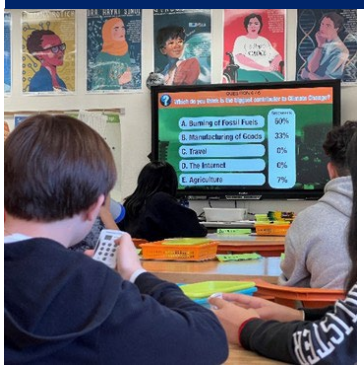
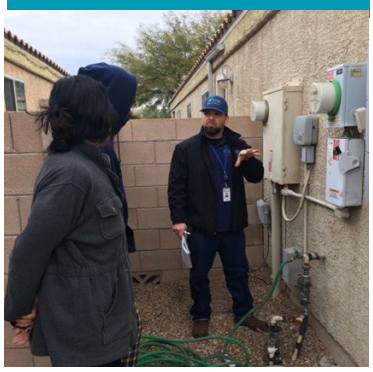
ANNUAL REPORT

2022





CITY OF TUCSON | TUCSON WATER

WATER USE IT WISELY

Water Conservation Program 2022 Annual Report

MAY 2023

City of Tucson

Regina Romero, Mayor

Michael J. Ortega, City Manager

City Council Members

Lane Santa Cruz, Ward One

Paul Cunningham, Ward Two

Kevin Dahl, Ward Three

Nikki Lee, Ward Four

Richard Fimbres, Ward Five

Steve Kozachik, Ward Six

Prepared by

Candice Rupprecht, Water Conservation Program Manager

Acknowledgments

Thank you to the Conservation & Stormwater Resources Staff and the GIS Staff at Tucson Water for helping to execute our programs and gather data for this annual report. We are grateful to our partners who make our high-quality conservation program possible, by working in our community every day, educating and providing services to our customers. This report reflects our collective conservation ethic and commitment to a thriving Tucson.

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2022 Conservation Snapshot

In 2022, total potable water use was 120 gallons per capita per day (GPCD) with a residential GPCD of 76, continuing a two-decade downward trend. The conservation fee, now in its 14th year, has allowed Tucson Water to offer our customers high-quality conservation and education programs and robust efficiency incentives.

In 2022, programs funded by the conservation fee have resulted in:

- 29.5 million gallons conserved
- $1.3 million invested in rebates and incentives
- 2,452 high-efficiency toilet (HET) and urinal installations
- 353 rainwater harvesting and gray water installations
- 762 water audits for customers

To date, programs funded by the conservation fee have resulted in:

- 4.9 billion gallons (14,985 acre-feet) conserved
- $16.2 million invested in rebates and incentives
- Over 71,000 HET and urinal installations, including 8,400 free toilets for low-income customers
- Over 3,500 rainwater harvesting and gray water installations, including nearly 500 subsidized systems for low-income customers

In 2022, our partner education programs reached over 25,000 students, teachers, and adults.

In the last 14 years with a dedicated conservation fund, our education partners have reached over 610,000 students and community members and Tucson Water Zanjeros have conducted over 19,000 water audits for customers.

Milestones for 2022 include:

- Launching an online platform for customer rebate applications.
- Rebate policy changes to drive additional water savings through customer incentives.
- Expansion of our free Conservation Kits, providing over 16,199 devices to customers.
- Implementation of Tier 1 measures under the City's Drought Preparedness and Response Plan, primarily focusing on communicating water use guidelines specific to each customer class and increasing engagement with customers exceeding their guidelines.
- Development of new conservation policies to maximize water conservation in new development, including WaterSense fixture requirements, irrigation meter requirements for commercial & multifamily properties and an ornamental turf prohibition.

Upcoming focus areas for 2023 include:

- Revamp rainwater harvesting program to improve outcomes, provide more benefits for passive harvesting and for DIY customers.
- Build stronger brand awareness with Water Use It Wisely and EPA WaterSense.
- Implement Tier 2 Drought Preparedness and Response Plan measures, focusing on:
    - Developing new self-help tools for customers with high water use.
    - Enhancing the water budget app to support more commercial customers.
    - Providing interdepartmental support for water efficiency opportunities based on audits and monthly water use information.
- Expand low-income incentive program to offerings to include discounted clothes washers and a gray water grant and loan program.
- Develop a turf replacement rebate program to accompany the prohibition on new ornamental turf.
- Coordinate with Planning and Development Services on water conservation code implementation.

Conservation Program Budget

This operating report describes the expenditures and activities of the Tucson Water Conservation Program for July 1, 2021 through June 30, 2022, referred to as Fiscal Year (FY 21/22). Although this annual report has shifted to a calendar year timeframe, financial reporting is provided on a fiscal year basis to ensure data accuracy and verification from business services. Funding for the Conservation Program is collected by a conservation fee assessed on all potable water sales and operates out of a separate fund within the Tucson Water Department.

Table 1 illustrates funds raised and the expenditures since the inception of the Water Conservation Fund in FY 08-09. The fund was established by the Mayor & Council through adoption of ordinance 10555 on May 20, 2008.

The Conservation and Education subcommittee of CWAC reviews and advises the Mayor and Council on the budget and programs funded by the water conservation fee. The subcommittee meets monthly with staff and makes recommendations to the main CWAC body.

Water Conservation Program Expenditures

The Conservation Fund expenditures listed below and shown in Table 4 (page 13) reflect a financial summary pulled from the City's budget and financial reporting system. This report also features rebate program summaries of the quantity, cost and estimated savings of rebates processed during the fiscal year. The program numbers provided in the following sections are for operating purposes and not intended to reconcile with financial reports. The water conservation fund can be separated into eight main categories as shown in Figure 1 with a total fund expenditure of $3,733,428.

The seven categories are:

1. Operating ($471,404)

   Salaries and wages for permanent employees:
   a. 1 Conservation Manager
   b. 1 Water Conservation Specialist
   c. 1 Lead Planner
   d. 1/2 Urban Landscape Manager
   e. 6 Zanjeros (including 1 Supervisor); *2 positions currently vacant*
2. Professional Services ($1,486,347)

   Contractors that support research, resource development and program implementation of education, green stormwater infrastructure (GSI) and low-income services.
3. Rebate Programs ($1,179,470)

   Incentive and rebate programs designed to offset customer expense of implementing water efficiency retrofits.
4. Outreach & Marketing ($33,760)

   Public relations and advertising to promote conservation programs.
5. Fixtures & Devices ($25,635)

   Conservation devices to support program outreach and promotional materials including store displays and conservation giveaway items.
6. Miscellaneous ($16,908)

   Travel, training, memberships, printing, subscriptions, uniforms, computers, etc.
7. Administration Fee ($149,870)

   Paid to the City of Tucson for business and administrative services.
8. Fund balance expenditures ($700,048)

   Mayor and Council approved spending of accrued fund balance. Not included in Program Expenditures breakdown in Figure 1.

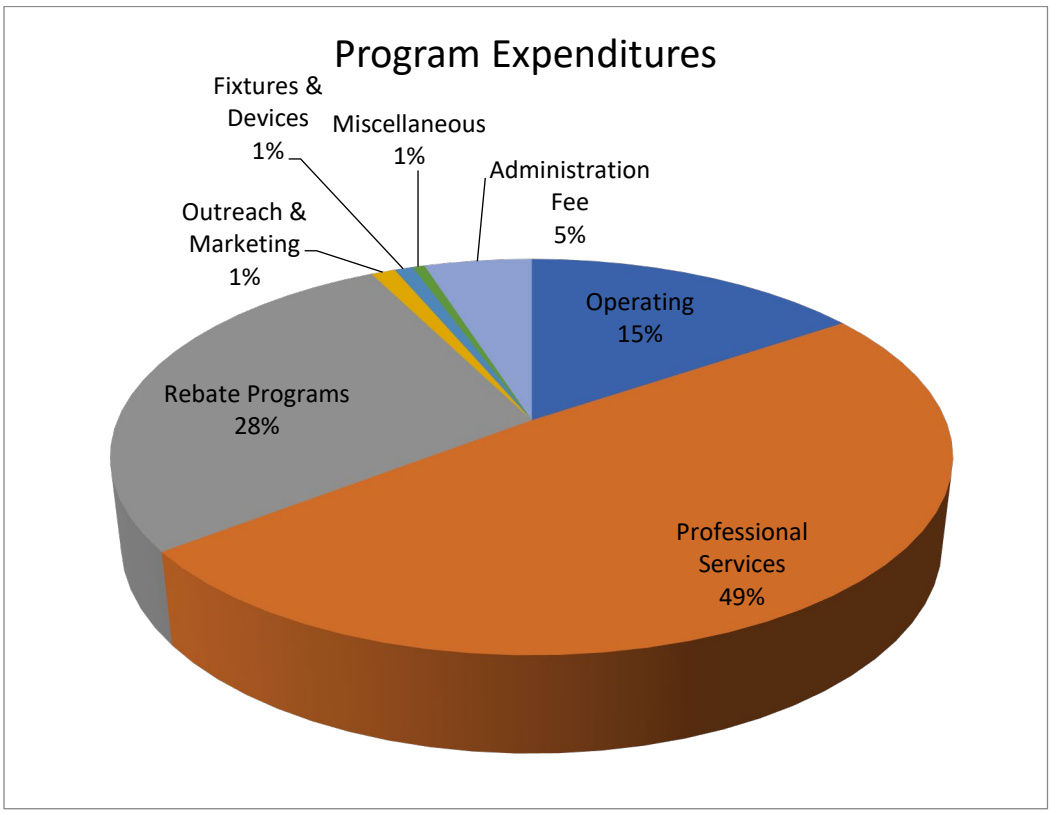


Figure 1: FY 21-22 Water Conservation Program expenditures by percentage.

Fiscal Year	Conservation Fee ($/ccf)	Approved Budget	Expenditures	Revenue
FY 08/09	$ 0.03	$ 997,000	$ 794,462	$ 1,217,280
FY 09/10	$ 0.04	$ 997,000	$ 831,883	$ 1,716,880
FY 10/11	$ 0.05	$ 1,086,690	$ 1,720,075	$ 2,124,838
FY 11/12	$ 0.07	$ 2,902,630	$ 1,795,082	$ 2,816,241
FY 12/13	$ 0.07	$ 3,356,820	$ 2,727,541	$ 2,830,967
FY 13/14	$ 0.07	$ 2,950,000	$ 2,725,288	$ 2,832,950
FY 14/15	$ 0.07	$ 3,050,000	$ 2,771,450	$ 2,726,208
FY 15/16	$ 0.08	$ 3,540,250	$ 2,785,621	$ 3,000,905
FY 16/17	$ 0.08	$ 3,540,250	$ 3,445,812	$ 3,035,932
FY 17/18	$ 0.09	$ 3,540,250	$ 3,108,333	$ 3,524,361
FY 18/19	$ 0.10	$ 3,895,620	$ 3,036,034	$ 3,613,761
FY 19/20	$ 0.10	$ 3,829,450	$ 3,776,282	$ 3,766,785
FY 20/21	$ 0.10	$ 3,707,690	$ 3,327,383	$ 4,019,836
FY 21/22	$ 0.10	$ 3,612,590	$ 3,733,428	$ 3,744,938

Table 1: Water Conservation Program Budget Historic Overview, reported on a Fiscal Year.

Conservation Program Annual Updates

The Conservation Program delivers conservation solutions to the community through three key program areas: water audits, rebates and incentives, and educational services.

Free *water audits* are provided to customers with high-usage concerns and conservation questions. These audits are available to residential and commercial customers and are scheduled through customer service or conservation staff.

Incentives are available to residential and commercial customers and help offset the cost of implementing conservation solutions for households and businesses.

Single-family Incentives:

- toilet rebate
- clothes washer rebate
- gray water rebate
- rainwater harvesting rebate
- low-income rainwater harvesting grants and no-interest loans
- low-income free toilet installations
- low-income emergency plumbing repairs

Multifamily Incentives:

- high-efficiency toilet rebate
- clothes washer rebate
- customized rebates

Commercial Incentives:

- toilet rebate
- urinal rebate
- customized rebates

Educational programs are provided to K-12 classrooms throughout each school year and teachers can take advantage of a variety of water-focused lessons and presentations. Landscape education is also offered throughout the year to residents and landscape professionals.

The impacts and updates of these various efforts are described in the following sections of this annual report.

GPCD Trend - Gallons per Capita per Day

Tucson Water has a long history of planning and developing water supplies for today and the future. This has been accomplished by increasing the use of renewable Colorado River water, using recycled water for irrigation purposes, expanding the use of rain and stormwater, and supporting one of the longest running conservation programs in the nation. As a result, Tucsonans are now using the same total amount of water as in mid-1980s, while population has increased by more than 200,000 and service connections have increased by more than 75,000. This fact alone is a strong indicator that water is being used more efficiently than ever.

A common metric for comparing annual water use and water conservation effectiveness is GPCD, which is derived by dividing the number of people served by the amount of water produced. Table 2 illustrates the reduction in GPCD compared to a rise in population over the last decade; Figure 2 illustrates total and residential GPCD trends since 2000. 2022 indicates the lowest residential GPCD in over 20 years.

Year	Total Potable GPCD	Residential GPCD*	Population
2000	165	112	635,073
2001	165	109	645,780
2002	170	114	655,834
2003	166	111	667,287
2004	163	109	678,418
2005	161	107	686,540
2006	159	104	703,157
2007	157	103	703,157
2008	148	99	705,271
2009	146	100	705,316
2010	139	94	705,817
2011	136	92	707,871
2012	131	89	709,926
2013	128	88	711,980
2014	124	85	714,034
2015	117	80	716,089
2016	117	81	718,143
2017	123	83	720,197
2018	118	81	722,251
2019	113	77	724,306
2020	122	83	726,360
2021	118	79	731,403
2022	120	76	737,794

Table 2: Annual GPCD (not including reclaimed system deliveries) and estimated Tucson Water service area population from 2000 to 2022. *Residential GPCD includes multifamily water use.

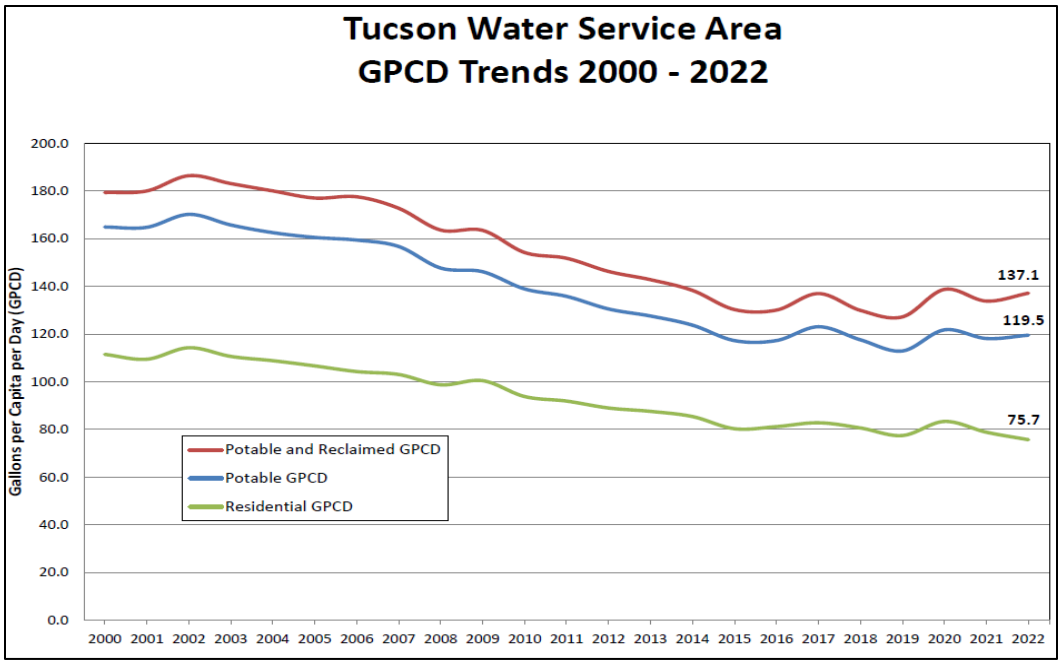


Figure 2: Total and Residential GPCD from 2000 to 2022

Zanjeros Water Audit Program

The Zanjeros continue to serve as Tucson Water's conservation experts, providing customer water audits, rainwater harvesting inspections and water waste enforcement throughout the community.

"Our Zanjero could not have been more professional or courteous. He arrived on time and clearly and patiently explained every step he took and every recommendation. The night of our audit, we hosted a neighborhood party, and we told many neighbors about our positive

Water Audits

Water audits are requested by customers, usually driven by a high bill and high consumption concerns. Audits are scheduled in two-hour blocks, scheduled at the customer's convenience. The onsite audit includes a download and review of hourly, 40-day water use data recorded at the meter when available, a review of all onsite water uses, identification of leaks and additional water efficiency opportunities at the property. A total of 762 audits were performed in 2022; 740 were for residential customers and 22 were commercial audits.

Leaks were identified at 25% of the properties that were audited. Based on meter readings taken during audits, the total excess usage was 5.8 million gallons and average monthly water usage for properties with continuous flow was over 30,000 gallons per month (40 ccf).

Audit reporting is all done electronically now, including follow-up surveys sent to customers when they receive an email with their audit report. 97% of customers indicated they would recommend a Tucson Water audit to friends and family.

"He is very professional, knowledgeable, and a good "teacher". I learned quite a bit and have already implemented the recommendations, especially those about the irrigation system. This service is important for Tucson residents and I recommend it highly." Customer, 12/27/2022

When asked to indicate whether they were satisfied with various aspects of the water audit service, customers almost always reported that they were Very Satisfied.

How often customers report being Very Satisfied			
Friendliness of Staff	Knowledge of Staff	Issue(s) Resolved	Quality of

Zanjeros audit savings:
A recent analysis found that single-family customers who have received a water audit save 1.7 ccfs (over 1,200 gallons) per month for at least two years following a water audit. For properties with detected ongoing flow at the meter, water usage is over 30,000 gallons per month on average, which is almost always curtailed at the time of the audit.

While the water audit intervention does not account for 100% of these savings because our team does not repair leaks that are found, they often help identify the source of the customer's high bill.

"The hourly usage information was very enlightening. The Zanjero was able to let me know that I didn't have leaks in the house based on no hourly usage during sleep time. He re-did the irrigation timing and taught me the proper way to make a seasonal change and use the timer. He is extremely knowledgeable and helpful. Thanks!" Customer, 6/27/2022

"This was one of most helpful and comprehensive learning things I have had in my house ever. Our Zanjero was thorough, able to explain things easily and a very likable person to boot. He helped me figure out the cause of our water leak, will be saving us hundreds of dollars a month. This far exceeded my hopes and expectations. He is a gem. Thank you!" Customer, 3/24/2022

Water Waste Enforcement

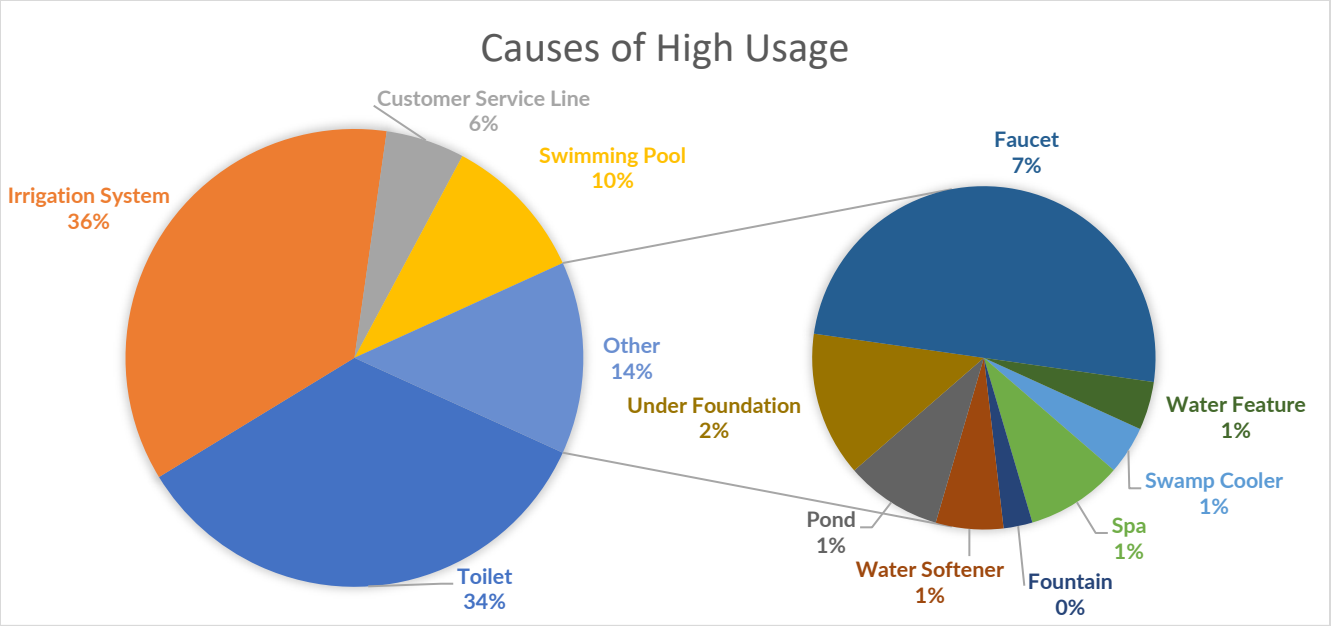
Enforcement of the Water Waste Ordinance (27-15) is under the purview of the Conservation Program staff. Water waste typically involves overwatering, leaks, improper discharge of water, malfunctioning irrigation systems, hose washing of hard surfaces, and misting systems operating in unoccupied areas.

Emails and phone calls are the two most common ways that water waste is reported. Reports of water waste also come in through the See Click Fix phone app. Water waste enforcement is first seen as a opportunity to educate the public on best practice. The fine structure for a first offense is a minimum of $250. Subsequent offenses within three years are a minimum of $500.

Conservation staff is working with IT on transferring the water waste database to an online system. No citations were issued in 2022.

Professional Training

The Zanjeros expanded on the intensive training they received on auditing commercial facilities, by supporting the city facility water audits and deploying the ultrasonic flow meter at commercial locations where continuous readings are useful in determining how water is being used at the site. The Zanjeros team can provide audit services to a wide range of commercial customers, which supports Tucson Water's drought response plan readiness. In October of 2022 the Zanjero team participated in the Mimir Water Efficiency Training which provides water professionals with the tools and knowledge to diagnose high water use at residential and commercial properties. Currently, two of the four Zanjeros have their National Green Infrastructure certification, and all have earned the professional rainwater harvesting design certification course offered by Watershed Management Group.



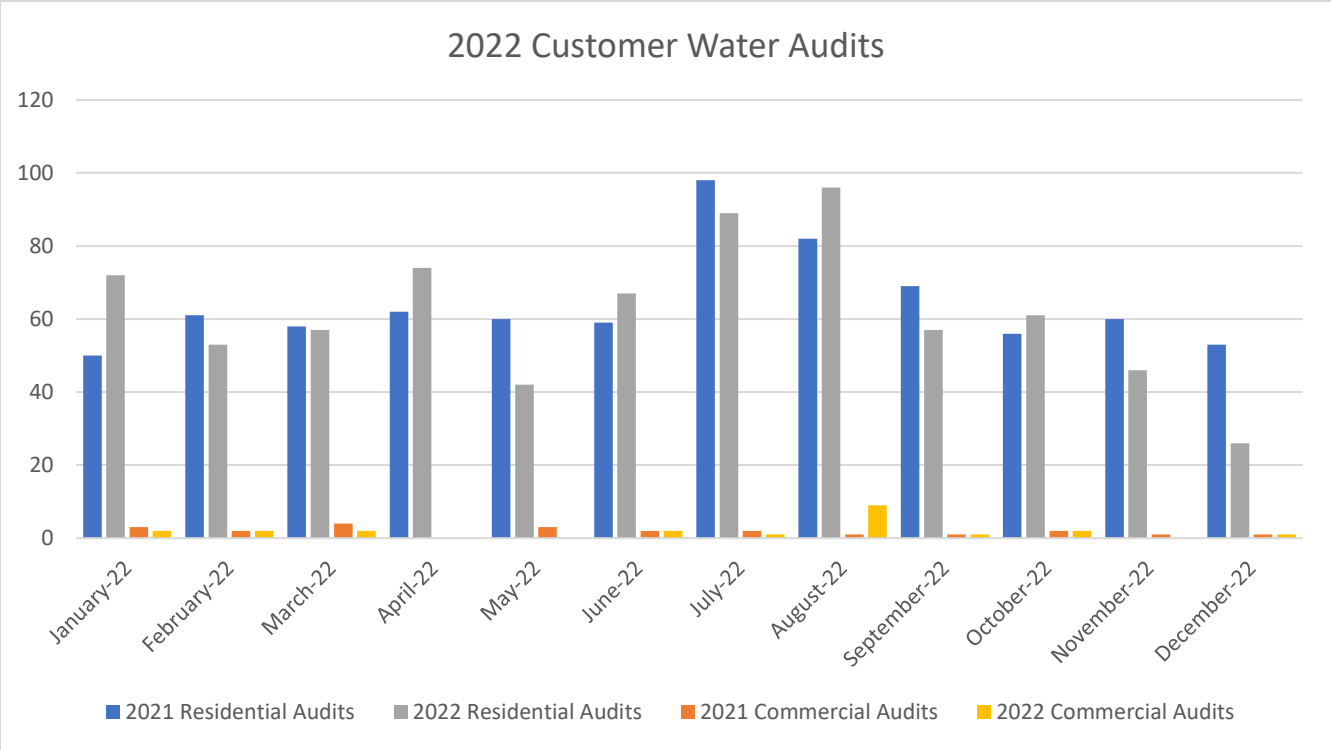


Figure 4: Graph of monthly audits completed by the Zanjeros team for 2022, including 2021 data for comparison

Rebates and Incentives

Program Administration

In 2022 nearly all rebate programs were converted to an online application system, which decreased processing times and data entry errors. Additionally, policy updates were made to the high-efficiency toilet and clothes washer rebate programs at the beginning of FY23. These changes have an objective of maximizing savings in the residential household and are described below.

High-efficiency Toilet Rebate

The new type of toilet available on the market, known as Premium High-efficiency toilets, are rated by MaP (Maximum Performance) and are all WaterSense-labeled. They meet a minimum solid waste removal threshold of 600 grams in one flush and flush no more than 1.1 gallons per flush. The rebate amount was increased from $75 to $100 per toilet (limit 2 per house, or two per apartment unit) to account for a slightly more expensive product. The qualifying construction date of the home was moved up from 1991 (city) or 1994 (county) to include homes and buildings built through 2010, when WaterSense products came into the Arizona market. This change achieves more water savings in an additional 30 years of housing stock that likely have 1.6-gpf toilets that may be reaching the end of their useful life. This policy change applies to all toilet rebate programs, although there is an exception for commercial toilet rebates instances where a 1.1-gpf toilet would be detrimental to old plumbing and sewer flows.

High-efficiency Clothes Washer Rebate

Tucson Water analyzed the savings for customers replacing front-loading and top-loading machines and determined that replacement of a top-loading machine with a qualifying front-loading machine yielded 85% water savings, while replacement of an older front-loading machine with a qualifying front-loading machine only saved 15%. To account for the discrepancy in savings and encourage more savings, customers are now offered a $200 rebate for replacement of a top-loader with a qualifying front-loader and $100 for replacing an older front-loader with a newer qualifying front-loader. A customer purchasing a new qualifying machine and not replacing an older one qualifies for a $100 rebate. An additional policy was added to allow customers to re-apply for a rebate after 5 years from the purchase date of the subsequent washer, after identifying that the machine may reach its useful life after that time frame.

National Updates

Income Tax Parity Issue

Currently any water efficiency rebates $600 or more are subject to income tax, as compared to energy efficiency rebates, which are tax-exempt. Water rebate applicants must submit a W-9 form with their application before Tucson Water can process their rebate. The W-9 form requires submitting a social security or tax identification number. The applicant will be issued a 1099-MISC for miscellaneous income to be filed with their tax return. The City of Tucson Mayor and Council continues to support legislative action, primarily through the Alliance for Water Efficiency, to change the tax code to remove the taxable income requirement and create parity between water and energy conservation programs.

EPA WaterSense Program

Tucson Water, along with over 2,000 organizations across the county, is a proud partner of the EPA's WaterSense program, established in 2006. WaterSense has helped American consumers save over 6.4 trillion gallons of water and more than $135 billion in water and energy bills. Additionally, because of the close connection between energy and water, WaterSense-labeled products have saved 754 billion kilowatt hours, enough to supply a year's worth of power to more than 70 million homes. Tucson Water continues to report data annually to WaterSense and contributes to the national savings numbers reported.

Additionally, Tucson Water continues to step up the use of WaterSense tools and educational materials to support conservation messaging efforts through the promotion of the WaterSense label. These range from indoor and outdoor water conservation campaigns in English and Spanish. Materials include social media graphics, videos, postcards, door hangers, tip cards, checklists, card games, web banners, and more. Educational materials include a variety of lesson plans, activities, and games for students to learn in engaging ways. As these are all readily developed and available, this allows Tucson Water to strategically use in an efficient manner, cutting down on development time and additional costs.

Service Area Distribution of Program

Distribution of Programs by Customer Class

A stated policy of the conservation program is to *"provide an equitable distribution of conservation benefits throughout customer classes and the community."* Water use, savings achieved through rebates and the expenditures for these rebates are broken out by customer class in Figures 3, 4 and 5.

Distribution of Programs by Ward

The geographical distribution of residential rebate programs by Ward, compared to the percentage of customers by Ward illustrates each rebate program's geographic distribution and saturation. This data, paired with a service area map showing all rebate recipients for a given program, provides a clear picture of rebate program participation.

Ward demographics are important considerations when developing and improving a program, as well as the age of homes and businesses. For example, the single-family HET program will not show a large percentage of installations where most of the homes were built after 1991; Ward 4 is a good example of this pattern.

Additionally, combining the impacts of regular rebate and low-income incentive programs provides a more holistic understanding of program uptake in specific parts of our community. For example, the single-family HET rebate program and the low-income HET direct install program have unequal concentrations of installations in the different jurisdictions.

Maps illustrating the geographic distribution of rebate programs are now available on the website. To access the rebate program map, go to: tucsonaz.gov/water/conservation. Navigate to the section titled Water Conservation Annual Reports.

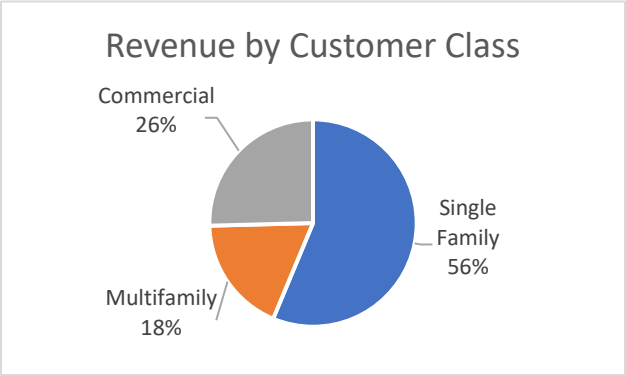


Figure 5: FY22 Revenue by Customer Class

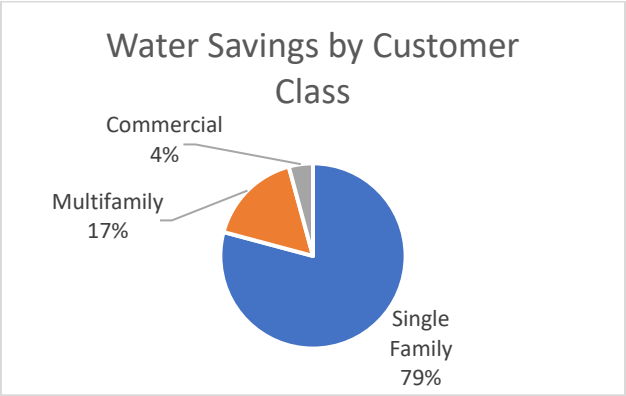


Figure 6: Percent Cumulative Water Savings by Customer Class since 2009. Savings are determined for each program (see program details starting on p. 14) and totaled by customer class depending on the type of rebate.

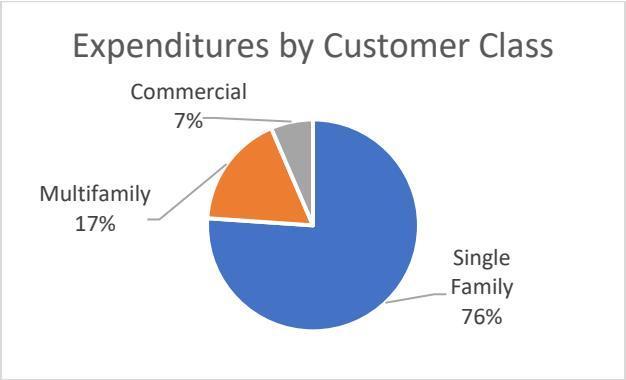


Figure 7: Percent of Cumulative Expenditures by Customer Class since 2009. Expenditures are determined for each program based on the dollar amount of each rebate given (see program details starting on p. 18) and totaled by customer class depending on the type of rebate.

Activity and Expenditures

Incentives by Year

Table 2 reports the rebates processed for each incentive program by fiscal year and Table 4 reports the expenditures for each incentive program.

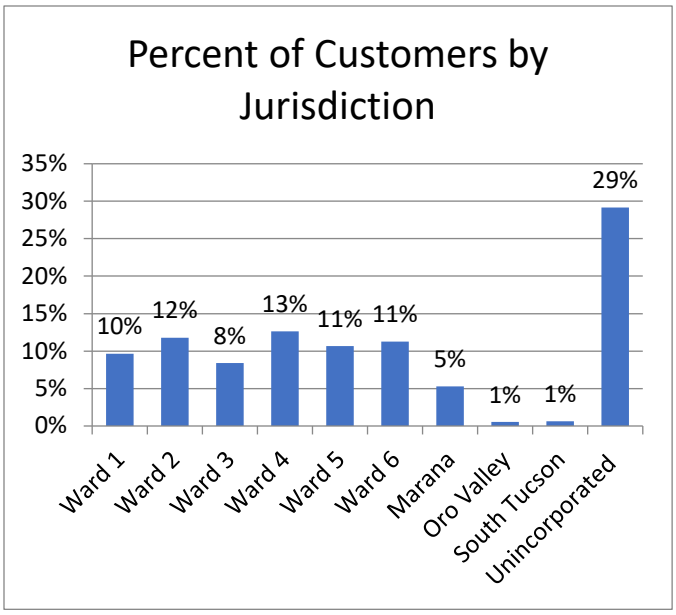


Figure 8: Percent of Residential Customers by Jurisdiction, broken out by Ward within city limits and outside of the city limits.

Water Savings

Annual water savings are calculated for each program by multiplying the number of fixtures replaced with an estimated annual savings number. Tucson Water calculates water savings for each incentive program using a mix of field research and customer consumption analysis. Savings for each program are calculated with the known information about fixture usage and behavior patterns. Specific program savings are described in the following section on rebate programs.

The cumulative savings are calculated for each program by summing the annual savings calculated for each year a given program has been running. This calculation is done for the expected lifetime of the fixtures, which is based on industry research for fixture devices and has been adopted by conservation organizations such as the Alliance for Water Efficiency.

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Total
Single-Family HET	1,794	2,774	2,166	1,762	2,477	2,279	2,034	2,202	1,659	1,655	1,403	1,210	815	523	**24,753**
Low-Income HET	58	1,132	202	519	926	946	897	764	675	433	576	420	313	539	**8,400**
Multi-Family HET	149	376	282	1,938	5,097	4,382	5,469	1,577	3,685	3,063	3,271	860	982	1,278	**32,410**
Commercial HET	116	351	586	195	259	172	860	191	269	188	193	365	105	17	**4,590**
High-Efficiency Urinal			16	0	43	282	411	12	28	2	0	8	267	95	**1,164**
Clothes Washer							509	1,774	1,713	1,434	1,234	1,371	1,090	1,100	**10,225**
Gray Water			7	9	11	21	41	25	28	15	16	19	20	21	**233**
Irrigation Upgrade	1	4	7	8	2	9	0	1	0	1					**33**
Commercial Upgrade								31	7	3	3	0	1	1	**46**
Rainwater Harvesting				140	314	295	346	311	467	343	316	318	310	353	**3,513**
Emergency Repairs											87	232	181	143	**643**

Table 3: Total Rebates by Calendar Year; gray cells indicate program had not started in that year.

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Total
Single-Family HET	$153,959	$232,598	$177,966	$144,544	$201,949	$184,553	$160,419	$165,381	$122,184	$123,475	$101,850	$88,500	$58,200	$38,500	**$ 1,954,078**
*Low-Income HET**	$30,090	$450,326	$ 77,772	$188,434	$342,213	$311,397	$293,682	$248,278	$228,988	$165,807	$270,936	$287,154	$135,560	$302,295	**$ 3,332,933**
Multi-Family HET	$11,920	$28,554	$21,259	$190,762	$504,264	$434,362	$523,699	$118,255	$276,375	$229,725	$245,325	$64,350	$73,650	$104,850	**$ 2,827,350**
Commercial HET	$10,378	$31,211	$49,902	$17,336	$20,964	$14,210	$75,995	$16,125	$31,050	$14,700	$14,475	$29,400	$114,000	$1,400	**$ 440,247**
High-Efficiency Urinal	$ -	$ -	$3,200	$ -	$19,300	$141,000	$89,700	$2,400	$5,800	$400	$ -	$1,600	$50,200	$19,000	**$ 332,600**
Clothes Washer	$ -	$ -	$ -	$ -	$ -	$ -	$101,800	$354,600	$342,400	$287,200	$246,800	$274,200	$218,000	$202,400	**$ 2,028,400**
Gray Water	$ -	$ -	$1,208	$1,471	$5,644	$8,323	$18,177	$12,473	$17,844	$11,767	$10,301	$11,477	$11,437	$10,121	**$ 120,243**
Irrigation Upgrade	$2,823	$5,743	$35,393	$52,110	$3,532	$80,156	$600	$664	$ -	$8,869	$ -	$ -	$ -		**$ 189,889**
Commercial Upgrade	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$32,484	$3,450	$7,800	$14,114	$ -	$ -		**$ 84,048**
*Rainwater Harvesting**	$ -	$ -	$ -	$163,838	$399,610	$333,896	$428,251	$385,979	$524,189	$501,314	$450,119	$433,350	$417,473	$475,594	**$ 4,513,772**
*Emergency Repairs**	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$27,973	$110,062	$102,255	$130,770	**$ 371,059**
Total	**$209,170**	**$748,432**	**$366,699**	**$758,495**	**$1,497,475**	**$1,507,897**	**$1,692,324**	**$1,336,639**	**$1,552,280**	**$1,351,057**	**$1,381,894**	**$1,300,093**	**$1,180,774**	$1,284,430	**$ 16,194,118**

Table 4: Total Incentive Program Expenditures by Calendar Year; gray cells indicate program had not started in that year. *Includes contracted services to execute limited-income program.

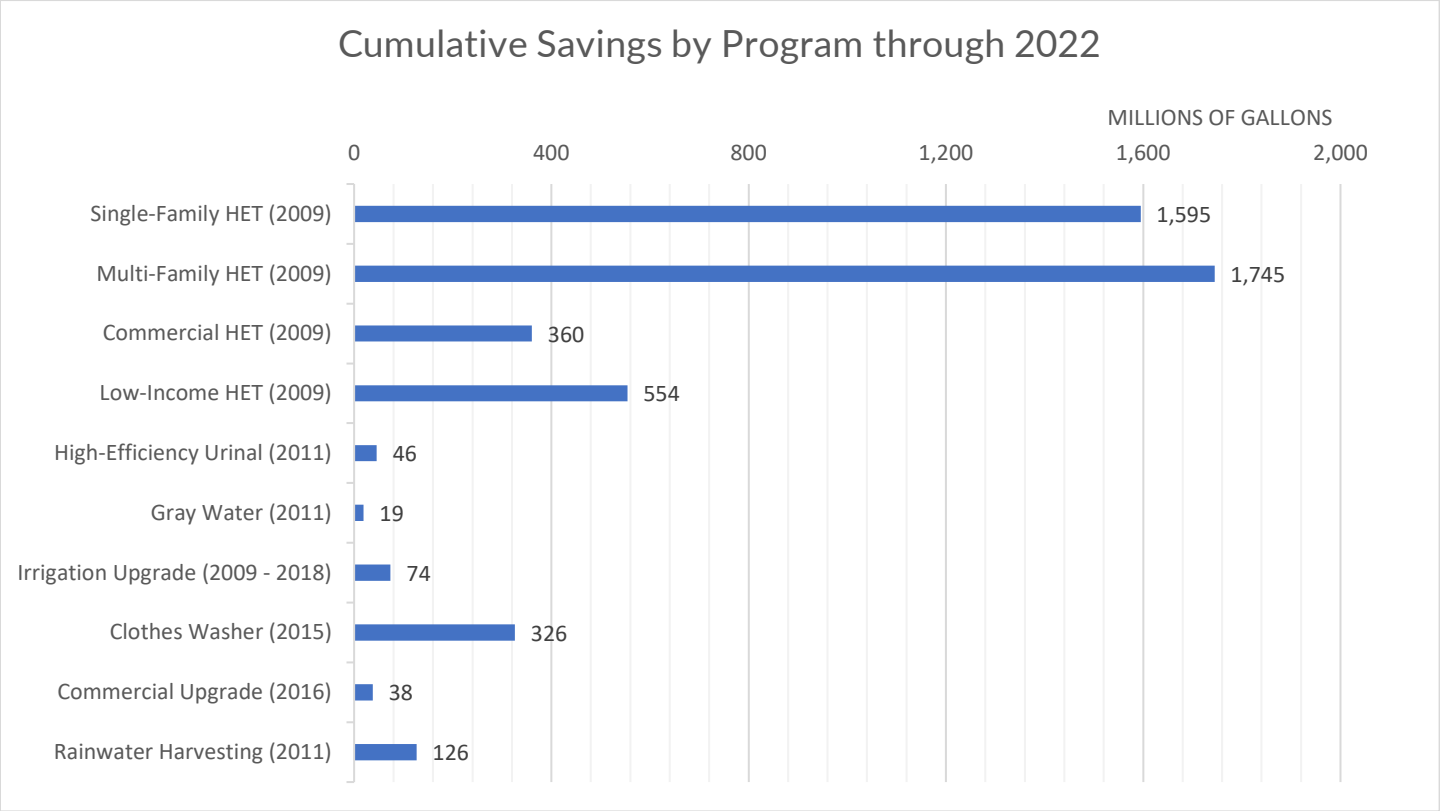


Figure 9: Cumulative Water Savings shown by program achieved from Tucson Water's Incentive Programs.

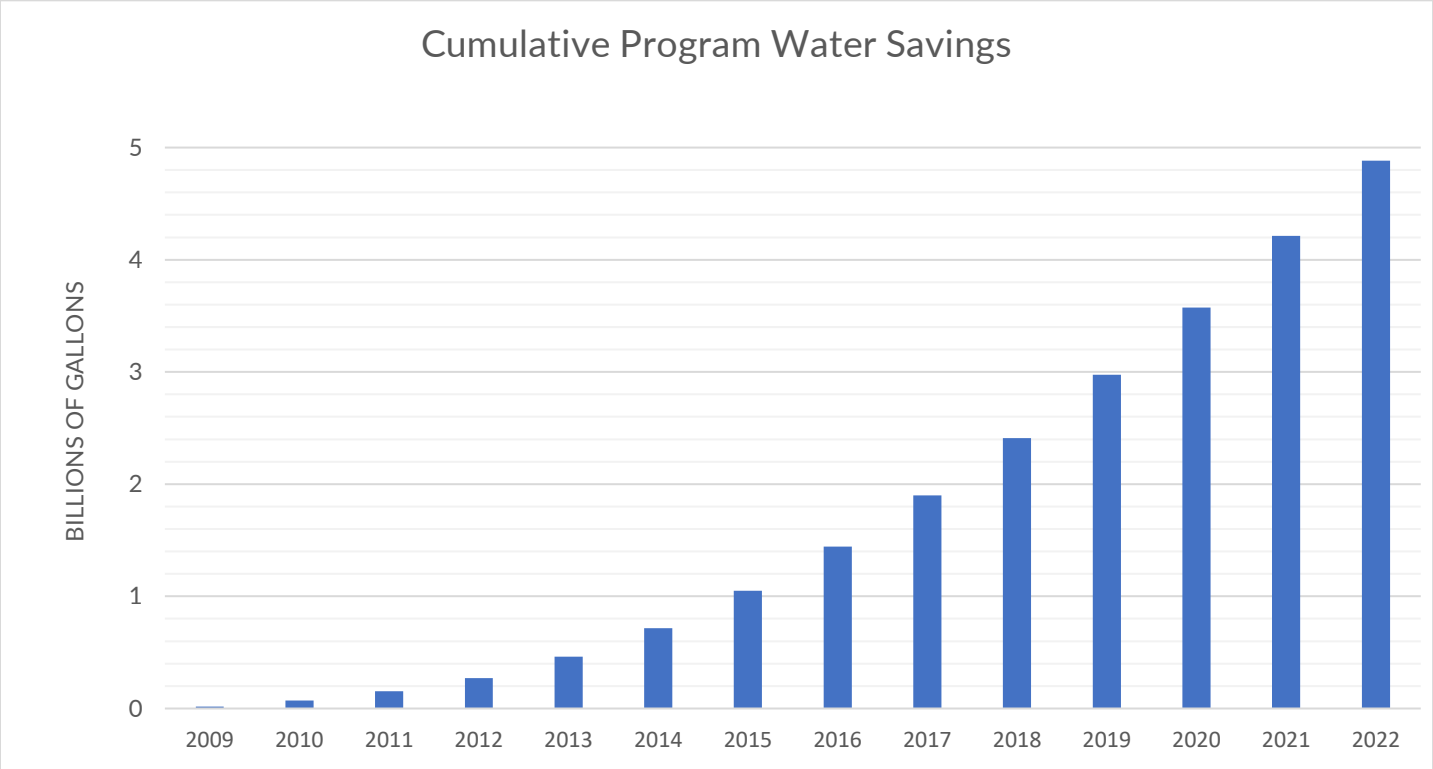


Figure 10: Total program water savings calculated from incentives since Conservation Fee inception.

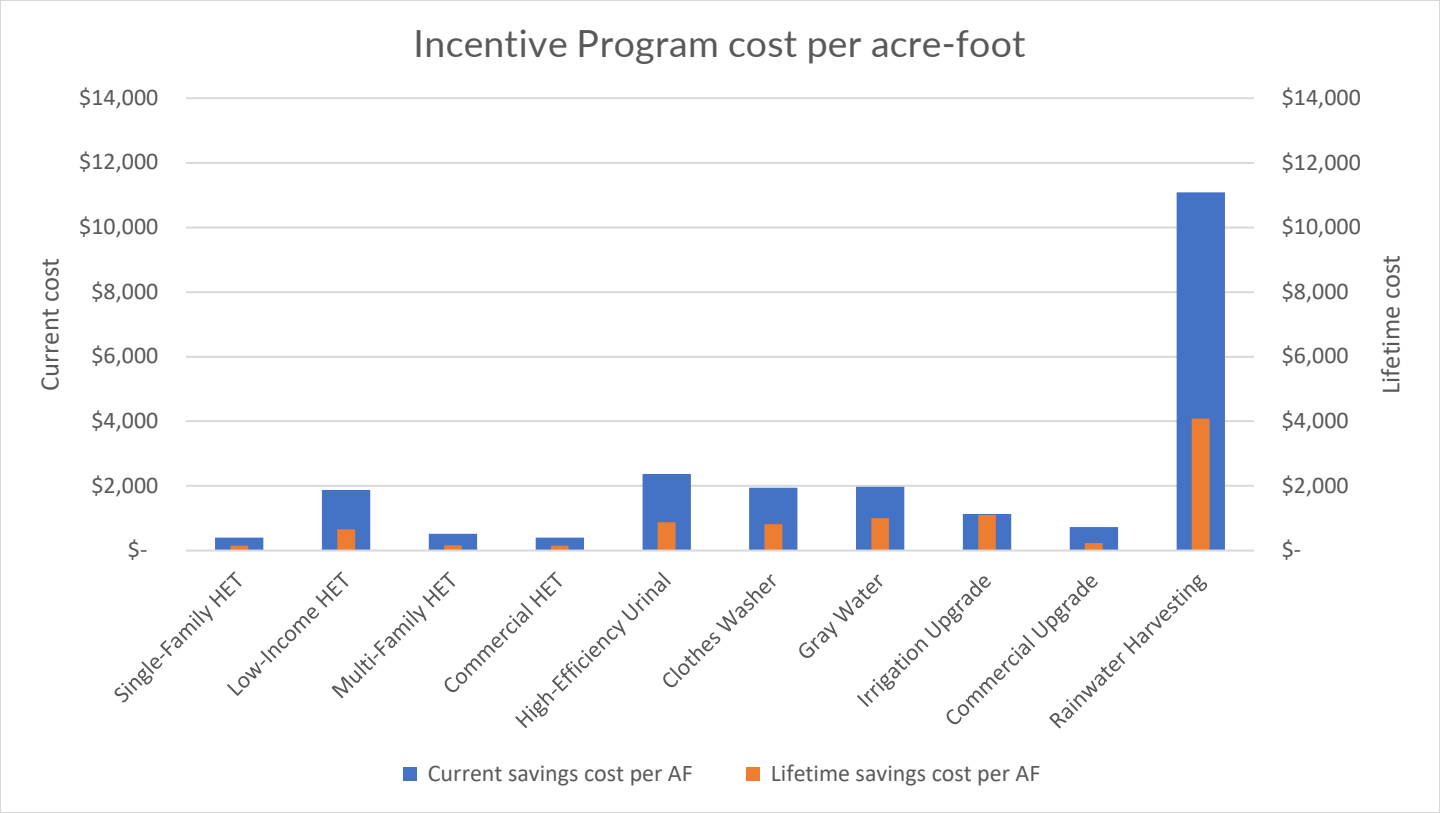


Figure 11: Cost per acre-foot of savings per program, to-date and for projected fixture life.

Incentive Program Details

Single-Family HET Rebate

Implementation date: July 7, 2008
Modified: March 1, 2015; July 1, 2016; July 1, 2022

Description: This rebate program is designed to encourage single-family residential customers to retrofit older toilet models with newer, high-efficiency models. The previous rebate required customers to replace toilets using 3.5 gallons per flush or more with WaterSense-labeled toilet models using 1.28-gpf or less. Only homes built before 1991 in the city and 1994 in Pima County qualified.

As of July 1, 2022, $100 rebates are provided only for Premium High-efficiency toilets rated by MaP (Maximum Performance). These toilets are all WaterSense-labeled and meet a minimum solid waste removal threshold of 600 grams in one flush and use 1.1-gpf or less. Qualifying construction date is now prior to 2011.

Customer Payback:
Prior to the new rebate policy:
-Average cost of 1.28-gpf toilet: $191
-Average cost after rebate applied: $116

After July 1, 2022 new policy:
-Average cost of 1.1-gpf toilet: $369
-Average cost after rebate applied: $269
-Lowest cost: $146

Total annual water and sewer savings per retrofit is $70 with, on average, a payback period of 3.9 years, after the $100 rebate per toilet.

Outreach and Promotion: Point-of-sale displays are provided by Tucson Water to any stores that want them to promote rebate programs. Before launching applications online, displays were stocked at about 35 stores monthly with brochures and rebate applications. Post online-application launch, we updated the brochure to include the relevant updated information addressing the new rebate policies and including a QR code to access the online applications. Furthermore, we extended our outreach to 26 library locations in town.

These outreach efforts will continue in 2023. Plans include extending outreach to more local and big box retailers, targeted mailings and establishing consistent communication with all our rebate retailer partners.

Low-Income HET Direct Install

Implementation date: October 2009
Modified: October 2019

Description: This efficiency program offers free high-efficiency toilet replacements for qualifying low-income homeowners who are Tucson Water customers. The program replaces toilets in homes built prior to 2011 with ultra high-efficiency toilets, also known as premium toilets, flushing 1.1-gpf or less.

Since many of these older toilets have other functional problems that cause chronic leaking or water flow, the effectiveness of the program is magnified by resolving these issues.

Customer Payback: The payback is immediate because the HET and installation are free to the customer. Therefore, the participant will experience, on average, an annual savings of $70.

Outreach and Promotion: Tucson Water utilizes the program contractor, Community Home Repair Projects of Arizona (CHRPA), to execute this program and promotes this program as one of several low-income services provided by the utility, along with promotion of other residential rebate programs.
Income Eligibility: The income guidelines are based on Federal Poverty Level (FPL) determined by the U.S. Department of Health and Human Services (HHS). The conservation low-income threshold is 200% of FPL, which is updated each year by HHS, and documentation of homeownership.

Multifamily and Commercial HET Rebate

Implementation date: July 7, 2008
Modified: March 1, 2015
Modified: July 1, 2022

Description: This rebate program is designed to encourage multifamily and commercial customers to retrofit older toilet models with newer, high-efficiency models. The previous rebate policy required customers to replace toilets using 3.5 gallons per flush or more with WaterSense-labeled toilet models using 1.28-gpf or less. Only properties built before 1991 in the city and 1994 in Pima County qualified.

As of July 1, 2022, $100 rebates are provided only for Premium High-efficiency toilets rated by MaP (Maximum Performance). These toilets are all WaterSense-labeled and meet a minimum solid waste removal threshold of 600 grams in one flush and use 1.1-gpf or less. Qualifying construction date is now prior to 2011.

If a customer expresses that they have old plumbing concerns, a small number of fixtures, and sewer flow that will not support installation of the newer rebated toilet model, Tucson Water considers the old rebate policy to provide the customer with a rebate suitable for their property while still encouraging savings.

Customer Payback:

Prior to the new rebate policy:
-Average cost of 1.28-gpf toilet: $127
-Average cost after rebate applied: $52

After July 1, 2022 new policy:
-Average cost of 1.1-gpf toilet: $89
-Average cost after rebate applied: $0

After the policy change, total annual water and sewer savings per retrofit is $88 with, on average, a payback period of immediately, after the $100 rebate per toilet.

Outreach and Promotion: The same point-of-sale displays are used to promote all high-efficiency toilet rebates, provided to retailers and plumbing suppliers. Both the multifamily and commercial HET rebates require pre-authorization to ensure the property is eligible. The pre-authorization considers current water usage, a fixture count and return-on-investment calculations to help customers make informed decisions.

High-Efficiency Urinal Rebate

Implementation date: January 1, 2011
Modified January 1, 2013; modified March 1, 2015

Description: This rebate program is designed to encourage commercial customers to retrofit high water-use urinals with high-efficiency models. Currently a $200 rebate for WaterSense-labeled and waterless models is offered.

Customer Payback:
- Average cost of WaterSense-labeled urinal: $1,000
-Average cost after rebate applied: $800

Total annual water and sewer savings per retrofit is $68 with, on average, a payback period of 11.8 years, after the $200 rebate per urinal.

Outreach and Promotion: The same point-of-sale displays used for high-efficiency toilets are used to promote urinals. Similar to the multi-family and commercial HET program, pre-authorization is provided to the customer. Large institutional customers have been the primary target for this rebate.

Clothes Washer Rebate

Implementation date: August 1, 2015
Modified: July 1, 2022

Description: This rebate is designed to encourage residential customers to purchase high-efficiency washing machines, as designated by the Consortium for Energy Efficiency (CEE), which reviews manufacturer criteria and specifies tiers of efficiency based on both water and energy use.

Previously residential customers received a $200 rebate for purchasing a qualifying high-efficiency clothes washer.

In July 1, 2022, the policy was modified to account for the discrepancy in savings depending on the type of washer replaced. Customers now receive a $200 rebate for replacement of a top-loader with a qualifying front-loader and $100 for replacing an older front-loader with a newer qualifying front-loader. Customers without an existing machine to replace qualify for a $100 rebate. Customers may now also re-apply for a rebate after 5 years from the purchase date of the subsequent washer.

Customer Payback:
- Average cost of CEE-qualifying washing machines: $946
-Average cost after rebate applied: $746

Total annual water, sewer and energy savings per retrofit is $101 with, on average, a payback period of 7.4 years, after the $200 rebate and 8.4 years after the $100 rebate.

Outreach and Promotion: Point-of-sale displays are provided by Tucson Water to any stores that want them to promote rebate programs. Before launching applications online, displays were stocked at about 35 stores monthly with brochures and rebate applications. Post online-application launch, we updated the brochure to include the relevant updated information addressing the new rebate policies and including a QR code to access the online applications. Furthermore, we extended our outreach to 26 library locations in town.

These outreach efforts will continue in 2023. Plans include extending outreach to more local and big box retailers and establishing consistent communication with all our rebate retailer partners.

Gray Water Rebate

Implementation date: January 1, 2011
Modified: January 1, 2013

Description: This rebate program is designed to encourage homeowners to install gray water systems for landscape irrigation. The rebate covers one-half the cost of the system, up to $1,000.

Customer Payback: Of the total amount of wastewater generated in a typical home, clothes washers, showers, and hand-washing sinks illustrated in Figure 18, approximately 34 percent can be re-used as gray water for landscape plants. Most applicants are installing laundry-to-landscape systems, which can recycle 12-16 percent of household use directly from clothes washers. Customer payback has not been calculated due to the variability of types of systems installed and associated varying savings.

Outreach and Promotion: Participation has remained low since the program began. In 2022, over 7,000 postcards were mailed City of Tucson customers who live in homes built since 2010 when the gray water ordinance was put into place requiring new homes to be built with gray water stub-outs.

Eligibility: To be eligible for the gray water incentive rebate program, applicants must attend a two-hour workshop. Qualifying workshops are currently offered through Watershed Management Group.

Rainwater Harvesting Rebate Program

Implementation date: September 27, 2011
Modified June 1, 2013; modified July 1, 2015
Description: The residential rainwater harvesting rebate program is designed to encourage homeowners to install rainwater harvesting systems for landscape irrigation. The rebate is up to $2,000 and covers both passive and active harvesting:

- Level 1 – Passive (earthworks) will rebate 50 percent of the cost of eligible material and labor up to $500
- Level 2 – Active (tanks) will rebate system costs up to $2,000 based on gallon capacity:
  - $0.25 per gallon capacity of 50–799-gallon tanks
  - $1 per gallon capacity of 800 gallon and larger tanks

Applicants may apply for both a passive and active rebate not exceeding $2,000 for the combination.

Customer Payback: Customer payback has not been calculated due to the variability in types and sizes of systems installed and associated varying water capture volumes and estimated savings.

Eligibility: Applicants must attend an approved workshop to qualify for the rebate program. Qualifying workshops are offered in English through Smartscape and Watershed Management Group, and in Spanish by SERI.

Low-Income Rainwater Harvesting Grant & Loan Program

In FY 14-15, Tucson Water partnering with Sonora Environmental Research Institute (SERI), conducted a pilot to develop a low-income rainwater harvesting program. SERI continues to provide services for this program, including qualifying customers based on low-income status and offering design consultations and installation services for interested families.

In addition to the regular rebate of up to $2,000, qualifying customers are eligible for grants up to $750 and loans up to $2,000. Eligibility is based on Federal Poverty Level (FPL) income guidelines determined by the U.S. Department of Health and Human Services (HHS). The conservation low-income threshold is 200% of FPL, which is updated each year by HHS, and documentation of homeownership.

Rebounding from low numbers during the pandemic, in 2022, 41 low-income rainwater harvesting installations were completed, representing 12% of all water harvesting incentives provided. Additionally, low-income projects also now receive one tree and two shrubs at no additional cost to help customers put rainwater to beneficial use.

Customized Commercial Efficiency Program

Implementation date: January 1, 2016

Description: Tucson Water's customized commercial efficiency provides information, resources and incentives to help commercial customers reduce water use. Water audits identify water and financial savings opportunities for organizations and businesses and rebates and customized based on audit report findings.

Resources: As another Drought Plan measure, staff are working on a landscape water budget application that will identify commercial customers whose water use exceeds their water budget target and will develop targeted outreach to these customers.

To meet the demand for commercial audits the staff are also developing a process for conducting desktop audits that will provide a review of consumptive history and recommendations as a first step before field audits are scheduled.

Incentives: Rebates help offset the initial costs of installing water-saving hardware, equipment, and systems and amounts are calculated based on estimated water savings to ensure program cost-effectiveness. All technologies and retrofits that can prove real water savings are considered for a rebate including the HET, urinal, and clothes washer rebates, which are already in place.

Water Audits: The primary staff position leading this work retired in early 2022, so the primary focus has been to follow-up on audit recommendations that were made during the 2021 city facility audits. The Zanjeros have received additional commercial audit training and the conservation team is providing water use reviews for commercial customers that request water audits.

Community Education & Outreach Programs

Tucson Water contracts with several partners that provide outreach, conservation services and education throughout our service area.

Tucson Water partners with Arizona Project WET (APW) and Environmental Education Exchange (EEExchange) to offer youth education programs, and Smartscape which offers adult education for landscape professionals and residents. Both APW and EEExchange ensure that all programming meets Arizona Department of Education K-12 Standards. The pandemic presented challenges in delivering traditional programs, but each provider developed additional resources and leveraged technology to become more flexible in how they deliver content and services.

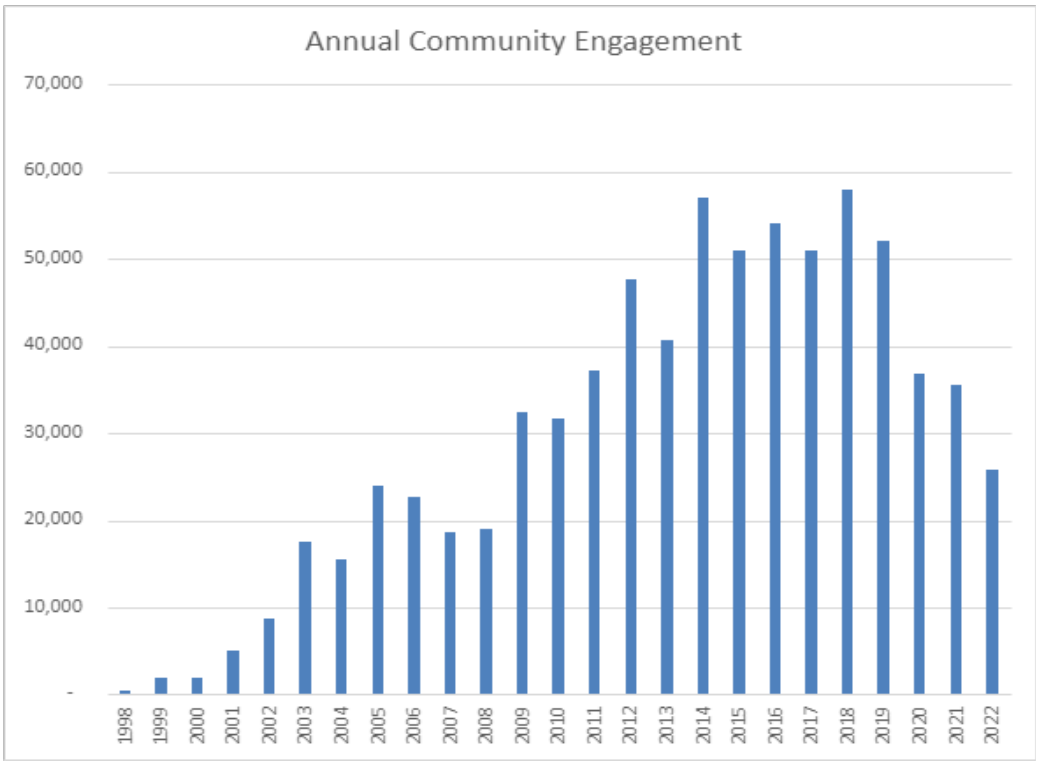
The low-income conservation programs are administered by SERI and CHRPA. SERI manages the Low-Income Rainwater Harvesting Grant and Loan Program and CHRPA manages the free High-Efficiency Toilet Installation Program, as well as the newer Emergency Repairs Program. Both organizations use the same qualification criteria that is now aligned with Tucson Water's other income-based assistance programs.

Tucson Clean and Beautiful and Watershed Management Group both implement water harvesting and green stormwater infrastructure projects in conjunction with neighborhoods and schools.

Figure 12 illustrates the total annual engagement of students, teachers, parents, and the general public, giving an indication of the expansion and increased investment in Tucson Water's education programs with a dedicated Conservation Fund. Together, our education partners have reached over 600,000 students, teachers, and community members in the last decade.

GIS maps illustrating the geographic distribution of school programs are available on the website. To access the school program map, go to: tucsonaz.gov/water/conservation.

Figure 12: Bar graph showing the yearly impact of the education programs funded by Tucson Water



Arizona Project WET (APW)

Tucson Water and The University of Arizona Water Resources Research Center established the first intergovernmental agreement (IGA) with APW in 2006. Today, APW provides seven primary programs to elementary through middle schools throughout Tucson, as well as community outreach through various events. Since 2006, with Tucson Water's collaboration and support, APW has engaged over 6,000 teachers, over 300,000 students, and over 30,000 adults in STEM-based water education in the Tucson Water service area.

2022 Activity:	
Students Reached	7,880
Teachers Reached	142
Adults Reached	308
Audit Projected Water Savings[1]	891,954

APW provides teacher training and direct student outreach to teachers and students in the Tucson Water service area to develop stewardship and STEM literacy in K-12 learners. Teacher trainings, or professional development, provide motivated teachers with the knowledge and skills to deepen their students' understanding of local water issues. Direct engagement provides classrooms with interactive presentations by trained educators, as well as exploratory field trips to Tucson Water's Sweetwater Wetlands and Shirley Scott Southeast Houghton Area Recharge Project.

Direct student educational programs include:

- 4th grade Water Festivals
- 3rd – 5th grade Hands-on Groundwater
- K – 12th grade Discovery Program
- K – 12th grade Recharge the Rain
- 6th – 12th grade Groundwater Simulator
- 6th – 12th grade Water Scene Investigation

APW renewed their IGA in 2022 and added several new options for teachers and students. Field trips and Discovery programs can now take place at both the Shirley Scott Southeast Houghton Area Recharge Project on the east side of Tucson and the Sweetwater Wetlands on the west side of Tucson. Recharge the Rain uses STEM principles to help students learn about rainwater harvesting. Numerous schools have designed and built rainwater harvesting basins that serve as living laboratories. APW has begun working with Career and Technical Education teachers to build water related offerings in the vocational education space.

[1] Water savings estimate (in gallons) is from the Water Scene Investigation program after retrofitting aerators in student's homes.

Environmental Education Exchange

The EEExchange began working under contract with Tucson Water in 1998 to develop and manage water conservation education programs. Three programs are provided for grades one through eight, in multiple school districts throughout Tucson. A new program focused on climate change education for 8th – 12th graders was added this year. Since the partnership began, EEE has engaged over 226,000 students in Tucson Water-sponsored water education programs throughout the service area.

2022 Activity:

Students Reached	16,337
Water Smart Kids	6,802
Our Water, Our Future	4,780
Watching Our Water	4,755
Teachers Reached	574

1st through 3rd Grade: Water Smart Kids

Water Smart Kids is designed for our community's youngest learners, in honor of the animated talking water drops that take students on a journey beginning in the clouds and ending in the kitchen sink. The presentation focuses on groundwater model activities in which students experience changes in how people have used water over time. At the end of this hour-long program, the presenter passes out student activity booklets and a reusable cup for each student that encourages them to "*Brush up with Just One Cup!*"

4th and 5th Grade: Our Water, Our Future

Our Water, Our Future provides an interactive presentation to upper elementary students with a focus on our water cycle and our sources of water. At the end of this hour-long presentation with Dr. Faucet, students receive a shower timer and a reminder to be mindful about water use when showering. An exciting addition to *Our Water, Our Future* is a full-color activity book given to each student at the end of the presentation.

Middle School: Watching Our Water

The hour-long program formerly called *El Tour de Agua* has been renamed *Watching our Water* and focuses on water sources, water recycling, and water conservation. Students are taught to question if their water sources are reliable, safe, and sustainable. New multimedia technology has been incorporated, as well as classroom activities to more deeply engage students. Teachers show a pre-visit video to students for background information and follow up with a post-visit lesson on water conservation (using the Shower Flow Kit materials that are student giveaways).

Student Stories of Climate Change

This new, two-day classroom educational program provides 8th-12th graders with an overview of the science behind climate change and how it is impacting our community, especially our water resources. On the first day of the program, students learn the science of climate change by examining evidence directly from NASA, NOAA, and the National Weather Service. Students hear short, first-hand narrative accounts from high school to graduate school aged students from around the world, who share their experiences with climate change. On the second day, students learn more about climate change impacts on the United States, Arizona, and Tucson. The City's climate plan (Tucson Resilient Together) and One Water 2100 (Tucson Water's resource management plan) are explored in-depth, teaching students about the unique challenges climate change presents to their desert home. This program will be piloted during the 2023 spring semester with full launch in the 2023 – 2024 school year.

Smartscape

Since 1989, Tucson Water has executed a series of IGAs with the University of Arizona for a landscape water conservation program designed to reduce water consumption. With this partnership, Tucson Water launched a WaterSmart program in 1990 aimed at homeowners to broaden the community's water conservation ethic. By the end of 1992, the need for training specifically tailored to landscape professionals was identified. In twenty-five years, Smartscape has trained over 4,500 landscape pros and provided classes for over 6,000 community members.

2022 Activity:

Professional Workshops	45
Pro Workshop Attendees	172
Pro Certificates	100
Residential Workshops	16
Workshop Attendees	352

Smartscape's *"A Training Program for Landscape Professionals"* was launched in both the Tucson and Phoenix areas in 1994 and was developed collaboratively by Tucson Water, the University of Arizona Cooperative Extension, Arizona Municipal Water Users Association, the Arizona Nursery Association, the Arizona Landscape Contractors Association, and industry representatives. The program is a comprehensive, research-based training program that instructs landscape professionals in the fundamentals of design, installation, irrigation, and maintenance of low-water-use landscapes. Key components of the program are the need for efficient water use, the regulatory environment, methods of water conservation in the landscape, and the principles of Xeriscape.

The Pro series of eight classes are taught by local industry experts in both English and Spanish, which include:

- Plants, Soils, and Water
- Landscape Irrigation Systems
- Landscape Water Management
- Desert Adapted Plants
- Maintaining Desert Adapted Plants
- Plant Disorders
- Landscape Design and Renovation
- Plant Selection and Installation

In 2018, Smartscape implemented an exam for the Pro series, requiring course participants to pass a closed-book exam at the completion of the course. The results have been positive and move the program in the direction of requiring pros to demonstrate a base level of knowledge and proficiency.

Additional advanced classes for professionals include:

- Advanced Irrigation (English and Spanish)
- Advanced Plant ID & Selection
- Turf Irrigation Management
- Urban Tree Management (English and Spanish)
- NEW: Green Stormwater Infrastructure Maintenance

In response to the City of Tucson's commitment to increase tree canopy and invest in green stormwater infrastructure, Smartscape has developed a one-day training offered to all City of Tucson employees who have a role in landscape management and tree care. This training will play an important role in ensuring are public green spaces are healthy and watered efficiently.

Additionally, Smartscape launched the Tucson Homeowners' Association (HOA) Landscape Transformation Pilot Program which provides guidance on transitioning to water efficient landscapes. Specifically, the program aims to provide tools on doing initial landscape assessments to plan for a sustainable conversion of the landscape, tailored training through Smartscape classes, strategic planning support, along with grants from Tucson Water to help HOAs invest in landscape transformations.

CHRPA Emergency Plumbing Repairs

The newly expanded Emergency Plumbing Repairs program run administered by CHRPA launched at the end of 2019, positioning CHRPA respond to a variety of needs during the unanticipated pandemic and a time of increased need. Plumbing repairs made possible by the Tucson Water Emergency Repairs Program were a key part of this work. This program covers the cost of labor and materials for plumbing repairs for low-income customers. In 2022 CHRPA provided 210 emergency repairs to 144 households that range from replacing a toilet float to re-piping a home; the average repair was $684.

CHRPA workers hear stories nearly every day of exponentially increased water bills leading to water off in a home, or families being unable to flush a toilet or take a shower for weeks. For many of their clients, turning the water off to avoid a high bill or hiring a costly plumber also means losing access to evaporative cooling and basic sanitation. The Emergency Repairs Program means CHRPA crews can respond quickly to the most urgent need, increasing comfort and even saving lives.

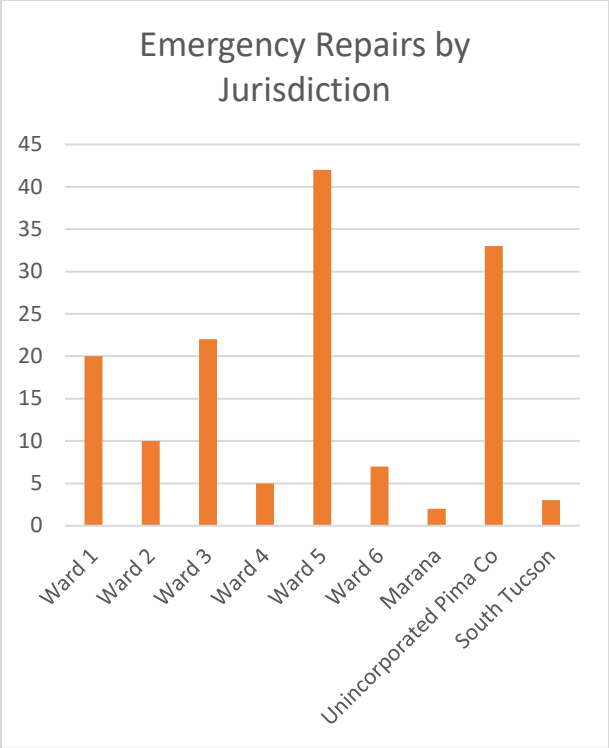


Figure 13: Breakdown of percentage of Emergency Repairs by Jurisdiction in 2022

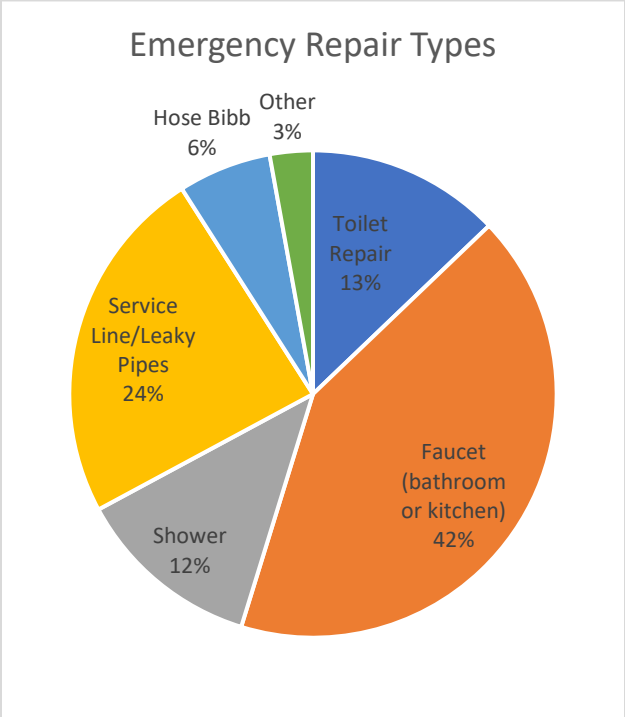


Figure 14: Breakdown of Emergency Repairs done by CHRPA in 2022

City of Tucson Parks Irrigation Investments

Over the past two years, the conservation program has been supporting water efficiency improvements in parks across the City. The irrigation systems and drinking fountains in many neighborhood parks are reaching the end of their useful life. Although Proposition 407 (the 2018 Parks + Connections Bond Projects) is funding numerous parks improvements, there is still a funding gap for aging irrigation controllers, drinking fountains and service lines. At Mayor and Council's direction, $1.8 million dollars of the conservation fund was set aside in 2019. The Parks & Recreation Department created a prioritized list of parks that would benefit the most from this funding. The funding has been used to update irrigation system controllers, irrigation lines, drinking fountains, and drinking fountain service lines in 55 parks. These parks now have 26 new drinking fountains and 33 new irrigation controllers. The new equipment reduces leaks, irrigates the turf more efficiently, and improves the quality of the park experience.

Green Stormwater Infrastructure Mini-Grant Program

(formerly the Neighborhood-Scale Stormwater Harvesting Program)

TUCSON CLEAN & BEAUTIFUL INC.

The Neighborhood-Scale Stormwater Harvesting Program (NSSH) was closed out on June 31, 2020 and relaunched on January 1, 2021 under the new program name Green Stormwater Infrastructure (GSI) Mini-Grant Program. With a new focus on targeted equity work and increased outreach to heat vulnerable, low-tree canopy neighborhoods, GSI Mini-Grant program expended a large portion of program efforts on community relationship building to develop trust and solicit applications in target equity neighborhoods.

In addition to completing 6 projects, the program continued to manage 3 existing projects and initiated and approved 11 new project applications. All of the 11 new projects were located in moderate to high priority tree equity areas.

	# Projects Completed FY22	# Projects Completed to Date	# Projects in Process	Total Spending through FY22	Total Trees and Pollinator Plants	Square Feet of GSI Installed
Ward 1	0	10	3	$156,716	35	11,200
Ward 2	1	4	1	$182,000	12	500
Ward 3	2	9	0	$154,818	60	11,000
Ward 4	1	4	0	$107,731	165	51,000
Ward 5	1	4	5	$183,000	37	21,750
Ward 6	2	12	5	$211,876	59	11,500
Mayor's	1	1	0	$42,368		
Totals	6	44	6	$1,038,509	304	111,950

Table 5: Breakdown of activities by Ward supported by the GSI Mini-Grant Program.

WMG Schoolyard Water Harvesting Program

In conjunction with the partnership Tucson Water has with APW, Watershed Management Group (WMG) currently has a contract to install rain gardens at schools in support of the Recharge the Rain program which provides professional development and curriculum support for participating teachers. WMG works with teachers, students and staff to design and build rain gardens at their schools, empowering students to better understand and enhance their school campuses. In 2022, rain gardens were installed at four schools: Pueblo High School, Empire High School, Wakefield Middle School and Laguna Elementary School.

Conservation Kits for Customers

In 2019 Tucson Water, in partnership with EEE, began mailing conservation kits to customers upon request. Customers complete a request form in English or Spanish, available on the Tucson Water website. Historically, these kits contain low-flow shower heads (up to 2), a 5-minute shower timer, toilet tank bags (up to 2) and leak detection dye tabs faucet aerators (up to 2). These kits were expanded 2022 to include additional outdoor conservation devices and the kits were promoted in the December 2022 issue of our Water Matters newsletter. In 2022, kits were distributed to 2,473 customers; 2,458 requests in English and 15 requests in Spanish.

Shower heads	2,298
Shower timers	1,748
Toilet tank bags	2,560
Toilet tank dye tabs	2,852
Faucet aerators	2,850
Irrigation repair kit	1,097
Hose timer	1,359
Rain gauge	1,435
Total	**16,199**

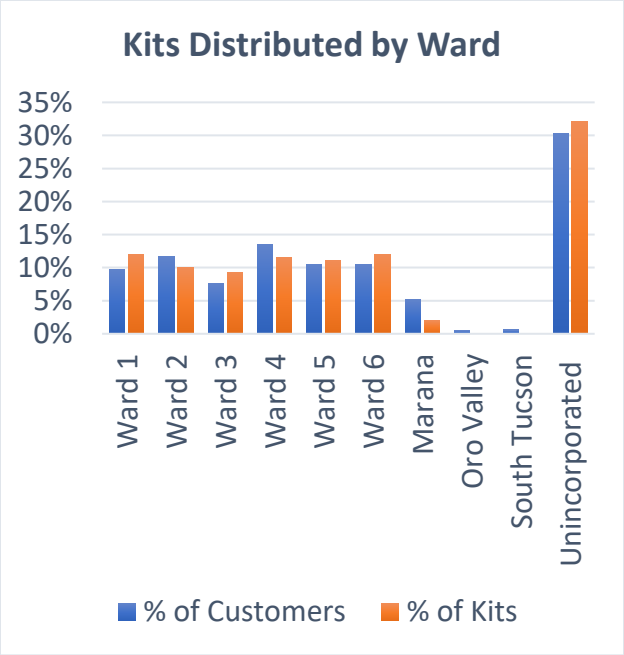


Figure 15: Kits Distributed by Ward displays the percent of kits provided compared to the percent of single-family customers in each ward or other political boundary served by Tucson Water.

Community Garden Pilot Program

In 2018 Tucson Water launched a pilot program to offer more affordable potable water rates and infrastructure to qualifying community garden customers. This pilot program was developed through engagement with representatives from local community gardens, in support of Plan Tucson goals to increase urban agriculture and better serve disadvantaged communities. Gardens must be within city limits, have a potable meter feeding the garden only and backflow unit, and meet the definition of a community garden, as defined in the City's land use code. By the end of 2022, 14 gardens had been approved for the pilot community garden rate, including three that entered into payment plans, one for their backflow unit and two for both the meter and backflow. For more information, visit: tucsonaz.gov/water/garden.

A review of the program was conducted in 2022 and identified cumulative water cost savings and nearly $34,000, compared to the cost of water at the commercial rate. Broadly, this financial benefit allowed gardens to:

- Stabilize expenses without tiered, or summer surcharge rates

- Provide additional assistance to members' plot fees
- Increase the number of garden participants
- Purchase water-saving devices
- Remain open during the pandemic

However, barriers still exist, including:

- Upfront meter installation fees remain cost-prohibitive
- Leaks and the need for leak detection

Flume Flow Device Pilot Project

Tucson Water launched an employee pilot project in August of 2021 to provide Flume devices provide participants with real-time, accurate water use data that may help identify leaks and conservation opportunities. The device attaches to the water meter and communicates with a base in the home, which is connected to WiFi and communicates with a smart phone. Data about water usage is made available to users through the phone application and the user data will also be given to Tucson Water and Flume to help inform leak identification and for future Flume device use. By mid-2022 Flume devices had been installed at 37 households, representing a 70% success rate. Data will be analyzed in 2023.

HOA Landscape Transformation Pilot Project

Together with Smartscape, Tucson Water is piloting an effort to help HOAs transition their landscapes conserve water and become more sustainable. Smartscape has developed an educational series for HOAs, along with a toolkit of resources to help HOAs establish contracts that adhere to Smartscape principles. Tucson Water is supporting this pilot by providing kickstarter grants to two HOAs who have committed to landscape transformation projects and will also be monitoring water use before and after the landscape transformations occur. Many HOAs have recently reached out to Tucson Water for water conservation assistance, so Tucson Water has developed a desktop audit service to review HOA property water usage and this has become the first step to participation with Smartscape in the Landscape Transformation Pilot Program. In some cases, HOAs may also receive an on-site water audit.

Water Use It Wisely Regional Partnership

Tucson Water joined the Water Use It Wisely campaign as a steering committee member in 2022. This Arizona-wide campaign provides tips and resources on water conservation to the public and provides partners with a toolkit of outreach materials. Last year the wateruseitwisely.com website had nearly 800,000 views, social media had over 225,000 engagements and the monthly newsletter had over 28,000 subscribers. The website is now accessible in English and Spanish, along with additional outreach materials. Within the larger ongoing campaign, Spring and Fall "Water – Plant It Wisely" campaigns were run, achieving over 60 million impressions for the year.

Appendix A – Water Savings Factors and Useful Life Projections for Rebate Programs

Incentive Program	Per Unit Per Day Savings (gallons)	Annual Savings Per Unit (gallons)	Source of Savings
Single-Family HET	20.5	7,483	The Alliance for Water Efficiency determined this value in their Conservation Tracking Tool 2.0.
Low-Income HET	23.5	8,578	2014 analysis of program participants that had participated in 2011
Multi-Family HET	20.5	7,483	The Alliance for Water Efficiency determined this value in their Conservation Tracking Tool 2.0.
Commercial HET	23 (tank-type) 50 (flushometer)	8,030 (tank-type) 16,425 (flushometer)	Differentiated water savings were calculated for flushometer-type and tank-tank types based on the CII estimated toilet savings in the CCTF 2006 report. These estimates were based on ULFTs (1.6 gpf), so a 20% additional savings is added for WaterSense HETs (1.28 gpf).
High-Efficiency Urinal	17	6,206	The Alliance for Water Efficiency determined this value in their Conservation Tracking Tool 2.0. This number compares closely with a study completed in California that looked at potential savings from large-scale urinal retrofits.
Clothes Washer	19.3	7,043	The Alliance for Water Efficiency determined this value in their Conservation Tracking Tool 2.0. This value is a mid-range estimate, as published literature has indicated both higher and lower potential savings.
Gray Water	37.2	13,615	Calculated by multiplying the percent end use of clothes washers (16%) and Tucson's GPCD, to get 13.5 GPCD. This number is multiplied by the average persons per single-family household (2.76).
Irrigation Upgrade	N/A		
TAP Commercial Upgrade	N/A		
Rainwater Harvesting		5,535	Calculated from the assumption that tanks will fill, on average, five times per year, based on historic weather and assumed tank usage patterns. This "engineering estimate" provides a total savings number based on total tank storage for all participants. When divided by the number of rebate participants to-date, average savings is 7.4 ccf/year (5,535 gal) per customer.

Low-Income Rainwater Harvesting	N/A	N/A	Preliminary tracking of water use for the thirty-one participants was about 0.8 ccf more per month than the class average. The passive water harvesting installations have not shown a decrease in usage since installing the systems.

Incentive Program	Useful Life (years)
Single-Family HET	25
Low-Income HET	25
Multi-Family HET	25
Commercial HET	25
High-Efficiency Urinal	25
Clothes Washer	15
Gray Water	15
Irrigation Upgrade	10
TAP Commercial Upgrade	20
Rainwater Harvesting	20

Table 6: Useful life of fixtures used to calculate cost per savings; all numbers taken from the Alliance for Water Efficiency except for Rainwater Harvesting, which was taken from Batchelor, C., Fonseca, C. and Smits, S., 2011. *Life-cycle costs of rainwater harvesting systems.* **<http://www.irc.nl/op46>.**

Appendix B – Plan Tucson Policies Addressed with Water Conservation Programs

- E4: Build and maintain partnerships among neighborhood, community, business and regional institutions and programs to increase educational opportunities.
- G1: Provide the public with regular communication and sufficient information regarding policy, program, and project planning and decisions-making via multiple methods.
- G4: Increase participation of the traditionally underrepresented populations in policy, program, and project planning and decision-making.
- G6: Coordinate and collaborate with NGOs to increase public participation.
- G7: Develop and maintain strong partnerships with regional and local NGOs, including educational institutions, non-profit organizations, and neighborhood and citizen groups.
- EC9: Assess and address the vulnerability of the community's health and safety, economy, and natural resources to climate change, and develop assurances that vulnerable and disadvantages populations are not disproportionately impacted by climate change.
- WR2: Expand the use of alternative sources of water for potable and non-potable uses, including rainwater, gray water, reclaimed water, effluent, and stormwater.
- WR3: Expand effective water efficiency and conservation programs for City operations and for the residential, commercial, and industrial sectors.
- WR6: Integrate land use and water resources planning.
- WR7: Collaborate on multi-jurisdictional and regional water planning and conservation efforts.
- WR8: Integrate the use of green infrastructure and low impact development for stormwater management in public and private development and redevelopment projects.
- WR11 Conduct ongoing drought and climate variability planning.
- GI1: Encourage green infrastructure and low impact development techniques for stormwater management in public and private new development and redevelopment, and in roadway projects.
- GI4: Expand and maintain a healthy, drought-tolerant, low-water use tree canopy and urban forest to provide ecosystem services, mitigate the urban heat island, and improve the attractiveness of neighborhoods and the city as a whole.
- RR5: Pursue interim uses and/or green infrastructure on vacant and financially distressed properties.
- LT10: Support urban agriculture and green infrastructure opportunities in new development or redevelopment when appropriate.
- LT12: Design and retrofit streets and other rights-of-way to include green infrastructure and water harvesting, complement the surrounding context, and offer multi-modal transportation choices that are convenient, attractive, safe, and healthy.