TUCSON WATER CONSERVATION PROGRAM
FY 2018-2019 ANNUAL REPORT

February 2020

City of Tucson

Regina Romero, Mayor

Michael Ortega, City Manager

City Councilors

Lane Santa Cruz, Ward One

Paul Cunningham, Ward Two

Paul Durham, Ward Three

Nikki Lee, Ward Four

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Prepared by

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Acknowledgments

Thank you to the Public Information & Conservation 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 a high-quality conservation program possible, by working in our community every day, educating and providing services to our customers.

TUCSON WATER
A proud part of the City of Tucson

CITY OF TUCSON FOUNDED 1775

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Abbreviations

Ccf – hundred cubic feet (1 Ccf = 748 gallons)

CCTF – Community Conservation Task Force

CEE – Consortium for Energy Efficiency

CHRPA – Community Home Repair Projects of Arizona

CW – Clothes Washer (usually referring to rebate program)

CWAC – Citizens' Water Advisory Committee

FY – Fiscal Year

GPCD – gallons per capita per day

Gpf – gallons-per-flush

GW – gray water (usually referring to rebate program)

HET – high-efficiency toilet

HEU – high-efficiency urinal

L-I – low-income (usually referring to conservation programs with income qualifications)

RWH – Rainwater Harvesting (usually referring to rebate program)

SERI – Sonoran Environmental Research Institute

TAP – Tucson Audit Program (customized commercial rebate program)

ULFT – Ultra-low-flush toilet (1.6 gpf)

Conservation Snapshot of Fiscal Year 2018-2019

In 2018, total potable water use was 116 GPCD with a residential GPCD of 80, continuing a decade-long trend. The conservation fee, now in its eleventh year, has allowed Tucson Water to offer our customers high-quality conservation and education programs and robust efficiency incentives.

In FY 2018-2019, programs funded by the conservation fee have resulted in:

- 52.1 million gallons conserved
- $1.13 million invested in rebates and incentives
- 5,157 HET and urinal installations
- 333 rainwater harvesting and gray water installations

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

- More than 2.6 billion gallons (8,014 acre-feet) conserved
- More than $10.5 million invested in rebates and incentives
- Nearly 60,000 HET and urinal installations
- Over 2,500 rainwater harvesting, and gray water installations

In FY 2018-2019 our partner education programs reached 45,000 students and over 7,000 adults:

- Arizona Project WET programs reached 515 teachers, 26,286 students, and 4,308 adults
- Environmental Education Exchange reached 17,166 students and 580 teachers
- Smartscape reached 842 adults (homeowners & professionals) with 90 workshops
- Nearly 1,000 adults attended water harvesting workshops offered by program partners

Together, our education partners have engaged 289,000 students, 11,500 teachers who have taught nearly 159,000 students, and 54,000 adults over the last 11 years since the conservation fund was established.

Milestones for FY 2018-2019 include:

- Smartscape celebrates 25 years of landscape training and education for Tucsonans. Spanish-language trainings continue to grow
- Accelerated the Low-Income Rainwater Harvesting program to provide grants and loans for eligible customers, engaging over 150 customers to date
- Expanded the Neighborhood-scale Stormwater Harvesting program to install green stormwater infrastructure in neighborhoods, with seven completed projects and several more underway
- The Zanjeros – Tucson Water's audit team – moved to PICO, conducting over 2,000 customer audits
- New online maps to illustrate incentive and education program reach and impacts: https://www.tucsonaz.gov/water/residential-and-commercial-conservation

Upcoming focus areas for FY 2019-2020 include:

- Increase participation of customers in the low-income program offerings, including rainwater harvesting, high-efficiency toilets and emergency repairs
- Lead a conservation planning process and draft a 10-year conservation plan, in conjunction with One Water 2100 – the utility-wide planning process that launched in 2019
- Develop technology solutions to improve administration of rebate programs and provide more data to customers to support their conservation goals
- Invest in additional training for the Zanjeros and expand their role in the Conservation program
- Support community partners who are working to execute conservation programs and achieve goals on behalf of Tucson Water

Conservation Program Budget

This operating report describes the expenditures and activities of the Tucson Water Conservation Program for July 1, 2018 through June 30, 2019, referred to as Fiscal Year (FY) 18-19. 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. Beginning July 1, 2018, the conservation fee increased to ten cents per ccf (hundred cubic feet or 748 gallons) for FY 18-19. 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 1 reflect a financial summary of the fiscal year prepared by the Business Services division of Tucson Water. 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 seven main categories as shown in Figure 1 with a total fund expenditure of $3,036,034.

The seven categories are:

1. Operating ($201,265)
   Salaries and wages for permanent employees:
   a. 1 Supervisor
   b. 1 Water Conservation Specialist
   c. 1 Lead Planner
   d. 2 Zanjeros
   e. 1 Secretary
2. Professional Services ($1,297,568)
   Contractors that support the conservation program through research and implementation of education, commercial water audits, and low-income toilet and rainwater harvesting programs
3. Rebate Programs ($1,131,593)
   Incentive and rebate programs designed offset customer expense of implementing water efficiency retrofits. Rainwater harvesting programs account for $489,452 of total category expenditures.
4. Outreach & Marketing ($78,224)
   Public relations and advertising to promote conservation programs.
5. Fixtures & Devices ($147,852)
   Materials to support programs (Low-income HET materials, irrigation training materials and conservation devices) and promotional materials including store displays and conservation giveaway items.
6. Miscellaneous ($29,664)
   Travel, training, memberships, printing, subscriptions, uniforms, computers, etc.
7. Administration Fee ($149,868)
   Paid to the City of Tucson for business and administrative services.

Table 1: Water Conservation Program Budget Historic Overview

	FY 08/09	FY 09/10	FY 10/11	FY 11/12	FY 12/13	FY 13/14	FY 14/15	FY15/16	FY 16/17	FY 17/18	FY 18/19
Cons. Fee	$0.03	$0.04	$0.05	$0.07	$0.07	$0.07	$0.07	$0.08	$0.08	$0.09	$0.10
Budget	$997,000	$997,000	$1,086,690	$2,902,630	$3,356,820	$2,950,000	$3,050,000	$3,540,250	$3,540,250	$3,540,250	$3,895,620
Revenue	$1,217,280	$1,716,880	$2,124,838	$2,816,241	$2,830,967	$2,832,950	$2,726,208	$3,000,905	$3,035,932	$3,524,361	$3,613,761
Expenditure	$794,462	$831,883	$1,720,075	$1,795,082	$2,727,541	$2,725,288	$2,771,450	$2,785,621	$3,445,812	$3,108,333	$3,036,034

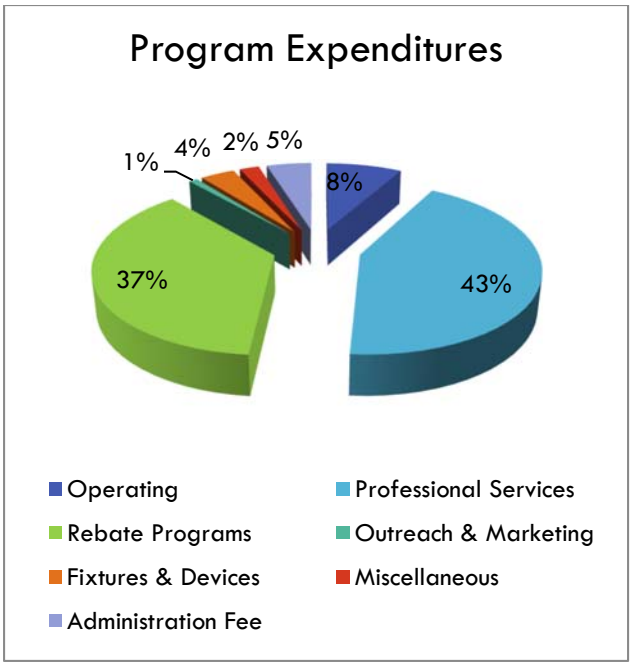


Figure 2: FY 18-19 Water Conservation Program Expenditures by Percentage

GPCD - 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 (known as reclaimed water) for irrigation purposes, 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 1985, 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 for the last five years; Figure 2 illustrates total and residential GPCD trends since 2000.

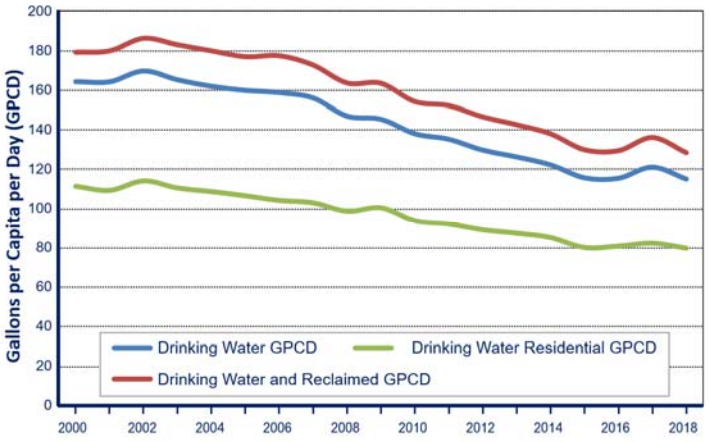


Figure 1: Total and Residential GPCD from 2000 to 2018

	Total GPCD	Residential GPCD[1]	Population
2010	139	94	705,817
2011	136	92	706,118
2012	131	89	708,863
2013	127	88	712,698
2014	124	85	715,260
2015	117	80	717,875
2016	117	81	721,205
2017	122	82	725,461
2018	116	80	731,236

Table 2: Annual GPCD (not including reclaimed system deliveries) and Tucson Water service area population from 2010 to 2018.

Water Efficiency Programs

Programmatic Updates

Rebate Administration

No administrative or policy changes were made to the rebate programs during this fiscal year. Most rebates continue to be issued as bill credits since the bulk of rebates processed are for toilets and clothes washers. Residential rainwater harvesting rebates, gray water rebates and commercial rebates are issued as checks.

[1] The residential GPCD does not include Multi-Family water use.

National Updates

Income Tax Parity Issue

Currently any rebates $600 or more are subject to income tax and 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. Tucson Water continues to support legislative action to change the tax code to remove the taxable income requirement and create parity between water and energy conservation programs. In the last year H.R. 2313 Water Conservation Rebate Tax Parity Act was introduced to make income from water conservation rebates exempt from federal taxes; however, there has been no movement on this bill.

EPA WaterSense Program

Tucson Water, along with over 2,000 organizations across the county, is a proud partner of the EPA's WaterSense program, which turned a decade old in 2016 and has helped American consumers save over 3.4 trillion gallons of water and more than $84.2 billion in water and energy bills. Additionally, because of the close connection between energy and water, WaterSense-labeled products have saved 462.5 billion kilowatt hours, enough to supply a year's worth of power to more than 44.4 million homes. In 2018 alone, over 30,000 WaterSense labeled products saved 725 billion gallons of water.

Like many water providers across the county, Tucson Water depends on the WaterSense program's product labeling criteria to identify rebate-eligible products. WaterSense has ensured national consistency in rebate programs and product quality that meet rigorous standards; high-quality products and a common language, similar to EnergyStar, have elevated the conversation about water efficiency and conservation to a national platform.

WaterSense is a necessary partner in effectively administering water conservation incentive programs and finally received federal authorization with the passing of America's Water Infrastructure Act of 2018. Although the Act does not set a budget for WaterSense, it ensures that the program remains in the EPA budget annually. WaterSense was funded in 2019 and both the House and Senate Appropriations Committees have directed funding to the Department of Interior and the EPA to continue WaterSense in 2020, so it is expected to remain funded next year.

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.

Programs for single-family customers include high-efficiency toilet, high-efficiency clothes washer, gray water, and rainwater harvesting rebates. Programs for multi-family customers include high-efficiency toilet and customized rebates. Programs for commercial customers include high-efficiency toilet, high-efficiency urinal and custom commercial rebates.

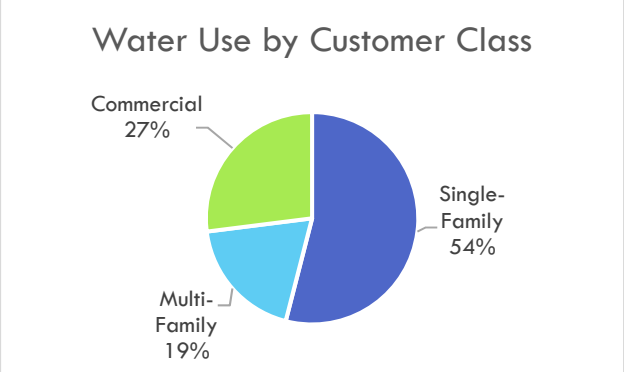


Figure 3: FY 18-19 Water Use by Customer Class

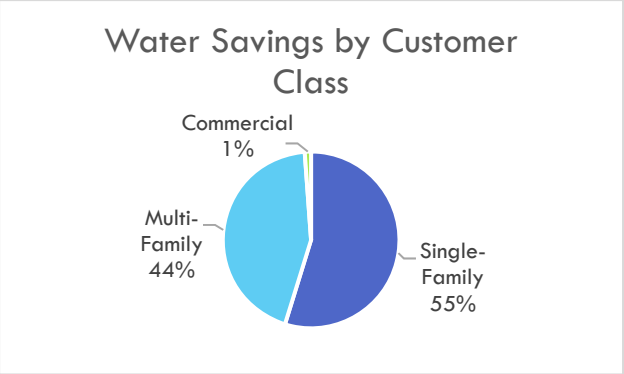


Figure 4: FY 18-19 Water Savings by Customer Class. Savings are determined for each program (see program details starting on p. 15) and totaled by customer class depending on the type of rebate.

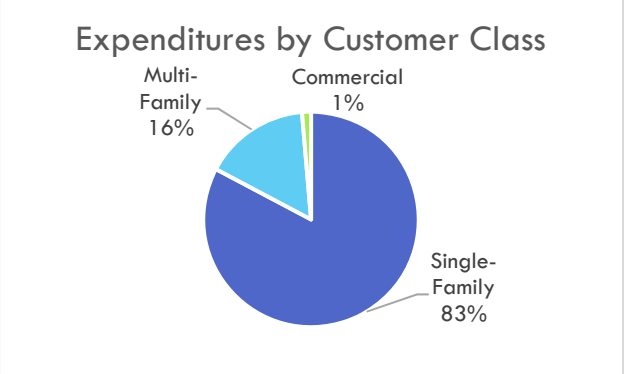


Figure 5: FY 18-19 Expenditures by Customer Class. Expenditures are determined for each program based on the dollar amount of each rebate given (see program details starting on p. 15) and totaled by customer class depending on the type of rebate.

Distribution of Programs by Ward

The geographical distribution of residential rebate programs by Ward, compared to the percent 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 a majority of the homes were built after 1991; Ward 4 is a good example of this pattern.

Additionally, combining the impacts of regular income and low-income incentive programs provides a more holistic understanding how 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. However, combined, the two programs illustrate a more uniform distribution throughout the service area as shown in Figure 12.

This information informs program planning to identify areas of potential savings that can be targeted with increased or modified outreach and new or modified programs that will reach underserved communities.

New for this fiscal year, maps illustrating the geographic distribution of rebate programs are available on the website. To access the rebate program map, go to: tucsonaz.gov/water/conservation. Navigate to the section titled Water Conservation and Efficiency Annual Reports and look for the FY 2018-2019 Efficiency Incentives map.

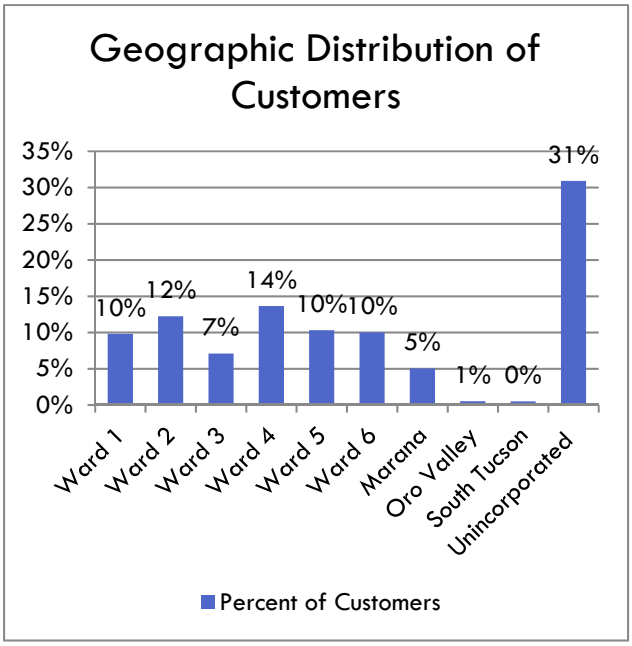


Figure 6: Percent of Customers by Jurisdiction, broken out by Ward within city limits and outside of the city limits.

Conservation Program Activity

Rebates by Year

Table 3 reports the rebates processed for each incentive program by fiscal year and Table 4 reports the expenditures for each incentive program.

Water Savings

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 numbers are described in the following sections that discuss rebate programs in greater detail.

Annual water savings are calculated for each program by multiplying the number of fixtures replaced with an average annual savings number. These numbers reflect the savings expected in a given program year based on the number of installations that were completed, so this savings number fluctuates annually. Additionally, cumulative savings are calculated for each program by summing the annual savings calculated for each year a given program has been running because these savings are assumed to persist well past their year of installation. 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.

	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	Total
Single-Family HET	353	2,959	2,629	1,716	1,916	2,493	2,171	2,305	1,891	1,527	1,559	**21,518**
Low-Income HET	0	484	808	288	840	871	1,041	734	719	503	521	**6,810**
Multi-Family HET	11	378	284	1,237	3,638	4,906	6,579	1,413	3,024	2,109	3,036	**26,614**
Commercial HET	3	428	382	345	136	361	416	482	219	409	41	**3,222**
High-Efficiency Urinal	0	0	10	6	3	108	423	205	14	25	0	**794**
Clothes Washer	0	0	0	0	0	0	0	1,325	1,948	1,417	1,335	**6,030**
Gray Water	0	0	2	9	11	10	34	38	23	21	17	**165**
Irrigation Upgrade	0	1	10	3	7	10	0	0	1	0	1	**33**
Commercial Upgrade	0	0	0	0	0	0	0	22	9	5	3	**42**
Rainwater Harvesting	0	0	0	0	296	272	269	325	438	365	333	**2,352**

Table 3: Total Rebates by Fiscal Year

	FY 08/09	FY 09/10	FY 10/11	FY 11/12	FY 12/13	FY 13/14	FY 14/15	FY 15/16	FY 16/17	FY 17/18	FY 18/19	Total
Single-Family HET	$30,036	$254,688	$213,543	$142,812	$155,473	$202,160	$177,552	$174,208	$139,980	$113,475	$116,350	**$1,720,278**
Low-Income HET*	$367	$213,720	$301,684	$110,379	$301,034	$313,116	$335,643	$240,922	$247,170	$179,728	$210,032	**$2,330,163**
Multi-Family HET	$705	$29,033	$21,329	$119,347	$358,485	$490,506	$645,690	$106,125	$226,780	$158,175	$227,700	**$2,383,875**
Commercial HET	$299	$37,985	$36,688	$25,086	$12,948	$28,886	$33,554	$45,600	$18,225	$42,150	$3,075	**$284,496**
High-Efficiency Urinal	$0	$0	$2,000	$1,200	$900	$52,400	$156,300	$41,000	$2,800	$5,200	$-	**$261,800**
Clothes Washer	$0	$0	$0	$0	$0	$0	$0	$265,800	$389,400	$283,200	$267,600	**$1,206,000**
Gray Water	$0	$0	$265	$1,566	$4,144	$4,678	$14,224	$17,398	$12,742	$14,670	$13,011	**$82,700**
Irrigation Upgrade	$0	$31,089	$52,770	$29,792	$48,964	$83,676	$600	$0	$664	$0	$8,869	**$256,423**
TAP Commercial Upgrade	$0	$0	$0	$0	$0	$0	$0	$8,766	$24,518	$3,050	$21,514	**$57,848**
Rainwater Harvesting*	$0	$0	$0	$0	$349,360	$353,858	$357,145	$426,100	$500,555	$593,183	$601,673	**$2,956,614**
Total	**$31,407**	**$566,514**	**$628,279**	**$430,182**	**$1,231,309**	**$1,529,280**	**$1,720,708**	**$1,325,919**	**$1,562,835**	**$1,392,831**	**$1,455,710**	**$11,526,081**

Table 4: Total Incentive Program Expenditures by Fiscal Year

*Includes contracted services to execute limited-income program.

	FY 08/09	FY 09/10	FY 10/11	FY 11/12	FY 12/13	FY 13/14	FY 14/15	FY 15/16	FY 16/17	FY 17/18	FY 18/19	Total
Single-Family HET	2,641,323	22,140,718	19,671,493	12,839,970	14,336,470	18,653,873	16,244,508	17,239,680	14,149,408	11,425,778	11,665,218	**161,008,435**
Low-Income HET*	0	4,151,510	6,930,620	2,470,320	7,205,100	7,471,003	8,929,178	6,295,885	6,175,800	4,314,483	4,468,878	**58,412,775**
Multi-Family HET	82,308	2,828,385	2,125,030	9,255,853	27,221,335	36,709,145	49,227,368	10,565,290	22,627,080	15,780,593	22,716,870	**199,139,255**
Commercial HET	30,660	4,374,160	3,904,040	3,525,900	1,389,920	3,689,420	4,251,520	5,258,555	2,075,025	4,941,370	344,195	**33,784,765**
High-Efficiency Urinal	0	0	62,060	37,236	18,618	670,248	2,625,138	1,272,230	86,884	155,150	0	**4,927,564**
Clothes Washer	0	0	0	0	0	0	0	9,367,190	13,719,764	9,979,931	9,402,405	**42,469,290**
Gray Water	0	0	27,230	122,535	149,765	136,150	462,910	517,370	313,145	285,915	231,455	**2,246,475**
Irrigation Upgrade	0	229,950	2,299,500	689,850	1,609,650	2,299,500	0	0	229,950	0	229,950	**7,588,350**
TAP Commercial Upgrade	0	0	0	0	0	0	0	1,108,305	3,061,837	238,926	260,591	**4,669,659**
Rainwater Harvesting*	0	0	0	0	1,545,490	1,743,835	1,632,560	2,108,010	2,134,225	2,900,135	2,752,545	**14,816,800**
Total	**2,754,290**	**33,724,723**	**35,019,973**	**28,941,664**	**53,476,348**	**71,373,173**	**83,373,181**	**53,732,515**	**64,573,118**	**50,022,280**	**52,072,106**	**529,063,368**

Table 5: Annual Water Savings by Program; this data is displayed in Figures 7 and 8

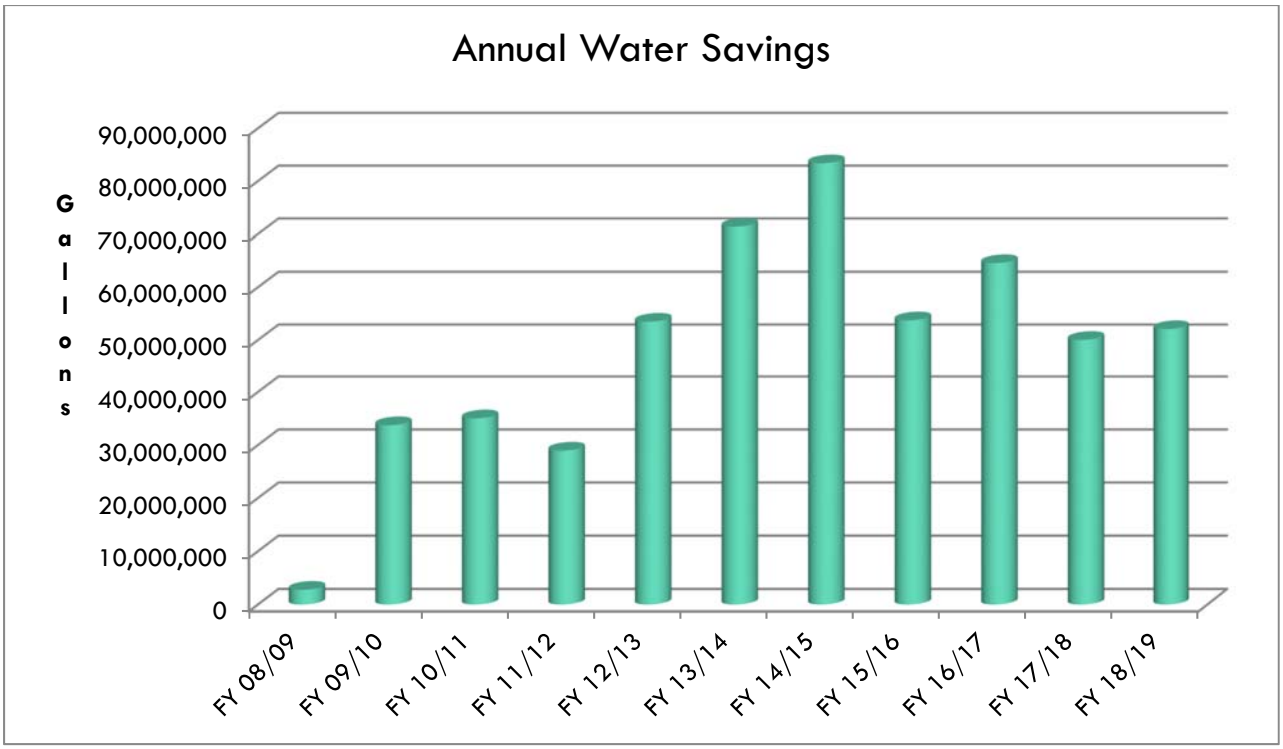


Figure 7: Annual Water Savings from Tucson Water's Incentive Programs

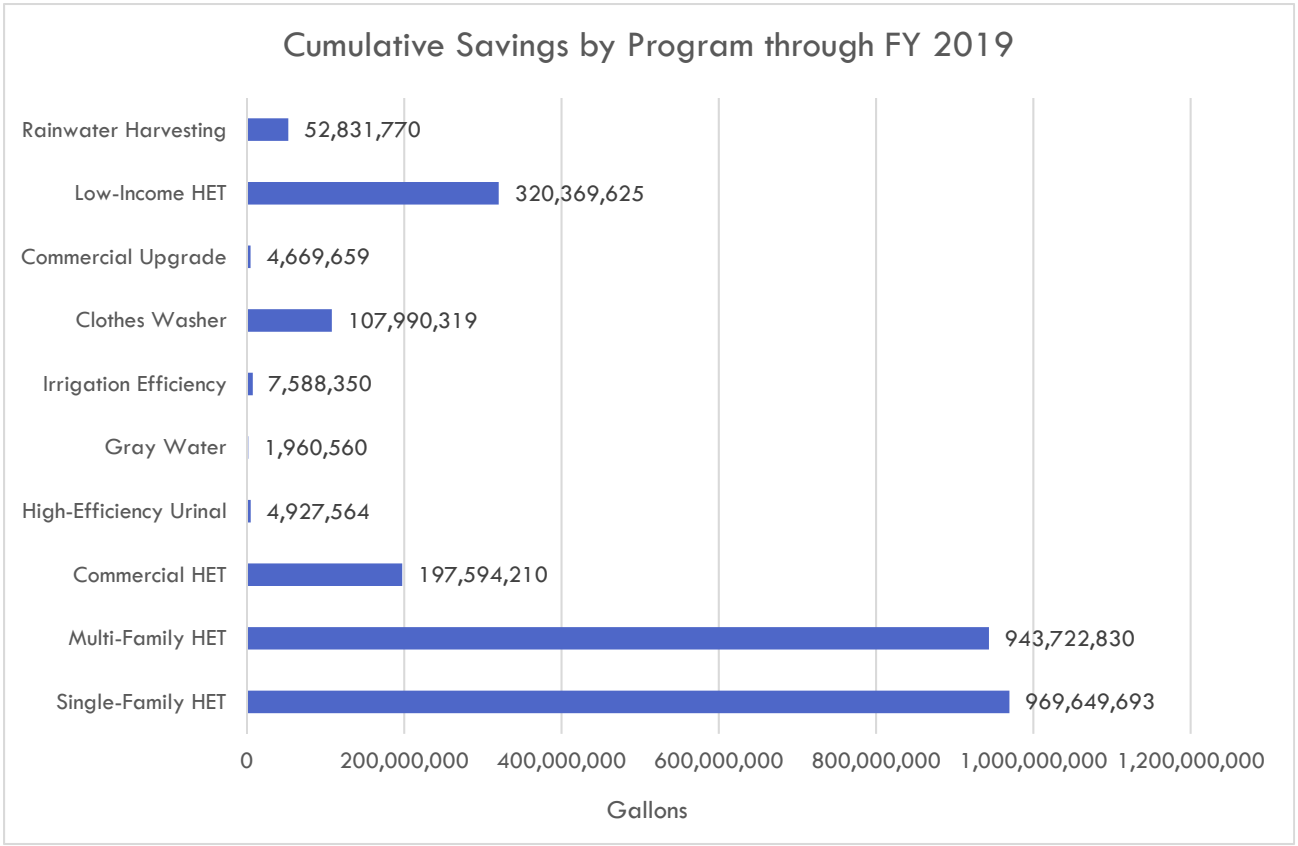


Figure 8: Cumulative Water Savings from Tucson Water's Incentive Programs

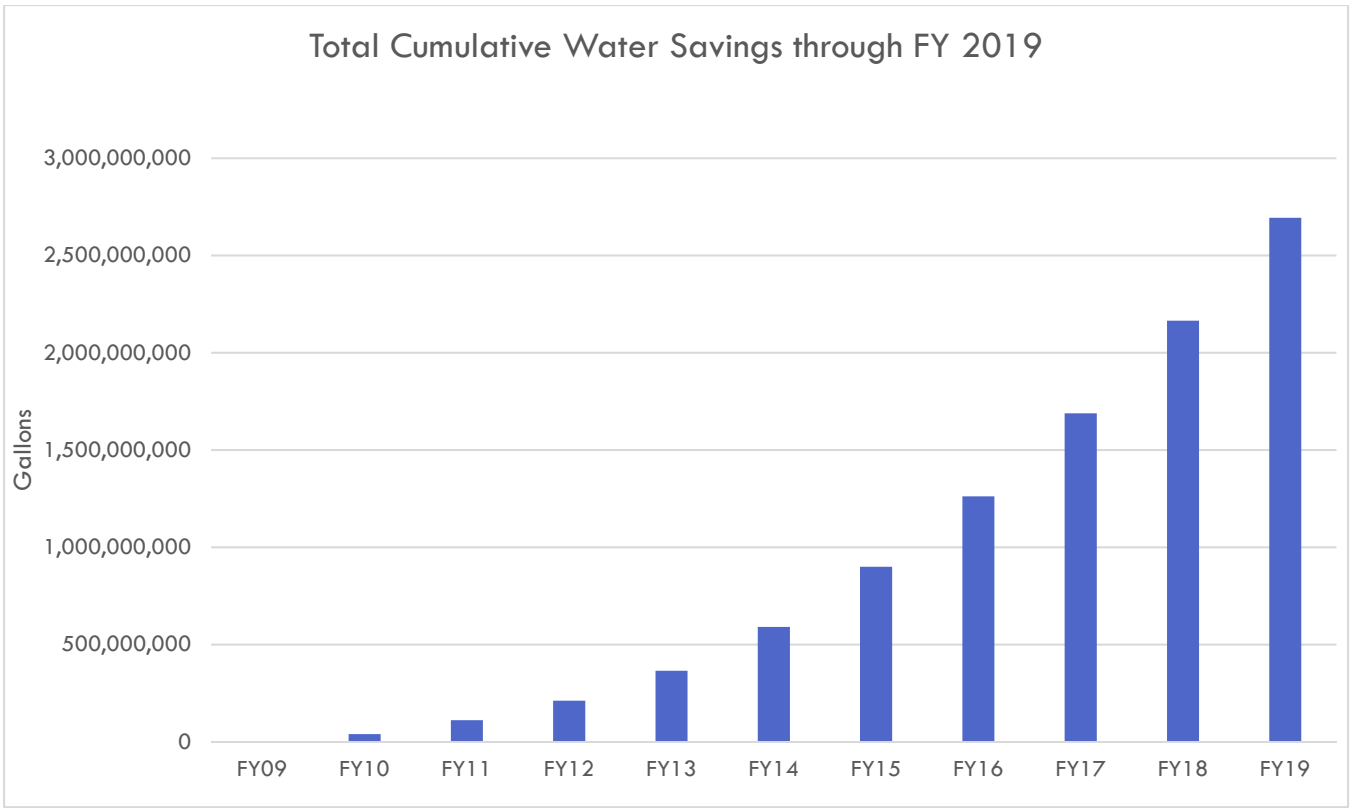
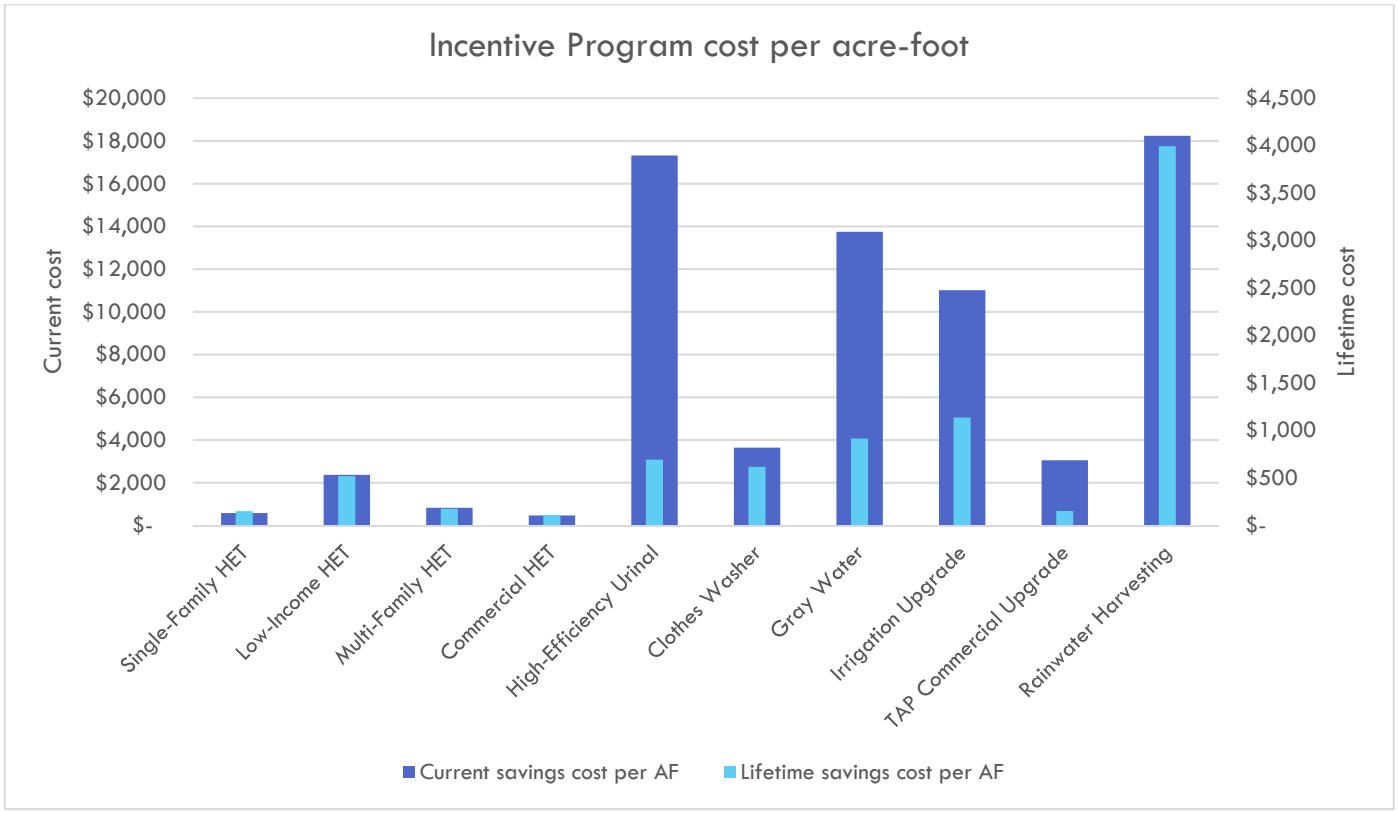


Figure 9: Total program water savings from incentives since Conservation Fee inception



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

Table 7: 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>.

Single-Family HET Rebate

Implementation date: July 7, 2008

Modified March 1, 2015; July 1, 2016

This rebate program is designed to encourage single-family residential customers to retrofit older 3.5 or more gpf toilets with high-efficiency models. Only WaterSense labeled, high-efficiency toilets qualify for the rebate, which use 1.28 gpf or less.

FY 18-19 Activity:		Cumulative:
Number of HETs Retrofit:	1,559	21,518
Expenditure:	$ 116,350	$ 1,720,278
Estimated Gallons Saved:	11.7 million	969.6 million
Estimated Acre-Feet Saved:	36	2,482

Customer Payback: The average cost of HETs purchased by participants was $183. The cost of qualifying toilets typically starts at $85. Total annual water and sewer savings per retrofit is $72 with, on average, a payback period of 1.4 years, after the $75 rebate per toilet.

Outreach and Promotion: Point-of-sale displays are provided to any stores that want them; currently 42 retailers are promoting the HET rebate programs. Tucson Water works with each retailer to provide display options that work with their merchandizing. Displays are stocked at most stores monthly with brochures and rebate applications. Additionally, rebates are promoted throughout the year through Tucson Water's monthly newsletter included in the utility services statement, at community events, on social media and through community partners.

Low-Income HET Direct Install

Implementation date: October 2009

This efficiency program offers free high-efficiency toilet replacements for qualifying low-income homeowners who are Tucson Water customers. The program replaces older toilets that use 3.5 gallons or more per flush. Since many of these older toilets have other functional problems that cause chronic leaking or water flow, the effectiveness of the program is compounded by resolving these issues.

FY 18-19 Activity:		Cumulative:
Number of HETs Retrofit:	521	6,810
Expenditure:	$ 210,032	$ 2,330,163
Estimated Gallons Saved:	4.5 million	320.4 million
Estimated Acre-Feet Saved:	14	638

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 $72.

Income Eligibility: The U.S. Department of Housing and Urban Development (HUD) State Income Limits are used for the low-income HET replacement program. The HUD area median income (AMI) for Pima County, Arizona is established each year, and 80 percent of that value is the maximum allowed to be considered low-income. The program is available to all owner-occupied households that verify an annual income of 80 percent area median income (AMI) or less.

Outreach and Promotion: Tucson Water utilizes the program contractor, 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.

Single-Family HET Retrofit Savings:

From Tom Arnold, Tucson Water, Management Analyst – 10.28.14

The single-family HET savings of 20.5 gallons per day (gpd) per unit (7,482.5 gallons per annum) originates from an analysis of program participants completed in 2011. This analysis compared water use between 2008 and 2011 of single-family households that had participated in the HET rebate program in 2008.

Low-Income HET Retrofit Savings:

From Tom Arnold, Tucson Water, Management Analyst – 10.28.14

The low-income HET savings of 23.5 gpd per unit (8,577.5 gallons per annum) comes from an analysis of program participants completed in 2014. This analysis compared water use between 2011 and 2014 of low-income households that had participated in the HET rebate program in 2011.

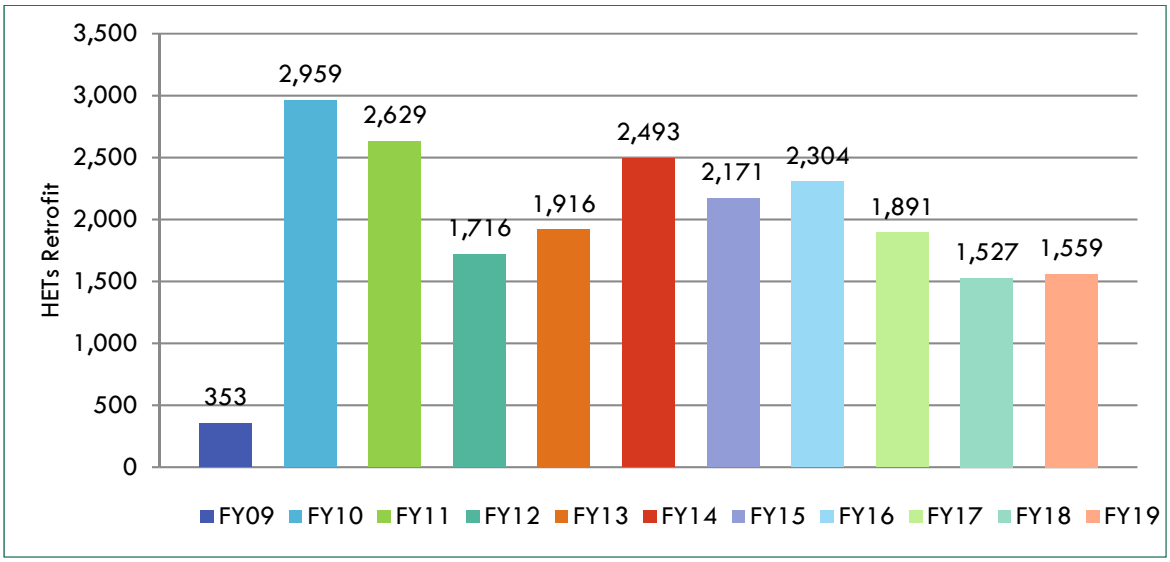


Figure 10: Single-Family HET Rebates by Fiscal Year

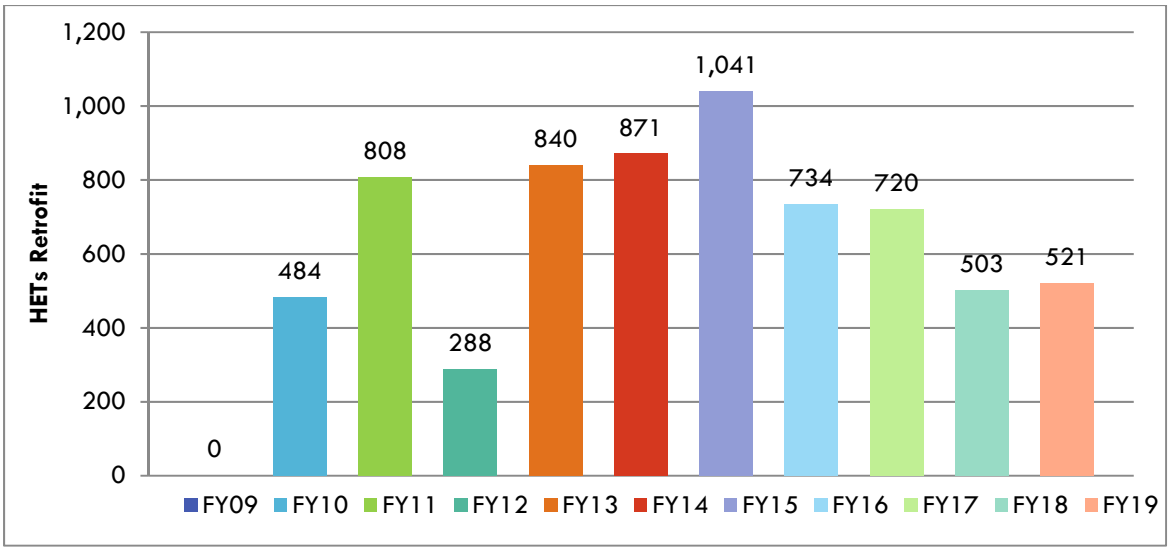


Figure 11: Low-Income HET Direct Installs by Fiscal Year

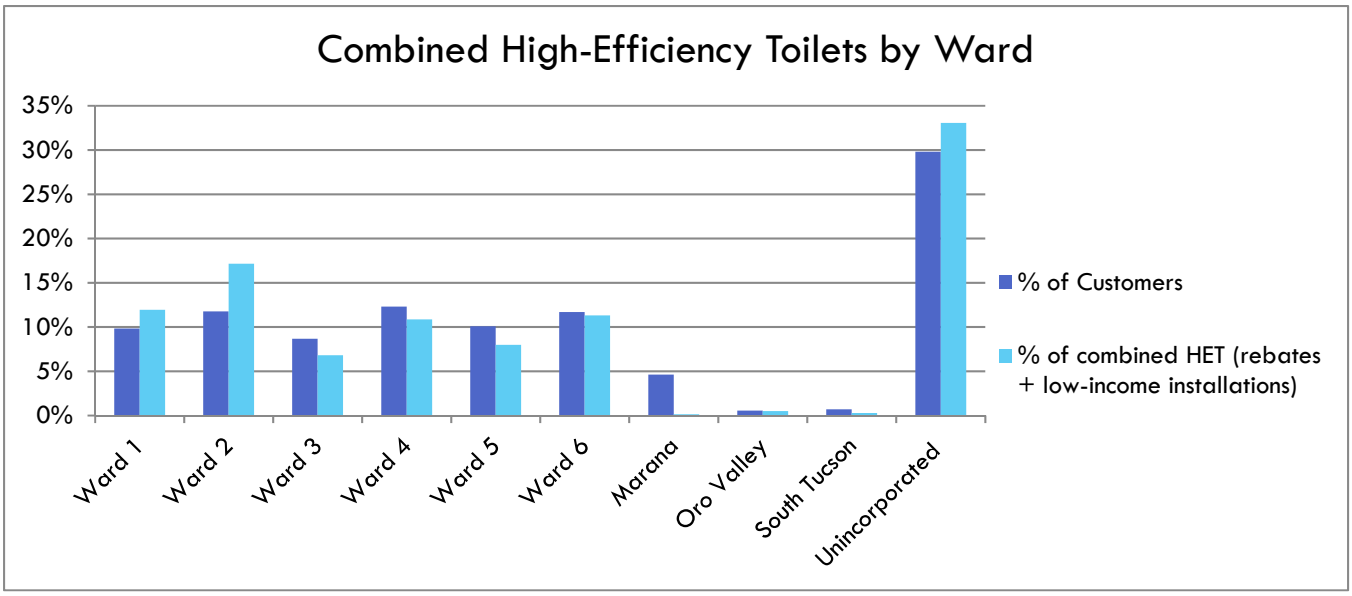


Figure 12: Combined single-family high-efficiency toilets, including rebates and direct installations for low-income customers compared to the percent of single-family customers in each ward or other political boundary served by Tucson Water.

Multi-Family HET Rebate

Implementation date: July 7, 2008; modified March 1, 2015

This rebate program is designed to encourage multi-family customers to retrofit older 3.5 or more gpf toilets with high-efficiency models. Only WaterSense labeled, high-efficiency toilets qualify for the rebate, which use 1.28 gpf or less.

FY 18-19 Activity:		Cumulative:
Number of HETs Retrofit:	3,036	26,614
Expenditure:	$227,700	$2,383,875
Estimated Gallons Saved:	22.7 million	943.7 million
Estimated Acre-Feet Saved:	70	2,896

Customer Payback: The average cost of multi-family HETs purchased by participants was $114. The cost of qualifying toilets typically starts at $75. Total annual water and sewer savings per retrofit is $80 with, on average, a payback period of 6 months after the $75 rebate.

Outreach and Promotion: Promotion of this program is largely done at a staff level by providing a customized analysis to customers interested in this rebate program. The analysis considers current water usage, a fixture count and behavior assumptions to provide each customer with return-on-investment calculations to help customers make informed decisions. Information is also provided at point-of-sale displays at retailers and plumbing suppliers, similar to our residential HET rebate.

Multi-Family HET Retrofit Savings:

From Tom Arnold, Tucson Water, Management Analyst – 10.28.14

The single-family savings number of 20.5 gpd (7,482.5 gallons per annum) is used to calculate multi-family savings estimates.

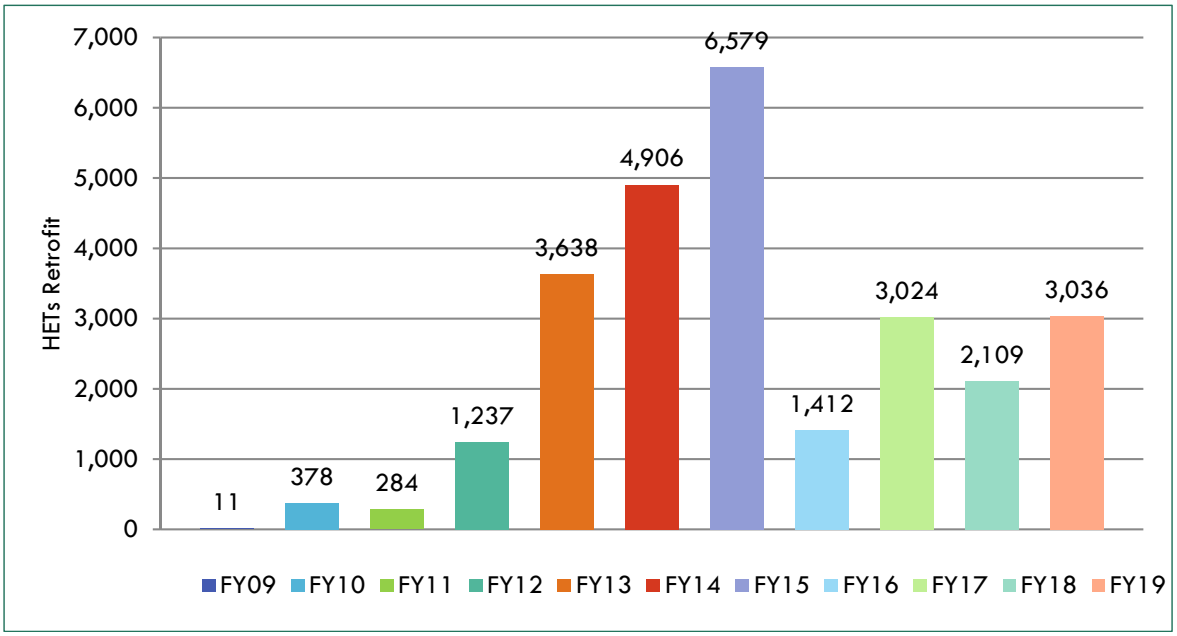


Figure 13: Multi-Family HET Rebates by Fiscal Year

Commercial HET Rebate

Implementation date: July 7, 2008; modified March 1, 2015

This rebate program is designed to encourage commercial/industrial customers to retrofit older 3.5 or more gpf toilets with high-efficiency models. Only WaterSense labeled, high-efficiency tank-type toilets or flushometer valve/bowl combinations rated by Maximum Performance (MaP) testing at 800 grams or more qualify for the rebate, which use 1.28 gpf or less.

FY 18-19 Activity:		Cumulative:
Number of HETs Retrofit:	41	3,222
Expenditure:	$3,075	$284,496
Estimated Gallons Saved:	344,195	182.2 million
Estimated Acre-Feet Saved:	1	559

Customer Payback: The average cost of commercial HETs purchased by participants was $156. The cost of qualifying toilets typically starts at $75. Total annual water and sewer savings per retrofit is $85 with, on average, a payback period of just over half a year after the $75 rebate.

Outreach and Promotion: The same point-of-sale displays are used to promote all high-efficiency toilet rebates. Similar to the multi-family HET program, a customized analysis is provided to the customer. The analysis considers current water usage, a fixture count and behavior assumptions to provide each customer with return-on-investment calculations to help customers make informed decisions.

Updated Commercial HET Retrofit Savings for FY 2015-16:
Differentiated water savings were calculated for flushometer-type and gravity-tank or pressure assist-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 HETs (1.28 gpf) resulting in 50 gpd for flushometer-type toilets and 23 gpd for gravity-type and pressure-assist tank toilets. The new calculations for determining water savings for flushometer-valve type toilet retrofit are 50 gpd or 16,425 per annum and 23 gpd or 8,030 gallons per annum for each gravity-tank and pressure assist-tank type toilet.

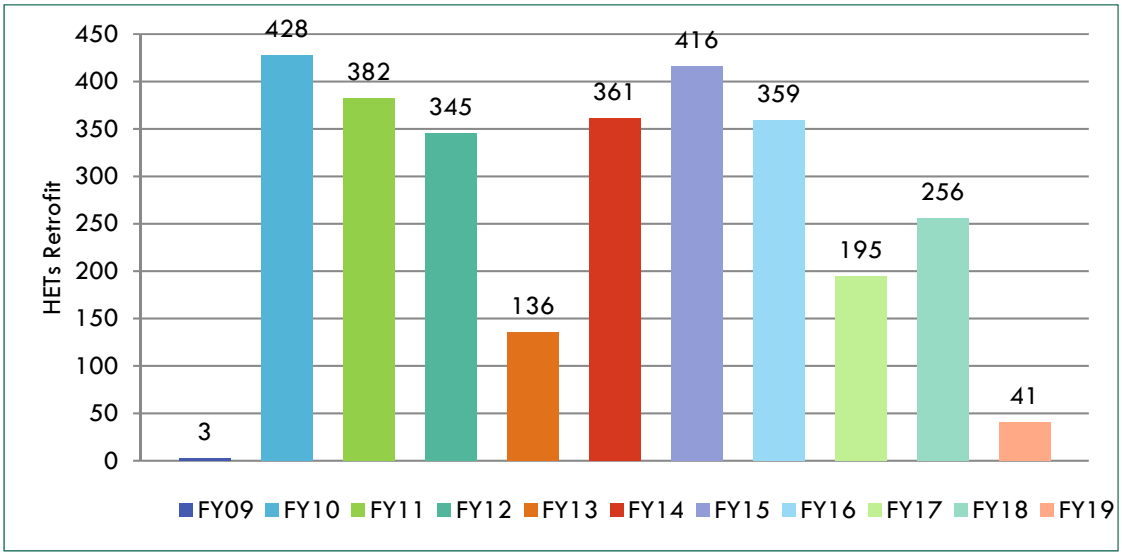


Figure 14: Commercial HET Rebates by Fiscal Year

High-Efficiency Urinal Rebate

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

This rebate program is designed to encourage commercial customers to retrofit high water-use urinals with high-efficiency models.

FY 18-19 Activity:		Cumulative:
Number of HEUs Retrofit:	0	794
Expenditure:	$0	$261,800
Estimated Gallons Saved:	0	23.8 million
Estimated Acre-Feet Saved:	0	58

Effective January 1, 2013, the rebate was increased from $200 to $500 and the range of options expanded to include all WaterSense labeled, as well as waterless models.

Effective March 1, 2015 the rebate was changed back to $200, which is more in line with the commercial HET rebate.

High-Efficiency Urinal Retrofit Savings:

The calculation for determining water savings for each retrofit is 17 gpd or 6,206 gallons per annum. This number has been adjusted from the previous number of 49 gpd to reflect updated savings estimates provided in the AWE 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.

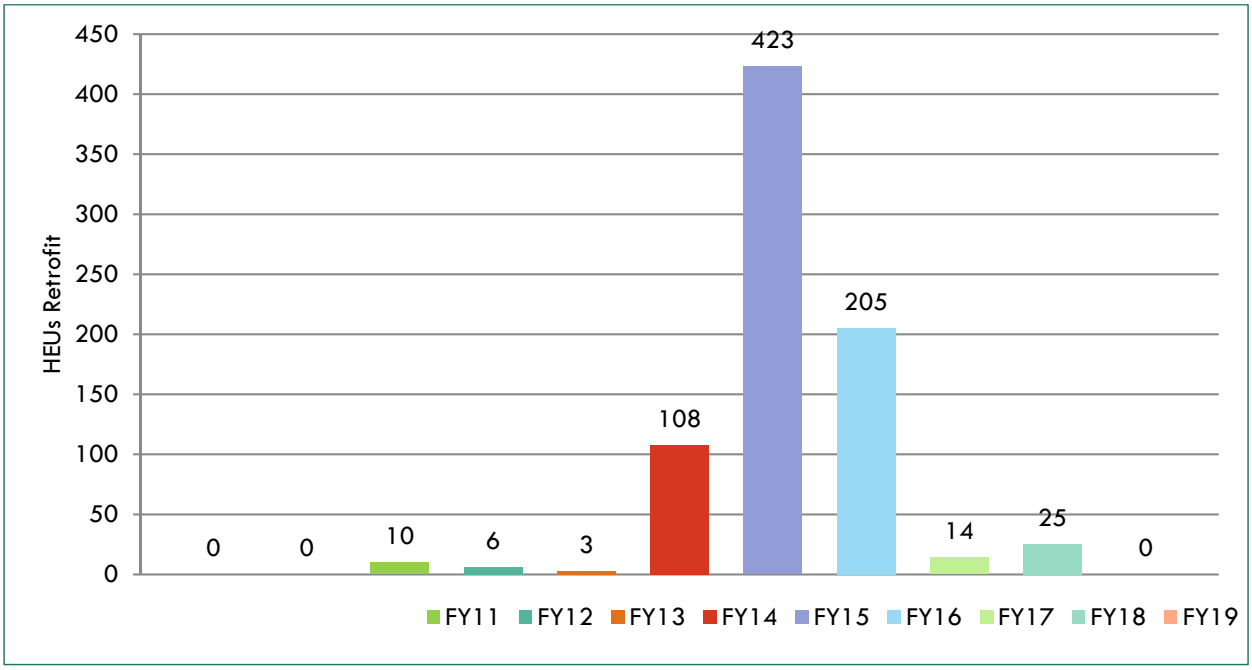


Figure 15: High-Efficiency Urinal Rebates by Fiscal Year

Clothes Washer Rebate (Pilot)

Implementation date: August 1, 2015

This rebate is designed to offset the difference between purchasing conventional clothes washers and high-efficiency models.

FY 18-19 Activity:		Cumulative:
Number of Clothes Washers:	1,335	6,030
Expenditure:	$267,600	$1,206,000
Estimated Gallons Saved:	9.4 million	108 million
Estimated Acre-Feet Saved:	29	331

Effective August 1, 2015, Tucson Water began offering residential customers a $200 rebate for purchasing a qualifying high-efficiency clothes washer, designated by the Consortium for Energy Efficiency (CEE), which specifies tiers of efficiency based on both water and energy use.

Customer Payback: The average cost of clothes washers purchased by participants was $743. The cost of qualifying clothes washers typically starts at $450. Total annual water, sewer, and energy savings per clothes washer is $116 with, on average, a payback period of less than five years after rebate.

Clothes Washer Savings:

The calculation for determining water savings for each purchase is 19.3 gpd or 7,043 gallons per annum. This assumption is from the Alliance for Water Efficiency that has used 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.

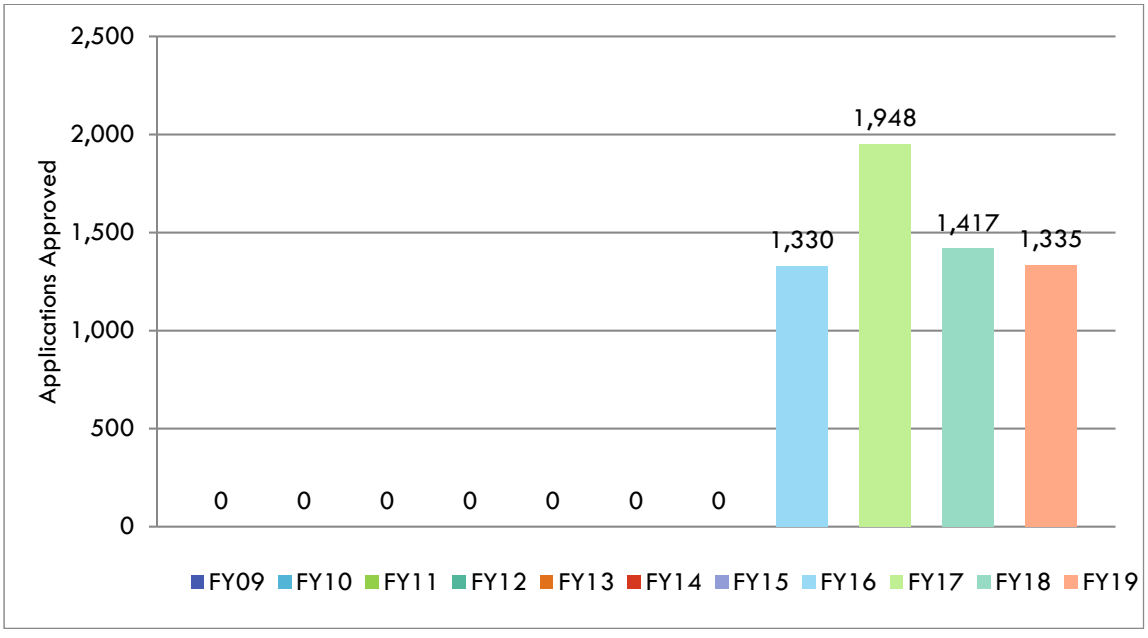


Figure 16: Clothes Washer Rebates by Fiscal Year

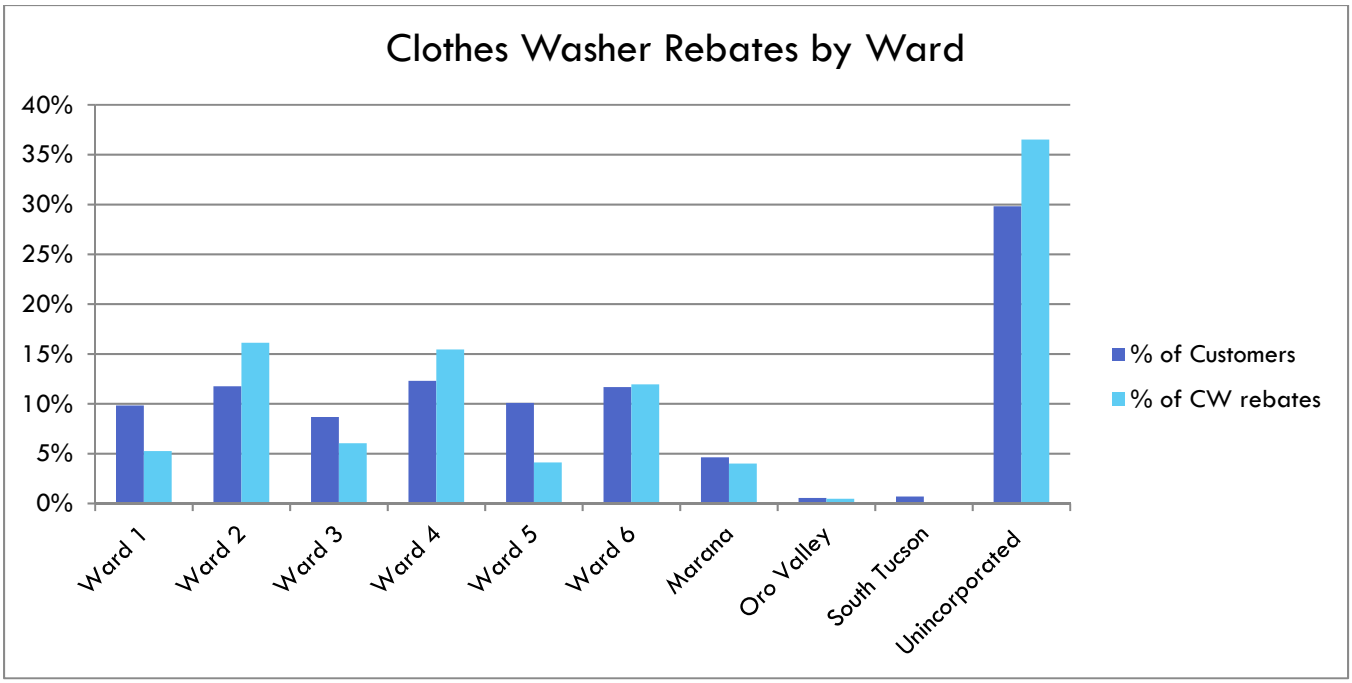


Figure 17: Clothes Washer Rebates by Ward displays the percent of rebates provided compared to the percent of single-family customers in each ward or other political boundary served by Tucson Water.

Gray Water Rebate

Implementation date: January 1, 2011; modified January 1, 2013

This rebate program is designed to encourage homeowners to install gray water systems for landscape irrigation. Beginning January 2013, the rebate amount increased from one-third of the cost up to $200 to one-half the cost up to $1,000. Participation in the program has remained low.

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

FY 18-19 Activity:		Cumulative:
Approved Applications:	17	165
Expenditure:	$13,011	$82,700
Estimated Gallons Saved:	231,455	8.6 million
Estimated Acre-Feet Saved:	1	27
Workshops:	6	
Workshop Attendees:	61	

Customer Impact: Of the total amount of waste water 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.

Figure 18: Typical Single-Family Water Use

Gray Water Savings:

The calculation for determining water savings for each rebate is 37.2 gpd or 13, 615 gallons per annum.

Most gray water systems approved for rebate are installing laundry-to-landscape systems that divert clothes washer water to the landscape instead of the sewer system. This savings number is 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).

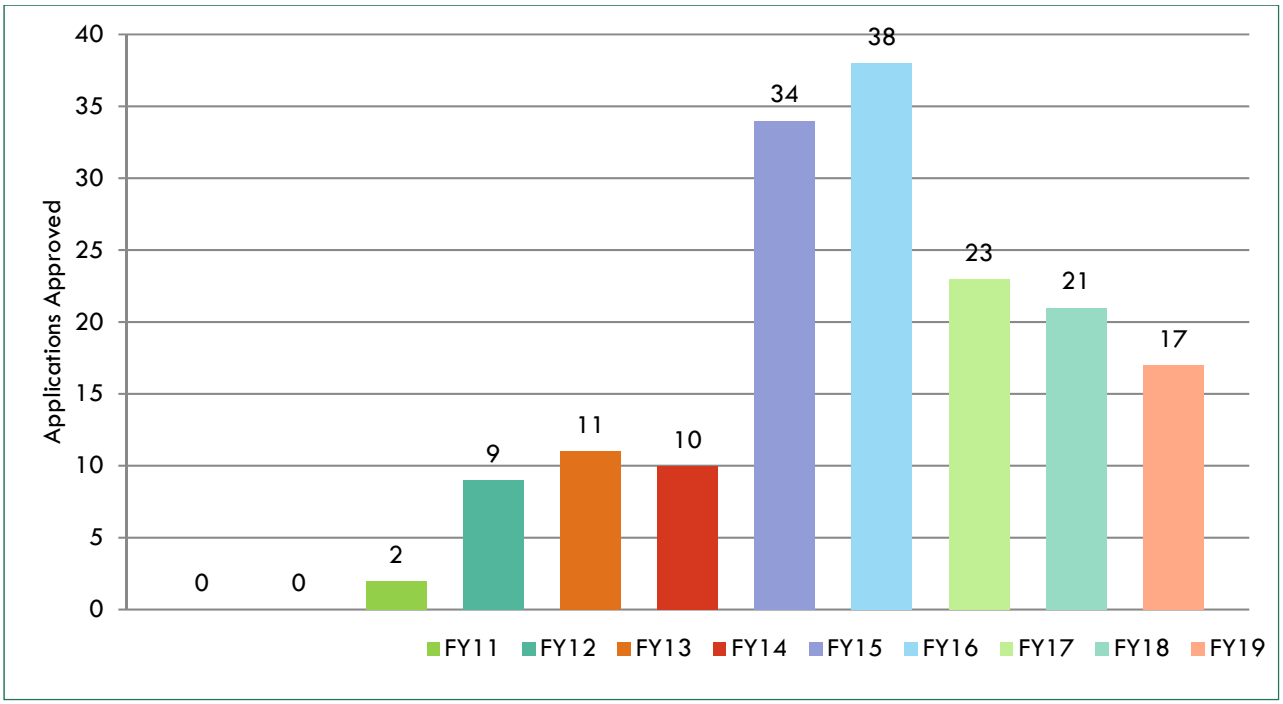


Figure 19: Gray Water Rebates by Fiscal Year

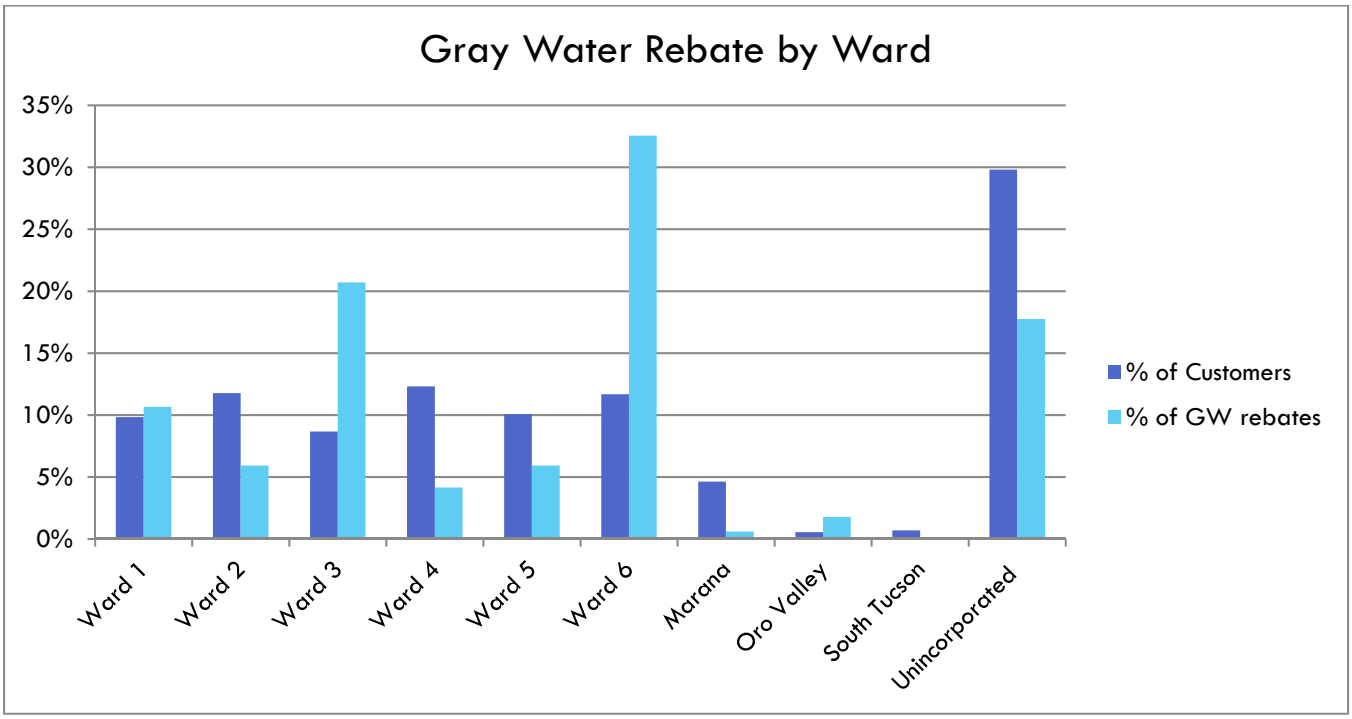


Figure 20: Gray Water Rebates by Ward displays the percent of rebates provided compared to the percent of single-family customers in each ward or other political boundary served by Tucson Water.

Irrigation Efficiency Incentive Program

Implementation date: July 7, 2008; modified fall 2014; put on hold beginning FY17-18

The Irrigation Efficiency Incentive Program, formerly Irrigation Upgrade Rebate Program, introduces multi-family and commercial water customers to the concepts of irrigation efficiency and uniformity. This program remains on hold.

Program Update: During several pre-upgrade inspections for applicants, it became apparent that some irrigation systems were in such disarray that we have had to re-examine the type of assistance best suited to achieve a more stringent landscape irrigation design standard. Concerns about investing in retrofitting existing systems that were either poorly designed from the start and/or have been improperly maintained throughout the years have become prominent. Tools need to be developed to help staff and customers evaluate landscapes and compare retrofitting an existing system to redesigning a brand new system. The challenge has been to identify ways of effectively inventorying existing flaws in established landscape irrigation systems (moving and/or adding sprinkler heads and emitters versus retrenching and installing brand new systems) and calculating potential savings opportunities.

There is also a need for landscape professionals with the proper credentials in efficient irrigation design, installation, and maintenance to help our customers.

To evaluate technology options to support landscape investigations, staff has worked with Cascadia Consulting Group, the contractor for commercial water audits, to conduct a thorough review of existing auditing tools. This review provided staff with additional information on the types and functions of auditing tools available that can be customized to represent local climate conditions. Currently, GIS technology options are being explored to provide water budgets and consumption information to commercial customers with large landscapes.

Customized Commercial Efficiency Program (Pilot)

Implementation date: January 1, 2016

Tucson Water's customized commercial rebate encourages businesses and industries to use water efficiently. Rebates help offset the initial costs of installing water-saving hardware, equipment, and systems. Rebate amounts are calculated based on estimated water savings to ensure program cost-effectiveness.

FY 18-19 Activity:		Cumulative:
TAP Customers:	2	42
Expenditure:	$21,514	$57,848
Estimated Gallons Saved:	260,591	14.4 million
Estimated Acre-Feet Saved:	1	44

The Tucson Audit Program (TAP), replaces the WaterSmart Business Program and offers free water audits and customized incentive packages to business customers. Tucson Water has contracted with Cascadia Consulting Group to provide technical services for this program. TAP audits identify water and financial savings opportunities for organizations and businesses through a Water Efficiency Recommendations Report, prepared by Cascadia Consulting Group, and reviewed by Tucson Water staff.

The City of Tucson Water Department's 2012 Drought Preparedness and Response Plan includes four drought response levels beginning with Stage 1 and increasing in severity to Stage 4. The Drought Plan states that if Stage 2 drought is declared, all commercial and industrial customers using, on average, over 325 ccf per month (2.5 million gallons per year) need to conduct a self-audit of water use at the facility and develop a conservation plan. Tucson Water is currently in Stage 1 drought and has been for several years. Declaration of Stage 2 drought is dependent on Colorado River conditions, and is made by the Tucson City Manager, on advice from the Director of Tucson Water. For more information the Drought Plan: tucsonaz.gov/files/water/docs/drought_plan_update_spring_2012_p_31-49.pdf

Tucson Water is offering these TAP audits free of charge to our customers now, to help get ahead of these requirements. This program is targeting our largest commercial and industrial users, but is available to any commercial or industrial customer.

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.

The uptake of rebates based on efficiency recommendations has been slow; it has become apparent that staff needs to invest more time in engaging customers that have already received audits to drive them to action. Fewer audits were completed this fiscal year and more focus has been on engagement of customers that have already received audits through TAP.

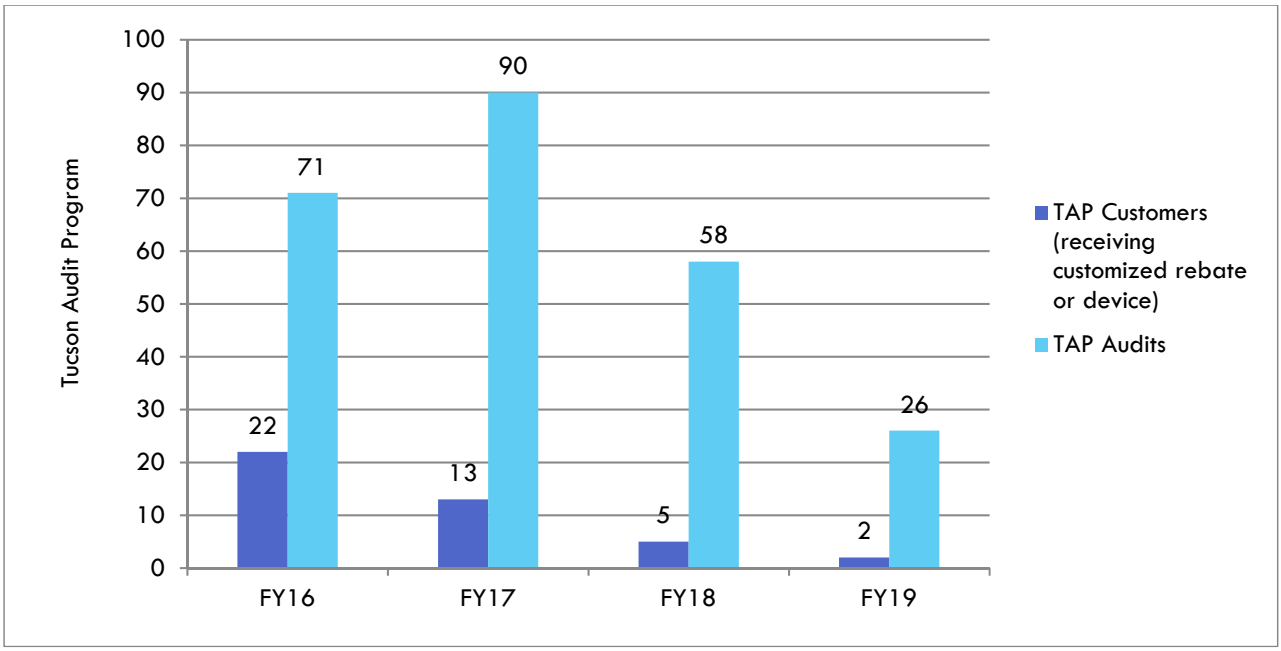


Figure 21: Custom Commercial Rebate by Fiscal Year

Rainwater and Stormwater Programs

Rainwater and Stormwater programs represent a shift in philosophy in water management strategies for Tucson Water. Both rainwater and stormwater harvesting are considered additional or alternative water supplies when captured and put to beneficial use. These alternative water supplies, when considered as part of a larger water supply portfolio and regional water planning, become part of an integrated water management approach, known as One Water.

There are two general categories of rainwater harvesting; active rainwater harvesting refers to a tank or cistern storing rainwater collected from roofs, which provides a means to store the rainwater for later use; passive rainwater harvesting refers to directing and retaining water in the landscape using site appropriate practices such as basins, berms, terraces, swales, and infiltration trenches.

Stormwater harvesting refers to rainwater collected from non-roof surfaces, such as streets, parking lots, hardscapes, and landscapes. Strategies to capture and utilize this water include, landscaping designs to retain water in soil, semi-porous hardscape material, curb cuts, and detention/retention basins. Reducing stormwater flows is often a main impetus of rainwater collection in urban settings and both play a role in an integrated approach to water management.

The rainwater harvesting rebate program is reported separately from the other efficiency programs because it addresses broader goals and objectives than demand management goals aimed at strictly conserving water. Rainwater and stormwater programs are designed to integrate this alternate water resource into a long-term planning framework that incorporates the One Water approach. Policy and guidance for this effort is provided through Plan Tucson.

One Water works to:

Integrate and optimize urban water systems within the larger context of a city.

One Water is defined as an approach "that considers the urban water cycle as a single integrated system, in which all urban water flows are recognized as potential resources, and the interconnectedness of water supply, groundwater, stormwater, and wastewater is optimized, and their combined impact on flooding, water quality, wetlands, watercourses, estuaries, and coastal waters is recognized." – *Water Environment & Reuse Foundation*

Rainwater Harvesting Rebate Program

Implementation date: September 27, 2011; modified June 1, 2013; modified July 1, 2015

The residential rainwater harvesting rebate program was introduced in June 2012, retroactive to September 27, 2011. The program was expanded in July 2015, to include curb cuts/core drilling and small commercial customers. As shown in Table 4, this program has the highest expenditures of Conservation Fund incentive programs.

FY 18-19 Activity:		**Cumulative:**
Approved Applications:	333	2,352
Expenditure Level 1:	$9.326	$110,225
Expenditure Level 2:	$395,567	$2,569,979
Expenditure L-I Level 1:	$2,085	$25,505
Expenditure L-I Level 2:	$69,813	$195,501
Limited-Income Grants	$13,368	$32,226
Estimated Gallons Offset:	2.8 million	52.8 million
Estimated AF Offset:	8	162
Gallons of Storage:	550,509	2.4 million

Tucson Water will rebate qualifying residential rainwater harvesting system costs under two levels of funding:

- Level 1 – Simple/Passive (earthworks) will rebate 50 percent of the cost of eligible material and labor up to $500
- Level 2 – Complex/Active System (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.

Applicants must attend an approved three-hour workshop to qualify for the rebate program. Sixty-six workshops were held this fiscal year and 993 people attended, with eight being held in Spanish. Qualifying workshops were offered in English through Smartscape and Watershed Management Group, and in Spanish by SERI.

Rainwater Harvesting Savings:

The basic evaluation method used by Tucson Water is to compare the usage of a control group to the participants in a conservation program before and after participants have taken some action to reduce their water usage. Preliminary tracking of water use for systems installed did not show a net reduction in water use compared to two control groups (all single-family and high use).

A new statistical analysis was done in 2017 and determined that savings are 10-12 ccf/year for participants who installed tanks and have not moved since their installation.

The current estimated water savings is 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, which when divided by the number of rebate participants to-date, yields 7.4 ccf/year of savings per customer – significantly less than the new statistical findings for the group analyzed.

Low-Income Rainwater Harvesting Grant & Loan Program

In FY 14-15, Tucson Water partnering with SERI, conducted a pilot to develop a low-income rainwater harvesting program.

In FY 18-19, SERI completed their second year of a three-year contract to expand low-income rainwater harvesting services to qualifying participants. Under this contract, SERI qualifies customers based on low-income status and offers design consultations and installation services for interested families. During FY 18-19, SERI provided nine workshops in English, eight workshops in

Spanish and provided information about the program at 40 community events. The largest barrier to implementation has been a back order of cisterns with reliable vendors.

The Community Food Bank (CFB) is in the second, and final year, of a workforce development program to build a business incubation and green jobs/workforce pipeline, aimed to provide water harvesting services to the economically challenged residential customer base. CFB is working with two groups seeking to launch a business offering rainwater harvesting systems installation and maintenance. One group is exploring a co-operative business framework.

Low-Income Pilot Savings:

Preliminary tracking of water use for the thirty-one participants compared to the class average usage was about 0.8 Ccf more per month than the class average. Overall, the passive water harvesting installations have not shown a decrease in usage since installing the systems.

Neighborhood-Scale Stormwater Harvesting Program

Tucson Clean and Beautiful (TCB) completed their second year of the pilot Neighborhood-Scale Stormwater Harvesting Program (NSSH). Community groups in Wards 3 and 6 have been proactively proposing projects and several have been installed; in Wards 1, 2, 4, and 5 with less organized neighborhood groups it has been more challenging to implement projects. TCB and Tucson Water have enlisted Tucson Parks to identify public parks areas to implement NSSH projects. In Ward 2, a larger park project was implemented in conjunction with Transportation's work to repave the parking areas. It has also been a challenge to collect the citizen science data from the basin sites. Tucson Water and TCB continue to work with neighborhood groups to collect information on the performance of these installed projects. Four projects were completed this fiscal year, two in Ward 1, one in Ward 2, and one in Ward 3, for a total of 10 projects since the program launched. The challenge remains to develop projects with community involvement.

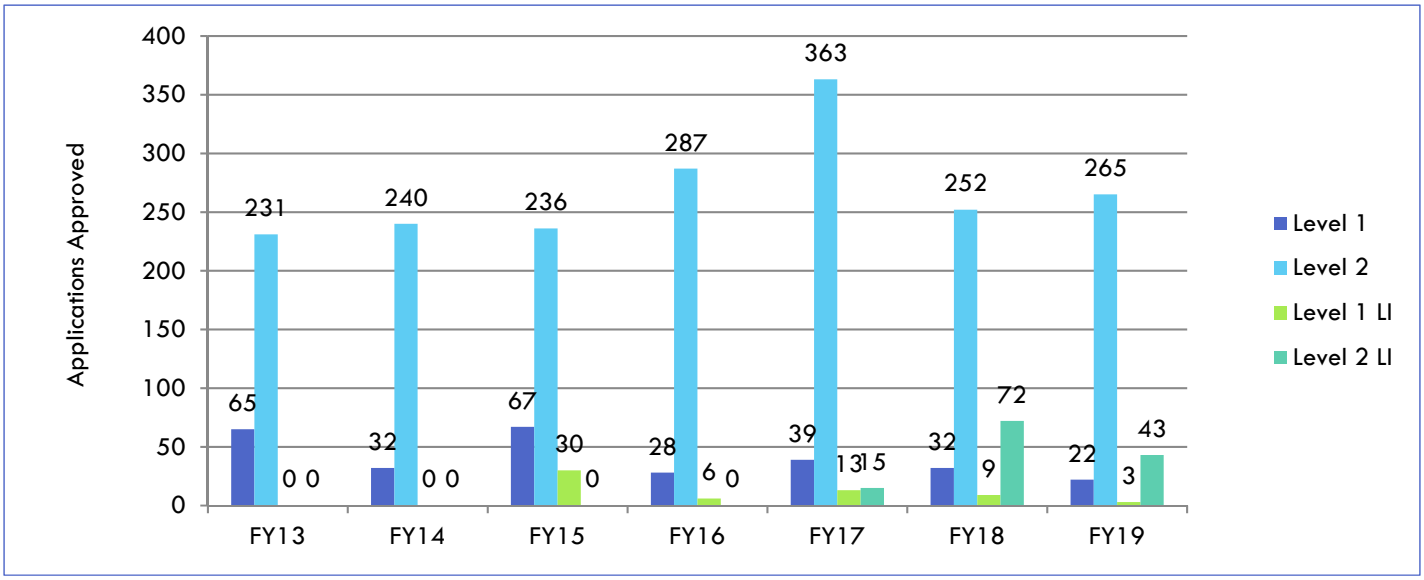


Figure 22: Rainwater Harvesting Rebates by Fiscal Year

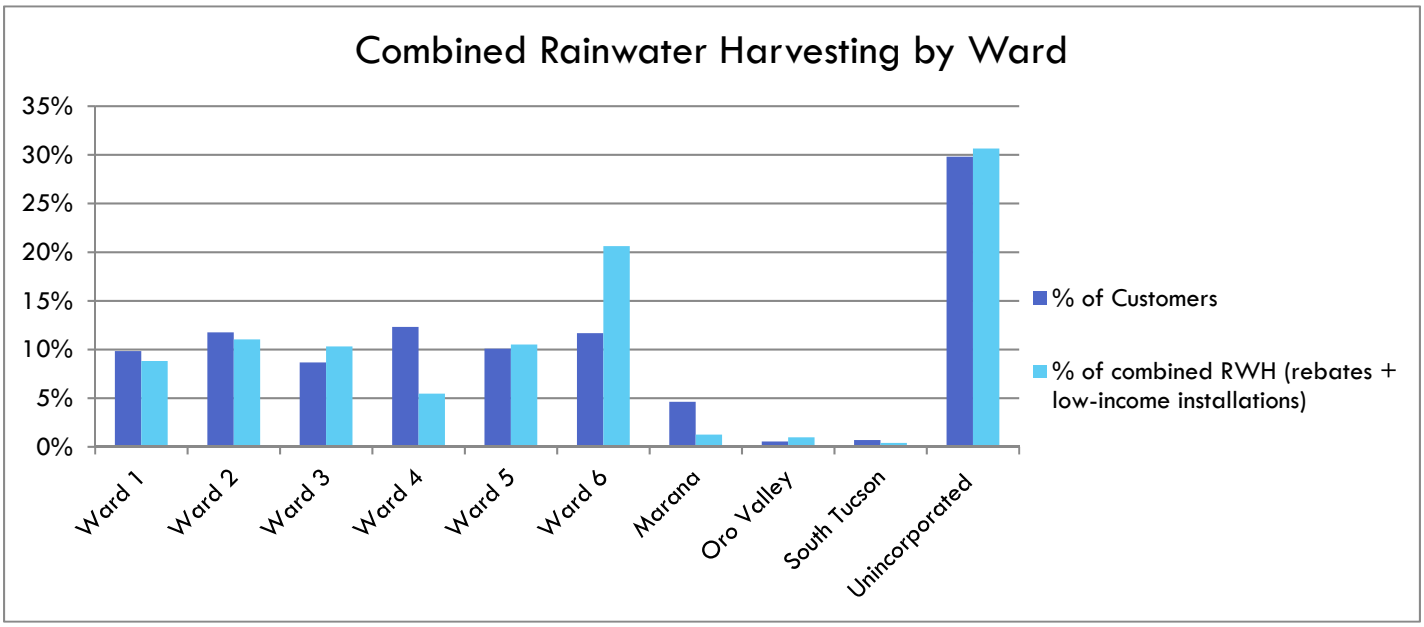


Figure 23: Combined rainwater harvesting projects, including rebates and grants/loans for low-income customers compared to the percent of single-family customers in each ward or other political boundary served by Tucson Water.

Zanjeros

The Zanjeros continue to serve as PICO's field team, providing customer water audits and water waste enforcement throughout the community.

Water Audits

Water audits are requested by customers, usually driven by 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 recorded at the meter, a review of all onsite water uses, identification of leaks and additional efficiency opportunities at the property. A total of over 2,000 residential audits were performed during the fiscal year, as well as 70 commercial audits.

Water Waste Enforcement

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

Conservation Inspectors made 328 visits in FY 18-19, and issued 176 verbal warnings, one written warning, and no citations were issued.

Drive-by identification and phone calls are the two most common ways that water waste is reported. Reports of water waste also come in through email and the See Click Fix phone app. The fine structure for a first offense is a minimum of $250. Subsequent offenses within three years are a minimum of $500.

Professional Training

Over the last year additional training opportunities have been offered to the Zanjeros to increase conservation skills, including better knowledge of green stormwater infrastructure and water harvesting. Two Zanjeros attended a green infrastructure training and passed the National Green Infrastructure Certification. Four of the Zanjeros took a professional rainwater harvesting design certification course offered locally by Watershed Management Group and two of the four have completed their certifications.

Zanjeros audit savings:

A recent analysis found that single-family customers who have received an audit save nearly 2,500 gallons (over 3 ccfs) per month. On average, these savings persist for at least three years, once use has returned to normal, following the audit.

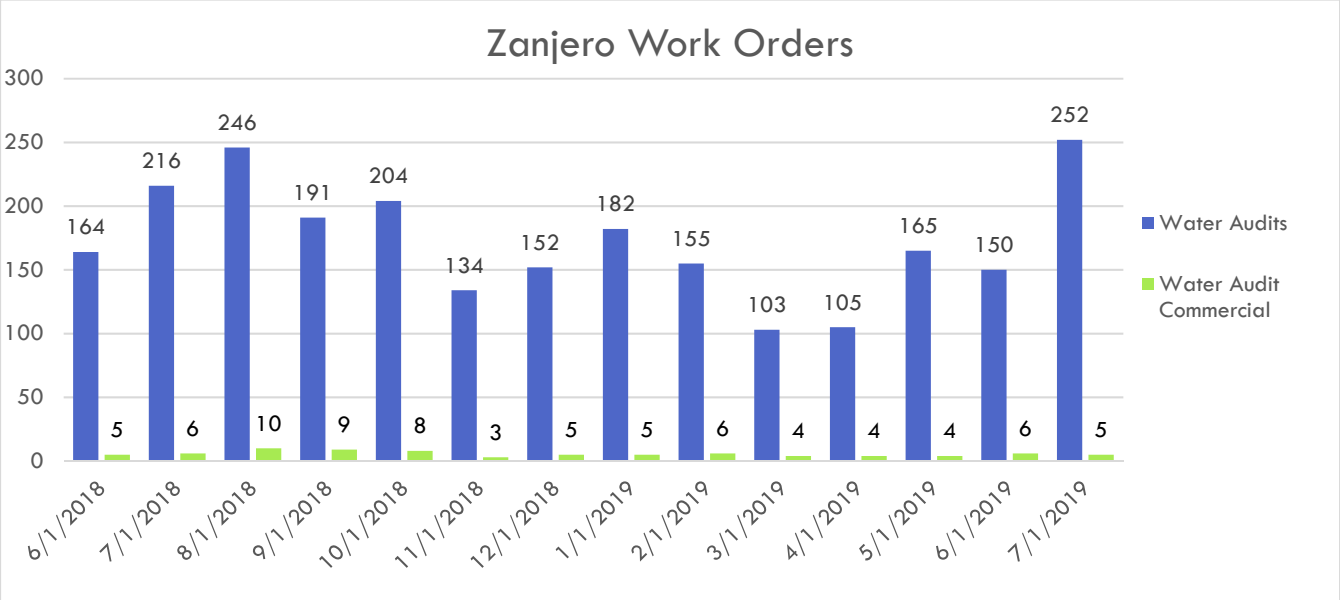


Figure 24: Graph of monthly audits completed by the Zanjeros team for FY 18-19, including one month on both ends of the fiscal year for comparison.

Community Education Programs

Tucson Water continues to contract three partners that provide educational services to K-12 audiences and landscape professionals 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.

Figure 25 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 over the last decade. Together, our education partners have reached over 500,000 students, teachers and community members in the last decade.

New for this fiscal year, dynamic 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. Navigate to the section titled Water Conservation and Efficiency Annual Reports and look for the Conservation Education for the 2018-2019 School Year map.

Public engagement counts:

Numbers of youth and adults engaged are reported by Tucson Water's partner programs as direct counts for Adults/Public and Students (Direct) and teacher reports of how many students are served by these programs for Students (Indirect).

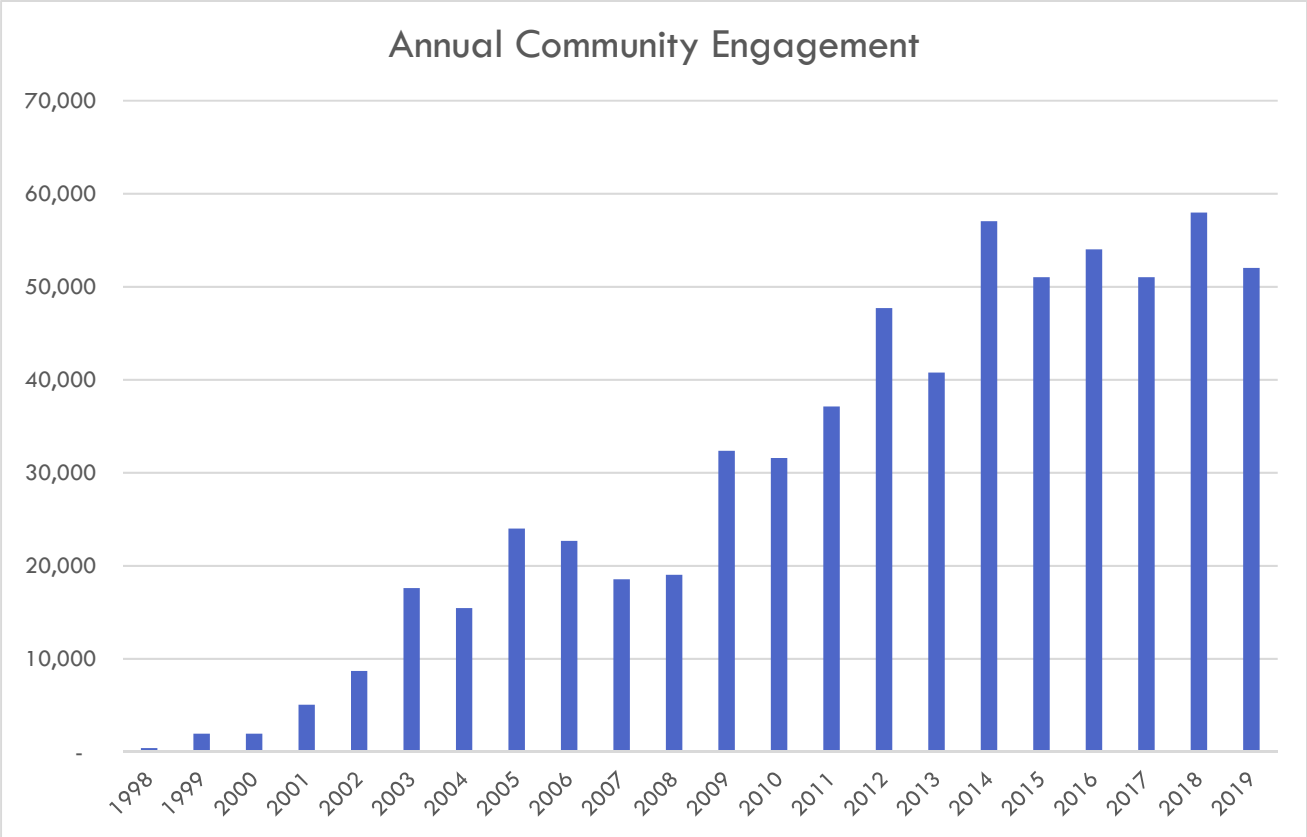


Figure 25: Bar graph showing the yearly impact of the education programs funded by Tucson Water.

Fiscal Year	Contractor	Adults/ Public	Students (Direct)	Students (Indirect)	Teachers
	Total	**53,917**	**288,551**	**158,741**	**11,456**
2019	Arizona Project WET	4,308	15,885	11,647	515
	Environmental Education Exchange		17,166		580
	Smartscape	1,921			
2018	Arizona Project WET	5,840	11,795	19,635	555
	Environmental Education Exchange		17,201		575
	Smartscape	2,364			
2017	Arizona Project WET	3,487	11,680	15,217	509
	Environmental Education Exchange		17,392		580
	Smartscape	2,151			
2016	Arizona Project WET	3,490	11,484	18,082	591
	Environmental Education Exchange		17,600		553
	Smartscape	2,211			
2015	Arizona Project WET	4,585	10,466	15,570	803
	Environmental Education Exchange		16,750		555
	Smartscape	2,303			
2014	Arizona Project WET	4,463	11,773	23,594	782
	Environmental Education Exchange		13,816		496
	Smartscape	2,121			
2013	Arizona Project WET	6,438	8,091	10,327	300
	Environmental Education Exchange		13,216		510
	Smartscape	1,887			
2012	Arizona Project WET	657	11,215	19,954	354
	Environmental Education Exchange		14,211		519
	Smartscape	800			
2011	Arizona Project WET	916	11,087	10,174	339
	Environmental Education Exchange		13,047		491
	Smartscape	1,081			
2010	Arizona Project WET		8,116	7,288	519
	Environmental Education Exchange		13,545		517
	Smartscape	1,603			
2009	Arizona Project WET		8,544	7,253	308
	Environmental Education Exchange		14,471		505
	Smartscape	1,291			

Table 8: Collective impact of education partner efforts by fiscal year.

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, sponsoring nine workshops and reaching a total of 108 teachers. Today the program has expanded to reach more than 600 teachers and 35,000 students annually. Additionally, since 2006, with Tucson Water's collaboration and support, APW has engaged 5,899 teachers, 289,177 students, and 31,261adults in STEM-based water education in the Tucson Water service area.

FY 18-19 Activity:

Students Reached	26,286
Teachers Reached	515
Adults Reached	4,308
Audit Projected Water Savings[2]	1.9 million

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 Tucson Water's Sweetwater Wetlands.

This year, 143 K-12 teachers participated in eight APW professional development offerings, which improved their instructional practice through real world, relevant STEM integration. Professional development includes STEM Academies and workshops to support curriculum integration. These teachers engaged 11,647 students directly in curriculum that advances critical thinking, problem solving, and collaboration skills. The average level of mastery gain for all workshops was 62%.

Additionally, direct classroom outreach resulted in the instruction of 15,885 students, including 403 students who performed water audits, replacing 145 faucet aerators, calculating an overall projected annual water savings of 1.45 million gallons. Through home audits, 74 students reported replacing bathroom aerators for an estimated savings of 425,536 gallons per year.

During APW's 37 public outreach events more than 4,000 students and 3,500 adults engaged in water education activities.

Direct student educational programs include:

- 3rd grade Groundwater Flow Model
- 3rd grade Sweetwater Wetlands Water Festival
- 6th grade Groundwater Flow Model
- Discovery Program – Sweetwater Wetlands
- Drinking Water Quality Testing
- School Water Audit
- Water Festival
- Water Scene Investigation

Professional development workshops include:

- STEM Summer Academy & follow-up (week-long)
- Santa Cruz River Field Study (two-day)
- Recharge the Rain: Summer Academy & follow-up (two-day)
- Water Festival Teacher Workshop (multiple)

Additional information about the program is provided in the annual report available online at tucsonaz.gov/water/conservation.

[2] 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. The three current programs reach more than 17,000 students annually in grades one through eight, in multiple school districts throughout Tucson. Additionally, since the partnership began, EEE has engaged nearly 250,000 students in Tucson Water-sponsored water education programs throughout the service area.

FY 18-19 Activity:	
Total Students Reached	17,166
Da Drops	7,530
Our Water, Our Future	4,339
El Tour de Agua	5,297

1st through 3rd Grade: Da Drops

Da Drops 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!*" *Da Drops* has reached over 5,600 classrooms and 138,000 students.

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. To date, *Our Water, Our Future* has reached almost 3,400 classrooms and 88,000 students and is now an institution for many local fourth and fifth grade teachers. 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). This exciting program has reached almost 1,000 classrooms and over 27,000 students.

Teacher evaluations indicated extremely high teacher satisfaction with classroom presenters and continue to have good response rates (41-73%). When asked about the effectiveness of the presenter in conveying information, teachers overwhelmingly rated presenters as Excellent and Good (99% for Da Drops, 100% for Our Water, Our Future, and 100% for Watching our Water).

Curriculum activities for Da Drops, Our Water, Our Future and the El Tour de Agua continue to be downloaded from the website. The number of downloads exceeds the number of Da Drops, Our Water, Our Future, and El Tour de Agua presentations, suggesting that there are teachers interested in the lessons who have not had classroom presentations or materials delivered. In addition, it is likely that we are reaching teachers beyond the Tucson area via these on-line curriculum activities.

Additional information about the program is provided in the annual report available online at tucsonaz.gov/water/conservation.

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 FY 18-19, 91 classes were attended by 842 people and 90 professionals earned their Smartscape certifications. 2019 marks the 25th Anniversary of Smartscape offering landscape training to Tucsonans.

FY 18-19 Activity:

Professional Workshops	56
Workshop Attendees	223
Residential Workshops	35
Workshop Attendees	619

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)
- Turf Irrigation Management
- Urban Tree Management (English and Spanish)

Smartscape also offers practical landscape water conservation classes for residential water users in the Tucson area and surrounding communities. These classes are designed to assist homeowners in creating and maintaining water-efficient landscapes in addition to qualifying for Tucson Water rebates. Homeowner workshops include:

- Gray Water Rebate Program
- Hands-On Landscape Design (3-part series)
- Hands On Drip Irrigation System Design
- Hands-On Drip Irrigation Scheduling and Controllers
- Rainwater Harvesting Rebate Program
- Weeds: Beneficial or Detrimental?

This year Smartscape also hosted the second annual Sustainable Landscapes Expo. This was a Saturday event at Pima County Cooperative Extension, designed to bring vendors and partners together to offer information to the public on sustainable landscape design and maintenance for our desert environment. Approximately 1,500 people attended.

Additional information about the program is provided in the annual report available online at tucsonaz.gov/water/conservation.

Other Conservation Activities

Tucson Water engages various partners in a host of other conservation program activities that help to broaden the reach and impact of Tucson's conservation program. Conservation staff participate in several community outreach events, as well as attending education partner activities on occasion. Professional presentations at technical conferences are made by staff several times per year, in addition to occasional community presentations. A few specific program activities are highlighted below.

National Mayor's Challenge for Water Conservation

The National Mayor's Challenge for Water Conservation is a friendly online competition among cities that encourages residents to pledge to take steps to achieve water and energy efficiency. Tucson has placed high several times and has won two years in a row for 2018 and 2019, in the 300,000 - 599,999 population city category. The Challenge takes place every April.

Regional & National Collaboration

Tucson Water maintains active involvement with the Conservation Committee of the Arizona Municipal Water Users Association (AMWUA) and staff continues to attend meetings via phone and in person. AMWUA has created a commercial conservation workgroup to address the needs and opportunities that exist with water conservation in the commercial sector and Tucson Water has played an active role in these discussions including making presentations on our program, providing input, and suggestions on topics and speakers for consideration.

On a national level, Tucson Water has engaged with the Alliance for Water Efficiency (AWE) through use of the tracking tool, participation in an avoided cost study to analyze the role of conservation and its impact on water rates, support for national legislation on water conservation rebate tax issues. AWE has identified national interest in cooling tower technology and program implementation and Tucson Water has been participating in this new working group, as cooling towers are in important part of the Tucson Audit Program.

Retail Outreach and Promotion

A main avenue for promoting conservation and incentive programs has been placement of display racks at nurseries, plumbing supply, and home improvement retailers. In FY 16-17 a partnership was established with Cirrus Visual to be a brand ambassador for Tucson Water and ensure that point-of-sale displays are kept filled with the most current information on residential rebates and that employees are updated on any program changes. Displays at about 20 of the highest-demand retails are stocked monthly with brochures and rebate applications. In total, Tucson Water has established relationships with 42 retailers in the service area. From tracking how customers learn about the rebate programs, staff knows that retailers are a very important part of program promotion; many customers do not know rebates exist until talking with an employee at one of our retail partners' stores.

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. Through FY 18-19, eight gardens applied for the pilot program and all were assigned the pilot rate, including one that entered into a payment plan for their backflow unit. For more information, visit: tucsonaz.gov/water/garden.

Appendix A – Plan Tucson Policies Addressed with Water Conservation Fee Programs

- H6: Take multiple approaches to reduce housing costs and increase affordability.
- PH8: Support streetscape and roadway design that incorporates features that provide healthy, attractive environments to encourage more physical activity.
- E4: Build and maintain partnerships among neighborhood, community, business and regional institutions and programs to increase educational opportunities.
- E7: Initiate a comprehensive approach to civic education that provides and promotes regular opportunities for members of the public to learn about the functions of the City and to take advantage of programs provided by the City.
- 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.
- BC2: Continue to develop and implement local strategies, services, and incentives to enhance Tucson's business climate.
- EC3: Reduce the urban heat island effect by minimizing heat generation and retention from the built environment using a range of strategies.
- 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.
- WR1: Continue to plan and manage the City's water supplies, quality, and infrastructure for long-term reliability and efficiency.
- 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.
- WR4: Ensure an adequate amount of water to meet the needs of riparian ecosystems.
- 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.
- GI2: Rehabilitate and enhance natural drainage systems, water detention and retention basins, and other infiltration areas for multiple benefits, such as recreation, wildlife habitat, and stormwater management.

- 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.
- GI5: Create, preserve, and manage biologically rich, connected open space; wildlife and plant habitat; and wildlife corridors, including natural washes and pockets of native vegetation, while working to eradicate invasive species.
- GI6: Protect, restore, enhance, and manage trees for their long-term health, including providing guidance on proper planting, care, and maintenance.
- PI4: Identify potential reclaimed water users, such as schools, golf courses, and sports facilities, that will support the expansion of the reclaimed water system.
- PI5: Continue to expand and diversify funding mechanisms for the repair, upgrade, maintenance, and service expansion of public infrastructure and facilities.
- RR5: Pursue interim uses and/or green infrastructure on vacant and financially distressed properties.
- RR6: Prioritize neighborhood revitalization efforts to focus on those geographic areas with the greatest need.
- 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.