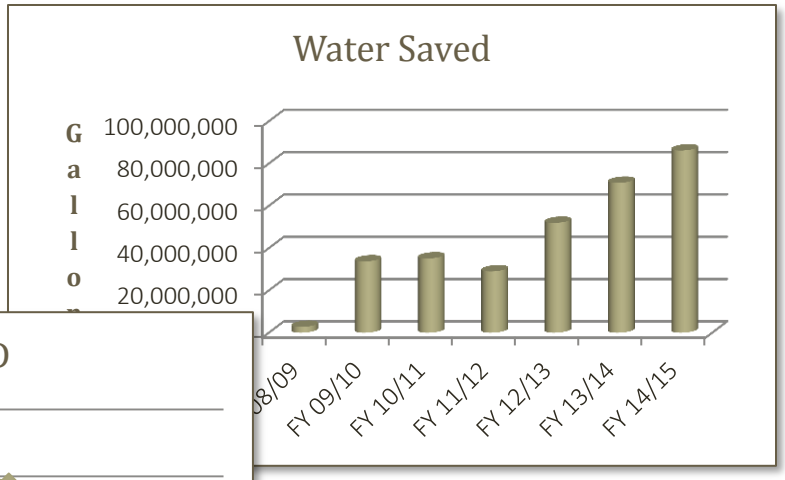
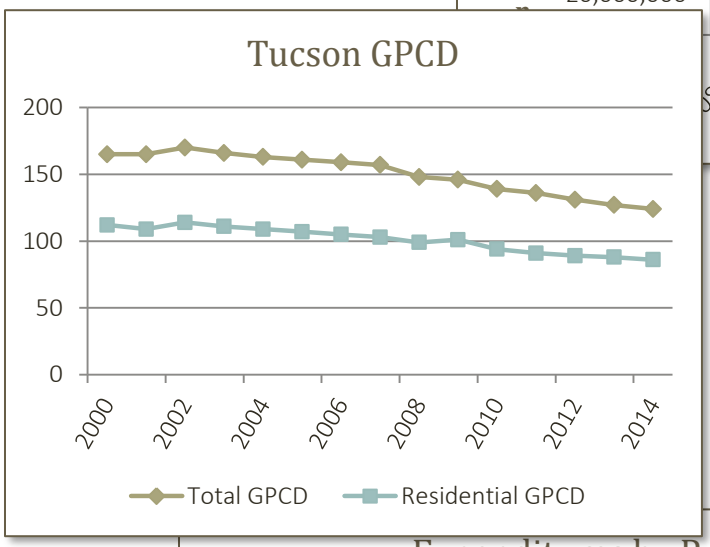
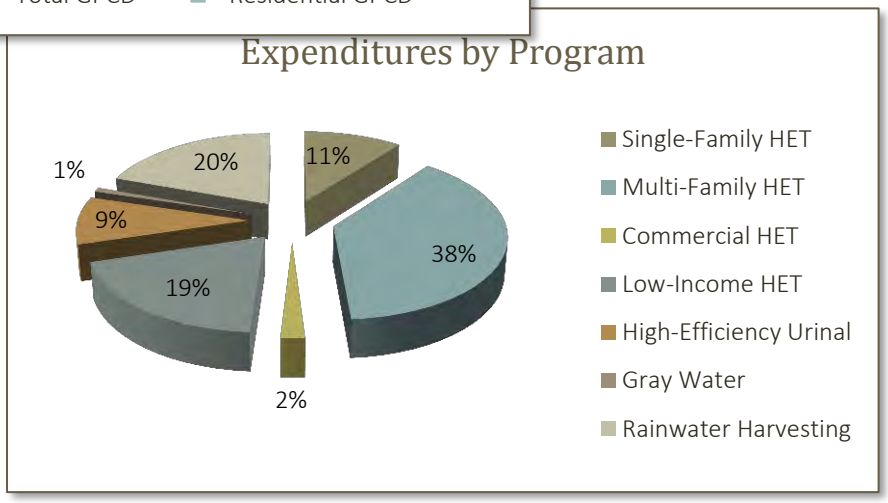
Water Conservation Program
FY 2014-15 Annual Report







TUCSON WATER

CITY OF TUCSON

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July 2015

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Conservation Snapshot of Fiscal Year 2014-2015

Water demand has continued to decline in the last few years with a record low gallons per capita per day (gpcd) of 124 and a residential gpcd of 86 in 2014. The conservation fee, now in its seventh year, has provided significant opportunity for Tucson Water and our customers to receive high-quality conservation and education programs and invest in robust efficiency incentives.

In FY 2014-2015, the conservation fee has resulted in:

- 81.7 million gallons (251 acre-feet) conserved
- $1.7 million invested in rebates and incentives
- 10,630 high-efficiency toilet (HET) and urinal installations
- 303 rainwater harvesting and gray water applications

To date, the conservation fee has resulted in:

- More than 889 million gallons (2,729 acre-feet) conserved
- More than 6 million dollars invested in rebates and incentives
- 38,223 HET and urinal installations
- 934 irrigation efficiency, rainwater harvesting, and gray water applications

In FY 2014-2015 our partner education programs provided:

- Arizona Project WET programs reached 584 teachers, 26,634 students, and 4,714 adults
- EEExchange reached 16,750 students
- SmartScape reached 2,519 adults (homeowners & professionals) with 96 workshops

Changes in FY 2014-15 include:

- Streamline and create more equitable high-efficiency toilet rebate programs by setting two rebate prices:
  - $75 for tank-type toilets and $150 for flushometer-valve type toilets (flushometer-valve types only for commercial sector)
  - Rebate changes effective March 1, 2015
- Reduce high-efficiency urinal rebates back to $200 to be consistent with commercial HET rebate
  - Rebate changes effective March 1, 2015

Changes for FY 2015-16 include:

- Expand the rainwater harvesting program to include curb cuts and small commercial customers as directed by Mayor and Council
  - Rebate changes effective July 1, 2015
- Offer a new high-efficiency clothes washer rebate of $200, available to single-family residential customers
  - Scheduled to begin August 1, 2015
- Offer a new, customized commercial rebate that will calculate a customer rebate amount based on potential water savings determined from a facility water audit
  - A contractor was selected to conduct commercial water audits for this program
- Offer an improved irrigation efficiency upgrade rebate program for commercial and multi-family customers, up to $10,000:
  - Two contractors will conduct pre-audits to qualify customers for upgrades
  - Develop a required irrigation workshop for contractors that perform work for customers participating in the irrigation efficiency rebate program
- Expand the adult education program for Landscape Irrigation Contractors by offering Irrigation Association (IA) developed training to address inefficiencies in landscape irrigation systems

Introduction

This operating report describes the activities of the Tucson Water Conservation Program for July 1, 2014, through June 30, 2015, referred to as Fiscal Year (FY) 2014-15. The program is funded through a water conservation fee currently set at seven cents per hundred cubic feet (Ccf). The fee is assessed to all potable water users. Table 1 illustrates funds raised and the expenditures since the inception of the Water Conservation Program Fee in FY 2008-09 that provided funding for an expanded conservation incentives program. Rollover funds are budgeted to maintain the current fee until the end of FY 2019-20 as established in the five-year Financial Plan *(see below)*. In FY 2015-16, the fee will increase to eight cents per Ccf and in FY 2017-18, the fee is scheduled to increase to nine cents per Ccf.

	FY 08/09	FY 09/10	FY 10/11	FY 11/12	FY 12/13	FY 13/14	FY 14/15
Cons. Fee	$0.03	$0.04	$0.05	$0.07	$0.07	$0.07	$0.07
Budget	$997,000	$997,000	$1,086,690	$2,902,630	$3,356,820	$2,950,000	$3,050,000
Revenue	$1,217,280	$1,716,880	$2,124,838	$2,816,241	$2,830,967	$2,832,950	$2,726,208
Expenditure	$794,462	$831,883	$1,720,075	$1,795,082	$2,727,541	$2,725,288	$2,771,450

Table 1: Water Conservation Program Budget Overview

TUCSON WATER

CONSERVATION PROGRAM FINANCIAL PLAN
Preliminary FY 2015 – FY 2020

Includes FY 2016 rate increase recommended by the CWAC Conservation and Education Sub-Committee

Revised 01/05/2015

	Inc	Rate	2014-15	2015-16	2016-17	2017-18	2018-19	2019-21
PROJECTED CONSUMPTION*								
Potable Water Consumption Projection (Ccf)			**39,018,442**	**38,307,264**	**37,812,014**	**37,527,754**	**37,396,899**	**37,283,713**
REVENUES								
Beginning Balance			**$ 2,363**	**$ 2,044**	**$ 1,211**	**$ 713**	**$ 540**	**$ 193**
Water Sales (7/05/15 Rates)		0.07	$ 2,731	$ 2,707	$ 2,659	$ 2,611	$ 2,563	$ 2,562
Water Sales Increases from Rate Adjustments:								
FY 2016 Rate Adjustment	0.01	0.08			$ 383	$ 378	$ 375	$ 374
FY 2017 Rate Adjustment	0.00	0.08			$ -	$ -	$ -	$ -
FY 2018 Rate Adjustment	0.01	0.09				$ 378	$ 375	$ 374
FY 2019 Rate Adjustment	0.00	0.09					$ -	$ -
FY 2020 Rate Adjustment	0.01	0.10						$ 374
Total from Rate Adjustments			$ -	$ -	$ 383	$ 756	$ 750	$ 1,122
Water Sales (Including Rate Adjustments)			**$ 2,731**	**$ 2,707**	**$ 3,042**	**$ 3,367**	**$ 3,313**	**$ 3,684**
Total Revenues Available			**$ 5,094**	**$ 4,751**	**$ 4,253**	**$ 4,080**	**$ 3,853**	**$ 3,877**
PROJECTED REQUIREMENTS								
Total Conservation Requirements			**$3,050**	**$3,540**	**$3,540**	**$3,540**	**$3,660**	**$3,785**
Projected Surplus/Deficit			***$ 2,044***	***$ 1,211***	***$ 713***	***$ 540***	***$ 193***	***$ 92***

*Ties to Potable Consumption Forecast

The Conservation and Education Subcommittee of the Citizens' Water Advisory Council (CWAC) is charged with overseeing the Water Conservation Fund and works with staff to develop and evaluate programs. Tucson Water is responsible to the ratepayers to provide cost-effective programs that save water and reduce demand. Each month, CWAC and Mayor and Council receive a detailed report showing activities, expenditures, and estimated water saved for the water-efficiency programs.

Water Conservation Program Expenditures

The water conservation program fund can be separated into seven main categories as shown in Figure 1:

1. Operating ($420,129) – salaries and wages for permanent employees
    a. 1 Supervisor
    b. 2 Water Conservation Specialists
    c. 2 Utility Service Representatives
    d. 1 Customer Service Representative
    e. 2: Administrative Assistant and Secretary (portion of time spent processing invoices and rebates)
2. Efficiency Programs ($1,026,162) – incentive and rebate programs designed to provide long-term measurable reductions in water use that are cost-effective
3. Rainwater/Stormwater Programs ($358,525) – rainwater harvesting rebate program and rainwater harvesting demonstration sites
4. Professional Services ($695,774) – contractors that support the conservation program in implementation of youth education and toilet replacement programs (Project WET, EEExchange, SmartScape, and CHRPA)
5. Community Outreach ($54,169) – public relations and advertising
6. Materials ($194,691) – information materials to promote programs and support behavioral change with low-income HET materials, shower heads, shower timers, aerators, signage, promotional materials, etc.
7. Other Miscellaneous ($34,421) – travel, training, printing and reproduction, computers, etc.

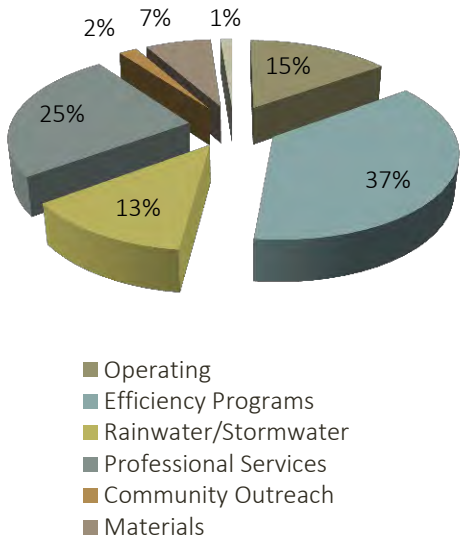

Figure 1: Water Conservation Program Expenditures by Percentage

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 water at the same level of use as in 1989, 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 shows total and residential gpcd since 2000. Long Range Water Plan projections indicate that there is enough water available today to meet demands through 2050, even if reductions in deliveries of CAP water occur. The report, 2012 Update, Water Plan: 2000-2050, is available on the City's website at: www.tucsonaz.gov/water/waterplan

	Population	Total GPCD	Residential GPCD[1]
2010	705,817	139	94
2011	706,118	136	91
2012	708,863	131	89
2013	712,698	127	88
2014	715,260	124	86

Table 2: Gallons per Capita per Day (GPCD)

Tucson Water works to secure a sustainable and reliable water supply for Tucson residents and water customers, and will continue to evaluate and update its water conservation program to ensure per capita water use does not exceed projections.

Furthermore, Tucson Water is committed to meeting requirements set by Arizona Department of Water Resources (ADWR) Fourth Management Plan.

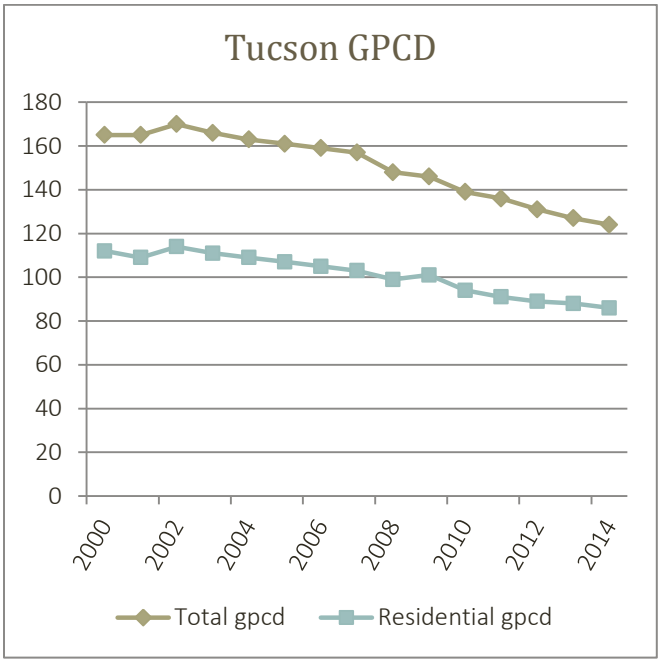

Figure 2: Total and Residential GPCD from 2000 to 2014

Water Conservation Policies & Requirements

Mayor and Council Policy for Water Conservation

Mayor and Council established water conservation policies January 26, 1998. Since then, Tucson Water has worked to expand education and conservation offerings and is working with Mayor and Council to revisit these initial policies.

The original policy states:

- The City of Tucson is required to meet conservation targets as established by the Arizona Department of Water Resources. Conservation program elements, such as public information and education, incentives and ordinances, will be developed and implemented to achieve conservation targets.
- The City of Tucson will "Lead by Example" by promoting water conservation and environmental aesthetics by applying the principles of Xeriscape to public projects and following adopted regulations.

While Xeriscape remains a core landscape aesthetic in Tucson, our community has moved beyond Xeriscape to incorporate more holistic views of

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

water use into vocabulary and behavior. Today "water efficiency" has replaced "water conservation" in Tucson as a result of previous success in reducing water demand, especially peak demand, and to recognize that any water use should be beneficial and appropriate.

Goals, Policies, and Objectives

The water conservation program goal is "To Protect and Enhance Water Resources through Conservation."

Policies:

- Provide an equitable distribution of conservation benefits throughout the customer classes and the community
- Employ a mix of methods to achieve desired results
- Develop and utilize guidelines for evaluating water conservation programs to modify existing programs and develop new ones

Objectives:

- Reinforce and strengthen the community's water conservation ethic
- Maintain compliance with regulatory requirements
- Ensure adequate supplies are available to meet customer demand, and public health and safety needs

Program Evaluation

To determine whether the Water Conservation Program is meeting the defined policies and objectives stated in the previous section, a variety of program evaluation tools are employed to assess program activity and success. This section describes the various tools and how they are used to analyze data and gather information.

Demand-Side Management

The role of water conservation requires balancing the development of adequate water supplies with the needs of the utility's customers. The focus of any supply strategy is to satisfy customer water needs in the most cost-effective and efficient manner, minimizing any adverse environmental impact and preserving the quality of life. Additionally, there should be a focus on demand-side management and planning to respond to drought.

Since July 2008, the water conservation program has offered customers incentives to encourage adoption of water-saving devices and practices. New incentive programs are introduced as pilot projects to ensure that they meet goals, policies, and objectives. New programs are evaluated after a three-year period for water efficiency impacts and cost-effectiveness before being adopted as part of the permanent conservation program. Low participation rates can be examined through surveys and marketing studies to aid efforts to promote greater participation. Those still under evaluation are identified as pilot projects.

Tucson Water's rebates are based on the amount of water saved per retrofit rather than the cost of the retrofit. It is a priority of the water conservation department to create incentives that equitably serve all water customers, and the department is working to modify and create new rebate programs with this in mind. In the future it also makes sense for Tucson Water to promote incentives that have a lower cost per Ccf to maximize budgetary and staffing needs.

Table 7 compares the expenditures for FY 2014-15 to the estimated water saved per Ccf and provides the cost per Ccf of each program.

Program	Expenditure[2]	Saved Water (Ccf)	Cost per Ccf
Single-Family HET	$175,923	21,717	$8.10
Multi-Family HET	$645,690	65,812	$9.81
Commercial HET	$33,554	5,684	$5.90
HE Urinal	$156,300	3,509	$44.54
Gray Water	$14,095	619	$22.77
Low-Income HET	$335,024	11,937	$28.07
RWH	$327,145	0[3]	$327,145.00

Table 3: Cost per Ccf by Program for FY 2014-15

[2] The expenditure does not include staff labor costs.

[3] Preliminary tracking of water use for systems installed in 2012 are not showing an overall reduction in water use. 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.

Avoided Costs

The model used to calculate Tucson Water's avoided supply costs (infrastructure and supply acquisition costs the utility will not have to incur because conservation decreases future supply needs) was developed for the California Urban Water Conservation Council and the American Water Works Association Research Foundation. It is a generalized Excel-based tool which is designed to be applied to any utility configuration. Based on user inputs regarding present and future demands, supplies, and facilities, as well as basic economic assumptions, the model computes seasonal short-run and long-run avoided costs over a user-designated planning period.

Water use studies such as the Residential End Uses of Water Study (REUWS) help to identify the potential for improving water use efficiencies. The REUWS is a research study that examined where water is used in single-family homes in North America published in 1999 by the AWWA Research Foundation and the American Water Works Association. The "end Uses" of water include all the places where water is used in a single-family home such as toilets, showers, clothes washers, faucets, lawn watering, etc.

An update to the 1999 report has been underway to repeat the effort and obtain updated results. Preliminary results are available and suggest that overall, residential gpcd is falling, a trend consistent with Tucson's gpcd since the turn of the century. Figures 3 and 4 offer a comparison of how these end uses are shifting and decreasing overall. This information helps with conservation program planning to identify the biggest areas of potential household savings that can be targeted with education and incentive programs. For example, toilets remain the largest household water use, followed by clothes washers and showers. The toilet rebate program is Tucson Water's longest running incentive program, and the clothes washer rebate program will launch August 1, 2015. Shower water use is driven in large part by behavior and is regularly addressed by our educational partners.

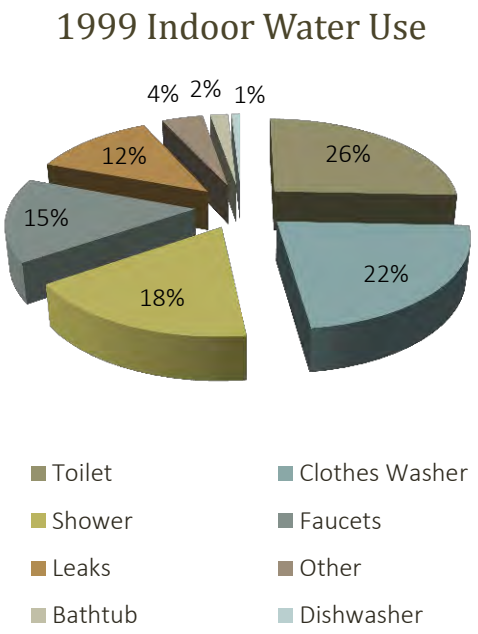

Figure 3: Average indoor residential water use from 1999 AWWA study

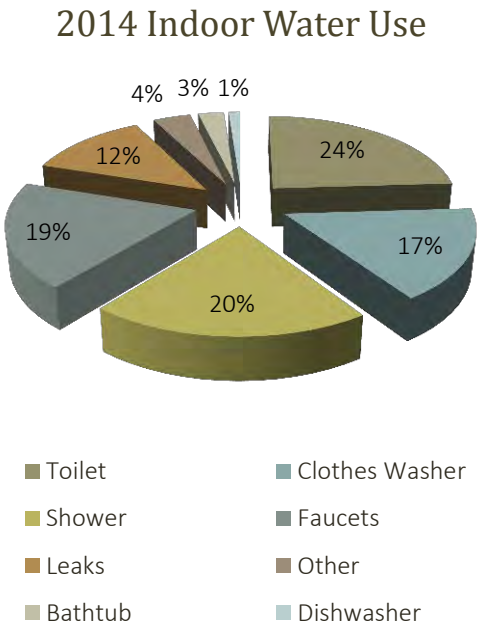

Figure 4: Average indoor residential water use from 2014 AWWA study

Unlike traditional water conservation incentives that are focused on demand reduction, Mayor and Council directed Tucson Water to offer rebate programs like rainwater harvesting that provide an alternate water supply. Tucson Water will strive for better coordination with other agencies,

departments, and organizations to holistically evaluate these non-traditional programs. This includes assessing green infrastructure, the urban heat island effect, etc., and evaluating the costs associated with efficient water use to improve the community's quality of life.

Water Conservation Planning Process

In 2015, Tucson Water will lead a planning process to develop a new water conservation plan for the City of Tucson and the Tucson Water service area. This process is estimated to take the duration of the 2015 and 2016 fiscal years, will include significant stakeholder engagement and technical analysis and will follow best practice guidelines for water conservation program planning established for the water conservation field. There is a need for a new water conservation plan because the Community Conservation Task Force Report published in 2006, which has been the basis of conservation planning decisions over the last decade, is based on outdated planning assumptions related to growth and water use patterns.

The resulting planning document will be a water conservation plan with a five-year planning horizon that restates conservation goals, evaluates conservation activities, and identifies priority conservation measures that will help meet conservation goals into the short and intermediate future. The plan will also help to better manage staffing resources and facilitate the annual budget process. This plan will be consistent with the Tucson Water Long Range Water Plan that was published in 2000 and updated in 2012, and will support the Integrated Resource Planning process that Tucson Water efforts are based upon.

Tucson Water is a member of the Alliance for Water Efficiency, which promotes the efficient and sustainable use of water. As Alliance members, Tucson Water will utilize their Water Conservation Tracking Tool, which is an Excel-based model that evaluates water savings, costs, and benefits of various conservation programs. Based on Tucson-specific information, the model provides a standardized methodology for water savings and benefit-cost accounting.

Lastly, objectives established by staff for FY 2014-15 were to increase participation in Tucson Water's incentive programs and continue to reduce Tucson's gpcd to be consistent with the Water Plan: 2000-2050, ensuring per capita water use does not exceed projections. The strategy was to strengthen the marketing approach for all programs. Additionally, the rebate application processes were reviewed and streamlined to reduce staff time and make it easier for customers to participate in the programs. This was accomplished by setting a single price for the HET rebates.

Objectives for FY 2014-15 were attained:

- Overall participation for the HET programs (rebate incentive programs) increased 25 percent from FY 2012-13 to FY 2013-14 and 17 percent from FY 2013-14 to FY 2014-15.
- Tucson's gpcd decreased from 127 to 124 in 2014 and is expected to continue to decrease for 2015.
- Changes were made to the HET rebate programs to streamline the application process.

Efficiency Programs – Incentives and Rebates[4]

To ensure that the water conservation strategies selected for implementation were both effective and broadly supported by the community, a Community Conservation Task Force (CCTF) was established by Tucson Water in the summer of 2005. Members of the CCTF represented a wide range of community stakeholders.

The mission of the CCTF was to *"Ensure community involvement in the development of a water conservation program strategy that will provide measurable water savings, consistent with the Long Range Water Plan."*

To that end, in 2006, the CCTF prepared a recommendations report that included a benefit-cost analysis of 48 different conservation measures. For each program, benefit-cost ratios (BCRs) were calculated from three perspectives (Utility, Participant, and Total Resource Cost). In each case, the BCR is calculated as the present value of the program benefits divided by the present value of the program costs. The BCR ratio, established in the CCTF, must be greater than or equal to 1.0, meaning benefits must equal or outweigh costs.

Utility perspective benefits are the reductions in utility revenue requirements that result from the program. Participant perspective benefits are the reductions in a participating customer's utility bill due to reduced consumption. Total Resource Cost (TRC) perspective benefits reflect the total economic resources which are expended for the program, whether they are borne by utility or not. The TRC ratio, established in the CCTF, must be greater than or equal to 0.6, allowing for various environmental and community factors to be included that are hard to quantify.

The only programs for which the Total Resource Cost benefit-cost ratios met the threshold are the HET rebates. The rainwater harvesting rebate program has a relatively low benefit to the Utility and a very high benefit to the participant. Efficiency programs shall be evaluated to ensure that water savings are cost-effective

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 consumption statistics by customer class reveal that residential customers consume 57 percent of all water consumed, while multi-family consumes 20 percent. The combined usage for commercial and industrial class accounts for 23 percent of the total water usage.

Table 4 lists current and new incentive programs by customer class; Figure 5 shows FY 2014-15 water savings by customer class; Figure 6 shows FY 2014-15 estimated expenditures by customer class.

	Single-Family 57%	Multi-Family 20%	Commercial 23%
Indoor	HET Rebate	HET Rebate	HET & Urinal Rebates
Outdoor	Gray Water Rebate	Irrigation Upgrade	Irrigation Upgrade
	Rainwater Harvesting		
New FY 15-16	Clothes Washer	Commercial Rebate	Commercial Rebate

Table 4: Distribution of Programs by Customer Class

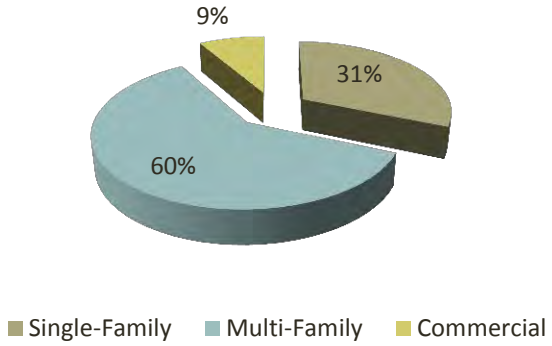

Figure 5: FY 2014-15 Water Savings by Customer Class

[4] The numbers and expenditures provided in this section are for operating purposes and reflect when the item/rebate or expenditure was approved and not when paid. This report is an operational report and not intended to reconcile with financial reports.

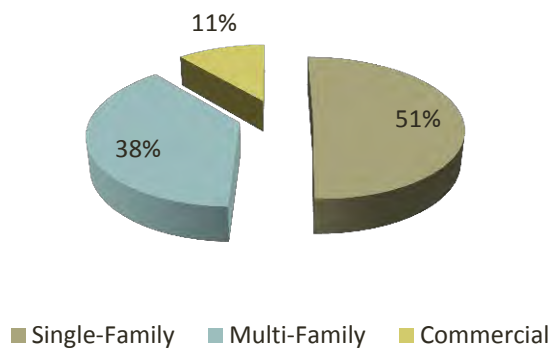

Figure 6: FY 2014-15 Expenditures by Customer Class

Table 5 reports the rebates processed for each efficiency program by **calendar year**; Table 6 reports the rebates processed for each efficiency program by **fiscal year**.

	2009	2010	2011	2012	2013	2014	2015[5]	Total
Single-Family HET[6]	1,794	2,774	2,166	1,762	2,477	2,279	985	14,237
Multi-Family HET[6]	149	376	282	1,938	5,097	4,382	4,809	17,033
Commercial HET[6]	116	351	586	195	259	172	392	2,071
High-Efficiency Urinal[6]	0	0	16	0	43	282	209	550
Gray Water[7]	0	0	7	9	11	21	18	66
Irrigation Upgrade[8]	1	4	7	8	2	9	0	31
Low-Income HET[9]	58	1,132	202	519	926	946	549	4,332
Rainwater Harvesting[7]	0	0	0	141	313	275	108	837

Table 5: Total Rebates by Calendar Year

	08/09	09/10	10/11	11/12	12/13	13/14	14/15	Total
Single-Family HET[6]	353	2,959	2,629	1,716	1,916	2,493	2,171	14,237
Multi-Family HET[6]	11	378	284	1,237	3,638	4,906	6,579	17,033
Commercial HET[6]	3	428	382	345	136	361	416	2,071
High-Efficiency Urinal[6]	0	0	10	6	3	108	423	550
Gray Water[7]	0	0	2	9	11	10	34	66
Irrigation Upgrade[8]	0	1	10	3	7	10	0	31
Low-Income HET[9]	0	484	808	288	840	871	1,041	4,332
Rainwater Harvesting[7]	0	0	0	0	296	272	269	837

Table 6: Total Rebates by Fiscal Year

[5] Quantity through June 30, 2015.
[6] The single-family HET, multi-family HET, commercial HET, and urinal are the number of fixtures replaced.
[7] The gray water and rainwater harvesting are the number of applications approved.
[8] The irrigation upgrade is the number of unique properties participating in the program.
[9] The low-income HET program is a direct install program and not a rebate program.

Table 7 reports the expenditures for each efficiency program by fiscal year; Figure 7 shows the percentage of expenditures by program, and Figure 8 shows the estimated water savings by program.

	08/09	09/10	10/11	11/12	12/13	13/14	14/15	Total
SF HET	$30,036	$254,688	$213,543	$142,812	$155,473	$202,160	$175,923	$1,174,635
MF HET	$705	$29,033	$21,329	$119,347	$358,485	$490,506	$645,690	$1,665,095
Comm. HET	$299	$37,985	$36,688	$25,086	$12,948	$28,886	$33,554	$175,446
HEU	n/a	n/a	$2,000	$1,200	$900	$52,400	$156,300	$212,800
Gray Water	n/a	n/a	$265	$1,566	$4,144	$4,678	$14,095	$24,749
Irrigation	n/a	$31,089	$52,770	$29,792	$48,964	$83,676	$600	$246,890
Subtotal	$31,040	$352,794	$326,595	$319,803	$580,914	$862,306	$1,026,087	$3,499,615
LI HET[10]	$367	$213,720	$301,684	$110,379	$301,034	$313,116	$325,024	$1,575,324
RWH	n/a	n/a	n/a	n/a	$349,460	$354,538	$327,145	$1,031,143
Total	$31,407	$566,514	$628,279	$430,182	$1,231,409	$1,529,960	$1,688,331	$6,106,081

Table 7: Rebate Expenditures by Fiscal Year

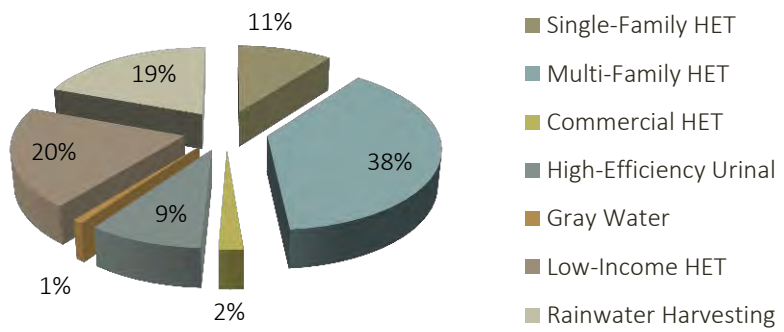

Figure 7: FY 2014-15 Expenditures by Program

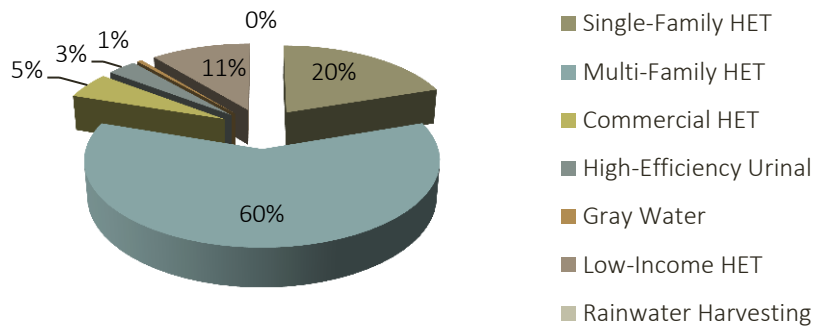

Figure 8: FY 2014-15 Water Savings by Program

[10] The budget for the low-income HET direct install program is combined from two object codes. Toilet installation is categorized in professional services and the cost of the toilet and misc. materials is categorized in materials. All other rebate program expenditures are in the object code for efficiency programs. Object codes are the term Tucson Water uses for how expenditures are assigned and processed.

Single-Family HET Rebate

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

This rebate program is designed to encourage single-family residential customers to retrofit older 3.5 or more gallons-per-flush (gpf) toilets with high-efficiency models. Only WaterSense certified high-efficiency toilets qualify for the rebate, which uses 1.28 gpf or less.

FY 2014-15 Activity:		Cumulative:
Number of HETs Retrofit:	2,171	14,237
Expenditure:	$175,923	$1,174,635
Estimated Gallons Saved:	16.2 million	397.6 million
Estimated Acre-Feet Saved:	50	1,220
Staff Labor Hours:	2,180	

In an effort to streamline the application process, create a more equitable rebate, and eliminate confusion for participants, the rebate was changed to $75 per retrofit limited to two HETs per household. The change became effective March 1, 2015. The previous rebate allowed Tucson Water customers to receive 50 percent of the purchase price, with a maximum rebate of $120 per HET and a maximum rebate of $200 per household if multiple HETs were installed. This structure had been very confusing to the participants as to how much their rebate will be and calculating the rebates was time consuming. Additionally, the rebate favored a larger return for those who can afford to replace their toilets and buy more expensive products. Toilets on the market that are WaterSense certified are available at all price-points.

Toilet water use is the highest of all indoor water use in most single-family homes and contributes to 20 percent of all use. Retrofitting toilets saves on both the water and sewer bills.

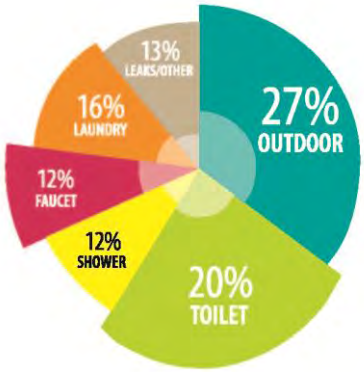

Figure 9: Typical Single-Family Water Use

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.

Included in Appendix D is a map of single-family HET retrofits and low-income HET direct installs.

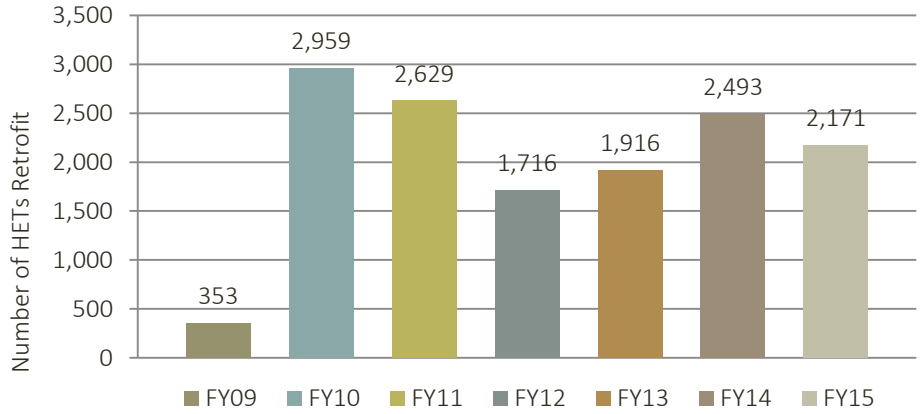

Figure 10: Single-Family HET Rebates by Fiscal Year

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 gallons-per-flush toilets with high-efficiency models. Only WaterSense certified high-efficiency toilets qualify for the rebate, which use 1.28 gallons per flush or less.

FY 2014-15 Activity:		Cumulative:
Number of HETs Retrofit:	6,579	17,033
Expenditure:	$645,690	$1,665,095
Estimated Gallons Saved:	49.2 million	269.5 million
Estimated Acre-Feet Saved:	151	827
Staff Labor Hours:	213	

In an effort to streamline the application process and create a more equitable rebate between classes, the rebate was changed to $75 per retrofit to match the single-family rebate. The change became effective March 1, 2015. The previous rebate allowed Tucson Water customers to receive 75 percent for the purchase price, with a maximum rebate of $100 per HET. Previously, most applicants received the full rebate because installers inflated the cost of the HET on the invoice to maximize the rebate.

Multi-Family HET Retrofit Savings:
From Tom Arnold, Tucson Water, Management Analyst – 10.28.14

The multi-family savings originate from the original CCTF study which used the same toilet utilization rates, the persons per household, and the toilets per household as an ultra-low flush toilet (ULFT) program and increased the savings by 6 gallons per day from the ULFT to the HET. We have not tried to update this number since then and have not attempted to do any empirical work in trying to measure the change in demand of participants. The equation for this savings number is listed on page 75 of the CCTF report; however, the savings number of 42.5 gpd may represent the savings per house or dwelling instead of the savings per toilet. For this reason, staff does not feel 42.5 gpd is a good number to use for per unit savings of multi-family replacements. Instead, the single-family savings number of 20.5 gpd (7,482.5 gallons per annum) is used to calculate multi-family savings estimates.

Included in Appendix D is a map of multi-family and commercial HET retrofits combined with HEU retrofits.

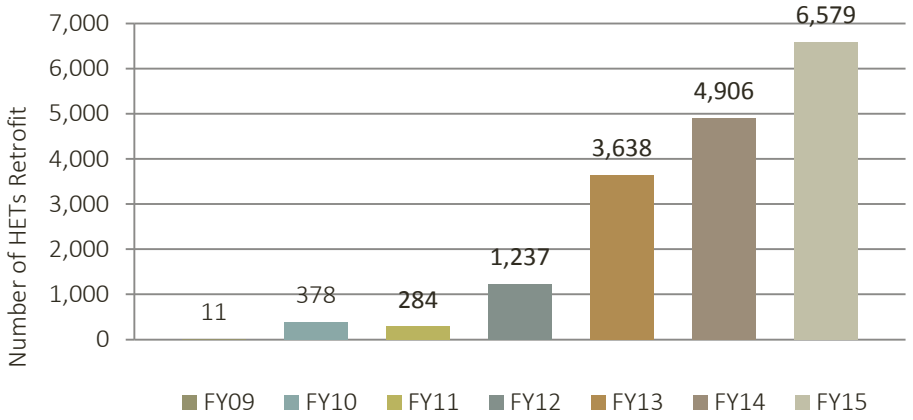

Figure 11: Multi-Family HET Rebates by Fiscal Year

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 gallons-per-flush toilets with high-efficiency models. Only WaterSense certified 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 gallons per flush or less.

FY 2014-15 Activity:		Cumulative:
Number of HETs Retrofit:	416	2,071
Expenditure:	$33,554	$175,446
Estimated Gallons Saved:	4.3 million	75.9 million
Estimated Acre-Feet Saved:	13	233
Staff Labor Hours:	64	

In an effort to streamline the application process and create a more equitable rebate between classes, the rebate was changed to $75 per retrofit per gravity-tank type and pressure assist-tank type toilets and $150 for flushometer-valve type toilets. The change became effective March 1, 2015. The previous rebate allowed Tucson Water customers to receive 75 percent for the purchase price, with a maximum rebate of $100 per HET, which was the same as the multi-family HET program.

Estimated water savings in nonresidential market segments is not the same. Typically, the greatest water savings can be achieved in restaurants, bars, and retail establishments with the least savings achieved in health-care facilities, offices, and hotel/motels. Furthermore, commercial applications include more types of toilets: the less expensive gravity-tank type and the pressure assist-tank type toilets and the flushometer-valve type toilets that cost more to retrofit. The flushometer-valve type toilets typically save more water because they are found most often in public restrooms that receive more use.

Commercial HET Retrofit Savings through FY 2014-15:

Adjusted from 2006 CCTF Report. Tucson area commercial, industrial, and institutional (CII) Toilet Savings weighted average is 28 gpd (10,220 per annum) for each unit. The weighted average value of 23.3 gpd was calculated for ULFT rated at 1.6 gpf *(see Table 8)*. HETs are 1.28 gpf or a 20 percent reduction in flush volume. A 20 percent additional savings was added to the 23.3 gpd savings, for a total HET savings of 28.0 gpd and is applied to the CII toilet rebate program to determine program savings.

Future Commercial HET Retrofit Savings 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. Flushometer-type tanks predominantly found in the retail and restaurant sector have higher savings per unit. A weighted average of 41.64 gpd was calculated for the Retail and Restaurant sectors and the weighted average for the remaining sectors is 19.1 gpd. These estimates were based on ULFTs (1.6 gpf), so a 20 percent 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. Therefore, new calculations for determining water savings for each 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.

Included in Appendix D is a map of multi-family and commercial HET retrofits combined with HEU retrofits.

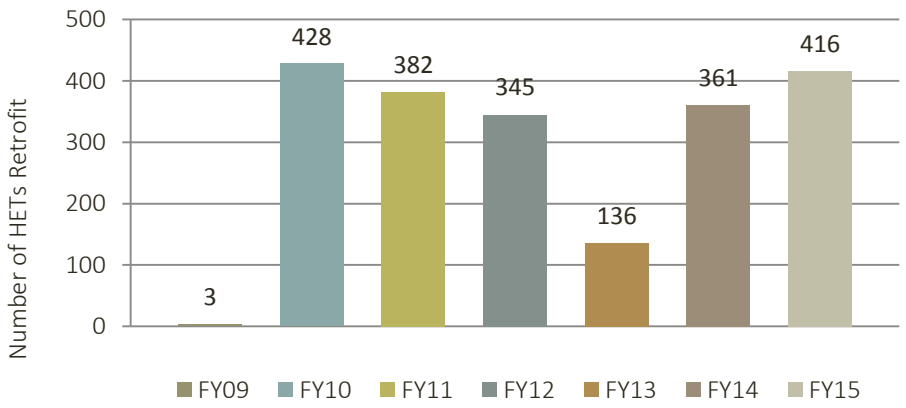

Figure 12: Commercial HET Rebates by Fiscal Year

Toilet Count by Sector	# Toilets	GPD savings per ULFT	Daily savings by Sector
Industrial	1,915	23	44,045
Retail	10,008	40	400,320
Restaurants	3,073	47	144,431
Office	12,311	20	246,220
Health care	6,198	21	130,158
Church	1,176	28	32,928
Government	1,620	25	40,500
Other	6,936	18	124,848
Hotels	6,384	16	102,144
Schools: 9-12	933	18	16,794
Schools: K-8	19,871	18	357,678
	70,425	Weighted avg savings (gpd)	23.29

Table 8: CII Toilet Savings table reproduced from CCTF Planning Report, 2006 (p. 48)

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 2014-15 Activity:		Cumulative:
Number of HEUs Retrofit:	423	550
Expenditure:	$156,300	$212,800
Estimated Gallons Saved:	2.6 million	4.5 million
Estimated Acre-Feet Saved:	8	14
Staff Labor Hours:	98	

Because the participation was low, beginning January 2013, the rebate was increased from $200 to $500 and the range of options expanded to include all WaterSense-certified as well as waterless models. The rebate was changed back to $200, which is more in line with the commercial HET rebate. The change became effective March 1, 2015.

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, currently being used by Tucson Water staff for conservation planning purposes. This number compares closely with a study completed in California that looked at potential savings from large-scale urinal retrofits.

Included in Appendix D is a map of multi-family and commercial HET retrofits combined with HEU retrofits

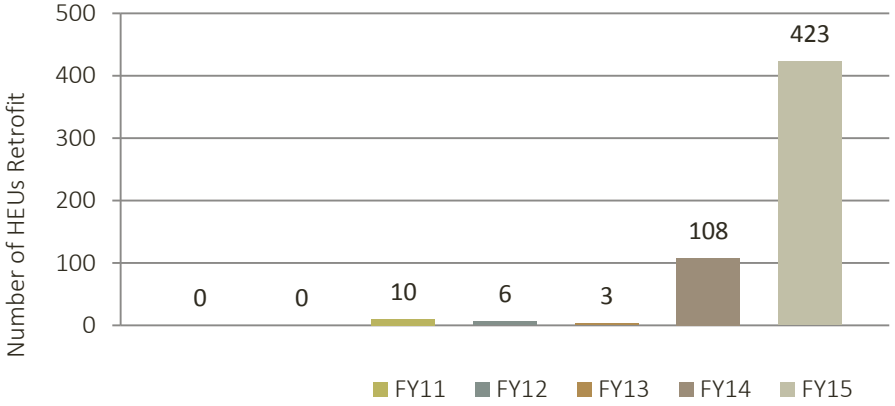

Figure 13: High-Efficiency Urinal Rebates by Fiscal Year

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.

FY 2014-15 Activity:		Cumulative:
Approved Applications:	34	66
Expenditure:	$14,095	$24,749
Estimated Gallons Saved:	462,910	1.8 million
Estimated Acre-Feet Saved:	1	6
Staff Labor Hours:	57	
Workshops:	8	
Workshop Attendees:	125	

To be eligible for the gray water incentive rebate program, applicants must attend a two-hour workshop. Eight workshops were held this fiscal year with a total of 125 people attending. Qualifying workshops were offered through SmartScape and Watershed Management Group. The Community Food Bank has expressed interest in offering qualifying workshops in both English and Spanish.

Of the total amount of waste water generated in a typical home, clothes washers, showers, and hand-washing sinks, 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.

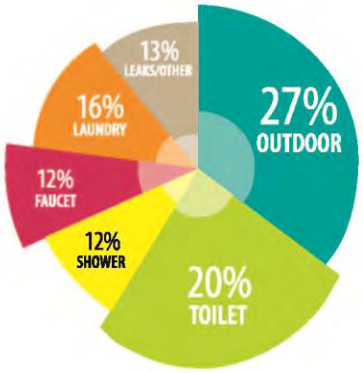

Figure 14: Typical Single-Family Water Use

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).

Preliminary results for 9 participants in 2011 and 2012 show a water reduction of 17 percent comparing 2010 usage to 2013. During the same time, all single-family reduced water use by 8 percent. The participants saw significant declines in water use during the summer months of 2013 of as much as 30 percent compared to 2010.

Included in Appendix D is a map of gray water and rainwater installations.

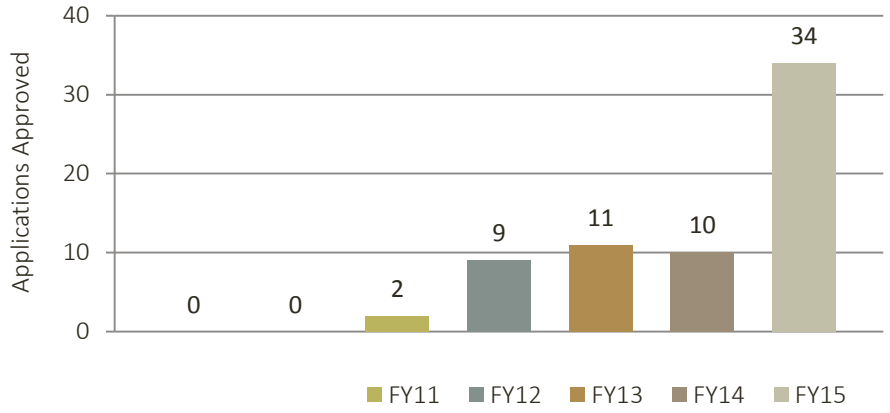

Figure 15: Gray Water Rebates by Fiscal Year

Irrigation Efficiency Incentives Program

Implementation date: July 7, 2008; modified fall 2014

The Irrigation Efficiency Incentives Program, formerly Irrigation Upgrade Rebate Program, introduces multi-family and commercial water customers to the concepts of irrigation efficiency and uniformity. Water customers learn how to fine tune, upgrade, and maintain their in-ground irrigation system to be more efficient resulting in healthier plants and save water. Participants will qualify for irrigation system upgrade rebates up to $10,000.

Water Conservation staff (or contractor) will evaluate existing irrigation systems and make recommendations to improve system efficiency. Staff (or contractor) will show owners and maintenance personnel how to use existing irrigation equipment more efficiently and how to upgrade the system. The goal is to optimize irrigation equipment performance, which improves distribution uniformity and lowers water application rates, resulting in shorter watering times, less waste, and lower water bills.

The revised program is more prescriptive than in the past; participants were on their own to increase distribution uniformity. The new program will identify specific problems with the irrigation system and the rebate will be proportionate to the amount of repairs and improvements completed. The evaluation will also identify the opportunity to install water saving devices such as rain, soil moisture, and flow sensors as well as weather-based irrigation controllers.

Two audits were conducted to test the revised program. Several issues were revealed. One of the most common issues with sprinkler system performance is caused by angled or low sprinklers. This is caused by poor maintenance and heads not being compacted after replacement. Other issues include incorrect nozzles on spray heads and rotors and mixed brands on the same zone. Lastly, zones were identified that have mixed technologies such as sprays and rotors on the same zone and very poor spacing of the sprinkler heads.

The best way to deal with these issues is education. Contractors will be required to attend a workshop and be certified before they are allowed to complete repairs for the rebate. They will be instructed on the proper way to lower, raise, and straighten sprinkler heads, install the correct nozzles, and how to correctly space sprinkler heads.

Irrigation Efficiency Incentives Savings:
The calculation for determining water savings for each rebate is 630 gpd or 229,950 gallons per annum.

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 2014-15 Activity:		Cumulative:
Number of HETs Retrofit:	1,041	4,332
Expenditure:	$325,024	$1,575,324
Estimated Gallons Saved:	8.9 million	114.9 million
Estimated Acre-Feet Saved:	27	353
Staff Labor Hours:	148	

The U.S. Department of Housing and Urban Development (HUD) State Income Limits are used for the low-income HET replacement program. The HUD median family income for Arizona is established each year, and 80 percent of that value is the maximum allowed to be considered low-income.

The HET Replacement program is available to all owner-occupied households that report an annual income of 80 percent area median income (AMI) or less. A City of Tucson and Pima County HUD report[11] published in 2015 reports that 66 percent of homes in Pima County are owner-occupied and 34 percent are renter-occupied. Tucson Water has approximately 203,000 single-family customer accounts and based on the report findings, about 134,000 (66%) of these single-family accounts are owner-occupied. Based on Table 9, 27 percent of owner-occupied, single-family customers would have an income threshold of 80 percent AMI or less, which is currently the cutoff for Low-Income HET replacement. Given these assumptions, 36,180 owner-occupied, single-family customers would be eligible for HET replacement.

[11] DRAFT City of Tucson and Pima County Consortium 02/19/15 Federal Fiscal Years 2015-2019 HUDG Consolidated Plan: http;//www.tucsonaz.gov/files/hcd/3-25-2015_CityofTucsonandPimaCounty5-yearHUDConsolidatedPlanPublicDommentDraft.pdf

Of the 3,212 HET retrofits in owner-occupied, single-family homes for FY 2014-15, 32 percent (1,041) were for low-income. This amount slightly exceeds the 27 percent of available low-income homes, which indicates the program is on target with HET retrofits within Tucson Water customer accounts.

AMI Threshold	<30% AMI	30-50% AMI	50-80% AMI	80-100% AMI	>100% AMI
# Owner-Occupied Homes	8,040	10,720	17,420	12,060	85,760
% of Owner-Occupied Homes	6%	8%	13%	9%	64%

Table 9: Estimated Owner-Occupied Tucson Water Customer Accounts, Projected from HUD Plan

Tucson Water purchases the HETs and the non-profit Community Home Repair of Arizona (CHRPA) verifies participants and does the installation. Tucson Water provides financial assistance for the reimbursement of HETs installed. The cost to Tucson Water is $200 for one HET replacement and $100 for the second HET, or $300 for two HETs.

Additionally, in fiscal 2012-13, Tucson Water expanded the scope of the program to include supplying materials for repairing water supply leaks in the homes. CHRPA uses the materials to repair leaks including faucets, tub/shower valves, main or secondary water lines. They have also repaired many toilets that did not qualify for replacement. For these water supply repairs, Tucson Water has provided materials, and has not paid for the installation or labor.

Promotion of this program has been through several means:

- Flyer distribution at eligible mobile home parks and townhouse developments
- Craigslist listing under “For Free” or “Household items”
- Public Service Announcements
- In-field assessments by CHRPA staff and volunteers
- Neighborhood *Prometores* of the Sonoran Environmental Research Institute
- Promotional materials at service fairs

- Tucson Water promotion at public outreach events and in the "message" area on water bills
- NewsNet for City Employees
- Ward Office newsletters

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.

Included in Appendix D is a map of single-family HET retrofits and low-income HET direct installs.

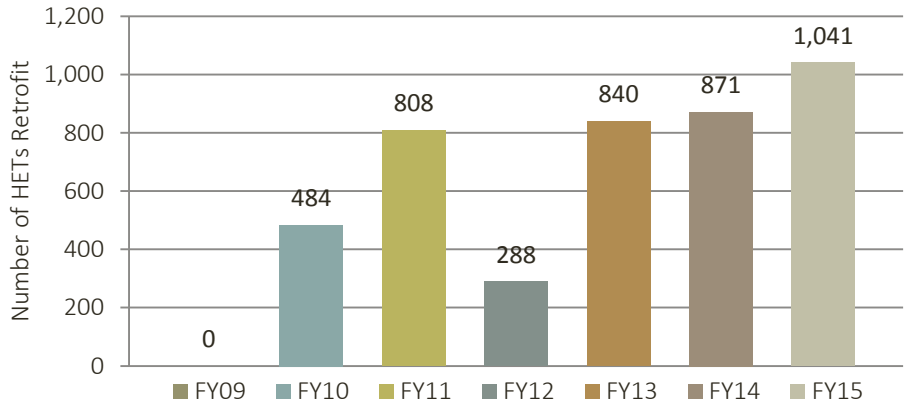

Figure 16: Low-Income Direct Installs by Fiscal Year

New Programs

Clothes Washer Rebate (Pilot)

Scheduled to start August 1, 2015

Clothes washing is the second-largest water user in most single-family households with an estimated seven loads per week. On average, 16 percent of residential water used goes to laundry. A household of four typically can generate more than 300 loads per year. This equates to saving more than 7,000 gallons of water and 352 kWh of energy per year.

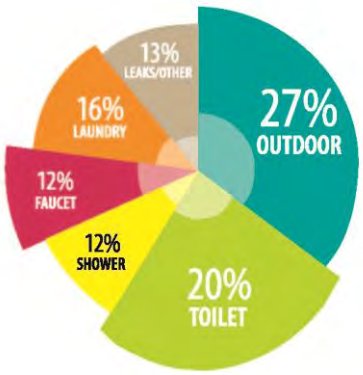

Figure 17: Typical Single-Family Water Use

The Consortium for Energy Efficiency (CEE) specifies tiers of efficiency based on both water and energy use so that rebate programs and manufacturers can work together to offer efficient products. Clothes washer efficiency is based on an integrated Modified Energy Factor and an Integrated Water Factor. The Integrated Modified Energy Factor is a ration that calculates the capacity of the clothes container divided by the total clothes washer energy consumption per cycle and a higher number indicates lower consumption and more efficient use of energy. The integrated Water Factor is a ratio that calculates the number of gallons of water needed for each cubic foot of laundry and a lower number indicates lower consumption and a more efficient use of water. Based on the water factor, high-efficiency clothes washers are divided into three tiers, with Tier 2 and 3 being the most efficient and Tier 3 machines are the most energy efficient. Tier 2 and 3 clothes washers use less than 15 gallons per load compared to typical top-loading models that use 40 or more gallons per full load. A Tier 2 or 3 high-efficiency clothes washer can reduce water use by 85 percent. For more information, visit cee1.org.

Beginning August 1, 2015, Tucson Water will offer single-family residential customers a $200 rebate for purchasing a new Tier 2 or 3 high-efficiency clothes washer. The rebate is designed to offset the difference between purchasing conventional clothes washers and high-efficiency models.

An important component of messaging for the Clothes Washer Rebate Program is providing point-of-sale displays and working with sales representatives. Displays are stocked with brochures and rebate applications, and sale representatives are provided a binder with information about the program to better serve their customers.

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.

Commercial Rebate (Pilot)

Start to be determined, 2015

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.

The Commercial Rebate Program will be linked to the WaterSmart Business Program and to the Drought Preparedness and Response Plan. If a shortage is determined for the Colorado River, a Stage 2 drought response will be triggered. For commercial customers using more than 325 Ccf/month, water audits must be conducted and water management plans will need to be developed. This program is designed to assist them with meeting that requirement. To qualify for a commercial rebate, participants will participate in the WaterSmart Business Program and have Tucson Water staff or a professional auditor under contract with Tucson Water conduct an audit of the property. The results of the audit will determine the potential for saving water, and the rebate will be based on the amount of water saved.

All retrofits that can prove real water savings will be considered for a rebate excluding the HET, urinal, and clothes washer rebates already in place.

Rainwater/Stormwater Programs

Both rainwater and stormwater harvesting create alternative water supplies. Active rainwater harvesting refers to a 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. Reducing stormwater flows is often a main impetus of rainwater roof collection in urban settings.

Stormwater harvesting is a term that refers to rainwater collected from non-roof surfaces, such as parking lots, hardscapes, and landscapes. Strategies to capture and utilize this water include, landscaping designs to retain water in soil, semi-porous hardscape material, and curb cuts.

Rainwater and stormwater programs are not considered demand management programs. Rainwater is not a reliable source of water. To properly evaluate its application and benefits, one must consider the frequency of local rain events that occur.

Rainwater Harvesting Incentives Program (3rd Year Pilot)

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

FY 2014-15 Activity:		Cumulative:
Approved Applications:	269	837
Expenditure:	$327,145	$1,031,143
Estimated Gallons Saved:	0[12]	0[12]
Estimated Acre-Feet Saved:	0[12]	0[12]
Staff Labor Hours:	231	
Workshops:	27	123
Workshop Attendees:	888	3,034

[12] Preliminary tracking of water use for systems installed in 2012 are not showing an overall reduction in water use. 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.

The single-family residential rainwater harvesting incentives program was introduced in June 2012, retroactive to September 27, 2011. The program was expanded July 1, 2015, to include curb cuts/core drilling and small commercial customers. As shown in Table 3, this program is the most expensive and preliminary tracking of water use for systems installed in 2012, are not showing an overall reduction in water use at the water meter.

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

- Level 1 –Simple/Passive will rebate 50 percent of the cost of eligible material and labor up to $500
- Level 2 – Complex/Active System will rebate system costs up to $2,000 based on gallon capacity:
- $0.25 per gallon capacity of 50-799 gallon rain tank
- $1 per gallon capacity of 800 gallon and larger rain tank

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. Twenty-seven workshops were held this fiscal year and 888 people attended. Qualifying workshops were offered through SmartScape and Watershed Management Group. Tucson Water is working with the Community Food Bank and Southern Arizona Rain Gutters Inc. to qualify rainwater harvesting workshops for the program.

Thirty-seven percent of applicants are attending the workshop after the system has been installed. This number is important because these applicants are not receiving the full benefit from the workshop and most likely are attending just to receive the rebate.

A workshop working group was formed to create a PowerPoint template for the workshops. The template will be used by all presenters so anyone attending a rainwater harvesting workshop receives the same information. The PowerPoint template will be translated to offer workshops in both English and Spanish.

The program promotes the use of gravity fed systems. If a pump is used to distribute the rainwater, a reduced pressure assembly (RPA) must be installed on the service connection to protect the public drinking water system from potential contamination.

The rainwater harvesting incentives program is at the end of the pilot phase. The program will be evaluated for effectiveness. The measure of program effectiveness will be based on three criteria:

- Water Savings – realized water savings based on historical usage and a comparison to a control group
- Participation – workshop participants, applications, and spatial distribution
- Cost-Benefit Analysis – costs, benefits, and payback period

Rainwater Harvesting Savings:
Preliminary tracking of water use for systems installed in 2012 are not showing a net reduction in water use compared to two control groups (all single-family and high use). Tucson Water staff is working with other city departments and agencies to identify and quantify additional benefits beyond water savings such as reduced flooding and improved water quality related to storm water reduction.

Included in Appendix D is a map of gray water and rainwater installations.

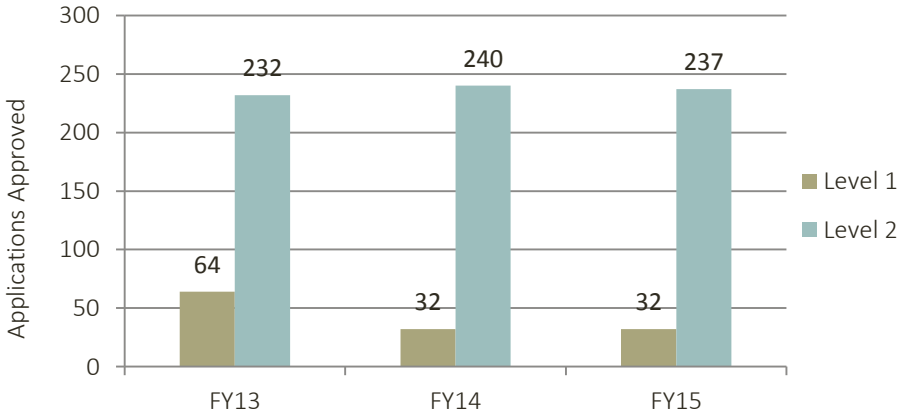

Figure 18: Rainwater Harvesting Rebates by Fiscal Year

Water Harvesting Demonstration Sites

Stakeholder groups involved in the creation of the Residential Gray Water Ordinance and the Commercial Water Harvesting Ordinance (and Development Standard) identified a need for Demonstration Projects to aid in education of the public affected by these ordinances. In addition, establishment of Pilot Projects to analyze various techniques and technologies related to gray water and rainwater harvesting systems was also identified as necessary to ensure successful implementation of the ordinances.

Prioritization of Projects for Funding

Demonstration Projects: Projects designed to educate the public on the various methods, techniques, and technologies that are available for harvesting of rainwater. Priority was given to sites that offer public access; provide educational opportunities, including signage, printed materials, and tours; and emphasize meeting requirements established in rainwater harvesting ordinances.

There are currently 16 demonstration sites throughout Tucson that familiarize residents with a variety of rainwater harvesting and usage techniques and designs.

All sites had until the end of June 2015, to be completed. A website featuring a guided tour of the sites is near completion.

Blue Moon Community Garden

1501 N Oracle Road
$19,000
Description: This repurposed parking lot hosts both active and passive rainwater harvesting systems. The garden collects nearly 45,000 gallons of rainwater a year from the adjacent 17-story Tucson House apartment complex roof and an additional 2,200 gallons of rainwater from the garden ramada roof. The rainwater irrigates fruit trees and landscapes plants. Notable features include a layout completely accessible to people with disabilities, green space for recreation, and fresh food supply in an area designated as a "food desert."

The irrigation design incorporates flow sensors, soil moisture sensors, and a smart controller.

Figure 19: Blue Moon Community Garden

Christopher Franklin Carroll Centennial Park

NW Corner of Main and Paseo Redondo
$9,934
Description: Centennial Park is a collaborative public private partnership to create a pedestrian oasis for citizens and visitors, featuring a curving walkway, benches, panels to interpret Tucson's rich history and low-impact development and green infrastructure techniques. This "pocket park" and rainwater harvesting demonstration site, highlights the 4,000 years of continuous agricultural history in Tucson. Design features include historic markers and signage, gabion retention walls to make the site more usable, curb cuts to direct water off the street into the park, and a xeriscape garden with native and desert adapted plants.

Figure 20: Christopher Franklin Carroll Centennial Park

The Nuestra Tierra Garden at the Community Food Bank

3003 S Country Club Road
$9,736
Description: No matter the budget, or space available, the rainwater harvesting demonstration gardens at the Community Food Bank have techniques to illustrate how everyone can effectively harvest and use water for urban agriculture and landscaping.

There are two main demonstrations on-site, one for commercial customers and the other for residential customers; however, the design principles of each are interchangeable. The more commercially-designed demonstration includes a 14,000 gallon cistern which catches rainwater from the food bank and is used to water native and desert adapted plants. This area also includes a passive terrace catchment system. The more residentially-designed demonstration illustrates various ways to capture rainwater for agricultural purposes, including cost-effective "rain jars" (approximately $50 to make and install yourself), water efficient planters, and a number of rainwater and gray water irrigation systems to water native and agricultural plants farmed in a passive rainwater terrace system.

Figure 21: Community Food Bank

The Nuestra Tierra garden is a public site where community members learn desert organic gardening methods by getting their hands dirty. This garden includes sunken veggie beds with drip irrigation, a hen house, olive, fig, and pomegranate trees, worm bins, and a composting station. The overflow from the cistern flows into a series of mulched basins with native plants.

Ewing Irrigation

4250 S Station Master Drive
$0
Description: This commercially designed demonstration site features a large cistern for rainwater captured from the roof. The water captured is used to support native and desert adapted landscaping. Other prominent features include large swales at various locations around the site that provide additional opportunities to capture rainwater for landscaping purposes.

Food Conspiracy Co-op Garden

725 E Seventh Street (Administration Building)
$10,029
Description: This rainwater harvesting demonstration site hosts a 2,500 gallon cistern for rainwater captured from the administration building of the Co-op. The rainwater is used to support a vegetable garden, fruit trees, and native shade trees. The vegetable garden is planted in a sunken bed to take advantage of passive rainwater harvesting techniques.

The Food Conspiracy Co-op offers monthly orientation tours for new co-op owners. They also offer tours to visiting school children of all ages. Finally, the site is featured on an annual tour of backyard chicken coops, which highlight backyard sustainability projects like solar ovens, composting systems, and rainwater harvesting.

4th Avenue Bicycle Boulevard

(Grant to Fort Lowell Road –4th turns into Fontana north of Grant)
$11,903
Description: This rainwater harvesting demonstration site highlights the benefits of using rainwater to create a more comfortable and esthetic corridor for cyclists and pedestrians. Design features include traffic calming circles with curb cuts to capture rainwater that would otherwise flow off site. The rainwater captured is used to support the planting of large native shade trees. Additionally,

artwork has been woven into the cyclist route creating a unique sense of place.

Native Seeds/SEARCH

3584 E River Road
$10,239
Description: The use of passive and active rainwater harvesting systems is used to transform a once bare dirt courtyard to support the planting of a native vegetable garden, fruit trees, and a variety of native and desert-adapted plants. Design features include meandering swales and basins that capture rainwater from the roof and hardscape, cisterns fed from the gutters off the seed bank rooftop, and basins stocked with a variety of plants. Additionally, this project includes the installation of two cisterns to collect roof runoff from the Seed Bank building. One 1,000 gallon cistern on the south side of the building demonstrates a gravity fed system to water the vegetable demonstration garden. A second 2,000 gallon cistern built on the north side of the building is linked into the existing irrigation system to water fruit trees and demonstration gardens. The tanks will have the capacity to store water from 2 to 3 inches of rain.

The site is open to the public twice daily, once a month. During this time both self and guided tours are available.

Reid Park Zoo

1100 S Randolph Way
$3,825
Description: The Zoo's rainwater harvesting demonstration illustrates that by saving rainwater more water can be used for wildlife habitats. By collecting rainwater from building rooftops and storing it in cisterns, the Zoo is able to enhance its exhibits and save water. Look for the large cistern, several smaller "rain jars," and lots of educational signage about the importance of conserving water for people and the environment.

REPP Design and Construction Offices

2502 N First Avenue
$10,000
Description: This site is a laboratory for innovative architectural features and a demonstration of environmental techniques in the desert. This site utilizes passive solar principles, environmentally-appropriate materials, a photovoltaic system, and a rainwater harvesting system. The active rainwater harvesting system collects water from the roof which is funneled into a cistern that holds the water until it is used to support a palette of desert appropriate drought tolerate plants. The passive rainwater harvesting system includes basins planted with desert plants that line the streets and offer pedestrians a more aesthetic experience.

The site can be accessed during business hours Monday through Friday 8:00 - 4:00 for tours and demonstration purposes. Brochures and information are available in the office.

Tri-Sports.com

4495 S Coach Drive
$10,000
Description: This rainwater harvesting demonstration site highlights how commercial uses can beautify their site using rainwater. It utilizes two 18,000 gallon storage tanks, which catches rainwater from the 22,000 square foot roof and stores the water for use to support the plantings of native shade trees and a palette of appropriate desert-adapted plants that add intrigue into the landscape.

Figure 22: Tri-Sports

Tucson Botanical Gardens
2150 N Alvernon Way
$10,000
Description: Hosting both active and passive features, the Tucson Botanical Gardens offers gardeners techniques that can be learned and applied to their own homes and businesses. Active rainwater harvesting features include: french drains, two underground cisterns (which can capture up to 11,000 gallons of rainwater), and two above ground cisterns that harvest rainwater from a pavilion. The features are placed in areas to mimic appropriate usage on a residential scale.

Passive rainwater harvesting is showcased throughout 17 demonstration gardens. Berms and swales are present in nearly every section of the garden to assure maximum water absorption and direct runoff to the plantings that require the most water. Contouring of the gardens has been completed in an aesthetic manner to demonstrate that water harvesting methods can be visually pleasing as well as economical for the home gardener. The new water harvesting education project emphasizes the gardens' recently redesigned native crops gardens where the horticultural practices of traditional desert peoples, including tiered, canal-fed garden plots are demonstrated.

Tucson Botanical Gardens provides structured opportunities for learning about the world of plants and gardening. Self-guided activities are available seven days a week, 8:30 – 4:30. Community Education Programs include guided tours, classes, workshops and field trips, and community lectures on botanical and horticultural topics. Workshops and classes address responsible gardening and landscape design, plant selection, irrigation, composting, water harvesting, and other aspects of desert gardening.

Ward 1
940 W Alameda Street
$16,169
Description: The Ward 1 office underwent an "asphalt-diet," shrank the size of the parking lot, added in curb cuts, and created earthwork basins to passively capture rainwater. Additionally, an active system catches rainwater from the roof with a 5' x 8' (1,176 gallon) steel culvert. The water caught from both the passive and the active systems is used to support a native plant palette.

Figure 23: Ward 1

Ward 2
7575 E Speedway Boulevard
$9,175
Description: The Ward 2 office utilizes both active and passive harvesting systems in their rainwater harvesting demonstration. A large cistern stores rainwater captured from the roof. Basins that passively capture rainwater are planted with a variety of native plants. Benches are available to sit and enjoy the native plant life and sculptures.

Ward 3
1510 E Grant Road
$9,430
Description: The Ward 3 office utilizes both active and passive harvesting systems in its rainwater harvesting demonstration. A 5' x 6' (882 gallon) steel culvert style cistern stores rainwater captured from the roof. The former non-native, higher water-using plant selection was replaced with a variety of appropriate native plants. Removing asphalt created space for a series of earthwork basins that capture rainwater and are planted with an appropriate selection of native plants. Benches are available to sit and enjoy the native plant life and sculptures.

Ward 6
3202 E 1st Street
$9,850
Description: This rainwater demonstration site utilizes passive basins to capture rainwater which is used to support a native plant palette. A cistern is to be added which will capture rainwater from the

roof, capturing an additional water supply for landscaping purposes. Benches will also be available to sit and enjoy the space.

Additionally, remaining funds were used in neighborhood rights-of-way, which are highly visible and residents have the chance to learn about water harvesting and maintenance techniques through project participation.

Figure 24: Ward 6

Watershed Management Group
1137 N Dodge Road
$15,350
Description: This demonstration site uses both active and passive systems to capture an astonishing 77,500 gallons of rainwater. The rainwater captured supports native trees, fruit trees, a vegetable garden, and there is even some water left over that is filtered for drinking. This unique five-acre site once belonged to a devoted conservationist, and was willed to the Watershed Management Group, who now operates the site as an education center.

Above ground rainwater catchment is demonstrated with both steel and plastic tanks, and below ground rainwater catchment is demonstrated through a 10,000 concrete tank. All the tank systems demonstrate use at commercial sites, and the underground tank demonstrates use with limited space.

The site is open to visitors during regular business hours, Monday through Friday 9AM-5PM. Guided tours are scheduled on 2nd Saturdays. Visit watershedmg.org for a schedule of upcoming tours as well as monthly rainwater and greywater classes held at the site.

Community Education Programs

Tucson Water continues to support three contracts 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. Table 10 references program costs since FY 2008-09, giving an indication of the expansion of the education programs in Tucson over the last seven years.

In FY 2015-16, Tucson Water will expand the adult education program with Contractor Landscape Irrigation Training & Certification. Tucson Water will offer Irrigation Association (IA) developed training to address inefficiencies in landscape irrigation systems. Participants will have the opportunity to become certified with the IA after completing the training. Classes will include:

- Advanced Irrigation Design for Water Conservation
- Irrigation System Installation & Maintenance
- Landscape Drip Design
- Landscape Irrigation Auditor
- Landscape Irrigation Design
- Smart Technologies for Irrigation Management

	APW	EEExchange	SmartScape	Total
FY 2008-09	$26,839	$26,400	$37,064	$90,303
FY 2009-10	$65,997	$125,350	$31,802	$223,149
FY 2010-11	$58,351	$113,750	$184,201	$356,302
FY 2011-12	$69,107	$162,505	$192,237	$423,849
FY 2012-13	$136,522	$114,400	$213,764	$464,686
FY 2013-14	$206,082	$159,785	$171,573	$537,440
FY 2014-15	$203,052	$144,565	$188,034	$517,975

Table 10: Education Program Costs by Fiscal Year

Arizona Project WET (APW)

Tucson Water and The University of Arizona Water Resources Research Center (WRRC) established the first intergovernmental agreement (IGA) with APW in 2006, sponsoring nine workshops and reaching a total of 108 teachers. Participating teachers reported reaching 5,506 students. Since 2006, the program has expanded to reach more than 500 teachers and 26,000 students annually. Additionally, since 2006, with Tucson Water's collaboration and support, APW has engaged 3,660 teachers, 195,799 students, and 18,509 adults in STEM-based water education.

APW entered into a new three-year IGA on July 1, 2013, to enhance the ability of teachers to instruct and students to learn about local issues pertaining to water. The work program defined in the IGA encompasses three educational areas: professional development, student educational programs, and community outreach.

In fiscal year 2014-15, APW programs reached 584 teachers, 26,634 students, and 4,714 adults. Through direct instruction, APW reached 9,448 students from 363 teachers' classes, gaining knowledge about water resources and efficiency. Student-driven school water audits and Water Scene Investigations resulted in a projected water savings of 2.1 million gallons/year.

Professional development includes STEM Academies and workshops to support curriculum integration. 221 teachers engaged in professional development that advances critical thinking, problem solving, and collaboration skills. This positively affects more than 9,000 students annually.

During public outreach events more than 7,000 students and 4,000 adults engaged in water education activities.

FY 2014-15 Activity:

Students Reached	26,634
Teachers Reached	584
Adults Reached	4,714
Audit Projected Water Savings	2.1 million

Direct student educational programs include:

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

Professional development workshops include:

- Biosphere 2
- Integrating Engineering Into the STEM Curriculum
- STEM Academy
- STEMAZing Institute
- Water Festival Teacher Workshop

Community outreach events include:

- Arizona STEM Adventure
- Science City at the Tucson Festival of Books
- Science Days/Nights at the Tucson Children's Museum
- Ted Walker Youth Day
- Tucson Hebrew Festival

See *Appendix A* for the full APW 2014-15 Annual Report

Environmental Education Exchange

The EEExchange began working under contract with Tucson Water in 1998 to develop and manage three water conservation education programs. The programs focused primarily on first through third grade. Together, the programs reach more than 16,000 students annually in grades one through eight, in multiple school districts throughout Tucson.

FY 2014-15 Activity:

Total Students Reached	16,750
Da Drops	7,828
Our Water, Our Future	4,379
El Tour de Agua	4,543

Originally, Tucson Water commissioned the EEExchange to develop an outreach program that would bring hands-on activities to fourth and fifth grade classrooms.

In 1993, the EEExchange developed *Our Water, Our Future*, and a two-part program consisting of five teacher-led activities followed by an interactive 90-minute presentation from an outreach educator. Now an hour-long presentation, *Our Water, Our Future* has reached more than 2,200 classrooms, and is now an institution for many local fourth and fifth grade teachers. *Our Water, Our Future* was revised for the start of the 2013-2014 school year, with changes to the pre- and post-visit lessons, as well as to the on-site presentation. An exciting addition to *Our Water, Our Future* is a full-color activity book given to each student at the end of the presentation.

In 1998, the EEExchange developed a new education program targeted for first through third grade audiences. The Water Info Van Program, which begins with a short video, soon became known as *Da Drops* 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 more than 83,000 students and has also become an institution for many local first through third grade teachers.

As an outgrowth of these highly successful elementary school programs, Tucson Water contracted the Exchange to develop and manage a middle school water education program as well. In the year 2000, the Exchange produced the *Tucson Toolkit: Perspectives on Our Water*, a five-unit curriculum developed for middle school science teachers to integrate into their lesson plans. The *Tucson Toolkit* contains nine engaging hands-on activities. The *Tucson Toolkit* differs from the other programs in that no presenter visits the classroom and all of the activities are led by the classroom teacher. All students receive a workbook, shower timer, and flow rate measurement bag. Because the *Tucson Toolkit* materials have become dated, and there was a desire to have a middle school on-site classroom presentation, the *Toolkit* will no longer be offered after this school year (although parts of it will be incorporated in to the new program).

During 2013-2014, *El Tour de Agua*, a new middle school program including an on-site classroom presentation, was developed. After the pilot program with 50 classes in spring 2014, the program was revised before launching the 2014-2015 school year. The program focuses on water sources, water recycling, and water conservation. Students are taught to question if their water sources are reliable, safe, and sustainable. The classroom presentation is approximately one hour in length and uses a Prezi media format rather than posters for a more exciting and interactive learning experience. Teachers show a pre-visit PowerPoint presentation to their students for background information (with a related Student Study Guide), and follow up with a post-visit lesson on water conservation (using the Shower Flow Kit materials that are student giveaways).

See *Appendix B* for the full EEExchange 2014-15 Annual Report

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. The first phase focused on indoor use, targeting plumbing supply retailers to promote the sale and use of water-efficient plumbing fixtures. In 1992, a series of workshops were developed to reduce water use inside and outside the home and were offered to both homeowners and landscapers. By the end of 1992, the need for training specifically tailored to landscape professionals was identified. In FY 2014-15, 92 workshops attracted 2,303 people.

FY 2014-15 Activity:

Professional Workshops	51
Workshop Attendees	1,337
Residential Workshops	45
Workshop Attendees	1,182

A main objective of the SmartScape program is to build capacity within the landscape industry to design, install, and maintain water-efficient landscapes. Additionally, the program promotes the adoption of water-efficient landscapes, and increases irrigation efficiencies in the residential, multi-family, commercial, and industrial user classes by conducting workshops, seminars, and training programs and developing appropriate educational materials.

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

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

All professional-level classes build on the instruction offered in the SmartScape series by expanding the subject matter to provide broader knowledge in given areas of interest, which include:

- Healthy Landscapes (3-part series)
- Landscape Irrigation Systems (3-part series)
- Urban Tree Management (3-part series)
- Turf Irrigation Management (half-day)

SmartScape 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 Incentives Rebate Program

See *Appendix C* for the full Smartscape 2014-15 Annual Report

Public Information Conservation Office (PICO) Outreach

Tucson Water participates in several community outreach events, as well as making multiple professional presentations at technical conferences. Public relations at Tucson Water are strategically planned. It is an ongoing process of building a mutually beneficial relationship between Tucson Water and our numerous stakeholders. Customer surveys and input from Mayor and Council are utilized. Relationships are built by attending numerous events where staff can talk to customers face-to-face. Free giveaways and printed materials are offered at events and point-of-sale locations in order to help people learn more about water and how to conserve it.

Professional Presentations

Several staff members attended the WaterSmart Innovations conference, which is the premier urban water efficiency conference. In addition to networking and sitting in on excellent sessions, PICO staff had a poster on its Low-Income Toilet Replacement Program and a presentation titled "Long-Term Partnerships Provide One-of-a-Kind Water Education Programs for Tucson Youth." Our education partner, Arizona Project WET, presented a poster titled "Students Drive the Use of Water Efficient Technology" and presented "Teachers Work with Professionals to Understand Tucson's Water Distribution System."

PICO staff also attended the Irrigation Association conference to keep up on emerging technologies and irrigation approaches to improve the design of our soon-to-be-released irrigation efficiency incentive program. Staff also delivered a presentation titled, "Partnering with Water Purveyors" to share examples of how Tucson Water invests in landscape water efficiency through education (SmartScape) program and incentives.

SAHBA Home Show (Fall & Spring)

Tucson Water has participated in the SAHBA Home Show since 2008, providing attendees opportunities to ask questions and receive Tucson Water promotional and educational materials. Working with our marketing contractors, we designed an improved set of displays to emphasize the Water Reliability message our utility is focused on. We also piloted a hands-on station to help customers identify soil type and discuss landscape watering schedules. Attendees primarily had questions about recycled water, water rates, and hard water solutions.

Community Events

Staffing events has proven to be a valuable method of direct contact with residential and commercial customers, who then gain a better understanding of Tucson Water's investments and commitments to ensure a reliable water supply now and for the future. In FY 2014-15 Tucson Water Staff reached over 10,000 customers through various community events.

Tucson Water had table displays at:

- Block Party 2015 at Christ Church United Methodist
- City/County G.I.S Fair
- Davis-Monthan Air Force Base National Night Out
- Desert Horticulture Conference
- Earth Day at Intuit
- Earth Day Celebration at Reid Park
- Earth Day Carnival at Robins K-8 School
- El Rio Health & Safety Fair
- Home Depot Safety Event for Kids
- Raytheon Employee Health & Safety Fair
- Santa Rita Neighborhood Center Back to School Event
- Science Night at Rattlesnake Ridge Elementary School
- Senior Health Fair
- Senior Safari at Reid Park Zoo
- Sunnyside Neighborhood National Night Out

In addition to hosting a booth, Tucson Water provided sponsorship for the following events: Family Festival in the Park at Reid Park, the Envision Tucson Sustainable Festival at the YWCA, and the Boo Bash at the Clements Center.

Guided Tours

Tucson Water has a long history of providing tours to groups, media, and members of the public interested in learning about the infrastructure, storage, treatment, and delivery of our potable and non-potable supplies. In FY 2014-15 Tucson Water

staff hosted 48 tours for 491 participants and made 53 unique visits to sites throughout the year.

Social Media

Tucson Water has become more active on social media in the last year. Our office has been contributing to the City of Tucson Facebook, Twitter, and Instagram pages on a regular basis and now has unique water department accounts for those three. Although connected, each of these social media platforms provides different opportunities for engaging with our customers, providing important information about water outages, repairs, etc., and interesting information on the many facets of a water utility. At the end of the fiscal year, Tucson Water has over 100 followers on Instagram and about 200 followers on both Twitter and Facebook.

SeeClickFix is an app already being utilized by the City of Tucson to report potholes, graffiti, and other municipal problems. Water waste has been added to the list. These violations will go directly to our Water Conservation Inspectors to address. This tool provides our customers with another way to report water waste in our community. This customer engagement tool is slowly gaining momentum. Since water waste was added in late 2014, 19 water waste "issues" were submitted and the Conservation Inspectors responded and closed all of the cases.

Regional Collaboration

Tucson Water PICO staff hosted an Arizona Water Conservation InfoShare on December 9 at the Randolph Golf Complex. This quarterly meeting brings together water conservation professionals from around the state to exchange ideas, identify opportunities for collaboration, and learn about research and new technology in the field. The morning featured a presentation from Gary Woodard of Montgomery and Associates on "Changing Preferences, New Development, and Passive Conservation: What's Driving Down Domestic Demand?" After lunch, the attendees were taken on a tour of the new Advanced Oxidation Process Water Treatment Plant and the Southern Avra Valley Storage and Recovery Project (SAVSARP).

Two surveys are underway with the University of Arizona through an IGA to collect information to help with planning about residential and commercial incentive programs. Results from these surveys will be available later in 2015 and into 2016.

National Mayor's Challenge for Water Conservation

The National Mayor's Challenge for Water Conservation is a friendly online competition among cities that encourages citizens to pledge to take steps to achieve water and energy efficiency. Tucson has placed 6th, 1st, 2nd, and 2nd in its four years of participating in the 300,000 - 599,999 population city category.

Tucson Water promotes the Challenge through multiple strategies. Participants receive information on Tucson's water web page for the challenge. Information is disseminated through newsletters, bill messaging, media releases, and auto-replies for certain Tucson Water GroupWise mail boxes. Social media is used with Facebook and Twitter. Additionally, partnerships with organizations help to spread the word as well as participation in local events.

The Wyland Foundation and Toyota Corporation sponsor the Challenge and have been very impressed with Tucson Water as a leader and model for water conservation and efficiency. Wyland's MLE – Mobile Learning Experience, an interactive classroom on wheels – has visited a Tucson school two years in a row while on its national tour. Wyland has also used Mayor Jonathan Rothschild in its promotional spots for the Challenge, which takes place in the month of April.

Retail Outreach and Promotion

Advertising is a component of public relations. Getting the message out through television advertising, web advertising and sponsoring events has proven successful. Tucson Water advertisements usually feature one of the following topics: Water Reliability, Gray Water, Rainwater Harvesting, or Toilet Rebate information.

Another avenue for promoting conservation and incentive programs has been placement of display

racks at nurseries, plumbing supply, and home improvement retailers. Racks are stocked with brochures, rebate applications, and publications on water efficiency. Relationships have been established with multiple businesses to the benefit of all parties. Retailers see an increase in sales of products eligible for rebates to their customers, participation in Tucson Water conservation programs rises, and residents become more aware of options they have to save water and money.

PICO staff has continued working on the new, unified look of our printed materials. Previously Tucson Water brochures and handouts had a variety of looks; making the public unsure if they were picking up materials from Tucson Water.

Water Waste Enforcement

Two Utility Service Representatives (Conservation Inspectors) conduct water waste inspections throughout the Tucson Water service area. Water waste typically involves overwatering, malfunctioning irrigation systems, hose washing of hard surfaces, and misting systems operating in unoccupied areas. They also provide high bill investigations for commercial properties.

Conservation Inspectors made 818 visits in FY 2014-15, and issued 425 verbal and 3 written warnings. No citations were issued. The fine structure for a first offense is a minimum of $250. Subsequent offenses within three years are a minimum of $500. They conducted 54 high bill investigations which assist customers in reducing their water-use.

WaterSmart Business Program

The WaterSmart Business (WSB) Program is managed by the Public Information and Conservation Office in consultation with an advisory group. The group developed best management practices for water-users in their business classes, established guidelines for certification, and assisted in developing signage, incentives and workshops offered through WSB. More than 15 businesses and government agencies were represented in the advisory group, including: AZ Small Business Association, AZ Landscape Contractors Association, International Facility Managers Association, Building Owner and Managers Association, Southern Arizona Lodging and Resort Association, the Chamber of Commerce, Pima County, and the Arizona Society of Landscape Architects, among others.

The WSB certification was initiated to build relationships between Tucson Water and the business community and offer businesses easier contact if concerns arise. Additionally, Tucson Water is able to use the relationships to assist in achieving greater water savings.

Businesses participating in the certification process receive a free water audit to determine how they can use water more efficiently and save money. Businesses that become certified will be listed on the City's website and receive recognition from the City for their efforts to conserve water. Moreover, participating businesses are more likely to be prepared for understanding the requirements of the Drought Preparedness and Response Plan because stages two through four of the ordinance require businesses to create a water conservation plan and reduce water use. As stage two may be in the near future, preparing businesses to manage water use more efficiently is a high priority. The Plan requires self-audits and conservation measures for commercial/industrial customers with a volume usage at/or exceeding 325 Ccf monthly.

Tucson businesses are on par with the U.S. national percent for water-use by commercial class. Office and educational customers in the Tucson Water service area use water at a slightly higher percent than the national average, whereas hospital and restaurant customers use less.

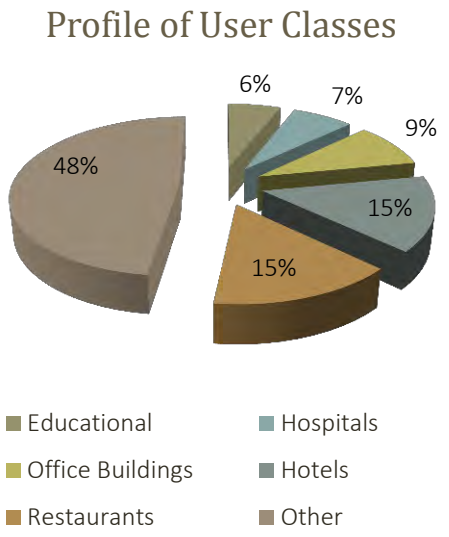

Figure 25: Water Use by Commercial Class - Tucson

Commercial classes have varying purposes for their water use. For example, hospitals tend to use more water than other commercial types to operate medical equipment, offices typically use more water for cooling and heating, and restaurant use occurs in food preparation and for dishwashing. These statistics are somewhat more complicated to compile for industry, as its water use is normally driven by resource extraction or production and is industry and site specific.

In efforts to garner greater participation in the WSB program several changes are being considered.

- Redesign the reduction in water-use percent criteria for certification. Instead use a custom approach to certification levels, which will evaluate each class and site for its unique characteristics and opportunities to conserve water.
- Conduct a water conservation walk-through or provide a professional water audit. Site complexity will determine whether a walk-through by Tucson Water staff or a professional audit is performed.
- Use a custom commercial rebate to assist businesses in meeting the water efficiency outlined in their audit. The custom commercial audit will be based on performance measures.

Appendix A – Arizona Project WET 2014-15 Annual Report

Arizona Project WET - City of Tucson IGA Annual Report 2014-15

Arizona Project WET (APW) shares the City of Tucson's goal to promote responsible water stewardship through excellent and effective education.

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Summary Table

2014-15 School Year Summary				
All Arizona Project WET Programs				
Teachers 561	**Adults 4,669**	**Students 25,972**	**Instruction Facehours 2,195**	
Professional Development				
Workshop	**Workshop Hours**	**Teachers**	**Students Reached By Teachers**	**Instruction Facehours**
Tucson Water Festival	6.5	9	230	19.5
Tohono Chul Volunteer Workshop	3.0	20 (non-formal)	NA	3.0
Integrating Engineering Into the STEM Curriculum	17.0	11	1,229	85.0
2014 Tucson STEM Academy Follow-up	6.0	15	1395	12.0
Tucson STEM Academy 2015	41.5	28	3,933	249.0
Biosphere 2	8.0	35	980	16.0
STEMAZing	15.0	12	1,250	60.0
Other 1-day workshops	10.5	91	Unknown	11.5
Totals	**107.5**	**221**	**9,017**	**456.0**
Direct Student Outreach Programs				
Sweetwater Wetlands				
Schools	**Classes**	**Teachers (421 Adults)**	**Students**	**Instruction Facehours**
43	120	120	2,646	360.0
Groundwater Model Presentation - 3rd Grade Classrooms				
Schools	**Classes**	**Teachers (131 presentations)**	**Students**	**Instruction Facehours**
47	137	137	3,086	268.0
Groundwater Model Presentation - 6th Grade Classrooms				
Schools	**Classes**	**Teachers (64 presentations)**	**Students**	**Instruction Facehours**
17	64	29	1,552	134.0
Groundwater Model Presentation - Other Classrooms				
Schools	**Classes**	**Teachers (6 Presentations)**	**Students**	**Instruction Facehours**
3	6	4	67	12.0
School Water Audit Program & Water Scene Investigation				
Schools	**Classes**	**Teachers**	**Students**	**Instruction Facehours**
9	32	24	849	222.8
Water Festival - Tucson				
Schools	**Classes**	**Teachers (84 Adults)**	**Students**	**Instruction Facehours**
8	19	19	462	59.5
Discovery Program - Sweetwater Wetlands				
Schools	**Classes**	**Teachers (45 Adults)**	**Students**	**Instruction Facehours**
2	9	7	180	47.0
Total Schools	**Total Classes**	**Total Teachers**	**Total Students**	**Total Facehours**
129	**387**	**340**	**8,842**	**1103.3**
Community Outreach Events				
Number of Events	**Hours**	**Adults**	**Students**	**Instruction Facehours**
56	**204**	**4,164**	**7,803**	**636.0**

Table 1

2014-15 School Year Summary

Arizona Project WET Programs

School Water Audit Program - Bathroom Faucet

School	# Students Participated	# Aerators Replaced	Projected Water Savings (gals/yr)
Hollinger K-8 School	39	25	42,656
Wilson K-8 School	44	66	1,687,500
Canyon del Oro High School	53	27	107,616
Walter Douglas Elementary School	196	23	256,248
Satori Charter School	19	17	41,509
Totals	**351**	**158**	**2,135,529**

School Water Audit Program - Irrigation

School	# Students Participated	# Sprinklers	Calculated DU
Amphiteater High School	92	20	35%
Walter Douglas Elementary School	105	12	33%
Totals	**197**	**32**	**34%**

School Water Audit Program - Drinking Fountain

School	# Students Participated	# Fountains	Calculated Waste
Wilson K-8 School	104	35	70.5%
Totals	**104**	**35**	**70.5%**

Water Scene Investigation

School	# Students Participated	# Students Reporting Data	Projected Water Savings (gals/yr)
Hollinger K-8 School	47	0	N/A
Canyon del Oro High School	57	36	78,567
Pistor Middle School	93	0	N/A
Totals	**197**	**36**	**78,567**

Projected Water Savings are reported data only - Actual Projected Water Savings would be much higher

Drinking Water Quality Testing

School	Grade Level	# Classes	# Students Participated
Paulo Freire Freedom School	6,7	2	54
Safford K-8 School	7	4	96
Wilson K-8 School	8	1	3
Casas Adobes K-8 School	7	1	1
CDO High School	11, 12	2	58
Tucson Academy School	8	1	1
Quail Run Elementary School	6	1	26
Walter Douglas Elementary School	6	1	31
Flowing Wells Junior High School	7,8	1	40
Totals		**14**	**310**

Table 2

Infographic Summary

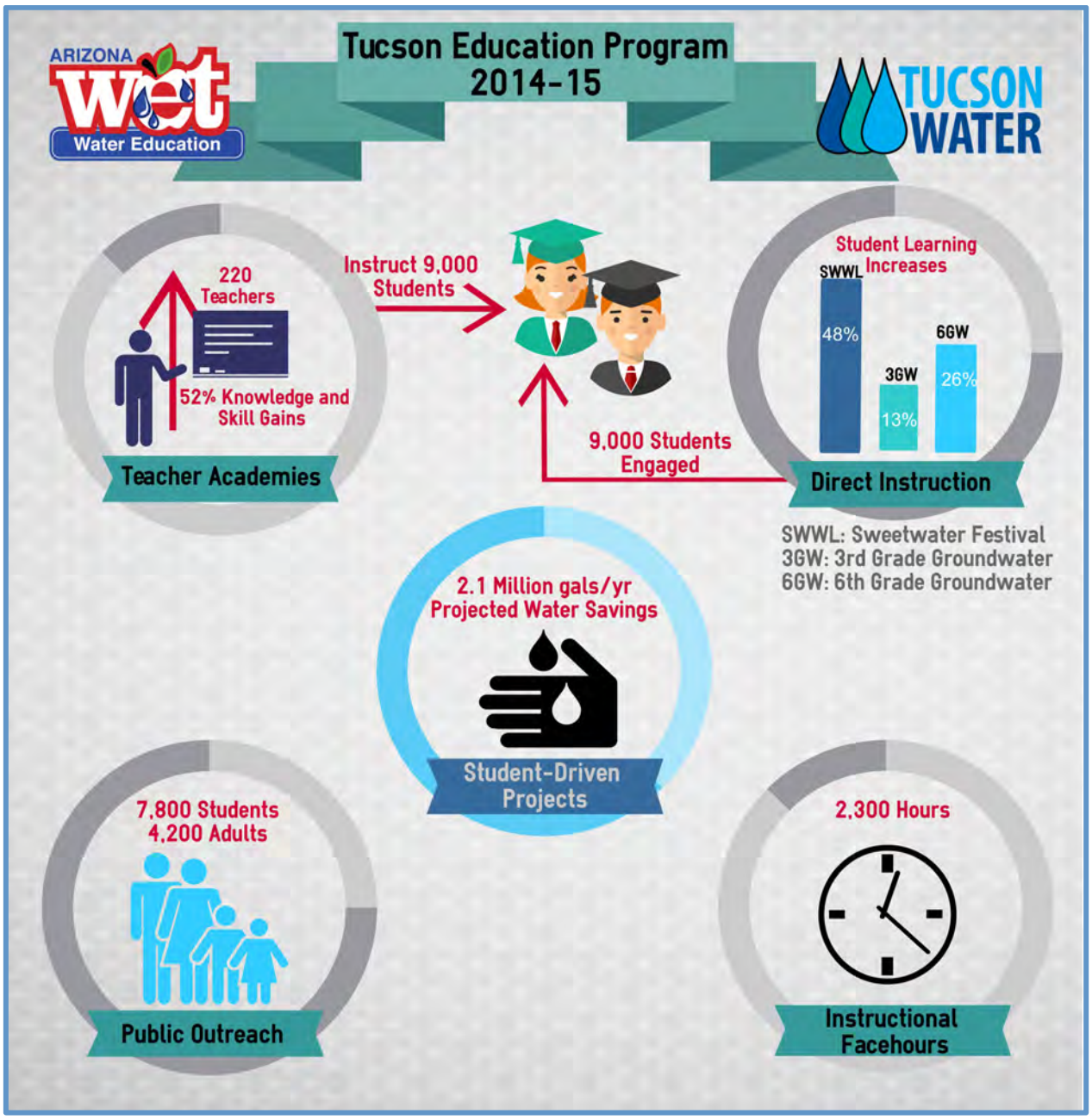


Figure 1

I. Summary

Arizona Project WET (APW) is a University of Arizona (UA) Cooperative Extension program that works statewide to accomplish two overarching goals through three pathways. APW develops water stewardship and STEM (Science, Technology, Engineering and Math) literacy by: 1) providing teacher professional development that evolves instructional practices and deepens content knowledge, 2) direct student outreach that delivers or extends classroom learning, and 3) community engagement that enables volunteers to effectively engage students in learning.

Cooperative Extension programs, like APW, are developed based on needs assessments and are governed by clear and measureable outcomes. Assessment is built in to these programs and used to improve lessons, programs and academies on a regular basis. APW programs target the specific needs of Arizona's students, teachers, and partners. It can be counted on that all APW programs are effectively achieving knowledge and skill gains. If they weren't, APW would stop doing them.

The APW team of ten professionals, dedicated to a targeted mission, stays abreast of the ever evolving needs of the Arizona education system as well as district partners. As part of the Water Resources Research Center (WRRC), Arizona's designated state water center, APW also brings relevant and research-based content in to instruction and programs.

APW is served by an advisory council represented by city water specialists and district education specialists from Tucson, Chandler, Gilbert, Scottsdale and Casa Grande, as well as specialists from Central Arizona Project, Salt River Project, U.S. Bureau of Reclamation and the Arizona Department of Education. These specialists advise and support the program, along with more than 40 other contributors across the state. The Tucson Education Program benefits from the thinking, creativity, and individual strengths of multiple teams of talented individuals (the statewide APW team, WRRC team, Cooperative Extension team and the APW Advisory Council).

The mission of Tucson Water (TW) parallels that of Arizona Project WET. Both organizations recognize that water stewardship begins when people know about, understand, and connect to their water resources. APW's Tucson programs teach about Tucson's interconnected water resources, water supplies and needs, regional and local water management, the effects of drought and uncertainty, water quality and chemistry, water efficiency, and wise water use. In Tucson, APW programs are adopted components of district curriculum for third, fourth and sixth grade students. Other APW programs delivered in Tucson target STEM education that reaches across the K-12 spectrum. For more than a decade, the TW/APW partnership has helped create a water literate citizenry invested in water stewardship for the future of our region.

In the 2014-15 fiscal year, Arizona Project WET programs reached 561 teachers, 25,972 students and 4,669 adults with 2,195 hours of instruction. This year 221 teachers improved their mastery of content knowledge and instructional practices by an average of 52% through participation in professional development academies and workshops. This positively affects the 9,017 students that they teach annually. Direct

student instruction engaged 9,448 students from 363 teachers' classes in learning about water resources, stewardship and efficiency. Student-driven school water audit projects resulted in a projected 2.1-million gallons/year water savings. During public outreach events 7,803 students and 4,164 adults engaged in water education activities.

II. History

Arizona Project WET's role at the University of Arizona is to work with partners across the state to address not only the need for water education and STEM literacy, but to adapt, as those needs shift with the times.

In 2005, APW worked closely with TW specialists and area school districts to ensure that TW's conservation education funding was put to best use. Opportunities to assist Tucson Unified School District (TUSD) in meeting state standards and science testing requirements were identified. The 3rd grade water curriculum was rewritten in 2006 by the APW Director, a TW specialist, TUSD science coordinators and master teachers. One third of the science taught at the third grade level for TUSD, Flowing Wells and Altar Valley is now this curriculum: Schwartz, K., Kottelman, M., Bouwens, E. and Bittel, K. (2006) ***3rd grade Water Curriculum Unit***. A field trip to TW's Sweetwater Wetlands, with four learning stations, was built in to the 3rd grade curriculum unit. This model is adapted from APW's **Arizona Water Festival Program** which began in 2000 (http://arizonawet.arizona.edu/programs/arizona_water_festival).

3rd Grade Student Exploring the Flow of Groundwater

The groundwater system is the least understood and therefore, the least taught part of the water cycle. Yet, Tucson's entire water supply depends on it. Misconceptions develop from textbook drawings and analogies that use surface water to describe what can't be seen beneath the ground. This essential component of the water cycle was not part of instruction at any grade level. **Therefore an in-classroom groundwater presentation was also built in to the 3rd grade curriculum unit**. The key to this instruction is the use of interactive groundwater models that provide opportunities to see and explore the groundwater system. Teachers do not have the knowledge or models to teach about it. In their ability to build foundational knowledge about this complex system so essential to Tucson, these presentations remain essential.

In 2009, the APW Director worked with a team of specialists to develop the 6th grade science curriculum: Schwartz, K., Gilbert, J., Herron, P. & Kist L. (2009, edited 2011) *Energy*

& Environmental Science (EES) 6th Grade Science Unit. Three school districts adopted this 6th grade science curriculum that covers one-third of the year. A total of 16 APW lessons from two curriculum guides are included. In-classroom groundwater flow model presentations, delivered by APW educators, are essential to the curriculum.

The need to quantify water savings resulting from education programs prompted the development of the **School Water Audit Program (SWAP)** in 2008 and culminated with the publication of the SWAP curriculum in 2009: (Schwartz, K., Stoll, M.A., Rupprecht, C. and Crocker, N. (2009), School Water Audit Program Curriculum, Arizona Cooperative Extension, Pub. #1505, (167 p.) Viewed at: http://arizonawet.arizona.edu/programs/school_water_audit). The SWAP meets the ongoing need for STEM integration in the form of real world, rigorous and relevant learning experiences for students.

The **Water Scene Investigation (WSI) program** evolved from the SWAP homework assignment. Shorter and easier to implement than a SWAP, the WSI program was designed to inspire participants to adopt home water conservation practices through the installation of water efficient technology, and the comparison of their savings with other water users. This program was published as a stand-alone program in 2013: (Schwartz, K., Stoll, M.A., Rupprecht, C., Thomas-Hilburn H., Krecek-Lynch T., Prescott A. and Ramaswamy, S. (2013), Water Scene Investigation Program, Peer-reviewed Arizona Cooperative Extension, Pub. #az1594, Viewed at: http://arizonawet.arizona.edu/programs/wsi).

Teacher Workshops (http://arizonawet.arizona.edu/programs/teacher_academies) are an integral part of APW's mission. Each of the aforementioned curriculum units are supported with teacher professional development that models instruction and deepens content knowledge. Additionally, APW developed new workshops as needs arose and partnered with other local education providers that include Biosphere 2, Arizona Sonora Science Museum, Tohono Chul Park and the Arizona Hydrological Society to name a few.

Tucson STEM Academy Teachers Touring SAVSARP

In 2013, Arizona Project WET began working with Tucson Water to offer a 4 to 5-day **Teacher STEM Academy** focused on Tucson Water's mission. This program replaced the long-running Teacher Internship Program offered by TW.

This year the APW Director worked with the Director of The STEMAZing Project to develop and conduct a three-day teacher institute on Water and Energy. TUSD master teachers and one district science specialist attended. Following the Institute, the TUSD team, APW Director and STEMAZing Director met for two days. The collaboration is resulting in a **revision of the 6th grade curriculum unit** integrating in STEM and real-world problem solving.

Since 2006, with Tucson Water's collaboration and support, Arizona Project WET has engaged 3,660 teachers, 195,799 students, and 18,509 adults in STEM-based water education.

III. School-Year Achievements

Educator Training and Management

Each semester, ten University of Arizona (UA) students trained as Water Educators facilitate lessons and work public events. Extensive training and mentoring ensures that Water Educators provide effective educational experiences to area students. All education components provide educators with a narrative that includes what to say, what to do, and what students at the target grade level might say in response. One-page lesson summaries are also used to ensure that the big ideas of each subject are stressed. In addition, classroom management skill development is also part of the Water Educators training.

Program coordinators model the interactive, inquiry-based lessons as they are to be taught to students, during the two-day training. After lesson modeling, Water Educators have the opportunity to study the written narratives and facilitate the lessons for the Tucson Program Coordinators and their peers. In order to build skills and confidence in both programs, new educators shadow teams of experienced educators in the classroom and at Sweetwater Wetlands. Returning educators provide advice and guide the team of new educators, effectively becoming mentors and leaders. After the shadowing phase, educators are ready to present collaboratively. Later in the year, educators are observed using standard evaluation instruments to ensure that effective delivery is maintained.

Workplace and facilitation skills, keys to success in APW programs, assist University students in obtaining jobs beyond college, while also benefitting the community and region.

Program Innovations

Tucson STEM Academy – Teacher Support

This year the Tucson APW Program worked to develop field study opportunities for middle and high school students; a daunting task considering the number of students assigned to each science teacher at those grade levels. Already committed to supporting participants of the Tucson STEM Academy, the Tucson APW team worked to develop a six-strand rotation at the Sweetwater Wetlands site to accommodate these greater student numbers.

The new Discovery Program offers small groups of students a choice of four different journeys that lead them on a tour of the wetlands. Participants utilize a QR code reader on a smart device to explore the wetlands through the lens of a hydrologist, botanist, ornithologist or wildlife biologist. Students hypothesize, record observations and data, draw conclusions based upon their evidence, and post them online.

The hydrology journey was made possible through an ongoing collaboration with TW hydrologists, Dick Thompson and Margaret Snyder. Student *hydrologists* on this journey investigate the surface water-groundwater connection at Sweetwater Wetlands utilizing measurement instruments (a sounding device and data logger). They understand that water management, storage and reuse are key components of TW's reliability mission.

A fifth strand is the Sweetwater Wetlands Phenology Trail, established this year as part of the overall Tucson Phenology Trail and the USA National Phenology Network. In this strand, visitors act as citizen scientists to record seasonal changes in 16 designated plants on the trail. Data is entered in the *Nature's Notebook* app that runs on smart devices. The sixth strand is a tour of the wetlands given by APW's Water Educators.

High School Students Discovering Hydrology

Teaching Engineering Practices

The Framework for the Next Generation Science Standards (NGSS) details specific engineering practices that are distinct from science practices. Many teachers are unfamiliar with the engineering practices. As a degreed Chemical Engineer and former classroom teacher, the Tucson Program Coordinator is highly qualified to assist teachers and direct students in the engineering design process. APW has developed professional development (See Teacher Professional Development section), engineering design projects and interactive lessons to address the need for teaching engineering practices.

With funding for supplies furnished by the National Girls Collaborative Project, APW worked with Imago Dei and Safford K-8 on student-driven engineering projects. Using the engineering design process, so important to STEM instruction, students designed, built and installed rain barrel systems to provide water to school gardens. APW will continue to develop water-oriented projects that utilize the engineering design process.

IV. Programs

Teacher Professional Development

Arizona Project WET Teacher Academies offer professional development that evolves teachers' instructional practice and water-related content mastery through STEM integration, student-directed learning, real-world and relevant application, and collaborative work. Academies provide the support that teachers need to adopt instructional practices that encourage students to apply their learning in developing ideas,

designing solutions, and delivering positive change. As a result of our academies, students will think critically, gain deeper understanding, and evaluate, prioritize and apply knowledge to find solutions. APW's multi-day Teacher Academies and one-day workshops help teachers meet the goals of the Arizona College and Career Ready Standards and the Science and Engineering Practices from the NGSS Framework.

This year, **221 K-12 teachers** participated in APW's professional development, which improved their instructional practice through real world, relevant STEM integration. Those **teachers engage 9,017 students each year** in curriculum that advances critical thinking, problem solving and collaboration skills. At the beginning and end of each workshop day, teachers rate their level of mastery of academy-specific content and skills using a 1 (low level) to 10 (high level) point scale. This year, teachers reported an average two-fold gain in mastery of the content areas. **The average gain for all workshops is 51.8%** using the following formula: $\frac{(Post\ Survey\ Avg - Pre\ Survey\ Avg)}{Post\ Survey\ Avg}\ x\ 100\%$.

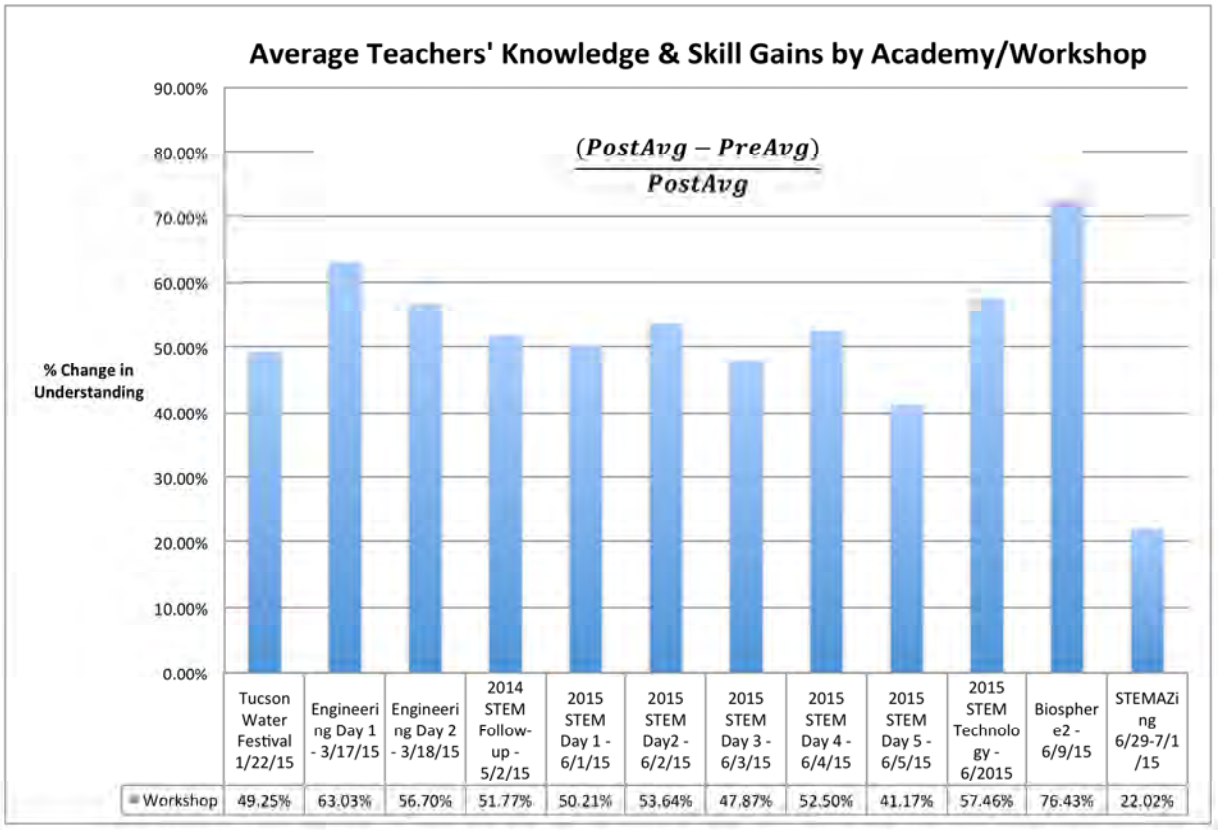


Figure 2

Post-academy or workshop, APW asks teachers to evaluate its utility and efficacy using a standard set of 12 questions on a Likert scale from 1 (strongly disagree) to 5 (strongly agree). **In all the workshops, the majority of questions received 100% responses of "*Strongly Agree*" or "*Agree*."**

Graphs outlining knowledge and skill gains, and evaluation results for each academy and workshop can be found in the appendix of this report.

Academies

Academies are characterized as multi-day offerings.

2015 Tucson STEM Academy – (June 1-5, 2015)

Tucson Water partnered with APW to provide the third Tucson STEM Academy for 28 area teachers. Five of the teachers work with gifted elementary students in TUSD, one teacher works as an educator for Pima County Natural Resources, and the remaining teachers are middle and high-school teachers from one of 9 local school districts.

This STEM Academy immerses the teachers in learning about the urban water cycle, water supply, water quality, water treatment, and water efficiency, all components of Tucson Water's reliability mission. Academy tours "follow the water" and collectively provide teachers with a cogent understanding of water management in our community. The multi-day tour destinations include Central Arizona Project (CAP) Twin Peaks pumping station, Southern Avra Valley Storage and Recovery Project (SAVSARP), Tucson Area Remediation Project/Advanced Oxidation Process (TARP/AOP), Agua Nueva Reclamation Plant, and UA Water & Energy Sustainable Technology (WEST) Center. The field experience is augmented by presentations and lessons that reinforce and expand ideas and understanding. After five days, teachers are able to grasp Tucson's water distribution and management system. They leave with a new confidence in Tucson's water reliability.

Technology applications, integrated into lessons throughout the week, challenge the teachers to learn new skills as they work to master the content. Nightly homework requires them to reflect and summarize their learning using technology. On the last day, using content that is meaningful to them and pertinent to their students, teachers construct and present an infographic. These shared products solidify their sense of accomplishment and excitement. Despite their exhaustion at the end of a long week, the teachers are appreciative. One commented, *I am blown away with the quality of the program. It greatly exceeded my expectations. It really reached into every possible teaching aspect*.

Across the week, teachers' mastery of content averaged a 49% increase, and their mastery of technology applications and skills increased 57%. Teachers' understanding of STEM careers within Tucson Water increased 66% over the course of the academy. An average of 95% of the final evaluation responses were "strongly agree" or "agree" for this workshop. (Appendix, Figures 1 – 7)

The commitment, time and professional knowledge that TW employees provide in the planning and execution of this academy is invaluable. A testament to the APW-Tucson Water partnership was explained by a teacher, *The amount of planning that went into this week was amazing. As teachers, we appreciate a well-oiled machine. I wish I could plan my classroom activities to run as smoothly as the activities and transitions this week*. At the culmination of the workshop, teachers provided ratings for their opinion of Tucson Water's quality, reliability, forward thinking and innovation. On a scale of 1 (low opinion) to 10 (high opinion), the areas received an average rating of 9.50. (Appendix, Figure 8) **The teachers left the academy with a greater understanding of their community's water supply and management system and a new confidence in the sustainability of that system.**

2014 Tucson STEM Academy Follow-up – May 2, 2015

Two-thirds of last year's STEM Academy teachers returned to present and collaborate with each other during the follow-up workshop in May. The morning was spent in peer-to-peer discussions and presentations where teachers shared how they implemented STEM Academy material in their classrooms. **All of the returning teachers did an excellent job incorporating APW lessons and information from Tucson Water into their curriculum**. In the afternoon, APW coordinators engaged teachers in new lessons highlighting potential shortage on the Colorado River, and the importance of snowpack conditions for storage and timely snowmelt runoff. Teachers' mastery of the content increased 52%. All teachers agreed or strongly agreed that, "*Time to collaborate with fellow teachers to share ideas, lessons, successes and obstacles was helpful to me*." (Appendix Figures 10 - 11)

Integrating Engineering into the STEM Curriculum – March 17 & 18, 2015

STEM professional development and classroom instruction alike, often gloss over the E in STEM – the engineering component. The NGSS actively engage students in science and engineering practices by integrating the core ideas in science with the problem solving and creativity of engineering. This year, APW provided a spring break academy focused on integrating engineering into the STEM curriculum. **This academy achieved high gains in mastery of content areas with 63% on day one and 57% on the second day.** The pre-workshop mastery of content area knowledge was lower, an average of 2.73 for day one and 3.29 for day 2, than other academies (3.92 was the average on a scale of 1-10). **This is evidence of the need for more engineering content within professional development opportunities.** One hundred percent of the teachers rated this workshop favorably in 10 of the 12 categories. (Appendix, Figures 11- 13)

STEMAZing Institute – June 29–30, 2015

APW partnered with the Office of the Pima County Superintendent to provide one of the six strands offered in this year's STEMAZing Institute. The workshop entitled, *Energy in Water, Water in Energy*, provided 3 days of training, which culminated on the third day with engineering projects, data, discussion and case studies that made clear the interdependence between water and energy in our region. Teachers left with a clear understanding of the energy used to lift and move water to Tucson, and the water needed to produce that energy.

Only two of the workshop days fell within the reporting period and are reported in the instructional hours. However, the evaluations apply to the entire 3 days of the workshop.

Teachers in this workshop started out with a higher background level of content mastery at an average value of 6.30, compared to the typical average of 3.92 seen across all of the workshops. However, gains in content knowledge were still made with the largest of 30% on the topic of "*Energy used to manage and distribute water supply.*" **The workshop received the highest possible ratings, where 100% of the responses were "Strongly Agree" or "Agree."** (Appendix, Figures 14 - 15)

One-Day Workshops

Tucson Water Festival Teacher Workshop – January 22, 2015

The Arizona Water Festival program engages teachers in learning foundational knowledge about interconnected water resources, while also preparing their students for the Water Festival Community Education Event. A workshop was provided for Tucson-area teachers in January. **Teachers' mastery of the content areas increased an average of 49%, and 100% of the teachers rated the workshop favorably across all 12 areas on the post evaluation.** (Appendix, Figures 16 - 17)

Biosphere 2 – June 9, 2015

Once again, APW facilitated one day of the two-week long Arizona Center for STEM Teachers Summer Institute. For eight years APW has been partnering with Biosphere 2 to deliver the water content portion of the 12-day Summer Institute reaching 40 teachers per year, many of who are from the Tucson region. This year the focus was environmental justice, and water quality was a natural fit. Data collection, scientific investigation and using claims and evidence to develop reasoning are always a focus.

Teachers improved their mastery of content knowledge across all areas for an average increase of 76.43%. The elementary teachers in this workshop made huge gains in understanding how to work with their students to make claims based on evidence, and effectively investigate water quality with their students. Teachers deepened their content knowledge and were better prepared to develop their Biosphere 2 investigations, which are a required component of the 12-day STEM Academy. The workshop was well received, with an average of 93% of the responses "strongly agree" or "agree" for the workshop evaluation questions. (Appendix, Figures 18)

Student Educational Programs

Direct student education programs support curriculum units for 3rd, 4th and 6th grade students and all teachers that have taken part in the Tucson STEM Academy. Programs this past year included in-classroom groundwater flow model presentations, Sweetwater Wetlands Water Festivals, school water audits, home water audits, community water festivals, the new Discovery Program, and drinking water quality testing.

Third Grade Curriculum Unit Programs

3rd Grade Groundwater Presentations

A one-hour classroom presentation facilitated by APW Water Educators is an integral part of the 3rd grade water curriculum. The in-classroom presentation is supported by pre- and post-instruction. Using an interactive groundwater model, Water Educators build foundational knowledge by asking questions and facilitating learning. Students learn that: groundwater is a system within the water cycle, water is between the grains of sand and gravel, groundwater moves because of gravity, and groundwater is important because it is part our water supply. Lesson scripts are available upon request. **APW Water Educators conducted 120 in-classroom presentations for 2,646 3rd grade students and 120 teachers.**

The pre- and post-assessment consists of ten true or false questions, and is administered prior to the presentation and revisited following the lesson. **The assessment covers the main ideas of the lesson and addresses common misconceptions**. The largest gain in understanding of 42.76% was in the concept, "*Groundwater moves faster through sand than gravel.*" The next largest gain of 27.01% occurred for the concept, "*Groundwater can be pumped from underground*." (Appendix, Figure 19) Our data shows that more foundational knowledge is needed for 3rd grade students to understand the surface water-groundwater connection. The assessment instrument is included as an attachment to this report.

3rd Grade Sweetwater Wetlands Water Festival

Students Exploring Sweetwater Wetlands

Also an integral part of the 3rd grade water curriculum, the Sweetwater Wetlands Water Festival is an event designed to synthesize students' conceptual understanding of the of the entire water unit. The Sweetwater Festival consists of lessons on the Water Cycle, Water Conservation and Watersheds, which have been adapted from the Arizona Water Festival model. During the fourth lesson, students explore the wetland ecosystem and reflect on the uniqueness of the place. **The Sweetwater Festival instructed 2,646 third grade students in 120 classes, along with their teachers and an additional 421 parents during the 43 field trips.**

Teachers administer pre-assessments to students prior to their Sweetwater visit. Pre-assessments are provided to teachers when APW educators come in to deliver the groundwater flow model presentation. The corresponding post-assessment is administered during the festival after each lesson via a booklet that students wear around their neck on a lanyard. The evaluation was modified slightly this year to improve our ability to assess students' conceptual learning. Copies of the assessment instrument are available in the attachments section. **Overall, student learning increased 47.54% as measured by the percentage of correct responses in the pre- and post-assessments.**

The average learning increase of 53.00% shows student understanding for the concept that a "*Watershed is a **land area** that drains to a **low point**, and water in a watershed moves because of **gravity**.*" Students gained 52.01% in understanding the concept that, "*The wetlands provide food, shelter and water*." Moreover, 92.56% of the students could name a bird/animal that lives at the wetlands. Understanding increased by 56.08% in the water cycle. Since students' knowledge gain on the topic of water conservation was so much less than the other content areas (9.21%), we can assume that Tucson students have prior knowledge on the subject. The lesson will be altered for the coming year to focus more on water efficient technology. (Appendix, Figures 20 - 22)

At the end of the wetlands tour, students are asked the following questions. "*What is different about this place compared to where you live?*" (Appendix, Figure 23) "*How did it*

feel to be here?" (Appendix, Figure 24) Student responses were placed into a word cloud. The words that were repeated most often appear larger in the image.

Sixth Grade Curriculum Unit Programs

6th Grade Groundwater Presentations

Sixth grade Arizona Science Standards incorporate earth science and water concepts into the curriculum. APW Water Educators provide a 1-hour groundwater presentation to 6th grade classrooms as an integral part of their science curriculum. The science standards were written to have older students spiral back to important concepts to build on the foundational knowledge acquired in earlier grades. For APW, first and foremost, that content is groundwater, the least understood and least taught part of the hydrologic cycle. **APW Water Educators facilitated 64 classroom presentations, reaching 1,552 students and 29 teachers in 17 schools throughout Tucson.**

The pre- and post-assessment for 6th grade was changed this year. In previous years it was an open-ended written evaluation that required students to explain the four most important things they know about the groundwater system. This year, students are assessed on their understanding of key concepts by differentiating between diagrams that depict the key concepts of: 1) *Groundwater moves underground,* 2) *Groundwater is in the pore spaces,* 3) *Groundwater is connected to surface water and* 4) *Groundwater is part of the water cycle.* The assessment instrument is included in the Appendix of this report.

The students averaged a 29.55% increase in overall learning. The most dramatic increase in learning of 77.05% was in the understanding that a portion of Tucson's supply of drinking water comes from the Colorado River. Student learning increased an average 23.44% on the concepts, "*Groundwater moves underground* and *is in pore spaces*." The concept, *"Groundwater is connected to surface water* and *is part of the water cycle*," posted a gain of only 5.32%. (Appendix, Figure 25) Based on this low knowledge gain, the lesson will be altered to focus on this connection and highlight infiltration and percolation more thoroughly.

Tucson STEM Academy Teacher Support Programs

Groundwater Presentations

In support of STEM Academy teachers, four additional groundwater presentations were provided to 67 students this year at the high school level and above. Two presentations were given to pre-service teachers in a Northern Arizona University teacher certification program at their Tucson campus.

An interactive summary of the distribution of all APW groundwater presentations across Tucson is available on Google Maps at: https://goo.gl/1sq8PU. A screenshot of the map is provided in (Appendix, Figure 26)

School Water Audit Program

The School Water Audit Program (SWAP) is unlike the hundreds of audit programs found online. Most are simple inventories of water use. Students in the SWAP collect real data (e.g. measuring water flow over time) using a scientifically replicable process, and grapple with that data to find meaning. The curriculum units on both the indoor and outdoor audits

move students through a thinking process, which is designed to teach them to apply their learning by asking their own questions and designing a means to find the answer. They use their data as evidence to make claims about their understanding and take action to implement changes or make recommendations for solutions.

The SWAP is specifically designed to improve critical thinking and problem solving skills through a focused and innovative educational program that yields water savings through technological and behavioral change. In each module, applied mathematics is utilized to analyze real-world data and make claims, arguments and recommendations based on that data. The SWAP offers a perfect union of real world, rigorous and relevant STEM learning while also addressing Arizona's growing water deficit through water efficiency and conservation.

An essential component of the SWAP curriculum is students taking action. This year at Wilson K-8, students in multiple grade levels communicated their audit findings, water savings, ideas, and recommendations to sponsors and adults. It all began at Wilson K-8, back in the 2008-09 school year, when 6th grade students pilot-tested the first SWAP curriculum with APW and TW. Four of those students, now seniors in high school, returned to their former school to share their experience with Wilson K-8 students. Eighth grade students audited bathroom faucets and replaced faucet aerators. **They calculated a projected water savings of 1,687,500 gallons/year with the new aerators.** Fourth grade students audited the water fountains and investigated the amount of water wasted while drinking. **They calculated that 70.5% of the water at the 35 school fountains is wasted while drinking.** Fundraising efforts were started with a goal of purchasing a water bottle filling station. Returning students, along with the 4th and 8th grade students, presented to TW, APW, school administrators, and parents. This event received news coverage on Channel 13, and Channel 12 created a video of the SWAP experience.

Other students, participating in the SWAP program, performed two outdoor irrigation audits on a total of 32 sprinklers at two different schools, Amphi High School and Walter Douglas Elementary School. Students at five schools installed 158 water efficient aerators on bathroom faucets this year. **The overall projected water savings due to SWAP student initiatives is 2,135,529 gallons/year.**

Water Scene Investigation Program

The Water Scene Investigation (WSI) program offers students an opportunity to apply their learning and skills regarding water audits and water efficient technology at home. Water Scene Investigators measure the average flow rate of their bathroom faucets before and after the installation of a new water efficient aerator, and interview family members about their water use patterns. Back in the classroom, they file their report online at the WSI Reporting Portal, where they can also compare their water savings with Water Scene Investigators across the state.

APW facilitated the WSI curriculum at three schools with 197 students installing a low flow aerator on a home bathroom faucet. A projected water savings of 78,567 gallons/year was reported by 36 of the participants on APW's website. The actual water savings are higher, since many students did not report data online.

Arizona Water Festival Program

Arizona Water Festivals (AWF) instill a deeper understanding of water in the earth system and Arizona's water resources through a community water festival event, teacher professional development workshop, and extensive volunteer and community involvement. The AWF program first engages teachers in professional development that builds understanding about water and water resources, knowledge not covered in a primary grade teacher's preparation. After attending the workshop, teachers implement the standards-aligned curriculum modeled in the workshop, which prepares students for the water festival. The curriculum also deepens students' investigatory learning subsequent to the water festival. The one-day Community Water Festival has trained volunteers from the community engaging up to 1,000 children in an interactive and fun exploration of the groundwater system, watersheds, water conservation, and the water cycle.

The Tucson Water Festival serves school districts not reached by the Sweetwater Wetlands Water Festivals. **A total of 19 classrooms from 8 schools** representing Amphi School District, Sonoran Science Academy, and Vail School District participated in the Tucson Water Festival on April 2nd at James Kreigh Park. **Tucson Water volunteers assisted APW in educating 462 students this festival.** The participating fourth grade students showed a **32% average increase in their understanding of the groundwater system and a 28% average increase in their understanding of watersheds.** (Appendix, Figure 27)

Discovery Program

Participants in the new Sweetwater Wetlands Discovery Program utilize a QR code reader on a smart device to explore the wetlands through the lens of a hydrologist, botanist, ornithologist or wildlife biologist. Students hypothesize, record observations and data, draw conclusions based upon their evidence and post them online. The hydrology journey investigates the surface water-groundwater connection at Sweetwater Wetlands utilizing measurement instruments. Students have the opportunity to physically measure the depth to groundwater and compare that with data from a data logger.

Four field trips were hosted in the spring involving 180 students from both Amphi High School and Walter Douglas Elementary School. The Tucson Water Deputy Director, Sandy Elder, attended a dedication of the new program along with the TW professionals that collaborated on the development and implementation of this program. Students from Amphi High School were joined by their teachers, principal and district spokeswoman. Channel 12 created a video documenting this new interactive field experience for students and the public. APW plans to offer this opportunity to more middle through high-school classrooms in 2015-16 school year.

Drinking Water Quality Testing

APW provides support to teachers who implement drinking water quality testing in their classrooms. Training on the use of the kits is offered at the STEM Academy, and as part of a GK-12 Heatwaves program in the UA Engineering College. Teachers check out testing kits to use in their classrooms and report back as to their use with their students. Tucson Water Quality reports, data tables, directions, and *How To* videos are available for classroom use. **APW supported 14 classrooms in the use of the drinking water quality kits totaling 310 students.**

Community Outreach

Arizona Project WET provided coverage for Tucson Water at 56 events reaching 4,164 adults and 7,803 students. Large events included Arizona STEM Adventure (formerly Tucson FunFest), Ted Walker Youth Day, and Science City at the Tucson Festival of Books. Family science days/nights at the Tucson Children's Museum, Biosphere 2, Tucson Hebrew Festival, and local schools were also included. Interactive lessons for children and youth were provided at all of the events along with water conservation information for adults. Details on individual events are included in the *IGA2015Reporting* spreadsheet. **A total of 7,029 Tucson Water promotional items were distributed at events.** (See Table 3)

2014-15 School Year Summary	
Arizona Project WET Programs	
Materials Distributed at Outreach Events	
Shower Timers,clips, pencils, pads, water bottles, rain gauges	1,241
Faucet Aerators & Flow Bags (1 gpm)	317
Tucson Toolkit Booklets	1,082
Water Smart Activity Booklets	3,357
Desert Wash Safety Booklets	452
Sweetwater Wetlands Guides	34
Da Drops Booklets	156
Stormwater in the Desert Booklets	135
Rainwater Harvesting Guides	135
Graywater Guides	120
Totals	**7,029**

Table 3

V. Appendix - Graphs

2015 Tucson STEM Academy

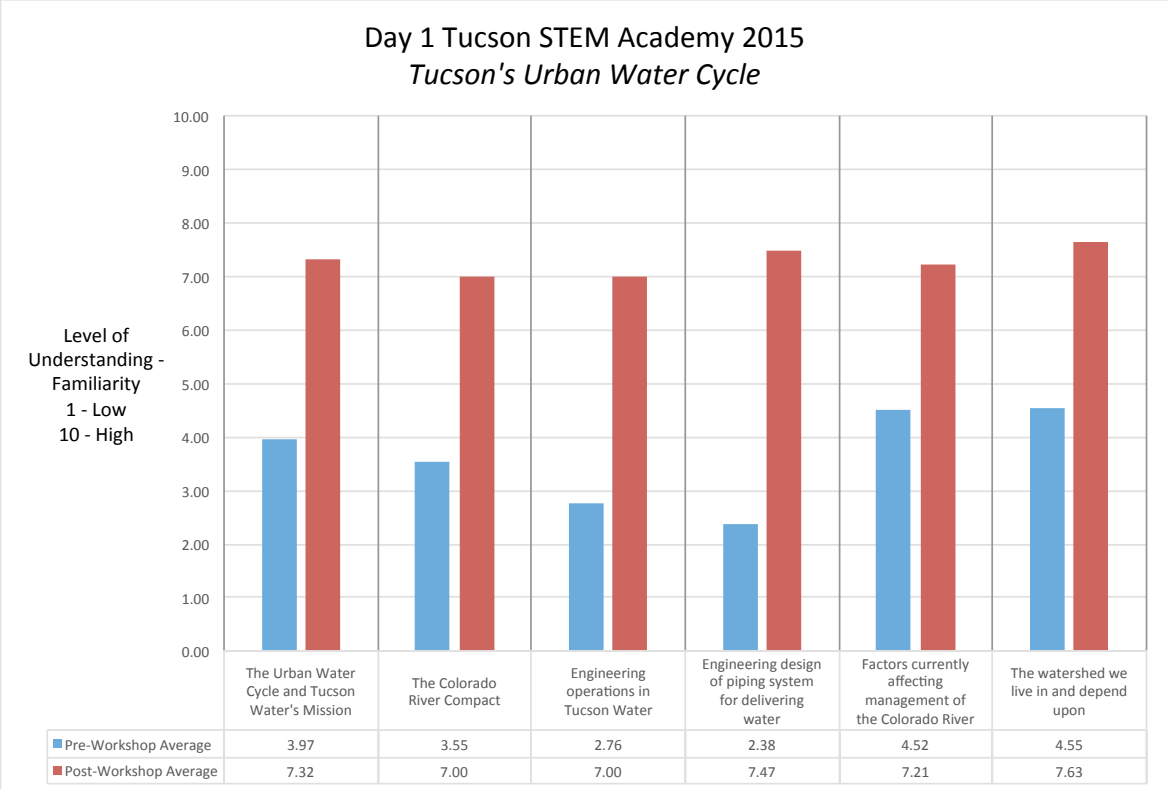


Figure 1 - STEM Academy Mastery of Content: Day 1

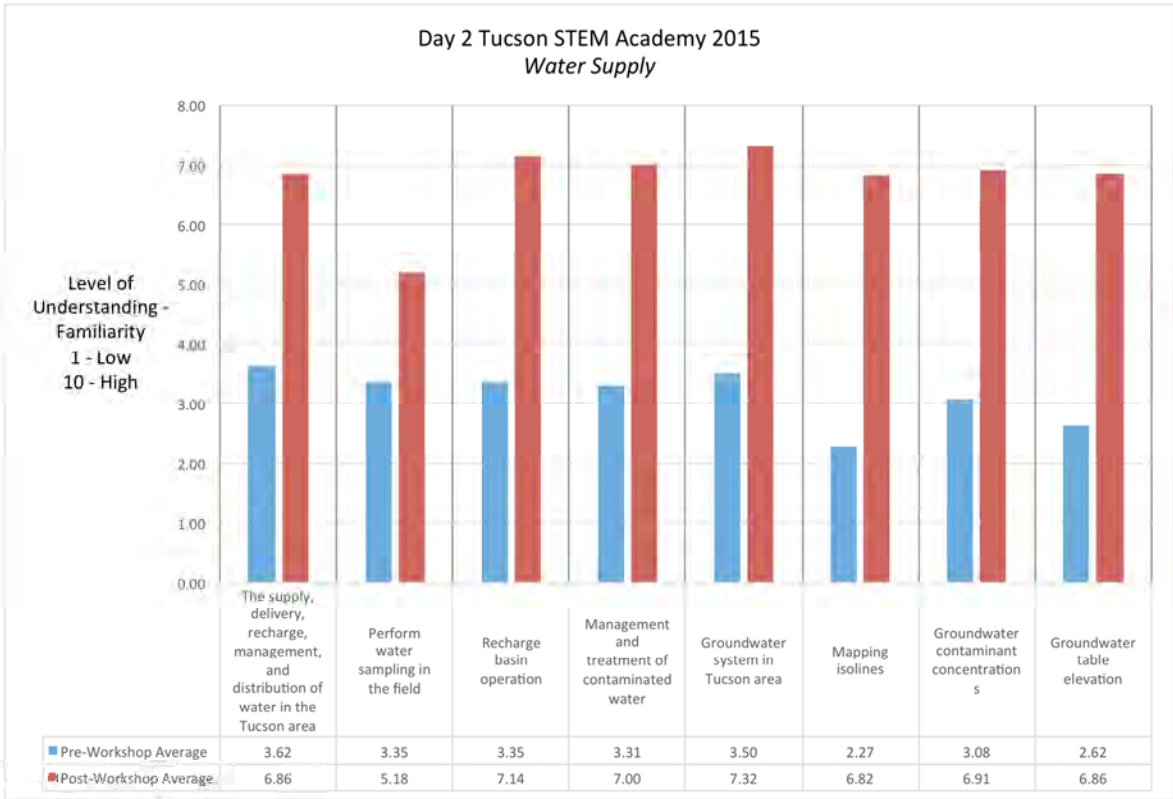


Figure 2 - STEM Academy Mastery of Content: Day 2

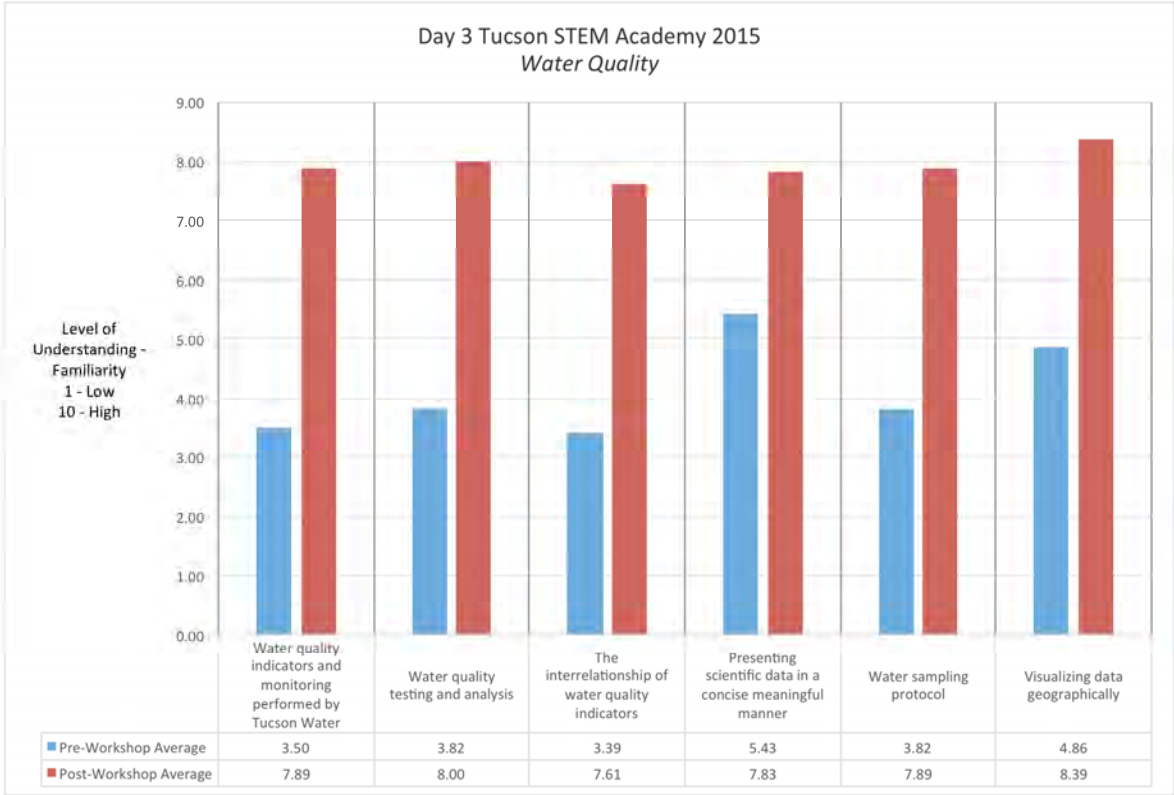


Figure 3 - STEM Academy Mastery of Content: Day 3

Figure 4 - STEM Academy Mastery of Content: Day 4

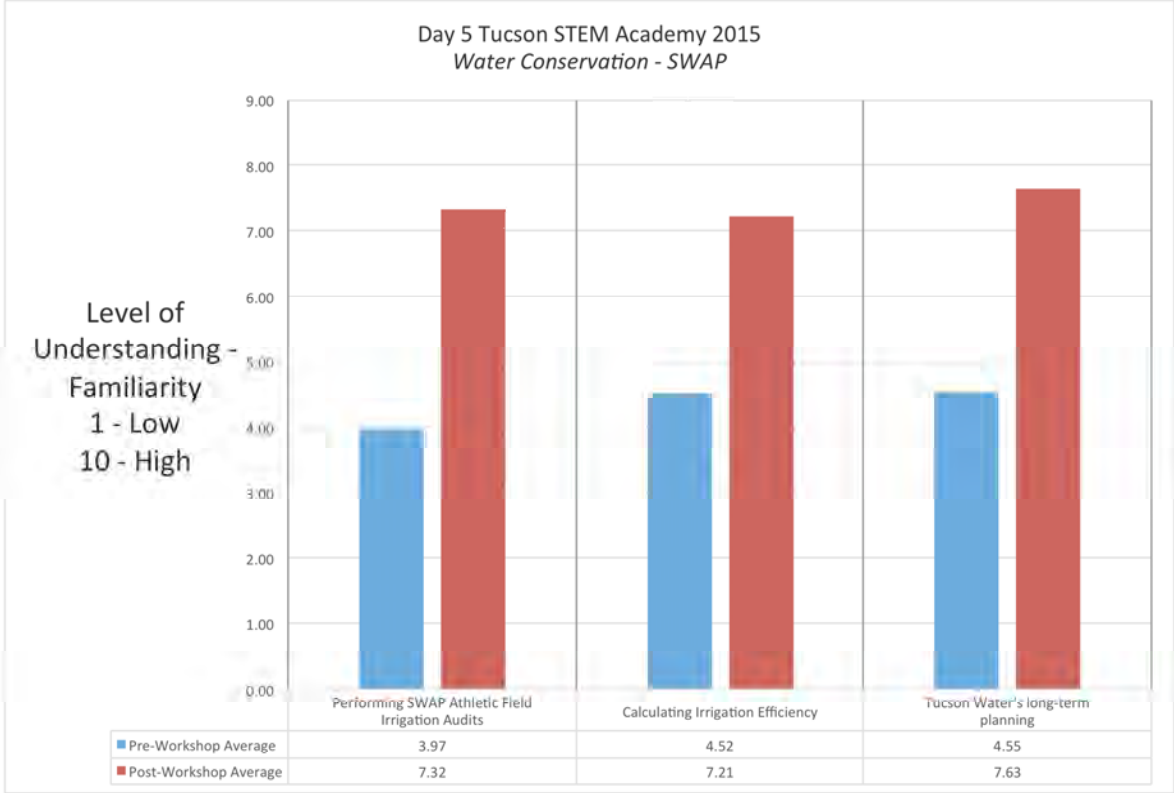


Figure 5 - STEM Academy Mastery of Content: Day 5

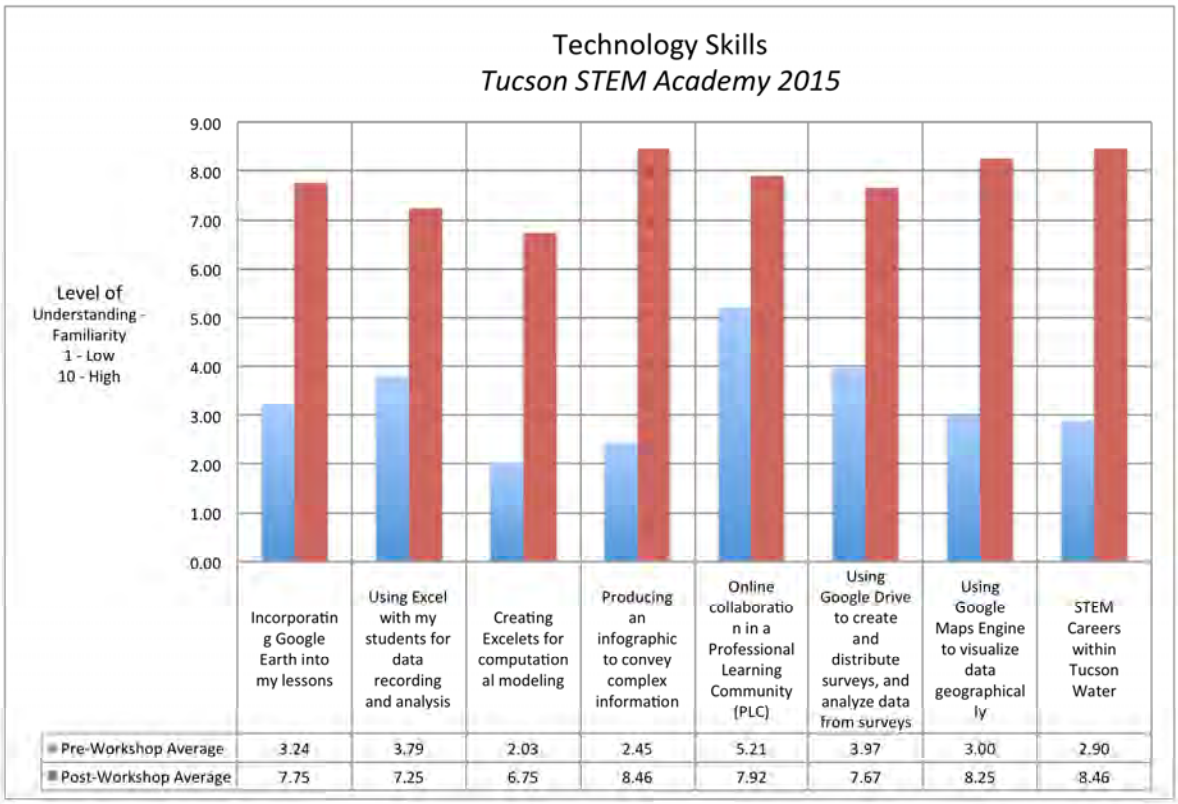


Figure 6 – STEM Academy Mastery of Content: Technology Skills

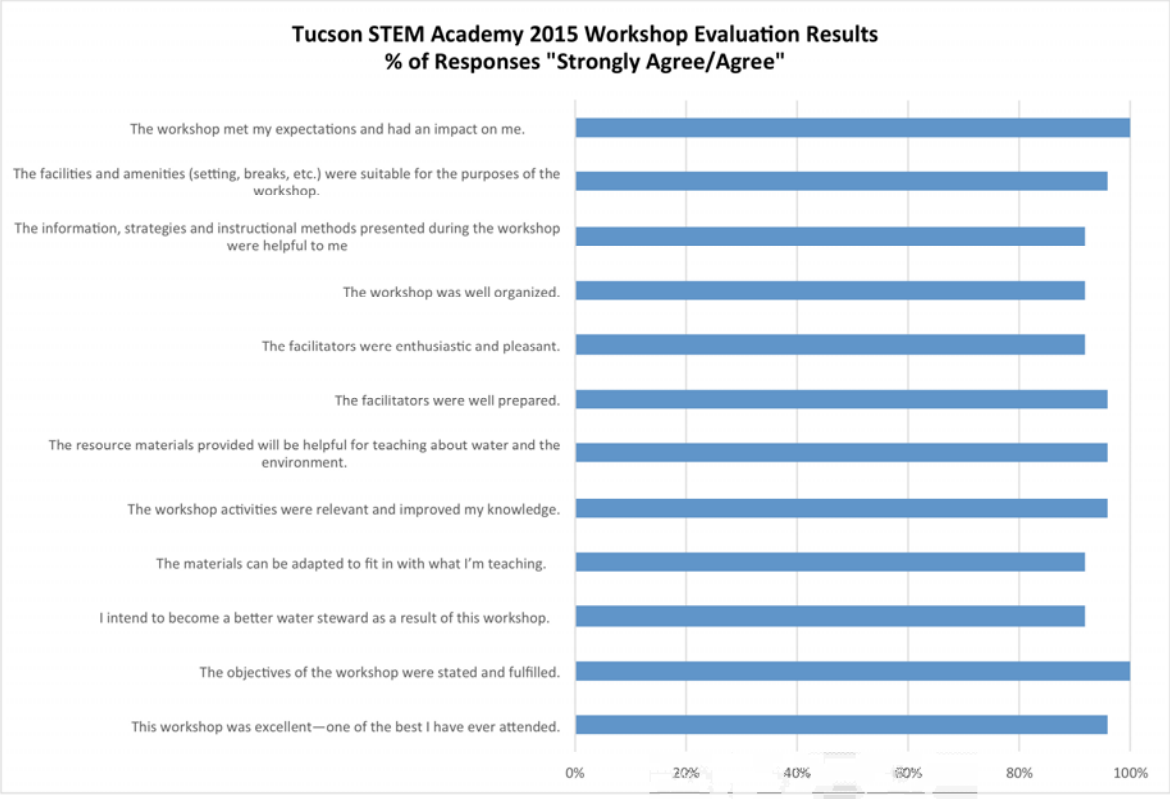


Figure 7 – STEM Academy: Workshop Rating

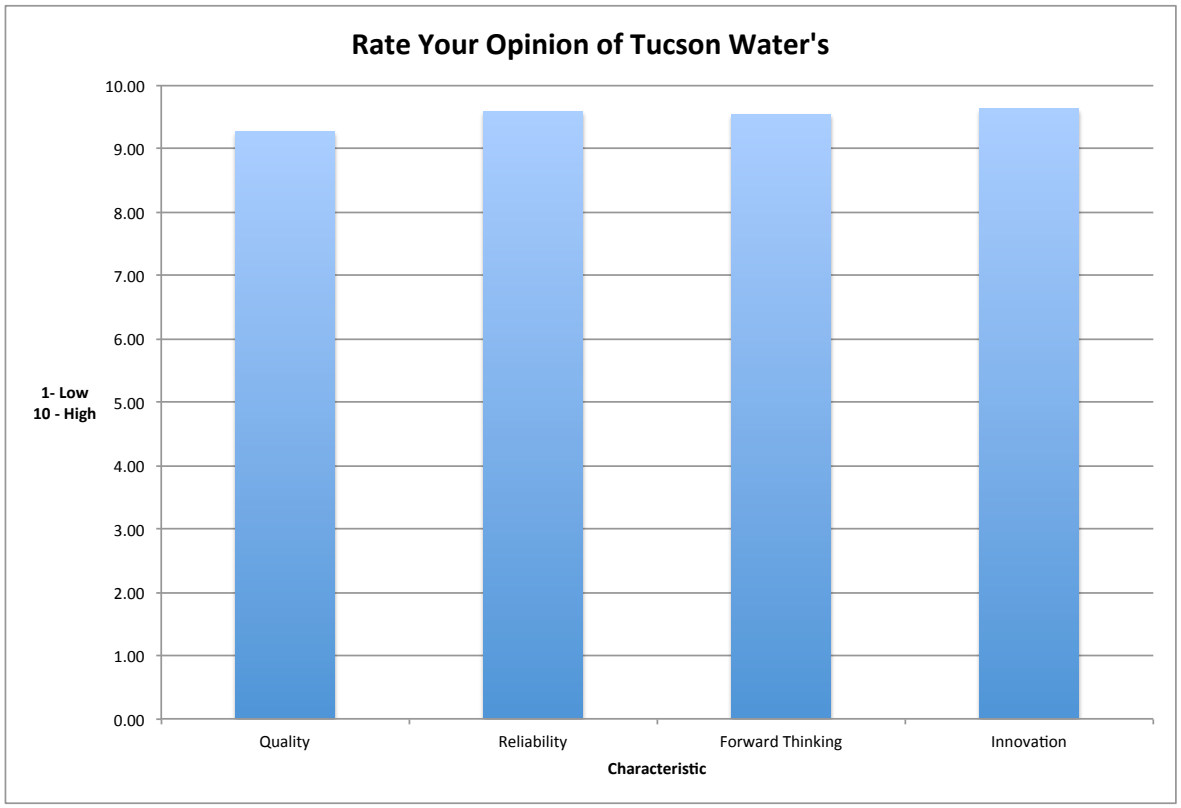
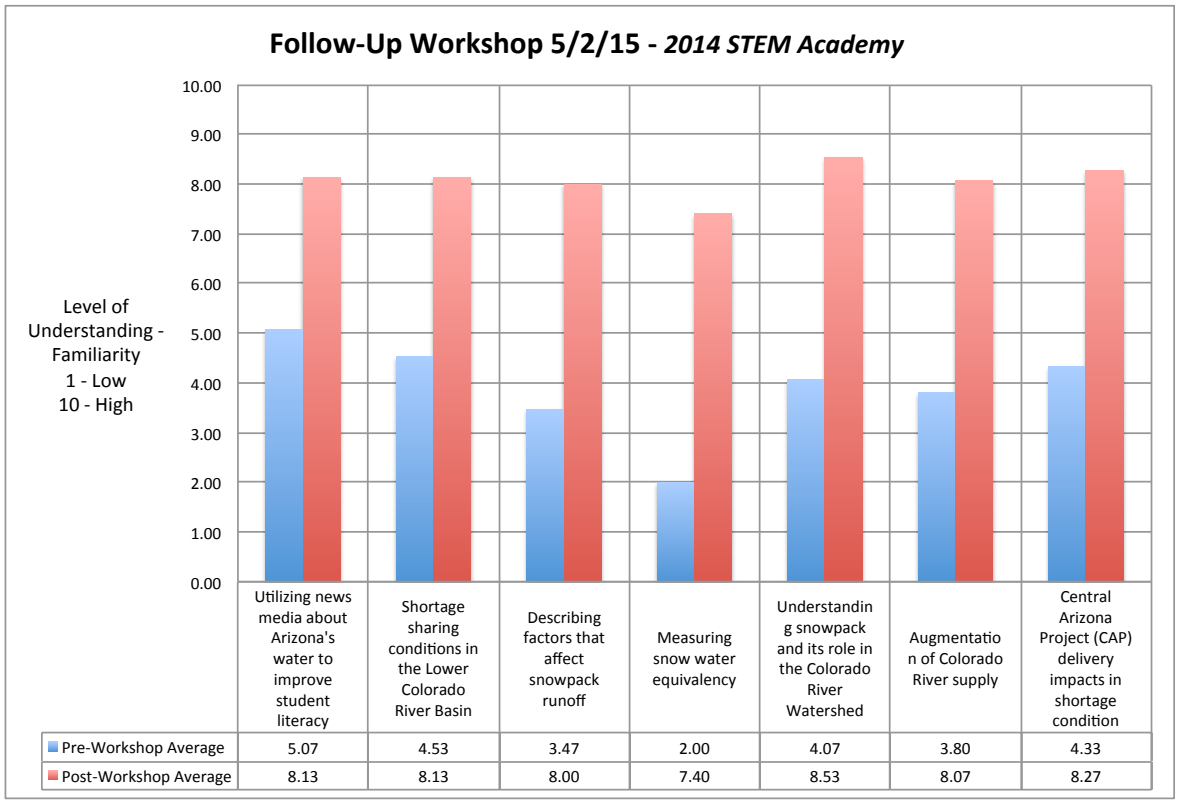


Figure 8 – STEM Academy: Understanding of Community's Water

2014 Tucson STEM Academy Follow-up



	Utilizing news media about Arizona's water to improve student literacy	Shortage sharing conditions in the Lower Colorado River Basin	Describing factors that affect snowpack runoff	Measuring snow water equivalency	Understanding snowpack and its role in the Colorado River Watershed	Augmentation of Colorado River supply	Central Arizona Project (CAP) delivery impacts in shortage condition
Pre-Workshop Average	5.07	4.53	3.47	2.00	4.07	3.80	4.33
Post-Workshop Average	8.13	8.13	8.00	7.40	8.53	8.07	8.27

Figure 9 – 2014 STEM Academy Follow-up Mastery of Content

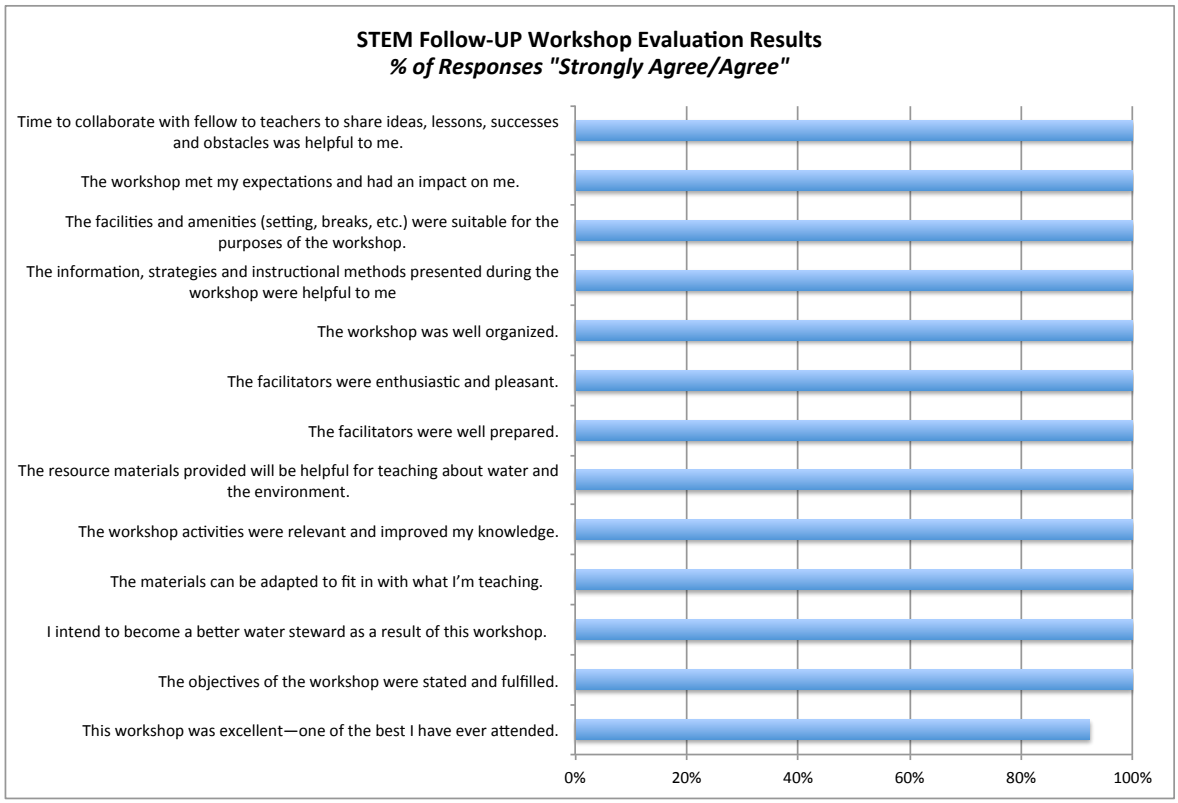
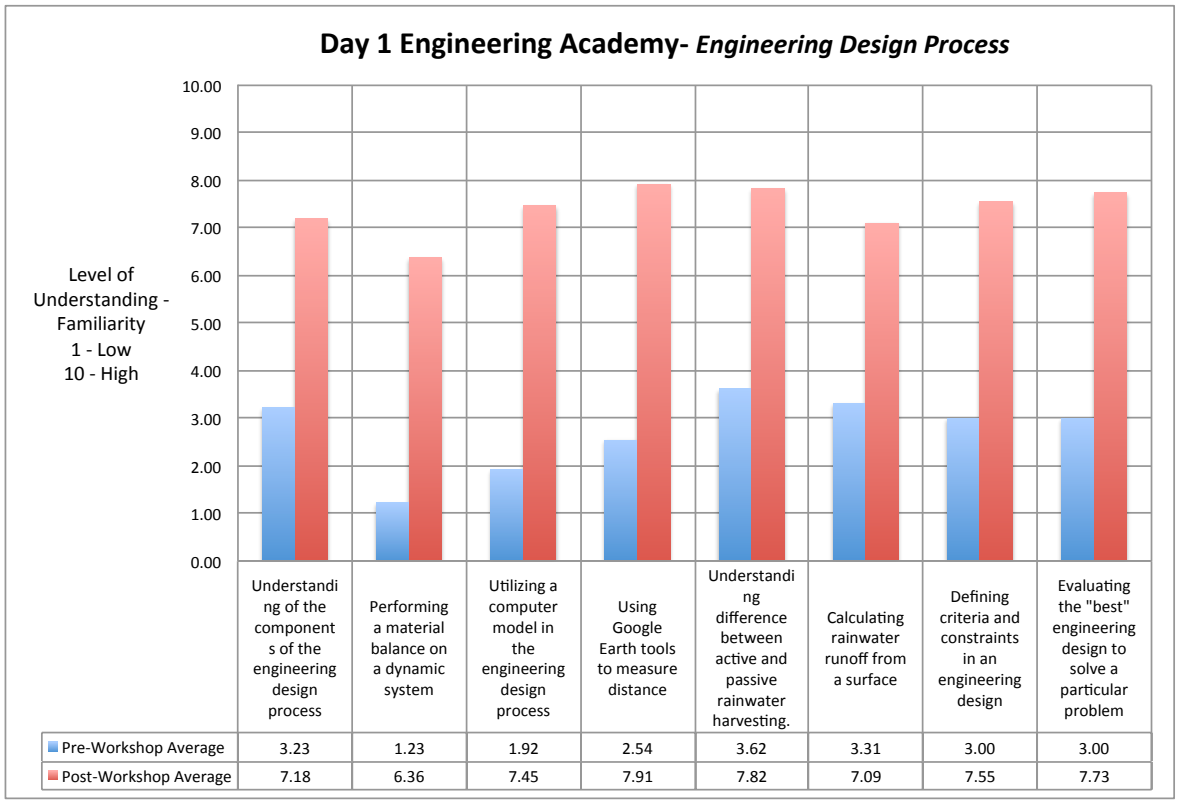


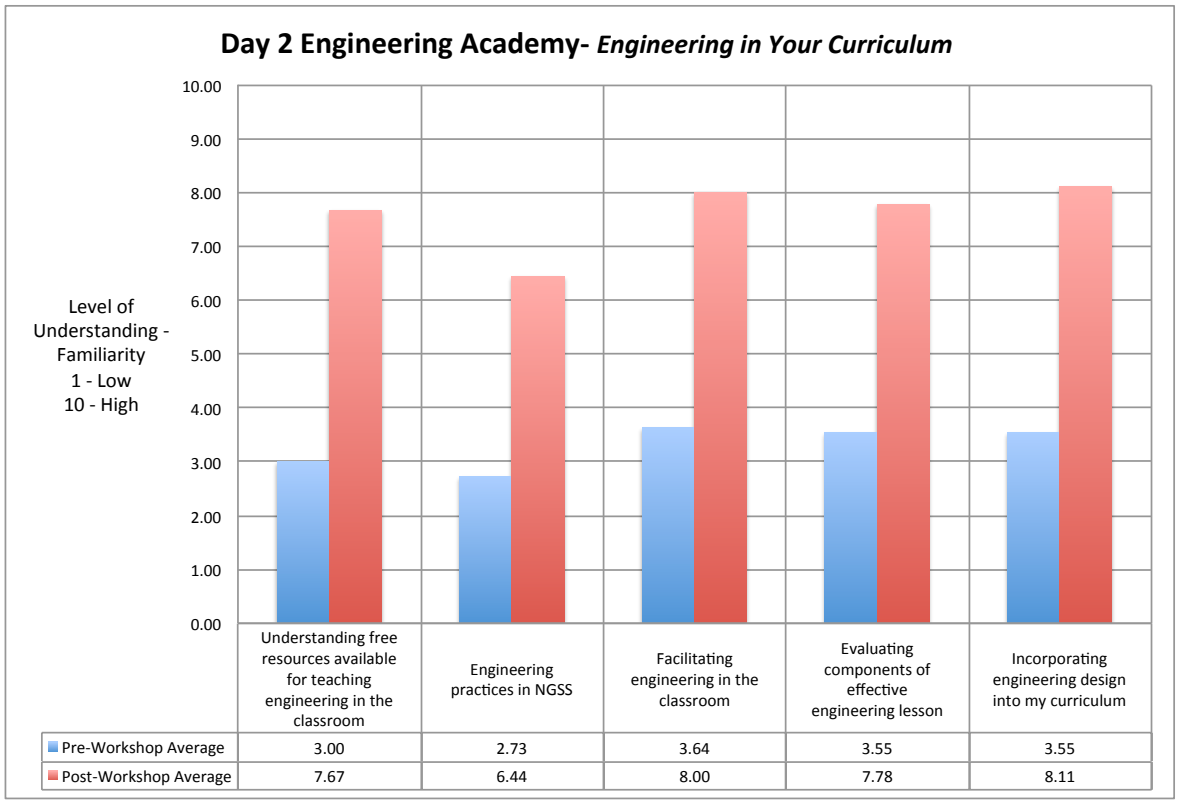
Figure 10 – 2014 STEM Academy Follow-up Workshop Rating

Integrating Engineering into the STEM Curriculum



	Understanding of the components of the engineering design process	Performing a material balance on a dynamic system	Utilizing a computer model in the engineering design process	Using Google Earth tools to measure distance	Understanding difference between active and passive rainwater harvesting.	Calculating rainwater runoff from a surface	Defining criteria and constraints in an engineering design	Evaluating the "best" engineering design to solve a particular problem
Pre-Workshop Average	3.23	1.23	1.92	2.54	3.62	3.31	3.00	3.00
Post-Workshop Average	7.18	6.36	7.45	7.91	7.82	7.09	7.55	7.73

Figure 11 – Engineering Academy Mastery of Content: Day 1



	Understanding free resources available for teaching engineering in the classroom	Engineering practices in NGSS	Facilitating engineering in the classroom	Evaluating components of effective engineering lesson	Incorporating engineering design into my curriculum
Pre-Workshop Average	3.00	2.73	3.64	3.55	3.55
Post-Workshop Average	7.67	6.44	8.00	7.78	8.11

Figure 12 – Engineering Academy Mastery of Content: Day

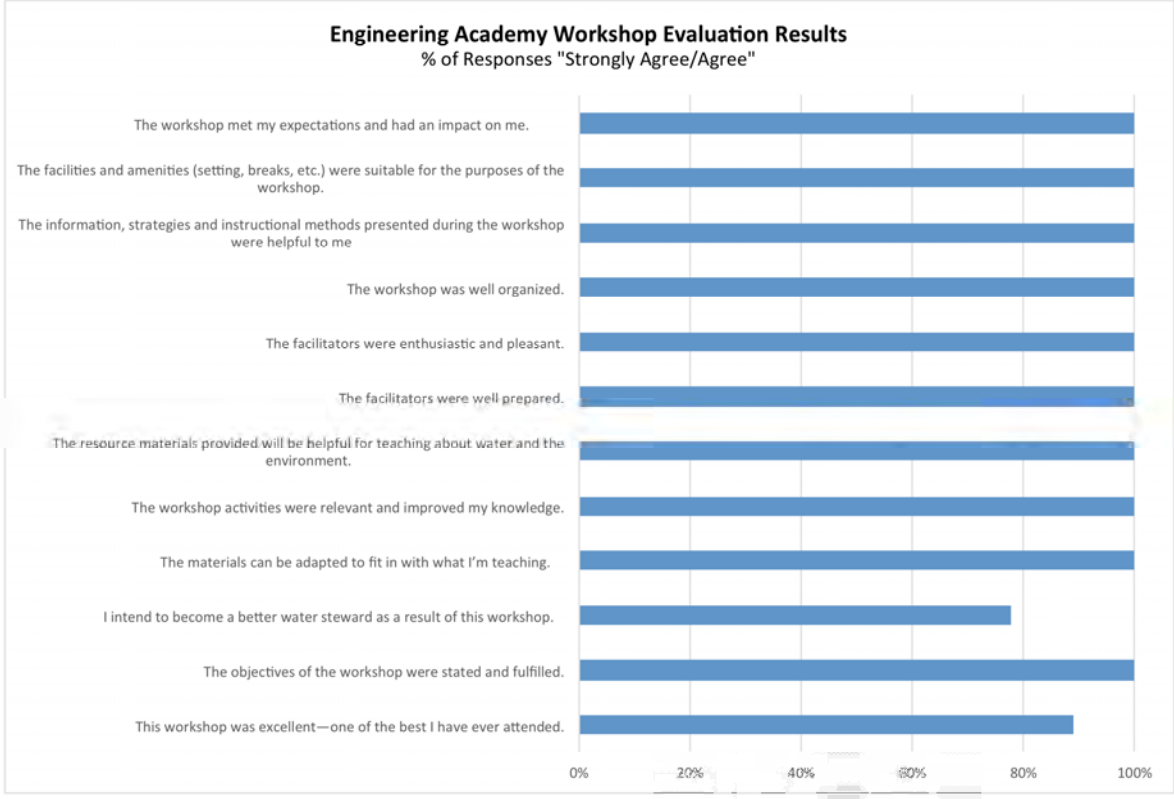


Figure 13 – Engineering Academy Workshop Rating

STEMAZing Institute

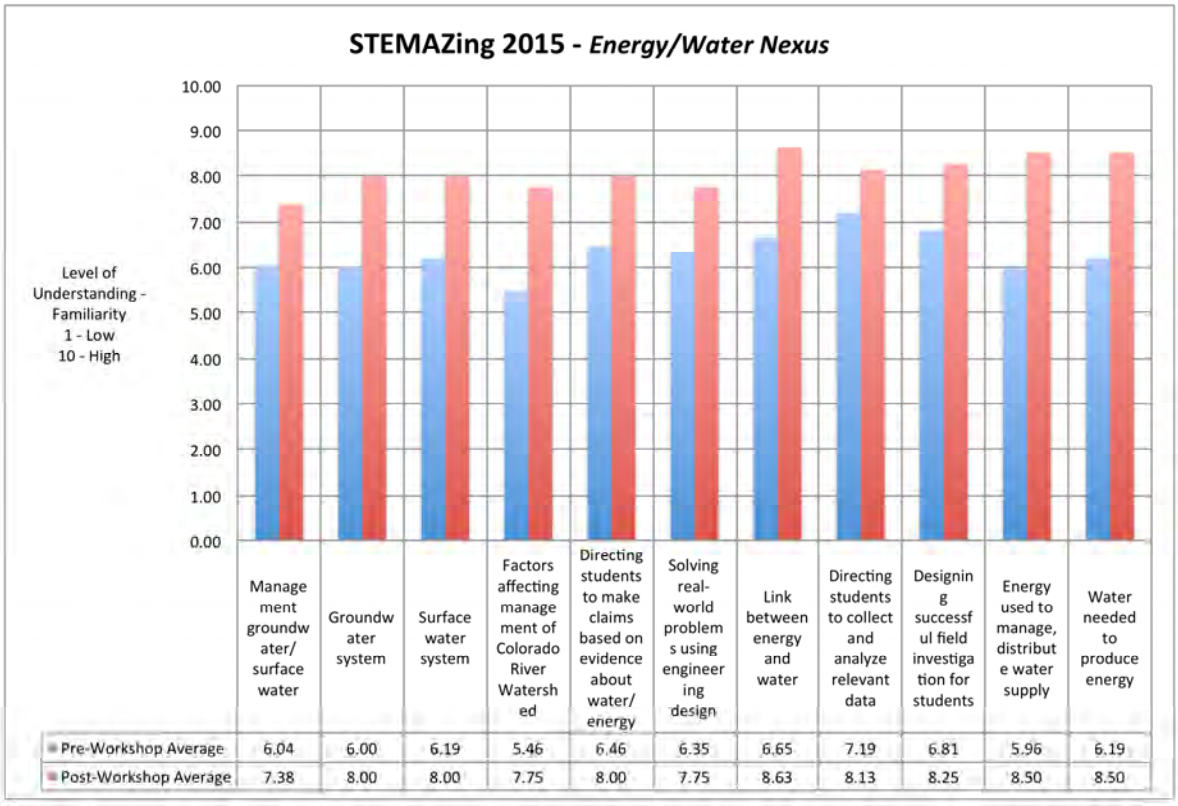


Figure 14 – STEMAZing Institute Mastery of Content

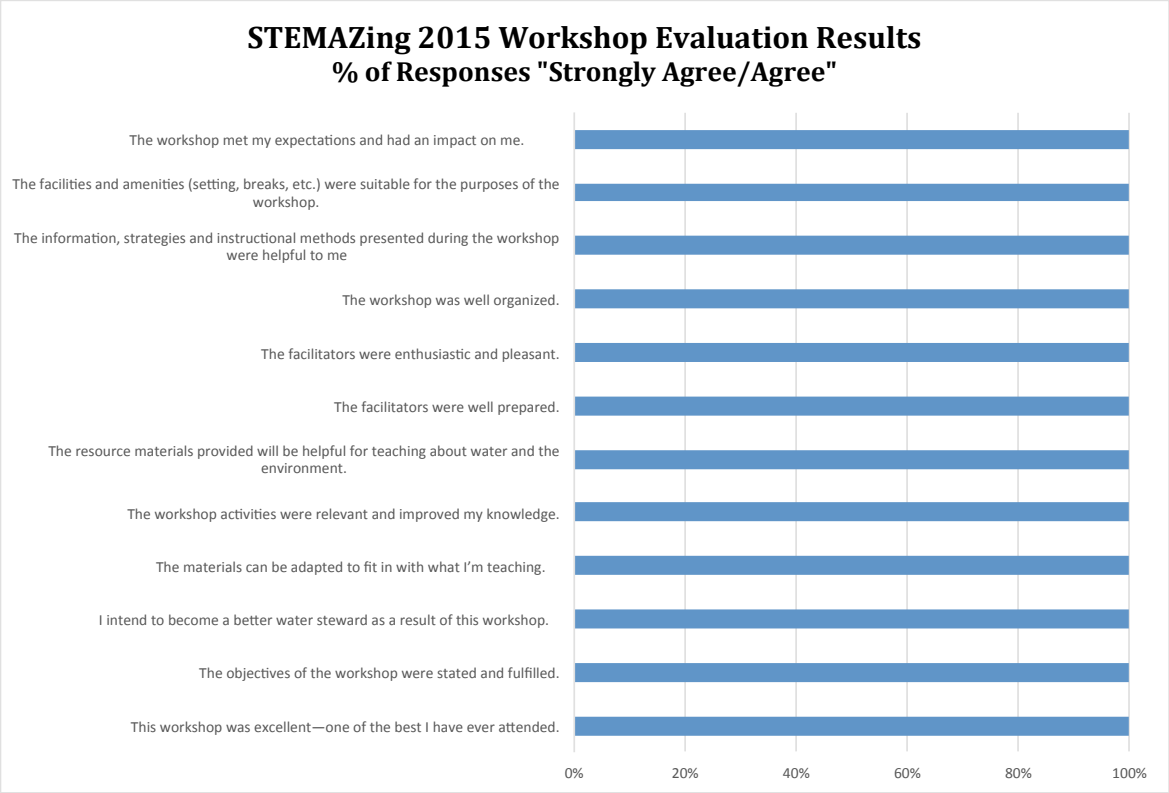
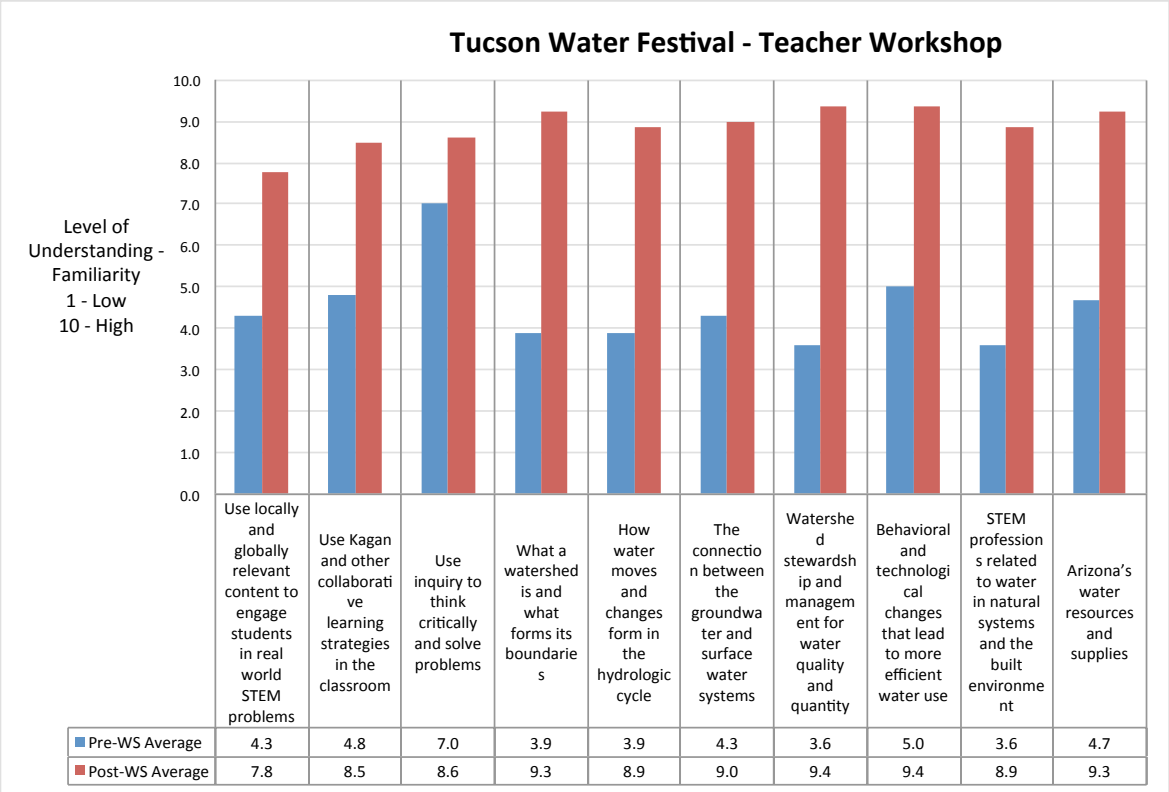


Figure 15 – STEMAZing Institute Workshop Rating

Tucson Water Festival Teacher Workshop



	Use locally and globally relevant content to engage students in real world STEM problems	Use Kagan and other collaborative learning strategies in the classroom	Use inquiry to think critically and solve problems	What a watershed is and what forms its boundaries	How water moves and changes form in the hydrologic cycle	The connection between the groundwater and surface water systems	Watershed stewardship and management for water quality and quantity	Behavioral and technological changes that lead to more efficient water use	STEM professions related to water in natural systems and the built environment	Arizona's water resources and supplies
Pre-WS Average	4.3	4.8	7.0	3.9	3.9	4.3	3.6	5.0	3.6	4.7
Post-WS Average	7.8	8.5	8.6	9.3	8.9	9.0	9.4	9.4	8.9	9.3

Figure 16 – Tucson Water Festival Workshop Mastery of Content

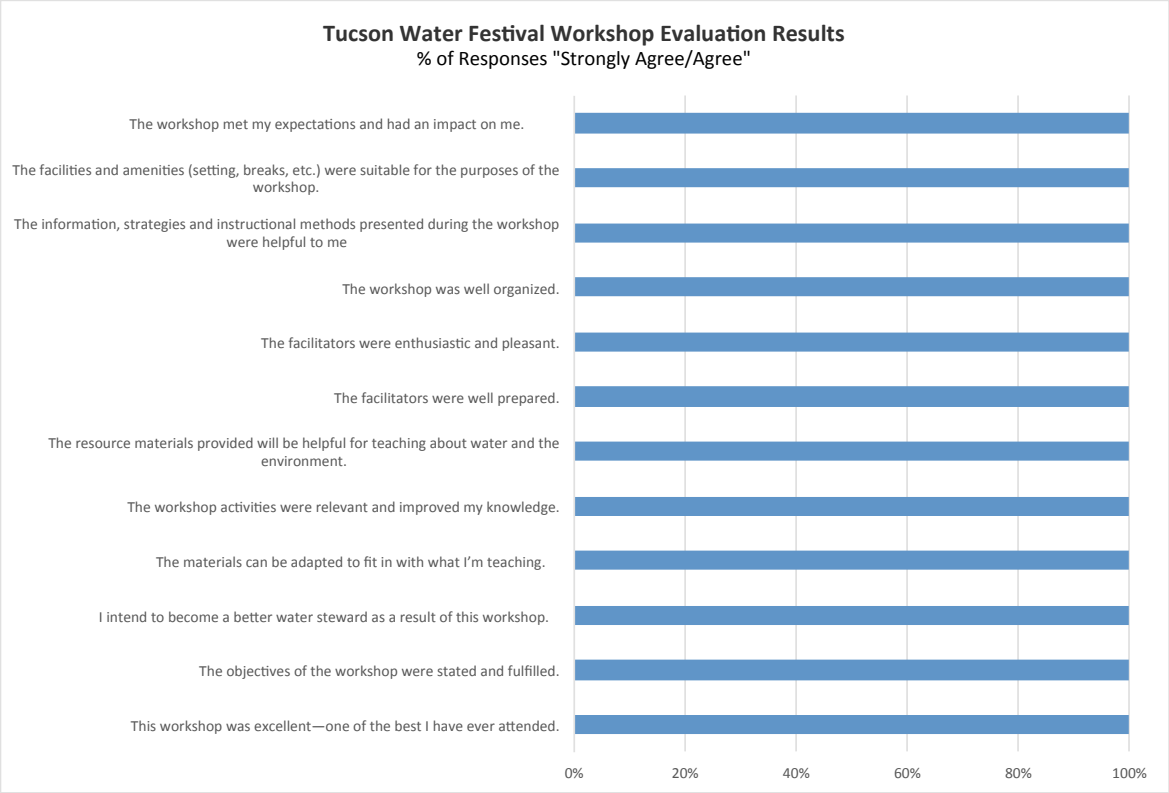


Figure 17 – Tucson Water Festival Workshop Rating

Biosphere 2

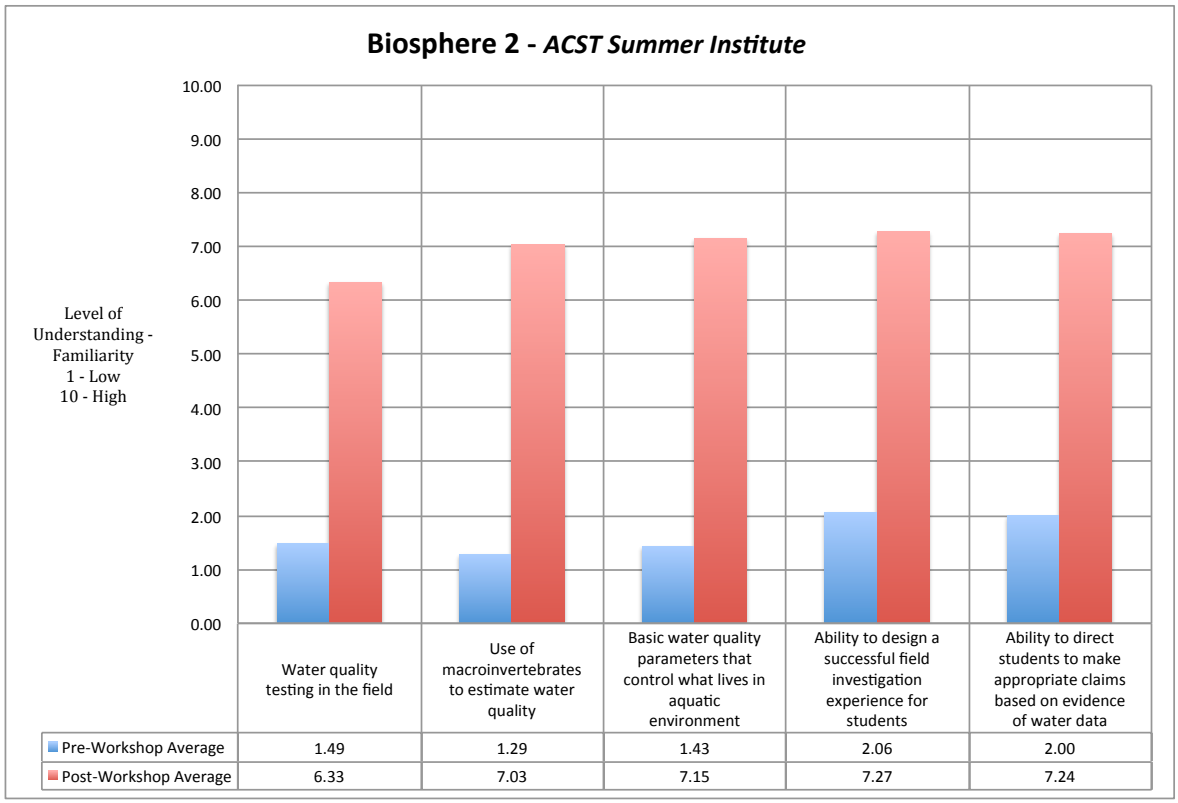
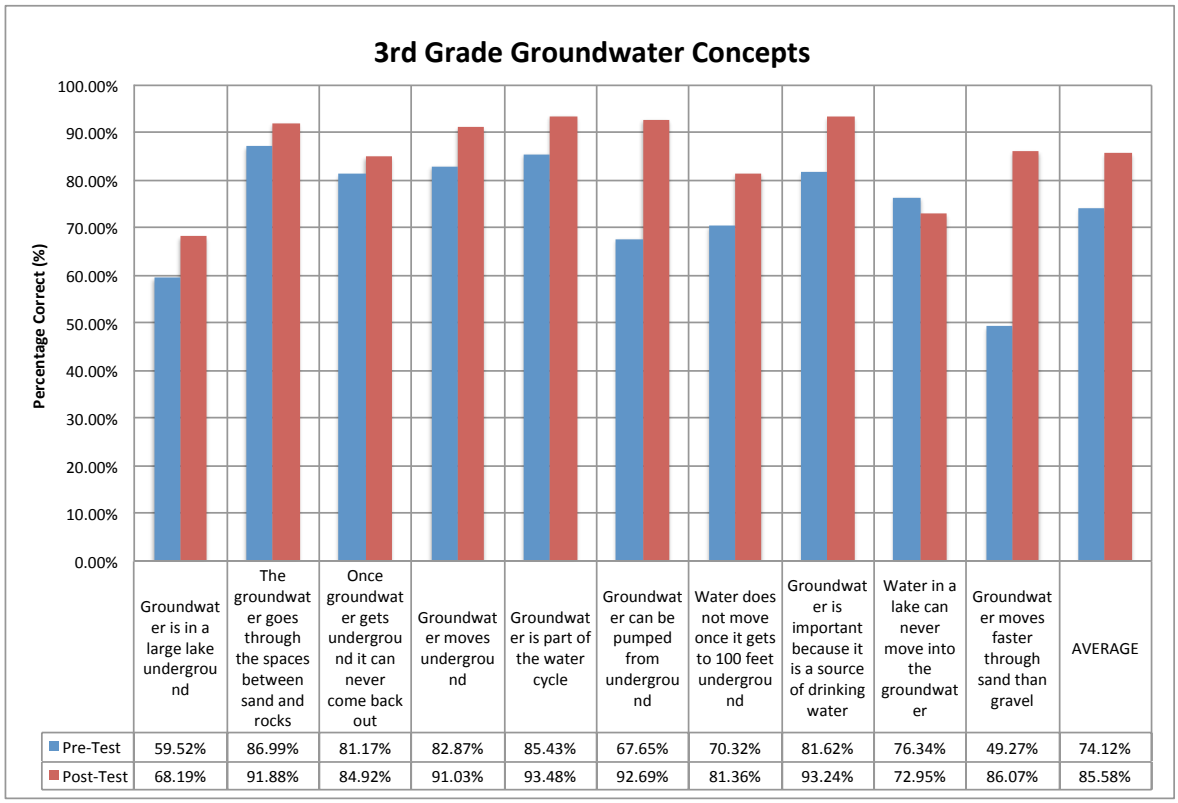


Figure 18 – Biosphere 2 Workshop Mastery of Content

Third Grade Curriculum Unit Programs



	Groundwater is in a large lake underground	The groundwater goes through the spaces between sand and rocks	Once groundwater gets underground it can never come back out	Groundwater moves underground	Groundwater is part of the water cycle	Groundwater can be pumped from underground	Water does not move once it gets to 100 feet underground	Groundwater is important because it is a source of drinking water	Water in a lake can never move into the groundwater	Groundwater moves faster through sand than gravel	AVERAGE
Pre-Test	59.52%	86.99%	81.17%	82.87%	85.43%	67.65%	70.32%	81.62%	76.34%	49.27%	74.12%
Post-Test	68.19%	91.88%	84.92%	91.03%	93.48%	92.69%	81.36%	93.24%	72.95%	86.07%	85.58%

Figure 19 – 3rd Grade Groundwater Evaluation

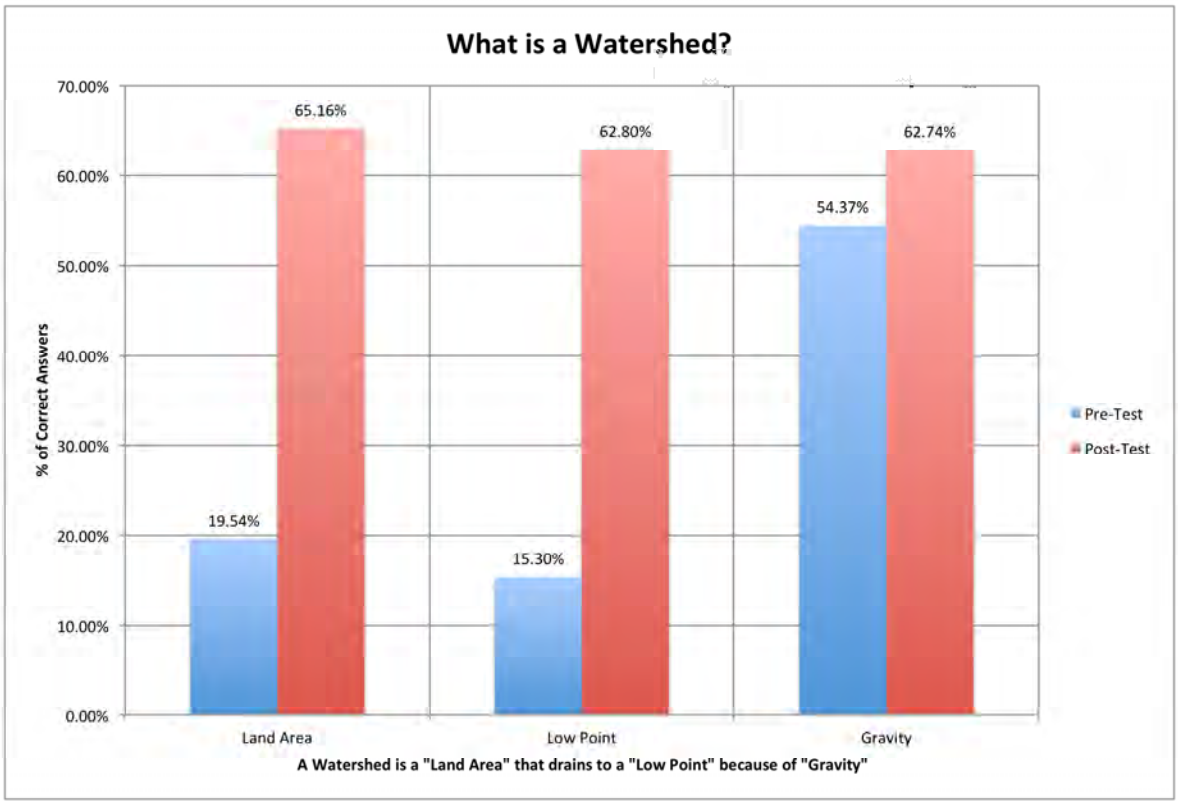


Figure 20 – Sweetwater Wetlands: Watershed

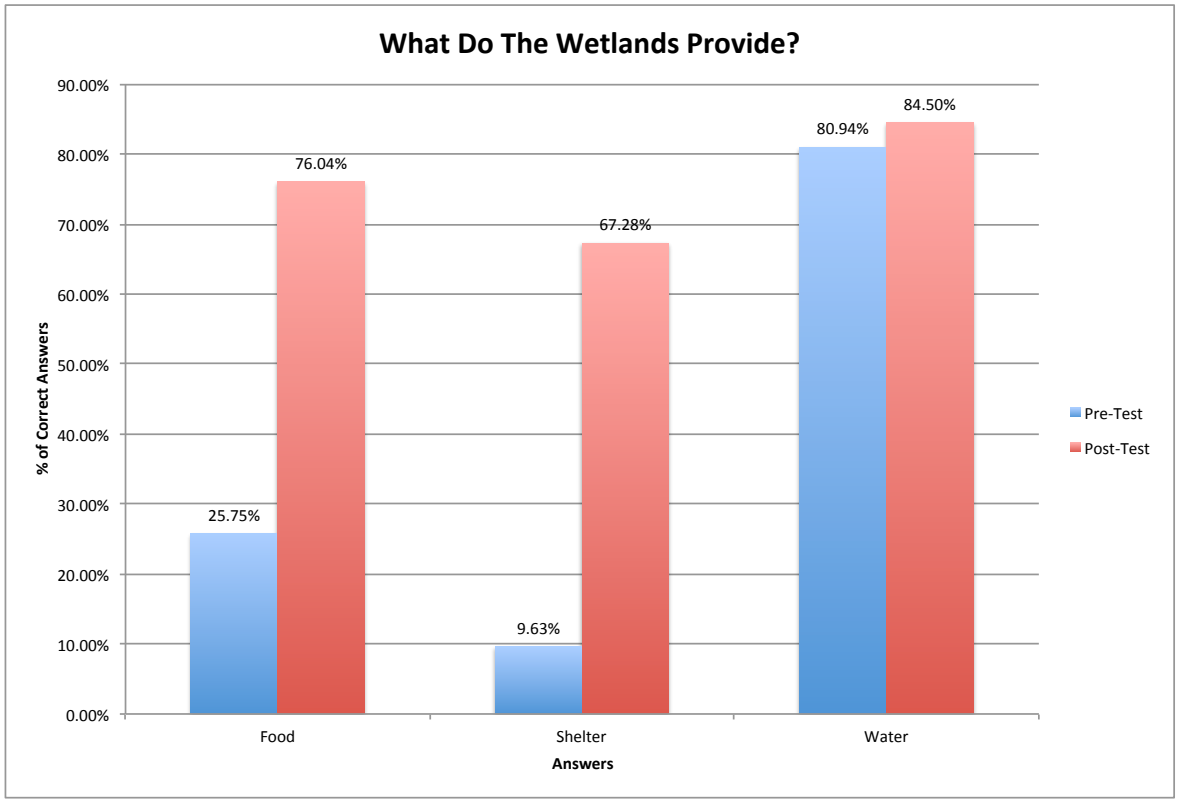


Figure 21 – Sweetwater Wetlands: Wetlands Provide

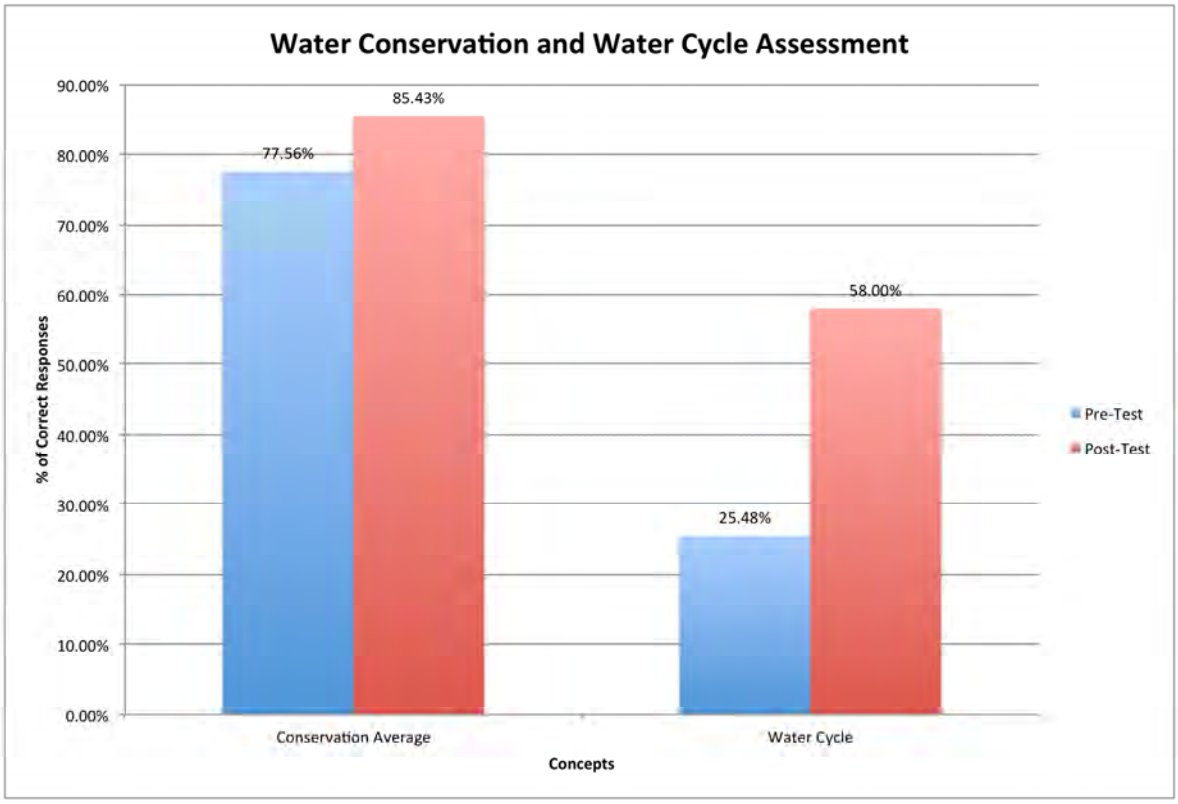


Figure 22 – Sweetwater Wetlands: Wetlands Provide

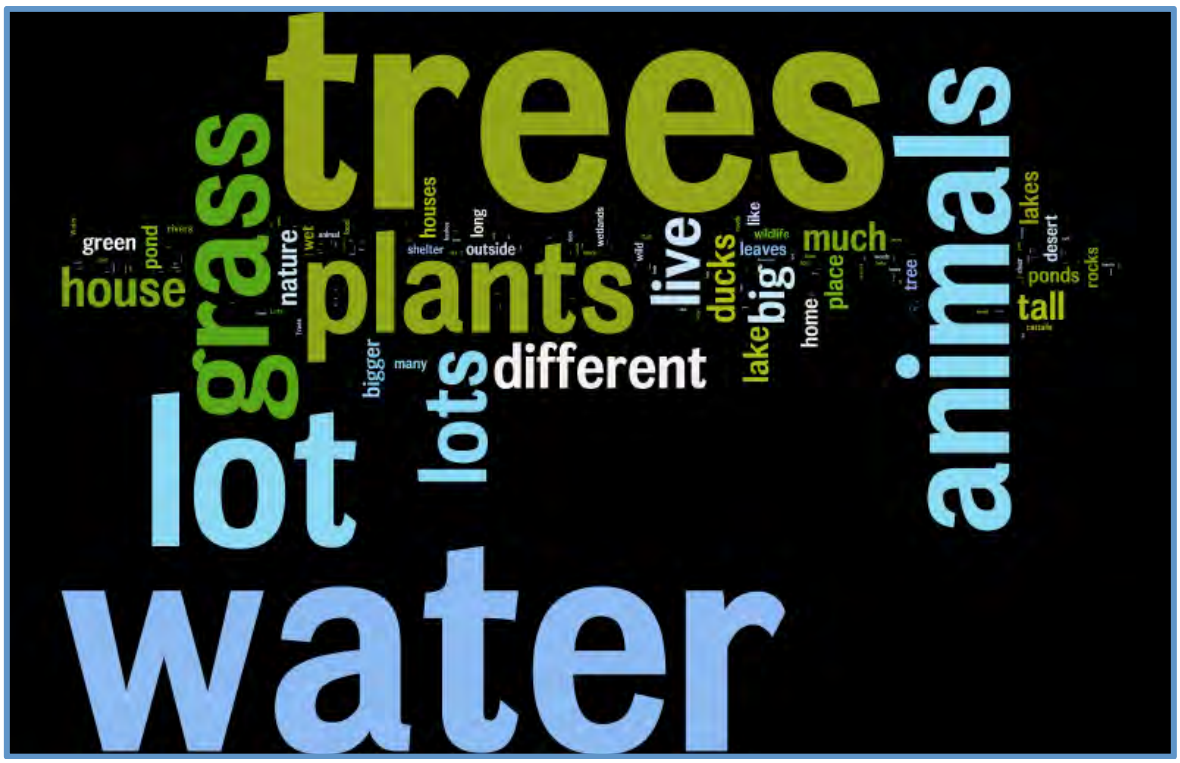
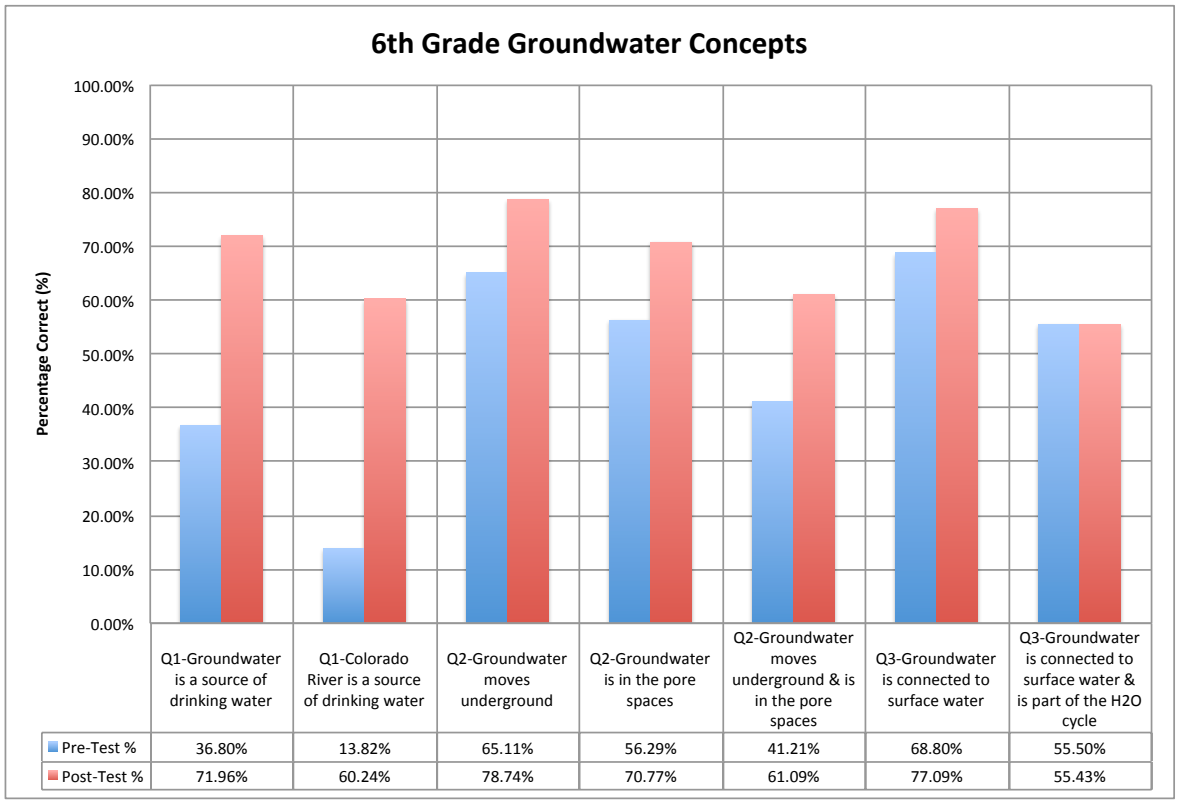


Figure 23 – Sweetwater Wetlands: What is different about this placed compared to where you live?

Figure 24 – Sweetwater Wetlands: How did it feel to be here

Sixth Grade Curriculum Unit Programs



	Q1-Groundwater is a source of drinking water	Q1-Colorado River is a source of drinking water	Q2-Groundwater moves underground	Q2-Groundwater is in the pore spaces	Q2-Groundwater moves underground & is in the pore spaces	Q3-Groundwater is connected to surface water	Q3-Groundwater is connected to surface water & is part of the H2O cycle
Pre-Test %	36.80%	13.82%	65.11%	56.29%	41.21%	68.80%	55.50%
Post-Test %	71.96%	60.24%	78.74%	70.77%	61.09%	77.09%	55.43%

Figure 25 – 6th Grade Groundwater Evaluation

Groundwater Presentations

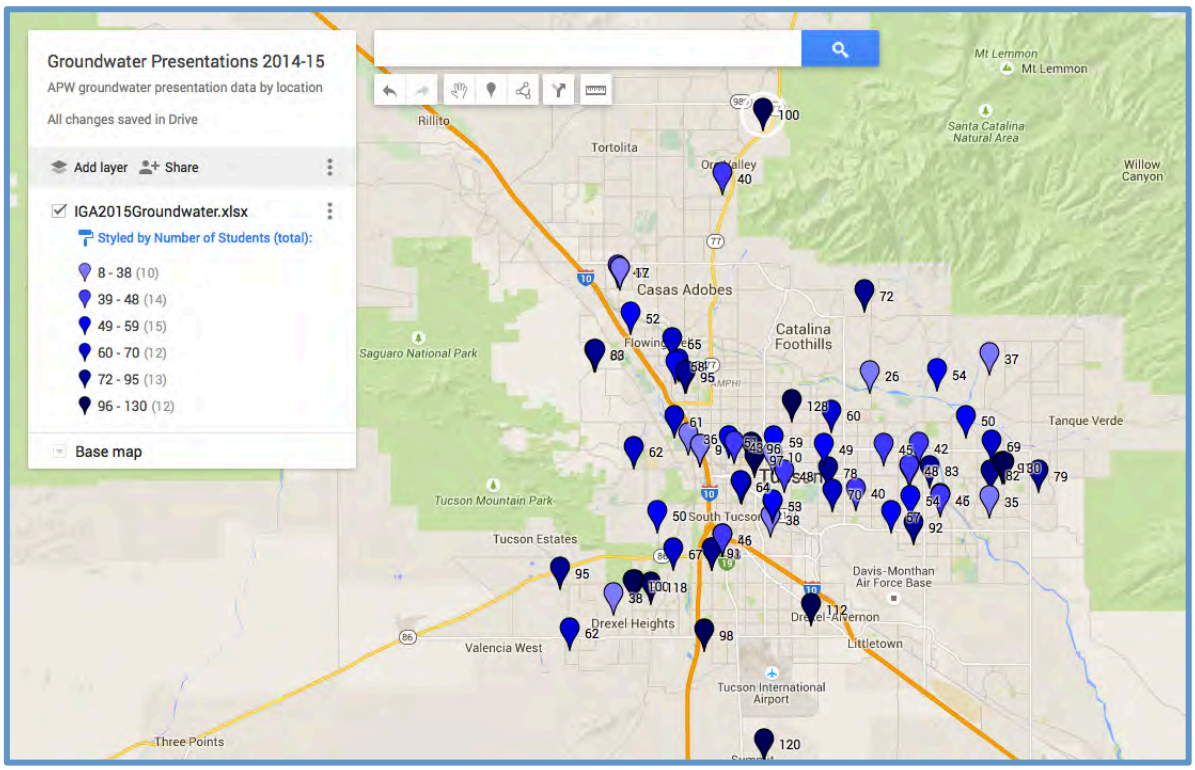


Figure 26 – 6th Grade Groundwater Evaluation

Arizona Water Festival Program

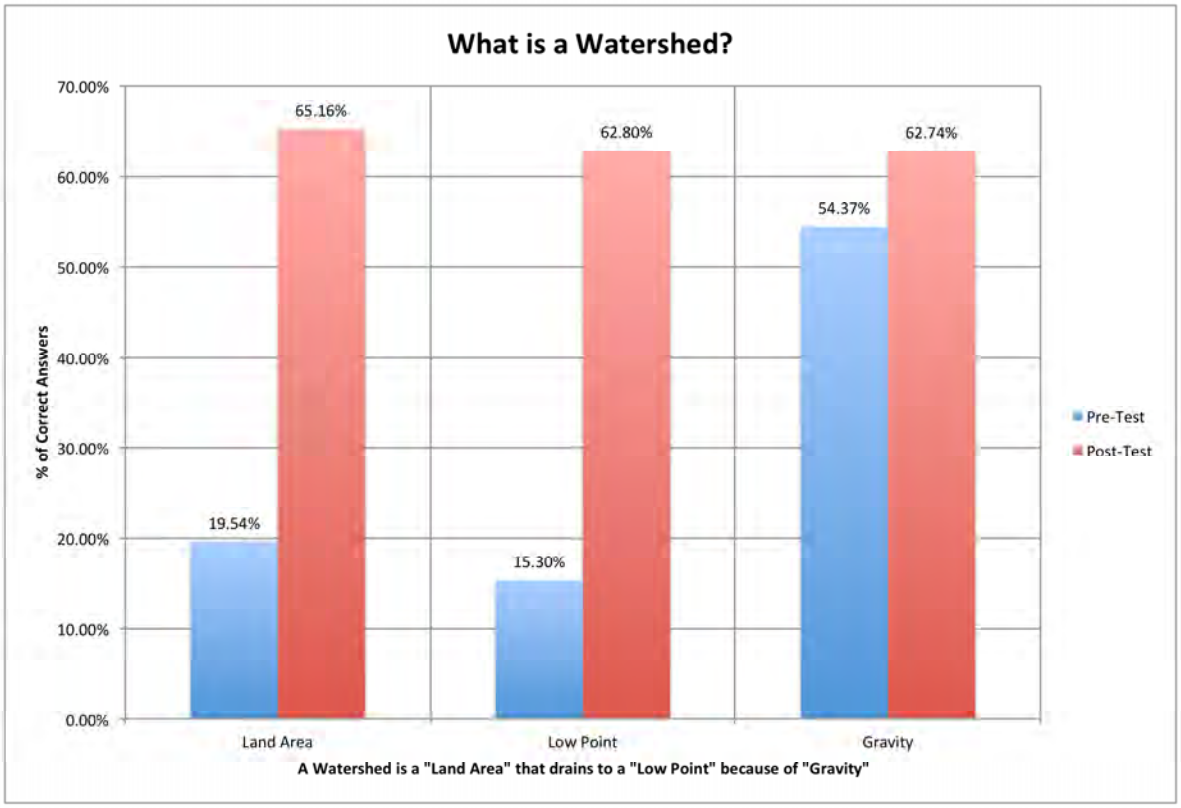


Figure 27 – Tucson Water Festival Evaluation

VI. Attachments

File Names	Description
SweetwaterPassport-2014-2015.pdf	3rd Grade Sweetwater Wetlands Evaluation
3rdGrade GW pre-post.doc	3rd Grade Groundwater Evaluation
6th grade Pretest.docx	6th Grade Groundwater Evaluation
IGA2015Reporting.xlsx	Data sheet of all presentations by location

Appendix B – EEExchange 2014-15 Annual Report

Tucson Water

Conservation Education Outreach Programs

Status Report for the 2014-2015 School Year

Submitted to:

Tucson Water
P.O. Box 27210
Tucson, Arizona 85726-7210

Submitted by:

Environmental Education Exchange
738 North 5th Ave., Suite 100
Tucson, Arizona 85705
(520) 670-1442
(520) 670-1443 Fax
www.eeexchange.org

May 2015

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IV. *Our Water, Our Future* Program Summary…… page 12

V. *El Tour de Agua* Middle School Program…….....page 16

VI. Classroom Presenters…….....page 21

VII. What Teachers Have To Say……..page 23

VIII. What Students Have To Say…… page 25

Appendices

Appendix A: Summary Report: 2014-2015……..page 27

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Appendix C: Summary Report: Spring 2015……...page 35

Appendix D: *Da Drops* Participating Schools 2014-2015…….....page 39

Appendix E: *Our Water, Our Future* Participating Schools 2014-2015…… page 47

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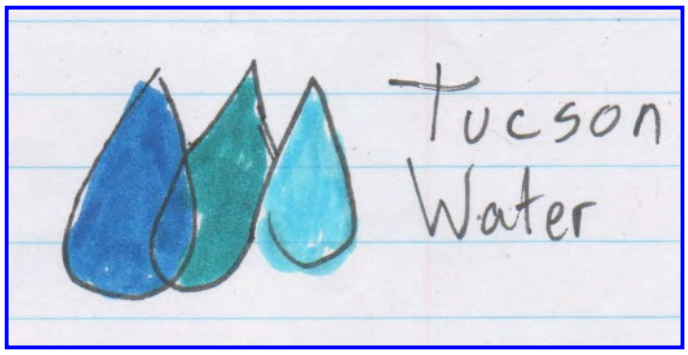


I. Program History

The Environmental Education Exchange in close partnership with Tucson Water has developed and continues to manage three water conservation education programs for Tucson Water. Together, the programs reached 16,750 students this year in grades one through eight in multiple school districts throughout the Tucson Basin. (In prior years, before *El Tour de Agua* was added as a middle school classroom presentation, the programs reached over 13,000 students per year.)

Originally Tucson Water commissioned the EEExchange to develop an outreach program that would bring hands-on activities to fourth and fifth grade classrooms. In 1993, the Exchange developed *Our Water, Our Future*, a two-part program consisting of five teacher-led activities followed by an interactive 90-minute presentation from an outreach educator. Now an hour-long presentation, *Our Water, Our Future* has reached over 2,200 classrooms, and is now an institution for many local fourth and fifth grade teachers.

In addition to developing *Our Water, Our Future*, the Exchange also manages the program. This entails contacting teachers, scheduling programs, revising curriculum activities, hiring and training presenters, maintaining equipment, conducting ongoing evaluation of the program, and otherwise coordinating this outreach effort. The on-site presentation is offered by a lively "Doctor Faucet" character and includes graphics, activities with a specially customized groundwater model, an overview of the water treatment process, ideas for water conservation, and complementary shower timers for each student. *Our Water, Our Future* was revised for the start of the 2013-2014 school year, with changes to the pre- and post-visit lessons, as well as to the on-site presentation. An exciting addition to *Our Water, Our Future* is a full-color activity book given to each student at the end of the presentation.

In 1998, the EEExchange developed and began to manage a new Tucson Water education program that was targeted primarily for first through third grade audiences. The Water Info Van Program, which begins with a short video, soon became known as *Da Drops* 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. Working with another customized groundwater model students first retrieve water with miniature buckets from the Santa Cruz River and later pump water through modern wells at a rapid rate. This teaching tool clearly demonstrates the connection between Tucson's growing population, diminishing underground water supply, new sources of water from the Colorado River and reclaimed water, and the importance of helping to conserve water on a daily basis. At the end of this hour-long program, the presenter passes out student activity booklets and a friendly cup for each student that encourages them to "*Brush Up With Just One Cup!*". *Da Drops* has reached over 83,000 students and has also become an institution for many local first through third grade teachers.

As an outgrowth of these highly successful elementary school programs, Tucson Water contracted the Exchange to develop and manage a middle school water education program as well. In the year 2000, the Exchange produced the *Tucson Toolkit: Perspectives on Our Water*, a

five-unit curriculum developed for middle school science teachers to integrate into their lesson plans. The *Tucson Toolkit* contains nine engaging hands-on activities such as collecting transpiration from leaves, constructing a miniature Mount Lemmon, and building a model to investigate groundwater contamination. In the culminating activity, after the class has learned why water is such a precious and limited resource in southern Arizona, students measure the flow rate of their showerheads at home. Those who report high flow rates receive a water-saving showerhead. The *Tucson Toolkit* differs from the other programs in that no presenter visits the classroom and all of the activities are led by the classroom teacher. All students receive a workbook, shower timer and flow rate measurement bag. Because the *Tucson Toolkit* materials have become dated, and there was a desire to have a middle school on-site classroom presentation, the *Toolkit* will no longer be offered after this school year (although parts of it will be incorporated in to the new program).

During 2013-2014, *El Tour de Agua*, a new middle school program including an on-site classroom presentation, was developed. After the pilot program with 50 classes in Spring 2014, the program was revised before launching the 2014-2015 school year. The program focuses on water sources, water recycling, and water conservation. Students are taught to question if their water sources are reliable, safe and sustainable. The classroom presentation is approximately one hour in length and uses a Prezi media format rather than posters, for a more exciting and interactive learning experience. Teachers show a pre-visit PowerPoint presentation to their students for background information (with a related Student Study Guide), and follow up with a post-visit lesson on water conservation (using the Shower Flow Kit materials that are student give-aways).

These educational programs are currently managed by the Environmental Education Exchange, on behalf of Tucson Water, and are offered free of charge to local teachers and students.

II. 2014-2015 School Year Overview

Students and Classes Reached

During the 2014-2015 school year, Dr. Faucet and *Da Drops* visited approximately 7,828 students in 318 first, second, and third grade classrooms in 74 different schools. Through the *Our Water, Our Future* program, Dr. Faucet visited 4,379 students in 167 fourth and fifth grade classes in 54 schools. *Da Drops* and *Our Water, Our Future* were presented in 98 elementary schools in eight school districts, as well as seven charter schools and six private schools. This year, EEExchange was budgeted for 485 elementary classroom presentations, instead of the usual 450 (with additional presentations added on at the end of the school year.) The total was actually 487 (2 additional because of the way teachers scheduled). The new middle school program, *El Tour de Agua,* was scheduled for 182 presentations, reaching a total of 4,543 students and 71 teachers from 45 schools representing five school districts, 10 charter schools and 7 private schools. (This program was initially budgeted for 200 presentations, but scheduling did not begin until late October while revisions were made from the pilot in the early fall.)

In total, all 3 outreach programs reached 16,750 students and 555 teachers at 127 schools representing 8 school districts, 14 charter schools and 11 private schools. Refer to Appendices A-G for details about school districts, schools and numbers of students reached.

Da Drops 2014-2015 Totals:

Presentations – 318
Students Reached – 7,828

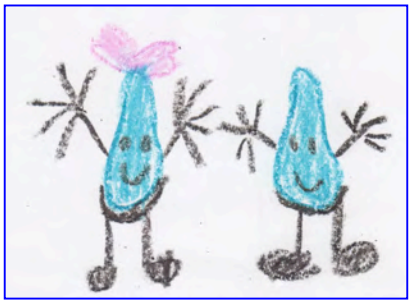
Our Water, Our Future 2014-2015 Totals:

Presentations – 167
Students Reached – 4,379

El Tour de Agua 2014-2015 Totals:

Presentations - 50
Students Reached – 4,543

In addition, one special event was attended during the 2014-2015 school year: Family Science Night at Rattlesnake Ridge Elementary School (MUSD) on November 18, 2014. During the past few years, Tucson Water has been opting to send Project WET or Tucson Water employees to events, rather than EEExchange presenters. Refer to Appendix G for details.



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. Pre- and post-visit materials for *El Tour de Agua* were linked to the download counter at the start of the 2014-2015 school year. Refer to Appendix A for details.

Program Highlights

- Evaluations continue to be completed by teachers on-line.
- Continued streamlined approach to outreach scheduling with scheduling website
- Presenter training, observation and feedback
- Outreach to new schools not visited in past years
- A new middle school program, *El Tour de Agua*, was developed during 2013-2014, piloted in Spring 2014, revised during summer 2014, and easily scheduled during 2014-2015.

The Scheduling Website

The scheduling website originally came on-line in mid-September 2003 and was revised in August, 2006 (www.outreach-scheduling.org). It continues to be extremely beneficial to teachers, the Outreach Education Coordinator and classroom presenters.

- The scheduling website continues to allow teachers and the Outreach Education Coordinator to easily schedule outreach presentations.
- During the 2014-2015 school year, 57% of *Da Drops* presentations, 71% *Our Water, Our Future*, and 38% of *El Tour de Agua* presentations were scheduled by teachers using the website. This not only includes when all presentations for specific dates are scheduled on-line, but also includes when one teacher schedules him/herself and writes an on-line note that other teachers at his/her school should be scheduled as well. These teachers scheduled at their convenience, without having to reach the Outreach Education Coordinator by phone or email. The remainder of the presentations was scheduled primarily by teachers contacting the Outreach Education Coordinator via email (40% for *Da Drops*, 26% for *Our Water, Our Future,* and 60% for *El Tour de Agua*) and very occasionally by telephone (2% for *Da Drops*, 3% for *Our Water, Our Future,* and 2% for *El Tour de Agua*). In the future, it is expected that more teachers will schedule directly online, especially for *El Tour de Agua*, as this was the first year that this program was offered. The Coordinator then enters the information onto the scheduling website. (After initial telephone conversations, schedules are finalized using email.)
- Teachers can download the complete set of curriculum activities for each program, or individual sections. It is extremely rare (no requests at all this year) that a teacher requests a copy sent by mail (thus eliminating hundreds of photocopies and mailings each year).
- Teachers complete evaluations on-line, saving paper and postage. In addition, statistics can easily be calculated using all of the data collected.
- The Outreach Education Coordinator can easily schedule presentations using the website, and keep track of all presentations for the entire school year. The website continues to offer easy access while out of the office. The database of teachers can be used to contact teachers for reminders and announcements.

- School addresses continue to be updated on the scheduling website. As presenters discover new ways to get to a school, or old ways that no longer work, they continue to inform the Outreach Education Coordinator, who updates the site (as well as a separate file that is printed out for each presenter at the beginning of each school year).
- The pdf download counter continues to provide information about the number of downloads for the various curricula available on-line. Refer to Appendix A for details.
- Presenters continue to obtain their schedules from the website, thus eliminating numerous photocopies of presentation details each month. Directions to schools and roundtrip mileage are also included, as well as a direct link to Google Maps.

Teacher Evaluation and Feedback

After a presentation is completed, a teacher receives a thank you note via email that contains a link to an on-line evaluation form. The site indicates when that form has been completed, so that the Outreach Education Coordinator can review it. Lots of paper and postage is saved using the

on-line method. The on-line site not only stores all of the valuable data, but it also does statistical analysis of the information. If a teacher does not have an email address, he/she can still receive a paper evaluation form. In this extremely rare case, the Coordinator can enter the data herself.

The average evaluation ratings for the on-site programs of *Da Drops* and *Our Water, Our Future* were overwhelmingly "Excellent" and "Good" (97% for *Da Drops*, 96% for *Our Water, Our Future*, and 97% for *El Tour de Agua*). The table below shows the average results for the both on-site programs. Data were collected from August 25, 2014 through May 25, 2015.

Da Drops **Average Teacher Evaluation Results for On-Site Programs**	***Our Water, Our Future*** **Average Teacher Evaluation Results for On-Site Programs**	***El Tour de Agua*** **Average Teacher Evaluation Results for On-Site Programs**
Excellent: 83%	**Excellent: 80%**	**Excellent: 84%**
Good: 14%	**Good: 16%**	**Good: 13%**
Fair: 1%	**Fair: 2%**	**Fair: 2%**
Poor: .1%	**Poor: .2 %**	**Poor: .3%**
Not Applicable: 2%	**Not Applicable: 3%**	**Not Applicable: 1%**

III. *Da Drops* Program Summary

2014-2015 was an extremely successful year in the history off the *Da Drops* program, with 318 programs presented. Compared with 2013-2014, there were 25 additional presentations, with 413 more students reached at 5 more schools. Approximately 27% of the presentations were given to 1st grade classes (down from 29%), 37% to 2nd grade classes (up from 31%), 33% to 3rd grade classes (down from 34%), and 3% to other classes (multi-age) (down from 76%). This is the first year that the number of 2nd grade presentations has surpassed 3rd grade! Refer to Appendices A-D for details about school districts, schools and numbers of students reached by the *Da Drops* program.

Da Drops pre/post-visit activities are being downloaded by more than just the teachers having on-site presentations. The complete set of activities was downloaded 446 times during the 2014-2015 school year (August 16, 2014-May 22, 2015), with individual sections downloaded between 294 and 458 times, so we know that many teachers are aware of these materials on-line, and are possibly even using them outside of the Tucson area. Refer to Appendix A for details.

Overview of Program Revisions – *Da Drops*

Worn props were replaced as needed throughout the year.

Teacher Evaluations – *Da Drops*

The 91 completed teacher evaluations showed a continuing strong satisfaction with the *Da Drops* program. Twenty-nine percent of the teachers returned their completed evaluations this year (as compared to 24% last year). Of the teachers who completed the evaluations, 28% teach 1st grade, 36% 2nd grade, and 30% 3rd grade.

The following areas of the on-site program received at least 85% excellent ratings: water cycle story with Slick the Drop, groundwater model and activities, conveying the value and importance of water, introduction the three states of water, introducing the water cycle, introducing the aquifer and groundwater, introducing water conservation, raising the interest and motivation of your students, being appropriate for the grade level of your students, and being easy to schedule. All other areas of the on-site program received 74-84% excellent ratings. All areas of the on-site program received 93-100% excellent and good ratings combined.

Approximately 76% of teachers completing the evaluation used one or more of the pre/post-visit activities, rating them primarily as excellent and good. However, not all of the teachers completing the evaluation used the materials, thus causing the level of satisfaction on the evaluation form to appear lower than it actually is. In addition, the wording of the question "My students completed these pre- and post-visit activities" may have been unclear to some teachers. Teachers should have selected the numbers 1, 2, and/or 3 based on which specific activities they completed. However, it appears that some teachers may have selected the total number of activities they completed, rather than indicating which specific activities they completed. It appears that approximately 23% used one lesson, 18% used two lessons, 21% used 3 lessons, 30% used none, and 7% did not respond. Fifty percent of the teachers indicated that they would complete lessons after the on-site presentation, 27% indicated they would not, and 23% did not respond. The predominant reasons for not completing pre/post-visit lessons are that teachers already have their own curriculum to teach, and they have time constraints.

Only three teachers indicated that they were not aware of pre/post-visit materials this year. Although all teachers receive the link to download the materials in both confirmation and reminder emails, unfortunately some teachers do not read their email messages carefully. These teachers are re-sent the link as well as an attachment of the complete set of activities.

Teacher access to the Internet is very high. Approximately 92% of teachers have Internet access to schedule presentations, and 90% have easy Internet access to download materials. Every teacher who scheduled this year provided an email address.

When asked if their students' understanding of water conservation improved by participating in the *Da Drops* program, 99% of the teachers responded yes. When asked if they would be

interested in participating in the program next year, 99% of all teachers completing the evaluation responded yes.

The table below lists the questions asked in the evaluations and percentages of response for each category. Note that each category may not add up to 100% because some teachers did not answer some questions. (This especially affects the results for questions related to the pre-visit activities, because some teachers did not complete the activities, and thus did not answer those questions.) Also, the blue bars are not accurate because of difficulties transferring the data from the scheduling website to this word document.

Da Drops - 91 Total Records	
Please give an overall rating for the following components of the ON-SITE program:	
	Excellent Good Fair Poor Not Applicable
Solid-liquid-gas ice cube activity	79% (E) 20% (G) 1% (F)
Water Cycle story with Slick the Drop	86% (E) 14% (G)
Da Drops video	82% (E) 10% (G) 3% (F) 4% (NA)
Groundwater model and activities	89% (E) 11% (G)
Introduction to reclaimed water	77% (E) 12% (G) 3% (F) 8% (NA)
Colorado River water/CAP canal images	74% (E) 16% (G) 3% (F) 7% (NA)
Water conservation activity	82% (E) 14% (G) 3% (NA)
Effectiveness of presenter in conveying information	82% (E) 12% (G) 2% (F) 1% (P) 2% (NA)
Presenter's ability to relate well with students	81% (E) 13% (G) 3% (F) 1% (P) 1% (NA)

Please rate the overall value of the ON-SITE program in...	
conveying the value and importance of water.	91% (E) 9% (G)
introducing the three states of water.	85% (E) 13% (G) 1% (F) 1% (NA)
introducing the water cycle.	88% (E) 11% (G) 1% (F)
introducing the aquifer and groundwater.	85% (E) 14% (G) 1% (F)
introducing Colorado River water and the CAP canal.	81% (E) 19% (G)
introducing water conservation.	90% (E) 10% (G)
teaching water-related vocabulary words.	75% (E) 23% (G) 1% (F) 1% (P)
Please rate the value of the ON-SITE program in…	
integrating into your classroom's curriculum.	78% (E) 15% (G) 4% (F) 2% (NA)
fitting easily into available classroom time.	84% (E) 14% (G) 1% (F) 1% (NA)
raising the interest and motivation of your students.	85% (E) 12% (G) 2% (F) 1% (NA)
being appropriate for the grade level of your students.	88% (E) 10% (G) 1% (F) 1% (NA)
being easy to schedule.	85% (E) 13% (G) 2% (NA)
addressing ADE academic standards.	76% (E) 13% (G) 2% (F) 3% (NA)

Please rate the following components of the PRE-VISIT activities:	
Teacher Background Reading	42% (E) 21% (G) 37% (NA)
Activity #1: Wondering About Water	35% (E) 15% (G) 2% (F) 47% (NA)
Activity #2: Desert Water Cycle Crossword Puzzle	32% (E) 18% (G) 2% (F) 48% (NA)
Activity #3: Can You Imagine…Life Without Water?	33% (E) 14% (G) 2% (F) 51% (NA)

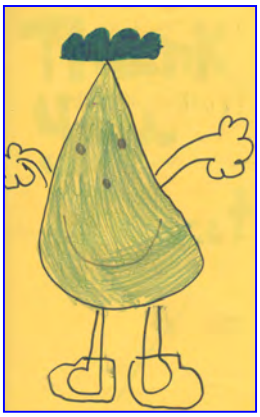
Please rate the following components of the PRE-VISIT activities:	
integrating into your classroom's curriculum.	46% (E) 16% (G) 3% 34% (NA)
fitting easily into available classroom time.	49% (E) 11% (G) 4% (F) 35% (NA)
raising the interest and motivation of your students.	51% (E) 13% (G) 1% 35% (NA)
being appropriate for the grade level of your students.	54% (E) 10% (G) 1% (F) 35% (NA)
addressing ADE academic Standards.	44% (E) 15% (G) 1% 40% (NA)

Suggestions for the Future – *Da Drops*

- Replace worn props in kit, including the Tucson Water sign so that it has the most recent Tucson Water logo.
- Encourage more teachers to do the pre-visit activities. Be more specific in email messages and phone conversations about the activities and how to download them. Emphasize that the activities have been updated to reflect the new ADE standards.
- Continue to analyze the data from the PDF download counter.
- Revise ADE academic standards once the new Next Generation Science Standards are adopted by the AZ Department of Education (the NGSS were released in April 2013).

- Move the teacher evaluation to Survey Monkey. (Some schools have been blocking the email link to the evaluations sent from scheduling website this year. In addition, Survey Monkey allows for more data analysis and easier downloading of information.) Reword the evaluation form question relating to the number of pre/post-visit activities completed.

IV. *Our Water, Our Future* Program Summary



The *Our Water, Our Future* program reached 169 classrooms and 4,379 students during the 2014-2015 school year. This represents 1 more presentation to 64 fewer students this year at the same number of schools. Approximately 69% of the presentations were given to 4th grade classes (down from 71% last year), 18% to 5th grade classes (down from 25%), and 12% to multi-age classes (up from 4%). Refer to Appendices A-C and E for details about school districts, schools and numbers of students reached.

Our Water, Our Future pre/post-visit activities are being downloaded by more than just the teachers having on-site presentations. The complete set of revised activities was downloaded 564 times during the 2014-2015 school year (August 16, 2014-May 22, 2015), with individual sections downloaded between 241 and 564 times, so we know that many teachers are aware of these materials on-line, and are possibly even using them outside of the Tucson area. In addition, some teachers continue to download the old versions of the pre/post-visit materials for *Our Water, Our Future*. Although both the scheduling website and the Tucson Water website have posted the revised files, some teachers are still downloading the older files probably found in cached older versions on-line. The complete set of older activities was downloaded 40 times, with individual sections downloaded between 40 and 169 times. Refer to Appendix A for details.

Overview of Program Revisions – *Our Water, Our Future*

Worn or outdated props were replaced as needed throughout the year.

Teacher Evaluations – *Our Water, Our Future*

The 38 completed teacher evaluations showed a continuing strong satisfaction with the *Our Water, Our Future* program. Eleven percent of teachers turned in their evaluations this year, compared with 18% last year. Of the teachers who returned the evaluations, 82% teach 4th grade, 11% 5th grade, and 5% multiage ($3^{rd}/4^{th}$ and $4^{th}/5^{th}$ grades).

All areas of the on-site program received 90-100% excellent and good ratings combined. Areas of the on-site program that received 100% excellent ratings included groundwater model activities, effectiveness of presenter in conveying information, teaching water supply (groundwater, CAP, reclaimed), fitting easily into available classroom time, being appropriate for your grade level students, and addressing ADE academic standards.

Part of the revision of the *Our Water, Our Future* program included the evaluation form. The original question asking teachers how many pre/post-visit lessons they completed was not clearly stated, so that question was redesigned into four separate questions, one for completion of each lesson. Approximately 55% of teachers submitting an evaluation completed Lesson 1, 53% Lesson 2, 34% Lesson 3, and 26% Lesson 4, with 3-13% not responding for each particular lesson. Sixty-three percent of the teachers indicated that they would complete lessons after the on-site presentation, 21% indicated they would not, and 16% did not respond. The predominant reasons for not completing pre/post-visit lessons are that teachers already have their own curriculum to teach, and they have time constraints.

This year, only one teacher indicated that she was not aware of pre/post-visit materials this year. Although all teachers receive the link to download the materials in both confirmation and reminder emails, unfortunately some teachers do not read their email messages carefully. These teachers are re-sent the link as well as an attachment of the complete set of activities.

Teacher access to the Internet is extremely high. Ninety-five percent of teachers have Internet access to schedule presentations and to access to download materials online. Five percent of teachers did not respond to these questions, so Internet access is probably even higher. Every teacher who scheduled this year provided an email address.

When asked if their students' understanding of water conservation improved by participating in the *Our Water, Our Future* program, 95% of the teachers responded yes (with 5% not responding). When asked if they would be interested in participating in the program next year, 92% of the teachers responded yes (with 8% not responding).

The table below lists the questions asked in the evaluations and percentages of response for each category. Note that each category may not add up to 100% because some teachers did not answer some questions. (This especially affects the results for questions related to the pre-visit activities, because some teachers did not complete the activities, and thus did not answer those questions.) Also, the blue bars are not accurate because of difficulties transferring the data from the scheduling website to this word document.

Our Water, Our Future - 38 Total Forms	
Please give an overall rating for the following components of the ON-SITE program:	
	Excellent Good Fair Poor Not Applicable
Groundwater model and activities	**84% (E)** **16% (G)**

Colorado River/CAP activity	68% (E) 24% (G) 11% (NA)
Reclaimed water activity	74% (E) 18% (G) 8% (NA)
Water On The Go game	84% (E) 13% (G) 3% (NA)
Water conservation activity	66% (E) 24% (G) 11% (NA)
Effectiveness of presenter in conveying information	87% (E) 13% (G)
Presenter's ability to relate well with students	84% (E) 11% (G) 3% (F) 3% (NA)
Please rate the value of the ON-SITE program in...	
teaching the concept of water cycles.	66% (E) 24% (G) 11% (F) 6% (NA)
teaching water supply (groundwater, CAP, reclaimed).	87% (E) 13% (G)
teaching the concept of conservation.	82% (E) 13% (G) 5% (F)
integrating into your classroom's curriculum.	76% (E) 21% (G) 3% (F)
fitting easily into available classroom time	82% (E) 18% (G)
raising the interest and motivation of your students.	82% (E) 16% (G) 3% (NA)
being appropriate for your grade level students.	97% (E) 3% (G)
being easy to schedule.	87% (E) 3% (G) 5% (F) 3% (P) 3% (NA)
addressing ADE academic standards.	79% (E) 21% (G)
Please give an overall rating of the PRE- and POST-VISIT lessons:	
Lesson 1: Water History and Supply - Tucson's Water Story	53% (E) 21% (G) 24% (NA)

Lesson 2: Water Systems - Our Water Cycle	53% (E) 26% (G) 21% (NA)
Lesson 3: Water Conservation - Becoming Water Smart	45% (E) 21% (G) 34% (NA)
Lesson 4: Water Poetry - “A River of Words” Poetry	32% (E) 21% (G) 3% (P) 45% (NA)
Our Water, Our Future Vocabulary	50% (E) 21% (G) 3% (F) 26% (NA)
Our Water, Our Future Activity Booklet	63% (E) 18% (G) 18% (NA)
Please rate the value of the PRE- and POST-VISIT lessons in...	
introducing the concept of water cycles.	55% (E) 26% (G) 18% (NA)
introducing water supply (groundwater, CAP, reclaimed).	61% (E) 18% (G) 21% (NA)
introducing the concept of water conservation.	63% (E) 16% (G) 21% (NA)
integrating into your classroom's curriculum.	58% (E) 18% (G) 24% (NA)
fitting easily into available classroom time.	55% (E) 18% (G) 26% (NA)
raising the interest and motivation of your students.	66% (E) 16% (G) 18% (NA)
being appropriate for your grade level students.	68% (E) 13% (G) 18% (NA)
addressing ADE academic standards.	58% (E) 16% (G) 3% (F) 24% (NA)

Suggestions for the Future – *Our Water, Our Future*

- Replace worn props in kit, including the Tucson Water sign so that it has the most recent Tucson Water logo.
- Encourage more teachers to do the pre-visit activities. Be more specific in email messages and phone conversations about the activities and how to download them. Emphasize that the activities have been updated to reflect the new ADE standards.
- Continue to analyze the data from the PDF download counter.

- Revise ADE academic standards once the new Next Generation Science Standards are adopted by the AZ Department of Education (the NGSS were released in April 2013).
- Move the teacher evaluation to Survey Monkey. (Some schools have been blocking the email link to the evaluations sent from scheduling website this year. In addition, Survey Monkey allows for more data analysis and easier downloading of information.)

V. *El Tour de Agua* Program Summary

El Tour de Agua, a new middle school program (grades 6-8) including an on-site classroom presentation, was developed during 2013-2014. *El Tour de Agua* focuses on water sources, water recycling, and water conservation, with an emphasis on understanding if our water sources are reliable, safe and sustainable.

The classroom presentation is approximately one hour in length and uses a Prezi media format rather than posters, for a more exciting and interactive learning experience. A model and assorted props are also used for hands-on and interactive learning. To provide background to their students, teachers first show a pre-visit PowerPoint presentation that includes a complete script (both in the notes section of the PowerPoint and as a separate file). Students complete the related Student Study Guide during the PowerPoint presentation. Teachers can follow up the on-site classroom presentation with a post-visit lesson on water conservation entitled "*How Does Your Shower Flow?*, using the Shower Flow Kit materials that all students receive at the end of the classroom presentation. (The Shower Flow Kit includes a flow measurement bag, shower timer, and parent permission form to request a low flow showerhead.) Teachers are encouraged to have their students participate in the *40 Gallon Challenge* (http://www.40gallonchallenge.org). For the pilot, teachers were able to download the pre- and post-visit materials at http://www.outreach-scheduling.org/eltourdeagua.php.

After a successful pilot in April and May 2014, *El Tour de Agua* was revised during Summer 2014, then launched into 182 classrooms reaching 4,543 students, representing 71 teachers at 45 schools in 5 districts, 10 charter schools and 7 private schools during the 2014-2015 school year. Because the presentations didn't begin until late October 2014, the target of 200 presentations was not reached for the school year, but this should easily be attainable next year if scheduling begins in August at the start of the school year. Refer to Appendices A, C and F for details about school districts, schools and numbers of students reached.

This school year, teachers were able to download the pre- and post-visit materials for *El Tour de Agua* (during the pilot, teachers were emailed files), and data indicate that the materials are being downloaded by more than just the teachers having on-site presentations. From October 1, 2014-May 22, 2015, the pre-visit video was downloaded a total of 1,138 times (the total of all four versions, high or low resolution/PC or Mac), the accompanying student study guide 382 times, the key to the study guide 338 times, and the post-visit lesson 297 times. Refer to Appendix A for details.

Overview of Program Revisions – *El Tour de Agua*

Based on responses from teachers completing the pilot evaluation, feedback from the presenters, and observations from Neil Markowitz and Debbie Gevirtzman, the following revisions were completed during Summer 2014:

- Development of the pre-visit PowerPoint presentation into a 15-minute video, with options for teachers to pause. Improvement of the Urban Water Cycle diagram. Revision of the accompanying Student Study Guide.
- Revision of the on-site script as needed including a more detailed explanation of "El Tour de Agua" and the Prezi character (now named Cruz), and revision of the water conservation activity to work with small groups rather than individuals.
- Modification of the on-site Prezi media presentation. Some revisions include the following: the first part of the program now moves more linearly (with forward clicks of the mouse), the "wheel of fortune" is only spun once at the beginning, the "wheel of fortune" has been removed from the conservation activity, the Down the Drain water recycling imagery and labeling was improved, infographics near the end of the Prezi now show water savings.

- Additional props were added to the water conservation activity.
- A movie version of the Prezi was created and stored on a portable USB drive in the kit, to be used in case there is ever a problem with the Prezi on the kit laptop.
- The Down the Drain model was rebuilt in a smaller, more manageable size, with openings for balls at the top rather than on the back of the model. Felt was added to the stands to prevent scratching. A new carrying case was created for the new model.
- The post-visit lesson was revised as needed.
- AZ Department of Education Academic Standards were included for all aspects of the program.
- The pre- and post-visit materials were formatted by a graphic artist, then posted on-line on the scheduling website.
- *El Tour de Agua* was added to the scheduling website, so that teachers can schedule themselves on-line and download related materials. The downloads have been linked to the pdf download counter.
- In April 2015, faucet aerators were added as student give-aways.

Teacher Evaluations – *El Tour de Agua*

The 22 completed teacher evaluations showed a continuing strong satisfaction with the *El Tour de Agua* program. Thirty-one percent of the teachers returned their completed evaluations this year (as compared to 60% for last spring's pilot). Of the teachers who completed the evaluations, 61% teach 6th grade, 9% 7th grade, 13% 8th grade, and 17% multi-grade (6th/7th, 7th/8th, and 6th-8th).

All areas of the on-site program received 91-100% excellent and good ratings combined. Fifty percent of the eighteen aspects of the on-site program received 100% excellent ratings.

Approximately 87% of teachers submitting an evaluation completed the Pre-Visit PowerPoint Program. Approximately 83% of teachers used the Pre-Visit Student Study Guide.

Approximately 61% of teachers submitting an evaluation completed the Post-Visit Lesson: *How Does Your Shower Flow?* and 30% had their students take the *40 Gallon Challenge*.

Forty-three percent of the teachers indicated that they would complete pre- and/or post-visit lessons after the on-site presentation, 13% indicated they would not, and 43% did not respond. The predominant reason for not completing pre/post-visit lessons is limited time available.

Teacher access to the Internet is extremely high. Ninety-six percent of teachers completing the evaluation have Internet access to schedule presentations and have access to download materials online. Every teacher who scheduled provided an email address.

When asked if their students' understanding of water sources and water conservation improved by participating in the *El Tour de Agua* program, 96% of the teachers responded yes. When asked if they would be interested in participating in the program next year, 91% of the teachers responded yes. (Two teachers responded no, only because they teach multi-grade classes, so they would wait two or three years to complete their cycle of students.)

The table below lists the questions asked in the evaluations and percentages of response for each category. Note that each category may not add up to 100% because some teachers did not answer some questions. (This especially affects the results for questions related to the pre- and post-visit activities, because some teachers did not complete the activities, and thus did not answer those questions.) Also, the blue bars are not accurate because of difficulties transferring the data from the scheduling website to this word document.

El Tour de Agua - 22 Total Forms	
Please give an overall rating for the following components of the ON-SITE program:	
	Excellent Good Fair Poor Not Applicable
Use of Prezi (visual media format)	**86% (E)** **14% (G)**
Water Use (Prezi, gallon container of water)	**86% (E)** **14% (G)**
Reliable, Safe, Sustainable (Prezi)	**82% (E)** **18% (G)**

Down the Drain (Prezi, model)	86% (E) 14% (G)
Water Conservation Dilemmas and Solutions (Prezi, props)	77% (E) 18% (G) 5% (F)
Effectiveness of presenter in conveying information	91% (E) 5% (G) 5% (NA)
Presenter's ability to relate well with students	95% (E) 5% (G)
Please rate the value of the ON-SITE program in...	
teaching about water use.	82% (E) 18% (G)
teaching about water sources (groundwater, CAP, recycled).	82% (E) 14% (G) 5% (NA)
teaching the concept of reliable, safe, and sustainable water.	68% (E) 23% (G) 5% (F) 5% (NA)
teaching how water is recycled.	82% (E) 14% (G) 5% (F)
teaching about water conservation.	82% (E) 9% (G) 9% (F)
integrating into your classroom's curriculum.	91% (E) 9% (G)
fitting easily into available classroom time	86% (E) 14% (G)
raising the interest and motivation of your students.	73% (E) 18% (G) 5% (F) 5% (P)
being appropriate for your grade level students.	86% (E) 14% (G)
being easy to schedule.	91% (E) 5% (G) 5% (F)
addressing ADE academic standards.	86% (E) 9% (G) 5% (NA)
Please give an overall rating of the PRE- and POST-VISIT lessons:	
Pre-Visit Video: Introduction to Tucson's Water	59% (E) 23% (G) 5% (F) 5% (P) 9% (NA)

Pre-Visit Student Study Guide	59% (E) 27% (G) 14% (NA)
Post-Visit Lesson: How Does Your Shower Flow?	23% (E) 32% (G) 5% (F) 5% (P) 36% (NA)
Post-Visit opportunity to receive free low flow showerhead	45% (E) 14% (G) 9% (F) 5% (P) 27% (NA)
Post-Visit 40 Gallon Challenge	32% (E) 14% (G) 5% (F) 5% (P) 45% (NA)
ADE Academic Standards for El Tour de Agua	36% (E) 18% (G) 45% (NA)
Please rate the value of the PRE- and POST-VISIT lessons in...	
introducing important water concepts and vocabulary.	73% (E) 14% (G) 14% (NA)
introducing water sources (groundwater, CAP, recycled).	77% (E) 14% (G) 9% (NA)
teaching about nature's and urban water cycles.	55% (E) 23% (G) 9% (F) 14% (NA)
introducing the concept of water conservation.	64% (E) 23% (G) 5% (F) 9% (NA)
preparing your students for the on-site presentation.	68% (E) 18% (G) 14% (NA)
reinforcing and applying student learning.	68% (E) 18% (G) 5% (F) 9% (NA)
challenging students to conserve water.	59% (E) 23% (G) 5% (F) 5% (P) 9% (NA)
having students share their learning with families.	41% (E) 32% (G) 9% (F) 5% (P) 14% (NA)
receiving and using give-aways to encourage water conservation.	64% (E) 23% (G) 5% (F) 9% (NA)
integrating into your classroom's curriculum.	68% (E) 18% (G) 14% (NA)
fitting easily into available classroom time.	82% (E) 9% (G) 5% (F) 5% (NA)
raising the interest and motivation of your students.	59% (E) 23% (G) 5% (F) 14% (NA)

being appropriate for your grade level students.	50% (E) 27% (G) 23% (NA)
addressing ADE academic standards.	64% (E) 18% (G) 18% (NA)

Suggestions for the Future – *El Tour de Agua*

- Revise the script and update the Prezi to shorten the on-site presentation by a few minutes. Class times have primarily been less than an hour, more commonly 50 minutes, and by the time the teacher takes attendance, there is even less time available for the presentation. In addition, there are a few places in the program that are a bit redundant and would benefit from some fine-tuning.
- Replace worn props in kit.
- Design and purchase new polo shirts for presenters.
- Continue to analyze the data from the PDF download counter.
- Revise ADE academic standards once the new Next Generation Science Standards are adopted by the AZ Department of Education (the NGSS were released in April 2013).
- Move the teacher evaluation to Survey Monkey. (Some schools have been blocking the email link to the evaluations sent from scheduling website this year. In addition, Survey Monkey allows for more data analysis and easier downloading of information.)
- Decide if faucet aerators will continue to be a give-away during the 2015-2016 school year.
- When timer/flow rate bags are next ordered, be sure that the insert card includes information on how to request a low flow showerhead. (The information is currently in the post-visit lesson, but not on the card in side the timer/flow rate package.)

VII. Classroom Presenters

Teacher evaluations indicated extremely high teacher satisfaction with classroom presenters. When asked about the effectiveness of the presenter in conveying information and the presenter's ability to relate well with students, teachers overwhelmingly rated presenters as excellent and good (97% and 96% for *Da Drops* and 93% and 91% for *Our Water, Our Future*).

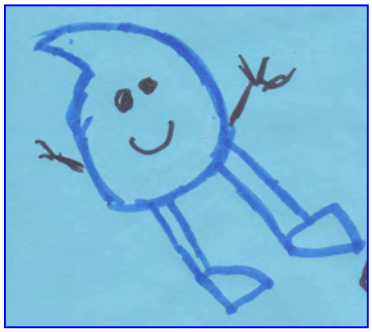
On August 26, 2013, new presenters attended a 2-hour *Da Drops* training to review scripts and kit materials, and on September 26, 2013, new and returning presenters attended a 2-hour *Our Water, Our Future* training to review the revised program. Presenters attended a 2-hour training on August 28, 2013 to learn about the logistics of being a presenter, including discussions on the contents of the training notebook, pay and time sheets, transportation, kit storage and supplies, the scheduling website, and classroom management. The new presenter observed two presentations of each program before doing programs on her own.

This year's presenters include:

Torran Anderson earned his B.A. in Liberal Studies from Northern Arizona University and his M.A. in Teacher Education from Goddard College. He has been in the field of education for over 20 years and worked with the Environmental Education Exchange as a presenter, as a program coordinator, and on presentation revisions. He writes leveled readers for Learning A-Z and created the environmental story app *Earth Day Carol*. Torran left EEE in April to spend 3 months as an artist-in-residence in Slovakia, followed by a year in Norway as a Fulbright Roving Scholar.

Claudia Diaz-Combs received her BS in Environmental Sciences from the University of Arizona with a focus on geology and climate sciences as well as a minor in Spanish. She has been working for Environmental Education Exchange for two years, and has been an intern *for Bring Your Own Bag Tucson* this past year. Claudia will be attending graduate school starting next fall combining her interest in Latin American Studies with Public Health, focusing on water-related issues.

Rachel Fisher received a B.S. in Natural Resources from the University of Michigan, an M.S. in Biology from the University of Central Florida, and a license to teach secondary biology in Georgia and Virginia. She is currently a PhD candidate in science education at the University of Arizona where she studies evolution education, and teaches science methods courses to pre-service teachers. Prior to entering the doctoral program, Rachel worked as a researcher in the fields of marine, molecular, and evolutionary biology, and taught middle school, high school, and college-level biology. She wrote and edited science curriculum for organizations, including National Geographic, and has published work in scientific journals. Rachel has thoroughly enjoyed being a presenter with EEE since March 2015, as it allows her to convey her passion for environmental issues to youth in the community.



Cassie Mason received a B.A. in Russian Area Studies with a minor in Biology from George Mason University and a Masters Degree in Russian Linguistics at the University of Arizona. Cassie spent a year abroad in Russia and lived in England for three years. Returning to the U.S. in 2001, she was a 4th-7th grade science teacher and curriculum director for 5 years at a private school in North Carolina. She coordinated a watershed education program for the Pacolet Area Conservancy. She continued her career as a 5th grade teacher in Portland, Oregon for three years. She helped coordinate and chaperone a mission trip to Nicaragua in 2010. This was Cassie's third year presenting with the EEExchange and she is excited to engage with students about issues of environmental impact. Cassie is building a new home in the desert and is planning to live off the land next year.

Brian Stark is a distance runner and published author who received his B.S. in Communication from Hanover College, his teaching certification from Prescott College, and his M.Ed. in Administration from Northern Arizona University. Brian taught middle school language arts for seven years, was an interpreter and tour guide at Kartchner Caverns, and has been a crew leader for a local environmental outdoor youth corps. He has participated in multiple sessions with the Arizona Department of Education AIMS data review and curriculum alignment. While growing up,

Brian spent 13 summers working at a rugged overnight summer camp in Indiana where he served as camp director. This was his third year presenting with the Environmental Education Exchange, and he recently became Energy Programs Manager for EEExchange.

Julie Strom joined the EEExchange as an outreach presenter in the fall of 2013. In addition to presenting established curriculum, she helped design and implement programs presented at ReCommunity Tucson's Materials Recovery Facility and to pilot the new middle school water program. Julie earned her bachelor's degrees in Botany and Zoology from the University of Massachusetts, Amherst, and received her teaching certificate and master's in environmental education from the University of Arizona. Julie was a classroom teacher and assistant principal for over ten years before joining the education staff at the Arizona-Sonora Desert Museum where she worked for 9 years designing and implementing environmental education curriculum, running the junior docent program, teaching and mentoring graduate interns as well as caring for and training Sonoran Desert animals. In addition to her work with the EEExchange, Julie currently works as an educator in the Pima County Natural Resources, Parks and Recreation Department.

Debbie Gevirtzman has been the Outreach Education Coordinator at the Environmental Education Exchange for twelve years, in addition to being an occasional classroom presenter. Debbie also assists in the design and development of classroom presentations, educational curricula, and training workshops. She received her B.A. in Geology from the University of Pennsylvania, her M.S. in Geology from the University of California at Davis, and her teaching certificate from the University of Arizona. She taught science and math in Tucson for many years, primarily at the middle school level. Her classroom was one of the pilot classes using Tucson Water's middle school curriculum, the *Tucson Toolkit*. Debbie has also worked at the Arizona-Sonora Desert Museum as an earth sciences interpreter, and has developed and presented teacher and student workshops for the Southwest Environmental Health Sciences Center at the University of Arizona.

VIII. What Teachers Have To Say…

I would not change anything about this program. My students enjoyed it and were still talking about the week after. They are still making connections to it in other lessons as well.

This is such a great presentation! The students are engaged, the speaker doesn't speak down to them, but introduces the vocabulary in a way that is understood. The models and props really add to the presentation. What a great resource you are!

The program gives my students excellent knowledge of water that they use throughout the year.

Lovely presenter. The kids were so engaged and I had a large (30) group. I noticed how we did active learning, then some listening, moved around, etc. and those min transitions really keep the kids intereste4d. Even just passing the ice was super engaging and helped them think abstractly about something they see on a regular basis.

Very well done with child appropriate materials.

The presenter was VERY knowledgeable! She did an amazing job! I had planned on grading papers but, was so interested in her presentation that I couldn't grade a thing!!

I wouldn't change a thing. The program seems like all aspects have been tested and proven to be well-paced, interesting, and informative.

All of the material presented was excellent and right on track with our students' knowledge and standards.

Thank you for your putting together informative, engaging activities for this water presentation! Our class had a blast and learned so much. We appreciate your time and would love to see you back again.

Dr. Faucet is a master teacher. He knows the content of course, but he is also an outstanding teacher who uses all of the most engaging techniques to maintain students' interest… He was able to expertly guide my students through the fun and motivating activities while also making sure they learned the content.

Thank you so much for providing this for my students. Both the pre and post activities were helpful, fun, and easy-to-do and presentation was excellent and just the right length.

My students enjoyed, learned and had their awareness raised. Whenever we are reading, especially History of Tucson, the students remember the water lesson and how the Santa Cruz once was a running river. It has added to their comprehension of our history and water conservation.

My students loved the visit and learning these life skills! Thank you so much for your time and creating these materials and presentation! Keep up the great work!

The presenter was knowledgeable and had excellent rapport with the students. The activities were engaging and paced according to the developmental levels of the kids.

The students and adults loved the presentation. She was excellent. She is a natural teacher. She adjusted her pace and content appropriately.

The presenter was awesome today! The kids were really into it and can't wait to do their home audits. Great activities!

An excellent presentation, especially with regards to water sources. I like the use of shower timers and flow meters to encourage conservation!

I really liked all aspects of the program from the pre-visit to the post-visit activities.

I loved the way Dr. Faucet involved the students and specifically addressed them by name. They felt so proud.

I love that the kids get invited to come up and help during the presentation.
The presenters were terrific! Thank you for the opportunity to have Tucson Water speak to our junior high classes. It was enjoyable and informative. Fortunately, our students were well-informed due to the pre-visit lesson which added to their interest and engagement.

Thank you for providing a fun way to diversify learning opportunities for our students.

It was very well presented. Our Dr. Faucet was an excellent teacher! There were many hands-on activities available for the students to do. There were things to see and hear. Each activity only lasted a short amount of time, perfect for keeping students' attention spans. The students loved their take-home materials. I will recommend this program to other teachers at other schools.

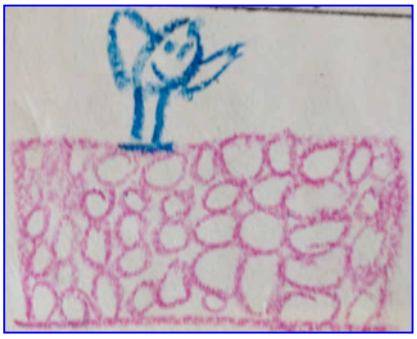
IX. What Students Have To Say…

I am glad that you taught us about water and how to save water. I did use that cup and I saved water last night.

Thank you for that great presentation. The model was magnificent. I really liked when I got to pump water… When I grow up I want to work where you do.

I loved your method of teaching us. The game was fun and I loved the pictures. It was interesting.

I never realized how much water we actually use. I will definitely be more water aware and conserve water.



Learning about water conservation was so cool!...I cannot wait to do the activity book and the cup is very helpful.

Thank you for the shower timer. When I get home I will run up and put it in my shower right away. It was terrific how you demonstrated how we get water.

I'll use my shower timer a lot, which means I will now only take 5 minute showers!

This morning I didn't drink all of my water so I reused my water by giving it to my dog in his bowl.

I will definitely try harder to conserve water and use it efficiently.

Thank you for the… shower timer which is spectacular and for the activity book and for the speaking in front of the classes. Now I don't use a mother load of water.

I learned a lot about water and how it is precious to us.

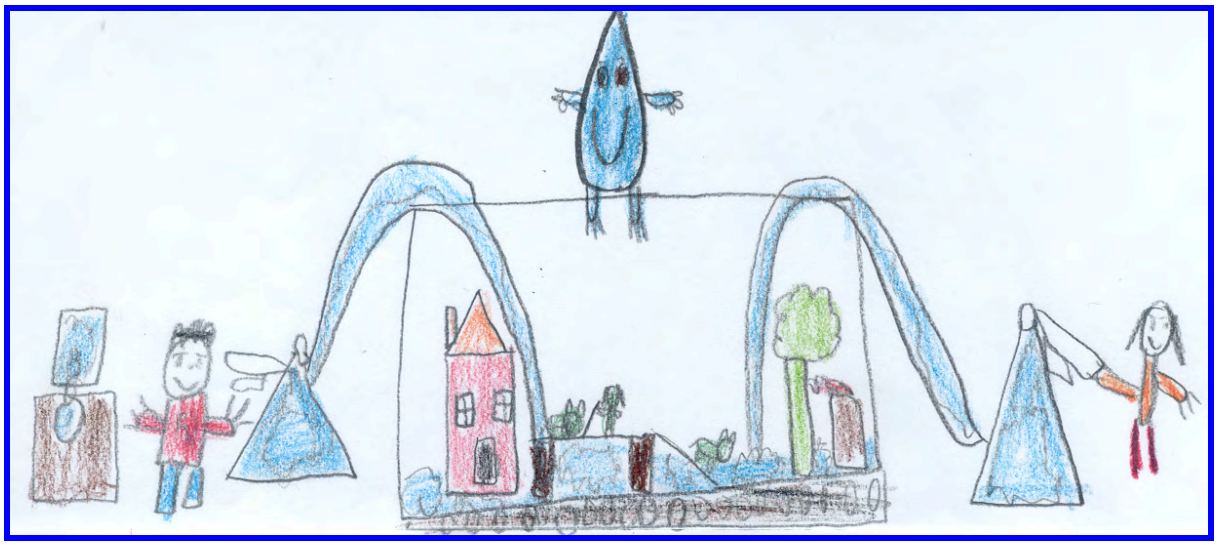
I love water… We need water to live. Do not waste it.

Because of your lesson, I promise to be water smart and watch how I use water.

Dear Mom and Dad, When you take a shower you should rinse then get out and when you wash your hands don't leave the water running… You an save water and don't waste it.

I will now always try to save water in as many ways as I can.

Guess what Dr. Faucet. I took a 5 minute shower this morning.



APPENDIX A

Tucson Water Outreach Education Summary Report: 2014-2015

Summary

In 2014-2015, The Environmental Education Exchange presented a total of **318** ***Da Drops*****, 169** ***Our Water, Our Future*** **programs**, and **182** ***El Tour de Agua*** programs. In total, **16,750 students** and **555 teachers** at **127 schools** were reached by all three outreach programs. In addition, **1** special event was attended.

Da Drops	
2014-2015 Presentations:	**318 Total**
1st Grade:	2067 students
2nd Grade:	2863 students
3rd Grade:	2704 students
Other (K-2nd, 1st/2nd, 1st+3rd, 1st-3rd, 3rd/4th, 2nd/3rd, 3rd-5th ELD):	194 students
Total Students:	**7828 students**
Total Teachers:	**318 teachers**
Total Schools:	**74 schools**

Schools visited

TUSD: Banks, Blenman, Bloom, Borton, Carrillo, Cavett, Collier, Davis Bilingual, Erickson, Ford, Fruchthendler, Gale, Grijalva, Henry, Hollinger, Howell, Hudlow, Hughes, Johnson, Kellond, Lineweaver, Lynn-Urquides, Maldonado, Marshall, Miller, Myers-Ganoung, Sewell, Soleng Tom, Tolson, Tully, Van Buskirk, Vesey, Wheeler, White, Whitmore, and Wright Elementary Schools; Miles Exploratory Learning Center; Booth-Fickett, Roberts-Naylor, Robins, Rose, Roskruge, and Safford K-8 Schools
AMPHI: Harelson, Keeling, Nash, and Rio Vista Elementary Schools; Coronado K-8 School
CFSD: Sunrise Drive and Ventana Vista Elementary Schools
FWUSD: Centennial, Hendricks and Walter Douglas Elementary Schools
MUSD: Butterfield, Coyote Trail, Desert Winds, Estes, Ironwood, Rattlesnake Ridge, Roadrunner, Thornydale, and Twin Peaks Elementary Schools
SUSD: Elvira Elementary School
TVUSD: Agua Caliente and Tanque Verde Elementary Schools
CHARTER: Academy of Tucson Elementary School, AmeriSchools Academy, Carden of Tucson, Children's Success Academy, Tucson Country Day School
PRIVATE: Desert Christian School, First Southern Christian School, Our Mother of Sorrows Catholic School, Tucson Hebrew Academy

Our Water, Our Future	
2014-2015 Presentations:	**169 Total**
4th Grade:	3096 students
5th Grade:	835 students
Other (3rd, 3rd/4th, 3rd-5th, 4th/5th, 5th/6th):	448 students
Total Students:	**4379 students**
Total Teachers:	**167 teachers**
Total Schools:	**54 schools**

Schools visited

TUSD: Bloom, Bonillas, Borman, Erickson, Grijalva, Henry, Hollinger, Kellond, Lineweaver, Manzo, Miller, Myers/Ganoung, Oyama, Robison, Soleng Tom, Tolson, Van Buskirk, Vesey, Warren, Wheeler, and Wright Elementary Schools; Booth-Fickett, Maxwell, McCorkle, and Roberts-Naylor K-8 Schools
AMPHI: Harelson, Nash, Painted Sky, and Walker Elementary Schools; Wilson K-8 School
CFSD: Canyon View and Ventana Vista Elementary Schools

FWUSD: Homer Davis and Richardson Elementary Schools
MUSD: Butterfield, Ironwood, Quail Run, Rattlesnake Ridge, and Thornydale Elementary Schools
SUSD: Sierra 2-8 School
TVUSD: Agua Caliente and Tanque Verde Elementary Schools
VUSD: Acacia Elementary School, Vail Academy and High School
CHARTER: Academy of Tucson Elementary School, AmeriSchools Academy, Children's Success Academy, La Paloma Academy-Central, Satori Charter School, Tucson Country Day School
PRIVATE: First Southern Christian School, Immaculate Heart Academy, Santa Cruz Catholic School,Tucson Hebrew Academy

El Tour de Agua	
2014-2015 Presentations:	**182 Total**
6th Grade:	2659 students
7th Grade:	627 students
8th Grade:	445 students
Other (5th, 5th/6th, 6th/7th, 7th/8th, 6th-8th, 8th/9th, 9th):	812 students
Total Students:	**4543 students**
Total Teachers:	**71 teachers**
Total Schools:	**45 schools**

Schools visited

TUSD: Booth-Fickett Magnet School (6th – 1 teacher); Dodge Middle School (6th – 1 teacher); Dietz K-8 School (6th and 7th – 1 teacher); Gridley Middle School (6th – 2 teachers; 8th – 1 teacher); Magee Middle Schools (6th – 2 teachers); Mansfeld Middle School (6th – 1 teacher; 6th, 7th, 8th – 1 teacher); Maxwell K-8 School (6th/7th GATE and 7th – 2 teachers); McCorkle PreK-8 School (5th/6th GATE and 7th/8th GATE – 1 teacher); Miles Exploratory Learning Center (6th/7th/8th – 1 teacher); Pistor Middle School (6th grade – 2 teachers); Pueblo Gardens K-8 School (6th – 1 teacher; 7th and 8th – 1 teacher; 7th/8th GATE – 1 teacher); Roberts/Naylor K-8 School (6th grade – 3 teachers; 7th/8th – 1 teacher); Robins K-8 School (6th, 7th, 8th – 1 teacher); Rose K-8 School (6th grade – 2 teachers); Roskruge Middle School (8th – 1 teacher); Safford K-8 School (7th – 1 teacher)
AMPHI: Amphi Middle School (6th – 2 teachers; 6th-8th – 1 teacher); Coronado K-8 School (6th – 1 teacher); Cross Middle School (7th – 1 teacher); La Cima Middle School (6th – 2 teachers)
FWUSD: Walter Douglas Elementary School (6th – 3 teachers); Laguna Elementary School (6th – 2 teachers)
MUSD: Butterfield Elementary School (6th – 3 teachers); DeGrazia Elementary School (6th – 3 teachers); Roadrunner Elementary (6th – 3 teachers); Thornydale Elementary School (6th – 1 teacher)
TVUSD: Desert Sky Middle School (6th – 2 teachers); Emily Gray Junior High School (8th – 1 teacher)
CHARTER: Academy of Tucson Middle School (6th – 1 teacher); Amerischools Academy (6th, 7th and 8th – 1 teacher); BASIS Tucson (5th - 1 teacher); Khalsa Montessori School (7th/8th – 1 teacher); Luz-Guerrero Early College High School (7th and 8th/9th – 1 teacher); Paulo Freire Freedom School-Downtown (6th/7th – 1 teacher); Paolo Freire Freedom School-University (6th/7th – 1 teacher); Satori Charter School (5th/6th and 6th – 2 teachers); Tucson Country Day School (6th grade – 1 teacher); Western Institute for Leadership Development (9th – 1 teacher)
PRIVATE: The Gregory School (6th – 1 teacher); Imago Dei Middle School (5th and 7th – 1 teacher; 6th and 8th – 1 teacher); Immaculate Heart Academy (6th – 1 teacher); Our Mother of Sorrows Catholic School (7th, 8th – 1 teacher); Sonoran Science Academy-Tucson/Sunset (6th – 1 teacher); SS Peter and Paul Catholic School (6th – 1 teacher); St. John the Evangelist School (6th, 7th, 8th – 1 teacher)

Special Events – 2014-2015

Date	Time	Event
11/18/2014	6:00-8:00 pm	Rattlesnake Ridge Elementary School Family Science Night

El Tour de Agua Low-Flow Showerhead Requests/Deliveries 2014-2015

Presentation Date	District	School	Grade	# Showerheads	Delivery Date
10/27/14	Charter	Paulo Freire Freedom School	6/7	3	11/25 & 12/8/14
11/10/14	Charter	Satori Charter School	5/6	1	11/25/14
11/12/14	TUSD	Maxwell K-8 School	7	20	11/25/14

11/18/14	Charter	Luz-Guerrero Early Coll HS	7-9	6	11/25/14
10/29/14	TUSD	Miles Expl Lrng Center (K-8)	6-8	5	12/5/14
12/9/14	Private	Immaculate Heart Academy	6	14	12/18/14
1/8/15	TUSD	Pueblo Gardens K-8	6	1	1/16/15
3/11/15	Private	St. John the Evangelist	6, 7, 8	56	3/30/15
4/13/15	Charter	Imago Dei Middle	5, 7	35	4/15/15
4/15/15	Charter	Imago Dei Middle	6, 8	40	4/15/15
1/9/15	TUSD	Booth-Fickett K-8	6	12	4/21/15
4/22/15	TVUSD	Emily Gray Jr. High	8	25	4/27/15
TOTAL				**218**	

Water Curricula Downloaded - 2014-2015

Water Curricula Downloaded	**2014-2015***
DD - COMPLETE	446
DD - ACTIVITY 1	401
DD - ACTIVITY 2	458
DD - ACTIVITY 3	422
DD - PRELIMINARY INFO	336
DD - ADE STANDARDS	294
REVISED OWF - COMPLETE	564
REVISED OWF - LESSON 1	444
REVISED OWF - LESSON 2	387
REVISED OWF - LESSON 3	279
REVISED OWF - LESSON 4	346
REVISED OWF – TEACHER LETTER	241
REVISED OWF - VOCABULARY	256
REVISED OWF - ADE STANDARDS	269
OWF - COMPLETE	40
OWF - LESSON 1	80
OWF - LESSON 2	87
OWF - LESSON 3	61
OWF - LESSON 4	169
OWF - PRELIMINARY INFO	49
OWF - ADE STANDARDS	49
ETDA – PRE-VISIT VIDEO – MAC, HIGH RES	253❖
ETDA – PRE-VISIT VIDEO – MAC, LOW RES	225❖
ETDA – PRE-VISIT VIDEO – PC, HIGH RES	377❖
ETDA – PRE-VISIT VIDEO – PC, LOW RES	283❖
ETDA – PRE-VISIT STUDY GUIDE	382❖
ETDA – PRE-VISIT STUDY GUIDE - KEY	338❖
ETDA – POST-VISIT LESSON	297❖
ETDA – ADE STANDARDS	277❖
TT - COMPLETE	145^
TT - UNIT 1	84^
TT - UNIT 2	91^

TT - UNIT 3	59^
TT - UNIT 4	56^
TT - UNIT 5	68^
TT - ADDITIONAL INFO	64^
TT - ADE STANDARDS	1111^
SW - COMPLETE	342
SW – FRONT COVERS, WELCOME	221
SW – WATER CYCLE	252
SW – INTRO TO WETLANDS	248
SW – WETLAND ECOLOGY	302
SW – WETLAND CONSERVATION	210
SW – ABOUT SW WETLANDS	230
SW – TRAIL MAP	206
SW – VIEWING WILDLIFE	217
SW – MAMMALS	215
SW – BIRDS	246
SW – INSECTS	269
SW – PLANTS	250
SW – REPTILES	233
SW – ANSWERS/GLOSSARY	212
SW – INSIDE/BACK COVERS	208

DD = *Da Drops* *August 16, 2014–May 22, 2015
OWF = *Our Water, Our Future* ❖October 1, 2014-May 22, 2015
ETDA = *El Tour de Agua*
TT = *Tucson Toolkit*
SW = *Sweetwater Wetlands Activity Book and Field Guide*

^The Tucson Toolkit is no longer offered, and the files have been removed from the online scheduling website, but it continues to be downloaded.

APPENDIX B

Tucson Water Outreach Education Summary Report: Autumn 2014

Summary

In Autumn 2014, The Environmental Education Exchange presented a total of **157** ***Da Drops*****, 101** ***Our Water, Our Future*** **programs**, and **46** ***El Tour de Agua*** programs. In total, **7,665 students** and **280 teachers** at **81 schools** were reached by all three outreach programs. In addition, **1** special event was attended.

Da Drops	
Autumn 2014 Presentations:	**157 Total**
1st Grade:	928 students
2nd Grade:	1763 students
3rd Grade:	1090 students
Other (K-2nd, 1st/2nd, 1st+3rd, 1st-3rd, 3rd/4th, 2nd/3rd):	163 students
Total Students:	**3944 students**
Total Teachers:	**157 teachers**
Total Schools:	**49 schools**

Schools visited

TUSD: Banks, Blenman, Bloom, Cavett, Collier, Erickson, Ford, Fruchthendler, Henry, Hollinger, Hudlow, Kellond, Lineweaver, Lynn-Urquides, Maldonado, Marshall, Miller, Robins, Roskruge, Sewell, Tolson, Tully, Van Buskirk, Vesey, Wheeler, White, Whitmore, and Wright Elementary Schools; Miles Exploratory Learning Center; Booth-Fickett and Roberts-Naylor K-8 Schools
AMPHI: Harelson, Nash, and Rio Vista Elementary Schools
FWUSD: Centennial Elementary School
MARANA: Coyote Trail, Desert Winds, Estes, Rattlesnake Ridge, Roadrunner, Thornydale, and Twin Peaks Elementary Schools
SUSD: Elvira Elementary School
CHARTER: Academy of Tucson Elementary School, AmeriSchools Academy, Carden of Tucson, Children's Success Academy
PRIVATE: Desert Christian School, Our Mother of Sorrows Catholic School

Our Water, Our Future	
Autumn 2014 Presentations:	**101 Total**
4th Grade:	1878 students
5th Grade:	470 students
Other (3rd, 3rd/4th, 3rd-5th):	278 students
Total Students:	**2626 students**
Total Teachers:	**100 teachers**
Total Schools:	**30 schools**

Schools visited

TUSD: Bonillas, Borman, Erickson, Grijalva, Manzo, Miller, Myers/Ganoung, Oyama, Robison, Tolson, Vesey, Warren, Wheeler, and Wright Elementary Schools; Booth-Fickett, Hollinger, and Roberts-Naylor K-8 Schools
AMPHI: Harelson and Walker Elementary Schools; Wilson K-8 School
CFSD: Ventana Vista Elementary School
TVUSD: Agua Caliente Elementary School
VUSD: Acacia Elementary School
MUSD: Butterfield and Quail Run Elementary Schools
CHARTER: Academy of Tucson Elementary School, AmeriSchools Academy, Children's Success Academy
PRIVATE: Santa Cruz Catholic School, Tucson Hebrew Academy

El Tour de Agua	
Autumn 2014 Presentations:	**46 Total**
6th Grade:	567 students
7th Grade:	189 students
8th Grade:	15 students
Other (5th/6th, 6th/7th, 7th/8th, 6th/7th/8th, 9th):	324 students
Total Students:	**1095 students**
Total Teachers:	**23 teachers**
Total Schools:	**17 schools**

Schools visited

TUSD: Gridley Middle School (8th – 1 teacher), Magee Middle Schools (6th – 2 teachers), Maxwell K-8 School (6th/7th GATE and 7th – 2 teachers), McCorkle PreK-8 School (5th/6th GATE and 7th/8th GATE – 1 teacher), Miles Exploratory Learning Center (6th/7th/8th – 1 teacher), Pistor Middle School (6th grade – 2 teachers), Pueblo Gardens K-8 School (7th/8th GATE – 1 teacher), Roberts/Naylor K-8 School (6th grade – 3 teachers), Rose K-8 School (6th grade – 2 teachers), and Safford K-8 School (7th – 1 teacher) (Note: Maxwell, McCorkle and Pueblo Gardens share one GATE teacher.)

FWUSD: Laguna Elementary School (6th – 2 teachers)

CHARTER: Luz-Guerrero Early College High School (7th and 8th/9th – 1 teacher), Paolo Freire Freedom School (6th/7th – 1 teacher), Satori Charter School (5th/6th and 6th – 2 teachers), Tucson Country Day School (6th grade – 1 teacher), Western Institute for Leadership Development (9th – 1 teacher)

PRIVATE: Immaculate Heart Academy (6th – 1 teacher)

Highlights:

1. Debbie Gevirtzman continues to be the Outreach Education Coordinator.
2. Torran Anderson, Claudia Diaz-Combs, Cassie Mason, and Julie Strom all returned as presenters. In addition, one of our energy program presenters, Brian Stark, has returned and occasionally does *Our Water, Our Future* presentations when needed. With all returning presenters, *Da Drops* and *Our Water, Our Future* presentations were able to begin during the last week of August, rather than in September after Labor Day, which has been the more usual starting date.
3. On August 21, new presenters attended a 1-hour "refresher" training, as all presenters are returning and both *Da Drops* and *Our Water, Our Future* did not have revisions this year.
4. *El Tour de Agua* was launched in October 2014. Teachers were able to schedule and download materials using the scheduling website (www.outreach-scheduling.org) in early October. On October 14, presenters attended a 2-hour training, and presentations began on October 24.
5. Low-flow showerheads were delivered to 6 teachers for a total of forty-nine 5th-9th grade students who had *El Tour de Agua* presentations.
6. On November 18, Claudia Diaz-Combs attended Family Science Night at Rattlesnake Ridge Elementary School in the Marana School District using the *Da Drops* kit.
7. The number of *Da Drops* programs presented in Autumn 2014 (157) increased from Autumn 2013 (137), with an increase in number of schools (6) and students (450). *Our Water, Our Future* increased by 28 programs and 781 students at 5 additional schools (30). Although *El Tour de Agua* was introduced in late October, it reached 725 more students, 20 more teachers, and 15 more schools than the *Tucson Toolkit* in Autumn 2013.
8. The total number of students reached by *Da Drops, Our Water, Our Future* and *El Tour de Tucson* increased in Autumn 2014 (1,956 students), as well as the number of schools (23) as compared to Autumn 2013. (Keep in mind that *El Tour de Agua* did not begin presentations until October this year, the *Tucson Toolkit* is no longer available – although Project WET may still be delivering it, and some schools previously scheduling *Da Drops* are now scheduling a version developed for the Oro Valley Water Utility.)

9. Teachers have already scheduled 133 *Da Drops* programs and 49 *Our Water, Our Future* programs for the spring. Last year, there was a total budget of 450 elementary water programs, but this year the number has increased to 485. Currently, 440 have been scheduled for the school year, with only 45 remaining to be scheduled. *El Tour de Agua* is budgeted for 200 programs, with 95 already booked for the school year (46 this fall, and 49 already scheduled for the spring). Keep in mind that *El Tour de Agua* did not begin until October of this school year, so more presentations will be scheduled this spring than might normally be scheduled in future years.
10. The programs continue to receive extremely positive feedback on evaluation forms and from direct communication with teachers.
11. Curriculum activities for *Da Drops* and *Our Water, Our Future* continue to be downloaded from the website, even during the summer when no programs occur. (Note that revised *Our Water, Our Future* materials are posted on the scheduling website, yet the old versions continues to be downloaded in addition to the revised version, possibly because files are still available in cached versions on the Internet.) The *Sweetwater Wetlands Activity Book and Field Guide* also continues to be downloaded. The *Tucson Toolkit* was removed from the scheduling website in mid-August and from the Tucson Water website in October, and replaced with the new middle school water program, *El Tour de Agua* (although the *Tucson Toolkit* is still downloaded from cached versions on the Internet). (See download table below.)

Special Events – Autumn 2014

Date	Time	Event
11/18/2014	6:00-8:00 pm	Rattlesnake Ridge Elementary School Family Science Night

El Tour de Agua Low-Flow Showerhead Requests/Deliveries Autumn 2014

Presentation Date	District	School	Grade	# Showerheads	Delivery Date
10/27/14	Charter	Paulo Freire Freedom School	6/7	3	11/25 & 12/8/14
11/10/14	Charter	Satori Charter School	5/6	1	11/25/14
11/12/14	TUSD	Maxwell K-8 School	7	20	11/25/14
11/18/14	Charter	Luz-Guerrero Early Coll HS	7-9	6	11/25/14
10/29/14	TUSD	Miles Expl Lrning Cntr (K-8)	6-8	5	12/5/14
12/9/14	Private	Immaculate Heart Academy	6	14	12/18/14
TOTAL				**49**	

Water Curricula Downloaded – Summer and Autumn 2014

Water Curricula Downloaded	Summer 2014*	Autumn 2014^
DD - COMPLETE	98	155
DD - ACTIVITY 1	99	178
DD - ACTIVITY 2	123	210
DD - ACTIVITY 3	153	185
DD - PRELIMINARY INFO	106	140
DD - ADE STANDARDS	69	120
REVISED OWF - COMPLETE	178	251
REVISED OWF - LESSON 1	71	133
REVISED OWF - LESSON 2	99	160
REVISED OWF - LESSON 3	69	105
REVISED OWF - LESSON 4	109	132
REVISED OWF – TEACHER LETTER	64	101
REVISED OWF - VOCABULARY	61	108
REVISED OWF - ADE STANDARDS	74	111

OWF - COMPLETE	68	28
OWF - LESSON 1	53	53
OWF - LESSON 2	20	23
OWF - LESSON 3	47	45
OWF - LESSON 4	53	63
OWF - PRELIMINARY INFO	38	31
OWF - ADE STANDARDS	26	33
ETDA – PRE-VISIT VIDEO – MAC, HIGH RES	NA	73❖
ETDA – PRE-VISIT VIDEO – MAC, LOW RES	NA	60❖
ETDA – PRE-VISIT VIDEO – PC, HIGH RES	NA	91❖
ETDA – PRE-VISIT VIDEO – PC, LOW RES	NA	85❖
ETDA – PRE-VISIT STUDY GUIDE	NA	126❖
ETDA – PRE-VISIT STUDY GUIDE - KEY	NA	96❖
ETDA – POST-VISIT LESSON	NA	80❖
ETDA – ADE STANDARDS	NA	75❖
TT - COMPLETE	216	123^
TT - UNIT 1	85	60^
TT - UNIT 2	54	62^
TT - UNIT 3	61	43^
TT - UNIT 4	56	37^
TT - UNIT 5	87	51^
TT - ADDITIONAL INFO	82	44^
TT - ADE STANDARDS	75	52^
SW - COMPLETE	112	189
SW – FRONT COVERS, WELCOME	59	92
SW – WATER CYCLE	102	122
SW – INTRO TO WETLANDS	72	118
SW – WETLAND ECOLOGY	251	105
SW – WETLAND CONSERVATION	63	88
SW – ABOUT SW WETLANDS	82	101
SW – TRAIL MAP	56	90
SW – VIEWING WILDLIFE	65	87
SW – MAMMALS	51	100
SW – BIRDS	57	120
SW – INSECTS	53	126
SW – PLANTS	63	117
SW – REPTILES	57	107
SW – ANSWERS/GLOSSARY	55	93
SW – INSIDE/BACK COVERS	66	90

DD = *Da Drops* *June 1-Aug. 15, 2014 ^Aug. 16-Dec. 19, 2014
OWF = *Our Water, Our Future* ❖Oct.1-Dec. 19, 2014
ETDA = *El Tour de Agua*
TT = *Tucson Toolkit*
SW = *Sweetwater Wetlands Activity Book and Field Guide*

^The Tucson Toolkit is no longer offered, and the files have been removed from the online scheduling website, but it continues to be downloaded.

APPENDIX C

Tucson Water Outreach Education Summary Report: Spring 2015

Summary

In Spring 2015, The Environmental Education Exchange presented a total of **161** ***Da Drops*****, 68** ***Our Water, Our Future*** **programs**, and **136** ***El Tour de Agua*** programs. In total, **9,085 students** and **275 teachers** at **84 schools** were reached by all three outreach programs.

Da Drops Spring 2015 Presentations:	**161 Total**
1st Grade:	1139 students
2nd Grade:	1100 students
3rd Grade:	1614 students
Other (1st/2nd, 3rd-5th ELD):	31 students
Total Students:	**3884 students**
Total Teachers:	**161 teachers**
Total Schools:	**43 schools**

Schools visited

TUSD: Banks, Borton, Carrillo, Davis Bilingual, Ford, Fruchthendler, Gale, Grijalva, Howell, Hughes, Johnson, Kellond, Marshall, Myers-Ganoung, Soleng Tom, Tully, Van Buskirk, and Whitmore Elementary Schools; Roberts-Naylor, Robins, Rose, Roskruge, and Safford K-8 Schools
AMPHI: Keeling, Nash, and Rio Vista Elementary Schools; Coronado K-8 School
CFSD: Sunrise Drive and Ventana Vista Elementary Schools
FWUSD: Hendricks and Walter Douglas Elementary Schools
MUSD: Butterfield, Coyote Trail, Desert Winds, Ironwood, Rattlesnake Ridge, Thornydale, and Twin Peaks Elementary Schools
TVUSD: Agua Caliente and Tanque Verde Elementary Schools
CHARTER: Tucson Country Day School
PRIVATE: First Southern Christian School, Tucson Hebrew Academy

Our Water, Our Future Spring 2015 Presentations:	68 **Total**
4th Grade:	1218 students
5th Grade:	365 students
Other (3rd/4th, 4th/5th, 5th/6th):	170 students
Total Students:	**1753 students**
Total Teachers:	**67 teachers**
Total Schools:	**25 schools**

Schools visited

TUSD: Bloom, Borman, Henry, Kellond, Lineweaver, Soleng Tom, and Wheeler Elementary Schools; Maxwell K-8 and McCorkle PreK-8 Schools
AMPHI: Nash and Painted Sky Elementary Schools
CFSD: Canyon View Elementary School
FWUSD: Homer Davis and Richardson Elementary Schools
MUSD: Ironwood, Rattlesnake Ridge, and Thornydale Elementary Schools
SUSD: Sierra 2-8 School
TVUSD: Tanque Verde Elementary School
VUSD: Vail Academy and High School
CHARTER: La Paloma Academy-Central, Satori Charter School, Tucson Country Day School
PRIVATE: First Southern Christian School, Immaculate Heart Academy

El Tour de Agua Spring 2015 Presentations:	**136 Total**
6th Grade:	2092 students
7th Grade:	438 students
8th Grade:	430 students
Other (5th, 6th/7th, 7th/8th, 6th-8th):	488 students
Total Students:	**3448 students**
Total Teachers:	**47 teachers**
Total Schools:	**31 schools**

Schools visited
Schools visited
TUSD: Booth-Fickett Magnet School (6th – 1 teacher); Dodge Middle School (6th – 1 teacher); Dietz K-8 School (6th and 7th – 1 teacher); Gridley Middle School (6th – 2 teachers); Mansfeld Middle School (6th – 1 teacher; 6th, 7th, 8th – 1 teacher); Pueblo Gardens K-8 School (6th – 1 teacher; 7th and 8th – 1 teacher); Roberts-Naylor K-8 School (7th/8th – 1 teacher); Robins K-8 School (6th, 7th, 8th – 1 teacher); Roskruge Middle School (8th – 1 teacher)
AMPHI: Amphi Middle School (6th – 2 teachers; 6th-8th – 1 teacher); Coronado K-8 School (6th – 1 teacher); Cross Middle School (7th – 1 teacher); La Cima Middle School (6th – 2 teachers)
FWUSD: Walter Douglas Elementary School (6th – 3 teachers)
MUSD: Butterfield Elementary School (6th – 3 teachers); DeGrazia Elementary School (6th – 3 teachers); Roadrunner Elementary (6th – 3 teachers); Thornydale Elementary School (6th – 1 teacher)
TVUSD: Desert Sky Middle School (6th – 2 teachers); Emily Gray Junior High School (8th – 1 teacher)
CHARTER: Academy of Tucson Middle School (6th – 1 teacher); Amerischools Academy (6th, 7th and 8th – 1 teacher); BASIS Tucson (5th - 1 teacher); Khalsa Montessori School (7th/8th – 1 teacher); Paulo Freire Freedom School-Downtown (6th/7th – 1 teacher)
PRIVATE: The Gregory School (6th – 1 teacher); Imago Dei Middle School (5th and 7th – 1 teacher; 6th and 8th – 1 teacher); Our Mother of Sorrows Catholic School (7th, 8th – 1 teacher); Sonoran Science Academy -Tucson/Sunset (6th – 1 teacher); SS Peter and Paul Catholic School (6th – 1 teacher); St. John the Evangelist School (6th, 7th, 8th – 1 teacher)

Highlights:

1. Five additional *Da Drops* program were presented in Spring 2015 than in Spring 2014, with a slight decrease of students (37) and the same number of schools (43).
2. *Our Water, Our Future* decreased by 29 programs in Spring 2015 as compared to Spring 2014, with a decrease in both the number of students (845) and the number of schools (8), but more presentations were scheduled during Fall 2014.
3. This was *El Tour de Agua's* first year after a Spring 2014 pilot of 50 presentations. In Spring 2015, there were 136 presentations to 3,448 students at 31 schools. Teachers requested 169 low flow showerheads. As of April 13, bathroom faucet aerators (1gpm) were included as a give-away to all students participating in the *El Tour de Agua* program.
4. Curriculum activities for *Da Drops, Our Water, Our Future* and *El Tour de Agua* continue to be downloaded from the website. Even during the spring, the number of downloads exceeds the number of presentations, suggesting that there are teachers interested in the lessons without having classroom presentations. The *Sweetwater Wetlands Activity Book and Field Guide* also continues to be downloaded. The *Tucson Toolkit* was removed from the scheduling website in mid-August 2014 and from the Tucson Water website in October 2014, and replaced with *El Tour de Agua*, although the *Tucson Toolkit* is still downloaded from cached versions on the Internet.
5. The programs continue to receive extremely positive feedback on evaluation forms and from direct communication with teachers.
6. Tucson Water and EEExchange staff had several meetings this spring:

- On January 12, Debbie Gevirtzman and Neil Markowitz met with Fernando Molina, Valerie Herman, and Joaquim Delgado to discuss programs. On January 20, Debbie and Neil met Valerie and Ruben Morales at the storage warehouse to inventory give-away materials for water programs.
- On March 24, representatives from EEExchange (Debbie Gevirtzman, Neil Markowitz), Project WET (Kerry Schwartz, Betsy Wilkening, Jessica Ahlstrom) and SmartScape (Kathryn Hahne, Karen Hanshaw) met with Tucson Water (Candice Rupprecht, Valerie Herman, Daniel Ransom, Joaquim Delgado, Brenda Venegas) to discuss our education programming.

7. Tucson Water staff observed a variety of water programs with EEE staff this spring: Valerie Herman (*El Tour de Agua*-January 20 and April 1; *Da Drops*-April 16; *Our Water, Our Future*-May 15), Fernando Molina (*El Tour de Agua*-April 15 and May 8), and Candice Rupprecht (*Da Drops*-April 16).

8. All teachers in the EEExchange database were notified by email and encouraged to participate in the National Mayor's Challenge on Water Conservation.

El Tour de Agua Low-Flow Showerhead Requests/Deliveries Spring 2015

Presentation Date	District	School	Grade	# Showerheads	Delivery Date
1/8/15	TUSD	Pueblo Gardens K-8	6	1	1/16/15
3/11/15	Private	St. John the Evangelist	6, 7, 8	56	3/30/15
4/13/15	Charter	Imago Dei Middle	5, 7	35	4/15/15
4/15/15	Charter	Imago Dei Middle	6, 8	40	4/15/15
1/9/15	TUSD	Booth-Fickett K-8	6	12	4/21/15
4/22/15	TVUSD	Emily Gray Jr. High	8	25	4/27/15
TOTAL				**169**	

Water Curricula Downloaded in Spring 2015

Water Curricula Downloaded	Spring 2015*
DD - COMPLETE	280
DD - ACTIVITY 1	212
DD - ACTIVITY 2	234
DD - ACTIVITY 3	224
DD - PRELIMINARY INFO	187
DD - ADE STANDARDS	169
REVISED OWF - COMPLETE	298
REVISED OWF - LESSON 1	273
REVISED OWF - LESSON 2	214
REVISED OWF - LESSON 3	162
REVISED OWF - LESSON 4	206
REVISED OWF – TEACHER LETTER	133
REVISED OWF - VOCABULARY	140
REVISED OWF - ADE STANDARDS	149
OWF - COMPLETE	11
OWF - LESSON 1	26
OWF - LESSON 2	64

OWF - LESSON 3	15
OWF - LESSON 4	106
OWF - PRELIMINARY INFO	16
OWF - ADE STANDARDS	16
ETDA – PRE-VISIT VIDEO – MAC, HIGH RES	176
ETDA – PRE-VISIT VIDEO – MAC, LOW RES	160
ETDA – PRE-VISIT VIDEO – PC, HIGH RES	280
ETDA – PRE-VISIT VIDEO – PC, LOW RES	193
ETDA – PRE-VISIT STUDY GUIDE	252
ETDA – PRE-VISIT STUDY GUIDE - KEY	236
ETDA – POST-VISIT LESSON	213
ETDA – ADE STANDARDS	196
TT - COMPLETE	17^
TT - UNIT 1	20^
TT - UNIT 2	28^
TT - UNIT 3	15^
TT - UNIT 4	17^
TT - UNIT 5	15^
TT - ADDITIONAL INFO	18^
TT - ADE STANDARDS	1056^
SW - COMPLETE	148
SW – FRONT COVERS, WELCOME	126
SW – WATER CYCLE	124
SW – INTRO TO WETLANDS	123
SW – WETLAND ECOLOGY	186
SW – WETLAND CONSERVATION	119
SW – ABOUT SW WETLANDS	125
SW – TRAIL MAP	113
SW – VIEWING WILDLIFE	124
SW – MAMMALS	111
SW – BIRDS	123
SW – INSECTS	132
SW – PLANTS	128
SW – REPTILES	123
SW – ANSWERS/GLOSSARY	115
SW – INSIDE/BACK COVERS	113

DD = *Da Drops* *January 1–May 22, 2015
OWF = *Our Water, Our Future*
ETDA = *El Tour de Agua*
TT = *Tucson Toolkit*
SW = *Sweetwater Wetlands Activity Book and Field Guide*

^The Tucson Toolkit is no longer offered, and the files have been removed from the online scheduling website, but it continues to be downloaded.

APPENDIX D

Da Drops Participating Schools 2014-2015

Date	District	School	Program	Students	Grades
8/25/14 9:30	TUSD	MILES EXPL LRNG CENTER K-8	DD	27	1/2
8/25/14 10:35	TUSD	MILES EXPL LRNG CENTER K-8	DD	27	K-2
8/25/14 12:45	TUSD	MILES EXPL LRNG CENTER K-8	DD	27	1-3
8/26/14 8:55	TUSD	MALDONADO ELEM SCH	DD	28	2
8/26/14 10:00	TUSD	MALDONADO ELEM SCH	DD	28	2
8/27/14 10:10	TUSD	KELLOND ELEM SCH	DD	28	3
8/27/14 11:15	TUSD	KELLOND ELEM SCH	DD	29	3
8/27/14 13:00	TUSD	KELLOND ELEM SCH	DD	29	3
8/28/14 9:25	TUSD	KELLOND ELEM SCH	DD	27	1
8/28/14 10:30	TUSD	KELLOND ELEM SCH	DD	22	1
8/29/14 9:25	TUSD	KELLOND ELEM SCH	DD	24	1
8/29/14 10:30	TUSD	KELLOND ELEM SCH	DD	20	1
9/2/14 8:25	TUSD	WHEELER ELEM SCH	DD	27	2
9/2/14 9:30	TUSD	WHEELER ELEM SCH	DD	27	1
9/3/14 9:45	MUSD	TWIN PEAKS ELEM SCH	DD	20	2
9/3/14 11:00	MUSD	TWIN PEAKS ELEM SCH	DD	20	2
9/4/14 12:00	C/P	CARDEN OF TUCSON INC	DD	15	1
9/4/14 13:05	C/P	CARDEN OF TUCSON INC	DD	16	2
9/5/14 8:45	MUSD	TWIN PEAKS ELEM SCH	DD	20	2
9/5/14 9:50	MUSD	TWIN PEAKS ELEM SCH	DD	20	2
9/8/14 9:00	MUSD	ESTES ELEM SCH	DD	26	3
9/8/14 10:05	MUSD	ESTES ELEM SCH	DD	27	3
9/8/14 11:35	MUSD	ESTES ELEM SCH	DD	26	3
9/9/14 11:35	MUSD	ESTES ELEM SCH	DD	25	3
9/9/14 12:40	MUSD	ESTES ELEM SCH	DD	26	3
9/10/14 10:00	TUSD	VESEY ELEM SCH	DD	29	2
9/10/14 11:05	TUSD	VESEY ELEM SCH	DD	29	2
9/11/14 13:10	TUSD	VESEY ELEM SCH	DD	30	2
9/11/14 14:15	TUSD	VESEY ELEM SCH	DD	30	2
9/12/14 11:50	C/P	AMERISCHOOLS ACADEMY	DD	23	1
9/12/14 12:55	C/P	AMERISCHOOLS ACADEMY	DD	23	2
9/12/14 14:00	C/P	AMERISCHOOLS ACADEMY	DD	24	3
9/15/14 9:15	TUSD	ROBERTS-NAYLOR K-8	DD	24	1
9/15/14 10:20	TUSD	ROBERTS-NAYLOR K-8	DD	25	1
9/16/14 9:00	TUSD	SEWELL ELEM SCH	DD	28	2
9/16/14 10:05	TUSD	SEWELL ELEM SCH	DD	26	2
9/17/14 8:55	TUSD	MILLER ELEM SCH	DD	24	2
9/17/14 10:00	TUSD	MILLER ELEM SCH	DD	25	2
9/18/14 8:55	TUSD	MILLER ELEM SCH	DD	21	2

9/18/14 10:00	TUSD	MILLER ELEM SCH	DD	25	2
9/19/14 12:25	C/P	DESERT CHRISTIAN SCHOOL	DD	16	1
9/19/14 13:30	C/P	DESERT CHRISTIAN SCHOOL	DD	16	1
9/22/14 8:00	TUSD	WHEELER ELEM SCH	DD	26	2
9/22/14 9:05	TUSD	WHEELER ELEM SCH	DD	26	2
9/23/14 8:50	MUSD	ROADRUNNER ELEM SCH	DD	24	2
9/23/14 9:55	MUSD	ROADRUNNER ELEM SCH	DD	24	2
9/23/14 11:30	MUSD	ROADRUNNER ELEM SCH	DD	24	2
9/24/14 8:00	MUSD	COYOTE TRAIL ELEM SCH	DD	30	2
9/24/14 9:05	MUSD	COYOTE TRAIL ELEM SCH	DD	25	2
9/24/14 10:10	MUSD	COYOTE TRAIL ELEM SCH	DD	30	2
9/26/14 8:15	TUSD	FORD ELEM SCH	DD	26	2
9/26/14 9:20	TUSD	FORD ELEM SCH	DD	26	2
9/26/14 10:25	TUSD	FORD ELEM SCH	DD	26	2
9/29/14 11:25	SUSD	ELVIRA ELEM SCH	DD	32	2
9/29/14 12:30	SUSD	ELVIRA ELEM SCH	DD	32	2
9/29/14 13:35	SUSD	ELVIRA ELEM SCH	DD	32	2
9/30/14 12:00	TUSD	ERICKSON ELEM SCH	DD	28	3/4
9/30/14 13:05	TUSD	ERICKSON ELEM SCH	DD	30	3
10/1/14 12:00	TUSD	ERICKSON ELEM SCH	DD	30	3
10/1/14 13:05	TUSD	ERICKSON ELEM SCH	DD	30	3
10/2/14 8:00	TUSD	ROBINS K-8 SCH	DD	27	3
10/2/14 9:05	TUSD	ROBINS K-8 SCH	DD	27	3
10/2/14 10:10	TUSD	ROBINS K-8 SCH	DD	27	3
10/6/14 8:30	AMPHI	HARELSON ELEM SCH	DD	25	2
10/6/14 9:30	AMPHI	HARELSON ELEM SCH	DD	25	2
10/6/14 10:30	AMPHI	HARELSON ELEM SCH	DD	25	2
10/7/14 9:00	AMPHI	NASH ELEM SCH	DD	20	2
10/7/14 10:05	AMPHI	NASH ELEM SCH	DD	20	2
10/8/14 9:00	AMPHI	NASH ELEM SCH	DD	20	2
10/8/14 10:05	AMPHI	NASH ELEM SCH	DD	20	2
10/13/14 9:00	TUSD	LINEWEAVER ELEM SCH	DD	24	1
10/13/14 10:05	TUSD	LINEWEAVER ELEM SCH	DD	24	1
10/14/14 10:00	TUSD	ROBINS K-8 SCH	DD	26	2
10/14/14 11:40	TUSD	ROBINS K-8 SCH	DD	26	2
10/14/14 12:35	TUSD	ROBINS K-8 SCH	DD	26	2
10/15/14 8:00	MUSD	COYOTE TRAIL ELEM SCH	DD	24	3
10/15/14 9:05	MUSD	COYOTE TRAIL ELEM SCH	DD	30	3
10/15/14 10:10	MUSD	COYOTE TRAIL ELEM SCH	DD	30	3
10/16/14 9:00	TUSD	MARSHALL ELEM SCH	DD	24	2
10/16/14 10:15	TUSD	MARSHALL ELEM SCH	DD	23	2
10/17/14 11:45	TUSD	LYNN-URQUIDES ELEM SCH	DD	20	1
10/17/14 12:50	TUSD	LYNN-URQUIDES ELEM SCH	DD	28	1

10/20/14 12:00	TUSD	HUDLOW ELEM SCH	DD	25	1
10/20/14 13:00	TUSD	HUDLOW ELEM SCH	DD	25	1
10/21/14 11:45	TUSD	LYNN-URQUIDES ELEM SCH	DD	26	1
10/21/14 12:50	TUSD	LYNN-URQUIDES ELEM SCH	DD	25	1
10/23/14 7:55	TUSD	BLOOM ELEM SCH	DD	25	2
10/23/14 9:00	TUSD	BLOOM ELEM SCH	DD	25	2
10/23/14 10:05	TUSD	BLOOM ELEM SCH	DD	25	2
10/24/14 10:40	TUSD	BOOTH-FICKETT MAG SCH	DD	28	2
10/24/14 12:25	TUSD	BOOTH-FICKETT MAG SCH	DD	25	2
10/24/14 13:30	TUSD	BOOTH-FICKETT MAG SCH	DD	25	2
10/27/14 9:00	TUSD	TULLY ELEM SCH	DD	21	2
10/27/14 10:05	TUSD	TULLY ELEM SCH	DD	27	2
10/28/14 9:30	TUSD	BANKS ELEM SCH	DD	25	2
10/28/14 10:35	TUSD	BANKS ELEM SCH	DD	28	2
10/29/14 9:00	MUSD	DESERT WINDS ELEM SCH	DD	31	3
10/29/14 10:05	MUSD	DESERT WINDS ELEM SCH	DD	31	3
10/29/14 11:50	MUSD	DESERT WINDS ELEM SCH	DD	31	3
10/30/14 9:00	TUSD	TULLY ELEM SCH	DD	36	3
10/30/14 10:15	TUSD	TULLY ELEM SCH	DD	27	3
11/3/14 8:25	TUSD	WHITE ELEM SCH	DD	25	2
11/3/14 9:30	TUSD	WHITE ELEM SCH	DD	25	2
11/3/14 11:25	TUSD	WHITE ELEM SCH	DD	25	2
11/6/14 8:45	TUSD	WHITMORE ELEM SCH	DD	18	1
11/6/14 10:00	TUSD	WHITMORE ELEM SCH	DD	18	1
11/7/14 8:30	TUSD	COLLIER ELEM SCH	DD	22	2
11/7/14 9:35	TUSD	COLLIER ELEM SCH	DD	21	3
11/7/14 10:40	TUSD	COLLIER ELEM SCH	DD	22	2/3
11/10/14 8:00	TUSD	WHITE ELEM SCH	DD	25	2
11/10/14 9:05	TUSD	WHITE ELEM SCH	DD	25	2
11/13/14 9:55	TUSD	WRIGHT ELEM SCH	DD	26	1
11/13/14 11:45	TUSD	WRIGHT ELEM SCH	DD	27	1
11/13/14 12:50	TUSD	WRIGHT ELEM SCH	DD	27	1
11/17/14 9:00	TUSD	TOLSON ELEM SCH	DD	27	1
11/17/14 10:05	TUSD	TOLSON ELEM SCH	DD	27	1
11/18/14 8:45	AMPHI	RIO VISTA ELEM SCH	DD	30	3
11/18/14 9:50	AMPHI	RIO VISTA ELEM SCH	DD	30	3
11/19/14 8:45	AMPHI	RIO VISTA ELEM SCH	DD	30	3
11/19/14 9:50	AMPHI	RIO VISTA ELEM SCH	DD	30	3
11/20/14 8:30	C/P	OUR MOTHER OF SORROWS	DD	21	3
11/20/14 9:45	C/P	OUR MOTHER OF SORROWS	DD	18	3
11/21/14 9:15	TUSD	MALDONADO ELEM SCH	DD	25	3
11/21/14 10:20	TUSD	MALDONADO ELEM SCH	DD	27	3
11/21/14 12:05	TUSD	MALDONADO ELEM SCH	DD	24	3

11/24/14 9:00	TUSD	TOLSON ELEM SCH	DD	26	3
11/24/14 10:05	TUSD	TOLSON ELEM SCH	DD	24	2
11/25/14 9:00	TUSD	BLENMAN ELEM SCH	DD	25	1
11/25/14 10:05	TUSD	BLENMAN ELEM SCH	DD	25	1
11/26/14 9:00	TUSD	BLENMAN ELEM SCH	DD	25	1
11/26/14 10:05	TUSD	BLENMAN ELEM SCH	DD	25	1
12/1/14 9:00	TUSD	HOLLINGER K-8 SCH	DD	32	1+3
12/1/14 10:05	TUSD	HOLLINGER K-8 SCH	DD	26	1
12/2/14 9:55	TUSD	FRUCHTHENDLER ELEM SCH	DD	28	3
12/2/14 11:00	TUSD	FRUCHTHENDLER ELEM SCH	DD	29	3
12/4/14 9:00	TUSD	HENRY ELEM SCH	DD	25	1
12/4/14 10:05	TUSD	HENRY ELEM SCH	DD	25	1
12/5/14 9:00	C/P	CHILDREN'S SUCCESS ACAD	DD	16	1
12/5/14 10:05	C/P	CHILDREN'S SUCCESS ACAD	DD	13	2
12/8/14 9:00	TUSD	HOLLINGER K-8 SCH	DD	28	2
12/8/14 10:05	TUSD	HOLLINGER K-8 SCH	DD	29	2
12/9/14 12:30	TUSD	BANKS ELEM SCH	DD	27	1
12/9/14 13:35	TUSD	BANKS ELEM SCH	DD	27	1
12/10/14 9:30	TUSD	CAVETT ELEM SCH	DD	20	2
12/10/14 10:35	TUSD	CAVETT ELEM SCH	DD	20	2
12/11/14 8:10	FWUSD	CENTENNIAL ELEM SCH	DD	25	1
12/11/14 9:15	FWUSD	CENTENNIAL ELEM SCH	DD	26	1
12/11/14 10:30	FWUSD	CENTENNIAL ELEM SCH	DD	25	1
12/12/14 12:00	TUSD	ROSKRUGE ELEM SCH	DD	23	2
12/12/14 13:05	TUSD	ROSKRUGE ELEM SCH	DD	23	2
12/15/14 12:00	MUSD	THORNYDALE ELEM SCH	DD	25	2
12/15/14 13:00	MUSD	THORNYDALE ELEM SCH	DD	25	2
12/16/14 9:00	TUSD	SEWELL ELEM SCH	DD	23	3
12/16/14 10:05	TUSD	SEWELL ELEM SCH	DD	22	3
12/17/14 8:30	C/P	ACAD OF TUCSON ELEM SCH	DD	19	3
12/17/14 9:35	C/P	ACAD OF TUCSON ELEM SCH	DD	18	3
12/17/14 10:40	C/P	ACAD OF TUCSON ELEM SCH	DD	18	3
1/6/15 9:30	TUSD	BANKS ELEM SCH	DD	24	3
1/6/15 10:35	TUSD	BANKS ELEM SCH	DD	25	2
1/7/15 8:45	TUSD	SOLENG TOM ELEM SCH	DD	29	3
1/7/15 9:50	TUSD	SOLENG TOM ELEM SCH	DD	28	3
1/8/15 8:30	TUSD	FRUCHTHENDLER ELEM SCH	DD	24	1
1/8/15 9:30	TUSD	FRUCHTHENDLER ELEM SCH	DD	22	1
1/8/15 10:30	TUSD	FRUCHTHENDLER ELEM SCH	DD	24	1
1/9/15 9:30	FWUSD	WALTER DOUGLAS ELEM SCH	DD	25	3
1/9/15 10:35	FWUSD	WALTER DOUGLAS ELEM SCH	DD	25	3
1/12/15 9:30	FWUSD	HENDRICKS ELEM SCH	DD	33	3
1/12/15 10:40	FWUSD	HENDRICKS ELEM SCH	DD	33	3

1/13/15 8:35	TUSD	ROBINS K-8 SCH	DD	25	1
1/13/15 9:40	TUSD	ROBINS K-8 SCH	DD	25	1
1/13/15 11:25	TUSD	ROBINS K-8 SCH	DD	25	1
1/14/15 8:30	TUSD	MARSHALL ELEM SCH	DD	17	3
1/14/15 9:45	TUSD	MARSHALL ELEM SCH	DD	16	3
1/15/15 9:00	TUSD	MYERS/GANOUNG ELEM SCH	DD	20	3
1/15/15 10:05	TUSD	MYERS/GANOUNG ELEM SCH	DD	20	3
1/16/15 9:30	FWUSD	WALTER DOUGLAS ELEM SCH	DD	25	3
1/16/15 10:35	FWUSD	WALTER DOUGLAS ELEM SCH	DD	25	3
1/20/15 12:40	AMPHI	RIO VISTA ELEM SCH	DD	21	2
1/20/15 14:00	AMPHI	RIO VISTA ELEM SCH	DD	21	2
1/21/15 12:40	AMPHI	RIO VISTA ELEM SCH	DD	18	2
1/21/15 14:00	AMPHI	RIO VISTA ELEM SCH	DD	20	2
1/23/15 12:45	TUSD	KELLOND ELEM SCH	DD	22	2
1/23/15 13:50	TUSD	KELLOND ELEM SCH	DD	26	2
1/26/15 10:15	CFSD	SUNRISE DRIVE ELEM SCH	DD	20	2
1/26/15 12:00	CFSD	SUNRISE DRIVE ELEM SCH	DD	19	2
1/26/15 13:15	CFSD	SUNRISE DRIVE ELEM SCH	DD	24	2
1/27/15 12:00	CFSD	SUNRISE DRIVE ELEM SCH	DD	19	2
1/27/15 13:15	CFSD	SUNRISE DRIVE ELEM SCH	DD	23	2
1/28/15 8:00	TUSD	FORD ELEM SCH	DD	30	3
1/28/15 9:05	TUSD	FORD ELEM SCH	DD	30	3
1/28/15 10:10	TUSD	FORD ELEM SCH	DD	30	3
1/29/15 9:30	TVUSD	TANQUE VERDE ELEM SCH	DD	22	2
1/29/15 10:35	TVUSD	TANQUE VERDE ELEM SCH	DD	23	2
1/30/15 12:45	TUSD	KELLOND ELEM SCH	DD	27	2
1/30/15 13:50	TUSD	KELLOND ELEM SCH	DD	28	2
2/2/15 12:30	TUSD	CARRILLO MAGNET SCH	DD	22	2
2/2/15 13:45	TUSD	CARRILLO MAGNET SCH	DD	25	2
2/3/15 9:00	TUSD	GRIJALVA ELEM SCH	DD	26	2
2/3/15 10:05	TUSD	GRIJALVA ELEM SCH	DD	26	2
2/5/15 8:00	TUSD	GRIJALVA ELEM SCH	DD	26	2
2/5/15 9:05	TUSD	GRIJALVA ELEM SCH	DD	26	2
2/5/15 10:10	TUSD	GRIJALVA ELEM SCH	DD	26	2
2/6/15 13:00	C/P	TUCSON HEBREW ACADEMY	DD	15	1
2/6/15 14:15	C/P	TUCSON HEBREW ACADEMY	DD	22	2
2/10/15 8:30	TUSD	WHITMORE ELEM SCH	DD	25	3
2/10/15 9:30	TUSD	WHITMORE ELEM SCH	DD	26	3
2/12/15 9:30	TVUSD	TANQUE VERDE ELEM SCH	DD	20	2
2/12/15 10:35	TVUSD	TANQUE VERDE ELEM SCH	DD	21	2
2/13/15 8:15	CFSD	VENTANA VISTA ELEM SCH	DD	30	3
2/13/15 9:20	CFSD	VENTANA VISTA ELEM SCH	DD	22	3
2/13/15 10:25	CFSD	VENTANA VISTA ELEM SCH	DD	23	3

2/16/15 10:30	C/P	FIRST SOUTHERN CHRIST SCH	DD	17	1/2
2/17/15 11:45	MUSD	DESERT WINDS ELEM SCH	DD	23	1
2/17/15 12:50	MUSD	DESERT WINDS ELEM SCH	DD	23	1
2/18/15 11:45	MUSD	DESERT WINDS ELEM SCH	DD	24	1
2/18/15 12:50	MUSD	DESERT WINDS ELEM SCH	DD	23	1
2/19/15 12:30	CFSD	VENTANA VISTA ELEM SCH	DD	20	2
2/19/15 13:45	CFSD	VENTANA VISTA ELEM SCH	DD	20	2
2/23/15 8:45	TUSD	BORTON ELEM SCH	DD	26	3
2/23/15 9:50	TUSD	BORTON ELEM SCH	DD	23	3
2/23/15 10:55	TUSD	BORTON ELEM SCH	DD	24	3
2/24/15 8:00	TUSD	GALE ELEM SCH	DD	28	3
2/24/15 8:00	TUSD	GALE ELEM SCH	DD	28	3
2/24/15 9:05	TUSD	GALE ELEM SCH	DD	28	3
2/25/15 9:15	TUSD	HOWELL ELEM SCH	DD	28	3
2/25/15 10:20	TUSD	HOWELL ELEM SCH	DD	29	3
3/2/15 10:00	TUSD	JOHNSON, HARRIET PRIM SCH	DD	22	2
3/2/15 11:05	TUSD	JOHNSON, HARRIET PRIM SCH	DD	23	2
3/3/15 9:00	TUSD	VAN BUSKIRK ELEM SCH	DD	25	3
3/3/15 10:05	TUSD	VAN BUSKIRK ELEM SCH	DD	25	3
3/3/15 11:10	TUSD	VAN BUSKIRK ELEM SCH	DD	25	3
3/6/15 12:00	TUSD	VAN BUSKIRK ELEM SCH	DD	31	1
3/6/15 13:05	TUSD	VAN BUSKIRK ELEM SCH	DD	23	1
3/9/15 8:15	MUSD	TWIN PEAKS ELEM SCH	DD	24	3
3/9/15 9:30	MUSD	TWIN PEAKS ELEM SCH	DD	24	3
3/9/15 10:45	MUSD	TWIN PEAKS ELEM SCH	DD	24	3
3/10/15 9:00	TUSD	ROBERTS-NAYLOR K-8	DD	21	3
3/10/15 10:05	TUSD	ROBERTS-NAYLOR K-8	DD	20	3
3/10/15 11:10	TUSD	ROBERTS-NAYLOR K-8	DD	14	3-5
3/11/15 8:30	TUSD	FRUCHTHENDLER ELEM SCH	DD	22	2
3/11/15 9:35	TUSD	FRUCHTHENDLER ELEM SCH	DD	22	2
3/11/15 10:40	TUSD	FRUCHTHENDLER ELEM SCH	DD	22	2
3/12/15 8:00	MUSD	IRONWOOD ELEM SCH	DD	27	3
3/12/15 9:15	MUSD	IRONWOOD ELEM SCH	DD	24	3
3/13/15 8:00	MUSD	IRONWOOD ELEM SCH	DD	24	3
3/13/15 9:15	MUSD	IRONWOOD ELEM SCH	DD	28	3
3/24/15 11:45	MUSD	COYOTE TRAIL ELEM SCH	DD	25	1
3/24/15 12:50	MUSD	COYOTE TRAIL ELEM SCH	DD	27	1
3/30/15 10:00	TUSD	JOHNSON, HARRIET PRIM SCH	DD	23	2
3/30/15 11:05	TUSD	JOHNSON, HARRIET PRIM SCH	DD	23	2
3/31/15 11:45	MUSD	COYOTE TRAIL ELEM SCH	DD	23	1
3/31/15 12:50	MUSD	COYOTE TRAIL ELEM SCH	DD	20	1
4/1/15 9:00	TUSD	HUGHES, SAM ELEM SCH	DD	32	3
4/1/15 10:05	TUSD	HUGHES, SAM ELEM SCH	DD	32	3

4/2/15 9:00	TUSD	SAFFORD K-8 SCH	DD	20	1
4/2/15 10:05	TUSD	SAFFORD K-8 SCH	DD	21	1
4/6/15 12:00	TUSD	ROSKRUGE ELEM SCH	DD	27	1
4/6/15 13:05	TUSD	ROSKRUGE ELEM SCH	DD	24	1
4/9/15 11:50	MUSD	RATTLESNAKE RIDGE EL SCH	DD	27	1
4/9/15 12:55	MUSD	RATTLESNAKE RIDGE EL SCH	DD	27	1
4/10/15 8:40	MUSD	RATTLESNAKE RIDGE EL SCH	DD	27	1
4/10/15 9:45	MUSD	RATTLESNAKE RIDGE EL SCH	DD	27	1
4/13/15 8:15	MUSD	BUTTERFIELD ELEM SCH	DD	23	1
4/13/15 9:30	MUSD	BUTTERFIELD ELEM SCH	DD	23	1
4/14/15 9:15	CFSD	SUNRISE DRIVE ELEM SCH	DD	20	1
4/14/15 10:30	CFSD	SUNRISE DRIVE ELEM SCH	DD	26	1
4/15/15 8:30	TVUSD	AGUA CALIENTE EL SCH	DD	22	2
4/15/15 9:30	TVUSD	AGUA CALIENTE EL SCH	DD	22	2
4/15/15 10:30	TVUSD	AGUA CALIENTE EL SCH	DD	22	2
4/16/15 9:15	CFSD	SUNRISE DRIVE ELEM SCH	DD	26	1
4/16/15 10:30	CFSD	SUNRISE DRIVE ELEM SCH	DD	26	1
4/17/15 9:25	AMPHI	KEELING ELEM SCH	DD	16	2
4/17/15 12:00	AMPHI	KEELING ELEM SCH	DD	26	2
4/17/15 13:05	AMPHI	KEELING ELEM SCH	DD	26	2
4/20/15 8:30	MUSD	TWIN PEAKS ELEM SCH	DD	25	1
4/20/15 9:35	MUSD	TWIN PEAKS ELEM SCH	DD	25	1
4/20/15 10:40	MUSD	TWIN PEAKS ELEM SCH	DD	25	1
4/21/15 8:15	MUSD	BUTTERFIELD ELEM SCH	DD	23	1
4/21/15 9:30	MUSD	BUTTERFIELD ELEM SCH	DD	23	1
4/22/15 9:00	TUSD	HOWELL ELEM SCH	DD	25	2
4/22/15 10:05	TUSD	HOWELL ELEM SCH	DD	25	2
4/23/15 9:00	AMPHI	NASH ELEM SCH	DD	25	1
4/23/15 10:05	AMPHI	NASH ELEM SCH	DD	25	1
4/24/15 9:00	TUSD	DAVIS BILINGUAL EL SCH	DD	21	3
4/24/15 10:05	TUSD	DAVIS BILINGUAL EL SCH	DD	23	3
4/27/15 13:30	TUSD	SAFFORD K-8 SCH	DD	22	3
4/27/15 14:35	TUSD	SAFFORD K-8 SCH	DD	22	3
4/28/15 9:00	C/P	TUCSON CNTRY DAY CH SCH	DD	24	1
4/28/15 10:05	C/P	TUCSON CNTRY DAY CH SCH	DD	24	2
4/28/15 11:10	C/P	TUCSON CNTRY DAY CHASCH	DD	24	3
4/30/15 9:00	AMPHI	NASH ELEM SCH	DD	25	1
4/30/15 10:05	AMPHI	NASH ELEM SCH	DD	25	1
5/4/15 9:40	TUSD	ROSE K-8 SCH	DD	27	3
5/4/15 10:45	TUSD	ROSE K-8 SCH	DD	26	3
5/4/15 12:35	TUSD	ROSE K-8 SCH	DD	28	3
5/4/15 13:40	TUSD	ROSE K-8 SCH	DD	14	3
5/6/15 8:45	MUSD	RATTLESNAKE RIDGE EL SCH	DD	24	2
5/6/15 9:50	MUSD	RATTLESNAKE RIDGE EL SCH	DD	24	2
5/7/15 11:30	MUSD	THORNYDALE ELEM SCH	DD	24	3

5/7/15 12:35	MUSD	THORNYDALE ELEM SCH	DD	24	3
5/8/15 9:00	C/P	TUCSON COUNTRY DAY SCH	DD	24	3
5/8/15 10:05	C/P	TUCSON COUNTRY DAY SCH	DD	24	3
5/8/15 11:10	C/P	TUCSON COUNTRY DAY SCH	DD	24	3
5/11/15 12:00	AMPHI	KEELING ELEM SCH	DD	26	3
5/11/15 13:05	AMPHI	KEELING ELEM SCH	DD	26	3
5/12/15 12:00	AMPHI	KEELING ELEM SCH	DD	26	3
5/12/15 13:05	AMPHI	KEELING ELEM SCH	DD	26	3
5/13/15 8:45	MUSD	RATTLESNAKE RIDGE EL SCH	DD	24	2
5/13/15 9:50	MUSD	RATTLESNAKE RIDGE EL SCH	DD	25	2
5/14/15 8:05	AMPHI	CORONADO K-8 SCH	DD	26	3
5/14/15 9:10	AMPHI	CORONADO K-8 SCH	DD	26	3
5/14/15 10:15	AMPHI	CORONADO K-8 SCH	DD	26	3
5/15/15 9:10	FWUSD	HENDRICKS ELEM SCH	DD	25	1
5/15/15 10:30	FWUSD	HENDRICKS ELEM SCH	DD	25	1
5/15/15 12:30	FWUSD	HENDRICKS ELEM SCH	DD	25	1
5/18/15 9:55	TUSD	TULLY ELEM SCH	DD	26	1
5/18/15 11:45	TUSD	TULLY ELEM SCH	DD	25	1
5/18/15 12:50	TUSD	TULLY ELEM SCH	DD	22	1

DD = *Da Drops*

APPENDIX E

Our Water, Our Future Participating Schools 2014-2015

Date	District	School	Program	Students	Grades
8/26/14 8:45	TUSD	HOLLINGER ELEM SCH	OWOF	25	4
8/26/14 9:50	TUSD	HOLLINGER ELEM SCH	OWOF	22	4
8/26/14 10:55	TUSD	HOLLINGER ELEM SCH	OWOF	22	5
8/27/14 8:45	TUSD	HOLLINGER ELEM SCH	OWOF	30	5
8/27/14 9:50	TUSD	HOLLINGER ELEM SCH	OWOF	35	3/4
8/27/14 10:55	TUSD	HOLLINGER ELEM SCH	OWOF	30	3/4
8/28/14 0:15	VUSD	ACACIA ELEM SCH	OWOF	33	4
8/28/14 10:25	VUSD	ACACIA ELEM SCH	OWOF	29	4
8/28/14 13:20	VUSD	ACACIA ELEM SCH	OWOF	27	4
9/3/14 9:30	C/P	AMERISCHOOLS ACADEMY	OWOF	22	4
9/3/14 10:45	C/P	AMERISCHOOLS ACADEMY	OWOF	23	5
9/4/14 9:05	TUSD	BOOTH-FICKETT MATH/SCI K-8	OWOF	26	4
9/4/14 10:10	TUSD	BOOTH-FICKETT MATH/SCI K-8	OWOF	25	4
9/4/14 11:15	TUSD	BOOTH-FICKETT MATH/SCI K-8	OWOF	24	4
9/5/14 10:00	TUSD	BORMAN ELEM SCH	OWOF	27	5
9/5/14 11:05	TUSD	BORMAN ELEM SCH	OWOF	27	5
9/11/14 8:50	AMPHI	WILSON K-8 SCH	OWOF	26	4
9/11/14 9:55	AMPHI	WILSON K-8 SCH	OWOF	26	4
9/11/14 11:55	AMPHI	WILSON K-8 SCH	OWOF	26	4
9/11/14 13:00	AMPHI	WILSON K-8 SCH	OWOF	26	4
9/15/14 8:00	MUSD	QUAIL RUN ELEM SCH	OWOF	27	4
9/15/14 9:05	MUSD	QUAIL RUN ELEM SCH	OWOF	27	4
9/15/14 10:10	MUSD	QUAIL RUN ELEM SCH	OWOF	28	4
9/19/14 9:00	TUSD	WHEELER ELEM SCH	OWOF	30	4
9/19/14 10:05	TUSD	WHEELER ELEM SCH	OWOF	30	4
9/19/14 11:10	TUSD	WHEELER ELEM SCH	OWOF	18	3-5
9/22/14 8:40	TUSD	TOLSON ELEM SCH	OWOF	24	4
9/22/14 9:45	TUSD	TOLSON ELEM SCH	OWOF	26	5
9/22/14 10:45	TUSD	TOLSON ELEM SCH	OWOF	24	5
9/25/14 9:35	CFSD	VENTANA VISTA ELEM SCH	OWOF	34	4
9/25/14 10:40	CFSD	VENTANA VISTA ELEM SCH	OWOF	31	4
9/25/14 12:30	CFSD	VENTANA VISTA ELEM SCH	OWOF	31	4
9/26/14 8:35	AMPHI	HARELSON ELEM SCH	OWOF	29	4
9/26/14 9:40	AMPHI	HARELSON ELEM SCH	OWOF	25	4
9/26/14 10:45	AMPHI	HARELSON ELEM SCH	OWOF	24	4
9/29/14 12:15	TUSD	ROBISON ELEM SCH	OWOF	30	4
9/29/14 13:30	TUSD	ROBISON ELEM SCH	OWOF	30	4
9/30/14 9:00	TUSD	MYERS/GANOUNG ELEM SCH	OWOF	22	4
9/30/14 10:05	TUSD	MYERS/GANOUNG ELEM SCH	OWOF	22	4
10/3/14 12:05	AMPHI	CORONADO K-8 SCH	OWOF	29	4

10/3/14 13:15	AMPHI	CORONADO K-8 SCH	OWOF	29	4
10/6/14 11:50	CFSD	MANZANITA ELEM SCH	OWOF	26	4
10/6/14 12:55	CFSD	MANZANITA ELEM SCH	OWOF	25	4
10/6/14 14:00	CFSD	MANZANITA ELEM SCH	OWOF	26	4
10/7/14 11:50	CFSD	MANZANITA ELEM SCH	OWOF	29	4
10/7/14 13:00	CFSD	MANZANITA ELEM SCH	OWOF	22	4
10/13/14 8:30	TUSD	WARREN ELEM SCH	OWOF	25	4
10/13/14 9:35	TUSD	WARREN ELEM SCH	OWOF	23	4
10/14/14 8:00	TUSD	GRIJALVA ELEM SCH	OWOF	30	4
10/14/14 9:05	TUSD	GRIJALVA ELEM SCH	OWOF	30	4
10/14/14 10:30	TUSD	GRIJALVA ELEM SCH	OWOF	25	4
10/16/14 9:30	TUSD	ERICKSON ELEM SCH	OWOF	32	4
10/16/14 10:35	TUSD	ERICKSON ELEM SCH	OWOF	28	4
10/16/14 12:45	TUSD	ERICKSON ELEM SCH	OWOF	32	4
10/24/14 8:30	TUSD	VAN BUSKIRK ELEM SCH	OWOF	20	4
10/24/14 9:35	TUSD	VAN BUSKIRK ELEM SCH	OWOF	21	3/4
10/24/14 10:40	TUSD	VAN BUSKIRK ELEM SCH	OWOF	28	4
10/28/14 9:00	TUSD	BONILLAS BSC CRRC EL SCH	OWOF	20	5
10/28/14 10:05	TUSD	BONILLAS BSC CRRC EL SCH	OWOF	22	5
10/28/14 11:10	TUSD	BONILLAS BSC CRRC EL SCH	OWOF	22	5
10/30/14 12:45	C/P	ADVENTURE SCHOOL	OWOF	21	3/4
10/30/14 13:50	C/P	ADVENTURE SCHOOL	OWOF	22	4/5
11/3/14 8:00	MUSD	BUTTERFIELD ELEM SCH	OWOF	25	5
11/3/14 9:05	MUSD	BUTTERFIELD ELEM SCH	OWOF	25	5
11/3/14 10:05	MUSD	BUTTERFIELD ELEM SCH	OWOF	25	5
11/4/14 8:30	TUSD	MILLER ELEM SCH	OWOF	29	4
11/4/14 9:35	TUSD	MILLER ELEM SCH	OWOF	28	4
11/6/14 8:30	TUSD	MILLER ELEM SCH	OWOF	25	4
11/6/14 9:35	TUSD	MILLER ELEM SCH	OWOF	28	4
11/10/14 9:00	C/P	CHILDREN'S SUCCESS ACAD	OWOF	17	3
11/10/14 10:05	C/P	CHILDREN'S SUCCESS ACAD	OWOF	21	3
11/13/14 9:20	TUSD	VESEY ELEM SCH	OWOF	30	4
11/13/14 10:20	TUSD	VESEY ELEM SCH	OWOF	30	4
11/13/14 11:20	TUSD	VESEY ELEM SCH	OWOF	30	4
11/14/14 9:55	AMPHI	HOLAWAY ELEM SCH	OWOF	17	4
11/14/14 11:00	AMPHI	HOLAWAY ELEM SCH	OWOF	25	4
11/17/14 11:00	C/P	ACAD OF TUCSON ELEM SCH	OWOF	30	4
11/17/14 12:50	C/P	ACAD OF TUCSON ELEM SCH	OWOF	30	4
11/18/14 12:00	C/P	SANTA CRUZ CATHOLIC SCH	OWOF	20	4
11/18/14 13:15	C/P	SANTA CRUZ CATHOLIC SCH	OWOF	30	5
11/20/14 8:30	TUSD	MILLER ELEM SCH	OWOF	27	5
11/20/14 9:35	TUSD	MILLER ELEM SCH	OWOF	34	5
11/20/14 10:40	TUSD	MILLER ELEM SCH	OWOF	29	5

11/24/14 9:30	AMPHI	WALKER LULU ELEM SCH	OWOF	21	4
11/24/14 10:35	AMPHI	WALKER LULU ELEM SCH	OWOF	24	4
11/24/14 12:05	AMPHI	WALKER LULU ELEM SCH	OWOF	28	4
11/25/14 9:00	TUSD	ROBERTS-NAYLOR K-8	OWOF	27	4
11/25/14 10:05	TUSD	ROBERTS-NAYLOR K-8	OWOF	27	4
11/25/14 11:10	TUSD	ROBERTS-NAYLOR K-8	OWOF	27	4
12/4/14 13:00	C/P	TUCSON HEBREW ACADEMY	OWOF	23	3
12/4/14 14:05	C/P	TUCSON HEBREW ACADEMY	OWOF	18	4
12/9/14 8:40	TVUSD	AGUA CALIENTE ELEM SCH	OWOF	25	4
12/9/14 9:45	TVUSD	AGUA CALIENTE ELEM SCH	OWOF	25	4
12/9/14 10:50	TVUSD	AGUA CALIENTE ELEM SCH	OWOF	25	4
12/11/14 9:00	TUSD	OYAMA ELEM SCH	OWOF	32	5
12/11/14 10:05	TUSD	OYAMA ELEM SCH	OWOF	21	4
12/15/14 9:30	TUSD	WRIGHT ELEM SCH	OWOF	24	4
12/15/14 10:35	TUSD	WRIGHT ELEM SCH	OWOF	24	4
12/16/14 9:00	TUSD	MANZO ELEM SCH	OWOF	23	4/5
12/16/14 10:05	TUSD	MANZO ELEM SCH	OWOF	23	4/5
12/16/14 11:10	TUSD	MANZO ELEM SCH	OWOF	24	4/5
1/9/15 9:00	C/P	FIRST SOUTHERN CHRIST SCH	OWOF	15	3/4
1/9/15 10:25	C/P	FIRST SOUTHERN CHRIST SCH	OWOF	14	5/6
1/14/15 8:00	TUSD	WHEELER ELEM SCH	OWOF	35	5
1/14/15 9:05	TUSD	WHEELER ELEM SCH	OWOF	35	5
1/26/15 8:35	TUSD	SOLENG TOM ELEM SCH	OWOF	28	4
1/26/15 9:35	TUSD	SOLENG TOM ELEM SCH	OWOF	29	3/4
1/26/15 10:35	TUSD	SOLENG TOM ELEM SCH	OWOF	28	4
1/28/15 10:50	VUSD	VAIL ACAD AND HIGH SCH	OWOF	28	4
2/2/15 10:00	TVUSD	TANQUE VERDE ELEM SCH	OWOF	26	4
2/2/15 11:05	TVUSD	TANQUE VERDE ELEM SCH	OWOF	21	4
2/5/15 9:15	AMPHI	NASH ELEM SCH	OWOF	27	4
2/5/15 11:15	AMPHI	NASH ELEM SCH	OWOF	27	4
2/9/15 10:00	TVUSD	TANQUE VERDE ELEM SCH	OWOF	20	4
2/9/15 11:05	TVUSD	TANQUE VERDE ELEM SCH	OWOF	25	4
2/10/15 10:40	FWUSD	RICHARDSON ELEM SCH	OWOF	30	4
2/10/15 12:30	FWUSD	RICHARDSON ELEM SCH	OWOF	30	4
2/12/15 8:45	AMPHI	NASH ELEM SCH	OWOF	27	4
2/12/15 10:00	AMPHI	NASH ELEM SCH	OWOF	30	4
2/16/15 8:50	C/P	LA PALOMA ACAD-CENTRAL	OWOF	25	4
2/16/15 9:55	C/P	LA PALOMA ACAD-CENTRAL	OWOF	26	4
2/17/15 8:50	C/P	LA PALOMA ACAD-CENTRAL	OWOF	25	4
2/17/15 9:55	C/P	LA PALOMA ACAD-CENTRAL	OWOF	22	4
2/19/15 9:30	AMPHI	PAINTED SKY ELEM SCH	OWOF	30	4
2/19/15 10:35	AMPHI	PAINTED SKY ELEM SCH	OWOF	30	4
2/20/15 9:30	AMPHI	PAINTED SKY ELEM SCH	OWOF	30	4

2/20/15 10:35	AMPHI	PAINTED SKY ELEM SCH	OWOF	30	4
2/23/15 12:55	C/P	IMMACULATE HEART ACAD	OWOF	20	4
2/23/15 14:00	C/P	IMMACULATE HEART ACAD	OWOF	26	5
2/24/15 8:45	TUSD	BORMAN ELEM SCH	OWOF	28	4
2/24/15 9:50	TUSD	BORMAN ELEM SCH	OWOF	28	4
2/24/15 10:55	TUSD	BORMAN ELEM SCH	OWOF	16	3/4
2/25/15 9:20	TUSD	KELLOND ELEM SCH	OWOF	25	4
2/25/15 10:25	TUSD	KELLOND ELEM SCH	OWOF	27	4
2/25/15 11:30	TUSD	KELLOND ELEM SCH	OWOF	27	4
3/2/15 13:00	TUSD	MCCORKLE PREK-8 SCH	OWOF	18	4/5
3/5/15 8:00	MUSD	RATTLESNAKE RIDGE ELEM SCH	OWOF	25	4
3/5/15 9:05	MUSD	RATTLESNAKE RIDGE ELEM SCH	OWOF	25	4
3/5/15 10:10	MUSD	RATTLESNAKE RIDGE ELEM SCH	OWOF	23	4
3/23/15 8:00	MUSD	IRONWOOD ELEM SCH	OWOF	26	4
3/23/15 9:30	MUSD	IRONWOOD ELEM SCH	OWOF	26	4
3/24/15 8:00	MUSD	IRONWOOD ELEM SCH	OWOF	26	4
3/24/15 9:30	MUSD	IRONWOOD ELEM SCH	OWOF	26	4
3/25/15 8:00	MUSD	THORNYDALE ELEM SCH	OWOF	23	4
3/25/15 9:05	MUSD	THORNYDALE ELEM SCH	OWOF	23	4
3/26/15 10:30	TUSD	MAXWELL K-8 SCH	OWOF	15	4/5
3/31/15 9:00	TUSD	BLOOM ELEM SCH	OWOF	28	4
3/31/15 10:15	TUSD	BLOOM ELEM SCH	OWOF	28	4
4/2/15 8:00	TUSD	HENRY ELEM SCH	OWOF	28	5
4/2/15 9:05	TUSD	HENRY ELEM SCH	OWOF	26	5
4/2/15 10:10	TUSD	HENRY ELEM SCH	OWOF	23	5
4/8/15 8:40	TUSD	LINEWEAVER ELEM SCH	OWOF	25	4
4/8/15 9:45	TUSD	LINEWEAVER ELEM SCH	OWOF	22	3/4
4/8/15 10:50	TUSD	LINEWEAVER ELEM SCH	OWOF	26	4
4/27/15 9:00	C/P	TUCSON CNTRY DAY CH SCH	OWOF	24	5
4/27/15 10:05	C/P	TUCSON CNTRY DAY CH SCH	OWOF	24	5
4/27/15 11:10	C/P	TUCSON CNTRY DAY CH SCH	OWOF	24	5
5/7/15 12:30	C/P	SATORI CHARTER SCH (2-8)	OWOF	17	3/4
5/7/15 13:35	C/P	SATORI CHARTER SCH (2-8)	OWOF	24	4/5
5/8/15 8:15	FWUSD	HOMER DAVIS ELEM SCH	OWOF	30	4
5/8/15 9:20	FWUSD	HOMER DAVIS ELEM SCH	OWOF	30	4
5/8/15 10:25	FWUSD	HOMER DAVIS ELEM SCH	OWOF	30	4
5/13/15 11:00	CFSD	CANYON VIEW ELEM SCH	OWOF	26	4
5/13/15 12:30	CFSD	CANYON VIEW ELEM SCH	OWOF	26	4
5/13/15 13:45	CFSD	CANYON VIEW ELEM SCH	OWOF	26	4
5/14/15 8:30	SUSD	SIERRA 2-8 SCHOOL	OWOF	30	5
5/14/15 9:30	SUSD	SIERRA 2-8 SCHOOL	OWOF	30	5
5/15/15 8:30	SUSD	SIERRA 2-8 SCHOOL	OWOF	30	5
5/15/15 9:30	SUSD	SIERRA 2-8 SCHOOL	OWOF	30	5

OWOF = *Our Water, Our Future*

APPENDIX F

El Tour de Agua Participating Schools 2014-2015

Date	District	School	Program	Students	Grades
10/24/14 11:00	TUSD	ROBERTS-NAYLOR K-8	ETDA	30	6
10/24/14 13:00	TUSD	ROBERTS-NAYLOR K-8	ETDA	30	6
10/24/14 14:00	TUSD	ROBERTS-NAYLOR K-8	ETDA	30	6
10/27/14 8:55	C/P	PAULO FREIRE SCH-UNIV	ETDA	25	6/7
10/27/14 10:00	C/P	PAULO FREIRE SCH-UNIV	ETDA	25	6/7
10/28/14 9:00	TUSD	PISTOR MIDDLE SCHOOL	ETDA	28	6
10/28/14 10:04	TUSD	PISTOR MIDDLE SCHOOL	ETDA	28	6
10/28/14 12:43	TUSD	PISTOR MIDDLE SCHOOL	ETDA	27	6
10/28/14 13:47	TUSD	PISTOR MIDDLE SCHOOL	ETDA	23	6
10/29/14 9:46	TUSD	MILES EXPL LRNING CNTR	ETDA	30	6/7/8
10/29/14 10:59	TUSD	MILES EXPL LRNING CNTR	ETDA	30	6/7/8
10/29/14 12:12	TUSD	MILES EXPL LRNING CNTR	ETDA	30	6/7/8
10/29/14 14:00	TUSD	MILES EXPL LRNING CNTR	ETDA	30	6/7/8
10/30/14 9:03	C/P	TUCSON CNTRY DAY SCH	ETDA	25	6
10/30/14 9:56	C/P	TUCSON CNTRY DAY SCH	ETDA	25	6
10/30/14 10:49	C/P	TUCSON CNTRY DAY SCH	ETDA	25	6
11/4/14 9:00	FWUSD	LAGUNA ELEM SCH	ETDA	33	6
11/4/14 10:05	FWUSD	LAGUNA ELEM SCH	ETDA	32	6
11/10/14 10:45	C/P	SATORI CHARTER SCH (2-8)	ETDA	11	6
11/10/14 12:30	C/P	SATORI CHARTER SCH (2-8)	ETDA	15	5/6
11/12/14 10:30	TUSD	MAXWELL K-8 SCH	ETDA	21	7
11/12/14 11:30	TUSD	MAXWELL K-8 SCH	ETDA	21	7
11/13/14 8:55	TUSD	SAFFORD K-8 SCH	ETDA	25	7
11/13/14 9:52	TUSD	SAFFORD K-8 SCH	ETDA	21	7
11/13/14 10:46	TUSD	SAFFORD K-8 SCH	ETDA	21	7
11/13/14 13:12	TUSD	SAFFORD K-8 SCH	ETDA	28	7
11/13/14 15:00	TUSD	SAFFORD K-8 SCH	ETDA	27	7
11/14/14 10:04	TUSD	PISTOR MIDDLE SCHOOL	ETDA	27	6
11/14/14 11:39	TUSD	PISTOR MIDDLE SCHOOL	ETDA	27	6
11/14/14 12:43	TUSD	PISTOR MIDDLE SCHOOL	ETDA	27	6/7
11/14/14 13:47	TUSD	PISTOR MIDDLE SCHOOL	ETDA	27	6
11/18/14 12:30	C/P	LUZ-GUERRERO EARLY COL HS	ETDA	12	7
11/18/14 13:35	C/P	LUZ-GUERRERO EARLY COL HS	ETDA	13	7
11/18/14 14:40	C/P	LUZ-GUERRERO EARLY COL HS	ETDA	11	8/9
11/25/14 9:00	TUSD	ROSE K-8 SCH	ETDA	27	6
11/25/14 10:05	TUSD	ROSE K-8 SCH	ETDA	25	6
12/9/14 10:45	C/P	IMMACULATE HEART ACAD	ETDA	17	6
12/9/14 13:15	C/P	IMMACULATE HEART ACAD	ETDA	14	6
12/11/14 8:30	TUSD	PUEBLO GARDENS K-8 SCH	ETDA	20	7/8

12/11/14 12:55	C/P	WSTRN INST FOR LDRSHP DVLPMNT	ETDA	25	9
12/12/14 14:20	TUSD	GRIDLEY MIDDLE SCHOOL	ETDA	15	8
12/15/14 10:30	TUSD	MCCORKLE PREK-8 SCH	ETDA	20	7/8
12/15/14 13:30	TUSD	MCCORKLE PREK-8 SCH	ETDA	18	5/6
12/16/14 8:00	TUSD	MAGEE MIDDLE SCH	ETDA	30	6
12/16/14 9:10	TUSD	MAGEE MIDDLE SCH	ETDA	26	6
12/17/14 10:30	TUSD	MAXWELL K-8 SCH	ETDA	18	6/7
1/8/15 8:30	TUSD	PUEBLO GARDENS K-8 SCH	ETDA	28	6
1/8/15 9:30	TUSD	PUEBLO GARDENS K-8 SCH	ETDA	27	6
1/9/15 9:00	TUSD	BOOTH-FICKETT MAG (K-8)	ETDA	30	6
1/9/15 10:15	TUSD	BOOTH-FICKETT MAG (K-8)	ETDA	29	6
1/9/15 11:50	TUSD	BOOTH-FICKETT MAG (K-8)	ETDA	30	6
1/9/15 13:50	TUSD	BOOTH-FICKETT MAG (K-8)	ETDA	28	6
1/12/15 9:03	TUSD	ROSKRUGE BIL MID MAG SCH	ETDA	29	8
1/12/15 9:56	TUSD	ROSKRUGE BIL MID MAG SCH	ETDA	23	8
1/12/15 11:42	TUSD	ROSKRUGE BIL MID MAG SCH	ETDA	30	8
1/12/15 13:10	TUSD	ROSKRUGE BIL MID MAG SCH	ETDA	32	8
1/12/15 14:03	TUSD	ROSKRUGE BIL MID MAG SCH	ETDA	27	8
1/20/15 8:55	TUSD	MANSFELD MIDDLE SCH	ETDA	30	7
1/20/15 9:42	TUSD	MANSFELD MIDDLE SCH	ETDA	30	6
1/20/15 11:52	TUSD	MANSFELD MIDDLE SCH	ETDA	30	7
1/20/15 12:44	TUSD	MANSFELD MIDDLE SCH	ETDA	30	8
1/20/15 14:10	TUSD	MANSFELD MIDDLE SCH	ETDA	30	8
1/21/15 8:00	MUSD	BUTTERFIELD ELEM SCH	ETDA	76	6
1/21/15 9:15	MUSD	BUTTERFIELD ELEM SCH	ETDA	21	6
1/21/15 10:30	MUSD	BUTTERFIELD ELEM SCH	ETDA	25	6
1/26/15 8:10	C/P	SS PETER & PAUL CATH SCH	ETDA	27	6
1/26/15 9:15	C/P	SS PETER & PAUL CATH SCH	ETDA	27	6
1/27/15 9:02	TUSD	DODGE MIDDLE SCHOOL	ETDA	29	6
1/27/15 10:05	TUSD	DODGE MIDDLE SCHOOL	ETDA	27	6
1/28/15 12:44	TUSD	DODGE MIDDLE SCH	ETDA	31	6
1/28/15 13:47	TUSD	DODGE MIDDLE SCH	ETDA	33	6
1/28/15 14:50	TUSD	DODGE MIDDLE SCH	ETDA	26	6
2/3/15 9:00	MUSD	ROADRUNNER ELEM SCH	ETDA	24	6
2/3/15 10:00	MUSD	ROADRUNNER ELEM SCH	ETDA	23	6
2/3/15 11:00	MUSD	ROADRUNNER ELEM SCH	ETDA	23	6
2/6/15 9:06	AMPHI	AMPHI MIDDLE SCHOOL	ETDA	26	6
2/6/15 10:00	AMPHI	AMPHI MIDDLE SCHOOL	ETDA	27	6
2/6/15 10:54	AMPHI	AMPHI MIDDLE SCHOOL	ETDA	18	6
2/6/15 11:48	AMPHI	AMPHI MIDDLE SCHOOL	ETDA	30	6
2/6/15 13:16	AMPHI	AMPHI MIDDLE SCHOOL	ETDA	28	6
2/6/15 14:10	AMPHI	AMPHI MIDDLE SCHOOL	ETDA	30	6
2/9/15 8:55	C/P	AMERISCHOOLS ACADEMY	ETDA	26	6

2/9/15 10:00	C/P	AMERISCHOOLS ACADEMY	ETDA	26	8
2/9/15 11:05	C/P	AMERISCHOOLS ACADEMY	ETDA	26	7
2/11/15 11:48	AMPHI	AMPHI MIDDLE SCHOOL	ETDA	24	6
2/11/15 13:16	AMPHI	AMPHI MIDDLE SCHOOL	ETDA	26	6
2/12/15 7:27	AMPHI	CROSS MIDDLE SCHOOL	ETDA	26	7
2/12/15 8:33	AMPHI	CROSS MIDDLE SCHOOL	ETDA	26	7
2/12/15 9:29	AMPHI	CROSS MIDDLE SCHOOL	ETDA	27	7
2/12/15 10:25	AMPHI	CROSS MIDDLE SCHOOL	ETDA	27	7
2/12/15 11:51	AMPHI	CROSS MIDDLE SCHOOL	ETDA	27	7
2/12/15 13:43	AMPHI	CROSS MIDDLE SCHOOL	ETDA	27	7
2/16/15 9:20	C/P	SONORAN SCI ACAD (Tucson/Sunset)	ETDA	22	6
2/16/15 13:29	C/P	SONORAN SCI ACAD (Tucson/Sunset)	ETDA	23	6
2/16/15 14:25	C/P	SONORAN SCI ACAD (Tucson/Sunset)	ETDA	25	6
3/5/15 8:15	C/P	ACAD OF TUCSON MIDDLE SCHO	ETDA	20	6
3/5/15 9:13	C/P	ACAD OF TUCSON MIDDLE SCH	ETDA	25	6
3/5/15 10:05	C/P	ACAD OF TUCSON MIDDLE SCH	ETDA	21	6
3/6/15 7:45	C/P	BASIS TUCSON K-6	ETDA	28	5
3/6/15 9:35	C/P	BASIS TUCSON K-6	ETDA	28	5
3/6/15 10:35	C/P	BASIS TUCSON K-6	ETDA	28	5
3/6/15 11:30	C/P	BASIS TUCSON K-6	ETDA	28	5
3/9/15 7:45	TUSD	ROBINS K-8 SCH	ETDA	18	7
3/9/15 9:43	TUSD	ROBINS K-8 SCH	ETDA	20	7
3/9/15 10:37	TUSD	ROBINS K-8 SCH	ETDA	30	6
3/9/15 11:31	TUSD	ROBINS K-8 SCH	ETDA	32	6
3/9/15 12:59	TUSD	ROBINS K-8 SCH	ETDA	18	8
3/9/15 13:53	TUSD	ROBINS K-8 SCH	ETDA	20	8
3/10/15 8:15	MUSD	DeGRAZIA ELEM SCH	ETDA	24	6
3/10/15 9:20	MUSD	DeGRAZIA ELEM SCH	ETDA	27	6
3/10/15 10:25	MUSD	DeGRAZIA ELEM SCH	ETDA	25	6
3/11/15 8:30	C/P	ST JOHN THE EVANGELIST SCH	ETDA	30	7
3/11/15 11:05	C/P	ST JOHN THE EVANGELIST SCH	ETDA	26	6
3/11/15 13:00	C/P	ST JOHN THE EVANGELIST SCH	ETDA	25	8
3/12/15 8:50	TUSD	MANSFELD MIDDLE SCH	ETDA	21	6
3/12/15 9:42	TUSD	MANSFELD MIDDLE SCH	ETDA	23	6
3/12/15 10:34	TUSD	MANSFELD MIDDLE SCH	ETDA	27	6
3/12/15 13:18	TUSD	MANSFELD MIDDLE SCH	ETDA	17	6
3/12/15 14:10	TUSD	MANSFELD MIDDLE SCH	ETDA	22	6
3/19/15 8:15	C/P	OUR MOTHER OF SORROWS	ETDA	16	7
3/19/15 9:35	C/P	OUR MOTHER OF SORROWS	ETDA	17	7
3/19/15 13:10	C/P	OUR MOTHER OF SORROWS	ETDA	15	8
3/19/15 14:05	C/P	OUR MOTHER OF SORROWS	ETDA	20	8
3/24/15 8:00	MUSD	THORNYDALE ELEM SCH	ETDA	24	6
3/24/15 10:15	MUSD	THORNYDALE ELEM SCH	ETDA	25	6

3/26/15 8:52	TUSD	ROBERTS-NAYLOR K-8	ETDA	30	7/8
3/26/15 9:57	TUSD	ROBERTS-NAYLOR K-8	ETDA	30	7/8
3/26/15 12:37	TUSD	ROBERTS-NAYLOR K-8	ETDA	30	7/8
3/26/15 13:44	TUSD	ROBERTS-NAYLOR K-8	ETDA	30	7/8
3/26/15 14:50	TUSD	ROBERTS-NAYLOR K-8	ETDA	30	7/8
4/1/15 9:15	C/P	PAULO FREIRE FRDM SCH - DNTWN	ETDA	24	6/7
4/1/15 10:30	C/P	PAULO FREIRE FRDM SCH - DNTWN	ETDA	24	6/7
4/2/15 8:30	TUSD	GRIDLEY MIDDLE SCH	ETDA	29	6
4/2/15 9:39	TUSD	GRIDLEY MIDDLE SCH	ETDA	34	6
4/2/15 11:13	TUSD	GRIDLEY MIDDLE SCH	ETDA	24	6
4/2/15 12:17	TUSD	GRIDLEY MIDDLE SCH	ETDA	20	6
4/3/15 8:19	AMPHI	CORONADO K-8 SCH	ETDA	29	6
4/3/15 10:20	AMPHI	CORONADO K-8 SCH	ETDA	29	6
4/3/15 11:17	AMPHI	CORONADO K-8 SCH	ETDA	29	6
4/3/15 12:54	AMPHI	CORONADO K-8 SCH	ETDA	29	6
4/3/15 13:50	AMPHI	CORONADO K-8 SCH	ETDA	29	6
4/3/15 14:46	AMPHI	CORONADO K-8 SCH	ETDA	30	6
4/6/15 9:39	TUSD	GRIDLEY MIDDLE SCH	ETDA	30	6
4/6/15 11:13	TUSD	GRIDLEY MIDDLE SCH	ETDA	31	6
4/6/15 12:17	TUSD	GRIDLEY MIDDLE SCH	ETDA	23	6
4/6/15 13:21	TUSD	GRIDLEY MIDDLE SCH	ETDA	27	6
4/6/15 14:25	TUSD	GRIDLEY MIDDLE SCH	ETDA	20	6
4/7/15 9:40	C/P	THE GREGORY SCHOOL	ETDA	28	6
4/8/15 8:12	AMPHI	AMPHI MIDDLE SCHOOL	ETDA	25	6-8
4/8/15 9:06	AMPHI	AMPHI MIDDLE SCHOOL	ETDA	24	6-8
4/8/15 10:00	AMPHI	AMPHI MIDDLE SCHOOL	ETDA	17	6-8
4/8/15 10:54	AMPHI	AMPHI MIDDLE SCHOOL	ETDA	23	6-8
4/8/15 11:48	AMPHI	AMPHI MIDDLE SCHOOL	ETDA	36	6-8
4/13/15 10:30	C/P	IMAGO DEI MIDDLE SCH	ETDA	12	5
4/13/15 13:30	C/P	IMAGO DEI MIDDLE SCH	ETDA	20	7
4/15/15 8:00	C/P	IMAGO DEI MIDDLE SCH	ETDA	18	8
4/15/15 9:30	C/P	IMAGO DEI MIDDLE SCH	ETDA	20	6
4/22/15 8:40	TVUSD	EMILY GRAY JR HIGH SCH	ETDA	25	8
4/22/15 9:45	TVUSD	EMILY GRAY JR HIGH SCH	ETDA	25	8
4/30/15 12:15	C/P	KHALSA MONTESS SCH-RIVER RD	ETDA	20	7/8
4/30/15 13:20	C/P	KHALSA MONTESS SCH-RIVER RD	ETDA	21	7/8
5/1/15 10:35	TUSD	PUEBLO GARDENS K-8 SCH	ETDA	17	8
5/1/15 11:40	TUSD	PUEBLO GARDENS K-8 SCH	ETDA	20	8
5/1/15 14:20	TUSD	PUEBLO GARDENS K-8 SCH	ETDA	30	7
5/5/15 8:20	AMPHI	LA CIMA MIDDLE SCH	ETDA	21	6
5/5/15 9:27	AMPHI	LA CIMA MIDDLE SCH	ETDA	21	6
5/5/15 10:24	AMPHI	LA CIMA MIDDLE SCH	ETDA	21	6
5/5/15 11:51	AMPHI	LA CIMA MIDDLE SCH	ETDA	21	6
5/5/15 12:48	AMPHI	LA CIMA MIDDLE SCH	ETDA	22	6
5/5/15 13:45	AMPHI	LA CIMA MIDDLE SCH	ETDA	22	6
5/5/15 14:42	AMPHI	LA CIMA MIDDLE SCH	ETDA	22	6

5/8/15 9:45	TUSD	DIETZ K-8 SCH	ETDA	24	6
5/8/15 10:50	TUSD	DIETZ K-8 SCH	ETDA	18	7
5/8/15 12:35	TUSD	DIETZ K-8 SCH	ETDA	24	6
5/8/15 13:40	TUSD	DIETZ K-8 SCH	ETDA	23	7
5/11/15 8:25	VUSD	DESERT SKY MIDDLE SCH	ETDA	27	6
5/11/15 10:20	VUSD	DESERT SKY MIDDLE SCH	ETDA	26	6
5/12/15 10:45	VUSD	DESERT SKY MIDDLE SCH	ETDA	26	6
5/12/15 13:30	VUSD	DESERT SKY MIDDLE SCH	ETDA	25	6
5/19/15 8:00	FWUSD	WALTER DOUGLAS ELEM SCH	ETDA	31	6
5/19/15 9:00	FWUSD	WALTER DOUGLAS ELEM SCH	ETDA	29	6
5/19/15 10:00	FWUSD	WALTER DOUGLAS ELEM SCH	ETDA	31	6

EDTA = *El Tour de Agua*

APPENDIX G

Special Events 2014-2015

Date	Time	Event
11/18/2014	6:00-8:00 pm	Rattlesnake Ridge Elementary School Family Science Night

Appendix C – SmartScape 2014-15 Annual Report

Pima SmartScape Program - City of Tucson IGA
Annual Report
FY 2014-15

I. Program Summary

Table 1: Pima SmartScape Program Annual Summary

Pima SmartScape Program 2014-2015 Workshop Summary (Deliverables)	# Classes	Class Hours (ea.)	Instructional Hours	Staff Hours	Total # Attend	Series Average	# Certificates
Total	**96**		**257.5**	**352.5**	**2519**		**105**
Professional Workshops							
Smartscape: A Training Program for Landscape Professionals™ (2*9-part series)	18	2.5	47.0	65.0	782	44	72
Smartscape Español (2*9-part series)	18	2.5	47.0	65.0	291	16	33
Turf Irrigation Management	2	4.5	9.0	11.0	36	18	
Professional Training Modules (4*3-part series)	12	2.5	33.0	45.0	142	12	
Other	1	3.5	3.5	4.5	86		
Sub Total	**51**	**15.5**	**139.5**	**190.5**	**1337**		**105**
Residential Workshops							
Guest Lecture	1	2.5	2.5	3.5	8		
Hands-On Drip Irrigation Scheduling and Controllers	5	2.0	8.0	12.0	43		
Hands-On Drip Irrigation System Design	5	3.0	15.0	20.0	72		
Hands-on Landscape Design (2*3-part Series)	6	3.0	18.0	24.0	63	11	
Rainwater Harvesting Incentives Rebate Program	19	3.0	57.0	76.0	731		
Gray Water Rebate Program	5	2.0	10.0	15.0	122		
Other	4	1.5-3	7.5	11.5	143		
Sub Total	**45**	**15.5**	**118.0**	**162.0**	**1182**		

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II. Historical Overview

In 1989, University of Arizona College of Agriculture and Life Sciences Pima County Cooperative Extension established, upon request, collaboration with City of Tucson Water through an Intergovernmental Agreement (IGA) to provide water conservation education and training in the Tucson Water Service Area for TW customers. This was done in response to, and in compliance with, Arizona's Groundwater Management Act and the concurrent Tucson City code regarding Xeriscape Landscaping and Screening Regulations. Thus, two areas of importance in meeting state and municipal mandates coalesced through one program to 1) increase irrigation efficiency to reduce water waste and 2) promote the adoption of Xeriscape principles for creating and maintaining low water use landscapes.

Education and training addressing these integrated issues is fundamental to Tucson's water conservation efforts; the targeted audience is Green Industry personnel and residential water users. Green Industry refers to occupations associated with horticultural endeavors and allied fields (e.g., landscape construction and maintenance, landscape design and architecture, plant nursery, arboriculture, irrigation, pest and management, property management, etc.). The basis for targeting this audience lies both in the city code and in the fact that approximately 1/3 of the potable water supplied to the residential and commercial sector is used for landscape irrigation. By focusing on creating water-efficient landscapes and irrigation practices, it is anticipated that reduction of water waste can be achieved.

Cooperative Extension's Pima SmartScape Program works collaboratively with Tucson Water to identify and implement programs that will help realize the utility's conservation objectives. The core of the education and training program is focused on efficient irrigation/reduction of water waste and sustainable landscape practices for the Tucson area. The sole source of funding for the program is the Water Conservation Fund, established as a cost incurred by water customers at the rate of seven cents per hundred cubic feet (Ccf). One Ccf = 748 gallons.

Over the course of its 26-year partnership, Pima SmartScape has become a dynamic, multi-faceted, and enduring landscape water conservation education program. Its longevity has allowed it to influence consumer water use habits and landscaping practices and participate in shaping of community consciousness. Its short-, mid-, and long-range goals plan for implementation today with an eye to the future, wherein longer term aspirations are achievable. Building capacity for a water-secure future takes time. Tucson Water and Pima SmartScape are building capacity towards that goal, together.

The latest of a series of 3-year IGAs was initiated on July 1, 2013, with the primary objective of reducing outdoor water consumption in commercial, industrial, multi-family, and residential water user classes. This is done by conducting workshops, seminars and training programs, and developing appropriate educational materials and delivering them to these targeted audiences. The IGA is due to renew July 1, 2016.

The program is staffed by 1 Horticulture Agent, 1 Program Coordinator, and 1 Student Worker located at Pima County Cooperative Extension.

Note: Originally named "Low 4" to reflect the philosophy of landscapes that can be sustained with low water, low maintenance, low energy, and low costs, the program name was officially changed to SmartScape in 2006. (Sometimes there is some confusion between the programmatic name "SmartScape" and the "signature" series of professional of classes offered through the program referred to simply as "Smartscape," thus Pima SmartScape became the official name of the program in 2013.)

III. Achievements

1. Fully integrated website. https://cals.arizona.edu/pima/smartscape/
2. Social media – Facebook. https://www.facebook.com/PimaSmartScape
3. Standardization of Excel data.
4. Implementation of Automated Response Technology.
5. Implementation of online survey software (Qualtrics).

6. Increased participation in Smartscape Español through radio advertising (La Caliente)
7. Pilot – Pro Training Module "Landscape Irrigation."

IV. Work Program Overview

The scope and objectives of the Pima SmartScape Program have adjusted over time to meet the needs of its sponsor, Tucson Water, and the community both entities serve. Cooperative Extension is the public outreach branch of the University of Arizona's College of Agriculture and Life Sciences, with a mission to provide public education on community issues and to transfer university technology and information to the public. An important characteristic of Extension is that it has *no regulatory mission or affiliation*. This allows Extension to work with clientele in a forthcoming manner, making the clientele more receptive to educational efforts.

The program objectives are to:

- Build capacity within the landscape industry to design, install, and maintain water-efficient landscapes
- Promote the adoption of water-efficient landscapes, and increase irrigation efficiencies in the residential, multi-family, commercial, and industrial user classes by conducting workshops, seminars, and training programs and developing appropriate educational materials
- Monitor and analyze program impacts on participants relating to workshop training to determine program effectiveness
- Maintain a list of all workshop attendees, addresses, and contact information, in a data base format approved by Tucson Water
- Maintain website for SmartScape and update as needed

Program Results

Program participants include, but are not limited to, the largest water users in the multi-family and commercial user classes, including institutional users such as parks and schools, and landscape design, construction, and maintenance personnel. Residential and commercial property owners and managers are also included as target program participants.

Pima SmartScape has consistently provided sound education and training for the above named user classes in the Tucson area. Current educational programs are targeted to Green Industry personnel and residential water customers. Information included in workshops relate to Best Management Practices for Sustainable Landscapes, Landscape Irrigation, Water Conservation, Use of Drought Resistant Plant Materials, and other appropriate topics. Below is a brief outline of the workshops and the clientele served in the 2014-2015 Fiscal Year. A concise summary of workshop inputs is provided above in Section I, Table 1.

Professional Workshops

Eleven (11) professional-level workshops were held, comprised of 51 individual classes with a total 139.5 hours of classroom/field instruction attended by 1,337 program participants. All classes are developed through or in conjunction with the Pima SmartScape Program unless noted otherwise and are taught by industry professionals and/or University of Arizona personnel. Classes are taught in Tucson at Pima County Natural Resources Parks and Recreation, Karsten Turfgrass Research Center, Pima County Cooperative Extension, and Campus Agriculture Center.

Program goals are to:

- Provide sound understanding of the art and science underlying conventional landscaping
- Foster best management practices for creating and maintaining healthy urban landscapes
- Educate participants regarding the need for water conservation
- Encourage the use of water-efficient practices and technologies

Course Descriptions

*SmartScape: A Training Series for Landscape Profes*sionals™ - Workshops for green industry and allied professionals, including landscape designers/architects, irrigation designers/technicians, installation and maintenance personnel, growers, property managers/homeowners associations, and related occupations. The training program consists of a series of nine classes taught by University of Arizona faculty and local industry professionals. They provide informative, research-based instruction designed to promote best landscape management practices for the urban Sonoran Desert. This training program was originally launched in 1994, and became a statewide program in 2014. It is offered in Tucson in January and August.

Smartscape Español – Workshops, as above, with targeted audience comprised of Spanish-speaking Green Industry and allied professionals. Classes are taught in Spanish by industry professionals. The classes are adapted from the standard program, above. Workshops offered in April and October.

- *Plants, Soils, and Water* provide basic understanding of the dynamic relationships of plants, soils, and water. Instruction focuses on soil texture and structure and how it affects water movement, infiltration rates, and water holding capacity. Mechanisms that plants use to regulate water use are also discussed.
- *Landscape Design and Renovation* provides information about the principles and concepts of designing and installing a landscape. Special attention is given to Xeriscape landscapes and renovating an existing landscape from high-water use to low-water use.
- *Landscape Irrigation Systems* discusses various common irrigation systems and focuses on designing, installing, and programming/scheduling a drip irrigation system. Maintenance, troubleshooting, and overview of smart controllers are also included.
- *Desert Adapted Plants* identifies many of Tucson's common desert landscape plants and provides basic discussion of their traits that make them suitable for the urban and suburban landscape. Specific characteristics such as flower color, seasonality, size, and hardiness, as well as maintenance specifications, and other considerations are also presented.
- *Plant Selection and Installation* focuses on factors that should be considered when selecting installing landscape plants. Participants learn how to choose healthy plants from a nursery and the proper way to install them.
- *Landscape Water Management* focuses on reducing water waste through efficient irrigation. Participants learn about irrigation scheduling, irrigation techniques and proper cultural practices. The class reiterates factors taught throughout the series that influence plant water use in landscape.
- *Maintaining Desert Adapted Plants* divides desert-plant maintenance into two categories – pruning and fertilizing. All pruning instruction is based on International Society of Arboriculture guidelines and uses pictorial slides and actual samples to illustrate the speaker's main points. The fertilizing portion of the workshop focuses on plant needs for macro- and micronutrients, determining correct fertilizers to use, and calculating the appropriate quantities of fertilizers to purchase and apply.
- *Plant Disorders* teaches participants what to look for to help diagnose common landscape plant diseases, disorders, and deficiencies. Cultural controls are also discussed.
- *Weed Control in Desert Landscapes* discusses weed identification, seasonal weeds, what products work best for given situations, and how to apply them.
- *Integrated Pest Management* considers typical insects and other pests associated with landscapes and focuses on cultural controls.

Turf Irrigation Management – Workshops for multi-family, commercial, and municipal landscape design, installation, and maintenance personnel, and allied professions. Workshops offered in March and September.

- *Spring Transition and Water Audit* specifically covers the hands-on catch can placement in the field, and the simple calculation of the actual in field precipitation rate. From there the students will learn how long to schedule run times on stand-alone field satellite stations for year round turf (Bermuda and Bermuda overseeded with rye).

- *Fall Overseed and Maintenance* focuses on overseeding with rye, mowing, fertilization, and weed control. Basic biology of turfgrass, plant I.D. tips, environmental and cultural factors that affect irrigation, and problem solving skills are also presented.

Professional Training Modules – Workshops for qualified Green Industry personnel (i.e., completed matriculation through Smartscape Training Program). The modules are created as a 3-part series of classes which build on the instruction provided in the Smartscape Training Program by expanding the subject matter to provide a broader and/or deeper knowledge in given areas of interest. Lessons are designed to address issues pertinent to landscape water conservation and education efforts unique to Tucson's urban Sonoran Desert community and the surrounding areas in which the program participants live and work. Rotating modules, usually offered once per quarter.

Healthy Landscapes (3-part series):

- *Understanding Your Site and Your Soil* focuses on understanding the site and identifying microclimates, understanding soil characteristics, and mulch and compost.
- *Cultural Practices for a Healthy Landscape* focuses on how to identify the plants that suit the site, as well as planting and maintenance practices that keep plants and soil healthy. In depth discussion on choosing plants for soil, exposure, and other factors of a microclimate, hydrozoning, and planting basics that help reduce diseases and pests.
- *What to Do When Pests and Diseases Happen* covers the safest options when pests and disease occur and focuses on methods of intervention that help preserve our health, the health of the soil, and the beneficial insects that are so valuable in the landscape. Topics covered include what weeds indicate about the soil and beneficial insects and how to attract them

Urban Tree Management – In this 3-part series, participants receive in-depth knowledge about managing the trees in our urban desert community. Topics include structural assessment, stem strength, tree failure prevention, pruning, irrigation, and general arboriculture science.

- *CODIT* is the basic science behind arboriculture and refers to Compartmentalization of Decay in Trees. This presentation focuses on arboricultural science, pruning according to tree physiological responses to injuries, and the social, economic, environmental benefits of trees.
- *Structural Assessment* teaches the basics of tree forms and structure, with emphasis on pruning for structural integrity and evaluating management needs.
- *Drought and Water Conservation* discusses proper irrigation practices as well as managing trees during drought-imposed water restrictions and awareness of the injury symptoms associated with drought.

Landscape Irrigation Systems – This 3-part series focuses on practical irrigation information for everyday field applications. Learn basic design concepts, maintenance, and management, from the valve to the sprinkler. Hands-on practical experiences to demonstrate skills and techniques taught during lecture.

- *Design* looks at maximizing irrigation efficiency through hydrozoning, proper sprinkler selection and spacing, pipe sizing and zone layout, hydraulics, and practical exercise with industry standards charts regarding pressure and flow and sprinkler/pipe sizes.
- *Maintenance* looks at site assessment, zone inventory and mapping, measuring flow and pressure, nozzle selection, and practical exercise with dissection of electronic solenoid valve.
- *Management* looks at evapotranspiration and Geographical Information Systems relevant to irrigation management. Also included is irrigation scheduling examples and software demonstrations.

Other – Tree Health Care workshop is offered in collaboration with the UA Cooperative Extension Horticulture Working Group for city employees, tree care workers, and others in the green industry responsible for care and maintenance of landscape trees. Topics change year to year. Workshop offered in December.

Residential Workshops

Residential-level workshops held were comprised of 45 individual classes with a total 118 hours of classroom/field instruction attended by 1,182 program participants. All classes are developed through or in conjunction with the SmartScape Program unless noted otherwise and are taught by industry professionals and/or University personnel. All classes are taught at Pima County Cooperative Extension unless otherwise noted.

Program goals are to:

- Provide information about creating and maintaining water-efficient landscapes
- Teach the principles of Xeriscape
- Educate homeowners about best management practices for sustaining a water-smart home landscape

Course Descriptions

Guest Lecture – This name is given to the intermittent classes on subjects that are suggested by homeowners on their class evaluation forms as topics of future interest. "Native Birds & Trees," which focused on selection of native tree species for attracting birds, was presented by the Audubon Society. When several participants suggest the same topic, the Guest Lecture is scheduled and advertised. If sufficient interest is generated, it may be launched as a pilot class. This helps the program to keep current with the educational interests and/or needs of the community.

Hands-On Drip Irrigation System Design – This class helps homeowners understand how to set up, maintain, change, and troubleshoot a drip irrigation system. It teaches about the PVC lines, tubing, connections, emitters, tools, and how to put it all together to create an efficient drip system. Typically, offered between March and September to accommodate planting and growing seasons.

Hands-On Drip Irrigation Scheduling and Controllers – This class discusses various common irrigation systems and focuses on installing and programming/scheduling a drip irrigation system controller, along with critical information about plants' watering needs and efficient irrigation techniques. Maintenance and troubleshooting are also included. Typically, offered every other month.

Hands-On Landscape Design – The purpose of this 3-part series is to provide a method to produce a landscape design for any area in a format which can be implemented as time and budget allow. Participants create their own design on paper for their project. Typically, offered between March and September to accommodate planting and growing seasons.

- *Site Inventory and Analysis* – Base sheet preparation, material research resources, and ideal development
- *Site Design and Functionality* – Integration of information and ideas into base plan
- *Design Review and Revision* – Discussion of construction sequencing, techniques, materials, and cost estimating

Rainwater Harvesting Incentives Rebate Program – This workshop, designed by Tucson Water, is mandatory to qualify for the rebate. Workshop focuses on designing a passive and active rainwater catchment system for a residential landscape and informs participants about the incentive levels and requirements. Participants are encouraged to bring a sketch or site plan of their property to refer to during the workshop. Offered at least once or twice per month except in October (instructor unavailable)

Gray Water Rebate Program – This workshop, designed by Tucson Water, is mandatory to qualify for the rebate. 1/3 of typical household waste water can be re-used as gray water for landscape plants. To participate in Tucson Water's Single-Family Residential Gray Water Rebate Program and receive reimbursement when a permanent gray water irrigation system is installed, one must attend this 2-hour workshop. It focuses on design, operation, and maintenance of a gray water system. Workshops offered every other month.

Other – Presentations in various locations throughout the community as requested for community organizations and presented by Program Faculty Leader.

V. Evaluation

In-Class

For both Professional and Residential workshops, program participants are requested to complete an in-class evaluation and to complete a follow up evaluation three months later. In-class evaluations are used to discern general knowledge of subject matter before and after the presentation and generic information, such as suitability of facilities, instructor, content, materials, etc. In addition, professional evaluations inquire about occupation. The SmartScape program is currently working towards standardizing the evaluation questions so that more direct comparisons, as well as unique parameters, can be assessed. On average, 80% of all residential class participants completed the in-class evaluations and 92% of all professional class participants completed theirs. A sample of an in-class professional evaluation and is provided in Example 1.

To navigate away from the very time consuming process of individual hand-tallies of participants' responses, SmartScape implemented use of Audience Response Systems or "clickers". These hand-held devises use an interactive technology that enables instructors or facilitators to ask questions through a PowerPoint presentation to participants and get immediate results that can be shared (as in a live poll) and/or can be exported to a spreadsheet for data storage and analysis. The learning curve to use this technology required a 3-day training session and approximately 6 months to synthesize, implement, utilize, and assimilate in the evaluation process.

Regarding use of the clickers, class participants' response can be envisioned as a normal bell curve wherein most participants are able to adapt to the use of the devises, usually within 5 minutes of facilitator instruction. Program staff is currently working with instructors and participants to fully integrate this technology with the workshops. We anticipate fully implementing the clickers in 2015.

3-Month Follow Up

Follow up evaluations are used to determine how/if the information/skills are put into use and the impacts they may have. Utilizing the software tools available to the University, Pima SmartScape undertook the process of shifting from "snail mail" paper evaluations, which had to be manually entered into a spreadsheet format (and incur the cost of postage plus time delay), to electronic software format via Qualtrics to conduct online surveys which automatically downloads into a spreadsheet as soon as they are received. Participants are made aware of the request for a follow up survey to be conducted via email when they take the class and are normally responsive to the survey. A sample of a 3-month follow up for professional evaluations is provided in Example 2.

VI. Reporting

Pima SmartScape is required to provide monthly and quarterly reports in a format approved by Tucson Water. Monthly reports, which are essentially a listing of the month's classes, are presented in a single page spreadsheet format which includes class name, date presented, and number of participants, class hours and staff hours. Table 2 provides a full summary of the monthly report submitted to TW. Quarterly reports are provided in an Excel spreadsheet format and are a combination of the accumulated monthly reports plus a summary of the in-class and 3-month follow ups. "Other" classes are not evaluated. Appendix 1 provides all in-class and follow-up evaluations and comments in their raw format. It is important to note that the comments of the participants are extremely insightful, and are revealing as qualitative measure to gauge the effectiveness of the programs, motivations of the participants, and insight towards developing programs.

Results of 3-month follow-up surveys by program

Professional Workshops

Smartscape: A Training Program for Landscape Professionals 71 surveys sent, 39 returned. 53% response

After attending the SmartScape training series, 93% indicate they are using the information presented on a regular basis. In order of daily use: Desert Adapted Plants (70%), Plant Selection and Installation (67%), Maintaining Desert Adapted Plants (64), Soils Plants and Water (63%), Landscape Water Management (53%), Irrigation & Controllers (51%), Plant Disorders (49%), Landscape Design & Renovation (47%), and Integrated Pest Management (35%). After taking the classes, 69% indicated they had experienced job improvement or increased responsibility either within or outside the company. The majority (51%) indicated they have improved technical skills, 32% report they are more involved in customer service, and 14% report they have had an increase in pay. When asked if the information provided helped them be more aware of the need to use water efficiently, 89% responded positively.

Smartscape Español 8 surveys sent. No responses

Turf Irrigation Management 24 surveys sent, 7 returned. 33% response

Participants in this class indicated they worked for a school district or park department (43%), Landscape Company (29%), or other (29%). After attending the workshop, 86% indicated they were using the information on a regular basis. The areas of usefulness on their job was reported as 57% for both soils and evaluating irrigation system performance and 43% each for using ET for irrigation scheduling, maintaining and repairing irrigation equipment, and utilizing sprinkler system checklist. 100% reported it was easy to apply the information. 71% have modified their irrigation scheduling practices and use ET, water budget, and soil probes. They also report being aware of a decrease in water use (71%) and 86% have made repairs to their irrigation systems in adjusting or replacing malfunctioning heads or regulating high pressure (29%), replacing mixed heads (14%), repaired leaks (71%), and installed new controller (14%). After these fixes, 86% report awareness of decreased water use. 57% have developed an irrigation equipment review system.

Professional Training Module – Urban Tree Management 12 surveys sent, 8 returned. 67% response

After attending the series, 38% report they are using the information on a regular basis. Of that information, C.O.D.I.T and Drought Response are used 38% and Structural Assessment 25%. 50% report opportunity for job improvement or increased responsibility in the areas of improved technical skill (25%) and customer service (13%). 63% report being more aware of the need for using water efficiently.

Professional Training Module – Healthy Landscapes 8 surveys sent, 5 returned. 63% response

100% report they are using the information on a regular basis, with 80% focused on pests and disease and 60% for both site and soil and cultural practices. 100% also report this information has provided opportunity for job improvement and increased responsibility, with 80% citing improved technical skills and 40% more involved in customer service. 80% also report being aware of the need to use water more efficiently.

Residential Workshops

Hands-On Drip Irrigation System Design 31 surveys sent, 16 returned. 52% response

In this class, 69% of respondents indicated they attended the class for the purpose of learning the basics of drip irrigation design and installation and the basics of troubleshooting. 63% wanted to learn how to make their system more efficient and how to install new lines and emitters. In design, most (69%) felt confident they could select emitters to meet needs of landscape plants. In installation, 31% felt they could connect to the mainline, install a valve box and a backflow preventer, and more than half (56%) felt they could install emitters. As regards maintenance, 75% felt confident in adding

or closing off lines or emitters as necessary, and 56% felt they could change the filter and flush the system. After the class, 31% installed a drip irrigation system, 13% doing it themselves and 6% having it hired out. 63% did not install a system after the class but 13% planned to do so.

Hands-On Drip Irrigation Scheduling and Controllers 11 surveys sent, 4 returned. 40% response

75% of the respondents indicated they attended the scheduling class in order to learn to create an efficient watering schedule. 50% indicated they wanted to learn how to determine the landscape water needs, program a controller, and learn to use the controller they already had. After taking the class, 75% felt confident in programming a controller and 50% felt confident to create an efficient landscape watering schedule. Other landscape water conservation features on the properties included Xeriscape landscape and rainwater harvesting (both 25%) and automated drip irrigation system (75%). At the time of the survey, 25% respondents had noticed a reduction in potable water consumption after employing conservation practices.

Hands-On Landscape Design Series 20 surveys sent, 13 returned. 65% response

Participants in this class attended because they wanted to learn how to renovate an older landscape (55%), create a new landscape (40%), or replace high water use landscape features with lower water use (40%). After taking the class, 62% indicated they are using the information learned in class. 77% felt confident in being able to design most or all of the landscape and 45% felt comfortable in making informed decisions about plants and materials selection and placement. Most people agreed that landscaping their home would add curb appeal and added property value and opted for sustainable and energy efficient features.

Rainwater Harvesting Incentives Rebate Program 430 surveys sent, 197 returned. 53% response

The majority (76%) of participants in this class did not have a rainwater harvesting system before attending the workshop. One quarter (24%) of participants installed a RWH system after the workshop, with 58% choosing an active system. Most participants (26%) hired a professional to do the installation and the most common (12%) size was between 501-1200 gallon capacity. Only 12% responded to having applied for the rebate at the time of the follow up survey and 22% chose Level 2 (up to $2,000). Most respondents (11%) anticipated longer than 2 years to recover the cost of the investment in their system but 4% had already recovered theirs. The majority of responses indicated an anticipated cost recovery periods between 1-3 months (7%), 3-6 months (1%), 6-12 months (6%), 1 year (7%), and 2 years (8%).

Gray Water Rebate Program 63 surveys sent, 25 returned. 39% response

The majority (74%) of participants in this class indicated they did not use gray water to irrigate their landscape plants, although 52% indicated that they are using the class information for their yards. Since attending the class, 3% indicated they had applied for the rebate and 7% had already received their refund but the majority (6%) thought it would take approximately 6-12 months to recover their installation costs.

VII. Submitted by:

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Example 1: In-class evaluation template sample of Professional-level workshop series and audience response

Professional Training Module - Landscape Irrigation - PILOT
(Intro to Basic Design, Maintenance, and Management)
In-Class Q2 (Apr.-May) 2015

Sign-Ins:	9
Number of Participants:	9
Percent Response:	100%

Please Indicate which Pima SmartScape Program Professional classes you have attended:

	%	#
Water Conservation Ordinances	0%	0
Urban Landscape Management	22%	2
Urban Tree Management	33%	3
Landscape Water Management	11%	1
Creating Healthy Landscapes	11%	1
Landscape Irrigation	56%	5
Landscape Design	44%	4
SmartScape Training for Landscape Professionals	78%	7
Spanish SmartScape Training for Landscape Professionals	0%	0
Tucson Water Audit	11%	1
Turf Irrigation Management	22%	2

1. Workshop Evaluator: Choose which best describes your occupation

	%	#
Landscape Company Employee	33%	3
Individual Landscaper	11%	1
Public Landscape Manager	0%	0
Nursery Owner/Manager	0%	0
Nursery Employee	22%	2
Property Management/Landscape	0%	0
Landscape Architect/Designer	0%	0
Master Gardener	0%	0
On-Site Facility Landscape Maintenance	11%	1
Other	11%	1

2. Please rate your overall Knowledge of this subject BEFORE this workshop:

	%	#
Excellent	0%	0
Good	44%	4
Average	11%	1

Poor	44%	4

3. Please rate your overall Knowledge of this subject AFTER this workshop:		
	%	#
Excellent	0%	0
Good	67%	6
Average	11%	1
Poor	0%	0

4. Please rate the workshop by checking the appropriate box:		
Presentation was:	%	#
Very Clear	11%	1
Clear	78%	7
Unclear	11%	1

Content was:	%	#
Very Important	78%	7
Important	22%	2
Unimportant	0%	0

Materials were:	%	#
Very Useful	33%	3
Useful	67%	6
Useless	0%	0

Speakers were:	%	#
Very Skilled	56%	5
Skilled	33%	3
Unskilled	11%	1

Objectives were:	%	#
Very Clear	22%	2
Clear	56%	5
Unclear	22%	2

5. Please rate the program on the basis of other workshops you have attended:		
	%	#
Excellent	22%	2
Good	56%	5
Average	11%	1
Needs Improvement	11%	1

6a. In which of the topics discussed are you MOST knowledgeable/skilled?		
	%	#
Design	0%	0
Maintenance	100%	9
Management	33%	3

6b. In which of the topics discussed are you LEAST knowledgeable/skilled?		
	%	#
Design	100%	9
Maintenance	0%	0
Management	11%	1

6c. Which of the topics presented helped you have a better understanding of landscape irrigation systems?		
	%	#
Design	22%	2
Maintenance	22%	2
Management	0%	0
All	67%	6

7. In this training module, I learned check all that apply:		
	%	#
How to design a basic lateral system (zone) for spray, rotor, and drip/bubbler	78%	7
How to determine pipe sizing and read friction loss tables	78%	7
How to read sprinkler performance curves to determine appropriate spacing	67%	6
How to choose appropriate nozzles for the irrigation system	89%	8
How to determine the number and size of drip emitters for plant materials	56%	5
How to conduct a site assessment using resources	67%	6
How to inventory an irrigation system/zone for different applications (lawn, mixed zones, micro/drip)	78%	7
How to measure working pressure in rotor, spray, and drip fittings	67%	6
How valves work and how to troubleshoot common problems	44%	4
Where to obtain evapotranspiration (ET) information (i.e. the available sources)	78%	7
How soil/plant/water relations impact effective management of an irrigation system	67%	6
How to use aerial photos and GIS for zone mapping	78%	7
How to calibrate an irrigation system through meter/area and catch can test	56%	5
How to create and adjust an irrigation schedule for maximum water use efficiency	67%	6

8. How do you anticipate application of this knowledge will be of benefit?		
	%	#
I will be able to use it in my job	78%	7
It will help me improve my professional skills	67%	6
I will be able to advance my position with my company	33%	3

I will be more competitive in the job market	44%	4
I will have more confidence in my abilities	89%	8
I can help property managers/owners make better decisions regarding landscape water management	56%	5
I can help prevent water waste in the landscape	67%	6
I can help advocate best landscape management practices	78%	7
I can promote realistic water conservation practices	67%	6

Note:
All evaluations are specific to the workshop. However, some questions are common to every class and are used to determine the frequency of "repeat" participants and to gauge their interest in other program offerings. The common questions asked to residential participants are:

What other water conservation classes have you taken through the Pima SmartScape Program? (Please select all that apply)

- ❑ Hands-On Drip Irrigation (designing & troubleshooting)
- ❑ Irrigation Timers (creating a watering schedule and setting the timer)
- ❑ Hands-On Landscape Design - 3 part series
- ❑ Gray Water Rebate Program
- ❑ Guest Lecture Series (3rd Wednesday of each month)
- ❑ Principles of Xeriscape
- ❑ Desert Rain Gardens - Design and Plant Selection
- ❑ Basic Landscape Maintenance - seasonal practices
- ❑ Other (please specify) _____

What other landscape water conservation classes/workshops would you like to see offered through the Pima SmartScape Program? (Please select all that apply)

- ❑ Plant Selection for Desert Landscapes
- ❑ Edible Desert Landscapes
- ❑ Designing Water-Wise Landscapes for Wildlife
- ❑ Seasonal topics (please specify) _____
- ❑ Hands-on training for…(please specify) _____
- ❑ Other (please specify) _____

Table 2: Summary of Monthly Workshop Reports

	SmartScape Program				
	Pima County Cooperative Extension				
	July 2014 - June 2015				
	Summary of Workshops				
Workshops	Class	Date	# Attend	Class Hours	Staff Hours
JULY = 6					
Residential	Rainwater Harvesting Incentives Rebate Program	07/09/14	34	3.0	4.0
	Guest Lecture Series – Birds and Trees	07/16/14	8	1.5	2.5
	Rainwater Harvesting Incentives Rebate Program	07/19/14	31	3.0	4.0
	Rainwater Harvesting Incentives Rebate Program	07/26/14	58	3.0	4.0
	Hands-On Drip Irrigation Scheduling & Controllers	07/26/14	10	2.0	3.0
Professional					
SmartScape Training Program	Orientation + Plants, Soils, and Water	07/31/14	49	3.0	4.0
			190	15.5	21.5
AUGUST = 12					
Residential	Hands-On Drip Irrigation System Design	8/2/2014	14	3.0	4.0
	Rainwater Harvesting Incentives Rebate Program	08/16/14	38	3.0	4.0
	Gray Water Rebate Program	08/16/14	32	2.0	3.0
	Hands-On Drip Irrigation Scheduling & Controllers	08/23/14	0	0.0	0
Professional					
SmartScape Training Program	Water Efficiency Programs + Plant Selection and Installation	08/05/14	42	3.0	4.0
(31 Certificates Issued)	Plant Disorders	08/07/14	48	2.5	3.5
	Desert Adapted Plants	08/12/14	36	2.5	3.5
	Integrated Pest Management (Weeds)	08/14/14	39	2.5	3.5
	Irrigation Systems and Controllers	08/19/14	44	2.5	3.5
	Maintaining Desert Adapted Plants	08/21/14	42	2.5	3.5
	Landscape Water Management	08/26/14	41	2.5	3.5
	Landscape Design and Renovation + Certificates	08/28/14	38	2.5	3.5
			414	28.5	39.5
SEPTEMBER = 5					
Residential	Rainwater Harvesting Incentives Rebate Program	09/06/14	55	3.0	4.0
	Rainwater Harvesting Incentives Rebate Program	09/06/14	49	3.0	4.0
	Hands-On Drip Irrigation System Design	09/20/14	21	3.0	4.0
Professional					

Turf Irrigation Management	Fall Overseed and Maintenance	09/25/14	24	4.5	5.5
Pro Training Module	Healthy Landscapes Site and Soil	09/27/14	8	3.0	4.0
			157	**16.5**	**21.5**

OCTOBER = 14					
Residential	Hands-On Drip Irrigation Scheduling & Controllers	10/04/14	4	2.0	3.0
	Hands-On Landscape Design – Site Inventory and Analysis	10/16/14	9	3.0	4.0
	Hands-On Landscape Design Site Design and Functionality	10/30/14	9	3.0	4.0
Professional					
SmartScape Español	Orientation + Plants, Soils, and Water	10/02/14	11	2.5	3.5
(11 Certificates Issued)	Water Efficiency Programs + Irrigation and Controllers	10/07/14	7	2.5	3.5
	Landscape Water Management	10/09/14	7	2.5	3.5
	Maintaining Desert Adapted Plants	10/14/14	8	2.5	3.5
	Plant Disorders	10/16/14	8	2.5	3.5
	Integrated Pest Management (Weeds)	10/21/14	8	2.5	3.5
	Desert Adapted Plants	10/23/14	8	2.5	3.5
	Plant Selection and Installation	10/28/14	7	2.5	3.5
	Landscape Design and Renovation + Certificates	10/30/14	11	2.5	3.5
Pro Training Module	Healthy Landscapes Cultural Practices	10/04/14	8	3.0	4.0
	Healthy Landscapes Pests and Disease	10/30/14	3	3.0	4.0
			108	**36.5**	**50.5**

NOVEMBER = 5					
Residential	Rainwater Harvesting Incentives Rebate Program	11/01/14	33	3.0	4.0
	Rainwater Harvesting Incentives Rebate Program	11/01/14	25	3.0	4.0
	Rainwater Harvesting Incentives Rebate Program	11/08/14	34	3.0	4.0
	Hands-On Landscape Design Plan Review and Revision	11/13/14	7	3.0	4.0
Other	Invited Speaker – Garden Patio Club Presentation	11/18/14	45	1.5	2.5
			144	**13.5**	**18.5**

DECEMBER = 6					
Residential	Gray Water Rebate Program	12/06/14	25	2.0	3.0
	Rainwater Harvesting Incentives Rebate Program	12/06/14	49	3.0	4.0
Professional					
	Urban Tree Management Module – C.O.D.I.T.	12/01/14	21	2.5	3.5
Pro Training Module	Urban Tree Management Module – Structure	12/02/14	21	2.5	3.5
	Urban Tree Management Module – Assessment	12/03/14	19	2.5	3.5
Other	Extension Tree Health Care Workshop	12/04/14	86	4.0	5.0
			221	**16.5**	**22.5**

JANUARY = 12					
Residential	Hands-On Landscape Design Site Inventory and Analysis	01/28/15	14	3.0	4.0
	Rainwater Harvesting Incentives Rebate Program	01/31/15	33	3.0	4.0
	Gray Water Rebate Program	01/31/15	18	2.0	3.0
Other	Master Gardeners Seminar – Home and Landscape Water Use	01/27/15	36	3.0	4.0
Professional					
SmartScape Training Program	Orientation + Plants, Soils, and Water	01/06/15	45	3.0	4.0
	Water Efficiency Programs + Irrigation Systems and Controllers	01/08/15	49	2.5	3.5
	Landscape Water Management	01/13/15	45	2.5	3.5
	Desert Adapted Plants	01/15/15	49	2.5	3.5
	Plant Selection and Installation	01/20/15	46	2.5	3.5
	Landscape Design and Renovation	01/22/15	46	2.5	3.5
	Maintaining Desert Adapted Plants	01/27/15	42	2.5	3.5
	Plant Disorders	01/29/15	39	2.5	3.5
			462	31.5	43.5

FEBRUARY = 5					
Residential	Hands-On Landscape Design – Site Design and Functionality	02/11/15	15	3.0	4.0
	Rainwater Harvesting Incentives Rebate Program	02/21/15	36	3.0	4.0
	Hands-On Landscape Design – Plan Review and Revision	02/25/15	9	3.0	4.0
Other	Master Gardeners Workshop – Shrub Pruning	02/26/15	52	1.5	2.5
Professional					
SmartScape Training Program	Integrated Pest Management + Certificates	02/03/15	42	2.5	3.5
(41 Certificates Issued)					
			154	13.0	18.0

MARCH = 5					
Residential	Hands-On Drip Irrigation System Design	03/14/15	9	3.0	4.0
	Rainwater Harvesting Incentives Rebate Program	03/21/15	38	3.0	4.0
	Hands-On Drip Irrigation Scheduling & Controllers	03/28/15	14	3.0	4.0
Professional					
Pro Training Module	(PILOT) Landscape Irrigation System Design	03/25/15	17	2.5	3.5
Turf Irrigation Management	Spring Transition – Water Audit	03/26/15	12	4.5	5.5
			90	16.0	21.0

APRIL = 16					
Residential	Rainwater Harvesting Incentives Rebate Program	04/25/15	34	3.0	4.0
	Gray Water Rebate Program	04/25/15	14	2.0	3.0
Other	Invited Lecturer – Community Investment Corp.	04/14/15	10	1.5	2.5
Professional					
SmartScape Español	Orientation + Plants, Soils, and Water	4/2/2015	48	3.0	4.0
(22 Certificates Issued)	Water Efficiency Programs + Irrigation and Controllers	04/07/15	24	3.0	4.0
	Landscape Water Management	04/09/15	24	2.5	3.5
	Maintaining Desert Adapted Plants	04/14/15	23	2.5	3.5
	Plant Disorders	04/16/15	24	2.5	3.5
	Integrated Pest Management – Pests and Weeds	04/21/15	24	2.5	3.5
	Desert Adapted Plants	04/23/15	26	2.5	3.5
	Plant Selection and Installation	04/28/15	24	2.5	3.5
	Landscape Design and Renovation	04/30/15	23	2.5	3.5
Pro Training Module	(PILOT) Landscape Irrigation Systems – Maintenance	04/01/15	11	2.5	3.5
	(PILOT) Landscape Irrigation Systems – Management	04/08/15	9	2.5	3.5
Pro Training Module	Healthy Landscapes Part 1 – Site and Soil	04/04/15	10	3.0	4.0
	Healthy Landscapes Part 2 – Cultural Practices	04/18/15	7	3.0	4.0
			335	41.0	57.0

MAY = 6					
Residential	Hands-On Drip Irrigation – System Design	05/02/15	16	3.0	4.0
	Rainwater Harvesting Incentives Rebate Program	05/13/15	40	3.0	4.0
	Rainwater Harvesting Incentives Rebate Program	05/16/15	31	3.0	4.0
	Hands-On Drip Irrigation – Scheduling & Controllers	05/16/15	15	2.0	3.0
	Rainwater Harvesting Incentives Rebate Program	05/27/15	31	3.0	4.0
Professional					
Pro Training Module	Healthy Landscapes – Pests and Disease	05/02/15	8	3.0	4.0
			141	17.0	23.0

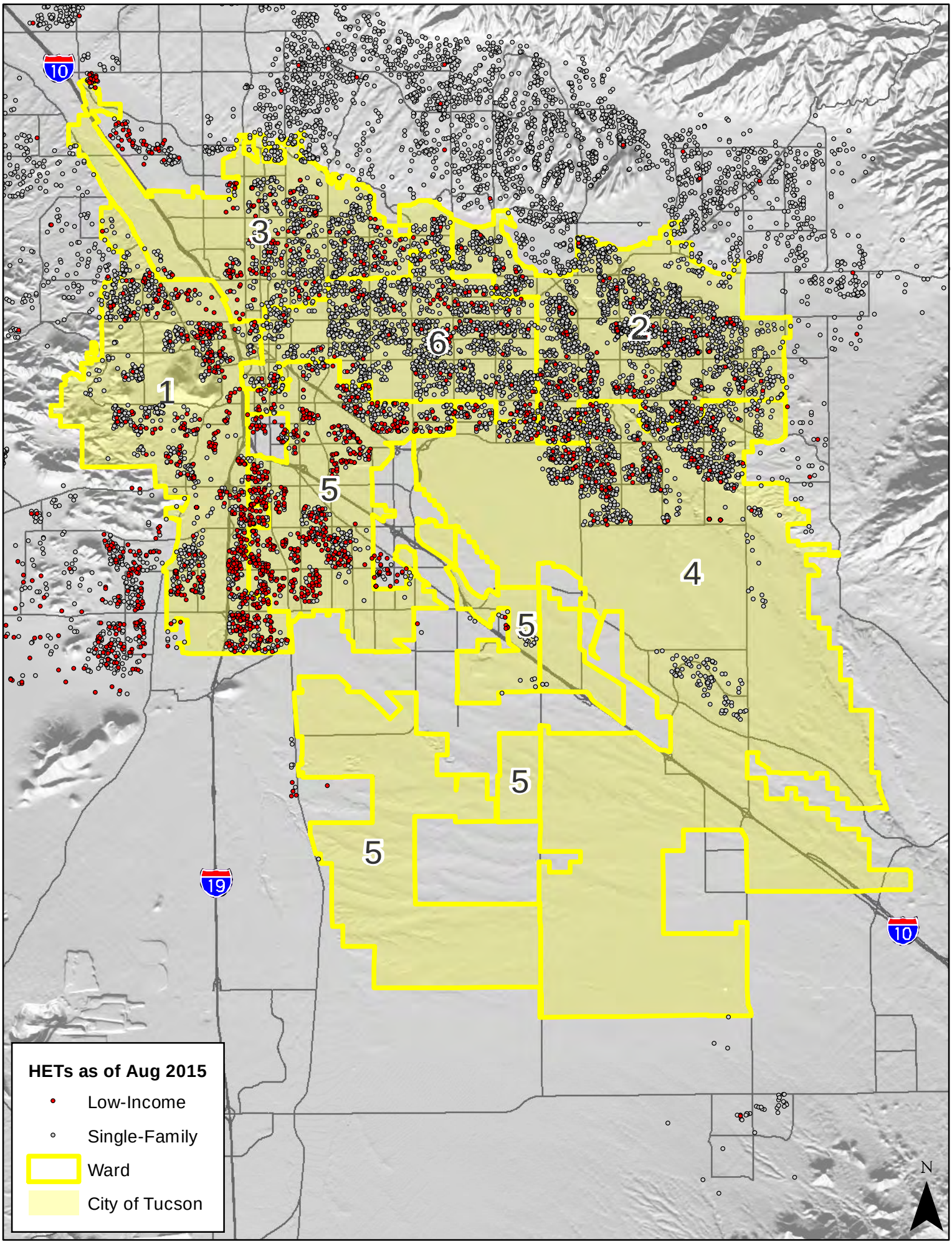
JUNE = 4					
Residential	Rainwater Harvesting Incentives Rebate Program	06/17/15	41	3.0	4.0
	Hands-On Drip Irrigation – System Design	06/20/15	12	3.0	4.0
	Rainwater Harvesting Incentives Rebate Program	6/27/15	41	3.0	4.0
	Gray Water Rebate Program	6/27/15	33	2.0	3.0
			127	11.0	15.0

Example 2: Sample 3-month follow up Professional-level evaluation

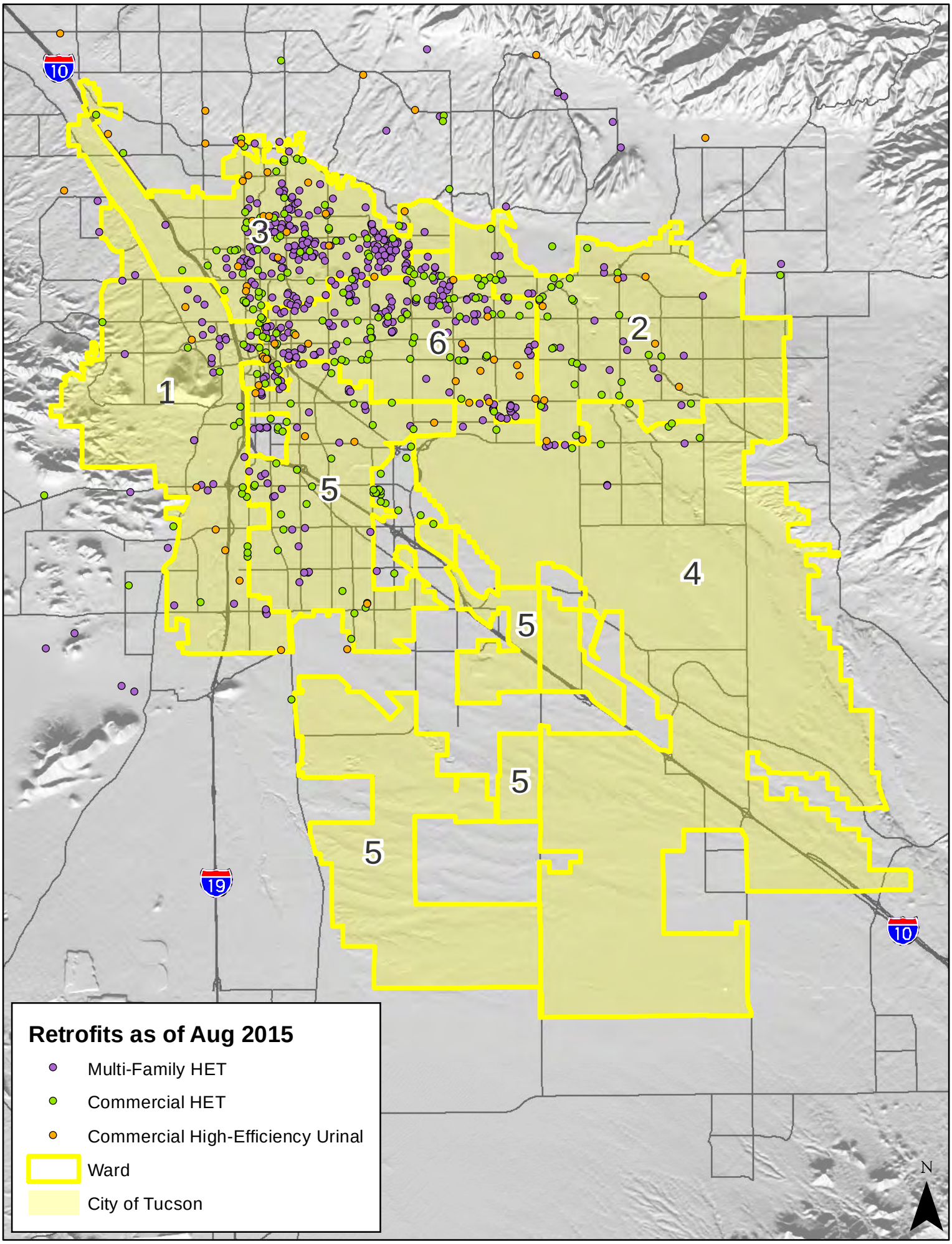
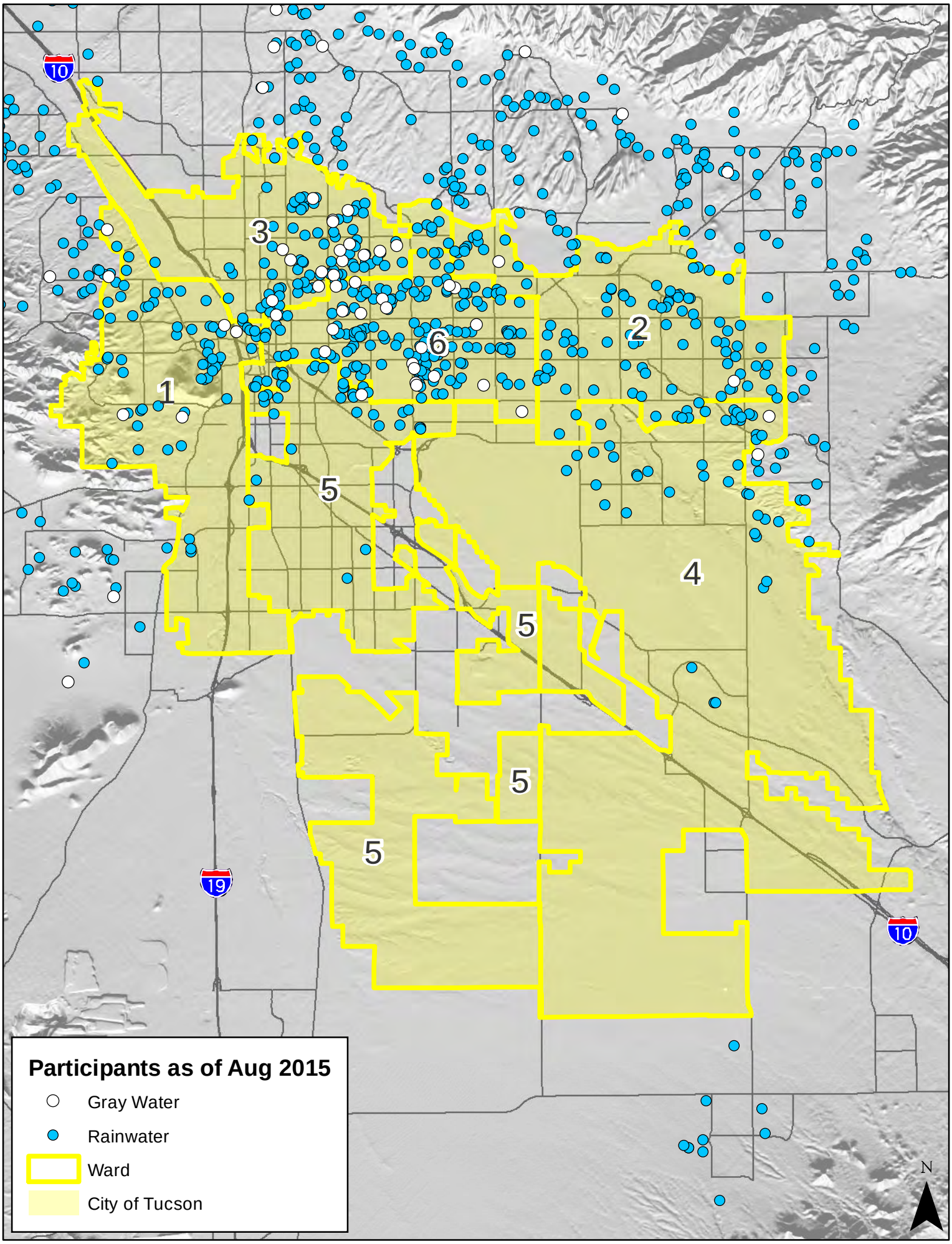
Tucson Water						
SmartScape Professional Workshop Follow-Up Evaluation Summary						
SmartScape Series: Q1 (Jan-Feb) 2015						
Number of Evaluations Sent:		41				
Number of Evaluations Received:		27				
Percent Response:		66%				
After attending the SmartScape Professional Series, are you using the information presented on a regular basis?	**#**	**%**		**Has taking the Smartscape classes given you the opportunity for job improvement or increased responsibility either within or outside your company?**	**#**	**%**
Yes	25	93%		Yes	19	70%
No	2	7%		No	8	30%
				If Yes, in which areas?	**#**	**%**
Please select the workshops that you use:	**#**	**%**		I am more involved in customer service	8	30%
Plants, Soils, and Water	18	67%		I am using improved technical skills	16	59%
Desert Adapted Plants	22	81%		My salary has increased	5	19%
Maintaining Desert Adapted Plants	19	70%		Other	0	0%
Plant Selection and Installation	18	67%				
Plant Disorders	15	56%				
Landscape Water Management	15	56%				
Irrigation and Controllers	14	52%				
Integrated Pest Management	10	37%				
Landscape Design and Renovation	12	44%				
Have you registered for any other SmartScape classes?	**#**	**%**		**Has the information provided helped you be more aware of the need to use water efficiently?**	**#**	**%**
Yes	7	26%		Yes	23	85%
No	20	74%		No	4	15%
If Yes, which ones?	**#**	**%**				
Turf Irrigation Management – Spring Transition/Audit	1	4%				
Turf Irrigation Management – Fall Overseed	0	0%				
Irrigation Design, Maintenance, and Management	2	7%				
Healthy Landscapes	4	15%				
Urban Tree Management	2	7%				

Appendix D – Conservation Program Maps

Single-Family and Low-Income High-Efficiency Toilet (HET) Retrofits



Multi-Family and Commercial High-Efficiency Toilet (HET) and Urinal Retrofits



Rainwater Harvesting and Gray Water Rebate Program Participants